

Final Report

Waiwhetu Stream Remediation Project

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Prepared for

CPG New Zealand Ltd (acting for Greater Wellington Regional Council)

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Executive Summary

A project to remove contaminated sediments from and widen and deepen the Waiwhetu Stream was carried out over the period November 2009 through May 2010. This report summarises the remediation aspects of the project.

The Waiwhetu Stream is a relatively small, slow flowing, and tidally-affected stream that rises in the Eastern Hills of the Hutt Valley, then flows south for approximately six kilometres to its confluence with the Hutt River estuary at Port Road. The lower reaches of the Waiwhetu Stream suffer from long standing heavy metal pollution, in particular lead, zinc, chromium and copper, as a result of historical untreated discharges from local industries in the Gracefield and Seaview area.

The project focused on the most heavily contaminated section of the stream, namely the lower reaches, between Bell Road Bridge and Port Road Bridge. The section of the stream that has been remediated is that extending approximately 1300 m downstream from Bell Road Bridge to approximately chainage 200, in a section now referred to as the "U-channel". The salt marsh located downstream of Seaview Road Bridge was also remediated. Widening and deepening works occurred over the total reach, between Bell Road Bridge and Port Road Bridge (a total of around 1460 m).

The project was jointly funded by Greater Wellington Regional Council (GWRC) and Hutt City Council (HCC). The remediation aspect of the project has also been partially funded by the Ministry for the Environment's Contaminated Sites Remediation Fund.

The contract for the project was tendered by GWRC in December 2008. GWRC selected Brian Perry Civil Ltd (BPC) as the main civil works contractor. CPG New Zealand Limited was appointed as Engineer to the Contract and URS New Zealand Limited was sub-contracted by CPG to monitor and oversee remediation of contaminated sediments.

The project proceeded under a suite of resource consents (WGN090127 [27264] - [27272]) issued by GWRC, and resource consent RM080615 issued by HCC. This report is required to satisfy condition 26 of land use consent WGN090127 [27265], in respect of the excavation and removal of contaminated sediment, and condition 14 of discharge permit WGN090127 [27267], in respect of the discharge of potentially contaminated water during the works.

Sediment Validation

Remediation of the sediments was effected by isolating sections of the stream using coffer dams, before excavating the contaminated material. In general, surface sediments to a depth of 0.5m to 1.5m were silty, black stream sediments with a strong sulphur odour. This black sediment is the contaminated material that has been referred to colloquially throughout the project as 'ooze'. The key contaminants of concern in this material were heavy metals, predominantly lead, zinc, chromium and copper.

After the contaminated material had been excavated from the stream bed and banks, remaining sediments in the excavation cell were sampled and analysed to confirm compliance with the consent conditions. Condition 26 of land use consent WGN090127 [27265] required that concentration of the four key contaminants in remaining sediment should be less than their respective Australian and New Zealand Environmental Conservation Council (ANZECC) Interim Sediment Quality Guideline (ISQG) High criteria.

All validation sample results for lead, zinc, chromium and copper were below the ISQG-High criteria. All contaminated material excavated during the project was disposed of at Silverstream Landfill, Lower Hutt.



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Executive Summary

Following validation, the stream channel was widened and deepened, and erosion and scour protection installed.

Discharge water quality

During the excavation works, the stream base flow was bypassed around the works by pumping and the excavation cells were de-watered by pumping. Surface water sampling was carried out as required by condition 14 of discharge permit WGN090127 [27267], to confirm the water quality in the stream downstream from the discharge of the by-pass and dewatering pumps.

The water sample results were compared with ANZECC Water Quality Guidelines (Table 3.4.1 trigger values for freshwater at 80% protection (ANZECC, 2000). A total of 30 samples were taken and analysed, from four different locations. In six samples, all from sample locations 1 and 2, exceedances of one of the criteria were reported. The exceedances were likely due to the disturbance of sediment near the de-watering pump intake(s) in the excavation cell in the hours leading up to the water sample being collected. There was an improvement in the control of water in subsequent cells, as no samples from sampling points 3 and 4 exceeded criteria. The remainder of the results were below the guideline criteria.

1

Introduction

This report summarises the remediation aspects of the works carried out over the period November 2009 through May 2010 to remove the contamination from and increase the flood carrying capacity of the Waiwhetu Stream. The works were conducted in the lower reaches of the stream, between Bell Road Bridge and Port Road Bridge.

1.1 Site Location and Description

The Waiwhetu Stream is a relatively small, slow flowing, and tidally-affected stream that rises in the Eastern Hills of the Hutt Valley above the suburb of Naenae. It then flows south for approximately six kilometres through the suburbs of Epuni, Waterloo, Waiwhetu and Gracefield to its confluence with the Hutt River estuary at Port Road (see **Figure 1-1**).

The lower reaches of the Waiwhetu Stream suffer from long standing heavy metal pollution, in particular lead, zinc, chromium and copper, and were considered to contain some of the most contaminated sediments in New Zealand. This contamination resulted from historical untreated discharges from local industries in the Gracefield and Seaview area.

The reach that was the subject of these works is that downstream from Bell Road Bridge. The section of the stream between Bell Road Bridge and Seaview Road Bridge is a naturally formed stream, although its route has been historically modified by roading and bridge placements. The outlet of the Awamutu Stream joins the Waiwhetu Stream just north of the Seaview Road Bridge. South of Seaview Road Bridge, there is a salt marsh (an inter-tidal wetland), on the true left bank (adjacent to the Owhiti urupa). Downstream of the salt marsh, the Stream enters a section now referred to as the "U-channel", a formed channel created during the works that extends as far as the Port Road Bridge. The section of the stream that has been remediated is approximately 1300 m from Bell Road Bridge to approximately one third of the way down the U-channel (see **Figure 1-1**). Widening and deepening works occurred over the total reach, between Bell Road Bridge and Port Road Bridge (a total of around 1400-1500 m).

Geology

The Waiwhetu area is located above the confined region of the Hutt Aquifer system. The aquifer system comprises a confining aquitard, the Petone Marine Beds Formation (which extends to a depth of approximately 20 m), which overlies the deep confined aquifer of the Waiwhetu Artesian Gravels. The gravels are tapped for potable municipal water supply.

Beach and marginal marine deposits consisting of gravels with sand and mud are the predominant shallow sediments between Bell Road Bridge and approximately mid-way down the U-Channel. Downstream of this point, the shallow geology is reclamation material, predominantly sand, boulders and rock.

1.2 Background

Since 2000, Greater Wellington Regional Council (GWRC) and Hutt City Council (HCC) have been working with the local community to identify suitable methods to remediate the contaminated sediments in the lower reaches of the Waiwhetu Stream. The Waiwhetu Cleanup Project forms a significant, but separate component of a broader project being undertaken by Greater Wellington Regional Council and Hutt City Council, to bring about improved and sustainable management to the whole of the Waiwhetu catchment, including addressing the flood risk associated with the stream.



1 Introduction

A list of all the previous investigations into contamination in the Waiwhetu Stream is contained in Section 7 of this report.

By 2004 a number of options had been developed to the concept design stage. Between 2004 and 2007, GWRC and HCC undertook further studies into the degree of contamination and the methodology for remediating the contaminated sediments. It became clear through this process that the options to remediate the lower reaches of the Waiwhetu Stream and the options to mitigate flooding and enhance the stream environment were linked – the most sensible solution was to undertake the cleanup and flood mitigation works as part of the same physical works operation. The studies undertaken pointed to an in-stream remediation methodology of isolation and excavation of contaminated sediments as the most suitable methodology.

Excavation and disposal of the contaminated material at a secure landfill was selected as the most suitable method of remediating the contaminated stream bed. This methodology is based on processes adopted by the US Environmental Protection Agency and used for the remediation of heavily contaminated waterways in the USA.

In 2007 GWRC and HCC agreed to trial the in-stream remediation methodology to confirm suitability of the method in local conditions and to quantify any uncertainties prior to full works. The trial took place in March 2008. The scope of the trial was to test the proposed remediation methodology only; no other in-stream channel works, such as stream channel widening and deepening, were carried out.

Based on the results of the trial, GWRC and HCC approved full-scale remediation and flood mitigation works for the lower reaches of the Waiwhetu Stream. URS New Zealand Ltd (URS) completed the remediation design and consenting for the full works. CPG New Zealand Ltd (formerly AC Consulting Ltd) completed the flood mitigation design work (ie. channel widening and deepening, erosion and scour protection, retaining structures at the downstream end of the works). The contract for the project was tendered by GWRC in December 2008.

1.3 Scope of Work

The contracted scope of works was:

"...to cover remediation of heavily contaminated sediments in the lower reaches of the Waiwhetu Stream, and widening and deepening of the stream to increase the flood carrying capacity of the stream, between Bell Road Bridge and Port Road Bridge. Also included is relocation of sewer and water mains underneath the Stream and rationalisation of parts of the stormwater network."

The works included a number of activities that happened concurrently:

- Excavation of contaminated sediments between Bell Road Bridge and the salt marsh immediately
 downstream of Seaview Road Bridge. During the works it was discovered that the extent of
 contaminated material was greater than originally estimated and that part of the "U-channel" stretch
 of the stream contained contaminated material which was excavated as per the rest of the stream.
- 2. In-stream channel widening and deepening, including installation of erosion and scour protection, between Bell Road Bridge and the mouth of the Waiwhetu Stream at Port Road Bridge.
- 3. Repositioning and improvement of the stormwater network where it discharges to the Waiwhetu Stream, realignment of a water main and two sewer crossings.
- 4. Implementation of environmental enhancements between Bell Road Bridge and the salt marsh downstream of Seaview Road Bridge.

1 Introduction

1.4 Roles of Parties

CPG was appointed as Engineer to the Contract and URS were sub-contracted by CPG to monitor and oversee remediation of contaminated sediments. GWRC selected Brian Perry Civil Ltd (BPC) as the main civil works contractor. The roles of the parties involved in the project are summarised in **Table 1-1**.

Table 1-1 Roles of involved parties

Role	Organisation	Engaged by
Contract Holder	GWRC	-
Lead Civil Contractor	Brian Perry Civil Ltd	GWRC
Engineer to the contract	CPG NZ Ltd	GWRC
Remediation consultant	URS NZ Limited	CPG NZ Ltd

BPC engaged several subcontractors during the works. Notably, John Ray Ltd were engaged to excavate and transport the material removed from the streambed, both during the remediation and widening and deepening, and to construct and install the erosion and scour protection (gabion baskets and reno mattresses). Multi Civil Contractors were engaged to carry out the sewer and stormwater realignment works, including the construction of the new pumping station.

This project has been jointly funded by GWRC and HCC, and has also been assisted by funding from the Ministry for the Environment's Contaminated Sites Remediation Fund.

1.5 Purpose and scope of this report

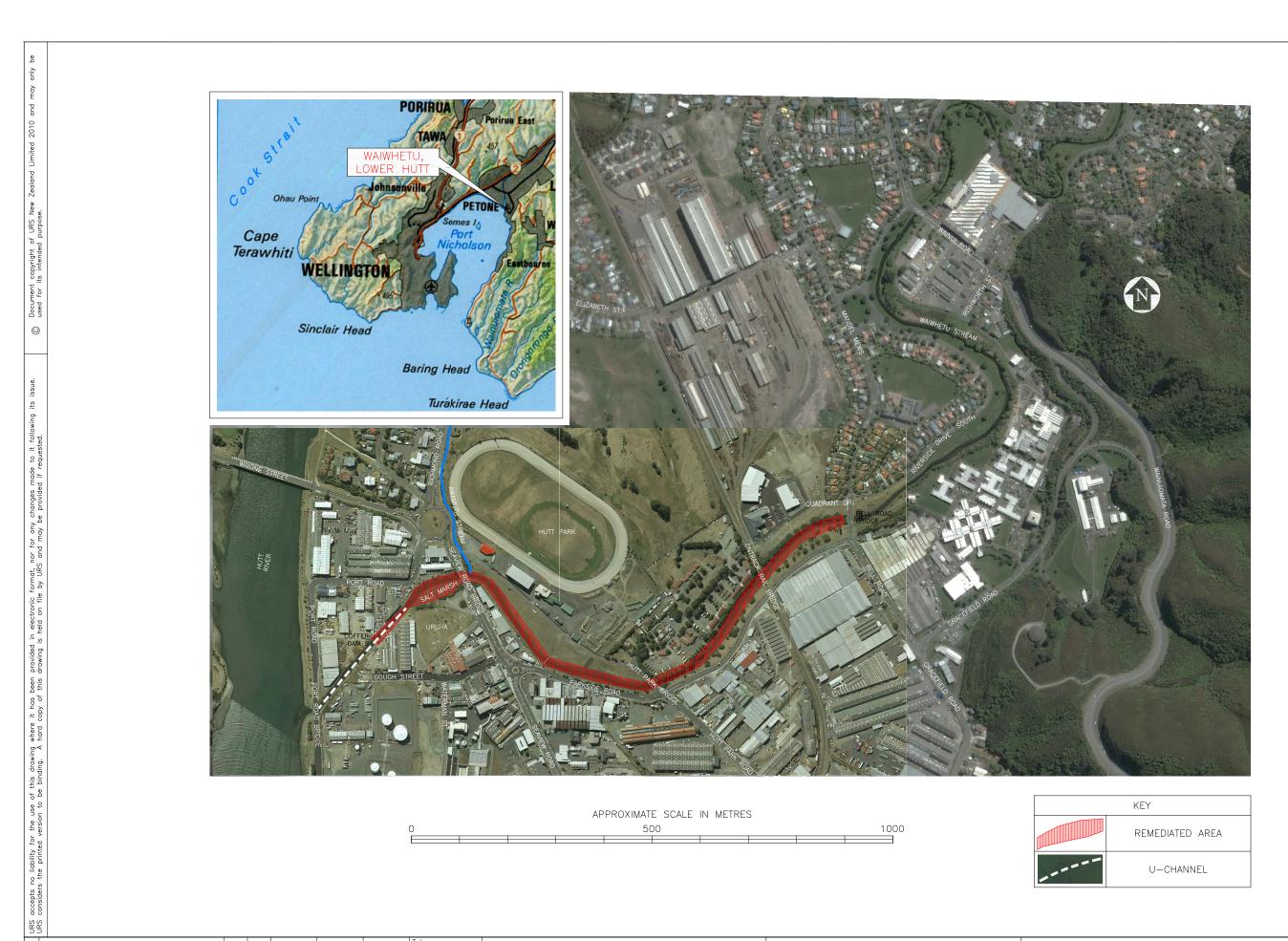
The Waiwhetu Stream Project proceeded under a suite of resource consents (WGN090127 [27264] – WGN090127 [27272]) issued by GWRC, and resource consent RM080615 issued by HCC. These consents are provided as Appendix A. This report summarises the remediation aspects of the project designed to remove the contamination from and increase the flood carrying capacity of the Waiwhetu Stream and is required to satisfy condition 26 of resource consent WGN090127 [27265] and condition 14 of resource consent WGN090127 [27267].

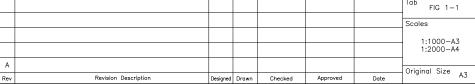
This report is also required as a condition of the funding provided by the Ministry for the Environment (MfE), and has therefore been completed in general accordance with section 2.4 'Stage 4 – Site Validation Report', of the Ministry's Contaminated Land Management Guidelines: No. 1, Reporting on Contaminated Sites in New Zealand.

This report contains the following:

- The remediation system design, including cell construction, bypass pumping and de-watering, excavation and landfill disposal.
- Description of works carried out in each cell, including validation sampling required for resource consent compliance.
- Results of water quality sampling required for resource consent compliance.

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WAIWHETU STREAM REMEDIATION PROJECT

WAIWHETU STREAM CATCHMENT PLAN

Drawing Number Revision A

2.1 Introduction

The approach for the full remediation works included the following elements:

- 1. Preparation of the work area
- 2. Construction of an excavation cell and a number of sedimentation cells using sheet-pile coffer dams across the width of the stream
- 3. Bypass pumping of stream base flows around the works and de-watering pumping of the excavation cell
- 4. Excavation of contaminated material from the stream bed and banks in the excavation cell
- 5. Validation sampling and analysis of remaining sediments in the excavation cell to check compliance with consent conditions for remaining material.

When results of validation sampling showed compliance with the consent conditions further flood protection works including channel widening, deepening, scour protection and service modifications were completed in the excavation cell – these flood protection works are not described in this report.

A schematic diagram of the remediation works layout is shown in **Figures 2-1 and 2-2**. The following sections provide a brief overview of key elements of the remediation design that were generally adopted in the remediation works, and any changes to the design that were adopted by the project team during the works. Detailed information on the remediation design is provided in the two resource consent applications submitted for the works (URS 2008a and 2008b).

The physical layout of the site required certain modifications to the general approach to be able to work around existing site conditions (e.g. underground services, bridges, access). Sections 4 to 10 provide specific details on the work approach taken in each of the remediation cells, shown in **Figure 2-3**.

2.2 Preparation of the work area

The contractor prepared the works area by installing security fences, silt curtains upstream and downstream of the works, haulage roads, storage areas, site office facilities, identification and isolation of underground services, and other works to enable the remediation works to progress.

2.3 Construction of cells using coffer-dams

Between three and five sheet-pile coffer-dams were in place across the width of the stream at any time during the works to form the adjacent in-stream cells (excavation and sedimentation cells). Sheet-piles were driven by a crane-mounted vibrating hammer into the stream bed and banks. The coffer dams were installed to block the upstream base flows and downstream tidal flows from entering the excavation cell.

A flood contingency management plan (FCMP) was in place for the duration of the works as a requirement of the resource consent. The FCMP included criteria for assessing whether a significant risk of flooding was present during the works (i.e. due to severe weather events), and a procedure with responsibilities and actions for the project team to follow in the case of a significant flooding risk. The FCMP was submitted to GWRC consent officers prior to works commencing. There were a number of weather events where the project team discussed whether the FCMP actions should be implemented. On one occasion (15 January 2010) it was decided that this action was warranted, and coffer dam 4 was lowered. A key element of the FCMP was that the contractor would drive a 10 m x 0.5 m notch in



all coffer-dams in the event of a severe weather forecast (and subsequent high stream flow) that could potentially result in flood conditions.

The original design of the sheet pile coffer dams, which required all coffer dam tip heights set to 1.1 m RL, was modified as part of the development of the FCMP because the contractor indicated they would not have time to drive sufficient sheet piles in the event of a severe weather forecast. The coffer-dam design was modified so that all coffer-dams downstream of the excavation cell (coffer dams 3, 4, and 5 in **Figure 2-3**) were installed with a 10 m x 0.5 m notch in place at all times. This plan, and revised calculations for the effectiveness of the sedimentation cells, was discussed with GWRC consent officers prior to the works commencing.

The original remediation design specified an alternative arrangement for the installation of coffer-dams in the salt marsh area of the works to eliminate the need for stream by-pass pumping in this area (refer to URS 2008 resource consent application). During the works, this approach was revised so that the arrangement of coffer-dams and the subsequent excavation in the salt marsh area was carried out in generally the same way as the rest of the works. This is described in more detail in Sections 10 and 11. Revised flood modelling was carried out for this approach prior to the works commencing, and these results were presented to GWRC consent officers for their approval.

2.4 By-pass pumping and cell de-watering

Stream flows accumulating on the upstream side of the excavation cell were bypassed around the excavation cell(s) by pumping into the first sedimentation cell. A 14" pump was used by the contractor to provide sufficient pumping capacity. The maximum flow rates measured at the Whites Line East monitoring station during the works was approximately 13 m³/s on 16 October 2010. This was the equivalent of a 2 year flood event. This and other rain events during October meant that by-pass pumping was did not commence until 2 November 2010. Typical flow rates were much lower during the remainder of the works (less than 0.5 m³/s) with some peak flows up to 7 m³/s. During periods of low flow, the contractor switched off the bypass pump until the stream levels upstream of the excavation cell reached a point where further pumping was necessary. The pump intake structure was designed and placed in such a way as to exclude fish as far as is practicable, and to present a minimal safety hazard to workers and the public.

Water that accumulated in the excavation cell was pumped using an array of 6" pumps which generally discharged into the by-pass pipe. In the later stages of the project (Cells H, M) the dewatering pumps were discharged into a separate pipe to the by-pass and discharged into Cell N. The estimated hydraulic retention time for 3 sedimentation cells (after modification of the design for the FCMP) was 5.8 hours. Silt curtains were set up both upstream and downstream of the works to provide protection against discharge of sediment to the stream from the works, as well as catching rubbish and debris that may block or damage the pumps.

2.5 Excavation

Cells A and B were excavated using 20 tonne diggers working in the stream bed. After Cell B was completed, a revised plan was developed by the project team in order to minimise the amount of water in the excavated material. The contractor was instructed to use long reach diggers from the banks of the stream to minimise the mixing of clean and contaminated material that had occurred in cells A and B, due to the diggers working in the stream bed. The contaminated material was excavated to a

stockpile area on the stream banks prior to being loaded into sealed trucks by a second digger on the stream bank. The excavation works in each cell are described in more detail in Sections 4 to 11.

2.6 Landfill disposal

The material excavated during the project was disposed of at Silverstream Landfill (the landfill), Lower Hutt. The landfill is owned by Hutt City Council, who engages Transpacific to run the day to day operations, and Tonkin & Taylor Ltd as consultants to provide technical and environmental advice.

The material disposed of at the landfill included all contaminated material removed as part of the remediation works, and all material removed as part of the widening and deepening works after 17 December 2009.

The material taken to the landfill was classified into a specific 'type' depending on the water content and level of contamination. A summary of the material types developed for this project is presented in **Table 2-1**.

Table 2-1 Su	ummary of ma	terial classifications
--------------	--------------	------------------------

Material Type	Characteristics
А	Dry, Contaminated
В	Wet, Contaminated
С	Free water, Contaminated (not used)
D	Heavily contaminated material from Cell D
F	Dry, Daily cover/levelling fill
G	Wet, Daily cover/levelling fill (not used)

Typically the material excavated from the remediation cells was classified at the landfill as 'Type B', and disposed of in purpose-dug trenches within the existing landfill material.

An exception to this was the material excavated from Cell D and the upper 15 m of Cell E (see Sections 6 and 7). This material had been identified during the planning stage as being highly contaminated, or 'Type D' material, as the concentrations of lead, zinc, copper and chromium were significantly higher in these sections than elsewhere in the stream. Although this material was also disposed of in trenches, these trenches were located in a different area of the landfill, and were capped with an impermeable fill layer to minimise rainfall infiltration and leaching.

Material that was removed as part of the widening and deepening of the stream channel (that is, following validation sampling as described in section 3.2) was disposed of at Silverstream Landfill as daily cover/levelling fill when dry. This is discussed in Section 3.3.

2.7 Environmental guideline values

Sediments

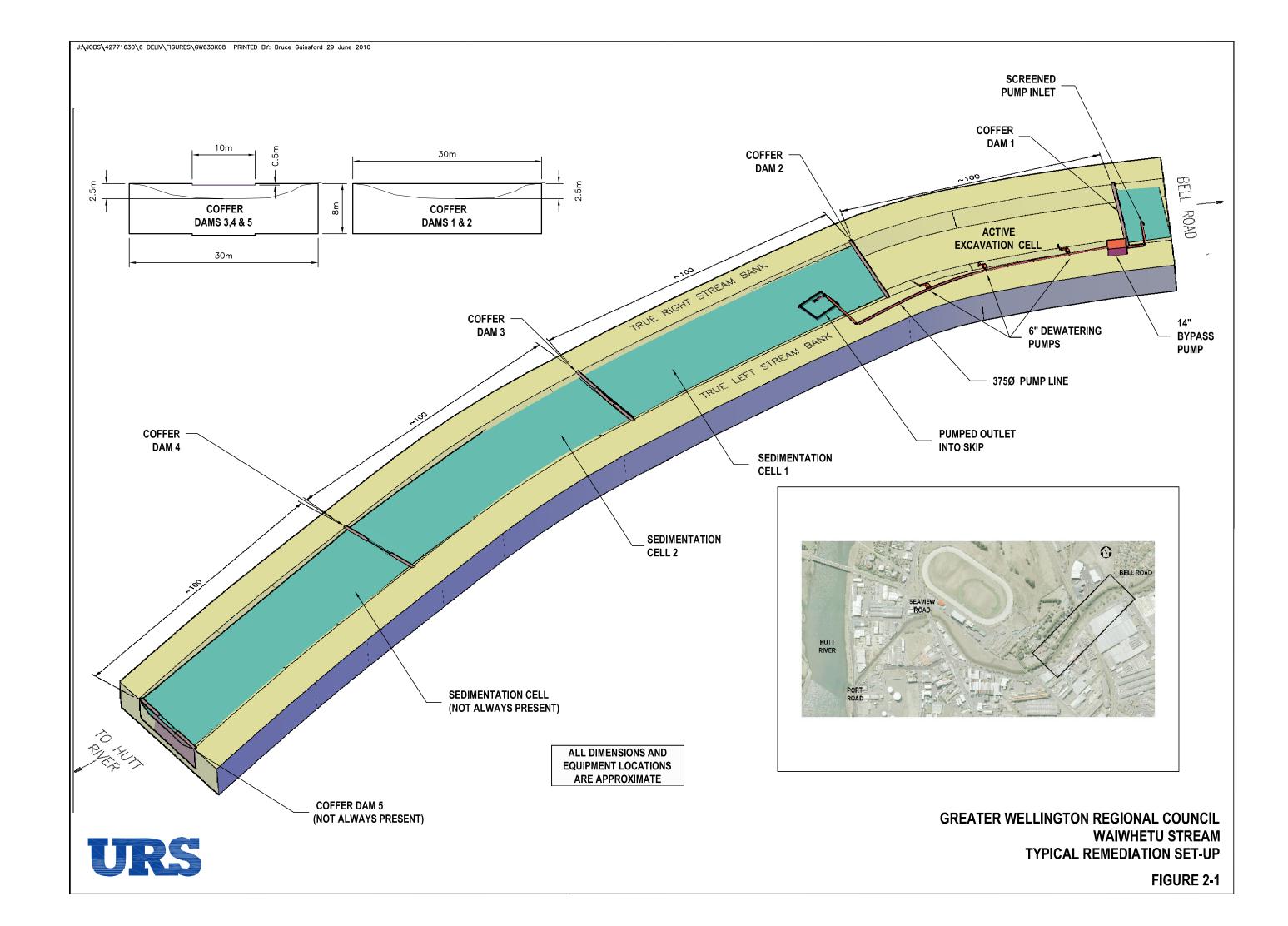
ANZECC Interim Sediment Quality Guideline (ISQG) values have been used to assess the degree of potential ecological hazard posed by contaminated stream sediments, and the requirements for remediation (ANZECC, 2000). The ANZECC ISQG values are the most appropriate criteria to apply to the Waiwhetu Stream as they are concerned with the biological responses of organisms to

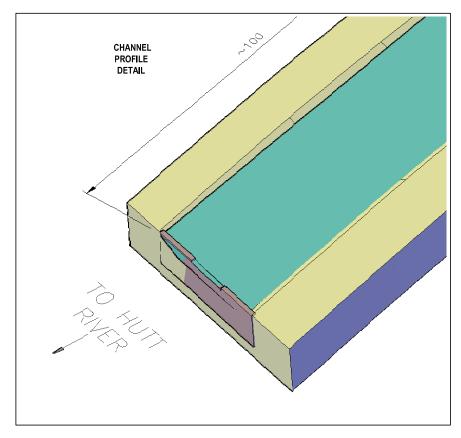


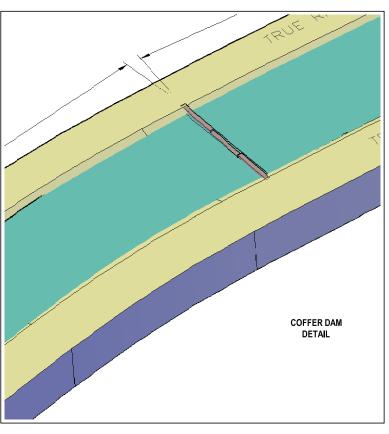
contaminants such as those currently present in the stream. The guidelines contain two concentrations, the ISQG-Low concentration (or trigger value) and the ISQG-High concentration. The trigger value is a threshold concentration below which the frequency of adverse biological effects is expected to be very low. The ISQG-High concentration is intended to represent a concentration above which biological effects are expected to occur more frequently. The resource consent for the works required that the sediment remaining in the streambed contain concentrations of the key contaminants of concern below the ISQG-High values.

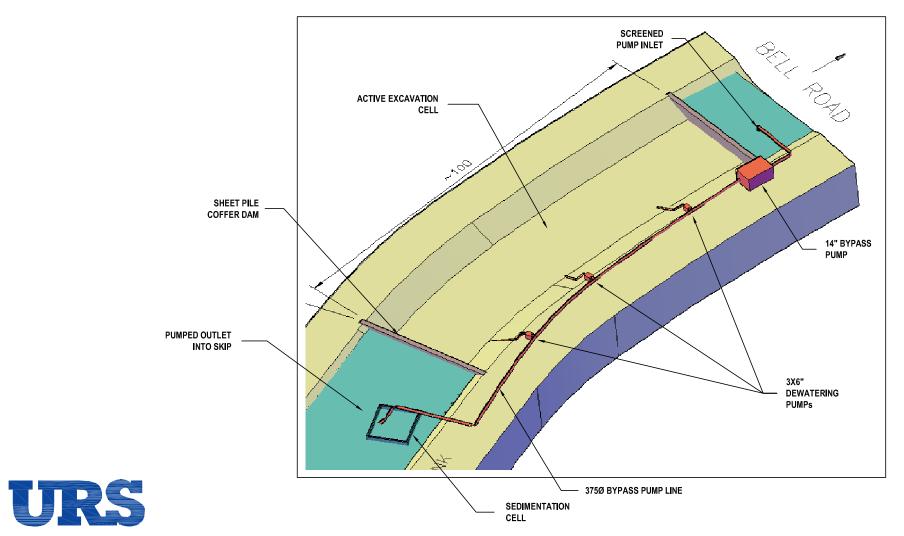
Water

Analytical results for water samples gathered during the trial have been compared to ANZECC guidelines trigger values for marine and freshwater (80% level of protection).









GREATER WELLINGTON REGIONAL COUNCIL WAIWHETU STREAM TYPICAL REMDIATION SET-UP DETAILS

FIG 2-3 Original Size A3

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WAIWHETU STREAM REMEDIATION PROJECT

STREAM OVERVIEW PLAN

Prawing Number FIGURE 2-3

Overview of Remediation Site Works

The proposed start date for the excavation of contaminated material was 1 October 2009, however significant rainfall during October resulted in excavation commencing on 2 November 2009. Excavation paused for the Christmas period between 22 December 2009 and 11 January 2010, and validation of the final cell was completed on 4 May 2010.

3.1 Cell Preparation and Removal of Contaminated Material

Cells took approximately two to three days to dewater using the method outlined in Section 2.4. Removal of the contaminated material commenced once the cell was dewatered to a level acceptable to the Engineer. The time taken to excavate contaminated sediments ranged between six and 28 days depending on the length of the cell.

3.1.1 Contaminated Material Characteristics

During excavations, several sediment types were encountered in the stream bed. In general, surface sediments to a depth of 0.5 m to 1.5 m were silty, black stream sediments with a strong sulphur odour. This black sediment is the contaminated material that has been referred to colloquially throughout the project as 'ooze'. The key contaminants of concern were heavy metals, predominantly lead, zinc, chromium and copper.

Beneath the surface sediments a thin layer (0.1 m to 0.2 m thick) of brown clay was observed. Beneath the brown clay layer was coarse gravels, sands, and shells. In some cases a further lens of brown clay, or black silt sediment pockets, was observed within the layer of coarse gravels, sands, and shells

During the works it was discovered that the 'ooze' profile extended laterally into the stream banks, further than the final design profile, suggesting the stream was historically wider than it is at present. The 'ooze' took the form of a seam of contaminated material, varying in thickness up to 250 mm, in both the true left and right banks following the completion of widening and deepening. Where possible, this seam of contamination was 'scalloped' out of the bank as far as practicable, and replaced with clean material. Remnants of this seam of contaminated material remain behind the clean material.

Surface soils on the stream banks comprised mixed silt, clay and gravel fill material overlying a thin layer of silty, black stream sediments (0.1 m to 0.2 m thick) and coarse gravels, sands, and shells below. It is likely that the surface soil is not native to the area and was historically imported and placed on the stream banks to contain the streams flow and allow development on the floodplain. URS is not aware of any historical records that document this filling process. The presence of fill material in the stream banks was found along the entire reach of the stream during the remediation works, including in the U-channel.

The contaminated material, when excavated, comprised 'ooze' mixed with the underlying clays and gravels. Collectively this is referred to as the contaminated material.

The volumes of material removed are summarised in Table 3-1. Volumes of material removed from each cell were provided by BPC based on survey data. The material removed from the 'seams' in the stream banks has been estimated based on truck loads (also provided by BPC).



3 Overview of Remediation Site Works

Table 3-1 Volumes of contaminated material removed

Cell	Volume (m/3)
A	1,111
В	2,971
C/D	4,037
Е	2,980
F/G	6,558
Н	4,862
M	3,768
Seams (all cells)	1,270
TOTAL	27,557

3.2 Sediment Validation Sampling

Following the removal of the contaminated material and prior to the widening and deepening of the stream channel, sediment samples, which will be referred to as 'validation samples', were collected from the active excavation cell in accordance with the conditions stated in Resource Consent No. WGN090127 [27265].

3.2.1 Resource Consent conditions

The full suite of resource consents issued for the project is provided in **Appendix A**. Condition 20 of Resource Consent WGN090127 [27265] sets out the minimum stream bed validation sampling requirements which, in brief, are:

- There are to be at least 5 equally spaced transects within the active remediation cell.
- These transects shall be located 10, 30, 50, 70 and 90 m from the upstream coffer dam wall.
- At least 15 samples shall be collected from each remediation cell (i.e., 3 samples per transect).
- Date, time, sampling method and weather conditions are to be recorded.
- Neither of the coffer dams that form the active remediation cell shall be removed until validation samples have been collected and the results submitted to the Manager, Environmental Regulation, GWRC.
- Each sample shall be analysed for total recoverable lead, zinc, copper and chromium, and results
 will be compared with the Interim Sediment Quality Guideline (ISQG) high concentration criteria, as
 set by the Australian and New Zealand Environmental Conservation Council (ANZECC, 2000).

3.2.2 Validation Sampling Methodology

Contaminated material was removed based on visual observations, and excavation generally continued down to the grey sandy gravels. The initial methodology stated that cells would be validated in full, only once all contaminated material had been removed. However in practice, it was common to validate a few transects of a cell at a time, provided that the risk of recontamination of the validated area was minimised.

Prior to validation samples being collected, the stream bed was spot checked with a portable X-Ray Fluorescence (XRF) analyser and any remaining areas of contaminated material were identified and

3 Overview of Remediation Site Works

removed. The purpose of using the portable XRF was to provide rapid screening data in the field, to assist in determining the end point of the excavation of contaminated material, and to minimise the cost and time associated with laboratory analyses.

When the resource consent was granted, it was expected that the cells would be in the vicinity of 100 m in length. Following modification to cell design, cells ranged in length from 107 m to 290 m (see **Figure 2-3**). To accommodate this, validation transects were placed every 20 m, with the first transect 10 m downstream of the upstream coffer dam. Three equally spaced samples were collected per transect, except for the salt marsh where 4-5 samples were collected per transect to accommodate the extra width of the cell.

The validation samples collected were representative of the top 100 mm of stream bed exposed after the removal of the contaminated 'ooze'. All samples were collected by hand, by a trained environmental scientist. As part of standard field reporting procedures the date, time and weather conditions were recorded at the time of sampling.

All validation samples were screened in the field using the portable XRF to allow comparison with laboratory results. The samples were then submitted to CRL Energy Ltd for lead, zinc, copper and chromium analysis. CRL is an IANZ accredited laboratory located in Seaview. Their estimated method detection limit for sediment analysis of the key contaminants is 0.001% (10 mg/kg), sufficient to satisfy the consent conditions. Results were typically received after 1 to 2 days, and were then compared with the ANZECC ISQG high concentration criteria, and provided to the Engineer's representative.

The validation sampling results and sample location plans for each cell are presented in Sections 4 to11, and a comparison between the portable XRF results (corrected for moisture content) and laboratory analysis results is presented in **Appendix D**.

3.3 Levelling Fill/Daily Cover Testing

From 18 December 2009, all material excavated as part of the widening and deepening (after the removal of contaminated material) was removed to Silverstream Landfill as levelling fill/daily cover. Acceptance criteria and testing requirements were agreed between the project team and Tonkin & Taylor, advisors to HCC. In summary, the testing carried out was:

- 1 sample per truckload of material was screened with the portable XRF for lead, zinc, copper and chromium.
- 1 sample per 5 truckloads of material was collected and submitted for laboratory analysis for lead, zinc, copper, chromium, arsenic, nickel, cadmium, polycyclic aromatic hydrocarbons (PAH) and DDT.

All results for the levelling fill/daily cover testing have been provided to the Engineer's representative. They are not included in this report.

This report does not include an analysis of the flood mitigation works, including the works in the U-channel such as CFA drilling, installation of panels, scour protection measures, storm-water improvements, services (e.g. pump stations, duplication of sewer crossings etc). These items are mentioned in the summary of works tables in the Sections 4 to 10 in order to provide context and an overall picture of each cell.



Cell A

Cell A comprised the section of the stream between Bell Road Bridge and coffer dam 1, and included the area of the remediation trial (see **Figure 4-1**). While flood protection works were required around Bell Road Bridge, it was not originally expected that excavation of contaminated material would be required. However, sediment sampling carried out on 31 August 2009 upstream of coffer dam 1 indicated that contaminated sediment was still present, and therefore excavation was undertaken.

The dewatering methodology used in Cell A differed to the other cells as there was no upstream coffer dam. Instead, the stream flow was diverted through a channel along the true right hand side of the streambed, with a cut off drain adjacent to coffer dam 1 directing the stream flow to the 14" bypass pump. This allowed for the excavation of contaminated material from the true left hand side and middle of the stream in reasonably dry conditions. Excavation began at coffer dam 1 and moved upstream towards Bell Road Bridge. When validation of the true left hand side and middle of the stream had been completed, the diversion channel was relocated to the true left hand side to allow for the removal of the contaminated material and validation of the true right hand side of the stream.

4.1 Works

A summary of the works carried out in Cell A is presented in **Table 4-1**.

Table 4-1 Cell A - Summary of works

14 November 2009
Top: Bell Road Bridge; Bottom: Coffer dam 1
107 m
Heavy rainfall on 18 November caused the cell to flood.
156
1111 m³ [Note: Volume provided to URS by BPC Ltd. Does not include material removed from 'seams' – see Section 3.1]
6 transects, 17 samples.
 Reno mattresses downstream of Bell Road Bridge to approximately chainage 1445 Widening and deepening of stream channel Fitting of wing walls to service outfalls
 A seam of contaminated material remained in both the TRB and TLB following the completion of the widening and deepening works. This seam was scalloped out and replaced with clean material where practicable. Some contaminated material may remain behind the overlying capping layer. It is possible that contaminated material may remain in the vicinity of location A/110L (see below)
Location A/110L was not validated because the sampling point was beneath the bypass pump intake, and the surrounding area was consistently under water. Visual inspection only.
20 November 2009
None



4 Cell A

4.2 XRF and Laboratory Analysis

The validation sample results for Cell A are presented in **Table 4-2**, and a sample location plan is presented in **Figure 4-1**. All validation samples were screened with the portable XRF prior to being sent to the laboratory.

All validation results were below ISQG-High criteria and therefore comply with condition 21 of Resource Consent No: WGN090127 [27265].

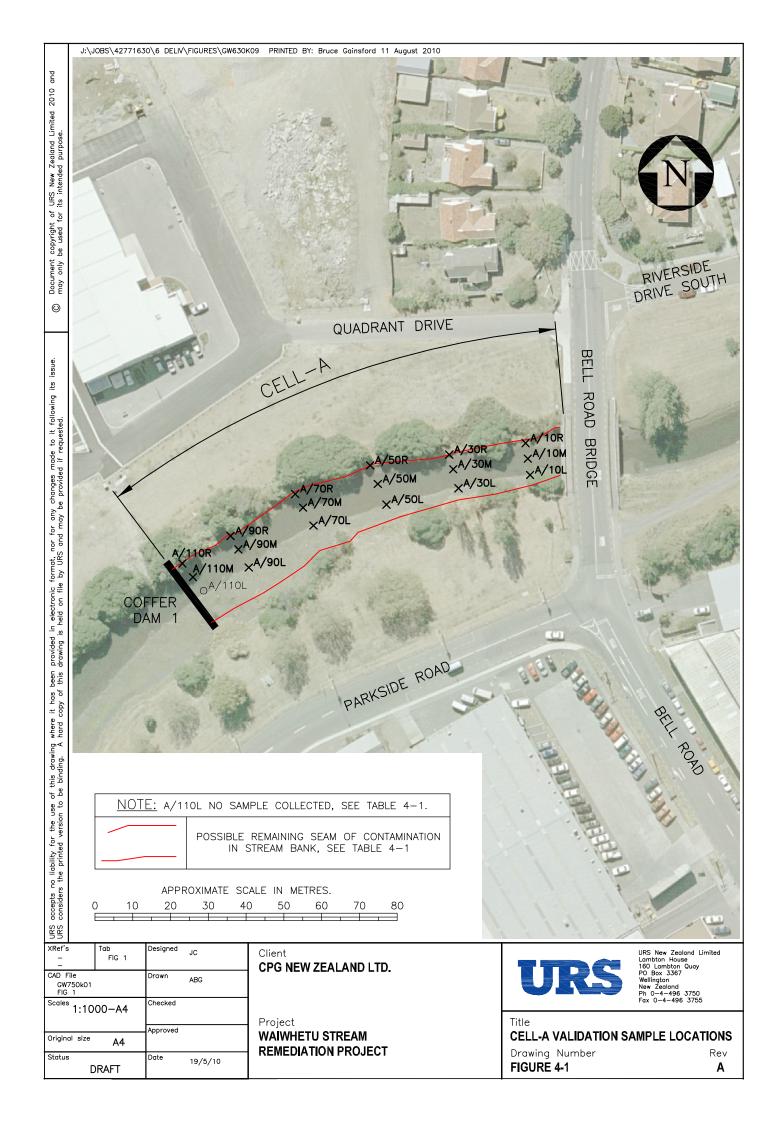




Table 4-2: Cell A Validation Sediment Sample Analytical Results Compared to ANZECC Sediment Quality Guidelines

					Validation Samp	le Details and Aı	nalytical Results				
URS Sample Reference	A/10R	A/10M	A/10L	A/30R	A/30M	A/30L	A/50R	A/50M	A/50L	ANZECC Sediment Quality Guidelines ¹	
Laboratory Sample Reference	SA12964-J	SA12964-J	SA12964-I	SA12964-J	SA12964-J	SA12964-I	SA12964-J	SA12964-J	SA12964-I		
Date Sampled	20-Nov-09	20-Nov-09	17-Nov-09	20-Nov-09	20-Nov-09	17-Nov-09	20-Nov-09	20-Nov-09	17-Nov-09		
Sample Location	10m transect, true right rank	10m transect, middle of stream bed	10m transect, true left bank	30m transect, true right rank	30m transect, middle of stream bed	30m transect, true left bank	50m transect, true right rank	50m transect, middle of stream bed	50m transect, true left bank	ISQG-Low	ISQG-High
Chromium	36	32	39	39	36	50	45	41	42	80	370
Copper	7	2	7	4	2	12	12	5	12	65	270
Zinc	82	64	61	71	64	131	123	68	143	200	410
Lead	31	21	20	24	18	61	54	20	65	50	220

					Validation Samp	le Details and Ar	nalytical Results				
URS Sample Reference	A/70R	A/70M	A/70L	A/90R	A/90M	A/90L	A/110R	A/110M	A/110L	ANZECC Sediment Quality Guidelines ¹	
Laboratory Sample Reference	SA12964-J	SA12964-J	SA12964-I	SA12964-J	SA12964-J	SA12964-I	SA12964-J	SA12964-J			
Date Sampled	20-Nov-09	20-Nov-09	17-Nov-09	20-Nov-09	20-Nov-09	17-Nov-09	20-Nov-09	20-Nov-09			
Sample Location	70m transect, true right rank	70m transect, middle of stream bed	70m transect, true left bank	90m transect, true right rank	90m transect, middle of stream bed	90m transect, true left bank	110m transect, true right rank	110m transect, middle of stream bed	110m transect, true left bank	ISQG-Low	ISQG-High
Chromium	42	41	49	54	40	40	36	73	Not sampled.	80	370
Copper	12	8	19	14	10	4	2	36	Sampling point	65	270
Zinc	108	79	149	95	122	66	58	382	is in pump	200	410
Lead	58	28	65	33	50	21	17	164	intake area.	50	220

All units mg/kg dry weight

Bold - exceeds the ANZECC Sediment Guidelines

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1

A Exceeds ISQG-Low

B Exceeds ISQG-High



Photograph 1: Excavation works in Cell A. Note diversion channel.



Photograph 2: Cell A during heavy rainfall on 18 November 2009.





Photograph 3: Cell A, looking upstream during excavation. Orange pegs denote validation sample locations.



Photograph 4: Cell A looking downstream post-excavation. Orange pegs denote validation sample locations.



Cell B

Cell B was the first cell to be excavated; removal of contaminated material began on 2 November 2009. Excavation began at coffer dam 1 and progressed downstream towards coffer dam 2 (see **Figure 5-1**). Two high pressure gas mains are located just downstream of the Ontrack rail bridge, at approximately chainage 1245. One of the pipes was found to be within the 'ooze' profile, so excavation in Cell B was temporarily stopped while it was decided how best to safely work around and protect the pipes, during which time excavation in Cell A took place. Excavation of contaminated material in Cell B resumed on 25 November.

5.1 Works

A summary of the works carried out in Cell B is presented in **Table 5-1**.

Table 5-1 Cell B - Summary of works

Date 'ooze' excavation commenced	2 November 2009						
Top/bottom of cell	Top: coffer dam 1; Bottom: coffer dam 2						
Length of cell	142 m						
Weather conditions during excavation	Heavy rainfall on 18 November caused the cell to flood.						
Truckloads of 'ooze' removed (approximate)	478						
Volume of 'ooze' removed	2971 m³ [Note: Volume provided to URS by BPC Ltd. Does not include material removed from 'seams' – see Section 3.1]						
Number of validation transects/samples	7 transects, 21 samples						
Flood protection and civil works in cell	 Gabion baskets beneath rail bridge Temporary rock rip-rap/scour protection around high pressure gas main (at approximately chainage 1245) Widening and deepening of stream channel Fitting of wing walls to service outfalls 						
Locations of remaining contaminated material (see Figure 5-1) Note: TRB = true right bank; TLB = true left bank	 A seam of contaminated material remained in both the TRB and TLB following the completion of the widening and deepening works. This seam was scalloped out and replaced with clean material where practicable. Some contaminated material may remain behind the overlying capping layer. It is possible that small amounts of contaminated material may remain immediately adjacent to the high pressure gas main. This area was excavated by hand, as opposed to machinery. It was visually inspected and sport-checked with the XRF, however no final scrape was possible with the excavator. 						
Areas not validated	None						
Date validation complete	26 November 2009						
Other notes/considerations	None						

5.2 XRF and Laboratory Analysis

The validation sample results for Cell B are presented in **Table 5-2**, and a sample location plan is presented in **Figure 5-1**. All validation samples were screened with the portable XRF prior to being sent to the laboratory.



5 Cell B

All validation results were below ISQG-High criteria and therefore comply with condition 21 of Resource Consent No: WGN090127 [27265].

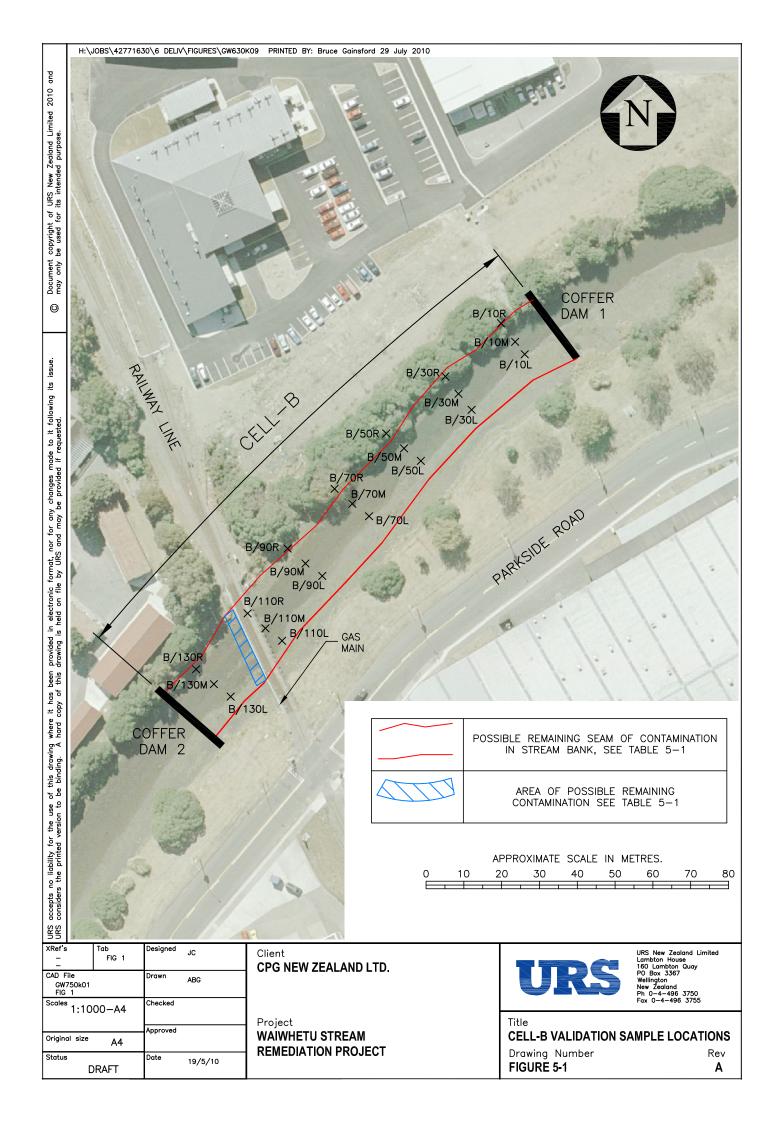




Table 5-2: Cell B Validation Sediment Sample Analytical Results Compared to ANZECC Sediment Quality Guidelines

	Validation Sample Details and Analytical Results										
URS Sample Reference	B/10R	B/10M	B/10L	B/30R	B/30M	B/30L	B/50R	B/50M	B/50L	ANZECC Sediment Quality	
Laboratory Sample Reference	SA12964-D	SA12964-D	SA12964-D	SA12964-D	SA12964-D	SA12964-D	SA12964-E	SA12964-E	SA12964-E	Guide	elines ¹
Date Sampled	7-Nov-09	7-Nov-09	7-Nov-09	7-Nov-09	7-Nov-09	7-Nov-09	9-Nov-09	9-Nov-09	9-Nov-09		
Sample Location	10m transect, true right bank	10m transect, middle of stream bed	10m transect, true left bank	30m transect, true right rank	30m transect, middle of stream bed	30m transect, true left bank	50m transect, true right rank	50m transect, middle of stream bed	50m transect, true left bank	ISQG-Low	ISQG-High
Chromium	48	42	38	42	32	52	39	44	43	80	370
Copper	10	7	6	13	5	17	3	8	9	65	270
Zinc	96	110	73	161	65	244	54	87	102	200	410
Lead	36	38	21	64	17	99	14	28	36	50	220

	Validation Sample Details and Analytical Results													
URS Sample Reference	B/70R	B/70M	B/70L	B/90R	B/90M	B/90L	B/110R	B/110M	B/110L	B/130R	B/130M	B/130L	ANZECC Sediment Quality Guidelines ¹	
Laboratory Sample Reference	SA12964-E	SA12964-E	SA12964-E	SA12964-F	SA12964-F	SA12964-F	SA12964-K	SA12964-K	SA12964-K	SA12964-L	SA12964-L	SA12964-L		
Date Sampled	9-Nov-09	9-Nov-09	9-Nov-09	11-Nov-09	11-Nov-09	11-Nov-09	25-Nov-09	25-Nov-09	25-Nov-09	26-Nov-09	26-Nov-09	26-Nov-09		
Sample Location	70m transect, true right bank	70m transect, middle of stream bed	70m transect, true left bank	90m transect, true right bank	90m transect, middle of stream bed	90m transect, true left bank	110m transect, true right bank	Imiddle of stream	110m transect, true left bank	130m transect, true right bank	middle of stream	1 40m transect	ISQG-Low	ISQG-High
Chromium	42	39	54	43	43	42	42	46	37	33	33	44	80	370
Copper	7	4	11	8	8	8	12	10	4	1	2	5	65	270
Zinc	63	63	181	65	80	65	127	133	67	47	51	63	200	410
Lead	18	16	70	20	28	19	44	56	31	11	15	20	50	220

All units mg/kg dry weight **Bold** - exceeds the ANZECC Sediment Guidelines

Values taken from Table 3.5.1

A Exceeds ISQG-High

⁻ No Data

¹ ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.



Photograph 1: Cell B immediately downstream of Coffer Dam 1 prior to the commencement of excavation.



Photograph 2: Looking upstream towards Coffer Dam 1 during excavation.



Photograph 3: The stream bed following the excavation of the contaminated material.



Photograph 4: The stream bed following the excavation of the contaminated material.





Photograph 5: Looking downstream towards the rail bridge. The gas main can be seen immediately downstream of the bridge.



Photograph 6: Looking downstream towards Coffer Dam 2. Photograph taken from on top of the rail bridge, the gas main can be seen in the foreground.



Cell C/D

The excavation of Cell C began on 7 December 2009. It was decided that coffer dam 3 (which was part of the original design) would be removed, and cells C and D would be treated as one cell (see **Figure 6-1**). The location of coffer dam 4 was also moved approximately 15 m upstream from the original design location.

Prior to the excavation of contaminated material commencing, changes to the excavation methodology were discussed and implemented. In previous cells, excavator movements within the streambed, coupled with excess water, caused a considerable amount of the underlying clean sediment to be mixed with the contaminated material, thus increasing the volume of material removed to landfill.

Therefore, for this and all remaining cells, a long reach excavator was used to remove the 'ooze' from the streambed to the load out point(s). In addition, longitudinal and lateral drainage channels were excavated in the ooze to allow the drainage of latent water and groundwater to the dewatering pumps.

Excavation of the bulk of the contaminated material was completed before the Christmas/New Year shut down period. The stream bed was spot-checked using the XRF and then coffer dam 4 was lowered, and normal stream flow resumed, in accordance with the agreed Flood Contingency Plan. Coffer dam 4 was raised and the cell dewatered again after the Christmas/New Year period. Some further excavation of contaminated material was undertaken and the cell validated.

Highly Contaminated 'Type D' Material

During the planning and design stage of the project it had been established that the sediment in the section approximately between chainages 1105 and 960 contained concentrations of lead, zinc, copper and chromium that were significantly higher than elsewhere in the stream. This area of highly contaminated material was classified as 'Type D' material for the landfill. With the re-positioning of the coffer dams, this material was contained in Cell D, and the upstream part of Cell E.

6.2 Works

A summary of the works carried out in Cell be is presented in Table 6-1.

Table 6-1 Cell C/D - Summary of works

Date 'ooze' excavation commenced	7 December 2009							
Top/bottom of cell	Top: coffer dam 2; Bottom: coffer dam 4							
Length of cell	196 m							
Weather conditions during excavation	Rainfall over the weekend of 12 and 13 December 2009 caused the cell to flood.							
Truckloads of 'ooze' removed (approximate)	556							
Volume of 'ooze' removed	4037 m³ [Note: Volume provided to URS by BPC Ltd. Does not include material removed from 'seams' – see Section 3.1]							
Number of validation transects/samples	10 transects, 30 samples							
Civil works carried out in the cell following remediation	Widening and deepening of stream channelFitting of wing walls to service outfalls							



6 Cell C/D

Locations of remaining contaminated material (see Figure 6-1) Note: TRB = true right bank; TLB = true left bank	 A seam of contaminated material remained in both the TRB and TLB following the completion of the widening and deepening works. This seam was scalloped out and replaced with clean material where practicable. Some contaminated material may remain behind the overlying capping layer.
Areas not validated	None
Date validation complete	15 January 2010
Other notes/considerations	 'Ooze' removal took place in December 2009 and January 2010. Over the Christmas/New Year period. Coffer dam 4 was lowered in accordance with the 'Waiwhetu Stream Flood Contingency Plan', and the cell was flooded.
	 The material excavated from cell D was classified as 'type D' material.

6.3 XRF and Laboratory Analysis

The validation sample results for Cell C/D are presented in **Table 6-2**, and a sample location plan is presented in **Figure 6-1**. All validation samples were screened with the portable XRF prior to being sent to the laboratory.

All validation results were below ISQG-High criteria and therefore comply with condition 21 of Resource Consent No: WGN090127 [27265].

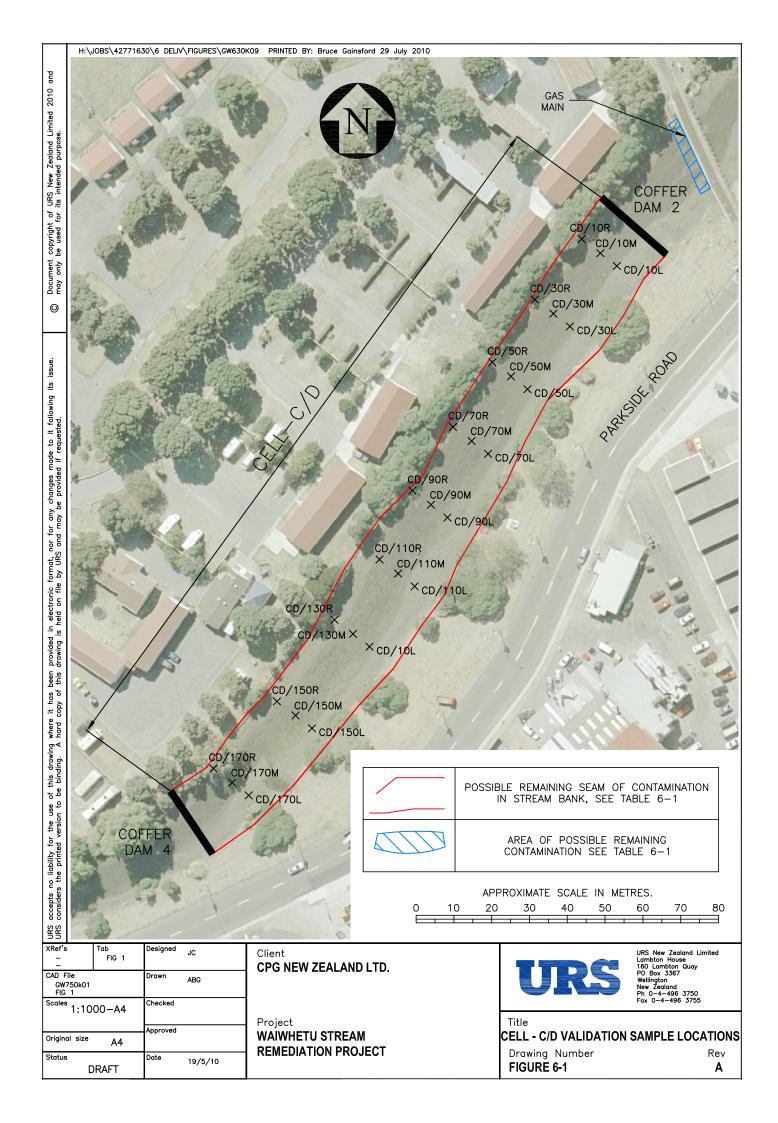




Table 6-2: Cell C/D Validation Sediment Sample Analytical Results Compared to ANZECC Sediment Quality Guidelines

					Validation Samp	le Details and Ar	nalytical Results				
URS Sample Reference	CD/10R	CD/10M	CD/10L	CD/30R	CD/30M	CD/30L	CD/50R	CD/50M	CD/50L	ANZECC Sec	liment Quality
Laboratory Sample Reference	SA13074-C	SA13074-C	SA13074-C	SA13074-C	SA13074-C	SA13074-C	SA13074-D	SA13074-D	SA13074-D	Guide	elines ¹
Date Sampled	13-Jan-10	13-Jan-10	13-Jan-10	13-Jan-10	13-Jan-10	13-Jan-10	14-Jan-10	14-Jan-10	14-Jan-10		
Sample Location	10m transect, true right rank	10m transect, middle of stream bed	10m transect, true left bank	30m transect, true right rank	30m transect, middle of stream bed	30m transect, true left bank	50m transect, true right rank	50m transect, middle of stream bed	50m transect, true left bank	ISQG-Low	ISQG-High
Chromium	34	34	29	35	36	37	28	33	32	80	370
Copper	6	3	1	4	2	2	1	1	<1	65	270
Zinc	95	51	49	62	50	55	45	56	45	200	410
Lead	44	16	16	28	14	18	13	20	11	50	220

					Validation Samp	le Details and A	nalytical Results				
URS Sample Reference	CD/70R	CD/70M	CD/70L	CD/90R	CD/90M	CD/90L	CD/110R	CD/110M	CD/110L	ANZECC Sec	liment Quality
Laboratory Sample Reference	SA13074-D	SA13074-D	SA13074-D	SA13074-E	SA13074-E	SA13074-E	SA13074-E	SA13074-E	SA13074-E	Guide	elines ^l
Date Sampled	14-Jan-10	14-Jan-10	14-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10		
Sample Location	70m transect, true right rank	70m transect, middle of stream bed	70m transect, true left bank	90m transect, true right rank	90m transect, middle of stream bed	90m transect, true left bank	110m transect, true right rank	110m transect, middle of stream bed	110m transect, true left bank	ISQG-Low	ISQG-High
Chromium	25	26	24	29	35	32	28	33	27	80	370
Copper	<1	<1	1	<1	1	1	1	1	1	65	270
Zinc	43	47	44	46	51	48	47	49	47	200	410
Lead	12	14	17	13	14	13	14	13	17	50	220

		-	CD/130M CD/130L CD/150R CD/150M CD/150L CD/170R CD/170M CD/170L CD/170L CD/190M CD/190M CD/190L ANZECC Sediment Quality SA13074-E SA13074-E SA13074-E SA13074-E SA13074-E SA13074-F SA														
URS Sample Reference	CD/130R	CD/130M	CD/130L	CD/150R	CD/150M	CD/150L	CD/170R	CD/170M	CD/170L	CD/190R	CD/190M	CD/190L	ANZECC Se	diment Quality			
Laboratory Sample Reference	SA13074-E	SA13074-E	SA13074-E	SA13074-E	SA13074-E	SA13074-E	SA13074-F	SA13074-F	SA13074-F	SA13074-F	SA13074-F	SA13074-F	Guid	lelines ¹			
Date Sampled	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10	15-Jan-10					
Sample Location	130m transect, true right rank	130m transect, middle of stream bed		150m transect, true right rank	150m transect, middle of stream bed	150m transect, true left bank	·	170m transect, middle of stream bed	170m transect, true left bank	190m transect, true right rank	190m transect, middle of stream bed	190m transect, true left bank	ISQG-Low	ISQG-High			
Chromium	36	35	33	27	29	34	31	26	26	28	31	28	80	370			
Copper	4	2	3	2	2	3	1	1	1	<1	2	1	65	270			
Zinc	56	56	54	62	47	59	59	52	46	49	66	48	200	410			
Lead	17	15	16	69	12	18	100	75	21	17	176	16	50	220			

All units mg/kg dry weight **Bold** - exceeds the ANZECC Sediment Guidelines

Values taken from Table 3.5.1

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\Results tables\Cell C and D\Waiwhetu Stream Remediation Project - Cell C & D Validation samples.xls

¹ ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.



Photograph 1: Cell C during the early stages of excavation. Coffer dam 3 (in background) was removed during the works.



Photograph 2: Cell C during the early stages of excavation. A long-reach excavator was used for Cell C/D and all downstream cells.





Photograph 3: Looking upstream towards coffer dam 2 following excavation.



Photograph 4: Looking upstream towards coffer dam 2 following excavation.



Photograph 5: Cell D during excavation.



Photograph 6: Cell C/D following excavation.



Cell E

The excavation of Cell E began on 21 January 2010. Due to the re-positioning of coffer dam 4 (described in Section 6), the material excavated within 15 m downstream of coffer dam 4 was classified as 'Type D' material, and was handled accordingly by the landfill. The remainder of the material in Cell E was classified as 'Type B' by Silverstream Landfill.

7.1 Works

A summary of the works carried out in Cell E is presented in **Table 7-1**.

Table 7-1 Cell E - Summary or works

Date 'ooze' excavation commenced	21 January 2010
Top/bottom of cell	Top: coffer dam 4; bottom: coffer dam 5.
Length of cell	210 m
Weather conditions during excavation	No significant rainfall events
Truckloads of 'ooze' removed (approximate)	451
Volume of 'ooze' removed	2980 m³ [Note: Volume provided to URS by BPC Ltd. Does not include material removed from 'seams' – see Section 3.1]
Number of validation transects/samples	10 transects, 24 samples
Flood protection and civil works in cell	 Reno mattresses, massbloc wall and rock rip-rap around Hutt Park Bridge Widening and deepening of stream channel Fitting of wing walls to service outfalls
Locations of remaining contaminated material (see Figure 7-1) Note: TRB = true right bank; TLB = true left bank	 A seam of contaminated material remained in both the TRB and TLB following the completion of the widening and deepening works. This seam was scalloped out and replaced with clean material where practicable. Some contaminated material may remain behind the overlying capping layer. E/70 and E/90 transects (see below).
Areas not validated (see Fig 7-1)	E/70 and E/90 transects were not validated at CPG instruction as this section (beneath the Hutt Park Bridge) was to be covered with reno mattresses. Visual inspection and XRF spot check only.
Date validation complete	4 February 2010
Other notes/considerations	The material removed from within 15 m (approximately) of coffer dam 4 was classified as 'type D' material. The remainder was 'type B'.

7.2 XRF and Laboratory Analysis

The validation sample results for Cell E are presented in **Table 7-2** and a sample location plan is presented in **Figure 7-1**. All validation samples were screened with the portable XRF prior to being sent to the laboratory.

All validation results were below ISQG-High criteria and therefore comply with condition 21 of Resource Consent No: WGN090127 [27265].



