Waste Remediation Services Limited
Symes Manawapou Landfarm
Monitoring Programme
Annual Report
2013-2014

Technical Report 2014-118

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Executive summary

The Waste Remediation Services Limited (WRS) now operates a Landfarm located on Manawapou Road near Manutahi (the Site). Disposal activities commenced at this site during the 2012-2013 monitoring year under the previous operator Remediation (NZ) Limited (RNZ), the consent was then transferred during June 2014 to WRS.

This report for the period July 2013 – June 2014 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess largely RNZ's environmental performance during the period under review, and the results and environmental effects of the site activities.

The facility encompasses three lined storage cells which are utilised to store water and synthetic based drilling muds (WBM and SBM) prior to landfarming on the designated landfarm area. The Site also has four groundwater monitoring wells, two of which are situated in close proximity to the storage cells and two which are located on the northern boundary of the site, closet to the nearest potential receptor.

WRS Limited now holds one resource consent, which includes a total of 27 conditions setting out the requirements that they must satisfy.

During the monitoring period, RNZ demonstrated an overall good level of environmental performance.

The Council's monitoring programme for the year under review included five scheduled inspections, 18 groundwater samples, six soil samples and one surface water sample collected for physicochemical analysis, in addition to a review of monitoring data received from the RNZ.

The monitoring showed that RNZ were able to manage the site as to ensure that there were limited measurable environmental effects as a result of the exercise of this Consent and as a result were able to demonstrate a **good** level of environmental performance. The installation of the groundwater monitoring well network as proposed in the 2012-2013 year was beneficial to the site in as much as it enabled the Council to identify groundwater impacts in the vicinity of the storage cells.

Conversely, the administration of the Site is rated as **poor**. The Council had to continually prompt the Consent holder, RNZ, for data and when it was provided it was insufficient. Unauthorized Incidents included the pooling of liquids longer than one hour after application, the non-notification of deliveries of material from well sites, the lack of compliance samples for both the pre-land spread material and the re-sown areas, Stage 3 and the impact on local groundwater quality surrounding the storage cells which resulted in the Council issuing an abatement notice for RNZ to drain one cell and repair the damaged liner. This was the only adverse environmental effect during the monitoring period 2013-2014.

To compound the issue the new site operator WRS was unable to provide any additional monitoring data for reporting. Such data should have been passed from the original site owner, RNZ, to the new site owner WRS, as a duty of care, but this information was not forthcoming. As the new site owner, WRS, acquired the site within the monitoring period and as the new site owner are now accountable for all the environmental and administrative

performance issues relating to the site within the monitoring period. However, in the case of this administrative poor performance they share the responsibility with RNZ.

For reference, in the 2013-2014 year, 60% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2014-2015 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 the Annual Report for the period July 2013- June 2014 by the Taranaki Regional Council (the Council) describes the monitoring programme associated with the resource consent now held by Waste Remediation Services Limited (WRS). WRS now operate the drilling waste landfarm (Symes Landfarm)located on Manawapou Road near Manutahi (the Site). Ownership was transferred from previous operator Remediation (NZ) Limited (RNZ) in June 2014.

Disposal activities commenced at this site during the 2012-2013 monitoring year. The original consent was granted 1 May 2012, and the Site became operational in September 2012.

During the 2013-2014 monitoring period, there were multiple disposals of approximately 1200m^3 of water based and synthetic based cuttings and fluids from the Mangahewa-C (14) wellsite and Manutahi-D production facilities by RNZ. These disposals commenced on 28 August 2013 through to 14 February 2014 respectively, across the consented area, Stage 3.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consent held by WRS, to discharge drilling wastes from hydrocarbon exploration and production activities, onto and into land via landfarming by RNZ. This is the second Annual Report to be prepared by the Council to cover the discharges and their effects at this site.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the RMA and the Council's obligations and general approach to monitoring sites though annual programmes, the resource consent now held by WRS, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted at the Site.

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 2014-2015 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

The *Resource Management Act 1991* (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 (eg, recreational, cultural, or aesthetic);
(e) risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the 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 consent performance

Besides discussing the various details of the performance and extent of compliance by the consent holder during the period under review, this report also assigns a rating as to the Company's environmental and administrative performance.

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 significant 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 in response to unauthorised incident reports, 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.

- **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 in response to unauthorised incident reports. 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 in response to unauthorised incident reports. 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 2013-2014 year, 60% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Process description

1.2.1 Drilling waste

Waste drilling material is produced during well drilling for hydrocarbon exploration. The primary components of this waste are drilling fluids (muds) and rock cuttings. Drilling fluids are engineered to perform several crucial tasks in the drilling of a hydrocarbon well. These include: transporting cuttings from the drill bit to the well surface for disposal; controlling hydrostatic pressure in the well; supporting the sides of the hole and preventing the ingress of formation fluids; and lubricating and cooling the drill bit and drill pipe in the hole.

Drilling fluids

Oil and gas wells may be drilled with either synthetic based mud (SBM) or water based mud (WBM). As the names suggest, these are fluids with either water (fresh or saline) or synthetic oil as a base material, to which further compounds are added to modify the physical characteristics of the mud (for example mud weight or viscosity). More than one type of fluid may be used to drill an individual well. In the past, oil based muds (diesel/crude oil based) have also been used. Their use has declined since the 1980s due to their ecotoxicity; they have been replaced by SBM. SBM use olefins, paraffins or esters as a base material. While this is technically still a form of oil based fluid, these fluids have been engineered to remove polycyclic aromatic hydrocarbons, reduce the potential for bioaccumulation, and accelerate biodegradation compared with OBM.

Common constituents of WBM and SBM include weighting agents, viscosifiers, thinners, lost circulation materials (LCM), pH control additives, dispersants, corrosion inhibitors, bactericides, filtrate reducers, flocculants and lubricants. Of these, the naturally occurring clay mineral barite (barium sulphate) is generally the most common additive. It is added to most drilling muds as a wetting and weighting agent.

Drilling fluids may be intentionally discharged in bulk for changes to the drilling fluid programme or at the completion of drilling. Depending on operational requirements and fluid type and properties, fluids may be re-used in multiple wells.

Cuttings

Cuttings are produced as the drill bit penetrates the underlying geological formations. They are brought to the surface in the drilling fluid where they pass over a shaker screen that separates the cuttings and drilling fluids. The drilling fluids are recycled for reuse within the drilling process, but small quantities of drilling fluids remain adhered to the cuttings. The cuttings and smaller particle material from the drill fluid treatment units drain into sumps. If sumps cannot be constructed, corrals or special bins are used. During drilling this material is the only continuous discharge.

1.2.2 Landfarming

The landfarming process has typically been used in the Taranaki region to assist the conversion of sandy coastal sites prone to erosion into productive pasture. Results of an independent research project conducted by AgKnowledge Ltd (2013) have indicated that the re-contoured sand dunes, after the inclusion of the drilling wastes (as per the consents), and with the addition of appropriate fertilisers and water (irrigation) are capable of producing high quality clover-based pastures and thus increasing the value of the land from about $3-4,000/ha to $30-40,000/ha (2013).

Landfarming uses natural and assisted bioremediation to reduce the concentration of petroleum compounds through degradation. The basic steps in the landfarming process are:

1. Drilling waste is transported from wellsites by truck (cuttings) or tanker (liquids). It may be discharged directly to land or placed in a dedicated storage pit.
2. The required area is prepared by scraping back and stockpiling existing pasture/topsoil and leveling out uneven ground.
3. Waste is transferred to the prepared area by excavator and truck and spread out with a bulldozer. Liquids may be discharged by tanker or a spray system.
4. Waste is allowed to dry sufficiently before being tilled into the soil to the required depth with a tractor and discs.
5. The disposal area is leveled with chains or harrows.
6. Stockpiled or brought in topsoil/clay is applied to aid stability and assist in grass establishment.
7. Fertiliser may be applied and the area is sown in crop or pasture at a suitable time of year.

The landfarming process utilised at the Site is on a single application basis. This means dedicated spreading areas each receive only a single application of waste. When disposal is complete, the area will be reinstated and monitored until consent surrender criteria have been met.

1.3 Site location and description

The Site is located on Manawapou Road at Manutahi. This site is located on marginal coastal farm land situated on reworked dune fields. An extensive (100-250 m) foredune is located seaward of the consented site, and will remain undisturbed by site activities. The foredune provides a considerable natural buffer from prevailing onshore winds. A natural gas pipeline runs adjacent to the length of the site on the seaward side, marking the seaward extent of the disposal site. In addition, a QE II covenant is located in the north western end of the site, and Lake Taumaha (which is a QE II covenant and a Key Native Ecosystem) is located east of the site. The proximity of the site to these recognised ecosystems has been taken into account in the setting of buffer distances and location of the stockpiling facilities.

The predominant soil type has been identified as black loamy sand and vegetation growth is primarily a mixture of pasture and dune grasses. Test pitting and the logging of boreholes on site indicated a relatively shallow water table. Test bores were augured to 10 m in the pit area, revealing extensive compacted, low permeable clays underlying coastal dune sands. Pit construction revealed mostly tightly packed sand at the pit bases (approximately 4-5 m below surface). Average annual rainfall for the site is 1023 mm (taken from the nearby 'Duffy' monitoring station). As with the other South Taranaki coastal sites, this Site is subject to strong winds.

Site data

Location

Word descriptor:	Manawapou Road, Manutahi, Taranaki
Map reference:	E 1717244
(NZTM)	N 5608736
Mean annual rainfall:	1023 mm
Mean annual soil temperature:	~15.1°C
Mean annual soil moisture:	~32.9%
Elevation:	~40 m
Geomorphic position:	Dune backslope
Erosion / deposition:	Erosion
Vegetation:	Pasture, dune grasses
Parent material:	Aeolian deposit
Drainage class:	Free / well draining

Table 1 Bore construction data

Bore	*Depth (m)*	*Drilling Formation*
GND2300	0.00 – 0.50	Sandy topsoil
	0.50 – 1.00	Sandy clay
	1.00 – 5.50	Light brown / orange fine-soft-sticky-clay
	5.50 – 10.50	Sandy / clay / loose sand, increasing moisture
GND2301	0.00 – 0.50	Sandy top soil
	0.50 – 2.50	Fine gravel / black sands
	2.50 – 3.50	Lit brown / orange clays / fine
	3.50 – 4.00	Yellow clays / very fine / sticky
	4.00 – 6.50	Sandy clay
	6.50 – 9.00	Tight dark clay with peat

Bore	*Depth (m)*	*Drilling Formation*
GND2302	0.00 – 2.00	Black fine gravel / sand
	2.00 – 8.00	Light brown / orange clay
	8.00 – 9.00	Grey sandy clay moisture loose
	9.00 – 10.00	Grey sandy clay / tight / compact
GND2303	0.00 – 0.50	Dark brown sandy soil
	0.50 – 2.00	Light brown / orange clay-loose-sticky-moist
	2.00 – 3.00	Light brown / orange clay tight
	3.00 – 5.00	Light brown / orange sandy clay saturated / soft
	5.00 – 7.00	Dark brown peaty clay / brown orange clay saturated
	7.00 – 7.50	Loose saturated sands
	7.50 – 10.00	Tight dark grey sands / dry / tight

Figure 1 Aerial photograph showing the location and approximate extent of the Symes Manawapou Landfarm and approximate regional location (inset)

1.4 Resource consents

1.4.1 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.

WRS now holds discharge permit 7795-1 to discharge drilling wastes [consisting of drilling cuttings and drilling fluids from water based muds and synthetic based muds], from hydrocarbon exploration and production activities, onto and into land via

landfarming. This permit was issued by the Council on 1 May 2012 to Remediation, as a resource consent under Section 87(e) of the Resource Management Act. This resource consent is due to expire on 1 June 2028.

Condition 1 sets out definitions, and condition 2 requires the consent holder to adopt the best practicable option to prevent or minimise any environmental effects.

Condition 3 sets out the requirements for a management plan, while condition 4 sets out the requirements for the installation of groundwater monitoring bores prior to the exercise of the consent.

Conditions 5 to 9 set out the requirements for a management plan, notifications, monitoring and reporting.

Conditions 10, 12, 13, 14 and 15 specify discharge limits, locations and loading rates.

Condition 11 requires a buffer zone between areas of disposal and surface water bodies, property boundaries, and QEII Key Native Ecosystems.

Conditions 16 and 17 regard operational requirements, while Conditions 18 to 24 specify receiving environment limits for both soil and water

Condition 25 concerns archaeological remains, while Conditions 26 and 27 concern lapse provisions and consent reviews.

The permit is attached to this report in Appendix I.

1.5 Monitoring programme

1.5.1 Introduction

Section 35 of the RMA sets out obligations upon the Council to gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region and report upon these.

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 Site consisted of four primary components.

1.5.2 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 reviews;
- renewals;
- new consents;

- advice on the Council's environmental management strategies and content of regional plans and;
- consultation on associated matters.

1.5.3 Site inspections

A total of five scheduled inspections were made of the site during the monitoring period, with regard to the consents for the discharge of drilling waste. Seven inspections were conducted at the site during chemical sampling runs, and another two additional inspections of the site were conducted at other times. Inspections focussed on the following aspects:

- observable and/or ongoing effects upon soil and groundwater quality associated with the land disposal process
- effective incorporation of material, application rates and associated earthworks
- integrity and management of storage facilities
- dust and odour effects in proximity of the site boundaries
- housekeeping and site management
- the neighbourhood was surveyed for environmental effects.

1.5.4 Chemical sampling

During the monitoring period the Council collected six composite soil samples from the Site. The samples were analysed for chloride, conductivity, hydrocarbons, pH, sodium absorption ratio (SAR) and total soluble salts.

During the monitoring period, four monitoring wells were each sampled three times, with the exception of groundwater bore GND2301, which was sampled six times in response to slightly elevated levels of benzene and toluene. Samples were analysed for pH, temperature, conductivity, chloride, total dissolved solids, sodium, barium, TPH and BTEX.

