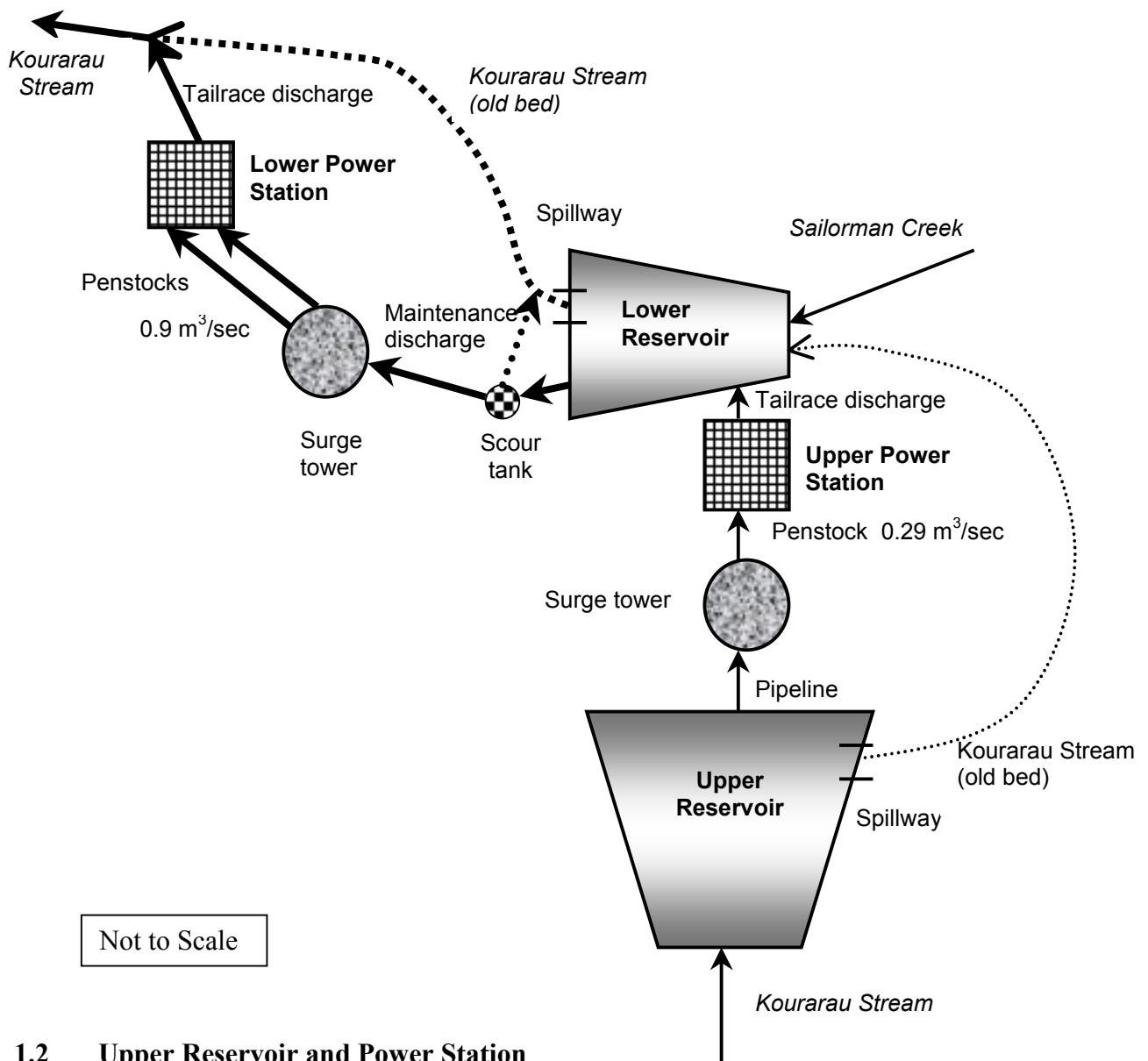


## 1.0 Description of Activity

### 1.1 General Overview

The Kourarau Power Scheme is a small hydro-electricity generating scheme that is located in the Kourarau Stream catchment north-east of Gladstone. The scheme was commissioned in 1923 and has the capacity to generate up to 1100 kilowatts (kW) of power. The scheme has two small power stations that are fed by pipelines and penstocks that are linked to two reservoirs. A schematic diagram of the operation of the Kourarau Power Scheme is shown in Figure 1 below.

Figure 1: Schematic Diagram of Kourarau Power Scheme



### 1.2 Upper Reservoir and Power Station

Water is taken from the upper reservoir at maximum rate of 0.29 m<sup>3</sup>/sec via a pipeline to a surge tower and then through a single penstock to the upper power station. The upper reservoir (which covers an area of approximately 15 hectares) is located in the bed of the

Kourarau Stream and excess water during floods is spilled into the old bed of the Kourarau Stream. The upper reservoir level is controlled by a float operated alarm system and has a normal operating range of 650 mm. The surge tower relieves pressure build up due to fluctuating flows and generation patterns. The upper power station is a 200 kW station located between the upper reservoir and lower reservoir. Water is discharged from the upper power station to the lower reservoir.

### **1.3 Lower Reservoir and Power Station**

Water is taken from the lower reservoir (which covers an area of 2 hectares) at maximum rate of 0.9 m<sup>3</sup>/sec to a scour tank approximately 20 metres from the lower reservoir. The majority of the time water is then diverted to the surge tower via a single pipeline and then to the lower power station via two penstocks. During maintenance activities water is diverted from the scour tank directly back to the old bed of the Kourarau Stream. Excess water during flood events is spilled over into the Kourarau Stream via a spillway on the edge of the lower reservoir. Immediately upstream of the lower reservoir Sailorman Creek enters the reservoir. The lower power station is a 900 kW station at the base of the Kourarau catchment. Water is discharged from the lower power station into a tailrace which then enters the Kourarau Stream.

### **1.4 Maintenance Activities**

Every two to three years lime that is built up inside the pipeline and penstocks of the lower part of the scheme is required to be removed as it reduces the efficiency and output of the power scheme. This is done by inserting a “hog” or large wire brush into the pipeline or penstock. Water is flushed the pipeline/penstock and the hog scrapes off lime as it travels downstream.

Approximately every four to five years, accumulated sediment in the lower reservoir is required to be removed as it can also affect the efficiency of the power scheme. Sediment is removed from the lower reservoir by draining the reservoir and sluicing the sediment with a high pressure water gun. Sediment is discharged into the Kourarau Stream via the scour tank. There is no practical way to remove sediment from the upper reservoir.

There are other minor maintenance activities undertaken to ensure that the power scheme operates efficiently. This includes clearing intakes, drains, pipes, and culverts; replacing worn components; clearing weeds; and trimming vegetation.

