STAFF REPORT

TO: Environment & Planning Subcommittee
Commissioner Hearing

FROM: Leif Pigott - Consent Planner Natural Resources

REFERENCE: RM060937 RM060938

SUBJECT: **NEW ZEALAND ENERGY LIMITED - REPORT EP09/02/03 -** Report prepared for hearing of 9 to 13 February 2009

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1. INTRODUCTION

This report forms part of the suite of reports that assess the Matiri Hydro Scheme application by New Zealand Energy Limited (NZEL). This report needs to be read in conjunction with the "Introduction, Summary and Recommendations" report.

This staff report assesses the applications to undertake works in a waterway and earthworks.

There are several specific and discrete items that are included in the application and these are summarised below.

1.1 Works in a Waterway

The works include the disturbance of both the bed of Lake Matiri (outlet) and the Matiri River. Because it is difficult to determine the boundary at which the transition from lake to river occurs, for the purpose of this report, the point the river commences is determined as the spill point of the lake. This point has not been defined by the applicant.

It is considered that the works include the intermittent disturbance of the bed of both Lake Matiri and the Matiri River from the Lake itself to the Confluence of the Matiri River with the West Branch of the Matiri River, an approximate distance of three kilometres.

The works in the bed of the Matiri River include the following activities and effects:

- The construction of three weirs, an intake structure, a spillway, penstock, tailrace and the construction and removal of a temporary crossing (most likely to be a baigent bridge);

- The on going use and maintenance of the structures within and over the bed of the watercourse; and

- The temporary discolouration of the watercourse during the various construction phases.

The construction of the three weirs, will result in the approximately 100 metres of the river bed being disturbed downstream of the intake structure. A further 200 metre reach of the bed of the river referred to in the application as the "sweeping bend" will be disturbed to allow for the construction of the penstock. The location of the tailrace from the proposed power station at or about map reference NZMS 260: M29 538-474 will also result in bed disturbance at this location as will the construction and removal of the temporary for within the West Brant of the Matiri River located approximately 300 metres upstream of the confluence with the Martiri River.

1.2 Earthworks

Earthworks proposed by the applicant include the following activities and effects:

- Upgrade of the existing road, access track and culverts
- Construction of a new access track
- Construction of a 1.6 metre penstock
- Construction of the building platform for the power station
- Construction of the a tail race from the power station to the Matiri River, and
- Stock piling of soil and over burden materials at various identified lay down areas.
- To remove indigenous vegetation including approximately 50 beech trees from the proposed routes of the penstock and tail race; and
- To extract gravel from a total of 4 separate locations on the Matiri and West Branch of the Matiri Rivers.

2. SUBMISSIONS

Various submitters raise issues relating specifically to the works in waterbodies (Section 13 of the RMA) and earthworks applications (Section 9 of the RMA). Some opposing submissions appear to be seeking what has previously been rejected by the Planning Tribunal under the comprehensive Buller Water Conservation Order (WCO) process.

The types of issues raised by submitters are listed briefly here before each submission is considered in more detail below.

2.1 General Issues

Pubic access, safety and amenity issues have been raised by several submitters and these are relevant to both earthworks and the works in the water course.

The Department of Conservation (DOC) have raised concerns about the lack of detail and certainty within the application. Although further measures have been recommended in some of the technical reports forming part of the application, these measures have not necessarily been adopted by the applicant. There are several issues remaining where it is uncertain whether the measures proposed will adequately avoid, remedy or mitigate the potential adverse environmental effects.

2.2 Works in the Water

The issues relating to matters with Section 13 of the RMA and earthworks are discussed below.

Issues raised in submissions relating to Section 13 activities are summarised here for each of the landscape segments as follows:

Landscape Segment A – Lake Matiri

- Effects of Damming and Scheme Operation on Lake Matiri.
- Effects of fluctuating lake levels (including hydro-peaking) on wildlife, native fishery and wild and scenic values
- Effects on fish passage including lake outlets 2 & 3 and the potential for fish entrainment at the Scheme intake, outlet 1.
- Ecological effects on Coal Creek
- Effects on avifauna recorded to be using the lake
- Reliability / uncertainty regarding the proposed residual flow of 1 cubic metre per second (cumec) discharging from the natural rock dam post scheme construction
- Amenity effects on Lake Matiri and its shore line.
- Effects on water quality of Lake Matiri during the construction.
- Effects on Lake Matiri during planned maintenance operations.

Landscape Segments B, C, D & E

- Effects of Taking and Use of water from Lake Matiri outlet for the purpose of power generation.
- Effects of Scheme operating regime, residual flow and flushing flows on the Matiri River.
- Effects on the trout fishery and native fish. Adequacy of the proposed residual flow regime, and maintenance of a permanent river flow connection from Lake Matiri to the Buller River. One fisher of the river for 35 years submits that it is a very important spawning and trout habitat that will be ruined.
- Safety issues for river users including fisherman

- Effects on natural character.
- Effects on Whio (Blue Duck)
- Effects on water quality during construction and maintenance

Landscape Segments Part E, F & G

- Effects of Scheme Operation and Discharge - Matiri River downstream of the proposed power station to the confluence with the Buller River.
- Fish and Game Council and others are particularly concerned about effects of the proposed flow regime on the trout fishery that may including hydro-peaking and may result in a reduced primary food production, reduced adult trout habitat and the potential for angler safety to be compromised by the rate the changes of flow may occur.
- Effects on water quality during construction and maintenance

Decision(s) Sought by Submitters (works in watercourses)

The decisions sought by submitters cover the complete range from granting, granting with conditions to full decline of the applications.

If the applications are granted, suggested conditions of consent include:

- That construction (and maintenance) activities in the period 1 January to 31 March in any year and to not occur within 500 metres of moulting shelduck (Fish and Game New Zealand).
- Restrictions on the rate at which flows increase and decrease and that appropriate notice be provided to river users of the flow regime. Fish & Game suggest a warning signal would be appropriate for rapid flow increase events (Fish and Game New Zealand).
- That the applicant be required to provide public access points to the river from the upgraded road through its property at 3km intervals (Fish and Game New Zealand).
- That during the trout fishing season, restrictions should apply requiring generation to occur at maximum rates for a minimum daytime period of three hours, to enhance trout fishing opportunities (Fish and Game New Zealand).
- A higher residual flow not less than MALF7 (7 day mean annual low flow) be maintained below the dam and a guaranteed flow connectivity to Lake Matiri (Department of Conservation).
- Provision for improved legal public access over private land (Department of Conservation).
- Restrictions on the rate at which flow are increased and decreased (Department of Conservation).

- Extensive restrictions to prevent the introduction of pest animal species and weeds and inclusion of monitoring (Department of Conservation).

2.3 Earthworks

Submissions relating to the earthworks activities addressed in this report raised the following issues: Stormwater run off being contaminated by sediment; sediment entering the lake and river; dust from construction traffic; restrictions to public access; effects of disturbing indigenous vegetation; effects on the amenity and the natural character of the area; and potential for intrusion of pest plant and animal species.

Summary of issues raised by submitters

- The effects of disturbing areas of indigenous vegetation and the presence of machinery and materials during construction (Department of Conservation).

- Maintaining existing public access and if possible enhancing it. Reasonable public access through to Lake Matiri and beyond should be maintained both during the construction and operational phases. Measures should be put in place to ensure that the walkers are not endangered by the activities associated with the proposed scheme (Department of Conservation).

- Forest and Bird have raised concerns over the impacts on the natural character. Specifically resulting from tree and boulder removal, man made structures and the associated access tracks (Forest and Bird).

- The size of the access track and the tuffa formation from the spring on the sweeping bend (Forest and Bird).

- Dust nuisance is already extreme during the summer months (John Loius and Beverley Falkner)

- The submitter has requested that the road be widened to two way and sealed. The road also floods and it would need to be raised (John Loius and Beverley Falkner).

- To remove the hydro scheme at the end of its useful life (Mick Hopkinson)

Decision(s) Sought by Submitters (earthworks*)*

If the consent is granted the Department of Conservation has requested several conditions that are relevant to earthworks these are summarised below:

- The preparation, approval and implementation of: final design and construction plans; lake edge and riparian monitoring and management plan; aquatic flora and fauna monitoring and management plan, and public safety and access management plan
- Prevention of contamination and spread of Didymo and other evasive species.

3. ASSESSMENT OF EFFECTS

The following is an assessment of effects for the for the construction and maintenance for the earthworks and works in Lake Matiri and the Matiri River.

The statutory provisions for these applications are discussed then the application is broken down by landscape segment and the proposal analysed to determine actual and potential effects.

3.1 Statutory Provisions

Statutory provisions: works in Lake Matiri and the Matiri River

Statutory provisions provide for works that access, or disturb the bed of a river or lake and those undertaken on land.

Currently there are no rules in the Tasman Resource Management Plan that expressly allow anyone to access or disturb a river or lake bed, all of the activities in, on or over the bed of a water course require resource consent. Thus the activity defaults to Section 13 of the Resource Management Act 1991 (RMA). Section 13 of the RMA is written as follows:

> Section 13 Restriction on certain uses of beds of lakes and rivers
> (1) No person may, in relation to the bed of any lake or river,—
> (a) Use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed; or
> (b) Excavate, drill, tunnel, or otherwise disturb the bed; or
> (d) Deposit any substance in, on, or under the bed; or
> (e) Reclaim or drain the bed—
> unless expressly allowed by a rule in a regional plan and in any relevant proposed regional plan or a resource consent.
>
> (2) No person may—
> (a) Enter or pass across the bed of any river or lake; or
> (b) Disturb, remove, damage, or destroy any plant or part of any plant (whether exotic or indigenous) or the habitats of any such plants or of animals in, on, or under the bed of any lake or river—
> in a manner that contravenes a rule in a regional plan or proposed regional plan unless that activity is—
> (c) Expressly allowed by a resource consent granted by the regional council responsible for the plan; or
> (d) Allowed by section 20A (certain existing lawful uses allowed).
>
> (4) Nothing in this section limits section 9.
>
> Pursuant to the Act, when considering this application Council shall have regard to the matters outlined in Section 104 of the Act and particularly the relevant provisions of the following planning documents:
>
> (a) the Tasman Regional Policy Statement (TRPS); and
> (b) the proposed Tasman Resource Management Plan (TRMP).

Most of the objectives and policies contained within the TRPS are mirrored in the TRMP.

Section 77C of the RMA states that the resource consents required by Section 13 of the RMA shall be treated as discretionary.

77C Certain activities to be treated as discretionary activities or prohibited activities
(1) An application for a resource consent for an activity must, with the necessary modifications, be treated as an application for a resource consent for a discretionary activity if—
(a) Part 3 requires a resource consent to be obtained for an activity and there is no plan or proposed plan, or no relevant rule in a plan or proposed plan; or
(b) a plan or proposed plan requires a resource consent to be obtained for an activity, but does not classify the activity as controlled, restricted discretionary, discretionary, or non-complying under section 77B; or
(d) A rule in a proposed plan describes the activity as a prohibited activity and the rule has not become operative.

The Buller Water Conservation Order Clauses 11 & 12, are also particularly relevant to the assessment of NZEL water permit applications.

Statutory provisions: Earthworks

For the earthworks component of these applications, the dominant statutory tool is the Tasman Resource Management Plan, which has operative objectives, policies and rules for landuse activities involving earthworks.

The reader is referred to Chapters 5, 8, 9, 10, 12, 13, 30, 33 and 34 of the TRMP for the full list of policies. Some particularly relevant objectives and policies are stated in Appendix 2. The key objectives from these chapters are listed below.

Relevant TRMP policies and objectives

Chapter 5 Site Amenity Effects

5.1.2 Objective

Avoidance, remedying or mitigation of adverse effects from the use of land on the use and enjoyment of other land and on the qualities of natural and physical resources.

5.1.3 Policies

5.1.3.1 To ensure that any adverse effects of subdivision and development on site amenity, natural and built heritage and landscape values, and contamination and natural hazard risks are avoided, remedied, or mitigated.

5.1.3.8 Development must ensure that the effects of land use or subdivision activities on stormwater flows and contamination risks are appropriately managed so that the adverse environmental effects are no more than minor.

5.1.3.9 To avoid, remedy, or mitigate effects of:
(a) noise and vibration;
(b) dust and other particulate emissions;
(c) contaminant discharges;
(d) odour and fumes;
(e) glare;
(f) electrical interference;
(g) vehicles;
(h) buildings and structures;
(i) temporary activities;
beyond the boundaries of the site generating the effect.

5.1.3.14 To provide sufficient flexibility in standards, terms and methods for rural sites to allow for the wide range of effects on amenities which are typically associated with rural activities, and which may vary considerably in the short or long term.

The application is consistent with these objectives and policies. NZEL have proposed to produce management plans that will address how they will control the adverse effects from the construction.

Chapter 8 Margins of Rivers, Lakes, Wetlands and the Coast

8.1.2 Objective

The maintenance and enhancement of public access to and along the margins of lakes, rivers, wetlands and the coast, which are of recreational value to the public.

8.1.3 Policies

8.1.3.1 To maintain and enhance public access to and along the margins of water bodies and the coast while avoiding, remedying or mitigating adverse effects on other resources or values, including: indigenous vegetation and habitat; public health, safety, security and infrastructure; cultural values; and use of adjoining private land.

8.1.3.2 Notwithstanding Policy 8.1.3.1, public access by way of esplanade requirements will not be sought in areas where risks to public health and safety cannot be avoided, remedied or mitigated; or in areas where it is necessary to maintain security, consistent with the purpose of any resource consent, such as operational port areas.

8.1.3.3 To avoid, remedy, or mitigate the adverse effects on public access caused by structures, buildings, and activities in or adjoining water bodies or the coastal marine area.

8.1.3.5 To seek public access linkages between reserves and public access adjoining water bodies or the coastal marine area in the vicinity.

8.1.3.7 To ensure that adequate public access is available to outstanding natural features and landscapes in the coastal environment or the margins of lakes, rivers or wetlands, except where the impact of such access is incompatible with the duty to protect these areas or access across private land cannot be negotiated.

8.2.2 Objective

Maintenance and enhancement of the natural character of the margins of lakes, rivers, wetland and the coast, and the protection of that character from adverse effects of the subdivision, use, development or maintenance of land or other resources, including effects on landform, vegetation, habitats, ecosystems and natural processes.

8.2.3 Policies

8.2.3.1 To maintain and enhance riparian vegetation, particularly indigenous vegetation, as an element of the natural character and functioning of lakes, rivers, the coast and their margins.

8.2.3.2 To control the destruction or removal of indigenous vegetation on the margins of lakes, rivers, wetlands and the coast.

8.2.3.4 To avoid, remedy or mitigate adverse effects of buildings or land disturbance on the natural character, landscape character and amenity values of the margins of lakes, rivers, wetlands or the coast.

8.2.3.6 To adopt a cautious approach in decisions affecting the margins of lakes, rivers and wetlands, and the coastal environment, when there is uncertainty about the likely effects of an activity.

8.2.3.7 To ensure that the subdivision, use or development of land is managed in a way that avoids where practicable, and otherwise remedies or mitigates any adverse effects, including cumulative effects, on the natural character, landscape character and amenity values of the coastal environment and the margins of lakes, rivers and wetlands

8.2.3.12 To enable the maintenance of physical resources for the well-being of the community, where those resources are located in riparian or coastal margins, subject to the avoidance, remedying or mitigation of adverse effects on the environment.

8.2.3.14 To avoid the disposal of refuse within 200 metres of the mean high water springs, or of any lake, river or wetland.

8.2.3.20 To ensure that where erosion protection works are deemed to be necessary to protect existing settlements or structures that these are designed as much as possible to harmonise with the natural character of the coastline, river bank or lake shore.

The application is consistent with these objectives and policies. Public access will be enhanced and minimise the visual effects of their structures and effects on the edge of Lake Matiri.

Chapter 9 Landscape

9.1.2 Objective
Protection of the District's outstanding landscapes and features from the adverse effects of subdivision, use or development of land and management of other land, especially in the rural area and along the coast to mitigate adverse visual effects.

9.1.3 Polices
9.1.3.1 To encourage broad scale land uses and land use changes such as plantation forestry and land disturbance to be managed in a way that avoids or mitigates the adverse effects on natural landform, surrounding natural features and on visual amenity values.

9.1.3.3 To ensure that structures do not adversely affect:
(a) visual interfaces such as skylines, ridgelines and the shorelines of lakes, rivers and the sea;
(b) unity of landform, vegetation cover and views.

9.1.3.4 To discourage subdivision developments and activities which would significantly alter the visual character of land in outstanding landscapes (including adjoining Abel Tasman, Nelson Lakes and Kahurangi national parks).

9.1.3.5 To promote awareness and protection of landscape (including seascape) values.

9.1.3.6 To manage activities which may cause adverse visual impacts in the general rural area.

9.2.2 Objective
Retention of the contribution rural landscapes make to the amenity values and environmental qualities of the District, and protection of those values from inappropriate subdivision and development.

9.2.3 Polices
9.2.3.1 To integrate consideration of rural landscape values into any evaluation of proposals for more intensive subdivision and development than the Plan permits.

9.2.3.3 To retain the rural characteristics of the landscape within rural areas.

9.2.3.4 To encourage landscape enhancement and mitigation of changes through landscape analysis, subdivision design, planting proposals, careful siting of structures and other methods, throughout rural areas.

9.2.3.5 To evaluate, and to avoid, remedy or mitigate cumulative adverse effects of development on landscape values within rural areas.

The application is consistent with these objectives and policies. The structures will be carefully sited and the views from Lake Matiri should not be effected.

Chapter 12 Land Disturbance Effects

12.1.2Objective

The avoidance, remedying, or mitigation of adverse effects of land disturbance, including:
(a) damage to soil;
(b) acceleration of the loss of soil;
(c) sediment contamination of water and deposition of debris into rivers, streams, lakes, wetlands, karst systems, and the coast;
(d) damage to river beds, karst features, land, fisheries or wildlife habitats, or structures through deposition, erosion or inundation;
(e) adverse visual effects;
(f) damage or destruction of indigenous animal, plant, and trout and salmon habitats, including cave habitats, or of sites or areas of cultural heritage significance;
(g) adverse effects on indigenous biodiversity or other intrinsic values of ecosystems.

12.1.3 Policies

12.1.3.1 To promote land use practices that avoid, remedy, or mitigate the adverse effects of land disturbance on the environment, including avoidance of sediment movement through sinkholes into karst systems.

