

NPDC Colson Road Landfill
Monitoring Programme
Annual Report
2020-2021

Technical Report 2021-97



Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

The New Plymouth District Council (NPDC) operates a regional landfill located on Colson Road, New Plymouth, in the Waiwhakaiho catchment. During the year under review, the landfill was continuing to fill Stage 3 of the site which has a design capacity of approximately 800,000 m³. Stages 1 and 2 have been closed and are fully reinstated. This report for the period July 2020 to June 2021 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess NPDC's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of NPDC's activities.

During the monitoring period, NPDC demonstrated an overall good level of environmental performance and improvement was required in their administrative performance.

NPDC holds nine resource consents, which include a total of 113 conditions setting out the requirements that NPDC must satisfy. NPDC holds one consent to discharge uncontaminated stormwater into the Puremu Stream, two consents to discharge contaminated stormwater and minor amounts of leachate into the Puremu Stream, two consents to discharge emissions into the air, one consent to discharge solids onto and into land and two consent to discharge stormwater from earthworks, one of which was granted during the year under review. NPDC also holds one consent to divert water.

The Council's monitoring programme for the year under review included 12 routine compliance monitoring inspections, eight stormwater/discharge samples, 22 surface water samples, seven groundwater samples, two biomonitoring surveys of receiving waters, and four ambient air quality surveys. NPDC also collected eight leachate samples and six under liner drainage samples for physicochemical analysis.

Inspection issues found that the site was generally well managed during the year under review, however continued attention to the installation and maintenance of localised erosion and sediment controls is required.

The issue of cap management and maintenance on Stage 2 remained unresolved at the end of the monitoring period. Extensive investigations into the cap depth and compaction were carried out during the 2018-2019 year and the remediation necessary was identified. It was found that there were areas where the cap depth needed to be increased. An abatement notice was issued allowing NPDC until March 2020 to complete the work so that the appropriate methodology could be developed and then be undertaken during the next dry weather construction season. It was agreed that this could be delayed to prioritise working on the Stage 3 cap following the landfill closure to municipal waste (August 2019) and special waste (October 2020) on the basis that this would minimise the potential discharge of contaminants from the site as a whole. The due date on the abatement notice was extended to March 2022.

An abatement notice was issued following confirmation that three of the groundwater monitoring bores had been compromised. The locations and depths of the replacement bores were agreed and these were installed during the year under review. A variation to consent was granted to update the requirements around the installation and maintenance of a groundwater monitoring network. The abatement notice was complied with.

Groundwater and under liner drainage sampling indicated that although there is no significant contamination occurring in the local aquifer as a result of the landfill's presence, there are emerging trends of increasing, but still low level, concentrations of chloride and nitrate/nitrite nitrogen in some bores and a number of parameters in the under liner drainage. An abatement notice has been issued and it is recommended that the monitoring programme be expanded so that the potential for future adverse effects can be evaluated. The abatement notice has an extended date of 30 April 2023 so that these potential effects can be taken into account during an early consent renewal application.

Chemical and bacteriological monitoring of the Puremu and Manganaha Streams found that the receiving water quality criteria on the consents were met for the majority of parameters at the time of the three scheduled sampling surveys. The exceptions to this were consent exceedances of the ammoniacal nitrogen

concentration at the compliance point as provided for by both consent 2370-3 (on three occasions) and consent 4619-1 (on two occasions). Investigations by NPDC identified the likely source of this contamination and at the time of writing this report drainage works had been undertaken to resolve the issue. During the year under review there were no confirmed non-compliances with the manganese concentrations in the receiving waters, however these did remain elevated and further investigation may be required to ensure continued consent compliance.

Overall, both biological monitoring surveys indicated that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effect on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream.

Air quality monitoring showed that there were no significant adverse effects in relation to suspended particulates, dust deposition rates or odour beyond the site boundary.

An enclosed gas flare system was installed for air quality control during the 2017-2018 monitoring period and there were no substantiated odour complaints received during the 2020-2021 period that were associated with the Colson Road landfill.

Overall, NPDC demonstrated a good level of environmental performance, however an improvement is required in their administrative performance and compliance with the resource consents as defined in Section 1.1.4. During the year under review there were on-going, and still unresolved, issues with the compliance of the cap on Stage 2, with an abatement notice in place requiring the works to be undertaken by 14 March 2022. Two abatement notices were also issued in relation to groundwater monitoring bore maintenance, water quality changes in the groundwater in the under liner drain, and monitoring plan requirements. On the whole, management of the on-going activities at the site was good. However, there appear to be some legacy issues that are affecting the water quality in the receiving environment. Although these have resulted in some consent non-compliances, they have not resulted in any significant adverse effects during the year under review. Monitoring requirements have been revised and evaluation is on-going. Additional investigations are also being undertaken by NPDC, when required, to ensure that any appropriate interventions are implemented where improvements are required.

For reference, in the 2020-2021 year, consent holders were found to achieve a high level of environmental performance and compliance for 86% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 11% of the consents, a good level of environmental performance and compliance was achieved.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance had improved. However, in the year under review and in the previous year, there is still an improvement required with their administrative performance and compliance with some consent conditions.

This report includes recommendations for the 2021-2022 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 2020 to June 2021 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by New Plymouth District Council (NPDC). NPDC operated a regional landfill situated on Colson Road, New Plymouth, in the Waiwhakaiho catchment that ceased accepting waste during the year under review and is now in the process of being capped.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by NPDC that relate to discharges of water, discharge to land, a stream diversion within the Waiwhakaiho catchment, and the two air discharge permits held by NPDC to cover emissions to air from the Colson Road landfill.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of NPDC's use of water, land and air, and is the 21st site specific Annual Report by the Council for NPDC covering only this site. Prior to this, during the period from 1990-1999, the Council produced ten combined NPDC landfills' Annual Reports that included the Colson Road landfill.

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 through annual programmes;
- the resource consents held by NPDC in the Waiwhakaiho catchment that relate to the Colson Road landfill;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Colson Road landfill.

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

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

Section 4 presents recommendations to be implemented in the 2020-2021 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

- a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;

- b. physical effects on the locality, including landscape, amenity and visual effects;
- c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
- e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

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

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

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

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

Environmental Performance

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

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

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;

- Strong odour beyond boundary but no residential properties or other recipient nearby.

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

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

Administrative performance

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

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

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

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

For reference, in the 2020-2021 year, consent holders were found to achieve a high level of environmental performance and compliance for 86% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 11% of the consents, a good level of environmental performance and compliance was achieved.¹

1.2 Process description

The site no longer accepts wastes and is in the process of being closed in accordance with the conditions of the consent and the Colson Road Regional Landfill Management Plan, prepared by NPDC, and approved by Council.

General and municipal waste was discharged to Stage 3 of the operation until early August 2019, with the site re-opening for special waste only later that month. The Council was informed early of NPDC's intent to continue to use the site for the disposal of special waste only (within the existing conditions of the various consents), and a significant amount of consultation occurred during the 2018-2019 year around how this could be managed in such a way as to continue to comply with the conditions of the existing consents. During the year under review, the site accepted special waste only, with this activity ceasing in October 2020.

¹ The Council has used these compliance grading criteria for 17 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

The special waste disposal cell is located on top of the Stage 3 towards the southern end of the landfill. A two meter deep clay cell was constructed that contained leachate collection lines, which were linked to the Stage 3 leachate collection system. Prior notification was required for the customers wanting to dispose of special waste. Pits, which were generally sized to take only a single day's waste, were dug into the clay cell. The cell was covered at the end of the day.

Daily operations at the site are governed by the requirements contained in the Colson Road Regional Landfill Management Plan, which is written to ensure operations comply with the requirements of the consent and that effects are minimised. The plan is reviewed annually and updated as required.

When the landfill was fully operational, wastes originating from municipal refuse kerbside collection, the Colson Road transfer station, other municipal transfer stations around the region and commercial operators were discharged to the landfill. As of December 2007 Colson Road was the sole operating landfill in the Taranaki region. Once the waste was discharged it was compacted and covered daily with clay or a suitable alternative as per the requirements of the management plan.

An aerial plan of the site is shown in Figure 1.

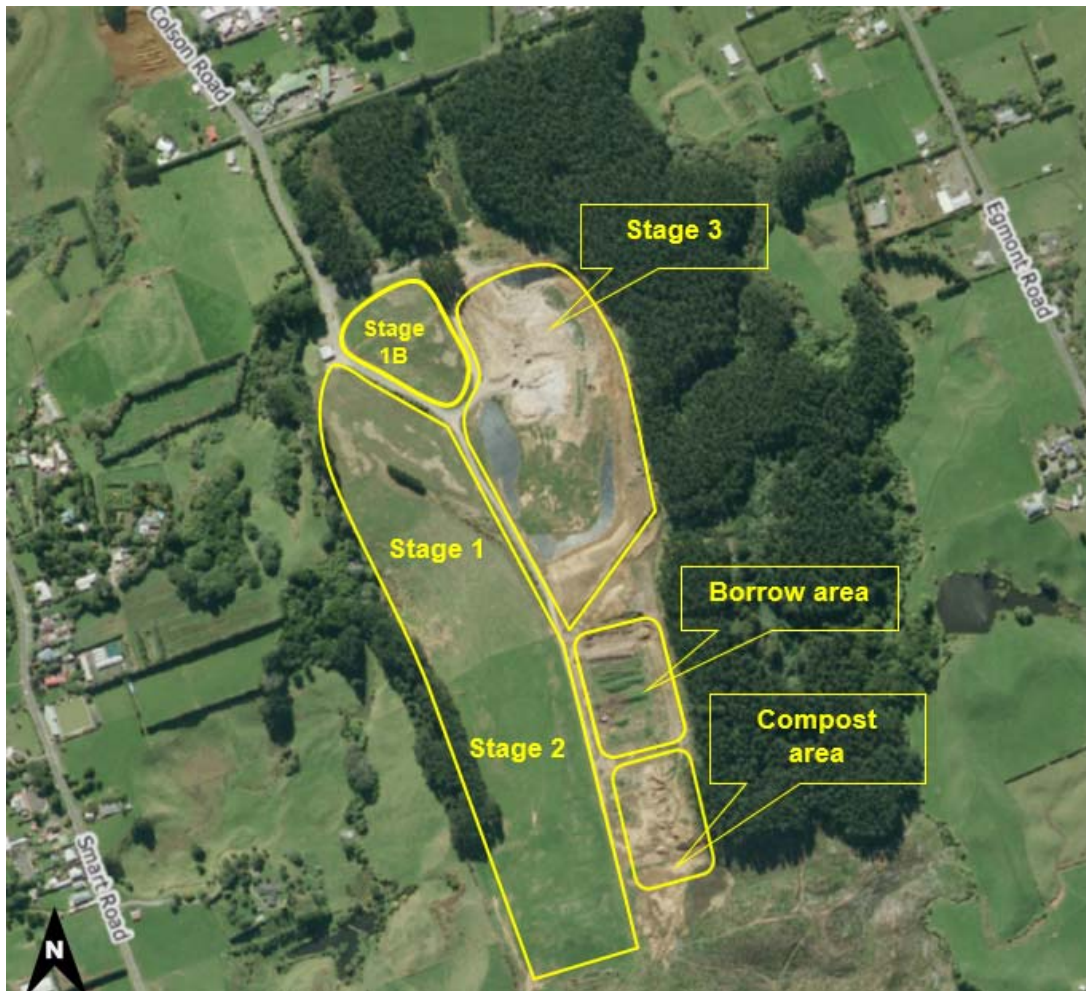


Figure 1 Aerial view of the Colson Road landfill

The Leachate from Stages 2 and 3 is collected and directed to the New Plymouth wastewater treatment plant, along with contaminated stormwater from Stage 3.

Contouring, preparation work and the application of the final cap has commenced (Photo 1 and Photo 2). A site closure plan has been prepared for NPDC that has been reviewed and accepted by Council. This is discussed further in Section 2.1.3.



Photo 1 Finished and partially stabilised cap on the northern batter of Stage 3, April 2021



Photo 2 Application of top soil on north-eastern batter of Stage 3, April 2021

To enable sufficient cover material to be accessed from within the property boundary, works have been undertaken in the south-eastern area of the site, in the composting area. These works included installing drainage around the composting area previously occupied by Return2Earth, allowing Revital to relocate to the southern end of the composting area, so that additional cover material could be safely accessed and borrowed from the northern end of the composting area. Sediment discharges from the borrow area are treated by a separate sediment pond (Photo 7, page 27).

The sediment treatment system for Stage 3 was upgraded during the year under review. This was undertaken following an analysis of the erosion and sediment control measures in place at the site and associated recommendations. These upgrades included the addition of a pretreatment pond (Photo 3) prior to the large silt pond and floating decants in the large silt pond (Photo 12, page 35).



Photo 3 Pretreatment pond for large silt pond, May 2021

1.2.1 Operational history relevant to on-going discharges and emissions

Waste disposal at this site occurred from the 1980's to October 2020, with the site developed for use in a number of stages.

Stage 1A is on the western side of the central access road and filled a valley on the western side of the property and was operational in the 1970's and 1980's. Landfilling methodology was in accordance with the then NPDC's Operative District Plan. The area was not lined, but did have a leachate drainage system that discharged to the sewerage system.

Stage 1B is on the eastern side of the central access road between the northern ends of Stage 1A and Stage 3. This stage involved the development of a valley directly to the east of the site weighbridge, and was developed to provide additional landfilling space to cover the period between the closure of Stage 1A and the granting of the consents for Stages 2 and/or Stage 3. Landfilling methodology was in accordance with

the conditions applying to the development of Stage 1A. The finished landform was capped and profiled consistent with modern landfilling practice and was subsequently planted with pine trees to act as a visual barrier for Stage 3.

Stage 2 was an overlay of Stage 1 and was established on top of a 600 mm Taranaki ash (clay) liner. Leachate collection drains were installed to drain leachate to the leachate pump station. This area was operational in the mid to late 1990's. At the time of closure Stage 2 was capped, with Stage 1 being recapped and reshaped with excess cut from the Stage 3 valley. This ensured that the entire landfill footprint on the western side of the property was capped and profiled consistent with modern landfill practice.

Construction of Stage 3 began in 1999, with filling commencing in June 2002. This stage has a fully engineered liner consisting of high density polyethylene (HDPE) laid over compacted clay. Under liner drainage was also installed. This discharges to a large stormwater detention pond at the northern end of the site. Leachate is collected in porous pipes that have been put down in herring bone configuration over the polyethylene liner. On 12 July 2005, the waste at the southern end of Stage 3 slumped a distance of 8 to 10 metres, with the waste also rotating within the lined area. The slip involved 50,000 tonnes of compacted refuse. An operator on site at the time of the slip described the motion of the waste as "sloshing backwards and forwards for about 30 seconds". This resulted in a number of tears in the liner that were visible above the level of the settled refuse. All but one of the tears were considered to be due to items in the refuse puncturing and ripping the liner during the slump, with only one tear that may have been as a result of the liner tearing due to being stretched. All of the visible tears were repaired. With the 300 mm clay cover over acting to protect the liner in the lower area of the landfill, it was considered reasonable to assume that damage under the waste lower down may have been less severe. It was agreed that 18 months of monitoring of the water quality in the under liner drainage would occur prior to attempting to remove the waste to visually inspect the liner. This monitoring did not detect any changes that would indicate contaminants escaping the landfill through the liner. Therefore removal of the waste and a visual inspection was not considered necessary at that time, but that monitoring of the under liner groundwater quality would continue. In terms of the leachate collection system, it was found that movement of the refuse resulted in issues with the integrity of the leachate system. Although the leachate line was in good condition up to 130 m from the northern end of the landfill, under the north eastern segment, beyond that it was compromised. These factors resulted in wet conditions developing in two areas within the landfill footprint. Bentonite matting was utilised and a secondary leachate drainage system was constructed on top of the clay cover over the slumped refuse in the southern end of the landfill. The layout of the leachate drains, as surveyed in September 2006, are shown in Figure 2.

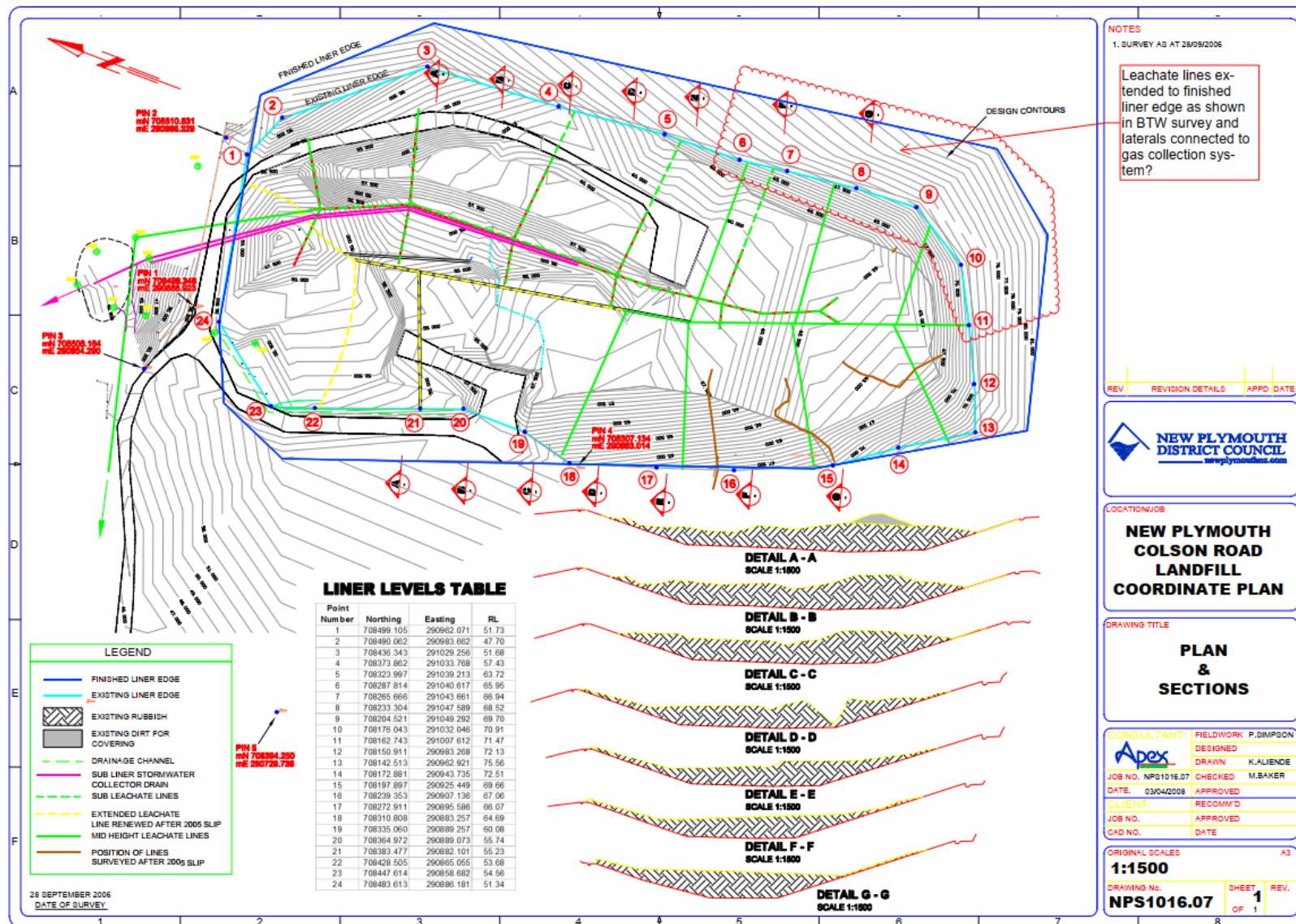


Figure 2 Location of leachate and under liner groundwater collection lines

During the 2013-2014 year, the lining of Stage 3 was completed so that the liner covered Stage 3's entire footprint (Photo 4). From this point on, there was an increase in the amount of potentially contaminated stormwater generated due to the increase in the lined and filled area, and this was therefore directed to the leachate collection system for discharge via the New Plymouth wastewater treatment plant. From this point in time, the volumes of leachate/contaminated stormwater generated exceeded the instantaneous capacity of the pipe to the waste water treatment plant on occasion. Therefore the flow from Stage 3 to the leachate system was controlled via a shut off valve to prevent overflows to the Puremu Stream tributaries, when required. Under these circumstances excess leachate/contaminated stormwater is stored within Stage 3 of the landfill.



Photo 4 Stage 3 extension works, February 2011

With respect to air discharges from the site, the landfill had been operated for most of its life without significant off site problems, but during the 2014-2015 period, 20 complaints were received regarding odours from the landfill. The Council worked with NPDC to target on site odour sources, whilst a consultant was engaged by NPDC to provide expert advice on remedial actions and longer term solutions. A range of mitigations measures were implemented by NPDC that had been recommended by the consultant as a staged approach to addressing the odour issue, these included remediation in areas of the intermediate cover, capping the open ends of the lateral leachate lines, improved management of the special waste pits and the installation of fixed deodorant sprayers and an automated spray system.

During 2017-2018 a fully enclosed gas flare was installed at the site. It is noted that although the landfill is no longer accepting waste, the landfill could continue to produce potentially odorous gas for up to 30 years post closure.

Commissioning of the landfill gas management system occurred during January to March 2018, with operational and monitoring procedures developed to ensure the gas system was managed effectively.

NPDC operations staff have been provided with training in order to carry out operation of the system in a safe and effective manner, while ongoing support and maintenance is provided by consultants.



Photo 5 Leachate pipes feeding into the gas collection system



Figure 3 As built drawing of the stage 1 landfill gas collection system

There has been a noticeable reduction in odour around the landfill perimeter since all of the above measures have been initiated and the operation of the flare began.



Photo 6 The fully enclosed flare

1.3 Resource consents

NPDC holds nine resource consents in relation to the Colson Road landfill, 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 in Appendix I, as are copies of all permits held by NPDC during the period under review.

The existing earthworks consent for the Stage 3 area (**6177-1**) expired on 1 June 2020. An application to renew this consent was received on 17 February 2020. Section 124 of the RMA provides for consent holder to continue to operate under the terms and conditions of their existing consent until a decision is made on the renewal. As the application was received between three and six months prior to the expiry of the consent, the Council exercised its discretion to allow NPDC to do so.

During the year under review, a consent application was received to provide for the discharge of stormwater and sediment associated with the earthworks required to remediate the Stage 2 cap.

NPDC requested that the applications for both of these consents be put on hold to allow time for a Cultural Impact Statement to be provided in support of the applications. The applications remained on hold at the end of the year under review.

An application for change to condition 1 of consent 4621-1 was received on 1 April 2021. The change related to replacing the original condition, which required the maintenance of specified bores, to a requirement to install and maintain bores that meet a specified standard, at locations approved by the Council, to enable monitoring to determine changes in groundwater quality.

Table 1 Consents held by NPDC that relate to the Colson Road landfill

Consent number	Purpose	Granted	Review	Expires
<i>Water discharge permits</i>				
2370-3	To discharge leachate and contaminated stormwater from area A to the Puremu Stream	March 2003	June 2020	June 2026
4619-1	To discharge treated stormwater and minor amounts of leachate from areas B1, B2, C1 & C2 to groundwater and the Puremu Stream	March 1999	-	1 June 2025
4620-1	To discharge uncontaminated stormwater from areas B1, B2, C1 and C2 into the Puremu Stream	March 1999	-	1 June 2025
6177-1	To discharge stormwater from earthworks	June 2003	-	Expired – S.124 protection
10804-1.0	To discharge stormwater and sediment arising from earthworks into an unnamed tributary of the Puremu Stream	Feb 2020	June 2022	1 June 2026
<i>Air discharge permit</i>				
4622-1	To discharge emissions to air from composting	March 1999	-	1 June 2025
4779-1.1	To discharge emissions to air from landfilling	Jan 2017*	-	June 2026
<i>Discharges of waste to land</i>				
4621-1	To discharge contaminants onto and into land in areas B1, C1 and C2	Jan 2010	-	replaced 4 May 2021
4621-1.1	To discharge contaminants onto and into land in areas B1, C1 and C2	May 2021		1 June 2025

Consent number	Purpose	Granted	Review	Expires
<i>Land use permits</i>				
0226-1	To divert the Puremu Stream by placing a culvert to provide road access	Oct 1986	-	Oct 2026

Key Commencement date of varied consent

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 Colson Road landfill site consisted of five primary components, as described in Sections 1.4.2 to 1.4.6. A summary is also provided in Table 2.

Table 2 Summary of monitoring activity for 2020-2021

Activity	Number
Inspections	12
Discharge samples	1
Stormwater samples	7
Receiving water samples	22
Groundwater samples	7
Air deposition samples	11
Ambient methane readings	22
Ambient hydrogen sulphide readings	22
Ambient PM ₁₀ readings	22
Biomonitoring surveys	2

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;
- in 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.

During the year under review NPDC commissioned a consultant to prepare a number of reports that were provided to Council. These included:

- An analysis of the erosion and sediment controls at the site provided in July 2020. This was reviewed within the Council.
- The closure plan for Stage 3 provided in December 2020. Council had a peer review of the draft report undertaken.

1.4.3 Site inspections

Twelve routine monitoring inspections were undertaken at the Colson Road landfill during the monitoring period. With regard to consents for the discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on site processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by the NPDC were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects. An additional inspection was also carried out in relation to a specific special waste activity that was undertaken during the year under review.

1.4.4 Chemical sampling

The Council undertook sampling of both the discharges from the site and the water quality upstream and downstream of the discharge points and mixing zones. Water quality and discharge sampling sites are shown in Figure 4.

The Puremu Stream, Manganaha Stream, and stormwater were all sampled on three occasions during the period under review. An additional survey of the Puremu Stream and stormwater discharges was also carried out following a consent non-compliance. There were no discharges from the composting area found at the time of inspection or at the time of the sampling survey. Therefore a sample was collected from the pond system on one occasion. The samples were analysed for a range of parameters including ammoniacal nitrogen, unionised ammonia, suspended solids, conductivity, and metals.

Groundwater in the vicinity of the landfill was sampled on one occasion. The groundwater sampling sites are shown in Figure 5. These bores were analysed for a range of physicochemical parameters including semi volatile organic compounds (SVOC) and metals.

1.4.5 Air quality

The Council undertook sampling of the ambient air quality in the neighbourhood.

Six deposition gauges were placed at selected sites in the vicinity of the landfill and at the landfill on two occasions, and the collected samples analysed for solids.

Three ambient suspended particulate, methane and hydrogen sulphide surveys were also undertaken. The air monitoring sites are shown in Figure 6.

1.4.6 Biomonitoring surveys

Biological surveys were performed on two occasions in the Puremu Stream (three sites) and Manganaha Stream (two sites) to determine whether or not the discharges from the site have had a detrimental effect upon the communities of the streams.

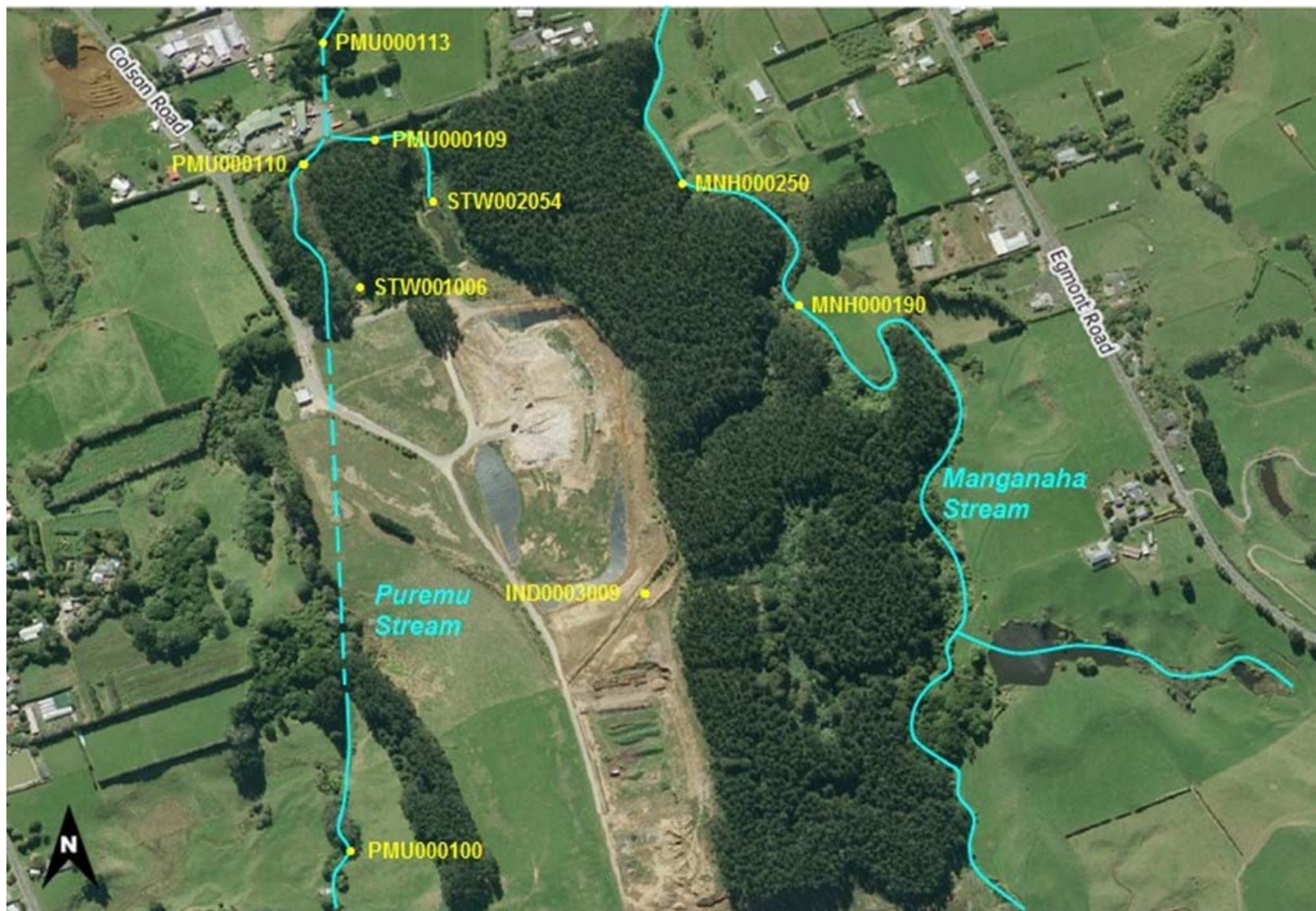


Figure 4 Aerial photo showing the stormwater and receiving water sampling sites at Colson Road landfill

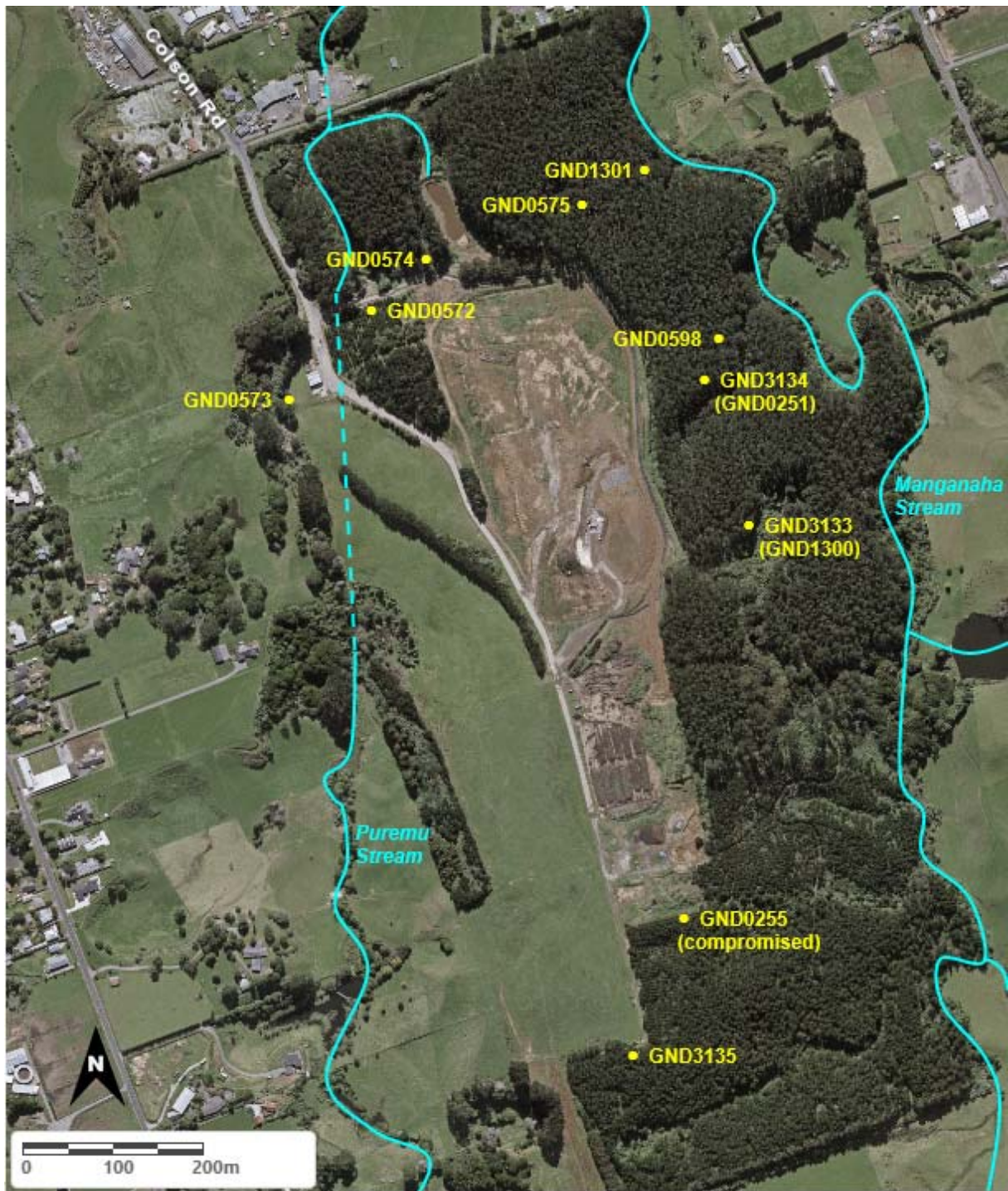


Figure 5 Aerial view showing the groundwater sampling sites at Colson Road landfill

