

APPENDIX J

ECOLOGICAL REVIEW PREPARED BY
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Dear Victoria

Specialist Ecological Input - Consideration of Ecological Submissions in relation to McPherson Quarry Ecological Impact Assessment (EclA) and Ecological Management Plan (EMP)

1.0 Introduction

This report considers submissions received by the Waikato District Council for an application from McPherson Resource Limited to expand and continue to operate the mineral extraction activities at the McPherson Quarry with associated overburden removal and placement, deposition of cleanfill and vegetation ('the Proposal'). The historical removal of a portion the Significant Natural Area (SNA) to the east of the existing operations have not been included in this statement. This matter will be redressed by Council, as part of the monitoring and compliance process.

2.0 Scope

The scope of this statement includes:

- Review and address the ecological submissions received;
- Based on the review, provide recommendation for the consent conditions;
- Considering the provisions of the new National Policy Statement for Freshwater Management, 2020 (NPS-FM).

3.0 Assessment of submissions relevant to ecology

The submissions addressed in this document were grouped under the following heading:

- Removal of indigenous vegetation and quantity of compensation¹ planting;
- Timing of planting (including ecological corridor);
- Stream mitigation for the removal of tributary 1 and effects on stream 1;
- Operational effects on stream quality (erosion, sedimentation) and hydrology (water table);
- Wetlands and open water;
- Protection of Kauri trees from dieback;
- Operational effects on surrounding ecological habitats from dust and noise pollution;
- Operational effects on game bird and trout fishing within the catchment;
- The need for robust, science-based conditions.

Table 1 in Section 4 provides a summary of references to individual submissions addressed within this statement.

¹ The term compensation has been used by the applicant and the submitters. The NZ Offset Guidelines (2014) defines offset as: "measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and/or rehabilitated or restored, in order to achieve no net loss loss net gain of biodiversity". The word compensation is applied in this context throw-out this statement.

3.1 Removal of indigenous vegetation and quantity of compensation planting

Ecological mitigation should be calculated based on the level of planting needed to meet the same ecological value as that of the vegetation to be removed or affected. The compensation quantity should consider the representativeness (ecological health/ degree of modification) of the vegetation to be removed as well as the ecological importance of that vegetation. Additional consideration should be given the “lag period” or the time it will take for compensation planting to provide the same ecological value as the vegetation that has been removed.

The value of native vegetation impacted by the Proposal was assessed as **High** for Kanuka-dominated forest. The proposed quarry expansion will result in the loss of 2.45 ha of Kanuka dominated forest, of which 2.08 ha is designated as an SNA². The overall ecological effect of this loss is assessed as **Low**. The main reasons likely informing this level of effect include:

- The relevant areas that meet the significance criteria is relatively small (5% of the overall proposed expansion area);
- Kanuka-dominated forest vegetation units are identified as Least Concern³;
- The significance classification is mainly informed by the position of the native vegetation in relation to Mt William Walkway to the west and the Hunua Ranges to the east and the potential to support species of conservation significance (At Risk and Threatened species). The baseline species assessment determined the residual capacity of the native vegetation to support species of conservation concern is limited and this also influences the connectivity function (position relative to other ecological nodes);
- The ecological health of the native vegetation associated with the proposed expansion is affected by exotic species, livestock damage, pest species and fragmentation. The ability of the native vegetation to provide its ecological services are impaired. The applicants EMMP aims to address these impediments.

The applicant provided the following management measures to mitigate the effects of native vegetation removal:

- Compensation planting of 4.16 ha, at a ratio of 2:1, for the Kanuka-dominated forest (2.08 ha) to the east of the quarry;
- Compensation planting of 0.37 ha, at a ratio of 1:1, for the Kanuka-dominated forest located next to the pond;
- The compensation planting will extend over 4.53 ha and form an east-west ecological corridor between the two SNAs to the north of the quarry. The corridor will be fenced prior to planting, and pest control will take place. It is recognised that the successful establishment of the proposed corridor will have substantial ecological benefits, as it will reconnect native vegetation areas to the west of the quarry with the Hunua Ranges.