### **1.5 Irrigation from Lower Power Scheme**

Up to 60 litres/sec of water is taken from the penstocks above the lower power station for irrigation purposes by Jamie Clinton-Baker. Genesis Power Ltd have not applied for a resource consent for this activity. The landowner will be applying for a separate resource to take water from the Kourarau Stream via the lower power station penstocks.

## **2.0 Statutory Reasons for Consent Requirements**

Sections 13-15 of the Resource Management Act 1991 states the restrictions in certain river and lake beds, restrictions relating to water, and discharges of contaminants in to the environment. These sections are outlined specifically in Appendix I.

## 2.1 Activities that Require Resource Consent

Genesis Power Ltd have applied for seven resource consents to operate the Kourarau Power Scheme as described in section 2. Previously the Kourarau Power Scheme operated under notified use rights issued under the Water and Soil Conservation Act 1967. Those notified use rights expire on 1 October 2001, hence the applications have been made under the sections 13-15 of the Resource Management Act 1991. Resource consents are required under rules in the Regional Freshwater Plan (RFP). The applications made and the relevant rules in the RFP are summarised in Table 1 below:

Table 1: Resource Consent Applications

<b>Application No.</b>	<b>Activity</b>	<b>Activity Status</b>
WAR 010067 (21129)	Water permit to take water at a maximum rate of 0.29 m <sup>3</sup> /sec from the Kourarau Stream (upper reservoir) at or about map reference NZMS 260 T27: 3710-0940.	Discretionary (RFP – Rule 16)
WAR 010067 (21131)	Discharge permit to discharge water and any other material contained therein into the Kourarau Stream (upper power station tailrace), at a maximum rate of 0.29 m <sup>3</sup> /sec at or about map reference NZMS 260 T27: 3690-0980.	Discretionary (RFP – Rule 5)
WAR 010068 (21132)	Water permit to take water at a maximum rate of 0.9 m <sup>3</sup> /sec from the Kourarau Stream (lower reservoir) at or about map reference NZMS 260 T27: 3680-0980.	Discretionary (RFP – Rule 16)
WAR 010068 (21133)	Discharge permit to discharge water and any other material contained therein into the Kourarau Stream (upper power station tailrace), at a maximum rate of 0.9 m <sup>3</sup> /sec at or about map reference NZMS 260 T26: 3540-1210.	Discretionary (RFP – Rule 5)
WAR 010069 (21134)	Discharge permit to discharge water and any material contained therein into the Kourarau Stream from the lower reservoir scour tank at or about map reference NZMS 260 T27: 3680-0990.	Discretionary (RFP – Rule 5)
WAR 010069 (21136)	Land use consent to disturb the bed of the Kourarau Stream and lower reservoir by dislodging sediment using a sluice gun, at or about map reference NZMS 260 T27: 3680-0990.	Discretionary (RFP – Rule 49)
WAR 010069 (21135)	Discharge permit to discharge water and any material contained therein as result of pipeline cleaning into the Kourarau Stream from the lower power station, at or about map reference NZMS 260 T26: 3540-1210.	Discretionary (RFP – Rule 5)

The applications have been divided into three groups – WAR 010067, WAR 010068, and WAR 010069. WAR 010067 relates to taking and discharging water for the upper reservoir and upper power station. WAR 010068 relates to taking and discharging water for the lower reservoir and lower power station. WAR 010069 relates to consents required for maintenance activities.

The applicant has submitted an 'Assessment of Environmental Effects' (AEE) report to support the applications made. There are also two supporting documents with the AEE report:

1. Kourarau Power Scheme October/November 2000 Maintenance Programme. Opus International Consultants Ltd.
2. Assessment of the effects of the Kourarau Power Scheme maintenance activities on downstream fish and invertebrate communities. National Institute of Water & Atmospheric Research Ltd.

## 2.2 Activities that Do Not Require Resource Consent

There are a number of activities undertaken as part of the Kourarau Power Scheme and described in section 2, that are permitted under the RFP and Regional Discharges to Land Plan (RDLP). These activities and the relevant rules are summarised in Table 2 below:

Table 2: Permitted Activities

<b>Activity</b>	<b>Relevant Rule</b>
Using structures within the scheme for generating hydro-electricity	Rule 34 – RFP
Entering or passing across river or lake beds	Rule 35 – RFP
Removing vegetation around the spillway structures	Rule 40 – RFP
Damming and diverting water in the Kourarau Stream for the Upper power scheme	Rule 8 – RFP
Damming and diverting water in the Kourarau Stream for the Lower power scheme	Rule 8 – RFP
Discharge water to land for maintenance and inspection purposes	Rule 1 – RDLP

It is my view that the resource consent applications made and the permitted activities described in Tables 1 and 2, are consistent with provisions in the Resource Management Act 1991, Regional Freshwater Plan, and Regional Discharges to Land Plan.

## 3.0 Resource Consent Process

### 3.1 Pre-Application Process Including Consultation

The applicant commenced the process for renewing existing consents in early 2000. The pre-application process involved the following stages:

- Advising potentially affected parties in July 2000 about Genesis' programme for renewing existing consents.
- Conducting site visits and meetings with various potentially affected parties between August 2000 and February 2001.
- Commissioning of two studies to assess potential effects of maintenance activities on fish and invertebrate communities, and to verify volumes of sediment discharged during maintenance activities.
- Distribution of a draft AEE report in February 2001.
- Conducting follow up meeting and site visits in March 2001.
- Consulting extensively with local iwi representatives.

The applicant took a very proactive approach in developing their AEE report and consulting with interested and affected parties. There were very few issues of concern raised by persons and organisations consulted. This is reflected in the number of submissions lodged.

The applicant submitted three letters of support for the application in their AEE report from Rangitaane o Wairarapa, Department of Conservation, Jamie and Anne Clinton-Baker. An additional letter of support from the Wellington Fish & Game Council was also provided.

The applications were lodged on 30 March 2001. The applications were placed on hold under section 92 of the Resource Management Act 1991 as consultation with local iwi was

continuing. Processing of the applications commenced on 21 May 2001 once further advice on consultation was received.

### 3.2 Notification

The applications were notified on Tuesday 29<sup>th</sup> May 2001. An advertisement was placed in the Wairarapa Times Age and Wairarapa Midweek and three signs were placed at entrance points to the upper and lower reservoirs and downstream of the lower power station. The following parties were also individually notified:

- Wellington Fish & Game Council
- Department of Conservation
- Rangitaane O Wairarapa
- Ngati Kahungunu ki Wairarapa
- Ministry for the Environment
- Carterton District Council
- Ducks Unlimited
- Forest & Bird (Wairarapa Branch)
- NZ Historic Places Trust
- Wellington Conservation Board
- Royal Forest & Bird Protection Society
- Te Puni Kokiri
- Murray Hemi
- All downstream and adjacent landowners to the confluence of the Ruamahanga River.