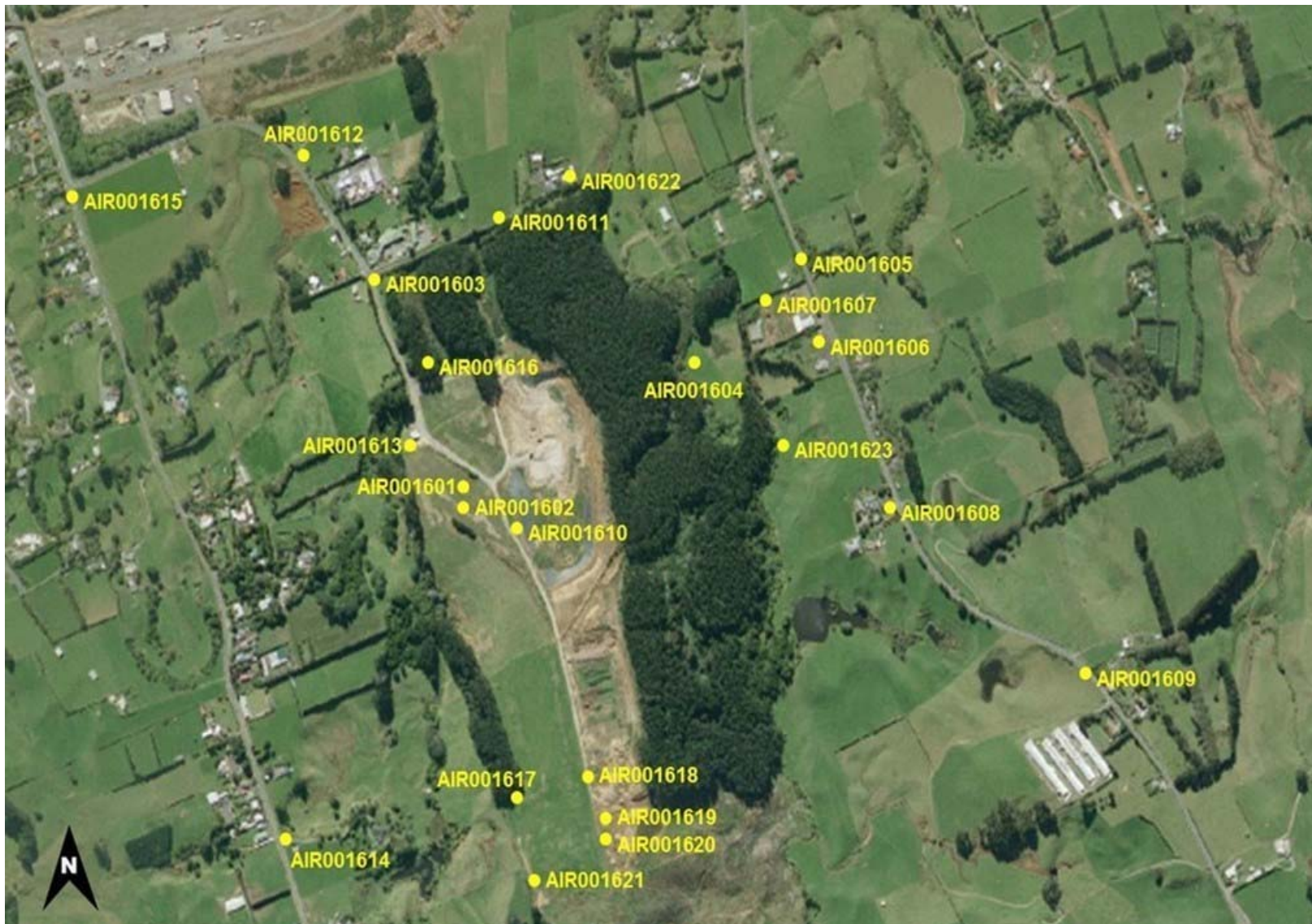


Figure 6 Aerial view showing the positions of air quality monitoring sites at and around Colson Road landfill

2 Results

2.1 Programme liaison and management

2.1.1 Erosion and sediment control analysis

This document was received on 14 July 2020. The report assessed the current treatment capacity of the existing erosion and sediment controls at the site and stated that:

- The main sediment retention pond (SRP) at the northern end of the site was estimated to provide effective treatment for stormwater generated from a 5 ha catchment area. This was due to the SRP's lack of a proper fore bay, the large amount of dead storage, its depth and the non-standard decant.
- The small western ponds were assessed as decanting earth bunds (DEB). It was anticipated that this DEB would not provide effective sediment treatment for any catchment size. This was due to the DEB's small size, its length-width-depth ratios and lack of a proper decant.

A number of recommendations were made that would ensure that adequate erosion and sediment controls were in place for the winter of 2020. These are summarised in Figure 7.

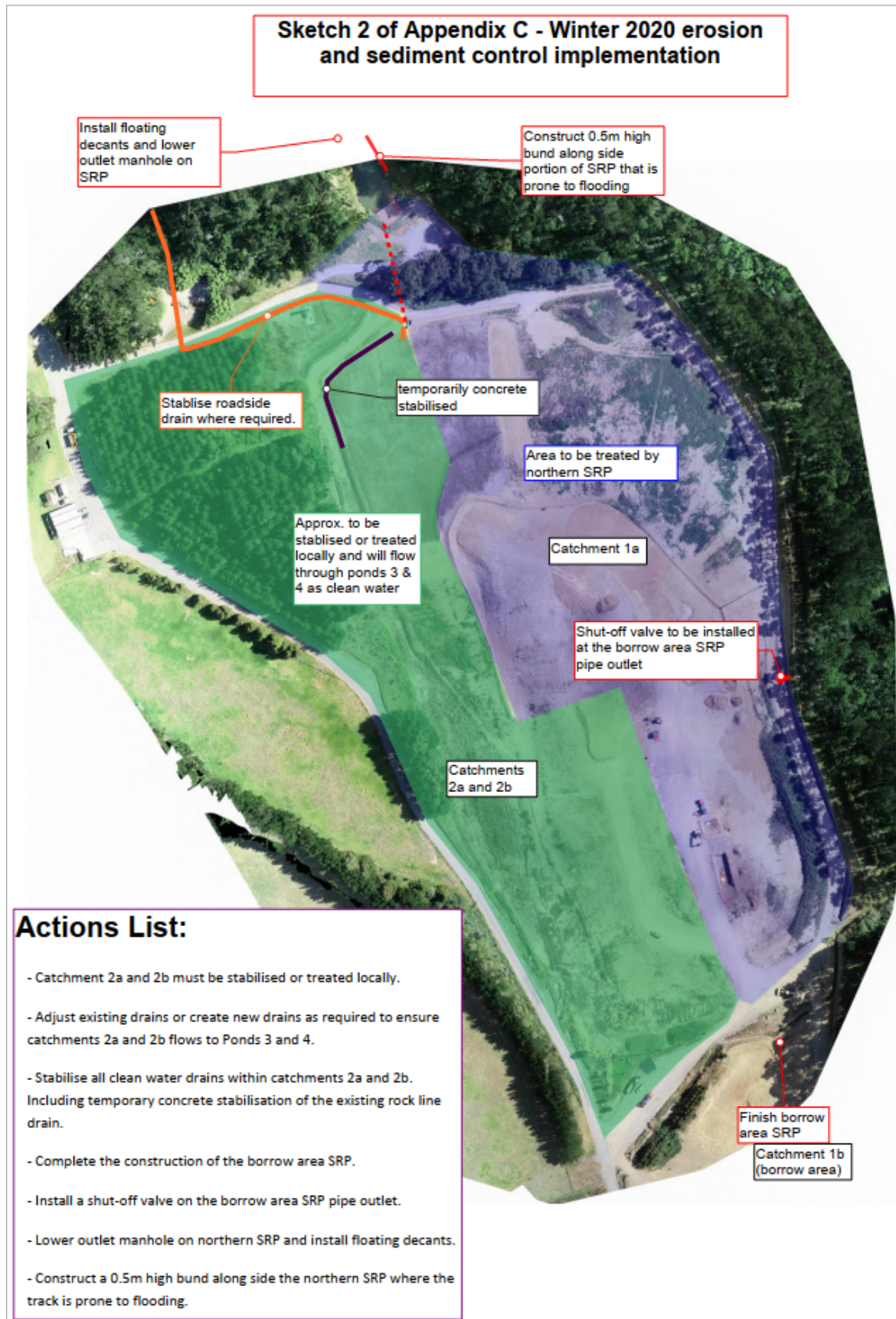


Figure 7 Summary of winter 2020 erosion and sediment control recommendations

2.1.2 Landfill management and contingency plans

Daily operations at the site are governed by the requirements contained in the Colson Road Regional Landfill Management Plan, which the consents require to be updated at not less than yearly intervals.

A contingency plan is also required for the site by special condition 7 of consent 6177-1.

NPDC reviewed the management plan early in the year under review. The draft plan was provided in August 2020. The Council requested that some minor changes and/or clarifications be made to the draft plan. This included updating the details around the stormwater management requirements to ensure that the installation and maintenance of the additional treatment systems recommended in the erosion and sediment control analysis was covered in the landfill management plan. The draft plan was revised with the final version being received and accepted by Council in September 2020.

The contingency planning for the Colson Road landfill is included in the NPDC Three Waters and Resource Recovery Incident Response Plan. The plan in place during the year under review was updated by NPDC in February 2019.

2.1.3 Stage 3 closure plan

The draft closure plan was provided to Council on 22 December 2020. Due to the technical nature of the plan, it was agreed that this would be subject to an external independent expert peer review. The principle finding of the review was that the proposed overall capping depth is likely to prove insufficient for the long term function of the site. It was recommended that NPDC look to increase the cap depth and in particular include a subsoil layer between the compacted clay and the topsoil. Additional suggestions were made around stormwater drains and landfill gas collection. In other respects the proposals were considered to be good practice and functional. NPDC provided additional clarification where requested and additional discussion on the suitability of design for local conditions. It was confirmed that the concerns raised about potential issues that could have an impact on the long term function of the cap were either not relevant given the local conditions and experience with the Stage 2 cap or could be adequately addressed as part of the monitoring, maintenance, contingency planning and restrictions that would be specified in the Aftercare Plan for the site. It has been agreed with NPDC that the aftercare plan will be provided prior to the completion of the capping activities.

2.1.4 Colson Road Landfill Liaison Committee

A liaison committee comprising representatives of NPDC, the Council, landfill contractor, and neighbours of the landfill was set up in 1999 as required by condition 32 of the land use consent for Colson Road landfill. The purpose of the committee is to facilitate the raising of concerns by the neighbours in relation to the landfill operations and to ensure that the landfill's neighbours are kept abreast of the development of the landfill site.

It is also a requirement of condition 11 of consent 4779 that the consent holder, staff of the Council, submitters to the application and any other party (at the Council's discretion) meet at least once per year. The liaison committee meetings also fulfil this consent requirement.

During the period under review, the committee met on 22 July and 18 November 2019 and 17 March 2021. This periodicity of meetings was agreed by all parties. The meetings covered site development progress, operations at the landfill, and future activities. It is also an opportunity for submitters and neighbours to be kept informed of any issues arising at the site, and mitigation measures NPDC is putting in place. Attendees of the meeting agree that they are worthwhile and provide a useful forum for neighbours to provide feedback to NPDC.

The Colson Road landfill liaison committee has been very successful to date and will continue in its present format for the 2021-2022 monitoring period.

2.1.5 Independent consultant's reports

A site inspection was undertaken by WAI Environmental (independent consultants) on 2 September 2020.

The lasting impression was of a neat and tidy operation by an operator who is paying attention to detail. There was practically no litter on the site and no seagulls were present. Stage 3 was now almost entirely covered by soil and awaited final cover. Pits had been dug to accept special waste such as asbestos although NPDC advised that the amount of waste dealt with had reduced to less than 2,000 tonnes a year.

In particular, the report of the visit noted that:

- Rehabilitation and earthworks associated with landfill closure is complete on Stages 1 and 2 although the planned remedial works to rectify the thickness of the final cover on Stage 2 has yet to start.
- No landfill gas odours were noted at the landfill. Although there appeared to have been a short power outage of the flare around 17 August, it appeared that the landfill gas flow was far more consistent than it has been in previous visits.
- Both fences and drainage ditches were clear of litter.
- Capital Works for Stage 3 are complete. All that remained was for the landfill to receive final cover. Restorative earthworks are still required on Stage 2. A new silt pond was under construction to the south of Stage 3 to control silt during excavation of the borrow area. A discharge from this pond has been constructed lower in the catchment since the visit through a directionally drilled pipeline.
- No landfilling operations were taking place although there were signs directing disposal of asbestos and a pit for the acceptance of special waste. A number of bunds and benches had been constructed to control the movement of surface water over the landfill and this is to be commended. There were collapsible drains which expand to accommodate the flow, direct the rainwater to the stormwater cutoff drains.
- There were no recent recorded complaints.
- A composting operation continues to the very south of the landfill designation but is now well clear of the landfilling operations and does not conflict with them.
- The leachate pumping station appeared to be operating satisfactorily. The over-excavated material had been replaced with fill to bring the base of the pond up to the correct level and ensure that leachate does not remain in the pond, but can all be disposed of via the pumping station. The pond was empty. A number of historic leachate breakouts have occurred on the sloping sides of the landfill in the past. None were noticed during the visit. This appeared to be under control.

The consultant recommended a reduction in the frequency of visits going forward. It was recommended that, as it was proposed to close the landfill in October 2020, this frequency be reduced to once a year, with a requirement for the NPDC's Engineering Manager to report any major changes in refuse acceptance levels or earthworks which may trigger an additional visit. NPDC consulted with the Council prior to accepting this recommendation. It was confirmed that there are no specific requirements in the Council's consents in relation to the independent consultant's inspections, therefore the Council had no objection to this reduction in frequency.

2.2 Inspections

Twelve routine inspections were undertaken during the 2020-2021 monitoring period. Photos were taken on each inspection and these were shared with relevant NPDC staff and the contractor following each inspection.

27 July 2020

The weather was cold but fine and sunny with a light southerly wind. There had been no rain in the previous two days. However, it had been quite wet in the week prior to the inspection, with 37 mm of rain recorded at the Hillsborough weather station.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate was clear of debris. The stream was slightly turbid and flowing at a moderate to high level with no scums, sheens, foam or other visible effects noted in the receiving water. The eastern tributary was also slightly turbid, with no heterotrophic growths observed.

Silt socks were in place around the drains at the weighbridge. The ground surface of the entire site was damp, but there was no water flowing in any of the bunds or drains.

There was a digger turning aged piles in the compost area. The area was quite full, mostly with aged product, although there was some fresher material present. No odours or issues with stormwater were noted.

It looked like there had been some activity happening in the borrow area earlier in the morning, but there was no activity at the time of inspection.

The old compost ponds were quite full of water but were not discharging to the outlet drain. No odours were noted. The trees previously growing along the southern side of the ponds had been removed.

The site was not open to receiving special waste. No special waste pits were noted on the main fill area.

The flare was operating. No dust or odours were noted.

There had been some work on the drainage along the northern side of the site since the June 2020 inspection. There was evidence that soil had been lost from the exposed area on the northern face during the heavy rainfall the week prior, as there was sediment observed in silt fences and bunds. This appeared to have been contained by the silt retention devices as intended, but should be removed as part of the maintenance of these devices.

The large silt pond was an orange/brown colour with a moderate to high level. The incoming flow appeared to be quite clear. A light sheen was noted near the outlet end. This flowed back together when it was disturbed, indicating a hydrocarbon sheen rather than iron oxide bacterial film. The outflow was a slightly higher flow than usual, and was fairly turbid. The stream/wetland area below the outlet was also orange/brown. No sheens or scums were observed below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. This was completely dry.

The small western silt pond was orange/brown in colour with a bright orange/red film across most of the surface. The pond had a moderate to high level, and there was a steady inflow. The small eastern pond was quite full and a small amount of discharge was overtopping the hay bales. The entire pond surface was covered in a bright orange/red film and the discharge was orange/brown.

The Puremu Stream culvert outlet was clear with a moderate to high, swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2021).
- Continue to maintain the silt detention devices to ensure their on-going effectiveness.

20 August 2020

There was no rain at the time of the inspection, however it had been raining off and on over the previous two days, with 30 mm of rain recorded at the Hillsborough weather station for the week prior to this inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate was clear of debris. The stream was very clear and flowing at a moderate level with no scums, sheens, foam or other visible effects noted in the receiving water. The side tributary was also clear, with no heterotrophic growths observed.

Silt socks were in place around the drains at the weighbridge. The entire site surface was damp with some ponded water in places but there was no flowing water in any of the bunds or drains.

There was activity in the compost area with a digger turning fresh piles. The area was quite full, mostly with aged product. No odours or issues with stormwater were noted.

A significant amount of work had occurred in the borrow area since the previous inspection. The hole was quite a bit deeper, and there was a large pile of earth off to the side. There was no activity in this area at the time of the inspection.

The old compost ponds were quite full of water but were not discharging to the outlet drain. No odours were noted. There was no water flowing along the north-eastern drain.

The site was not open to receiving special waste. There was no activity in the main fill area.

No dust or odours were noted around the flare.

It was unclear whether the sediment observed in silt fences and bunds was the same as that observed in the previous inspection, or if more recent heavy rainfall had resulted in further loss from the north face. As noted at the previous inspection, the silt retention devices appeared to be functioning as intended, but built up sediment should be removed as part of the maintenance of these devices.

The large silt pond was a very turbid orange/brown colour with a moderate to high level. The incoming flow appeared to be quite clear. Sheens were noted around the inlet and outlet ends. This flowed back together when it was disturbed, indicating a hydrocarbon sheen rather than iron oxide bacterial film. The outflow appeared to be quite clear. However, the stream/wetland area below the outlet was very turbid orange/brown. A small amount of sheen was observed immediately below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. This was empty.

The small western silt pond was orange/brown in colour. The pond had a moderate to high level and there was a small but steady inflow. The small eastern pond was quite full and, as noted in the previous inspection, a small amount of discharge was overtopping the hay bales. The stream below the pond was again turbid orange/brown.

The Puremu Stream was clear at the culvert with a moderate, swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506 (due by 15 March 2021).
- Continue to maintain the silt detention devices to ensure their on-going effectiveness.

24 September 2020

The landfill gates were locked as no one was on site that day due to the rain. As a result, the inspection was limited to the northern areas of the site.

There was no rain during the inspection. However it had been raining prior to the inspection, with approximately 20 mm of rain falling in the previous 24 hours, and 32 mm of rain recorded at the Hillsborough weather station for the week prior to the inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate was clear of debris. The stream was mostly clear and flowing at a moderate level, with no scums, sheens, foam or other visible effects noted in the receiving water. The side tributary was also fairly clear, with no heterotrophic growths observed.

The flare was operating and no dust or odours were noted.

There was water flowing through the drains and bund system along the northern side. The silt fences etcetera appeared to be working well, as all stormwater was contained and/or directed appropriately.

The large silt pond was a very turbid orange/brown colour with a moderate to high level. Incoming flow appeared to be quite clear. No sheens were observed. The outflow appeared to be quite clear, however the stream/wetland area below the outlet was turbid brown. No sheens were observed below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. There was only a small amount of ponded water in the pond.

The small western silt pond was turbid brown in colour. The pond had a moderate to high level, and there was a steady inflow coming from both inlet pipes. This appeared to be quite clear. The small eastern pond was quite full, with discharge overtopping the hay bales. The stream below the pond was again turbid orange/brown.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to maintain the silt detention devices to ensure their on-going effectiveness.

6 October 2020

The inspection was conducted during fine weather, with just 6 mm of rain recorded at the Hillsborough weather station for the week prior to the inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate was clear of debris. The stream was fairly clear and flowing at a moderate level with no scums, sheens, foam or other visible effects noted in the receiving water. No heterotrophic growths observed in the eastern tributary.

Silt socks were in place around the drains at the weighbridge. The entire site was dry with no odours noted at any time during the inspection. The landfill was open to special waste and there was a bit of activity in the main fill area. A couple of trucks were coming and going while the inspecting officer was onsite.

There was activity in the compost area. The area was quite full. The majority of this was aged product. No odours or issues with stormwater were noted.

There was no activity in the borrow area at the time of the inspection. There was evidence that work had occurred in the area since the August inspection as the hole was deeper.

The flare was operating with no dust or odours noted.

There was a small amount of ponded water in the drain at the northern toe of the landfill, but otherwise there was very little, if any, water in bunds and none of them were discharging.

The large silt pond was a turbid brown colour with a moderate level. There was a large sheen across the top of the weir at the inlet end of the pond. This flowed back together when it was disturbed, indicating a hydrocarbon sheen rather than iron oxide bacterial film. There was a small amount of inflow, which had a clear appearance over the iron oxide coating on the bed. There was suddenly increase in flow from the western pipe that was turbid and an orange/brown colour. This in comparison to the normally quite clear inflow, even after rainfall. There had been no significant rainfall for over a week, and all the bunds along the northern face were well below levels of discharging a few minutes prior to this event. NPDC subsequently contacted the contractors at the site, who confirmed that they were not undertaking any work that could have resulted in a discharge of this nature. As a single event of short duration, it was not anticipated that this would result in any significant effects on the receiving water below the pond discharge point.

There was a moderate outflow and this was quite clear. There were no sheens observed immediately below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. This was dry.

The small western silt pond was orange with a red film. The pond had a moderate to high level and there was a small but steady inflow. The small eastern pond was quite full and, a small amount of discharge was overtopping the hay bales. The stream below the pond was again turbid orange/brown.

The Puremu Stream was clear at the culvert with a moderate, swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to maintain the silt detention devices to ensure their on-going effectiveness.

3 November 2020

The inspection was conducted during fine weather, although it had rained earlier in the morning. It had also rained every day in the week prior to the inspection, with 61 mm of rain recorded at the Hillsborough weather station. There was a strong south-easterly wind blowing for the second day in a row.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate was mostly clear of debris. The stream was fairly clear and was flowing at a moderate to high level with no scums, sheens, foam or other visible effects noted in the receiving water. No heterotrophic growths observed in the eastern tributary.

Silt socks were in place around the drains at the weighbridge. No odours were noted at any time during the inspection.

There was no activity in the compost area. The area was only about half full, the majority of this was well-aged product. There was one small pile of fresher material. No odours or issues with stormwater were noted.

Machinery was operating in the borrow area, with a dump truck carting material from to the main face for capping. It appeared that this sediment treatment pond was either complete, or very close to completion,

and was looking good (Photo 7). No discharge was occurring from the old compost ponds and there was no flow observed in the drain along the north-eastern side.



Photo 7 Borrow area sediment pond, November 2020

The flare was operating with no dust or odours noted.

There was ponded water in all the bunds and drains along the northern side. There was evidence of recent flows into and out of these, but no discharges were occurring at the time of the inspection. All the retained water was clear. It was noted that the silt fences were again quite full in some places.

The large silt pond was a turbid orange/brown colour with a moderate level. There was a small area of sheen on the top eastern side of the weir. No sheens were noted anywhere in the main pond. The small amount of inflow to the weir had a clear appearance. There was a moderate outflow, and this was quite clear. The area below the outfall had the usual, brownish discolouration. There were no sheens, scums or other visible effects observed immediately below the pond outlet. No odours were noted in this area.

No odours were detected around the leachate pond. This was dry.

The small western silt pond was orange/brown. The pond had a moderate to high level and there was a moderate inflow. The small eastern pond was quite full and, again, a small amount of discharge was overtopping the hay bales. The stream below the pond was again turbid orange/brown.

The Puremu Stream was clear at the culvert with a moderate to high, swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to maintain the silt detention devices to ensure their on-going effectiveness.

14 December 2020

This was inspection focused on the northern area of the site. The inspection was conducted during fine weather, with a moderate south-easterly breeze. There was no rain the previous day, however it had rained on all the other days in the week prior to the inspection, with 54 mm of rain recorded at the Hillsborough weather station.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate had some debris present, although a decent amount of flow was still able to pass through the grate. The stream was fairly clear and flowing at a moderate to high level with no scums, sheens, foam or other visible effects noted in the receiving water. No heterotrophic growths were observed in the eastern tributary.

The flare was operating and no dust or odours were noted.

There was some ponded water in the bunds and drains along the north side of the landfill, however they were not discharging. All the retained water was clear. The silt fences were quite full in some places, but there was no evidence that they had not functioned adequately during the recent rainfall events, that is, all silt appeared to have been contained.



Photo 8 Silt fence, December 2020

The large silt pond was a turbid orange/brown colour with a moderate level. The small amount of inflow to the weir had a clear appearance. There was one small area of sheen just below the weir. There was a moderate outflow and this was quite clear. The area below the outfall had a brownish discolouration, as per usual. There were no sheens, scums or other visible effects observed immediately below the outlet. No odours were noted in the area.

No odours were detected around the leachate pond. This was quite full. The grate was clearly visible but there was no visible evidence of any outflow. The water appeared to be ponded. Staining on the bank indicated that this level had been significantly higher recently. NPDC had notified the Council in regard to this matter and this is discussed in Section 2.6

The small western silt pond was orange/brown. The pond had a moderate to high level and there was a moderate inflow. The small eastern pond was quite full and was discharging over the hay bales. The stream below the pond was turbid orange/brown.

The Puremu Stream was clear at the culvert with a moderate to high, swift flow.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to maintain the silt detention devices to ensure their on-going effectiveness.
- Ensure that the culvert above the SPCA driveway is kept clear of debris.

27 January 2021

The inspection was conducted with a focus on site stormwater management and erosion and sediment control. The weather was fine with light westerly winds. There was 19 mm of rain recorded at the Hillsborough weather station in the week prior to this inspection.

There were no off-site odours or dust issues observed prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate contained a small amount of debris. The stream was slightly cloudy and flowing at a moderate level with no scums, sheens, foam or other visible effects noted in the receiving water. No heterotrophic growths observed in the side tributary.

Silt socks were in place around the drains at the weighbridge. No odours were noted at any time during the inspection.

There was no activity in the compost area. The area was approximately half full, the majority of this was well-aged product. No issues with stormwater were noted.

Machinery was operating in the borrow area, with material being carted to the main face for final capping on Stage 3. The sediment treatment pond in this area had been well constructed. It was considered that it should be adequate to handle the stormwater generated in the borrow area.

It was noted that:

- The fore bay should be cleaned out regularly, as required, to prevent carry over into the main pond.
- Installation of a couple of 1x1x2m pre-treatment ponds would take pressure off the fore bay, if required.
- The bunds at the sides of the fore bay and along the top edge of the main pond needed to be maintained to ensure stormwater is directed appropriately and does not bypass the fore bay.
- Vegetation present in the bund directing stormwater from the composting area to the compost ponds was helpful in slowing and treating stormwater flow and should not be removed or sprayed.

There was a minor amount of dust being generated due to vehicle movements. There was evidence of a water truck having been used prior to the inspection, and this came through again during the inspection.

No discharge was occurring from the old compost ponds and no flow was observed in the drain along the north-eastern side of the landfill.

It was noted that any stormwater flowing out of the drop structure on the north-eastern side would run down that access track. This structure was servicing a large area of the top face, and it was suggested that a notch be cut in the north-eastern drain bund to direct any stormwater into the drain rather than letting it run down the access track.

It was noted that the large areas that had been hydroseeded hadn't taken, and the majority of the temporary capping on the landfill was bare of vegetation. This could therefore not be considered to be stabilised. It was recommended that the capping, application of topsoil and stabilisation (with hydroseeding plus hay mulch etcetera, depending on weather conditions) be undertaken in a staged manner so that large areas are not left exposed as they are currently. The matter of how the site is to be managed when significant rain is forecast was raised.

It was noted that silt fences along the top western side were upside down in places, most were not dug in and some were freely flapping in the wind (Photo 9).



Photo 9 Example of incorrectly installed silt fence 27 January 2021

The flare was operating with no visible emissions or odours noted.

There was ponded water in all the bunds and drains along the north side but no discharges were occurring. All of the retained water was clear. Silt fences were quite full in some places. There was evidence of flow bypassing the side of the silt fences in the drains along the edge of this area and it was noted that check dams (v-notch, made of rocks) would be more beneficial than silt fences in this area to encourage stormwater to flow along the centre of the drain and not by-pass around the sides of the silt fences.

The large silt pond was a turbid orange/brown colour with a moderate level. There was a moderate outflow and this was mostly clear. The area below the outfall was a brownish colour, as per previous inspections.

There were no sheens, scums or other visible effects found immediately below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. This was dry.

The small western silt pond was orange/brown. The pond had a moderate to high level and there was a moderate inflow. The small eastern pond was quite full and, as noted in the previous inspection, a small amount of discharge was overtopping the hay bales. The stream below the pond was again turbid orange/brown.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to ensure that silt detention devices are installed correctly and are maintained to ensure their on-going effectiveness.
- Provide further details around the progression of the works at the site in terms of how the capping activity will be undertaken and the timing of the works, including the order in which areas of the site will be capped (and approximate sizes), silt controls that will be put in place prior to working in a new area, and how the area being worked will be temporarily stabilised prior to rainfall events etcetera.

26 February 2021

The inspection was conducted in fine weather with light easterly winds. No rain had been recorded at the Hillsborough weather station in the week prior to the inspection.

There were no off-site odours or dust issues detected prior to going on site. No refuse was noted on Colson Road between the transfer station and the landfill gates.

The SPCA driveway culvert grate contained a small amount of debris. The stream was slightly cloudy and flowing at a moderate level with no scums, sheens, foam or other visible effects noted in the receiving water. No heterotrophic growths observed in the eastern tributary.

Silt socks were in place around the drains at the weighbridge. No odours were noted at any time during the inspection.

The compost area was approximately half full, the majority of this was well-aged product. Machinery was in use sorting the aged product. The area was completely dry and there was a small amount of localised dust as a result of vehicle movements.

There was no machinery operating in the borrow area at the time of the inspection. It was noted that a significant amount of soil appeared to have been relocated since the previous inspection one month prior. The sediment treatment pond was completely dry.

No discharge was occurring from the old compost ponds and no flow was observed in the drain along the north eastern side of the landfill.

No visible emissions or odours were noted around the flare.

Machinery was active over the north and eastern parts of the landfill area. Two bunds had been constructed across the north face and it appeared that these had been hydroseeded (Photo 10).



Photo 10 Hydroseeded bunds on northern face of the landfill, February 2021

There was a small amount of ponded water in all the bunds and drains along the bottom of the north side. All water was clear. Silt fencing at the bottom had been extended right along the entire length of this area. Haybales had been added at intervals in the rock bund coming down from the western side.

A fore bay in the stormwater flow path prior to the big silt pond was in the process of being constructed on the north-eastern side (Photo 11). A floating decant was to be installed in the big silt pond soon.

The large silt pond was a turbid brown/green colour with a very low level, the lowest that the inspecting officer had observed it to be. There was no outflow to the wetland/stream area below the pond. The tributary below the outfall was discoloured a greenish/brown. There were no sheens, scums or other visible effects observed immediately below the pond outlet. No odours were noted in the area.

No odours were observed around the leachate pond. This was dry.

The small western silt pond was orange/brown. The pond had a moderate level and there was a small trickle of inflow. The small eastern pond was quite full with a small amount of discharge overtopping the hay bales. The stream below the pond was turbid orange/brown.

The Puremu Stream at the culvert exit by the landfill entrance was running clear.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to ensure that silt detention devices are maintained to ensure their on-going effectiveness.



Photo 11 Fore bay being constructed for the large silt pond, February 2021

17 March 2021

The inspection was conducted in fine weather with light south-easterly winds. A total of 45 mm of rain was recorded at the Hillsborough weather station in the week prior to the inspection.

There were no off-site odours or dust issues observed prior to going on site.

The SPCA driveway culvert grate contained a small amount of debris. The stream was mostly clear and flowing at a moderate level with no scums, sheens, foam or other visible effects noted in the receiving water. No heterotrophic growths observed in the side tributary.

