Boffa Miskell

Maraekakaho Quarry

Assessment of Ecological Effects for Referral Application

Prepared for Russell Aggregates Limited

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1.0 Introduction

This assessment of ecological effects has been prepared by Boffa Miskell Limited ("BML") for Russell Aggregates Limited ("RAL"), the applicant, as part of an application to the Minister for the Environment for referral under the Covid-19 Recovery (Fast-track Consenting) Act 2020.

This assessment will review the potential ecological effects that would result from the proposed activity, including effects on terrestrial, freshwater and wetland environments.

The aim of the proposal is to obtain resource consent to enable the excavation of aggregate from land directly south of RAL's existing quarry processing site.

Currently, RAL operates an existing quarry processing site on Kereru Rd, Maraekakaho under the land use consent RMA20180258 ("land use consent") granted by Hastings District Council ("HDC") in 2019. Aggregate is currently sourced from the Ngaruroro River under short-duration resource consents granted by Hawkes Bay Regional Council ("HBRC") in accordance with a gravel allocation policy set out in the Hawkes Bay Regional Resource Management Plan.

RAL's growing requirement for gravel coupled with a reduction in the volume of gravel allocated by HBRC to RAL for extraction from the Ngaruroro River under their 2022/2023 short duration consent means a land-based source of aggregate needs to be secured as soon as possible. Due to the shortfall, RAL is currently sourcing aggregate for processing at the quarry site from from the Waipawa River in Central Hawkes Bay.

In this report we detail the regulatory definitions and provisions relevant to ecology that are applicable to the proposed activity, provide a classification of any watercourses and wetlands present, lay out the existing and potential ecological values, summarise the effects of the proposed activity on the ecological values, and outline how the outcomes relate to the provisions of the relevant statutory provisions.

2.0 Key regulatory policy and definitions

2.1 National Policy Statement for Freshwater Management 2020

2.1.1 Background

The National Policy Statement for Freshwater Management (NPS-FM) came into force on 3 September 2020 and was recently amended on 8 December 2022. The amended NPS-FM comes into effect on 5 January 2023. The NPS-FM directs regional councils to undertake a variety of policy inclusion or modifications to policy, as well as to undertake specific tasks. The NPS-FM also directs councils to be satisfied that the 'Effects Management Hierarchy' is applied to the existing and potential values.

2.1.2 Objective

The objective of the NPS-FM is to ensure that natural and physical resources are managed in a way that prioritises (NPS-FM 2.1(1)):

(a) first, the health and well-being of water bodies and freshwater ecosystems.

(b) second, the health needs of people (such as drinking water).

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

The proposed activities meet the requirements of objective 2.1(1)(a) and provides for the health and well-being of water body and freshwater ecosystem.

2.1.3 Relevant policies

Part 2, 2.2 of the NPS-FM lays out the policy requirements. All policies are relevant to the proposed quarrying activity, but we draw attention to:

Policy 3: Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments: *The proposed development does not result in adverse effects on the receiving environment.*

Policy 6: There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted: *Natural inland wetlands are protected and no adverse effects will occur to any natural inland wetlands.*

Policy 7: The loss of river extent and values is avoided to the extent practicable: *The proposal does not involve the loss of extent of any river system.*

Policy 9: The habitats of indigenous freshwater species are protected: *The proposed construction does not result in the loss or any disturbance to freshwater species.*

Our assessment below shows that these policies are upheld, and we have assessed the effects of the proposed extraction as minimal and meeting the requirements of the NPS-FM.

2.1.4 Definitions

RMA and NPS-FM wetland definitions

The RMA definition states:

- Wetland includes permanently or intermittently wet areas, shallow water, and land margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.

The revised NPS-FM definition[1] states:

- **Natural wetland** means a wetland (as defined in the Act) that is not:

(a) in the coastal marine area; or

[1] NPS-FM, s3.21(1)

(b) a deliberately constructed wetland, other than a wetland constructed to offset impacts on, or to restore, an existing or former natural inland wetland; or

(c) a wetland that has developed in or around a deliberately constructed water body, since the construction of the water body; or

(d) a geothermal wetland; or

(e) a wetland that:

  (i) is within an area of pasture used for grazing; and

  (ii) has vegetation cover comprising more than 50% exotic pasture species (as identified in the *National List of Exotic Pasture Species* using the *Pasture Exclusion Assessment Methodology* (*see* clause 1.8)); unless

  (iii) the wetland is a location of a habitat of a threatened species identified under clause 3.8 of this National Policy Statement, in which case the exclusion in (e) does not apply

In clarifying these definitions, we note that the RMA wetland definition is relevant, that natural wetlands are not restricted to indigenous ecosystems or biota, and no reference is made to the significance, quality or condition of the wetland feature.

We note that, in early 2022, MfE published '*Defining 'natural wetlands' and 'natural inland wetlands*' as a guidance document to support the interpretation of the (then) NPS-FM and NESF. We note that this MfE publication carries no regulatory or legal standing and we understand that this has been recently confirmed by the Environment Court in two recent decisions[2]. Although the NPS-FM has since been revised, we consider that the guidance document is helpful in understanding the intent behind the wetland definition.