The period for lodging submissions closed on Wednesday 27<sup>th</sup> June 2001.

### 3.3 Submissions

Two submissions were received. The **Carterton District Council** stated that they had no concerns with the applications. The **Department of Conservation (DoC)** opposed the application to discharge sediment into the Kourarau Stream as a result of sluicing operations in the lower reservoir. They requested that if the consent was granted, that conditions be put in place that ensures the sediment is removed from the lower reservoir by digging it out and removing off site. DoC requested to be heard at a hearing.

Following the close of submissions, the applications were placed on hold under section 92 of the Resource Management Act 1991 for further information on alternative options for removing sediment from the lower reservoir<sup>1</sup>. The applicant proceeded to directly consult with DoC who agreed to withdraw their right to be heard at a hearing if a condition was imposed that only allowed for the discharge of sediment into the Kourarau Stream between the months of April and June inclusive. Full copies of the submissions and letters resolving the submission from DoC can be viewed in [Appendix II](#).

## 4.0 Matters To Be Considered

### 4.1 Section 104 - Resource Management Act (1991)

*Section 104* of the *Resource Management Act 1991* outlines the matters that a consent authority is to have regard to when considering any resource consent applications. Section 104 gives precedence to Part II of the Resource Management Act (RMA).

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<sup>1</sup> Further information requested was provided on 31 August 2001.

**Section 5** of the RMA defines sustainable management as:

*“managing the use development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well being and for their health and safety while:*

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and*
- (c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.”*

**Section 6** concerns matters of national importance including the natural character of and public access to the margins of waterbodies, protecting outstanding features, significant indigenous vegetation and fauna, and the relationship of the tangata whenua with ancestral lands, water, sites, waahi tapu and other taonga.

**Section 7** addresses other matters, such as kaitiakitanga, efficient use and development of natural and physical resources and their finite characteristics, amenity values and ecosystems, heritage values, quality of the environment, and the habitat of trout and salmon.

**Section 8** requires that the principles of the Treaty of Waitangi be taken into account.

The relevant parts of section 104(1) of the Act are outlined below:

Matters to be considered -

- (1) Subject to Part II, when considering an application for a resource consent and any submissions received, the consent authority shall have regard to-*
  - (a) Any actual and potential effects on the environment of allowing the activity; This is discussed further in section 6 of this report*
  - (c) Any relevant ... regional policy statement ... The regional policy statement is operative - relevant sections are discussed in section 5.3.*
  - (d) Any relevant objectives, policies, rules or other provisions of a plan or proposed plan; The Regional Freshwater Plan is operative - relevant sections are discussed in section 5.4*
  - (e) Any relevant district plan or proposed district plan, where the application is made in accordance with a regional plan; There are no additional matters in the Carterton District Plan that relate to this application that are not covered under other planning documents.*
  - (i) Any other matters the consent authority considers relevant and reasonably necessary to determine the application. There are no other matters relevant and reasonable necessary to determine the applications.*

#### **4.2 Section 107 – Resource Management Act (1991)**

*Section 107* of the *Resource Management Act 1991* outlines the restrictions on the granting of discharge permits. This section states:

- 1) *Except as provided in subsection (2), a consent authority shall not grant a discharge permit [or a coastal permit to do something that would otherwise contravene section 15] [or section 15A] allowing—*
- (a) The discharge of a contaminant or water into water; or*
  - [(b) A discharge of a contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
  - [(ba) The dumping in the coastal marine area from any ship, aircraft, or offshore installation of any waste or other matter that is a contaminant,—] if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:*
    - (c) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:*
    - (d) Any conspicuous change in the colour or visual clarity:*
    - (e) Any emission of objectionable odour:*
    - (f) The rendering of fresh water unsuitable for consumption by farm animals:*
    - (g) Any significant adverse effects on aquatic life.*
- [(2) A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 [[or section 15A]] that may allow any of the effects described in subsection (1) if it is satisfied—*
- (a) That exceptional circumstances justify the granting of the permit; or*
  - (b) That the discharge is of a temporary nature; or*
  - (c) That the discharge is associated with necessary maintenance work— and that it is consistent with the purpose of this Act to do so.]*
- [(3) In addition to any other conditions imposed under this Act, a discharge permit or coastal permit may include conditions requiring the holder of the permit to undertake such works in such stages throughout the term of the permit as will ensure that upon the expiry of the permit the holder can meet the requirements of subsection (1) and of any relevant regional rules.]*

This section of the Act will be discussed in further detail in section 6 of this report.

### **4.3 Regional Policy Statement**

The Regional Policy Statement (RPS) contains three objectives relating to fresh water in the Region

- (1) The *quantity* of fresh water meets the range of uses and values for which it is required, safeguards its life supporting capacity, and has the potential to meet the reasonably foreseeable needs of future generations.
- (2) The *quality* of fresh water meets the range of uses and values for which it is required, safeguards its life supporting capacity, and has the potential to meet the reasonably foreseeable needs of future generations.

- (3) Freshwater resources of significance or of high value for cultural, spiritual, scenic, ecosystem, natural, recreational, or other amenity reasons are protected or enhanced.

Sixteen policies were developed, in line with the objectives, and were incorporated into the RPS. The relevant policies that need to be taken into consideration when assessing this application concern:

- Policy 1 - Manage fresh water quantity and quality for a wide range of uses and values. In particular for surface water any adverse effects on aquatic ecosystems are avoided, remedied or mitigated.
- Policy 4 – Maintain and protect quality of fresh water so that it is available for a wide range of uses and values. In particular for surface water any adverse effects on aquatic ecosystems are avoided, remedied or mitigated.
- Policy 6 – Ensure that effects of contaminants in point source discharges on fresh water quality and aquatic ecosystems is avoided, remedied, or mitigated, and allow for reasonable mixing.
- Policy 9 – Avoid, remedy, or mitigate the adverse effects of modification of river beds on water quality, aquatic ecosystems, and the amenity and cultural values of water.
- Policy 11 – Ensure that any adverse effects on amenity values or intrinsic values of ecosystems are avoided, remedied, or mitigated.
- Policy 12 - Avoid, remedy, or mitigate any adverse effects on natural character of wetlands, lakes, or rivers and their margins.
- Policy 13 - Recognise cultural relationship of tangata whenua with rivers including managing significant sites.

The full relevant policies for the RPS identified are attached as Appendix III.

