greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

By email

30 September 2018

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Kirsty van Reenen
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[Internal]

Dear Kirsty

Response 2 to further information request under section 92(1) of the RMA 91 - WGN130264, WGN130303, WGN140054, WGN150094

Thank you for your letter dated 1 August 2018 regarding the above.

Please find the information requested for questions 1-3 and 7. For completeness I have included the original responses for questions 4-6 as well.

Information requested

Question 1

Please outline the overall philosophy and objectives/outcomes/success measures the applicant is trying to achieve the proposed flood protection works. Please also explain where in the documentation this information will sit. It is our expectation that this will provide a framework that can be used to assess monitoring results against and inform the adaptive management process.

Sustainable and effective river management is based on the following six key principles and their relationships:

1 Rivers are dynamic. They are constantly changing and at any time, are a physical expression of a combination of their physical, climatic and human processes (both past and present) at the catchment and reach level.

2 To work with rivers and not against them. Healthy rivers are diverse rivers. Diverse rivers have greater natural character which provides for greater expression of mauri[1] and their inherent aquatic and riparian habitats, which in turn support greater species diversity.

3 Rivers need room to move. Rivers naturally meander, and the meander pattern will tend to migrate downstream over time. Central to this process is erosion and deposition of bed and bank material and the re-location of riparian margins.

4 River management requires knowledge. Understanding catchment specific river histories and bedload transport capacities is needed to predict reach specific future state, and what is realistically achievable.

5 Rivers are managed for a range of flood flows. Both maximum flood and channel carrying capacities are managed to meet the community's expectations for protection, and the avoidance and/or mitigation of flood hazards.

6 River management requires adaptability. The unpredictability of dynamic rivers combined with fixed channel capacity constraints, means flexibility of management is important to achieve agreed outcomes.

These principles (sit both in the conditions and the code. The proposed Operational Management plans will address how the proposed flood protection works will achieve the principles for Te Awa Kairangi, Waikanae, Otaki and Wanuiomata Rivers. Operational Management Plans will identify management reaches and the key river management principles, outcomes and success measures. They will also contain detailed guidelines for the specific management of each reach, including advice on the most appropriate methods and tools to be used in each reach.

The Environmental Monitoring Plan (EMP) sets out the environmental monitoring programme for river management activities. The consent holder must undertake monitoring in accordance with the EMP. The conditions will also incorporate NCI/HQI based monitoring into this plan and provide for kaitiaki monitoring to be undertaken by Mana Whenua.

[1] [1] According to the PNRP definition, mauri is an energy or life force that mana whenua considers exists in all things in the natural world.

There are currently information gaps related to effects of some instream, activities, including the impact of one-off large-scale works, and the cumulative effect of successive smaller interventions over time. It is intended that for the first five years that the baseline and event monitoring (through Site Specific Environmental Management Plans) detailed in the EMP will fill these gaps. We then intend to refine this monitoring to assess how we are going in achieving our six management principles. We see the NCI/HQI as a critical tool for doing this.

Question 2

Please provide an assessment of how the proposed monitoring will be used to assess whether the objectives/outcomes/success measures (required above in Question l) are being achieved and how this will feed into the adaptive management process (e.g. changes to the Code of Practice). For example, it would be useful to see a table with each of the monitoring proposed and an assessment of how the monitoring will be used to assess whether one or more of your success factors has been achieved, whether any of the proposed monitoring doesn't relate to any specific success factor(s) and whether there are any success factors for which monitoring is not proposed to be able to undertake an assessment.

The Environmental Monitoring Plan includes baseline monitoring, site specific (event based monitoring) and cumulative effects monitoring through developing the HQI for this purpose.

Attachment 1 shows what is being monitored and the reasons for it being udnertaken

Question 3

The application does not include measures or limits to manage the cumulative effects of work (i.e. there are no proposed limits on the number and/or length of works). Please comment on whether cumulative effects could be managed by including a trigger for a Site Specific Environmental Management Plan once a threshold(s) has been reached and what this trigger could be.

Cumulative effects will be addressed by the development of the NCI/HQI for this purpose. This is included as a condition. Attachment 1 underlines the use if NCI/HQI to assess cumulative impact .

