South Taranaki District Council
Eltham Central Landfill
Baseline Monitoring Programme
Annual Report
2018-2019

Technical Report 2019-79

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Executive summary

In 1996 the South Taranaki District Council (STDC) instigated plans to establish a large landfill in the Eltham area. The (proposed) Central landfill site is situated in the Waingongoro catchment on Rotokare Road, approximately two kilometres south of Eltham. The purpose of this site was originally to accept waste from the South Taranaki and Stratford Districts. The plan was changed to allow for a regionalised approach to waste disposal and the site is now currently a proposed option as the replacement regional landfill once the facility at Colson Road, New Plymouth has reached capacity. The Colson Road landfill closed to general waste in August 2019, however the Central Landfill was put on hold and waste is currently being disposed of out of the region. This report for the period July 2018 to June 2019 describes the baseline monitoring programme implemented by the Taranaki Regional Council (the Council), in anticipation of the site's eventual use as a landfill.

STDC holds a total of five consents which contain a total of 77 special conditions. These consents cover all aspects of the construction and operation of the landfill. At present none of the consents held by STDC in relation to landfill construction and operation have been exercised. The consents have extended lapse periods to allow for an interim period prior to exercise.

During the monitoring period the environmental performance of STDC at the Central landfill was not assessed as the consents are yet to be exercised.

Consent conditions specify that baseline monitoring of the ground and surface receiving waters is to be undertaken to obtain data for comparison to that to be gathered from compliance monitoring surveys when the landfill will have commenced operations. In the 2016-2017 year the Council was informed that site establishment was commencing. This report outlines the progress that had been made towards site establishment, the consents held by STDC for this site, reports on the baseline monitoring activities carried out in the 2018-2019 period, and discusses these results along with the previously obtained groundwater monitoring results.

As some baseline monitoring had been undertaken for a number of years, and there had been uncertainty around if and when the consents might be exercised, monitoring had been scaled back to consist of only the collection and analysis of six surface water samples per year between the 2014-2015 and 2017-2018 years.

During the 2017-2018 year, the baseline monitoring was increased significantly with the expectation that the site would become operational late in the 2018-2019 year. Although the project was put on hold, due the significant increase in the number of monitoring sites, and lack of information on the natural variability at them, this level of monitoring was continued during the year under review, as the project may recommence.

The monitoring has shown that surface water quality is generally comparable to that found during previous monitoring periods and was indicative of good water quality when compared to that expected in similar streams in the area. The only exception to this is the occasional high faecal coliform count. During the year under review, a high faecal coliform result was recorded in May 2019. No incidents were recorded by the Council in regards to the consents included in this programme during the period under review.

During the 2017-2018 monitoring year the Council liaised closely with STDC around the detailed requirements of the consent, changes to best practice guidelines and health and safety requirements since the consents were granted and how these requirements can be accommodated through the landfill design. This work is predominantly considered to be outside the scope of the baseline monitoring programme. However where this related directly to relevant consent conditions and/or there were resultant changes to the baseline monitoring programme, they have been included in this report. This is to provide some continuity and an indication of the further work required should the project proceed.

No rating is given for environmental and administrative performance as the project was on hold for the year under review.

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.

This report includes recommendations for the 2019-2020 year.

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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 2018 to June 2019 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by South Taranaki District Council (STDC) for a proposed regional landfill. STDC has consents to establish and operate a landfill situated on Rotokare Road, two kilometres south of Eltham in the Waingongoro catchment.

The report includes the results and findings of the baseline monitoring programme implemented by the Council in respect of the consents held by STDC that relate to damming, diverting and installing structures in tributaries of the Waingongoro Stream, and discharges to water, air and land associated with the establishment and operation of a proposed regional landfill in the Waingongoro catchment. It is noted that this report is for baseline environmental monitoring of the existing environment at the site as none of the consents associated with the landfill have been exercised. The report does however provide a brief summary of the work that has been undertaken towards preparing the site for the landfill establishment, prior to the project being put into abeyance during the year under review.

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 from the Central landfill's use of water, land and air, and is the tenth combined annual report by the Council for the STDC.

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 STDC for the Central landfill;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Waingongoro 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 2019-2020 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 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.[1]

1.2 Process description

STDC has identified a proposed landfill site in Eltham at Rotokare Road, on the east side of State Highway 3, approximately two kilometres south of the Eltham Township. The site of the proposed landfill is a 92 ha farm that is owned by STDC and will continue to be farmed until construction of the landfill commences. The original concept was that the landfilling operation would utilise approximately 5 ha of the site at any one time and the site was estimated to have a capacity of 2,200,000 m^3. Access to the site is proposed to be from Rotokare Road. The concept was that the proposed landfill would be a fully engineered facility with a 1.5 mm high density poly ethylene (HDPE) liner laid over a 600 mm layer of compacted clay. Leachate will be

[1] 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

collected by leachate lines and transferred to the sewer pipeline that runs between the Eltham oxidation ponds and the Hawera waste water treatment plant (WWTP).

Consents 5347, 5348, 5349, 5350, and 5351 were granted on 15 March 2000 with the expectation that, within three years, landfill space available to STDC at other landfill sites in the district would be full and that the Eltham site would commence operation (exercise of consent) within the five year lapse period set in the consents for the site.

However, during the intervening period, a plan was developed and agreed on by the three district councils in the region that saw a regionalised approach to waste management being implemented by the district councils. Part of this plan was to route all municipal waste in the region to Colson Road landfill in New Plymouth, with the eventual closure of all other municipal landfills in the region. When the Colson Road landfill approaches its projected capacity the plan called for Central landfill to be commissioned to take over as the regional landfill for Taranaki.

In July 2005 the STDC was granted changes to consent conditions to increase the consent lapse periods from 5 years to 20 years. These changes allowed for the extended timeframes resulting from the change of designation from proposed district to proposed regional landfill.

During 2016-2017, the Council was advised that planning for the establishment of the new landfill was commencing and work on the road re-alignment in the vicinity of the SH3 and Rotokere Road junction began.

During 2018-2019 the Council was advised that the project would not be progressing at this stage.

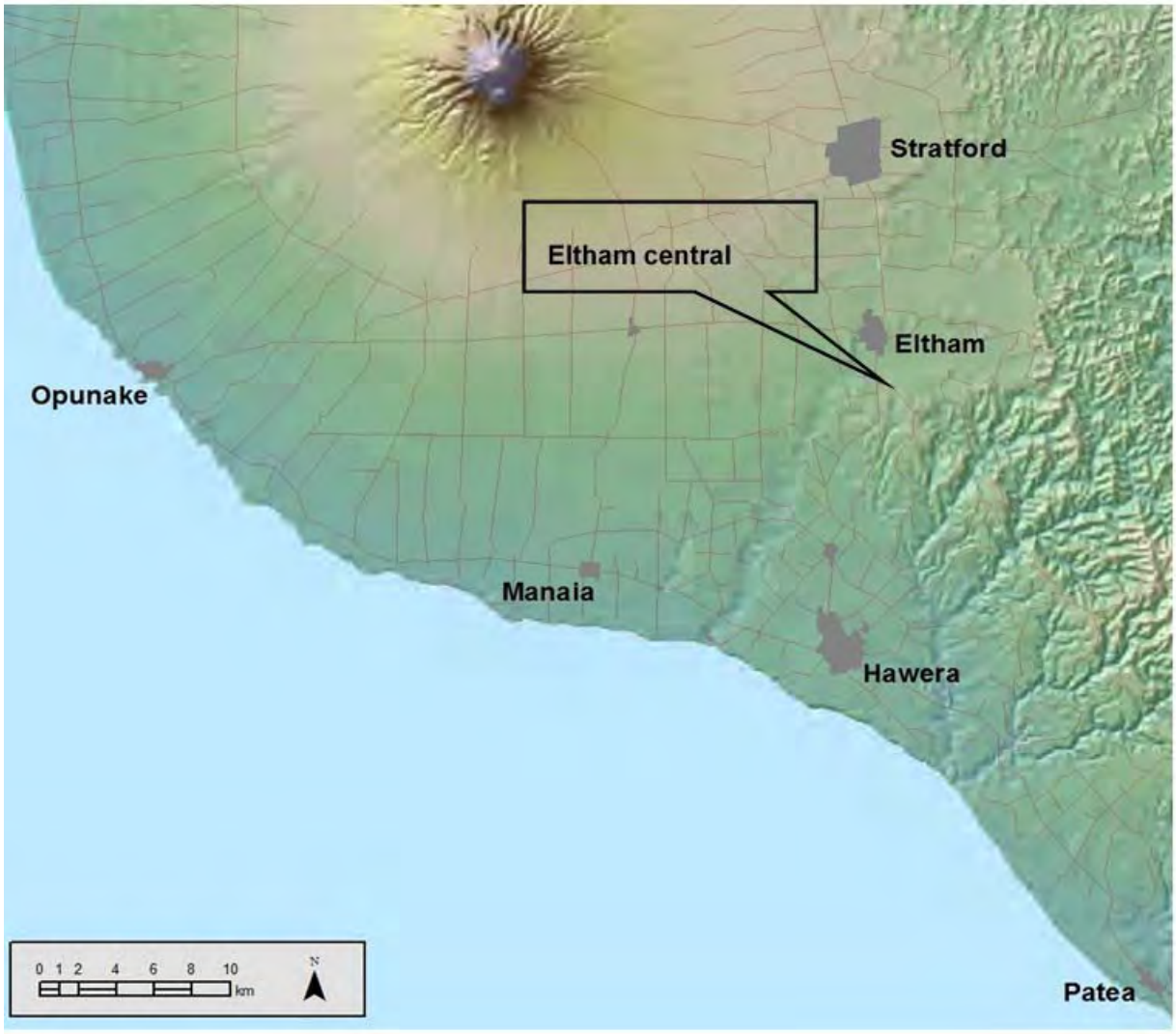

Figure 1 Regional map of Taranaki showing the location of the Central landfill site

Photo 1 Central landfill site (north westerly view from the east side of the site)

Photo 2 Central landfill site (westerly view from the east side of the site)

Photo 3 Central landfill site (south westerly view from the east side of the site)

As can been seen by the photos, the site itself consists of a large bowl shaped valley, which makes it well suited to use as a landfill site. The proposed landfill foot print is in the shape of a horseshoe and contains the headwaters of two unnamed tributaries that eventually feed into the Waingongoro River, approximately two kilometres northwest of the site. The northern landfill tributary is permanently flowing and has some established riparian planting. The southern tributary is currently ephemeral and the sediment ponds serving the stage one and two areas will be at the headwaters of this landfill tributary. Several groundwater bores and freshwater sampling sites have been established for the purposes of baseline monitoring.

1.2.1 Site enabling works

During the 2017-2018 year, a number of matters were progressed relating to the site establishment. These included:

- Continuation of the Neighbourhood Liaison Group meetings;
- Additional technical investigations at the site to inform the design;
- Consultation on changes to the draft design and detailed design;
- Consultation on the draft Operation and Management Plan;
- The granting of addition consents to allow the Stage 1 enabling works to commence;
- Commencement of the Stage 1 enabling works; and
- More intensive baseline monitoring.

During the year under review a decision was made that the landfill would not be progressed at this stage in favour of disposing of the waste outside the Region, with the new arrangement commencing in August 2019. The site was appropriately contoured and stabilised so that land could be returned to pasture.

The Council was advised that there will be a review of this arrangement in the 2021-2022 year, with the potential that work at the site may recommence after this review, in preparation for the site to accept waste in July 2024, if required.

Monitoring of the earthworks consent 10501-1 that is carried out under a different monitoring programme found that the site had been satisfactorily stabilised such that the sediment control ponds could be removed.

Photo 4 Central Landfill, 3 July 2018 – northern side of southern gully

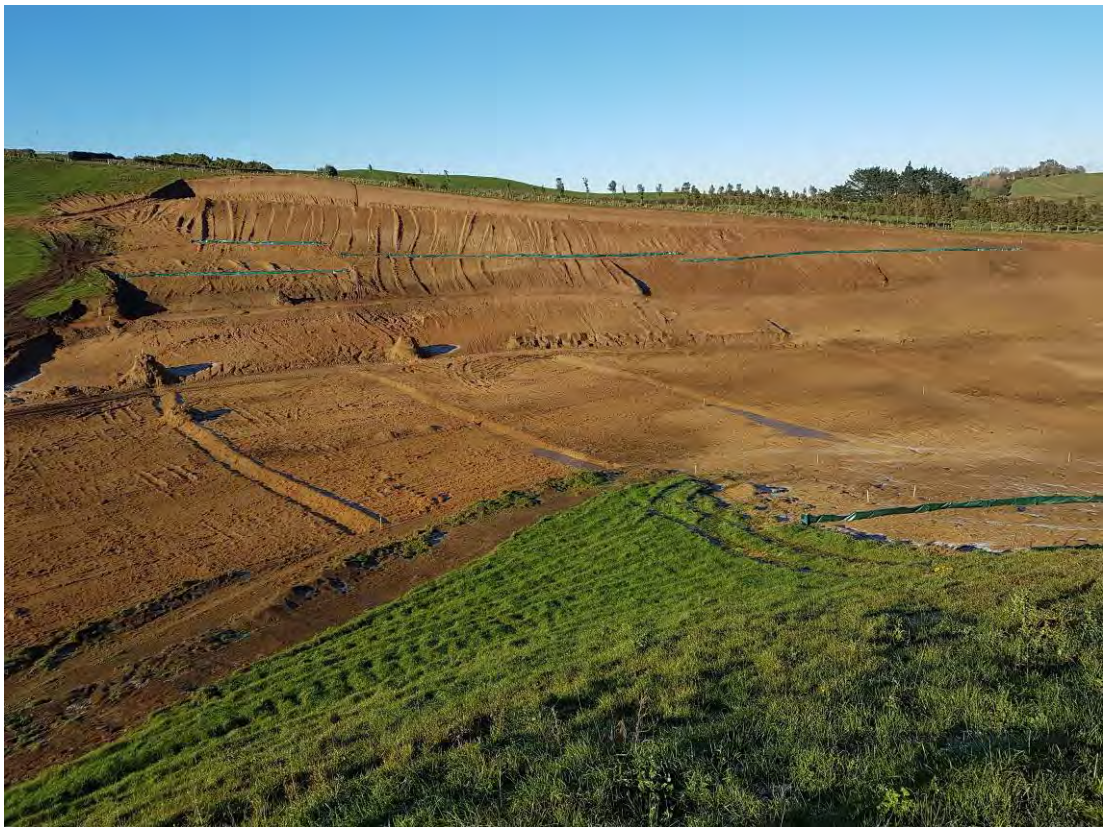

Photo 5 Central Landfill, 3 July 2018 – southern side of southern gully

Photo 6 Central Landfill, 12 June 2019 – southern side of southern gully after stabilisation

Photo 7 Central Landfill, 12 June 2019 – eastern side

Photo 8 Central Landfill, 12 June 2019 – along northern side of northern gully

1.3 Resource consents

STDC holds five resource consents the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in Section 3 of this report.

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

Table 1 Summary of resource consents held by the STDC for the proposed Central landfill

Consent number	Purpose	Commencement	Review	Expires
Water discharge permits				
5349-1.3	To discharge stormwater	14 December 2017	June 2023	June 2034
Air discharge permit				
5348-1.3	To discharge emissions into the air	24 August 2017	June 2023	June 2034
Discharges of waste to land				
5347-1.2	To discharge contaminants onto and into land	24 August 2017	June 2023	June 2034
Land use permits				
5350-1.2	To dam and divert water	24 August 2017	June 2023	June 2034
5351-1.2	To erect, place and maintain structures in the beds of the unnamed tributaries	24 August 2017	June 2023	June 2034

The above consents were originally granted in March 2000. In the 2016-2017 year the Council advised that a review was required on the consents for the following reasons:

- Conditions 27, 19, 19, 10, and 12 of the respective consents provided for the Council to review consent conditions for the purpose of assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharges of contaminants permitted by these consents.
- The original consents were issued based on an Assessment of Environmental Effects and draft Management Plan compiled in May 1998. Although the most recent versions of the consents were granted in July 2005, only the potential effects of the variation sought at this time (expanding the area from which the refuse would originate from) were able to be considered.
- Council was aware that there were likely to be a number of changes to the design, construction and operation of the landfill that had not yet been finalised.
- There have been new National Environmental Standards[2] and disposal to land guidelines[3] released since the consent conditions were drafted.
- There is no General Condition (d) on any of the consents so references to it are not needed.

The Council therefore determined that the current conditions on the consents may not be adequate to deal with potential adverse effects on the environment. Also that they may not be aligned with current best practice and expected levels of environmental performance. The consent conditions provided for a notice of review to be served during June 2017 but all the information required to undertake the review was not yet

[2] Resource Management (National Environmental Standards for Air Quality) Regulations 2004

[3] Waste Management Institute of New Zealand (April 2016): Technical Guidelines for Disposal to Land

available. STDC was therefore advised that the Council would be reviewing the consents to provide additional review opportunities, allowing for reviews to be undertaken in an appropriate and timely manner as the landfill design progresses. The additional review opportunities included in all the consents were December 2017, June 2018 and June 2019. The reviewed consents were granted on 24 August 2017.

Applications for a variation to all fives consents were received on 22 May 2019. The variation applied for was an extension on the lapse date from March 2020 to 21 December 2025 to align with the lapse dates on the designation in the proposed South Taranaki District Plan Decisions Version 2016. The application was made under Section 125(1)(b) of the RMA. Applications were also received at this time to transfer the consents from STDC to New Plymouth District Council (NPDC). The varied consents were granted in NPDC's name on 2 July 2019.

Two additional permits were issued to STDC in May 2017, one to allow for the extension of a culvert in the tributary of the Waingongoro Stream tributary (**10428-1**), and one to allow for the discharge of stormwater from the earthworks (**10418-1**). These consents both relate to the road widening and re-alignment required by the New Zealand Transport Agency to provide safe access to Rotokere Road, rather than to the development of the landfill site itself. Two consents were also granted on 23 November 2017, one to discharge stormwater and sediment arising from earthworks onto land (**10501-1**), and one to install a culvert in an unnamed tributary of the Waingongoro River, including the associated disturbance of the stream bed (**10502-1**). These consents relate to the first stage of enabling works on the landfill site, including construction of the access road into the property and the replacement of an existing culvert under the proposed access road. The consents themselves are not covered in this annual report, as they are monitored under the short term culvert/earthworks monitoring rounds, rather than being included in this compliance monitoring programme. However, any issues occurring that may have had the potential to affect the baseline conditions in the receiving waters will be discussed in this report.

1.4 Monitoring programme

1.4.1 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 monitoring programme for the proposed Central landfill site consisted of three primary components.

1.4.2 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.

1.4.3 Chemical sampling

The Council undertook baseline monitoring of groundwater in the vicinity of the site and the receiving waters below the proposed landfill site.

The programme included the sampling of up to 19 groundwater sites and six surface water sites on two occasions. The samples were analysed for a wide variety of components to assess the baseline concentrations of the analytes that the consents would require to be monitored once they are exercised and those recommended by New Zealand and international best practice guidelines.

Three of the surface water sites were those that have been monitored for a small range of basic parameters for 14 years (Figure 2). An additional three sites (Figure 3) were added to the programme during the 2017-2018 year, due to the then planned construction of Stage 1, in the headwaters of the 'southern ephemeral' tributary.

Seven of the groundwater monitoring bores were those that had been monitored for a small range of basic parameters for up to 14 years, during the period August 2005 to June 2014 (Figure 2). However, during this time period, some of the bores fell into disrepair so do not have a full data set. The 12 bores added to the programme were drilled during the year under review to meet the requirement of consent 5347. The bores monitored during the year under review to meet the requirements of this consent are shown in Figure 3.

At the request of STDC, the programme also included baseline monitoring of the neighbours' water supplies that would require testing after the consents are exercised. This was agreed during the consent application consultation process and documented in the consent conditions. The consent provides for this work to be undertaken by STDC, however, the Council was requested to undertake this work on their behalf.

1.4.4 Biomonitoring surveys

Biological surveys were performed on one occasion in an unnamed tributary of the Waingongoro River. Three of the sites were established sites, used on 11 occasions previously to gather baseline data prior to the establishment of the proposed Central landfill. An additional two sites were added during the 2017-2018 period, due to the then planned construction of Stage 1, in the headwaters of the 'southern ephemeral' tributary, however samples were not collected from the new sites during the year under review.