12.1.3.2 To avoid, remedy, or mitigate the actual or potential soil erosion or damage, sedimentation, and other adverse effects of land disturbance activities consistent with their risks on different terrains in the District, including consideration of:
(a) natural erosion risk, and erosion risk upon disturbance;
(b) scale, type, and likelihood of land disturbance;
(c) sensitivity and significance of water bodies and other natural features in relation to sedimentation or movement of debris.

12.1.3.3 To investigate and monitor the actual or potential adverse effects of soil erosion, other soil damage, sedimentation and damage to river beds, subsurface water bodies and caves in karst, aquatic and other natural habitats, arising from land disturbances.

12.1.3.4 To avoid, remedy, or mitigate the adverse effects of earthworks for the purpose of mineral extraction, on the actual or potential productive values of soil, particularly on land of high productive value.

The application is consistent with these objectives and policies. NZEL proposes a detailed Construction Plan with a Sediment Control Plan to control erosion and sedimentation, they will also monitor the water quality in the river to determine any increase in sedimentation.

Chapter 13 Natural Hazards

13.1.2Objective

Management of areas subject to natural hazard, particularly flooding, instability, coastal and river erosion, inundation and earthquake hazard, to ensure that development is avoided or mitigated, depending on the degree of risk.

13.1.3 Policies

13.1.3.1 To avoid the effects of natural hazards on land use activities in areas or on sites that have a significant risk of instability, earthquake shaking, flooding, erosion or inundation, or in areas with high groundwater levels.

13.1.3.7 To maintain or consider the need for protection works to mitigate natural hazard risk where:
(a) there are substantial capital works or infrastructure at risk; or
(b) it is impracticable to relocate assets; or
(c) it is an inefficient use of resources to allow natural processes to take their course; or
(d) protection works will be effective and economic; or
(e) protection works will not generate further adverse effects on the environment, or transfer effects to another location.

13.1.3.10 To regulate land disturbance so that slope instability and other erosion processes are not initiated or accelerated.

13.1.3.11 To avoid damage by land use activities to flood control structures or works for flood or erosion control.

13.1.3.12 To prepare a hazard management strategy identifying hazards and hazardous areas, and management options for these areas.

The application is consistent with these objectives and policies. NZEL propose to amour the penstock route where required to protect it from flood flows. They have also assessed the geological stability of the area and it has been found to be stable for their purposes. The development should not cause any significant flooding.

Chapter 33 Discharges to Land and Freshwater

33.1.0 Objective

The discharge of contaminants in such a way that avoids, remedies, or mitigates adverse effects while:
(a) maintaining existing water quality; and
(b) enhancing water quality where existing quality is degraded for natural and human uses or values.

Policies 33.1

33.1.2 To avoid, remedy, or mitigate the adverse effects of discharges of contaminants so that both individually and cumulatively with the effects of other contaminant discharges, they enable the relevant water quality classification standards to be complied with.

33.1.4 To ensure that water quality is not degraded where the existing water quality is the same or higher than the relevant water classification or any water conservation order.

33.1.5 To ensure that existing water quality is not degraded after reasonable mixing as a result of any discharge of contaminants into water and to take into account the following criteria when determining what constitutes reasonable mixing:
- (a) The depth, width and flow characteristics of the receiving water body, including the nature and extent of mixing which may occur and the assimilative capacity of the water.
- (b) The extent of the mixing zone and the likely adverse effects on aquatic life or ecosystems within the mixing zone.
- (c) The characteristics of the discharge, including the presence of toxic constituents.
- (d) The community (public) uses and values of the water or any mixing zone including those specified in the plan, any water conservation order or water classification for any water body.

33.1.6 To take into account the following factors in determining the significance of actual or likely adverse effects on the receiving water of or from contaminant discharges:
- (a) Any water classification given in any schedule to Chapter 36 or water conservation order.
- (b) Existing water quality of the receiving water.
- (c) The significance or sensitivity of the aquatic life or ecosystem.
- (d) The extent of the water body adversely affected.
- (e) The magnitude, time of year, frequency and duration of the adverse effect(s), including any cumulative effects as a result of the discharge.
- (f) The range and intensity of uses and values of the water body.
- (g) The conflicts between uses and values of the water body.
- (h) The nature of the risks of adverse effect(s).
- (i) Any relevant national or international water quality guidelines or standards, or water conservation order.

33.1.8 To avoid, remedy or mitigate the adverse effects of non-point source contamination arising from land use and discharge activities by a mixture of methods including regulation of discharge activities, and particularly through advocacy of best management practices; and to review the mixture of methods used if environmental monitoring shows that water quality standards are not being maintained.

33.2.0Objective
The avoidance, remediation or mitigation of the adverse effects resulting from emergency discharges or accidental spills.

Policies 33.2
33.2.1To promote and advocate development of site contingency plans to avoid, remedy or mitigate the likely adverse effects of any emergency discharges or other accidental spills.

33.2.2To ensure that land use and discharge activities are carried out having regard to contingency planning measures appropriate to the nature and scale of any discharge and risk to the environment for any accidental discharge of any contaminant that may result in connection with the activity.

33.3.0Objective
Stormwater discharges that avoid, remedy or mitigate the actual and potential adverse effects of downstream stormwater inundation, erosion and water contamination.

Policies 33.3

33.3.2To advocate works to restore and protect stream or coastal habitats and improve and protect water quality affected by stormwater and drainage water discharges.

33.3.4To avoid, remedy or mitigate the potential for flooding, erosion and sedimentation arising from stormwater run off.

33.3.5To avoid, remedy or mitigate the adverse effects of stormwater on water quality and the potential for contamination.

The application is consistent with these objectives and policies. NZEL have proposed sediment control measures in the Sediment Control Plan and the Construction Plan to control the discharges during construction, they have also proposed stormwater control measures (including cut of drains above works and sediment settling ponds) to minimise the risk of runoff into the Matiri River.

Chapter 34 Discharges to Air
34.2.0Objective
The discharge of contaminants to air in such a way that avoids, remedies or mitigates adverse effects while:
(a) maintaining existing air quality; and
(b) enhancing air quality where existing quality is degraded for natural or human uses or values.

Policies 34.2
34.2.1To ensure that any discharges of contaminants to air are undertaken in a way that avoids, remedies, or mitigates any adverse effects on the receiving environment or surrounding activities.

34.2.1A To allow or regulate contaminant discharges to air in relation to their actual or potential contamination effects, including:
(a) Adverse effects on human health.
(b) Adverse effects on amenity values.
(c) Contamination of adjacent sites.
(d) Degradation of water quality.
(e) The production of objectionable, noxious or offensive odours.

34.2.2To provide for contaminant discharges to air while maintaining or enhancing the ambient air quality.

34.2.4To provide for management of some actual and potential adverse effects of discharges to air - particularly odour and dust effects - as ancillary to landuse activities, and to take them into account when resource consent applications are being considered.

34.2.5To consider other resource management techniques such as buffer areas, separation distances, landscaping or planting requirements, or covenants over the land's title as alternative means of protecting sensitive areas or activities from the adverse effects of discharges to air.

34.2.5A To adopt the best practicable option for discharge of contaminants to air associated with activities which are temporary or informal in nature.

The application is consistent with these objectives and policies. NZEL propose a Construction management plan this will include dust control measures.

Commentary on consistency with policies and objectives of the TRMP

In my opinion the application is in general accordance with the objectives and policies of the TRMP. In general the objectives and polices envisage development and state that the effects from this development need to be avoided, remedied and mitigated. The temporary effects will be addressed with management plans and the long term effects will be addressed in the detailed design phase of the project.

TRMP relevant rules (Earthworks)

The proposed land disturbance activities do not comply with the permitted activity rule 18.5.2.1 of the TRMP and it is deemed to be a restricted discretionary activity in accordance with Rule 18.5.2.5 because more than 50 cubic metres of material is being quarried (gravel is being extracted). Rule 18.5.2.5 provides some guidance as to the matters the Council will have regard to when assessing the application.

Rule 18.5.2.1: Land disturbance in Land Disturbance Area 1

(1) The extent, timing, and duration of bare ground.

(2) The location, timing of construction, design and density of earthworks including roads, tracks or landings.

(3) The re-establishment of vegetation cover.

(4) The disposal and stabilisation of waste material or fill.

(5) Loss of or damage to soil.

(6) Damage to riparian vegetation or soil.

(7) Damage to animal or plant communities or habitats in water bodies or coastal water.

(8) Effects of the activity on river or stream flows.

(9) Sedimentation effects on subsurface streams or caves in karst.

(10) The potential for slope instability.

(11) The visual effects of the activity, including the effects and screening of the locality from excavations, heaps, dumps, spoil, materials, buildings and machinery.

(12) Potential damage to any cultural heritage site or area, including any archaeological site or site of significance to Māori.

(13) Damage to any natural habitat or feature.

(14) The duration of the consent (Section 123 of the Act) and the timing of reviews of conditions and purpose of reviews (Section 128).

(15) Financial contributions, bonds and covenants in respect of the performance of conditions, and administrative charges (Section 108).

Additional Matters for Land Disturbance Associated with Quarrying

(16) The depth and area of excavation and effects on groundwater.

(17) Restoration of the site, including ground levels and planting.

(18) The machinery to be used and manner of excavation.

(19) The method of storage and replacement of subsoil and of topsoil, including management of stockpiles and minimisation of compaction.

(20) Types and quantities of introduced fill.

(21) Measures to ensure both surface and subsurface drainage is at least as good as that prior to mining or recontouring.

(22) Measures to avoid, remedy or mitigate compaction or damage to the soil resource.

(23) Establishment and management of appropriate vegetation and fertiliser application and grazing management to ensure optimal rehabilitation.

(24) Likely difficulty in avoiding adverse impact on the land's actual and potential productivity and versatility.

(25) The potential for increased hazard at the site or on adjacent land.

(26) Measures to avoid or mitigate adverse effects on adjacent land uses, including limiting hours of operation and measures to control noise and dust.

Additional Matters for Destruction or Removal of Indigenous Vegetation

(27) The setting aside or creation of an esplanade reserve or esplanade strip as appropriate.

(28) The significance of the indigenous vegetation, including its representativeness, and significance as a habitat for indigenous fauna.

(29) The contribution of the indigenous vegetation to the protection of other natural values.

(30) The practicality of providing protection to the indigenous vegetation by setting aside or creating an esplanade reserve or esplanade strip.

Statutory provisions: Buller Water Conservation Order Restrictions

The Water Conservation Order (WCO) does envisage the construction and use of a power scheme. A full discussion of this can be found in the Introduction, Summary and Recommendations staff report.

The Matiri River flows into the Buller River, which is listed in Schedule 2 of the WCO (Clause 11), which refers to water quality. However there is significant distance for any mixing to occur before the water is discharged to the Buller River and this should minimise any adverse effects.

The construction operations in and around the water may result is some sediment being released but the applicant has proposed to minimise these temporary events. This coupled with the reasonable mixing zones of 200 metres in radius in the lake and 200 metres down stream should result in meeting the requirements of the WCO.

It is my option that the physical characteristics of the water diverted from the Matiri River through the NZEL power scheme and back via the tailrace into the Matiri River will not be significantly altered, and that water quality will not be significantly reduced.

Clause 12 of the WCO specifically addresses Lake Matiri and the Matiri River downsteam of the lake. The writer's assessment is that the NZEL applications comply with the restrictions under Clause 12 with only two possible exceptions. The first exception relates to the Clauses 12(1) and 12(2) concerning the level of Lake Matiri

during construction. The second exception relates to Clause 12(3) that any structure provides for eel and kōara passage in both directions.

WCO clause 13 (3b) specifically allows for hydrological or water quality monitoring investigations, and therefore the presence of the stilling wells on the shores of Lake Matiri are permitted.

In my option the proposed activities of NZEL are generally consistent with the WCO.

3.2 Summary of Proposed Works

This section of the staff report examines the works in the lake and the river in each of the landscape segments identified in the application and identifies the possible issues and environmental risks.

The application is light on detail and is generally conceptual. A design document entitled "Matiri Hydro Electric Power Scheme Engineering Conceptual Design" was supplied by the applicant, and describes the construction and operation of elements of the proposed power scheme for the purpose of obtaining resource consent. The applicant has stated that, should consent be granted, engineering details will be finalised and submitted to the Council for approval during the engineering design phase of the project. A further document supplied was the "Conceptual Sediment Control Plan" are these actually the same document?.

It should be stressed that the application documents do not specifically address the construction methods, nor the control of potential adverse effects from earthworks or works in the Lake and River. This lack of detail, and a general reluctance of the applicant to provide further information, has added significant difficulties for staff involved in making an assessment of the proposed activities and their potential adverse effects.

However, despite the absence of detail in the application, staff have been able to determine the basic features of the proposed power scheme, the areas of the Lake and River that may be adversely affected, and the types of construction techniques that the applicant may propose to employ. The applicant proposes that the following are constructed in and around the bed and banks and Lake Matiri and the Matiri River:

The earthworks and activities proposed to occur within the bed of Lake Matiri and the Matiri River (downstream from the lake) proposed by the application are as follows:

- To construct the weirs and penstock in the bed of the Matiri River and disturb the river bed during construction for a distance of 100 metres downstream of the lake intake structure.

- To construct a penstock in the bed of the Matiri River and disturb the river bed during construction for a distance of 200 metres at the sweeping bend.

- To construct a (power station) tailrace in the bed of the Matiri River (at or about M29 538474); and to disturb the bed of the Matiri River during construction of the tailrace.

- To construct a temporary crossing (Baigent bridge) structure in the bed of the west branch of the Matiri River (at a location approximately 300 metres upstream of confluence with the Matiri River).

- To use and maintain the structures, which are to be considered permanent components of the hydro scheme, on an ongoing basis.

- To undertake earthworks and land disturbance for the purpose of constructing the proposed Matiri Power Scheme, including:

    - Upgrade the existing road, access track and culverts
    - Construction of a new access track
    - Construction of a 1.6 metre penstock
    - Construction of the building platform for the power station
    - Construction of the a tail race from the power station to the Matiri River, and
    - Stock piling of soil and over burden materials at various identified lay down areas.

- To remove indigenous vegetation including approximately 50 beech trees from the proposed routes of the penstock and tail race; and

- To extract gravel from a total of 4 separate locations on the Matiri and West Branch of the Matiri Rivers.

These various activities are assessed below. The report is arranged in sections that distinguish between earthworks and works in watercourses, and, additionally, is arranged in "landscape segments". These landscape segments describe spatially distinct parts of the proposed working area, moving from the upstream end of the proposed scheme at the lake shore (Segment A) to the downstream end of the work where a temporary crossing is proposed (Segment F).

Requests for further information

Additional information was requested several times from NZEL and their latest response was made to staff on 16 January 2009. This information was provided at a late stage in the process of preparing this report. The applicants responses to staff questions are provided in tables corresponding to the nature of the proposed works (earthworks or works in waterbodies) and each landscape segment. The applicant's responses are set out in the third column of each table, and are supplemented in series of photographs. While their response is quite brief it does provide significant information and has helped staff to recommend consent conditions.

3.3 Works in Lake Matiri and the Matiri River

This section details the works that are proposed to be undertaken in waterbodies. The works have been divided into sections using the Landscape Segments as per the applicant's landscape report.
The current information about each segment is discussed then the potential effects are determined. In some circumstances, due to the lack of detailed information or the application being silent on the matter, it has been difficult for staff to determine the possible adverse environmental effects. As mentioned earlier additional information

has been supplied by NZEL at a late stage, this has been incorporated into this report.

Works in the lake bed – Segment A

The applicant is proposing to construct and maintain three weirs just below the outlet of the lake. For this to work to occur it is necessary for machinery to travel over the lake shore and bed.

There are provisions within the WCO to ensure that the wild and scenic nature of the lake is protected. There is a potential risk that heavy machinery will make significant tracks in the lake bed and the foreshore that may result in degradation of the amenity values protected by the WCO. The applicant has not addressed this issue, nor has it confirmed that the foreshore is sufficiently stable for machines to work . Weirs 2 and 3 will be accessed around the lake edge currently there is no assessment of the effect of this activity or in fact the ability to move machinery around the lake edge.

The construction of these weirs requires channels to be cut in the spill point of the lake at each of the outlets to drop the level of the lake in a series of steps.

These works will require machinery crossing the lake bed for access and construction and could result in damage to the foreshore. The applicant proposes to use flotation curtains during works in the channel to reduce the impact of the sediment. They are normally designed to work in localized areas and not to span the river channel. The effectiveness of curtains given the velocity of the water towards the lake outlet or possible wave action at the outlet has not been assessed.

The applicant has stated that there will be no construction around the shore of Lake Matiri where the shore is characterized by thick muddy sediments, however the application does not provide any details as to where these areas exist.

Currently the applicant has not determined the nature of the sediments, or how the excavated material will be disposed of. The site is within the Kahurangi National Park clarification is required to determine whether this material can be removed from the park.

There is the additional risk that the proposed works could alter the seepage/ drainage rate through the existing natural dam. Based on the current level of information is impossible to quantify this risk.

Coffer dam construction

A coffer dam is proposed to be placed upstream of Weir 1 to control the lake outflow during construction.

The application contains very little information about the construction details and the nature of the bed at this location, although a basic over view has been provided in the Conceptual Sediment Control Plan. NZEL state that the details will be defined within the engineering plans to be submitted for approval prior to construction. Additionally NZEL state that the materials used to construct the coffer dam should be relatively free of fines to minimise the volume of sediment released.

Lake Level

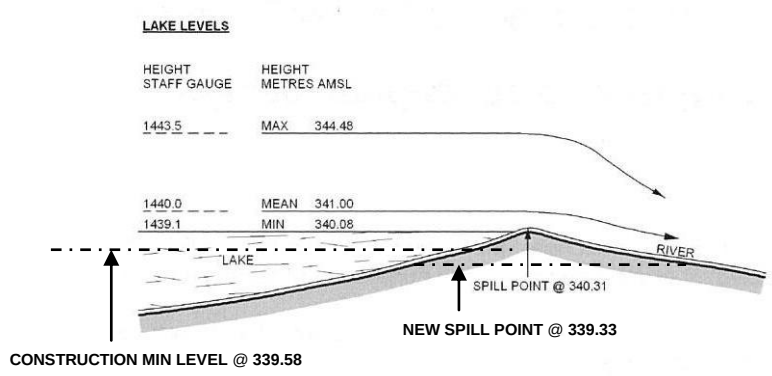
The applicant proposes to drop the existing spill point of the lake from RL 340.31 metres to RL 339.33 metres (0.75 metres). This will be undertaken in stages to allow the construction of the weirs.

