s 9(2)(f)(ii), s 9(2)(g)(i)

s 9(2)(f)(ii), s 9(2)(g)(i)

Comments on applications for referral under the COVID-19 Recovery (Fast-track Consenting) Act 2020

This form is for local authorities to provide comments to the Minister for the Environment on an application to refer a project to an expert consenting panel under the COVID-19 Recovery (Fast-track Consenting) Act 2020.

Local authority providing comment	Hawke's Bay Regional Council
Contact person (if follow-up is required)	Gavin Ide, Principal Advisor Strategic Planning, s 9(2)(a)
	Click or tap here to enter text.
	Click or tap here to enter text.

Comment form

Please use the table below to comment on the application.

1. Project name	Maraekakaho Quarry
2. General comment – potential benefits	Click or tap here to indicate any initial views you have on whether the project could create benefits for your district / region, or to state "no comment".
3. General comment – significant issues	Click or tap here to indicate any initial views you have on whether the project could create significant issues, or to state "no comment".
4. Is Fast-track appropriate?	<u>Resource consents required from HBRC</u> HBRC staff have not undertaken a full section 95 RMA assessment on this application as it would typically do so for an application through existing RMA consenting processes. Given that, and on a 'without prejudice basis', the consenting requirements identified the functions of the Regional Council would not appear to necessitate automatic limited or public notification. It appears that the level of detail supplied by the applicant is considered sufficient to allow HBRC to process an application of this nature for consents required from HBRC. Notwithstanding this, senior members from HBRC's Consents and Compliance teams are aware that there is recent history of neighbouring residents complaining about the gravel processing operations on the **existing** site. We are not convinced that the proposal for the **new** quarry and associated processing will ease those neighbours' concerns about impacts of aggregate processing at this Maraekakaho location. In terms of HBRC's consent requirements, there do not appear to be any unique or peculiar features of the project that cannot be properly assessed and addressed in a regular RMA consenting process, rather than the FTCA process. We note that bundling and joint hearing processes are entirely possible under regular RMA process (if the applicant were to lodge concurrent applications with HDC and HBRC). Also see comments under #6 below. <u>Consultation with HBRC</u> The Applicant confesses that it has not yet undertaken consultation with Hawke's Bay Regional Council and Hastings District Council regarding this project, albeit that some "discrete enquiries" have been made with the Regional Council on one particular facet of the project relating to flood

	risks. This is surprising given the Regional Council's various interests in the matters arising (such as a consent authority; as landowner of the current gravel processing site; as asset manager of the Heretaunga Plains flood control and drainage scheme (including adjacent stopbank and river edge plantings; plus holder of resource consents[1] for the extraction of gravel from the Ngaruroro River). Russell Aggregates currently has a lease agreement with HBRC for the use and occupation of HBRC's property for the existing aggregate processing operations. That lease is due to expire in July 2024. HBRC has not made any decisions about renewing or replacing that lease after its expiry. Also in that immediate vicinity is another of HBRC's critical assets – the access road (unnamed). That access road provides strategic access to and from the Ngaruroro River for river control and drainage scheme operations. The Regional Council is extremely concerned about what impacts the proposal may have on integrity of that road (passage plus structural integrity).
5. Environmental compliance history	The Applicant has supplied a copy of an abatement notice issued against it by the Regional Council (see Application bundle Attachment N). There are currently no other abatement notices issued by the Regional Council against the Applicant or any of its Directors. At the time of writing this feedback, the Regional Council currently has an open investigation into alleged unlawful activities by the Applicants at a Maraekakaho riverine location shortly after Cyclone Gabrielle hit our region in February. By mid-May we should be able to provide an update to MFE's Fast-track consenting team on that investigation (and any subsequent compliance and enforcement activity that the Regional Council might take).
6. Reports and assessments normally required	Without prejudice, and without making a full s95 assessment, the consenting requirements of the functions of Regional Council do not appear to necessitate automatic limited or public notification. When assessing regional consent requirements, the Applicant's documentation has referred to resource consent requirements in the Regional Resource Management Plan ('RRMP'). They do also acknowledge rules set out in TANK Plan Change 9 (currently under appeal) would also apply. The application (Page 20 Planners Report) notes that in the RRMP, stormwater is defined as runoff of water that is not absorbed by the land, and comments that the subject site will not contain any impermeable surface associated with the quarrying activity to collect stormwater. They consider that rainfall on the site will be absorbed and not flow off. Therefore they consider that the RRMP rules do not trigger the need for resource consent. This is accepted, but if there is any capture and managed discharge of stormwater by the Applicant's operations, then a resource consent will be required under rules in the RRMP and Plan Change 9. These are discussed below. Stormwater rules in RRMP (Rule 43) currently apply for industrial and trade premise sites over 2ha, but will be replaced by TANK plan change Rules once those rules become beyond challenge. RRMP and TANK PC9 Stormwater rules both have application now. In this case the land is zoned Rural, the activity is an industrial process. TANK PC9 Rule 24 would apply (Restricted Discretionary Activity) if the impervious area on the site exceeds 1000m^2. Rule 43 will also apply if there are impervious areas, and the diversion and discharge of stormwater will be a controlled activity. The application indicates that there will be no impervious surfaces and stormwater will not be diverted and collected. Rather, it will be left to discharge through gravelly soils of the site. Higher risk areas of the site (such as fuel storage areas, refuelling areas, machinery servicing areas, etc) should be managed so that contaminants (e.g. spills) can be captured. This would typically involve having higher risk activities occurring on sealed ground, with appropriate treatment and capture of the runoff from these areas. If impervious areas are constructed, consent for the diversion and discharge of stormwater will be required. There will be discharges from processes on the site e.g. gravel washing. Rule 52 RRMP will apply. The application identifies this. Existing HBRC consents for taking water and for the discharge of wash water exist and may already cover this aspect of the activity, but that would require further confirmation. The application also recognises that surface flood water may be diverted and that ground water flow may be diverted. Rule 59 applies.

[1] Consent references are AUTH-123467-01 and AUTH-123469-01 (refer Attachment A).

	Dust discharge is regulated by RRMP Rule 29 as a permitted activity but if condition (d)(v) cannot be complied with (i.e. dust deposition > 4g/m^2 / 30 days of the ambient level), then Rule 30 (Restricted Discretionary Activity) would apply. Need for dust suppression, monitoring and a site management plan to establish and verify good management practices. This proposal is a change in use of production land. The change is from production to extraction so is different to the focus of the TANK PC9's rules which are about limiting land use intensification that could cause increases in nutrient levels in the receiving environment. TANK Rule 3 should apply making it a Permitted Activity. If not, a resource consent may be required. Reference is made to an anticipated volume of 20 – 30,000m3 being extracted from the river as well. There is an existing site where this is stockpiled and processed that is adjacent to the quarry site.
7. Iwi and iwi authorities	Iwi authorities for RMA purposes with interests in the proposal area include: - Heretaunga Tamatea Settlement Trust - Ngati Kahungunu Iwi Incorporated - Te Taiwhenua o Heretaunga. The application area is not in the coastal marine area so we do not identify any applicants for Customary Marine Titles and/or Protected Customary Rights in nearby coastal areas. Sources: • www.tkm.govt.nz • https://www.tearawhiti.govt.nz/te-kahui-takutai-moana-marine-and-coastal-area/applications/hawkes-bay/ 'Pataka' (Hawke's Bay councils' online storehouse of information about tāngata whenua groups) accessible online at: https://gis.hbrc.govt.nz/LocalMapsViewer/?map=16398cdd055a45499c5d8ce736bfd190
8. Relationship agreements under the RMA	None applicable to the proposal area/site. However, HBRC has received several management plans prepared by tāngata whenua and authorised by an iwi authority. Electronic copies of these can be provided to MFE if required.
9. Insert responses to other specific requests in the Minister's letter (if applicable)	Ministers' questions are: 1. **Are there any reasons that you consider it more appropriate for the project, or part of the project, to proceed through existing Resource Management Act 1991 (RMA) consenting processes rather than the processes in the FTCA?** Refer question #4 above. 2. **Does the applicant, or a company owned by the applicant, have any environmental regulatory compliance history in your region?** Refer question #5 above.
10. Other considerations	**Natural Hazards** The property is subject to a number of natural hazards. Many of those can be viewed via the online Hawke's Bay Hazards portal tool.[2] This is a 'self-help' information portal. **Impacts of Cyclone Gabrielle and regional recovery efforts** We understand that the Applicants filed their Fast-track application materials in December 2022. This is several months **before** Cyclone Gabrielle hit our region in mid-February 2023. **Riverbed gravel as a resource** See Attachment B for a succinct update (dated 6 July 2022) on one initiative that the Regional Council has taken (i.e. applied for an been granted a 'global consent' for riverbed gravel extraction activities). That report refers to availability and allocation issues with some of the region's river bed gravel resources. Attachment A is copy of the global consents as granted in July 2022.

[2] https://gis.hbrc.govt.nz/hazards/

	The Applicant's documentation makes rather loose references to availability of gravel resources in the Ngaruroro River vicinity, and wider Hawke's Bay region. The Applicant's letter oversimplifies reasons why they are seeking consents to extract aggregate from this site adjacent to the current processing site when it says this is *"[d]ue to constraints on the availability of aggregate from the Ngaruroro River, the high cost of importing material from Central Hawke's Bay, and the high demand for aggregate…"* Aggregate movement and removal in the Ngaruroro River corridor requires careful management. Extraction is for sustainable volumes and at specified locations that support integrity of the flood scheme and river channel management. Accordingly, those parameters may not always be 'convenient' for commercial aggregate extractors and processing operations. For example, financial incentives are provided to extractors operating in the Central Hawke's Bay area in recognition of some of the extra operating costs and mutual benefits for flood scheme management in those locations.

Note: All comments, including your name and contact details, will be made available to the public and the applicant either in response to an Official Information Act request or as part of the Ministry's proactive release of information. Please advise if you object to the release of any information contained in your comments, including your name and contact details. You have the right to request access to or to correct any personal information you supply to the Ministry.

ATTACHMENTS

Attachment A – Copy of resource consents AUTH-123467-01 and AUTH-123469-01.

Attachment B – staff briefing paper dated 6 July 2022 providing update on Gravel Extraction and new global consent.

HAWKE'S BAY
REGIONAL COUNCIL

RESOURCE CONSENT
Land Use Consent

In accordance with the provisions of the Resource Management Act 1991 (RMA), and subject to the attached conditions, the Hawke's Bay Regional Council (the Council) grants a resource consent for a restricted discretionary activity to:

Regional Assets Section of Hawke's Bay Regional Council
Hawke's Bay Mail Centre
Private Bag 6006
Napier 4142

To extract sand, gravel or other material from the bed of the Ngaruroro River and to undertake other activities directly associated with the activity that may be restricted by Section 13 of the RMA.

LOCATION

Address of site:	Various – refer to **Appendix A**
Legal description (site of extraction):	Various – refer to **Appendix A**
Map reference:	Various – refer to **Appendix A**

CONSENT DURATION

This consent is granted for a period expiring on 20 years after date of commencement.

LAPSING OF CONSENT

This consent shall lapse in accordance with section 125 of the RMA on 5 July 2027, if it is not exercised before that date.

Paul Cooney
Hearing Commissioners
Under authority delegated by Hawke's Bay Regional Council
5 July 2022

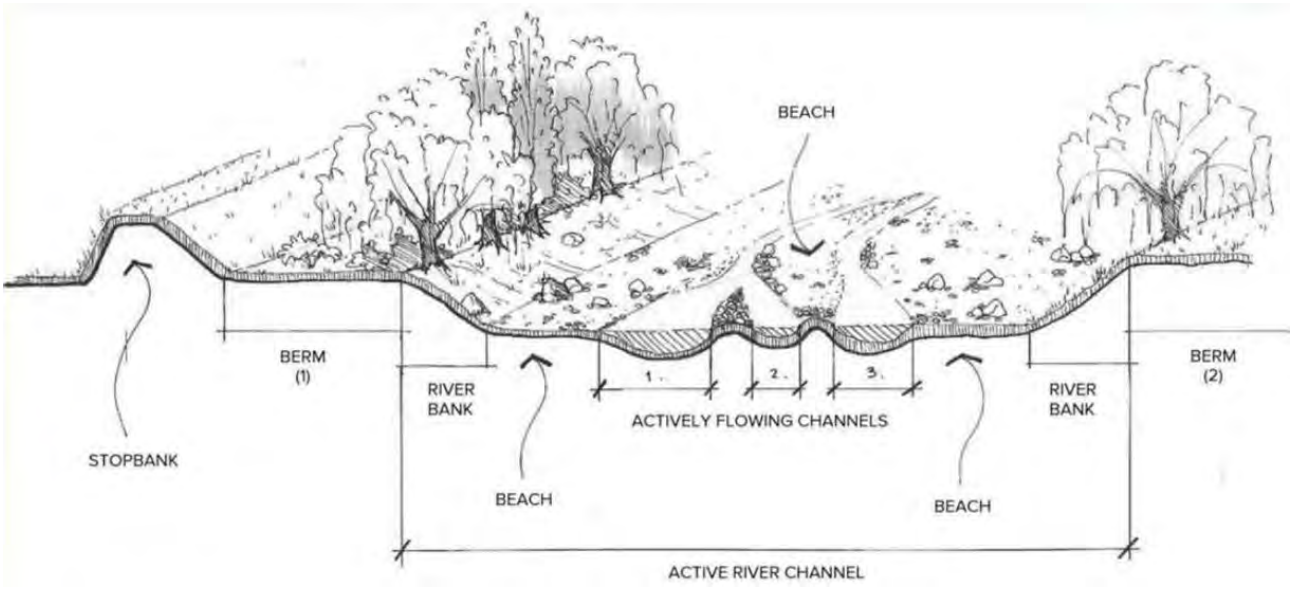
CONDITIONS

Definitions

For the purposes of this consent, the following definitions apply:

Term	Definition
Active river channel	The entire width of the river channel including gravel beaches, actively flowing channels, and riverbanks, but excluding berms, as shown in **Figure 1**.
Actively Flowing Channel	Comprises the wetted river area of the active river channel being that part of the channel that is in contact with water. **See Figure 1**.
Council	Hawke's Bay Regional Council in its capacity a consent authority.
Manager Compliance	The Manager Compliance of the Hawke's Bay Regional Council.
Berm	Land between the active river channel and the stopbank or naturally elevated land that forms part of the floodplain.
Gravel	Refer to 'sediment' definition below.
Sediment	Includes all alluvial material found in the active river channel and berms. Sediment consists of the broad categories of gravels, sands and silts. For convenience, the term 'gravel' is often used as it is the bulk of the extraction in most cases.

Figure 1: Definitions of terms used in these consent conditions



Preamble

The purpose of this consent is for the essential maintenance of the existing flood control schemes. Gravel extraction activities must be considered within the context of a wider flood management approach and must give effect to Te Mana o Te Wai.

Activity Authorised

1. The consent holder shall only extract gravel (defined as gravel and associated sand, silt and other riverbed sediments) from the dry beaches and dry berm areas of the Ngaruroro River as identified within the Plans attached in **Appendix A**.

2. There shall be no gravel extraction from the Actively Flowing Channel.

3. The extraction of gravel under this consent is for the purpose of undertaking essential maintenance of flood control schemes managed by the consent holder.

4. This consent does not authorise gravel extraction within the Coastal Marine Area or within any area identified in the Hawke's Bay Regional Coastal Environment Plan as Coastal Hazard Zone 1, or within any of the gravel extraction exclusion areas in **Appendix A**.

5. Gravel extraction in any one year shall not exceed the authorised Sustainable Gravel Allocation (as determined through reporting required by Condition 68) for that year.

6. With the written approval of the Manager Compliance, the Consent Holder may exceed the Sustainable Gravel Allocation in a given year, where additional gravel extraction is required to mitigate a significant risk to assets, property or human health and safety, providing the proposed extraction does not cause significant adverse effects to other properties and not withstanding Condition 20.

7. Where a request is made for written approval under Condition 6, the Ngaruroro Gravels Tangata Whenua Group will be immediately notified and given reasonable opportunity to comment on the proposal.

8. Except as specifically provided for by other conditions of this consent, all activities to which this consent relates shall be undertaken generally in accordance with:

    a) The information contained in the application for this consent including: *"Hawke's Bay Regional Council – Regional Assets Section: Application to Extract Gravel from the Ngaruroro Catchment Rivers"* prepared by Mitchell Daysh Ltd, dated October 2017.

    b) The Section 92 (RMA) Response, contained within the Gravel Resource Management report, Appendix 15, September 2018, prepared by the Asset Management Group, HBRC.

    c) The statements of evidence presented at the Hearing of the Application as follows:

        i. Christopher William Dolley, 5 November 2021
        ii. Dr Robin Holmes, 5 November 2021
        iii. José Francisco Beyá, 5 November 2021
        iv. Adam Sean Forbes, 5 November 2021
        v. Simon Donald Bendall, 5 November 2021

9. Where there is any disagreement between the application documentation and resource consent conditions the resource consent conditions below shall prevail.

Notification Requirements

10. Following confirmation of the Sustainable Gravel Allocation for the upcoming year of 1 January to 31 December, the Consent Holder shall notify the following parties of proposed gravel extraction areas ten working days prior to extraction operations commencing:

    a) the Manager Compliance;

    b) Te Taiwhenua o Heretaunga;

    c) Ngāti Kahungunu Iwi Inc;

    d) the Heretaunga Tamatea Settlement Trust; and

    e) the Hawkes Bay Fish and Game Council.

    The notification shall include an invitation to attend a site visit to discuss the proposed works, scope of activities and proposed methods to avoid adverse effects.

    Advice Note: the Sustainable Gravel Allocation is calculated in accordance with Condition 68.

11. The consent holder shall notify Waka Kotahi New Zealand Transport Agency ten working days prior to any new extraction operation commencing within the area specified by the resource consent where works are proposed within 15 metres of a Waka Kotahi New Zealand Transport Agency roading structure.

Tangata Whenua Operations Management Group and Tangata Whenua Principles

12. No later than 6 months following the commencement of this consent, the consent holder shall make an invitation in writing to the Chief Executive/Te Kaihautu of Te Taiwhenua o Heretaunga, Chief Executive of the Heretaunga Tamatea Settlement Trust and to the Chief Executive of Ngāti Kahungunu Iwi Incorporated to appoint kaimahi to the Ngaruroro Gravels Tangata Whenua Group.

13. The Ngaruroro Gravels Tangata Whenua Group shall be comprised of:

    a) Up to 2 members appointed by Te Taiwhenua o Heretaunga;

    b) Up to 2 members appointed by the Heretaunga Tamatea Settlement Trust;

    c) Up to 2 members appointed by Ngāti Kahungunu Iwi Incorporated;

    d) Up to 2 members appointed by the Consent Holder;

    e) An independent facilitator; and

    f) Any additional members as agreed by consensus of the members of the groups.

14. Any of the appointing parties listed in Condition 13 (a) – (c) may at their discretion transfer their responsibilities for appointing members to the Ngaruroro Gravels Tangata Whenua Group to an alternative tangata whenua organisation. Where such a request is made, the Consent Holder shall notify the Regulatory Manager.

15. The consent holder shall invite and facilitate an annual on-site and/or office meeting (or another interval agreed with the group and advised to Council) with the Ngaruroro Gravels Tangata Whenua Group. The consent holder shall provide reasonable administrative support to facilitate these meetings. The results of the meetings shall be reported to Council Manager Compliance within a month of the meeting.

16. The objectives of the Ngaruroro Gravels Tangata Whenua Group is to ensure the following outcomes are achieved in the carrying out of consented activities:

    a) There is no further degradation of the mauri of the Ngaruroro River, and opportunities for enhancement and restoration are identified and pursued;

    b) Mahinga kai are protected;

    c) Impacts on areas of cultural significance are avoided;

    d) The role of the Marae/Hapū as kaitiaki is provided for and facilitated;

    e) Te Mana o te Wai;

    f) Tikanga Māori is adhered to;

    g) The extraction of gravel as an essential maintenance activity for flood control schemes is enabled for the benefit of the wider community in the context of consideration of alternative approaches to river management.

17. The purpose of the Ngaruroro Gravels Tangata Whenua Group is to provide input into the way in which the consented activities authorised by this consent are undertaken, as follows:

    a) Reviewing and endorsing the Mauri Enhancement Plan required by Condition 58 and the Mātauranga Monitoring Plan required by Condition 54.

    b) Providing oversight of the FEMEP implementation and review process including selecting the experts engaged to undertake the review report required by Condition 72, consultation on the draft findings of that report and input into the avoidance, remediation and mitigation measures proposed as result of those findings.

    c) Providing oversight of the gravel extraction activities authorised by this consent.

    d) Ensuring that areas of cultural significance are appropriately identified with the consent holder for the purposes of managing extraction activity to avoid effects on those areas (including establishing appropriate buffers) as identified in **Appendix A** and in addition to **Appendix A**.

    e) Enabling dialogue to address any concerns about adverse effects of the activity or other issues (including impacts on cultural or customary practices) that arise during the exercise of consent.

    f) Providing non-binding and informal feedback to Council officers regarding Council policy relevant to riverbed gravel management, including any consideration of proposed changes to the Regional Resource Management Plan or Regional Coastal Environment Plan.

    g) Investigating alternative gravel management approaches to minimise adverse effects on the environment and enhance the environment (including any effects on groundwater, Heretaunga Plains Aquifer / Muriwaihou Recharge Area) and cultural values (including mauri and mahinga kai).

    h) Supporting the development and implementation of the induction process required by Condition 22 and attending the induction (if required).

    i) Evaluating information produced from the conditions of this consent, including from any monitoring and reporting required by the conditions.

    j) Identifying and discussing opportunities to integrate tikanga Māori into the extraction of gravel authorised by this consent and to recommend changes to gravel management practices or to the conditions of this consent, where those changes would reduce any adverse effects, including any effects identified by monitoring.

    k) Identifying and discussing external influences over the management of gravel extraction for flood control purposes, such as national and regional policy changes, climate change, research outcomes and changes within the catchment.

l) Considering implications for costs and affordability to the wider community from the extraction of gravel as an ongoing maintenance requirement for flood control schemes.

m) Reviewing the appropriateness of proposed and future access paths and being involved in the access path process.

n) Reviewing the appropriateness of restrictions on consented activities during fish spawning seasons in relation to the changing seasonality of actual spawning.

o) Identifying and discussing opportunities for enhancing recreational enjoyment of the river and mahinga kai.

p) Confirming tangata whenua expert(s) to undertake Cultural Aspiration Reports/Cultural Impact Assessments if/as required and commissioning and directing site specific CIAs if/as required.

q) Investigating opportunities to appoint a tangata whenua awa warden to assist in the implementation of this consent.

18. Members of the Ngaruroro Gravels Tangata Whenua Group shall be paid a meeting fee in accordance with the Hawke's Bay Regional Council's current meeting fee policies.

Operational Requirements

19. Gravel extraction activities shall generally only occur during the hours 7:00 AM to 7:00 PM Monday to Friday and 8:00 AM to 4:00 PM Saturday. No gravel extraction activities shall occur on Sundays and Public Holidays.

20. In the exercise of this Consent, the Consent Holder shall avoid causing any significant adverse effects on:

    a) Mahinga kai

    b) Waahi tapu and sites of significance to tangata whenua identified in Appendix A or as identified by the Ngaruroro Gravels Tangata Whenua Groups.

    c) Freshwater quality

    d) Freshwater ecology

    e) Terrestrial ecology; and

    shall recognise and provide for the need to protect the integrity of the aquifer recharge systems within the catchments.

21. The consent holder shall ensure that any contractors engaged to undertake work authorised by this consent abide by the conditions of this consent. A copy of the consent conditions shall be included with any authorisation issued to contractors by the consent holder.

22. The Consent Holder shall ensure that all works authorised by this consent are undertaken by parties who have taken part in an induction process which includes:

    a) All conditions of this consent including the areas where gravel extraction can occur

    b) Sites of cultural significance that are to be protected and avoided

    c) Sites of ecological significance that are to be protected and avoided

    d) Mauri enhancement initiatives as set out in the Mauri Enhancement Plan

    e) Te Mana o Te Wai as defined in the NPSFM (2020)

    f) All OMP requirements

g) Health and safety risks and requirements

h) People undertaking gravel extraction should make themselves aware of the current health of the awa, and of the requirement to avoid, remedy, or mitigate the impact of their activities on the awa and the aquatic life it supports.

23. The Consent Holder shall take all reasonable efforts to avoid causing significant adverse effects on registered water takes, drinking water supplies and Source Water Risk Management Areas / Protection Zones within the active river channel.

24. All machinery, equipment and material shall be stored above the maximum anticipated flood level at the end of each working day, or whenever the site is to be left unattended.

25. Gravel stockpiling within the active river channel shall only occur temporarily, while extraction is occurring in the immediate area.

26. No refuelling of machinery shall occur within 20 m of the active river channel. No fuel shall be stored within 30 m of the active river channel.

27. The consent holder shall ensure that the site is restored on completion of the gravel extraction operation as follows:

    a) Gravel heaped up during the process of removal shall be spread out by the consent holder on completion of the gravel extraction operation.

    b) Consent holder shall remove all plant, machinery, equipment, signs and other structures associated with the operation from the riverbed immediately on completion of operations.

    c) No reject, surplus or unused gravel from a gravel processing plant is to be deposited into or onto the active river channel.

    d) All disturbed areas shall be reinstated as far as is practical to minimise the release of sediment to flowing waters and to maintain the natural character of the river system.

28. The consent holder shall only use authorised access paths for access to the river for gravel extraction activities as far as reasonably practicable.