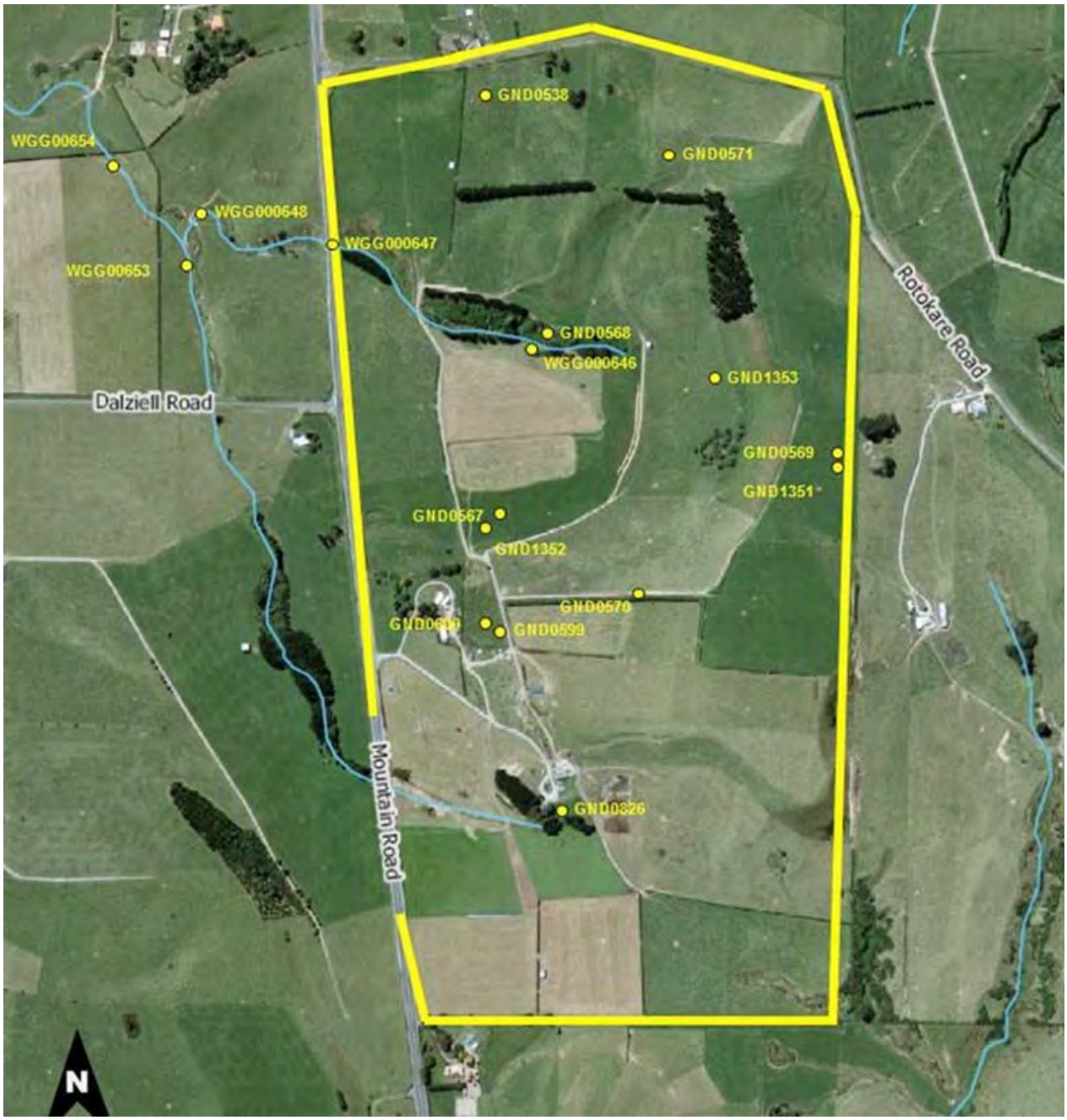

Figure 2 Aerial view of the Central landfill site and sampling points, up to June 2017

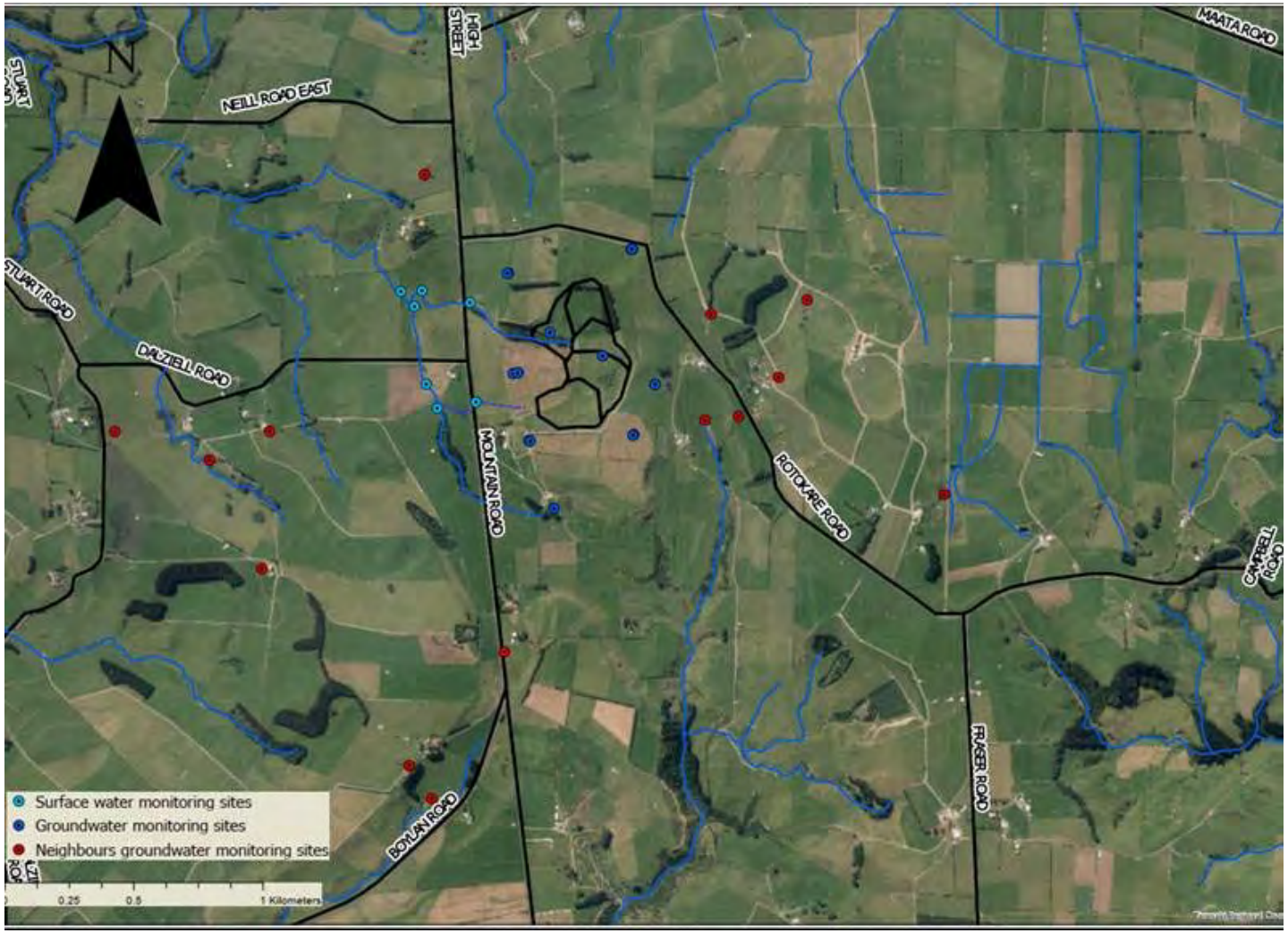

Figure 3 Increased Central landfill monitoring network, July 2017 onward

2 Results

2.1 Programme management and liaison

During the 2017-2018 year, there were a series of meetings held with the STDC design team and their consultants, along with the technical expert supporting the Council as required by the consents (for example condition 3 of consent 5347).

The meetings and associated liaison occurred on a regular basis from July 2017 to May 2018. During this period the initial draft design, additional testing (e.g. compaction and infiltration rate), the final design and operation and management plans were developed, and the Stage 1 enabling works commenced. The initial draft design showed that the slopes proposed for the sides of the landfill, the cap contour and liner details provided in the concept plans provided with the initial applications, presented health and safety implications and/or did not meet current best practice. The STDC design team kept the Council fully informed of the changes that would have to be made to the build design and sought confirmation that these would be acceptable with respect to a variation and/or review of the conditions of the consent and environmental performance. The neighbourhood liaison meetings required by the consents also commenced, with the neighbours kept abreast of changes to the design and the proposed stage preparation ground work schedule. Their comments were sought prior to moving to the next stage of the design work. Areas of particular relevance to the neighbours were discussed and these included the road re-alignment feedback, the changed contour of the cap, and the screen planting.

Council was advised on 24 May 2018 that the decision had been made to stop the enabling works in order to undertake stabilisation works for the winter. The site was to be monitored by the contractors during the winter and work was expected to recommence in October 2018.

During the year under review, the Council was advised that the project would not be continuing at this stage. Therefore the liaison and consultation meetings were put in abeyance, and will not recommence unless a decision is made to proceed with landfill construction.

2.2 Water

2.2.1 Results of surface water monitoring

Sampling of six sites was undertaken on two occasions (5 November 2018 and 9 May 2019). The sampling sites are shown in Figure 4 and the results for selected parameters are presented in Table 2 and Table 3.

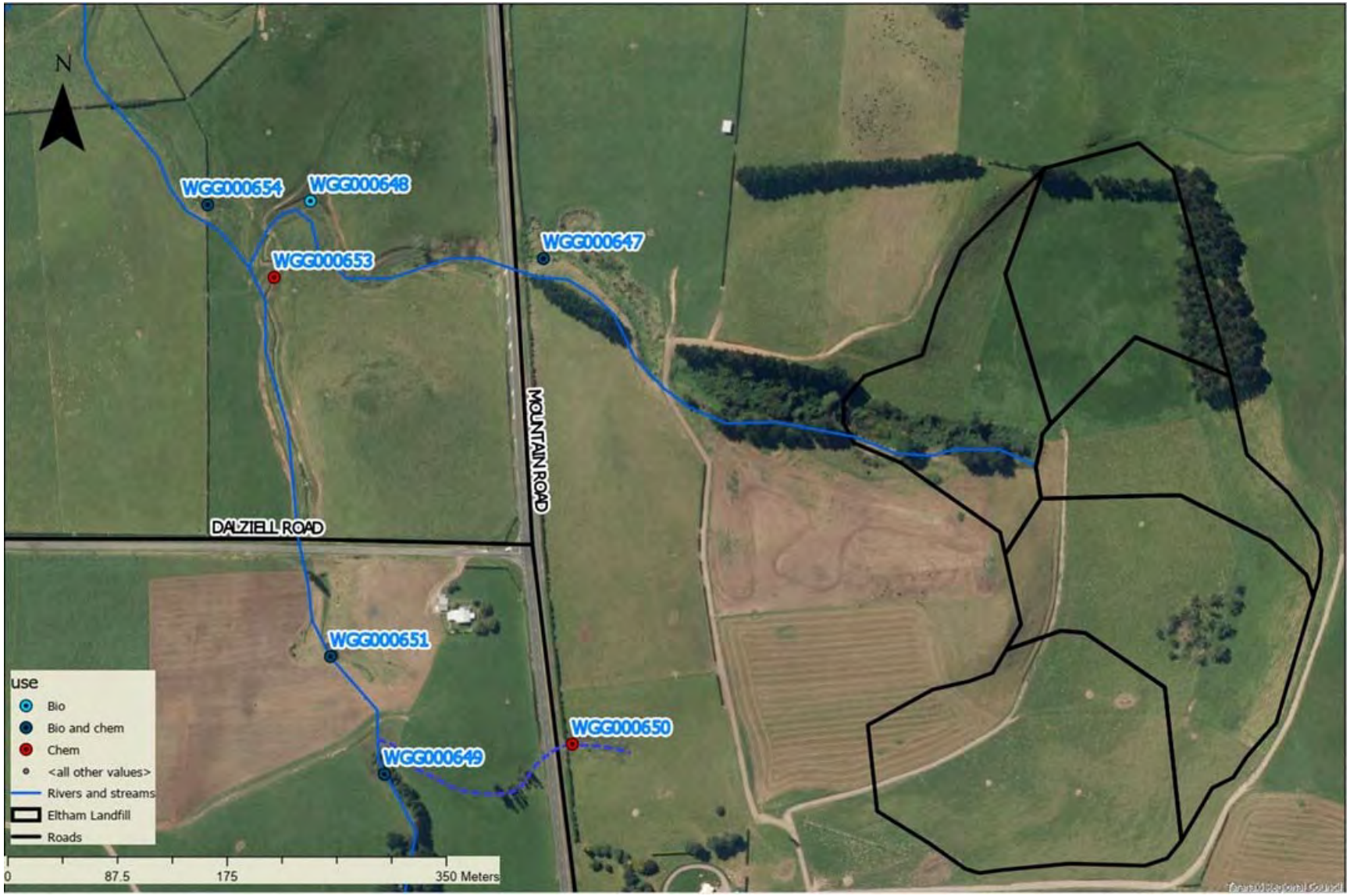

Figure 4 Central landfill surface water monitoring sites

The results for most of the surface water are as expected for the site in its current use, and the downstream land use (dairy farming).

From a baseline monitoring perspective, it is noted that there are occasional high faecal coliform results found in the main tributary that are above the levels permitted by the landfill consent (1,000 cfu/100 ml). There were elevated results found during the 2015-2016 and 2016-2017 years. In the 2016-2017 year, the level of faecal coliforms found in the main tributary on 28 February 2017 was 3,700 cfu/100 ml. This result was logged as an unauthorised incident. The investigation did not identify the source of this particular discharge. However, some recommendations were made to neighbouring farms to minimise the effects of the agricultural land use. During the 2017-2018 year a result of 5,400 cfu/100 ml was returned for the sample collected at the same location (WGG000653) on 6 March 2018.

During the year under review, a high result of 2,400 cfu/100 ml was returned for the sample collected at the same location (WGG000653) on 9 May 2019. The site 200m downstream also had an elevated level with 1,600 cfu/100 ml. It is noted that both of the landfill tributaries had substantially lower faecal coliform counts.

The levels of zinc, copper, and dissolved reactive phosphorus are low and stable, as are the levels for alkalinity, conductivity and filtered carbonaceous biochemical oxygen demand (BODCF). The results from this monitoring period are, for the most part, comparable to those found over previous monitoring periods and generally indicate typical water quality for this type of waterbody.

In addition to the previously monitored biological and physicochemical parameters and organic and non organic indicator chemicals, the samples collected during the year under review were also tested for volatile and semi-volatile organic compounds (VOC's and SVOC's), organo-nitrogen and phosphorus pesticides and a range of total and dissolved metals. There were no VOC's, SVOC's and organo-nitrogen and phosphorus pesticides detected at any of the sites at the time of the two sampling surveys.

Table 2 Results of surface water sampling at the Central landfill, 5 November 2018

Parameter	Unit	5 November 2018					
		WGG000649 250m u/s Dalziell road	WGG000650 Ephemeral landfill trib d/s of site	WGG000651 75m u/s Dalziell road	WGG000653 u/s landfill trib	WGG000647 landfill trib d/s of site	WGG000654 200m d/s S.H.3
Alkalinity	g/m^3	73	91	74	68	52	60
BODCF	g/m^3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Conductivity	mS/m@25°C	31.1	28.7	31.0	28.8	25.2	26.3
Dissolved copper	g/m^3	<0.0005	0.0014	0.0005	0.0005	0.0005	0.0006
Total copper	g/m^3	0.00073	0.0048	0.00094	0.00085	0.00084	0.00111
Dissolved oxygen	g/m^3	8.81	5.55	8.92	7.76	8.42	8.09
Dissolved reactive phosphorus	g/m^3	0.012	0.010	0.012	0.010	0.014	0.010
Faecal coliforms	per/100ml	49	23	170	350	920	350
Dissolved iron	g/m^3	0.02	0.09	0.04	0.02	0.05	0.02
Total iron	g/m^3	0.29	3.7	0.68	0.101	0.26	0.106
Hardness	g/m^3-$CaCO_3$	92	93	89	83	68	73
Unionised ammonia	g/m^3-N	<0.00014	0.00013	0.00014	0.00007	0.00013	0.00008

Parameter	Unit	5 November 2018					
		WGG000649 250m u/s Dalziell road	WGG000650 Ephemeral landfill trib d/s of site	WGG000651 75m u/s Dalziell road	WGG000653 u/s landfill trib	WGG000647 landfill trib d/s of site	WGG000654 200m d/s S.H.3
Ammoniacal nitrogen	g/m^3-N	<0.010	0.021	0.012	0.012	0.021	0.010
Nitrate/nitrite nitrogen	g/m^3-N	3.1	0.16	2.8	3.2	4.3	3.6
Nitrite nitrogen	g/m^3-N	0.003	0.005	0.003	0.006	0.005	0.007
pH	pH	7.7	7.4	7.6	7.3	7.3	7.4
Suspended solids	g/m^3	6	40	14	<3	3	<3
Temperature	Deg °C	12.4	12.7	12.8	13.7	13.5	14.1
Dissolved zinc	g/m^3	0.0021	0.0011	0.0018	0.0013	<0.0010	<0.0010
Total zinc	g/m^3	0.0048	0.0070	0.0058	0.0025	0.0014	0.0027
SVOC's	g/m^3	ND	ND	ND	ND	ND	ND
VOC	g/m^3	ND	ND	ND	ND	ND	ND
Pesticides	g/m^3	ND	ND	ND	ND	ND	ND

ND Not detected

Table 3 Results of surface water sampling at the Central landfill, 9 May 2019

Parameter	Unit	9 May 2019					
		WGG000649 250m u/s Dalziell road	WGG000650 Ephemeral trib below*	WGG000651 75m u/s Dalziell road	WGG000653 u/s landfill trib	WGG000647 landfill trib d/s of site	WGG000654 200m d/s S.H.3
Alkalinity	g/m^3	85	-	86	71	57	62
BODCF	g/m^3	<1.0	-	<1.0	<1.0	<1.0	<1.0
Conductivity	mS/m@25°C	30.4	-	30.5	27.0	25.5	25.8
Dissolved copper	g/m^3	<0.0005	-	0.0006	<0.0005	0.0006	0.0005
Total copper	g/m^3	0.00055	-	0.0033	0.00057	0.0029	0.00091
Dissolved oxygen	g/m^3	9.17	-	9.13	7.86	8.02	8.13
Dissolved reactive phosphorus	g/m^3	0.026	-	0.017	0.015	0.009	0.010
Faecal coliforms	per/100ml	170	-	540	2,400	920	1,600
Dissolved iron	g/m^3	0.10	-	0.22	0.11	0.07	0.05
Total iron	g/m^3	0.37	-	2.8	0.36	1.43	0.27
Hardness	g/m^3-$CaCO_3$	91	-	92	80	71	72
Unionised ammonia	g/m^3-N	0.00020	-	0.00038	0.00031	0.00021	0.00016
Ammoniacal nitrogen	g/m^3-N	0.018	-	0.026	0.039	0.041	0.020
Nitrate/nitrite nitrogen	g/m^3-N	0.97	-	0.82	3.1	4.3	3.5

Parameter	Unit	9 May 2019					
		WGG000649 250m u/s Dalziell road	WGG000650 Ephemeral trib below*	WGG000651 75m u/s Dalziell road	WGG000653 u/s landfill trib	WGG000647 landfill trib d/s of site	WGG000654 200m d/s S.H.3
Nitrite nitrogen	g/m^3-N	0.002	-	0.005	0.009	0.015	0.018
pH	pH	7.6	-	7.7	7.5	7.2	7.5
Suspended solids	g/m^3	8	-	21	3	29	<3
Temperature	Deg °C	12.1	-	13.2	12.9	13.5	12.6
Dissolved zinc	g/m^3	0.0015	-	0.0014	0.0015	<0.0010	<0.0010
Total zinc	g/m^3	0.0037	-	0.021	0.0020	0.0027	0.0015
SVOC's	g/m^3	ND	-	ND	ND	ND	ND
VOC	g/m^3	ND	-	ND	ND	ND	ND
Pesticides	g/m^3	ND	-	ND	ND	ND	ND

ND Not detected

* Not flowing at the time of sampling

Historical surface water data for the proposed landfill site for selected parameters are shown in Figure 5 to Figure 9.

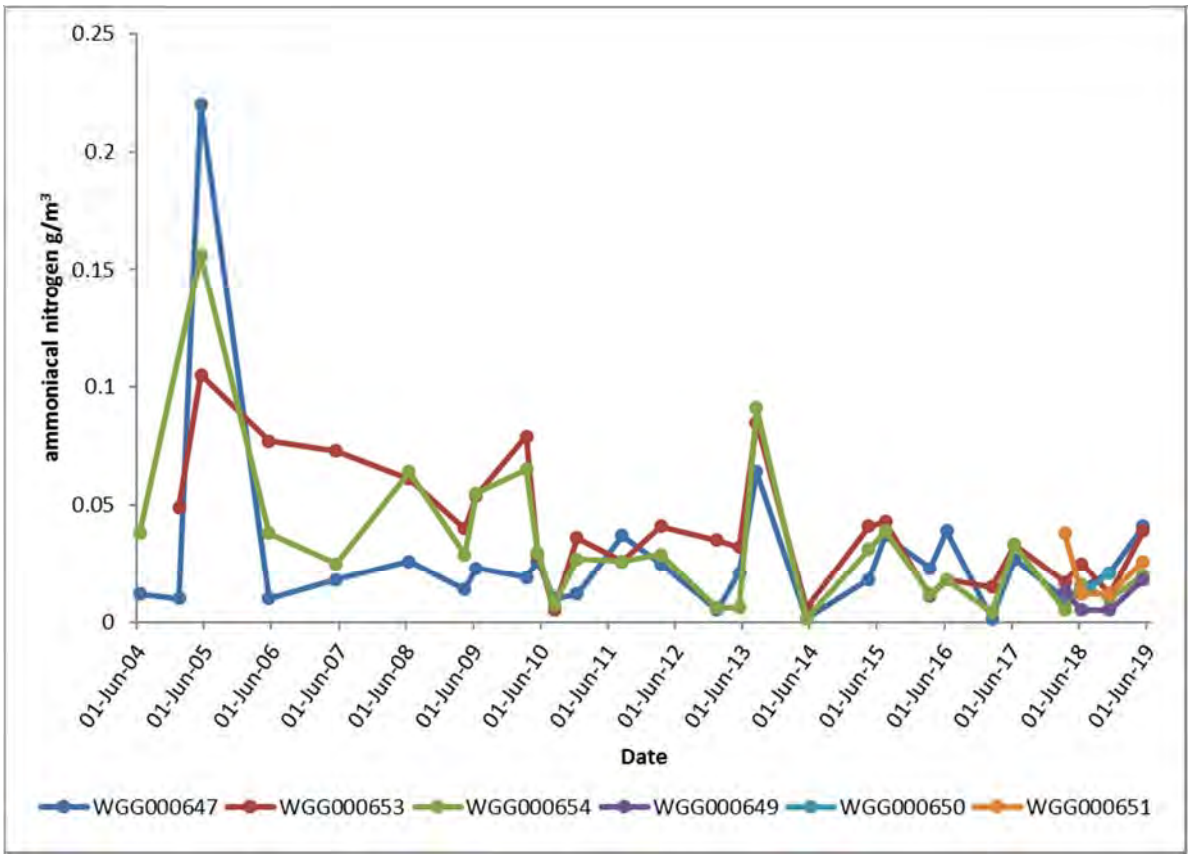

Figure 5 Ammoniacal nitrogen levels found in surface water at the Central landfill site, 2004-2019

Figure 5 illustrates comparative fluctuations in the levels of ammoniacal nitrogen at all sites. All the results are for surface water sites in pastoral areas, and when taken in conjunction with pH and temperature

measurements, the highest level of free ammonia found to date at any of the sites is 0.0012 g/m^3 (WGG000653, January 2013 and WGG000651, 6 March 2018) . This is well within the 0.025 g/m^3 guideline for aquatic ecosystem protection.

The level of suspended solids also fluctuate over time with a range of <2 to 250 g/m^3 recorded over all the sites. The unnamed tributaries on this site are generally small, clear running, low energy brooks with silty beds. Some of the monitoring sites are very slow flowing under low flow conditions and can become covered in duck weed at some sites. With increased rainfall the suspended solids level in these tributaries can rise quite quickly as silt is stirred up from the beds and edges of the streams, entraining it in the flow. There were some elevated suspended solids found in previous monitoring periods, one across all sites related to a fresh, and the other at site WGG000654 taken during the road re-alignment works in June 2017. Barring these exceptions, the overall the level of suspended solids indicates good water quality in the stream system.

Apart from a slight comparative spike in conductivity levels in the results for June 2008 in the downstream sites, the overall levels had appeared to be quite stable. All but two results were in the 20-30 mS/m @ 25°C range, indicating only moderate to low levels of dissolved ions in this stream system. During the 2017-2018, seven of the 11 results were greater than 30.0 mS/m @ 25°C, two of which were samples collected from the sites that have been monitored since 2004. During the year under review, five of the 11 results were above this value, one of which was a longer term monitoring site (WGG000653) and the rest were at the new sites upstream and downstream of the ephemeral landfill tributary (that is sites WGG000649 and WGG000651).