Considering the above, the EMMP for the loss of native vegetation is considered fit for purpose provided the following recommendations are implemented:

1. Planting within the corridor should start as soon as possible, but with consideration to any seasonal time constraints that may exist (also refer to Section 3.2);
2. Planting within the corridor should be completed as soon as possible, but should not extend over more than three consecutive planting seasons;
3. It is recommended that the planting mix for the terrestrial habitat is developed further than that presented in the EMMP in Table 8. It is understood that the mix is focused on those locally available species that will ensure rapid canopy closure. However, the mix should include a greater diversity of tree species. The mix is focused on low growing species that are generally not

² EclA report, Section 4.1.1 page 26

³ Singers N, Osborne B, Lovegrove T, Jamieson A, Boow J, Sawyer J, Hill K, Andrews J, Hill S, Webb C. 2017. Indigenous terrestrial and wetland ecosystems of Auckland. Auckland Council;

long living species. The conditions should state that the planting mix will require prior approval from WRC;

4. Plant covers must be applied if Pukeko disturbs planting efforts;
5. The conditions should stipulate that the applicant would need to contact QEII at the start of the planting and that the northern corridor must be placed under a covenant prior to planting being completed.
6. The responsibility for the maintenance of the planting will remain with the applicant until 75% canopy closure and 90% survival rate has been achieved;
7. The responsibility for pest control will remain with the applicant for the lifespan of the quarry as stipulated in the EMMP.

3.2 Timing of planting

A concern was raised regarding the timing of planting. Following a strict interpretation of the like-for-like principle, the lag time should be as small as possible. The applicant therefore needs to demonstrate consideration to lag time and measures taken to minimise the lag period. To this end two measures have been included:

- The inclusion of plant species that ensure quick reestablishment of canopy cover;
- Although not stated as a deliberate intent within the EMMP, the compensation ratio used (e.g. 2:1) also assists in mitigating for the “lag” in ecological utility between planting and vegetation removal.

The significance of the lag period needs to be assessed against the loss of ecological functions within the areas where native vegetation will be removed. As discussed in Section 3.1, the significance of the vegetation to be removed relates to its relative position between other ecological nodes and the potential presence of species of conservation significance. The relevance of the former is limited due to the extent of existing fragmentation, while the latter is limited based in the findings of the baseline assessment. With consideration to the residual functions and the potential implication of a protracted lag period the following is recommended to be included within the consent conditions:

1. Planting must commence in the next planting season from when consent is given; and
2. The northern corridor is planted in no more than three planting seasons.

3.3 Stream mitigation for the removal of Tributary 1 and effects on Stream 1

Some submissions expressed concern about the mitigation for the loss of 311 m of permanent stream associated with Tributary 1 and the downstream effects on the receiving Stream 1 (Waipunga). Submissions include comments on: (1) the direct loss of 311 m permanent stream habitat, (2) hydrological changes (both surface and groundwater) and (3) sediment and potential contamination from the cleanfill material.

1. The EclA assessed Tributary 1 as a degraded system of **Low** ecological value. Although the tributary retains some connectivity to its upper catchment, its instream and riparian habitat reflect a loss in ecological health. Therefore, the ability of the stream to provide its ecological goods and services are impaired. The loss of ecosystem health may be attributed to the surrounding land use, livestock access, exotic species and lack of indigenous vegetation. A single valley head pond (higher up in the catchment) also contributes to some hydrological modification of the stream. The trajectory of ecological degradation is expected to be negative given the status quo, as the causal drivers will remain in place over the medium to long term (if the proposed activities do not occur). Two important features associated with Tributary 1 include a likely NPS FM (2020)⁴ natural wetland (NPS wetland) to the north (from the wooded footslopes) and a likely NPS wetland to the south (prior to the confluence with the Waipunga Stream).

The EclA determined a **High** level of effect on Tributary 1 due to the loss of the permanent stream. A considerable portion of the catchment of the northern wetland will be lost during

⁴ National Policy Statement for Freshwater Management, 2020.

