Discharge permit to apply diquat to the Waiwhetu Stream

1. Purpose

To report to the environmental committee on the resource consent application from Flood Protection Department, Greater Wellington - The Regional Council[1], under the Resource Management Act 1991.

2. Application

2.1 Applicant

Flood Protection Department
Greater Wellington – The Regional Council
PO Box 11 646
Wellington

2.2 Consents applied for

2.2.1 WP030059 [22344]: Discretionary Activity

Discharge permit to apply diquat to the Waiwhetu Stream to control aquatic weed growth.

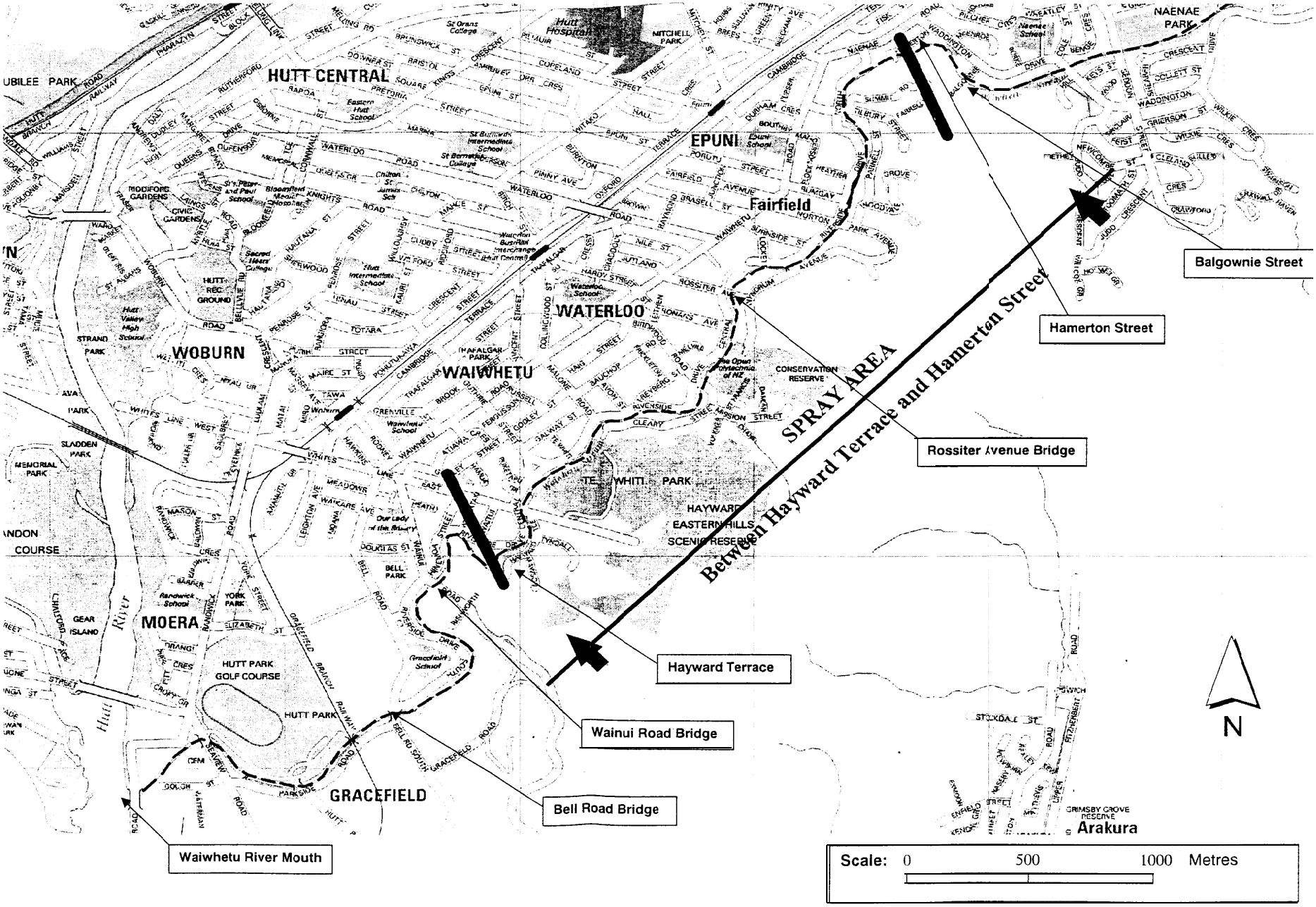
2.3 Location

The Waiwhetu Stream from upstream at Hamerton Street to downstream at Hayward Terrace, at or about map references NZMS 260:R27;727.984 to NZMS 260:R27;708.959.

Refer to the attached map, figure 1.

1 Formerly the Wellington Regional Council prior to 6 January 2003.

Figure 1 : Area of Waiwhetu Stream maintained by the Wellington Regional Council (extent of spray area is indicated)



3. Background

3.1 Previous resource consents

The Flood Protection Department (FPD) have been granted the following resource consents to apply diquat to the Waiwhetu Stream;

- In 1994 – 1997 a resource consent was granted by the Planning Tribunal. This consent was granted for a term of three years.

- In 1998 – 2003 a resource consent was granted by Consents Management, Wellington Regional Council. This consent (WGN980033) was granted for a term of 5 years and expires in February 2003. This consent was publicly notified under section 93 of the Resource Management Act, 1991.

The FPD are therefore applying for a renewal of the existing consent to apply diquat to the Waiwhetu Stream.

3.2 History of flooding

The Waiwhetu Stream has a history of flooding. The stream channel has been modified and confined by roads, bridges, housing, and industrial properties. The result is a stream channel too small to cope with even relatively small floods.

Increased flood levels also occur as a result of heavy weed infestations, which cause a reduction in the channel capacity, increases in silt levels and an increased resistance to flow.

From Gracefield upstream, dense aquatic weed growth can choke the stream channel and block stormwater outlets, consequently increasing the flood risk. Downstream of Gracefield, there is significantly less weed growth, most likely as a result of the increasingly saline conditions.

Computer Modelling (WRC, Dec 1996[2]) has shown that if aquatic weed growth (in particular Cape Pondweed) is left unchecked, then flood levels in a 100-year flood event could increase by between 0.3 and 0.7 metres in those reaches affected by weed.

3.2.1 Potential for flooding of properties

The increased industrial flood damages would occur mainly between the Bell Road Bridge and the Wainui Road Bridge. The main increase in flooding of residential properties would affect properties directly adjacent to the Stream, and those in the Waterloo area, due to overflows from Rossiter Avenue Bridge. Refer to the attached map, figure 1.

2 Wellington Regional Council, 1996, Baseline Water Quality of Rivers and Streams in Wellington Region 1995-1996.

The increase in flood levels could result in 525 properties being affected by flooding compared to only 380 properties if the weed is cleared (an additional 140 properties). An estimated $1.6 million increase in industrial flood damage could occur if weed in the Stream is left unchecked.

The likely savings in flood damage from controlling weeds can be expressed in terms of "annualised damages". Without weed control the cost of the annualised damages is estimated to be $880,000, however, this cost is reduced to $740,000 with weed control. In other words, the community runs the risk of incurring, over time, an extra annual flood damage cost of $140,000 by not controlling the weeds. This demonstrates the economic benefit of an effective weed control programme (Waiwhetu Stream Management Plan, 1997).