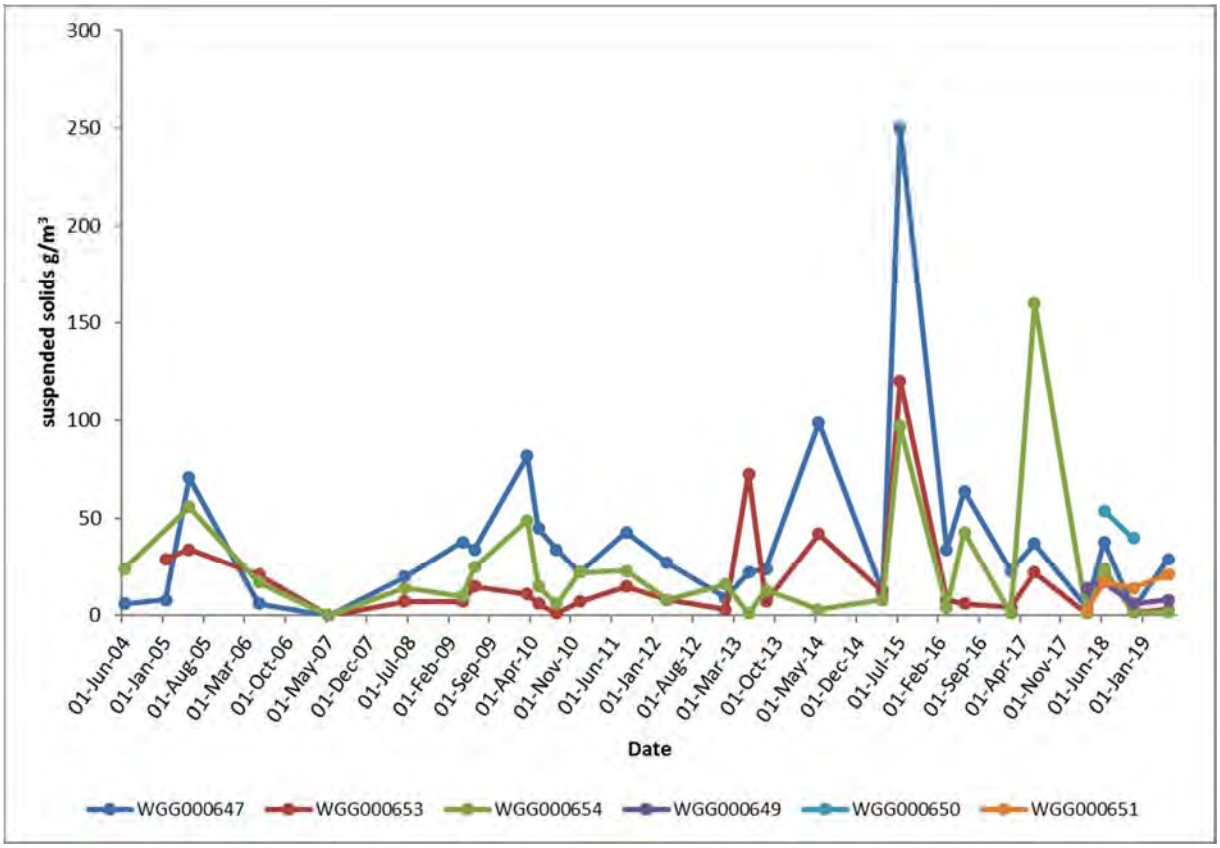

Figure 6 Suspended solids levels found in surface water at the Central landfill site, 2004-2019

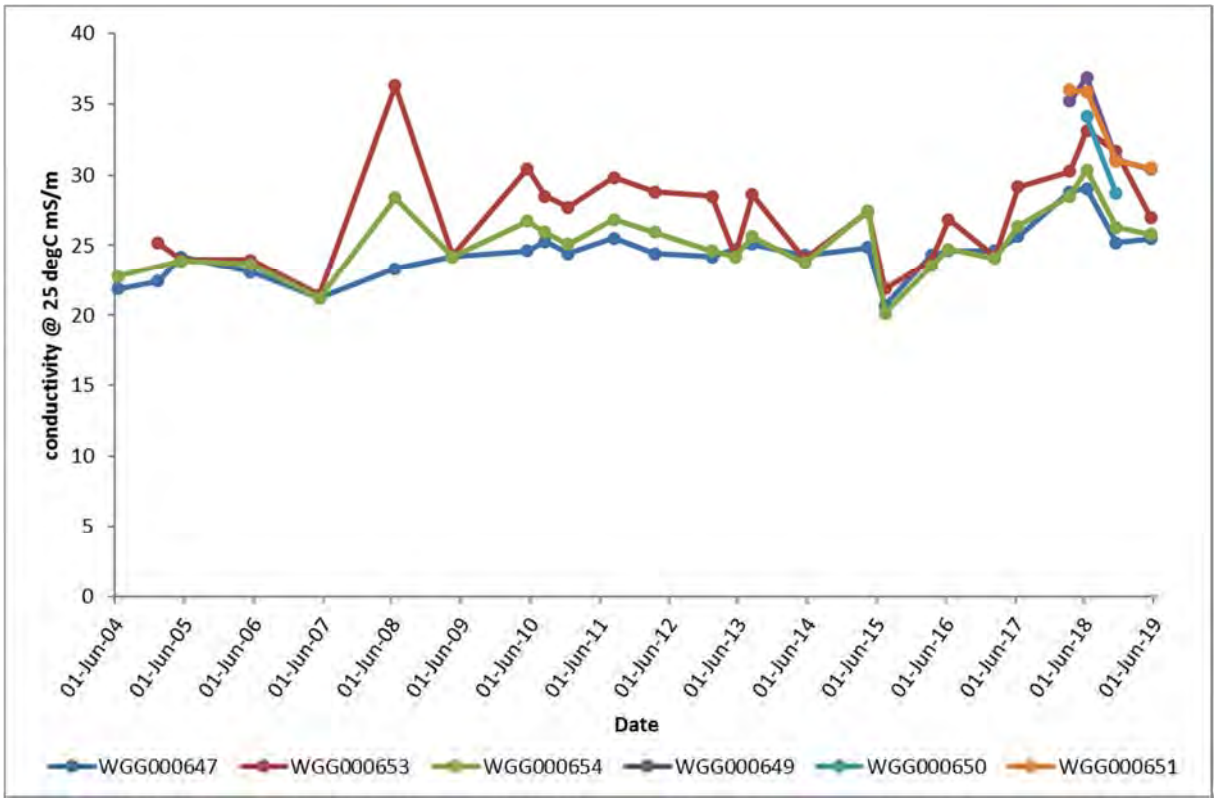

Figure 7 Conductivity levels found in surface water at the Central landfill site, 2004-2019

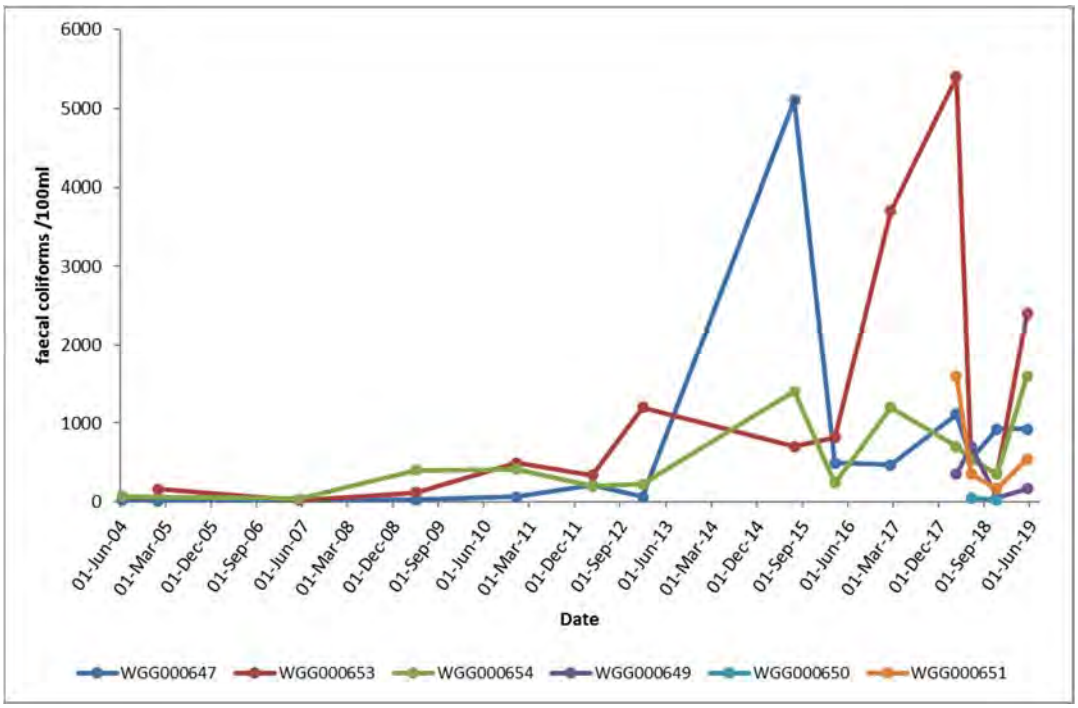

Figure 8 Faecal coliform counts found in surface water at the Central landfill site, 2004-2019

In terms of nitrate/nitrite nitrogen, the concentrations are typical of relatively small and sometimes slow flowing tributaries in an agricultural setting, and are not considered excessive from an environmental perspective. It is noted that the largest variations have been observed at the three recently established monitoring sites.

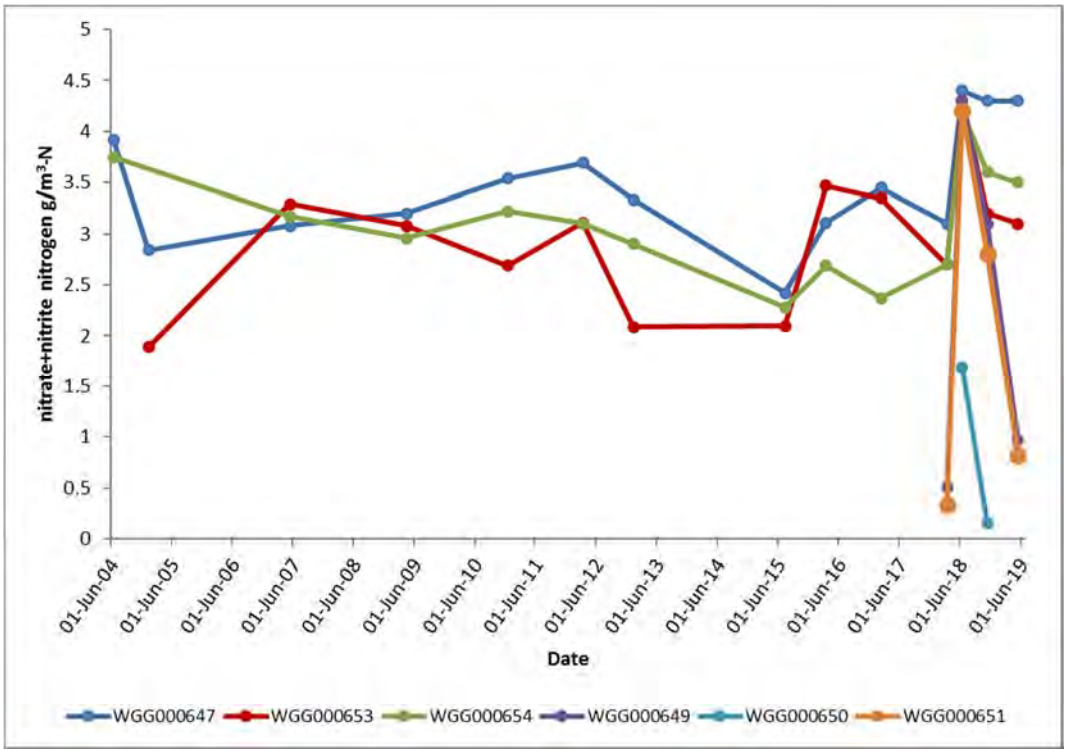

Figure 9 Nitrate/nitrite nitrogen found in surface water at the Central landfill site, 2004-2019

Overall water quality downstream of the proposed landfill site is quite good and is comparable to that expected in similar streams in the area. Looking at the data set for the longer term monitoring sites, the concentrations of ammoniacal nitrogen, conductivity and faecal coliforms are generally found to be higher at site WGG000653, upstream of the northern landfill tributary (with the exception of the faecal coliforms in the northern landfill tributary in July 2015). The newly introduced sampling sites aimed to isolate potential effects from the southern ephemeral tributary that is downstream of Stage 1 of the landfill have been found to have a higher ammoniacal nitrogen and conductivity than site WGG000653 on occasion. It is noted that there appears to be an emerging trend of increasing conductivity and faecal coliforms in the pre landfilling condition of the tributaries.

2.2.2 Groundwater monitoring

Monitoring of groundwaters at the site commenced in 2015, however, with no expected date of commencement of the activity, this monitoring was put in abeyance until the two years prior to construction activities commencing at the site. As it was anticipated that the landfill would be accepting waste some time just prior to June 2019, the baseline groundwater monitoring was increased significantly during the 2017-2018 year, based on the recommendations of the 2016-2017 year, which are summarised below.

The nature of the baseline monitoring that needed to be undertaken to add to the baseline data already collected was assessed as follows:

- Parameters for baseline monitoring needed to include those listed in the consent for on-going monitoring, those deemed necessary for groundwater characterisation, and those identified as possible landfill contaminants. Baseline monitoring should be carried out as early as feasible and be carried out during summer and winter to capture any seasonal differences.
- All bores needed to be surveyed to provide accurate ground reduced levels (GRL) and casing heights to allow for ongoing groundwater flow monitoring in the target aquifers.

- Water level monitoring needed to be undertaken at least quarterly in the majority of bores to monitor seasonal effects and at 15 minute intervals, using downhole loggers, in at least three (shallow, moderate, deep) bores to provide a more comprehensive dataset.

Consent 5347 requires quarterly monitoring of the bores shown in the application documentation, with an additional bore to be installed down gradient of the leachate pond. The application documentation was reviewed and it was identified that this amounted to a minimum of 15 bores. The consent is also specific about the parameters that need to be monitored on a quarterly and/or annual basis. Work was undertaken during the 2016-2017 year in an attempt to locate all of the bores specified in the application and assess their condition. The activities and revisions to the baseline monitoring programme with respect to the groundwater monitoring locations is discussed further in section 2.2.2.1, with the results of the baseline groundwater monitoring undertaken to date discussed in the following sections.

Once consent 5347 is exercised the monitoring of groundwater will need to be undertaken on a quarterly basis as per good practice guidelines and condition 17 of consent 5347.

2.2.2.1 Groundwater monitoring bores

The original groundwater monitoring bores were installed for geotechnical and engineering purposes such as groundwater level and flow direction determination, and it was previously considered that there may have been be sufficient water level data collected already to serve this purpose. For a number of years, it was considered that the existing bores could, in the short term, remain in their current state and be dealt with once it was confirmed that the site would be developed for landfilling.

In previous annual reports it was noted that, prior to the exercise of the consents, many of the bores required maintenance and in some cases may need relining or re-drilling. It was noted that many of the bores are likely to be sitting within the proposed landfill footprint and would have to be retired appropriately to prevent them becoming a potential conduit for contaminants to enter groundwater.

Condition 17 of consent 5347 requires that all 14 bores identified in the application information (Appendix IV), and at least one additional bore down gradient of the leachate storage pond, are monitored. During the 2016-2017 year, the site was visited to reassess the condition of the bores and to attempt to locate all 14 bores. The consent requirements and recommendations contained in previous annual reports were also evaluated. Only seven of the original bores were located that were, or could easily be made, fit for the purpose of monitoring groundwater levels and quality, with some of the bores requiring maintenance to make them useable. New monitoring bores were drilled and old bores reconditioned as required. Bore GND0567, which was required for monitoring under the air discharge consent rather than for groundwater quality purposes, was decommissioned to allow for the installation of a sediment detention pond.

In August and September 2017, STDC installed 12 new groundwater monitoring wells and renovated six old wells at the proposed landfill site. Bores GND0568, GND0569, GND0599, GND0600, GND1351 and GND1353 were renovated. This involved gently developing each well with compressed air, repairing/replacing the steel upstand and pouring a cement pad around the wellhead. The bore details are given in Table 4 and their locations are shown in Figure 10.

Table 4 Groundwater monitoring bore locations required by consent 5347

Bore Name	STDC Name	Coordinates (NZTM) (Taradise)		Ground reduced level masl	Depth	Screened/slotted interval	Depth Range
		Eastings	Northings		mbgl	mblg	
GND0568	BH2	1712127	5631551	206.76	10.1	4.2-10.1	Shallow
GND0569	BH1	1712534	5631349	228.55	35.6	27.5-35.0	Shallow

Bore Name	STDC Name	Coordinates (NZTM) (Taradise)		Ground reduced level masl	Depth	Screened/slotted interval	Depth Range
		Eastings	Northings		mbgl	mblg	
GND0600	BH7a	1712046	5631130	217.77	20.1	16.3-19.3	Shallow
GND0826	-	1712142	5630866	-	24.2*	-	Shallow
GND1351	BH1a	1712534	5631349	228.48	12	3.0 - 12.0	Shallow
GND1353	BH6	1712331	5631460	209.53	13	9.2 - 12.2	Shallow
GND2693	new	1712448	56311501	250.34	10	5.5 – 8	Shallow
GND2696	new	1711961	5631781	215.00	10	5.5 – 7.5	Shallow
GND2699	new	1712441	5631875	218.10	11	4.8 - 10	Shallow
GND2702	new	1711984	5631391	217.87	18	6.5 – 18	Shallow
GND2692	new	1712449	5631152	250.34	40	36 – 38	Intermediate
GND2695	new	1711963	5631782	215.05	41	22.9 – 38.8	Intermediate
GND2698	new	1712444	5631875	218.14	49	37 – 48	Intermediate
GND2701	new	1712001	5631394	218.01	49	40.5 – 47.5	Intermediate
GND0599	BH7	1712050	5631128	250.33	83	78.5 - 81.5	Deep
GND2691	new	1712451	5631153	215.07	83	74 - 80	Deep
GND2694	new	1711965	5631782	218.12	75	68.5 – 72.5	Deep
GND2697	new	1712446	5631875	217.95	79	71 – 74	Deep
GND2700	new	1712004	5631394	206.76	75	65 – 72.5	Deep

Key: * - to be confirmed

Figure 10 Central landfill groundwater monitoring bore locations, 2017-2018 year onwards

The 2016-2017 Annual Report listed the bores that would need to be appropriately abandoned as the project progressed. These are given in Table 5, with the bores to be monitored, to be abandoned and those Council attempted to locate at the site visit are also depicted in Figure 11. The monitoring sites within the landfill footprint are to be decommissioned only when that stage needs to be developed for accepting waste.

During the site enabling works carried out during the year under review some of these bores were appropriately abandoned. Three holes have been decommissioned to date. The decommissioning involved digging a 0.5 m deep square hole around each well head, removing the PVC liner, cutting the steel casing off below ground level, then filling each well and its surrounding hole with cement slurry. It is important to keep a record of the bores that will be under the landfill footprint and of the decommissioning of these bores should the landfill go ahead, due to the risks associated with undecommissioned bores under the landfill.

Table 5 Groundwater bores to be appropriately retired and their status

Bore Name	STDC Name	Estimated Coordinates (NZTM)		Shown in consent application documentation (appendix 10 Figure 4 of AEE)	Depth Range (m)	Comments
		Eastings	Northings			
GND0570	BH4	1712142	5630866	Yes	20.3	Bore couldn't be found as it is located in a very overgrown area. Headworks may have been destroyed
-	-	Refer to Appendix IV		Yes	Unknown	Couldn't find a bore in this location. Figure 4 shows the bore about 40 m to west of BH4
-	-	1712396	5630956	Yes	Unknown	Couldn't find a bore in this location
-	-	1712299	5631174	Yes	Unknown	Couldn't find a bore in this location. Figure 4 shows located in stage 3, south of borrow area
GND1352	BH3a	1712093	5631275	Yes	Deep	Decommissioned Oct 2017
Unknown	-	Inside landfill footprint		No	Unknown	Tidy, closed and capped bore not on map or recorded in TRC database. Will require abandonment
GND0538	-	1712043	5631837	No	37.3 m	In a turnip field, determined it would probably have been destroyed during ploughing, or may be incorrect coordinates on GIS
GND0571	BH5	1711888	5631716	Yes	28.0 m	Damaged. Not useable

Bore Name	STDC Name	Estimated Coordinates (NZTM)		Shown in consent application documentation (appendix 10 Figure 4 of AEE)	Depth Range (m)	Comments
		Eastings	Northings			
-	-	Refer to Appendix IV		Yes	Unknown	On figure 4 –stage 5/6 border towards the south west of stage 5, in the borrow area. A pipe/hose was found going into the ground, but no sign of the bore
-	-	1712298	5631522	No	Unknown	RL 209.30 m
-	-	1712325	5631460	No	Unknown	RL 210.30 m
-	-	1712293	5631311	No	Unknown	RL 217.62 m
-	-	1712333	5631350	No	Unknown	RL 215.55 m
-	-	1712228	5631283	No	Unknown	RL 213.75 m

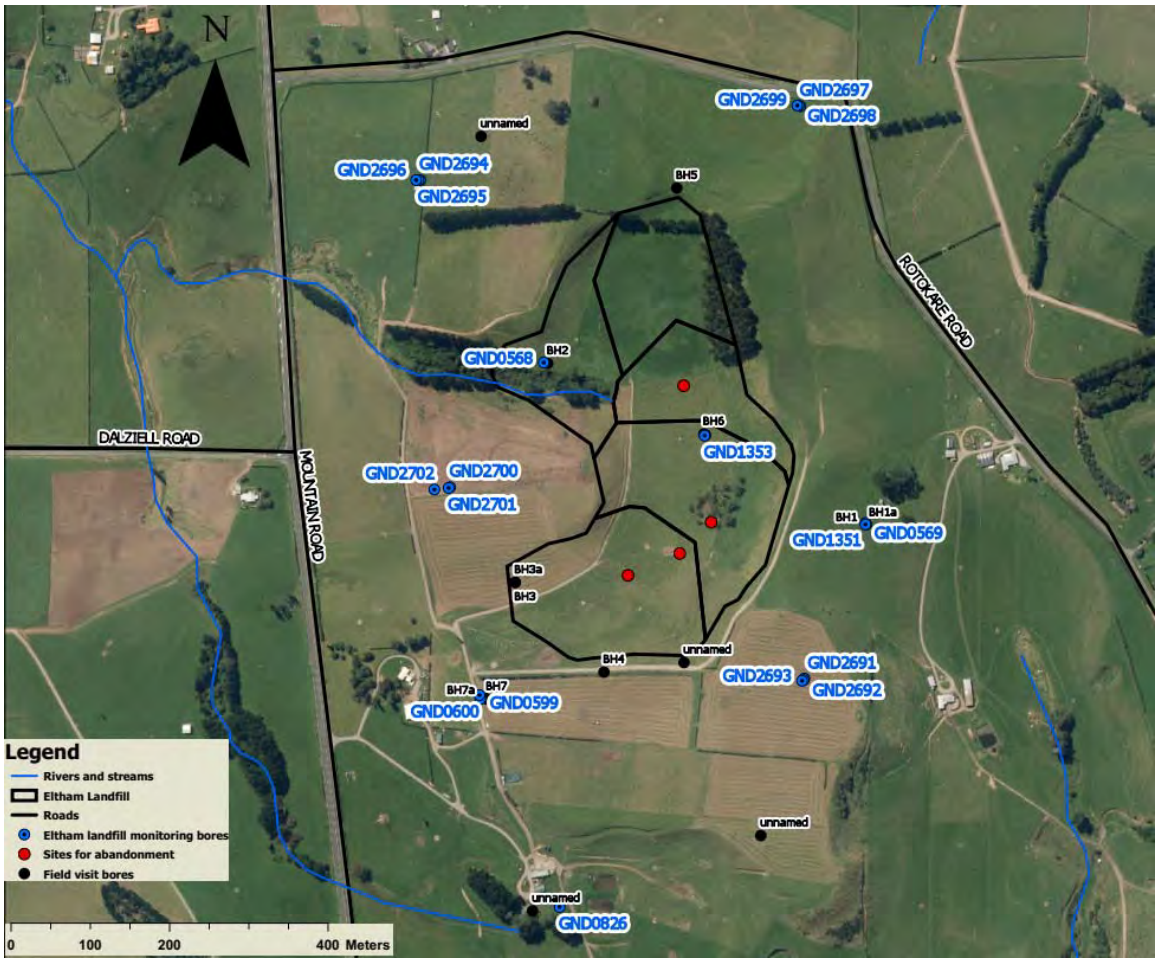

Figure 11 The location of the bores to be monitored and abandoned, and those investigated during the site visit

The bores referred to in the air discharge consent 5348 are given in Table 6. The consent requires annual sampling of the headspace gas in these water monitoring bores, and of the leachate pumping chamber, to

be undertaken for the first five years and at five yearly intervals thereafter. The Stage 1 enabling works required BH3 to be abandoned and therefore the appropriate bores for this monitoring, to satisfy the intent of the consent conditions, will be determined when the consents are reviewed/varied prior to waste disposal taking place.