Wetland constructed by artificial means

The guidance document provides the following clarification on constructed wetlands:

- Wetlands constructed by artificial means were excluded to avoid discouraging anyone from constructing a wetland or restricting the ability to maintain a wetland or waterbody constructed by artificial means for a specific purpose
- While 'deliberately' constructed wetlands may develop values over time and provide ecosystem services, it is not the intent of the NPS-FM or NESF to regulate activities that affect constructed wetlands; and
- 'Constructed wetlands' are intended to include waterbodies that have been deliberately constructed by artificial means for a specific purpose and that may require maintenance over time (for example, vegetation or silt removal) to continue to fulfil that purpose.

The guidance document goes on to list specific examples of constructed wetlands as '*areas of wetland habitat in or around bodies of water created for, or in connection with…. stormwater management, water storage ponds and other artificial water storage facilities, including open drainage channels and engineered soil conservation structures*.'

[2] *Federated Farmers v Northland Regional Council* [2022] NZEnvC 016 at [29] and *Greater Wellington Regional Council v Adams* [2022] NZEnvC 25 at [136].

Induced wetlands

The guidance document makes special reference to 'induced[3] wetlands' as:

- wetlands that have resulted from any human activity, except the deliberate construction of a wetland or waterbody by artificial means (see section 5). They are considered 'natural wetlands'.

The guidance goes on to say: 'In a highly modified landscape, as we have across New Zealand, wetlands often result from human activities or changes to the landscape. Many wetlands that we have today have historically been induced through these activities, such as deforestation, and have often developed significant values over time and warrant protection.' Thus, the guidance considers that induced wetlands are captured by the definition of 'natural wetland' and do not meet the exclusion for 'constructed by artificial means'.

NPS-FM natural inland wetlands

Section 3.22 of the NPS-FM requires that:

(1) Every regional council must include the following policy (or words to the same effect) in its regional plan(s):

"*The loss of extent of natural inland wetlands is avoided, their values are protected, and their restoration is promoted" except where* (amongst others):

(d) the regional council is satisfied that:

(i) the activity is necessary for the purpose of quarrying activities; and

(ii) the extraction of the aggregate will provide significant national or regional benefits; and

(iii) there is a functional need for the activity to be done in that location; and

(iv) the effects of the activity will be managed through applying the effects management hierarchy.

2.2 National Objectives Framework

Subpart 2 of the NPS-FM requires certain attributes to be managed within a compulsory National Objectives Framework (NOF). The NOF requires that water quality is maintained or improved to established water quality attribute bands for a variety of parameters. The NPS-FM requires that Councils apply compulsory values to stream management units in their respective regions as part of the NOF (Subpart 2, 3.9(1)). Those compulsory values relevant to freshwater ecology are:

Ecosystem health refers to the extent to which a Freshwater Management Unit (**FMU**) or part of an FMU supports an ecosystem appropriate to the type of water body (for example, river, lake, wetland, or aquifer).

There are five biophysical components that contribute to freshwater ecosystem health, and it is necessary that all of them are managed. They are:

Water quality – the physical and chemical measures of the water, such as temperature, dissolved oxygen, pH, suspended sediment, nutrients and toxicants.

[3] 'induced' is used here with its meaning 'bring about or give rise to'.

Water quantity – the extent and variability in the level or flow of water.

Habitat – the physical form, structure, and extent of the water body, its bed, banks and margins; its riparian vegetation; and its connections to the floodplain and to groundwater.

Aquatic life – the abundance and diversity of biota including microbes, invertebrates, plants, fish and birds

Ecological processes – the interactions among biota and their physical and chemical environment such as primary production, decomposition, nutrient cycling and trophic connectivity.

In a healthy freshwater ecosystem, all five biophysical components are suitable to sustain the indigenous aquatic life expected in the absence of human disturbance or alteration (before providing for other values).

The compulsory values (Appendix 1A) also reference human contact, threatened species and mahinga kai. For threatened species:

This refers to the extent to which an FMU or part of an FMU that supports a population of threatened species has the critical habitats and conditions necessary to support the presence, abundance, survival, and recovery of the threatened species. All the components of ecosystem health must be managed, as well as (if appropriate) specialised habitat or conditions needed for only part of the life cycle of the threatened species.

Threatened species means any indigenous species of flora or fauna that:

(a) relies on water bodies for at least part of its life cycle; and

(b) meets the criteria for nationally critical, nationally endangered, or nationally vulnerable species in the *New Zealand Threat Classification System Manual* (*see* clause 1.8, Incorporation by Reference).

2.3 National Environmental Standards Freshwater

NESF regulations on natural wetlands

The current NESF provides some specific regulations for natural wetland activities, notably:

- Earthworks within a natural wetland, and the taking, use, damming, diversion or discharge of water outside, a natural wetland, that results in complete or partial drainage of all or part of the wetland, is prohibited (Reg. 53).
- Earthworks outside, but within 100 m setback from a natural wetland, and the taking, use, damming, diversion or discharge of water outside, but within a 100 m setback from a natural wetland, that results in complete or partial drainage of all or part of the wetland, is a non-complying activity (Reg. 52).
- Vegetation clearance within, or within a 10 m setback from, a natural wetland, earthworks within, or within a 10 m setback from, a natural wetland, and the taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland is a non-complying activity (Reg. 54).