Question 4

Please provide details on the process for developing and reviewing Floodplain Management Plans (FMP).

Floodplain Management Plans (FMPs) are key strategic documents, which largely determine the Council's approach to river management within those rivers and streams administered by GWRC. Currently there are four completed FMPs

- Hutt River Floodplain Management Plan
- Waikanae River Floodplain Management Plan
- Otaki River Floodplain Management Plan
- Pinehaven Stream Floodplain Management Plan

Two further schemes that meet some but not all the criteria for a FMP are:

- Waitohu Stream Study
- Porirua Flood Mitigation Scheme

A further three FMP's are currently under development for the floodplains of the:

- Waiohine River
- Te Kauru/Upper Ruamahanga Rivers
- Waiwhetu Stream

Priorities for developing FMPs are set by the LTP planning process and each FMP has a review period of 10-15 years (up to three reviews may occur over the 40 year planning timeframe of a FMP) with more substantive reviews envisaged after a major flood event.

Question 5

Given the FMPs underpin the works done under this consent application and their apparent rigidity, please comment on whether there is scope to consider RMA/environmental outcomes through the process for developing and reviewing FMPs e.g. a consent condition requiring consideration of environmental outcomes through the FMP review process.

FMPs are created through the application of Floodplain Management Planning principles to a river and its floodplain. This is an internationally recognised process that provides a comprehensive long-term strategy for managing areas at risk from flooding and river erosion. It relies on the Council's expertise in understanding both the nature and behaviour of the river and on the Council's ability to engage effectively with affected communities and work with them to develop enduring and affordable solutions. The FMP process is set out in GWRCs FMP Guidelines [2001].

FMPs set the management objectives for a particular river, including a long term strategy for managing flood risk. A FMP is developed through a consultation process which includes the local community. Although FMPs can have a long lifespan, the documents themselves contain review procedures that provide for adaptation.

FMPs define the flood and erosion hazard management activities that will be undertaken and levels of service that will be provided within a specified floodplain area within a river catchment. These responses are not limited to the creation of infrastructure assets for flood protection; the use of other non-structural solutions such as the promotion of hazard avoidance and the use of planning restrictions are also important elements in the overall mix of responses and solutions. FMP planning also identifies cultural, ecological or amenity needs in relation to river management which a community identifies as being an important component that needs to be addressed in conjunction with flood and erosion protection.

The monitoring and reporting undertaken as part of the proposed consent framework will provide information on RMA/environmental outcomes which will be able to inform subsequent reviews of the FMPs. Therefore we do not consider it is necessary to include a consent condition on this, and instead prefer that this is covered off in the Code. The Code (section 3) currently contains objectives to ensure that, as part of the review of an FMP, the adoption of the good practice river management methods in the Code, and lessons learnt through the Kaitiaki Monitoring Plan and the Environmental Monitoring Plan, are considered. Other documents, including the Annual Report, Operational Management Plan and any Site Specific Environmental Management Plan prepared for a particular work will provide information that is then able to be included as part of the FMP review process.

In the future, Integrated Catchment Management Plans or implementation plans from Whaitua processes, will guide implementation, of OMPs and annual work plans. Overtime these will be reflected in reviews of Floodplain Management Plans.

Question 6

Please provide detail of your process for the design and review of measures/structures to be constructed under this consent, i.e. is the design of all flood protection measures and structures peer reviewed internal/externally prior to being implemented?

The structures to be built under the consent may vary as follows:

- Small structures (typically less than 50k) including small additions to existing structures or maintenance of existing works.

  This work is normally completed through supervision by GWRC staff or direct labour with plant and operator hire from a contractor. This work would comply with the resource consent conditions and Code and be supervised by senior staff, Area Engineers or technical staff typically with over 20 years' experience. Works would be noted and checked by senior staff and included within GWRC asset management system. Any ongoing issues would be picked up as a minimum in the annual asset inspections that take place on all river systems.

- Medium sized structures or river works (typically greater than 50k)

This work typically involve a small sketch and an agreed design, methodology and typical costings of the works. Work would be supervised senior river staff, Area Engineers or technical staff typically with over 20 years' experience. A record of the new asset by survey and digitising would also be made.

- Large Structures or river works (typically anything greater than 100k).