Table 6 Bores for monitoring required by consent 5348-1

Bore Name	STDC Name	Coordinates (NZTM)		Status	Depth	Screened/slotted interval	Depth Range
		Eastings	Northings		m	m	
GND0569	BH1	1712534	5631349		35.6	27.5-35.0	Shallow
GND0567	BH3	1712087	5631271	Decommissioned	-	-	24.0

2.2.2.2 Baseline groundwater monitoring programme

A comprehensive monitoring programme was designed to provide an indication of baseline groundwater flow and quality in the vicinity of the proposed landfill footprint, with the chemical parameters monitored and the reasons for their inclusion outlined in section 1.4.3.

The selected groundwater monitoring sites have been separated into shallow, intermediate and deep, depending on the actual drilled depth of each bore, with additional bores installed during 2017, designed to fill any gaps in monitoring depth (Table 4) and provide good spatial coverage of the area surrounding the proposed landfill (Figure 10). The monitoring sites should provide for reasonable and practicable coverage of the shallow, intermediate and deeper aquifers in the vicinity of the footprint and enable any future assessment of change in flow or quality to be robust.

2.2.2.3 Baseline groundwater elevations

Groundwater level loggers are installed into GND2691, GND2692, and GND2693 up gradient of the landfill footprint and GND2700, GND2701 and GND2702 down gradient of the landfill footprint. Groundwater loggers are also installed in GND0599 and GND0600 up gradient of the landfill and have provided continuous groundwater level data since 2013 as part of the Council's regional State of Environment (SEM) monitoring programme.

Groundwater elevations indicate that the predominant groundwater flow follows topography, with all intervals generally exhibiting higher groundwater elevations in the lower lying areas in the base of the topographic depression. All three intervals also show a seasonal response with groundwater elevations increasing in response to rainfall. The range and speed of the response differs between bores with the majority of shallower bores showing greater fluctuations and more rapid response to rainfall than the deeper bores.

The groundwater elevations in the vicinity of the landfill footprint, which vary by location as well as by depth, indicate a complex geology and the presence of a mixture of unconfined, semi confined and/or perched aquifers.

The data since 18 July 2018 are shown graphically in the figures below. The data for GND2692 has not been included as the data collected appeared erroneous which may have been a result of either a faulty logger (which has now been replaced) or disturbance to the bore from ongoing site works. Figure 12, Figure 13 and Figure 14 display the range of groundwater elevations by location. Figure 15 and Figure 16 demonstrate that the shallow and deeper aquifers in the vicinity of the proposed landfill both respond to rainfall. Figure 17 has been provided to show that although all intervals respond to rainfall the range and speed of the response is generally determined by depth, with the deeper bores showing a slower more subdued response than the shallower bores.

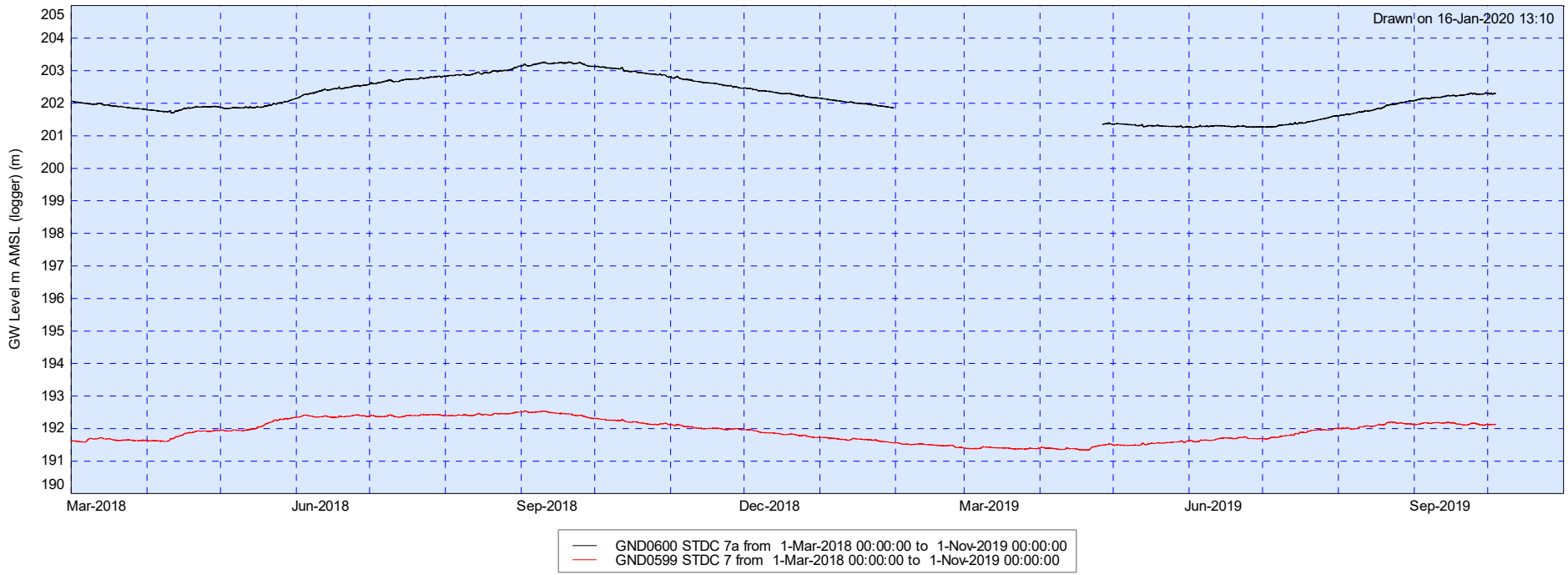

Figure 12 Groundwater elevations GND0599 and GND0600 – southern bores

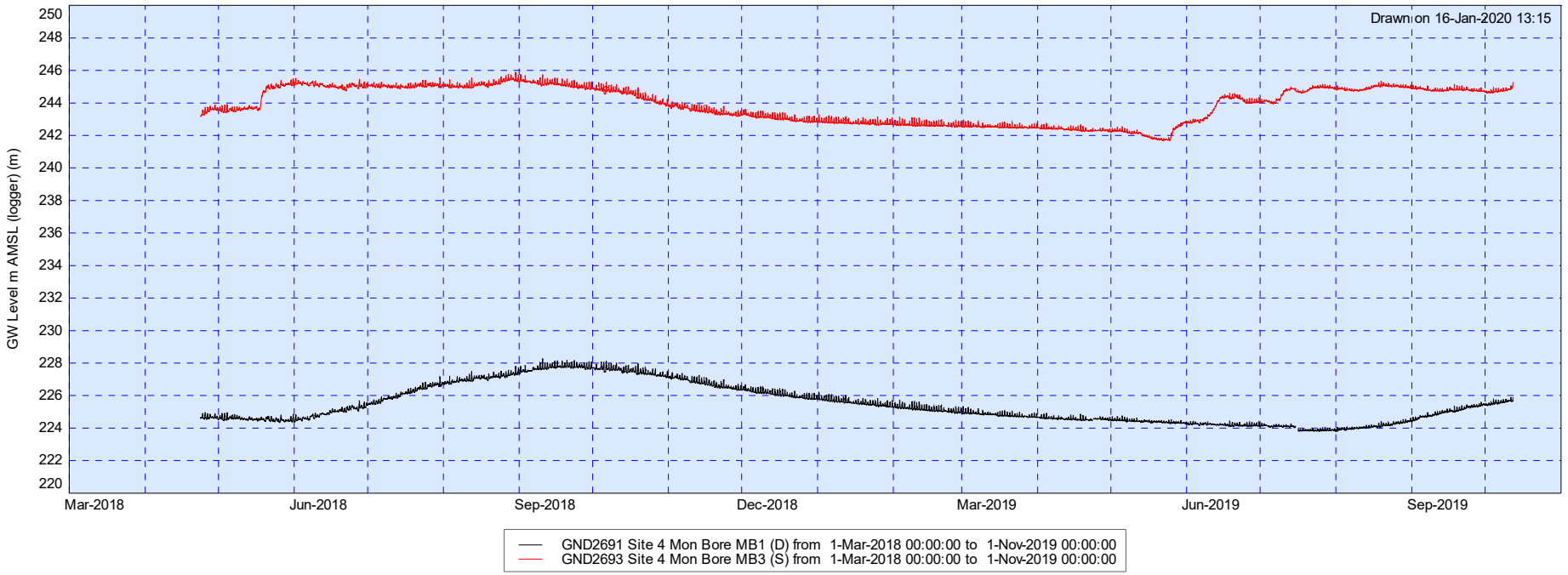

Figure 13 Groundwater elevations GND2691 and GND2693 – south east

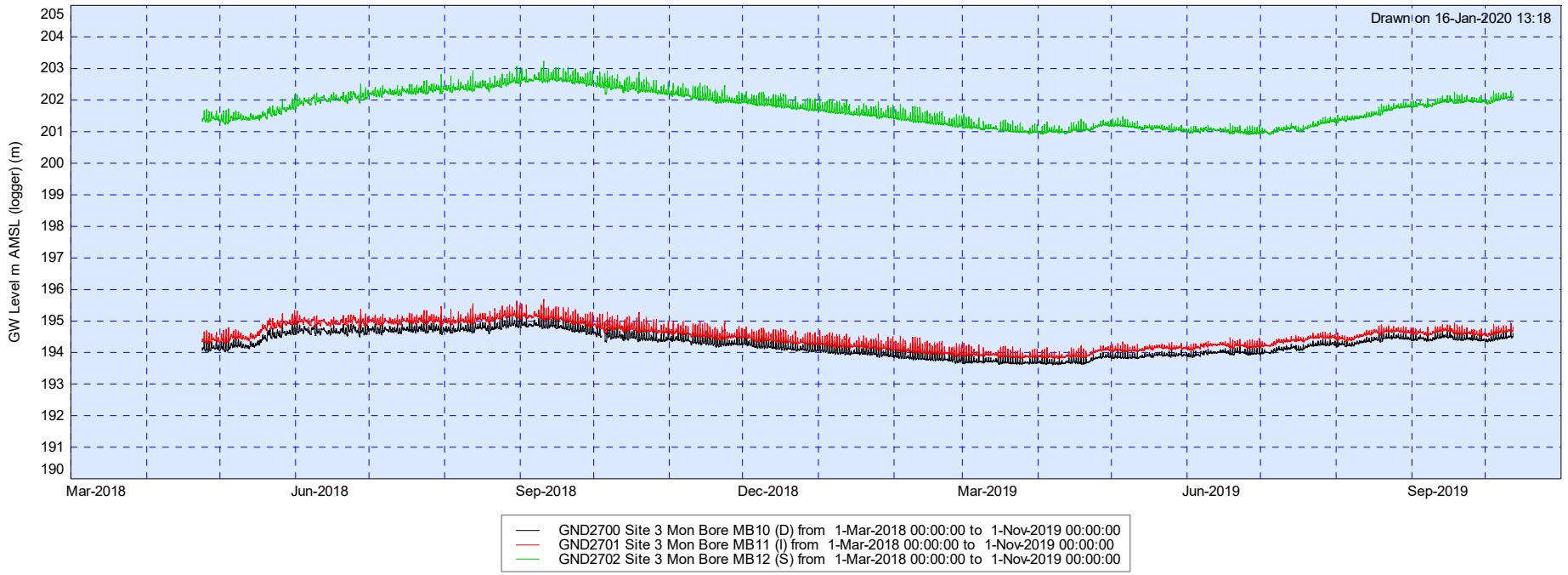

Figure 14 Groundwater elevations GND2700, GND2701 and GND2703 – west

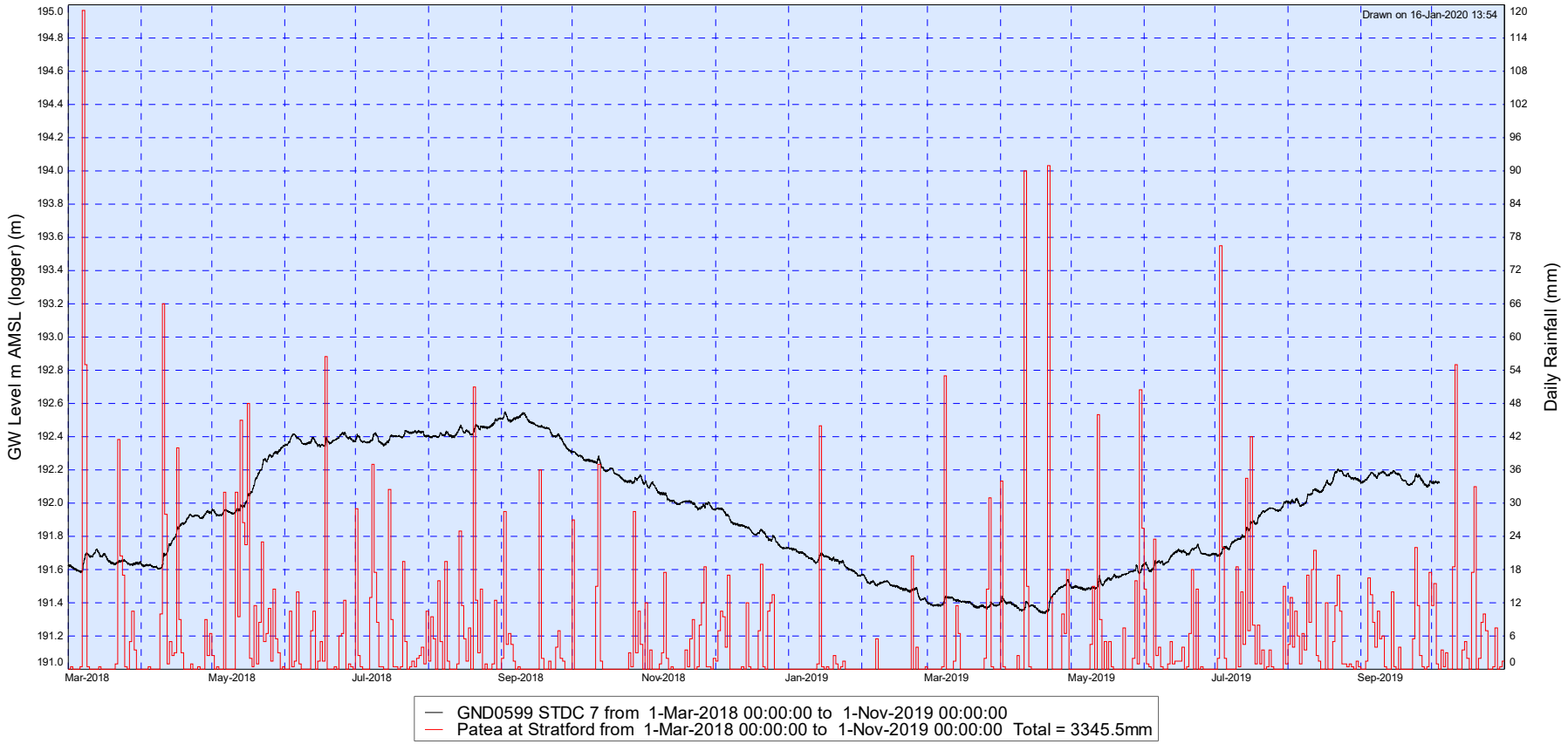

Figure 15 Groundwater elevations in the deep bore GND0599 in comparison to rainfall

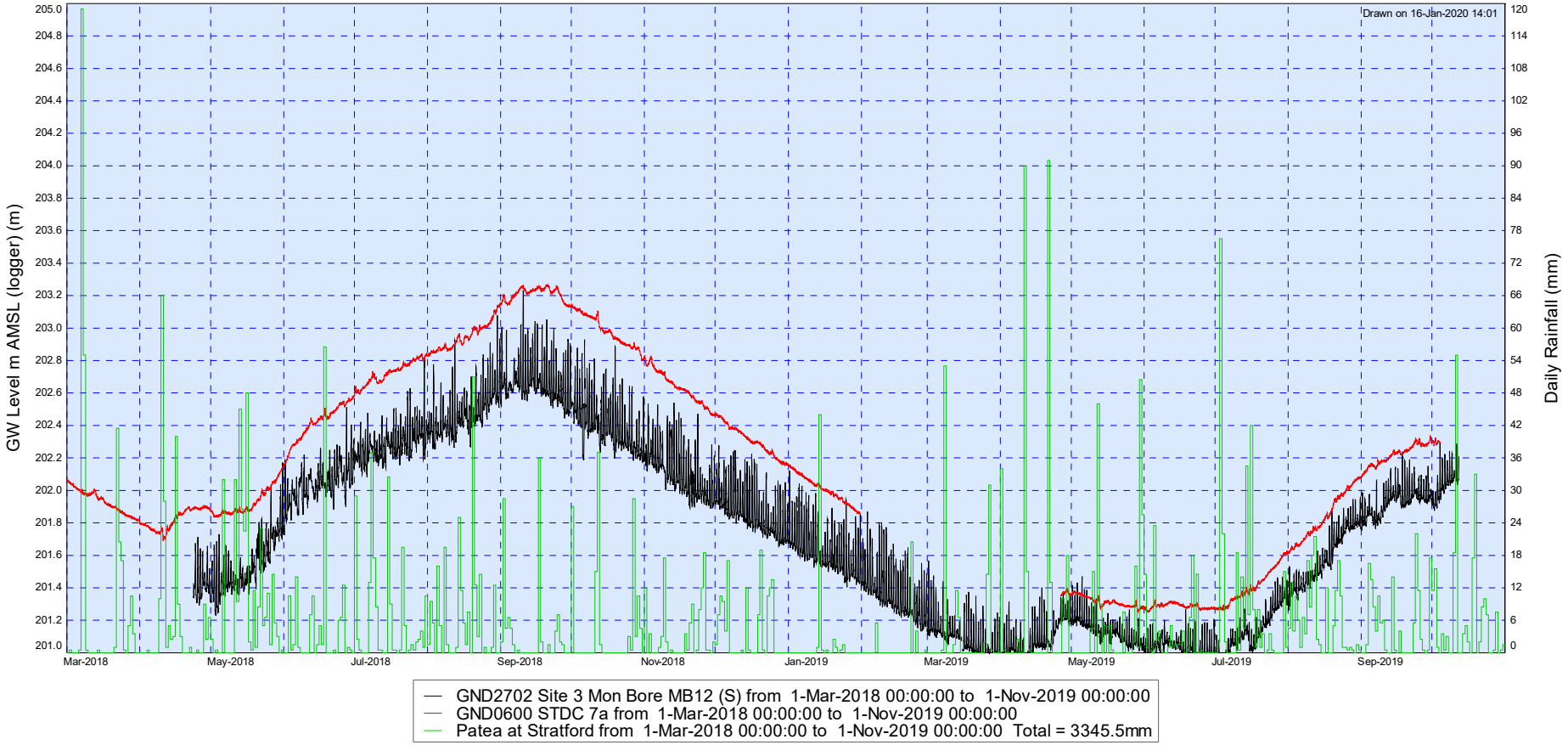

Figure 16 Groundwater elevations in shallow bores GND0600, and GND2702 in comparison to rainfall

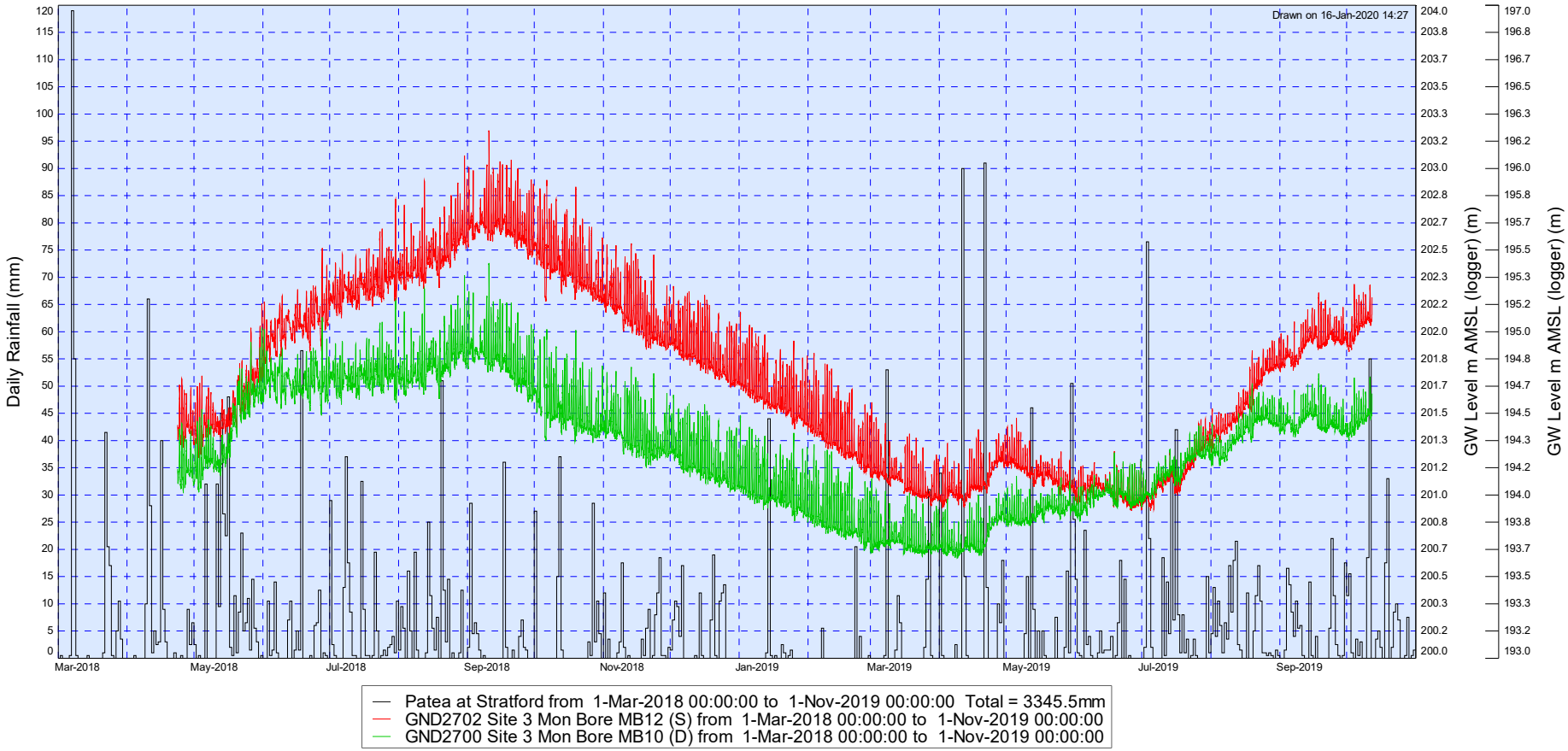

Figure 17 Groundwater elevations in shallow bore GND2702 and deep bore GND2700, in comparison to rainfall

2.2.2.4 Baseline groundwater quality

Shallow, intermediate and deep groundwater monitoring bores were sampled in October 2018 and April 2019 and analysed for a comprehensive suite of baseline parameters. The full groundwater quality results are available upon request. Selected parameters are presented in the tables and graphs in the following sections.

