

South Taranaki District Council
Eltham, Hawera, Kaponga, Manaia, Patea,
Opunake and Otakeho Landfills
Monitoring Programme
Annual Report
2008-2009

Technical Report 2009-52

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Executive summary

The South Taranaki District Council (STDC) holds consents to cover the discharge of leachate and stormwater from seven closed landfills. The landfills are at Kaponga and Manaia in the Waiokura catchment, Patea in the Patea catchment, Opunake in the Otahi catchment, Hawera in the Tangahoe catchment, Otakeho in the Taikatu catchment and Eltham in the Waingongoro catchment

This report for the period July 2008 - June 2009 describes the monitoring programme implemented by the Taranaki Regional Council to assess STDC's environmental performance during the period under review, and the results and environmental effects of STDC's activities.

In relations to its closed landfills STDC hold ten resource consents consisting of eight discharge of stormwater and or leachate to water consents, one discharge to air consent, and one land use consent. These permits have a total of 75 special conditions that STDC must adhere to.

To monitor compliance with these conditions during the 2008-2009 year, Council conducted 16 inspections, took 28 discharge and receiving environment samples and conducted one biomonitoring survey.

The monitoring undertaken during the 2008-2009 period showed that STDC's six closed landfills at Manaia, Kaponga, Opunake, Eltham, Otakeho and Hawera were managed and maintained to a high standard. During the monitoring year, the landfill at Patea was capped and reinstated in satisfactory manner.

There were no significant issues observed at these sites and no adverse effects were noted. During the year, the STDC generally demonstrated a high level of environmental performance and compliance for all the resource consents it held for its closed landfills. In general, issues of concern were addressed positively and co-operatively by the STDC.

This report includes recommendations for the 2009-2010 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	1
1.1.4 Evaluation of environmental performance	2
1.2 Process description	2
1.3 Resource consents	3
1.3.1 Water discharge permit	3
1.3.2 Air discharge permit	6
1.3.3 Land use permit	7
1.4 Monitoring programme	7
1.4.1 Introduction	7
1.4.2 Programme liaison and management	8
1.4.3 Site inspections	8
1.4.4 Chemical sampling	8
1.4.5 Biomonitoring surveys	9
2. Hawera landfill	10
2.1 Background	10
2.2 Results	10
2.2.1 Inspections	10
2.2.2 Results of discharge monitoring	11
2.2.3 Results of receiving environment monitoring	11
2.2.3.1 Groundwater	12
2.2.3.2 Surface water	13
2.3 Register of incidents	15
2.4 Discussion	15
2.4.1 Discussion of plant performance	15
2.4.2 Environmental effects of exercise of consents	15
2.5 Evaluation of performance	15
2.6 Recommendations from the 2007-2008 Annual Report	17
2.7 Alterations to monitoring programmes for 2009-2010	17
2.8 Exercise of optional review of consent	17
2.9 Recommendations	18
3. Otakeho landfill	19
3.1 Background	19
3.2 2008 – 2009 monitoring	19
4. Eltham landfill	20
4.1 Background	20
4.2 Results	20
4.2.1 Inspections	20
4.2.2 Results of receiving environment monitoring	20
4.3 Surface water	20
4.3.1 Biomonitoring	22

4.4	Register of incidents	22
4.5	Discussion	23
4.5.1	Discussion of plant performance	23
4.5.2	Environmental effects of exercise of consents	23
4.6	Evaluation of performance	23
4.7	Recommendations from the 2007-2008 Annual Report	24
4.8	Alterations to monitoring programmes for 2009-2010	24
4.9	Recommendation	24
5.	Manaia landfill	25
5.1	Background	25
5.2	Results	25
5.2.1	Inspections	25
5.2.2	Discharge monitoring	27
5.2.3	Results of receiving environment monitoring	27
5.2.3.1	Surface water	27
5.2.3.2	Biomonitoring	28
5.3	Register of incidents	29
5.4	Discussion	29
5.4.1	Discussion of plant performance	29
5.4.2	Environmental effects of exercise of consents	29
5.5	Evaluation of performance	29
5.6	Recommendations from the 2007-2008 Annual Report	30
5.7	Alterations to monitoring programmes for 2008-2009	30
5.8	Recommendations	31
6.	Opunake landfill	32
6.1	Background	32
6.2	Results	32
6.2.1	Inspections	32
6.2.2	Results of discharge monitoring	33
6.2.3	Results of receiving environment monitoring	33
6.2.3.1	Surface water	33
6.2.3.2	Biomonitoring	34
6.3	Register of incidents	34
6.4	Discussion	35
6.4.1	Discussion of plant performance	35
6.4.2	Environmental effects of exercise of consents	35
6.4.3	Evaluation of environmental performance	35
6.5	Recommendations from the 2007-2008 Annual Report	36
6.6	Alterations to monitoring programmes for 2009-2010	36
6.7	Recommendations	36
7.	Patea landfill	37
7.1	Background	37
7.2	Results	37
7.2.1	Inspections	37
7.2.2	Discharge monitoring	42
7.3	Register of incidents	43
7.4	Discussion	43
7.4.1	Discussion of plant performance	43

7.4.2	Environmental effects of exercise of consents	45
7.5	Evaluation of performance	45
7.6	Recommendations from the 2007-2008 Annual Report	46
7.7	Alterations to monitoring programmes for 2009-2010	47
7.8	Recommendations	47
8.	Kaponga landfill	48
8.1	Background	48
8.2	Results	48
8.2.1	Inspection	48
8.2.2	Discharge sampling	49
8.3	Register of incidents	49
8.4	Discussion	49
8.4.1	Discussion of plant performance	49
8.4.2	Environmental effects of exercise of consents	49
8.4.3	Evaluation of environmental performance	50
8.5	Recommendations from the 2007-2008 Annual Report	50
8.6	Alterations to monitoring programmes for 2009-2010	50
8.7	Recommendations	51
9.	Summary of recommendations	52
	Glossary of common terms and abbreviations	53
	Bibliography and references	55
	Appendix I Resource consents held by STDC	
	Appendix II Biomonitoring reports	

List of tables

Table 1	Water Discharge permit 0444-4 - Consent Summary	3
Table 2	Water Discharge permit 0427-3 - Consent Summary	3
Table 3	Water Discharge permit 3952-2 Consent Summary	4
Table 4	Water Discharge permit 3459-3 Consent Summary	4
Table 5	Water Discharge permit 3953-3 Consent Summary	5
Table 6	Water Discharge permit 3387-3 Consent Summary	5
Table 7	Water Discharge permit 0526-3 Consent Summary	6
Table 8	Water Discharge permit 7268-1 Consent Summary	6
Table 9	Air discharge permit 4636-2 Consent Summary	7
Table 10	Land use permit 5831-1 Consent Summary	7
Table 11	STDC landfill Inspection details for the monitoring period 2008-2009	8
Table 12	STDC landfill water quality sampling details for the monitoring period 2008-2009	9
Table 13	STDC landfill biological surveys details for the monitoring period 2008-2009	9
Table 14	Chemical analysis of Hawera landfill leachate samples collected in 2007-2008	11
Table 15	Chemical analysis of groundwater samples from Hawera landfill, 21 May 2009	12
Table 16	Results of chemical analysis of surface water at the Hawera landfill 18 June 2009	14
Table 17	Summary of performance for consent 0444-4 discharge of leachate and stormwater	15
Table 18	Summary of performance for consent 5831-1 to divert an unnamed tributary to the Tawhiti Stream	16
Table 19	Chemical analysis of water samples taken in relation to Eltham landfill on 5 March 2009	21
Table 20	Summary of performance for consent 3387-3 to discharge leachate and stormwater	23
Table 21	Chemical analysis of leachate pond at Manaia landfill for the 2008-2009 period	27
Table 22	Chemical analysis of receiving waters at Manaia landfill for the 2008-2009 period	28
Table 23	Summary of performance for consent 3952-2 to discharge of leachate and stormwater	30
Table 24	Chemical analysis of receiving water samples taken at Opunake landfill in 2008-2009	33
Table 25	Summary of performance for consent 0526-3 discharge of leachate and stormwater	35

Table 26	Chemical analysis of water samples taken at the Patea Landfill site	42
Table 27	Summary of performance for consent 0427-3 discharge of leachate and stormwater	45
Table 28	Summary of performance for consent 4636-2 discharge emissions into the air	45
Table 29	Summary of performance for consent 7268-1 to discharge stormwater from landfill closure earthworks	46
Table 30	Results of sampling at site WKR00057, 3 September 2008	49
Table 31	Summary of performance for consent 0526-3 discharge of leachate and stormwater	50

List of figures

Figure 1	Aerial view of Hawera landfill and sampling sites	10
Figure 2	Graph showing downward trend in levels of contamination in bore GND1012	13
Figure 3	Aerial image of Otakeho landfill and Taikatu stream	19
Figure 4	Eltham landfill and sampling sites	20
Figure 5	Aerial view of Manaia landfill showing sampling sites and landfill foot print	25
Figure 6	Aerial view of Opunake landfill foot print and sampling sites	32
Figure 7	Aerial view of the landfill at Patea	37
Figure 8	Original design of cross section of Patea landfill cap at chainage 40	44
Figure 9	Same cross section of Patea landfill cap (as-built)	44
Figure 10	Aerial view of Kaponga landfill	48

List of photographs

Photograph 1	Patea Landfill during early stages of capping works, 24 October 2009	39
Photograph 2	Plastic lined silt traps on north side of cap, 4 November 2009	40
Photograph 3	New redesigned final settling pond, 27 November 2008	41

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 2008-June 2009 by the Taranaki Regional Council on the monitoring programme associated with resource consents held by STDC for municipal landfills. STDC maintains seven closed landfills at Manaia, Eltham, Hawera, Opunake, Kaponga, Otakeho and Patea

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by STDC that relate to discharges of water, the air discharge permits held by STDC to cover emissions to air from the site, and discharges of contaminants onto and into land.

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 the STDC's use of water, land, and air.

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 landfill resource consents held by STDC shown in , the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted by STDC.

Section 2- 8 presents the results of monitoring during the period under review, including scientific and technical data for each landfill. The results for each landfill are discussed and interpreted and recommendations made for the next monitoring period.

Section 9 presents summary recommendations to be implemented in the 2009-2010 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, (covering both activity and 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, and considered responsible resource utilisation 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 STDC during the period under review with regard to landfills, 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 trivial (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 year were negligible or minor at most, items of concern were resolved positively, co-operatively, and quickly, the Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices, 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.
- **improvement desirable** indicates that the Council may have been obliged to record against the consent holder a verified unauthorised incident involving significant environmental impacts, and/or abatement notices may have been issued; there were adverse 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 end of the period under review.
- **poor** performance is used when there were grounds for prosecution or infringement notice

1.2 Process description

STDC managed seven closed municipal landfills in the South Taranaki district during the 2008-2009 period. All these sites tend to have a long history of waste

disposal and as such do not have engineered liners and are thus classed as Class B landfills as designated in the MfE publication Module 2: Hazardous Waste Guidelines, Landfill Waste Acceptance Criteria and Landfill Classification (2004). The number of open landfills in the district has steadily decreased over the years and expected future waste disposal will be to discharge the entire region's waste to one or two engineered landfills, such as Colson Road Regional landfill, or Eltham Central landfill (which is yet to open).

1.3 Resource consents

1.3.1 Water discharge permit

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.

STDC hold water discharge permits 0444, 0427, 7268, 3952, 3459, 3387, 3953 and 0526 all issued by the Taranaki Regional Council. Details of each consent are given in tables 1-8 below.

Table 1 Water Discharge permit 0444-4 - Consent Summary

Consent	Issued	Term	Reviews	Expiry
0444-4	28/06/2001	15 years	June 2010	01/06/2016
Purpose	To discharge up to 2800 cubic metres/day of leachate and stormwater from the closed Matangara Landfill, Hawera, to groundwater and into an unnamed tributary of the Tawhiti Stream in the Tangahoe catchment.			
Description	GPS 1711348-5617069			
Special Condition/s	Purpose of conditions			
1 - 3	To ensure that STDC adopts best practice, maintain the landfill cap and provide a landfill management plan			
4-6	Ensures that the consent holder to adhere to the management plan, control the flow of surface water on the site, and maintain the leachate collection system respectively			
7-8	Places limits on the effects the discharge gives rise to in waterways			
9-10	Ensures that STDC install and maintain groundwater monitoring bores			
10-11	Set out lapse and review dates			

The permit is attached to this report in Appendix I.

Table 2 Water Discharge permit 0427-3 - Consent Summary

Consent	Issued	Term	Reviews	Expiry
0427-3	16/12/2003	19 years	June 2010 June 2016	01/06/2022
Purpose	To discharge surface stormwater and leachate from the Patea municipal landfill into an unnamed tributary of the Patea River			
Description	1711348-5617069			
Special Conditions	Purpose of conditions			
1 - 4	To ensure STDC provide, maintain and adhere to landfill management and contingency plans			
5-6	Ensures the consent holder install and maintain groundwater monitoring, stormwater and leachate collection systems			

Special Conditions	Purpose of conditions
7-8	Places limits on the effects the discharge gives rise to in waterways
9-10	Ensures that STDC adopt best practice
10-11	Set out lapse and review dates

The permit is attached to this report in Appendix I.

Table 3 Water Discharge permit 3952-2 Consent Summary

Consent	Issued	Term	Reviews	Expiry
3952-1	20/02/2005	18 years	June 2011 June 2017	01/06/2023
Purpose	To discharge leachate and stormwater from the closed Manaia landfill and from composting operations into the Waiokura Stream.			
Description	GPS 1697649-5620660			
Special Conditions	Purpose of conditions			
1	Ensures that STDC adopt best practice			
2-4	To ensure STDC provide, maintain and adhere to landfill management and contingency plans			
5-6	Ensures the consent holder undertake monitoring, and install and maintain stormwater and leachate collection systems			
7	Places limits on the effects the discharge gives rise to in waterways			
8	Sets out review dates			

The permit is attached to this report in Appendix I.

Table 4 Water Discharge permit 3459-3 Consent Summary

Consent	Issued	Term	Reviews	Expiry
3459-3	17/03/2005	18 years	June 2011 June 2017	01/06/2023
Purpose	To discharge stormwater and leachate from the former Kaponga landfill site into an unnamed tributary of the Waiokura Stream			
Description	GPS 1699441-5634259			
Special Conditions	Purpose of conditions			
1	Ensures that STDC adopt best practice			
2	To ensure STDC provide, maintain and adhere to contingency plans			
3-4	Ensures the consent holder undertakes monitoring, and install and maintain stormwater and leachate collection systems			
5	Places limits on the effects the discharge gives rise to in waterways			
6	Sets out review dates			

The permit is attached to this report in Appendix I.

Table 5 Water Discharge permit 3953-3 Consent Summary

Consent	Issued	Term	Reviews	Expiry
3953-3	22/08/2005	13 years	June 2012	01/06/2018
Purpose	To discharge leachate and stormwater from the closed Otakeho Municipal Landfill onto and into land			
Description	GPS 1689041-56211752			
Special Conditions	Purpose of conditions			
1	Ensures that STDC adopt best practice			
2	Ensures consent is exercise in accordance with information supplied in the application			
3-4	To ensure STDC provide, maintain and adhere to contingency plans			
5	Ensures the consent holder undertakes monitoring			
6	Places limits on the effects the discharge gives rise to in waterways			
7	Sets out review dates			

The permit is attached to this report in Appendix I.

Table 6 Water Discharge permit 3387-3 Consent Summary

Consent	Issued	Term	Reviews	Expiry
3387-3	17/03/2005	18 years	June 2011 June 2017	01/06/2023
Purpose	To discharge stormwater and leachate from the former Eltham landfill site into the Mangawhero Stream in the Waingongoro catchment			
Description	GPS 1712277-5633249			
Special Conditions	Purpose of conditions			
1	Ensures that STDC adopt best practice			
2	To ensure STDC provide, maintain and adhere to contingency plans			
3	Ensures the consent holder undertakes monitoring			
4	Places limits on the effects the discharge gives rise to in waterways			
5	Sets out review dates			

The permit is attached to this report in Appendix I.

Table 7 Water Discharge permit 0526-3 Consent Summary

Consent	Issued	Term	Reviews	Expiry
0526-3	23/08/2005	13 years	June 2012	01/06/2018
Purpose	To discharge stormwater and leachate from the closed Opunake landfill into the Otahi Stream			
Description	GPS 1673093-5633366			
Special Conditions	Purpose of conditions			
1	Ensures that STDC adopt best practice			
2-3	To ensure STDC provide, maintain and adhere to contingency plans			
4	Ensures the consent holder undertakes monitoring			
5	Places limits on the effects the discharge gives rise to in waterways			
6	Sets out review dates			

The permit is attached to this report in Appendix I.