We also draw attention to the specific requirements for the following fish passage (NPS-FM, 3.26). Here Councils are required to include words in their regional plans that:

'...fish passage is maintained, or improved by instream structures, except where it is desirable to prevent the passage of some fish species in order to protect desired fish species, their life stages, or their habitats'

Proposed amendments to NESF regulations on natural wetlands

We note that amendments to the NESF (Resource Management (National Environmental Standards for Freshwater) Amendment Regulations (No 2) 2022) are proposed under the Notice Under the Legislation Act 2019. Particularly relevant to the proposed application are the following:

- New regulation 45A has been introduced providing that certain earthworks, land disturbance, vegetation clearance, diversion of water or discharge of water can be discretionary activities if they are for the purpose of quarrying activities and meet other criteria within the regulation (see Appendix 1 of our report).
- New regulation 45D has been introduced providing that certain earthworks, land disturbance, vegetation clearance, diversion or taking of water or discharge of water into water are discretionary activities if they are for the purpose of extraction of minerals and ancillary activities and meet other criteria within the regulation (see Appendix 1 of our report).

These proposed amendments are critical to the proposed activities and provide greater discretion and flexibility should natural inland wetlands be present or within the vicinity within the proposed extraction area.

We draw particular attention to the amendments that refer to:

- results, or is likely to result, in the complete or partial drainage of all or part of the wetland.
- results, or is likely to result, in the complete or partial drainage of all or part of the wetland.
- there is a hydrological connection between the taking, use, damming, or diversion and the wetland.
- the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland.
- the discharge will enter the wetland; and the discharge will change, or is likely to change, the water level range or hydrological function of the wetland.

In all cases the amendments to 45A and 45D require that the effects management hierarchy is applied.

2.4 Hastings District Plan (HDP)

2.4.1 Riparian Land Management and Public Access District Wide Activity

The objectives of the Riparian Land Management and Public Access District Wide Activity chapter of the HDP are:

(1) To protect areas of the coastline and the margins of rivers, lakes and streams that are identified as being of significant, natural, cultural, or recreational value.

(2) To recognise the importance of the natural character of the riparian margins of the coastal environment, wetlands, lakes and rivers, protect them from inappropriate subdivision, use and development and promote their preservation and enhancement.

(3) To create, link, maintain and enhance public access to and along the margins of the District's identified significant waterbodies in a manner that is compatible with the preservation of conservation and recreation values, management of natural hazards and adjoining land uses.

A number of policies are relevant to the proposal including:

Policy RMP6: *To encourage the retention of indigenous vegetation and promote planting within the coastal environment and on the margins of wetlands, lakes and rivers.*

2.4.2 Indigenous Vegetation and Habitat of Indigenous Fauna District Wide Activity

The objectives of the Indigenous Vegetation and Habitat of Indigenous Fauna District Wide Activity chapter of the HDP are:

(1) To protect and encourage the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.

(2) To maintain and enhance the biodiversity of indigenous species and the natural habitats and ecosystems that support them.

(3) Recognise that the economic, social and cultural wellbeing of people, and in particular the rural community, depends on, amongst other things, making reasonable use of land.

Several policies are relevant to the proposal including:

- Policy INP2: Maintain and protect areas of significant indigenous vegetation and significant habitats of indigenous fauna (including wetlands) from being significantly adversely affected by indigenous vegetation modification activities.
- Policy INP3: Include rules to maintain and protect areas of significant indigenous vegetation and significant habitats of indigenous fauna (including wetlands) not identified in Appendix 56 from being adversely affected by indigenous vegetation modification activities.
- Policy INP4: Control the adverse effects of feral and introduced species of fauna on the indigenous vegetation and fauna within the district.
- Policy INP5: To maintain or enhance the biodiversity of areas of significant indigenous vegetation and significant habitats of indigenous fauna.

3.0 Ecological values

3.1 Ecological context

The site lies within the Heretaunga Ecological District (McEwen 1987). The topography within the District contains extensive broad plains, river terraces and braided river systems, low rolling downlands and hill country. The district consists of a moderate diversity of indigenous flora and fauna, including a range of 'Threatened', 'At Risk' and regionally significant species. We comment on these as appropriate in our description of the ecological values of the Site.

The proposed site is located < 200 m south of the current flow path of the Ngaruroro River and within the historical flow path of the River. The braided river pattern has varied over time and previous river courses are evident in the surrounding landscape, especially when viewed from the air. These former channels now form part of the terrestrial environment.

The Ngaruroro Riverbed ("RAP 19") has been identified by the Department of Conservation ("DOC") as a Recommended Area for Protection ("RAP") within the Hastings District under the Protected Natural Areas Programme. In addition, the Ngaruroro River has been identified as having riparian areas with natural, recreational or cultural significance. The proposed extraction site is located within the RAP and riparian area of the Ngaruroro River.

3.2 Terrestrial ecology

3.2.1 Vegetation

Satellite imagery of the vegetation within the proposed extraction areas suggest that it is mostly exotic. The northern extant of the site is dominated by exotic rank grasses and shrubs. The southern extent is agricultural land used for livestock grazing and crop. Vegetation along the water channel to the southwest of the site appears to be rank grasses.

In the Ecological Management and Enhancement Plan for the Ngaruroro River Flood Protection and Drainage Scheme, MWH (2013) describe the vegetation in the vicinity of the proposed gravel extraction area. They consider that the terrestrial vegetation consists of:

- Native and exotic shrubland.
- Exotic forest and treeland.
- Palustrine floodplain wetland.