No odours were noted at any time during the inspection. There was a small amount of dust being generated by vehicle movements, but otherwise dust was not an issue. Dust monitoring was carried out around the site, which were within the range of 0.010 - 0.012 mg/m³.

The compost area was approximately one third full, the majority of this was well-aged product. Machinery was in use sorting aged product. The area was completely dry and there was small amount of localised dust as a result of vehicle movements. No odours were noted.

Machinery was operating in the borrow area. It was noted that a significant amount of soil appeared to have been relocated since the previous inspection approximately three weeks ago. The sediment treatment pond contained a small amount of water.

No discharge was occurring from the old compost ponds and no flow was observed in the drain along the north-eastern side of the landfill

The flare was operating with no visible emissions or odours.

The north and north-western parts of the landfill area had been grassed and covered with a hay mulch and grass was beginning to germinate. There was a small amount of ponded water in all of the bunds and drains along the bottom of the north face of the landfill. All retained stormwater was clear. Machinery was active along the eastern face, with soil from the borrow area being imported and contouring and compaction taking place.

The pre-treatment pond for the large silt pond had been completed (Figure 8). The large silt pond was a turbid brown colour with a very low level. A floating decant had been installed at the outlet (Photo 12). There was a small amount of outflow to the wetland/stream area below. The area below the outfall was discoloured a greenish/brown. There were no sheens, scums or other visible effects observed immediately below the outlet. No odours were noted in the area.



Figure 8 Completed fore bay to large silt pond, March 2021

No odours were observed around the leachate pond. This was dry.

The small western silt pond was orange/brown. The pond had a moderate level and there was a small amount of inflow. The small eastern pond was quite full with a small amount of discharge overtopping the hay bales. The stream below the pond was turbid and orange/brown.

The Puremu Stream at the culvert exit by the landfill entrance was running at a low level and was clear.



Photo 12 New floating decant system in the large silt pond, March 2021

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to ensure that silt detention devices are maintained to ensure their on-going effectiveness.

7 April 2021

The inspection was conducted in fine weather with light south-easterly winds. A total of 38 mm of rain was recorded at the Hillsborough weather station in the week prior to the inspection, with most of this rainfall occurring in one day a week prior to the inspection, with no rain in the five days preceding this inspection.

There were no off-site odours detected or dust issues observed prior to going on site.

The SPCA driveway culvert grate was covered in debris (Photo 13). Water was still slowly getting through the grate and the stream was not too backed up. The inspecting officer advised the site manager of this finding so the grate could be cleared before the heavy rain forecast in the next few days arrived. The stream was mostly clear and flowing at a moderate level with no scums, sheens, foam or other visible effects noted in the receiving water. No heterotrophic growths observed in the side tributary.

No odours or dust were noted at any time during the inspection. There was a small amount of dust being generated by the inspecting officer's vehicle movements, but otherwise dust was not an issue. Dust monitoring carried out around the site recorded an acceptable range of 0.014 - 0.017 mg/m³.

The compost area was approximately one third full, made up of approximately equal parts of fresh, aged, and well-aged product. There was no activity in this area. No odours were noted.



Photo 13 Accumulation of debris at the SPCA driveway culvert inlet, April 2021

There was no activity in the borrow area at the time of inspection. The sediment treatment pond contained a moderate amount of water. It was noted that the stormwater from the composting area had now been directed to the pond. This flows through the first of the four existing ponds and into the forebay of the borrow area silt pond.

The flare was operating with no visible emissions or odours.

There was good grass growth on the north and north-western parts of the landfill area. There was a small amount of ponded water in all of the bunds and drains along the bottom of the northern face. All retained water was clear. Silt fences along the bottom of the northern face were quite full of silt. Top soil was being spread and contoured on the eastern face.

The large silt pond was a turbid brown colour with a moderate level. The inflow had a cloudy appearance. There was a moderate amount of fairly clear outflow to the wetland/stream area. The tributary below the outfall was discoloured a greenish/brown. There were no sheens, scums or other visible effects observed immediately below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. The pond was damp, but contained no ponded water.

The small western silt pond was orange. The pond had a moderate level and there was a small amount of inflow. The small eastern pond was quite full with a small amount of discharge overtopping the hay bales. The stream below the pond was turbid orange/brown.

The Puremu Stream at the culvert exit by the landfill entrance was running at a moderate level and was clear.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.
- Continue to ensure that silt detention devices are maintained to ensure their on-going effectiveness.

- Ensure the grate by SPCA driveway is kept clear of debris.

7 May 2021

The inspection was conducted in fine weather with light easterly winds. A total of 1 mm of rain was recorded at the Hillsborough weather station in the week prior to this inspection.

There were no off-site odours detected or dust issues observed prior to going on site.

The SPCA driveway culvert grate was clear of debris and the stream was mostly clear and flowing at a low level with no scums, sheens, foam or other visible effects noted in the receiving water.

No odours were noted at any time during the inspection. There was a small amount of dust being generated by vehicle movements. Dust monitoring was carried out around the site recorded results in the range of 0.010 - 0.012 mg/m³.

The compost area was less than one quarter full. There was one small pile of fresh material, the rest being aged and well-aged product. There was no activity in this area at the time of inspection. No odours were noted.

There was no activity in the borrow area. The sediment treatment pond contained a small amount of water.

The flare was operating with no visible emissions or odours.

There was good grass growth on the north and north-western parts of the old landfill area (Photo 14). There was some ponded water in the bunds along the bottom of the north side. All the water was clear. Silt fences along the bottom of the northern face had been removed. A digger was working to fill in the drain and contour the area along the northern toe of the landfill.



Photo 14 Northern face of the landfill, May 2021

Hydroseed had been applied around the new fore bay by the large silt pond, with grass growing well on the nearby areas that had been hydroseeded earlier. The large silt pond was a turbid brown colour with a low level. The inflow had a clear appearance. There was a small amount of fairly clear outflow to the

wetland/stream area below. The tributary below the outfall was discoloured a greenish/brown. There were no sheens or scums observed immediately below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. This was dry.

The small western silt pond was orange. The pond had a moderate level and there was a small amount of inflow. The small eastern pond was quite full with a small amount of discharge overtopping the hay bales. The stream below the pond was turbid orange/brown.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.

11 June 2021

The final inspection of the year under review was conducted in fine weather with light south-easterly winds. A total of 7 mm of rain was recorded at the Hillsborough weather station in the week prior to the inspection. The site was closed at the start of the inspection, with one truck present when the inspecting officer left the site.

There were no off-site odours detected or dust issues observed prior to going on site.

The SPCA driveway culvert grate was clear of debris and the stream was mostly clear and flowing at a low level, with no scums, sheens, foam or other visible effects noted in the receiving water.

No odours or dust were noted at any time during the inspection.

The compost area was less than one quarter full. There was one pile of fresh material, the rest was aged and well-aged product. There was no activity in this area during the inspection. No odours or stormwater issues were noted.

There was no activity in the borrow area. The sediment treatment pond contained a small amount of water. The top of the landfill area had been seeded, with hay mulch applied and new grass growth visible in places.



Photo 15 Stabilisation on southern end of the landfill, June 2021

The flare was operating with no visible emissions or odours.

There was good grass growth on the north and north-western parts of the landfill area. Contouring and hydro-seeding had been completed for the winter. There was some ponded water in the bunds along the bottom of the north side but no discharge. All the retained water was clear.



Photo 16 Northern face, June 2021

The silt fence near the eastern boundary needed to be cleaned out and the silt cloth dug in to prevent stormwater fast tracking the system (Photo 17).

The large silt pond was a turbid orange/brown colour with a moderate level. The inflow had a clear appearance. There was a moderate amount of cloudy outflow to the wetland/stream area below. The tributary below the outfall was discoloured an orange/brown. There were no sheens, scums or other visible effects observed in the tributary immediately below the outlet. No odours were noted in the area.

No odours were observed around the leachate pond. This was dry.

The small western silt pond was orange. The pond had a moderate level and there was a small amount of inflow. The small eastern pond was quite full with a small amount of discharge overtopping the hay bales. The stream below the pond was turbid orange/brown.

The following action was to be undertaken:

- Continue to work towards complying with abatement notice EAC-22506.



Photo 17 Silt fence requiring maintenance, June 2021

2.3 Water

2.3.1 NPDC monitoring results

2.3.1.1 Leachate

NPDC collected nine samples of leachate during the 2020-2021 monitoring period. Analyses were carried out for a range of parameters. The leachate is pumped to, and treated at the New Plymouth wastewater treatment plant. Whilst the leachate is not discharged directly to the environment, the results are used by the Council to compare with groundwater and surface water quality. The results are also of interest to the Council because the leachate can reveal information about the landfill processes taking place. The results of the analyses from the samples collected by the NPDC are presented in Table 3.

Table 3 Chemical analysis of Colson Road landfill leachate

Parameter	Unit	Date							
		23-Jul-20	4-Sep-20	16-Oct-20	20-Nov-20	10-Dec-20	7-Jan-21	23-Apr-21	20-May-21
pH	pH	7.2	7.4	7.1	7.4	6.8	7.2	7.3	6.9
BOD	g/m ³	21	49	17	59	<10	25	69	14
Suspended solids	g/m ³	43	24	46	26	52	38	23	53
Conductivity	mS/m	345	620	372	721	186	381	682	289.7
Alkalinity	g/m ³	-	-	-	3000	783	1567	2768	1230

Parameter	Unit	Date							
		23-Jul-20	4-Sep-20	16-Oct-20	20-Nov-20	10-Dec-20	7-Jan-21	23-Apr-21	20-May-21
Ammoniacal N	g/m ³	238	463	270	596	112	277	553	209
Cadmium	g/m ³	-	-	-	-	-	-	<0.003	<0.0011
Chromium	g/m ³	0.04	0.08	0.03	0.1	<0.005	0.03	0.1	0.02
Chloride	g/m ³	-	-	-	-	86	-	-	-
Copper	g/m ³	0.18	<0.005	<0.01	<0.02	<0.02	<0.02	<0.02	<0.011
Iron	g/m ³	19.5	11.1	12.1	11.4	-	12.2	9.61	13.3
Lead	g/m ³	<0.005	<0.005	<0.03	<0.01	<0.01	<0.01	<0.01	<0.0021
Manganese	g/m ³	2.6	1.87	1.8	1.55	2.35	1.5	1.49	1.8
Nickel	g/m ³	0.02	-	<0.02	-	-	0.013	0.04	<0.011
Zinc	g/m ³	0.06	0.03	<0.02	<0.04	<0.04	<0.04	0.06	<0.021
Turbidity	NTU	7.2	7.4	7.1	7.4	6.8	7.2	7.3	6.9

The results gathered by NPDC during the year under review reflect typical leachate quality. There are no obvious trends in the indicator leachate constituents measured emerging at this stage (for example, the concentration variations within each parameter are likely to reflect seasonal variations in leachate quality and the dilution afforded by the contaminated stormwater that is diverted through this system).

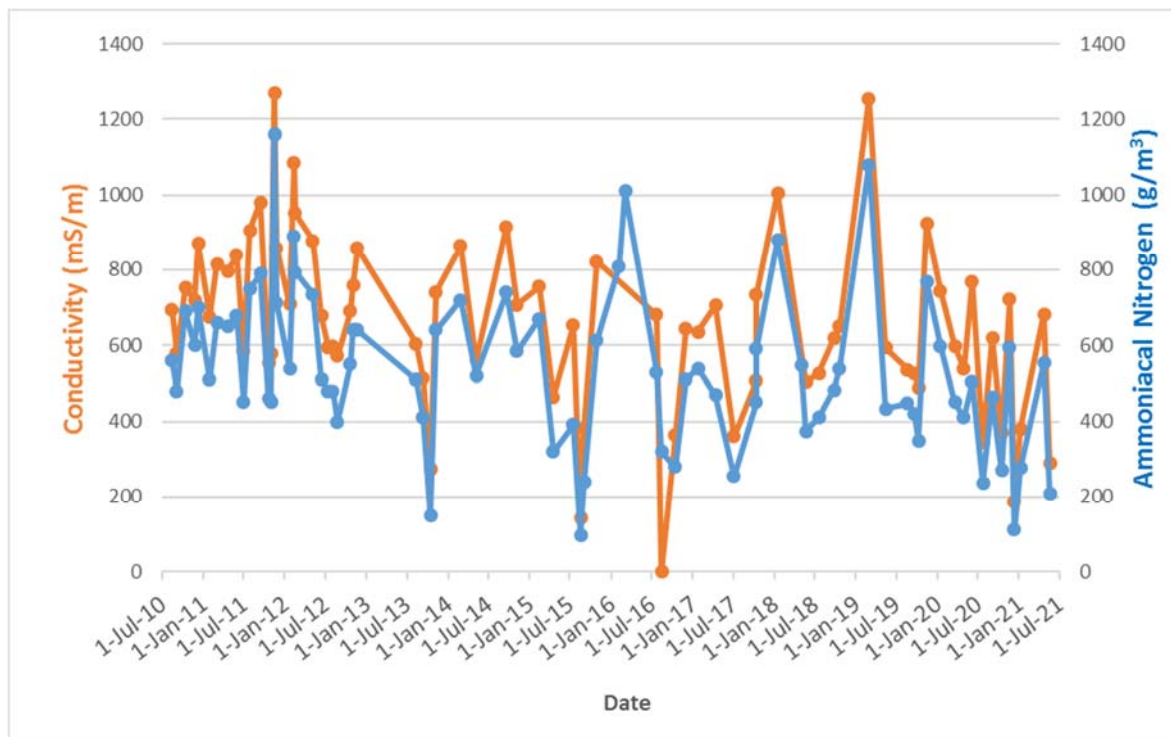


Figure 9 Leachate conductivity and ammoniacal nitrogen, July 2010 to date

2.3.1.2 Under liner drainage

NPDC collects samples of the groundwater that drains from a network of pipes under the liner. The results of the analyses are given in Table 4. The quality of this water is a useful indicator of whether leachate is

passing through the liner. This is especially important in view of the slip that occurred in 2005 that ripped the liner in several places on the western side of Stage 3. The rips that were visible above the height of the settled waste were repaired, but it was not known if the liner had ripped underneath the slipped refuse. As outlined in Section 1.2.1, early monitoring of the water quality in the under liner groundwater indicated that there was no contamination occurring as a result of this incident.

Rips in the liner at the edge of the landfill footprint were found at inspection in June 2017. The rips were small, but in an open drainage channel that (at that time) was capturing leachate breakouts from the south eastern area of the landfill. These were appropriately repaired early in July 2017.

Monitoring of the groundwater in the under liner drain has been undertaken on at least a quarterly basis as specified in the Colson Road landfill management plan. In July 2020, a report prepared for NPDC confirmed that there were some parameters for which 2018-2019 sample results were exceeding the calculated natural variation in the under liner drain. Condition 5 of consent 4621-1 requires that in this event, NPDC should implement such measures as to remedy, mitigate and if practicable prevent the continuation of this effect on the groundwater. This was logged as an incident on Council's unauthorised incidents register and is discussed further in Section 2.6. Whilst further investigations were being undertaken, NPDC collected additional samples from the under liner drain. During the year under review, six samples were collected.

Table 4 Results of analysis of under liner drainage for the year under review.

Parameter	Unit	Date					
		23-Jul-20	28-Oct-20	2-Dec-20	7-Jan-21	19-Apr-21	3-Jun-21
pH	pH	6.8	6.7	6.7	6.6	6.7	6.5
COD	g/m ³	11	11	14	-	36	-
BOD	g/m ³	<3	<3	<3	<2	<2	<3
Suspended solids	g/m ³	7	16	32	21	85	25
Faecal coliforms	/100ml	1	<1	<2	61	-	2
Conductivity	mS/m	48.0	41.9	47.7	43.8	49.4	47.0
Turbidity	N.T.U.	20.0	78.0	-	140.0	128.0	-
Alkalinity	g/m ³	140	116	135	125	150	129
Ammoniacal nitrogen	g/m ³ -N	3.70	2.86	3.40	2.83	3.20	3.00
Dissolved cadmium	g/m ³	-	<0.003	<0.003	<0.003	<0.00005	<0.001
Total cadmium	g/m ³	<0.005	<0.003	-	-	-	-
Dissolved chromium	g/m ³	-	<0.005	<0.005	<0.005	<0.0005	<0.01
Total chromium	g/m ³	<0.005	<0.005	-	-	-	-
Chloride	g/m ³	61.0	56.0	60.0	55.0	59.0	60.0
Dissolved copper	g/m ³	-	<0.02	<0.02	0.005	<0.0005	<0.01
Total copper	g/m ³	<0.005	<0.02	-	-	-	-
Dissolved iron	g/m ³	-	3.4	2.2	9.8	0.22	6.40

Parameter	Unit	Date					
		23-Jul-20	28-Oct-20	2-Dec-20	7-Jan-21	19-Apr-21	3-Jun-21
Total iron	g/m ³	4.22	9.7	-	-	-	-
Dissolved lead	g/m ³	-	<0.01	<0.01	<0.01	<0.00010	<0.002
Total lead	g/m ³	<0.005	<0.01	-	-	-	-
Dissolved manganese	g/m ³	-	1.80	1.68	2.61	1.69	2.20
Total manganese	g/m ³	1.46	1.80	-	-	-	-
Dissolved nickel	g/m ³	-	<0.008	<0.008	<0.008	<0.0005	<0.01
Total nickel	g/m ³	<0.01	<0.008	-	-	-	-
Dissolved zinc	g/m ³	-	<0.04	<0.04	<0.04	<0.0010	<0.02
Total zinc	g/m ³	0.01	<0.04	-	-	-	-

Earlier Annual Reports typically reviewed each year's data in isolation. When viewed in this way it was considered that the results had shown that little, if any, contamination had been occurring in the groundwater immediately below the liner.

The initial review of time series data carried out by the Council from the 2017-2018 to the 2019-2020 Annual Reports compared the data collected from 1 June 2010 onwards only.

On the basis of this review, it was concluded that, although the level of key indicator species such as zinc and chloride (Figure 10) appeared to have been relatively stable over the last several years, there may have been an emerging trend of very slight increasing contaminants. In particular, the results for the 2017-2020 years indicated that some contaminant concentrations such as ammoniacal nitrogen had increased more noticeably.

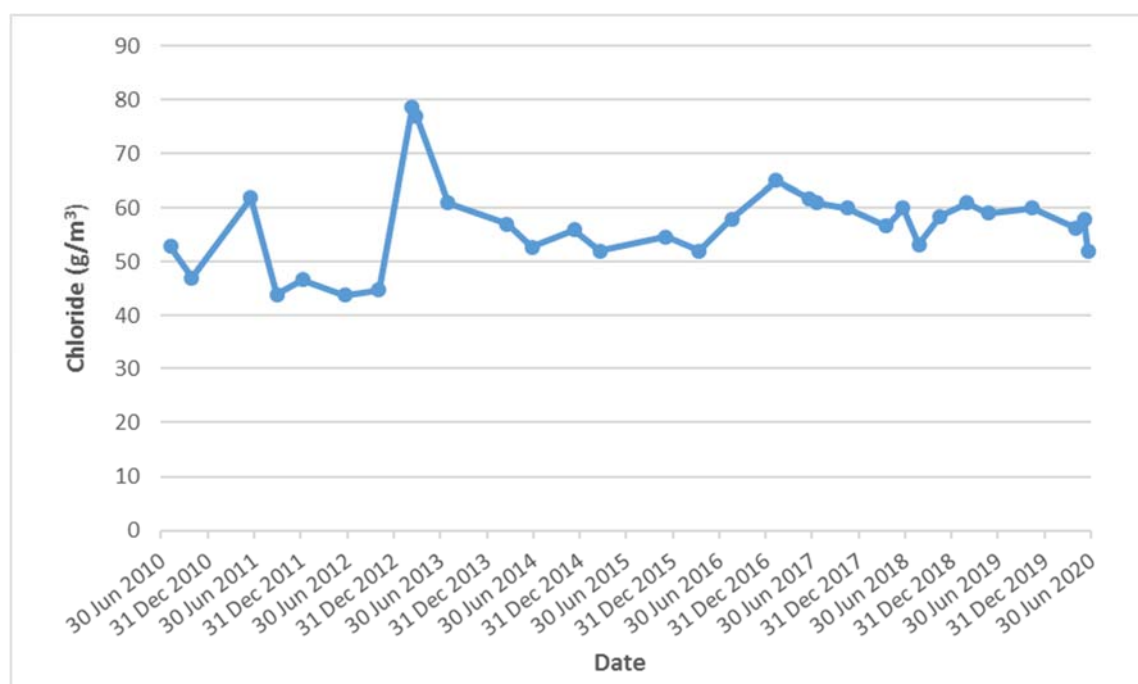


Figure 10 Chloride concentration in the under liner drainage, June 2010 to June 2020

Following the provision of the consultant's report, the Council requested that the results of all of NPDC's under liner groundwater monitoring samples be provided to Council. These were provided. It is noted that the monitoring data for the under liner drainage commenced in the month following the slip.

A review of the expanded time series data indicates that the trend of increasing levels of parameters may have started soon after the July 2005 slip as shown in Figure 11, Figure 12, Figure 13, Figure 14, and Figure 15.

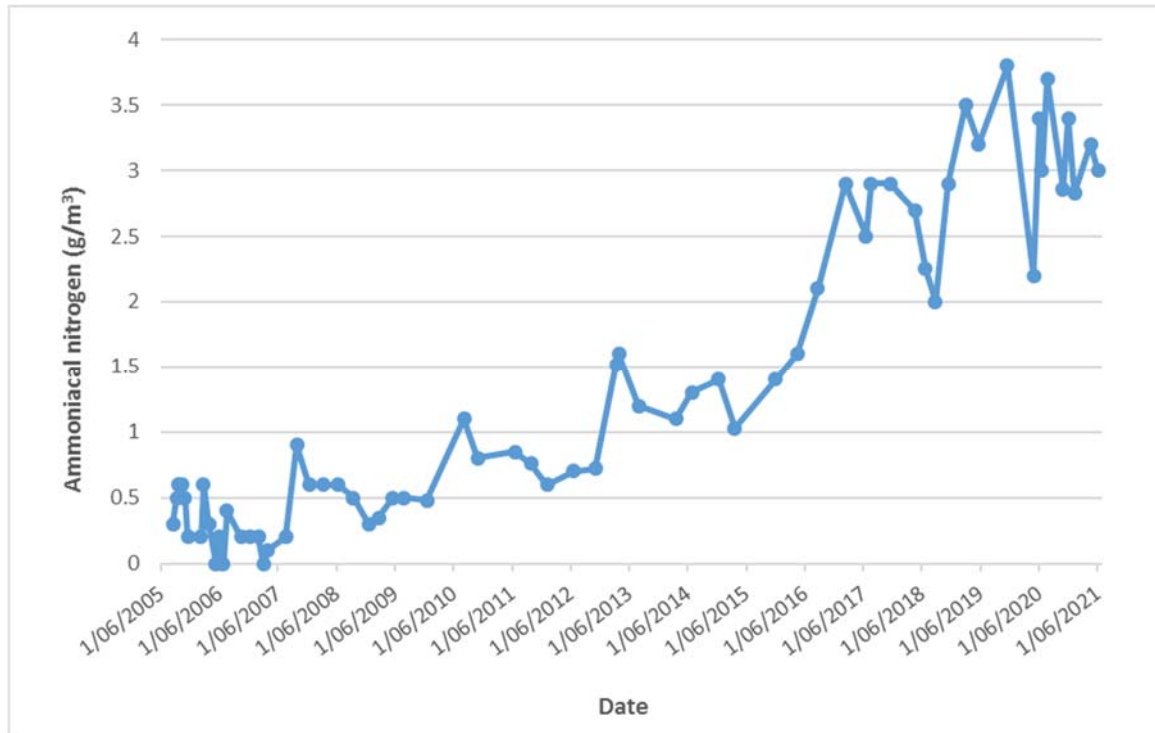


Figure 11 Full time series data for the ammoniacal nitrogen concentration of the under liner drainage

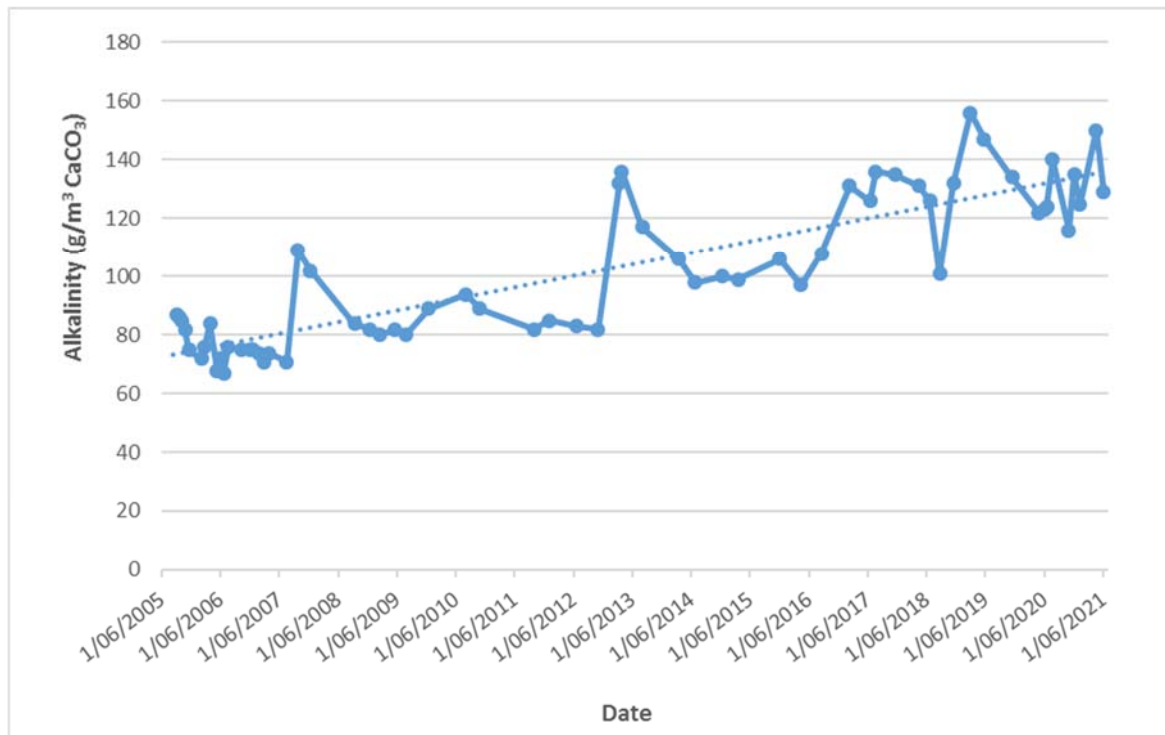


Figure 12 Full time series data for the alkalinity of the under liner drainage

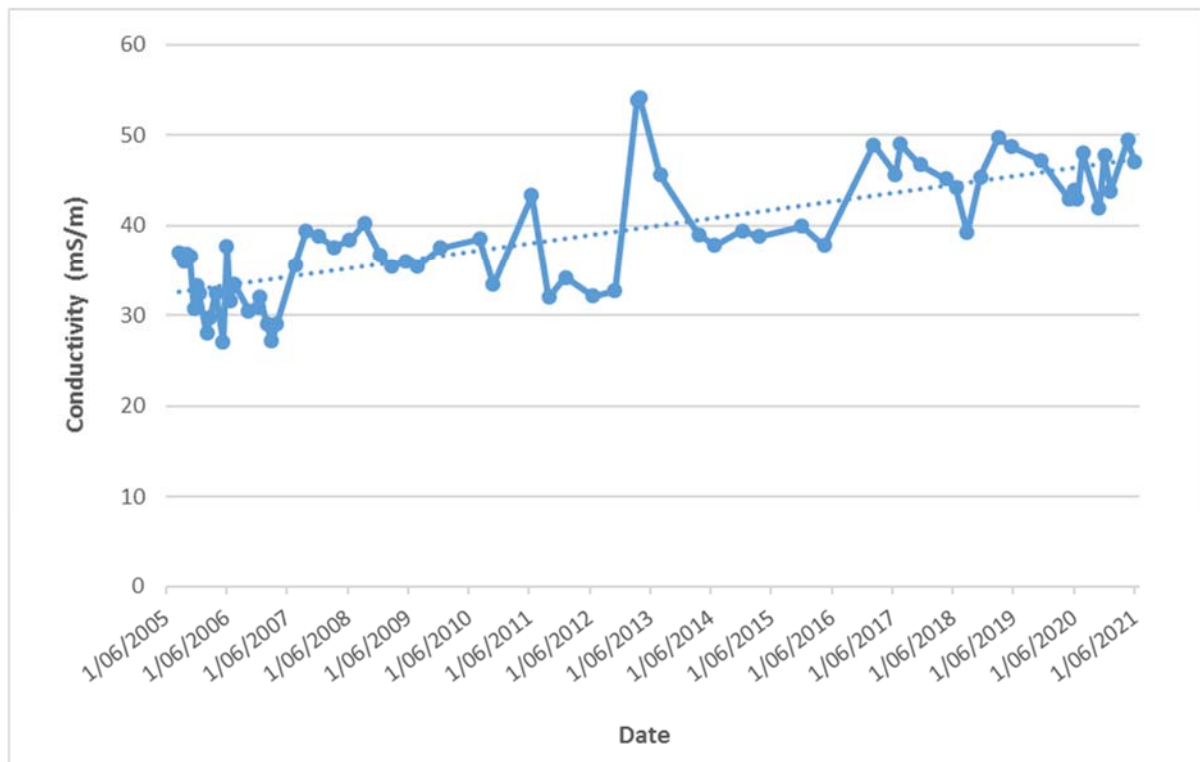


Figure 13 Full time series data for the conductivity of the under liner drainage

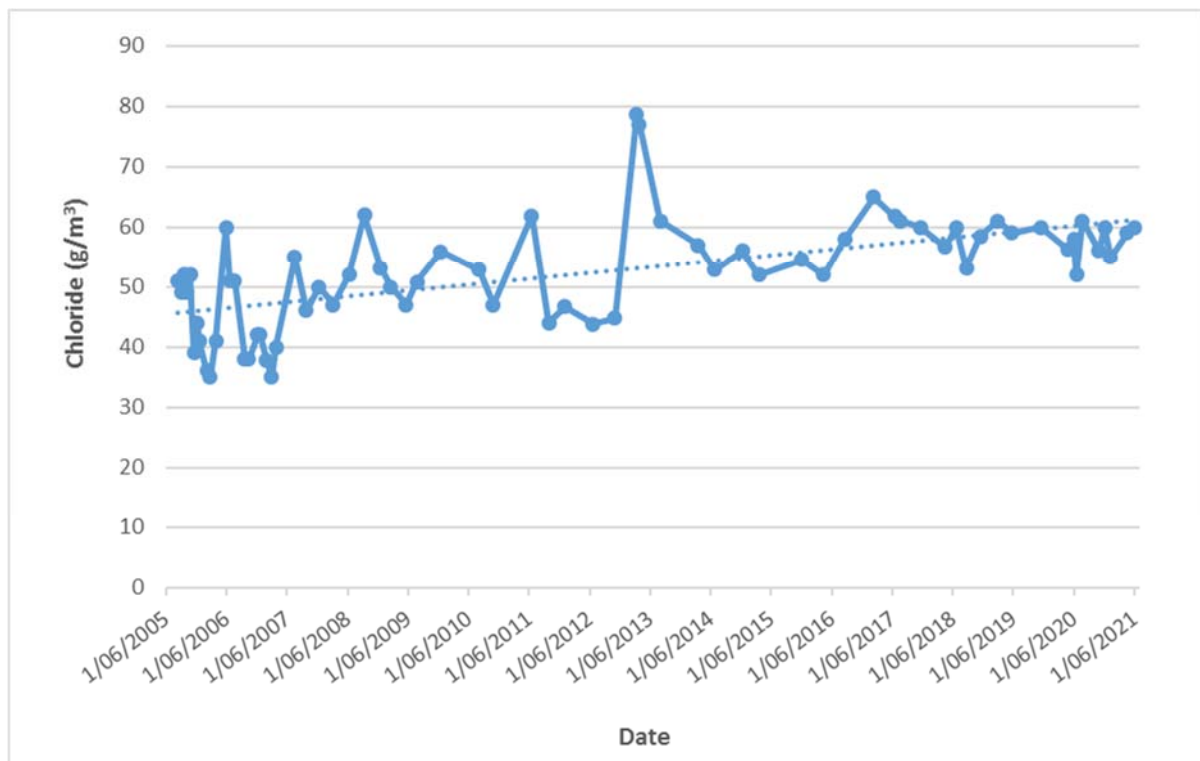


Figure 14 Full time series data for the chloride concentration of the under liner drainage

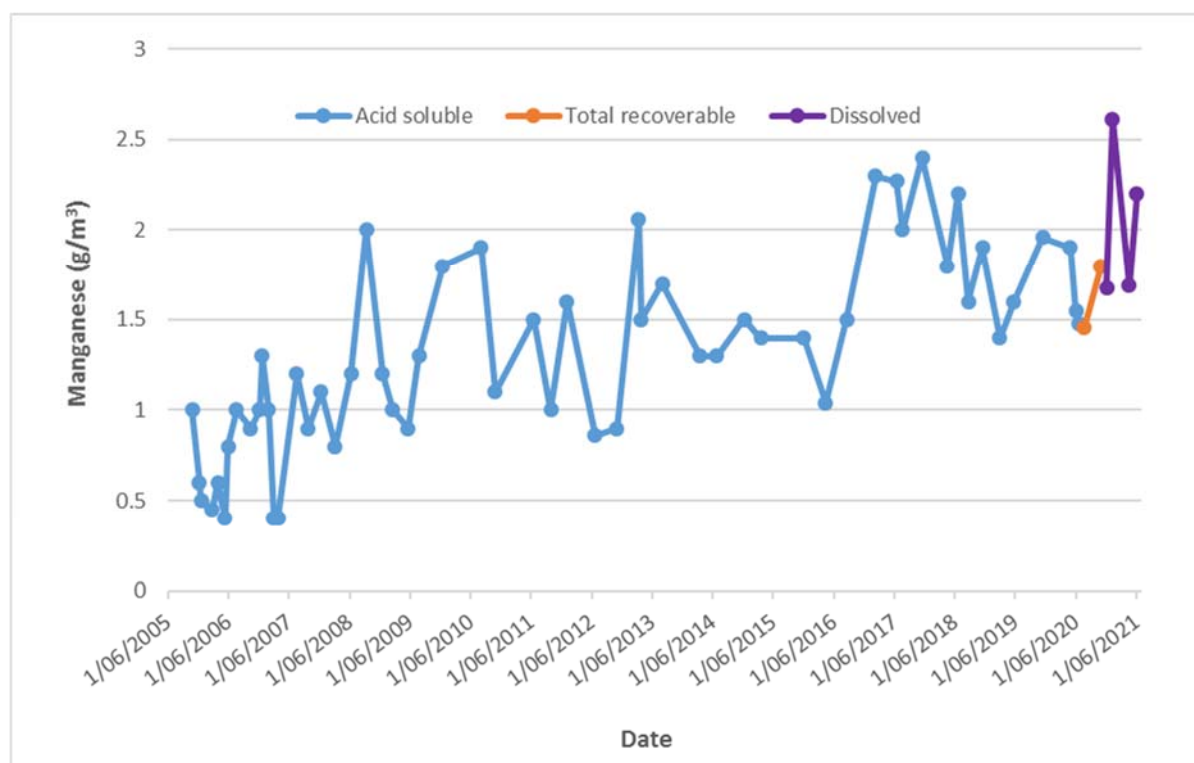


Figure 15 Full time series data for the manganese concentration of the under liner drainage

Although these indicator constituents show potential contamination of the groundwater and/or springs under the landfill, the levels are not currently of immediate environmental concern as they remain within normal ranges for Taranaki groundwater. They are however comparatively higher than any of the monitoring bores surrounding the landfill. At this stage it is difficult to assess whether the increase in the ammoniacal nitrogen concentration in the under liner drainage is as a result of changes in the leachate strength or an increasing amount of leachate getting through the liner. It is proposed that from the start of the 2021-2022 year, the leachate from the older Stages 1 and 2 is monitored separately from the leachate from Stage 3 so that the contaminants in the leachate from the areas of the landfill that are in distinctly different stages of waste degradation can be determined. This is so that an assessment of the potential effects from the two areas can be made.

