Stratford District Council Landfills (Stratford, Huiroa and Pukengahu) Monitoring Programme Annual Report 2019-2020

Technical Report 2020-67

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Executive summary

The Stratford District Council (SDC) maintains a closed landfill located on Victoria Road at Stratford, in the Patea catchment. The landfill was closed to the public on 11 March 2002, and to commercial disposers on 23 March 2002. The site has more recently been used to dewater and dispose of oxidation pond sludge from the adjacent municipal wastewater treatment plant. This activity ceased in early 2006, and the landfill was recapped and reinstated. The only external material now accepted at the landfill is soil from a local sawmill site remediation project. This activity is covered by separate consent[1] held by a third party.

SDC also maintains closed landfills at Douglas Road, Huiroa, and Wingrove Road, Pukengahu, in the Patea catchment. Both the Huiroa and Pukengahu landfills have been closed since 1991, but are still monitored with regards to maintenance and leachate discharge on a triennial basis. Monitoring of these sites is undertaken triennially and is next scheduled in the 2020-2021 year.

This report for the period July 2019 to June 2020 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess SDC's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of the Company's activities.

SDC holds three resource consents in association with these landfills, which include a total of 17 conditions setting out the requirements that SDC must satisfy. The consents allow SDC to discharge stormwater and leachate from the landfills.

During the monitoring period, SDC demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included two site inspections and six ground water samples collected for physicochemical analysis. This report also includes the results of the surface water samples taken in conjunction with the Stratford Wastewater Treatment Plant.

The monitoring showed that there were no significant adverse effects occurring as a result of the exercise of any of SDC's landfill consents. As in previous years, the monitoring indicated improvement has been made since last year, where there was an issue with vehicle damage to the cap. There were no unauthorised incidents noted in respect to the Stratford Landfill during the year under review.

During the year, SDC demonstrated a high level of environmental and high level of administrative performance with the Stratford landfill resource consent.

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance is improving to a high level.

This report includes recommendations for the 2020-2021 year.

[1] Consent 7645-1 Alby M Limited

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1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2019 to June 2020 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Stratford District Council (SDC). SDC maintains closed landfills on Victoria Road, Stratford, on Douglas Road, Huiroa, and on Wingrove Road, Pukengahu.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by SDC that relate to discharges of leachate and stormwater from the three closed landfills within the Patea catchment, in the Stratford district. The Huiroa and Pukengahu landfills are monitored on a triennial cycle, and monitoring of these sites will next be undertaken in 2020-2021.

One of the intents of the *Resource Management Act 1991* (RMA) 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 Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the Company's use of water, land and air, and is the 27th report by the Council for the landfills managed by the consent holder.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites though annual programmes;
- the resource consents held by SDC in the Patea catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Company's site/catchment.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2020-2021 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 RMA 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 an activity, and may include cultural and social-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 (for example recreational, cultural, or aesthetic); and

e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, 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 and administrative performance

Besides discussing the various details of the performance and extent of compliance by the Company, this report also assigns them a rating for their environmental and administrative performance during the period under review.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

Good: Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self reports, or during investigations of incidents reported to the Council by a third party but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

Poor: Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

High: The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

Improvement required: Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

Poor: Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.[2]

1.2 Resource consents

The Company holds three resource consents the details of which are summarised in the table below.

A summary of the various consent types issued by the Council is included in Appendix I, as are copies of all permits held by the Company during the period under review.

Table 1 Stratford District Council landfill consents

Consent number	Location	Purpose	Granted	Review	Expires
3889-3	Stratford	To discharge leachate into land and into groundwater adjacent to the Patea River	December 2010	June 2022	1 June 2028

[2] The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

Consent number	Location	Purpose	Granted	Review	Expires
3890-3	Huiroa	To discharge stormwater and leachate from the former Huiroa landfill onto and into land in the vicinity of an unnamed tributary of the Makuri Stream	June 2016	June 2022	1 June 2034
3891-3	Pukengahu	To discharge stormwater and leachate from the former Pukengahu landfill into an unnamed tributary of the Waihapa Stream	June 2016	June 2022	1 June 2034

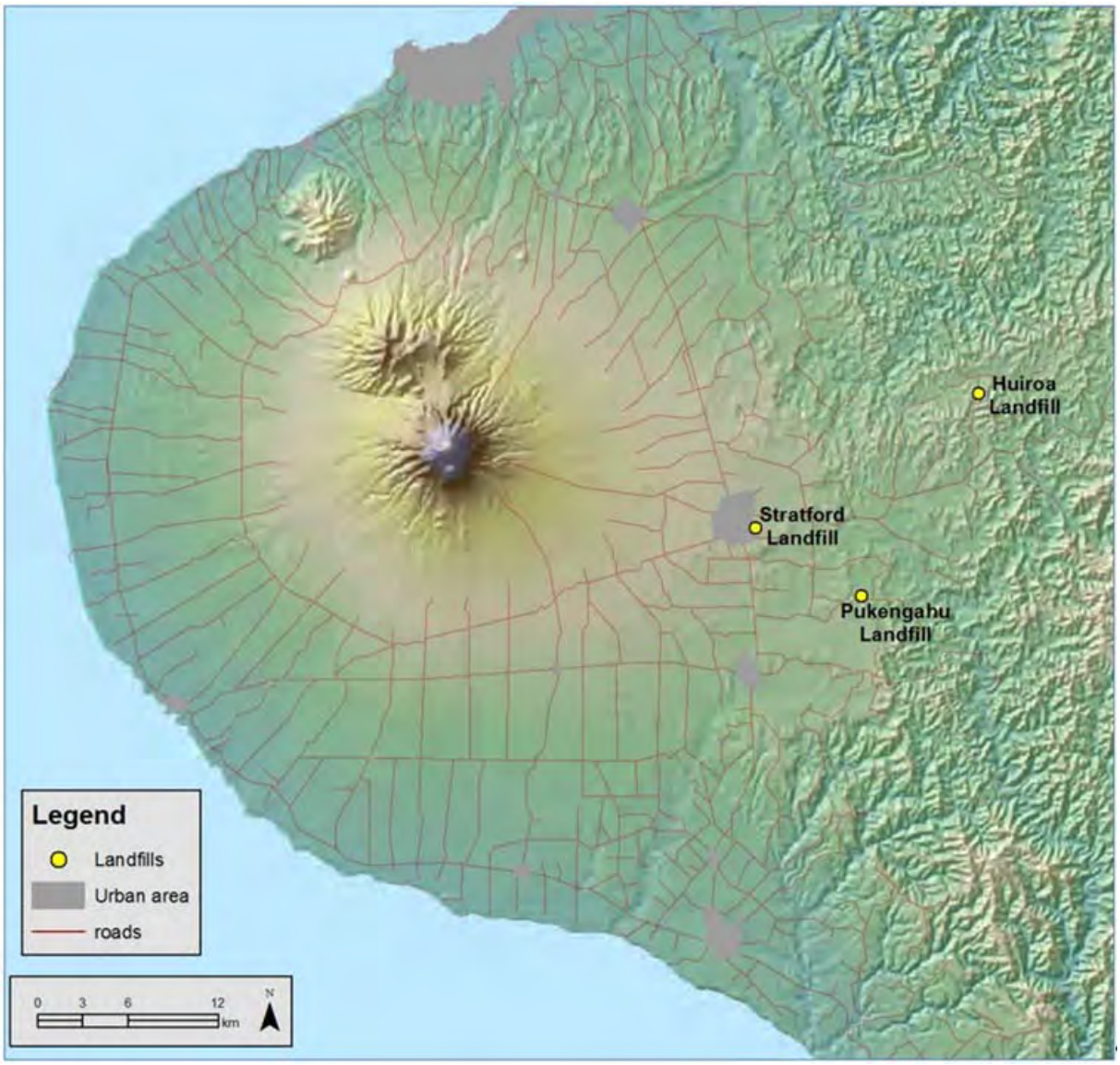

Figure 1 Regional map showing SDC landfill sites

A summary of the various consent types issued by the Council is included in Appendix I, as are copies of all permits held by the Company during the period under review.