One surface water sample was obtained from the unnamed lake to the Northwest of the landfarm site and was analysed for standard surface water quality parameters.

1.5.5 Review of analytical results

The Council reviewed two soil sampling results and a representative pre-disposal sample from a individual waste stream prior to disposal, and receiving environment soil samples from two of three spreading areas post waste application. These samples were sent to an independent IANZ accredited laboratory for analysis for a wider range of contaminants. Chemical parameters tested were (all solid/sludge samples):

- pH
- chlorides
- potassium
- sodium
- total nitrogen
- barium
- heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)

- BTEX
- PAHs
- TPH (and individual hydrocarbon fractions C7-C9, C10-C14, C15-C36)

Receiving environment soil samples were also tested for electrical conductivity and sodium absorption ratio (SAR).

2. Results

2.1 Inspections

7 October 2013

No objectionable odours were detected beyond the site boundary at the time of inspection. However, strong hydrocarbon odours were noted around the storage pits. All pits contained materials. Pit one appeared to be mostly water based muds with some surface hydrocarbons. Pit two appeared to have black oil across its entire surface. The levels of all pits were good. The hole in the liner of the pit one had been repaired. Drilling muds from Manutahi-D were being delivered at the time of inspection. It was understood that approximately 13 loads had been delivered the day before without appropriate notification. The spreading area where muds had recently been land farmed looked good. The area had been bunded (bund walls appeared to be stable), contoured and the muds appeared to be well blended into the soil. The spreading area was yet to be sown. It was outlined to the consent holder (RNZ) to ensure the appropriate notifications were given to the Council as required by resource consent conditions, as no notifications for deliveries from Manutahi-D had been received.

6 January 2014

At the time of inspection Contract Resources were skimming crude oil off the top of the storage pits for processing at the Rimu Production Station. The pit area in general appeared okay, and liners appeared to be intact. The current spreading area Stage 3 (S3) appeared half finished, with mud having been spread and topsoil potentially reapplied, but winds had mobilised much of the sandy soil and areas of mud were exposed. It was unclear whether the material had been incorporated via tilling. Stockpiled topsoil around the perimeter of the site was significantly vegetated suggesting the area had been open for some months. In one corner of the site there was a body of ponded water. The water was turbid and likely related to heavy rainfall over previous three days. There was no evidence of hydrocarbons in the ponded water. Areas Stage 1 (S1) and Stage 2 (S2) appeared good, pasture coverage was good and plants appeared healthy. It was noted that it was necessary to contact the consent holder to determine what stage the S3 spreading area was at to ensure compliance with consent conditions.

9 January 2014

Inspection was conducted in conjunction with groundwater and soil sampling (obtained from spreading areas S1 and S2). Some concrete, debris and one shaker screen was piled up next to pit one. No further issues were noted at the time of inspection.

23 January 2014

Inspection conducted in conjunction with repeat groundwater sampling of bore GND2301, as the previous sample showed high chloride and low level benzene. Sample obtained at the time of inspection had 'sweet' chemical odour. No other changes were observed at the site since the previous sampling run.

4 February 2014

Drilling muds and cuttings from the front two pits had been spread in area S3, consistent with information supplied to the Council by Remediation (NZ) Services. Spreading and incorporation looked well done. A significant amount of oily material

was present within the pits. An inquiry had been sent to the site manager to determine what the plan is regarding the disposal/removal of the oily material.

5 February 2014
No objectionable odours were detected beyond the site boundary at the time of inspection. However, hydrocarbon odours were noted around the storage pits and recent application area. All pits had been lowered as approximately one metre of freeboard was available. The liners were not really visible due to material adhesion. All pits contained some oily liquids and muds as well as discoloured water. An application of materials had occurred in/on a disposal area previously used during October 2013. Ponded liquid remained in the north western corner and samples were obtained. Dried muds were present at the surface in clumps and appeared to be weathering nicely. They were very easy to break apart and the area had been recently worked. The topsoil bund walls were naturally vegetating due to the length of time since they were established.

17 February 2014
Inspection was conducted in conjunction with groundwater sampling (re-test of bore GND2301). Pits were inspected and still had remains of SBM/WBM within them and still featured significant amounts of surface oil. Contractors were actively re-applying topsoil to spreading area /S 3. Ponding previously observed within the north western quadrant was absent.

12 March 2014
Inspection was conducted to assess compliance with abatement notice 20118. It was found that the abatement notice had not been complied with. No works had occurred to empty the drilling mud storage pits adjacent to groundwater monitoring bore GND2301. Only one repair patch appeared to have been applied to an area of liner around the 'balance' pipe, the repair was not stuck down to the liner. Confidence in the integrity of the liner was not ensured. The S3 area had the topsoil reapplied and the area had been contoured, very little mud was present at the surface. No pasture strike was yet visible.

20 March 2014
Inspection was conducted in conjunction with groundwater and soil monitoring. Two soil samples, four groundwater samples and one surface water sample from the QEII lake were obtained. The recently spread area looked good, top soil was re-applied and no ponding was observed. The pit area remained in a similar condition to the last inspection. The pit and spreading areas were fenced off with hotwire. At the time of departure a tanker truck turned up onsite to deliver material from Cheal. This was to be discussed with Inspecting officers from the Council as no notification appeared to have been received prior to the consignment arriving at site.

1 April 2014
Inspection conducted in conjunction with re-sampling of groundwater bore GND2301. Hotwire 'fencing' around pits had fallen down, enabling stock access. All pits were occupied with drilling waste and all featured an oily slick on the surface.

15 April 2014
No objectionable odours or visible emissions were detected at the time of inspection. However, hydrocarbon odours were noted down wind of pits. The integrity of storage pit liner one was inspected, the repair around balance pipe looked OK, a lot of surface oils were still present within the pit. The other two storage pits had a small amount of surface oiling and plenty of freeboard was available. No recent spreading had occurred at the time of inspection. Previous application areas appeared stable and the pasture strike looked good. Muds were visible within the soil profile, yet no hydrocarbon odours were noted. No ponded liquids were present and the delivery area appeared tidy.

20 May 2014
Inspection was conducted in conjunction with soil sampling. The site remained inactive (as contractor was trespassed from land till further notice). The pits appeared more full in contrast to previous inspections, perhaps due to recent rainwater. Spreading areas looked good with abundant pasture growth.

28 May 2014
No objectionable odours were detected at the time of inspection. No recent land-farming of drilling wastes had occurred. A portion of the original application area was being grazed and the rest was fenced off. Pasture appeared good across most of the recent spreading area with a small bare patch noted in one location. Drilling muds were well mixed into the soil profile. All lined pits at the site were found to have plenty of freeboard available. Liner repair below the balance pipe was still holding. A lot of surface oil was evident within the pit. The adjacent pit had a small amount of surface oils. The delivery area appeared tidy.

3 June 2014
Inspection was conducted in conjunction with groundwater sampling. The site still appeared abandoned as there was no evidence of recent site works. Spreading areas had good pasture growth.

Photo 1 Topsoil re-applied to spreading area Stage 3 post spreading activities, taken 17 February 2014

2.2 Results of discharge monitoring

The Consent holder provided the Council with delivery notification manuscripts which detailed the arrival date, the product, the site identification, the transport company and the volume of delivered fluids/mud. Table 2 provides a brief summary of the total amounts delivered and there source.

Table 2 Delivery Summary

Delivery Dates	Product	Site	Volume m^3
19-31 August 2013	WBF	Mangahewa C (14) Wellsite	385.5
03-23 September 2013	WBF	Mangahewa C (14) Wellsite	386
27 Sept – 10 Oct 2013	WBM	Mangahewa C (14) Wellsite	382
05-31 October 2013	SBF/WBF	Origin Manutahi D	483.5
06 November 2013	SBF	Manutahi D	7
			1644.00
n.b: additional deliveries were made early in the 2014 year, however the operator failed to provide volume, product and source information. As such they have been omitted from this list.			

The consent holder utilised the area of the site described as Stage 3, whereby the material was landfarmed on multiple occasions through out the monitoring year, 27 August 2013, 19 September 2013, 12 October 2013 and 2 February 2014.

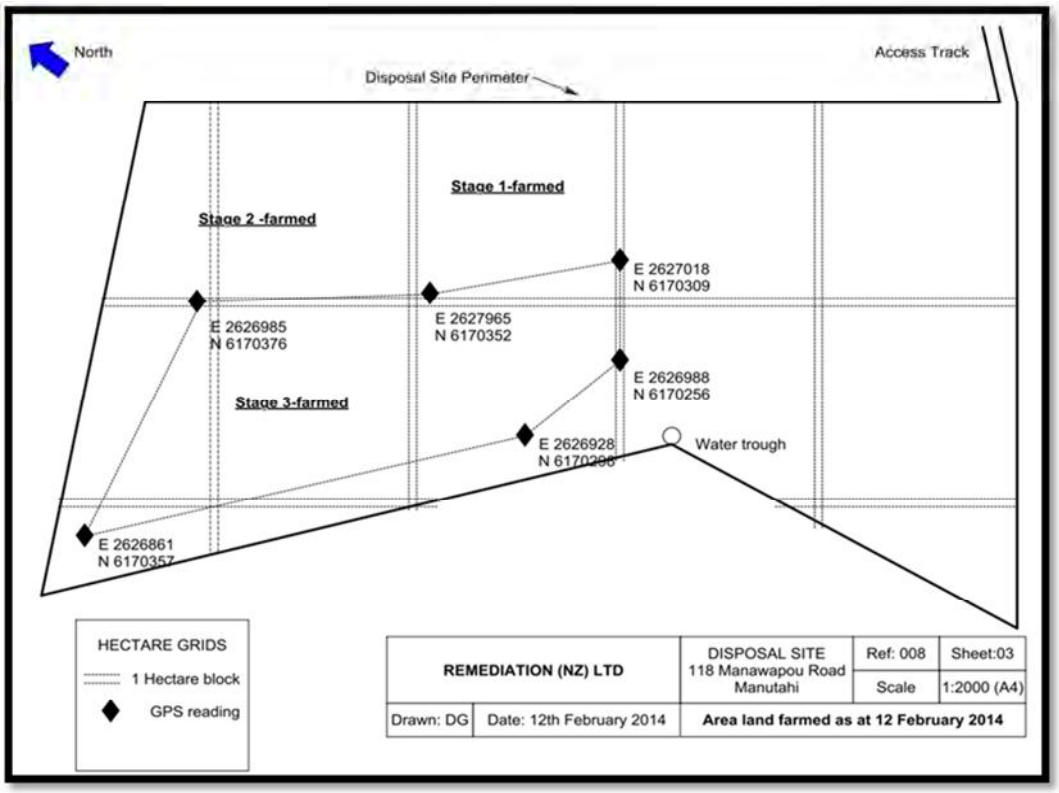


Figure 2 Remediation (NZ) Limited supplied map showing previously spread and completed areas Stage 1 & 2, and the recently spread area Stage 3 which was spread in the 2013-2014 monitoring period

2.3 Results of receiving environment monitoring

2.3.1 Council soil results

During the monitoring year, six composite soil samples were collected by sub-sampling along transects at 10 m intervals to a depth of 250 mm in spreading areas Stage 1, Stage 2 and Stage 3 (Figure 3). The results are presented below in Table 2.

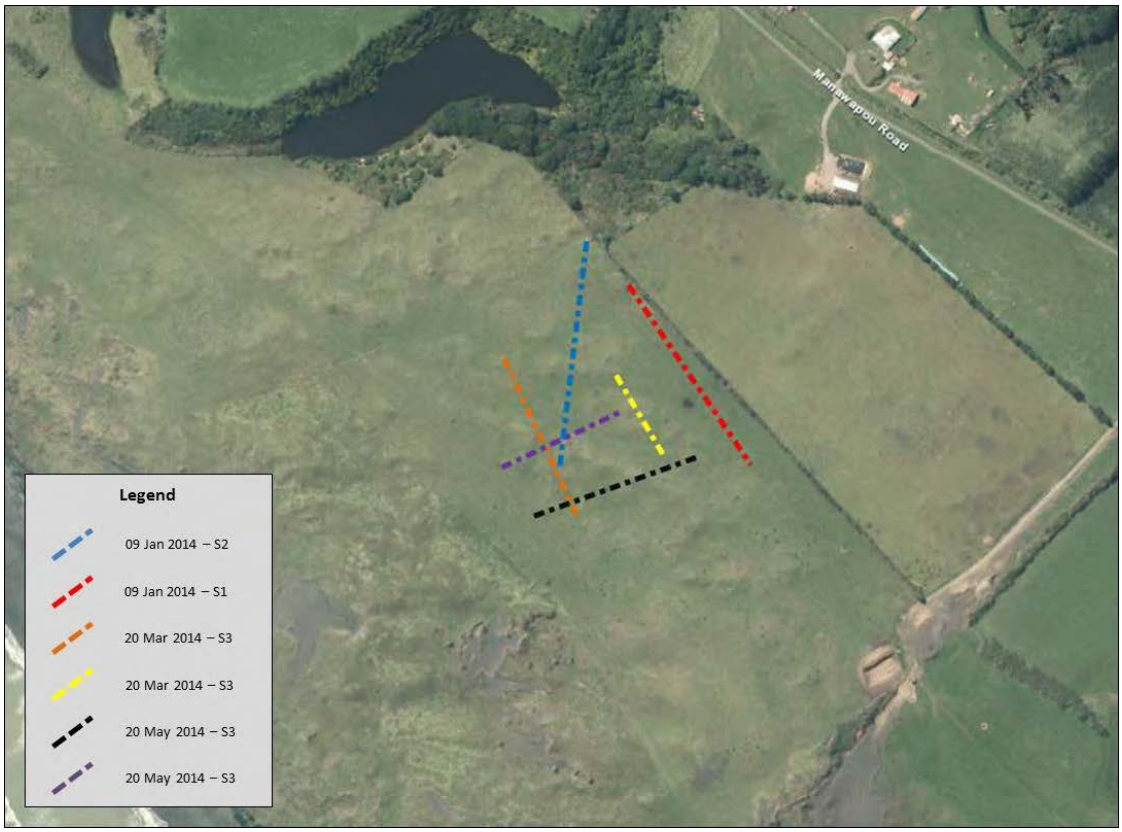


Figure 3 Council soil sampling transect locations at the Symes Manawapou Landfarm during the 2013-2014 monitoring period

Table 3 Council soil sample results obtained from Symes Manawapou Landfarm during the 2013-2014 monitoring period

Parameter	Unit	09 Jan 2014 *S2*	09 Jan 2014 *S1*	20 Mar 2014 *S3*	20 Mar 2014 *S3*	20 May 2014 *S3*	20 May 2014 *S3*
Calcium	mg/kg	255	48.6	109	220	56.3	89.2
Chloride	mg/kg DW	74.2	99.5	176	492	37.7	12.6
Conductivity	mS/m@20C	174	89.4	109	262	52.8	56.2
Hydrocarbons	mg/kg DW	48	72	1600	3000	950	2300
Magnesium	mg/kg	19.1	9.1	11.0	18.9	7.2	9.7
Moisture factor	Nil	1.143	1.120	1.038	1.038	1.071	1.070
pH	pH	7.7	6.9	7.2	7.6	7.4	7.1
Sodium absorption ratio	None	0.45	1.15	1.13	1.51	-	-
Sodium	mg/kg	27.4	33.4	46.2	87.0	16.7	11.7
Total soluble salts	mg/kg	1361.7	699.6	853.0	2050.4	-	-

The analysis of the Councils soil results detailed that the application of the land farmable muds were not in exceedance of any of the consent conditions.