3.2.2 Terrestrial fauna

Herpetofauna records collected from iNaturalist[4] determined that three gecko species including the ruakawa gecko classed as Not Threatened and the barking gecko and ngahere gecko, both At Risk - Declining are present within 20 km of the project site. Habitat present is considered low quality for all gecko species which predominantly are either arboreal or occupy rock habitat which are both largely absent from the site. The project site is within the known distribution

[4] https://inaturalist.nz/observations?place_id=6803&subview=map&iconic_taxa=Reptilia

range of the glossy brown skink (At Risk – Declining) but no records are known from the project site. Agricultural land / grassland habitat in the project area is most suited to glossy brown skinks, providing suitable natural refugia. Herpetofauna values within the proposed excavation site are considered to be low.

A desktop assessment of potential bird species that are likely to occur within and adjacent to the proposed extraction site was taken from the New Zealand Bird Atlas, which includes a number of observations of birds observed within the Ecological District. Bird records were taken from the four 10 x 10 km grid squares of the New Zealand Bird Atlas effort map[5], that surrounds the proposed extraction site. Native birds are known to occur throughout the wider area including silvereye, tui, bellbird, pukeko, kingfisher, grey warbler, Australasian harrier, spur-winged plover, welcome swallow, and fantail. Other observations of little pied shag, southern black-backed gull, pied stilt, banded dotterel, black-fronted dotterel, grey teal, South Island pied oystercatcher, white-faced heron, silver gull, Caspian tern and black shag have been recorded likely around water including the Ngaruroro River and small lakes in the area. Specific avifauna surveys will be carried out at the site following referral but given the current horticultural land use land use and highly modified habitat, avifauna values are expected to be low.

The closest known population of long-tailed bats is located approximately 18 km southwest from the site[6]. Long-tail bats have large home ranges and travel tens of kilometres in a night between roosting grounds and foraging areas. However, the predominantly horticultural cropping land use of the proposed excavation site means that bats are unlikely to frequent the site. Given the mobility of long-tailed bats coupled with the vegetation connectivity between the site and closest records, there is very low likelihood of bats being present within the proposed aggregate extraction site.

Overall, terrestrial ecological values within the proposed site are assessed as low.

3.2 Freshwater ecology

The proposed extraction site is bounded on the southern border by a watercourse. This watercourse appears to be manmade diversion or water race providing for land management practices, in parts following the natural curvature on the historic braided river and straight cut manmade channels. The Maraekakaho River, which is a tributary of the Ngaruroro River, occurs to the west of the site.

Native fish diversity is high in the main Ngaruroro River and Maraekakaho River and consists of black flounder, dwarf galaxiid, torrent fish, common bully, longfin eel, shortfin eel, redfin bully, Crans bully, inanga and upland bully. The Ngaruroro River is also a known brown and rainbow trout fishery. Although a different habitat to the Ngaruroro River, the watercourses adjacent to the proposed extraction site are likely to provide habitat for several of these fish species and accordingly the ecological values of the proposed extraction site are assessed as moderate.

3.3 Freshwater Wetlands

The existing and proposed quarry sites are located on the Heretaunga aquifer close to the boundary between this aquifer and the Upper Ngaruroro aquifer (Aqualinc 2022). The presence of a confined or semi-confined aquifer beneath the site is currently uncertain and is subject to further assessment.

[5] https://ebird.org/atlasnz/block/blkBH83

Where the gravels of the proposed extraction site are unconfined and free draining with a connection to the Heretaunga aquifer, the surface expression of this water outside of the Ngaruroro River channel is unlikely. Aqualinc (2022) make no reference to the likelihood of persistent or even intermittent surface waters that would be sufficient to support a wetland.

Historic photographs of the location show the transition of the proposed extraction site from being part of the Ngaruroro River riverbed with major river channel (1950) to river side with minor river channels and vegetation (1988-1996), and from 2009 some vegetation clearance and conversion to pasture, and more recently to cropping (2020) (LDE HAIL assessment 2022).

Our observations of the location show the area as terrestrial vegetation (as above) as well as livestock grazing and cropping with no wetlands present. Minor gully features are present to the east of the proposed site.

The palustrine floodplain wetland identified by MWH (2013) in the Ecological Management and Enhancement Plan for the Ngaruroro River Flood Protection and Drainage Scheme does not appear to be present within the extraction site but is likely to occur along the boundary with the Ngaruroro River.

Our assessment of the effects of the proposed activity on freshwater ecological values is addressed below in Section 5.2.

4.0 Proposed activities

4.1 Excavation

Excavation of aggregate is likely to commence within the central part of each proposed source site until a maximum safe depth has been reached, then slowly extending the size of excavation, while working towards the maximum excavation limits to the edges of the site. It is expected that several constraints will influence the depth and size of the excavation to complete this process safely, and that the extraction methodology may be altered following further geotechnical investigation which will be undertaken to support a resource consent application.

The proposed extraction process is broadly anticipated to comprise the following:

- Strip the topsoil from proposed excavation area using an excavator and dump truck.
- Utilise suitable topsoil to form any necessary bunds on site. Any excess soil will be temporarily stockpiled and taken off site. A planted bund is currently proposed between the extraction site and the processing site to assist in screening the processing site and stock-piling area. However, any bunding on site will be confirmed following further flood risk assessment modelling.
- Extract the silt material present below the topsoil layer using an excavator and dump truck.
- Transport silt to the plant for screening and use in basecourse mix.
- Unsuitable silt material will be incorporated into any bunds adjacent to area excavated.
- Progressively extract aggregate from open area using a 250-ton excavator.