Table 8 Water Discharge permit 7268-1 Consent Summary

Consent	Issued	Term	Reviews	Expiry
7268-1	26/03/2008	14 years	June 2010 June 2016	01/06/2022
Purpose	To discharge stormwater and leachate from the closed Opunake landfill into the Otahi Stream			
Description	GPS 1673093-5633366			
Special Conditions	Purpose of conditions			
1-2	Ensures that STDC adopt best practice and that the consent is exercised in accordance with information supplied			
3	Requires STDC to notify Council upon commencement of earthworks			
4-5	Requires the consent holder to minimise environmental effects and reinstate the any disturb areas			
6-7	Set out lapse and review dates			

The permit is attached to this report in Appendix I.

1.3.2 Air discharge permit

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

Table 9 Air discharge permit 4636-2 Consent Summary

Consent	Issued	Term	Reviews	Expiry
4636-2	12/12/2003	19 years	June 2010 June2016	01/06/2022
Purpose	To discharge emissions into the air from the Patea municipal landfill activities			
Description	GPS 1725957-5599376			
Special Conditions	Purpose of conditions			
1-3	To ensure STDC provide, maintain and adhere to management and contingency plans			
4	Prohibits burning of refuse			
5-6	Ensures res that STDC adopt best practice and exercise consent in accordance with information supplied			
7	Sets out review dates			

The permit is attached to this report in Appendix I.

1.3.3 Land use permit

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

Table 10 Land use permit 5831-1 Consent Summary

Consent	Issued	Term	Reviews	Expiry
5831-1	28/06/2001	15 years	June 2010	01/06/2016
Purpose	To divert an unnamed tributary of the Tawhiti Stream in the Tangahoe catchment			
Description	GPS 17111349-5617068			
Special Conditions	Purpose of conditions			
1-5	Specifies the manner in which STDC must install and maintain the culvert			
6	Requires STDC to have blockage contingency plan			
7	Sets out review dates			

The permit is attached to this report in Appendix I.

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 monitoring programme for the sites consisted of four 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

Landfill sites were inspected during the monitoring period as described in Table 11. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Site inspections focussed on waste compaction and daily coverage (for the open landfills), stormwater and silt control, leachate management and litter control (for all landfills) and the condition of landfill caps (for closed landfills). Sources of data being collected by the consent holder were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council.

Table 11 STDC landfill Inspection details for the monitoring period 2008-2009

Landfill Site	No. of inspections	Site location	Catchment
Patea	7	Scotland Street, Patea	Patea
Manaia	3	Cemetery Road, Manaia	Waiokura
Hawera	1	Matangara Road, Hawera	Tawhiti
Kaponga	1	Alamein Street, Kaponga	Waiokura
Otakeho	No programme 08-09	SH45, Otakeho	Taikatu
Eltham	1	Castle Street, Eltham	Waingongoro
Opunake	2	Whitcombe Road, Opunake	Otahi

1.4.4 Chemical sampling

The Taranaki Regional Council undertook sampling of both the discharges from the sites and the water quality upstream and downstream of the discharge point and mixing zone.

Discharges and the receiving waters associated with the landfills were sampled during the monitoring period as described in Table 12. The samples were analysed for various water quality parameters depending on the site.

Table 12 STDC landfill water quality sampling details for the monitoring period 2008-2009

Consent holder	No. samples taken	Site location	Catchment
Patea	2	Scotland Street, Patea	Patea
Manaia	9	Cemetery Road, Manaia	Waiokura
Hawera	12	Matangara Road, Hawera	Tawhiti
Kaponga	1	Alamein Street, Kaponga	Waiokura
Otakeho	No programme 08-09	SH45, Otakeho	Taikatu
Eltham	2	Castle Street, Eltham	Waingongoro
Opunake	2	Whitcombe Road, Opunake	Otahi

1.4.5 Biomonitoring surveys

Biological surveys were performed at two landfill sites to determine whether or not the discharge of treated stormwater and leachate from sites had a detrimental effect upon the communities of the stream.

Table 13 STDC landfill biological surveys details for the monitoring period 2008-2009

Consent holder	No. of biological surveys	Site location	Catchment
Manaia	1 (inspection)	Cemetery Road, Manaia	Waiokura
Eltham	1 (survey)	Castle Street, Eltham	Waingongoro

2. Hawera landfill

2.1 Background

The Matangara Road Municipal Landfill was used for domestic waste disposal for the Hawera District. A natural stream flowed down a deep gully [approximately 30 metres] from the north-west to the south-east of the landfill site [unnamed tributary of the Tawhiti Stream]. The stream was directed into a 750 mm pipe and waste was deposited into the landfill over the pipe. The stream now flows underneath the landfill area. The stream exits the diversion pipe where it intersects with a roadside drain which flows into a second unnamed tributary [roadside tributary] that runs adjacent to Matangara Road, before entering the Tawhiti Stream. The landfill closed in September 1998, and STDC reinstated the site. Leachate is captured via leachate collection lines in the landfill and is pumped to the Hawera waste water treatment plant.

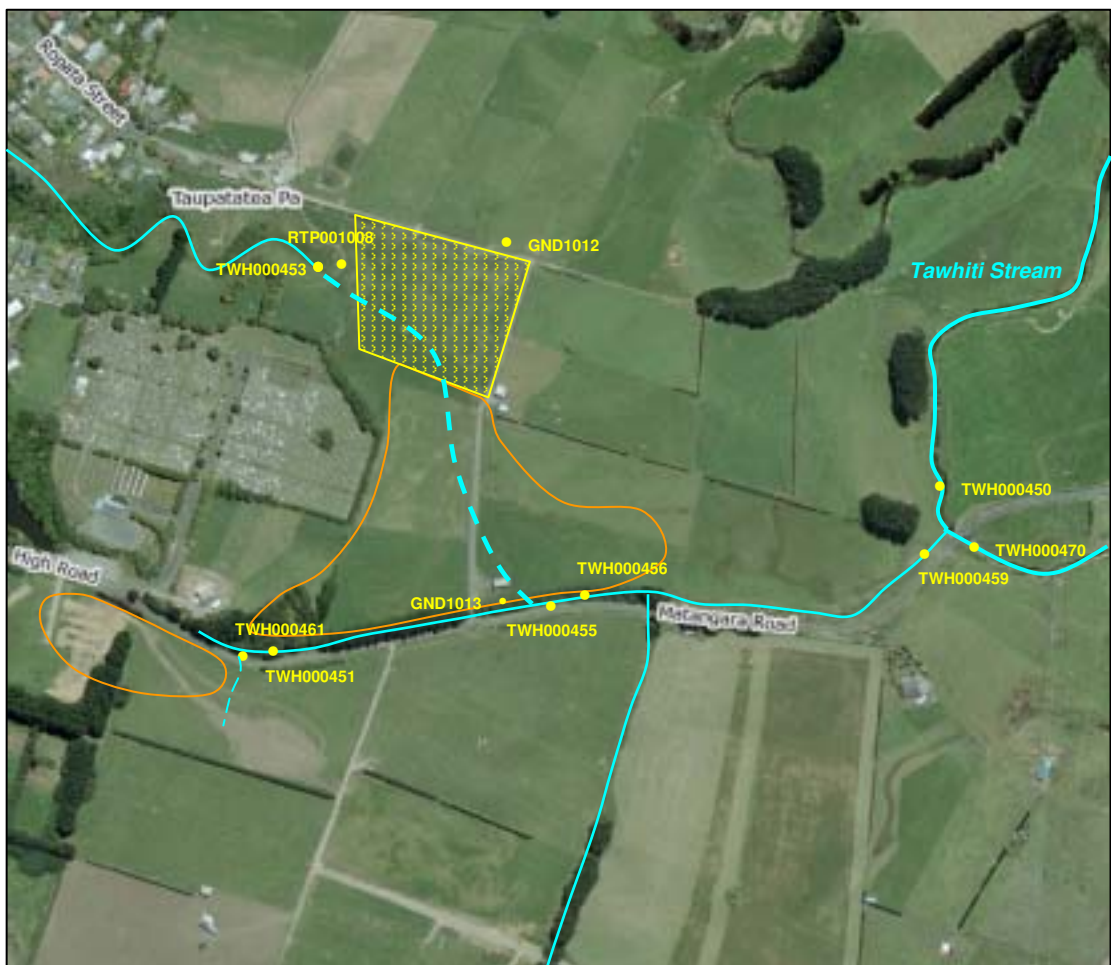


Figure 1 Aerial view of Hawera landfill and sampling sites. The older areas of landfill area shown in orange and the new area in yellow

2.2 Results

2.2.1 Inspections

One inspection was carried out in the 2008-2009 monitoring year.

16 June 2009

A site visit was made to conduct a compliance monitoring inspection and to take surface water samples. The landfill cap was inspected, and was found to be in a sound condition with no evidence of erosion, cracking or slumping observed. The leachate sump was inspected, the level of leachate was below the switch float, and there was inflow at the time of the inspection.

The unnamed tributary of the Tawhiti Stream that runs along the southern boundary of the site was inspected and sampled. The tributary was running clean and clear (but with the usual iron oxide deposits on the bed). There were no odours in any of the samples taken.

2.2.2 Results of discharge monitoring

One leachate sample was taken at the leachate sump (site RTP001008) during the 2008-2009 monitoring period. The results are presented in Table 14 and the sampling site is shown in Figure 1.

Table 14 Chemical analysis of Hawera landfill leachate samples collected in 2007-2008

Parameter	Unit	Value	Historical Data (given where N >9)		
			Min	Mean	Max
Alkalinity	g/m ³ CaCO ₃	908	754	1056	1310
Chloride	g/m ³	193	190	393	1100
Chemical oxygen demand filtered	g/m ³	116	99	171	290
Conductivity @ 20°C	mS/m	214	144	248	319
Dissolved chromium	g/m ³	<0.03			
Dissolved reactive phosphorus	g/m ³	0.006	0.003	00.008	0.030
Acid soluble iron	g/m ³	24.5	25.1	44.8	71.8
Total mercury	g/m ³	<0.0001			
Ammoniacal nitrogen	g/m ³ N	99.1	82	120	176
Nitrite/nitrate nitrogen	g/m ³ N	0.34	0.010	0.177	1.130
pH	pH	7.0	6.5	6.88	7.6
Temperature	°C	15.8			
Dissolved zinc	g/m ³	0.049	0.0050	0.0179	0.0680

Key: * not measured

Results indicate that waste in the landfill is still actively degrading and releasing contaminants. High chloride, ammoniacal nitrogen, and chemical oxygen demand concentrations are typical values for landfill leachate. Some of the major contaminants in the leachate appear to be gradually trending down over time. As this leachate is pumped to the Hawera wastewater treatment plant, it has no direct effect on the immediate environment.

2.2.3 Results of receiving environment monitoring

Eight surface water sites were scheduled for sampling as part of the annual water quality monitoring of the Tawhiti Stream and tributaries. Samples were also collected from two groundwater bores. Each of the sampling sites is shown in Figure 1.

2.2.3.1 Groundwater

Two groundwater sites were sampled in the 2009-2010 period. The results of the chemical analyses are set out in Table 15.

Table 15 Chemical analysis of groundwater samples from Hawera landfill, 21 May 2009

Parameter	Unit	GND1012	GND1013
Alkalinity	g/m ³ CaCO ₃	773	81
Chloride	g/m ³	211	15.2
Filtered COD	g/m ³	86	<5
Conductivity @ 20°C	mS/m	171	30.1
Dissolved reactive phosphorus	g/m ³	0.023	0.005
Hardness	g/m ³ HCO ₃	943.06	98.82
Water level	m	3.86	2.52
Unionised ammonia	g/m ³ N	0.01165	0.00001
Ammoniacal nitrogen	g/m ³ N	11	0.01
Nitrite/nitrate nitrogen	g/m ³ N	0.04	3.99
pH	pH	6.6	6.2
Temperature	Deg.C	12.1	14.8
Dissolved zinc	g/m ³	0.022	0.005

At bore GND1012 (adjacent the landfill cap), alkalinity, chlorides, chemical oxygen demand, hardness and ammoniacal nitrogen were elevated in the sample taken. Ammoniacal nitrogen was elevated when compared to recent samples taken from this site; however it still appears to be trending downward in regard to all historical data. Conductivity, dissolved reactive phosphorus, filtered COD and hardness also seem to be trending downwards (see Figure 2).

Groundwater bore GND1013 was sampled on one occasion over 2008-2009 period. Historically this bore has shown little evidence of any significant leachate infiltration. This trend continues with the levels of all indicator species for the 2008-2009 period being low and commensurate with the historical data.

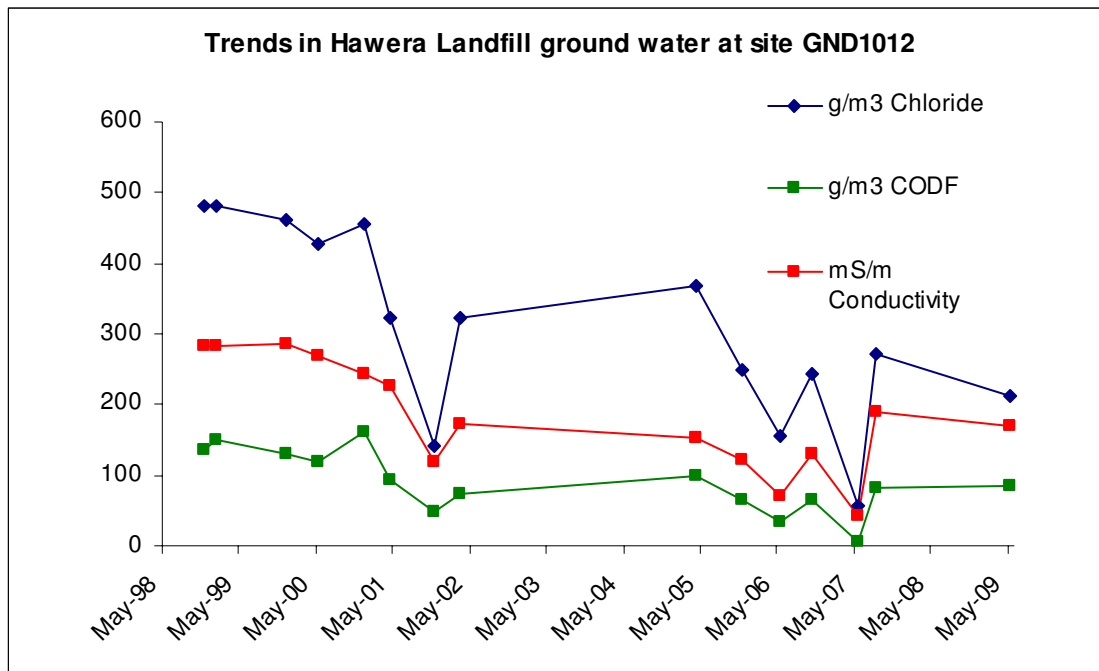


Figure 2 Graph showing downward trend in levels of contamination in bore GND1012

2.2.3.2 Surface water

Eight surface water sites (see Figure 1) were sampled on one occasion over the 2008-2009 period. The results of the chemical analysis of these samples are listed in Table 16.

Site TWH000461 had the highest levels of levels of BOD on this occasion. This sample is taken from a culvert that discharges into the roadside drain upstream of the landfill culvert. The higher level of BOD is most likely from the older areas of landfill on the southern side of Matangara Rd, or from the grazed paddock that sits above the old landfill. After mixing with the flow in the roadside drain the BOD drops back to an acceptable level at site TWH000452.

The results from the sample taken at the mouth of the landfill culvert (TWH000455) have low BOD levels and only a moderate level of ammoniacal nitrogen indicating that leachate contamination in the culverted stream is minimal.

The results downstream of the landfill culvert were all within acceptable ranges for all parameters tested for and there is no indication of adverse effects in the unnamed tributary or in the Tawhiti Stream itself.

