

Resource Consent Application and AEE

**AL and BJ Newsom Family Trust
Micro-hydro and Hydrostatic
Pump Project**

Andrew L Newsom

Belinda J Newsom

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Report prepared by: Andrew L Newsom

Reviewed by: Simon Banks, Opus – (planning consultant)

619A Esdaile Road, RD8

Tauranga 3180

Mob: 0211184456

Hm: 07 9750993

E: andrewlnewsom@hotmail.com

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- Appendix 2 - Report from Mike Joy
- Appendix 3 - Power Spout manual
- Appendix 4 - Flow rates supplied by Bay of Plenty Regional Council

1 Introduction

Pursuant to section 88 of the Resource Management Act 1991 (RMA), the Newsom Family Trust (the Applicant) seek resource consent from Bay of Plenty Regional Council (BOPRC) to take water from the Waipapa River for the purposes of a micro-hydro scheme, and to undertake associated works in the bed of the river. An additional consumptive water take is proposed for domestic use, which is a permitted activity.

Following an assessment of the proposal in terms of the RMA the Bay of Plenty Regional Water and Land Plan (RWLP), and Proposed Plan Change 9 - Region-wide Water Quantity (PC9), the following resource consents are required:

- Land use consent pursuant to section 13(1) of the RMA, to disturb the bed of the Waipapa River, being a discretionary activity under Rule 71.
- Water permit pursuant to section 14(2) of the RMA, to take water from the Waipapa River, being a discretionary activity under Rule 43.
- Water permit pursuant to section 14(2) of the RMA, to take water from the Waipapa River, being a discretionary activity under Rule WQ R11 of PC9.

Although the proposal involves returning the full amount of water (Net take = 0) directed through the micro-hydro scheme to the river at the base of the waterfall a short distance downstream from the intake, the definition of “water” under the RWLP excludes water while in a pipe. This means that the proposed take must be assessed separately, and therefore falls under section 14(2) of the RMA.

Section 88(2)(b) of the RMA requires that an application for resource consent include, in accordance with Schedule 4, an assessment of effects on the environment (AEE) in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment. The application comprises this report, the application forms, and the supporting technical information.

The matters covered in this application include:

- A description of the project background, the site, and the proposal.
- A description of the consents sought, and an assessment of the proposal against relevant rules.
- An assessment of the actual or potential effects on the environment of the proposal, including a description of mitigation measures where applicable.
- An assessment of the proposal against the objectives and policies of the relevant planning documents.
- A description of any consultation undertaken, and identification of affected parties.

Given the sensitivity of water allocation issues to tangata whenua and in light of the consultation undertaken to date, the Applicant requests public notification of this application pursuant to section 95A(2)(b) of the RMA.

2 Background

The Newsom Family Trust have investigated the feasibility of generating power from the Waipapa River which runs through their property at 619A Esdaile Road. In June 2015 the Newsom Family Trust purchased the property at 619A Esdaile Road and subsequently identified that the river and waterfall were close to the site of their new proposed dwelling and that they were in the position to investigate a micro-hydro system to help power a new dwelling which is still to be built.

Initial investigations identified that the flow and fall of the Waipapa River was suitable for a small scale micro-hydro scheme to generate power. In addition to reducing the net import of electricity for use at their property, it will provide a demonstration of possibilities to Iwi, local farmers and the wider community of the potential for micro- hydro technology to be more widely utilised in rural New Zealand.

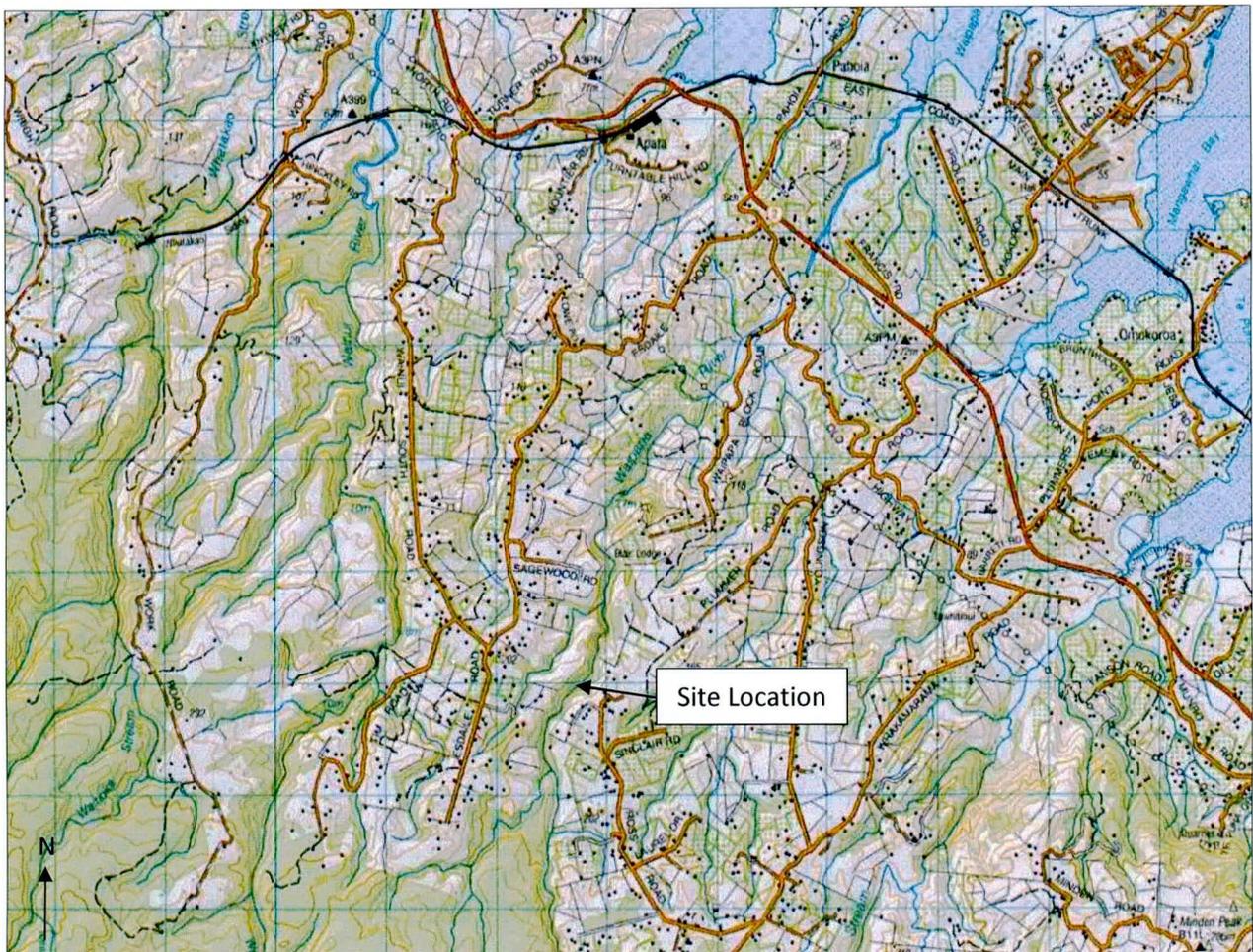
Having a power source independent of the electricity grid has additional merit as a civil defence resource where, in the event of local emergency (earthquakes etc.) which may disrupt power supply and other rural services. This project could function as a model that could be used by other groups in the design of a self-supported emergency facility if such an event occurred.

3 Location of Activity

3.1 General

- Site Address: 619A Esdaile Road, RD8, Tauranga 3180
- Legal description: Lot 5 DP372163
- Map reference NZTM: 1862083.94, 5824099.22
- Water Course name: Waipapa River

The site is located within the property at 619A Esdaile Rd, Whakamarama, in the Western Bay of Plenty (Lat, Long - 37.69289550, 175.97240790) (NZTM (e.N.)1862083.94, 5824099.22). The proposal involves the take and return of water from the Waipapa River, which is located within the Tauranga Harbour catchment.



Location Diagram

3.2 Site Description

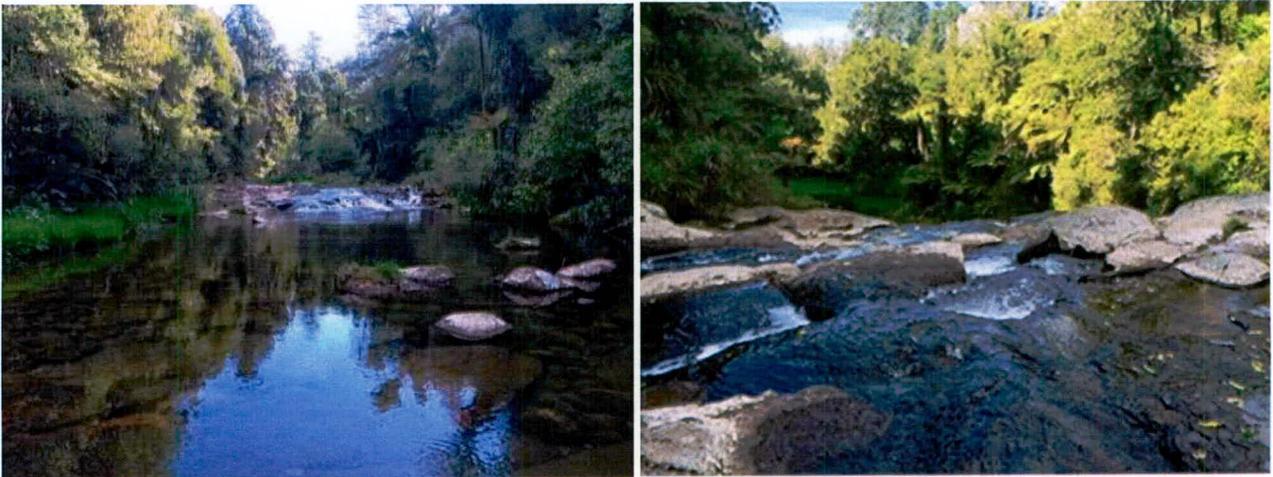
The site is predominately typical rolling farm land and the owner mainly runs some beef cows and horses. There are steeper slopes either side of the Waipapa river itself. The Waipapa river generally north from its origins in Kaimai Mamaku Forest Park to reach Tauranga Harbour 12 kilometres (7 mi) west of Tauranga. The property has two well maintained bush Protection Areas with a covenant in favour of Western Bay of Plenty District Council. It has Part of reach 1 of the Waipapa river and the property runs right up to a section of Reach 2 of the Waipapa river. The bush runs from the edge of the pasture to the river bed. See photos

below that are indicative of the bush in the area.



Map with boundaries (black) and proposed house site

The main reach of the river (reach 2) is approximately outlined in blue and our proposed house with arrows indicating views indicated in black.



Above waterfall looking up the river

Looking over the top of the waterfall

Hand held GPS readings indicate the height at the top of the waterfall is 107m, and the fall from the top of the waterfall to the bottom is 15m +/- 4m. A hand-held tape measure indicated a drop of 13 to 15m from the top to the bottom of the waterfall. Upstream and downstream there is a gentle meandering river. The banks of the river and surround is made up of NZ native bush and are fairly steep. The actual usable fall is 13m once intake and platform for generators is constructed.



“zoom out” view property - Aerial view Waipapa river



“zoom in” view property - Aerial view Waipapa river

The Bay of Plenty Regional Council have supplied data on the modelled flows of the 3 reaches of the Waipapa River. **Reach 2** (NZ Reach 4001041) is the reach of interest as this is the section water will be taken from and returned to (see diagram). See appendix 4.

- Mean flow (l/s) 555
- MALF (l/s) 155
- Permitted take - 10% of MALF (l/s) 15.5



Reach 1 and Reach 2 of the Waipapa River (purple). Black outline our property boundary.

4 Description of Activity

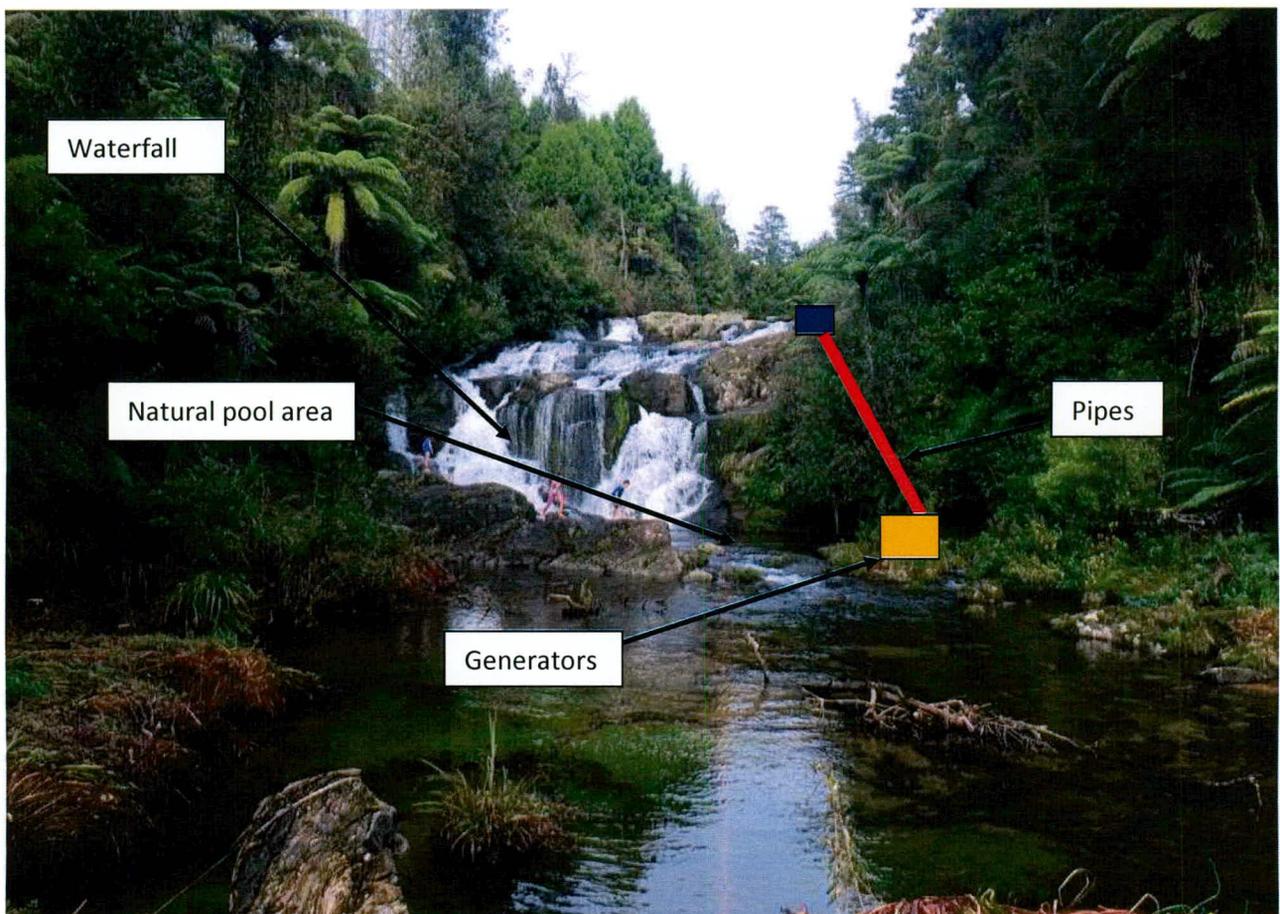
The waterfall is approximately 13 metres high. This is the most significant head and is therefore the appropriate location for electricity generation, using the PowerSpout “TRG-HP 200V” turbines (www.powerspout.com). Above the waterfall is a bush area where water pipes can be taken “inland” in the bush which slopes gently down to the proposed turbine site just adjacent to the bottom of the waterfall.



It is proposed to install one or two above ground pipe(s) on the property owners side (true right) of the stream/waterfall. From the channel (part excavated, most natural) (10-15m long), pipe(s) (300 to 400mm dia) will run almost horizontally for 10 to 15m, then drop almost vertically down to supplying the generators and hydrostatic pump with water. To provide the required flow, one pipe would be approximately 300 to 400mm in diameter. Two pipes of smaller diameter may be needed but this is unlikely.

PowerSpout TRG:

The intake channel will be located at the top of the waterfall and will be located almost perpendicular to the stream flow. This means that the water will enter the channel at a lower velocity than the general river speed which will reduce impact on fish by enabling them to move away from the channel intake. The pipe will convey water to the turbines after going down the 13m fall.



Waterfall and pipe location and generator location

The turbines will carry the water down over boulders into a natural pool/ side of the river below the waterfall and adjacent to the main flow. The return of water will be designed to minimise any abnormal disruption of the water in the pool.

Pipes will be laid above ground so there will be no significant disturbance of the soil in this area. The ground where the turbines will be located is rocky. This will mean water returned to the stream below the waterfall should not disturb the soil or bank in this area and there should be minimal if any silt returned into the Waipapa river. Pipes will be held in place by two steel stakes driven into the ground and pipes secured onto place.