1.3 Monitoring programme

1.3.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The 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 Stratford landfill closed in 2006 and monitoring is conducted annually.

Both the Huiroa and Pukengahu landfills have been closed since 1991 but are still monitored with regards to leachate discharge and site maintenance. Monitoring at these sites is undertaken triennially, this was last conducted in 2017-2018 and is next due in 2020-2021.

The monitoring programme for the SDC landfills consisted of four primary components as outlined below.

1.3.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.3.3 Site inspections

The Stratford municipal landfill site was visited on two occasions during the monitoring period.

The landfill inspections focused on the stability, integrity, and drainage of the caps, any potential or actual discharges to receiving watercourses, including potential for leachate discharges, and visual assessment of the receiving water quality.

1.3.4 Chemical sampling

The Patea River in the vicinity of the Stratford landfill was sampled on one occasion, and the sample analysed for black disc transparency, biochemical oxygen demand, cadmium, chloride, conductivity, chromium, dissolved oxygen, dissolved reactive phosphorus, faecal coliforms, ammoniacal nitrogen, nitrate/nitrite nitrogen, dissolved oxygen saturation, pH, suspended solids, temperature, turbidity, and zinc.

The Council also undertook sampling of the groundwater at the Stratford landfill. Groundwater was sampled at three sites on two occasions, and the samples were analysed for alkalinity, dissolved zinc, chloride, conductivity, filtered chemical oxygen demand, dissolved chromium, dissolved copper, dissolved reactive phosphorus, ammoniacal nitrogen, nitrate/nitrite nitrogen, pH, temperature, water level and dissolved zinc.

1.3.5 Biomonitoring surveys

A biological survey was performed on one occasion in the Patea River to determine whether or not the Stratford landfill has had a detrimental effect upon the macroinvertebrate communities of the river.

2 Stratford landfill at Victoria Road

2.1 Process description

SDC operated a landfill located on Victoria Road at Stratford, in the Patea catchment (Figure 2). The landfill was closed to the public on 11 March 2002, and to commercial disposers on 23 March 2002. All contaminated surface water from the landfill is pumped to the adjacent oxidation ponds for treatment.

In March 2004 SDC cleared a site on top of the landfill and created a bunded area for the purpose of oxidation pond sludge dewatering. This dewatering process continued through to early 2006 and the sludge was then covered and capped and the site reinstated. There has been no discharge of refuse to the landfill since 2006.

A third party currently holds a consent to discharge chromated copper arsenate (CCA) contaminated soil from the old Fazackerly timber treatment plant site as base fill to the landfill for re-contouring purposes[3] (under the supervision of SDC). This consent has been exercised. However, due to an excess of clean overburden, further re-contouring is required.

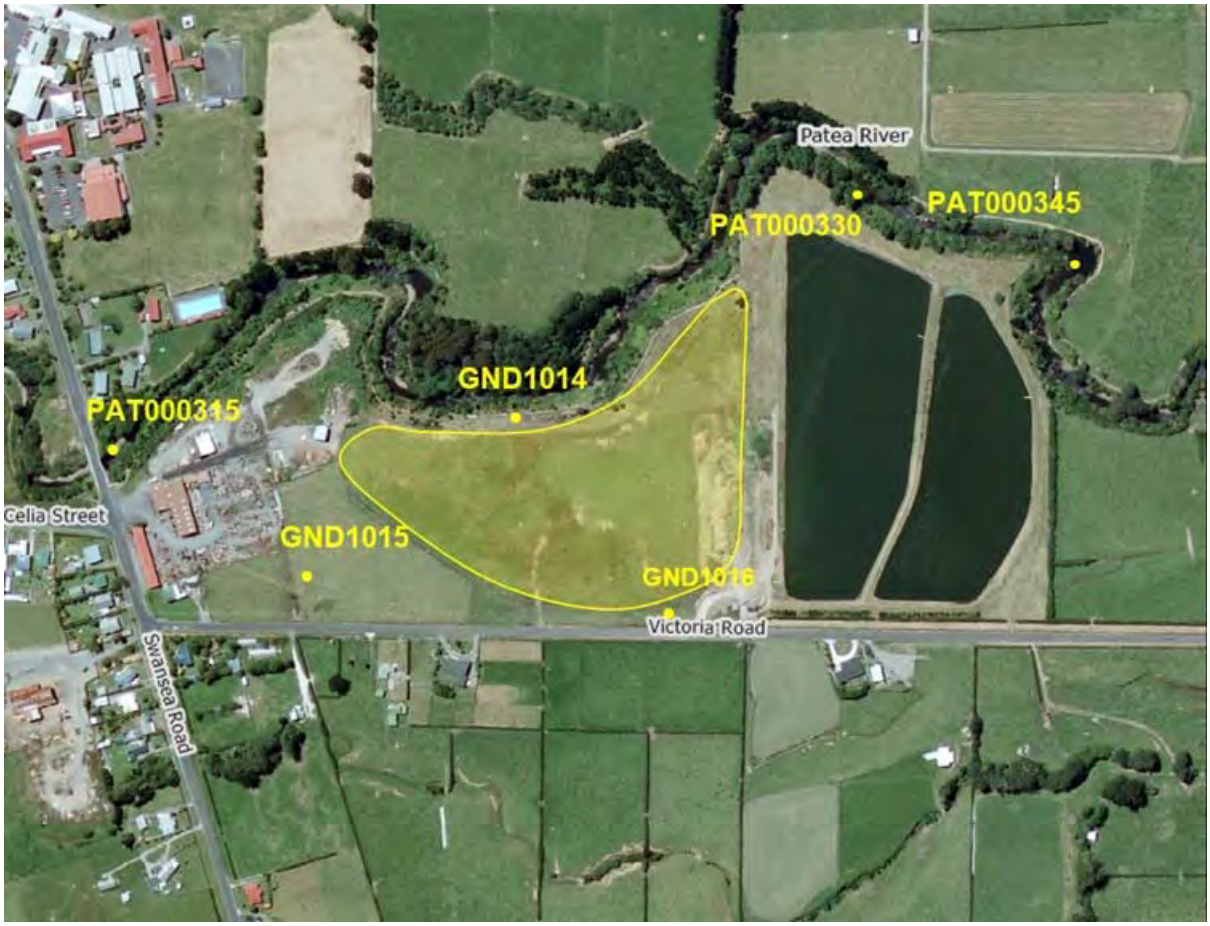

Figure 2 Stratford landfill (shaded in yellow) and sampling locations

[3] This consent was granted to provide for the remediation of a local sawmill site. The consent (7645-1) is held by Alby M Limited, and compliance monitoring of consent 7645-1 is not included in this report

2.2 Results

2.2.1 Inspections

29 November 2019

An inspection was conducted in fine weather with light NE wind conditions. The cap and batters were intact and well-grassed. No damage to gateways or area around troughs was observed. The pasture was dry and firm underfoot with no sign of slumping, cracking or exposed refuse noted. The water troughs were in good condition with no sign of spills or overflows. No stock were onsite at the time.

