

South Taranaki Water Supplies  
Monitoring Programme  
Annual Report  
2012-2013  
Technical Report 2013-65

ISSN: 0114-8184 (Print)  
ISSN: 1178-1467 (Online)  
Document: 1239752 (Word)  
Document: 1268771 (Pdf)

Taranaki Regional Council  
Private Bag 713

STRATFORD

November 2013



## Executive summary

The South Taranaki District Council (STDC) operates a total of 11 water supply schemes throughout the district. STDC holds 39 resource consents which include conditions setting out the requirements that must be satisfied. STDC holds 187 consents to take water, 11 consents to discharge to both land and water, and 12 consents to construct and maintain in-stream structures.

Oaonui Water Supply Limited (OWSL) operates the Oaonui Water Supply scheme. It took the scheme over from STDC in September 2000. OWSL holds two resource consents which include a total of 15 conditions setting out requirements that must be satisfied. OWSL holds one consent to abstract water and one consent to maintain an in-stream structure.

The Nukumarū Water Scheme Society Incorporated [NWSSI] operates a rural water supply scheme. The original consent (now surrendered) to take surface water for this scheme was held by STDC but a new consent, with seven conditions, to take water for the scheme from two bores, was issued to the NWSSI in 2004.

This report for the period July 2012-June 2013 describes the monitoring programme implemented by the Taranaki Regional Council to assess the environmental performance of the three organisations during the period under review, and the results and environmental effects of their activities.

During the 2011-2012 monitoring period the Council's monitoring programme included an annual inspection of each water supply scheme abstracting from surface water, the collection of seven water samples for physicochemical analysis, three biomonitoring surveys of receiving water, three fish passage surveys, seven hydrometric gaugings and the review of abstraction data provided by the consent holders.

Chemical sampling of discharges and receiving waters, macroinvertebrate surveys and fish surveys, all indicated that the water supply schemes did not appear to be causing any significant adverse environmental effects.

A review of abstraction records showed that there were some minor non-compliances at Patea, Rahotu, Waimate West, Oaonui and Waverley plants in regards to daily volumes or abstraction rates. However all of these plants were compliant for over 98% of the monitoring period.

In the 2012-2013 year there were two incidents recorded against STDC in regards to not having telemetry installed at the Otakeho Stream and Mangawhero Stream intakes. An abatement notice was issued and STDC are currently addressing the matter at the time of the preparation of this report with a deadline for resolution set at 31 October 2013.

STDC demonstrated a good level of environmental performance and compliance with their resource consents. Whilst there was the on-going issue of telemetry not being installed at some sites, STDC was working proactively to have all of their abstraction data to be sent electronically to Council's database.

OWSL demonstrated a good level of environmental performance and compliance with their resource consents. No environmental effects were noted, however there were two non-compliances in regards to exceeding daily volume limits.

Nukumaru Water Scheme Society Incorporated demonstrated a good level of environmental performance and compliance with their resource consents. No environmental effects were noted, however data was not supplied by the due date.

For reference, in the 2012-2013 year, 35% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 59% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2013-2014 year.

## Table of contents

	Page
1. Introduction	1
1.1 Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1 Introduction	1
1.1.2 Structure of this report	1
1.1.3 The Resource Management Act (1991) and monitoring	2
1.1.4 Evaluation of environmental performance	2
1.2 Process description	3
1.3 Resource consents	10
1.3.1 Cold Creek water supply	10
1.3.1.1 Water abstraction permit	10
1.3.1.2 Water discharge permit	11
1.3.1.3 Land use permits	11
1.3.2 Eltham water supply	11
1.3.2.1 Water abstraction permit	11
1.3.2.2 Water discharge permit	12
1.3.3 Hawera water supply	13
1.3.3.1 Water abstraction permits	13
1.3.3.2 Water discharge permit	14
1.3.3.3 Land use permit	15
1.3.4 Inaha water supply	16
1.3.4.1 Water abstraction permits	16
1.3.4.2 Water discharge permits	18
1.3.4.3 Land use permits	18
1.3.5 Opunake water supply	19
1.3.5.1 Water abstraction permit	19
1.3.5.2 Water discharge permit	20
1.3.5.3 Land use consents	20
1.3.6 Patea water supply	21
1.3.6.1 Water abstraction permits	21
1.3.7 Pope water supply	21
1.3.7.1 Water abstraction permit	21
1.3.7.2 Water discharge permit	21
1.3.8 Rahotu water supply	22
1.3.8.1 Water abstraction permit	22
1.3.8.2 Water discharge permit	22
1.3.9 Wai-inu Beach water supply	22
1.3.9.1 Water abstraction permit	22
1.3.10 Waimate West water supply	23
1.3.10.1 Water abstraction permit	23
1.3.10.2 Water discharge permit	24
1.3.10.3 Land use consents	25
1.3.11 Waverley Beach water supply	26
1.3.11.1 Water abstraction permit	26
1.3.12 Waverley water supply	26
1.3.12.1 Water abstraction permits	26
1.3.13 Oaonui water supply	27
1.3.13.1 Water abstraction permit	27

1.3.13.2	Land use permit	27
1.3.13.3	Water discharge permit	28
1.3.14	Nukumarū water supply	28
1.3.14.1	Water abstraction permits	28
1.4	Monitoring programme	29
1.4.1	Introduction	29
1.4.2	Programme liaison and management	29
1.4.3	Site inspections	29
1.4.4	Chemical sampling	30
1.4.5	Biomonitoring surveys	30
1.4.6	Fish surveys	30
2.	Results	31
2.1	Inspections	31
2.1.1	Opunake water supply	31
2.1.2	Cold Creek water supply	34
2.1.3	Eltham water supply	34
2.1.4	Inaha water supply	34
2.1.5	Rahotu water supply	35
2.1.6	Waimate West water supply	35
2.1.7	Oaonui water supply	36
2.1.8	Hawera water supply	36
2.1.9	Patea water supply	36
2.2	Results of discharge monitoring	37
2.2.1	Hawera WTP (Kapuni)	37
2.2.2	Waimate West WTP (Kelly's Creek)	38
2.2.3	Inaha WTP (discharge)	39
2.3	Results of receiving environment monitoring	39
2.3.1	Hawera WTP macroinvertebrate survey (Kapuni)	39
2.3.2	Waimate West WTP macroinvertebrate survey (Mangawhero-iti)	40
2.3.3	Rahotu WTP macroinvertebrate survey (Pungaereere)	41
2.3.4	Cold Creek WTP fish survey	41
2.3.5	Oaonui WTP electric fishing survey	42
2.3.6	Waimate West WTP (Mangawhero) electric fishing survey	42
2.4	Abstraction data	43
2.4.1	Cold Creek water supply	44
2.4.2	Eltham water supply	44
2.4.3	Hawera water supply	45
2.4.4	Inaha water supply	45
2.4.5	Opunake water supply	47
2.4.6	Patea water supply	47
2.4.7	Rahotu water supply	48
2.4.8	Wai-inu Beach water supply	49
2.4.9	Waimate West water supply	49
2.4.10	Waverley water supply	50
2.4.11	Oaonui water supply	52
2.4.12	Waverley Beach water supply	53
2.4.13	Nukumarū water supply	53
2.5	Investigations, interventions, and incidents	53
3.	Discussion	55
3.1	Discussion of plant performance	55

3.2	NES water metering requirements	57
3.3	Environmental effects of exercise of consents	57
3.4	Evaluation of performance	57
3.4.1	Cold Creek water supply	57
3.4.2	Eltham water supply	59
3.4.3	Hawera water supply	60
3.4.4	Inaha water supply	65
3.4.5	Opunake water supply	68
3.4.6	Patea water supply	69
3.4.7	Pope water supply	70
3.4.8	Rahotu water supply	70
3.4.9	Wai-inu Beach water supply	71
3.4.10	Waimate West water supply	71
3.4.11	Waverley water supply	76
3.4.12	Oaonui water supply	77
3.4.13	Nukumarū water supply	78
3.5	Recommendations from the 2011-2012 Monitoring Report	78
3.6	Alterations to monitoring programmes for 2013-2014	79
4.	Recommendations	80
	Glossary of common terms and abbreviations	81
	Bibliography and references	83
Appendix I	Resource consents held by STDC, OWSL and NWSSI	
Appendix II	Biomonitoring and fish survey reports	

## List of tables

Table 1	South Taranaki water supplies resource consents and processes	5
Table 2	Kapuni WTP sample results 7 November 2012	37
Table 3	Kapuni WTP sample results 27 June 2013	38
Table 4	Results of sampling at the Waimate West WTP 9 April 2013	38
Table 5	Results of sampling at the Inaha WTP 15 April 2013	39
Table 6	Compliance with abstraction rates at the Patea bores	47
Table 7	Compliance with consents 0634 and 3911	49
Table 8	Compliance with abstraction rates at the Waverley bores	50
Table 9	Summary of compliance in regards to abstraction rates, volumes and data	55
Table 10	Summary of performance for Consent 1134-2 to take and use water for the Cold Creek rural supply from Cold Stream a tributary of the Taungatara Stream	57
Table 11	Summary of performance for Consent 5454-1 to erect, place, use and maintain a water intake structure on the bed of Cold Creek for water abstraction purposes	58
Table 12	Summary of performance for Consent 6077-1 to discharge filter backwash water and supernatant from the Cold Creek water treatment plant into the Cold Stream	58
Table 13	Summary of performance for Consent 0213-3 to take and use water from the Waingongoro River	59
Table 14	Summary of performance for Consent 0989-2 to discharge reservoir contents, including accumulated silt, for the Eltham water supply reservoir	59
Table 15	Summary of performance for Consent 1810-3 to discharge overflow and reservoir drainage water from the Eltham water supply reservoir	60
Table 16	Summary of performance for Consent 1811-3 to discharge filter backwash from the Eltham water treatment plant	60
Table 17	Summary of performance for Consent 0146-2 to take and use water from the Kapuni Stream for municipal water supply purposes	60
Table 18	Summary of performance for Consent 0933-3 to discharge filter backwash and settling tank sediment into the Kapuni Stream	61
Table 19	Summary of performance for Consent 5596-1 to and to maintain two existing intake structures in the Kapuni Stream for the Hawera water supply	62
Table 20	Summary of performance for Consent 7002-1 to take and use groundwater for municipal, rural, industrial, and recreational supply purposes	62
Table 21	Summary of performance for Consent 7413-1 to erect, use and maintain a water intake structure on the bed of the Kapuni Stream	63



Table 22	Summary of performance for Consent 7446-1 to discharge membrane backwash water and cleaning wastewater into the Kapuni Stream	64
Table 23	Summary of performance for Consent 7447-1 to install, use and maintain an outfall structure on the bank of the Kapuni Stream	64
Table 24	Summary of performance for Consent 1185-3 to take water from the Mangatoki Stream in the Waingongoro catchment for Inaha rural water supply purposes	65
Table 25	Summary of performance for Consent 1186-3 to take water from the Waingongoro River for Inaha rural water supply purposes	65
Table 26	Summary of performance for Consent 3927-2 to discharge backwash wastes from the Inaha water supply treatment plant into an unnamed tributary of the Mangatoki Stream	66
Table 27	Summary of performance for Consent 3928-2 to discharge uncontaminated overflow water from the Inaha rural water supply treatment plant	66
Table 28	Summary of performance for Consent 4102-2 to construct a low-level weir and fish pass across the Mangatoki Stream to improve water intake efficiencies	67
Table 29	Summary of performance for Consent 5364-1 to take and use water from the Mangatoki Stream for Inaha rural supply scheme purposes	67
Table 30	Summary of performance for Consent 5365-1 to erect, place and maintain a low level intake weir in the Mangatoki Stream for Inaha rural water supply scheme purposes	68
Table 31	Summary of performance for Consent 0232-3 to take water from the Waiaua Stream for Opunake town water supply purposes	68
Table 32	Summary of performance for Consent 5574-1 to discharge filter backwash water and settling tank sediment from the Opunake Water Treatment Plant into the Waiaua River	68
Table 33	Summary of performance for Consent 9473-1 to construct, place and use a water intake structure on the bed of the Waiaua River for water abstraction purposes	69
Table 34	To take and use groundwater from three bores (known as Bore 1, Bore 2 and Bore 4) for Patea Township water supply purposes	69
Table 35	Summary of performance for Consent 4446-1 to discharge treated backwash water from the Pope Rural Water Supply Treatment Plant	70
Table 36	Summary of performance for Consent 3696-2 to take and use water from the Pungaereere Stream for Rahoitu community water supply scheme	70
Table 37	Summary of performance for Consent 6038-1 to discharge filter backwash water and settling tank waste from the Rahoitu water treatment plant into the Pungaereere Stream	71
Table 38	Summary of performance for Consent 3770-2 to take water from a bore in the Waitotara Catchment for Wai-inu Beach Settlement water supply purposes	71
Table 39	Summary of performance for Consent 0129-3 to discharge treated washwater from the Waimate water supply scheme into an unnamed tributary of the Mangawhero-iti Stream	71

Table 40	Summary of performance for Consent 0634-3 to take water from the Mangawhero-iti Stream for the Waimate West water supply	72
Table 41	Summary of performance for Consent 0635-3 to take water from the Mangawhero Stream to add to the flow of the Mangawhero-iti Stream for water supply purposes	73
Table 42	Summary of performance for Consent 3911-2 to divert and use water from the Otakeho Stream for the Pope and Waimate West water supply schemes	73
Table 43	Summary of performance for Consent 4826-2 to place, use and maintain a water intake structure and associated structures on the bed of the Otakeho Stream	74
Table 44	Summary of performance for Consent 5451-1 to erect, place, use and maintain a water intake structure on the bed of the Mangawhero-iti Stream for water abstraction purposes	75
Table 45	Summary of performance for Consent 5452-1 to erect, place, use and maintain a water intake structure on the bed of the Mangawhero Stream for water abstraction	75
Table 46	Summary of performance for Consent 3313-3 to take and use groundwater from the Fookes and Chester Street bores for Waverley municipal supply purposes	76
Table 47	Summary of performance for Consent 0231-3 to take and use water from the Oaonui Stream for a rural community water supply scheme and the Maui Production Station	77
Table 48	Summary of performance for Consent 5453-1 to erect, place, use and maintain a water intake structure on the bed of the Oaonui Stream for water abstraction purposes	77
Table 49	Summary of performance for Consent 6451-1 to take and use groundwater from up to two bores for the purpose of supplying the Nukumarū community rural water scheme	78

## List of figures

Figure 1	Location of South Taranaki District Council and Oaonui Water Supply Limited resource consents	8
Figure 2	Aerial photo showing locations of the old and new WTPs, and relevant sampling sites	37
Figure 3	Graph of the daily abstraction for the Cold Creek water supply	44
Figure 4	Graph of the daily abstraction for the Eltham water supply	44
Figure 5	Graph of the daily abstraction for the Hawera water supply	45
Figure 6	Graph of the daily abstraction from the Waingongoro River for the Inaha water supply	46
Figure 7	Graph of the daily combined abstraction from the Mangatoki Stream for the Inaha water supply	46
Figure 8	Graph of the daily abstraction for the Opunake water supply	47

Figure 9	Graph showing combined daily abstractions from the Patea groundwater bores	48
Figure 10	Graph of the daily abstraction for the Rahotu water supply	48
Figure 11	Graph of daily abstractions for the Wai-inu Beach water supply	49
Figure 12	Residual flow in the Mangawhero-iti Stream	50
Figure 13	Graph of daily abstractions from the Chester Street bore	51
Figure 14	Graph of the daily abstraction from the Fookes Street bore	51
Figure 15	Graph of the daily abstraction from the Swinbourne Street bore	52
Figure 16	Graph of the daily abstraction from the Oaonui Stream for the Oaonui water supply	52
Figure 17	Graph of the average daily abstraction for the Nukumaru water supply	53

### **List of photographs**

Photograph 1	Membrane racks at the new Kapuni WTP	4
Photograph 2	Kapuni WTP intake and fishpass on the Kapuni Stream	30
Photograph 3	Coffer dam on the Waiaua Stream for Opunake WTP intake installation	32
Photograph 4	Opunake WTP intake structure prior to installation	32
Photograph 5	Wet well and intake line installation at the Opunake WTP	33
Photograph 6	Silt controls at the Opunake WTP intake installation	34
Photograph 7	Solar panel array powering Mangawhero-iti intake data logging and telemetry	35
Photograph 8	Fish pass at Mangawhero-iti weir	36



# **1. Introduction**

## **1.1 Compliance monitoring programme reports and the Resource Management Act 1991**

### **1.1.1 Introduction**

This report is the Annual Report for the period July 2012-June 2013 by the Taranaki Regional Council on the monitoring programme associated with resource consents held by the South Taranaki District Council [STDC], Nukumarū Water Scheme Society Inc [NWSSI], and Oaonui Water Supply Limited [OWSL]. STDC operates 11 water supply schemes and NWSSI and OWSL each operate one water supply scheme in the South Taranaki District.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by STDC, NWSSI and OWSL that relate to water supply schemes within the South Taranaki District

One of the intents of the Resource Management Act (1991) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Taranaki Regional Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of water supply schemes in the South Taranaki District and their use of water and land, and is the 15th report by the Taranaki Regional Council for water supplies in the district.

### **1.1.2 Structure of this report**

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the Resource Management Act and the Council's obligations and general approach to monitoring sites through annual programmes, the resource consents held by STDC, NWSSI and OWSL, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted at the consent holders' sites.

Section 2 presents the results of monitoring for the 2012-2013 monitoring period, including scientific and technical data and discusses the results, their interpretation, and their significance for the environment.

Section 3 presents an evaluation of performance and implementation of previous recommendations and any alterations to the monitoring programme.

Section 4 presents recommendations to be implemented in the 2013-2014 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

### 1.1.3 The Resource Management Act (1991) and monitoring

The Resource Management Act primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- (a) the neighbourhood or the wider community around a discharger, and may include cultural and socio-economic effects;
- (b) physical effects on the locality, including landscape, amenity and visual effects;
- (c) ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- (d) natural and physical resources having special significance (e.g., recreational, cultural, or aesthetic);
- (e) risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Taranaki Regional Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each discharge source. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the Resource Management Act to assess the effects of the exercise of consents.

In accordance with section 35 of the Resource Management Act 1991, the Council undertakes compliance monitoring for consents and rules in regional plans; and maintains an overview of performance of resource users against regional plans and consents. Compliance monitoring, including impact monitoring, also enables the Council to continuously assess its own performance in resource management as well as that of resource users particularly consent holders. It further enables the Council to continually re-evaluate its approach and that of consent holders to resource management, and, ultimately, through the refinement of methods, to move closer to achieving sustainable development of the region's resources.

### 1.1.4 Evaluation of environmental performance

Besides discussing the various details of the performance and extent of compliance by the Company/companies in the catchment during the period under review, this report also assigns an overall rating. The categories used by the Council, and their interpretation, are as follows:

- a **high** level of environmental performance and compliance indicates that essentially there were no adverse environmental effects to be concerned about, and no, or inconsequential (such as data supplied after a deadline) non-compliance with conditions.
- a **good** level of environmental performance and compliance indicates that adverse environmental effects of activities during the monitoring period were negligible or minor at most, or, the Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices, or, there were perhaps some items noted on inspection notices for attention but these items were not urgent nor critical, and follow-up inspections showed they have been dealt with, and any

inconsequential non compliances with conditions were resolved positively, co-operatively, and quickly.

- **improvement desirable (environmental) or improvement desirable (administrative compliance)** (as appropriate) indicates that the Council may have been obliged to record a verified unauthorised incident involving measurable environmental impacts, and/or, there were measurable environmental effects arising from activities and intervention by Council staff was required and there were matters that required urgent intervention, took some time to resolve, or remained unresolved at the end of the period under review, and/or, there were on-going issues around meeting resource consent conditions even in the absence of environmental effects. Abatement notices may have been issued.
- **poor performance (environmental) or poor performance (administrative compliance)** indicates generally that the Council was obliged to record a verified unauthorised incident involving significant environmental impacts, or there were material failings to comply with resource consent conditions that required significant intervention by the Council even in the absence of environmental effects. Typically there were grounds for either a prosecution or an infringement notice.

For reference, in the 2012-2013 year, 35% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 59% demonstrated a good level of environmental performance and compliance with their consents.

## 1.2 Process description

The water treatment plants operated by STDC, OWSL and NWSSI generally operate in the following manner. Raw water is abstracted from a river or stream via an intake structure. It is passed through a settling pond, followed by coagulation and flocculation before being passed through sand filters. At some plants the water is passed through a clarifier prior to the sand filters. The new plant at Kapuni utilises membrane filtration technology. Chemicals such as lime or soda ash are used to adjust pH and water is disinfected with either hypochlorite solution or chlorine gas, before it is ready for distribution. The waste products from the backwashing of filters (and at some sites, the clarifier bleed) are discharged to water via a settling pond or tank. The water supply schemes sourced by groundwater are typically not treated, but may be chlorinated.

A summary of the process at each individual water supply plant is included in Table 1.



**Photograph 1** Membrane racks at the new Kapuni WTP

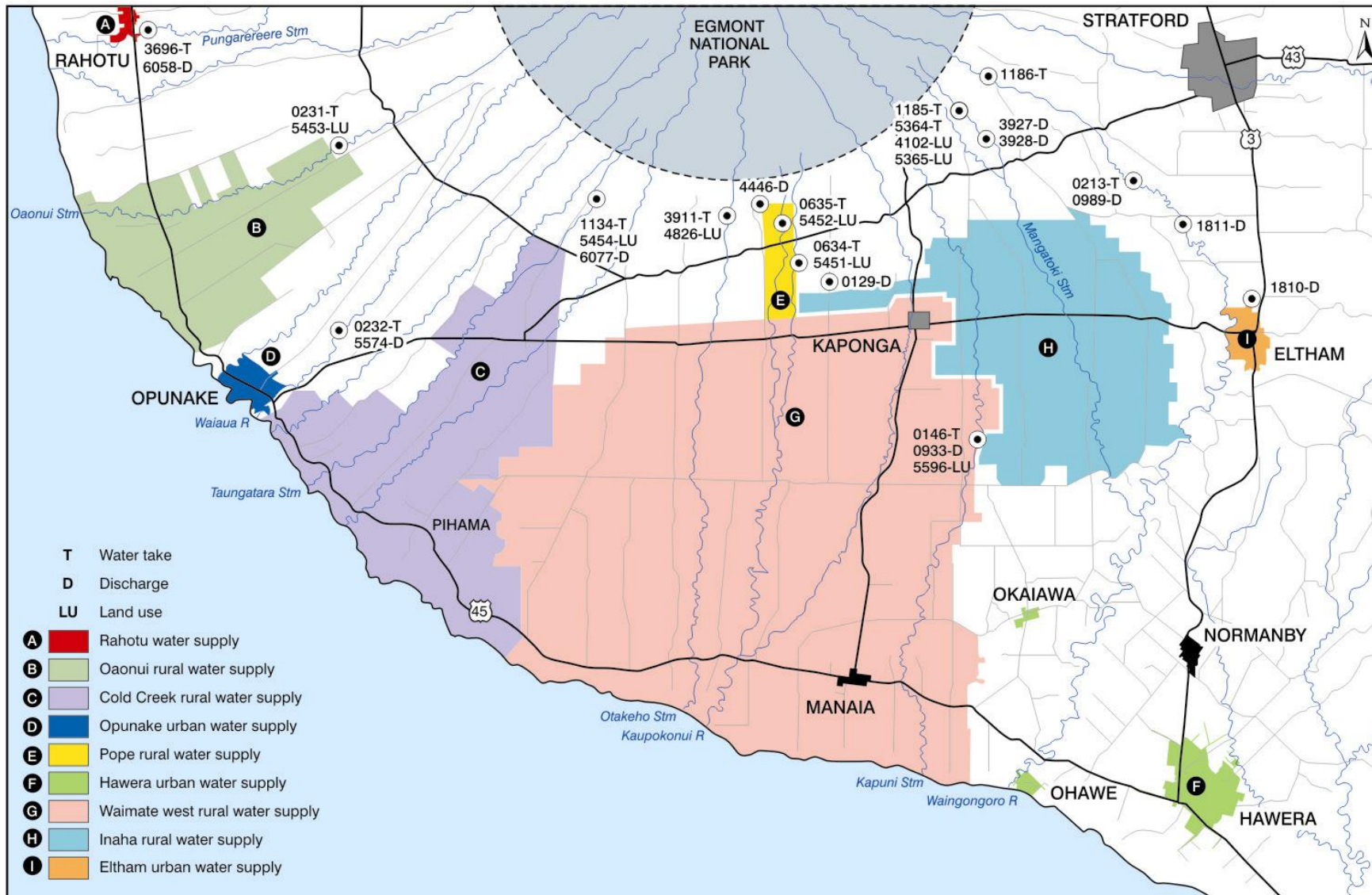


**Table 1** South Taranaki water supplies resource consents and processes

Water Supply Scheme	Resource consent	Expiry	Activity	Process
Cold Creek Rural Water Supply	1134-2 Take	2012-under renewal	To take up to 5,095 m <sup>3</sup> /day, at a maximum rate of 59 L/s, for the Cold Creek rural supply from Cold Stream.	Raw water is abstracted from a weir on Cold Stream. The water is gravity fed to the treatment plant and is passed through a sand filter and then chlorinated (chlorine gas).
	6077-1 Discharge	2018	To discharge filter backwash water and supernatant from the Cold Creek WTP into the Cold Stream.	The filter backwash discharges to Cold Creek via settling ponds. The filter is backwashed roughly once every nine hours.
	5454-1 Land Use	2018	To erect and maintain a water intake structure (weir) on the bed of Cold Creek.	
Eltham Water Supply	0213-3 Take	2018	To take up to 4,020 m <sup>3</sup> /day, at a maximum rate of 47 L/s (unrestricted), with an additional 1,500 m <sup>3</sup> /day at a maximum rate of 17 L/s (restricted) from the Waingongoro River.	Raw water is abstracted from a pool (no weir) and piped to the treatment plant via a settling pond. Pond overflow is discharged directly back to the river. The pond level is managed to minimise overflow to waste.
	0989-3 Discharge	2029	To discharge reservoir contents from the Eltham Water Supply Reservoir onto land adjacent to the Waingongoro River	PACI is added and the water passed through sand filters. The water is pH buffered (sodium bicarbonate) and chlorinated.
	1810-3 Discharge	2017	To discharge up to 2,000 m <sup>3</sup> /day [50 litres/second] of overflow and reservoir drainage water from the Eltham water supply reservoir into the Mangawharawhara Stream.	Backwash from the filters is discharged via 1 of 2 settling ponds to a drain which flows to an unnamed tributary of the Waingongoro River.
	1811-3 Discharge	2017	To discharge up to 220 m <sup>3</sup> /day [20 litres/second] of filter backwash from the Eltham WTP via a settling pond into an unnamed tributary of the Waingongoro River.	
Hawera Water Supply	0146-2 Take	2020	Take up to 10,756.8 m <sup>3</sup> /day at a maximum rate of 124.5 L/s (unrestricted) with an additional 1,343.2 m <sup>3</sup> /day at a maximum rate of 15.5 L/s (restricted), from the Kapuni Stream.	Old Hawera WTP Raw water is abstracted from the Kapuni Stream and passes through a sedimentation chamber. Flocculant is added and the water passed through clarifiers and sand filters. The water is pH buffered (soda ash) and chlorinated. Clarifier bleed and filter backwash are discharged to the Kapuni Stream via a settling pond.
	0933-3 Discharge	2023	To discharge up to 227 m <sup>3</sup> /day of settling pond supernatant from a WTP into the Kapuni Stream.	
	5596-1 Land Use	2017	To construct and maintain a weir and intake structure, and to maintain two existing intake structures in the Kapuni Stream.	
	7002-1 Take	2023	Take and use up to 4,320 m <sup>3</sup> /day of groundwater at a maximum rate of 50 L/s as a combined total from up to three water bores in a bore field at the Kapuni reservoir site.	New Kapuni WTP commissioned December 2009 Raw water is abstracted from the Kapuni Stream and pumped to the WTP. It passes through grit tanks and a flocculant is added before it goes into a flocculation tank. It then is pumped through strainers before going through the membrane filters. The water is then pH adjusted using caustic soda, chlorinated, and fluoride added before going to the site reservoirs.
	7446-1 Discharge	2023	To discharge membrane backwash water and cleaning wastewater from the Kapuni WTP into the Kapuni Stream.	
	7413-1 Intake structure	2023	To erect, use and maintain a water intake structure on the bed of the Kapuni Stream.	Membrane backwash water is discharged via 2 settling ponds to the Kapuni Stream. The discharge water is dechlorinated and pH adjusted before it goes to the ponds.
	7447-1 Outfall structure	2023	To install, use and maintain an outfall structure on the bank of the Kapuni Stream for the Kapuni WTP.	
Inaha Rural Water Supply	1185-3 Take	2023	To take up to 1,122 m <sup>3</sup> /day, at a maximum rate of 13 L/s, from the Mangatoki Stream.	Raw water is abstracted from two intake structures (weirs) on the Mangatoki Stream and a single intake (no weir) on the Waingongoro River. Water is gravity fed and pumped to a settling pond and then to the treatment plant. PACI is added and the water is passed through 2 sand filters. The water is pH buffered (sodium
	1186-3 Take	2023	To take up to 2,592 m <sup>3</sup> /day, at a maximum rate of 30 L/s, from the Waingongoro River.	

Water Supply Scheme	Resource consent	Expiry	Activity	Process
	5364-1 Take	2017	To take up to 1,382 m <sup>3</sup> /day, at a maximum rate of 16 L/s, from the Mangatoki Stream.	bicarbonate) and chlorinated. Filter backwash is discharged to a small settling pond, then to an unnamed tributary of the Mangatoki Stream via a natural pond.
	3927-2 Discharge	2017	To discharge up to 228 m <sup>3</sup> /day of filter backwash to the Mangatoki Stream.	
	3928-2 Discharge	2017	To discharge up to 3,060 m <sup>3</sup> /day of uncontaminated overflow water into the Mangatoki Stream.	
	4102-2 Land Use	2023	To maintain an existing low-level weir and fish pass across the Mangatoki Stream.	
	5365-1 Land Use	2017	To erect and maintain an intake structure (weir) on the bed of Mangatoki Stream.	
Opunake Water Supply	0232-3 Take	2012-under renewal	To take up to 3,650 m <sup>3</sup> /day, at a maximum rate of 42.2 L/s, from the Waiaua Stream.	Water is abstracted from the true right bank of the Waiaua Stream (no weir) and enters a settling pond prior to being gravity fed to the treatment plant. PACl is added and the water passed through a sand filter and then chlorinated (chlorine gas). Accumulated solids from the settling pond are regularly removed. The plant has three sand filters that operate in parallel. Each of the filters backwashes (using chlorinated water) approximately once every 1-2 hours depending on river conditions. The filter backwash and reservoir overflow is discharged via a settling tank to the Waiaua Stream.
	5574-1 Discharge	2012-under renewal	To discharge filter backwash into the Waiaua Stream.	
	9473-Structure	2030	To construct, place and use a water intake structure on the bed of the Waiaua River for water abstraction purposes	
Patea Water Supply	3388-2 Take	2028	To take and use groundwater from three bores (known as Bore 1, Bore 2 and Bore 4) for Patea Township water supply purposes	Groundwater is pumped from bores 1,2 and 4 and then sent to the treatment plant Egmont Rd.
Pope Rural Water Supply	See Waimate West 3911-2	2018	Up to 5 L/s is diverted to the Pope water supply from a larger take from the Otakeho Stream (Waimate West Scheme).	Up to 5 L/s of raw water is taken from the Otakeho-Mangawhero diversion pipeline and gravity fed to the Pope rural water supply. Water enters the treatment plant and is passed through a sand filter and then chlorinated (sodium hypochlorite). Treated water is stored in tanks adjacent to the treatment plant. The filter backwash is discharged to an unnamed tributary of the Mangawhero Stream via a small settling pond.
	4446-2 Discharge	2023	To discharge treated backwash water from the Pope Rural Water Supply Treatment Plant into an unnamed tributary of the Mangawhero Stream.	
Rahotu Water Supply	3696-2 Take	2013	To take up to 180 m <sup>3</sup> /day, at a maximum rate of 3 L/s from the Pungaereere Stream.	Raw water is pumped from a pool in the Pungaereere Stream (no weir) to the adjacent treatment plant. Water is passed through a clarifier and sand filter and chlorinated (sodium hypochlorite). The filter is backwashed daily using treated water. The filter backwash and clarifier bleed is discharged directly to the Pungaereere Stream.
	6038-1 Discharge	2019	To discharge filter backwash water and settling tank waste from the Rahotu WTP into the Pungaereere Stream.	

Water Supply Scheme	Resource consent	Expiry	Activity	Process
Wai-inu Beach Water Supply	3770-3 Take	2010	To take up to 346 m <sup>3</sup> /day, at a maximum rate of 4 L/s, of groundwater from a bore (GND0853).	Groundwater is pumped from a bore, chlorinated and then pumped to a reservoir for distribution.
Waimate West Water Supply	0634-3 Take	2023	To take water from the Mangawhero-iti Stream for the Waimate West water supply.	Raw water is diverted from the Otakeho and Mangawhero Streams to the Mangawhero-iti Stream. Water is then abstracted from the Mangawhero-iti Stream (all takes are via weirs) and gravity fed to the treatment plant. Up to 5 litres/sec from the Otakeho take is diverted to the Pope rural supply. When sufficient water can be abstracted from the other two streams in the scheme, water from the Mangawhero Stream is avoided due to its turbidity.  PACI and flocculent are added and the water passes through a clarifier and sand filters. The water is pH buffered (soda ash) and chlorinated (chlorine gas).  On average the clarifier is bled every 6 hours and each of the four filters are backwashed once per day. Clarifier bleed and filter backwash are discharged via 1 of 2 settling ponds to an unnamed tributary of the Mangawhero-iti Stream.
	0635-3 Take	2023	To take water from the Mangawhero Stream for the purpose of adding to the flow of the Mangawhero-iti Stream and providing water for the Waimate West water supply.	
	3911-2 Take	2018	To take water from the Otakeho Stream for the Pope and Waimate West water supply schemes.	
	0129-3 Discharge	2023	To discharge treated washwater from the Waimate Water Supply Scheme into an unnamed tributary of the Mangawhero-iti Stream.	
	4826-2 Land Use	2017	To erect and maintain an intake structure (weir) on the bed of the Otakeho Stream.	
	5451-1 Land Use	2017	To erect and maintain an intake structure (weir) on the bed of the Mangawhero-iti Stream.	
	5452-1 Land Use	2017	To erect and maintain an intake structure (weir) on the bed of the Mangawhero Stream.	
Waverley Water Supply	3313-3 Take	2022	To take and use groundwater from the "Fookes Street" bore (GND0244) and the "Chester Street" bore (GND0059) for municipal water supply purposes.	Groundwater is pumped from two bores, which tap a confined aquifer in the Whenuakura formation, to a reservoir for distribution. The water passes through a sand trap prior to being pumped to a reservoir for distribution. There is no treatment.
Waverley Beach Water Supply	Permitted Activity – Take		Under RFWP : Take up to 50 m <sup>3</sup> /day, at a maximum rate of 1.5 L/s, from a bore (GND1061).	Groundwater is pumped from a bore to a reservoir for distribution. It is not chlorinated.
Oaonui Rural Water Supply	0231-3 Take	2018	To take up to 3,500 m <sup>3</sup> /day, at a maximum rate of 50 L/s, from the Oaonui Stream for a rural community water supply scheme and the Maui Production Station.	Raw water is abstracted from the Oaonui Stream (weir) and is piped to a settling pond. For 30 min/day water is backflushed to the stream to remove sediment. Water from the pond is treated with chlorine prior to distribution. Chlorine dosing is automated according to the raw water abstraction rate and turbidity.
	Permitted Activity – Discharge		Discharge accumulated solids from race and settling pond.	
	5453-1 Land Use	2018	To erect and maintain an intake structure (weir) on the bed of the Oaonui Stream.	
Nukumarū Rural Water Supply	6451-1 Take	2039	To take up to 605 litres/day (7 L/s) from up to two bores.	



**Figure 1** Location of South Taranaki District Council and Oaonui Water Supply Limited resource consents



**Figure 1 (contd)** Location of South Taranaki District Council and Nukumaru Water Scheme Society Inc resource consents

## 1.3 Resource consents

Section 14 of the Resource Management Act stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14.

Section 15(1)(a) of the Resource Management Act stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations.

Section 13(1)(a) of the Resource Management Act stipulates that no person may use, erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, on, under, or over the bed of any lake or river, unless the activity is expressly allowed for by a resource consent, or a rule in a Regional Plan and in any relevant proposed regional plan.

STDC, OWSL and NWSSI hold various resource consents including water abstraction permits, discharge permits and land use consents for the various water supply plants and structures they operate. These resource consents are listed in Table 1 and their locations are shown in Figure 1. The conditions of the consents are summarised below in Sections 1.3.1 to 1.3.14. Copies of all resource consents held in relation to water supply plants and structures in the South Taranaki District are included in Appendix I.

### 1.3.1 Cold Creek water supply

#### 1.3.1.1 Water abstraction permit

STDC held water permit 1134-2 to cover the abstraction of water from Cold Creek, a tributary of the Taungatara Stream, for rural water supply purposes. This permit was issued by the Taranaki Regional Council on 20 June 1990 under Section 87 of the Resource Management Act. It expired on 1 June 2012. STDC has lodged an application to renew consent 1134 and continues to exercise the expired consent under section 124 of the RMA.

Condition 1 limits the rate of taking.

Conditions 2 and 3 require the consent holder to record the rate and volume of abstraction, while condition 4 requires that this is provided to Council.

Condition 5 specifies a residual flow to be maintained.

Conditions 6 and 7 relate to staff gauge installation and stream flow measurements.

Condition 8 requires annual reporting.

Condition 9 requires an annual contribution to remedy or mitigate adverse environmental effects.

Condition 10 is a review provision.

### **1.3.1.2 Water discharge permit**

STDC holds water discharge permit **6077-1** to cover the discharge of filter backwash water and supernatant from the Cold Creek water treatment plant into the Cold Stream in the Taungatara catchment. This permit was issued by the Taranaki Regional Council on 29 November 2002 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2018.

Condition 1 establishes the location of the discharge point.

Condition 2 limits the rate of discharge.

Condition 3 specifies effects which the discharge is prohibited to cause in the receiving waters.

Condition 4 limits certain contaminants in the discharge.

### **1.3.1.3 Land use permits**

STDC holds land use permit **5454-1** to erect, place, use and maintain a water intake structure on Cold Creek for the Cold Creek rural water supply scheme. This permit was issued by the Taranaki Regional Council on 1 March 1999 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2018.

Conditions 1 and 5 deal with construction and maintenance works.

Condition 2 requires the structure to be constructed in accordance with the documentation in support of the application.

Conditions 3 and 4 require the consent holder to minimise discharge of silt, disturbance of riverbed and adverse effects on water. Areas disturbed are to be reinstated.

Conditions 6 and 7 deal with provision of fish passage.

Condition 8 requires that the structure be removed when no longer required and the area reinstated.

Condition 9 is a review provision.

## **1.3.2 Eltham water supply**

### **1.3.2.1 Water abstraction permit**

STDC holds water permit **0213-3** to cover the abstraction of water from the Waingongoro River. This permit was issued by the Taranaki Regional Council on 15 December 1999 under Section 87 of the resource Management Act. It is due to expire on 1 June 2018.

Condition 1 imposes limits on the volume and rate of abstraction.

Condition 2 requires measuring of daily rates of abstraction and provision of abstraction data to the Council.

Condition 3 requires exercise of the consent to be in accordance with the information supplied in support of the application.

Condition 4 requires quantification and reporting of reticulation losses.

Condition 5 requires investigation and reporting on the blocking of the intake.

Conditions 6 and 8 are review provisions.

Condition 7 sets out a requirement for a contribution to the Taranaki Tree Trust.

### **1.3.2.2 Water discharge permit**

STDC holds water discharge permit **0989-3** to discharge reservoir contents from the Eltham Water Supply Reservoir onto land adjacent to the Waingongoro River. This permit was issued by the Taranaki Regional Council on 5 November 2012 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2029.

Condition 1 requires that the best practical option be adopted.

Condition 2 requires that Council be notified prior to discharge.

Conditions 3 and 4 specify volume and time of discharge.

Condition 5 prohibits direct discharge to the Waingongoro River.

Conditions 6 and 7 deal with the minimisation of sediment entering the stream.

Condition 8 set out effects the discharge must not cause.

Condition 9 is a review condition.

STDC holds water discharge permit **1810-3** to cover the discharge of overflow and reservoir drainage from the Eltham water treatment plant reservoir to the Mangawharawhara Stream. This permit was issued by the Taranaki Regional Council on 28 July 1999 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 requires approval of the Council prior to the emptying and cleaning of the reservoir.

Condition 2 requires the consent holder to minimise the periods when the consent is exercised.

Condition 3 requires the consent holder to minimise the discharge of accumulated sediments in the reservoir to the receiving water when emptying and cleaning the reservoir.



Condition 4 specifies effects which the discharge is prohibited to cause in the receiving waters, while condition 5 places limits on certain contaminants in the discharge.

Condition 6 is a review provision.

STDC holds water discharge permit **1811-3** to cover the discharge of filter backwash from the Eltham water treatment plant to an unnamed tributary of the Waingongoro River. This permit was issued by the Taranaki Regional Council on 28 July 1999 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 deals with maintenance and operation of the settlement pond system.

Condition 2 specifies effects which the discharge is prohibited to cause in the receiving waters.

Condition 3 places limits on certain contaminants in the discharge.

Condition 4 is a review provision.

### **1.3.3 Hawera water supply**

#### **1.3.3.1 Water abstraction permits**

STDC holds water permit **0146-2** to take and use water from the Kapuni Stream for municipal water supply purposes. This permit was issued by the Taranaki Regional Council on 7 June 2000 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2020.

Condition 1 imposes limits on the volume and rate of abstraction.

Condition 2 requires measuring of daily rates of abstraction and provision of this data to the Council.

Condition 3 requires exercise of the consent to be in accordance with the information supplied in support of the applications, and includes the provision of reporting on efficiency measures every two years.

Condition 4 specifies the circumstances when additional water can be taken and reporting requirements following such an event.

Condition 5 sets out a requirement for a contribution to the Taranaki Tree Trust.

Condition 6 requires the preparation and maintenance of a management plan, in conjunction with other users, for the Kapuni Stream.

Condition 7 requires the consent holder to undertake a leak detection and repair programme.

Condition 8 requires that the point of abstraction remain the same until the new intake is commissioned.

Condition 9 is a review provision.

STDC holds water permit **7002-1** to take and use up to 4,320m<sup>3</sup>/day of groundwater at a maximum rate of 50 l/s as a combined total from up to three water bores in a bore field at the Kapuni reservoir site for municipal, rural, industrial, and recreational supply purposes. This permit was issued by the Taranaki Regional Council on 2 November 2006 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2023.

Condition 1 requires the exercise of consent to be in accordance with the documentation submitted in support of the application.

Condition 2 requires the consent holder to notify the Council seven days prior to the exercise of the consent.

Condition 3 states that the consent holder must supply the Council with a report detailing the results of pump testing prior to the exercise of the consent.

Conditions 4 and 5 deal with the rate and volume of abstraction, while condition 6 deals with recording of the abstractions.

Conditions 7 and 8 deal with monitoring of the bores.

Conditions 9 and 10 deal with lapse and review of consent.

### **1.3.3.2 Water discharge permit**

STDC holds water discharge permit **0933-3** to cover the discharge of clarifier bleed and filter backwash to the Kapuni Stream. This permit was issued by the Taranaki Regional Council on 24 March 1993 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2023.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires the consent to be exercised in accordance with the application documentation.

Condition 3 requires notification of Council prior to exercising the consent.

Condition 4 requires the consent holder to address the issue of a permanent solution for water treatment residuals by constructing a new water treatment plant in 2010.

Condition 5 requires the proper and efficient maintenance and operation of the settlement system.

Condition 6 lists certain effects which the discharge shall not have on the receiving waters.

Condition 7 places limits on certain parameters in the discharge.

Conditions 8 and 9 deal with lapse and review of the consent.

STDC holds water discharge permit **7446-1** to discharge membrane backwash water and cleaning wastewater from the Kapuni Water Treatment Plant into the Kapuni

Stream. This permit was issued by the Taranaki Regional Council on 13 March 2009 under Section 87 of the Resource Management Act. The consent is due to expire on 1 June 2023.

Condition 1 requires that the consent holder adopt the best practicable option to minimise adverse environmental effects.

Conditions 2, 3 and 4 deal with levels of contaminants in the discharge and effects on receiving waters.

Condition 5 and 6 deal with lapse and review of consent.

### **1.3.3.3 Land use permit**

STDC holds land use permit **5596-1** to construct, place, use and maintain a weir and intake structure, and to maintain two existing intake structures in the Kapuni Stream for the Hawera water supply. This permit was issued by the Taranaki Regional Council on 19 May 2000 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 requires notification of the Council prior to construction or maintenance works.

Condition 2 requires the construction of the structures to be in accordance with the documentation submitted in support of the application.

Condition 3 prohibits construction works during the period 1 May to 31 October.

Conditions 4 and 5 require the consent holder to minimise streambed disturbance, discharge of silt and adverse effects on water quality.

Condition 6 prohibits the refuelling of equipment or machinery on the streambed.

Conditions 7 and 8 deal with the provision of fish passage.

Condition 9 deals with prevention of erosion adjacent to or downstream of the rock riprap.

Condition 10 prohibits the removal of streambed material during construction other than the material that makes up the weir/rock ramp.

Condition 11 prohibits the removal of streambed material from above the weir other than between 1 November and 30 April.

Condition 12 requires material removed from the streambed to be placed on the banks or dry sections of streambed downstream of the weir so it can re-enter the stream and minimise effects.

Condition 13 deals with the removal of the structure when no longer required.

Condition 14 is a review provision.

STDC holds land use permit **7413-1** to erect, use and maintain a water intake structure on the bed of the Kapuni Stream, including temporary damming and diversion during construction. This permit was issued by the Taranaki Regional Council on 5 February 2009 under Section 87(a) of the Resource Management Act. The consent is due to expire on 1 June 2023.

Condition 1 requires that the consent is carried out in accordance with the documentation submitted with the application.

Conditions 2 and 3 deal with timing and notification of maintenance.

Conditions 4 and 5 require the consent holder to minimise disturbance to the stream.

Condition 6 requires that the structure is removed and the area reinstated, if and when it is no longer required.

Condition 7 requires monitoring and maintenance of the fish pass.

Condition 8 deals with any archaeological remains discovered during construction.

Conditions 9 and 10 deal with lapse and review of consent.

STDC holds land use permit **7447-1** to install, use and maintain an outfall structure on the bank of the Kapuni Water Treatment Plant. This permit was issued by the Taranaki Regional Council on 20 February 2009 under Section 87(a) of the Resource Management Act. The consent is due to expire on 1 June 2023.

Condition 1 requires that the consent is carried out in accordance with the documentation submitted with the application.

Conditions 2 and 3 deal with timing and notification of maintenance.

Conditions 4 and 5 require the consent holder to minimise disturbance to the stream.

Condition 6 requires that the structure is removed and the area reinstated, if and when it is no longer required.

Condition 7 deals with any archaeological remains discovered during construction.

Conditions 8 and 9 deal with lapse and review of consent.