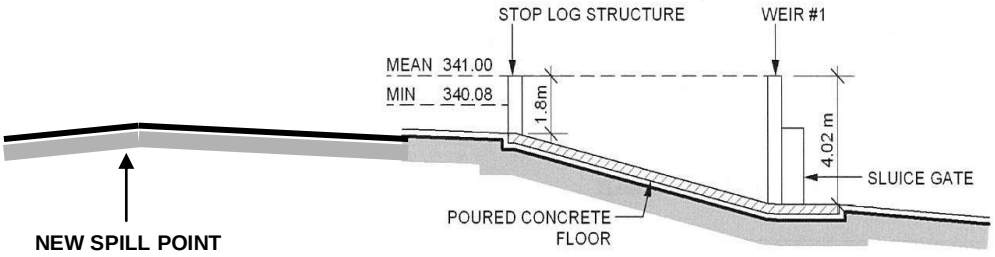
The photo shows the current spill point upstream of the proposed Weir 1.

The minimum lake level during construction will be RL 339.58 metres, 0.5 metres lower than the natural minimum lake level.

The following two figures show the proposed changes to the lake levels.

Spill Section Changes





SECTION C-C WEIR #1

The proposed new spill point at 339.33 metres will be dug to facilitate construction of weirs 2 and 3. On completion of these weirs, the no.1 channel will be excavated to its final level 1 metre below the natural lake minimum spill point. The application provides no explanation for why the lower spill point is necessary.

The level of the Lake may need to be lowered for maintenance if an event such as the lodging of a large tree trunk, or minor movement due to earthquake activity, were to damage either of Weirs 2 or 3, or the stop log structure itself. From practical experience NZEL suggests such events to be very rare occurring perhaps once every 10 to 20 years.

Further information requested and NZEL response for works in Segment A

As described above, additional information was requested of the applicant in order for staff to assess the adverse effects of the proposed activities. The following table lists these requests and their rationale, and provides the response received from the applicant.

Additional information	**Why this information is required**	**NZEL reply**
1. The composition of the lake bed and foreshore.	NZEL stated that no construction will take place around the shore of Lake Matiri near the outlet where the lake shore is characterized by thick muddy sediments. No information has been supplied to determine where these areas are, or if there are any areas where the sediment is fine or clay based.	The bed of the lake within the zone that becomes exposed during low lake levels and also with further temporary lowering is a "mud" zone as described in Peter Williams and Niwa reports. This is particularly so at the southern end of the lake where the 3 outlets are located: Refer photo illustration at the end of this table.
2. The lake bathymetry near the outlet	This is needed to determine whether machinery can access the lake edge and the size of the channels that need to be cut	The exposed lake bed at and near the outlets is of a gentle sloping nature and poses no problem to access by suitably sized machinery. Outlet channels are firmer underfoot due to natural flow carrying away fine sediment.

Additional information	Why this information is required	NZEL reply
		Refer photo illustration at the end of this table.:
3. Confirm that the lake bottom is stable enough to support machinery	The applicant proposes machinery to access weirs 2 and 3. Therefore it is necessary to determine if this is possible without the machinery becoming stuck	As mentioned above, there are sections (ie: between the outlets) that comprise of a thick top level mud zone. Near the outlets however this firms as the fine sediment is replaced by gravels. Where required, it was envisaged that Track mats are laid over the mud sections to be transverse in order to prevent significant damage and getting stuck.
4. What machinery will be used to undertake the construction?	The size and type of the machinery will influence the potential adverse effects	The earth works and weirs required at outlets two and three will be quite small in scale and it is envisaged that these works could easily be undertaken by a maximum 12 tonne excavator. It is envisaged the concrete will be helicopted in. Light machinery will comprise of 4 x 4 tractor/bike with vehicle trailers.
5. What maintenance the weirs will need and how this work will be undertaken.	Maintenance of the weirs will be on going and it could cause significant on going effects e.g., tracking around the lake edge.	The weirs will be of a very simple design with stop logs as there only movable parts. There will be no regular maintenance required however should for any reason any unscheduled work be required on the weirs in future then equipment would be either carried in by hand or helicopted in. refer to photo illustration 3: which shows our weirs at Fox power scheme which will be of very similar but smaller nature.
6. Location of the spill point.	The spill point is taken as the point where the lake becomes the river. The location may have implications on where the WCO applies	The natural spill point is show in photo illustration 4: this is approx 40 mtrs upstream of the proposed no: 1 weir structure.
7. Actual spill point morphology.	It is assumes that the diagrams showing the spill point on the lake are stylised. No details have been provided to indicate the locations, depth and widths of the channels proposed to be cut to the weirs and how these will be constructed.	Weirs 2 and 3 will not require any permanent channels as these weirs simply serve only to dam the waters behind them. However the channel from the natural spill point to the "Stop Log structure on outlet one will need to be cut down into the existing river bed and then a boxed section open concrete culvert formed. This will typically take the width of permanent stop log structure located directly

Additional information	Why this information is required	NZEL reply
		upstream of Weir no:1 the In order to construct weir no:1 in relative dry conditions, a coffer dam/stop logs will be erected/placed at or about the natural spill point and a temporary channel formed to outlet weir 2 thereby diverting normal flows down outlet 2. Flood flows will pass over the temporary coffer dam/stop logs at outlet one. No future maintenance is envisaged on outlet no:1 channel. Please note that final engineering will determine design etc.
8. How will the channels be maintained?	What maintenance will be required to keep the channels cut into the spill point.	As above, only the one channel and it will be concrete formed
9. Location of the coffer dam.	To determine the potential adverse effects it is necessary to now the location and scale of the coffer dam.	The coffer dam location will be located immediately above the lake outlet spill point so that the boxed concrete channel can be formed. Once formed the coffer dam can be replaced in part with temporary stop logs fixed to the concrete culvert at or about the natural spill point.
10. Construction details for the coffer dam.	What materials are to be used and how the coffer dam is constructed will determine the possible adverse environmental effects.	It is envisaged that material removed from the river bed whilst excavating the penstock route will be used to form the coffer dam. The coffer dam will be less than a metre in height and does not need to be water tight as any seepage is simply pumped back over the dam. This is the simplest and less intrusive means of forming a dam barrier and can be easily re-established in a flood.
11. The potential for the lake to drain below minimum level envisaged in the conservation order, should equipment fail.	It is necessary to determine the potential of the lake levels becoming lower than those envisaged in the WCO .	Yes, failure of the sluice gate in Weir no:1 or catastrophic failure of the penstock gate and penstock could result in a temporary lowering of the lake but only in low flow conditions. This may occur until such time as stop logs are placed in the stop log structure. Lowering however would take some time and an alarm would be raised immediately giving some time to place logs in the stop log structure. An event like this would be very unlikely.

Additional information	Why this information is required	NZEL reply
12. The area and locations of the extra foreshore that will be exposed as a result of lowering of the minimum lake level.	The WCO states that for any consent to be granted fluctuations in lake level, caused by artificial control, cannot significantly affect riparian vegetation.	This has been well covered by the assessment of our experts, in Particular Peter Williams. The conclusion is that the effects will be less than minor.
13. Explanation of how the 3 weirs will operate and should the penstock be left open could result in a 1 metre drop in lake level.	The application does not state how the weirs operate or how the setup will prevent the lake from emptying in the event that any component fails.	The weirs are simply a device to hold back water. Weirs two and three will have stop logs placed in them on a permanent basis which will be set to the mean lake level. Should the logs suddenly fail, a lake emptying would still not be possible as the dam sill in front of these weirs will be higher than the minimum level. At weir one, a sluice gate and penstock intake gate are the only two components that physically operate. Failure of either of these components is covered above. The penstock will have pressure release valves, inspection hatches and the main turbine inlet. A penstock left "Open" would constitute full power on the turbine until such time as the penstock discharged to a point where the generator would go into reverse power and trip, thus tripping the weir gate valve. Alternatively, a partial or complete failure in the penstock would be detected by lose of pressure and or increased flow and a independent standalone trip unit would shut off the weir gate valve and alarm out.
14. How long will the lake take to drain following the completion of each channel.	Draining the lake is a key component of the building timeline. While the lake level drop is temporary the exposure time is important to understand	Still working on this with our experts. TBA
15. Details showing how the floatation sediment curtains will be used, including wave heights and water depth and the expected though-flow due to seepage.	Sediment curtains have limitations: they are unable to stop the flow of a significant amount of water, they must not be used to filter entire stream flows, they have relatively low effectiveness in removing fine silt and clay particles, and they cannot be used in high energy	Sediment curtains used within the lake will not be subjected to through flow but may be subject to wave action. This we believe is a matter for the construction contractor to manage as part of his procedures and will be incorporated in the management/construction plan. Details of how work is undertaken will vary depending on techniques

Additional information	Why this information is required	NZEL reply
	environments.	that contractors deploy. We feel this would simply be managed by stipulating acceptable turbidity levels during construction.
16. The disposal details of the material dug from the new channels.	NZEL has not stated what will happen to the material dug out of the lake in forming the new lowered channels. This material has the potential to cause significant sediment generation if it is not stabilised.	Excess material will be removed completely from site and deposited as fill on the penstock route or on NZE land.
17. How will fish passage be maintained during construction?	WCO states that fish passage be maintained.	Fish passage is only applicable to eels. Still working on this with our experts. TBA
18. How will the construction be managed to allow for adverse weather conditions.	Given the flood frequency there is likely to be at least one event during construction, and the Council needs to assess how will this be allowed for in the work programme.	Again, this is a matter for the contractor to manage and we would expect and require any suitably qualified contractor to manage this in the best possible way. However, in saying that, a risk of work being lost or delayed will always exist. Work at the headworks will be scheduled for the drying, settled weather months anyway.

When queried about working on the lake edge the applicant provided the following response:

You have asked us about the engineering viability of the proposed construction methodology, in particular our ability to maneuver a digger around the lake edge between the weirs and the ability of sediment screens to control resulting sediment in the lake.

Some time ago an engineer from Taylor Contracting was shown over the entire project site and asked about the viability of the proposed construction methodology. Both ourselves and the engineer examined the lake edge and determined that with the use of mats it is entirely feasible to maneuver a digger between the 3 weirs as proposed.

MWH have been consulted and advise that sediment control curtains will be satisfactory in this area, please see section 6 of our application. Please note also that section 8 of the MWH report discusses the use of form works to contain concrete as it is poured for the structures around the lake.

The following photographs were supplied by NZEL on 16 January 2009 and show the lake shore and the mud zone.



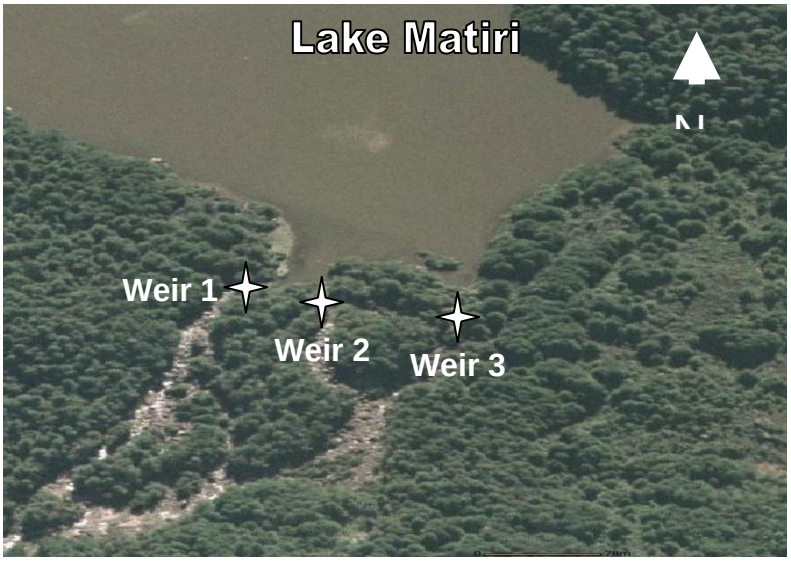


The responses provided are not considered to be complete or in sufficient detail to allow a complete assessment of the application to be made. Until complete information has been provided the potential effects on the environment resulting from this proposal, and ways these effects can be mitigated, cannot be fully determined and assessed.

It is expectation that these matters will be further addressed as part of the applicant's evidence presented at the hearing.

Weirs, inlet and penstock intake- Segment B

There are proposed to be three weirs constructed at each of the outlets. They are numbered west to east with Weir 1 including the penstock inlet.



Weir Locations

The penstock inlet is proposed to be located at Weir 1 and this location is likely to have the most disturbance during construction. To construct Weir 1, a temporary coffer dam will be required immediately upstream of the weir to de-water the area as much as practical. This construction of the coffer dam is likely to pose the greatest risk since the bottom of the lake/river, at this point may contain significant amounts of fine sediment.

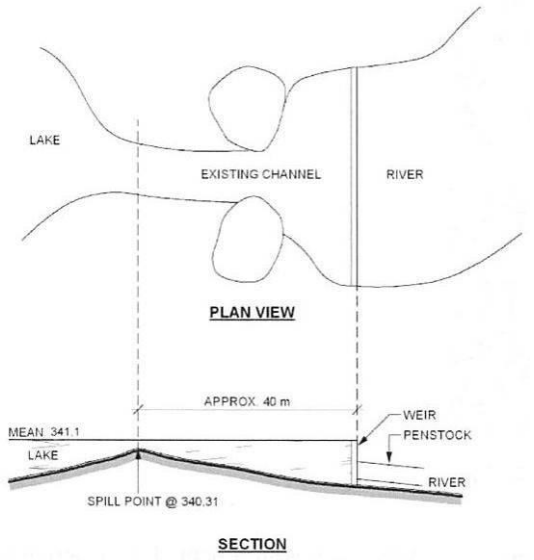
The construction of each weir includes stop log structure that will enable the lake to be blocked off from the rest of the weir. This will allow most of the maintenance to be undertaken without lowering the lake level. Most of the programmed maintenance will be undertaken during periods when the lake level is low. It is not expected that the lake will not need to be lowered for general maintenance as the stop log structures will be used to remove the water from each weir. The result of this is that the lake will not need to be lowered and avoiding possibly breaches the WCO lake level conditions.

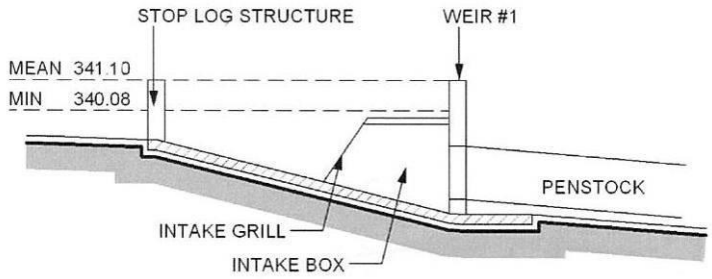
Weirs 2 and 3 will be accessed via the lake edge. The possible adverse effects of this have not been assessed in the application nor have the sediment profiles or lake contours been provided.

Both weirs will be simple structures with the same crest height as weir1 and integrated stop logs. The base of the stop logs will be 0.5 m below the minimum lake level. The following photograph shows a small weir similar to the proposed Weirs 2 and 3.

Example of a small weir.

Weir 1, inlet





SECTION D-D WEIR #1

Construction of the Weirs

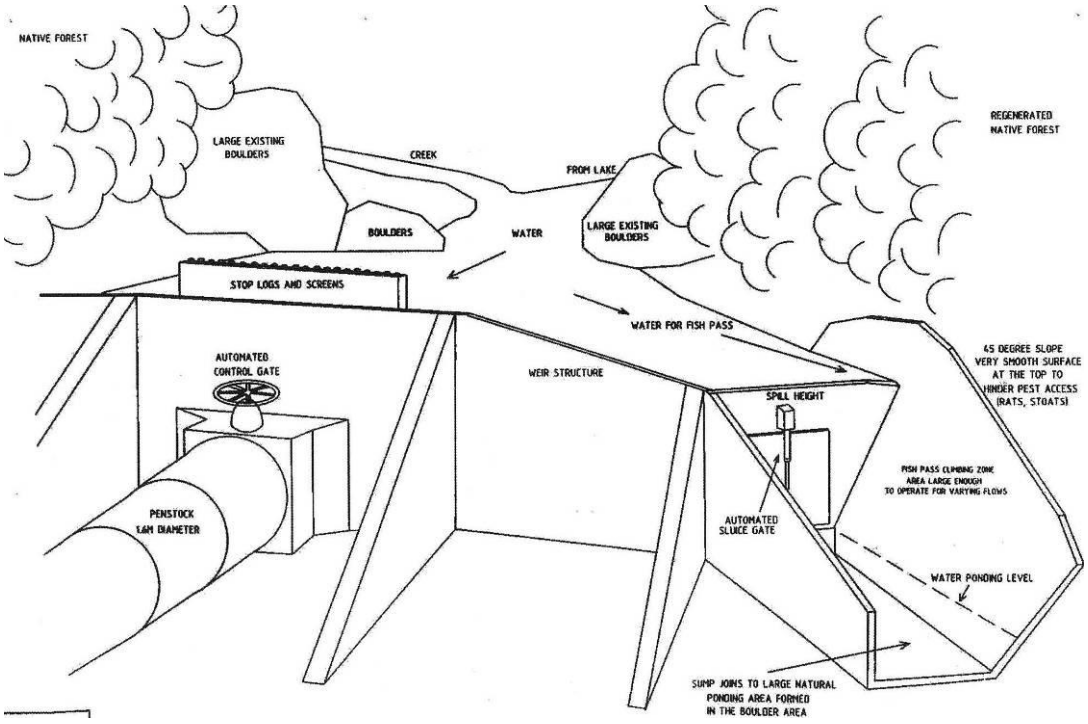
Engineering plans and construction details have yet to be finalised. The exact construction details are unclear and are likely to be determined by what is found under and around the proposed construction areas. Although it is known that the construction of the weirs will require the removal or cutting of some boulders within the bed of the river to enable the construction of timber or metal framework. Concrete will then be pored into the framework. The potential exists for the concrete to enter any residual river flow and the adverse effects of this have not been clarified by the applicant.

In the application, Section 2.3.2, being the MWH geotechnical feasibility report, the following is stated:

"Subsequent to the writing of our 2001 Geotechnical Report we have made a preliminary site assessment of the Lake Matiri outlet channels where the three weirs, a stop log structure and an intake structure are proposed for use in the power scheme. In our professional opinion the substrate of large (1m – 5m diameter) sandstone boulders in the outlet channels is generally stable and would

provide suitable foundations for the structures that are proposed in the NZEL Engineering Concept design Report (2008)."

This suggests that the area where the weirs are proposed is stabile enough for foundations the weirs and associated structures.