#### **4.4 Regional Freshwater Plan**

The Regional Freshwater Plan (RFP) has identified issues, objectives, policies, rules, and methods for managing freshwater resources in the Wellington Region.

**Section four** of the RFP outlines general provisions for the use and development of fresh water resources. These general provisions are grouped into tangata whenua values, natural values, amenity values, and use and development. There are certain policies that are pertinent to these applications:

- Policy 4.2.1 – Manage sites of special value to tangata whenua.
- Policy 4.2.4 – Avoid, remedy, or mitigate any adverse effects on habitats of species traditionally harvested by tangata whenua.
- Policy 4.2.9 – Have regard to natural characteristics of wetlands, rivers, lakes, and their margins. In particular ecosystems, habitats and species, water quality, natural flow characteristics and hydraulic processes, and topography and physical composition of the environment.
- Policy 4.2.10 – Avoid adverse effects on Kourarau dam wetland and its margins, when considering the protection of its natural character.
- Policy 4.2.11 - Avoid, remedy, or mitigate the adverse effects of the use and development of water bodies by having regard to maintenance of biological and physical processes,



habitat, diversity, fish movement and spawning, and prevention of irreversible adverse effects.

- Policy 4.2.14 – Avoid, remedy, or mitigate any adverse effects on important trout habitat (includes Taueru River downstream) by having regard to other water quality and water quantity policies.
- Policy 4.2.23 - Have regard to benefits arising from the proposal;
- Policy 4.2.24 - Have regard to effects on other established activities;
- Policy 4.2.31 - Ensure that the process for making decisions is fair and transparent;
- Policy 4.2.33 – Provide for activities which have no more than minor adverse effects on the environment.
- Policy 4.2.34 – Avoid, remedy, or mitigate any adverse effects on cultural, natural, amenity, and recreational values by placing conditions on resource consents.
- Policy 4.2.36 - Avoid, remedy, or mitigate any adverse effects by placing conditions on resource consents relating to certain activities.

**Section five** of the RFP outlines issues, objectives, policies, and methods for water quality. Relevant policies in this section are:

- Policy 5.2.3 – Manage water quality for trout fishery and fish spawning purposes in the Taueru River.
- Policy 5.2.6 – Manage water quality of all surface water bodies for aquatic ecosystem purposes.
- Policy 5.2.8 – Have regard to Water Quality Guidelines in *Appendix 8* of the RFP.
- Policy 5.2.10 – Allow discharges which do not satisfy policies 5.2.1 to 5.2.9 where:
  1. The discharge is of a temporary nature, or
  2. The discharge is associated with necessary maintenance works; or
  3. Exceptional circumstances justify the granting of a permit.
  4. The discharge was present at the time the Plan was notified and does not decrease existing water quality; or
  5. That in any event, it is consistent with the purpose of the Act to allow the discharge.
- Policy 5.2.11 – Ensure that the determination of any mixing zones have regard to management purposes of receiving waters; tangata whenua values; volume and concentration of contaminants; and physical, hydraulic, and hydrological characteristics of the receiving water.

**Section six** of the RFP outlines issues, objectives, policies, and methods for water quantity and the taking of fresh water. Relevant policies in this section are:

- Policy 6.2.2 – Manage flows in rivers and streams by having regard to the significance, scale/magnitude, and reversibility of any adverse effects on natural, amenity, and tangata whenua values.
- Policy 6.2.7 – To encourage users to take groundwater as an alternative to surface water resources.
- Policy 6.2.13 – Manage water levels and lakes and wetlands by having regard to the significance, scale/magnitude, and reversibility of any adverse effects on natural, amenity, and tangata whenua values.
- Policy 6.2.18 – To have regard to whether the amount of water required is reasonable given the intended use.

The full relevant policies for the RFP identified above are attached as Appendix IV.

The Hearings Committee is required to have regard to these matters in the RMA and issues, objectives, policies in the RPS and RFP, when considering the applications made by Genesis Power Ltd.

## **5.0 Assessment of Resource Consent Applications**

The assessment of the resource consent applications includes any outstanding issues raised in submissions. The assessment is broken down into categories that have been determined as a result of assessing policy in the RPS and RFP, and the assessment provided in the AEE report. The categories are as follows:

1. Background – environmental setting.
2. Effects on flow regime in Kourarau catchment.
3. Effects on sediment regime in Kourarau catchment.
4. Effects on aquatic ecosystems including trout habitat and ecosystems on river/lake margins and water quality .
5. Effects on natural, amenity, and recreational values.
6. Effects on tangata whenua values

Within each category assessment is provided on both the ongoing operation of the Kourarau Power Scheme (resource consent applications for taking and discharging water - WAR 010067 and WAR 010068) and maintenance activities required (resource consent applications for discharging contaminants and undertaking land use activities - WAR 010069). Within each assessment category consent conditions are suggested to avoid, remedy, or mitigate any potential adverse effects.