Monitoring of the contaminant concentrations in the under liner drainage will also continue.

Given the changes in the indicator parameters, a recommendation was included in the 2018-2019 report that NPDC widen the range of parameters monitored to match those given in Table 8-1 of the Technical Guidelines for Disposal to Land (WasteMINZ, 2018) on at least one occasion annually. During the year under review, this was carried out on a sample collected on 19 April 2021. The results showed that the volatile and semi-volatile organic compounds were all below the detection limits.

2.3.2 Results of wet weather stormwater and receiving environment monitoring

A survey was conducted following a rainfall event and the results are given in the tables below. Table 5 shows the results for discharges and receiving water into which the discharges from within the landfill catchment flow (Puremu Stream). Table 6 shows the results for the Manganaha Stream, which lies adjacent to the landfill site and has no surface water discharges from the landfill directed to it.

The Puremu Stream system receives discharges from two stormwater ponds on the site. STW001006 discharges stormwater and minor amounts of leachate from Stages 1 and 2, and STW002054 discharges stormwater from Stage 3, some of the eastern forest of the site and the composting pad. STW002054 also

receives leachate in the event that the leachate pumping system is overloaded, or fails. It is noted that consent 4619 provides only for minor amounts of leachate to be present in this discharge.

The results show that during this wet weather period, the site was complying with consent conditions in regards to the water quality parameters in both the Puremu and Manganaha Streams, with the exception of ammoniacal nitrogen at sites PMU000110 and PMU000113.

There were exceedances of the ammoniacal nitrogen concentrations in the Puremu Stream at the compliance point for both the Stage 1 and 2 (consent 2370, site PMU000110) and the Stage 3 (4619, PMU000113) areas of the landfill. However, the temperature and pH conditions at the time of the survey ensured that the potentially toxic un-ionised ammonia concentration remained below the level considered to cause significant environmental effects. The ammoniacal nitrogen concentrations in the Puremu Stream were shown to be compliant with consent conditions at the time of the next sampling survey (2.3.3.2.2).

The small eastern silt pond was again found to be the main contributor of ammoniacal nitrogen (17.9 g/m³).

Table 5 Results of rain event monitoring – discharge and Puremu Stream samples, 19 August 2020

Site	Alkalinity g/m ³ CaCO ₃	Conductivity mS/m @25°C	Faecal Coliforms cfu/100ml	Un-ionised ammonia g/m ³ -N	Ammoniacal nitrogen g/m ³ -N	pH	Suspended solids g/m ³	Temp. Deg.C	Turbidity NTU
Limits PMU000110	NA	NA	NA	NA	2.5	[within ±0.5]		≤ 15.2 [+2]	NA (visual)
Limits PMU000113	NA	NA	≤ 1000	NA	2.0 at pH < 7.75	≥ 6.5 & ≤ 8.5	13 [+10]		NA (visual)
IND003009 ⁺		54.8	2000	0.00036	0.071	7.3	<3	10.5	12.7
STW001006	230	64.1	10	0.033	17.1	6.8	42	14.1	230
STW002054	116	43.9	10	0.0117	1.76	7.4	14	12.3	75
PMU000100	24	14.3	90	0.00021	0.043	7.3	<3	11.2	3.8
PMU000109	83	32.8		0.0037	0.62	7.4	6	12.0	23
PMU000110	63	26.5		0.021	3.2	7.4	4	12.1	10.9
PMU000113	58	25.5	400	0.022	2.5	7.5	<3	12.2	8.1

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[] indicates this is a maximum permitted change from the upstream value at PMU000100

+ no discharge occurring, sample obtained from second to last pond as the final pond was empty

As stated earlier, the Manganaha Stream receives no direct discharges from the landfill catchment, but it is a useful indicator for any groundwater contamination.

Additionally, the consents state that the water quality in the Manganaha Stream shall not be changed as a result of discharges from the landfilling activities.

The results show that water quality in the stream is quite high and there is negligible difference in water quality when comparing the results from the two Manganaha Stream sites. These results are comparable to those obtained in previous monitoring periods.

Table 6 Results of rain event monitoring - Manganaha Stream, 19 August 2020

Parameter	Unit	Site	
		MNH000190	MNH000250
Ammoniacal nitrogen	g/m ³ -N	0.017	0.020
Conductivity	mS/m@25 °C	14.6	15.5
pH	-	7.4	6.6
Suspended solids	g/m ³	<3	<3
Temperature	Deg C	12.0	12.0
Turbidity	NTU	1.62	3.2
Unionised ammonia	g/m ³	0.00011	0.00004

2.3.3 Results of dry weather stormwater and receiving environment monitoring

2.3.3.1 Dry weather stormwater monitoring

Samples of the discharge from the composting area (IND0003009), stormwater from below the large silt pond (STW002054), and discharge from the small eastern silt pond (STW001006) were collected if they were discharging during dry weather runs. The sites are shown in Figure 16. The compost pond discharge and the under liner drainage discharge via the large silt pond. The catchment areas within the landfill footprint that drain through each of the stormwater ponds can change as the active filling areas and those areas with intermediate and/or final cover change. The results of the routine compliance monitoring survey sampling are presented in Table 7 below.

Table 7 Chemical analysis of site discharges during dry weather

Parameter	units	IND003009		STW001006		STW002054	
		24-Nov-20*	4-Feb-21*	24-Nov-20	4-Feb-21	24-Nov-20	4-Feb-21
Acid soluble iron	g/m ³			21	26	2.7	3.6
Alkalinity	g/m ³ CaCO ₃	-	-	260	260	117	140
Ammoniacal nitrogen	g/m ³ -N	-	-	20.0	19.4	1.18	1.29
BOD (total)	g O ₂ /m ³	-	-	1.5	1.2	1.1	1.2
Conductivity	mS/m@25 °C	-	-	75.5	80.2	45.2	51.0
Faecal coliforms	cfu/100ml	-	-	10	10	10	190
Manganese Dissolved	g/m ³			6.4	7.2	9.2	14.1
Manganese Total	g/m ³			7.5	6.7	10.6	12.5
Nitrate+Nitrite-N	g/m ³	-	-	0.167	0.210	0.610	0.390
pH	pH	-	-	6.9	7.0	7.6	7.8

Parameter	units	IND003009		STW001006		STW002054	
		24-Nov-20*	4-Feb-21*	24-Nov-20	4-Feb-21	24-Nov-20	4-Feb-21
Sulphate	g/m ³	-	-	-	-	5.6	4.3
Suspended solids	g/m ³	-	-	36	26	9	11
Temperature	Deg.C	-	-	15.4	16.2	16.5	18.2
Unionised ammonia	g/m ³	-	-	0.054	0.067	0.0188	0.031
Dissolved zinc	g/m ³	-	-	<0.001	<0.001	<0.001	<0.001

* Sample not collected as no discharge occurring

Historically, the compost pond discharge is usually found to be the major source of faecal coliforms at the time of sampling surveys. At the time of the dry weather surveys undertaken during the year under review there was insufficient water in the compost ponds to obtain a sample.

Other contaminants of note in the pond discharges are acid soluble iron, alkalinity, ammoniacal nitrogen, and manganese. In the case of acid soluble iron, alkalinity and ammoniacal nitrogen, these tended to be higher in the discharge from the eastern small silt pond, whereas manganese tends to be higher in the discharges from the large silt pond.

There are no consent limits on the discharges from the stormwater ponds, rather the effects of the activity are controlled by contaminant concentration limits on the receiving waters. The dry weather receiving water results for the Puremu Stream are presented in Table 9 and Table 10 and discussed in Section 2.3.3.2.2.

It is noted that although the ammoniacal nitrogen concentration in the discharge at STW001006 had increased from 17.9 g/m³ in the wet weather survey of August 2020 (Section 2.3.2) to 20.0 g/m³ in the survey in November 2020, the receiving water results showed a reduction in the ammoniacal nitrogen concentration in the Puremu Stream below this discharge point (2.3.3.2.2).

2.3.3.2 Dry weather receiving environment monitoring

The Colson Road landfill site has two streams associated with it. The Puremu Stream has been culverted to run under the north-western quadrant of the landfill site. It emerges from the culvert near the driveway to the landfill entrance, and then flows approximately 300 m to a second culvert that takes it under two other properties. Just upstream of the second culvert, the unnamed tributary that carries the discharge from the large settling pond, flows into the main stream stem. The smaller silt pond discharges directly into the main stream stem just upstream of the confluence (see Figure 16).

The Manganaha Stream follows alongside the eastern boundary of the site and is approximately 200 m away from the landfill (at its closest point). As required by the landfill's water discharge permits, there are no direct discharges into the Manganaha Stream from the landfill.

The results of the dry weather receiving water sampling undertaken during the period under review are given in Table 8 to Table 12.

2.3.3.2.1 Manganaha Stream

On both sampling occasions the Manganaha Stream showed no adverse effects from the landfilling operation.

For the most part the upstream and downstream results showed little, if any, difference in water quality. There were small changes in the acid soluble iron concentrations, which are expected in a stream that has

groundwater infiltration and runs through an agricultural area. All results were comparable to background levels, and were similar to those found over the last six years.

Table 8 Chemical analysis of the Manganaha Stream

Parameter	Units	24-Nov-20		4-Feb-2021	
		MNH000190 u/s of landfill	MNH000250 d/s of landfill	MNH000190 u/s of landfill	MNH000250 d/s of landfill
Alkalinity	g/m ³ – CaCO ₃	27	26	25	26
Conductivity	mS/m@25°C	14.4	14.6	17.5	17.4
Acid soluble iron	g/m ³	0.46	0.53	0.72	0.88
Ammonia (unionised)	g/m ³	0.0001	0.00016	<0.000018	<0.00004
Ammoniacal nitrogen	g/m ³ -N	0.016	0.022	<0.010	<0.010
pH	pH	7.3	7.4	6.8	7.1
Suspended solids	g/m ³	< 3	< 3	< 3	< 3
Temperature	Deg C	14.2	14.2	13.2	13.4
Dissolved zinc	g/m ³	0.0011	0.0012	0.0012	0.0012

There are no specific consent conditions in regards to the Manganaha Stream water quality other than the requirements that authorised discharges to land and to the Puremu Stream from the landfill shall not affect water quality in the Manganaha Stream.

Based on these results, and those from previous monitoring periods, the landfill's presence is having no measurable effect on water quality in the Manganaha Stream.

2.3.3.2.2 Puremu Stream

In stream limits are given for a range of parameters for Stage 2 (2370-3) where the compliance point is at PMU000110, and for Stage 3 (4619-1) where the compliance point is at PMU000113. For certain constituents, the limit placed on the consent is in the form of a maximum change from the upstream value, which is determined at site PMU000100. These requirements are indicated within the square brackets in the following tables.

The Puremu Stream was sampled on two occasions in dry weather under low to moderate flow conditions.

The downstream sampling sites are shown in Figure 16. The results for the general parameters are given in Table 9 and Table 10, with the dry weather metals analysis covered in Section 2.3.3.3.

Table 9 Chemical analysis of the Puremu Stream, sampled on 24 November 2020

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	Consent limits at PMU000113* (PMU000110**)
Alkalinity	g/m ³ CaCO ₃	28	97	50	55	NA

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	Consent limits at PMU000113* (PMU000110**)
Ammoniacal-N	g/m ³ N	0.031	0.420	1.86	1.69	2 [at pH<7.75; limit is pH dependant] (2.5)
BOD	g/m ³	0.7	1.5	1.0	1.0	NA
Conductivity	mS/m@25°C	13.9	36.3	22.2	23.5	NA
Dissolved oxygen	g/m ³	8.47	5.41	8.92	8.88	≥ 7.47 [-1] (≥ 5.0)
DRP	g/m ³	0.004	0.004	0.004	0.004	NA
Faecal coliforms	cfu/100 ml	160	1900	310	540	≤ 1,000
Nitrate/nitrite N	g/m ³ N	0.11	0.46	0.83	0.81	10 (100)
pH	pH	7.1	7.1	7.3	7.3	≥ 6.5 & ≤ 8.5 ([within ± 0.5])
Oxygen saturation	%	85.8	53.6	88.9	88.8	NA
Sulphates	g/m ³	5.8	4.6	8.3	8.0	1,000 (500)
Suspended solids	g/m ³	< 3	4	< 3	< 3	14 [+10]
Temperature	Deg C	16.0	15.0	15.2	15.4	(≤ 16.3 [+2])
Unionised ammonia	g/m ³ N	0.00014	0.00175	0.0126	0.0113	NA

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[] indicates this is a maximum permitted change from the upstream value at PMU000100

The results of this survey showed that the consent conditions were being complied with at the time of sampling.

Although the faecal coliform count was elevated below the site, the samples complied with the consent limit and it is noted that the count had reduced substantially from that obtained at the upstream control site.

In terms of ammoniacal nitrogen concentration, although the concentration in the discharge from the eastern small stormwater pond was high (20.0 g/m³), this had reduced to 1.86 g/m³ in the Puremu Stream and was compliant with conditions on consent 2370 at the compliance point (PMU000110). The unionised ammonia concentration was also less than the 0.025 g/m³ considered to be toxic to aquatic ecosystems.

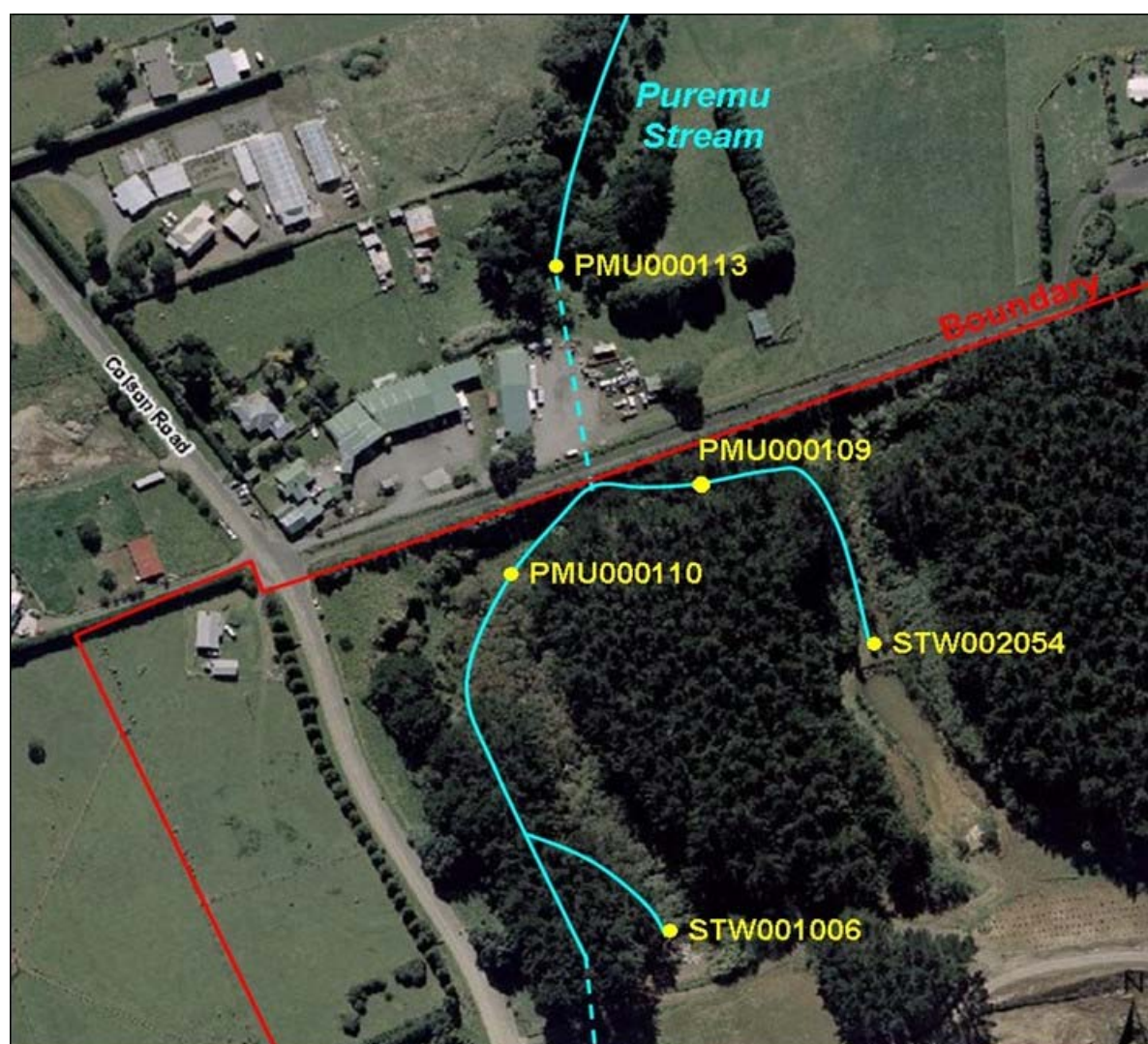


Figure 16 Sampling sites on the Puremu Stream downstream of the landfill

Table 10 Chemical analysis of the Puremu Stream, sampled on 4 February 2021

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	Consent limits at PMU000113* (PMU000110**)
Alkalinity	g/m ³ CaCO ₃	28	109	70	76	NA
Ammoniacal-N	g/m ³ N	0.02	0.48	2.9	2.5	2 [at pH<7.75; limit is pH dependant] (2.5)
BOD	g/m ³	0.9	1.2	4.3	2.3	NA
Conductivity	mS/m@25° C	14.4	40.0	28.5	30.1	NA
Dissolved oxygen	g/m ³	7.59	4.62	7.52	7.64	≥ 6.59 [-1] (≥ 5.0)
Oxygen saturation	%	79.2	47.3	76.2	78.4	NA

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	Consent limits at PMU000113* (PMU000110**)
DRP	g/m ³	< 0.004	< 0.004	< 0.004	< 0.004	NA
Faecal coliforms	cfu/100 ml	220	670	1000	650	≤ 1,000
Nitrate/nitrite N	g/m ³ N	0.04	0.33	0.82	0.81	10 (100)
pH	pH	7.1	7.3	7.3	7.4	≥ 6.5 & ≤ 8.5 ([within ± 0.5])
Sulphates	g/m ³	4	4	5.8	5.6	1,000 (500)
Suspended solids	g/m ³	4	5	5	< 3	14 [+10]
Temperature	Deg C	17.4	16.5	16	16.6	(≤ 19.4 [+2])
Unionised ammonia	g/m ³ N	0.00009	0.0033	0.024	0.023	NA

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[] indicates this is a maximum permitted change from the upstream value at PMU000100

With the exception of ammoniacal nitrogen, the samples taken during the year under review complied with the consent conditions of both 2370 and 4619 for the parameters listed in the above table.

In this February survey it was found that there were exceedances of the ammoniacal nitrogen concentrations in the Puremu Stream at the compliance point for both the Stage 2 (consent 2370, site PMU000110) and the Stage 3 (4619, PMU000113) areas of the landfill. However, the temperature and pH conditions at the time of the survey ensured that the potentially toxic un-ionised ammonia concentrations (0.023 g/m³ at PMU000110 and 0.024 g/m³ at PMU000113) remained below the level considered to cause significant environmental effects (0.025 g/m³). This was logged as an unauthorised discharge on the Council's incidents register, with the results of the follow-up sampling carried out by the Council and NPDC's investigation are discussed in Section 2.6

2.3.3.3 Dry weather metals analysis

Consents 2370 and 4619 have some differing limits on the concentrations of various metals at sites PMU000100 and PMU000113 respectively, with PMU000110 being the compliance point for consent 2370, and with PMU000113 being the compliance point for consent 4619.

In the consents, total recoverable metal limits are given as absolute concentrations that must not be exceeded, whereas the dissolved metal limits are given in terms of a maximum permitted increase relative to the upstream site as indicated within the square brackets in the following tables.

In previous monitoring periods, as the limits for each are similar, and PMU000110 is only a short way upstream of PMU000113, a metals screen was undertaken on site PMU000113 only, with site PMU000100 (upstream of the landfill) acting as a control.

During the 2013-2014 year, metals monitoring at sites PMU000110 and PMU000109 was introduced. The results of the dry weather metals monitoring for the year under review are given in Table 11 and Table 12.

Table 11 Results of metal analysis undertaken on 24 November 2020

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Dissolved aluminium	g/m ³	0.010	0.003	< 0.003	0.003	0.100 [+0.1]
Total aluminium	g/m ³	0.026	0.0196	0.045	0.03	5.0 (5.0)
Dissolved arsenic	g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.05 [+0.05]
Total arsenic	g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.2 (0.1)
Dissolved beryllium	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	NA
Total beryllium	g/m ³	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)
Dissolved boron	g/m ³	0.016	0.029	0.026	0.029	NA
Total boron	g/m ³	0.0171	0.029	0.027	0.029	5.0 (0.5)
Dissolved cadmium	g/m ³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.001 [+0.001]
Total cadmium	g/m ³	< 0.000053	< 0.000053	< 0.000053	< 0.000053	0.05 (0.01)
Dissolved chromium	g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.02 [+0.02]
Total chromium	g/m ³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	1.0 (0.1)
Dissolved cobalt	g/m ³	0.0003	0.0021	0.0008	0.001	NA
Total cobalt	g/m ³	0.00043	0.0021	0.00074	0.00098	1.0 (0.05)
Dissolved copper	g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.007 [+0.002]
Total copper	g/m ³	0.00139	0.00156	0.00055	0.00055	0.5 (0.2)
Dissolved iron	g/m ³	0.80	0.09	0.65	0.62	1.1 [+0.3]
Total iron	g/m ³	1.48	2.1	1.27	1.49	10.0 (5.0)
Dissolved lead	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.002 [+0.002]

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Total lead	g/m ³	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)
Dissolved manganese	g/m ³	0.081	4.8	0.47	0.85	NA
Total manganese	g/m ³	0.102	5.5	0.54	0.97	5.0 (1.0)
Dissolved selenium	g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.001 [+0.001]
Total selenium	g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.05 (0.02)
Dissolved vanadium	g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA
Total vanadium	g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.1 (0.1)
Dissolved zinc	g/m ³	< 0.0010	< 0.0010	< 0.0010	0.0015	0.0310 [+0.03]
Total zinc	g/m ³	0.0018	0.0021	0.0016	0.002	2.4 (2.0)

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[] indicates this is a maximum permitted change from the upstream value at PMU000100

The metals limits on both consent 2370 and 4619 were complied with on this occasion.

Table 12 Results of metal analysis undertaken on 4 February 2021

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Dissolved aluminium	g/m ³	0.006	< 0.003	< 0.003	< 0.003	0.104 [+0.1]
Total aluminium	g/m ³	0.0196	0.073	0.0124	0.0182	5.0 (5.0)
Dissolved arsenic	g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.05 [+0.05]
Total arsenic	g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.2 (0.1)
Dissolved beryllium	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	NA
Total beryllium	g/m ³	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Dissolved boron	g/m ³	0.019	0.025	0.036	0.034	NA
Total boron	g/m ³	0.0179	0.025	0.036	0.034	5.0 (0.5)
Dissolved cadmium	g/m ³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.001 [+0.001]
Total cadmium	g/m ³	< 0.000053	< 0.000053	< 0.000053	< 0.000053	0.05 (0.01)
Dissolved chromium	g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.02 [+0.02]
Total chromium	g/m ³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	1.0 (0.1)
Dissolved cobalt	g/m ³	0.0003	0.0025	0.0013	0.0014	NA
Total cobalt	g/m ³	0.00047	0.0025	0.00145	0.00148	1.0 (0.05)
Dissolved copper	g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.008 [+0.002]
Total copper	g/m ³	< 0.00053	< 0.00053	0.00076	< 0.00053	0.5 (0.2)
Dissolved iron	g/m ³	0.85	0.07	0.84	0.67	1.15 [+0.3]
Total iron	g/m ³	1.57	1.93	2.7	1.96	10.0 (5.0)
Dissolved lead	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.002 [+0.002]
Total lead	g/m ³	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.1 (0.1)
Dissolved manganese	g/m ³	0.118	7.2 ^a	1.14	2.1 ^a	NA
Total manganese	g/m ³	0.143	6.6 ^a	1.06 ± 0.11	1.89 ^a	5.0 (1.0)
Dissolved selenium	g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.001 [+0.001]
Total selenium	g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.05 (0.02)
Dissolved vanadium	g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA

Parameter	Unit	PMU000100	PMU000109	PMU000110	PMU000113	Consent limit at PMU000113 (PMU000110)
Total vanadium	g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	0.1 (0.1)
Dissolved zinc	g/m ³	0.0013	< 0.0010	< 0.0010	0.0014	0.0313 [+0.03]
Total zinc	g/m ³	0.0011	< 0.0011	0.0016	0.0013	2.4 (2.0)

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113
 ** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110
 [] indicates this is a maximum permitted change from the upstream value at PMU000100
 a the dissolved fraction was greater than the total fraction, but within analytical variation of the methods

With the exception of total manganese at site PMU000110, the metals limits on both consent 2370 and 4619 were complied with on this occasion. It is noted that the total manganese result obtained is within the uncertainty of measurement of the consent limit, (that is, the result is in the potential range of 0.95 to 1.17 g/m³). Therefore non-compliance cannot be substantiated in this case. It is also noted that the result obtained for both the total and the more bioavailable dissolved manganese were both well below the ANZECC default guideline for freshwater offering protection to 95 % of species (1.9 g/m³)

There were only very slight, if any, increases in most of the other metals determined.

The results from the dry weather sampling during the year under review indicate that discharges from the landfill were not resulting in any significant adverse effect at the time of the surveys.

2.3.4 Biological monitoring

2.3.4.1 Macroinvertebrate surveys

Two macroinvertebrate surveys were conducted during the year under review. Summaries of the surveys' findings are given below and a full copy of the reports can be obtained from the Council upon request.

Biological surveys have been undertaken on the Puremu Stream since 1986, to assess potential adverse effects of leachate from the landfill on the macroinvertebrate communities of the stream. Further to this, biological monitoring has been undertaken on the Manganaha Stream since 1994 to assess the effects of seepage from the landfill site on the macroinvertebrate communities in the stream.

Results of freshwater biological surveys performed in relation to the Colson Road landfill since the 2000-2001 monitoring year are discussed in numerous biomonitoring reports listed in the biomonitoring report reference lists.

The Council's 'kick-sampling' technique and a combination of the 'kick-sampling' and 'vegetation-sweep' sampling techniques, along with a combination of the two techniques, were used at six sites to collect streambed macroinvertebrates from the Manganaha Stream, Puremu Stream and an unnamed tributary of the Puremu Stream. This has provided data to assess any potential adverse effects of leachate from the landfill on the macroinvertebrate communities of these streams. Samples were processed to provide number of taxa (richness), MCI, and SQMCI scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of nutrient pollution in streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to

pollution. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored and enable the overall health of the macroinvertebrate communities to be determined.

The sites sampled are described in Table 13 and their locations are shown in Figure 17.

Overall, both surveys indicated that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effect on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream.

Table 13 Biomonitoring sites in the Puremu and Manganaha Streams related to the Colson Road landfill

Stream	Site No.	Site Code	Location
Puremu Stream	1	PMU000104	Upstream of the landfill
	2	PMU000110	400 m downstream landfill
	3	PMU000113	Downstream of the RSPCA driveway
Unnamed tributary of Puremu Stream	PT1	PMU000108	60 m upstream of the confluence with Puremu Stream
Manganaha Stream	M4	MNH000190	10 m downstream of an unnamed tributary of the Manganaha Stream
	M6	MNH000260	500 m downstream of site M4



Figure 17 Biomonitoring sites related to the Colson Road landfill, New Plymouth

22 December 2020

Taxa richness was low in this survey, ranging between seven and 13 taxa. All sites recorded lower numbers of taxa than their respective site medians. In comparison to the previous survey results, sites 1 and 3 both recorded lower numbers of taxa, while sites 1, M4 and M6 recorded slightly higher numbers. Site PT1 recorded the same number of taxa as that recorded in the previous survey. Site 3 recorded seven taxa, which was equal to the lowest number of taxa recorded for this site to date. A concrete products site is situated directly upstream of site 3 and may have contributed stormwater discharges immediately upstream of site 3 which may have influenced the results at this site.

MCI scores were reflective of 'poor' macroinvertebrate community health at sites 1, 2, PT1 and M6, and 'very poor' health at site 3. Site M4 recorded the highest MCI score of 90 units, which was reflective of 'fair' macroinvertebrate community health. MCI scores were below medians at all sites (although not significantly), with the exception of sites PT1 and M4, which recorded MCI scores that were equal to their respective site medians. There were no significant differences recorded between MCI scores at 'control' site 1 and sites 2 and PT1, while site 3 recorded an MCI score which was significantly lower than that recorded at sites 2 and PT1. Again, stormwater discharges from an upstream concrete products site may have contributed to the lowered MCI score recorded at site 3, although it is also possible that the Colson Road landfill stormwater and leachate discharges have also contributed to this lowered MCI score. There was a significant decrease in MCI score between sites M4 and M6, however this is thought to be related to subtle habitat changes between the two sites, rather than to any effects from the landfill discharges.

SQMCI scores ranged between 2.9 and 4.9 units across the six sites surveyed. 'Control' site 1 recorded the highest SQMCI score, which was reflective of 'fair' macroinvertebrate community health. The SQMCI scores recorded at sites M4 and M6 were also reflective of 'fair' macroinvertebrate health, while site 3 recorded a 'poor' SQMCI score, and sites 2 and PT1 'very poor' SQMCI scores. In comparison to median SQMCI scores the current survey results were lower at all sites with the exceptions of site 1, which recorded a significantly higher SQMCI score and site 3, which recorded a substantially higher SQMCI score.

Overall, the results of this survey indicated that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effects on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream. No undesirable biological growths were detected at any of these sites during this December 2020 survey. It is recommended that 'control' site 1 and site PMU000106, 100 metres downstream of site 1 be sampled concurrently in the next monitoring year to determine whether or not the aforementioned site would be a more representative 'control' site.

11 February 2021

Taxa richness was low in this survey, ranging between 11 and 16 taxa. All sites, excluding site 3 recorded lower numbers of taxa than their respective site medians. In comparison to the previous survey results, sites 2 recorded the same number of taxa, whilst the remaining sites recorded higher numbers of taxa. All taxa numbers were within the range of those recorded previously. Taxa abundances had generally improved from the previous survey, with higher proportions of 'abundant' and 'very abundant' taxa recorded.