Looking upstream towards Weir 1

Weir Construction Sequence

The following sequence is currently proposed. It is unclear how flexible this construction sequence is and how NZEL will work with the frequent freshes / floods that can occur every ten or so days on average.

Weir construction is proposed to occur during mid to late summer and is anticipated to follow the following sequence:

1. Lake level will be lowered to 0.5 m below minimum level by digging out outlet 1 control point in the lake
2. Diggers to access Weirs 2 and 3 via the lake and foreshore
3. Outlets 2 and 3 excavated to their working depth (3 days)
4. Construction of coffer dam immediately downstream of Coal Creek (5 days). This concurrently done with work on outlets 2 and 3.
5. Coffer dam in place and all water directed down outlets 2 and 3.
6. Headworks of Weir 1to be completed behind coffer dam (14 days)
7. Coffer dam removed and channel dropped to 0.75 m below minimum level
8. Outlets 2 and 3 to be dry and weirs 2 and 3 will be constructed (7 days)
9. Channel 1 to be excavated to 1m below normal lake level
10. Stop logs inserted and lake refilled to its normal level

During construction a comprehensive weather and a lake monitoring plan will be undertaken. This will allow time for site clearing if adverse weather occurs.

Construction time

The total construction time will comprise of the following

Work item	Work days
Dig out channel	1
Wait for lake to drop	?
Diggers access lake foreshore	
Dig out 2 and 3 to working depth + Construct coffer dam	5
Head works for weir 1 complete	14
Coffer dam removed and channel depth increased	
Wait for lake to drop	?
Construction of weirs 2 &3	7
Drop channels for weir 1	?
Stop logs inserted	?
Refill lake to normal level	?

Currently insufficient information is contained in the application to determine the total construction time and all the potential effects on the environment.

It should be noted that the lake will not drop rapidly considering a 1 metre drop in lake level equates to a reduction of about 530,000 cubic metres of water (lake area is 53 Ha). By increasing the outflow by 1 cumec it will take about 6 days to achieve a 1 metre drop in lake level.

Construction sediment generation

The applicant has proposed sediment curtains to control the released sediment generated by working in the lake bed.

These are a flotation silt curtain (also called a turbidity curtain) that consists of a geosynthetic fabric that is suspended vertically in a body of water. The top of the curtain is attached to floats, and the bottom is weighted. Flotation silt curtains are used when construction occurs in a water body or along a stream bank or shoreline. Flotation silt curtains prevent sediment, which is stirred up during construction, from migrating out of the work area and into the rest of the water body.

The advantages are that they allow for containment of sediment-laden water within a water body and by protecting contained water from turbulence, it allows particles to fall out of suspension.

They do have limitations:

- They cannot stop the flow of a significant amount of water.
- They must not be used to filter entire stream flow.
- They do not effectively fine silt and clay particles.
- They cannot be used in high energy environments e.g., wave action in the lake may be an issue

A provision must be made to allow water to flow through the curtain. This is normally accomplished by constructing part of the curtain from heavy filter fabric. The filter fabric allows water to pass through the curtain, maintaining equilibrium, but retaining sediment particles. While these curtains are designed to allow for some water movement, they do not have high flow-through rates, and should not be installed across a channel. When used in a stream, channel, or other body of moving water, the flotation silt curtains must be placed parallel to the direction of flow.

Unless the water body is subject to wind or wave actions, the curtain should extend the entire depth of the water, and rest on the bottom. The weighted bottom of the curtain needs to maintain contact with the bottom of the water body in order to keep sediment from flowing under the curtain. In order to do this, enough slack must be provided to allow the curtain to rise and fall as the depth of the watervaries, without breaking contact with the bottom of the water body.

In situations where there is significant wind or wave action, the weighted end of the curtain should not extend to the bottom of the water body. Wind/wave action on the flotation system can cause movement of the lower end of the curtain, causing it to rub against the bottom, stirring up additional sediment. In these situations, a minimum of 30 centimetres should be provided between the lower end of the curtain and the bottom of the water body. In addition, it is not practical to extend the curtain deeper than 3 metres. Deeper installations can be affected by the moving water, stressing the material, and causing the bottom of the curtain to be pushed around, billowing up toward the surface.

Regardless of whether or not the accumulated sediment is removed, suspended sediment should always be allowed to settle prior to removal of the silt curtain. It is unclear how fast the water will clear inside the sediment curtain once work is complete.

Ongoing maintenance of the control structures and intake

The applicant has stated that the weirs will be maintained annually. It is currently unclear what sort of maintenance will be undertaken. NZEL have provided comment on the maintenance in their response further information for works in Segment B (see table on the next page).

Additionally NZEL have supplied the following information:

Maintenance is required on hydro structures for the periodic clearance of debris and repair of failed or worn components.

As described in the engineering concept section of our application the structures relevant to maintaining lake level are the three weirs and the stop log structure upstream of weir 1.

Weir 1 and associated components (penstock off take with screens and cleaners, sluice gate, and fish pass) will require the vast majority of the maintenance work for which purpose the stop logs immediately up stream of the weir exist. This maintenance will not effect lake levels.

If an event such as the lodging of a large tree trunk or minor movement due to earthquake activity were to occur to damage either of weirs 2 or 3, or the stop log structure itself, it may be necessary to lower the lake to effect repairs.

It is standard engineering practice to design these structures to withstand most expected events however in reality no engineers can predict the occurrence or magnitude of all future events that will occur and there always remains the possibility that the lake may have to be lowered to repair resulting damage.

From practical experience New Zealand Energy expects such events to be very rare occurring perhaps once every 10 to 20 years.

It is likely that some bed load material will enter into Weir 1 from Coal Creek as this creek enters into the Matiri River after the spill point. Photographs supplied by NZEL show moss growing on the rocks in Coal Creek. This suggests that there is limited bed movement down the Creek. It is likely that any material will be discharged through the scour valve during high flows allowing the material to carry on down the River. .

The following photos and explanation have been supplied by NZEL as part of their further information and show the growths on the stones indicating low rates of bed movement. (Supplied by NZEL on the 16 January 2008.)

Coal creek flowing in from the LHS to the Matiri River. Note moss on the rocks

Looking downstream of the Matiri River Coal creek coming in on RHS note some moss on the rocks.

Comments from NZEL relating to sediment have been received as further information and they are as follows:

You have explained to us that your concerns here relate to the issues that arose for the Onekaka hydro with sedimentation of the lake and the discharge of that sediment from a scour valve located in the dam. You are concerned about the handling of mineral debris that flows from Coal Creek which is indicated as "stream" in the plan view of the number 1 weir plan drawing contained in the Engineering Concept section of our application.

Coal creek is located in the channel between Lake Matiri and the proposed weir site. At present all mineral debris from coal creek is naturally washed down the Matiri River through the natural restriction comprising the two large rocks identified in the engineering concept drawings.

Post construction and as illustrated in the Engineering Concept section of our application, mineral debris from Coal Creek will continue to be washed through the open stop log structure constructed between the existing large rocks and on to the poured concrete slab floor between the stop log structure and the #1 weir. As indicated in the engineering concept paper this floor will be below and sloped away from the penstock intake so as to prevent ingestion of mineral debris to the penstock and subsequently the turbines. The sloped floor will guide the mineral debris to the sluice gate which will be opened as required to flush the mineral debris down the Matiri River.

These are common concepts employed in the design of hydro off takes, the detailed design will be determined during the engineering design phase of the project and will ensure the concept works in practice.

It is common operating practice in hydro installations to open the sluice gate on receding floods when the danger of debris such as floating logs (which we want to pass over the top of the weir) becoming jammed in the gate is significantly reduced.

The only time mineral debris is washed down Coal Creek is during large flood events. Flushing on the declining phase of flood events can be fully automated as the gate is controlled by a computer that is aware of lake levels and the direction and rate of lake level change. The computer can control the hydraulic mechanism that opens and closes the gate.

As at New Zealand Energy's other hydro generation installations the computer control system at the power station will both automatically control station operation and enable constant contact with NZEL staff via satellite enabled internet connection and cell phone alarm messaging. This will enable rapid response to any unusual situations arising either by remote control or a visit to the site.

Staff accept that the applicant can control the mineral build up with Weir 1.

Penstock in river bed - Segment B

The penstock will be constructed of 12 meter lengths of 1.6 meter diameter piping welded together to form one continuous pipe.

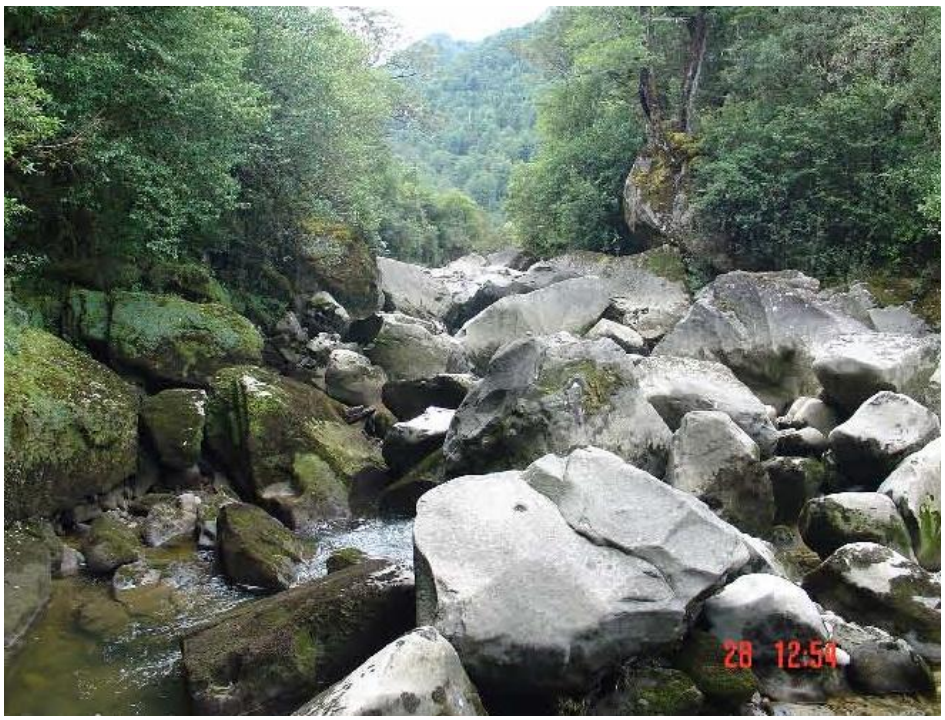
The first section of the penstock route follows the true right bank of the river downstream before leaving the river into the bush. To construct the penstock in the river several large boulders will have to be relocated, cut or removed. Where a boulder is relocated it will be used as armour to protect the penstock.

There is no construction information supplied within the application about the following items:

- what armouring will be required to protect the penstock;
- the support structures;
- the route the penstock will take within the river; and
- where the penstock will be located in relation to the flood level.

It is currently impossible to assess the potential adverse effects of this work based on the limited information provided.

The following photos have been supplied by NZEL as part of their further information. (Supplied by NZEL on the 16 January 2008.)



Matiri River downstream of Weir 1, looking up river?

Matiri River looking downstream of Weir 1

Further information and NZEL response for works in Segment B

Additional information was requested to determine the adverse effects in segment B; the response from NZEL is summarised in the following table.

Additional information	**Why this information is required**	**NZEL Reply**
19. How much sediment will be generated from the works in this segment.	This will determine what kind of sediment control may be needed	Because there will be significant excavations and disturbances within this area then sediment will be generated. It is not possible to determine quantities at this stage. However the Sediment management plan will stipulate how works are managed to minimise sediment and how it is controlled. It is important to note that contractors who specialise in this type of work will have their own work techniques to manage sediment.
20. The construction methodology intended to be used.	The construction methodology will have an influence on the type and scale of adverse effects	Construction methodology can not be finalise at this stage. It will be dependant on final design before a contractor can determine how to undertake the works. Based however on the conceptual design, the construction methodology will follow along the lines as explained above and below.
21. The proposed timeframe required to complete the works in segment B.	The application does not state how long the construction will take and therefore how long the temporary effects may last.	Again, times cannot be definite until such time as final design is completed and the works are tendered. At this stage we would anticipate a 3-6mth period for this section
22. The bed composition below the proposed weirs.	The bed composition will significantly influence how the weirs are built	Geotech engineers have determined that the substrate under the weirs is a continuation of what you see within the river. Ie: large boulders from the landslip. Fines however are intertwined amongst these boulders creating a damming effect. Weir no:1 will be keyed well down into these boulders.
23. How the residual flows be maintained while ensuring the weirs are anchored into the river bed.	Necessary to determine that the residual flows can be managed	Only one weir will be constructed at a time therefore during construction, the entire river flow will still be passed down the river by means of the outlets and seepage flows

Additional information	Why this information is required	NZEL Reply
24. Where is the secondary seepage coming through the dam	The residual flows rely on seepage and the construction could block these off.	Seepage rate vary depending on the lake level. Ie: higher level higher flows. A correlation will quickly be drawn between height and flow flowing commissioning and any loss of seepage flow will be offset by a discharge valve at Weir no:1. There will be a telemetry link between the weir and the station and therefore residual flows as measured at the station will be able to set discharge valve rates.
25. Fish passage during construction	To determine the possible effects on fish	Fish passage is only applicable to eels. Still working on this with our experts. TBA
26. Clarification on the activities that will generate sediment and how these will be managed	To determine the adverse effects on the water quality and aquatic ecosystems.	Essentially, all excavations' have the potential to create sediment if weather conditions cause run off. Or raising of water levels. These will be managed using the contractors sediment control procedures.
27. The period of time taken to drop the lake during construction.	The construction timeline requires the lake to be dropped, which forms part of the critical path of the project.	This appears to be the same as 14 above.
28. Detail indicating what, how and when maintenance will be undertaken	Maintenance could generate significant amounts of sediment to be released by machinery in the river.	It is not envisaged that any further maintenance will be require for the penstock or weirs once installed. However the access road will require unscheduled maintenance from time to time. This maintenance will need to be undertaken in accordance with best practices for the maintenance of access tracks with particular attention to avoidance of sediment runoff. Catastrophic failure, of the penstock will cause localised disturbance, however our experience shows that this is far less than one would envisage. Furthermore it would be limited to the time taken to discharge the upstream section of the penstock.
29. How the rock coming out of coal creek will be managed	The rock coming out of Coal creek is likely to fill	This has now been discussed but to summarise, the debris

Additional information	Why this information is required	NZEL Reply
	up weir 1 and this will need to be managed.	from Coal creek which appears to be of low volume given the observations made from consecutive visit will continue to pass down its natural water course via the sluicing gate. Note that any debris movement will be at times of high flood and thus will make no difference to the rivers flood flow turbidity as it would have been carrying it anyway.
30. How will the weirs be fitted into the boulders	Fitting the weirs into the boulders could generate significant sediment.	Weirs two and three are very small in scale and have no workable components to them, this will allow them to be simply formed around the existing boulders as shown in the illustrations with shallow foundations formed into these boulders as well.. Weir one will require significant excavations of the "Footprint" . the extent and design of the foundations will be concluded at design stage. As surface flows will be diverted away from the structures that are being built then sediment ingress into the river flow will be prevented. Sub-terrain water entering the foundation excavations will be managed using appropriate techniques determined by the contractor. The possibility exists to pump this water back onto the grass flats adjacent to the recording site thereby allowing the water to filter back into the lake.
31. How stable are the large boulders in flood flows	Given that the weirs and the penstock may be anchored into some of the large boulders it is important to understand how stable they are.	The existing boulders are very stable. The assessment done by the geotech engineers has confirmed this. They have obviously remained in position since the formation of the dam. We have not noticed any boulders that have moved in the last 8years. The Design of the anchoring will take into consideration the terrain in which the weirs and penstock are going to be located. In any situation there will still be a small element of risk. Should a

Additional information	Why this information is required	NZEL Reply
		failure of a weir or penstock occur say because of a severe earth quake, the result will be that the water contained within or behind these structures will simply disperse down its natural course.
32. How the penstock be anchored to the river bed	Possible contamination of water from sediment and concrete	Penstocks are secured by either completely burying them or anchoring by concrete anchor blocks or pedestals. Both anchor blocks and pedestals will require vertical boring of anchor rods to fix the foundations to. Again contamination of the water by sediment and concrete will be avoided by using appropriate techniques for working in such environments
33. What machinery will be required to work in the river to install the Penstock	To determine the possible adverse effects	The main machinery will be an excavator, hiab and boring machine. The rest of the equipment will be hand tools etc
34. The route the penstock take below the weir	Will the works or machinery be in the flowing water	The penstock will be located out of the normal flow water course. The penstock bed will need to be initially temporarily formed so that it provides access to Weir no:1 for the big machinery. The weirs will then be constructed and once that is achieved then flows will be diverted down weirs two and three thereby providing a relatively dry river bed to form the penstock foundations and install the penstock. Again any sub terrain flows as they emerge will be either diverted to the other side of the river or pumped away from construction area's.
35. Whether the penstock be above a Q100 flood	The penstock may need to be armoured if it interacts with flood flows	Where the penstock isn't buried but exposed to flood flows then armouring will be achieved by appropriate placement of boulders excavated from the site works. It is envisaged that this will likely occur in a short 20mtr section of the penstock. Important to note that exposure

Additional information	Why this information is required	NZEL Reply
		to flood flows does not pose a significant threat to the penstock. As the waters are lake feed, debris likely to be carried in high flows will be minimal. Furthermore, a penstock full of water has a equal or higher density than the flood water itself. The penstock will be fabricated from 10mm plate steel.