The stormwater drains were clear and free-flowing. There was no sign of ponding or recent flow. The leachate drains were clear and free-draining, and were slightly damp underfoot with no sign of recent flow or overflows to the adjacent public walkway. The fencing was intact and permanent.

The site was unoccupied at the time and there were no odour or dust issues noted.

22 May 2020

An inspection was conducted in fine weather conditions. The cap was dry underfoot, with no signs of ponding or slumping. No cracking or exposed refuse was noted on either the cap or batters.

The stormwater drains were clear and free flowing. The water troughs were in good condition with no sign of spills. There were no sign of recent flow or overflow to the adjacent public walkway. Fencing was intact and permanent.

No odour or dust issues were observed on site. Young cattle were grazing the cap.

2.2.2 Results of groundwater monitoring

Groundwater samples were taken from monitoring bores up slope (GND1015 and GND1016) and down slope (GND1014) of the landfill on two occasions. The results from these samples are shown in Table 2 and Table 3.

Table 2 Results of the Stratford landfill groundwater quality survey, 21 February 2020

Parameter	Unit	GND1014 down-gradient	GND1015 up-gradient	GND1016 up-gradient
Alkalinity	g/m^3	540	34	73
Dissolved arsenic	g/m^3	<0.0010	<0.0010	<0.0010
Chloride	g/m^3	26	7.5	9.5
Chemical oxygen demand	g/m^3	31	<6	<6
Conductivity @ 25°C	µS/cm	1209	119	182
Dissolved chromium	g/m^3	<0.0005	<0.0005	<0.0005
Dissolved copper	g/m^3	<0.0005	0.057	0.0005
Dissolved reactive phosphorus	g/m^3	<0.004	<0.004	<0.0011
Level	m	4.389	5.020	3.13
Unionised ammonia	g/m^3N	0.101	<0.00001	0.000163
Ammoniacal nitrogen	g/m^3-N	55	<0.010	0.162

Parameter	Unit	GND1014 down-gradient	GND1015 up-gradient	GND1016 up-gradient
Nitrate/nitrite nitrogen	g/m^3-N	0.025	0.22	0.023
pH	pH	6.7	6.4	6.4
Temperature	Deg. C	17.2	15.4	16.8
Dissolved zinc	g/m^3	0.0028	0.0053	0.0093

Table 3 Results of the Stratford landfill groundwater quality survey, 6 August 2019

Parameter	Unit	GND1014 down-gradient	GND1015 up-gradient	GND1016 up-gradient
Alkalinity	g/m^3	590	24	87
Dissolved arsenic	g/m^3	<0.0010	<0.0010	<0.0010
Chloride	g/m^3	26	7.8	7.9
Chemical oxygen demand	g/m^3	42	< 6	< 6
Conductivity @ 25°C	µS/cm	1191	104	124
Dissolved chromium	g/m^3	<0.0005	<0.0005	<0.0005
Dissolved copper	g/m^3	<0.0005	0.0147	0.0007
Dissolved reactive phosphorus	g/m^3	0.041	<0.004	<0.004
Level	m	2.27	3.16	1.76
Unionised ammonia	g/m^3	0.059	<0.000010	<0.000010
Ammoniacal nitrogen	g/m^3-N	54	<0.010	<0.010
Nitrate/nitrite nitrogen	g/m^3-N	0.021	2.0	0.30
pH	pH	6.6	6.1	6.0
Temperature	Deg. C	13.2	13.7	13.0
Dissolved zinc	g/m^3	0.0194	0.0096	0.0030

As with the results from previous samples taken from these monitoring bores, the groundwater down gradient of the landfill (as represented by bore GND1014), shows some evidence of contamination from the landfill. The graphs of historical data given in Figure 4 and Figure 5.

Figure 5 shows how bore GND1014 is affected by landfill indicator species; ammoniacal nitrogen, chloride, and zinc. The graphs also show how the levels of chloride and ammonia are apt to fluctuate against the more stable background levels found in the two bores mid and up gradient from the filled area (more so in the case of chloride and ammoniacal nitrogen). Historically zinc has found to be higher in the down gradient bore and has also seen to fluctuate in the up gradient bores which may indicate other local effects in the groundwater.

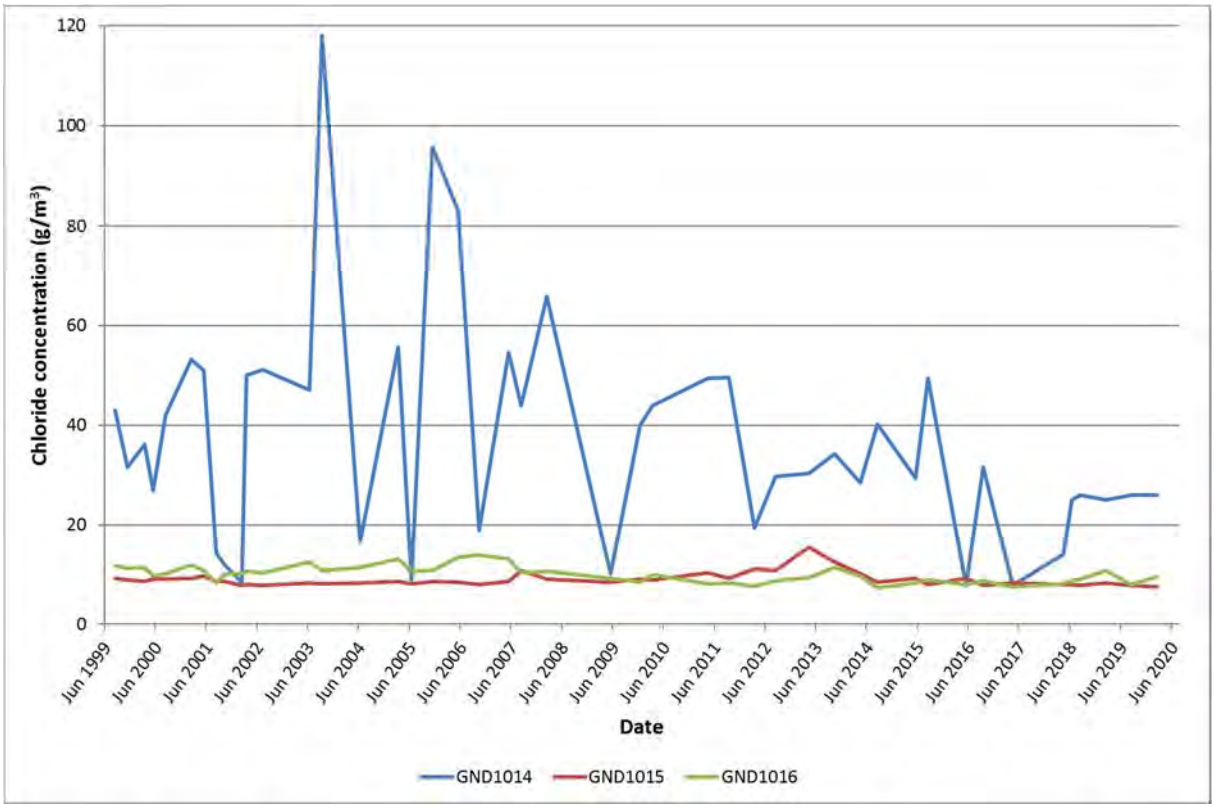

Figure 3 Graph showing chloride levels in the groundwater at the Stratford landfill