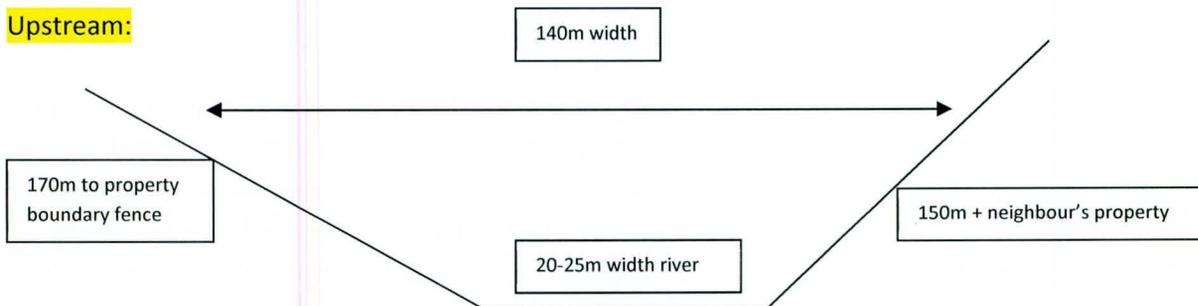
4.1 Bed Disturbance - Intake Channel

The key elements of the bed disturbance activity are:

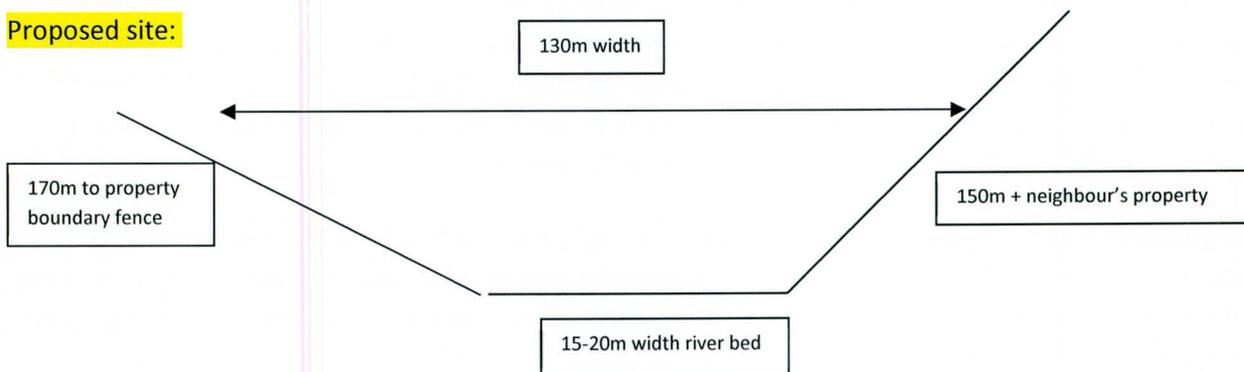
- **Purpose of activity:** to create an intake channel in the bed of the stream to maximise the efficiency of the water take
- **Duration of works:** It is expected the bulk of the work in the covenanted area will take 3 weeks
- **Date of works:** Estimated start Dec 2017
- **Machinery to be used:** Concrete cutter type machine and/or small kango type hammer drill
- **Access to site:** Small track in bush approximately 1m wide. All equipment will be relatively small as it will need to be carried 200m to the work site.

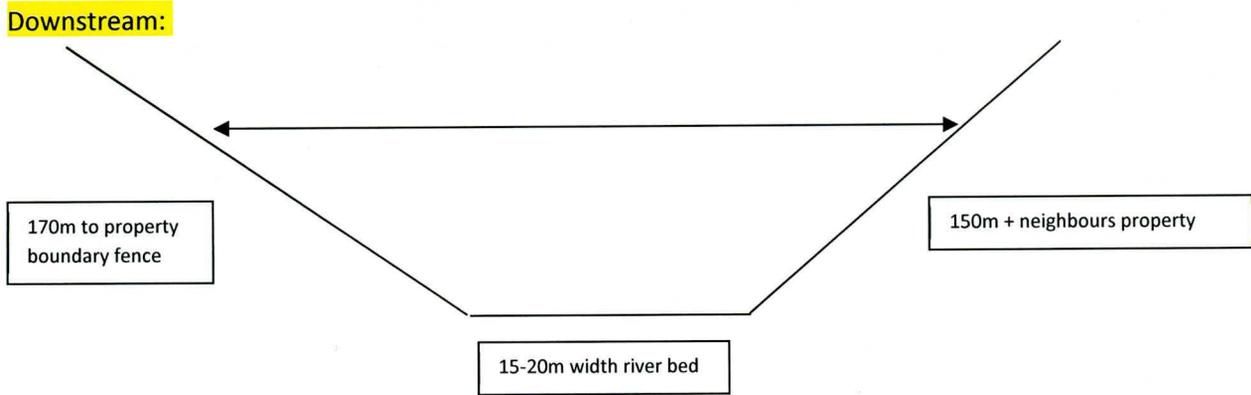
A site plan showing location of works in relation to property boundaries is shown previously. Indicative cross section of the proposed site, and locations 50 m upstream and downstream of the site are shown below:

Upstream:



Proposed site:





4.2 Water Take

The purpose of the water take is:

- (a) generation of electricity (non-consumptive take, with all water returned to the river); and
- (b) back up water supply for the property

The key elements of the water take are:

- Rate of take 78 L per second
- Maximum time 24 hours per day
- Maximum volume 6739 m³ per day

As the rate of take is more than 5 litres per second, an appropriate measuring device will be installed in accordance with the Resource Management (Measuring and Reporting of Water Takes) Regulations 2010. Monitoring and reporting will also be undertaken in accordance with these regulations.

Bay of Plenty Regional Council Toi Moana has provided information about their regional water and land plan (see appendix for document). Of note in relation to our set up, Rule 41(c) requires that the rate of abstraction shall not exceed 2.5 l/s or 10% of the estimated 5-year low flow (Q5 7 day low flow) at the point of abstraction or whichever is lesser. If the proposed scheme does not meet these criteria, then resource consent from the Bay of Plenty Regional Council is required. We are taking more water than this hence the consent is needed.

Flood data has not been provided and is not available but site observations that the stream carries large flood flow volumes in wet conditions. The proposed design will not be affected by flood flows except the intake channel which will be located in the "main" flow area of the river. The pipes will be laid away from the river in the bush protecting them from being washed away in flood conditions. The platform the generators will be situated on will be above the flood levels indicated by debris in the bush wash down river. The platform will be securely fixed to rocks with rigid rock anchor points and the bush floor with solid foundations. Impact on this ecological feature will be considered during construction and every effort will be made to make any structure as low impact as possible.

During summer low flows, generators may be turned off to reduce the take from the river – demand for power in the summer will be low compared to the winter. However, given that the take is non-consumptive and water is only diverted and not taken from the river it is anticipated that residual flows will be sufficient to support aquatic flora and fauna.

Resource consent will be sought for the installation of up to 5 turbines and one hydrostatic pump. A flow rate of approximately 78 litres per second is required for 5 turbines. If the maximum 78 litres per second is removed, this is approximately 50% of the lower estimate of summer low flow of 155 litres/second.

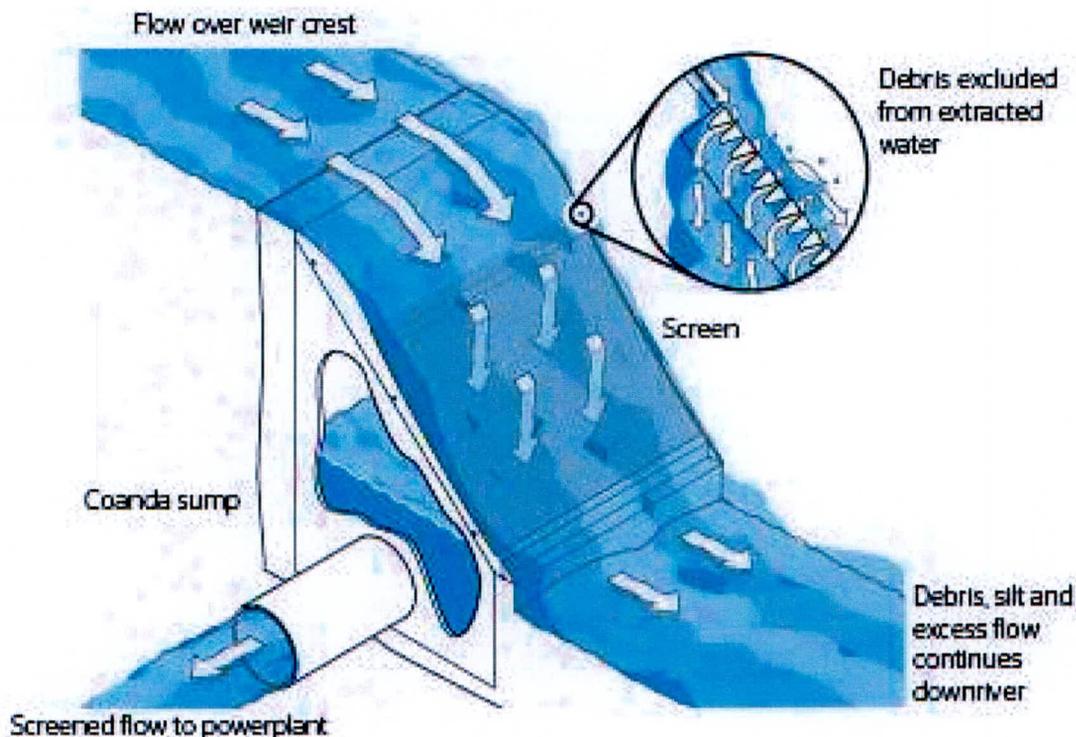
The total length of stream section between the abstraction point (above the waterfall) and reintroduction site (below the waterfall) is approximately 30-60 metres. The hydrostatic pump will be used to supply water to the dwelling and water troughs – back up supply only.

4.3 Water Intake Structure

Key details of the water intake structure are:

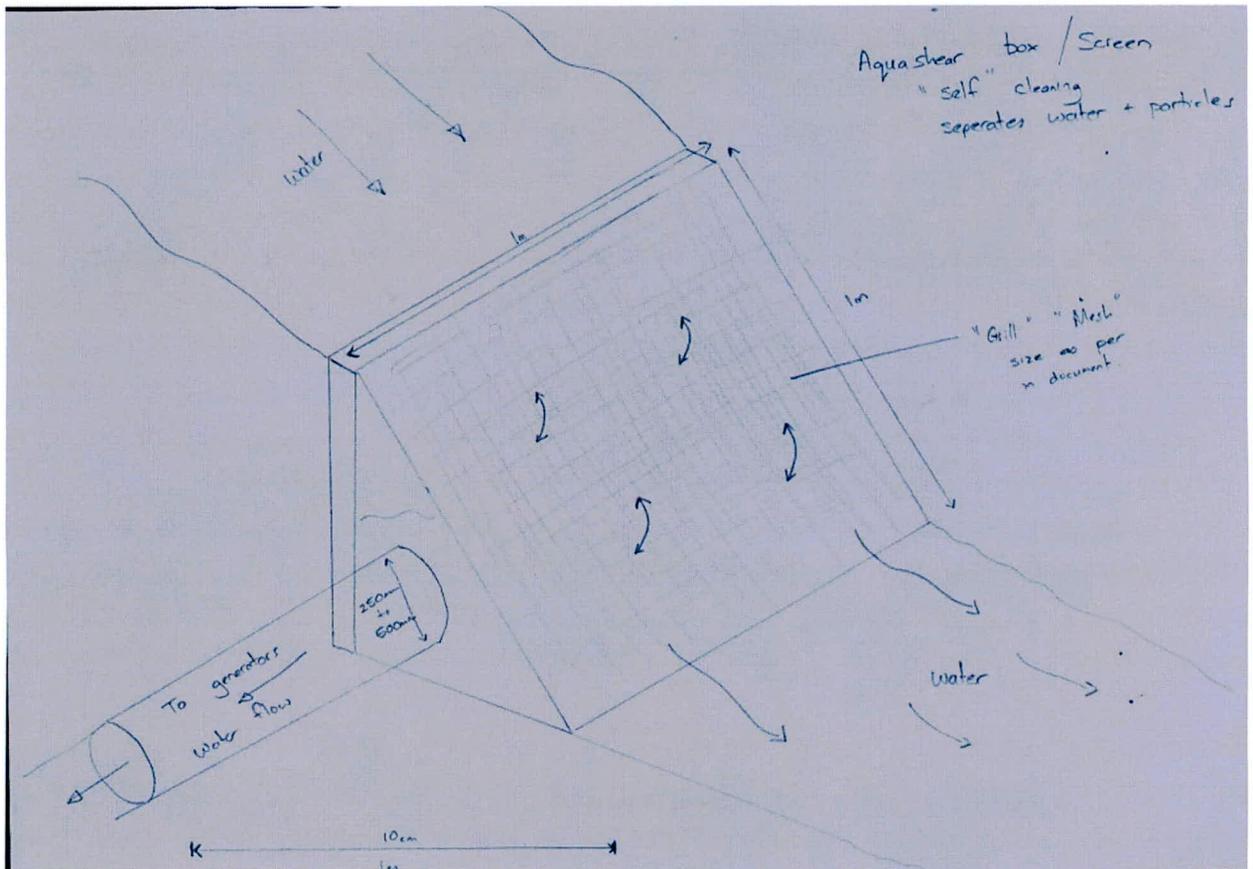
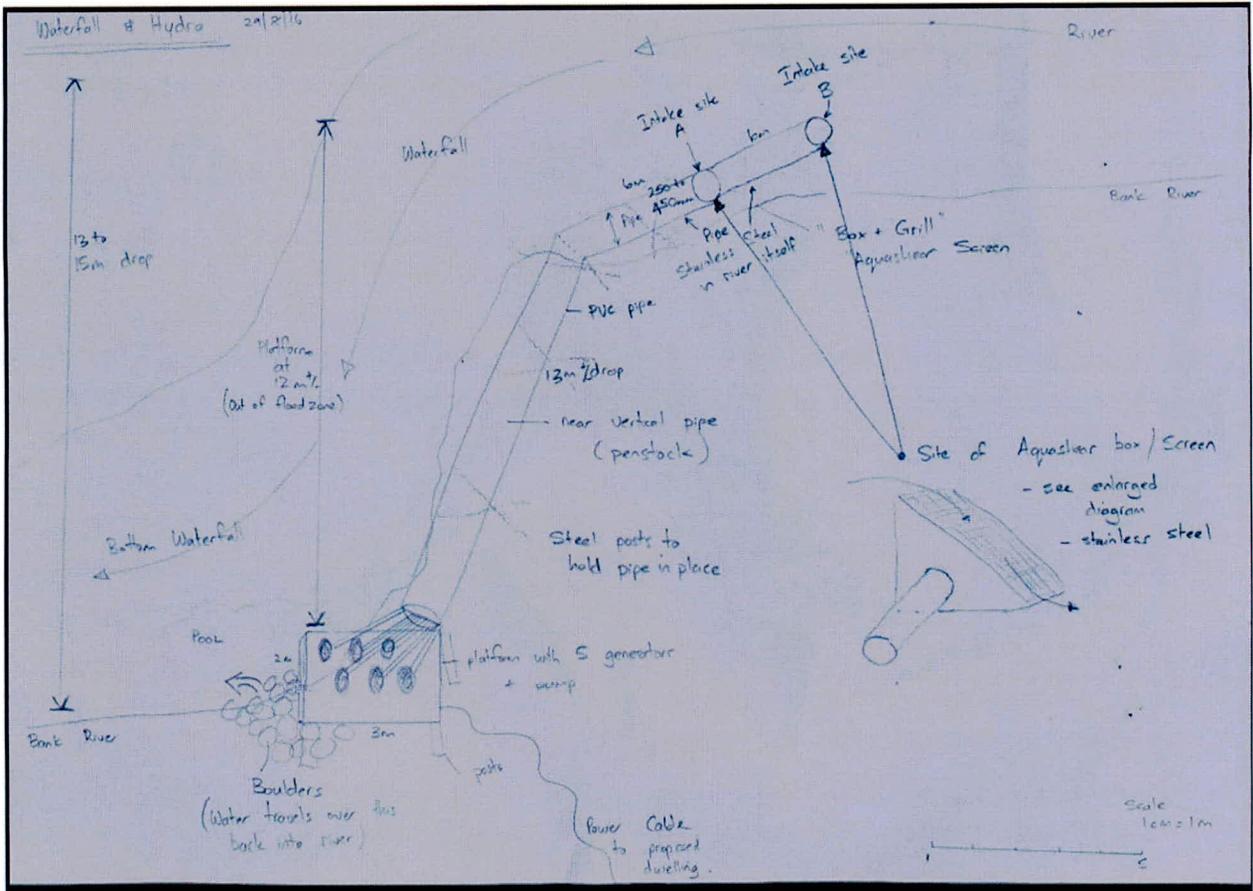
- Mesh size: (standard: $\leq 5 \text{ mm} \times 30 \text{ mm}$ mesh, or $\leq 5 \text{ mm}$ diameter holes) will be used
- Diameter of intake screen 1000 mm
- Length of intake screen 1000 mm
- Pumping velocity through screen (standard: $\leq 0.3 \text{ m/s}$) $< 0.3 \text{ m/s}$

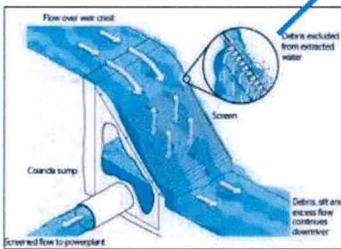
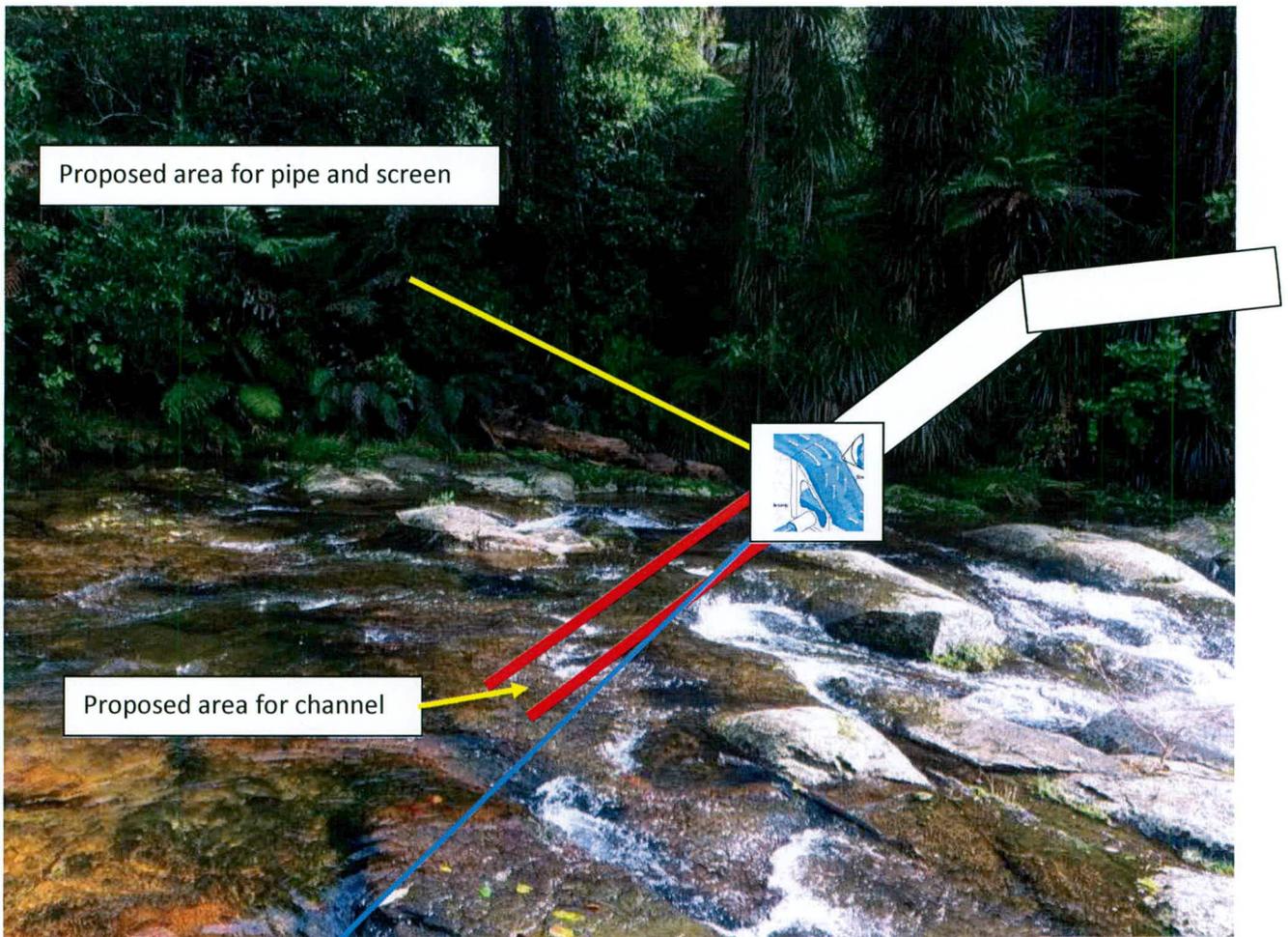
It is proposed that the intake will incorporate a stainless steel structure near the top of the waterfall at the end of the channel. The intake is required to be covered by a mesh/grille to minimize or avoid impacts on aquatic life. It is therefore proposed that a $\leq 5 \text{ mm} \times 30 \text{ mm}$ mesh, or $\leq 5 \text{ mm}$ diameter holes in stainless steel mesh will be used.