The data gathered since monitoring commenced indicates the following:

- There is no clear distinction in groundwater quality between shallow, intermediate and deep groundwater bores;
- There is no clear distinction between water quality reported in spring (high groundwater levels) and autumn (low groundwater levels) across the site as a whole. Shallow bores GND0600, , GND2694, and GND2702 and deep bore GND2691 exhibit some slight changes in water quality between spring and autumn, which may be linked to seasonal effects;
- The majority of bores exhibit generally stable water quality; and
- More data is required to establish the extent of any seasonal or depth related trends. This will be collected in quarterly monitoring of all the bores for one year prior to the commencement of the activity.

2.2.2.5 Chemical parameters

Chemical monitoring of the groundwater had been put in abeyance until two years prior to the construction activities commencing. Groundwater monitoring recommenced in the 2017-2018 year, and during the year under review, the monitoring programme included sampling of 19 bores on two occasions. At the time of the sampling surveys it was found that bore GND2696 was dry (on both occasions) and bore GND2699 was dry at the time of the April survey. This had also been the case in the 2018-2019 year. In addition, bores GND2693 and GND2072 were also too dry to sample at the time of the April 2019 survey. Therefore 18 groundwater samples were collected in October 2018 and December 2017 and 15 were collected in April 2019. The results for selected parameters are given in Table 7 and Table 8, with the full results available upon request.

The nitrate nitrogen was found to be elevated in some of the bores at the time of either both or one of the surveys. This indicates that the bores are showing some impacts from the agricultural activities occurring in the basin prior to the establishment of the landfill, as could be expected in this pre-existing environment. It is noted that there are some elevations observed in shallow, intermediate and deep bores, which may support the possibility of interconnectivity between the various aquifer intervals in some locations.

Table 7 A selection of groundwater results, October 2018

Site	Collected	Ammoniacal-N g/m³ N	Alkalinity g/m³ $CaCO_3$	Boron* g/m³	Chloride g/m³	CODF g/m³	Condy mS/m @25°C	Iron* g/m³	Manganese* g/m³	Nitrate-N g/m³ N	pH	Zinc* g/m³	Arsenic g/m³	Chromium g/m³	Nickel g/m³	TDS g/m³
Shallow																
GND0568	02 Oct 2018	< 0.010	47	0.016	28	< 6	25.5	< 0.02	< 0.0005	6.7	7.0	0.0099	< 0.0010	0.0024	< 0.0005	192
GND0569	04 Oct 2018	< 0.010	35	0.014	27	< 6	21.5	< 0.02	< 0.0005	3.4	6.4	0.0019	< 0.0010	0.0022	< 0.0005	167
GND0600	05 Oct 2018	0.22	39	0.018	49	< 6	38.8	< 0.02	0.0134	25	6.4	0.084	< 0.0010	0.0015	< 0.0005	320
GND0826	05 Oct 2018	< 0.010	74	0.02	43	< 6	37.4	< 0.02	< 0.0005	8.6	6.6	0.0015	< 0.0010	0.0023	< 0.0005	320
GND1351	04 Oct 2018	< 0.010	30	0.015	39	< 6	26.1	< 0.02	< 0.0005	5.5	6.4	< 0.0010	< 0.0010	0.0021	< 0.0005	181
GND1353	02 Oct 2018	< 0.010	49	0.02	19.2	< 6	22.8	< 0.02	< 0.0005	3.6	6.8	0.0101	< 0.0010	0.0026	< 0.0005	173
GND2693	03 Oct 2018	< 0.010	29	0.019	22	< 6	20.5	< 0.02	< 0.0005	2.8	6.8	0.012	< 0.0010	0.0019	< 0.0005	156
GND2696		-	-	-	-	-	-	-	-	-	-	-	-			
GND2699	02 Oct 2018	< 0.010	78	0.013	34	< 6	31.4	< 0.02	< 0.0005	2.9	7.1	0.0052	< 0.0010	0.0009	< 0.0005	192
GND2702	04 Oct 2018	< 0.010	42	0.015	42	< 6	31.2	< 0.02	0.0013	9.0	6.5	0.007	< 0.0010	0.0014	0.0006	240

Site	Collected	Ammoniacal-N g/m³ N	Alkalinity g/m³ $CaCO_3$	Boron* g/m³	Chloride g/m³	CODF g/m³	Condy mS/m @25°C	Iron* g/m³	Manganese* g/m³	Nitrate-N g/m³ N	pH	Zinc* g/m³	Arsenic g/m³	Chromium g/m³	Nickel g/m³	TDS g/m³
Intermediate																
GND2692	03 Oct 2018	< 0.010	41	0.019	17.3	< 6	18.1	< 0.02	0.0022	1.64	6.6	0.0035	< 0.0010	0.0029	< 0.0005	134
GND2695	02 Oct 2018	< 0.010	57	0.023	34	< 6	28.9	< 0.02	0.0195	5.8	6.8	0.0012	< 0.0010	0.0006	< 0.0005	230
GND2698	02 Oct 2018	< 0.010	53	0.015	19.4	< 6	20.1	< 0.02	0.001	1.91	6.8	0.0038	< 0.0010	0.0016	< 0.0005	127
GND2701	05 Oct 2018	< 0.010	85	0.017	38	< 6	35.3	< 0.02	0.0034	6.7	7.6	0.0027	< 0.0010	0.001	0.0019	340
Deep																
GND0599	11 Oct 2018	0.29	162	0.026	39	6	33.8	< 0.02	0.088	< 0.002	8.2	0.0051	0.004	< 0.0005	0.0006	230
GND2691	03 Oct 2018	< 0.010	47	0.015	23	< 6	20.2	< 0.02	0.001	2.3	6.6	0.0028	< 0.0010	0.0007	0.0009	150
GND2694	10 Oct 2018	< 0.010	102	0.018	26	< 6	29.8	< 0.02	0.0011	0.51	8.0	< 0.0010	0.0026	0.0011	< 0.0005	250
GND2697	02 Oct 2018	< 0.010	70	0.018	29	< 6	27.1	< 0.02	0.0009	1.3	7.0	0.0117	< 0.0010	0.0015	< 0.0005	168
GND2700	05 Oct 2018	< 0.010	42	0.013	42	< 6	30.2	< 0.02	0.068	8.5	7.0	< 0.0010	< 0.0010	0.0006	< 0.0005	250

Table 8 A selection of groundwater results, April 2019

Site	Collected	Ammoniacal-N g/m³ N	Alkalinity g/m³ $CaCO_3$	Boron* g/m³	Chloride g/m³	CODF g/m³	Condy mS/m @25°C	Iron* g/m³	Manganese* g/m³	Nitrate-N g/m³ N	pH	Zinc* g/m³	Arsenic g/m³	Chromium g/m³	Nickel g/m³	TDS g/m³
Shallow																
GND0568	09 Apr 2019	< 0.010	49	0.018	28	< 6	26.7	< 0.02	< 0.0005	6.9	7.2	0.0144	< 0.0010	0.0025	< 0.0005	187
GND0569	23 Apr 2019	< 0.010	41	0.017	31	< 6	23.9	< 0.02	0.0007	4.7	6.5	0.0081	< 0.0010	0.0022	< 0.0005	199
GND0600	26 Apr 2019	0.012	32	0.017	77	< 6	53.5	< 0.02	0.0017	28	6.5	0.125	< 0.0010	0.0008	< 0.0005	470
GND0826	23 Apr 2019	< 0.010	70	0.021	38	< 6	33.9	< 0.02	< 0.0005	7.6	6.6	0.184	< 0.0010	0.0026	< 0.0005	290
GND1351	10 Apr 2019	< 0.010	32	0.015	34	< 6	24.1	< 0.02	< 0.0005	4.5	6.4	0.0017	< 0.0010	0.0022	< 0.0005	165
GND1353	09 Apr 2019	< 0.010	49	0.021	18.1	< 6	20.8	< 0.02	< 0.0005	3.8	7.4	0.009	< 0.0010	0.0027	< 0.0005	145
GND2693		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GND2696		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GND2699		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GND2702		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Site	Collected	Ammoniacal-N g/m³ N	Alkalinity g/m³ $CaCO_3$	Boron* g/m³	Chloride g/m³	CODF g/m³	Condy mS/m @25°C	Iron* g/m³	Manganese* g/m³	Nitrate-N g/m³ N	pH	Zinc* g/m³	Arsenic g/m³	Chromium g/m³	Nickel g/m³	TDS g/m³
Intermediate																
GND2692	17 Apr 2019	< 0.010	46	0.023	14.1	< 6	17.3	< 0.02	0.0009	1.56	7.0	0.0108	< 0.0010	0.0033	< 0.0005	168
GND2695	09 Apr 2019	< 0.010	60	0.021	35	< 6	31.2	< 0.02	0.0011	7.0	6.7	0.0018	< 0.0010	0.0008	< 0.0005	240
GND2698	08 Apr 2019	< 0.010	56	0.016	18.9	< 6	20.4	< 0.02	0.0007	1.69	7.1	0.002	< 0.0010	0.0016	< 0.0005	159
GND2701	10 Apr 2019	< 0.010	60	0.016	43	< 6	34.0	< 0.02	0.0017	8.5	6.8	0.0035	< 0.0010	0.0008	0.0011	240
Deep																
GND0599	26 Apr 2019	0.124	112	0.030	36	< 6	32.5	< 0.02	0.067	< 0.002	8.0	0.0032	0.0027	< 0.0005	< 0.0005	200
GND2691	23 Apr 2019	< 0.010	49	0.015	22	< 6	21.8	< 0.02	0.0005	3.1	6.6	< 0.0010	< 0.0010	0.001	< 0.0005	182
GND2694	09 Apr 2019	< 0.010	101	0.017	25	< 6	29.7	< 0.02	0.0007	0.58	8.0	< 0.0010	0.0025	0.0015	< 0.0005	171
GND2697	08 Apr 2019	< 0.010	94	0.018	25	< 6	29.6	< 0.02	0.008	0.41	7.4	0.0096	< 0.0010	0.001	< 0.0005	194
GND2700	10 Apr 2019	< 0.010	38	0.014	40	< 6	30.1	< 0.02	0.0006	8.7	6.6	0.0028	< 0.0010	0.0021	< 0.0005	210

As previously discussed, chemical monitoring of the groundwater was undertaken at this site between the 2005-2006 and 2013-2014 years, before being put into abeyance, recommencing in the 2017-2018 year. The graphs provided in Figure 18 to Figure 21 illustrate the trends over time for selected parameters. The data collected so far is baseline data prior to any consented activity at the site. The variations in groundwater quality can therefore be considered as natural, or at most, the results of pressures exerted on groundwater quality by the grazing and dairying activities currently undertaken at the site.

Conductivity levels over the whole site generally range between 16.5 and 38.5 mS/m@25°C (15 and 35 mS/m @20°C). This indicates that the groundwater generally has relatively low levels of dissolved solids (also refer Table 7 and Table 8) and that groundwater quality is quite good in this regard. For those bores with a larger dataset, over the period that the groundwater has been monitored, the conductivity level for each bore also generally appears to be relatively stable (Figure 18). The exceptions to this are bores GND0599 and GND0600, which have exhibited a tendency to increase over time. Further sampling during the year under review has supported this finding in GND0600, however there was a reduction in the conductivity of the samples from GND0599. Based on the (up to) four samples collected from these sites during the 2017-2019 years, bores GND0600, GND2691, GND2694, and GND2702 appear to show the larger seasonal variations in conductivity, however further monitoring will be required to confirm this. There was a significant reduction in the conductivity found in GND2699 between October 2017 and October 2018, but the bore has been dry on both April sampling rounds.

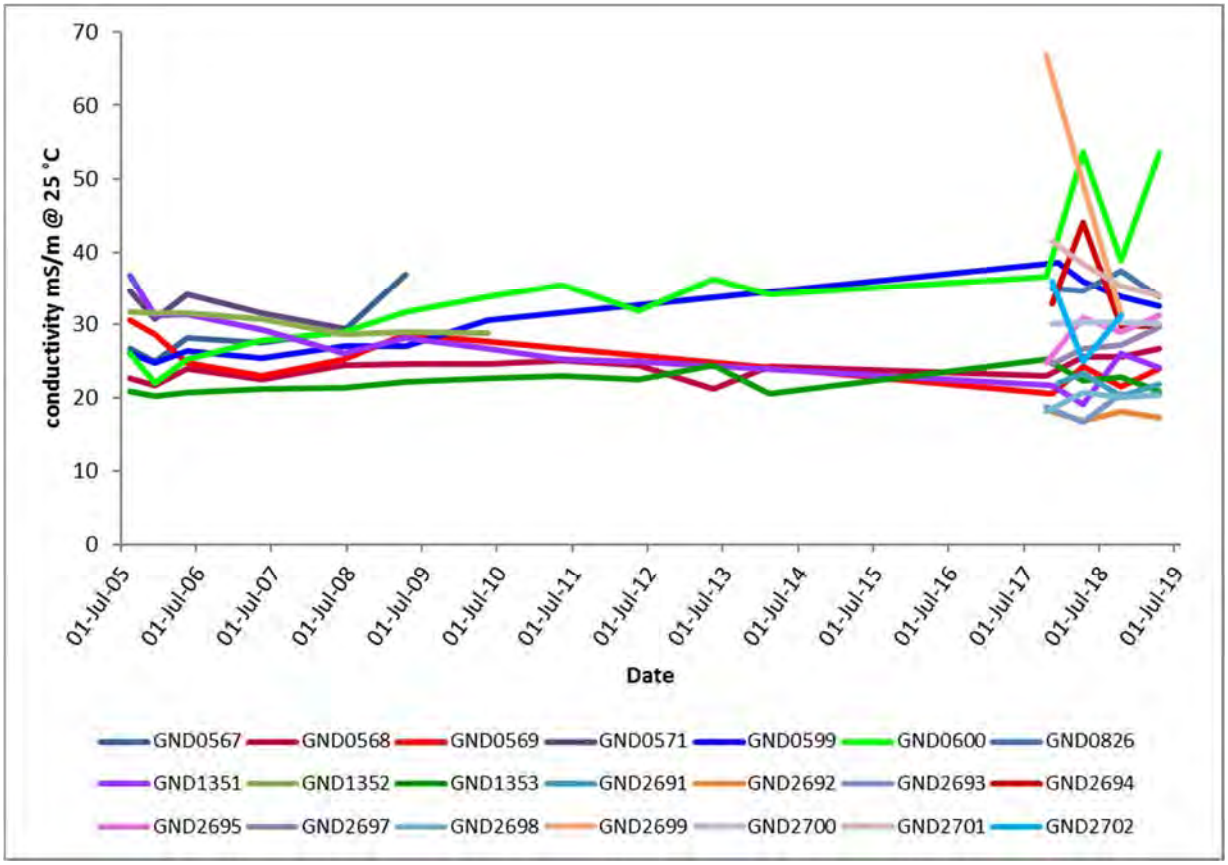

Figure 18 Conductivity found in the groundwater at Central landfill

Nitrite and nitrate levels show some variability with some sites showing increases and others showing decreases in concentration (Figure 19). Bore GND0599 has had very low and stable levels of nitrite/nitrate (and a higher pH) when compared to the other sites. However, this bore is far deeper than the other older bores (83 m). The highest nitrate/nitrite nitrogen concentration was found in bore GND0600, which has continued to be above the calculated maximum acceptable value for drinking water of 11.3 g/m^{3}-N from April 2009 onwards. This bore is located south west of the landfill footprint and is a shallow bore that is

topographically relatively low below an area of grazing land that is approximately 9 ha. The baseline monitoring therefore showed some impact from the agricultural activities occurring up gradient of the bore, however there are no known drinking water bores in the immediate vicinity of this monitoring location.

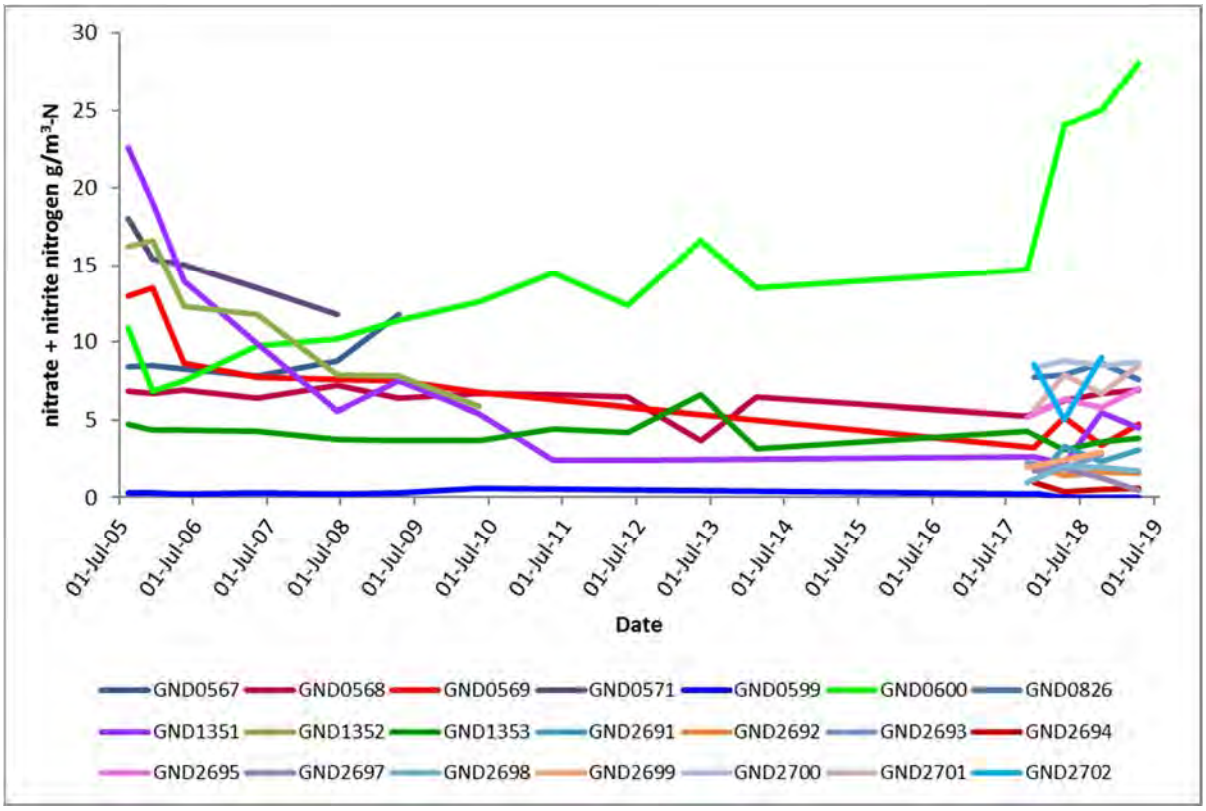

Figure 19 Nitrate/nitrite levels found in the groundwater at Central landfill

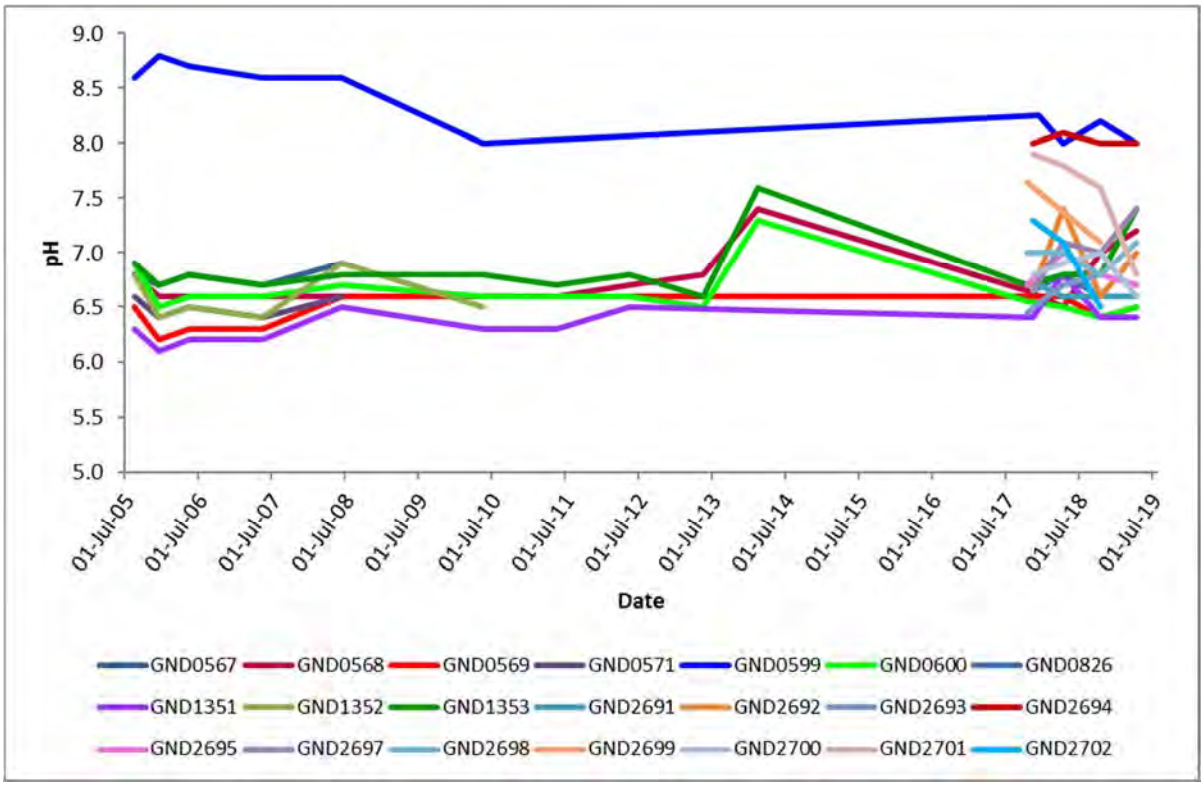

Figure 20 pH found in the groundwater at Central landfill

As the graph in Figure 20 shows, the pH level of the shallow aquifer appears generally quite stable over time for the bore with the longer monitoring history. The deeper original bore (GND0599) exhibits a significantly higher pH, as does the new deep bore GND2694. The new intermediate bore GND2701 exhibited a high pH in the initial sampling, however this has dropped notably from 7.9 to 6.8.