29. The consent holder shall take all reasonable measures to avoid damage to riverbanks or river protection works in the undertaking of works authorised under this consent. Where any damage does occur, it shall be immediately repaired to the relevant management plans, guidelines and standards.

30. No extraction activity under this consent shall take place within 100m of any wetland that meets the definition of a natural wetland under the National Policy Statement for Freshwater Management 2020.

    Advice Note: **Appendix A** identifies wetlands mapped by the Council.

31. No extraction activity under this consent shall take place within 15m of the following bridge structures (including piers, abutments, retaining and all built structures that form part of the bridge) when gravel levels are below the stated levels:

Bridge / Structure	*Location Easting*	*Northing*	*Design Bed Level of piers in water*

Ngaruroro River Bridge, State Highway 50	1922994	5611507	*90.16' lowest BL around pier*
Ngaruroro River Bridge, State Highway 51	1936930	5613065	*100' lowest BL around pier*
Ngaruroro River Bridge, State Highway 2	1930495	5610312	*Varies, see dwg 3/110/7/7304*
Clive River Bridge, State Highway 51	1936305	5611429	*14.66' av of lowest BL around piers*

32. The consent holder shall immediately notify the asset owner and repair any damage caused by the exercise of this consent to any banks, access roads, bridges, culverts, roading structures, fences, gates, protection or other works relating to the control of the river. The cost of such repair shall be met by the consent holder.

    Advice Note: For the avoidance of doubt this condition relates to damage caused to physical assets by the gravel extraction process, and not damage caused by the physical river processes that continually change the geomorphology and river alignment.

33. The consent holder shall immediately repair any damage to recreational access to the river through public land caused as a result of extraction activity authorised by this consent.

34. The consent holder shall take all practicable steps to avoid causing a release of sediment into the actively flowing channel.

35. Should the gravel extraction operation result in increased turbidity of the actively flowing channel, the consent holder shall take all practicable steps, including any actions directed by a Compliance Officer of the Council, to remedy the turbidity. The consent holder shall in particular avoid causing turbidity within waterways during the fish-spawning period of May-October.

36. Machinery shall be kept out of water to the extent possible. Where this is unavoidable all measures shall be taken to minimise bed disturbance and release of sediment (e.g. using only one crossing point, typically upstream of riffles, sediment control or minimisation measures).

37. Crossing of the active river channel by machinery shall be avoided where practicable during the fish spawning months of May to October.

38. Crossing of the active river channel by machinery shall avoid side-braids and braids near or within shallow riffle habitat as much as is practicable.

39. Dust control methods shall be used to mitigate potential dust effects where dust from works may otherwise reach residential dwellings.

40. The consent holder shall ensure that gravel extraction activities do not spread any plant pests (such as Chilean needle grass, privet and yellow bristle grass) listed under sustained control programmes in the Regional Pest Management Plan 2018-2038 (2019, HBRC Publication No. 5030) to other properties and undertake all gravel extraction activities in general accordance with Section 5.3 of the Regional Pest Management Plan.

41. Gravel shall not be extracted below standing water level and gravel extraction shall generally be managed to provide for an approximately 300mm buffer above the standing water level.

42. The consent holder shall maintain a minimum one-metre-wide barrier between the active channel and excavation site to reduce the potential for an increase in turbidity in the river. The barrier is to be opened at the downstream end (to avoid fish stranding) upon completion of work.

43. If kōiwi tangata (human remains), taonga or archaeological sites are discovered during the undertaking of works authorised by the consent, the Consent Holder shall cease work immediately and contact relevant mana whenua and the Ngaruroro Gravels Tangata Whenua Group, Heritage New Zealand - Pouhere Taonga and HBRC (Manager Compliance) and, in the case that the discovery includes or may include kōiwi tangata, the New Zealand Police Ngā Pirihimana o Aotearoa. Works shall not recommence until:

    a) a site inspection is carried out by those parties should they consider it necessary;

    b) appropriate cultural procedures and tikanga have been undertaken as required by mana whenua;

    c) any other reasonable requests made by mana whenua in respect of the discovery are complied with;

    d) the site has been recorded appropriately;

    e) if required for works to continue as determined by Heritage New Zealand, an archaeological authority has been obtained under the Heritage New Zealand Pouhere Taonga Act 2014;

    f) any other appropriate action has been carried out as determined by Heritage New Zealand or the New Zealand Police; and

    g) approval to continue work is given by HBRC (Manager Compliance).

Management Plans

<u>Certification process</u>

44. For all management plans listed below, the Consent Holder shall provide at least 10 working days' notice to the Council (Manager Compliance) of their intention to submit an item for certification.

45. The Council shall be advised by a suitably qualified and experienced expert(s).

46. The costs of the certification process and expert advice shall be borne by the Consent Holder.

47. The Council shall use best endeavours to provide a decision on certification within 30 working days of having been supplied with the item to be certified and shall provide written reasons if certification is withheld (which reasons must relate directly to the purpose, scope and requirements of the item as prescribed by the relevant Resource Consent condition(s)).

48. If the Council refuses to certify the item, the Consent Holder shall revise the item to address the reasons for certification having been withheld and resubmit a revised item to the Council for certification as soon as practicable, and no later than three months after receiving notification from the Council that it refused to certify the item.

49. The consent holder may update management plans to reflect improvements in practice and/or new information. Where any such changes are proposed, the Consent Holder shall submit an updated management plan to the Manager Compliance for certification. The updated management plan shall take effect upon written confirmation from the Manager Compliance.

50. The certification of the revised item shall follow the process set out above.

Operational Management Plan

51. The Consent Holder shall prepare an Operational Management Plan (OMP) in accordance with best practice guidelines. The purpose of the OMP is to set out the practices and procedures to be followed by the Consent Holder and those extracting gravel under this resource consent to ensure that:
    a) Extraction activities are undertaken in compliance with the conditions of this resource consent.
    b) Extraction activities are managed to avoid significant adverse effects on:
        i. Mahinga kai
        ii. Waahi tapu and sites of significance to tangata whenua identified in Appendix A or as identified by the Ngaruroro Gravels Tangata Whenua Group.
        iii. Freshwater quality
        iv. Freshwater ecology
        v. Terrestrial ecology
    c) The mauri of the river is enhanced.

52. Matters to be addressed in the OMP shall include, but not be limited to:
    a) Mitigation measures to ensure that extraction activities are managed to avoid significant adverse effects on:
        I. Mahinga kai
        II. Waahi tapu and sites of significance to tangata whenua identified in Appendix A or as identified by the Ngaruroro Gravels Tangata Whenua Group.
        III. Freshwater quality
        IV. Freshwater ecology
        V. Terrestrial ecology
    b) Consented activities and scope of the management plan
    c) Details of consent holder governance and key contact details
    d) Mauri enhancement requirements
    e) The key requirements that must be adhered to as set out in companion management plans and all managements plans referenced in this consent including but not limited to:
        I. Environmental Code of Practice for River Control and Waterway Works 2017 (HBRC Report No. 3256 – AM 04/15)
        II. 'Ngaruroro River Flood Protection and Drainage Scheme Ecological Management and Enhancement Plan' March 2011 (HBRC Plan 4276) (NEMEP)
        III. Mauri Enhancement Plan
    f) Details on pre-extraction requirements for avian surveys, sustainable gravel allocation, authorisation process and induction process for extractors
    g) Operational requirements including general use of machinery, gravel extraction procedures, river and stream crossings and site restoration requirements

h) Monitoring and reporting requirements

i) Spills and contaminant reporting

j) Notification protocols

k) Review protocols

l) Complaints management

m) Warning signs and public safety:

I. warning signs must be erected adjacent to the site of extraction where, as a result of the extraction, the stretch of river is, has or is likely to become, dangerous to the public;

II. at the conclusion of the operation the area will be made safe for public access;

III. signs must be then removed once the area is made safe for public access.

53. The Consent Holder shall implement the OMP as certified through the certification process. A review of the OMP shall be undertaken at least five yearly or following any significant changes to operations or best practice.

Mātauranga Māori Monitoring and Mauri Enhancement Plan

54. The consent holder shall engage suitably experienced tangata whenua, as selected by the Ngaruroro Gravels Tangata Whenua Group, to prepare a Mātauranga Māori Monitoring Plan (MMMP).

55. The MMMP shall be submitted to the Council (Manager Compliance) within 30 months from commencement of consent.

56. The reasonable costs of preparing the MMMP shall be met by the consent holder.

57. The MMMP shall include but not be limited to:

a) Proposed monitoring methods in accordance with relevant and/or established tangata whenua mātauranga Māori guidelines (if applicable)
b) Maps and details of locations of monitoring sites
c) Programme and frequency

58. The Consent Holder shall engage suitably experienced tangata whenua, as selected by the Ngaruroro Gravels Tangata Whenua Group, to prepare a Mauri Enhancement Plan ("MEP") within five years of the commencement of this consent.

59. The reasonable costs of preparing the MEP shall be met by the consent holder.

60. The purpose of the MEP is to set out methods, including projects and any operational improvements that the Consent Holder will undertake, to enhance the mauri of the rivers where gravel extraction is occurring under this consent.

Spill Management Plan

61. To ensure worksite spills are avoided and otherwise managed appropriately, the consent holder shall ensure that a **Spill Management Plan** (SMP) is in place and is appropriate for the activities being undertaken on each gravel extraction site. The SMP must:

a) Include procedures for preventing contaminants such as hydrocarbons or chemicals entering any waterbody in the event of a spill

b) Be prepared by a suitably qualified person

c) Be provided to the Council prior to commencement of the works.

62. The consent holder shall ensure that all works are undertaken in accordance with the SMP and a copy of this SMP must be present on site at all times while the work is being undertaken.

Monitoring Requirements

63. The Consent Holder shall implement the Freshwater Ecological Monitoring and Evaluation Plan ("FEMEP") and attached as Appendix B to these conditions.

64. Within 6 months of the completion of the three-year monitoring programme outlined in the FEMEP, a review report shall be prepared by independent appropriately experienced and qualified experts in freshwater ecology and fluvial geomorphology and submitted to the Council (Manager Compliance). The review report shall, at a minimum:

a) Provide the results of monitoring undertaken in accordance with the FEMEP.

b) Provide an analysis and interpretation of those results.

c) Recommend mitigation options if adverse ecological effects have been identified in relation to the activities authorised under this consent.

d) Identify the means of measuring the effectiveness of proposed measures and responses under 64c).

e) Recommend further monitoring programmes if adverse effects are possible, but not clearly attributable to the activities authorised under this consent from the data available.

f) Recommend discontinuation of aspects of the FEMEP if it is clear that no adverse effects are occurring.

g) Provide recommendations for enhancement initiatives to be incorporated into updates of the NEMEP and OMP.

65. The consent holder shall maintain an accurate and accessible monthly record of the locations and volumes of gravel taken under this consent. All quantities are to be based on loose measure and rounded to the nearest cubic metre. These records shall be made available to the Manager Compliance (Council) upon request.

66. Bed level cross section surveys shall be undertaken within 12 months of the commencement of this consent and at least every three years thereafter, at the established benchmarks illustrated in the plan attached as **Appendix A**.

67. Riverbed gravel particle size monitoring surveys shall be undertaken within 12 months of the commencement of this consent and at least every six years thereafter, at the established benchmarks that represent the extraction reach illustrated in the plan attached as **Appendix A.**

Reporting and Review Requirements

68. Based on the survey results of Conditions 66 and 67, an Annual Gravel Status Report shall be submitted to the Manager Compliance by the end of June each year for approval by the Manager Compliance in a technical authorisation capacity. The report shall address but not be limited to:

a) Calculation and comparison of mean bed levels and reach volumes between cross sections and between annual surveys.

b) Comparison of mean bed levels and reach volumes with bed level design grade lines.

c) Based on (a) and (b), an assessment of the Sustainable Gravel Allocation (cubic metres per year [loose measure]) for the upcoming year of 1 January to 31 December.

d) Coastal gravel supply volume estimates (m^3/year), coastal gravel erosion effects assessment and recommended coastal erosion mitigation measures (if required).

69. The Annual Gravel Status Report required by Condition 68, once approved by the Manager Compliance, shall be provided to the Manager – System Management at the New Zealand Transport Agency, Te Taiwhenua o Heretaunga and Ngāti Kahungunu Iwi Inc.

70. The consent holder shall maintain a log of all complaints received directly from the public. The log shall be maintained in accordance with the relevant provisions of the OMP.

71. The consent holder shall prepare an annual report and provide it to the Council (Manager Compliance) before 31 October each year. The annual report shall include, but not be limited to:

a) A tabulated assessment of all consent conditions

b) A summary of all results of monitoring

c) A description of any potential and actual effects that have been identified and how the effects were mitigated

d) Commentary on any complaints and how these were managed and closed out

e) Recommendations for improvements

f) The annual report shall be for the period beginning July and ending June of the following year.

72. Five years following commencement of this consent and every five years thereafter, the consent holder shall submit a report (to Council) undertaken by an independent appropriately experienced and qualified person(s) approved by the Manager Compliance. The report shall review and include:

a) Any new relevant regulations, research, investigations or other material.

b) The results of monitoring undertaking under this permit.

c) Whether any effects have been identified as a result of activities authorised by this permit that are more significant than expected.

d) Discussions and agreed minutes with the Ngaruroro Gravels Tangata Whenua Group.

e) Recommendations including any practices or activities that should be avoided or modified to reduce any adverse effects on the environment (in particular groundwater), climate change and cultural and Tangata Whenua values.

73. Where, for any cause (accidental or otherwise), contaminants associated with the consent holder's operations escape to water other than in conformity with the consent, the consent holder shall:

a) Immediately take all practicable steps to contain and then remove the contamination from the environment, and

b) Immediately notify the Council of the escape, and

c) Report to the Council, in writing and within 7 days, describing the manner and cause of the escape and steps taken to control it and prevent its reoccurrence.

74. The Council may review conditions of this consent pursuant to sections 128, 129, 130, 131 and 132 of the RMA. The actual and reasonable costs of any review undertaken will be charged to the consent holder, in accordance with section 36 of the RMA. Times of service of notice of any review: During the month of May, of any year. Purposes of review include:

    a) To deal with any adverse effect on the environment and cultural values (including mauri and mahinga kai) which may arise from the exercise of this consent, which it is appropriate to deal with at that time, or which became evident after the date of issue.

    b) To require the adoption of the best practicable option to remove or reduce any adverse effects on the environment and cultural values (including mauri and mahinga kai).

    c) To take into account the results from monitoring (including cultural monitoring) modify any monitoring programme, or to require additional monitoring if there is evidence that current monitoring requirements are inappropriate or inadequate to address adverse effects of the consented activities.

    d) To deal with findings of the monitoring programmes undertaken in accordance with this consent.

    e) To address any matters raised in the reports prepared under Conditions 71 and 72.

    f) To address any relevant matters required under the Climate Change Response (Zero Carbon) Amendment Act 2019 such as the emissions reduction plan.

ADVICE NOTES

i. An officer of the Council shall have the right, during business hours, of access to the site of extraction and to the books and documents relating to the extraction of gravel authorised by this consent and kept by the holder in order to check the accuracy of the returns made to the Council.

ii. The consent does not of itself confer any right of access over private and/or public property. Arrangements for access must be made between the consent holder and the property owner (including land under the control of the HBRC).

iii. Where the consent holder requires access across river berm areas held by Council under the Reserves Act (or any other relevant Act) and leased to a third party, the consent holder must negotiate access across that land with the lessee.

iv. The consent does not confer any exclusive right of occupation over the area allotted to the holder.

v. All information required by all conditions can be provided to the Council by email to ComplianceReturns@hbrc.govt.nz

MONITORING NOTE

Routine monitoring

Routine monitoring inspections will be undertaken by Council officers on at least one occasion each year during and/or after gravel extraction works. The costs of **any** routine monitoring will be charged to the consent holder in accordance with the Council's Annual Plan of the time.

Non-Routine monitoring

"Non routine" monitoring will be undertaken if there is cause to consider (e.g. following a complaint from the public, or routine monitoring) that the consent holder is in breach of the conditions of this consent. The cost of non-routine monitoring will be charged to the consent holder in the event that non-compliance with conditions is determined, or if the consent holder is deemed not to be fulfilling the obligations specified in section 17(1) of the RMA shown below.

Section 17(1) of the RMA states:

Every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of the person, whether or not the activity is carried on in accordance with

a) any of sections 10, 10A, 10B, and 20A; or

b) a national environmental standard, a rule, a resource consent, or a designation.

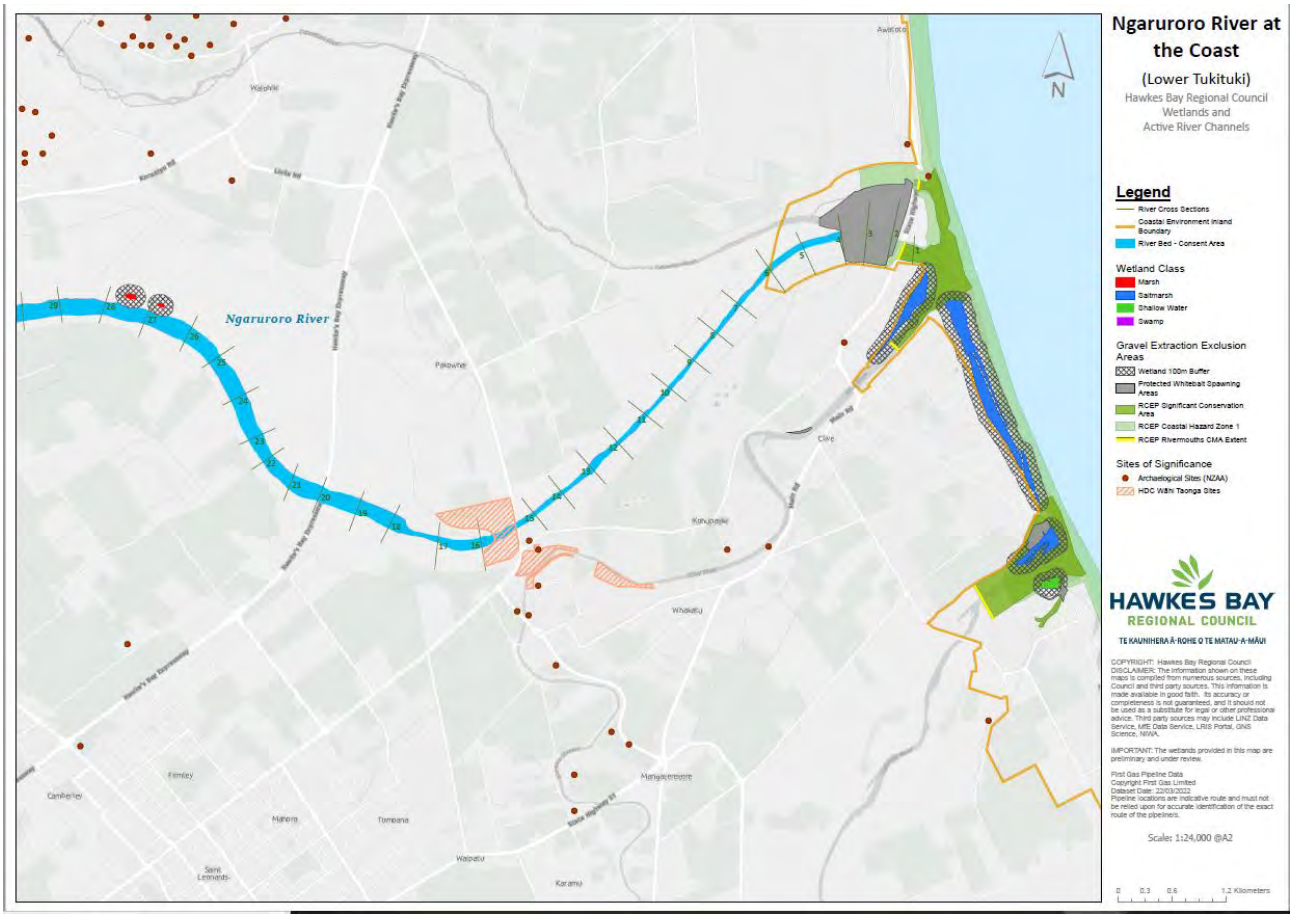
Debt Recovery

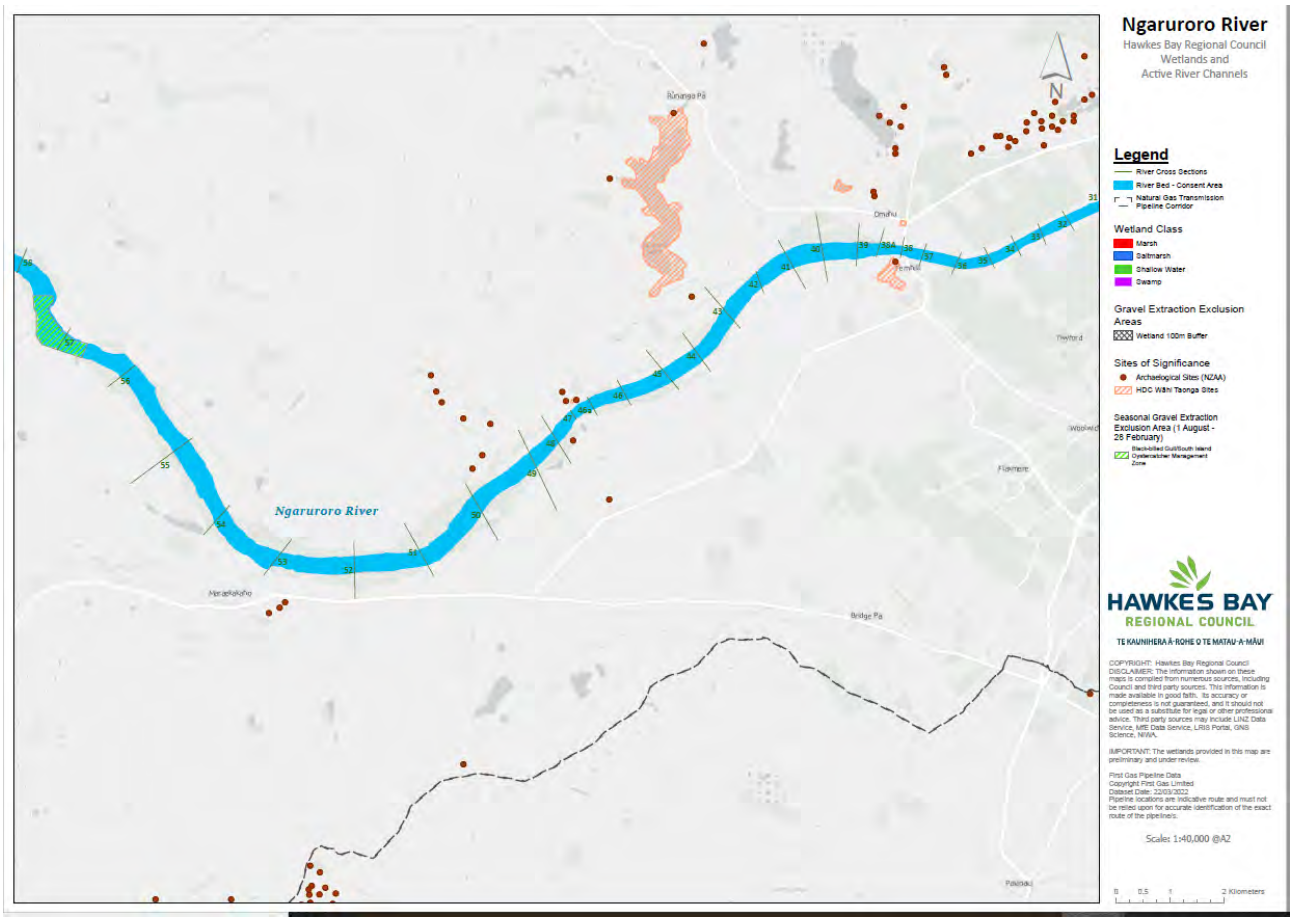
It is agreed by the consent holder that it is a term of the granting of this resource consent that all costs incurred by the Council for, and incidental to, the collection of any debt relating to this resource consent, whether as an individual or as a member of a group, and charged under section 36 of the RMA, shall be borne by the consent holder as a debt due to the Council, and for that purpose the Council reserves the right to produce this document in support of any claim for recovery.