  Detailed design for these type of works can be completed in house or by an external consultant (in-house design capacity is currently being increased). Depending on the scale of the works they would be drawn up with survey control points and set-out as well as detailed costings. This work would as a minimum be checked by a suitably qualified Chartered Professional Engineer and if necessary this would be completed by external consultants. These works would be supervised by an Engineer as well as by Senior River staff, Area Engineers or technical staff typically with over 20 years' experience. It is likely to be controlled by daily survey set out and checks by technical staff officers.

- Contract works

  These works are completed to the prescribed standard, the detailed design for these works would either be completed in house or by a consultant. This work is checked by a suitably qualified Chartered Professional Engineer. The works are supervised on behalf and to the approval of the Engineer to the Contract. All design and construction decisions require the Engineer to the Contract's approval. Typically there are full records kept of this type of work, and the works are as-built surveyed at the end of construction. These steps are mandated by legislation typically the Construction Contracts Act 2002 and the agreed minimum standards under the Australian and New Zealand (incorporated as conditions into the contract).

Question 7

Please provide details of the process that the person who implements works under this consent goes through when they decide what measure and methods within the code are to be implemented at a particular location.

The decision making framework for determining whether a river management activity should proceed is described in Figures 1 and 2 below.

Figure 2 outlines the steps to be carried out at all levels of management planning to ensure that the effects of river management activities are appropriately considered and addressed.

Table 1: Process for management of effects arising from river management activities