MCI scores were reflective of 'poor' macroinvertebrate community health at sites 1, and 'fair' health at sites 2, 3, PT1 and M4. Site M6 recorded the highest MCI score of 104 units, which was the highest MCI score recorded for the site to date and was reflective of 'good' macroinvertebrate community health. MCI scores were above site medians at all sites, with sites 3 and M6 recording MCI scores significantly higher than their respective site medians. This was an improvement from the previous survey results, in which all sites recorded MCI scores that were below medians (although not significantly), with the exception of sites PT1 and M4, which recorded MCI scores that were equal to their respective site medians. All six sites recorded MCI scores that were higher than that recorded by the previous survey, with sites 1, 2, 3 and M6 all

recording significantly higher MCI scores. There were no significant differences recorded between the MCI score recorded at 'control' site 1 and those recorded downstream at sites 2, 3 and PT1. There was a significant increase in MCI score between sites M4 and M6, however this is thought to be related to habitat differences between the two sites. On this sampling occasion, the sample for site M6 was taken slightly downstream of where it has previously been taken, due to poor accessibility to the site, which may explain some of the improvement in MCI recorded.

SQMCI scores ranged between 2.9 and 6.6 units across the six sites surveyed. 'Control' site 1 recorded an SQMCI score reflective of 'fair' macroinvertebrate community health, while the downstream sites 2 and 3 both recorded 'poor' health. Site PT1 recorded 'very poor' health, however there were no significant differences in SQMCI score recorded between sites 2, 3 and PT1. 'Control' site 1 recorded an SQMCI score significantly higher than those recorded at sites 2 and PT1, with the higher SQMCI score recorded at site 1 predominantly attributed to the 'very abundant' and 'moderately sensitive' amphipod (*Paracalliope*) that was recorded at this site. The SQMCI score recorded at site M4 was reflective of 'fair' macroinvertebrate health, while the SQMCI recorded at site M6 was reflective of 'very good' macroinvertebrate health. In comparison to median SQMCI scores, the current survey results were higher at all sites, with the exception of site M4, which recorded an SQMCI score equal to the median.

Overall, the results of this survey indicated that the discharge of treated stormwater and leachate discharges from the Colson Road landfill site had not had any significant detrimental effects on the macroinvertebrate communities of the Puremu and Manganaha Streams, or the unnamed tributary of the Puremu Stream. No undesirable biological growths were detected at any of these sites during this February 2021 survey. It is recommended that 'control' site 1 and site PMU000106, 100 m downstream of site 1 be sampled concurrently in the next monitoring year to determine whether the aforementioned site would be a more representative 'control' site.

2.4 Groundwater

Groundwater was sampled from six bores over two separate days in June 2021. The bores sampled are described in Table 14 results of the analyses are given in Table 15.

During the 2019-2020 year it was found that the bore depths of three of the bores had reduced from that provided in the original bore logs. The affected bores were GND0251, GND0255 and GND1300. During the year under review replacement bores were installed. The impact bores GND0251 and GND1300 were replaced by GND3134 and GND3133 respectively. These replacement bores were located adjacent to the compromised bores. It was agreed that the compromised control bore (GND0255) would be replaced with a control bore that was also up gradient of the Stage 2 area (GND3135).

Table 14 Groundwater sampling sites

Bore	Location description	Easting	Northing	Bore depth (mbgl)	Relative level (masl)	Screened depth (mbgl)
GND0251 ^a	Original L2, pine forest east of landfill	1697412	5676148	22.6		21.6 – 22.6
GND0255 ^b (control bore)	L8, south of composting area	1697388	5675542	20.8		19.8 – 20.8
GND0573	WQA, north and east of Stage 2	1696949	5676126	10		5 - 10
GND0575	AH1, north eastern of Stage 3	1697283	5676349	12		7 - 12
GND0598	WQD, pine forest east of northern toe	1697415	5676245	20.5		18.6 – 20.6

Bore	Location description	Easting	Northing	Bore depth (mbgl)	Relative level (masl)	Screened depth (mbgl)
GND1300 ^c	AH3, pine forest east of landfill	1697451	5675966	26		19 - 21
GND1301	AH2, eastern property boundary north of landfill	1697415	5676373	15.3		unknown
GND3133	AH3, pine forest east of landfill	1697460	5675967	18.3		9 – 18
GND3134	L2, pine forest east of landfill	1697424	5676150	23		8 - 23
GND3135 (control bore)	L9, southern end of landfill, up gradient of Stage 2	1697322	5675396	15.0		6 - 15

Key: a Bore collapsed as at 18/6/19 depth to base 19.52m
b Bore collapsed as at 18/6/19 depth to base 17.4 m
c Bore collapsed as at 18/6/19 depth to base 19.71m

Table 15 Chemical analysis of Colson Road landfill groundwater sampled June 2021

Parameter	Unit	GND0573	GND0575	GND0598	GND1301	GND3133	GND3134	GND3135
Date		28 Jun 21	28 Jun 21	30 Jun 21	28 Jun 21	30 Jun 21	30 Jun 21	28 Jun 21
Alkalinity Total	g/m ³ CaCO ₃	26	58	160	86	27	135	22
Aluminium Dissolved	g/m ³	0.003	0.004	0.008	< 0.003	< 0.003	0.014	0.016
Ammoniacal nitrogen	g/m ³ N	< 0.1	< 0.1	1.16	< 0.1	< 0.1	0.055	< 0.1
Arsenic Dissolved	g/m ³	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Beryllium dissolved	g/m ³	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Boron Dissolved	g/m ³	0.022	0.016	0.050	0.021	0.018	0.016	0.015
Cadmium Dissolved	g/m ³	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Chloride	g/m ³	82	73	21	29	23	22	40
Chromium Dissolved	g/m ³ N	< 0.0005	0.0005	< 0.0005	0.001	< 0.0005	< 0.0005	0.0009
Cobalt dissolved	pH	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0018	< 0.0002
Conductivity @ 25°C	mS/m	35.9	39.2	36.3	28.6	15.5	34.6	19.7
Copper Dissolved	g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0006	0.0006
Dissolved Oxygen	g/m ³	2.4	2.66	0.5	2.17	3.23	1.79	7.34
Dissolved Oxygen Saturation %	%	24.1	26.6	4.8	21.4	32.1	17.7	75.4
Iron Dissolved	g/m ³	0.03	< 0.02	0.15	< 0.02	< 0.02	< 0.02	< 0.02
Lead Dissolved	g/m ³	< 0.0001	< 0.0001	0.00034	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Manganese Dissolved	g/m ³	0.0072	0.0033	0.071	0.0015	0.0098	0.29	0.0151
Nitrite nitrogen	g/m ³ N	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.007	< 0.002
Nitrite/nitrate nitrogen	g/m ³ N	0.199	2.6	< 0.002	2.1	1.45	0.026	0.41
pH	g/m ³	5.7	6.0	7.9	7.0	6.3	7.7	5.9
Selenium Dissolved	g/m ³	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Sulphate	g/m ³	6.8	2.5	0.5	5.2	3.9	9.2	3.4

Parameter	Unit	GND0573	GND0575	GND0598	GND1301	GND3133	GND3134	GND3135
Temperature	Deg C	15.0	14.7	13.6	14.4	15.3	15.2	15.9
Un-ionised ammonia	g/m ³ N	< 0.000019	< 0.00004	0.029	< 0.00004	< 0.00001	0.00095	< 0.00001
Vanadium Dissolved	g/m ³	< 0.001	0.0044	0.0018	0.0085	< 0.001	0.0014	< 0.001
Water Level	m	4.405	7.32	9.812	7.685	12.466	12.98	8.09
Zinc Dissolved	g/m ³	0.0028	0.0027	0.0037	0.0093	< 0.001	0.0013	0.031
SVOC	g/m ³	ND	ND	ND	ND	ND	ND	ND

Key ND None detected

Historically, GND0598 has shown some elevation in alkalinity, conductivity, ammoniacal nitrogen, pH, dissolved manganese and dissolved iron when compared to the other bores. The results have remained consistent in this bore since the monitoring of each of these parameters began, which for the most part was prior to the construction of Stage 3. The elevated levels of these parameters in this bore are therefore not considered to be a result of leachate contamination.

The samples were also analysed for SVOCs (semi-volatile organic compounds) and none were found to be above detection levels. A copy of the SVOC results is available on request.

Although the NPDC subsurface drainage samples (Table 4, Section 2.3.1.2) is showing slight contamination from the impact of leachate for some parameters, on the whole, the groundwater results show little evidence of leachate contamination. During the year under review, all parameters measured for all the bores, were well within the ranges expected in Taranaki groundwater. However, there are some small changes in recent years, particularly in the chloride, conductivity and nitrate/nitrite nitrogen concentrations, that may be indicative of newly emerging trends.

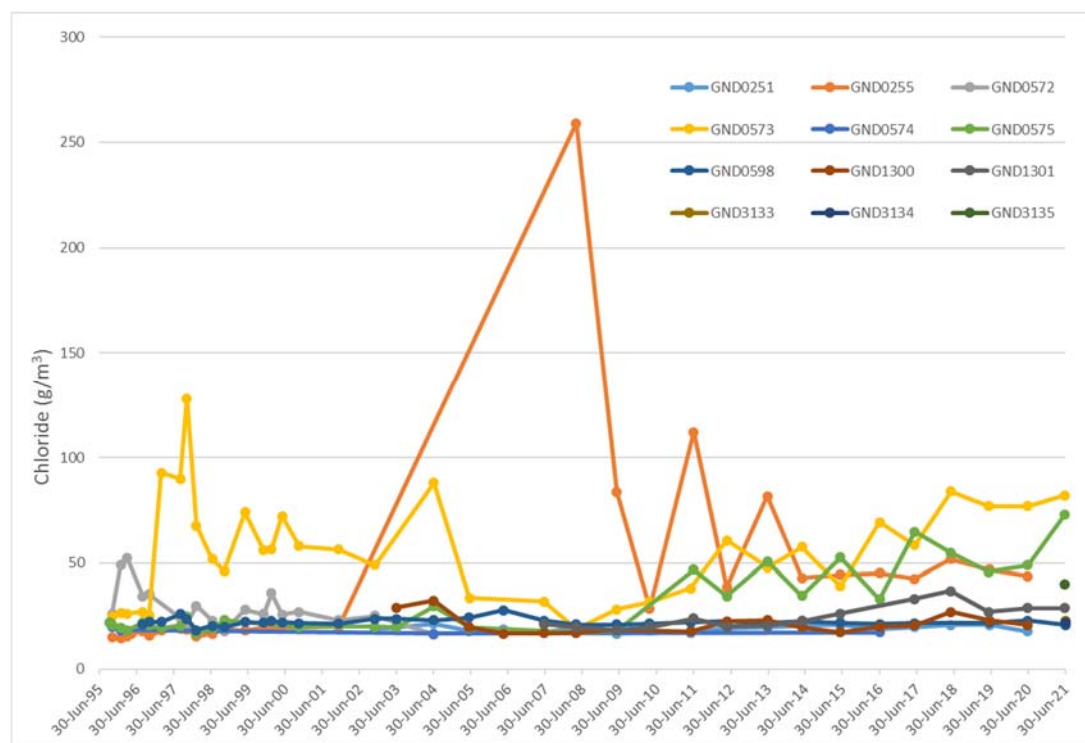


Figure 18 Chloride concentrations in the Colson Road groundwater bores

It can be seen that the chloride concentration and conductivities in bore GND0255 (up gradient of the landfill) had been stabilising at a decreased level since the spike found in April 2008. This bore was

confirmed as having become compromised during the year under review. An examination of historical records showed that this bore had an initial bore depth of 22.6 m. The bore was not sampled between January 2002 and March 2008. The recorded bore depth at the time of the April 2008 groundwater survey was 17.60 m indicating that the events that affected the integrity of the bore occurred prior to this resumption of monitoring.

In bores GND0573 (down gradient of Stages 1 and 2) and GND0575 (down gradient of Stage 3) although the changes are relatively small, it does appear that there may be an emerging trend of increasing chloride concentrations in the groundwater at these locations. This may be indicative of some minor leachate contamination. These trends are also apparent in the conductivity of the groundwater samples from these bores.

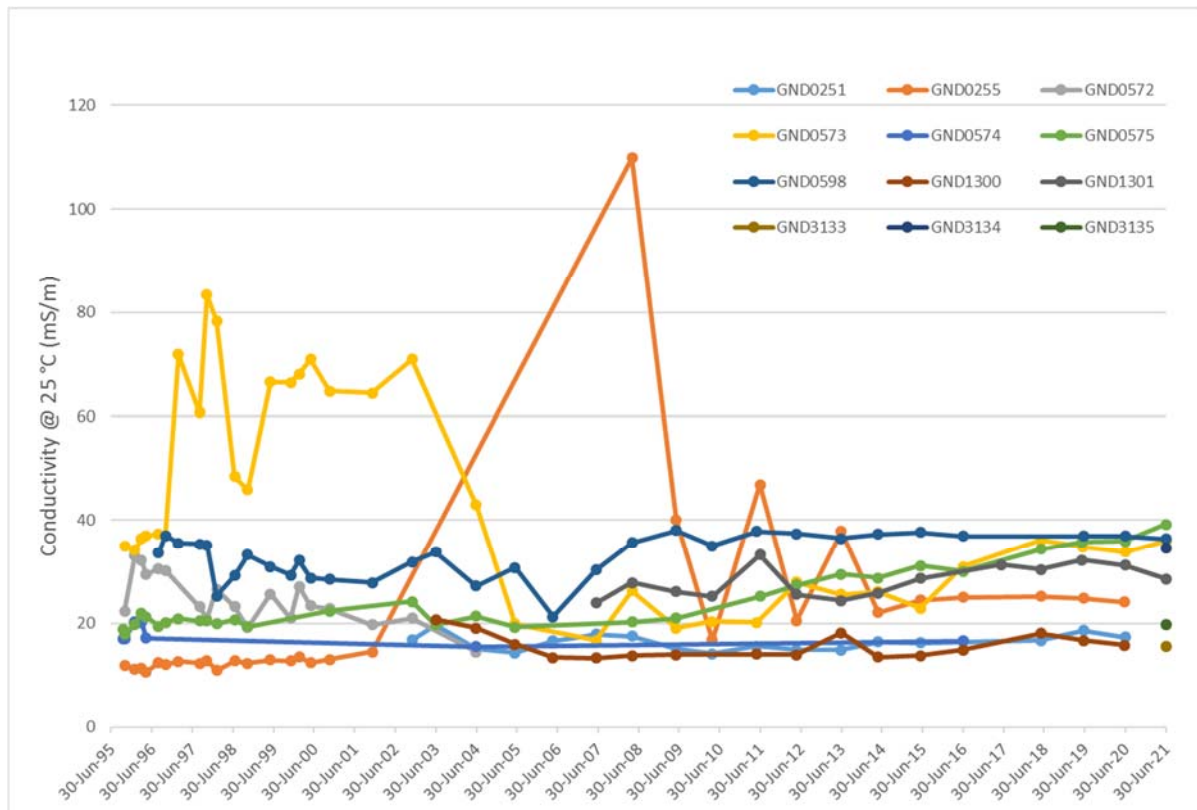


Figure 19 Conductivity in the Colson Road groundwater bores

Figure 20 shows that there may also be an emerging trend of increasing nitrate/nitrite nitrogen concentrations in GND0575 (north of Stage 3). This finding is consistent with emerging trend of increasing ammoniacal nitrogen in the under liner drainage results provided by NPDC (2.3.1.2, Figure 11).

Nitrate/nitrite nitrogen is not currently determined in the under liner drainage monitoring undertaken by NPDC. The nitrate/nitrite nitrogen concentration obtained at GND1301 (further east of the landfill than GND0575) during the year under review was again elevated above the historical median for this monitoring location, and was the third highest on record for this site. In contrast there is a trend of decreasing nitrate/nitrite concentration at GND0251.

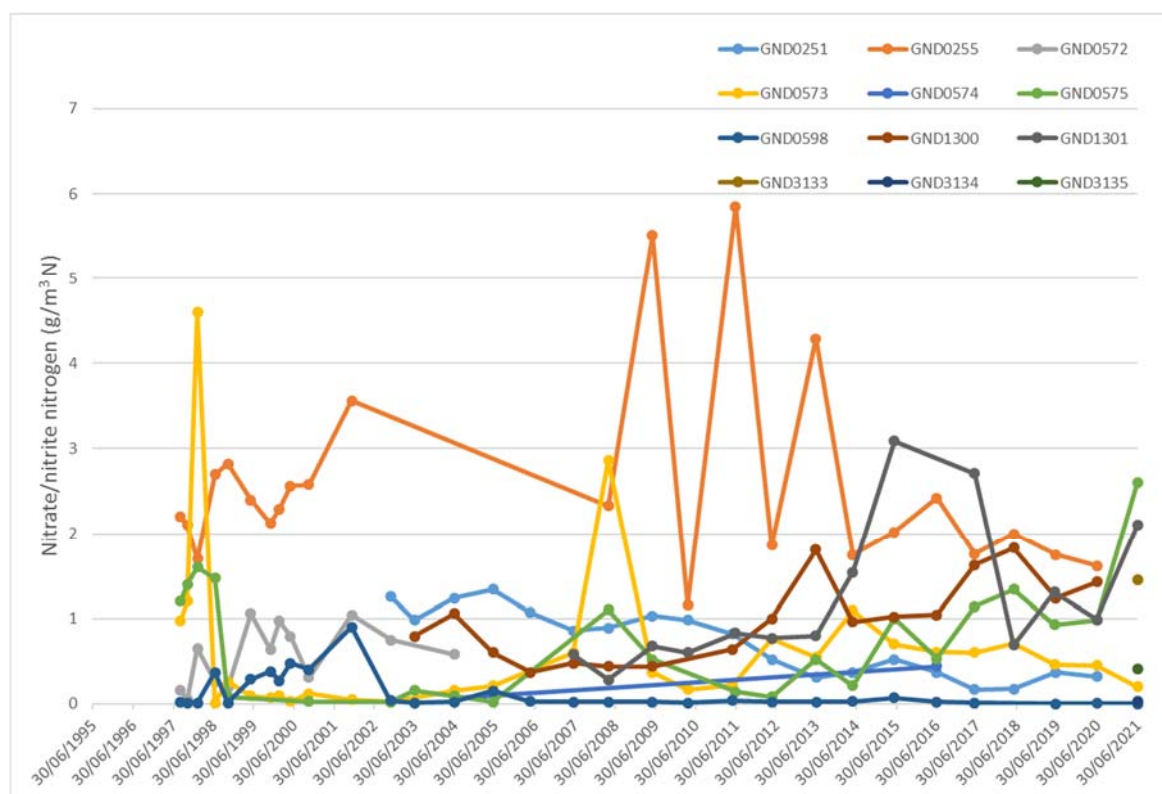


Figure 20 Nitrate/nitrite nitrogen concentrations in the Colson Road groundwater bores, June 2006 to date

In general terms, the groundwater quality in the vicinity of the landfill is good, and all parameters are comparable with typical Taranaki groundwater. The data gathered in this, and other monitoring periods, indicates that the effect that the Colson Road landfill is having on groundwater quality at this time is minor, at most.

2.5 Air

2.5.1 Data review – landfill gas flare

The Resource Management (National Environmental Standards for Air Quality) Regulations 2004 as at 1 July 2017 (NES) requires the control of greenhouse gas emissions at landfills (Regulations 25 to 27). Regulation 25 discusses the applicability of the two following regulations. In the case of the Colson Road landfill, Regulations 26 and 27 do not apply as the landfill has a total capacity of less than 1 million tonnes (the threshold for Regulations 26 and 27 to apply).

As discussed in Section 1.2, NPDC chose to install a flare at the landfill to mitigate odour issues that were resulting in a significant number of complaints in the 2014 to 2016 years. Although the NES does not apply at the site, this was used to provide guidance in the development of the conditions attached to the varied consent and on the “best practicable option” requirement contained in the pre-existing consent.

Conditions on the varied consent 4779-1.1 require that:

1. Within three months of the first operation of any landfill gas flare, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a measurement of the temperature of the flare together with a measurement of the concentrations of methane and of hydrogen sulphide in the flare feedstock. Thereafter the consent holder shall annually provide updated information on flare temperature and feedstock composition.

- 3 The first revision of the landfill management plan, described in condition 9(c) following installation of any landfill gas flare shall describe, variously, methods of, schedules for, and/or the recording of: observations and inspections of the flare, its operation, and its effects, including downwind odour and smoke plume details; a calibration schedule; records of maintenance; and any complaints. Information gathered under these provisions shall be made available to the Chief Executive, Taranaki Regional Council upon request.

Condition 1

Commissioning of the flare was completed on 28 March 2018, with testing undertaken by an independent consultant on the same day. The information required to satisfy special condition 1 was received within the three months stipulated by consent conditions, on 16 April 2018 and has been presented in the 2017-2018 Annual Report.

Updated annual information on the feed gas and temperature was provided upon request in the form of graphed gas flow, methane concentration in the feed gas and temperature data from the continuous (1 minute) data collected by the monitoring system that is integrated into the flare system (Figure 21 and Figure 22).

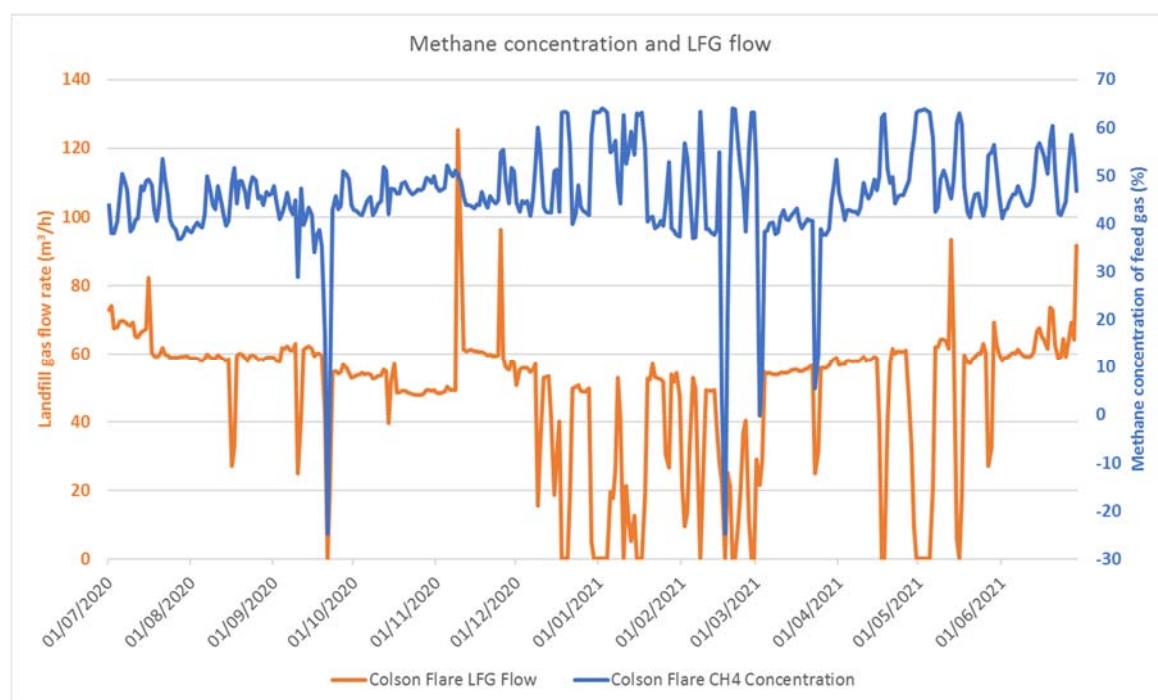


Figure 21 Flare feed gas flow rate and methane concentration during the year under review

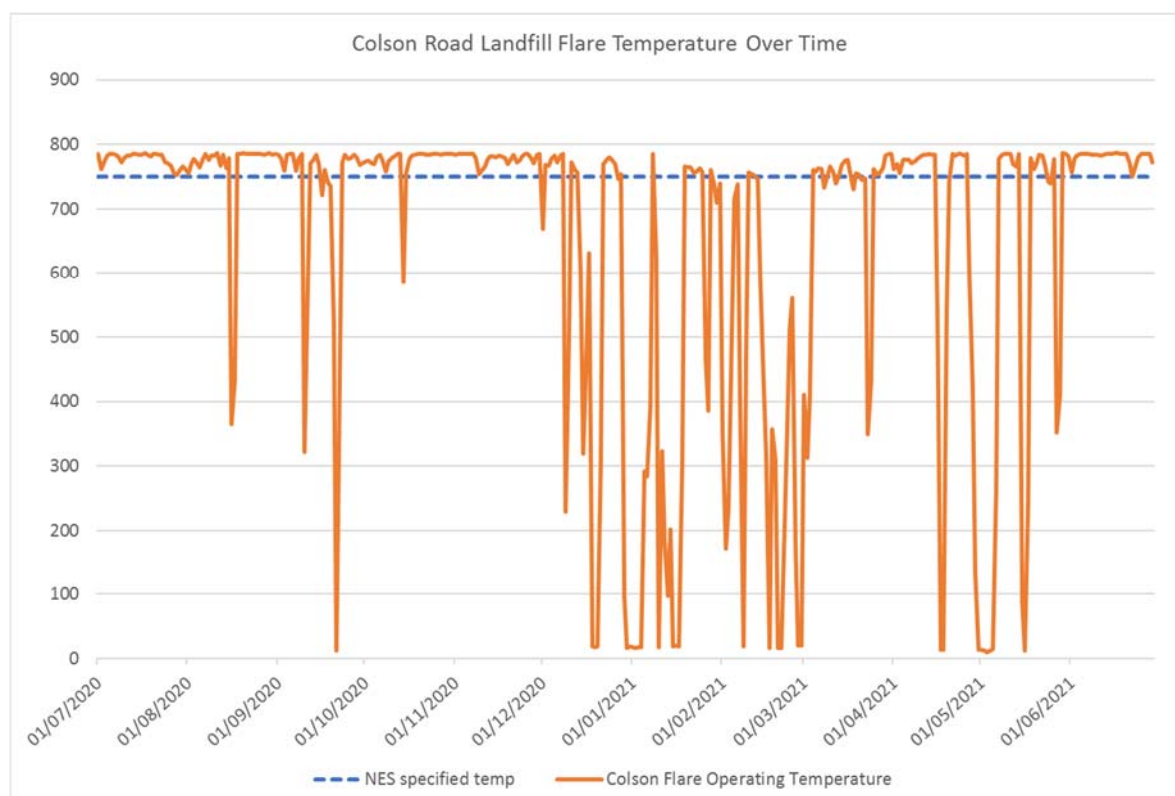


Figure 22 Colson Road landfill flare temperature for the year under review

The hydrogen sulphide concentration of the feedstock gas was measured on three occasions during the year under review with the results given in Table 16.

Table 16 Feedstock gas hydrogen sulphide concentration test results

Date	Hydrogen sulphide concentration (ppm)
31 October 2029	25.0
12 December 2019	11.0
21 January 2020	2.0
10 August 2020	10
8 September 2020	10
30 June 2021	0

Due to the number of occasions that the flare temperature was recorded to be less than is optimal for complete combustion of the landfill gas components, to check that the flare was being operated in accordance with the best practicable option (condition 4 of consent 4779-1.1) based on the guidance provided by the NES, NPDC confirmed that:

- The system incorporates automatic isolation valves and a flame arrestor so that there are no emissions of unburnt gas from the flare during periods when the flare is not operational;
- While the flare is not operating the landfill gas is not extracted. It accumulates in the landfill and vents passively as is the case with all smaller landfills that are not required to have an engineered extraction and flaring system;
- During times of operation the flare temperature was maintained at or above 750°C.

- There is a process for manually restarting the flare given that for safety reasons, the flare does not have an auto-ignition system. Council was informed that a text alarm is sent to NPDC staff, who will respond during work hours and attempt to restart the flare, resulting in varying response times.

The total landfill gas volume treated by the flare during the year under review was 425,383 m³ calculated from daily average landfill gas flow in m³/h. This is 3% lower than the total of 440,758 m³ for the 2019-2020 year. The approximate monthly landfill gas volumes are shown in Figure 23.

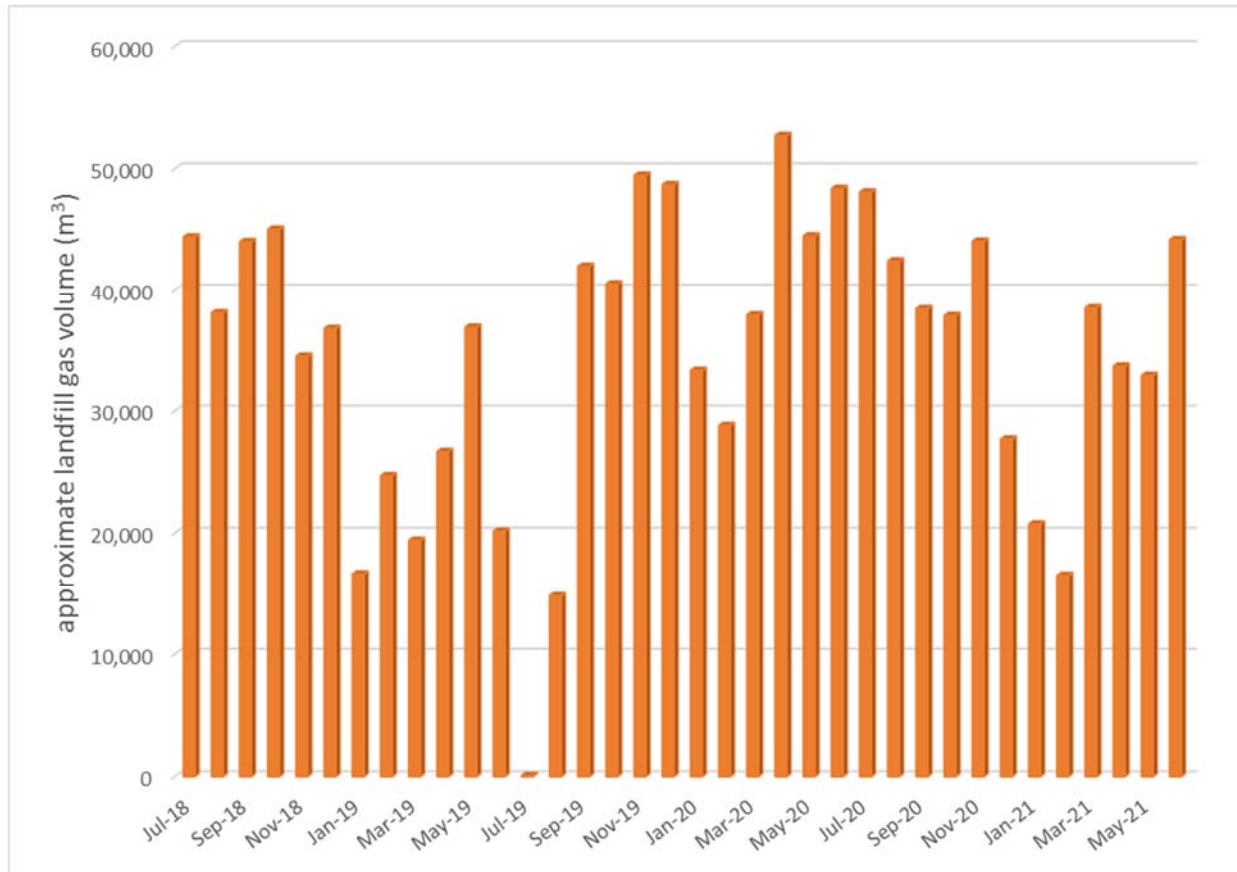


Figure 23 Monthly landfill gas flow volumes flared, July 2018 to date

Condition 3

The Colson Road Regional Landfill Management Plan was updated in June 2018. It included a general description of the flare, outlined that the flare's performance is continually monitored by means of real time electronic data. The plan also clarified that NPDC, with the support of external contractors, have responsibility for the maintenance, inspections and calibration of the flare. The plan references a separate specific NPDC procedure for the management and operation of the flare that must be adhered to, which has also been received. It has previously been confirmed that the plan covers the required procedures, schedules and records keeping information. The latest iteration of the Colson Road Regional Landfill Management Plan retains this information.

A flare fault log was provided for the year under review. This showed that there was a total of 59 non-operational days due to faults (40 in total), which is 16% of the year (compared to 28% in the 2019-2020 year). Issues with the burner resulted in 23 of the shutdowns, seven were due to compressor faults, seven were due to planned or unplanned power outages, two were due to planned maintenance and one was for an unknown reason. In all but three of the unplanned shutdowns, no specific maintenance was required to bring the flare back on line as restarting the system was effective. The length of the outages varied and were affected by the response being limited to during normal working hours. The shortest outage was approximately one and a half hours. The longest outage was seven and a half days from Thursday 29 April

to Tuesday 6 May 2021. In this instance, the reason given for the shutdown was a compressor fault and the unit was restarted. A summary of the monthly non-operational hours is given in Table 17 and Figure 24. Outages are counted in the month in which the non-operation period commenced in the cases where the outage started in one month and the flare was restarted in the following month.