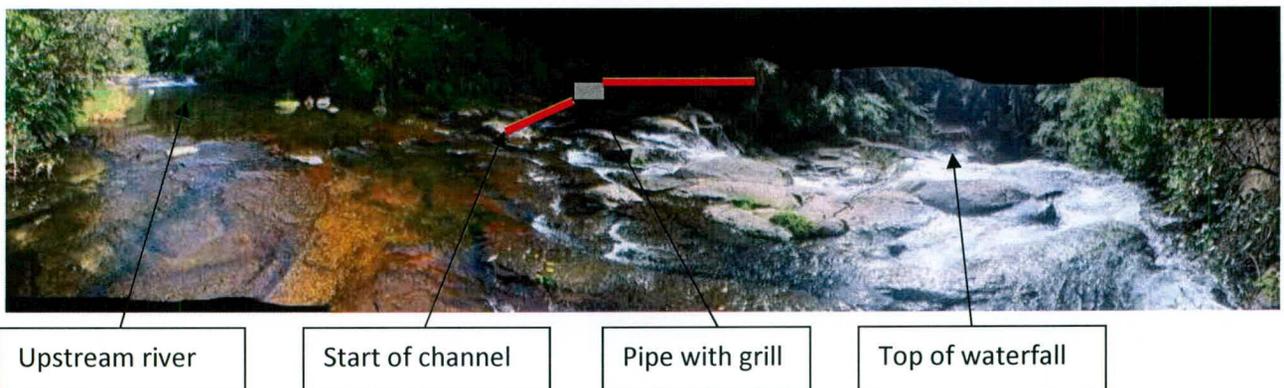
In accordance with Rule 52 Permitted – Surface Water Intake Structures (c) The intake structure shall be screened ii) Not exceeding five (5) millimetres by 30 millimetres or five (5) mm diameter holes in any other area that is not in the tidal area of a river or stream.

Utilizing a channel means no structure will be placed directly in the stream. This will reduce the chances of any structure being washed away down the river in high flow conditions.





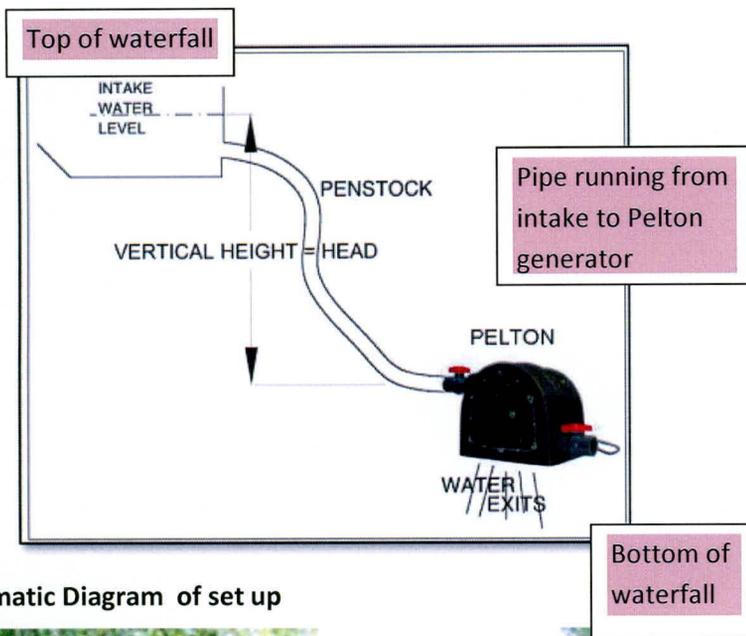
Panorama photo look from upstream on the left and top of waterfall on the right



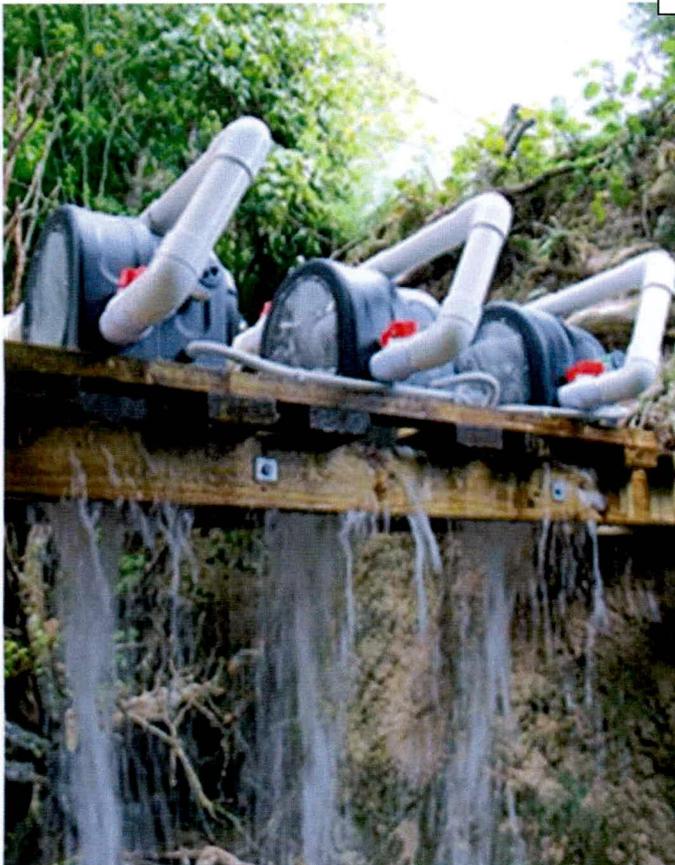
4.4 Micro-Hydro Scheme Details

The pipe(s) will convey the water from the river to the turbines which will generate power. The water falls “vertically” into each turbine unit to turn the propeller/water wheel inside the generator. Exiting water flows out of the bottom of the unit back to the river.

The discharge area is adjacent to the main flow and below the waterfall, thus minimising risk of damage from high flows/floods. It will be over rocks minimising possible erosion or damage to the riverbed.



Schematic Diagram of set up



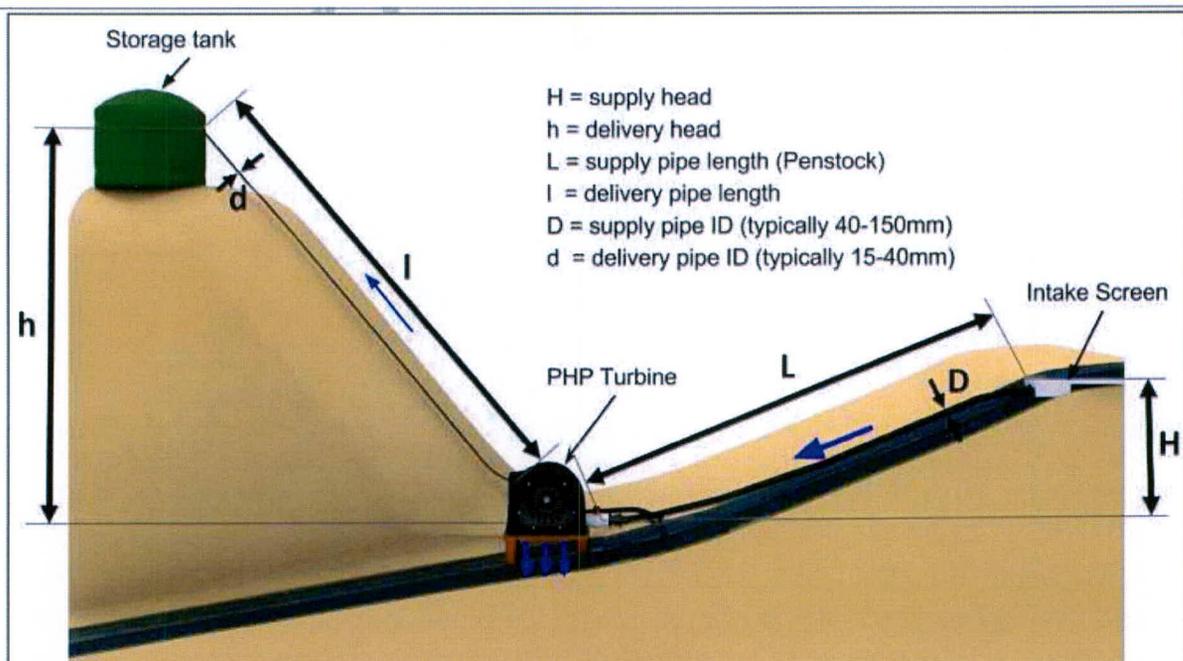
Example of 3 Turbine Setup



Example of 3 Turbine Setup



Example of "3" phase power board set up – near house



PHP Turbine or hydrostatic pump "water pump"

4.4.1 Turbines and Power Output

Turbines supplied by EcolInnovations Ltd who are based in New Plymouth. The turbines are unique as they are constructed from surplus Fisher & Paykel components that would otherwise be disposed in a landfill. Numerous installations of these units have been completed worldwide. They are reported to be approximately made of 80% recycled material.

The turbines are relatively small being approximately 450cm x 450cm x 450cm outside dimensions. They will be installed on a wooden base made on site at the time of installation. The PowerSpout is encased in a very durable LDPE housing, ensuring all internal parts are protected from rain, rodents, children and UV. The LDPE enclosure also helps reduce noise and dampens any slight vibrations.



Note: Purple lines = bush protection area (Area R and area by Waipapa river belong to 619A Esdaile Rd). Area Q is our neighbours. |

Figure 5: Diagram of Hydro Scheme and associated infrastructure

The PowerSpout generator will be located at -37.6942802,175.9788322 (Lat,Long).

With an available head at the waterfall of 13 metres, a flow rate of 13 litres per second per turbine should be able to generate 800 to 1000 W/turbine. It is proposed to install up to 5 turbines. In addition, one PowerSpout hydrostatic pump will be installed that will involve a take from the river. The “full take” of this pump on water volume will be low – it will be used for water troughs and for household use as a back-up.

4.4.2 Power Connections

Power connections for the project – likely connection of the micro-hydro scheme with off grid batteries located at the main dwelling. This will mean we are independent of the power grid and will only produce the electricity we need for the property. Too much electricity is an issue so not all turbines maybe required all year round.

- Consultations regarding connection to the main grid have been made and costing completed. There are substantial costs involved with this and over-ground power lines would be required.
- Connection of the micro-hydro scheme with off grid batteries located at the main dwelling is preferred to enable the dwelling to have sufficient power. Batteries supplied by Tesla or similar would be used. See https://www.teslamotors.com/en_AU/powerwall if further details are required.



Figure 6: Example of Battery Installation

5 Rules Assessment

This section outlines the resource consents required for the proposal, including identifying the zoning and features in the relevant Regional and District Plans, and an assessment of the proposal against the relevant rules and performance standards.

The Project is subject to the RWLP and the Western Bay of Plenty District Plan (the District Plan). In addition, BOPRC notified PC9 to the RWLP on 18 October 2016. The submissions period closed on 14 December 2016. Further submissions were publicly notified on 30 May 2017 and have now closed. Hearings are scheduled for November 2017. The rules in PC9 have immediate legal effect in accordance with section 86B(3) of the RMA, as they “protect or relate to water”.

5.1 Zoning and Features

The RWLP identifies and classifies watercourses according to a range of criteria. The Waipapa River is classified as a “Contact Recreation” throughout the project area, and is not listed in any of the schedules to the RWLP.

The District Plan identifies land-use zoning, as well as significant ecological and landscape features. The site is located in the rural zone, while the wider Waipapa River corridor through the site is classified as an Outstanding Landscape Feature (S6 - Kaimai Ranges) and also a Significant Ecological Feature (U14/16 - Waipapa River Bush 1).

5.2 Resource Consents Required

The resource consents required have been grouped according to the type of consent sought and rule number, as outlined in the Table 1 below. Where elements of the proposal are considered to be permitted activities, these are also included in the table. For the avoidance of doubt, the Applicant is seeking resource consents under any rules which apply to the activity, even if not specifically identified here.

Table 1: Resource Consents Required

Consent Type	Activity	Rule	Activity Status	Scope of Application
Regional Water and Land Plan				
Land use consent s13	Surface water intake structure	52	Permitted	Erection of a surface water intake structure in the bed of the river.
	Turbine and discharge structure	53	Permitted	Erection of turbines and discharge platform secured to the river bed.
	Disturbance of the river bed	71	Discretionary	Excavation of intake channel in river bed to direct flow to the intake structure on the river bank.
Water Permit s14	Take surface water (domestic use)	41	Permitted	Take surface water for domestic and animal use

Consent Type	Activity	Rule	Activity Status	Scope of Application
	Take surface water (hydro)	43	Discretionary	Take surface water from the river for micro-hydro scheme at up to 78 l/s
Discharge permits ¹⁵	Discharge water to surface water	33	Permitted	Discharge of water from the micro-hydro scheme back to the river.
Plan Change 9 - Region-wide Water Quantity				
Water Permits ¹⁴	Take surface water (domestic use)	WQ R3	Permitted	Take surface water for domestic and animal use
	Take surface water (hydro)	WQ R11	Discretionary	Take surface water from the river for micro-hydro scheme at up to 78 l/s

A detailed assessment of the proposal against these rules is set out below.

5.2.1 Water Take for Micro-Hydro Scheme

The RWLP provides for surface water takes as a permitted activity under Rule 41, subject to conditions. Rule WQ R3 under PC9 contains similar conditions. However, the proposed take exceeds the permitted volume of 15m³ per day, and the permitted abstraction rate of 2.5 l/s or 10% of the estimated five-year low flow (Q5 7 day low flow) - whichever is the lesser.

The proposed abstraction rate for the take is up to 78 l/s, which is continuous and would result in a daily volume of 6,740m³. Although the full volume of the take will be returned to the river a short distance downstream, because of the definition of “water” under the RWLP it falls to be considered under Rule 43, which states that:

The take and use of surface water or groundwater that:

- 1 *Is not permitted by a rule in this regional plan, and*
- 2 *Is not a controlled activity under a rule in this regional plan, and,*
- 3 *Is not prohibited by Rule 49.*

Is a discretionary activity.

Rule 43 identifies a number of Assessment Criteria¹ which BOPRC will consider when assessing resource consent applications for new water takes under this rule, as follows:

- (a) *Site characteristics.*
- (b) *Statistical variations in water flow data.*
- (c) *Adverse effects of the activity on the matters listed in Method 169.*
- (d) *Adverse effects on existing users of the surface water body.*

These matters, where relevant, are addressed throughout this application and have informed the assessment of effects at Section 5 below.

¹ Rule WQ R11 under PC9 removes these criteria, and does not propose any replacement.

The term sought for this consent is the maximum 35-year period.

5.2.2 Disturbance of the River Bed

The RWLP provides explicitly for bed disturbances under Rules 66 (Boat Ramp and Jetty Maintenance), 66A (Hazard Management), and 66B (Cultural or Scientific Purposes). The proposed disturbance of the river bed to create and maintain an intake channel to direct flow to the intake structure on the banks of the river is not covered by any of these rules, and therefore falls to be considered under Rule 71, which states that:

Unless provided for by another rule in this regional plan, the:

- 1 *Use, erection, reconstruction, placement, alteration, extension, removal, or demolition of any structure or part of any structure in, on, under, or over the bed of a stream, river or lake,*
- 2 *Excavation, drilling, tunnelling or other disturbances to the bed of a stream, river or lake,*
- 3 *Introduction of planting of any plant or any part of any plant in, on, or under the bed of a stream, river or lake,*
- 4 *Disturbance, removal, damage or destruction of any plant or any part of any plant in, on, or under the bed of a stream, river or lake,*
- 5 *Deposition of any substance in, on, or under the bed of a stream, river or lake,*
- 6 *Reclamation or drainage of the bed of a stream, river or lake,*

Is a discretionary activity.

Rule 71 does not identify any specific assessment criteria.

The term sought for this consent is the maximum 35-year period, which reflects the unique nature of the non-consumptive take, the acceptability of the effects (see Section 6 of this AEE), and the level of investment required by the applicant to establish the micro-hydro scheme and associated electrical infrastructure.

5.3 Permitted Activity Conditions

5.3.1 Surface Water Intake Structure

The RWLP provides for the use and placement of a surface water intake structure in the bed of a river and associated bed disturbance as a permitted activity under Rule 52, subject to conditions. The proposed intake structure fully complies with these conditions, as outlined in the assessment below (clauses a-x correspond to the permitted activity conditions under Rule 52 - where a clause is not included it is not considered relevant to this proposal).

- (a) The structure will not include an infiltration gallery in the bed of the river.
- (b) The structure will not restrict the cross-sectional area of the river by more than five square metres, or 5 percent of the width of the river; whichever is the lesser.
- (c) The intake structure will be screened with a mesh aperture size not exceeding 5mm by 30mm (or 5mm diameter holes).
- (e) The disturbance of the bed of the water body and release of sediment resulting from the construction of the structure will not occur for a period greater than 48 consecutive hours. However, consent will also be sought for bed disturbance (see 5.2.2 above).