Table 16 Results of chemical analysis of surface water at the Hawera landfill 18 June 2009

Site Code		TWH000450 u/s of Matangara Rd	TWH000452 Road side drain u/s landfill culvert	TWH000453 10 m u/ s of landfill	TWH000455 Discharge from culvert under landfill	TWH000456 Unnamed trib 50m d/s of landfill culvert	TWH000459 Unnamed trib 10 m u/s confluence	TWH000461 SW trib in-flow culvert	TWH000470 d/s of Matangara Rd
Alkalinity	g/m ³	71	106	71	100	102	95	107	71
BOD	g/m ³	1.7	1.3	1.7	2	1.9	2	19	1.8
Conductivity	mS/m	26.5	30.2	29.7	35.4	31.8	33.2	29.4	27.1
Dissolved chromium	g/m ³	*	*	*	<0.03	*	*	*	*
Dissolved reactive phosphorus	g/m ³	0.019	0.006	0.008	0.004	<0.003	0.006	0.004	0.018
Acid soluble iron	g/m ³	0.54	1.76	0.90	3.4	1.58	1.11	4.48	0.58
Mercury	g/m ³	*	*	*	<0.00001	*	*	*	*
Unionised ammonia	g/m ³ -N	0.00016	0.00604	0.00046	0.00547	0.01011	0.00943	0.00538	0.0009
Ammoniacal nitrogen	g/m ³ -N	0.015	1.03	0.054	2.03	1.14	0.72	1.12	0.082
Nitrate/nitrite nitrogen	g/m ³	2.14	1.25	2.02	2.41	1.89	1.76	1.21	2.01
pH	Deg. C	7.8	7.4	7.5	7.1	7.6	7.8	7.3	7.8
Temperature	Deg C	6.2	10.4	9.3	9.2	9.8	8.9	10.8	6.5
Dissolved zinc	g/m ³	<0.005	0.022	0.015	0.024	0.016	0.01	0.022	<0.005

2.3 Register of incidents

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 have a significant effect upon the environment. The register ('unauthorised incident register') includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Incidents may be alleged to be associated with a particular site. If there is 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 2008-2009 period, there were no incidents recorded by the Council that were associated with the Hawera landfill.

2.4 Discussion

2.4.1 Discussion of plant performance

In general, the Hawera landfill was well managed. No complaints were recorded by the Council during the monitoring period under review. The culvert remains in good condition at either end and allows unimpeded flow. The final cap appears in good condition and grass growth was noted as good at the time of the inspection.

A contingency plan and a post-closure management plan are in place for the site.

2.4.2 Environmental effects of exercise of consents

The physicochemical monitoring associated with consent 0444-4 indicates the leachate discharge from the landfill shows some very minor effects on the water quality in the culvert flowing below the landfill and on water quality in the roadside drain. Despite this, the landfill is having a negligible effect on the water quality of the Tawhiti Stream. Groundwater is affected by the presence of the landfill, but the level of contamination appears to be declining with time

2.5 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 17 and 18.

Table 17 Summary of performance for consent 0444-4 discharge of leachate and stormwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Prevent or minimise any likely adverse effects on the environment	Site specific monitoring programme – inspection and water sampling	Yes
2. Maintain adequate capping and vegetative cover	Site specific monitoring programme – inspection	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Provide a landfill post-closure management plan	Site specific monitoring programme – programme management	Yes
4. Adhere to the landfill management plan	Site specific monitoring programme – programme management	Yes
5. Maintain drains, ponds and contours on site to minimise unwanted water movement and ponding on site	Site specific monitoring programme – inspection	Yes
6. Maintain the leachate collection system	Site specific monitoring programme – inspection	Yes
7. Mixing zone shall extend 20 m downstream from point of discharge	N/A	N/A
8. Discharge shall not adversely affect the receiving waters	Site specific monitoring programme – inspection and water sampling	Yes
9. Monitoring of groundwater, surface water and leachate	Site specific monitoring programme – water sampling	Yes
10. The two existing monitoring bores shall be maintained	Site specific monitoring programme – inspection	Yes
11. Optional review provision re contamination of the unnamed tributary of the Tawhiti Stream	N/A	N/A
12. Optional review provision re environmental effects	N/A	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

N/A = not applicable

Table 18 Summary of performance for consent 5831-1 to divert an unnamed tributary to the Tawhiti Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of any maintenance works which may disturb the stream	N/A	N/A
2. Construct structures in accordance with documentation submitted in support of application	N/A	N/A
3. Prevent or minimise any likely adverse effects on the riverbed and water quality due to the discharge of contaminants	Site specific monitoring programme – site specific monitoring programme	Yes
4. Minimise the area of riverbed which must be disturbed, and reinstate the areas that have been disturbed	Site specific monitoring programme – site specific monitoring programme	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Insure the diversion pipe is clear of any blockages	Site specific monitoring programme – inspection	Yes
6. Prepare a contingency plan re blockages	Site specific monitoring programme – site specific monitoring programme	Yes
7. Optional review provision re environmental effects	N/A	
Overall assessment of consent compliance and environmental performance in respect of this consent		High

N/A = not applicable

During the year, STDC demonstrated a high level of environmental performance and compliance with the resource consents. During the year under review there were no incidents associated with the site.

2.6 Recommendations from the 2007-2008 Annual Report

In the 2007-2008 Annual Report it was recommended:

THAT the monitoring programme for the 2008-2009 period for the Hawera landfill be continued at the same level as the programmes implemented in the 2007 -2008 period.

The recommendation was subsequently implemented.

2.7 Alterations to monitoring programmes for 2009-2010

In designing and implementing the monitoring programmes for air/water 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 emissions/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 emitting to the atmosphere/discharging to the environment.

In the case of the Hawera landfill, the programme for 2008-2009 was unchanged from that for 2007-2008. It is now proposed that for 2009-2010, that the programme continue as was defined in the 2008-2009 monitoring programme. A recommendation to this effect is presented in Section 2.9 of this report.

2.8 Exercise of optional review of consent

Resource consent 444-4 provides for an optional review of the consent in June 2010. Condition 11 allows the Council to review the consent, if there are grounds to believe that the current consent conditions are not adequate to deal with adverse effects arising from the exercise of this consent.

Based on the results of monitoring in the year under review, and in previous years as set out in earlier annual compliance monitoring reports, it is considered that there are no grounds that require a review to be pursued.

Resource consent 5831-1 provides for an optional review of the consent in June 2010. Condition 7 allows the Council to review the consent, if there are grounds to believe that the current consent conditions are not adequate to deal with adverse effects arising from the exercise of this consent.

Based on the results of monitoring in the year under review, and in previous years as set out in earlier annual compliance monitoring reports, it is considered that there are no grounds that require a review to be pursued.

2.9 Recommendations

1. THAT monitoring of discharges from Hawera landfill in the 2009-2010 year continue at the same level as in the 2008-2009 period.
2. THAT the option for a review of resource consent 0444-4 in June 2010, as set out in condition 11 of the consent **not** be exercised, on the grounds that the current consent conditions are adequate to deal with adverse effects arising from the exercise of this consent.
3. THAT the option for a review of resource consent 5831-2 in June 2010, as set out in condition 7 of the consent **not** be exercised, on the grounds that the current consent conditions are adequate to deal with adverse effects arising from the exercise of this consent.

3. Otakeho landfill

3.1 Background

The Otakeho Landfill was a small uncontrolled landfill that STDC closed in 1991. STDC also applied for a consent to discharge leachate and stormwater into the Taikatu Stream. This consent was renewed in 2000 and again in 2005. In its current form the consent allows for discharge of leachate and stormwater to land.

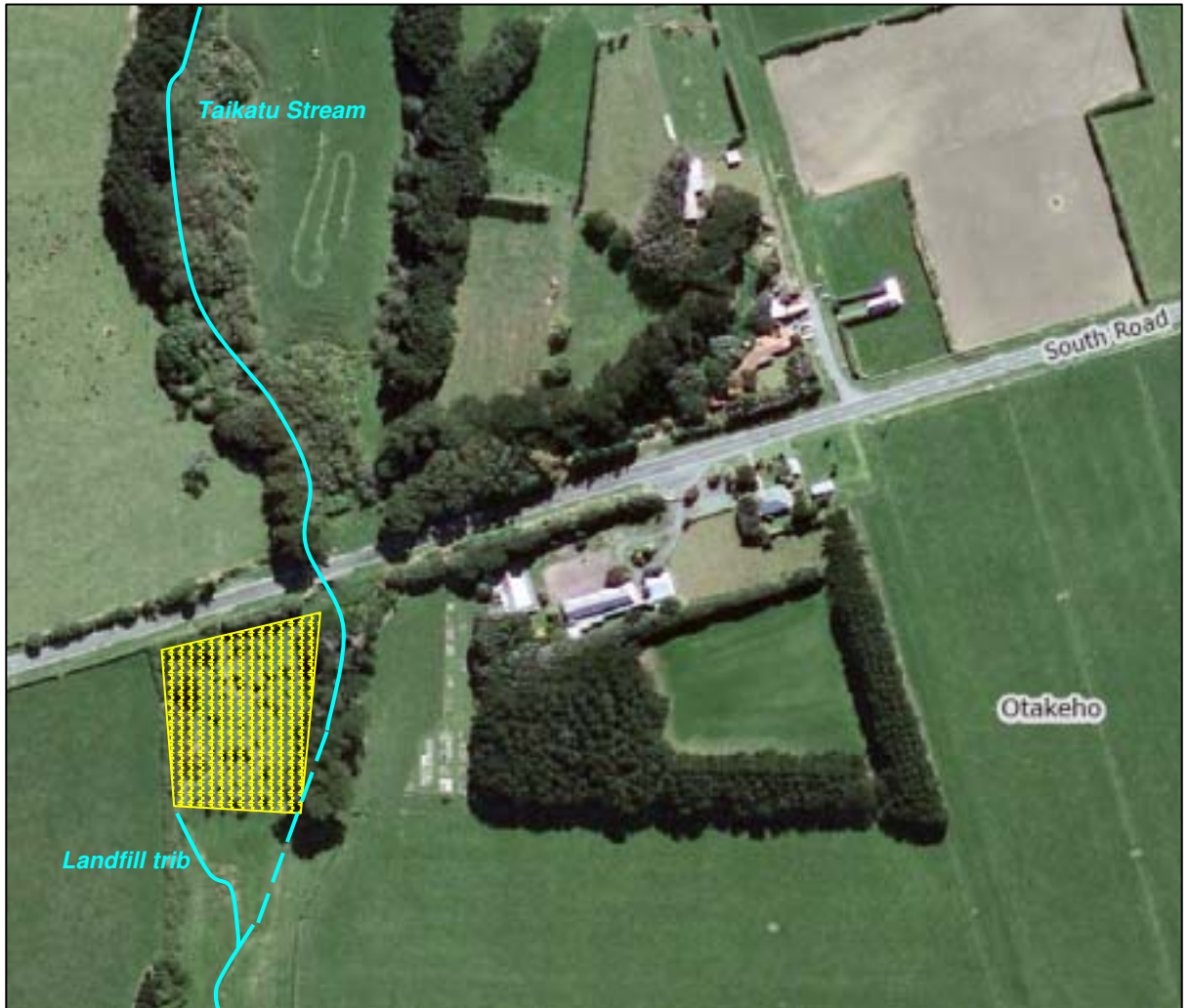


Figure 3 Aerial image of Otakeho landfill and Taikatu stream

3.2 2008 – 2009 monitoring

The Otakeho Landfill is monitored on a triennial basis. It was last monitored in the 2007-2008 period and the programme will be instigated again in the 2010-2011 monitoring period.

4. Eltham landfill

4.1 Background

This landfill used to service the township of Eltham and surrounding rural areas but was closed in 1992 due to exhaustion of landfill capacity. The 0.71ha site is located on Castle Road, just downstream of the Eltham oxidation ponds. The area is generally well rehabilitated, with the majority of the area grassed.

4.2 Results

4.2.1 Inspections

Landfill inspections were undertaken in conjunction with inspections of the waste water treatment system. Inspections of the landfill focussed on stormwater systems, cap condition and fill stability. There were no issues with the landfill noted during any of the inspections undertaken during the monitoring year.

4.2.2 Results of receiving environment monitoring

Water quality samples were taken on 14 April 2008 from the Mangawhero Stream that flows beside the closed Eltham landfill as shown in Figure 4.



Figure 4 Eltham landfill and sampling sites

4.3 Surface water

The water quality of the Mangawhero Stream is influenced by a number of factors. Potentially the most significant of these are farming, the Eltham municipal oxidation pond effluent and landfill leachate. Two sites were sampled on one occasion in the 2008-2009 period. The results of the analysis of these samples are set out in Table 19.

Table 19 Chemical analysis of water samples taken in relation to Eltham landfill on 5 March 2009

Parameter	Unit	MWH000410 u/s of landfill	MWH000470 d/s of landfill
Biochemical oxygen demand	g/m ³	15	17
Chloride	g/m ³	54.2	54.3
Conductivity @ 20°C	mS/m	39.7	39.1
Acid soluble chromium	g/m ³	<0.03	<0.03
Dissolved oxygen	g/m ³	7.2	4.7
Percentage dissolved oxygen	%	75	49
Dissolved reactive phosphorus	g/m ³	1.37	1.12
Fecal coliforms	g/m ³	7800	4600
Ammoniacal nitrogen	g/m ³	3.61	3.18
Nitrite/nitrate nitrogen	g/m ³	1.53	1.9
pH	pH	7.4	7.3
Suspended solids	g/m ³	29	24
Temperature	pH	16.1	16
Turbidity	NTU	22	22
Acid soluble zinc	g/m ³	0.026	0.018

There was no evidence of an increase in the concentration of any contaminants due to discharge from the landfill. However as in previous years it was difficult to ascertain the impact of the leachate originating from the landfill on the Mangawhero Stream because of the effects attributed to the wastewater from the Eltham wastewater treatment plant. Water quality deteriorates greatly below the wastewater treatment plant discharge which is upstream of the old landfill. The effects of the waste water treatment plant effectively smother any effect the landfill may be having. Rainfall levels at the time of sampling will also have an influence on water quality measured.

There are no significant rises in the levels of the indicator species zinc, phosphorus or chromium. This indicates that the landfill's contribution to the effect already produced by the waste water system is likely to be minimal. There was a slight rise in BOD, but the rise itself (of 2.0 g/m³) was not significant when compare to the upstream level of 15.0 g/m³.

4.3.1 Biomonitoring

4 March 2009

The Council's standard 'kick-sampling' technique was used at four established sites to collect streambed macroinvertebrates from the Mangawhero Stream and at three established sites in the Waingongoro River. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI_s 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_s 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 SQMCI_s between sites may indicate the degree of adverse effects (if any) of the discharges being monitored.

This late summer-early autumn macroinvertebrate survey following period of low recession flow indicated that the discharge of treated wastewater from the Eltham WWTP was having significant effects on the macroinvertebrate communities of the Mangawhero Stream. Changes in the macroinvertebrate communities were recorded between the upstream 'control' site, and sites downstream of the WWTP discharge as far as the confluence with the Waingongoro River, and were more significant at the two sites in the mid reaches to the boundary of the consented mixing zone (SH3), where physicochemical water quality was poorest due to poor dilution of the wastewater discharge and overloading of the assimilative capacity of the receiving waters. The presence of traces of heterotrophic growths at two downstream Mangawhero Stream sites was consistent with these macroinvertebrate community effects.

The macroinvertebrate communities of the Mangawhero Stream contained high proportions of 'tolerant' taxa at all sites and the communities downstream of the discharge were dominated almost entirely by 'tolerant' taxa. Taxonomic richness (number of taxa) was moderate to poor at the time of this late summer-early autumn survey under low flow conditions.

MCI and SQMCI_s scores indicated that the Mangawhero Stream communities ranged from poor to very poor 'health' at all of the downstream sites, well below the typical condition recorded in similar Taranaki streams.

No significant differences in macroinvertebrate communities were found in the Waingongoro River below the Mangawhero Stream confluence. There was some downstream decline in SQMCI scores but minimal change in taxa richness and MCI value through the surveyed reach of the river, indicative of minimal impacts from the Mangawhero Stream which receives the Eltham WWTP discharge. The 'health' of the main river throughout the reach was 'good' and typical of conditions recorded in the mid reaches of similar Taranaki ringplain rivers.

4.4 Register of incidents

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 have a significant effect upon the

environment. The register ('unauthorised incident register') includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Incidents may be alleged to be associated with a particular site. If there is 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 2008-2009 period, there were no incidents recorded by the Council that were associated with Eltham landfill.

4.5 Discussion

4.5.1 Discussion of plant performance

The site has been closed for a reasonable time. Vegetative cover is very thick and in good condition. Slumping does not seem to be a problem at the site, although the vegetative cover masked most of the surface area. The site appears to be in good condition and managed well.