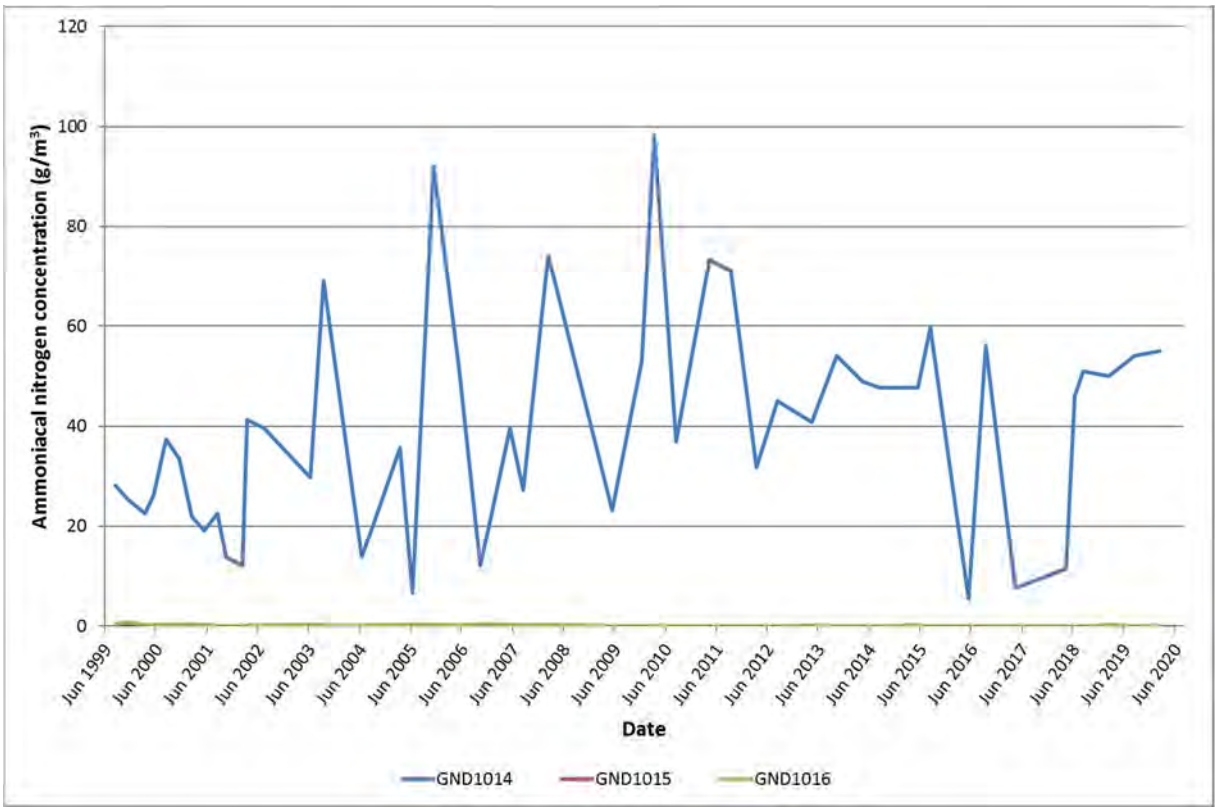

Figure 4 Graph showing ammoniacal nitrogen levels in the groundwater at the Stratford landfill

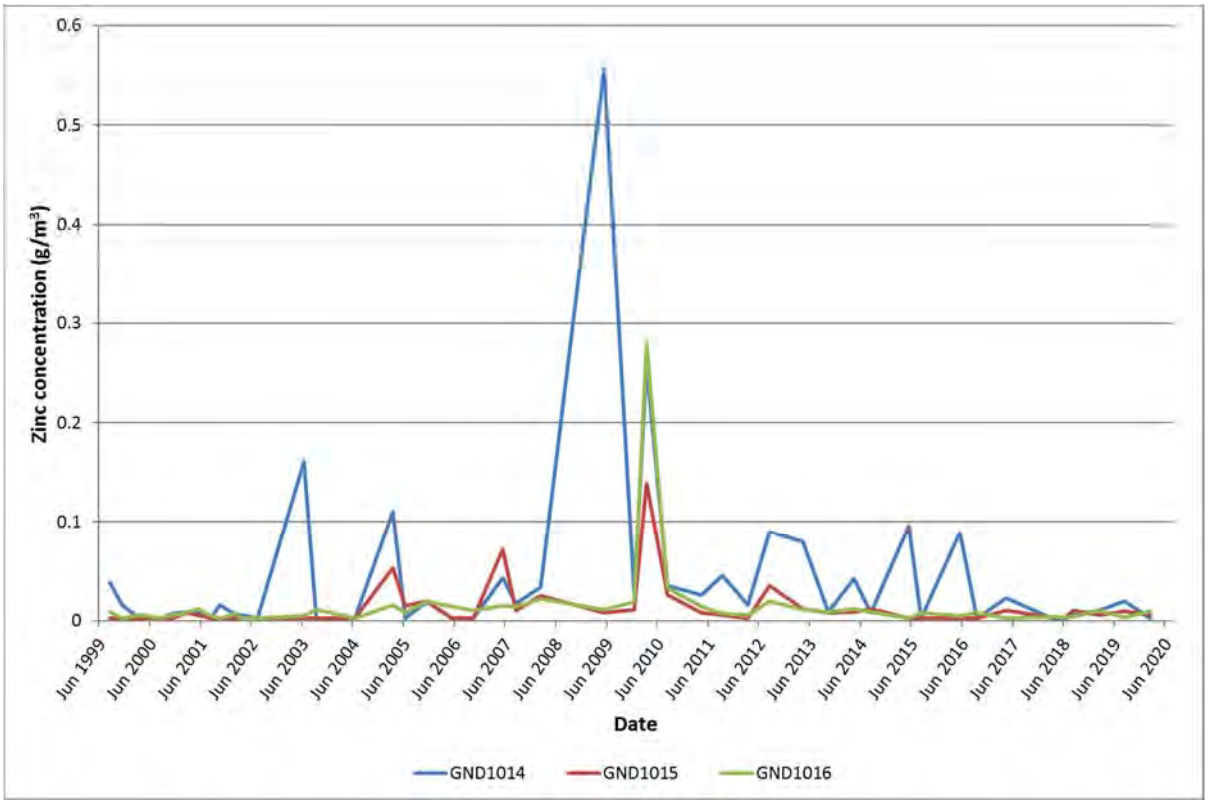

Figure 5 Graph showing dissolved zinc levels in the groundwater at the Stratford landfill

Figure 6 compares the unionised ammonia in the down gradient bore (GND1014) which is most impacted by the landfill due to its location. Given the dependency of unionised ammonia on pH and temperature there is a seasonal variation in ammonia levels which presents as a saw tooth pattern in Figure 6. This makes it hard to determine an overall trend however it should be noted that on 21 February 2020 the third highest unionised ammonia on record was documented (Table 3). Although the unionised ammonia presented in the groundwater is high this doesn't appear to have significantly influenced levels in the surface water which remains well below the 0.025 g/m^3 guideline for the long term protection of aquatic ecosystems.