Chlorides and hardness are in the normal ranges for Taranaki groundwater (Figure 21). It is noted that there had appeared to be a trend of increasing chlorides pre-landfilling in bores GND0599 and GND0600, with the possibility of large seasonal variations at sited GND0600 and GND2694. During the year under review, there has been a notable decrease in the chloride concentration in GND0599 and GND2701, with only GND0600 continuing to show a large seasonal variation.

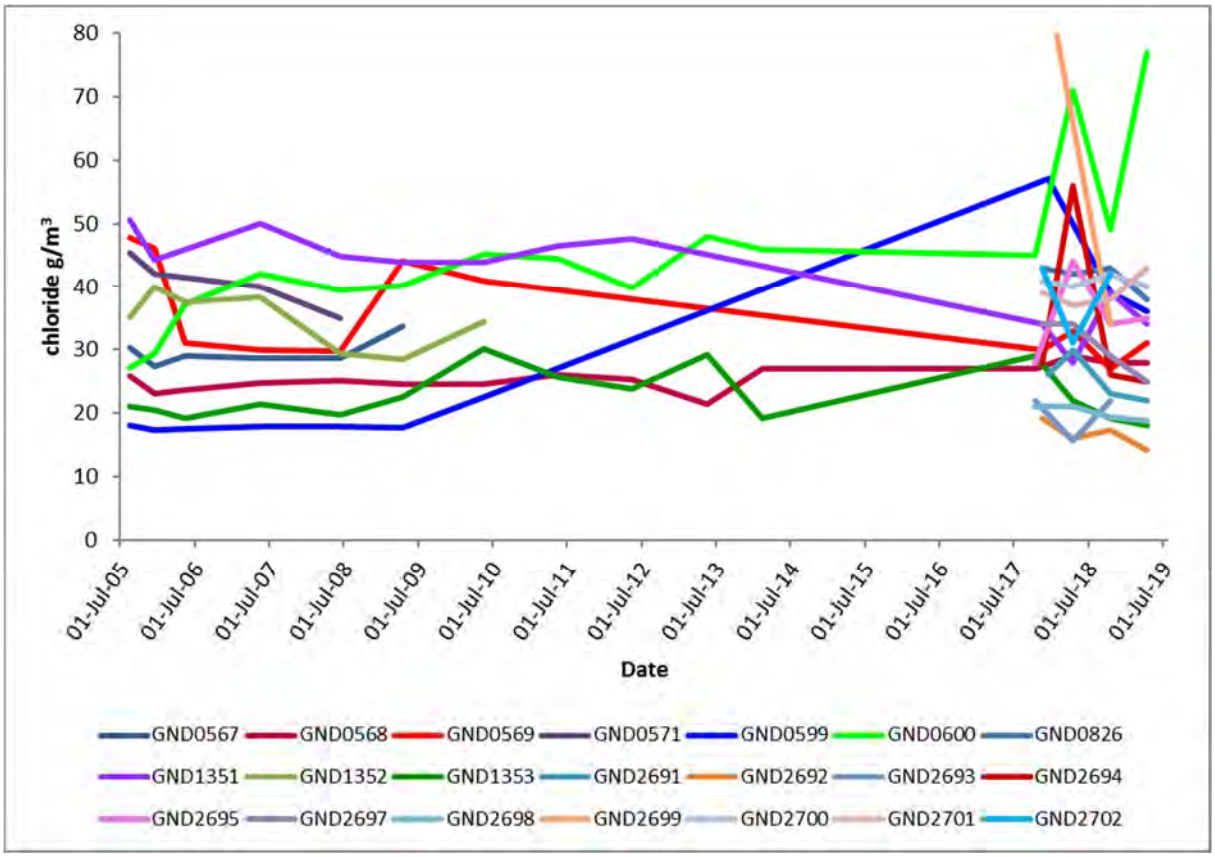

Figure 21 Chloride levels found in the groundwater at Central landfill

There were no organonitrogen or phosphorus pesticides, or semi volatile organic compounds detected in any of the samples collected from any of the bores. In terms of gasses in groundwater, methane and toluene were detected in some bores. The presence of methane and toluene at these low levels indicates the presence of immature hydrocarbons (peats), likely to have been deposited in this former ox bow lake. During the year under review, the only volatile organic compounds detected were low levels of trihalomethanes in some of the bores (Table 9 and Table 10). Only those gases in groundwater and trihalomethanes with reported result that were greater than the measurement uncertainty above the detection limit have been highlighted in the tables below.

Table 9 Detected gases in groundwater and VOC's, October 2018 groundwater survey

Site	Date	Toluene (mg/m^3)	Methane (mg/m^3)	Bromoform (tribromo methane) (mg/m^3)	Bromodichloro methane (mg/m^3)	Chloroform (mg/m^3)	Dibromochloro methane (mg/m^3)
Shallow							
GND0568	02 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND0569	04 Oct 2018	0.0005	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND0600	05 Oct 2018	0.0021	0.106	< 0.0003	< 0.0003	0.0003	< 0.0003
GND0826	05 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND1351	04 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND1353	02 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2693	03 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2696	-	-	-	-	-	-	-
GND2699	02 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2702	04 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Intermediate							
GND2692	03 Oct 2018	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2695	02 Oct 2018	0.0005	< 0.002	< 0.0003	< 0.0003	0.0005	< 0.0003
GND2698	02 Oct 2018	< 0.0003	< 0.002	0.0004	< 0.0003	< 0.0003	0.0003
GND2701	05 Oct 2018	0.0006	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Deep							
GND0599	08 Oct 2018	0.0016	0.700	< 0.0003	< 0.0003	0.0003	< 0.0003
GND2691	03 Oct 2018	0.0003	< 0.002	< 0.0003	< 0.0003	0.0003	< 0.0003
GND2694	08 Oct 2018	0.0037	< 0.002	< 0.0003	< 0.0003	0.0005	< 0.0003
GND2697	02 Oct 2018	0.0006	< 0.002	0.0128	0.0036	0.0018	0.0098
GND2700	05 Oct 2018	0.0023	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003

Table 10 Detected gases in groundwater and VOC's, April 2019 groundwater survey

Site	Date	Toluene (mg/m^3)	Methane (mg/m^3)	Bromoform (tribromo methane) (mg/m^3)	Bromodichloro methane (mg/m^3)	Chloroform (mg/m^3)	Dibromochloro methane (mg/m^3)
Shallow							
GND0568	09 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND0569	23 Apr 2019	0.0024	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND0600	26 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND0826	23 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND1351	10 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND1353	09 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2693	-	-	-	-	-	-	-

Site	Date	Toluene (mg/m^3)	Methane (mg/m^3)	Bromoform (tribromo methane) (mg/m^3)	Bromodichloro methane (mg/m^3)	Chloroform (mg/m^3)	Dibromochloro methane (mg/m^3)
GND2696	-	-	-	-	-	-	-
GND2699	-	-	-	-	-	-	-
GND2702	-	-	-	-	-	-	-
Intermediate							
GND2692	17 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2695	09 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2698	08 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2701	10 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Deep							
GND0599	26 Apr 2019	0.0006	0.27	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2691	23 Apr 2019	0.0034	< 0.002	< 0.0003	< 0.0003	0.0012	< 0.0003
GND2694	09 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	< 0.0003	< 0.0003
GND2697	08 Apr 2019	< 0.0003	< 0.002	0.0051	0.0022	0.0012	0.005
GND2700	10 Apr 2019	< 0.0003	< 0.002	< 0.0003	< 0.0003	0.0005	< 0.0003

2.2.3 Monitoring of neighbouring water supplies

Condition 17 (h) of consent 5347-1 requires the annual sampling and testing of surface water supplies and bores on neighbouring properties, and condition 20 (d) requires that STDC provides an alternative supply in the case of any of these becoming significantly affected. For this reason, the neighbourhood water supply monitoring commenced during the 2017-2018 year, so that it could be determined if any of the supplies had become significantly affected after the landfill became operational. At the time of the application, there were 16 water supplies on the neighbouring properties. As the consent was granted over 16 years ago, and consultation with the neighbourhood liaison committee had commenced, the owners of the surrounding properties were visited during the initial sampling survey in 2017-2018 to update the water supply records. It was confirmed that there were no groundwater or surface water supplies on two of the properties, and three of the water supplies on record no longer existed. During the 2018-2019 monitoring period, samples were collected from the remaining 13 sites shown in Figure 10 during October 2018. The samples were analysed for the parameters that would be required by the consent: alkalinity, ammonia-N, benzene, boron, chloride, COD, conductivity, iron, pH, manganese, nitrate-N, nitrite-N, and zinc. In addition to these parameters, bacterial testing in the form of an *E.Coli* count was also undertaken on each of the water supplies.

It was found that some of the water supplies exceeded guideline values and/or drinking water maximum acceptable values for *E.Coli* and/or nitrate-N, which is not uncommon for shallow groundwater in an agricultural area. As per the 2017-2018 year, the affected bores were GND2775, and GND2787. In the case of GND2787, the pH was also outside the guideline range. It is also noted that some of the bores contained iron and/or ammoniacal nitrogen concentrations above the guidelines set for aesthetic reasons (GND1312 and GND2476). As the Council was effectively contracted by STDC to undertake this monitoring, it has previously been agreed that they would notify the landowners. The results were forwarded to STDC. A copy of Chapter 19 of the drinking water guidelines, which provides information and advice for small, individual and roof water supplies, has previously been forwarded to STDC.

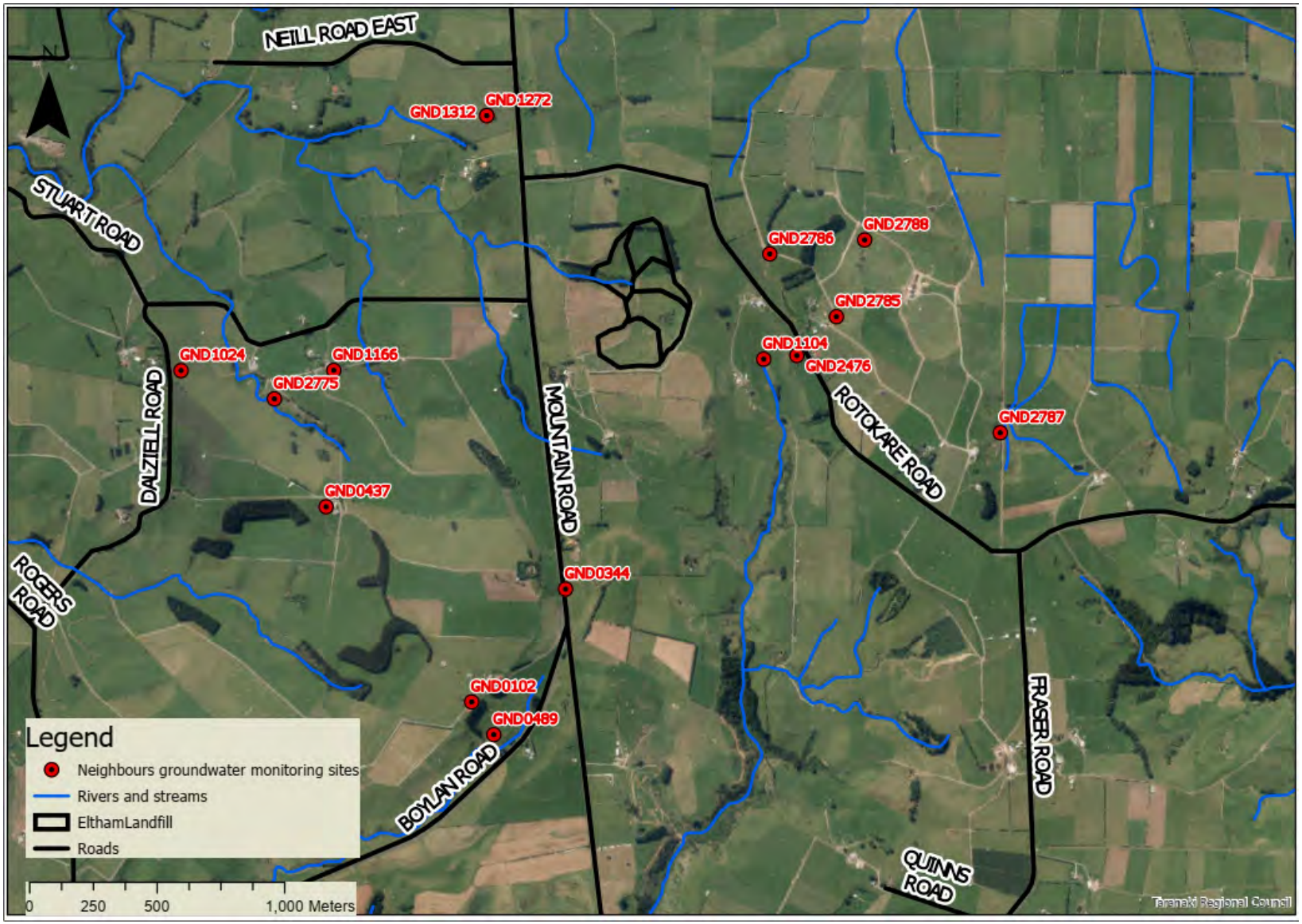

Figure 22 Location of neighbours' water supplies

Table 11 Groundwater results from water supplies on neighbouring properties, sampled October 2018

Site	Collected	Level m	Alkalinity g/m³ $CaCO_3$	Ammonia-N g/m³ N	Benzene g/m³	Boron g/m³	Chloride g/m³	CODF g/m³	Condy mS/m @25°C	E.Coli cfu/100ml	Iron* g/m³	Manganese* g/m³	Nitrate-N g/m³ N	Nitrite-N g/m³ N	pH	Zinc* g/m³
Drinking-water standards (Revised 2018) for supply schemes			-	*1.5 (odour in alkaline conditions)*	*0.01[a]*	*1.4[a]*	*250 (taste, corrosion)*	-	-	*<1[b]*	*0.2 (staining - laundry and sanitary ware)*	*0.4[a]*	*11.3[a]*	*0.2[a]*	*7.0-8.5*	*1.5 (taste)*
Livestock drinking water standards			-			*5.8*				*550*			*93*	*9.1*		*20*
GND0836	Bore covered by landslide	-	-	-	-	-	-	-	-		-	-	-		-	-
GND1024	No longer exists	-	-	-	-	-	-	-	-		-	-	-		-	-
GND1166	No longer exists	-	-	-	-	-	-	-	-		-	-	-		-	-
GND2775	8 Oct 2018	spring	54	<0.010	< 0.0010	0.02	29	<6	27.2	**300**	0.05	0.037	4.9	0.015	7.1	0.0015
GND0437	8 Oct 2018	-	102	0.280	< 0.0010	0.02	23	<6	28.2	<1	0.09	0.300	0.171	0.002	7.5	0.0199
GND0102	8 Oct 2018	-	90	<0.010	< 0.0010	0.02	25	<6	30.0	<1	<0.02	0.0038	3.3	<0.002	7.5	0.055
GND0489	8 Oct 2018	-	77	<0.010	< 0.0010	0.02	20	<6	26.4	<1	0.06	0.0034	3.4	<0.002	7.5	0.029
GND2787	11 Oct 2018	spring	62	0.048	< 0.0010	0.02	43	<6	42.9	<1	<0.02	0.024	**17.6**	0.026	6.5	0.0011
GND2788	11 Oct 2018	spring	51	<0.010	< 0.0010	0.02	24	<6	23.9	<1	<0.02	0.0030	5.4	<0.002	6.8	0.0064
GND1272	10 Oct 2018	-	44	<0.010	< 0.0010	0.03	12	<6	16.8	<1	<0.02	<0.0005	4.4	<0.002	6.9	0.0068
GND1312	10 Oct 2018	-	540	16.8	< 0.0010	0.14	15	51	98.6	<1	0.71	0.30	<0.002	<0.002	7.2	0.0049

Site	Collected	Level m	Alkalinity g/m³ $CaCO_3$	Ammonia-N g/m³ N	Benzene g/m³	Boron g/m³	Chloride g/m³	CODF g/m³	Condy mS/m @25°C	E.Coli cfu/100ml	Iron* g/m³	Manganese* g/m³	Nitrate-N g/m³ N	Nitrite-N g/m³ N	pH	Zinc* g/m³
Drinking-water standards (Revised 2018) for supply schemes			-	*1.5 (odour in alkaline conditions)*	*0.01[a]*	*1.4[a]*	*250 (taste, corrosion)*	-	-	*<1[b]*	*0.2 (staining - laundry and sanitary ware)*	*0.4[a]*	*11.3[a]*	*0.2[a]*	*7.0-8.5*	*1.5 (taste)*
Livestock drinking water standards			-			*5.8*				*550*			*93*	*9.1*		*20*
GND2786	9 Oct 2018	2.47	64	<0.010	< 0.0010	0.02	36	<6	34.9	<1	<0.02	0.0015	11.2	<0.002	6.9	0.0106
GND2476	8 Oct 2018	-	420	5.5	< 0.0010	0.33	15	22	77.5	<1	0.03	0.0129	<0.002	<0.002	8.0	0.056
GND1104	9 Oct 2018	0.87	47	<0.010	< 0.0010	0.02	22	<6	23.2	<1	<0.02	0.0007	1.94	<0.002	6.9	0.0034
GND2785	9 Oct 2018	-	112	0.058	< 0.0010	0.02	22	<6	29.1	<1	<0.02	0.32	<0.002	<0.002	7.6	0.022
GND0344	8 Oct 2018	-	65	<0.010	< 0.0010	0.02	22	<6	26.3	<1	<0.02	0.0005	5.5	<0.002	7.1	0.021

* metals are dissolved

a Maximum acceptable value

b Regulatory compliance for water supply scheme, rather than health effect

2.2.4 Biological monitoring

The Council's 'vegetation sweep' technique was used to collect streambed macroinvertebrates from three sites in an unnamed tributary of the Waingongoro River on 26 March 2019. This has provided baseline data to assess any impacts the development of the Central Landfill may cause in this unnamed tributary. Samples were processed to provide number of taxa (richness), MCI and SQMCI scores for each site.

Taxa richness is the most robust index when determining whether a macroinvertebrate community has been exposed to toxic discharges. When exposed to toxic discharges, macroinvertebrates may die and be swept downstream or may deliberately drift downstream as an avoidance mechanism (catastrophic drift). 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 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. However, it is also influenced by the 'patchiness' of macroinvertebrates on the streambed, and as such must be considered in the context of all three metrics. Significant differences in either the MCI or SQMCI scores between sites may indicate the degree of adverse effects (if any) of the discharge being monitored.

The survey recorded a moderate to moderately low taxa richness, with a range from 11-16 taxa across the three sites. Further, those taxa recorded are typically associated with macrophyte beds. Three taxa were characteristic to all three sites, including the 'moderately sensitive' taxon, amphipod (*Paracalliope*) and two 'tolerant' taxa seed shrimp (Ostracoda) and snail (*Potamopyrgus*). This is consistent with previous surveys carried out in relation to Central landfill, which have recorded communities dominated by lower scoring 'moderately sensitive' and 'tolerant' taxa typical of small, seepage-fed, macrophyte dominated, soft-bottomed farmland streams.

Site WGG000647, the uppermost site, recorded the highest scores of all sites surveyed for taxa richness and MCI, which is similar to that recorded in the previous survey. This contrasted to the November 2017 survey, in which this site recorded the lowest invertebrate metric results of the surveyed sites. It is possible that the improvements at this site over the last two surveys were related to the removal of the silt controls associated with the road realignment, which were in place immediately downstream of the sampling site in the previous survey, but had been removed prior to the previous survey. In the current survey, site WGG000648, recorded the lowest MCI score and taxa richness of the three sites surveyed. SQMCI scores were similar across the three sites, whereas the MCI score recorded at the uppermost site WGG000647 was a significant 11 MCI units higher than the middle site WGG000648 and a substantial 10 units higher than site WGG000654, further downstream. The differences between the three sites surveyed are likely a result of subtle habitat differences between the sites, with greater bank instability and minor to moderate stock damage at the downstream sites.

Overall, the results of this March 2019 survey were indicative of 'poor' to 'fair' biological health in an unnamed tributary of the Waingongoro River. This is consistent with previous surveys carried out in relation to Central landfill, which have recorded communities dominated by lower scoring 'moderately sensitive' and 'tolerant' taxa, typical of small, seepage-fed, macrophyte dominated, soft-bottomed farmland streams. Invertebrate metrics varied slightly between sites; with site WGG000647 recording an MCI score 11 and 10 units higher than that recorded downstream, at sites WGG000648 and WGG000654. SQMCI scores and taxa richness was relatively similar across the three sites sampled. The decrease in MCI scores at the two lower sites can likely be attributed to greater bank instability and to the minor to moderate stock damage recorded at the sites. The results of this survey provided no evidence that any activities associated with the Central Landfill had impacted on the macroinvertebrate communities of this unnamed tributary of the Waingongoro River. This survey has also provided useful baseline information to monitor any future impacts from the activities at the Central Landfill, in relation to the unnamed tributary of the Waingongoro Stream.

A copy of the full biomonitoring report is available on request.

2.3 Air monitoring

No specific air monitoring was carried out during the 2018-2019 year as the landfill was not in operation. However, air discharge matters were considered during the inspections of the construction work.

Once the Central landfill commences operations an air quality monitoring programme will be implemented to monitor dust deposition, particulate matter, methane levels, hydrogen sulphide levels and odour. However, it is noted that the consent holder is required to undertake landfill gas dispersion modelling prior to the discharge consents being exercised.

To support this modelling, STDC has had a weather station in place at the site since 2000. However, it was been ascertained that the initial data was not suitable for the purpose of odour dispersion modelling, as the weather station was only serviced once per year. This matter was raised with the consent holder and they undertook to collect more robust data prior to the site being developed, as per condition 11 of consent 5348-1. A proposed location for a new station was confirmed as acceptable to the Council in July 2014, and it was installed as proposed, however this was subsequently struck by lightning. STDC consulted with Council regarding the specifications required for the data collection from a further new weather station, and the installation was completed in October 2016. Council has been advised that annual calibration of the site is undertaken by their consultants, and that routine maintenance is undertaken by the Rural Fire Service. The monitoring programme was updated during 2017-2018 to include a review of the data collected and an annual inspection of the weather station to confirm that it is being adequately maintained. The site was visited 29 August 2017. The system was found to be generally acceptable, however there was further action required with respect to the wind speed/direction. It was found that the wind arm was pointing at magnetic North instead of true North, and that this would require either a correction to be applied to the data, or for the wind arm position to be corrected. It is recommended that monitoring of this aspect of the programme is put in abeyance until Council receives notification that the site will be proceeding.

It is noted, that since the consents were granted an Air Quality National Environmental Standard has come into effect. This standard requires that the landfill gas generated from a landfill of this size is collected and either flared, or used as a fuel for generating electricity. This requirement impacts on both the design concept provided to Council at the time of the consent application, and the assessment of environmental effects. As such, the conditions of the current consent will need to be reviewed and/or changed prior to the exercise of the consent.