4.5.2 Environmental effects of exercise of consents

It is somewhat difficult to accurately gauge the effects associated with the discharge of leachate from the Eltham landfill. This is because any effect that the leachate may have on the Mangawhero Stream is masked by the discharge of wastes from the Eltham wastewater treatment plant. No definitive conclusions can be drawn from results of the biomonitoring and physicochemical surveys. However as there is no significant difference in the water quality between the sites upstream and downstream of the landfill, it is likely that the landfill is contributing only very minor amounts of contaminants to the overall contaminant load in the Mangawhero Stream. Once the works to pump Eltham's WWTP plant discharge to Hawera's WWTP is complete, the water quality in the Mangawhero Stream should improve and then allow for a better understanding any effects the landfill's presence may be having.

4.6 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 20.

Table 20 Summary of performance for consent 3387-3 to discharge leachate and stormwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. STDC shall adopt the best practicable option	Site specific monitoring programme – programme management	Yes
2. STDC shall prepare and maintain a site contingency plan	Site specific monitoring programme – programme management	Yes
3. The site and associated water shall be monitored	Site specific monitoring programme – water sampling and inspections	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Discharges from the site shall not cause adverse environmental effects	Site specific monitoring programme – water sampling and inspections	Yes
5. Optional review provision	Site specific monitoring programme – programme management	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

N/A = not applicable

During the year, STDC demonstrated a high level of environmental performance and compliance with the resource consents. During the period under review there were no issues relating to odour nuisance. The landfill cap continued to remain intact and with very good vegetative cover. There was no erosion of the cap noted.

4.7 Recommendations from the 2007-2008 Annual Report

In the 2007-2008 Annual Report, it was recommended:

THAT monitoring of discharges from Eltham landfill in the 2008-2009 year continue at the same level as in 2007-2008.

This recommendation was implemented.

4.8 Alterations to monitoring programmes for 2009-2010

In designing and implementing the monitoring programmes for air/water 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 emissions/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 emitting to the atmosphere/discharging to the environment.

In the case of Eltham landfill, the programme for 2008-2009 was unchanged from the programme implemented in the 2007-2008 period. It is now proposed for the 2009-2010, the monitoring programme continue at that level as that of 2008-2009. A recommendation to this effect is presented in Section 4.9 of this report.

4.9 Recommendation

THAT monitoring of discharges from Eltham landfill in the 2009-2010 year continue at the same level as in 2008-2009.

5. Manaia landfill

5.1 Background

The Manaia Community Landfill was in operation from the 1980's and STDC has held consent 3952, which authorises the discharge of both leachate and stormwater from the site, since 1991. The landfill used to service the township of Manaia and the surrounding rural areas exclusively. However with the closure of the Matangara landfill [Hawera] in June 1998 and the Opunake landfill in November 1999, the landfill's catchment expanded to service these other areas until it closed in June 2006.

Currently STDC and Transpacific Industries are planning to use the Manaia landfill cap as a composting pad to process the district kerbside green waste collection.

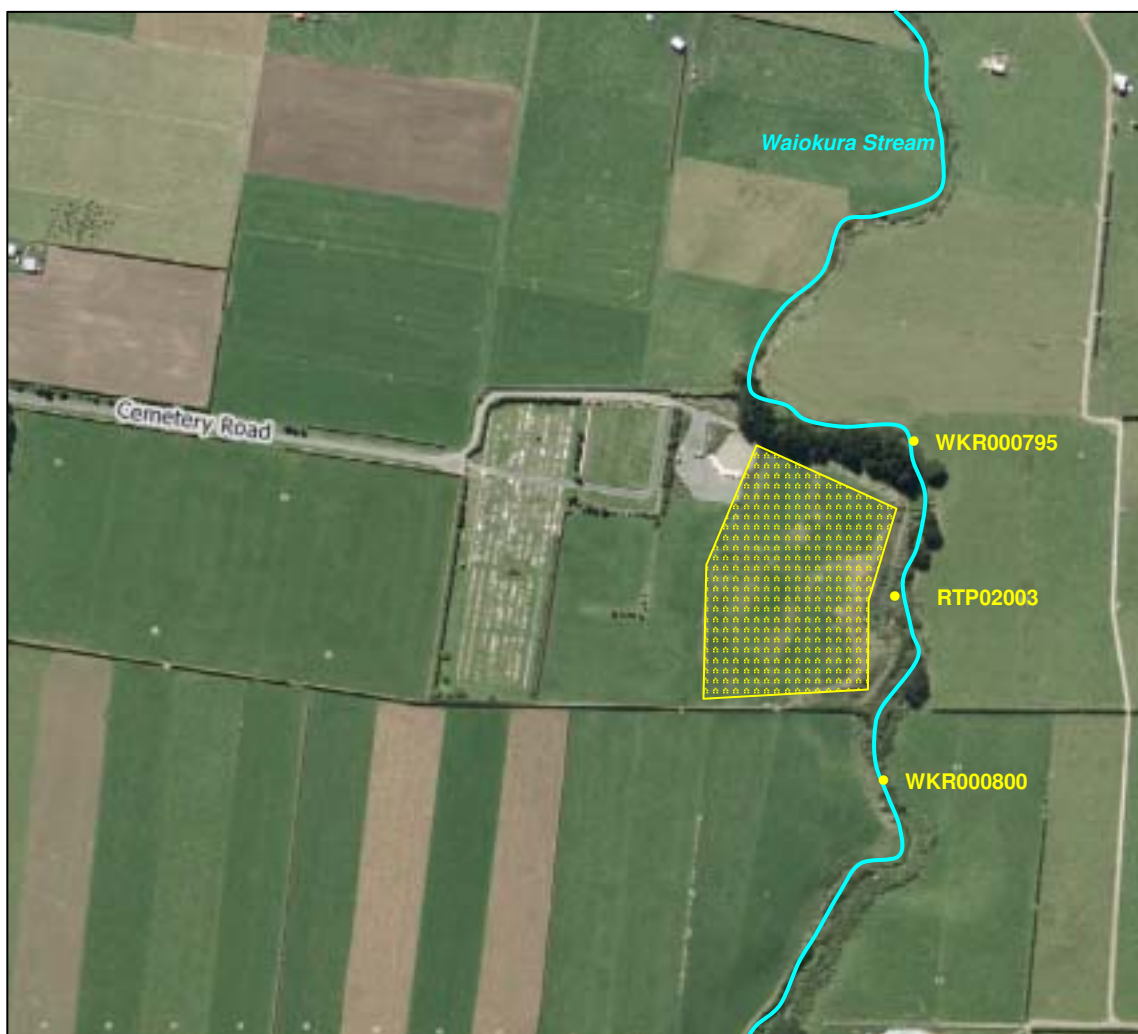


Figure 5 Aerial view of Manaia landfill showing sampling sites and landfill foot print

5.2 Results

5.2.1 Inspections

Four inspections were carried out during the monitoring year. The inspections focused on the condition of the cap and stormwater/leachate management.

3 September 2008

A site visit was made to conduct a compliance monitoring inspection and to take water samples. The cap was well vegetated and there was less refuse migrating through than had been seen on previous inspections. There was some windblown rubbish on the southern and eastern edges of the landfill cap. This may have come from the transfer station or is from the plastic and refuse previously seen migrating through the cap. There was a small area of ponding approximately 50 m south of the south eastern corner of the transfer station (1697731E-5620700N).

The leachate pond was quite full but access to the discharge point was prevented by a thick growth of gorse which will have to be removed. It was therefore difficult to see if the pond was discharging. A sample was taken from the pond itself as well as two samples from the Waiokura Stream.

The following action was to be taken:

1. Remove the gorse that is growing along the southern edge of the site.
2. Remedy the area of ponding mentioned in the inspection text.

13 February 2009

A site visit was made to conduct a compliance monitoring inspection, to take water samples and to do a follow up inspection on the requested works. There were intermittent showers at the time of the inspection and heavy rain 2 days prior. The Waiokura Stream had a high and swift flow.

The cap was inspected and there no signs of any slumping, erosion or cracking. The small area of ponding noted at the previous inspection was not in evidence. There no ponding observed anywhere on the cap despite the recent rains. The hedge on the southern boundary of the cap was free of litter as was the area on the western boundary adjacent the stream.

The leachate pond was only approximately half full and was not discharging at the time of the inspection. A leachate sample was not taken as access to the site was impeded by heavy growths of gorse. The site manager was phoned and undertook to have the gorse sprayed and the access track cleared as soon as possible. A follow up inspection was to be made in 4 weeks. A referral to a Pest Plant officer was to be pursued if this action was not taken as the gorse was within 25 metres of the southern and western property boundaries. Samples were taken from the Waiokura Stream.

The following action was to be taken:

- Spray the gorse as instructed in the previous inspection notice.

16 March 2009

The following was found to be occurring: A site visit was made to inspect the progress of the requested works. The access track and the area around the leachate pond had been cleared of gorse. Photos of the site were provided by the consent holder. During an earlier phone conversation with the site manager, it was indicated that the rest of the gorse on the site would be sprayed.

17 April 2009

A site visit was made to conduct a compliance monitoring inspection and to take water samples. The cap was well vegetated and there was no evidence of slumping, erosion or ponding. The problem noted in earlier inspections of plastics poking out of the cap seems to have cleared up. The gorse on the cap and along the access track had been sprayed and cleared. Works on the proposed composting pad had not yet started. A sample was taken from the leachate pond, which was 3/4 full and not discharging at the time of the inspection. Water samples were also taken from the Waiokura Stream.

5.2.2 Discharge monitoring

At present the leachate pond receives very little volume of leachate, and the bulk of fluid in the pond is most likely to be stormwater. Two samples were taken from the pond, even though it was not discharging at the time. The results from this sample are set out in Table 21 below.

Table 21 Chemical analysis of leachate pond at Manaia landfill for the 2008-2009 period

Parameter	Unit	03-Sep-08	17-Apr-09
BOD	g/m ³	2.6	*
Conductivity @ 20°C	mS/m	118	159
Dissolved reactive phosphorus	g/m ³	0.015	*
Dissolved iron	g/m ³	0.29	*
Unionised ammonia	g/m ³ N	0.06254	0.01051
Ammoniacal nitrogen	g/m ³ N	4.99	1.22
Nitrate/nitrite	g/m ³	<0.05	*
pH	pH	7.7	7.4
Suspended solids	g/m ³	6	35
Temperature	Deg. C	11.4	15.6
Dissolved zinc	g/m ³	*	0.006

Key: * = not measured

The results indicate that there is some leachate contamination in the water in the collection pond which is most highlighted by the high level of conductivity and moderate ammoniacal nitrogen levels. However when viewed in terms of the size of the potential discharge and the rate of instream dilution, there is unlikely to be adverse effects when a discharge is occurring.

5.2.3 Results of receiving environment monitoring

5.2.3.1 Surface water

Samples were collected from the Waiokura Stream upstream of the landfill and downstream of the landfill during the monitoring period. The results are presented in Table 22.

As can be seen from Table 22 the landfill is having a negligible effect on water quality of the Waiokura Stream. As mentioned before the leachate pond was not discharging at any time during the sampling visits so this is to be expected. However

it appears from the results that leachate is not circumventing the leachate system and entering the stream via seepage.

There were no significant differences between upstream and downstream samples on any of the sampling occasions. The conductivity and ammoniacal nitrogen content of the samples taken were generally consistent with all historical results for the sites, which indicate that water quality at the site has changed little in the last 15 years.

Table 22 Chemical analysis of receiving waters at Manaia landfill for the 2008-2009 period

Parameter	Unit	03-Sep-08		13-Feb-09		17-Apr-09	
		WKR000795 u/s landfill	WKR000800 d/s of landfill	WKR000795 u/s landfill	WKR000800 d/s of landfill	WKR000795 u/s landfill	WKR000800 d/s of landfill
BOD	g/m ³	0.7	0.7	1.2	1.3	*	*
Conductivity @ 20°C	mS/m	24.3	24.7	25.8	26	25.9	26
Dissolved reactive phosphorus	g/m ³ P	0.022	0.019	0.047	0.047	*	*
Acid soluble iron	g/m ³	0.3	0.3	0.7	0.68	*	*
Unionised ammonia	g/m ³ N	0.00026	0.00007	0.00033	0.00177	0.00083	0.0017
Ammoniacal nitrogen	g/m ³ N	0.021	0.034	0.01	0.053	0.026	0.052
Nitrite/nitrate nitrogen	g/m ³ N	4.04	4	1.8	1.81	*	*
pH	pH	7.7	6.9	7.9	7.9	8	8
Suspended solids	g/m ³	20	20	15	17	10	8
Temperature	Deg.C	11.4	11.5	18.6	18.6	14.9	15.2
Dissolved zinc	g/m ³	*	*	0.033	<0.005	<0.005	<0.005

Key: * = not measured

5.2.3.2 Biomonitoring

During the 2008-2009 monitoring year, one visual inspection was made of the ecology of the Waiokura Stream.

2 March 2009

The leachate pond was not discharging at the time of the survey, and it appeared that no discharge had occurred for some time. It is likely that if ever there was sufficient rainfall to cause a discharge from the pond, the stream would be in fresh and the discharge would therefore be greatly diluted.

During the inspection the stream had a moderate but discoloured flow. A site upstream of the landfill boundary was inspected for macroinvertebrates. The stream contained patches macrophytes, which generally support a diverse macroinvertebrate community. The cobble substrate was also examined. Healthy populations of mayfly and caddisfly larvae were observed at this upstream site.

A second site downstream of the leachate pond and landfill boundary was also examined. The stream at this site was slower flowing due to the presence of willows on the stream banks and macrophyte beds were less common due to this shade. The substrate was generally sandier. Mayfly and caddisfly larvae were observed on the streambed at this site, in similar abundance to that observed upstream. Compared with the previous inspection, there was less silage wrap in the stream. No undesirable heterotrophic growths (sewage fungus) were noted on the bed of the stream.

The presence of mayflies, which are moderate to highly sensitive taxa, and the lack of undesirable heterotrophic growths on the bed, indicates that any recent discharges from the land fill site have not had a significant adverse effect on the macroinvertebrate communities of the Waiokura Stream.

5.3 Register of incidents

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 register ('unauthorised incident register') includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Incidents may be alleged to be associated with a particular site. If there is 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 2008-2009 period, there were no incidents recorded by the Council that were associated with Manaia landfill.

5.4 Discussion

5.4.1 Discussion of plant performance

The only issue of note was that of the gorse preventing access to some part of the site, however this was rectified by STDC. There was also a small amount of amount of ponding. Overall the site was well managed and STDC was cooperative in resolving any issues raised by Council.

5.4.2 Environmental effects of exercise of consents

There was very little variation in water quality in the Waiokura Stream above and below the landfill site, indicating that the discharge of leachate from the landfill is not causing any adverse effects on the receiving environment.

There were no dust or odour complaints concerning the site received by the Council.

5.5 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 23.

Table 23 Summary of performance for consent 3952-2 to discharge of leachate and stormwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. STDC shall adopt the best practical option	Site specific monitoring programme – programme management	Yes
2. STDC shall prepare a site contingency plan	Site specific monitoring programme – programme management	Yes
3. Prepare a landfall management plan	Site specific monitoring programme – programme management	Yes
4. STDC shall notify the Council of changes to plans prior to changes	Site specific monitoring programme – programme management	Yes
5. Monitor ground and surface water on and near the site	Site specific monitoring programme – water sampling	Yes
6. Install leachate and stormwater collection, treatment and discharge systems	Site specific monitoring programme – inspection	Yes
7. Discharges from the site shall not cause any adverse environmental effect	Site specific monitoring programme – programme management	Yes
8. Is an optional review provision	N/A	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

N/A = not applicable

During the year, the STDC demonstrated a high level of environmental performance and compliance with the resource consents. During the year under review there were no issues regarding water pollution, or dust, or odour at the site.

5.6 Recommendations from the 2007-2008 Annual Report

In the 2007-2008 Annual Report, it was recommended:

THAT monitoring of discharges from Manaia landfill site in the 2008-2009 year continue at the same level as in 2007-2008.

The recommendation was subsequently implemented.

5.7 Alterations to monitoring programmes for 2008-2009

In designing and implementing the monitoring programmes for air/water 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 emissions/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 emitting to the atmosphere/discharging to the environment.

In the case of Manaia landfill, the programme for 2008-2009 was unchanged from that for 2007-2008. It is now proposed that for 2009-2010, the monitoring programme remain unchanged from that of the 2008-2009 period. A recommendation to this effect is attached to section 5.8 of this report.

5.8 Recommendations

THAT monitoring of discharges from Manaia landfill site in the 2009-2010 year continue at the same level as in 2008-2009.