Table 17 Statistical summary of the Colson Road landfill gas flare non-operational hours for the year under review

Month	No. shutdowns	Average non-operational time (days)	Maximum non-operational time (days)	Minimum non-operational time (days)	Monthly total non- operational time (days)
Jul-19	0	-	-	-	0
Aug-19	1	-	-	-	1.0
Sep-19	2	1.4	1.9	0.9	2.8
Oct-19	1	-	-	-	0.3
Nov-19	0	-	-	-	0
Dec-19	6	1.6	3.8	0.3	9.3
Jan-20	10	1.3	4.3	0.1	14.0
Feb-20	11	1.3	2.5	0.6	15.0
Mar-20	2	0.8	1.1	0.5	2.5
Apr-20	4	1.3	0.1	2.7	5.3
May-20	3	2.4	5.7	0.6	9.4
Jun-20	0	-	-	-	0
Totals	40	-	-	-	59.6

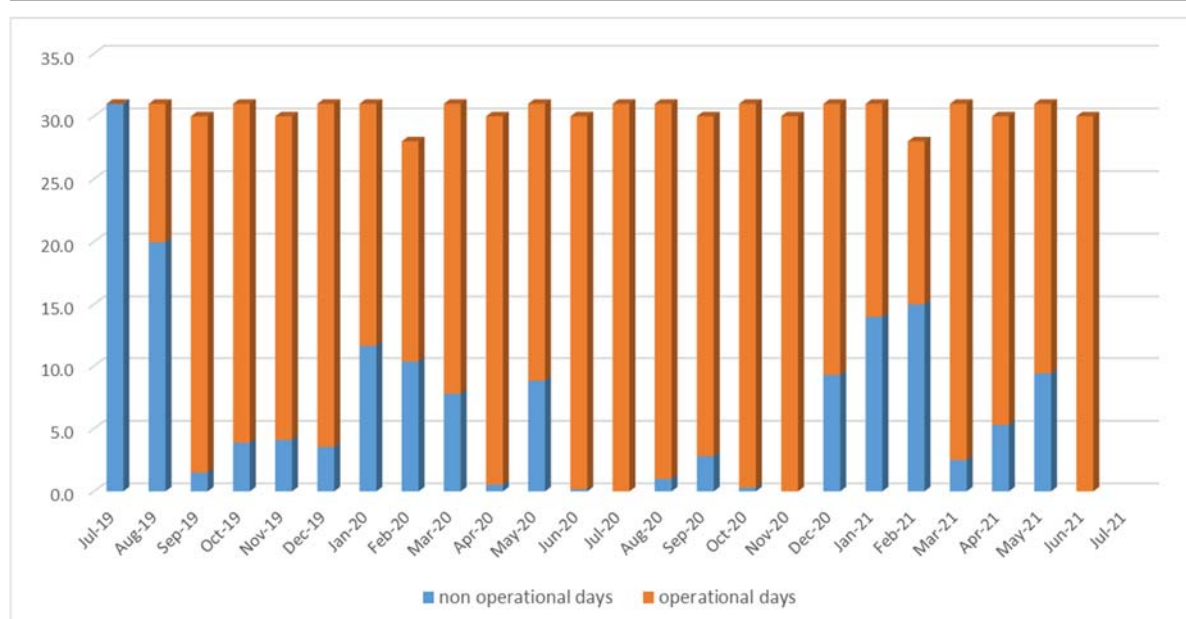


Figure 24 Monthly operational/non-operational hours for the Colson Road landfill gas flare for the 2019 to 2021 years.

Despite the slightly lower total non-operational time during the 2020-2021 year, a smaller volume of landfill gas was treated during the year under review than during the previous year. It is noted that there were no odour complaints attributable to the landfill operation received by the Council during any of the non-operational periods.

2.5.2 Results of receiving environment monitoring

2.5.2.1 Deposition gauging

Many industries emit dust from various sources during operational periods. In order to assess the effects of the emitted dust, industries have been monitored using deposition gauges.

Deposition gauges are basically buckets elevated on a stand to about 1.6 m. The buckets have a solution in them to ensure that any dust that settles out of the air is not re-suspended by wind.

Gauges are placed around the site and within the surrounding community. The gauges were left in place for a period of two weeks to a month, on two separate occasions.

The rate of dust fall is calculated by dividing the weight of insoluble material collected (g) by the cross-sectional area of the gauge (m^2) and the number of days over which the sample was collected. The units of measurement are $\text{g}/\text{m}^2/\text{day}$.

Guideline values used by the Council for dust deposition are $4 \text{ g}/\text{m}^2/30 \text{ days}$ or $0.13 \text{ g}/\text{m}^2/\text{day}$ deposited matter. Consideration is given to the location of the industry and the sensitivity of the surrounding community, when assessing results against these values.

Material from the gauges was analysed for solid particulates, the results of which are presented in Table 18.

Table 18 Air deposition monitoring results for January and February 2020

Site code	Site description	Particulate $\text{g}/\text{m}^2/\text{day}$	
		6 Jan 2020 to 27 Jan 2020 (21 days)	10 Feb 2020 to 3 Mar 2020 (21 days)
AIR001603	At entrance to landfill	0.02	*
AIR001604	Adjacent to Manganaha Stream, behind rose nursery	0.03	0.08
AIR001608	124 Egmont Road, paddock boundary, west of house	0.02	0.09
AIR001613	Grass lawn, behind work shed	0.02	0.05
AIR001622	At rear of RSPCA building	0.03	0.10
AIR001623	Behind 194 Egmont Road	0.03	0.01

* Gauge empty

All results of both surveys were below guideline deposition values of $0.13 \text{ g}/\text{m}^2/\text{day}$.

2.5.2.2 Ambient suspended particulate and landfill gas component monitoring

Ambient monitoring of suspended particulates (dust) and/or landfill gas components was undertaken under dry weather conditions on two occasions during the year under review at seven monitoring locations on, and in the neighbourhood of, the landfill. The particulate (dust) monitoring was undertaken using a

DustTrak, and the methane and H₂S monitoring was undertaken using a MultiRae. The results are shown in Table 19 and Table 20.

Particulates

Particulates can derive from many sources, including motor vehicles (especially diesels), solid and oil-burning processes for industry and power generation, incineration and waste burning, photochemical processes, and natural sources such as pollen, abrasion and sea spray.

PM₁₀ particles (those of less than 10 µm in diameter) are linked to adverse health effects that arise primarily from the ability of particles of this size to penetrate the defences of the human body and enter deep into the lungs. Health effects from inhaling PM₁₀ include increased mortality and the aggravation of existing respiratory and cardiovascular conditions such as asthma and chronic pulmonary diseases. The national guideline for air quality (averaged over a 24 hr period) is 50 µg/m³ PM₁₀.

Landfill gas components

The landfill gas components monitored during the ambient surveys in the year under review were methane and H₂S.

The monitoring showed that there were no exceedances of the PM₁₀ guideline. There were no landfill gas components detected at the time of either of the surveys when this monitoring was carried out.

Table 19 Ambient PM₁₀ and methane survey results, 17 March 2021

Site	Methane (%LEL)	H ₂ S (ppm)	PM ₁₀ µg/m ³
AIR001603 (on-site)	0	0	11
AIR001619 (on-site)	0	0	12
Top SE corner of track (on-site)	0	0	11
Beside leachate pond (on-site)	0	0	12
Beside flare (on-site)	0	0	10
AIR001612 (off-site)	0	0	9
AIR001615 (off-site)	0	0	11
Averages	0	0	11

Table 20 Ambient PM₁₀ and methane survey results, 7 April 2021

Site	Methane (%LEL)	H ₂ S (ppm)	PM ₁₀ µg/m ³
AIR001603 (on-site)	0	0	14
AIR001619 (on-site)	0	0	14
Top SE corner of track (on-site)	0	0	14
AIR001610 (on-site)	0	0	17
Beside flare (on-site)	0	0	14
AIR001612 (off-site)	0	0	15
AIR001615 (off-site)	0	0	14
Averages	0	0	15

Table 21 Ambient PM₁₀ and methane survey results, 7 May 2021

Site	Methane (%LEL)	H ₂ S (ppm)	PM ₁₀ µg/m ³
AIR001603 (on-site)	0	0	11
AIR001619 (on-site)	0	0	10
Top SE corner of track (on-site)	0	0	12
AIR001610 (on-site)	0	0	6
Beside flare (on-site)	0	0	11
Beside leachate pond (on-site)	0	0	11
AIR001612 (off-site)	0	0	9
AIR001615 (off-site)	0	0	9
Averages	0	0	11

2.5.3 Composting

In the past concerns have been raised about whether the material in each windrow had a plant derived matter content of at least 95% as required by consent conditions. These concerns were mostly directed at the acceptance of stock bedding which is a mixture of hay (or wood chips) and manure. To address this the Council clarified plant derived matter as being any plant derived material that has only been exposed to external degradation processes (and has not been partially or wholly ingested by any type of animal). This definition includes green waste, shredded green waste, humate, untreated woodchip/shavings, the plant derived component of animal litter (such as hay and wood shavings), and old existing compost stored on the site. This definition does not include paunch grass, or animal manure. It is however Council's position, that poultry, goat and horse manure are acceptable constituents of the 5% non-plant derived proportion of the windrows.

Changes occurred to the composting operations during the 2014-2015 year, due to a change in the contractor employed by EnviroWaste, who is the operator of the transfer station.

The main compost operator on site changed from Return2Earth to Revital.

During the 2019-2020 year, work was completed on preparing the southern end of the composting area to be used as a borrow area for landfill cover material, as discussed in Section 1.2. This work began by excavating the treatment ponds for the remaining composting area, which would then allow the extraction of cover material from this composting pad area. Plans were submitted to Council outlining the drainage that would be constructed to accommodate the relocated activity prior to any work being undertaken and this was done.

In summary, during the year under review, there were no issues raised with regards to the condition relating to the acceptable percentage of non-plant derived material throughout the monitoring period. It was also considered, in general, the stormwater from the composting areas was being managed such that compliance with the conditions of the stormwater discharge consents for the landfill was not being compromised by the composting activities, with no issues noted. No odours were detected at the composting area during any of the inspections. There were also no concerns raised relating to dust in this area, with only localised dust found to be generated by vehicle movements during two of the inspections.

2.6 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 NPDC. 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).

Table 22 below gives an outline of any incidents recorded, additional investigations, or interventions required by the Council in relation to NPDC's activities during the 2020-2021 period. This table presents a summary of all events that required further investigation or intervention regardless of whether these were found to be compliant or not, and includes any on-going matters from previous years. Where additional investigations were undertaken, they are reported in more detail following the table.

Table 22 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
23-May-2018	During routine monitoring it was found that capping, compaction and vegetative cover in the Stage 2 area was insufficient to comply with resource consent conditions.	N	Abatement notice issued	Cap depth investigations by NPDC during the year under review found that the cap depth was insufficient in some areas. A remediation plan was developed and presented to the Council. An abatement notice was issued requiring that works be undertaken to ensure compliance by 15 March 2020. Extension of due date to 14 March 2021 approved to allow prioritisation of Stage 3 capping. Further extension to 14 March 2022 approved during the year under review
21-Jul-2020	During analysis of data it was found that three groundwater monitoring bores were compromised and also that there were some changes in parameters in the groundwater in the under liner drain that likely exceeded the maximum natural background variation. It was also found that the "trigger values" that should have been included in the sites monitoring plan had not been identified and documented.	N	Abatement notices issued	NPDC have undertaken further investigation and have confirmed that non-compliant discharges are occurring. Compromised groundwater bores were replaced. Change to consent granted with respect to the bores that are required to be maintained. Abatement notice EAC-23543 was complied with. Investigations continued during the year under review. Management plan updated.

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
				Early consent renewals to be sought to ensure compliance with abatement notice EAC-23544 by 30 April 2023
17-Aug-2020	A complaint received of a silage smelling odour	Y	N/A	The source of the odour was confirmed as being open special waste pits at the Colson Road landfill. However, the odour was deemed not to be objectionable as the odour was not continuous at time of inspection. Cover was placed in the open pit to stop the odour
11-Dec-2020	Notification was received concerning an overflow from a leachate pond at the Colson Road Landfill	N	Letter of explanation requested	Explanation received and accepted. No further enforcement action
4-Feb-2021	During analysis of samples taken during routine monitoring it was found that consent conditions had been contravened at the Colson Road Landfill site	N	Letter of explanation requested	Explanation received and accepted. No further enforcement action

21 July 2020

During the 2019-2020 year NPDC commissioned a consultant to conduct a two part desk top study to:

- assess the Stage 3 under liner drainage, and if contamination is confirmed, identify possible sources of that groundwater contamination; and
- consider the effect of any contamination and options to address it.

The consultant's report covering the first part of this investigation was provided to Council following a meeting on 21 July 2020. This report identified that there were a significant number of parameters that either exceeded the calculated natural maximum values and/or showed increasing trends over time, suggesting that contamination of the groundwater collected by the under liner drain had occurred between 2008 and 2019. It was identified that the contamination appeared to originate from the landfill and that this was most likely to be as a result of leakage of leachate to the under liner drain. Further investigation was recommended to determine:

- The direction of groundwater flow by carrying out a hydrogeological assessment to determine if groundwater may be flowing offsite or whether it is being captured in the under liner drain;
- Whether the contamination noted in the groundwater discharged through the under liner drainage system or potentially migrating offsite in groundwater may be affecting the downstream/down gradient groundwater and surface water quality (including trend analysis on groundwater and surface water quality data); and
- Options to address groundwater and surface water quality impacts if necessary.

Special conditions 5 and 6 of consent 4621-1 states

5. *THAT should groundwater quality be significantly affected by activities or processes associated with the landfill or composting, then the consent holder shall implement such measures as are necessary to remedy or mitigate and if practicable to prevent the continuation of any effect upon quality of the*

groundwater. 'Significantly affected' for the purposes of this condition is defined as a change greater than the maximum natural variation in any parameter for water in any piezometer, bore, or spring, and the criteria for this shall be set out in the monitoring programme under condition 6.

6. THAT the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the Chief Executive, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.

It was found that the maximum natural variations had not been provided to Council. It was also noted that a similar requirement to set out guidelines for the determination of whether contamination is occurring in the surface waters that is contained in condition 5 of consent 4619-1 had also not been complied with.

A letter of explanation was requested.

The response was accompanied by a preliminary summary of the Part 2 investigation. The preliminary summary indicated that there may be some limited impact on groundwater quality beyond the underliner drain, however while some parameters have demonstrated increasing trends, these are only small increases and the contaminant levels remain below relevant water quality standards. The preliminary summary also indicated that where surface water samples have exceeded the water quality guidelines these were not considered to be the result of contaminants in the discharge from the underliner drain. Maximum limits for calculated natural variation had also been determined. NPDC proposed that, considering the change in landfill activity following closure in October 2020, it is logical to review monitoring requirements and align groundwater bore locations with proposed monitoring to ensure the programme is fit for purpose. As NPDC is committed to ensuring compliance with resource consent requirements, the following timeline was proposed to the identified matters and any further recommendations from Part 2 and 3 of the investigation:

Table 23 Proposed timeline for resolution of consent non compliances

Action	Timeframe
Complete Part 2 investigation	18 September 2020
Complete Part 3 investigation	20 November 2020
Confirm new bore locations with Council	December 2020
Apply for variation to consent 4621-1 in relation to the specified bores that are listed as needing to be maintained in condition 1	February 2021
Install new bores (subject to supplier availability and weather)	By 30 April 2021
Lodge renewal applications for the landfill consents that are due to expire in June 2025	2022

Following receipt of this report two abatement notices were issued.

Abatement notice EAC-23543 was issued requiring that works be undertaken to comply with condition 1 of consent 4621-1 by 30 April 2021. This consent condition lists specific bores that are required to be maintained including several bores that were within the landfill footprint that have been appropriately retired. It was agreed that the three compromised bores would be replaced either at the same location or, in the case of the control bore, at a suitable alternative location. A change to consent was granted and the bores were installed. This abatement notice was complied with during the year under review.

Abatement notice EAC-23544 was issued requiring that works be undertaken to comply with conditions 5 and 6 of consent 4621-1 and condition 5 of consent 4619-1 by 30 April 2021.

In summary, the Part 2 investigation found that groundwater and surface water analytical results indicated a likely release of contaminants associated with the landfill beneath the Stage 3 liner, and although the under

liner drain provides a preferential pathway, some groundwater may bypass the drain and travel north-northwest with the natural flow of groundwater. Analysis of the groundwater data suggested that the impact on groundwater quality down gradient of Stage 3 is relatively minor and unlikely to present a human health risk. Parameters that do exhibit an increasing trend are generally at low levels and do not indicate imminent or near-future exceedances of the drinking water standards. It was concluded that discharges from Stage 3 were not significantly degrading water quality in either down gradient groundwater or the downstream Puremu Stream. On this basis, immediate remedial action was not considered necessary. The consultant recommended ongoing monitoring and assessment to determine any future need for remedial action.

The Part 3 investigation focused on developing a site-wide monitoring programme that considers the site conditions characterised in Part 1 and is protective of the receptors identified in Part 2. Additionally, NPDC requested an assessment of suitable locations for monitoring wells to replace the three damaged wells. The scope of work was as follows:

- Developing a recommended site-wide monitoring programme comprising:
 - Appropriate monitoring locations for surface water and groundwater that provide suitable coverage.
 - A targeted list of analytes based on historical concentrations and typical leachate constituents;
 - Appropriate response procedures in the event of an exceedance of a trigger value and/or consent limit; and
 - A stepped reduction in monitoring frequency, in accordance with Ministry for the Environment (MfE) guidance.
- Identifying appropriate consent limits for surface water and groundwater, that are protective of likely receptors and based on published guidelines, and suitable "point of compliance" monitoring locations;
- Developing trigger values (TV) for surface water and groundwater to provide advance warning of contamination that may lead to a consent limit being exceeded in the future at the point of compliance;
- Recommending suitable locations for replacement monitoring wells

During the review of the report by Council officers, there were a number of discussions focusing on ensuring that any monitoring programme addressed:

- current consent conditions; and
- the identification and evaluation of potential adverse effects on the environment in preparation for the application for early renewal of the landfill discharge consents; and
- the concerns raised by the submitters (including the Te Atiawa Tribal Council) during the processing of the application for the current consents.

Following these discussions Council developed the methodology that would be applied to the development of the monitoring programme during the transition of the site from a closing site with a recently emerged trend of increases in some of the indicator parameters, to a closed site that there is a clear conceptual model for. The methodology is outlined in Table 24.

Table 24 Monitoring programme objectives and programme development methodology

On-going monitoring	Baseline and site characterisation	Post closure monitoring
<u>Objective:</u> <i>Compliance monitoring of discharges and effects in relation to current consent conditions</i>	<u>Objective:</u> <i>Investigation of emerging contamination issue and information gathering for the re-consenting AEE</i>	<u>Objective:</u> <i>Compliance monitoring of discharges and effects in relation to consent conditions on the closed site consent(s)</i>
Monitoring of the existing site against the current consent conditions	<u>Step 1.</u> Baseline characterisation of contaminants in the actual or potential discharges from the site at the time of closure, as per the recommendation in "A Guide to the Management of Closed and Closing Landfills in new Zealand" and international best practice landfills. Presence or absence of seasonal variation needs to be understood.	
	<u>Step 2.</u> Determination of groundwater flow directions and appropriate on-going groundwater monitoring locations (may be prior to or concurrent with step 1. This is required to enable the following steps)	
Appropriate modification of compliance monitoring programme against the current consent conditions	<u>Step 3.</u> Review results from Steps 1 and 2 and determine appropriate on-going monitoring locations and parameters for groundwater and surface water discharges and receiving water sites with respect to actual or potential adverse effects and current consent conditions.	
	<u>Step 4.</u> Determine appropriate consultation, consent conditions and consent limits during the re-consenting process	Monitoring of the closed site against the new consent conditions with an understanding of the potential environmental effects and a clear conceptual model.

It is noted that the programme developed for the monitoring of the closed site will need to include the "contingency comprehensive monitoring" and details of the contaminants and levels at which more comprehensive monitoring will need to be undertaken based on "indicator" results

It was proposed that the first year of baseline and site characterisation monitoring be commenced in the 2021-2022 year. A recommendation to this effect is attached to this report.

It was determined that compliance with the abatement notice could not be achieved until there was a change to condition 5, as this condition contains a specific definition of "significantly affected" as being a change greater than the maximum natural variation. It is noted that this differs from the definition of a "significant effect" in the RMA. So, whilst this condition was deemed appropriate and agreed to by both NPDC and the submitters at the time the discharge application was processed, this may not be appropriate for the re-issued consents. This would be determined during the processing of the application for the replacement consents.

Council agreed that the timing of the early application to renew the landfill consents could be revised to ensure that there is sufficient information available to inform the assessment of environmental effects and to allow pre-application consultation. A schedule was provided by NPDC that outlined the timeframes for the various activities that would need to be undertaken during the preparation to lodge the consent replacement application. Based on this schedule a request was made to extend the deadline on the abatement notice to 30 April 2023. This was approved by Council.

11 December 2020

On Friday 11 December 2020, notification was received from NPDC that an overflow from the stormwater and leachate pond at the Colson Road Landfill, Colson Road New Plymouth, was likely, as a result of significant rainfall. An email was received from NPDC on Monday 14 December 2021 advising that due to a blockage in the overflow pipe there was no discharge to the stream, that the volume was small enough to be contained within the manhole and the manhole had been pumped out. On 14 January 2021 investigation of the overflow pipe determined that no blockage was present and an overflow had occurred. This was reported to Council on 18 January 2021 accompanied by notification that an investigation was underway by NPDC. A letter of explanation was requested. The report on NPDC's investigation was received on 27 January 2021. NPDC had determined that initial investigation of the blocked pipe should be delayed until the leachate pond was empty. This was due to concerns that should the pipe rupture during the investigation, the entire volume of the leachate pond would be drained into the stormwater pond and from there, enter the Puremu Stream. At this time NPDC was also addressing other wastewater related issues throughout the district representing a greater risk to residents and the environment as a result of the heavy rainfall event. NPDC's investigation found that the cause of the overflow was cumulative high rainfall and high groundwater levels. The Stage 1 and 2 areas of the Landfill (Area A) are unlined and can therefore be impacted by rising groundwater levels. It was concluded that the system performed as per design in a high rainfall situation. Leachate was diluted by rainfall and surface water runoff within the leachate pond, after overflowing from the pump station into the leachate pond, and the discharge from the leachate pond overflow discharge is then further diluted within the stormwater pond prior to discharge to ensure minimal impact on the Puremu Stream. At the time of the event the following corrective actions were undertaken:

- The contractor closed the leachate valve from Stage 3 to reduce leachate inflow to the pump station and pond;
- the pump station operation was monitored to ensure the pumps continued to operate and divert as much leachate to the sewer throughout the event;
- a sample of leachate from the pump station was collected and tested;
- the manhole containing the leachate pond overflow was pumped out to reduce the rate of overflow;
- further investigation into a suspected overflow pipe blockage was undertaken once the leachate pond had been emptied.

The following long term corrective actions were also undertaken:

- Improve contractor understanding of the leachate/stormwater system,
- In any future events, collect samples from the stormwater pond and leachate pond in addition to sampling from the leachate pump station.

It was considered that no further enforcement action was necessary.

4 February 2021

On Thursday 4 February 2021, during routine monitoring, surface water sampling undertaken to monitor the discharges and effects from the Colson Road Landfill at Colson Road, New Plymouth. Analysis of the samples found the consent limits for ammoniacal nitrogen given condition 14 of consent 2370-3 and condition 2 of consent 4619-1 had been exceeded (Section 2.3.3.2.2). Follow-up sampling was undertaken

17 March 2021. Analysis found that the consent limit for ammoniacal nitrogen given in condition 14 of consent 2370-3 was again exceeded. The results of this sampling are provided in Table 25.

Table 25 Chemical analysis of the Puremu Stream, re-sampled on 17 March 2021

Parameter	Unit	PMU000100 500 m u/s of landfill	PMU000109 Trib d/s large silt pond	STW001006 small silt pond	PMU000110 d/s landfill culvert	PMU000113 d/s SPCA drive culvert	Consent limits at PMU000113* (PMU000110*)
Alkalinity	g/m ³ CaCO ₃	29	106	200	73	83	NA
Ammoniacal-N	g/m ³ N	0.042	0.48	17.7	2.8	1.88	2 [at pH<7.75; limit is pH dependant] (2.5)
Chloride	g/m ³	24	56	71	41	45	
Conductivity	mS/m@25 °C	14.8	39.6	66.6	30.1	32.8	NA
Dissolved oxygen	g/m ³	7.49	5.05	-	7.35	7.69	≥ 6.49 [-1] (≥ 5.0)
Oxygen saturation	%	74.7	51.1	-	73	76.6	NA
Manganese Dissolved	g/m ³	0.36	6.6	4.9	1.08	2.6	NA
Manganese Total	g/m ³	0.44	6.2	4.7	0.97	2.3	5.0 (1.0)
Nitrate/nitrite N	g/m ³ N	0.041	0.55	0.58	0.91	0.87	10 (100)
pH	pH	7.0	7.1	6.8	7.2	7.2	≥ 6.5 & ≤ 8.5 ([within ± 0.5])
Suspended solids	g/m ³	5	12	13	3	3	15 [+10]
Temperature	Deg C	15.3	15.9	15.9	15.0	15.2	(≤ 19.4 [+2])
Unionised ammonia	g/m ³ N	0.00014	0.0021	0.040	0.016	0.0092	NA

Key: * Consent limits with no brackets are for consent 4619 at site PMU000113

** Consent limits shown in rounded brackets are for consent 2370-3 at site PMU000110

[] indicates this is a maximum permitted change from the upstream value at PMU000100

A letter of explanation was requested.

NPDC's investigations determined that based on the sample results, the elevated ammoniacal nitrogen concentration appeared to be coming from the series of two small ponds at sample point STW001006. As the two small ponds are only fed by stormwater from part of the main access pond and part of the western

side of Stage 3 that is fully stabilised NPDC was looking into the practicality of decommission these ponds. It is noted that groundwater infiltration into the pipework feeding these ponds and from the base of the pond itself, including potentially, minor amounts of leachate from below Stage 1 and 2. There had been no significant rainfall for just over two weeks prior to the follow-up sampling. Therefore the water entering the ponds was likely to be groundwater infiltration. There is also the potential for water in these ponds to become stagnant and concentration contaminants as a point source discharge.

NPDC undertook additional sampling of the Stage 1 and 2 leachate and under liner drain in April 2021, and these were analysed for a comprehensive range of parameters. The results were provided to Council and the results for the contaminants relevant to this consent non-compliance are presented in Table 26.

Table 26 Selected parameters from NPDC follow-up sampling, April 2021

Sampling site	Date	Ammoniacal nitrogen (g/m ³)	Chloride (g/m ³)	Total manganese (g/m ³)
Stage 1 and 2 leachate	15 Apr 2021	131	65	1.52
Under liner drain	19 Apr 2021	3.2	59	2.5

The NPDC letter of explanation noted that the ammoniacal nitrogen was only marginally above consent limit, and in the most recent sample, the ammoniacal nitrogen concentration was not exceeded at site PMU000113. Therefore NPDC concluded that the downstream effects were considered to be negligible and limited to within the landfill boundary. Further investigations were proposed including to determine if any effects could be detected within the groundwater and to investigate the practicality of filling in the small silt ponds. At the time of writing this report, as a result of these further investigations by NPDC, it had been identified that groundwater and leachate infiltration was occurring into a stormwater pipe that carries stormwater from one of the open grates near the weighbridge, under Stage 1B to the small sediment pond system. The surface stormwater flow has been diverted away from Stage 1B, and the pipework under Stage 1B has been directed to the leachate collection system.

3 Discussion

3.1 Discussion of site performance

At inspection there were aspects of the site operations that continued to be very well managed. These included:

- The continued use of the odour mitigating sprays and operation of the gas extraction system and flare, which resulted in only occasional mild odours being noted on site;
- Appropriate daily cover on the special waste pits; and
- Appropriate intermediate cover over the site.
- Installation and maintenance of a new sediment retention pond to treat stormwater from the "borrow" area.
- Closure of the site to special waste; and
- Capping of the site, including contouring, compaction and drainage for the completed areas.

During the year under review monitoring and maintenance of the grate on the inlet to the SPCA driveway culvert had improved when compared to the previous year, with this noted as requiring attention at only of the 12 compliance monitoring inspections.

However, there were also some on-going issues that included:

- Large areas of unstabilised earthworks;
- Hydrocarbon sheens on the large stormwater pond, which although retained in the pond, need to be monitored to ensure that they are not discharged.
- Reminders for NPDC and/or the contractors to ensure that the localised silt controls were installed and maintained effectively, and
- Repair of the Stage 2 cap. A further request to extend the date by which the abatement notice required this work to be carried out was approved in order that work on the capping of Stage 3 could be prioritised. The abatement notice was further extended to 14 March 2022.

Although the sediment issues were on site and within the mixing zone, they appear to have resulted in some impoundment within the tributaries over the 2017-2019 monitoring periods (Photo 18 and Photo 19). This indicates that there is the potential for adverse effects if the sedimentation is not kept under control. During the 2019-2020 year, NPDC engaged a consultant to undertake an analysis of the erosion and sediment control measures at the site. The report on this work was completed and provided to Council in July 2020. NPDC confirmed that would be adopting the recommendations made in the report. Although, some of the recommendations, namely:

- the installation of a pre-treatment pond at the northern end of the site to act as an appropriately sized "fore bay" for the large silt pond; and
- the installation of the floating decants in the large silt pond,

were not able to be implemented prior to the winter of 2020 as per the report's recommendations, these were completed during the year under review, and were in place prior to the winter of 2021.

In terms of erosion and localised silt control, general comments were made in the inspection advices provided to NPDC to communicate Council's expectations regarding best practice for the on-going works at the site. It was also noted that areas that had been hydro-seeded had suffered grass die off during the dry weather and it was recommended that hydro-seeded areas be covered with hay mulch to help overcome this issue, and to stabilise the areas until the grass became adequately established. At the final inspection of the year under review, it was found that the site had been contoured and hydro-seeded for the winter.



Photo 18 Silt in the western tributary below the small eastern silt pond, February 2019



Photo 19 Widening of eastern tributary above wetland polishing area, Jan 2019

Sampling of the stormwater and compost area discharges found that the constituent concentrations were within historical ranges at the times the surveys were undertaken. However, it is noted that discharges from the site resulted in consent exceedances of the ammoniacal nitrogen concentration at the compliance point as provided for by both consent 2370-3 (on three occasions) and consent 4619-1 (on two occasions). There also continued to be elevated levels of manganese in the stormwater pond discharges, and receiving waters of the Puremu Stream. These two matters are discussed in Sections 2.3.3.3 and 3.2.

The flare was managed effectively during the year under review, as were activities in the composting area that had the potential to result in odours.

A lack of understanding of the leachate overflow system by the maintenance contractors lead to a confusion about whether or not a leachate overflow had occurred following a self-notification of an event in December 2020, during a heavy rainfall event. Following the investigation, NPDC undertook to improve the contractors understanding of the system.

NPDC continued to work towards being able to remediate the cap on Stage 2 by having a method of works and erosion and sediment control plan developed, and by submitting an application for a consent to provide for the discharge of stormwater and sediment from the activity.

3.2 Environmental effects of exercise of consents

An evaluation of NPDC's monitoring of the water quality of the groundwater captured by the under liner drain confirmed that there were a significant number of parameters that either exceeded the calculated natural maximum values and/or showed increasing trends over time. It was concluded that the findings suggested that contamination of the groundwater collected by the under liner drain had occurred between 2008 and 2019 that was likely to be as a result of damage caused to the liner by the slumping of the refuse within the landfill in July 2005. The data for the under liner drain analysis performed by NPDC in the 2019-2021 years indicated that these trends have continued. The results show that the groundwater beneath the landfill has been "significantly affected" as defined by the conditions of the consent. However, these results, and the monitoring of the wider groundwater and surface water in the vicinity of the landfill indicate that this is not currently resulting in any significant adverse effects. As a result, in the short term, it is proposed that the groundwater and surface water monitoring related to this site be expanded to ensure that a clear conceptual model of the site, and the potential effects of discharges from the site, can be better understood.

Council's chemical sampling and biological monitoring found that there was no evidence of contaminants entering the Manganaha Stream from the landfill, and that there were no significant adverse effects occurring in the Puremu Stream during the period under review. There were also no direct discharges found to the Manganaha Stream during the year under review

There were a total of five non-compliant results found in relation to discharges to the Puremu Stream authorised by consents 2370-3 and 4619-1. The ammoniacal nitrogen concentration at PMU000110 (the compliance point for consent 2370-3) was exceeded at the time of two of the three routine compliance monitoring surveys and at the time of a follow-up sampling survey. The ammoniacal nitrogen concentration was also exceeded at PMU000113 (the compliance point for consent 4619-1) at the time of two of the four surveys. Due to the pH and temperature conditions prevailing at the time of the surveys, the unionised ammonia concentration remained below the 0.25 g/m³ that is considered to be toxic in an aquatic environment. It was considered that the primary contribution to the elevated ammoniacal nitrogen was the small silt ponds. Subsequent investigations by NPDC identified that it was likely that groundwater and leachate infiltration was occurring into a stormwater pipe that carries stormwater from one of the open grates near the weighbridge, under Stage 1B to the small sediment pond system. At the time of writing this report the surface stormwater flow had been diverted away from Stage 1B, and the pipework under Stage 1B had been directed to the leachate collection system.