3.3 Responsibilities of Greater Wellington - The Regional Council

Greater Wellington is responsible for maintaining the Waiwhetu Stream from the end of the concrete channel at Balgownie Street to the Stream mouth. Refer to the attached map, figure 1.

The Flood Protection Department has managed the Stream to maintain its flood carrying capacity since 1980 using a variety of means, including debris and rubbish removal, bank edge maintenance and aquatic weed control. Its predecessors, the Wellington Regional Water Board and the Hutt River Board, undertook similar management techniques.

The Flood Protection Department has applied to renew its resource consent to apply diquat into the Waiwhetu Stream to control aquatic weed growth. The renewal of the existing consent will enable Greater Wellington to maintain the Stream's flood carrying capacity, meet its responsibilities under the Soil Conservation and Rivers Control Act 1941, and flood hazard mitigation under the Resource Management Act 1991 (RMA).

3.4 Background to spraying

Diquat has been used successfully to control aquatic weed in the Waiwhetu Stream by Greater Wellington and its predecessors since 1978. Resource consents have been held by the applicant and its predecessors since 1994. Following the expiry of the first consent granted by the Planning Tribunal in 1998, the Flood Protection Department applied for a consent to apply diquat to the Waiwhetu Stream. This consent expires in February 2003, hence its application for renewal.

The original resource consent (granted by the Planning Tribunal in 1994) permitted the spot application of diquat to control excessive weed growth on not more than two occasions each year, during spring and autumn. During 1996, applications of diquat were made during April and October over a 1.2 km section of the Stream between Rossiter Avenue and Haywards Terrace, excluding the Te Whiti Park Reach.

The existing resource consent (granted by Wellington Regional Council in 1998) introduced a range of stream management methods to control weed

growth, with emphasis placed on manual methods of control. These methods included hand and mechanical clearing of weeds, tree planting and the use of diquat and glyphosate as contingency measures. This consent limited diquat spraying to one application per year in autumn only.

As part of the conditions of the existing consent, the consent holder had to establish a Liaison Group with a list of key representatives. This group is now collectively called the Waiwetu Stream Working Group. It is a condition of the existing consent that this group be consulted prior to all spraying.

In 1998 and 1999 eradication of the most troublesome weed (Cape Pondweed) was attempted by digging out the plant's tuberous roots from the bed of the Stream. This proved unsuccessful. Regrowth of the weeds was quick and numerous. Since November 1999 periodic detention workers have been manually clearing weed from the channel on a regular basis. This approach kept weed growth under control and allowed the Flood Protection Department to meet the intentions of the 1998 consent and the Waiwhetu Stream Management Plan[3], without the need to spray the Stream between 1997 and April 2002.

By 2001/2002 manual clearance work was unable to control weed growth for the following reasons:

- An unusually wet and cold spring and summer meant that raised Stream levels prevented hand clearing work in the Stream;
- A season of prolific weed growth; and
- Changes in periodic detention staff, which lessened the effectiveness of hand clearing.

By early 2002 weed growth was particularly excessive in parts of the Stream. If this situation had been allowed to continue over the winter months, when hand clearing generally slows due to the weather conditions, by spring the channel would have been choked with weed. Manual clearance of weeds would have struggled to clear this amount of weed.

To avoid this situation worsening the Flood Protection Department, in consultation with the Waiwhetu Stream Working Group used diquat in the Stream between 6-17 May 2002. This was the first time diquat had been used in the Stream since 1996.

4. Proposal

4.1 Use of Diquat

Diquat is classified as a general herbicide by the US Environmental Protection Agency (EPA). Diquat (trade name Reglone, with 20% active ingredient) is an

[3] The Waiwhetu Stream Management Plan was published in July 1997 as part of the consent conditions issued by the Planning Tribunal.

aqueous formulation that is mixed with "Depth Charge" (thickening agent) to form a gel. In New Zealand, diquat is the only herbicide that is approved and considered acceptable for use directly over or in water (MAF 1986).

Diquat works by contact with green plant tissue. It stops chemical processes in the leaves and stems of target plants and they wither and die over approximately a 7-day period. However, diquat does not kill the root system and the plant recovers over a 2-3 month period.

In order for diquat to be effective it is imperative that is applied at the right time of year, which is in spring and/or autumn. Spraying in autumn may be required if the summer hand clearance has failed to control weed growth for the coming winter. Spraying in spring may be required if there has been a mild winter and weed growth is beyond the available resources to clear by hand.

Spraying diquat in winter and/or summer would be the wrong time of year because, in winter, conditions are usually too cold, or water flow is too high, which makes diquat less effective. In summer, flows are often too low and dissolved oxygen may also be low, and diquat would create a further stress on the Stream by further reducing the dissolved oxygen levels.

The 2002 report completed on the Waiwhetu Stream ecology (Kingett Mitchell, 2002) includes a number of comments in terms of the restoration potential of the Waiwhetu Stream. The following are relevant to this application.

- *The use of gel diquat for the removal of Cape Pondweed (and other plants) is recommended, because the selectivity offered by diquat is advantageous where total vegetation control is not the desired outcome. Diquat is effective on Cape Pondweed and Elodea, but less effective on Potamogeton species, and has no effect on the native Nitella, all commonly occurring aquatic plants in the Waiwhetu Stream.*

- *Furthermore, because the viscous diquat assists the herbicide to sink into the water and to attach to plants, followed by a slow herbicide release, there is more localised efficiency against target species (Boothroyd 1981).*

- *Selective removal and/or management of aquatic plants, in conjunction with other mechanisms (see riparian management below), have some strong potential for restoration of the Waiwhetu Stream.*

4.2 Application of Diquat

Diquat is mixed with "Depth Charge" (thickening agent) to obtain a 10% concentration of the active ingredient. This is mixed with water to obtain a maximum of 60 litres per application.

Diquat is mixed off-site and applied by trained Greater Wellington staff who have completed a "Growsafe"[4] course. Staff use hand operated, manually pumped sprayers working their way upstream. This has proved the most efficient and effective way of applying the chemical to date and keeps diquat concentrations to a minimum. There is no aerial drift of the chemical. Spot spraying has been trialled but gave a disappointing result, with only a 50% kill of the target weed.

The applicant proposes to apply diquat generally in autumn and potentially in spring, if the need arises. All applications will be in strict accordance with the manufacturer's recommendations and the 'NZS 8409: 1999 Agrichemical Users Code of Practice'.

The application of diquat is managed so that the maximum concentration of diquat in the water after application does not exceed 1.5g/m^3 or (1.5ppm) active ingredient (a.i). Monitoring carried out by Flood Protection during the April 1996 application, showed water concentrations reached 0.7 g/m^3 (a.i) on the day of application, reducing to 0.2 g/m^3 (a.i) two days after application. Monitoring undertaken by Flood Protection during the May 2002 application showed concentrations reached 0.35g/m^3, 1 hour after spraying, reducing to 0.27 m/g^3 3 hours after spraying.