- (g) No works will be undertaken in the bed of the river between 15 August and 15 October.
- (h) All practicable steps will be taken to avoid, remedy or mitigate the release of sediment during construction of the structure, and no clearly discernible change in the visual clarity of the water will occur beyond a distance of 100 metres downstream of the activity site. Sock type barriers will be used to restrict any sediment created during the construction of this scheme.
- (i) The disturbance of the bed will be limited to the extent necessary to carry out the activity. However, consent will also be sought for bed disturbance (see 5.2.2 above).
- (j) The activity will not cause or induce erosion of the bed or banks of any surface water body. Discharge from the generators will occur naturally over rock and boulders and should not disturb the banks of the water body or the water bed.
- (l) The activity will not prevent the passage of migrating fish. See ecology assessment of the area.
- (m) The activity will not compromise the structural integrity of use of any other authorised structure or activity in the bed of the river.
- (o) The activity will not alter the natural course of the river.
- (p) All machinery will be kept out of the bed of the river where practicable.
- (q) No machinery refuelling or fuel storage will occur at a location where fuel can enter any water body.
- (r) All practicable measures will be taken to avoid vegetation, soil, slash or any other debris being deposited into a water body or placed in a position where it could readily enter or be carried into a water body.
- (s) The structure will at all times be maintained in a sound condition for the purpose for which it was constructed, and be kept clear of accumulated debris. The intake will be regularly cleaned to ensure efficient running of the system.
- (t) The structure will be constructed to ensure that the structure cannot break free and cause a blockage or erosion. The intake will be situated on the bank at the edge of the river above the waterfall. The generators will be placed above the "flood zone" of the river and will be securely anchored in place.
- (w) Following the completion of construction, all excess construction materials and equipment will be removed from the bed of the river.
- (x) No contaminants (including, but not limited to, oil, hydraulic fluids, petrol, diesel, other fuels, paint, solvents, or anti-fouling paints), excluding sediment, will be released to water from the activity.

5.3.2 Turbines and Discharge Structure

The RWLP provides for the use and placement of a discharge structures in the bed of a river and associated bed disturbance as a permitted activity under Rule 53, subject to conditions. The platform will be constructed of timber and be secured to river bed rock by secure anchors in the rock. Solid foundations will be laid into the bush floor where necessary. There is a gentle discharge out of the turbines this will fall onto

rocks and boulders that are naturally occurring at the base of the waterfall. Images of a similar set up are inserted below:



The proposed platform housing the turbines and outlets to the river fully complies with these conditions, as outlined in the assessment below (clauses a-u correspond to the permitted activity conditions under Rule 53 - where a clause is not included it is not considered relevant to this proposal):

- (a) The structure will not restrict the cross-sectional area of the river by more than five square metres, or 5 percent of the width of the river; whichever is the lesser.
- (c) The disturbance of the bed of the water body and release of sediment resulting from the construction of the structure will not occur for a period greater than 48 consecutive hours. However, consent will also be sought for bed disturbance (see 5.2.2 above).
- (e) No works will be undertaken in the bed of the river between 15 August and 15 October.
- (f) All practicable steps will be taken to avoid, remedy or mitigate the release of sediment during construction of the structure, and no clearly discernible change in the visual clarity of the water shall occur beyond a distance of 100 metres downstream of the activity site.
- (g) The disturbance of the bed will be limited to the extent necessary to carry out the activity. However, consent will also be sought for bed disturbance (see 5.2.2 above).
- (h) The activity will not cause or induce erosion of the bed or banks of the river.
- (j) The activity will not prevent the passage of migrating fish. See ecology assessment of the area.
- (k) The activity will not compromise the structural integrity or use of any other authorised structure or activity in the bed of the river.
- (m) The activity will not alter the natural course of the river.

- (n) All machinery will be kept out of the bed of the river where practicable.
- (o) No machinery refuelling or fuel storage will occur at a location where fuel can enter any water body.
- (p) All practicable measures will be taken to avoid vegetation, soil, slash or any other debris being deposited into a water body or placed in a position where it could readily enter or be carried into a water body.
- (q) The structure will at all times be maintained in a sound condition for the purpose for which it was constructed, and be kept clear of accumulated debris. Regular checks of the generators and associated discharge will be made with an annual service.
- (r) The structure will be constructed to ensure that the structure cannot break free and cause a blockage or erosion.
- (u) Following the completion of construction, all excess construction materials and equipment will be removed from the bed of the stream, river or lake.

5.3.3 Take Surface Water for Domestic Use

The RWLP provides for surface water takes as a permitted activity under Rule 41, subject to conditions. Rule WQ R3 under PC9 contains similar conditions. For ease of reference, we have used the conditions under Rule 41 as the basis for this assessment. However, the proposed activity also satisfies the conditions of Rule WQ R3.

Section 14(3)(b) also permits a person to take fresh water provided the water is taken or used for:

- (i) *an individual's reasonable domestic needs; or*
- (ii) *the reasonable needs of an individual's animals for drinking water, -*
and the taking or use does not, or is not likely to, have an adverse effect on the environment;

The proposed take for domestic use will supplement rain water collected in tanks only when needed, and will be managed to ensure it fully complies with these conditions and does not result in adverse effects on the environment, as outlined in the assessment below (clauses b-f correspond to the permitted activity conditions under Rule 41 - where a clause is not included it is not considered relevant to this proposal):

- (b) Less than 15 cubic metres of water per day will be taken for domestic use. Less than this will be taken. Rain water will be used as the primary source of water for the property, and water from the river will only be used as a supplementary source.
- (c) The rate of abstraction will not exceed 2.5 litres per second, or 10% of the estimated five year low flow (Q5 7 day low flow) at the point of abstraction whichever is the lesser. It will only be used to supplement rain water collected in 1 or 2 30,000L tanks. More will be taken for power generation but this will be returned over a short distance as noted in this application (see 5.2.1 above).
- (d) The take will not cause the total abstraction (all users) of surface water takes to exceed the instream minimum flow requirement (including the default instream minimum flow requirement) for the river.
- (e) The intake structure will be screened with a mesh aperture size not exceeding 5mm by 30mm (or 5mm diameter holes).

- (f) The intake velocity through the screen will not exceed 0.3 metres per second. A similar design will be used as described above for the TRG Powerspout generators.

5.3.4 Discharge of Water to Surface Water

The RWLP provides for the discharge of water to water where the discharge is of water to the same surface water body and the water quality is the same as the receiving waters, as a permitted activity under Rule 33, subject to conditions. The return of water from the micro-hydro turbines to the river fully complies with these conditions, as outlined in the assessment below (clauses a-d correspond to the permitted activity conditions under Rule 33 - where a clause is not included it is not considered relevant to this proposal).

- (a) The discharge will not cause or induce erosion to the bed or banks of the river. The discharge will be over boulders and rocks and will allow water to trickle back into a pool at the base of the waterfall. There will be a very low chance of damage to the banks or river beds due to these naturally occurring features in the area.
- (b) The discharge will not cause nor contribute to flooding or ponding on any land or property owned or occupied by another person. Only water collected at the top of the waterfall will be discharged back into the Waipapa river therefore there is no chance of any contribution to flooding or ponding. A small amount of water will be taken for use on the farm (see 5.3.3 above), in accordance with the permitted activity rules noted above.
- (c) The discharge will not have an adverse effect on the water quality of the receiving water body. The generators and pump are of a very ecologically friendly design. The design is basically a water wheel. A sealed bearing system that is greased is used in this system and is designed so it should not contaminate the water or effect water quality.
- (d) The discharge shall not damage or destroy significant aquatic indigenous vegetation, aquatic habitats of indigenous species, spawning sites of indigenous species or trout, or significant habitats of trout.

5.4 District Council Consents

In terms of resource consents required under the District Plan, an application has been lodged with Western Bay of Plenty District Council (Ref: 12315_P). The following consents are required under the District Plan:

- Rule 10.3(m) - to establish a new electrical generating schemes/plants/facilities (being hydropower) for onsite domestic use is a restricted discretionary activity in an Identified Significant Feature (both Ecological and Landscape).
- Rule 5.4.2(l) - to undertake works and network utilities within an identified significant ecological feature is a restricted discretionary activity.
- Rule 6.4.3.1(f) - works and network utilities classified as restricted discretionary activities in Rule 10.3 are a restricted discretionary activity.

These consents are the subject of a separate application and are not considered any further in this report.

5.5 Summary

Overall, the proposal requires resource consent for a discretionary activity under the RWLP.

6 Assessment of Environmental Effects

In terms of section 104(1)(a) of the RMA, when considering this application, the consent authority must have regard to any actual and potential effects on the environment of the proposed activity. This section considers those effects, and is guided by the Fourth Schedule of the RMA and the relevant assessment criteria of the RWLP.

After considering the nature and scale of the proposal and the receiving environment, it is considered that the potential environmental effects that need assessing relate to:

- Construction Effects
- Hydraulic Effects
- Effects on Water Quality
- Effects on Ecological Values
- Recreational Impacts
- Visual and Amenity Effects (including noise)
- Cultural effects

The assessment of effects in relation to these matters, including positive effects, is set out below.

6.1 Positive Effects

Whilst the primary objective is to produce low cost, renewable energy with an absolutely minimal impact on the environment other benefits include:

- The project aligns well with the National Policy Statement on Renewable Electricity Generation 2011, the Bay of Plenty Energy Strategy 2011 (Our Future From Energy) and allied Policies/objectives of regional and local government.
- Regional councils are also likely to encounter increasing interest in renewable energy. The BOP Energy strategy anticipates this and it is likely that this will also occur in the Bay of Plenty.
- This project could also help demonstrate potential for micro-hydro in rural areas, and hence be of wide interest to landowners, and rural (farming) organisations.

6.2 Construction Effects

Effects of immediate activity/construction (*e.g. disturbance of stream bed, sediment*) on the immediate vicinity. The main activity within the river the creation of a channel. This activity may involve the cutting of rock with powered tools. There is likely to be a concrete cutting type saw that will be water cooled. The other would be an electric chipping drill like a Kango hammer. All other construction should be outside the river bed itself.

Micro and macro debris is likely to be created. "Sock" type debris traps will be used. Debris will be collected and disposed of. If other means of containing debris are identified then these will also be used.

6.3 Hydraulic Effects

Because water is being returned back to the Waipapa river over only approximately 30 to 60m and the water is not being “used” for off-site purposes then the total available water volume will remain constant. Only a small amount may be “used” for the dwelling and water troughs and general farm use. Rain water will be the main source of water for the property.

Water is being returned to the river in a gentle manor so there should be no upstream or downstream effects from silting or other effects from water being returned to the river. In typical and extreme conditions there should be no adverse effects on the river.

6.4 Effects on Water Quality

There should be less than minor impact on the ecological feature effects on water quality as water will only travel through pipes and a turbine. The majority of the water will only come in contact with “plastic” and we cannot see this will affect the water quality.

6.5 Effects on Ecological Values

6.5.1 Fish Passage

A report has been commissioned regarding fish passage. Please see the attached document for details. The summary of the report is:

The proposed micro-hydro would have minimal or no impact on freshwater fish passage because there is a natural barrier downstream that would mean only two species the most specialist climbers would require passage as all other species could not get upstream past the lower waterfall. The freshwater fish database records support my assessment as only eels have been found above the waterfalls.

The other specialist climber (koaro) has not been found in the catchment so may not be present at all. Downstream passage for migrating adult eels would not be impacted in any way by the proposed water take. The risk of juvenile eels or galaxiids would be mitigated by having a mesh size no greater than 3mm.

6.6 Recreational Impacts

Public access to the site would be only via private property. The site is not easily accessible. To our knowledge there has been no public access to this area since we have owned the property or when the previous owners had the property. In our view there is no effect on water quality with the proposed activity so this should not affect use of the river downstream by others. There should be no effect on contact recreation on this river or other parts of the river from our activity.

6.7 Effects on Amenity Values

6.7.1 Visual Effects

The pipes and generators will be located in bush on the banks of the river. It is expected that the only visible part of the pipe system from the river will be the stainless-steel intake. Pipe will be sourced if

possible in colours that blend in with the bush. It is expected that the natural growth of the bush will obscure the pipes in a short space of time.

The generators will be housed on a wooden platform. There is likely to be a corrugated iron roof covering this to protect the generators from falling branches and general forest debris. Colours will be chosen so that they will blend in with the native bush. The generators may be partially visible at the base of the waterfall but will be tucked away as much as possible.

6.7.2 Noise Effects

The closest neighbours dwelling is approximately 200 to 250m to the proposed site for the generators in a straight line off the map. The actual distance is likely to be longer. There is thick bush on the banks of the river and a steep incline up to the nearest dwelling. Sound from the generators not be an issue, nor should any noise be created from the installation.



Figure 6: Proximity to Adjacent Dwellings

Noise pollution should be minimal and should be contained within the generation area and will be dampened by the thick bush.

From the PowerSpout manual 2014 page 128 & 129 measurements are as follows.

PowerSpout	Installation Manual
 <p>1m away from running turbine: 83.3 dBA</p>	 <p>2m away from running turbine: 81.9 dBA</p>
 <p>6m away from running turbine: 73.9 dBA</p>	 <p>12m away from running turbine: 56.7 dBA</p>

6.8 Cultural effects

See 7.0 – consultation has been undertaken and correspondence included as part of this application.

7 Consultation

Consultations with the following groups have been undertaken and reports attached.

Consultation with the Tangata Whenua groups has taken some considerable time and effort. The consultation with the other groups went smoothly and quick responses to the project were received.

- **Department of Conservation** – Result – approve of the project (see appendix 8 for approval)
- **New Zealand Fish and Game Council** - Result – approve of the project (see appendix 9 for approval)
- **Tangata Whenua groups** regarding obtaining cultural effects assessments associated with the application. They are:
 - *Pirirakau Incorporated Society* - Contact – Julie Shephard. They do not support the project (see appendix for correspondence). A response to their initial letter was sent and is attached. We have met Julie Shephard who represents the iwi and have discussed the project at the council rooms. We have been unable to find a way in which they would approve of this project.

We have tried to mitigate the effects of the project by involving Pahoia School in the project. They could be involved in: A pest control program we intend to start up – monitoring pest numbers. Education about living “off the grid” and where electricity comes from. Waipapa river vertebrates, invertebrates, native species present etc – survey and assessment of species diversity in the river. Waipapa river water quality – measure over time. Covenanted bush – 2.5 hectares on our property – could do project in this – condition of bush, animals present, how to improve.

This attempt at mitigation was unsuccessful. See Appendix 6

- *Ngāti Taka* – Contact - Bob Leaf and Caine Taiapa. Bob was very interested in the project and was the only person who accepted the offer for a site visit. I took him to the river and showed him where the scheme would be set up. I also attended a Hui with them both to present the project. Bob was very complementary about the project in general but is as yet undecided whether they will support the project.
- *Ngāti Ranginui* - Contact - Tawharangi Nuku. I have attached final correspondence from Tawharangi and while he has no issues with the project they are as yet undecided whether they will support the project. See appendix 7.

8 Statutory Assessment

8.1 Statutory Planning Framework

A determination of an application for a discretionary activity must be made in terms of section 104B of the RMA. This states that the consent authority may grant or refuse the application, and may impose conditions in relation to any matters deemed relevant. However, before determining an application, the consent authority must consider the application in terms of section 104 of the RMA.

Section 104(1) requires the consent authority, subject to Part 2, to have regard to any actual and potential effects on the environment, along with any relevant provisions of:

- a national environmental standard
- other regulations
- a national policy statement
- a New Zealand coastal policy statement
- a regional policy statement or proposed regional policy statement
- a plan or proposed plan

Section 104(2) goes on to state that “when forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect”.

The following sections set out an assessment of the proposal against any relevant provisions of the statutory planning framework listed under section 104(1)(b) of the RMA.

8.1.1 National Policy Statement

There are four national policy statement (NPS) in place. The NPS for Freshwater Management and the NPS on Renewable Electricity Generation are considered relevant to this application.

8.1.1.1 *NPS for Freshwater Management*

The NPS for Freshwater Management sets out objectives and policies that direct Regional Councils to manage water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits. Specific objectives and policies relate to water quality, water quantity, integrated management of freshwater on a catchment basis, national objectives, monitoring plans, tangata whenua roles and interests and the progressive implementation programme for the NPS.

Objectives A1 and A2 (Water Quality) are relevant to the proposal. The non-consumptive water take will not affect the life-supporting capacity or the significant values of the river, and will not impact on water quality. The proposal is therefore consistent with the NPS for Freshwater Management.

8.1.1.2 *NPS for Renewable Electricity Generation*

The NPS on Renewable Electricity Generation recognises the national significance of renewable electricity generation activities, including small-scale electricity generation for use on a particular site, such as this proposal. The NPS provides direction to Regional Policy Statements and Plans, and acknowledges the

contribution such activities make to achieving New Zealand’s target for electricity generation from renewable resources and reducing the causes of climate change.

Specifically, Objective F and Policy F direct Regional Councils to provide for the development of small and community-scale renewable electricity generation activities such as this. The proposal is therefore consistent with, and directly implements, the NPS for Renewable Electricity Generation.

8.1.2 National Environmental Standards

There are five National Environmental Standards in force as regulations under the RMA, none of which are considered relevant to this application.

8.1.3 Regional Policy Statement (RPS)

The Bay of Plenty Regional Policy Statement (RPS) has been operative since October 2014. The RPS is a broad policy document which considers all of the regionally significant resource management issues and provides objectives, policies, and methods to address those issues. The key objectives and policies from the Operative RPS that are relevant to consideration of the proposal are listed and addressed in Table 2.

Table 2: Relevant Objectives and Policies of the RPS

Issue	Relevant objectives	Relevant policies	Comment
Energy and infrastructure	5	EI 1B, E1 2B	The proposal directly provides for the use and development of renewable energy sources, and also contains measures to ensure energy efficiency and conservation.
Iwi Resource Management	17	WQ 8B	The non-consumptive take and associated works represent an efficient use of water, and has been discussed extensively with tangata whenua.
Matters of National Importance	19	MN 8B	The effects of the non-consumptive take and disturbance of the river bed on the natural character of the river and its margins have been assessed as acceptable.
Water Quantity	30	WQ 2A, WQ 3B, WQ 8B	The non-consumptive take for hydro use will only affect water quantity for the short stretch of stream between the intake and the discharge. The effects on this stretch of the river have been assessed as acceptable. The consumptive take for domestic use is within permitted limits.