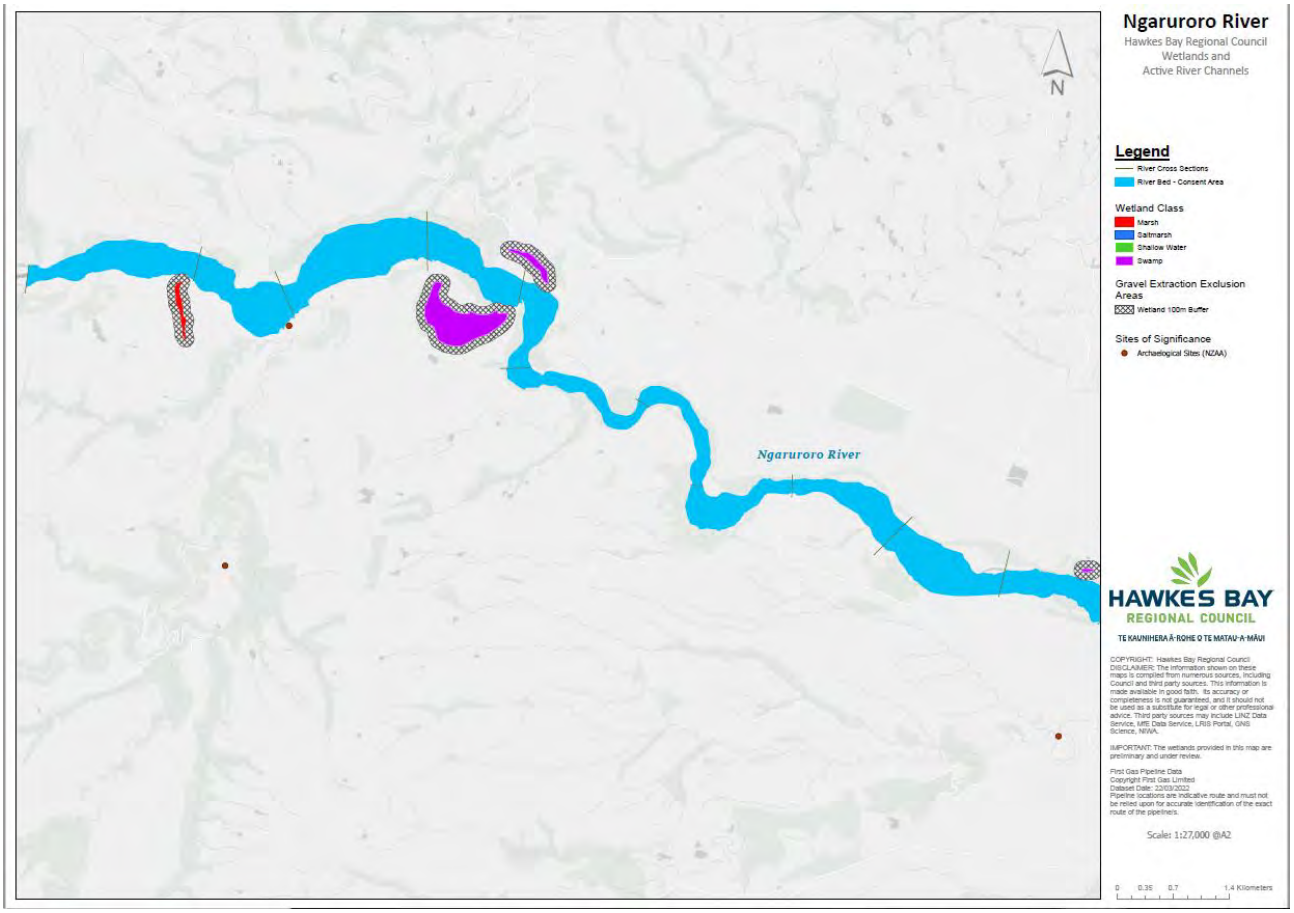
Consent History

Consent No. (Version)	**Date**	**Event**	**Relevant Rule Number**	**Plan**
AUTH-123467-01 and AUTH-123469-01	05/07/2022	Consent initially granted	74 61	Regional Resource Management Plan (28 August 2006) Hawke's Bay Regional Coastal Environmental Plan (8 November 2014)
AUTH-123467-01 and AUTH-123469-01	04/08/2022	Minor corrections	S133	RMA 1991

Appendix A
Plan of Gravel Extraction Areas and Cross Section Locations




Ngaruroro River
Hawkes Bay Regional Council
Wetlands and
Active River Channels
Legend
River Cross Sections
River Bed - Consent Area
Natural Gas Transmission Pipeline Corridor
Wetland Class
Marsh
Saltmarsh
Shallow Water
Swamp
Gravel Extraction Exclusion Areas
Wetland 100m Buffer
Sites of Significance
Archaeological Sites (NZAA)
HDC Wāhi Taonga Sites
Seasonal Gravel Extraction Exclusion Area (1 August - 28 February)
Black-billed Gull/South Island Oystercatcher Management Zone
Ngaruroro River
Rūnanga Pā
Omahu
Twyford
Flaxmere
Bridge Pa
Poraiti
N
HAWKES BAY
REGIONAL COUNCIL
TE KAUNIHERA Ā-ROHE O TE MATAU-A-MĀUI
Scales 1:40,000 @A2
2 Kilometers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Ngaruroro River
N
HAWKES BAY
REGIONAL COUNCIL
TE KAUNIHERA Ā-ROHE O TE MATAU-A-MĀUI
Scale: 1:27,000 @A2
1.4 Kilometers

Appendix B
Freshwater Ecological Monitoring and Evaluation Plan

CAWTHRON

REPORT NO. 3751

FRESHWATER ENVIRONMENTAL MONITORING AND EVALUATION PLAN FOR GRAVEL EXTRACTION IN THE TUKITUKI, NGARURORO, AND TUTAEKURI RIVERS

FRESHWATER ENVIRONMENTAL MONITORING AND EVALUATION PLAN FOR GRAVEL EXTRACTION IN THE TUKITUKI, NGARURORO, AND TUTAEKURI RIVERS

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EXECUTIVE SUMMARY

This report details an adaptive, phased approach to assessing the ecological effects of gravel extraction activities in the braided rivers of the Heretaunga Plains. These include the Ngaruroro, Tukituki and Tutaekuri river catchments (hereafter the three rivers). This Freshwater Ecological Monitoring and Evaluation Plan (FEMEP) includes five ecological assessment modules;

1. **Channel form.** LiDAR, aerial / satellite imagery at selected sites.
2. **Suspended sediment.** Sampled during gravel extraction and following side-braid crossings at evaluation reaches.
3. **Deposited sediment and periphyton**. Assessed at multiple evaluation reaches and at a long-term monitoring reach during gravel extraction for at least three years.
4. **Macroinvertebrates**. Sampled annually at a long-term monitoring reach during gravel extraction for at least three years.
5. **Fish stranding**. Assessed at a single evaluation reach in each river (three reaches in total) following at least one high flood or fresh event.

Because of the large areas of river habitat within the Heretaunga Plains gravel management area, the FEMEP proposes carrying out geomorphological investigations (module 1) through desktop analyses of annual LiDAR surveys (and other remote sensing data), rather than using field-based surveys. Meanwhile, the instream ecological components of the FEMEP (modules 2–5) will focus most effort on reach-specific evaluation studies. Once enough ecological evaluations of gravel extraction activities are undertaken, observed ecological effects can be inferred to occur in gravel extraction areas where data are absent.

The FEMEP recommends geomorphological assessments in three river segments (module 1) and reach-scale evaluations (modules 2–5) in (at least) three gravel extraction areas in each of the three rivers (nine evaluation studies in total); long-term monitoring is suggested at a single site that is subjected to relatively intensive and ongoing gravel extraction activities. All nine evaluation studies should be completed within three years, followed by a review of the results. We recommend long-term monitoring occurs for at least three years.

The three-year review process should be undertaken by an appropriately qualified freshwater ecologist and fluvial geomorphologist. The aim of the review process is to:

1. recommend that mitigation options are instigated if adverse ecological effects are clear,
2. recommend further data collection if adverse effects are possible but not clearly attributable to gravel extraction or,
3. discontinuation of aspects of the FEMEP if it is clear that no adverse effects are occurring.

To aid the FEMEP review process, we provide a set of guideline ecological threshold values that (if exceeded) would indicate that adverse effects are occurring. Threshold values are based on Hawke's Bay Regional Resource Management Plan documents and the National Policy Statement for Freshwater Management 2020.

A suggested timetable of data collection tasks for the first three years of the FEMEP is provided below in the summary table. It should be noted there is some flexibility within this schedule for the evaluation study components. For example, it is not a requirement that three ecological evaluations are completed each year, as long as nine are competed before the review phase. It is anticipated that the following data will be available for review after three years:

1. suspended sediment, deposited sediment and periphyton data from 9 river reaches (three reaches in each of the three catchments)
2. three assessments of potential fish stranding events
3. three years of (annual) macroinvertebrate, deposited sediment and periphyton data from one long-term monitoring reach
4. three LiDAR surveys of a river segment affected by gravel extraction in each of the three rivers.

Summary Table. Suggested timetable for monitoring tasks over the next three years following implementation of the FEMEP.

	Field evaluation of: suspended sediment, deposited sediment and periphyton	**Field evaluation of fish stranding**	**Long-term Monitoring: macroinvertebrates, deposited sediment, periphyton**	**LiDAR survey flights**
Year 1	Three reaches sampled once (for all attributes) during mid-late summer	One reach assessed	One reach (fixed-location) sampled once during mid-late summer	One flight of three river segments, one segment per catchment
Year 2	Three reaches sampled once (for all attributes) during mid-late summer	One reach assessed	One reach (fixed-location) sampled once during mid-late summer	One flight of three river segments, one segment per catchment
Year 3	Three reaches sampled once during mid-late summer	One reach assessed	One reach (fixed-location) sampled once during mid-late summer	One flight of three river segments, one segment per catchment

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1. INTRODUCTION

Within this report, we detail a Freshwater Environmental Monitoring and Evaluation Plan (FEMEP) for gravel extraction activities in the braided rivers of the Heretaunga Plains. These include the Ngaruroro, Tukituki and Tutaekuri river catchments (hereafter 'the three rivers'). The monitoring plan assesses instream attributes including fine sediment (entrained and deposited), periphyton, macroinvertebrates and fish. In addition, we prescribe monitoring activities for potential wider-scale, fluvial geomorphological effects that have the potential to influence instream ecology through changes to the river habitat template.

This FEMEP is a component of the management plan proposed by the Hawke's Bay Regional Council's (HBRC) Regional Assets Section (the Applicant), as part of a post-hearing process for resource consent applications APP-123534, APP-123548, APP-123526, APP-123550, APP-123535 & APP-123536. When implemented, this FEMEP will provided the basis for triggering mitigation options to avoid potential adverse instream ecological effects if required.

1.1. Gravel extraction practices

HBRC is responsible for maintaining flood protection infrastructure throughout the major braided river systems in the Gravel Management Area (GMA) that includes the three rivers (Figure 1). To maintain flood protection infrastructure, HBRC undertakes targeted gravel extraction at multiple sites within the GMA. Gravel extraction counteracts sediment aggradation in the river channels that would otherwise reduce channel capacity and increase the risk of flooding. Beach raking is also undertaken to encourage gravel to move through the river channels. However, this practice is not being considered as part of the current consenting process. Therefore, monitoring and evaluation of beach raking activities are not explicitly considered within this FEMEP.

The HBRC extracts gravel according to their Code of Practice (Groves & Clode 2017). A summary of this and other regional gravel extraction Code of Practices (CoPs) is provided in Appendix 1.

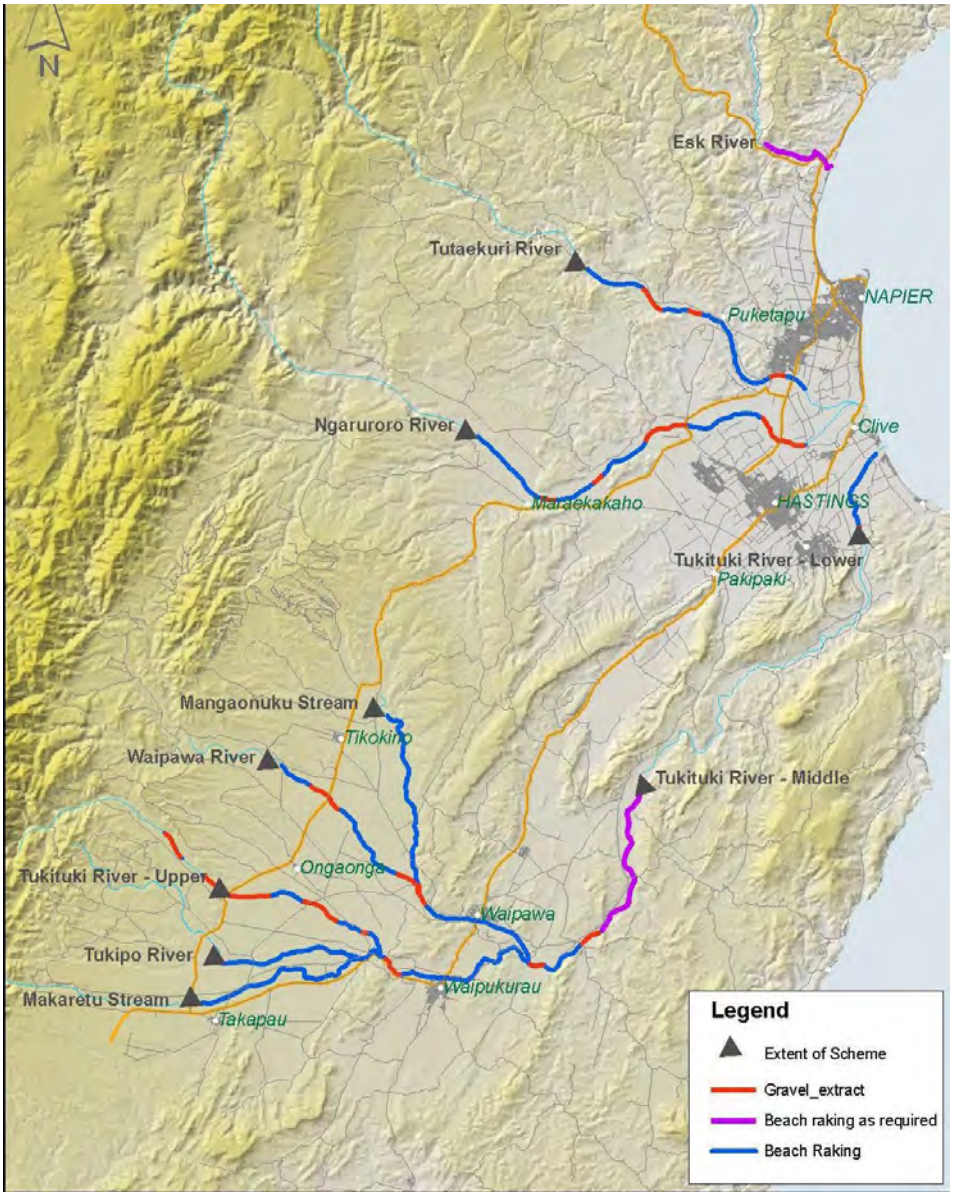

Figure 1. The management areas in the Heretaunga Plans as shown the Code of Practice for gravel extraction in the Hawke's Bay region (Groves & Clode 2017). The upper extent of the gravel management is shown by the grey triangles. Purple lines denote areas where beach raking activities occur which are not considered within this report.

1.2. Ecological values of the Heretaunga plan rivers and potential effects of gravel extraction

Gravel extraction in any river has the potential to change channel form and adversely affect instream ecology. However, HBRC does not extract gravel from within the wetted area any of the rivers. The typical practice is to remove gravel from exposed (dry) riverbeds, leaving a minimum 1 m buffer between the extraction area and the wetted river channel (Groves & Clode 2017). This buffer / restriction is important because it means that mechanical disturbance and the resuspension of fine sediment

during low flows is limited. However, in practice, a 1-m buffer may not allow much tolerance between gravel works and the wetted channel (Figure 2 and see Holmes (2017)), so there is a need to evaluate if instream ecological values are affected.

Figure 2. Aerial image captured on Google Earth in 2018 (accessed 29 October 2021) showing gravel extraction occurring in the Ngaruroro River at Roy's Hill. Note some resuspended fine sediment in the main channel downstream of the digger (top right of photo). The river flows from the bottom to the top of the photograph.

Potential ecological effects can be thought of in two broad categories:

1. 'Indirect' effects on channel morphology at the reach-to-segment-scale that can be triggered by the removal of gravel (in other words, changes in channel morphology occurring over 100s to 1000s of metres of river length). These changes can flow on to affect river ecology.
2. Direct effects on biota created by the disturbance of machinery crossing river channel side-braids or working near the flowing parts of a riverbed.

While there are some important differences between the ecosystems of the three rivers, for example, the Ngaruroro River tends to show a higher degree of braiding

than the Tukituki River, all the rivers have broadly similar catchment-scale characteristics and biota. Accordingly, our explanation of ecological values and potential impacts applies to all three of the rivers combined.

1.2.1. Potential indirect effects: Fluvial geomorphology and flow

The Heretaunga Plains rivers comprise gravel bed, braided-wandering channels that are confined laterally within valley margins or by engineering works (stopbanks and willow plantings). In the most confined settings and in their lower reaches in particular, the rivers exhibit single thread channels with alternate bars. The Ngaruroro and Tutaekuri rivers have a gravel-sand transition close (c. 3 km) to the coast, while the Tukituki continues to deliver gravel to the sea.

All three catchments are characterised by high rates of sediment delivery that result in dynamic downstream sediment regimes. The rivers exhibit significant variability in gravel flux year on year (Measures 2012), which in combination with multiple gravel extraction operations, gives rise to complex local patterns of bed level adjustment.

The potential effects of gravel extraction on the river habitat template depend on the balance between extraction rates and amounts and gravel supply. Holmes (2017) reviewed the potential effects of dry riverbed gravel mining and found they can include:

1. creation of wide, flat cross-sections in the extraction reach that reduce confinement of the low flow channel and may enhance channel instability
2. disruption of the pool-riffle sequence and pool morphology, creating longer pools and less riffle area
3. reduction in planform complexity, including a reduction in the area of side-braid channels (chutes) and high bar surfaces
4. reduced sediment transport capacity in extracting reaches due to increased width to depth ratio, which may promote channel instability
5. knickpoint development that leads to upstream headcutting and re-grading of channel slope causing local incision and bed armouring
6. bed degradation downstream of the extraction reaches resulting from a local sediment deficit
7. lowering of the water table due to bed degradation, resulting in intermittent drying or desiccation of riparian habitats (e.g. floodplain wetlands)
8. creation of depressions in gravel bars formed from extraction activities that may lead to fish stranding during recessional flows where fish are trapped in depressions without a flow path back to the main channel
9. mechanical disruption of the surface bed armour during extraction may release trapped fines, resulting in excess fine sediment deposition downstream and the loss of structured gravel beds.

It is important to consider the cumulative effects of both upstream and downstream extraction activities when interpreting the local pattern of bed level change observed in a reach. Where extraction results in a sediment deficit, a knickpoint may develop and travel upstream, steepening the bed and increasing erosion, leading to incision and coarsening of the bed material. Conversely, a local reduction in gravel supply can also propagate downstream as a wave, steepening the channel gradient and increasing the rate of erosion.

Channels subject to periodic changes in gravel supply due to both natural variation and extraction operations may therefore exhibit transient phases of aggradation followed by degradation, with concomitant changes in gradient, planform and sediment calibre (or roughness) as the morphology adjusts to the sediment supply.

Importantly, as the transport of material is dominated by large floods, the effects of changes in sediment supply may take multiple floods (and therefore years) to become apparent. In large systems, such as the Heretaunga Plains rivers, the effect of lags and long transit times may continue long after gravel extraction operations have ceased at a local site.

Bedload supply to the coast

Gravel transport in the Ngaruroro and Tutaekuri rivers stops c. 3 km from the coast due to the loss of competence arising from coastal uplift and basin subsidence associated with the 1931 Napier earthquake. The effects of extraction on the Tukituki River may, however, interrupt the supply of sediment to the coast and result in consequent effects on coastal erosion / retreat. These potential effects are outside the scope of this FEMEP.

Hydrology

The hydrology of the Heretaunga Plains rivers is dominated by their large upstream catchments that drain the Kaweka, Kaimanawa and Ruahine ranges. High rates of runoff from the steep, greywacke terrain results in flood-dominated flow regimes that also exhibit relatively long low flow periods during mid to late summer. While recharge through the rivers, is an important source of groundwater, gravel extraction has limited effect on flow rates although local riparian water levels may be affected (see above). The potential effects on groundwater are outside of scope of this FEMEP.

1.2.2. Potential direct effects

Water quality

The effects of gravel extraction on most water quality attributes (including nitrogen and phosphorus concentrations) are likely to be minimal. The exception is the potential for elevated suspended solids to occur as a result of fine sediment being resuspended during gravel extraction activities. Fine sediment, stored in the gravel matrix of the riverbed, can be resuspended during side-braid crossing, or as a result of flushing from the extraction trenches and / or pits that are dug near the main

channel. With respect to water quality attributes, this FEMEP focuses solely on assessing the occurrence of suspended fines associated with these activities.

A reduction in the visual clarity of the water, as a result of elevated suspended solids, can impede drift feeding efficiency for some fish (Grossman et al. 2002). In excessive levels, suspended sediment can directly impact the growth or survival of fishes by clogging their gills (Wood & Armitage 1997). We do not expect excessive levels of suspended fine sediment to occur as a result of gravel extraction practices, however, monitoring suspended sediment will indicate the potential for elevated *deposited* fine sediment, as the suspended sediments will settle in depositional areas downstream. Therefore, monitoring suspended sediment levels will complement deposited fine sediment assessments as part of this FEMEP.

Benthic periphyton (streambed growths)

Periphyton is the biofilm made up of algae, cyanobacteria and heterotrophic organisms (e.g. fungi) that forms on the beds of rivers and provide primary productivity to support other aspects of the foodweb. Periphyton cover and biomass in rivers reflects the balance of two opposing processes: accrual (which, simplistically, is affected by nutrient and light levels) and loss—usually occurring as a result of high flows which 'flush' periphyton from the riverbed (Biggs 2000). Gravel extraction has limited potential to affect the degree of flushing. However, increases in deposited fine sediment, as a result of gravel extraction activities, do have the potential to affect periphyton communities. Deposited fine sediment alters the nature of the streambed habitat which may favour certain algal communities such as mat forming benthic cyanobacteria (Wood et al. 2015). These potential effects would be most pronounced during summer low flow periods. This potential effect pathway means an assessment of periphyton should be a component of any gravel extraction FEMEP.

Macroinvertebrates

Macroinvertebrates are animals without backbones that can be seen with the bare eye and live in and on the streambed. They are an essential foodweb link, transferring energy from periphyton to the larger animals that live in and around the stream (such as fish and river birds). The potential for gravel extraction activities to temporarily increase deposited fine sediment on the streambed (during stable flow periods) may impact on the macroinvertebrate community by reducing the habitat quality for species that prefer low sediment environments. Anything that affects macroinvertebrates is likely to have consequences for other parts of the ecosystem.

Macroinvertebrates and macroinvertebrate community structure are widely used to assess water and habitat quality in rivers. Stream-health indices specific to New Zealand, such as the Macroinvertebrate Community Index (MCI) and its quantitative (QMCI) variant, are commonly used in biomonitoring. These indices convert macroinvertebrate community data to a single number to indicate habitat quality. Other macroinvertebrate data and indices used in stream-health reporting include:

- total macroinvertebrate density and diversity
- percent EPT (mayfly, stonefly and caddis fly) abundance
- percent EPT taxa
- EPT taxon richness.

Collecting macroinvertebrate community data around the gravel extraction sites to calculate these indices will help determine any ecosystem effects of gravel extraction.

Native fish and fisheries

The rivers of the Heretaunga Plains have relatively diverse fish assemblages, with few introduced pest species. Hughey et al. (2012) identified all three of the major rivers in the GMA as 'nationally significant' native fish habitats. In total, 21 fish species have been recorded of which 17 are native. Excluding the estuarine species (e.g. yellow-eyed mullet and the estuarine triplefin), 15 native freshwater fish have been recorded in the three catchments (Appendix 2). Six of the fish species present in the rivers are listed by Dunn et al. (2017) as being 'At Risk, Declining', with lamprey having the higher conservation threat ranking of 'Nationally Vulnerable'.

All the rivers also support regionally significant trout fisheries (for brown and rainbow trout)—with the Tukituki being the most popular of the three fisheries (Unwin 2009). Important mahinga kai species also occur within the rivers. These include longfin and shortfin eel, which are spread throughout catchments. In the lower rivers, juvenile īnanga and kōaro (which together constitute the majority of the whitebait catch) occur, as well as black flounder and smelt. A variety of other mahinga kai species can be found in the estuarine area (such as flounder, yellow-eyed mullet and kahawai).

There is potential for gravel extraction activities to affect fish populations through geomorphological changes to the river habitat template. For example, many native fish and juvenile salmonids are found in relatively high densities within side-braid habitats of the rivers. If gravel extraction results in a reduction of side-braid habitat, then this can indirectly affect fish populations. There may also be potential effects on fish populations through changes to the foodweb as a result of increased deposited fine sediment downstream of the gravel extraction areas during stable flow periods. Finally, there is some potential for fish to become stranded in depressions left by gravel extraction following high flows that inundate these depressions before receding.

2. FRESHWATER ENVIRONMENTAL MONITORING AND EVALUATION PLAN STRUCTURE

Monitoring geomorphological change and ecological attributes over time will determine if adverse effects of gravel extraction on instream ecosystems are occurring. Alongside monitoring, *evaluating* gravel extraction activities will allow extraction to be assessed in areas that are not practical to monitor long term. We define 'evaluation' as a discrete, short-term study in a defined river reach.

This FEMEP uses an adaptive phased approach to assessing ecological effects. In Section 3.3 we propose some guideline ecological threshold values. If monitoring or evaluation studies find these values are exceeded, then this signals that there is a need for action. All data generated by the FEMEP should be reviewed by both a freshwater ecologist and a fluvial geomorphologist within three years, and again at year five (if required), following implementation. The review process will assess if adverse effects are occurring, using expert opinion and the proposed guideline threshold values. If existing data are deemed sufficient to determine that gravel extraction is causing adverse ecological effects, then mitigation options should be considered. If adverse effects are deemed possible, the review process might recommend more intensive / extensive data collection to enable cause and effect to be attributed to gravel extraction with more certainty (before recommending the need for mitigation). Alternatively, if the data gathered are deemed sufficient to determine that ecological effects are less than minor, then the FEMEP (or aspects of it) can be discontinued. The flowchart in Figure 3 provides a framework to adaptively monitor and evaluate gravel extraction in the Hawke's Bay rivers. We do not provide any guidance on what potential mitigation options might be within this document.