4.3 Procedure for applying Diquat

The procedure for the use of diquat has been developed since the original consent was granted in 1994, in consultation with Consents Management - Greater Wellington and the Waiwhetu Stream Working Group. It is adopted for the current consent and is the procedure proposed for the renewal of this consent. This procedure is summarised below:

1. *Consult with the Waiwhetu Stream Working Group prior to spraying.*

2. *In consultation with the Flood Protection Operations Engineer, select area of the Stream to be sprayed. Spraying may be completed in sections.*

3. *Check the weather forecast and select a proposed spray date.*

4. *Erect warning signs 2 days prior to spraying. These signs must remain in place for 5 days after spraying and are monitored by the applicant to ensure they remain in place.*

5. *Contact Iwi, Consents Management and Hutt City Council at least 48 hours prior to the spray operation to advise them of the proposed spray dates.*

6. *Advise the Periodic Detention Centre 48 hours prior to spraying. (Periodic detention workers manually clear weed from the Stream).*

[4] Growsafe is a certificate issued by the New Zealand Agrichemical Education Trust. It is a requirement in the Regional Air Quality Management Plan for the application of agrichemicals.

7. *Contact Greater Wellington Laboratory and arrange dissolved oxygen and water temperature tests.*

8. *Carry out spraying in the lower end of the Stream working on upstream.*

9. *Actual areas sprayed will be recorded and documented.*

10. *The amount of chemical used will be recorded and documented, with a total of 60 litres of per application maximum to be used.*

11. *Record the batch numbers of the chemicals used.*

12. *Record the water level of the Stream at the Whites Line East Bridge.*

13. *Record the weather conditions during the spray run.*

14. *Arrange for the Greater Wellington Laboratory to obtain grab samples for diquat. Grab samples shall be taken 5 metres below the start of spraying.*

15. *Remove warning signs 5 days after spraying.*

16. *After 7 days of spraying arrange with for the Greater Wellington Laboratory to carry out dissolved oxygen tests in the agreed locations.*

17. *Record the diquat analysis results.*

18. *All documentation, plans and test results are distributed to Consents Management, HCC and Waiwhetu Stream Working Group.*

4.4 Changes sought to the existing consent

Several changes are sought by the applicant to the 1998 consent conditions. These changes are sought because of the management practices developed since 1994, lessons learnt and successful monitoring undertaken over the last 8 years by the Flood Protection Department.

- Since 1996 the Flood Protection Department (FPD) has changed its philosophy and approach to spraying in the Stream. A Stream Management Plan has been developed that promotes manual methods of controlling weed. Diquat is only used as a contingency measure when manual methods fail. The FPD remains committed to this approach. The requirement for ongoing consultation with the Waiwhetu Stream Working Group will help to reinforce this approach.

- During the last consent term of 5 years diquat was applied to the Stream only once. This is indicative of the FPD's commitment to manual methods.

4.4.1 Ability to spray twice a year in spring and autumn

The Flood Protection Department (FPD) is seeking the ability to increase spraying up to twice a year in spring and autumn. This is instead of the one application in autumn that is permitted by the existing consent.

The FPD is seeking this change to increase its flexibility for when it can spray. On the basis of the weed control undertaken since 1996, the FPD does not expect to spray twice a year every year. Although in some years, if weed growth is excessive this might be the case. For example, spraying in spring may be required if excessive weed growth occurs over winter when little manual control is undertaken. Spraying in autumn may be required to control excessive weed growth prior to winter.

The FPD is also looking at alternative ways to potentially eradicate the Cape Pondweed bulbs, which may remove the need to spray diquat altogether. Methods currently being considered are a weed mat trial, and/or a trial using glyphosate sprayed directly onto the aquatic weeds.

4.4.2 Reduction in monitoring

The Flood Protection Department (FPD) is seeking to reduce the number of dissolved oxygen tests that are currently required to reflect more accurately the areas sprayed. Currently under the existing consent, sampling must be undertaken from all 10 sites along the Waiwhetu Stream regardless of the length of Stream being sprayed. The FPD is seeking to reduce the number of dissolved oxygen tests, if smaller lengths of the Stream are sprayed. The FPD suggests that the number of tests are reduced to only one above the spraying site (the previous consent required all upstream sites to be monitored) and all of the currently used sites below the spraying site. No changes are proposed to the frequency or number of grab tests undertaken for diquat.

5. Other consents and approvals required

The Flood Protection Department do not require any other consents associated with the application of diquat to the Waiwhetu Stream.

6. Consultation

Consultation has played an important part in the approach taken by the Flood Protection Department (FPD) to managing the Waiwhetu Stream. Since the granting of the original consent in 1994, it was a requirement of the consent conditions to develop a Stream Management Plan and to set up a Stream Liaison Committee. This group's role has been ongoing and is now part of the Waiwhetu Stream Working Group, which is looking at ways to restore the health of the Stream. As part of this current resource consent application the FPD have consulted with the Waiwhetu Stream Working Group, Department of Conservation, Hutt City Council, iwi, local users and local residents of the Stream.

The Flood Protection Department has followed a specific consultation programme prior to lodging this application:

- In July 2002 meetings were held with Consents Management and the Waiwhetu Stream Working Group.

- On 2 August 2002, an information sheet was sent to (approximately 400) adjoining property owners and occupiers, iwi and Hutt City Council advising them about the proposed renewal of the resource consent to spray diquat gel into the Waiwhetu Stream.

- On the 20 August 2002, a preliminary meeting to discuss the application was held with Teri Puketapu.

- During August 2002, a draft resource consent document was prepared and sent to the following groups:

Individual/Group/Organisation	**Contact Person**
Department of Conservation	Wendy Harris
Fish and Game NZ	Miranda Robinson
Te Runanganui O Taranaki Whanui Ki Te Upoko O Te Ika A Maui	Teri Puketapu
Hutt City Council	Kelly Crandle Robert Hayles
Waiwhetu Stream Working Group	Tim Porteous
Consents Management, Greater Wellington	Richenda Garland
Wellington Conservation Board	Gavin Rodley
Toxins Action Group	Alison White

On 10 September 2002, the Hutt News published three articles about the Waiwhetu Stream and proposed resource consent application (refer Appendix 9.8 of the application).

7. Notification and submissions

The application lodged with Greater Wellington - The Regional Council was publicly notified in the *Dominion Post* on Saturday 9 November 2002 and the *Hutt News* on Tuesday 12 November 2002, in accordance with section 93 of the RMA 1991. Signs were posted along the Stream on 11 November 2002, in the following areas:

- At the end of Hamerton Street, at the start of the walkway
- At the bridge between Summit Road and Tilbury Street
- At the bridge at Rossiter Avenue
- At the bridge at Te Whiti Park.

Persons considered by Greater Wellington to be directly affected by the proposed activities were individually notified. These included:

- Department of Conservation
- Hutt City Council
- Wellington Fish & Game Council
- Wellington Conservation Board
- Te Runanganui O Taranaki Whanui Ki Te Upoko O Te Ika A Maui Inc.
- Wellington Tenths Trust
- Public Health Service
- Waiwhetu Stream Working Group
- Toxins Action Group
- Approximately 600 neighbouring residents and businesses.

A total of 20 parties made submissions within the submission period, which closed on Tuesday 10 December 2002. 18 of these were in support, 1 was in opposition and 1 gave conditional support.

The one submission in opposition to the application was from Te Runanganui O Taranaki Whanui Ki Te Upoko O Te Ika A Maui Inc. who raised the following points in their submission:

- Limit term of consent to 5 years.
- Support method of manual clearing.
- The application of diquat should be applied only once annually and not twice annually as proposed. Diquat should be applied in late spring following consultation with the iwi.