Photo 9 Central landfill weather station, September 2017

2.4 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 STDC. 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 2018-2019 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.

3 Discussion

3.1 Discussion of site performance

The Central landfill site baseline results are not remarkable in themselves. Surrounding farming activities exert subtle and varying pressures on surface water and groundwater quality as would be expected. The results show that there are no unusually high values for any given water quality indicator, with the exception of the occasional high faecal coliform count. Water quality overall is good for the headwaters of small stream tributaries in a dairying catchment, however, there may be an emerging trend of increasing conductivity and faecal coliform counts upstream of the northern landfill tributary.

STDC had initiated the Neighbourhood Liaison Group meetings and employed the Technical Expert to support the Council as required by consent. There was good consultation occurring between STDC and both the neighbours and the Council during the 2017-2018 year as the design, operational plans and site enabling works progressed. It is expected that a similar level of consultation will re-commence if a decision is made that the project will go ahead.

3.2 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 12 to Table 16. As the consents have not been exercised many of the conditions are not applicable.

Table 12 Summary of performance for discharge to land consent 5347-1.3

Purpose: ***To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare and comply with a landfill management plan. Plan to be updated at least every two years	To be provided prior to exercise of consent	Draft plan previously reviewed by Council
2. The consent holder and all staff shall adhere to the management plan	Consent not exercised	N/A
3. The consent holder shall meet cost of a technical advisor on development and operations	Technical Adviser previously provided, and will be re-engaged if the project goes ahead	N/A
4. The consent holder shall construct a landfill liner to given specifications and provide for the collection of leachate	Consent not exercised. Liner design updated to current best practice during early part of detailed design phase. Consent change required	N/A
5. The landfill liner must be certified by a registered engineer	Consent not exercised	N/A
6. The consent holder shall keep records of wastes accepted	Consent not exercised	N/A
7. Certain wastes to be handled by specified guidelines.	Consent not exercised	N/A

Purpose: *To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. Contaminated soils accepted at site shall be covered as soon as practical	Consent not exercised	N/A
9. Appointment of person to control entry of waste to the site	Consent not exercised	N/A
10. Certain wastes not to be accepted	Consent not exercised	N/A
11. Other special wastes to meet certain criteria	Consent not exercised	N/A
12. Wastes that do not meet TCLP test or exceed certain contaminant limits not to be accepted	Consent not exercised	N/A
13. Special waste to be handled as specified	Consent not exercised	N/A
14. Measures to prevent contaminants entering surrounding land	Consent not exercised	N/A
15. Compact and cover waste to certain specifications	Consent not exercised	N/A
16. Supply report on stage closure in relation to compliance with condition 15	Consent not exercised	N/A
17. Provide, comply with and maintain an STDC annual monitoring plan	To be provided at least six months prior to exercise of consent Baseline monitoring requirements reviewed and increased for 2017-2018. STDC monitoring plan was being drafted The Technical Advisor has also been appointed	Baseline monitoring in progress
18. Results of STDC monitoring to be supplied annually by 31 August	Consent not exercised	N/A
19. Prevent surface run-off into tributaries	Consent not exercised	N/A
20. Undertake review and remedial actions should leachate cause contamination	Consent not exercised	N/A
21. Inspect landfill for leachate breakout at least once a month	Consent not exercised	N/A
22. Keep records on any remedial actions taken	Consent not exercised	N/A

Purpose: *To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
23. Keep records on any investigations and engineering works	Consent not exercised	N/A
24. Liaise and meet with Neighbourhood Liaison Group	Consent not due to be exercised yet, however meetings were previously held at more than the required frequency. These will recommence if project goes ahead	Yes
25. Lapse provision	Lapse was not due until 2020. Change requested to extend to 2025	N/A
26. Limits areas from which refuse can originate from. Taranaki including Mokau and Awakino	Consent not exercised	N/A
27. Review condition	Next optional review in June 2023	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**

Table 13 Summary of performance for air discharge consent 5348-1

Purpose: *To discharge emissions into the air from landfilling activities at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare and comply with a landfill management plan. Plan to be updated at least every two years	To be provided three months prior to exercise of consent	Draft plan previously reviewed by Council
2. The consent holder shall adopt best practical option	Consent not exercised	N/A
3. Discharges not to result in objectionable or offensive odours or airborne contaminants beyond the boundary	Consent not exercised	N/A
4. Discharges not to result in objectionable or offensive levels of dust, beyond the boundary	Consent not exercised	N/A
5. Dust controlled on access roads and landfill	Consent not exercised	N/A
6. No burning of waste at the site	Consent not exercised	N/A
7. No composting of waste at the site	Consent not exercised	N/A

Purpose: *To discharge emissions into the air from landfilling activities at the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. No extraction venting of landfill gas within 200 metres of site boundary	Consent not exercised	N/A
9. Avoid discharges of waste or contaminants to the surrounding environment	Consent not exercised	N/A
10. Provide, comply with and maintain an STDC annual monitoring plan	To be provided at least six months prior to exercise of consent	Baseline monitoring in progress
11. Establish meteorological station and use data to undertake dispersion modelling	Consent not exercised. Inspection and liaison with consent holder in 2017-2018 – 12 months data required commencing within one year of exercise of consent. To re-commence monitoring if project is to go ahead	Weather station replaced and relocated in 2017-2018. Data quality to be assessed. More data required
12. Modelling to be done to parameters supplied in appendix 10 of the application	Review of Council records – 12 months data required commencing within one year of exercise of consent	N/A-modelling not done yet
13. Keep records on any complaints received relating to air discharges	Consent not exercised	N/A
14. Provide results of monitoring plan, complaints and meteorological data annually by 31 August	Consent not exercised	N/A
15. Keep records of any site investigations and engineering works	Consent not exercised	N/A
16. Liaise and meet with a Neighbourhood Liaison Group	Liaison with consent holder – consent not exercised, however in 2017-2018 meetings were held at more than the required frequency. The Technical Advisor had also been appointed. Will recommence if project I to go ahead	Yes
17. Lapse provision	Lapse not due until 2020, application received to extend lapse date to 2025	N/A
18. Limits areas from which refuse can originate from. Taranaki including Mokau and Awakino	Liaison with consent holder – consent not exercised	N/A
19. Review condition	Next optional review in June 2023	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**

Table 14 Summary of performance for stormwater discharge consent 5349-1

Purpose: ***To discharge up to 15,000 m^3/day of uncontaminated stormwater and 4,000 m^3/day of treated stormwater from the South Taranaki District Council Central Landfill, Eltham, onto and into land and into an unnamed tributary of the Waingongoro River***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare and comply with a landfill management plan. Plan to be updated at least every two years	To be provided prior to exercise of the consent	Draft plan reviewed by Council
2. No leachate to be discharged	Consent not exercised	N/A
3. Leachate storage lagoon bunded to prevent stormwater infiltration	Consent not exercised	N/A
4. Adopt best practical option	Consent not exercised	N/A
5. No direct discharge of contaminated stormwater to receiving waters	Consent not exercised	N/A
6. Stormwater treatment pond be installed	Consent not exercised	N/A
7. Discharge not give rise to certain effects in receiving waters	Consent not exercised	Baseline monitoring in progress
8. Contaminants in receiving waters not to exceed certain limits	Consent not exercised	Baseline monitoring in progress
9. System designed to minimise erosion in channels	Consent not exercised	N/A
10. System designed to minimise land instability	Consent not exercised	N/A
11. Rehabilitation of any land made unstable	Consent not exercised	N/A
12. Minimise disturbance of riparian plants and undertake planting as set out in application	Consent not exercised	N/A
13. Provide, comply with and maintain an STDC annual monitoring plan	Review of Council records – to be provided at least six months prior to exercise of consent Baseline monitoring requirements increased for 2017-2019 years The Technical Advisor had also been appointed, and will be re-engaged if project is to go ahead	Baseline monitoring in progress
14. Results of STDC monitoring to be supplied	Consent not exercised	N/A
15. Design and construction of system to be certified by registered engineer	Consent not exercised	N/A

Purpose: *To discharge up to 15,000 m^3/day of uncontaminated stormwater and 4,000 m^3/day of treated stormwater from the South Taranaki District Council Central Landfill, Eltham, onto and into land and into an unnamed tributary of the Waingongoro River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
16. Liaise and meet with Neighbourhood Liaison Group	Consent not exercised, however meetings were held at more than the required frequency in 2017-2018 and will recommence if project goes ahead	Yes
17. Lapse provision	Lapse not due until 2020, application receive to extend lapse date to 2025	N/A
18. Limits areas from which refuse can originate from to Taranaki including Mokau and Awakino	Consent not exercised	N/A
19. Review condition	Next optional review in June 2025	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**

Table 15 Summary of performance for dam and diversion consent 5350-1

Purpose: *To dam and divert water around the South Taranaki District Council Central Landfill, Eltham, in the headwaters of an unnamed tributary of the Waingongoro River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare and comply with a landfill management plan. Plan to be updated at least every two years	To be provided three months prior to exercise of consent	Draft plan reviewed by Council
2. System designed to minimise erosion in channels	Consent not exercised	N/A
3. System designed to minimise land instability	Consent not exercised	N/A
4. Rehabilitation of any land made unstable	Consent not exercised	N/A
5. Provide, comply with and maintain an STDC annual monitoring plan	To be provided at least six months prior to exercise of consent	Baseline monitoring in progress
6. Design and construction of system to be certified by registered engineer	Consent not exercised	N/A
7. Liaise and meet with Neighbourhood Liaison Group	Consent not exercised, however meetings were held at more than the required frequency in 2017-2018 and will recommence if project goes ahead. The Technical Advisor had also been appointed. Will recommence if project I to go ahead	N/A

Purpose: *To dam and divert water around the South Taranaki District Council Central Landfill, Eltham, in the headwaters of an unnamed tributary of the Waingongoro River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
8. Lapse provision	Lapse not due until 2020, application receive to extend lapse date to 2025	N/A
9. Limits areas from which refuse can originate from to Taranaki including Mokau and Awakino	Inspection and liaison with consent holder – consent not exercised	N/A
10. Review condition	Next optional review in June 2023	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**

Table 16 Summary of performance for structures consent 5351-1

Purpose: *To erect, place and maintain structures in the beds of unnamed tributaries of the Waingongoro River for the construction and maintenance of the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The consent holder shall prepare and comply with a landfill management plan. Plan to be updated at least every two years	To be provided three months prior to exercise of consent	Draft plan reviewed by Council
2. Construction and maintenance not give rise to certain effects	Consent not exercised	N/A
3. Structures designed to minimise land instability	Consent not exercised	N/A
4. Rehabilitation of any eroded areas	Consent not exercised	N/A
5. Minimise disturbance of riparian plants and undertake planting as set out in application	Consent not exercised	N/A
6. Provide, comply with and maintain an STDC annual monitoring plan	To be provided at least six months prior to exercise of consent	Baseline monitoring in progress
7. Design and construction of system to certified by registered engineer	Consent not exercised	N/A
8. Removal of structures and reinstatement when structures no longer required	Consent not exercised	N/A

Purpose: *To erect, place and maintain structures in the beds of unnamed tributaries of the Waingongoro River for the construction and maintenance of the South Taranaki District Council Central Landfill, Eltham*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
9. Liaise and meet with Neighbourhood Liaison Group	Consent not exercised, however meetings were held at more than the required frequency in 2017-2018 and will recommence if project goes ahead. The Technical Advisor had also been appointed. Will recommence if project I to go ahead	Yes
10. Lapse provision	Lapse not due until 2020, application receive to extend lapse date to 2025	N/A
11. Limits areas from which refuse can originate from to Taranaki including Mokau and Awakino	Consent not exercised	N/A
12. Review condition	Next optional review in June 2023	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**

No rating is given for environmental and administrative performance as the project was on hold for the year under review.

3.3 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT in the first instance, the baseline monitoring for the consented activities at Eltham Central landfill in the 2018-2019 year continue at the same level as in 2017-2018.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consents 5347-1, 5348-1, 5349-1, 5350-1, and 5351-1 in June 2019, as set out in conditions 27, 19, 19, 10 and 12 of the consents, be exercised if and when there is sufficient certainty regarding the landfill design, and operation and management practices to be implemented at the site, and the potential adverse effects of any changes have been evaluated.
4. STDC continue to locate and appropriately retire all groundwater bores from within the landfill foot print that will not be used for monitoring, as identified in Table 5 of this report.

The monitoring was implemented as recommended. Recommendations 3 and 4 were not implemented due to the project being put on hold.

3.4 Alterations to monitoring programmes for 2019-2020

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 2019-2020 monitoring of the site is reduced until notification is received that the project is going ahead.

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 2019-2020.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Central landfill in the 2019-2020 year be amended from that undertaken in 2018-2019, by putting the groundwater and weather station verification monitoring into abeyance, and reducing the surface water sampling frequency and range of parameters determined.
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:

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.
BODCF	Carbonaceous biochemical oxygen demand of a filtered sample. A measure of the presence of degradable dissolved 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.
CODF	Chemical oxygen demand of a filtered sample.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
Cu*	Copper.
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
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	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.
GIS	Geographical information system. A system designed to capture, store, manipulate, manage, and present spatial or geographic data. It can be used to visualize, question, analyse, and interpret data to understand relationships, patterns, and trends.
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.
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 seven 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.
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
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 including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
SVOC	Semi volatile organic compounds.
TCLP	Toxicity characteristic leaching procedure is a soil sample extraction method using an appropriately buffered acidic solution. Chemical analysis of the extract is undertaken. This is employed as an analytical method to simulate leaching through a landfill.
Taradise	Council geographical information system.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
VOC	Volatile organic compounds.
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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Thomas, B (2019): *Biomonitoring of an unnamed tributary of the Waingongoro River in relation to the Eltham Central Landfill, March 2019,* internal report (BT106).

Appendix I

Resource consents held by STDC

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

Consent number	Purpose	Commencement	Review	Expires
Water discharge permits				
5349-1.3	To discharge stormwater	14 December 2017	June 2023	June 2034
Air discharge permit				
5348-1.3	To discharge emissions into the air	24 August 2017	June 2023	June 2034
Discharges of waste to land				
5347-1.2	To discharge contaminants onto and into land	24 August 2017	June 2023	June 2034
Land use permits				
5350-1.2	To dam and divert water	24 August 2017	June 2023	June 2034
5351-1.2	To erect, place and maintain structures in the beds of the unnamed tributaries	24 August 2017	June 2023	June 2034

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:	South Taranaki District Council Private Bag 902 Hawera 4640
Decision Date (Review):	24 August 2017
Commencement Date (Review):	24 August 2017 (Granted Date: 15 March 2000)

Conditions of Consent

Consent Granted:	To discharge contaminants onto and into land at the South Taranaki District Council Central Landfill, Eltham
Expiry Date:	1 June 2034
Review Date(s):	December 2017, June 2018, June 2019, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Grid Reference (NZTM)	1712140E-5631866N
Catchment:	Waingongoro

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

General condition

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

Special conditions

1. That:

   a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

   b) the Management Plan shall be reviewed and updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

   c) the consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

   d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. That the consent holder shall ensure that:

   a) the operation of the landfill and the disposal of wastes shall be carried out at all times in accordance with the requirements of the Landfill Management Plan prepared as required in Condition (1) above or subsequent version of that document which does not lessen environmental protection standards;

   b) all site staff working at the landfill are regularly trained on the content and implementation of the Landfill Management Plan, the maximum period between training sessions being 12 months. New staff are to be trained on recruitment and the training record made available to the General Manager, Taranaki Regional Council upon request; and

   c) in order to avoid adverse effects arising from the exercise of this consent, all site staff are advised immediately of any revision or additions to the Landfill Management Plan.

3. That the consent holder shall meet the reasonable cost of the Taranaki Regional Council retaining a Technical Advisor, suitably qualified and knowledgeable in landfill development and operational procedures, to advise the General Manager, Taranaki Regional Council on aspects of the operation of the landfill related to disposal of solid waste and the installation and maintenance of the leachate collection system, and the ability to achieve compliance with the conditions of consent. Apart from other activities undertaken by the Technical Advisor, the Advisor shall undertake annual reviews, or other such reviews as reasonably determined by the General Manager, Taranaki Regional Council, of the landfill operations for the first 6 years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council, in consultation with the Neighbourhood Liaison Group.

4. That the consent holder shall:

   a) construct a composite liner in all areas where refuse is to be placed. The liner shall be constructed with a layer of compacted clay with a permeability of less than $1x10^{-8}$ m/sec and a minimum thickness of 600 mm, overlain by a membrane of high density polyethylene HDPE at least 1.5 mm thick. The consent holder may use materials and a specification other than described above, provided that any such materials shall perform to the same or higher standard than those specified and provided further that the consent holder shall first obtain the written approval of the General Manager, Taranaki Regional Council; and

   b) provide for collecting leachate from the liner and transferring it to a pond within the landfill property boundary, such pond to be lined with a composite liner as specified in Condition 4(a) above;

   c) ensure there is no discharge of refuse or leachate to land or water in any area without the liner as required in Conditions 4a and 4b above; and

   d) remove sufficient daily cover and remove at least 20% of the intermediate cover to ensure downward migration of leachate, before placing refuse on an existing cell.

5. That the construction, installation, placement, integrity and expected performance of landfill lining systems, groundwater drainage systems, and leachate interception, collection, holding and recirculation systems on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to General Manager, Taranaki Regional Council, prior to discharge of waste in those areas.

6. That the consent holder shall maintain a manifest/declaration system that shall record the following information on the waste received for disposal. This information is to be forwarded to the General Manager, Taranaki Regional Council on a 6-monthly basis no later than the 10th working day of the following month:

   a) general description in volume or quantity in cubic metres or kilograms per day of domestic, commercial and industrial waste received from other than transfer stations; and

   b) general description in volume or quantity (in cubic metres or kilograms) of all waste received at the landfill from transfer stations.

   Where the consent holder reasonably considers any information required under this condition is confidential, it may notify the General Manager, Taranaki Regional Council, accordingly so that reasonable measures can be taken to protect confidentiality.

7. That the consent holder shall ensure that:

   a) Medical waste is managed in accordance with NZS4304;

   b) Animal parts are buried immediately upon receipt

   c) Asbestos is managed in accordance with the Asbestos Regulations;

   d) Waste that is potentially a health hazard shall be placed in a hole specifically excavated and immediately covered with appropriate cover material. The location of special waste holes shall be recorded by survey.

8. That any contaminated soils that are accepted at the landfill and whose contaminant concentration exceeds those levels specified in any New Zealand Standard or guidelines as being appropriate for industrial unpaved sites shall be covered over as soon as practicable such that the risk to human and environmental health is avoided.

9. That the consent holder shall appoint a person to control entry of waste into the landfill.

10. That the consent holder shall not dispose of waste of an explosive, flammable, reactive, toxic, radioactive, corrosive or infectious nature other than minor quantities of such waste where they are ordinarily part of and found in general wastes. In addition, the consent holder shall not dispose of wastes deemed unacceptable under Conditions 11 and 12.

11. That further to Condition 10 of this consent, the wastes which are acceptable or unacceptable are as follows:

   a) General waste is solid waste generated from residential, commercial and industrial sources. General waste covers all waste not otherwise defined below. It is acceptable and may contain minor quantities of special or prohibited waste which are normally part of the waste stream;

   b) Difficult wastes are wastes which are acceptable but due to their physical nature require specific disposal management. These wastes include offal, dead animal bodies, wire rope, documents and bulky items;

   c) Special Wastes contain substances that may adversely affect the final landfill or leachate or landfill gas quality. Their acceptance in the landfill shall be based on an assessment of the nature of the waste and its effects on the landfill and its receiving environment in accordance with the requirements of Condition 12 of this consent;

   d) Liquid wastes shall not be accepted other than those liquids which are in small containers that are impractical to empty ;

   e) Sludges may be accepted, as long as they contain no separated liquids.

12. That no waste shall be accepted for disposal which may cause a significant potential or actual adverse environmental effect. In the absence of other criteria, no wastes shall be accepted:

    a) if a TCLP test extract exceeds 2,500 times the level specified in any New Zealand Standard or guideline as being appropriate for stock watering purposes; or

    b) if containing any contaminant exceeding 300 times the level specified in any New Zealand Standard or guideline as being appropriate for soil for agricultural use unless such wastes have been treated so as to comply with conditions as above and are not placed within the top 4 metres lift of refuse beneath any final landfill cap at any point.

13. That in order to maintain the integrity of the liner and to minimise the risk of discharge of contaminants, the consent holder shall ensure that special wastes as defined in Condition 11(c) shall not be deposited within 5 metres of the liner or the top 4 metres lift of refuse beneath the final landfill cap at any point or within 10 metres of the edge of the landfill.

14. That the consent holder shall take all practicable measures to avoid the discharge of contaminants from within the landfill site to surrounding land. To this end, the consent holder shall ensure:

    a) refuse is spread in thin layers and is compacted on the same day refuse is received;

    b) the amount of refuse exposed at any one time is confined to a practicable minimum; and

    c) exposed refuse is covered regularly with appropriate material and in any case no less frequently than daily.

15. That the consent holder shall:

    a) compact refuse to such an extent that post closure settlement is minimised, targeting a compacted refuse density averaging at least 700 kg/m^3 as far as practicable;

    b) progressively, as parts of the landfill are completed, cover exposed refuse with not less than 650 mm of earth material, of which 500 mm is compacted to a permeability of less than $1x10^{-7}$m/sec, and no less than 150 mm comprises topsoil, and establish and maintain pasture on those completed areas at the landfill; and

    c) within two months following the closure of any landfill stage, grade the tipping face to achieve a final slope less than or equal to 1V:3H (1 in 3) on any face.

16. That within one month following completion of each stage at the landfill, the consent holder shall report in writing to the General Manager, Taranaki Regional Council of the consent holder's compliance with Condition 15 of this consent.

17. That the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The Plan shall describe in detail practices for water and soil chemistry monitoring, shall contain guidelines for the determination of whether contamination is occurring including "alert" and "response" levels for individual contaminants and shall make reference to the Management Plan, to be prepared as required in Condition 1 of this consent. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any discharge of solid wastes authorised by this consent. The initial Monitoring Plan is to include:

    a) further baseline monitoring [biological, chemical and physical] of surface water quality and groundwater prior to commencement of landfilling;
    b) quarterly monitoring of groundwater levels and water quality of each of the existing monitoring bores shown in Figure 4 of the application documentation dated May 1998, plus the installation and monitoring of at least one further bore downslope of the leachate storage lagoon at a site approved by the General Manager, Taranaki Regional Council;
    c) biological, physical and chemical monitoring of surface water quality twice per year in the two unnamed tributaries of the Waingongoro River at site(s) approved by the General Manager, Taranaki Regional Council;
    d) measurement of volume of leachate removed from the site monthly;
    e) annual testing of leachate for the following components: pH, conductivity, alkalinity, chloride, sulphate, carbonate, bicarbonate, ammonia–N, nitrate-N, reactive dissolved phosphorus; COD, BOD_5; aluminium, arsenic, boron, cadmium, calcium, chromium, copper, iron, magnesium, manganese, mercury, sodium, nickel, potassium, lead, zinc; volatile organic compounds, semi-volatile organic compounds [volatile and semi-volatile organic compound scans to include but not be restricted to benzene, benzo-a-pyrene, phenol, perchlorethylene, and napthalene], organochlorine pesticides screen, organophosphate pesticide screen, and polyaromatic hydrocarbon screen;
    f) quarterly testing of leachate for the following components: pH, conductivity, alkalinity, chloride, sulphate, carbonate, bicarbonate, ammonia–N, nitrate-N, reactive dissolved phosphorus; COD, BOD_5; aluminium, arsenic, boron, cadmium, calcium, chromium, copper, iron, magnesium, manganese, mercury, sodium, nickel, potassium, lead, zinc;
    g) quarterly sampling and testing of groundwater from on-site bores as noted in Condition 17(b) above as follows: Comprehensive testing (April) - pH, conductivity, alkalinity, chloride, sulphate, carbonate, bicarbonate, ammonia–N, nitrate-N, reactive dissolved phosphorus; COD, BOD_5; aluminium, arsenic, boron, cadmium, calcium, chromium, copper, iron, magnesium, manganese, mercury, sodium, nickel, potassium, lead, zinc, benzo-a-pyrene, benzene, phenol, perchlorethylene, and napthalene; Indicator testing (July, October, January) - pH, conductivity, COD, boron, iron, manganese, chloride, ammonia-N, nitrate-N;
    h) annual sampling and testing of surface water supplies and bores on neighbouring properties, located as noted in Appendix 10 of the application documentation dated May 1998, subject to the agreement of the respective owners, as follows: pH, benzene, zinc, alkalinity, conductivity, chloride, ammonia–N, nitrate-N, nitrite-N, boron, COD, iron, manganese; and
    i) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured.