2.3.2 Council groundwater results

During the 2013-2014 monitoring period, the Council undertook groundwater sampling across the groundwater monitoring bore network at the site. The locations of the monitoring bores are detailed in Figure 4. Monitoring Bores GND2300 and 2301 were installed to monitor the integrity of the storage pits, while GND 2302 and 2303 are located on the site boundaries to detect any potential offsite migration. The results for each of the bores are presented in Tables 4 to 7.

Figure 4 Groundwater monitoring bore sampling sites at the Symes Manawapou Landfarm

Table 4 Groundwater monitoring results from bore GND2300, Symes Manawapou Landfarm during the 2013-2014 monitoring period

Parameter	Unit	09 Jan 2014	20 Mar 2014	03 Jun 2014
Benzene	g/m³	<0.0010	<0.0010	<0.0010
Toluene	g/m³	0.0010	<0.0010	<0.0010
Ethylbenzene	g/m³	0.0010	<0.0010	<0.0010
meta-Xylene	g/m³	<0.002	<0.002	<0.002
ortha-Xylene	g/m³	<0.0010	<0.0010	<0.0010
Hydrocarbons	g/m³	0.7	<0.7	<0.7
C7-C9	g/m³	<0.10	<0.10	<0.10
C10-C14	g/m³	<0.2	<0.2	<0.2
C15-C36	g/m³	<0.4	<0.4	<0.4
Barium (acid soluble)	g/m³	0.10	0.06	0.13
Barium (dissolved)	g/m³	-	-	0.012
Chloride	g/m³	83.5	82.1	86.2
Conductivity	mS/m@20C	43.6	43.4	42.4
pH	pH	6.4	6.5	6.3
Sodium	g/m³	-	46.5	46.8
Static water level	m	7.242	7.770	7.699
Temperature	Deg.C	14.3	15.1	14.1
Total dissolved solids	g/m³	337.3	-	328.1

Table 5 Groundwater monitoring results from bore GND2301, Symes Manawapou Landfarm during the 2013-2014 monitoring period

Parameter	Unit	09 Jan 2014	23 Jan 2014	17 Feb 2014	20 Mar 2014	01 Apr 2014	03 Jun 2014
Benzene	g/m³	0.0050	0.0072	0.0051	0.0024	0.0017	<0.0013
Toluene	g/m³	0.0025	0.0037	0.0020	0.0011	0.0014	<0.0010
Ethylbenzene	g/m³	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
meta-Xylene	g/m³	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
ortha-Xylene	g/m³	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Hydrocarbons	g/m³	<0.7	<0.7	<0.8	<0.7	-	<0.7
C7-C9	g/m³	<0.10	<0.10	<0.15	<0.10	<0.10	<0.10
C10-C14	g/m³	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
C15-C36	g/m³	<0.4	<0.4	0.6	<0.4	0.5	<0.4
Barium (acid soluble)	g/m³	82.4	86	26	-	-	9.18
Barium (dissolved)	g/m³	-	-	26	-	-	9.0
Chloride	g/m³	6000	5110	4970	-	-	4610
Conductivity	mS/m@20C	1740	1540	1530	-	-	1460
pH	pH	5.7	5.6	6.3	-	-	6.2
Sodium	g/m³	-	-	-	-	-	923
Static water level	m	7.004	7.101	7.447	7.912	-	7.754
Temperature	Deg.C	15.6	15.9	16.6	-	-	15.3
Total dissolved solids	g/m³	13462.6	11915.1	11837.8	-	-	11296.2

Table 6 Groundwater monitoring results from bore GND2302, Symes Manawapou Landfarm during the 2013-2014 monitoring period

Parameter	Unit	09 Jan 2014	20 Mar 2014	03 Jun 2014
Benzene	g/m³	<0.0010	<0.0010	<0.0010
Toluene	g/m³	<0.0010	<0.0010	<0.0010
Ethylbenzene	g/m³	<0.0010	<0.0010	<0.0010
meta-Xylene	g/m³	<0.002	<0.002	<0.002
ortha-Xylene	g/m³	<0.0010	<0.0010	<0.0010
Hydrocarbons	g/m³	<0.7	<0.7	<0.7
C7-C9	g/m³	<0.1	<0.10	<0.10
C10-C14	g/m³	<0.2	<0.2	<0.2
C15-C36	g/m³	<0.4	<0.4	<0.4
Barium (acid soluble)	g/m³	0.07	0.038	0.069
Barium (dissolved)	g/m³	-	-	0.069
Chloride	g/m³	64.2	64.9	62.2
Conductivity	mS/m@20C	37.5	36.0	34.4
pH	pH	6.6	6.6	6.6
Sodium	g/m³	-	42.1	41.9
Static water level	m	7.495	7.687	7.712
Temperature	Deg.C	15.1	15.7	14.5
Total dissolved solids	g/m³	290.1	-	266.2

Table 7 Groundwater monitoring results from bore GND2303, Symes Manawapou Landfarm during the 2013-2014 monitoring period

Parameter	Unit	09 Jan 2014	20 Mar 2014	03 Jun 2014
Benzene	g/m³	<0.0010	<0.0010	<0.0010
Toluene	g/m³	<0.0010	<0.0010	<0.0010
Ethylbenzene	g/m³	<0.0010	<0.0010	<0.0010
meta-Xylene	g/m³	<0.002	<0.002	<0.002
ortha-Xylene	g/m³	<0.0010	<0.0010	0.0010
Hydrocarbons	g/m³	<0.7	<0.7	<0.7
C7-C9	g/m³	<0.10	<0.10	<0.10
C10-C14	g/m³	<0.2	<0.2	<0.2
C15-C36	g/m³	<0.4	<0.4	<0.4
Barium (acid soluble)	g/m³	0.40	-	0.69
Barium (dissolved)	g/m³	-	.-	0.07
Chloride	g/m³	729	-	384
Conductivity	mS/m@20C	226	-	126
pH	pH	6.3	-	6.2
Sodium	g/m³	-	-	131
Static water level	m	4.981	5.411	5.317
Temperature	Deg.C	13.9	-	15.0
Total dissolved solids	g/m³	1748.6	-	974.9

The results of the annual monitoring of the groundwater bore network detailed a significant impact detected in GND 2301, this monitoring well is located down gradient of the storage pits. The analysis reported a significant increase in chloride and total dissolved solids as well as trace Monocyclic Aromatics such as benzene and toluene. This detection constituted a breach in Consent Conditions 18 and 19;

'the exercise of this consent shall not shall not result in the concentration of total dissolved salts in any fresh water body exceeding 2500 g/m³'

'other than as provided for in condition 18, the exercise of this consent shall not result in any contaminant, within surface water or groundwater, which after reasonable mixing, exceeds the background concentration for that particular contaminant'

The reason for this impact was due to a hole in the liner of the storage pit. An Abatement Notice (20118) was issued by the Council's Investigating Officer and the Consent Holder was required to fix the issue or face further action.

The remaining three monitoring wells on site GND2300, 2302 and 2303 respectively did not return any significant impacts. Of note was the slight elevation of the chloride levels in the monitoring well GND2303, however, given the fact the level was recorded in January, it is considered insignificant.

2.3.3 Council surface water results

One surface water sample was obtained from the unnamed lake to the Northwest of the landfarm site (as per Figure 4) and was analysed for standard surface water quality parameters. The results are presented in Table 7.

Table 8 Surface water sample obtained from the unnamed lake adjacent to the Symes Manawapou Landfarm site on 20 May 2014

Parameter	Unit	20 Mar 2014
Barium	g/m^3	0.015
Chloride	g/m^3	84.7
Conductivity	mS/m@20C	41.2
Sodium	g/m^3	49.4
Temperature	Deg.C	19.6

The surface water results from the unnamed lake indicated that there had been no adverse environmental effects detected on this body of water from activities conducted at the adjacent Symes Manawapou landfarm site.

2.4 Review of analytical results

Remediation (NZ) Ltd supplied receiving environment soil results during the monitoring year, a total of two composite samples from spreading area(s) S1 and S2 were analysed. Their results indicated that they were compliant with the Consent Conditions. However no results were received for post spread area S3 which was land farmed during this period. The original laboratory analyses are detailed in Appendix II.

Table 9 Consent Holder Supplied Soil Samples

	Sample Name:	Section One 20-Nov-2013	Section Two 20-Nov-2013
	Lab Number:	1206741	1206741
Dry Matter	g/100g as rcvd	93	88
Total Recoverable Barium	mg/kg dry wt	210	70
Total Recoverable Boron	mg/kg dry wt	< 20	< 20
Total Recoverable Vanadium	mg/kg dry wt	260	220
Chloride	mg/kg dry wt	55	84
Total Nitrogen	g/100g dry wt	0.26	0.27
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg			
Total Recoverable Arsenic	mg/kg dry wt	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.16
Total Recoverable Chromium	mg/kg dry wt	21	18
Total Recoverable Copper	mg/kg dry wt	12	12
Total Recoverable Lead	mg/kg dry wt	1.9	2
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	8	7
Total Recoverable Zinc	mg/kg dry wt	92	77
BTEX in Soil by Headspace GC-MS			
Benzene	mg/kg dry wt	< 0.05	< 0.05
Toluene	mg/kg dry wt	< 0.05	< 0.05
Ethylbenzene	mg/kg dry wt	< 0.05	< 0.05
m&p-Xylene	mg/kg dry wt	< 0.10	< 0.10
o-Xylene	mg/kg dry wt	< 0.05	< 0.05
Polycyclic Aromatic Hydrocarbons Screening in Soil			
Acenaphthene	mg/kg dry wt	< 0.03	< 0.03
Acenaphthylene	mg/kg dry wt	< 0.03	< 0.03
Anthracene	mg/kg dry wt	< 0.03	< 0.03
Benzo[a]anthracene	mg/kg dry wt	< 0.03	< 0.03
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.03	< 0.03
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.03	< 0.03
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.03	< 0.03
Benzo[k]fluoranthene	mg/kg dry wt	< 0.03	< 0.03
Chrysene	mg/kg dry wt	< 0.03	< 0.03

Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.03	< 0.03
Fluoranthene	mg/kg dry wt	< 0.03	< 0.03
Fluorene	mg/kg dry wt	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.03	< 0.03
Naphthalene	mg/kg dry wt	< 0.12	< 0.13
Phenanthrene	mg/kg dry wt	< 0.03	< 0.03
Pyrene	mg/kg dry wt	< 0.03	< 0.03
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 8	< 8
C10 - C14	mg/kg dry wt	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70

2.5 Investigations, interventions, and incidents

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

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The Unauthorised Incident Register (UIR) includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

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

In the 2013-2014 period, it was necessary for the Council to undertake significant additional investigations and interventions, or record incidents, in association with Site's conditions in resource consents or provisions in Regional Plans in relation to the Company's activities during the monitoring period.

Four incidents were recorded against the Site during the monitoring period. These incidents are summarized below.

Incident 07 October 2013

Non-notified delivery of muds from Manutahi-D.

Action undertaken: Ensure the appropriate notifications are given to the Council as required by the consent conditions.

Incident 05 February 2014

Ponding in corner of spreading area, post spread.

Consent holder reminded that Conditions dictate that the application of landafarmable materials must be undertaken;

'in a rate and manner such that no ponded liquids remain after one hour, for all waste; prior to incorporation into the soil'

Incident 30515 – 20 March 2014
Investigation found that drilling wastes had been delivered to the site, without the knowledge of the consent holder. A meeting was held with the Company. A letter of explanation was received and accepted. This letter revealed that the delivery was made to the wrong site. Consent Holder followed up with the delivery Company.

Abatement 20118 – 9 January 2014 and 23 January 2014
An abatement notice (number 20118) was issued to Remediation (NZ) Limited regarding elevated levels of benzene, chloride, toluene and total dissolved solids detected within groundwater monitoring bore GND2301 sampled on 9 January 2014 and 23 January 2014. This contravened special conditions 18 and 19 of resource consent 7795-1, which stipulates that

'*the concentration of total dissolved salts in any freshwater body shall not exceed 2,500 g/m*^{3}

that the exercise of the consent shall not result in any contaminant concentration, within surface or groundwater, which exceeds the background concentration for that particular contaminant'

It was suspected that the liner of the storage pit adjacent to groundwater monitoring bore GND2301 had sustained a tear/hole and thus the integrity of the liner was questionable. The abatement notice required Remediation (NZ) Limited to undertake works to empty the contents of said pit and to undertake works to ensure the integrity of the pit liner. Remediation (NZ) Limited was prompt to respond and remedy the situation. The Council continued to sample groundwater monitoring bore GND2301 on a monthly basis until results returned levels that reflected background concentrations for those particular parameters.