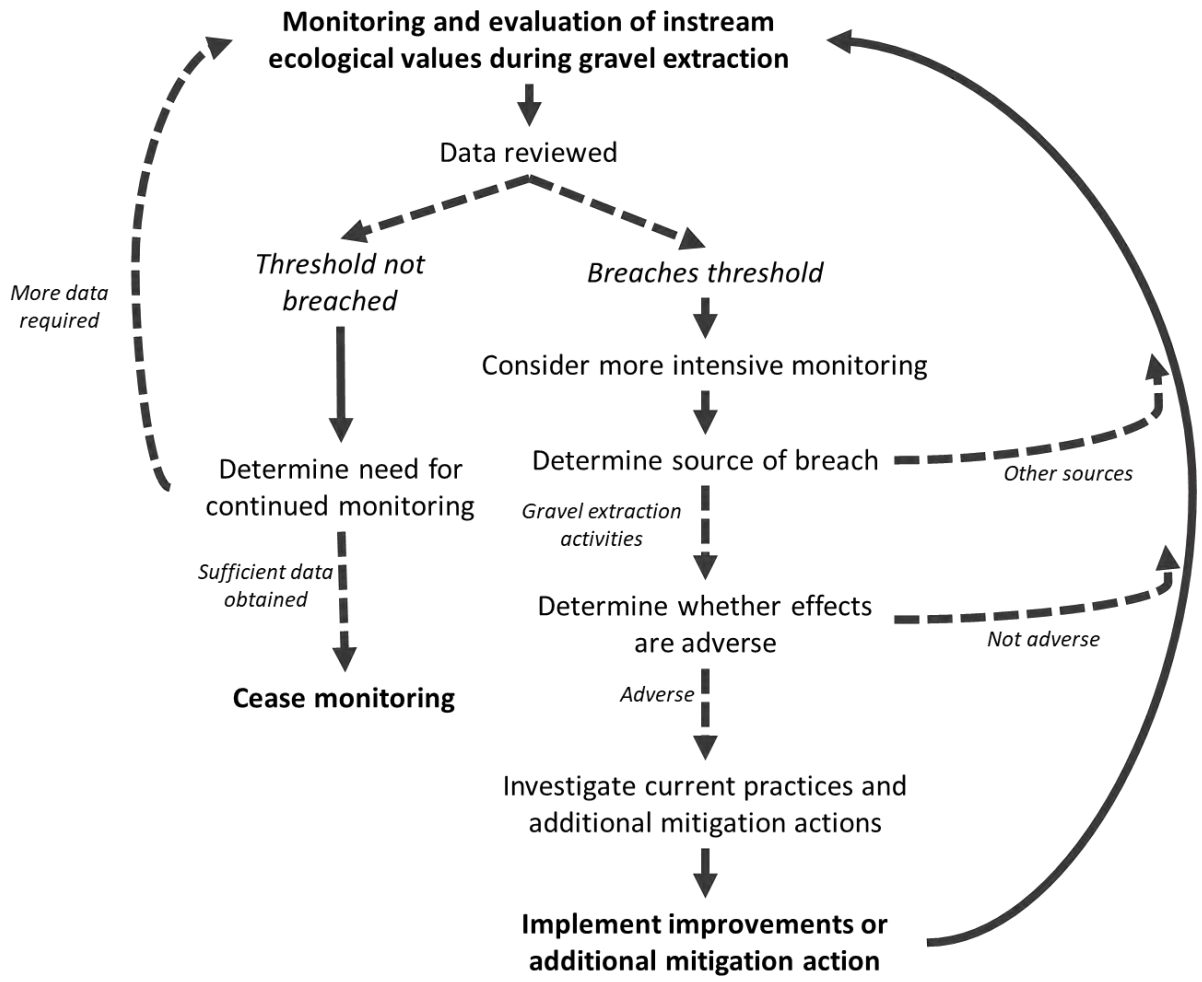

Figure 3. Workflow for this Freshwater Environmental Monitoring and Evaluation Plan. Shown are feedback loops based on the outcomes of ecological monitoring reviews that can be used to assess the need for further data collection, investigation of mitigate options or discontinuation of monitoring. We recommend data reviews at years three and five following implementation of the FEMEP (unless adverse effects are obvious after year one).

2.1. A desktop approach to assessing impacts on channel form

We propose a desktop analysis to quantify the structure, form and changes in the ecologically significant aspects of the geomorphology of the rivers within the GMA. This approach leverages high-resolution LiDAR and satellite imagery to develop a baseline model of ecologically relevant parameters, against which change over time can be quantified through a programme of annual resurveys. This methodology is applied to quantify the impacts of extraction in three 20–30 km river segments as shown in Figure 4.

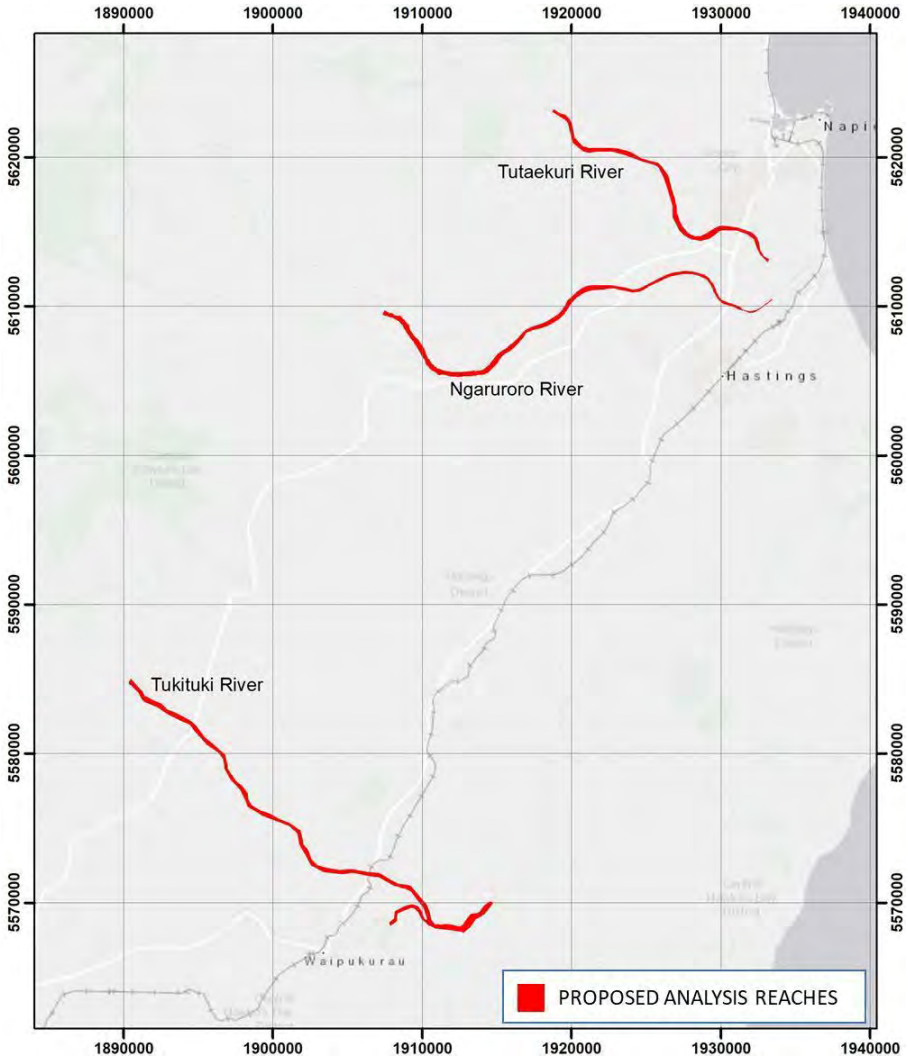

Figure 4. Proposed reaches of the Tutaekuri (20 km), Ngaruroro (32 km) and Tukituki (30 km) Rivers for desktop geomorphological analysis. The extents are coincident with LiDAR capture over the GMA in 2016.

Focusing efforts at the segment scale enables the rapid assessment of longitudinal responses in river geomorphology, upstream and downstream of multiple gravel operations. Furthermore, the large spatial extent permits the cumulative temporal effects of extraction to be evaluated in the light of lags (transit times of bed disturbances) and variations in upstream sediment supply.

The methods described (in Section 3.1) require annual surveys of the study reaches—building on an existing baseline derived from historical surveys. This approach is facilitated by technological advances in the acquisition of digital survey data, which have been accompanied by parallel reductions in the cost of capture.

Given channel widths of 100–400 m, high quality models of each reach could be achieved using only two parallel flightlines (along each berm), thus limiting the total survey capture to approximately 160 km of LiDAR data. Moreover, the data generated can also be used to inform future gravel consents as well as evidence to assess the compliance extraction operations within the GMA. In addition to LiDAR, the planform measures of river complexity described below are best derived from RGB orthoimagery or (more cost-effectively) using medium resolution, satellite imagery. Orthorectified Planetscope imagery (from Planet.com) can be obtained at low cost, and with a ground resolution of 3.7 m the optical red, green, blue and near infrared spectral bands enable rapid automated classification of land cover, ideally suited to this task.

The proposed scheme of desktop analyses presented in Section 3.1 focuses on three interrelated geomorphic properties of rivers:

1. morphological complexity – 2D (planform) and 3D (vertical) form and structure.
2. longitudinal stability – downstream changes in river gradient and bed level.
3. bed sediment calibre – changes in particle size and texture.

In concert, these analyses can provide spatially-distributed insights into ecologically consequential geomorphic changes. All the methods used can be readily implemented using standard geospatial and numerical modelling environments (ESRI's ArcGIS Pro, Mathworks Matlab) or through open source software, such as the Geomorphic Change Detection analysis suite (see for example Vericat et al. (2017)) and Cross-Section Viewer. These latter two tools were developed as part of a United Kingdom NERC-funded project GeoTERM that the HBRC helped to design, while also receiving support and training. In order to account for the longer-term impacts of historical operations (as discussed above), this analysis should be extended to the 2016 LiDAR capture (covering the Ngaruroro, Tutaekuri and Tukituki rivers) in order to create a baseline against which future changes can be effectively benchmarked.

2.2. Instream ecological evaluation studies

Because of the large areas of river that are potentially subjected to gravel extraction, it will be impractical to undertake long-term instream ecological monitoring at all locations. Consequently, this FEMEP focuses most field survey effort on evaluation studies, especially at temporary extraction sites, where gravel extraction occurs for a restricted time. Once enough ecological evaluations of gravel extraction are undertaken, this will enable an understanding of ecological effects to be inferred to areas where data do not exist. At least three gravel extraction sites should be evaluated in each of the three rivers (nine evaluation studies in total). All nine evaluation studies should be completed prior to the three-year review process. The

specific locations of the evaluation reaches cannot be determined within this document because extraction locations are dependent on the outcomes of ongoing HBRC riverbed level monitoring. This monitoring dictates their programme of work for the year and thus the locations of any field work.

2.3. Long-term instream ecological monitoring

We suggest long-term instream monitoring is undertaken at a minimum of one location where gravel extraction activities have taken place over multiple years and will take place over at least three years following implementation of the FEMEP. The reach chosen for long-term monitoring should be a river reach that is subjected to relatively intensive gravel extraction (e.g. the Roy's Hill site on the Ngaruroro River). The rational is that if gravel extraction is causing detrimental ecological effects, then they will be mostly likely to be detected in a heavily extracted area.

Monitoring should occur once, during summer (December, January or February) while the site is operational for at least three years. Monitoring should involve surveying an unaffected 'control' sampling location immediately upstream of gravel extraction activities, a within-site 'impact' location and another impact location a short distance downstream of any influence of gravel extraction activities (i.e. downstream of the confluence of any side-braids within the extraction site area).

2.4. Instream ecological monitoring and evaluation study design

In Figure 5 we present a generic schematic showing how the monitoring and evaluation programme can be carried out at a gravel extraction site. The figure is intended to guide where suspended sediment, deposited sediment, periphyton, and macroinvertebrate community monitoring will be conducted. We recognise that the suggested design will require modifications to the spatial lay out of sampling locations, based on site-specific river conditions. However, the principles depicted in Figure 5, such as the presence of an upstream control and the minimum amount of replication, must be conserved. The spatial replication of monitoring and evaluation reach locations across the catchments is suggested in Figure 6. In Section 3.2, we detail the various protocols and techniques that should be used. We also provide rational for not proposing fish population monitoring—although monitoring of the potential for fish stranding is prescribed.

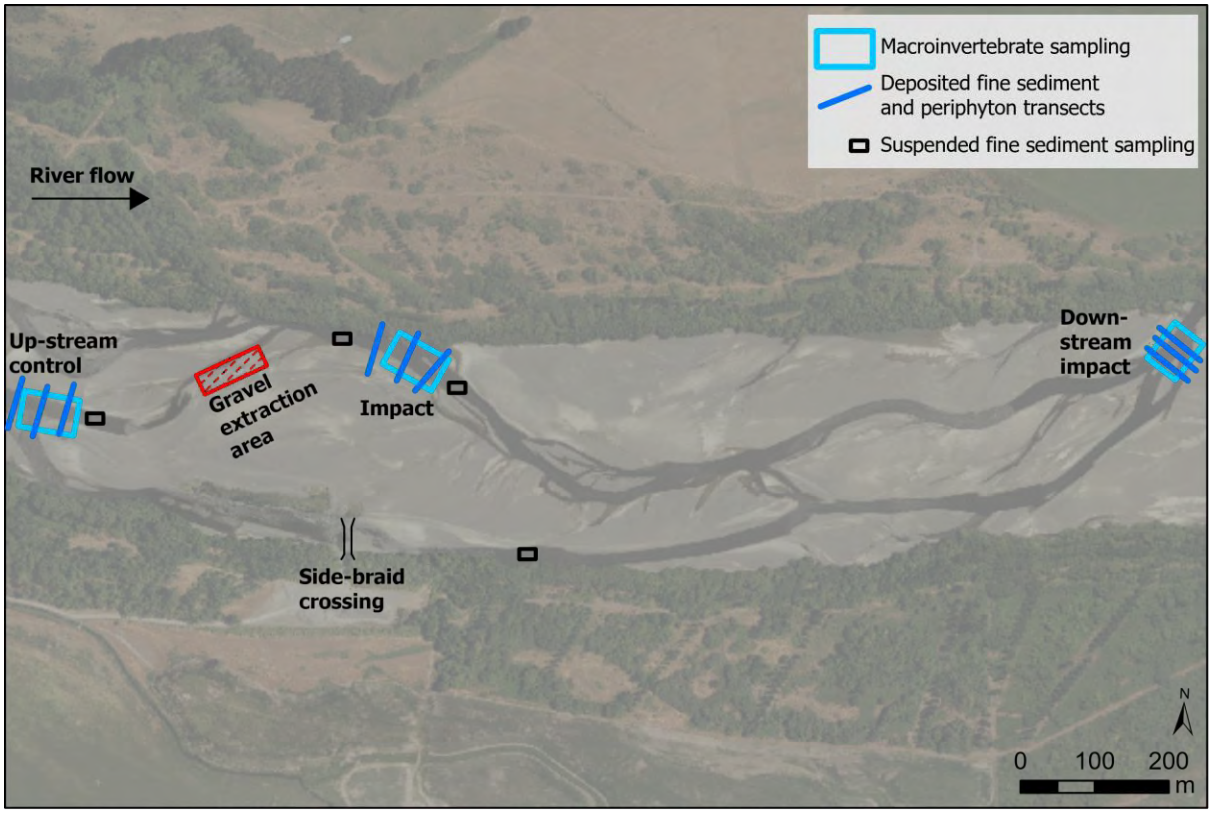

Figure 5. Schematic of a generic gravel extraction site showing a side-braid crossing and a gravel extraction trench 1 m from a main channel braid. Superimposed on the image are the combined study designs for both the evaluation and long-term monitoring studies, including the suggested assessment / sampling locations for turbidity / suspended sediment (evaluation sites only), deposited fine sediment (evaluation and long-term monitoring sites), periphyton (evaluation and long-term monitoring sites) and macroinvertebrates (long-term monitoring sites only). Specific details on the various monitoring and evaluation methods are provided in Section 3.2.

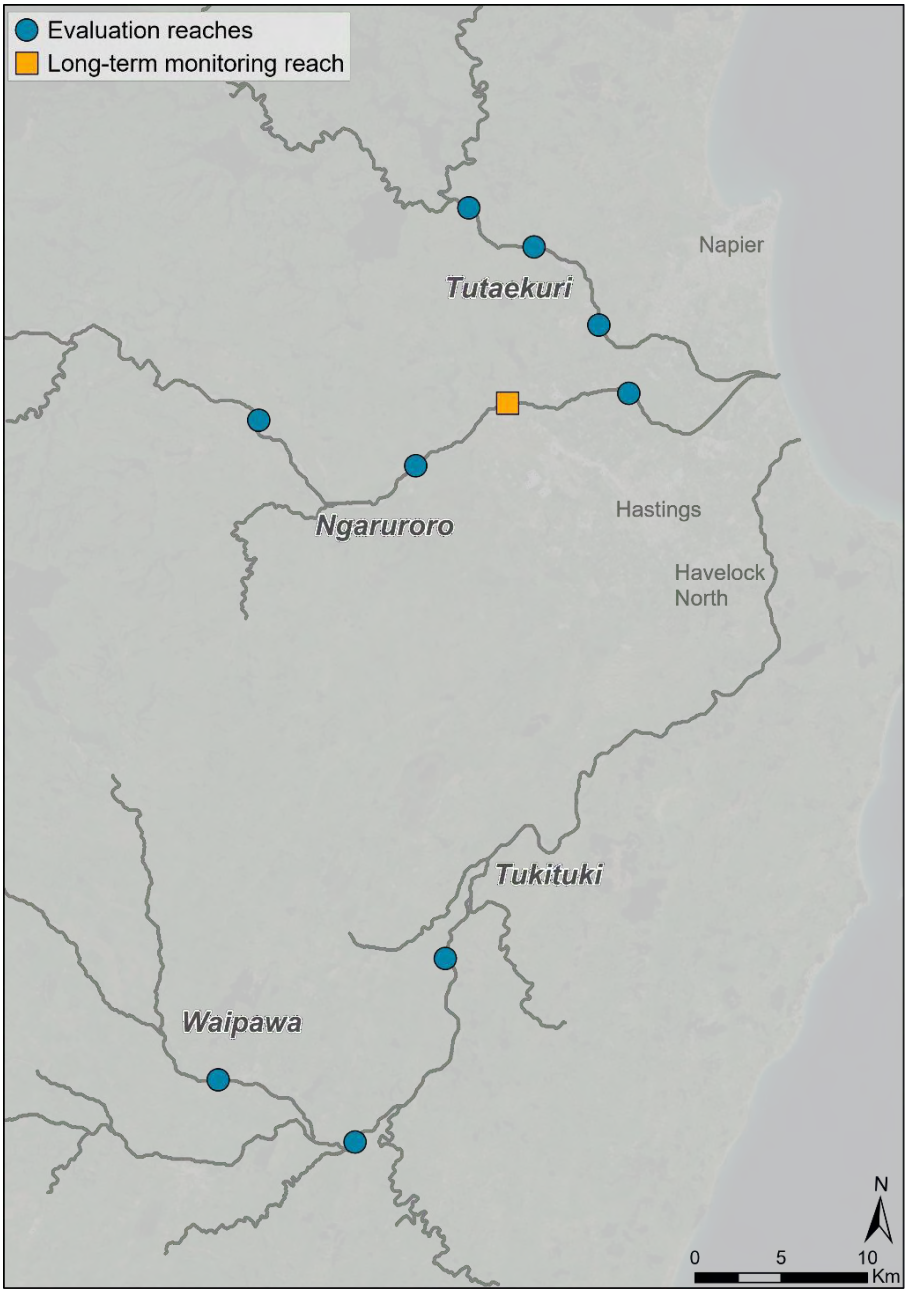

Figure 6. The three river catchments within the gravel management areas (Tukituki, Ngaruroro and Tutaekuri rivers). Shown are the suggested minimum replication of the monitoring and evaluation reaches—nine evaluation reaches and one permanent long-term monitoring reach. Evaluation reaches should be situated to capture a spread of gravel extraction intensity (in terms of activity). As a best as is practically possible, evaluation reaches should also account for segment-scale habitat variability that occurs throughout the rivers (e.g. flow rate, local slope and channel form). The long-term monitoring reach should be located at a site that receives a relatively high-level gravel extraction activity. We have suggested the long-term monitoring reach is located at Roy's Hill. However, there may be a more suitable sites to situate the long-term monitoring reach, dependent on future gravel extraction plans.

3. MONITORING AND EVALUATION PROTOCOLS AND TECHNIQUES

3.1. Assessing potential fluvial geomorphology impacts

3.1.1. Morphological complexity

The maintenance of high-quality river habitat is dependent on a dynamic mosaic of fluvial landforms (Richards et al. 2002). This mosaic provides a heterogeneous physical template for freshwater (and associated terrestrial) biological communities with an ensemble of hydraulic conditions (depths, velocities and shear stresses), substrates (particle size and bed structure) and habitat connectivity (both longitudinal and lateral). As described in Section 1.2.1, this physical template may be affected by an array of impacts associated with extraction of gravels. These include simplifying the bed topography, excess deposition of fine sediment, reductions in the area of side-braids (chute channels), the development of bed perturbations (knickpoints and waves) that lead to incision and coarsening of the bed.

This complex array of landforms is challenging to summarise in single metrics; therefore, a suite of measures is proposed which aim to reveal changes in: a) the 2D or planform organisation; and b) the 3D (vertical) morphological complexity of river habitat. A spatially distributed approach is proposed to quantify river complexity using a combination of LiDAR-derived 1-m resolution digital elevation models and 3-m resolution image analysis products. These distributed models are sampled using a longitudinal set of high frequency cross-sections, enabling detailed downstream models of each study reach. Using a consistent spatial framework to model and sample the rivers over time will permit deviations from the baseline condition to be quantified, assessed and placed in a spatial context.

2D planform complexity

Measurement of the 2D or planform complexity first requires classification of the channel into a schema of relevant landform or landcover units. Here we propose a simple three-fold classification comprising: (1) inundated bed topography (the wetted channels or anabranches); (2) gravel bars; and (3) vegetated bars or riparian margins. This approach thus distinguishes of the channel into three regions as shown in Table 1 below.

Table 1. Planform channel classification scheme.

Classification Unit	Code	Interpretation	Width		
Wetted Channels	1	Active bed	Wet	Active	Total
Gravel Bars	2				
Vegetated Bars & Margins	3	Stable bed			

More complex classification schemes that, for example, distinguish specific geomorphic units, such as pools and riffles or quantify bar lengths, would require complex expert judgement and are likely to incorporate operator bias, reducing the reproducibility of measurement. Moreover, in braided and wandering channels, the key geomorphic units are confluences and diffluences and the frequency of these units requires only delineation of the wetted channel.

Classification can be achieved by visual inspection/digitising RGB orthoimagery or through supervised classification of multispectral imagery that incorporates a near infrared spectral band (such as Planetscope). In order to maintain inter-annual comparability, it is essential that the imagery used is obtained at an equivalent river flow each year (e.g. the median flow ±10%).

Once classified, the 2D planform structure should be summarised in terms of:

a. the Braiding Index, BI, (Brice 1960; Egozi & Ashmore 2008) defined here as the number of anabranches in a given cross-section
b. the width of the wetted, active (wet + gravel) and total (wet + gravel + vegetated) channel (see Table 1 above).

The braiding index (BI) is a metric used to quantify the complexity of multichannel rivers and provides insight into the presence of subordinate anabranches (side-braids) as well as, implicitly, the frequency of confluences and diffluences. As noted in Section 3.1.1 the degree of river braiding has important consequences for river ecology. Some care must be taken in its interpretation however, as a BI value of 1 could relate equally to a single, wide channel but also a narrow, incised single thread. It is important therefore, to interpret this metric alongside measures of the wetted, active and total channel width.

A spatial model of planform complexity can be derived by sampling the classified map of river units using a longitudinal set of high frequency cross-sections. Egozi and Ashmore (2008) examined the methodological dependence of BI to cross-section spacing, and found that a minimum spacing equal to approximately the width of the high flow channel was required to derive a robust index.

As an illustration, Figure 7 shows a classified model of the Ngaruroro River, derived using supervised (trained) image classification of a 3-m resolution while the river was in a low flow condition (Planetscope orthoimage acquired 8 January 2021). A set of 50-m cross-sections were derived in ArcGIS Pro (based on single river centreline) and used to sample the classification, effectively counting the number of cells in each class along each section. A ‘wet’ channel was then defined as having a minimum of 10-m separation between inundated pixels and the BI derived by counting the number of wet channels per section.

The resulting model of planform complexity can be visualised either in spatial form (as shown in Figure 7B) or plotted longitudinally against chainage. This example clearly reveals the progressive change in river character from a single thread, alternate bar dominated form in the lower 5–15 km, to a peak in braiding intensity and active width between 25–35 km, just downstream of Maraekakaho.