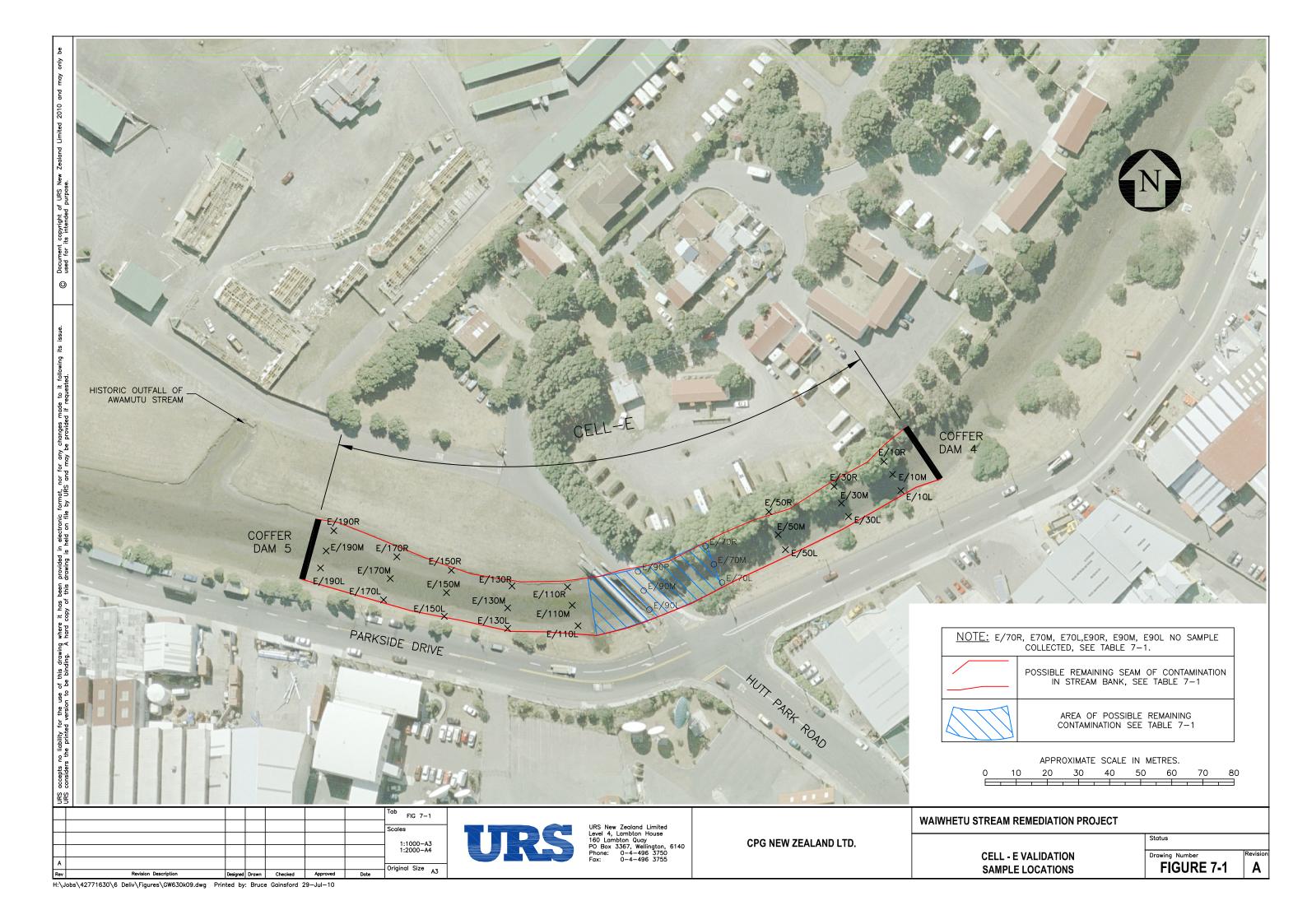




Table 7-2: Cell E Validation Sediment Sample Analytical Results Compared to ANZECC Sediment Quality Guidelines

					Validation Samp	le Details and A	nalytical Results				
URS Sample Reference	E/10R	E/10M	E/10L	E/30R	E/30M	E/30L	E/50R	E/50M	E/50L	ANZECC Sec	liment Quality
Laboratory Sample Reference	SA13074-I	SA13074-I	SA13074-I	SA13074-I	SA13074-I	SA13074-I	SA13074-I	SA13074-I	SA13074-I	Guide	elines ¹
Date Sampled	28-Jan-10	28-Jan-10	28-Jan-10	28-Jan-10	28-Jan-10	28-Jan-10	28-Jan-10	28-Jan-10	28-Jan-10		
Sample Location	10m transect, true right bank	10m transect, middle of stream bed	10m transect, true left bank	30m transect, true right bank	30m transect, middle of stream bed	30m transect, true left bank	50m transect, true right bank	50m transect, middle of stream bed	50m transect, true left bank	ISQG-Low	ISQG-High
Chromium	31	32	32	31	30	31	36	35	29	80	370
Copper	1	4	22	<1	1	2	1	2	2	65	270
Zinc	51	69	70	52	59	50	52	55	52	200	410
Lead	13	142	200	21	22	15	13	13	13	50	220

		Validation Sample Details and Analytical Results OR E/70M E/70L E/90R E/90M E/90L E/110R E/110M E/110L ANZECC Sediment Not validated as per CPG instruction. This area is to be covered with reno matresses. SA13118-A SA13118-A SA13118-A 3-Feb-10 3-Feb-10 3-Feb-10												
URS Sample Reference	E/70R	E/70M	E/70L	E/90R	E/90M	E/90L	E/110R	E/110M	E/110L	ANZECC Sec	diment Quality			
Laboratory Sample Reference	Nota	alidatad as par CD	OG instruction. Th	is area is to be see	varad with rang ma	trassas	SA13118-A	SA13118-A	SA13118-A	Guide	elines ¹			
Date Sampled	Not v	andated as per Cr	o instruction. Th	is area is to be co-	vered with reno ma	1165565.	3-Feb-10	3-Feb-10	3-Feb-10					
Sample Location	70m transect, true right bank	70m transect, middle of stream bed	70m transect, true left bank	90m transect, true right bank	90m transect, middle of stream bed	90m transect, true left bank	110m transect, true right bank	110m transect, middle of stream bed	110m transect, true left bank	ISQG-Low	ISQG-High			
Chromium Copper Zinc Lead	Not v	alidated as per CP	G instruction. Th	is area is to be co	vered with reno ma	tresses.	38 5 90 65	42 8 73 28	31 2 54 14	80 65 200 50	370 270 410 220			

						Valida	tion Sample Deta	ils and Analytica	al Results					
URS Sample Reference	E/130R	E/130M	E/130L	E/150R	E/150M	E/150L	E/170M	E/170L	E/170R	E/190M	E/190L	E/190R	ANZECC Se	ediment Quality
Laboratory Sample Reference	SA13118-A	SA13118-A	SA13118-A	SA13118-A	SA13118-A	SA13118-A	SA13118-A	SA13118-A	SA13118-B	SA13118-A	SA13118-A	SA13118-B	Guio	delines ^l
Date Sampled	3-Feb-10	3-Feb-10	3-Feb-10	3-Feb-10	3-Feb-10	3-Feb-10	3-Feb-10	3-Feb-10	4-Feb-10	3-Feb-10	3-Feb-10	4-Feb-10		
Sample Location	130m transect, true right bank	130m transect, middle of stream bed	130m transect, true left bank	150m transect, true right bank	150m transect, middle of stream bed	150m transect, true left bank	170m transect, middle of stream bed		170m transect, true right bank	190m transect, middle of stream bed		190m transect, true right bank	ISQG-Low	ISQG-High
Chromium	34	37	34	32	29	32	30	29	31	34	36	36	80	370
Copper	2	5	2	2	3	3	5	2	1	2	3	7	65	270
Zinc	54	62	54	49	47	52	62	53	49	106	150	186	200	410
Lead	14	23	15	14	13	14	20	15	13	39	15	91	50	220

All units mg/kg dry weight

Bold - exceeds the ANZECC Sediment Guidelines

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1

⁻ No Dat



Photograph 1: Looking upstream towards coffer dam 4. Photograph taken from Hutt Park Bridge.



Photograph 2: Cell E during excavation, looking downstream towards coffer dam 5.



Photograph 3: Cell E at coffer dam 5 during excavation.



Photograph 4: Looking upstream during excavation.





Photograph 5: Looking downstream towards coffer dam 5 following excavation.



Photograph 6: Looking upstream following excavation.





Photograph 7: Looking upstream towards coffer dam 4. Photograph taken from Hutt Park Bridge following excavation and installation of erosion and scour protection.



Photograph 8: Looking downstream towards Hutt Park Bridge, following excavation and installation of erosion and scour protection.



Cell F/G

Excavation works began on 17 February 2010. Coffer dam 6 (which was part of the original design) was removed to make cells F and G one cell.

The historical outfall of the Awamutu Stream (now a stormwater outfall) joins the stream on the true right bank at approximately chainage 770 (see **Figure 8-1**). The outfall was excavated as per the rest of the cell up to the edge of Hutt Park Road.

8.1 Works

A summary of the works carried out in Cell F/G is presented in Table 8-1.

Table 8-1 Cell F/G - Summary of works

Date 'ooze' excavation commenced	17 February 2010
Top/bottom of cell	Top: coffer dam 5; Bottom: coffer dam 7
Length of cell	290 m
Weather conditions during excavation	Severe southerly storm on 12 March 2010. Cells did not flood.
Truckloads of 'ooze' removed (approximate)	814
Volume of 'ooze' removed	6558 m³ [Note: Volume provided to URS by BPC Ltd. Does not include material removed from 'seams' – see Section 3.1]
Number of validation transects/samples	14 transects, 42 samples
	Deconstruction of the Hutt Park footbridge and realignment of attached water main at approximately chainage 695
Flood protection and civil works in cell	Realignment of sewer crossing at approximately chainage 550
	Widening and deepening of stream channel
	Fitting of wing walls to service outfalls
Locations of remaining contaminated material (see	 A seam of contaminated material remained in both the TRB and TLB following the completion of the widening and deepening works. This seam was scalloped out and replaced with clean material where practicable. Some contaminated material may remain behind the overlying capping layer.
Figure 8-1) Note: TRB = true right bank; TLB = true left bank	The historical Awamutu Stream outfall was visually inspected and spot-checked with the XRF, however as it did not fall on a validation transect, no validation samples were collected. No inspection of the box culvert running beneath Hutt Park Road was carried out following the removal of contaminated material by JetVac due to safety reasons.
Areas not validated	None
Date validation complete	18 March 2010
Other notes/considerations	The remedial excavation in Cell F/G extended below the final design profile. The cell was excavated and validated, and then backfilled to profile using the bank material that would otherwise be removed during the widening and deepening works.
	 JetVac were engaged to remove the contaminated material from the box culvert running beneath Hutt Park Road using a vacuum truck.



8 Cell F/G

8.2 XRF and Laboratory Analysis

The validation sample results for Cell F/G are presented in **Table 8-2** and a sample location plan is presented in **Figure 8-1**. All validation samples were screened with the portable XRF prior to being sent to the laboratory.

All validation results were below ISQG-High criteria and therefore comply with condition 21 of Resource Consent No: WGN090127 [27265].



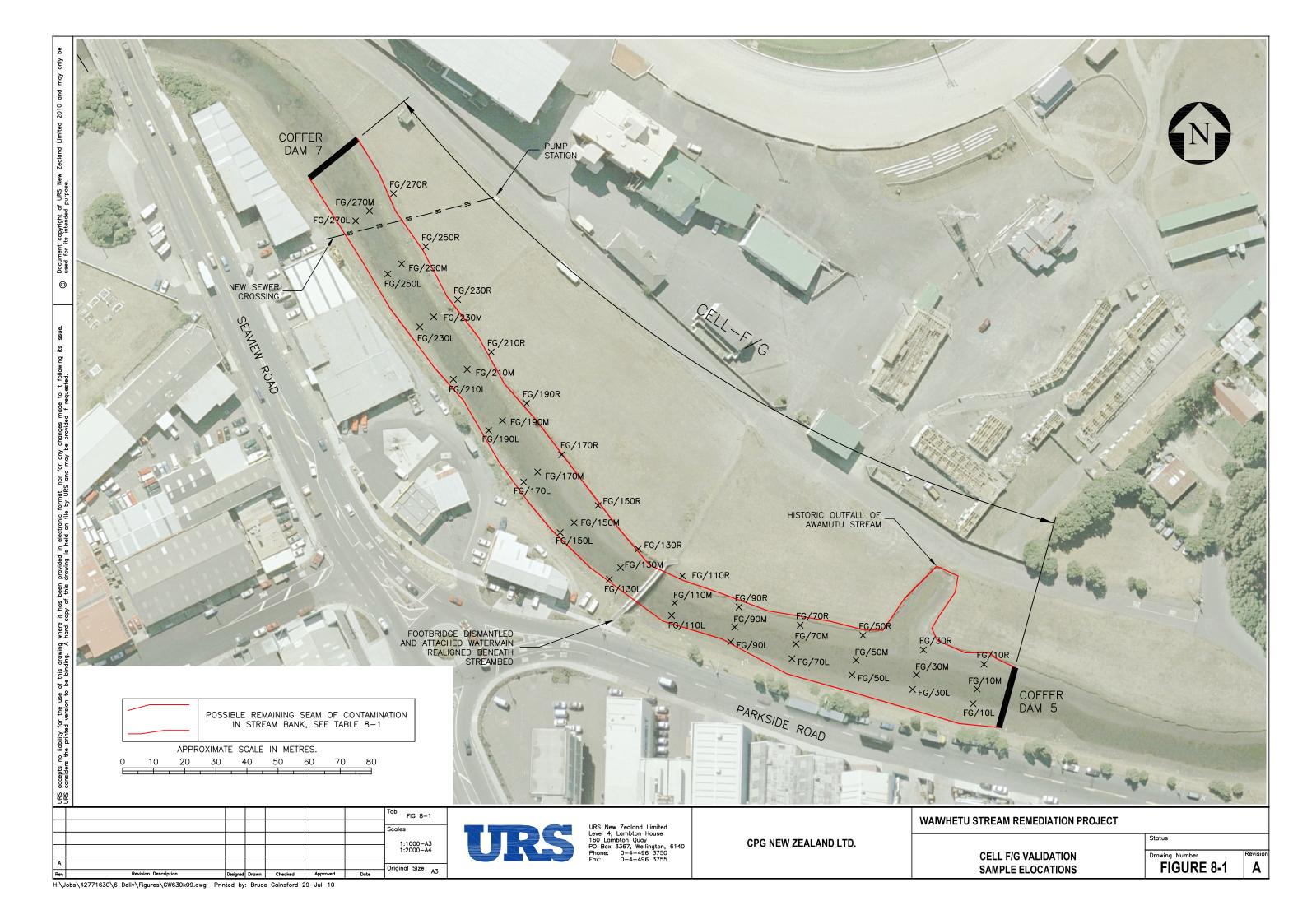




Table 8-2: Cell F/G Validation Sediment Sample Analytical Results Compared to ANZECC Sediment Quality Guidelines

		ı	1	1	1	1	,	Validation Samp	le Details and A	nalytical Results	ı	Ī	1		ſ		
URS Sample Reference	FG/10R	FG/10M	FG/10L	FG/30R	FG/30M	FG/30L	FG/50R	FG/50M	FG/50L	FG/70R	FG/70M	FG/70L	FG/90R	FG/90M	FG/90L	ANZECC Se	diment Quality
Laboratory Sample Reference	SA13206-D	SA13206-A	SA13206-A	SA13206-D	SA13206-A	SA13206-A	SA13206-A	SA13206-A	SA13206-A	SA13206-B	SA13206-B	SA13206-B	SA13206-B	SA13206-B	SA13206-B	Guid	elines ¹
Date Sampled	11-Mar-10	10-Mar-10	10-Mar-10	11-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10		
Sample Location	10m transect, true right bank	10m transect, middle of stream bed	10m transect, true left bank	30m transect, true right bank	30m transect, middle of stream bed	30m transect, true left bank	50m transect, true right bank	50m transect, middle of stream bed	50m transect, true left bank	70m transect, true right bank	70m transect, middle of stream bed	70m transect, true left bank	90m transect, true right bank	90m transect, middle of stream bed	90m transect, true left bank	ISQG-Low	ISQG-High
Chromium	33	36	32	34	32	33	33	34	37	39	35	32	38	36	33	80	370
Copper	3	1	4	2	3	2	2	1	3	4	3	2	5	3	3	65	270
Zinc	48	54	106	84	85	51	50	48	82	122	74	51	87	65	51	200	410
Lead	14	13	15	34	18	19	14	12	39	72	30	14	46	24	13	50	220

							•	Validation Samp	le Details and A	nalytical Results							
URS Sample Reference	FG/110R	FG/110M	FG/110L	FG/130R	FG/130M	FG/130L	FG/150R	FG/150M	FG/150L	FG/170R	FG/170M	FG/170L	FG/190R	FG/190M	FG/190L	ANZECC Se	diment Quality
Laboratory Sample Reference	SA13206-B	SA13206-B	SA13206-B	SA13206-F	SA13206-F	SA13206-F	SA13206-C	SA13206-C	SA13206-C	SA13206-C	SA13206-C	SA13206-C	SA13206-C	SA13206-C	SA13206-C	Guid	elines ¹
Date Sampled	10-Mar-10	10-Mar-10	10-Mar-10	16-Mar-10	16-Mar-10	16-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10	10-Mar-10		
Sample Location	110m transect, true right bank	110m transect, middle of stream bed	110m transect,	130m transect, true right bank	130m transect, middle of stream bed	130m transect, true left bank	150m transect, true right bank	150m transect, middle of stream bed	150m transect,	170m transect, true right bank	170m transect, middle of stream bed	170m transect, true left bank	190m transect, true right bank	190m transect, middle of stream bed	190m transect, true left bank	ISQG-Low	ISQG-High
Chromium	38	32	35	34	38	36	43	41	33	37	35	44	54	36	39	80	370
Copper	3	1	2	1	2	6	6	6	3	5	3	10	14	3	1	65	270
Zinc	65	58	60	55	53	95	110	82	51	79	76	130	183	55	57	200	410
Lead	27	25	16	17	16	46	63	37	11	34	38	49	116	17	16	50	220

		FG/210M FG/210L FG/230R FG/230M FG/230L FG/250R FG/250M FG/250L FG/250L FG/270R FG/270M FG/270L ANZECC Sediment Quality FS/40T FS/40T														
URS Sample Reference	FG/210R	FG/210M	FG/210L	FG/230R	FG/230M	FG/230L	FG/250R	FG/250M	FG/250L	FG/270R	FG/270M	FG/270L	ANZECC Sec	diment Quality		
Laboratory Sample Reference	15-Mar-10	15-Mar-10	15-Mar-10	15-Mar-10	15-Mar-10	15-Mar-10	15-Mar-10	15-Mar-10	15-Mar-10	16-Mar-10	16-Mar-10	16-Mar-10	Guid	elines ¹		
Date Sampled S	SA13206-E	SA13206-E	SA13206-E	SA13206-E	SA13206-E	SA13206-E	SA13206-E	SA13206-E	SA13206-E	SA13206-F	SA13206-F	SA13206-F				
Sample Location	10m transect, rue right bank	210m transect, middle of stream bed		230m transect, true right bank	230m transect, middle of stream bed	230m transect, true left bank	250m transect, true right bank	250m transect, middle of stream bed	,	270m transect, true right bank	270m transect, middle of stream bed	270m transect, true left bank	ISQG-Low	ISQG-High		
Chromium	40	37	43	36	36	43	31	43	43	43	39	47	80	370		
Copper	9	4	8	2	3	7	2	10	6	6	9	11	65	270		
Zinc	88	75	144	53	64	129	54	131	124	129	130	203	200	410		
Lead	167	33	85	14	23	82	16	86	89	98	102	153	50	220		

All units mg/kg dry weight **Bold** - exceeds the ANZECC Sediment Guidelines

- No Data

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000. Values taken from Table 3.5.1



Photograph 1: View looking downstream towards coffer dam 7 during the removal of contaminated material.



Photograph 2: View looking upstream towards the Hutt Park footbridge that was dismantled during excavation works in this cell.





Photograph 3: View looking downstream towards the Hutt Park footbridge that was dismantled during excavation works in this cell.



Photograph 4: View looking downstream towards coffer dam 7 following the removal of the contaminated material.





Photograph 5: View looking upstream towards coffer dam 6 following the removal of the contaminated material.



Cell H

Cell H began at coffer dam 7 and included the stream channel and the salt marsh down to coffer dam 8 at approximately chainage 364 (see **Figure 9-1**). This configuration differed to the original design due to the discovery of contaminated material downstream in the U-Channel. This is discussed further in Section 10.

9.1 Works

The excavation of Cell H began at coffer dam 7 on 22 March 2010, and progressed downstream towards Seaview Road Bridge and coffer dam 8.

The Awamutu Stream discharged into Cell H, immediately upstream of Seaview Road Bridge. Additional dewatering pumps were used to mitigate the increase in base flow into the cell, particularly during rain events.

A summary of the works carried out in Cell H is presented in Table 9-1

Table 9-1 Cell H - Summary of works

Date 'ooze' excavation commenced	22 March 2010							
Top/bottom of cell	Top: coffer dam 7; bottom: coffer dam 8 (subsequently removed after installation of coffer dam 9)							
Length of cell	161 m							
Weather conditions during excavation	Heavy rain on 24 March caused the cell to flood.							
Truckloads of 'ooze' removed (approximate)	642							
Volume of 'ooze' removed	4862 m³ [Note: Volume provided to URS by BPC Ltd. Does not include material removed from 'seams' – see Section 3.1]							
Number of validation transects/samples	8 transects, 28 samples							
	Realignment of sewer crossing at approximately chainage 470							
	 Reno mattresses on approach to and surrounding Seaview Road Bridge 							
Flood protection and civil works in cell	 Reno mattresses on top of trunk main sewer at approximately chainage 430 							
	 CFA piling and panel placement along TRB 							
	 Widening and deepening of stream channel 							
	Re-instatement of salt marsh							



9 Cell H

Locations of remaining contaminated material (see Figure 9-1) Note: TRB = true right bank; TLB = true left bank	 Upstream of Seaview Road Bridge, A seam of contaminated material remained in both the TRB and TLB following the completion of the widening and deepening works. This seam was scalloped out and replaced with clean material where practicable. Some contaminated material may remain behind the overlying capping layer. No visual inspection of the TRB downstream of Seaview Road Bridge was possible as a CFA pile wall and concrete panels were installed. This has the effect of containing any remaining contamination. It is likely that contaminated material remains beneath the boardwalk on the edge of the salt marsh, beyond the extent of excavation (see Section 9.3). It was not practical to excavate further, as doing so would undermine the gardens and Urupa carpark.
Areas not validated	None
Date validation complete	26 April 2010
Other notes/considerations	 The Awamutu Stream discharged into Cell H, immediately upstream of the Seaview Road Bridge. Additional dewatering pumps were used to mitigate the increase in base flow into the cell, particularly during rain events. The remedial excavation in Cell H downstream of Seaview Road Bridge extended below the final design profile in places. The cell was excavated and validated, and then backfilled to profile using imported Hutt River gravels.

9.2 Trunk main sewer

One of the high risk areas of the project was working around the trunk main sewer crossing located immediately downstream of the Seaview Road bridge, at approximately chainage 420. The sewer crossing, encased in concrete, was constructed in 1959. Its condition was unknown. Prior to works commencing in the vicinity of the sewer crossing, a contingency plan was developed by the Engineer to define a clear methodology for working around the sewer crossing, and a clear procedure for managing any incidents that may occur.

9.3 Salt Marsh

The salt marsh, located adjacent to the Urupa on the true left hand side of the stream between the Seaview Road Bridge and approximately chainage 300, was incorporated into cells H and M, and was excavated concurrently with the stream channel.

The extent of the contaminated material in the salt marsh was not accurately known prior to works commencing. GWRC consulted with lwi during the works, and the preference was for all contaminated material to be removed from the salt marsh, and then for it to be rebuilt to its original profile.

The salt marsh was excavated up to an agreed extent behind the boardwalk, and filter cloth material was placed on the cut face to provide a marker of the extent of the excavation. The salt marsh was

9 Cell H

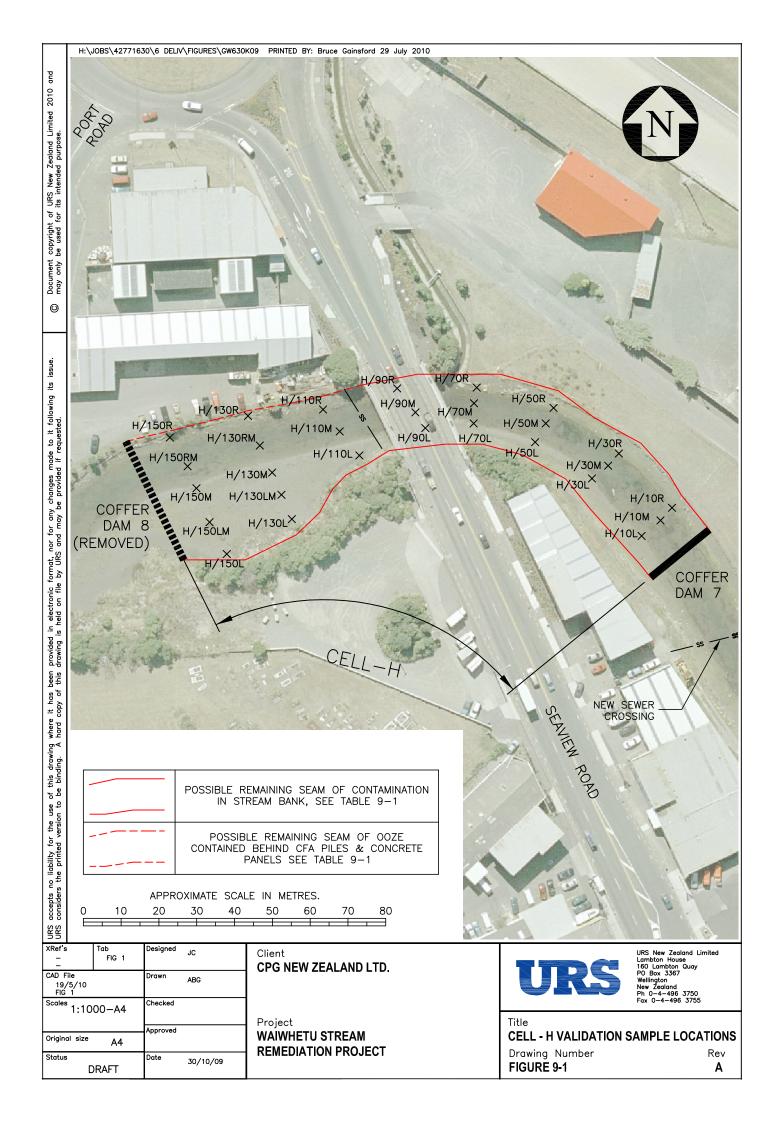
rebuilt in layers using imported angular gravels as a base, with river gravels on top. All material was screened with the portable XRF prior to placement.

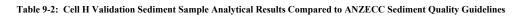
9.4 XRF and Laboratory Analysis

The validation sample results for Cell H are presented in **Table 9-2** and a sample location plan is presented in **Figure 9-1**. All validation samples were screened with the portable XRF prior to being sent to the laboratory.

All validation results were below ISQG-High criteria and therefore comply with condition 21 of Resource Consent No: WGN090127 [27265].









	Validation Sample Details and Analytical Results																
URS Sample Reference	H/10R	H/10M	H/10L	H/30R	H/30M	H/30L	H/50R	H/50M	H/50L	H/70R	H/70M	H/70L	H/90R	H/90M	H/90L	ANZECC Se	diment Quality
Laboratory Sample Reference	SA13287-A	SA13287-A	SA13287-A	SA13287-A	SA13287-A	SA13287-A	SA13287-A	SA13287-A	SA13287-A	SA13287-E	SA13287-E	SA13287-E	SA13287-E	SA13287-E	SA13287-E	Guidelines ¹	
Date Sampled	8-Apr-10	8-Apr-10	8-Apr-10	8-Apr-10	8-Apr-10	8-Apr-10	8-Apr-10	8-Apr-10	8-Apr-10	19-Apr-10	19-Apr-10	19-Apr-10	19-Apr-10	19-Apr-10	19-Apr-10		
Sample Location	10m transect, true right bank	10m transect, middle of stream bed	10m transect, true left bank	30m transect, true right bank	30m transect, middle of stream bed	30m transect, true left bank	50m transect, true right bank	50m transect, middle of stream bed	50m transect, true left bank	70m transect, true right bank	70m transect, middle of stream bed	70m transect, true left bank	90m transect, true right bank	90m transect, middle of stream bed	90m transect, true left bank	ISQG-Low	ISQG-High
Chromium	36	33	35	32	33	29	37	34	39	36	40	33	49	59	37	80	370
Copper	4	3	1	1	3	2	4	4	4	6	5	4	15	21	4	65	270
Zinc	93	57	48	51	53	49	71	57	94	83	78	82	219	223	86	200	410
Lead	33	18	13	13	15	13	31	17	37	39	41	35	160	182	51	50	220

		Validation Sample Details and Analytical Results													
URS Sample Reference	H/110R	H/110M	H/110L	H/130R	H/130MR	H/130M	H/130ML	H/130L	H/150R	H150MR	H/150M	H/150ML	H/150L	ANZECC Sec	diment Quality
Laboratory Sample Reference	SA13287-F	SA13287-F	SA13287-F	SA13287-F	SA13287-F	SA13287-F	SA13287-G	SA13287-G	SA13287-F	SA13287-F	SA13287-F	SA13287-F	SA13287-G	Guide	elines ¹
Date Sampled	22-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	26-Apr-10	26-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	26-Apr-10		
Sample Location	110m transect, true right bank	110m transect, middle of stream bed	110m transect, true left bank	130m transect, true right bank	130m transect, middle/true right of streambed	130m transect, middle of stream bed	130m transect, middle/true left of streambed	130m transect, true left bank	150m transect, true right bank	150m transect, middle/true right of streambed	150m transect, middle of stream bed	150m transect, middle/true left of streambed	150m transect, true left bank	ISQG-Low	ISQG-High
Chromium	33	36	34	30	36	30	31	30	36	35	31	28	29	80	370
Copper	2	3	2	2	5	1	3	2	16	5	4	0	3	65	270
Zinc	59	76	56	47	64	51	54	57	83	60	61	45	58	200	410
Lead	23	35	21	13	24	13	16	22	51	24	25	12	12	50	220

All units mg/kg dry weight **Bold** - exceeds the ANZECC Sediment Guidelines

A Exceeds ISQG-Low

B Exceeds ISQG-High

⁻ No Data

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000. Values taken from Table 3.5.1



Photograph 1: Cell H looking upstream towards coffer dam 7, prior to the removal of contaminated material.



Photograph 2: Cell H looking downstream towards Seaview Road Bridge, prior to the removal of contaminated material.



Photograph 3: Cell H looking downstream towards Seaview Road Bridge, following the removal of contaminated material.



Photograph 4: Cell H looking downstream towards Seaview Road Bridge, following the removal of contaminated material and during the installation of reno matresses.





Photograph 5: View looking upstream towards Seaview Road Bridge of the salt marsh in Cell H during the removal of contaminated material.

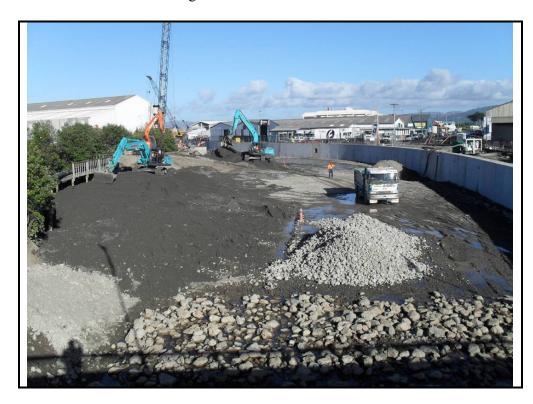


Photograph 6: Close-up view of the contaminated material excavated from the salt marsh.





Photograph 7: View looking upstream towards Seaview Road Bridge of the salt marsh in Cell H following the removal of contaminated material.



Photograph 8: View from Seaview Road Bridge looking downstream following the removal of contaminated material, and during the re-building of the salt marsh.





Photograph 9: View of the re-built salt marsh



Photograph 10: View looking upstream towards Seaview Road Bridge following the removal of contaminated material, and the rebuilding of the salt marsh.



Cell M

There was no Cell M in the original design of the remediation work, however streambed sampling carried out on 3 December 2009 between Port Road Bridge and the entry to the U-Channel showed that contaminated material was likely to be present between chainage 290 and chainage 200. It was therefore decided that another cell would be required to allow for excavation of this material.

Cell M therefore began at coffer dam 8 and included the stream channel, the salt marsh and the U-Channel down to coffer dam 9 (at chainage 200) (see **Figure 10-1**).

10.1 Works

The excavation of Cell M commenced at coffer dam 8 on 6 April 2010. Coffer dam 8 was removed during the early stages of excavation; however cells H and M would continue to be treated as separate cells.

A summary of the works carried out in Cell M is presented in **Table 10-1**.

Table 10-1 Cell M - Summary of works

Date 'ooze' excavation commenced	6 April 2010							
Top/bottom of cell	Top: coffer dam 8 (removed during the works), Bottom: coffer dam 9.							
Length of cell	164 m							
Weather conditions during excavation	Heavy rain on 27 April caused the cell to flood							
Truckloads of 'ooze' removed (approximate)	240							
Volume of 'ooze' removed	3768 m³ [Note: Volume provided to URS by BPC Ltd. Does not include material removed from 'seams' – see Section 3.1]							
Number of validation transects/samples	7 transects, 21 samples							
Flood protection and civil works in cell	 CFA piling and panel placement on both sides of the stream Re-instatement of Salt Marsh Realignment of sewer crossing at approximately chainage 280. 							
Locations of remaining contaminated material (see Figure 10-1) Note: TRB = true right bank; TLB = true left bank	 No visual inspection of the TRB, or the TLB downstream of the salt marsh was possible as a CFA pile wall and concrete panels have been installed. This has the effect of containing any remaining contamination. It is likely that contaminated material remains in the TLB on the edge of the salt marsh, beyond the extent of excavation (see Section 9.3). It was not practical to excavate further, as doing so would undermine the gardens and Urupa carpark. 							
Areas not validated (see Fig 10-1)	M/70R not validated as sample point was located on top of ch280 sewer crossing concrete slab							
Date validation complete	4 May 2010							
Other notes/considerations	The remedial excavation in Cell M extended below the final design profile in places. The cell was excavated and validated, and then backfilled to profile using imported Hutt River gravels.							



10 Cell M

10.2 XRF and Laboratory Analysis

The validation sample results for Cell M are presented in **Table 10-2** and a sample location plan is presented in **Figure 10-1**. All validation samples were screened with the portable XRF prior to being sent to the laboratory.

All validation results were below ISQG-High criteria and therefore comply with condition 21 of Resource Consent No: WGN090127 [27265].

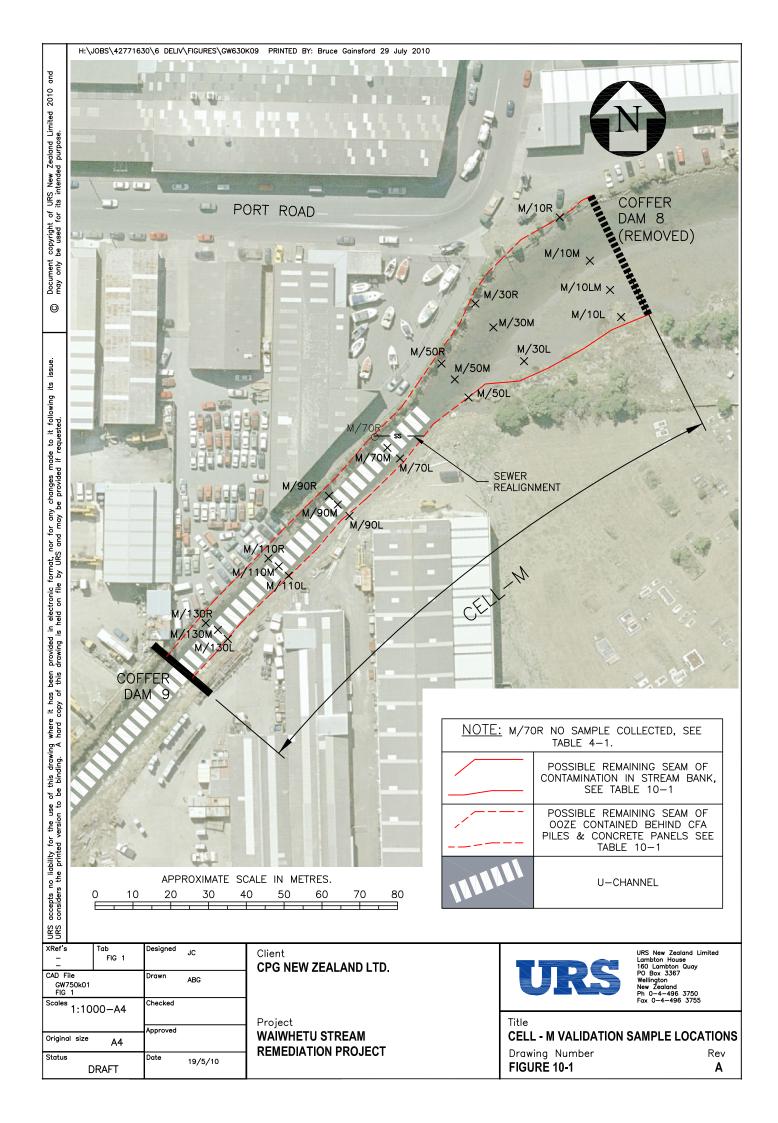




Table 10-2: Cell M Validation Sediment Sample Analytical Results Compared to ANZECC Sediment Quality Guidelines

	Validation Sample Details and Analytical Results													
URS Sample Reference	M/10R	M/10M	M/10ML	M/10L	M/30R	M/30M	M/30L	M/50R	M/50M	M/50L	ANZECC Sec	liment Quality		
Laboratory Sample Reference	SA13287-G	SA13287-G	SA13287-G	SA13347-A	SA13287-H	SA13287-H	SA13347-A	SA13287-H	SA13287-H	SA13287-H	Guide	elines ¹		
Date Sampled	26-Apr-10	26-Apr-10	26-Apr-10	3-May-10	30-Apr-10	30-Apr-10	3-May-10	30-Apr-10	30-Apr-10	30-Apr-10				
Sample Location	10m transect, true right rank	10m transect, middle of stream bed	10m transect, middle left of stream bed	10m transect, true left bank	30m transect, true right rank	30m transect, middle of stream bed	30m transect, true left bank	50m transect, true right rank	50m transect, middle of stream bed	50m transect, true left bank	ISQG-Low	ISQG-High		
Chromium	34	44	31	33	33	32	35	33	31	29	80	370		
Copper	34	12	3	4	4	3	6	2	1	2	65	270		
Zinc	48	136	72	70	58	58	76	50	55	48	200	410		
Lead	13	98	12	13	16	22	58	14	22	13	50	220		

	Validation Sample Details and Analytical Results													
URS Sample Reference	M/70R	M/70M	M/70L	M/90R	M/90M	M/90L	M/110R	M/110M	M/110L	M/130R	M/130M	M/130L	ANZECC Sec	liment Quality
Laboratory Sample Reference		SA13347-A	SA13347-A-2	SA13287-H	SA13287-H	SA13287-H	SA13287-F	SA13287-F	SA13287-F	SA13287-F	SA13287-F	SA13287-F	Guide	elines ¹
Date Sampled	1	3-May-10	4-May-10	30-Apr-10	30-Apr-10	30-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10	22-Apr-10		
Sample Location	Sampling point not accessible located on top of concrete slab on	middle of stream bed	70m transect, true left bank	90m transect, true right rank	90m transect, middle of stream bed	90m transect, true left bank	110m transect, true right rank	110m transect, middle of stream bed		130m transect, true right rank	130m transect, middle of stream bed		ISQG-Low	ISQG-High
Chromium	chainage 280	30	33	35	33	36	37	40	47	42	38	37	80	370
Copper	sewer crossing.	3	3	3	3	3	4	5	10	6	6	4	65	270
Zinc		60	61	56	55	64	56	65	77	59	59	58	200	410
Lead		79	25	18	15	23	18	26	41	19	18	18	50	220

All units mg/kg dry weight

Bold - exceeds the ANZECC Sediment Guidelines

- No Data

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1

A Exceeds ISQG-Low

B Exceeds ISQG-High



Photograph 1: Cell M immediately downstream of coffer dam 8 prior to the removal of contaminated material.



Photograph 2: Cell M (U-channel) looking downstream towards coffer dam 9 prior to the removal of contaminated material.





Photograph 3: Cell M looking upstream during the removal of contaminated material



Photograph 4: Cell M (U-channel) looking downstream towards coffer dam 9 following the removal of contaminated material.





Photograph 5: Cell M looking upstream following the removal of contaminated material and during the re-building of the stream bed level.



Photograph 6: Cell M (U-channel) looking downstream towards coffer dam 9 following the rebuilding of the salt marsh and the stream bed.



Water Sampling

11.1 Resource Consent Conditions

Condition 5 of resource consent WGN090127 [27267], sets out the minimum water sampling requirements which, in brief, are:

- There is to be a sampling point downstream of the active sedimentation cell.
- The downstream sampling point shall be no more than 150 m downstream from the most downstream coffer dam.
- Samples shall be collected within 24 hours of the first discharge occurring, then every third day while the discharge is occurring.
- Date, time, sampling method, tidal and weather conditions are to be recorded.
- Each sample shall be analysed for total and dissolved lead, zinc, copper, chromium, total suspended solids and pH.
- Specific electrical conductivity, turbidity, water temperature, water depth and an estimate of flow rate at the time of sampling are to be measured in the field at the time of sampling.
- The sampler will visually inspect the stream at the sampling point for any conspicuous oil, grease, film, scum, foam, floatable or suspended material, change in colour or visual clarity, biological growth, objectionable odour and erosion at the point of discharge.

11.2 Water Sampling Methodology

Sampling points were selected based on distance from the most downstream coffer dam, and accessibility.

Samples were collected from the flow of the stream using a telescopic sampling pole. The sample was collected directly into a 1L unpreserved sample bottle then decanted into two 100 mL acid preserved sample bottles. A summary of the bottles used and the relevant analyses is presented in **Table 11-1**.

Table 11-1 Water Sample Bottles and Analyses

Bottle type	Analysis
1 L unpreserved	Total suspended solids, pH
100 mL field filtered, acid preserved	Total dissolved Zn, Pb, Cr, Cu
100 mL acid preserved	Total recoverable Zn, Pb, Cr, Cu

Samples were collected prior to, and as near to, low tide as possible. If low tide did not fall within the hours of 7 am and 6 pm, or if the sampling day fell on a Sunday, the sample was collected the following day.

The samples were put on ice in chilly bins and couriered to R J Hill Laboratories (Hills), an IANZ-accredited laboratory in Hamilton, for analysis.

Hills' estimated method detection limits for water analysis of key contaminants (trace level) are 0.0005 g/m³ (chromium, copper), 0.0001 g/m³ (lead), and 0.001 g/m³ (zinc), which are sufficient to satisfy the consent conditions (i.e. ANZECC Water Quality Guidelines Table 3.4.1: Trigger Values For Freshwater (at 80% protection)).

Field measurements (e.g, conductivity, turbidity, temperature) were made at the same time the sample was collected using a Horiba U52-02 Multiparameter instrument. Water depth was visually assessed



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11 Water Sampling

in the field at the time of sampling, and the stream flow rate was recorded from GWRC's website (data from the flow meter at White's Line East.¹

Laboratory results were typically received after 10 working days, and were then compared with the freshwater toxicity trigger values (for the 80% level of species protection) as specified in condition 9 of the Resource Consent, and provided to the Engineer's representative. While not required by the resource consent, the laboratory results were also compared with the marine toxicity trigger values (for the 80% level of species protection) for information and comparison.

11.3 Water Sample Locations

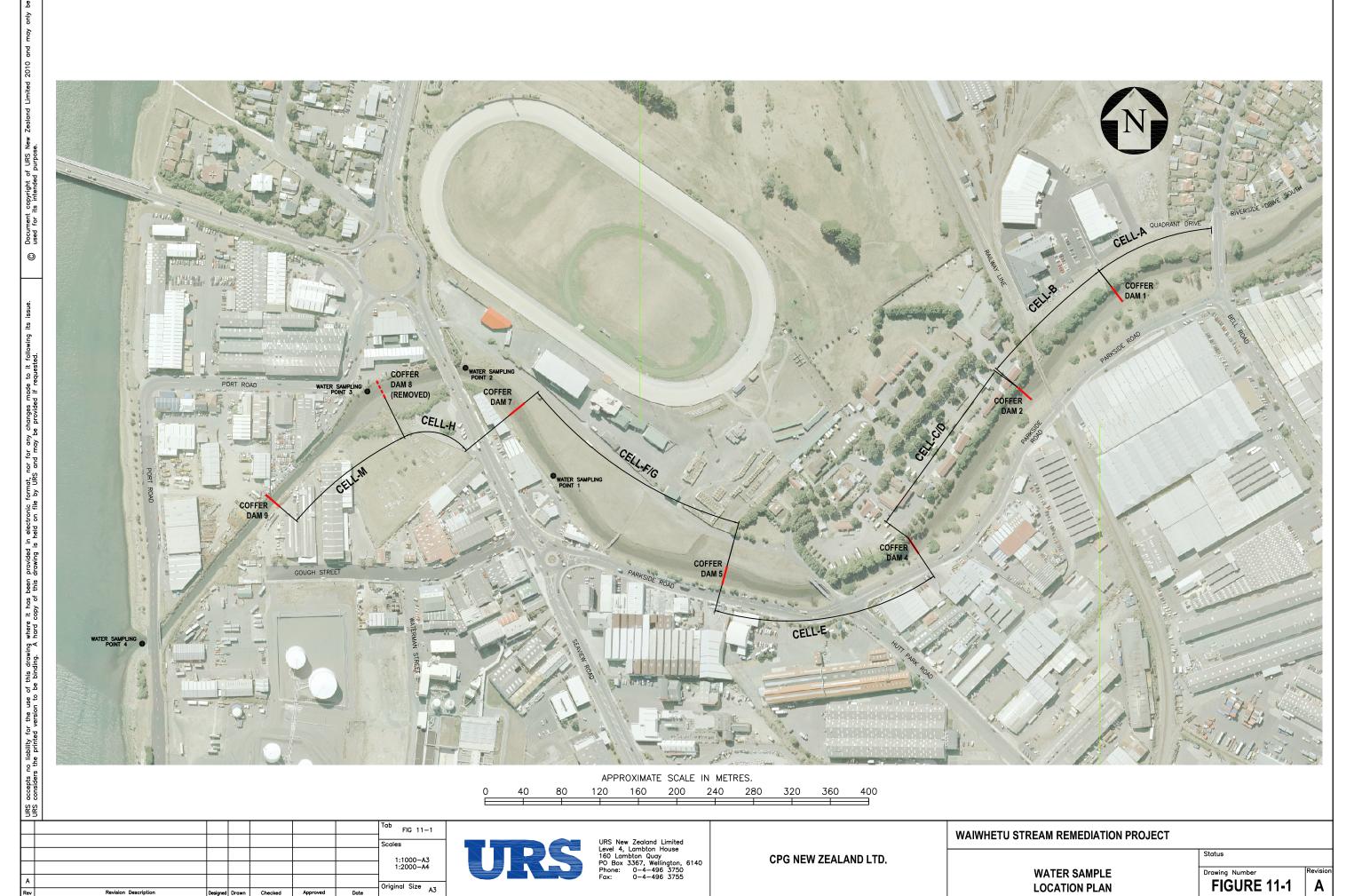
The four locations where water samples were collected during the works are summarised in **Table 11-2**, and are presented in **Figure 11-1**.

Table 11-2 Water Sample Locations

Sample Location	Location	Excavation of Cell(s)
1	Approx. 150 m downstream of coffer dam 5	A and B
2	Approx. 80 m downstream of coffer dam 6	C/D and E
3	Approx. 80 m downstream of coffer dam 7	F/G
4	Approx. 5 m downstream of Port Road Bridge.	H and M

The water sampling results are presented in **Table 11-3**.

¹ http://www.gw.govt.nz/waiwhetu-stream-at-whites-line-east





		Sample Details and Analytical Results							
Sample Date	3-Nov-09	6-Nov-09	9-Nov-09	12-Nov-09	16-Nov-09	19-Nov-09	24-Nov-09	27-Nov-09	ANZECC
Sample Location		S	ampling Poir	t 1: Approx 1:	50 m downstre	am of coffer da	am 5		ANZECC Freshwater /
URS Sample time (NZDT)	12:00	14:45	17:30	7:20	11:20	15:55	17:30	7:00	Marine
URS Sample Number	93270	93271	93272	93273	93274	93275	93276	93277	Guidelines ¹
Laboratory Sample Reference	740770.1	741840.1	742701.1	743756.1	744180.1	745506.1	747332.1	747635.1	Guidennes
рН	7.3	7.5	7.5	7.6	7.4	7.6	7.6	7.5	
Total									
Suspended Solids (g/m³)	180	52	51	11	220	92	160	12	-/-
Chromium	0.014	0.0041	< 0.0051	0.00062	0.0096	0.0039	0.0062	< 0.00051	-/-
Copper	0.024	0.0085	0.0059	0.0028	0.014	0.01	0.013	0.0031	-/-
Lead	0.17	0.058	0.077	0.016	0.12	0.05	0.061	0.014	-/-
Zinc	0.44	0.12	0.089	0.032	0.2	0.084	0.11	0.021	-/-
Dissolved									
Chromium	< 0.00050	< 0.00050	< 0.0010	< 00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	ID / 0.0906
Copper	0.0013	0.0011	0.016 ^A	0.0013	< 0.0010	0.0013	0.00096	< 0.0010	0.0025 / 0.008
Lead	0.0034	0.0059	0.0033	0.0011	0.0019	0.0047	0.0028	0.0014	0.0094 / 0.012
Zinc	0.0056	0.011	0.012	0.013	0.0048	0.011	0.0054	0.01	0.031 / 0.043
Field Parameters									
Temperature (°C)	17.9	20.5	14.38	10.3	16.24	20.4	20.71	15.9	-/-
Electrical Conductivity (µs/cm)	634	2431	2118	2169	2224	535	1336	2080	-/-
Turbidity (ntu)	270	76.4	53	15.1	342	134	270	17.6	-/-
Depth (mm)	500	500	500	300	500	500	500	500	-/-
Flow (L/sec)	225	179	180	180	154	150	131	122	-/-

		Sample Details and Analytical Results								
SI- D-4-	8-Dec-09	14-Dec-09	17-Dec-09	14-Jan-10	22-Jan-10	27-Jan-10	29-Jan-10	2-Feb-10	10-Feb-10	
Sample Date	8-Dec-09	14-Dec-09						Z-Feb-10	10-reb-10	ANZECC
Sample Location					**	downstream of		1		Freshwater /
URS Sample time (NZDT)	16:10	10:00	13:00	10:15	16:15	8:30	9:30	14:20	9:00	Marine
URS Sample Number	93278	93279	93280	93281	93282	93283	93284	93285	93286	Guidelines ¹
Laboratory Sample Reference	752398.1	752398.2	753751.1	758327	760443.1	761612.1	762392.1	763567.1	766045.1	Guidennes
рН	7.4	7.4	7.4	7.7	7.5	7.6	7.8	8	7.9	
Total										
Suspended Solids (g/m³)	27	15	15	15	61	23	13	51	9	-/-
Chromium	0.0024	0.0017	0.0018	< 0.0011	0.0074	0.002	< 0.0026	0.0036	< 0.0011	-/-
Copper	0.0034	0.0035	0.0037	0.0024	0.013	0.0049	< 0.0026	0.0041	0.0013*	-/-
Lead	0.26	0.13	0.63	0.038	0.47	0.12	0.052	0.11	0.019	-/-
Zinc	0.068	0.058	0.057	0.031	0.22	0.082	0.036	0.11	0.016	-/-
Dissolved										
Chromium	< 0.0010	< 0.00050	0.0018	< 0.0010	0.0074	< 0.00050	< 0.0025	< 0.0010	< 0.0010	ID / 0.0906
Copper	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0025	0.0017	< 0.0025	< 0.0010	0.0029^{A}	0.0025 / 0.008
Lead	0.03 ^{AB}	0.015^{AB}	0.095^{AB}	0.0087	0.0034	0.0073	0.0042	0.0022	0.0063	0.0094 / 0.012
Zinc	0.0099	0.02	0.016	0.014	0.036 ^A	0.02	0.0072	0.0027	0.0052	0.031 / 0.043
Field Parameters										
Temperature (°C)	20.26	17.12	19.31	18.54	20.59	19.47	20.62	20.8	19.23	-/-
Electrical Conductivity (µs/cm)	3200	618	1880	2620	9060	850	5580	2990	4000	-/-
Turbidity (ntu)	78.8	32.9	39.2	28.4	121	38.5	20.1	131	23.2	-/-
Depth (mm)	500	500	500	500	750	500	500	500	500	-/-
Flow (L/sec)	180	165	131	141	520	159	165	142	167	-/-

	Sample Details and Analytical Results						
Sample Date	17-Feb-10	23-Feb-10	26-Feb-10	1-Mar-10	4-Mar-10	10-Mar-10	ANZECC
Sample Location	Sampli	ing Point 3: A	pprox 70 m d	ownstream of S	Seaview Road	Bridge	Freshwater /
URS Sample time (NZDT)	14:41	16:45	8:35	11:55	15:00	8:30	Marine
URS Sample Number	93287	93288	93289	93290	93291	93292	Guidelines ¹
Laboratory Sample Reference	767431.1	770208.1	770444.1	7711000.1	772654.1	774501.1	Guidelines
рН	8.0	8	7.6	7.8	7.8	7.4	
Total							
Suspended Solids (g/m³)	49	64	14	20	25	7.4	-/-
Chromium	0.0033	0.0060	0.0013	< 0.0026	0.0027	< 0.0011	-/-
Copper	0.0049	0.0058	0.0042	< 0.0026	0.0031	0.0014	-/-
Lead	0.078	0.083	0.020	0.020	0.062	0.0098	-/-
Zinc	0.110	0.120	0.060	0.033	0.072	0.013	-/-
Dissolved							
Chromium	< 0.00050	< 0.0010	< 0.00050	< 0.0025	< 0.0025	< 0.0010	ID / 0.0906
Copper	0.00061	< 0.0010	< 0.0025	< 0.0025	< 0.0025	< 0.0010	0.0025 / 0.008
Lead	0.0012	0.0014	0.0029	0.00070	0.0017	0.0025	0.0094 / 0.012
Zinc	0.0031	0.0033	0.029	< 0.0050	< 0.0050	0.0041	0.031 / 0.043
Field Parameters							
Temperature (°C)	20.54	21.73	18.87	19.22	20.33	18.46	-/-
Electrical Conductivity (µs/cm)	3220	2690	2150	2330	2870	4100	-/-
Turbidity (ntu)	178	483	97.4	102	69.4	14.9	-/-
Depth (mm)	500	500	500	500	500	500	-/-
Flow (L/sec)	81	65	65	56	48	45	-/-

	Sample Details and Analytical Results							
Sample Date	23-Mar-10	26-Mar-10	30-Mar-10	6-Apr-10	9-Apr-10	15-Apr-10	20-Apr-10	ANZECC
Sample Location		Sampling Point 4: Waiwhetu Stream mouth, Port Road.						ANZECC Freshwater /
URS Sample time	17:00*	07:30*	11:30*	16:30	6:45	9:30	14:24	Marine
URS Sample Number	93293	93294	93295	93296	93297	93298	93299	Guidelines ¹
Laboratory Sample Reference	780319.1	780319.2	780319.3	784376.1	784376.2	784376.3	786737.1	Guidennes
pH	5.9**	6.2**	6.2**	7.8	7.8	7.8	7.6	
Total								
Suspended Solids (g/m³)	57	47	48	7.3	7.3	15.3	49	-/-
Chromium	< 0.003	< 0.003	< 0.003	< 0.011	< 0.011	< 0.011	< 0.010	-/-
Copper	< 0.006	< 0.006	< 0.006	< 0.011	< 0.011	< 0.011	< 0.010	-/-
Lead	0.024	0.024	0.023	0.0025	0.0021	0.0026	0.034	-/-
Zinc	0.035	0.035	0.034	< 0.03	< 0.03	< 0.03	< 0.02	-/-
Dissolved								
Chromium	< 0.003	< 0.003	< 0.003	< 0.010	< 0.010	< 0.010	< 0.010	ID / 0.0906
Copper	< 0.003	< 0.003	< 0.003	< 0.010	< 0.010	< 0.010	< 0.010	0.0025 / 0.008
Lead	0.00090	0.00095	0.00077	< 0.002	< 0.002	< 0.002	0.0021	0.0094 / 0.012
Zinc	0.0060	0.0073	0.0059	< 0.02	< 0.02	< 0.02	< 0.02	0.031 / 0.043
Field Parameters								
Temperature (°C)	16.25	16.25	16.26	15.67	15.66	15.67	17.43	-/-
Electrical Conductivity (µs/cm)	863	1010	1010	2470	2460	2400	1290	-/-
Turbidity (ntu)	82.2	78.2	72.1	50.1	18.2	21	71.6	-/-
Depth (mm)	750	750	750	750	750	750	750	-/-
Flow (L/sec)	69	106	105	131	118	72.7	73	-/-

Notes:

* All samples times are in NZST unless marked with an * which sample times are in NZDT

pH values marked with an ** were field-recorded with a portable pH water meter

All results and criteria are expressed in units of mg/L unless otherwise stated.

Criteria used: ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

1 Values taken from Table 3.4.1 as trigger values for freshwater, 80% level of protection.

ID - insufficient data is available to derive a reliable trigger value.

- no criteria/ no guideline trigger value

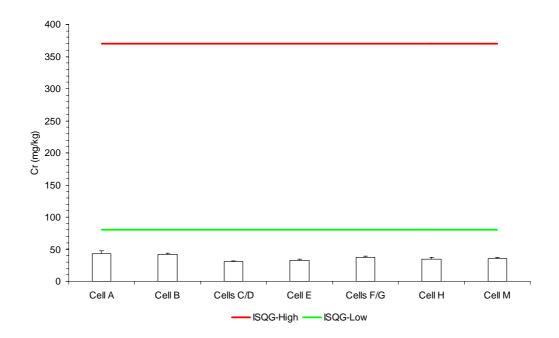
BOLD Denotes Exceedance of ANZECC Guideline criteria

^A Denotes exceedance of ANZECC Freshwater Guidelines

12.1 Compliance with consent conditions for stream bed sediment sampling

The resource consent that covers works in the bed of the stream associated with the excavation and removal of contaminated sediments (WGN090127 [27265]) includes a number of conditions related to the project. The key condition is that remaining sediments are shown, through validation sampling of the stream bed after excavation, to have key contaminant concentrations below the consent criteria (ANZECC ISQG-High). All validation results were below their respective ISQG-High criteria. The majority of validation results were also below the ANZECC ISQG-Low criteria. The following charts show average concentrations of key contaminants in each of the excavation cells compared to the consent criteria.

Chart 12-1 Average concentrations of Chromium (Cr) in validation samples from all cells.





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Chart 12-2 Average concentrations of Copper (Cu) in validation samples from all cells.

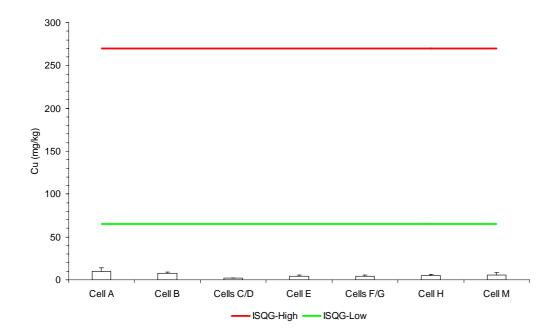


Chart 12-3 Average concentrations of Zinc (Zn) in validation samples from all cells.

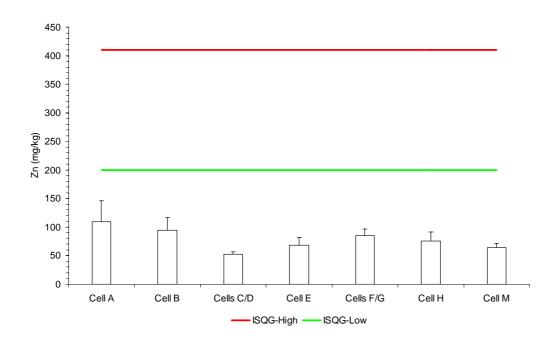
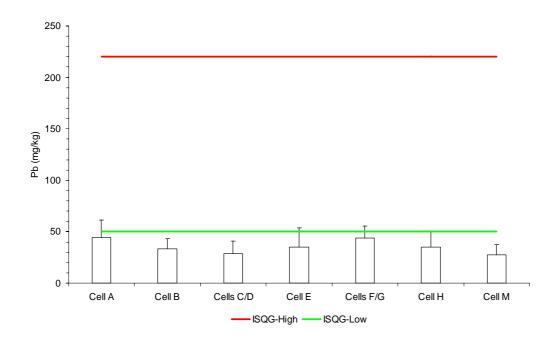


Chart 12-4 Average concentrations of Lead (Pb) in validation samples from all cells.



There were some areas of contaminated material that could not be removed due to physical constraints. The resource consent required that any contaminated material remaining be identified and marked on a map, and explanations provided why the material was not removed. These areas and explanations are outlined in Sections 4 to 10. Based on the validation results the project was successful in meeting the resource consent conditions for removal of contaminated sediment.

12.2 Compliance with consent conditions for water sampling

Resource consent (WGN090127 [27265]) sets out the requirements for water monitoring. The sampling methodology is discussed in Section 11, and the sampling results are presented in **Table 11-1**. The resource consent required the comparison of total dissolved lead, zinc, chromium and copper, to the ANZECC Freshwater Toxicity Trigger Values (for the 80% level of species protection) ANZECC, 2000). The exceedances of the guideline criteria are summarised in **Table 12-1**. All other samples complied with the guideline criteria.

Table 12-1 Summary of water sample exceedances

Sample Location	Date sample collected	Sample name	Criteria Exceeded
1	9 Nov 09	93272	Total dissolved Copper
2	8 Dec 09	93278	Total dissolved Lead
2	14 Dec 09	93279	Total dissolved Lead
2	17 Dec 09	93280	Total dissolved Lead
2	22 Jan 10	93282	Total dissolved Zinc
2	10 Feb 10	93286	Total dissolved Copper



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Exceedances were only seen at sample locations 1 and 2 (ie, during the excavation of cells A, B, C/D and E). The exceedances were likely due to the disturbance of sediment near the de-watering pump intake(s) in the excavation cell in the hours leading up to the water sample being collected. There was an improvement in the control of water in cell F/G, and in Cells H and M the de-watering pumps were discharged into a separate pipe to the by-pass pipe (as described in Section 2.4). Both of these factors are likely to have contributed to an improvement in the water quality, as no samples from sampling points 3 and 4 exceeded criteria.

References

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The following bibliography lists previous investigations commissioned by Wellington Regional Council into contamination in the Waiwhetu Stream:

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Limitations

URS New Zealand Limited (URS) has prepared this report for the use of CPG New Zealand Limited and only those third parties who have been authorised in writing by URS to rely on the report. It has been prepared in accordance with the agreed scope of work and for the purpose outlined in Section 1. In particular, the scope of this report is to summarise the remediation aspects only of the remediation and widening and deepening of the Waiwhetu Stream, and is required to satisfy condition 26 of resource consent WGN090127 [27265], in respect of stream bed sediment remaining, and condition 14 of resource consent WGN090127 [27267], in respect of water quality sampling. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

Validation sampling and analysis was conducted in accordance with the agreed scope of works and the resource consent conditions. In particular the validation sampling density, and the suite of chemicals analysed, have been agreed by all parties prior to the works commencing. URS makes no statement or representation as to the existence (or otherwise) of any other chemicals. Conditions vary across the stream and cannot be exhaustively defined by the validation sampling and analysis conducted. The results and estimations expressed may not represent conditions at any location removed from the specific points of sampling. URS provides no guarantee that all contamination in the reach of stream containing the validation sampling points has been removed. The validation results represent contaminant levels at the time of sampling only. Conditions may change at any point in the stream due to migration of contaminants from inside and outside the project area. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.



42771630/01/3



Appendix A Resource Consents

WGN090127 [27264] Water permit

WGN090127 [27265] Land use consent

WGN090127 [27266] Land use consent

WGN090127 [27267] Discharge permit

WGN090127 [27268] Discharge permit

WGN090127 [27269] Land use consent

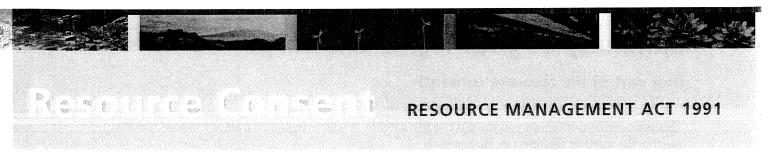
WGN090127 [27270] Land use consent

WGN080127 [27271] Land use consent

WGN090127 [27272] Coastal permit







Consent No. WGN090127 [27264]

Category: Water permit

Pursuant to sections 104, 104B and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Flood Protection Department, Wellington Regional Council			
Address	Flood Protection Department, Wellington Regional Council, PO Box 11646, Wellington 6142			
Duration of consent	Effective: 12 March 2009 Expires: 12 March 2015			
Purpose for which right is granted	To temporarily divert the full flow of the Waiwhetu Stream around an active remediation cell, in the stream reach extending downstream from the Bell Road Bridge to the salt marsh area downstream of the Seaview Road Bridge.			
Location	The Waiwhetu Stream, Lower Hutt: the reach downstream from the Bell Road Bridge (south of the trial remediation area), Waiwhetu to the salt marsh area downstream of the Seaview Road Bridge, Seaview, between approximate map references NZMS 260: R27;2670395.5995230 and NZMS 260: R27;2669546.5995063.			
Legal description of land	Various			
Conditions	1 - 7 as attached			

For and on behalf of

WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27264]

General conditions

- 1. The location, design and construction of the diversion shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this permit, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the permit holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to the works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The permit holder shall provide a copy of this permit and any documents referred to in this permit to each operator or contractor undertaking works authorised by this permit, before that operator or contractor starts any works. The permit holder shall verbally brief the contractor regarding the conditions of the permit, prior to the works authorised by this permit commencing.
- 4. The permit holder shall ensure that a copy of this permit and all documents referred to in this permit, is kept on site at all times and presented to any Wellington Regional Council officer on request.

Works/design standard conditions

- 5. The permit holder shall ensure that the pump intake structure for the water diversion is screened or designed or adapted to exclude fish. If a screen is to be used on the intake structure it must be screened with a maximum mesh diameter of 3mm so that small fish, eggs and larvae do not enter the intake.
- 6. The permit holder shall re-instate the flow of the Waiwhetu Stream and remove all material used in the construction of the diversion as soon as is practicable. The materials used in the diversion shall not be removed until all works within a particular active cell, associated with the remediation, channel deepening and widening and erosion and scour protection works have been completed.

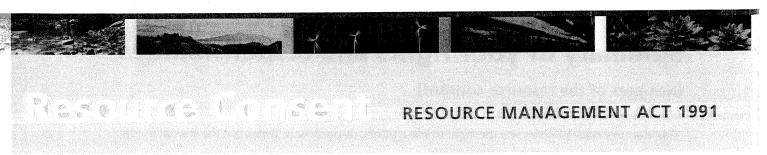
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- 7. From the exercise of this permit the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first and second anniversary of the granting of this permit for the purpose of:
 - Dealing with any adverse effects on the environment which may arise from the exercise of this permit, and which is appropriate to deal with at a later stage;
 - To review the adequacy of any plans and/or methods used to divert the water; and/or
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the permit holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the permit" is deemed to be once the works authorised by this permit have commenced.





Consent No. WGN090127 [27265]

Category: Land use consent

Pursuant to sections 104, 104B and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name		

Flood Protection Department, Wellington Regional Council

Address

Flood Protection Department, Wellington Regional Council, PO Box 11646, Wellington 6142

Duration of consent

Effective: 12 March 2009

Expires: 12 March 2015

Purpose for which right is granted

To undertake works in the bed of the Waiwhetu Stream associated with the excavation and removal of contaminated sediment and the placement, use and removal of an active remediation cell and sedimentation cell coffer dams, including any associated disturbance of and deposition on the stream bed in the stream reach extending downstream from the Bell Road Bridge to the salt marsh area downstream of the Seaview Road Bridge.

Location

The Waiwhetu Stream, Lower Hutt: the reach downstream from the Bell Road Bridge (south of the trial remediation area), Waiwhetu to the salt marsh area downstream of the Seaview Road Bridge, Seaview, between approximate map references NZMS 260: R27;2670395.5995230 and NZMS 260: R27;2669546.5995063.

Legal description of land

Conditions

Various

1 - 31 as attached

For and on behalf of

WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27265]

General conditions

- 1. The location, design and construction of the works shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this consent, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the consent holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to the works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The consent holder shall provide a copy of this consent and any documents referred to in this consent to each operator or contractor undertaking works authorised by this consent, before that operator or contractor starts any works. The consent holder shall verbally brief the contractor regarding the conditions of the consent, prior to the works authorised by this consent commencing.
- 4. The consent holder shall ensure that a copy of this consent and all documents referred to in this consent, is kept on site at all times and presented to any Wellington Regional Council officer on request.
- 5. All works affecting the Waiwhetu Stream, including tidy up on completion of the works, shall be completed to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Works/Design details

- 6. Prior to commencing the placement and removal of the coffer dams, the consent holder shall install silt curtains upstream and downstream of the proposed site. The silt curtains shall be installed at a maximum distance of 15 metres from the most upstream or downstream coffer dam or at a distance that is to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council. These silt curtains shall remain in place until works associated with the remediation and channel deepening and widening works have been completed.
- 7. The consent holder shall ensure the coffer dams are of a sufficient width to exclude water ingression as far is practicable into the active remediation cell while the works are being undertaken.

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- 8. The consent holder shall ensure that the coffer dams that form the active cell and the sedimentation cells are in place and the active cell is dewatered as far as practicable prior to any excavation works commencing in the active cell.
- 9. Prior to any work that has the potential to affect neighbouring properties or infrastructure the consent holder shall inform the relevant utility service provider or property owner(s). The consent holder shall ensure that the works do not impede any utility service provider's or property owner(s) access to their property or infrastructure.
- 10. Where practicable, the closure of the active cell's downstream coffer dam shall occur during low tide, to prevent, as far as is possible, the trapping of fish in the active cell.
- 11. The tip heights of the coffer dams shall be placed at a sufficient height above the mean high sea level so that tidal waters do not enter the active remediation cell. In the event that tidal waters do enter the active remediation cell, the consent holder shall ensure that the tidal water is appropriately treated prior to being discharged back into the Waiwhetu Stream. The consent holder shall notify the Manager, Environmental Regulation, Wellington Regional Council within 24 hours, or the next working day, of the occurrence and the measures implemented to remedy the tidal overflow.

The consent holder shall keep tidal charts on site for the duration of these works and shall inform the contractor at least one working day in advance of high tide times, in particular the spring tide.

- 12. All contaminated sediment excavated from the channel in excess of the Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Sediment Quality Guidelines shall be removed from the area and disposed of in an appropriate manner. No such sediment is to be stockpiled on the flood plain.
- 13. Only sediment below the Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Sediment Quality Guidelines may be stockpiled on the floodplain. The consent holder shall install a silt fence or any other appropriate sediment control measure that is to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council, between any stockpiles and the stream to ensure no sediment laden runoff discharges to the stream. All stockpiles shall be aligned in such a way as to not impede flood flows and removed from the site as soon as practicable.

Note: Greater Wellington does not consider hay bales as an appropriate sediment control measure.