A copy of the abatement notice is attached in Appendix III.

Photo 2 Storage pit (to the right) prior to the repair of the liner, as seen from groundwater monitoring bore GND2301, taken on 6 January 2014

Photo 3 Storage pit post repair of the liner, taken on 4 February 2014

3. Discussion

3.1 Discussion of site performance

For the majority of the monitoring period the site was managed by the previous consent holder Remediation NZ Limited (RNZ). Under this previous management regime there were several administrative issues around the supply of correct information. There were some housekeeping issues at the site and site safety and security measures were largely absent. The physical landfarming operations required some improvement. There was one instance of ponding in a low point in the corner of one spreading area, this area was also half completed and left open for several months, the consent requires operators to finish opened areas reinstate and re-vegetate as soon as is practicable to avoid destabilisation of existing in-situ soil . The supply of accurate mapping and loading calculation data led to one incident being recorded against the site, whereby RNZ were required to explain discrepancies between the supplied information and evidence collected during monitoring. RNZ also accepted some oily wastes to site which they were not approved to do, and were instructed to remove these wastes from the storage pits via sucker truck. RNZ were also abated for a breech of there Consent Conditions with regard to local contamination of groundwater, one of there storage pits was damaged and as a results elevated concentration of salts and trace dissolved phase hydrocarbons were detected by the monitoring bore in the close vicinity.

The management of the site changed hands at the end of the monitoring period, and some improvements have begun to take place regarding site operations and housekeeping. However, supply of accurate data remains an issue, which has been communicated to the new consent holder. Where appropriate, enforcement action has been undertaken by the Council, and all of these factors have been accounted for in the poor administrative compliance rating given in Section 3.3 of this report.

3.2 Environmental effects of exercise of consents

Monitoring indicates that there appears to be no more than minor adverse environmental effects due to activities at the site. Levels of contaminants in the surface soil meet the required consent conditions for metals and hydrocarbons.

Abatement notice 20118 was issued in relation to Council concerns of the substandard/torn liner within one of the storage pits and the subsequent local elevation of salts and trace dissolved phase hydrocarbons. Continued monitoring throughout the 2014-2015 year had reported a decrease in this groundwater monitoring well.

Due to the location of the site and the significant distance to any neighbours no air monitoring was undertaken as effects on air quality are known to be minimal.

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 8.

Table 10 Summary of performance for Consent 7795-1 to discharge drilling wastes (consisting of drilling cuttings and drilling fluids from water based muds and synthetic based muds), from hydrocarbon exploration and production activities, onto and into land via landfarming

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Definitions which apply to the consent	N/A	N/A
2. Best practicable option to be adopted	Inspection and liaison with consent holder	No
3. The consent holder shall provide a stockpiling and landfarming management plan prior to the exercise of the consent	Management plan received and approved	Yes
4. Install groundwater monitoring wells prior to exercise of consent	Inspections and site records	Yes
5. Notify TRC 48 hrs prior to stockpiling	Notifications received	No
6. Notify TRC 48 hrs prior to landfarming	Notifications received	No
7. The consent holder shall sample for the following: a. Total petroleum hydrocarbons b. Benzene, toluene, ethylbenzene, xylenes c. Polycyclic aromatic hydrocarbons d. Chloride, nitrogen, pH, potassium, sodium	Sampling	Partial Analysis Supplied Once
8. Keep records relating to wastes, areas, compositions, volumes, dates, treatments and monitoring	Company records	No
9. Report on records in condition 6 to Council by 31 August each year	Report received	No
10. Discharges made only within area as specified by submitted application	Inspection	Yes
11. No discharge within 25m of a water body, 10m from any property boundary and 50m from the QEII covenant Key Native Ecosystems	Inspection	Yes
12. Maximum application thickness for wastes: a) 100 mm TPH <5% b) 50 mm TPH >5% c) No ponded liquids 1 hr after application	Company records and inspection	No

Condition requirement	Means of monitoring during period under review	Compliance achieved?
13. Incorporation into soil as soon as practicable to a depth of at least 250mm	Inspection and sampling	Yes
14. Hydrocarbon concentrations in soil shall not exceed 50,000 mg/ kg dry weight	Sampling	Yes
15. Landfarming areas to be used in accordance with conditions 10 and 11 and shall not be used for any subsequent discharges of drilling wastes	Inspection	Inconclusive
16. All material to be landfarmed as soon as practicable and no later than 12 months	Company records and inspections	
17. Re-vegetate landfarmed areas as soon as practicable	Company records and inspections	No
18. Total dissolved salts in any fresh water body shall not exceed 2500 g/m^3	Sampling	No
19. Disposal of waste shall not lead to contaminants entering surface water or ground water exceeding background concentrations	Sampling	Yes
20. Conductivity must be less than 400 mS/m. If background conductivity exceeds 400 mS/m, then increase shall not exceed 100 mS/m	Sampling	Yes
21. Sodium absorption ratio [SAR] must be less than 18.02, if background SAR exceeds 18.0 then increase shall not exceed 1.0	Sampling	Yes
22. Concentrations of heavy metals in the soil shall at all times comply with MfE guidelines	Sampling	Yes
23. Prior to expiry/cancellation of consent these levels must not be exceeded: a. conductivity, 290 mSm^{-1} b. chloride, 700 g/m^3 c. dissolved salts, 2500 g/m^3 d. sodium, 460 g/m^3	Not applicable - sampling prior to surrender of consent	N/A
24. If condition 23 is not met, consent cannot be surrendered	Not applicable - sampling prior to surrender of consent	N/A
25. Notification of discovery of archaeological remains	Not applicable – none found	N/A
26. Consent shall lapse on 30 June 2017	Not applicable – consent exercised	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
27. Optional review provision re environmental effects	Next optional review June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		Poor

During the period under review, there were four incidents recorded against the Symes Manawapou Landfarm site and subsequently one abatement notice was issued to the consent holder at the time, Remediation (NZ) Limited.

Overall, the consent holder demonstrated a good level of environmental performance and a poor level of administrative consent compliance. The incidents that occurred in respect of resource consent 7795-1 have been discussed in section 2.5.

- A **high** level of environmental performance and compliance indicates that essentially there were no adverse environmental effects to be concerned about, and no, or inconsequential non-compliance with conditions.

- A **good** level of environmental performance and compliance indicates that adverse environmental effects of activities during the monitoring period were negligible or minor at most, or, the Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices, or, there were perhaps some items noted on inspection notices for attention but these items were not urgent nor critical, and follow-up inspections showed they have been dealt with, and any inconsequential non compliances with conditions were resolved positively, co-operatively, and quickly.

- **Improvement required (environmental)** or **improvement required (administrative compliance)** (as appropriate) indicates that the Council may have been obliged to record a verified unauthorised incident involving measurable environmental impacts, and/or, there were measurable environmental effects arising from activities and intervention by Council staff was required and there were matters that required urgent intervention, took some time to resolve, or remained unresolved at the end of the period under review, and/or, there were on-going issues around meeting resource consent conditions even in the absence of environmental effects. Abatement notices may have been issued.

- **Poor performance (environmental)** or **poor performance (administrative compliance)** indicates generally that the Council was obliged to record a verified unauthorised incident involving significant environmental impacts, or there were material failings to comply with resource consent conditions that required significant intervention by the Council even in the absence of environmental effects. Typically there were grounds for either a prosecution or an infringement notice.

3.4 Recommendations from the 2012-2013 Annual Report

In the 2012-2013 Annual Report, it was recommended:

1. THAT the monitoring programme for the Remediation NZ Limited site in the 2013-2014 year, remain unchanged from that for 2012-2013.

2. THAT the Company reviews their reporting and notification formatting with input from Council scientific staff.

3. THAT prior to the utilisation of the southern 'Stage 2' spreading zone, the Council reviews whether the installation of additional monitoring wells is required in this area.

3.5 Alterations to monitoring programmes for 2014-2015

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account the extent of information made available by previous authorities, its relevance under the RMA the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently 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 emitting to the atmosphere/discharging to the environment.

It is proposed that for 2014-2015 the monitoring programme for the Symes Manawapou Landfarm site remains unchanged from that for the 2013-2014 monitoring period. A recommendation to this effect is attached to this report.

4. Recommendations

1. THAT the monitoring programme for the Site in the 2014-2015 year, remain unchanged from that for 2013-2014 monitoring period.

2. THAT the new Consent holder WRS improves administrative compliance with the Consent required conditions.

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 20°C and expressed in mS/m.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	Escherichia coli, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
F	Fluoride.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.

Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
l/s	Litres per second.
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N.)
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM_{10}	Relatively fine airborne particles (less than 10 micrometre diameter).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act* 1991 and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
UI	Unauthorised Incident.
UIR	Unauthorised Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
Zn*	Zinc.

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

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

Bibliography and references

Department of Health 1992: Public health guidelines for the safe use of sewage effluent and sewage sludge on land. Department of Health.

Ministry for the Environment 1999: Guidelines for assessing and managing petroleum hydrocarbon contaminated sites in New Zealand, Ministry for the Environment.

Ministry for the Environment 2003: Guidelines for the safe application of biosolids to land in New Zealand, Ministry for the Environment.

Taranaki Regional Council 2013: Remediation NZ Limited Drilling Waste Disposal Monitoring Programme Annual Report 2012-2013. Technical report 2013-67

Appendix I

Resource consents held by Waste Remediation Services Limited

Discharge Permit

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

Name of Consent Holder:	Waste Remediation Services Limited PO Box 7150 New Plymouth 4341
Decision Date:	01 May 2012
Commencement Date:	01 May 2012

Conditions of Consent

Consent Granted:	To discharge drilling wastes (consisting of drilling cuttings and drilling fluids from water based muds and synthetic based muds), from hydrocarbon exploration and production activities, onto and into land via landfarming
Expiry Date:	01 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	156 Manawapou Road, Manutahi
Legal Description:	Lot 1 DP 7324 (Discharge site)
Grid Reference (NZTM)	1717244E-5608736N
Catchment:	Manawapou

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. For the purposes of this consent the following definitions shall apply:

    a) stockpiling means a discharge of drilling wastes from vehicles, tanks, or other containers onto land for the purpose of interim storage prior to landfarming, but without subsequently spreading onto, or incorporating the discharged material into the soil within 48 hours; and
    b) landfarming means the discharge of drilling wastes onto land, subsequent spreading and incorporation into the soil, for the purpose of attenuation of hydrocarbon and/or other contaminants, and includes any stripping and relaying of topsoil.

2. The consent holder shall adopt the best practicable option (as defined section 2 of the Resource Management Act 1991) to prevent or minimise any actual or potential effects on the environment arising from the discharge.

Requirements prior to exercise of consent

3. Prior to the exercise of this consent, the consent holder shall provide a stockpiling and landfarming management plan that, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council, demonstrates the activity can and will be conducted to comply with all of the conditions of this consent. The management plan shall be reviewed annually (on or about the anniversary of the date of issue of this consent) and shall include as a minimum:

    a) procedures for notification to Council of disposal activities;
    b) procedures for the receipt and stockpiling of drilling wastes onto the site;
    c) methods used for the mixing and testing of different waste types;
    d) procedures for site preparation;
    e) procedures for landfarming drilling wastes (including means of transfer from stockpiling area, means of spreading, and incorporation into the soil);
    f) procedures for sowing landfarmed areas, post-landfarming management, monitoring and site reinstatement;
    g) contingency procedures;
    h) sampling regime and methodology;
    i) control of site access; and
    j) documentation for all the procedures and methods listed above.

4. Prior to the exercise of this consent, the consent holder shall after consultation with the Chief Executive, Taranaki Regional Council, install a minimum of three groundwater monitoring bores. The bores shall be at locations and to depths, that enable monitoring to determine any change in groundwater quality resulting from the exercise of this consent. The bores shall be installed in accordance with NZS 4411:2001 and all associated costs shall be met by the consent holder.

Notifications, monitoring and reporting

5. The consent holder shall notify the Chief Executive, Taranaki Regional Council, (by emailing worknotification@trc.govt.nz) at least 48 hours prior to permitting drilling wastes onto the site for stockpiling, from each well drilled. Notification shall include the following information:

   a) the consent number;
   b) the name of the well(s) from which the waste was generated;
   c) the type of waste to be stockpiled; and
   d) the volume of waste to be stockpiled.

6. The consent holder shall notify the Chief Executive, Taranaki Regional Council, (by emailing worknotification@trc.govt.nz.) at least 48 hours prior to landfarming stockpiled material, or material brought onto the site for landfarming within 48 hours. Notification shall include the following information:

   a) the consent number;
   b) the name of the well(s) from which the waste was generated;
   c) the type of waste to be landfarmed;
   d) the volume and weight (or density) of the waste to be landfarmed;
   e) the concentration of chlorides, nitrogen and hydrocarbons in the waste; and
   f) the specific location and area over which the waste will be landfarmed.

7. The consent holder shall take a representative sample of each type of waste, from each individual source, and have it analysed for the following:

   a) total petroleum hydrocarbons (C_6-C_9, C_{10}-C_{14}, C_{15}-C_{36});
   b) benzene, toluene, ethylbenzene, and xylenes;
   c) polycyclic aromatic hydrocarbons screening; and
   d) chloride, nitrogen, pH, potassium, and sodium.

8. The consent holder shall keep records of the following:

   a) wastes from each individual well;
   b) composition of wastes (in accordance with condition 5);
   c) stockpiling area(s);
   d) volumes of material stockpiled;
   e) landfarming area(s), including a map showing individual disposal areas with GPS co-ordinates;
   f) volumes and weights of wastes landfarmed;
   g) dates of commencement and completion of stockpiling and landfarming events;
   h) dates of sowing landfarmed areas;
   i) treatments applied; and
   j) details of monitoring, including sampling locations, sampling methods and the results of analysis;

   and shall make the records available to the Chief Executive, Taranaki Regional Council.

9. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 31 August of each year, a report on all records required to be kept in accordance with condition 6, for the period of the previous 12 months, 1 July to 30 June.

Discharge limits

10. The discharge shall only occur on the disposal sites shown in the Drawing entitled 'Remediation NZ Ltd Proposed Disposal Site' submitted with the application and attached to this consent.

11. There shall be no discharge within buffer zone, being:

    - 25 metres of the Manawapou River;
    - 25 metres of the unnamed tributary;
    - 10 metres from any property boundary; and
    - 50 metres from the QE II covenant Key Native Ecosystem areas.

12. For the purposes of landfarming, drilling wastes shall be applied to land in a layer not exceeding:

    a) 100 mm thick for wastes with a hydrocarbon concentration less than 50,000 mg/kg dry weight;
    b) 50 mm thick for wastes with a hydrocarbon concentration equal to or greater than 50,000 mg/kg dry weight; and
    c) in a rate and manner such that no ponded liquids remain after one hour, for all wastes;

    prior to incorporation into the soil.

13. As soon as practicable following the application of solid drilling wastes to land, the consent holder shall incorporate the wastes into the soil to a depth of at least 250 mm.

14. The hydrocarbon concentration in the soil over the landfarming area shall not exceed 50,000 mg/kg dry weight at any point where:

    a) liquid waste has been discharged; or
    b) solid waste has been discharged and incorporated into the soil.

15. An area of land used for the landfarming of drilling wastes in accordance with conditions 10 and 11 of this consent, shall not be used for any subsequent discharges of drilling waste.

Operational requirements

16. All material must be landfarmed as soon as practicable, but no later than twelve months after being brought onto the site.

17. As soon as practicable following landfarming, areas shall be sown into pasture (or into crop). The consent holder shall monitor revegetation and if adequate establishment is not achieved within two months of sowing, shall undertake appropriate land stabilisation measures to minimise wind and stormwater erosion.

Receiving environment limits - water

18. The exercise of this consent shall not result in the concentration of total dissolved salts in any fresh water body exceeding 2500 g/m^3.

19. Other than as provided for in condition 18, the exercise of this consent shall not result in any contaminant concentration, within surface water or groundwater, which after reasonable mixing, exceeds the background concentration for that particular contaminant.

Receiving environment limits - soil

20. The conductivity of the soil/waste layer after landfarming shall be less than 400 mS/m, or alternatively, if the background soil conductivity exceeds 400 S/m, the landfarming of waste shall not increase the soil conductivity by more than 100 mS/m.

21. The sodium adsorption ratio (SAR) of the soil/waste layer after landfarming shall be less than 18.0, or alternatively if the background soil SAR exceeds 18.0, the landfarming of waste shall not increase the SAR by more than 1.0.

22. The concentration of heavy metals in the soil over the disposal area shall at all times comply with the Ministry for the Environment and New Zealand Water & Wastes Assoication's Guidelines for the safe application of biosolids to land in New Zealand (2003), as shown in the following table:

Constituent	Standard (mg/kg dry weight)
Arsenic	20
Cadmium	1
Chromium	600
Copper	100
Lead	300
Mercury	1
Nickel	60
Zinc	300

23. From 1 March 2028 (three months prior to the consent expiry date), constituents in the soil shall not exceed the standards shown in the following table:

Constituent	Standard
conductivity	290 mS/m
chloride	700 mg/kg
sodium	460 mg/kg
total soluble salts	2500 mg/kg
MAHs PAHs TPH	Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Ministry for the Environment, 1999). Tables 4.12 and 4.15, for soil type sand.

MAHs - benzene, toluene, ethylbenzene, xylenes
PAHs - napthalene, non-carc. (pyrene), benzo(a)pyrene eq.
TPH - total petroleum hydrocarbons (C_7-C_9, C_{10}-C_{14}, C_{15}-C_{36})

The requirement to meet these standards shall not apply if, before 1 March 2028, the consent holder applies for a new consent to replace this consent when it expires, and that application is not subsequently withdrawn.

24. This consent may not be surrendered at any time until the standards in condition 23 have been met.

Archaeological remains

25. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.

Lapse and review

26. This consent shall lapse on 30 June 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

27. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2016 and/or June 2022, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 3 June 2014

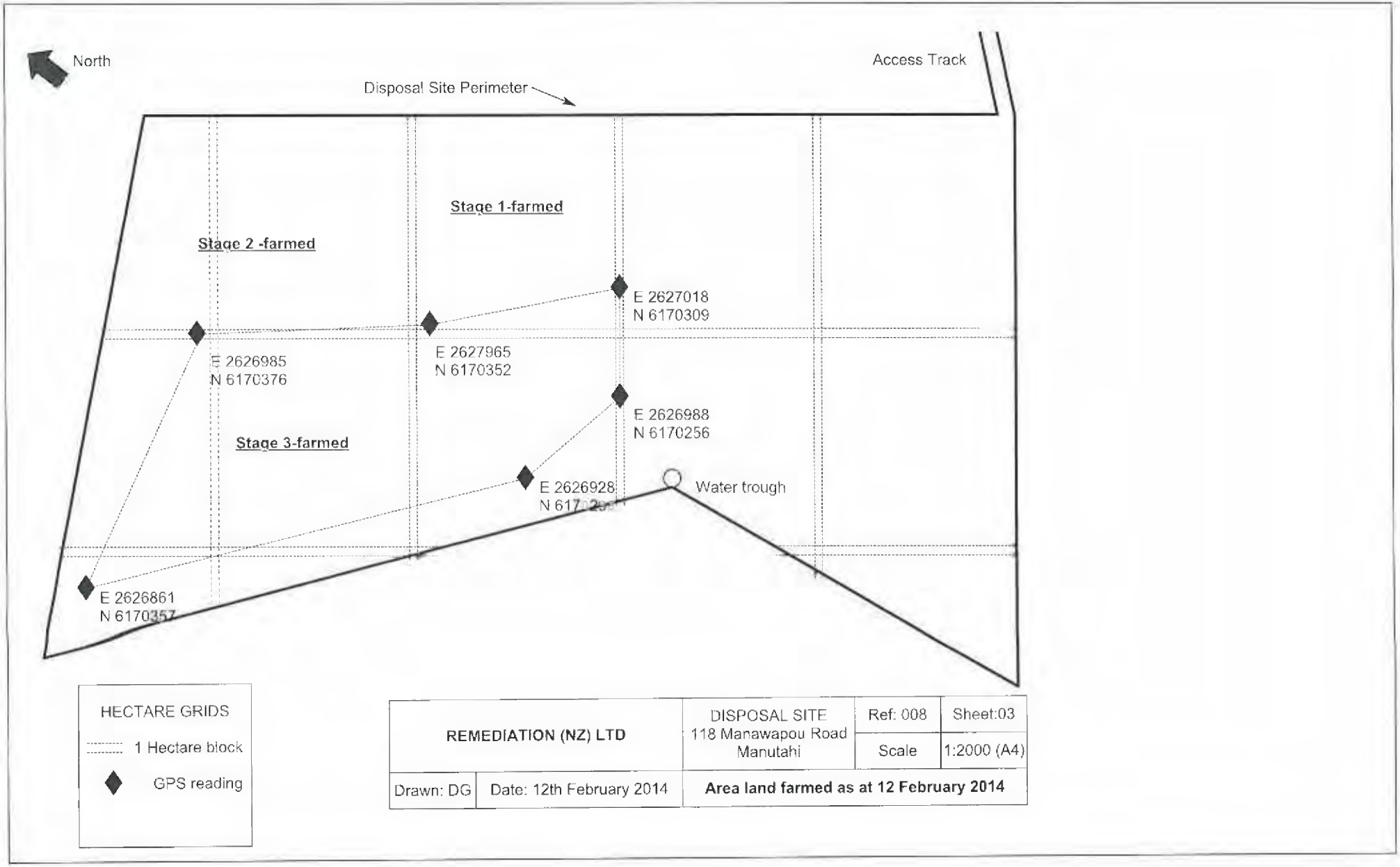
For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director - Resource Management

Appendix II

Supplied annual reports



REMEDIATION (NZ) LTD		DISPOSAL SITE 118 Manawapou Road Manutahi	Ref: 008	Sheet:03
			Scale	1:2000 (A4)
Drawn: DG	Date: 12th February 2014	**Area land farmed as at 12 February 2014**		

Industrial Chemistry Services

Analytical Report

NAME:	**Remediation (NZ) Ltd**
ADDRESS:	PO Box 8045, New Plymouth
Contact:	Kerry O'Neill
Sample Type:	**Solids for disposal**
Date / Time Sampled:	**29.08.13**
Date Received	29.08.13
Site:	**TE M14**

TEST		Units
Lab Number	M50623	
Dry Matter	**14.5**	g/100g as rcvd
Total Recoverable Potassium*	**124,000**	mg/kg dry wt
Total Recoverable Sodium	**11,500**	mg/kg dry wt
Chloride*	**107,000**	mg/kg dry wt
pH	**12.0**	pH units
Total Nitrogen*	**0.18**	g/100g dry wt
Poly-aromatic Hydrocarbons Screen		
Acenaphthene	**<0.4**	mg/kg dry wt
Acenaphthylene	**<0.4**	mg/kg dry wt
Anthracene	**<0.4**	mg/kg dry wt
Benzo[a]anthracene	**<0.4**	mg/kg dry wt
Benzo[a]pyrene (BAP)	**<0.4**	mg/kg dry wt
Benzo[b]fluoranthene + Benzo[j]fluoranthene	**<0.4**	mg/kg dry wt
Benzo[g,h,i]perylene	**<0.4**	mg/kg dry wt
Benzo[k]fluoranthene	**<0.4**	mg/kg dry wt
Chrysene	**<0.4**	mg/kg dry wt
Dibenzo[a,h]anthracene	**<0.4**	mg/kg dry wt
Fluoranthene	**<0.4**	mg/kg dry wt
Fluorene	**<0.4**	mg/kg dry wt
Indeno[1,2,3-c,d]pyrene	**<0.4**	mg/kg dry wt
Naphthalene	**<1.7**	mg/kg dry wt
Phenanthrene	**<0.4**	mg/kg dry wt
Pyrene	**<0.4**	mg/kg dry wt

Industrial Chemistry Services Ltd - PO Box 345 - 27 Miranda Street - Stratford - New Zealand
Phone (06) 765 5976 / Fax (06) 765 5935

TEST		Units
Lab Number	M50623	
BTEX		
Benzene	**<0.7**	mg/kg dry wt
Toluene	**<0.7**	mg/kg dry wt
Ethylbenzene	**<0.7**	mg/kg dry wt
m&p-Xylene	**<1.4**	mg/kg dry wt
o-Xylene	**<0.7**	mg/kg dry wt
Total Petroleum Hydrocarbons	**50,000**	mg/kg dry wt
C7-C9	**66**	mg/kg dry wt
C10-C14	**18,000**	mg/kg dry wt
C15-C36	**32,000**	mg/kg dry wt

Comments:

- *Sample collected by Client and analysed as received at the laboratory.*
- *This report must not be reproduced, except in full, without the written consent of the signatory.*
- *All analyses presented in this report other than those indicated (*) have been carried out by Industrial Chemistry Services or by a sub contracted laboratory in accordance with the requirements of International Accreditation New Zealand.*

< End of Report >

Checked by:

(Laboratory Manager)

Industrial Chemistry Services Ltd - PO Box 345 - 27 Miranda Street - Stratford - New Zealand
Phone (06) 765 5976 / Fax (06) 765 5935

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ANALYSIS REPORT

Client:	Remediation (NZ) Ltd	**Lab No:**	1206741 SPv2
Contact:	Kerry O'Neill	**Date Registered:**	23-Nov-2013
	C/- Remediation (NZ) Ltd	**Date Reported:**	09-Dec-2013
	Brixton Organic Centre	**Quote No:**	55240
	PO Box 8045	**Order No:**	
	NEW PLYMOUTH 4342	**Client Reference:**	Receiving Environment Sam|
		Submitted By:	Kerry O'Neill

Amended Report

This report replaces an earlier report issued on the 06 Dec 2013 at 5:08 pm
The client reference has been amended.