Overall, the proposal is considered to be consistent with the Operative RPS, and actively implements objectives and policies relating to renewable energy.

8.1.4 Regional Plan

The RWLP addresses the sustainable management of land and water resources within the region, with additional and amended provisions contained in PC9. Key issues contained in the objectives and policies from the RWLP and PC9 that are relevant to the proposal are considered in the assessment of effects at Section 7 of this report. These relevant objectives and policies are listed in Table 6.

Table 6: Relevant Objectives and Policies of the RWLP and PC9

Issue	Relevant objectives	Relevant policies	Comment
Regional Water and Land Plan			
Kaitiakitanga	4	11, 13, 19	The non-consumptive take and associated works represent an efficient use of water, and has been discussed extensively with tangata whenua.
Integrated Management of Land and Water	13, 22	32	The effects of the non-consumptive take on water quality have been assessed as acceptable. The take will provide for the social and economic wellbeing of the applicant and represents development of renewable energy source.
Water Quantity and Allocation	39, 40, 42	66, 68A, 71, 73	The proposal is an efficient use of water resources, removing the water from only a short section of the river and providing for the development of hydroelectric electricity generation as a renewable energy source. The non-consumptive take for hydro use will only affect water quantity for the short stretch of the river between the intake and the discharge. The effects on this stretch of stream have been assessed as acceptable.
Beds of Rivers, Streams, Lakes and Wetlands	55, 57, 58	98, 99, 100,	The effects of the non-consumptive take and disturbance of the river bed on the natural character of the river and its margins have been assessed as acceptable. The assessment found that the proposal will not affect the habitat and pathways of native fish, as there are significant natural barriers to fish passage downstream of the site.
Plan Change 9 - Region-wide Water Quantity			
Water Quantity	WQ 01, WQ 02, WQ 03, WQ 08	WQ P5, WQP10(d), WQ P13, WQ P15	The proposal is an efficient use of water resources, removing the water from only a short section of the river and providing for the development of a renewable energy source for domestic use. The proposal provides for social and economic benefits of the applicant. The non-consumptive take for hydro use will only affect water quantity for the short stretch of the river between the intake and the discharge. The effects on this stretch of stream have been assessed as acceptable.

Overall, the proposal is considered to be consistent with the RWLP and PC9, given that the take affects only a small section of the river, and the effects on this section are assessed to be acceptable.

8.2 Part 2 - Purpose and Principles of the RMA

BOPRC's consideration of the resource consent application under section 104 of the RMA is subject to Part 2 of the RMA. In Part 2, the purpose of the RMA in terms of Section 5(1) of the RMA is stated in section 5 as being to "promote the sustainable management of natural and physical resources" whilst avoiding, remedying and mitigating any adverse effects of activities on the environment. The RMA's purpose and principles are given practicable expression through policies and plans.

8.2.1 Section 5: Purpose of the RMA

The term “*sustainable management*” is defined in section 5(2)(a) to (c) of the RMA. In summary, it means managing resources in a way that enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety, while achieving specified bottom line environmental outcomes. The proposal represents development of renewable energy sources for domestic use, which will directly contribute to sustainable management.

In achieving section 5(1) of the RMA, section 5(2)(c) of the RMA states, in summary, that activities must be managed so that adverse effects on the environment are avoided, remedied or mitigated, and section 5(b) of the RMA requires the life-supporting capacity of air, water, soil and ecosystems to be safeguarded. The effects of the non-consumptive take and disturbance of the river bed on the natural character of the river and its margins have been assessed as acceptable.

Overall, the proposal is considered to be consistent with the purpose of the RMA under Section 5.

8.2.2 Section 6: Matters of National Importance

Section 6 of the RMA sets out those matters of national importance that are to be recognised and provided for in achieving the purpose of the RMA. Matters in section 6 that may be of relevance to the Project are considered to be those identified below:

- (a) *the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- (d) *the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- (e) *the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*

The effects of the non-consumptive take and disturbance of the river bed on the natural character of the river and its margins have been assessed as acceptable. Public access to and along the river margin will not be affected by the proposal. The non-consumptive take and associated works represent an efficient use of water, and has been discussed extensively with tangata whenua.

Overall, the proposal is considered to be consistent with the section 6 of the RMA.

8.2.3 Section 7: Other Matters

Section 7 of the RMA sets out those “other matters” that BOPRC is to have particular regard to in achieving the purpose of the RMA. Matters in section 7 that are considered to be of relevance to the Project are:

- (a) *kaitiakitanga:*
- (b) *the efficient use and development of natural and physical resources:*
 - (ba) *the efficiency of the end use of energy:*
- (c) *the maintenance and enhancement of amenity values:*
- (d) *intrinsic values of ecosystems:*
- (j) *the benefits to be derived from the use and development of renewable energy.*

The proposal has been discussed extensively with tangata whenua, and an attempt has been made to take account of their views. The non-consumptive take is an efficient use of the water resource, and contributes to the efficiency of energy use and the development of renewable energy. The effects of the non-consumptive take and disturbance of the river bed on amenity values and ecosystems have been assessed as acceptable.

Overall, the proposal is considered to be consistent with the section 7 of the RMA.

8.2.4 Section 8: Treaty of Waitangi

Section 8 of the RMA, in summary, requires all persons exercising functions and powers under the RMA to take into account the principles of the Treaty of Waitangi. BOPRC, in this context, must weigh the matter of Treaty obligations with other matters that are being considered. The wording “shall take into account” requires decision makers to consider the principles of the Treaty with all other matters. The proposal is not considered to be inconsistent with the principles of the Treaty.

9 Conclusion

The Newsom Family Trust (the Applicant) seek resource consent from Bay of Plenty Regional Council (BOPRC) to take water from the Waipapa River for the purposes of a micro-hydro scheme, and to undertake associated works in the bed of the river. The main purpose of this take is for power generation for their new dwelling. A small additional take will be used to supplement collected rainwater as a water source for the property. There will be less than minor effects from this project overall.

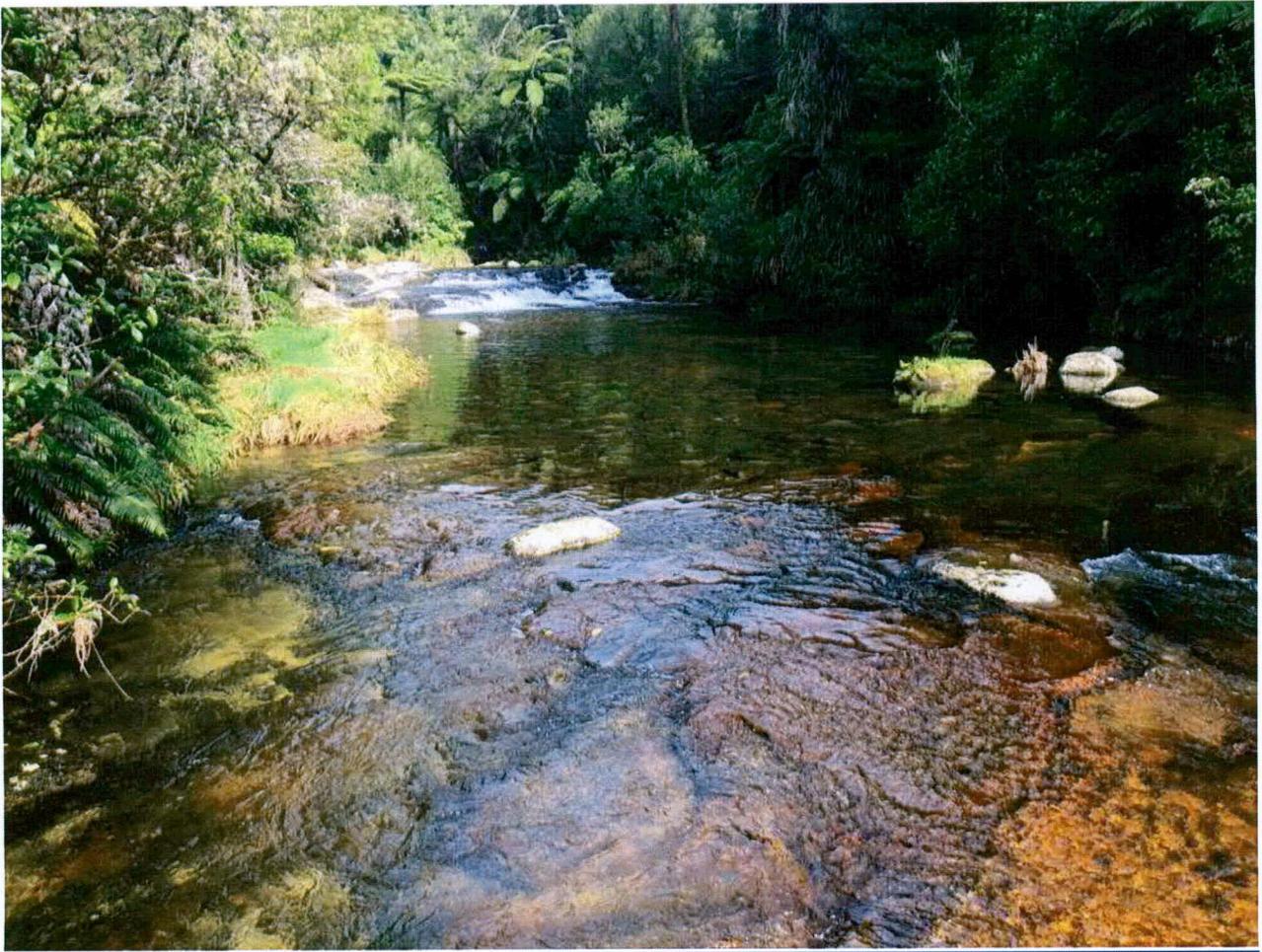
The works require resource consent from BOPRC as a discretionary activity.

The assessment of effects concluded that any adverse effects associated with the proposal will be avoided, remedied, or mitigated to an acceptable level. No parties are considered to be affected. However, given the sensitivity of water allocation issues to tangata whenua and in light of the consultation undertaken to date, the Applicant requests public notification of this application pursuant to section 95A(2)(b) of the RMA.

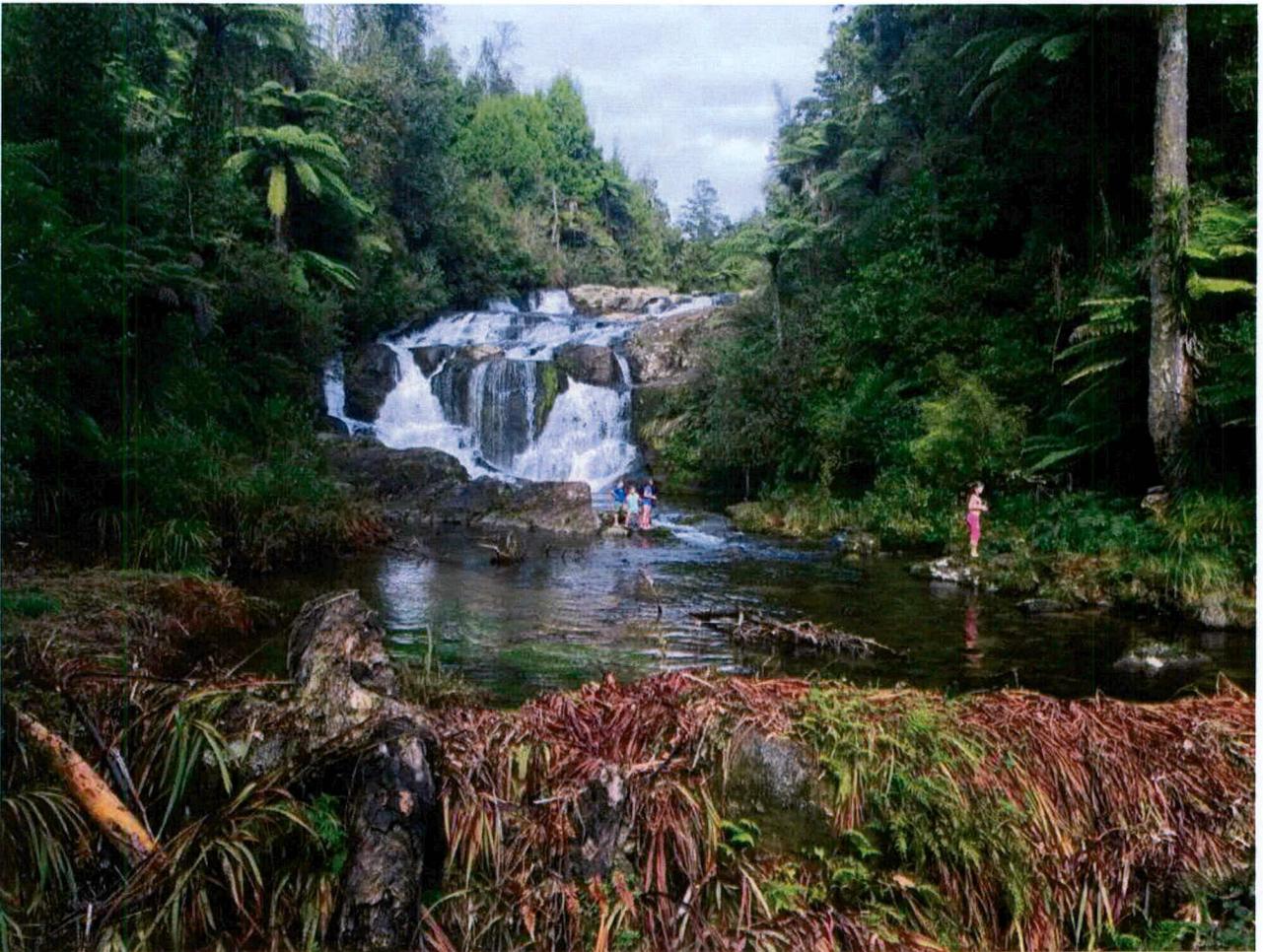
The assessment of the proposal against the relevant statutory planning framework concluded that the proposal is in accordance with relevant plans and policies, and is consistent with Part 2 of the RMA.

In light of the above, we consider that BOPRC can process and approve this application.

Appendix 1: Photos for planning, design and benefit of people assessing the site



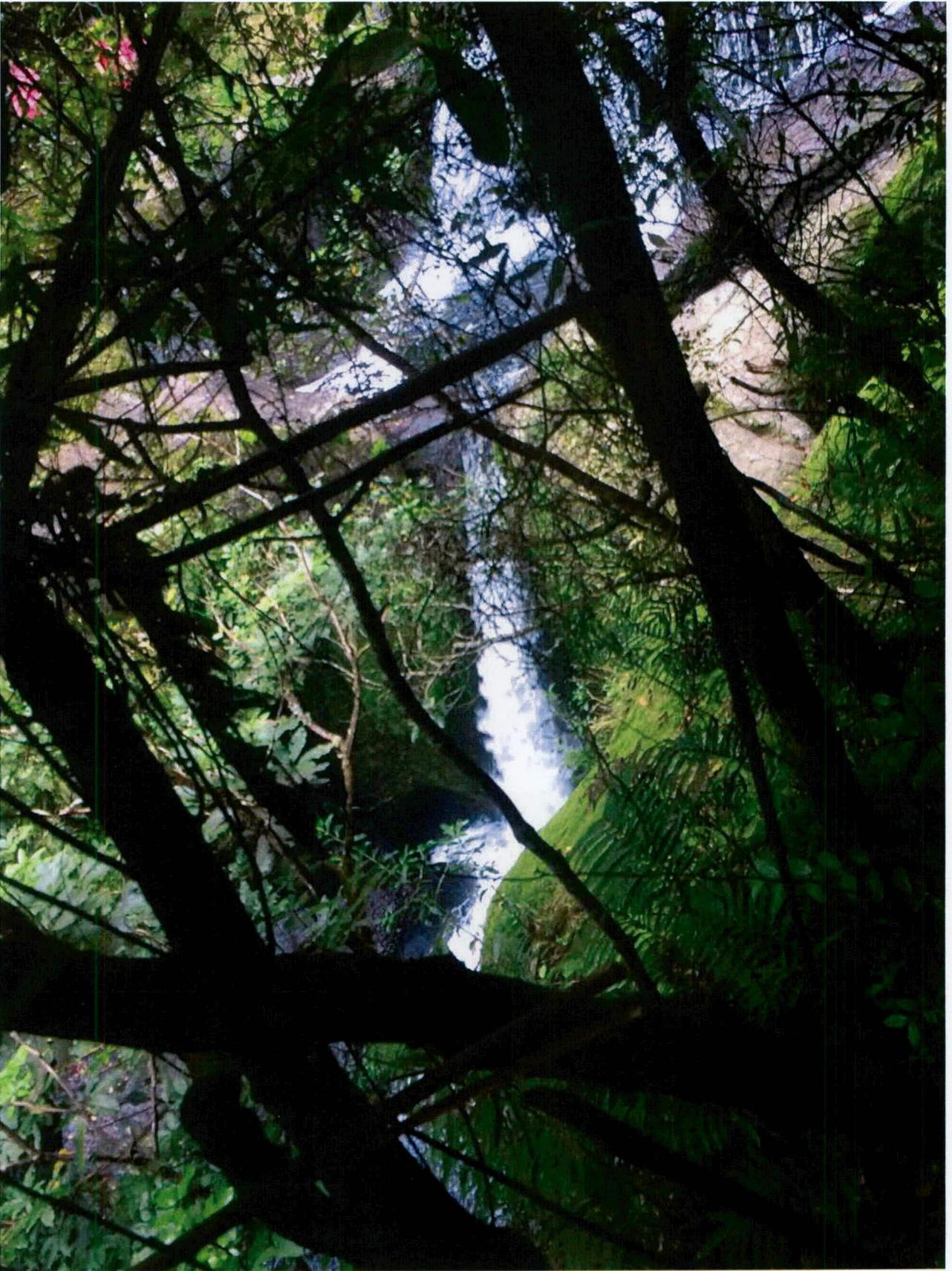
Looking upstream from the top of the waterfall



Looking from downstream back up at the waterfall



Lower waterfall with its “jet” of water in “lower flow”



Lower waterfall in “lower flow”



Lower waterfall in "higher flow"



Lower waterfall in "higher flow"