Following meetings between the applicant and Te Runanganui O Taranaki Whanui Ki Te Upoko O Te Ika A Maui Inc, the term of the consent applied for has been reduced from 10 years to 5 years. A manual clearing programme has also been agreed to by the applicant. The remaining issue raised by in relation to the application rate was discussed at a meeting between the applicant and Teri Puketapu held on 22 January 2003. Mr Puketapu agreed on the application rate of twice annually providing a conditions was included to consult with Tangata Whenua of the area prior to spraying. Refer to Condition 7 of the Suggested Conditions in Attachment 2.

Ms Margaret Aitken conditionally supported the application and raised the following points:

- Concern about the use of diquat, although she agrees that it may be the only effective way to control aquatic weed growth.
- Aquatic weeds downstream of Hayward Terrace also need to be controlled.
- Manual clearing of weeds has not been successful.

Following consultation between the applicant and Ms Aitken on 4 February 2003, the issues raised in the submission were resolved. Ms Aitken agreed that using diquat to clear the stream as a contingency measure, following manual removal was acceptable. Ms Aitken agreed that she did not want to go to a hearing.

8. Further information and meetings

No further information was requested, and no pre-hearing meeting was held. The applicant consulted directly with the two submitters, who were not in support of the application, to reach consensus on the concerns raised in their submissions.

9. Statutory reasons for requiring resource consents

The discharge of contaminants into air in connection with land-based agrichemical spray application is a *permitted activity* under rule 1 of the Regional Air Quality Plan for the Wellington Region. However, the application of diquat to the Waiwhetu Stream does not meet the conditions associated with rule 1, as diquat will be applied directly into water. Condition (i) of rule 1 states that if the discharge is directly into water, a Resource Consent may be required under the Regional Freshwater Plan (RFP).

The RFP assists the Greater Wellington to sustainably manage the region's freshwater resources. These rules are not permissive and resource consent for a discretionary activity is required if a proposed activity is contrary to the rules in the plan.

Rule 5 of the Regional Freshwater Plan provides for the discharge of any contaminant into fresh water as a *discretionary activity.*

A statutory evaluation is provided in Section 12 of this report.

9.1 Discharge permit

Section 15 of the RMA 1991, Discharge of Contaminants into Environment, provides as follows:

> *(1) No person may discharge any –*
>
> *(a) Contaminants or water into water; or*
>
> *(b) Contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
>
> *(c) Contaminant from any industrial or trade premises into air; or*
>
> *(d) Contaminant from any industrial or trade premises onto or into land –*

unless the discharge is expressly allowed by a rule in a regional plan and in any relevant regional plan, a resource consent, or regulations.

(2) No person may discharge a contaminant into the air, into or onto land from -

(a) Any place; or

(b) Any other source whether moveable or not –

in a manner that contravenes a rule in a regional plan or proposed regional plan unless the discharge is expressly allowed by a resource consent or allowed by section 20 (certain existing lawful activities allowed).

Section 2 of the RMA 1991 defines contaminant to include:

Any substance (including gases, liquids, solids and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar or other substances, energy or heat –

(a) When discharged into water, changes or is likely to change the physical, chemical or biological condition of water; or

(b) When discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land or air onto which it is discharged.

The proposal to discharge diquat into the Waiwhetu Stream is not *expressly allowed* by a rule in a regional plan. Therefore the proposal needs consent under sections 15(1)(a) of the RMA 1991.

10. Matters for consideration

Section 104 of the RMA 1991 states the matters that a consent authority must have regard to. These matters are:

- various sections of the RMA 1991;
- the Regional Policy Statement for the Wellington Region;
- the Regional Freshwater Plan for the Wellington Region; and
- the Waiwhetu Stream Management Plan.

11. Assessment of effects

11.1 Summary of environmental effects

In summary, the anticipated environmental effects are:

(a) The community adjacent to the Waiwhetu Stream will be significantly safer from floods once the weed growth has been controlled.

(b) The community adjacent to the Waiwhetu Stream will benefit from the aesthetically improved Stream without the thick weed growth.

(c) The overall water quality of the Waiwhetu Stream will be enhanced following the removal of the weeds. The dissolved oxygen levels will increase following weed removal, which will result in an increase in species diversity in the Waiwhetu Stream.

(d) There will be some disturbance to the ecological environment following spraying. There may be a temporary localised reduction in amphipods (small crustaceans) directly adjacent to the sprayed areas.

(e) Recreation may be limited during spraying, however, access along the banks will always be maintained.

11.2 Receiving environment

11.2.1 Catchment

The Waiwhetu Stream originates in the bush covered Eastern Hutt Hills which rise to approximately 200m to 400m above sea level to the north east of Wellington Harbour. The Waiwhetu Stream is a relatively small, slow flowing watercourse with an average annual maximum flow 12 m^3/s [5]. The catchment is initially steep but after passing through residential/light industrial in Naenae via a concrete lined channel, the Stream emerges onto the floor of the Hutt Valley with a much reduced gradient. The Waiwhetu Stream then runs south for approximately 6 km through the suburbs of Epuni, Waterloo, Waiwhetu and Gracefield to its confluence with the Hutt River Estuary at Seaview.

11.2.2 Land use and planning

The majority of the catchment is urban, mostly residential becoming industrial towards the mouth of the Stream. Hutt City Council is the Territorial Local Authority, with the majority of the Stream and its banks being zoned as River Recreation Zone. Areas in the upper reaches are zoned either Road Reserve or Residential.

11.2.3 Vegetation

The instream aquatic vegetation is dominated by Cape Pondweed (*Aponogeton distachyus*), and the emergent vegetation by Starwort (*Callitriche Stagnalis*)

[5] Greater Wellington Website (www.gw.govt.nz) 2003

and Willow weed (*Polygonum salicifolium*). The bank edge vegetation is dominated by adventive grasses and herbs. There are a total of thirty-three indigenous vascular plant and sixty adventive species, three indigenous algae and one indigenous moss species. Most of the indigenous species are relatively widespread or common species (WRC,1996).[6]

The dominance of exotic weeds is a result of a combination of factors including the high light levels, native species growing in relatively dark areas, and the slow channel velocities, which are insufficient to dislodge the deeply rooted weeds.

One small colony of *Leptinella dioica* subsp. Monoica, a nationally threatened plant, occurs in the lower Stream. This grows naturally in the wild at only a few estuarine sites on the west coast of the North Island and is thought to have been introduced to the Waiwhetu Stream. The application of diquat has had no effect on this plant in the past.

11.2.4 Ecology

In 2002 a report on the Waiwhetu Stream ecology was completed (Kingett Mitchell 2002).[7] This report looks at the entire length of the Waiwhetu Stream and was commissioned to quantify the existing ecological health of the Waiwhetu Stream and understand the ecological potential of the Stream in terms of land use and contamination effects. The key ecological characteristics of Waiwhetu Stream identified in Section 1.1.4 of the application are summarised below.

Fish

The number of fish species and abundance was low overall compared to similar sites in the Lower Hutt area. Overall, species diversity was similar between sites, but shortfinned eels were most abundant in the lower and middle reaches of the Stream, while bullies and banded Kokopu were most abundant in the headwater reaches. A single unidentified bully and a low number of eels were collected from the lower Stream reaches.

The low diversity and variable abundance of the fish fauna probably reflects the habitat at each surveyed site. For example, the large number of inanga in the middles reaches reflects the abundance of macrophyte vegetation and invertebrate food resources present in these surveyed sites, along with the short distance of these sites to the sea.

