



25 May 2018

Chief Executive
Hauraki District Council
1 William Street
PAEROA

Chief Executive
Waikato Regional Council
3 Cook Street
HAMILTON EAST

Attention: Mark Buttimore

Attention: Sheryl Roa

Dear Mark and Sheryl

RE: PROJECT MARTHA RESOURCE CONSENT APPLICATIONS

Please find enclosed the consent applications for Project Martha.

Project Martha comprises two main elements:

- Martha Phase 4 - a cutback of the north wall of the Martha pit. This will complete remediation of the north wall slip, provide a source of backfill material for slope voids from proposed underground mining, and allow access to the remaining pit ore buried under the slip debris; and
- Martha Underground – a continuation of the existing underground mining activity in a new location, primarily under the Martha pit but including a small vein under the area defined by the blocks between Seddon/Gilmour/Kenny and Mueller Streets.

In the interests of ensuring the Waihi community has adequate opportunity to be involved in the decision-making process on the applications, we request that the applications be publicly notified.

As noted in a recent letter (Buttimore, 22 May 2018), HDC staff and advisors have been receiving and providing comment on some of the draft technical reports that have since been finalised and are included in the applications. The responses to those comments are at various stages of preparation by our specialist advisors. We have enclosed a table providing the status of each as at the time of lodgement and a list of the comments on which responses are still awaited.

From the table you will note that PSM has not responded to the following question from Peter Fuller (Q10, dated 4 May 2018) in respect of Martha Phase 4;

Is there any remedial action that can be applied to at least partly stabilize the Milking Cow zone?

As a mine planning question, this is for us to answer rather than PSM.

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To ensure worker safety and to avoid exacerbating existing stability issues, the Milking Cow will be treated as a “no-go” zone due to the expectation of very poor geotechnical conditions. The exclusion zone is defined by the base of the Milking Cow cave, projecting this horizontally outwards by 20 m and projecting it upwards at an angle of 65° from horizontal.

No mining is planned in the exclusion zone and we do not propose undertaking any remedial stabilisation work.

Yours sincerely

OCEANA GOLD (NEW ZEALAND) LTD



Bernie O'Leary

General Manager -Waihi Operations

Encl: Technical Studies Report Further Information Status, 25 May 2018
Attachment I – Comments on Appendix G Draft: Vibration Assessment
Attachment II – Comments on Appendix H Draft: Groundwater Assessment
Attachment III – Comments on Appendix M Draft: Geotechnical Assessment; Martha Underground

Project Martha - Technical Studies Report Further Information Status, 25 May 2018

Appendix	Study	Consultant	Received	Reviewer	Preliminary Review Comments
					Response Status
B	Economics Assessment	Sense Partners	15 May 2018	McDermott	Addressed in final report.
D	Visual and Landscape Effects	Boffa Miskell	4 May 2018	Mansergh	Addressed in final report.
E	Traffic Assessment	Traffic Design Group			
F	Noise Assessment	Hegley Acoustic Consultants			
G	Vibration Assessment	Heilig & Partners	17 May 2018	McKenzie	Further information to follow.
H	Groundwater Assessment	GWS	2 May 2018	Fuller	Further information to follow.
I	Water Management Assessment	GHD			
J	Freshwater Ecology Assessment	Boffa Miskell			
K	Heritage Assessment	Clough & Associates			
L	Air Quality Assessment	Beca Limited	4 May 2018	HDC	No response required.
M	Geotechnical Assessment: Martha Underground	AMC	1, 8, 11 May 2018	Fuller	Further information to follow.
P	Pit Stability Assessment from the Martha Underground Mine	PSM	8 May 2018	Fuller	Addressed in final report (App P2 of electronic files)
Q	Pit Stability Assessment for the Phase 4 Cutback	PSM	4, 15 May 2018	Fuller	Addressed in final report (excluding Q10 of 4/05/18).
R	Ground Settlement Assessment	Engineering Geology	2 May 2018	Fuller	Addressed in final report.
S	Geochemical Assessment	AECOM			
T	Hydrodynamic Assessment of Pit Lake	Hydronumerics			
U	Martha Pit Lake Management Strategy	AECOM			
V	Pit Lake Limnological Assessment	Hydronumerics			
W	Social Impact Summary	Phoenix Research	3 May 2018	HDC	No response required.
X	Property Valuations	Telfer Young			

**Application by OceanaGold for Project Martha
Hauraki District Council (HDC)**

Reviewer's Report: Blasting Vibration Effects

Blastechnology, May 2018

Does the Heilig & Partners report adequately describe the vibration effects of Project Martha?