### **1.3.4 Inaha water supply**

#### **1.3.4.1 Water abstraction permits**

STDC holds water permit **1185-3** to cover the abstraction of water from the Mangatoki Stream for water supply purposes. This permit was issued by the Taranaki Regional Council on 16 June 1993 under Section 87 of the Resource Management Act on 29 August 2006. It is due to expire on 1 June 2023.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires the consent to be exercised in accordance with information supporting the application.

Condition 3 places a limit on the rate and volume of abstraction.

Condition 4 requires the installation of a device to measure abstraction and the provision of these records to the Council.

Condition 5 deals with maintenance of the structure and its removal when no longer required.

Condition 6 requires the screening of intake structures to avoid the entrainment of fish.

Condition 7 deals with the provision of fish passage.

Condition 8 requires the promotion of water use efficiency and the undertaking of a leak detection and repair programme. This programme is to be reported on annually.

Condition 9 is a lapse provision.

Condition 10 provides for a review of the consent to ensure that conditions are adequate to deal with any adverse effects on the environment arising from the exercise of the consent.

STDC holds water permit **1186-3** to cover the abstraction of water from the Waingongoro River for water supply purposes. This permit was issued by the Taranaki Regional Council on 1 June 2005 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2023.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires the consent to be exercised in accordance with the application documentation.

Condition 3 places a limit on the volume and rate of abstraction.

Condition 4 requires the recording of abstraction rates and provision of data to the Council.

Condition 5 deals with the maintenance of the intake and its removal when no longer required.

Condition 6 requires screening of intake structures to avoid entrainment of fish.

Condition 7 provides for adequate fish passage.

Condition 8 requires the promotion of water use efficiency and the undertaking of a leak detection and repair programme which is to be reported on annually.

Conditions 9 and 10 deal with lapse and review of consent.

STDC holds water permit **5364-1** to cover the abstraction of water from the Mangatoki Stream for water supply purposes. This permit was issued by the Taranaki Regional Council on 23 September 1998 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2017.

Conditions 1 and 2 deal with the abstraction volume and rate and recording of these.

Condition 3 requires the consent to be exercised in accordance with the documentation in support of the application.

Condition 4 requires mitigation of effects through riparian management.

Condition 5 allows for the suspension or reduction of abstraction during extreme low flow events.

Condition 6 is a review provision.

#### **1.3.4.2 Water discharge permits**

STDC holds water discharge permit **3927-1** to cover the discharge of filter backwash to an unnamed tributary of the Mangatoki Stream. This permit was issued by the Taranaki Regional Council on 24 March 1993 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 deals with the maintenance and operation of the settlement pond system.

Condition 2 specifies effects which the discharge is prohibited to cause in the receiving waters.

Condition 3 places limits on certain contaminants in the discharge.

Condition 4 is a review provision.

STDC holds water discharge permit **3928-2** to cover the discharge of uncontaminated overflow water from a settling pond to the Mangatoki Stream. This permit was issued by the Taranaki Regional Council on 4 June 1999 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 deals with the maintenance and operation of the settlement pond system.

Condition 2 specifies effects which the discharge is prohibited to cause in the receiving waters.

Condition 3 is a review provision.

#### **1.3.4.3 Land use permits**

STDC holds land use permit **4102-2** to erect, place, use and maintain a water intake structure on the bed of the Mangatoki Stream for the Inaha water supply scheme.

This permit was issued by the Taranaki Regional Council on 15 June 2005 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2023.

Condition 1 requires the adoption of best practicable option.

Condition 2 requires the consent to be exercised in accordance with the application documentation.

Condition 3 requires notification of Council prior to exercise of consent.

Conditions 4 to 8 deal with maintenance of the structure.

Condition 9 requires the structure to not impede fish passage.

Condition 10 requires the structure to be removed and the area reinstated when no longer required.

Conditions 11 and 12 deal with lapse and review of consent.

STDC holds land use permit **5365-1** to erect, place, use and maintain a water intake structure on the bed of the Mangatoki Stream for the Inaha water supply scheme. This permit was issued by the Taranaki Regional Council on 23 September 1998 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 requires notification of the Council prior to major construction or maintenance works.

Condition 2 requires prevention of discharge of contaminants into the stream during construction or maintenance works.

Condition 3 prohibits obstruction of fish passage.

Condition 4 requires the structure to be constructed in accordance with the documentation in support of the application.

Condition 5 requires the consent holder to ensure the safety of the structure.

Condition 6 requires the structure to be removed when no longer required and the area reinstated.

Condition 7 is a review provision.

### **1.3.5 Opunake water supply**

#### **1.3.5.1 Water abstraction permit**

STDC held water permit **0232-3** to cover the abstraction of water from the Waiaua Stream for the Opunake water supply. This permit was issued by the Taranaki Regional Council on 23 March 1994 under Section 87 of the Resource Management

Act. It expired on 1 June 2012. STDC has lodged an application to renew consent 0232, and continues to exercise the expired consent under section 124 of the RMA.

Condition 1 requires monitoring of daily abstraction volumes and provision of abstraction data to the Council.

Condition 2 requires the provision of fish passage.

Condition 3 is a review provision.

#### **1.3.5.2 Water discharge permit**

STDC held water discharge permit **5574-1** to cover the discharge of filter backwash via a settling pond into the Waiaua Stream. This permit was issued by the Taranaki Regional Council on 17 January 2000 under Section 87 of the Resource Management Act. It expired on 1 June 2012. STDC has lodged an application to renew consent 5574, and currently continues to exercise the expired consent under section 124 of the RMA.

Condition 1 deals with the settlement lagoon system.

Condition 2 specifies effects which the discharge is prohibited to cause in the receiving waters.

Condition 3 places limits on certain contaminants in the discharge.

Condition 4 is a review provision.

#### **1.3.5.3 Land use consents**

STDC holds land use permit **9473** to construct, place and use a water intake structure on the bed of the Waiaua River for water abstraction purposes. This permit was issued by the Taranaki Regional Council on 21 February 2013 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2030.

Condition 1 specifies intake dimensions and screen slot size.

Condition 2 requires that Council be notified prior to works.

Condition 3 requires that river bed disturbance be kept to a minimum.

Condition 4 requires that sediment discharge into the river be minimised.

Condition 5 specifies maximum screen slot velocity.

Condition 6 requires that fish passage not be obstructed.

Condition 7 requires a one-off payment to contribute to riparian planting to mitigate effects.

Condition 8 deals with procedures if archaeological remains are discovered during works.



Condition 9 requires the structure be removed when no longer required.

Condition 10 is a lapse condition.

Condition 11 is a review condition.

### **1.3.6 Patea water supply**

#### **1.3.6.1 Water abstraction permits**

STDC holds water permit **3388-3** to take and use groundwater from three bores (known as Bore 1, Bore 2 and Bore 4) for Patea Township water supply purposes. This permit was issued by the Taranaki Regional Council on 30 April 2012 under Section 87 of the Resource Management Act. It will expire on 1 June 2028.

Conditions 1, 2 and 3 deal with the maximum daily takes for the three bores.

Conditions 4, 5, 6 and 7 deal with requirements to fit and maintain flow meters and data loggers at each bore.

Condition 8 requires that the best practical option be adopted.

Conditions 9, 10 and 11 deal with monitoring and mitigating effects on a nearby private bore.

Condition 12 requires that no salt water intrusion shall occur as result of the take.

Condition 13 deals with change and review of consent.

### **1.3.7 Pope water supply**

#### **1.3.7.1 Water abstraction permit**

Raw water is abstracted for the Waimate water supply scheme from the Otakeho Stream licensed by resource consent 3911 (Section 1.3.3.1). Up to 5 litres per second is diverted from the pipeline to the Pope rural water supply treatment plant.

#### **1.3.7.2 Water discharge permit**

STDC holds water discharge permit **4446-2** to cover the discharge of filter backwash into an unnamed tributary of the Mangawhero Stream. This permit was issued by the Taranaki Regional Council on 9 June 2006 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2023.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires the consent to be exercised in accordance with the application documentation.

Condition 3 limits the discharge rate.

Condition 4 places limits on certain parameters in the discharge.

Condition 5 requires the proper and efficient maintenance of the settling pond.

Condition 6 lists effects that the discharge should not have on the receiving waters.

Conditions 7 and 8 deal with lapse provision and review of consent.

### **1.3.8 Rahotu water supply**

#### **1.3.8.1 Water abstraction permit**

STDC holds water permit **3696-2** to cover the abstraction of water from the Pungaereere Stream for water supply purposes. This permit was issued by the Taranaki Regional Council on 15 September 2000 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2013. STDC has lodged an application to renew consent 1134 and continues to exercise the expired consent under section 124 of the RMA.

Condition 1 limits the volume and rate of abstraction.

Condition 2 requires monitoring of abstraction volumes and provision of data to the Council.

Condition 3 is a review provision.

#### **1.3.8.2 Water discharge permit**

STDC holds water discharge permit **6038-1** to cover the discharge of filter backwash water and settling tank waste from the Rahotu Water Treatment Plant into the Pungaereere Stream. This permit was issued by the Taranaki Regional Council on 2 September 2002 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2019.

Condition 1 specifies effects which the discharge is prohibited to cause in the receiving waters.

Condition 2 places limits on certain contaminants in the discharge.

Condition 3 is a review provision.

### **1.3.9 Wai-inu Beach water supply**

#### **1.3.9.1 Water abstraction permit**

STDC held water permit **3770-3** to cover the abstraction of groundwater from the bore for water supply purposes. This permit was issued by the Taranaki Regional Council on 7 May 2012 under Section 87 of the Resource Management Act. The consent expires on 1 June 2028.

Condition 1 sets limits for daily volumes and abstraction rates.

Conditions 2 to 5 deal the installation and maintenance of water metering equipment.

Condition 6 deals with the provision of records.

Condition 7 requires the consent holder to adopt best practice.

Conditions 8 and 9 are lapse and review conditions.

### **1.3.10 Waimate West water supply**

#### **1.3.10.1 Water abstraction permit**

STDC holds water permit **0634-3** to take water from the Mangawhero-iti Stream for the Waimate West water supply. This permit was issued by the Taranaki Regional Council on 7 June 2011 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2023.

Conditions 1 and 2 limit the rate of abstraction.

Conditions 3 to 6 deal with the maintenance, installation and operation of data-logging equipment.

Condition 7 requires the consent holder to provide records of water taken. While condition 10 sets a date by which these should be provided in 'real time'.

Conditions 8 and 9 deal with flow in the Mangawhero-iti Stream downstream of the intake. Condition 12 requires sufficient stream flow measurements to be undertaken in order to comply with condition 9.

Condition 11 requires the consent holder to install a staff gauge.

Condition 13 deals with best practicable option to prevent or minimise adverse environmental effects.

Condition 14 requires the consent holder to supply an annual report in September each year on various aspects of the scheme.

Condition 15 requires five annual financial contributions.

Condition 16 is a review provision.

STDC holds water permit **0635-3** to take water from the Mangawhero Stream for the purpose of adding to the flow of the Mangawhero-iti Stream and providing water for the Waimate West water supply. This permit was issued by the Taranaki Regional Council on 7 June 2011 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2023.

Condition 1 limits the rate of abstraction, while condition 2 sets restrictions on the take.

Conditions 3 to 6 deal with the maintenance, installation and operation of data-logging equipment.

Condition 7 requires the consent holder to provide records of water taken. While condition 8 sets a date by which these should be provided in 'real time'.

Condition 9 deals with best practicable option to prevent or minimise adverse environmental effects.

Condition 10 is a review provision.

STDC holds water permit **3911-2** to take water from the Otakeho Stream for the Pope and Waimate West water supply schemes. This permit was issued by the Taranaki Regional Council on 22 November 2000 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2018. Changes to the conditions of the consent were made on 7 June 2011.

Condition 1 limits the rate of abstraction.

Conditions 2 to 5 deal with the maintenance, installation and operation of data-logging equipment.

Condition 6 requires the consent holder to provide records of water taken. While condition 8 sets a date by which these should be provided in 'real time'.

Condition 7 deals with best practicable option to prevent or minimise adverse environmental effects.

Condition 9 deals with recording of flows of less than 500 l/s.

Condition 10 is a review provision.

### **1.3.10.2 Water discharge permit**

STDC holds water discharge permit **0129-3** to cover the discharge of clarifier bleed and filter backwash via a settling pond into an unnamed tributary of the Mangawhero-iti Stream. This permit was issued by the Taranaki Regional Council on 12 June 2006 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2023.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires the consent to be exercised in accordance with the application documentation.

Condition 3 limits the discharge rate.

Condition 4 places limits on certain parameters in the discharge.

Condition 5 requires the proper and efficient maintenance of the settling ponds.

Condition 6 lists effects that the discharge should not have on the receiving waters.

### 1.3.10.3 Land use consents

STDC holds land use permit **4826-2** to place, use and maintain a water intake structure and associated erosion protection on the bed of the Otakeho Stream. This permit was issued by the Taranaki Regional Council on 1 March 1999 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2017. Changes to consent conditions were made on 10 December 2010 to allow for the weir to be upgraded and a new fish pass to be built.

Condition 1 requires notification of the Council prior to construction or maintenance works.

Condition 2 requires the structure to be constructed in accordance with the documentation in support of the application.

Conditions 3 and 4 require the consent holder to minimise discharge of silt, disturbance of riverbed and adverse effects on water. Areas disturbed are to be reinstated.

Condition 5 limits the timing of major construction or maintenance works to between 1 November and 30 April.

Condition 6 requires provision of fish passage.

Condition 7 states that a Council biologist shall be present during construction of the fish pass.

Condition 8 requires that the structure be removed when no longer required and the area reinstated.

Condition 9 is a review provision.

STDC holds land use permit **5451-1** to erect, place, use and maintain a water intake structure on the bed of the Mangawhero-iti Stream. This permit was issued by the Taranaki Regional Council on 1 March 1999 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 requires notification of the Council prior to construction or maintenance works.

Condition 2 requires the structure to be constructed in accordance with the documentation submitted in support of the application.

Conditions 3 and 4 require the consent holder to minimise discharge of silt, disturbance of riverbed and adverse effects on water. Areas disturbed are to be reinstated.

Condition 5 limits the timing of major construction or maintenance works to between 1 November and 30 April.

Condition 6 requires provision of fish passage.

Condition 7 requires monitoring and reporting of adequacy of fish passage.

STDC holds land use permit **5452-1** to erect, place, use and maintain a water intake structure on the bed of the Mangawhero Stream. This permit was issued by the Taranaki Regional Council on 1 March 1999 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2017.

Condition 1 requires notification of the Council prior to construction or maintenance works.

Condition 2 requires the structure to be constructed in accordance with the documentation supplied in support of the application.

Conditions 3 and 4 require the consent holder to minimise discharge of silt, disturbance of riverbed and adverse effects on water. Areas disturbed are to be reinstated.

Condition 5 limits the timing of major construction or maintenance works to between 1 November and 30 April.

Condition 6 requires provision of fish passage.

Condition 7 requires monitoring and reporting of adequacy of fish passage.

Condition 8 requires that the structure be removed when no longer required and the area reinstated.

Condition 9 is a review provision.

### **1.3.11 Waverley Beach water supply**

#### **1.3.11.1 Water abstraction permit**

STDC abstracts groundwater from a bore as a permitted activity for the Waverley Beach water supply and does not require a resource consent.

The current statutory document that covers this activity is the Regional Fresh Water Plan [RFPW].

The RFPW allows the abstraction of up to 50m<sup>3</sup> per day (at a maximum rate of 1.5 litres per second) of groundwater as a permitted activity provided certain conditions are met.

### **1.3.12 Waverley water supply**

#### **1.3.12.1 Water abstraction permits**

STDC holds water permit **3313-3** to take and use groundwater from the "Fookes Street" bore (GND0244), the "Chester Street" bore (GND0059) and the "Swinbourne Street" bore (GND2242) for municipal water supply purposes at Waverley. This permit was issued by the Taranaki Regional Council on 23 September 2010 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2022.

Condition 1 sets limits on the combined daily volume and combined abstraction rate for all three bores.

Condition 2 sets limits on the daily volume of water and abstraction rate of each bore.

Conditions 3 to 8 deals with the installation and maintenance of metering and logging equipment and the provision of data.

Condition 9 requires the consent holder adopt best practice.

Condition 10 states that the exercise of this consent shall not cause saltwater intrusion.

Condition 11 requires that the wells be accessible for measurement of static and pumping water levels.

Condition 12 deals with review of the consent.

### **1.3.13 Oaonui water supply**

#### **1.3.13.1 Water abstraction permit**

Oaonui Water Supply Limited holds water permit **0231-3** to cover the abstraction of water from the Oaonui Stream for a rural water supply scheme and the Maui Production Station. This permit was issued by the Taranaki Regional Council on 22 November 2000 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2018.

Condition 1 limits the abstraction volume and rate.

Condition 2 requires recording of daily abstraction rates and provision of abstraction data to the Council.

Condition 3 requires promotion of water conservation and undertaking of a leak detection and repair programme.

Condition 4 sets out a requirement for a contribution to the Taranaki Tree Trust.

Conditions 5 and 6 deal with change and review of consent.

#### **1.3.13.2 Land use permit**

Oaonui Water Supply Limited holds land use permit **5453-1** to erect, place, use and maintain a water intake structure on the bed of the Oaonui Stream for water abstraction purposes. This permit was issued by the Taranaki Regional Council on 1 March 1999 under Section 87(a) of the Resource Management Act. It is due to expire on 1 June 2018.

Condition 1 requires notification prior to construction and maintenance works.

Condition 2 requires that the structure be constructed in accordance with the documentation supporting the application.

Condition 3 requires the adoption of best practicable option to minimise adverse effects.

Condition 4 requires the area disturbed during construction and maintenance to be minimised and disturbed areas reinstated.

Condition 5 requires major maintenance involving in-stream works to be undertaken between 1 November and 30 April.

Conditions 6 and 7 deal with the provision of fish passage.

Condition 8 requires the structure to be removed when no longer required and the area reinstated.

Condition 9 is a review provision.

### **1.3.13.3 Water discharge permit**

The raw water is not passed through a clarifier or filter, consequently there is no clarifier bleed or filter backwash discharge. Water flows from the weir to a settling pond along a race. The settling pond is continually flushed by two small discharges from the surface and bottom of the pond back to the Oaonui Stream. The race is regularly flushed to the Oaonui Stream. Due to the small scale nature of both these flows they can be considered as a discharge of water to water and are a permitted activity as allowed by Rule 21 of the Regional Fresh Water Plan. Consequently a resource consent is not required.

### **1.3.14 Nukumarū water supply**

#### **1.3.14.1 Water abstraction permits**

Nukumarū Water Scheme Society Inc holds water permit **6451-1** to cover the abstraction of groundwater from up to two bores for rural water supply purposes. This permit was issued by the Taranaki Regional Council on 20 October 2004 under Section 87 of the Resource Management Act. It is due to expire on 1 June 2039.

Condition 1 requires the consent to be exercised in accordance with the documentation submitted in support of the application and condition 2 places a limit on the abstraction volume and rate.

Conditions 3 and 4 require the recording of abstraction rates and provision of abstraction data to the Council.

Condition 5 deals with payment of monitoring costs and conditions 6 and 7 deal with lapse and review of consent.



## **1.4 Monitoring programme**

### **1.4.1 Introduction**

Section 35 of the Resource Management Act sets out an obligation for the Taranaki Regional Council to: gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region.

The Taranaki Regional Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations, and seek information from consent holders.

The 2012-2013 monitoring programme for the water supply schemes in the South Taranaki District consisted of five primary components.

### **1.4.2 Programme liaison and management**

There is generally a significant investment of time and resources by the Taranaki Regional Council in ongoing liaison with resource consent holders over consent conditions and their interpretation and application, in discussion over monitoring requirements, preparation for any reviews, renewals, or new consents, advice on the Council's environmental management strategies and the content of regional plans, and consultation on associated matters.

### **1.4.3 Site inspections**

Each water supply scheme that has a weir and/or required NES assessment was inspected, with site visits focussing on: compliance with water abstraction limits, the effects of filter backwash discharges on receiving waters, fish passage at abstraction weirs and NES water metering requirements.



**Photograph 2** Kapuni WTP intake and fishpass on the Kapuni Stream

#### **1.4.4 Chemical sampling**

The Council undertook sampling of discharges from the Kapuni, Rahoitu and Cold Creek WTPs. Receiving water samples were collected in relation to discharges from the Kapuni WTP and Cold Creek WTP. Samples were analysed for chlorine, pH and suspended solids. The Kapuni WTP sample was also analysed for conductivity and sodium.

#### **1.4.5 Biomonitoring surveys**

Biomonitoring surveys were undertaken in relation to the Kapuni, Waimate West and Rahoitu plants to determine effects upon the stream communities due to the discharge of filter backwash.

#### **1.4.6 Fish surveys**

Three fish surveys were carried out in relation to the Cold Creek, Waimate West and Oaonui Plants to determine whether the intake weirs were obstructing fish passage.

## **2. Results**

### **2.1 Inspections**

All surface water sites (except Rahotu WTP) were inspected over the January-February 2013 period. The Opunake WTP had extra inspections in May during the construction of a new intake.

#### **2.1.1 Opunake water supply**

##### **10 January 2013**

The Waiaua Stream was clean and clear and at low flow. There was a trickle discharge from the raw water pond. No issues were noted from backwash discharges. A new intake was to be constructed in April 2013.

##### **13 May 2013**

A site visit was made to inspect the installation of the intake structure. An access track had been cut down to the site of the intake and a coffer dam had been constructed using sacks of aggregate and river rocks. There were some small inflows of water into the dammed area and a pump was operating to keep the area pumped out.

The slope running down from the access track was steep and consisted largely of exposed soil. This area had no silt controls and this was discussed with the contractor. It was outlined that it was planned to have works completed before the forecast rain so the risk of sediment run off would be reduced. The contractor also outlined that silt mesh would be acquired and put in as a precaution. Silt controls were in place for other areas of earthworks.

Overall the activity was causing a slight increase in the turbidity in the Waiaua Stream. This was mostly coming from the area around the coffer dam and the pump discharge. Upstream and downstream samples were taken and the turbidity was found to be 1.0 NTU (u/s) and 3.3 NTU (d/s).

The precast intake structure was inspected and it appeared to be constructed to the specifications set out in the consent. The intake screen was covered with protective covers so the slot size was not measured to check compliance.



**Photograph 3** Cofferdam on the Waiaua Stream for Opunake WTP intake installation



**Photograph 4** Opunake WTP intake structure prior to installation

**14 May 2013**

The pipe trench and wet well pit had been dug. Water running through the coffer dam was now running into the newly dug area leaving the concrete pour area

drained. Boxing was being installed for the concrete at the time and HDPE pipes were being laid and welded.

Water being pumped out from the just below the intake area was quite clear and there was no noticeable visual rise in turbidity in the stream.

### 16 May 2013

A site visit was made to inspect the installation of the intake structure. The intake structure was now in the stream and underwater. The pipe back to the wet well was in place. The area along the river between the intake and the wet well was still bare loose earth. It was of concern that the promised silt controls were not installed and that rain was predicted for the next day. The staff on site outlined how the area would be armoured when the job is complete.

Consent 9473 required that all reasonable steps be taken to minimise sediments and suspended levels in the stream. No measures were being undertaken in this area in regards to any surface run off in the event of rain or any scouring in the event of a river rise prior to the site being armoured.

The river was inspected and there was found to be a moderate level of turbidity below the site and this was probably a result of recent instream works in and around the intake structure. No sediment discharges were noted at the time. A sample was taken downstream of the site.

The following action was required to taken:

- Install silt/scouring control measures in area of loose soil adjacent the stream.



**Photograph 5** Wet well and intake line installation at the Opunake WTP

### 20 May 2013

A site visit was made to inspect the silt controls after the heavy rain. Present were representatives from Fulton Hogan, BECA and Project Management Services. The silt controls had been installed and had held up well during the rain and it was outlined that more rocks and rip rap would be used to armour the bank. No silt discharges from the area were occurring at the time. The site was in compliance with consent conditions.



**Photograph 6** Silt controls at the Opunake WTP intake installation

#### 2.1.2 Cold Creek water supply

The Cold Stream was at a moderate level and was clean and clear at the intake. The fish pass was overgrown and had a large rock at the entrance. The site manager undertook to have it attended to. No visible effects were noted on the receiving waters. No non-compliances were noted.

#### 2.1.3 Eltham water supply

The Waingongoro River was at a low level, and clean and clear at the intake. No abstraction was occurring as a backwash was in progress. The large back wash pond was discharging and the discharge was found to be clean and clear. No non-compliances were noted.

#### 2.1.4 Inaha water supply

The Mangatoki Stream was at a moderate level; it was clean and clear at the intakes. The abstraction rate was 50 m<sup>3</sup>/ hour (13.8 L/s) from the Mangatoki and 110 m<sup>3</sup>/hour (31.2 L/s) for the Waingongoro. These were both slightly over the consented maximum instantaneous abstraction rates of 13 L/s and 30L/s

respectively. The Mangatoki Stream was at a moderate level; it was clean and clear at the intakes. Both weirs and fish passes were satisfactory. No discharges were occurring from the settling ponds.

### 2.1.5 Rahoju water supply

This plant was not inspected in the 2012-2013 period.

### 2.1.6 Waimate West water supply

The Otakeho Stream was at a moderate level, and clean and clear at the intake. The fish pass was working well. The abstraction rate was 265m<sup>3</sup>/hr which was within the consented take rate of 306 m<sup>3</sup>/hr.

The Mangawhero Stream was inspected and it was noted that no water was being abstracted at the time.

The Mangawhero-iti Stream was at a moderate level, and fairly clean and clear at the intake. The flow to the Waimate West WTP was 406 m<sup>3</sup>/hour (consent limit of 737.5 m<sup>3</sup>/hour). Solar power and telemetry had been installed at the site. The northern backwash settling pond was discharging and there was no visible effect on the unnamed tributary, which was fairly clean and clear.



**Photograph 7** Solar panel array powering Mangawhero-iti intake data logging and telemetry



**Photograph 8** Fish pass at Mangawhero-iti weir

### **2.1.7 Oaonui water supply**

The weir and fish pass were in good condition and there were no issues in regards to scouring or bed disturbance.

The flow meter appeared to be installed correctly and was measuring the water taken from a wet well. The wet well had an overflow channel that went directly back to the Waiaua Stream. This was in flow at the time of the inspection.

To comply with NES regulations, the consent holder would need approval to have the flow meter situated away from the point of abstraction. The consent holder has subsequently applied for approval and this was granted in October 2013.

### **2.1.8 Hawera water supply**

The Kapuni Stream was at low flow and clean and clear. The intake and fish pass were inspected and found to be fine. The bore abstraction rate was 58 m<sup>3</sup>/hr and the Kapuni abstraction rate was 272 m<sup>3</sup>/hour (both within consent conditions). No non-compliances were noted.

### **2.1.9 Patea water supply**

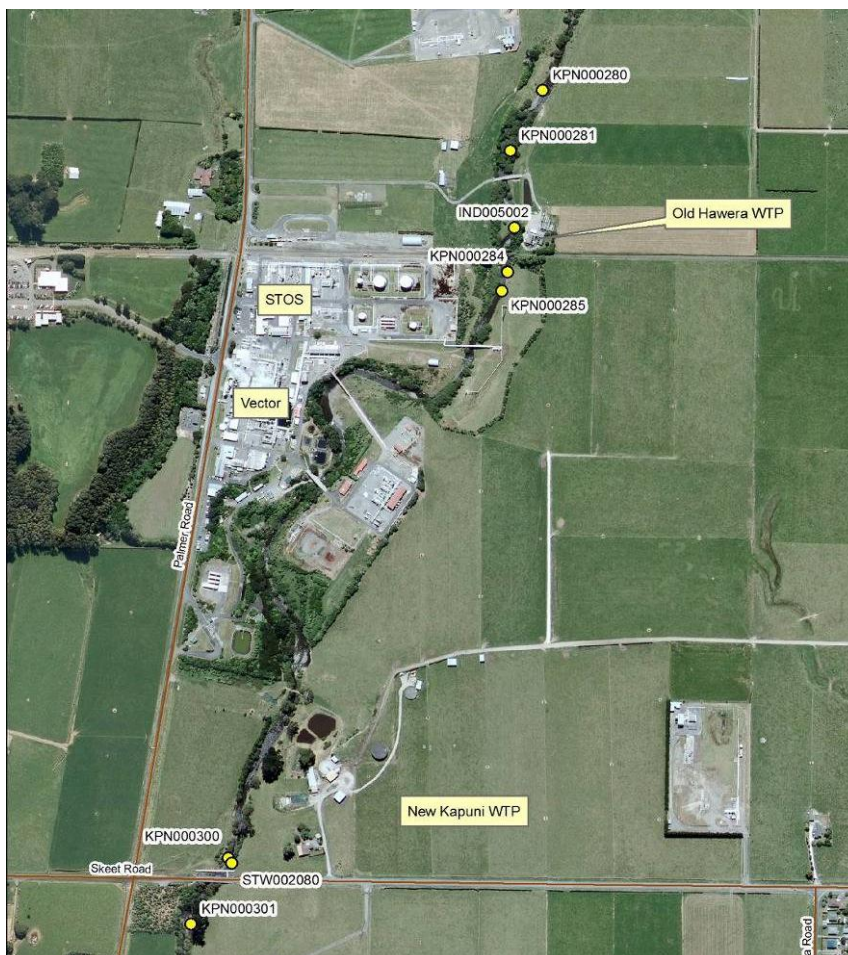
A site visit was made to conduct an annual inspection. The bore installation had been completed and appeared to meet NES standards. No issues were noted on-site. All flows are being metered at the point of abstraction and the meters appeared to have been correctly installed.



## 2.2 Results of discharge monitoring

### 2.2.1 Hawera WTP (Kapuni)

Discharge and receiving water samples were taken at the Kapuni WTP on 7 November 2012 and 29 June 2013 and the results are given in Tables 2 and 3 below.



**Figure 2** Aerial photo showing locations of the old and new WTPs, and relevant sampling sites

**Table 2** Kapuni WTP sample results 7 November 2012

Parameter		Upstream (KPN000300)	Pond discharge (STW002080)	Downstream (KPN000301)	Consent limits for discharge and (KPN000301)
Free available chlorine	g/m <sup>3</sup>	-	<0.1	-	0.1
Conductivity	mS/m	10.2	14.0	10.2	-
Sodium	g/m <sup>3</sup>	9.8	14.6	9.1	-
pH	pH	7.7	8.0	7.7	6.5 - 8.5
Suspended solids	g/m <sup>3</sup>		4		20
Temperature	Deg C	13.6	15.2	-	-
Turbidity	NTU	0.79	-	0.76	(1.185)

**Table 3** Kapuni WTP sample results 27 June 2013

Parameter	Unit	Upstream (KPN000300)	Pond discharge (STW002080)	Downstream (KPN000301)	Consent limits for discharge)
Free available chlorine	g/m <sup>3</sup>		<0.01		0.1
Conductivity	mS/m	9.7	14.8	9.8	-
Sodium	g/m <sup>3</sup>	8.6	15.8	8.6	-
pH	pH	7.0	7.0	7.0	6.5 - 8.5
Suspended solids	g/m <sup>3</sup>		3		20
Temperature	Deg C	7.9	8.9	7.9	-
Turbidity	NTU	1.6		1.6	-

The above results comply with the consent limits and samples collected upstream and downstream were not significantly different. While the consent does not limit sodium it is of particular interest due to the use of chemicals such as sodium hypochlorite, sodium hydroxide and sodium bisulphate in the WTP process. Ballance Agri-Nutrients and Vector both have discharges to the Kapuni Stream, upstream of the WTP discharge which, have limits placed on them for sodium. The WTP discharge will continue to be regularly monitored for sodium to establish whether it is making a significant contribution to sodium loadings in the Kapuni Stream.

### 2.2.2 Waimate West WTP (Kelly's Creek)

The filter backwash from the Waimate West WTP is discharged via a settling pond into an unnamed tributary of the Mangawhero Stream. Samples of the discharge and receiving waters were taken on 9 April 2013 and the results are shown in Table 4.

**Table 4** Results of sampling at the Waimate West WTP 9 April 2013

Site	Unit	MWR000310 (u/s of discharge)	STW002069 (discharge)	MWR000312 (d/s of discharge)	Consent Limit (in discharge)
Free available chlorine	g/m <sup>3</sup>	<0.1	<0.1	<0.1	0.1
pH		7.5	7.7	7.6	>6.5 <8.5
Suspended solids	g/m <sup>3</sup>	10	8	13	100
Turbidity	NTU	5.6	-	6.8	-

The results were within consent limits in regards to pH and free available chlorine. Other parameters measured (suspended solids and turbidity) also indicate that the discharge quality was quite good. The receiving water results indicate that the discharge is not having an adverse effect on water quality.

### 2.2.3 Inaha WTP (discharge)

A sample was collected from the backwash treatment ponds discharge on 15 April 2013 and the results are shown in Table 5. All parameters were found to be in compliance with consent conditions.

**Table 5** Results of sampling at the Inaha WTP 15 April 2013

Site	Free available chlorine g/m <sup>3</sup>	pH	Suspended solids g/m <sup>3</sup>
Consent Limit (in discharge)	0.1	>6.5 <8.5	100
STW002069 (discharge)	<0.1	7.5	2

## 2.3 Results of receiving environment monitoring

### 2.3.1 Hawera WTP macroinvertebrate survey (Kapuni)

The Council's standard 'kick-sampling' technique was used on 13 March 2013 at two sites to collect streambed macroinvertebrates from the Kapuni Stream to determine if there had been any adverse effects on the macroinvertebrate community of the stream from Kapuni water treatment plant backwash discharges. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI<sub>s</sub> scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI<sub>s</sub> takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in either the MCI or the SQMCI<sub>s</sub> between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This survey was the third to follow full commissioning of the Kapuni Water Treatment Plant. The new discharge point is now located just upstream of the Skeet Road bridge, and the sampling sites were consequently changed, to enable monitoring of this new location. Site 1 has an extensive historical dataset, as a result of monitoring undertaken in relation to the Vector Kapuni and Ballance Agri-Nutrients Kapuni Ltd sites, located upstream. This dataset can also be used as a reference for site 2 (KPN000301), until a suitable data record has been established here. It should be noted however, that the monitoring undertaken in relation to the Vector Kapuni and Ballance Agri-Nutrients Kapuni Ltd sites is done so using a slightly different methodology, which has the potential to produce lower taxa richness and higher MCI scores.

This late summer macroinvertebrate survey indicated that there were only relatively subtle differences between site 1, upstream of the discharge point, and site 2, downstream of the discharge point. There is no evidence to suggest that the discharge of filter backwash and settling tank sediment had resulted in an impact on

the macroinvertebrate communities of the Kapuni Stream. This is supported by the MCI score recorded downstream of the discharge being similar to the median score for the upstream site, and similar to that recorded during the previous two surveys.

The macroinvertebrate communities of the Kapuni Stream contained significant proportions of 'sensitive' taxa at both sites and the communities were generally dominated by 'sensitive' taxa. Taxonomic richness (number of taxa) was very high at the control site 1 and decreased slightly at site 2 downstream of the discharge, although there were some changes in the presence/absence of a few taxa found as rarities (less than 5 individuals). Both sites recorded average MCI scores. An insignificant change in the MCI value between sites was a result of some subtle differences in taxa presence/absence. The SQMCI<sub>s</sub> values were identical between sites, reflective of the similarity in dominant taxa.

The full biomonitoring report is attached in Appendix II.

### **2.3.2 Waimate West WTP macroinvertebrate survey (Mangawhero-iti)**

Macroinvertebrate sampling was undertaken on 13 March 2013, at four sites in the Mangawhero-iti Stream; a control site upstream of the intake weir (1), a primary impact site approximately 40 metres downstream of the intake weir (2), a secondary impact site 3 kilometres downstream of that intake and a tertiary impact site approximately 5.6 kilometres downstream of the intake and 340 metres upstream of the confluence with the Mangawhero Stream. Sampling was performed at all four sites using the 'kick' sampling technique, a standard sampling technique used by the Council. This was undertaken to assess whether the abstraction of water from the Mangawhero-iti Stream for the Waimate West Water Treatment Plant (WWWTP) had had any adverse effects on the macroinvertebrate communities of this stream. Samples were processed to provide number of taxa (richness), MCI and SQMCI<sub>s</sub> scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI<sub>s</sub> takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in the MCI or the SQMCI<sub>s</sub> between sites indicate the degree of adverse effects (if any) of the activity monitored.

This early autumn survey did not indicate that the water abstraction for the WWWWTP from the Mangawhero-iti Stream had significantly affected the freshwater macroinvertebrate communities immediately downstream of the abstraction point.

High MCI and SQMCI<sub>s</sub> scores were recorded at the upstream control site (1). These scores were relatively similar to those recorded at site 2, located approximately 40 metres downstream of the water take. Typically there was a decline in MCI score between sites 2 and 3 although the SQMCI<sub>s</sub> score at site 3 was the highest recorded in the survey due to increased numerical abundances within some 'sensitive' taxa.

The results of this survey showed a significant decline in the macroinvertebrate communities between sites 1 and 4, and sites 3 and 4, where the MCI rates of decline

were significantly higher than predicted. This is consistent with a general trend of increasing water temperature and decreasing physicochemical water quality with decreasing altitude in ringplain streams in the region coincident with point and non-point source discharges. Abstraction of water from the Mangawhero-iti Stream may exacerbate the decline in macroinvertebrate 'health' by reducing available dilution of such discharges particularly as cumulative impacts occur in a downstream direction.

### **2.3.3 Rahoitu WTP macroinvertebrate survey (Pungaereere)**

The Council's standard 'kick-sampling' technique was used at three established sites to collect streambed macroinvertebrates from the Pungaereere Stream. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI<sub>s</sub> scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI<sub>s</sub> takes into account tax abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in either the MCI or SQMCI<sub>s</sub> between sites may indicate the degree of adverse effects (if any) of the abstractions or discharges being monitored.

This late summer macroinvertebrate survey indicated that during a period of low recession flow of the river there were no effects on the macroinvertebrate communities' compositions downstream of the abstraction or discharge beyond the designated mixing zone. Very few significant changes in individual taxon abundances were recorded between sites through the stream reach surveyed.

In general, the macroinvertebrate communities of the stream contained relatively high proportions of 'tolerant' taxa at all sites and the communities were generally dominated by similar numbers of 'sensitive' and 'tolerant' taxa. Taxonomic richnesses (number of taxa) were slightly higher than those of the previous three summer surveys conducted over the past 13 years.

MCI and SQMCI<sub>s</sub> scores indicated that the stream communities were of 'fair' and 'below expected' health, although relatively typical of conditions recorded in the lower reaches of similar Taranaki rivers, with minimal differences in the numerical abundances of the characteristic taxa accounting for the very similar SQMCI<sub>s</sub> values through the short stream reach surveyed.

### **2.3.4 Cold Creek WTP fish survey**

A night spotlighting survey was conducted on 30 June 2013 upstream and downstream of the Cold Stream weir (Cold Creek water supply scheme).

Very low fish diversity was recorded in the Cold Stream, but good populations of brown trout were found upstream and downstream of the weir, indicating that the fish pass was providing adequate passage for these fish. It was interesting to note that the brown trout population consisted entirely of juveniles, indicating that Cold

Stream provides important spawning and juvenile rearing habitat, which in turn supports the Taungatara Stream brown trout fishery.

Trout have been the only fish species recorded in this stream in the three TRC surveys conducted to date, although the Department of Conservation did observe one longfin eel in 1994. For this reason the spotlighting method was used in the current survey, to target galaxiids such as koaro and shortjaw kokopu. However, the flow conditions were such that this method was not very effective. The flow was far too swift, reducing visibility. This method is better suited to areas of slower flow, and should only be repeated in this stream in such habitat.

The full fish survey report is attached in Appendix II.

### **2.3.5 Oaonui WTP electric fishing survey**

Previous surveys have failed to record torrentfish upstream of the weir, and this absence continued in the current survey. This may suggest that the fish pass is not working effectively, however this absence could also be attributed to the differences in habitat (particularly the proportion of riffle habitat) immediately upstream of the weir. In addition, the absence of torrentfish in the current survey may also be related to the fact that spotlighting is not the most effective means of recording torrentfish, and the upstream site was located above the expected altitudinal range for this species. This is further confirmed by two surveys conducted since the fish pass was installed where inanga (an indicator species) were recorded in abundance upstream of the weir for the first time (February 2003 and April 2004). Although no inanga were recorded in the current survey, this does not mean that these fish were not present however, and the absence of inanga may be associated more with the time of year the survey was undertaken and the location of the upstream site. Inanga migrate downstream in autumn to spawn in the lower tidal reach, and in most cases do not survive. Therefore, inanga will only be present in the surveyed reach during and shortly after the spring whitebait migration. In addition, the upstream site was located above the expected altitudinal range for this species. The presence of inanga upstream of the weir would suggest that most, if not all other species of native fish would be capable of negotiating the fish pass. It is likely that the Oaonui Water Supply weir is currently not a barrier to fish, therefore compliance with fish passage requirements of resource consent 5453 is being achieved.

As monitoring of fish communities to date indicates that the fish pass is operating with reasonable success, the need to perform annual fish surveys is not required. Provided that regular inspection of the pass confirms that it is operating as required and being maintained, it is recommended that fish monitoring continues at the rate of once every three years.

### **2.3.6 Waimate West WTP (Mangawhero) electric fishing survey**

A fish survey was conducted upstream and downstream of an STDC weir in the Mangawhero Stream weir on 30 June 2013. This survey used the night spotlighting technique, but due to the natural iron oxide turbidity that is frequently present in the Mangawhero Stream being especially bad, to the point where visibility was severely reduced, the effectiveness of the spotlighting technique was significantly reduced.

This is the second survey undertaken since a new fish pass was installed in 2007. In the Mangawhero Stream fish diversity was low both upstream and downstream of the weir, as has been recorded in previous surveys. This is likely to be related to the distance from the sea and the high altitude at which these sites are located, as fish diversity does decrease with increasing altitude and distance inland. Fish communities were similar between the two sites and indicate that the STDC weir is generally not a barrier to the stronger climbing longfin eels, or trout. However there may be times when trout are unable to negotiate the jump at the bottom of the old fish pass, and flows in the new pass may be too shallow at times, but they are more likely to pass the weir during floods, which is generally when trout migrate.

Torrentfish (*Cheimarrichthys fosteri*) were not recorded in the current survey at either site. These fish have been recorded downstream of the weir in the past but have not yet been recorded upstream of the weir. Torrentfish are moderate swimmers which can negotiate reasonably swift flows, however their climbing ability is poor to moderate. It is expected that the new fish pass is adequate to provide for the passage of torrentfish, however, the likelihood of recording torrentfish again at this altitude and distance from the coast is considered low, as the predicted probability of capture in this reach is only 0.7%.

***Summary and recommendations for further monitoring***

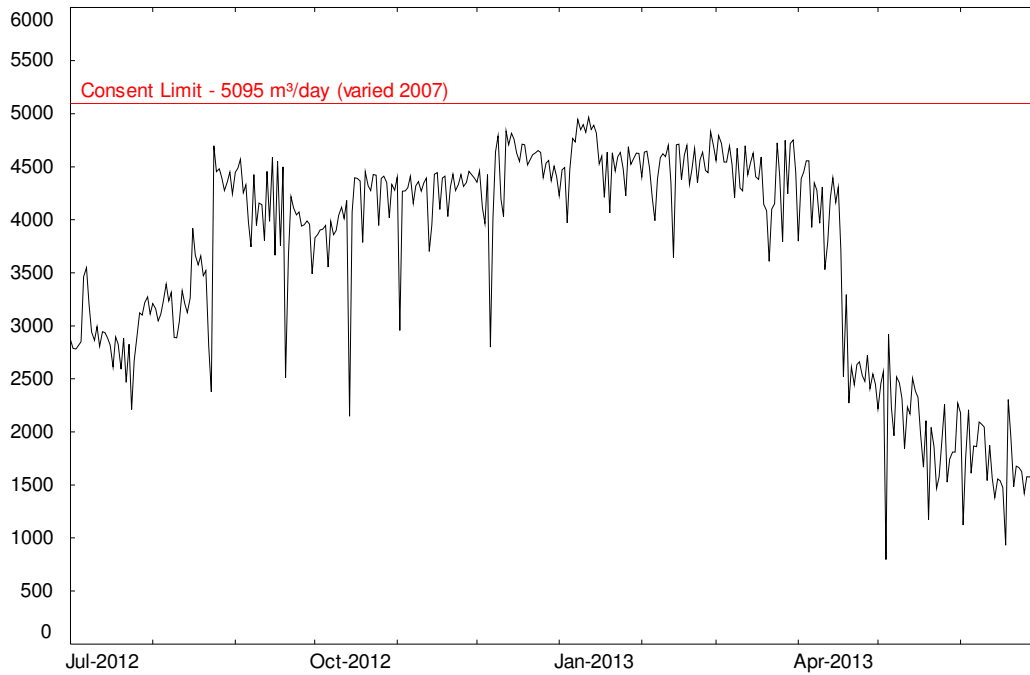
The monitoring of the Mangawhero Stream indicates that fish passage provided by the new fish pass is likely to provide fish passage for most fish present in this reach. This includes torrentfish, which were recorded on one previous occasion at this location.

Provided that regular inspections of the fish pass confirm that it is operating as required and being maintained, it is recommended that the fish monitoring be conducted once every three years as per the scheduled monitoring programme currently implemented.

## **2.4 Abstraction data**

As a condition of their various resource consents to abstract water, STDC, OWSL and NWSSI are required to record measurements of abstraction volumes for each site and this data is to be provided to the Council on request. This data was forwarded as requested to the Council during the 2012-2013 period and is discussed below. Most consents require that daily abstraction volume data be supplied, however newer consents require 30 minute abstraction rate data to be supplied. Compliance is assessed on the type data that is required to be provided by consent conditions.

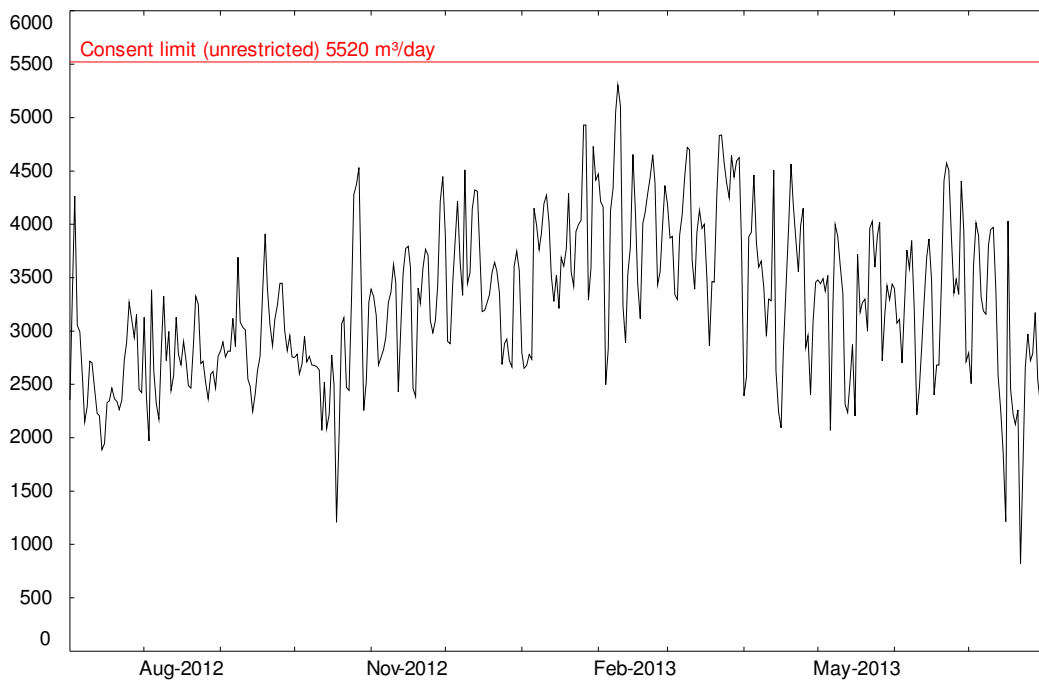
### 2.4.1 Cold Creek water supply



**Figure 3** Graph of the daily abstraction for the Cold Creek water supply

Consent 1134 sets a maximum abstraction rate of 59 L/s which if exercised continuously over a 24 hour period equates to 5095 m<sup>3</sup>/day and the Cold Creek WTP complied with this limit. Based on the residual flow data supplied and gaugings undertaken by Council the residual flow limit of 187 L/s was not breached at any point during the monitoring period.