It seems unlikely that the contaminated sediments in the lower Stream reaches will prevent fish residing in this section of the river. In addition, the lack of suitable riparian vegetation in the lower reaches will prevent fish from spawning in the Stream (Kingett Mitchell 2002).

[6] Wellington Regional Council, 1996, *Baseline Water Quality of Rivers and Streams in Wellington Region 1995-1996.*
[7] Kingett Mitchell Ltd, July 2002, *Report for the Wellington Regional Council on Waiwhetu Stream Ecology.*

Invertebrates

Species diversity was low in the lower section of the Stream, but increased towards the headwater sites, with up to 21 taxa collected at the single site in the headwater reach and a site in the middle reach of the Waiwhetu Stream. The greatest species diversity and proportion of pollution sensitive taxa was found in sites with the least urban development, and the most extensive riparian zones were found in the headwater Stream sections.

Overall the invertebrate population of Waiwhetu Stream is relatively low in species diversity (total taxa – 41 taxa from 8 sites; mean = 13) compared to sites in the Wainuiomata River catchment (total taxa = 28 taxa from two sites; mean = 18). Species diversity in Waiwhetu Stream is also lower compared to the wider Wellington region (total taxa 82 from 29 sites; mean = 20). Snails, amphipods, the chironomid *N. forsythi* and purse caddis (*O. albiceps*) were numerically the most abundant animals in the Waiwhetu Stream (Kingett Mitchell 2002).

11.2.5 Water quality

The available water quality information indicates that water quality is generally better in the upper reaches of the Stream and deteriorates as the Stream moves through the residential and industrial reaches. The area where spraying is undertaken is characterised by reduced water quality and some contaminated sediments.

The reaches below where spraying is undertaken (Gracefield), are badly contaminated with heavy metals including Cadmium, Copper, Zinc and Lead, compared to relatively uncontaminated sediments in the headwaters of the Stream. The sources of the metals are either upward remobilization from buried contamination of sediment and/or present day discharge from industries in the Gracefield area (Deely 1992)[8].

From the information the Greater Wellington has collected to date, diquat has not been identified as causing adverse environmental effects as a result of Flood Protection Department's spraying. The selectivity offered by diquat is supported by the most recent information received by the Greater Wellington (Kingett Mitchell 2002). In particular diquat does not control all aquatic vegetation (refer to section 11.3.2 below).

11.2.6 Cultural values

Te Runanganui O Taranaki Whanui Ki Te Upoko O Te Ika A Maui have maintained Mana Whenua over the Waiwhetu area since the 1830s and have an active role in kaitiakitanga. The Waiwhetu Stream has been an important source of eels, inanga and watercress to the iwi in the past, and the current state of the Stream is of concern.

[8] Deely, J. et al. 1992, *Heavy Metals in Surface Sediments of the Waiwhetu Stream, Lower Hutt*, New Zealand Journal of Marine and Freshwater Research.

Their view on the future management of the Waiwhetu Stream is that it should be based on the following (Puketapu 1997)[9]:

- Partnership responsibility with Runanga
- Sharing of resources and information to effect partnership
- Flood mitigation
- Ecological and aesthetically sensitive approach to physical management
- Exploring alternatives to weed control methods
- Ongoing scientific monitoring and investigation of biota and silts
- Minimise chemical and other forms of pollution in collaboration with the Hutt City Council
- The installation of low weirs where appropriate
- Lowest cost

These matters have been reviewed by iwi as part of the consultation undertaken during the 2002 application. At this time no changes were sought.

11.2.7 Recreation

The Stream and its banks are mainly used for passive recreation such as walking. The Stream banks are also used as an "illegal" race track for motorbikes, and are used extensively for dog walking, leading to many complaints about dog faeces.

Where the Stream directly abuts private property, some residents have incorporated the Stream into their gardens with landscaping and planting, displaying an obvious appreciation and care for the Stream. Other residents have fenced their properties off from the Stream, while others use the bank edges as a dumping area for garden refuse.

11.3 Actual or Potential Effects of Spraying Diquat

11.3.1 Effects on humans

Chemical use can be controversial, with a wide range of scientific evidence and views expressed. The US EPA fact sheet on Diquat is included in full in Appendix 9.2 of the application.

In summary, diquat is a moderately toxic chemical. It may be fatal to humans if swallowed, inhaled, or absorbed through the skin, however, at the concentrations required for spraying, this risk is significantly reduced. To further reduce skin exposure to diquat, protective clothing is worn when handling the concentrated product, and splashes are immediately washed from eyes and skin. Breathing diquat spray is avoided. With good work practices, including safety precautions, hygiene measures and proper supervision, occupational exposure during application of diquat will not cause a hazard (WHO, 1991)[10].

[9] The Flood Protection Department have had ongoing discussions over the course of spraying with Teri Puketapu, representative of local iwi.
[10] WHO: 1991 *Diquat Health and Safety Guide*. World Health Organisation, Geneva.

Adverse effects are most likely to occur when mixing the chemical, rather than during is application into the Stream where concentrations are very low. Potential adverse effects will be minimised by mixing the diquat off-site and by using staff that are appropriately qualified. It is considered that the level of risk to the community from the application of diquat in this way is very small, if at all.

When spraying occurs there will be some restrictions on the use of the Stream bed and banks. As a precaution, spraying is well sign posted both before and after spraying has taken place. Signs are monitored and replaced if necessary. Monitoring is undertaken for diquat levels in the Stream immediately after spraying. Levels recorded to date show that diquat is very quickly diluted and any residual diquat would be gone by the time signs are removed. In terms of flood protection, removing weed growth, provides a positive benefit to the surrounding community and helps to avoid an increase in flooding levels to adjacent residential and industrial properties.

11.3.2 Effects on vegetation

The application of diquat results in almost complete removal of surface leaves and partial removal of submerged stems of Cape Pondweed. Diquat does not affect the below sediment parts of Cape Pondweed as it is a contact herbicide and is de-activated by sediment. Cape Pondweed is therefore able to regrow from the buried bulbs and does so within 2-3 months or sooner (Wells 1994)[11].

Diquat is also effective against Starwort and moderately effective against Curled Pondweed. Emergent species such as yellow flag, willow weed, *Glyceria,* Raupo and most rushes are not affected (Clayton and Tanner 1983)[12]. It is likely that diquat will control submerged portions of watercress. The aquatic moss (*Leptodyctyum riparium)* remains well established in the Stream and appears to be unaffected by the October 1996 and May 2002 diquat applications.

11.3.3 Effects on ecology

The concentration of diquat required to treat and remove sensitive target plants is between 0.5 and 2 g/m^3 (active ingredient). The current resource consent (WGN980033) permits concentrations of diquat in surrounding water at up to 1.5g/m^3(a.i). This was reduced from the original consent (granted by the Planning Tribunal in 1994) which allowed up to 2 g/m^3 (a.i).

Following the application of diquat to water, the concentration of active ingredient rapidly declines as a result of dilution, plant uptake, deactivation and sediment absorption (Clayton 1993, refer Appendix 9.6 of the application). Diquat has a half life, (the period required for half of the amount of material to be broken down by natural processes) of less that 48 hours (TOXNET 1995)[13].

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[11] Wells R.D.S. 1994: *Re-evaluation of Alternative Strategies for Cape Pondweed (Aponogeton distachyus) Control in the Waiwhetu Stream*, Report prepared of the Wellington Regional Council.
[12] Clayton J.S. and Tanner C.C 1983: An improved method for applying herbicides to water for control of submerged plants.
[13] TOXNET 1985: National library of medicines toxicology date network. Hazardous Substance Databank. National Institute of Health, U.S Department of Health and Human Services. Bethesda MD: NLM.