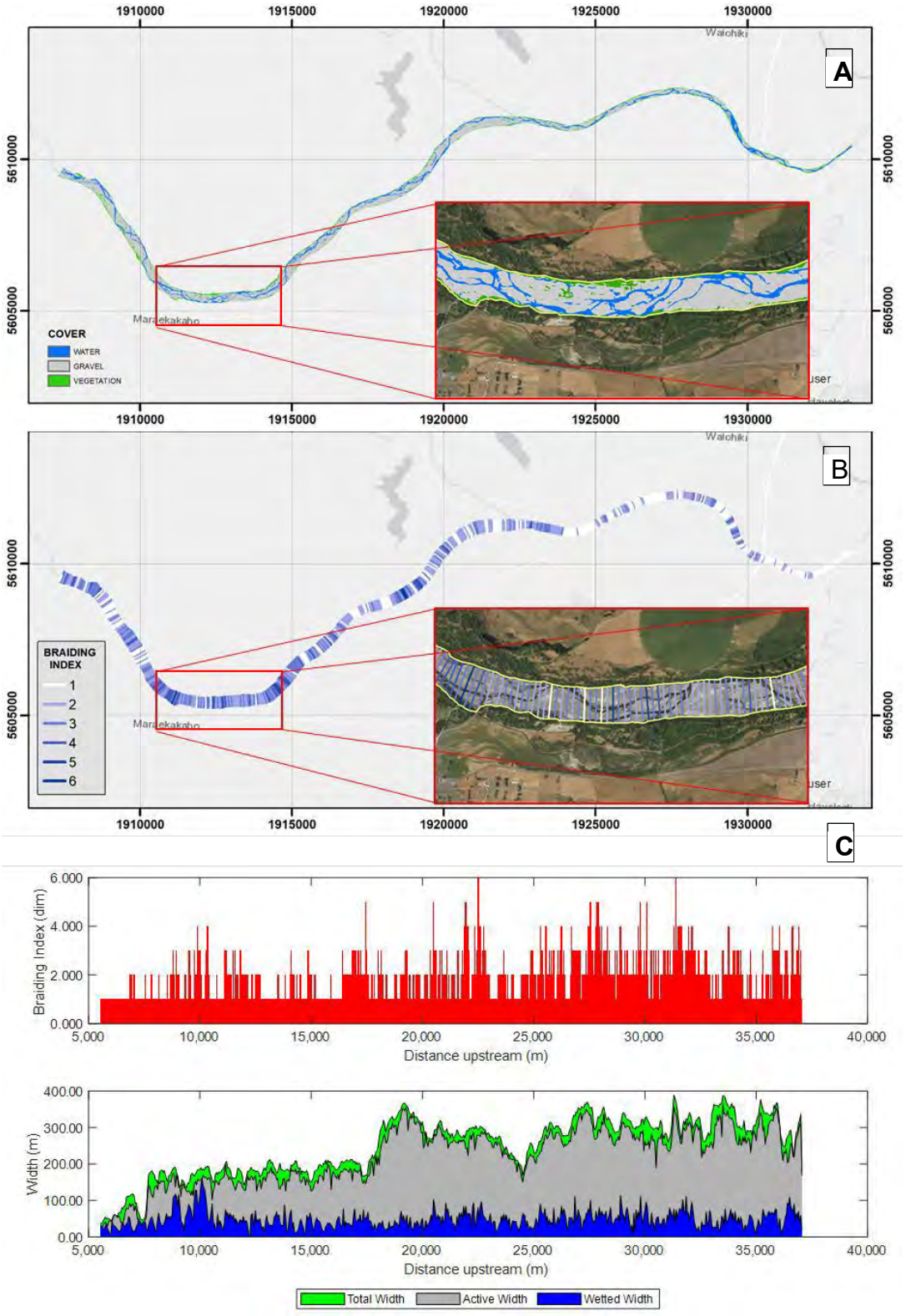

Figure 7. Planform complexity of the Ngaruroro River derived from satellite image analysis of Planetscope imagery obtained on 8 January 2021. A. Classified satellite image; B. Longitudinal visualisation of Braiding Index plotted at 50 m frequency; C. longitudinal pattern of Braiding Index, wetted, active and total width.

Looking more closely (e.g. Figure 8), the impact of extensive ongoing gravel extraction south of Fernhill appears to be associated with the reduction in braiding intensity (at river km 18.5–19, again at 19.5–20), while the total width and area of gravel bars expands, with flows confined to a single channel on the true left.

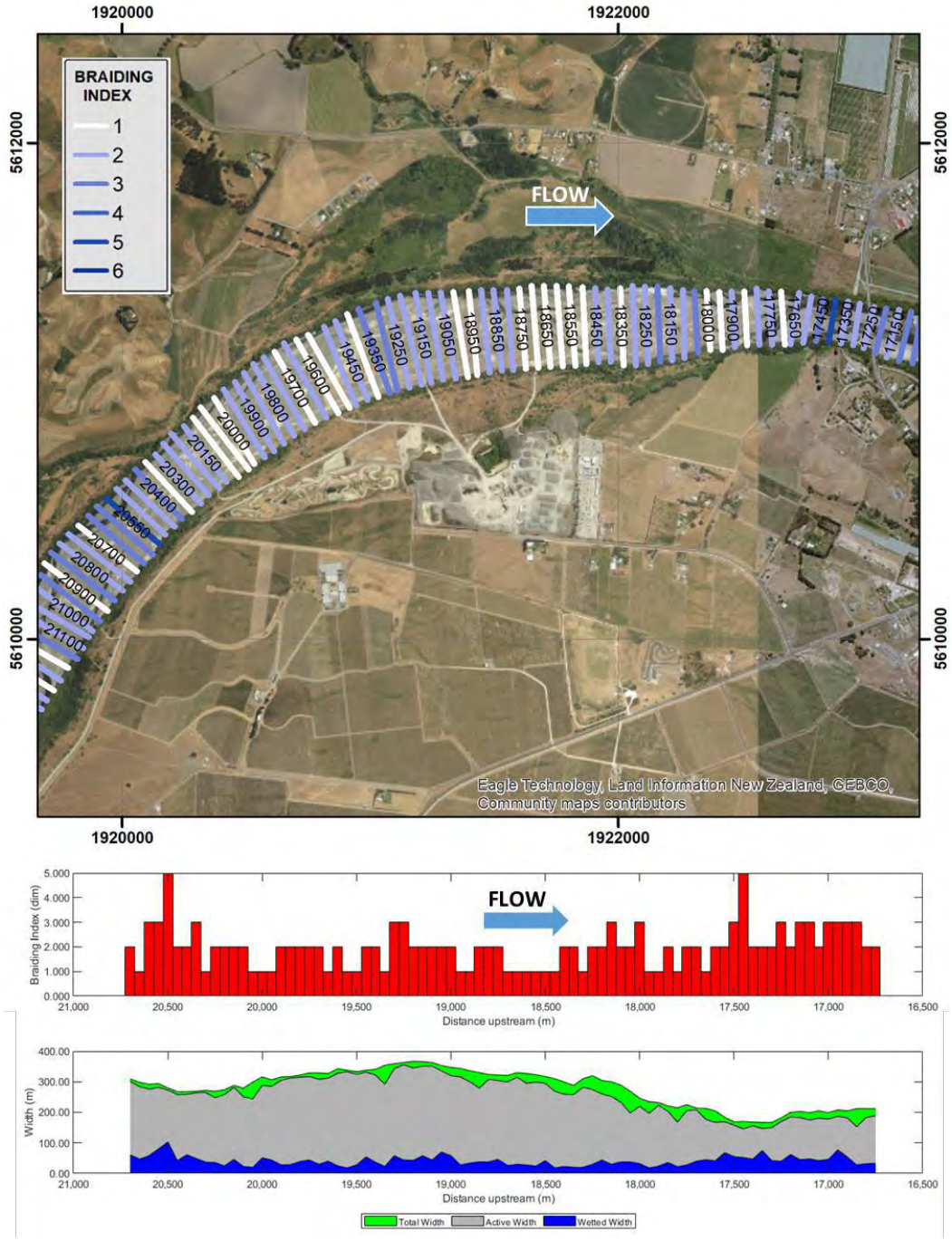

Figure 8. Reduction in apparent planform complexity south of Fernhill (c. river kms 17–21).

Application of this approach must follow some established principles:

a. The imagery used should be acquired at an equivalent river flow each year—ideally at a level no higher than the median discharge ±10%. These metrics are highly stage-dependent, so that comparisons over time must reflect similar flow states.
b. Images should ideally be acquired following a period of low flows, to minimise misclassification of recently wetted gravels.
c. The analysis should use a consistent 'area of interest' to mask the quantified river widths to a consistent benchmark.
d. A consistent set of cross-sections should be used to sample the classified imagery in order to ensure reproducibility.
e. The image resolution should be sufficient to delineate accurately channels (less than 1/3 of typical anabranch widths, i.e. 3–5 m).
f. If (semi-)automated methods of image analysis are used to classify river units, an analysis of classification accuracy should be reported.

3D Complexity: adding the vertical dimension

While the planform metrics discussed above provide a powerful insight into the changing nature of longitudinal river complexity, they are stage dependent and do not capture the evolving three-dimensional form of the river. Analysis of this higher dimensionality is important to identify directly: (i) incision of channels indicating knickpoint or wave development (increasing relative relief); (ii) the creation of uniform plane bed morphologies (loss of elevation variance); and (iii) the persistence of high flow stage morphologies (bar tops) that may provide important refugia for macroinvertebrates and fish during floods.

3D models of river topography can now be readily acquired through airborne laser scanning (LiDAR) or photogrammetry, offering high resolution information on the structure of exposed bar and vegetated surfaces. Continuing technological developments now also create the opportunity to capture the subaqueous bathymetry using either short wavelength LiDAR (green; see Mandelburger et al. 2020) or through accompanying image analysis.

To extend the planform analysis, we suggest an analysis of vertical measures of river complexity. These can be sampled directly from a bare earth Digital Elevation Model (DEM) (processed from a classified LiDAR point cloud) using the same, set of cross-sections used for the planform analysis. Again, existing tools can be used to achieve this and the Geomorphic Change Detection suite with the Cross-Section Viewer can perform simple linear extractions of elevation values (see www.riverscapes.xyz). A variety of metrics can then be used to reflect the morphological complexity of the cross-section elevations, including: a) rugosity (3D line/2D line length)—the vertical sinuosity; b) relief (max–min elevation); and c) standard deviation (or variance) in elevation.

Figure 9 shows the longitudinal distribution of these metrics extracted from bare earth DEMs derived from LiDAR surveys of the Ngaruroro River in 2003 and 2016.

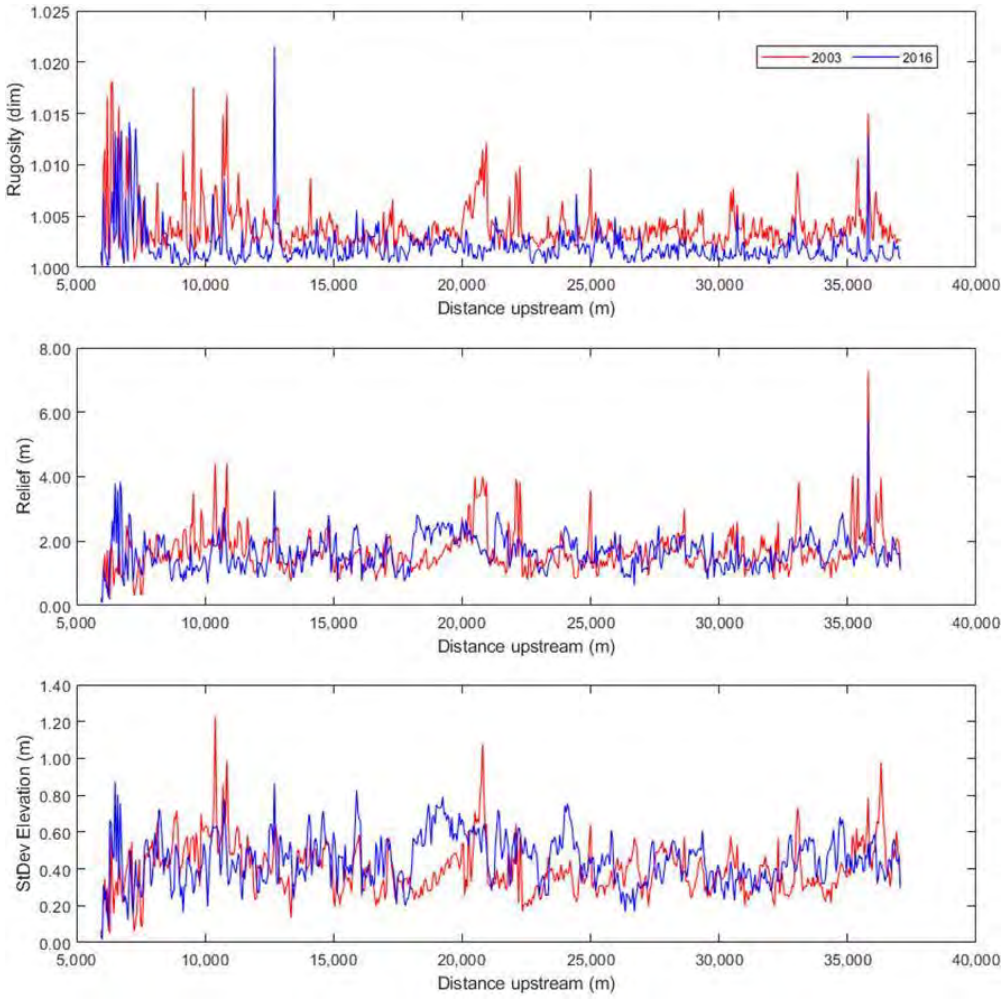

Figure 9. Longitudinal (upstream) distribution of 3D measures of channel complexity derived from bare earth DEMs of the Ngaruroro River acquired in 2003 and 2016.

In this case, the pattern revealed by the three measures is similar, with the planform change from a single thread, alternate bar dominated morphology (river kms 5–12) to braiding (13 km and upstream) associated with a fall in average cross-sectional relief. This reflects the transition from an alternate bar morphology (with rugosity fluctuating as a function of bar length) to a more uniform distribution of elevations associated with the dispersed, multichannel, morphodynamic regime.

From a monitoring perspective, the power of these data is leveraged by examining the ***changing vertical structure of the channel form over time***. Figure 10 shows (again) the extensively mined Ngaruroro River south of Fernhill, between river kms 17.5–21. The upper map (A) shows the derived change in cross-relief between 2016

and 2003 plotted at 50 m intervals. The lower map (B) shows the observed bed elevation change as a DEM of Difference (DoD) while the plot (C) shows the longitudinal relief (plotted from upstream to downstream to match the maps above) for both survey dates.

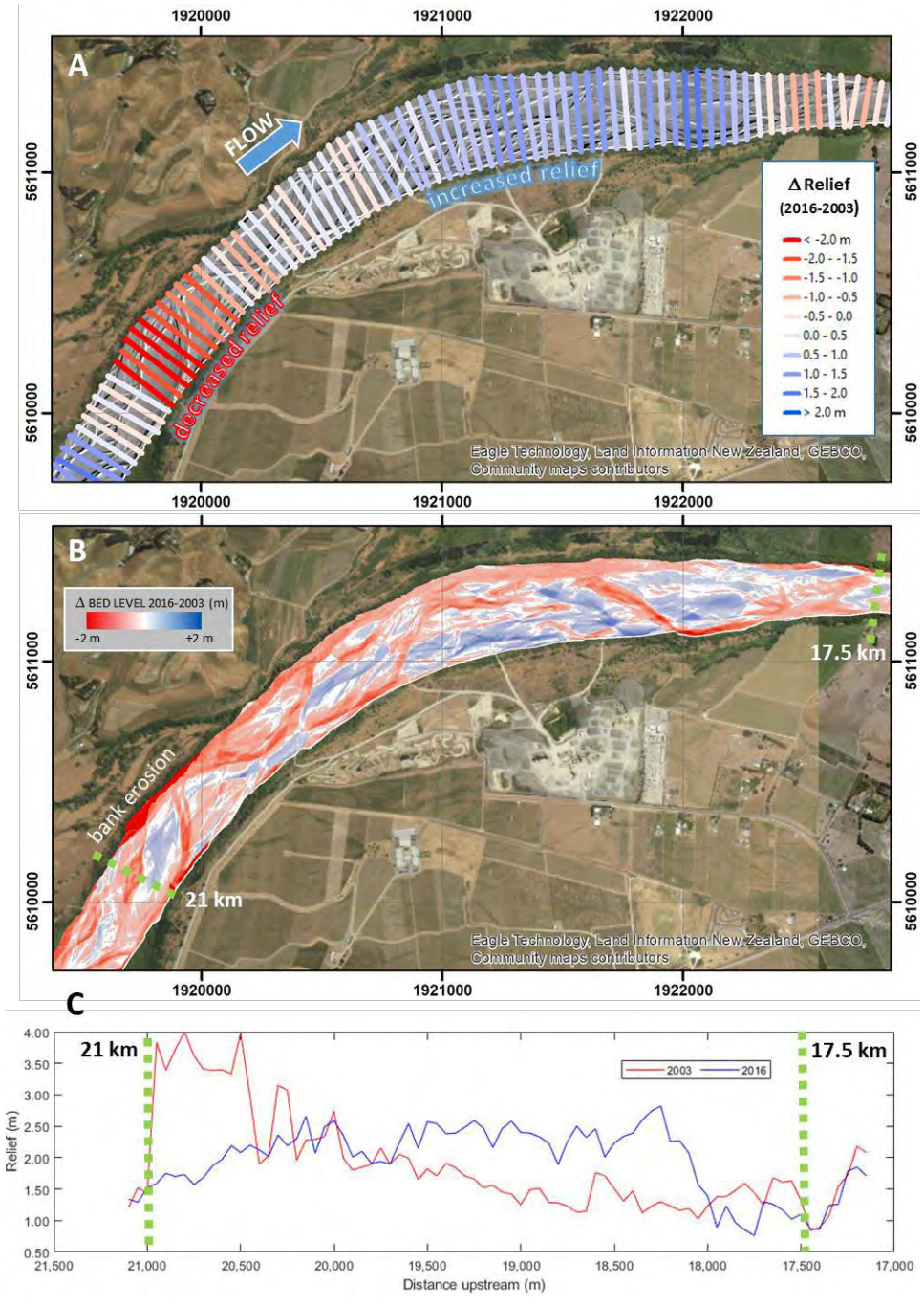

Figure 10. Change in river relief and bed elevations close to Fernhill, 2016 and 2003.

This reveals an increase in relief (c. +1 m) through the area of active extraction. This reflects the reduction in braiding intensity (Figure 8) and incision of a dominant anabranch hard against the true left, with deposition on the true right attached bar—a pattern clearly revealed by the DEM of Difference (DoD). This pattern is, however, reversed upstream of the gravel extraction, where relief is shown to decrease significantly (-2 m) due to significant bank erosion on the true left, indicating enhanced erosion upstream of the gravel extraction area.

The analysis of vertical measures of channel complexity, in common with the planform metrics discussed above, must adopt some established principles to ensure consistency over time:

a. The DEMs must be derived from LiDAR acquired at comparable low river flows (equal/less than the median flow ±10%) to maximise the exposed bed area.
b. The DEMs should be constructed using ground classified points and either (i) be hydroflattened; or (ii) ideally incorporate the bathymetry of the subaqueous areas through the application of (green) LiDAR or through optical bathymetric correction.
c. The LiDAR data should be acquired at a resolution sufficient to enable accurate ground penetration (at least 10–15 points per square metre).
d. Care should be taken to use a consistent area of interest (AoI) so that changes along the riparian margins are accounted for.
e. A consistent set of cross-sections should be used to sample the DEMs to ensure reproducibility over time (and the same as used for the planform analysis).
f. A baseline should be set for future monitoring by analysing the vertical complexity from the most recent LiDAR data currently available (2016 or later if available).

3.1.2. Longitudinal stability

The above analysis reveals the importance of examining changes in river form longitudinally (upstream / downstream). This perspective is needed to diagnose the potential impacts of gravel extraction on bed levels and sediment calibre that may occur both upstream and downstream of mining operations, travelling as bed waves or knickpoints. It is additionally important to recognise that these effects may evolve slowly due to the episodic nature of sediment transport during floods.

We propose the extension of the analysis of morphological complexity described above, to consider specifically ***changes in the longitudinal river profile and associated changes in bed level***. This may be derived using the same series of bare earth DEMs, sampled using the same network of cross-sections.

Figure 11 shows longitudinal bed level change derived for the Ngaruroro River between 2016 and 2003. The distribution of bed elevation changes are mapped as a 1-m resolution DoD, while the plots reveal section averaged mean bed level change, the longitudinal profile of mean bed level and a moving average (over 1 km) model of

the river gradient derived for both the 2003 and 2016 datasets. Note: this pattern could be used to help understand the rates of gravel supply if adjusted for the observed (or consented) volumes of gravel extraction are incorporated.

Based on this time period, there is a clear switch between net aggradation below river km 15 to a net degradation between river kms 15–35, before reversing back again upstream. This pattern is consistent with a steep increase in the bed gradient (i.e. the second derivative of mean bed level) from river km 15, where it rises from 0.2 to 0.4%. Again, the power of these data—from a monitoring perspective—lie in the analysis of changes in bed level over time. However, as longitudinal changes respond to the cumulative effects of sediment transport during floods, quantifying significant changes over the three year monitoring window may prove challenging. As such, a baseline analysis should be derived using historic LiDAR datasets (2003; 2016 and later if available) against which changes observed during the monitoring plan can be evaluated.

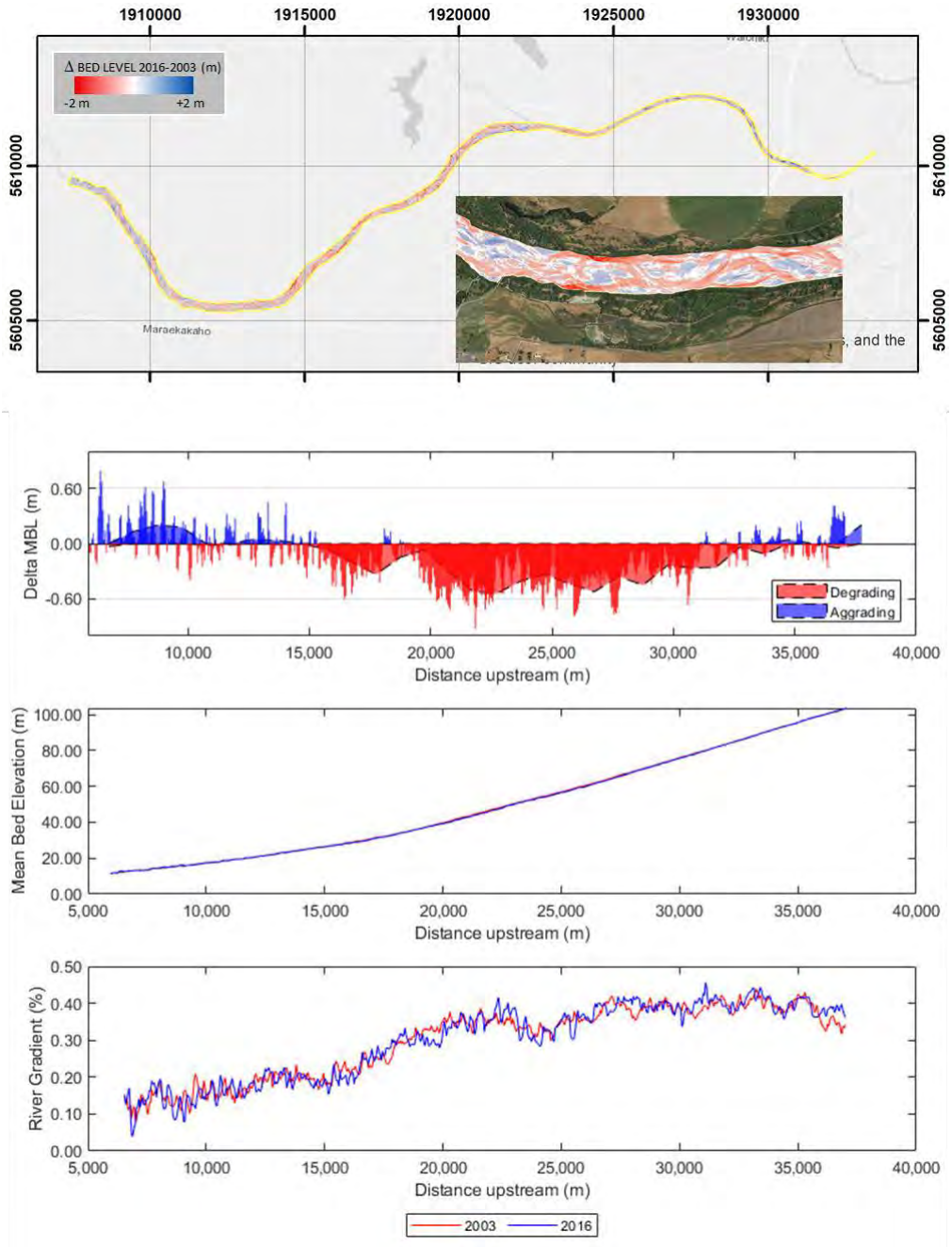

Figure 11. Longitudinal modelling of bed level and channel gradient for the Ngaruroro River, 2016 and 2003.

3.1.3. Sediment calibre and roughness

As discussed in Section 1.2.1 gravel extraction operations may affect the surficial character of the riverbed sediments both directly (by exposing the finer subarmour) and indirectly (through selective entrainment associated with changes in river gradient / incision). The impact of extraction on the downstream distribution of deposited fine sediment is discussed in Section 3.2.2. This approach aims to quantify the proportion

of instream habitat covered by fine (< 2 mm) sediment. However, changes in the size and structure (texture) of the gravel framework may occur both upstream and downstream of operations and evolve through mutual adjustment with changes in channel morphology and gradient.