### 2.4.2 Eltham water supply

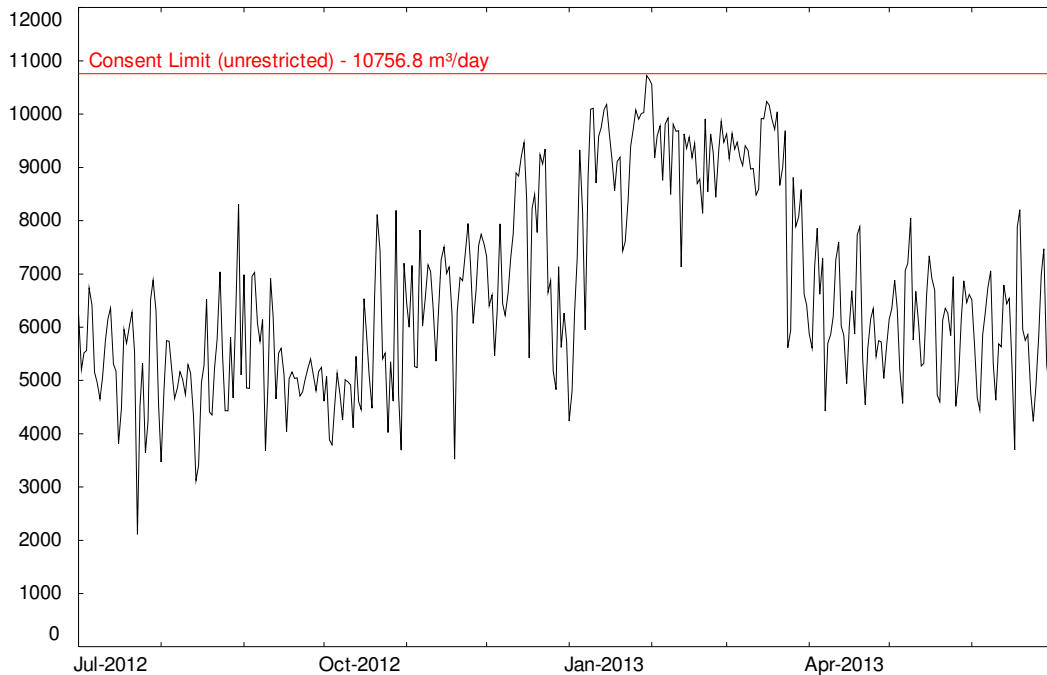


**Figure 4** Graph of the daily abstraction for the Eltham water supply



The maximum daily abstraction from the Waingongoro River was 5297 m<sup>3</sup>, which complied with the restricted consent limit of 5,520 m<sup>3</sup>/day (Figure 4).

### 2.4.3 Hawera water supply



**Figure 5** Graph of the daily abstraction for the Hawera water supply

The maximum daily abstraction from the Kapuni Stream was 10,689m<sup>3</sup>, which complied with the consent limit of 10756 m<sup>3</sup>/day (Figure 5).

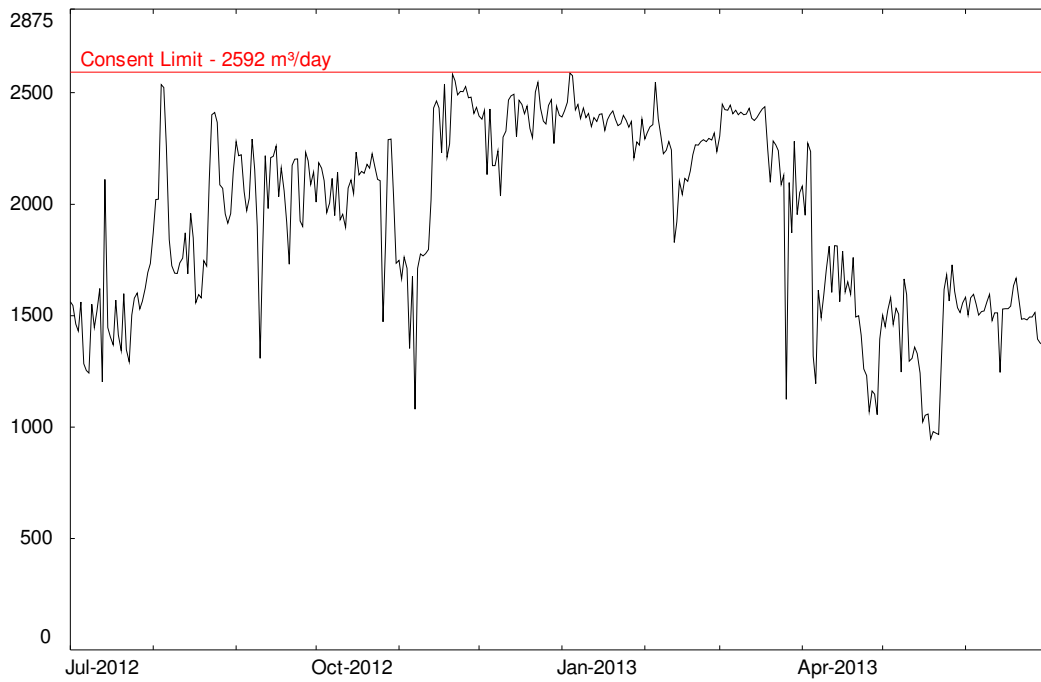
There were no abstractions from the Kapuni bore during this monitoring period.

### 2.4.4 Inaha water supply

The Inaha water supply system abstracts water from the Waingongoro River and the Mangatoki Stream. There is one gravity-fed abstraction on both streams, along with a pumped abstraction on the Mangatoki Stream for use when the gravity fed amount is insufficient. Water surplus to requirements flows back into the Mangatoki Stream (regardless of which stream it is initially collected from).

Abstractions from the Mangatoki Stream are reported as one figure and therefore compliance with the individual consents could not be assessed. The maximum daily abstraction for the combined Mangatoki Stream takes was within the combined consent limits of 2,504 m<sup>3</sup>/day. As the two points of take are spatially very close together (<500 m) the consent holder proposes to resolve this by combining the two take points into one consent.

The maximum daily take from the Waingongoro River was also within consent limits (Figures 6 and 7).

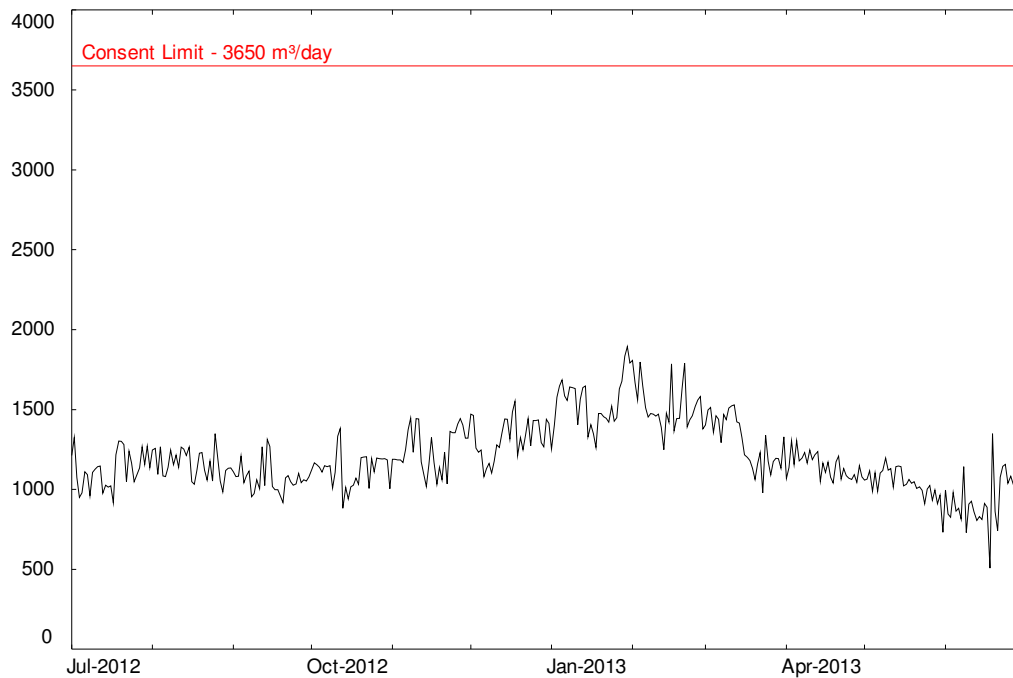


**Figure 6** Graph of the daily abstraction from the Waingongoro River for the Inaha water supply



**Figure 7** Graph of the daily combined abstraction from the Mangatoki Stream for the Inaha water supply

### 2.4.5 Opunake water supply



**Figure 8** Graph of the daily abstraction for the Opunake water supply

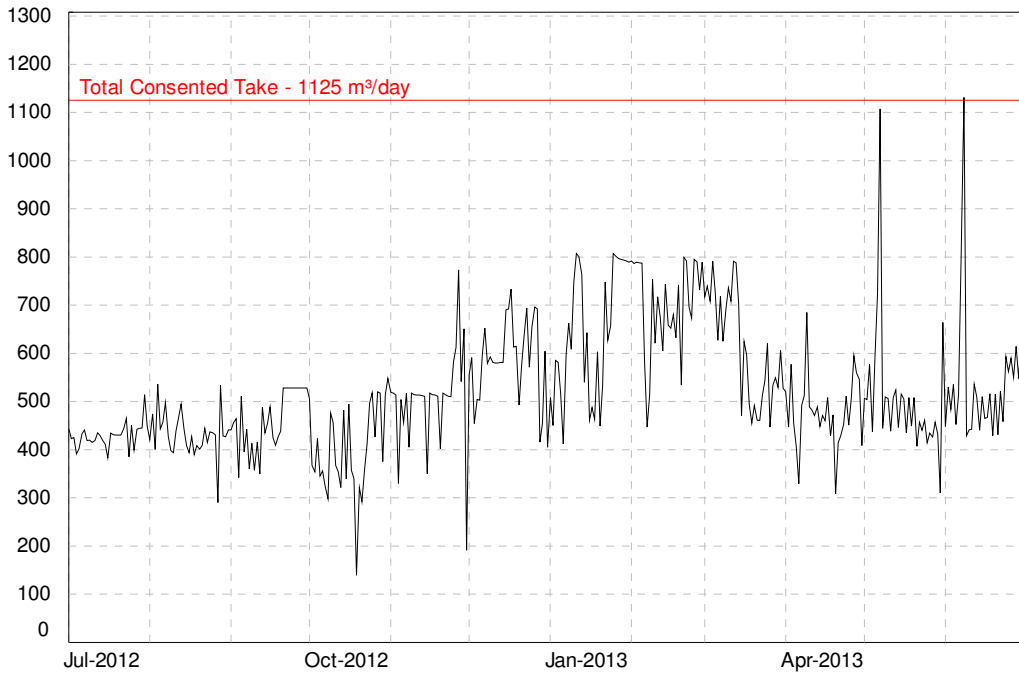
The maximum daily abstraction from the Waiaua Stream was 1,893 m<sup>3</sup>, which complied with the daily consented limit of 3,650 m<sup>3</sup>/day (Figure 8).

### 2.4.6 Patea water supply

All three bores that are used at the Patea WTP are covered by consent 3388. The analysis of abstraction rates and the level of compliance are given in table form below. The consent holder is also required to comply with a combined daily abstraction volume of 1125 m<sup>3</sup>/day. This was exceeded on one occasion with a maximum daily volume of 1131 m<sup>3</sup>.

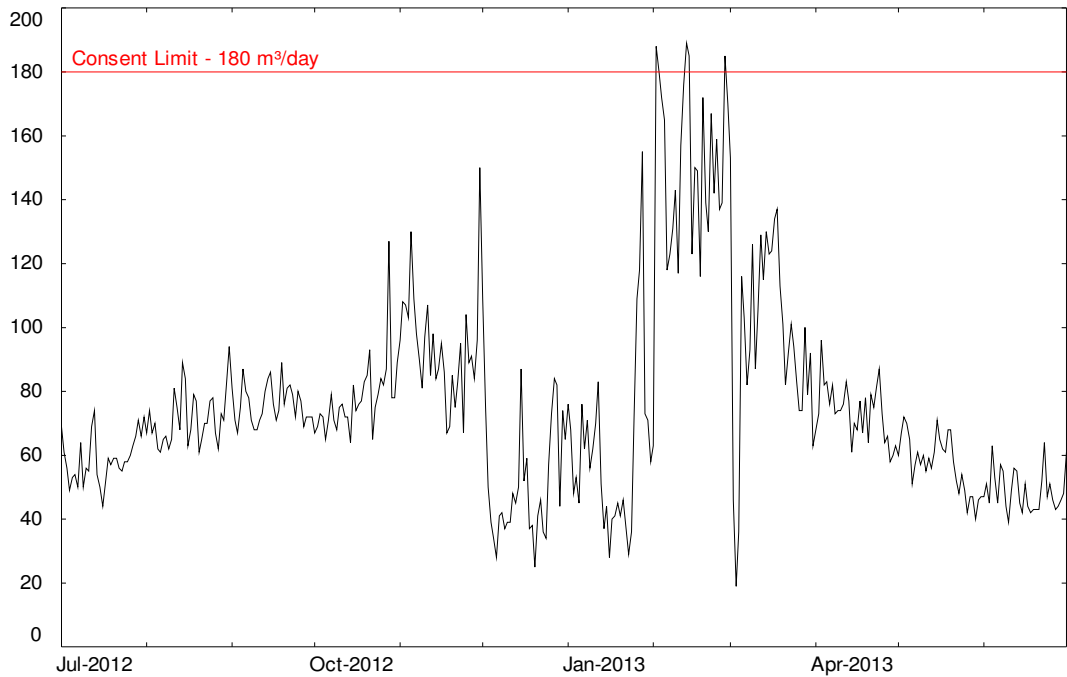
**Table 6** Compliance with abstraction rates at the Patea bores

Bore No.	Consent Limit	% Compliance with 15 minute averages	Highest rate of take found in 15 minute data
1	4.7 L/s	99.99	14.75 L/s
2	3.9 L/s	99.3	14.75 L/s
4	10 L/s	99.66	19.7037 L/s



**Figure 9** Graph showing combined daily abstractions from the Patea groundwater bores

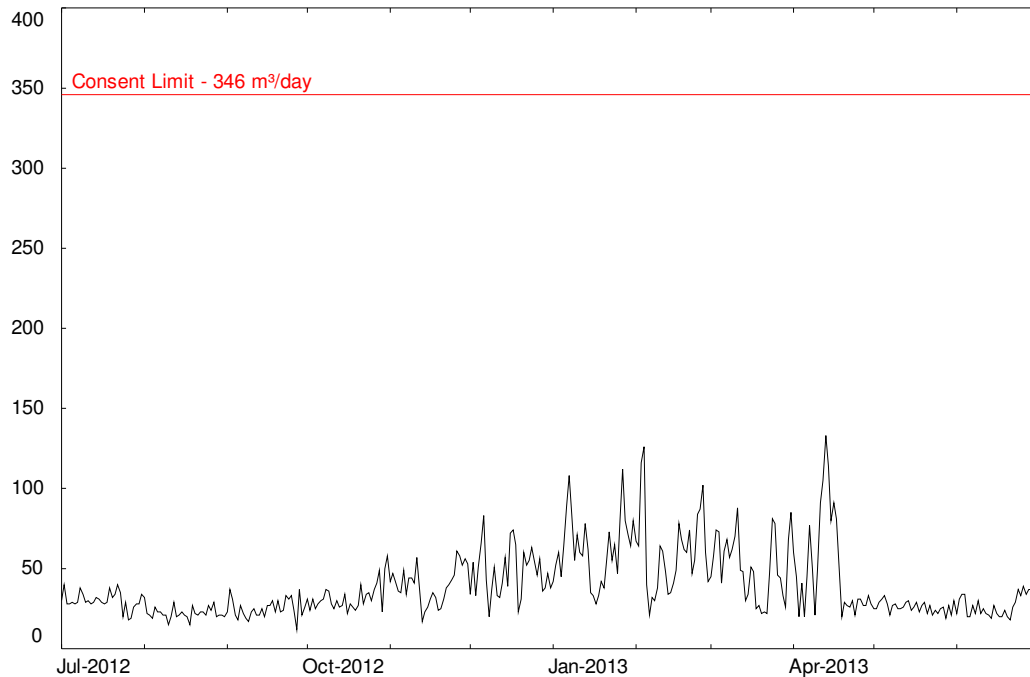
#### 2.4.7 Rahoju water supply



**Figure 10** Graph of the daily abstraction for the Rahoju water supply

There were four occasions when the maximum daily abstraction limit of 180 m<sup>3</sup>/day from the Pungaereere Stream was exceeded with a maximum daily take of 188 m<sup>3</sup> (Figure 10).

### 2.4.8 Wai-inu Beach water supply



**Figure 11** Graph of daily abstractions for the Wai-inu Beach water supply

The maximum daily abstraction from the bore was 133 m<sup>3</sup>, which complied with the daily consent limit of 346 m<sup>3</sup>/day (Figure 11)

### 2.4.9 Waimate West water supply

There are three individual takes for the Waimate West scheme:

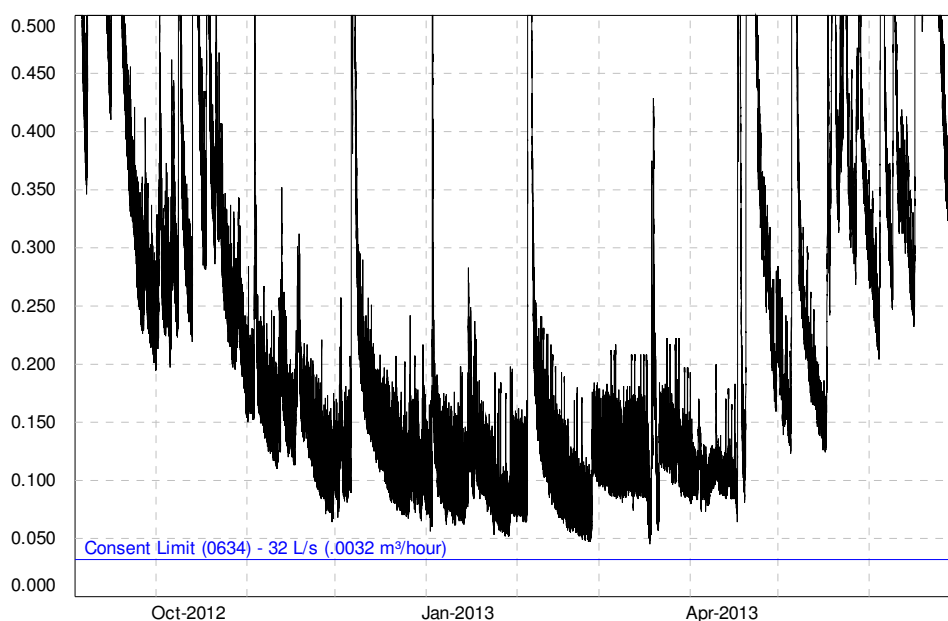
- The Mangawhero-iti take directly supplies the Waimate West plant
- The Otakeho take supplies both the Waimate West plant and the Pope WTP
- The Mangawhero take is a contingency used to top-up the Mangawhero-iti Stream during periods of low flow.

The consents for the abstractions from the Mangawhero-iti and Otakeho Streams (consents 0634 and 3911) require that 15 minute abstraction data be telemetered to the Council every two hours. Currently this only occurs with the Mangawhero-iti when the telemetered data starting coming in on 5 September 2012. However this data stream has had issues and the figures below have been produced using the consent holder's Water Outlook web service which enables Council staff to interrogate the consent holder's SCADA database directly for 15 minute data.

**Table 7** Compliance with consents 0634 and 3911

Water take	Consent Limit	% Compliance with 15 minute averages	Highest rate of take found in 15 minute data
Mangawhero-iti	121 L/s	98.3%	133.6
Otakeho	85 L/s	100%	84 L/s

Consent 0631 also requires that a residual flow of 32 L/s be maintained in the Mangawhero-iti Stream below the intake. During the time that data was supplied this requirement was complied with.



**Figure 12** Residual flow in the Mangawhero-iti Stream

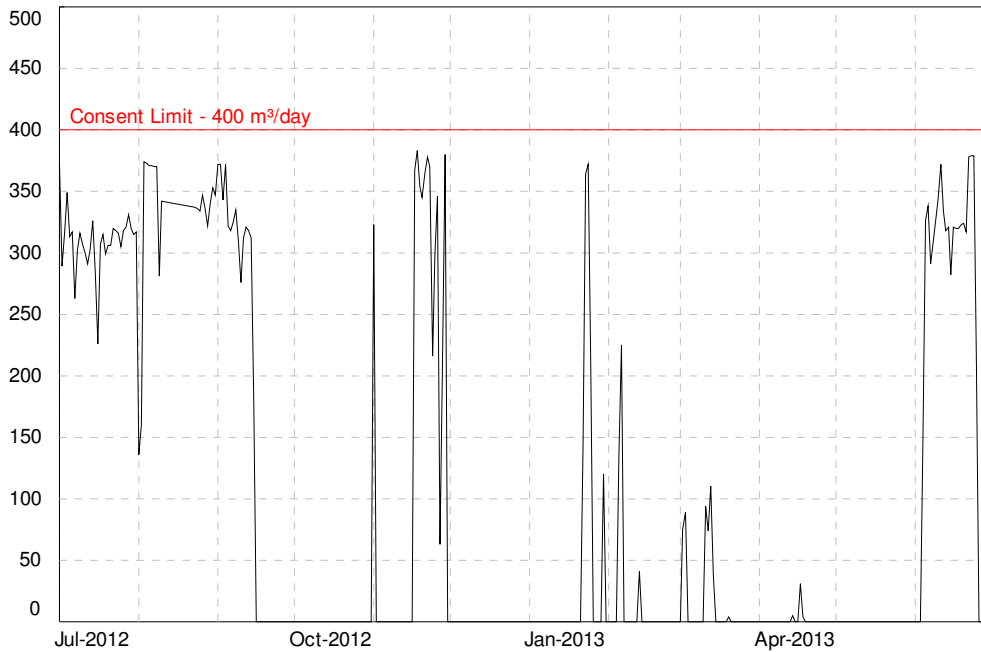
During the 2012-2013 water was abstracted from the Mangawhero Stream during the drought period in March-April 2013. Only daily volumes for this take appear to be available and on that basis compliance was met.

#### 2.4.10 Waverley water supply

Consent 3313 has instantaneous abstraction for each of the three bores and the consent holder is required to provide 15 minute data. This data is analysed in the table below. Consent 3313 also sets a limit of daily abstraction volumes for each bore and this data is illustrated in Figures 13, 14 and 15.

**Table 8** Compliance with abstraction rates at the Waverley bores

Bore	Consent Limit (L/s)	% Compliance with 15 minute averages	Highest rate of take found in 15 minute data (L/s)
Chester St	7.0	100	2.69
Fookes St	7.2	99.93	8.80
Swinbourne St	10.3	99.99	14.3



**Figure 13** Graph of daily abstractions from the Chester Street bore

The maximum daily abstraction from the Chester Street bore was 383 m<sup>3</sup>, which complied with the consent limit of 400 m<sup>3</sup>/day (Figure 13), however as the table shows there very short period of non compliance in regards to instantaneous rates for the Fookes Street and Chester Street bores. Small periods of non-compliance usually occur on pumped bores during pump start-up where the flow will spike and then settle back to the desired rate. Council deems these non-compliances to be too minor to warrant further action.



**Figure 14** Graph of the daily abstraction from the Fookes Street bore

The maximum daily abstraction from the Fookes Street bore was 475 m<sup>3</sup>, which complied with the consent limit of 500 m<sup>3</sup>/day (Figure 19).



**Figure 15** Graph of the daily abstraction from the Swinbourne Street bore

The maximum daily abstraction from the Swinbourne Street bore was 799 m<sup>3</sup>, which complied with the consent limit of 890 m<sup>3</sup>/day (Figure 15).

**2.4.11 Oaonui water supply**



**Figure 16** Graph of the daily abstraction from the Oaonui Stream for the Oaonui water supply

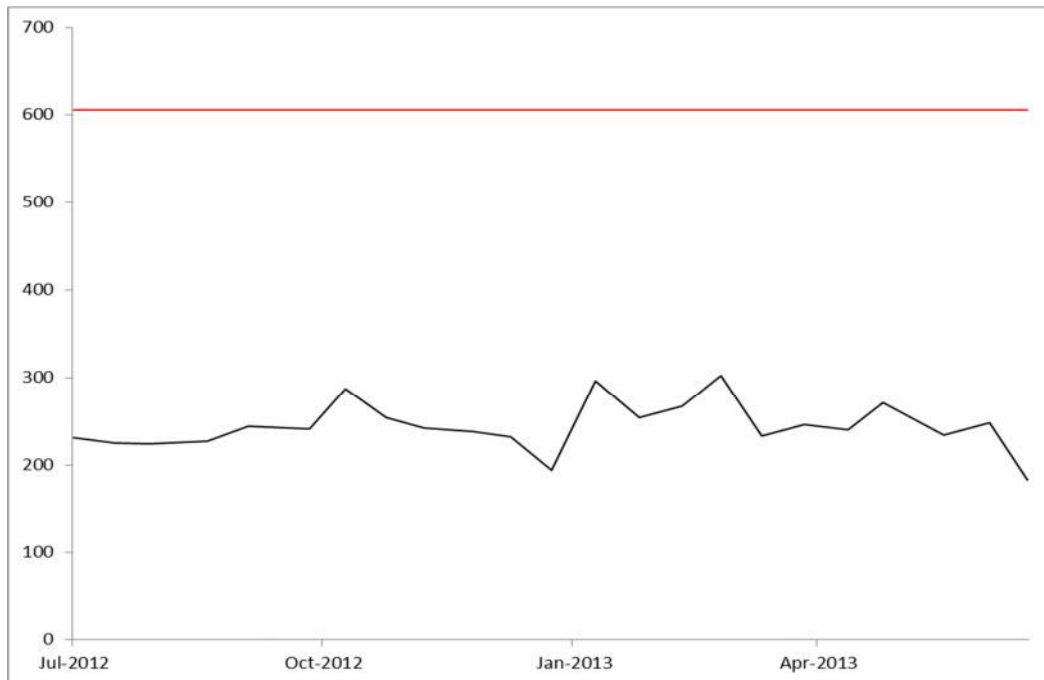


There were two minor exceedances with a maximum daily abstraction of 3,664m<sup>3</sup> (consent limit of 3,500 m<sup>3</sup>/day) (Figure 20). These exceedances were brief and no incidents were logged as the abstraction level quickly returned to being in compliance.

#### 2.4.12 Waverley Beach water supply

STDC operate this abstraction as a permitted activity and consequently are not required to obtain a resource consent. The Regional Fresh Water Plan for Taranaki [RFP] allows an abstraction of up to 50 m<sup>3</sup>/day of groundwater (at a maximum rate of 1.5 litres/second) as a permitted activity.

#### 2.4.13 Nukumaru water supply



**Figure 17** Graph of the average daily abstraction for the Nukumaru water supply

Abstraction data for the Nukumaru scheme was recorded manually every one to two weeks. The maximum average daily abstraction was 302 m<sup>3</sup>/day, which complied with the consent limit of 605 m<sup>3</sup>/day (Figure 17).

## 2.5 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the consent holder. During the year matters may arise which require additional activity by the Council eg provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Taranaki Regional Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment.

The Unauthorised Incident Register (UIR) includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2012-2013 year it was not necessary for the Council record an incident or undertake any significant intervention in regards to the activities of Oaonui Water Supply Limited or Nukumarū Water Supply Society.

Two incidents were logged in regards to STDC not complying with consent conditions in regards to providing telemetered data from the Waimate West water takes. Two abatement notices were issued setting a deadline date of 30 June 2013 for completion of works. This was later moved back to 31 October 2013 after STDC gave Council access to their Water Outlook database which allows real time monitoring of all STDC abstractions. STDC is currently working on having the data sent automatically via the internet to direct into Council's data management systems.

### 3. Discussion

#### 3.1 Discussion of plant performance

Resource consent conditions require that daily volumes of water abstracted are recorded and the data provided to the Council. This data was provided in a timely manner upon request by all consent holders during the monitoring period with the exception of Nukumarū Water Supply Society.

All intake structures were inspected and found to be in good condition and no issues with fish passage were noted.

During the 2012-2013 periods there were short term exceedances in daily volumes at the Rahotu, Patea and Oaonui plants. These were not deemed sufficient to warrant enforcement action.

Abstractions from the Mangatoki Stream, for the Inaha water supply, are reported as one figure and therefore compliance with the individual consents could not be assessed. The combined daily abstraction complied with the combined consent limits. This matter is been addressed by the consent holder proposing to apply for single consent to cover both takes from the Mangatoki.

Short periods of non –compliance in regard to instantaneous rates occurred At the Waverly WWTP Council deems these non -compliances to be too minor to warrant further action.

There was a period over Christmas 2012 where the abstraction rates from the Mangawhero-iti Stream exceeded the 121 L/s consent limit. However the highest rate was only 131 L/s and the residual flow never fell below the consent limit of 31 L/s. STDC investigated and found that debris in the Otakeho line from the weir construction constricting flow causing the Mangawhero-iti intake to fluctuate (the intakes are hydraulically linked). When construction of the new plant at Waimate West is completed in in 2014, the intakes will not be linked and this should address this issue. The consent holder is also investigating having the Otakeho line cleared of debris.

Table 9 below summarises compliance in regards to abstraction rates and volumes and the provision of data.

**Table 9** Summary of compliance in regards to abstraction rates, volumes and data

Plant	Source	Records Supplied on time?	Compliance with daily volumes	Compliance with abstraction rates
Cold Creek	Cold Creek	Yes	100%	n/a
Eltham	Waingongoro	Yes	100%	n/a
Hawera	Kapuni	Yes	100%	n/a
	Kapuni bore	Yes	Not exercised	n/a
Inaha	Mangatoki	Yes	100%	n/a
	Waingongoro	Yes	100%	n/a
Opunake	Waiua	Yes	100%	n/a

Plant	Source	Records Supplied on time?	Compliance with daily volumes	Compliance with abstraction rates
Patea	Bore 1	Yes	98.4%	99.99
	Bore 2	Yes		99.3
	Bore 3	Yes		99.66
Rahotu	Pungaereere	Yes	98.9%	n/a
Wai-inu	Wai-inu bore	Yes	100%	n/a
Waimate West	Mangawhero-iti	Yes	N/A	99.12%
	Otakeho	Yes	N/A	100%
	Mangawhero	Yes	100%	n/a
Oaonui	Oaonui	Yes	99.4%	n/a
Nukumarū	Nukumarū bore	No	100%	n/a
Waverley	Chester St bore	Yes	100%	100%
	Fookes St bore	Yes	100%	99.93%
	Swinbourne St bore	Yes	100%	99.99%
	Combined take	Yes	100%	Not assessed

**Key:**

N/A= not applicable as consent does not specify a daily volume

n/a= not assessed as consents only require daily volumes be reported

Table 9 below summarises compliance in regards to abstraction rates and volumes and the provision of data.

In the 2012-2013 year the STDC was operating under abatement notices for not providing telemetered data required by consent conditions from the Mangawhero-iti, Mangawhero and Otakeho takes. The deadline given in the abatement notice for having the works completed to provide telemetered data was 30 June 2013.

Mangawhero-iti data went live on 4 September 2012, however the Otakeho and Mangawhero data was not being sent in as of 30 June 2013. Other consents coming online also have such requirements and it was the consensus view that a more integrated approach for handling STDC's abstraction data was needed.

As part of an initiative to standardise all STDC water take data handling, the consent holder is arranging to have live abstraction data from its Water Outlook database to be sent automatically to the Councils data systems on an hourly basis. It is envisaged this will occur for all STDC water treatment plants and that the consent holder will also provide other data of interest such raw water physico-chemical parameters.

This is planned to occur in October 2013 and in the interim Council staff have web access to the Water Outlook database which allows real time interrogatory monitoring to occur.

Reports required by consents 0146-2, 1134-2, 1185-3 and 1186-3 on efficient water use, leak detection and repair were submitted to Council.

### 3.2 NES water metering requirements

STDC is in the process of addressing NES compliance requirements. They have made a number of applications for approval for meters to be situated way from the point of take. STDC also intends to apply to have consents for the Mangatoki Stream takes combined so that the combined abstraction measurement currently taken would be compliant.

### 3.3 Environmental effects of exercise of consents

No adverse environmental effects were noted on inspections of the water supply schemes.

Filter backwash discharge sampling was conducted at the Kapuni, Inaha and Waimate West WTPs. The results indicated that the discharges were not likely to be causing any adverse environmental effects.

None of the macroinvertebrate or fish surveys indicated any adverse effects occurring due to abstraction activities or related structures.

### 3.4 Evaluation of performance

A tabular summary of the consent holders' compliance record for the year under review is set out in Tables 10 to 49.

#### 3.4.1 Cold Creek water supply

**Table 10** Summary of performance for Consent 1134-2 to take and use water for the Cold Creek rural supply from Cold Stream a tributary of the Taungatara Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Rate of abstraction shall not exceed 59 l/s	Review of abstraction data	Yes
2. Measure and record abstraction and provide to Council	Data received	Yes
3. Measure and record rate of abstraction and residual flow	Records received	Yes
4. Measurements transmitted in 'real time' to Council	System not yet up and running	No
5. Residual flow of 189 l/s to remain downstream	Records received	Yes
6. Staff gauge installed	Maintained by Council staff	Yes
7. Stream flow measurements undertaken to obtain a 'rating curve'	Undertaken by Council staff	Yes
8. Report annually on efficient water use, leak detection and repair	Received	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
9. One off payment of \$20,000 for mitigation	Received	Yes
10. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 11** Summary of performance for Consent 5454-1 to erect, place, use and maintain a water intake structure on the bed of Cold Creek for water abstraction purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to construction and maintenance works	No maintenance in monitoring period	N/A
2. Structure to be constructed in accordance application	Construction completed	N/A
3. Adoption of best practicable option to minimise adverse effects	No maintenance in monitoring period	N/A
4. Minimise area disturbed and reinstate areas disturbed	No maintenance in monitoring period	N/A
5. Major construction and maintenance to occur between 1 Nov and 30 Apr	No maintenance in monitoring period	N/A
6. No obstruction of fish passage	Inspection	Yes
7. Monitoring and reporting of adequacy of fish passage	Fish surveys scheduled for every 3 years	Yes
8. Structure to be removed when no longer required and area reinstated.	Structure in use	N/A
9. Review provision	No review option this period	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 12** Summary of performance for Consent 6077-1 to discharge filter backwash water and supernatant from the Cold Creek water treatment plant into the Cold Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Location of discharge point	Inspection	Yes
2. Limit on discharge rate	Inspection	Yes
3. Discharge not to cause certain effects in the receiving waters	Inspection	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Limits on chlorine, suspended solids and pH in discharge	Not assessed this year	N/A
5. Review provision	No review option this period	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.2 Eltham water supply

**Table 13** Summary of performance for Consent 0213-3 to take and use water from the Waingongoro River

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction volume and rate	Review of abstraction data provided	Yes
2. Recording of abstraction data and provision of records to Council	Data received	Yes
3. Consent to be exercised in accordance with application	Inspection and liaison with consent holder	Yes
4. Quantification of reticulation system losses and reporting	Report received 1 March 2001	Yes
5. Investigation and report on blocking of intake	Report received 18 January 2002	Yes
6. Review of SC1 in 2002 to assess water conservation measures	Liaison with consent holders	N/A
7. Mitigation by riparian planting	Completed	N/A
8. Review provision	No review option this period	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 14** Summary of performance for Consent 0989-2 to discharge reservoir contents, including accumulated silt, for the Eltham water supply reservoir

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to discharge	Notification received	Yes
2. Minimum flow requirement at time of discharge	Monitoring of river flow telemetry	Yes
3. Minimise discharge of silt and sediment	Consent holder liaison	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 15** Summary of performance for Consent 1810-3 to discharge overflow and reservoir drainage water from the Eltham water supply reservoir

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Approval required prior to emptying reservoir	No discharge during period under review	N/A
2. Periods when consent exercised minimised	No discharge during period under review	N/A
3. Minimise discharge of sediments when emptying reservoir	No discharge during period under review	N/A
4. Discharge not to cause certain effects in the receiving waters	No discharge during period under review	N/A
5. Limits on chlorine and suspended solids in the discharge	No discharge during period under review	N/A
6. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>N/A</b>

**Table 16** Summary of performance for Consent 1811-3 to discharge filter backwash from the Eltham water treatment plant

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Proper and efficient maintenance of the settlement pond system	Inspection	Yes
2. Discharge not to cause certain effects in the receiving waters below the established mixing zone	Inspection	Yes
3. Limits on chlorine and suspended solids in the discharge	Not assessed this year	N/A
4. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.3 Hawera water supply

**Table 17** Summary of performance for Consent 0146-2 to take and use water from the Kapuni Stream for municipal water supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction volume and rate	Review of abstraction data provided	Yes
2. Recording of abstraction data and provision of records to Council	Data received	Yes



Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Consent to be exercised in accordance with application documentation. Report on efficiency measures every two years	Report received	Yes
4. Reporting of events when abstraction is greater than 124.5 l/s	Data review	N/A
5. Mitigation by riparian planting	Total amount has been paid to the Taranaki Tree Trust	Yes
6. Preparation and maintenance of management plan for Kapuni Stream in conjunction with other users (within three months of granting)	Liaison with consent holder – Plan prepared in 2003 and updated in 2006	Yes
7. Annual leak detection and repair report	Report received	Yes
8. Point of abstraction	Inspection	Yes
9. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 18** Summary of performance for Consent 0933-3 to discharge filter backwash and settling tank sediment into the Kapuni Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Inspections and liaison with consent holder	Yes
2. Exercise of consent in accordance with application documentation	Inspections and liaison with consent holder	Yes
3. Notification prior to exercise		N/A
4. Permanent solution for treatment of wastes at time of upgrade in 2008	Backwash settling pond operating	Yes
5. Proper and efficient maintenance and operation of settlement system.	Inspections and liaison with consent holder	Yes
6. Discharge not to have adverse effects on receiving waters	Inspection and sampling	Yes
7. Limits on certain parameters in the discharge	Sampling	Yes
8. Lapse provision	Not applicable – consent exercised	N/A
9. Review provision	Next scheduled in 2017, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 19** Summary of performance for Consent 5596-1 to and to maintain two existing intake structures in the Kapuni Stream for the Hawera water supply

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to construction and maintenance works	No longer in use	N/A
2. Structure to be constructed in accordance with application	No longer in use	N/A
3. Construction not to occur between 1 May and 31 October	No longer in use	N/A
4. Adoption of best practicable option to minimise adverse effects on water quality	No longer in use	N/A
5. Minimise disturbance during construction and maintenance and reinstate disturbed areas	No longer in use	N/A
6. No refuelling on the streambed	No longer in use	N/A
7. No obstruction of fish passage	No longer in use	N/A
8. Maintenance of flow down fish pass to ensure fish passage	No longer in use	N/A
9. Structure not to cause erosion adjacent to or downstream of rock riprap ramp	No longer in use	N/A
10. Only material which makes up existing structure should be extracted from streambed during construction	No longer in use	N/A
11. Removal of streambed material for maintenance purposes only to occur between 1 November and 30 April	No longer in use	N/A
12. Removed material to be placed on banks of stream downstream of weir	No longer in use	N/A
13. Structure to be removed when no longer required and area reinstated.	Structure removed	Yes
14. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 20** Summary of performance for Consent 7002-1 to take and use groundwater for municipal, rural, industrial, and recreational supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent to be in accordance with application	Inspections of site and records	Yes
2. Notify the Council in writing at least 7 days prior to exercise of consent	Notification received	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Provide Council with results of pump testing prior to exercise of consent	Received	Yes
4. Abstraction not to exceed 4320m <sup>3</sup> per day	Review of abstraction data provided	Yes
5. Abstraction not to cause a more than 10% drop in static water level by interference	Monitored by STDC	Yes
6. Maintain records of the abstraction from each bore	Records kept and received by Council	Yes
7. Install device to record abstraction	Inspection and data received by Council	Yes
8. Consent holder to meet monitoring costs	Liaison with consent holder	Yes
9. Lapse provision	Not applicable – consent exercised	N/A
10. Review provision	Next scheduled in 2017, if required	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 21** Summary of performance for Consent 7413-1 to erect, use and maintain a water intake structure on the bed of the Kapuni Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent to be in accordance with application	Inspection	Yes
2. Disturbance of riverbed between 1 November and 30 April only	N/A	N/A
3. Notification prior to works and maintenance	Notification received	Yes
4. Area and volume of disturbance minimised	Inspection	Yes
5. Minimise sediment entering stream	Inspection	Yes
6. Structure removed and area reinstated when no longer required	Structure in use	N/A
7. Consent holder to monitor and maintain fish pass	Fish surveys scheduled for every 3 years	N/A
8. Procedure if archaeological remains discovered during construction	None found	N/A
9. Lapse provision	Not applicable – consent exercised	N/A
10. Review provision	Next scheduled in June 2017, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 22** Summary of performance for Consent 7446-1 to discharge membrane backwash water and cleaning wastewater into the Kapuni Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option to minimise adverse effects	Inspection and liaison with consent holder	Yes
2. No adverse effects on receiving waters	Inspection, sampling, biomonitoring	Yes
3. Allowable increase in turbidity below mixing zone	Sampling	N/A
4. Levels of contaminants in discharge	Sampling	Yes
5. Lapse provision	Not applicable	N/A
6. Review provision	Next scheduled in June 2017, if required	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 23** Summary of performance for Consent 7447-1 to install, use and maintain an outfall structure on the bank of the Kapuni Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent to be in accordance application	Inspections	Yes
2. Disturbance of riverbed between 1 November and 30 April only	N/A	N/A
3. Notification prior to works and maintenance	N/A	N/A
4. Area and volume of disturbance minimised	N/A	N/A
5. Minimise sediment entering stream	N/A	N/A
6. Structure removed and area reinstated when no longer required	Structure in use	N/A
7. Procedure if archaeological remains discovered during construction	N/A	N/A
8. Lapse provision	Consent exercised	N/A
9. Review provision	Next scheduled in June 2017, if required	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.4 Inaha water supply

**Table 24** Summary of performance for Consent 1185-3 to take water from the Mangatoki Stream in the Waingongoro catchment for Inaha rural water supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Inspection and liaison with consent holder	Yes
2. Exercise in accordance with application	Inspection and liaison with consent holder	Yes
3. Maximum abstraction 1,122 m <sup>3</sup> /day at 13 l/s	Review of abstraction data	Partly(separate data required)
4. Measure and record abstraction rate and provide to Council	Data received	Partly(separate data required)
5. Maintain intake structure and remove when no longer required	Inspection and liaison with consent holder	Yes
6. Intake screened to avoid fish entrainment	Inspection	Yes
7. Intake structure shall not obstruct fish passage	Inspection	Yes
8. Report annually on efficient water use, leak detection and repair	Report received	Yes
9. Lapse provision	Not applicable – consent exercised	N/A
10. Review provision	Next scheduled in June 2018, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Good</b>

**Table 25** Summary of performance for Consent 1186-3 to take water from the Waingongoro River for Inaha rural water supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Inspection and liaison with consent holder	Yes
2. Exercise in accordance with application	Inspection and liaison with consent holder	Yes
3. Maximum abstraction 2,592 m <sup>3</sup> /day at 30 l/s	Review of abstraction data	Yes
4. Measure and record abstraction rate and provide to Council	Data received	Yes
5. Maintain intake structure and remove when no longer required	Inspection and liaison with consent holder	Yes
6. Intake screened to avoid fish entrainment	Inspection	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. Intake structure shall not obstruct fish passage	Inspection	Yes
8. Report annually on efficient water use, leak detection and repair	Report received	Yes
9. Lapse provision	Not applicable – consent exercised	N/A
10. Review provision	Next scheduled in June 2018, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 26** Summary of performance for Consent 3927-2 to discharge backwash wastes from the Inaha water supply treatment plant into an unnamed tributary of the Mangatoki Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Proper and efficient maintenance of the settlement pond system	Inspection	Yes
2. Discharge not to cause certain effects in the receiving	Inspection	Yes
3. Limits on chlorine and suspended solids in the discharge	Sampling not	Yes
4. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 27** Summary of performance for Consent 3928-2 to discharge uncontaminated overflow water from the Inaha rural water supply treatment plant

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Proper and efficient maintenance of the settlement pond system	Inspection	Yes
2. Discharge not to cause certain effects in the receiving waters	Inspection	Yes
3. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 28** Summary of performance for Consent 4102-2 to construct a low-level weir and fish pass across the Mangatoki Stream to improve water intake efficiencies

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	No maintenance during period under review	N/A
2. Exercise of consent in accordance with application documentation	No maintenance during period under review	N/A
3. Notification of Council prior to exercise of consent	No maintenance during period under review	N/A
4. Notification of Council prior to major maintenance works	No maintenance during period under review	N/A
5. Adoption of best practicable option during maintenance works	No maintenance during period under review	N/A
6. River bed to disturbance to be minimised during maintenance	No maintenance during period under review	N/A
7. No maintenance works between 1 May to 31 Oct	No maintenance during period under review	N/A
8. Structure to be properly maintained	Inspection	Yes
9. Structure not to impede fish passage	Inspection	Yes
10. Structure to be removed and area reinstated when no longer required	Structure in use	N/A
11. Lapse Provision	Not applicable - consent exercised	N/A
12. Review provision	Next scheduled in June 2017, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 29** Summary of performance for Consent 5364-1 to take and use water from the Mangatoki Stream for Inaha rural supply scheme purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction volume and rate	Review of abstraction data	Partly(separate data required)
2. Recording of abstraction data and provision of records to Council	Data received	Partly(separate data required)
3. Consent to be exercised in accordance with application	Inspection and liaison with consent holder	Yes
4. Mitigation by riparian planting	Liaison with consent holder	Yes
5. Right of Council to suspend or reduce abstraction during extreme low flows	Right not exercised	N/A
6. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Good</b>

**Table 30** Summary of performance for Consent 5365-1 to erect, place and maintain a low level intake weir in the Mangatoki Stream for Inaha rural water supply scheme purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to construction and maintenance works	No maintenance during period under review	N/A
2. Adoption of best practicable option to minimise adverse effects	No maintenance during period under review	N/A
3. No obstruction of fish passage	Inspection	Yes
4. Construction and maintenance to be in accordance with application	No maintenance during period under review	N/A
5. Maintain and operate safe structure	Inspection	Yes
6. Structure to be removed when no longer required and area reinstated	Structure in use	N/A
7. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.5 Opunake water supply