### **5.1 Background – Environmental Setting**

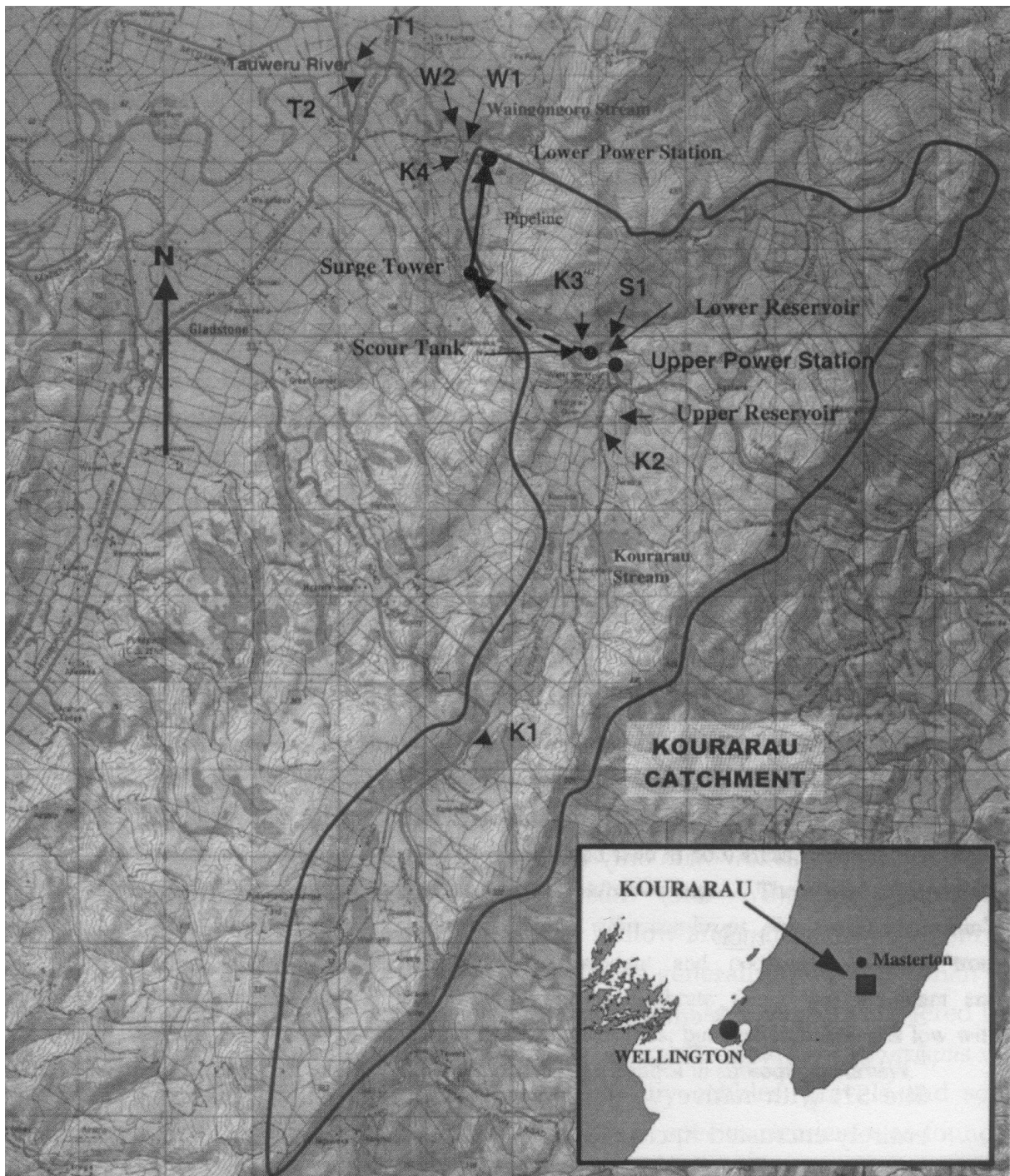
The AEE report describes in detail the environmental setting in which the Kourarau Power Scheme is located.

The Kourarau Stream catchment is approximately 31 km<sup>2</sup> with the main geological feature of the catchment being the uplifted limestone blocks that form the Maungaraki Range. The upper and lower parts of the catchment consist of average slopes, while the middle section of the catchment has a steep escarpment, hence making the catchment favourable for hydro-electricity generation. The catchment is dominated by pastoral farming with less than 5% of native vegetation present in the catchment. The average annual rainfall for the Kourarau Stream catchment is approximately 900mm. The majority of flow in the Kourarau Stream catchment is sourced from springs. The major tributaries in the catchment are Sailorman Creek and the Kourarau Stream. The upper reservoir provides important habitat for a variety of waterfowl species and commonly used for picnicking and other recreational purposes such as fishing.

As there was very little information on water quality and aquatic ecosystems within the Kourarau catchment, Genesis Power Ltd commissioned a baseline survey, which was undertaken by NIWA. The baseline survey assessed nine sites in the Kourarau catchment.

Three of the sites were established as control sites in order to assess the potential effects of maintenance activities on the environment. The sites are shown in Figure 1 below:

Figure 1: Site Locations of Baseline Survey (taken from AEE report)



The sampling methods used in the baseline survey included kick-sampling technique for assessing macroinvertebrate communities, electric fishing for determining fish species, various water quality assessment techniques, and stream bed measurements.

In summary the baseline survey of water quality showed that sites in the Kourarau catchment had high conductivity and pH, due to the limestone geology present in the catchment. Water

quality was assessed using the macroinvertebrate community index, which showed that the stream fauna had characteristics of moderately polluted streams, most likely due to the predominance of farming in the catchment. Flood events prior to the baseline survey may have lowered the water quality status below its norm.

In terms of fish species present, there were a variety of species recorded by electric fishing. A summary of the baseline fish survey is shown in Table 3 below:

Table 3: Fish Species in Kourarau Catchment

Species	Kourarau Stream (u/s upper reservoir)	Kourarau Stream (d/s lower reservoir)	Waingongoro Stream	Taueru River
Koura	✓	✓	✓	
Bullies	✓	✓	✓	✓
Longfinned eels		✓	✓	✓
Shortfinned eels		✓	✓	✓
Brown trout	✓	✓		✓
Rainbow trout	✓			
Torrent fish			✓	
Inanga				✓

## 5.2 Effects on Flow Regime in Kourarau Catchment

### 5.2.1 Ongoing Operation

The flow regime in the Kourarau catchment is highly modified by the Kourarau Power Scheme. In particular between the upper reservoir and lower power station flow in the Kourarau Stream is absent for most of the year, the exceptions being during maintenance activities and high flow events. The AEE report states that the Kourarau Power Scheme operates as a 'run of the river' scheme where flow inputs are generally consistent with flow outputs. Compliance monitoring inspections over the past couple of years in the catchment have shown significant differences between flow inputs and flow outputs. Any significant changes in flow regime can have a significant impact on downstream watercourses, particularly the Taueru River in summer low flow periods. During the summer period, the Kourarau catchment can contribute over 90% of water in the Taueru River at the Te Whiti bridge. The Taueru River supports other uses of water including an important trout habitat (as identified in the RFP) and irrigation.

To mitigate any potential adverse effects of flow regulation, a consent condition placing a minimum flow on the Kourarau Stream has been considered. Rather than impose a minimum flow condition, it is considered more appropriate to monitor the flow regime downstream of the lower power station. A minimum two year period is considered appropriate. Following monitoring of the downstream flow regime, the consent may be reviewed to allow for either further monitoring or changes to consent conditions if there are significant changes in the natural flow regime. During this period, the Council may undertake concurrent flow gaugings (at the consent holder's expense) for compliance monitoring purposes.

### 5.2.2 Short Term Maintenance Activities

The delimiting of the pipeline and penstocks between the lower reservoir and lower power station results in short, but high volume pulses of water being discharged downstream of the

lower power station. Each run of the hog described in section 1 of this report takes approximately 1 hour and it generally takes 4 runs to effectively delime the pipeline and penstocks. There is a very short period where there will be no residual flow in the Kourarau Stream while the penstocks are dewatered. This is necessary so that hog can be inserted into the penstocks. Once the hog is inserted water is discharged into the penstocks which forces the hog down the penstocks. To minimise the potential effect of no residual flow in the Kourarau Stream, a consent condition is proposed that requires the dewatering of the penstocks and insertion of the hog to be completed as soon as practicable.