- Cart extracted aggregate via dump truck to the stockpile area adjacent to processing plant.
- Process material as necessary at RAL's existing processing site adjacent to the proposed extraction sites.,

This process will ensure that existing top-soil resource on the Site is used to facilitate mitigation and remediation of the site where possible.

Aggregate is to be extracted creating the excavation, which is anticipated to intercept groundwater, which will be filled naturally via the latent groundwater level. This will effectively create a lake or surface water body which is enlarged over time as gravel is extracted from the centre of each source site outwards. The site will ultimately result in two separate waterbodies once the entire excavation activity has been completed. The preliminary geotechnical report prepared by LDE has estimated that aggregate may be extracted to an approximate depth of 9 – 17.5m across the excavation site (with a maximum depth of 30 m). However, the exact depth of the excavation will be confirmed at resource consent stage through further detailed investigations.

The excavation is proposed to have a battered slope angle to ensure stability and avoid slumping or erosion. LDE address this in their Geotechnical report (LDE 2022) noting that a specific batter angle will be calculated to inform the substantive resource consent application.

It is proposed to progressively manage the excavation to realise the total 23 ha area of surface water bodies over the lifetime of the operation with progressive rehabilitation occurring. On completion, it is proposed that two waterbodies (lakes) are to be created, one either side of the access road. Further detail regarding the end of life proposal can be found in the LDE geotechnical report and the landscape and visual impact assessment prepared by Wayfinder (2022).

The total amount of time required to extract the gravel resource is estimated to be 10-25 years depending on the depth achievable and demand of material in future. There is potentially 6.42 million m^3 of material in the area available to be extracted.

4.2 Processing

Processing of the extracted aggregate will take place at the Existing Processing Site, under Russell Aggregates existing resource consent (land use consent RMA20180258).

4.3 Preliminary end of life remediation plan

The project will include an end of life remediation plan to provide two lakes/water bodies, and is currently intended to comprise terraced banks and riparian planting. The inclusion of terraces will allow for fluctuations in water depth and movement and increase the habitat availability as water levels fluctuate. These features will enhance the terrestrial and aquatic features of the site through provision of habitats and proximity to the river corridor. The end of life remediation plan is discussed in the preliminary landscape and visual assessment (Wayfinder, 2022).

Whilst the ecological values of the proposed extraction site are low at present as a result of the current and antecedent land use modifications, the end of life remediation plan will aim to provide habitats suitable for the range of flora and fauna likely to colonise and provide ecological function and connectivity to the location. The detail of the proposed end of life

remediation plan will be set out in a management plan as part of any substantive resource consent application.

5 Effects of proposed extraction on ecological values

5.1 Effects on terrestrial ecological values

5.1.1 Vegetation

The proposed extraction of aggregate from the site will result in the clearance of areas of rank grassland, shrubs and any exotic treeland to the northern extent of the site and agricultural land throughout the remainder of the area.

Given the low ecological value of the vegetation to be removed and these vegetation communities are very common in the wider area, the effects of vegetation removal will be negligible.

5.1.2 Fauna

Although the area is largely used for horticultural cropping at present, the clearance of rank grassland and shrubland areas has the potential to reduce habitat availability for native lizards and birds. Removal of rank grasses may reduce the availability of suitable natural refugia for lizards. Additionally, where lizards are present, clearance of vegetation of other refugia within the site may leave them susceptible to injury and mortality as they are visually and behaviourally cryptic (freeze and hind under cover when disturbed

The agricultural land and rank grassland provides potential foraging and roosting habitat for a range of indigenous species but does not provide nesting habitat for these species. Shrubland provides foraging, roosting and potential nesting for present bird species. Although the current land use is largely horticultural cropping, permanent habitat loss of shrubland habitats may occur, these habitat types are locally and regionally common and all avian fauna are highly mobile, therefore are able to disperse to alternate habitats. As such, we consider there will be a negligible effect on avifauna.

As the likelihood of bats being present within the proposed footprint is low, and the vegetation is generally not suitable for roosting, the effect on bats is likely to be negligible and no further management is recommended.

5.2 Effects on freshwater ecological values

5.2.1 Extent of watercourses.

No loss of watercourses is anticipated by the proposal. The manmade diversion and watercourse features will be retained with a setback of at least 10 m. Where streamworks are required the effects management hierarchy will be applied.

5.2.2 Sediment

During the extraction works, it is possible that sediments and increased turbidity may extend into the aquifer and to the Ngaruroro River. Aqualinc (2022), in observing previous research, consider that smallest clay particles extend only 40 metres into the aquifer before filtration effects remove suspended sediment and colloids. Aqualinc (2022) go on to conclude that the Ngaruroro River is unlikely to be affected by turbidity resulting from the quarrying activity.

5.3 Effects on wetlands

No wetlands have been identified within the proposed extraction areas. The proposed extraction avoids the areas indicated by the Ecological Management and Enhancement Plan for the Ngaruroro River Flood Protection and Drainage Scheme (MWH 2013), although we note that land use has intensified since that report and the vegetation is now a greater extent of cropping within the subject area. Accordingly, there will be no loss of extent of wetlands.