**Table 31** Summary of performance for Consent 0232-3 to take water from the Waiau Stream for Opunake town water supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Recording of abstraction and provision of data to Council	Data received	Yes
2. No obstruction of fish passage	Inspection	Yes
3. Review provision	No review option this period	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 32** Summary of performance for Consent 5574-1 to discharge filter backwash water and settling tank sediment from the Opunake Water Treatment Plant into the Waiau River

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Proper and efficient maintenance and operation of settlement lagoon	Inspection and liaison with consent holder	Yes
2. Discharge not to cause certain effects in the receiving waters	Inspection, sampling and biomonitoring	Yes
3. Limits on chlorine and suspended solids in discharge	Not assessed this period	N/A
4. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>



**Table 33** Summary of performance for Consent 9473-1 to construct, place and use a water intake structure on the bed of the Waiaua River for water abstraction purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Intake specifications	Inspection during construction	Yes
2. Notification prior to works	Notification received	Yes
3. Minimise river bed disturbance	Inspection during construction	Yes
4. Minimise sediment discharge to river	Inspection during construction	Yes
5. Ensure screen does not entrap fauna	Not yet assessed	N/A
6. No obstruction of fish passage	Inspection	Yes
7. Financial payment	Payment not due until September 2013	Yes
8. Procedures for archaeological finds	Nothing found	N/A
9. Remove structure when no longer required	Structure being used	N/A
10. Lapse condition	Consent exercised	N/A
11. Reviews June 2018 and June 2024	No review option this period	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.6 Patea water supply

**Table 34** To take and use groundwater from three bores (known as Bore 1, Bore 2 and Bore 4) for Patea Township water supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Total daily extraction not to exceed 1125 m <sup>3</sup>	Data received	<b>One non compliance</b>
2. Each bore not to exceed certain abstraction rates	Data received	<b>Minor non-compliance</b>
3. Bore 3 not to exceed 300 m <sup>3</sup> /day	Data received	Yes
4. Install flow meters	Data received	N/A
5. Install data logger	Data received	Yes
6. Inform Council of any equipment malfunction	Programme supervision	N/A
7. Provide access to equipment	Inspection	Yes
8. Adopt best practical option	Inspection	Yes
9. Measure level in Brannigan's bore	Groundwater level recorder installed	Yes
10. Consultations with Brannigan's bore owner if levels meet certain criteria	Liaison with consent holder – not necessary	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
11. Restrict use or provide water to Brannigan's bore owner if levels meet certain criteria	Liaison with consent holder – not necessary	Yes
12. Not to cause saltwater intrusion	Not assessed	N/A
13. Review provision	No further options for review prior to expiry.	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Good</b>

### 3.4.7 Pope water supply

**Table 35** Summary of performance for Consent 4446-1 to discharge treated backwash water from the Pope Rural Water Supply Treatment Plant

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Inspection and liaison with consent holder	Yes
2. Exercise in accordance with application	Inspection and liaison with consent holder	Yes
3. Maximum discharge of 6 m <sup>3</sup> /day at 5 l/s	Not assessed	N/A
4. Limits not to be exceeded in the discharge	Sampling – not sampled during period under review	N/A
5. Efficient operation	Inspection and liaison with consent holder	Yes
6. No effects on receiving water	Inspection	Yes
7. Lapse provision	Not applicable – consent exercised	N/A
8. Review provision	Next scheduled in June 2017, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.8 Rahoju water supply

**Table 36** Summary of performance for Consent 3696-2 to take and use water from the Pungaere Stream for Rahoju community water supply scheme

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction volume and rate	Review abstraction data provided to Council	<b>4 non-compliances</b>
2. Recording of abstraction and provision of data to Council	Data received	Yes
3. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Good</b>

**Table 37** Summary of performance for Consent 6038-1 to discharge filter backwash water and settling tank waste from the Rahotu water treatment plant into the Pungaereere Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge not to cause certain effects in the receiving waters below the established mixing zone	Not assessed this year	N/A
2. Limits on chlorine and pH in discharge	Not assessed this year	N/A
3. Review provision	A review was not required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>N/A</b>

### 3.4.9 Wai-inu Beach water supply

**Table 38** Summary of performance for Consent 3770-2 to take water from a bore in the Waitotara Catchment for Wai-inu Beach Settlement water supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Recording of abstraction data	Liaison with consent holder	Yes
2. Provision of abstraction data to Council	Data received	Yes
3. Forward results of hydraulic or chemical testing for bore	Liaison with consent holder – no testing carried out	N/A
4. Provision at top of bore for water level measurements and water quality sampling	Inspection	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.10 Waimate West water supply

**Table 39** Summary of performance for Consent 0129-3 to discharge treated washwater from the Waimate water supply scheme into an unnamed tributary of the Mangawhero-iti Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Inspection and liaison with consent holder	Yes
2. Exercise in accordance with application	Inspection and liaison with consent holder	Yes
3. Maximum discharge rate 360 m <sup>3</sup> /day	Not assessed	N/A
4. Limits on discharge not to be exceeded	Sampling	Yes
5. Efficient operation	Inspection and liaison with consent holder	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. No effects on receiving water	Inspection and sampling	Yes
7. Lapse provision	Not applicable- consent exercised	N/A
8. Review provision	Next scheduled in June 2017, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 40** Summary of performance for Consent 0634-3 to take water from the Mangawhero-iti Stream for the Waimate West water supply

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Max rate of abstraction 121 l/s	Review of abstraction data provided	No
2. Limit on abstraction unless water is taken from Otakeho Stream at 85 l/s	Review of abstraction data provided	Not assessed
3. Installation of water meter and datalogger and records of volumes abstracted	Inspections and abstraction data	Yes
4. Notification of installation of water meter and datalogger	Received	Yes
5. Notification of equipment failure	No problems during monitoring period	Yes
6. Water meter and datalogger accessible to Council	Inspections	Yes
7. Records of water taken in suitable format	Review of abstraction data provided	Yes
8. Flow in Mangawhero-iti Stream downstream of intake to be maintained above 32 l/s	New consent – data to be provided in next monitoring period	N/A
9. Flow of Mangawhero-iti Stream recorded when less than 500 l/s	New consent – data to be provided in next monitoring period	N/A
10. Measurements to be transmitted to Council in 'real time'	Reception of telemetry	Yes
11. Staff gauge to be installed	Installed by Council	Yes
12. Sufficient stream flow measurements undertaken to maintain a 'rating curve'	Gauging undertaken by Council	Yes
13. Best practicable option to prevent or minimise adverse environmental effects	Inspections, data review	Yes
14. Annual report due 1 September	Received July 2011	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
15. Five annual payments of \$30,600 due 2011 to 2015	Payment received	Yes
16. Review of consent conditions	Next scheduled during 2018, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Good</b>

**Table 41** Summary of performance for Consent 0635-3 to take water from the Mangawhero Stream to add to the flow of the Mangawhero-iti Stream for water supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Max rate of take 70 l/s	Review of abstraction data provided	Yes
2. No water taken unless also taken from Otakeho and Mangawhero-iti Streams	Inspections and liaison with consent holder	Yes
3. Installation of water meter and datalogger and records of volumes abstracted	Inspections and abstraction data	Yes
4. Notification of installation of water meter and datalogger	Received	Yes
5. Notification of equipment failure	N/A	N/A
6. Water meter and datalogger accessible to Council	Inspections	Yes
7. Records of water taken in suitable format	Review of abstraction data provided	Yes
8. Measurements to be transmitted to Council in 'real time'	Data received- due June 2012	No-overdue
9. Best practicable option to prevent or minimise adverse environmental effects	Inspections, data review	Yes
10. Provision for review in June 1994	N/A	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Improvement Desired</b>

**Table 42** Summary of performance for Consent 3911-2 to divert and use water from the Otakeho Stream for the Pope and Waimate West water supply schemes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction rate	Review of abstraction data provided	<b>Yes</b>
2. Installation of water meter and datalogger and records of volumes abstracted	Inspections and abstraction data	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Notification of installation of water meter and datalogger	Received	Yes
4. Notification of equipment failure	N/A	Yes
5. Water meter and datalogger accessible to Council	Inspections	Yes
6. Records of water taken in suitable format	Review of abstraction data provided	Yes
7. Best practicable option to prevent or minimise adverse environmental effects	Inspections, data review	Yes
8. Measurements to be transmitted to Council in 'real time'	Data received	Overdue
9. Flows of less than 500 l/s recorded	Due June 2017	N/A
10. Review provision	Recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Improvement Desired</b>

**Table 43** Summary of performance for Consent 4826-2 to place, use and maintain a water intake structure and associated structures on the bed of the Otakeho Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to construction and maintenance works	Notification received	Yes
2. Structure to be constructed in accordance with application	Construction completed	N/A
3. Adoption of best practicable option to minimise adverse effects on water quality	Inspection and liaison with consent holder	Yes
4. Minimise disturbance during construction and maintenance	Inspection and liaison with consent holder	Yes
5. Maintenance works to only occur between 1 April and 30 November	Waived by Council	Yes
6. No obstruction of fish passage	Inspection	Yes
7. Council Biologist to be present during construction of the fish pass	Biologist present	Yes
8. Structure to be removed when no longer required and area reinstated. Council to be notified prior to removal	Structure in use	N/A
9. Review provision	No further options for review prior to expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 44** Summary of performance for Consent 5451-1 to erect, place, use and maintain a water intake structure on the bed of the Mangawhero-iti Stream for water abstraction purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to construction and maintenance works	Notification received	Yes
2. Structure to be constructed in accordance with application documents	Construction completed	N/A
3. Adoption of best practicable option to minimise adverse effects on water quality	Inspection and liaison with consent holder	Yes
4. Minimise disturbance during construction and maintenance and reinstate disturbed areas	Inspection and liaison with consent holder	Yes
5. Maintenance works to only occur between 1 April and 30 November		Yes
6. No obstruction of fish passage	Inspection and triennial fish survey	Yes
7. Monitoring programme to determine fish passage	Triennial fish surveys	Yes
8. Structure to be removed when no longer required and area reinstated	Structure in use	N/A
9. Review provision	No further options for review prior to expiry	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

**Table 45** Summary of performance for Consent 5452-1 to erect, place, use and maintain a water intake structure on the bed of the Mangawhero Stream for water abstraction

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to construction and maintenance works	No maintenance during period under review	N/A
2. Structure to be constructed in accordance with application	Construction completed	N/A
3. Adoption of best practicable option to minimise adverse effects on water quality	No maintenance during period under review	N/A
4. Minimise disturbance during construction and maintenance and reinstate disturbed areas	No maintenance during period under review	N/A
5. Maintenance works to only occur between 1 April and 30 November or with written approval from Council	No maintenance during period under review	N/A
6. No obstruction of fish passage	Triennial fish surveys	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. Monitoring programme to determine fish passage	Triennial fish surveys	Yes
8. Structure to be removed when no longer required and area reinstated	Structure in use	N/A
9. Review provision	No further options for review prior to expiry	Yes
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.11 Waverley water supply

**Table 46** Summary of performance for Consent 3313-3 to take and use groundwater from the Fookes and Chester Street bores for Waverley municipal supply purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Combined take not to exceed 14.2 L/s or 900 m <sup>3</sup> /day	Review of abstraction data	Yes
2. Daily maximum volume and abstraction limits for each bore	Review of abstraction data	Yes (daily volumes)
		99%+ compliance for rates of abstraction
3. Bores to have permanent labelling	Inspections	Yes
4. Water meter and datalogger installed and maintained on Chester and Fookes St bores	Inspections	Yes
5. Install and maintain equipment on Swinbourne St bore.	Inspection	Yes
6. Install and maintain equipment on Swinbourne St bore.	Inspection	Yes
7. Recording of abstraction data	Data received	Yes
8. Notice of installation of water measuring equipment	Notification received	Yes
9. Notification of non-operational measuring equipment	No problems during monitoring period	Yes
10. Best practicable option to prevent or minimise adverse effects	Inspections, review or data	Yes
11. No intrusion of salt water	Not assessed	N/A
12. Access to well provided for water measurement purposes	Inspections	Yes
13. Review of consent	Next scheduled in June 2016, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>



### 3.4.12 Oaonui water supply

**Table 47** Summary of performance for Consent 0231-3 to take and use water from the Oaonui Stream for a rural community water supply scheme and the Maui Production Station

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction volume and rate	Review of abstraction data provided	No – volume exceeded on two occasions
2. Recording of abstraction data and provision of records to Council	Data received	Yes
3. Promotion of water conservation and reporting	No longer required	N/A
4. Mitigation by riparian planting	Payments up to date with Taranaki Tree Trust	Yes
5. Provision for change or cancellation	No request for change or cancellation	N/A
6. Review provision	Recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Good</b>

**Table 48** Summary of performance for Consent 5453-1 to erect, place, use and maintain a water intake structure on the bed of the Oaonui Stream for water abstraction purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of Council prior to construction and maintenance works	No maintenance in period under review	N/A
2. Construction and maintenance to be in accordance application	No maintenance in period under review	N/A
3. Adoption of best practicable option to minimise adverse effects on water quality	No maintenance in period under review	N/A
4. Minimise riverbed disturbance and reinstate areas disturbed	No maintenance in period under review	N/A
5. Major maintenance to occur between 1 November and 30 April	No maintenance in period under review	N/A
6. No obstruction of fish passage	Inspection	Yes
7. Monitoring and reporting of adequacy of fish passage	Fish surveys scheduled for once every three years	N/A
8. Structure to be removed when no longer required and area reinstated.	Structure in use	N/A
9. Review provision	No further review options	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>

### 3.4.13 Nukumarū water supply

**Table 49** Summary of performance for Consent 6451-1 to take and use groundwater from up to two bores for the purpose of supplying the Nukumarū community rural water scheme

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent to be in accordance with documentation supporting application	Inspection and liaison with consent holder	Yes
2. Limit on abstraction rate and volume	Review of abstraction data provided	Yes
3. Installation of water meter	Inspection	Yes
4. Recording of abstraction data and provision of data to Council by 31 July each year	Data provided	No
5. Cost of monitoring to be borne by Consent holder	Consent holder charged for monitoring	Yes
6. Lapse condition	Not applicable - consent exercised	N/A
7. Review provision	Next optional review June 2017, if required	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		Good

Overall STDC demonstrated a good level of environmental performance and compliance with their resource consents. Whilst there are some on-going non-compliances in regards to meeting deadlines for electronic transmission of abstraction data, the consent holder is constantly working toward compliance whilst simultaneously undertaking a major network upgrade. Non compliances in regards to abstraction rates and volumes were not considered significant.

OWSL demonstrated a good level of environmental performance and compliance with their resource consents. There were two minor short term non compliances in regards to daily volumes.

Nukumarū Water Scheme Society Incorporated demonstrated a good level of environmental performance and compliance with their resource consents. All abstraction volumes were within compliance, however abstraction records were not provided by 31 July 2013 as required.

## 3.5 Recommendations from the 2011-2012 Monitoring Report

In the 2011-2012 Monitoring Report, it was recommended:

1. THAT monitoring of the South Taranaki water supply schemes during 2012-2013 remain unchanged from that of 2011-2012.

2. THAT the option for a review of resource consent 6031-1 in June 2013, as set out in conditions of the consent, not be exercised, on the grounds that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of the consent.

These recommendations were implemented.

### **3.6 Alterations to monitoring programmes for 2013-2014**

In designing and implementing the monitoring programmes for water abstractions/discharges in the region, the Taranaki Regional Council has taken into account the extent of information made available by previous authorities, its relevance under the Resource Management Act, the obligations of the Act in terms of monitoring abstractions / discharges and effects, and subsequently reporting to the regional community, the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki abstracting water and discharging to the environment.

It is proposed that for 2013-2014 the monitoring programme remain unchanged from that of 2012-2013.

A recommendation to this effect is presented in Section 4 of this report.

## **4. Recommendations**

THAT monitoring of the South Taranaki water supply schemes during 2013-2014 remain unchanged from that of 2012-2013.

## Glossary of common terms and abbreviations

The following abbreviations and terms may have been used within this report:

Aeolian erosion	wind erosion
Al*	aluminium
As*	arsenic
Biomonitoring	assessing the health of the environment using aquatic organisms
BOD	biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate
BODF	biochemical oxygen demand of a filtered sample
bund	a wall around a tank to contain its contents in the case of a leak
CBOD	carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate
cfu	colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample
COD	chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction
Condy	conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
Cu*	copper
DO	dissolved oxygen
DRP	dissolved reactive phosphorus
<i>E.coli</i>	<i>escherichia coli</i> , an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample
Ent	enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample
F	fluoride
FC	faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample
fresh	elevated flow in a stream, such as after heavy rainfall
g/m <sup>3</sup>	grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures
Incident	an event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred
Intervention	action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring
Investigation	action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident
l/s	litres per second/litres per second

MCI	macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats
mS/m	millisiemens per metre
mixing zone	the zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point
NH <sub>4</sub>	ammonium, normally expressed in terms of the mass of nitrogen (N)
NH <sub>3</sub>	unionised ammonia, normally expressed in terms of the mass of nitrogen (N)
NO <sub>3</sub>	nitrate, normally expressed in terms of the mass of nitrogen (N)
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water
O&G	oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons)
Pb*	lead
pH	a numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5
Physicochemical	measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment
PM <sub>10</sub>	relatively fine airborne particles (less than 10 micrometre diameter)
resource consent	refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15)
RMA	Resource Management Act 1991 and subsequent amendments
SS	suspended solids
Temp	temperature, measured in °C (degrees Celsius)
Turb	turbidity, expressed in NTU
UI	Unauthorised Incident
UIR	Unauthorised Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan
Zn*	zinc

\*an abbreviation for a metal or other analyte may be followed by the letters 'As', to denote the amount of metal recoverable in acidic conditions. This is taken as indicating the total amount of metal that might be solubilised under extreme environmental conditions. The abbreviation may alternatively be followed by the letter 'D', denoting the amount of the metal present in dissolved form rather than in particulate or solid form.

For further information on analytical methods, contact the Council's laboratory.

## **Bibliography and references**

- Taranaki Regional Council, 2012, South Taranaki Water Supplies Monitoring Programme Annual Report 2011-2012, Technical Report 2012-78
- Taranaki Regional Council, 2011, South Taranaki Water Supplies Monitoring Programme Annual Report 2010-2011, Technical Report 2011-42
- Taranaki Regional Council, 2010, South Taranaki Water Supplies Monitoring Programme Annual Report 2009-2010, Technical Report 2010-53
- Taranaki Regional Council, 2010, South Taranaki Water Supplies Monitoring Programme Annual Report 2008-2009, Technical Report 2009-84
- Taranaki Regional Council, 2008, South Taranaki District Water Supply Plants Monitoring Programme Biennial Report 2006-2008, Technical Report 2008-85
- Taranaki Regional Council, 2006, South Taranaki District Water Supply Plants and Structures Monitoring Programme Annual Report 2005-2006, Technical Report 2006-22
- Taranaki Regional Council, 2005, South Taranaki District Water Supply Plants and Structures Monitoring Programme Annual Report 2004-2005, Technical Report 2005-54
- Taranaki Regional Council, 2004, South Taranaki District Council Water Supply Plants and Structures Monitoring Programme Annual Report 2003-2004, Technical Report 2004-09
- Taranaki Regional Council, 2003, South Taranaki District Council Water Supply Plants and Structures Monitoring Programme Annual Report 2002-2003, Technical Report 2003-69
- Taranaki Regional Council, 2002, South Taranaki District Council Water Supply Plants and Structures Monitoring Programme Annual Report 2001-2002, Technical Report 2002-64
- Taranaki Regional Council, 2001, South Taranaki District Council Water Supply Plants and Structures Monitoring Programme Annual Report 2000-2001, Technical Report 2001-65
- Taranaki Regional Council, 2000, South Taranaki District Council Water Supply Plants and Structures Monitoring Programme Annual Report 1999-2000, Technical Report 2000-80
- Taranaki Regional Council, 1999, South Taranaki District Council Water Supply Plants and Structures Monitoring Programme Annual Report 1998-99, Technical Report 99-51
- Taranaki Regional Council, 1998, South Taranaki District Council Water Supply Plants and Structures Monitoring Programme Annual Report 1997-98, Technical Report 98-94
- Taranaki Regional Council, 1997, Hawera Water Treatment Plant Annual Report 1996-97. Technical Report 97-43.
- Taranaki Regional Council, 1996, Hawera Water Treatment Plant Annual Report 1995-96. Technical Report 96-40.

Taranaki Regional Council, 1995, Hawera Water Treatment Plant Annual Report 1994-95.  
Technical Report 95-24.

Taranaki Regional Council, 1994, Hawera Water Treatment Plant Annual Report 1993-94.  
Technical Report 94-47.

Taranaki Regional Council, 1993, Hawera Water Treatment Plant Annual Report 1992-93.  
Technical Report 93-19.

Taranaki Regional Council, 1992, Hawera Water Treatment Plant Annual Report 1991-92.  
Technical Report 92-24.

Taranaki Regional Council, 1991, Hawera Water Treatment Plant Annual Report 1990-91.  
Technical Report 91-24.

Taranaki Regional Council, 1990, Hawera Water Treatment Plant Annual Report 1989-90.  
Technical Report 90-38.



## **Appendix I**

**Resource consents held by  
STDC, OWSL and NWSSI**



## **Cold Creek water supply**





CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
www.trc.govt.nz

Please quote our file number  
on all correspondence

**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date [Change]: 27 January 2011

★ Commencement Date [Change]: 27 January 2011 [Granted: 23 March 1994]

**Conditions of Consent**

Consent Granted: To take and use water for the Cold Creek rural supply from Cold Stream a tributary of the Taungatara Stream at or about (NZTM) 1686862E-5639956N

Expiry Date: 1 June 2012

Review Date(s): June 2011

Site Location: Cold Creek Intake, Kiri Road, Opunake

Legal Description: Pt Sec 4 Blk V Kaupokonui SD [Site of take & use]

Catchment: Taungatara

Tributary: Cold Stream

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.



### Special conditions

1. The rate of taking shall not exceed 59 litres per second.
2. The consent holder shall, to an accuracy of  $\pm 5\%$  using a tamper-proof device, measure and digitally record the daily volume of water taken. The consent holder shall make these records available to the Council on request.
3. From 1 September 2010 the consent holder shall measure and record, to an accuracy of  $\pm 5\%$  using a tamper-proof device:
  - (a) the rate that the water is taken at intervals not exceeding 30 minutes; and
  - (b) the flow remaining in the Cold Stream immediately downstream of the intake at intervals not exceeding 30 minutes.
4. The measurements made in accordance with condition 3, in a format to be advised by the Chief Executive, Taranaki Regional Council, shall be transmitted to the Council's computer system to maintain a 'real time' record of the water taken and the flow remaining downstream of the intake.
5. The consent holder shall ensure that a residual flow of at least 189 litres per second is maintained in Cold Stream immediately downstream of the intake at all times.
6. The consent holder shall ensure that a staff gauge is installed and maintained to effectively display the water level in Cold Stream downstream of the intake to an accuracy of 0.005 m at all times when the flow is less than 500 litres per second.

7. If necessary to comply with condition 3(b), the consent holder shall ensure that sufficient stream flow measurements are undertaken to maintain a 'rating curve' that accurately translates the water level, as displayed on the staff gauge referenced in condition 6, to stream flow immediately downstream of the intake.

*Note: Work required by special conditions 6 and 7 will be undertaken by the Taranaki Regional Council and all reasonable costs will be recovered from the consent holder through the annual compliance monitoring programme that is in place for the activity.*

8. The consent holder shall, on an annual basis, provide a report detailing:
- the work done to detect and minimise leaks within each of the areas supplied;
  - water use efficiency and conservation measures undertaken for each of the areas supplied; and
  - water use benchmarking data for the region and how each of the areas supplied compare.

The report[s] shall be provided to the Chief Executive, Taranaki Regional Council before 1 September each year and cover the previous 1 July to 30 June period. The first report shall be provided by 1 September 2010.

9. The consent holder shall make an annual payment of \$20,000 [GST exclusive] to the Taranaki Regional Council as a financial contribution in order to remedy or mitigate adverse effects the environment. This payment shall be made no later than 1 January 2010.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

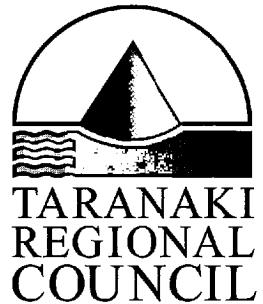
Signed at Stratford on 27 January 2011

For and on behalf of  
Taranaki Regional Council

  
\_\_\_\_\_  
Director-Resource Management







**Discharge Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 06-765 7127  
FAX 06-765 5097

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA

Consent Granted  
Date: 29 November 2002

**Conditions of Consent**

Consent Granted: To discharge filter backwash water and supernatant from  
the Cold Creek water treatment plant into the Cold Stream  
in the Taungatara catchment at or about GR: P20:968-013

Expiry Date: 1 June 2018

Review Date(s): June 2006, June 2012

Site Location: State Highway 45, Rahotu

Legal Description: Lot 1 DP 16088 Blk V Kaupokonui SD

Catchment: Taungatara

Tributary: Cold Creek

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

## Consent 6077-1

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. The discharge point shall be located at GPS 2596882E- 6201396N
2. The discharge rate shall not exceed 10 litres per second
3. That after allowing for reasonable mixing, within a mixing zone extending 25 metres below the discharge point, the discharge shall not give rise to any of the following effects in the Cold Stream:
  - (a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - (b) any conspicuous change in the colour or visual clarity;
  - (c) any emission of objectionable odour;
  - (d) the rendering of fresh water unsuitable for consumption by farm animals;
  - (e) any significant adverse effects on aquatic life, habitats, or ecology.
4. That the discharge quality shall not exceed the following limits at all times:

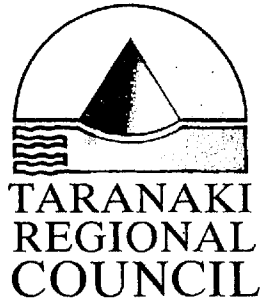
Suspended solids	20 gm <sup>-3</sup>
pH	6.5-8.5
Free available chlorine	0.1 gm <sup>-3</sup>
5. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2006 and/or June 2012, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 29 November 2002

For and on behalf of  
Taranaki Regional Council

  
\_\_\_\_\_  
Director-Resource Management

TRK995454



## LAND USE CONSENT

Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council

PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA

Consent  
Granted Date: 1 March 1999

## CONDITIONS OF CONSENT

Consent Granted: TO ERECT, PLACE, USE AND MAINTAIN A WATER INTAKE  
STRUCTURE ON THE BED OF COLD CREEK IN THE  
TAUNGATARA CATCHMENT FOR WATER ABSTRACTION  
PURPOSES AT OR ABOUT GR: P20:970-019

Expiry Date: 1 June 2018

Review Date[s]: June 2001, June 2006 and June 2012

Site Location: COLD CREEK, KIRI ROAD, OPUNAKE

Legal Description: SO 377 PT SEC 5 BLK V KAU0POKONUI SD

Catchment: TAUNGATARA 361.000

Tributary: COLD CREEK 361.030

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK995454

### General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. THAT the consent holder shall notify the Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of the initial construction, and again prior to, and upon completion of, any subsequent maintenance works which would involve disturbance of, or the deposition to the riverbed or discharges to water.
2. THAT the structure[s] authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
3. THAT during any construction or maintenance the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into the water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. THAT during any construction or maintenance the consent holder shall ensure that the area and volume of riverbed disturbance shall so far as is practicable, be minimised and any areas which are disturbed, shall so far as is practicable be reinstated.
5. THAT during any construction or maintenance the consent holder shall ensure that any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April except where this requirement is waived by the written approval of the General Manager, Taranaki Regional Council.
6. THAT structure[s] which are the subject of this consent shall not obstruct fish passage.
7. THAT the consent holder shall develop and undertake a monitoring programme to determine the adequacy of fish passage as deemed necessary by the General Manager, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the General Manager, Taranaki Regional Council, upon request.
8. THAT the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

TRK995454

9. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001 and/or June 2006 and/or June 2012, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 1 March 1999

For and on behalf of  
TARANAKI REGIONAL COUNCIL



---

DIRECTOR - RESOURCE MANAGEMENT



## **Eltham water supply**







## Water Permit

**Pursuant to the Resource Management Act 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA

Consent Granted  
Date: 15 December 1999

### Conditions of Consent

Consent Granted: To take and use water from the Waingongoro River for  
municipal water supply purposes at or about GR:  
Q20:188-014

Expiry Date: 1 June 2018

Review Date(s): June 2002, June 2006, June 2012

Site Location: Finnerty Road, Ngaere, Eltham

Legal Description: Pt 31 Lot 2 DP 2918 Blk V Ngaere SD

Catchment: Waingongoro

## Consent 0213-3

### General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

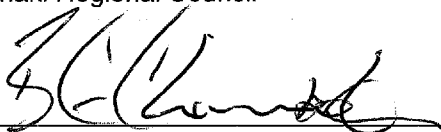
1. THAT the consent allows the abstraction of:
  - a) 4020 cubic metres/day [47 litres/second] on an unrestricted basis; and
  - b) 1500 cubic metres/day [17 litres/second] on a restricted basis as per condition 6.
2. THAT the consent holder shall install and maintain, to the satisfaction of the General Manager, Taranaki Regional Council, a measuring device capable of recording daily rates of abstraction and shall make such records available to the General Manager, Taranaki Regional Council, upon request.
3. THAT the exercise of this consent shall be undertaken in general accordance with the information supplied in support of application 534, particularly regarding the promotion of the efficiency of use of the water, and the installation of a telemetry system at the water treatment plant.
4. THAT the consent holder shall quantify the reticulation system losses by 31 December 2000 and report the results to the General Manger, Taranaki Regional Council, by 28 February 2001.
5. THAT the consent holder shall investigate and report on the blocking of the intake, and options for addressing this; the report to be received by the General Manager, Taranaki Regional Council, not later than 10 months from the date the consent is granted.
6. THAT the Taranaki Regional Council by the agreement of the consent holder, shall review condition 1(b), pursuant to section 128 of the Resource Management Act 1991, by giving notice of review during the month of June 2002, for the purpose of assessing the success of consent holder 5437 in implementing water conservation measures in reducing plant water use and to demonstrate a need for the water.
7. THAT by the agreement of the consent holder, the consent holder shall mitigate the effects of the abstraction by donating \$10,000 [goods and services tax exclusive] to the Taranaki Tree Trust by 31 January 2000, for the purpose of providing riparian management in the Waingongoro catchment, in the reach above the Climie Stream, and in the Climie Stream catchment.

Consent 0213-3

8. THAT the Taranaki Regional Council may review, according to section 128 of the Resource Management Act 1991, any or all of the conditions of this consent by giving notice of review during June 2002 and/or June 2006 and/or June 2012, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 15 December 1999

For and on behalf of  
Taranaki Regional Council

A handwritten signature in black ink, appearing to be 'S. Clendon', written over a horizontal line.

**General Manager**



**Discharge Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 5 November 2012

Commencement  
Date: 5 November 2012

**Conditions of Consent**

Consent Granted: To discharge reservoir contents from the Eltham Water  
Supply Reservoir onto land adjacent to the Waingongoro  
River at or about (NZTM) 1708817E-5639437N

Expiry Date: 1 June 2029

Review Date(s): June 2017, June 2023

Site Location: Finnerty Road Ngaere Eltham

Legal Description: Lot 1 DP 11209 Blk V Ngaere SD  
(Discharge source & site)

Catchment: Waingongoro

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

### General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

### Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent including, but not limited to, ensuring the discharge occurs over a period in excess of 4 days.
2. The consent holder shall notify the Council of the intention to discharge at least 2 working days prior to discharge occurring. Notification shall include the consent number and a brief description of the activity consented and be emailed to [worknotification@trc.govt.nz](mailto:worknotification@trc.govt.nz).
3. The volume of the discharge shall not exceed 5000 cubic metres and shall occur no more frequently than once every calendar year.
4. The discharge shall only commence when flows in the Waingongoro River at Eltham road are greater than 1050 litres per second.
5. All reservoir contents shall be directed over land before entering the Waingongoro River. There shall be no direct discharge to the Waingongoro River.
6. The consent holder shall, as far as practicable, reduce the volume of sediment and silt in the discharge before entering the Waingongoro River, including the off-site disposal of settled solids from the bottom of the reservoir.
7. The maximum concentration of the suspended solid contained in the discharge shall not exceed 100 gm<sup>-3</sup>.
8. After allowing for reasonable mixing, within a mixing zone extending 100 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
  - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - b) any conspicuous change in the colour or visual clarity;
  - c) any emission of objectionable odour;
  - d) the rendering of fresh water unsuitable for consumption by farm animals;
  - e) any significant adverse effects on aquatic life.

Consent 0989-3

9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 5 November 2012

For and on behalf of  
Taranaki Regional Council

---

**Director-Resource Management**





TRK991810



## DISCHARGE PERMIT

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTON ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: **SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA**

Renewal  
Granted Date: **28 July 1999**

## CONDITIONS OF CONSENT

Consent Granted: **TO DISCHARGE UP TO 2,000 CUBIC METRES/DAY [50 LITRES/SECOND] OF OVERFLOW AND RESERVOIR DRAINAGE WATER FROM THE ELTHAM WATER SUPPLY RESERVOIR INTO THE MANGAWHARAWHARA STREAM IN THE WAINGONGORO CATCHMENT AT OR ABOUT GR: Q20:220-976**

Expiry Date: **1 June 2017**

Review Date[s]: **June 2005 and June 2011**

Site Location: **ELTHAM WATER SUPPLY RESERVOIR, ANDERSON ROAD,  
ELTHAM**

Legal Description: **PT SEC 10 BLK X NGAERE SD**

Catchment: **WAINGONGORO 350.000**

Tributary: **MANGAWHARAWHARA 350.040**

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK991810

**General conditions**

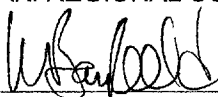
- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

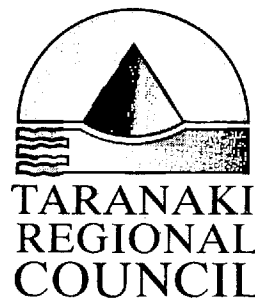
- 1. THAT approval shall be obtained from the General Manager, Taranaki Regional Council, prior to emptying and cleaning of the reservoir.
- 2. THAT the consent holder shall minimise the periods when this consent is exercised.
- 3. THAT the consent holder shall observe all practicable measures to minimise the discharge of accumulated sediments in the reservoir to the receiving water when emptying and cleaning the reservoir.
- 4. THAT after allowing for a mixing zone of 25 metres downstream of the discharge, the discharge shall not give rise to any of the following effects in the tributary of the Mangawharawhara Stream:
  - i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - ii) any conspicuous change in the colour or visual clarity;
  - iii) any emission of objectionable odour;
  - iv) the rendering of fresh water unsuitable for consumption by farm animals;
  - v) any significant adverse effects on aquatic life.
- 5. THAT the discharge shall not exceed the following limits at all times:
  - i) suspended solids                      20 gm<sup>-3</sup>
  - ii) free available chlorine              0.1 gm<sup>-3</sup>
- 6. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 28 July 1999

For and on behalf of  
TARANAKI REGIONAL COUNCIL

  
\_\_\_\_\_  
DIRECTOR—RESOURCE MANAGEMENT

TRK991811



## DISCHARGE PERMIT

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTON ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA

Renewal  
Granted Date: 28 July 1999

## CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE UP TO 220 CUBIC METRES/DAY [20 LITRES/SECOND] OF FILTER BACKWASH FROM THE ELTHAM WATER TREATMENT PLANT VIA A SETTLING POND INTO AN UNNAMED TRIBUTARY OF THE WAINGONGORO RIVER AT OR ABOUT GR: Q20:199-008

Expiry Date: 1 June 2017

Review Date[s]: June 2005 and June 2011

Site Location: ELTHAM WATER TREATMENT PLANT, FINNERTY ROAD, NGAERE

Legal Description: SEC 33 PT SEC 32 BLK V NGAERE SD

Catchment: WAINGONGORO 350.000

Tributary: UNNAMED TRIBUTARY

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK991811

**General conditions**

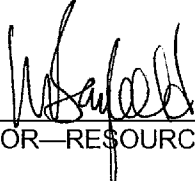
- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

- 1. THAT the consent holder shall properly and efficiently maintain and operate the settlement pond system. The pond shall be cleaned out to the satisfaction of the General Manager, Taranaki Regional Council, by 16 August 1999.
- 2. THAT after allowing for a mixing zone of 25 metres downstream of the discharge, the discharge shall not give rise to any of the following effects in the tributary of the Waingongoro River:
  - i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - ii) any conspicuous change in the colour or visual clarity;
  - iii) any emission of objectionable odour;
  - iv) the rendering of fresh water unsuitable for consumption by farm animals;
  - v) any significant adverse effects on aquatic life.
- 3. THAT the discharge shall not exceed the following limits at all times:
  - i) suspended solids  $20 \text{ gm}^{-3}$
  - ii) free available chlorine  $0.1 \text{ gm}^{-3}$
- 4. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

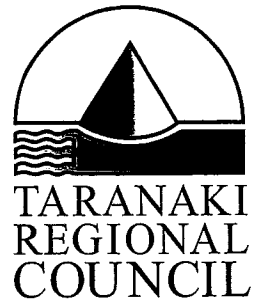
Signed at Stratford on 28 July 1999

For and on behalf of  
TARANAKI REGIONAL COUNCIL

  
\_\_\_\_\_  
DIRECTOR—RESOURCE MANAGEMENT

## **Hawera water supply**





CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
www.trc.govt.nz

Please quote our file number  
on all correspondence

**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640



Change To  
Conditions Date: 28 October 2008 [Granted: 7 June 2000]

**Conditions of Consent**

Consent Granted: To take and use water from the Kapuni Stream for  
municipal water supply purposes at or about (NZTM)  
1701447E-5630678N

Expiry Date: 1 June 2020

Review Date(s): June 2011

Site Location: Kapuni Stream, Palmer Road, Kapuni

Legal Description: Adjacent to Lot 1 DP 10570 & Lot 3 DP 10570 Blk XVI  
Kaupokonui SD

Catchment: Kapuni

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.



**Special conditions**

1. That the consent allows the abstraction of:
  - a) 10756.8 cubic metres/ day [124.5 litres/second] on an unrestricted basis; and
  - b) 1343.2 cubic metres/ day [15.5 litres/second] on a restricted basis as per condition 4.
2. The consent holder shall install and maintain, to the satisfaction of the Chief Executive, Taranaki Regional Council, a measuring device(s) capable of recording daily rates of abstraction and shall make such records available to the Chief Executive, Taranaki Regional Council, on a monthly basis.

**Condition 3 [changed]**

3. The exercise of this consent shall be undertaken in general accordance with the information supplied in support of applications 533 and 6128, particularly regarding the promotion of the efficiency of use of the water and reporting on efficiency measures every two years from the commencement of this consent.

**Conditions 4 to 7 [unchanged]**

4. That the water available under condition 1(b) shall only be used for those times where peak demand exceeds 124.5 litres/second. On each occasion that condition 1(b) is exercised, the consent holder shall, within seven days of the reduction of demand below 124.5 litres/second, provide a written report to the Chief Executive, Taranaki Regional Council, detailing the volumes of water abstracted, the time period during which the abstraction exceeded 124.5 litres/second, and the conservation measures adopted during that time.



## Consent 0146-2

5. That, by the agreement of the consent holder, the consent holder shall mitigate the effects of the abstraction by donating a minimum amount of \$3,150 and a maximum of \$12,000 per annum [GST exclusive and inflation adjusted], with a total contribution not to exceed \$63,000 [GST exclusive and inflation adjusted] to the Taranaki Tree Trust, for the purpose of providing riparian management in the Kapuni Stream and its tributaries, preferably above Skeet Road.
6. The consent holder shall prepare and subsequently update and maintain a management plan for the Kapuni Stream between GR's: Q20:116-928 and Q20: 110-913, in conjunction with the other users, including but not restricted to the Natural Gas Corporation of New Zealand Limited and Petrochem Limited, to manage the abstraction of water from and discharge of contaminants to the Kapuni Stream. The management plan shall be submitted to the Chief Executive, Taranaki Regional Council, for approval within three months of the granting of the consent.
7. The consent holder shall undertake a leak detection and repair programme throughout the term of the consent within Hawera, Normanby, Okaiawa and Ohawe Beach townships and report on this programme annually to the Chief Executive, Taranaki Regional Council.

### Condition 8 [new]

8. The point of abstraction shall remain at its current location [at or about GR: Q20:115-925 NZMSG] until the new intake to be constructed pursuant to resource consent 7413-1 is commissioned. At that time the point of abstraction shall be at the new intake [at or about 1701447E-5630678N NZTM].

### Condition 9 [changed, previously condition 8]

9. The Taranaki Regional Council may review, according to section 128 of the Resource Management Act 1991, any or all of the conditions of this consent by giving notice of review during June 2011, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time, and for the purpose of assessing the implementation of the leak detection and repair programme specified in condition 7.

Signed at Stratford on 28 October 2008

For and on behalf of  
Taranaki Regional Council



Director-Resource Management





CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

**Discharge Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4800



Change To  
Conditions Date: 1 February 2007 [Granted: 26 January 2006]

**Conditions of Consent**



Consent Granted: To discharge up to 227 cubic metres/day of settling pond supernatant from a water treatment plant into the Kapuni Stream at or about GR: Q20:112-916

Expiry Date: 1 June 2023

Review Date(s): June 2008, June 2011, June 2017

Site Location: Palmer Road, Kapuni

Legal Description: Lot 2 DP 3675 Lot 2 DP 10737 Lot 2 DP 15107 Blk XVI  
Kaupokonui SD

Catchment: Kapuni

### **General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.



### **Special conditions**

#### **Conditions 1 to 3 – unchanged**

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 4516. In the case of any contradiction between the documentation submitted in support of application 4516 and the conditions of this consent, the conditions of this consent shall prevail.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent.

#### **Condition 4 – changed**

4. The consent holder shall address the issue of a permanent solution for water treatment residuals with the construction of a new water treatment plant, planned for 2010.

#### **Condition 5 to 9 – unchanged**

5. The consent holder shall properly and efficiently maintain and operate the settlement facility to the general satisfaction of the Chief Executive, Taranaki Regional Council.
6. After allowing for a mixing zone of 25 metres downstream of the discharge, the discharge shall not give rise to any of the following effects in the Kapuni Stream:

- i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
- ii) any conspicuous change in the colour or visual clarity;
- iii) any emission of objectionable odour;
- iv) the rendering of fresh water unsuitable for consumption by farm animals; and
- v) any significant adverse effects on aquatic life.

7. The discharge quality shall not exceed the following limits at all times:


<b>Component</b>	<b>Concentration</b>
suspended solids	20 g/m <sup>3</sup>
free available chlorine	0.1 g/m <sup>3</sup>
pH	6.5 - 8.5

8. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2008 and/or June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 1 February 2007

For and on behalf of  
Taranaki Regional Council



---

Director-Resource Management





**Land Use Consent**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4800



Change To  
Conditions Date: 1 February 2007 [Granted: 19 May 2000]

**Conditions of Consent**



Consent Granted: To construct, place, use and maintain a weir and intake structure, and to maintain two existing intake structures in the Kapuni Stream for the Hawera water supply at or about GR: Q20:115-925

Expiry Date: 1 June 2017

Review Date(s): June 2005, June 2011

Site Location: Palmer Road, Kaponga

Legal Description: Crown land adjoining Lot 1 & Lot 2 DP 10570 Blk XVI  
Kaupokonui SD

Catchment: Kapuni

### **General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.



### **Special conditions**

#### **Conditions 1 to 12 – unchanged**

1. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the commencement and upon completion of the initial construction and again prior to and upon completion of any subsequent maintenance works which would involve the disturbance of or deposition to the streambed or discharges to water.
2. The structures authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application, and with the finalised engineering diagrams, and shall be maintained to ensure the conditions of this consent are met.
3. The structure authorised by this consent shall not be constructed during the period 1 May to 31 October.
4. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the streambed and to avoid or minimise the disturbance of the streambed and any adverse effects on water quality.
5. The consent holder shall ensure that the area and volume of streambed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
6. No refuelling of equipment or machinery shall take place on any area of the streambed.
7. The structures authorised by this consent shall be constructed so as not to obstruct the passage of fish.
8. The consent holder shall maintain, at all times, a sufficient flow down the fish pass to ensure that the passage of fish is not restricted.



9. The structures authorised by this consent shall be constructed so as not to cause any erosion adjacent to or downstream of the rock riprap ramp.
10. That in the construction of the weir and intake structure the applicant shall extract from the streambed only the material that makes up the existing weir/rock ramp.
11. Any removal of streambed material from above the new weir and intake structure for maintenance purposes shall only occur between 1 November and 30 April.
12. Streambed material removed pursuant to condition 11 shall be placed on dry sections of the streambed or on the banks of the stream downstream of the weir and intake structure in such a way that it can re-enter the stream while minimising adverse effects on the stream.

**Condition 13 and 14 [previously condition 14 and 15] - unchanged**

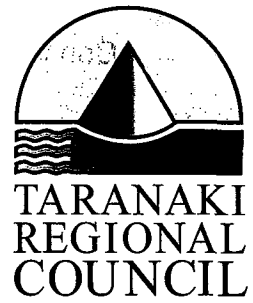
13. The structures authorised by this consent shall be removed and the area reinstated, if and when the structures are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the structure[s] removal and reinstatement.
14. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2011, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 1 February 2007

For and on behalf of  
Taranaki Regional Council

  
\_\_\_\_\_  
Director-Resource Management





**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4800

Consent Granted  
Date: 2 November 2006

**Conditions of Consent**

Consent Granted: To take and use up to 4,320 m<sup>3</sup>/day of groundwater at a maximum rate of 50 l/s as a combined total from up to three water bores in a bore field at the Kapuni reservoir site for municipal, rural, industrial, and recreational supply purposes at or about GR: Q20:111-909

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Kapuni reservoir site, off 1054 Skeet Road, Kapuni

Legal Description: Lot 2 DP 6410 Blk XVI Kaupokonui SD

Catchment: Kapuni

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

## Consent 7002-1

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. The exercise of this consent shall be undertaken in general accordance with the documentation submitted in support of application 4419 and shall ensure the efficient and effective use of water. In the case of any contradiction between the documentation submitted in support of application 4419 and the conditions of this consent, the conditions of this consent shall prevail.
2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent.
3. Prior to the exercise of this consent, the consent holder shall provide a report to Chief Executive, Taranaki Regional Council, detailing the results of pump testing (72-hour constant discharge at 50 l/s and recovery tests) of the bores used for water supply to show (1) that the abstraction is sustainable, and (2) the effects of the abstraction on flows in the Kapuni Stream.
4. The volume of groundwater abstracted shall not exceed 4,320 cubic metres per day at a rate not exceeding 50 litres per second as a combined total from the bores in the bore field.
5. The abstraction shall not cause more than a 10% lowering of the static water level by interference in any adjacent registered water bore located beyond the boundary of the bore field.
6. The consent holder shall maintain daily records of the abstraction from each bore including date, abstraction rate and daily volume, and pumping hours, and make these records available to the Chief Executive, Taranaki Regional Council, no later than 31 July of each year, or upon request.
7. Prior to the exercise of this consent the consent holder shall install groundwater monitoring piezometers between the Kapuni Stream and the boundary of the bore field for the purposes of monitoring groundwater levels.