The desedimentation of the lower reservoir takes approximately 18 hours to complete. Flow is maintained downstream of the bypass at all times, however pulses of water are discharged into the Kourarau Stream during this operation.

Both the deliming of the pipeline and penstocks and desedimentation of the lower reservoir can highly modify the natural flow regime in the Kourarau catchment and downstream Taueru River. Hence any maintenance activities should be undertaken outside of low flow periods. A minimum flow has been determined for the Taueru River of 125 litres per second adjacent to Bruce Patrick's property at or about map reference NZMS 260 T26: 2735884-6014890. This flow site and level is based on a current consent held by Bruce Patrick which requires restrictions to be put in place when the flow at or below the abstraction point falls below 65 litres per second. (Bruce Patrick has a consent to take up to 40 litres per second, hence it is assumed that naturalised minimum flow is 105 litres per second.) The minimum flow for the discharge activities may be altered following either monitoring results being submitted that should there is an adverse effect at these minimum flow levels, or if minimum flows are altered through a change to the RFP.

### **5.3 Effects on Sediment Regime in Kourarau Catchment**

#### *5.3.1 Ongoing Operation*

The placement of the dam structures reduces the ability of the Kourarau catchment to transport sediment. This has a positive effect as water is essentially cleaner than what it would be under natural conditions. The AEE report stated that the effect of reducing sediment loads in a localised area would be minor. I am satisfied with the assessment provided, and that no consent conditions are necessary to avoid, remedy, or mitigate any potential effects.

#### *5.3.2 Short Term Maintenance Activities*

Both the deliming and desedimentation processes also release high concentrations of lime and sediment (up to 26 tonnes of lime and 366 tonnes of sediment in total). The increased sediment loads are for a very short term period. Monitoring of sediment loads and the substrate composition before and after maintenance activities in October and November 2000 showed an increase in silt in downstream sites in the Kourarau catchment. However after seven weeks the substrate composition had almost returned to baseline levels. There was a negligible effect of increased sediment loads on substrate composition in the Taueru River. I am satisfied that the effects of short term maintenance activities on the sediment regime downstream of the discharges are minor. There are no conditions considered necessary to avoid, remedy, or mitigate any potential effects. (Note: The impact of this increased sediment load on aquatic ecosystems and water quality is discussed further in section 5.4 of this report.)

## 5.4 Effects on Aquatic Ecosystems Including Instream Habitat and Ecosystems on River/Lake Margins and Water Quality .

### 5.4.1 Ongoing Operation

It is difficult to assess the real effects of the ongoing operation of the Kourarau Power Scheme on aquatic ecosystems (including instream habitat and ecosystems on river and lake margins) and water quality as the scheme has been in place for many decades. In many respects the power scheme is now part of the modified natural environment. There are differing fish species within this highly modified catchment. Obviously the dam structures will restrict fish passage, however it should be noted that the dam structures are permitted under the RFP.

The AEE report states that there will be both positive and negative effects on fish species within the Kourarau dam. The scheme has a significant impact on the old bed of the Kourarau Stream however this is can be offset with the fact that the upper reservoir now supports a valued trout fishery and abundant bird life. The dam structures are likely to restrict native fish species more than introduced species such as trout.

Concerns have been raised prior to the application being lodged about the effect of fluctuating water levels in the upper reservoir on bird life. A neighbouring resident believed the birds undergo significant stress when the lake level is significantly lowered. The applicant has stated in the AEE report that they operate the upper reservoir within a 650 mm water level band. This is recommended as a consent condition to ensure that birdlife is not placed under undue stress.

The AEE report identified that changes in flow regime from the ongoing operation of the Kourarau Power Scheme can have effects on water quality including water temperature. Hence the extent to which the flow regime is modified needs to be properly determined as discussed in section 5.2. If that monitoring shows significant flow regulation and variability as a result of the scheme operations, the consent and its conditions may be reviewed. The baseline survey showed that there were no adverse effects on water quality downstream of the lower power station compared to natural control sites.

### 5.4.2 Short Term Maintenance Activities

Extensive monitoring of the effects of maintenance activities (both deliming of the lower scheme pipeline and penstocks and desedimentation of the lower reservoir) was undertaken during between October 2000 and January 2001. Three control sites (upstream of discharge activities) and three sites downstream of the discharges were monitored as depicted in [Figure 1](#). Summary results for macroinvertebrate communities are shown in [Table 4](#) below:

Table 4: QMCI Scores (from AEE report)

Site	Baseline	Deliming	Desedimentation	7 week recovery
K2 (control)	4.7	4.1	3.8	3.0
K4	4.1	3.8	4.0	3.8
W1 (control)	4.6	4.6	4.9	4.5
W2	4.5	4.0	4.8	4.1
T1 (control)	4.8	4.4	4.7	4.3
T2	4.9	4.3	5.0	4.9

Note: >6 = clean water, 5-6 = possible mild pollution, 4-5 = probable moderate pollution and <4 = probable severe pollution

There is no significant difference in QMCI scores for the control sites and downstream sites, hence the AEE report stated that the effects of discharge activities on the overall aquatic health of the Kourarau catchment is minor. Two other parameters were used to assess the quality of aquatic habitat before and after the discharges – number of taxa, and %EPT. Again there were no clear trends that showed that the delimiting and desedimentation discharges activities were having an adverse effect on aquatic habitat. Any changes within the catchment were not due to discharge activities, but most likely prevailing climatic conditions at the time of sampling.

The effects of delimiting of the lower scheme piepline and penstocks, and desedimentation of the lower reservoir were also assessed by electric fishing. The monitoring results are summarised in Table 5 below:

Table 5: Distribution of Fish Species (adapted from AEE report)

Site	Baseline	Delimiting	Desedimentation	7 week recovery
K2 (control)	K, B, RT	K, B	K, B	K, V, RT, BT
K4	LE, B	LE, SE, B	SE, B, K	LE, SE, B, K, BT
W1 (control)	LE, SE, B	SE, B, K	LE, SE, B, K	SE, B, K
W2	LE, SE, K, TF	LE, SE, K, TF, B	LE, SE, K, TF	LE, SE, K, TF, B
T1 (control)	B	LE, SE, B	LE, SE, B	LE, SE, BT, I
T2	SE, B	SE, B	LE, SE, B	LE, SE, B, I

K = koura, B = bullies, RT = rainbow trout, BT = brown trout, LE = longfin eels, SE = shortfin eels, TF = torrentfish, I = inanga

There was no decline in species during the monitoring period. In fact species composition was greater following 7 week recovery compared to the baseline survey.