Furthermore, diquat is quickly rendered biologically inactive by sorption into clay minerals in the soil and is thus not mobile in soil or available for root uptake. It therefore does not bioaccumulate in sediments, plants or animals.

Diquat is not toxic to fish at the concentrations required to treat target aquatic plants and it does not accumulate in them (WHO, 1991). The most sensitive aquatic organisms known to be affected by diquat are amphipods (minute crustaceans). The potential effect of diquat treatment may be a temporary and localised reduction in some amphipods (Clayton 1993, Appendix 9.6). However, there are unlikely to be any amphipods in the reaches affected by spraying. Higher animal species tend to be less susceptible than fish or aquatic invertebrates to toxicity from aquatic herbicide use.

11.3.4 Effects on water quality

The greatest hazard to aquatic life comes from deoxygenation rather than from diquat toxicity. The decomposition of weed material after diquat application may result in depletion of oxygen levels in the Stream. All aquatic organisms require oxygen for life. Reduction in dissolved oxygen levels could potentially have an adverse impact on the instream ecology. However, monitoring of dissolved oxygen levels after application has indicated that the spray operation is unlikely to result in significant oxygen depletion, provided that spraying does not occur during warm summer low flow conditions and that the biomass to be controlled is not excessive. In the past, if a dissolved oxygen level lower than 5.0g/m^3 occurs then spraying is not undertaken.

11.3.5 Summary

In Summary, I consider the effects identified in this assessment to be no more than minor providing the applicant adheres to the suggested consent conditions and the mitigation measures and monitoring discussed in sections 11.4 are carried out.

11.4 Monitoring

Diquat

Monitoring of diquat will be undertaken by a "Telarc" registered laboratory. Grab samples of stream water will be taken and analysed for diquat concentration by the spectophotometric (Colourmetric) method.

Four grab samples will be taken five metres below the start of spraying (refer to Appendix 9.3 of the appliction - Diquat Application Procedures). The first sample will be taken immediately after the completion of spraying and a sample will be taken every hour over the four hours after spraying is completed.

Dissolved Oxygen

Monitoring of dissolved oxygen (DO) will be undertaken by a "telarc" registered laboratory. Dissolved oxygen and water temperatures will be carried out at specified locations throughout the proposed spray area.

Following every application of diquat in the Waiwhetu Stream, two sets of samples will be taken for DO analysis. The first sample is taken one day prior to spraying and the second sample is taken seven days after the completion of spraying.

If samples taken prior to spraying are less than 7.0g/m^3, spraying is deferred until DO readings increase. This is to ensure that diquat is not applied when the Stream is already under stress from deoxygenation. The ANZEC Guidelines for the minimum level of dissolved oxygen for aquatic systems is 6.0g/m^3. Therefore, if the Stream is above 7.0g/m^3 DO before spraying, this will provide a "buffer" for ensuring the diquat does not fall below the ANZEC minimum limit.

Between 1995 and May 2002, six sets of dissolved oxygen samples were taken and their results recorded. Dissolved oxygen levels recorded from these tests were never below the 5.0g/m^3 threshold (stipulated in the consent), 7 days after spraying.

The applicant has proposed a reduction in the number of DO tests. All sites downstream of the spraying will continue to be monitored, however the upstream sites will be reduced to one only. I consider sampling one site upstream from the spraying site to be sufficient to reflect the effect of the sprayed areas on the Stream.

Monitoring results of both diquat and dissolved oxygen levels are included in Appendix 9.4 of the application.

Glyphosate

Glyphosate will continue to be used to control excessive weed growth of some bank edge weeds, as a contingency, where hand or mechanical clearing proves impracticable. The application of glyphosate is a *permitted activity* and as such does not require a resource consent.

11.5 Mitigation measures

Should the chemical control of weeds be required then the potential impacts will be minimised by implementing the following mitigation measures.

- Applying diquat only when manual methods have failed to sufficiently control weed growth.
- Consulting with the Waiwhetu Working Group prior to any spraying being undertaken.
- Applying diquat in early autumn or early spring when lower water temperatures enable the water to hold a maximum of dissolved oxygen and allow the decay of the dead weed to proceed at a slower rate.
- Applying diquat to weed infested areas which pose a flooding risk and not attempting to spray all weed.

- Application of diquat will be from downstream working its way upstream. This keeps the overall concentration of the substance to a minimum.

- Ensuring that the minimum amount of diquat necessary is used to reduce flood risk to an acceptable level and a maximum of 60 litres of diquat gel is sprayed per application only.

- Ensuring that if samples taken prior to spraying are less than 7.0g/m^3, spraying is deferred until DO readings increase. This is to ensure that diquat is not applied when the Stream is already under stress from deoxygenation.

- Managing diquat so that the maximum concentration in the water after spraying does not exceed 1.5m/m^3 active ingredient.

- Applying the herbicides in strict accordance with the procedures detailed in fact sheet by the US EPA and Nuchem Ltd and the application procedures outlined by the Flood Protection Department, Greater Wellington.

- Persons applying the herbicide will be 'Growsafe' qualified and holders of a current certificate and the NZS 8409:1999 Agrichemical Users Code of Practice"

11.6 Alternatives considered

In accordance with clause 1 (b) of the Fourth Schedule, RMA 1991, an assessment of alternatives for an activity is required if it is likely that the activity will result in any significant adverse effects on the environment.

A complete range of weed control methods has been considered including the manual removal of aquatic weed, mechanical dredging, manual cutting, mechanical cutting, application of diquat herbicide, application of glyphosate herbicide, grass carp, riparian shade planting (native and exotic) and do nothing.

The table below summarises the reasons for the rejection of some of these methods for aquatic weed control.

Do Nothing	This allows uncontrolled weed growth and is untenable given the potential increased flood levels, overflow volumes and higher costs to residents and industry in the event of a major flood. Uncontrolled weed growth also has unacceptable environmental consequences in an urban setting.
Hand Clearing of Bulbs	Manual removal of Cape Pondweed bulbs was intended to be a long-term solution to weed growth. This method was used for two years and proved ineffective in preventing regrowth of bulbs. It also raised issues in relation to disturbance of the bed and safety of people employed to remove the bulbs.

Grass Carp	The need to confine fish to the target area by using screens, would lead to a reduction in the hydraulic efficiency of the Stream. The screens are liable to get blocked with rubbish and other debris and impede flood flows as a result. This may constitute a greater flood hazard than the weed which it is seeking to control. The implications of introducing an exotic fish on native species, the ecology of the Stream and potentially the Hutt River are also of concern.
Planting of Exotic Trees	The option of planting only exotic tree species to provide shade was rejected because of local resident's desires to see native species.
Dense native plantings	The option of planting thicker native plant associations was rejected because of potential risks to residential property security, increases in flood levels, the concerns that access to and views of the Stream could be compromised, and cost.
Glyphosate as an alternative to diquat	Glyphosate has the potential to provide a high level of control in some plant species, however, the efficacy of glyphosate for controlling submerged aquatic weed species is unclear. Glyphosate is not developed for use in aquatic environments. As a result of recent information received from Niwa (Appendix 9.6 of the application) the Council is considering trailing the use of glyphosate as an alternative to diquat. If successful in killing Cape Pondweed bulbs this may provide a possible long-term solution to the weed problem.
Hot Water Control	Has been considered and trailed in previous years, but has proved ineffective (Wells, 1994).