Stage 3 expansion and may therefore impact on the hydrological maintenance of this wetland. Similarly, the hydrological pathway maintaining the southern wetland will be impacted by the reclamation of Tributary 1. The ecological value (**Low**) of Tributary 1 and the anticipated level of effect (**High**) informed the restoration of 930 m reach of receiving Waipunga Stream. Restoration will include planting, fencing and pest control. The Waipunga Stream is assessed as a **High Value** permanent stream, but with some loss in ecosystem health (due to stock access, exotic species, bank erosion and riparian fragmentation etc.). The trajectory of ecological change is likely to be negative given the current land use and drivers of ecological change.

The proposed mitigation for the loss of Tributary 1 within a reach of the Waipunga Stream is based on improving the ecological health of the Waipunga Stream and averting the potential future loss by removing some of the causes of ecological degradation. Based on this the proposed stream mitigation is considered fit for purpose provided the following:

- a. The proposed restoration on the Waipunga Stream is completed effectively;
 - b. Natural wetlands will be hydrologically maintained and will not be affected;
 - c. Erosion and sediment control will be implemented effectively;
 - d. Hydrological modification that may result due to changes in runoff characteristics, groundwater levels and water management are managed in such a way as to not cause a loss in ecological health of the Waipunga Stream and the downstream environment;
 - e. To this end the following additional recommendations are provided:
 - i. The proposed 7.5 m planting either side of Waipunga Stream is increased to 10 m on either side of the stream banks⁵. This is considered to be the minimum width required to ensure that stream function is restored. This is particularly relevant to the eastern bank of the stream, where it is proposed that material / overburden will be stored;
 - ii. It is recommended that the planting mix for the riparian margins is developed further than that presented in the EMMP in Table 10. It is understood that the mix is focused on those species that will ensure rapid canopy closure. However, the objective of the planting is to provide instream shade in the long term, therefore, the species mix at the top of the embankment needs to be developed to include taller tree species. The conditions should state that the planting mix will require prior approval from WRC;
 - iii. The EMMP indicates that there is a section of stream where bank collapse means that plants will be set back from the stream. It is recommended that the conditions state that in areas of erosion or bank collapse the bank should be reprofiled to ensure that the streams natural function is restored on completion of the planting.
2. In terms of hydrological effects to the **wider** downstream receiving environment, a basic analysis of catchment contributions show that the Waipunga Stream drains a catchment of approximately 420 ha of which Tributary 1 contributes about 12.2 ha or 3%. The Mangatawhiri River (immediately downstream of the quarry) drains a catchment of some 930 ha of which the existing and future quarry footprint represents approximately 7%. The total extent of catchment modification is therefore relatively limited, and the potential magnitude of catchment scale hydrological change is expected to be relatively low.

The hydrological effects to the **immediate** downstream environment will be localised but more pronounced. The wetland near the confluence of Tributary 1 (southern wetland) and the Waipunga Stream is likely depended on Tributary 1 for its hydrological maintenance. It is not clear how the potential effect on this wetland will be managed through the

⁵ Becker, K., Blackford, C., Bowden, D., Jamieson, A., Lovegrove, T., Macted, J., Viljevac, Z. (2001). Riparian zone management – Strategy guideline, planting guide. Auckland Regional Council Technical Publication TP148.

implementation of the EMMP. Similarly, the northern wetland may decrease in extent due to a decrease in catchment size during Stage 3 quarry expansion. The increase in the proposed wetland extension (as part of the EMMP) to the north will further reduce the water budget for the wetland in the south and the catchment modification (specifically the reclamation of Tributary 1) will influence the hydrology of the southern wetland. It is therefore possible that impacts to both wetlands will not be avoided and are not accounted for in the EMMP.

The fitness of the EMMP to maintain existing wetlands needs to be improved. To this end, the applicant must demonstrate that impacts on wetlands will be avoided through the proposed geomorphological and stormwater management. The applicant also needs to demonstrate that the water requirements for the wetlands (and the proposed constructed wetlands) can be met under the proposed EMMP.

An additional recommendation in this regard include: the conditions stipulate that there will be additional buffer planting around the existing and proposed wetland features. The buffer (>5m) should include taller tree species and be placed between the wetlands and the working area. The objective of the plantings would be to increase the potential for species such as New Zealand dabchick (*Poliocephalus rufopectus*) to visit them. It is considered that without this screening it is unlikely that these species would occur.