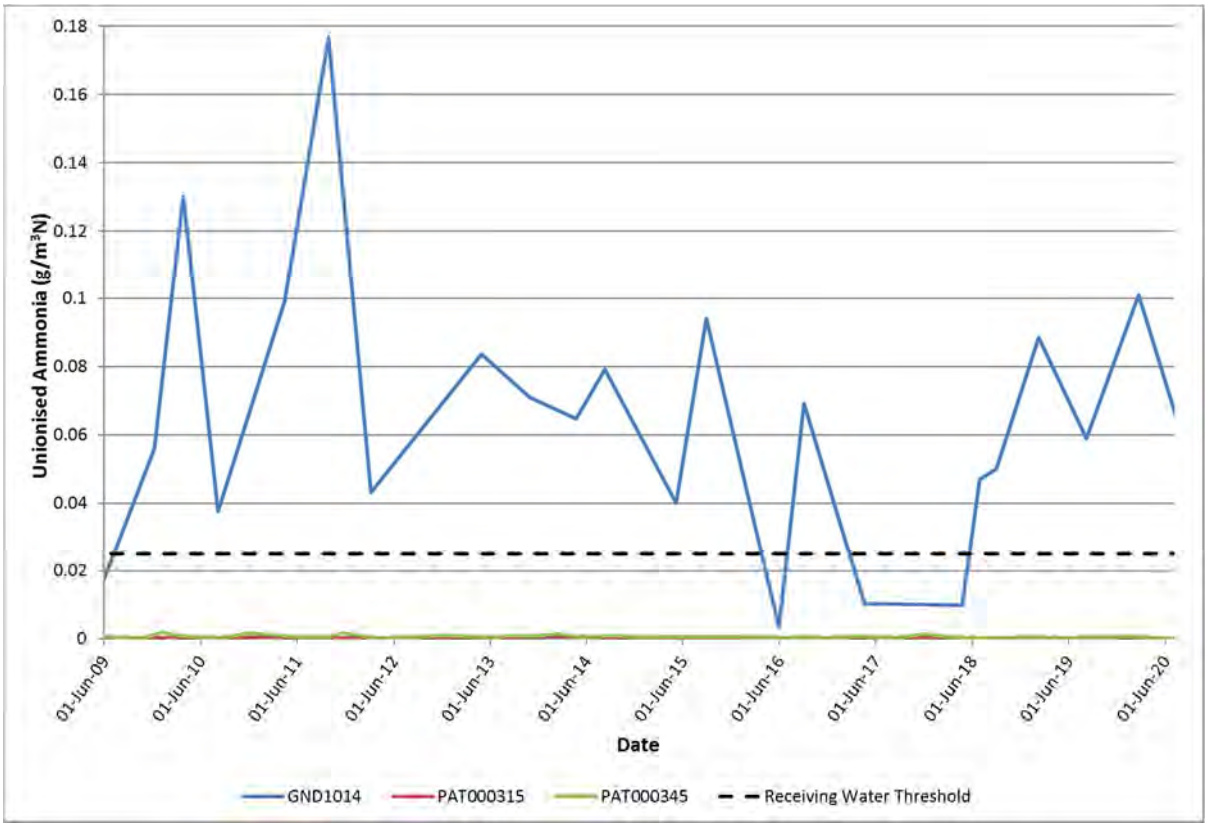

Figure 6 Graph showing unionised ammonia levels in the down gradient bore (GND1014) groundwater and the downstream surface water sites at the Stratford landfill.

2.2.3 Results of surface water monitoring

Samples were collected from the Patea River on 24 January 2020 and the results are set out in Table 4. This sampling was undertaken in conjunction with the monitoring of the Stratford wastewater treatment plant (WWTP), which is discussed in a separate report.

It was noted that the *E. coli* levels at the upstream sampling site (PAT000315) were at levels within the "alert" range (261-550) specified in the MfE Microbiological Water Quality Guidelines for contact recreation. However, it is considered that this increase was not associated with the landfill or the WWTP. The downstream site (PAT000345) was lower than that of the upstream site and was outside of the alert range.

In relation to the other parameters determined, there was no significant difference in the physicochemical water quality between the upstream and downstream sites. The level of unionised ammonia downstream of the landfill has decrease since last monitoring year where it began to rise, this was still well below the 0.025 g/m^3 guideline for the long term protection of aquatic ecosystems.

As with the results from previous monitoring periods, the results from this period indicate that the Stratford landfill had only a very minor, if not negligible, effect on the physicochemical water quality of the Patea River.

Table 4 Results of the Stratford landfill water quality survey

Parameter	Units	24 January 2020	
		Above landfill PAT000315	Below landfill and wastewater treatment pond outlet PAT000345
Black disc transparency	m	3.17	3.18
Biochemical oxygen demand	g/m^3	< 0.8	1.0
Filtered biochemical oxygen demand	g/m^3	< 1.0	< 1.0
Cadmium (dissolved)	g/m^3	<0.00005	<0.00005
Chloride	g/m^3	8.5	8.6
Conductivity @ 25°C	µS/cm	114	128
Chromium (dissolved)	g/m^3	<0.0005	<0.0005
Dissolved oxygen	g/m^3	9.51	9.35
Dissolved reactive phosphorus	g/m^3-P	0.013	0.007
E. coli	/100ml	411	109
Unionised ammonia	g/m^3	<0.00018	0.00067
Ammoniacal nitrogen	g/m^3-N	<0.010	0.041
Nitrate/nitrite nitrogen	g/m^3-N	0.45	0.46
pH	pH	7.7	7.7
Suspended solids	g/m^3	<4	< 3
Temperature	Deg.C	17.4	17.6
Turbidity	FNU**	0.46	0.50
Dissolved zinc	g/m^3	0.0013	0.0012

Figure 7 shows the ammoniacal nitrogen data gathered over the past 27 years. It is noted that, as the Stratford WWTP had an upgrade in 2009, the discharge point of the WWTP was moved and the sites used to monitor the downstream effects of the landfill have also changed. Monitoring at site PAT000330 ceased in March 2009, with monitoring continuing at site PAT000345, further downstream.