Quantification of longitudinal changes in surface grain size remain a challenging problem in fluvial geomorphology due to the presence of variability at multiple scales—from patches (0.5–10 m), to fluvial units (pools, riffles, bars, 10–500 m), to broad, reach-scale trends (1–10s of kms). Such variability poses a significant sampling problem for established approaches to grain size measurement via pebble counting or weighing (Wolman 1954; Leopold 1970). A common approach to quantifying variability over long reach scales involves sampling specific fluvial units (pools, riffles, runs) at regular intervals (e.g. every 1–2 km). Bar heads are often selected for this purpose, as they provide a consistent indicator of the coarsest material deposited locally and exhibit lower levels of short-range variability (e.g. Kodama 1994). Alternatively, Bevenger and King (1995) advocate sampling a zig-zag longitudinal transect extending over multiple fluvial units (pools/riffles or confluences/diffluences) in an attempt to integrate variability, a process that can then be replicated longitudinally at larger intervals (multiple kms).

Manual sampling, whether by counting or sieving, requires local replication at each regional sampling point in order to maximise the statistical power of tests to distinguish changes over time. Over the large reaches of the Heretaunga Plains GMA this will require a significant allocation of labour and management of water hazards.

An increasingly popular alternative to quantify reach-scale trends and changes in grain size is through the detection of surface roughness signals in remotely sensed data. While this approach uses roughness as a proxy for grain size, roughness is arguably a more ecologically relevant parameter, relating directly to habitat quality. Attempts to extract roughness from remotely sensed data have been approached from two directions. First, through the local variance (texture) in the optical brightness numbers observed locally in RGB airborne imagery (e.g. Carbonneau et al. 2004, 2005). More recently, however, advances in the fidelity and resolution of topographic point cloud survey methods (LiDAR and photogrammetry) have enabled retrieval of roughness signals from the local variance of elevation values directly (Brasington et al. 2012; Woodget & Austrums 2017).

Given the need to acquire airborne LiDAR to support assessments of morphological complexity (3.1.1) and longitudinal stability (3.1.2), here we propose the use a geospatial framework for extracting scale-dependent roughness metrics from high resolution airborne LiDAR point clouds, after Brasington et al. (2012). This approach is embedded in the open source toolkit—Topographic Analysis Toolkit—available at tat.riverscapes.xyz. Briefly, the approach involves raster segmentation of a topographic point cloud at an appropriate resolution (e.g., 1 m) and deriving the locally

detrended moments of the elevation distribution (standard deviation, skewness and kurtosis). This provides a data-efficient structure to map and statistically summarise very large point clouds. The approach is shown schematically in Figure 12, after Brasington et al. (2012).

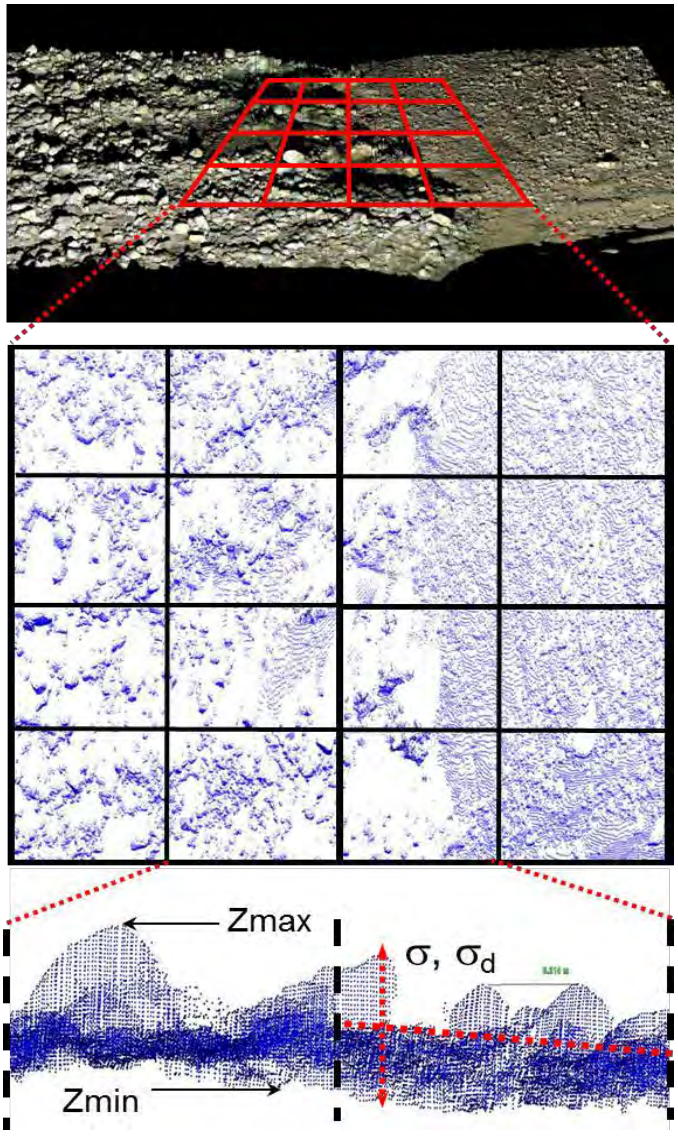

Figure 12. Statistical modelling of surface roughness derived from high resolution point cloud data, after Brasington et al. (2012).

This approach has been applied by Rogers et al. (2022) to quantify the longitudinal change in surface roughness along 55 km of the piedmont Rangitata River using airborne LiDAR data acquired at high density (> 150 points per square metre). Figure 13 illustrates the retrieval of roughness distributions, and while mapped at 1-m resolution, here statistics are summarised for 1-km downstream intervals.

This analysis reveals the progressive reduction in roughness as the river transitions from a steep, single thread channel (river kms 55–45, to a wandering planform braided (45–25 km) before becoming extensively braided in the lower 25 km. Over this longitudinal transect, the peak of the statistical distribution of roughness progressive translates to lower values and the kurtosis (peakedness of the distribution) increases, reflecting the progressive downstream fining of bed material and increasing cover of deposited fine sediment in the lower river.

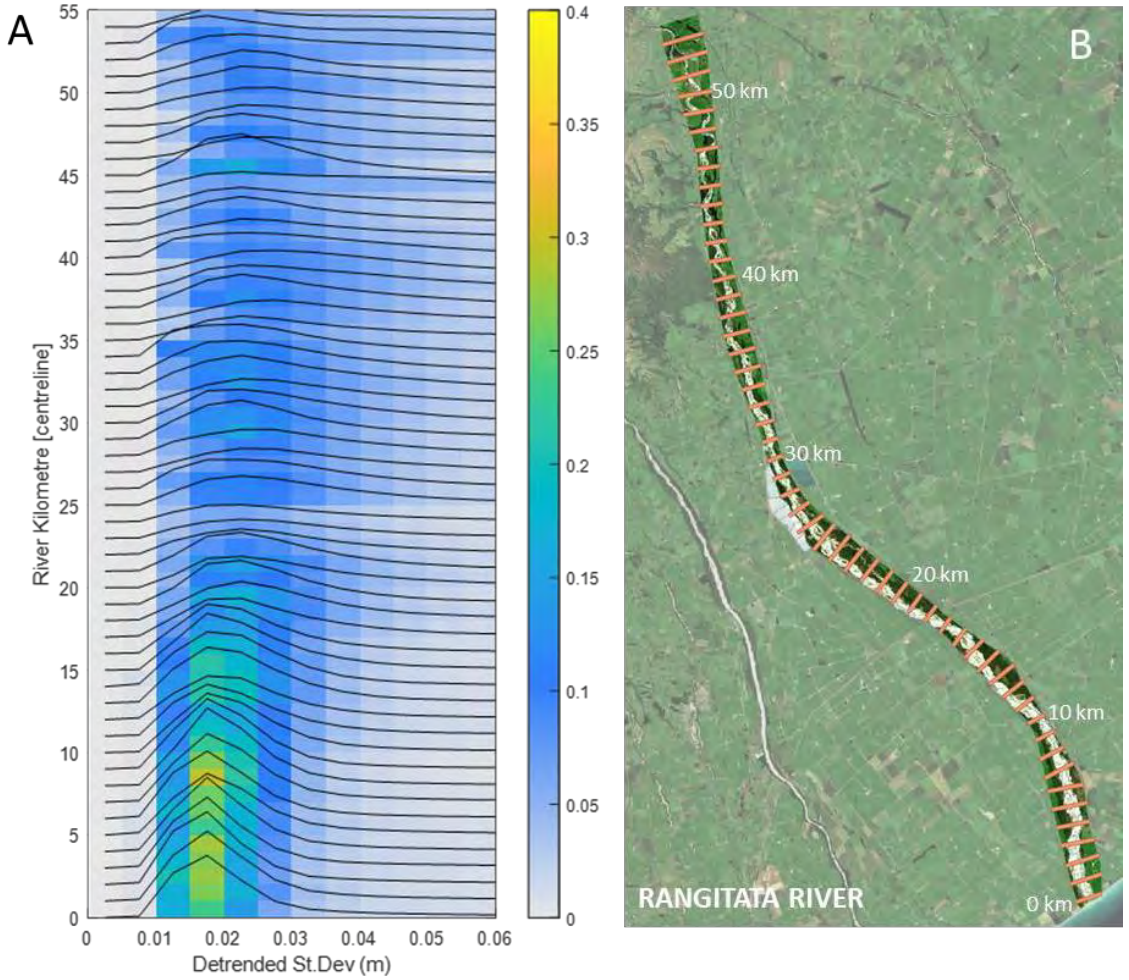

Figure 13. Longitudinal model of bed roughness extracted from statistical analysis of dense point cloud data for the lower 55 km of the Rangitata River (Canterbury).

This approach is presented as a data-rich alternative to labour-intensive ground sampling on each of the three main rivers. Furthermore, while the approach would require an increase in the LiDAR acquisition density, preliminary analysis has shown that the statistical distribution of roughness is robust at point densities as low as 50 to

100 points per square metre, which would not increase the cost of data acquisition significantly.

Most importantly, this approach essentially eliminates the traditional sampling problem that has bedevilled the analysis of bed sediment measurements—essentially moving from a problematic sampling exercise towards a comprehensive census of the river bed. Moreover, by the use of a reproducible methodology and consistent reference frame to summarise the longitudinal pattern of river bed texture, the approach is ideally suited to detect the presence of significant changes in bed material.

3.2. Assessing potential impacts on instream ecological values

3.2.1. Suspended sediment

Measuring resuspended fine sediment in rivers is logistically challenging, as reach-scale increases in resuspended sediment can dissipate and settle rapidly. Given the transient nature of resuspended sediments, we recommend measurements of suspended sediment are taken as part of the targeted evaluation studies of gravel extraction activities. We do not propose assessing suspended fine sediment at the long-term monitoring reach. Continuous turbidity loggers are expensive and have some logistical constrains when deploying in large rivers. Therefore, we recommend taking repeated NTU (Nephelometric Turbidity Units) field measurements (using portable NTU Hatch turbidity meters), and water sample grabs for laboratory analyses of turbidity and suspended sediment. There are two gravel extraction practices to assess with regards to suspended sediment / turbidity: 1) the practice of extracting gravel from near the main channel edge, and 2) machinery crossings at side-braids (if crossings are present at an evaluation reach).

Gravel extraction near the wetted channel

For assessing gravel extraction plumes resulting from diggers employing the minimum 1-m buffer gravel extraction method, we recommend that NTU turbidity measurements are taken simultaneously from two locations (by two field staff) downstream of an active extraction location to quantify the magnitude and duration of suspended sediment discharges. One sampling location should be 30–50 m downstream of the extraction trench, while the second should be around 100 m further downstream (Figure 5). The specific locations should account for local river flow conditions to ensure sampling is undertaken in the areas where the majority of the sediment plume occurs.

NTU turbidity measurements should be taken at the onset of the release of a bund that separates a sediment extraction trench from the mainstem river flow. NTU measurements should be taken every five minutes until the visible plume dissipates.

Three NTU measurements should also be taken upstream of the gravel extraction areas for comparison. At all locations, at least three water samples should be taken for laboratory analysis of suspended sediment concentrations. These water samples should be taken at the NTU sampling locations from the most discoloured part of the visible sediment plume and during the peak of suspended sediment concentrations. Field workers will have to exercise some judgment in the field to achieve this. We recommend that multiple water samples are taken—the three most discoloured samples should be sent for analysis with the rest discarded. The aim is to establish an approximate 'highest concentration' of suspended solids as a result of the gravel extraction activity. We recommend that evaluation of suspended sediment levels as prescribed above be conducted at (at least) three gravel extraction sites in each of the three rivers.

Side-braid crossings

If a side-braid stream crossing is present at an evaluation reach, repeated NTU turbidity measurements should be taken a short distance downstream of the crossing point (e.g. 30 m). The NTU turbidity measurements should be taken before a visible sediment plume is created, when machinery crosses the stream, and the repeated every three-five minutes until the visible plume clears.

3.2.2. Deposited sediment

Deposited fine sediment assessments should be undertaken at all of the evaluation reaches and at the long-term monitoring reach using the Sediment Assessment Protocol 2 (SAM2), as set out in Clapcott et al. (2011). At all evaluation and monitoring reaches, three transect replicate assessments should be undertaken at three locations:

1. a control location (upstream of all gravel extraction activities),
2. at location within the gravel extraction site approximately 100m below the gravel extraction activities and,
3. at a third location below all potential effects of gravel extraction operations (Figure 5).

At the long-term monitoring reach, we recommend the deposited fine sediment assessments are aligned with other monitoring tasks and undertaken annually during summer. Monitoring should be undertaken while extraction sites are operational but must avoid times when gravel extraction is in progress.

3.2.3. Periphyton

Periphyton cover (and type) assessments should be conducted using the Rapid Assessment Method 2 (RAM2) (Biggs & Kilroy 2000) at the same transect locations uses to assess deposited fine sediment (see Figure 5 and Section 2.4) This

monitoring should be done at all the evaluation reaches and at the long-term monitoring reach in the same locations, and with the same frequency, as the deposited fine sediment assessments. Assessments should not be undertaken within 7 days of small floods and freshes (about 3 or more times the median flow), as these 'flushing flows' can remove fine sediment, periphyton and other aquatic vegetation (Biggs & Close 1989; Clausen & Biggs 1997).

Biomass (measurements of chlorophyll-*a* and Ash Free Dry Weight) is another commonly used approach for quantitatively assessing the concentration of periphyton in rivers. Biomass measurements are not recommended for the first phase of data collection. Biomass monitoring is more relevant for determining changes in nutrient concentrations rather than deposited sediment (Biggs 2000). Nevertheless, If changes in periphyton cover are observed below extraction areas, upon review of the periphyton cover data, it may be recommended to also undertake biomass assessments to better define the extent of any effects both qualitatively (cover) and quantitatively (biomass).

3.2.4. Macroinvertebrates

The macroinvertebrate community can be expected to respond to habitat changes over a time scale of weeks. Therefore, we do not recommend macroinvertebrate sampling as part of the evaluation studies at temporary extraction sites. Instead, macroinvertebrate sampling should form part of the assessment at the long-term monitoring reach.

At the long-term monitoring reach, quantitative macroinvertebrate Surber samples should be taken following Protocol C3 in Stark et al. (2001) once annually during summer low flows (December–February, inclusive). This is when the potential effects of gravel extraction on macroinvertebrates are likely to be most severe. Sampling must be undertaken at the tail end of an extended period of stable base flows (i.e. at least two weeks after flow > 10 times base flows). As with the sediment and periphyton assessments, macroinvertebrate sampling should be undertaken at a control location upstream of all gravel extraction activities, within the extraction site approximately 100 m below the area where the majority of gravel extraction occurs, and at a third location located below all potential effects of gravel extraction operations. Macroinvertebrate sampling should be undertaken within the vicinity of the deposited sediment and periphyton sampling transects but must not occur in the areas disturbed by sampling activity for monitoring other attributes (see Figure 5).

At each macroinvertebrate sampling location within the monitoring reach (i.e. control, within-site impact and downstream impact), three replicates of six Surber samples should be taken. The six samples collected from each replicate should be pooled to aid efficient processing while ensuring that habitat in the sample areas is adequately

represented (Wood et al. 2014). This will produce nine (pooled) Surber samples for laboratory analysis for each monitoring occasion.

3.2.5. Fish

While native fish and trout are important ecological values within the GMA rivers, monitoring fish populations to determine whether they are affected by gravel extraction would require an unfeasible amount of sampling to occur over decades. Fish species display huge variations in population abundance in large flood-prone rivers, like those in the Heretaunga Plains. Furthermore, any cumulative effects of the various gravel management activities on fish will be dispersed throughout the entire rivers' fish populations as they migrate with the catchment. The approach to assessing the effects of gravel management on key fish species needs to link to an assessment of potential changes to broader scale habitat structure (see geomorphology Section 3.1) and then infer effects on fish through knowledge of their habitat requirements. Once channel-form data are collected this should be reviewed by an appropriately qualified fish ecologist to assess if any effects on geomorphology are likely to result in effects on fish populations.

Machinery crossing streams will inevitably crush some benthic organisms, including fish (such as bullies and juvenile eels). However, there are vast areas of habitat available for fish within each of the three rivers. Therefore, while there may be some localised (reach-scale) effects in the side-braids where crossings occur, the river fish populations as a whole are unlikely to be adversely affected. In Section 3.2.6 we recommend monitoring the frequency of side-braid crossings. Alongside information on potential changes to channel form. Together, this information will help inform how fish populations might be affected by gravel extraction activities.

Fish stranding evaluation

To assess the potential for fish stranding, electric fishing, seine netting and visual inspection for dead fish should be conducted within trenches and pits created by extraction works following a flood or fresh event that inundates these areas. The opportunistic nature of this sampling will require a degree of flexibility and is best suited to an evaluation approach. At least one assessment of this nature should be conducted in each of the three catchments (three assessments in total). Sampling should target the spring and summer periods. Measurement of the dimensions and depth of the various areas fished should be obtained to determine the areas sampled. In addition, detailed photographic documentation of the depressions fished is required.

During the review of fish stranding investigation data, any requirement for further monitoring or enactment of mitigations will necessarily be based on an expert assessment. This is because 'significantly adverse' number of stranded fish will

depend on multiple variables including, fish species and number, time of year, size of depressions and likelihood that the fish will survival till the next inundation event.

3.2.6. Stream crossing frequency monitoring

Machinery occasionally needs to cross side-braids to access extraction sites, and such stream crossings will cause localised damage to the streambed (Holmes 2017). The current gravel extraction CoP encourages that wetted channels only be crossed when there are no other access options and restricts crossings to periods outside of May–September to protect trout spawning values (Groves & Clode 2017), likely reducing the ecological effects. However, it is important to understand the degree of machinery activity within wetted areas. Therefore, documenting the locations and frequency of stream crossings is necessary to allow the affected areas to be placed in context with the amount of un-impacted river (both in terms of extent and duration). These data should be collected by the gravel extraction teams and provided as part of the FEMEP three-year data review process.

3.3. Adverse ecological effects guideline thresholds

The thresholds proposed below (summarised in Table 2) are applicable to some of the instream ecological monitoring components. They have been determined from regional and national policy to provide guidance for assessing whether the effects of gravel extraction on instream ecological values are adverse.

The proposed thresholds have been based on the most stringent values provided within the relevant policy documents. The intention is that these monitoring thresholds inform an assessment of data as part of the review process within the FEMEP (Figure 3). The thresholds are *guidelines* and should be considered in conjunction with expert opinion. Given that the rivers within the Heretaunga Plains are similar in nature, the same guideline thresholds are suggested for all three rivers. HBRC State of the Environment monitoring indicates that current condition of the rivers does not breach these proposed thresholds (Ausseil et al. 2016; Haidekker et al. 2016). A description of the documents and rational used to determine the threshold guideline values is provided in Appendix 3. With respect to assessing effects based on fluvial geomorphological data, this will necessarily rely on expert opinion during the review phase periods. This is because there are no established policy guidelines to determine ‘adverse’ geomorphological effects. In addition, how observed geomorphological effects translate into ecological effects will be highly context dependent.

Table 2. Proposed guideline thresholds that instream ecological values should not exceed in relation to gravel extraction monitoring and evaluation.

Domain	Threshold/guideline value	Source
Deposited sediment	8% increase in deposited fine sediment cover at the reach scale.	NPS-FM (MfE 2020) Table 16
Suspended sediment	Peak turbidity downstream of gravel extraction double upstream levels, or Downstream turbidity remains 10 NTU higher or greater than upstream turbidity once visible plume dissipates, or Visible sediment plume persists longer than 30 minutes, or Suspended sediment > 25 mg/L.	HBRC Regional Resource Management Plan (RRMP) Table 8, Plan Change 6 Policy 72, Cavanagh et al. (2014)
Periphyton	A 20% increase in cover relative to the upstream control or, > 30% filamentous green algae cover, or > 60% diatom & cyanobacterial mats cover, or > 50% cyanobacterial mats cover.	HBRC Plan Change 6*
Macroinvertebrates	MCI score < 100, or a decrease of 20 (i.e. an NPS-FM attribute band).	HBRC Plan Change 6, NPS-FM (MfE 2020) Table 14
Fish strandings	N/A context dependent and needs to be based on expert assessment of data	

* Although Plan Change 6 specifically addresses water quality and water quantity in the Tukituki catchment (see Appendix 3), the threshold/guidelines values from the plan change that are presented in this table are assumed to be valid for the other large river catchments in the Heretaunga plains.

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5. APPENDICES

Appendix 1. Existing code of practice summary (as it relates to instream ecology).

Hawke's Bay Regional Council have developed an Environmental Code of Practice for river control and waterway works, which includes gravel extraction (Groves & Clode 2017). The Code of Practice (CoP) defines the range of operational activities that are used in river control and drainage works and describes the best practice environmental standards. In implementing this CoP, the Tukituki, Ngaruroro, and Tutaekuri rivers are all subject to individual Ecological Management and Enhancement Plans that give effect to the CoP (Forbes 2011; HBRC 2015; Forbes & Whitesell 2015). In relation to addressing the effects of river control activities on instream ecology, general standards of practice for all works include restricting work to approved contractors, keeping machinery out of water, minimising the opportunities for fuel and chemical spills, allowing for fish passage during works and remediating sites following work when possible.

Gravel extraction requires resource consents to ensure the annual extraction quantities and locations are sustainable for each river (as determined by HBRC). The most important CoP standards, in relation to the effects of gravel extraction on instream ecology, is the stipulation that no gravel extraction shall occur within one metre of the active river channel with flowing water, unless specifically authorised. Other relevant standards include the requirement to remediate sites by spreading stockpiles on dry riverbeds in a way that conforms to the general bed profile and not depositing it in the active channel of the river—as well as the reduction of dust generation, which may help reduce the quantity of fine sediment that enters waterways.

Other regional councils around New Zealand that employ gravel extraction as a method of flood control (including the Bay of Plenty Regional Council, Environment Canterbury, Environment Southland, Marlborough District Council, and Taranaki Regional Council) have also developed CoPs and gravel management strategies for individual regions. As with the Hawke's Bay region, flood protection is the primary concern, followed by servicing local demands for construction and roading aggregate. In most regions, considerations around environmental, cultural, and recreational values are also outlined. These CoPs and management strategies share many characteristics, including a focus on assessing gravel supplies to determine appropriate locations for extraction and determining the quantity able to be sustainably extracted in the context of surrounding flood management and flood management infrastructure (i.e. stop banks). Managing where and how much gravel is extracted has important implications for instream ecology as it determines how much habitat is altered. It also controls whether gravel extraction causes further riverbed erosion by depleting sediment reserves (e.g. MDC 2016). Another key feature of these codes of practice that has significant implications for instream ecology is setting

allowed methods for gravel extraction and required setbacks, as well as defining rules to minimise the impact of any required river crossings, therefore controlling the direct effect of extraction activities on the instream environment (e.g. Environment Bay of Plenty 2003; Environment Canterbury 2012).

However, when considering the effects of gravel extraction on instream ecology, it should be noted that there are no requirements within any existing CoPs for assessing the actual instream ecological impacts of gravel extraction activities. Considerable variation exists in the specific consideration of ecological values within CoPs, ranging from only outlining the need to consider ecological values through to specific requirements attempting to mitigate the effects of gravel extraction on birds, fish, and riverbed vegetation. For example, both Environment Bay of Plenty and Environment Canterbury require extraction activities to avoid areas where bird nesting is occurring (Environment Bay of Plenty 2003; Environment Canterbury 2012). Environment Bay of Plenty also requires river crossings to be avoided during trout spawning and hatching season or during low flow conditions and limited extraction is to occur during the whitebait migration season (Environment Bay of Plenty 2003). Additionally, multiple CoPs set out requirements for machinery to be free of plant material and seeds before entering the riverbed (Environment Canterbury 2012; Groves & Clode 2017), so reducing the potential for introduced plant species to be brought in and alter instream ecology (Hicks et al. 2007). While these specific mitigation requirements can be expected to reduce the ecological effects of gravel extraction, monitoring of instream ecological values is not required to determine the extent of such effects and the effectiveness of mitigation measures. The FEMEP proposed in this document will address this deficiency and place HBRC ahead of other councils in terms of environmental responsibility.

Appendix 2. Fish species recorded (as NZ freshwater fish database records) in the Heretaunga Plain braided river catchments (including the Ngaruroro, Tukituki and Tutaekuri rivers). Also shown are the national threat classification levels from Dunn et al. (2017).