Typical images close up in river – winter



Typical images close up in river – winter



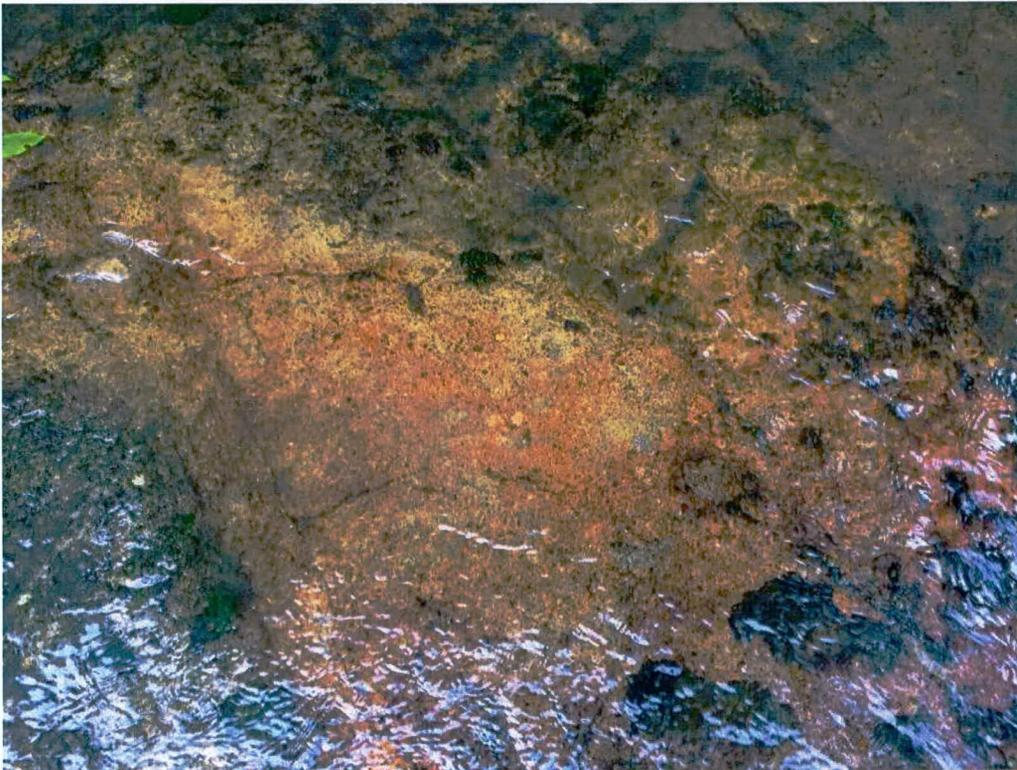
Typical images close up in river – winter



Typical images close up in river – winter



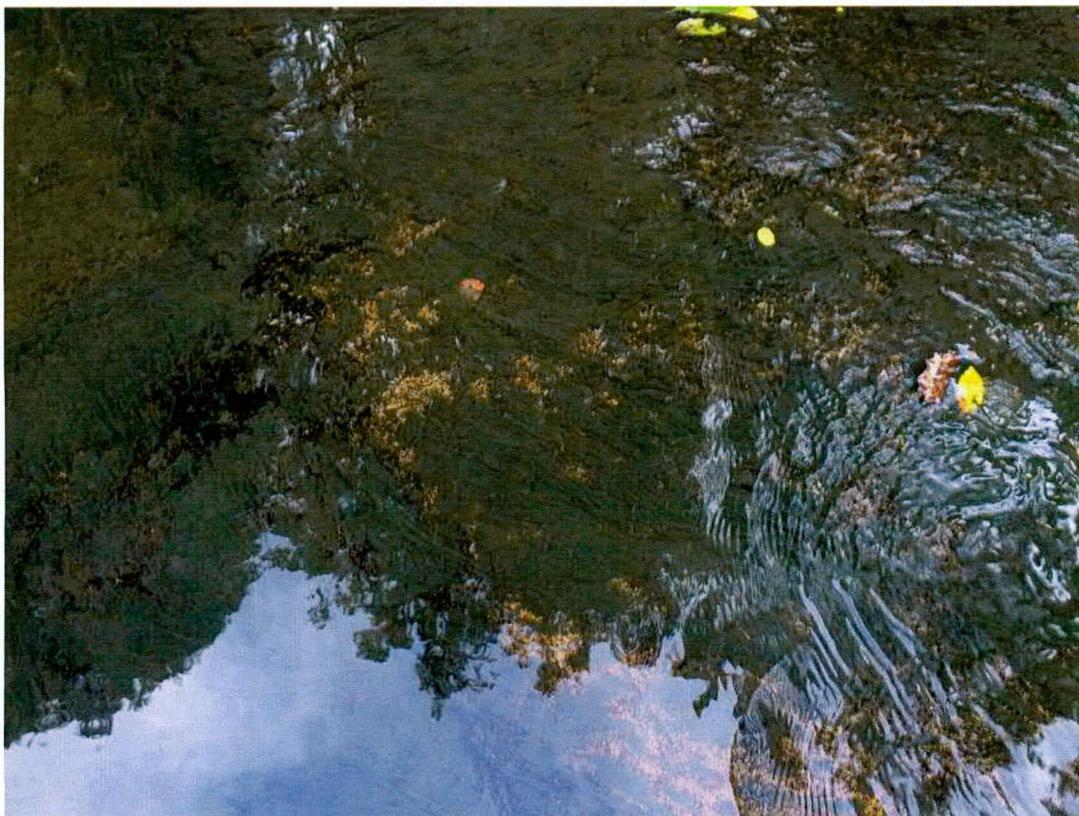
Typical images close up in river – winter



Typical images close up in river – winter



Typical images close up in river – winter



Typical images close up in river – winter

Appendix 2: Report from Mike Joy**ASSESSMENT OF EFFECTS ON FISH PASSAGE OF PROPOSED MICRO-HYDRO ON WAIPAPA STREAM TAURANGA****BACKGROUND - evidence of expertise**

1. My full name is Michael Kevin Joy, I hold a BSc, MSc (1st Class Hons) and a PhD in Ecology from Massey University. For the last twenty years I have been a researcher in freshwater ecology, especially native fish distribution and freshwater bioassessment. I have been employed at Massey University Palmerston North since 2003 as a lecturer, now Senior Lecturer, in Ecology and Environmental Science.

1.1 In the last fifteen years I have published more than 20 peer-reviewed scientific papers on freshwater ecology and bioassessment, mostly in relation to New Zealand freshwater fish, and the majority of these papers are published in international journals. I have published five book chapters and a book on native fish, bioassessment and freshwater environmental degradation. I have also published many reports for about half the regional councils in the New Zealand, and have supplied software to run the bioassessment models I developed for these regions.

- i. My areas of expertise are bioassessment of water and habitat quality in flowing waters, especially in relation to freshwater fish, and spatial distributional modelling using Geographic information systems (GIS).
- ii. I am a member of the New Zealand Freshwater Sciences Society, the New Zealand Ecological Society, the Australian Society of Fish Biology and the New Zealand Royal Society.
- iii. I have supervised more than 17 postgraduate (honours, Masterate and PHD) student research projects mostly directly related to freshwater ecology and bioassessment.
- iv. I was awarded the New Zealand Ecological Society Ecology in Action Award in 2009 and the Royal Society Charles Fleming Award for Environmental Achievement in 2014.
- v. I have refereed scientific manuscripts for at least 9 journals and one book.

- vi. I have been involved in a number of hearings in relation water quality, freshwater fisheries, fish distribution, river ecology and instream habitat.
2. I have been involved in multidisciplinary teams to develop national protocols for freshwater habitat and ecological function assessment and fish surveying².
3. I have been involved in native fish passage issues in relation to dams and fish barriers on regional and national scales³ and in relation to particular dams⁴. I have helped design two fish passes in the Wellington region on Silver Stream and the Wharemauku Stream for Greater Wellington Regional Council.

Details of publications are available here:

<http://www.massey.ac.nz/massey/expertise/profile.cfm?stref=851830>

² Joy, M. K., B. O. David, and M. D. Lake. 2013. New Zealand Freshwater Fish Sampling Protocols: Part 1- Wadeable Rivers and Streams. Massey University, Palmerston North.

Harding, J. S., J. E. Clapcott, J. Quinn, J. W. Hayes, M. K. Joy, R. G. Storey, H. S. Greig, T. James, M. A. Beech, A. S. Ozane, A. S. Merideth, and I. K. G. Boothroyd. 2009. Stream Habitat Assessment Protocols for wadeable rivers and streams of New Zealand University of Canterbury, Christchurch.

Rowe, D. K., S. Parkyn, J. Quinn, K. Collier, C. Hatton, M. K. Joy, J. Maxted, and S. Moore. 2009. A Rapid Method to Score Stream Reaches Based on the Overall Performance of Their Main Ecological Functions. *Environmental Management* **43**:1287-1300.

³ Joy, M. K., and R. G. Death. 2000. Development and application of a predictive model of riverine fish community assemblages in the Taranaki region of the North Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research* **34**:243-254.

Joy, M. K. 1999. Freshwater fish community structure in Taranaki : dams, diadromy or habitat quality? : a thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in Ecology at Massey University, Palmerston North. M. Sc. Massey University.

Joy, M. K., and R. G. Death. 2001. Control of freshwater fish and crayfish community structure in Taranaki, New Zealand: dams, diadromy or habitat structure? *Freshwater Biology* **46**:417-429.

Joy, M. K., and R. G. Death. 2002. A discriminant analysis investigation of reference site fish assemblages in the Manawatu-Wanganui region, North Island, New Zealand. *Verhandlungen der Internationalen Vereinigung fur Theoretische und Angewandte Limnologie* **28**:319-322.

Joy, M. K., I. M. Henderson, and R. G. Death. 2000. Diadromy and longitudinal patterns of upstream penetration of freshwater fish in Taranaki, New Zealand. *New Zealand Journal of Marine and Freshwater Research* **34**:531-543.

Tonkin, J. D., R. G. Death, and M. K. Joy. 2009. INVERTEBRATE DRIFT PATTERNS IN A REGULATED RIVER: DAMS, PERIPHYTON BIOMASS OR LONGITUDINAL PATTERNS? *River Research and Applications* **25**:1219-1231.

⁴ Joy, M. K., and R. G. Death. 2002. The potential for enhancement of fish communities of a fish pass on the Orongorongo Intake Dam. A report to the Wellington Regional Council., Massey University, Palmerston North.

Atkinson, N., and M. K. Joy. 2007. A Comparative Assessment of Three Prospective Dam Sites. Massey University, a report to wellington regional council.

ASSESSMENT OF EFFECTS OF PROPOSED MICRO-HYDRO

4. I was asked by the Andrew Newsom to assess the fish passage issues in relation to their application for Micro-Hydro property at 619A Esdaile Rd, Whakamarama, in the Western Bay of Plenty (NZTM 1862083.94, 5824099.22). The hydro would mean that approximately half the mean annual low flow (based on modelled flow from BOP regional council Ref 7.00184). Mean annual low flow (MALF) at the proposed site is 155 l/s and the maximum take for 6 turbines is 78l/s thus it would be at most approximately 50% of MALF.
5. I visited the site on 24th June 2016, with the applicant and looked at the waterfall where they they plan to install the hydro and then inspected the stream downstream. Approximately 100 meters downstream I inspected another substantial waterfall.
6. At the time of the visit the flow was high after significant rainfall but due to good riparian cover in the catchment the water was still running clear and I was able to get a good look at the face of the waterfalls to assess their potential to restrict fish passage.
7. The waterfall where the micro-hydro water is proposed to be sited is the waterfall that will be influenced by the planned water take. In reality of course, the water is “borrowed” from above and delivered back in at the bottom so only taken from the waterfall. Thus my job was to assess how the reduction of flow would affect fish passage up and down the waterfall. To do this I need to know which particular fish species would be likely to require passage up the waterfall and in what numbers given a maximum 50% reduction in flow.
8. Close inspection of the lower waterfall approximately 100m downstream from the proposed Hydro site revealed that this lower waterfall is the key to this assessment because it is substantially more of a barrier than the hydro site waterfall. The water is forced into a chute, a narrow (approximately 2m wide) gap with almost vertical rock sides and this forces the water to blast down a narrow cascade (Figure 1). The rock sides and high velocity would make this very difficult if not impossible for most native fish species to climb up. The only species possibly able negotiate this would be eels (*Anguilla* spp.) and the Galaxiid koaro (*Galaxias brevipinnis*). The juvenile eels (elvers) can move around the edges away from the flow over moss. While more species could negotiate steep rock face

they would be forced by the steep rock sides to then have to get through the velocity barrier of the chute of fast flowing water at the top.



Figure 1. The lower waterfall approximately 100m below proposed hydro site.

FRESHWATER FISH DISTRIBUTION IN THE CATCHMENT FROM THE NEW ZEALAND FRESHWATER FISH DATABASE

9. Inspection of the freshwater fish database (accessed 08/07/2016) revealed that the two site records above the waterfalls on the Newsom property only contained eels (Figure 2). A sample site at a similar elevation to the proposed site on a tributary that joins the Waipapa below the waterfalls contained banded kokopu as well as eels. These records support my assessment that the waterfalls severely limit fish migration.

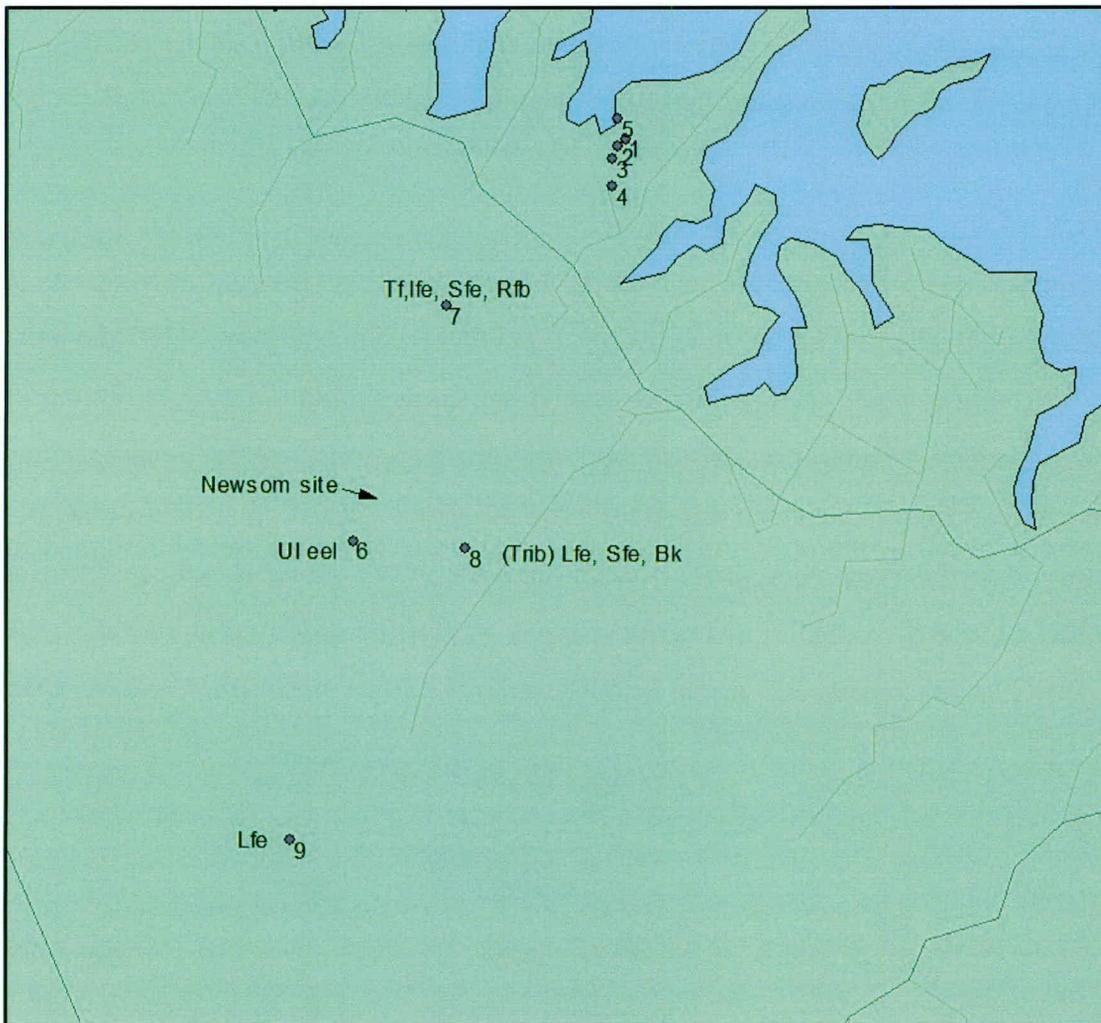


Figure 2 NZFFDB sites on the Waipapa Stream in the vicinity of the proposed site Accessed 08/07/2016. The cluster of sites close to the sea contained the usual lower fish fauna, eels, inanga banded kokopu and bullies. Abbreviation details: Lfe = longfin eel, UI = unidentified, Trib = tributary, Sfe = shortfin eel, Tf = torrentfish, Rfb = redfin bully, BK = banded kokopu.

10. Given that the lower waterfall would severely limit the species and numbers of migratory fish then the taking of half of the flow from the waterfall for the hydro is much less of an issue than if there were free fish access to this point. The flow reduction down the hydro site waterfall would not in my opinion be an issue given the reduced fish number and species but also because its less steep almost stepped shape. The lower gradient and pools giving resting and refuge from predation places would still be available even after flow reduction.

11. The only other issue for native fish would be the intake structure and the mesh size must be no larger than 3mm to exclude elvers and juvenile galaxiids⁵

SUMMARY

12. The proposed micro-hydro would have minimal or no impact on freshwater fish passage because there is a natural barrier downstream that would mean only two species the most specialist climbers would require passage as all other species could not get upstream past the lower waterfall. The freshwater fish database records support my assessment as only eels have been found above the waterfalls. The other specialist climber (koaro) has not been found in the catchment so may not be present at all. Downstream passage for migrating adult eels would not be impacted in any way by the proposed water take. The risk of juvenile eels or galaxiids would be mitigated by having a mesh size no greater than 3mm.

⁵ <http://www.doc.govt.nz/Documents/conservation/native-animals/Fish/fish-passage/fish-screen-guidelines.pdf>

Appendix 3: Powerspout Manual

See following for manual - PDF:

<http://www.powerspout.com/assets/Published/public/PLT/PLT-Manuals/PS-manual-May-2014.pdf>

Appendix 4: Flow rates supplied by the council:

Your Ref: P/1186/200/2
Our Ref: 7.00184

COPY FOR YOUR
INFORMATION



18 January 2016

Anna Price
Western Bay of Plenty District Council
Private Bag 12803
Tauranga Mail Centre
Tauranga 3143

Dear Anna

Application for Resource Consent: AL & BJ Newsom, 619A Esdaile Road, Whakamarama

Thank you for your letter of 29 December 2015 regarding the above application for resource consent.