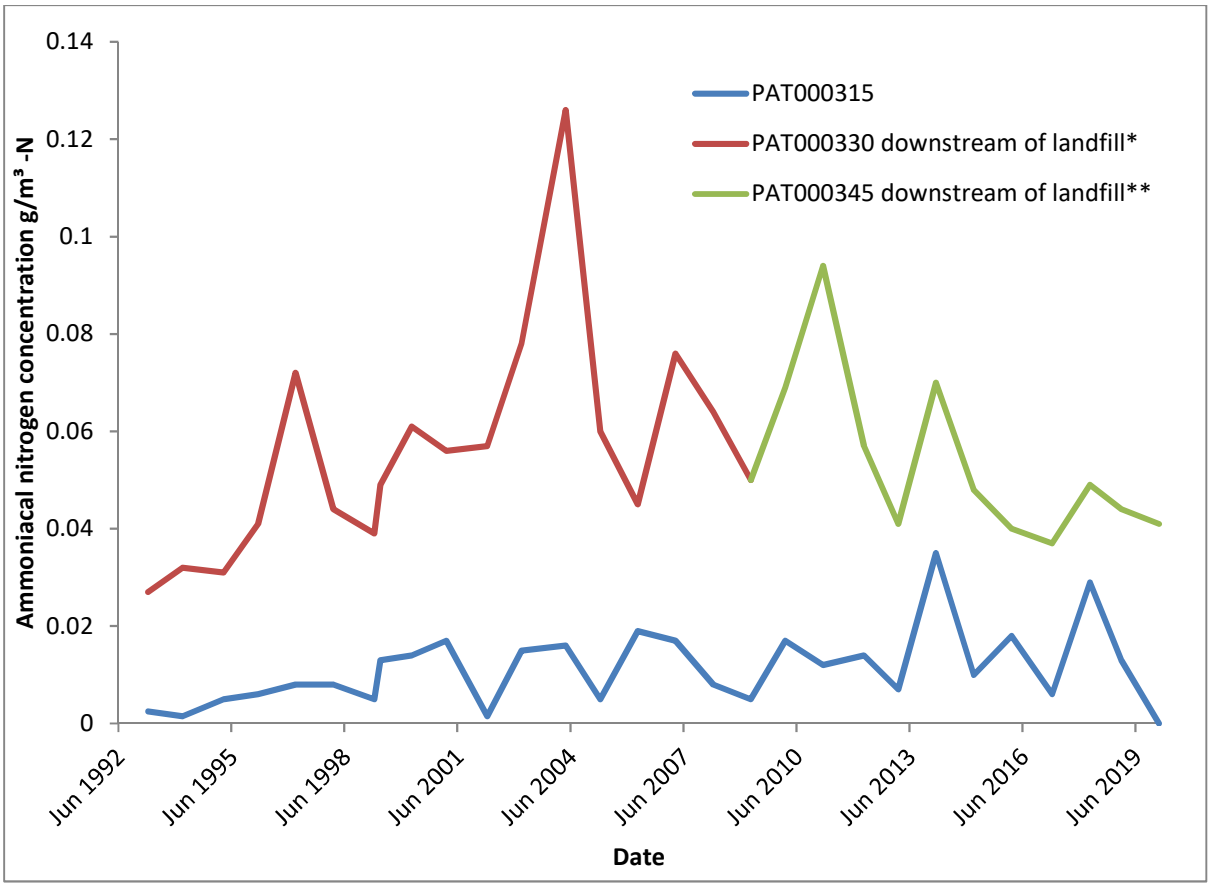

Figure 7 Graph showing ammoniacal nitrogen levels in the Patea Stream up and downstream of the landfill (where comparative data is available)

**Downstream site prior to WWTP upgrade*
***Downstream site after WWTP upgrade*

Whilst there is some separation between the site's locations, the graph indicates that a similar, stable, and modest rise in ammoniacal nitrogen has occurred in the Patea River as result of the landfill's presence. The highest level of ammoniacal nitrogen found downstream of the landfill since monitoring began was 0.87 g/m^3 at site PAT000345, on 16 March 2005 (prior to the WWTP upgrade and not plotted in Figure 7). Under the pH and temperature conditions prevailing at the time of sampling, this ammoniacal nitrogen concentration would have resulted in an unionised ammonia concentration of 0.014 g/m^3, well below the 0.025 g/m^3 unionised ammonia guideline used for the long term protection of aquatic ecosystems.

2.2.4 Biomonitoring

The Council collected streambed macroinvertebrates from the Patea River to investigate the effects of a closed landfill and the Stratford WWTP discharge on macroinvertebrate health. The different types of macroinvertebrate from samples were identified and the number of different types (taxa richness), MCI score, and SQMCI score were calculated for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of nutrient pollution in streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to pollution. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored and enable the overall health of the macroinvertebrate communities to be determined.

Macroinvertebrate richness at sites 1, 2 and 3a was moderate, while at site 4 it was moderately low. Sites 1, 2 and 3a slightly lower than historic medians (2-3 taxa) while at site 4 it was substantially lower by ten taxa. There was no evidence of any acute toxic discharges emanating from the closed landfill or sewerage outfall, lowering taxa richness.

The MCI scores categorised sites 1 and 2 as being in 'good' health and sites 3a and 4 in 'poor' health. There were highly significant declines in MCI scores between the two sites upstream of the Stratford WWTP discharge and the two sites downstream of the discharge. In addition, sites 3a and 4 had scores that were significantly lower than their historic median and both recorded low MCI scores. Furthermore, results from another survey indicates that the negative affect of the discharge was occurring as least as far downstream as Skinner Road (DS138).

The SQMCI can be more sensitive to organic pollution compared with the MCI as it also takes into account taxa abundances. The SQMCI categorised site 1 as being in 'good' health, site 2 in 'fair' health, and sites 3a and site 4 as being in 'poor' health. There was a highly significant decline between sites 1 and 2 and sites 3a and 4, largely congruent with the MCI results. Blood worms (*Chironomus*), as well as oligochaete worms, were abundant at both sites 3a and 4, but not sites 1 and 2. Both taxa are highly pollution tolerant and a good indicator of nutrient enrichment.

Overall, the results indicate there was a highly significant, serious, decline in macroinvertebrate health in the Patea River. This was indicative of chronic nutrient enrichment between sites 2 and 3a, and coincident with discharges from the Stratford WWTP. There was no evidence that leachate from the closed Stratford landfill site had negatively affected macroinvertebrate communities.

Copies of biomonitoring reports for this site are available from the Council upon request.

2.2.5 Incidents, investigations, and interventions

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

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

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

In the 2019-2020 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

2.3 Discussion

2.3.1 Discussion of site performance

SDC displayed a high level of site performance at Stratford closed landfill during the 2019-2020 monitoring year. Site inspections showed the cap was well grassed with no signs of slumping, cracking or exposed refuse. All fences and troughs were intact and well maintained. No non-compliances were noted.

2.3.2 Environmental effects of exercise of consents

Groundwater bore GND1014 continued to exhibit some signs of contamination, however surface water sampling and biomonitoring indicated that the closed landfill was not having a significant effect on the Patea River during the year under review. There was no evidence of odour or dust problems at the site during any inspection.

2.3.3 Evaluation of performance

A tabular summary of SDC's compliance record for the year under review in regard to the Stratford landfill is set out in Table 5.

Table 5 Summary of performance for consent 3889-3 (Stratford landfill)

Purpose: ***To discharge leachate into land and into groundwater adjacent to the Patea River***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practical option	Site specific monitoring programme-programme supervision	Yes
2. Prepare a Contingency and Maintenance Plan	Check of Council records. Revised plan received May 2018	Yes
3. Maintain landfill site	Inspection	Yes
4. Effects beyond mixing zone	Water quality monitoring of the Patea River upstream and downstream of the landfill	Yes
5. Optional review	Next opportunity for review June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 6 Evaluation of environmental performance over time-Stratford landfill

Year	Consent no	High	Good	Improvement req	Poor
2010-2011	3889-3	-	1	-	-
2011-2012	3889-3	-	1	-	-
2012-2013	3889-3	1	-	-	-
2013-2014	3889-3	1	-	-	-
2014-2015	3889-3	1	-	-	-
2015-2016	3889-3	1	-	-	-
2016-2017	3889-3	1	-	-	-
2017-2018	3889-3	-	-	1	-
2018-2019	3889-3	-	1	-	-
Totals		5	3	1	0

During the year, SDC demonstrated a high level of environmental and high level of administrative performance with the resource consents as defined in Section 1.1.4.

2.3.4 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT monitoring of the consented activities at the Stratford landfill in the 2019-2020 year continues at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

The monitoring programme was implemented as recommended.

2.3.5 Alterations to monitoring programmes for 2020-2021

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account 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 exercising resource consents.

It is proposed that for 2020-2021, the monitoring programme remains unchanged from 2019-2020.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2020-2021.

2.4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Stratford Landfill in the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

3 Huiroa landfill

3.1 Process description

The Huiroa landfill is sited within an elbow of Douglas Road. The dump was an uncontrolled roadside landfill used by local residents to dispose of domestic waste. The site was closed in 1991 and reinstated by SDC.

This closed landfill is monitored on a triennial basis, with inspections and sampling next scheduled in 2020-2021. The location of the landfill and monitoring sites are shown in Figure 8.