6.0 Effects management

Measures to avoid, mitigate and remedy effects on ecological values will follow the effects management hierarchy and are summarised below:

- Prior to construction, a dedicated lizard survey should be undertaken between October and April. The survey will be undertaken in mild, fine conditions with preferably little wind and temperatures between 15 and 25 degrees and will be implemented be a suitably qualified herpetologist.
    - If lizards are detected during the survey, a Lizard Management Plan (LMP) and Wildlife Act Authority will be prepared and submitted to DOC. The permit will allow for the salvage of lizards from the site and the implementation of other appropriate mitigation actions and offsetting and compensation if required.
- To manage avifauna, any vegetation clearance (of which there is expected to be minimal) should be done outside bird breeding season and/or checks for bird nest prior to vegetation clearance.
- Avoid streamworks and maintain a setback of at least 10 m from the manmade diversion. Where streamworks are required the application of the effects management hierarchy is required.

7.0 Review against statutory provisions

A review against selected objectives and policies of the NPS-FM, NESF and the HDC RPS is provided in Appendix 1. The respective provisions of these statutory documents are met.

8.0 Conclusion

In conclusion, the proposed extraction of aggregate from land directly to the south of the Ngaruroro River as an alternative to the river-based source at Kereru Rd, Maraekakaho will not result in significant adverse effects on the ecological values of the location or the Ngaruroro River. Accordingly, with the implementation of fauna management and effects management, the ecological effects of the proposed extraction of aggregate are anticipated to be minimal. With the application of effects management, the relevant provisions the NESF, NPS-FM and HDP have been considered and addressed.

Appendix 1: Response to key statutory provisions

Objective reference	Objective	Outcome
NPS-FM		
3.24(1)	"The loss of river extent and values is avoided, unless the council is satisfied: (a) that there is a functional need for the activity in that location; and the effects of the activity are managed by applying the effects management hierarchy."	The proposed expansion of the quarry activities is not expected to result in the loss of river extent or values.
NOF		
NOF (Subpart 2, 3.9(1)).	**Compulsory values** **Ecosystem health** refers to the extent to which an FMU or part of an FMU supports an ecosystem appropriate to the type of water body (for example, river, lake, wetland, or aquifer). There are 5 biophysical components that contribute to freshwater ecosystem health, and it is necessary that all of them are managed. They are: *Water quality* – the physical and chemical measures of the water, such as temperature, dissolved oxygen, pH, suspended sediment, nutrients and toxicants *Water quantity* – the extent and variability in the level or flow of water *Habitat* – the physical form, structure, and extent of the water body, its bed, banks and margins; its riparian vegetation; and its connections to the floodplain and to groundwater *Aquatic life* – the abundance and diversity of biota including microbes, invertebrates, plants, fish and birds. *Ecological processes* – the interactions among biota and their physical and chemical environment such as primary production, decomposition, nutrient cycling and trophic connectivity. In a healthy freshwater ecosystem, all 5 biophysical components are suitable to sustain the indigenous aquatic life expected in the absence of human disturbance or alteration (before providing for other values). **Threatened species** refers to the extent to which an FMU or part of an FMU that supports a population of threatened species has the critical habitats and conditions necessary to support the presence, abundance, survival, and recovery of the threatened species. All the components of ecosystem health must be managed, as well as (if appropriate) specialised habitat or conditions needed for only part of the life cycle of the threatened species.	The compulsory values of the NOF are met. *Water quality* – the physical and chemical measures of the water, such as temperature, dissolved oxygen, pH, suspended sediment, nutrients and toxicants are all maintained or managed. *Water quantity* – the extent and variability in the level or flow of water. Flow of water in the Ngaruroro River is maintained. *Habitat* – the immediate physical form, structure, and extent of the water body (Ngaruroro River), its bed, banks and margins; its riparian vegetation; and its connections to the floodplain and to groundwater for both tributaries are retained. *Aquatic life* – the abundance and diversity of biota in the Ngaruroro River is provided for through the above three attributes. *Ecological processes* – the interactions among biota and their physical and chemical environment such as primary production, decomposition, nutrient cycling and trophic connectivity are all retained in the Ngaruroro River catchment. All components of ecosystem health are maintained for all or part of the life cycle of the threatened species present, including fish passage and wetland habitat.

	(1) Every regional council must include the following fish passage objective (or words to the same effect) in its regional plan(s): The passage of fish is maintained, or is improved, by instream structures, except where it is desirable to prevent the passage of some fish species in order to protect desired fish species, their life stages, or their habitats.	The proposed expansion of the quarry activities will maintain fish passage.
NESF- (with key amendments coming into effect on 5 January 2023)		
Drainage of natural wetlands		
Non-complying activities	52 (1) Earthworks outside, but within a 100 m setback from, a natural wetland is a non-complying activity if it— (a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and (b) does not have another status under any of regulations 38 to 51. (2) The taking, use, damming, diversion, or discharge of water outside, but within a 100 m setback from, a natural wetland is a non-complying activity if it— (a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and (b) does not have another status under any of regulations 38 to 51.	Earthworks within a 100 m setback is not expected to occur as a consequence of the proposed application. The taking, use, damming, diversion, or discharge of water outside, but within a 100 m setback is not expected to occur as a consequence of the proposed application.
	54 The following activities are non-complying activities if they do not have another status under this subpart: (a) vegetation clearance within, or within a 10 m setback from, a natural wetland: (b) earthworks within, or within a 10 m setback from, a natural wetland: (c) the taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland.	The proposed expansion of the quarry activities is not expected to result in: • Vegetation cleared within, or within a 10 m setback from, a natural wetland: • earthworks within, or within a 10 m setback from, a natural wetland: • the taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland
Prohibited activities	53 (1) Earthworks within a natural wetland is a prohibited activity if it— (a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and (b) does not have another status under any of regulations 38 to 51. (2) The taking, use, damming, diversion, or discharge of water within a natural wetland is a prohibited activity if it—	The proposed expansion of the quarry activities is not expected to: • Result in earthworks that will occur with a natural wetland, or within a 10 m setback from a natural wetland: • Result in the taking, use, damming, diversion, or