Bay of Plenty Regional Council Toi Moana makes the following comments on the application:

Regional Water and Land Plan

For the take and use of surface water to be a permitted activity the applicant should ensure they comply with Rule 41 (Take and Use of Surface Water) of the Regional Water and Land Plan (RWLP). Rule 52 (Surface Water Intake Structures) of the RWLP allows the installation of a water take structure in a river, stream or lake that meets a set of conditions. Otherwise resource consent from the Bay of Plenty Regional Council is required.

It should be noted that Rule 41(c) requires that the rate of abstraction shall not exceed 2.5 litres per second or 10% of the estimated 5 year low flow (Q5 7 day low flow) at the point of abstraction or whichever is lesser. Please refer to the information below regarding the flow rates of the stream surrounding the property as this may impact where the surface water intake structure is place.



Figure 1: Property boundaries as identified in the AEE, showing three potential reaches

A2264891

5 Quay St, PO Box 364, Whakatāne 3158, New Zealand 0800 884 880 0800 884 882 info@boprc.govt.nz www.boprc.govt.nz

Application for Resource Consent, AL & BJ Newsom, 619A Esdaile Road, Whakamarama

18 January 2016

2

Reach (NZReach)	Mean flow (l/s)	MALF (l/s)	Permitted take (10% of MALF)	Percentage allocated relative to permitted (at 5.76 l/s)
Reach 1 (4001040)	29	5	0.5	1052% (over)
Reach 2 (4001041)	555	155	15.5	62% (under)
Reach 3 (4000989)	607	170	17.0	66% (under)

Table 1: List of NZ Reach numbers for the three rivers as shown in figure 1, showing the modelled mean flow, and MALF, as well as permitted takes (based on 10% MALF). Also shown is the percentage of MALF taken by the proposed scheme at 15 m³ per day

Please contact Richard Lyons (Consents Officer) at the Bay of Plenty Regional Council for any queries regarding this matter.

Significant Ecological Feature

Bay of Plenty Regional Council suggests the following conditions with respect to the significant ecological feature:

- The vegetation disturbance/earthworks may only be undertaken using hand tools, no machinery (e.g. diggers) are permitted within the Significant Ecological Feature.
- The spatial extent of vegetation disturbance/earthwork must be kept to the minimum required and no greater than 1m in width.
- No felling or damage to mature trees, or disturbance of the bush canopy is permitted.
- If the branches of any trees with a DBH greater than 20cm are to be removed, the branches must be surveyed by a bat ecologist no more than two days prior to the works being undertaken to ensure that the trimming location is not being actively used by long-tailed bats for roosting and/or feeding.
- All equipment and materials being used in the covenant area must be cleaned and thoroughly inspected to minimise the potential for weed seeds and plant materials to be introduced to the Significant Ecological Feature.

Please contact Shay Dean (Environmental Scientist) at the Bay of Plenty Regional Council for any queries regarding this matter.

Fish passage

The applicant will need to ensure there is adequate fish passage above and below any structures placed in the stream and that young fish are not entrained into any pumping apparatus etc. However, from the information provided by the applicant, given the small size of the pipes to be used and the fact that adequate screens will be in place it seems as these issues may be of little concern.

Please contact Alastair Suren (Environmental Scientist) at the Bay of Plenty Regional Council for any queries regarding this matter.

A2284891

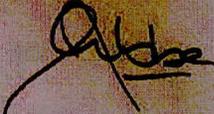
Application for Resource Consent: AL & BJ Newsom, 619A Esdaile Road, Whakamarama
18 January 2018

3

Decision

When this application is completed please forward a copy of your Council's decision to the Bay of Plenty Regional Council (attention Pam Crabbe) or by email to dac@boprc.govt.nz in accordance with section 8 of our agreed protocol.

Yours faithfully



Pam Crabbe
District Applications Coordinator

Copy to: AL & BJ Newsom
619A Esdaile Road
RD 8
Tauranga 3181

CRI Newsom

Appendix 5: Corrospondance from Pirirakau Incorporated Society



Pirirakau Incorporated Society

3 Lochhead Rd RD6

Te Puna

Tauranga 3174

Environment Manager – Julie Shepherd 0272 105 522

23 November 2016

AL and BJ Newsom Family Trust

Micro-hydro and Hydrostatic

Pump Project – Resource Consent Application

Tena koe Andrew,

Pirirakau cultural assessment of effects

Thank you for communicating your proposal of a Micro – hydro and hydrostatic pump project on the Waipapa River in the Bay of Plenty Region and within the tribal rohe *area* of Pirirakau hapu.

In my capacity as the Pirirakau Environment Manager, I have undertaken a review of your application to apply for a Discretionary Resource Consent to the consenting authority, the Bay of Plenty Regional Council for your project.

At this stage I regret to inform you, in forming this assessment of cultural effects. Pirirakau is not satisfied the proposal meets with our approval. I am supplying you with information relating to our concerns. In this response, which follows this letter, I outline our concerns against the information you have provided to me within your application, via email on the 11th November 2016.

Nga mihi

Julie Shepherd

Pirirakau Incorporated Society Environment

Manager pirirakau.hapu@gmail.com

Mobile: 0272105522

Pirirakau Assessment of Cultural Effects

AL and BJ Newsom Family Trust

Micro-hydro and Hydrostatic

Pump Project – Resource Consent Application

Contents

1. Cultural Effects	58
2. Purpose of the activity	58
2.2 Proposal site	59
3. Table of concerns	59
4. Conclusion.....	61

1 Pirirakau Cultural Effects

The Pirirakau cultural effects linked to your proposal, which we consider are more than minor have cultural impacts which must be addressed to ensure the preservation of taonga *natural resources* for future generations. The Pirirakau tribal rohe consists of many water bodies and they are imbued with close links to Pirirakau ancestors, events and traditional activities which includes a spiritual and physical interconnectedness of our people and the natural environment.

The Waipapa River is a stream⁶ and has traditionally been associated with Pirirakau for its spiritual connection, for ceremonial activities, historic uses, mahinga kai *food gathering*, collecting hangi rocks and various, recreation activities. Pirirakau view the length of the Waipapa as being embodied with mauri *life force*.

2 Purpose of the activity

The purpose of the activity is to create;

- Generation of electricity
- Back up water supply
- Future considerations of a dwelling (further consultation with Pirirakau will be required).

⁶ http://nz.geoview.info/waipapa_river,2180038

2.1 Proposal site

The proposal is situated within an area of protected covenanted bush. In addition, the Western Bay of Plenty District Plan identifies the site location as being located within and outstanding landscape feature (S6 Kaimai Ranges) and is a Significant ecological feature (U14/16 Waipapa River Bush). Considering the bush surrounds and the Waipapa River at the proposed site Pirirakau deem them intertwined as each natural element supports each other.

3 Table of concerns

The following table expresses concerns in relation to the site proposal/application we view as culturally significant.

3.1 Pipe location	Installation within the bush surround as described above in section 2.2. Introducing unnatural materials (PVC pipes, Steel stakes, within a protected natural environ being the adjacent bush and potential harm to native species root systems.
3.2 Water over allocation	<p>Currently water takes are over allocated in the Western Bay of Plenty District. Bay of Plenty Regional Council are currently undertaking a Region-wide Water Quantity -Proposed Plan Change 9 to the Bay of Plenty Regional Water and Land Plan⁷ (BOPRWLP).</p> <p>Notwithstanding Treaty of Waitangi obligations and its process for Māori rights in freshwater. Pirirakau preference is to put all water allocation consent applications on hold pending the relevant changes to the plan.</p>
3.3 Water take and discharge measuring	<p>The dual takes for hydroelectricity and back up water supply and single discharge require accurate recording mechanisms. The application does not give any evidence of methodology to inform an exact take or discharge volume. A solution to this aspect may be addressed by water metering and utilisation of the BOPRC water use data management system.</p> <p>However, this solution would not satisfy Pirirakau in the event of prior over allocation in the area.</p>
3.4 Water intake structure Creating a channel Disturbance of the river Bed 71 Discretionary	<p>Excavation of intake channel in river bed to direct flow to the intake structure on the river bank. The main activity within the river, the creation of a channel. This activity will involve the cutting of rock with powered tools. There is likely to be an electric concrete cutting type saw that will be water cooled. The other would be an electric chipping drill like a Kango hammer.</p> <p>Pirirakau will not support altering a water course, its flow or any activity which causes damage or disturbance to the mauri of the natural entity of the stream including insitu rocks.</p>

⁷ <https://www.boprc.govt.nz/media/569507/20161018-plan-change-9-track-changes-plan-change-v3-8-v2va3750055.pdf>

<p>3.6 Take surface water (hydro) 43 Discretionary</p>	<p>Take surface water from the river for micro-hydro scheme at up to 78 l/s.</p> <p>Pirirakau will not support a daily volume of 6,740m³ in an over allocated waterway, regardless of discharge volume. In addition, as the water take occurs the water is removed in a mauri quality state once discharged it will not retain the quality or mauri it had when it is removed from its parent body/natural entity.</p>
<p>3.7 Water intake mesh grilles</p>	<p>A mesh size covering the diameter is proposed initially at 5mm with a further downsize in the application to 3mm. The grilles may prevent juvenile aquatic species, eel, kokopu, koaro from entering the intake or turbines</p> <p>Pirirakau assert that the altered channel and higher force/flow of water directed to the intake renders the mesh grilles of serving</p>
	<p>one purpose, to not cause an obstruction within the intake. It does nothing to address protecting native species against the potential damage of force. It could be debated that rocks within the stream may have the same effect, the stream is their natural habitat and such habitat species have natural coping mechanisms i.e. slippery rock surfaces to ease the traverse of their passage.</p>
<p>3.8 Fish passage</p>	<p>Acknowledgement is given to the Assessment of effects on fish passage of proposed micro-hydro on Waipapa Stream Tauranga undertaken by Mike Joy.</p> <p>Pirirakau assert that it has been a tradition to harvest native species, eel, kokopu and others in the upper reaches of Waipapa.</p> <p>Pirirakau decline to accept the views of infrequent visitors to our ancestral water locations and their assumptions which are generally reinforced by desktop reviews. Such assumptions are generally incorrect.</p>
<p>3.9 Turbines and discharge structures</p>	<p>The proposed platform housing the turbines and outlets to the river will be constructed of timber and be secured to river bed rock by secure anchors in the rock. Solid foundations will be laid into the bush floor where necessary.</p> <p>Pirirakau will not support any structure which forms any physical structure over any part of the stream or causes any damage to the locale and its natural entity.</p>
<p>3.10 Further built structures</p>	<p>The generators will be housed on a wooden platform. There is likely to be a corrugated iron roof covering this to protect the generators from falling branches and general forest debris.</p> <p>To reiterate Pirirakau will not support built structures within a protected bush area or having any impact on the locale or its natural entity.</p>

4 Conclusion

Supplying the Pirirakau assessment of cultural effects against this application has required an indepth understanding of the application and thorough review. It is appreciated by Pirirakau that individuals are seeking renewable energy sources but we are opposed to any activity which has cultural environmental implications.

Pirirakau do not support or encourage any activity which has the potential to maximize cultural implications and impacts which set precedent in turn open floodgates to permit exhaustion of natural resources within the Pirirakau rohe.

Appendix 6: Correspondence back to Pirirakau Incorporated Society

Julie Shepherd
 Pirirakau Incorporated Society
 Environment Manager
 pirirakau.hapu@gmail.com
 Mobile: 0272105522

24/1/17

Dear Julie,

Thank you for your response to our proposal and the time you have taken responding to it. I apologise in the delay in getting back to you.

The proposal is in the main to generate power for a private dwelling. We have had a dream for a long time of living "off the grid" and will only generate the power we need. We do not intend to sell power back to the grid. We are seeking to do this in an environmentally sound way with minimal impact on the environment. We are using generators that are made from 80% recycled materials and will be thoughtful in anything we do in relation to the project. We maintain our protected bush to a high standard and are keen to keep it this way if we are successful in this project. We would like to share this project with our 4 children and show them how you can connect with the environment and use something that occurs naturally and work alongside nature to produce something beneficial without harming what is around you. I think this is very special and unique to be able to do this and is while we feel passionately about this project.

While it is disappointing that the initial proposal is not acceptable in its current form I would like to take the opportunity to respond to some of your points and see if we can work with you to make this proposal acceptable to you, the Pirirakau Incorporated Society and its members.

I have responded in blue below.

I would also like to provide information relating to a similar project in Rotorua by Kearoa Marae.

Some of the following is taken from supplied articles.

The iwi there decided to harness the nearby Pokaitu Stream behind the marae and divert the water flow through a culvert to three turbines and generate power. Potaiku Stream, and other nearby waterways, have been historically, spiritually and culturally significant to the iwi for more than 100 years reported Eugene Berryman-Kamp. Ngati Kearoa Ngati Tuara is one of three iwi involved in the Te Arawa River Iwi Trust assigned to help restore the Waikato River, he says. The trust is involved in sustainable use of natural resources which fits well with the idea of installing a hydro power unit, Eugene says. "It's not a complicated process to generate our own electricity and become independent of the national grid. "We wanted to achieve sustainable energy generation with minimal environmental impact," he says. – [from attached article - By Mike Watson Friday Mar 28, 2014.

We are requesting with this proposal to do the same as the Te Arawa River Iwi Trust. We embody the same ideals as them and also would like to generate power with minimal environmental impact.

You could say they have set a precedent for this type of project by placing a micro hydro scheme in sensitive areas as have others around the country. However there are micro-hydro schemes dotted around the country and I should think some of these are in sensitive areas too. They have carried out extensive earthworks and diverted a large amount of the flow of the river used to generate power. We are proposing a much smaller scale project with minimal effects on the environment. I am sure this information will be of interest to you. Please see the attached documents. These can be readily found by searching with Google.

Another long standing hydro project in the Bay of Plenty is the at the Ngatuhua Lodge in Kaimai Mamaku Forest Park. This is run off hydro power and is another excellent example of how it can work in a National Forest Park. This is a accepted power generation facility using very similar principals to what we propose. There are other schemes like this around the country and are very widely supported as they have a absolutely minimal effect on the environment and "use" no water!

I would also like to again invite you our site and any of your members who may be interested. I would be happy to meet with any of you to discuss the proposal. It is an exciting project that the Pirirakau Incorporated Society and it members should embrace not discourage.

We as yet have not submitted any information to the council so have no one involved there.

I look forward to your thoughts on the information provided.

Many thanks and kind regards

Andrew Newsom

AL and BJ Newsom Family Trust

619A Esdaile Rd, RD8, Tauranga 3180. 0211184456

Response to pointed made:

3.1 Pipe location Installation within the bush surround as described above in section 2.2. Introducing unnatural materials (PVC pipes, Steel stakes, within a protected natural environment being the adjacent bush and potential harm to native species root systems).

The department of conservation has been consulted and has reviewed the proposal and do not see any significant effects on the bush in the area proposed for our project. They have voiced no concerns regarding the installation. If we follow the guidelines as described in council rules to abide by (Bay of Plenty Regional Council) then we will have less than minor impact on the bush area.

Material have been chosen so they will have less than minor impact on the water and the environment. We will use almost identical generators to those used by Kearoa Marae and our structures that we will be placing in the bush and river area will be very small in size in comparison.

The stakes will be small. A steel stakes represents the strongest smallest size material we can use to fix structures in place. They will have the least chance of damaging the bush compared to other materials. If you have a suggestion for another material we could use that would be more suitable then we would be happy to consider it.

Polyvinyl chloride (PVC) pipe is made from a plastic and vinyl combination material. The pipes are durable, hard to damage, and long lasting. They do not rust, rot, or wear over time. For that reason, PVC piping is most commonly used in water systems. Most of us will drink water that has been through a PVC pipe. We chose this material because of these properties.

I would be grateful if you have any other suggestions relating to materials that may be acceptable. We would happily consider other material if they are suitable.

3.2 Water over allocation Currently water takes are over allocated in the Western Bay of Plenty District. Bay of Plenty Regional Council are currently undertaking a Region-wide Water Quantity -Proposed Plan Change 9 to the Bay of Plenty Regional Water and Land Plan2 (BOPRWLP). Notwithstanding Treaty of Waitangi obligations and its process for Māori rights in freshwater. Pirirakau preference is to put all water allocation consent applications on hold pending the relevant changes to the plan.

I refer to rule 41:

Rule 41 Permitted – Take and Use of Surface Water

Except as provided for under s14(3)(b) of the Act, the take and use of water from any surface water body, where the water has a temperature of less than 30^o Celsius and the quantity taken does not exceed 15 cubic metres per day per property is a permitted activity subject to the following conditions:

etc

We will not exceed the permitted take of water as set out in rule 41. We do not intend to take water unless absolutely necessary as we will have 2 x 30,000L water tanks collecting rainwater for our property. The hydrostatic pump that we may install is a back up water supply for us.

Technically though we “take” water for the micro-hydro scheme but will return 100% of it.

3.3 Water take and discharge measuring The dual takes for hydroelectricity and back up water supply and single discharge require accurate recording mechanisms. The application does not give any evidence of methodology to inform an exact take or discharge volume. A solution to this aspect may be addressed by water metering and utilisation of the BOPRC water use data management system. However, this solution would not satisfy Pirirakau in the event of prior over allocation in the area

As notes above in 3.2, We will not exceed the permitted take of water as set out in rule 41. We do not intend to take water unless absolutely necessary as we will have 2 x 30,000L water tanks collecting rainwater for our property. The hydrostatic pump that we may install is a back up supply for us.

Council may ask us to measure water use which we would be happy to do. All water taken by the micro-hydro scheme will be returned to the Waipapa river. I believe water measurement is already happening with other schemes in other areas so it is a tested a proven method to check what water is being “taken”.

I would be grateful if you could advise us of a measuring set up that would satisfy Pirirakau if the council suggested one is not acceptable.

3.4 Water intake structure Creating a channel Disturbance of the river Bed 71 Discretionary Excavation of intake channel in river bed to direct flow to the intake structure on the river bank. The main activity within the river, the creation of a channel. This activity will involve the cutting of rock with powered tools. There is likely to be an electric concrete cutting type saw that will be water cooled. The other would be an electric chipping drill like a Kango hammer. Pirirakau will not support altering a water course, its flow or any activity which causes damage or disturbance to the mauri of the natural entity of the stream including insitu rocks.

The department of conservation have been advised there will be minor works on the river bed. They do not have issues with this minor works on the river bed.