Consent 7002-1

8. The consent holder shall install and maintain a measuring device approved by the Chief Executive, Taranaki Regional Council, on each bore for the purposes of accurately recording the abstraction of water.
9. This consent shall be subject to monitoring by the Taranaki Regional Council and the consent holder shall meet all reasonable costs associated with the monitoring.
10. This consent shall lapse on the expiry of five years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
11. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

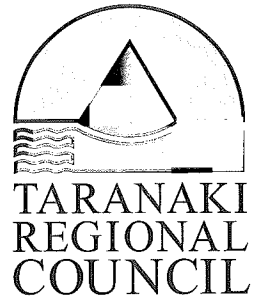
Signed at Stratford on 2 November 2006

For and on behalf of  
Taranaki Regional Council



Director - Resource Management





**Discharge Permit  
Pursuant to the Resource Management Act 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
www.trc.govt.nz

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Consent Granted  
Date: 13 March 2009

**Conditions of Consent**

Consent Granted: To discharge membrane backwash water and cleaning  
wastewater from the Kapuni Water Treatment Plant into  
the Kapuni Stream at or about (NZTM) 1700804E-  
5628910N

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Skeet Road, Kapuni

Legal Description: Lot 1 DP 18183 Blk XVI Kaupokonui SD

Catchment: Kapuni

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

- 1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
- 2. After allowing for reasonable mixing, within a mixing zone extending 25 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
  - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - b) any conspicuous change in the colour or visual clarity;
  - c) any emission of objectionable odour;
  - d) the rendering of fresh water unsuitable for consumption by farm animals;
  - e) any significant adverse effects on aquatic life.
- 3. After allowing for reasonable mixing, within a mixing zone extending 25 metres downstream of the of the discharge point, the discharge shall not give rise to an increase in the turbidity of the Kapuni Stream of more than 50%, as determined using NTU [nephelometric turbidity units].
- 4. Constituents of the discharge shall meet the standards shown in the following table.

<u>Constituent</u>	<u>Standard</u>
free available chlorine	Concentration not greater than 0.1 gm <sup>-3</sup>
pH	Within the range 6.5 to 8.5
suspended solids	Concentration not greater than 20 gm <sup>-3</sup>

This condition shall apply before entry of the treated wastewater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.



Consent 7446-1

5. This consent shall lapse on 31 March 2014, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

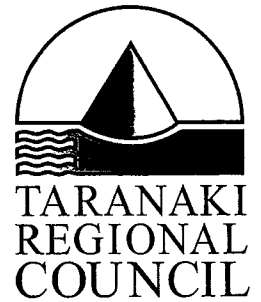
Signed at Stratford on 13 March 2009

For and on behalf of  
Taranaki Regional Council



Director-Resource Management





**Land Use Consent  
Pursuant to the Resource Management Act 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Consent Granted  
Date: 5 February 2009

**Conditions of Consent**

Consent Granted: To erect, use and maintain a water intake structure on the  
bed of the Kapuni Stream, including temporary damming  
and diversion during construction at or about (NZTM)  
1701447E-5630678N

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Kapuni Stream, Palmer Road, Kapuni

Legal Description: Lot 1 DP 10570 Lot 1 DP 3675 Lot 3 DP 10570 Blk XVI  
Kaupokonui SD

Catchment: Kapuni

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

## Consent 7413-1

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. The exercise of this consent shall be undertaken in accordance with the documentation submitted in support of application 6131, in particular Drawing No. 80066/19. If there is any conflict between the documentation submitted in support of application 6131 and the conditions of this consent, the conditions of this consent shall prevail.
2. Any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to [worknotification@trc.govt.nz](mailto:worknotification@trc.govt.nz). Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
5. The consent holder shall take all reasonable steps to:
  - a. minimise the amount of sediment discharged to the stream;
  - b. minimise the amount of sediment that becomes suspended in the stream; and
  - c. mitigate the effects of any sediment in the stream.

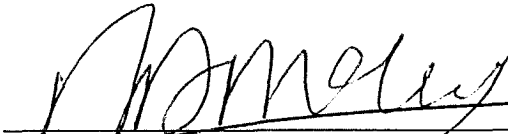
Undertaking work in accordance with *Guidelines for Earthworks in the Taranaki Region*, by the Taranaki Regional Council, will achieve compliance with this condition.

Consent 7413-1

6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
7. The consent holder shall monitor and maintain the fish pass, to ensure it performs as designed and allows for the effective passage of fish.
8. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.
9. This consent shall lapse on 31 March 2014, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

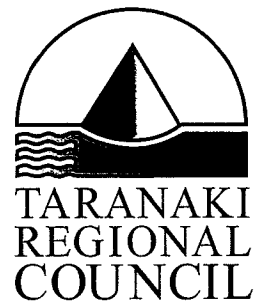
Signed at Stratford on 5 February 2009

For and on behalf of  
Taranaki Regional Council



Director-Resource Management





**Land Use Consent**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Consent Granted  
Date: 20 February 2009

**Conditions of Consent**

Consent Granted: To install, use and maintain an outfall structure on the bank  
of the Kapuni Stream for the Kapuni Water Treatment Plant  
at or about (NZTM) 1700804E-5628910N

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Skeet Road, Kapuni

Legal Description: Lot 1 DP 18183 Blk XVI Kaupokonui SD

Catchment: Kapuni

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

[www.trc.govt.nz](http://www.trc.govt.nz)

Doc# 573075-v1

## Consent 7447-1

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. The exercise of this consent shall be undertaken in accordance with the documentation submitted in support of application 6202, in particular Drawing No. 0652C010. If there is any conflict between the documentation submitted in support of application 6202 and the conditions of this consent, the conditions of this consent shall prevail.
2. Any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to [worknotification@trc.govt.nz](mailto:worknotification@trc.govt.nz). Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
5. The consent holder shall take all reasonable steps to:
  - a. minimise the amount of sediment discharged to the stream;
  - b. minimise the amount of sediment that becomes suspended in the stream; and
  - c. mitigate the effects of any sediment in the stream.

Undertaking work in accordance with *Guidelines for Earthworks in the Taranaki Region*, by the Taranaki Regional Council, will achieve compliance with this condition.



6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
7. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.
8. This consent shall lapse on 31 March 2014, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 20 February 2009

For and on behalf of  
Taranaki Regional Council

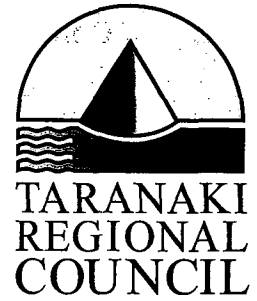
---

**Director-Resource Management**



**Inaha water supply**





**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Chief Executive  
Private Bag 902  
HAWERA 4800

Consent Granted  
Date: 29 August 2006

**Conditions of Consent**

Consent Granted: To take water from the Mangatoki Stream in the  
Waingongoro catchment for Inaha rural water supply  
purposes at or about GR: Q20:107-039

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2018

Site Location: Inaha Water Supply, Upper Palmer Road, Mahoe

Legal Description: Sec 24 Blk VII Kaupokonui SD

Catchment: Waingongoro

Tributary: Mangatoki

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

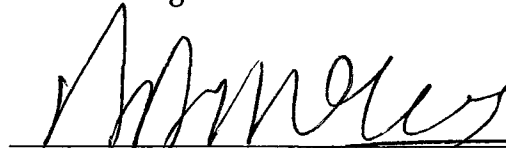
1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3449. In the case of any contradiction between the documentation submitted in support of application 3449 and the conditions of this consent, the conditions of this consent shall prevail.
3. The volume of water abstracted shall not exceed 1,122 cubic metres/day at a rate not exceeding 13 litres/second.
4. The consent holder shall install and operate a measuring device capable of accurately recording daily rates of abstraction and shall measure, record and make such records available to the Chief Executive, Taranaki Regional Council, upon request.
5. The intake structure shall be maintained to the satisfaction of the Chief Executive, Taranaki Regional Council. Once the abstraction licensed by this consent is no longer required, the consent holder shall remove the intake structure to the satisfaction of the Chief Executive, Taranaki Regional Council.
6. The intake structures shall be screened to avoid the entrainment of fish.
7. The intake structure shall be maintained and operated so that the passage of fish is not obstructed.
8. The consent holder shall promote the efficient use of water and undertake a leak detection and repair programme throughout the term of the consent for the Inaha Water Supply Scheme and report on this programme annually for the duration of this consent.

Consent 1185-3

9. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2018, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 29 August 2006

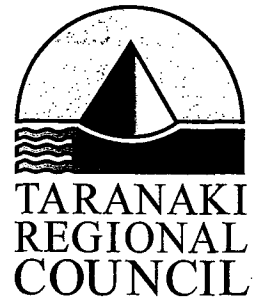
For and on behalf of  
Taranaki Regional Council



Director-Resource Management







**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of Consent Holder: South Taranaki District Council  
Chief Executive  
Private Bag 902  
HAWERA 4800

Consent Granted Date: 29 August 2006

**Conditions of Consent**

Consent Granted: To take water from the Waingongoro River for Inaha rural water supply purposes at or about GR: Q20:104-070

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2018

Site Location: Inaha Water Supply, Upper Palmer Road, Mahoe

Legal Description: Sec 15 Blk VIII Kaupokonui SD

Catchment: Waingongoro

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

- 1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
- 2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3450. In the case of any contradiction between the documentation submitted in support of application 3450 and the conditions of this consent, the conditions of this consent shall prevail.
- 3. The volume of water abstracted shall not exceed 2,592 cubic metres/day at a rate not exceeding 30 litres/second.
- 4. The consent holder shall install and operate a measuring device capable of accurately recording daily rates of abstraction and shall measure, record and make such records available to the Chief Executive, Taranaki Regional Council, upon request.
- 5. The intake structure shall be maintained to the satisfaction of the Chief Executive, Taranaki Regional Council. Once the abstraction licensed by this consent is no longer required, the consent holder shall remove the intake structure to the satisfaction of the Chief Executive, Taranaki Regional Council.
- 6. All intake structures shall be screened to avoid the entrainment of fish.
- 7. The intake structure shall be maintained and operated so that the passage of fish is not obstructed.
- 8. The consent holder shall promote the efficient use of water and undertake a leak detection and repair programme throughout the term of the consent for the Inaha Water Supply Scheme and report on this programme annually for the duration of this consent.

Consent 1186-3

9. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2018, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 29 August 2006

For and on behalf of  
Taranaki Regional Council



~~Director Resource Management~~



TRK985364



## WATER PERMIT

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: **SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA**

Consent  
Granted Date: **23 September 1998**

## CONDITIONS OF CONSENT

Consent Granted: **TO TAKE AND USE WATER FROM THE MANGATOKI  
STREAM FOR INAHA RURAL WATER SUPPLY SCHEME  
PURPOSES AT OR ABOUT GR: Q20:109-037**

Expiry Date: **1 June 2017**

Review Date[s]: **June 2005 and June 2011**

Site Location: **MANGATOKI STREAM, PALMER ROAD, MAHOE**

Legal Description: **PT SECS 3 & 4 BLOCK VIII KAUPOKONUI SD**

Catchment: **WAINGONGORO 350.000**

Tributary: **MANGATOKI 350.010**

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK985364

**General conditions**

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

1. THAT the abstraction volume shall not exceed 1,382 m<sup>3</sup>/day and the abstraction rate shall not exceed 16 litres/second.
2. THAT the consent holder shall maintain, to the satisfaction of the General Manager, Taranaki Regional Council, a measuring device capable of recording daily rates of abstraction and shall make such records available to the General Manager, Taranaki Regional Council, upon request.
3. THAT the exercise of this consent shall be undertaken in general accordance with the information supplied in support of application 393, particularly regarding the promotion of the efficiency of use of the water.
4. THAT the consent holder shall mitigate the effects of the abstraction through riparian management in the Mangatoki Stream catchment, to the satisfaction of the General Manager, Taranaki Regional Council.
5. THAT the Taranaki Regional Council reserves the right to temporarily suspend or reduce the abstraction during extreme low flow events, in order to protect the biological communities in the stream, in accordance with 329 of the Resource Management Act 1991.
6. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Signed at Stratford on 23 September 1998

For and on behalf of  
TARANAKI REGIONAL COUNCIL

  
GENERAL MANAGER

TRK993927



## DISCHARGE PERMIT

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTON ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of Consent Holder: SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA

Renewal Granted Date: 4 June 1999

## CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE UP TO 228 CUBIC METRES/DAY OF BACKWASH WASTES FROM THE INAHA RURAL WATER SUPPLY TREATMENT PLANT INTO AN UNNAMED TRIBUTARY OF THE MANGATOKI STREAM IN THE WAINGONGORO CATCHMENT AT OR ABOUT GR: Q20:110-030

Expiry Date: 1 June 2017

Review Date[s]: June 2005 and June 2011

Site Location: INAHA WATER TREATMENT PLANT, PALMER ROAD, MAHOE

Legal Description: PT SEC 3 BLK VIII KAUPOKONUI SD

Catchment: WAINGONGORO 350.000

Tributary: MANGATOKI 350.010  
UNNAMED TRIBUTARY

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK993927

**General conditions**

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.


**Special conditions**

- 1. THAT the consent holder shall properly and efficiently maintain and operate the settlement pond system.
- 2. THAT after allowing for a mixing zone of 25 metres downstream of the discharge, the discharge shall not give rise to any of the following effects in the tributary of the Mangatoki Stream:
  - i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - ii) any conspicuous change in the colour or visual clarity;
  - iii) any emission of objectionable odour;
  - iv) the rendering of fresh water unsuitable for consumption by farm animals; and
  - v) any significant adverse effects on aquatic life.
- 3. THAT the discharge quality shall not exceed the following limits at all times:

suspended solids	20	gm <sup>-3</sup>
free available chlorine	0.1	gm <sup>-3</sup>
- 4. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 4 June 1999

For and on behalf of  
TARANAKI REGIONAL COUNCIL

  
\_\_\_\_\_  
DIRECTOR—RESOURCE MANAGEMENT



TRK993928



**DISCHARGE PERMIT**

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTON ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of Consent Holder: **SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA**

Renewal Granted Date: **4 June 1999**

**CONDITIONS OF CONSENT**

Consent Granted: **TO DISCHARGE UP TO 3,060 CUBIC METRES/DAY OF UNCONTAMINATED OVERFLOW WATER FROM THE INAHA RURAL WATER SUPPLY TREATMENT PLANT VIA A SETTLEMENT POND INTO AN UNNAMED TRIBUTARY OF THE MANGATOKI STREAM AND THEN INTO THE MANGATOKI STREAM IN THE WAINGONGORO CATCHMENT AT OR ABOUT GR: Q20:110-030 and Q20:109-036**

Expiry Date: **1 June 2017**

Review Date[s]: **June 2005 and June 2011**

Site Location: **INAHWA WATER TREATMENT PLANT, PALMER ROAD, MAHOE**

Legal Description: **PT SEC 3 BLK VIII KAUPOKONUI SD**

Catchment: **WAINGONGORO 350.000**

Tributary: **MANGATOKI 350.010  
UNNAMED TRIBUTARY**

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK993928

**General conditions**

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

1. THAT the consent holder shall properly and efficiently maintain and operate the settlement pond system.
2. THAT after allowing for a mixing zone of 25 metres downstream of the discharge, the discharge shall not give rise to any of the following effects in the receiving waters:
  - i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - ii) any conspicuous change in the colour or visual clarity;
  - iii) any emission of objectionable odour;
  - iv) the rendering of fresh water unsuitable for consumption by farm animals; and
  - v) any significant adverse effects on aquatic life.
3. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 4 June 1999

For and on behalf of  
TARANAKI REGIONAL COUNCIL



\_\_\_\_\_  
DIRECTOR - RESOURCE MANAGEMENT



**Land Use Consent**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA

Consent Granted  
Date: 15 June 2005

**Conditions of Consent**

Consent Granted: To maintain an existing low-level weir and fish pass across  
the Mangatoki Stream in the Waingongoro catchment at or  
about GR: Q20:105-042

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Inaha Intake Site, Palmer Road, Mahoe, Stratford

Legal Description: Sec 24 Blk VII Kaupokonui SD

Catchment: Waingongoro

Tributary: Mangatoki

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

[www.trc.govt.nz](http://www.trc.govt.nz)

**Working with people • Caring for our environment**

## Consent 4102-2

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

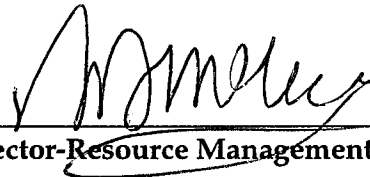
1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3451. In the case of any contradiction between the documentation submitted in support of application 3451 and the conditions of this consent, the conditions of this consent shall prevail.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent.
4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, at least 48 hours prior to any maintenance works of the structure[s] or fish pass licensed by this consent which would involve disturbance of, or deposition to, the streambed or discharges to water.
5. The consent holder, during any maintenance works, shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the streambed and to avoid or minimise the disturbance of the streambed and any adverse effects on water quality.
6. The consent holder, during any maintenance, shall ensure that the area and volume of river bed disturbance shall, so far as practicable, be minimised and any areas which are disturbed shall, so far as practicable, be reinstated.
7. No maintenance work shall be conducted during the period 1 May to 31 October unless waived in writing by the Chief Executive, Taranaki Regional Council.
8. The structure[s] authorised by this consent shall be maintained to ensure the conditions of this consent are met.

Consent 4102-2

9. The structure[s] authorised by this consent shall be constructed and maintained so as not to restrict the passage of native fish and trout, to the satisfaction of the Chief Executive, Taranaki Regional Council.
10. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the removal of the structures and reinstatement of the area
11. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 15 June 2005

For and on behalf of  
Taranaki Regional Council



---

Director-Resource Management



TRK985365



PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

## LAND USE CONSENT

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

Name of  
Consent Holder: **SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA**

Consent  
Granted Date: **23 September 1998**

## CONDITIONS OF CONSENT

Consent Granted: **TO ERECT, PLACE AND MAINTAIN A LOW LEVEL INTAKE  
WEIR IN THE MANGATOKI STREAM FOR INAHA RURAL  
WATER SUPPLY SCHEME PURPOSES AT OR ABOUT GR:  
Q20:109-037**

Expiry Date: **1 June 2017**

Review Date[s]: **June 2005 and June 2011**

Site Location: **MANGATOKI STREAM, PALMER ROAD, MAHOE**

Legal Description: **PT SECS 3 & 4 BLK VIII KAUPOKONUI SD**

Catchment: **WAINGONGORO 350.000**

Tributary: **MANGATOKI 350.010**

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK985365

**General conditions**

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

- 1. THAT the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to, and upon completion of, any major construction or maintenance works which might involve disturbance of, or discharges to, the stream.
- 2. THAT during any construction or maintenance work, the consent holder shall observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or any other contaminant into the stream.
- 3. THAT any works or structure which are the subject of this consent shall not obstruct fish passage.
- 4. THAT the construction and maintenance of the weir shall be undertaken in general accordance with the information supplied in support of application 394.
- 5. THAT it is the responsibility of the consent holder to maintain and operate a safe structure, and the Taranaki Regional Council accepts no responsibility in this regard.
- 6. THAT the consent holder shall remove the weir and reinstate the area to a satisfactory standard, if and when the weir is no longer required.
- 7. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Signed at Stratford on 23 September 1998

For and on behalf of  
TARANAKI REGIONAL COUNCIL

  
GENERAL MANAGER

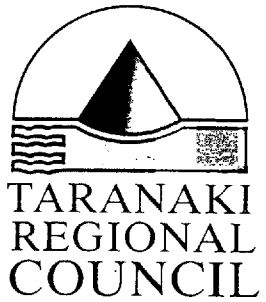


## **Opunake water supply**



COPY

TRK940232



**WATER PERMIT**

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTON ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG HAWERA

Renewal  
Granted Date: 23 March 1994

**CONDITIONS OF CONSENT**

Consent Granted: TO TAKE UP TO 3650 CUBIC METRES/DAY  
[42.2 LITRES/SECOND] OF WATER FROM THE WAIUA  
STREAM FOR OPUNAKE TOWN WATER SUPPLY PURPOSES AT  
OR ABOUT GR: P20:880-972

Expiry Date: 1 June 2012

Review Date[s]: 1 June 2000 and 1 June 2006

Site Location: OPUNAKE WATER SUPPLY INTAKE, IHAIA ROAD, OPUNAKE

Legal Description: SEC 61 & 62 BLK X OPUNAKE SD

Catchment: WAIUA 364.000

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

**GENERAL CONDITIONS**

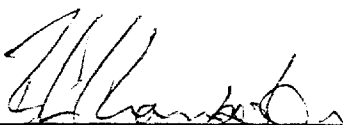
- (a) The consent holder shall provide on request by the General Manager, Taranaki Regional Council, plans, specifications and maintenance programmes of works associated with the exercise of the consent, showing that the conditions of the consent are able to be met.
- (b) The standards, techniques and frequency of monitoring of the consent shall be to the specific approval of the General Manager, Taranaki Regional Council.
- (c) The consent holder shall pay all charges required by the General Manager, Taranaki Regional Council, to enable recovery of the actual and reasonable costs incurred in administration, monitoring and supervision of the consent.

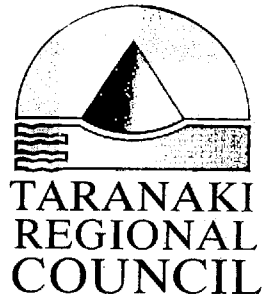
**SPECIAL CONDITIONS**

- 1) THAT the consent holder must monitor daily abstraction volumes and shall make such records available to the General Manager, Taranaki Regional Council, upon request.
- 2) THAT the consent holder must maintain, to the satisfaction of the General Manager, Taranaki Regional Council, the existing intake system so as to ensure adequate fish passage is maintained within the stream.
- 3) THAT the Taranaki Regional Council may review any or all of the conditions of this consent on or about 1 June 2000 and/or 1 June 2006 if the General Manager, Taranaki Regional Council, considers that it is necessary to do so for the purpose of ensuring that the conditions adequately deal with the environmental effects of the abstraction.

Signed at Stratford on 23 March 1994

For and on behalf of  
TARANAKI REGIONAL COUNCIL

  
\_\_\_\_\_  
GENERAL MANAGER



PRIVATE BAG 713  
47 CLOTON ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

## Discharge Permit

**Pursuant to the Resource Management Act 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA

Consent Granted  
Date: 17 January 2000

### Conditions of Consent

Consent Granted: To discharge filter backwash water and settling tank sediment from the Opunake Water Treatment Plant into the Waiaua River at or about GR: P20:877-970

Expiry Date: 1 June 2012

Review Date(s): June 2003, June 2009

Site Location: Opunake Water Treatment Plant, Ihaia Road, Opunake

Legal Description: Sec 4 Blk X Opunake SD

Catchment: Waiaua

## Consent 5574-1

### General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. THAT the consent holder shall properly and efficiently maintain and operate the settlement lagoon system. The settlement lagoon system shall be constructed and operational by 30 July 2000.
2. THAT after allowing for reasonable mixing, within a mixing zone extending 50 metres below the discharge point, the discharge shall not give rise to any of the following effects in the Waiaua River:
  - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - b) any conspicuous change in the colour or visual clarity;
  - c) any emission of objectionable odour;
  - d) the rendering of fresh water unsuitable for consumption by farm animals;
  - e) any significant adverse effects on aquatic life, habitats, or ecology.

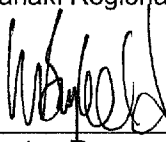
3. THAT the discharge shall not exceed the following limits at all times:

<b>Contaminant</b>	<b>Concentration</b>
Suspended solids	50 gm <sup>-3</sup>
Free available chlorine	0.1 gm <sup>-3</sup>

4. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2003 and/or June 2009, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 17 January 2000

For and on behalf of  
Taranaki Regional Council



\_\_\_\_\_  
Director-Resource Management

**Land Use Consent**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 21 February 2013

Commencement Date: 21 February 2013

**Conditions of Consent**

Consent Granted: To construct, place and use a water intake structure on the bed of the Waiaua River for water abstraction purposes

Expiry Date: 1 June 2030

Review Date(s): June 2018, June 2024

Site Location: Opunake Water Treatment Plant, 470 Ihaia Road, Opunake

Legal Description: Sec 4 Blk X Opunake SD (Site of structure)

Grid Reference (NZTM) 1678013E-5635411N

Catchment: Waiaua

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

### General condition

- a. The consent holder shall pay to the Taranaki Regional Council [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

### Special conditions

1. The water intake structure shall:
  - a) have a 0.75 mm slot size wedge wire screen;
  - b) be 300 mm in diameter;
  - c) 1500 mm in length; and
  - d) the bottom of the screen to sit a nominal 225 mm above the existing riverbed.
2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to [worknotification@trc.govt.nz](mailto:worknotification@trc.govt.nz). Notification by fax or post is acceptable only if the consent holder does not have access to email.
3. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
4. The consent holder shall take all reasonable steps to:
  - a. minimise the amount of sediment discharged to the river;
  - b. minimise the amount of sediment that becomes suspended in the river; and
  - c. mitigate the effects of any sediment in the river.

Undertaking work in accordance with *Guidelines for Earthworks in the Taranaki Region*, by the Taranaki Regional Council, will achieve compliance with this condition.

5. The consent holder shall ensure that the water intake structure is appropriately screened to avoid the entrapment of freshwater fauna. The maximum screen slot velocity shall be no more than 0.15 m/s at design capacity.
6. The water intake structure shall not obstruct fish passage.
7. To mitigate the adverse environmental effects of this consent the consent holder shall make a single payment of \$20,000 (excluding GST) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and management in the Waiaua Stream catchment. The payment shall be made before 1 September 2013.



## Consent 9473-1

8. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.
9. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
10. This consent shall lapse on 31 March 2018, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
11. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2018 and/or June 2024, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 21 February 2013

For and on behalf of  
Taranaki Regional Council

---

**Director-Resource Management**



## **Patea water supply**



**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 30 May 2012

Commencement  
Date: 30 May 2012

**Conditions of Consent**

Consent Granted: To take and use groundwater from three bores (known as Bore 1, Bore 2 and Bore 4) for Patea Township water supply purposes at or about (NZTM) 1725371E-5599179N, 1725360E-5599188N and 1725006E-5599997N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Egmont Street, Patea

Legal Description: Pt Lot 1 DP 411166 (Bores 1 & 2) & Lot 1 DP 5899 (Bore 4)  
Patea Dist Blk VI Carlyle SD (Site of structures)

Catchment: Patea

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

### General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

### Special conditions

1. The total volume of groundwater taken from the three bores combined shall not exceed 1,125 cubic metres per day.
2. Subject to condition 3, the rate of take from each bore shall not exceed the maximum rate shown in the table below:

Bore #	Maximum rate
1	4.7 litres per second
2	3.9 litres per second
4	10 litres per second

3. The volume taken from Bore 1 shall not exceed 300 cubic metres per day unless either Bore 2 or Bore 4 is unable to be operated because of breakdown or is shut down for essential maintenance.
4. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger on each bore. The water meters and dataloggers shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of  $\pm 5\%$ .

*Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.*

5. Within 30 days of the installation of a water meter or datalogger, and at other times when reasonable notice is given, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that:
  - a. water measuring or recording equipment required by the conditions of this consent has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
  - b. water measuring or recording equipment required by the conditions of this consent has been tested and shown to be operating to an accuracy of  $\pm 5\%$ .
6. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.

## Consent 3388-3

7. The water meter and datalogger shall be accessible to Taranaki Regional Council officer's at all reasonable times for inspection and/or data retrieval.
8. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of groundwater, including, but not limited to, the efficient and conservative use of water.
9. The consent holder shall measure and record the water level in the Brannigan bore (GND0076, located at grid reference 1725550E-5599498N) to an accuracy of  $\pm 0.05$  metres and at intervals not exceeding 15 minutes.
10. An assessable groundwater level indicator shall be installed on the Brannigan bore which shows when groundwater levels have reached 6 metres above the pump. Should groundwater reach this level then consultation between the owner of the Brannigan bore and the consent holder shall occur and, if necessary, the measures in condition 11 shall be implemented.
11. That the consent holder shall immediately restrict the exercise of this consent and/or provide a suitable unchlorinated alternative water supply for the Brannigan bore owner should the exercise of this consent restrict the use of the Brannigan bore.
12. The taking shall not cause the intrusion of salt water into any freshwater aquifer.
13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2016 and/or June 2022, for the purposes of:
  - a. ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
  - b. to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 30 May 2012

For and on behalf of  
Taranaki Regional Council

---

**Chief Executive**





## **Pope water supply**





**Discharge Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
www.trc.govt.nz

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4800

Consent Granted  
Date: 9 June 2006

**Conditions of Consent**

Consent Granted: To discharge treated backwash water from the Pope Rural Water Supply Treatment Plant into an unnamed tributary of the Mangawhero Stream in the Kaupokonui catchment at or about GR: P20:032-003

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Upper Mangawhero Road, Kaponga

Legal Description: Pt Lot 2 DP 7928 Blk VI Kaupokonui SD

Catchment: Kaupokonui

Tributary: Mangawhero 2

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

- 1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
- 2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3452. In the case of any contradiction between the documentation submitted in support of application 3452 and the conditions of this consent, the conditions of this consent shall prevail.
- 3. The discharge shall not exceed 6 cubic metres per day, at a rate not exceeding 5 litres per second.
- 4. The discharge quality shall not exceed the following limits at all times:

<b>Component</b>	<b>Concentration</b>
free available chlorine	<0.1g/m <sup>3</sup>
suspended solids	20 g/m <sup>3</sup>
pH	6.5-8.5

- 5. The consent holder shall properly and efficiently maintain and operate the settling pond so as to meet the conditions of this consent.
- 6. After allowing for reasonable mixing, within a mixing zone extending 20 metres below the discharge point, the discharge shall not give rise to any of the following effects in the unnamed tributary of the Mangawhero Stream:
  - (a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - (b) any conspicuous change in the colour or visual clarity;
  - (c) any emission of objectionable odour;
  - (d) the rendering of fresh water unsuitable for consumption by farm animals;
  - (e) any significant adverse effects on aquatic life, habitats, or ecology.

Consent 4446-2

7. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
  
8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 9 June 2006

For and on behalf of  
Taranaki Regional Council



Director-Resource Management



## **Rahotu water supply**







**Water Permit  
Pursuant to the Resource Management Act 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA

Consent Granted  
Date: 15 September 2000

**Conditions of Consent**

Consent Granted: To take and use water from the Pungaereere Stream for  
Rahotu community water supply scheme at or about  
GR:P20:794-075

Expiry Date: 1 June 2013

Review Date: June 2007

Site Location: State Highway 45, Rahotu

Legal Description: Lot 1 DP 15882 Blk I Opunake SD

Catchment: Pungaereere

## Consent 3696-2

### General conditions

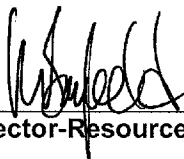
- a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. The resource consent allows the abstraction of up to 180 cubic metres/day at a maximum rate of up to 3 litres/second.
2. The resource consent holder shall maintain, to the satisfaction of the Chief Executive, Taranaki Regional Council, a measuring device capable of accurately recording daily rates of abstraction and shall measure, record and make such records available to the Chief Executive, Taranaki Regional Council, on a monthly basis.
3. The Taranaki Regional Council may review any or all of the conditions of this resource consent by giving notice of review during the month of June 2007, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 15 September 2000

For and on behalf of  
Taranaki Regional Council



Director-Resource Management



CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 06-765 7127  
FAX 06-765 5097

Please quote our file number  
on all correspondence

**Discharge Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA

Consent Granted  
Date: 2 September 2002

**Conditions of Consent**

Consent Granted: To discharge filter backwash water and settling tank waste  
from the Rahoitu Water Treatment Plant into the  
Pungaereere Stream at or about GR: P20:794-075

Expiry Date: 1 June 2019

Review Date(s): June 2007, June 2013

Site Location: State Highway 45, Rahoitu

Legal Description: Lot 1 DP 15882 Blk I Opunake SD

Catchment: Pungaereere

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General conditions**

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

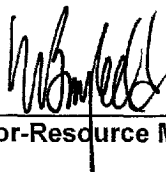
**Special conditions**

- 1. That after allowing for reasonable mixing, within a mixing zone extending 50 metres below the discharge point, the discharge shall not give rise to any of the following effects in the Pungaereere Stream:
  - (a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - (b) any conspicuous change in the colour or visual clarity;
  - (c) any emission of objectionable odour;
  - (d) the rendering of fresh water unsuitable for consumption by farm animals;
  - (e) any significant adverse effects on aquatic life, habitats, or ecology.
- 2. That the discharge quality shall not exceed the following limits at all times:

pH	6.5-8.5
Free available chlorine	0.1 gm <sup>-3</sup>
- 3. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2007 and/or June 2013, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 2 September 2002

For and on behalf of  
Taranaki Regional Council



\_\_\_\_\_  
Director-Resource Management

## **Waiinu Beach water supply**



**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 7 May 2012

Commencement  
Date: 7 May 2012

**Conditions of Consent**

Consent Granted: To take and use groundwater for Waiinu Beach water  
supply purposes at or about (NZTM) 1748362E-5586586N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Nukumaru Domain Reserve, Waiinu Road, Waiinu Beach

Legal Description: Pt Sec 150 Waitotara Dist Blk XIV Wairoa SD  
(Site of take & use)

Catchment: Waitotara

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

**General condition**

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

**Special conditions**

1. The volume of water taken shall not exceed 4 litres per second (346 m<sup>3</sup>/day).
2. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter at the site of taking. The water meter shall be tamper-proof and shall measure and record the volume of water taken to an accuracy of  $\pm 5\%$ .

Note: Water meters must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters have a limited lifespan.

3. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring equipment required by the conditions of this consent ('the equipment'):
  - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
  - (b) has been tested and shown to be operating to an accuracy of  $\pm 5\%$ .

The documentation shall be provided:

- (i) within 30 days of the installation of a water meter;
  - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
  - (iii) no less frequently than once every five years.
4. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
  5. The water meter shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.
  6. The consent holder shall maintain a record of the water taken by recording the meter reading and the date of the reading at monthly intervals. This record shall be provided to the Chief Executive, Taranaki Regional Council, no later than 31 July of each year, or earlier upon request.



## Consent 3770-3

7. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of water, including, but not limited to, the efficient and conservative use of water.
8. This consent shall lapse on 30 June 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023, for the purposes of:
  - (a) ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
  - (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 7 May 2012

For and on behalf of  
Taranaki Regional Council

---

**Director-Resource Management**



## **Waimate West water supply**





**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
www.trc.govt.nz

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 7 June 2011

Commencement  
Date: 7 June 2011

**Conditions of Consent**

Consent Granted: To take water from the Mangawheroiti Stream for the  
Waimate West water supply at or about (NZTM)  
1694422E-5637449N

Expiry Date: 1 June 2023

Review Date(s): June 2018

Site Location: Rowan Road, Kaponga

Legal Description: Pt Sec 79 Blk X Kaupokonui SD

Catchment: Kaupokonui

Tributary: Mangawhero  
Mangawheroiti

**General condition**

- a. The consent holder shall pay to the Council all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

**Special conditions**

1. The rate of taking shall not exceed 121 litres per second [including any water that is taken from the Mangawhero Stream, in accordance with consent 0635, and discharged to the Mangawheroiti Stream].
2. No water shall be taken pursuant to this consent unless water is being concurrently taken from the Otakeho Stream at 85 litres per second. If, for a temporary period, the Otakeho Stream intake and diversion can not supply 85 litres per second, for example during maintenance, the consent holder shall immediately advise the Chief Executive, Taranaki Regional Council and this condition shall not apply.
3. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and datalogger. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of  $\pm 5\%$ . Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes.

*Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.*

4. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ['the equipment']:
  - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
  - (b) has been tested and shown to be operating to an accuracy of  $\pm 5\%$ .

The documentation shall be provided:

- (i) within 30 days of the installation of a water meter or datalogger;
  - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
  - (iii) no less frequently than once every five years.
5. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
6. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.

7. The records of water taken shall:
  - (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and
  - (b) specifically record the water taken as 'zero' when no water is taken.
8. The taking of water authorised by this consent shall be managed to ensure that the flow in the Mangawheroiti Stream, immediately downstream of the intake, is not less than 32 litres per second.
9. When the flow in the Mangawheroiti Stream is less than 500 litres per second the consent holder shall measure and record the flow of the Mangawheroiti Stream that passes downstream the intake to an accuracy of  $\pm 10\%$  at intervals not exceeding 30 minutes.
10. From a date no later than 30 June 2012, the measurements made in accordance with conditions 3 and 9 of this consent, in a format to be advised by the Chief Executive, Taranaki Regional Council, shall be transmitted to the Taranaki Regional Council's computer system to maintain a 'real time' record of the water taken and the flow past the intake, with a delay of no more than 2 hours.
11. The consent holder shall ensure that a staff gauge is installed and maintained to effectively display the water level at the weir to an accuracy of 0.005 m at all times when the flow is less than 500 litres per second.
12. If necessary to comply with condition 9, the consent holder shall ensure that sufficient stream flow measurements are undertaken to maintain a 'rating curve' that accurately translates the water level to stream flow over the weir.

*Note: Work required by special condition 12 may be undertaken by the Taranaki Regional Council and all reasonable costs recovered from the consent holder through the annual compliance monitoring programme that is in place for the activity.*

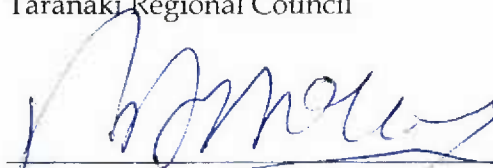
13. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of water, including, but not limited to, the efficient and conservative use of water.
14. The consent holder shall, on an annual basis, provide a report detailing:
  - the work done to detect and minimise leaks within each of the areas supplied;
  - water use efficiency and conservation measures undertaken and planned for all users of the Waimate Water Supply Scheme area; and
  - water use benchmarking data for the region compared to water use for the Waimate Water Supply Scheme.

The report[s] shall be provided to the Chief Executive, Taranaki Regional Council before 1 September each year and cover the previous 1 July to 30 June period. The first report shall be provided by 1 September 2011.

15. The consent holder shall make five annual payments of \$30,600 [GST exclusive] to the Taranaki Regional Council as a financial contribution in order to remedy or mitigate adverse effects on the environment. These payments shall be made no later than 1 September each year from 2011 to 2015.
16. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2018, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 7 June 2011

For and on behalf of  
Taranaki Regional Council



**Director-Resource Management**





CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 7 June 2011

Commencement  
Date: 7 June 2011

**Conditions of Consent**

Consent Granted: To take water from the Mangawhero Stream for the purpose of adding to the flow of the Mangawheroiti Stream and providing water for the Waimate West water supply at or about (NZTM) 1694040E-5640090N

Expiry Date: 1 June 2023

Review Date(s): June 2018

Site Location: Mangawhero Road, Kaponga

Legal Description: Sec 11 Blk VI Kaupokonui SD

Catchment: Kaupokonui

Tributary: Mangawhero

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

[www.trc.govt.nz](http://www.trc.govt.nz)

### General condition

- a. The consent holder shall pay to the Taranaki Regional Council [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

### Special conditions

1. The rate of taking shall not exceed 70 litres per second.
2. No water shall be taken pursuant to this consent unless water is concurrently being taken from the Otakeho and Mangawheroiti Streams, at 85 litres per second and 121 litres per second, respectively. If, for a temporary period, the Otakeho and Mangawheroiti Streams can not supply 85 litres per second and 121 litres per second respectively, for example during maintenance, the consent holder shall immediately advise the Chief Executive, Taranaki Regional Council and this condition shall not apply.
3. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and datalogger. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of  $\pm 5\%$ . Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes.

*Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.*

4. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent [the equipment]:
  - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
  - (b) has been tested and shown to be operating to an accuracy of  $\pm 5\%$ .

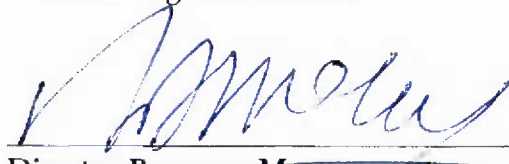
The documentation shall be provided:

- (i) within 30 days of the installation of a water meter or datalogger;
  - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
  - (iii) no less frequently than once every five years.
5. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.

6. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.
7. The records of water taken shall:
  - (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and
  - (b) specifically record the water taken as 'zero' when no water is taken.
8. From a date no later than 30 June 2012, the measurements made in accordance with condition 3 of this consent, in a format to be advised by the Chief Executive, Taranaki Regional Council, shall be transmitted to the Taranaki Regional Council's computer system to maintain a 'real time' record of the water taken, with a delay of no more than 2 hours.
9. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of water, including, but not limited to, the efficient and conservative use of water.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2018, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 7 June 2011

For and on behalf of  
Taranaki Regional Council



Director-Resource Management





**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

Name of Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 7 June 2011

Change To Conditions Date: 7 June 2011 [Granted: 22 November 2000]

**Conditions of Consent**

Consent Granted: To take water from the Otakeho Stream for the Pope and Waimate West water supply schemes at or about (NZTM) 1691940E-5639453N

Expiry Date: 1 June 2018

Review Date(s): June 2012

Site Location: Mangawhero Road, Kaponga

Legal Description: Sec 7 Blk VI Kaupokonui SD

Catchment: Otakeho

### General condition

- a. The consent holder shall pay to the Taranaki Regional Council [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

### Special conditions

1. The rate of taking shall not exceed 85 litres per second.
2. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and datalogger. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of  $\pm 5\%$ . Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes.

*Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.*

3. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ['the equipment']:
  - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
  - (b) has been tested and shown to be operating to an accuracy of  $\pm 5\%$ .

The documentation shall be provided:

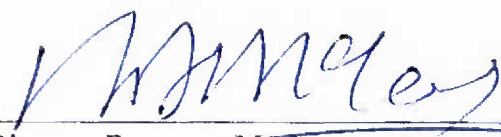
- (i) within 30 days of the installation of a water meter or datalogger;
  - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
  - (iii) no less frequently than once every five years.
4. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
5. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.
6. The records of water taken shall:
  - (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and
  - (b) specifically record the water taken as 'zero' when no water is taken.

Consent 3911-2

7. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of water, including, but not limited to, the efficient and conservative use of water.
8. From a date no later than 30 June 2012, the measurements made in accordance with condition 2 of this consent, in a format to be advised by the Chief Executive, Taranaki Regional Council, shall be transmitted to the Taranaki Regional Council's computer system to maintain a 'real time' record of the water taken, with a delay of no more than 2 hours.
9. The consent holder shall ensure that, before 1 June 2017, all flows of less than 500 litres per second past the intake structure, are measured and recorded to an accuracy  $\pm 10\%$  at intervals not exceeding 30 minutes for a continuous period of at least 12 months.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2012, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 7 June 2011

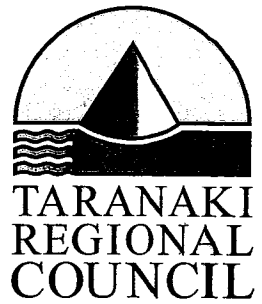
For and on behalf of  
Taranaki Regional Council



Director-Resource Management







CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

**Discharge Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4800

Consent Granted  
Date: 12 June 2006

**Conditions of Consent**

Consent Granted: To discharge treated washwater from the Waimate Water Supply Scheme into an unnamed tributary of the Mangawhero-iti Stream a tributary of the Mangawhero Stream in the Kaupokonui catchment at or about GR: P20:055-986

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Waimate Water Treatment Plant, Rowan Road, Manaia

Legal Description: Pt Sec 79 Blk X Kaupokonui SD

Catchment: Kaupokonui

Tributary: Mangawhero  
Mangawhero-iti

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

Doc# 178254-v1

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3445. In the case of any contradiction between the documentation submitted in support of application 3445 and the conditions of this consent, the conditions of this consent shall prevail.
3. The discharge shall not exceed 360 cubic metres per day.
4. The discharge quality shall not exceed the following limits at all times:

<b>Component</b>	<b>Concentration</b>
free available chlorine	<0.1g/m <sup>3</sup>
suspended solids	20 g/m <sup>3</sup>
pH	6.5-8.5

5. The consent holder shall properly and efficiently maintain and operate the settling ponds so as to meet the conditions of this consent.
6. After allowing for reasonable mixing, being a mixing zone extending seven times width of the unnamed tributary of the Mangawhero-iti Stream at the point of discharge, any discharge of contaminants shall not give rise to any of the following effects in the unnamed tributary of the Mangawhero-iti Stream:
  - a) any conspicuous change in the colour or visual clarity;
  - b) any emission of objectionable odour;
  - c) the rendering of fresh water unsuitable for consumption by farm animals;
  - d) any significant adverse effects on aquatic life.

7. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 12 June 2006

For and on behalf of  
Taranaki Regional Council



Director-Resource Management





**Land Use Consent**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
www.trc.govt.nz

Please quote our file number  
on all correspondence

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 10 December 2010



Change To  
Conditions Date: 10 December 2010 [Granted: 1 March 1999]

**Conditions of Consent**



Consent Granted: To place, use and maintain a water intake structure and associated erosion protection structures, including upgrading the intake structure and constructing a new fish pass, on the bed of the Otakeho Stream at or about (NZTM) 1691980E-5639445N

Expiry Date: 1 June 2017

Review Date(s): June 2011

Site Location: Upper Mangawhero Road, Riverlea

Legal Description: Section 7 Blk VI Kaupokonui SD [Site of structure]

Catchment: Otakeho

*For General, Standard and Special conditions  
pertaining to this consent please see reverse side of this document*

### General conditions

- a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council [hereinafter the Chief Executive], the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.



### Special conditions

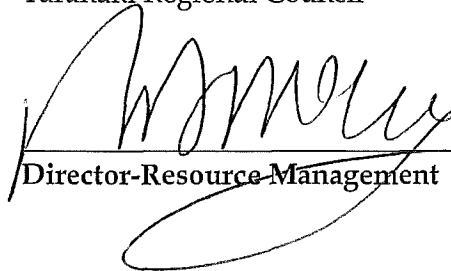
1. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of any construction and/or maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to [worknotification@trc.govt.nz](mailto:worknotification@trc.govt.nz).
2. The structure[s] authorised by this consent shall be constructed in accordance with the documentation submitted in support of applications 95/185, 542, and 6622 [specifically Drawing No. 80357] and shall be maintained to ensure the conditions of this consent are met.
3. During any construction or maintenance the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. During any construction or maintenance the consent holder shall ensure that the area and volume of riverbed disturbance shall so far as is practicable, be minimised and any areas which are disturbed, shall so far as is practicable be reinstated.
5. During any construction or maintenance the consent holder shall ensure that any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April except where this requirement is waived by the written approval of the Chief Executive, Taranaki Regional Council.
6. The structure[s] shall provide for the passage of fish to the satisfaction of the Chief Executive, Taranaki Regional Council as determined by a monitoring programme conducted by the Taranaki Regional Council at the consent holders expense.