Common Name	Scientific name	Threat classification
Lamprey	*Geotria australis*	Nationally Vulnerable
Longfin eel	*Anguilla dieffenbachii*	At Risk, Declining
Torrentfish	*Cheimarrichthys fosteri*	At Risk, Declining
Bluegill bully	*Gobiomorphus hubbsi*	At Risk, Declining
Īnanga	*Galaxias maculatus*	At Risk, Declining
Kōaro	*Galaxias brevipinnis*	At Risk, Declining
Dwarf galaxias	*Galaxias divergens*	At Risk, Declining
Giant bully	*Gobiomorphus gobioides*	At Risk, Naturally Uncommon
Redfin bully	*Gobiomorphus huttoni*	Not Threatened
Black flounder	*Rhombosolea retiaria*	Not Threatened
Cran's bully	*Gobiomorphus basalis*	Not Threatened
Upland bully	*Gobiomorphus breviceps*	Not Threatened
Common smelt	*Retropinna retropinna*	Not Threatened
Common bully	*Gobiomorphus cotidianus*	Not Threatened
Shortfin eel	*Anguilla australis*	Not Threatened
Yellow-eyed mullet	*Aldrichetta forsteri*	Not Threatened
Estuarine triplefin	*Grahamina* sp.	Not Threatened
Rainbow trout	*Oncorhynchus mykiss*	Introduced and Naturalised
Brown trout	*Salmo trutta*	Introduced and Naturalised
Gambusia	*Gambusia affinis*	Introduced and Naturalised
Goldfish	*Carassius auratus*	Introduced and Naturalised

Appendix 3. Rational for determine guideline trigger values to assess if adverse ecological effects are occurring as a result of gravel extraction.

Regional planning documents used to identify the region's freshwater values include the Hawke's Bay Regional Resource Management Plan (2006), the Hawke's Bay Land and Water Management Strategy (2011), and Plan Change 6 specifically addressing the Tukituki River (2015). Ecological management and enhancement plans are also in effect for the Ngaruroro and Tutaekuri rivers (Forbes 2011; Forbes & Whitesell 2015) but these do not specify thresholds for instream ecological values.

The Hawke's Bay Regional Resource Management Plan (RRMP) includes the Regional Policy Statement (RPS) and the Regional Plan for the integrated management of the region's natural and physical resources. Section 5 of the Regional Plan policy framework provides an objective and an associated policy addressing freshwater health as follows:

OBJECTIVE 40

The maintenance of the water quality of specific rivers in order that the existing species and natural character are sustained, while providing for resource availability for a variety of purposes, including groundwater recharge.

POLICY 71, ENVIRONMENTAL GUIDELINES — SURFACE WATER QUALITY

To manage the effects of activities affecting the quality of water in rivers, lakes and wetlands in accordance with the environmental guidelines set out in Tables 7 and 8.

The Water Quality Framework focuses on maintaining aquatic ecosystem and natural character values whilst providing for resource use. The environmental guidelines set out in Tables 7 and 8 of the RRMP detail site specific guidelines, with the most relevant to gravel extraction being suspended solids targets and that the diversity and quantities of fish species or indigenous invertebrates is maintained.

While not providing guideline values, the Hawke's Bay Land and Water Management Strategy (the Strategy) is a high level, non-statutory document that offers further supporting guidance for setting thresholds by outlining the region's strategic direction for the future management of land and water. Of the values attributed to water in Section 1.6 of the Strategy, the following are relevant to freshwater health:

- Freshwater bodies are valued for their natural form, intrinsic qualities and mauri; they provide a sense of place for people and communities and are a source of inspiration
- Water supports the flora and fauna which make up the regional diversity.

Section 4 of the Strategy summarises the values of each major catchment in Hawke's Bay. The following values have been identified as the key drivers for rivers within the GMA:

- cultural values
- life supporting capacity of rivers, lakes and wetlands
- municipal water supplies
- existing and potential substantial economic development (including tourism)
- native and trout fishery
- recreation.

Additionally, Plan Change 6 specifically addresses water quality and water quantity in the Tukituki catchment and overrides the RRMP. The plan change contains more specific objectives to maintain or enhance the habitat and health of aquatic ecosystems, macroinvertebrates, native fish, and trout. Of relevance to the effects of gravel extraction, environmental state indicators are defined for the Macroinvertebrate Community Index (MCI), Visual Water Clarity as well as Suspended and Deposited Sediment (see Table A3.1). Policy 72 within the Plan Change lays out that guideline values should be measured at or below median flows or levels except for suspended sediment. For suspended sediment, the guideline values apply at all flows with the stipulation that when the suspended sediment concentration is less than the guideline, no activity should breach the guideline and in no case should an activity cause more than a doubling of the suspended solids concentration or turbidity. Alternatively, where the suspended solids concentration is equal to or greater than the specified guideline, an individual activity should not cause the concentration of suspended solids or the turbidity to increase by more than 10%.

Table A3.1 Water quality limits set out in Plan Change 6 for the Tukituki River gravel extraction areas. Within Plan Change 6, these values are treated as limits at locations where existing water quality is better than the relevant value, and targets at locations where existing water quality is worse than the relevant value.

Water Quality Limit	Value
Periphyton cover (Annual maximum)	
Chl-A biomass (mg/m^2)	120
% cover of green filamentous algae >2cm	30
% cover of diatom & cyanobacterial mats	60
% cover of cyanobacterial mats	50
Water clarity (black disk)	2.8
Benthic macro-invertebrates (MCI)	100
Suspended solids (mg/l)	25

National attributes for freshwater health

Over the regional planning documents, the National Policy Statement for Freshwater Management (MfE 2020) lays out national level attributes and limits for instream ecological values. As the most recent national freshwater policy, these attribute limits have been used to provide thresholds for ecological values not detailed in regional

policy. In turn, this will support the RRMP objective of ensuring species and natural character are sustained as well as the regional-level strategy aim to maintain the life supporting capacity of rivers and conserve fish populations.

Hawke's Bay regional policy does not specify thresholds for deposited fine sediment or changes in the fish species or populations present. The NPS-FM contains attribute bands and values for deposited fine sediment, but the absolute values are dependent on the River Environment Classification (REC) of the site being monitored. Given that the rivers being addressed by this FEMEP vary in their climate, source of flow and geology characteristics as defined by REC, a degree of allowable change rather than the absolute value is included here to provide a single guideline value. This amount of allowable change is based on the average change in deposited fine sediment needed to cause a change in attribute band within the NPS-FM.

The NPS-FM also contains a fish community index for monitoring long term trends; however, this does not offer a guideline for acceptable fish strandings. Given the value of the trout fisheries and the diversity of native fish present in the GMA rivers, we suggest a conservative tolerance for fish strandings within ponded areas created by gravel extraction; although this must be based on a case-by-case expert assessment of data.

The NPS-FM attributes supports the values defined in Hawke's Bay regional policy for macroinvertebrates. The MCI threshold proposed for macroinvertebrates from Plan Change 6 sits in band C of the NPS-FM ecosystem health attribute (the lowest band above the national bottom line). Each MCI band has a range of 20, so we further suggest that a decrease in MCI of more than 20, i.e., shifting an attribute band, should be included for macroinvertebrates as a threshold indicator of significant change.

The NPS-FM does not suggest an appropriate threshold value for suspended sediment, as guideline values have been set to consider suspended sediment, turbidity, or water clarity values representative of long-term conditions. In contrast, gravel extraction is expected to elevate suspended sediment concentrations for relatively short periods following the release of extraction bunds and machinery crossings. With this in mind, the most suitable guideline value is a 10 NTU increase from upstream ambient turbidity proposed by Cavanagh et al. (2014), based on the direct and indirect effects of elevated suspended sediment concentrations on fish survival and growth. Setting a suspended sediment threshold relative to upstream conditions is most relevant for the rivers in the GMA as the three rives have different baseloads of suspended sediment. For example, the Ngaruroro tends to have a higher turbidity than the Tukituki and the Tutaekuri (Ausseil et al. 2016; Haidekker et al. 2016).

HAWKE'S BAY REGIONAL COUNCIL

ENVIRONMENT AND INTEGRATED CATCHMENTS COMMITTEE

06 July 2022

Subject: GRAVEL EXTRACTION - CURRENT SITUATION AND NEW GLOBAL CONSENT

Reason for Report

1. This item updates the Committee on riverbed gravel extraction undertaken as part of Hawke's Bay Regional Council flood control functions, including discussing some challenges the region is facing with decreasing gravel availability in the rivers, and a brief update on the status of the new global resource consent process.

Background

2. Under the Soil Conservation and Rivers Control Act 1941, regional councils have a statutory responsibility for flood control. To achieve this in the context of sediment build-up, the Asset Management Group (AMG) encourages aggregate suppliers to excavate gravel from the dry parts of the river beds (sometimes referred to as beaches), with the objective of maintaining the bed at a design grade. The design grade is the calculated grade of the river bed (i.e. the bed level at any particular location) required to maintain the required floodway height and area.

3. This gravel extraction activity is authorized by very short-term consents, typically one year, using a Council-managed consent application template system. However, this system is not delivering the desired results for extractors (who seek longer-term certainty) or for HBRC in terms of achieving its flood management objectives.

4. In the last five years, the volume of gravel available for extraction has decreased in the lower reaches of the Ngaruroro, Tutaekuri and Lower Tukituki Rivers. This is due to not having high flows with sufficient velocity to move the gravel downstream. The last significant gravel movement we recorded was during Cyclone Bola.

5. The Ngaruroro River is the main river from where gravel has been extracted in the past. It has been over-extracted historically, at an average rate of 300,000m^3/y, nearly three times the net supply rate of 120,000m^3/y. The grade line, a mean bed level that determines the availability of gravel in the river, has been lowered in the past to 'create' more availability. The current grade line and the latest bed survey show availability of 386,000m^3 between Ormond Rd, Twyford, and 740,000m^3 between Marakekakaho and Matapiro Road. This means that, at current extraction rates and without a significant flood event to replenish gravel volumes, there will be no more gravel available in the Ngaruroro River within 1 to 2 years.

6. The gravel extraction industry is seeking higher volumes from the reaches where gravel is unavailable (based on gradeline assessments), and are challenging our decisions to move extraction activities where the gravel is available, for example, the Upper Tukituki scheme in Central Hawkes Bay.

7. Transport costs are a key factor for extractors to manage, and these have increased significantly in recent years. However, there is the opportunity to submit a tender for the IRG gravel extraction and gain subsidies from this funding.

8. The Tutaekuri River and Lower Tukituki are facing similar issues with restrictions to the extraction and allocation in all areas.

9. The Allocation in the Esk River has been restricted in the last three years with the minimal allocation of only 5000m^3 p/a.

Global Consent

10. As part of implementing the Hawke's Bay Rivered Gravel Management Plan 2017[1] (GMP), the Regional Assets Section of HBRC has applied for global resource consent to extract gravel from the Ngaruroro River, Tukituki Catchment Rivers and Tutaekuri River (the Applications).

11. The GMP was developed with the purpose "*to sustainably manage gravel extraction from rivers for flood protection purposes, and to ensure community safety while allowing for economic development without compromising cultural, social and environmental outcomes and values associated with the region's freshwater resources*."

12. The GMP established the concept of Authorisation Zones within which the Regional Assets Section of HBRC would hold resource consents for gravel extraction and would issue authorisations to commercial gravel extractors to operate within those zones.

13. The authorisation process is intended to provide improved management of gravel extraction for flood control purposes by establishing a single, accountable consent holder and comprehensive management regime, replacing the existing practice of issuing short duration (annual) resource consents directly to extractors (which is the practice that remains in place today).

14. The applications were lodged in October 2017, and following an extensive further information process were publicly notified in February 2019. 7 submissions were received, with none opposing. The submitters were First Gas Limited, Hawke's Bay Fishing and Game Council, Michael Barker, New Zealand Transport Agency, Ngāti Kahungunu iwi Inc, Te Taiwhenua O Heretaunga and Winestone Aggregates.

15. The Regional Assets Section of HBRC sought to resolve matters directly with submitters in an attempt to reach an agreed outcome, rather than take the matter to a hearing. This process was unsuccessful, with the matter heard before a Hearing Panel on 10 December 2021.

16. After hearing evidence from Regional Assets Section of HBRC, Ngāti Kahungunu iwi Inc and Te Taiwhenua O Heretaunga, the Hearing Panel adjourned the hearing, and directed that caucusing occur to refine the proposed conditions of consent. That process has now been completed and the outcome is with the Hearing Panel to issue a final decision on the Applications.

17. If the consent applications are granted by the panel, and no party appeals the decision, Regional Assets Section of HBRC intends to implement the new consent regime in the next gravel allocation process from July 2023.

Gravel Supply and Allocation processes

18. Historically, Hawke's Bay's rivers have transported large volumes of gravel and other sediments from Ruahine, Kaimanawa, and Kaweka Ranges, depositing in onto alluvial plains to the east of ranges. This sediment transport process resulted in the rivers meandering across the alluvial plains over time as braided and semi-braided river channels.

19. Riverbed gravel extraction is carried out as a critical maintenance activity to maintain flood water conveying capacity and address erosion issues in the Upper Tukituki Flood Control Scheme (UTTFCS) and the Heretaunga Plains Flood Control Scheme (HPFCS). Gravel extraction has previously occurred in low volumes in the Esk River but has not occurred in recent years. It is also undertaken in the Mohaka River, but not for flood control purposes.

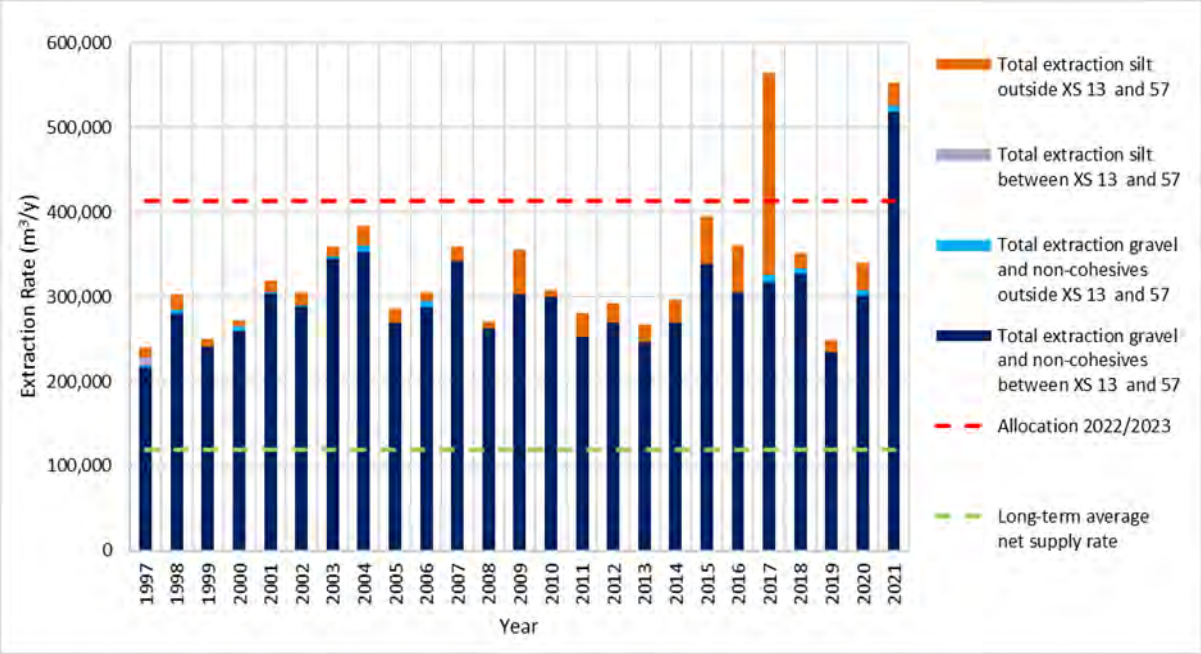
20. This activity is managed by HBRC under its regulatory (RMA) and flood control management functions, but with commercial operators undertaking the extraction. This provides benefits to the whole region, by cost-effectively maintaining flood control schemes and providing benefits to the regional economy and construction industry.

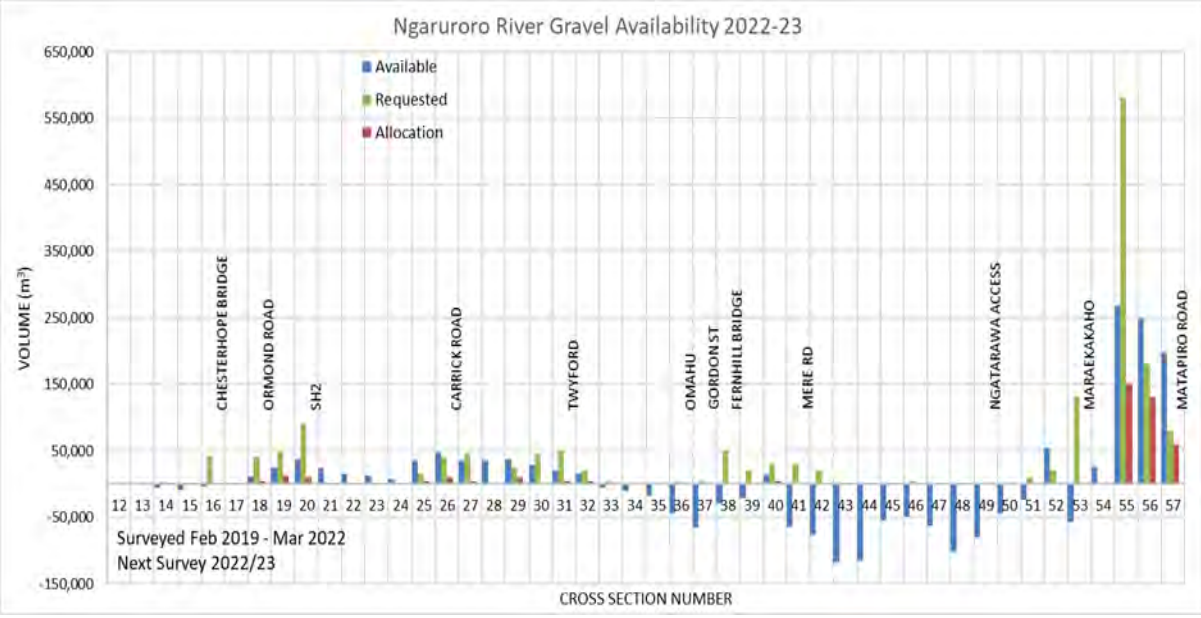
21. The current allocation process is by receiving contractors' requests annually in April. The AMG

[1] HBRC Report No. AM 17-11. HBRC Publication No. 4949.

received approximately 90 requests from different contractors this year. The AMG then allocates gravel based on gradeline assessments of gravel availabilty and advises contractors on volumes and areas by a letter in May. Before receiving allocation requests, the AMG meets with the industry (gravel extractors) and explains the process, challenges with availability, areas of concern, and ecological and environmental monitoring matters. This meeting also provides an opportunity for contractors to raise and ask any questions.

22. Due to the growth in infrastructure in the region, gravel extractors are struggling to find suitable materials for roads and development. Contractors are asking for significantly more gravel than in previous years. Refer to the graph and chart below, which shows the availability and allocation for the Ngaruroro River.





23. The Engineers and Gravel Assurance Officer within the AMG annually review the availability from riverbed survey data and site visits; this is then allocated fairly to contactors. It is important to note that we can't distribute/allocate gravel below the established design grade line each year.

24. A modelling study about the long-term effects of gravel extraction and beach raking in the Tukituki and Ngaruroro has been carried out by NIWA. The Tukituki is in the process of being

finalised. The Ngaruroro was completed 10 years ago. The main recommendations for gravel management from this study are:

24.1. Ngaruroro - very little aggradation occurs naturally upstream of Ohiti, which means that once the available gravel has been extracted, minimal extraction will be sustainable in this reach.

24.2. Ngaruroro - gravel extraction does not affect the overall natural supply rate. Still, it changes the distribution of gravel deposition area around Fernhill, where historical extraction rates have been the highest.

24.3. Ngaruroro - beach raking significantly influences gravel transport at and downstream of the raked areas. For this reason, gravel raking should be encouraged upstream of Maraekakaho to facilitate deposition in the lower reaches currently in deficit.

24.4. Cease extraction from the Lower Tukituki and the lower reaches of the Middle Tukituki in the short and long-term is due to long-term negative effects on coastal supply.

24.5. Encourage the establishment of long-term gravel extraction plants in the depositional reaches of the Upper Tukituki, aiming at maintaining long-term extraction rates at approximately the sustainable extraction rates (100,000 m^3/year in total).

24.6. Cease extraction from the degrading upstream reaches of the Upper Tukituki.

24.7. Consider reducing the frequency or stopping beach raking in the Lower Tukituki and upper sections of the Upper Tukituki.

24.8. Continue with the river raking programme in the rest of the Upper Tukituki.

25. The AMG plan to model the remaining main rivers (Tutaekuri, Esk, Waipawa), where extraction occurs by 2024.

Next steps

26. The AMG are looking at improving the process of allocation and management of riverbed gravel in the future; the new global consent, if granted, will reinforce the need for change.

27. In order to avoid a complete depletion of the gravel resources in the river, the criteria used to allocate gravel was:

27.1. No allocation in areas with negative availability (except 5,000m^3 at XS 40)

27.2. Requests between Maraekakaho and Matapiro Rd capped at a maximum of 50,000m^3 per individual contractor based on their requested volume and company size. The total amount allocated here is 340,000m^3, which is 46% of the current availability in the area.

27.3. No more consents to be issued during the year on the Ngaruroro.

Decision Making Process

28. Staff have assessed the requirements of the Local Government Act 2002 in relation to this item and have concluded that, as this report is for information only, the decision making provisions do not apply.

Recommendation

That the Environment and Integrated Catchments Committee receives and notes the *Gravel Extraction - current situation and new global consent* staff report.

Authored by:

José Beya **Martina Groves**

PRINCIPAL ENGINEER **MANAGER REGIONAL ASSETS**

Approved by:

Chris Dolley
GROUP MANAGER ASSET MANAGEMENT

Attachment/s

There are no attachments for this report.

Comments by Hastings District Council on applications for referral under the COVID-19 Recovery (Fast-track Consenting) Act 2020

Local authority providing comment	Hastings District Council (**HDC**)
Contact person (if follow-up is required)	Sara Field – Senior Environmental Planner – Consents s 9(2)(a)
	Anna Sanders – Senior Environmental Planner – Policy, Special Projects s 9(2)(a)
	Click or tap here to enter text.

Comment form

Please use the table below to comment on the application.

Project name	**Maraekakaho Quarry, Hawkes Bay (Russell Aggregates Limited) (Proposal)** *The project is to establish and operate a quarry on approximately 29.2 hectares of land at State Highway 50, Maraekakaho, Hawkes Bay. The project will include extraction of up to 6.42 million cubic metres of gravel aggregate over a period of up to 20 years, stockpiling processed aggregate on site, construction of infrastructure, including upgrading an existing vehicle access off State Highway 50, and structures associated with quarry operations and site remediation upon completion. The processing of the gravel aggregate will be undertaken on an adjacent site immediately to the north of the project site under existing consents granted by held by Russell Roads Limited.* *The project involves activities such as removing vegetation, extracting and stockpiling gravel aggregate, taking, diverting and discharging groundwater and discharging to land and water, diverting the surface water of the Ngaruroro River during flood events, discharging stormwater and contaminants to land and water, undertaking earthworks, undertaking remediation including creating artificial lakes and landscaping and planting, constructing roads and vehicle accessways, constructing or installing infrastructure or structures, storing hazardous materials.*
1. Summary of HDC's position -	HDC takes a neutral position as to whether the Proposal should be referred under the Covid-19 Recovery (Fast Track Consenting) Act 2020 (**FTCA**). The Council requests that the Minister have regard to the following main points when making a decision on referral: • The lack of consultation with mana whenua to date, and the lack of information as to the potential cultural effects, is of particular concern to HDC. The Minister may wish to consider requiring further information in this regard before making a decision on referral, or consider whether the RMA process is more appropriate in the circumstances; • There was significant community interest and involvement in past consenting for the Proposal site and HDC expects there to be a similar level of interest and concern around this proposal. HDC requests that the Minister consider whether in those circumstances

	a process allowing for full community participation (through an RMA notification process) is appropriate; Effects such as river hazards, dust nuisance, rural character and amenity and cultural effects need to be better understood, but on the basis of the information available have the potential to be significantly adverse. HDC is satisfied that these effects can be appropriately considered either through the standard RMA or the FTCA process.
2. **General comment – potential benefits**	HDC acknowledges that the Proposal would provide opportunity for employment through the construction sector and it would also have economic benefits for the landowners. The Property Economics Report (Attachment M) states that the Proposal will have economic benefits by virtue of the efficient provision of aggregate within the local market. While not expressly covered in this report as the report was prepared pre-Cyclone Gabrielle, it Is expected that the demand for aggregate will have been increased as a result of the need for recovery and rebuilding works.
3. **General comment – significant issues**	HDC considers the most significant issue is that full consideration be given to the potentially significant adverse effects on the environment of the Proposal given the size, scale, nature and duration of the proposed activity. HDC considers this can be achieved under both the FTCA and the RMA processes. There is expected to be a high level of community interest in the Proposal, given the level of involvement in consenting for the existing quarry operation at the subject site. The existing extraction and processing consent was publicly notified (at the request of the applicant) with a total of 65 submissions received. Note that the section 42A report summarising the issues raised by that consent may be useful to the Minister and can be provided on request. There is a pressing need and requirement to engage and consult with mana whenua given the location of the site in a culturally sensitive environment and within an area identified in the Water Conservation (Ngaruroro and Clive River) Order which HDC understands has been substantively confirmed. Further commentary on these matters is provided in Sections #4, #7 and #9 below.
4. Reports and Assessments usually required	<u>Resource Consents required from HDC</u> The site is located in the Rural Zone under the Operative Hastings District Plan and is covered by the following overlays: • River Hazard Overlay • Recommended Are for Protection 19 • Rural Landscape Character Area 4 • Riparian Areas Landuse Consent is required as a Non-Complying Activity (bundled) for the following reasons: *Chapter 15.1 Natural Hazards* *The proposal is located within the River Hazard Overlay Area. Permanent Buildings, structures and habitable buildings are classified as Non-Complying Activities pursuant to Rule NH12. As the proposal includes 'permanent' structures within the River Hazard, the proposal is therefore a Non-Complying Activity under this rule. The proposed 'permanent' structures include the portacoms and toilet block, which are shown to be located together in the north-western corner of the western extraction area on the indicative Quarry Site Plan (Attachment D).*

Chapter 27.1 Earthworks Mineral Aggregation and Hydrocarbon Extraction

The proposed gravel extraction is defined as a 'mining' activity, and as such, requires resource consent for a Discretionary Activity pursuant to Rule EM9.