6. Opunake landfill

6.1 Background

The Opunake landfill was operational from 1979, closing in 1999 with the expiry of the 20-year lease of the land. The landfill site is located at Whitcombe Road, and used to service the township of Opunake and the surrounding rural areas. Waste from Rahotu and Pungarehu was also disposed of at the landfill. The 4.73 ha site was initially operated in an uncontrolled manner for many years with a significant amount of rubbish being burnt. In 1990 a ban on fires was imposed and the site began to operate under restricted hours. In 1999 STDC submitted a landfill closure plan and had the site reinstated.



Figure 6 Aerial view of Opunake landfill foot print and sampling sites

6.2 Results

6.2.1 Inspections

Two inspections were carried out at the Opunake landfill in the 2008-2009 period. Details of these inspections are given below.

20 March 2009

A site visit was made to conduct a compliance monitoring inspection. The weather was fine and warm with approximately 3 mm rain over the previous 5 days. The landfill cap was well vegetated and there was no evidence of cracking, subsidence or erosion. There were no issues in regards to dust or odour or illegally dumped rubbish.

The Otahi Stream was inspected and no adverse effects were noted. There appeared to be no leachate seeping into the stream at the discharge point but this was difficult to assess as the area around the leachate pond, drain and discharge point has over grown with gorse and blackberry. The gorse and blackberry will have to be cleared to allow proper access for sampling and inspection.

The site manager was contacted in regard to this.

The following action was to be taken:

- Remove and spray gorse and blackberry around the leachate pond and drain.

18 May 2009

A site visit was made to conduct a compliance monitoring visit and to take water samples. There were intermittent showers and approximately 45 mm rain over the past seven days. The cap of the landfill had good grass cover and it appeared that it had not been grazed recently. There was no ponding despite the recent rain indicating that the cap contour and the stormwater drains are working well. There was no sign of erosion, cracking or slumping of the cap. The gorse around the leachate/stormwater drain was dying off after spraying but access to the discharge point was still difficult.

Water samples were taken up and down stream of the site. A leachate sample as not obtained as no flow was evident. No effects on the stream were noted.

6.2.2 Results of discharge monitoring

There was no leachate discharging from the site during any of the inspections.

6.2.3 Results of receiving environment monitoring

6.2.3.1 Surface water

Samples were taken from the Otahi Stream at sites above and below the landfill on 18 May 2009. The results are presented in Table 24.

Table 24 Chemical analysis of receiving water samples taken at Opunake landfill in 2008-2009

Parameter	Units	18 May 2009	
		OTH000310 u/s of landfill	OTH000340 d/s of landfill
Alkalinity	g/m ³ CaCO ₃	48	47
Biochemical oxygen demand	g/m ³	1.7	1.7
Conductivity @ 20 °C	mS/m	20.6	20.4
Acid soluble iron	g/m ³	0.41	0.37
Unionised ammonia	g/m ³ N	0.00045	0.00036
Ammoniacal nitrogen	g/m ³ N	0.025	0.02
pH	pH	7.8	7.8
Temperature	Deg.C	13.3	13.3
Dissolved zinc	g/m ³	0.009	0.005

There is no detectable change in water quality between the upstream and downstream sites indicating that the closed landfill at Opunake is not having a significant effect on the receiving waters.

6.2.3.2 Biomonitoring

Biomonitoring surveys are carried out at the Opunake landfill on a biennial basis and a survey was undertaken on 15 January 2009. Below is a summary of the survey's findings. A full copy of the report is attached in the appendix of this report.

15 January 2009

The Council's standard 'kick-sampling' technique was used at two established sites to collect streambed macroinvertebrates from the Otahi Stream. Samples were sorted and identified to provide the number of taxa (richness) and MCI and SQMCI_s 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_s 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_s between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This summer macroinvertebrate survey indicated that the discharge of leachate from the closed Opunake landfill site had not had any detrimental effect on the macroinvertebrate communities of the Otahi Stream. No significant changes in the macroinvertebrate communities were found between the upstream 'control' site, and site downstream of the landfill discharge.

The macroinvertebrate communities of the stream contained moderate proportions of 'sensitive' taxa at both sites and the communities were generally dominated by a combination of several 'moderately sensitive' and 'tolerant' taxa. Taxonomic richnesses (numbers of taxa) were similar at the time of this summer survey compared to the other recent surveys conducted in this stream.

MCI and SQMCI_s scores indicated that the stream communities were of fair 'health', and generally similar to the condition recorded in the lower reaches of similar Taranaki streams.

6.3 Register of incidents

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 register ('unauthorised incident register') includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Incidents may be alleged to be associated with a particular site. If there is 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 2008-2009 period, there were no incidents recorded by the Council that were associated with Opunake landfill.

6.4 Discussion

6.4.1 Discussion of plant performance

The landfill has been closed for several years and reverted to pasture land. STDC responded quickly and co-operatively to have the blackberry and gorse removed from the leachate drain. During the year under review the site was managed very well and there were no issues of concern.

6.4.2 Environmental effects of exercise of consents

In the year under review there were no issues of concern relating to leachate discharges from the site, landfill gas, or water quality in the Otahi Stream as a result of the landfill. It was not possible to collect a leachate sample at the time of inspections which indicated that contouring of the site and compaction of the cap may be effective at preventing infiltration of excess stormwater on the site.

6.4.3 Evaluation of environmental performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 25.

Table 25 Summary of performance for consent 0526-3 discharge of leachate and stormwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. STDC shall adopt the best practicable option	Site specific monitoring programme – programme management	Yes
2. Prepare and maintain a site contingency plan	Site specific monitoring programme – programme management	Yes
3. STDC shall inform the Council prior to any changes to these plans	Site specific monitoring programme – programme management	Yes
4. Site water quality shall be monitored	Site specific monitoring programme – water sampling	Yes
5. There shall be no adverse impact on aquatic life as a result of discharges	Site specific monitoring programme – water sampling and inspection	Yes
6. Is an optional review provision	There were no grounds for review	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

N/A = not applicable

During the year, STDC demonstrated a high level of environmental performance and compliance with the resource consents. During the year under review there were no

adverse environmental issues as a result of the landfill. There were no complaints received concerning the landfill.

6.5 Recommendations from the 2007-2008 Annual Report

In the 2007-2008 Annual Report, it was recommended:

THAT monitoring of discharges from Opunake landfill in the 2008-2009 year continue at the same level as in 2007-2008.

This recommendation was implemented.

6.6 Alterations to monitoring programmes for 2009-2010

In designing and implementing the monitoring programmes for air/water 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 emissions/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 emitting to the atmosphere/discharging to the environment.

In the case of Opunake landfill, the programme for 2008-2009 was unchanged from that for 2007-2008. It is now proposed that for 2009-2010, the monitoring programme remain unchanged from that implemented in 2008-2009. A recommendation to this effect is presented in Section 6.7 of this report.

6.7 Recommendations

THAT monitoring of discharges from Opunake landfill in the 2009-2010 year continue at the same level as in 2008-2009.

7. Patea landfill

7.1 Background

Prior to 1991, the Patea landfill was a largely uncontrolled landfill servicing the residents of the Patea. In 1992 STDC applied for resource consents to continue operating the landfill under the RMA. The landfill continued to operate until December 2007 and was then covered with a light clay cap. Full landfill closure works commenced in August 2008 and were completed in November 2008.



Figure 7 Aerial view of the landfill at Patea

7.2 Results

7.2.1 Inspections

25 July 2008

A site visit was made to carry out a follow up inspection of the disused Patea landfill (Refer to last inspection 12 June 2008).

The stormwater sump adjacent to the Transfer Station entrance had now been commissioned. All stormwater from around that area was now directed and discharged into the boundary stormwater ring drain. The bottom interceptor pit was full of stormwater. Rubbish had been removed from this pit as requested.

Car bodies had been removed from around the back of the transfer station along with drums of waste oil. The remainder of material in this area still required removing along with contaminated soil where the waste oil drums were sitting.

No further work has been done on the tip face cap due to incumbent weather.

20 August 2008

A site visit was made to conduct a compliance monitoring inspection. At the time of the inspection Hurlstone Earthmoving contractors were surveying the site for the upcoming reinstatement works which are due to start 1 September 2008.

Discussions were held in regard to the reinstatement works.

The illegally dumped rubbish on the grassed area just north of the transfer station had yet to be cleaned up, the soil contaminated with oil had also not been removed.

There was ponding on the light clay covering over the most recent area of landfilling, however the clay covering appeared to remaining stable despite the recent inclement weather.

Some windblown litter still persisted at the site and this should be removed along with illegally dumped rubbish.

The following action was to be taken:

- Remove ALL of the illegally dumped rubbish, contaminated soil and windblown litter.

19 September 2008

A site visit was made to view the progress of reinstatement works and to investigate the notification made by the contractor that they had encountered buried refuse during digging and contouring operations.

There had been significant progress on the reinstatement project with almost all of the landfill area covered with clay. Some areas of the clay had already been contoured and were ready for topsoil. A new settling pond had been constructed below the site (in the same place as the old pond), which will eventually be fed by the perimeter drain. A silt fence had also been installed around the borrow area. The perimeter drain had been partially constructed but construction was interrupted when buried refuse was encountered. A temporary silt trap was in place on the NW corner of the landfill area to trap silt from any run-off that occurs before the perimeter drain can be completed.

The contractor had encountered buried rubbish during contouring and digging operations. The contractor was placing all exposed and excavated rubbish in the centre of the cap where it was to be subsequently buried with clay. At the time of the inspection there was an area of approximately 800m² of exposed rubbish. There was strong odour onsite but this was not detectable at the boundary. The contractor stated that they would ensure that the exposure refuse would be covered by clay at the end of the day.

The rubbish and oily soil behind the transfer station had been cleared away. There was no dust, ponding or sedimentation issues observed.

The following action was to be taken:

Ensure that any exposed rubbish is covered on a daily basis

10 October 2008

Significant progress had been made since the last inspection. A large area of the cap was close to the contour required, and was just awaiting top soil. The redesigned perimeter stormwater system had been constructed as contouring progressed.

There were some small areas where the presence of buried refuse was detectable by odour near the eastern fenceline of the transfer station. The odour was detectable where the perimeter drain had been dug down to design levels and the refuse was just below the surface.

It was agreed that the contractor would have to excavate some of the buried refuse and relocate it to point of the cap where it would be buried by at least 600 mm of clay.

Stormwater from the cap area was being diverted to either the permanent settling pond or to a temporary grit trap (used until final contour allows for all water to be diverted to the settling pond.) Silt fencing was also in place around the borrow area (including the silt trap).

The permanent settling pond had been damaged by the recent heavy rains; the lip of the pond had been scoured out by the inflowing water. The contractor had been asked by STDC to redesign the pond. The pond was not discharging at the time of the inspection, but appeared to be working well.

24 October 2008

A site visit was made to the Patea Landfill reinstatement project after a period of heavy rain. Storm water runoff was discharging back to the perimeter drain and this was directing the flow through the grits which appeared to be effective in trapping silt, minimizing downstream silt effects. The discharge from the final trap was reasonably clean. All ongoing works had been halted due to wet weather conditions.



Photograph 1 Patea Landfill during early stages of capping works, 24 October 2009

4 November 2008

A site visit was made to view the progress of reinstatement works. Topsoil was being applied to the cap at the time of the inspection. Approximately 70% of the cap had topsoil on it and was at the final contour. On the western extremity of the cap there is a very steep slope of exposed topsoil from the outside of the perimeter drain leading down to the fenceline. This could potentially cause sediment to run in the stream that flows through the gully below. A silt fence will need to be installed until the slopes have good grass cover.

The perimeter drainage system appeared to be working as planned. Although there was no flow at the time of the inspection, there was no evidence that water had ponded anywhere during the rain over the past 2-3 days.

Two silt traps had been installed on the north side of the landfill and these were lined with plastic. These will pre-treat stormwater before it passes into the culvert buried under the cap.

The final silt pond was still in the process of being reconfigured to address the scouring that had occurred previously.

Silt controls for the borrow area still remained in place and these seemed to be working well.

The following action was to be taken:

- Install a silt fence on the existing fence line on the western edge of the landfill to prevent sediment run-off. The fence should remain in place until the slope has good grass cover.



Photograph 2 Plastic lined silt traps on north side of cap, 4 November 2009

27 November 2008

The reinstatement earthworks appeared to have been completed. There was earthworks machinery present on the site. The top soil had been sown with grass seed which had started growing in some areas of the cap. A silt fence had been installed (as requested) on the southern edge of the cap where there was a very steep batter running down to the gully below.

The silt pond had been redesigned to prevent the scouring that occurred earlier. The borrow area had been leveled to a gentle batter and also had been sown with grass seed.



Photograph 3 New redesigned final settling pond, 27 November 2008

28 January 2009

A site visit was made to conduct an inspection of the new landfill cap. There was significant growth of vegetation all across the capped area. The borrow area was also well grassed. All silt traps and the settling pond had new fences around them. The perimeter of the cap had also been fenced and a race had been established running down the centre of the cap. There was no evidence of slumping, cracking or erosion, nor was there any evidence of refuse migrating through to the surface. The transfer station appeared clean and well organised

9 April 2009

A site visit was made to conduct a compliance monitoring inspection and to take discharge and water samples. There was a strong southerly wind and 15 mm of rain over the previous seven days.

The new cap had thick vegetation on it consisting of pasture grasses and weeds (there was no evidence to suggest that the cap had been grazed yet). The borrow area was also well vegetated. There was a small flow of water in the lower reaches of the perimeter drain and this was flowing into the settling pond via the sub surface

culvert. The pond was discharging and a sample was taken. There was no ponding or subsidence noted, nor was there any refuse protruding from the cap. The silt traps on the downhill western edge of the cap were working well and had accumulated significant amounts of silt (most likely from the first flush). These will have be de-silted in the near future.

A receiving water sample was taken from the unnamed tributary to the west of the site.

The site manager was contacted in regards to the accumulated silt in the silt traps.

6 June 2009

A site visit was made to conduct a compliance monitoring inspection. The weather was overcast with a southerly breeze, approximately 30 mm rain over the last 7 days.

The perimeter drain was retaining water along most its length and there were several areas of significant ponding extending out from the drainage system and on to the cap proper. The areas adjacent the ponding were very boggy. Despite the large amount of water present in the stormwater system, and on the fringes of the cap, there was only a very small discharge occurring from the system, indicating that there were issues with topography of the stormwater system. This discharge however was running clean and clear and had no odour.

It appeared the some remedial works had been done to the drains recently, evidenced by digger tracks and fresh cut earth in the drains.

Site manager was contacted to discuss the issue with the drainage and informed the Council that further remedial works were schedule over the next week.

Follow up visit and close monitoring of the situation were recommended.

The following action was to be taken:

- Scheduled a site meeting between STDC staff, consultant, and contactor to discuss drainage issues.

7.2.2 Discharge monitoring

During the 2008-2009 period a discharge sample was taken from the new silt pond and a sample was taken from the tributary that it discharges into. The results from the chemical analysis of these samples are set out in Table 26.

Table 26 Chemical analysis of water samples taken at the Patea Landfill site

Parameter	Site	9 April 2009	
	Date	PAT000954	Silt pond discharge
Conductivity @ 20°C	mS/m	79.5	19.5
Acid soluble iron	g/m ³	0.24	0.27
Ammoniacal nitrogen	g/m ³ N	0.292	0.044
Suspended solids	g/m ³	21	12
Temperature	°C	12.2	10.8
Dissolved zinc	g/m ³	<0.005	<0.005

Key: * = not measured

The results show that the discharge from the silt pond at the time of sampling was low in all the contaminants tested for. Its worth noting that the stream itself exhibited higher levels in all parameters except iron, although the levels were not high enough to compromise water quality.

The increased levels of contaminants in the stream could be a result of either sub-surface leachate seepage from the farming activities further up stream. As noted earlier the water quality remains high and no adverse effects from the landfill are observed.

7.3 Register of incidents

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 register ('unauthorised incident register') includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Incidents may be alleged to be associated with a particular site. If there is 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 2008-2009 period there were no incidents associated with the Patea landfill registered with the Taranaki Regional Council.

7.4 Discussion

7.4.1 Discussion of plant performance

The landfill ceased to accept waste in December 2007 but the capping of the landfill did not commence until August 2008. STDC originally had planned to not start capping works until as late as January 2009 to avoid undertaking works over the spring and winter months. Council was concerned however, of the potential issues that could arise by leaving the landfill un-capped for such a long period and STDC brought the capping works forward to September 2008.