The Heilig & Partners report present a very large amount of work directed specifically at addressing expected impact levels, and has made a good attempt at considering the effects of the various impacts. An area of deficiency is that it does not address very well the effects of the acknowledged unpredictability of the vibration levels, or how the company plans to identify anomalous areas other than to say there will be a "fleet of roving monitors", and that the Vibration Management Plan will address those areas. The last sentence of paragraph 4 of section 14 Vibration Monitoring is incomplete in that regard:

"These matters are already and can be addressed in the Vibration Management Plan."

It looks like they were going to suggest something, but failed to go back and complete the thought/sentence.

Robustness and Technical Standard of the report.

The Heilig and Partners report has followed their standard approach (i.e. as used for Favona, Trio, Correnso), but has extended the analysis to a broader section of the potentially affected community. The report proposes the abolition of segregation according to blast type, without strong justification. H&P acknowledge the reason for the differentiation in the Correnso conditions, but do not give a good explanation why that differentiation is no longer valid or necessary. This will be an area in which some disagreement will occur, and the report does not present an argument other than that the receptors don't care what the source of the disturbance was. The abandonment of blast type segregation can potentially increase the effects of blasting because it effectively allows a greater number of higher-level vibrations while still complying with the 95 percentile condition covering all blasts fired in Project Martha. In effect, the merging of development blasts and production blasts, subject only to a 95 percentile condition, allows the company greater lenience with respect to the vibration levels experienced from production blasting. The report needs to present a more robust defence of this proposition.

Flyrock modelling also appears disturbing, with very little Factor of Safety evident (Plate C) between maximum projection distances and the distance to occupied houses. Flyrock from the in-pit modelling point clearly suggests no risk, but the flyrock footprints presented in Plate C at the top of the north wall of the pit suggest fragments capable of landing very close to residential and potentially occupied structures. Since precise conditions such as velocity of detonation and blasthole pressure within a blasthole (the driving conditions for rock projections) can never be known, the report should justify the adoption of very low safety factors.

Gaps in the draft report.

The report covers the issues of how compliance will be determined (95% less than 5 mm/s at each monitor location during daytime, 1 mm/s at night), and what constitutes compliance (PPV, time of blasting, duration of blasting). It defines the monitoring points at which compliance will be assessed, but it shifts the onus of full coverage of the potentially affected area (Waihi East, north of Martha Pit, and the Waihi CBD area) to the Vibration Management Plan and the role of a fleet of roving monitors. An appropriate way to manage anomalous areas is likely to be a significant issue, and perhaps too big an issue to be left to the Management Plan.

Is the Assessment adequate for the needs of an S42A Staff Report.

The stumbling issues would appear to be those mentioned above – defending the scrapping of the segregation into development and production blasting, the factor of safety associated with the maximum flyrock projection distances, and the manner in which anomalous areas will be both detected and managed (once found).

ATTACHMENT II - COMMENTS ON APPENDIX H DRAFT: GROUNDWATER ASSESSMENT

For this Groundwater Effects draft report, Dr. Fuller has the following requests for further information on this matter as follows:

1. What information has been used to assess the permeability of the lower Andesite rockmass and what permeabilities have been assigned to this unit between about 700mRL and 1,000mRL, and below about 700mRL? If these are significantly different as the draft report seems to imply, can permeabilities for each be shown in Table 1.
2. Is it correct to assume that the drawdown mechanism as the groundwater level in lower Andesite moves below about 700mRL would be analogous to draining an overlying relatively permeable rockmass with a series of crisscrossing localized "box type" drains? If that is the case, what if any effect would this be expected to have on the drainage profiles in the overlying lower Andesite and would any substantial lateral expansion of the drained area be expected?
3. It is noted in Section 5.1.2 that additional multilevel piezometers are recommended to be installed around the south and southwest perimeter areas of the Martha pit. There also seems to be a gap in groundwater monitoring in the southeast region and therefore, can your recommendation (which I endorse) also include the southeast zone where surface settlements are predicted to be highest?

ATTACHMENT III - COMMENTS ON APPENDIX M DRAFT: GEOTECHNICAL ASSESSMENT; MARTHA UNDERGROUND

No details of the planned mining [have been included] in terms of:

- areas of particular lenses intended to be mined,
- sequence of mine access development and mining (stopping) sequence, and
- mining methods to be used.

AMC refer to two SRK reports; one a scoping study and the other more recent one on mine design but apart from a few not very distinct Figures presumably scanned from one or both SRK reports, I have virtually no information on the mining that is planned. Some Figures show mining in the Rex vein but details on its location relative to the surface, the south rim of the Martha pit, and the Waihi town infrastructure are either not shown or are indistinct at best.