Consent 4826-2

7. A Taranaki Regional Council Freshwater Biologist shall be present during the placement and concreting of rocks in the fish pass.
8. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
9. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001 and/or June 2005 and/or June 2011, for the purpose of ensuring that the conditions are adequate to deal with the any significant adverse effects arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 10 December 2010

For and on behalf of  
Taranaki Regional Council

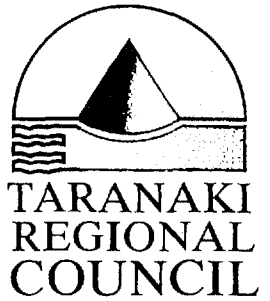


Director-Resource Management





TRK995451



**LAND USE CONSENT**

**Pursuant to the RESOURCE MANAGEMENT ACT 1991  
a resource consent is hereby granted by the  
Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: **SOUTH TARANAKI DISTRICT COUNCIL  
PRIVATE BAG 902 HAWERA**

Consent  
Granted Date: **1 March 1999**

**CONDITIONS OF CONSENT**

Consent Granted: **TO ERECT, PLACE, USE AND MAINTAIN A WATER INTAKE  
STRUCTURE AND ANCILLARY STRUCTURES ON AND OVER  
THE BED OF THE MANGAWHEROITI STREAM A TRIBUTARY  
OF THE MANGAWHERO STREAM IN THE KAUPOKONUI  
CATCHMENT FOR WATER ABSTRACTION PURPOSES AT  
OR ABOUT GR: P20:044-992**

Expiry Date: **1 June 2017**

Review Date[s]: **June 2001, June 2005 and June 2011**

Site Location: **MANGAWHEROITI STREAM, ROWAN ROAD, KAPONGA**

Legal Description: **SO 10908 PT SEC 79 BLK X KAUPOKONUI SD**

Catchment: **KAUPOKONUI 355.000**

Tributary: **MANGAWHERO 355.010  
MANGAWHROITI 355.014**

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK995451

**General conditions**

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

- 1. THAT the consent holder shall notify the Taranaki Regional Council, at least 48 hours prior to commencement and upon completion of the initial construction, and again prior to, and upon completion of, any subsequent maintenance works which would involve disturbance of, or the deposition to the riverbed or discharges to water.
- 2. THAT the stricture[s] authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
- 3. THAT during any construction or maintenance the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into the water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
- 4. THAT during any construction or maintenance the consent holder shall ensure that the area and volume of riverbed disturbance shall so far as is practicable, be minimised and any areas which are disturbed, shall so far as is practicable be reinstated.
- 5. THAT during any construction or maintenance the consent holder shall ensure that any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April except where this requirement is waived by the written approval of the General Manager, Taranaki Regional Council.
- 6. THAT structure[s] which are the subject of this consent shall not obstruct fish passage.
- 7. THAT the consent holder shall develop and undertake a monitoring programme to determine the adequacy of fish passage as deemed necessary by the General Manager, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the General Manager, Taranaki Regional Council, upon request.
- 8. THAT the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

TRK995451

9. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001 and/or June 2005 and/or June 2011, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 1 March 1999

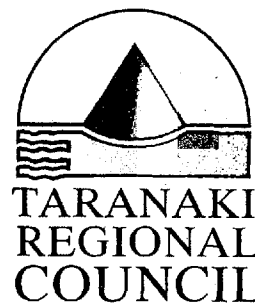
For and on behalf of  
TARANAKI REGIONAL COUNCIL



\_\_\_\_\_  
DIRECTOR - RESOURCE MANAGEMENT



TRK995452



## LAND USE CONSENT

Pursuant to the **RESOURCE MANAGEMENT ACT 1991**  
a resource consent is hereby granted by the  
**Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of  
Consent Holder: **SOUTH TARANAKI DISTRICT COUNCIL**  
**PRIVATE BAG 902 HAWERA**

Consent  
Granted Date: **1 March 1999**

## CONDITIONS OF CONSENT

Consent Granted: **TO ERECT, PLACE, USE AND MAINTAIN A WATER INTAKE STRUCTURE AND ASSOCIATED ANCILLARY STRUCTURES INCLUDING EROSION PROTECTION AND RIVER CONTROL WORKS UPSTREAM, AND A SWINGBRIDGE DOWNSTREAM, OF THE INTAKE STRUCTURE ON THE BED OF THE MANGAWHERO STREAM IN THE KAUPOKONUI CATCHMENT FOR WATER ABSTRACTION PURPOSES AT OR ABOUT GR: P20:041-016**

Expiry Date: **1 June 2017**

Review Date[s]: **June 2001, June 2005 and June 2011**

Site Location: **MANGAWHERO STREAM, MANGAWHERO ROAD, KAPONGA**

Legal Description: **SO370 SEC 11 BLK VI KAUPOKONUI SD**

Catchment: **KAUPOKONUI 355.000**

Tributary: **MANGAWHERO 355.010**

For General, Standard and Special Conditions pertaining to this consent please see reverse side of this document.

TRK995452

**General conditions**

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

**Special conditions**

1. THAT the consent holder shall notify the Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of the initial construction, and again prior to, and upon completion of, any subsequent maintenance works which would involve disturbance of, or the deposition to the riverbed or discharges to water.
2. THAT the structure[s] authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
3. THAT during any construction or maintenance the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into the water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. THAT during any construction or maintenance the consent holder shall ensure that the area and volume of riverbed disturbance shall so far as is practicable, be minimised and any areas which are disturbed, shall so far as is practicable be reinstated.
5. THAT during any construction or maintenance the consent holder shall ensure that any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April except where this requirement is waived by the written approval of the General Manager, Taranaki Regional Council.
6. THAT structure[s] which are the subject of this consent shall not obstruct fish passage.
7. THAT the consent holder shall develop and undertake a monitoring programme to determine the adequacy of fish passage as deemed necessary by the General Manager, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the General Manager, Taranaki Regional Council, upon request.
8. THAT the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

TRK995452

9. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001 and/or June 2005 and/or June 2011, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 1 March 1999

For and on behalf of  
TARANAKI REGIONAL COUNCIL



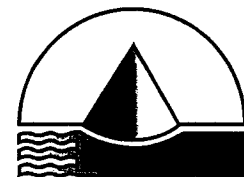
\_\_\_\_\_  
DIRECTOR—RESOURCE MANAGEMENT





## **Waverley water supply**





**TARANAKI  
REGIONAL  
COUNCIL**

CHIEF EXECUTIVE  
PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE: 06-765 7127  
FAX: 06-765 5097  
[www.trc.govt.nz](http://www.trc.govt.nz)

Please quote our file number  
on all correspondence

**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of  
Consent Holder: South Taranaki District Council  
Private Bag 902  
HAWERA 4640

Decision Date: 23 September 2010

Commencement  
Date: 23 September 2010

**Conditions of Consent**

Consent Granted: To take and use groundwater from the "Fookes Street"  
bore [GND0244] at or about (NZTM) 1739130E-5597816N  
and the "Chester Street" bore [GND0059] at or about  
(NZTM) 1740040E-5597843N for municipal water supply  
purposes at Waverley

Expiry Date: 1 June 2022

Review Date(s): June 2016

Site Location: Fookes Street & Chester Street, Waverley

Legal Description: Pt Sec 31 SO 34857 Waverley Tn Belt [Fookes Street]  
Sec 28 Waverley Tn Belt [Chester Street]

Catchment: Whenuakura

## Consent 3313-3

### General condition

- a. The consent holder shall pay to the Taranaki Regional Council [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

### Special conditions

1. The volume of water taken from the 'Fookes Street' bore [GND0244] shall not exceed 500 cubic metres per day at a rate not exceeding 7.2 litres per second.
2. The volume of water taken from the 'Chester Street' bore [GND0059] shall not exceed 400 cubic metres per day at a rate not exceeding 7.0 litres per second.
3. The bores shall be easily identifiable by permanent labels, which may be welded or engraved on the casing, or on the equivalent fixed part of the well construction or associated building. The label shall show the bore number assigned by the Taranaki Regional Council [GND0059 at Chester Street and GND0244 at Fookes Street].
4. Prior to the exercise this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger on each bore. The water meters and dataloggers shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of  $\pm 5\%$ .

Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited life-span.

5. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.
6. Within 30 days of the installation of a water meter or datalogger, and upon requests the consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that:
  - a. water measuring or recording equipment required by the conditions of this consent has been installed and/or maintained in accordance with the manufacturer's specifications; and
  - b. water measuring or recording equipment required by the conditions of this consent has been tested and shown to be operating to an accuracy of  $\pm 5\%$ .
7. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.

Consent 3313-3

8. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of groundwater, including, but not limited to, the efficient and conservative use of water.
9. The taking shall not cause the intrusion of salt water into any freshwater aquifer.
10. The consent holder shall ensure that there is access into the well that enables the measurement of static and pumping water levels. The access point shall be closed when not in use.
11. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2016 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 23 September 2010

For and on behalf of  
Taranaki Regional Council

  
\_\_\_\_\_  
Director-Resource Management



## **Oaonui water supply**







**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

Name of Consent Holder: Oaonui Water Supply Limited  
R Stanley  
P O Box 593  
NEW PLYMOUTH

New Address:  
P O Box 3157  
Fitzroy  
New Plymouth 4347

Consent Granted Date: 22 November 2000

**Conditions of Consent**

Consent Granted: To take and use water from the Oaonui Stream for a rural community water supply scheme and the Maui Production Station at or about GR: P20:866-027

Expiry Date: 1 June 2018

Review Date(s): June 2006, June 2012

Site Location: Arawhata Road, Oaonui

Legal Description: Lot 1 DP 3682 Blk VII Opunake SD

Catchment: Oaonui

## Consent 0231-3

### General conditions

- a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

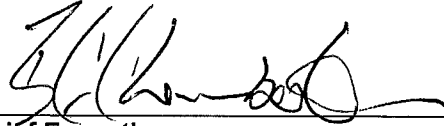
1. The resource consent allows the abstraction of up to 3,500 cubic metres/day at a maximum rate of up to 50 litres/second.
2. The resource consent holder shall maintain, to the satisfaction of the Chief Executive, Taranaki Regional Council, a measuring device capable of accurately recording daily rates of abstraction and shall measure, record and make such records available to the Chief Executive, Taranaki Regional Council, upon request.
3. The resource consent holder shall promote the efficient use of water and undertake a leak detection and repair programme throughout the term of the consent for the Oaonui Rural Water Supply Scheme and report on this programme by 31 May 2001, 2002, 2003, 2006, 2012 to the Chief Executive, Taranaki Regional Council.
4. The resource consent holder shall mitigate the effects of the abstraction by donating annually to the Taranaki Tree Trust \$1,000 [GST exclusive] for the purposes of providing riparian management in the Oaonui Stream catchment. The amount shall be adjusted annually according to the consumer price index, or similar index, to account for the effects of inflation.
5. The resource consent holder may apply to the Taranaki Regional Council for a change or cancellation of the conditions of this resource consent, in accordance with section 127(1)(a) of the Resource Management Act 1991, to take into account operational requirements or the results of monitoring.
6. In accordance with section 128 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review amend, delete or add to the conditions of this resource consent, at the resource consent holders expense, by giving notice of review during the month of June 2001, June 2002, June 2003, June 2006 and/or June 2012 for the purpose of:

Consent 0231-3

- (a) ensuring that the conditions are adequate to deal with any significant adverse effects arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at that time; and
- (b) assessing the reports prepared under condition 3 and scheme water use efficiency.

Signed at Stratford on 22 November 2000

For and on behalf of  
Taranaki Regional Council



\_\_\_\_\_  
Chief Executive





PRIVATE BAG 713  
47 CLOTEN ROAD  
STRATFORD  
NEW ZEALAND  
PHONE 0-6-765 7127  
FAX 0-6-765 5097

**Land Use Consent**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

Name of Consent Holder: Oaonui Water Supply Limited  
R Stanley  
P O Box 593  
NEW PLYMOUTH

New Address:  
P O Box 3157  
Fitzroy  
New Plymouth 4347

Consent Granted Date: 1 March 1999

**Conditions of Consent**

Consent Granted: To erect, place, use and maintain a water intake structure on the bed of the Oaonui Stream for water abstraction purposes at or about GR: P20:865-031

Expiry Date: 1 June 2018

Review Date(s): June 2001, June 2006, June 2012

Site Location: Oaonui Stream, 685 Arawhata Road, Opunake

Legal Description: Lot 29 DP 682 Blk VIII Opunake SD

Catchment: Oaonui

## Consent 5453-1

### General conditions

- a) That on receipt of a requirement from the General Manager, Taranaki Regional Council (hereinafter the General Manager), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

### Special conditions

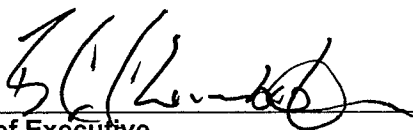
1. THAT the consent holder shall notify the Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of the initial construction, and again prior to, and upon completion of, any subsequent maintenance works which would involve disturbance of, or deposition to the riverbed or discharges to water.
2. THAT the structure[s] authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
3. THAT during any construction or maintenance the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into the water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. THAT during any construction or maintenance the consent holder shall ensure that the area and volume of riverbed disturbance shall so far as is practicable, be minimised and any areas which are disturbed, shall so far as is practicable be reinstated.
5. THAT during any construction or maintenance the consent holder shall ensure that any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April except where this requirement is waived by the written approval of the General Manager, Taranaki Regional Council.
6. THAT structure[s] which are the subject of this consent shall not obstruct fish passage.
7. THAT the consent holder shall develop and undertake a monitoring programme to determine the adequacy of fish passage as deemed necessary by the General Manager, Taranaki Regional Council, subject to section 35(2)(d) and section 36 of the Resource Management Act 1991. This monitoring information is to be forwarded to the General Manager, Taranaki Regional Council, upon request.
8. THAT the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

Consent 5453-1

9. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2001 and/or June 2006 and/or June 2012, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 19 October 2000

For and on behalf of  
Taranaki Regional Council

  
\_\_\_\_\_  
Chief Executive





## **Nukumaru water supply**





**Water Permit**  
**Pursuant to the Resource Management Act 1991**  
**a resource consent is hereby granted by the**  
**Taranaki Regional Council**

CHIEF EXECUTIVE  
 PRIVATE BAG 713  
 47 CLOTEN ROAD  
 STRATFORD  
 NEW ZEALAND  
 PHONE 06-765 7127  
 FAX 06-765 5097

Please quote our file number  
 on all correspondence

Name of Consent Holder: Nukumaru Water Scheme Society Inc  
 P O Box 53  
 WAITOTARA

*NEW ADDRESS*  
*186 Parsons Street*  
*WANGANUI*

Consent Granted Date: 20 October 2004

**Conditions of Consent**

Consent Granted: To take and use groundwater from up to two bores for the purpose of supplying the Nukumaru community rural water scheme at or about GR: R22:662-549

Expiry Date: 1 June 2039

Review Date(s): June 2010, June 2017, June 2025

Site Location: Pakaraka Road, Waitotara

Legal Description: Lot 1 DP 26645 Lot 1 DP 85667 Secs 8, 20 Blk V Secs 4, 20 Blk VI Pt Sec 4 Blk IX Nukumaru SD

Catchment: Waitotara

Tributary: Ohie

### General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
  - i) the administration, monitoring and supervision of this consent; and
  - ii) charges authorised by regulations.

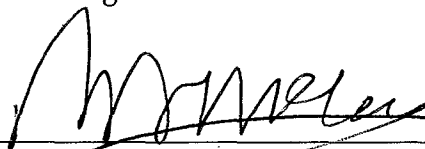
### Special conditions

1. The exercise of this consent shall be undertaken in general accordance with the documentation submitted in support of application 3297 and shall ensure the efficient and effective use of water. In the case of any contradiction between the documentation submitted in support of application 3297 and the conditions of this consent, the conditions of this consent shall prevail.
2. The volume of groundwater abstracted shall not exceed 605 cubic metres per day at a rate not exceeding 7.0 litres per second.
3. The consent holder shall install and maintain a water meter approved by the Chief Executive, Taranaki Regional Council, for the purposes of accurately recording the abstraction of water.
4. The consent holder shall maintain weekly records of the abstraction including date, pumping hours and volume pumped, and make these records available to the Chief Executive, Taranaki Regional Council, no later than 31 July of each year, or upon request.
5. This consent shall be subject to monitoring by the Taranaki Regional Council and the consent holder shall meet all reasonable costs associated with the monitoring.
6. This consent shall lapse on the expiry of five years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2010 and/or June 2017 and/or June 2025, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 20 October 2004

For and on behalf of  
Taranaki Regional Council



~~Director Resource Management~~



## **Appendix II**

### **Biomonitoring and fish survey reports**





To Job Manager, S Cowperthwaite  
From Scientific Officer, C R Fowles  
Doc # 1199792  
Report No CF565  
Date 22 May 2013

## **Biomonitoring of the Pungaereere Stream in relation to the abstraction of water and the backwash discharge from the South Taranaki District Council Rahoitu water supply, January 2013**

### **Introduction**

The South Taranaki District Council ('STDC') owns and operates the Rahoitu Water Supply Scheme which involves the abstraction of water from the Pungaereere Stream and discharge of filter backwash into that stream. Special condition one of consent 6038 (to discharge backwash), requires that the activity shall not have significant adverse effects on aquatic life, habitats and ecology in the receiving water.

Subsequently, to assess compliance, biological surveys have been carried out in the Pungaereere Stream on three previous occasions since the consent was issued in September 2000 (see References). This report presents the results of the single summer survey programmed for the 2012-2013 period.

### **Methods**

The standard '400 ml kick sampling technique' was used to collect streambed (benthic) macroinvertebrates and algae from three established sites upstream and downstream of the Rahoitu water supply treatment plant abstraction and backwash discharge (Figure 1), on 22 January 2013. These sites were established at the time of the initial survey performed in February 2000 with surveys repeated in January 2003 and February 2008.

These sites were:

Site No	Site code	Map reference	GPS location	Location	Elevation (m asl)
1	PNG000195	BJ28: 694458	E1669439 N5645804	u/s of WTP abstraction and filter backwash discharge	45
2	PNG000197	BJ28: 694458	E1669398 N5645822	15 m d/s of WTP abstraction and filter backwash discharge	45
3	PNG000200	BJ28: 693458	E1669349 N5645803	SH45	45

This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).



**Figure 1** Biomonitoring sites in the Pungaereere Stream in relation to the Rahoitu water supply

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al, 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= 20-99 individuals;
VA (very abundant)	= 100-499 individuals;
XA (extremely abundant)	= 500 or more individuals.

Macroinvertebrate Community Index (MCI) values were calculated for taxa present at each site (Stark 1985) with certain taxa scores modified in accordance with Taranaki experience.

A semi-quantitative MCI value, SQMCI<sub>s</sub> (Stark, 1999) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these scores, and dividing by the sum of the loading factors. The loading factors were 1 for rare (R), 3 for common (C), 5 for abundant (A), 100 for very abundant (VA), and 500 for extremely abundant (XA).

## Results and discussion

### General

Stream flow was low, uncoloured, and clear at the time of the survey, which followed a seven day recession since a fresh in excess of three times median flow and 23 days since a fresh in excess of seven times the median flow. Water temperatures ranged from 17.1°C to 17.3°C during this mid morning survey. Periphyton mats were patchy on the substrate while filamentous algae were also patchy on the stony, bouldery substrate at all sites where some silt, sand and gravel also comprised part of the substrate. Some macrophytes were recorded at the stream's margins at sites 1 and 3.

### Macroinvertebrate communities

Three previous biomonitoring surveys had been undertaken at these three sites (located at an altitude of 45 m asl). The results of these surveys are summarised in Table 1 and the results of the current survey are presented in Table 2.

**Table 1** Summary of macroinvertebrate taxa numbers and MCI values for the previous surveys performed between February 2000 and February 2008

Site	No of surveys	Taxa numbers		MCI values	
		Range	Median	Range	Median
1	3	20-23	21	70-80	73
2	3	20-23	22	72-78	74
3	3	21-23	23	70-82	71

This surveyed short reach of the stream, had a moderate taxa richness ranging from 22 to 27 taxa at the three sites. These richnesses generally were slightly higher than previous surveys' richnesses (Table 1) and relatively similar to median taxa richness (25 taxa) from 45 previous surveys at 'control' sites in Taranaki ringplain rivers and streams sourced outside the National Park and located between altitudes of 25 and 49 m asl, and below the maximum richness (32 taxa) found at such sites (TRC, 1999 (updated 2012)). Compositions of the communities included high proportions (59 to 60%) of 'tolerant' taxa. Only two 'highly sensitive' taxa were recorded within the reach of the stream, coincident with patchy periphyton cover of the streambed.

The dominant taxa which characterised the surveyed reach of the Pungaere Stream in the immediate vicinity of the Rahotu water treatment plant, included one 'highly sensitive' taxon [mayfly (*Deleatidium*)], up to seven 'moderately sensitive' taxa [amphipod (*Paracalliope*), mayfly (*Austroclima*), extremely abundant elmid beetles, dobsonfly (*Archichauliodes*), cased caddisfly (*Pycnocentroides*), free-living caddisfly (*Hydrobiosis*), and crane fly (*Aphrophila*)]; and up to eight 'tolerant' taxa [flatworm (*Cura*), oligochaete worms, snail (*Potamopyrgus*), net-building caddisfly (*Aoteapsyche*), midges (tanytarsids, orthoclads, and *Maoridiamesa*), and sandfly (*Austrosimulium*)]. More localised abundances of only one of these 'tolerant' taxa and one 'sensitive' taxon were recorded. Twelve of these taxa have characterised the communities over this short reach of the stream on previous survey occasions (2000 to 2008), indicative of very stable community compositions over the past 13 years. Most of these 'tolerant' taxa are commonly associated with extensive periphyton cover, a feature of the substrate of the lower reaches of ringplain rivers and streams during warmer, low flow summer conditions. Numerically, the most dominant taxa were a combination of 'tolerant' and 'moderately sensitive' taxa. This accounted for the moderate

SQMCI<sub>s</sub> values which had a very narrow range of 4.8 to 4.9 units (Table 2). Very few significant changes in individual taxon abundances were recorded between sites which also were reflected in the very narrow range of SQMCI<sub>s</sub> values.

**Table 2** Macroinvertebrate fauna of the Pungaereere Stream in relation to STDC Rahotu Water Supply sampled on 22 January 2013

Taxa List	Site Number	MCI score	1	2	3
	Site Code		PNG000195	PNG000197	PNG000200
	Sample Number		FWB13009	FWB13010	FWB13011
PLATYHELMINTHES (FLATWORMS)	<i>Cura</i>	3	A	A	A
NEMERTEA	Nemertea	3	-	C	C
NEMATODA	Nematoda	3	R	-	R
ANNELIDA (WORMS)	Oligochaeta	1	A	C	A
	Lumbricidae	5	-	R	-
MOLLUSCA	<i>Ferrissia</i>	3	-	-	R
	<i>Physa</i>	3	-	R	R
	<i>Potamopyrgus</i>	4	VA	XA	XA
CRUSTACEA	Ostracoda	1	R	R	R
	<i>Paracalliope</i>	5	C	VA	A
	<i>Paranephrops</i>	5	-	-	R
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	C	C	A
	<i>Deleatidium</i>	8	A	A	A
COLEOPTERA (BEETLES)	Elmidae	6	XA	XA	XA
	Ptilodactylidae	8	-	-	R
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	A	A	A
TRICHOPTERA (CADDISFLIES)	<i>Aoteapsyche</i>	4	A	VA	A
	<i>Costachorema</i>	7	R	R	R
	<i>Hydrobiosis</i>	5	A	A	A
	<i>Oxyethira</i>	2	C	R	C
	<i>Pycnocentroides</i>	5	XA	VA	VA
DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	A	C	A
	<i>Maoridamesa</i>	3	A	A	A
	Orthoclaadiinae	2	VA	C	A
	Tanytarsini	3	VA	A	VA
	Empididae	3	C	R	C
	Muscidae	3	C	R	R
	<i>Austrosimulium</i>	3	R	A	C
	Tanyderidae	4	-	R	-
<b>No of taxa</b>			22	25	27
<b>MCI</b>			82	82	83
<b>SQMCI<sub>s</sub></b>			4.9	4.9	4.8
<b>EPT (taxa)</b>			6	6	6
<b>%EPT (taxa)</b>			27	24	22
<b>'Tolerant' taxa</b>		<b>'Moderately sensitive' taxa</b>	<b>'Highly sensitive' taxa</b>		

R = Rare      C = Common      A = Abundant      VA = Very Abundant      XA = Extremely Abundant

The communities' compositions described above were reflected in the very narrow range and relatively low MCI scores (82 to 83 units) which were significantly lower than the median score (102 units) recorded from forty-five previous surveys of 'control sites' in Taranaki ringplain streams at similar altitudes and sourced below the National Park (TRC,

1999 (updated 2012)). These scores were slightly higher (by 1 to 4 units) than MCI scores recorded by the three previous surveys (Table 1) but 6 to 7 units less than predicted scores for sites at this altitude (45 m asl) in ringplain streams (Stark & Fowles, 2009). These scores categorised these sites as having 'fair' generic and 'worse than expected' predictive stream health (TRC, 2013) at the time of this survey. However, no significant differences in scores were recorded between sites indicative of no recent impacts of water abstraction or filter backwash discharges on the macroinvertebrate fauna of the surveyed reach of the Pungaereere Stream.

## Conclusions

This fourth survey of the macroinvertebrate fauna of the lower reaches of the Pungaereere Stream in the vicinity of the Rahoitu supply water treatment plant, found no significant recent impacts of the abstraction of water nor the discharge of filter backwash wastes on the macroinvertebrate communities. The results were relatively typical of biological communities present under low flow conditions in the lower reaches of a seepage-fed ring plain stream rising below the National Park boundary and very similar to communities found by three previous summer surveys of this reach of the stream since 2000. The very narrow range of MCI scores was indicative of 'fair' stream biological health and scores were slightly lower than predicted for ringplain sites at an equivalent altitude.

## Summary

The Council's standard 'kick-sampling' technique was used at three established sites to collect streambed macroinvertebrates from the Pungaereere Stream. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI<sub>s</sub> scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/ absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI<sub>s</sub> takes into account tax abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in either the MCI or SQMCI<sub>s</sub> between sites may indicate the degree of adverse effects (if any) of the abstractions or discharges being monitored.

This late summer macroinvertebrate survey indicated that during a period of low recession flow of the river there were no effects on the macroinvertebrate communities' compositions downstream of the abstraction or discharge beyond the designated mixing zone. Very few significant changes in individual taxon abundances were recorded between sites through the stream reach surveyed.

In general, the macroinvertebrate communities of the stream contained relatively high proportions of 'tolerant' taxa at all sites and the communities were generally dominated by similar numbers of 'sensitive' and 'tolerant' taxa. Taxonomic richnesses (number of taxa) were slightly higher than those of the previous three summer surveys conducted over the past 13 years.

MCI and SQMCI<sub>s</sub> scores indicated that the stream communities were of 'fair' and 'below expected' health, although relatively typical of conditions recorded in the lower reaches of similar Taranaki rivers, with minimal differences in the numerical abundances of the characteristic taxa accounting for the very similar SQMCI<sub>s</sub> values through the short stream reach surveyed.

## References

### Internal Taranaki Regional Council reports

Fowles CR, 2000: Biomonitoring of the Pungaereere Stream in relation to the abstraction of water and the backwash discharge from the STDC Rahotu water supply, February 2000. TRC Technical Report CF210.

Fowles CR, 2003: Biomonitoring of the Pungaereere Stream in relation to the abstraction of water and the backwash discharge from the STDC Rahotu water supply, January 2003. TRC Technical Report CF266.

Fowles CR, 2008: Biomonitoring of the Pungaereere Stream in relation to the abstraction of water and the backwash discharge from the STDC Rahotu water supply, February 2008. TRC Technical Report CF439.

TRC, 1999: Some statistics from the Taranaki Regional Council database (FWB) of freshwater macroinvertebrate surveys performed during the period from January 1980 to 31 December 1998 (State of the Environment Report). TRC Technical Report 99-17.

TRC, 2013: Freshwater macroinvertebrate fauna biological monitoring programme Annual SEM Report 2011-2012. TRC Technical Report 2012-18.

### External publications

Stark J D, 1985: A macroinvertebrate community index of water quality for stony stream. Water and Soil Miscellaneous Publication No. 87.

Stark J D, 1998: SQMCI<sub>s</sub>: a biotic index for freshwater macroinvertebrate coded-abundance data. NZJ Mar FW Res 32: 55-66.

Stark, J D; 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Report No 472. 32pp.

Stark, JD, Boothroyd IKG, Harding JS, Maxted JR, Scarsbrook MR, 2001: Protocols for sampling macroinvertebrates in wadeable streams. New Zealand Macroinvertebrate Working Group Report No 1. Prepared for the Ministry for the Environment. Sustainable Management Fund Project No 5103. 57p.

Stark JD and Fowles CR, 2009. Relationships between MCI, site altitude, and distance from source Taranaki ring plain streams. Stark Environmental report No. 2009-01.

To Job Manager, Scott Cowperthwaite  
 From Scientific Officers, Chris Fowles and Katrina Smith  
 Report No CF580  
 Document No 1181553  
 Date 9 April 2013

## **Biomonitoring of the Mangawheroiti Stream in relation to the South Taranaki District Council’s Waimate West Water Supply Scheme, November 2012**

### **Introduction**

The South Taranaki District Council (‘STDC’) owns and operates the Waimate West Water Supply Scheme (WWWSS) which involves the abstraction of water from three streams; the Mangawheroiti Stream, the Mangawhero Stream and the Otakeho Stream. This scheme provides water for dairy farms, industry, and domestic use. The main intake for the WWWWSS is on the Mangawheroiti Stream. However, the flow in Mangawheroiti Stream is supplemented by water diverted into it from the Mangawhero Stream upstream of the intake.

Consent 0634-3 authorises the taking of water from the Mangawheroiti Stream for the water supply scheme. This consent contains a Special Condition (8) that requires STDC to ensure that a minimum flow of 32 litres per second (0.032 m<sup>3</sup>/s) is provided at all times immediately downstream of the intake structure.

This biological survey was the first of two programmed for the 2012-2013 monitoring period, the inaugural survey having been performed in January 2012. The intention of these surveys was to monitor the health of the macroinvertebrate communities in the Mangawheroiti Stream in relation to any effects of water abstraction by the WWWWSS.

### **Methods**

This survey was undertaken on 22 November 2012 at four sites on the Mangawheroiti Stream; a control site upstream of the intake weir (1), a primary impact site approximately 40 metres downstream of the intake weir (2), a secondary impact site nearly three kilometres downstream of that intake and a tertiary impact site approximately 8.3 kilometres downstream of the intake and 340 metres upstream of the confluence with the Mangawhero Stream (Figure 1).

**Table 1** Biomonitoring sites in the Mangawheroiti Stream in relation to the WWWWSS

Site	Site code	GPS location	Location	Elevation (m asl)	Distance from NPk boundary (km)
1	MWI000170	E1694422 N5637468	Upstream of the intake weir	340	3.6
2	MWI000174	E1694425 N5637409	Approximately 40 metres downstream of the water intake	340	3.7
3	MWI000330	E1694186 N5635091	Approximately 3 km downstream of the water intake (580 metres upstream of Eltham Road bridge)	270	6.5
4	MWI000490	E1693732 N5631251	Approximately 8.3 km downstream of the water intake (340 metres upstream of confluence with the Mangawhero Stream)	180	11.9

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from all sites. The 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative), of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark *et al.*, 2001).

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark *et al.* 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams (MCI). Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1 and 0.1 in hard bottomed and soft bottomed streams respectively. The sensitivity scores for certain taxa found in hard bottomed streams have been modified in accordance with Taranaki experience. After extensive use of the MCI, categories were assigned to the sensitivity scores, to clarify their 'relative' sensitivity e.g. taxa that scored between 1 and 4 inclusive are considered tolerant (see Table 3).

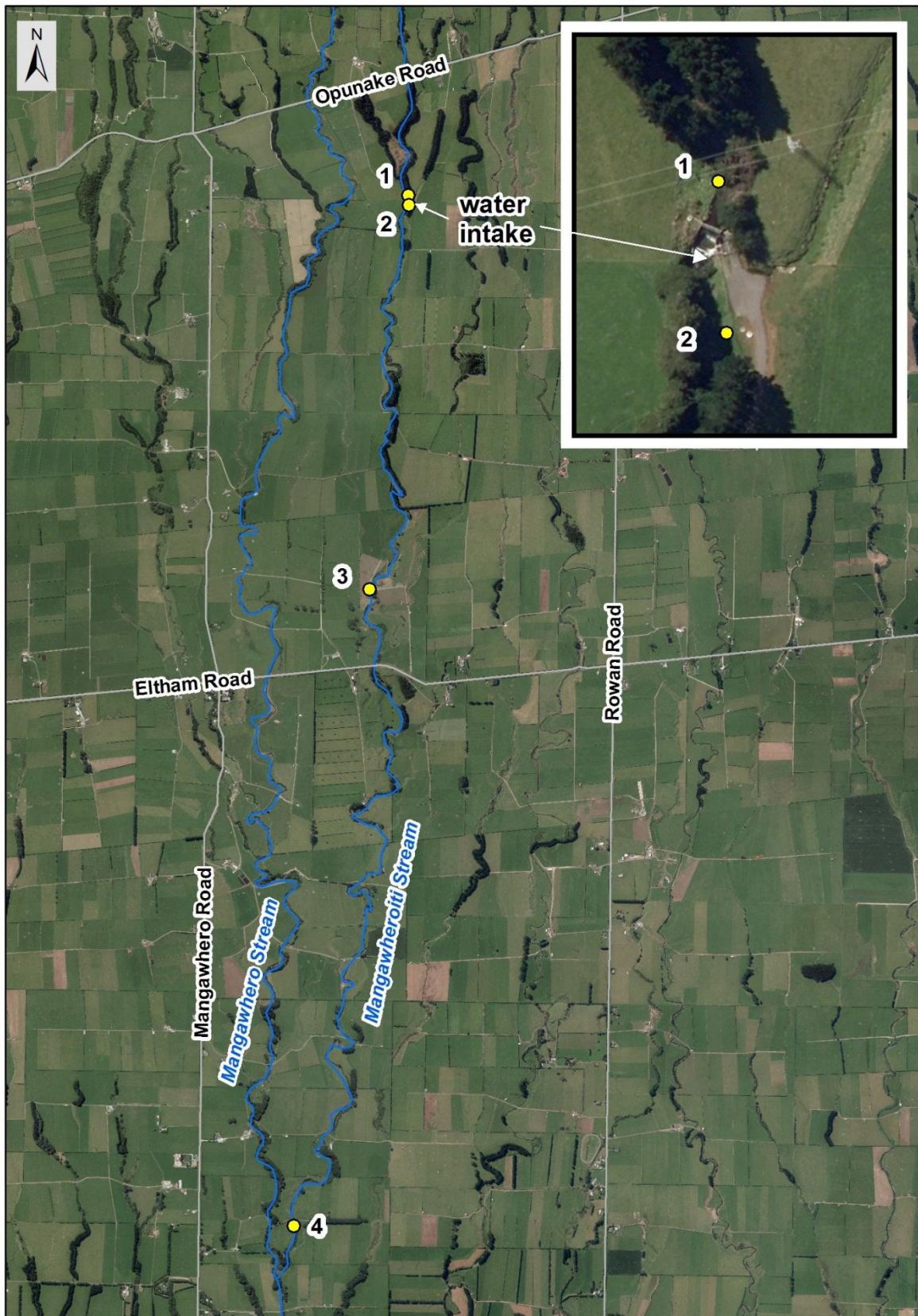
By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value (SQMCI<sub>s</sub>) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCI<sub>s</sub> is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower.

## Results

During this November 2012 survey, there was a moderate, swift, clear, and uncoloured flow at all four sites. In the absence of a lengthy flow record for the Mangawheroiti Stream at the time of this survey, the flow data from the neighbouring Kaupokonui Stream indicated that it had been 19 days since a three times median flow and 35 days since flows exceeded seven times median. In the three months prior to this survey, the flow in the Mangawheroiti Stream upstream of the intake weir exceeded 200 L/s and the flow at the time of the survey was 220 L/s at this recently established hydrological recording site. Water abstraction of approximately 100 L/s at the time of the survey resulted in a residual flow of 130 L/s below the weir. Water temperatures ranged from 10.2°C at the two sites adjacent to the intake, through 13.6°C (site 3) to 15.7°C at the downstream site (4) at the time of this midday to early afternoon survey.





**Figure 1** Biomonitoring sites related to the WWWWSS intake on the Mangawheroiti Stream.

Slippery mats but no filamentous algae were recorded at the partially shaded control site (1) upstream of the intake weir on the Mangawheroiti Stream. Patchy moss was also recorded at this site where the substrate composition predominantly consisted of cobbles with smaller proportions of sand, gravels, and boulders resulting in a moderately stable bed.

At the slightly more open site 2, 40m downstream of the intake weir, thin mats and patchy filamentous algae were recorded along with patchy moss, leaves, and wood. Similar to site 1, the bed substrate at this site primarily consisted of cobbles and gravels, although there was a slightly higher proportion of sand, coarse gravels, and boulders recorded at this site which was reflected in the very stable bed recorded by this survey.

Periphyton growth recorded at site 3 consisted of thin mats and patchy moss, but no filamentous algae were recorded at this open site. The stream bed was dominated by cobbles and there were also smaller quantities of boulders, fine and coarse gravels, sand, and silt recorded at this site by the current survey.

At the partially shaded site 4, upstream of the confluence with the Mangawhero Stream, there were widespread algal mats and patchy filamentous algae recorded but no moss was present. Cobbles dominated this site with some coarse and fine gravels, boulders, silt, and sand also present.

### Macroinvertebrate communities

A summary of the results from the previous survey is presented in Table 2 and from the current survey in Table 3 along with predicted MCI scores using established relationships between MCI scores and ringplain stream altitude and distance from the National Park boundary (Stark and Fowles (2009)). Equations generated from these relationships can be used to predict MCI values at a particular location on a stream or river on the ringplain.

**Table 2** Summary of macroinvertebrate taxa numbers, MCI and SQMCI<sub>s</sub> values for the previous survey performed in January 2012

Site	Site code	No. of surveys	Taxa numbers		MCI values		SQCI <sub>s</sub> value	
			Range	Median	Range	Median	Range	Median
1	MWIO00170	1	-	34	-	132	-	7.3
2	MWIO00174	1	-	35	-	127	-	7.3
3	MWIO00330	1	-	20	-	118	-	8.0
4	MWIO00490	1	-	24	-	97	-	4.7

**Table 3** Results of the survey of 22 November 2012 in relation to WWSS, and predicted MCI scores (from Stark and Fowles (2009)).

Site No.	Results			Predicted MCI scores	
	No. of taxa	MCI	SQMCI <sub>s</sub>	Altitude	Distance
1	31	123	7.5	119	117
2	36	122	7.0	119	117
3	26	129	7.3	112	110
4	20	101	5.3	103	104

The macroinvertebrate fauna recorded by the current survey at each of the four sites are presented in Table 4.

**Table 4** Macroinvertebrate fauna recorded at four sites in the Mangawheroiti Stream in relation to the WWSS water abstraction, 22 November 2012

Taxa List	Site Number	MCI score	1	2	3	4
	Site Code		MWI000170	MWI000174	MWI000330	MWI000490
	Sample Number		FWB12438	FWB12439	FWB12440	FWB12441
<b>NEMATODA</b>	Nematoda	3	-	-	-	R
<b>ANNELIDA (WORMS)</b>	Oligochaeta	1	R	R	-	A
<b>MOLLUSCA</b>	<i>Potamopyrgus</i>	4	-	R	R	C
<b>EPHEMEROPTERA (MAYFLIES)</b>	<i>Acanthophlebia</i>	9	-	R	-	-
	<i>Ameletopsis</i>	10	-	R	-	-
	<i>Austroclima</i>	7	A	A	A	VA
	<i>Coloburiscus</i>	7	XA	XA	XA	A
	<i>Deleatidium</i>	8	XA	VA	XA	VA
	<i>Nesameletus</i>	9	VA	VA	VA	R
	<i>Zephlebia group</i>	7	-	R	R	-
<b>PLECOPTERA (STONEFLIES)</b>	<i>Acroperla</i>	5	R	R	R	-
	<i>Austroperla</i>	9	-	-	R	-
	<i>Megaleptoperla</i>	9	A	C	R	-
	<i>Spaniocerca</i>	8	R	-	-	-
	<i>Stenoperla</i>	10	R	-	-	-
	<i>Zelandobius</i>	5	C	R	R	-
	<i>Zelandoperla</i>	8	R	R	R	-
	<b>COLEOPTERA (BEETLES)</b>	Elmidae	6	VA	XA	A
	Hydraenidae	8	A	A	A	R
	Hydrophilidae	5	R	R	-	-
	Ptilodactylidae	8	R	-	-	-
<b>MEGALOPTERA</b>	<i>Archichauliodes</i>	7	A	A	A	A
<b>TRICHOPTERA (CADDISFLIES)</b>	<i>Aoteapsyche</i>	4	A	A	A	VA
	<i>Costachorema</i>	7	-	-	R	C
	<i>Hydrobiosis</i>	5	C	C	C	C
	<i>Hydrobiosella</i>	9	-	R	-	-
	<i>Orthopsyche</i>	9	C	C	-	-
	<i>Psilochorema</i>	6	-	R	R	-
	<i>Beraeoptera</i>	8	XA	XA	VA	-
	<i>Confluens</i>	5	R	-	-	-
	<i>Helicopsyche</i>	10	A	-	-	-
	<i>Olinga</i>	9	-	R	R	-
	<i>Pycnocentria</i>	7	-	R	R	-
	<i>Pycnocentroides</i>	5	C	C	VA	C
	<i>Zeloesica</i>	7	-	R	-	-
<b>DIPTERA (TRUE FLIES)</b>	<i>Aphrophila</i>	5	A	VA	A	VA
	Eriopterini	5	R	R	R	-
	<i>Harrisius</i>	6	R	-	-	-
	<i>Maoridiamesa</i>	3	R	R	R	VA
	Orthoclaadiinae	2	-	R	-	C
	<i>Polypedilum</i>	3	R	R	-	-
	Tanypodinae	5	R	R	R	-
	Tanytarsini	3	-	-	-	R
	Empididae	3	A	A	-	-
	Muscidae	3	-	-	-	R
Tanyderidae	4	R	R	-	C	
<b>ACARINA (MITES)</b>	Acarina	5	-	R	-	-
<b>No of taxa</b>			31	36	26	20
<b>MCI</b>			123	122	129	101
<b>SQMCI</b>			7.5	7.0	7.3	5.3
<b>EPT (taxa)</b>			17	21	18	8
<b>%EPT (taxa)</b>			55	58	69	40
<b>'Tolerant' taxa</b>		<b>'Moderately sensitive' taxa</b>		<b>'Highly sensitive' taxa</b>		

R = Rare      C = Common      A = Abundant      VA = Very Abundant      XA = Extremely Abundant

### **Site 1 (upstream of intake weir)**

**A good richness (31 taxa) was recorded, well above the median number (23 taxa) and toward the maximum (35 taxa) found by more than 165 previous surveys of National Park-sourced streams at 'control' sites between 300 and 350 m asl (TRC, 1999 (updated 2012)).** This richness was three taxa fewer than found by the only previous survey performed at this site. The community was comprised of a very high proportion (80%) of 'sensitive' taxa, ten of which were 'highly sensitive' taxa. The community was characterised by six 'highly sensitive' taxa (mayflies (extremely abundant *Deleatidium*, and *Nesameletus*), stonefly (*Megaleptoperla*), hydraenid beetles, and cased-caddisflies (*Helicopsyche* and extremely abundant *Beraeoptera*)); five 'moderately sensitive' taxa (mayflies (*Austroclima* and extremely abundant *Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), and crane fly (*Aphrophila*)); and two 'tolerant' taxa (net-building caddisfly (*Aoteapsyche*) and empidid dance-flies). The numerical dominance by 'sensitive' taxa (particularly two 'highly sensitive' taxa), resulted in the high SQMCI<sub>s</sub> value of 7.5 units, very similar to the value recorded by the previous survey (Table 2). This was indicative of good physical habitat and preceding physicochemical water quality, typical of the upper mid-reaches of ringplain streams.

The high proportion of 'sensitive' taxa comprising the community resulted in the relatively high MCI score (123 units) which was nine units below that recorded by the only previous survey but seven units above the median MCI score recorded by more than 165 surveys of 'control' sites in National Park-sourced rivers and streams between 300 and 350 m asl (TRC, 1999 (updated 2012)). It was also four and six units above predicted (Stark & Fowles, 2009) altitude and distance scores respectively (Table 3) and categorised this site as having 'very good' generic stream health and 'well above expected' predictive health (TRC, 2013) for a site in the upper mid-reaches of a ringplain stream.

### **Site 2 (40 m downstream of intake weir)**

A very good richness (36 taxa) was found at this site, five taxa more than at the site upstream of the weir, and one taxon more than the maximum richness recorded by more than 165 previous surveys at similar 'control' sites (see above and TRC, 1999 (updated, 2012)). This was only one taxon above the richness recorded by the single, previous survey at this site (Table 2) with a community composition mainly comprised of 'sensitive' taxa (77% of richness), 11 of which were 'highly sensitive' taxa. The community was characterised by 11 of the same 13 dominant taxa as at the upstream 'control' site, the exceptions being two 'highly sensitive' taxa (stonefly *Megaleptoperla*) and spiral cased caddisfly (*Helicopsyche*) – the latter not present at site 2 at all). The continued numerical dominance by 'sensitive' taxa (although only one 'highly sensitive' taxon) resulted in a high SQMCI<sub>s</sub> value of 7.0 units, only 0.3 unit lower than the score recorded by the previous survey (Table 2) and 0.5 unit lower than the score at the upstream site (Table 4). This was also indicative of good physical habitat and preceding physicochemical water quality, typical of the upper, mid-reaches of ringplain streams, and coincidental with limited periphyton substrate cover.

The high proportion of 'sensitive' taxa in the composition of the community was reflected in the relatively high MCI score (122 units), only one unit below that found at the 'control' site upstream of the intake weir, an insignificant five units less than the score recorded by the single, previous survey, but six units above the median score recorded by more than 165 previous surveys at similar sites (see above and TRC, 1999 (updated, 2012)). The score was also three and five units above predicted altitude and distance scores respectively (Stark and Fowles, 2009; Table 3). This categorised the site as having 'very good' generic stream health

and 'well above expected' predictive health (TRC, 2013) for a site in the upper mid reaches of a ringplain stream.

### **Site 3 (approximately 3 km downstream of the intake)**

Taxa richness (26) was good for a site in the mid-reaches of a ringplain stream and equal with the median richness found to date by 158 surveys of 'control' sites in National Park-sourced streams at altitudes between 250 and 299 m asl (TRC, 1999 (updated, 2012)). This richness was six taxa more than recorded by the single, previous survey at this site (Table 2). The community comprised a very high proportion (85%) of 'sensitive' taxa, seven of which were 'highly sensitive' taxa. It was characterised by all of the same 'highly sensitive' and 'moderately sensitive' taxa also dominant at site 2 (3 km upstream), plus one additional 'moderately sensitive' taxon (stony-cased caddisfly (*Pycnocentroides*)), and one less 'tolerant' taxon (empidid dance flies). This continued numerical dominance by 'sensitive' taxa resulted in a high SQMCI<sub>s</sub> value of 7.3 units which although 0.7 unit lower than found by the previous survey (Table 2), was only 0.2 unit less than recorded at the upstream 'control' site (1). This was further indication of good physical habitat and preceding physicochemical water quality (under conditions of about 45% abstraction of upstream flow), and better than typical of the mid-reaches of ringplain streams, coincidental with minimal periphyton substrate cover.

The very high proportion of 'sensitive' taxa comprising this community resulted in a high MCI value of 129 units, atypically six units above the score upstream of the intake weir and a significant (Stark, 1998) 11 units higher than recorded by the single, previous survey at this site. This current score was also a significant 14 units above the median score recorded by 158 previous surveys at similar sites (see above and TRC, 1999 (updated, 2012)), and also significantly 17 and 19 units higher than predicted altitude and distance from the National Park boundary scores respectively (Stark and Fowles, 2009; Table 2). This characterised the site as having 'very good' generic stream health and 'well above expected' predictive health (TRC, 2013) for a site in the mid-reaches of a ringplain stream.