14. The permit holder shall re-instate the flow of the Waiwhetu Stream and remove all material used to construct the diversion as soon as is practicable but not until all works, associated with the remediation and channel deepening and widening, within the stream bed have been completed.

Works exclusion period

15. No works which impede the full flow of the Waiwhetu stream shall be carried out in the wetted channel during the native fish spawning/migration season (1 August to 30 September inclusive).

Note: The applicant has advised that the installation of the environmental enhancement structures, the works within the u shaped channel, and the works in the stretch between Bell Road Bridge and the remediation works, will take place within the native fish spawning/migration season.

Installation of fyke nets

During the period 1 February to 31 May inclusive, and only during those periods when the coffer dams are in place and the flow of the Waiwhetu Stream is stopped, fyke net(s) must be installed upstream of active cell to capture eels.

The consent holder shall ensure the fyke net(s) are in place by the end of each working day, or by 5pm, which ever is earliest.

The consent holder shall ensure that prior to works recommencing the following working day on site any eels caught in the fyke net(s) are relocated to below the most downstream silt curtain and released back into the Waiwhetu Stream during an outgoing tide.

Flood contingency measures

- 17. The consent holder shall prepare and submit a Flood Contingency Management Plan (FCMP) in relation to the proposed works in the Waiwhetu Stream to the Manager, Environmental Regulation, Wellington Regional Council for approval 20 working days prior to works commencing on site. The FCMP shall include, but not be limited to:
 - A detailed description of what contingency methods will be used by the consent holder to reduce and manage the flood effects of the coffers dams in the Waiwhetu Stream;
 - A detailed strategy outlining how the identified contingency measures will be undertaken in differing sized flood events/situations. For instance, the use of an on call roster, how those events that may lead to flooding will be identified and tracked, a list of key responsibilities and who will be responsible for implementing them when a flood is occurring.
 - A description of what procedures will be used to stabilise the exposed areas of contaminated sediment in the active remediation cell and how any placed material(s) and/or structure(s) will be secured during a flood event e.g. to minimise erosion and scour effects of the stream bed and banks.

The consent holder shall provide a copy of the FCMP to the Team Leader, Resource Consents, Hutt City Council on approval.

- 18. The consent holder shall monitor the weather (e.g. metservice) to forecast flooding in the Waiwhetu Stream during the works period, including liaising with the Hutt City Council Emergency Management Officer and Wellington Regional Council Flood Warning Manager. Copies of the daily weather reports shall be kept onsite for the duration of the works. If a weather event is identified that may potentially lead to flooding, within 24 hours, or the next working day, the consent holder shall inform the Manager, Environmental Regulation, Wellington Regional Council and the Wellington Regional Council Duty Flood Manager.
- 19. The consent holder shall ensure that the appropriate machinery and operators are on 24 hour standby to implement the Flood Contingency Management Plan (FCMP) as required.

Stream bed sediment sampling

- 20. The consent holder shall submit for approval by the Manager, Environmental Regulation, Wellington Regional Council, prior to commencement of the works, a detailed sampling and analysis plan for assessing stream bed sediment quality in the active remediation cell. No works are to commence on site until this plan has been approved. This monitoring plan shall include, but not be limited to, the following:
 - a) The locations of all the proposed stream bed sampling points. At a minimum, the consent holder shall undertake five equally spaced transects (located at 10, 30, 50, 70, and 90 metre distances from the away from the upstream coffer dam wall within each active cell) along the excavation cell and a minimum of 15 samples.
 - b) The frequency and timing of sampling.
 - c) The methods to be used to collect and analyse the stream bed samples. These methods shall include recording the date, time and weather conditions at the time that the samples are collected.
- 21. The consent holder shall not remove either of the coffer dams that form the active remediation cell until stream bed samples are taken from the final top layer of the stream bed and these sample results are submitted to the Manager, Environmental Regulation, Wellington Regional Council. The stream bed sample results shall be compared against the following parameter values, as specified in the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1:

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- Total recoverable lead: 220 mg/kg (dry weight);
- Total recoverable zinc: 410 mg/kg (dry weight);
- c) Total recoverable copper: 270 mg/kg (dry weight); and
- d) Total recoverable chromium: 370 mg/kg (dry weight).
- 22. If all of the contaminated sediment can not be removed from a particular area in the stream bed, due to circumstances outside of the consent holder's control, the consent holder shall:
 - Identify and mark these affected areas where contaminated sediment may remain on a map and provide GIS coordinates for the affected areas; and
 - Provide an explanation of why the contaminated sediment can not be removed.

On completion of the remediation works, the maps and GIS coordinates shall be submitted to the Manager, Environmental Regulation, Wellington Regional Council and Wellington Regional Council Contaminated Land Scientist so that the Wellington Regional Council Selected Land Use Register (SLUR) can be updated.

- 23. The sediment sampling location points for each active cell shall, as far as practicable, remain constant.
- All sampling techniques employed in respect of the conditions of this consent shall be to the satisfaction of the Manager, Environment Regulation, Wellington Regional Council and in general accordance with the Ministry for the Environment's Contaminated Land Management Guidelines, where appropriate. All analyses undertaken in connection with this consent shall be performed by an International Accreditation New Zealand (IANZ) registered laboratory or otherwise as specifically approved by the Manager, Environmental Regulation, Wellington Regional Council.

Stream bed sampling reporting

25. The results of the stream bed sampling required by conditions 20 and 21 of this consent shall be provided as a hard and electronic copy to the Manager, Environmental Regulation, Wellington Regional Council on completion of the remediation and channel deepening and widening works. The hard copies of the results shall be in the form of analytical certificates under the letterhead of the laboratory which carried out the analyses and bear authorised signatures.

The results shall also include the sample dates and times in New Zealand Standard Time (NZST).

Note: The format of the test results submitted electronically should, where possible, be consistent with that required for upload to Wellington Regional Council's Hilltop Database.

Note: The results of the stream bed sampling may also be included in the completion report required by condition 26 of this consent.

- 26. The results of the stream bed sampling required by conditions 20 and 21 of this consent shall be submitted in a report to the Manager, Environmental Regulation, Wellington Regional Council within 3 months on completion of the remediation and channel deepening and widening works. The report shall be to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council, and shall include, but not be limited to the following:
 - Comparison of the stream bed samples to the Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Sediment Quality Guidelines
 - b) Details on those areas where contaminated stream bed sediments have not been fully removed and remain in the stream bed;
 - c) Any other matters the consent holder considers relevant.

Note: The stream bed sampling report and the water sampling report required by condition 14 of WGN090127 [27267] can be combined into a single completion report.

Sedimentation effects

- 27. The consent holder shall take all practicable steps to minimise sedimentation and increased turbidity of the Waiwhetu Stream during the excavation and removal of contaminated sediment and the construction, implementation, use and removal of the active remediation cell and sedimentation cell/s, including but not limited to:
 - a) Installation and use of at least two sedimentation cells at all times;
 - b) Installation and use of silt curtains upstream and downstream of the works area;
 - c) The installation of a second silt curtain upstream and downstream, unless installation is not practicable;
 - d) Completing all works in the minimum time practicable;
 - e) Minimising the area of disturbance at all times;
 - f) Avoiding placement of construction material or excavated matter in the flowing channel or in a location where runoff enters the stream; and
 - g) Undertaking works from outside the actively flowing stream bed, where practicable and separation of construction activities from flowing water (by diverting the stream flow around the works as detailed in the application).

Vehicle contaminants

- 28. The consent holder shall ensure that:
 - a) All machinery is thoroughly cleaned of any vegetation, seeds or contaminants (such as sediments and mud) away from the works site prior to entering or exiting the works site. Cleaning shall be undertaken in an area where the wash water does not enter the stream;
 - b) No contaminants (including but not limited to oil, petrol, diesel or hydraulic fluid) shall be released into water from equipment being used for the works;
 - c) All contaminant storage or re-fuelling areas are bunded or contained in such a manner so as to prevent the discharge of contaminants;
 - d) All machinery is regularly maintained in such a manner so as to minimise the potential for leakage of contaminants (including but not limited to fuels, hydraulic fluids and lubricants); and

No machinery is stored or refuelled within 10 metres of any ephemeral or permanent watercourse.

Erosion and scour

- 29. During the works the active remediation cell and sedimentation cell(s) shall remain the responsibility of the consent holder and shall be maintained so that:
 - a) Any erosion of the stream bed or banks that is attributable to the coffer dams is remedied by the consent holder to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council; and
 - b) The structural integrity of coffer dams remains sound.

Maintenance does not include any works outside of the scope of the application. Any additional works (including structures, reshaping or disturbance to the bed of the watercourse) following completion of the construction works as proposed in the application, may require further resource consents.

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30. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall follow the 'Protocol for dealing with Koiwi and Taonga' outlined in the Hutt Park Management Plan submitted as Appendix F in the application documents 20 October 2008.

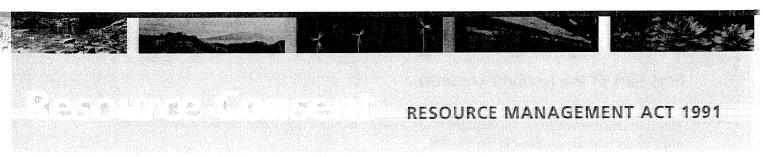
Review conditions

- 31. From the exercise of this consent the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first and second anniversary of the granting of this consent for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this consent, and which is appropriate to deal with at a later stage;
 - To review the adequacy of any plans and/or methods used during the excavation and removal of contaminated sediment and the use of a active remediation cell and sedimentation cell; and/or
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the consent holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the consent" is deemed to be once the works authorised by this consent have commenced.





Consent No. WGN090127 [27266]

Category: Land use consent

Pursuant to sections 104, 104B and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Flood Protection Department, Wellington Regional Council			
Address	Flood Protection Department, Wellington Regional Council, PO Box 11646, Wellington 6142			
Duration of consent	Effective: 12 March 2009 Expires: 12 March 2015			
Purpose for which right is granted	To widen and deepen the Waiwhetu Stream channel between Bell Road Bridge to the salt marsh area downstream of the Seaview Road Bridge, including any associated disturbance of and deposition on the stream bed.			
Location	The Waiwhetu Stream, Lower Hutt: the reach downstream, from the Bell Road Bridge, Waiwhetu, to the Waiwhetu Stream mouth at Port Road Bridge, Seaview between approximate map references NZMS 260: R27;2670458.5995245 and NZMS 260: R27;2669345.5994850.			
Legal description of land	Various			
Conditions	1 - 19 as attached			

For and on behalf of

WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27266]

General conditions

- 1. The location, design and construction of the works shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this permit, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the consent holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991.

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to the works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The consent holder shall provide a copy of this consent and any documents referred to in this consent to each operator or contractor undertaking works authorised by this consent, before that operator or contractor starts any works. The consent holder shall verbally brief the contractor regarding the conditions of the consent, prior to the works authorised by this consent commencing.
- 4. The consent holder shall ensure that a copy of this consent and all documents referred to in this consent, is kept on site at all times and presented to any Wellington Regional Council officer on request.
- 5. All works affecting the Waiwhetu Stream, including tidy up on completion of the works, shall be completed to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Works/Design details

- 6. The consent holder shall contour the stream bed within the active remediation cell area to minimise erosion and scour of the stream bed and bank, to prevent the stream banks from collapsing and to ensure stability of the stream bed.
- 7. The consent holder shall ensure that the coffer dams that form the active cell and the sedimentation cells are in place and the active cell is dewatered as far as practicable prior to any works commencing in the active cell.
- 8. The consent holder shall ensure the coffer dams are of a sufficient width to exclude water ingression as far is practicable into the active remediation cell while the works are being undertaken.

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- 9. Prior to any work that has the potential to affect neighbouring properties or infrastructure the consent holder shall inform the relevant utility service provider or property owner(s). The consent holder shall ensure that the works do not impede any utility service provider's or property owner(s) access to their property or infrastructure.
- Only sediment below the Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Sediment Quality Guidelines may be stockpiled on the floodplain. The consent holder shall install a silt fence or any other appropriate sediment control measure that is to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council, between any stockpiles and the stream to ensure no sediment laden runoff discharges to the stream. All stockpiles shall be aligned in such a way as to not impede flood flows and removed from the site as soon as practicable.

Note: Greater Wellington does not consider hay bales as an appropriate sediment control measure.

11. The excavated stream banks shall be stabilised as soon as possible following completion of the works within that active remediation cell to prevent erosion and scour.

Note: "stabilised" in relation to any site or area means an area inherently resistant to erosion such as rock, or rendered resistant by the application of aggregate, geotextile, vegetation or mulch. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by the Manager, Environmental Regulation, Wellington Regional Council, an 80% vegetative cover has been established.

Environmental enhancement planting plan

12. The consent holder shall prepare and submit an Environmental Enhancement Plan (EEP) for the Waiwhetu Stream to the Manager, Environmental Regulation, Wellington Regional Council for approval within 6 months of the commencement of this consent. The consent holder shall use native species such as those identified in the planting list received as further information at the pre hearing meeting on 2 December 2008, where practicable in the design of the proposed Environmental Enhancement works and shall engage a suitably qualified and experienced person to prepare the EEP.

The EEP shall include, but not be limited to:

- Details of the species to be planted (predominately eco sourced species to be used), when and where they
 are to be planted, size of the plants to be planted, density of planting, sourcing of plants and fertilising and
 time line for implementation;
- A to scale plan(s) showing the location and extent where planting will be undertaken and associated environmental enhancement structures (e.g. jetty's, boardwalks etc);
- Detailed methodology(s) of how the environmental enhancement structures will be constructed;
- What monitoring and maintenance will be used/undertaken to maintain the riparian plantings and structures and the duration of the monitoring and maintenance; and
- A list of the key responsibilities and who will be responsible for implementing the monitoring and maintenance.

The consent holder shall provide a copy of the EEP to the Director General of Conservation and the Team Leader, Resource Consents, Hutt City Council on approval.

The final EEP shall be developed in accordance with Drawing No. 4-13, Proposed Environmental Enhancements submitted to the Wellington Regional Council in the application on 20 October 2008.

The EEP is to be implemented prior to the expiry of this consent and the plantings shall be to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: The works described in the EEP are to be completed prior to the expiry of this consent.

Environmental bond

Prior to undertaking the remediation, channel deepening and widening and erosion and scour protection works, the consent holder shall provide a surety bond and associated bond document to ensure vegetation is established and maintained in accordance with the Environmental Enhancement Plan (EEP) as required by condition 12 of this consent and is to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

The bond shall be for 150% of the estimated value of the environmental enhancement works described in condition 12 of this consent for the establishment of plantings along the Waiwhetu Stream, based on a quote from an independent contractor engaged by the applicant and approved by the Manager, Environmental Regulation, Wellington Regional Council.

The consent holder's liability is not limited to the amount of the bond, should the necessary work exceed the bond figure. The form of the bond shall be as specified by the Manager, Environmental Regulation, Wellington Regional Council.

The bond shall be held until the expiry of this consent, or until works in accordance with the approved EEP are completed.

Works exclusion period

No works which impede the full flow of the Waiwhetu stream shall be carried out in the wetted channel during the native fish spawning/migration season (1 August to 30 September inclusive).

Note: The applicant has advised that the installation of the environmental enhancement structures, the works within the u shaped channel, and the works in the stretch between Bell Road Bridge and the remediation works, will take place within the native fish spawning/migration season.

Sedimentation effects

- 15. The consent holder shall take all practicable steps to minimise sedimentation and increased turbidity of the Waiwhetu Stream during the widening and deepening excavations, including but not limited to:
 - a) Installation and use of at least two sedimentation cells in those areas as detailed in the application;
 - b) Installation and use of silt curtains;
 - c) The installation of a second silt curtain, unless the installation is not practicable;
 - d) Completing all works in the minimum time practicable;
 - e) Minimising the area of disturbance at all times;
 - f) Avoiding placement of construction material or excavated matter in the flowing channel or in a location where runoff enters the stream; and
 - g) Undertaking works from outside the actively flowing stream bed, where practicable and separation of construction activities from flowing water (by diverting the stream flow around the works as detailed in the application).

Vehicle contaminants

- 16. The consent holder shall ensure that:
 - a) All machinery is thoroughly cleaned of any vegetation, seeds or contaminants (such as sediments and mud) away from the works site prior to entering or exiting the works site. Cleaning shall be undertaken in an area where the wash water does not enter the stream;
 - b) No contaminants (including but not limited to oil, petrol, diesel or hydraulic fluid) shall be released into

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water from equipment being used for the works;

- c) All contaminant storage or re-fuelling areas are bunded or contained in such a manner so as to prevent the discharge of contaminants;
- d) All machinery is regularly maintained in such a manner so as to minimise the potential for leakage of contaminants (including but not limited to fuels, hydraulic fluids and lubricants); and

No machinery is stored or refuelled within 10 metres of any ephemeral or permanent watercourse.

Erosion and scour

- 17. The works shall remain the responsibility of the consent holder and shall be maintained to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council such that:
 - a) Any erosion of the stream bed and banks that is attributable to the works carried out as part of this consent is repaired by the consent holder to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Maintenance does not include any works outside of the scope of the application. Any additional works (including structures, reshaping or disturbance to the bed of the watercourse) following completion of the construction works as proposed in the application, may require further resource consents.

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18. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall follow the 'Protocol for dealing with Koiwi and Taonga' outlined in the Hutt Park Management Plan submitted as Appendix F in the application documents 20 October 2008.

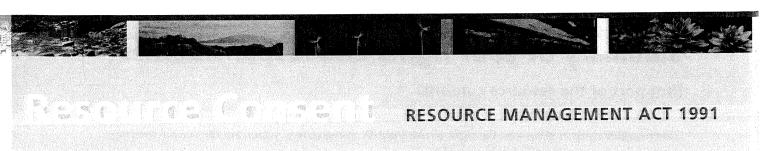
Review conditions

- 19. From the exercise of this consent the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first and second anniversary of the granting of this consent for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this consent, and which is appropriate to deal with at a later stage;
 - To review the adequacy of any plans and/or methods used in the widening and deepening works; and/or
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the consent holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the consent" is deemed to be once the works authorised by this consent have commenced.





Consent No. WGN090127 [27267]

Category: Discharge permit

Pursuant to sections 104, 104B, 105, 107 and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Flood Protection Department, Wellington Regional Council				
Address	Flood Protection Department, Wellington Regional Council, PO Box 11646, Wellington 6142				
Duration of consent	Effective: 12 March 2009 Expires: 12 March 2015				
Purpose for which right is granted	To discharge potentially contaminated water (contaminated by mobilising contaminated sediments) to the Waiwhetu Stream during in stream remediation and channel widening and deepening works.				
Location	The Waiwhetu Stream, Lower Hutt: the reach downstream from the Bell Road Bridge (south of the trial remediation area), Waiwhetu to the salt marsh area downstream of the Seaview Road Bridge, Seaview, between approximate map references NZMS 260: R27;2670395.5995230 and NZMS 260: R27;2669546.5995063.				
Legal description of land	Various				
Conditions	1 - 22 as attached				

For and on behalf of

WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27267]

General conditions

- 1. The location, design and construction of the discharge shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this permit, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the permit holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to maintenance works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The permit holder shall provide a copy of this permit and any documents referred to in this permit to each operator or contractor undertaking works authorised by this permit, before that operator or contractor starts any works. The permit holder shall verbally brief the contractor regarding the conditions of the permit, prior to the works authorised by this permit commencing.
- 4. The permit holder shall ensure that a copy of this permit and all documents referred to in this permit, is kept on site at all times and presented to any Wellington Regional Council officer on request.

Water Sampling

- 5. The permit holder shall submit for approval by the Manager, Environmental Regulation, Wellington Regional Council, at least 20 working days prior to commencement of the works, a detailed sampling and analysis plan for assessing stream water quality downstream of the works site. No works are to commence on site until this plan has been approved. This monitoring plan shall include, but not be limited to, the following:
 - a) The location of the proposed water sampling points downstream of the sedimentation cell(s). The sampling points shall be a maximum of 150 metres downstream from the most downstream coffer dam wall.
 - b) The frequency and timing of sampling. At a minimum, the permit holder shall take water samples at the downstream sampling points within 24 hours of the first discharge occurring, and then every third day thereafter for the duration of the discharge. These samples shall be taken while a discharge is occurring.

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c) The methods to be used to collect and analyse the water samples. These methods shall include recording the date, time, tidal and weather conditions at the time that the samples are collected.

Water sampling under this plan may cease once works under resource consents WGN090127 [27265] and WGN090127 [27266] have been completed.

- 6. The permit holder shall analyse each of the samples taken from the sampling point identified in condition 5 of this permit for the following parameters:
 - a) Total recoverable and dissolved lead g/m3;
 - b) Total recoverable and dissolved zinc g/m3;
 - c) Total recoverable and dissolved copper g/m3;
 - d) Total recoverable and dissolved chromium g/m3;
 - e) Total suspended solids g/m3; and
 - f) pH.
- 7. The permit holder shall measure and record field parameters in-situ at the sampling points identified in condition 5 of this permit daily. These field parameters shall include:
 - a) Specific electrical conductivity (uS/cm);
 - b) Turbidity (NTU);
 - c) Water temperature (°C);
 - d) An estimate of average water depth (mm); and
 - e) An estimate of flow rate (I/s).

The permit holder shall record the date, time, tidal and weather conditions at the time that the samples are collected.

- 8. The permit holder shall at the sampling points identified in condition 5 of this permit at the time each water sample is collected visually inspect the stream for the following:
 - a) Any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b) Any conspicuous change in colour or visual clarity;
 - c) Any undesirable biological growths;
 - d) Any emission of objectionable odour; and
 - e) Any erosion at the point of discharge.
- 9. The permit holder shall compare the results of the samples taken under conditions 6 of this permit against the Freshwater toxicity Trigger Values (for the 80% level of species protection) in the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Water Quality Guidelines.

The permit holder shall inform the Manager, Environmental Regulation, Wellington Regional Council within 48 hours of the receipt of the sample results, if any of the samples taken are greater than the Freshwater toxicity Trigger Values (for the 80% level of species protection) in the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Water Quality Guidelines.

10. If the elevated sample result is attributable to the in stream channel remediation, channel deepening and widening works (i.e. it is not attributable to stormwater discharges or any other outside influences) the permit holder shall undertake site contaminant-source investigations to identify the likely sources of contaminants and implement measures to reduce contaminant levels including, but not limited to, installing additional silt curtains and reducing the discharge rate from the sedimentation cell.

The investigations undertaken shall be to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

The outcomes of any contaminant-source investigations undertaken and details of the activities undertaken to reduce contaminant levels shall be detailed in the completion report as required by condition 14 of this permit.

- 11. The water sampling location points for each active cell shall, as far as practicable, remain constant.
- 12. All sampling techniques employed in respect of the conditions of this permit shall be to the satisfaction of the Manager, Environment Regulation, Wellington Regional Council and in general accordance with the Ministry for the Environment's Contaminated Land Management Guidelines, where appropriate. All analyses undertaken in connection with this permit shall be performed by an International Accreditation New Zealand (IANZ) registered laboratory or otherwise as specifically approved by the Manager, Environmental Regulation, Wellington Regional Council.

Water sampling reporting

The results of the water sampling required by conditions 6 and 7 of this permit shall be provided as a hard and electronic copy to the Manager, Environmental Regulation, Wellington Regional Council on completion of the remediation and channel deepening and widening works. The hard copies of the results shall be in the form of analytical certificates under the letterhead of the laboratory which carried out the analyses and bear authorised signatures.

The results shall also include the sample dates and times in New Zealand Standard Time (NZST).

Note: The format of the test results submitted electronically should, where possible, be consistent with that required for upload to Wellington Regional Council's Hilltop Database.

Note: The results of the sampling may also be included in the completion report required by condition 14 of this permit.

- The results of the water sampling required by conditions 6 and 7 of this permit shall be submitted in a report to the Manager, Environmental Regulation, Wellington Regional Council within 3 months on completion of the remediation and channel deepening and widening works. The report shall be to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council, and shall include, but not be limited to the following:
 - a) Comparison of the water quality samples to the Freshwater toxicity Trigger Values (for the 80% level of species protection) in Table 3.4.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Water Quality Guidelines;
 - b) Details of any breaches of the limits as outlined in condition 9 of this permit and the site contaminantsource investigations undertaken under condition 10 of this permit and any measures implemented to remedy the breach;
 - c) Observations and photographs from the visual inspections undertaken under condition 8 of this permit; and
 - d) Any other matters the permit holder considers relevant.

Note: The water sampling report and the stream bed sampling report required by condition 26 of WGN090127 [27265] can be combined into a single completion report.

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Sedimentation effects

- The permit holder shall install at least one silt curtain downstream of the sedimentation cell and this silt curtain shall remain in place for the duration of the in-stream works. If any of the effects described in condition 8 occur the permit holder shall install a second silt curtain(s), unless the installation of a second silt curtain is impracticable.
- 16. The silt curtains shall remain the responsibility of the permit holder and be cleared of debris as required to maintain effectiveness. The silt curtains shall be installed, operated and maintained to the reasonable satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Flood contingency measures

- 17. The consent holder shall monitor the weather (e.g. metservice) to forecast flooding in the Waiwhetu Stream during the works period, including liaising with the Hutt City Council Emergency Management Officer and Wellington Regional Council Flood Warning Manager. Copies on the daily weather reports shall be kept onsite for the duration of the works. If a weather event is identified that may potentially lead to flooding, within 24 hours, or the next working day, the consent holder shall inform the Manager, Environmental Regulation, Wellington Regional Council and the Wellington Regional Council Duty Flood Manager.
- 18. The permit holder shall ensure that the appropriate machinery and operators are on 24 hour standby to implement the Flood Contingency Management Plan (FCMP) as required.

Note: the FCMP is required by condition 17 of WGN090127 [27265].

Erosion and scour

19. The discharge shall remain the responsibility of the permit holder and shall be managed so that any erosion of the stream bed or bank due to the discharge shall be remedied by the permit holder, to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Any activities undertaken in accordance with this condition shall be to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council. The permit holder shall notify the Manager, Environment Regulation, Wellington Regional Council within two working days of any activities undertaken.

Incident notification

20. The permit holder shall keep a permanent record of any incident(s) related to this permit that results, or could result, in an adverse effect on the environment beyond the boundary of the permit holder's site. The permit holder shall make the incident register available to officers of the Wellington Regional Council, on request.

The permit holder shall notify the Manager, Environmental Regulation, Wellington Regional Council, of any such incident within 24 hours of the incident being brought to the attention of the permit holder or the next working day.

The permit holder shall forward an incident report to the Manager, Environmental Regulation, Wellington Regional Council within seven (7) working days of the incident occurring, unless otherwise agreed with the Manager, Environmental Regulation, Wellington Regional Council. The report shall describe reasons for the incident, measures taken to mitigate the incident, and measures to prevent recurrence.

Public complaints

- 21. The permit holder shall maintain a permanent record of any complaints received alleging adverse effects from or related to the exercise of this permit. This record shall include the following:
 - a) The name and address of the complainant;
 - b) Date, time and details of the received complaint;
 - c) Weather conditions at the time of the alleged event;

- d) Investigations undertaken by the permit holder in regards to the complaint and any measures adopted to remedy the effects of the incident/complaint; and
- e) Measures put in place to prevent occurrence of a similar incident.

The permit holder shall notify the Manager, Environmental Regulation, Wellington Regional Council, of any complaints received, which relate to the exercise of this permit, within 24 hours of being received, or the next working day.

The complaints record shall be made available to the officers of the Wellington Regional Council on request.

Review conditions

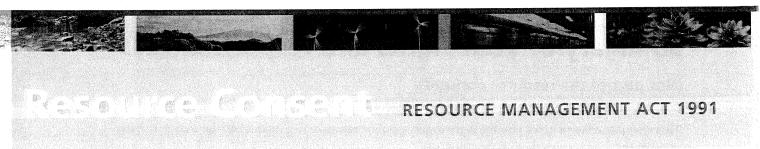
- 22. From the exercise of this consent the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first and second anniversary of the granting of this consent for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this permit, and which is appropriate to deal with at a later stage;
 - To review the adequacy of any monitoring plans and/or alter any monitoring requirements so as to incorporate into the permit any monitoring or other requirements which may become necessary to clarify or deal with any adverse effect on the environment of arising from this activity;
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the permit holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the permit" is deemed to be once the works authorised by this consent have commenced.







Consent No. WGN090127 [27268]

Category: Discharge permit

Pursuant to sections 104, 104B, 105, 107 and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Flood Protection Department, Wellington R	egional Council
Address	Flood Protection Department, Wellington Wellington 6142	on Regional Council, PO Box 11646,
Duration of consent	Effective: 12 March 2009	Expires: 12 March 2015
Purpose for which right is granted	To discharge silt and stream bed sedime with the widening and deepening worldownstream of the Seaview Road Bridge Bridge and upstream of the remediation excavation of contaminated sediment).	ks (being undertaken in the u-channel and the stretch downstream of Bell Road
Location	The Waiwhetu Stream, Lower Hutt: the Bridge, Waiwhetu, Lower Hutt to the Waiw Seaview, Lower Hutt between approx R27;2670458.5995245 and NZMS 260: R2	whetu Stream mouth at Port Road Bridge, oximate map references NZMS 260:
Legal description of land	Various	
	1	

-13 as attached

For and on behalf of

Conditions

WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27268]

General conditions

- 1. The location, design and construction of the discharge shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this permit, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the permit holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to maintenance works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The permit holder shall provide a copy of this permit and any documents referred to in this permit to each operator or contractor undertaking works authorised by this permit, before that operator or contractor starts any works. The permit holder shall verbally brief the contractor regarding the conditions of the permit, prior to the works authorised by this permit commencing.
- 4. The permit holder shall ensure that a copy of this permit and all documents referred to in this permit, is kept on site at all times and presented to any Wellington Regional Council officer on request.

Works/Design details

- 5. Machinery working in the flowing water shall take all practicable steps to minimise sediment loading and increased turbidity of the Waiwhetu Stream, such steps shall include, but not be limited to:
 - a) Only disturbing the river bed and banks as much as necessary to widen and deepen the channel; and
 - b) Spending the minimum amount of time possible working in flowing water.
- 6. The excavated stream banks shall be stabilised as soon as possible following completion of the works within the u-shaped channel and the stretch downstream of Bell Road Bridge before the start of the excavation of the contaminated sediment, to prevent erosion and scour.

Note: "stabilised" in relation to any site or area means an area inherently resistant to erosion such as rock, or rendered resistant by the application of aggregate, geotextile, vegetation or mulch.

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- 7. Prior to works commencing downstream of the Bell Road Bridge before the start of the excavation of the contaminated sediment, the permit holder shall install silt curtains upstream and downstream of the proposed site. These silt curtains shall remain in place until works associated with the widening and deepening works have been completed in this area.
- 8. Prior to works commencing in the u shaped channel, the permit holder shall install longitudinal silt curtains around the proposed work site. These silt curtains shall remain in place until works in this area have been completed.
- 9. The discharge shall not cause any of the following effects in the receiving waters after reasonable mixing (the downstream boundary of the mixing zone shall be a maximum of 150 metres from the most downstream silt curtain):
 - a) The production of any conspicuous oil or grease films, scum or foams, or floatable or suspended material;
 - b) Any conspicuous change in the colour or visual clarity:
 - c) Any emission of objectionable odour; and
 - d) The formation of undesirable biological growths.

Sedimentation effects

- 10. The permit holder shall take all practicable steps to minimise sedimentation and increased turbidity of the Waiwhetu Stream during the widening and deepening excavations, including but not limited to:
 - a) Installation and use of silt curtains;
 - b) The installation of a second silt curtain, unless the installation is not practicable;
 - c) Completing all works in the minimum time practicable;
 - d) Minimising the area of disturbance at all times;
 - e) Avoiding placement of construction material or excavated matter in the flowing channel; and
 - f) Undertaking works from outside the actively flowing stream bed, where practicable.

Vehicle contaminants

- 11. The permit holder shall ensure that:
 - a) All machinery is thoroughly cleaned of any vegetation, seeds or contaminants (such as sediments and mud) away from the works site prior to entering or exiting the works site. Cleaning shall be undertaken in an area where the wash water does not enter the stream;
 - b) No contaminants (including but not limited to oil, petrol, diesel or hydraulic fluid) shall be released into water from equipment being used for the works;
 - c) All contaminant storage or re-fuelling areas are bunded or contained in such a manner so as to prevent the discharge of contaminants;
 - d) All machinery is regularly maintained in such a manner so as to minimise the potential for leakage of contaminants (including but not limited to fuels, hydraulic fluids and lubricants); and
 - e) No machinery is stored or refuelled within 10 metres of any ephemeral or permanent watercourse.

Erosion and scour

- 12. The works shall remain the responsibility of the permit holder and shall be maintained to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council such that:
 - a) Any erosion of the stream bed and banks that is attributable to the works carried out as part of this permit is repaired by the permit holder to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Maintenance does not include any works outside of the scope of the application. Any additional works (including structures, reshaping or disturbance to the bed of the watercourse) following completion of the construction works as proposed in the application, may require further resource consents.

Review conditions

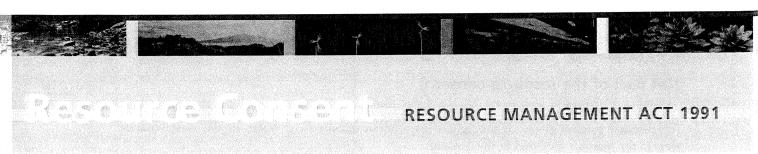
- 13. From the exercise of this permit the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first and second anniversary of the granting of this permit for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this permit, and which is appropriate to deal with at a later stage;
 - To review the adequacy of any monitoring plans and/or alter any monitoring requirements so as to incorporate into the permit any monitoring or other requirements which may become necessary to clarify or deal with any adverse effect on the environment of arising from this activity; and
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the permit holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the permit" is deemed to be once the works authorised by this consent have commenced.

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Consent No. WGN090127 [27269]

Category: Land use consent

Pursuant to sections 104, 104B and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Flood Protection Department, Wellington R	egional Council
Address	Flood Protection Department, Wellington Wellington 6142	on Regional Council, PO Box 11646,
Duration of consent	Effective: 12 March 2009	Expires: 12 March 2015
Purpose for which right is granted	 u-channel downstream of the Seavie The construction and installation of notation The construction and installation associated works; and 	the Waiwhetu Stream channel in the work Road Bridge; etaining walls and associated works; of erosion and scour protection and associated with the environmental
Location	Bridge, Waiwhetu, Lower Hutt to the Waiv	reach downstream, from the Bell Road whetu Stream mouth at Port Road Bridge, eximate map references NZMS 260: 27;2669345.5994850.
Legal description of land	Various	
Conditions	1 -17 as attached	

For and on behalf of WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27269]

General conditions

- 1. The location, design and construction of the works shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this consent, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the consent holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to the works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The consent holder shall provide a copy of this consent and any documents referred to in this consent to each operator or contractor undertaking works authorised by this consent, before that operator or contractor starts any works. The consent holder shall verbally brief the contractor regarding the conditions of the consent, prior to the works authorised by this consent commencing.
- 4. The consent holder shall ensure that a copy of this consent and all documents referred to in this consent, is kept on site at all times and presented to any Wellington Regional Council officer on request.
- 5. All works affecting the Waiwhetu Stream, including tidy up on completion of the works, shall be completed to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Works/Design details

- 6. The consent holder shall ensure that no wet concrete, concrete wash water or any water contaminated with concrete enters the flowing water in the Waiwhetu Stream as a result of construction works.
- 7. Prior to any work that has the potential to affect neighbouring properties or infrastructure the consent holder shall inform the relevant utility service provider or property owner(s). The consent holder shall ensure that the works do not impede any utility service provider's or property owner(s) access to their property or infrastructure.
- 8. All structures (the erosion and scour protection structures, retaining walls and environmental enhancement structures) shall be bedded into the stream to a sufficient depth to prevent erosion and scour.

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9. Only sediment below the Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Sediment Quality Guidelines may be stockpiled on the floodplain. The consent holder shall install a silt fence or any other appropriate sediment control measure that is to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council, between any stockpiles and the stream to ensure no sediment laden runoff discharges to the stream. All stockpiles shall be aligned in such a way as to not impede flood flows and removed from the site as soon as practicable.

Note: Greater Wellington does not consider hay bales as an appropriate sediment control measure.

- 10. The consent holder shall ensure the reno mattresses and gabion baskets are constructed and maintained to a high standard. The reno mattresses shall have tight joins, smooth edges, and returns at the ends.
- 11. The consent holder shall place rock rip-rap in the bed of the stream as a transition measure at the edges of all the bed linings (both concrete and reno mattresses) and at the upstream and downstream ends of the gabion basket structure located at the railway bridge.

Note: 'Transition measure' has the same meaning as that inferred in the peer review received on 9 December 2008 and is to ensure there is no local turbulence and hence scour at the edges of the proposed structures.

Works exclusion period

12. No works which impede the full flow of the Waiwhetu stream shall be carried out in the wetted channel during the native fish spawning/migration season (1 August to 30 September inclusive).

Note: The applicant has advised that the installation of the environmental enhancement structures, the works within the u shaped channel, and the works in the stretch between Bell Road Bridge and the remediation works, will take place within the native fish spawning/migration season.

Sedimentation effects

- 13. The consent holder shall take all practicable steps to minimise sedimentation and increased turbidity of the Waiwhetu Stream during the construction, implementation and maintenance of the structures, including but not limited to:
 - a) Installation and use of silt curtains;
 - b) The installation of a second silt curtain, unless the installation is not practicable;
 - c) Completing all works in the minimum time practicable;
 - d) Minimising the area of disturbance at all times;
 - e) Avoiding placement of construction material or excavated matter in the flowing channel or in a location where runoff enters the stream; and
 - f) Undertaking works from outside the actively flowing stream bed, where practicable and separation of construction activities from flowing water (by diverting the stream flow around the works as detailed in the application).

Vehicle contaminants

- 14. The consent holder shall ensure that:
 - a) All machinery is thoroughly cleaned of any vegetation, seeds or contaminants (such as sediments and mud) away from the works site prior to entering or exiting the works site. Cleaning shall be undertaken in an area where the wash water does not enter the stream;

- b) No contaminants (including but not limited to oil, petrol, diesel or hydraulic fluid) shall be released into water from equipment being used for the works;
- c) All contaminant storage or re-fuelling areas are bunded or contained in such a manner so as to prevent the discharge of contaminants;
- d) All machinery is regularly maintained in such a manner so as to minimise the potential for leakage of contaminants (including but not limited to fuels, hydraulic fluids and lubricants); and
- e) No machinery is stored or refuelled within 10 metres of any ephemeral or permanent watercourse.

Erosion and scour

- 15. The structures shall remain the responsibility of the consent holder and shall be maintained so that:
 - a) Any erosion of the stream bed and banks that is attributable to the works carried out as part of this consent is repaired by the consent holder to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council;
 - b) Fish passage is not impeded on completion of the works;
 - c) The structures remain substantively clear of debris and rubbish; and
 - d) The structures associated with this consent (e.g. the reno mattresses etc) are kept in a well maintained condition and the structural integrity of all the structures authorised by this consent remains sound.

Maintenance does not include any works outside of the scope of the application. Any additional works (including structures, reshaping or disturbance to the bed of the watercourse) following completion of the construction works as proposed in the application, may require further resource consents.

lwi

16. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall follow the 'Protocol for dealing with Koiwi and Taonga' outlined in the Hutt Park Management Plan submitted as Appendix F in the application documents 20 October 2008.

Review conditions

- 17. From the exercise of this consent the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first, fifth, tenth, fifteenth, twentieth, twenty-fifth and thirtieth anniversary of the granting of this consent for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this consent, and which is appropriate to deal with at a later stage;
 - To review the adequacy of any plans and/or methods used in the structures design or construction; and/or
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the consent holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the consent" is deemed to be once the works authorised by this consent have commenced.

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RESOURCE MANAGEMENT ACT 1991

Consent No. WGN090127 [27270]

Category: Land use consent

Pursuant to sections 104, 104B and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name

Address

Duration of consent

Purpose for which right is granted

Hutt City Council

Hutt City Council, Private Bag 31912, Lower Hutt, 5040

Effective: 12 March 2009

Expires: 12 March 2044

For works in, on, under or over the bed of the Waiwhetu Stream, including:

- The upgrade, relocation, removal and demolition of obsolete and existing stormwater outfall structures and the construction of new stormwater outfall structures including the maintenance of these structures; and
- The construction and/or upgrade and maintenance of 4 pipelines (sewer main downstream of urupa, sewer main duplication upstream of Seaview Road Bridge, sewer main at Hutt Park and the water main at Hutt Park Bridge) under the bed of the Waiwhetu Stream;

including any associated disturbance of and deposition of stream bed material on the stream bed.

Location

The Waiwhetu Stream, Lower Hutt: the reach downstream, from the Bell Road Bridge, Waiwhetu, Lower Hutt to the Waiwhetu Stream mouth at Port Road Bridge, Seaview, Lower Hutt between approximate map references NZMS 260: R27;2670458.5995245 and NZMS 260: R27;2669345.5994850.

Legal description of land

Conditions

Various

1 -15 as attached

For and on behalf of WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27270]

General conditions

- 1. The location, design and construction of the works shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this consent, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the consent holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to the works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The consent holder shall provide a copy of this consent and any documents referred to in this consent to each operator or contractor undertaking works authorised by this consent, before that operator or contractor starts any works. The consent holder shall verbally brief the contractor regarding the conditions of the consent, prior to the works authorised by this consent commencing.
- 4. The consent holder shall ensure that a copy of this consent and all documents referred to in this consent, is kept on site at all times and presented to any Wellington Regional Council officer on request.
- 5. All works affecting the Waiwhetu Stream, including tidy up on completion of the works, shall be completed to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Works/Design details

- 6. The consent holder shall ensure that no wet concrete, concrete wash water or any water contaminated with concrete enters the flowing water in the Waiwhetu Stream as a result of construction works.
- 7. Prior to any work that has the potential to affect neighbouring properties or infrastructure the consent holder shall inform the relevant utility service provider or property owner(s). The consent holder shall ensure that the works do not impede any utility service provider's or property owner(s) access to their property or infrastructure.
- 8. The upgraded and newly created stormwater outfall structures shall be suitably embedded in the stream bed to minimise the potential for erosion and scour.

30%

9. Only sediment below the Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Sediment Quality Guidelines may be stockpiled on the floodplain. The consent holder shall install a silt fence or any other appropriate sediment control measure that is to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council, between any stockpiles and the stream to ensure no sediment laden runoff discharges to the stream. All stockpiles shall be aligned in such a way as to not impede flood flows and removed from the site as soon as practicable.

Note: Greater Wellington does not consider hay bales as an appropriate sediment control measure.

Works exclusion period

10. No works which impede the full flow of the Waiwhetu stream shall be carried out in the wetted channel during the native fish spawning/migration season (1 August to 30 September inclusive).

Note: The applicant has advised that the installation of the environmental enhancement structures, the works within the u shaped channel, and the works in the stretch between Bell Road Bridge and the remediation works, will take place within the native fish spawning/migration season.

Sedimentation effects

- 11. The consent holder shall take all practicable steps to minimise sedimentation and increased turbidity of the Waiwhetu Stream during the upgrade, construction, implementation and maintenance of the pipelines and stormwater outfall structures, including but not limited to:
 - a) Installation and use of at least two sedimentation cells in those areas as detailed in the application;
 - b) Installation and use of silt curtains;
 - c) The installation of a second silt curtain, unless the installation is not practicable;
 - d) Completing all works in the minimum time practicable;
 - e) Minimising the area of disturbance at all times;
 - f) Avoiding placement of construction material or excavated matter in the flowing channel or in a location where runoff enters the stream; and
 - g) Undertaking works from outside the actively flowing stream bed, where practicable and separation of construction activities from flowing water (by diverting the stream flow around the works as detailed in the application).

Vehicle contaminants

- 12. The consent holder shall ensure that:
 - a) All machinery is thoroughly cleaned of any vegetation, seeds or contaminants (such as sediments and mud) away from the works site prior to entering or exiting the works site. Cleaning shall be undertaken in an area where the wash water does not enter the stream;
 - b) No contaminants (including but not limited to oil, petrol, diesel or hydraulic fluid) shall be released into water from equipment being used for the works;
 - c) All contaminant storage or re-fuelling areas are bunded or contained in such a manner so as to prevent the discharge of contaminants;
 - d) All machinery is regularly maintained in such a manner so as to minimise the potential for leakage of contaminants (including but not limited to fuels, hydraulic fluids and lubricants); and

No machinery is stored or refuelled within 10 metres of any ephemeral or permanent watercourse.

Erosion and scour

- 13. The pipes and stormwater outfall structures shall remain the responsibility of the consent holder and shall be maintained so that:
 - a) Any erosion or scour of the stream bed and banks that is attributable to the works carried out as part of this consent is repaired by the consent holder to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council;
 - b) The pipelines are kept in a well maintained condition so that there are no leakages from the pipes;
 - c) Fish passage is not impeded on completion of the works;
 - d) The structures remain substantively clear of debris and rubbish; and
 - e) The structures associated with this consent are kept in a well maintained condition and the structural integrity of all the structures authorised by this consent remains sound.

Maintenance does not include any works outside of the scope of the application. Any additional works (including structures, reshaping or disturbance to the bed of the watercourse) following completion of the construction works as proposed in the application, may require further resource consents.

lwi

14. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall follow the 'Protocol for dealing with Koiwi and Taonga' outlined in the Hutt Park Management Plan submitted as Appendix F in the application documents 20 October 2008.

Review conditions

- 15. From the exercise of this consent the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first, fifth, tenth, fifteenth, twentieth, twenty-fifth and thirtieth anniversary of the granting of this consent for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this consent, and which is appropriate to deal with at a later stage:
 - To review the adequacy of any plans and/or methods used in the pipelines and stormwater outfall structures design or construction; and/or
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the consent holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the consent" is deemed to be once the works authorised by this consent have commenced.





RESOURCE MANAGEMENT ACT 1991

Consent No. WGN090127 [27271]

Category: Land use consent

Pursuant to sections 104, 104B and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Flood Protection Department, Wellington R	egional Council	
Address	Flood Protection Department, Wellington Wellington 6142	on Regional Council, PO Box 11646,	
Duration of consent	Effective: 12 March 2009	Expires: 12 March 2044	
Purpose for which right is granted	structures and with the channel wide	the various erosion and scour protection ning and deepening works;	
	 Bed and bank recontouring (including the removal of silt build up); and The maintenance of environmental enhancements and associated structures; including any associated disturbance of and deposition on the stream bed and any 		
	associated discharges to the stream.		
Location			
Legal description of land	Various		
Conditions	1 -15 as attached		

For and on behalf of WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27271]

General conditions

- The location, design and construction of the works shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this consent, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the consent holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to maintenance works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The consent holder shall provide a copy of this consent and any documents referred to in this consent to each operator or contractor undertaking works authorised by this consent, before that operator or contractor starts any works. The consent holder shall verbally brief the contractor regarding the conditions of the consent, prior to the works authorised by this consent commencing.
- 4. The consent holder shall ensure that a copy of this consent and all documents referred to in this consent, is kept on site at all times and presented to any Wellington Regional Council officer on request.
- 5. All maintenance works affecting the Waiwhetu Stream, including tidy up on completion of the works, shall be completed to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Works/Design details

Once the remediation, channel deepening and widening and erosion and protection works are complete the consent holder shall keep annual records (from 1 July to 30 June inclusively) of all maintenance works that occur on the Waiwhetu Stream, including the specific location, details on what maintenance has been undertaken on a particular structure or plantings. The records shall also identify those areas where any bed or bank recontouring has been undertaken and quantities of silt removed from the stream bed. This information should be submitted to the Manager, Environmental Regulation, Wellington Regional Council by the 10 July each year.

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- 7. The consent holder shall provide prior to undertaking any maintenance works a detailed methodology for the proposed works, including but not limited to:
 - Location and timeline for the works:
 - How the works will be undertaken (e.g. details on any temporary diversion);
 - Identification of who the contractor is for the works;
 - What erosion and sediment control measures will be implemented on site to minimise sedimentation to the Waiwhetu Stream.

The methodology shall be to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

- 8. Prior to any work that has the potential to affect neighbouring properties or infrastructure the consent holder shall inform the relevant utility service provider or property owner(s). The consent holder shall ensure that the works do not impede any utility service provider's or property owner(s) access to their property or infrastructure.
- 9. Only sediment below the Interim Sediment Quality Guideline (ISQG) high concentration criteria in Table 3.5.1 of the Australian and New Zealand Environmental and Conservation Council (ANZECC, 2000) Sediment Quality Guidelines may be stockpiled on the floodplain. The consent holder shall install a silt fence or any other appropriate sediment control measure that is to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council, between any stockpiles and the stream to ensure no sediment laden runoff discharges to the stream. All stockpiles shall be aligned in such a way as to not impede flood flows and removed from the site as soon as practicable.

Note: Greater Wellington does not consider hay bales as an appropriate sediment control measure.

10. The consent holder shall ensure all structures including the reno mattresses and gabion baskets are maintained to a high standard to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Works exclusion period

11. No works shall be carried out within the wetted channel of the stream during the native fish spawning/migration season (1 April to 31 July inclusive).

Sedimentation effects

- 12. The consent holder shall take all practicable steps to minimise sedimentation and increased turbidity of the Waiwhetu Stream during the maintenance works, including but not limited to:
 - a) Completing all works in the minimum time practicable;
 - b) The installation of a silt curtain, unless the installation is not practicable;
 - c) Minimising the area of disturbance at all times;
 - d) Undertaking works in low flow conditions;
 - e) Avoiding placement of construction material or excavated matter in the flowing channel; and
 - f) Undertaking works from outside the actively flowing stream bed and the separation of construction activities from flowing water.

Vehicle contaminants

- 13. The consent holder shall ensure that:
 - a) All machinery is thoroughly cleaned of any vegetation, seeds or contaminants (such as sediments and mud) away from the works site prior to entering or exiting the works site. Cleaning shall be undertaken in an area where the wash water does not enter the stream;

- b) No contaminants (including but not limited to oil, petrol, diesel or hydraulic fluid) shall be released into water from equipment being used for the works;
- c) All contaminant storage or re-fuelling areas are bunded or contained in such a manner so as to prevent the discharge of contaminants;
- d) All machinery is regularly maintained in such a manner so as to minimise the potential for leakage of contaminants (including but not limited to fuels, hydraulic fluids and lubricants); and
- e) No machinery is stored or refuelled within 10 metres of any ephemeral or permanent watercourse.

Erosion and scour

- 14. The structures shall remain the responsibility of the consent holder and shall be maintained so that:
 - a) Any erosion of the stream bed and banks that is attributable to the works carried out as part of this consent is repaired by the consent holder to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council;
 - b) Fish passage is not impeded on completion of the works;
 - c) The structures remain substantively clear of debris and rubbish; and
 - d) The structures associated with this consent are kept in a well maintained condition and the structural integrity of all the structures authorised by this consent remains sound.

Maintenance does not include any works outside of the scope of the application. Any additional works (including structures, reshaping or disturbance to the bed of the watercourse) following completion of the construction works as proposed in the application, may require further resource consents.

Review conditions

- 15. From the exercise of this consent the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first, fifth, tenth, fifteenth, twentieth, twenty-fifth and thirtieth anniversary of the granting of this consent for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this consent, and which is appropriate to deal with at a later stage;
 - To review the adequacy of the maintenance being undertaken; and/or
 - Enable consistency with the relevant Regional Freshwater Plan and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the consent holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the consent" is deemed to be once the works authorised by this consent have commenced.

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RESOURCE MANAGEMENT ACT 1991

Consent No. WGN090127 [27272]

Category: Coastal permit

Pursuant to sections 104, 104B, 105 and 108, and subject to all the relevant provisions of the Resource Management Act 1991 and any regulations made thereunder, a consent in respect of a natural resource is hereby granted to:

Name	Flood Protection Department, Wellington Re	egional Council
Address	Flood Protection Department, Wellingto Wellington 6142	n Regional Council, PO Box 11646,
Duration of consent	Effective: 12 March 2009	Expires: 12 March 2044
Purpose for which right is granted	 the abutments and piles of the Port F Construction and maintenance of er Bridge, including any associated dis 	ion of existing erosion protection around
Location	The Waiwhetu Stream mouth at Port Road map reference NZMS 260: R27;2669352.5	
Legal description of land	Various	
Conditions	1 -15 as attached	

For and on behalf of

WELLINGTON REGIONAL COUNCIL

Manager, Environmental Regulation

Date: 12 March 2009

Summary of your rights and responsibilities

(Not part of the resource consent)

This resource consent gives you the right to use a public resource (e.g. water, air, the coastal marine area) in the manner specified in the consent.

You may exercise the resource consent as you see fit provided that you comply with all the conditions of your resource consent and all other laws of the land.

If you wish to change the way you operate under this resource consent or if you wish to change or cancel any consent conditions, please contact the Wellington Regional Council (hereafter referred to as Greater Wellington) prior to making the changes. You may need a formal change to your resource consent conditions.

You may transfer your coastal, discharge, or water permit to any other person. If you sell your operation please contact Greater Wellington and we will arrange the transfer. The service is free of charge.

If your resource consent application contained inaccurate or misleading information, Greater Wellington may cancel or alter the resource consent.

Your resource consent does not:

- provide any warranty of any structure or process;
- provide any guarantee that the resource will be available at all times;
- provide any right of access through or over public or private land;
- negate the need for any approvals necessary under other legislation.

You, as the holder(s) of this resource consent and your agents (including contractors and employees), are jointly and severally liable for compliance with the conditions of this consent. It is important that anyone operating on your behalf fully understands and complies with the conditions of the resource consent.

You are required to pay any relevant charges that are associated with the consent. Greater Wellington fixes these charges under section 36 of the Resource Management Act 1991. The Act allows you to comment on any proposed charges *prior to them being fixed*. Charges may be reviewed every year. If you would like a copy of our current Resource Management Charging Policy please ask us.

You are required to allow Greater Wellington Enforcement Officers access to your site and operation at any reasonable time so that we can inspect your operation and confirm that it is complying with the resource consent.

Your resource consent will lapse if you do not give effect to it within five years of the date it was granted (unless otherwise specified in the resource consent conditions). If you wish to apply for an extension of this lapse date please contact Greater Wellington before the lapse date.

If you stop using your resource consent for a continuous five-year period, Greater Wellington may cancel your resource consent. We will advise you in advance if we propose to cancel your consent. You have the right to object to your consent being cancelled.

This consent is issued without prejudice to any claim that is lodged with the Waitangi Tribunal in relation to the customary ownership of natural resources, whether it be a claim that is awaiting hearing or awaiting settlement by the Crown.

Conditions to Resource Consent WGN090127 [27272]

General conditions

- 1. The location, design and construction of the works shall be in general accordance with the application, and its associated plans and documents, lodged with the Wellington Regional Council on 20 October 2008, and further information received:
 - At the pre hearing meeting on 2 December 2008;
 - On 5 December 2008 (via email); and
 - In the peer review received on 9 December 2008.

For the avoidance of doubt, where information contained in the application is contrary to conditions of this permit, the conditions shall prevail.

Minor changes to the location, design concepts and parameters, implementation and/or operation may be made by the permit holder where practicable and provided that these changes are to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: Any significant change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change of consent conditions pursuant to section 127 of the Resource Management Act 1991

2. The Manager, Environmental Regulation, Wellington Regional Council, shall be given a minimum of two working days (48 hours) notice prior to maintenance works commencing.

Note: Notifications can be emailed to notifications@gw.govt.nz.

- 3. The permit holder shall provide a copy of this permit and any documents referred to in this permit to each operator or contractor undertaking works authorised by this permit, before that operator or contractor starts any works. The permit holder shall verbally brief the contractor regarding the conditions of the permit, prior to the works authorised by this permit commencing.
- 4. The permit holder shall ensure that a copy of this permit and all documents referred to in this permit, is kept on site at all times and presented to any Wellington Regional Council officer on request.
- 5. All works affecting the Waiwhetu Stream and the coastal marine area, including tidy up on completion of the works, shall be completed to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Works/Design details

- 6. Prior to any work that has the potential to affect neighbouring properties or infrastructure the consent holder shall inform the relevant utility service provider or property owner(s). The consent holder shall ensure that the works do not impede any utility service provider's or property owner(s) access to their property or infrastructure.
- 7. All sediment excavated from the channel shall be removed from the area and disposed of in an appropriate manner.
- 8. All structures (the erosion and scour protection structures, retaining walls and environmental enhancement structures) shall be bedded into the stream to a sufficient depth to prevent erosion and scour.

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- 9. The permit holder shall ensure that no wet concrete, concrete wash water or any water contaminated with concrete enters the flowing water in the Waiwhetu Stream as a result of construction works.
- 10. Upon completion of the works, all materials surplus to the works shall be removed from the coastal marine area and disposed of in an appropriate manner.

Sedimentation effects

- 11. The permit holder shall take all practicable steps to minimise sedimentation and increased turbidity of Waiwhetu Stream and the coastal marine area due to the implementation and operation of the works, including but not limited to:
 - a) Completing all works in the minimum time practicable;
 - b) Minimising the area of disturbance at all times;
 - c) Separating construction activities from the coastal marine area and from outside the actively flowing stream bed, where practicable;
 - d) Ensuring that no excavated, surplus or waste construction materials are dumped or stored in the coastal marine area or in the flowing channel; and
 - e) Undertaking the works in such weather, tidal or sea conditions where the potential for sediment to be mobilised into the coastal marine area is minimised

Vehicle contaminants

- 12. The permit holder shall ensure that:
 - a) All machinery is thoroughly cleaned of any vegetation, seeds or contaminants (such as sediments and mud) away from the works site prior to entering or exiting the works site. Cleaning shall be undertaken in an area where the wash water does not enter the stream:
 - b) No contaminants (including but not limited to oil, petrol, diesel or hydraulic fluid) shall be released into water from equipment being used for the works;
 - c) All contaminant storage or re-fuelling areas are bunded or contained in such a manner so as to prevent the discharge of contaminants;
 - d) All machinery is regularly maintained in such a manner so as to minimise the potential for leakage of contaminants (including but not limited to fuels, hydraulic fluids and lubricants); and
 - e) No machinery is stored or refuelled within 10 metres of any ephemeral or permanent watercourse or refuelled within the coastal marine area.

Erosion and scour

- 13. The works and structures shall remain the responsibility of the permit holder and shall be maintained so that:
 - a) Any erosion of the stream bed or banks that is attributable to the works carried out as part of this permit is remedied by the permit holder to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council;
 - b) Any erosion of the foreshore that is attributable to the structures is repaired by the permit holder;
 - c) Access to the foreshore is not impeded by the structure(s);
 - d) The structures do not pose a hazard to navigation; and
 - e) The structural integrity of the structures remains sound.

Maintenance does not include any works outside of the scope of the application. Any additional works (including structures, reshaping or disturbance to the bed of the watercourse) following completion of the construction works as proposed in the application, may require further resource consents.

lwi

14. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall follow the 'Protocol for dealing with Koiwi and Taonga' outlined in the Hutt Park Management Plan submitted as Appendix F in the application documents 20 October 2008.

Review conditions

- 15. From the exercise of this permit the Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the first, fifth, tenth, fifteenth, twentieth, twenty-fifth and thirtieth anniversary of the granting of this permit for the purpose of:
 - Enabling consistency with the Waiwhetu Stream Floodplain Management Plan;
 - Dealing with any adverse effects on the environment which may arise from the exercise of this permit, and which is appropriate to deal with at a later stage;
 - To review the adequacy of any plans and/or methods used during the works; and/or
 - Enable consistency with the relevant Regional Freshwater and Coastal Plans and or with National Environmental Standards.

The Wellington Regional Council shall be entitled to recover from the permit holder the costs of any review, calculated in accordance with and limited to the Council's scale of charges in force and applicable at that time pursuant to Section 36 of the Resource Management Act 1991.

Note: For the purposes of this condition the "exercise of the permit" is deemed to be once the works authorised by this consent have commenced.

John John

Appendix B Validation Sample Results







CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA12964-J

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 12 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 21/11/2009 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand.

This report may not be reproduced either in part or whole without the prior consent of the undersigned.

Date: 23/11/2009 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





URS NEW ZEALAND LTD

JOB REFERENCE: SA12964-J

X-RAY FLUORESCENCE ANALYSES

20.11.09 20.11.09 36 73 54 2 36 14 58 382 95 17 164 33 33/Kg on oven-dried 110°C basis	A/90R A/9	A/90M A/70R	OR A/70M
54 14 95 33 -			
95 33 - 46.9		40 42	2
33		10 12	8
33		122 108	8 79
46.9		50 58	3 28
46.9			
18.3 56.4 46.9			
•		29.0 23.5	.5 23.2
>zmm rraction %		1	1





URS NEW ZEALAND LTD

JOB REFERENCE: SA12964-J

X-RAY FLUORESCENCE ANALYSES

SAMPLE	A/50R	A/50M	A/30R	A/30M	A/10R	A/10M
	20.11.09	20.11.09	20.11.09	20.11.09	20.11.09	20.11.09
ပ်	45	41	39	36	36	32
Cu	12	2	4	2	7	2
Zn	123	89	7.1	64	82	64
Pb	54	20	24	18	31	21
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 1	10°C basis.				
	0	(1	1	1	1
Moisture Content %	28.0	12.8	22.7	15.8	17.7	16.7
<2mm fraction %		,				•
>2mm fraction %			•	•	•	•





CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA12964-D

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 9/11/2009 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand. This report may not be reproduced either in part or whole without the prior consent of the undersigned.

Date: 9/11/2009 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





URS NEW ZEALAND LTD

JOB REFERENCE: SA12964-D

X-RAY FLUORESCENCE ANALYSES

SAMPLE	1/10R	1/10M	1/10L	1/30R	1/30M	1/30L
	07.11.09	07.11.09	07.11.09	07.11.09	07.11.09	07.11.09
່ວັ	48	42	38	42	32	52
Cu	10	7	9	13	2	17
Zn	96	110	73	161	65	244
Pb	36	38	21	64	17	66
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 1	10°C basis.				
		!	((
Moisture Content %	20.1	27.7	20.6	19.1	19.1	20.6
<2mm traction %	ı	ı	1	ı	1	
>2mm fraction %	ı	ı	ı	ı	ı	ı





CLIENT : URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA12964-E

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 10/11/2009 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
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Cr, Cu, Zn, Pb Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand. This report may not be reproduced either in part or whole without the prior consent of the undersigned.

Date: 10/11/2009 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





URS NEW ZEALAND LTD

JOB REFERENCE: SA12964-E

X-RAY FLUORESCENCE ANALYSES

SAMPLE	1/50R	1/50M	1/501	1/70R	1/70M	1/701
	09.11.09	09.11.09	09.11.09	09.11.09	09.11.09	09.11.09
Ċ	39	44	43	42	39	54
Cu	က	∞	O	7	4	7
Zn	54	87	102	63	63	181
Pb	4	28	36	18	16	70
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 1	10°C basis.				
Moisture Content %	14.3	22.8	22.4	20.4	18.2	20.4
<2mm fraction % >2mm fraction %	1 1	1 1				





CLIENT : URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA12964-F

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 3 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 11/11/2009 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand. This report may not be reproduced either in part or whole without the prior consent of the undersigned.

Date: 12/11/2009 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





URS NEW ZEALAND LTD

JOB REFERENCE: SA12964-F

X-RAY FLUORESCENCE ANALYSES

SAMPLE	1/90R 11.11.09	1/90M 11.11.09	1/90L 11.11.09
Ċ	43	43	42
Cu	∞	∞	∞
Zn	65	80	65
Pb	20	28	19

Results are expressed as mg/Kg on oven-dried 110°C basis.

Moisture Content %	25.1	22.2	20.9
<2mm fraction %	ı	1	ı
>2mm fraction %	ı	ı	ı





ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA12964-K

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 3 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 26/11/2009 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand. This report may not be reproduced either in part or whole without the prior consent of the undersigned.

Date: 26/11/2009 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA12964-K

X-RAY FLUORESCENCE ANALYSES

SAMPLE	B/110R 25.11.09	B/110M 25.11.09	B/110L 25.11.09
່ວ	42	46	37
On	12	10	4
Zn	127	133	29
Pb	4	56	31

Results are expressed as mg/Kg on oven-dried 110°C basis.

Moisture Content %	24.2	26.9	3.8
<2mm fraction %	ı	ı	ı
>2mm fraction %	ı	ı	ı





ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA12964-L

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 3 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 27/11/2009 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand. This report may not be reproduced either in part or whole without the prior consent of the undersigned.

Date: 27/11/2009 Signed: Lee Searle IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA12964-L

X-RAY FLUORESCENCE ANALYSES

SAMPLE	B/130L 25.11.09	B/130M 25.11.09	B/110R 25.11.09
Ö	33	33	44
Cu	~	7	2
Zn	47	51	63
Pb	7	15	20

Results are expressed as mg/Kg on oven-dried 110°C basis.

19.3 21.2	1	1	
Moisture Content %	<2mm fraction %	>2mm fraction %	





ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13074-C

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 14/01/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand.

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Date: 15/01/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13074-C

SAMPLE	CD/10L	CD/10M	CD/10R	CD/30L	CD/30M	CD/30R
	13.01.10	13.01.10	13.01.10	13.01.10	13.01.10	13.01.10
ö	29	34	34	37	36	35
Cu	_	က	9	2	2	4
Zn	49	51	96	22	90	62
Pb	16	16	44	18	41	28
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 11	0°C basis.				
Moisture Content %	12.6	6.0	17.4	20.6	15.2	16.5





ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13074-D

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 14/01/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



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SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13074-D

			!	ļ		į
SAMPLE	CD/50R 14.01.10	CD/50M 14.01.10	CD/50L 14.01.10	CD/70R 14.01.10	CD/70M 14.01.10	CD/70L 14.01.10
ర	28	33	32	25	26	24
Cu	~	~	٧	7	7	~
Zn	45	99	45	43	47	44
Pb	13	20		12	41	17
Results are expressed as mg/Kg on oven-dried 110°C basis.	g on oven-dried 11	0°C basis.				
Moisture Content %	18.8	5.9	15.9	20.9	16.9	16.3





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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13074-E

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 12 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 15/01/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



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JOB REFERENCE: SA13074-E

SAMPLE	CD/90L 14.01.10	CD/90M 14.01.10	CD/90R 14.01.10	CD/110L 14.01.10	CD/110M 14.01.10	CD/110R 14.01.10
ర్	32	35	59	27	33	28
Cu	~	~	7	_	~	~
Zn	48	51	46	47	49	47
Pp	13	41	13	17	13	4
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 11	0°C basis.				
Moisture Content %	18.9	19.4	19.9	19.2	19.6	20.5





JOB REFERENCE: SA13074-E

SAMPLE	CD/130L 14.01.10	CD/130M 14.01.10	CD/130R 14.01.10	CD/150L 14.01.10	CD/150M 14.01.10	CD/150R 14.01.10
ప	33	35	36	34	29	27
Cu	က	2	4	က	2	2
Zn	54	56	26	59	47	62
Pb	16	15	17	18	12	69
Results are expressed as mg/Kg on oven-dried 110°C basis.	/Kg on oven-dried 1	10°C basis.				
Moisture Content %	21.6	16.0	18.6	22.2	12.3	16.6





ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13074-F

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 15/01/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg



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SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13074-F

SAMPLE	CD/170L 15.01.10	CD/170M 15.01.10	CD/170R 15.01.10	CD/190L 15.01.10	CD/190M 15.01.10	CD/190R 15.01.10
ວັ	56	26	31	28	31	28
Cu	~	~	~	~	2	7
Zn	46	52	59	48	99	49
Pb	21	75	100	16	176	17
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 1'	10°C basis.				
Moisture Content %	17.5	18.4	16.9	9.7	23.1	18.7





ADDRESS: PO BOX 3367, WELLINGTON 6011.

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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13074-I

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 9 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 28/01/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit

Cr, Cu, Zn, Pb,

As & Ni

Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 29/01/2010 Signed: Lee Searle IANZ Signatory

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JOB REFERENCE: SA13074-I

SAMPLE	E/10R	E/10M	E10/L	E/30R	E/30M	E/30L
	28.01.10	28.01.10	28.01.10	28.01.10	28.01.10	28.01.10
ర్	31	32	32	31	30	31
Cu	_	4	22	7	_	2
Zn	51	69	70	52	29	20
Pb	13	142	200	21	22	15
As	2	9	7	2	2	က
ïZ	12	12	15	12	12	13
Results are expressed as mg/Kg on	g on oven-dried 110°C basis.	0°C basis.				
Moisture Content %	15.4	14.0	5.5	18.7	10.3	5.6





JOB REFERENCE: SA13074-I

X-RAY FLUORESCENCE ANALYSES

Cr 36 35 29 Cu 1 2 2 Zn 52 55 52 Pb 13 13 13 As 3 4 4 Ni 12 13 14	SAMPLE	E/50R 28.01.10	E/50M 28.01.10	E/50L 28.01.10
1 2 52 55 13 13 3 4 12 13	č	98	35	29
52 55 13 13 3 4 12 13	5 73	} -	8 8	2
13 13 3 4 12 13	Zn	52	55	52
3 4 12 13	Pb	13	13	13
12 13	As	က	4	4
	Ż	12	13	14

Results are expressed as mg/Kg on oven-dried 110°C basis.

21.0	
22.5	
23.5	
Moisture Content %	





ADDRESS: PO BOX 3367, WELLINGTON 6011.