[The SRK reports referred to are:

SRK 2016, Martha Mine Scoping Study, unpublished report October 2016

SRK 2017, Martha Mine Design, unpublished report August 2017]

Information Required for Proposed Underground Mining in MUG including Rex vein

1. At least three (3) horizontal sections at levels just below the base of the MP4 pit, the mid levels of proposed mining in the Martha vein and towards the lower limit of mining. I can't be specific on the RL's because I don't have an overall vertical section to scale. Each is to include all lenses intersected and named, old historic unfilled stope voids, old historic filled stope voids and proposed new stopes colour coded according mining method.
2. A series of vertical sections cut perpendicular to the average strike direction of the Martha vein at 50m intervals and extending from surface to at least 500mRL showing MP4 pit, all veins intersected and named, and the same details as listed in 1. for stoping with the same colour code as the horizontal sections.
3. Typical vertical section/s showing the proposed top – down mining sequence. It is presumed that the top-down sequence relates to mining blocks within which there will a series of stoping levels and stopes within the blocks mined with a bottom-up sequence. Details down to stope scale are required.

In its current form the report adequately addresses the overall rock mass quality of the host Quartz Andesite and has taken into account previous mining induced loosening of some zones based on the rock mass condition model developed by PSM as part of various studies of the Martha pit. AMC were probably under the impression that mining in the Rex vein would have been included in PSM's underground – open pit interaction study but now understand this is not the case because it was considered by PSM to be far enough away from the pit not to have any influence on it.

Because MUG lies within the one rock unit, AMC have appropriately devised a geotechnical model based of the degree of weathering in that unit and have taken into account rock mass quality variations and rock mass strength/stress ratio to check the stability of stope sizes proposed by SRK in their mining study. As noted in a request below, this approach needs to be used to define the limits of open stope dimensions before backfilling is required to maintain both local and regional stability.

While the report addresses many relevant geotechnical issues, I will need to consider the responses to my requests for further information below before commenting on its overall adequacy for its review for the s42A Staff Report.

Request for additional information and clarification

1. It is stated that the pillar between the top mining level in the Rex vein and the surface is 80m thick and from yesterday's discussion, the thickness of lower (Quartz) Andesite is said to be at least 40m. This needs to be confirmed as does its adequacy to form a competent and stable pillar between the uppermost stope back in Rex and the near surface groundwater system. It appears from the geology model outlined in the Surface Settlement Assessment report that the near surface layers above the Andesite thicken further to the East of the Rex vein and this needs to be considered in the surface pillar stability assessment.

2. What instrumentation (type and density) is recommended to properly monitor the stability of the surface pillar above the Rex vein?
3. Details of the proposed mining methods in various veins and areas in each that are proposed to be mined are needed. Although this is part of a separate request for further information, these details may need to be included as part of the geotechnical assessment so results of that work can be considered in the context of the proposed mining.
4. The report notes that there is likely to be a change to the detailed mine plan as more information on the resource and ground conditions becomes available. Is this likely to result in any changes to the mining methods that are currently proposed and if so, what additional methods could be required?
5. It appears that some open stope mining is proposed. If that is the case, what are the size limits of open stope size before backfilling is required to preserve regional stability and how will this relate with ground conditions, proximity to the open cut, depth and any other factors influencing stability?
6. The modulus E for Quartz Andesite is listed in Table 3.1 as 47 GPa yet in Table 12.1 of PSM's MP4 assessment report, the rock mass modulus is shown as 8.7 GPa for undisturbed material. Does the higher value relate to intact rock or the rock mass?
7. Since PSM have now completed the assessment of the interaction between the proposed mining in MUG and the open cut, are there any implications of those results to the assessment of regional stability resulting from the proposed MUG and are there any additional recommendations required so that regional stability can be maintained?
8. On p18, paragraph 1, please clarify if "existing voids" means those within the orebody and in the country rock.
9. In paragraph 3 also on p18, is the intended meaning that CAF has the same strength as concrete?
10. In section 5.3.3 on p19, the wording could imply that mining in the Rex vein will cause surface disturbance. Please clarify if this is the meaning intended and if so what type of surface disturbance could be expected.
11. Are there any MUG project specific changes to the current void management plan recommended?
12. In the 3rd dot point on p24, are the "open stopes" those from historic mining or newly formed stopes?
13. Are there any areas of high priority for the location of geophones as part of the recommended seismic monitoring system?