Sample Type: Soil

Sample Name:		Section One 20-Nov-2013 11:30 am	Section Two 20-Nov-2013 11:30 am			
Lab Number:		1206741.1	1206741.2			
Individual Tests						
Dry Matter	g/100g as rcvd	93	88	-	-	-
Total Recoverable Barium	mg/kg dry wt	210	70	-	-	-
Total Recoverable Boron	mg/kg dry wt	< 20	< 20	-	-	-
Total Recoverable Vanadium	mg/kg dry wt	260	220	-	-	-
Chloride*	mg/kg dry wt	55	84	-	-	-
Total Nitrogen*	g/100g dry wt	0.26	0.27	-	-	-
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg						
Total Recoverable Arsenic	mg/kg dry wt	< 2	< 2	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.16	-	-	-
Total Recoverable Chromium	mg/kg dry wt	21	18	-	-	-
Total Recoverable Copper	mg/kg dry wt	12	12	-	-	-
Total Recoverable Lead	mg/kg dry wt	1.9	2.0	-	-	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	-	-	-
Total Recoverable Nickel	mg/kg dry wt	8	7	-	-	-
Total Recoverable Zinc	mg/kg dry wt	92	77	-	-	-
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.05	< 0.05	-	-	-
Toluene	mg/kg dry wt	< 0.05	< 0.05	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.05	< 0.05	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.10	< 0.10	-	-	-
o-Xylene	mg/kg dry wt	< 0.05	< 0.05	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Anthracene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Chrysene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Fluoranthene	mg/kg dry wt	< 0.03	< 0.03	-	-	-

Sample Type: Soil						
Sample Name:		Section One 20-Nov-2013 11:30 am	Section Two 20-Nov-2013 11:30 am			
Lab Number:		1206741.1	1206741.2			
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Fluorene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Naphthalene	mg/kg dry wt	< 0.12	< 0.13	-	-	-
Phenanthrene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Pyrene	mg/kg dry wt	< 0.03	< 0.03	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	-	-	-
C10 - C14	mg/kg dry wt	< 20	< 20	-	-	-
C15 - C36	mg/kg dry wt	< 40	< 40	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	-	-	-

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-2
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	-	1-2
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	-	1-2
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	-	1-2
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	-	1-2
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-2
eslCextn*	Potassium phosphate extraction for Ion Chromatography. In House.	-	1-2
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-2
Total Recoverable Barium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	1-2
Total Recoverable Boron	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	20 mg/kg dry wt	1-2
Total Recoverable Vanadium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	100 mg/kg dry wt	1-2
Chloride*	Ion Chromatography determination of es potassium phosphate extraction.	3 mg/kg dry wt	1-2
Total Nitrogen*	Catalytic Combustion, separation, Thermal Conductivity Detector [Elementar Analyser].	0.05 g/100g dry wt	1-2

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Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	Remediation (NZ) Ltd	**Lab No:**	1175012	SPv1
Contact:	Kerry O'Neill	**Date Registered:**	03-Sep-2013	
	C/- Remediation (NZ) Ltd	**Date Reported:**	16-Sep-2013	
	Brixton Organic Centre	**Quote No:**	55240	
	PO Box 8045	**Order No:**		
	NEW PLYMOUTH 4342	**Client Reference:**	Baseline Sample	
		Submitted By:	Kerry O'Neill	

Sample Type: Soil

		Sample Name:	Stage One Section Three 29-Aug-2013				
		Lab Number:	1175012.1				
Individual Tests							
Dry Matter	g/100g as rcvd		88	-	-	-	-
Total Recoverable Barium	mg/kg dry wt		15.1	-	-	-	-
Total Recoverable Boron	mg/kg dry wt		< 20	-	-	-	-
Total Recoverable Vanadium	mg/kg dry wt		230	-	-	-	-
Chloride*	mg/kg dry wt		7	-	-	-	-
Total Nitrogen*	g/100g dry wt		0.12	-	-	-	-
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg							
Total Recoverable Arsenic	mg/kg dry wt		< 2	-	-	-	-
Total Recoverable Cadmium	mg/kg dry wt		< 0.10	-	-	-	-
Total Recoverable Chromium	mg/kg dry wt		19	-	-	-	-
Total Recoverable Copper	mg/kg dry wt		9	-	-	-	-
Total Recoverable Lead	mg/kg dry wt		1.7	-	-	-	-
Total Recoverable Mercury	mg/kg dry wt		< 0.10	-	-	-	-
Total Recoverable Nickel	mg/kg dry wt		7	-	-	-	-
Total Recoverable Zinc	mg/kg dry wt		70	-	-	-	-
BTEX in Soil by Headspace GC-MS							
Benzene	mg/kg dry wt		< 0.05	-	-	-	-
Toluene	mg/kg dry wt		< 0.05	-	-	-	-
Ethylbenzene	mg/kg dry wt		< 0.05	-	-	-	-
m&p-Xylene	mg/kg dry wt		< 0.10	-	-	-	-
o-Xylene	mg/kg dry wt		< 0.05	-	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil							
Acenaphthene	mg/kg dry wt		< 0.03	-	-	-	-
Acenaphthylene	mg/kg dry wt		< 0.03	-	-	-	-
Anthracene	mg/kg dry wt		< 0.03	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt		< 0.03	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt		< 0.03	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt		< 0.03	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt		< 0.03	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt		< 0.03	-	-	-	-
Chrysene	mg/kg dry wt		< 0.03	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt		< 0.03	-	-	-	-
Fluoranthene	mg/kg dry wt		< 0.03	-	-	-	-
Fluorene	mg/kg dry wt		< 0.03	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt		< 0.03	-	-	-	-
Naphthalene	mg/kg dry wt		< 0.13	-	-	-	-

Sample Type: Soil						
Sample Name:		Stage One Section Three 29-Aug-2013				
Lab Number:		1175012.1				
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Phenanthrene	mg/kg dry wt	< 0.03	-	-	-	-
Pyrene	mg/kg dry wt	< 0.03	-	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	< 40	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	-	-	-	-

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Samples**
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	-	1
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	-	1
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	-	1
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	-	1
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1
esICextn*	Potassium phosphate extraction for Ion Chromatography. In House.	-	1
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1
Total Recoverable Barium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	1
Total Recoverable Boron	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	20 mg/kg dry wt	1
Total Recoverable Vanadium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	100 mg/kg dry wt	1
Chloride*	Ion Chromatography determination of es potassium phosphate extraction.	3 mg/kg dry wt	1
Total Nitrogen*	Catalytic Combustion, separation, Thermal Conductivity Detector [Elementar Analyser].	0.05 g/100g dry wt	1

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Martin Cowell - BSc
Client Services Manager - Environmental Division

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

Fluids Remediation M Hareb Manutahi August 2013

Date	Arrival Time	Product	Site& Manifest No	Transporter	Volume
19/08/2013		WBF	MHW C 05482	Symons	22
21/08/2013		WBF	MHW C 05485	Symons	20
22/08/2013		WBF	MHW C 05988	Symons	22
22/08/2013		WBF	MHW C 05486	Symons	20
22/08/2013		WBF	MHW C No Docket	Symons	22
22/08/2013		WBF	MHW C 05988	Symons	22
23/08/2013		WBF	MHW C 05486	Symons	22
23/08/2013		WBF	MHW C 05989	Symons	23
23/08/2013		WBF	MHW C 05487	Symons	20
23/08/2013		WBF	MHW C 05738	Symons	22
25/08/2013		WBF	MHW C 06126	Symons	22.5
25/08/2013		WBF	MHW C 05101	Symons	22
25/08/2013		WBF	MHW C 05740	Symons	22
25/08/2013		WBF	MHW C 05740	Symons	22
25/08/2013		WBF	MHW C 06126	Symons	22.5
25/08/2013		WBF	MHW C 05101	Symons	22.5
26/08/2013		WBF	MHW C 05748	Symons	15
31/08/2013		WBF	MHW C 05108	Symons	22
					385.5

Drilling Waste Manutahi Matt Hareb September 2013

Date	Arrival Time	Product	Site& Manifest No	Transporter	Volume
3/09/2013		WBF	MHW C 14 04377	Symons	22
3/09/2013		WBF	MHW C 14 05996	Symons	20
4/09/2013		WBF	MHW C 14 0498	M Hareb	20
7/09/2013		WBF	MHW C 14 06023	Symons	20
8/09/2013		WBF	MHW C 14 00727	Symons	22
11/09/2013		WBF	MHW C 14 08152	Symons	18
13/09/2013		WBF	MHW C 14 Peter	Symons	22
14/09/2013		WBF	MHW C 14 03046	Symons	44
14/09/2013		WBF	MHW C 14 08508	Symons	44
15/09/2013		WBF	MHW C 14 08509	Symons	44
16/09/2013		WBF	MHW C 14 09235	Symons	12
19/09/2013		WBF	MHW C 14 05122	Symons	20
20/09/2013		WBF	MHW C 14 05123	Symons	18
22/09/2013		WBF	MHW C 14 6145	Symons	20
22/09/2013		WBF	MHW C 14 6145	Symons	20
23/09/2013		WBF	MHW C 14 6146	Symons	20
					386

M Hareb Manutahi October 2013

Date	Arrival Time	Product	Site& Manifest No	Transporter	Volume
27/09/2013	2.50pm	WBM	MHW C 14 05125	Symons	23
28/09/2013	2.30pm	WBM	MHW C 14 05126	Symons	18
28/09/2013	2.30pm	WBM	MHW C 14 08203	Symons	22
29/09/2013	11.00am	WBM	MHW C 14 08564	Symons	22
29/09/2013	3.50pm	WBM	MHW C 14 08564	Symons	22
1/10/2013	12.30pm	WBM	MHW C 14 08566	Symons	22
1/10/2013	2.00pm	WBM	MHW C 14 06757	Symons	20
2/10/2013	9.30am	WBM	MHW C 14 08567	Symons	22
2/10/2013	9.30am	WBM	MHW C 14 00736	Symons	22
2/10/2013	2.50pm	WBM	MHW C 14 00737	Symons	22
2/10/2013	10.30am	WBM	MHW C 14 06758	Symons	22
4/10/2013	11.15am	WBM	MHW C 14 08624	Symons	22
4/10/2013	11.50am	WBM	MHW C 14 08568	Symons	20
5/10/2013	9.15am	WBM	MHW C 14 08624	Symons	22
6/10/2013	1.45pm	WBM	MHW C 14 08625	Symons	22
9/10/2013	11.00am	WBM	MHW C 14 S Mason	Symons	22
9/10/2013	4.00pm	WBM	MHW C 14 S Mason	Symons	22
10/10/2013	11.00am	WBM	MHW C 14 S Mason	Symons	15
					382

Contract Resources October 2013

Date	Arrival Time	Product	Site& Manifest No	Transporter	Volume
5/10/2013	4.40pm	SBF	Origin Manutahi D	Contract R	8.5
5/10/2013	6.00pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	11.30am	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	11.55am	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	12.30pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	1.00pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	1.45pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	2.45pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	3.35pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	4.25pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	4.40pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	5.25pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	5.35pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	6.15pm	SBF	Origin Manutahi D	Contract R	8.5
6/10/2013	6.30pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	8.20am	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	9.30am	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	10.20am	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	11.20am	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	12.15pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	1.50pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	2.40pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	2.50pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	3.30pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	4.00pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	4.30pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	5.15pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	5.15pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	6.00pm	SBF	Origin Manutahi D	Contract R	9
7/10/2013	6.00pm	SBF	Origin Manutahi D	Contract R	8.5
7/10/2013	6.40pm	SBF	Origin Manutahi D	Contract R	9
8/10/2013	9.00am	SBF	Origin Manutahi D	Contract R	8.5
8/10/2013	10.10am	SBF	Origin Manutahi D	Contract R	8.5
8/10/2013	11.00am	SBF	Origin Manutahi D	Contract R	8.5
8/10/2013	1.00pm	SBF	Origin Manutahi D	Contract R	8.5
8/10/2013	2.30pm	SBF	Origin Manutahi D	Contract R	8.5
8/10/2013	4.00pm	SBF	Origin Manutahi D	Contract R	8.5
9/10/2013	9.00am	SBF	Origin Manutahi D	Contract R	9
10/10/2013	4.30pm	SBF	Origin Manutahi D	Contract R	7
10/10/2013	6.20pm	SBF	Origin Manutahi D	Contract R	6
25/10/2013	10.30am	WBF	Origin Manutahi D	Contract R	6
25/10/2013	12.20pm	WBF	Origin Manutahi D	Contract R	7
29/10/2013	12.38pm	WBF	Origin Manutahi D	Contract R	7
29/10/2013	1.40pm	WBF	Origin Manutahi D	Contract R	7
29/10/2013	2.45pm	WBF	Origin Manutahi D	Contract R	7
29/10/2013	3.48pm	WBF	Origin Manutahi D	Contract R	7
29/10/2013	5.00pm	WBF	Origin Manutahi D	Contract R	7
30/10/2013	9.40am	WBF	Origin Manutahi D	Contract R	7
30/10/2013	10.40am	WBF	Origin Manutahi D	Contract R	7
30/10/2013	1.30pm	WBF	Origin Manutahi D	Contract R	7
30/10/2013	2.45pm	WBF	Origin Manutahi D	Contract R	7
30/10/2013	4.20pm	WBF	Origin Manutahi D	Contract R	7
31/10/2013	9.30am	WBF	Origin Manutahi D	Contract R	6
31/10/2013	10.21am	WBF	Origin Manutahi D	Contract R	6
31/10/2013	11.10am	WBF	Origin Manutahi D	Contract R	6
31/10/2013	12.00pm	WBF	Origin Manutahi D	Contract R	9
31/10/2013	12.10pm	WBF	Origin Manutahi D	Contract R	6
31/10/2013	12.50pm	WBF	Origin Manutahi D	Contract R	9
31/10/2013	1.20pm	WBF	Origin Manutahi D	Contract R	6
31/10/2013	2.10pm	WBF	Origin Manutahi D	Contract R	9
31/10/2013	7.00pm	WBF	Origin Manutahi D	Contract R	6
					483.5

CRL Manutahi November 2013

Date	Arrival Time	Product	Site& Manifest No	Transporter	Volume
6/11/2013		SBF	Manutahi D	Contract R	7

Appendix III

Abatement notice

EAC-20118
Document: 1305436

ABATEMENT NOTICE UNDER SECTIONS 322 & 324 OF THE RESOURCE MANAGEMENT ACT 1991

To: Remediation (NZ) Limited
PO Box 8045
New Plymouth 4342

Taranaki Regional Council gives notice that you must take the following action:

1. Undertake works to empty the contents of the drilling mud storage pits adjacent to groundwater monitoring bore GND2301, in a manner compliant with the special conditions of resource consent 7795-1.

2. Undertake works to ensure the integrity of the pit liners.

The location to which this abatement notice applies is:

118-156 Manawapou Road, Hawera
LOTS 1 & 2 DP 7324 BLK XIV HAWERA SD
1717244E 5608736N

You must comply with this abatement notice within the following period:

03 March 2014.

You must continue to comply with this abatement notice after that date.

This notice is issued under:

Section 322(1)(b)(ii) of the Resource Management Act 1991, which states that:

(1) An abatement notice may be served on any person by an enforcement officer—

(b) Requiring that person to do something that, in the opinion of the enforcement officer, is necessary to ensure compliance by or on behalf of that person with this Act, any regulations, a rule in a plan or a proposed plan, or a resource consent, and also necessary to avoid, remedy, or mitigate any actual or likely adverse effect on the environment—

(ii) Relating to any land of which the person is the owner or occupier.

The reasons for this notice are:

3. Groundwater monitoring undertaken on 9 January 2014, and 23 January 2014 found elevated levels of Benzene, Chloride, Toluene and Total Dissolved Solids within monitoring bore GND2301.