It should be noted however that monitoring was undertaken 5 days after delimiting and 14 days after desedimentation. It is unclear what the effect on aquatic ecosystems and habitats would be during the discharge, however monitoring of the delimiting and desedimentation maintenance activities (as described in the AEE report) after the period identified above showed to have no effect on aquatic ecosystems and habitats.

Short term maintenance activities are not expected to adversely effect bird life as the habitat characteristics of the stream environment will not change. Also the discharge locations are downstream of the significant bird habitat present in the upper reservoir.

The AEE report only described the effect on water quality parameters (pH, conductivity, and temperature) that were monitored before and after the delimiting of the lower scheme piepline and penstocks, and desedimentation of the lower reservoir by NIWA. This monitoring was completed 5 days after delimiting had finished and 14 days after desedimentation had finished. There were no observable adverse effects in any of the water quality parameters assessed. Any changes in water quality were observed at both control (natural) sites and downstream sites.

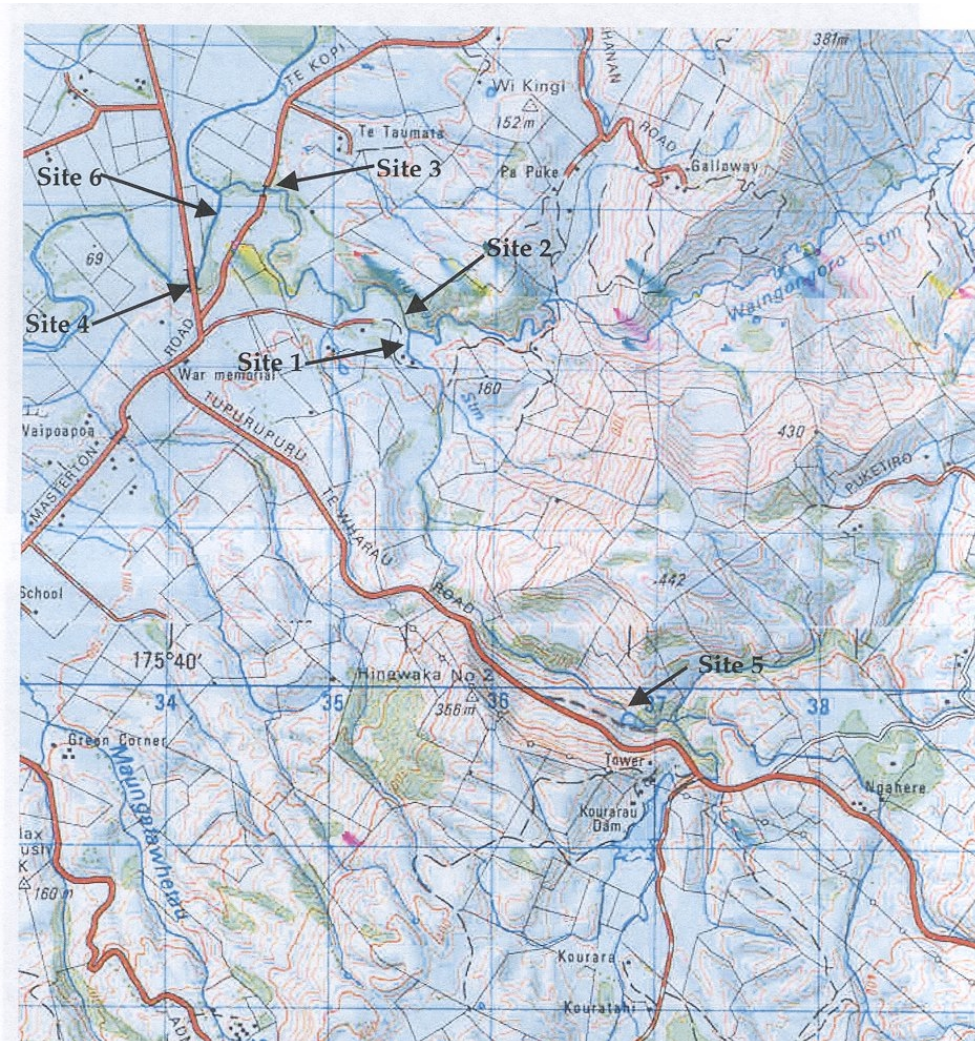
Water quality monitoring undertaken by Opus during the discharge activities showed that the discharge was having a significant effect, particularly on suspended sediment in the downstream receiving waters.

For all sites in the receiving waters pH ranged between 7.3 and 8.8 during the delimiting process. During the desedimentation of the lower reservoir, pH ranged between 7.1 and 8.3. This is well within water quality guideline limits in the RFP and was similar to water quality results obtained by NIWA after the discharge activities.

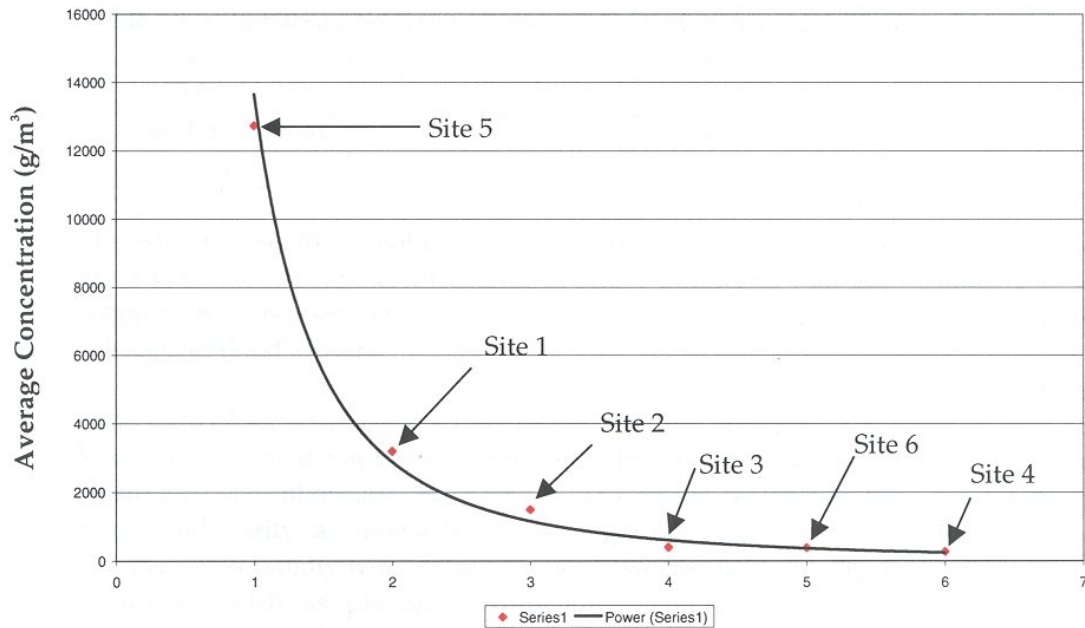
In terms of conductivity for all sites ranged between 42 and 50 mS/cm during the delimiting process. During the desedimentation of the lower reservoir, conductivity ranged between 43 and 56 mS/cm. These results were considerably higher than baseline results which ranged between 0.07 and 1.1 mS/cm.