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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13118-A

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 13 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 3/02/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 4/02/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13118-A

SAMPLE	E/110R 3.02.10	E/110M 3.02.10	E110/L 3.02.10	E/130R 3.02.10	E/130M 3.02.10	E/130L 3.02.10	E/150R 3.02.10
ပ်	38	42	31	34	37	34	32
Cu	2	∞	2	2	S	2	2
Zn	06	73	45	54	62	54	49
Pb	65	28	41	41	23	15	41
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 11	0°C basis.					
Moisture Content %	22.7	25.0	22.4	17.2	20.7	15.7	13.8





JOB REFERENCE: SA13118-A

SAMPLE	E/150M 3.02.10	E/150L 3.02.10	E/170M 3.02.10	E/170L 3.02.10	E/190M 3.02.10	E/190L 3.02.10
ڻ	59	32	30	59	34	36
Cu	က	က	2	2	2	က
Zn	47	52	62	53	106	150
Pb	13	4	20	72	39	15
Results are expressed as mg/Kg on oven-dried 110°C basis.	g on oven-dried 11	0°C basis.				
Moisture Content %	13.1	12.7	12.8	9.7	9.5	16.0





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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13118-B

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 2 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 4/02/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 5/02/2010 Signed: Craig Fraser IANZ Signatory

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JOB REFERENCE: SA13118-B

X-RAY FLUORESCENCE ANALYSES

SAMPLE	E/170R 4.02.10	E/190R 4.02.10
ဝံ	31	36
Cu	_	7
Zn	49	186
Pb	13	91

Results are expressed as mg/Kg on oven-dried 110°C basis.

14.4	
11.8	
Moisture Content %	





ADDRESS: PO BOX 3367, WELLINGTON 6011.

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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13206-A

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 7 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 10/03/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 11/03/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13206-A

SAMPLE	FG/10L 10.03.10	FG/10M 10.03.10	FG/30L 10.03.10	FG/30M 10.03.10	FG/30R 10.03.10	FG/50L 10.03.10	FG/50M 10.03.10
ڻ	32	36	33	32	34	37	34
Cu	4	~	2	က	2	က	~
Zn	106	54	51	82	84	82	48
Pb	15	13	19	18	34	39	12
Results are expressed as mg/Kg on oven-dried 110°C basis.	on oven-dried 11	0°C basis.					
Moisture Content %	15.0	15.4	0.9	14.2	14.3	5.5	7.9





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ATTENTION: SARAH HALLIDAY JOB REFERENCE: SA13206-B

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 9 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 10/03/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 12/03/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





CRL Energy Ltd

JOB REFERENCE: SA13206-B

SAMPLE	FG/70L 10.03.10	FG/70M 10.03.10	FG/70R 10.03.10	FG/90L 10.03.10	FG/90M 10.03.10	FG/90R 10.03.10	FG/110L 10.03.10	FG/110M 10.03.10	FG/110R 10.03.10
່ວັ	32	35	39	33	36	38	35	32	38
Cu	2	က	4	က	က	2	2	_	က
Zn	51	74	122	51	65	87	09	28	65
Pb	41	30	72	13	24	46	16	25	27
Results are expressed as mg/Kg on oven-dried 110°C basis.	ıg/Kg on oven-drie	ed 110°C basis.							
Moisture Content %	د رن	13.1	15.1	7.1	14.4	10.7	16.5	12.3	4.3





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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13206-C

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 9 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 10/03/2010 CONDITION: COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13206-C

SAMPLE	FG/150L 10.03.10	FG/150M 10.03.10	FG/150R 10.03.10	FG/170L 10.03.10	FG/170M 10.03.10	FG/170R 10.03.10	FG/190L 10.03.10	FG/190M 10.03.10	FG/190R 10.03.10
ັວ	33	41	43	44	35	37	39	36	54
Cn	က	9	9	10	က	2	_	က	14
Zn	51	82	110	130	92	79	24	22	183
Pb		37	63	49	38	34	16	17	116
Results are expressed as mg/Kg on oven-dried 110°C basis.	ng/Kg on oven-drie	ed 110°C basis.							
Moisture Content %	4.5	16.6	10.0	20.2	8.3	5.9	9.7	2.3	4.0





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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13206-D

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 2 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 11/03/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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JOB REFERENCE: SA13206-D

X-RAY FLUORESCENCE ANALYSES

SAMPLE	FG/10R	FG/50R
Cr	33	33
Cu	3	2
Zn	48	50
Pb	14	14

Results are expressed as mg/Kg on oven-dried 110°C basis.

Moisture Content % 15.7 14.8





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ATTENTION: SARAH HALLIDAY JOB REFERENCE: SA13206-E

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 9 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 16/03/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 17/03/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13206-E

SAMPLE	FG/210L 15.03.10	FG/210M 15.03.10	FG/210R 15.03.10	FG/230L 15.03.10	FG/230M 15.03.10	FG/230R 15.03.10	FG/250L 15.03.10	FG/250M 15.03.10	FG/250R 15.03.10
ວັ	43	37	40	43	36	36	43	43	31
Cu	œ	4	O	7	က	2	9	10	2
Zn	144	75	88	129	64	53	124	131	54
P ₀	82	33	167	82	23	41	88	86	16
Results are expressed as mg/Kg on oven-dried 110°C basis.	ng/Kg on oven-drie	ed 110°C basis.							
Moisture Content %	5.7	4.	3.0	5.5	2.7	3.6	8.7	12.8	3.5





ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION: SARAH HALLIDAY JOB REFERENCE: SA13206-F

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 16/03/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 18/03/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13206-F

SAMPLE	FG/270L 16.03.10	FG/270M 16.03.10	FG/270R 16.03.10	FG/130L 16.03.10	FG/130M 16.03.10	FG/130R 16.03.10
ర	47	39	43	36	38	34
Cn	7	O	9	9	7	~
Zn	203	130	129	95	53	22
Po	153	102	86	46	16	17
Results are expressed as mg/Kg on oven-dried 110°C basis.	ng/Kg on oven-dri	ed 110°C basis.				
Moisture Content %	11.1	11.5	14.7	8.4	5.6	5.8





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ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13287-A

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 9 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 8/04/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 9/04/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13287-A

SAMPLE	H/10L 8.04.10	H/10M 8.04.10	H/10R 8.04.10	H/30L 8.04.10	H/30M 8.04.10	H/30R 8.04.10	H/50L 8.04.10	H/50M 8.04.10	H/50R 8.04.10
ັວ	35	33	36	29	33	32	39	34	37
Cu	_	က	4	7	က	~	4	4	4
Zn	48	22	93	49	53	51	94	22	7.1
Pb	13	18	33	13	15	13	37	17	31
Results are expressed as mg/Kg on oven-dried 110°C basis.	ng/Kg on oven-drie	ed 110°C basis.							
Moisture Content %	3.1	3.5	9.6	2.8	5.2	10.9	7.5	17.3	9.3





ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13287-C

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 15/04/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 19/04/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt





JOB REFERENCE: SA13287-C

SAMPLE	H/110 L 13.04.10	H/110 M 13.04.10	H/130 L 13.04.10	H/130 LM 13.04.10	H/130 M 13.04.10	H/130 RM 13.04.10
ပ်	31	34	35	31	31	33
Cu	2	4	2	~	2	_
Zn	55	74	29	51	54	52
Pb	19	33	31	16	18	18
Results are expressed as mg/Kg on oven-dried 110°C basis.	ng/Kg on oven-dr	ied 110°C basis.				
Moisture Content %	0.4	5.8	3.2	5.6	3.2	2.3





CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION: SARAH HALLIDAY JOB REFERENCE: SA13287-E

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 20/04/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 21/04/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





JOB REFERENCE: SA13287-E

SAMPLE	H/70 M 19.04.10	H/70 L 19.04.10	H/70 R 19.04.10	H/90 M 19.04.10	H/90 L 19.04.10	H/90 R 19.04.10
ర	40	33	36	59	37	49
ņ	2	4	9	21	4	15
Zn	78	82	83	223	98	219
Pb	41	35	39	182	51	160
Results are expressed as mg/Kg on oven-dried 110°C basis.	mg/Kg on oven-dri	ed 110°C basis.				
Moisture Content %	8.9	3.4	7.9	11.1	15.4	11.6





CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13287-F

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 17 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 23/04/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



SpectraChem Analytical is an IANZ accredited analytical laboratory. All analyses presented in this report other than those indicated (*), have been carried out by SpectraChem or by a sub-contracted laboratory in accordance with the requirements of International Accreditation New Zealand.

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Date: 27/04/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz



CRL Energy Ltd

JOB REFERENCE: SA13287-F

SAMPLE	M/110 L 22.04.10	M/110 M 22.04.10	M/110 R 22.04.10	M/130 L 22.04.10	M/130 M 22.04.10	M/130 R 22.04.10	H/110 L rep 22.04.10	H/110 L rep H/110 M rep H/110 R rep 22.04.10 22.04.10 22.04.10	H/110 R rep 22.04.10
່ວັ	47	40	37	37	38	42	34	36	33
Cu	10	2	4	4	9	9	2	က	2
Zn	77	92	26	28	59	29	99	92	29
Вр	14	26	18	18	8	19	21	35	23
Results are expressed as mg/Kg on oven-dried 110°C basis.	ng/Kg on oven-drie	ed 110°C basis.							
Moisture Content %	21.7	6.2	16.5	6.3	4.0	20.6	10.4	11.9	4.11





JOB REFERENCE: SA13287-F

SAMPLE	H/130 M rep 22.04.10	H/130 M rep H/130 MR rep 22.04.10 22.04.10	H/130 R 22.04.10	H/150 ML 22.04.10	H/150 M 22.04.10	H/150 MR 22.04.10	H/150 R 22.04.10	MBS 22.04.10
ဝံ	30	36	30	28	31	35	36	34
Cn	_	ય	7	0	4	2	16	က
Zn	51	64	47	45	61	09	83	52
Pb	13	24	13	12	25	24	51	17
Results are expressed as mg/Kg on oven-dried 110°C basis.	mg/Kg on oven-dri	ied 110°C basis.						
Moisture Content %	14.1	7.9	13.3	3.3	6.8	4.2	12.8	10.1





CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13287-G

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 6 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 28/04/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 30/04/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





JOB REFERENCE: SA13287-G

SAMPLE	M/10 R 26.04.10	M/10 M 26.04.10	M/10 LM 26.04.10	H/150 L 26.04.10	H/130 L 26.04.10	H/130 LM 26.04.10
ర	34	44	31	29	30	31
Cu	34	12	က	က	2	က
Zn	48	136	72	58	22	54
Pb	13	86	12	12	22	16
Results are expressed as mg/Kg on oven-dried 110°C basis.	mg/Kg on oven-dri	ied 110°C basis.				
Moisture Content %	4.7	5.5	3.2	3.8	6.2	4.7





CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13287-H

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 13 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 30/04/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Cr, Cu, Zn, Pb.	Powder briquette / X-ray spectrometry / Spectra plus	1	mg/Kg
Δc R. Ni			



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Date: 3/05/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





JOB REFERENCE: SA13287-F

SAMPLE	UCW 5	UCW 10	UCW 15	UCW 20	UCW 25
	30.04.10	30.04.10	30.04.10	30.04.10	30.04.10
	Ξ	H2	Н3	H	H5
່ວ	42	43	38	40	35
Cn	12	16	_ග	9	7
Zn	120	122	115	84	80
Pb	91	88	84	46	43
As	9	Ø	9	4	2
Ż	4	4	15	13	13
Results are expressed as mg/Kg on oven-dried 110°C basis.	mg/Kg on oven-drie	ed 110°C basis.			
Moisture Content %	8.9	8.7	8.6	9.6	9.6

0,	
9.4	
8.6	
8.7	
8.9	
Moisture Content %	





JOB REFERENCE: SA13287-H

SAMPLE	M/30 R 30.04.10	M/30 M 30.04.10	M/50 R 30.04.10	M/50 M 30.04.10	M/50 L 30.04.10	M/90 R 30.04.10	M/90 M 30.04.10	M/90 L 30.04.10
ప	33	32	33	31	59	35	33	36
n	4	က	2	-	2	က	က	က
Zn	58	58	50	55	48	99	22	64
Pb	16	22	4	22	13	18	15	23
Results are expressed as mg/Kg on oven-dried 110°C basis.	y/Kg on oven-drie	d 110°C basis.						
Moisture Content %	8.8	4.6	3.9	6.8	4.5	18.6	16.5	14.6





CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13347-A

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 4 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 3/05/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis Method used LLD Unit

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 4/05/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





JOB REFERENCE: SA13347-A

SAMPLE	M/10 L 3.05.10	M/30 L 3.05.10	M/70 L 3.05.10	M/70 M 3.05.10
່ວ	33	35	36	30
Cu	4	9	9	ဇ
Zn	70	92	102	09
Pb	13	28	371	79
Results are expressed as mg/Kg on oven-dried 110°C basis.	: mg/Kg on oven-dri	ied 110°C basis.		
Moisture Content %	10.4	5.2	7.9	10.3





CLIENT: URS NEW ZEALAND LTD

ADDRESS: PO BOX 3367, WELLINGTON 6011.

EMAIL : sarah_halliday@urscorp.com

TEL : 04 496 3877

ATTENTION : SARAH HALLIDAY JOB REFERENCE : SA13347-A2

CLIENT REFERENCE : PROJECT No. not supplied

SAMPLE TYPE[S] : 1 x SLUDGES/STREAM SEDIMENTS

DATE OF SAMPLE RECEIPT : 4/05/2010 CONDITION : COARSE WET SOLID

ANALYSES CARRIED OUT : TRACE ELEMENTS

REPORTING BASIS : OVEN DRIED (110°C) - on <2mm fraction

The analytical results presented in this report apply to the sample(s) received by SpectraChem Analytical.

Analysis	Method used	LLD	Unit
Analysis	Method used	LLD	Un

Cr, Cu, Zn, Pb. Powder briquette / X-ray spectrometry / Spectra plus 1 mg/Kg



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Date: 5/05/2010 Signed: Craig Fraser IANZ Signatory

SpectraChem Analytical, CRL Energy Ltd : 68 Gracefield Rd : Lower Hutt

P O Box 31-244 Lower Hutt : Tel. 04 589-6333 : Fax. 04 569-6605 : Email. spectra@spectrachem.co.nz





JOB REFERENCE: SA13347-A-2

X-RAY FLUORESCENCE ANALYSES

SAMPLE	M/70 L (repeat) 4.05.10
Cr	33
Cu	3
Zn	61
Pb	25

Results are expressed as mg/Kg on oven-dried 110°C basis.

Moisture Content % 6.7

Appendix C Water Sample Results





R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: Dr J Coakley

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: **Date Registered:** 04-Nov-2009 **Date Reported:** 10-Nov-2009

Quote No: 36794 **Order No:** 42771630

Client Reference: GWRC - Waiwhetu Stream

740770

Submitted By: S Halliday

Sample Type: Aqueous							
	Sample Name:	93270 03-Nov-2009					
	Lab Number:	740770.1					
рН	pH Units	7.3	-	-	-	-	
Total Suspended Solids	g/m³	180	-	-	-	-	
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-	
Total Chromium	g/m³	0.014	-	-	-	-	
Dissolved Copper	g/m³	0.0013	-	-	-	-	
Total Copper	g/m³	0.024	-	-	-	-	
Dissolved Lead	g/m³	0.0034	-	-	-	-	
Total Lead	g/m³	0.17	-	-	-	-	
Dissolved Zinc	g/m³	0.0056	-	-	-	-	
Total Zinc	g/m³	0.44	-	-	-	-	

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples	
Total Digestion	Boiling nitric acid digestion. APHA 3030 E 21st ed. 2005.	-	1	
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1	
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1	
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1	
Total Chromium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.00053 g/m ³	1	
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1	
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.00053 g/m ³	1	
Dissolved Lead	0.00010 g/m ³	1		
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.00011 g/m ³	1	
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m³	1	
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.0011 g/m ³	1	



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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which

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.

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Ara Heron BSc (Tech)

Client Services Manager - Environmental Division

740770

No of Samples 1

No of Fractions 6

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SAMPLE RECEIPT DOCUMENTATION



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

741840 Lab No:

Date Registered: 07-Nov-2009 **Date Reported:** 19-Nov-2009

Quote No: 36794 **Order No:** 42771630 **Client Reference:**

Waiwhetu Submitted By: Dr J Coakley

Sample Type: Aqueo		93271				
	Sample Name:	93271 06-Nov-2009				
	Lab Number:	741840.1				
Individual Tests	Lub Humber:		1	1	I	
pH	pH Units	7.5	-	-	-	-
Total Suspended Solids	g/m³	52	-	-	-	-
Heavy metals, dissolvd, tra	ce As,Cd,Cr,Cu,Ni,Pb,	Zn	1	1		
Dissolved Arsenic	g/m³	< 0.0010	-	-	-	-
Dissolved Cadmium	g/m³	< 0.000050	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Dissolved Copper	g/m³	0.0011	-	-	-	-
Dissolved Lead	g/m³	0.0059	-	-	-	-
Dissolved Nickel	g/m³	0.00070	-	-	-	-
Dissolved Zinc	g/m³	0.011	-	-	-	-
Heavy metals, totals, trace	As,Cd,Cr,Cu,Ni,Pb,Zn					
Total Arsenic	g/m³	0.0024	-	-	-	-
Total Cadmium	g/m³	0.00048	-	-	-	-
Total Chromium	g/m³	0.0041	-	-	-	-
Total Copper	g/m³	0.0085	-	-	-	-
Total Lead	g/m³	0.058	-	-	-	-
Total Nickel	g/m³	0.0020	-	-	-	-
Total Zinc	g/m³	0.12	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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: Aqueous			
Test	Method Description	Default Detection Limit	Samples
Heavy metals, dissolvd, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm filtration, ICP-MS, trace level	-	1
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level	-	1
Total Digestion	Boiling nitric acid digestion. APHA 3030 E 21st ed. 2005.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.

The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which

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.

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Peter Robinson MSc (Hons), PhD, FNZIC

Client Services Manager - Environmental Division

Appendix No.1 - Chain of Custody - Page 1 of 1

SAMPLE RECEIPT DOCUMENTATION

	741840 No of Samples 1 No of Samples 1
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	Blank or Duplicate Samples
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SS New Zealand Limited mbton House	Total No. of Sample Bottles: AME: Sance L Hellickey OMPANY: URS ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES
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URS New Zealand Limited Lambton House 160 Lambton Quay Wellington Ph: (04) 496 3750 Fax (09) 496 3755 RESULTS ATTENTION: SAMPLER(S): SAMPLER(S): SAMPLER(D): SAMPLER(D): SAMPLER(D): MATER 73271 MATER 73271 MATER 73271	Total No. of Sample Bottles: NAME: Sand Has COMPANY: URS ALL SAMPLES AND ASSOCIATED DOCU SPECIAL! HANDLING/S. CAUTION - SAMPLES MA



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 742701 **Date Registered:** 11-Nov-2009

Date Reported:

Quote No:

Order No: 42771630

Client Reference: SWRC - Waiwhetu Submitted By: Dr J Coakley

24-Nov-2009

Sample Type: Aqueous Sample Name: 93272 09-Nov-2009 Lab Number: 742701.1 рΗ pH Units 7.5 **Total Suspended Solids** g/m³ 51 Dissolved Chromium g/m³ < 0.0010 Total Recoverable Chromium g/m3 < 0.0051 **Dissolved Copper** g/m³ 0.016 Total Recoverable Copper g/m³ 0.0059 0.0033 Dissolved Lead g/m³ Total Recoverable Lead g/m³ 0.077 Dissolved Zinc 0.012 g/m³ g/m³ Total Recoverable Zinc 0.089

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Ara Heron BSc (Tech)

Client Services Manager - Environmental Division

Page 1 of 1

INTERNAL USE: URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF

EMAIL

LETTER

FAX

REPORT FORMAT: EMAIL ADDRESS:

CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES

ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER

NAME: Sarah Halliday

COMPANY: URS

Total No. of Sample Bottles:



11.60 METHOD OF SHIPMENT URS RECEPTION HILLS DOCKET Тепр: Blank or Duplicate Samples YES / NO / NA YES / NO / NA DISK ANALYSES REQUIRED LABORATORY BATCH NO. CUSTODY SEAL INTACT: DATE PLEASE COMPLETE THIS SECTION (CROLE AS APPROPRIATE) AND RETURNIFAX A COPY IMMEDIATELY AFTER RECEIVING SAMPLES) SAMPLES CHILLED: REPORTING PLEASE CONTACT THE LABORATORY RECEIVED BY 001N この後アリ CHAIN OF CUSTODY DATA SAMPLE RECEIPT DATA Including: SP.155 575 12401 NAME: COMPANY: CONTAINERS **SALYJANA** YES / NO 36794 Normal Priority 36796 Urgent Priority 36795 High Priority COMMENTS DATE: 9-11-09 SPECIAL HANDLING/STORAGE OR DISPOSAL/INSTRUCTIONS: 0061 R J Hill Laboratories Limited 42771630.

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LAB QUOTE NO: PROJECT NO:

Jorasha Cooklan

Sarah The Miden

RESULTS ATTENTION:

RESULTS REQUIRED BY:

Same Halliday

DATE/TIME 9-11-0

MATRIX

SAMPLEID

Nate

93272

Ph: (07) 858 2000

1 Clyde Street

URS New Zealand Limited

160 Lambton Quay

Lambton House

Ph: (04) 496 3750 Fax (09) 496 3755

Wellington

Hamilton

SWRE

CLIENT

SAMPLE RECEIPT DOCUMENTATION

CHAIN OF CUSTODY AND



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

Tel +64 7 858 2000 +64 7 858 2001 Fax Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: Dr J Coakley

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: **Date Registered:** 14-Nov-2009 **Date Reported:** 20-Nov-2009

Quote No: 36794 **Order No:** 42771630

Client Reference: GWRL - Waiwhetu

743756

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93273 12-Nov-2009				
	Lab Number:	743756.1				
рН	pH Units	7.6	-	-	-	-
Total Suspended Solids	g/m³	11	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Recoverable Chromium	g/m³	0.00062	-	-	-	-
Dissolved Copper	g/m³	0.0013	-	-	-	-
Total Recoverable Copper	g/m³	0.0028	-	-	-	-
Dissolved Lead	g/m³	0.0011	-	-	-	-
Total Recoverable Lead	g/m³	0.016	-	-	-	-
Dissolved Zinc	g/m³	0.013	-	-	-	-
Total Recoverable Zinc	g/m³	0.032	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples	
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1	
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1	
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1	
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1	
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1	
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1	
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00050 g/m ³	1	
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1	
Total Recoverable Lead			1	
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1	
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1	



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Carole Rodgers-Carroll BA, NZCS Client Services Manager - Environmental Division

Job No **743756**No of Samples **1**No of Fractions **3**

Page 1 of 1		
EMAIL ADDRESS: INTERNAL USE: URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF	EMAIL	
REPORT FORMAT: FAX LETTER EMAIL		CALITION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES
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SAMPLE RECEIPT DOCUMENTATION



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

Tel +64 7 858 2000 +64 7 858 2001 Fax Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: Dr J Coakley

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: **Date Registered:** 17-Nov-2009 27-Nov-2009

Date Reported:

Quote No:

Order No: 42771630

Client Reference: SWRC Waiwhetu

744180

Submitted By: S Halliday

Sample Type: Aqueous						
	Sample Name:	93274 16-Nov-2009				
	Lab Number:	744180.1				
pH	pH Units	7.4	-	-	-	-
Total Suspended Solids	g/m³	220	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Recoverable Chromium	g/m³	0.0096	-	-	-	-
Dissolved Copper	g/m³	< 0.0010	-	-	-	-
Total Recoverable Copper	g/m³	0.014	-	-	-	-
Dissolved Lead	g/m³	0.0019	-	-	-	-
Total Recoverable Lead	g/m³	0.12	-	-	-	-
Dissolved Zinc	g/m³	0.0048	-	-	-	-
Total Recoverable Zinc	g/m³	0.20	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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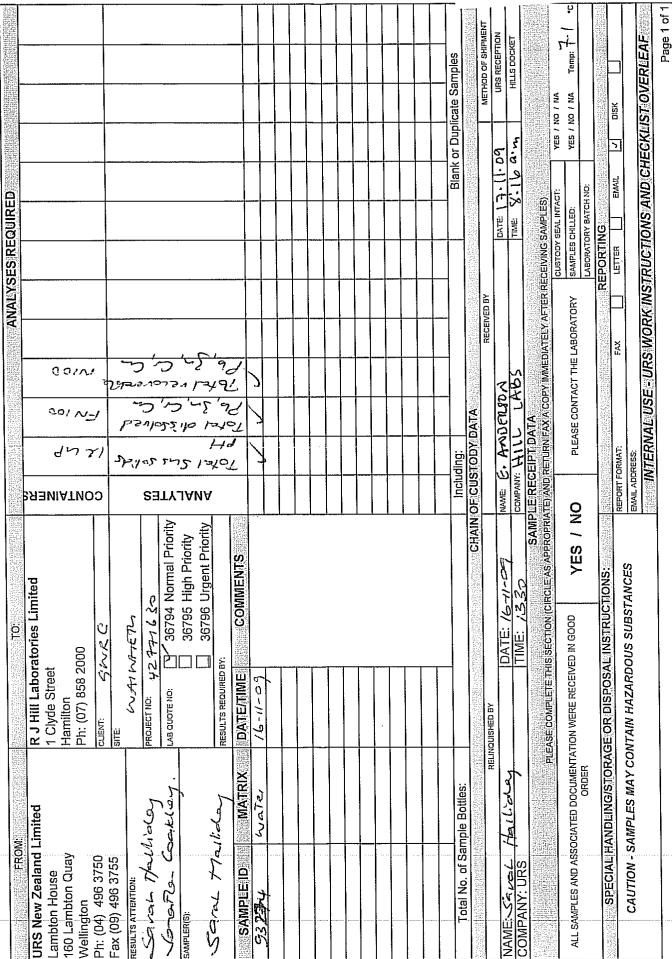
Karen Nichol BSc

Client Services Manager - Environmental Division

SAMPLE RECEIPT DOCUMENTATION CHAIN OF CUSTODY AND

Time Received







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ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 745506 Date Registered: 20-Nov-

Date Registered: 20-Nov-2009 **Date Reported:** 30-Nov-2009

Quote No: 36794 Order No: 42771630 Client Reference: GWRC

Submitted By: Dr J Coakley

Sample Type: Aqueous	;					
	Sample Name:	93275 19-Nov-2009				
	Lab Number:	745506.1				
pH	pH Units	7.6	-	-	-	-
Total Suspended Solids	g/m³	92	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Recoverable Chromium	g/m³	0.0039	-	-	-	-
Dissolved Copper	g/m³	0.0013	-	-	-	-
Total Recoverable Copper	g/m³	0.010	-	-	-	-
Dissolved Lead	g/m³	0.0047	-	-	-	-
Total Recoverable Lead	g/m³	0.050	-	-	-	-
Dissolved Zinc	g/m³	0.011	-	-	-	-
Total Recoverable Zinc	g/m³	0.084	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
pH	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Ara Heron BSc (Tech)

Client Services Manager - Environmental Division

No of Fractions: 6

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

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R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: Date Registered: Date Reported:

Quote No:

Order No:

Client Reference:

42771630

27-Nov-2009

08-Dec-2009

747332

GWRC WAIWHETU

Submitted By: Dr J Coakley

Sample Type: Aqueous									
	Sample Name:	93276 26-Nov-2009							
	Lab Number:	747332.1							
рН	pH Units	7.6	-	-	-	-			
Total Suspended Solids	g/m³	160	-	-	-	-			
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-			
Total Recoverable Chromium	g/m³	0.0062	-	-	-	-			
Dissolved Copper	g/m ³	0.00096	-	-	-	-			
Total Recoverable Copper	g/m ³	0.013	-	-	-	-			
Dissolved Lead	g/m³	0.0028	-	-	-	-			
Total Recoverable Lead	g/m³	0.061	-	-	-	-			
Dissolved Zinc	g/m³	0.0054	-	-	-	-			
Total Recoverable Zinc	g/m ³	0.11	-	-	-	-			

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	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

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Peter Robinson MSc (Hons), PhD, FNZIC

Client Services Manager - Environmental Division

Appendix No.1 - Chain of Custody - Page 1 of 1

SAMPLE RECEIPT DOCUMENTATION

CHAIN OF CUSTODY AND

Job 140

No of Samples: 1

No of Fractions 6

		03174	733	2	· 1 F700	
	Blank or Duplicate Samples	METHOD OF SHIPMENT	URS RECEPTION	HILLS DOCKET	YES / NO / NA Temp: 20.)	DISK
REQUIRED	Blank or Du		2001 at 12 mail	1.55 am	F 2	LETTER EMAIL VI
ANALYSES REQUIRED	00/~ 77'77'8'92		RECEIVED BY	Y IMMEDIATELY AFTER RECEI	PLEASE CONTACT THE LABORATORY SAM LAB	REPORTING PINK DISK SAME DISK DISK
	ANALYTES CONTAINERS Total dixestrated -1/100 -	CHAIN OF CUSTODY DATA		SAMPLE ROLL OUS SAMPLE RECEIPT DATA SECTION DELIGION DE	NO PLEASE CONTA	REPORT FORMAT: EMAIL ADDRESS: INTIERNAL: USE
:01	R J Hill Laboratories Limited 1 Clyde Street Hamilton Ph. (07) 858 2000 GLIENT: 今んとC SITE: レノイカレナモブル PROJECT NO: 4,2 ラテノらろう A8 GUOTE NO: 4,2 ラテトらろう	CHAIN		TIME: 12-11-07 COMPANY: \$ HIT! COLOS TIME: ASSOCIATION SAMPLES SAMPLES TIME: ASSOCIATION SAMPLES SAMPLES SAMPLES	ECEIVED IN GOOD YES / N	POSAL INSTRUCTIONS:
	Limited Linited Lockley Raticley Water	Total No. of Sample Bottles:	RELINGUISHED BY	Flection	PLEASE COMPLETE THIS SECTION ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER	SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES
120	URS New Zealand Limited Lambton House 160 Lambton Quay Wellington Ph. (04) 496 3750 Fax (09) 496 3755 Fax (09) 496 3755 SAMPLER(S): SAMPLER(S): SAMPLER(S): SAMPLER(D): MARCHANA SAMPLER(S): SAMPLER(S):	Total No. c		NAME: SERREL COMPANY: URS	ALL SAMPLES ANI	CAUTIO



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ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: Date Registered:

Date Reported:

Quote No: Order No:

42771630

747635

28-Nov-2009

14-Dec-2009

Client Reference: GWRC Waiwetu
Submitted By: Dr J Coakley

Sample Type: Aqueous						
	Sample Name:	93277 27-Nov-2009				
	Lab Number:	747635.1				
рН	pH Units	7.5	-	-	-	-
Total Suspended Solids	g/m³	12	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Recoverable Chromium	g/m³	< 0.00051	-	-	-	-
Dissolved Copper	g/m³	< 0.0010	-	-	-	-
Total Recoverable Copper	g/m³	0.0031	-	-	-	-
Dissolved Lead	g/m³	0.0014	-	-	-	-
Total Recoverable Lead	g/m³	0.014	-	-	-	-
Dissolved Zinc	g/m³	0.010	-	-	-	-
Total Recoverable Zinc	g/m³	0.021	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1

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Ara Heron BSc (Tech)

SAMPLE RECEIPT DOCUMENTATION

Appendix No.1 - Chain of Custody - Page 1 of 1

INTERNAL USE - URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF METHOD OF SHIP HILLS DOCK URS RECEPT Blank or Duplicate Samples YES / NO / NA YES / NO / NA üSK > *60/11/8€* :∃1VO せにの EMAIL LABORATORY BATCH NO: CUSTODY SEAL INTACT: ANALYSES REQUIRED PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURN FAX A COPY IMMEDIATELY AFTER RECEIVING SAMPLES) SAMPLES CHILLED; TIME REPORTING LETTER RECEIVED BY PLEASE CONTACT THE LABORATORY ξ¥ 001/\v Including: | CHAIN OF CUSTODY DATA SAMPLE RECEIPT DATA NAME: HYMEKES REPORT FORMAT: EMAIL ADDRESS: **SATYJANA** СОИТАІИЕВ YES / NO 36794 Normal Priority 36796 Urgent Priority -36795 High Priority COMMENTS DATE: 27-11-07 CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: R J Hill Laboratories Limited 1620 591227 SAMER ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER いとない Ph: (07) 858 2000 RESULTS REQUIRED BY: 1 Clyde Street DATE/TIME LAB QUOTE NO; Hamilton PROJECT NO: 27-11 RELINCUISHED BY CLIENT: NAME: COMPANY: URS bons. Conta MATRIX wate Seval Franciscon Total No. of Sample Bottles: Larah Mallians **URS New Zealand Limited** 160 Lambton Quay Ph: (04) 496 3750 Fax (09) 496 3755 SAMPLEID ambton House RESULTS ATTENTION: Wellington AMPLER(S):

Job No 747635
No of Samples: 1 No of Fractions 6

Page 1 of 1



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ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: Dr J Coakley

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 752398 **Date Registered:** 15-Dec-2009

Date Registered:
Date Reported:

Quote No:

24-Dec-2009

Order No: 42771630

Client Reference: GWRC
Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93278 14-Dec-2009	93279 14-Dec-2009			
	Lab Number:	752398.1	752398.2			
рН	pH Units	7.4	7.4	-	-	-
Total Suspended Solids	g/m³	27	15	-	-	-
Dissolved Chromium	g/m³	< 0.0010	< 0.00050	-	-	-
Total Recoverable Chromium	g/m³	0.0024	0.0017	-	-	-
Dissolved Copper	g/m³	< 0.0010	< 0.0010	-	-	-
Total Recoverable Copper	g/m³	0.0034	0.0035	-	-	-
Dissolved Lead	g/m³	0.030	0.015	-	-	-
Total Recoverable Lead	g/m³	0.26	0.13	-	-	-
Dissolved Zinc	g/m³	0.0099	0.020	-	-	-
Total Recoverable Zinc	g/m³	0.068	0.058	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1-2
pH	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1-2
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1-2
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1-2
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1-2
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1-2
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1-2
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1-2
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1-2
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1-2
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1-2



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Karen Nichol BSc

Ho of Samples 2 No of Fractions 12

SAMPLE RECEIPT DOCUMENTATION

	DATE: 15 No. 1 NO.
ANALYSES REQUIRED	Blank of Blank of Blank of The In SO The In SO The Intract: CUSTODY SEAL INTRACT. CUSTOD
1012/566.56141 12 4P	CHAIN OF CUSTODY DATA Including: CHAIN OF CUSTODY DATA RECEIVED BY CHAIN OF CUSTODY DATA RECEIVED BY RE
noratories Limited 8 2000 7 ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	T. 72.
R. J. Hill Laborator ambton House 60 Lambton Quay Vellington 7th (07) 858 2000 Vellington 7th (07) 858 2000 Phr. (07) 858 2000 Phr. (04) 496 3750 Sime. SAMPLER(S): SAMPLER(Total No. of Sample Bottles: Total No. of Sample Bottles: NAME: Serce Freukling Part Date: 14.72. NAME: Serce Freukling Part Date: 14.72. TIME: 10.20 COMPANY: URS COMPANY: URS CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES



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ANALYSIS REPORT

Page 1 of 2

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Date Registered: 1

Quote No: Order No:

Lab No:

Client Reference: \
Submitted By:

753751 SPv1 **18-Dec-2009**

07-Jan-2010 36794 42771630

Waiwhetu Dr J Coakley

Sample Type: Aqueo	us					
	Sample Name:	93280 17-Dec-2009				
	Lab Number:	753751.1				
pH	pH Units	7.4	-	-	-	-
Total Suspended Solids	g/m³	15	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Chromium	g/m³	0.0018	-	-	-	-
Dissolved Copper	g/m³	< 0.0010	-	-	-	-
Total Copper	g/m³	0.0037	-	-	-	-
Dissolved Lead	g/m³	0.095	-	-	-	-
Total Lead	g/m³	0.63	-	-	-	-
Dissolved Zinc	g/m³	0.016	-	-	-	-
Total Zinc	g/m³	0.057	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Digestion	Boiling nitric acid digestion. APHA 3030 E 21st ed. 2005.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Chromium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.00053 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.00053 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.00011 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m³	1
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21st ed. 2005 / US EPA 200.8.	0.0011 g/m ³	1



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Ara Heron BSc (Tech)

SAMPLE RECEIPT DOCUMENTATION

CHAIN OF CUSTODY AND

753751

He of Samples. 1

No of Fractions 6



Темр: (3.9) METHOD OF SHIPMENT INTERNAL USE - URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF URS RECEPTION HILLS DOCKET Blank or Duplicate Samples YES I NO I NA YES / NO / NA DISK DATE (8/12/109) > EMAIL ANALYSES REQUIRED LABORATORY BATCH NO: CUSTODY SEAL INTACT: PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURN FAX A COPY IMMEDIATELY AFTER RECEIVING SAMPLES) SAMPLES CHILLED: REPORTING LETTER RECEIVED BY PLEASE CONTACT THE LABORATORY ξX 052N THI LODS 001 NJ Including: Including: CHAIN OF CUSTODY DATA SAMPLE RECEIPT DATA NAME: (1) AN 12C REPORT FORMAT: EMAIL ADDRESS: Total Shi solids COMPANY: рязиіатиоо **SATYJANA** YES / NO 1 36794 Normal Priority 36796 Urgent Priority F-12-09 36795 High Priority COMMENTS SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES 1500 R J Hill Laboratories Limited PROJECT NO: 42771630 くれことにして ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER DATE: ííí ≥ ⊢ Ph: (07) 858 2000 SWRC RESULTS REQUIRED BY: 1 Clyde Street DATE/TIME 12-12-51 LAB QUOTE NO: Hamilton RELINGUISHED BY CLIENT: Malliday. Codplay Sarah Hallidas Sorah Hadiolog MATRIX 505 Total No. of Sample Bottles: **URS New Zealand Limited** Sarah SAMPLER(S): 160 Lambton Quay Ph: (04) 496 3750 Fax (09) 496 3755 SAMPLEID COMPANY: URS -ambton House ESULTS ATTENTION: 93280 Wellington NAME:

Page 1 of



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Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Date Registered: Date Reported:

Quote No:

Lab No:

Order No:

Client Reference:

GWRC - Waiwhetu

758327

15-Jan-2010

20-Jan-2010

42771630

Submitted By: S Halliday

Sample Type: Aqueous	5					
	Sample Name:	93281 14-Jan-2010				
	Lab Number:	758327.1				
рН	pH Units	7.7	-	-	-	-
Total Suspended Solids	g/m³	15	-	-	-	-
Dissolved Chromium	g/m³	< 0.0010	-	-	-	-
Total Recoverable Chromium	g/m³	< 0.0011	-	-	-	-
Dissolved Copper	g/m³	< 0.0010	-	-	-	-
Total Recoverable Copper	g/m³	0.0024	-	-	-	-
Dissolved Lead	g/m³	0.0087	-	-	-	-
Total Recoverable Lead	g/m³	0.038	-	-	-	-
Dissolved Zinc	g/m³	0.014	-	-	-	-
Total Recoverable Zinc	g/m³	0.031	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Ara Heron BSc (Tech)

Page 1 of 1

Job No. **758327**No. of Samples. 1 No. of Fractions: **6**

URS New Zealand Limited Lambton House	R J Hill Laboratories Limited 1 Clyde Street	NERS	d	0		LYSESIR	ANALYSESIREQUIRED			
160 Lambton Quay Wellington Ph: (04) 496 3750 Fax (09) 496 3755	Hamilton Ph: (07) 858 2000 cuent:	CONTAI	'n 1!	52 N 01NJ 'Y 71				-		
Talliday	4277163C		.57.	10 sol	দ্য ন					
	IAB QUOTE NO: 36794 Normal Priority 36795 High Priority 36706 High Priority	₹ ₹	stol 5/102	ارد المراكم المود	1 40					
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Total No. of Sample Bottles:		lock Lock	Including:					Blank or Dinicate Samples	- Sam	Joles
		NOFICU	CHAIN OF GUSTODY DATA	TATE NEW	ANALYS STATES OF THE STATES OF					
RELINO	SHED BY		1		REÇEIVED BY		,		METHOD	METHOD OF SHIPMENT
COMPANY-LIRS	TIME: 17:07-0	NAME:		Nalowood A	000		DATE: 15	10	URS	URS RECEPTION
ALTONOMY TO THE THE PROPERTY OF THE PROPERTY O			STATE OF COLUMN	4	201010101010101010101010101010101010101		TIME		로	HILLS DOCKET
PLEA.	OANINTEE THIS SECTION (CHOLEAS APPROPRIATE) AND RETURN FAX A COPY IMMEDIATELY AFTER RECEIVING SAMPLES)	RIATE) AND	RETURN FAX	A A COPY IMMEI	JIATELY AFTER	RECEIVING	SAMPLES)			
ALL SAMPLES AND ASSOCIATED DOCUMENTATIC		9				CUSTODY	CUSTODY SEAL INTACT:	YES / /	YES / NO / NA	
ORDER	YES / NO	2	PLEASE	PLEASE CONTACT THE LABORATORY	LABORATORY	SAMPLES CHILLED	SAMPLES CHILLED;	YES / h	YES / NO / NA	Temp: Y. 8 -c
SPECIAL HANDLING/STORAGE ORDISPOSAL INSTRUCT	SORIDISPOSAL INSTRUCTIONS:					REPORTING	16 ST. ST.	100000000000000000000000000000000000000		
CAUTION - SAMPLES MAY CONT	CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES	REPORT FORMAT:	ORMAT:		FAX	LETTER	EMAIL	3	DISK	
		EMAIL ADDRESS:	RESS:	odili Jalili	WAIL ADDRESS:	TOHOL	*CIA-V-SO		L. C.	
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Appendix No.1 - Chain of Custody - Page 1 of 1

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION



Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Date Registered: 23-Jan-2010 Date Reported: 02-Feb-2010

Lab No:

Quote No: 36794 Order No: 42771630

Client Reference: | GWRC - Waiwhetu

760443

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93282 22-Jan-2010				
	Lab Number:	760443.1				
рН	pH Units	7.5	-	-	-	-
Total Suspended Solids	g/m³	61	-	-	-	-
Dissolved Chromium	g/m³	< 0.0025	-	-	-	-
Total Recoverable Chromium	g/m³	0.0074	-	-	-	-
Dissolved Copper	g/m³	< 0.0025	-	-	-	-
Total Recoverable Copper	g/m³	0.013	-	-	-	-
Dissolved Lead	g/m³	0.0034	-	-	-	-
Total Recoverable Lead	g/m³	0.47	-	-	-	-
Dissolved Zinc	g/m³	0.036	-	-	-	-
Total Recoverable Zinc	g/m³	0.22	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which

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.

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Ara Heron BSc (Tech)

Appendix No.1 - Chain of Custody - Page 1 of 1

SAMPLE RECEIPT DOCUMENTATION CHAIN OF CUSTODY AND

م بی METHOD OF SHIPMENT URS RECEPTION INTERNAL USE: URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF HILLS DOCKET Тетр: Blank or Duplicate Samples YES / NO / NA YES / NO / NA DISK DATE 23.1.1010 TIME 10:41 a.m. ANALYSES REQUIRED EMAIL LABORATORY BATCH NO: CUSTODY SEAL INTACT: PLEASE COMPLETE THIS SECTION (CIRCLE, AS APPROPRIATE) AND RETURN FAXA COPY, IMMEDIATELY, AFIER RECEIVING SAMPLES) SAMPLES CHILLED: REPORTING LETTER RECEIVED BY PLEASE CONTACT THE LABORATORY FAX *6*25√ NAME TO AND PURCH Including: CHAIN OF CUSTOBY DATA COMPANY: 1416 SAMPLERECEIPT DATA REPORT FORMAT: EMAIL ADDRESS: 26102242 СОИТАІИЕВ YES / NO 36794 Normal Priority 36796 Urgent Priority 22-21-09 36795 High Priority COMMENTS 6 30 CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES R J Hill Laboratories Limited SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: 42771450 していまでして などろの ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD DATE: Ph: (07) 858 2000 RESULTS REGUIRED BY: 1 Clyde Street MATRIX DATE/TIME LAB QUOTE NO: PROJECT NO: 220 RELINGUISHED BY CLENT: 17a11:000 Sarah Hallson Swah Hallider SATER Total No. of Sample Bottles: **URS New Zealand Limited** Soral SAMPLEID 160 Lambton Quay Ph: (04) 496 3750 Fax (09) 496 3755 Lambton House COMPANY: URS RESULTS ATTENTION: 33282 Wellington SAMPLER(S): NAME:

760443 No of Samples: 1

rime Received

Page 1 of 1



Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 761612 Date Registered: 28-Jan-2010

Date Reported: 09-Feb-2010 Quote No: 36794

Quote No: Order No:

Order No: 42771630
Client Reference: GWRC Waiwhetu

Submitted By: S Halliday

Sample Type: Aqueous						
	Sample Name:	93283 27-Jan-2010				
	Lab Number:	761612.1				
рН	pH Units	7.6	-	-	-	-
Total Suspended Solids	g/m³	23	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Recoverable Chromium	g/m³	0.0020	-	-	-	-
Dissolved Copper	g/m³	0.0017	-	-	-	-
Total Recoverable Copper	g/m³	0.0049	-	-	-	-
Dissolved Lead	g/m³	0.0073	-	-	-	-
Total Recoverable Lead	g/m³	0.12	-	-	-	-
Dissolved Zinc	g/m³	0.020	-	-	-	-
Total Recoverable Zinc	g/m³	0.082	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1

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.

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Ara Heron BSc (Tech)

SAMPLE RECEIPT DOCUMENTATION CHAIN OF CUSTODY AND

			Time Received Job No.	28-Jan-2010 10:30	
		ω	No of Samples	6161 1 No of Fra	2 octions 6
	Temperature On Arrival	Temperature was measured on one or more arbitrarily chosen samples in this batch.			
	်စ် ၂	perature was measured on or more arbitrarily chosen samples in this batch.	0317616120	- 	<u> </u>
	rature (arbitre	N Section	METHOD OF SHIPMENT URS RECEPTION HILLS DOCKET	np:
	npera 나	erature r more sampl	Sample	THOD OF SHIPME URS RECEPTION HILLS DOCKET	A Tomp:
	_ 	Temp	plicate	W	YES / NO / NA
			Blank or Duplicate Samples		YES YES TECKI
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SREG				1 1 E	THE ASE COMPLETE. THIS ISECTION (CIRCLE' AS APPROPRIATE); AND RETURN FAX A COPY IMMEDIAL LETTER AND THE TOTAL THE LABORATORY SAMPLES CHILLED: TABORATORY SEAL INTACT: TABORATORY SEAL INTACT: TREPORT FORMAT: TREPORT FORMAT:
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AND				RECEIVED BY	ORATOR
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stated pt. Itup.	2/		Including:	OF CUSTODY DATA NAME: TALLA A COMPANY: HILLS L LETRECEIPT DATA	O PL REPORT FORMAT: EMAIL ADDRESS:
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riority				CHAIN OF IC	YES / NO
ies Limited た カーピナー・ ラティムミン・ 36794 Normal Priority 36796 Urgent Priority	COMMENTS		:	1-10	YES VES CES
RJ Hill Laboratories Limited 1 Clyde Street Hamilton Ph: (07) 858 2000 CLIENT:	OMME			10-F5 08.11	CCRCH JCTIOI ISTAN
# Laboratories Limit e Street on 7) 858 2000	<u>o</u>			DATE:	IN GOOF
					CEIVED
R J Hill Laborat 1 Clyde Street 1 Hamilton Ph: (07) 858 200 CLIENT: CLENT SITE PROJECT NO: CLENT IAB QUOTE NO: CLENT IAB QUOTE NO: CLENT IAB CHOURED BY:	DATEMIN			D BY	COMPLET REPERENCE NO HAZA
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ited (, c,	MATRIX		Bottle	710-11.	TED DOO
d Lim	3 6		Total No. of Sample Bottles	7 7	PLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES
Zealand Lincows Ou Quay 96 3750 96 3755 mion:	93283		No. of	: URS	SS AND /
■ N T T T E T T T T T T T T T T T T T T T	SAMPLEID MATRIX DATEITME o 93283 WATER ZF-CL		Total	NAME: - Serve L COMPANY: URS	ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER ORDER SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES
URS Ne Lambton 160 Lam Wellingt Ph. (04) Fax (09) RESULTS AT SAMPLER(S)	N.º			NAME: -	ALI.



762392

30-Jan-2010

08-Feb-2010

42771630

Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Date Registered: Date Reported:

Quote No:

Lab No:

Order No:

Client Reference: GWRC Waiwhetu

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93284 29-Jan-2010				
	Lab Number:	762392.1				
pH	pH Units	7.8	-	-	-	-
Total Suspended Solids	g/m³	13	-	-	-	-
Dissolved Chromium	g/m³	< 0.0025	-	-	-	-
Total Recoverable Chromium	g/m³	< 0.0026	-	-	-	-
Dissolved Copper	g/m³	< 0.0025	-	-	-	-
Total Recoverable Copper	g/m³	< 0.0026	-	-	-	-
Dissolved Lead	g/m³	0.0042	-	-	-	-
Total Recoverable Lead	g/m³	0.052	-	-	-	-
Dissolved Zinc	g/m³	0.0072	-	-	-	-
Total Recoverable Zinc	g/m³	0.036	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1

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.

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Ara Heron BSc (Tech)

30-Jan-2010 11 08:50 a

762392

No of Samples

No of Fractions 6

Page 1 of 1

6317623926

Ž Q METHOD OF SHIPMENT URS RECEPTION INTERNAL USE - URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF HILLS DOCKET Blank or Duplicate Samples YES / NO / NA YES / NO / NA DISK DATE: 3001 110 TIME 11:00 EMAIL ANALYSES REQUIRED LABORATORY BATCH NO: CUSTODY SEAL INTACT PLEASE.COMPLETETHIS SECTION (GIRCLE AS A PROPRIATE) AND RETURN FAX A GOPY IMMEDIATELY AFTER RECEIVING SAMPLES SAMPLES CHILLED: REPORTING ETTER RECEIVED BY PLEASE CONTACT THE LABORATORY FÆ 057NB COMPANY: Hill LOUD CHAIN OF CUSTODY DATA SAMPLEIRECEIPT DATA 29-01-10. NAME HYROLD REPORT FORMAT: EMAIL ADDRESS: Including: 10ブラログ СОИТАІИЕВЯ **SATYJANA** YES / NO 36794 Normal Priority 36796 Urgent Priority 36795 High Priority COMMENTS CAUTION - SAIMPLES IMAY CONTAIN HAZARDOUS SUBSTANCES SPECIAL HANDLING/STORAGE; OR DISPOSAL: INSTRUCTIONS: R J Hill Laboratories Limited クオラナボア 42771630 Ţ ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER ろとなり DATE Ph: (07) 858 2000 RESULTS REQUIRED BY: 1 Clyde Street MATRIX DATE/TIME 29-01-10 AB QUOTE NO: Hamilton PROJECT NO: RELINQUISHED BY CLIENT: NAME: Sarah + Hall: day. Sarah Hallialoy Sarah Halliday Wate, Total No. of Sample Bottles: **URS New Zealand Limited** SAMPLEID 160 Lambton Quay Ph: (04) 496 3750 =ax (09) 496 3755 .ambton House 78286 ESULTS ATTENTION: Wellington SAMPLER(S):

SAMPLE RECEIPT DOCUMENTATION

CHAIN OF CUSTODY AND



Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

 Lab No:
 763567

 Date Registered:
 04-Feb-2010

 Date Reported:
 16-Feb-2010

Quote No: 36794 **Order No:** 42771630

Client Reference: | GWRC WAIWHETU

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93285 02-Feb-2010				
	Lab Number:	763567.1				
рН	pH Units	8.0	-	-	-	-
Total Suspended Solids	g/m³	51	-	-	-	-
Dissolved Chromium	g/m³	< 0.0010	-	-	-	-
Total Recoverable Chromium	g/m³	0.0036	-	-	-	-
Dissolved Copper	g/m³	< 0.0010	-	-	-	-
Total Recoverable Copper	g/m³	0.0041	-	-	-	-
Dissolved Lead	g/m³	0.0022	-	-	-	-
Total Recoverable Lead	g/m³	0.11	-	-	-	-
Dissolved Zinc	g/m³	0.0027	-	-	-	-
Total Recoverable Zinc	g/m³	0.11	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which

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.

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Ara Heron BSc (Tech)

/4-Feb-2010 11:42:12 ал

763567

No of Samples:

No of Fractions

Page 1 of 1



Temp: /2,1 INTERNAL USE: URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF METHOD OF SHIPMENT URS RECEPTION HILLS DOCKET Blank or Duplicate Samples MALYSES REQUIRED YES / NO / NA YES / NO / NA 뚪 TIME: THOUSE DATE: 4/2/10 EMAIL LABORATORY BATCH NO: CUSTODY SEAL INTACT: PLEASE COMPLETETHIS SECTION (CIRCLEAS APPROPRIATE) AND RETURN FAX A COPY INVISED ATELY AFTER RECEIVING SAMPLES) SAMPLES CHILLED: REPORTING LETTER RECEIVED BY PLEASE CONTACT THE LABORATORY \$ X 025V NAME: CODINIE ITUITE COMPANY: 4/11/1 (0,105 CHAIN OF CUSTODY DATA SAMPLE RECEIPT DATA REPORT FORMAT: Including: EMAIL ADDRESS: CONTAINERS **SATYJAMA** YES / NO 36794 Normal Priority 2-02-10. 36796 Urgent Priority 36795 High Priority COMMENTS CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: 900 R J Hill Laboratories Limited WAINTENS. ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER らどなり DATE: TIME: Ph: (07) 858 2000 Ò Shart Hill Day RESULTS REQUIRED BY 1 Clyde Street BOATE/TIME 2-20-2 Marcal + (alliala) LAB QUOTENO. Hamilton RELINQUISHED BY CLIENT: trallials MATRIX 93285 KVATER Total No. of Sample Bottles: **URS New Zealand Limited** 7 160 Lambton Quay Ph: (04) 496 3750 SAMPLEID Fax (09) 496 3755 -ambton House **ESULTS ATTENTION** COMPANY: Wellington SAMPLER(S): 일

SAMPLE RECEIPT DOCUMENTATION

CHAIN OF CUSTODY AND



Tel +64 7 858 2000 +64 7 858 2001 Fax Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: **Date Registered:** 12-Feb-2010 **Date Reported:** 19-Feb-2010

Quote No: 36794 **Order No:** 42771630

Client Reference: GWRC Waiwhetu

766045

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93286 10-Feb-2010				
	Lab Number:	766045.1				
рН	pH Units	7.9	-	-	-	-
Total Suspended Solids	g/m³	9.0	-	-	-	-
Dissolved Chromium	g/m³	< 0.0010	-	-	-	-
Total Recoverable Chromium	g/m³	< 0.0011	-	-	-	-
Dissolved Copper	g/m³	0.0029 #1	-	-	-	-
Total Recoverable Copper	g/m³	0.0013 #1	-	-	-	-
Dissolved Lead	g/m³	0.0063	-	-	-	-
Total Recoverable Lead	g/m³	0.019	-	-	-	-
Dissolved Zinc	g/m³	0.0052	-	-	-	-
Total Recoverable Zinc	g/m³	0.016	-	-	-	-

Analyst's Comments

#1 It has been noted that the results for the dissolved fraction were greater than those for the total recoverable fraction, but within analytical variation of the method.

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Samples
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1

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.

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Graham Corban MSc Tech (Hons)

Job No. **766045**No of Samples: 1 No of Fractions 6

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Appendix No.1 - Chain of Custody - Page 1 of 1

Page 1 of 1



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ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 767431
Date Registered: 18-Feb-2010
Date Reported: 01-Mar-2010

Quote No: 36794 Order No: 42771630

Client Reference: GWRC-Waiwhetu

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93287 17-Feb-2010				
	Lab Number:	767431.1				
рН	pH Units	8.0	-	-	-	-
Total Suspended Solids	g/m³	49	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Recoverable Chromium	g/m³	0.0033	-	-	-	-
Dissolved Copper	g/m³	0.00061	-	-	-	-
Total Recoverable Copper	g/m³	0.0049	-	-	-	-
Dissolved Lead	g/m³	0.0012	-	-	-	-
Total Recoverable Lead	g/m³	0.078	-	-	-	-
Dissolved Zinc	g/m³	0.0031	-	-	-	-
Total Recoverable Zinc	g/m³	0.11	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Carole Rodgers-Carroll BA, NZCS Client Services Manager - Environmental Division

767431

No of Samples:

No of Fractions



Page 1 of 1 INTERNALIUSE: URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF ANALYSESIREQUIRED METHOD OF SHIPMENT Temp: 14.9 URS RECEPTION HILLS DOCKE Blank or Duplicate Samples YES / NO / NA 器 ONTE: 18/03/10 EMAIL LABORATORY BATCH NO: TIME: 9, 51 PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURNIFAX A COPY IMMEDIATELY AFTER RECEIVING SAMPLES) SAMPLES CHILLED: REPORTING LETTER RECEIVED BY PLEASE CONTACT THE LABORATORY Ϋ́ COMPANY: HILLS LA CHAIN OF CUSTODY DATA SAMPLE RECEIPT DATA NAME: MANUELLA REPORT FORMAT: EMAIL ADDRESS: Including: СОИТАІИЕВЯ **SATYJANA** YES / NO 36794 Normal Priority 36796 Urgent Priority DATE: 17-2-10. 36795 High Priority COMMENTS 0000 CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES SPECIAL HANDEING/STORAGE OR DISPOSAL INSTRUCTIONS: R J Hill Laboratories Limited PROJECT NO: 42771630 ともうといって ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER TIME: のどろの Ph: (07) 858 2000 RESULTS REQUIRED BY: 1 Clyde Street DATETIME 14-02-6 LAB QUOTE NO: Hamilton RELINGUISHED BY Sarah Hallieles SAMPLEID Jarah Hallider 93287 WATER Total No. of Sample Bottles: Sial Hallides IRS New Zealand Limited 60 Lambton Quay Ph: (04) 496 3750 =ax (09) 496 3755 OMPANY: URS ambton House RESULTS ATTENTION: Wellington VAME SAMPLER(S)

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION



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Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: **Date Registered:** 26-Feb-2010 **Date Reported:** 11-Mar-2010

Quote No: 36794 **Order No:** 42771630

Client Reference: GWRC Waiwhetu

770208

Submitted By: S Halliday

Sample Type: Aqueous	;					
	Sample Name:	93288 23-Feb-2010				
	Lab Number:	770208.1				
рН	pH Units	8.0	-	-	-	-
Total Suspended Solids	g/m³	64	-	-	-	-
Dissolved Chromium	g/m³	< 0.0010	-	-	-	-
Total Recoverable Chromium	g/m³	0.0060	-	-	-	-
Dissolved Copper	g/m³	< 0.0010	-	-	-	-
Total Recoverable Copper	g/m³	0.0058	-	-	-	-
Dissolved Lead	g/m³	0.0014	-	-	-	-
Total Recoverable Lead	g/m³	0.083	-	-	-	-
Dissolved Zinc	g/m³	0.0033	-	-	-	-
Total Recoverable Zinc	g/m³	0.12	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Graham Corban MSc Tech (Hons) Client Services Manager - Environmental Division

Time Received

No of Samples: 1

No of Fractions 6

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ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 770444

Date Registered: 27-Feb-2010

Date Reported: 10-Mar-2010

Quote No: 36794 Order No: 42771630

Client Reference: GWRC Waiwhetu

Submitted By: S Halliday

Sample Type: Aqueous	5					
	Sample Name:	93289 26-Feb-2010				
	Lab Number:	770444.1				
рН	pH Units	7.6	-	-	-	-
Total Suspended Solids	g/m³	14	-	-	-	-
Dissolved Chromium	g/m³	< 0.00050	-	-	-	-
Total Recoverable Chromium	g/m³	0.0013	-	-	-	-
Dissolved Copper	g/m³	< 0.0025	-	-	-	-
Total Recoverable Copper	g/m³	0.0042	-	-	-	-
Dissolved Lead	g/m³	0.0029	-	-	-	-
Total Recoverable Lead	g/m³	0.020	-	-	-	-
Dissolved Zinc	g/m³	0.029	-	-	-	-
Total Recoverable Zinc	g/m³	0.060	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Ara Heron BSc (Tech)

770444 mples 1 No of Fractions 6

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

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	ANALYSES REQUIRED	ANALY			FROM



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 771000
Date Registered: 02-Mar-2010
Date Reported: 12-Mar-2010

Quote No: 36794 Order No: 42771630

Client Reference: GWRC Waiwhetu

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93290 01-Mar-2010				
	Lab Number:	771000.1				
рН	pH Units	7.8	-	-	-	-
Total Suspended Solids	g/m³	20	-	-	-	-
Dissolved Chromium	g/m³	< 0.0025	-	-	-	-
Total Recoverable Chromium	g/m³	< 0.0026	-	-	-	-
Dissolved Copper	g/m³	< 0.0025	-	-	-	-
Total Recoverable Copper	g/m³	< 0.0026	-	-	-	-
Dissolved Lead	g/m³	0.00070	-	-	-	-
Total Recoverable Lead	g/m³	0.020	-	-	-	-
Dissolved Zinc	g/m³	< 0.0050	-	-	-	-
Total Recoverable Zinc	g/m³	0.033	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Ara Heron BSc (Tech)

Client Services Manager - Environmental Division

02-Mar-2010 9:5

771000

No of Samples:

No of Fractions 6

Page 1 of 1



9 METHOD OF SHIPMENT INTERNAL USE - URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF URS RECEPTION HILLS DOCKET Blank or Duplicate Samples YES / NO / NA DISK TIME 9:557 --DATE: 7/3/10 EMAIL CUSTODY SEAL INTACT: SAMPLES CHILLED: LABORATORY BATCH NO: ANALYSES REQUIRED PLEASE COMPLETE THIS SECTION (GIRCLE AS A PROPRIATE) AND RETURNIFAX A CORY IMMEDIATELY AFTIER RECEIVING SAMPLES) REPORTING LETTER RECEIVED BY PLEASE CONTACT THE LABORATORY ž SON NAME: CODDIS IVVIVE CHAIN OF CUSTODY DATA COMPANY: 4) 11 (016) SAMPLE RECEIPT DATA EMAIL ADDRESS: REPORT FORMAT: Including: CONTAINER **SATYJANA** YES / NO 36794 Normal Priority 36796 Urgent Priority 36795 High Priority -07-10 COMMENTS CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: R J Hill Laboratories Limited 42771630 ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER とからればいる SWRC Ph: (07) 858 2000 RESULTS REQUIRED BY: 1 Clyde Street MATRIX DATE/TIME 1-03-10. AB QUOTE NO: ROJECT NO: Hamilton CLIENT: RELINGUISHED BY NAME: Carac Mallida COMPANY: URS Sarah Hallidey. WAFER Total No. of Sample Bottles: Sorah Mallioloy **URS New Zealand Limited** FROM: SAMPLEID 93290160 Lambton Quay Ph: (04) 496 3750 -ax (09) 496 3755 ambton House RESULTS ATTENTION: Wellington SAMPLER(S): ż

SAMPLE RECEIPT DOCUMENTATION



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 772654
Date Registered: 06-Mar-2010
Date Reported: 12-Mar-2010

 Date Reported:
 12-Mar-20

 Quote No:
 36794

 Order No:
 42771630

Client Reference: GWRC Waiwhetu

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93291 04-Mar-2010				
	Lab Number:	772654.1				
рН	pH Units	7.8	-	-	-	-
Total Suspended Solids	g/m³	25	-	-	-	-
Dissolved Chromium	g/m³	< 0.0025	-	-	-	-
Total Recoverable Chromium	g/m³	0.0027	-	-	-	-
Dissolved Copper	g/m³	< 0.0025	-	-	-	-
Total Recoverable Copper	g/m³	0.0031	-	-	-	-
Dissolved Lead	g/m³	0.0017	-	-	-	-
Total Recoverable Lead	g/m³	0.062	-	-	-	-
Dissolved Zinc	g/m³	< 0.0050	-	-	-	-
Total Recoverable Zinc	g/m³	0.072	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Ara Heron BSc (Tech)

Client Services Manager - Environmental Division

SAMPLE RECEIPT DOCUMENTATION CHAIN OF CUSTODY AND

772654
No of Fractions 6



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WOCH IN THE PROPERTY OF THE PR	imited at line of a second.	10 93291	CAUTION - SAMPLES MAY CON



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ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: Date Registered: Date Reported:

Quote No:

Order No:

Client Reference:

42771630

12-Mar-2010

19-Mar-2010

774501

GWRC Waiwhetu

Submitted By: S Halliday

Sample Type: Aqueous	S					
	Sample Name:	93292 10-Mar-2010				
	Lab Number:	774501.1				
рН	pH Units	7.4	-	-	-	-
Total Suspended Solids	g/m³	7.4	-	-	-	-
Dissolved Chromium	g/m³	< 0.0010	-	-	-	-
Total Recoverable Chromium	g/m³	< 0.0011	-	-	-	-
Dissolved Copper	g/m³	< 0.0010	-	-	-	-
Total Recoverable Copper	g/m³	0.0014	-	-	-	-
Dissolved Lead	g/m³	0.0025	-	-	-	-
Total Recoverable Lead	g/m³	0.0098	-	-	-	-
Dissolved Zinc	g/m³	0.0041	-	-	-	-
Total Recoverable Zinc	g/m³	0.013	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3.0 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00050 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



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Karen Nichol BSc

Client Services Manager - Environmental Division

Time Received: No of Samples: 1 No of Fractions: 6

Page 1 of 1

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CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand

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Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

780319 Lab No: **Date Registered:** 01-Apr-2010

Date Reported:

Quote No: 36794

Order No: Client Reference:

GWRC Waiwhetu **GWRC** Waiwhetu

16-Apr-2010

Submitted By: S Halliday

	0 I - NI	00000	00004	02205		
;	Sample Name:	93293	93294	93295		
		23-Mar-2010	26-Mar-2010	30-Mar-2010		
	Lab Number:	780319.1	780319.2	780319.3		
Total Suspended Solids	g/m³	57	47	48	-	-
Dissolved Chromium	g/m³	< 0.003	< 0.003	< 0.003	-	-
Total Recoverable Chromium	g/m³	< 0.003	< 0.003	< 0.003	-	-
Dissolved Copper	g/m³	< 0.003	< 0.003	< 0.003	-	-
Total Recoverable Copper	g/m³	< 0.006	< 0.006	< 0.006	-	-
Dissolved Lead	g/m³	0.00090	0.00095	0.00077	-	-
Total Recoverable Lead	g/m³	0.024	0.024	0.023	-	-
Dissolved Zinc	g/m³	0.0060	0.0073	0.0059	-	-
Total Recoverable Zinc	g/m³	0.035	0.035	0.034	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1-3
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3 g/m ³	1-3
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1-3
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1-3
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1-3
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1-3

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Karen Nichol BSc

Client Services Manager - Environmental Division

FROM	ÖL				ANAL	ANALYSES REQUIRED	JUIRED			M
IRS New Zealand Limited ambton House 60 Lambton Quay Vellington h: (04) 496 3750	R J Hill Laboratories Limited 1 Clyde Street Hamilton Ph: (07) 858 2000	СОИТАІИЕВ	Jac. 1	001N						
ax (US) 496 3755 SBULTS ATTENTION:	SITE	1	2	ر ر مه ک						
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SAMPLE RECEIPT DOCUMENTATION



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Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

Page 1 of 2

SPv1

URS New Zealand Limited Client:

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Date Registered: 16-Apr-2010 **Date Reported:** 22-Apr-2010 **Quote No:** 36794

Lab No:

Order No: 42771630

Client Reference: CPG - Waiwhetu Submitted By: R Sutherland

784376

Sample Type: Aqueous										
	Sample Name:	93296 06-Apr-2010	93297 09-Apr-2010	93298 15-Apr-2010						
	Lab Number:	784376.1	784376.2	784376.3						
рН	pH Units	7.8	7.8	7.8	-	-				
Total Suspended Solids	g/m³	7.3	7.3	15.3	-	-				
Dissolved Chromium	g/m³	< 0.010	< 0.010	< 0.010	-	-				
Total Recoverable Chromium	g/m³	< 0.011	< 0.011	< 0.011	-	-				
Dissolved Copper	g/m³	< 0.010	< 0.010	< 0.010	-	-				
Total Recoverable Copper	g/m³	< 0.011	< 0.011	< 0.011	-	-				
Dissolved Lead	g/m³	< 0.002	< 0.002	< 0.002	-	-				
Total Recoverable Lead	g/m³	0.0025	0.0021	0.0026	-	-				
Dissolved Zinc	g/m³	< 0.02	< 0.02	< 0.02	-	-				
Total Recoverable Zinc	g/m³	< 0.03	< 0.03	< 0.03	-	-				

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
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рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1-3
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3 g/m ³	1-3
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1-3
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1-3
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1-3
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1-3
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1-3

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Peter Robinson MSc (Hons), PhD, FNZIC Client Services Manager - Environmental Division

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

784376

			0317843762		0
			Blank or Duplicate Samples	13/3/	PLEASE CONTACT THE LABORATORY SAMPLES CHILLED. PLEASE CONTACT THE LABORATORY SEAL INTACT: REPORTING ORWAT: FAX LETTER ORWAT: ORESS: Sarah, halliday@urscorp.com / ryan_sutherland@urscorp.com INTERNAL USE: URS: WORK INSTRUCTIONS: AND CHECKLIST OVERLEAF
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R J Hill Laboratories Limited 1 160 Clyde Street Ph: Hamilton (07) 858 2000	SITE: Waiwhetu FROJECT NO: 42771630 LAB QUOTE NO: 736794 Normal Priority A36795 High Priority B5796 Urgent Priority RESULTS REQUIRED 9Y: COMMENTS	فَ فَيْ		RELINGUISHED BY RELINGUISHED BY TIME: /ここの4-1 O. TIME: /ここの SAMP	PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND PLEASE CONTACT THE LABORATORY SAMPLES CHILLED: ORDER ORDER SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS: EMAIL ADDRESS: Sarah_halliday@urscorp.com / ryan_sutherland@urscorp. EMAIL ADDRESS: Sarah_halliday@urscorp.com / ryan_sutherland@urscorp.
Limited 160	S S S S S S S S S S S S S S S S S S S	93296 Water. 98297 Water. 98298 Water.	Tabal No. of Samula Buffles:		ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBS



R J Hill Laboratories Limited 1 Clyde Street Private Bag 3205 Hamilton 3240, New Zealand Tel +64 7 858 2000 Fax +64 7 858 2001 Email mail@hill-labs.co.nz Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 2

SPv1

Client: URS New Zealand Limited

Contact: S Halliday

C/- URS New Zealand Limited

PO Box 3367

WELLINGTON 6140

Lab No: 786737 Date Registered: 24-Apr-2010

Date Reported:

Quote No:

Order No: 42771630
Client Reference: Waiwhetu

Submitted By: S Halliday

10-May-2010

Sample Type: Aqueous										
	Sample Name:	93299 20-Apr-2010								
	Lab Number:	786737.1								
pH	pH Units	7.6	-	-	-	-				
Total Suspended Solids	g/m³	49	-	-	-	-				
Dissolved Chromium	g/m³	< 0.010	-	-	-	-				
Total Recoverable Chromium	g/m³	< 0.010	-	-	-	-				
Dissolved Copper	g/m³	< 0.010	-	-	-	-				
Total Recoverable Copper	g/m³	< 0.010	-	-	-	-				
Dissolved Lead	g/m³	0.0021	-	-	-	-				
Total Recoverable Lead	g/m³	0.034	-	-	-	-				
Dissolved Zinc	g/m³	< 0.02	-	-	-	-				
Total Recoverable Zinc	g/m³	< 0.02	-	-	-	-				

Analyst's Comments

Appendix No.1 - Chain of Custody

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.