	(a) results, or is likely to result, in the complete or partial drainage of all or part of a natural wetland; and (b) does not have another status under any of regulations 38 to 51.	discharge of water within, or within a 100 m setback from, a natural wetland. • Result in the taking, use, damming, diversion, or discharge of water within a natural wetland.
Key amendments to NESF (in effect from 5 January 2023)		
Amended Discretionary activities	*45A Quarrying activities* (1) Vegetation clearance within, or within a 10 m setback from, a natural inland wetland is a discretionary activity if it is for the purpose of quarrying activities. (2) Earthworks or land disturbance within, or within a 10 m setback from, a natural inland wetland is a discretionary activity if it is for the purpose of quarrying activities. (3) Earthworks or land disturbance outside a 10 m, but within a 100 m, setback from a natural inland wetland is a discretionary activity if it— (a) is for the purpose of quarrying activities; and (b) results, or is likely to result, in the complete or partial drainage of all or part of the wetland. (4) The taking, use, damming, or diversion of water within, or within a 100 m set- back from, a natural inland wetland is a discretionary activity if— (a) the activity is for the purpose of quarrying activities; and (b) there is a hydrological connection between the taking, use, damming, or diversion and the wetland; and (c) the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland. (5) The discharge of water into water within, or within a 100 m setback from, a natural inland wetland is a discretionary activity if— (a) the discharge is for the purpose of quarrying activities; and (b) there is a hydrological connection between the discharge and the wet- land; and (c) the discharge will enter the wetland; and (d) the discharge will change, or is likely to change, the water level range or hydrological function of the wetland (6) A resource consent for a discretionary activity under this regulation must not be granted unless the consent authority has first— (a) satisfied itself that the quarrying activity will provide significant national or regional benefits; and (b) satisfied itself that there is a functional need for the quarrying activity in that location; and (c) applied the effects management hierarchy.	The proposed expansion of the quarry activities is not expected to result in: • Vegetation cleared within, or within a 10 m setback from, a natural wetland: • earthworks within, or within a 10 m setback from, a natural wetland: • the taking, use, damming, diversion, or discharge of water within, or within a 100 m setback from, a natural wetland; • The discharge of water into water within, or within a 100 m setback from, a natural inland wetland. If any of the above occurs the effects management hierarchy will be applied.
Amended Discretionary activities	*45D Extraction of minerals and ancillary activities* (1) Vegetation clearance within, or within a 10 m setback from, a natural inland wetland is a discretionary activity if it is for the purpose of extraction of minerals and ancillary activities. (2) Earthworks or land disturbance within, or within a 10 m setback from, a natural inland wetland is a discretionary activity if it is for the purpose of extraction of minerals and ancillary activities. (3) Earthworks or land disturbance outside a 10 m, but within a 100 m, setback from a natural inland wetland is a discretionary activity if it—	The proposed expansion of the extraction of aggregate is not expected to result in: • Vegetation cleared within, or within a 10 m setback from, a natural wetland: • earthworks within, or within a 10 m setback from, a natural wetland: • the taking, use, damming, diversion, or

	a. is for the purpose of extraction of minerals and ancillary activities; and b. results, or is likely to result, in the complete or partial drainage of all or part of the wetland. (4) The taking, use, damming, or diversion of water within, or within a 100 m set- back from, a natural inland wetland is a discretionary activity if— a. the activity is for the purpose of extraction of minerals and ancillary activities; and b. there is a hydrological connection between the taking, use, damming, or diversion and the wetland; and c. the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland. (5) The discharge of water into water within, or within a 100 m setback from, a natural inland wetland is a discretionary activity if— a. the discharge is for the purpose of extraction of minerals and ancillary activities; and b. there is a hydrological connection between the discharge and the wet- land; and c. the discharge will enter the wetland; and d. the discharge will change, or is likely to change, the water level range or hydrological function of the wetland (6) A resource consent for a discretionary activity under this regulation must not be granted unless the consent authority has first— a. satisfied itself that the extraction of minerals and ancillary activities will provide significant national or regional benefits; and b. satisfied itself that there is a functional need for the extraction of minerals and ancillary activities in that location; and c. applied the effects management hierarchy (7) In relation to the extraction of coal and ancillary activities, no person may apply for a consent to carry out any activity under subclauses (1) to (5) unless the activity is for the purpose of the extraction of coal or ancillary activities as part of operating or extending a coal mine that was lawfully established before 5 January 2023. (8) At the close of 31 December 2030, the extraction of coal (other than coking coal) is excluded from the purposes for which consent may be obtained under this regulation	discharge of water within, or within a 100 m setback from, a natural wetland; • The discharge of water into water within, or within a 100 m setback from, a natural inland wetland. If any of the above occurs the effects management hierarchy will be applied.	
Culverts			
	70 Permitted activities (1) The placement, use, alteration, extension, or reconstruction of a culvert in, on, over, or under the bed of any river or connected area is a permitted activity if it complies with the conditions. *Conditions* (2) The conditions are that— a. the culvert must provide for the same passage of fish upstream and downstream as would exist without the culvert, except as required to carry out the works to place, alter, extend, or reconstruct the culvert; and b. the culvert must be laid parallel to the slope of the bed of the river or connected area; and c. the mean cross-sectional water velocity in the culvert must be no greater than that in all immediately adjoining river reaches; and d. the culvert's width where it intersects with the bed of the river or connected area (**s**) and the width of the bed at that location (**w**), both measured in metres, must compare as	The proposed expansion of the quarry activities will meet the requirements of the permitted activity.	