There were some issues in regards to the cap design and on 18 September 2008, Council was informed that the contractors had encountered refuse while digging the perimeter drain. The cap contour had to be totally redesigned to allow for this.

The new design utilised a perimeter bund which precluded the need to dig out a drain which may have disturbed buried refuse. The new design did not appear to be as efficient at draining water off the cap and Council raised this concern with STDC who gave assurances that the design was sound.

In June 2009, an inspection revealed that some areas of the cap were not draining and ponding was occurring in several areas. This was exacerbated by the fact that the vegetation on the cap died away after spraying to get rid of a barnyard grass (*Echinochloa crus-galli*) infestation.

STDC staff and the contractor met onsite and agreed on a plan to rectify the situation and this was subsequently carried out shortly after the monitoring period ended.

7.4.2 Environmental effects of exercise of consents

During the period under review the landfill ceased to accept waste and therefore risk of adverse effects is reduced. Despite the delay in the reinstatement works, no significant effects were detected during the inspection by the water quality monitoring.

7.5 Evaluation of performance

A tabular summary of STDC's compliance record for the year under review is set out in Tables 27-29.

Table 27 Summary of performance for consent 0427-3 discharge of leachate and stormwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Prepare and maintain a site contingency plan	Site specific management plan – programme management	Yes
2. Prepare and maintain a landfill management plan	Site specific management plan – programme management	Yes
3. Advise of any changes being made to the management plan or the site contingency plan	Site specific management plan – programme management	Yes
4. Comply with information submitted in support of application	Site specific management plan – programme management	Yes
5. Monitor ground and surface water on and near the site	Site specific management plan – water sampling	Yes
6. Maintain all stormwater and leachate collection systems	Site specific management plan – inspection	No- reinstatement delayed
7. No adverse impact on aquatic life	Site specific management plan – inspection and water sampling	Yes
8. Prevent or minimise any likely adverse effects on the environment	Site specific management plan – programme management	Yes
9. Optional review provision re environmental effects	N/A	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Good

N/A = not applicable

Table 28 Summary of performance for consent 4636-2 discharge emissions into the air

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Prepare and maintain a site contingency plan	Site specific management plan – programme management	Yes
2. Prepare and maintain a landfill operations and management plan	Site specific management plan – programme management	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Advise of any changes being made to the operations and management plan or the site contingency plan	Site specific management plan – programme management	Yes
4. No material shall be burnt on site	Site specific management plan – inspection	Yes
5. Comply with information submitted in support of application	Site specific management plan – programme management	Yes
6. Prevent or minimise any likely adverse effects on the environment	Site specific management plan – inspection and water sampling	Yes
7. Optional review provision re environmental effects	N/A	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Good

N/A = not applicable

Table 29 Summary of performance for consent 7268-1 to discharge stormwater from landfill closure earthworks

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option	Site specific management plan – programme management	No- landfill only earthworks partially completed
2. Exercise consent in accordance with application	Site specific management plan – programme management	Yes
3. Notify before exercising consent	Programme management	Yes
4. Take reasonable steps to minimise effects	Site specific management plan – programme management	No - reinstatement delayed
5. Reinstatement and stabilisation as soon as possible	Site specific management plan – programme management	No - reinstatement delayed
6. A lapse condition	N/A	N/A
7. Optional review provision re environmental effects	N/A	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Good

N/A = not applicable

STDC demonstrated a good level of environmental performance and compliance with the resource consents it holds in regards to Patea landfill. During the year under review there were no serious adverse environmental issues as a result of the landfill.

7.6 Recommendations from the 2007-2008 Annual Report

In the 2007-2008 Annual Report, it was recommended:

THAT monitoring of discharges from Patea landfill in the 2008-2009 year be increased to 12 inspections per year, with 2 water quality samples to be taken on six occasions to be analysed for alkalinity, pH, ammoniacal nitrogen, dissolved zinc, dissolved iron, chloride, chemical oxygen demand, and conductivity.

This recommendation was partially implemented. The recommendation was made based on the premise that STDC would not commence capping works until January 2009. As capping works commenced shortly after the beginning of the monitoring year, a less stringent monitoring programme was implemented. 10 inspections were carried out and two water samples were taken.

7.7 Alterations to monitoring programmes for 2009-2010

In designing and implementing the monitoring programmes for air/water 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 emissions/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 emitting to the atmosphere/discharging to the environment.

In the case of Patea landfill, the programme for 2008-2009 was altered from that of 2007-2008. It is now proposed that for 2009-2010 period, that monitoring be reduced to the pre-closure levels of four inspections and two water samples per year. A recommendation to this effect is given in section 7.8.

7.8 Recommendations

THAT monitoring of discharges from Patea landfill in the 2009-2010 year be reduced to the pre-closure levels of four inspections and two water samples per year.

8. Kaponga landfill

8.1 Background

STDC [previously as Eltham District Council] operated the Kaponga landfill from the 1970's to 1993. The Kaponga landfill site is located in a gully that is also a wetland fed by a number of springs emanating from within the landfill. The site closed as a landfill in 1993 and has been covered by pasture for approximately 11 years and is now part of a dairy farm. On closure the site was sown in suitable pasture grasses to ensure rapid stormwater runoff and minimise percolation through the capping layer. Raupo growth on the lower face of the reinstated surface provides some natural attenuation of leachate and hence gives protection to the Waiokura Stream.

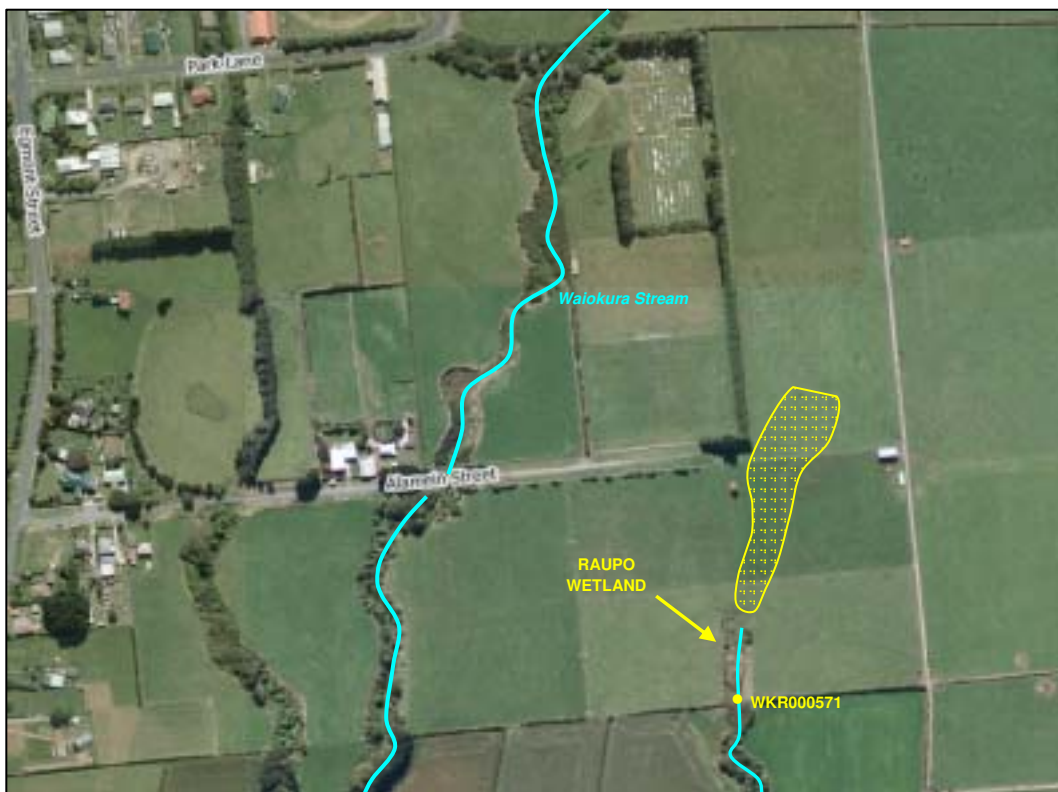


Figure 10 Aerial view of Kaponga landfill. Approximate landfill footprint is shown in yellow

8.2 Results

8.2.1 Inspection

A site visit was made to conduct a compliance monitoring inspection and to take a water sample. The cap was well vegetated and there was no evidence of cracking, erosion or subsidence over the most of the land filled area. There was a small area of boggy ground approximately 50 m uphill of the wetland (most likely surface pugging by stock). No other issues were noted.

8.2.2 Discharge sampling

One discharge sample was taken over the 2008-2009 period. The sampling point was just downstream from the wetland immediately below the toe of the landfill.

Table 30 Results of sampling at site WKR00057, 3 September 2008

Parameter	Unit	Result
Ammoniacal nitrogen	g/m ³ - N	0.036
Unionised ammonia	g/m ³ - N	0.00074
Conductivity @ 20°C	mS/m	18.0
Acid soluble iron	g/m ³	1.40
Temperature	Deg.C	11.7
Dissolved zinc	g/m ³	0.032
pH	pH	6.9

The results indicate that the landfill discharge is not having a significant adverse effect on the unnamed tributary of the Waiokura Stream. Zinc, iron and unionised ammonia are at background levels, and the low conductivity result indicates that the overall level of dissolved solids is low also.

8.3 Register of incidents

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 register ('unauthorised incident register') includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Incidents may be alleged to be associated with a particular site. If there is 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 2008-2009 period, there were no incidents recorded by the Council that were associated with Kaponga landfill.

8.4 Discussion

8.4.1 Discussion of plant performance

The landfill has been closed for several years and reverted to pasture land. The issues associated with such a site are illegal dumping, cap integrity, vegetation growth on the cap, landfill gas, and any excavation of the cap. During the year under review the site was managed very well and there were no issues of concern.

8.4.2 Environmental effects of exercise of consents

In the year under review there were no issues of concern relating to leachate discharges from the site, landfill gas, or water quality in the Waiokura Stream as a result of the landfill.

8.4.3 Evaluation of environmental performance

A tabular summary of STDC's compliance record for the year under review is set out in Table 31.

Table 31 Summary of performance for consent 0526-3 discharge of leachate and stormwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Site water quality shall be monitored	Site specific monitoring programme – programme management	Yes
2. Discharge shall not alter colour or clarity of Waiokura Stream	Site specific monitoring programme – programme management	Yes
3. There shall be no adverse impact on aquatic life as a result of discharges	Site specific monitoring programme – water sampling	Yes
4. Stormwater and leachate control structures designed and maintained	Site specific monitoring programme – water sampling and inspection	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		High

N/A = not applicable

During the year, STDC demonstrated a high level of environmental performance and compliance with the resource consents. During the year under review there were no adverse environmental issues as a result of the landfill. There were complaints received concerning the landfill.

8.5 Recommendations from the 2007-2008 Annual Report

In the 2007-2008 Annual Report, it was recommended:

THAT monitoring of discharges from Kaponga landfill in the 2007-2008 year continue at the same level as in 2004-2005.

This recommendation was not implemented in 2007-2008, but was implemented in 2008-2009 to reset the programme on its original triennial schedule.

8.6 Alterations to monitoring programmes for 2009-2010

In designing and implementing the monitoring programmes for air/water 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 emissions/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 emitting to the atmosphere/discharging to the environment.

In the case of Kaponga landfill, the programme for 2008-2009 was unchanged from that for 2005-2006. It is now proposed that the triennial programme remain unchanged and next be implemented in the 2011-2012 period. A recommendation to this effect is presented in 8.7 of this report.

8.7 Recommendations

THAT the triennial programme for monitoring the discharges at Kaponga landfill remain unchanged and next be implemented in the 2011-2012 period.

9. Summary of recommendations

Hawera landfill

1. THAT monitoring of discharges from Hawera landfill in the 2009-2010 year continue at the same level as in the 2008-2009 period.
2. THAT the option for a review of resource consent 0444-4 in June 2010, as set out in condition 11 of the consent **not** be exercised, on the grounds that the current consent conditions are adequate to deal with adverse effects arising from the exercise of this consent.
3. THAT the option for a review of resource consent 5831-2 in June 2010, as set out in condition 7 of the consent **not** be exercised, on the grounds that the current consent conditions are adequate to deal with adverse effects arising from the exercise of this consent.

Eltham landfill

THAT monitoring of discharges from Eltham landfill in the 2009-2010 year continue at the same level as in 2008-2009.

Manaia landfill

THAT monitoring of discharges from Manaia landfill site in the 2009-2010 year continue at the same level as in 2008-2009.

Opunake landfill

THAT monitoring of discharges from Opunake landfill in the 2009-2010 year continue at the same level as in 2008-2009.

Patea landfill

THAT monitoring of discharges from Patea landfill in the 2009-2010 year be reduced to the pre-closure levels of four inspections and two water samples per year.

Kaponga

THAT the triennial programme for monitoring the discharges at Kaponga landfill remain unchanged and next be implemented in the 2011-2012 period.

Glossary of common terms and abbreviations

The following abbreviations and terms are used within this report:

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 ³	grammes per cubic metre, and equivalent to milligrammes per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures
l/s	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 ₄	ammonium, normally expressed in terms of the mass of nitrogen (N)
NH ₃	unionised ammonia, normally expressed in terms of the mass of nitrogen (N)
NO ₃	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 ₁₀	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
UIR	Unauthorised Incident Register entry- an event recorded by the Council on the basis that it had 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: `STDC: Eltham Landfill, Hawera Landfill, Kaponga Landfill, Opunake Landfill, Patea Landfill, Waverley Landfill: Annual Report 1989/90' Technical Report 90-43, Taranaki Regional Council, October 1990.
- Taranaki Regional Council: `STDC: Eltham Landfill, Hawera Landfill, Kaponga Landfill, Opunake Landfill, Patea Landfill, Waverley Landfill: Annual Report 1990/91' Technical Report 91-15, Taranaki Regional Council, July 1991.
- Taranaki Regional Council: `STDC: Eltham Landfill, Hawera Landfill, Kaponga Landfill, Opunake Landfill, Patea Landfill, Waverley Landfill: Annual Report 1991/92' Technical Report 92-14, Taranaki Regional Council, July 1992.
- Taranaki Regional Council: `STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1992/93'. Technical Report 93-47, Taranaki Regional Council, December 1993.
- Taranaki Regional Council: `STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1993/94'. Technical Report 94-16, Taranaki Regional Council, October 1994.
- Taranaki Regional Council: `STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1994/95'. Technical Report 95-65, Taranaki Regional Council, November 1995.
- Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1995/96'. Technical Report 96-25, Taranaki Regional Council, November 1995.
- Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1996/97'. Technical Report 97-27, Taranaki Regional Council, August 1996.
- Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1997-98'. Technical Report 98-18, Taranaki Regional Council, July 1997.
- Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1998-99'. Technical Report 99-08, Taranaki Regional Council, July 1999.
- Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 1999-00'. Technical Report 00-50, Taranaki Regional Council, December 2000.
- Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 2000-01'. Technical Report 01-43, Taranaki Regional Council, November 2001.
- Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 2001-02'. Technical Report 02-39, Taranaki Regional Council, November 2002.

Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, Otakeho and Waverley Landfills: Annual Report 2002-03'. Technical Report 03-57, Taranaki Regional Council, October 2003.

Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, and Otakeho Landfills: Annual Report 2003-04'. Technical Report 04-68, Taranaki Regional Council, November 2004.

Taranaki Regional Council: 'STDC, Eltham Wastewater Treatment Plant Monitoring Programme Annual Report 2004-05'. Technical Report 2005-69, Taranaki Regional Council.

Ministry for the Environment: 'Module 2: Hazardous Waste Guidelines, Landfill Waste Acceptance Criteria and Landfill Classification'. Ministry for the Environment, May 2004.

Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, and Otakeho Landfills: Annual Report 2004-05'. Technical Report 05-98, Taranaki Regional Council, April 2006.

Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, and Otakeho Landfills: Annual Report 2005-2007 Technical Report 07-47, Taranaki Regional Council, April 2006.

Taranaki Regional Council: 'STDC, Eltham, Hawera, Kaponga, Manaia, Patea, Opunake, and Otakeho Landfills: Annual Report 2007-2008 Technical Report 08-48, Taranaki Regional Council, April 2008.