Test	Method Description	Default Detection Limit	Samples
Total Recoverable Extraction	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hours. US EPA 1638.	-	1
рН	pH meter. APHA 4500-H+ B 21st ed. 2005.	0.1 pH Units	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21st ed. 2005.	3 g/m ³	1
Dissolved Chromium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1
Total Recoverable Chromium	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0005 g/m ³	1
Total Recoverable Copper	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.0005 g/m ³	1
Dissolved Lead	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Total Recoverable Lead	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.00010 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1
Total Recoverable Zinc	Nitric/Hydrochloric acid extraction, 85°C, 2.75 hr, ICP-MS, trace level. APHA 3125 B 21st ed. 2005.	0.0010 g/m ³	1



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.

The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which

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

This report must not be reproduced, except in full, without the written consent of the signatory.

Carole Rodgers-Carroll BA, NZCS Client Services Manager - Environmental Division

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

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	Delimi PasisoZ well 2811	O INEW ZE	Lambton House	Lambton Quay	Wellington	Ph: (04) 496 3750	Fax (09) 496 3755	BESIN TO ATTENTION	sarah Halliday	, m		10000	Sarah Hallidav			SAMPLEID	000	89288									-4-F	otal NC			NAIWIE: CSG/S	WPANY: L		. SAMPLES A.)EdS		CAUT	
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Time Received: 24-Apr-2010 1 4 1:27 pm

786737

No of Samples: 1 No of Fractions: 6

D

Appendix D XRF Data



XRF Data 02 November 2009



Reading	Cr	Cu	Zn	Pb	Description		
1		Ç	Standardisa	tion			
2		Ç	Standardisa	tion			
3		Ç	Standardisa	tion			
4		(Standardisa	tion			
5	<lod< th=""><th><lod< th=""><th>462</th><th>168</th><th>091102T3</th></lod<></th></lod<>	<lod< th=""><th>462</th><th>168</th><th>091102T3</th></lod<>	462	168	091102T3		
6	<lod< th=""><th>43</th><th>1067</th><th>398</th><th>091102T4</th></lod<>	43	1067	398	091102T4		
7	<lod< th=""><th><lod< th=""><th>39</th><th><lod< th=""><th colspan="3">091102T5</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>39</th><th><lod< th=""><th colspan="3">091102T5</th></lod<></th></lod<>	39	<lod< th=""><th colspan="3">091102T5</th></lod<>	091102T5		
8	<lod< th=""><th><lod< th=""><th>563</th><th>182</th><th>091102T5</th></lod<></th></lod<>	<lod< th=""><th>563</th><th>182</th><th>091102T5</th></lod<>	563	182	091102T5		
9	<lod< th=""><th><lod< th=""><th>433</th><th>135</th><th>091102T6</th></lod<></th></lod<>	<lod< th=""><th>433</th><th>135</th><th>091102T6</th></lod<>	433	135	091102T6		
10	<lod< th=""><th><lod< th=""><th>247</th><th>80</th><th>091102T7</th></lod<></th></lod<>	<lod< th=""><th>247</th><th>80</th><th>091102T7</th></lod<>	247	80	091102T7		
11	<lod< th=""><th><lod< th=""><th>1034</th><th>374</th><th>091102T8</th></lod<></th></lod<>	<lod< th=""><th>1034</th><th>374</th><th>091102T8</th></lod<>	1034	374	091102T8		
12	<lod< th=""><th>33</th><th>733</th><th>239</th><th>091102T9</th></lod<>	33	733	239	091102T9		
13	<lod< th=""><th><lod< th=""><th>430</th><th>172</th><th>091102T10</th></lod<></th></lod<>	<lod< th=""><th>430</th><th>172</th><th>091102T10</th></lod<>	430	172	091102T10		
14	<lod< th=""><th><lod< th=""><th>414</th><th>228</th><th>091102T11</th></lod<></th></lod<>	<lod< th=""><th>414</th><th>228</th><th>091102T11</th></lod<>	414	228	091102T11		
15	<lod< th=""><th><lod< th=""><th>27</th><th><lod< th=""><th>091102T12</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>27</th><th><lod< th=""><th>091102T12</th></lod<></th></lod<>	27	<lod< th=""><th>091102T12</th></lod<>	091102T12		
16	<lod< th=""><th><lod< th=""><th>623</th><th>289</th><th>091102T12</th></lod<></th></lod<>	<lod< th=""><th>623</th><th>289</th><th>091102T12</th></lod<>	623	289	091102T12		
17		Ç	Standardisa	tion			
18			Standardisa	tion			
19	<lod< th=""><th>65</th><th>1566</th><th>684</th><th>091102T13</th></lod<>	65	1566	684	091102T13		
20	<lod< th=""><th>37</th><th>1711</th><th>576</th><th>091102T14</th></lod<>	37	1711	576	091102T14		
21	<lod< th=""><th><lod< th=""><th>483</th><th>230</th><th>091102T15</th></lod<></th></lod<>	<lod< th=""><th>483</th><th>230</th><th>091102T15</th></lod<>	483	230	091102T15		
22	<lod< th=""><th>42</th><th>468</th><th>156</th><th>091102T16</th></lod<>	42	468	156	091102T16		
23	<lod< th=""><th><lod< th=""><th>483</th><th>155</th><th>091102T17</th></lod<></th></lod<>	<lod< th=""><th>483</th><th>155</th><th>091102T17</th></lod<>	483	155	091102T17		
24	<lod< th=""><th><lod< th=""><th>510</th><th>203</th><th>091102T18</th></lod<></th></lod<>	<lod< th=""><th>510</th><th>203</th><th>091102T18</th></lod<>	510	203	091102T18		
25	<lod< th=""><th>42</th><th>332</th><th>125</th><th>091102T19</th></lod<>	42	332	125	091102T19		
26	<lod< th=""><th><lod< th=""><th>372</th><th>133</th><th>091102T20</th></lod<></th></lod<>	<lod< th=""><th>372</th><th>133</th><th>091102T20</th></lod<>	372	133	091102T20		
27	<lod< th=""><th><lod< th=""><th>479</th><th>172</th><th>091102T21</th></lod<></th></lod<>	<lod< th=""><th>479</th><th>172</th><th>091102T21</th></lod<>	479	172	091102T21		
28	<lod< th=""><th><lod< th=""><th>419</th><th>158</th><th>091102T22</th></lod<></th></lod<>	<lod< th=""><th>419</th><th>158</th><th>091102T22</th></lod<>	419	158	091102T22		
29	<lod< th=""><th><lod< th=""><th>441</th><th>176</th><th>091102T23</th></lod<></th></lod<>	<lod< th=""><th>441</th><th>176</th><th>091102T23</th></lod<>	441	176	091102T23		
30	<lod< th=""><th><lod< th=""><th>422</th><th>170</th><th>091102T24</th></lod<></th></lod<>	<lod< th=""><th>422</th><th>170</th><th>091102T24</th></lod<>	422	170	091102T24		
31	<lod< th=""><th><lod< th=""><th>376</th><th>146</th><th>091102T25</th></lod<></th></lod<>	<lod< th=""><th>376</th><th>146</th><th>091102T25</th></lod<>	376	146	091102T25		
32	<lod< th=""><th><lod< th=""><th>474</th><th>195</th><th>091102T26</th></lod<></th></lod<>	<lod< th=""><th>474</th><th>195</th><th>091102T26</th></lod<>	474	195	091102T26		
33	<lod< th=""><th><lod< th=""><th>441</th><th>155</th><th>091102T27</th></lod<></th></lod<>	<lod< th=""><th>441</th><th>155</th><th>091102T27</th></lod<>	441	155	091102T27		
34	<lod< th=""><th><lod< th=""><th>429</th><th>161</th><th>091102T28</th></lod<></th></lod<>	<lod< th=""><th>429</th><th>161</th><th>091102T28</th></lod<>	429	161	091102T28		
35	<lod< th=""><th><lod< th=""><th>693</th><th>202</th><th>091102T29</th></lod<></th></lod<>	<lod< th=""><th>693</th><th>202</th><th>091102T29</th></lod<>	693	202	091102T29		
36		(Standardisa	tion			
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38	<lod< th=""><th><lod< th=""><th>430</th><th>175</th><th>091102T30</th></lod<></th></lod<>	<lod< th=""><th>430</th><th>175</th><th>091102T30</th></lod<>	430	175	091102T30		
39	<lod< th=""><th><lod< th=""><th>349</th><th>141</th><th>091102T31</th></lod<></th></lod<>	<lod< th=""><th>349</th><th>141</th><th>091102T31</th></lod<>	349	141	091102T31		
40	<lod< th=""><th><lod< th=""><th>368</th><th>173</th><th>091102T32</th></lod<></th></lod<>	<lod< th=""><th>368</th><th>173</th><th>091102T32</th></lod<>	368	173	091102T32		
41	<lod< th=""><th><lod< th=""><th>411</th><th>201</th><th>091102T33</th></lod<></th></lod<>	<lod< th=""><th>411</th><th>201</th><th>091102T33</th></lod<>	411	201	091102T33		
42	<lod< th=""><th><lod< th=""><th>301</th><th>139</th><th>091102T34</th></lod<></th></lod<>	<lod< th=""><th>301</th><th>139</th><th>091102T34</th></lod<>	301	139	091102T34		
43	<lod< th=""><th>34</th><th>634</th><th>323</th><th colspan="3">091102T35</th></lod<>	34	634	323	091102T35		
44	<lod< th=""><th><lod< th=""><th>413</th><th>148</th><th>091102T36</th></lod<></th></lod<>	<lod< th=""><th>413</th><th>148</th><th>091102T36</th></lod<>	413	148	091102T36		
45	<lod< th=""><th><lod< th=""><th>354</th><th>163</th><th>091102T37</th></lod<></th></lod<>	<lod< th=""><th>354</th><th>163</th><th>091102T37</th></lod<>	354	163	091102T37		
46	<lod< th=""><th><lod< th=""><th>175</th><th>59</th><th>091102T38</th></lod<></th></lod<>	<lod< th=""><th>175</th><th>59</th><th>091102T38</th></lod<>	175	59	091102T38		
47	<lod< th=""><th>41</th><th>369</th><th>161</th><th>091102T39</th></lod<>	41	369	161	091102T39		

XRF Data 03 November 2009



Reading	Cr	Cu	Zn	Pb	Description			
1		5	Standardisa	tion				
2	<lod< th=""><th><lod< th=""><th>397</th><th>160</th><th>091103T1</th></lod<></th></lod<>	<lod< th=""><th>397</th><th>160</th><th>091103T1</th></lod<>	397	160	091103T1			
3	<lod< th=""><th><lod< th=""><th>410</th><th>172</th><th>091103T2</th></lod<></th></lod<>	<lod< th=""><th>410</th><th>172</th><th>091103T2</th></lod<>	410	172	091103T2			
4	<lod< th=""><th><lod< th=""><th>454</th><th>189</th><th colspan="3">091103T3</th></lod<></th></lod<>	<lod< th=""><th>454</th><th>189</th><th colspan="3">091103T3</th></lod<>	454	189	091103T3			
5	<lod< th=""><th><lod< th=""><th>397</th><th>143</th><th>091103T4</th></lod<></th></lod<>	<lod< th=""><th>397</th><th>143</th><th>091103T4</th></lod<>	397	143	091103T4			
6	<lod< th=""><th><lod< th=""><th>353</th><th>128</th><th>091103T5</th></lod<></th></lod<>	<lod< th=""><th>353</th><th>128</th><th>091103T5</th></lod<>	353	128	091103T5			
7	<lod< th=""><th><lod< th=""><th>376</th><th>133</th><th>091103T6</th></lod<></th></lod<>	<lod< th=""><th>376</th><th>133</th><th>091103T6</th></lod<>	376	133	091103T6			
8	<lod< th=""><th><lod< th=""><th>425</th><th>149</th><th>091103T7</th></lod<></th></lod<>	<lod< th=""><th>425</th><th>149</th><th>091103T7</th></lod<>	425	149	091103T7			
9	<lod< th=""><th><lod< th=""><th>547</th><th>226</th><th>091103T8</th></lod<></th></lod<>	<lod< th=""><th>547</th><th>226</th><th>091103T8</th></lod<>	547	226	091103T8			
10	<lod< th=""><th><lod< th=""><th>407</th><th>179</th><th>091103T9</th></lod<></th></lod<>	<lod< th=""><th>407</th><th>179</th><th>091103T9</th></lod<>	407	179	091103T9			
11	<lod< th=""><th>49</th><th>461</th><th>168</th><th>091103T10</th></lod<>	49	461	168	091103T10			
12	<lod< th=""><th><lod< th=""><th>307</th><th>128</th><th>091103T11</th></lod<></th></lod<>	<lod< th=""><th>307</th><th>128</th><th>091103T11</th></lod<>	307	128	091103T11			
13	<lod< th=""><th><lod< th=""><th>356</th><th>132</th><th>091103T12</th></lod<></th></lod<>	<lod< th=""><th>356</th><th>132</th><th>091103T12</th></lod<>	356	132	091103T12			
14	<lod< th=""><th><lod< th=""><th>327</th><th>151</th><th>091103T13</th></lod<></th></lod<>	<lod< th=""><th>327</th><th>151</th><th>091103T13</th></lod<>	327	151	091103T13			
15		Standardisation						
16	<lod< th=""><th><lod< th=""><th>317</th><th>119</th><th>091103T14</th></lod<></th></lod<>	<lod< th=""><th>317</th><th>119</th><th>091103T14</th></lod<>	317	119	091103T14			
17	<lod< th=""><th><lod< th=""><th>471</th><th>161</th><th>091103T15</th></lod<></th></lod<>	<lod< th=""><th>471</th><th>161</th><th>091103T15</th></lod<>	471	161	091103T15			
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20	<lod< th=""><th><lod< th=""><th>380</th><th>159</th><th>091103T17</th></lod<></th></lod<>	<lod< th=""><th>380</th><th>159</th><th>091103T17</th></lod<>	380	159	091103T17			
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22			Standardisa					
23	<lod< th=""><th><lod< th=""><th>524</th><th>229</th><th>TRB Screen</th></lod<></th></lod<>	<lod< th=""><th>524</th><th>229</th><th>TRB Screen</th></lod<>	524	229	TRB Screen			
24	<lod< th=""><th><lod< th=""><th>256</th><th>109</th><th>TRB Screen</th></lod<></th></lod<>	<lod< th=""><th>256</th><th>109</th><th>TRB Screen</th></lod<>	256	109	TRB Screen			
25	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th>TRB Screen</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th>TRB Screen</th></lod<></th></lod<>	28	<lod< th=""><th>TRB Screen</th></lod<>	TRB Screen			
26	<lod< th=""><th><lod< th=""><th>266</th><th>90</th><th>TRB Screen</th></lod<></th></lod<>	<lod< th=""><th>266</th><th>90</th><th>TRB Screen</th></lod<>	266	90	TRB Screen			
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XRF Data 04 November 2009



Reading	Cr	Cu	Zn	Pb	Description		
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2		5	Standardisat	tion			
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4	<lod< th=""><th>35</th><th>346</th><th>137</th><th>091104T2</th></lod<>	35	346	137	091104T2		
5	<lod< th=""><th><lod< th=""><th>624</th><th>463</th><th>091104T3</th></lod<></th></lod<>	<lod< th=""><th>624</th><th>463</th><th>091104T3</th></lod<>	624	463	091104T3		
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8	<lod< th=""><th><lod< th=""><th>266</th><th>118</th><th>091104T6</th></lod<></th></lod<>	<lod< th=""><th>266</th><th>118</th><th>091104T6</th></lod<>	266	118	091104T6		
9	<lod< th=""><th><lod< th=""><th>233</th><th>91</th><th>091104T7</th></lod<></th></lod<>	<lod< th=""><th>233</th><th>91</th><th>091104T7</th></lod<>	233	91	091104T7		
10	<lod< th=""><th>34</th><th>289</th><th>86</th><th>091104T8</th></lod<>	34	289	86	091104T8		
11	<lod< th=""><th><lod< th=""><th>235</th><th>81</th><th>091104T9</th></lod<></th></lod<>	<lod< th=""><th>235</th><th>81</th><th>091104T9</th></lod<>	235	81	091104T9		
12	<lod< th=""><th><lod< th=""><th>277</th><th>115</th><th>091104T10</th></lod<></th></lod<>	<lod< th=""><th>277</th><th>115</th><th>091104T10</th></lod<>	277	115	091104T10		
13	<lod< th=""><th><lod< th=""><th>360</th><th>113</th><th>091104T11</th></lod<></th></lod<>	<lod< th=""><th>360</th><th>113</th><th>091104T11</th></lod<>	360	113	091104T11		
14	<lod< th=""><th><lod< th=""><th>333</th><th>149</th><th>091104T12</th></lod<></th></lod<>	<lod< th=""><th>333</th><th>149</th><th>091104T12</th></lod<>	333	149	091104T12		
15	<lod< th=""><th><lod< th=""><th>330</th><th>166</th><th>091104T13</th></lod<></th></lod<>	<lod< th=""><th>330</th><th>166</th><th>091104T13</th></lod<>	330	166	091104T13		
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21	<lod< th=""><th><lod< th=""><th>420</th><th>137</th><th>091104T21</th></lod<></th></lod<>	<lod< th=""><th>420</th><th>137</th><th>091104T21</th></lod<>	420	137	091104T21		
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25	<lod< th=""><th><lod< th=""><th>348</th><th>119</th><th>091104T24</th></lod<></th></lod<>	<lod< th=""><th>348</th><th>119</th><th>091104T24</th></lod<>	348	119	091104T24		
26	<lod< th=""><th><lod< th=""><th>282</th><th>99</th><th>091104T25</th></lod<></th></lod<>	<lod< th=""><th>282</th><th>99</th><th>091104T25</th></lod<>	282	99	091104T25		
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31			Standardisat				
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33	<lod< th=""><th><lod< th=""><th>154</th><th>49</th><th>091104T35</th></lod<></th></lod<>	<lod< th=""><th>154</th><th>49</th><th>091104T35</th></lod<>	154	49	091104T35		
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35	<lod< th=""><th><lod< th=""><th>274</th><th>105</th><th>091104T37</th></lod<></th></lod<>	<lod< th=""><th>274</th><th>105</th><th>091104T37</th></lod<>	274	105	091104T37		
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41	<lod< th=""><th><lod< th=""><th>58</th><th>26</th><th>TLB shingle</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>26</th><th>TLB shingle</th></lod<>	58	26	TLB shingle		

XRF Data 05 November 2009



Reading	Cr	Cu	Zn	Pb	Description
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4	<lod< th=""><th><lod< th=""><th>392</th><th>170</th><th>Cell B 091105T2</th></lod<></th></lod<>	<lod< th=""><th>392</th><th>170</th><th>Cell B 091105T2</th></lod<>	392	170	Cell B 091105T2
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7			Standard	isation	
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11	179	<lod< th=""><th>192</th><th>71</th><th>Cell B 091105T4</th></lod<>	192	71	Cell B 091105T4
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14	<lod< th=""><th><lod< th=""><th>112</th><th>48</th><th>Cell B 091105T7</th></lod<></th></lod<>	<lod< th=""><th>112</th><th>48</th><th>Cell B 091105T7</th></lod<>	112	48	Cell B 091105T7
15	<lod< th=""><th><lod< th=""><th>35</th><th><lod< th=""><th>Cell B 091105T8</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>35</th><th><lod< th=""><th>Cell B 091105T8</th></lod<></th></lod<>	35	<lod< th=""><th>Cell B 091105T8</th></lod<>	Cell B 091105T8
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18	<lod< th=""><th><lod< th=""><th>235</th><th>69</th><th>Cell B 091105T11</th></lod<></th></lod<>	<lod< th=""><th>235</th><th>69</th><th>Cell B 091105T11</th></lod<>	235	69	Cell B 091105T11
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XRF Data 06 November 2009



Reading	Cr	Cu	Zn	Pb	Description
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4	475	108	434	128	NIST 2702
5	179	580	1148	195	NIST 2781
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7	<lod< td=""><td>41</td><td>770</td><td>805</td><td>CFA Pile 213D</td></lod<>	41	770	805	CFA Pile 213D
8	<lod< td=""><td><lod< td=""><td>46</td><td>16</td><td></td></lod<></td></lod<>	<lod< td=""><td>46</td><td>16</td><td></td></lod<>	46	16	
9	<lod< td=""><td><lod< td=""><td>39</td><td>12</td><td></td></lod<></td></lod<>	<lod< td=""><td>39</td><td>12</td><td></td></lod<>	39	12	
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27	<lod< td=""><td><lod< td=""><td>222</td><td>82</td><td></td></lod<></td></lod<>	<lod< td=""><td>222</td><td>82</td><td></td></lod<>	222	82	
28	<lod< td=""><td><lod< td=""><td>164</td><td>52</td><td></td></lod<></td></lod<>	<lod< td=""><td>164</td><td>52</td><td></td></lod<>	164	52	
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33	<lod< td=""><td>33</td><td>165</td><td>56</td><td></td></lod<>	33	165	56	
34	<lod< td=""><td><lod< td=""><td>199</td><td>78</td><td></td></lod<></td></lod<>	<lod< td=""><td>199</td><td>78</td><td></td></lod<>	199	78	
35	<lod< td=""><td><lod< td=""><td>118</td><td>44</td><td></td></lod<></td></lod<>	<lod< td=""><td>118</td><td>44</td><td></td></lod<>	118	44	
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37	<lod< td=""><td><lod< td=""><td>116</td><td>43</td><td></td></lod<></td></lod<>	<lod< td=""><td>116</td><td>43</td><td></td></lod<>	116	43	
38	<lod< td=""><td><lod< td=""><td>33</td><td><lod< td=""><td></td></lod<></td></lod<></td></lod<>	<lod< td=""><td>33</td><td><lod< td=""><td></td></lod<></td></lod<>	33	<lod< td=""><td></td></lod<>	
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44	<lod< td=""><td><lod< td=""><td>157</td><td>46</td><td></td></lod<></td></lod<>	<lod< td=""><td>157</td><td>46</td><td></td></lod<>	157	46	

XRF Data 07 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standardis	sation	
2			Standardis	sation	
3	<lod< th=""><th><lod< th=""><th>251</th><th>92</th><th></th></lod<></th></lod<>	<lod< th=""><th>251</th><th>92</th><th></th></lod<>	251	92	
4	<lod< th=""><th><lod< th=""><th>263</th><th>110</th><th></th></lod<></th></lod<>	<lod< th=""><th>263</th><th>110</th><th></th></lod<>	263	110	
5	<lod< th=""><th><lod< th=""><th>283</th><th>114</th><th></th></lod<></th></lod<>	<lod< th=""><th>283</th><th>114</th><th></th></lod<>	283	114	
6	<lod< th=""><th><lod< th=""><th>485</th><th>246</th><th>]</th></lod<></th></lod<>	<lod< th=""><th>485</th><th>246</th><th>]</th></lod<>	485	246]
7	<lod< th=""><th><lod< th=""><th>172</th><th>96</th><th></th></lod<></th></lod<>	<lod< th=""><th>172</th><th>96</th><th></th></lod<>	172	96	
8	<lod< th=""><th><lod< th=""><th>601</th><th>116</th><th></th></lod<></th></lod<>	<lod< th=""><th>601</th><th>116</th><th></th></lod<>	601	116	
9	<lod< th=""><th>44</th><th>102</th><th>31</th><th></th></lod<>	44	102	31	
10	<lod< th=""><th><lod< th=""><th>1240</th><th>692</th><th></th></lod<></th></lod<>	<lod< th=""><th>1240</th><th>692</th><th></th></lod<>	1240	692	
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13	<lod< th=""><th><lod< th=""><th>227</th><th>189</th><th></th></lod<></th></lod<>	<lod< th=""><th>227</th><th>189</th><th></th></lod<>	227	189	
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17	<lod< th=""><th><lod< th=""><th>207</th><th>97</th><th></th></lod<></th></lod<>	<lod< th=""><th>207</th><th>97</th><th></th></lod<>	207	97	
18	<lod< th=""><th>38</th><th>262</th><th>125</th><th></th></lod<>	38	262	125	
19	<lod< th=""><th><lod< th=""><th>398</th><th>147</th><th></th></lod<></th></lod<>	<lod< th=""><th>398</th><th>147</th><th></th></lod<>	398	147	
20	<lod< th=""><th><lod< th=""><th>149</th><th>47</th><th>Cell B Pre-</th></lod<></th></lod<>	<lod< th=""><th>149</th><th>47</th><th>Cell B Pre-</th></lod<>	149	47	Cell B Pre-
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25	<lod< th=""><th><lod< th=""><th>172</th><th>71</th><th></th></lod<></th></lod<>	<lod< th=""><th>172</th><th>71</th><th></th></lod<>	172	71	
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30	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th>_</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th>_</th></lod<></th></lod<>	38	<lod< th=""><th>_</th></lod<>	_
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39	<lod< th=""><th><lod< th=""><th>403</th><th>146</th><th>1</th></lod<></th></lod<>	<lod< th=""><th>403</th><th>146</th><th>1</th></lod<>	403	146	1
40	1.00	100	Standardis	•	Io. II D. B
41	<lod< th=""><th><lod< th=""><th>116</th><th>33</th><th>Cell B Pre-</th></lod<></th></lod<>	<lod< th=""><th>116</th><th>33</th><th>Cell B Pre-</th></lod<>	116	33	Cell B Pre-
42	<lod< th=""><th><lod< th=""><th>39</th><th><lod< th=""><th>B/10L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>39</th><th><lod< th=""><th>B/10L</th></lod<></th></lod<>	39	<lod< th=""><th>B/10L</th></lod<>	B/10L
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Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2009 Master.xls7 Nov 09

XRF Data 09 November 2009

Reading	Cr	Cu	Zn	Pb	Description
1			Standardisa	tion	
2	<lod< th=""><th><lod< th=""><th>41</th><th><lod< th=""><th>٠ . ح</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>41</th><th><lod< th=""><th>٠ . ح</th></lod<></th></lod<>	41	<lod< th=""><th>٠ . ح</th></lod<>	٠ . ح
3	<lod< th=""><th><lod< th=""><th>37</th><th><lod< th=""><th>8 - ioi</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>37</th><th><lod< th=""><th>8 - ioi</th></lod<></th></lod<>	37	<lod< th=""><th>8 - ioi</th></lod<>	8 - ioi
4	<lod< th=""><th><lod< th=""><th>210</th><th>52</th><th>Cell B 30 - 90m pre- validation</th></lod<></th></lod<>	<lod< th=""><th>210</th><th>52</th><th>Cell B 30 - 90m pre- validation</th></lod<>	210	52	Cell B 30 - 90m pre- validation
5	<lod< th=""><th><lod< th=""><th>38</th><th>14</th><th>alic gell</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>14</th><th>alic gell</th></lod<>	38	14	alic gell
6	<lod< th=""><th><lod< th=""><th>47</th><th>19</th><th>Ο ω ></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>19</th><th>Ο ω ></th></lod<>	47	19	Ο ω >
7			Standardisa		
8	<lod< th=""><th>43</th><th>118</th><th>42</th><th></th></lod<>	43	118	42	
9	<lod< th=""><th><lod< th=""><th>467</th><th>246</th><th>1</th></lod<></th></lod<>	<lod< th=""><th>467</th><th>246</th><th>1</th></lod<>	467	246	1
10	<lod< th=""><th><lod< th=""><th>288</th><th>155</th><th>⊑</th></lod<></th></lod<>	<lod< th=""><th>288</th><th>155</th><th>⊑</th></lod<>	288	155	⊑
11	<lod< th=""><th><lod< th=""><th>154</th><th>77</th><th>atio</th></lod<></th></lod<>	<lod< th=""><th>154</th><th>77</th><th>atio</th></lod<>	154	77	atio
12	<lod< th=""><th><lod< th=""><th>1498</th><th>216</th><th>ig</th></lod<></th></lod<>	<lod< th=""><th>1498</th><th>216</th><th>ig</th></lod<>	1498	216	ig
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15					م ر
	<lod< th=""><th><lod< th=""><th>301</th><th>157</th><th>0m</th></lod<></th></lod<>	<lod< th=""><th>301</th><th>157</th><th>0m</th></lod<>	301	157	0m
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19	<lod< th=""><th><lod< th=""><th>87</th><th>40</th><th>Cell</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>40</th><th>Cell</th></lod<>	87	40	Cell
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21	<lod< th=""><th><lod< th=""><th>210</th><th>81</th><th></th></lod<></th></lod<>	<lod< th=""><th>210</th><th>81</th><th></th></lod<>	210	81	
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23			Standardisa		
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36	<lod< th=""><th>31</th><th>198</th><th>151</th><th>p _</th></lod<>	31	198	151	p _
37	<lod< th=""><th><lod< th=""><th>249</th><th>99</th><th>m_O</th></lod<></th></lod<>	<lod< th=""><th>249</th><th>99</th><th>m_O</th></lod<>	249	99	m _O
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40	<lod< th=""><th>38</th><th>484</th><th>223</th><th>B 3</th></lod<>	38	484	223	B 3
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42	<lod< th=""><th><lod< th=""><th>82</th><th>23</th><th>O</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>23</th><th>O</th></lod<>	82	23	O
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44	<lod< th=""><th><lod< th=""><th>64</th><th>31</th><th>1</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>31</th><th>1</th></lod<>	64	31	1
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50	<lod <lod< th=""><th><lod <lod< th=""><th>44</th><th>13</th><th>B/50R</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>44</th><th>13</th><th>B/50R</th></lod<></lod 	44	13	B/50R
51			43	15	
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		<lod< th=""><th>39</th><th></th><th>B/70R</th></lod<>	39		B/70R
54	<lod< th=""><th><lod< th=""><th>27</th><th>12</th><th>B/70M</th></lod<></th></lod<>	<lod< th=""><th>27</th><th>12</th><th>B/70M</th></lod<>	27	12	B/70M
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Validation

XRF Data 10 November 2009



Reading	Cr	Cu	Zn	Pb	Description	
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2	<lod< th=""><th><lod< th=""><th>178</th><th>101</th><th></th></lod<></th></lod<>	<lod< th=""><th>178</th><th>101</th><th></th></lod<>	178	101		
3	<lod< th=""><th><lod< th=""><th>237</th><th>137</th><th></th></lod<></th></lod<>	<lod< th=""><th>237</th><th>137</th><th></th></lod<>	237	137		
4	<lod< th=""><th><lod< th=""><th>59</th><th>65</th><th></th></lod<></th></lod<>	<lod< th=""><th>59</th><th>65</th><th></th></lod<>	59	65		
5	<lod< th=""><th>63</th><th>1682</th><th>684</th><th></th></lod<>	63	1682	684		
6	<lod< th=""><th><lod< th=""><th>128</th><th>67</th><th></th></lod<></th></lod<>	<lod< th=""><th>128</th><th>67</th><th></th></lod<>	128	67		
7	<lod< th=""><th><lod< th=""><th>82</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>82</th><th><lod< th=""><th></th></lod<></th></lod<>	82	<lod< th=""><th></th></lod<>		
8	<lod< th=""><th><lod< th=""><th>165</th><th>37</th><th></th></lod<></th></lod<>	<lod< th=""><th>165</th><th>37</th><th></th></lod<>	165	37		
9	<lod< th=""><th><lod< th=""><th>323</th><th>90</th><th></th></lod<></th></lod<>	<lod< th=""><th>323</th><th>90</th><th></th></lod<>	323	90		
10	<lod< th=""><th><lod< th=""><th>104</th><th>10</th><th></th></lod<></th></lod<>	<lod< th=""><th>104</th><th>10</th><th></th></lod<>	104	10		
11	<lod< th=""><th>100</th><th>1887</th><th>611</th><th></th></lod<>	100	1887	611		
12	<lod< th=""><th><lod< th=""><th>502</th><th>135</th><th></th></lod<></th></lod<>	<lod< th=""><th>502</th><th>135</th><th></th></lod<>	502	135		
13	<lod< th=""><th><lod< th=""><th>208</th><th>115</th><th></th></lod<></th></lod<>	<lod< th=""><th>208</th><th>115</th><th></th></lod<>	208	115		
14	<lod< th=""><th><lod< th=""><th>66</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>66</th><th><lod< th=""><th></th></lod<></th></lod<>	66	<lod< th=""><th></th></lod<>		
15	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<>	38	<lod< th=""><th></th></lod<>		
16	<lod< th=""><th><lod< th=""><th>165</th><th>53</th><th></th></lod<></th></lod<>	<lod< th=""><th>165</th><th>53</th><th></th></lod<>	165	53		
17	<lod< th=""><th><lod< th=""><th>841</th><th>121</th><th></th></lod<></th></lod<>	<lod< th=""><th>841</th><th>121</th><th></th></lod<>	841	121		
18	<lod< th=""><th><lod< th=""><th>181</th><th>69</th><th></th></lod<></th></lod<>	<lod< th=""><th>181</th><th>69</th><th></th></lod<>	181	69		
19	183	<lod< th=""><th>1164</th><th>697</th><th>Ė</th></lod<>	1164	697	Ė	
20	<lod< th=""><th><lod< th=""><th>207</th><th>33</th><th>06</th></lod<></th></lod<>	<lod< th=""><th>207</th><th>33</th><th>06</th></lod<>	207	33	06	
21	<lod< th=""><th><lod< th=""><th>166</th><th>40</th><th>- 0</th></lod<></th></lod<>	<lod< th=""><th>166</th><th>40</th><th>- 0</th></lod<>	166	40	- 0	
22	<lod< th=""><th><lod< th=""><th>195</th><th>59</th><th>, O</th></lod<></th></lod<>	<lod< th=""><th>195</th><th>59</th><th>, O</th></lod<>	195	59	, O	
23	<lod< th=""><th><lod< th=""><th>42</th><th>15</th><th>Ī</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>15</th><th>Ī</th></lod<>	42	15	Ī	
24	<lod <lod< th=""><th><lod <lod< th=""><th>174</th><th>42</th><th>.⊆</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>174</th><th>42</th><th>.⊆</th></lod<></lod 	174	42	.⊆	
25	<lod <lod< th=""><th><lod <lod< th=""><th>201</th><th>69</th><th>ng</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>201</th><th>69</th><th>ng</th></lod<></lod 	201	69	ng	
26	<lod <lod< th=""><th>76</th><th>1570</th><th>595</th><th>validation check, and delineation of ooze remaining in TLB, 0 - 90m.</th></lod<></lod 	76	1570	595	validation check, and delineation of ooze remaining in TLB, 0 - 90m.	
27	<lod <lod< th=""><th><lod< th=""><th>265</th><th>80</th><th>B B</th></lod<></th></lod<></lod 	<lod< th=""><th>265</th><th>80</th><th>B B</th></lod<>	265	80	B B	
28	<lod <lod< th=""><th><lod <lod< th=""><th>288</th><th>57</th><th>ē</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>288</th><th>57</th><th>ē</th></lod<></lod 	288	57	ē	
29	<lod <lod< th=""><th><lod <lod< th=""><th>182</th><th>103</th><th>Ze</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>182</th><th>103</th><th>Ze</th></lod<></lod 	182	103	Ze	
30	<lod <lod< th=""><th><lod <lod< th=""><th>402</th><th>178</th><th>8</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>402</th><th>178</th><th>8</th></lod<></lod 	402	178	8	
31	<lod <lod< th=""><th><lod <lod< th=""><th>388</th><th>152</th><th>ð</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>388</th><th>152</th><th>ð</th></lod<></lod 	388	152	ð	
32	<lod <lod< th=""><th><lod <lod< th=""><th>231</th><th>78</th><th>.io</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>231</th><th>78</th><th>.io</th></lod<></lod 	231	78	.io	
33	<lod <lod< th=""><th><lod <lod< th=""><th>82</th><th>21</th><th>eat</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>82</th><th>21</th><th>eat</th></lod<></lod 	82	21	eat	
34	<lod <lod< th=""><th><lod <lod< th=""><th>103</th><th>19</th><th><u>i.</u></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>103</th><th>19</th><th><u>i.</u></th></lod<></lod 	103	19	<u>i.</u>	
35	<lod <lod< th=""><th><lod <lod< th=""><th><lod< th=""><th><lod< th=""><th>de</th></lod<></th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th><lod< th=""><th><lod< th=""><th>de</th></lod<></th></lod<></th></lod<></lod 	<lod< th=""><th><lod< th=""><th>de</th></lod<></th></lod<>	<lod< th=""><th>de</th></lod<>	de	
36	<lod <lod< th=""><th>51</th><th>616</th><th>213</th><th>Б</th></lod<></lod 	51	616	213	Б	
37	<lod< th=""><th><lod< th=""><th>104</th><th>34</th><th>, a</th></lod<></th></lod<>	<lod< th=""><th>104</th><th>34</th><th>, a</th></lod<>	104	34	, a	
38	<lod< th=""><th><lod< th=""><th>51</th><th>15</th><th>60</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>15</th><th>60</th></lod<>	51	15	60	
39	<lod <lod< th=""><th><lod <lod< th=""><th>80</th><th>27</th><th>ਪੁੱ</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>80</th><th>27</th><th>ਪੁੱ</th></lod<></lod 	80	27	ਪੁੱ	
40	<lod< th=""><th><lod< th=""><th>54</th><th>19</th><th>uo</th></lod<></th></lod<>	<lod< th=""><th>54</th><th>19</th><th>uo</th></lod<>	54	19	uo	
41	<lod< th=""><th><lod< th=""><th>50</th><th><lod< th=""><th>ati</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>50</th><th><lod< th=""><th>ati</th></lod<></th></lod<>	50	<lod< th=""><th>ati</th></lod<>	ati	
42	<lod< th=""><th>39</th><th>289</th><th>163</th><th>) Jil</th></lod<>	39	289	163) Jil	
40	143	-	349	407		
43 44	<lod< th=""><th><lod <lod< th=""><th>120</th><th>33</th><th>Pre</th></lod<></lod </th></lod<>	<lod <lod< th=""><th>120</th><th>33</th><th>Pre</th></lod<></lod 	120	33	Pre	
45	<lod <lod< th=""><th><lod <lod< th=""><th>147</th><th>41</th><th><u></u></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>147</th><th>41</th><th><u></u></th></lod<></lod 	147	41	<u></u>	
46	<lod <lod< th=""><th>35</th><th>670</th><th>368</th><th>Cell</th></lod<></lod 	35	670	368	Cell	
47	<lod <lod< th=""><th><lod< th=""><th>90</th><th>47</th><th>Ō</th></lod<></th></lod<></lod 	<lod< th=""><th>90</th><th>47</th><th>Ō</th></lod<>	90	47	Ō	
48	<lod <lod< th=""><th><lod <lod< th=""><th>36</th><th><lod< th=""><th></th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>36</th><th><lod< th=""><th></th></lod<></th></lod<></lod 	36	<lod< th=""><th></th></lod<>		
49	<lod <lod< th=""><th><lod <lod< th=""><th>81</th><th>20</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>81</th><th>20</th><th></th></lod<></lod 	81	20		
50	<lod <lod< th=""><th><lod <lod< th=""><th>202</th><th>86</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>202</th><th>86</th><th></th></lod<></lod 	202	86		
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52	<lod <lod< th=""><th><lod <lod< th=""><th>114</th><th>100</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>114</th><th>100</th><th></th></lod<></lod 	114	100		
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56	<lod <lod< th=""><th>44</th><th>628</th><th>172</th><th></th></lod<></lod 	44	628	172		
57	<lod <lod< th=""><th><lod< th=""><th>277</th><th>129</th><th></th></lod<></th></lod<></lod 	<lod< th=""><th>277</th><th>129</th><th></th></lod<>	277	129		
58	<lod <lod< th=""><th><lod <lod< th=""><th>109</th><th>45</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>109</th><th>45</th><th></th></lod<></lod 	109	45		
59	<lod <lod< th=""><th><lod <lod< th=""><th>150</th><th>48</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>150</th><th>48</th><th></th></lod<></lod 	150	48		
60	<lod <lod< th=""><th><lod <lod< th=""><th>108</th><th>46 55</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>108</th><th>46 55</th><th></th></lod<></lod 	108	46 55		
61	<lod <lod< th=""><th><lod <lod< th=""><th>46</th><th><lod< th=""><th></th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>46</th><th><lod< th=""><th></th></lod<></th></lod<></lod 	46	<lod< th=""><th></th></lod<>		
62	<lod <lod< th=""><th><lod <lod< th=""><th>797</th><th>190</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>797</th><th>190</th><th></th></lod<></lod 	797	190		
63	<lod <lod< th=""><th><lod <lod< th=""><th>180</th><th>97</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>180</th><th>97</th><th></th></lod<></lod 	180	97		
64	<lod <lod< th=""><th><lod <lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<></lod 	38	<lod< th=""><th></th></lod<>		
65	\LUD				l	
ชอ	Standardisation					

XRF Data 11 November 2009



Reading	Cr	Cu	Zn	Pb	Description
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3	<lod< th=""><th><lod< th=""><th>58</th><th>16</th><th>B/90M</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>16</th><th>B/90M</th></lod<>	58	16	B/90M
4	<lod< th=""><th><lod< th=""><th>40</th><th><lod< th=""><th>B/90L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>40</th><th><lod< th=""><th>B/90L</th></lod<></th></lod<>	40	<lod< th=""><th>B/90L</th></lod<>	B/90L
5			Standardi	sation	
6			Standardi	sation	
7	<lod< th=""><th><lod< th=""><th>90</th><th>422</th><th></th></lod<></th></lod<>	<lod< th=""><th>90</th><th>422</th><th></th></lod<>	90	422	
8	<lod< th=""><th><lod< th=""><th>154</th><th>1157</th><th>Waiu St</th></lod<></th></lod<>	<lod< th=""><th>154</th><th>1157</th><th>Waiu St</th></lod<>	154	1157	Waiu St
9	<lod< th=""><th><lod< th=""><th>43</th><th>19</th><th>vvalu St</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>19</th><th>vvalu St</th></lod<>	43	19	vvalu St
10	<lod< th=""><th><lod< th=""><th>62</th><th>130</th><th></th></lod<></th></lod<>	<lod< th=""><th>62</th><th>130</th><th></th></lod<>	62	130	
11			Standardi	sation	
12	<lod< th=""><th><lod< th=""><th>463</th><th>114</th><th></th></lod<></th></lod<>	<lod< th=""><th>463</th><th>114</th><th></th></lod<>	463	114	
13	<lod< th=""><th><lod< th=""><th>206</th><th>178</th><th></th></lod<></th></lod<>	<lod< th=""><th>206</th><th>178</th><th></th></lod<>	206	178	
14	<lod< th=""><th>39</th><th>782</th><th>896</th><th></th></lod<>	39	782	896	
15	<lod< th=""><th><lod< th=""><th>57</th><th>14</th><th></th></lod<></th></lod<>	<lod< th=""><th>57</th><th>14</th><th></th></lod<>	57	14	
16	<lod< th=""><th><lod< th=""><th>42</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>42</th><th><lod< th=""><th></th></lod<></th></lod<>	42	<lod< th=""><th></th></lod<>	
17	<lod< th=""><th><lod< th=""><th>87</th><th>37</th><th>Cell B in and</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>37</th><th>Cell B in and</th></lod<>	87	37	Cell B in and
18	<lod< th=""><th><lod< th=""><th>1488</th><th>431</th><th>around rail bridge.</th></lod<></th></lod<>	<lod< th=""><th>1488</th><th>431</th><th>around rail bridge.</th></lod<>	1488	431	around rail bridge.
19	<lod< th=""><th><lod< th=""><th>46</th><th><lod< th=""><th>Spot check while</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>46</th><th><lod< th=""><th>Spot check while</th></lod<></th></lod<>	46	<lod< th=""><th>Spot check while</th></lod<>	Spot check while
20	<lod< th=""><th><lod< th=""><th>435</th><th>231</th><th>removing material.</th></lod<></th></lod<>	<lod< th=""><th>435</th><th>231</th><th>removing material.</th></lod<>	435	231	removing material.
21	<lod< th=""><th><lod< th=""><th>159</th><th>72</th><th>Tomoving material.</th></lod<></th></lod<>	<lod< th=""><th>159</th><th>72</th><th>Tomoving material.</th></lod<>	159	72	Tomoving material.
22	<lod< th=""><th><lod< th=""><th>156</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>156</th><th>19</th><th></th></lod<>	156	19	
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24	<lod< th=""><th><lod< th=""><th>86</th><th>25</th></lod<></th></lod<>	<lod< th=""><th>86</th><th>25</th></lod<>	86	25	
25	<lod< th=""><th><lod< th=""><th>74</th><th>12</th></lod<></th></lod<>	<lod< th=""><th>74</th><th>12</th></lod<>	74	12	
26	<lod< th=""><th>127</th><th>6388</th><th>356</th><th></th></lod<>	127	6388	356	
27	<lod< th=""><th><lod< th=""><th>300</th><th>322</th><th>Cell B TRB seam</th></lod<></th></lod<>	<lod< th=""><th>300</th><th>322</th><th>Cell B TRB seam</th></lod<>	300	322	Cell B TRB seam

Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2009 Master.xls11 Nov 09

XRF Data 12 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2	<lod< th=""><th>30</th><th>318</th><th>130</th><th>Spot checking d/s of</th></lod<>	30	318	130	Spot checking d/s of
3	<lod< th=""><th><lod< th=""><th>1215</th><th>172</th><th>rail bridge</th></lod<></th></lod<>	<lod< th=""><th>1215</th><th>172</th><th>rail bridge</th></lod<>	1215	172	rail bridge
4			Standar	disation	
5	<lod< th=""><th><lod< th=""><th>729</th><th>521</th><th></th></lod<></th></lod<>	<lod< th=""><th>729</th><th>521</th><th></th></lod<>	729	521	
6	<lod< th=""><th><lod< th=""><th>678</th><th>539</th><th>Spot checking d/s of</th></lod<></th></lod<>	<lod< th=""><th>678</th><th>539</th><th>Spot checking d/s of</th></lod<>	678	539	Spot checking d/s of
7	<lod< th=""><th><lod< th=""><th>248</th><th>158</th><th>rail bridge</th></lod<></th></lod<>	<lod< th=""><th>248</th><th>158</th><th>rail bridge</th></lod<>	248	158	rail bridge
8	<lod< th=""><th><lod< th=""><th>183</th><th>125</th><th>raii biluge</th></lod<></th></lod<>	<lod< th=""><th>183</th><th>125</th><th>raii biluge</th></lod<>	183	125	raii biluge
9	<lod< th=""><th><lod< th=""><th>198</th><th>131</th><th></th></lod<></th></lod<>	<lod< th=""><th>198</th><th>131</th><th></th></lod<>	198	131	

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2009 Master.xls12 Nov 09

XRF Data 13 November 2009



Reading	Cr	Cu	Zn	Pb	Description		
1		Standardisation					
2		Standardisation					
3		Standardisation					
4	<lod< th=""><th><lod< th=""><th>246</th><th>58</th><th>Spot checking d/s of</th></lod<></th></lod<>	<lod< th=""><th>246</th><th>58</th><th>Spot checking d/s of</th></lod<>	246	58	Spot checking d/s of		
5	<lod< th=""><th><lod< th=""><th>248</th><th>91</th><th colspan="2">rail bridge</th></lod<></th></lod<>	<lod< th=""><th>248</th><th>91</th><th colspan="2">rail bridge</th></lod<>	248	91	rail bridge		
6	<lod< th=""><th><lod< th=""><th>125</th><th>42</th><th>raii briuge</th></lod<></th></lod<>	<lod< th=""><th>125</th><th>42</th><th>raii briuge</th></lod<>	125	42	raii briuge		

XRF Data 14 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standardisa	ation	
2	<lod< th=""><th><lod< th=""><th>103</th><th>44</th><th></th></lod<></th></lod<>	<lod< th=""><th>103</th><th>44</th><th></th></lod<>	103	44	
3	<lod< th=""><th><lod< th=""><th>344</th><th>150</th><th></th></lod<></th></lod<>	<lod< th=""><th>344</th><th>150</th><th></th></lod<>	344	150	
4	<lod< th=""><th><lod< th=""><th>280</th><th>83</th><th></th></lod<></th></lod<>	<lod< th=""><th>280</th><th>83</th><th></th></lod<>	280	83	
5	<lod< th=""><th><lod< th=""><th>229</th><th>75</th><th></th></lod<></th></lod<>	<lod< th=""><th>229</th><th>75</th><th></th></lod<>	229	75	
6	<lod< th=""><th><lod< th=""><th>214</th><th>72</th><th></th></lod<></th></lod<>	<lod< th=""><th>214</th><th>72</th><th></th></lod<>	214	72	
7	<lod< th=""><th><lod< th=""><th>132</th><th>51</th><th></th></lod<></th></lod<>	<lod< th=""><th>132</th><th>51</th><th></th></lod<>	132	51	
8	<lod< th=""><th>53</th><th>447</th><th>692</th><th></th></lod<>	53	447	692	
9	<lod< th=""><th><lod< th=""><th>222</th><th>83</th><th></th></lod<></th></lod<>	<lod< th=""><th>222</th><th>83</th><th></th></lod<>	222	83	
10	<lod< th=""><th><lod< th=""><th>236</th><th>168</th><th></th></lod<></th></lod<>	<lod< th=""><th>236</th><th>168</th><th></th></lod<>	236	168	
11	<lod< th=""><th>41</th><th>316</th><th>334</th><th>Seam in TRB</th></lod<>	41	316	334	Seam in TRB
12	<lod< th=""><th>68</th><th>1037</th><th>927</th><th></th></lod<>	68	1037	927	
13	<lod< th=""><th><lod< th=""><th>455</th><th>441</th><th rowspan="4">of Cell B</th></lod<></th></lod<>	<lod< th=""><th>455</th><th>441</th><th rowspan="4">of Cell B</th></lod<>	455	441	of Cell B
14	<lod< th=""><th><lod< th=""><th>238</th><th>258</th></lod<></th></lod<>	<lod< th=""><th>238</th><th>258</th></lod<>	238	258	
15	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""></lod<></th></lod<>	<lod< th=""></lod<>	
16	<lod< th=""><th><lod< th=""><th>880</th><th>170</th></lod<></th></lod<>	<lod< th=""><th>880</th><th>170</th></lod<>	880	170	
17	<lod< th=""><th>77</th><th>2152</th><th>639</th><th>Bed of Cell B</th></lod<>	77	2152	639	Bed of Cell B

XRF Data 16 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standardisa	ation	
2	<lod< th=""><th>36</th><th>837</th><th>361</th><th>Spot check</th></lod<>	36	837	361	Spot check
3	<lod< th=""><th><lod< th=""><th>180</th><th>43</th><th>Cell A</th></lod<></th></lod<>	<lod< th=""><th>180</th><th>43</th><th>Cell A</th></lod<>	180	43	Cell A
4	<lod< th=""><th><lod< th=""><th>117</th><th>50</th><th>Cell A</th></lod<></th></lod<>	<lod< th=""><th>117</th><th>50</th><th>Cell A</th></lod<>	117	50	Cell A
5			Standardisa	ation	
6	<lod< th=""><th>207</th><th>250</th><th>174</th><th></th></lod<>	207	250	174	
7	<lod< th=""><th><lod< th=""><th>116</th><th>28</th><th></th></lod<></th></lod<>	<lod< th=""><th>116</th><th>28</th><th></th></lod<>	116	28	
8	<lod< th=""><th><lod< th=""><th>35</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>35</th><th>15</th><th></th></lod<>	35	15	
9	<lod< th=""><th><lod< th=""><th>100</th><th>87</th><th></th></lod<></th></lod<>	<lod< th=""><th>100</th><th>87</th><th></th></lod<>	100	87	
10	<lod< th=""><th><lod< th=""><th>21</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>21</th><th><lod< th=""><th></th></lod<></th></lod<>	21	<lod< th=""><th></th></lod<>	
11	<lod< th=""><th><lod< th=""><th>165</th><th>78</th><th>Spot check</th></lod<></th></lod<>	<lod< th=""><th>165</th><th>78</th><th>Spot check</th></lod<>	165	78	Spot check
12	<lod< th=""><th><lod< th=""><th>31</th><th><lod< th=""><th>Cell A</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>31</th><th><lod< th=""><th>Cell A</th></lod<></th></lod<>	31	<lod< th=""><th>Cell A</th></lod<>	Cell A
13	<lod< th=""><th><lod< th=""><th>50</th><th>14</th><th>Cell A</th></lod<></th></lod<>	<lod< th=""><th>50</th><th>14</th><th>Cell A</th></lod<>	50	14	Cell A
14	<lod< th=""><th><lod< th=""><th>360</th><th>195</th><th rowspan="2"></th></lod<></th></lod<>	<lod< th=""><th>360</th><th>195</th><th rowspan="2"></th></lod<>	360	195	
15	<lod< th=""><th><lod< th=""><th>52</th><th>20</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>20</th></lod<>	52	20	
16	<lod< th=""><th><lod< th=""><th>98</th><th>34</th><th></th></lod<></th></lod<>	<lod< th=""><th>98</th><th>34</th><th></th></lod<>	98	34	
17	<lod< th=""><th><lod< th=""><th>185</th><th>130</th><th></th></lod<></th></lod<>	<lod< th=""><th>185</th><th>130</th><th></th></lod<>	185	130	
18	<lod< th=""><th><lod< th=""><th>370</th><th>208</th><th></th></lod<></th></lod<>	<lod< th=""><th>370</th><th>208</th><th></th></lod<>	370	208	

XRF Data 17 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standardisa	ation	
2			Standardisa	ation	
3	<lod< td=""><td><lod< td=""><td>105</td><td>43</td><td>Demo GWRC</td></lod<></td></lod<>	<lod< td=""><td>105</td><td>43</td><td>Demo GWRC</td></lod<>	105	43	Demo GWRC
4			Standardisa	ation	
5	<lod< td=""><td><lod< td=""><td>427</td><td>46</td><td></td></lod<></td></lod<>	<lod< td=""><td>427</td><td>46</td><td></td></lod<>	427	46	
6	<lod< td=""><td>165</td><td>82</td><td>22</td><td></td></lod<>	165	82	22	
7	<lod< td=""><td><lod< td=""><td>43</td><td>10</td><td></td></lod<></td></lod<>	<lod< td=""><td>43</td><td>10</td><td></td></lod<>	43	10	
8	<lod< td=""><td><lod< td=""><td>39</td><td><lod< td=""><td>Spot check</td></lod<></td></lod<></td></lod<>	<lod< td=""><td>39</td><td><lod< td=""><td>Spot check</td></lod<></td></lod<>	39	<lod< td=""><td>Spot check</td></lod<>	Spot check
9	<lod< td=""><td><lod< td=""><td>27</td><td><lod< td=""><td>TLB Cell A</td></lod<></td></lod<></td></lod<>	<lod< td=""><td>27</td><td><lod< td=""><td>TLB Cell A</td></lod<></td></lod<>	27	<lod< td=""><td>TLB Cell A</td></lod<>	TLB Cell A
10	<lod< td=""><td><lod< td=""><td>51</td><td>22</td><td>ILD Cell A</td></lod<></td></lod<>	<lod< td=""><td>51</td><td>22</td><td>ILD Cell A</td></lod<>	51	22	ILD Cell A
11	<lod< td=""><td><lod< td=""><td>118</td><td>35</td><td></td></lod<></td></lod<>	<lod< td=""><td>118</td><td>35</td><td></td></lod<>	118	35	
12	<lod< td=""><td><lod< td=""><td>138</td><td>53</td><td></td></lod<></td></lod<>	<lod< td=""><td>138</td><td>53</td><td></td></lod<>	138	53	
13	<lod< td=""><td><lod< td=""><td>194</td><td>75</td><td></td></lod<></td></lod<>	<lod< td=""><td>194</td><td>75</td><td></td></lod<>	194	75	
14	<lod< td=""><td><lod< td=""><td>31</td><td>11</td><td>A/10L</td></lod<></td></lod<>	<lod< td=""><td>31</td><td>11</td><td>A/10L</td></lod<>	31	11	A/10L
15	<lod< td=""><td><lod< td=""><td>61</td><td>28</td><td>A/30L</td></lod<></td></lod<>	<lod< td=""><td>61</td><td>28</td><td>A/30L</td></lod<>	61	28	A/30L
16	<lod< td=""><td><lod< td=""><td>77</td><td>36</td><td>A/50L</td></lod<></td></lod<>	<lod< td=""><td>77</td><td>36</td><td>A/50L</td></lod<>	77	36	A/50L
17	<lod< td=""><td><lod< td=""><td>92</td><td>40</td><td>A/70L</td></lod<></td></lod<>	<lod< td=""><td>92</td><td>40</td><td>A/70L</td></lod<>	92	40	A/70L
18	<lod< td=""><td><lod< td=""><td>42</td><td><lod< td=""><td>A/90L</td></lod<></td></lod<></td></lod<>	<lod< td=""><td>42</td><td><lod< td=""><td>A/90L</td></lod<></td></lod<>	42	<lod< td=""><td>A/90L</td></lod<>	A/90L

Validation

XRF Data 19 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1		(Standardisa	tion	
2	<lod< th=""><th><lod< th=""><th>180</th><th>44</th><th></th></lod<></th></lod<>	<lod< th=""><th>180</th><th>44</th><th></th></lod<>	180	44	
3	<lod< th=""><th><lod< th=""><th>145</th><th>53</th><th></th></lod<></th></lod<>	<lod< th=""><th>145</th><th>53</th><th></th></lod<>	145	53	
4	<lod< th=""><th><lod< th=""><th>22</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>22</th><th><lod< th=""><th></th></lod<></th></lod<>	22	<lod< th=""><th></th></lod<>	
5	<lod< th=""><th><lod< th=""><th>226</th><th>65</th><th></th></lod<></th></lod<>	<lod< th=""><th>226</th><th>65</th><th></th></lod<>	226	65	
6	<lod< th=""><th><lod< th=""><th>264</th><th>146</th><th></th></lod<></th></lod<>	<lod< th=""><th>264</th><th>146</th><th></th></lod<>	264	146	
7	<lod< th=""><th>45</th><th>2376</th><th>1687</th><th></th></lod<>	45	2376	1687	
8	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<>	38	<lod< th=""><th></th></lod<>	
9	<lod< th=""><th><lod< th=""><th>412</th><th>297</th><th></th></lod<></th></lod<>	<lod< th=""><th>412</th><th>297</th><th></th></lod<>	412	297	
10	<lod< th=""><th><lod< th=""><th>153</th><th>94</th><th>Spot check</th></lod<></th></lod<>	<lod< th=""><th>153</th><th>94</th><th>Spot check</th></lod<>	153	94	Spot check
11	<lod< th=""><th><lod< th=""><th>56</th><th>23</th><th>Cell A TLB</th></lod<></th></lod<>	<lod< th=""><th>56</th><th>23</th><th>Cell A TLB</th></lod<>	56	23	Cell A TLB
12	<lod< th=""><th><lod< th=""><th>55</th><th><lod< th=""><th>Pre-</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>55</th><th><lod< th=""><th>Pre-</th></lod<></th></lod<>	55	<lod< th=""><th>Pre-</th></lod<>	Pre-
13	<lod< th=""><th><lod< th=""><th>200</th><th>69</th><th>validation</th></lod<></th></lod<>	<lod< th=""><th>200</th><th>69</th><th>validation</th></lod<>	200	69	validation
14	<lod< th=""><th><lod< th=""><th>43</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>43</th><th>15</th><th></th></lod<>	43	15	
15	<lod< th=""><th><lod< th=""><th>77</th><th>63</th><th></th></lod<></th></lod<>	<lod< th=""><th>77</th><th>63</th><th></th></lod<>	77	63	
16	<lod< th=""><th><lod< th=""><th>80</th><th>36</th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>36</th><th></th></lod<>	80	36	
17	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th></th></lod<></th></lod<>	36	<lod< th=""><th></th></lod<>	
18	<lod< th=""><th><lod< th=""><th>52</th><th>18</th><th></th></lod<></th></lod<>	<lod< th=""><th>52</th><th>18</th><th></th></lod<>	52	18	
19	<lod< th=""><th><lod< th=""><th>49</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>49</th><th><lod< th=""><th></th></lod<></th></lod<>	49	<lod< th=""><th></th></lod<>	
20	<lod< th=""><th><lod< th=""><th>271</th><th>335</th><th></th></lod<></th></lod<>	<lod< th=""><th>271</th><th>335</th><th></th></lod<>	271	335	
21	<lod< th=""><th>44</th><th>359</th><th>62</th><th></th></lod<>	44	359	62	
22	<lod< th=""><th>175</th><th>8386</th><th>55</th><th></th></lod<>	175	8386	55	
23	<lod< th=""><th><lod< th=""><th>199</th><th>87</th><th>Slump in Cell</th></lod<></th></lod<>	<lod< th=""><th>199</th><th>87</th><th>Slump in Cell</th></lod<>	199	87	Slump in Cell
24	<lod< th=""><th><lod< th=""><th>159</th><th>63</th><th>- B</th></lod<></th></lod<>	<lod< th=""><th>159</th><th>63</th><th>- B</th></lod<>	159	63	- B
25	<lod< th=""><th><lod< th=""><th>117</th><th>53</th><th>] [</th></lod<></th></lod<>	<lod< th=""><th>117</th><th>53</th><th>] [</th></lod<>	117	53] [
26	<lod< th=""><th><lod< th=""><th>243</th><th>181</th><th></th></lod<></th></lod<>	<lod< th=""><th>243</th><th>181</th><th></th></lod<>	243	181	
27	<lod< th=""><th>38</th><th>146</th><th>215</th><th></th></lod<>	38	146	215	
28	<lod< th=""><th><lod< th=""><th>251</th><th>83</th><th>Beneath Bell</th></lod<></th></lod<>	<lod< th=""><th>251</th><th>83</th><th>Beneath Bell</th></lod<>	251	83	Beneath Bell
29	<lod< th=""><th>49</th><th>1305</th><th>564</th><th>Rd Bridge</th></lod<>	49	1305	564	Rd Bridge
30	<lod< th=""><th><lod< th=""><th>181</th><th>79</th><th>ixa bilage</th></lod<></th></lod<>	<lod< th=""><th>181</th><th>79</th><th>ixa bilage</th></lod<>	181	79	ixa bilage
31	<lod< th=""><th><lod< th=""><th>222</th><th>66</th><th></th></lod<></th></lod<>	<lod< th=""><th>222</th><th>66</th><th></th></lod<>	222	66	
32	<lod< th=""><th><lod< th=""><th>61</th><th>26</th><th>Urupa 1</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>26</th><th>Urupa 1</th></lod<>	61	26	Urupa 1
33	<lod< th=""><th><lod< th=""><th>54</th><th>16</th><th>Urupa 2</th></lod<></th></lod<>	<lod< th=""><th>54</th><th>16</th><th>Urupa 2</th></lod<>	54	16	Urupa 2
34	<lod< th=""><th><lod< th=""><th>48</th><th><lod< th=""><th>Urupa 3</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>48</th><th><lod< th=""><th>Urupa 3</th></lod<></th></lod<>	48	<lod< th=""><th>Urupa 3</th></lod<>	Urupa 3
35	<lod< th=""><th><lod< th=""><th>38</th><th>13</th><th>Urupa 4</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>13</th><th>Urupa 4</th></lod<>	38	13	Urupa 4
36	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>Urupa 5</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>Urupa 5</th></lod<></th></lod<>	33	<lod< th=""><th>Urupa 5</th></lod<>	Urupa 5
37	<lod< th=""><th><lod< th=""><th>54</th><th><lod< th=""><th>Urupa 6</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>54</th><th><lod< th=""><th>Urupa 6</th></lod<></th></lod<>	54	<lod< th=""><th>Urupa 6</th></lod<>	Urupa 6