18. That the results of the Annual Monitoring Programme for the year ending 30 June be provided to the General Manager Taranaki Regional Council by 31 August of each year following the monitoring, and be made available to the Neighbourhood Liaison Group, and to any other interested party.

19. That the consent holder shall prevent surface runoff of water or contaminants to the unnamed tributaries of the Waingongoro River from any surface area being used or previously used for the deposition of refuse, or for extraction of soil, clay, or other cover material, or prepared for the deposition of refuse, unless such surface area has been covered and rehabilitated.

20. That where any leachate or other contaminants associated with the consent holder's activities or processes associated with the landfill significantly affect surface and ground water, the consent holder shall:

    a) undertake appropriate remedial action as soon as practicable as described in the consent holder's Management Plan required by Condition 1, or other such action reasonably required by the General Manager, Taranaki Regional Council;

    b) as soon as reasonably practicable, notify the General Manager, Taranaki Regional Council, of the escape of wastes;

    c) shall review the Monitoring Programme and Management Plan and incorporate such reasonable modifications as are considered necessary by the General Manager, Taranaki Regional Council; and

    d) where water supplies are significantly affected, immediately provide alternative supplies as reasonably required by the General Manager, Taranaki Regional Council.

    "Significantly affected" for the purposes of this condition shall be determined by the General Manager Taranaki Regional Council, by reference to the monitoring data and taking into account the purpose for which the water is to be used.

21. That the consent holder shall inspect the landfill for leachate break out, settlement and other adverse environmental effects at least once per month until such time as discharge of refuse to the landfill ceases. Thereafter, the frequency of inspection shall be determined in consultation with the General Manager, Taranaki Regional Council.

22. That the consent holder shall record the date, time, observations and any remedial action as a result of Condition 21. The record shall be made available to the Neighbourhood Liaison Group and the General Manager, Taranaki Regional Council on an annual basis.

23. That the consent holder shall ensure that records are kept of any site investigations for any engineering works associated with this consent, and that these records are forwarded to the General Manager, Taranaki Regional Council.

24. That the consent holder and staff of the Taranaki Regional Council shall meet, with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

    (a) one month prior to the exercise of this consent;

    (b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

    (c) thereafter at one interval of no more than six months; and

    (d) thereafter at intervals of no more than twelve months;

    unless all parties agree that changes to the intervals are acceptable.

    The Technical Adviser may attend one meeting per year for the first six years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council

25. That this consent shall lapse on the expiry of twenty [20] years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

26. That the consent holder shall not apply for any further variation of its resource consent seeking to permit the discharge of waste into the Eltham landfill from beyond Taranaki Region (i.e. beyond the waste-stream presently accepted by New Plymouth, South Taranaki and Stratford District Councils) and for avoidance of doubt includes the peripheral townships of Awakino and Mokau. Any further variations will be restricted to health and safety and/or applications to enhance the environmental performance of the Eltham landfill due to improvements in engineering methods and available technology relevant to landfill construction and operation or as a result of monitoring.

27. That the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, December 2017, June 2018, June 2019, June 2023, and June 2029 and within 18 months of the date this consent is first exercised, for the purpose of:

    i) ensuring the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 17 of this consent; and

    ii) ensuring the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to land.

    The review of conditions may allow for:

    a) modification of the Monitoring Programme and methods of implementation outlined in Condition 17 of this consent;

    b) deletion, additions or changes to Conditions 3, 4, 7, 8, 11, 13, 14, 15 and 20.

Signed at Stratford on 24 August 2017

For and on behalf of
Taranaki Regional Council

_____

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:	South Taranaki District Council Private Bag 902 Hawera 4640
Decision Date (Review):	24 August 2017
Commencement Date (Review):	24 August 2017 (Granted Date: 15 March 2000)

Conditions of Consent

Consent Granted:	To discharge emissions into the air from landfilling activities at the South Taranaki District Council Central Landfill, Eltham
Expiry Date:	1 June 2034
Review Date(s):	December 2017, June 2018, June 2019, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Grid Reference (NZTM)	1712140E-5631866N

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. That:

   a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

   b) the Management Plan shall be reviewed and updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

   c) The consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect that already allowed; and

   d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. That the consent holder shall at all times adopt the best practicable option [as defined in section 2 of the Act] to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the landfill operation.

3. That the discharge of contaminants into the air from the landfill shall not result in offensive or objectionable odours or dangerous or noxious ambient concentrations of any airborne contaminant, in the opinion of an appropriately qualified enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the site.

4. That the discharge of contaminants into the air from the landfill shall not result in either dust or other particulate matter that is offensive or objectionable, in the opinion of an appropriately qualified enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the site.

5. That the consent holder shall ensure that dust is controlled on access roads and on the landfill as necessary.

6. That there shall be no burning of waste at the site.

7. That there shall be no composting of waste at the site.

8. That there shall be no extraction venting of untreated landfill gases within 200 metres of the boundary of the site.

9. That the consent holder shall take all practicable measures to avoid the discharge of waste or contaminants from within the landfill site to the surrounding environment. To this end, the consent holder shall ensure:

   a) refuse is spread in thin layers and is compacted on the same day refuse is received;

   b) the amount of refuse exposed at any one time is confined to a practicable minimum; and

   c) exposed refuse is covered regularly with appropriate material and in any case no less frequently than daily.

10. That the consent holder shall maintain and comply with an Annual Monitoring Plan, prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council, and prepared in consultation with the Neighbourhood Liaison Group, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any discharge under this consent. The initial Monitoring Plan is to include:

    a) annual sampling of landfill gas constituents for a period of five years and thereafter at five yearly intervals from a suitable landfill gas well using a tech tube or equivalent method to the satisfaction of the General Manager Taranaki Regional Council. The head space in the water monitoring bores B1 and B3, as shown in Figures 5 and 8 of Appendix 4 of the application documentation dated May 1998, and in the leachate pump chamber shall also be sampled;

    b) samples shall be monitored and analysed for: hydrogen sulphide, methane and carbon dioxide, vinyl chloride, benzene, perchlorethlyene and xylene;

    c) every five years another landfill gas well shall be installed in waste placed in the preceding five years and monitored as in (a) and (b) above;

    d) monitoring of each well shall cease when there is a significant reduction in the level of landfill gas [to the reasonable satisfaction of the General Manager, Taranaki Regional Council];

    e) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured; and

    f) monthly odour surveys around the perimeter of the site or a lesser frequency as agreed to by the Neighbourhood Liaison Group.

11. That a meteorological station be established, at a site to the reasonable satisfaction of the General Manager, Taranaki Regional Council, to measure and record, for a period of no less than 12 months commencing within one year of the development of the site, wind speed, wind direction, temperature and net radiation . The results are to be used to undertake dispersion modelling to predict ground level concentrations of hydrogen sulphide or other gaseous or airborne contaminants around the site.

12. That in fulfilment of Condition 11 above the meteorological parameters are to be measured as specified in Appendix 10 to the application documentation dated May 1998.

13. That the consent holder shall keep a record of any complaints received relating to discharges to air with respect to the landfill activity. The complaints record shall include the following where possible:

    a) name and address of complainant;

    b) nature of complaint;

    c) date and time of the complaint and alleged event;

    d) weather conditions at the time of the event; and

    e) any action taken in response to the complaint.

14. That the results of the Annual Monitoring Plan, the complaints record, and the meteorological data, for the year ending 30 June be provided to the General Manager Taranaki Regional Council by 31 August of each year following the monitoring, and be made available to the Neighbourhood Liaison Group, and to the public.

15. That the consent holder shall ensure that records are kept of any site investigations for any engineering works associated with this consent, and that these records are forwarded to the General Manager, Taranaki Regional Council.

16. That the consent holder and staff of the Taranaki Regional Council shall meet with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

    (a) one month prior to the exercise of this consent;

    (b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

    (c) thereafter at one interval of no more than six months; and

    (d) thereafter at intervals of no more than twelve months;

    unless all parties agree that changes to the intervals are acceptable.

    The Technical Adviser may attend one meeting per year for the first six years and thereafter a frequency determined by the General Manager, Taranaki Regional Council.

17. That this consent shall lapse on the expiry of twenty [20] years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

18. That the consent holder shall not apply for any further variation of its resource consent seeking to permit the discharge of waste into the Eltham landfill from beyond Taranaki Region (i.e. beyond the waste-stream presently accepted by New Plymouth, South Taranaki and Stratford District Councils) and for avoidance of doubt includes the peripheral townships of Awakino and Mokau. Any further variations will be restricted to health and safety and/or applications to enhance the environmental performance of the Eltham landfill due to improvements in engineering methods and available technology relevant to landfill construction and operation or as a result of monitoring.

19. That the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, December 2017, June 2018, June 2019, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

    i) ensuring the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 10 of this consent; and
    ii) ensuring the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to air.

    The review of conditions may allow for:

    a) modification of the Monitoring Programme and methods of implementation outlined in Condition 10 of this consent; and
    b) deletion, additions or changes to conditions 2, 3, 4 and 9.

Signed at Stratford on 24 August 2017

For and on behalf of
Taranaki Regional Council

_____

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:	South Taranaki District Council Private Bag 902 Hawera 4640
Decision Date (Change):	14 December 2017
Commencement Date (Change):	14 December 2017 (Granted Date: 15 March 2000)

Conditions of Consent

Consent Granted:	To discharge up to 15,000 cubic metres/day of uncontaminated stormwater and 4,000 cubic metres/day of treated stormwater from the South Taranaki District Council Central Landfill, Eltham, onto and into land and into an unnamed tributary of the Waingongoro River
Expiry Date:	1 June 2034
Review Date(s):	December 2017, June 2018, June 2019, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Grid Reference (NZTM)	1712140E-5631870N
Catchment:	Waingongoro

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

General condition

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

Special conditions

1. That:

   a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

   b) The Management Plan shall be updated at not greater than two yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council, and following consultation with the Neighbourhood Liaison Group;

   c) The consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

   d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. That no leachate discharge shall be permitted by the exercise of this consent.

3. That in order to give effect to Condition 2, the consent holder shall ensure that the leachate storage lagoon is bunded to ensure no entry of stormwater to that lagoon.

4. That the consent holder shall at all times adopt the best practicable option [as defined in section 2 of the Act] to keep uncontaminated stormwater separate from contaminated stormwater.

5. That no contaminated stormwater be discharged directly to the unnamed tributaries of the Waingongoro River.

6. That stormwater holding ponds be installed.

7. That after allowing for reasonable mixing in a zone that extends downstream no further than the western boundary of the site ["the mixing zone"], the discharge shall not give rise to all or any of the following effects in the receiving water:

   (a) the production of 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 freshwater unsuitable for consumption by farm animals; and

   (e) any significant adverse effects on aquatic life.

8. That the exercise of this consent shall not cause the water quality of the tributary streams, beyond the mixing zone, to exceed the following criteria:

Parameter	**Limit**
pH	6.0-9.0
Copper (dissolved)	0.01 g/m^3
Iron (dissolved)	1.0 g/m^3
Manganese (dissolved)	0.01 g/m^3
Zinc (dissolved)	0.1 g/m^3
Dissolved reactive phosphorus	0.5 g/m^3
Nitrate nitrogen	10 g/m^3
Ammonia nitrogen	1.8 g/m^3
Suspended solids	100 g/m^3
Faecal coliforms	1000 n/100 ml

9. That all stormwater diversion and containment channels shall be designed, constructed and maintained so as to prevent or minimise erosion of the channel.

10. That the earthworks and construction associated with the landfill and the stormwater diversion and containment channels shall be designed, constructed and maintained so as to minimise instability of the surrounding land.

11. That the consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the diversion channels or landfilling operations associated with the exercise of this consent.

12. That the consent holder shall minimise disturbance to riparian vegetation during the exercise of this consent, and shall undertake, at a minimum, planting within the site in accordance with those areas shown in Figures 5a, 5b, 5c, and 5d of the Assessment of Environmental Effects accompanying the application dated May 1998.

13. That the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Plan shall describe in detail practices for water monitoring. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any discharge under this consent. The initial Monitoring Plan is to include:

    a) biological and water quality monitoring twice per year in the two unnamed tributaries of the Waingongoro River at site(s) to the reasonable satisfaction of the General Manager, Taranaki Regional Council;

    b) monitoring of the parameters as set out in Condition 8 above, and also alkalinity, BOD_5, and conductivity; and

    c) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured.

14. That the results of the Annual Monitoring Programme for the year ending 30 June be provided to the General Manager Taranaki Regional Council by 31 August of each year following the monitoring, and be made available to the Neighbourhood Liaison Group, and to any other interested party, and to the public.

15. That the construction, installation, placement, integrity and expected performance of stormwater collection, drainage and holding systems on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to the General Manager, Taranaki Regional Council, prior to and on completion of construction of any such systems, and prior to the disposal of any waste in those areas.

16. That the consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least once per year, with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

    (a) one month prior to the exercise of this consent;

    (b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

    (c) thereafter at one interval of no more than six months; and

    (d) thereafter at intervals of no more than twelve months;

    unless all parties agree that changes to the intervals are acceptable.

    The Technical Adviser may attend one meeting per year for the first six years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council.

17. That this consent shall lapse on the expiry of twenty [20] years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

18. That the consent holder shall not apply for any further variation of its resource consent seeking to permit the discharge of waste into the Eltham landfill from beyond Taranaki Region (i.e. beyond the waste-stream presently accepted by New Plymouth, South Taranaki and Stratford District Councils) and for avoidance of doubt includes the peripheral townships of Awakino and Mokau. Any further variations will be restricted to health and safety and/or applications to enhance the environmental performance of the Eltham landfill due to improvements in engineering methods and available technology relevant to landfill construction and operation or as a result of monitoring.

19. That the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent June 2005, June 2011, June 2017, December 2017, June 2018, June 2019, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

    i) ensuring the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 13 of this consent; and
    ii) ensuring the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to land and water.

    The review of conditions may allow for:

    a) modification of the Monitoring Programme and methods of implementation outlined in Condition 13 of this consent; and
    b) deletion, additions or changes to Conditions 7 and 8.

Signed at Stratford on 14 December 2017

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Land Use Consent

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

Name of Consent Holder:	South Taranaki District Council Private Bag 902 Hawera 4640
Decision Date (Review):	24 August 2017
Commencement Date (Review):	24 August 2017 (Granted Date: 15 March 2000)

Conditions of Consent

Consent Granted:	To dam and divert water around the South Taranaki District Council Central Landfill, Eltham, in the headwaters of an unnamed tributary of the Waingongoro River
Expiry Date:	1 June 2034
Review Date(s):	December 2017, June 2018, June 2019, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Grid Reference (NZTM)	1712140E-5631866N
Catchment:	Waingongoro

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

General condition

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

Special conditions

1. That:

   a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

   b) the Management Plan shall be reviewed and updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

   c) the consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

   d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. That all stormwater diversion and containment channels shall be designed, constructed and maintained so as to prevent or minimise erosion of the channel in all circumstances.

3. That the earthworks and construction associated with the landfill and the stormwater diversion and containment channels shall be designed, constructed and maintained so as to minimise instability of the surrounding land.

4. That the consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the diversion channels or landfilling operations associated with the exercise of this consent.

5. That the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any dam construction under this consent. The initial Monitoring Plan shall describe in detail practices and sites for water monitoring.

6. That the construction, installation, placement, integrity and expected performance of the damming and diversion systems on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to the General Manager, Taranaki Regional Council, prior to and on completion of the construction of any such systems in those areas.

7. That the consent holder and staff of the Taranaki Regional Council shall meet with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

   (a) one month prior to the exercise of this consent;

   (b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

   (c) thereafter at one interval of no more than six months; and

   (d) thereafter at intervals of no more than twelve months;

   unless all parties agree that changes to the intervals are acceptable.

   The Technical Adviser may attend one meeting per year for the first six years and thereafter a frequency determined by the General Manager, Taranaki Regional Council.

8. That this consent shall lapse on the expiry of twenty [20] years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

9. That the consent holder shall not apply for any further variation of its resource consent seeking to permit the discharge of waste into the Eltham landfill from beyond Taranaki Region (i.e. beyond the waste-stream presently accepted by New Plymouth, South Taranaki and Stratford District Councils) and for avoidance of doubt includes the peripheral townships of Awakino and Mokau. Any further variations will be restricted to health and safety and/or applications to enhance the environmental performance of the Eltham landfill due to improvements in engineering methods and available technology relevant to landfill construction and operation or as a result of monitoring.

10. That the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent in June 2005, June 2011, June 2017, December 2017, June 2018, June 2019, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

    i) ensuring the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 5 of this consent; and
    ii) ensuring the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the damming and diversion of water.

    The review of conditions may allow for:

    a) modification of the Monitoring Programme and methods of implementation outlined in Condition 5 of this consent.

Signed at Stratford on 24 August 2017

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Land Use Consent

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

Name of Consent Holder:	South Taranaki District Council Private Bag 902 Hawera 4640	
Decision Date (Review):	24 August 2017	
Commencement Date (Review):	24 August 2017	(Granted Date: 15 March 2000)

Conditions of Consent

Consent Granted:	To erect, place and maintain structures in the beds of unnamed tributaries of the Waingongoro River for the construction and maintenance of the South Taranaki District Council Central Landfill, Eltham
Expiry Date:	1 June 2034
Review Date(s):	December 2017, June 2018, June 2019, June 2023, June 2029
Site Location:	Central Landfill, Rotokare Road, Eltham
Grid Reference (NZTM)	1712140E-5631866N
Catchment:	Waingongoro

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

General condition

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

Special conditions

1. That:

   a) the consent holder shall prepare a Landfill Management Plan addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved, such Plan (excluding that part of the Plan that deals with contingency events) to be prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council three months prior to the exercise of this consent. The initial Management Plan shall be reviewed by the General Manager in consultation with the Neighbourhood Liaison Group. The adverse environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 1(b), shall be no greater than those arising from the implementation of the draft plan provided with the application dated May 1998 and in any case shall be within the limits set by the conditions on this consent;

   b) the Management Plan shall be updated at not greater than two yearly intervals, in consultation with the General Manager, Taranaki Regional Council, and the Neighbourhood Liaison Group;

   c) the consent holder shall adhere to and comply with the procedures, requirements, obligations and all other matters specified in the management plan, unless it can be demonstrated to the reasonable satisfaction of the General Manager, Taranaki Regional Council, that any changes in those procedures, requirements, and obligations will result in the same or any lesser adverse environmental effect than already allowed; and

   d) in case of any contradiction between the management plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

2. That the construction and maintenance authorised by this consent, in conjunction with the exercise of any other consent associated with the landfill, shall not give rise to all or any of the following effects in the unnamed tributaries of the Waingongoro River at the western boundary of the site:

   a) the production of 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 freshwater unsuitable for consumption by farm animals; and

   e) any significant adverse effects on aquatic life.

3. That the earthworks and construction associated with the erection, placement and maintenance of structures shall be designed, constructed and maintained so as to minimise instability of the stream banks and the surrounding land.

4. That the consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the structures.

5. That the consent holder shall minimise disturbance to riparian vegetation during the exercise of this consent, and that any areas of such vegetation disturbed shall be reinstated and additional areas planted within the site in accordance with those areas shown in Figures 5a, 5b, 5c, and 5d of the Assessment of Environmental Effects accompanying the application dated May 1998.

6. That the consent holder shall maintain and comply with an Annual Monitoring Plan prepared to the reasonable satisfaction of the General Manager, Taranaki Regional Council and prepared in consultation with the Neighbourhood Liaison Group. The Annual Monitoring Plan may be amended by the General Manager following consultation with the consent holder. The initial Monitoring Plan is to be received by the General Manager, Taranaki Regional Council, at least six months prior to any streambed structure construction under this consent. The initial Monitoring Plan shall describe in detail practices and sites for water monitoring.

7. That the construction, installation, placement, integrity and expected performance of the structures in the streambeds on any part of the site shall be certified by a registered engineer, a copy of such certification to be provided to the General Manager, Taranaki Regional Council, prior to and on completion of the construction of any structures in those areas.

8. That the consent holder shall remove any structure(s) in waterways and reinstate the area if and when any structure(s) is no longer required.

9. That the consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least once per year, with representatives of the Neighbourhood Liaison Group to discuss any matter relating to the exercise of this resource consent, in order to facilitate ongoing consultation, such meetings to be according to the following schedule:

   a) one month prior to the exercise of this consent;

   b) thereafter at intervals of three months for the first eighteen months after the date of exercise;

   c) thereafter at one interval of no more than six months; and

   d) thereafter at intervals of no more than twelve months;

   unless all parties agree that changes to the intervals are acceptable.

   The Technical Adviser may attend one meeting per year for the first six years and thereafter at a frequency determined by the General Manager, Taranaki Regional Council.

10. That this consent shall lapse on the expiry of twenty [20] years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

11. That the consent holder shall not apply for any further variation of its resource consent seeking to permit the discharge of waste into the Eltham landfill from beyond Taranaki Region (i.e. beyond the waste-stream presently accepted by New Plymouth, South Taranaki and Stratford District Councils) and for avoidance of doubt includes the peripheral townships of Awakino and Mokau. Any further variations will be restricted to health and safety and/or applications to enhance the environmental performance of the Eltham landfill due to improvements in engineering methods and available technology relevant to landfill construction and operation or as a result of monitoring.

12. That the Taranaki Regional Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent June 2005, June 2011, June 2017, December 2017, June 2018, June 2019, June 2023, and June 2029 and within 18 months of the exercise of this consent, for the purpose of:

    i) ensuring the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 6 of this consent; and
    ii) ensuring the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the construction and maintenance of structures.

    The review of conditions may allow for:

    a) modification of the Monitoring Programme and methods of implementation outlined in Condition 6 of this consent; and
    b) deletion, additions or changes to Condition 2.

Signed at Stratford on 24 August 2017

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management