11.7 Preferred option

The preferred option, as presented in the consent application, is the most viable option after consideration by the applicant of the river management, environmental, social and economic viewpoints.

Although it is possible to carry out manual clearing of the weed, this method is not as effective in isolation. When weed growth becomes prolific in the Stream, spraying is the most effective method of controlling the weed growth. The application of diquat results in almost complete removal of surface leaves and partial removal of submerged stems of Cape Pondweed.

In this instance, this consent will only be used if all other methods are unsuccessful.

11.8 Proposed mitigation measures

The mitigation measures proposed by the applicant include specific methods proposed in the work methodology, and the Agrichemical Users Code of Practice. These mitigation measures have been developed by the Flood

Protection Department over many years, and have met the requirements of agencies and groups interested in the river and its environment.

12. Statutory Evaluation

12.1 Resource Management Act 1991

The matters to which Greater Wellington (as consent authority) shall have regard to when considering applications for resource consents and related submissions are set out in Sections 104, 107 and 108 of the Act and the circumstances in which it can make a decision to grant a resource consent are set out in Section 105.

In summary, subject to Part II of the Act, the following matters in Section 104(1) are relevant to these applications:

(a) Any actual or potential effects on the environment;

(c) Any relevant provisions of the Regional Policy Statement for the Wellington Region operative dated May 1995 (RPS);

(d) Any relevant objectives, policies, rules or other provisions of the Regional Freshwater Plan for the Wellington Region operative December 1999 (RFP);

(i) Any other matters the consent authority considers relevant and reasonably necessary to determine the application.

Furthermore in relation to any application for a discharge permit, Section 104(3) requires that the consent authority shall, in having regard to the actual and potential effects on the environment of allowing the activity, have regard to:

(a) The nature of the discharge and the sensitivity of the proposed receiving environment to adverse effects and the applicant's reasons for making the proposed choice; and

(b) Any possible alternative methods of discharge, including discharge into any other receiving environment.

Section 105(1)(b) states that after considering an application for a resource consent for a discretionary activity, a consent authority may grant or refuse consent, and (if granted) may impose conditions under section 108.

Section 108(1) specifies the types of conditions that may be included in resource consents, and section 108(3) authorises conditions requiring monitoring.

Section 107 provides for the restriction on grant of certain discharge permits as follows;

(1) Except as provided in subsection (2), a consent authority shall not grant a discharge permit […to do something that would otherwise contravene section 15][or section 15A] allowing-

(a) The discharge of a contaminant or water into water; or

[(b) A discharge of a contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or]

[(ba) The dumping in the coastal marine area from any ship …]

if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar or other contaminants or water), is likely to give rise to all or any of the following effects on the receiving waters:-

(c) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:

(d) Any conspicuous change in the colour or visual clarity:

(e) Any emission of objectionable odour:

(f) The rendering of freshwater unsuitable for consumption by farm animals:

(g) Any significant adverse effect on aquatic life.

(2) A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 […] that may allow any of the effects described in subsection (1) if it is satisfied-

(a) That exceptional circumstances justify the granting of the permit; or

(b) That the discharge is of a temporary nature; or

(c) That the discharge is associated with necessary maintenance work-

and that it is consistent with the purpose of the Act to do so.

(3) In addition to any other conditions imposed under this Act, a discharge permit or coastal permit may include conditions requiring the holder of the permit to undertake such works in such stages throughout the term of the permit as will ensure that upon expiry of the permit, the holder can meet the requirements of subsection (1) and of any relevant regional rules.

I consider that the discharge permit application is covered by section 107(2) of the Act, because the risk of a significant discharge is of a temporary nature. In addition at most times during the proposed works, adverse effects will be minor, providing conditions controlling spraying are complied with.

12.1.1 Sections 2 and 3 (Interpretation)

Section 104(1)(a) of the Act requires that consideration is given to the actual or potential effects on the environment of allowing the activity. In the Act the terms *"environment"* and *"effects"* have been defined as follows.

The term *"environment"* includes *"...ecosystems and their constituent parts, including people and communities; all natural and physical resources; amenity values and the social, economic, aesthetic and cultural conditions..."* which affect the aforementioned matters or are affected by those matters.

The term *"effect"* includes *"...any positive or adverse effect; any temporary or permanent effect; any past, present or future effect; and any cumulative effect which arises over time or in combination with other effects regardless of the scale, intensity, duration, or frequency of the effect, and also includes; any potential effect of high probability; and any potential effect of low probability which has a high potential impact."*

12.1.2 Section 5 – purpose and principles

The purpose of the Act is to promote sustainable management of natural and physical resources.

The considerations of Section 104 are all subject to Part II of the Act. "Subject to" gives primacy to Part II and is an indication that this provision shall prevail. In the case *Gardner v Tasman DC* (1994) NZRMA 513 the then Planning Tribunal expressed the view that "subject to" meant that the purpose and principles are an overriding guide when construing the provisions of the RMA.

Within this framework, it is considered that approving these resource consent applications, subject to suggested consent conditions, will enable the people and communities adjacent to the Waiwhetu Stream to provide for their social, economic and cultural well-being and for their health and safety.

12.1.3 Section 6 – matters of national importance

In exercising its powers and functions under the Act, Greater Wellington is required to recognise and provide for the matters set out in Section 6, which are considered to be of national importance.

The effects of the proposed works on these matters is discussed in section 11 of this report, and the general conclusions in that regard are that the discharge of diquat in the Waiwhetu Stream will have no more than minor effects on the receiving environment. However, such effects can be minimised if appropriate controls are put in place to minimise the risk. In that respect, the proposed

conditions of consent provide control measures which recognise and provide for the matters listed in section 6.

With respect to Section 6(e) of the Act, Greater Wellington recognises the tangata whenua who have relationships with the Waiwhetu Stream. The applicant has consulted with iwi, and concerns raised have been addressed in the application.

12.1.4 Section 7 – other matters

The other matters to which the Greater Wellington must have regard are listed in Section 7 of the Act.

Section 7(a) provides opportunities for tangata whenua, through the practical expression of kaitiakitanga (the exercise of guardianship) to be involved in managing the use, development and protection of their ancestral taonga (resources). This highlights the importance of ongoing consultation with tangata whenua as the proposed works proceed. In relation to the matters set out in Section 7, the effects of the proposed works have been discussed in depth, and it is considered that, subject to the suggested consent conditions, the intentions of the Section 7 provisions will be satisfied.

12.1.5 Section 8 – principles of the Treaty of Waitangi

In considering the application, Greater Wellington is required to take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi). The Waitangi Tribunal and Courts continue to establish the principles of the Treaty of Waitangi and it is recognised that the principles are continuing to evolve. Two key principles that are of relevance to these applications are active protection and consultation.

The general requirements of consultation have been well established by the judiciary and Courts both within and outside the RMA. Consultation should facilitate tangata whenua understanding of the effects of a proposal on their relationship with the area in question to a point where the applicant can consider how those effects might be avoided, remedied or mitigated. Greater Wellington requires this kind of information to be able to assess how the Council can meet its statutory responsibilities. The consultation process undertaken by the applicant appears to be adequate and the applicant has demonstrated all the principles of consultation established by the Courts for those tangata whenua groups who were consulted.