HDC has not identified any additional District Plan consenting requirements beyond those identified in the Fast Track application documentation. We anticipate there will be Hawkes Bay Regional Council (HBRC) consenting requirements, however assume HBRC's comments will address those.

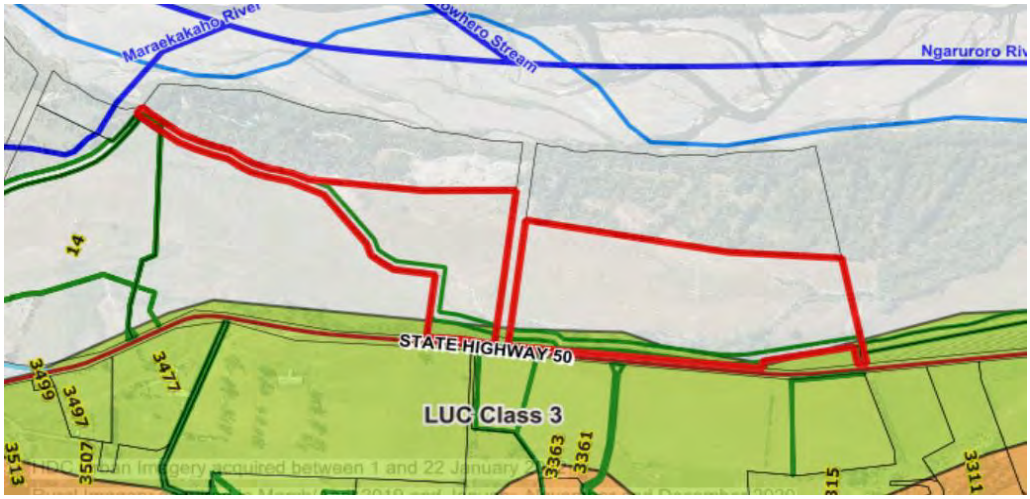
The application is supported by a number of technical reports by a range of specialists. In addition to what has been provided, HDC would expect the following:

Cultural Impact Assessment –

Given the scale, context and extent of development, and the proximity to the Ngaruroro River, the Council would likely require a cultural impact assessment if the application went through the standard process. This is subject to the outcome of engagement with the local iwi authorities and mana whenua.

Soil Quality and Productive Potential Assessment / National Policy Statement for Highly Productive Land (NPS – HPL) -

The NPS-HPL came into effect on 17 October 2022 and will apply to the land comprising the proposal. The most recent land use capacity mapping identifies a portion of the site as LUC 3 (the application estimates this area to be approximately 4100m^2), as represented in the map below. As is common with land along rivers, the LUC mapping does not currently identify an LUC class. HDC expects that site specific mapping would identify this land as LUC3 consistent with the adjoining land:



Section 3.5(7) of the NPS-HPL requires that until a regional policy statement containing maps of highly productive land in the region is operative, land classified as LUC 1-3 (in the NZLRI or more detailed mapping), zoned rural or rural production, and not identified for future urban development must be treated as highly productive land (HPL). At least part, and possibly all, of the Proposal land would be HPL within this interim definition. The Proposal therefore falls to be assessed under the NPS-HPL. If going through the RMA consenting process, site specific mapping may be required to determine whether the full site was HPL, and an assessment of the productive capacity of any HPL would be required to inform an assessment against the requirements of the NPS-HPL. HDC notes there is provision for mineral extraction on HPL in limited circumstances.

	Transportation - Waka Kotahi New Zealand Transport Agency need to be consulted to further identify any potential transport effects. A comprehensive Transport Impact Assessment would need to be provided to address any such effects. HDC would also expect this assessment to include details on the proposed internal functioning of the site in terms of traffic management having particular regard to the existing access to the River (owned by HBRC) which severs the proposed quarry sites and any conflicts. **Flood Risk -** The proposal contains a Preliminary Flood Risk Assessment. HDC would expect a comprehensive Flood Risk Assessment given the site's location in the River Hazard District Plan overlay, with the preliminary information updated in light of Cyclone Gabrielle. HDC questions whether the ARI used for the modelling is appropriate. This would be subject to discussion with the HBRC. Given the site's location in a River Hazard overlay, an assessment is needed to ensure that investment and infrastructure is assessed through a climate change lens given its location and potential natural hazard effects and risks. Providing for new development without appropriate information risks direct conflict with the National Adaptation Plan's direction to avoid development that may be exposed to climate hazards. **Economic Assessment -** The Property Economics Report makes reference to Central Hawkes Bay in a number of areas and includes what appears to be draft comments. These references should be clarified and the report finalised. It would also be useful if the Economic Assessment addressed any positive effects of the activity in Cyclone Gabrielle Recovery projects including whether there is sufficient supply. **Three Waters -** Any approvals for discharging to ground, water takes and diversions will be subject to HBRC approval. Council's Engineering Team have highlighted the importance of ensuring that HDC is engaged as part of any application to ensure the activity does not have the potential to impact on HDC water recharge zones or water take zones. **Cumulative Effects -** Effects do not appear to have been addressed in the context of the existing environment and having regard to those activities already consented on the site. Cumulative effects need to be considered. HDC notes that the existing site activities were restricted through consent conditions to ensure that effects were at a level that could be satisfactory mitigated and controlled. **Effects Assessment -** The effects assessment accompanying any application to be considered by an Expert Consenting Panel should also address; - Effects on Rural Character and Amenity - Dust Effects - Hazardous Substances - Reverse Sensitivity
5. Is Fast-track appropriate?	Refer #9

6. Environmental compliance history	Russell Roads – Existing Operations : Council's Compliance Team have commented that there have been issues with the ability of the applicant to comply with conditions of the existing consent (consented under RMA20180258). The Compliance team report issues arising from current activities in terms of dust, road safety due to truck movements, noise and windscreen damage due to stone chips. A summary from Council's Compliance Team has been attached as **Attachment A**. Full compliance records including investigation outcomes are available should the Minister wish to see the details, however given that the records are lengthy and detailed, and contain confidential information, they have not been attached at this stage. HDC can provide these records to MfE should these be required but would like to ensure complainants' confidentiality is maintained. The records include HDC Infringement Notice R0187 which has been included in the application (refer Attachment N). Russell Roads Infringement Notice – Fire Hydrant Access (15 August 2011), refer **Attachment B**. RR or M C Gale Family Trust: Due to time constraints and staff unavailability, a full review has not been undertaken. A full review of Council's Compliance records is available on request.
7. Iwi and iwi authorities	The applicant has identified the following list of Iwi authorities and Treaty settlement entities in the application documentation: **Part V: Iwi authorities and Treaty settlements** Iwi authorities | Iwi authority | Consultation undertaken | |---|---| | Ngati Kahungunu | Consultation will be undertaken as part of Russell Aggregates' preparation of its substantial application for resource consent. | | Te Taiwhenua o Heretaunga | As above. | | Te Taiwhenua o Tamatea | As above. | | Ahuriri Hapu | As above. | | Heretaunga Tamatea | As above. | Treaty settlement entities: | Treaty settlement entities | Consultation undertaken | |---|---| | Heretaunga Tamatea Settlement Trust | Consultation will be undertaken as part of Russell Aggregates' preparation of its substantial application for resource consent. | | Te Taiwhenua o Te Whanganui-a Orotu Inc | As above. | | Mana Ahuriri Trust | As above. | Council's Cultural Advisors have stated: *That although iwi consultation is referred to in the primary document, it has not been undertaken. The area in which the site is located, is the Ngaruroro Awa where droughts and floods are critical issues for mana whenua and there is no acknowledgement beyond the naming of the entities.*
8. **Relationship agreements under the RMA**	HDC is not aware of any relationship agreements but as part of engagement with mana whenua this needs confirming.

9. **Insert responses to other specific requests in the Minister's letter (if applicable)**	**Question 1 - Are there any reasons that you consider it more appropriate for the project, or part of the project, to proceed through existing Resource Management Act 1991 (RMA) consenting processes rather than the processes in the FTCA.** The Council takes an overall neutral position as to whether the FTCA process is used, however reasons why the RMA consenting process may be more appropriate include: • Lack of consultation to date and concern over potential cultural effects may make notification appropriate to ensure mana whenua have an appropriate opportunity to be involved; • The expected degree of public interest and whether a fully notified process may mean it is considered appropriate to allow for greater community input than the FTCA process allows. Should the Minister decide to refer the Proposal, it may be appropriate to specify additional persons from whom the Panel must invite comment on the application to provide greater opportunity for community input. It is understood that relevant iwi authorities would be invited to provide comment (under cl 17, schedule 6) however, as noted above, HDC considers the Minister should consider seeking further information from mana whenua prior to making a decision. **Question 2 - Does the applicant, or a company owned by the applicant, have any environmental regulatory compliance history in your district?** Yes - Refer to #6 above. Detailed compliance records can be provided to MfE should this be required. Comments completed 11th April 2023
Other considerations	N/A

Note: All comments, including your name and contact details, will be made available to the public and the applicant either in response to an Official Information Act request or as part of the Ministry's proactive release of information. Please advise if you object to the release of any information contained in your comments, including your name and contact details. You have the right to request access to or to correct any personal information you supply to the Ministry.

Attachment A - Summary of Hastings District Council Compliance Records – Russell Roads (CONFIDENTIAL)

11/09/19	Landscape Plan, Dust Mitigation Plan, Construction Management Plan, Noise assessment, security fencing erected, legal access to be obtained onto state hwy 50 – required to be done & proof given to Council (conditions of consent).
05/11/19	Dust Management Plan submitted (2 months after required date)
19/12/19	Remaining outstanding information received (3 and a half months after required date) apart from additional noise questions.
30/01/20	Noise & Dust complaint
03/02/20	Dust complaint
04/02/20	Noise assessment questions from 19th of the 12th 2019 answered.
14/04/20	Complaint – Russell Roads. Checked Consent conditions. No CMP on new road no planting and no fence as yet.
16/04/20	Planting/screening requirements fencing requirements well overdue; reminder sent.
10/05/20	Complaint. Non-performance of conditions required by the Consent. Specifically the complainants seek explanation as to why the landscaping as prescribed has not been completed, why the fencing required by the Consent has not been completed. And that the new road is not going to be completed within the twelve months post commissioners decision as required.
22/05/20	Approx. 8000sm section of hardstand with a pile of unprocessed shingle/silt etc on it, situated outside of the consented processing area.
14/12/20	Complaint - regarding planting.
24/12/20	Resolved - trees planted as per conditions to follow up tree planting late March to see if all trees have survived the summer.
18/05/20	Site visit to check on planting situation. Larger trees appear to be in bad health/dead & smaller trees are dead or are gone completely.
28/07/21	Re-planting has occurred, Site visit required
29/09/21	Complaint - regarding truck reversing beepers (noise) condition 12. Tonal reverse alarms shall be prohibited on machinery and vehicles that undertake the processing activity on the site. To avoid doubt, this does not include trucks being loaded and unloaded on the site
17/02/22	Complaint in relation to Russell Roads using the unsealed track from their site to Kereru Road access.
23/02/22	Complaint re trucks tracking gravel onto state hwy - *'Was just showered with gravel on State Highway 50 (between St Hwy 50A and Maraekakaho by two different trucks. It is not the first time but really scary when travelling fast. I now have chips in my windscreen'*.
14/07/22	Non-compliance with Condition 19,20 & 21 of RMA20210119
19/07/22	Abatement Notice - breach of Condition 19, 20 & 21 of RMA20210119

If calling ask for Dylan Stuijt

File Ref WAT-20-20-11-282

HASTINGS DISTRICT COUNCIL

HASTINGS, THE LIFESTYLE OF CHOICE,
A PLACE OF OPPORTUNITIES

15 August 2011

Chris Russell
Managing Director
Russell Roads
PO Box 2191
Stortford Lodge
Hastings 4153

Dear Mr Russell

Illegal use of fire hydrants

On the 15th Aug 2011 a Russell Roads vehicle was identified illegally gaining access to a fire hydrant and unlawful taking water. The hydrant standpipe observed did not have an RPZ installed, causing a backflow risk. This issue has been officially raised with your company on a number of occasions; with an infringement notice now being applicable.

Prior to this incidence, on the 2nd Dec 2010, the driver of water tanker Rego CMZ233 was given a verbal warning after drawing water from a Portsmouth Road hydrant. The driver stated he was aware that he wasn't permitted to draw water from a hydrant, and advised me he had been using the Copeland Road filling station all day. After inspecting our telemetry records, none of our tanker filling sites had recorded any usage by Russell Roads. What was of particular concern was that the driver informed me that his management had stated not to worry about using the hydrants. The warning was formalised via MWH managing the Bridge Pa water supply contract.

Please note, we will no longer only issue a warning for this type of offense. Should your company be witnessed gaining access to; or drawing water from a hydrant or water main without the Water Supply Authorities expressed permission, council is likely to pursue legal proceedings under the Health Act 1957, Local Government Act 2002 and Water Services By-law.

Relevant sections breached:

Health Act 1956 - 69ZZR Offences against sections in this Part:

(4) Every person commits an offence who, without reasonable excuse, takes any water from a fire hydrant, unless—

(a) that person is a firefighter (as defined in section 2 of the Fire Service Act 1975); or

(b) that person is a member of a volunteer fire brigade (as defined in section 2 of the Fire Service Act 1975); or

(c) that person takes the water for the purposes of firefighting; or

(d) that person—

(i) has the written approval of the drinkingwater supplier who supplies water to the hydrant; and

(ii) has been assessed by that drinkingwater supplier as being competent to take water from that hydrant in a way that does not endanger the networked system of which the hydrant forms a part or the water in that system.

Health Act 1956 - 69ZZO Contamination of raw water or pollution of water supply:

(1) Every person commits an offence who does any act likely to contaminate any raw water or pollute any drinking water, knowing that the act is likely to contaminate or pollute that water, or being reckless as to the consequences of that act.

(2) Every person who commits an offence under subsection (1) is liable on conviction on indictment to imprisonment for a term not exceeding 5 years, or to a fine not exceeding $200,000, or both.

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DX MA75020
Phone: (06) 871-5000 Fax: (06) 871-5105
www.hastingsdc.govt.nz

LGA 2002, Section 225: Offences relating to waterworks and network assets of Watercare Services Limited.

(1) Every person commits an offence and is liable on summary conviction to the penalty set out in section 242(1) who, wilfully or negligently,—

(a) takes water from the supply provided to another person without having entered into an agreement to be supplied with water from a waterworks; or

(b) having been supplied with water from a waterworks,

(i) supplies that water to another person who has not entered into an agreement to be supplied; or

(ii) permits that other person to take water supplied from a waterworks;

LGA 2002, Section 242. Penalties for offences.

(1) A person who is convicted of an offence under section 225, section 227, section 228, or section 232(3), is liable to a fine not exceeding $20,000.

Hastings District Council Water Supply By-Law, Section 11.1 Protection of Water Supply

11.1.1.1 Access to system

No person other than the WSA and its authorised agents shall have access to any part of the water supply system, except to connect to the point of supply, subject to 11.2.1, and to operate the owner or occupier stopcock.

11.1.1.2 No person to connect to or interfere with a water supply system

Except as set out in 11.1.1.1, 11.1.1.3 and 11.1.1.4, no person shall make any connection to or otherwise interfere with any part of the water supply system.

11.1.1.3 Fire

The right to gain access to, and draw water from, fire hydrants for the purpose of fighting fires shall be restricted to employees or volunteers of the NZ Fire Service or Rural Fire Authority.

11.1.1.4 Access Restrictions:

(a) The right to gain access to, and draw water from, the water supply for uses other than fire fighting shall be restricted to:

(i) The WSA or its agents;

(ii) Permit holders: Those persons who after having submitted an application to the WSA are subsequently approved to draw water from fire hydrants or tanker filling points. Such permits shall be valid only so long as the permit holder complies with the conditions endorsed on the permit.

(b) Without prejudice to other remedies available, the WSA may remove and hold any equipment used by any person to gain access to, or draw water from, a fire hydrant, and assess and recover the value of water drawn without authorisation and any other associated costs

Hastings District Council Water Supply By-Law, Section 6.2- Interference with Equipment

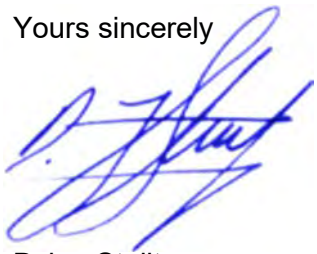
Any tampering or interference with WSA property, either directly or indirectly, shall be an offence.

The Hastings District Council takes compliance with the New Zealand Drinking Water Standards and Health (Drinking Water) Amendment Act 2007 very seriously, and any company that wilfully risks council's compliance with these standards will be addressed in a suitable manner.

Two filling stations are currently available at Copeland Road and Napier Road, and you're currently setup to use these sites. These are the only locations where a water tanker is permitted to fill from. You may wish to pursue installing a dedicated filling station at your own depot. For an 80mm connection Water Capacity charges/Development Contributions of $159,626.00 (Incl GST) would be payable, in addition to any physical connection costs. Standard meter charges would then apply. An additional filling station is currently planned for Kenilworth Road with a possible fourth site yet to be determined.

Infringement Notice is attached.

Yours sincerely



Dylan Stuijt
Water Supply Manager
s 9(2)(a)

Copy to: David Fraser – Group Manager: Asset Management

3rd Floor, 100 Warren St South
Private Bag 9002, HASTINGS 4156
DX MA75020
Phone: (06) 871-5000 Fax: (06) 871-5105
www.hastingsdc.govt.nz

TRIM Ref: 19234#001#0005

INFRINGEMENT NOTICE
Unauthorised Access to Fire Hydrant (Water Supply)

Notice Number - 1

(Issued under the authority of section 699C of the Local Government Act 1974)

Enforcement Authority:	Enforcement Officer Identification :
Hastings District Council (HDC)	Water Supply Manager

Christopher Paul Russell
Managing Director
Russell Roads Limited
PO Box 2191 Stortford Lodge
Hastings, 4153

You are alleged to have committed an infringement offence against the Health Act 1956, and Hastings District Council's Water Supply By-Law.

Details of Alleged Infringement Offence

Legislation contravened:
Health Act 1956, *Section 69ZZR – Taking water from a fire hydrant.*
Health Act 1956, *Section 69ZZO – Potential contamination of raw water or pollution of the water supply.*
Local Government Act 2002, Section 225 – Offences relating to waterworks and network assets...
HDC – Water Supply Bylaw, *Section 11.1 – Protection of Water Supply.*
HDC – Water Supply Bylaw, *Section 6.2 - Interference with equipment.*

Nature of infringement:

The company Russell Roads Limited of which you are the sole director has contravened the above legislation by unlawfully gaining access to Hastings District Council's water supply system from a fire hydrant. Tampering with and gaining access to any part of the Hastings District Council's water supply system is an offence. This offence could have lead to the contamination of the Hastings District Council's public water supply.

Location: 67 Waimarama Road, Hawke's Bay

Date: 15th August 2011 Approximate time: 1:00pm

THE FEE FOR THIS INFRINGEMENT IS $500.00 (Incl GST)

Payment of Infringement Fee

The infringement fee is payable to the enforcement authority within 28 days after the date of this letter.

The infringement fee is payable to the enforcement authority either:

by post:
Hastings District Council
Private Bag 9002
Hastings 4156

or in person at:
Hastings District Council
Civic Administration Building
207 Lyndon Road East
Hastings 4122

Payments by cheque should be crossed 'Not Transferable'.

Water Supply Manager

IMPORTANT - PLEASE READ SUMMARY OF RIGHTS PRINTED OVERLEAF
SUMMARY OF RIGHTS

Note: If, after reading this summary, you do not understand anything in it, you should consult a lawyer immediately.

Payment

If you pay the infringement fee within 28 days after the service of this notice, no further action will be taken against you in respect of this infringement offence. Payments should be made to the enforcement authority at the address shown on the front of this notice.

Note: Section 21(10) Summary Proceedings Act 1957, (a) It shall be a defence if the defendant proves that the infringement fee for the offence has been paid to the enforcement authority at the address specified in the notice before or within 28 days after service on the defendant of a reminder notice in respect of the offence, and (b) It shall not be a defence that the infringement fee for the offence has been paid otherwise than as referred to in paragraph (a) of this subsection.

Further action

If you wish to raise any matter relating to circumstances of the alleged offence, you should do so by writing to the enforcement authority at the address shown on the front of this notice within 28 days after the service of this notice.

If you deny liability and wish to request a hearing in the District Court in respect of the alleged offence, you must, within 28 days after the service of this notice, write to the enforcement authority at the address shown on the front page of this notice requesting a Court hearing in respect of the offence. The enforcement authority will then, if it decides to commence court proceedings in respect of the offence, serve you with a notice of hearing setting out the place and time at which the matter will be heard by the Court.

Note: If the Court finds you guilty of the offence, costs will be imposed in addition to any penalty.

If you admit liability in respect of the alleged offence but wish to have the Court consider submissions as to penalty or otherwise, you must, within 28 days after the service of this notice, write to the enforcement authority at the address shown on the front page of this notice requesting a hearing in respect of the offence AND in the same letter admit liability in respect of the offence AND set out the submissions that you would wish to be considered by the Court. The enforcement authority will then, if it decides to commence court proceedings in respect of the offence, file your letter with the Court. There is no provision for an oral hearing before the Court if you follow this course of action.

Note: Costs will be imposed in addition to any penalty.

Non-payment of fee

If you do not pay the infringement fee and do not request a hearing within 28 days after the issue of this notice, you will be served with a reminder notice (unless the enforcement authority decides otherwise).

If you do not pay the infringement fee and do not request a hearing in respect of the alleged infringement offence within 28 days after the service of the reminder notice, you will become liable to pay COSTS IN ADDITION TO THE INFRINGEMENT FEE (unless the enforcement authority decides not to commence court proceeding against you).

Defence

You will have a complete defence against proceedings relating to the alleged offence if the infringement fee is paid to the enforcement authority at the address shown on the front page of this notice within 28 days after the date of service of this notice on you. Late payment or payment made to any other address will not constitute a defence to proceeding in respect of the alleged offence.

Queries/correspondence

When writing or making payment of an infringement fee, please indicate:

(1) The date of the infringement offence; AND

(2) The infringement notice number: AND

(3) The identifying number of each alleged offence and the course of action you are taking in respect of it (if this notice sets out more than one offence and you are not paying all the infringement fees for all the alleged offences); AND

(4) Your address for replies (if you are not paying all the infringement fees for all the alleged offences).

FULL DETAILS OF YOUR RIGHTS AND OBLIGATIONS ARE SET OUT IN SECTIONS 225 OF THE LOCAL GOVERNMENT ACT 2002, SECTION 69ZZO OF THE HEALTH ACT 1956, THE COUNCILS WATER SUPPLY BY-LAW, SECTIONS 699C OF THE LOCAL GOVERNMENT ACT 2002, SECTIONS 225, 240, 244 AND 247 LOCAL GOVERNMENT ACT 2002 AND SECTION 21 OF THE SUMMARY PROCEEDINGS ACT 1957.

NOTE:
ALL PAYMENTS, ALL QUERIES, AND ALL CORRESPONDENCE REGARDING THIS INFRINGEMENT MUST BE DIRECTED TO THE ENFORCEMENT AUTHORITY AT THE ADDRESS SHOWN.

s 9(2)(f)(ii), s 9(2)(g)(i)

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s 9(2)(f)(ii), s 9(2)(g)(i)

Comments on applications for referral under the COVID-19 Recovery (Fast-track Consenting) Act 2020

This form is for persons requested by the Minister for the Environment to provide comments on an application to refer a project to an expert consenting panel under the COVID-19 Recovery (Fast-track Consenting) Act 2020.

Organisation providing comment	Waka Kotahi NZ Transport Agency
Contact person (if follow-up is required)	Kathryn Millar-Coote, Team Lead Environmental Planning
	Environmentalplanning@nzta.govt.nz
	Our reference 2023-0375

Comment form

Please use the table below to comment on the application.

Project name	Maraekakaho Quarry Project
General comment	Waka Kotahi has not identified any reason why this application should not be referred to an expert consenting panel.
Other considerations	
[Insert specific requests for comment]	As the proposal involves direct access onto State Highway 50, should the project be referred, Waka Kotahi seeks the applicant be directed to continue to consult with Waka Kotahi, with the express requirement to gain approval from Waka Kotahi under the Government Roading Powers Act 1989 for intersection design of the access onto State Highway 50.

Note: All comments, including your name and contact details, will be made available to the public and the applicant either in response to an Official Information Act request or as part of the Ministry's proactive release of information. Please advise if you object to the release of any information contained in your comments, including your name and contact details. You have the right to request access to or to correct any personal information you supply to the Ministry.

s 9(2)(f)(ii), s 9(2)(g)(i)

s 9(2)(f)(ii), s 9(2)(g)(i)