4. Special condition 18 of Resource Consent 7795-1 states:

   18. The exercise of this consent shall not result in the concentration of total dissolved salts in any fresh water body exceeding 2,500 g/m3.

5. Special condition 19 of Resource Consent 7795-1 states:

   19. Other than as provided for in condition 18, the exercise of this consent shall not result in any contaminant concentration, within surface or groundwater, which after reasonable mixing, exceeds the background concentration for that particular contaminant.

6. At the time of sampling special conditions 18 and 19 of resource consent 7795-1 were not being complied with.

7. Section 15(1)(b) of the Resource Management Act 1991 prohibits the discharge of contaminants onto or into land in circumstances which may result in that contaminant entering water unless the discharge is expressly allowed by a national environmental standard or other regulations, a rule in a regional plan, or a resource consent.

8. The contamination of groundwater, as discovered on 9 January 2014 and 23 January 2014, was not authorised by resource consent 7795-1, and therefore contravened section 15(1)(b) of the Resource Management Act 1991.

9. Contravention of section 15(1)(b) of the Resource Management Act 1991 is an offence under section 338(1)(a) of the Resource Management Act 1991.

10. This notice has been issued to you to require you to take the action as set out in clause 1 because in the opinion of the enforcement officer that issued this notice, this action is necessary to ensure compliance by you/on your behalf with section 15(1)(b) of the Resource Management Act 1991/regulations/a rule in a plan/a proposed plan/a resource consent and also necessary to avoid/remedy/mitigate any actual/likely adverse effect on the environment relating to any land of which you are the owner/occupier.

If you do not comply with this notice, you may be prosecuted under section 338 of the Resource Management Act 1991 (unless you appeal and the notice is stayed as explained below), or an infringement notice may be served on you under section 343C of the Resource Management Act 1991.

You have the right to appeal to the Environment Court against the whole or any part of this notice. If you wish to appeal, you must lodge a notice of appeal in form 49 with the Environment Court within 15 working days of being served with this notice.

An appeal does not automatically stay the notice and so you must continue to comply with it unless you also apply for a stay from an Environment Judge under section 325(3A) of the Resource Management Act 1991 (*see* form 50). To obtain a stay, you must lodge both an appeal and a stay with the Environment Court.

You also have the right to apply in writing to Taranaki Regional Council to change or cancel this notice in accordance with section 325A of the Resource Management Act 1991.

The Taranaki Regional Council authorised the enforcement officer who issued this notice. Its address is:

Taranaki Regional Council
Private Bag 713
Stratford 4352

Phone: (06) 765 7127
Facsimile: (06) 765 5097

The enforcement officer is acting under the following authorisation:

A warrant of authority issued by the Taranaki Regional Council, pursuant to section 38 of the Resource Management Act 1991, authorising the officer to carry out specified functions and powers as an enforcement officer under the Resource Management Act 1991 including issue of abatement notices.

…….
John Cooper
Enforcement Officer
Taranaki Regional Council
Warrant No. 174

03 February 2014

Appendix IV

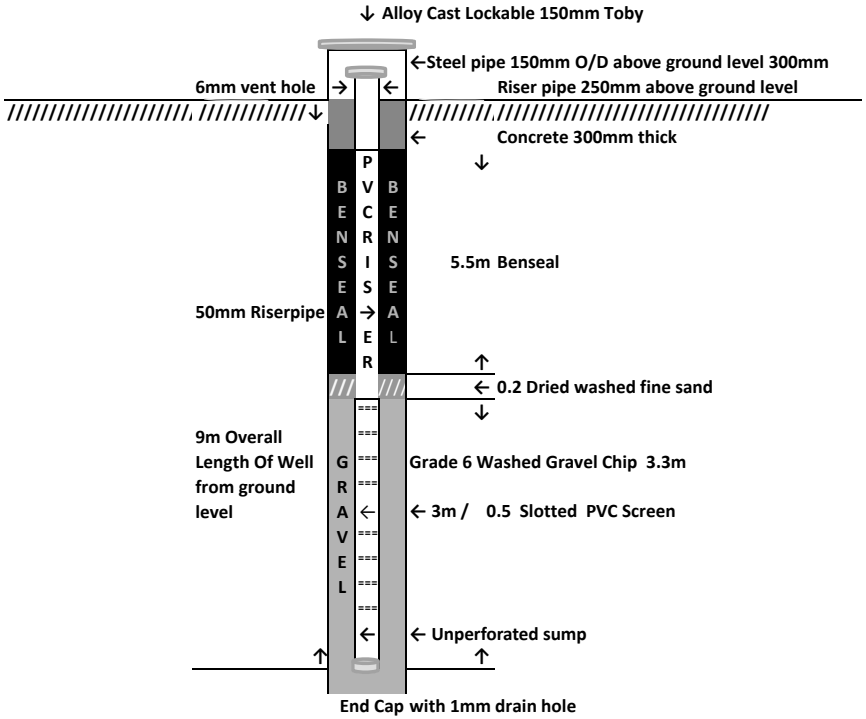
Monitoring well schematics

Symes Manawapou Landfarm

Construction Diagram Of Monitoring Well MW1 GND 2300

Date: 4-10-2012

Hole Drilled With Tractor Rig From 0 to 10m with 100mm flighted augers
TRC on site observing formation layers & drill cuttings
Note: BTW to survey in ground elevations & GPS well locations



Monitoring Wells Installed By Strata Drilling Services Ltd 04/10/2012

Drilling Formations

0 to 0.5 sandy topsoil
0.5 to 1m sandy clay
1m to 5.5m light brown/orange clay-fine-soft-sticky
5.5 to 10.5 sandy/clay /loose sand increasing moisture

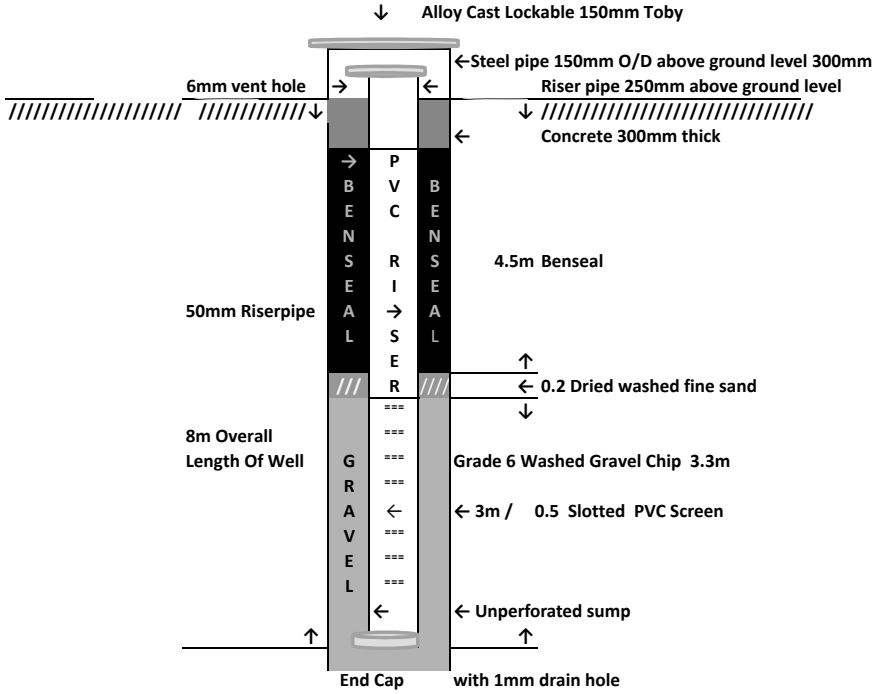
Tagged bottom of screen 8.9 top of riser pipe
SWL Water Table @ 7.275m dipped by TRC @ 1035am on 9-10-2012

Symes Manawapou Landfarm

Construction Diagram Of Monitoring Wells MW2 GND 2301

Date: 4-10-2012

Hole Drilled With Tractor Rig From 0 to 10m with 100mm flighted augers
TRC on site observing formation layers & drill cuttings
Note: BTW to survey in ground elevations & GPS well locations



Monitoring Wells Installed By Strata Drilling Services Ltd 4 -10- 2012

Drilling Formations

0 - 0.5 sandy top soil
0.5 to 2.5 fine gravel/black sands
2.5 to 3.5 lit brown/orange clays /fine
3.5 to 4.0 yellow clays/very fine/stick moust
4.0 to 6.5 sandy clay
6.5 to 9.0 tight dark clay with peat

Tagged bottom of screen 8.82 top of riser pipe
Water Table @ 6.5m dipped by TRC @ 1325 on 9-10-2012

Symes Manawapou Landfarm

Construction Diagram Of Monitoring Wells

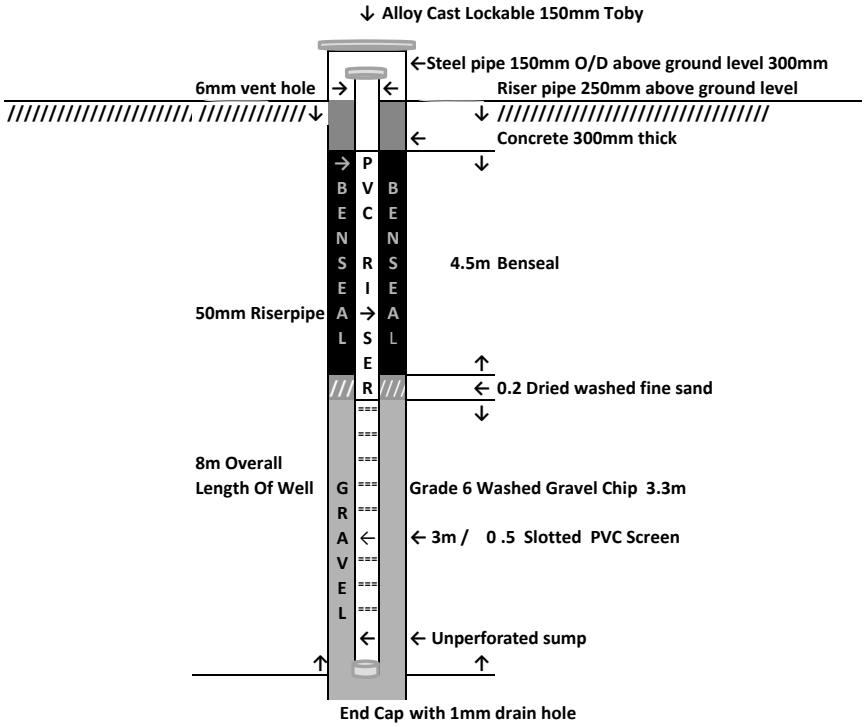
MW2 GND 2302

Date: 4-10-2012

Hole Drilled With Tractor Rig From 0 to 8m with 100mm flighted augers

TRC on site observing formation layers & drill cuttings

Note: BTW to survey in ground elevations & GPS well locations



Monitoring Wells Installed By Strata Drilling Services Ltd 04/10/2012

Drilling Formations

0 - 2m black fine gravel/sand
2m to 8m light brown/orange clay
8.0m to 9.0m grey sandy clay moisture loose
9.0m to 10m grey sandy clay/tight/compact

Tagged bottom of screen 8.3m top of riser pipe
Water Table @ 8.078 dipped by TRC on 9-10-2012

Symes Manawapou Landfarm

Construction Diagram Of Monitoring Wells

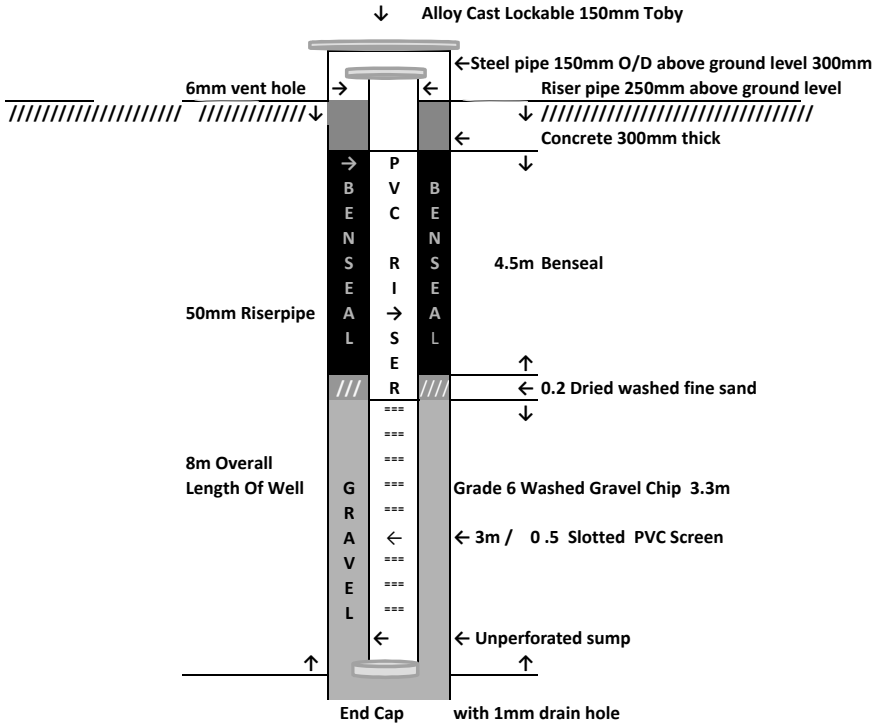
MW2 GND 2303

Date: 4-10-2012

Hole Drilled With Tractor Rig From 0 to 10m with 100mm flighted augers

TRC on site observing formation layers & drill cuttings

Note: BTW to survey in ground elevations & GPS well locations



Drilling Formations

0 - 0.5 dark brown sandy soil
0.5 - 2.0 light brown/orange clay- loose -sticky-moist
2.0 to 3.0 light brown /orange clay tight
3.0 to 5.0 light brown / orange sandy clay saturated/soft
5.0 to 7.0 dark brown peaty clay/brow orange clay saturated
7.0 to 7.5 loose saturated sands
7.5 to 10m tight dark grey sands/dry /tight
Tagged bottom of screen 8.8 top of riser pipe
Water Table 5.404@ dipped by TRC on 9-10-2012