Other similar schemes have made significant changes to water flow in sensitive areas as previously noted - I have attached information about a similar scheme nearby. There are many other similar schemes around the country that have less than minor effects. We feel this minor change to the river bed will have less than minor effect of the river and will have less than minor disturbance to the mauri of the natural entity of the stream including insitu rocks. The project in Rotorua made significant changes to the landscape that were acceptable to the iwi there. I assume they must have accepted the disturbance to the mauri of the natural entity of the stream including insitu rocks was less than minor and gone ahead with the project.

3.5 – no pointed identified.

3.6 Take surface water (hydro) 43 Discretionary Take surface water from the river for micro-hydro scheme at up to 78 l/s. Pirirakau will not support a daily volume of 6,740m³ in an over allocated waterway, regardless of discharge volume. In addition, as the water take occurs the water is removed in a mauri quality state once discharged it will not retain the quality or mauri it had when it is removed from its parent body/natural entity.

All the water will be returned over a very short distance as noted in the proposal. The waterway maybe over allocated but we are not "taking" water and keeping it. We are returning it after a short distance. The water will only pass through PVC pipes and the proposed generators.

Is there anything you can suggest that we can do in regard to the effect on the quality or mauri of the water to help with this application? Any suggestions would be welcomed.

3.7 Water intake mesh grilles. A mesh size covering the diameter is proposed initially at 5mm with a further downsize in the application to 3mm. The grilles may prevent juvenile aquatic species, eel, kokopu, koaro from entering the intake or turbines Pirirakau assert that the altered channel and higher force/flow of water directed to the intake renders the mesh grilles of serving one purpose, to not cause an obstruction within the intake. It does nothing to address protecting native species against the potential damage of force. It could be debated that rocks within the stream may have the same effect, the stream is their natural habitat and such habitat species have natural coping mechanisms i.e. slippery rock surfaces to ease the traverse of their passage.

I refer to rule 52:

Rule 52 Permitted – Surface Water Intake Structures

The use, erection, reconstruction, placement, alteration and extension of a surface water intake structure in, on, under or over the bed of a river, stream or lake, and associated bed disturbance, is a permitted activity subject to the following conditions:

- (a) The structure shall not include an infiltration gallery in the bed of a surface water body.
- (b) The structure shall not restrict the cross-sectional area by more than five square metres, or 5 percent of the width of the river, stream, or lake; whichever is the lesser.
- (c) The intake structure shall be screened with a mesh aperture size (i) Not exceeding three (3) millimetres in the tidal areas or river and streams. (ii) Not exceeding five (5) millimetres or five (5) millimetre diameter holes in any other area that is not in the tidal area of a river or stream.
- (d) No works shall be carried out in the wet part of the bed in the tidal reaches of rivers and streams, between 1 March and 31 May. 1 December 2008 Bay of Plenty Regional Water and Land Plan Regional Rules 265
- (e) The disturbance of the bed of the water body and release of sediment resulting from the construction of the structure shall not occur for a period greater than: (i) A total period of 48 consecutive hours per structure in any water body listed in Schedule 1. (ii) A total period of five (5) consecutive days per structure in a water body not otherwise covered by (i).
- (f) No works shall be undertaken in the bed of a water body listed in Schedule 1D between 1 May and 30 August.
- (g) No works shall be undertaken in the bed of a water body listed in Schedule 1A between 15 August and 15 October.
- (h) All practicable steps shall be taken to avoid, remedy or mitigate the release of sediment during construction of the structure, and no clearly discernible change in the visual clarity of the water shall occur beyond a distance of 100 metres downstream of the activity site.
- (i) The disturbance of the bed shall be limited to the extent necessary to carry out the activity.
- (j) The activity shall not cause or induce erosion of the bed or banks of any surface water body. Erosion includes: (i) Instability of land or the banks of the surface water body. (ii) Scour to the bed of the surface water body.
- (k) The activity shall not disturb vegetation in a wetland, or change the water flow or quantity, or water quality in a wetland.
- (l) The activity shall not prevent the passage of migrating fish.

(m) The activity shall not compromise the structural integrity of use of any other authorised structure or activity in the bed of the stream, river or lake, including flood control works in River Scheme Works Areas (defined in Schedule 5).

(n) The activity shall not cause a hazard to navigation in navigable rivers and lakes.

(o) The activity shall not alter the natural course of the river.

(p) All machinery shall be kept out of the bed of the stream, river or lake where practicable.

(q) No machinery refuelling or fuel storage shall occur at a location where fuel can enter any water body.

(r) All practicable measures shall be taken to avoid vegetation, soil, slash or any other debris being deposited into a water body or placed in a position where it could readily enter or be carried into a water body.

(s) The structure shall at all times be maintained in a sound condition for the purpose for which it was constructed, and be kept clear of accumulated debris.

(t) The structure shall be constructed to ensure that the structure cannot break free and cause a blockage or erosion.

(u) Approaches and abutments shall be stabilised, and appropriate water controls installed, to protect against erosion.

(v) Structures in, on or over the beds of lakes shall be designed and constructed to account for natural lake water level fluctuations.

(w) Following the completion of construction, all excess construction materials and equipment shall be removed from the bed of the stream, river or lake.

(x) No contaminants (including, but not limited to, oil, hydraulic fluids, petrol, diesel, other fuels, paint, solvents, or anti-fouling paints), excluding sediment, shall be released to water from the activity.

Explanation/Intent of Rule To allow minor structures for the take and use of surface water. This rule links to Rule 41 (permitted surface water takes), but may also be used for structures associated with consented surface water takes. A surface water intake structure is a structure specifically for the take of water from a stream, river or lake, and is not a culvert (which is a stream crossing structure). Condition (c)(i) is more restrictive to address adverse effects on whitebait.

My understanding is that if the above rule is adhered to there should be no effect on aquatic life in the river. I believe this is NZ game and fish and Mike Joy's opinion also.

3.8 Fish passage Acknowledgement is given to the Assessment of effects on fish passage of proposed micro-hydro on Waipapa Stream Tauranga undertaken by Mike Joy. Pirirakau assert that it has been a tradition to harvest native species, eel, kokopu and others in the upper reaches of Waipapa. Pirirakau decline to accept the views of infrequent visitors to our ancestral water locations and their assumptions which are generally reinforced by desktop reviews. Such assumptions are generally incorrect.

The area where the structure is being proposed is difficult to get to. A steep bank needs to be navigated. The proposed scheme involves the "take" and return of water over a waterfall. This should have less than minor impact on fish passage and native species in the stream. The waterfalls in the area including the one for the proposed site are a large barrier to fish passage themselves. If the water "take" was to be over an extended distance then I could accept the point you have made. The view by Dr Mike Joy is that will be no effect on fish passage. There is no view in the report or identified by NZ Game and Fish that there will be any impact on native species in the area.

Harvesting of native species should not be affected by the proposed project.

In my proposal regarding infrequent visitors, I was referring only to the site of the proposed hydro scheme and not the area and river in general. I apologise if it read otherwise. This site is not easy to get to so I assume it would unlikely be visited a lot.

3.9 Turbines and discharge structures The proposed platform housing the turbines and outlets to the river will be constructed of timber and be secured to river bed rock by secure anchors in the rock. Solid foundations will be laid into the bush floor where necessary. Pirirakau will not support any structure which forms any physical structure over any part of the stream or causes any damage to the locale and its natural entity.

Structures will be constructed so they have they have a small as possible impact on the bush area as possible. DOC and NZ game and fish has assessed the proposed structures and deem them acceptable. The location of these structures is at the bottom of a steep bank and will be located in an area that is unlikely to be seen.

Only the intake and some pipe will be in the river itself. This is relatively small. All other pipes and structures will be above ground. Pipes will be supported by steel stakes and the platform the generators will be on is above ground. There will be no structures over the Waipapa River. It is quite likely that the proposed scheme will be well camouflaged by the bush.

There are many examples in New Zealand where physical structures are placed in the bush. Walking tracks often have bridges, huts, shelters, signs etc. They appears to be widely accepted as not damaging the bush. I was just tramping with my kids in the weekend and staying the night at a DOC hut. It was made of wood and had a corrugated iron roof. We crossed several streams with bridges and passed signs and structures in the bush. There were steps on the track. All these structures were well accepted by the bush and there were no signs of adverse effects.

I would appreciate any suggestions on alternative ways we could use to satisfy Piriakau in relation to placing structures in the bush and around the river.

3.10 Further built structures The generators will be housed on a wooden platform. There is likely to be a corrugated iron roof covering this to protect the generators from falling branches and general forest debris. To reiterate Pirirakau will not support built structures within a protected bush area

I would appreciate any suggestions on alternative that would be acceptable. Please see above answer in 3..9

4. Conclusion Supplying the Pirirakau assessment of cultural effects against this application has required an indepth understanding of the application and thorough review. It is appreciated by Pirirakau that individuals are seeking renewable energy sources but we are opposed to any activity which has cultural environmental implications. Pirirakau do not support or encourage any activity which has the potential to maximize cultural implications and impacts which set precedent in turn open floodgates to permit exhaustion of natural resources within the Pirirakau rohe.

I believe because we are seeking a renewable energy scheme that is friendly to the environment that we are not causing adverse effects on the environment. Renewable energy is energy generated from natural resources—such as sunlight, wind, rain, tides and geothermal heat—which are renewable (naturally replenished). Our scheme is a renewable energy scheme cannot see how it will exhaust a natural resource.

We do not seek to maximize cultural implications. We seek to work with the people who have interests in what we are doing so that we can put in place sensible and well thought out scheme than has minimal

impact for everyone. We would be very keen to further understand how we could make this project culturally acceptable to you.

The Powerspout company who would supply the equipment for the scheme estimate 1 in 10,000 properties could consider using micro-hydro power as an energy source. Of those 10,000 someone very dedicated would have to design a scheme and work with a variety of groups and organisations to get a scheme off the ground. They would also have to invest a significant amount of money to build a good quality scheme, even though the schemes are relatively simple. 95% + of all goods Powerspout manufacture are exported so this is not a massive industry for New Zealand. There are not a huge number of schemes throughout the country and the technology has been available for many years. I am certain the floodgates will not open depleting the natural resources within the Pirirakau rohe. If this was an easy project and viable for many people then many more applications would have been made over the years here and throughout New Zealand. This is a modernisation of the basic waterwheel principal that has been around for 100's of years. I believe this is the first application for the Bay of Plenty Regional Council to consider ever, so I doubt after all these years if people will start suddenly start built lots of micro-hydro schemes.

Kearoa Marae make successful move to generate their own power

By [Mere McLean](#) 2:54pm, Friday 28 August 2015

• WAIKATO/BAY OF PLENTY

• VIDEO OF THE PROJECT:

<http://www.maoritelevision.com/news/regional/kearoa-marae-make-successful-move-generate-their-own-power>

A Bay of Plenty marae in Rotorua is avoiding power hikes by becoming self-sustainable and generating their own power through water. Their success has become so popular that other marae are now interested in the idea.

A micro-hydro unit on Pokaitu stream in Horohoro generates enough power for a marae, church and a farm house.

Eugene Berryman-Kamp says, "In increasing demand, it's important to be able to look after your own. So with having our own power source here we generate more power than the marae and iwi owned farm use."

The micro-hydro unit which, is at the rear of the marae, produces 2.5 kilowatts per hour, saving the marae \$4000 a year in power bills.

Eru George says, "In time, we will be increasing the usage in power, so what's being produced now will increase."

According to Eugene Berryman-Kamp, a number of iwi have contacted them in regards to this project, however the amount of work required is not an overnight job.

Berryman-Kamp says, "To do this sort of thing you need engineering reports, you need water flow testing. Obviously there's the turbines units themselves, you need to know how those work."

But if you are serious about self-sustainability and renewable energy the benefits for marae are huge.

Further video of project:

<http://ngatikeangatituara.com/environment/>

Weekender: Hydro unit helps save on marae power bills

By Mike Watson

7:00 AM Friday Mar 28, 2014



POWER BROKER:

Project manager Eugene Berryman-Kamp beside the micro-hydro unit, which is saving Kearoa Marae.

Eugene Berryman-Kamp is a contented man.

Eugene's marae at Kearoa, south west of Rotorua, has installed a small hydro power unit to generate electricity, saving at least \$4000 a year in expensive power bills.

The micro-hydro unit, which has three turbines producing 2.5 kilowatts per hour, will be used to provide power to the marae, nearby iwi-owned trust farm and to grow vegetables in hydroponic glasshouses on the marae land, says Eugene.

Te Runanga o Ngati Kearoa Ngati Tuara came up with the idea of generating their own electricity to cut costs at a hui two years ago, says project manager Eugene.

The Apirana Rd marae buildings were used intermittently for events and functions, such as tangi and hui, resulting in spikes in electricity use.

The iwi decided to harness the nearby Pokaitu Stream behind the marae and divert the water flow through a culvert to three turbines and generate power.

There is capacity to install three more turbines to maximise generation up to 5kw/h - more than the marae presently needs, Eugene says.

Before the hydro was installed the marae was using around 18,000kw of power annually at around 22 cents a kilowatt, he says.

The three turbines can generate about 23,000 kw per year - slightly more than current power consumption for the marae and the associated farm trust, with the excess being sold into the grid.

The turbines are connected to the switchboard in the marae and an import-export meter installed to enable surplus power to be put into the main power grid.

Potaiku Stream, and other nearby waterways, have been historically, spiritually and culturally significant to the iwi for more than 100 years, Eugene says.

A waterwheel was installed on the stream for a flax mill, and the birds, eels and fish were used as food source.

Ngati Kearoa Ngati Tuara is one of three iwi involved in the Te Arawa River Iwi Trust assigned to help restore the Waikato River, he says.

The trust is involved in sustainable use of natural resources which fits well with the idea of installing a hydro power unit, Eugene says.

"It's not a complicated process to generate our own electricity and become independent of the national grid.

"We wanted to achieve sustainable energy generation with minimal environmental impact," he says.

Across the stream the iwi have fenced off riparian land and replanted 1000 native trees.

"If we want to be self-sustaining we have learnt you can't shake your finger at others unless you clean up your own backyard first."

- Rotorua Daily Post

By Mike Watson

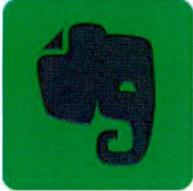
Please also see Powerspout LH case study that has more technical detail.

Appendix 7: Final correspondence with Tawharangi Nuku

RE: Project on our property 619a Esdaile Road

TN

Tawharangi Nuku <Tawharangi.Nuku@twoa.ac.nz>



Reply

Tue 24/01, 09:35

You

You replied on 13/03/2017 21:04.

Kia ora Andrew,

Firstly, apologies for not getting back to you sooner, life has been hectic.

Personally I have no issues with your application. The fact that it uses a renewable energy source with minimal impact on the environment is a no brainer.

[I have a board meeting on Thursday and I will ask for support for your project which I can then follow up with an official letter to endorse your application.](#)

I notice the area identified in your application is within the boundaries of Te Pirirakau hapū.

I assume the Western Bay District Council would have informed you of the appropriate contacts, if not please give me a ring.

All the best for your application

Tawharangi Nuku

Tawharangi Nuku

Pouahorangi | Certificate Te Arataki Manu Kōrero

P 07 557 8216

Te Wānanga o Aotearoa

Tauranga - 17th Avenue, 180 17th Avenue Business Park

17th Avenue, Tauranga, 3110

www.twoa.ac.nz



Te Wānanga o Aotearoa

Appendix 8: Department of Conservation approval

Department of Conservation

DOC- 2919744

Te Papa Atawhai

17th November 2016

Andrew Newsom

619A Esdaile Road, RD 8

Tauranga 3180

New Zealand

Dear Andrew

APPLICATION FOR APPROVAL: ~~s95E(3)(A)~~RMA

Resource Consent Application — Bay of Plenty Regional Council, Land Use Consent, Water Permit and Discharge Permit, 619A Esdaile Road, Tauranga.

I have considered your application for approval in terms of s95E(3)(A) RMA and am pleased to advise that I approve of the application being considered on a without notice basis.

My approval is on the basis that the proposal is as described, is for the purposes described, and will have the effects on the Department's interests as described in the original Resource Consent application

This approval is limited to the likely adverse effects of the proposal on the Department's interests and should not be construed as approval to effects on the environment generally.

This approval is specific to the above application and is for the purposes of s95E(3)(a) RMA only. It is not indicative of any associated concession or other statutory approval which may be required from the Department in regard to this proposal.

This approval will be rendered null and void if the proposal to which it refers is changed between the date of this approval and its consideration by the consent authority without referral back to me for my further assessment.

Regards



Jeff Milham
Operations Manager,

Tauranga Rotorua Office

Pursuant to delegated authority.
On behalf of
Lou Sanson
Director General of Conservation

Rotorua District Office

PO Box 1146, 99 sala Sfreet, Rotorua 2010
Telephone 07 349 7400, Fax 07 349 7401

17 Nov 16

Appendix 9: New Zealand Fish and Game Approval



Ref: 2.01.06

21 November, 2016

Andrew Newsom
619A Esdaile Road,
RD8
Tauranga 3180

Dear Andrew

Micro-hydro and Hydrostatic Pump Project, Waipapa Stream, Whakamarama

Thank you for forwarding information relating to the above application for resource consent.

The ecological report undertaken by Mike Joy (Massey University) indicated that the Waipapa Stream upstream of the waterfalls has nil trout presence due to the fish barrier issues created by the waterfalls. Given that water diverted for power generation above the falls will rejoin the Waipapa Stream immediately below the falls, the scale and quality of the downstream aquatic environment will not be diminished. Screening of the intakes with 3mm mesh will reduce likelihood of intake or entrapment of juvenile native species.

Fish & Game NZ, Eastern Region has reviewed the proposal and advises that we have no objections.

In accordance with Section 95E(3)(A) of the Resource Management Act 1991, Fish & Game NZ, Eastern Region gives its approval to an application;

By: Andrew L Newsom

For Resource Consent to: Construct and place a Micro-hydro and hydrostatic pump in the Waipapa Stream at 619A Esdaile Rd, RD8 Whakamarama for the purposes of small scale power generation.

Yours Faithfully

Matt Osborne
Fish & Game Officer
Fish & Game New Zealand, Eastern Region
Email: mosborne@fishandgame.org.nz

Statutory managers of freshwater sports fish, game birds and their habitats

Eastern Region

11-30 Paradise Valley Rd, Ngongotaha, Private Bag 2010, Rotorua 3046, New Zealand. Telephone (07) 357 5503 Facsimile (07) 357 5503
Email: easterng@fishandgame.org.nz www.fishandgame.org.nz