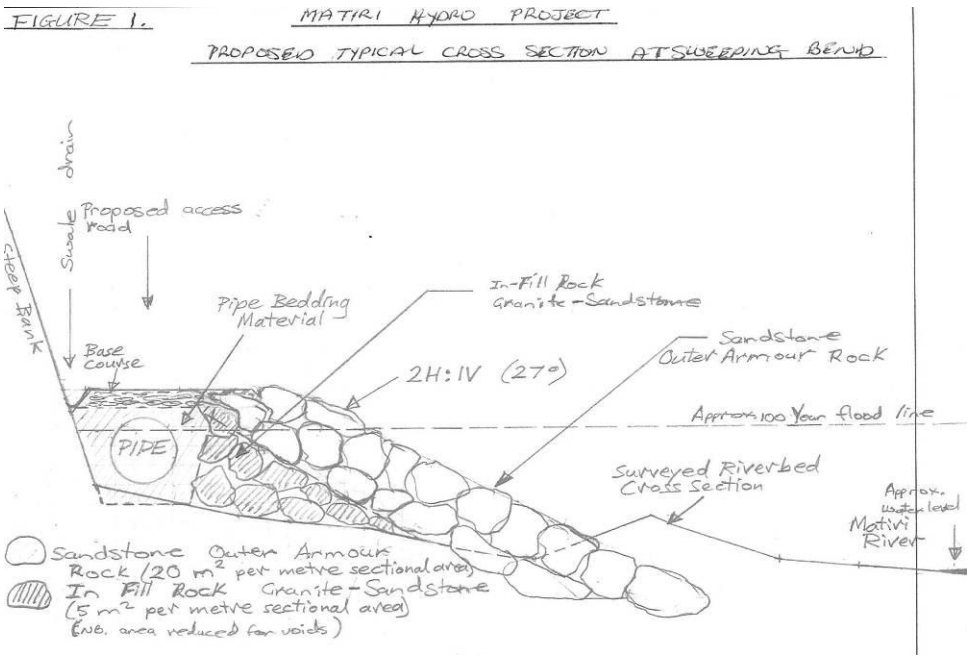
Until this information has been provided the potential effects on the environment resulting from this proposal and ways these effects can be mitigated cannot be determined.

A draft of the list above was provided to NZEL and their response forms the third column. It is expectation that these matters will be addressed as part of their evidence.

Penstock and access road- Segment C

The penstock route enters the river at sweeping bend defined as landscape segment C about 1km downstream from the weirs. The penstock is on the true right bank and is about 200 meters in length. This area is very exposed and will be subject to high erosion forces. Therefore the penstock is likely to require significant protection. .

It is proposed to armour the pipe outlined in the diagram below, which shows the typical proposed cross section of the penstock route around sweeping bend.



To blend the amour rock into the landscape and is it proposed that sandstone rocks will be placed on the visible face. Imported rocks will armour the outside edge of the penstock route these will be sourced off site and the rocks in the river shall remain in place. NZEL has stated that the armouring rock should be of an irregular shape and in the 1- 4+ tonnes. The application is lacking detail and a description on grading, density, weight, and hardness, all factors that need to taken into account when assessing works of this nature.

Unique Spring Geology

This segment crosses a small stream that has produced unique rock formations. Boulders have been formed by calcium carbonate precipitating out of the stream water and forming boulders of calcareous tuff (a type of Travertine).

It is proposed that the access track will cross this stream. Being spring fed it should be relatively stable flow, only requiring a relatively small culvert. The applicant does not describe or assess how the boulders will be protected during this project.

Further information and NZEL response for works in Segment C

Additional information was requested to determine the adverse effects of the propsed work, and the response from NZEL to the request is summarised in the table below.

Additional information	**Why this information is required**	**NZEL reply**
Location of penstock in the river	Is it above Q100? Does it need armouring? How will it be anchored?	This has been covered in the application. River level have been determined by the Hydrologist and illustrated on the drawings. Explanation of how it will be armoured and illustrations have been provided
How stable are boulders in the river to use as anchor structures?	If the penstock is being anchored to the boulders they need to be stable.	Like the lake outlet, the “large” boulders in the river are very stable and appear to have remain stationery since the landslip. The penstock route avoids these large boulders
What grading / density / weight of rock will be required for the purpose of armouring?	The 1-4 tonnes is insufficiently descriptive. For the armouring to last the rock used needs to be large enough and quality to withstand the flood flows.	The armouring wall will be engineered and then built to withstand flood flows. This is a matter for engineering design. Important to note is that at out Turnbull station where an armouring wall has existed for 35yrs, Its design is much steeper and the river flow volumes and velocities excessively greater than that which is experienced in the Matiri River.
How will the Tuff formation be protected?	The tuff formation is regarded as significant by submitters.	What is “Tuff”. If it is the limestone clumps that have fallen from the Traverline

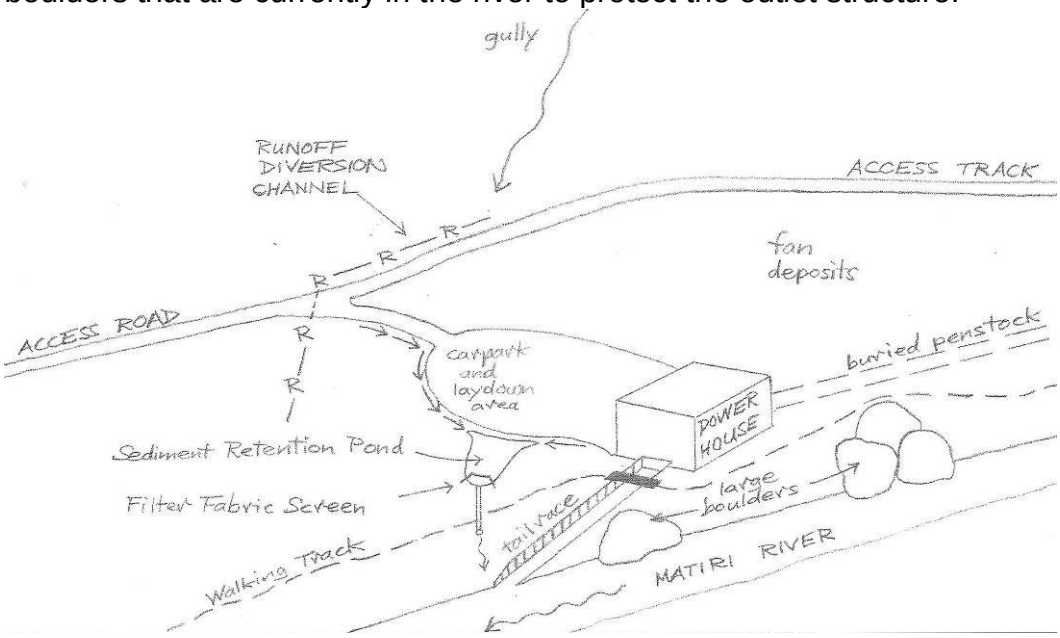
Additional information	Why this information is required	NZEL reply
		waterfall then these will be avoided!
Will the machinery be working in the waterway to construct the penstock be in the flowing channel?	Machinery working in the flowing channel is likely to release more sediment.	Machinery will not be required to work directly in the water however from time to time they may need to enter the water course when building the penstock foundations and installing the penstock.
Is it proposed to divert or alter the river channel during construction?	If a diversion is proposed it will need to met the permitted activity rules or be covered by a resource consent	It is not anticipated that the river channel will need to be moved at all unless required to install armoured wall. There exists quite an active channel during high floods at sweeping bend and is no doubt the reason the water level at the sweeping bend does not rise as high as one would expect. An option exists to divert the river flow down this channel during installation of the Penstock and armouring wall around the sweeping bend.
What volume of rock will be required to armour the Penstock?	It is unclear if there is enough rock to undertake this armouring	Refer to section that describes this.
How is it proposed that the base for armouring be undertaken given it is likely to be lower than mean flow level		This is a matter for the contractor to come up with the best technique. In saying that though it may be necessary to move river channel during this section of the works

Sweeping Bend flood channel as mentioned above in the NZEL reply.

The sweeping bend looking upstream is shown above. Note the River channel is not hard against the true right back of the river where the penstock route is proposed. The flood channel can be seen in the bottom right of the image.

Tailrace - Segment E

The trail race will discharge water diverted thought the power station and back into back to the river just below the power house. The applicant proposes to use the large boulders that are currently in the river to protect the outlet structure.



Very little design detail has been provided on the tailrace structure or how it will discharge back into the river. Currently there are no design details about how the tailrace will be constructed, its slope, the water velocities, what outlet protection is proposed and if any velocity dissipation is required.

The use of a sediment curtain has been suggested to control the sediment released during construction of the tailrace.

Further information and NZEL response for works in Segment E

Additional information needed to determine the adverse effects and the response from NZEL to the request.

	Why this information is required	**NZEL reply**
The configuration of the discharge point	To determine the possible adverse environmental effects	The conceptual design has a tail race entering the river just below the power station. This will likely be a boxed open concrete culvert section. Discharge level will be at the same level as the natural river level.
How will the water from the powerhouse be conveyed to the discharge point?		Yes, as above

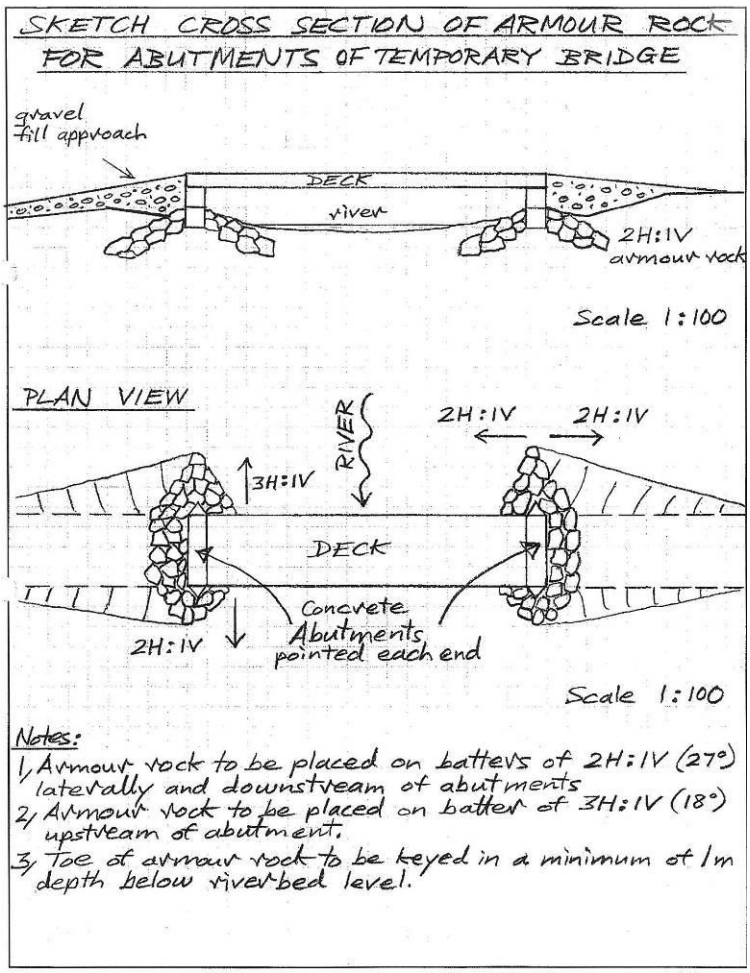
	Why this information is required	NZEL reply
What materials will be used to construct the tailrace structures?		Yes, as above
Will the discharge point of the tailrace into the river be armoured?		Rocks will be placed around the river bank and concrete culvert to protect the structure and river bank.
Will there be any energy dissipating structure installed before the tailrace is discharged into the river?		No, this will not be required as the draft tube on the turbine will exit lower than the river level.
How will a sediment curtain be used?		This is a matter for the contractor to manage so that they minimise or avoid sediment entering the river whilst undertaking these works.

Until this information has been provided the potential effects on the environment resulting from this proposal and ways these effects can be mitigated cannot be determined in detail.

A draft of the list above was provided to NZEL and their response forms the third column. It is expectation that these matters will be addressed as part of their evidence.

West Branch Matiri River Crossing -Segment F

The applicant proposes to place a temporary bridge across the West Branch of the Matiri River to allow access for construction machinery and materials.



A temporary Baigent bridge is proposed to cross the watercourse. The applicant accepts that the crossing will not be useable during flood events and that it may require maintenance following such events.

Once construction of the power scheme has been completed the formed crossing will be removed and the river bed returned to its natural state. Ongoing access will be by fording the river as is the current situation.

Possible environmental risks are associated with the works in the river bed and the potential changes to the flood cross section. These may result in the generation of sediment and a reduction in amenity values and fish passage.

Further information and NZEL response for works in Segment F

The following table summarises additional information requested and the response from the applicant.

Additional information	**NZEL reply**
How will the river be restored once he bridge is removed?	The river channel will remain unaffected by the removal of the bridge as it will pass under the bridge anyway. The abutments leading to either side of the river bridge will be levelled to that of the natural river bed.

3.4 Proposed Earthworks

The application is very light on details and only provides a broad overview of the earthworks proposed to be undertaken. The key items requiring earthworks are as follows:

- Penstock route;
- Construction of penstock;
- Stock piling areas;
- Access tracks;
- Construction of power station and tail race;
- Upgrading of the road; and
- Gravel extraction and crushing.

The "Matiri Hydro Electric Project Conceptual Sediment Control Plan" provided with the application provides a rudimentary description of the proposed earthworks and works.

Although details were not provided, the applicant's conceptual plan recognises that the following general principles should be adhered to:

- Minimising disturbance
- Staged construction
- Protect steep slopes
- Protect water courses
- Rapid stabilisation of exposed areas
- Install perimeter controls
- Employ detention devices
- Use trained and experienced contractors and staff
- Update the plan as the project evolves
- Assess and monitor of effects.

NZEL therefore accepts that a Sediment Control Plan is necessary to mitigate the risk of excessive sediment discharge into the Matiri River and its tributaries and that excessive sedimentation can be harmful for native fish, trout, eels and invertebrates. Discolouration of the river is predominantly an adverse visual effect altering the aesthetic values for recreational users, although it can also reduce photosynthesis and increase water temperatures.

There may be some more detail is needed once the work plan has been developed. There may be the requirement for the works to adapt to the conditions and performance achieved. If any non-compliance is found during monitoring, the contractors may need to be ready to apply more effective and elaborate sediment control measures. This may even mean using flocculant in the sediment control ponds to increase settling velocities. Caution is required using aluminium-based flocculants because the material is toxic and if the dosing is too high, adverse ecological effects can result.

NZEL acknowledges that the sediment control measures can not eliminate elevated suspended solids with the water column. The applicant therefore states an aims to minimise any increase in suspended sediments entering waterways below the works; and outside of the mixing zone from the suspended solids levels measured up stream. i.e., background levels. It should also be noted that the catchment has naturally elevated levels of turbidity.

Staff assume that the applicant is therefore happy to undertake adequate monitoring of the upstream and downstream water quality to ensure the increase in sediment is minimal or maintained within acceptable levels.

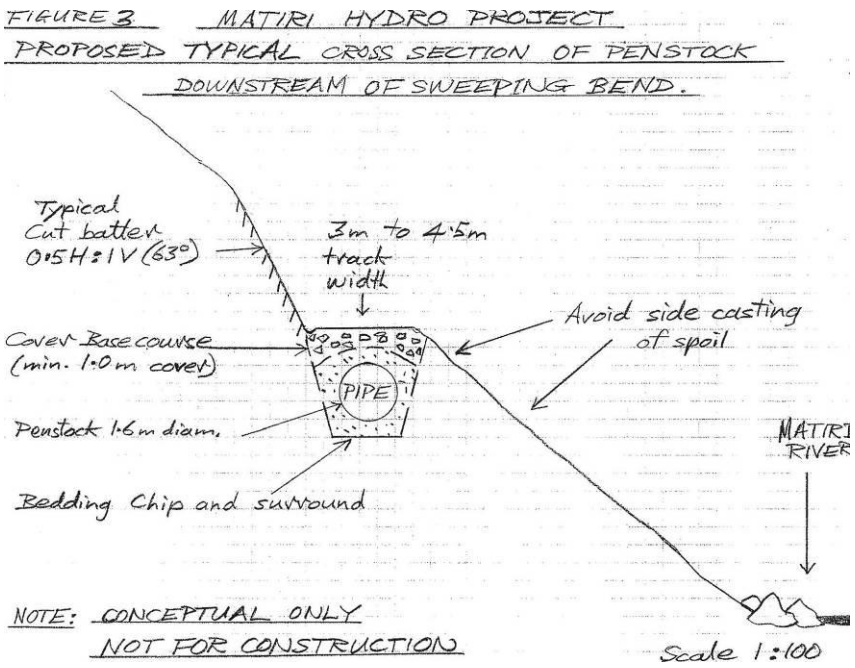
Staff accept that the risk of sediment from earthworks entering or becoming suspended in waterways depends on the scale and extent of site works, how the earthworks are managed through sediment control measures and the occurrence of significant rainfall events. During rainfall that cause runoff there is an increased likelihood of sediment from earthworks entering waterways. This can be minimised by an appropriate erosion and sediment control plan. Apart from the earthworks at the power house, weirs, and at the gravel pits, most of the proposed construction will be occurring along a relatively narrow corridor.

The most appropriate sediment control measure for the corridor including most of the penstock route, access track and the access road up to the Power House will need to be determined once the engineering plans are developed. The application mentions TP90 (Erosion & Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region) in the volunteered conditions. While this is not a standard it is regarded as a defacto standard in the industry and is a very good starting point for addressing sediment control from earthworks. Sediment management plans will form part of the volunteered Construction Management Plan and conceptual sediment control plan has been provided as part of the application.

Penstock / Access Tracks

NZEL propose to build a track the penstock route from the powerhouse to the outlet of the lake. This track will be used for construction access and maintenance. The proposed scheme involves laying a 6 metre wide road for the construction of the penstock with two turning areas in the forest. The total area of forest disturbed will be about 0.5 hectares in area and about 70 beech trees will a diameter of more than 20 centimetres will need to be removed. The ground along the pipeline and access way will be permanently covered and the temporary turning areas will be re vegetated with local plant material.

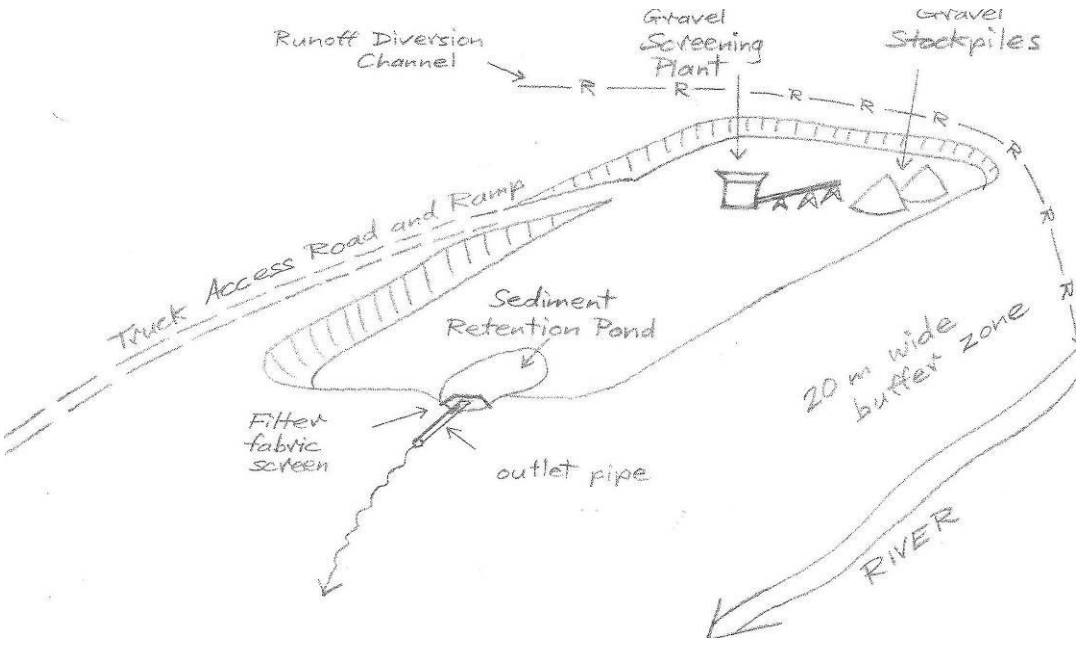
NZEL propose to place the penstock in the ground downstream of sweeping bend and this will generate significant earthworks. The following figure shows the typical cross section downstream of sweeping bend where the penstock is buried.