Appendix I

Resource consents held by STDC



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: 16 December 2003

Conditions of Consent

Consent Granted: To discharge surface stormwater and leachate from the Patea municipal landfill into an unnamed tributary of the Patea River at or about GR: Q21:360-611

Expiry Date: 1 June 2022

Review Date(s): June 2010, June 2016

Site Location: Patea Municipal Landfill, Scotland Street, Patea

Legal Description: Lot 1 DP 20064 Pt Sec 8 Patea Sbrn All DP 3495 Town of Patea Blk VII Carlyle SD

Catchment: Patea

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

www.trc.govt.nz

Consent 0427-3

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. Within three months of granting of this consent the consent holder shall prepare and maintain a site contingency plan to the satisfaction of the Chief Executive, Taranaki Regional Council, outlining measures and procedures undertaken to prevent spillage or accidental discharge of contaminants and procedures carried out should such a spillage or discharge occur. This shall be reviewed by the Council on an annual basis.
2. Within three months of granting of this consent the consent holder shall prepare and maintain a landfill operations and management plan to the satisfaction of the Chief Executive, Taranaki Regional Council, and shall adhere to such a plan in so far as they concern the exercise of this consent at all times. This shall be reviewed by the Council on an annual basis.
3. The consent holder shall advise the Taranaki Regional Council one month prior to any changes being made to the operation and management plan and/or site contingency plan. Should the Taranaki Regional Council wish to review either of these plans, one month's notice shall be provided to the consent holder.
4. The exercise of this resource consent shall be carried out in general accordance with the information submitted in support of the application [2705].
5. The monitoring of the site and adjacent surface and groundwaters shall be to the satisfaction of the Chief Executive, Taranaki Regional Council
6. The leachate and stormwater diversion, collection, treatment and discharge systems shall be maintained to the satisfaction of the Chief Executive, Taranaki Regional Council.
7. Any discharge shall not, in the opinion of the Chief Executive, Taranaki Regional Council, cause nor be likely to cause any significant adverse effects on aquatic life or receiving water quality.
8. Notwithstanding any conditions within this consent, 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 actual or potential effect on the environment arising from any discharge at the site.

Consent 0427-3

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 2010 and/or 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 16 December 2003

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

PRIVATE BAG 713
47CLOTEN ROAD
STRATFORD
NEWZEALAND
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: 28 June 2001

Conditions of Consent

Consent Granted: To discharge up to 2800 cubic metres/day of leachate and stormwater from the closed Matangara Landfill, Hawera, to groundwater and into an unnamed tributary of the Tawhiti Stream in the Tangahoe catchment at or about GR: Q21:214-788

Expiry Date: 1 June 2016

Review Date(s): June 2004, June 2010

Site Location: former Matangara Landfill, Matangara Road, Hawera

Legal Description: Lot 2 DP 20563 Lot 2 DP 20819 Blk VI Hawera SD

Catchment: Tangahoe

Tributary: Tawhiti

Consent 0444-4

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

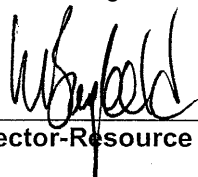
- 1) The consent holder shall at all times adopt the best practicable option, as defined in the Resource Management Act 1991, to prevent or minimise any or likely adverse effects on the environment associated with the discharges of leachate and/or stormwater from the site.
- 2) The consent holder shall maintain an adequate landfill capping and vegetative cover on the site to the satisfaction of the Chief Executive, Taranaki Regional Council.
- 3) The consent holder shall provide a landfill post-closure management plan to the satisfaction of the Chief Executive, Taranaki Regional Council by 1 December 2001; such plan to address site security, litter control, vegetation cover, stormwater diversion, leachate control, site contouring, and cover placement and compaction, in addition to any other matters relevant to the exercise of this consent.
- 4) The consent holder shall adhere to the landfill management plan insofar as it concerns the exercise of this consent at all times.
- 5) The consent holder shall maintain stormwater drains, the sediment detention pond, and/or ground contours at the site, in order to minimise stormwater movement across, or ponding on the site.
- 6) The consent holder shall maintain the leachate collection system at the site in order to minimise leachate discharges to the environment at the site.
- 7) The mixing zone in each condition of this consent shall extend for a distance of 20 metres downstream of the point of the discharge of leachate and stormwater at the confluence of the unnamed tributary of the Tawhiti Stream and the Tawhiti Stream.
- 8) After allowing for reasonable mixing the consent holder shall ensure that the discharge shall not give rise to any of the following effects in the receiving waters of the Tawhiti Stream:
 - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;
 - b) any conspicuous change in 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.
- 9) Monitoring of surface waters, groundwater and leachate on or in the vicinity of the site shall be undertaken to the satisfaction of the Chief Executive, Taranaki Regional Council.

Consent 0444-4

- 10) The two existing monitoring bores shall be maintained to the satisfaction of the Chief Executive, Taranaki Regional Council.
- 11) In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent in June each year after this consent was granted, should further chemical sampling of the unnamed tributary of the Tawhiti Stream reveal levels of contamination resulting in significant adverse environmental effects.
- 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 2004 and/or June 2010, 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 28 June 2001

For and on behalf of
Taranaki Regional Council



Director-Resource Management



TRK940526

COPY



TARANAKI
REGIONAL
COUNCIL

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 HAWERA**

Renewal
Granted Date: **9 February 1994**

CONDITIONS OF CONSENT

Consent Granted: **TO DISCHARGE A COMBINED TOTAL OF UP TO 20 CUBIC METRES/DAY [10 LITRES/SECOND] OF LEACHATE AND SURFACE STORMWATER FROM THE OPUNAKE LANDFILL SITE INTO THE OTAHI STREAM AT OR ABOUT GR: P20:831-952**

Expiry Date: **1 June 2005**

Review Date[s]: **1 June 1999**

Site Location: **OPUNAKE LANDFILL, WHITCOMBE ROAD OPUNAKE**

Legal Description: **SEC 1 & 2 SO13128 OPUNAKE TOWN BELT BLK IX OPUNAKE SD**

Catchment: **OTAHI 365.000**

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 shall, by 1 June 1994, prepare a landfill operations and management plan for the Opunake landfill to the satisfaction of the General Manager, Taranaki Regional Council; such plan to address methods of control of refuse deposition, compaction and cover, the nature of refuse to be accepted at the landfill, site security, litter control, stormwater diversion, stabilisation of capped areas, and leachate collection, treatment and discharge, in addition to any other matters relevant to the exercise of this consent, as well as having regard to the prevention of any unauthorised discharge to land or receiving waters.
- 2) THAT the consent holder shall subsequently adhere to the landfill operations and management plan insofar as concerns the exercise of this consent at all times.
- 3) THAT leachate and stormwater diversion, collection, treatment and discharge systems shall be maintained to the satisfaction of the General Manager, Taranaki Regional Council, at all times.
- 4) THAT any discharge shall not cause any significant adverse effects on aquatic life or receiving water quality.

Signed at Stratford on 9 February 1994

For and on behalf of
TARANAKI REGIONAL COUNCIL



GENERAL MANAGER

TRK983889

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 prepare and maintain a landfill operations and management plan for the site, including reinstatement details for the site, to the satisfaction of the General Manager, Taranaki Regional Council, and shall adhere to such plans as they concern the exercise of this consent.
- 2. THAT the consent holder shall install and operate a leachate and stormwater collection, diversion and discharge system for treatment in the Stratford District Council oxidation pond system, by 1 June 1998, to the satisfaction of the General Manager, Taranaki Regional Council.
- 3. THAT after allowing for reasonable mixing, within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the Patea River:
 - a) the production of any conspicuous oil or grease films, scums or foams or floatable or suspended materials;
 - b) any conspicuous change in 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 effects of aquatic life.
- 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 2004 and/or June 2007, 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 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 27 February 1998

For and on behalf of
TARANAKI REGIONAL COUNCIL



DIRECTOR - RESOURCE MANAGEMENT



CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOUTLN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
FAX: 06-765 5097
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 4640



Change To
Conditions Date: 29 October 2008 [Granted: 20 January 2005]

Conditions of Consent



Consent Granted: To discharge leachate and stormwater from the closed
Manaia landfill and from composting operations into the
Waiokura Stream at or about (NZTM)
1697799E-5620638N

Expiry Date: 1 June 2023
Review Date(s): June 2011, June 2017
Site Location: Cemetery Road, Manaia
Legal Description: Pt Sec 23 Blk VII Waimate SD
Catchment: Waiokura

*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

Conditions 1 – 6 [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. Within three months of granting this consent the consent holder shall prepare and maintain a site contingency plan to the satisfaction of the Chief Executive, Taranaki Regional Council, outlining measures and procedures undertaken to prevent spillage or accidental discharge of contaminants and procedures carried out should such a spillage or discharge occur.
3. Within three months of granting this consent the consent holder shall prepare and maintain a landfill management plan to the satisfaction of the Chief Executive, Taranaki Regional Council, and shall adhere to such a plan in so far as it concerns the exercise of this consent at all times.
4. The consent holder shall advise the Taranaki Regional Council one month prior to any changes being made to the landfill management plan and/or the site contingency plan referred to in special conditions 3 and 4. Should the Taranaki Regional Council wish to review either of these plans, one month's notice shall be provided to the consent holder.
5. The consent holder shall monitor the site and adjacent surface water and ground water to the satisfaction of the Chief Executive, Taranaki Regional Council.
6. The consent holder shall install and maintain leachate and stormwater diversion, collection, treatment and discharge systems, to the satisfaction of the Chief Executive, Taranaki Regional Council.

[Condition 7 – changed]

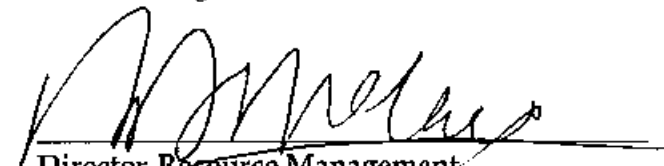
7. That after reasonable mixing, any discharge from the closed landfill or composting operations shall not cause Waiokura Stream to exceed the following parameters;
- a rise in biochemical oxygen demand of 2.0 g/m³
 - unionised ammonia of 0.025 g/m³

[Condition 8-unchanged]

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 29 October 2008

For and on behalf of
Taranaki Regional Council



Director-Resource Management

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;
 - (ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
 - (iii) charges authorised by regulations.

SPECIAL CONDITIONS

1. THAT the consent holder shall install and maintain stormwater drains and ground contours at the site, to the satisfaction of the General Manager, Taranaki Regional Council, in order to minimise stormwater movement across, or ponding on the site, and the maintenance of soil cover on the site.
2. THAT the consent holder shall maintain an adequate vegetative cover on the site, to the satisfaction of the General Manager, Taranaki Regional Council, to prevent dust emission or stormwater erosion of the site.
3. THAT the consent holder shall at all times adopt the best practicable option to prevent or minimise any adverse effect or any likely adverse effect on the environment associated with the discharges of leachate from the site. Without restriction or limitation, the best practicable option shall include the measures specified in conditions 1 and 2 above.
4. THAT the discharge shall not give rise to any of the following effects in the receiving waters of the unnamed tributary of the Makuri 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.
5. THAT the Taranaki Regional Council may review any or all of the conditions of this consent should further chemical sampling of the unnamed tributary of the Makuri Stream reveal levels of contamination resulting in or likely to result in significant adverse environmental effects.

TRK963890

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6. THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2004 and/or June 2010, 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 were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Signed at Stratford on 17 October 1996

For and on behalf of
TARANAKI REGIONAL COUNCIL



OPERATIONS MANAGER

TRK983891



DISCHARGE PERMIT

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

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

Name of
Consent Holder: **STRATFORD DISTRICT COUNCIL
PO BOX 320 STRATFORD**

Renewal
Granted Date: **12 February 1998**

CONDITIONS OF CONSENT

Consent Granted: **TO DISCHARGE UP TO 910 CUBIC METRES/DAY [84
LITRES/SECOND] OF STORMWATER AND LEACHATE FROM
THE FORMER PUKENGAHU LANDFILL INTO AN UNNAMED
TRIBUTARY OF THE WAIHAPA STREAM IN THE PATEA
CATCHMENT AT OR ABOUT GR: Q20:292-016**

Expiry Date: **1 June 2016**

Review Date[s]: **June 2004 and June 2010**

Site Location: **FORMER LANDFILL, WINGROVE ROAD, STRATFORD**

Legal Description: **ROAD RESERVE WINGROVE ROAD PUKENGAHU BLK VII
NGAERE SD**

Catchment: **PATEA 343.000**

Tributary: **WAIHAPA 343.280
UNNAMED TRIBUTARY**

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

TRK983891

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 ensure, to the satisfaction of the General Manager, Taranaki Regional Council, that:
 - a) the site contours are maintained so that no ponding, damming or retention of water occurs on the site;
 - b) the integrity of the cover is maintained so as to minimise infiltration of stormwater; and
 - c) access to the site is restricted so that illegal dumping of wastes is discouraged.
2. THAT allowing for a mixing zone of 50 metres downstream of the discharge, the discharge shall not give rise to any of the following effects in the unnamed tributary of the Waihapa 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 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 2004 and/or June 2010, 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 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 12 February 1998

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: 20 January 2005

Conditions of Consent

Consent Granted: To discharge leachate and stormwater from the Manaia
Landfill into the Waiokura Stream at or about GR:
P21:078-823

Expiry Date: 1 June 2023

Review Date(s): June 2011, June 2017

Site Location: Manaia Landfill, Cemetery Road, Manaia

Legal Description: Pt Sec 23 Blk VII Waimate SD

Catchment: Waiokura

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

Consent 3952-2

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. Within three months of granting this consent the consent holder shall prepare and maintain a site contingency plan to the satisfaction of the Chief Executive, Taranaki Regional Council, outlining measures and procedures undertaken to prevent spillage or accidental discharge of contaminants and procedures carried out should such a spillage or discharge occur.
3. Within three months of granting this consent the consent holder shall prepare and maintain a landfill management plan to the satisfaction of the Chief Executive, Taranaki Regional Council, and shall adhere to such a plan in so far as it concerns the exercise of this consent at all times.
4. The consent holder shall advise the Taranaki Regional Council one month prior to any changes being made to the landfill management plan and/or the site contingency plan referred to in special conditions 3 and 4. Should the Taranaki Regional Council wish to review either of these plans, one month's notice shall be provided to the consent holder.
5. The consent holder shall monitor the site and adjacent surface water and ground water to the satisfaction of the Chief Executive, Taranaki Regional Council.
6. The consent holder shall install and maintain leachate and stormwater diversion , collection, treatment and discharge systems, to the satisfaction of the Chief Executive, Taranaki Regional Council.
7. Any discharge from the landfill shall not, in the opinion of the Chief Executive, Taranaki Regional Council, cause nor be likely to cause any significant adverse effects on aquatic life or receiving water quality.

Consent 3952-2

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 20 January 2005

For and on behalf of
Taranaki Regional Council



Director-Resource Management

TRK954528

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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: NEW PLYMOUTH DISTRICT COUNCIL
PRIVATE BAG 2025 NEW PLYMOUTH

Renewal
Granted Date: 22 March 1995

CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE EMISSIONS INTO THE AIR FROM THE OKATO
MUNICIPAL LANDFILL ACTIVITIES AT OR ABOUT GR:
P19:852-257

Expiry Date: 1 June 2013

Review Date[s]: June 2001 and June 2007

Site Location: OKATO MUNICIPAL LANDFILL HAMPTON ROAD OKATO

Legal Description: LOT 1 DP13150 BLK I WAIRAU SD

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

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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;
 - (ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
 - (iii) charges authorised by regulations.

SPECIAL CONDITIONS

- 1) THAT the consent holder shall prepare and maintain both a landfill operations and management plan and a site contingency plan to the satisfaction of the General Manager, Taranaki Regional Council, and shall adhere to such plans in so far as they concern the exercise of this consent at all times.
- 2) THAT the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2001 and/or June 2007 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects of the discharge on the receiving environment.

Signed at Stratford on 22 March 1995

For and on behalf of
TARANAKI REGIONAL COUNCIL



GENERAL MANAGER



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

CHIEF EXECUTIVE
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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: 26 March 2008

Conditions of Consent

Consent Granted: To discharge stormwater and sediment onto and into land
and into an unnamed tributary of the Patea River from
earthworks associated with the closure of the Patea
Landfill at or about 2636144E-6161215N

Expiry Date: 1 June 2022

Review Date(s): June 2010, June 2016

Site Location: Patea Landfill, Scotland Street, Patea

Legal Description: Ali DP 3495

Catchment: Patea

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 4931. In the case of any contradiction between the documentation submitted in support of application 4931 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. Notification shall include the consent number and a brief description of the activity consented and be emailed to 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 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.