3. The pre-mitigation effect of sediment on the receiving Waipunga Stream and downstream receiving environment was assessed as **Very High**. Operation effects due to erosion and sedimentation is discussed separately below.

3.4 Operational effects on stream quality (erosion, sedimentation) and hydrology (water table)

Submissions referring to stream quality due to erosion and sedimentation are discussed below. The likely implications of hydrological changes are contextualised in Section 3.3 under point 2.

The potential for indirect impacts on Waipunga Stream (Stream 1) through sediment discharge have been assessed as **Very High** prior to mitigation. These effects also have the potential to alter instream habitat of value for native longfin eel and inanga. Erosion and sediment related risks can be managed through the implementation of erosion and sediment management plan. The scope of the ecological review did not include an erosion and sediment plan, but it is assumed that an erosion and sediment management plan will be a condition of consent (if granted). Key aspects to be included within the erosion and sediment control plan must include:

1. Clear guidelines on controlling the extent of vegetation and soil disturbance to the authorised extent;
2. Control measures must be in place prior to the onset of authorised disturbance;
3. Measures must be inspected at a frequency that will allow rapid response and corrective action;
4. Monitoring of the receiving environment must include relevant measures such as Total Suspended Solids (TSS) or appropriate proxies such as turbidity. The receiving environment must be monitored at a frequency that will allow the detection of chronic or acute sediment inputs and must include a control (upslope) location;
5. The ecological consequences of potential sediment exposure should be assessed against the ecological health of the receiving environment. This can be achieved through included aquatic ecological monitoring at strategically located control and test sites;

Although the potential effect of erosion and sedimentation has been assessed as **Very High**, these effects are preventable through the implementation a suitable erosion and sediment control plan.

3.5 Wetlands and open water

One submission referred to effects on wetlands to the north of the quarry. This is a separate consideration from the wetlands associated with Tributary 1. The wetland indicated within the submission forms part of the headwaters of the stream to the east of the quarry activities and is upslope from the existing and proposed quarry activities. It is therefore unlikely that this wetland

specific wetland be affected. However, the EclA identified several artificial open water bodies (ponds) within the proposed footprint of the quarry. It is not clear from the EclA how the classification of these features relates to the definition of an NPS wetland and if they indeed can be considered artificial.

It was stated that the ecological functioning and therefore the ecological value of the ponds were low. Subsequently a compensation ratio of 1:0.5 for the ponds were recommended within the EMMP. This mitigation measure includes the expansion of wetland features around the Tributary 1 NPS wetlands (refer to section 3.3, point 2). It is important that the EMMP recognises functional services associated with the ponds and consider the provisions of the NPS FM (2020). Functional services are referred to as regulatory and supporting ecosystem services and may include flood attenuation, streamflow regulation, sediment trapping, nutrient and toxicant assimilation and erosion control. It is likely that some or all these ecosystem services are provided by the ponds and the palustrine wetland environment associated with their margins. Conversely, the retention capacity of the ponds may have negative implications for the downstream environment in terms of water availability and hydrology.

The suitability of the EMMP to compensate for the loss of the ponds should take into consideration the habitat value, functional value and potential to improve or degrade catchment hydrology as well as the provisions of the NPS FM (2020). The EclA does not outline specific consideration to the functional services of the ponds within the EMMP, but it is likely that most of these will be represented within the proposed wetland enhancement and creation plan. This notion is based on the successful implementation of the wetland compensation plan (refer to Section 3.3, point 2 for limitation regarding this plan). However, it is recommended that these features and the proposed mitigation measures be assessed in terms of the provisions of the NPS FM (2020).

3.6 Protection of Kauri trees from dieback

Some submissions raised a concern regarding Kauri dieback. Kauri dieback is known to be spreading in in parts of the Waitākere, Hunua Ranges across the upper north Island. The EclA and EMMP did not refer to the presence of Kauri trees within the proposed footprint or enhancement areas. Subsequent ecological reviews of the EclA and EMMP also did not specifically identified Kauri dieback as an issue. However, given the presence of Kauri trees within the surrounding landscape and the soil disturbance that will occur with the project footprint, it is considered that precautional measures must be implemented.