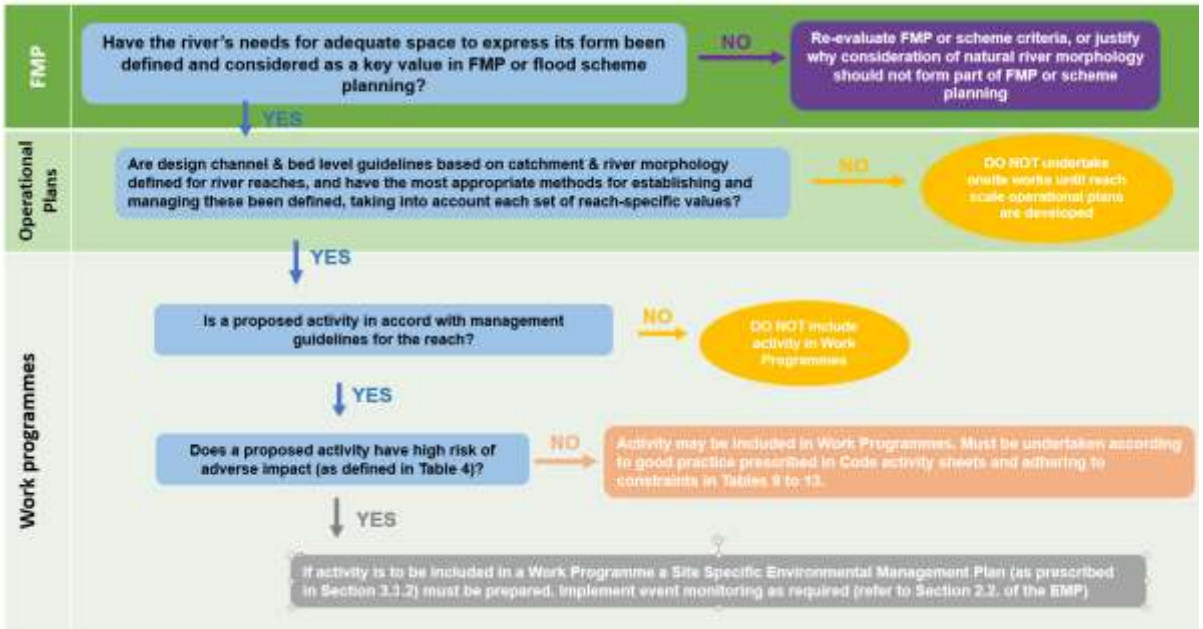
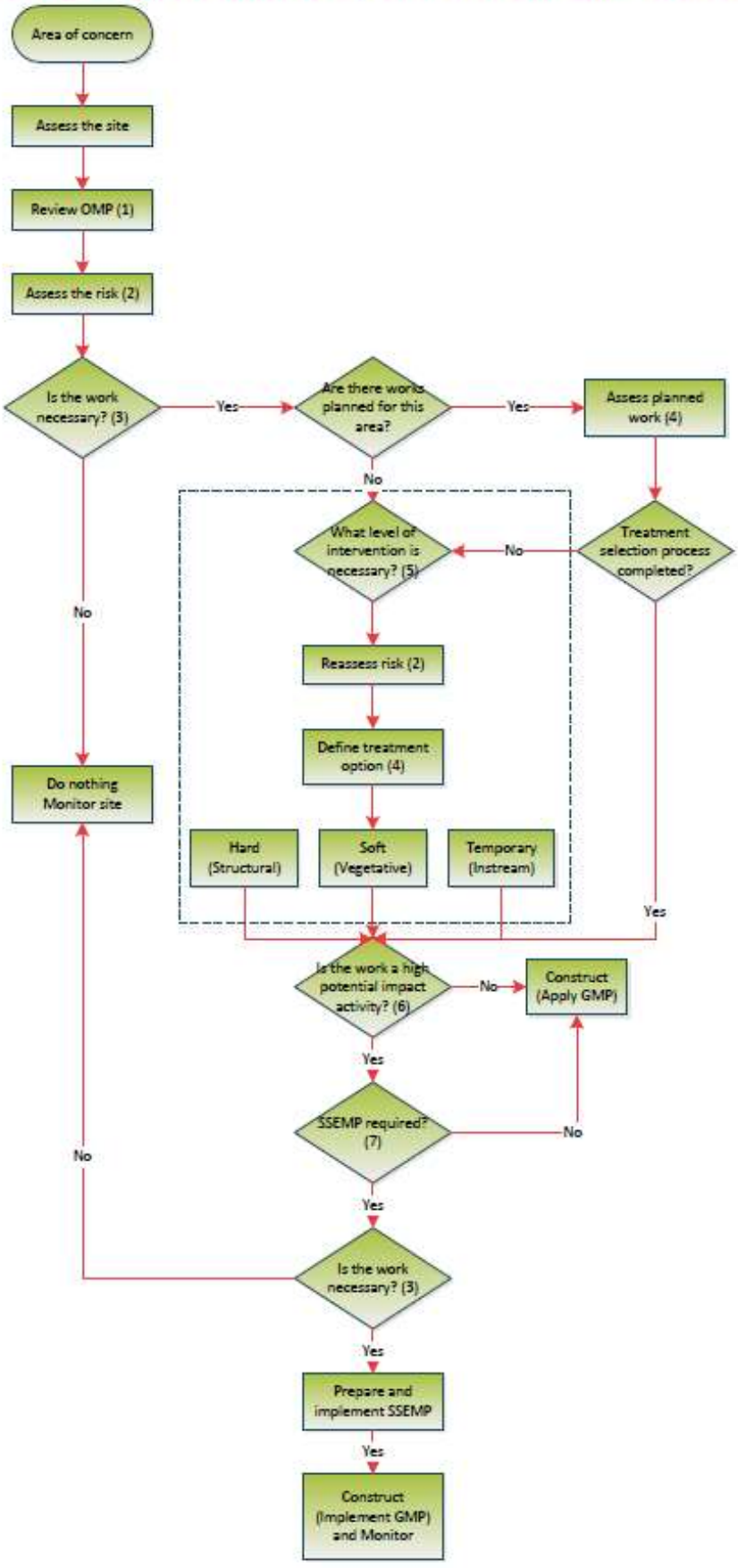


Figure 2 outlines the process that staff follow to decide whether work is necessary and then which GMP from Section 10 is appropriate. The first question that should always be asked is, is it necessary to do anything? Should we intervene? Can we avoid, remedy or mitigate the effects of the proposed work and finally what will the knock on effects of that work be and what is the appropriate response to this consideration.