Gravel Extraction

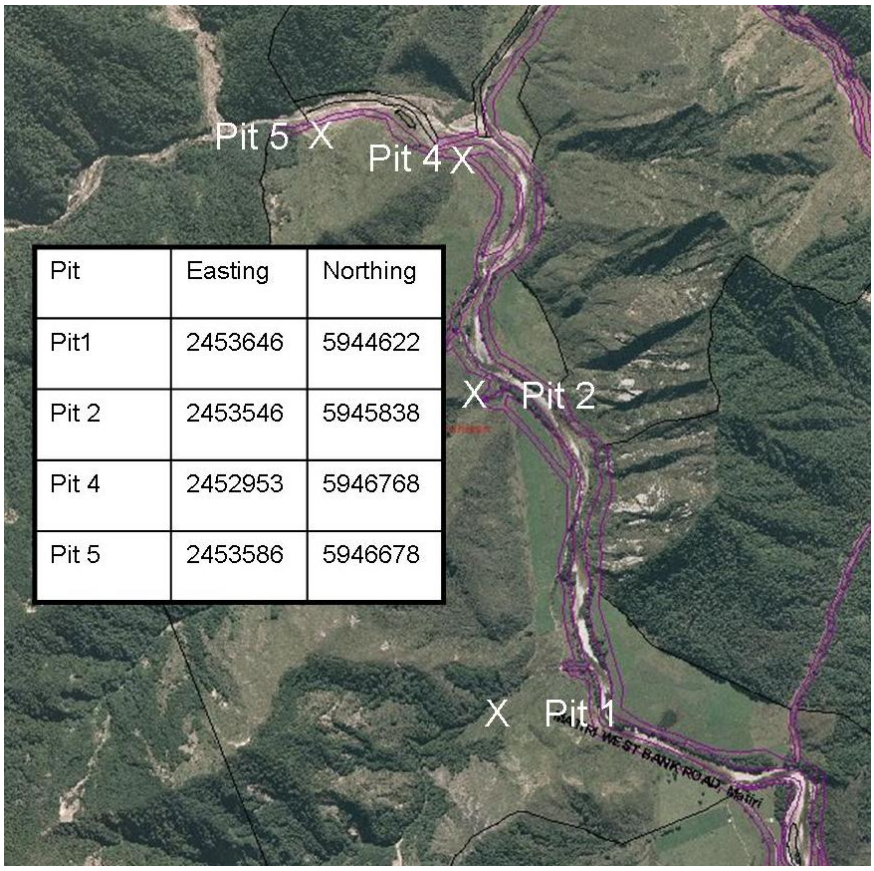
The gravel extraction is proposed to occur at four separate locations. The four sites have been identified for gravel extraction, these are located on the terraces of both the Matiri River and the West Branch of the Matiri. (Note the site 3 has been deleted from the proposal so the sites are numbered 1,2,4 and 5.)

The extraction areas will be separated from the main channels and have uphill diversion channels to divert the stormwater around the sites. See the following diagram for the conceptual diagram of the of the gravel extraction site.



It is proposed that a mobile gravel screening plan and possibly a crushing plant will be used in the gravel pits. It is also possible that a concrete batching plant be setup in one of the upper pits and a vehicle wash down will be located in to top pit (pit 5 in the application).

The location of the gravel extraction sites is shown the following figure



Pit	Easting	Northing
Pit1	2453646	5944622
Pit 2	2453546	5945838
Pit 4	2452953	5946768
Pit 5	2453586	5946678

Gravel extraction of nature and scale described in the application is relatively standard and the effects can be controlled by a management plan.

Recommendations from NZEL

The conceptual sediment control plan makes several recommendations these are as follows.

1. We recommend sediment control measures which are appropriate to the type of earthworks and to the proximity to water courses as outlined in this report.

2. No earthworks should take place along the riverbed penstock section when the river is in high flow such that the water level could reach the site works.

3. Road and track construction works should not be carried out during periods of heavy rain when runoff from road works is likely to cause sedimentation into water courses and into the Matiri River.

4. Monitoring of weather patterns should be carried out during the construction phase to allow works to be discontinued and appropriate protection and mitigation measures put in place prior to heavy rainfalls and floods reaching the site works.

5. Appropriate sediment control equipment, erosion protection matting and batter covers should be kept on site for use in minimising potential sedimentation problems from areas of exposed soil.

6. Regular maintenance and cleaning of silt fences and filter fabric screens should be carried out to maintain their effectiveness.

7. Baseline turbidity measurements in the Matiri River should be carried out prior to construction works to establish the baseline turbidity levels at different flow levels for the Matiri River.

8. Sedimentation monitoring is recommended during construction using a turbidimeter so that the levels of sedimentation and discolouration into water courses can be quantified.

9. Hay bale barriers should not be used for sedimentation control for this project due to their potential to become a seed source for invasive weed species. This is particularly relevant in the upper part of the project within the DOC administered land.

10. Contractors carrying out the work should use staff experienced and trained in erosion and sediment control and they should be familiar with guidelines of the Technical Publication No. 90 "Erosion and Sediment Control" (Auckland Regional Council). The staff must also be familiar with any resource consent conditions imposed by TDC and concession conditions imposed by DOC.

Staff agree with these general the recommendation above and the intent has been carried through into the recommended conditions at the end of this report.

In general there is nothing stopping the applicant from avoiding, remedying or mitigating the adverse effects of the proposed earthworks. The assessment of this will need to be undertaken when the management plans are submitted for approval.

3.5 Water Quality

As identified in the AEE, only one discharge consent has been applied for , this is for the discharge of uncontaminated water from the tailrace back into the Matiri River. The "Matiri Hydro Electric Project Conceptual Sediment Control Plan" identifies that there will be a discharge of sediment into water during construction and ongoing maintenance.

Having evaluated the application information, it is considered that there are two main concerns in terms of water quality-related, actual and potential effects:

- temporary effects that occur during construction; and
- possible long-term effects on aquatic ecology.

This report primarily deals with the short term construction effect. Discharges that affect aquatic ecology in the long term are recognised but they are not the primary focus of these consents that deal with the temporary discharges during construction and maintenance.

Discharges with elevated suspended sediment concentrations will occur from the coffer dam, weir construction, flows through the channel and works in the river and lake. These can be managed to be acceptable as temporary activities with temporary effects. Because discharges will stop on completion of the works it is acceptable to treat them as temporary activities.

What constitutes temporary effects during construction, and the possible alterations under the construction management plan. "Temporary", in my view, is where effects are of short duration and reversible through natural processes. During the construction stage, the "temporary" effects on water quality rely on the performance of mixing zones and the robustness of the aquatic life to cope with those temporary effects in order to sustain the aquatic populations.

Several specific standards are proposed within the recommended conditions, as limits on the changes to water quality. These are based on the WCO.

As stated previously the water coming out of Lake Matiri is relatively turbid and is unlikely to ever be very clear as seen in several bush streams and rivers.

Monitoring

Upstream and downstream continuous turbidity monitoring with real-time data transfer to TDC compliance (and potentially the public) should alert all concerned to non-compliant discharges and therefore increase the likelihood of compliance with the relevant water quality conditions. In addition to turbidity, monitoring of visual water clarity and suspended are recommended. Having a range of such sediment indicators can give useful information as to the likely source of the material if it is not clear or is contested. Turbidity is the only measure that can be measured automatically. Turbidity and water clarity are the only measures that can be measured at the streamside. It is appropriate to allow for a higher level of sediment discharge for very short intervals (ie 20min) but these are lower for longer intervals (ie over 2 hours). This is based on the effect this sediment will have on fish and invertebrate populations. It is anticipated that these controls on sediment discharges and monitoring will lead to compliance with the Buller WCO downstream of the Matiri River.

The following photographs supplied by NZEL to show the naturally high turbidity (Supplied 16 January 2009)

The TRMP permitted activity rules for the discharges to freshwater are 36.2.4 and 36.2.5:

36.2.4Discharge of Sediment or Debris from Land Disturbance Activities

The discharge into water of sediment or debris, or water that may contain sediment or debris, from any land disturbance activity, is a permitted activity that may be undertaken without a resource consent if it complies with the following conditions:

(a) The discharge is in such a manner that it does not cause any:
  (i) diverting or damming of any river or stream; or
  (ii) erosion of the bed of any river or stream; or
  (iii) discernable change to any habitat by deposition of sediment onto the bed of any water body or coastal water body.

(b) No soil or debris is placed directly into a water body or the coastal marine area.

(c) The discharge must not cause the visual clarity of the receiving water to change by more than 40 percent as measured by a black disc at any point more than:
  (i) 50 metres downstream where the wetted width of the river is less than 5 metres; or
  (ii) 100 metres downstream where the wetted width of the river is between 5 metres and 20 metres; or
  (iii) 200 metres downstream where the wetted width of the river is more than 20 metres; or
  (iv) 100 metres from the point of discharge in the Coastal Marine Area;
  measured from the furthest downstream point of the discharge.

36.2.5Discharge of Vegetation from Land Disturbance Activities

The discharge of vegetation from any land disturbance operation into water is a permitted activity that may be undertaken without a resource consent if it complies with the following conditions:

(a) The discharge is in such a manner that it does not cause any:
  (i) diverting or damming of any river or stream; or
  (ii) erosion of the bed of any river or stream; or
  (iii) discernable change to any habitat by deposition of vegetation onto the bed of any water body or coastal water body.

(b) The dissolved oxygen content of the water is not decreased below 80 percent of saturation concentration as a result of the discharge, measured at any point no more than:
  (i) 50 metres downstream where the wetted width of the river is less than 5 metres; or
  (ii) 100 metres downstream where the wetted width of the river is between 5 metres and 20 metres; or
  (iii) 200 metres downstream where the wetted width of the river is more than 20 metres; or
  (iv) measured from the furthest downstream point of the discharge.

It is likely that with good practice NZEL can meet the limits imposed by the permitted activity rules. The WCO needs to be considered. The Matiri River flows into the Buller River, this is listed in Schedule 2 of the WCO and Clause 11 that refers to water quality applies. (Additionally 11(2) also applies to the Matiri River.) There is significant distance for any mixing to occur before the water is discharged to the Buller River and this should minimise and adverse effects.

3.6 Bond and Public Liability

The applicant needs to provide a bond that is large enough to remedy any issues should the project be abandoned. Additionally the applicant will need to have public liability insurance.

The purpose of the bond is to secure the performance of all of the conditions of this consent and to ensure the remediation of the adverse effects on the environment arising from the exercise of the consent.

The construction bond should be in two parts: the first to cover the construction and the second it to cover the ongoing maintenance of the scheme.

The bond will be adjusted annually to reflect changes in the Construction Code Index and shall be maintained at this sum throughout the term of the consent.

The Consent Holder and the surety remain liable under the bond for any adverse effects on the environment arising from the exercise of the resource consent which may become apparent either during or after the expiry of the consent.

The term of the bond shall continue until:

- One year after the expiry of the term of the resource consent; or
- The holder has complied with all of the terms and conditions of the resource consent; or
- In the reasonable opinion of the Council, the likelihood of an adverse effect on the environment arising from the resource consent has been exercised, is not greater than that from adjacent undisturbed surrounding land.

The bond is to be given by the holder before this consent may be exercised. The form of the bond is to be prepared by the Council's Solicitors and the holder is to pay the Council's costs on preparation and execution of the bond.

If the consent is transferred in part of whole to another party or person, the bond shall continue until any outstanding work at the date of transfer is completed to ensure compliance with the conditions of this consent unless the Council is satisfied adequate provisions have been made to transfer the liability to the new consent holder.

3.7 Natural Character

Some loss of natural character is inevitable with the weirs, penstock structure, tail race and control building within the river margin and at sweeping bend the penstock is within the river bank.

To minimise the impact of these structures the design, materials and finished colours of scheme infrastructure including the control hut, weirs and associated structures, penstock pipeline and generation station building should be recessive and this will help mitigate the impact of these structures on the visual amenity.

This can be achieved by building and colouring the structures to blend into the environment. This could include colouring of the of concrete to be a similar colour as the stone in the riverbed, avoiding visible straight lines and shaped to look like the natural substrate (boulders) to minimise visual intrusiveness of the concrete structures.

The weirs and associated structures need to be located and constructed so they are not visible with naked eye from the lake and the area surrounding the lake. This is to protect the wild and scenic nature as required in the Water Conservation order.

The same conditions should apply to any new flow recorder while the appearance and impact of the existing lake level recorder (flow recorder 1 as it is referred to in the monitoring schedule 1 in consents RM060939, RM060940, RM060941 and RM090023) needs to be reviewed with a view to rationalisation and removal of any unnecessary structures.

The natural character of the bed needs to be maintained as much as possible. If it is not possible to cover with natural rock any in-stream structures (including the weirs and penstocks) should be shaped and coloured to look like the natural substrate (boulders).

3.8 Summary of Key issues

The application does not contain enough detail to identify all the possible adverse effects associated with the project, nor to assess how these may be avoided, remedied or mitigated.

The applicant has provided significant additional information very recently. However, for a prject of this size, it is acknowledged that much of the detail will only be realised when the engineering plans are developed.

Key Issues	Details
Water Conservation Order	Works must be undertaken in such a way that the applicant complies with the Water Conservation Order.
Lack of design information	The designs supplied are conceptual only and provide little certainty. Where design cross sections are supplied they are the typical proposed cross sections. The designs do not constitute engineering plans. This lack of design detail makes it difficult to determine the adverse effects on the environment with any certainty.
Unknown subsurface conditions	The work in the upper section is being undertaken on an old landslide, composed of large sandstone boulders and land slide debris. This lack of information makes it difficult to determine the possible adverse effects of pouting large amounts of concrete to form the weirs. There are possible amenity effects and effects on the residual flow of water that currently percolates through the landslide dam.
The building of Weirs 2 and 3	It is unclear just how difficult it will be to build Weirs 2 and 3. Accessing the site across the lake sediments is likely to prove difficult. The WCO puts additional constrains on any visual impacts.
Sediment generation and control	The catchment has a lot of clay and muddy sand stone. The river naturally runs coloured when there is heavy rain. Sediment control in the lake with relatively fine lake sediments and the flowing water will make sediment control difficult. Sediment control in the river will be difficult. Moving machinery in the lake and river over mudstone is likely to release significant sediment.
Possible contamination of water via discharge	Use of cement in the river channel may result in adverse effect on fish. Moving materials through the water results in a risk of contamination from an accidental discharge.
Pest species	Risk of bringing a biological contaminant into the site either machinery or materials.
Amenity effects during the	Visual effects during construction and possible dust.

construction phase	
Amenity effects of the structures on the lake	The weirs and associated control structures should not be visible from the lake Any damage to lake foreshore or lake bed
Public access during construction	Allowing the public to access the national park while maintaining their safety

4. RECOMMENDATION AND DRAFT CONSENT CONDITIONS

4.1 Volunteered Consent Conditions

The applicant has volunteered the following consent conditions relating to sediment control and engineering.

Sediment Control

- We recommend sediment control measures which are appropriate to the type of earthworks and to the proximity to water courses as outlined in this report.
- No earthworks should take place along the riverbed penstock section when the river is in high flow such that the water level could reach the site works.
- Road and track construction works should not be carried out during periods of heavy rain when runoff from road works is likely to cause sedimentation into water courses and into the Matiri River.
- Monitoring of weather patterns should be carried out during the construction phase to allow works to be discontinued and appropriate protection and mitigation measures put in place prior to heavy rainfalls and floods reaching the site works.
- Appropriate sediment control equipment, erosion protection matting and batter covers should be kept on site for use in minimising potential sedimentation problems from areas of exposed soil.
- Regular maintenance and cleaning of silt fences and filter fabric screens should be carried out to maintain their effectiveness.
- Baseline turbidity measurements in the Matiri River should be carried out prior to construction works to establish the baseline turbidity levels at different flow levels for the Matiri River.
- Sedimentation monitoring is recommended during construction using a turbidimeter so that the levels of sedimentation and discolouration into water courses can be quantified.
- Hay bale barriers should not be used for sedimentation control for this project due to their potential to become a seed source for invasive weed species. This is particularly relevant in the upper part of the project within the DOC administered land.

- Contractors carrying out the work should use staff experienced and trained in erosion and sediment control and they should be familiar with guidelines of the Technical Publication No. 90 “Erosion and Sediment Control” (Auckland Regional Council).

Engineering

- NZEL applies for consent to use the resource as specified and relies on engineering design to ensure the final design and construction meets the terms of its consent. Conditions are therefore required in the consent that will ensure design and engineering will meet certain minimum requirements in terms of impact on the environment. These impacts are on: Natural character, aquatic ecology, vegetation and public safety

- NZEL expects relevant RC conditions along the lines of:

    - A professional engineering company with recognized expertise and experience in the design of hydro electric power structures will be agreed on by NZEL, TDC and DOC to provide engineering design services.
    - The chosen company will have formal internal peer review and quality control measures in place. The outputs of these formal processes will be made directly available to TDC and DOC.
    - The final engineering plans produced are to be approved by TDC and DOC against the proposed impacts on the environment promoted by NZEL in the consent application.

4.2 Management Plans

The applicant states that when consent is obtained to utilise the resource, engineering details will be finalised in an engineering design phase of the project. This make it difficult, at this stage, to assess the environmental issues and risks associated with this development and write specific consent conditions.

The applicant has not specifically addressed the earthworks or works in a water body. Most of the useful information is the Engineering concept design and the Conceptual Sediment Control Plan. This fact and the lack of detail has made writing this report difficult. The application is light on detail and is at a high level. It does not provide details that would be expected in engineering plans.