Kauri dieback is the result of contamination with the *Phytophthora agathidicida* pathogen. The pathogen is soil-borne and can spread via water or root to root contact. Water movement through the soil and soil disturbance by humans and animals are the main vectors for transmission.

The existing and proposed project footprint spans between Mt William and Pouraureroa Stream Bush. The Mt William walkway is under DoC control and they currently implement dieback control measures. The native bush to the east of the quarry is connected to the Hunua Ranges of the Auckland Region where dieback is also controlled. The requirement for the control of dieback will depend on the presence of Kauri and the associated pathogen in areas to be disturbed and the likelihood that it will spread. With regards to the water flow contamination pathway, most of the area to be disturbed drains to the south and away from adjacent native bush. The likelihood of contamination through flow is therefore limited. However, soil to soil contamination is possible if contaminated soil, from areas to be disturbed, are transferred to adjacent areas where Kauri trees may occur.

Mitigation measures include hygiene stations, avoidance of soil disturbing activity within a predefined distance of the dripline of kauri trees and avoidance of soil disturbing activity within the wetter months in locations where dieback may occur. It is therefore recommended that access to native bush on either side of the proposed expansion be controlled to prevent the potential spread of dieback to these areas. Access should be restricted as far as possible and where unavoidable, control measures must include soil cleaning and sterilisation stations. Only approved disinfectants (such as Sterigene) must be used at control stations. Details regarding access and dieback should be included into the employee induction and reference should be made to available Kauri dieback resources.

3.7 Operational effects on surrounding ecological habitats from dust and noise pollution

Details regarding dust control measures have not been reviewed. The EclA and EMMP also do not make specific reference to noise and dust pollution. However, it is understood that, with the increase in water allocation for dust suppression in the way proposed, all potential and actual dust effects will be

managed to a standard considered appropriate by the WRC. Moreover, buffer planting will further assist in mitigating operational dust and noise impacts to the receiving environment. Operational activity will be restricted to daytime, thus reducing the potential effects on nocturnal species such as potentially occurring longtail bat.

3.8 Operational effects on game bird and trout fishing within the catchment

Of the 13 game birds, two upland species have been recorded within the baseline assessment. These included California quail (*Callipepla californica*) and Common pheasant (*Phasianus colifronica*). Both inhabit a wide variety of open habitats including grasslands and pastures. No detail is available of the number of individuals supported by the habitat associated with the proposed footprint, or the significance of the local population in a wider context. However, given the adaptability of these species and the large extent of alternative habitat that can be utilised it is not expected that the proposed activities will result in a meaningful impact to local quail and pheasant counts.

None of the wetland game birds have been recorded within the proposed footprint. Furthermore, the project footprint does not extend over any obvious flight paths between larger waterbodies where wetland species may commute. The proposed enhancement of existing wetlands and constructed wetlands (if constructed successfully) will provide suitable habitat for potentially occurring wetland game birds, including some of the duck species (mallards and paradise shelduck).

Potentially occurring trout fish include brown (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*), although neither of these fish are expected to occur in Tributary 1, they have been sampled within the Mangatawhiri River (NFFDB- NIWA 2020). The potential effect of the proposed activities on these species will depend on the potential for indirect impacts on Waipunga Stream (Stream 1) through sediment discharge, which discharges into the Mangatawhiri River and then the Waikato River (refer to Section 3.4). Therefore, the effective implementation of the erosion and sediment plan is likely to manage negative effects on trout species within the receiving environment. Flow effects are not considered pose a meaningful risk to instream habitat and biological cues for trout at a catchment scale (refer to Section 3.3, point 2).

3.9 The need for robust, science-based conditions

The ecological baseline assessment applied industry standard assessment methods for avifauna, bats and lizards, while similar standard approaches were applied for the aquatic ecology assessment. The terrestrial vegetation assessment could benefit from a tree count of species with a DBH exceeding 15cm. This will be particularly useful to inform the compensation quantity for the northern corridor enhancement area.