### **Site 4 (approximately 8 km downstream of the intake weir)**

The moderate richness (20 taxa) at this site was equivalent to the median taxa number found by more than 330 previous surveys of National Park-sourced streams at 'control' sites between 155 and 199 m asl (TRC, 1999 (updated, 2012)), and was four taxa fewer than found by the single previous survey at this site (Table 2). The community comprised a higher proportion (45% of taxa) of 'tolerant' taxa than any of the three upstream sites' communities, and fewer (three) 'highly sensitive' taxa. It was characterised by only one 'highly sensitive' taxon (mayfly (*Deleatidium*)); five 'moderately sensitive' taxa (mayflies (*Austroclima* and *Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), and crane fly (*Aphrophila*)); and three 'tolerant' taxa (oligochaete worms, net-building caddisfly (*Aoteapsyche*), and midge (*Maoridiamesa*)). Several significant differences in individual taxon abundances were found between adjacent sites (3 and 4) and principally involved decreasing numbers within 'highly sensitive' (three) and 'moderately sensitive' (two) taxa and increasing numbers within four 'tolerant' taxa. The numerical dominance shared between three 'sensitive' and two 'tolerant' taxa was responsible for the moderate SQMCI<sub>s</sub> value of 5.3 units which was 0.6 unit higher than found by the single previous survey at this site, but significantly lower (2.0 units) than the score at the nearest upstream site, 3 (Table 4). This value was consistent with some degradation in physical streambed periphyton cover (more widespread mats and patchy filamentous algae) but the relatively high percentage of 'sensitive' taxa was indicative of good preceding physicochemical water quality conditions.

The more relative balance between 'tolerant' and 'sensitive' taxa comprising this community resulted in the good MCI score of 101 units, but a significant 28 units (Stark, 1998) lower than the score at site 3 (5.4 km upstream), but four units higher than the score recorded by the single, previous survey at this site (Table 2). The current score was six units below the median score recorded by more than 330 previous surveys of 'control' sites in National Park-sourced streams situated between 155 and 199 m asl (TRC, 1999 (updated, 2012)) but within three units of predicted altitude and distance from the National Park boundary values (Stark and Fowles, 2009 (Table 3)). This characterised the site as having 'good' generic stream health and 'better than expected' predictive health (TRC, 2013) for a site in the mid reaches of a ringplain stream.

## Discussion and conclusions

The abstraction of surface water particularly for extended periods of time may result in significant adverse effects on the macroinvertebrate communities living within a waterbody by altering stream temperature, flow conditions, wetted habitat, periphyton growth, and certain aspects of physicochemical water quality. This November 2012 survey was undertaken to monitor whether the operation of the WWSS was having an effect on the macroinvertebrate communities in the Mangawheroiti Stream downstream of the water take under spring relatively low flow conditions.

The macroinvertebrate communities recorded at sites 1 and 2 comprised very high proportions of 'sensitive' taxa and were numerically dominated by three extremely abundant 'sensitive' taxa. The composition of the communities at both sites reflected the partially shaded, cool, fast-flowing nature of the stream located in the upper mid-reaches of the catchment. This resulted in relatively high and very similar MCI and SQMCI<sub>s</sub> scores at both sites which were higher than the predicted scores for each site, based on altitude and distance from the National Park boundary. This was consistent with good preceding physical habitat conditions immediately upstream and downstream of the intake weir indicative of no recent significant impacts of water abstraction during a period of residual flow of about 130 L/s.

At site 3, approximately 3 kilometres downstream of the water intake, the macroinvertebrate community again comprised a high proportion of 'sensitive' taxa which was reflected in the MCI score of 129 units. This MCI score was significantly higher than the predicted scores for altitude and distance from the National Park (Stark and Fowles 2009), and atypically, was higher than at site 1 and site 2. This result did not reflect the typical differences in site location within the catchment or in habitat quality between sites (despite a more intact riparian margin at sites 1 and 2 compared to site 3). The community at site 3 was also dominated by similar 'sensitive' taxa including three very or extremely abundant 'highly sensitive' taxa coincident with minimal periphyton substrate cover, with these taxa indicative of good preceding physicochemical water quality and habitat conditions.

In the current survey, the lowest MCI and SQMCI<sub>s</sub> scores were recorded at site 4. Of the four sites surveyed, site 4 recorded the highest proportion of 'tolerant' taxa. This community was numerically dominated by more 'tolerant taxa' and fewer 'highly and moderately sensitive' taxa. There was a significant (Stark, 1998) decrease in both the MCI and SQMCI<sub>s</sub> scores between sites 3 and 4. This was coincident with a marked increase in periphyton substrate cover at site 4, a probable reflection of the cumulative impacts of increased nutrient inputs to the stream from point source and non-point source discharges and increased water

temperatures in a downstream direction through mid-catchment under moderately low flow, late spring conditions.

The overall MCI score decline of 22 units between sites 1 and 4 over a stream distance of 8.3 km equated to a rate of decline of 2.6 units/km, higher than the predicted rate of 1.6 units/km for the equivalent reach of a National Park sourced stream (Stark and Fowles, 2009), but lower than the rate (4.2 units/km) found by the single, previous (summer) survey in January, 2012 (KS017). The rate of decline between sites 3 and 4 (over a stream length of 5.4 km) of 5.2 units/km was a very significant 4.1 MCI units/km higher than predicted for this equivalent reach indicative of a more marked deterioration in macroinvertebrate community health in these lower mid-reaches of the Mangawheroiti Stream.

These effects may be exacerbated by the reduction in available instream dilution due to the abstraction of higher quality flow upstream by the water supply scheme.

## Summary

Macroinvertebrate sampling was undertaken on 22 November 2012, at four sites in the Mangawheroiti Stream; a control site upstream of the intake weir (1), a primary impact site approximately 40 metres downstream of the intake weir (2), a secondary impact site 3 kilometres downstream of that intake and a tertiary impact site approximately 5.6 kilometres downstream of the intake and 340 metres upstream of the confluence with the Mangawhero Stream. Sampling was performed at all four sites using the 'kick' sampling technique, a standard sampling technique used by the Council. This was undertaken to assess whether the abstraction of water from the Mangawheroiti Stream for the WWWS had had any adverse effects on the macroinvertebrate communities of this stream. Samples were processed to provide number of taxa (richness), MCI and SQMCI<sub>s</sub> scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI<sub>s</sub> takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in with the MCI or the SQMCI<sub>s</sub> between sites indicate the degree of adverse effects (if any) of the activity monitored.

This November 2012 survey did not indicate that the water attraction for the WWWS Mangawheroiti Stream had significantly affected the freshwater macroinvertebrate communities immediately downstream of the abstraction point.

High MCI and SQMCI<sub>s</sub> scores were recorded at the upstream control site (1). These scores were relatively similar to those recorded at site 2, located approximately 40 metres downstream of the water take. Atypically there was no decline in MCI score between sites 2 and 3 and the SQMCI<sub>s</sub> score at site 3 was the highest recorded in the survey due to increased numerical abundances within some 'sensitive' taxa.

The results of this survey showed a significant decline in the macroinvertebrate communities between site 3 and site 4 in particular, where the MCI rate of decline was significantly higher than predicted. This is consistent with a general trend of increasing water temperature and decreasing physicochemical water quality with decreasing altitude

in ringplain streams in the region coincident with point and non-point source discharges. Abstraction of water from the Mangawheroiti Stream may exacerbate the decline in macroinvertebrate 'health' by reducing available dilution of such discharges particularly as cumulative impacts occur in a downstream direction.

## References

- Smith KL, 2012: Biomonitoring of the Mangawheroiti Stream in relation to the Waimate West Water Supply Scheme, January 2012. TRC Internal Report KS017.
- Stark JD, 1985: A macroinvertebrate community index of water quality for stony streams. *Water and Soil Miscellaneous Publication No. 87*.
- Stark JD, 1998: SQMCI: a biotic index for freshwater macroinvertebrate coded abundance data. *New Zealand Journal of Marine and Freshwater Research* 32(1): 55-66.
- Stark JD, 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Institute, Nelson. Cawthron Report No. 472.
- Stark JD, Boothroyd IKG, Harding JS, Maxted JR, Scarsbrook MR, 2001: Protocols for sampling macroinvertebrates in wadeable streams. New Zealand Macroinvertebrate Working Group Report No. 1. Prepared for the Ministry for the Environment. Sustainable Management Fund Project No. 5103. 57p.
- Stark JD and Maxted JR, 2004. Macroinvertebrate community indices for Auckland's soft-bottomed streams and applications to SOE reporting. Prepared for Auckland Regional Council. Cawthron Report No. 970. Cawthron Institute, Nelson. ARC Technical Publication 303. 59p.
- Stark JD and Maxted JR, 2007. A biotic index for New Zealand's soft bottomed streams. *New Zealand Journal of Marine and Freshwater Research* 41(1).
- Stark JD and Maxted JR, 2007a. A user guide for the macroinvertebrate community index. Cawthron Institute, Nelson. Cawthron Report No. 1166.
- Stark JD and Fowles CR, 2009. Relationships between MCI, site altitude, and distance from source Taranaki ring plain streams. Stark Environmental report No. 2009-01
- TRC, 1999: Some statistics from the Taranaki Regional Council database of freshwater macroinvertebrate surveys performed during the period from January 1980 to 31 December 1998. TRC Technical Report 99-17.
- TRC, 2013: Freshwater macroinvertebrate fauna biological monitoring programme Annual SEM Report 2011-2012. Technical Report 2012-18.



To Job Manager, Scott Cowperthwaite  
 From Scientific Officers, Chris Fowles and Bart Jansma  
 Report No CF582  
 Document No 1230469  
 Date 1 August 2013

## Biomonitoring of the Mangawheroiti Stream in relation to the South Taranaki District Council's Waimate West Water Supply Scheme, March 2013

### Introduction

The South Taranaki District Council ('STDC') owns and operates the Waimate West Water Supply Scheme (WWWSS) which involves the abstraction of water from three streams; the Mangawheroiti Stream, the Mangawhero Stream and the Otakeho Stream. This scheme provides water for dairy farms, industry, and domestic use. The main intake for the WWWWSS is on the Mangawheroiti Stream. However, the flow in Mangawheroiti Stream is supplemented by water diverted into it from the Mangawhero Stream upstream of the intake.

Consent 0634-3 authorises the taking of water from the Mangawheroiti Stream for the water supply scheme. This consent contains a Special Condition (8) that requires STDC to ensure that a minimum flow of 32 litres per second (0.032 m<sup>3</sup>/s) is provided at all times immediately downstream of the intake structure.

This biological survey was the second of two programmed for the 2012-2013 monitoring period, the inaugural survey having been performed in January 2012 and the most recent survey undertaken in November 2012. The intention of these surveys was to monitor the health of the macroinvertebrate communities in the Mangawheroiti Stream in relation to any effects of water abstraction by the WWWWSS.

### Methods

This survey was undertaken on 13 March 2013 at four sites on the Mangawheroiti Stream; a control site upstream of the intake weir (1), a primary impact site approximately 40 metres downstream of the intake weir (2), a secondary impact site nearly three kilometres downstream of that intake and a tertiary impact site approximately 8.3 kilometres downstream of the intake and 340 metres upstream of the confluence with the Mangawhero Stream (Figure 1).

**Table 1** Biomonitoring sites in the Mangawheroiti Stream in relation to the WWWWSS

Site	Site code	GPS location	Location	Elevation (m asl)	Distance from NPK boundary (km)
1	MWI000170	E1694422 N5637468	Upstream of the intake weir	340	3.6
2	MWI000174	E1694425 N5637409	Approximately 40 metres downstream of the water intake	340	3.7
3	MWI000330	E1694186 N5635091	Approximately 3 km downstream of the water intake (580 metres upstream of Eltham Road bridge)	270	6.5
4	MWI000490	E1693732 N5631251	Approximately 8.3 km downstream of the water intake (340 metres upstream of confluence with the Mangawhero Stream)	180	11.9

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from all sites. The 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative), of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark *et al.*, 2001).

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark *et al.* 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

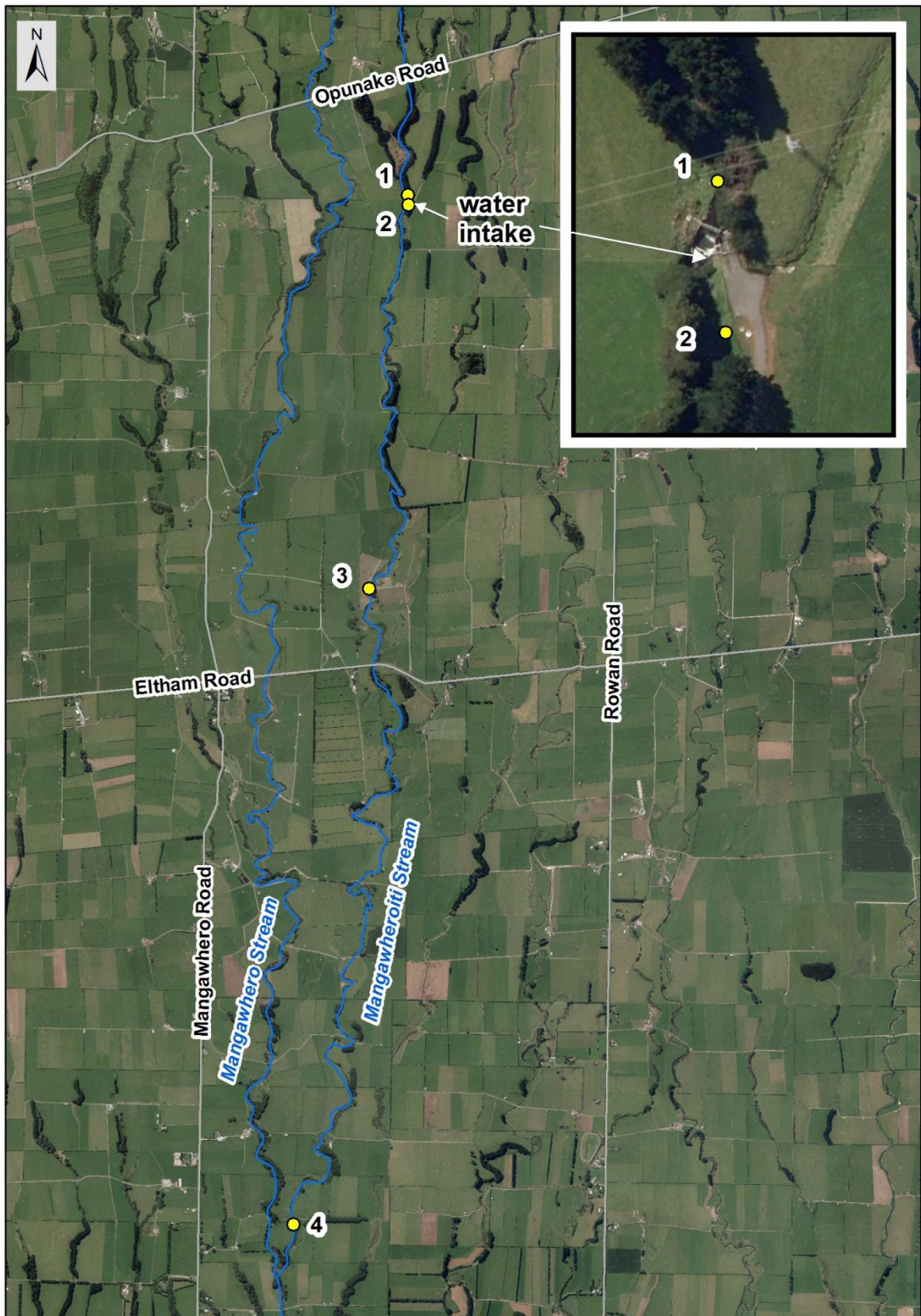
Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams (MCI). Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1 and 0.1 in hard bottomed and soft bottomed streams respectively. The sensitivity scores for certain taxa found in hard bottomed streams have been modified in accordance with Taranaki experience. After extensive use of the MCI, categories were assigned to the sensitivity scores, to clarify their 'relative' sensitivity e.g. taxa that scored between 1 and 4 inclusive are considered tolerant (see Table 3).

By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value (SQMCI<sub>s</sub>) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCI<sub>s</sub> is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower.

## Results

During this March 2013 survey, there was a very low, swift, clear, and uncoloured flow at all sites except the upstream site (1) where there was some cloudiness (possibly due to iron-laden seepage inflows). In the absence of a lengthy flow record for the Mangawheroiti Stream at the time of this survey, the flow data from the neighbouring Kaupokonui Stream indicated that it had been 36 days since a three times median flow and seven times median flow. In the five weeks prior to this survey, the flow in the Mangawheroiti Stream upstream of the intake weir ranged between 150 and 250 L/s (early to late February) prior to a flow augmentation to this resulting in a range between 220 and 180 L/s over the two previous weeks in March. The flow at the time of the survey was about 190 L/s at this recently established hydrological recording site. Water abstraction of approximately 110 L/s at the time of the survey resulted in a residual flow of 80 L/s below the weir. Water temperatures ranged from 11.6°C to 12.0°C at the two sites adjacent to the intake, through 14.2°C (site 3) to 14.9°C at the downstream site (4) at the time of this mid morning to late morning survey.



**Figure 1** Biomonitoring sites related to the WWSS intake on the Mangawheroiti Stream.

Slippery mats but no filamentous algae were recorded at the partially shaded control site (1) upstream of the intake weir on the Mangawheroiti Stream. Patchy moss and leaves were also recorded at this site where the substrate composition predominantly consisted of cobbles with smaller proportions of sand, gravels, and boulders resulting in a moderately stable bed.

At the slightly more open site 2, 40m downstream of the intake weir, thin mats but no filamentous algae were recorded along with patchy moss and leaves. Similar to site 1, the bed substrate at this site primarily consisted of cobbles and gravels, although there was a moderate proportion of sand, fine gravels, and boulders at this site which was reflected in the very stable bed recorded by this survey.

Periphyton growth recorded at site 3 consisted of thin mats and patchy moss and filamentous algae at this open site. The stream bed was composed predominantly of cobbles and there were also smaller quantities of boulders, fine and coarse gravels, sand, and silt recorded at this site by the current survey.

At the partially shaded site 4, upstream of the confluence with the Mangawhero Stream, there were patchy algal mats and moss, but no filamentous algae was present. Cobbles were predominant at this site with some coarse and fine gravels, silt, and sand also present.

### Macroinvertebrate communities

A summary of the results from the previous survey is presented in Table 2 and from the current survey in Table 3 along with predicted MCI scores using established relationships between MCI scores and ringplain stream altitude and distance from the National Park boundary (Stark and Fowles (2009)). Equations generated from these relationships can be used to predict MCI values at a particular location on a stream or river on the ringplain.

**Table 2** Summary of macroinvertebrate taxa numbers, MCI and SQMCI<sub>s</sub> values for the previous surveys performed between January 2012 and November 2012

Site	Site code	No. of surveys	Taxa numbers		MCI values		SQMCI <sub>s</sub> value	
			Range	Median	Range	Median	Range	Median
1	MWIO00170	2	31-34	33	123-132	128	7.3-7.5	7.4
2	MWIO00174	2	35-36	36	122-127	125	7.0-7.3	7.2
3	MWIO00330	2	20-26	23	118-129	124	7.3-8.0	7.7
4	MWIO00490	2	20-24	22	97-101	99	4.7-5.3	5.0

**Table 3** Results of the survey of 13 March 2013 in relation to WWSS, and predicted MCI scores (from Stark and Fowles (2009)).

Site No.	Results			Predicted MCI scores	
	No. of taxa	MCI	SQMCI <sub>s</sub>	Altitude	Distance
1	37	130	7.1	119	117
2	33	125	7.1	119	117
3	28	111	7.5	112	111
4	30	95	4.4	103	104

The macroinvertebrate fauna recorded by the current survey at each of the four sites are presented in Table 4.

**Table 4** Macroinvertebrate fauna recorded at four sites in the Mangawheroiti Stream in relation to the WWWSS water abstraction, 13 March 2013

Taxa List	Site Number	MCI score	1	2	3	4
	Site Code		MWI000170	MWI000174	MWI000330	MWI000490
	Sample Number		FWB13148	FWB13149	FWB13150	FWB13151
PLATYHELMINTHES (FLATWORMS)	<i>Cura</i>	3	-	-	-	R
NEMERTEA	Nemertea	3	-	-	-	A
ANNELIDA (WORMS)	Oligochaeta	1	C	R	C	A
	Lumbricidae	5	-	-	-	R
MOLLUSCA	<i>Potamopyrgus</i>	4	R	C	C	VA
CRUSTACEA	<i>Paranephrops</i>	5	-	-	-	R
EPHEMEROPTERA (MAYFLIES)	<i>Acanthophlebia</i>	9	R	-	-	-
	<i>Ameletopsis</i>	10	R	R	-	-
	<i>Austroclima</i>	7	A	A	A	A
	<i>Coloburiscus</i>	7	XA	XA	XA	A
	<i>Deleatidium</i>	8	VA	XA	XA	A
	<i>Nesameletus</i>	9	VA	VA	XA	R
	<i>Zephlebia group</i>	7	C	R	R	-
	<i>Zelandonia</i>	5	C	R	-	-
PLECOPTERA (STONEFLIES)	<i>Acroperla</i>	5	-	R	-	-
	<i>Austroperla</i>	9	-	R	-	-
	<i>Megaleptoperla</i>	9	A	A	C	-
	<i>Stenoperla</i>	10	R	-	-	-
	<i>Zelandobius</i>	5	C	R	-	-
	<i>Zelandoperla</i>	8	C	C	-	-
COLEOPTERA (BEETLES)	Elmidae	6	VA	VA	VA	VA
	Dytiscidae	5	R	-	-	-
	Hydraenidae	8	A	VA	VA	-
	Ptilodactylidae	8	R	-	-	R
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	A	VA	VA	A
TRICHOPTERA (CADDISFLIES)	<i>Aoteapsyche</i>	4	A	VA	VA	XA
	<i>Costachorema</i>	7	R	R	-	C
	<i>Hydrobiosis</i>	5	C	C	A	C
	<i>Hydrobiosella</i>	9	R	-	-	-
	<i>Neurochorema</i>	6	-	-	R	-
	<i>Orthopsyche</i>	9	R	R	-	-
	<i>Plectrocnemia</i>	8	R	-	-	-
	<i>Psilochorema</i>	6	R	R	-	-
	<i>Beraeoptera</i>	8	A	A	VA	C
	<i>Confluens</i>	5	R	-	-	-
	<i>Helicopsyche</i>	10	R	R	R	-
	<i>Olinga</i>	9	A	C	C	-
	<i>Oxyethira</i>	2	-	-	R	C
	<i>Pycnocentria</i>	7	-	R	-	-
	<i>Pycnocentroides</i>	5	R	-	A	R
<i>Tripletides</i>	5	R	-	-	-	
DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	A	VA	A	A
	Eriopterini	5	R	R	R	-
	<i>Corynoneura</i>	3	-	-	-	R
	<i>Maoridiamesa</i>	3	-	-	-	C
	Orthoclaadiinae	2	R	R	C	C
	<i>Polypedilum</i>	3	C	R	R	-
	Tanypodinae	5	-	R	R	-
	Tanytarsini	3	-	-	R	A
	Empididae	3	R	R	R	R
	Ephydriidae	4	-	-	-	R
	Muscidae	3	-	-	-	R
	<i>Austrosimulium</i>	3	-	-	C	R
	Tanyderidae	4	R	R	R	R
	ACARINA (MITES)	Acarina	5	-	R	-
No of taxa			37	33	28	30
MCI			130	125	111	95
SQMCIs			7.1	7.1	7.5	4.4
EPT (taxa)			24	20	13	9
%EPT (taxa)			65	61	46	30
'Tolerant' taxa		'Moderately sensitive' taxa		'Highly sensitive' taxa		

R = Rare    C = Common    A = Abundant    VA = Very Abundant    XA = Extremely Abundant

### **Site 1 (upstream of intake weir)**

A very high richness (37 taxa) was recorded, well above the median number (23 taxa) and also above the maximum (35 taxa) found by more than 165 previous surveys of National Park-sourced streams at 'control' sites between 300 and 350 m asl (TRC, 1999 (updated 2012)). This richness was up to three taxa more than found by the two previous surveys performed at this site. The community was comprised of a very high proportion (81%) of 'sensitive' taxa, fourteen of which were 'highly sensitive' taxa. The community was characterised by six 'highly sensitive' taxa [mayflies (very abundant *Deleatidium* and *Nesameletus*), stonefly (*Megaleptoperla*), hydraenid beetles, and cased-caddisflies (*Olinga* and *Beraeoptera*)]; five 'moderately sensitive' taxa [mayflies (*Austroclima* and extremely abundant *Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), and crane fly (*Aphrophila*)]; and one 'tolerant' taxon [net-building caddisfly (*Aoteapsyche*)]. The numerical dominance by 'sensitive' taxa (particularly two 'highly sensitive' and one 'moderately sensitive' taxa), resulted in the high SQMCI<sub>s</sub> value of 7.1 units, within 0.2 to 0.4 units of the values recorded by the two previous surveys (Table 2). This was indicative of good physical habitat and preceding physicochemical water quality, typical of the upper mid-reaches of ringplain streams.

The high proportion of 'sensitive' taxa comprising the community resulted in the relatively high MCI score (130 units) which was within the range recorded by the two previous surveys but a significant (Stark, 1998) 14 units above the median MCI score recorded by more than 165 surveys of 'control' sites in National Park-sourced rivers and streams between 300 and 350 m asl (TRC, 1999 (updated 2012)). It was also 11 and 13 units above predicted (Stark & Fowles, 2009) altitude and distance scores respectively (Table 3) and categorised this site as having 'very good' generic stream health and 'well above expected' predictive health (TRC, 2013) for a site in the upper mid-reaches of a ringplain stream.

### **Site 2 (40 m downstream of intake weir)**

A high richness (33 taxa) was found at this site, four taxa fewer than at the site upstream of the weir, and within two taxa of the maximum richness recorded by more than 165 previous surveys at similar 'control' sites (see above and TRC, 1999 (updated, 2012)). This was two to three taxa fewer than the richnesses recorded by the two previous surveys at this site (Table 2) with a community composition mainly comprised of 'sensitive' taxa (79% of richness), 11 of which were 'highly sensitive' taxa. The community was characterised by 11 of the same 12 dominant taxa as at the upstream 'control' site, the exception being one 'highly sensitive' taxon [horn-cased caddisfly (*Olinga*)]. The continued numerical dominance by 'sensitive' taxa (three 'highly sensitive' and four 'moderately sensitive' taxa in particular) resulted in a high SQMCI<sub>s</sub> value of 7.1 units, within the range of scores recorded by the previous two surveys (Table 2) and equal with the score at the upstream site (Table 4). This was also indicative of good physical habitat and preceding physicochemical water quality, typical of the upper, mid-reaches of ringplain streams, and coincidental with minimal periphyton substrate cover.

The high proportion of 'sensitive' taxa in the composition of the community was reflected in the relatively high MCI score (125 units), an insignificant five units below that found at the 'control' site upstream of the intake weir, equal with the median score recorded by the two previous surveys, but nine units above the median score recorded by more than 165 previous surveys at similar sites (see above and TRC, 1999 (updated, 2012)). The score was also six and eight units above predicted altitude and distance scores respectively (Stark and Fowles, 2009; Table 3). This categorised the site as having 'very good' generic stream health and 'well above expected' predictive health (TRC, 2013) for a site in the upper mid reaches of a ringplain stream.

### **Site 3 (approximately 3 km downstream of the intake)**

Taxa richness (28) was relatively high for a site in the mid-reaches of a ringplain stream and two taxa above the median richness found to date by 158 surveys of 'control' sites in National Park-sourced streams at altitudes between 250 and 299 m asl (TRC, 1999 (updated, 2012)). This richness was two taxa more than the higher richness of the two previous surveys at this site (Table 2). The community comprised a high proportion (64%) of 'sensitive' taxa, seven of which were 'highly sensitive' taxa. It was characterised by all but one of the same 'highly sensitive' and 'moderately sensitive' taxa also dominant at site 2 (3 km upstream), plus two additional 'moderately sensitive' taxa [stony-cased caddisfly (*Pycnocentroides*) and free-living caddisfly (*Hydrobiosis*)], and the same 'tolerant' taxon. This continued numerical dominance by 'sensitive' taxa resulted in a high SQMCI<sub>s</sub> value of 7.5 units which was within the range found by the two previous surveys (Table 2) and 0.4 unit higher than recorded at the upstream 'control' site (1). This was an indication of relatively good physical habitat and preceding physicochemical water quality (under conditions of about 68% reduction in upstream flow), and better than typical of the mid-reaches of ringplain streams, coincidental with moderate periphyton substrate cover.

The relatively high proportion of 'sensitive' taxa comprising this community resulted in a moderate MCI value of 111 units, which was typically lower (by 19 units) than the score upstream of the intake weir but also 7 to 18 units lower than recorded by the two previous surveys at this site. This current score was also an insignificant 4 units below the median score recorded by 158 previous surveys at similar sites (see above and TRC, 1999 (updated, 2012)) and within one unit of predicted altitude and distance from the National Park boundary scores respectively (Stark and Fowles, 2009; Table 2). This score characterised the site as having 'good' generic stream health and 'better than expected' predictive health (TRC, 2013) for a site in the mid-reaches of a ringplain stream.

### **Site 4 (approximately 8 km downstream of the intake weir)**

The relatively high richness (30 taxa) at this site was ten taxa more than the median taxa number found by 338 previous surveys of National Park-sourced streams at 'control' sites between 155 and 199 m asl (TRC, 1999 (updated, 2012)), and was six to ten taxa more than found by the two previous surveys at this site (Table 2). The community comprised a higher proportion (50%) of 'tolerant' taxa than any of the three upstream sites' communities, and fewer (four) 'highly sensitive' taxa. It was characterised by only one 'highly sensitive' taxon [mayfly (*Deleatidium*)]; five 'moderately sensitive' taxa [mayflies (*Austroclima* and *Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), and crane fly (*Aphrophila*)]; and five 'tolerant' taxa [oligochaete and nemertean worms, snail (*Potamopyrgus*), net-building caddisfly (*Aoteapsyche*), and tanytarsid midges]. Several significant differences in individual taxon abundances were found between adjacent sites (3 and 4) and principally involved decreasing numbers within 'highly sensitive' (six) and 'moderately sensitive' (two) taxa and increasing numbers within four 'tolerant' taxa. The numerical dominance shared between one 'sensitive' and two 'tolerant' taxa (particularly the net-building caddisfly) was responsible for the moderate SQMCI<sub>s</sub> value of 4.4 units which was from 0.3 to 0.9 unit lower than found by the two previous surveys at this site, and significantly lower (3.1 units) than the score at the nearest upstream site, 3 (Table 4). This value was coincident with an increase in physical streambed periphyton cover (more widespread mats) although there was a decrease in filamentous algal cover, but the moderate percentage of 'sensitive' taxa was indicative of relatively good preceding physicochemical water quality conditions during the dry late summer period preceding this survey.

The even balance between 'tolerant' and 'sensitive' taxa comprising this community resulted in a moderate MCI score of 95 units, a significant 16 units (Stark, 1998) lower than the score at site 3 (5.4 km upstream), and two to six units lower than the scores recorded by the two

previous surveys at this site (Table 2). The current score was 12 units below the median score recorded by more than 330 previous surveys of 'control' sites in National Park-sourced streams situated between 155 and 199 m asl (TRC, 1999 (updated, 2012)) and eight to nine units lower than predicted altitude and distance from the National Park boundary values (Stark and Fowles, 2009 (Table 3)). This characterised the site as having 'fair' generic stream health and 'expected' predictive health (TRC, 2013) for a site in the mid reaches of a ringplain stream.

## Discussion and conclusions

The abstraction of surface water particularly for extended periods of time may result in significant adverse effects on the macroinvertebrate communities living within a waterbody by altering stream temperature, flow conditions, wetted habitat, periphyton growth, and certain aspects of physicochemical water quality. This March 2013 survey was undertaken to monitor whether the operation of the WWWS was having an effect on the macroinvertebrate communities in the Mangawheroiti Stream downstream of the water take under autumn very low flow conditions after a particularly dry late summer period.

The macroinvertebrate communities recorded at sites 1 and 2 comprised very high proportions of 'sensitive' taxa and were numerically dominated by four very or extremely abundant 'sensitive' taxa. The composition of the communities at both sites reflected the partially shaded, relatively cool, fast-flowing nature of the stream located in the upper mid-reaches of the catchment. This resulted in relatively high and very similar MCI and SQMCI<sub>s</sub> scores at both sites which were higher than the predicted scores for each site, based on altitude and distance from the National Park boundary. This was consistent with good preceding physical habitat conditions immediately upstream and downstream of the intake weir indicative of no recent significant impacts of water abstraction during a period of residual flow with a minimum of about 50 L/sec and an actual residual flow of about 80 L/sec at the time of the survey.

At site 3, approximately 3 kilometres downstream of the water intake, the macroinvertebrate community again comprised a high proportion of 'sensitive' taxa which was reflected in the MCI score of 111 units. This MCI score was very similar to the predicted scores for altitude and distance from the National Park (Stark and Fowles 2009), and typically, was lower than at site 1 and site 2. This result reflected the differences in site location within the catchment and in habitat quality between sites (eg. a more intact riparian margin at sites 1 and 2 compared to site 3). The community at site 3 was dominated by relatively similar 'sensitive' taxa including three very or extremely abundant 'highly sensitive' taxa although coincident with some increase in filamentous algal periphyton substrate cover, with these taxa indicative of relatively good preceding physicochemical water quality and habitat conditions.

In the current survey, the lowest MCI and SQMCI<sub>s</sub> scores were recorded at site 4. Of the four sites surveyed, site 4 recorded the highest proportion of 'tolerant' taxa. This community was numerically dominated by more 'tolerant' taxa and fewer 'highly and moderately sensitive' taxa. There was a significant (Stark, 1998) decrease in both the MCI and SQMCI<sub>s</sub> scores between sites 3 and 4. This was coincident with a marked increase in algal mats periphyton substrate cover at site 4, a probable reflection of the cumulative impacts of increased nutrient inputs to the stream from point source and non-point source discharges and increased water temperatures in a downstream direction through the mid-catchment under very low flow, early autumn conditions.



The overall MCI score decline of 35 units between sites 1 and 4 over a stream distance of 8.3 km equated to a rate of decline of 4.2 units/km, which was markedly higher than the predicted rate of 1.6 units/km for the equivalent reach of a National Park sourced stream (Stark and Fowles, 2009), and the rate (2.6 units/km) found by the previous spring survey (in November 2012), but equal with the rate (4.2 units/km) found by the previous (summer) survey in January, 2012. The rate of decline between sites 3 and 4 (over a stream length of 5.4 km) of 3.0 units/km was a significant 1.9 MCI units/km higher than predicted for this equivalent reach indicative of a more marked deterioration in macroinvertebrate community health in these lower mid-reaches of the Mangawheroiti Stream.

These effects may have been exacerbated by a reduction in available instream dilution of any point source discharges due to the abstraction of higher quality flow upstream by the water supply scheme.

## Summary

Macroinvertebrate sampling was undertaken on 13 March 2013, at four sites in the Mangawheroiti Stream; a control site upstream of the intake weir (1), a primary impact site approximately 40 metres downstream of the intake weir (2), a secondary impact site 3 kilometres downstream of that intake and a tertiary impact site approximately 5.6 kilometres downstream of the intake and 340 metres upstream of the confluence with the Mangawhero Stream. Sampling was performed at all four sites using the 'kick' sampling technique, a standard sampling technique used by the Council. This was undertaken to assess whether the abstraction of water from the Mangawheroiti Stream for the WWSS had had any adverse effects on the macroinvertebrate communities of this stream. Samples were processed to provide number of taxa (richness), MCI and SQMCI<sub>s</sub> scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI<sub>s</sub> takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in the MCI or the SQMCI<sub>s</sub> between sites indicate the degree of adverse effects (if any) of the activity monitored.

This early autumn survey did not indicate that the water abstraction for the WWSS from the Mangawheroiti Stream had significantly affected the freshwater macroinvertebrate communities immediately downstream of the abstraction point.

High MCI and SQMCI<sub>s</sub> scores were recorded at the upstream control site (1). These scores were relatively similar to those recorded at site 2, located approximately 40 metres downstream of the water take. Typically there was a decline in MCI score between sites 2 and 3 although the SQMCI<sub>s</sub> score at site 3 was the highest recorded in the survey due to increased numerical abundances within some 'sensitive' taxa.

The results of this survey showed a significant decline in the macroinvertebrate communities between sites 1 and 4, and sites 3 and 4, where the MCI rates of decline were significantly higher than predicted. This is consistent with a general trend of increasing water temperature and decreasing physicochemical water quality with decreasing altitude in ringplain streams in the region coincident with point and non-point source discharges. Abstraction of water from the Mangawheroiti Stream may exacerbate the decline in macroinvertebrate 'health' by reducing available dilution of such discharges particularly as cumulative impacts occur in a downstream direction.

## References

- Fowles CR and Smith KL, 2012: Biomonitoring of the Mangawheroiti Stream in relation to the Waimate West Water Supply Scheme, November 2012. TRC Internal Report CF580.
- Smith KL, 2012: Biomonitoring of the Mangawheroiti Stream in relation to the Waimate West Water Supply Scheme, January 2012. TRC Internal Report KS017.
- Stark JD, 1985: A macroinvertebrate community index of water quality for stony streams. *Water and Soil Miscellaneous Publication No. 87*.
- Stark JD, 1998: SQMCI: a biotic index for freshwater macroinvertebrate coded abundance data. *New Zealand Journal of Marine and Freshwater Research* 32(1): 55-66.
- Stark JD, 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Institute, Nelson. Cawthron Report No. 472.
- Stark JD, Boothroyd IKG, Harding JS, Maxted JR, Scarsbrook MR, 2001: Protocols for sampling macroinvertebrates in wadeable streams. New Zealand Macroinvertebrate Working Group Report No. 1. Prepared for the Ministry for the Environment. Sustainable Management Fund Project No. 5103. 57p.
- Stark JD and Maxted JR, 2004. Macroinvertebrate community indices for Auckland's soft-bottomed streams and applications to SOE reporting. Prepared for Auckland Regional Council. Cawthron Report No. 970. Cawthron Institute, Nelson. ARC Technical Publication 303. 59p.
- Stark JD and Maxted JR, 2007. A biotic index for New Zealand's soft bottomed streams. *New Zealand Journal of Marine and Freshwater Research* 41(1).
- Stark JD and Maxted JR, 2007a. A user guide for the macroinvertebrate community index. Cawthron Institute, Nelson. Cawthron Report No. 1166.
- Stark JD and Fowles CR, 2009. Relationships between MCI, site altitude, and distance from source Taranaki ring plain streams. Stark Environmental report No. 2009-01
- TRC, 1999: Some statistics from the Taranaki Regional Council database of freshwater macroinvertebrate surveys performed during the period from January 1980 to 31 December 1998. TRC Technical Report 99-17.
- TRC, 2013: Freshwater macroinvertebrate fauna biological monitoring programme Annual SEM Report 2011-2012. Technical Report 2012-18.

To Job Manager, S Cowperthwaite  
From Freshwater Biologist, B Jansma  
File 03-02-005-15/01; 0933;  
Report No BJ204  
Doc No 1242851  
Date 28 August 2013

## **Biomonitoring of the Kapuni Stream in relation to the Kapuni Water Treatment Plant, March 2013**

### **Introduction**

This survey of two sites in the Kapuni Stream was conducted to determine if there had been adverse effects related to the discharge of filter backwash and settling tank sediment from the Kapuni Water Treatment Plant. The survey fulfilled the biological monitoring requirements for this STDC consent monitoring programme in the 2012-2013 monitoring year. Results from surveys performed since the 2000-01 monitoring year are detailed in the references.

This survey was the fourth to follow commissioning of the Kapuni Water Treatment Plant. The new discharge point is now located just upstream of the Skeet Road bridge, and the sampling sites have consequently been changed, to enable monitoring of this new location.

At the time of the initial survey, no discharge of filter backwash and settling tank sediment had yet occurred from this new discharge point, and therefore that survey acted as a baseline survey, with which future surveys can be compared. The current survey is the third survey undertaken since the plant became fully operational.

### **Methods**

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from two established sites in the Kapuni Stream in relation to the Kapuni Water Treatment Plant on 13 March 2013. This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001). The sites are described in Table 1 and Figure 1.

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al. 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

**Table 1** Biomonitoring sites in the Kapuni Stream in relation to the Kapuni Water Treatment Plant

Site No.	Site Code	Location
1	KPN000300	Approximately 30 metres upstream of Skeet Rd, upstream of the Kapuni water treatment plant discharge.
2	KPN000301	Approximately 30m downstream of Skeet Rd & 50m downstream of Kapuni water treatment plant discharge



**Figure 1** Aerial photo showing the location of the old and new water treatment facilities, and relevant sampling sites.

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value (SQMCI<sub>s</sub>) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark, 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCI<sub>s</sub> is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower.

## Results and discussion

At the time of this afternoon survey there was a clear, uncoloured flow in the Kapuni Stream and the water temperature ranged from 18.7 to 19.2°C. The survey was performed during a period of very low flow, 36 days after a fresh in excess of three times median flow and 37 days after a fresh in excess of 7 times median flow. The bed of the stream at both sites comprised predominantly cobbles, coarse gravel and boulders, with some fine gravel and with sand. Both sites had only a thin film of algae on the substrate and some patchy filamentous growths, and site 1 enjoyed partial shading from riparian vegetation, while little such shading present at site 2.

It was noted during the survey that a backwash discharge was occurring, and that this discharge was causing notable discolouration downstream (Photo 1). Although this discolouration was not observed at site 2, it was evident that the discharge only begun once that survey had been completed, and that the discolouration would have extended at least as far as site 2.



**Photo 1** The backwash discharge entering the Kapuni Stream from the left, 13 March 2013

## Macroinvertebrate communities

Previous biological surveys in the Kapuni Stream have generally recorded macroinvertebrate communities that would be expected in clean, mid-catchment ringplain streams. The communities have had moderate to relatively good numbers of taxa and moderately high MCI values. The results of previous surveys are summarised in Table 2, together with current results and for site 1 are illustrated in Figure 2. The full results of the current survey are presented in Table 3.

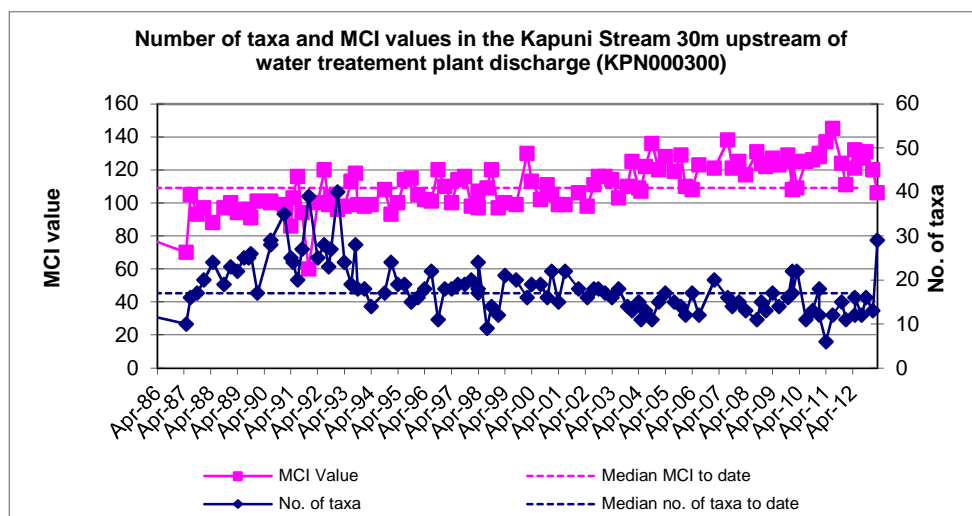
### Site 1 - upstream of WTP discharge

This site has an extensive historical dataset, as a result of monitoring undertaken in relation to the Vector Kapuni and Ballance Agri-Nutrients Kapuni Ltd sites, located upstream. This dataset extends as far back as October 1982 and can also be used as a reference for results at site 2 (KPN000301), until a suitable data record has been established here. It should be noted however, that the monitoring undertaken in relation to the Vector Kapuni and Ballance Agri-Nutrients Kapuni Ltd sites is done so using slightly different methodology, which has the potential to produce lower taxa richness and higher MCI scores.

**Table 2** Numbers of taxa and MCI values recorded in previous surveys performed in the Kapuni Stream in relation to the Kapuni WTP, together with current results

Site	Number of previous surveys	Numbers of taxa			MCI values		
		Median	Range	Current	Median	Range	Current
1	115	17	6-40	29	109	60-145	106
2	3	22	17-23	25	114	110-116	110

The macroinvertebrate community at site 1 (upstream of the water treatment plant) had a high richness of 29 taxa which significantly higher than the median richness of all surveys conducted at this site to date (Table 2), being the fourth highest on record, and the highest since January 1993 (Figure 2). Seven 'highly sensitive' taxa were found, indicative of generally high preceding physicochemical water quality conditions and good physical habitat. The faunal community was characterised by two of these 'highly sensitive' taxa ((extra abundant mayfly (*Deleatidium*) and abundant *Nesameletus* mayfly); two 'moderately sensitive' taxa (elmid beetles and *Aphrophila* crane fly); and three 'tolerant' taxa (oligochaete worms, net-building caddisfly (*Aoteapsyche*) and orthoclad midge larvae).



**Figure 2** Numbers of taxa and MCI values in the Kapuni Stream upstream of Kapuni WTP

The moderate proportion of 'sensitive' taxa (59% of taxa numbers) comprising this community was reflected in the MCI score of 106 units, which was similar to the median, (Stark, 1998) but lower than all previous surveys undertaken since July 2003 (Figure 2, Table 2). However, this score was higher than the predicted score for this site (99 units), 19.1 km downstream of the National Park boundary (Stark and Fowles, 2009), although not significantly (Stark, 1998).