XRF Data 20 November 2009

Reading	Cr	Cu	Zn	Pb	Description
1	<u> </u>		Standardis		2000
2	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th>Si02 Blank</th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th>Si02 Blank</th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>Si02 Blank</th></lod<></th></lod<>	<lod< th=""><th>Si02 Blank</th></lod<>	Si02 Blank
3	347	110	388	148	NIST2702
4	173	531	1158	186	NIST2781
5			Standardis		
6	<lod< th=""><th><lod< th=""><th>165</th><th>1084</th><th></th></lod<></th></lod<>	<lod< th=""><th>165</th><th>1084</th><th></th></lod<>	165	1084	
7	<lod< th=""><th><lod< th=""><th>111</th><th>380</th><th>Training with</th></lod<></th></lod<>	<lod< th=""><th>111</th><th>380</th><th>Training with</th></lod<>	111	380	Training with
8	<lod< th=""><th><lod< th=""><th>175</th><th>497</th><th>Suz and spot</th></lod<></th></lod<>	<lod< th=""><th>175</th><th>497</th><th>Suz and spot</th></lod<>	175	497	Suz and spot
9	<lod< th=""><th><lod< th=""><th>123</th><th>857</th><th>check of Cell A</th></lod<></th></lod<>	<lod< th=""><th>123</th><th>857</th><th>check of Cell A</th></lod<>	123	857	check of Cell A
10	<lod< th=""><th><lod< th=""><th>62</th><th>17</th><th>pre validation.</th></lod<></th></lod<>	<lod< th=""><th>62</th><th>17</th><th>pre validation.</th></lod<>	62	17	pre validation.
11	<lod< th=""><th><lod< th=""><th>119</th><th>60</th><th>·</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>60</th><th>·</th></lod<>	119	60	·
12			Standardis	ation	
13	<lod< th=""><th><lod< th=""><th>239</th><th>98</th><th></th></lod<></th></lod<>	<lod< th=""><th>239</th><th>98</th><th></th></lod<>	239	98	
14	<lod< th=""><th><lod< th=""><th>51</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>51</th><th>24</th><th></th></lod<>	51	24	
15	<lod< th=""><th><lod< th=""><th>71</th><th>23</th><th></th></lod<></th></lod<>	<lod< th=""><th>71</th><th>23</th><th></th></lod<>	71	23	
16	<lod< th=""><th><lod< th=""><th>129</th><th>60</th><th></th></lod<></th></lod<>	<lod< th=""><th>129</th><th>60</th><th></th></lod<>	129	60	
17	<lod< th=""><th><lod< th=""><th>179</th><th>49</th><th></th></lod<></th></lod<>	<lod< th=""><th>179</th><th>49</th><th></th></lod<>	179	49	
18	<lod< th=""><th><lod< th=""><th>76</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>76</th><th>15</th><th></th></lod<>	76	15	
19	<lod< th=""><th><lod< th=""><th>113</th><th>61</th><th>Training with</th></lod<></th></lod<>	<lod< th=""><th>113</th><th>61</th><th>Training with</th></lod<>	113	61	Training with
20	<lod< th=""><th><lod< th=""><th>83</th><th>21</th><th>Suz and spot</th></lod<></th></lod<>	<lod< th=""><th>83</th><th>21</th><th>Suz and spot</th></lod<>	83	21	Suz and spot
21	<lod< th=""><th><lod< th=""><th>46</th><th><lod< th=""><th>check of Cell A</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>46</th><th><lod< th=""><th>check of Cell A</th></lod<></th></lod<>	46	<lod< th=""><th>check of Cell A</th></lod<>	check of Cell A
22	<lod< th=""><th><lod< th=""><th>49</th><th><lod< th=""><th>pre validation.</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>49</th><th><lod< th=""><th>pre validation.</th></lod<></th></lod<>	49	<lod< th=""><th>pre validation.</th></lod<>	pre validation.
23	<lod< th=""><th><lod< th=""><th>47</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>19</th><th></th></lod<>	47	19	
24	<lod< th=""><th><lod< th=""><th>46</th><th>17</th><th></th></lod<></th></lod<>	<lod< th=""><th>46</th><th>17</th><th></th></lod<>	46	17	
25	<lod< th=""><th><lod< th=""><th>189</th><th>145</th><th></th></lod<></th></lod<>	<lod< th=""><th>189</th><th>145</th><th></th></lod<>	189	145	
26	<lod< th=""><th>37</th><th>94</th><th>54</th><th></th></lod<>	37	94	54	
27	<lod< th=""><th><lod< th=""><th>58</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>20</th><th></th></lod<>	58	20	
28	<lod< th=""><th><lod< th=""><th>57</th><th>31</th><th></th></lod<></th></lod<>	<lod< th=""><th>57</th><th>31</th><th></th></lod<>	57	31	
29	<lod< th=""><th><lod< th=""><th>40</th><th><lod< th=""><th>A (4.40D)</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>40</th><th><lod< th=""><th>A (4.40D)</th></lod<></th></lod<>	40	<lod< th=""><th>A (4.40D)</th></lod<>	A (4.40D)
30	<lod< th=""><th><lod< th=""><th>41</th><th><lod< th=""><th>A/110R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>41</th><th><lod< th=""><th>A/110R</th></lod<></th></lod<>	41	<lod< th=""><th>A/110R</th></lod<>	A/110R
31	<lod< th=""><th><lod< th=""><th>42</th><th><lod< th=""><th>A (0.0D</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>42</th><th><lod< th=""><th>A (0.0D</th></lod<></th></lod<>	42	<lod< th=""><th>A (0.0D</th></lod<>	A (0.0D
32	<lod< th=""><th><lod< th=""><th>39</th><th><lod< th=""><th>A/90R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>39</th><th><lod< th=""><th>A/90R</th></lod<></th></lod<>	39	<lod< th=""><th>A/90R</th></lod<>	A/90R
33	<lod< th=""><th><lod< th=""><th>65</th><th>34</th><th>A/70R</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>34</th><th>A/70R</th></lod<>	65	34	A/70R
34 35	<lod <lod< th=""><th><lod <lod< th=""><th>77 142</th><th>38 58</th><th>A/50R A/110M</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>77 142</th><th>38 58</th><th>A/50R A/110M</th></lod<></lod 	77 142	38 58	A/50R A/110M
36	<lod <lod< th=""><th><lod <lod< th=""><th>69</th><th>24</th><th>A/110M A/90M</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>69</th><th>24</th><th>A/110M A/90M</th></lod<></lod 	69	24	A/110M A/90M
37	<lod <lod< th=""><th><lod <lod< th=""><th>90</th><th>39</th><th>A/70M</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>90</th><th>39</th><th>A/70M</th></lod<></lod 	90	39	A/70M
38	<lod <lod< th=""><th><lod <lod< th=""><th>43</th><th>14</th><th>A/50M</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>43</th><th>14</th><th>A/50M</th></lod<></lod 	43	14	A/50M
39	<lod< th=""><th><lod <lod< th=""><th>49</th><th>16</th><th>7 (00 () 1</th></lod<></lod </th></lod<>	<lod <lod< th=""><th>49</th><th>16</th><th>7 (00 () 1</th></lod<></lod 	49	16	7 (00 () 1
40	<lod< th=""><th><lod< th=""><th>86</th><th>50</th><th>Errors</th></lod<></th></lod<>	<lod< th=""><th>86</th><th>50</th><th>Errors</th></lod<>	86	50	Errors
41			Standardis		
42			Standardis		
43	<lod< th=""><th><lod< th=""><th>47</th><th>21</th><th></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>21</th><th></th></lod<>	47	21	
44	<lod< th=""><th><lod< th=""><th>37</th><th><lod< th=""><th>F##===</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>37</th><th><lod< th=""><th>F##===</th></lod<></th></lod<>	37	<lod< th=""><th>F##===</th></lod<>	F##===
45	<lod< th=""><th>35</th><th>59</th><th>15</th><th>Errors</th></lod<>	35	59	15	Errors
46	<lod< th=""><th><lod< th=""><th>50</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>50</th><th><lod< th=""><th></th></lod<></th></lod<>	50	<lod< th=""><th></th></lod<>	
47	<lod< th=""><th><lod< th=""><th>57</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>57</th><th>19</th><th></th></lod<>	57	19	
48	<lod< th=""><th><lod< th=""><th>93</th><th>30</th><th>A/10R</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>30</th><th>A/10R</th></lod<>	93	30	A/10R
49	<lod< th=""><th><lod< th=""><th>70</th><th>16</th><th></th></lod<></th></lod<>	<lod< th=""><th>70</th><th>16</th><th></th></lod<>	70	16	
50	<lod< th=""><th><lod< th=""><th>45</th><th><lod< th=""><th>A/30R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>45</th><th><lod< th=""><th>A/30R</th></lod<></th></lod<>	45	<lod< th=""><th>A/30R</th></lod<>	A/30R
51	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>A/30M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>A/30M</th></lod<></th></lod<>	36	<lod< th=""><th>A/30M</th></lod<>	A/30M
52	<lod< th=""><th><lod< th=""><th>40</th><th><lod< th=""><th>A/10M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>40</th><th><lod< th=""><th>A/10M</th></lod<></th></lod<>	40	<lod< th=""><th>A/10M</th></lod<>	A/10M

Validation

XRF Data 24 November 2009



Reading	Cr	Cu	Zn	Pb	Description	
1			Standardis	sation		
2	<lod< th=""><th><lod< th=""><th>74</th><th>21</th><th>Exposed ooze in</th></lod<></th></lod<>	<lod< th=""><th>74</th><th>21</th><th>Exposed ooze in</th></lod<>	74	21	Exposed ooze in	
3	<lod< th=""><th><lod< th=""><th>349</th><th>172</th><th>Cell A TLB</th></lod<></th></lod<>	<lod< th=""><th>349</th><th>172</th><th>Cell A TLB</th></lod<>	349	172	Cell A TLB	
4	<lod< th=""><th>36</th><th>172</th><th>114</th><th>Cell A TLB</th></lod<>	36	172	114	Cell A TLB	
5			Standardis	sation		
6	Standardisation					
7	<lod< th=""><th>48</th><th>864</th><th>256</th><th></th></lod<>	48	864	256		

XRF Data 25 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1		Standar	disation		
2	<lod< th=""><th><lod< th=""><th>211</th><th>77</th><th></th></lod<></th></lod<>	<lod< th=""><th>211</th><th>77</th><th></th></lod<>	211	77	
3	<lod< th=""><th><lod< th=""><th>54</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>54</th><th>24</th><th></th></lod<>	54	24	
4	<lod< th=""><th><lod< th=""><th>52</th><th>31</th><th></th></lod<></th></lod<>	<lod< th=""><th>52</th><th>31</th><th></th></lod<>	52	31	
5	<lod< th=""><th><lod< th=""><th>49</th><th>14</th><th></th></lod<></th></lod<>	<lod< th=""><th>49</th><th>14</th><th></th></lod<>	49	14	
6	<lod< th=""><th><lod< th=""><th>42</th><th>14</th><th></th></lod<></th></lod<>	<lod< th=""><th>42</th><th>14</th><th></th></lod<>	42	14	
7	<lod< th=""><th><lod< th=""><th>52</th><th>23</th><th></th></lod<></th></lod<>	<lod< th=""><th>52</th><th>23</th><th></th></lod<>	52	23	
8	<lod< th=""><th><lod< th=""><th>148</th><th>36</th><th></th></lod<></th></lod<>	<lod< th=""><th>148</th><th>36</th><th></th></lod<>	148	36	
9	<lod< th=""><th><lod< th=""><th>101</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>101</th><th><lod< th=""><th></th></lod<></th></lod<>	101	<lod< th=""><th></th></lod<>	
10	<lod< th=""><th><lod< th=""><th>353</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>353</th><th><lod< th=""><th></th></lod<></th></lod<>	353	<lod< th=""><th></th></lod<>	
11	<lod< th=""><th><lod< th=""><th>83</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>83</th><th><lod< th=""><th></th></lod<></th></lod<>	83	<lod< th=""><th></th></lod<>	
12	<lod< th=""><th><lod< th=""><th>249</th><th>14</th><th></th></lod<></th></lod<>	<lod< th=""><th>249</th><th>14</th><th></th></lod<>	249	14	
13	<lod< th=""><th><lod< th=""><th>55</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>55</th><th><lod< th=""><th></th></lod<></th></lod<>	55	<lod< th=""><th></th></lod<>	
14	<lod< th=""><th><lod< th=""><th>92</th><th>28</th><th></th></lod<></th></lod<>	<lod< th=""><th>92</th><th>28</th><th></th></lod<>	92	28	
15	<lod< th=""><th><lod< th=""><th>223</th><th>30</th><th>Spot check Cell</th></lod<></th></lod<>	<lod< th=""><th>223</th><th>30</th><th>Spot check Cell</th></lod<>	223	30	Spot check Cell
16	<lod< th=""><th><lod< th=""><th>50</th><th>17</th><th>B 90 - 110m,</th></lod<></th></lod<>	<lod< th=""><th>50</th><th>17</th><th>B 90 - 110m,</th></lod<>	50	17	B 90 - 110m,
17	<lod< th=""><th><lod< th=""><th>170</th><th>103</th><th>also around gas</th></lod<></th></lod<>	<lod< th=""><th>170</th><th>103</th><th>also around gas</th></lod<>	170	103	also around gas
18	<lod< th=""><th><lod< th=""><th>608</th><th>666</th><th>pipes.</th></lod<></th></lod<>	<lod< th=""><th>608</th><th>666</th><th>pipes.</th></lod<>	608	666	pipes.
19	<lod< th=""><th><lod< th=""><th>46</th><th>21</th><th></th></lod<></th></lod<>	<lod< th=""><th>46</th><th>21</th><th></th></lod<>	46	21	
20	<lod< th=""><th><lod< th=""><th>110</th><th>52</th><th></th></lod<></th></lod<>	<lod< th=""><th>110</th><th>52</th><th></th></lod<>	110	52	
21	464	216	<lod< th=""><th>12349</th><th></th></lod<>	12349	
22	<lod< th=""><th><lod< th=""><th>143</th><th>80</th><th></th></lod<></th></lod<>	<lod< th=""><th>143</th><th>80</th><th></th></lod<>	143	80	
23	<lod< th=""><th><lod< th=""><th>120</th><th>65</th><th></th></lod<></th></lod<>	<lod< th=""><th>120</th><th>65</th><th></th></lod<>	120	65	
24	<lod< th=""><th><lod< th=""><th>176</th><th>133</th><th></th></lod<></th></lod<>	<lod< th=""><th>176</th><th>133</th><th></th></lod<>	176	133	
25	<lod< th=""><th><lod< th=""><th>212</th><th>138</th><th></th></lod<></th></lod<>	<lod< th=""><th>212</th><th>138</th><th></th></lod<>	212	138	
26	<lod< th=""><th><lod< th=""><th>320</th><th>194</th><th></th></lod<></th></lod<>	<lod< th=""><th>320</th><th>194</th><th></th></lod<>	320	194	
27	<lod< th=""><th><lod< th=""><th>110</th><th>62</th><th></th></lod<></th></lod<>	<lod< th=""><th>110</th><th>62</th><th></th></lod<>	110	62	
28	<lod< th=""><th><lod< th=""><th>322</th><th>343</th><th></th></lod<></th></lod<>	<lod< th=""><th>322</th><th>343</th><th></th></lod<>	322	343	
29	<lod< th=""><th><lod< th=""><th>184</th><th>106</th><th></th></lod<></th></lod<>	<lod< th=""><th>184</th><th>106</th><th></th></lod<>	184	106	
30	<lod< th=""><th><lod< th=""><th>72</th><th>85</th><th></th></lod<></th></lod<>	<lod< th=""><th>72</th><th>85</th><th></th></lod<>	72	85	
31	<lod< th=""><th><lod< th=""><th>166</th><th>98</th><th></th></lod<></th></lod<>	<lod< th=""><th>166</th><th>98</th><th></th></lod<>	166	98	
32	<lod< th=""><th><lod< th=""><th>75</th><th>19</th><th>B/110R</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>19</th><th>B/110R</th></lod<>	75	19	B/110R
33	<lod< th=""><th><lod< th=""><th>113</th><th>43</th><th>B/110M</th></lod<></th></lod<>	<lod< th=""><th>113</th><th>43</th><th>B/110M</th></lod<>	113	43	B/110M
34	<lod< th=""><th><lod< th=""><th>63</th><th>20</th><th>B/110L</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>20</th><th>B/110L</th></lod<>	63	20	B/110L

Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2009 Master.xls25 Nov 09

XRF Data 26 November 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standardis	sation	
2	<lod< th=""><th><lod< th=""><th>214</th><th>265</th><th></th></lod<></th></lod<>	<lod< th=""><th>214</th><th>265</th><th></th></lod<>	214	265	
3	<lod< th=""><th><lod< th=""><th>465</th><th>343</th><th></th></lod<></th></lod<>	<lod< th=""><th>465</th><th>343</th><th></th></lod<>	465	343	
4	<lod< th=""><th><lod< th=""><th>29</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>29</th><th><lod< th=""><th></th></lod<></th></lod<>	29	<lod< th=""><th></th></lod<>	
5	<lod< th=""><th><lod< th=""><th>380</th><th>159</th><th>]</th></lod<></th></lod<>	<lod< th=""><th>380</th><th>159</th><th>]</th></lod<>	380	159]
6	<lod< th=""><th><lod< th=""><th>66</th><th>33</th><th>]</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>33</th><th>]</th></lod<>	66	33]
7	<lod< th=""><th><lod< th=""><th>757</th><th>39</th><th>]</th></lod<></th></lod<>	<lod< th=""><th>757</th><th>39</th><th>]</th></lod<>	757	39]
8	<lod< th=""><th>38</th><th>86</th><th>35</th><th></th></lod<>	38	86	35	
9	<lod< th=""><th><lod< th=""><th>120</th><th>68</th><th></th></lod<></th></lod<>	<lod< th=""><th>120</th><th>68</th><th></th></lod<>	120	68	
10	<lod< th=""><th><lod< th=""><th>289</th><th>63</th><th>]</th></lod<></th></lod<>	<lod< th=""><th>289</th><th>63</th><th>]</th></lod<>	289	63]
11	<lod< th=""><th><lod< th=""><th>228</th><th>73</th><th></th></lod<></th></lod<>	<lod< th=""><th>228</th><th>73</th><th></th></lod<>	228	73	
12	<lod< th=""><th><lod< th=""><th>54</th><th>21</th><th>Spot Check Cell</th></lod<></th></lod<>	<lod< th=""><th>54</th><th>21</th><th>Spot Check Cell</th></lod<>	54	21	Spot Check Cell
13	153	<lod< th=""><th>1286</th><th>591</th><th>B D/S of gas</th></lod<>	1286	591	B D/S of gas
14	<lod< th=""><th><lod< th=""><th>326</th><th>25</th><th>pipes and under</th></lod<></th></lod<>	<lod< th=""><th>326</th><th>25</th><th>pipes and under</th></lod<>	326	25	pipes and under
15	<lod< th=""><th>55</th><th>448</th><th>939</th><th>rail bridge</th></lod<>	55	448	939	rail bridge
16	<lod< th=""><th><lod< th=""><th>96</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>96</th><th>24</th><th></th></lod<>	96	24	
17	<lod< th=""><th>44</th><th>1431</th><th>433</th><th></th></lod<>	44	1431	433	
18	<lod< th=""><th>49</th><th>338</th><th>215</th><th></th></lod<>	49	338	215	
19	<lod< th=""><th><lod< th=""><th>56</th><th>35</th><th></th></lod<></th></lod<>	<lod< th=""><th>56</th><th>35</th><th></th></lod<>	56	35	
20	<lod< th=""><th><lod< th=""><th>40</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>40</th><th><lod< th=""><th></th></lod<></th></lod<>	40	<lod< th=""><th></th></lod<>	
21	<lod< th=""><th><lod< th=""><th>229</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>229</th><th>20</th><th></th></lod<>	229	20	
22	<lod< th=""><th><lod< th=""><th>274</th><th>134</th><th></th></lod<></th></lod<>	<lod< th=""><th>274</th><th>134</th><th></th></lod<>	274	134	
23	<lod< th=""><th><lod< th=""><th>173</th><th>64</th><th></th></lod<></th></lod<>	<lod< th=""><th>173</th><th>64</th><th></th></lod<>	173	64	
24	<lod< th=""><th><lod< th=""><th>159</th><th>57</th><th></th></lod<></th></lod<>	<lod< th=""><th>159</th><th>57</th><th></th></lod<>	159	57	
25	<lod< th=""><th><lod< th=""><th>60</th><th>18</th><th></th></lod<></th></lod<>	<lod< th=""><th>60</th><th>18</th><th></th></lod<>	60	18	
26			Standardis	sation	•
27	<lod< th=""><th><lod< th=""><th>353</th><th>431</th><th></th></lod<></th></lod<>	<lod< th=""><th>353</th><th>431</th><th></th></lod<>	353	431	
28	<lod< th=""><th>45</th><th>1061</th><th>565</th><th>1</th></lod<>	45	1061	565	1
29	<lod< th=""><th>71</th><th>1030</th><th>1404</th><th></th></lod<>	71	1030	1404	
30	<lod< th=""><th>35</th><th>813</th><th>1350</th><th></th></lod<>	35	813	1350	
31	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th>Spot Check Cell</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th>Spot Check Cell</th></lod<></th></lod<>	28	<lod< th=""><th>Spot Check Cell</th></lod<>	Spot Check Cell
32	<lod< th=""><th><lod< th=""><th>125</th><th>38</th><th>B D/S of gas</th></lod<></th></lod<>	<lod< th=""><th>125</th><th>38</th><th>B D/S of gas</th></lod<>	125	38	B D/S of gas
33	<lod< th=""><th>57</th><th>203</th><th>175</th><th>pipes and under</th></lod<>	57	203	175	pipes and under
34	<lod< th=""><th><lod< th=""><th>42</th><th><lod< th=""><th>rail bridge</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>42</th><th><lod< th=""><th>rail bridge</th></lod<></th></lod<>	42	<lod< th=""><th>rail bridge</th></lod<>	rail bridge
35	<lod< th=""><th><lod< th=""><th>48</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>48</th><th><lod< th=""><th></th></lod<></th></lod<>	48	<lod< th=""><th></th></lod<>	
36	<lod< th=""><th><lod< th=""><th>72</th><th>36</th><th></th></lod<></th></lod<>	<lod< th=""><th>72</th><th>36</th><th></th></lod<>	72	36	
37	<lod< th=""><th><lod< th=""><th>51</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>51</th><th><lod< th=""><th></th></lod<></th></lod<>	51	<lod< th=""><th></th></lod<>	
38	<lod< th=""><th><lod< th=""><th>55</th><th>38</th><th></th></lod<></th></lod<>	<lod< th=""><th>55</th><th>38</th><th></th></lod<>	55	38	
39			Standardis	sation	
40	<lod< th=""><th><lod< th=""><th>207</th><th>89</th><th>Spot Check Cell</th></lod<></th></lod<>	<lod< th=""><th>207</th><th>89</th><th>Spot Check Cell</th></lod<>	207	89	Spot Check Cell
41	<lod< th=""><th><lod< th=""><th>48</th><th>12</th><th>B D/S of gas</th></lod<></th></lod<>	<lod< th=""><th>48</th><th>12</th><th>B D/S of gas</th></lod<>	48	12	B D/S of gas
42	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th>pipes and under</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th>pipes and under</th></lod<></th></lod<>	32	<lod< th=""><th>pipes and under</th></lod<>	pipes and under
43	<lod< th=""><th><lod< th=""><th>43</th><th>21</th><th>rail bridge</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>21</th><th>rail bridge</th></lod<>	43	21	rail bridge
44	<lod< th=""><th><lod< th=""><th>39</th><th><lod< th=""><th>B/130L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>39</th><th><lod< th=""><th>B/130L</th></lod<></th></lod<>	39	<lod< th=""><th>B/130L</th></lod<>	B/130L
45	<lod< th=""><th><lod< th=""><th>30</th><th><lod< th=""><th>B/130M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>30</th><th><lod< th=""><th>B/130M</th></lod<></th></lod<>	30	<lod< th=""><th>B/130M</th></lod<>	B/130M
46	<lod< th=""><th><lod< th=""><th>39</th><th><lod< th=""><th>B/130R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>39</th><th><lod< th=""><th>B/130R</th></lod<></th></lod<>	39	<lod< th=""><th>B/130R</th></lod<>	B/130R

Validation

CLIENT: CPG New Zealand Ltd PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2009 Master.xls26 Nov 09

XRF Data 27 November 2009



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2	<lod< th=""><th><lod< th=""><th>313</th><th>1084</th><th>U-channel piles</th></lod<></th></lod<>	<lod< th=""><th>313</th><th>1084</th><th>U-channel piles</th></lod<>	313	1084	U-channel piles			
3	<lod< th=""><th>44</th><th>526</th><th>400</th><th>of material from</th></lod<>	44	526	400	of material from			
4	<lod< th=""><th><lod< th=""><th>243</th><th>185</th><th>bed, stockpiled</th></lod<></th></lod<>	<lod< th=""><th>243</th><th>185</th><th>bed, stockpiled</th></lod<>	243	185	bed, stockpiled			
5	<lod< th=""><th>75</th><th>828</th><th>547</th><th>on TRB</th></lod<>	75	828	547	on TRB			

XRF Data 03 December 2009



Reading	Cr	Cu	Zn	Pb	Description	
1			Standardi	sation		
2	<lod< th=""><th><lod< th=""><th>72</th><th>23</th><th></th></lod<></th></lod<>	<lod< th=""><th>72</th><th>23</th><th></th></lod<>	72	23		
3			Standardi	sation		
4			Standardi	sation		
5			Standardi	sation		
6	<lod< th=""><th><lod< th=""><th>86</th><th>479</th><th>Waiu St Comp 1</th></lod<></th></lod<>	<lod< th=""><th>86</th><th>479</th><th>Waiu St Comp 1</th></lod<>	86	479	Waiu St Comp 1	
7	<lod< th=""><th><lod< th=""><th>98</th><th>460</th><th>Waiu St Comp 2</th></lod<></th></lod<>	<lod< th=""><th>98</th><th>460</th><th>Waiu St Comp 2</th></lod<>	98	460	Waiu St Comp 2	
8	<lod< th=""><th><lod< th=""><th>59</th><th>90</th><th>Waiu St Comp 3</th></lod<></th></lod<>	<lod< th=""><th>59</th><th>90</th><th>Waiu St Comp 3</th></lod<>	59	90	Waiu St Comp 3	
9	<lod< th=""><th><lod< th=""><th>49</th><th>20</th><th>Waiu St Comp 4</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>20</th><th>Waiu St Comp 4</th></lod<>	49	20	Waiu St Comp 4	
10	<lod< th=""><th><lod< th=""><th colspan="4"><lod 36="" 75="" th="" wa<=""></lod></th></lod<></th></lod<>	<lod< th=""><th colspan="4"><lod 36="" 75="" th="" wa<=""></lod></th></lod<>	<lod 36="" 75="" th="" wa<=""></lod>			
11	<lod< th=""><th><lod< th=""><th>76</th><th>80</th><th>Waiu St Comp 6</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>80</th><th>Waiu St Comp 6</th></lod<>	76	80	Waiu St Comp 6	
12	<lod< th=""><th><lod< th=""><th>53</th><th>23</th><th>Waiu St Comp 7</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>23</th><th>Waiu St Comp 7</th></lod<>	53	23	Waiu St Comp 7	

XRF Data 05 December 2009



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2	<lod< th=""><th><lod< th=""><th>2266</th><th>2014</th><th></th></lod<></th></lod<>	<lod< th=""><th>2266</th><th>2014</th><th></th></lod<>	2266	2014				

XRF Data 07 December 2009



Reading	Cr	Cu	Zn	Pb	Description			
1	Standardisation							
2	<lod< th=""><th><lod< th=""><th>45</th><th>16</th><th>U-Ch/L1</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>16</th><th>U-Ch/L1</th></lod<>	45	16	U-Ch/L1			
3	<lod< th=""><th><lod< th=""><th>135</th><th>90</th><th>U-Ch/L2</th></lod<></th></lod<>	<lod< th=""><th>135</th><th>90</th><th>U-Ch/L2</th></lod<>	135	90	U-Ch/L2			
4	<lod< th=""><th><lod< th=""><th>73</th><th>35</th><th>U-Ch/L3</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>35</th><th>U-Ch/L3</th></lod<>	73	35	U-Ch/L3			
					Cell C brown clay beneath			
5	<lod< th=""><th><lod< th=""><th>100</th><th>18</th><th>ooze</th></lod<></th></lod<>	<lod< th=""><th>100</th><th>18</th><th>ooze</th></lod<>	100	18	ooze			
6	<lod< th=""><th><lod< th=""><th>110</th><th>70</th><th>U-Ch/L4</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>70</th><th>U-Ch/L4</th></lod<>	110	70	U-Ch/L4			
7	<lod< th=""><th><lod< th=""><th>99</th><th>56</th><th>U-Ch/L4</th></lod<></th></lod<>	<lod< th=""><th>99</th><th>56</th><th>U-Ch/L4</th></lod<>	99	56	U-Ch/L4			
8	<lod< th=""><th><lod< th=""><th>154</th><th>100</th><th>U-Ch/L5</th></lod<></th></lod<>	<lod< th=""><th>154</th><th>100</th><th>U-Ch/L5</th></lod<>	154	100	U-Ch/L5			
9	<lod< th=""><th><lod< th=""><th>127</th><th>82</th><th>U-Ch/L6</th></lod<></th></lod<>	<lod< th=""><th>127</th><th>82</th><th>U-Ch/L6</th></lod<>	127	82	U-Ch/L6			
10	<lod< th=""><th><lod< th=""><th>50</th><th>17</th><th>U-Ch/R7</th></lod<></th></lod<>	<lod< th=""><th>50</th><th>17</th><th>U-Ch/R7</th></lod<>	50	17	U-Ch/R7			
11	<lod< th=""><th>112</th><th>309</th><th>269</th><th>U-Ch/R8</th></lod<>	112	309	269	U-Ch/R8			
12	<lod< th=""><th><lod< th=""><th>353</th><th>301</th><th>U-Ch/R9</th></lod<></th></lod<>	<lod< th=""><th>353</th><th>301</th><th>U-Ch/R9</th></lod<>	353	301	U-Ch/R9			
13	<lod< th=""><th><lod< th=""><th>393</th><th>471</th><th>U-Ch/R9a</th></lod<></th></lod<>	<lod< th=""><th>393</th><th>471</th><th>U-Ch/R9a</th></lod<>	393	471	U-Ch/R9a			
14	<lod< th=""><th><lod< th=""><th>274</th><th>202</th><th>U-Ch/R10</th></lod<></th></lod<>	<lod< th=""><th>274</th><th>202</th><th>U-Ch/R10</th></lod<>	274	202	U-Ch/R10			
15	<lod< th=""><th>58</th><th>229</th><th>222</th><th>U-Ch/R11</th></lod<>	58	229	222	U-Ch/R11			
16	<lod< th=""><th><lod< th=""><th>54</th><th>13</th><th>U-Ch/R11a</th></lod<></th></lod<>	<lod< th=""><th>54</th><th>13</th><th>U-Ch/R11a</th></lod<>	54	13	U-Ch/R11a			
17				dardisation				
18	<lod< th=""><th><lod< th=""><th>344</th><th>337</th><th></th></lod<></th></lod<>	<lod< th=""><th>344</th><th>337</th><th></th></lod<>	344	337				
19	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th></th></lod<></th></lod<>	38	<lod< th=""><th></th></lod<>				
20	<lod< th=""><th>56</th><th>504</th><th>396</th><th></th></lod<>	56	504	396				
21	<lod< th=""><th>63</th><th>1669</th><th>722</th><th></th></lod<>	63	1669	722				
22	<lod< th=""><th>33</th><th>417</th><th>203</th><th>Spot check in Cell C</th></lod<>	33	417	203	Spot check in Cell C			
23	<lod< th=""><th><lod< th=""><th>131</th><th>22</th><th></th></lod<></th></lod<>	<lod< th=""><th>131</th><th>22</th><th></th></lod<>	131	22				
24	<lod< th=""><th>58</th><th>815</th><th>377</th><th></th></lod<>	58	815	377				
25	<lod< th=""><th>45</th><th>871</th><th>487</th><th></th></lod<>	45	871	487				
26	<lod< th=""><th><lod< th=""><th>103</th><th>18</th><th></th></lod<></th></lod<>	<lod< th=""><th>103</th><th>18</th><th></th></lod<>	103	18				

XRF Data 11 December 2009



Reading	Cr	Cu	Zn	Pb	Descritpion
1			Standard	disation	
2	<lod< th=""><th><lod< th=""><th>47</th><th>29</th><th></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>29</th><th></th></lod<>	47	29	
3	<lod< th=""><th><lod< th=""><th>50</th><th>35</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>35</th><th></th></lod<>	50	35	
4	<lod< th=""><th><lod< th=""><th>86</th><th>47</th><th></th></lod<></th></lod<>	<lod< th=""><th>86</th><th>47</th><th></th></lod<>	86	47	
5	<lod< th=""><th><lod< th=""><th>358</th><th>123</th><th></th></lod<></th></lod<>	<lod< th=""><th>358</th><th>123</th><th></th></lod<>	358	123	
6	<lod< th=""><th><lod< th=""><th>26</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>26</th><th>24</th><th></th></lod<>	26	24	
7	<lod< th=""><th><lod< th=""><th>132</th><th>332</th><th></th></lod<></th></lod<>	<lod< th=""><th>132</th><th>332</th><th></th></lod<>	132	332	
8	<lod< th=""><th><lod< th=""><th>96</th><th>223</th><th></th></lod<></th></lod<>	<lod< th=""><th>96</th><th>223</th><th></th></lod<>	96	223	
9	<lod< th=""><th><lod< th=""><th>114</th><th>396</th><th></th></lod<></th></lod<>	<lod< th=""><th>114</th><th>396</th><th></th></lod<>	114	396	
10	<lod< th=""><th><lod< th=""><th>98</th><th>330</th><th></th></lod<></th></lod<>	<lod< th=""><th>98</th><th>330</th><th></th></lod<>	98	330	
11	<lod< th=""><th><lod< th=""><th>80</th><th>127</th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>127</th><th></th></lod<>	80	127	
12	<lod< th=""><th><lod< th=""><th>81</th><th>97</th><th>Waiu St visit with</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>97</th><th>Waiu St visit with</th></lod<>	81	97	Waiu St visit with
13	<lod< th=""><th>42</th><th>95</th><th>369</th><th>CPG. CPG directed</th></lod<>	42	95	369	CPG. CPG directed
14	<lod< th=""><th><lod< th=""><th>81</th><th>480</th><th>testing and</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>480</th><th>testing and</th></lod<>	81	480	testing and
15	<lod< th=""><th><lod< th=""><th>61</th><th>76</th><th>recorded results at</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>76</th><th>recorded results at</th></lod<>	61	76	recorded results at
16	<lod< th=""><th><lod< th=""><th>55</th><th>31</th><th>the time</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>31</th><th>the time</th></lod<>	55	31	the time
17	<lod< th=""><th>40</th><th>862</th><th>370</th><th>the time</th></lod<>	40	862	370	the time
18	<lod< th=""><th><lod< th=""><th>99</th><th>305</th><th></th></lod<></th></lod<>	<lod< th=""><th>99</th><th>305</th><th></th></lod<>	99	305	
19	<lod< th=""><th><lod< th=""><th>47</th><th>59</th><th></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>59</th><th></th></lod<>	47	59	
20	<lod< th=""><th><lod< th=""><th>42</th><th>18</th><th></th></lod<></th></lod<>	<lod< th=""><th>42</th><th>18</th><th></th></lod<>	42	18	
21	<lod< th=""><th><lod< th=""><th>55</th><th>28</th><th></th></lod<></th></lod<>	<lod< th=""><th>55</th><th>28</th><th></th></lod<>	55	28	
22	<lod< th=""><th><lod< th=""><th>44</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>44</th><th>19</th><th></th></lod<>	44	19	
23	<lod< th=""><th>38</th><th>64</th><th>36</th><th></th></lod<>	38	64	36	
24	<lod< th=""><th><lod< th=""><th>39</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>39</th><th>15</th><th></th></lod<>	39	15	
25	<lod< th=""><th><lod< th=""><th>80</th><th>242</th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>242</th><th></th></lod<>	80	242	
26	<lod< th=""><th><lod< th=""><th>126</th><th>199</th><th></th></lod<></th></lod<>	<lod< th=""><th>126</th><th>199</th><th></th></lod<>	126	199	
27	<lod< th=""><th><lod< th=""><th>87</th><th>953</th><th></th></lod<></th></lod<>	<lod< th=""><th>87</th><th>953</th><th></th></lod<>	87	953	

XRF Data 16 December 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standardi	isation	
2			Standardi	isation	
3	<lod< th=""><th><lod< th=""><th>259</th><th>119</th><th></th></lod<></th></lod<>	<lod< th=""><th>259</th><th>119</th><th></th></lod<>	259	119	
4	<lod< th=""><th><lod< th=""><th>233</th><th>184</th><th></th></lod<></th></lod<>	<lod< th=""><th>233</th><th>184</th><th></th></lod<>	233	184	
5	<lod< th=""><th><lod< th=""><th>165</th><th>66</th><th></th></lod<></th></lod<>	<lod< th=""><th>165</th><th>66</th><th></th></lod<>	165	66	
6	<lod< th=""><th><lod< th=""><th>35</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>35</th><th><lod< th=""><th></th></lod<></th></lod<>	35	<lod< th=""><th></th></lod<>	
7	<lod< th=""><th><lod< th=""><th>114</th><th>79</th><th></th></lod<></th></lod<>	<lod< th=""><th>114</th><th>79</th><th></th></lod<>	114	79	
8	<lod< th=""><th><lod< th=""><th>49</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>49</th><th><lod< th=""><th></th></lod<></th></lod<>	49	<lod< th=""><th></th></lod<>	
9	<lod< th=""><th><lod< th=""><th>252</th><th>178</th><th></th></lod<></th></lod<>	<lod< th=""><th>252</th><th>178</th><th></th></lod<>	252	178	
10	<lod< th=""><th><lod< th=""><th>167</th><th>65</th><th></th></lod<></th></lod<>	<lod< th=""><th>167</th><th>65</th><th></th></lod<>	167	65	
11	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th></th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th></th></lod<></th></lod<>	<lod< th=""><th></th></lod<>	
12	<lod< th=""><th><lod< th=""><th>147</th><th>90</th><th></th></lod<></th></lod<>	<lod< th=""><th>147</th><th>90</th><th></th></lod<>	147	90	
13	<lod< th=""><th><lod< th=""><th>159</th><th>58</th><th></th></lod<></th></lod<>	<lod< th=""><th>159</th><th>58</th><th></th></lod<>	159	58	
14	<lod< th=""><th><lod< th=""><th>491</th><th>290</th><th></th></lod<></th></lod<>	<lod< th=""><th>491</th><th>290</th><th></th></lod<>	491	290	
15	<lod< th=""><th>39</th><th>846</th><th>383</th><th></th></lod<>	39	846	383	
16	<lod< th=""><th>36</th><th>444</th><th>257</th><th></th></lod<>	36	444	257	
17	<lod< th=""><th><lod< th=""><th>461</th><th>337</th><th></th></lod<></th></lod<>	<lod< th=""><th>461</th><th>337</th><th></th></lod<>	461	337	
18	<lod< th=""><th><lod< th=""><th>444</th><th>246</th><th></th></lod<></th></lod<>	<lod< th=""><th>444</th><th>246</th><th></th></lod<>	444	246	
19	<lod< th=""><th><lod< th=""><th>194</th><th>100</th><th></th></lod<></th></lod<>	<lod< th=""><th>194</th><th>100</th><th></th></lod<>	194	100	
20	<lod< th=""><th><lod< th=""><th>586</th><th>392</th><th></th></lod<></th></lod<>	<lod< th=""><th>586</th><th>392</th><th></th></lod<>	586	392	
21	<lod< th=""><th><lod< th=""><th>45</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>45</th><th><lod< th=""><th></th></lod<></th></lod<>	45	<lod< th=""><th></th></lod<>	
22	<lod< th=""><th><lod< th=""><th>23</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>23</th><th><lod< th=""><th></th></lod<></th></lod<>	23	<lod< th=""><th></th></lod<>	
23	<lod< th=""><th><lod< th=""><th>93</th><th>38</th><th></th></lod<></th></lod<>	<lod< th=""><th>93</th><th>38</th><th></th></lod<>	93	38	
24	<lod< th=""><th><lod< th=""><th>241</th><th>142</th><th></th></lod<></th></lod<>	<lod< th=""><th>241</th><th>142</th><th></th></lod<>	241	142	
25	<lod< th=""><th><lod< th=""><th>90</th><th>38</th><th></th></lod<></th></lod<>	<lod< th=""><th>90</th><th>38</th><th></th></lod<>	90	38	
26	<lod< th=""><th><lod< th=""><th>188</th><th>130</th><th></th></lod<></th></lod<>	<lod< th=""><th>188</th><th>130</th><th></th></lod<>	188	130	
27	<lod< th=""><th><lod< th=""><th>79</th><th>29</th><th></th></lod<></th></lod<>	<lod< th=""><th>79</th><th>29</th><th></th></lod<>	79	29	
28	<lod< th=""><th><lod< th=""><th>44</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>44</th><th><lod< th=""><th></th></lod<></th></lod<>	44	<lod< th=""><th></th></lod<>	
29	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<>	32	<lod< th=""><th></th></lod<>	
30	<lod< th=""><th>37</th><th>707</th><th>594</th><th></th></lod<>	37	707	594	
31	<lod< th=""><th><lod< th=""><th>57</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>57</th><th><lod< th=""><th></th></lod<></th></lod<>	57	<lod< th=""><th></th></lod<>	
32	<lod< th=""><th><lod< th=""><th>250</th><th>200</th><th></th></lod<></th></lod<>	<lod< th=""><th>250</th><th>200</th><th></th></lod<>	250	200	
33	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<>	32	<lod< th=""><th></th></lod<>	
34	<lod< th=""><th>56</th><th>936</th><th>440</th><th></th></lod<>	56	936	440	
35	<lod< th=""><th><lod< th=""><th>492</th><th>295</th><th></th></lod<></th></lod<>	<lod< th=""><th>492</th><th>295</th><th></th></lod<>	492	295	
36	<lod< th=""><th><lod< th=""><th>331</th><th>150</th><th></th></lod<></th></lod<>	<lod< th=""><th>331</th><th>150</th><th></th></lod<>	331	150	
37	<lod< th=""><th><lod< th=""><th>257</th><th>80</th><th></th></lod<></th></lod<>	<lod< th=""><th>257</th><th>80</th><th></th></lod<>	257	80	
38	<lod< th=""><th><lod< th=""><th>527</th><th>486</th><th></th></lod<></th></lod<>	<lod< th=""><th>527</th><th>486</th><th></th></lod<>	527	486	
39	<lod< th=""><th><lod< th=""><th>43</th><th>11</th><th></th></lod<></th></lod<>	<lod< th=""><th>43</th><th>11</th><th></th></lod<>	43	11	

XRF Data 17 December 2009



Reading	Cr	Ni	Cu	Zn	Pb	Description
1			St	andardisatio	on	
2			St	andardisatio	on	
3	<lod< th=""><th><lod< th=""><th><lod< th=""><th>86</th><th>24</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>86</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>86</th><th>24</th><th></th></lod<>	86	24	
4	<lod< th=""><th><lod< th=""><th><lod< th=""><th>48</th><th>17</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>48</th><th>17</th><th></th></lod<></th></lod<>	<lod< th=""><th>48</th><th>17</th><th></th></lod<>	48	17	
5	<lod< th=""><th><lod< th=""><th><lod< th=""><th>78</th><th>22</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>78</th><th>22</th><th></th></lod<></th></lod<>	<lod< th=""><th>78</th><th>22</th><th></th></lod<>	78	22	
6	<lod< th=""><th><lod< th=""><th><lod< th=""><th>65</th><th>30</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>65</th><th>30</th><th></th></lod<></th></lod<>	<lod< th=""><th>65</th><th>30</th><th></th></lod<>	65	30	
7	<lod< th=""><th><lod< th=""><th><lod< th=""><th>58</th><th>19</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>58</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>19</th><th></th></lod<>	58	19	
8	<lod< th=""><th><lod< th=""><th><lod< th=""><th>68</th><th>22</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>68</th><th>22</th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>22</th><th></th></lod<>	68	22	
9	<lod< th=""><th><lod< th=""><th>41</th><th>751</th><th>612</th><th></th></lod<></th></lod<>	<lod< th=""><th>41</th><th>751</th><th>612</th><th></th></lod<>	41	751	612	

XRF Data 18 December 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standard	lisation	
2	<lod< th=""><th><lod< th=""><th>69</th><th>26</th><th>CFC/T1/1218</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>26</th><th>CFC/T1/1218</th></lod<>	69	26	CFC/T1/1218
3	<lod< th=""><th><lod< th=""><th>56</th><th>24</th><th>CFC/T2/1218</th></lod<></th></lod<>	<lod< th=""><th>56</th><th>24</th><th>CFC/T2/1218</th></lod<>	56	24	CFC/T2/1218
4	<lod< th=""><th><lod< th=""><th>63</th><th>35</th><th>CFC/T3/1218</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>35</th><th>CFC/T3/1218</th></lod<>	63	35	CFC/T3/1218
5	<lod< th=""><th><lod< th=""><th>79</th><th>33</th><th>CFC/T4/1218</th></lod<></th></lod<>	<lod< th=""><th>79</th><th>33</th><th>CFC/T4/1218</th></lod<>	79	33	CFC/T4/1218
6	<lod< th=""><th><lod< th=""><th>69</th><th>23</th><th>CFC/T5/1218</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>23</th><th>CFC/T5/1218</th></lod<>	69	23	CFC/T5/1218
7	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>CFC/T6/1218</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>CFC/T6/1218</th></lod<></th></lod<>	36	<lod< th=""><th>CFC/T6/1218</th></lod<>	CFC/T6/1218

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2009 Master.xls18 Dec 09

XRF Data 19 December 2009



Reading	Cr	Cu	Zn	Pb	Description		
1	Standardisation						
2	<lod< th=""><th><lod< th=""><th>52</th><th>15</th><th>CFC/T7/1219</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>15</th><th>CFC/T7/1219</th></lod<>	52	15	CFC/T7/1219		
3	<lod< th=""><th><lod< th=""><th>65</th><th>19</th><th>CFC/T8/1219</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>19</th><th>CFC/T8/1219</th></lod<>	65	19	CFC/T8/1219		
4	<lod< th=""><th><lod< th=""><th>65</th><th>27</th><th>CFC/T9/1219</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>27</th><th>CFC/T9/1219</th></lod<>	65	27	CFC/T9/1219		
5	<lod< th=""><th><lod< th=""><th>57</th><th>28</th><th>CFC/T10/1219</th></lod<></th></lod<>	<lod< th=""><th>57</th><th>28</th><th>CFC/T10/1219</th></lod<>	57	28	CFC/T10/1219		
6	<lod< th=""><th><lod< th=""><th>65</th><th>28</th><th>CFC/T11/1219</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>28</th><th>CFC/T11/1219</th></lod<>	65	28	CFC/T11/1219		
7	<lod< th=""><th><lod< th=""><th>71</th><th>33</th><th>CFC/T12/1219</th></lod<></th></lod<>	<lod< th=""><th>71</th><th>33</th><th>CFC/T12/1219</th></lod<>	71	33	CFC/T12/1219		
8	<lod< th=""><th><lod< th=""><th>63</th><th>30</th><th>CFC/T13/1219</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>30</th><th>CFC/T13/1219</th></lod<>	63	30	CFC/T13/1219		
9	<lod< th=""><th><lod< th=""><th>171</th><th><lod< th=""><th>CFC/T14/1219</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>171</th><th><lod< th=""><th>CFC/T14/1219</th></lod<></th></lod<>	171	<lod< th=""><th>CFC/T14/1219</th></lod<>	CFC/T14/1219		
10	<lod< th=""><th><lod< th=""><th>76</th><th>22</th><th>CFU/T15/1219</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>22</th><th>CFU/T15/1219</th></lod<>	76	22	CFU/T15/1219		
11	<lod< th=""><th><lod< th=""><th>50</th><th><lod< th=""><th>CFC/T16/1219</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>50</th><th><lod< th=""><th>CFC/T16/1219</th></lod<></th></lod<>	50	<lod< th=""><th>CFC/T16/1219</th></lod<>	CFC/T16/1219		
12	<lod< th=""><th><lod< th=""><th>82</th><th>20</th><th>CFC/T17/1219</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>20</th><th>CFC/T17/1219</th></lod<>	82	20	CFC/T17/1219		
13	<lod< th=""><th><lod< th=""><th>50</th><th>24</th><th>CFC/T14/1219</th></lod<></th></lod<>	<lod< th=""><th>50</th><th>24</th><th>CFC/T14/1219</th></lod<>	50	24	CFC/T14/1219		
14	<lod< th=""><th><lod< th=""><th>69</th><th>20</th><th>CFC/T18/1219</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>20</th><th>CFC/T18/1219</th></lod<>	69	20	CFC/T18/1219		
15	<lod< th=""><th><lod< th=""><th>66</th><th>27</th><th>CFU/T19/1219</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>27</th><th>CFU/T19/1219</th></lod<>	66	27	CFU/T19/1219		
16	<lod< th=""><th><lod< th=""><th>66</th><th>29</th><th>CFC/T20/1219</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>29</th><th>CFC/T20/1219</th></lod<>	66	29	CFC/T20/1219		
17	<lod< th=""><th><lod< th=""><th>57</th><th>16</th><th>CFU/T21/1219</th></lod<></th></lod<>	<lod< th=""><th>57</th><th>16</th><th>CFU/T21/1219</th></lod<>	57	16	CFU/T21/1219		
18	<lod< th=""><th>34</th><th>79</th><th>26</th><th>CFU/T22/1219</th></lod<>	34	79	26	CFU/T22/1219		
19	<lod< th=""><th><lod< th=""><th>65</th><th>26</th><th>CFC/T23/1219</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>26</th><th>CFC/T23/1219</th></lod<>	65	26	CFC/T23/1219		
20	<lod< th=""><th><lod< th=""><th>66</th><th>25</th><th>CFC/T24/1219</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>25</th><th>CFC/T24/1219</th></lod<>	66	25	CFC/T24/1219		
21			Standardis	ation			
22	<lod< th=""><th><lod< th=""><th>65</th><th>34</th><th>CFU/T25/1219</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>34</th><th>CFU/T25/1219</th></lod<>	65	34	CFU/T25/1219		
23	<lod< th=""><th><lod< th=""><th>76</th><th>39</th><th>CFC/T26/1219</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>39</th><th>CFC/T26/1219</th></lod<>	76	39	CFC/T26/1219		
24	<lod< th=""><th><lod< th=""><th>70</th><th>25</th><th>CFC/T27/1219</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>25</th><th>CFC/T27/1219</th></lod<>	70	25	CFC/T27/1219		

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2009 Master.xls19 Dec 09

XRF Data 21 December 2009



Reading	Cr	Cu	Zn	Pb	Description
1			Standaı	disation	
2	<lod< th=""><th><lod< th=""><th>74</th><th>25</th><th>CFC/T28/1221</th></lod<></th></lod<>	<lod< th=""><th>74</th><th>25</th><th>CFC/T28/1221</th></lod<>	74	25	CFC/T28/1221
3	<lod< th=""><th><lod< th=""><th>63</th><th>14</th><th>CFC/T29/1221</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>14</th><th>CFC/T29/1221</th></lod<>	63	14	CFC/T29/1221
4	<lod< th=""><th><lod< th=""><th>69</th><th>32</th><th>CFC/T30/1221</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>32</th><th>CFC/T30/1221</th></lod<>	69	32	CFC/T30/1221
5	<lod< th=""><th><lod< th=""><th>54</th><th>20</th><th>CFC/T31/1221</th></lod<></th></lod<>	<lod< th=""><th>54</th><th>20</th><th>CFC/T31/1221</th></lod<>	54	20	CFC/T31/1221
6	<lod< th=""><th>37</th><th>57</th><th>19</th><th>CFC/T32/1221</th></lod<>	37	57	19	CFC/T32/1221
7	<lod< th=""><th><lod< th=""><th>73</th><th>16</th><th>CFC/T33/1221</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>16</th><th>CFC/T33/1221</th></lod<>	73	16	CFC/T33/1221
8	<lod< th=""><th><lod< th=""><th>72</th><th>27</th><th>CFC/T34/1221</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>27</th><th>CFC/T34/1221</th></lod<>	72	27	CFC/T34/1221
9	<lod< th=""><th><lod< th=""><th>70</th><th>16</th><th>CFC/T35/1221</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>16</th><th>CFC/T35/1221</th></lod<>	70	16	CFC/T35/1221
10	<lod< th=""><th><lod< th=""><th>72</th><th>20</th><th>CFC/T36/1221</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>20</th><th>CFC/T36/1221</th></lod<>	72	20	CFC/T36/1221
11	<lod< th=""><th><lod< th=""><th>71</th><th>20</th><th>CFC/T37/1221</th></lod<></th></lod<>	<lod< th=""><th>71</th><th>20</th><th>CFC/T37/1221</th></lod<>	71	20	CFC/T37/1221
12	<lod< th=""><th><lod< th=""><th>59</th><th>15</th><th>CFC/T38/1221</th></lod<></th></lod<>	<lod< th=""><th>59</th><th>15</th><th>CFC/T38/1221</th></lod<>	59	15	CFC/T38/1221
13	<lod< th=""><th><lod< th=""><th>51</th><th><lod< th=""><th>CFC/T39/1221</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>51</th><th><lod< th=""><th>CFC/T39/1221</th></lod<></th></lod<>	51	<lod< th=""><th>CFC/T39/1221</th></lod<>	CFC/T39/1221
14	<lod< th=""><th>37</th><th>71</th><th>27</th><th>CFC/T40/1221</th></lod<>	37	71	27	CFC/T40/1221
15 16	<lod< th=""><th><lod< th=""><th>56 Standar</th><th>23 disation</th><th>CFC/T41/1221</th></lod<></th></lod<>	<lod< th=""><th>56 Standar</th><th>23 disation</th><th>CFC/T41/1221</th></lod<>	56 Standar	23 disation	CFC/T41/1221
17	<lod< th=""><th><lod< th=""><th>58</th><th>26</th><th>CEC/T42/4224</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>26</th><th>CEC/T42/4224</th></lod<>	58	26	CEC/T42/4224
18	<lod <lod< th=""><th><lod <lod< th=""><th>61</th><th>26</th><th>CFC/T42/1221 CFC/T43/1221</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>61</th><th>26</th><th>CFC/T42/1221 CFC/T43/1221</th></lod<></lod 	61	26	CFC/T42/1221 CFC/T43/1221
19	<lod< th=""><th>\LUD</th><th></th><th>disation</th><th>CFC/143/1221</th></lod<>	\LUD		disation	CFC/143/1221
20	<lod< th=""><th><lod< th=""><th>63</th><th>26</th><th>CFC/T44/1221</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>26</th><th>CFC/T44/1221</th></lod<>	63	26	CFC/T44/1221
21	<lod <lod< th=""><th><lod <lod< th=""><th>42</th><th>24</th><th>CFC/T45/1221</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>42</th><th>24</th><th>CFC/T45/1221</th></lod<></lod 	42	24	CFC/T45/1221
22	<lod <lod< th=""><th>55</th><th>58</th><th>19</th><th>CFC/T45/1221 CFC/T46/1221</th></lod<></lod 	55	58	19	CFC/T45/1221 CFC/T46/1221
23	<lod <lod< th=""><th><lod< th=""><th>60</th><th>16</th><th>CFC/T46/1221 CFC/T47/1221</th></lod<></th></lod<></lod 	<lod< th=""><th>60</th><th>16</th><th>CFC/T46/1221 CFC/T47/1221</th></lod<>	60	16	CFC/T46/1221 CFC/T47/1221
24	<lod <lod< th=""><th><lod <lod< th=""><th>59</th><th>25</th><th>CFC/T48/1221</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>59</th><th>25</th><th>CFC/T48/1221</th></lod<></lod 	59	25	CFC/T48/1221
25	<lod <lod< th=""><th><lod <lod< th=""><th>38</th><th><lod< th=""><th>CFC/T49/1221</th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>38</th><th><lod< th=""><th>CFC/T49/1221</th></lod<></th></lod<></lod 	38	<lod< th=""><th>CFC/T49/1221</th></lod<>	CFC/T49/1221
26	<lod< th=""><th><lod< th=""><th>59</th><th>21</th><th>CFC/T50/1221</th></lod<></th></lod<>	<lod< th=""><th>59</th><th>21</th><th>CFC/T50/1221</th></lod<>	59	21	CFC/T50/1221
27	<lod< th=""><th><lod< th=""><th>65</th><th>19</th><th>CFC/T51/1222</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>19</th><th>CFC/T51/1222</th></lod<>	65	19	CFC/T51/1222
28	<lod< th=""><th><lod< th=""><th>72</th><th>23</th><th>01 0/101/1222</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>23</th><th>01 0/101/1222</th></lod<>	72	23	01 0/101/1222
29	<lod< th=""><th><lod< th=""><th>72</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>72</th><th>20</th><th></th></lod<>	72	20	
30	<lod< th=""><th><lod< th=""><th>59</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>59</th><th>24</th><th></th></lod<>	59	24	
31	<lod< th=""><th><lod< th=""><th>252</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>252</th><th>20</th><th></th></lod<>	252	20	
32	<lod< th=""><th><lod< th=""><th>68</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>19</th><th></th></lod<>	68	19	
33	<lod< th=""><th><lod< th=""><th>68</th><th>16</th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>16</th><th></th></lod<>	68	16	
34	<lod< th=""><th><lod< th=""><th>94</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>94</th><th>24</th><th></th></lod<>	94	24	
35	<lod< th=""><th><lod< th=""><th>77</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>77</th><th>24</th><th></th></lod<>	77	24	
36	<lod< th=""><th><lod< th=""><th>55</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>55</th><th>24</th><th></th></lod<>	55	24	
37	<lod< th=""><th><lod< th=""><th>71</th><th>29</th><th></th></lod<></th></lod<>	<lod< th=""><th>71</th><th>29</th><th></th></lod<>	71	29	
38	<lod< th=""><th><lod< th=""><th>66</th><th>28</th><th></th></lod<></th></lod<>	<lod< th=""><th>66</th><th>28</th><th></th></lod<>	66	28	
39	<lod< th=""><th><lod< th=""><th>67</th><th>21</th><th></th></lod<></th></lod<>	<lod< th=""><th>67</th><th>21</th><th></th></lod<>	67	21	
40	<lod< th=""><th><lod< th=""><th>72</th><th>25</th><th></th></lod<></th></lod<>	<lod< th=""><th>72</th><th>25</th><th></th></lod<>	72	25	
41	<lod< th=""><th><lod< th=""><th>62</th><th>31</th><th>Stockpile sampling of</th></lod<></th></lod<>	<lod< th=""><th>62</th><th>31</th><th>Stockpile sampling of</th></lod<>	62	31	Stockpile sampling of
42	<lod< th=""><th><lod< th=""><th>87</th><th>25</th><th>remaining material in</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>25</th><th>remaining material in</th></lod<>	87	25	remaining material in
43	<lod< th=""><th><lod< th=""><th>64</th><th>24</th><th>compound stockpiles.</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>24</th><th>compound stockpiles.</th></lod<>	64	24	compound stockpiles.
44	<lod< th=""><th><lod< th=""><th>70</th><th>41</th><th>CF01 - CF07 were</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>41</th><th>CF01 - CF07 were</th></lod<>	70	41	CF01 - CF07 were
45	<lod< th=""><th><lod< th=""><th>66</th><th>253</th><th>collected for lab</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>253</th><th>collected for lab</th></lod<>	66	253	collected for lab
46	<lod< th=""><th><lod< th=""><th>68</th><th>35</th><th>analysis.</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>35</th><th>analysis.</th></lod<>	68	35	analysis.
47	<lod< th=""><th><lod< th=""><th>63</th><th>16</th><th>analysis.</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>16</th><th>analysis.</th></lod<>	63	16	analysis.
48	<lod< th=""><th><lod< th=""><th>53</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>53</th><th>20</th><th></th></lod<>	53	20	
49	<lod< th=""><th><lod< th=""><th>57</th><th>45</th><th></th></lod<></th></lod<>	<lod< th=""><th>57</th><th>45</th><th></th></lod<>	57	45	
50	<lod< th=""><th><lod< th=""><th>73</th><th>27</th><th></th></lod<></th></lod<>	<lod< th=""><th>73</th><th>27</th><th></th></lod<>	73	27	
51	<lod< th=""><th><lod< th=""><th>51</th><th><lod< th=""><th> </th></lod<></th></lod<></th></lod<>	<lod< th=""><th>51</th><th><lod< th=""><th> </th></lod<></th></lod<>	51	<lod< th=""><th> </th></lod<>	
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53	<lod< th=""><th><lod< th=""><th>68</th><th>23</th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>23</th><th></th></lod<>	68	23	
54	<lod< th=""><th><lod< th=""><th>47</th><th>35</th><th> </th></lod<></th></lod<>	<lod< th=""><th>47</th><th>35</th><th> </th></lod<>	47	35	
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57	<lod< th=""><th><lod< th=""><th>53</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>53</th><th><lod< th=""><th></th></lod<></th></lod<>	53	<lod< th=""><th></th></lod<>	
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59	<lod< th=""><th><lod< th=""><th>75</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>75</th><th>15</th><th></th></lod<>	75	15	
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61	176	<lod< th=""><th>88</th><th>24</th><th>CF01</th></lod<>	88	24	CF01
62	<lod< th=""><th><lod< th=""><th>108</th><th>69</th><th>CF02</th></lod<></th></lod<>	<lod< th=""><th>108</th><th>69</th><th>CF02</th></lod<>	108	69	CF02
63	<lod< th=""><th><lod< th=""><th>96</th><th>25</th><th>CF04</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>25</th><th>CF04</th></lod<>	96	25	CF04
64	<lod< th=""><th><lod< th=""><th>43</th><th><lod< th=""><th>CF04</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>43</th><th><lod< th=""><th>CF04</th></lod<></th></lod<>	43	<lod< th=""><th>CF04</th></lod<>	CF04
65	<lod< th=""><th>39 </th><th>61</th><th>28</th><th>CF05 CF06</th></lod<>	39 	61	28	CF05 CF06
66 67	<lod <lod< th=""><th><lod <lod< th=""><th>85 70</th><th>30 35</th><th>CF06 CF07</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>85 70</th><th>30 35</th><th>CF06 CF07</th></lod<></lod 	85 70	30 35	CF06 CF07
01	\LUD	CLOD	70	30	CI UI



Reading	Cr	Cu	Zn	Pb	Description
1			Standar		T
2	<lod< th=""><th><lod< th=""><th>32</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>32</th><th>20</th><th></th></lod<>	32	20	
3	<lod< th=""><th><lod< th=""><th>52</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>52</th><th><lod< th=""><th></th></lod<></th></lod<>	52	<lod< th=""><th></th></lod<>	
4	<lod< th=""><th><lod< th=""><th>45</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>45</th><th>19</th><th></th></lod<>	45	19	
5	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>_</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>_</th></lod<></th></lod<>	36	<lod< th=""><th>_</th></lod<>	_
6	<lod< th=""><th><lod< th=""><th>55</th><th>27</th><th></th></lod<></th></lod<>	<lod< th=""><th>55</th><th>27</th><th></th></lod<>	55	27	
7	<lod< th=""><th><lod< th=""><th>61</th><th>16</th><th></th></lod<></th></lod<>	<lod< th=""><th>61</th><th>16</th><th></th></lod<>	61	16	
8	<lod< th=""><th><lod< th=""><th>78 57</th><th>24</th><th>Compound stockpile</th></lod<></th></lod<>	<lod< th=""><th>78 57</th><th>24</th><th>Compound stockpile</th></lod<>	78 57	24	Compound stockpile
9 10	<lod <lod< th=""><th><lod <lod< th=""><th>57 46</th><th>15 <lod< th=""><th>spot check</th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>57 46</th><th>15 <lod< th=""><th>spot check</th></lod<></th></lod<></lod 	57 46	15 <lod< th=""><th>spot check</th></lod<>	spot check
11	<lod <lod< th=""><th><lod <lod< th=""><th>45</th><th><lod <lod< th=""><th>Spot check</th></lod<></lod </th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>45</th><th><lod <lod< th=""><th>Spot check</th></lod<></lod </th></lod<></lod 	45	<lod <lod< th=""><th>Spot check</th></lod<></lod 	Spot check
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14	<lod <lod< th=""><th><lod <lod< th=""><th>57</th><th>20</th><th>-</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>57</th><th>20</th><th>-</th></lod<></lod 	57	20	-
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18	<lod <lod< th=""><th><lod <lod< th=""><th>38</th><th><lod< th=""><th>CFC/SP2/1</th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>38</th><th><lod< th=""><th>CFC/SP2/1</th></lod<></th></lod<></lod 	38	<lod< th=""><th>CFC/SP2/1</th></lod<>	CFC/SP2/1
19	<lod <lod< th=""><th><lod <lod< th=""><th>39</th><th><lod <lod< th=""><th>CFC/SP2/1 CFC/SP2/2</th></lod<></lod </th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>39</th><th><lod <lod< th=""><th>CFC/SP2/1 CFC/SP2/2</th></lod<></lod </th></lod<></lod 	39	<lod <lod< th=""><th>CFC/SP2/1 CFC/SP2/2</th></lod<></lod 	CFC/SP2/1 CFC/SP2/2
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22	<lod <lod< th=""><th>36</th><th>98</th><th>13 54</th><th>UPU/3FZ/4</th></lod<></lod 	36	98	13 54	UPU/3FZ/4
23			71	25	
23	<lod <lod< th=""><th><lod <lod< th=""><th>190</th><th>180</th><th>-</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>190</th><th>180</th><th>-</th></lod<></lod 	190	180	-
					-
25 26	<lod <lod< th=""><th><lod <lod< th=""><th>208 22</th><th>84 <lod< th=""><th></th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>208 22</th><th>84 <lod< th=""><th></th></lod<></th></lod<></lod 	208 22	84 <lod< th=""><th></th></lod<>	
27	<lod <lod< th=""><th><lod <lod< th=""><th>165</th><th>91</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>165</th><th>91</th><th></th></lod<></lod 	165	91	
28	<lod <lod< th=""><th><lod <lod< th=""><th>626</th><th>242</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>626</th><th>242</th><th></th></lod<></lod 	626	242	
29	<lod <lod< th=""><th>37</th><th>286</th><th>143</th><th></th></lod<></lod 	37	286	143	
30	<lod <lod< th=""><th><lod< th=""><th>197</th><th>70</th><th></th></lod<></th></lod<></lod 	<lod< th=""><th>197</th><th>70</th><th></th></lod<>	197	70	
31	<lod <lod< th=""><th></th><th></th><th></th><th></th></lod<></lod 				
32	<lod <lod< th=""><th><lod <lod< th=""><th>236 193</th><th>96 122</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>236 193</th><th>96 122</th><th></th></lod<></lod 	236 193	96 122	
33	<lod <lod< th=""><th><lod <lod< th=""><th>196</th><th>94</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>196</th><th>94</th><th></th></lod<></lod 	196	94	
34			88	145	
35	<lod <lod< th=""><th><lod <lod< th=""><th>82</th><th>143</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>82</th><th>143</th><th></th></lod<></lod 	82	143	
36	<lod <lod< th=""><th><lod <lod< th=""><th>96</th><th>106</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>96</th><th>106</th><th></th></lod<></lod 	96	106	
37	<lod <lod< th=""><th>45</th><th>131</th><th>125</th><th></th></lod<></lod 	45	131	125	
38	<lod <lod< th=""><th><lod< th=""><th>124</th><th>124</th><th></th></lod<></th></lod<></lod 	<lod< th=""><th>124</th><th>124</th><th></th></lod<>	124	124	
39	<lod <lod< th=""><th><lod <lod< th=""><th>99</th><th>200</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>99</th><th>200</th><th></th></lod<></lod 	99	200	
40	<lod <lod< th=""><th><lod <lod< th=""><th>80</th><th>144</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>80</th><th>144</th><th></th></lod<></lod 	80	144	
41	<lod< th=""><th><lod <lod< th=""><th>80</th><th>105</th><th></th></lod<></lod </th></lod<>	<lod <lod< th=""><th>80</th><th>105</th><th></th></lod<></lod 	80	105	
42	<lod< th=""><th><lod <lod< th=""><th>88</th><th>106</th><th></th></lod<></lod </th></lod<>	<lod <lod< th=""><th>88</th><th>106</th><th></th></lod<></lod 	88	106	
43	<lod< th=""><th>40</th><th>71</th><th>107</th><th></th></lod<>	40	71	107	
44	<lod <lod< th=""><th><lod< th=""><th>121</th><th>189</th><th></th></lod<></th></lod<></lod 	<lod< th=""><th>121</th><th>189</th><th></th></lod<>	121	189	
45	\LOD	\LOD	Standar		1
46	<lod< th=""><th><lod< th=""><th>69</th><th>96</th><th></th></lod<></th></lod<>	<lod< th=""><th>69</th><th>96</th><th></th></lod<>	69	96	
47	<lod< th=""><th>40</th><th>76</th><th>107</th><th></th></lod<>	40	76	107	
48	<lod< th=""><th><lod< th=""><th>113</th><th>152</th><th></th></lod<></th></lod<>	<lod< th=""><th>113</th><th>152</th><th></th></lod<>	113	152	
49	<lod< th=""><th><lod< th=""><th>93</th><th>139</th><th></th></lod<></th></lod<>	<lod< th=""><th>93</th><th>139</th><th></th></lod<>	93	139	
50	<lod< th=""><th><lod< th=""><th>109</th><th>188</th><th></th></lod<></th></lod<>	<lod< th=""><th>109</th><th>188</th><th></th></lod<>	109	188	
51	<lod< th=""><th><lod< th=""><th>145</th><th>166</th><th></th></lod<></th></lod<>	<lod< th=""><th>145</th><th>166</th><th></th></lod<>	145	166	
52	<lod< th=""><th><lod< th=""><th>79</th><th>43</th><th></th></lod<></th></lod<>	<lod< th=""><th>79</th><th>43</th><th></th></lod<>	79	43	
53	<lod< th=""><th><lod< th=""><th>112</th><th>115</th><th></th></lod<></th></lod<>	<lod< th=""><th>112</th><th>115</th><th></th></lod<>	112	115	
54	<lod< th=""><th><lod< th=""><th>128</th><th>235</th><th></th></lod<></th></lod<>	<lod< th=""><th>128</th><th>235</th><th></th></lod<>	128	235	
55	<lod< th=""><th><lod< th=""><th>201</th><th>87</th><th></th></lod<></th></lod<>	<lod< th=""><th>201</th><th>87</th><th></th></lod<>	201	87	
56	<lod< th=""><th><lod< th=""><th>164</th><th>303</th><th></th></lod<></th></lod<>	<lod< th=""><th>164</th><th>303</th><th></th></lod<>	164	303	
57	<lod< th=""><th><lod< th=""><th>101</th><th>91</th><th></th></lod<></th></lod<>	<lod< th=""><th>101</th><th>91</th><th></th></lod<>	101	91	
58	<lod< th=""><th><lod< th=""><th>96</th><th>49</th><th></th></lod<></th></lod<>	<lod< th=""><th>96</th><th>49</th><th></th></lod<>	96	49	
59	<lod< th=""><th><lod< th=""><th>69</th><th>32</th><th></th></lod<></th></lod<>	<lod< th=""><th>69</th><th>32</th><th></th></lod<>	69	32	
60	<lod< th=""><th><lod< th=""><th>85</th><th>64</th><th></th></lod<></th></lod<>	<lod< th=""><th>85</th><th>64</th><th></th></lod<>	85	64	
61	<lod< th=""><th><lod< th=""><th>825</th><th>51</th><th></th></lod<></th></lod<>	<lod< th=""><th>825</th><th>51</th><th></th></lod<>	825	51	
62	<lod< th=""><th><lod< th=""><th>146</th><th>330</th><th></th></lod<></th></lod<>	<lod< th=""><th>146</th><th>330</th><th></th></lod<>	146	330	
63	<lod< th=""><th><lod< th=""><th>51</th><th>53</th><th></th></lod<></th></lod<>	<lod< th=""><th>51</th><th>53</th><th></th></lod<>	51	53	
64	<lod< th=""><th><lod< th=""><th>119</th><th>168</th><th></th></lod<></th></lod<>	<lod< th=""><th>119</th><th>168</th><th></th></lod<>	119	168	
65	<lod< th=""><th><lod< th=""><th>103</th><th>80</th><th></th></lod<></th></lod<>	<lod< th=""><th>103</th><th>80</th><th></th></lod<>	103	80	
66	<lod< th=""><th><lod< th=""><th>148</th><th>73</th><th></th></lod<></th></lod<>	<lod< th=""><th>148</th><th>73</th><th></th></lod<>	148	73	
67	<lod< th=""><th><lod< th=""><th>83</th><th>141</th><th></th></lod<></th></lod<>	<lod< th=""><th>83</th><th>141</th><th></th></lod<>	83	141	