This staff report examines the works in the lake and the river by landscaping segment and examines the possible issues, risks and highlights where more information is required.

The earthworks are dealt with generically as the conditions to control the environmental effects are more generic but the landscape segments are still used to reference the areas.

From the information provided the adverse effects look manageable. However, there will need to be significant management input both from the Council and NZEL to achieve the desired outcome. The only way to manage this activity is to develop and utilise management plans.

Large-scale projects often require further refinement of management techniques and operations once the consent for the development is granted. They often operate under a formalised management plan. With the lack of engineering designs it is appropriate to impose a condition of consent that requires a management plan to be supplied at a later date.
The Environment Court has determined that a future management plan can be required by a condition of consent where the management plan provides detailed information as to how the consent holder will comply with other conditions to the consent (see Wood v West Coast Regional Council (C127/99)).

4.3 Roading

General conditions about the runoff etc from the Roading have been included in the earthworks resource consent. Please see Dugald Ley's report for additional conditions.

4.4 General Discussion

As included in the application, the detailed management of environmental effects of construction is largely left, and thus is somewhat deferred in time, until the Council certify the Management Plan(s) required as a conditions of consent. The additional plans that form the basis of the Management Plans are set out in the draft consents included in this report.

The effects assessment at this point in time has considered the broader anticipated effects that are documented in the consent application. Also potential subsequent changes to the Construction Management Plan once construction is underway are anticipated over the construction period. This may require further certification by the Council. In my opinion, this is acceptable practice, although the lack of knowledge until the design and construction methodology is finalised makes an assessment of the effects under the RMA more difficult. Also the acceptance of this approach is based on the ability of the application's broad assessment of effects of the proposed construction to be achieved through the details of the construction management plan(s).

The locations of all the structures subject to the provisions that some details (specially the location of the structures) are to be confirmed by the Hearing Committee.

4.5 Recommendation

If the Committee is of a mind to grant resource consent to NZEL, the writer's assessment is that the conditions of consent must result in:

(i) The maintenance of fish passage in both directions (Buller R to Lake Matiri), and including provision for a minimum residual flow during construction;

(ii) Minimising the discharges of sediment to the lake and river during construction with the associated monitoring;

(iii) Management plans for Construction, sediment control, and water quality shall be produced and signed off by Council before construction starts;

(iv) Conditions controlling maintenance for the life of the consent; and

(vii) Avoiding any adverse effects on the wild and scenic nature of Lake Matiri.
(viii)

In the event that the consents are granted the following draft consents have been included for the committee to consider.

Leif Pigott
Consent Planner Natural Resources

(DRAFT) RESOURCE CONSENT DECISION

Resource Consent Number: RM060937

Pursuant to Section 104B of the Resource Management Act 1991 ("the Act"), resource consent is hereby granted to:

New Zealand Energy Limited
(hereinafter referred to as "the Consent Holder")

Activity authorised by this consent: To undertake earthworks for the purposes of constructing and maintaining the Matiri hydro-electric power scheme.

Location details:

Address of property: Matiri Valley, Murchison
Valuation number: Crown land
Legal Description: Pt Sec 43

Pursuant to Section 108 of the Act, RM060937 is granted for a term expiring on **31 May 2019** and subject to the following conditions:

1. General Earthworks

1.1 The earthworks shall be undertaken in accordance with the documentation submitted with the application and consent conditions listed in this resource consent document. Where consent conditions conflict with information submitted with the application, the consent conditions of shall prevail.

1.2 The Consent Holder shall be responsible for all contracted operations relating to the exercise of this resource consent, and shall ensure that all personnel working on the site are made aware of the conditions of this resource consent and with the Management Plans required by Condition 6.1 and 8.1 of this consent, and shall ensure compliance with consent conditions.

1.3 A copy of this resource consent shall be available to contractors undertaking the works, and shall be produced without unreasonable delay upon request from a servant or agent of the Council.

1.4 The Consent Holder shall appoint a representative(s) prior to the exercise of this resource consent, who shall be the Council's principal contact person(s) in regard to matters relating to this resource consent. At least 10 days prior to beginning the works authorised by this consent, the Consent Holder shall inform the Council's Co-ordinator of Compliance Monitoring of the representative's name and how they can be contacted within the works period. Should that person(s) change during the

term of this resource consent, the Consent Holder shall immediately inform the Manager and shall also give written notice to the Manager of the new representative's name and how they can be contacted.

1.5 The Consent Holder shall carry out operations in accordance with the provisions of the approved Construction, Erosion and Sediment Management Plan.

1.6 Any changes to the Construction, Erosion and Sediment Management Plan shall be made in accordance with the methodology and approved procedures in that plan and shall be confirmed in writing by the Consent Holder following consultation with the Manager. Changes to the Construction, Erosion and Sediment Management Plan shall not be implemented until authorised by the Council's Coordinator Compliance Monitoring.

1.7 All the works shall be supervised by a Chartered Professional engineer.

1.8 Contractors and staff carrying out the work shall be experienced and trained in erosion and sediment control.

Advice Note
Contractors and staff should be familiar with guidelines of the Technical Publication No. 90 "Erosion and Sediment Control" (Auckland Regional Council) or other similar guidelines.

2. Contaminant Management

2.1 The Consent Holder shall undertake all practicable steps to minimise the effect of any contaminant discharges to the receiving environment.

2.2 The Consent Holder shall ensure that any discharge of contaminants onto or into land or water from any activity is avoided, remedied or mitigated to ensure no contaminants are present at a concentration that is, or is likely to have, a more then minor effect on the environment.

2.3 No petrochemical or synthetic contaminants (including but not limited to oil, petrol, diesel, hydraulic fluid) shall be released into water from equipment being used for the activity and no machinery shall be cleaned, stored, or refuelled within 5 metres of any watercourse.

2.4 Only fuels, oils and hydraulic fluids associated with the operation, and in the volumes required, may be stored on-site. Such substances shall be stored in a secure and contained manner in order to prevent the contamination of adjacent land and/or waterbodies.

2.5 The Consent Holder shall notify the Council as soon as is practicable, and as a minimum requirement within 12 hours, of the Consent Holder becoming aware of a spill of hazardous materials, fuel, oil, hydraulic fluid or other similar contaminants. The Consent Holder shall, within 7 days of the incident occurring, provide a written report to the Council, identifying the causes, steps undertaken to remedy the effects of the incident and any additional measures that will be undertaken to avoid future spills.

2.6 Should the Consent Holder cease or abandon work on-site, it shall first take adequate preventative and remedial measures to control sediment discharge, and shall thereafter maintain these measures for so long as necessary to prevent sediment discharge from the site. All such measures shall be of a type, and to a standard, which are to the satisfaction of the Council Environment & Planning Manager.

2.7 Prior to bulk earthworks commencing for each construction phase, the Consent Holder shall submit to the Council's Co-ordinator Compliance Monitoring, a certificate signed by an appropriately qualified and experienced engineer to certify that the appropriate erosion and sediment control measures have been constructed in accordance with the Construction, Erosion and Sediment Control Plan (Condition 6.1) and the conditions of this consent. The certified controls shall include, where relevant, diversion channels, sediment fences, decanting earth bunds and sediment retention ponds. The certification for these measures for each construction phase shall be supplied to the Council Coordinator Compliance Monitoring.

2.8 All disturbed vegetation, soil or debris shall be handled so that it does not result in diversion or damming of any river or stream. All stockpiled material shall be bunded to protect against stormwater erosion.

2.9 All disturbed vegetation, soil or debris shall be disposed of off site or stabilised to minimise the risk of erosion. All other waste materials shall be disposed of off site at premises licensed to receive such materials.

2.10 All practical measures shall be taken to ensure that any dust created by operations at the site and vehicle manoeuvring (in accessing the site and driving within it) shall not, in the opinion of Councils Co-ordinator Regulatory Services, become a nuisance to the public or adjacent property owners or occupiers. The measures employed shall include, but are not limited to, the watering of unsealed traffic movement areas, roadways and stockpiles as may be required.

2.11 Topsoil shall and subsoil shall be stripped and stockpiled separately. This shall then be re-spread at completion of the works.

2.12 The Consent Holder shall take all practical measures to limit the discharge of sediment with stormwater run-off to water or land where it may enter water during and after the earthworks.

Advice note
In particular, the key earthworks should be carried out during fine weather periods when the likelihood of erosion and sedimentation will be least.

2.13 The discharge of stormwater shall not cause in the receiving water any of the following:

a) the production of any visible oil or grease films, scums or foams, or conspicuous floatable or suspended material;
b) any emission of objectionable odour;

c) the rendering of freshwater unsuitable for bathing;

d) the rendering of freshwater unsuitable for consumption by farm animals; and

e) any adverse effect on aquatic life.

2.14 The Consent Holder shall monitor weather patterns during the construction phase and works shall be discontinued and appropriate protection and mitigation measures put in place prior to heavy rainfalls and floods reaching the site works.

2.15 The Consent Holder shall stop construction in heavy rain when the activity shows sedimentation that is more than minor in the view of the Council's Compliance Officer.

2.16 Sediment controls shall be implemented and maintained in effective operational order at all times.

Advice Note
Appropriate sediment control equipment including erosion protection matting and batter covers should be kept on site for use in minimising potential sedimentation problems from areas of exposed soil.

2.17 All erosion and sediment control measures shall be inspected after any major rainfall event and any problems shall be rectified within 24 hours required.

2.18 All exposed ground shall be re-vegetated within 12 months of completion of the works so that erosion/downhill movement of soil is limited as much as is practical. This shall include supplemental planting of appropriate vegetation that enhances the stability and minimises surface erosion.

Advice note:
Any vegetation used should be approved for use by the Department of Conservation.

2.19 Hay bale barriers shall not be used for sedimentation control for this project due to their potential to become a seed source for invasive weed species.

3. Culverts

3.1 All culverts above the West Branch of the Matiri and any other culverts not on legal road shall be sized to at least pass a 20% AEP flood (1 in 5 year on average) before water overtops any roadway or track which the culvert passes under.

3.2 All culverts below the West Branch of the Matiri on the legal road shall be sized to at least pass a 2% AEP flood (1 in 50 year on average) before water overtops any roadway or track which the culvert passes under.

3.3 The Consent Holder shall ensure that the inlet and outlet of all culverts is armoured as necessary to protect against erosion of the water course or undermining of the culvert structure.

3.4 There shall be a secondary flow path constructed and armoured to minimise any erosion or washout.

3.5 The Consent Holder shall ensure that for the duration of this consent any debris build-up is removed and ensure scour protection measures are installed and maintained at the inlet and outlet of all culverts.

3.6 The culverts shall be constructed to allow fish passage both up and down stream.

4. Roading and Track

4.1 The water table, cut-offs and culverts shall be constructed and installed to prevent scour, gulleying or other erosion for the formed or constructed surface.

4.2 All culverts within drains shall be armoured at the outlet to protect against erosion.

4.3 No significant erosion, scour or deposition shall result from the placement of culverts.

4.4 All batters shall be constructed to avoid batter failure.

5. Management Plans

5.1 Prior to undertaking any activities authorised by these consents, the Consent Holder shall prepare the following Management Plans:

(a) Construction, Erosion and Sediment Management Plan
(b) Quarrying Management plan

Works shall not commence before these plans have been approved by the Council's Coordinator Compliance Monitoring.

5.2 Both management plans shall comply with the relevant conditions of the resource consents RM060937, RM060938, RM060939, RM060940, RM060941 and RM060942. Either management plan may be amended as the Consent Holder considers appropriate during the period of these consents. These amendments shall be supplied to the Council and works under the amended plan(s) shall not commence before amendments have been approved by the Council's Coordinator Compliance Monitoring.

5.3 The consents shall be exercised in accordance with the management plans prepared by the applicant refer to Conditions 6.1 and 8.1.

5.4 At any time during the period of these consents, a copy of the latest version of each managed plan shall be on site and available to all relevant staff.

6. Construction, Erosion and Sediment Management Plan

6.1 The Construction, Erosion and Sediment Management Plan required by Condition 5.1(a) shall set out the practices and procedures to be adopted in order that compliance with the conditions of the this consent can be achieved, and in order that the effects of the activity are minimised to the greatest extent practical. This plan shall, as a minimum, address the following matters:

(a) Description of the works
(b) Engineering design details
(c) Silt and dust control during earthwork stages
(d) Temporary activities and equipment storage in specified areas

(e) Construction programme including timetable, sequence of events and duration including any landscaping
(f) Construction methods and equipment to be used
(g) Dust sources and potential impact during construction
(h) Methods used for dust suppression during construction activities
(i) Location, design operation and maintenance of stormwater runoff controls and sediment control facilities
(j) Detailed specifications of the diversion of any water bodies including channel configurations and rehabilitation measures
(k) Detailed specifications of the spoil storage and stabilization
(l) Construction method for watercourse crossings
(m) Staff and contractor training
(n) Traffic management and property access management
(o) Contingency plans (e.g., mechanical failures, oil/fuel spills, flooding, land slips)
(p) Public access, community information and liaison procedures
(q) Complaints and reporting procedures
(r) Cultural and archaeological protocols (including discovery protocols)
(s) Assessment and monitoring procedures
(t) Methodology and approval procedures for making changes to the Construction, Erosion and Sediment Management Plan

Advice note
The following are the general principles that should be adhered to when writing and implementing the Construction, Erosion and Sediment Control Plan.

1. Minimise the disturbance to land
2. Stage construction
3. Protect steep slopes
4. Protect water courses
5. Stabilise exposed areas as soon as possible
6. Minimise the runoff velocities
7. Revegetate as soon as possible
8. Install perimeter controls and protect disturbed areas from runoff sourced above site
9. Employ detention devices
10. Take the season and weather forecast into account
11. Use trained and experienced contractors and staff
12. Update the plan as the project evolves
13. Assess and monitor

Keep on site runoff velocities low by the use of the following; contour drains, retention of natural vegetation, provision of buffer strips of vegetation, low gradients and short slopes, control anticipated erosion and prevent sediment from leaving the site.

7. Quarry

7.1 The area of land open to quarry operations (including excavation, stockpiling and processing areas but excluding access roads) shall be kept to a minimum and shall not exceed a total area of 1 hectare at any one of the four sites.

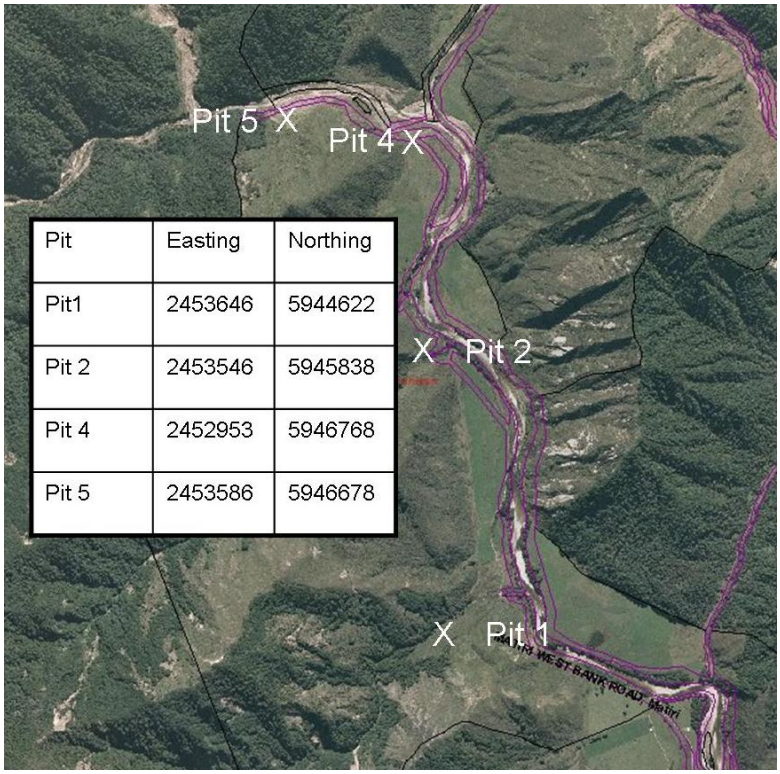
Advice Note:
Once an area, including stockpiles, has started to be rehabilitated as per Condition 7.4, then it will no longer be considered as open to rock abstraction operations.

7.2 The Consent Holder shall maintain the quarry site in a clean and tidy condition. Redundant machinery and equipment not required for the operation of the quarry shall be removed from the site. No disposal of refuse (domestic, agricultural or other waste) shall occur at the site.

7.3 The Consent Holder may operate a vehicle wash within the upper gravel extraction site by the West Branch of the Matiri River.

7.4 During and following quarry operations at the site the Consent Holder shall rehabilitate the land to the satisfaction of the Council's Co-ordinator Compliance Monitoring, such that it is left in a safe and stable manner and with a suitable vegetative groundcover having been established, or other suitable measures, such that the erosion of soil and generation of dust is minimised as much as practical. Reinstatement may require the management of stormwater discharges from the site. In line with quarry operations, reinstatement shall be carried out in a progressive manner.

7.5 The gravel extraction shall only occur from the areas marked on map below.



Pit	Easting	Northing
Pit1	2453646	5944622
Pit 2	2453546	5945838
Pit 4	2452953	5946768
Pit 5	2453586	5946678

8. Quarry Management Plan

8.1 The Gravel Extraction Management Plan required by Condition 4.1 shall set out the practices and procedures to be adopted in order that compliance with Conditions 6.1-6.5 can be achieved and the effects of the activity are minimised to the greatest extent practical, and shall as a minimum address the following matters:

(a) Description of the works
(b) Work programme including any final landscaping
(c) Work methods and equipment to be used
(d) Dust sources and potential impact during construction
(e) Methods used for minimising erosion
(f) Location, design operation and maintenance of stormwater runoff controls and sediment control facilities
(g) Specifications of the over burden storage
(h) Staff training
(i) Contingency plans (e.g., mechanical failures, oil/fuel spills, flooding, land slips)
(j) Complaints and reporting procedures

9. Vegetation clearance

9.1 The only indigenous vegetation to be removed shall be that required to construct the access tracks, control hut, penstock route and laydowns. The Consent Holder shall not remove any trees or shrubs other than those identified in the application and shall ensure that all disturbed land is planted as soon as practical after completion of the works.

Advice Note:
Where possible the alignment of the access road should be chosen to avoid disturbing the larger trees.

9.2 The works shall be undertaken in such a manner as to ensure that the least practical amount of indigenous vegetation is removed.