**Table 3** Macroinvertebrate fauna of the Kapuni Stream in relation STDC Kapuni WTP sampled on 13 March 2013

Taxa List	Site Number	MCI score	1	2
	Site Code		KPN000300	KPN000301
	Sample Number		FWB13152	FWB13153
<b>ANNELIDA (WORMS)</b>	Oligochaeta	1	A	A
<b>MOLLUSCA</b>	<i>Potamopyrgus</i>	4	R	C
<b>EPHEMEROPTERA (MAYFLIES)</b>	<i>Austroclima</i>	7	R	C
	<i>Coloburiscus</i>	7	-	R
	<i>Deleatidium</i>	8	XA	XA
	<i>Nesameletus</i>	9	A	A
<b>PLECOPTERA (STONEFLIES)</b>	<i>Zelandoperla</i>	8	R	-
<b>COLEOPTERA (BEETLES)</b>	Elmidae	6	VA	VA
	Hydraenidae	8	R	R
<b>MEGALOPTERA (DOBSONFLIES)</b>	<i>Archichauliodes</i>	7	C	A
<b>TRICHOPTERA (CADDISFLIES)</b>	<i>Aoteapsyche</i>	4	VA	VA
	<i>Costachorema</i>	7	C	C
	<i>Hydrobiosis</i>	5	C	A
	<i>Plectrocnemia</i>	8	R	R
	<i>Psilochorema</i>	6	R	C
	<i>Beraeoptera</i>	8	C	A
	<i>Olinga</i>	9	C	R
	<i>Pycnocentria</i>	7	C	-
	<i>Pycnocentrodes</i>	5	C	A
	<b>DIPTERA (TRUE FLIES)</b>	<i>Aphrophila</i>	5	A
Eriopterini		5	R	C
<i>Chironomus</i>		1	R	-
<i>Maoridiamesa</i>		3	C	-
Orthoclaadiinae		2	A	C
<i>Polypedilum</i>		3	R	R
Tanytarsini		3	R	R
Ephydriidae		4	R	R
Muscidae		3	R	-
<i>Austrosimulium</i>		3	R	R
Tanyderidae		4	R	R
<b>No of taxa</b>			29	25
<b>MCI</b>			106	110
<b>SQMCI</b>			6.8	6.8
<b>EPT (taxa)</b>			13	12
<b>%EPT (taxa)</b>			45	48
<b>'Tolerant' taxa</b>		<b>'Moderately sensitive' taxa</b>		<b>'Highly sensitive' taxa</b>

R = Rare    C = Common    A = Abundant    VA = Very Abundant    XA = Extremely Abundant

## Site 2 - downstream of WTP

Taxa richness at site 2, 30m downstream of the water treatment plant discharge, was 25 taxa, slightly lower than that recorded at site 1 (Table 2). The difference in community composition between sites was relatively insignificant as in all but two instances it was due to the presence/absence of taxa found only as rarities (less than 5 individuals per taxon) at the upstream site when they were absent/present downstream. Six 'highly sensitive' taxa were present, with the community characterised by the same taxa as those dominant at site 1 with the exception of orthoclad midge larvae, and the addition of one highly sensitive caddisfly (*Beraeoptera*) and three moderately sensitive taxa (dobson fly larvae (*Archichauliodes*), stony cased caddisfly (*Pycnocentroides*) and free swimming caddisfly (*Hydrobiosis*) (Table 3). Due to only relatively subtle changes to community composition, the MCI score at site 2 (110 units) was only four units higher than the score recorded at site 1 upstream, although this was not a statistically significant result (Stark, 1998). This score was similar to the median of past scores from KPN00300 and similar to that recorded at this site in the previous two surveys. In addition, when the nature of the changes is considered, it is not considered to be indicative of impacts from the water treatment plant discharge. Because of the proximity of KPN00300 to this site, the historical data for this site can be used for comparison at this site, which was only sampled for the fourth time in this survey.

Only two significant changes in individual taxon abundance was recorded between sites, being a reduction in the 'moderately sensitive' caddisfly *Pycnocentria* and in the 'tolerant' midge *Maoridiamesa*. The relative similarity in dominant taxa at the two sites was reflected in the SQMCI<sub>s</sub> scores which were identical (Table 3).

## Summary and conclusions

The Council's standard 'kick-sampling' technique was used on 13 March 2013 at two sites to collect streambed macroinvertebrates from the Kapuni Stream to determine if there had been any adverse effects on the macroinvertebrate community of the stream from Kapuni water treatment plant backwash discharges. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI<sub>s</sub> scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI<sub>s</sub> takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring. Significant differences in either the MCI or the SQMCI<sub>s</sub> between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This survey was the third to follow full commissioning of the Kapuni Water Treatment Plant. The new discharge point is now located just upstream of the Skeet Road bridge, and the sampling sites were consequently changed, to enable monitoring of this new location. Site 1 has an extensive historical dataset, as a result of monitoring undertaken in relation to the Vector Kapuni and Ballance Agri-Nutrients Kapuni Ltd sites, located upstream. This dataset can also be used as a reference for site 2 (KPN00301), until a suitable data record has been established here. It should be noted however, that the monitoring undertaken in relation to the Vector Kapuni and Ballance Agri-Nutrients Kapuni Ltd sites is done so using slightly different methodology, which has the potential to produce lower taxa richness and higher MCI scores.

This late summer macroinvertebrate survey indicated that there were only relatively subtle differences between site 1, upstream of the discharge point, and site 2, downstream of the discharge point. There is no evidence to suggest that the discharge of filter backwash and



settling tank sediment had resulted in an impact on the macroinvertebrate communities of the Kapuni Stream. This is supported by the MCI score recorded downstream of the discharge being similar to the median score for the upstream site, and similar to that recorded during the previous two surveys.

The macroinvertebrate communities of the Kapuni Stream contained significant proportions of 'sensitive' taxa at both sites and the communities were generally dominated by 'sensitive' taxa. Taxonomic richness (number of taxa) was very high at the control site 1 and decreased slightly at site 2 downstream of the discharge, although there were some changes in the presence/absence of a few taxa found as rarities (less than 5 individuals). Both sites recorded average MCI scores. An insignificant change in the MCI value between sites was a result of some subtle differences in taxa presence/absence. The SQMCI<sub>s</sub> values were identical between sites, reflective of the similarity in dominant taxa.

## References

- Colgan BG, 2003: Biomonitoring of the Kapuni Stream, upstream and downstream of the Hawera Water Treatment Plant, April 2003. TRC report BC009.
- Dunning KJ, 2001: Biomonitoring of the Kapuni Stream, upstream and downstream of the Hawera Water Treatment Plant, April 2001. TRC report KD68.
- Dunning KJ, 2002: Biomonitoring of the Kapuni Stream, upstream and downstream of the Hawera Water Treatment Plant, March 2002. TRC report KD118.
- Fowles CR and Hope KJ, 2005: Biomonitoring of the Kapuni Stream, upstream and downstream of the Hawera Water Treatment Plant, March 2005. TRC report CF386.
- Fowles CR and Moore SC, 2004: Biomonitoring of the Kapuni Stream, upstream and downstream of the Hawera Water Treatment Plant, March 2004. TRC report CF316.
- Fowles CR and Jansma B, 2008: Biomonitoring of the Kapuni Stream in relation to the Hawera Water Treatment Plant, February 2008. TRC report CF454.
- Hope K J, 2006: Biomonitoring of the Kapuni Stream, upstream and downstream of the Hawera Water Treatment Plant, February 2006. TRC report KH084.
- Jansma B, 2009: Biomonitoring of the Kapuni Stream in relation to the Hawera Water Treatment Plant, January 2009. TRC report BJ076.
- Jansma B, 2010: Biomonitoring of the Kapuni Stream in relation to the Kapuni Water Treatment Plant, January 2010. TRC report BJ114.
- Jansma B, 2011: Biomonitoring of the Kapuni Stream in relation to the Kapuni Water Treatment Plant, January 2011. TRC report BJ147.
- Jansma B, 2013: Biomonitoring of the Kapuni Stream in relation to the Kapuni Water Treatment Plant, May 2012. TRC report BJ186.
- McWilliam H, 2000: Biomonitoring of the Kapuni Stream, in relation to the Hawera Water Treatment Plant, March 2000. TRC report HM216.

Stark JD, 1985: A macroinvertebrate community index of water quality for stony streams. *Water and Soil Miscellaneous Publication No. 87.*

Stark JD, 1998: SQMCI: a biotic index for freshwater macroinvertebrate coded abundance data. *New Zealand Journal of Marine and Freshwater Research* 32(1): 55-66.

Stark JD, 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Institute, Nelson. Cawthron Report No. 472.

Stark JD, Boothroyd IKG, Harding JS, Maxted JR, Scarsbrook MR, 2001: Protocols for sampling macroinvertebrates in wadeable streams. New Zealand Macroinvertebrate Working Group Report No. 1. Prepared for the Ministry for the Environment. Sustainable Management Fund Project No. 5103. 57p.

Stark JD and Fowles CR, 2009: Relationships between MCI, site altitude, and distance from source for Taranaki ring plain stream. Prepared for Taranaki Regional Council. Stark Environmental Report No. 2009-01. 47p.

Taranaki Regional Council, 1999: Some statistics from the Taranaki Regional Council database (FWB) of freshwater macroinvertebrates surveys performed during the period from January 1980 to 31 December 1998. (State of the Environment Monitoring Reference Report). Technical Report 99-17

## Memorandum

**To** Scott Cowperthwaite, Job Manager  
**From** Bart Jansma, Scientific Officer – Freshwater Biology  
**Document No.** 1236607  
**Report No.** BJ201  
**Date** 14 August 2013

### **Fish survey conducted in the Oaonui Stream in relation to a STDC water supply weir, June 2013**

#### **Introduction**

South Taranaki District Council (STDC) hold resource consents in relation to several rural water supply schemes. The monitoring programmes for these schemes include fish monitoring of a selection of the weirs each year. The programme for the 2012-2013 monitoring period included monitoring of the Oaonui Stream weir. The consent relating to the Oaonui Water Supply Scheme is as follows:

*5453 To erect, place, use and maintain a water intake structure on the bed of the Oaonui Stream for water abstraction purposes*

Special conditions under resource consents 5453 require that the water intake weir structure does not obstruct fish passage, and that the consent holder shall develop a monitoring programme to determine the adequacy of fish passage. The purpose of this monitoring programme is to assess compliance with said conditions.

The weir associated with the Oaonui Water Supply scheme is 1.6 metres high. A fish pass was installed on this weir in April 2002. Prior to the installation of the fish pass, the 1.6 metre high weir presented a barrier to all except the excellent climbing species of native fish.

The fish pass was designed and installed by the consent holder in conjunction with supervision and advice from the Taranaki Regional Council. The pass is designed for the passage of native fish (trout passage was not considered as the stream is not a significant trout fishery, and this also made the pass easier to design and install). Fish and Game Taranaki were also consulted to gain their approval to confine the fish pass to a native pass only.

Several fish surveys have previously been conducted in relation to the Oaonui Water Supply weir, using two survey methods – night spotting and electric fishing. Both methods have their advantages and disadvantages for determining fish populations. When used together these methods can provide comprehensive fish community data. The results from surveys performed previously are discussed in various reports listed in the references in this report.



**Photo 1** Oaonui Water Supply weir post installation (April 2002) of new fish pass and repairs to splash pad



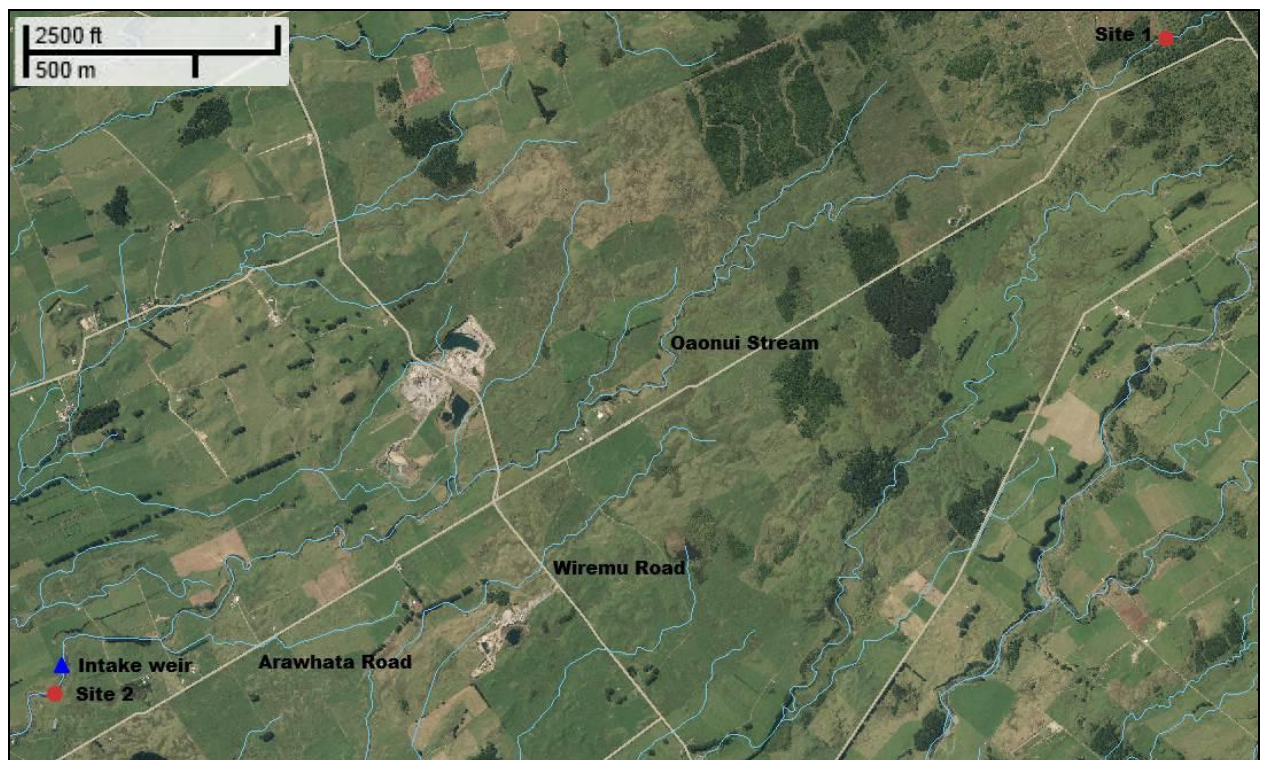
**Photo 2** The operating fish pass (April 2002) at the Oaonui Water Supply weir

## Methods

In this survey two sites were sampled, one site upstream of the weir and one site downstream of the weir, using the night spotlighting method. This method involves the use of hand held spotlights powered by 12 amp hour batteries, with observed fish captured using handnets where possible. All fish observed and/or captured were counted and identified where possible. In general a spotlighting survey will survey a larger area of stream than electric fishing. In this case, 92 meters of stream length was surveyed at site 1 (upstream of the weir), and 32 meters of stream length was surveyed at site 2 (downstream of the weir). Details of the sites surveyed are given in Table 1 and the location of sites surveyed in relation to the weir and fish pass are shown in Figure 1. A small area upstream of the weir was also checked, but not to a standardised method.

**Table 1** Location of sites surveyed for fish in relation to the Oaonui water supply weir

Site	Site code	Description	Area surveyed (m <sup>2</sup> )	Altitude (m)	Distance Inland from sea (km)
1	OAN000170	Just below the national park boundary	506	380	23.2
2	OAN000280	Immediately downstream of the water supply weir	224	140	12.9



**Figure 1** Location of water supply weir and sites surveyed in the current survey

## Results

The results of the survey conducted in the Oaonui Stream on 30 June 2013 are presented in Table 2. Fish species recorded in previous surveys at these sites are also included in Table 2 for comparison.

**Table 2** Fish species recorded in the Oaonui Stream upstream and downstream of the water supply weir together with results of past surveys

Fish species recorded	OAN000280 (D/S)	OAN000170 (U/S)	Previously recorded downstream	Previously recorded upstream
Longfin eel			✓	✓
Shortfin eel			✓	✓
Torrentfish			✓	✓
Giant kokopu			✓	
Shortjaw kokopu				✓
Lamprey				✓
Inanga			✓	✓
Smelt			✓	
Redfin bully	1	>25	✓	✓
Common bully			✓	✓
UID bully				
UID eel	1			
Shrimp	2		✓	✓
Freshwater crayfish			✓	✓
<b>Total abundance of fish</b>	<b>2</b>	<b>&gt;25</b>	<b>-</b>	<b>-</b>
<b>Total no. of fish species</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>8</b>

In addition to the results presented in Table 2, two redfin bully and an individual shrimp were observed immediately upstream of the weir. Species diversity was very low upstream (one species) and downstream of the weir (two species), although the abundance of fish was higher upstream of the weir compared to the downstream site (Table 2). Redfin bully were found to be abundant near the National Park, with in excess of 25 individuals observed. This is a good result, as redfin bully are diadromous, which means that all of these fish must have negotiated the weir and fish pass. The absence of other species at either site is a concern, although it could be attributed in part to the time of year that this survey was undertaken, with colder water temperatures possibly reducing fish activity.

Previous surveys have failed to note an absence of torrentfish upstream of the weir, and this absence continued in the current survey. However, spotlighting is not the most effective means of recording torrentfish. Their absence in previous surveys may be due to the lack of riffle habitat (the preferred torrentfish habitat) immediately upstream of the weir. Torrentfish (*Cheimarrichthys fosteri*) were recorded downstream of the weir in previous surveys (Table 2). Torrentfish, along with inanga (*Galaxias maculatus*), are good indicator species for determining the successfulness of this fish pass as both are swimming fish (and therefore relatively poor climbers) which naturally occur at this altitude and distance inland from the coast, provided no barriers exist in the Oaonui Stream between the coast and the survey areas. If they are able to negotiate the pass, then all other fish species (generally better climbers) should also be able to successfully pass over the weir via the fish pass.

A search on the NIWA fish database (New Zealand Freshwater Fish Database (NZFFDB)), which generally contains most fish monitoring results conducted within New Zealand, indicated only a few additional surveys in the Oaonui Stream, all of which had similar fish communities to that recorded by TRC surveys in recent years. However, an electric fishing survey conducted in March 1982 by NIWA recorded one torrentfish at Wiremu Road, well upstream of the Oaonui water supply weir. This is an interesting result, as the weir existed well before this survey was conducted (the scheme has been operating since 1935).

In previous surveys (February 2003 and April 2004), inanga were recorded both upstream and downstream of the weir, and in February 2003 inanga were recorded in abundance (approximately 50 individual fish sighted) upstream of the weir. This indicates that inanga are able to negotiate the new fish pass. Inanga are swimming fish, and are renowned as

having a poor swimming ability, thus are easily hindered by instream obstacles. Their presence upstream of the weir would suggest that most if not all other species of native fish would be capable of negotiating the fish pass (the pass has been designed to provide wetted margins to accommodate for climbing species).

Inanga were not recorded at either site in the current survey. This does not mean that these fish were not present however, and absence of inanga may be associated more with the time of year the survey was undertaken and the location of the upstream site. Inanga migrate downstream in autumn to spawn in the lower tidal reach, and in most cases do not survive. Therefore, inanga will only be present in the surveyed reach during and shortly after the spring whitebait migration. In addition, the upstream site was located above the expected altitudinal range for this species.

The common bully (*Gobiomorphus cotidianus*) was recorded both upstream and downstream previous surveys. However, this species was not recorded in the current survey. As in past surveys, the redfin bully (*Gobiomorphus huttoni*) was recorded at all sites.

Included in the current report is the observation of paratya shrimp, a migratory invertebrate. Previous reports do not discuss shrimp, so it is not known whether they were able to negotiate the weir prior to the fishpass being installed. However, the present survey shows that the weir forms no barrier to their passage.

## Conclusions

A night spotlighting survey was conducted on 30 June 2013 at two sites. The first site was located upstream of the Oaonui Water Supply weir, just downstream of the National Park, while the second site was located just downstream of the weir. A small area was also surveyed immediately upstream of the weir. Fish diversity was low both upstream and downstream of the weir. Fish species recorded were similar both upstream and downstream of the weir. No target species were recorded during this survey, being torrentfish and inanga, although redfin bully, and the migrant invertebrate paratya shrimp, were both recorded at all sites. Fish abundance was low downstream of the weir, but redfin bully were abundant near the National Park, with over 25 individuals observed. The low species diversity at either site is a concern, although it could be attributed in part to the time of year that this survey was undertaken, with colder water temperatures possibly reducing fish activity.

Previous surveys have failed to record torrentfish upstream of the weir, and this absence continued in the current survey. This may suggest that the fish pass is not working effectively, however this absence could also be attributed to the differences in habitat (particularly the proportion of riffle habitat) immediately upstream of the weir. In addition, the absence of torrentfish in the current survey may also be related to the fact that spotlighting is not the most effective means of recording torrentfish, and the upstream site was located above the expected altitudinal range for this species. This is further confirmed by two surveys conducted since the fish pass was installed where inanga (an indicator species) were recorded in abundance upstream of the weir for the first time (February 2003 and April 2004). Although no inanga were recorded in the current survey, this does not mean that these fish were not present however, and the absence of inanga may be associated more with the time of year the survey was undertaken and the location of the upstream site. Inanga migrate downstream in autumn to spawn in the lower tidal reach, and in most cases do not survive. Therefore, inanga will only be present in the surveyed reach during and shortly after the spring whitebait migration. In addition, the upstream site was located

above the expected altitudinal range for this species. The presence of inanga upstream of the weir would suggest that most, if not all other species of native fish would be capable of negotiating the fish pass. It is likely that the Oaonui Water Supply weir is currently not a barrier to fish, therefore compliance with fish passage requirements of resource consent 5453 is being achieved.

As monitoring of fish communities to date indicates that the fish pass is operating with reasonable success, the need to perform annual fish surveys is not required. Provided that regular inspection of the pass confirms that it is operating as required and being maintained, it is recommended that fish monitoring continues at the rate of once every three years.

## **References**

- Colgan BG, 2003: Fish surveys in the Oaonui Stream in relation to the Oaonui water supply weir. Memorandum to M O'Rourke, 29 July 2003.
- Colgan BG, 2004: Fish survey conducted in the Oaonui Stream in relation to the Oaonui water supply weir. Memorandum to M O'Rourke, 21 June 2004.
- Hope K, 2005a: Fish survey conducted in the Oaonui Stream in relation to the Oaonui water supply weir. Memorandum to M O'Rourke, March 2005.
- Jansma, B, 2009: Fish survey conducted in the Cold Stream and Oaonui Stream in relation to STDC water supply weirs, June 2008. Report no. BJ108.
- McDowall R.M., 2000: The Reed Field Guide to New Zealand Freshwater Fishes. Reed books, Reed Publishing (New Zealand) Ltd. 224pp.
- McWilliam H, 2000: Fish surveys in the Mangawhero Stream, Otakeho Stream and Oaonui Stream in relation to STDC weirs for water takes, May 2000. Memorandum to G Stevens, 3 May 2000.
- McWilliam H, 2001: Fish surveys in relation to water takes in the South Taranaki District, December 2000. Memorandum to G Stevens, 26 March 2001.
- Rhys FG, Barrier DJ and Caskey D, 2002: Survey methodology for Shortjawed Kokopu (*Galaxias postvectis*) – standardised spotlighting techniques. Department of Conservation, Wellington, New Zealand.



## Memorandum

**To** Scott Cowperthwaite, Job Manager  
**From** Bart Jansma, Scientific Officer – Freshwater Biology  
**Document No.** 1242442  
**Report No.** BJ202  
**Date** 28 August 2013

### **Fish survey conducted in the Cold Creek in relation to a STDC water supply weir, June 2013**

#### **Introduction**

South Taranaki District Council (STDC) hold resource consents in relation to several rural water supply schemes. The monitoring programmes for these schemes include fish monitoring of a selection of the weirs each year. The programme for the 2012-2013 monitoring period included monitoring of the Cold Creek weir. The consent relating to the Cold Creek Water Supply Scheme is as follows:

*5454 To erect, place, use and maintain a water intake structure on the bed of Cold Creek in the Taungatara Catchment for water abstraction purposes*

Special conditions under resource consents 5454 require that the water intake weir structure does not obstruct fish passage, and that the consent holder shall develop a monitoring programme to determine the adequacy of fish passage. The purpose of this monitoring programme is to assess compliance with said conditions.

The weir in the Cold Stream is 1 metre high and located at an altitude of 350 m a.s.l. A fish pass was installed at this weir in 1999, and comprised of a “natural looking stream” channel of concrete and rocks, catering for trout and native fish of moderate climbing ability. The weir and fish pass are shown in Photo 1.

Three fish surveys have previously been conducted in relation to the Cold Stream diversion weir for the Cold Creek Water Supply Scheme, using electric fishing. The results of these surveys are presented in reports referenced at the end of this report.



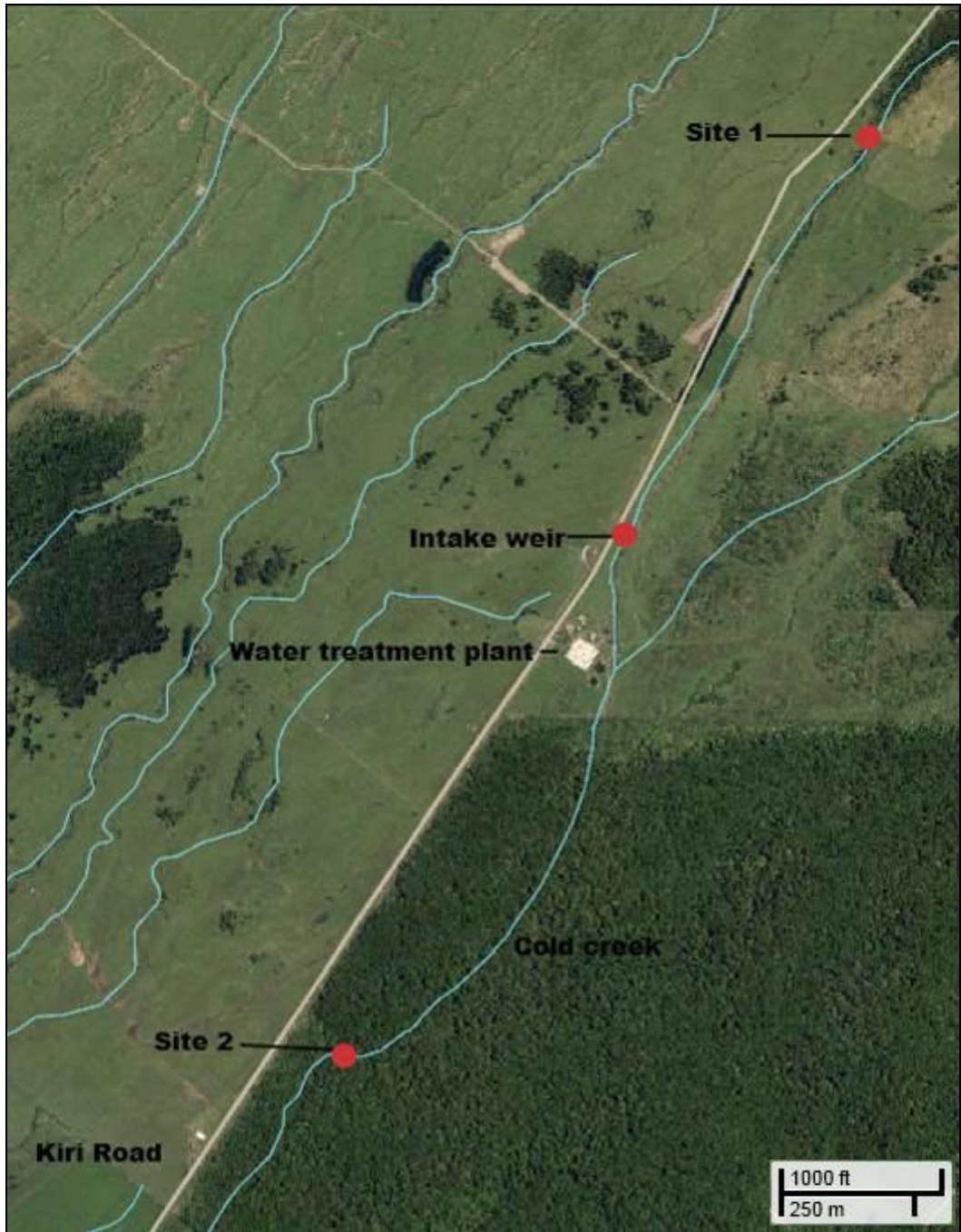
**Photo 1** Cold Stream weir and fish pass

## Methods

In this survey two sites were sampled, one site upstream of the weir and one site downstream of the weir, using the night spotlighting method. This method involves the use of hand held spotlights powered by 12 amp hour batteries, with observed fish captured using handnets where possible. All fish observed and/or captured were counted and identified where possible. In general a spotlighting survey will survey a larger area of stream than electric fishing. In this case, 34 meters of stream length was surveyed at site 1 (upstream of the weir), and 40 meters of stream length was surveyed at site 2 (downstream of the weir). Details of the sites surveyed are given in Table 1 and the location of sites surveyed in relation to the weir and fish pass are shown in Figure 1.

**Table 1** Location of sites surveyed for fish in the Cold Stream in relation to the Cold Creek water supply weir

Site	Site code	Description	Area surveyed (m <sup>2</sup> )	Altitude (m)	Distance Inland from sea (km)
1	CLD000090	Approximately 960m upstream of the water supply weir	153	380	20.4
2	CLD000187	Approximately 1.4km downstream of the water supply weir	160	290	18.1



**Figure 1** Location of sites surveyed in the Cold Stream in relation to the Cold Creek Water Supply weir and fish pass.

**Results**

The results of the survey conducted in the Cold Stream on 30 June 2013 are presented in Table 2. Fish species recorded in the previous surveys at these sites are also included for comparison.

The diversity (number of fish species) of fish in the communities at both sites was low during this survey, the same as found in the previous surveys. Only brown trout were recorded in this survey, however trout were slightly more abundant upstream of the weir where 4 trout were observed. In addition, those trout observed upstream of the weir represented two years of reproduction, as two fish were less than one year old, and the other

were one year old. This provides a good indication that the fish pass on the weir is providing adequate passage for trout. Two trout were recorded downstream of the weir, and previous surveys closer to the weir have found that there is no aggregation of trout immediately below the weir.

**Table 2** Fish species recorded in the Cold Stream upstream and downstream of the Cold Creek water supply weir together with results of past surveys

Fish species recorded	Site 1 (U/S)	Site 2 (D/S)	Previously recorded downstream	Previously recorded upstream
Brown trout	4	2	✓	✓
Longfin eel	-	-	-	✓
<b>Total abundance of fish</b>	<b>4</b>	<b>2</b>	<b>-</b>	<b>-</b>
<b>Total no. of fish species</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>

The ages of the trout observed, being less than two years old, suggests that this stream provides important spawning and therefore recruitment to the Taungatara Stream fishery.

A search on the NIWA fish database (New Zealand Freshwater Fish Database (NZFFDB)), which generally contains most fish monitoring results conducted within New Zealand, indicated only a few additional surveys in the Cold Stream, all of which had similar fish communities to that recorded by TRC surveys in recent years. However, an electric fishing survey conducted in September 1994 by the Department of Conservation did record one longfin eel.

A small drop at the bottom of the fish pass has been noted during inspections since 2002, however this does not seem to be a barrier to trout. Other than the single longfin eel recorded in 1994, no native fish have been recorded in this stream to date. For this reason the spotlighting method was used in the current survey, to target galaxiids such as koaro and shortjaw kokopu. However, the flow conditions were such that this method was not very effective. The flow was far too swift, reducing visibility. This method is better suited to areas of slower flow, and should only be repeated in this stream in such habitat.

## Conclusions

A night spotlighting survey was conducted on 30 June 2013 upstream and downstream of the Cold Stream weir (Cold Creek water supply scheme).

Very low fish diversity was recorded in the Cold Stream, but good populations of brown trout were found upstream and downstream of the weir, indicating that the fish pass was providing adequate passage for these fish. It was interesting to note that the brown trout population consisted entirely of juveniles, indicating that Cold Stream provides important spawning and juvenile rearing habitat, which in turn supports the Taungatara Stream brown trout fishery.

Trout have been the only fish species recorded in this stream in the three TRC surveys conducted to date, although the Department of Conservation did observe one longfin eel in 1994. For this reason the spotlighting method was used in the current survey, to target galaxiids such as koaro and shortjaw kokopu. However, the flow conditions were such that this method was not very effective. The flow was far too swift, reducing visibility. This method is better suited to areas of slower flow, and should only be repeated in this stream in such habitat.

## References

- Jansma, B, 2009: Fish survey conducted in the Cold Stream and Oaonui Stream in relation to STDC water supply weirs, June 2008. Report no. BJ108.
- Hope K, 2005: Fish surveys conducted in the Cold Stream and Otakeho Stream in relation to STDC water supply weirs. Memorandum to M O'Rourke, March 2005.
- McDowall R.M., 2000: The Reed Field Guide to New Zealand Freshwater Fishes. Reed books, Reed Publishing (New Zealand) Ltd. 224pp.
- McWilliam H, 2000: Fish surveys in the Mangawhero Stream, Otakeho Stream and Oaonui Stream in relation to STDC weirs for water takes, May 2000. Memorandum to G Stevens, 3 May 2000.
- McWilliam H, 2001: Fish surveys in relation to water takes in the South Taranaki District, December 2000. Memorandum to G Stevens, 26 March 2001.
- Rhys FG, Barrier DJ and Caskey D, 2002: Survey methodology for Shortjawed Kokopu (*Galaxias postvectis*) – standardised spotlighting techniques. Department of Conservation, Wellington, New Zealand.

## Memorandum

**To** S Cowperthwaite, Scientific Officer  
**From** B Jansma, Scientific Officer  
**Date** 28 August 2013  
**Document No.** 1242699  
**Report No.** BJ203

### **Fish surveys conducted in the Mangawhero Stream in relation to an STDC water supply weir for the Waimate West scheme, June 2013**

#### **Introduction**

South Taranaki District Council (STDC) hold resource consents in relation to several rural water supply schemes. The monitoring programmes for these schemes include fish monitoring of a selection of the weirs each year. The programme for the 2012-2013 monitoring period included monitoring of the Mangawhero Stream weir. The consent relating to this weir is as follows:

*5452 To erect, place, use and maintain a water intake structure and associated ancillary structures including erosion protection and river control works upstream, and a swing bridge downstream, of the intake structure on the bed of the Mangawhero Stream in the Kaupokonui Catchment for water abstraction purposes.*

Special conditions under resource consent 5452 require that the water intake weir structure does not obstruct fish passage (special condition 6), and that the consent holder shall develop a monitoring programme to determine the adequacy of fish passage (special condition 7). The purpose of this monitoring programme is to assess compliance with special condition 6.

A night spotlighting survey was performed on 30 June 2013 in the Mangawhero Stream, upstream (1 site) and downstream (1 site) of the STDC water supply weir to assess the effectiveness of fish passes installed on these weirs. The STDC weir in the Mangawhero Stream is located at an altitude of 440 m a.s.l. and is 0.5 metres high. Due to the high altitude, considerable distance inland from the sea and generally steep gradient in this stream, passage for weaker climbing fish is not considered necessary as these fish are unlikely to occur naturally at these sites. This was taken into account by STDC, who installed a v-notched rock ramp type fish pass at this weir in 1999, catering for moderate to strong climbing fish. However, due to the destructive floods that this stream frequently experiences, maintenance was regularly required, by placing rocks at the base of the fish pass in an effort to reduce a drop. These rocks were frequently washed away, and in April 2007, a new fish pass was installed on the true left bank. The new pass has a more gentle gradient while retaining a deeper channel, and ample area for climbing fish to negotiate. The old fish pass still remains also. The weir and fish passes are shown in Photo 1.

Previous fish surveys have been conducted in relation to the Mangawhero Stream diversion weir for the Waimate West Water Supply Scheme, all using the electric fishing survey

method. The results of these past fish surveys are summarised in STDC water supply annual reports.



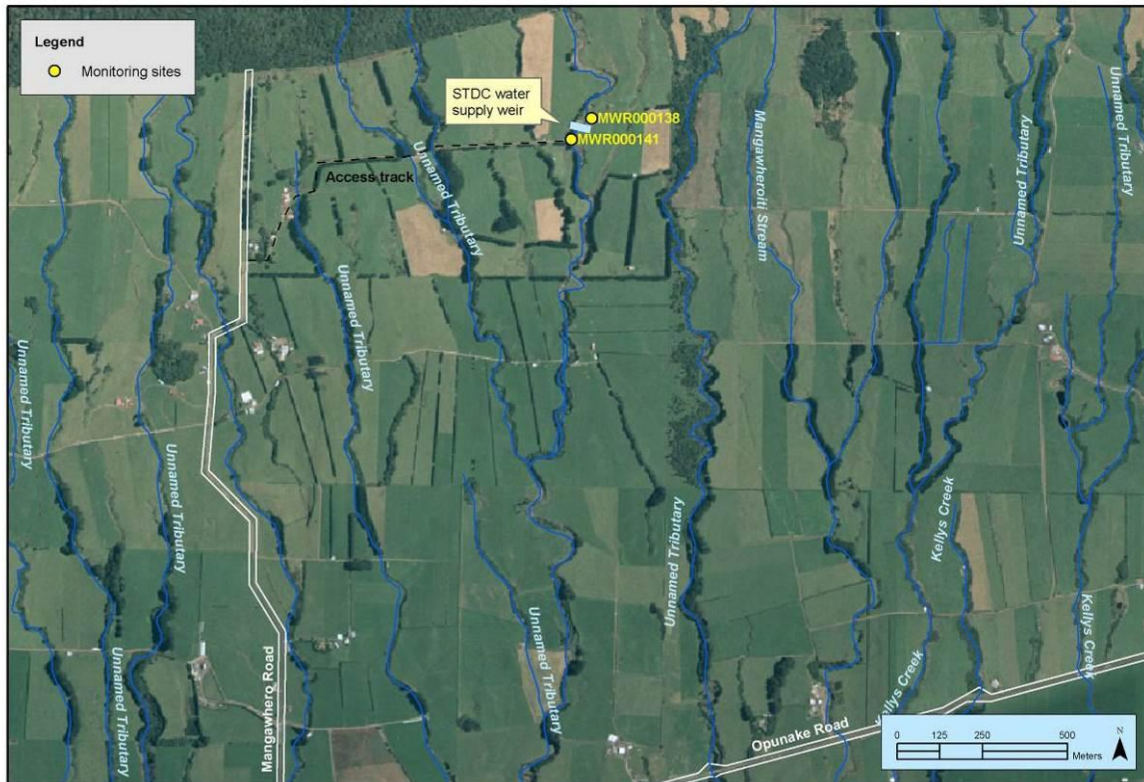
**Photo 1** STDC weir, new fish pass (right of photo) and old fish pass (left of photo) in the Mangawhero Stream

## Methods

In this survey two sites were sampled, one site upstream of the weir and one site downstream of the weir, using the night spotlighting method. This method involves the use of hand held spotlights powered by 12 amp hour batteries, with observed fish captured using handnets where possible. All fish observed and/or captured were counted and identified where possible. In general a spotlighting survey will survey a larger area of stream than electric fishing. In this case, 45 meters of stream length was surveyed at site 1 (upstream of the weir), and 47 meters of stream length was surveyed at site 2 (downstream of the weir). Details of the sites surveyed are given in Table 1 and the location of sites surveyed in relation to the weir and fish pass are shown in Figure 1.

**Table 1** Location of sites surveyed for fish in relation to the Mangawhero Stream water supply weir

Stream	Site code	Description	Altitude (m)	Distance Inland from sea (km)
Mangawhero Stream	MWR000138	40 m upstream of the STDC water supply weir	440	31.7
	MWR000141	50 m downstream of the STDC water supply weir	440	31.6



**Figure 1** Location of sites surveyed in the Mangawhero Stream in relation to the Waimate West Water Supply weir and fish pass.

## Results

It was noted during this survey that the natural iron oxide turbidity that is frequently present in the Mangawhero Stream was especially bad, to the point where visibility was severely reduced, significantly reducing the effectiveness of the spotlighting technique. The results of the survey conducted in the Mangawhero Stream are presented in Table 2. Fish species recorded in previous surveys at these sites are also included in Table 2 for comparison.

**Table 2** Fish species recorded in the Mangawhero Stream upstream and downstream of the water supply weir together with results of past surveys; P=present. Included are predicted probability of capture values (Leathwick *et al* 2008).

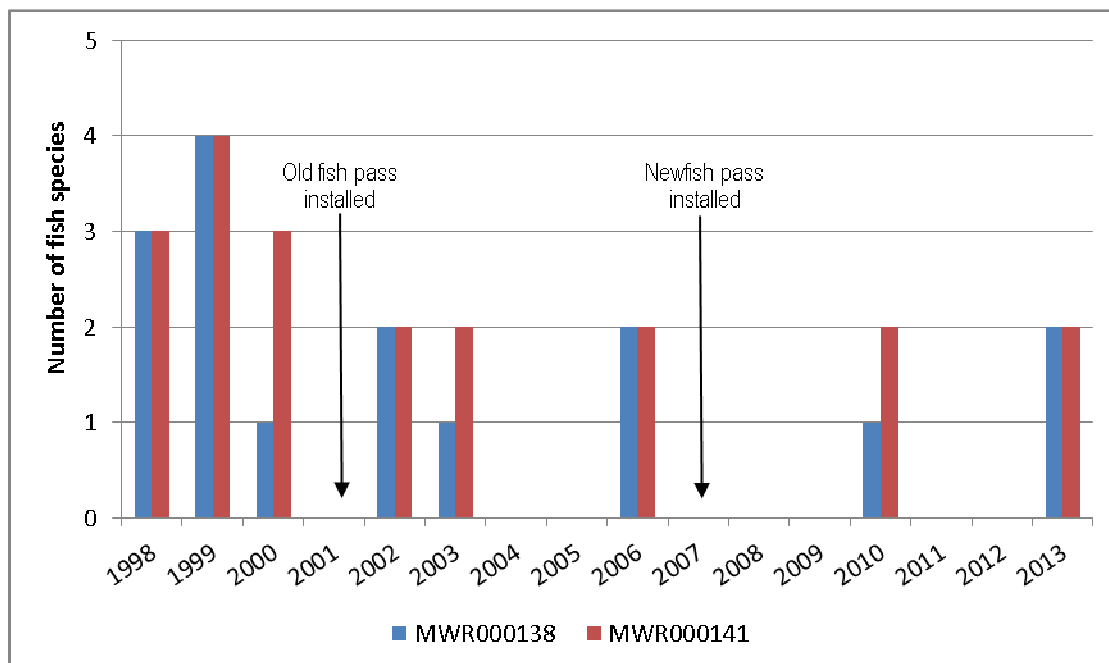
Fish species recorded	MWR000138 (u/s)		MWR000141 (d/s)		Predicted probability of capture
	2013 survey	Previous surveys (7)	2013 survey	Previous surveys (7)	
Longfin eel	1	P	1	P	0.883
Brown trout	1	P	1	P	
Koaro		P		P	0.196
UID eel		P		P	
UID galaxiid		P			
Torrentfish		-		P	0.007
<b>Total abundance of fish</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>-</b>	
<b>Total no. of fish species</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>4</b>	



The diversity (number of fish species) of fish in the communities at both sites was low during this survey, similar to previous surveys where the highest number of fish species recorded in any survey was 4. Diversity was the same upstream and downstream of the weir, as was the abundance of fish (Table 2). It is possible that other fish were present, but that the naturally elevated turbidity resulted in them not being observed. Longfin eels (*Anguilla dieffenbachia*) and brown trout (*Salmo trutta*) were recorded both upstream and downstream of the weir. Previous results have frequently recorded both species upstream of the weir, suggesting that these fish have been able to negotiate the old fish pass.

Since 1998, eight fish surveys (including the current survey) have been conducted in relation to the Mangawhero Stream water supply weir. This includes two surveys prior to the old fish pass being installed, four surveys after the old fish pass was installed but prior to the installation of the new fish pass, and two surveys after the new pass was installed. This provides sufficient data to assess compliance with special condition 6 of resource consent 5452, by comparing baseline fish communities with communities since the new fish pass was installed. Unfortunately, results from the current survey are inconclusive, due to a poor species richness and abundance both upstream and downstream of the weir.

Figure 2 shows the diversity recorded at sites above the weir (blue bars) and below the weir (red bars). The graph indicates that both before and after the fish pass was installed, diversity was low but is generally similar upstream and downstream of the weir. Fish diversity is generally lower in areas of high altitude or distance inland such as the location of this weir, as many of New Zealand’s native fish need to migrate between the sea and freshwater to complete their life cycle, and therefore penetration inland varies with the swimming and climbing abilities of each species. As a result, fish diversity generally decreases as distance inland from the coast and altitude increases.



**Figure 2** Diversity of fish (number of fish species) recorded in surveys conducted in the Mangawhero Stream since 1998. Blue = above weir; Red = below weir

Torrentfish (*Cheimarrichthys fosteri*) were not recorded in the current survey at either site. These fish have been recorded downstream of the weir in the past but have not yet been

recorded upstream of the weir. Torrentfish are moderate swimmers which can negotiate reasonably swift flows, however their climbing ability is poor to moderate. It is expected that the new fish pass is adequate to provide for the passage of torrentfish, however, the likelihood of recording torrentfish again at this altitude and distance from the coast is considered low. This is reinforced by the predicted probability of capture of 0.7% (Leathwick *et al* 2008). This model predicts that only two species have a greater than 5% probability of capture in this reach, being longfin eel and koaro. Brown trout are not included in this model.

## **Conclusions**

A fish survey was conducted upstream and downstream of an STDC weir in the Mangawhero Stream weir 30 June 2013. This survey used the night spotlighting technique, but due to the natural iron oxide turbidity that is frequently present in the Mangawhero Stream being especially bad, to the point where visibility was severely reduced, the effectiveness of the spotlighting technique was significantly reduced.

This is the second survey undertaken since a new fish pass was installed in 2007. In the Mangawhero Stream fish diversity was low both upstream and downstream of the weir, as has been recorded in previous surveys. This is likely to be related to the distance from the sea and the high altitude at which these sites are located, as fish diversity does decrease with increasing altitude and distance inland. Fish communities were similar between the two sites and indicate that the STDC weir is generally not a barrier to the stronger climbing longfin eels, or trout. However there may be times when trout are unable to negotiate the jump at the bottom of the old fish pass, and flows in the new pass may be too shallow at times, but they are more likely to pass the weir during floods, which is generally when trout migrate.

Torrentfish (*Cheimarrichthys fosteri*) were not recorded in the current survey at either site. These fish have been recorded downstream of the weir in the past but have not yet been recorded upstream of the weir. Torrentfish are moderate swimmers which can negotiate reasonably swift flows, however their climbing ability is poor to moderate. It is expected that the new fish pass is adequate to provide for the passage of torrentfish, however, the likelihood of recording torrentfish again at this altitude and distance from the coast is considered low, as the predicted probability of capture in this reach is only 0.7%.

### ***Summary and recommendations for further monitoring***

The monitoring of the Mangawhero Stream indicates that fish passage provided by the new fish pass is likely to provide fish passage for most fish present in this reach. This includes torrentfish, which were recorded on one previous occasion at this location.

Provided that regular inspections of the fish pass confirm that it is operating as required and being maintained, it is recommended that the fish monitoring be conducted once every three years as per the scheduled monitoring programme currently implemented.

## References

- Dunning K, 2002: Fish surveys in the Mangatoki and Mangawhero Streams in relation to STDC water supply weirs. Memorandum to Bruce Colgan, 2 September 2002.
- Hope K, 2006: Fish surveys conducted in the Mangawhero Stream and Mangawhero-iti Stream in relation to STDC water supply weirs for the Waimate West scheme, January 2006.
- Jansma B, 2010: Fish surveys conducted in the Mangawhero Stream and Mangawhero-iti Stream in relation to STDC water supply weirs for the Waimate West scheme, March 2010. Report no. BJ115.
- Leathwick, J., Julian, K., Elith, J. & Rowe, D. 2008. *Predicting the distributions of freshwater fish species for all New Zealand's rivers and stream*. Prepared by NIWA for the Department of Conservation. NIWA Client Report: HAM2008-005.
- McDowall R.M., 2000: The Reed Field Guide to New Zealand Freshwater Fishes. Reed books, Reed Publishing (New Zealand) Ltd. 224pp.
- McWilliam H, 1998: Fish communities of Cold Stream, Mangatoki Stream and Mangawhero Streams, sampled in relation to the STDC water take structures. Memorandum to Ben Altoft, 18 August 1998.
- McWilliam H, 2000: Fish surveys in the Mangawhero Stream, Otakeho Stream and Oaonui Stream in relation to STDC weirs for water takes, May 2000. Memorandum to G Stevens, 3 May 2000.
- McWilliam H, 2001: Fish surveys in relation to water takes in the South Taranaki District, December 2000. Memorandum to Glenn Stevens, 26 March 2001.
- Rhys FG, Barrier DJ and Caskey D, 2002: Survey methodology for Shortjawed Kokopu (*Galaxias postvectis*) – standardised spotlighting techniques. Department of Conservation, Wellington, New Zealand.