Cell C/D spot check Waiu St

XRF Data 22 December 2009



Reading	Cr	Cu	Zn	Pb	Description
68	<lod< th=""><th><lod< th=""><th>94</th><th>380</th><th></th></lod<></th></lod<>	<lod< th=""><th>94</th><th>380</th><th></th></lod<>	94	380	
69	<lod< th=""><th><lod< th=""><th>46</th><th>29</th><th></th></lod<></th></lod<>	<lod< th=""><th>46</th><th>29</th><th></th></lod<>	46	29	
70	<lod< th=""><th><lod< th=""><th>58</th><th>65</th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>65</th><th></th></lod<>	58	65	
71	<lod< th=""><th><lod< th=""><th>58</th><th>16</th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>16</th><th></th></lod<>	58	16	
72	<lod< th=""><th><lod< th=""><th>112</th><th>67</th><th></th></lod<></th></lod<>	<lod< th=""><th>112</th><th>67</th><th></th></lod<>	112	67	
73	<lod< th=""><th><lod< th=""><th>69</th><th>49</th><th></th></lod<></th></lod<>	<lod< th=""><th>69</th><th>49</th><th></th></lod<>	69	49	
74	<lod< th=""><th><lod< th=""><th>82</th><th>322</th><th></th></lod<></th></lod<>	<lod< th=""><th>82</th><th>322</th><th></th></lod<>	82	322	
75	<lod< th=""><th><lod< th=""><th>50</th><th>31</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>31</th><th></th></lod<>	50	31	
76	<lod< th=""><th><lod< th=""><th>74</th><th>80</th><th></th></lod<></th></lod<>	<lod< th=""><th>74</th><th>80</th><th></th></lod<>	74	80	
77	<lod< th=""><th><lod< th=""><th>66</th><th>42</th><th></th></lod<></th></lod<>	<lod< th=""><th>66</th><th>42</th><th></th></lod<>	66	42	
78	<lod< th=""><th><lod< th=""><th>59</th><th>42</th><th></th></lod<></th></lod<>	<lod< th=""><th>59</th><th>42</th><th></th></lod<>	59	42	
79	<lod< th=""><th>45</th><th>75</th><th>103</th><th></th></lod<>	45	75	103	
80	<lod< th=""><th><lod< th=""><th>176</th><th>269</th><th></th></lod<></th></lod<>	<lod< th=""><th>176</th><th>269</th><th></th></lod<>	176	269	
81	<lod< th=""><th><lod< th=""><th>150</th><th>96</th><th></th></lod<></th></lod<>	<lod< th=""><th>150</th><th>96</th><th></th></lod<>	150	96	
82	<lod< th=""><th><lod< th=""><th>102</th><th>99</th><th></th></lod<></th></lod<>	<lod< th=""><th>102</th><th>99</th><th></th></lod<>	102	99	
83	<lod< th=""><th><lod< th=""><th>80</th><th>135</th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>135</th><th></th></lod<>	80	135	
84	<lod< th=""><th><lod< th=""><th>64</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>64</th><th>24</th><th></th></lod<>	64	24	
85	<lod< th=""><th>34</th><th>68</th><th>43</th><th></th></lod<>	34	68	43	
86	<lod< th=""><th><lod< th=""><th>142</th><th>43</th><th></th></lod<></th></lod<>	<lod< th=""><th>142</th><th>43</th><th></th></lod<>	142	43	
87	<lod< th=""><th><lod< th=""><th>150</th><th>341</th><th></th></lod<></th></lod<>	<lod< th=""><th>150</th><th>341</th><th></th></lod<>	150	341	
88	<lod< th=""><th><lod< th=""><th>80</th><th>203</th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>203</th><th></th></lod<>	80	203	
89	<lod< th=""><th><lod< th=""><th>149</th><th>97</th><th></th></lod<></th></lod<>	<lod< th=""><th>149</th><th>97</th><th></th></lod<>	149	97	
90	<lod< th=""><th><lod< th=""><th>82</th><th>48</th><th></th></lod<></th></lod<>	<lod< th=""><th>82</th><th>48</th><th></th></lod<>	82	48	
91	<lod< th=""><th><lod< th=""><th>78</th><th>99</th><th></th></lod<></th></lod<>	<lod< th=""><th>78</th><th>99</th><th></th></lod<>	78	99	
92	<lod< th=""><th><lod< th=""><th>126</th><th>181</th><th></th></lod<></th></lod<>	<lod< th=""><th>126</th><th>181</th><th></th></lod<>	126	181	
93	<lod< th=""><th><lod< th=""><th>69</th><th>45</th><th></th></lod<></th></lod<>	<lod< th=""><th>69</th><th>45</th><th></th></lod<>	69	45	

XRF Data 12 January 2010



Reading	Cr	Cu	Zn	Pb	Description				
1	Standardisation								
2			Standardi	sation					
3	<lod< th=""><th><lod< th=""><th>120</th><th>378</th><th></th></lod<></th></lod<>	<lod< th=""><th>120</th><th>378</th><th></th></lod<>	120	378					
4	<lod< th=""><th><lod< th=""><th>55</th><th>37</th><th></th></lod<></th></lod<>	<lod< th=""><th>55</th><th>37</th><th></th></lod<>	55	37					
5	<lod< th=""><th><lod< th=""><th>61</th><th>35</th><th></th></lod<></th></lod<>	<lod< th=""><th>61</th><th>35</th><th></th></lod<>	61	35					
6	<lod< th=""><th><lod< th=""><th>47</th><th>37</th><th></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>37</th><th></th></lod<>	47	37					
7	<lod< th=""><th><lod< th=""><th>47</th><th>38</th><th></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>38</th><th></th></lod<>	47	38					
8	<lod< th=""><th><lod< th=""><th>88</th><th>112</th><th></th></lod<></th></lod<>	<lod< th=""><th>88</th><th>112</th><th></th></lod<>	88	112					
9	<lod< th=""><th><lod< th=""><th>85</th><th>216</th><th>Waiu St final spot</th></lod<></th></lod<>	<lod< th=""><th>85</th><th>216</th><th>Waiu St final spot</th></lod<>	85	216	Waiu St final spot				
10	<lod< th=""><th><lod< th=""><th>52</th><th>38</th><th>check under</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>38</th><th>check under</th></lod<>	52	38	check under				
11	<lod< th=""><th><lod< th=""><th>51</th><th>44</th><th>CPG direction</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>44</th><th>CPG direction</th></lod<>	51	44	CPG direction				
12	<lod< th=""><th><lod< th=""><th>66</th><th>72</th><th></th></lod<></th></lod<>	<lod< th=""><th>66</th><th>72</th><th></th></lod<>	66	72					
13	<lod< th=""><th><lod< th=""><th>99</th><th>290</th><th></th></lod<></th></lod<>	<lod< th=""><th>99</th><th>290</th><th></th></lod<>	99	290					
14	169	<lod< th=""><th>91</th><th>102</th><th></th></lod<>	91	102					
15	<lod< th=""><th><lod< th=""><th>44</th><th>36</th><th></th></lod<></th></lod<>	<lod< th=""><th>44</th><th>36</th><th></th></lod<>	44	36					
16	<lod< th=""><th><lod< th=""><th>101</th><th>180</th><th></th></lod<></th></lod<>	<lod< th=""><th>101</th><th>180</th><th></th></lod<>	101	180					
17	<lod< th=""><th><lod< th=""><th>77</th><th>75</th><th></th></lod<></th></lod<>	<lod< th=""><th>77</th><th>75</th><th></th></lod<>	77	75					
18	<lod< th=""><th><lod< th=""><th>42</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>42</th><th><lod< th=""><th></th></lod<></th></lod<>	42	<lod< th=""><th></th></lod<>					
19	<lod< th=""><th><lod< th=""><th>42</th><th>14</th><th></th></lod<></th></lod<>	<lod< th=""><th>42</th><th>14</th><th></th></lod<>	42	14					

XRF Data 13 January 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standard	isation	
2	<lod< th=""><th><lod< th=""><th>108</th><th>42</th><th></th></lod<></th></lod<>	<lod< th=""><th>108</th><th>42</th><th></th></lod<>	108	42	
3	<lod< th=""><th><lod< th=""><th>324</th><th>104</th><th></th></lod<></th></lod<>	<lod< th=""><th>324</th><th>104</th><th></th></lod<>	324	104	
4	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<>	32	<lod< th=""><th></th></lod<>	
5	<lod< th=""><th><lod< th=""><th>27</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>27</th><th><lod< th=""><th></th></lod<></th></lod<>	27	<lod< th=""><th></th></lod<>	
6			Standard	isation	
7	<lod< th=""><th><lod< th=""><th>273</th><th>173</th><th></th></lod<></th></lod<>	<lod< th=""><th>273</th><th>173</th><th></th></lod<>	273	173	
8	<lod< th=""><th><lod< th=""><th>34</th><th>13</th><th>CD/10L</th></lod<></th></lod<>	<lod< th=""><th>34</th><th>13</th><th>CD/10L</th></lod<>	34	13	CD/10L
9	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>CD/10M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>CD/10M</th></lod<></th></lod<>	33	<lod< th=""><th>CD/10M</th></lod<>	CD/10M
10	<lod< th=""><th><lod< th=""><th>42</th><th>16</th><th>CD/10R</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>16</th><th>CD/10R</th></lod<>	42	16	CD/10R
11	<lod< th=""><th><lod< th=""><th>39</th><th>16</th><th>CD/30L</th></lod<></th></lod<>	<lod< th=""><th>39</th><th>16</th><th>CD/30L</th></lod<>	39	16	CD/30L
12	<lod< th=""><th><lod< th=""><th>42</th><th><lod< th=""><th>CD/30M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>42</th><th><lod< th=""><th>CD/30M</th></lod<></th></lod<>	42	<lod< th=""><th>CD/30M</th></lod<>	CD/30M
13	<lod< th=""><th><lod< th=""><th>45</th><th>19</th><th>CD/30R</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>19</th><th>CD/30R</th></lod<>	45	19	CD/30R

Validation

XRF Data 14 January 2010



Reading	Cr	Cu	Zn	Pb	Description				
1		Standardisation							
2	<lod< th=""><th><lod< th=""><th>101</th><th>113</th><th></th></lod<></th></lod<>	<lod< th=""><th>101</th><th>113</th><th></th></lod<>	101	113					
3	<lod< th=""><th><lod< th=""><th>68</th><th>50</th><th>Cell C/D spot</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>50</th><th>Cell C/D spot</th></lod<>	68	50	Cell C/D spot				
4	<lod< th=""><th><lod< th=""><th>82</th><th>41</th><th>check</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>41</th><th>check</th></lod<>	82	41	check				
5	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th></th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th></th></lod<></th></lod<>	<lod< th=""><th></th></lod<>					
6			Standard	lisation					
7	<lod< th=""><th><lod< th=""><th>241</th><th>676</th><th></th></lod<></th></lod<>	<lod< th=""><th>241</th><th>676</th><th></th></lod<>	241	676					
8	<lod< th=""><th><lod< th=""><th>125</th><th>300</th><th></th></lod<></th></lod<>	<lod< th=""><th>125</th><th>300</th><th></th></lod<>	125	300					
9	<lod< th=""><th><lod< th=""><th>137</th><th>207</th><th></th></lod<></th></lod<>	<lod< th=""><th>137</th><th>207</th><th></th></lod<>	137	207					
10	<lod< th=""><th><lod< th=""><th>218</th><th>524</th><th></th></lod<></th></lod<>	<lod< th=""><th>218</th><th>524</th><th></th></lod<>	218	524					
11	<lod< th=""><th><lod< th=""><th>117</th><th>154</th><th></th></lod<></th></lod<>	<lod< th=""><th>117</th><th>154</th><th></th></lod<>	117	154					
12	<lod< th=""><th><lod< th=""><th>146</th><th>227</th><th>Cell C/D spot</th></lod<></th></lod<>	<lod< th=""><th>146</th><th>227</th><th>Cell C/D spot</th></lod<>	146	227	Cell C/D spot				
13	<lod< th=""><th><lod< th=""><th>189</th><th>361</th><th>check</th></lod<></th></lod<>	<lod< th=""><th>189</th><th>361</th><th>check</th></lod<>	189	361	check				
14	<lod< th=""><th><lod< th=""><th>187</th><th>253</th><th>CHECK</th></lod<></th></lod<>	<lod< th=""><th>187</th><th>253</th><th>CHECK</th></lod<>	187	253	CHECK				
15	<lod< th=""><th><lod< th=""><th>256</th><th>149</th><th></th></lod<></th></lod<>	<lod< th=""><th>256</th><th>149</th><th></th></lod<>	256	149					
16	174	<lod< th=""><th>158</th><th>646</th><th></th></lod<>	158	646					
17	<lod< th=""><th><lod< th=""><th>453</th><th>707</th><th></th></lod<></th></lod<>	<lod< th=""><th>453</th><th>707</th><th></th></lod<>	453	707					
18	<lod< th=""><th><lod< th=""><th>29</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>29</th><th><lod< th=""><th></th></lod<></th></lod<>	29	<lod< th=""><th></th></lod<>					
19	<lod< th=""><th><lod< th=""><th>92</th><th>159</th><th></th></lod<></th></lod<>	<lod< th=""><th>92</th><th>159</th><th></th></lod<>	92	159					
20	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th>CD/70L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th>CD/70L</th></lod<></th></lod<>	28	<lod< th=""><th>CD/70L</th></lod<>	CD/70L				
21	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th>CD/70M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th>CD/70M</th></lod<></th></lod<>	38	<lod< th=""><th>CD/70M</th></lod<>	CD/70M				
22	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th>CD/70R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th>CD/70R</th></lod<></th></lod<>	32	<lod< th=""><th>CD/70R</th></lod<>	CD/70R				
23	<lod< th=""><th><lod< th=""><th>30</th><th><lod< th=""><th>CD/50L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>30</th><th><lod< th=""><th>CD/50L</th></lod<></th></lod<>	30	<lod< th=""><th>CD/50L</th></lod<>	CD/50L				
24	<lod< th=""><th><lod< th=""><th>68</th><th>17</th><th>CD/50M</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>17</th><th>CD/50M</th></lod<>	68	17	CD/50M				
25	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th>CD/50R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th>CD/50R</th></lod<></th></lod<>	28	<lod< th=""><th>CD/50R</th></lod<>	CD/50R				
26	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th>Cell C/D spot</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th>Cell C/D spot</th></lod<></th></lod<>	28	<lod< th=""><th>Cell C/D spot</th></lod<>	Cell C/D spot				
27	<lod< th=""><th><lod< th=""><th>37</th><th><lod< th=""><th>check</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>37</th><th><lod< th=""><th>check</th></lod<></th></lod<>	37	<lod< th=""><th>check</th></lod<>	check				
28	<lod< th=""><th><lod< th=""><th>259</th><th>198</th><th>CHECK</th></lod<></th></lod<>	<lod< th=""><th>259</th><th>198</th><th>CHECK</th></lod<>	259	198	CHECK				

Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls14 Jan 10

XRF Data 15 January 2010



Reading	Cr	Cu	Zn	Pb	Description				
1		Standardisation							
2	<lod< th=""><th><lod< th=""><th>23</th><th><lod< th=""><th>CD/90L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>23</th><th><lod< th=""><th>CD/90L</th></lod<></th></lod<>	23	<lod< th=""><th>CD/90L</th></lod<>	CD/90L				
3	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>CD/90M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>CD/90M</th></lod<></th></lod<>	36	<lod< th=""><th>CD/90M</th></lod<>	CD/90M				
4	<lod< th=""><th><lod< th=""><th>25</th><th><lod< th=""><th>CD/90R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>25</th><th><lod< th=""><th>CD/90R</th></lod<></th></lod<>	25	<lod< th=""><th>CD/90R</th></lod<>	CD/90R				
5	<lod< th=""><th><lod< th=""><th>49</th><th>18</th><th>CD/110L</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>18</th><th>CD/110L</th></lod<>	49	18	CD/110L				
6	<lod< th=""><th><lod< th=""><th>34</th><th><lod< th=""><th>CD/110M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>34</th><th><lod< th=""><th>CD/110M</th></lod<></th></lod<>	34	<lod< th=""><th>CD/110M</th></lod<>	CD/110M				
7	<lod< th=""><th><lod< th=""><th>35</th><th><lod< th=""><th>CD/110R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>35</th><th><lod< th=""><th>CD/110R</th></lod<></th></lod<>	35	<lod< th=""><th>CD/110R</th></lod<>	CD/110R				
8	<lod< th=""><th><lod< th=""><th>25</th><th><lod< th=""><th>CD/130L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>25</th><th><lod< th=""><th>CD/130L</th></lod<></th></lod<>	25	<lod< th=""><th>CD/130L</th></lod<>	CD/130L				
9	<lod< th=""><th><lod< th=""><th>40</th><th>14</th><th>CD/130M</th></lod<></th></lod<>	<lod< th=""><th>40</th><th>14</th><th>CD/130M</th></lod<>	40	14	CD/130M				
10	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th>CD/130R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th>CD/130R</th></lod<></th></lod<>	32	<lod< th=""><th>CD/130R</th></lod<>	CD/130R				
11	<lod< th=""><th><lod< th=""><th>41</th><th><lod< th=""><th>CD/150L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>41</th><th><lod< th=""><th>CD/150L</th></lod<></th></lod<>	41	<lod< th=""><th>CD/150L</th></lod<>	CD/150L				
12	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>CD/150M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>CD/150M</th></lod<></th></lod<>	33	<lod< th=""><th>CD/150M</th></lod<>	CD/150M				
13	<lod< th=""><th><lod< th=""><th>70</th><th>26</th><th>CD/150R</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>26</th><th>CD/150R</th></lod<>	70	26	CD/150R				
14	<lod< th=""><th><lod< th=""><th>29</th><th><lod< th=""><th>CD/170L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>29</th><th><lod< th=""><th>CD/170L</th></lod<></th></lod<>	29	<lod< th=""><th>CD/170L</th></lod<>	CD/170L				
15				rdisation					
16		Standardisation							
17	<lod< th=""><th><lod< th=""><th>35</th><th>16</th><th>CD/170M</th></lod<></th></lod<>	<lod< th=""><th>35</th><th>16</th><th>CD/170M</th></lod<>	35	16	CD/170M				
18	<lod< th=""><th><lod< th=""><th>77</th><th>121</th><th>CD/170R</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>121</th><th>CD/170R</th></lod<>	77	121	CD/170R				
19	<lod< th=""><th><lod< th=""><th>38</th><th>13</th><th>CD/190L</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>13</th><th>CD/190L</th></lod<>	38	13	CD/190L				
20	<lod< th=""><th><lod< th=""><th>40</th><th>77</th><th>CD/190M</th></lod<></th></lod<>	<lod< th=""><th>40</th><th>77</th><th>CD/190M</th></lod<>	40	77	CD/190M				
21	<lod< th=""><th><lod< th=""><th>45</th><th>12</th><th>CD/190R</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>12</th><th>CD/190R</th></lod<>	45	12	CD/190R				
22	<lod< th=""><th><lod< th=""><th>151</th><th>308</th><th></th></lod<></th></lod<>	<lod< th=""><th>151</th><th>308</th><th></th></lod<>	151	308					
23	<lod< th=""><th><lod< th=""><th>87</th><th>183</th><th></th></lod<></th></lod<>	<lod< th=""><th>87</th><th>183</th><th></th></lod<>	87	183					
24	<lod< th=""><th><lod< th=""><th>81</th><th>119</th><th>Spot checking</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>119</th><th>Spot checking</th></lod<>	81	119	Spot checking				
25	<lod< th=""><th><lod< th=""><th>90</th><th>192</th><th>validation samples as</th></lod<></th></lod<>	<lod< th=""><th>90</th><th>192</th><th>validation samples as</th></lod<>	90	192	validation samples as				
26	<lod< th=""><th><lod< th=""><th>31</th><th>18</th><th>concerned about high</th></lod<></th></lod<>	<lod< th=""><th>31</th><th>18</th><th>concerned about high</th></lod<>	31	18	concerned about high				
27	<lod< th=""><th><lod< th=""><th>44</th><th><lod< th=""><th>levels.</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>44</th><th><lod< th=""><th>levels.</th></lod<></th></lod<>	44	<lod< th=""><th>levels.</th></lod<>	levels.				
28	<lod< th=""><th><lod< th=""><th>52</th><th>117</th><th>icvcis.</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>117</th><th>icvcis.</th></lod<>	52	117	icvcis.				
29	<lod< th=""><th><lod< th=""><th>35</th><th><lod< th=""><th colspan="2"></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>35</th><th><lod< th=""><th colspan="2"></th></lod<></th></lod<>	35	<lod< th=""><th colspan="2"></th></lod<>					
30	<lod< th=""><th><lod< th=""><th>40</th><th>50</th><th></th></lod<></th></lod<>	<lod< th=""><th>40</th><th>50</th><th></th></lod<>	40	50					
31	<lod< th=""><th><lod< th=""><th>27</th><th><lod< th=""><th>CF/CD1</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>27</th><th><lod< th=""><th>CF/CD1</th></lod<></th></lod<>	27	<lod< th=""><th>CF/CD1</th></lod<>	CF/CD1				
32	<lod< th=""><th><lod< th=""><th>37</th><th>18</th><th>CF/CD2</th></lod<></th></lod<>	<lod< th=""><th>37</th><th>18</th><th>CF/CD2</th></lod<>	37	18	CF/CD2				
33	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>CF/CD3</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>CF/CD3</th></lod<></th></lod<>	33	<lod< th=""><th>CF/CD3</th></lod<>	CF/CD3				
34	<lod< th=""><th><lod< th=""><th>40</th><th><lod< th=""><th>CF/CD4</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>40</th><th><lod< th=""><th>CF/CD4</th></lod<></th></lod<>	40	<lod< th=""><th>CF/CD4</th></lod<>	CF/CD4				
35	<lod< th=""><th><lod< th=""><th>23</th><th>40</th><th>CF/CD5</th></lod<></th></lod<>	<lod< th=""><th>23</th><th>40</th><th>CF/CD5</th></lod<>	23	40	CF/CD5				

Validation Lab tested

XRF Data 18 January 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре		
1	Standardisation							
2	<lod< th=""><th><lod< th=""><th>41</th><th>18</th><th>CF/CD6</th><th></th></lod<></th></lod<>	<lod< th=""><th>41</th><th>18</th><th>CF/CD6</th><th></th></lod<>	41	18	CF/CD6			
3	<lod< th=""><th><lod< th=""><th>53</th><th>40</th><th>CF/CD7</th><th></th></lod<></th></lod<>	<lod< th=""><th>53</th><th>40</th><th>CF/CD7</th><th></th></lod<>	53	40	CF/CD7			
4	<lod< th=""><th><lod< th=""><th>61</th><th>61</th><th>CF/CD8</th><th></th></lod<></th></lod<>	<lod< th=""><th>61</th><th>61</th><th>CF/CD8</th><th></th></lod<>	61	61	CF/CD8			
5	<lod< th=""><th><lod< th=""><th>56</th><th>83</th><th>CF/CD9</th><th></th></lod<></th></lod<>	<lod< th=""><th>56</th><th>83</th><th>CF/CD9</th><th></th></lod<>	56	83	CF/CD9			
6	<lod< th=""><th><lod< th=""><th>54</th><th>81</th><th>CF/CD10</th><th></th></lod<></th></lod<>	<lod< th=""><th>54</th><th>81</th><th>CF/CD10</th><th></th></lod<>	54	81	CF/CD10			
7	<lod< th=""><th><lod< th=""><th>42</th><th>61</th><th>CF/CD11</th><th></th></lod<></th></lod<>	<lod< th=""><th>42</th><th>61</th><th>CF/CD11</th><th></th></lod<>	42	61	CF/CD11			
8	<lod< th=""><th><lod< th=""><th>43</th><th>54</th><th>CF/CD12</th><th></th></lod<></th></lod<>	<lod< th=""><th>43</th><th>54</th><th>CF/CD12</th><th></th></lod<>	43	54	CF/CD12			
9	<lod< th=""><th><lod< th=""><th>68</th><th>143</th><th>CF/CD13</th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>143</th><th>CF/CD13</th><th></th></lod<>	68	143	CF/CD13			
10	<lod< th=""><th><lod< th=""><th>67</th><th>166</th><th>CF/CD14</th><th></th></lod<></th></lod<>	<lod< th=""><th>67</th><th>166</th><th>CF/CD14</th><th></th></lod<>	67	166	CF/CD14			
11	<lod< th=""><th><lod< th=""><th>58</th><th>176</th><th>GF/GD14</th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>176</th><th>GF/GD14</th><th></th></lod<>	58	176	GF/GD14			
12	<lod< th=""><th><lod< th=""><th>49</th><th>131</th><th>CF/CD15</th><th></th></lod<></th></lod<>	<lod< th=""><th>49</th><th>131</th><th>CF/CD15</th><th></th></lod<>	49	131	CF/CD15			
13	<lod< th=""><th>37</th><th>116</th><th>434</th><th>These trucks went as</th><th></th></lod<>	37	116	434	These trucks went as			
14	<lod< th=""><th><lod< th=""><th>83</th><th>171</th><th>type A. From here on I</th><th></th></lod<></th></lod<>	<lod< th=""><th>83</th><th>171</th><th>type A. From here on I</th><th></th></lod<>	83	171	type A. From here on I			
15	<lod< th=""><th><lod< th=""><th>52</th><th>66</th><th>made an effort to test</th><th></th></lod<></th></lod<>	<lod< th=""><th>52</th><th>66</th><th>made an effort to test</th><th></th></lod<>	52	66	made an effort to test			
16	<lod< th=""><th>38</th><th>123</th><th>68</th><th>the truckloads before</th><th></th></lod<>	38	123	68	the truckloads before			
17	<lod< th=""><th><lod< th=""><th>166</th><th>105</th><th>they left and advise if</th><th></th></lod<></th></lod<>	<lod< th=""><th>166</th><th>105</th><th>they left and advise if</th><th></th></lod<>	166	105	they left and advise if			
18	<lod< th=""><th><lod< th=""><th>193</th><th>95</th><th>type A or F.</th><th></th></lod<></th></lod<>	<lod< th=""><th>193</th><th>95</th><th>type A or F.</th><th></th></lod<>	193	95	type A or F.			
19	<lod< th=""><th><lod< th=""><th>158</th><th>123</th><th>CD/CD16</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>158</th><th>123</th><th>CD/CD16</th><th>Α</th></lod<>	158	123	CD/CD16	Α		
20				tandardisati				
21	<lod< th=""><th><lod< th=""><th>171</th><th>69</th><th>CF/CD17</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>171</th><th>69</th><th>CF/CD17</th><th>F</th></lod<>	171	69	CF/CD17	F		
22	<lod< th=""><th><lod< th=""><th>124</th><th>64</th><th>CF/CD18</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>124</th><th>64</th><th>CF/CD18</th><th>F</th></lod<>	124	64	CF/CD18	F		
23	<lod< th=""><th><lod< th=""><th>108</th><th>104</th><th>CF/CD19</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>108</th><th>104</th><th>CF/CD19</th><th>F</th></lod<>	108	104	CF/CD19	F		
24	<lod< th=""><th><lod< th=""><th>104</th><th>78</th><th>CF/CD20</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>104</th><th>78</th><th>CF/CD20</th><th>F</th></lod<>	104	78	CF/CD20	F		
25	<lod< th=""><th><lod< th=""><th>155</th><th>138</th><th>CF/CD21</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>155</th><th>138</th><th>CF/CD21</th><th>F</th></lod<>	155	138	CF/CD21	F		
26	<lod< th=""><th>53</th><th>162</th><th>92</th><th></th><th></th></lod<>	53	162	92				
27	<lod< th=""><th><lod< th=""><th>82</th><th>63</th><th>CF/CD22</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>63</th><th>CF/CD22</th><th>F</th></lod<>	82	63	CF/CD22	F		
28	<lod< th=""><th><lod< th=""><th>82</th><th>39</th><th>CF/CD23</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>39</th><th>CF/CD23</th><th>F</th></lod<>	82	39	CF/CD23	F		
29	<lod< th=""><th><lod< th=""><th>98</th><th>113</th><th>CF/CD24</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>98</th><th>113</th><th>CF/CD24</th><th>F</th></lod<>	98	113	CF/CD24	F		
30	<lod< th=""><th><lod< th=""><th>123</th><th>55</th><th>CF/CD25</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>123</th><th>55</th><th>CF/CD25</th><th>F</th></lod<>	123	55	CF/CD25	F		
31	4.0=			tandardisati				
32	167	<lod< th=""><th>60</th><th>38</th><th>CF/CD26</th><th><u> </u></th></lod<>	60	38	CF/CD26	<u> </u>		
33	<lod< th=""><th><lod< th=""><th>114</th><th>45</th><th>CF/CD27</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>45</th><th>CF/CD27</th><th>F</th></lod<>	114	45	CF/CD27	F		
34	<lod< th=""><th>67</th><th>241</th><th>310</th><th>CF/CD28</th><th>A</th></lod<>	67	241	310	CF/CD28	A		
35	<lod< th=""><th>98</th><th>392</th><th>572</th><th>CF/CD29</th><th>Α</th></lod<>	98	392	572	CF/CD29	Α		
36	<lod< th=""><th>45</th><th>174</th><th>159</th><th>CF/CD30</th><th>Α</th></lod<>	45	174	159	CF/CD30	Α		
37	<lod< th=""><th>63</th><th>167</th><th>179</th><th></th><th></th></lod<>	63	167	179				

XRF Data 19 January 2010



Reading	Cr	Cu	Zn	Pb	Description	Type	
1			5	Standardisatio	n		
2	<lod< th=""><th><lod< th=""><th>134</th><th>107</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>134</th><th>107</th><th></th><th></th></lod<>	134	107			
3	<lod< th=""><th><lod< th=""><th>109</th><th>85</th><th>CF/CF31</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>109</th><th>85</th><th>CF/CF31</th><th>F</th></lod<>	109	85	CF/CF31	F	
4	<lod< th=""><th><lod< th=""><th>120</th><th>67</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>120</th><th>67</th><th></th><th></th></lod<>	120	67			
5	<lod< th=""><th>45</th><th>60</th><th>44</th><th>CF/CD32</th><th>Α</th></lod<>	45	60	44	CF/CD32	Α	
6	<lod< th=""><th>84</th><th>552</th><th>425</th><th>CF/CD33</th><th>Α</th></lod<>	84	552	425	CF/CD33	Α	
7			5	Standardisatio	n		
8	<lod< th=""><th>101</th><th>400</th><th>253</th><th>CF/CD34</th><th>Α</th></lod<>	101	400	253	CF/CD34	Α	
9	<lod< th=""><th><lod< th=""><th>111</th><th>74</th><th>CFU/1</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>111</th><th>74</th><th>CFU/1</th><th>В</th></lod<>	111	74	CFU/1	В	
10		Standardisation					
11	<lod< th=""><th><lod< th=""><th>137</th><th>102</th><th>CFU/2</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>137</th><th>102</th><th>CFU/2</th><th>В</th></lod<>	137	102	CFU/2	В	

XRF Data 20 January 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре
1			Standar	disation		
2	<lod< th=""><th>48</th><th>305</th><th>354</th><th>CFU/3</th><th>В</th></lod<>	48	305	354	CFU/3	В
3	<lod< th=""><th><lod< th=""><th>53</th><th>19</th><th>CFU/4</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>19</th><th>CFU/4</th><th>В</th></lod<>	53	19	CFU/4	В
4	<lod< th=""><th><lod< th=""><th>85</th><th>30</th><th>CFU/5</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>85</th><th>30</th><th>CFU/5</th><th>В</th></lod<>	85	30	CFU/5	В
5	<lod< th=""><th><lod< th=""><th>62</th><th>32</th><th>CFU/6</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>62</th><th>32</th><th>CFU/6</th><th>В</th></lod<>	62	32	CFU/6	В
6	<lod< th=""><th><lod< th=""><th>93</th><th>32</th><th>CFU/7</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>32</th><th>CFU/7</th><th>В</th></lod<>	93	32	CFU/7	В
7	<lod< th=""><th><lod< th=""><th>60</th><th><lod< th=""><th>CFU/8</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>60</th><th><lod< th=""><th>CFU/8</th><th>В</th></lod<></th></lod<>	60	<lod< th=""><th>CFU/8</th><th>В</th></lod<>	CFU/8	В
8	<lod< th=""><th><lod< th=""><th>58</th><th>22</th><th>CFU/9</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>22</th><th>CFU/9</th><th>В</th></lod<>	58	22	CFU/9	В
9	<lod< th=""><th><lod< th=""><th>45</th><th><lod< th=""><th></th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>45</th><th><lod< th=""><th></th><th></th></lod<></th></lod<>	45	<lod< th=""><th></th><th></th></lod<>		
10	<lod< th=""><th><lod< th=""><th>41</th><th><lod< th=""><th></th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>41</th><th><lod< th=""><th></th><th></th></lod<></th></lod<>	41	<lod< th=""><th></th><th></th></lod<>		
11	<lod< th=""><th><lod< th=""><th>83</th><th>53</th><th>CFU/10</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>83</th><th>53</th><th>CFU/10</th><th>В</th></lod<>	83	53	CFU/10	В
12	<lod< th=""><th><lod< th=""><th>83</th><th>27</th><th>CFU/11</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>83</th><th>27</th><th>CFU/11</th><th>В</th></lod<>	83	27	CFU/11	В
13	<lod< th=""><th><lod< th=""><th>66</th><th>36</th><th>CFU/12</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>36</th><th>CFU/12</th><th>В</th></lod<>	66	36	CFU/12	В
14			Standar	disation		
15	<lod< th=""><th><lod< th=""><th>77</th><th>19</th><th>CFU/13</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>19</th><th>CFU/13</th><th>В</th></lod<>	77	19	CFU/13	В
16	<lod< th=""><th><lod< th=""><th>61</th><th>26</th><th>CFU/14</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>26</th><th>CFU/14</th><th>В</th></lod<>	61	26	CFU/14	В
17	<lod< th=""><th><lod< th=""><th>66</th><th>28</th><th>CFU/15</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>28</th><th>CFU/15</th><th>В</th></lod<>	66	28	CFU/15	В
18	<lod< th=""><th><lod< th=""><th>58</th><th>17</th><th>CFU/16</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>17</th><th>CFU/16</th><th>В</th></lod<>	58	17	CFU/16	В
19	<lod< th=""><th><lod< th=""><th>64</th><th>14</th><th>CFU/17</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>14</th><th>CFU/17</th><th>В</th></lod<>	64	14	CFU/17	В
20	<lod< th=""><th><lod< th=""><th>27</th><th><lod< th=""><th>CFU/18</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>27</th><th><lod< th=""><th>CFU/18</th><th>В</th></lod<></th></lod<>	27	<lod< th=""><th>CFU/18</th><th>В</th></lod<>	CFU/18	В
21			Standar	disation		
22	<lod< th=""><th><lod< th=""><th>83</th><th>31</th><th>CFU/19</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>83</th><th>31</th><th>CFU/19</th><th>В</th></lod<>	83	31	CFU/19	В
23	<lod< th=""><th><lod< th=""><th>75</th><th>18</th><th>CFU/20</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>18</th><th>CFU/20</th><th>В</th></lod<>	75	18	CFU/20	В
24	<lod< th=""><th><lod< th=""><th>49</th><th>21</th><th>CFU/21</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>21</th><th>CFU/21</th><th>В</th></lod<>	49	21	CFU/21	В
25	<lod< th=""><th><lod< th=""><th>60</th><th>19</th><th>CFU/22</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>60</th><th>19</th><th>CFU/22</th><th>В</th></lod<>	60	19	CFU/22	В
26	<lod< th=""><th><lod< th=""><th>49</th><th>18</th><th>CFU/23</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>18</th><th>CFU/23</th><th>В</th></lod<>	49	18	CFU/23	В
27	<lod< th=""><th><lod< th=""><th>51</th><th>22</th><th>CFU/24</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>22</th><th>CFU/24</th><th>В</th></lod<>	51	22	CFU/24	В
28	<lod< th=""><th><lod< th=""><th>51</th><th>15</th><th>CFU/25</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>15</th><th>CFU/25</th><th>В</th></lod<>	51	15	CFU/25	В
29	<lod< th=""><th><lod< th=""><th>61</th><th>20</th><th>CFU/26</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>20</th><th>CFU/26</th><th>В</th></lod<>	61	20	CFU/26	В
30	<lod< th=""><th><lod< th=""><th>66</th><th>25</th><th>CFU/27</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>25</th><th>CFU/27</th><th>В</th></lod<>	66	25	CFU/27	В
31	<lod< th=""><th><lod< th=""><th>66</th><th>15</th><th>CFU/28</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>15</th><th>CFU/28</th><th>В</th></lod<>	66	15	CFU/28	В
32	<lod< th=""><th><lod< th=""><th>66</th><th>29</th><th>CFU/29</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>29</th><th>CFU/29</th><th>В</th></lod<>	66	29	CFU/29	В
33	<lod< th=""><th><lod< th=""><th>91</th><th>40</th><th>CFU/30</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>91</th><th>40</th><th>CFU/30</th><th>В</th></lod<>	91	40	CFU/30	В
34	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th>Error</th><th>_</th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th>Error</th><th>_</th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>Error</th><th>_</th></lod<></th></lod<>	<lod< th=""><th>Error</th><th>_</th></lod<>	Error	_
35	<lod< th=""><th><lod< th=""><th>21</th><th><lod< th=""><th>CFU/31</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>21</th><th><lod< th=""><th>CFU/31</th><th>В</th></lod<></th></lod<>	21	<lod< th=""><th>CFU/31</th><th>В</th></lod<>	CFU/31	В
36	<lod< th=""><th><lod< th=""><th>53</th><th>24</th><th>CFU/32</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>24</th><th>CFU/32</th><th>В</th></lod<>	53	24	CFU/32	В
37	<lod< th=""><th><lod< th=""><th>78</th><th>23</th><th>CFU/33</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>23</th><th>CFU/33</th><th>В</th></lod<>	78	23	CFU/33	В
38	<lod< th=""><th><lod< th=""><th>89</th><th>36</th><th>CFU/34</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>89</th><th>36</th><th>CFU/34</th><th>В</th></lod<>	89	36	CFU/34	В
39	<lod< th=""><th><lod< th=""><th>35</th><th>20</th><th>CFU/35</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>35</th><th>20</th><th>CFU/35</th><th>В</th></lod<>	35	20	CFU/35	В
40	<lod< th=""><th><lod< th=""><th>54</th><th>19</th><th>CFU/36</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>54</th><th>19</th><th>CFU/36</th><th>В</th></lod<>	54	19	CFU/36	В

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls20 Jan 10

XRF Data 21 January 2010



Reading	Cr	Cu	Zn	Pb	Description	Type
1			Standar	disation		
2	<lod< th=""><th><lod< th=""><th>43</th><th>24</th><th>CFU/37</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>24</th><th>CFU/37</th><th>В</th></lod<>	43	24	CFU/37	В
3	<lod< th=""><th><lod< th=""><th>76</th><th>31</th><th>CFU/38</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>31</th><th>CFU/38</th><th>В</th></lod<>	76	31	CFU/38	В
4	<lod< th=""><th><lod< th=""><th>27</th><th><lod< th=""><th>CFU/39</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>27</th><th><lod< th=""><th>CFU/39</th><th>В</th></lod<></th></lod<>	27	<lod< th=""><th>CFU/39</th><th>В</th></lod<>	CFU/39	В
5	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>CFU/40</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>CFU/40</th><th>В</th></lod<></th></lod<>	36	<lod< th=""><th>CFU/40</th><th>В</th></lod<>	CFU/40	В
6	<lod< th=""><th><lod< th=""><th>49</th><th>19</th><th>CFU/41</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>19</th><th>CFU/41</th><th>В</th></lod<>	49	19	CFU/41	В
7	<lod< th=""><th><lod< th=""><th>35</th><th>21</th><th>CFU/42</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>35</th><th>21</th><th>CFU/42</th><th>В</th></lod<>	35	21	CFU/42	В
8	<lod< th=""><th><lod< th=""><th>31</th><th>14</th><th>CFU/43</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>31</th><th>14</th><th>CFU/43</th><th>В</th></lod<>	31	14	CFU/43	В
9	<lod< th=""><th><lod< th=""><th>37</th><th><lod< th=""><th>CFU/44</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>37</th><th><lod< th=""><th>CFU/44</th><th>В</th></lod<></th></lod<>	37	<lod< th=""><th>CFU/44</th><th>В</th></lod<>	CFU/44	В
10	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th>CFU/45</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th>CFU/45</th><th>В</th></lod<></th></lod<>	32	<lod< th=""><th>CFU/45</th><th>В</th></lod<>	CFU/45	В
11	162	<lod< th=""><th>61</th><th>15</th><th>CFU/46</th><th>В</th></lod<>	61	15	CFU/46	В
12	<lod< th=""><th><lod< th=""><th>41</th><th>13</th><th>CFU/47</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>41</th><th>13</th><th>CFU/47</th><th>В</th></lod<>	41	13	CFU/47	В
13	<lod< th=""><th><lod< th=""><th>48</th><th>24</th><th>CFU/48</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>48</th><th>24</th><th>CFU/48</th><th>В</th></lod<>	48	24	CFU/48	В
14			Standar	disation		
15	<lod< th=""><th><lod< th=""><th>73</th><th>39</th><th>CFU/49</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>39</th><th>CFU/49</th><th>В</th></lod<>	73	39	CFU/49	В
16	<lod< th=""><th><lod< th=""><th>43</th><th><lod< th=""><th>CFU/50</th><th>В</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>43</th><th><lod< th=""><th>CFU/50</th><th>В</th></lod<></th></lod<>	43	<lod< th=""><th>CFU/50</th><th>В</th></lod<>	CFU/50	В
17	<lod< th=""><th><lod< th=""><th>88</th><th>53</th><th>CFU/51</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>88</th><th>53</th><th>CFU/51</th><th>В</th></lod<>	88	53	CFU/51	В
18	<lod< th=""><th><lod< th=""><th>70</th><th>87</th><th>CFU/52</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>87</th><th>CFU/52</th><th>В</th></lod<>	70	87	CFU/52	В
19	<lod< th=""><th><lod< th=""><th>93</th><th>61</th><th>CFU/53</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>61</th><th>CFU/53</th><th>В</th></lod<>	93	61	CFU/53	В
20	<lod< th=""><th><lod< th=""><th>53</th><th>15</th><th>Show ERMA XRF</th><th></th></lod<></th></lod<>	<lod< th=""><th>53</th><th>15</th><th>Show ERMA XRF</th><th></th></lod<>	53	15	Show ERMA XRF	
21	<lod< th=""><th>43</th><th>74</th><th>17</th><th>CFU/54</th><th>В</th></lod<>	43	74	17	CFU/54	В
22	<lod< th=""><th><lod< th=""><th>53</th><th>54</th><th>CFU/55</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>54</th><th>CFU/55</th><th>В</th></lod<>	53	54	CFU/55	В
23	<lod< th=""><th><lod< th=""><th>61</th><th>23</th><th>CFU/56</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>23</th><th>CFU/56</th><th>В</th></lod<>	61	23	CFU/56	В
24	<lod< th=""><th><lod< th=""><th>50</th><th>25</th><th>CFU/57</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>50</th><th>25</th><th>CFU/57</th><th>В</th></lod<>	50	25	CFU/57	В
25	<lod< th=""><th><lod< th=""><th>63</th><th>27</th><th>CFU/58</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>27</th><th>CFU/58</th><th>В</th></lod<>	63	27	CFU/58	В
26	<lod< th=""><th>45</th><th>94</th><th>43</th><th>CFU/59</th><th>В</th></lod<>	45	94	43	CFU/59	В
27	<lod< th=""><th><lod< th=""><th>61</th><th>31</th><th>CFU/60</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>31</th><th>CFU/60</th><th>В</th></lod<>	61	31	CFU/60	В
28	<lod< th=""><th><lod< th=""><th>82</th><th>30</th><th>CFU/61</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>30</th><th>CFU/61</th><th>В</th></lod<>	82	30	CFU/61	В
29	<lod< th=""><th><lod< th=""><th>49</th><th>18</th><th>CFU/62</th><th>В</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>18</th><th>CFU/62</th><th>В</th></lod<>	49	18	CFU/62	В

XRF Data 22 January 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2	<lod< th=""><th>43</th><th>769</th><th>3474</th><th>Spot Check Cell E</th></lod<>	43	769	3474	Spot Check Cell E

XRF Data 26 January 2010



Reading	Cr	Cu	Zn	Pb	Description				
1		Standardisation							
2	<lod< th=""><th><lod< th=""><th>101</th><th>151</th><th></th></lod<></th></lod<>	<lod< th=""><th>101</th><th>151</th><th></th></lod<>	101	151					
3	<lod< th=""><th><lod< th=""><th>44</th><th><lod< th=""><th>Spot Check Cell E</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>44</th><th><lod< th=""><th>Spot Check Cell E</th></lod<></th></lod<>	44	<lod< th=""><th>Spot Check Cell E</th></lod<>	Spot Check Cell E				
4	<lod< th=""><th><lod< th=""><th>139</th><th>656</th><th></th></lod<></th></lod<>	<lod< th=""><th>139</th><th>656</th><th></th></lod<>	139	656					
5	<lod< th=""><th><lod< th=""><th>72</th><th>30</th><th>CFU/63</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>30</th><th>CFU/63</th></lod<>	72	30	CFU/63				

XRF Data 27 January 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2	<lod< th=""><th><lod< th=""><th>69</th><th><lod< th=""><th>Spot Check Cell E</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>69</th><th><lod< th=""><th>Spot Check Cell E</th></lod<></th></lod<>	69	<lod< th=""><th>Spot Check Cell E</th></lod<>	Spot Check Cell E
3			Standar	disation	
4	<lod< th=""><th>64</th><th>1124</th><th>19154</th><th></th></lod<>	64	1124	19154	
5	<lod< th=""><th><lod< th=""><th>386</th><th>2030</th><th></th></lod<></th></lod<>	<lod< th=""><th>386</th><th>2030</th><th></th></lod<>	386	2030	
6	<lod< th=""><th><lod< th=""><th>287</th><th>1459</th><th></th></lod<></th></lod<>	<lod< th=""><th>287</th><th>1459</th><th></th></lod<>	287	1459	
7	<lod< th=""><th><lod< th=""><th>197</th><th>1223</th><th></th></lod<></th></lod<>	<lod< th=""><th>197</th><th>1223</th><th></th></lod<>	197	1223	
8	<lod< th=""><th><lod< th=""><th>309</th><th>575</th><th>Spot Check Cell E</th></lod<></th></lod<>	<lod< th=""><th>309</th><th>575</th><th>Spot Check Cell E</th></lod<>	309	575	Spot Check Cell E
9	<lod< th=""><th><lod< th=""><th>170</th><th>582</th><th></th></lod<></th></lod<>	<lod< th=""><th>170</th><th>582</th><th></th></lod<>	170	582	
10	<lod< th=""><th><lod< th=""><th>189</th><th>995</th><th></th></lod<></th></lod<>	<lod< th=""><th>189</th><th>995</th><th></th></lod<>	189	995	
11	<lod< th=""><th><lod< th=""><th>57</th><th>145</th><th></th></lod<></th></lod<>	<lod< th=""><th>57</th><th>145</th><th></th></lod<>	57	145	
12	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<>	32	<lod< th=""><th></th></lod<>	

XRF Data 28 January 2010



Reading	Cr	Cu	Zn	Pb	Description			
1	Standardisation							
2	<lod< th=""><th><lod< th=""><th>39</th><th>92</th><th></th></lod<></th></lod<>	<lod< th=""><th>39</th><th>92</th><th></th></lod<>	39	92				
3	<lod< th=""><th><lod< th=""><th>27</th><th>30</th><th></th></lod<></th></lod<>	<lod< th=""><th>27</th><th>30</th><th></th></lod<>	27	30				
4	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th></th></lod<></th></lod<>	28	<lod< th=""><th></th></lod<>				
5	<lod< th=""><th>58</th><th>1776</th><th>1769</th><th></th></lod<>	58	1776	1769				
6	<lod< th=""><th><lod< th=""><th>40</th><th>33</th><th></th></lod<></th></lod<>	<lod< th=""><th>40</th><th>33</th><th></th></lod<>	40	33				
7	<lod< th=""><th><lod< th=""><th>38</th><th>18</th><th>E/10R</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>18</th><th>E/10R</th></lod<>	38	18	E/10R			
8	<lod< th=""><th><lod< th=""><th>43</th><th>68</th><th>E/10M</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>68</th><th>E/10M</th></lod<>	43	68	E/10M			
9	<lod< th=""><th><lod< th=""><th>42</th><th>133</th><th>E/10L</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>133</th><th>E/10L</th></lod<>	42	133	E/10L			
10	<lod< th=""><th><lod< th=""><th>47</th><th>184</th><th>L/ TOL</th></lod<></th></lod<>	<lod< th=""><th>47</th><th>184</th><th>L/ TOL</th></lod<>	47	184	L/ TOL			
11	<lod< th=""><th><lod< th=""><th>29</th><th>13</th><th>E/30R</th></lod<></th></lod<>	<lod< th=""><th>29</th><th>13</th><th>E/30R</th></lod<>	29	13	E/30R			
12	<lod< th=""><th><lod< th=""><th>37</th><th>15</th><th>E/30M</th></lod<></th></lod<>	<lod< th=""><th>37</th><th>15</th><th>E/30M</th></lod<>	37	15	E/30M			
13	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th>E/30L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th>E/30L</th></lod<></th></lod<>	28	<lod< th=""><th>E/30L</th></lod<>	E/30L			
14			Standar	disation				
15	<lod< th=""><th><lod< th=""><th>58</th><th>32</th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>32</th><th></th></lod<>	58	32				
16	<lod< th=""><th><lod< th=""><th>313</th><th>351</th><th></th></lod<></th></lod<>	<lod< th=""><th>313</th><th>351</th><th></th></lod<>	313	351				
17	<lod< th=""><th><lod< th=""><th>24</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>24</th><th><lod< th=""><th></th></lod<></th></lod<>	24	<lod< th=""><th></th></lod<>				
18	<lod< th=""><th><lod< th=""><th>43</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>43</th><th><lod< th=""><th></th></lod<></th></lod<>	43	<lod< th=""><th></th></lod<>				
19	<lod< th=""><th><lod< th=""><th>31</th><th><lod< th=""><th>E/50R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>31</th><th><lod< th=""><th>E/50R</th></lod<></th></lod<>	31	<lod< th=""><th>E/50R</th></lod<>	E/50R			
20	<lod< th=""><th><lod< th=""><th>44</th><th>14</th><th>E/50M</th></lod<></th></lod<>	<lod< th=""><th>44</th><th>14</th><th>E/50M</th></lod<>	44	14	E/50M			
21	<lod< th=""><th><lod< th=""><th>16</th><th>24</th><th>E/50L</th></lod<></th></lod<>	<lod< th=""><th>16</th><th>24</th><th>E/50L</th></lod<>	16	24	E/50L			

Validation

XRF Data 02 February 2010



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2	<lod< th=""><th><lod< th=""><th>98</th><th>47</th><th>CF/CD35</th></lod<></th></lod<>	<lod< th=""><th>98</th><th>47</th><th>CF/CD35</th></lod<>	98	47	CF/CD35			

l ah	tested
Lab	lesieu

XRF Data 03 February 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2	<lod< th=""><th><lod< th=""><th>35</th><th>31</th><th></th></lod<></th></lod<>	<lod< th=""><th>35</th><th>31</th><th></th></lod<>	35	31	
3	<lod< th=""><th><lod< th=""><th>39</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>39</th><th><lod< th=""><th></th></lod<></th></lod<>	39	<lod< th=""><th></th></lod<>	
4	<lod< th=""><th><lod< th=""><th>47</th><th>12</th><th></th></lod<></th></lod<>	<lod< th=""><th>47</th><th>12</th><th></th></lod<>	47	12	
5	<lod< th=""><th><lod< th=""><th>50</th><th>26</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>26</th><th></th></lod<>	50	26	
6	<lod< th=""><th><lod< th=""><th>23</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>23</th><th><lod< th=""><th></th></lod<></th></lod<>	23	<lod< th=""><th></th></lod<>	
7	<lod< th=""><th>43</th><th>316</th><th>323</th><th></th></lod<>	43	316	323	
8	<lod< th=""><th><lod< th=""><th>127</th><th>87</th><th></th></lod<></th></lod<>	<lod< th=""><th>127</th><th>87</th><th></th></lod<>	127	87	
9	<lod< th=""><th><lod< th=""><th>192</th><th>152</th><th></th></lod<></th></lod<>	<lod< th=""><th>192</th><th>152</th><th></th></lod<>	192	152	
10	<lod< th=""><th><lod< th=""><th>31</th><th>21</th><th></th></lod<></th></lod<>	<lod< th=""><th>31</th><th>21</th><th></th></lod<>	31	21	
11	<lod< th=""><th><lod< th=""><th>60</th><th>32</th><th></th></lod<></th></lod<>	<lod< th=""><th>60</th><th>32</th><th></th></lod<>	60	32	
12	<lod< th=""><th><lod< th=""><th>143</th><th>154</th><th>0 .0 .0</th></lod<></th></lod<>	<lod< th=""><th>143</th><th>154</th><th>0 .0 .0</th></lod<>	143	154	0 .0 .0
13	<lod< th=""><th><lod< th=""><th>81</th><th>56</th><th>Spot Check Cell E</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>56</th><th>Spot Check Cell E</th></lod<>	81	56	Spot Check Cell E
14	<lod< th=""><th><lod< th=""><th>127</th><th>98</th><th></th></lod<></th></lod<>	<lod< th=""><th>127</th><th>98</th><th></th></lod<>	127	98	
15	<lod< th=""><th><lod< th=""><th>368</th><th>490</th><th></th></lod<></th></lod<>	<lod< th=""><th>368</th><th>490</th><th></th></lod<>	368	490	
16	<lod< th=""><th><lod< th=""><th>307</th><th>84</th><th></th></lod<></th></lod<>	<lod< th=""><th>307</th><th>84</th><th></th></lod<>	307	84	
17	<lod< th=""><th><lod< th=""><th>58</th><th>14</th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>14</th><th></th></lod<>	58	14	
18	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th></th></lod<></th></lod<>	33	<lod< th=""><th></th></lod<>	
19 20	<lod <lod< th=""><th><lod <lod< th=""><th>219 94</th><th>152 13</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>219 94</th><th>152 13</th><th></th></lod<></lod 	219 94	152 13	
21			203	25	
21	<lod <lod< th=""><th><lod <lod< th=""><th>124</th><th>25</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>124</th><th>25</th><th></th></lod<></lod 	124	25	
23	<lod <lod< th=""><th><lod <lod< th=""><th>105</th><th>37</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>105</th><th>37</th><th></th></lod<></lod 	105	37	
24	<lod <lod< th=""><th><lod <lod< th=""><th>97</th><th>20</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>97</th><th>20</th><th></th></lod<></lod 	97	20	
25	<lud< th=""><th><lud< th=""><th></th><th>disation</th><th></th></lud<></th></lud<>	<lud< th=""><th></th><th>disation</th><th></th></lud<>		disation	
26	<lod< th=""><th><lod< th=""><th>75</th><th>51</th><th></th></lod<></th></lod<>	<lod< th=""><th>75</th><th>51</th><th></th></lod<>	75	51	
27	<lod <lod< th=""><th><lod <lod< th=""><th>120</th><th>54</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>120</th><th>54</th><th></th></lod<></lod 	120	54	
28	<lod< th=""><th><lod< th=""><th>65</th><th>36</th><th></th></lod<></th></lod<>	<lod< th=""><th>65</th><th>36</th><th></th></lod<>	65	36	
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31	<lod< th=""><th><lod< th=""><th>50</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>24</th><th></th></lod<>	50	24	
32	<lod< th=""><th><lod <lod< th=""><th>50</th><th>24</th><th></th></lod<></lod </th></lod<>	<lod <lod< th=""><th>50</th><th>24</th><th></th></lod<></lod 	50	24	
33	<lod< th=""><th><lod< th=""><th>41</th><th>26</th><th></th></lod<></th></lod<>	<lod< th=""><th>41</th><th>26</th><th></th></lod<>	41	26	
34	<lod< th=""><th><lod< th=""><th>35</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>35</th><th>15</th><th></th></lod<>	35	15	
35	<lod< th=""><th><lod< th=""><th>68</th><th>37</th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>37</th><th></th></lod<>	68	37	
36	<lod< th=""><th><lod< th=""><th>36</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>36</th><th>19</th><th></th></lod<>	36	19	
37	<lod< th=""><th><lod< th=""><th>40</th><th>17</th><th></th></lod<></th></lod<>	<lod< th=""><th>40</th><th>17</th><th></th></lod<>	40	17	
38	<lod< th=""><th><lod< th=""><th>195</th><th>166</th><th></th></lod<></th></lod<>	<lod< th=""><th>195</th><th>166</th><th></th></lod<>	195	166	
39	<lod< th=""><th><lod< th=""><th>114</th><th>149</th><th></th></lod<></th></lod<>	<lod< th=""><th>114</th><th>149</th><th></th></lod<>	114	149	
40	<lod< th=""><th><lod< th=""><th>132</th><th>148</th><th></th></lod<></th></lod<>	<lod< th=""><th>132</th><th>148</th><th></th></lod<>	132	148	
41	<lod< th=""><th><lod< th=""><th>109</th><th>112</th><th></th></lod<></th></lod<>	<lod< th=""><th>109</th><th>112</th><th></th></lod<>	109	112	
42	<lod< th=""><th><lod< th=""><th>158</th><th>238</th><th></th></lod<></th></lod<>	<lod< th=""><th>158</th><th>238</th><th></th></lod<>	158	238	
43	<lod< th=""><th><lod< th=""><th>44</th><th>12</th><th></th></lod<></th></lod<>	<lod< th=""><th>44</th><th>12</th><th></th></lod<>	44	12	
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45	<lod< th=""><th><lod< th=""><th>55</th><th>27</th><th>Spot Check Cell E</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>27</th><th>Spot Check Cell E</th></lod<>	55	27	Spot Check Cell E
46	<lod< th=""><th><lod< th=""><th>137</th><th>98</th><th></th></lod<></th></lod<>	<lod< th=""><th>137</th><th>98</th><th></th></lod<>	137	98	
47	<lod< th=""><th><lod< th=""><th>82</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>82</th><th><lod< th=""><th></th></lod<></th></lod<>	82	<lod< th=""><th></th></lod<>	
48	<lod< th=""><th><lod< th=""><th>136</th><th>106</th><th></th></lod<></th></lod<>	<lod< th=""><th>136</th><th>106</th><th></th></lod<>	136	106	
49	<lod< th=""><th><lod< th=""><th>97</th><th>77</th><th></th></lod<></th></lod<>	<lod< th=""><th>97</th><th>77</th><th></th></lod<>	97	77	
50	<lod< th=""><th><lod< th=""><th>95</th><th>60</th><th></th></lod<></th></lod<>	<lod< th=""><th>95</th><th>60</th><th></th></lod<>	95	60	
51	<lod< th=""><th><lod< th=""><th>126</th><th>93</th><th></th></lod<></th></lod<>	<lod< th=""><th>126</th><th>93</th><th></th></lod<>	126	93	
52	<lod< th=""><th><lod< th=""><th>61</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>61</th><th>19</th><th></th></lod<>	61	19	
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54	<lod< th=""><th><lod< th=""><th>86</th><th>48</th><th></th></lod<></th></lod<>	<lod< th=""><th>86</th><th>48</th><th></th></lod<>	86	48	
55	<lod< th=""><th><lod< th=""><th>230</th><th>239</th><th></th></lod<></th></lod<>	<lod< th=""><th>230</th><th>239</th><th></th></lod<>	230	239	
56	<lod< th=""><th><lod< th=""><th>50</th><th>52</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>52</th><th></th></lod<>	50	52	
57	<lod< th=""><th><lod< th=""><th>39</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>39</th><th><lod< th=""><th></th></lod<></th></lod<>	39	<lod< th=""><th></th></lod<>	
58	<lod< th=""><th><lod< th=""><th>146</th><th>129</th><th></th></lod<></th></lod<>	<lod< th=""><th>146</th><th>129</th><th></th></lod<>	146	129	
59	<lod< th=""><th><lod< th=""><th>100</th><th>75</th><th></th></lod<></th></lod<>	<lod< th=""><th>100</th><th>75</th><th></th></lod<>	100	75	
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61	<lod< th=""><th><lod< th=""><th>43</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>43</th><th>15</th><th></th></lod<>	43	15	
62	<lod< th=""><th><lod< th=""><th>197</th><th>196</th><th></th></lod<></th></lod<>	<lod< th=""><th>197</th><th>196</th><th></th></lod<>	197	196	
63	<lod< th=""><th><lod< th=""><th>103</th><th>59</th><th></th></lod<></th></lod<>	<lod< th=""><th>103</th><th>59</th><th></th></lod<>	103	59	

XRF Data 03 February 2010



Reading	Cr	Cu	Zn	Pb	Description
64	<lod< th=""><th><lod< th=""><th>57</th><th>38</th><th></th></lod<></th></lod<>	<lod< th=""><th>57</th><th>38</th><th></th></lod<>	57	38	
65	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>E/110R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>E/110R</th></lod<></th></lod<>	33	<lod< th=""><th>E/110R</th></lod<>	E/110R
66	<lod< th=""><th><lod< th=""><th>84</th><th>77</th><th></th></lod<></th></lod<>	<lod< th=""><th>84</th><th>77</th><th></th></lod<>	84	77	
67	<lod< th=""><th><lod< th=""><th>50</th><th>26</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>26</th><th></th></lod<>	50	26	
68	<lod< th=""><th><lod< th=""><th>29</th><th>13</th><th>E/110M</th></lod<></th></lod<>	<lod< th=""><th>29</th><th>13</th><th>E/110M</th></lod<>	29	13	E/110M
69	<lod< th=""><th><lod< th=""><th>37</th><th>14</th><th></th></lod<></th></lod<>	<lod< th=""><th>37</th><th>14</th><th></th></lod<>	37	14	
70	<lod< th=""><th><lod< th=""><th>30</th><th>13</th><th></th></lod<></th></lod<>	<lod< th=""><th>30</th><th>13</th><th></th></lod<>	30	13	
71	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>E/110L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>E/110L</th></lod<></th></lod<>	36	<lod< th=""><th>E/110L</th></lod<>	E/110L
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74	<lod< th=""><th><lod< th=""><th>31</th><th><lod< th=""><th>E/130R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>31</th><th><lod< th=""><th>E/130R</th></lod<></th></lod<>	31	<lod< th=""><th>E/130R</th></lod<>	E/130R
75	<lod< th=""><th><lod< th=""><th>21</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>21</th><th><lod< th=""><th></th></lod<></th></lod<>	21	<lod< th=""><th></th></lod<>	
76	<lod< th=""><th><lod< th=""><th>39</th><th>18</th><th></th></lod<></th></lod<>	<lod< th=""><th>39</th><th>18</th><th></th></lod<>	39	18	
77	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>E/130M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>E/130M</th></lod<></th></lod<>	33	<lod< th=""><th>E/130M</th></lod<>	E/130M
78	<lod< th=""><th><lod< th=""><th>36</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>36</th><th>15</th><th></th></lod<>	36	15	
79	<lod< th=""><th><lod< th=""><th><lod< th=""><th>12</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>12</th><th></th></lod<></th></lod<>	<lod< th=""><th>12</th><th></th></lod<>	12	
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81	<lod< th=""><th><lod< th=""><th>35</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>35</th><th><lod< th=""><th></th></lod<></th></lod<>	35	<lod< th=""><th></th></lod<>	
82	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th></th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th></th></lod<></th></lod<>	<lod< th=""><th></th></lod<>	
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84	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<>	32	<lod< th=""><th></th></lod<>	
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86	<lod< th=""><th><lod< th=""><th>31</th><th>13</th><th>E/150M</th></lod<></th></lod<>	<lod< th=""><th>31</th><th>13</th><th>E/150M</th></lod<>	31	13	E/150M
87	<lod< th=""><th><lod< th=""><th>31</th><th>15</th><th></th></lod<></th></lod<>	<lod< th=""><th>31</th><th>15</th><th></th></lod<>	31	15	
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91	<lod< th=""><th><lod< th=""><th>61</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>61</th><th>19</th><th></th></lod<>	61	19	
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93	<lod< th=""><th><lod< th=""><th>56</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>56</th><th>19</th><th></th></lod<>	56	19	
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98	<lod< th=""><th><lod< th=""><th>86</th><th>41</th><th>E/190M</th></lod<></th></lod<>	<lod< th=""><th>86</th><th>41</th><th>E/190M</th></lod<>	86	41	E/190M
99	<lod< th=""><th><lod< th=""><th>90</th><th>19</th><th></th></lod<></th></lod<>	<lod< th=""><th>90</th><th>19</th><th></th></lod<>	90	19	
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101	<lod< th=""><th><lod< th=""><th>130</th><th><lod< th=""><th>E/190L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>130</th><th><lod< th=""><th>E/190L</th></lod<></th></lod<>	130	<lod< th=""><th>E/190L</th></lod<>	E/190L
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Validation