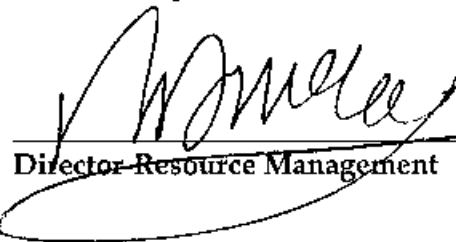
5. All earthwork areas shall be stabilised vegetatively or otherwise as soon as is practicable immediately following completion of soil disturbance activities.
6. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before 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.

Consent 7268-1

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 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 26 March 2008

For and on behalf of
Taranaki Regional Council



Director Resource Management

Appendix II

Biomonitoring reports

To Job Manager, S Cowperthwaite
From Scientific Officer, C R Fowles
Document No 560234
Report No CF478
Date 21 January 2009

Biomonitoring of the Otahi Stream in relation to the closed Opunake landfill leachate discharge, January 2009

Method

The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates from two established sampling sites in the Otahi Stream (Table 1, Figure 1) on 15 January 2009 in relation to the discharge of leachate from the closed Opunake landfill. The landfill had been closed for about eight years and re-grassed.

Table 1 Biomonitoring sites in the Otahi Stream in relation to the Opunake landfill

Site No	Site Code	Map reference	Location
1	OTH000310	P20:833952	Upstream of rubbish landfill
2	OTH000350	P20:829949	Upstream of SH45 (downstream of landfill and weir)

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).

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_s (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), 5 for common (C), 20 for abundant (A), 100 for very abundant (VVA), and 500 for extremely abundant (XA).

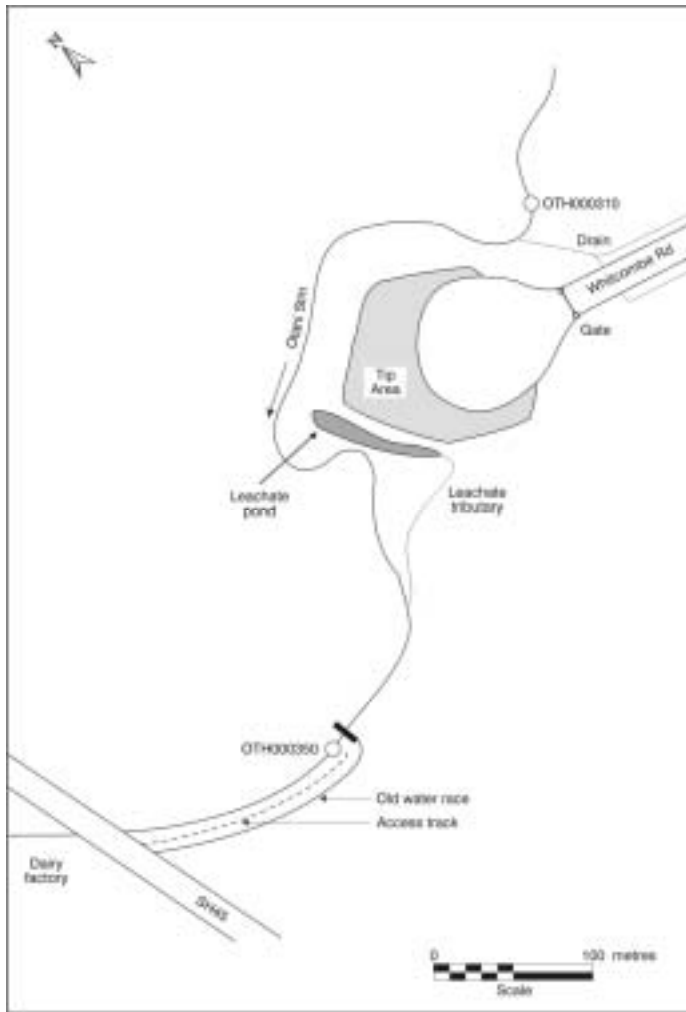


Figure 1 Sampling sites in the Otahi Stream in relation to Opunake landfill

Results and discussion

Low clear flow conditions were noted in the Otahi Stream during this survey which was performed twelve days following a fresh in excess of three times median flow and twenty-two days after a fresh in excess of seven times median flow. Water temperatures ranged from 16.3 to 17.2°C at the time of this mid morning summer survey. The upstream site was almost completely shaded and had patchy periphyton mats, filamentous algae and moss on the streambed. The downstream site was partly shaded with patchy periphyton mats and moss but no filamentous algae recorded on the stony substrate. Both sites were characterised by sand-gravel-cobble-boulder substrates and were within the lower river reach, less than 2 km from the coast, and below 25 m asl in elevation.

Macroinvertebrate communities

Results from the current survey are presented in Table 2 and previous surveys are summarised in Table 3 and Figure 2.

Table 2 Summary of macroinvertebrate taxa numbers and MCI values for the current and previous surveys performed between November 1989 and January 2007

Site	No of surveys	Taxa numbers		MCI values	
		Range	Median	Range	Median
1	16	15 – 24	19	60 – 91	78
2	16	17 – 24	21	68 – 89	78

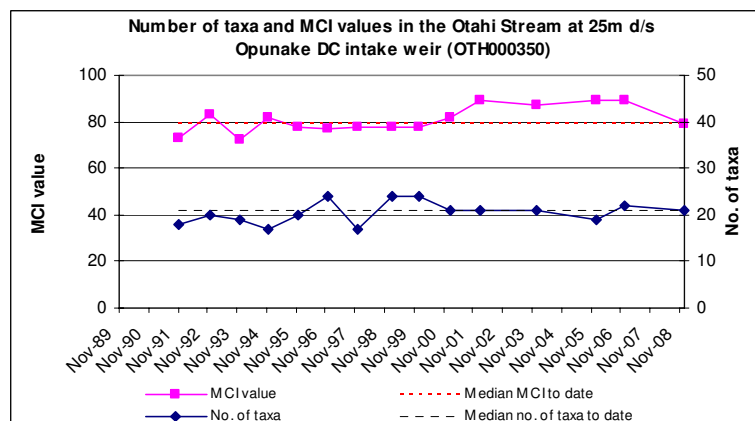
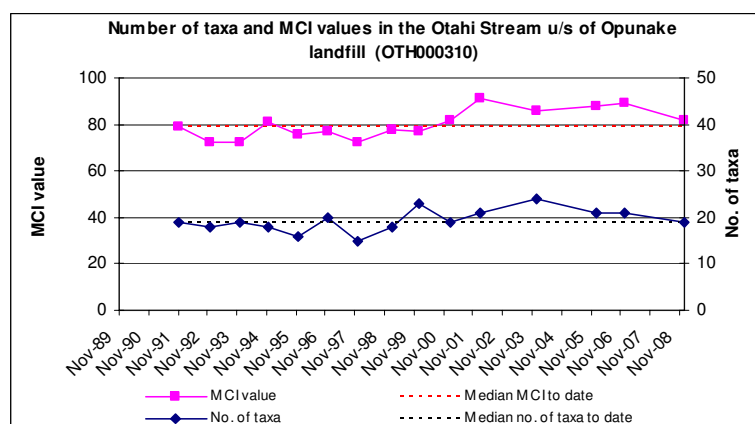


Figure 2 Taxa richness and MCI scores from previous surveys at sites upstream and downstream of Opunake landfill

Table 3 Macroinvertebrate fauna of the Otahi Stream in relation to the (closed) Opunake landfill discharges sampled on 15 January 2009

Taxa list	Site Number	MCI score	1	2
	Site Code		OTH000310	OTH000350
	Sample Number		FWB09016	FWB09017
COELENTERATA		3	-	R
NEMERTEA		3	R	C
ANNELIDA	Oligochaeta	1	A	A
	Lumbricidae	5	C	R
MOLLUSCA	<i>Potamopyrgus</i>	4	VA	XA
	<i>Gyraulus</i>	3	R	-
	<i>Physa</i>	3	-	R
CRUSTACEA	<i>Paracalliope</i>	5	VA	VA
Ephemeroptera	<i>Deleatidium</i>	8	R	R
PLECOPTERA	<i>Zelandoperla</i>	8	R	-
COLEOPTERA	Elmidae	6	A	A
HEMIPTERA	<i>Sigara</i>	3	-	R
MEGALOPTERA	<i>Archichauliodes</i>	7	-	R
TRICHOPTERA	<i>Aoteapsyche</i>	4	-	R
	<i>Hydrobiosis</i>	5	A	A
	<i>Oxyethira</i>	2	C	C
	<i>Pycnocentroides</i>	5	VA	VA
DIPTERA	<i>Aphrophila</i>	5	C	C
	<i>Maoridiamesa</i>	3	R	R
	Orthocladiinae	2	VA	VA
	Tanytarsini	3	A	A
	<i>Austrosimulium</i>	3	A	C
	Muscidae	3	R	R
	Ephydriidae	4	R	
No of taxa			19	21
MCI			82	79
SQMCI _s			3.9	4.0
EPT (taxa)			4	4
%EPT (taxa)			21	19
'Tolerant' taxa		'Moderately sensitive' taxa		'highly sensitive' taxa

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

Taxa richness at both sites was very similar (Table 2) and equivalent with the medians found by sixteen previous surveys at their respective sites (Table 3 and Figure 2). These two sites in the stream were characterised by a combination of four 'moderately sensitive' taxa, (amphipod (*Paracalliope*), elmid beetles, free-living caddisfly (*Hydrobiosis*), and stony-cased caddisfly (*Pycnocentroides*)); and up to five 'tolerant taxa' (oligochaete worms, snails (*Potamopyrgus*), midges (orthoclads and *Maoridiamesa*) and sandfly (*Austrosimulium*)). Community composition at both sites was very similar with sixteen taxa (67% of the reach's 24 taxa) shared by both sites. Those remaining taxa found only at one site were present as rarities (Table 2). Many of the dominant taxa are commonly associated with periphyton growths on the stony substrates of the lower reaches of nutrient enriched river catchments and have dominated this reach of the Otahi Stream previously. No significant differences in individual taxon abundances were recorded between sites as reflected in the very similar SQMCI_s scores at the two sites (Table 2). The presence of the 'highly sensitive' mayfly (*Deleatidium*) at both sites, although only as rarities, was indicative of recent relatively good physicochemical water quality conditions in this reach of the Otahi Stream.

The very similar faunal composition at the two sites was reflected in the MCI scores (both 79 and 82) which were 1 to 3 units above the medians of scores found from previous surveys (Table 3 and Figure 2). These scores were within ranges of scores in the lower reaches of Taranaki ring plain streams, and slightly less than the median value (86) from 251 surveys of 'control' sites in National Park sourced ringplain rivers and streams at similar altitudes (below 25 m asl) to these Otahi Stream sites (TRC, 1999 (updated, 2007)). The similarity in sites' scores was indicative of no recent impacts of rubbish tip leachate seepage discharges on the macroinvertebrate fauna of the Otahi Stream.

Microscopic heterotrophic assessment

No unusual heterotrophic growths were found in the samples from either site in the Otahi Stream upstream and downstream of the closed landfill.

Conclusion

Moderate, typical taxa richness and very similar MCI scores upstream and downstream at the Opunake rubbish tip were within ranges and above medians previously recorded at the two sites in this lower reach of the Otahi Stream. The similarities in macroinvertebrate communities and absence of significant heterotrophic growths at both sites were indicative of good preceding water quality and no recent impacts of leachate from the closed Opunake landfill on the biological communities of the stream.

Summary

The Council's standard 'kick-sampling' technique was used at two established sites to collect streambed macroinvertebrates from the Otahi Stream. Samples were sorted and identified to provide the number of taxa (richness) and MCI and SQMCI_S 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_S 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_S between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This summer macroinvertebrate survey indicated that the discharge of leachate from the closed Opunake landfill site had not had any detrimental effect on the macroinvertebrate communities of the Otahi Stream. No significant changes in the macroinvertebrate communities were found between the upstream 'control' site, and site downstream of the landfill discharge.

The macroinvertebrate communities of the stream contained moderate proportions of 'sensitive' taxa at both sites and the communities were generally dominated by a combination of several 'moderately sensitive' and 'tolerant' taxa. Taxonomic richnesses (numbers of taxa) were similar at the time of this summer survey compared to the more recent surveys conducted in this stream.

MCI and SQMCI_s scores indicated that the stream communities were of fair 'health', and generally similar to the condition recorded in the lower reaches of similar Taranaki streams.

References

Internal Taranaki Regional Council reports

- Fowles, CR 1994: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, 20 December 1993. CF71.
- Fowles, CR 1995: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, 5 December 1994. CF83.
- Fowles, CR 1996: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, 21 December 1995. CF98.
- Fowles, CR 1997: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, December 1996. CF126.
- Fowles, CR 1998: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, December 1997. CF156.
- Fowles, CR 1999: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, February 1999. CF178.
- Fowles, CR 2000: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, January 2000. CF202.
- Dunning, KJ 2001: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, February 2001. KD39.
- Fowles, CR 2002: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, February 2002. CF246.
- Fowles, CR 2004: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, January 2004. CF293.
- Fowles, CR 2006: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, January 2006. CF394.
- Fowles, CR 2007: Biomonitoring of the Otahi Stream in relation to the Opunake rubbish tip leachate discharge, January 2007. CF413.
- 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

External Publications

Stark, J D, 1985: A macroinvertebrate community index of water quality for stony streams. Water and Soil Miscellaneous Publication No 87.

Stark, J D, 1998: SQMCI: A biotic index for freshwater macroinvertebrate coded abundance data. *New Zealand Journal of Marine and Freshwater Research* 32(1): 55-66.

Stark, J D, 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Report No 472. 32pp.

Stark, JD, Boothroyd IKH, Harding J, 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 5102. 57p.

To Job Manager, Scott Cowperthwaite
From Scientific Officer, Bart Jansma
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Biological inspection of the Waiokura Stream in relation to the discharge of leachate and stormwater from the Manaia Community Landfill, January 2009

1. Introduction

The South Taranaki District Council (STDC) holds a consent to discharge leachate and stormwater from the Manaia Community Landfill into the Waiokura Stream. A brief biological inspection was scheduled in the 2008-2009 monitoring year to monitor the effects of the landfill. This was conducted on 28 January 2009.

A full biomonitoring survey of two sites was performed in May 2004 (Colgan, 2004) to assess any effects from the landfill and provide reference information for future monitoring purposes. Subsequent to this survey, a number of biological inspections have also been undertaken. The results of the previous visits suggest that there have been no significant adverse effects as a result of the discharge, to date. The results are discussed in more detail in the references listed below.

2. Observations

The leachate pond was not discharging at the time of the survey, and it appeared that no discharge had occurred for some time. It is likely that if ever there was sufficient rainfall to cause a discharge from the pond, the stream would be in fresh and the discharge would therefore be greatly diluted.

During the inspection the stream had a moderate but discoloured flow. A site upstream of the landfill boundary was inspected for macroinvertebrates. The stream contained patches macrophytes, which generally support a diverse macroinvertebrate community. The cobble substrate was also examined. Healthy populations of mayfly and caddisfly larvae were observed at this upstream site.

A second site downstream of the leachate pond and landfill boundary was also examined. The stream at this site was slower flowing due to the presence of willows on the stream banks and macrophyte beds were less common due to this shade. The substrate was generally sandier. Mayfly and caddisfly larvae were observed on the streambed at this site, in similar abundance to that observed upstream. Compared with the previous inspection, there was less silage wrap in the stream. No undesirable heterotrophic growths (sewage fungus) were noted on the bed of the stream.

The presence of mayflies, which are moderate to highly sensitive taxa, and the lack of undesirable heterotrophic growths on the bed, indicates that any recent

discharges from the land fill site have not had a significant adverse effect on the macroinvertebrate communities of the Waiokura Stream.

References

- Colgan B, 2004: Biomonitoring of sites in the Waiokura Stream in relation to the discharge of leachate and stormwater from the Manaia Community Landfill, May 2004. TRC report BC015.
- Hope K, 2005: Biological inspection of the Waiokura Stream in relation to the discharge of leachate and stormwater from the Manaia Community Landfill, April 2005. TRC Report KH013
- Hope K, 2006: Biological inspection of the Waiokura Stream in relation to the discharge of leachate and stormwater from the Manaia Community Landfill, April 2006. TRC Report KH064
- Jansma B, 2007: Biological inspection of the Waiokura Stream in relation to the discharge of leachate and stormwater from the Manaia Community Landfill, April 2007. TRC Report BJ021
- Jansma B, 2008: Biological inspection of the Waiokura Stream in relation to the discharge of leachate and stormwater from the Manaia Community Landfill, March 2008. TRC Report BJ040