Figure 8 Huiroa landfill and approximate sampling locations

3.2 Results

The closed landfill at Huiroa is monitored on a triennial basis. Monitoring is next scheduled for the 2020-2021 year. No inspections or sampling were undertaken during the year under review.

3.2.1 Investigations, interventions, and incidents

In the 2019-2020 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with SDC's conditions in the Huiroa landfill resource consents or provisions in Regional Plans.

3.3 Discussion

3.3.1 Evaluation of performance

A tabular summary of SDC's compliance record for the Huiroa landfill during the period under review is set out in Table 7.

Table 7 Summary of performance for consent 3890-3 (Huiroa closed landfill)

Purpose: ***To discharge stormwater and leachate from the former Huiroa landfill onto and into land in the vicinity of an unnamed tributary of the Makuri Stream***		
Condition requirement	**Condition requirement**	**Condition requirement**
1. Adoption of best practicable option	Not monitored during period under review	N/A
2. Maintenance of cap and drainage systems	Not monitored during period under review	N/A
3. Site to be operated in accordance with a 'Management Plan' that is to be within three months of granting of consent	Not monitored during period under review	N/A
4. Component concentration limits on water quality after mixing	Not monitored during period under review	N/A
5. General water quality after mixing	Not monitored during period under review	N/A
6. Optional review	Next opportunity for review June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A
Overall assessment of administrative performance in respect of this consent		N/A

N/A = not applicable

Table 8 Evaluation of environmental performance over time- Huiroa landfill

Year	Consent no	High	Good	Improvement req	Poor
2012	3890-2	1	-	-	-
2015	3890-2	-	1	-	-
2018	3890-3	1	-	-	-
Totals		2	1	-	-

During the year, the environmental and administrative performance of SDC was not assessed in relation to their Huiroa landfill resource consent.

3.3.2 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance, the triennial monitoring for the Huiroa landfill remains unchanged in the 2019-2020 year, with monitoring next scheduled in 2020-2021.
2. THAT should there be issues with environmental or administrative performance in 2019-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

The monitoring programme was implemented as recommended.

3.3.3 Alterations to monitoring programmes for 2020-2021

In designing and implementing the monitoring programmes for air and water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account 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 exercising resource consents.

It is proposed that for 2020-2021 the monitoring remains unchanged from 2017-2018 when it was last monitored.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2020-2021.

3.4 Recommendations

1. THAT in the first instance, the triennial monitoring for the Huiroa landfill remains unchanged in the 2020-2021 year continue at the same level as in 2017-2018 when it was last monitored.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

4 Pukengahu landfill

4.1 Process description

The site is situated in a small gully off Wingrove Road (Figure 9). At the base of the gully is a small wetland area, which is fed by a spring that is culverted beneath the road and feeds into a small unnamed stream. The dump was unmanaged and was mostly used for the discharge of domestic waste by local residents. The landfill closed in 1991 and the site was reinstated by SDC. It is monitored on a triennial basis, with inspections and sampling next scheduled to be undertaken during the 2020-2021 monitoring year.

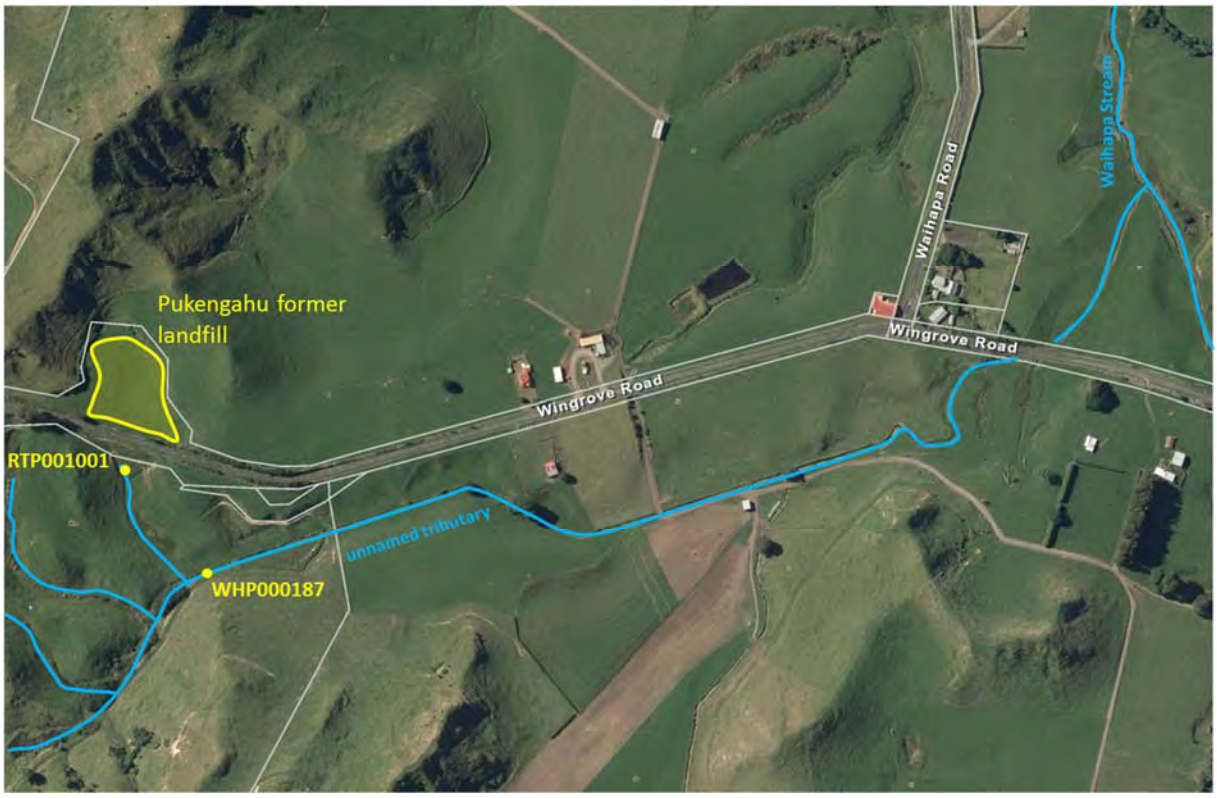

Figure 9 Pukengahu landfill and approximate sampling locations

4.2 Results

The closed landfill at Pukengahu is monitored on a triennial basis. Monitoring is next scheduled during the 2020-2021 year. No inspections or sampling were undertaken during the year under review.

4.2.1 Investigations, interventions, and incidents

In the 2019-2020 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with SDC's conditions in the Pukengahu landfill resource consents or provisions in Regional Plans.

4.3 Discussion

4.3.1 Evaluation of performance

A tabular summary of SDC's compliance record for the Pukengahu landfill during the period under review is set out in Table 9.

Table 9 Summary of performance for Consent 3891-3 (Pukengahu closed landfill)

Purpose: ***To discharge stormwater and leachate from the former Pukengahu landfill into an unnamed tributary of the Waihapa Stream***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option	Not monitored during period under review	N/A
2. Maintenance of cap and drainage systems	Not monitored during period under review	N/A
3. Site to be operated in accordance with a 'Management Plan' that is to be provided within three months of granting of consent	Not monitored during period under review	N/A
4. Component concentration limits on water quality after mixing	Not monitored during period under review	N/A
5. General water quality after mixing	Not monitored during period under review	N/A
6. Optional review	Next opportunity for review June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A
Overall assessment of administrative performance in respect of this consent		N/A

N/A = not applicable

Table 10 Evaluation of environmental performance over time-Pukengahu landfill

Year	Consent no	High	Good	Improvement req	Poor
2012	3891-2	1	-	-	-
2015	3891-2	1	-	-	-
2018	3891-3	1	-	-	-
Totals		3	-	-	-

During the year, the environmental and administrative performance of SDC was not assessed in relation to their Pukengahu landfill resource consent.