Decision making framework for planned and reactive maintenance



(1)
- OMP would detail future work planned for the area
- Would also display constraints and values
- Important to note/remember that principles of river management are embedded in these Plans

(2)
- What is at risk? – people/infrastructure
- This is a judgement call but feeds into the treatment selection process
- This judgement call is based on experience and is made in the context of the OMP information (constraints/values/planned works)

(3) Avoid/remedy/mitigate
- What are the potential knock on effects of the works?
- What is the appropriate response to the consideration? (avoid/remedy/mitigate)

(4) If it is decided to bring future planned works forward there is a process to go through in terms of bringing forward that budget. This process is not shown on this diagram.

(5) Treatment selection process
These are effectively a hierarchy of river engineering solutions (treatment options) available. Broadly these range from temporary (instream works) through to permanent (structural) methods.
Permanent solutions then range from soft (vegetative) to hard (rock) methods. The RISK will determine the level of intervention and subsequent treatment option.

(6) These are defined in Appendix 3 of the Code
- Wet gravel extraction
- Bed recontouring
- Channel diversion cuts
- Ripping in the wet channel

(7) An assessment of whether the work requires separate consent to be included in the SSEMP process.

The process contained within the dashed box is termed the treatment selection process.

Please feel free to contact me on 04 830 4045 if you have any questions or concerns

Yours sincerely

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Attachment 1

Parameter	What is monitored	Reasons for monitoring	Relevant river management principle
Hydrological information	Continuous monitoring of flow regime, flood and low flow summary data for each river	Provides context for analysis of other monitoring data. This information is collected routinely as part of GWRC's river monitoring network.	4. River management requires knowledge; 5. Rivers are managed to contain predetermined flood carrying capacities;
Aerial photography	At least once every three years in river management reaches in the Otaki, Waikanae, Hutt, Ruamahanga, Waiohine, Waipoua, and Waingawa rivers	Provides a range of river morphology information including meander forms, sinuosity, extent of braiding, percent pools, active channel width, bar location and area, etc. This information is: • Included in the OMP when describing the channel type and key morphological characteristics. • Made available to the Independent Review Panel • Potentially one of several inputs to the HQI as a measure of cumulative and/or event-based change.	1. River are dynamic; 2. Healthy rivers are diverse rivers; 3. Rivers need room to move; 4. River management requires knowledge 5. Rivers are manged to contain predetermined flood carrying capacity; 6. River management requires adaptability
Pool and riffle counts	At least once every three years in river management reach in the Otaki, Waikanae, Hutt, Ruamahanga, Waiohine, Waipoua, and Waingawa rivers	The number of pools and riffles is one measure of the diversity of aquatic habitat and morphological complexity of a river, which in turn can be used as an indicator of the overall ecological health of the river (particularly when considered in conjunction with other aquatic survey data). Information included in annual surveys will: • Be assessed against triggers included in Table 6 of the COP, potentially triggering a management response as detailed in Table 6 and Table 8. • Made available to the Independent Review Panel • Potentially be one of several inputs to HQI as a measure of cumulative and/or event-based change.	1. River are dynamic; 2. Healthy rivers are diverse rivers; 3. Rivers need room to move; 4. River management requires knowledge
River bed levels	River bed levels are monitored at least once every five years in river	Monitoring of riverbed levels is important due to their impact on flood capacity and channel stability. Survey data are used to analyse trends in gravel movement	4. Rivers are manged to contain predetermined flood carrying capacity;

Parameter	What is monitored	Reasons for monitoring	Relevant river management principle
	management reaches in the Otaki, Waikanae, Hutt, Ruamahanga, Waiohine, Waipoua, and Waingawa rivers	and to determine river management policies for the next five-year period. This information is: • Included in the OMP when describing the channel type and key morphological characteristics. • Made available to the Independent Review Panel	
Deposited sediment	Deposited sediment levels are monitored annually at baseline monitoring sites.	The amount of deposited sediment on the river bed is used as an indicator of aquatic habitat quality; changes can be used to indicate changes in habitat quality over time. Information included in annual surveys will: • Be assessed against triggers included in Table 6 of the COP, potentially triggering a management response as detailed in Table 6. • Made available to the Independent Review Panel • Potentially be one of several inputs to HQI as a measure of cumulative and/or event-based change.	2. Healthy rivers are diverse rivers;
Riverbank undercutting & overhanging vegetation	River bank undercutting and overhanging vegetation are monitored annually at baseline monitoring sites	River bank undercutting and overhanging vegetation provide opportunities for aquatic habitat diversity, which in turn may contribute to overall aquatic ecological health. Information included in annual surveys will: • Be assessed against triggers included in Table 6 of the COP, potentially triggering a management response as detailed in Table 6. • Made available to the Independent Review Panel • Potentially be one of several inputs to HQI as a measure of cumulative and/or event-based change.	2. Healthy rivers are diverse rivers;
Trout abundance	Annual surveys are conducted in the Otaki, Waikanae and Hutt Rivers (at least until the 2018/19	To identify trends in population numbers and distribution, and to investigate the effects of river management activities in both the short and longer term. Information included in an in-depth assessment to be conducted after the 2018/19 summer survey:	2. Healthy rivers are diverse rivers;