The assessment of wetlands followed an improvised qualitative approach considering aspects that are likely to indicate habitat value. These included connectivity, thermal regulation and vegetation composition. The EclA does not outline how these aspects have been applied within the overall value assessment. Clarkson *et al.* (2003) provides a New Zealand guideline for determining wetland condition⁶ and it is recommended that this method (or a repeatable version of it) be incorporated into the preconstruction monitoring of the natural wetlands.

Given the potential risk related to erosion and sedimentation to the downstream environment, uncertainties regarding impacts on natural wetlands and the success of efforts to construct additional wetlands, it is recommended to include monitoring of the following into the EMMP:

1. Following the completion of a robust wetland baseline assessment, include the same wetland monitoring on an annual basis. Monitoring should be undertaken during December to February. Reoccurring monitoring efforts should take place during the same period as the initial baseline assessment;
2. Annual aquatic biomonitoring should be included for control and test locations on the Waipunga Stream and the Mangatawhiri River. The biomonitoring regime should at least

⁶ Clarkson BR, Sorrel BK, Reeves PN, Champion PD, Partridge TR and Clarkson BD. 2003. Handbook for the monitoring of wetland condition. Coordinated monitoring of New Zealand Wetlands. A ministry for the Environment Sustainable Management Fund Project (5105)

include habitat and response metrics from the baseline assessment that are sensitive to sedimentation and flow modification.

4.0 Summary of submissions

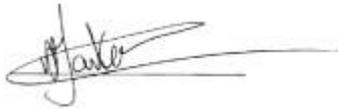
Table 1 provides a summary of the ecological submissions and references to the relevant sections for this S42 report.

Table 1: Summary of submissions relevant to the ecological review with corresponding reference

No	Reasons	Response reference
14	No consideration of effects on wetlands to the north of the quarry	Section 3.2, point 2, Section 3.5 and Section 3.9
	Impacts from quarry operation on these wetlands	Section 3.2, point 2, Section 3.5
17	Justification for removal of indigenous vegetation	Section 3.1
	Location of the proposed ecological corridor shown where stage 4 is (not subject to this application)	Section 3.1
	Compensation of 2:1 and 1:1 insufficient	Section 3.1
	Mitigation for removal of tributary 1 and effects on stream 1 inadequate	Section 3.2 and Section 3.9
19	Justification for removal of indigenous vegetation	Section 3.1
	Timing on removal of indigenous vegetation- no timeframe on removal	Section 3.2
	Timing on planting of ecological corridor	Section 3.2
21	Destruction of any indigenous vegetation.	Section 3.2
22	Destruction of any indigenous vegetation.	Section 3.2
27	Need for robust scientific conditions	Section 3.9
	Measures implemented to manage effects on Kauri dieback	Section 3.6
29	Removal of indigenous vegetation resulting in reduction in oxygen, erosion, increase noise and loss of bird habitats	Section 3.2, Section 3.4, Section 3.7 and Section 3.9
	Further destruction of indigenous vegetation	Section 3.1 and Section 3.2
	Effects of quarrying activities on habitats	Section 3.1, Section 3.2, Section 3.3 and Section 3.9
	Kauri dieback	Section 3.6
30	Removal of SNA and impacts of this removal on neighbouring sites	Section 3.1
31	Oppose any destruction of any indigenous vegetation	Section 3.1
32	Impacts on game bird and trout habitat within the catchment	Section 3.8
	Cumulative effects on downstream environments	Section 3.3, Section 3.4, Section 3.5 and Section 3.9

No	Reasons	Response reference
	No proffered consent conditions to determine whether effects will be avoided, remedied or mitigated	All sections
	Increase in sediment and impacts downstream	Section 3.3, Section 3.4 and Section 3.9
	Potential for contamination in waterways due to proximity of cleanfill areas to streams	Section 3.3 and Section 3.9
33	Removal of SNA setting a precedent	Section 3.1
	Timing of planting of ecological corridor	Section 3.2
	Concern that there is additional mature native trees not been considered that will be impacted	Section 3.1
	Impacts on flora and fauna from operation.	Section 3.7 and Section 3.8
35	Removal of SNA	Section 3.1 and Section 3.2
36	Removal of SNA	Section 3.1 and Section 3.2

Yours faithfully



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