There was also one occasion on which the total manganese concentration was elevated, but could not be deemed a substantiated exceedance of the consent limit at the compliance point for discharges authorised by consent 2370 (PMU000110). This is the fourth time in the last three years that the total manganese concentration has been at, or above, consent limit. It is noted that total manganese has been monitored at this point only since the 2013-2014 year. The historical results for the more bioavailable dissolved manganese are shown in Figure 25. Due to the data gaps, it is too early to confidently comment on whether this is part of an emerging trend of increasing concentrations at this site. It does appear that there may be a trend of increasing manganese concentration at site PMU000109, which is inside the mixing zone and

therefore not a compliance issue. It may however suggest that NPDC may want to investigate this further to ensure continued consent compliance at site PMU000113. In order to assist data interpretation monitoring of the manganese concentration in the discharges from the stormwater ponds commenced during the year under review.

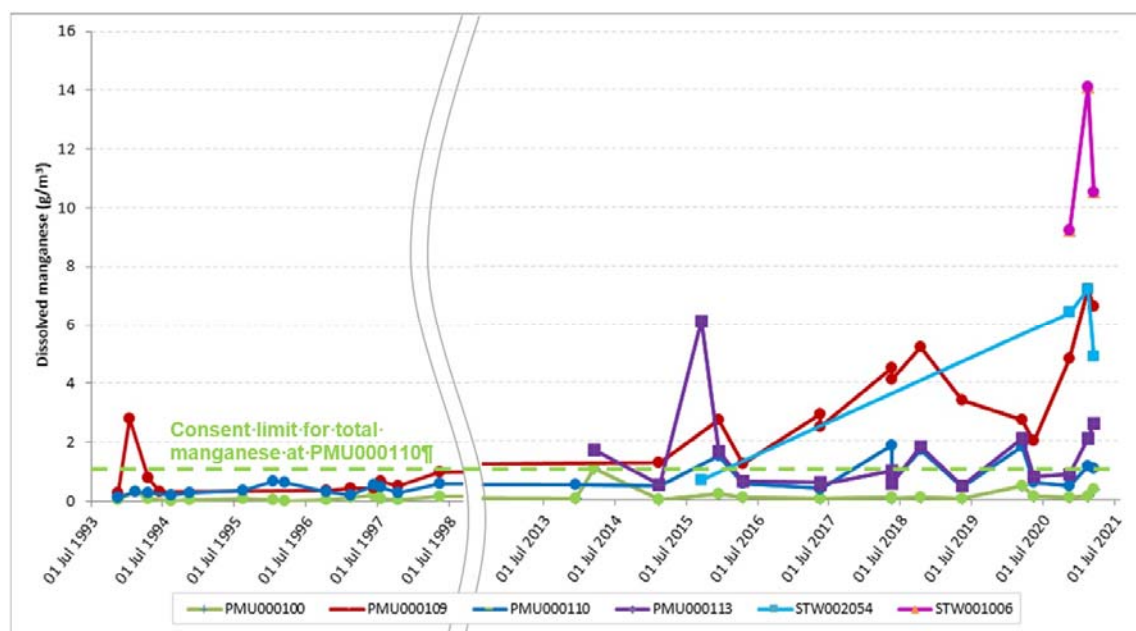


Figure 25 Dissolved manganese concentrations in the wetland polishing area and Puremu Stream

Groundwater sampling found that the groundwater in the vicinity of the site was such that no remedial actions, as contained in special condition 5 of consent 4621-1, were required at this time. Groundwater quality remains satisfactory and there is no evidence of significant adverse environmental effects from contamination either in the groundwater or in the under liner drainage system. However increasing trends in conductivity, chloride and/or nitrate/nitrite nitrogen are observed in some of the bores, along with ammoniacal nitrogen and the concentration some other parameters in the under liner drainage (groundwater and springs from under the landfill). Monitoring will continue to ensure that remedial actions will be undertaken, if required, as per the conditions of consent 4621-1.

All ambient deposited particulate levels obtained were below the Council guideline level for dust deposition in residential areas (0.13 g/m²/day). Therefore, based on the results of the deposition gauge surveys undertaken during the period under review, it is unlikely that landfill is causing off site dust deposition levels that exceed the guideline. Suspended particulate readings also indicate that the landfill is complying with off-site National Environmental Standard for PM₁₀. There were no dust related complaints received by Council during the year under review.

There was one odour complaint received by Council during the year under review in relation to the landfill site. The odour was not found to be objectionable at the time of investigation as the odour was not continuous at that time, and the contractors operating the site undertook measures to further reduce the odour.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 27 to Table 35.

Table 27 Summary of performance for diversion consent 0226-1

Purpose: To divert the Puremu Stream in the Waiwhakaiho catchment by culverting stream to provide road access to refuse tip		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Comply with Water Right 226	Site inspections	Yes
2. Pipe laid in accordance with manufacturer's specifications	Site inspection	Yes
Overall assessment of environmental performance and compliance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 28 Summary of performance for contaminated stormwater and leachate consent 2370-3

Purpose: To discharge up to 1,000 m³/day [5 L/s] of leachate and contaminated stormwater from the closed section, Area A, of Colson Road municipal landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practice to be adopted	Site inspection	No. Following attempted remediation, cap still needs to be re-contoured and cap thickness addressed. Abatement notice for works by 14 Mar 2022.
2. Consent undertaken in accordance with information supplied in the application	Site inspection and review of documentation on file	No. As per condition 1
3. Discharge not alter colour, clarity or pH of Puremu Stream	Site inspection and water sampling	Yes
4. No significant adverse effects on aquatic life	Site inspection, sampling and biomonitoring	Yes
5. Monitor surface water on/near the site	Undertaken by the Council via site specific monitoring programme, inspections and water sampling	Yes
6. Satisfy all requirements of the District Plan of the New Plymouth District Council	N/A	N/A
7. Management and site contingency plan	Site inspection and review of documentation on file	No. As per condition 1

Purpose: To discharge up to 1,000 m³/day [5 L/s] of leachate and contaminated stormwater from the closed section, Area A, of Colson Road municipal landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment

Condition requirement	Means of monitoring during period under review	Compliance achieved?
8. Maintain a landfill capping barrier and vegetative cover	Site inspection (Stages 1 & 2)	No. As per condition 1
9. Area is closed and managed in accordance with the management plan	Site inspection and review of documentation on file	No. As per condition 1
10. Maintain drains, ponds and contours on site to minimise unwanted water movement and ponding on site	Site inspections	No. As per condition 1
11. No cleaning or hosing out of refuse vehicles on site	Site inspections	Yes
12. The mixing zone extends downstream from the culvert outlet to 2 m above the confluence between the Puremu Stream and its tributary	N/A	N/A
13. Discharge shall not alter the Puremu Stream in the way of films, foams or suspended materials, change colour or visibility, objectionable odour, harm aquatic or farm animals, or increase temperature by more than 2.0°C	Site inspection and water sampling	Yes
14. Discharge shall not alter the water quality of the Puremu Stream below the given criteria	Site inspection and water sampling	No. Three of four ammoniacal nitrogen concentrations above consent limit
15. Discharge shall not reduce the concentration of dissolved oxygen below 5 mg/litre	Site inspection and water sampling	Yes
16. Discharge shall not render the Puremu Stream unfit for stock consumption	Site inspection and water sampling	Yes
17. Satisfactorily maintain and manage the leachate collection and treatment systems	Site inspection	Yes
18. Optional review provision re environmental effects	No further opportunities to review prior to expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		Improvement required
Overall assessment of administrative performance in respect of this consent		Improvement required

Table 29 Summary of performance for Consent 4619-1 treated stormwater and leachate discharge

Purpose: To discharge up to 675 L/s of treated stormwater and minor amounts of leachate from areas B1, B2, C1 and C2 of the Colson Road landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Water quality in the Manganaha Stream shall not be changed	Site inspection and water sampling	Yes
2. Water quality of the Puremu Stream shall not exceed the given criteria	Site inspection and water sampling	No. Ammoniacal nitrogen concentration above consent limit in two of four samples collected.
3. Discharge shall not alter the Puremu Stream in the way of films, foams or suspended materials, change colour or visibility, objectionable odour, harm aquatic or farm animals, or increase temperature by more than 2.0°C	Site inspection and water sampling	Yes
4. Operate according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated August 2020	Further update to plan required following work to identify criteria (see condition 5). To be provided in next plan update
5. Maintain and comply with a monitoring programme. Programme to include guidelines for determining if contamination is occurring	Review of documentation on file. Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this
6. Consent will lapse after six years if not exercised	Consent exercised	N/A
7. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		Improvement required
Overall assessment of administrative performance in respect of this consent		Improvement required

N/A = not applicable

Table 30 Summary of performance for uncontaminated stormwater consent 4620-1

Purpose: To discharge up to 675 L/s of uncontaminated stormwater from areas B1, B2, C1 and C2 of the Colson Road landfill into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Water quality in the Manganaha Stream shall not be altered	Inspections and water sampling	Yes
2. Discharge to have pH 6.5-8.5, maximum suspended solids 100 g/m ³ , and maximum ammoniacal nitrogen 0.5 g/m ³ as nitrogen	Inspections and water sampling	Not able to assess as discharge is mixed with that of consent 4619
3. No leachate discharge	Sampling and inspection	Yes
4. Channels shall minimise erosion	Site inspections	Yes
5. Channels shall minimise instability of the surrounding land	Site inspections	Yes
6. Repair land eroded/made unstable due to construction/maintenance	Site inspections	Yes
7. Notification of any proposal which may affect areas contributing runoff	Site inspections and liaison with consent holder	Yes
8. Discharge shall not alter the Puremu Stream in the way of films, foams or suspended materials, change colour or visibility, objectionable odour, harm aquatic or farm animals, or increase temperature by more than 2.0°C	Site inspections and water sampling	Not able to assess as discharge is mixed with that of consent 4619
9. No excavation or landfilling if any runoff to Manganaha Stream will contain suspended solids or any other contaminant	Site inspection and water sampling	Yes
10. Operate according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated August 2020	Further update to plan required following work to identify criteria (see condition 11). To be provided in next plan update

Purpose: To discharge up to 675 L/s of uncontaminated stormwater from areas B1, B2, C1 and C2 of the Colson Road landfill into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
11. Maintain and comply with a monitoring programme that contains guidelines for determining if contamination is occurring	Review of documentation on file. Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this
12. Consent will lapse after six years if not exercised	N/A, consent has been exercised	N/A
13. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		Improvement required

N/A = not applicable

Table 31 Summary of performance for discharge to land consent 4621-1, to 3 May 2021

Purpose: To discharge up to 500 tonnes/day of contaminants onto and into land in areas B1, C1 and C2 at the Colson Road landfill		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Install and maintain specified list of groundwater monitoring piezometers	Site inspection and liaison with consent holder	Three bores compromised. Replacement bore locations agreed. Two of three bores replaced April 2021.
2. Prevent surface runoff into the Manganaha Stream from any area used or previously used for the deposition of refuse	Site inspection and water sampling	Yes
3. All drainage channels, bunds and contouring is complete prior to use	N/A	N/A
4. Civil works relating to construction of Stage 3 be certified by a registered engineer prior to use	N/A	N/A

Purpose: To discharge up to 500 tonnes/day of contaminants onto and into land in areas B1, C1 and C2 at the Colson Road landfill		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Mitigate if spring and/or groundwater "significantly affected". Defined as increase above natural variation. Criteria to be set out in plan produced under condition 6	Changes observed in spring water that are above natural variation. Monitoring and investigations continuing. No mitigation required at this stage	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this. To be provided in next plan update
6. Maintain and comply with a monitoring programme	Review of documentation on file. Monitoring programme is provided in Landfill Management Plan	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this. To be provided in next plan update
7. Operate according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated August 2019	Further update to plan required following work to identify criteria (see conditions 5 and 6). To be provided in next plan update
8. Disposal of waste shall comply with the 'criteria for calculating landfill potentials' and the 'Draft Health and Environment Guidelines for selected Timber Treatment Chemicals'	Not assessed during period under review	N/A
9. Consent will lapse after six years if not exercised	N/A, consent exercised	N/A
10. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		Improvement required

N/A = not applicable

Table 32 Summary of performance for discharge to land consent 4621-1.1, from May 2021

Purpose: To discharge up to 500 tonnes/day of contaminants onto and into land in areas B1, C1 and C2 at the Colson Road landfill		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Install and maintain network of groundwater monitoring bores to determine changes in groundwater quality. New bores to be installed to NZS 4411:2001 at locations and depths approved by Council	Site inspection and liaison with consent holder	Remaining replacement bore installed June 2021 to approved location and depth
2. Prevent surface runoff into the Manganaha Stream from any area used or previously used for the deposition of refuse	Site inspection and water sampling	Yes
3. All drainage channels, bunds and contouring is complete prior to use	N/A	N/A
4. Civil works relating to construction of Stage 3 be certified by a registered engineer prior to use	N/A	N/A
5. Mitigate if spring and/or groundwater "significantly affected". Defined as increase above natural variation. Criteria to be set out in plan produced under condition 6	Changes observed in spring water that are above natural variation. Monitoring and investigations continuing. No mitigation required at this stage	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this. To be provided in next plan update
6. Maintain and comply with a monitoring programme	Review of documentation on file. Monitoring programme is provided in Landfill Management Plan	Guidelines for determining if contamination is occurring are not identified. Work has commenced to rectify this To be provided in next plan update
7. Operate according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated August 2019	Further update to plan required following work to identify criteria (see conditions 5 and 6). To be provided in next plan update

Purpose: To discharge up to 500 tonnes/day of contaminants onto and into land in areas B1, C1 and C2 at the Colson Road landfill		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
8. Disposal of waste shall comply with the 'criteria for calculating landfill potentials' and the 'Draft Health and Environment Guidelines for selected Timber Treatment Chemicals'	Not assessed during period under review	N/A
9. Consent will lapse after six years if not exercised	N/A, consent exercised	N/A
10. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		Improvement required

N/A = not applicable

Table 33 Summary of performance for composting air consent 4622-1

Purpose: To discharge emissions into the air from composting and ancillary activities at the Colson Road landfill		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Minimise adverse effects on the environment	Site inspection and liaison with consent holder	Yes
2. No offensive odours	Air surveys	Yes
3. No adverse ecological effects on any ecosystem	Site inspection, sampling, and neighbourhood surveys	Yes
4. Materials accepted for composting comply with the 'Assessment of Discharges to Air' July 1994 and the New Plymouth District Council Colson Road Landfill Management Plan July 1994	Site inspection	Yes
5. All composting to occur at least 300 m from any dwelling existing as of 21 March 1999	Site inspections	Yes
6. Composting piles must consist of no less than 95% plant-derived material	Site inspections and visual assessment	Yes
7. Composting to occur on a trial basis until the consent is approved or reviewed on receipt of a full report	N/A	N/A

Purpose: To discharge emissions into the air from composting and ancillary activities at the Colson Road landfill		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
8. Consent will lapse after six years if not exercised	N/A, consent has been exercised	N/A
9. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 34 Summary of performance for air discharge consent 4779-1.1

Purpose: To discharge contaminants into the air associated with operation of the municipal landfill at Colson Road, New Plymouth		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of temperature and feedstock composition data within three months of landfill gas flare operation commencing and annually thereafter	Data provided	Yes
2. Provision of as built plans and suppliers operating instructions within three months of operation of the flare	Data provided	Yes
3. First revision of the landfill management plan following the installation of the flare is to include specified aspects of the flares operation, monitoring, maintenance and record keeping	Management plan revised, and is supported by a separate flare specific document (SW-G-20)	Yes
4. Best practicable option (BPO) to prevent or minimise adverse effects on the environment	Site inspection, air surveys, complaint response	Yes
5. No offensive odours or dust or noxious concentrations	Site inspection, air surveys, complaint response	Yes
6. No burning on site with the exception of the flare	Site inspection, complaint response	Yes
7. No adverse ecological effects on any ecosystem	Inspections of site and neighbouring areas	Yes
8. No venting untreated landfill gases within 200 m of any boundary	Site inspection	Yes

Purpose: To discharge contaminants into the air associated with operation of the municipal landfill at Colson Road, New Plymouth		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
9. Comply with 'Air Discharge Consent Application Supporting Documentation' and according to the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994, or subsequent versions with no less environmental protection. Plan to be updated at not greater than yearly intervals	Site inspection and review of documentation on file. Plan on file dated June 2018. Plan review in progress to accommodate special waste only considerations	Yes
10. Council approval to be sought in the event of alterations at the site or to site operations	Site inspections and liaison with consent holder and site operator	Yes
11. Meet once a year to discuss any matter relating to the consent	Landfill liaison committee meetings	Yes
12. Provide a report within a year on the collection, extraction, venting and combustion of landfill gas	Review of documentation on file. Compliance previously achieved, as report had been received	Yes
13. Optional review provision re environmental effects	No further opportunity for review prior to consent expiry	N/A
14. Optional review provision re landfill gas combustion	No further opportunity for review prior to consent expiry	N/A
Overall assessment of environmental performance and compliance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = Not applicable

Table 35 Summary of performance for earthworks stormwater consent 6177-1

Purpose: To discharge stormwater (due to earthworks in providing an area for Stage 3 of the municipal landfill) onto land and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge quality within specified parameters	Site inspection and sampling	Not able to assess as discharge is mixed with that of consent 4619
2. No leachate discharged	Site inspection	Yes

Purpose: To discharge stormwater (due to earthworks in providing an area for Stage 3 of the municipal landfill) onto land and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Maintenance of drains to prevent erosion and sedimentation	Site inspections	Yes
4. No conspicuous effect on clarity or colour of receiving waters	Site inspection and sampling	Yes
5. No significant effect on aquatic life	Site inspection, sampling and biomonitoring	Yes
6. Monitoring to satisfaction of the Council	Site inspection, sampling and data review	Yes
7. Preparation and maintenance of management and site contingency plans	Review of Council records and liaison with consent holder	Yes
8. Sediment and erosion management plan	Erosion and sediment control analysis provided.	Yes
9. Adopt best practice	Site inspection and liaison with content holder	Improvements undertaken during year under review
10. Rehabilitation of disturbed areas	Site inspection	Yes
11. Maintain stormwater system to prevent ponding and overland flow	Site inspection	Yes
12. Receiving waters not adversely affected	Site inspection, sampling and biomonitoring	Yes
13. Provision for review	Consent expired. Renewal application received	N/A
Overall assessment of environmental performance and compliance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = Not applicable

Table 36 Summary of performance for earthworks stormwater consent 10804-1.0 (from 7 February 2020)

Purpose: To discharge stormwater and sediment arising from earthworks into an unnamed tributary of the Puremu Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent to be exercised in accordance with application	Site inspection	Yes

Purpose: To discharge stormwater and sediment arising from earthworks into an unnamed tributary of the Puremu Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
2. Adopt best practice	Site inspection	Yes
3. Notification of commencement required	Review of Council records	Yes
4. Site and stormwater to be managed as per NPDC Soil Erosion and Sediment Control Plan	Site inspection	Yes
5. Requirements of Condition 4 and control measures cease only after suitable stabilisation has been established	Site inspection	Yes
6. On site meeting required prior to exercise of consent	Site inspection	Yes
7. Sediment control measures to be installed prior to works other than construction of sediment control pond	Site inspection	Yes
8. Stabilisation required as soon as is practicable, but no longer than 6 month post completion of earthworks	No areas needing stabilisation	N/A
9. Suspended solids limit of 100 g/m ³ from "large silt pond"	Visual assessment at inspection and sampling	Yes
10. Provision for review	Next opportunity to review June 2022	N/A
Overall assessment of environmental performance and compliance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = Not applicable

Overall, NPDC demonstrated a good level of environmental performance, however an improvement is required in their administrative performance and compliance with the resource consents as defined in Section 1.1.4. During the year under review there were on-going, and still unresolved, issues with the compliance of the cap on Stage 2, with an abatement notice in place requiring the works to be undertaken by 14 March 2022. Two abatement notices were also issued in relation to groundwater monitoring bore maintenance, water quality changes in the groundwater in the under liner drain, and monitoring plan requirements. On the whole, management of the on-going activities at the site was good. However, there appear to be some legacy issues that are affecting the water quality in the receiving environment. Although these have resulted in some consent non-compliances, they have not resulted in any significant adverse effects during the year under review. Monitoring requirements have been revised and evaluation is on-going. Additional investigations are also being undertaken by NPDC, when required, to ensure that any appropriate interventions are implemented where improvements are required.

Table 37 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement required	Poor	N/A
2012-13	0226-1, 2370-3, 4622-1, 4779-1	4	-	-	-	
	6177-1	-	1	-	-	
	4619-1, 4620-1, 4621-1	-	-	3	-	
2013-14	0226-1, 4779-1, 4620-1, 4619-1, 2370-3, 4622-1, 4621-1, 6177-1	8	-	-	-	
2014-15	0226-1, 2370-3, 4619-1, 4622-1	4	-	-	-	
	4620-1, 4621-1, 6177-1	-	3	-	-	
	4779-1	-	-	1	-	
2015-16	0226-1, 4622-1, 6177-1	3	-	-	-	
	2370-3	-	1	-	-	
	4619-1, 4620-1, 4621-1	-	-	3	-	
	4779-1	-	-	-	1	
2016-17	0226-1, 4620-1, 4621-1, 4622-1, 6177-1	5	-	-	-	
	2370-3, 4619-1, 4779-1 (4779-1.1)	-	3	-	-	
2017-18	0226-1, 4622-1, 4779-1, 6177-1	4	-	-	-	
	4619-1, 4620-1, 4621-1	-	3	-	-	
	2370-3	-	-	1	-	
2018-19	0226-1, 4620-1, 4622-1, 4779-1.1, 6177-1, 10804-1.0	6	-	-	-	
	4619-1, 4621-1	-	2	-	-	
	2370-3	-	-	1	-	
2019-20	0226-1, 4622-1, 4779-1.1, 6177-1, 10804-1.0	5	-	-	-	
	4619-1, 4621-1	-	2	-	-	
	2370-3	-	-	1	-	
	4620-1	-	-	-	-	1
Totals		39	15	10	1	1

3.4 Recommendations from the 2019-2020 Annual Report

In the 2019-2020 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the Colson Road regional landfill in the 2020-2021 year be amended from that of 2019-2020 by the inclusion of total and dissolved manganese determination for the stormwater samples collected during the dry weather surveys.

2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the NPDC complete the investigations and review of the Landfill Management Plan to ensure that the criteria for determining whether any contamination is occurring that is greater than the natural variation be included along with measure to be taken remedy, mitigate or if practicable prevent continuation of any effect on the groundwater quality as per conditions 5, 6 and 7 of consent 4621-1, and guidelines for determining contamination is occurring as per condition 5 of consent 4619-1, are included in the plan.
4. THAT NPDC replace compromised bores GND0251 (L2), GND0255 (L8) and GND1300 (AH3).

Recommendations one was implemented by Council. Recommendation two was also implemented with follow-up sampling being undertaken. Work commenced by NPDC on the implementation of recommendation four, with the anticipation that these criteria would be included in the next update of the management plan. Recommendation four was implemented by NPDC.

3.5 Alterations to monitoring programmes for 2021-2022

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.

As discussed in Section 2.6 it is proposed that for 2021-2022 the Council's monitoring of discharges from the Colson Road regional landfill be amended from that of 2020-2021 in order to further investigate the emerging contamination issue that appears to be occurring as a result of the July 2005 refuse slump that is likely to have damaged the liner underneath the settled waste.

This proposed increase in monitoring includes the addition of two groundwater monitoring bores that were not previously routinely monitored. It is proposed that groundwater monitoring be undertaken twice a year in order to evaluate any potential seasonal variation. It is proposed that a more comprehensive set of parameters is determined on one occasion per year, with the second run initially looking at a range of indicator parameters. It is also proposed that a more comprehensive set of parameters be determined during the surface water monitoring in the Puremu Stream and contributing discharges, with an additional Puremu Stream site being monitored just upstream of the landfill site boundary and toe of the Stage 1 and 2 fill area.

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 2021-2022.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at the Colson Road regional landfill in the 2021-2022 year be amended from that of 2020-2021 by the inclusion of two additional groundwater sites and one surface water site with a more comprehensive range of parameters determined.
2. THAT a second groundwater surveys be undertaken analysing for a range of indicator parameters to ascertain the extent of any seasonal variation that may be occurring.
3. THAT should there be issues with environmental or administrative performance in 2021-2022, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
4. THAT the NPDC complete the investigations and review of the Landfill Management Plan to ensure that the criteria for determining whether any contamination is occurring that is greater than the natural variation be included along with measure to be taken remedy, mitigate or if practicable prevent continuation of any effect on the groundwater quality as per conditions 5, 6 and 7 of consent 4621-1, and guidelines for determining contamination is occurring as per condition 5 of consent 4619-1, are included in the plan.
5. THAT on two of the regular sampling occasions per year NPDC undertake comprehensive monitoring of the Stage 1 and 2 leachate, the Stage 3 leachate and the under liner drain.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Al*	Aluminium.
As*	Arsenic.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Condy	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.
<i>E.coli</i>	<i>Escherichia coli</i> , an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
F	Fluoride.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m ³	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.
HDPE	High density polyethylene.
L/s	Litres per second.
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.
LFG	Landfill gas, a complex mixture of gaseous components produced as the refuse decomposes.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
Moxie	A large earthmoving truck.
NH ₄	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH ₃	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NLG	Neighbourhood liaison group.
NO ₃	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM ₁₀	Relatively fine airborne particles (less than 10 micrometre diameter).
ppm	Parts per million on a volume/volume basis.
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	<i>Resource Management Act 1991</i> and subsequent amendments.
SS	Suspended solids.
SVOC	Semi-volatile organic compounds
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
Zn*	Zinc.

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

For further information on analytical methods, contact a Science Services Manager.

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Appendix I

Resource consents held by NPDC

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

Water abstraction permits

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

Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

Discharges of wastes to land

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

Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

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

TRK750226

WATER PERMIT

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

Name of: NEW PLYMOUTH DISTRICT COUNCIL
Consent Holder: PRIVATE BAG 2025 NEW PLYMOUTH

Change to
Conditions Date: 8 October 1986

CONDITIONS OF CONSENT

Consent Granted: TO DIVERT THE PUREMU STREAM A TRIBUTARY OF THE
MANGAONE STREAM IN THE WAIWHAKAIHO CATCHMENT
BY CULVERTING THE STREAM TO PROVIDE ROAD ACCESS
TO THE REFUSE TIP AT OR ABOUT GR: P19:070-380

Expiry Date: 1 October 2026 [as per section 386(2) of the Resource Management Act 1991]
[originally granted 2 April 1975 under the Water and Soil Conservation Act 1967 'at the pleasure of the
Commission']

Site Location: COLSON ROAD NEW PLYMOUTH

Legal Description: SEC 223 HUA DIST BK VI PARITUTU SD

Catchment: WAIWHAKAIHO 392.000

Tributary: MANGAONE 392.010
PUREMU 392.012

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

TRK750226

Conditions of right

- (a) The Commission may prescribe the method of management of this right, including the limitation of periods during which the right may be fully exercised, if a water shortage or other abnormal circumstances occur in the locality.
- (b) This right may be operated only by the person holding the right or his agent and only for the purpose stated in the right.
- (c) The right may, with the consent of the Commission in writing, be transferred to a new owner or occupier of the property to which the right relates, but only on the same conditions as contained in this right.
- (d) The conditions relating to this right cannot be varied without the prior consent in writing of the Commission.
- (e) This right is not a guarantee that the quantity and quality of water specified will be available.
- (f) Unless specifically authorised by this right the discharge of water or waste containing pollutants into natural water is not permitted.
- (g) This right is not an authority to obtain access to a source of water or a point of discharge.
- (h) The grantee of the right shall keep such records as may reasonably be required by the Commission and shall if so requested supply this information to the Commission.
- (i) This right may be cancelled by the Commission, or Commission may take such other action as the Act provides, if the right is not exercised within 12 months of its granting or such longer time as the Commission may approve.
- (j) This right may be cancelled by the Commission if in the opinion of the Commission it is not diligently and beneficially exercised.
- (k) This right is granted subject to the Commission or its servants or agents being permitted access at all reasonable times for the purpose of carrying out inspections and measurements.
- (l) The design and maintenance of any works relating to the right must be to a standard adequate to meet the conditions of the right so that neither the works nor the exercise of the right is likely to cause damage to any property or injury to any person.
- (m) Should the grantee in the opinion of the Commission commit any breach of the right or its conditions the Commission may cancel the right.
- (n) This right is granted, subject to the Commission retaining the right to review the terms and conditions attached hereto including the period of the right at intervals of not less than five [5] years.
- (o) This right will expire upon the date shown overleaf or upon 14 days notice, whichever comes sooner.
- (p) The cost of supervision of this right, including water sampling deemed necessary by the Commission shall be carried by the grantee.
- (q) The final drawings of the culvert are to be submitted to the Commission for approval before work is commenced.

TRK750226

VARIATION OF 14 MAY 1986:

Additional General Conditions

- (a)The grantee shall provide to the Manager, Taranaki Catchment Commission, on request plans, specifications and maintenance programmes of works associated with the exercise of this right, showing that the conditions of this right are able to be met.
- (b)The standards, techniques and frequency of monitoring of this right shall be to the specific approval of the Manager, Taranaki Catchment Commission.
- (c)The actual and reasonable cost of administration supervision and monitoring of this right, deemed necessary by the Manager, Taranaki Catchment Commission, shall be met by the grantee.
- (d)This right may be cancelled in writing to the grantee by the Commission if the right is not exercised within twelve months of the date of grant of such longer time as the Manager, Taranaki Catchment Commission, may approve.
- (e)This right may be terminated by the Commission upon not less than six months notice in writing to the grantee if, in the opinion of the Commission, the public interest so requires, but without prejudice to the grantee to apply for a further right in respect of the same matter.

Additional Special Conditions

- 1)The terms and conditions pertaining to Water Right 226 shall apply.
- 2)[**Note: Condition 2 was subsequently deleted as per variation of 8 October 1986.**]
- 3)The new 900 mm pipe shall be laid in accordance with the manufacturers specifications.

VARIATION OF 8 OCTOBER 1986:

Deletion of special condition 2.

Signed at Stratford on 8 October 1986

For and on behalf of
TARANAKI REGIONAL COUNCIL

OPERATIONS MANAGER

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

Name of
Consent Holder: New Plymouth District Council
Private Bag 2025
NEW PLYMOUTH

Consent Granted
Date: 19 March 2003

Conditions of Consent

Consent Granted: To discharge up to 1000 cubic metres/day [5 litres/second] of leachate and contaminated stormwater from the closed section, Area A, of Colson Road municipal landfill to groundwater in the vicinity of and into the Puremu Stream a tributary of the Mangaone Stream in the Waiwhakaiho catchment at or about GR: P19:074-372

Expiry Date: 1 June 2026

Review Date(s): June 2004, June 2006, June 2008, June 2014, June 2020

Site Location: Colson Road Landfill, Colson Road, New Plymouth

Legal Description: Sec 223 Hua Dist Blk VI Paritutu SD

Catchment: Waiwhakaiho

Tributary: Mangaone
Puremu

Consent 2370-3

General conditions

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

Special conditions

- 1. That any discharge shall not alter to a conspicuous extent the natural colour, clarity or pH of the receiving water, nor shall it contain visible oil or grease, nor shall it emit objectionable odours, nor shall it increase the temperature of the Puremu Stream by more than 2.0°C.
- 2. That there shall be no significant adverse impact upon natural aquatic life downstream of the landfill as a result of the exercise of this permit.
- 3. Monitoring of surface waters and groundwater on or in the vicinity of the site shall be undertaken to the satisfaction of the Chief Executive, Taranaki Regional Council.
- 4. That the Grantee shall satisfy all relevant requirements, obligations and duties of the District Plan of the New Plymouth District Council.
- 5. That the consent holder shall maintain and comply with a current management and contingency plan as per condition 9 for Area A and associated activities on the site, to the approval of the Chief Executive, Taranaki Regional Council.
- 6. The consent holder shall at all times adopt the best practicable option, as defined in the Resource Management Act 1991, to prevent or minimise any or likely adverse effects on the environment associated with the discharges of leachate and/or stormwater from the site, including but not limited to the collection, containment and removal from the site of any discharge of leachate and/or contaminated stormwater.
- 7. The consent holder shall maintain an adequate landfill capping barrier and vegetative cover on the site to the satisfaction of the Chief Executive, Taranaki Regional Council.
- 8. The consent holder shall ensure that the area to which this consent is attributed to is closed and subsequently managed in accordance with the amended Management Plan provided November 2001 or as subsequently amended provided that subsequent amendments do not reduce the level of environmental protection set out in the amendment of November 2001.