	follows: i. where w ≤ 3, s ≥ 1.3 × w: ii. where w > 3, s ≥ (1.2 × w) + 0.6; and e. the culvert must be open-bottomed or its invert must be placed so that at least 25% of the culvert's diameter is below the level of the bed; and f. the bed substrate must be present over the full length of the culvert and stable at the flow rate at or below which the water flows for 80% of the time; and g. the culvert provides for continuity of geomorphic processes (such as the movement of sediment and debris). Information requirements h. See also regulations 62 and 63 for information requirements that apply to the permitted activity (unless the activity is use).	
Hastings District Plan		
Riparian Land Management and Public Access District Wide Activity		
Objective B7.3.1 (2)	(1) To protect areas of the coastline and the margins of rivers, lakes and streams that are identified as being of significant, natural, cultural, or recreational value. (2) To recognise the importance of the natural character of the riparian margins of the coastal environment, wetlands, lakes and rivers, protect them from inappropriate subdivision, use and development and promote their preservation and enhancement. (3) To create, link, maintain and enhance public access to and along the margins of the District's identified significant waterbodies in a manner that is compatible with the preservation of conservation and recreation values, management of natural hazards and adjoining land uses.	The proposed expansion of the quarry activities will not result in any loss of riparian margins, and the proposed extraction location is set back from the river margins. .
Policy B7.3.2 (4)	Policy RMP6: To encourage the retention of indigenous vegetation and promote planting within the coastal environment and on the margins of wetlands, lakes and rivers.	No significant indigenous vegetation occurs along the margins of the Ngaruroro River within the site. Planting of indigenous vegetation along the riparian margins of the Ngaruroro River will be encouraged.
Indigenous Vegetation and Habitat of Indigenous Fauna District Wide Activity		
Objective 20.1	(1) To protect and encourage the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna. (2) To maintain and enhance the biodiversity of indigenous species and the natural habitats and ecosystems that support them. (3) Recognise that the economic, social and cultural wellbeing of people, and in particular the rural community, depends on, amongst other things, making reasonable use of land.	No significant indigenous vegetation occurs along the margins of the Ngaruroro River within the site. Planting of indigenous vegetation along the riparian margins of the Ngaruroro River will be encouraged.
Policy B7.4.2	Policy INP2: Maintain and protect areas of significant indigenous vegetation and significant habitats of indigenous fauna (including wetlands) from being significantly adversely affected by indigenous vegetation modification activities. Policy INP3: Include rules to maintain and protect areas of significant indigenous vegetation and significant habitats of indigenous fauna (including wetlands) not identified in Appendix 56 from being adversely affected by indigenous vegetation modification activities. Policy INP4: Control the adverse effects of feral and introduced species of fauna on the indigenous vegetation and fauna within the District.	No significant indigenous vegetation occurs along the margins of the Ngaruroro River within the proposed site. Planting of indigenous vegetation along the riparian margins of the Ngaruroro River will be encouraged.

	Policy INP5: To maintain or enhance the biodiversity of areas of significant indigenous vegetation and significant habitats of indigenous fauna	
Policy D9.2	(1) Areas of significant indigenous biodiversity value in terrestrial, freshwater, and coastal marine areas are protected from the adverse effects of subdivision, use and development. (2) Indigenous biodiversity values of significant ecological areas are enhanced. (3) The relationship of Mana Whenua and their customs and traditions with indigenous vegetation and fauna is recognised and provided for.	No significant indigenous vegetation occurs within the proposed extraction site. Management is proposed to protect indigenous biodiversity values that may be present.
Significant Ecological Areas		
Objective D9.2	(1) Areas of significant indigenous biodiversity value in terrestrial, freshwater, and coastal marine areas are protected from the adverse effects of subdivision, use and development. (2) Indigenous biodiversity values of significant ecological areas are enhanced. (3) The relationship of Mana Whenua and their customs and traditions with indigenous vegetation and fauna is recognised and provided for.	No significant indigenous vegetation occurs within the proposed extraction site. Management is proposed to protect indigenous biodiversity values that may be present.
Policy D9.3	Managing effects on significant ecological areas – terrestrial.	No significant indigenous vegetation occurs within the proposed extraction site. Management is proposed to protect indigenous biodiversity values that may be present.

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Whangarei, Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin, and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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