Suspended solid concentrations recorded during the discharge activities were understandably very high, particularly during the desedimentation of the lower reservoir. The peak concentration of suspended solids was 160,000 g/m<sup>3</sup> immediately downstream of the discharge point. Figure 3 below shows the effect of dilution in terms of average concentrations of suspended solids.

**Figure 3: Average Suspended Solid Concentrations by Site**







The effects on water quality during the discharge activities could be considered to be more than minor as it is unlikely that discharge after reasonable mixing meets criteria established under section 107 of the Resource Management Act 1991. Also the discharge after reasonable mixing is unlikely to meet water quality guidelines in the RFP.

Both section 107 of the RMA and policy 5.2.10 of the RFP state that such a discharge may be allowed if the discharge is required for maintenance activities. I am satisfied that the granting of the discharge permits is consistent with both the RMA and RFP. To ensure that the discharge is only of short duration, restrictions on the frequency and duration of discharge will be included as consent conditions. These conditions will limit delimiting to once every two years on average for a cumulative duration of 24 hours. Desedimentation will be limited to once every four years on average for a cumulative duration of 48 hours. In interpreting these conditions it is expected that in any given four year period, there will be two maintenance activities undertaken – one involving desedimentation and delimiting and the other involving delimiting only. An average is used in the conditions to allow flexibility, if for any reason maintenance activities could not be done during an anticipated monitoring period.

The RFP identifies the Taueru River as important for trout habitat and spawning. In discussions with Blake Abernathy (Wellington Fish & Game Council Field Officer) the lower reaches of the Taueru River where the discharge enters, is not important for spawning purposes in the spawning season between June and August. Nevertheless the discharge has the potential to disrupt fish passage to spawning grounds upstream. It is my view that the minimum flow condition as discussed earlier will minimise potential adverse effects on fish passage during trout spawning in the Taueru River as there will be more available dilution of the discharge.

The Department of Conservation (DoC) raised concerns in their submission about the potential effects of sluicing sediment from the lower reservoir. They suggested removing the sediment mechanically. The application was placed on hold as a result of this issue being raised and further information was requested on alternative options for removing sediment.

Genesis Power Ltd believed that removing all the sediment mechanically was not practicable for the following reasons:

- The bed of the reservoir would need to be dried before mechanical excavation could occur. This could take months and have a significant effect on the operation of the power scheme.
- Access to the site is difficult due to the steep terrain.
- A suitable disposal site would need to be found.
- Transportation of the material could create other adverse effects on roading etc.

Following the applicants consultation with DoC, they agreed to withdraw their right to be heard if the maintenance activities were completed between April and June inclusive when impacts on native fish species would be minimised. The applicant agreed to this suggestion by DoC and the period of discharge has been restricted to this period by way of a consent condition.

I am satisfied with the assessment provided in the AEE report on the potential effect on short term maintenance activities on aquatic ecosystems including instream habitat and ecosystems on stream/lake margins and water quality.

## **5.5 Effects on Natural, Amenity, and Recreational Values**

### *5.5.1 Ongoing Operation*

The upper reservoir has important recreational values – it is a popular place for picnicking and fishing. The upper reservoir is also identified in the RFP as a wetland with a high degree of natural character. As the ongoing operation of the scheme has been in place for nearly 70 years, it is now considered part of the modified natural environment. Provided that the reservoir levels are operated in accordance with minimum levels specified in their application and reflected in a consent condition, no adverse effects are expected.

### *5.5.2 Short Term Maintenance Activities*

The short term maintenance activities will have temporary effects on downstream natural, amenity, and recreational values. The maintenance activities are of short duration (once every 2 years for 24 hours for delimiting of the pipeline and penstocks and once every 4 years for 48 hours for desedimentation of the lower reservoir).

## **5.6 Effects on Tangata Whenua Values**

The applicant has consulted extensively with both iwi authorities in the Wairarapa – Rangitaane o Wairarapa and Ngati Kahungunu ki Wairarapa. The applicant has also initiated two hui at two maraes close to the location site. No iwi, hapu, or marae group has lodged submissions on the applications.

It was identified during the consultation process with tangata whenua, that there are some waahi tapu in the immediate area of the Kourarau Power Scheme. There have been no concerns with the ongoing operation of the scheme. Concerns were expressed about potential expansion of the scheme and how that could affect these sites. The consent applications made cover only the existing activities undertaken as part of the scheme.

I am satisfied that the potential effects on tangata whenua have been appropriately considered during both the preparation and assessment of the applications and AEE report.

## 6.0 Monitoring and Consent Term

### 6.1 Monitoring

Resource Investigations staff believe that it is appropriate to undertake an additional survey of the potential effects of the maintenance activities on fish and invertebrate communities to confirm results obtained in the survey completed between October 2000 and January 2001 as outlined in Table 6 below.

Table 6: Monitoring Requirements

<b>Monitoring frequency</b>	<b>Monitoring parameters</b>
<ul style="list-style-type: none"> <li>• Initial baseline survey</li> <li>• Survey within one week of desedimentation of the lower reservoir</li> <li>• Survey within one week of delimiting of pipeline and penstocks</li> <li>• Follow up survey after two months</li> </ul>	<ul style="list-style-type: none"> <li>• Macroinvertebrate study</li> <li>• Electric fishing</li> <li>• Substrate composition</li> </ul>

If there is new information as a result of this follow up survey the consents and their associated conditions may be reviewed.

The volume of sediment discharged from the lower reservoir is also required to be accurately measured. Any changes in sediment released can lead to the review of the consents and their associated conditions.

### 6.2 Consent Term

The applicant has applied for consents for a 35 year term. Given the high quality level of information provided in the AEE report and the demonstrated minor and/or mitigated effects on the environment, I am satisfied with the 35 year term requested. Given the long term recommended, review conditions are considered appropriate. A review of the consents and its conditions may take place every 5 years at the consent holder's expense.

## 7.0 Summary

The assessment of the applications has shown that the applications can be granted for a 35 year term subject to a number of consent conditions that avoid, remedy, and mitigate any potential adverse effects on the environment. The one submitter who requested to be heard at a hearing has withdrawn their right to be heard subject to a consent condition being imposed. The applicant has agreed to the consent conditions and withdrawn their right to be heard at a hearing (see Appendix II).