Parameter	What is monitored	Reasons for monitoring	Relevant river management principle
	summer)	• Be assessed against triggers included in Table 6 of the COP, potentially triggering a management response as detailed in Table 6. • Made available to the Independent Review Panel	
Native fish communities	Surveys of native fish communities are conducted every three years at baseline monitoring sites, and in low gradient stream where mechanical weed clearance is undertaken	To provide quantitative data on populations and distribution of native fish species. This information will: • Be incorporated into the Ecological Values GIS layer, • Be included and taken account of in Operational Management Plans. • Made available to the Independent Review Panel • Assist in the assessment of cumulative effects of river management activities over time.	2. Healthy rivers are diverse rivers;
Riparian vegetation	Mapping of vegetation types on the riparian margins of the Otaki, Waikanae, Hutt, Ruamahanga, Waiohine, Waipoua, and Waingawa rivers. Mapped using high resolution aerial photography, and compiled in GIS.	Information obtained is used to map vegetation types on the riparian margins. This information will: • Identify high value areas of riparian vegetation to be incorporated into the Ecological Values GIS layer. • Be included and taken account of in Operational Management Plans. • Be made available to an Independent Review Panel • Identify of areas inclusion in the environmental enhancement programme. • Potentially be one of several inputs to HQI as a measure of cumulative change.	2. Healthy rivers are diverse rivers;
River birds	Ongoing annual surveys of bird species on a 'three-year on three year off' cycle, alternating between the western rivers (Hutt, Waikanae, Otaki) and the Wairarapa rivers	Information obtained in river bird surveys will: • Be assessed against triggers included in Table 6 of the COP, potentially triggering a management response as detailed in Table 6. • Be made available to an Independent Review Panel • Be incorporated into the Ecological Values GIS layer • Be included and taken account of in Operational	2. Healthy rivers are diverse rivers;

Parameter	What is monitored	Reasons for monitoring	Relevant river management principle
	(Ruamahanga, Waingawa, Tauherenikau).	Management Plans, • Allow assessment and quantification of the impacts of river management activities on river nesting bird populations	
Inanga spawning habitat	Inanga spawning habitat is surveyed at least once every seven years in tidal parts of waterways managed Flood Protection.	Information obtained would: • Be incorporated into the Ecological Values GIS layer to show: • Be included and taken account of in Operational Management Plans, • Be made available to an Independent Review Panel • Identify potential areas for inclusion in the environmental enhancement programme.	2. Healthy rivers are diverse rivers;
Habitat Quality Index	Once every three years assessment of selected reach scale geomorphological characteristics (sinuosity, braiding, percent pools, active channel width, bank-full channel width, floodplain channel width) for each river management reach.	The HQI is under development as a tool to measure relative change in selected geomorphological characteristics and habitat quality. The output of this assessment would: • Be used to assess the cumulative effect of river management activities • Be made available to an Independent Review Panel	1. River are dynamic; 2. Healthy rivers are diverse rivers; 3. Rivers need room to move; 4. River management requires knowledge
Event monitoring	A site specific monitoring plan is required for any works activity that triggers the need an SSEMP	Site specific monitoring is required for any activity that has a high potential impact because of its scale, location or timing. The monitoring components would be designed specifically for the event in question, but would generally be based on a before/after/control/impact design.	Site specific impact assessment

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The Greater Wellington Regional Council promotes **Quality for Life** by ensuring our environment is protected while meeting the economic, social and cultural needs of the community