4.3.2 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance, the triennial monitoring for the Pukengahu landfill remains unchanged in the 2019-2020 year, with monitoring next scheduled in 2020-2021.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

The monitoring programme was implemented as recommended.

4.3.3 Alterations to monitoring programmes for 2020-2021

In designing and implementing the monitoring programmes for air and water discharges in the region, the Council has taken into account:

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- reporting to the regional community.

The Council also takes into account 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 exercising resource consents.

It is proposed that for 2020-2021 the monitoring remains unchanged from 2017-2018 when it was last monitored.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2020-2021.

4.4 Recommendations

1. THAT in the first instance, the triennial monitoring for the Pukengahu landfill remains unchanged in the 2020-2021 year and continues at the same level as in 2017-2018 when it was last monitored.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

The following abbreviations and terms may be 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.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in µS/cm.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	Escherichia coli, 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.
$g/m^2/day$	grams/$metre^2$/day.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.

Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident register	The incident register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square Metres.
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.
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.
MPN	Most Probable Number. A method used to estimate the concentration of viable microorganisms in a sample.
µS/cm	Microsiemens per centimetre.
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.
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 including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
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 a Science Services Manager.

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Appendix I

Resource consents held by Stratford District Council

(For a copy of the signed resource consent
please contact the TRC Consents department)

Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

Section 15(1)(a) of the RMA 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. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

Section 15(1)(c) of the RMA 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. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

Land use permits

Section 13(1)(a) of the RMA 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. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

Discharge Permit

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

Name of Consent Holder:	Stratford District Council P O Box 320 STRATFORD 4352
Decision Date:	6 December 2010
Commencement Date:	6 December 2010

Conditions of Consent

Consent Granted:	To discharge leachate into land and into groundwater adjacent to the Patea River at or about (NZTM) 1712119E-5644346N
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	Swansea Road, Stratford
Legal Description:	Lots 5-6 DP Pt Lot 4 DP 1942 Lot 2 DP 11213 Blk II Ngaere SD [Discharge source & site]
Catchment:	Patea

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

General condition

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

Special conditions

1. The consent holder shall at all time adopt the best practical option as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.

2. Before 31 March 2011 the consent holder shall submit a Landfill Maintenance and Contingency Plan to the satisfaction to the Chief Executive of the Taranaki Regional Council that;

    a) sets out the requirements and scheduling for the maintenance of the landfill cap;

    b) identifies all other structures on the site [drains, stock watering troughs, and groundwater bores etc] that require ongoing maintenance and sets out requirements and scheduling for their maintenance;

    c) outlines the proposed responses to inadvertent exposure of refuse, significant cap disturbance, and leachate breakouts; and

    d) provides a list of contact details for all appropriate staff and agencies to be contacted during an emergency at the site.

3. In addition to adhering to the Landfill Maintenance and Contingency Plan as required by condition 2, the consent holder shall at all times take all reasonable steps to ensure;

    a) that the cap is contoured is maintained in a manner that prevents ponding, stormwater infiltration and minimises leachate production;

    b) that the cap retains a reasonable cover of appropriate vegetation;

    c) that any stock water troughs on the site are maintained to ensure that they do not leak or overflow;

    d) that any existing drains or other diversion structures are kept clear and functional; and

    e) that the cap depth is maintained to the original specifications as set out in the Swansea Street Sanitary Landfill Management Plan of 1992.

4. That downstream of the discharge zone in the Patea River , beyond grid reference 1712256E-5644543N, 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.

5. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2016 and/or June 2022, 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 6 December 2010

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

Name of Consent Holder:	Stratford District Council PO Box 320 Stratford 4352
Decision Date:	16 June 2016
Commencement Date:	16 June 2016

Conditions of Consent

Consent Granted:	To discharge stormwater and leachate from the former Huiroa landfill onto and into land in the vicinity of an unnamed tributary of the Makuri Stream
Expiry Date:	1 June 2034
Review Date(s):	June 2022, June 2028
Site Location:	Huiroa Landfill, Douglas Road, Huiroa
Grid Reference (NZTM)	1726881E-5653373N
Catchment:	Patea
Tributary:	Makuri

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

General condition

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The landfill cap and stormwater and leachate drainage systems shall be maintained in a manner that:

   a) minimises stormwater infiltration into the filled area; and
   b) ensures stormwater is adequately diverted and/or drained away from the landfill cap.

3. The site shall be operated in accordance with a 'Management Plan' prepared by the consent holder within 3 months of granting of this consent, and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The plan shall detail how the site will be managed to achieve compliance with the conditions of this consent and shall include but not be limited to:

   a) specifying the consent holders monitoring schedule for the site;
   b) maintenance of the landfill cap to minimise ponding and stormwater infiltration;
   c) maintenance and management of the stormwater drains on and around the landfill to ensure stormwater is adequately diverted and/or drained away from the landfill cap.

4. After reasonable mixing the receiving waters of the unnamed tributary of the Makuri Stream downstream of the discharge shall meet the following standards:

   a) unionised ammonia concentration less than 0.025 g/m^3;
   b) ammoniacal nitrogen level concentration less than 0.9 g/m^3;
   c) pH within the range of 6.0 and 9.0; and
   d) dissolved zinc concentration less than or equal to 0.05 g/m^3.

5. The discharge shall not cause 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.

6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2022 and/or June 2028 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 June 2016

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Discharge Permit

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

Name of Consent Holder:	Stratford District Council PO Box 320 Stratford 4352
Decision Date:	16 June 2016
Commencement Date:	16 June 2016

Conditions of Consent

Consent Granted:	To discharge stormwater and leachate from the former Pukengahu Landfill into an unnamed tributary of the Waihapa Stream
Expiry Date:	1 June 2034
Review Date(s):	June 2022, June 2028
Site Location:	Wingrove Road, Pukengahu
Grid Reference (NZTM)	1719066E-5639665N
Catchment:	Patea
Tributary:	Waihapa

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

General condition

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The landfill cap and stormwater and leachate drainage systems shall be maintained in a manner that:

   a) minimises stormwater infiltration into the filled area; and
   b) ensures stormwater is adequately diverted and/or drained away from the landfill cap.

3. The site shall be operated in accordance with a 'Management Plan' prepared by the consent holder within 3 months of granting of this consent, and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The plan shall detail how the site will be managed to achieve compliance with the conditions of this consent and shall include but not be limited to:

   a) specifying the consent holders monitoring schedule for the site;
   b) maintenance of the landfill cap to minimise ponding and stormwater infiltration;
   c) maintenance and management of the stormwater drains on and around the landfill to ensure stormwater is adequately diverted and/or drained away from the landfill cap.

4. After reasonable mixing the receiving waters downstream of the discharge shall meet the following standards:

   a) unionised ammonia concentration less than 0.025 g/m^3;
   b) ammoniacal nitrogen level concentration less than 0.9 g/m^3;
   c) pH within the range of 6.0 and 9.0; and
   d) dissolved zinc concentration less than or equal to 0.05 g/m^3.

5. The discharge shall not cause the following effects in the receiving waters after reasonable mixing:

   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.

6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2022 and/or June 2028 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 June 2016

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management