The principle of active protection has been described as a "guarantee to Maori to continue a relationship with resources that was as much about their use as about their conservation." *NZ Cooperative Dairy Company Limited v Commerce Commission* (1991). In the context of these applications, active protection must be taken into account when considering the tangata whenua relationship with their ancestral land, water, *waahi tapu* and other *taonga.*

12.2 Regional Policy Statement for the Wellington Region (RPS)

The RPS (operative in May 1995) is a statement about the resource management issues of significance to the region, and the objectives, policies and methods, which are designed to achieve integrated management of the natural and physical resources of the whole region. Greater Wellington in exercising its functions and powers needs to have regard to the relevant provisions of this document as follows.

12.2.1 Chapter 4 – The iwi management system

Chapter 4 states the broad issues of resource management significance to tangata whenua of the region. In general, it states that: there are increased opportunities for the cultural aspirations and tikanga of tangata whenua with regard to resources; and the principles of the Treaty of Waitangi need to be taken into account in resource management.

12.2.2 Chapter 5 – fresh water

Chapter 5 contains objectives, policies and methods, which address water quality issues in terms of both the character of the water, encompassing the health and other values of ecosystems, and the sediments or contaminants that may be carried in or deposited by that water.

12.2.3 Chapter 9 – ecosystems

Chapter 9 contains the objectives, policies and methods, which address ecosystems (any system of interacting terrestrial or aquatic organisms within their natural and physical environment) and generally address the sustainable management of ecosystems.

12.2.4 Chapter 13 – waste management and hazardous substances

Chapter 13 contains objectives, policies and methods, which address the storage, transportation and use of hazardous substances, encompassing reducing in the amount and toxicity of hazardous substances in the Region and minimising of risk of damage to the environment and human health from agrichemicals.

I consider that the adoption of the mitigation measures outlined in the application together with the suggested conditions of consent will contribute to the treatment of long-term water quality, and will ensure that any adverse effects of diquat discharges in the short-term are mitigated. Therefore, I consider the application is consistent with the policies in Chapter 4, 5, 9 and 13 of the RPS.

12.3 Regional Freshwater Plan for the Wellington Region (RFP)

The Regional Freshwater Plan (RFP) contains objectives and policies relevant to the application. These are summarised in this section.

I consider Sections 4, 5 and 7 of the RFP relevant to the application, in particular, the following policies:

12.3.1 General objectives and policies

The relationship of tangata whenua with freshwater

Policy 4.2.1 - To manage sites of special value to the tangata whenua in water bodies and river and lake beds so that the cultural values of those sites are not adversely affected.

Policy 4.2.2 - To encourage applicants to consult directly with affected tangata whenua when making an application for a resource consent which is for an activity within, upstream, or immediately downstream of any identified site of special value to the tangata whenua. As part of this consultation the applicant should determine:

(1) Whether granting the resource consent could have any adverse effects on the special values of the site.

(2) How any potential adverse effects that might result from the activity could be avoided or remedied.

Policy 4.2.5 - To have regard to the values and customary knowledge of the tangata whenua, where these have been identified by the tangata whenua, when assessing resource consent applications for the use and development of water bodies and river and lake beds.

I consider the proposed diquat spraying is consistent with general policies 4.2.1, 4.2.2 and 4.2.5 in relation to the tangata whenua. As part of the application, both the Flood Protection Department and Consents Management consulted local iwi, Te Runanganui O Taranaki Whanui Ki Te Upoko O Te Ika A Maui, who are also represented on the Waiwhetu Stream Working Group. I also consider that the proposal has regard for the values of the tangata whenua.

12.3.2 Section 5 – water quality

Receiving Water Quality

Policy 5.2.8 – To have regard to the relevant guidelines in Appendix 8 when considering applications for resource consents (subject to Policy 5.2.10).

I consider that the proposed diquat spraying, is consistent with Policy 5.2.8 as the monitoring proposed for the Waiwhetu Stream is consistent with Appendix 8, which in essence, stipulates that consent conditions must be expressed in terms of the receiving water rather than the discharge. I also consider that the monitoring proposed is more than adequate to ensure that the effects on the water quality will be no more than minor.

Policy 5.2.9 – To manage the quality of the fresh water of the rivers, or parts of rivers, identified in Appendix 7 so that water quality is enhanced to satisfy the purposes identified in the Appendix (subject to Policy 5.2.10).

I consider that the proposed diquat spraying is consistent with Policy 5.2.9 as the Waiwhetu Stream is listed in Appendix 7, which provides for water bodies with water quality identified as needing enhancement. I also consider that the proposed clearing of weeds will not compromise the overall water quality of the Stream and will contribute to the long-term enhancement of the Stream.

12.3.3 Section 7 – use of the beds of rivers and lakes and development of the floodplain

Appropriate Uses within the River and Lake Bed

Policy 7.2.1 - To allow the following uses within river and lake beds:

- *structures or activities for flood mitigation or erosion protection purposes; or*
- *the removal of aquatic weeds from farm drains and urban drains for drainage purposes.*

provided that any adverse effects are avoided, remedied or mitigated and that the significant adverse effects identified in Policy 7.2.2 are avoided.

I consider that the proposed spraying is consistent with Policy 7.2.1 as I consider the clearing weeds in the Waiwhetu to be an appropriate activity in rivers, for flood protection and river enhancement purposes.

Flood and Erosion Mitigation in River and Lake Beds and on the Floodplain

Policy 7.2.6 - To have regard to any relevant Floodplain Management Plan and the information provided in any relevant flood hazard assessment, or in connection with any River Management Scheme, when considering subdivision, use, or development within any river bed or floodplain.

I consider that the proposed diquat spraying is consistent with Policy 7.2.6 as the control of aquatic weeds is outlined in the Waiwhetu Stream Management Plan - Flood Hazard Assessment. The use of diquat is listed in Section 4.6 of the Plan, in the evaluation of alternative weed control strategies.

In summary, I consider the proposed application methodology and mitigation measures proposed in the application, together with the suggested conditions of consent will meet the intentions of the relevant policies outlined in Sections 5 and 7 of the RFP.

13. Conclusions

I consider that the effects of the proposed activities are generally minor, and the adverse effects on the environment can be sufficiently avoided, remedied or mitigated by imposing appropriate consent conditions.

The applicant has acknowledged the adverse and positive effects of the works, they have incorporated mitigation measures to avoid, remedy or mitigate adverse effects from the proposed works.

I consider that the proposed works will not have a long-term effect on water quality, fish spawning or aquatic ecosystems. I consider that the proposed mitigation measures, application methodology and suggested conditions of consent will mitigate any short-term effects on water quality.

14. Recommendation

I recommend, pursuant to sections 105, 107, and 108 of the Resource Management Act 1991, that the Hearings Committee grant the consent WGN030059 [22344] subject to the suggested conditions of consent.

15. Term of the consents

I consider five years, as requested by the applicant, to be an appropriate term for this consent. This term will allow the applicant to carry out the proposed works over the next five years to optimise the need for a balanced expenditure, and flood security, as well as limit the potential cumulative effects on the Waiwhetu Stream environment.

The applicant has also requested that the standard lapsing term of two years within which the consents have to be exercised (section 125 of the RMA 1991), be extended to five years. I support this extension of the lapsing period, which will ensure that the applicant can apply diquat to the Stream only when manual clearing methods fail.