Consent 2370-3

9. The consent holder shall maintain stormwater drains, the sediment detention pond, and/or ground contours at the site, in order to minimise stormwater movement across, or ponding on the site.
10. The consent holder shall ensure that any discharge from the cleaning and hosing out of refuse containing vehicles shall not occur on site.
11. The mixing zone in each condition of this consent shall extend for a distance downstream of the point of the culvert outlet of the Puremu Stream to 2 metres above the confluence of the unnamed tributary of the Puremu Stream and the Puremu Stream at the sites legal boundary.
12. After allowing for reasonable mixing the consent holder shall ensure that the discharge shall not give rise to any of the following effects in the receiving waters of the Puremu Stream:
 - a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;
 - b) any conspicuous change in colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life.
 - f) an increase in the temperature of the Puremu Stream by more than 2.0° Celsius
13. The discharge shall not be shown to reduce the quality of the Puremu Stream at or beyond the mixing zone below the following criteria:

Constituent	Max. Concentration or level
Aluminium	5.0 mg/l
Arsenic	0.1 mg/l
Beryllium	0.1 mg/l
Boron	0.5 mg/l
Cadmium	0.01 mg/l
Chromium	0.1 mg/l
Cobalt	0.05 mg/l
Copper	0.2 mg/l
Fluoride	1.0 mg/l
Iron	5.0 mg/l
Lead	0.1 mg/l
Manganese	1.0 mg/l
Nitrate + Nitrite (NO ₃ -N + NO ₂ -N)	100 mg/l
Nitrite -N	5.0 mg/l
Selenium	0.02 mg/l
Vanadium	0.1 mg/l
Zinc	2.0 mg/l
Ammoniacal nitrogen	2.5 mg/l
pH	6.5 - 8.5
Sulphate	500 mg/l

Note: Levels of trace metals expressed as total recoverable metals

14. The discharge shall not be shown to reduce the concentration of dissolved oxygen in the Puremu Stream below 5 mg/litre, beyond the mixing zone specified in special condition 12 above.
15. The discharge shall not, in the opinion of the Chief Executive, Taranaki Regional Council, contain substances or constituents other than those listed in Condition 15, nor pathogenic organisms, which would render the water of the Puremu Stream, beyond the mixing zone specified in special condition 12 above, unpalatable or unfit for stock consumption purposes.

Consent 2370-3

16. The maintenance, management and operation of the leachate and collection and treatment systems shall be to the satisfaction of the Chief Executive, Taranaki Regional Council, to ensure that the conditions attached to this permit can be met.
17. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2004 and/or June 2006 and/or June 2008 and/or June 2014 and/or June 2020, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 19 March 2003

For and on behalf of
Taranaki Regional Council

Chief Executive

TRK994619

DISCHARGE PERMIT

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

Name of
Consent Holder: NEW PLYMOUTH DISTRICT COUNCIL
PRIVATE BAG 2025 NEW PLYMOUTH

Consent
Granted Date: 21 March 1999

CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE UP TO A MAXIMUM OF 675 LITRES/SECOND
OF TREATED STORMWATER AND MINOR AMOUNTS OF
LEACHATE FROM AREAS B1, B2, C1 AND C2 OF THE
COLSON ROAD LANDFILL TO GROUNDWATER IN THE
VICINITY OF AND INTO THE PUREMU STREAM A
TRIBUTARY OF THE MANGAONE STREAM IN THE
WAIWHAKAIHO CATCHMENT AT OR ABOUT GR:
P19:074-372

Expiry Date: 1 June 2025

Review Date[s]: June 2006, June 2012, June 2018 and/or within six months of the
first exercise of this consent

Site Location: COLSON ROAD LANDFILL, COLSON ROAD, NEW
PLYMOUTH

Legal Description: SEC 223 HUA DIST BLK VI PARITUTU SD

Catchment: WAIWHAKAIHO 392.000

Tributary: MANGAONE 392.010
PUREMU 392.012

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

General conditions

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

Special conditions

- 1. THAT the water quality in the Manganaha Stream above its confluence with the Mangaone Stream shall not be changed as a result of this discharge.
- 2. THAT the exercise of this consent shall not cause the water quality of the Puremu Stream at the northern boundary of the site to exceed the following criteria:

Component	Criteria
pH	range within 6.5-8.5
Dissolved oxygen	maximum reduction of 1.0 gm ⁻³ in the upstream dissolved oxygen concentration
Ammoniacal nitrogen	2.0 gm ⁻³ for pH below 7.75 1.3 gm ⁻³ for pH between 7.75-8.00 1.0 gm ⁻³ for pH between 8.00-8.50
Nitrate	10 gm ⁻³ as nitrogen
Nitrite	0.06 gm ⁻³ as nitrogen
Faecal coliforms	1000/100 mL
Sulphate	1000 gm ⁻³
Oil and grease	10 gm ⁻³
Suspended solids maximum permitted increase in instream concentration	
[dry weather conditions]	10 gm ⁻³
[wet weather conditions]	10%
of upstream concentration	

	Maximum instream concentration Total Recoverable Metals gm⁻³	Maximum permitted increase in concentration Filtered Metals gm⁻³
Aluminium	5.0	0.1
Arsenic	0.2	0.05
Beryllium	0.1	n/a
Boron	5.0	n/a
Cadmium	0.05	0.001
Chromium	1.0	0.02
Cobalt	1.0	n/a
Copper	0.5	0.002
Iron	10.0	0.3
Lead	0.1	0.002
Manganese	5.0	n/a
Selenium	0.05	0.001
Vanadium	0.1	n/a
Zinc	2.4	0.03

3. THAT the discharge authorised by this consent, in conjunction with the exercise of any other consent associated with the landfill property, shall not give rise to any of the following effects in the Puremu Stream at the northern boundary of the site:
 - a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials [other than storm debris and suspended solids as permitted under condition 2 above];
 - b) any conspicuous change in the colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life.
4. THAT this consent shall be exercised in a manner conforming with the relevant requirements of the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan 1994', or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council.
5. THAT the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the General Manager, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.
6. THAT this consent shall lapse on the expiry of six 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

TRK994619

Council fixes a longer period pursuant to section 125(b) of the Resource Management Act 1991.

7. THAT pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2012, June 2018 and/or within six months of the first exercise of this consent, to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 21 March 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

GENERAL MANAGER

TRK994621

DISCHARGE PERMIT

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

Name of
Consent Holder: NEW PLYMOUTH DISTRICT COUNCIL
PRIVATE BAG 2025 NEW PLYMOUTH

Consent
Granted Date: 21 March 1999

CONDITIONS OF CONSENT

Consent Granted: TO DISCHARGE UP TO 200 TONNES/DAY OF
CONTAMINANTS ONTO AND INTO LAND IN AREAS B1, C1
AND C2 AT THE COLSON ROAD LANDFILL AT OR ABOUT
GR: P19:074-372

Expiry Date: 1 June 2025

Review Date[s]: June 2006, June 2012, June 2018 and/or within six months of the
first exercise of this consent

Site Location: COLSON ROAD LANDFILL, COLSON ROAD, NEW
PLYMOUTH

Legal Description: SEC 223 HUA DIST BLK VI PARITUTU SD

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

TRK994621

General conditions

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

Special conditions

1. THAT the consent holder shall install and maintain to the satisfaction of the General Manager, Taranaki Regional Council, a further groundwater monitoring piezometer approximately equidistant between the bores designated as AH9 and L2, and shall maintain to the satisfaction of the General Manager, Taranaki Regional Council, groundwater monitoring piezometers and bores at the sites designated as WQA, WQB and WQC, as AH1, AH2, AH3, AH5, AH6, AH7, and as L1, L2, L5, L7 and L8. [Bore designations are those in Appendix A2, Figure 1, in the Assessment of Effects on the Environment prepared by Woodward-Clyde for New Plymouth District Council, July 1994].
2. THAT the consent holder shall prevent surface runoff of water or contaminants to the Manganaha Stream 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 to the satisfaction of the General Manager, Taranaki Regional Council.
3. THAT prior to commencing any use of any part of Area B, C1 or C2 for the deposition of refuse or for composting activities, the consent holder shall demonstrate to the satisfaction of the General Manager, Taranaki Regional Council, that drainage channels, bunds, surface contouring, or other engineering and landscaping works associated with an Area or part of an Area have been undertaken and completed to the extent that compliance with condition 2 above will be achieved.
4. THAT the construction, installation, placement, integrity and performance of groundwater drainage systems, landfill lining systems, and leachate interception, collection, holding, recirculation, and discharge systems in any part of Areas B1, B2, C1 and C2 of the Colson Road Landfill as described in the 'Colson Road Landfill Assessment of Effects on the Environment' July 1994 and the 'New Plymouth District Council Colson Road Landfill Management Plan' July 1994 be certified by a registered engineer prior to any discharge of solid wastes in such part of those areas.
5. THAT should groundwater quality be significantly affected by activities or processes associated with the landfill or composting, then the consent holder shall implement such measures as are necessary to remedy or mitigate and if practicable to prevent the continuation of any effect upon quality of the groundwater. 'Significantly affected' for the purposes of this condition is defined as a change greater than the maximum natural variation in any parameter for water in any piezometer, bore, or spring, and the criteria for this shall be set out in the monitoring programme under condition 6.

TRK994621

6. THAT the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the General Manager, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.
7. THAT the disposal of wastes shall be carried out in a manner conforming with the relevant requirements of the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council.
8. THAT the acceptance and disposal of waste types at the landfill for disposal shall conform to Section 2.5, Section 5.6 and Appendix E [or their equivalent] of the Landfill Management Plan referred to in condition 7 above, and in particular shall conform to the following:

Table 11.2 'Criteria for calculating landfill potentials' Hazardous Waste Management Handbook, Ministry for the Environment, 1994;

and

Chapter 5 of the 'Draft Health and Environmental Guidelines for Selected Timber Treatment Chemicals', Ministry for the Environment / Ministry of Health, September 1993, in compliance with the requirement for a Class 2 landfill.

9. THAT this consent shall lapse on the expiry of six 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(b) of the Resource Management Act 1991.
10. THAT pursuant to section 128(1) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2102, June 2018 and/or within six months of the first exercise of this consent, to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 21 March 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL

GENERAL MANAGER

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

Name of
Consent Holder: New Plymouth District Council
Private Bag 2025
NEW PLYMOUTH 4342

Change To
Conditions Date: 19 January 2010 [Granted: 21 March 1999]

Conditions of Consent

Consent Granted: To discharge up to 500 tonnes/day of contaminants onto
and into land in areas B1, C1 and C2 at the Colson Road
landfill at or about (NZTM) 1697313E-5675450N

Expiry Date: 1 June 2025

Review Date(s): June 2012, June 2018

Site Location: Colson Road Landfill, Colson Road, New Plymouth

Legal Description: Sec 223 Hua Dist Blk VI Paritutu SD

Catchment: Waiwhakaiho

Tributary: Puremu

General conditions

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

Special conditions

- 1. THAT the consent holder shall install and maintain to the satisfaction of the Chief Executive, Taranaki Regional Council, a further groundwater monitoring piezometer approximately equidistant between the bores designated as AH9 and L2, and shall maintain to the satisfaction of the Chief Executive, Taranaki Regional Council, groundwater monitoring piezometers and bores at the sites designated as WQA, WQB and WQC, as AH1, AH2, AH3, AH5, AH6, AH7, and as L1, L2, L5, L7 and L8. [Bore designations are those in Appendix A2, Figure 1, in the Assessment of Effects on the Environment prepared by Woodward-Clyde for New Plymouth District Council, July 1994].
- 2. THAT the consent holder shall prevent surface runoff of water or contaminants to the Manganaha Stream 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 to the satisfaction of the Chief Executive, Taranaki Regional Council.
- 3. THAT prior to commencing any use of any part of Area B, C1 or C2 for the deposition of refuse or for composting activities, the consent holder shall demonstrate to the satisfaction of the Chief Executive, Taranaki Regional Council, that drainage channels, bunds, surface contouring, or other engineering and landscaping works associated with an Area or part of an Area have been undertaken and completed to the extent that compliance with condition 2 above will be achieved.

4. THAT the construction, installation, placement, integrity and performance of groundwater drainage systems, landfill lining systems, and leachate interception, collection, holding, recirculation, and discharge systems in any part of Areas B1, B2, C1 and C2 of the Colson Road Landfill as described in the 'Colson Road Landfill Assessment of Effects on the Environment' July 1994 and the 'New Plymouth District Council Colson Road Landfill Management Plan' July 1994 be certified by a registered engineer prior to any discharge of solid wastes in such part of those areas.
5. THAT should groundwater quality be significantly affected by activities or processes associated with the landfill or composting, then the consent holder shall implement such measures as are necessary to remedy or mitigate and if practicable to prevent the continuation of any effect upon quality of the groundwater. 'Significantly affected' for the purposes of this condition is defined as a change greater than the maximum natural variation in any parameter for water in any piezometer, bore, or spring, and the criteria for this shall be set out in the monitoring programme under condition 6.
6. THAT the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the Chief Executive, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.
7. THAT the disposal of wastes shall be carried out in a manner conforming with the relevant requirements of the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the Chief Executive, Taranaki Regional Council.
8. THAT the acceptance and disposal of waste types at the landfill for disposal shall conform to Section 2.5, Section 5.6 and Appendix E [or their equivalent] of the Landfill Management Plan referred to in condition 7 above, and in particular shall conform to the following:

Table 11.2 'Criteria for calculating landfill potentials' Hazardous Waste Management Handbook, Ministry for the Environment, 1994;

and

Chapter 5 of the 'Draft Health and Environmental Guidelines for Selected Timber Treatment Chemicals', Ministry for the Environment / Ministry of Health, September 1993, in compliance with the requirement for a Class 2 landfill.

9. THAT this consent shall lapse on the expiry of six 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(b) of the Resource Management Act 1991.

Consent 4621-1

10. THAT pursuant to section 128(1) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2102, June 2018 and/or within six months of the first exercise of this consent, to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 19 January 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: New Plymouth District Council
Private Bag 2025
New Plymouth 4342

Decision Date
(Change): 4 May 2021

Commencement Date
(Change): 4 May 2021 (Granted Date: 21 March 1999)

Conditions of Consent

Consent Granted: To discharge up to 500 tonnes/day of contaminants onto
and into land in areas B1, C1 and C2 at the Colson Road
landfill

Expiry Date: 1 June 2025

Site Location: Colson Road Landfill, Colson Road, New Plymouth

Grid Reference (NZTM) 1697310E-5675450N

Catchment: Waiwhakaiho

Tributary: Puremu

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

General condition

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

Special conditions

1. The consent holder shall install and maintain a network of groundwater monitoring sites in consultation with The Chief Executive, Taranaki Regional Council at locations, and to depths, that enable monitoring to determine any change in groundwater quality resulting from the exercise of this consent. Any new bores shall be installed in accordance with NZS 4411:2001 at locations and depths approved by The Chief Executive, Taranaki Regional Council.
2. That the consent holder shall prevent surface runoff of water or contaminants to the Manganaha Stream 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 to the satisfaction of the Chief Executive, Taranaki Regional Council.
3. That prior to commencing any use of any part of Area B, C1 or C2 for the deposition of refuse or for composting activities, the consent holder shall demonstrate to the satisfaction of the Chief Executive, Taranaki Regional Council, that drainage channels, bunds, surface contouring, or other engineering and landscaping works associated with an Area or part of an Area have been undertaken and completed to the extent that compliance with condition 2 above will be achieved.
4. That the construction, installation, placement, integrity and performance of groundwater drainage systems, landfill lining systems, and leachate interception, collection, holding, recirculation, and discharge systems in any part of Areas B1, B2, C1 and C2 of the Colson Road Landfill as described in the 'Colson Road Landfill Assessment of Effects on the Environment' July 1994 and the 'New Plymouth District Council Colson Road Landfill Management Plan' July 1994 be certified by a registered engineer prior to any discharge of solid wastes in such part of those areas.
5. That should groundwater quality be significantly affected by activities or processes associated with the landfill or composting, then the consent holder shall implement such measures as are necessary to remedy or mitigate and if practicable to prevent the continuation of any effect upon quality of the groundwater. 'Significantly affected' for the purposes of this condition is defined as a change greater than the maximum natural variation in any parameter for water in any piezometer, bore, or spring, and the criteria for this shall be set out in the monitoring programme under condition 6.
6. That the consent holder shall provide, maintain and comply with a monitoring programme, to the satisfaction of the Chief Executive, Taranaki Regional Council, setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring, the initial plan to be provided at least three months prior to the exercise of this consent.

Consent 4621-1.1

7. That the disposal of wastes shall be carried out in a manner conforming with the relevant requirements of the 'New Plymouth District Council Colson Road Landfill: Landfill Management Plan July 1994', or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the Chief Executive, Taranaki Regional Council.
8. That the acceptance and disposal of waste types at the landfill for disposal shall conform to Section 2.5, Section 5.6 and Appendix E [or their equivalent] of the Landfill Management Plan referred to in condition 7 above, and in particular shall conform to the following:

Table 11.2 'Criteria for calculating landfill potentials' Hazardous Waste Management Handbook, Ministry for the Environment, 1994;

and

Chapter 5 of the 'Draft Health and Environmental Guidelines for Selected Timber Treatment Chemicals', Ministry for the Environment/Ministry of Health, September 1993, in compliance with the requirement for a Class 2 landfill.

9. That this consent shall lapse on the expiry of six 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(b) of the Resource Management Act 1991.
10. That pursuant to section 128(1) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2102, June 2018 and/or within six months of the first exercise of this consent, to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 4 May 2021

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

TRK994622



DISCHARGE PERMIT

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

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

Name of
Consent Holder: **NEW PLYMOUTH DISTRICT COUNCIL
PRIVATE BAG 2025 NEW PLYMOUTH**

Consent
Granted Date: **21 March 1999**

CONDITIONS OF CONSENT

Consent Granted: **TO DISCHARGE EMISSIONS INTO THE AIR FROM
COMPOSTING AND ANCILLARY ACTIVITIES AT THE
COLSON ROAD LANDFILL AT OR ABOUT GR: P19:074-372**

Expiry Date: **1 June 2025**

Review Date[s]: **June 2006, June 2012 and June 2018**

Site Location: **COLSON ROAD LANDFILL, COLSON ROAD, NEW PLYMOUTH**

Legal Description: **SEC 223 HUA DIST BLK VI PARITUTU SD**

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

TRK994622

General conditions

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

Special conditions

- 1. THAT the consent holder shall at all times adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the composting operation. 'Best practicable option' [as defined in section 2 of the Act] shall be determined by the Taranaki Regional Council, following review of the conditions of this consent as set out under condition 9 of this consent.
- 2. THAT the discharge of contaminants into the air from the composting operation shall not result in offensive or objectionable odours or dust or dangerous or noxious ambient concentrations of any airborne contaminant in the opinion of an enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the site.
- 3. THAT the discharges authorised by this consent shall not give rise to any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna.
- 4. THAT the nature of materials accepted for composting and the operation of the composting activities shall give effect to the 'Assessment of Discharges to Air' July 1994, prepared for the New Plymouth District Council by Woodward-Clyde [in particular, but not exclusively, section 2.2.2] and the New Plymouth District Council Colson Road Landfill Management Plan July 1994 [in particular, but not exclusively, section 5.9.6 and Figure 1 of Appendix A] or any subsequent version of that document which does not lessen environmental protection standards. The Management Plan shall be updated at not greater than yearly intervals, to the satisfaction of the General Manager, Taranaki Regional Council.
- 5. THAT any composting pile or windrow shall be located at least 300 metres from any dwellinghouse existing as of 21 March 1999.
- 6. THAT the maximum proportion of a composting windrow or pile comprising other than plant-derived material shall not exceed 5% by weight.
- 7. THAT the composting operation shall initially be undertaken on a trial basis. After at least six, but not more than nine, months of operation, the consent holder shall report to the Taranaki Regional Council on trial, noting particularly the results of operation and effects-based monitoring, and recording any complaints received about odour from composting. Upon receipt of that report, the Taranaki Regional Council may either approve the continuation of composting, or require a review of this consent pursuant to section 128(1)(a) of the Resource Management Act 1991.

TRK994622

8. THAT this consent shall lapse on the expiry of six 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(b) of the Resource Management Act 1991.
9. THAT pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2012, June 2018, for the purpose of reviewing the best practicable option or options available to reduce or remove any adverse effects on the environment, or to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Signed at Stratford on 21 March 1999

For and on behalf of
TARANAKI REGIONAL COUNCIL



GENERAL MANAGER

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

Name of
Consent Holder: New Plymouth District Council
Private Bag 2025
New Plymouth 4342

Decision Date 24 January 2017
(Change):

Commencement Date 24 January 2017 (Granted Date: 21 March 1999)
(Change):

Conditions of Consent

Consent Granted: To discharge contaminants into the air associated with
operation of the municipal landfill at Colson Road, New
Plymouth

Expiry Date: 1 June 2025

Review Date(s): June 2018 and in accordance with special condition 14

Site Location: Colson Road, New Plymouth

Grid Reference (NZTM) 1697239E-5676071N (approx. centre of landfill)
1697127E-5676249N (approx. location of flare)

*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. Within 3 months of the first operation of any landfill gas flare, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a measurement of the temperature of the flare together with a measurement of the concentrations of methane and of hydrogen sulphide in the flare feedstock. Thereafter the consent holder shall annually provide updated information on flare temperature and feedstock composition.
2. Within 3 months of the first operation of any landfill gas flare, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a copy of 'as built' drawings for the flare, including a figure to scale showing the location of the flare relative to the boundaries of the landfill property, and a copy of the supplier's or manufacturer's operating instructions.
3. The first revision of the landfill plan, described in condition 9(c) following installation of any landfill gas flare shall describe, variously, methods of, schedules for, and/or the recording of: observations and inspections of the flare, its operation, and its effects, including downwind odour and smoke plume details; a calibration schedule; records of maintenance; and any complaints. Information gathered under these provisions shall be made available to the Chief Executive, Taranaki Regional Council upon request.
4. That the consent holder shall at all times adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the landfill operation. 'Best practicable option' [as defined in section 2 of the Act] shall be determined by the Taranaki Regional Council, following review of the conditions of this consent as set out under conditions 13 and 14 of this consent and having regard to the requirements of condition 9 of this consent.
5. That the discharge of contaminants into the air from the landfill operation shall not result in any of the following – offensive or objectionable odours; offensive or objectionable dust; or dangerous or noxious ambient concentrations of any airborne contaminant -- as determined by at least one enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the site.
6. That no material is to be burnt at the landfill site with the exception of landfill gas in a flare.
7. That the discharges authorised by this consent shall not give rise to any significant adverse ecological effects on any ecosystem, including but not limited to, habitats, plants, animals, microflora and microfauna.

Consent 4779-1.1

8. That no extraction venting of untreated landfill gases be located closer than 200 metres to any boundary of the landfill property site.
9. That the operation of the landfill shall give effect to:
 - (a) the 'Air Discharge Consent Application Supporting Documentation' July 1995, prepared for the New Plymouth District Council by Woodward Clyde;
 - (b) *Variation to Air Discharge Consent – Colson Road Landfill*, prepared by Tonkin & Taylor Ltd and dated December 2016; and
 - (c) the New Plymouth District Council Colson Road Landfill Management Plan July 1994 or any subsequent version of that document which does not lessen the standard of environmental protection afforded by that document. The management plan shall be updated at not greater than yearly intervals, to the satisfaction of the Chief Executive, Taranaki Regional Council.
10. That prior to undertaking any alteration to the site or site operations other than as specified and discussed in the application and supporting documentation lodged with the Taranaki Regional Council for this consent, and any subsequent application to change the conditions of this consent, which may significantly alter the nature or quantities of contaminants discharged from the site into the air, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.
11. That the consent holder and staff of the Taranaki Regional Council shall meet as appropriate, and at least once per year, with the submitters to the consent, and any other interested party at the discretion of the Chief Executive, Taranaki Regional Council, to discuss any matter relating to the exercise of this consent, and in order to facilitate ongoing consultation.
12. That the consent holder shall, within one year of the commencement of this consent, provide a report on the feasibility of collecting, extracting, venting, or combusting of landfill gas at the Colson Road landfill, to the satisfaction of the Chief Executive, Taranaki Regional Council.
13. That pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2006, June 2012, June 2018 and/or within six months of the first exercise of this consent, for the purpose of reviewing the best practicable option or options available to reduce or remove any adverse effects on the environment, or to deal with any significant adverse ecological effects on any ecosystems, including but not limited to, habitats, plants, animals, microflora and microfauna, arising from discharges licensed by this consent.

Consent 4779-1.1

14. That in addition to the review provisions of condition 13 above, pursuant to section 128(1)(a) of the Resource Management Act 1991 the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review:

- (a) within six months of receipt of the report required by condition 12; and/or
- (b) during June 2001, June 2003, June 2006, June 2012 and/or June 2018; and/or
- (c) within the 6 months following the installation of any landfill gas collection and treatment at the site;

for the purposes of:

- (i) considering the options of collecting, extracting, venting or combusting landfill gas; and/or
- (ii) monitoring landfill gas combustion and its effects.

Signed at Stratford on 24 January 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: New Plymouth District Council

Decision Date: 13 October 2021

Commencement Date: 13 October 2021

Conditions of Consent

Consent Granted: To discharge stormwater and sediment from earthworks associated with the capping of Stage 3 of the Colson Road landfill onto land and into an unnamed tributary of the Puremu Stream

Expiry Date: 1 June 2025

Review Date(s): June 2022 and in accordance with special condition 17

Site Location: Colson Road Landfill, 76 Colson Road, New Plymouth

Grid Reference (NZTM) 1697110E-5676383N (discharge point)
1697265E-5676055N (approximate centre of earthworks)

Catchment: Waiwhakaiho

Tributary: Puremu

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

General condition

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.
2. The site shall be managed and any stormwater treated in accordance with a Soil Erosion and Sediment Control Plan (ESCP) that has been approved by the Taranaki Regional Council acting in a technical certification capacity. This plan is to be prepared and maintained in accordance with the "*Erosion and sediment control plan preparation guideline*" (Waikato Regional Council, 2019), taking account of the principles and practices given in "*Erosion & Sediment Control Guidelines for Soil Disturbing Activities*" (Waikato Regional Council, 2009), and any subsequent amendments. The plan shall include, but not be limited to:
 - a) the way in which the work will be phased, and
 - b) stormwater drainage plans, and
 - c) estimates of sediment loss from each area, and
 - d) the erosion and sediments controls, and
 - e) how these will be developed prior to the start of each phase, and
 - f) the location capacity and design of each structure, and
 - g) monitoring and maintenance, record keeping and reporting, and
 - h) preparation and responses in relation to heavy rainfall, and
 - i) contingency measures, including for matters that may arise such as ponding, rilling, vehicle tracking, erosion.
3. Prior to this consent being exercised the consent holder must appoint a principal contact for matters relating to this consent. The representative's name and how they can be contacted shall be provided to the Taranaki Regional Council.
4. The consent holder must arrange and conduct a pre-construction site meeting and invite, with a minimum of five working days' notice, the Taranaki Regional Council, the site representative(s) nominated under condition 3 of this consent, the contractor, and any other party representing the consent holder prior to any work authorised by this consent commencing on site.

Advice note: *In the case that any of the invited parties, other than the site representative does not attend this meeting, the Consent Holder will have complied with this condition, provided the invitation requirement is met.*

Consent 6177-2.0

5. The consent holder must ensure that a copy of the certified ESCP required by condition 2, including any certified amendments, is kept onsite in a place where it is available to officers of Taranaki Regional Council, and this copy is updated within five working days of any amendments being certified.
6. The consent holder shall, prior to bulk earthworks commencing in any phase, submit to the Taranaki Regional Council "As Built Certification Statements" signed by an appropriately qualified and experienced professional certifying that the erosion and sediment controls have been constructed in accordance with the certified ESCP. Information contained in the certification statement shall include at least the following:
 - a) confirmation of contributing catchment areas;
 - b) the location, capacity and design of each structure;
 - c) position of inlets and outlets; and
 - d) any other relevant matter.
7. There shall be no discharge of untreated stormwater from any unstabilised areas to the Puremu Stream or its tributaries.
8. Any discharge authorised by this consent from the SRP (Pond 1) (NZTM: 1697110E-5676383N) to the unnamed tributary of the Puremu Stream, in combination with the other discharges at the same location, shall have a suspended solids concentration no greater than 100 gm⁻³.
9. As far as practicable, all clean water run-off from stabilised surfaces including catchment areas above the site must be separated from the exposed areas via a stabilised system to prevent erosion.
10. The consent holder must progressively stabilise, re-contour and re-vegetate any disturbed areas, to minimise sediment runoff and erosion until the site has been stabilised in accordance with the measures detailed in the document Waikato Regional Council document titled "Erosion and Sediment Control – Guidelines for Soil Disturbing Activities", as soon as practically possible and within a period not exceeding five days after completion of any phase authorised by this resource consent.
11. Further to condition 10, any area that is not to be worked within a 21 day period is to be stabilised.
12. Stabilisation must be undertaken by providing adequate measures (vegetative and/or structural) that will immediately stabilise disturbed areas, and will minimise sediment runoff and erosion. The consent holder must monitor and maintain the site until vegetation is established to such an extent that it prevents erosion and prevents sediment from entering any water body.

13. Before exercising this consent, the consent holder shall establish a 'Kaitiaki Forum'. The purpose of the Kaitiaki Forum shall be to provide advice to the consent holder, regarding but not limited to the following:
- a) avoiding, remedying and mitigating adverse effects on the cultural, traditional, historical and spiritual values of the Puremu Stream associated with exercising this consent; and
 - b) recognising and providing for the relationship of Ngāti Tawhirikura and their culture and traditions with their ancestral lands, waters, sites, taonga and wāhi tapu associated with exercising this consent; and
 - c) the exercise of kaitiakitanga by Ngāti Tawhirikura Hapū associated with exercising this consent.

The make-up of the Kaitiaki Forum, its operations and procedures are to be determined by the consent holder, Ngāti Tawhirikura Hapū and Te Kotahitanga o Te Atiawa Trust and detailed in a forum collaboration agreement. A copy of the forum collaboration agreement shall be provided to the Chief Executive, Taranaki Regional Council.

14. Except as provided for in condition 15 no earthworks shall occur, and all exposed areas shall be stabilised between 1 May and 1 October.
15. Maintenance work may be undertaken between 1 May and 1 October, in accordance with the ESCP required by condition 2, or an activity specific ESCP that has been approved by the Taranaki Regional Council acting in a technical certification capacity.
16. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2022, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.
17. In addition to the review provision of condition 16 above, in accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may review condition 8 of this consent by giving notice within 3 months of receiving the ESCP required by condition 2 or subsequent amendments, if it is determined that the 100 gm⁻³ suspended solids limit does not adequately avoid or mitigate adverse effects.

Signed at Stratford on 13 October 2021

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: New Plymouth District Council
Private Bag 2025
New Plymouth 4342

Decision Date 7 February 2020

Commencement Date 7 February 2020

Conditions of Consent

Consent Granted: To discharge stormwater and sediment arising from
earthworks into an unnamed tributary of the Puremu Stream

Expiry Date: 1 June 2026

Review Date(s): June 2022, June 2024

Site Location: 76 Colson Road, Waiwhakaiho

Grid Reference (NZTM) 1697110E-5676383N

Catchment: Waiwhakaiho

Tributary: Puremu

*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. This consent shall be exercised in general accordance with the information provided in support of the original application. If there is conflict between the application and consent conditions the conditions shall prevail.
2. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.
3. No less than 2 and no more than 20 working days before commencing work the consent holder shall notify the Chief Executive, Taranaki Regional Council ('the Chief Executive'). Notification shall include the consent number, a brief description of the work, and the intended commencement date. Unless the Chief Executive advises that an alternative electronic method is required this notice shall be served by completing and submitting the 'Notification of work' form on the Council's website (<http://bit.ly/TRCWorkNotificationForm>).
4. During and immediately following earthworks the site shall be managed and any stormwater discharged, shall be in general accordance with the Soil Erosion and Sediment Control Plan provided with the application (Document #2392643).
5. The obligation described in condition 4 above shall cease to apply, and accordingly the erosion and sediment control measures may be removed, in respect of any particular area only when the site is stabilised.

For the purpose of this consent 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of base course, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Waikato Regional Council's Guidelines for Soil Disturbing Activities, 2009. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.

6. Before commencing any earthworks, the consent holder shall ensure that they (or their representative) meet on site with a Taranaki Regional Council officer who is directly responsible for monitoring compliance with the conditions of this consent. The purpose of the meeting shall be for the consent holder to detail the measures proposed to ensure compliance with the conditions of this consent.
7. The sediment control measures necessary to comply with the conditions of this consent shall be constructed before any additional soil is exposed, except for further earthworks necessary for the construction of any required sediment control measures, and shall remain in place, in respect of any particular area, until that area is stabilised.

Consent 10804-1.0

8. All earthwork areas shall be stabilised vegetatively or otherwise as soon as is practicable and no longer than 6 months after completion of soil disturbance activities.
9. Any discharge authorised by this consent from the 'large silt pond' (NZTM: 1697110E-5676383N) to the unnamed tributary of the Puremu Stream, in combination with the other discharges at the same location, shall have a suspended solids concentration no greater than 100 gm⁻³.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2022 and/or June 2024, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 7 February 2020

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management