9.3 The vegetation shall be pushed over by an excavator and left on site adjacent to the area.

10. General Conditions

10.1 The Consent Holder shall contact Council's Co-ordinator Compliance Monitoring at least 24 hours prior to commencing works for monitoring purposes.

10.2 The Consent Holder shall ensure that the site is left in a neat and tidy condition following the completion of the works.

11. Review Conditions

11.1 The Council may review any or all of the conditions of the consent pursuant to Section 128 of the Resource Management Act 1991 for all or any of the following purposes:

(a) to deal with any adverse effect on the environment which may arise from the exercise of the consent that was not foreseen at the time of granting of the consent, and which is therefore more appropriate to deal with at a later stage; and/or

(b) to require the Consent Holder to adopt the best practical option to remove or reduce any adverse effects on the environment resulting from the discharge; and/or

(c) to review the contaminant limits, loading rates and/or discharge volumes and flow rates of this consent if it is appropriate to do so; and/or

(d) to review the frequency of sampling and/or number of determinants analysed if the results indicate that this is required and/or appropriate;

(e) to require consistency with any relevant Regional Plan, District Plan, National Environmental Standard or Act of Parliament.

12. Bond (Details and bond sum to be confirmed by Committee)

12.1 The Consent Holder shall enter into a bond with a financial institution of good repute to be provided as surety to the satisfaction of the Council. The purpose of the bond is:

(a) To secure the performance of all of the conditions of this consent; and
(b) To ensure the remediation of the adverse effects on the environment arising from the exercise of the consent.

The bond shall be in the sum of NZ$500,000 + GST (adjusted annually to reflect changes in the Construction Code Index) and shall be maintained at this sum throughout the term of the consent. The bond is a single bond of $500,000 + GST and shall be designed to cover this consent.

The Consent Holder and the surety remain liable under the bond for any adverse effects on the environment arising from the exercise of the resource consent which may become apparent either during or after the expiry of the consent.

The term of the bond shall continue until:

- One year after the power station has been operating; or
- The Consent Holder has complied with all of the terms and conditions of the resource consent; or
- In the reasonable opinion of the Council, the likelihood of an adverse effect on the environment arising from the land in respect of which the resource consent has been exercised, is not greater than that from adjacent undisturbed land.

The bond is to be secured before this consent may be exercised.

The form of the bond is to be prepared by the Council's Solicitors and the holder is to pay the Council's costs on preparation and execution of the bond.

If the consent is transferred in part of whole to another party or person, the bond shall continue until any outstanding work at the date of transfer is completed to ensure compliance with the conditions of this consent, unless the Council is satisfied adequate provisions have been made to transfer the liability to the new Consent Holder.

In the event of any such transfer of the consent, the Consent Holder shall ensure that the transfer forthwith provides a replacement bond to the Council on the terms required by the Bond Conditions.

Draft Landuse Consent RM060938

(DRAFT) RESOURCE CONSENT DECISION

Resource Consent Number: RM060938

Pursuant to Section 104B of the Resource Management Act 1991 ("the Act"), resource consent is hereby granted to:

New Zealand Energy Limited
(hereinafter referred to as "the Consent Holder")

Activity authorised by this consent: To undertake works in and on Lake Matiri and the Matiri River for the purposes of constructing and maintaining the Matiri hydro-electric power scheme.

Location details:

Address of property: Matiri Valley, Murchison
Valuation number: Crown land
Legal Description: Pt Sec 43

Pursuant to Section 108 of the Act, RM060937 is granted for a term expiring on **31 May 2019** and subject to the following conditions:

Conditions

1. Site and Dam Details: (details to be confirmed by Committee)

River or Stream Being Dammed:	Matiri River – immediately below Lake Matiri
Zone, Catchment:	Upper Buller, Buller Catchment
Catchment Area (km^2):	134
Live Storage (m^3):	500,000
<u>Dam Details</u> - Weir Outlet 1:	
Crest Level (m):	341 AMSL
Dam storage (m3):	900,000 cubic metres approx
Maximum Crest Height (m):	4
Crest Length (m):	20
Location:	Easting: Northing: (NZ Map Grid)
<u>Dam Details</u> - Weir Outlet 2:	
Maximum Crest Height (m):	1.8
Crest Length (m):	20

Location:	Easting:	Northing: (NZ Map Grid)
Dam Details - Weir Outlet 3:		
Maximum Crest Height (m):	1.8	
Crest Length (m):	20	
Location:	Easting:	Northing: (NZ Map Grid)

2. General

2.1 The earthworks shall be undertaken in accordance with the documentation submitted with the application and consent conditions listed in this resource consent document. Where consent conditions conflict with information submitted with the application, the consent conditions of shall prevail.

2.2 The Consent Holder shall be responsible for all contracted operations relating to the exercise of this resource consent, and shall ensure that all personnel working on the site are made aware of the conditions of this resource consent and with the Construction, Erosion and Sediment Management Plan required by Condition 5.1 of RM060937, and shall ensure compliance with consent conditions.

2.3 A copy of this resource consent shall be available to contractors undertaking the works, and shall be produced without unreasonable delay upon request from a servant or agent of the Council.

2.4 The Consent Holder shall appoint a representative(s) prior to the exercise of this resource consent, who shall be the Council's principal contact person(s) in regard to matters relating to this resource consent. At least 10 days prior to beginning the works authorised by this consent, the Consent Holder shall inform the Council's Co-ordinator of Compliance Monitoring of the representative's name and how they can be contacted within the works period. Should that person(s) change during the term of this resource consent, the Consent Holder shall immediately inform the Manager and shall also give written notice to the Manager of the new representative's name and how they can be contacted.

2.5 The Consent Holder shall carry out operations in accordance with the provisions of the approved Construction, Erosion and Sediment Management Plan.

2.6 Any changes to the Construction, Erosion and Sediment Management Plan shall be made in accordance with the methodology and approved procedures in that plan and shall be confirmed in writing by the Consent Holder following consultation with the Manager. Changes to the Construction, Erosion and Sediment Management Plan shall not be implemented until authorised by the Council's Coordinator Compliance Monitoring.

2.7 All the works shall be supervised by a Chartered Professional engineer.

2.8 Contractors and staff carrying out the work shall be experienced and trained in erosion and sediment control.

Advice Note
Contractors and staff should be familiar with guidelines of the Technical Publication No. 90 "Erosion and Sediment Control" (Auckland Regional Council) or other similar guidelines.

3. Works in the water

3.1 Large rocks shall remain in the waterway for aquatic habitat except where individual rocks have been identified as part of the initial proposal. Any additional rock required for bank strengthening shall be sourced locally and be of a similar geological properties to the rock found in the stream.

3.2 The natural character of the lake and river shall be maintained.

3.3 The work shall not compromise fish passage upstream or downstream.

3.4 Machinery may work in the waterway but all practical measures shall be taken to minimise damage to the watercourse and banks.

3.5 At the completion of the works the working areas in the Matiri River will be rehabilitated as far as is practical.

3.6 At the completion of the works the working areas and the bed of Lake Matiri shall be rehabilitated so there is no visible damage on the foreshore or lake bed.

3.7 There shall be no ongoing increase of sediment loading as a result of these works in the Matiri River.

3.8 No earthworks should take place along the riverbed penstock section when the river is in high flow, such that the water level could reach the site works.

3.9 All the works shall be supervised by a Chartered Professional engineer.

3.10 Where flow is stopped in a channel, monitoring shall be undertaken to determine if there are any fish strandings. Any such stranded fish should be transferred to pools in the river.

Advice Note.
During the construction the flows from each weirs will be stopped and this condition is to mitigate any resultant fish stranding if there is insufficient leakage from the geology of the natural dam.

3.11 The Consent Holder may temporarily divert the Matiri river away from the Penstock route around Sweeping bend allow construction.

Advice note:
This should only be undertaken if there risk of excessive sediment generation from construction occurring in the riverbed.

3.12 In the event that diversion of the river is undertaken, monitoring shall be undertaken to determine if there are any fish strandings. Such strandings should be transferred to pools in the river.

4. Construction of the Weirs and Spill Point

4.1 The weirs shall be constructed in accordance with the application. The design and specifications shall be in accordance with the following;

- New Zealand Dam Safety Guidelines (as produced by New Zealand Society on Large Dams, November 2000);
- Dam safety legislation;
- Prudent dam engineering practice; and
- The site directions from the supervising engineer (required under Condition 2.4).

4.2 The weirs shall be located and constructed so they are not visible with naked eye from the lake and the area surronding the lake.

Advice note:
This is to protect the wild and scenic nature as required in the Water Conservation Order.

4.3 All structures shall be built and coloured to blend into the environment. The surface layers of concrete shall be dyed a simular colour as the stone in the riverbed to minisime visual intrusiveness of the concete structures.

4.4 The spill point at weir 1 shall be no lower than 339.33 metres.

5. Engineering Supervision:

5.1 The Consent Holder shall employ an appropriately qualified and experienced Chartered Professional Civil Engineer to supervise dam construction to the extent required under the NZSOLD Dam Safety Guidelines.

5.2 The Consent Holder shall provide to the Council producer statements from both the supervising engineer and the contractor for the dam.

5.3 Appropriate rock protection (or similar) shall be provided sufficient to avoid or remedy any adverse erosion of the watercourse downstream of the spillway discharge.

5.4 Dam construction earthworks shall only occur during the (summer) period 1 October to 31 April inclusive.

5.4 A comprehensive sediment and erosion control plan using best practice still needs to be developed.

6. Pests

6.1 The Consent Holder shall take all reasonable precautions to minimise the spread of pest plants and aquatic weeds. In particular, the Consent Holder shall:

1. remove any vegetation caught on machinery before entering watercourses or operating near to watercourses;
2. where necessary, clear vegetation from the site before gravel is extracted;
3. avoid working in areas where aquatic weeds, such as Lagarosiphon major, are known to be present (for information, contact the Council); and

4. to avoid the spread of the didymosphenia geminata or any other pest plant, do not use machinery in the berm or bed of the river that has been used in any area where the pest plant(s) are known to be present in the previous 20 working days, unless it has been thoroughly cleansed.

Advice Note:
Avoid spreading Didymo – It is strongly recommends that the Consent Holder, and any person or contractor engaged by the Consent Holder to carry out the works authorised by this consent, use the "check, clean, dry" management approach as set out in the Biosecurity Management Guidelines (available at www.biosecurity.govt.nz) when entering and leaving the river environs.

7. Weather

7.1 No earthworks should take place along the riverbed penstock section when the river is in high flow such that the water level could reach the site works.

7.2 The Consent Holder shall stop construction in heavy rain and or high river flows when the activity shows sedimentation that is more than minor in the view of the Council's Compliance Officer.

8. Sediment control

8.1 Sediment controls shall be implemented and maintained in effective operational order at all times.

8.2 All erosion and sediment control measures shall be inspected after any major weather (rainfall, high river levels or wind) event and report on sediment control.

8.3 The discharge of stormwater shall not cause in the receiving water any of the following:

a) the production of any visible oil or grease films, scums or foams, or conspicuous floatable or suspended material;
b) any emission of objectionable odour;

c) the rendering of freshwater unsuitable for bathing;

d) the rendering of freshwater unsuitable for consumption by farm animals; and

e) any adverse effect on aquatic life.

9. Lake Level

9.1 The level of Lake Matiri may be lowered to X (to be determined by the Hearings Committee) for the construction and for emergency maintenance of the weirs and associated structures.

9.2 The fluctuations in lake level, caused by artificial control, shall not significantly affect riparian vegetation.

10. Construction, Erosion and Sediment Management Plan

10.1 The Construction, Erosion and Sediment Management Plan required by Condition 5.1 of RM060937 shall set out the practices and procedures to be adopted in order that compliance with Conditions A-Z can be achieved and the effects of the activity are minimised to the greatest extent practical, and shall as a minimum address the following matters:

1. Description of the works in the River and Lake
2. Constriction programme including any final rehabilitation
3. Construction methods and equipment to be used
4. Sediment sources and potential impact during construction
5. Methods used for minimising generation of sediment and limiting erosion
6. Location, design operation and maintenance of sediment control facilities
7. Specifications of entry and exit points
8. Staff training
9. Contingency plans (e.g., mechanical failures, oil/fuel spills, flooding, land slips)
10. Water quality monitoring procedures and plan
11. Complaints and reporting procedures

11. Amenity Issues

11.1 There shall be no visible construction on the lake foreshore.

11.2 No new permanent structures shall be visible from Lake Matiri.

Advice Note
It is accepted that the two towers associated with monitoring of the lake level are visible.

11.3 Any visual effects caused by the movement of equipment or materials must be completely removed at or before the completion of the works.

12. Water Quality

12.1 The Consent Holder shall ensure that the work is carried out in such a manner as to minimise sedimentation and contamination to Lake Matiri. There shall be no visual increase in sediment at beyond a radius of 200 metres from a discharge into Lake Matiri.

12.2 Sediment control shall be undertaken so as to avoid introducing silt and other contaminants into the Matiri River provided that the discharge of silt is authorised to the extent that it does not contravene the standards in Clause 11(2) of the Water Conservation (Buller River) Order 2001 or decrease the visual clarity of the Matiri River by more than 20% as measured by the black disc method 50 metres downstream of the discharge and compared to the visual clarity upstream of the discharge point.

13. Water Quality monitoring

13.1 Continuous turbidity monitoring equipment shall be installed and run by suitably qualified person. These people shall be approved by the Council in writing before undertaking this work.

13.2 Monthly calibrations and maintenance shall be carried out by the suitably qualified personal (See condition 9.1). Written records shall be available on request showing the maintenance and calibration has been undertaken. Results shall be cross checked with duplicate samples analysed in the laboratory.

13.3 All water quality sampling shall be undertaken by people who have been trained to take these samples.

Advice note
All sampling should be following documented procedures to insure the data quality. The construction management plan in Condition 7.1 includes water quality monitoring procedures.

14. Continuous turbidly monitoring

14.1 The date, time and duration of all periods of turbidity equipment downtime shall be recorded with explanation of the cause measures to prevent future failures. Up to 2% downtime of turbidity equipment is permitted.

Advice Note
It is advisable that the turbidity probe be placed in an in-line chamber (~10 litre) of river water that is continuously pumped from a suitable site in the river.

14.2 The turbidity shall be monitored during construction using a turbidimeter to quantify the levels of sedimentation and discolouration arising from their activities. When measured using a datasonde or telemetered probe the data shall be logged with an integration period of less than or equal to 5 minutes. The resolution of the datasonde or telemetered probe shall be at least 1 NTU and resolve at least 0 to 1000NTU. The turbidly increase down stream should be less than that specified in the following table:

Maximum increase 200m down stream	Sample period	Consecutive 5- minute samples
50 NTU	20 minute	Median of 4 samples
20 NTU	40 minute	Median of 8 samples
10 NTU	2 hour	Median of 24 samples

15. Discrete sampling

15.1 Discrete sampling shall be undertaken monthly while the construction works are being undertaken in the waterway. When the power station is operational samples shall be taken at once a year when maintenance is being undertaken.

Advice note:
This is to augment the continuous sampling in Conditions 9.3 and 9.4

15.2 Discrete turbidity samples shall not be more than 50 NTU at a point 200m downstream of any discharge compared to a site upstream of the discharge as analysed using method APHA 21st Edn 2130B. The turbidity shall not be more than 10 NTU for the median of 4 consecutive samples.

15.3 Suspended solids: The suspended solids shall not be more than 50 g/m^3 at a point 200m downstream of any discharge compared to a site upstream of the discharge as analysed using method APHA 21st Edn 2540D. The suspended solids shall not be more than 10 NTU at a point 200m downstream of any discharge compared to a site upstream of the discharge as analysed using method APHA 21st Edn 2540D for the median of 4 consecutive samples.

15.4 Visual Water Clarity: The water clarity as measured by horizontal sighting of a 200mm diameter black disc shall not be reduced by less than 20% at a point 200m downstream of any discharge compared to a site upstream of the discharge.

15.5 While concrete is being pored with two metres of the lake or river the Consent Holder shall measure the pH at least daily. The pH shall not be altered by more than 1 pH unit and to take it outside the range of 6.0 to 8.5 at a point 200m downstream of any discharge compared to a site upstream of the discharge as measured by APHA 21st Edn 4500 H B or approved data sonde.

Advice note
This condition excludes the area where the tuff formation exists as this may be naturally alkaline.

16. Reporting of water quality monitoring

16.1 If monitoring results indicate the exceedance of the maximum levels in Condition 9.6 to 9.8, the Consent Holder shall submit a report within 2 days to the Council's Co-ordinator Compliance Monitoring that identifies why and how this exceedance occurred. If the exceedance is caused by the exercise of this consent, or by the activities of NZEL generally, then a further report shall be provided within one week detailing what measures will be employed to avoid, remedy, or mitigate any future exceedance. The Consent Holder shall immediately notify the Council's Co-ordinator Compliance Monitoring when these measures become operative.

Advice notes:
The water quality monitoring shall be undertaken as per consent RM060940 & RM060941. Monitoring of the residual flows in the river shall also be undertaken as per RM060939 and RM060940

17. Maintenance

17.1 The Consent Holder shall maintain all the structures.

17.2 The Consent Holder shall inspect the weirs, the embankments, intake and spillway and low flow system a minimum of weekly for the first six months following commissioning of the scheme and maintain all structures in good condition. In particular, the spillway and low flow pipe shall not be obstructed and any damage to the spillway shall be repaired promptly and to the satisfaction of the Consent Holder's suitably experienced registered civil engineer.

17.3 Should any slumping be observed, the Consent Holder shall immediately inform the Council's Co-ordinator Compliance Monitoring and shall employ a suitably experienced registered civil engineer to advice on appropriate remediation measures.

17.4 The Consent Holder may enter the river or the lake to maintain the structures.

18. General Conditions

18.1 The Consent Holder shall contact Council's Co-ordinator Compliance Monitoring at least 24 hours prior to commencing works for monitoring purposes.

18.2 All machinery on the work site shall be refuelled, and any maintenance works undertaken, in such a manner as to prevent contamination of water. Spillage of contaminants into any watercourse shall be adequately cleaned up so that no residual potential for contamination of land and surface water run-off from the site occurs. If a spill of more than 10 litres of fuel or other hazardous substance occurs, the Consent Holder shall immediately inform Council's Co-ordinator Compliance Monitoring.

18.3 The Consent Holder shall ensure that the site is left in a neat and tidy condition following the completion of the works.

19. Review Conditions

19.1 The Council may during construction, serve notice of its intention to review the conditions of this consent for the purpose of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

19.2 Once construction is complete the Council may each May or November serve notice of its intention to review the conditions of this consent for the purpose of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.