Remediation NZ Manutahi Land Farm

Construction Diagram Of Monitoring Wells

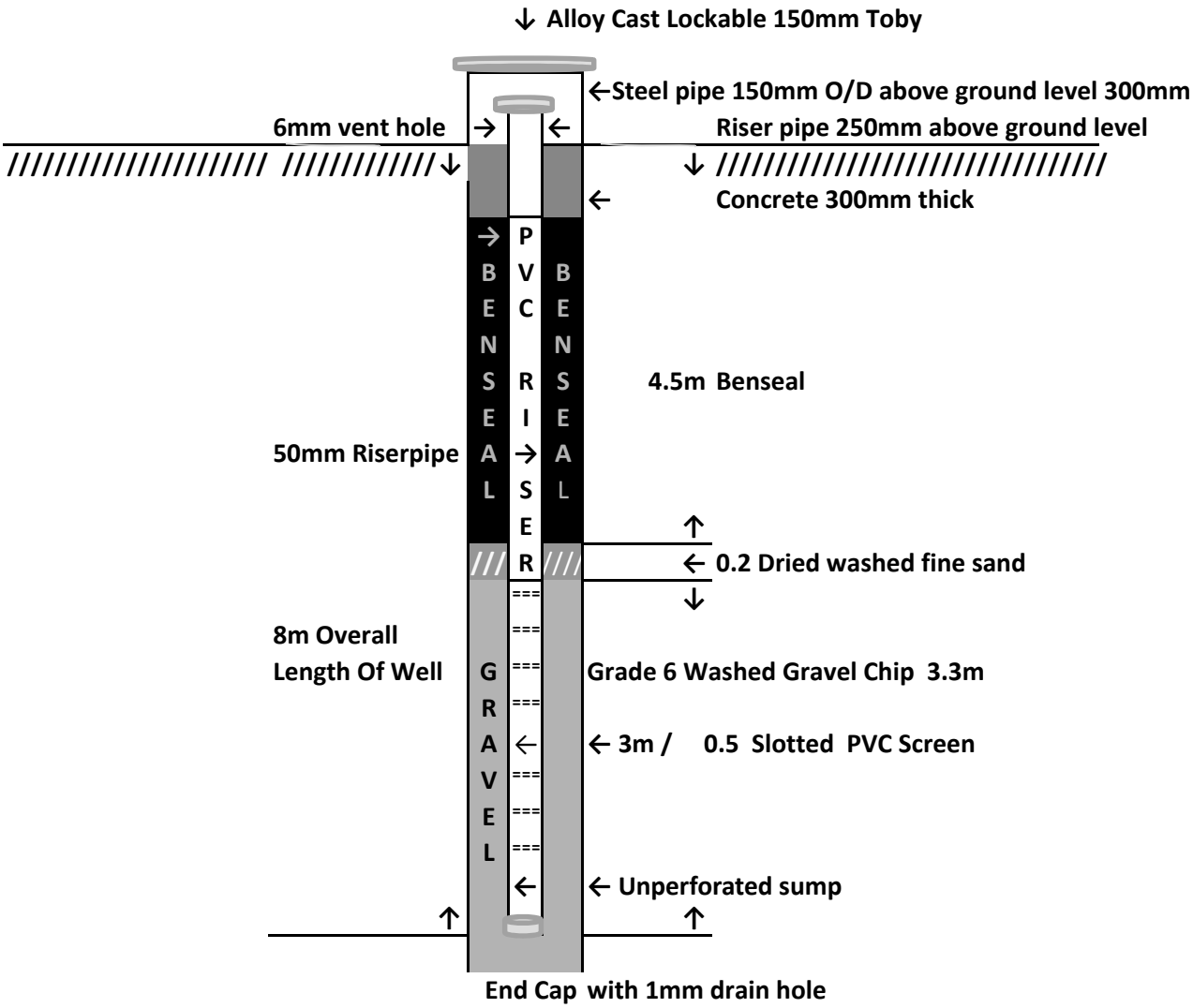
MW2 GND 2301

Date: 4-10-2012

Hole Drilled With Tractor Rig From 0 to 10m with 100mm flighted augers

TRC on site observing formation layers & drill cuttings

Note: BTW to survey in ground elevations & GPS well locations



Monitoring Wells Installed By Strata Drilling Services Ltd 4 -10- 2012

Drilling Formations

0 - 0.5 sandy top soil
0.5 to 2.5 fine gravel/black sands
2.5 to 3.5 lit brown/orange clays /fine
3.5 to 4.0 yellow clays/very fine/stick moust
4.0 to 6.5 sandy clay
6.5 to 9.0 tight dark clay with peat

Tagged bottom of screen 8.82 top of riser pipe
Water Table @ 6.5m dipped by TRC @ 1325 on 9-10-2012

Remediation NZ Manutahi Land Farm

Construction Diagram Of Monitoring Wells

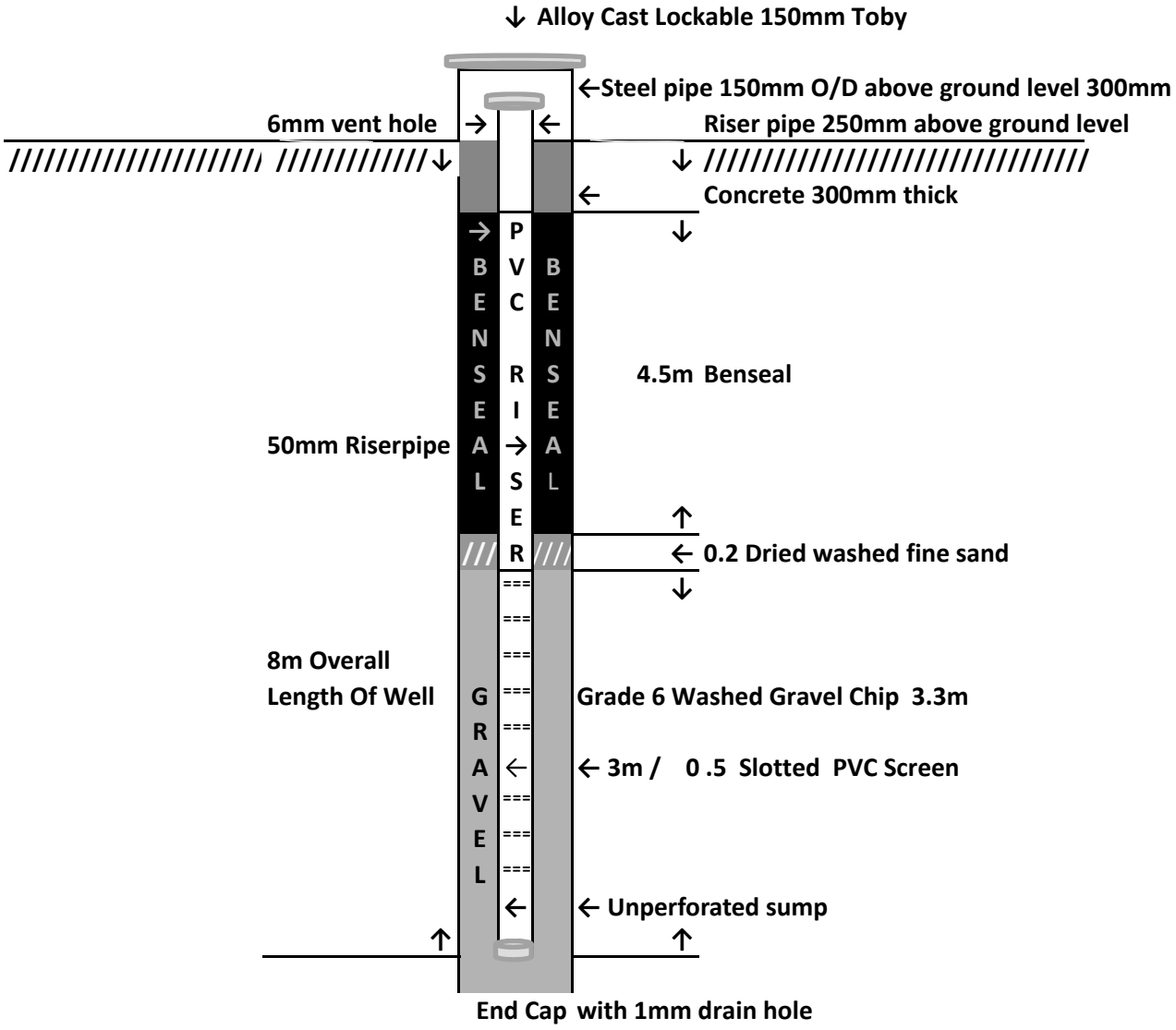
MW2 GND 2302

Date: 4-10-2012

Hole Drilled With Tractor Rig From 0 to 8m with 100mm flighted augers

TRC on site observing formation layers & drill cuttings

Note: BTW to survey in ground elevations & GPS well locations



Monitoring Wells Installed By Strata Drilling Services Ltd ########

Drilling Formations

0 - 2m black fine gravel/sand

2m to 8m light brown/orange clay

8.0m to 9.0m grey sandy clay moisture loose

9.0m to 10m grey sandy clay/tight/compact

Tagged bottom of screen 8.3m top of riser pipe

Water Table @ 8.078 dipped by TRC on 9-10-2012

Remediation NZ Manutahi Land Farm

Construction Diagram Of Monitoring Wells

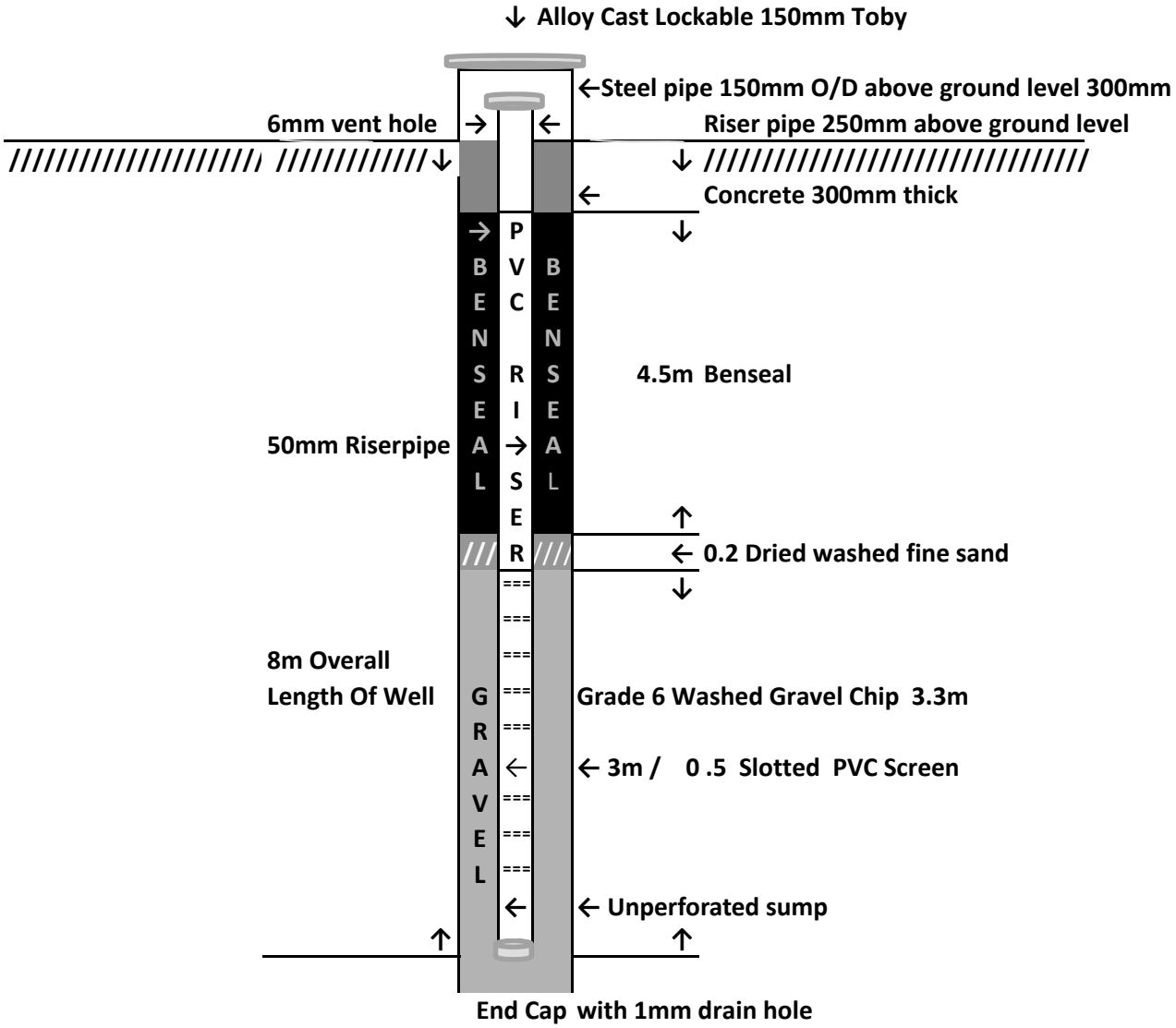
MW2 GND 2303

Date: 4-10-2012

Hole Drilled With Tractor Rig From 0 to 10m with 100mm flighted augers

TRC on site observing formation layers & drill cuttings

Note: BTW to survey in ground elevations & GPS well locations



Drilling Formations

0 - 0.5 dark brown sandy soil

0.5 - 2.0 light brown/orange clay- loose -sticky-moist

2.0 to 3.0 light brown /orange clay tight

3.0 to 5.0 light brown / orange sandy clay saturated/soft

5.0 to 7.0 dark brown peaty clay/brow orange clay saturated

7.0 to 7.5 loose saturated sands

7.5 to 10m tight dark grey sands/dry /tight

Tagged bottom of screen 8.8 top of riser pipe

Water Table 5.404@ dipped by TRC on 9-10-2012