XRF Data 04 February 2010



Reading	Cr	Cu	Zn	Pb	Description
1	O.	•		disation	2 cccpc
2	<lod< th=""><th><lod< th=""><th>375</th><th>159</th><th></th></lod<></th></lod<>	<lod< th=""><th>375</th><th>159</th><th></th></lod<>	375	159	
3	<lod <lod< th=""><th><lod <lod< th=""><th>112</th><th>26</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>112</th><th>26</th><th></th></lod<></lod 	112	26	
4	<lod <lod< th=""><th><lod <lod< th=""><th>143</th><th>45</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>143</th><th>45</th><th></th></lod<></lod 	143	45	
5	<lod <lod< th=""><th><lod <lod< th=""><th>124</th><th>78</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>124</th><th>78</th><th></th></lod<></lod 	124	78	
6	<lod <lod< th=""><th><lod <lod< th=""><th>291</th><th>173</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>291</th><th>173</th><th></th></lod<></lod 	291	173	
7	<lod <lod< th=""><th><lod <lod< th=""><th>30</th><th><lod< th=""><th></th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>30</th><th><lod< th=""><th></th></lod<></th></lod<></lod 	30	<lod< th=""><th></th></lod<>	
8	<lod <lod< th=""><th><lod <lod< th=""><th>27</th><th><lod <lod< th=""><th>Spot Check Cell E</th></lod<></lod </th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>27</th><th><lod <lod< th=""><th>Spot Check Cell E</th></lod<></lod </th></lod<></lod 	27	<lod <lod< th=""><th>Spot Check Cell E</th></lod<></lod 	Spot Check Cell E
9	<lod< th=""><th><lod <lod< th=""><th>30</th><th><lod <lod< th=""><th>Opot Officer Octi L</th></lod<></lod </th></lod<></lod </th></lod<>	<lod <lod< th=""><th>30</th><th><lod <lod< th=""><th>Opot Officer Octi L</th></lod<></lod </th></lod<></lod 	30	<lod <lod< th=""><th>Opot Officer Octi L</th></lod<></lod 	Opot Officer Octi L
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11	<lod <lod< th=""><th><lod <lod< th=""><th>62</th><th>18</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>62</th><th>18</th><th></th></lod<></lod 	62	18	
12	<lod <lod< th=""><th><lod <lod< th=""><th>157</th><th>128</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>157</th><th>128</th><th></th></lod<></lod 	157	128	
13	<lod <lod< th=""><th><lod <lod< th=""><th>69</th><th>13</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>69</th><th>13</th><th></th></lod<></lod 	69	13	
14	<lod <lod< th=""><th><lod <lod< th=""><th>31</th><th>14</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>31</th><th>14</th><th></th></lod<></lod 	31	14	
15	<lod <lod< th=""><th><lod <lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></lod 	32	<lod< th=""><th></th></lod<>	
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18	<lod <lod< th=""><th><lod <lod< th=""><th>46</th><th>40</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>46</th><th>40</th><th></th></lod<></lod 	46	40	
19	<lod <lod< th=""><th><lod <lod< th=""><th>143</th><th>89</th><th>E/190R</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>143</th><th>89</th><th>E/190R</th></lod<></lod 	143	89	E/190R
20	<lod< th=""><th><lod< th=""><th>117</th><th>37</th><th>L/10010</th></lod<></th></lod<>	<lod< th=""><th>117</th><th>37</th><th>L/10010</th></lod<>	117	37	L/10010
21	<lod< th=""><th><lod< th=""><th>55</th><th>35</th><th>CFC/1</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>35</th><th>CFC/1</th></lod<>	55	35	CFC/1
22	<lod< th=""><th><lod< th=""><th>68</th><th>21</th><th>CFC/2</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>21</th><th>CFC/2</th></lod<>	68	21	CFC/2
23	<lod< th=""><th><lod< th=""><th>55</th><th>25</th><th>CFC/3</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>25</th><th>CFC/3</th></lod<>	55	25	CFC/3
24	<lod< th=""><th><lod< th=""><th>114</th><th>31</th><th>CFC/4</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>31</th><th>CFC/4</th></lod<>	114	31	CFC/4
25	<lod< th=""><th><lod< th=""><th>48</th><th>39</th><th>CFC/5</th></lod<></th></lod<>	<lod< th=""><th>48</th><th>39</th><th>CFC/5</th></lod<>	48	39	CFC/5
26	<lod< th=""><th><lod< th=""><th>59</th><th>26</th><th>CFC/6</th></lod<></th></lod<>	<lod< th=""><th>59</th><th>26</th><th>CFC/6</th></lod<>	59	26	CFC/6
27	\LOD	\LOD		disation	01 0/0
28	<lod< th=""><th><lod< th=""><th>57</th><th>138</th><th>CFC/7</th></lod<></th></lod<>	<lod< th=""><th>57</th><th>138</th><th>CFC/7</th></lod<>	57	138	CFC/7
29	<lod< th=""><th><lod< th=""><th>78</th><th>37</th><th>CFC/8</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>37</th><th>CFC/8</th></lod<>	78	37	CFC/8
30	<lod< th=""><th><lod< th=""><th>56</th><th>103</th><th>CFC/9</th></lod<></th></lod<>	<lod< th=""><th>56</th><th>103</th><th>CFC/9</th></lod<>	56	103	CFC/9
31	<lod< th=""><th><lod< th=""><th>72</th><th>34</th><th>CFC/10</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>34</th><th>CFC/10</th></lod<>	72	34	CFC/10
32	<lod< th=""><th><lod< th=""><th>76</th><th>48</th><th>CFC/11</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>48</th><th>CFC/11</th></lod<>	76	48	CFC/11
33	<lod< th=""><th><lod< th=""><th>42</th><th>26</th><th>CFC/12</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>26</th><th>CFC/12</th></lod<>	42	26	CFC/12
34	<lod< th=""><th><lod< th=""><th>49</th><th>30</th><th>CFC/13</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>30</th><th>CFC/13</th></lod<>	49	30	CFC/13
35	<lod< th=""><th><lod< th=""><th>57</th><th>22</th><th>CFC/14</th></lod<></th></lod<>	<lod< th=""><th>57</th><th>22</th><th>CFC/14</th></lod<>	57	22	CFC/14
36	<lod< th=""><th><lod< th=""><th>70</th><th>33</th><th>CFC/15</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>33</th><th>CFC/15</th></lod<>	70	33	CFC/15
37	<lod< th=""><th><lod< th=""><th>61</th><th>19</th><th>CFC/16</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>19</th><th>CFC/16</th></lod<>	61	19	CFC/16
38	<lod< th=""><th><lod< th=""><th>46</th><th>21</th><th>CFC/17</th></lod<></th></lod<>	<lod< th=""><th>46</th><th>21</th><th>CFC/17</th></lod<>	46	21	CFC/17
39	<lod< th=""><th><lod< th=""><th>79</th><th>36</th><th>CFC/18</th></lod<></th></lod<>	<lod< th=""><th>79</th><th>36</th><th>CFC/18</th></lod<>	79	36	CFC/18
40	<lod< th=""><th><lod< th=""><th>64</th><th>27</th><th>CFC/19</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>27</th><th>CFC/19</th></lod<>	64	27	CFC/19
41			Standar	disation	
42	<lod< th=""><th><lod< th=""><th>41</th><th>31</th><th>CFC/20</th></lod<></th></lod<>	<lod< th=""><th>41</th><th>31</th><th>CFC/20</th></lod<>	41	31	CFC/20
43	<lod< th=""><th><lod< th=""><th>36</th><th>16</th><th>CFC/21</th></lod<></th></lod<>	<lod< th=""><th>36</th><th>16</th><th>CFC/21</th></lod<>	36	16	CFC/21
44	<lod< th=""><th><lod< th=""><th>46</th><th>21</th><th>CFC/22</th></lod<></th></lod<>	<lod< th=""><th>46</th><th>21</th><th>CFC/22</th></lod<>	46	21	CFC/22
45	<lod< th=""><th><lod< th=""><th>52</th><th>36</th><th>CFC/23</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>36</th><th>CFC/23</th></lod<>	52	36	CFC/23
46	<lod< th=""><th><lod< th=""><th>55</th><th>22</th><th>CFC/24</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>22</th><th>CFC/24</th></lod<>	55	22	CFC/24
47	<lod< th=""><th><lod< th=""><th>42</th><th>21</th><th>CFC/25</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>21</th><th>CFC/25</th></lod<>	42	21	CFC/25
48	<lod< th=""><th><lod< th=""><th>52</th><th>31</th><th>CFC/26</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>31</th><th>CFC/26</th></lod<>	52	31	CFC/26
49	<lod< th=""><th><lod< th=""><th>38</th><th>12</th><th>CFC/27</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>12</th><th>CFC/27</th></lod<>	38	12	CFC/27
50				disation	
51			Standar	disation	
52	<lod< th=""><th><lod< th=""><th>43</th><th>36</th><th>CFC/28</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>36</th><th>CFC/28</th></lod<>	43	36	CFC/28
53	<lod< th=""><th><lod< th=""><th>73</th><th>37</th><th>CFC/29</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>37</th><th>CFC/29</th></lod<>	73	37	CFC/29

Validation Lab tested

XRF Data 05 February 2010



Reading	Cr	Cu	Zn	Pb	Description			
1	Standardisation							
2	Standardisation							
3	<lod< th=""><th><lod< th=""><th>68</th><th>81</th><th>CFC/30</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>81</th><th>CFC/30</th></lod<>	68	81	CFC/30			
4	<lod< th=""><th><lod< th=""><th>63</th><th>23</th><th>CFC/31</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>23</th><th>CFC/31</th></lod<>	63	23	CFC/31			
5	<lod< th=""><th><lod< th=""><th>76</th><th>31</th><th>CFC/32</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>31</th><th>CFC/32</th></lod<>	76	31	CFC/32			
6	<lod< th=""><th><lod< th=""><th>64</th><th>27</th><th>CFC/33</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>27</th><th>CFC/33</th></lod<>	64	27	CFC/33			
7	<lod< th=""><th><lod< th=""><th>53</th><th>29</th><th>CFC/34</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>29</th><th>CFC/34</th></lod<>	53	29	CFC/34			
8	<lod< th=""><th><lod< th=""><th>51</th><th>22</th><th>CFC/35</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>22</th><th>CFC/35</th></lod<>	51	22	CFC/35			
9	<lod< th=""><th>36</th><th>65</th><th>31</th><th>CFC/36</th></lod<>	36	65	31	CFC/36			
10	<lod< th=""><th><lod< th=""><th>60</th><th>34</th><th>CFC/37</th></lod<></th></lod<>	<lod< th=""><th>60</th><th>34</th><th>CFC/37</th></lod<>	60	34	CFC/37			
11	<lod< th=""><th><lod< th=""><th>37</th><th>18</th><th>CFC/38</th></lod<></th></lod<>	<lod< th=""><th>37</th><th>18</th><th>CFC/38</th></lod<>	37	18	CFC/38			
12	<lod< th=""><th><lod< th=""><th>46</th><th>26</th><th>CFC/39</th></lod<></th></lod<>	<lod< th=""><th>46</th><th>26</th><th>CFC/39</th></lod<>	46	26	CFC/39			
13	<lod< th=""><th><lod< th=""><th>63</th><th>26</th><th>CFC/40</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>26</th><th>CFC/40</th></lod<>	63	26	CFC/40			
14	<lod< th=""><th><lod< th=""><th>52</th><th>24</th><th>CFC/41</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>24</th><th>CFC/41</th></lod<>	52	24	CFC/41			
15	<lod< th=""><th><lod< th=""><th>64</th><th>35</th><th>CFC/42</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>35</th><th>CFC/42</th></lod<>	64	35	CFC/42			
16	<lod< th=""><th><lod< th=""><th>50</th><th>17</th><th>CFC/43</th></lod<></th></lod<>	<lod< th=""><th>50</th><th>17</th><th>CFC/43</th></lod<>	50	17	CFC/43			
17	<lod< th=""><th><lod< th=""><th>88</th><th>77</th><th>Didn't go to tip</th></lod<></th></lod<>	<lod< th=""><th>88</th><th>77</th><th>Didn't go to tip</th></lod<>	88	77	Didn't go to tip			
18	<lod< th=""><th><lod< th=""><th>62</th><th>27</th><th>CFC/45</th></lod<></th></lod<>	<lod< th=""><th>62</th><th>27</th><th>CFC/45</th></lod<>	62	27	CFC/45			
19	<lod< th=""><th><lod< th=""><th>51</th><th>39</th><th>CFC/46</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>39</th><th>CFC/46</th></lod<>	51	39	CFC/46			
20	<lod< th=""><th><lod< th=""><th>53</th><th>38</th><th>CFC/47</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>38</th><th>CFC/47</th></lod<>	53	38	CFC/47			
21	<lod< th=""><th><lod< th=""><th>42</th><th>32</th><th>CFC/48</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>32</th><th>CFC/48</th></lod<>	42	32	CFC/48			
22				disation				
23	<lod< th=""><th><lod< th=""><th>74</th><th>30</th><th>CFC/49</th></lod<></th></lod<>	<lod< th=""><th>74</th><th>30</th><th>CFC/49</th></lod<>	74	30	CFC/49			
24	<lod< th=""><th><lod< th=""><th>70</th><th>34</th><th>CFC/50</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>34</th><th>CFC/50</th></lod<>	70	34	CFC/50			
25	<lod< th=""><th><lod< th=""><th>77</th><th>46</th><th>CFC/51</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>46</th><th>CFC/51</th></lod<>	77	46	CFC/51			
26				disation				
27	<lod< th=""><th><lod< th=""><th>58</th><th>20</th><th>CFC/52</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>20</th><th>CFC/52</th></lod<>	58	20	CFC/52			
28	<lod< th=""><th><lod< th=""><th>39</th><th>23</th><th>CFC/53</th></lod<></th></lod<>	<lod< th=""><th>39</th><th>23</th><th>CFC/53</th></lod<>	39	23	CFC/53			
29	<lod< th=""><th><lod< th=""><th>49</th><th>23</th><th>CFC/54</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>23</th><th>CFC/54</th></lod<>	49	23	CFC/54			
30	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>Peat layer in stream</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>Peat layer in stream</th></lod<></th></lod<>	36	<lod< th=""><th>Peat layer in stream</th></lod<>	Peat layer in stream			
31	<lod< th=""><th><lod< th=""><th>61</th><th>56</th><th>CFC/55</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>56</th><th>CFC/55</th></lod<>	61	56	CFC/55			
32	<lod< th=""><th><lod< th=""><th>53</th><th>26</th><th>CFC/56</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>26</th><th>CFC/56</th></lod<>	53	26	CFC/56			
33	<lod< th=""><th><lod< th=""><th>55</th><th>17</th><th>CFC/57</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>17</th><th>CFC/57</th></lod<>	55	17	CFC/57			
34 35	<lod< th=""><th><lod< th=""><th>72 65</th><th>40 39</th><th>CFC/58</th></lod<></th></lod<>	<lod< th=""><th>72 65</th><th>40 39</th><th>CFC/58</th></lod<>	72 65	40 39	CFC/58			
	<lod< th=""><th><lod< th=""><th>65</th><th></th><th>CFC/59</th></lod<></th></lod<>	<lod< th=""><th>65</th><th></th><th>CFC/59</th></lod<>	65		CFC/59			
36	<lod< th=""><th><lod< th=""><th>41</th><th>21</th><th>CFC/60</th></lod<></th></lod<>	<lod< th=""><th>41</th><th>21</th><th>CFC/60</th></lod<>	41	21	CFC/60			
37	<lod< th=""><th><lod< th=""><th>94</th><th>34</th><th>CFC/61</th></lod<></th></lod<>	<lod< th=""><th>94</th><th>34</th><th>CFC/61</th></lod<>	94	34	CFC/61			
38 39	<lod< th=""><th><lod <lod< th=""><th>58 43</th><th>33 23</th><th>CFC/62 CFC/63</th></lod<></lod </th></lod<>	<lod <lod< th=""><th>58 43</th><th>33 23</th><th>CFC/62 CFC/63</th></lod<></lod 	58 43	33 23	CFC/62 CFC/63			
40	<lod< th=""><th><lod <lod< th=""><th>76</th><th>34</th><th>CFC/63 CFC/64</th></lod<></lod </th></lod<>	<lod <lod< th=""><th>76</th><th>34</th><th>CFC/63 CFC/64</th></lod<></lod 	76	34	CFC/63 CFC/64			
41	<lod< th=""><th></th><th>55</th><th>25</th><th></th></lod<>		55	25				
41	<lod< th=""><th><lod< th=""><th>43</th><th>19</th><th>CFC/65</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>19</th><th>CFC/65</th></lod<>	43	19	CFC/65			
	<lod< th=""><th><lod< th=""><th></th><th></th><th>CFC/66</th></lod<></th></lod<>	<lod< th=""><th></th><th></th><th>CFC/66</th></lod<>			CFC/66			
43 44	<lod< th=""><th><lod< th=""><th>62 45</th><th>32</th><th>CFC/67</th></lod<></th></lod<>	<lod< th=""><th>62 45</th><th>32</th><th>CFC/67</th></lod<>	62 45	32	CFC/67			
44	<lod< th=""><th><lod< th=""><th>45</th><th>31</th><th>CFC/68</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>31</th><th>CFC/68</th></lod<>	45	31	CFC/68			

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls5 Feb 10

XRF Data 08 February 2010



Reading	Cr	Cu	Zn	Pb	Description
1	O.	J u		disation	Decemption
2	<lod< th=""><th><lod< th=""><th>63</th><th>42</th><th>CFC/69</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>42</th><th>CFC/69</th></lod<>	63	42	CFC/69
3	<lod <lod< th=""><th><lod <lod< th=""><th>67</th><th>42</th><th>CFC/70</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>67</th><th>42</th><th>CFC/70</th></lod<></lod 	67	42	CFC/70
5	<lod< th=""><th><lod< th=""><th>67</th><th>42</th><th>CFC/71</th></lod<></th></lod<>	<lod< th=""><th>67</th><th>42</th><th>CFC/71</th></lod<>	67	42	CFC/71
	<lod< th=""><th><lod< th=""><th>49</th><th>21</th><th>CFC/72</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>21</th><th>CFC/72</th></lod<>	49	21	CFC/72
6	<lod< th=""><th><lod< th=""><th>55</th><th>29</th><th>CFC/73</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>29</th><th>CFC/73</th></lod<>	55	29	CFC/73
7	<lod< th=""><th><lod< th=""><th>63</th><th>36</th><th>CF/E1</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>36</th><th>CF/E1</th></lod<>	63	36	CF/E1
8	<lod< th=""><th><lod< th=""><th>103</th><th>37</th><th>CF/E2</th></lod<></th></lod<>	<lod< th=""><th>103</th><th>37</th><th>CF/E2</th></lod<>	103	37	CF/E2
9	<lod< th=""><th><lod< th=""><th>93</th><th>49</th><th>CF/E3</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>49</th><th>CF/E3</th></lod<>	93	49	CF/E3
10	<lod< th=""><th><lod< th=""><th>67</th><th>47</th><th>CF/E4</th></lod<></th></lod<>	<lod< th=""><th>67</th><th>47</th><th>CF/E4</th></lod<>	67	47	CF/E4
11	<lod< th=""><th><lod< th=""><th>137</th><th>53</th><th>CF/E5</th></lod<></th></lod<>	<lod< th=""><th>137</th><th>53</th><th>CF/E5</th></lod<>	137	53	CF/E5
12	<lod< th=""><th><lod< th=""><th>188</th><th>112</th><th>CF/E6</th></lod<></th></lod<>	<lod< th=""><th>188</th><th>112</th><th>CF/E6</th></lod<>	188	112	CF/E6
13	<lod< th=""><th><lod< th=""><th>138</th><th>74</th><th>CF/E7</th></lod<></th></lod<>	<lod< th=""><th>138</th><th>74</th><th>CF/E7</th></lod<>	138	74	CF/E7
14	<lod< th=""><th><lod< th=""><th>390</th><th>45</th><th></th></lod<></th></lod<>	<lod< th=""><th>390</th><th>45</th><th></th></lod<>	390	45	
15	<lod< th=""><th><lod< th=""><th>383</th><th>60</th><th>CF/E8</th></lod<></th></lod<>	<lod< th=""><th>383</th><th>60</th><th>CF/E8</th></lod<>	383	60	CF/E8
16	<lod< th=""><th>37</th><th>309</th><th>41</th><th></th></lod<>	37	309	41	
17	<lod< th=""><th><lod< th=""><th>147</th><th>29</th><th>CF/E9</th></lod<></th></lod<>	<lod< th=""><th>147</th><th>29</th><th>CF/E9</th></lod<>	147	29	CF/E9
18	<lod< th=""><th><lod< th=""><th>431</th><th>44</th><th></th></lod<></th></lod<>	<lod< th=""><th>431</th><th>44</th><th></th></lod<>	431	44	
19	<lod< th=""><th><lod< th=""><th>228</th><th>116</th><th>CF/E10</th></lod<></th></lod<>	<lod< th=""><th>228</th><th>116</th><th>CF/E10</th></lod<>	228	116	CF/E10
20	<lod< th=""><th><lod< th=""><th>273</th><th>132</th><th></th></lod<></th></lod<>	<lod< th=""><th>273</th><th>132</th><th></th></lod<>	273	132	
21	<lod< th=""><th><lod< th=""><th>101</th><th>60</th><th>CF/E11</th></lod<></th></lod<>	<lod< th=""><th>101</th><th>60</th><th>CF/E11</th></lod<>	101	60	CF/E11
22	<lod< th=""><th><lod< th=""><th>53</th><th><lod< th=""><th>CF/E12</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>53</th><th><lod< th=""><th>CF/E12</th></lod<></th></lod<>	53	<lod< th=""><th>CF/E12</th></lod<>	CF/E12
23	<lod< th=""><th><lod< th=""><th>344</th><th>139</th><th></th></lod<></th></lod<>	<lod< th=""><th>344</th><th>139</th><th></th></lod<>	344	139	
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31				disation	
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XRF Data 09 February 2010



Reading	Cr	Cu	Zn	Pb	Description
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7	<lod< th=""><th><lod< th=""><th>68</th><th>45</th><th>CFC/101</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>45</th><th>CFC/101</th></lod<>	68	45	CFC/101
8	<lod< th=""><th><lod< th=""><th>61</th><th>32</th><th>CFC/102</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>32</th><th>CFC/102</th></lod<>	61	32	CFC/102
9	<lod< th=""><th><lod< th=""><th>69</th><th>30</th><th>CFC/103</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>30</th><th>CFC/103</th></lod<>	69	30	CFC/103
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17				disation	
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27	365	36	193	97	
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J 1	\LUD	\LOD	120	UI	01 0/142

XRF Data 10 February 2010



Reading	Cr	Cu	Zn	Pb	Description
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3	<lod< th=""><th><lod< th=""><th>95</th><th>69</th><th>CFC/144</th></lod<></th></lod<>	<lod< th=""><th>95</th><th>69</th><th>CFC/144</th></lod<>	95	69	CFC/144
4	<lod< th=""><th><lod< th=""><th>112</th><th>82</th><th>CFC/145</th></lod<></th></lod<>	<lod< th=""><th>112</th><th>82</th><th>CFC/145</th></lod<>	112	82	CFC/145
5	<lod< th=""><th><lod< th=""><th>103</th><th>119</th><th>CFC/146</th></lod<></th></lod<>	<lod< th=""><th>103</th><th>119</th><th>CFC/146</th></lod<>	103	119	CFC/146
6	<lod< th=""><th><lod< th=""><th>106</th><th>76</th><th>CFC/147</th></lod<></th></lod<>	<lod< th=""><th>106</th><th>76</th><th>CFC/147</th></lod<>	106	76	CFC/147
7	<lod< th=""><th><lod< th=""><th>94</th><th>71</th><th>CFC/148</th></lod<></th></lod<>	<lod< th=""><th>94</th><th>71</th><th>CFC/148</th></lod<>	94	71	CFC/148
8	<lod< th=""><th><lod< th=""><th>197</th><th>84</th><th>CFC/149</th></lod<></th></lod<>	<lod< th=""><th>197</th><th>84</th><th>CFC/149</th></lod<>	197	84	CFC/149
9	<lod< th=""><th><lod< th=""><th>86</th><th>62</th><th>CFC/150</th></lod<></th></lod<>	<lod< th=""><th>86</th><th>62</th><th>CFC/150</th></lod<>	86	62	CFC/150
10	<lod< th=""><th><lod< th=""><th>101</th><th>63</th><th>CFC/151</th></lod<></th></lod<>	<lod< th=""><th>101</th><th>63</th><th>CFC/151</th></lod<>	101	63	CFC/151
11	<lod< th=""><th><lod< th=""><th>148</th><th>64</th><th>CFC/152</th></lod<></th></lod<>	<lod< th=""><th>148</th><th>64</th><th>CFC/152</th></lod<>	148	64	CFC/152
12	<lod< th=""><th><lod< th=""><th>124</th><th>80</th><th>CFC/153</th></lod<></th></lod<>	<lod< th=""><th>124</th><th>80</th><th>CFC/153</th></lod<>	124	80	CFC/153
13	<lod< th=""><th><lod< th=""><th>186</th><th>61</th><th>CFC/154</th></lod<></th></lod<>	<lod< th=""><th>186</th><th>61</th><th>CFC/154</th></lod<>	186	61	CFC/154
14	<lod< th=""><th><lod< th=""><th>229</th><th>78</th><th>CFC/155</th></lod<></th></lod<>	<lod< th=""><th>229</th><th>78</th><th>CFC/155</th></lod<>	229	78	CFC/155
15	<lod< th=""><th><lod< th=""><th>176</th><th>60</th><th>CFC/156</th></lod<></th></lod<>	<lod< th=""><th>176</th><th>60</th><th>CFC/156</th></lod<>	176	60	CFC/156
16	<lod< th=""><th><lod< th=""><th>133</th><th>35</th><th>CFC/157</th></lod<></th></lod<>	<lod< th=""><th>133</th><th>35</th><th>CFC/157</th></lod<>	133	35	CFC/157
17	<lod< th=""><th><lod< th=""><th>80</th><th>36</th><th>CFC/158</th></lod<></th></lod<>	<lod< th=""><th>80</th><th>36</th><th>CFC/158</th></lod<>	80	36	CFC/158
18	<lod< th=""><th><lod< th=""><th>147</th><th>108</th><th>CFC/159</th></lod<></th></lod<>	<lod< th=""><th>147</th><th>108</th><th>CFC/159</th></lod<>	147	108	CFC/159
19	<lod< th=""><th><lod< th=""><th>104</th><th>71</th><th>CFC/160</th></lod<></th></lod<>	<lod< th=""><th>104</th><th>71</th><th>CFC/160</th></lod<>	104	71	CFC/160
20	<lod< th=""><th><lod< th=""><th>138</th><th>56</th><th>CFC/161</th></lod<></th></lod<>	<lod< th=""><th>138</th><th>56</th><th>CFC/161</th></lod<>	138	56	CFC/161
21	<lod< th=""><th><lod< th=""><th>168</th><th>114</th><th>CFC/162</th></lod<></th></lod<>	<lod< th=""><th>168</th><th>114</th><th>CFC/162</th></lod<>	168	114	CFC/162
22	<lod< th=""><th>46</th><th>126</th><th>129</th><th>CFC/163</th></lod<>	46	126	129	CFC/163
23	<lod< th=""><th><lod< th=""><th>172</th><th>93</th><th></th></lod<></th></lod<>	<lod< th=""><th>172</th><th>93</th><th></th></lod<>	172	93	
24	<lod< th=""><th><lod< th=""><th>257</th><th>155</th><th></th></lod<></th></lod<>	<lod< th=""><th>257</th><th>155</th><th></th></lod<>	257	155	
25	<lod< th=""><th>59</th><th>163</th><th>87</th><th></th></lod<>	59	163	87	
26	324	<lod< th=""><th>279</th><th>172</th><th></th></lod<>	279	172	
27	<lod< th=""><th><lod< th=""><th>69</th><th>51</th><th>CF/E19</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>51</th><th>CF/E19</th></lod<>	69	51	CF/E19
28				disation	
29	<lod< th=""><th><lod< th=""><th>93</th><th>78</th><th>CF/E20</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>78</th><th>CF/E20</th></lod<>	93	78	CF/E20
30	<lod< th=""><th><lod< th=""><th>100</th><th>73</th><th>CF/E21</th></lod<></th></lod<>	<lod< th=""><th>100</th><th>73</th><th>CF/E21</th></lod<>	100	73	CF/E21

XRF Data 11 February 2010



Reading	Cr	Cu	Zn	Pb	Description
1	Standardisation				
2	<lod< th=""><th><lod< th=""><th>93</th><th>74</th><th>CF/E22</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>74</th><th>CF/E22</th></lod<>	93	74	CF/E22
3	<lod< th=""><th><lod< th=""><th>137</th><th>107</th><th>CF/E23</th></lod<></th></lod<>	<lod< th=""><th>137</th><th>107</th><th>CF/E23</th></lod<>	137	107	CF/E23
4	<lod< th=""><th><lod< th=""><th>143</th><th>80</th><th>CF/E24</th></lod<></th></lod<>	<lod< th=""><th>143</th><th>80</th><th>CF/E24</th></lod<>	143	80	CF/E24
5	<lod< th=""><th>38</th><th>101</th><th>95</th><th>CF/E25</th></lod<>	38	101	95	CF/E25
6	<lod< th=""><th><lod< th=""><th>51</th><th>35</th><th>CF/E26</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>35</th><th>CF/E26</th></lod<>	51	35	CF/E26
7	<lod< th=""><th><lod< th=""><th>169</th><th>146</th><th>CF/E27</th></lod<></th></lod<>	<lod< th=""><th>169</th><th>146</th><th>CF/E27</th></lod<>	169	146	CF/E27
8	<lod< th=""><th><lod< th=""><th>155</th><th>174</th><th>CF/E28</th></lod<></th></lod<>	<lod< th=""><th>155</th><th>174</th><th>CF/E28</th></lod<>	155	174	CF/E28
9	<lod< th=""><th><lod< th=""><th>203</th><th>152</th><th>CF/E29</th></lod<></th></lod<>	<lod< th=""><th>203</th><th>152</th><th>CF/E29</th></lod<>	203	152	CF/E29
10	<lod< th=""><th><lod< th=""><th>32</th><th>13</th><th>CF/E30</th></lod<></th></lod<>	<lod< th=""><th>32</th><th>13</th><th>CF/E30</th></lod<>	32	13	CF/E30
11	<lod< th=""><th><lod< th=""><th>174</th><th>148</th><th>CF/E31</th></lod<></th></lod<>	<lod< th=""><th>174</th><th>148</th><th>CF/E31</th></lod<>	174	148	CF/E31
12	<lod< th=""><th><lod< th=""><th>92</th><th>57</th><th>CF/E32</th></lod<></th></lod<>	<lod< th=""><th>92</th><th>57</th><th>CF/E32</th></lod<>	92	57	CF/E32
13	Standardisation				
14	Standardisation				
15	<lod< th=""><th><lod< th=""><th>132</th><th>116</th><th>CF/E33</th></lod<></th></lod<>	<lod< th=""><th>132</th><th>116</th><th>CF/E33</th></lod<>	132	116	CF/E33
16	<lod< th=""><th><lod< th=""><th>134</th><th>106</th><th>CF/E34</th></lod<></th></lod<>	<lod< th=""><th>134</th><th>106</th><th>CF/E34</th></lod<>	134	106	CF/E34
17	<lod< th=""><th><lod< th=""><th>146</th><th>433</th><th rowspan="2">CF/E35</th></lod<></th></lod<>	<lod< th=""><th>146</th><th>433</th><th rowspan="2">CF/E35</th></lod<>	146	433	CF/E35
18	<lod< th=""><th><lod< th=""><th>113</th><th>79</th></lod<></th></lod<>	<lod< th=""><th>113</th><th>79</th></lod<>	113	79	
19	<lod< th=""><th>45</th><th>107</th><th>84</th><th>CF/E36</th></lod<>	45	107	84	CF/E36
20	Standardisation				
21	<lod< th=""><th><lod< th=""><th>227</th><th>121</th><th>CF/E37</th></lod<></th></lod<>	<lod< th=""><th>227</th><th>121</th><th>CF/E37</th></lod<>	227	121	CF/E37
22	<lod< th=""><th><lod< th=""><th>132</th><th>128</th><th>CF/E38</th></lod<></th></lod<>	<lod< th=""><th>132</th><th>128</th><th>CF/E38</th></lod<>	132	128	CF/E38
23	<lod< th=""><th><lod< th=""><th>161</th><th>115</th><th>CF/E39</th></lod<></th></lod<>	<lod< th=""><th>161</th><th>115</th><th>CF/E39</th></lod<>	161	115	CF/E39
24	<lod< th=""><th><lod< th=""><th>133</th><th>104</th><th>CF/E40</th></lod<></th></lod<>	<lod< th=""><th>133</th><th>104</th><th>CF/E40</th></lod<>	133	104	CF/E40
25	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th>Error</th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th>Error</th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>Error</th></lod<></th></lod<>	<lod< th=""><th>Error</th></lod<>	Error
26	<lod< th=""><th><lod< th=""><th>77</th><th>50</th><th>CF/E41</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>50</th><th>CF/E41</th></lod<>	77	50	CF/E41
27	<lod< th=""><th><lod< th=""><th>110</th><th>64</th><th>CF/E42</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>64</th><th>CF/E42</th></lod<>	110	64	CF/E42
28	<lod< th=""><th><lod< th=""><th>206</th><th>236</th><th rowspan="2">CF/E43</th></lod<></th></lod<>	<lod< th=""><th>206</th><th>236</th><th rowspan="2">CF/E43</th></lod<>	206	236	CF/E43
29	<lod< th=""><th><lod< th=""><th>126</th><th>110</th></lod<></th></lod<>	<lod< th=""><th>126</th><th>110</th></lod<>	126	110	
30	<lod< th=""><th><lod< th=""><th>182</th><th>140</th><th>CF/E44</th></lod<></th></lod<>	<lod< th=""><th>182</th><th>140</th><th>CF/E44</th></lod<>	182	140	CF/E44
31	<lod< th=""><th><lod< th=""><th>148</th><th>166</th><th>CF/E45</th></lod<></th></lod<>	<lod< th=""><th>148</th><th>166</th><th>CF/E45</th></lod<>	148	166	CF/E45
32	<lod< th=""><th><lod< th=""><th>140</th><th>133</th><th>CF/E46</th></lod<></th></lod<>	<lod< th=""><th>140</th><th>133</th><th>CF/E46</th></lod<>	140	133	CF/E46
33	<lod< th=""><th><lod< th=""><th>254</th><th>179</th><th>CF/E48</th></lod<></th></lod<>	<lod< th=""><th>254</th><th>179</th><th>CF/E48</th></lod<>	254	179	CF/E48
34	<lod< th=""><th><lod< th=""><th>174</th><th>193</th><th>01/270</th></lod<></th></lod<>	<lod< th=""><th>174</th><th>193</th><th>01/270</th></lod<>	174	193	01/270
35	<lod< th=""><th><lod< th=""><th>148</th><th>207</th><th>CF/E47</th></lod<></th></lod<>	<lod< th=""><th>148</th><th>207</th><th>CF/E47</th></lod<>	148	207	CF/E47
36	<lod< th=""><th><lod< th=""><th>178</th><th>151</th><th>017247</th></lod<></th></lod<>	<lod< th=""><th>178</th><th>151</th><th>017247</th></lod<>	178	151	017247

Lab tested

CLIENT: CPG New Zealand Ltd

PROEJCT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls11 Feb 10

XRF Data 12 February 2010



Reading	Cr	Cu	Zn	Pb	Description	
1			Standar	disation		
2	177	<lod< th=""><th>301</th><th>233</th><th>CF/E49</th></lod<>	301	233	CF/E49	
3	<lod< th=""><th><lod< th=""><th>149</th><th>126</th><th>GF/E49</th></lod<></th></lod<>	<lod< th=""><th>149</th><th>126</th><th>GF/E49</th></lod<>	149	126	GF/E49	
4	<lod< th=""><th><lod< th=""><th>154</th><th>106</th><th>CF/E50</th></lod<></th></lod<>	<lod< th=""><th>154</th><th>106</th><th>CF/E50</th></lod<>	154	106	CF/E50	
5	<lod< th=""><th><lod< th=""><th>121</th><th>88</th><th>CF/E51</th></lod<></th></lod<>	<lod< th=""><th>121</th><th>88</th><th>CF/E51</th></lod<>	121	88	CF/E51	
6	<lod< th=""><th><lod< th=""><th>131</th><th>104</th><th>CF/E52</th></lod<></th></lod<>	<lod< th=""><th>131</th><th>104</th><th>CF/E52</th></lod<>	131	104	CF/E52	
7	<lod< th=""><th><lod< th=""><th>208</th><th>200</th><th>CF/E53</th></lod<></th></lod<>	<lod< th=""><th>208</th><th>200</th><th>CF/E53</th></lod<>	208	200	CF/E53	
8	<lod< th=""><th><lod< th=""><th>114</th><th>94</th><th>CF/E55</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>94</th><th>CF/E55</th></lod<>	114	94	CF/E55	
9	<lod< th=""><th><lod< th=""><th>140</th><th>116</th><th>CF/E54</th></lod<></th></lod<>	<lod< th=""><th>140</th><th>116</th><th>CF/E54</th></lod<>	140	116	CF/E54	
10	<lod< th=""><th><lod< th=""><th>66</th><th>67</th><th>CF/E55</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>67</th><th>CF/E55</th></lod<>	66	67	CF/E55	
11	<lod< th=""><th><lod< th=""><th>84</th><th>75</th><th>CF/E56</th></lod<></th></lod<>	<lod< th=""><th>84</th><th>75</th><th>CF/E56</th></lod<>	84	75	CF/E56	
12			Standar	disation		
13	<lod< th=""><th><lod< th=""><th>72</th><th>79</th><th>CF/E57</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>79</th><th>CF/E57</th></lod<>	72	79	CF/E57	
14	<lod< th=""><th><lod< th=""><th>68</th><th>90</th><th>CF/E58</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>90</th><th>CF/E58</th></lod<>	68	90	CF/E58	
15	<lod< th=""><th><lod< th=""><th>138</th><th>84</th><th>CF/E59</th></lod<></th></lod<>	<lod< th=""><th>138</th><th>84</th><th>CF/E59</th></lod<>	138	84	CF/E59	
16	<lod< th=""><th><lod< th=""><th>125</th><th>86</th><th></th></lod<></th></lod<>	<lod< th=""><th>125</th><th>86</th><th></th></lod<>	125	86		
17	<lod< th=""><th>79</th><th>137</th><th>293</th><th>CF/E60</th></lod<>	79	137	293	CF/E60	
18	<lod< th=""><th>78</th><th>198</th><th>412</th><th></th></lod<>	78	198	412		
19	<lod< th=""><th>237</th><th>208</th><th>328</th><th></th></lod<>	237	208	328		
20	<lod< th=""><th><lod< th=""><th>65</th><th>64</th><th>Unsure what these</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>64</th><th>Unsure what these</th></lod<>	65	64	Unsure what these	
21	<lod< th=""><th>58</th><th>139</th><th>233</th><th>tests were for</th></lod<>	58	139	233	tests were for	
22	<lod< th=""><th><lod< th=""><th>46</th><th><lod< th=""><th>lesis were for</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>46</th><th><lod< th=""><th>lesis were for</th></lod<></th></lod<>	46	<lod< th=""><th>lesis were for</th></lod<>	lesis were for	
23	<lod< th=""><th><lod< th=""><th>46</th><th>21</th><th></th></lod<></th></lod<>	<lod< th=""><th>46</th><th>21</th><th></th></lod<>	46	21		
24	<lod< th=""><th><lod< th=""><th>152</th><th>364</th><th></th></lod<></th></lod<>	<lod< th=""><th>152</th><th>364</th><th></th></lod<>	152	364		
25	<lod< th=""><th><lod< th=""><th>92</th><th>126</th><th>CF/E62</th></lod<></th></lod<>	<lod< th=""><th>92</th><th>126</th><th>CF/E62</th></lod<>	92	126	CF/E62	
26	<lod< th=""><th><lod< th=""><th>314</th><th>143</th><th>CF/E66</th></lod<></th></lod<>	<lod< th=""><th>314</th><th>143</th><th>CF/E66</th></lod<>	314	143	CF/E66	
27	<lod< th=""><th><lod< th=""><th>166</th><th>133</th><th>017200</th></lod<></th></lod<>	<lod< th=""><th>166</th><th>133</th><th>017200</th></lod<>	166	133	017200	
28				disation		
29	<lod< th=""><th><lod< th=""><th>93</th><th>85</th><th>CF/E60</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>85</th><th>CF/E60</th></lod<>	93	85	CF/E60	
30	<lod< th=""><th><lod< th=""><th>139</th><th>100</th><th>CF/E61</th></lod<></th></lod<>	<lod< th=""><th>139</th><th>100</th><th>CF/E61</th></lod<>	139	100	CF/E61	
31	<lod< th=""><th><lod< th=""><th>83</th><th>102</th><th>CF/E63</th></lod<></th></lod<>	<lod< th=""><th>83</th><th>102</th><th>CF/E63</th></lod<>	83	102	CF/E63	
32	<lod< th=""><th><lod< th=""><th>77</th><th>68</th><th>CF/E64</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>68</th><th>CF/E64</th></lod<>	77	68	CF/E64	
33	<lod< th=""><th><lod< th=""><th>192</th><th>175</th><th>CF/E65</th></lod<></th></lod<>	<lod< th=""><th>192</th><th>175</th><th>CF/E65</th></lod<>	192	175	CF/E65	
34	<lod< th=""><th><lod< th=""><th>158</th><th>167</th><th>CF/E67</th></lod<></th></lod<>	<lod< th=""><th>158</th><th>167</th><th>CF/E67</th></lod<>	158	167	CF/E67	
35	198	<lod< th=""><th>272</th><th>631</th><th></th></lod<>	272	631		
36	<lod< th=""><th>37</th><th>176</th><th>183</th><th colspan="2">CF/E68</th></lod<>	37	176	183	CF/E68	
37	<lod< th=""><th><lod< th=""><th>160</th><th>157</th><th></th></lod<></th></lod<>	<lod< th=""><th>160</th><th>157</th><th></th></lod<>	160	157		
38	<lod< th=""><th><lod< th=""><th>53</th><th>61</th><th>CF/E69</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>61</th><th>CF/E69</th></lod<>	53	61	CF/E69	
39	<lod< th=""><th><lod< th=""><th>166</th><th>127</th><th>CF/E70</th></lod<></th></lod<>	<lod< th=""><th>166</th><th>127</th><th>CF/E70</th></lod<>	166	127	CF/E70	

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls12 Feb 10

XRF Data 24 February 2010



Reading	Cr	Cu	Zn	Pb	Description			
1			Standar	disation				
2			Standar	disation				
3			Standar	disation				
4			Standar	disation				
5	<lod< th=""><th><lod< th=""><th>38</th><th>13</th><th></th></lod<></th></lod<>	<lod< th=""><th>38</th><th>13</th><th></th></lod<>	38	13				
6	<lod< th=""><th><lod< th=""><th>103</th><th>53</th><th></th></lod<></th></lod<>	<lod< th=""><th>103</th><th>53</th><th></th></lod<>	103	53				
7	<lod< th=""><th><lod< th=""><th>56</th><th>22</th><th>Spot Check TLB of</th></lod<></th></lod<>	<lod< th=""><th>56</th><th>22</th><th>Spot Check TLB of</th></lod<>	56	22	Spot Check TLB of			
8	<lod< th=""><th>38</th><th>1372</th><th>1494</th><th>Cell F/G</th></lod<>	38	1372	1494	Cell F/G			
9	<lod< th=""><th><lod< th=""><th>303</th><th>186</th><th colspan="4"></th></lod<></th></lod<>	<lod< th=""><th>303</th><th>186</th><th colspan="4"></th></lod<>	303	186				
10	<lod< th=""><th><lod< th=""><th>118</th><th>48</th><th></th></lod<></th></lod<>	<lod< th=""><th>118</th><th>48</th><th></th></lod<>	118	48				

XRF Data 02 March 2010



Reading	Cr	Cu	Zn	Pb	Description		
1		Standardisation					
2	<lod< th=""><th><lod< th=""><th>105</th><th>111</th><th></th></lod<></th></lod<>	<lod< th=""><th>105</th><th>111</th><th></th></lod<>	105	111			
3	<lod< th=""><th><lod< th=""><th>81</th><th>82</th><th>Spot Check Cell F/G</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>82</th><th>Spot Check Cell F/G</th></lod<>	81	82	Spot Check Cell F/G		

XRF Data 09 March 2010



Reading	Cr	Cu	Zn	Pb	Descr	iption	
1			Standar	disation			
2	<lod< th=""><th><lod< th=""><th>487</th><th>303</th><th>ST1</th><th></th></lod<></th></lod<>	<lod< th=""><th>487</th><th>303</th><th>ST1</th><th></th></lod<>	487	303	ST1		
3	<lod< th=""><th><lod< th=""><th>484</th><th>488</th><th>ST2</th><th>ਲ</th></lod<></th></lod<>	<lod< th=""><th>484</th><th>488</th><th>ST2</th><th>ਲ</th></lod<>	484	488	ST2	ਲ	
4	<lod< th=""><th>48</th><th>365</th><th>312</th><th>ST3</th><th>Ë</th></lod<>	48	365	312	ST3	Ë	
5	<lod< th=""><th>57</th><th>338</th><th>220</th><th>ST4</th><th>er</th></lod<>	57	338	220	ST4	er	
6	<lod< th=""><th><lod< th=""><th>126</th><th>80</th><th>ST5</th><th>Shoulder Tria</th></lod<></th></lod<>	<lod< th=""><th>126</th><th>80</th><th>ST5</th><th>Shoulder Tria</th></lod<>	126	80	ST5	Shoulder Tria	
7	<lod< th=""><th><lod< th=""><th>98</th><th>86</th><th>ST6</th><th>ᅌ</th></lod<></th></lod<>	<lod< th=""><th>98</th><th>86</th><th>ST6</th><th>ᅌ</th></lod<>	98	86	ST6	ᅌ	
8	<lod< th=""><th><lod< th=""><th>635</th><th>582</th><th>ST7</th><th></th></lod<></th></lod<>	<lod< th=""><th>635</th><th>582</th><th>ST7</th><th></th></lod<>	635	582	ST7		
9	<lod< th=""><th><lod< th=""><th>140</th><th>105</th><th>ST8</th><th>Cell F/G</th></lod<></th></lod<>	<lod< th=""><th>140</th><th>105</th><th>ST8</th><th>Cell F/G</th></lod<>	140	105	ST8	Cell F/G	
10	<lod< th=""><th>42</th><th>579</th><th>538</th><th>ST9</th><th>□</th></lod<>	42	579	538	ST9	□	
11	<lod< th=""><th><lod< th=""><th>473</th><th>283</th><th>ST10</th><th>O</th></lod<></th></lod<>	<lod< th=""><th>473</th><th>283</th><th>ST10</th><th>O</th></lod<>	473	283	ST10	O	
12	<lod< th=""><th><lod< th=""><th>383</th><th>359</th><th>ST11</th><th></th></lod<></th></lod<>	<lod< th=""><th>383</th><th>359</th><th>ST11</th><th></th></lod<>	383	359	ST11		
13			Standar	disation			
14	<lod< th=""><th><lod< th=""><th>58</th><th>12</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>58</th><th>12</th><th></th><th></th></lod<>	58	12			
15	<lod< th=""><th><lod< th=""><th>105</th><th>34</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>105</th><th>34</th><th></th><th></th></lod<>	105	34			
16	<lod< th=""><th><lod< th=""><th>136</th><th>134</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>136</th><th>134</th><th></th><th></th></lod<>	136	134			
17	<lod< th=""><th><lod< th=""><th>38</th><th>20</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>38</th><th>20</th><th></th><th></th></lod<>	38	20			
18	<lod< th=""><th><lod< th=""><th>43</th><th>12</th><th>Spot Che</th><th>cking Call</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>12</th><th>Spot Che</th><th>cking Call</th></lod<>	43	12	Spot Che	cking Call	
19	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th></th><th>~</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th></th><th>~</th></lod<></th></lod<>	32	<lod< th=""><th></th><th>~</th></lod<>		~	
20	<lod< th=""><th><lod< th=""><th>249</th><th>249</th><th colspan="2" rowspan="2">F/G</th></lod<></th></lod<>	<lod< th=""><th>249</th><th>249</th><th colspan="2" rowspan="2">F/G</th></lod<>	249	249	F/G		
21	<lod< th=""><th><lod< th=""><th>302</th><th>94</th></lod<></th></lod<>	<lod< th=""><th>302</th><th>94</th></lod<>	302	94			
22	<lod< th=""><th><lod< th=""><th>140</th><th>91</th><th colspan="3" rowspan="2"></th></lod<></th></lod<>	<lod< th=""><th>140</th><th>91</th><th colspan="3" rowspan="2"></th></lod<>	140	91			
23	<lod< th=""><th><lod< th=""><th>114</th><th>110</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>110</th></lod<>	114	110			
24	<lod< th=""><th><lod< th=""><th>79</th><th>18</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>79</th><th>18</th><th></th><th></th></lod<>	79	18			

XRF Data 10 March 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	· ·
2	<lod< th=""><th><lod< th=""><th>57</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>57</th><th><lod< th=""><th></th></lod<></th></lod<>	57	<lod< th=""><th></th></lod<>	
3	<lod< th=""><th><lod< th=""><th>37</th><th>20</th><th>Call E/C atacksila to</th></lod<></th></lod<>	<lod< th=""><th>37</th><th>20</th><th>Call E/C atacksila to</th></lod<>	37	20	Call E/C atacksila to
4	<lod< th=""><th><lod< th=""><th>43</th><th>26</th><th>Cell F/G stockpile to</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>26</th><th>Cell F/G stockpile to</th></lod<>	43	26	Cell F/G stockpile to
5	<lod< th=""><th><lod< th=""><th>183</th><th>177</th><th>go in around sewer</th></lod<></th></lod<>	<lod< th=""><th>183</th><th>177</th><th>go in around sewer</th></lod<>	183	177	go in around sewer
6	<lod< th=""><th><lod< th=""><th>151</th><th>117</th><th>crossing spot scheck</th></lod<></th></lod<>	<lod< th=""><th>151</th><th>117</th><th>crossing spot scheck</th></lod<>	151	117	crossing spot scheck
7	<lod< th=""><th><lod< th=""><th>72</th><th>40</th><th></th></lod<></th></lod<>	<lod< th=""><th>72</th><th>40</th><th></th></lod<>	72	40	
8	<lod< th=""><th><lod< th=""><th>86</th><th><lod< th=""><th>Cell F/G spot check</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>86</th><th><lod< th=""><th>Cell F/G spot check</th></lod<></th></lod<>	86	<lod< th=""><th>Cell F/G spot check</th></lod<>	Cell F/G spot check
9	<lod< th=""><th><lod< th=""><th>110</th><th>20</th><th>Cell F/G spot check</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>20</th><th>Cell F/G spot check</th></lod<>	110	20	Cell F/G spot check
10	<lod< th=""><th><lod< th=""><th>55</th><th><lod< th=""><th>FG/10L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>55</th><th><lod< th=""><th>FG/10L</th></lod<></th></lod<>	55	<lod< th=""><th>FG/10L</th></lod<>	FG/10L
11	<lod< th=""><th><lod< th=""><th>25</th><th><lod< th=""><th>FG/10M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>25</th><th><lod< th=""><th>FG/10M</th></lod<></th></lod<>	25	<lod< th=""><th>FG/10M</th></lod<>	FG/10M
12	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th>FG/30L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th>FG/30L</th></lod<></th></lod<>	38	<lod< th=""><th>FG/30L</th></lod<>	FG/30L
13	<lod< th=""><th><lod< th=""><th>83</th><th>12</th><th>FG/30M</th></lod<></th></lod<>	<lod< th=""><th>83</th><th>12</th><th>FG/30M</th></lod<>	83	12	FG/30M
14	<lod< th=""><th><lod< th=""><th>55</th><th>20</th><th>FG/30R</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>20</th><th>FG/30R</th></lod<>	55	20	FG/30R
15	<lod< th=""><th><lod< th=""><th>44</th><th><lod< th=""><th>FG/50L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>44</th><th><lod< th=""><th>FG/50L</th></lod<></th></lod<>	44	<lod< th=""><th>FG/50L</th></lod<>	FG/50L
16	<lod< th=""><th><lod< th=""><th>29</th><th><lod< th=""><th>FG/50M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>29</th><th><lod< th=""><th>FG/50M</th></lod<></th></lod<>	29	<lod< th=""><th>FG/50M</th></lod<>	FG/50M
17	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th>FG/70L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th>FG/70L</th></lod<></th></lod<>	38	<lod< th=""><th>FG/70L</th></lod<>	FG/70L
18	<lod< th=""><th><lod< th=""><th>23</th><th>14</th><th>FG/70M</th></lod<></th></lod<>	<lod< th=""><th>23</th><th>14</th><th>FG/70M</th></lod<>	23	14	FG/70M
19	<lod< th=""><th><lod< th=""><th>105</th><th>56</th><th></th></lod<></th></lod<>	<lod< th=""><th>105</th><th>56</th><th></th></lod<>	105	56	
20	<lod< th=""><th><lod< th=""><th>29</th><th>13</th><th>FG/70R</th></lod<></th></lod<>	<lod< th=""><th>29</th><th>13</th><th>FG/70R</th></lod<>	29	13	FG/70R
21	<lod< th=""><th><lod< th=""><th>34</th><th><lod< th=""><th>FG/90L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>34</th><th><lod< th=""><th>FG/90L</th></lod<></th></lod<>	34	<lod< th=""><th>FG/90L</th></lod<>	FG/90L
22	<lod< th=""><th><lod< th=""><th>57</th><th>20</th><th>FG/90M</th></lod<></th></lod<>	<lod< th=""><th>57</th><th>20</th><th>FG/90M</th></lod<>	57	20	FG/90M
23	<lod< th=""><th><lod< th=""><th>72</th><th>31</th><th>FG/90R</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>31</th><th>FG/90R</th></lod<>	72	31	FG/90R
24	<lod< th=""><th><lod< th=""><th>35</th><th><lod< th=""><th>FG/110L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>35</th><th><lod< th=""><th>FG/110L</th></lod<></th></lod<>	35	<lod< th=""><th>FG/110L</th></lod<>	FG/110L
25	<lod< th=""><th><lod< th=""><th>43</th><th>19</th><th>FG/110M</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>19</th><th>FG/110M</th></lod<>	43	19	FG/110M
26	<lod< th=""><th><lod< th=""><th>47</th><th>22</th><th>FG/110R</th></lod<></th></lod<>	<lod< th=""><th>47</th><th>22</th><th>FG/110R</th></lod<>	47	22	FG/110R
27	<lod< th=""><th><lod< th=""><th>44</th><th>34</th><th>Cell F/G spot check</th></lod<></th></lod<>	<lod< th=""><th>44</th><th>34</th><th>Cell F/G spot check</th></lod<>	44	34	Cell F/G spot check
28				rdisation	1
29	<lod< th=""><th><lod< th=""><th>652</th><th>312</th><th></th></lod<></th></lod<>	<lod< th=""><th>652</th><th>312</th><th></th></lod<>	652	312	
30	<lod< th=""><th><lod< th=""><th>75</th><th>28</th><th>0 11 5 60 6 1 1</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>28</th><th>0 11 5 60 6 1 1</th></lod<>	75	28	0 11 5 60 6 1 1
31	<lod< th=""><th><lod< th=""><th>61</th><th>22</th><th>Cell F/G spot check</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>22</th><th>Cell F/G spot check</th></lod<>	61	22	Cell F/G spot check
32	<lod< th=""><th><lod< th=""><th>39</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>39</th><th>20</th><th></th></lod<>	39	20	
33	<lod< th=""><th><lod< th=""><th>75</th><th>29</th><th>FO/450L</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>29</th><th>FO/450L</th></lod<>	75	29	FO/450L
34	<lod< th=""><th><lod< th=""><th>41</th><th><lod< th=""><th>FG/150L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>41</th><th><lod< th=""><th>FG/150L</th></lod<></th></lod<>	41	<lod< th=""><th>FG/150L</th></lod<>	FG/150L
35 36	<lod< th=""><th><lod< th=""><th>79 59</th><th>35 23</th><th>FG/150M</th></lod<></th></lod<>	<lod< th=""><th>79 59</th><th>35 23</th><th>FG/150M</th></lod<>	79 59	35 23	FG/150M
36	<lod <lod< th=""><th><lod< th=""><th></th><th>37</th><th>FG/150R</th></lod<></th></lod<></lod 	<lod< th=""><th></th><th>37</th><th>FG/150R</th></lod<>		37	FG/150R
38	<lod <lod< th=""><th><lod <lod< th=""><th>98 41</th><th>20</th><th>FG/170L</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>98 41</th><th>20</th><th>FG/170L</th></lod<></lod 	98 41	20	FG/170L
39	<lod <lod< th=""><th><lod <lod< th=""><th>71</th><th>30</th><th>FG/170M</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>71</th><th>30</th><th>FG/170M</th></lod<></lod 	71	30	FG/170M
40	<lod <lod< th=""><th><lod <lod< th=""><th>37</th><th>13</th><th>FG/170R FG/190L</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>37</th><th>13</th><th>FG/170R FG/190L</th></lod<></lod 	37	13	FG/170R FG/190L
41	<lod <lod< th=""><th><lod <lod< th=""><th>28</th><th><lod< th=""><th>FG/190L FG/190M</th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>28</th><th><lod< th=""><th>FG/190L FG/190M</th></lod<></th></lod<></lod 	28	<lod< th=""><th>FG/190L FG/190M</th></lod<>	FG/190L FG/190M
42	<lod <lod< th=""><th><lod <lod< th=""><th>84</th><th>54</th><th>FG/190W FG/190R</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>84</th><th>54</th><th>FG/190W FG/190R</th></lod<></lod 	84	54	FG/190W FG/190R
43	\LOD'	\LOD		rdisation	1 0/1901
44	<lod< th=""><th><lod< th=""><th>34</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>34</th><th><lod< th=""><th></th></lod<></th></lod<>	34	<lod< th=""><th></th></lod<>	
44	\LUD	\LUD	J 4	\LUD	

Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls10 Mar 10

XRF Data 11 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Type
1			Standar	disation		
2	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th></th><th></th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th></th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th></th><th></th></lod<></th></lod<>	<lod< th=""><th></th><th></th></lod<>		
3	<lod< th=""><th><lod< th=""><th>19</th><th><lod< th=""><th></th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>19</th><th><lod< th=""><th></th><th></th></lod<></th></lod<>	19	<lod< th=""><th></th><th></th></lod<>		
4			Standar	disation		
5	<lod< th=""><th><lod< th=""><th>314</th><th>192</th><th>CF/FG1</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>314</th><th>192</th><th>CF/FG1</th><th>Α</th></lod<>	314	192	CF/FG1	Α
6	<lod< th=""><th><lod< th=""><th>221</th><th>308</th><th>CF/FG2</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>221</th><th>308</th><th>CF/FG2</th><th>А</th></lod<>	221	308	CF/FG2	А
7	<lod< th=""><th><lod< th=""><th>157</th><th>69</th><th>CF/FG3</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>157</th><th>69</th><th>CF/FG3</th><th>Α</th></lod<>	157	69	CF/FG3	Α
8	<lod< th=""><th><lod< th=""><th>390</th><th>502</th><th>01/1/03</th><th>^</th></lod<></th></lod<>	<lod< th=""><th>390</th><th>502</th><th>01/1/03</th><th>^</th></lod<>	390	502	01/1/03	^
9	<lod< th=""><th><lod< th=""><th>113</th><th>80</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>113</th><th>80</th><th></th><th></th></lod<>	113	80		
10	<lod< th=""><th><lod< th=""><th>88</th><th>46</th><th>CF/FG4</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>88</th><th>46</th><th>CF/FG4</th><th>Α</th></lod<>	88	46	CF/FG4	Α
11	<lod< th=""><th><lod< th=""><th>148</th><th>56</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>148</th><th>56</th><th></th><th></th></lod<>	148	56		
12	<lod< th=""><th>47</th><th>217</th><th>134</th><th>CF/FG5</th><th>А</th></lod<>	47	217	134	CF/FG5	А
13	<lod< th=""><th><lod< th=""><th>166</th><th>45</th><th>01/1/03</th><th>^</th></lod<></th></lod<>	<lod< th=""><th>166</th><th>45</th><th>01/1/03</th><th>^</th></lod<>	166	45	01/1/03	^
14	<lod< th=""><th><lod< th=""><th>144</th><th>36</th><th>CF/FG6</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>144</th><th>36</th><th>CF/FG6</th><th>F</th></lod<>	144	36	CF/FG6	F
15	<lod< th=""><th><lod< th=""><th>328</th><th>187</th><th>CF/FG7</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>328</th><th>187</th><th>CF/FG7</th><th>Α</th></lod<>	328	187	CF/FG7	Α
16	<lod< th=""><th><lod< th=""><th>160</th><th>106</th><th>CF/FG8</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>160</th><th>106</th><th>CF/FG8</th><th>А</th></lod<>	160	106	CF/FG8	А
17			St	andardisati	on	
18	<lod< th=""><th><lod< th=""><th>266</th><th>210</th><th>CF/FG9</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>266</th><th>210</th><th>CF/FG9</th><th>Α</th></lod<>	266	210	CF/FG9	Α
19	<lod< th=""><th><lod< th=""><th>154</th><th>84</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>154</th><th>84</th><th></th><th></th></lod<>	154	84		
20	<lod< th=""><th><lod< th=""><th>173</th><th>61</th><th>CF/FG10</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>173</th><th>61</th><th>CF/FG10</th><th>Α</th></lod<>	173	61	CF/FG10	Α
21	<lod< th=""><th><lod< th=""><th>193</th><th>127</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>193</th><th>127</th><th></th><th></th></lod<>	193	127		
22	<lod< th=""><th>44</th><th>248</th><th>158</th><th>CF/FG11</th><th>Α</th></lod<>	44	248	158	CF/FG11	Α
23	<lod< th=""><th><lod< th=""><th>67</th><th>40</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>67</th><th>40</th><th></th><th></th></lod<>	67	40		
24	<lod< th=""><th><lod< th=""><th>323</th><th>212</th><th>CF/FG12</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>323</th><th>212</th><th>CF/FG12</th><th>Α</th></lod<>	323	212	CF/FG12	Α
25	<lod< th=""><th><lod< th=""><th>161</th><th>57</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>161</th><th>57</th><th></th><th></th></lod<>	161	57		
26	<lod< th=""><th>49</th><th>136</th><th>91</th><th>CF/FG13</th><th>Α</th></lod<>	49	136	91	CF/FG13	Α
27	<lod< th=""><th><lod< th=""><th>250</th><th>66</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>250</th><th>66</th><th></th><th></th></lod<>	250	66		
28	<lod< th=""><th><lod< th=""><th>99</th><th>21</th><th>CF/FG14</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>99</th><th>21</th><th>CF/FG14</th><th>F</th></lod<>	99	21	CF/FG14	F
29	<lod< th=""><th><lod< th=""><th>89</th><th>39</th><th>CF/FG15</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>89</th><th>39</th><th>CF/FG15</th><th>F</th></lod<>	89	39	CF/FG15	F
30	<lod< th=""><th><lod< th=""><th>96</th><th>28</th><th>01/1 010</th><th></th></lod<></th></lod<>	<lod< th=""><th>96</th><th>28</th><th>01/1 010</th><th></th></lod<>	96	28	01/1 010	

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls11 Mar 10

XRF Data 12 March 2010



Dooding	Cr	Cu	Zn	Pb	Description	Tyma
Reading	Cr	Cu			Description	Type
2	1.00	1.00		tandardisati	on I	I
	<lod< th=""><th><lod< th=""><th>250</th><th>118</th><th>CF/FG16</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>250</th><th>118</th><th>CF/FG16</th><th>Α</th></lod<>	250	118	CF/FG16	Α
<u>3</u>	<lod< th=""><th><lod< th=""><th>277</th><th>142</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>277</th><th>142</th><th></th><th></th></lod<>	277	142		
5	<lod< th=""><th><lod< th=""><th>227</th><th>102 112</th><th>CF/FG17</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>227</th><th>102 112</th><th>CF/FG17</th><th>Α</th></lod<>	227	102 112	CF/FG17	Α
6	<lod< th=""><th>41 <lod< th=""><th>213</th><th></th><th></th><th></th></lod<></th></lod<>	41 <lod< th=""><th>213</th><th></th><th></th><th></th></lod<>	213			
7	178 <lod< th=""><th></th><th>329</th><th>185 173</th><th>CF/FG18</th><th>Α</th></lod<>		329	185 173	CF/FG18	Α
8		<lod< th=""><th>359</th><th></th><th></th><th></th></lod<>	359			
9	172 <lod< th=""><th><lod< th=""><th>190 228</th><th>100 110</th><th>CF/FG19</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>190 228</th><th>100 110</th><th>CF/FG19</th><th>A</th></lod<>	190 228	100 110	CF/FG19	A
		<lod< th=""><th></th><th></th><th>CF/FG19</th><th>A</th></lod<>			CF/FG19	A
10	<lod< th=""><th>44</th><th>319</th><th>166</th><th>CE/EC20</th><th>Λ</th></lod<>	44	319	166	CE/EC20	Λ
11	<lod< th=""><th><lod< th=""><th>278</th><th>171</th><th>CF/FG20</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>278</th><th>171</th><th>CF/FG20</th><th>A</th></lod<>	278	171	CF/FG20	A
12	<lod< th=""><th>53</th><th>427</th><th>169</th><th>CF/FG21</th><th>A</th></lod<>	53	427	169	CF/FG21	A
13	<lod< th=""><th>48</th><th>311</th><th>189</th><th>CF/FG22</th><th>А</th></lod<>	48	311	189	CF/FG22	А
14	<lod< th=""><th><lod< th=""><th>187</th><th>96 456</th><th>CF/FG23</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>187</th><th>96 456</th><th>CF/FG23</th><th>Α</th></lod<>	187	96 456	CF/FG23	Α
15	<lod< th=""><th><lod< th=""><th>308</th><th>156</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>308</th><th>156</th><th></th><th></th></lod<>	308	156		
16 17	<lod< th=""><th><lod< th=""><th>108</th><th>56</th><th>CF/FG24</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>108</th><th>56</th><th>CF/FG24</th><th>F</th></lod<>	108	56	CF/FG24	F
	<lod< th=""><th><lod< th=""><th>85</th><th>14</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>85</th><th>14</th><th></th><th></th></lod<>	85	14		
18	<lod< th=""><th><lod< th=""><th>127</th><th>43</th><th>CF/FG25</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>127</th><th>43</th><th>CF/FG25</th><th>Α</th></lod<>	127	43	CF/FG25	Α
19	204	<lod< th=""><th>289</th><th>130</th><th>OF/FOOO</th><th>Λ</th></lod<>	289	130	OF/FOOO	Λ
20	<lod< th=""><th><lod< th=""><th>389</th><th>330</th><th>CF/FG26</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>389</th><th>330</th><th>CF/FG26</th><th>Α</th></lod<>	389	330	CF/FG26	Α
21	<lod <lod< th=""><th><lod <lod< th=""><th>109</th><th>50</th><th>Cnot about of tanget</th><th>Lataokaila</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>109</th><th>50</th><th>Cnot about of tanget</th><th>Lataokaila</th></lod<></lod 	109	50	Cnot about of tanget	Lataokaila
22			202	77	Spot check of topsoi	stockpile
23 24	<lod< th=""><th><lod< th=""><th>86</th><th>34</th><th>05/5007</th><th>Ι Δ</th></lod<></th></lod<>	<lod< th=""><th>86</th><th>34</th><th>05/5007</th><th>Ι Δ</th></lod<>	86	34	05/5007	Ι Δ
	<lod< th=""><th><lod< th=""><th>384</th><th>313</th><th>CF/FG27</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>384</th><th>313</th><th>CF/FG27</th><th>А</th></lod<>	384	313	CF/FG27	А
25	<lod< th=""><th><lod< th=""><th>137</th><th>68</th><th>CF/FG28</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>137</th><th>68</th><th>CF/FG28</th><th>F</th></lod<>	137	68	CF/FG28	F
26	<lod< th=""><th><lod< th=""><th>137</th><th>69</th><th>05/5000</th><th></th></lod<></th></lod<>	<lod< th=""><th>137</th><th>69</th><th>05/5000</th><th></th></lod<>	137	69	05/5000	
27	<lod< th=""><th>44</th><th>320</th><th>169</th><th>CF/FG29</th><th>А</th></lod<>	44	320	169	CF/FG29	А
28	<lod< th=""><th><lod< th=""><th>163</th><th>116</th><th>CF/FG30</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>163</th><th>116</th><th>CF/FG30</th><th>Α</th></lod<>	163	116	CF/FG30	Α
29	<lod <lod< th=""><th><lod< th=""><th>41</th><th>22</th><th>OE/E024</th><th>Λ</th></lod<></th></lod<></lod 	<lod< th=""><th>41</th><th>22</th><th>OE/E024</th><th>Λ</th></lod<>	41	22	OE/E024	Λ
30 31		<lod< th=""><th>208</th><th>145</th><th>CF/FG31</th><th>A</th></lod<>	208	145	CF/FG31	A
32	<lod <lod< th=""><th><lod <lod< th=""><th>109 58</th><th>16 15</th><th></th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>109 58</th><th>16 15</th><th></th><th></th></lod<></lod 	109 58	16 15		
			317	143	CE/EC22	Λ
33 34	<lod< th=""><th><lod< th=""><th></th><th>tandardisati</th><th>CF/FG32</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th></th><th>tandardisati</th><th>CF/FG32</th><th>Α</th></lod<>		tandardisati	CF/FG32	Α
35	<lod< th=""><th><lod< th=""><th>195</th><th>92</th><th>UII </th><th></th></lod<></th></lod<>	<lod< th=""><th>195</th><th>92</th><th>UII </th><th></th></lod<>	195	92	UII 	
36	<lod <lod< th=""><th><lod <lod< th=""><th>200</th><th>92</th><th>CF/FG33</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>200</th><th>92</th><th>CF/FG33</th><th>F</th></lod<></lod 	200	92	CF/FG33	F
37	<lod <lod< th=""><th><lod <lod< th=""><th>500</th><th>376</th><th>CF/FG33 CF/FG34</th><th>A</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>500</th><th>376</th><th>CF/FG33 CF/FG34</th><th>A</th></lod<></lod 	500	376	CF/FG33 CF/FG34	A
38	<lod <lod< th=""><th><lod <lod< th=""><th>116</th><th>27</th><th>OI /I°G34</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>116</th><th>27</th><th>OI /I°G34</th><th></th></lod<></lod 	116	27	OI /I°G34	
39	<lod <lod< th=""><th><lod <lod< th=""><th>117</th><th>45</th><th>CF/FG35</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>117</th><th>45</th><th>CF/FG35</th><th>F</th></lod<></lod 	117	45	CF/FG35	F
40	<lod <lod< th=""><th><lod <lod< th=""><th>105</th><th>43</th><th>01/1/033</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>105</th><th>43</th><th>01/1/033</th><th></th></lod<></lod 	105	43	01/1/033	
41	<lod <lod< th=""><th><lod <lod< th=""><th>143</th><th>54</th><th>CF/FG36</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>143</th><th>54</th><th>CF/FG36</th><th>F</th></lod<></lod 	143	54	CF/FG36	F
42	<lod <lod< th=""><th><lod <lod< th=""><th>70</th><th>23</th><th>01/1 000</th><th> '</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>70</th><th>23</th><th>01/1 000</th><th> '</th></lod<></lod 	70	23	01/1 000	'
43	<lod <lod< th=""><th><lod <lod< th=""><th>284</th><th>182</th><th>CF/FG37</th><th>Λ</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>284</th><th>182</th><th>CF/FG37</th><th>Λ</th></lod<></lod 	284	182	CF/FG37	Λ
43	<lod <lod< th=""><th><lod <lod< th=""><th>50</th><th>14</th><th>CF/FG37 CF/FG38</th><th>A F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>50</th><th>14</th><th>CF/FG37 CF/FG38</th><th>A F</th></lod<></lod 	50	14	CF/FG37 CF/FG38	A F
45	<lod <lod< th=""><th><lod <lod< th=""><th>51</th><th>35</th><th>CF/FG36 CF/FG39</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>51</th><th>35</th><th>CF/FG36 CF/FG39</th><th>F</th></lod<></lod 	51	35	CF/FG36 CF/FG39	F
46	<lod <lod< th=""><th><lod <lod< th=""><th>50</th><th>13</th><th>CF/FG40</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>50</th><th>13</th><th>CF/FG40</th><th>F</th></lod<></lod 	50	13	CF/FG40	F
47	<lod <lod< th=""><th><lod <lod< th=""><th>63</th><th>23</th><th>CF/FG40 CF/FG41</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>63</th><th>23</th><th>CF/FG40 CF/FG41</th><th>F</th></lod<></lod 	63	23	CF/FG40 CF/FG41	F
48	<lod <lod< th=""><th><lod <lod< th=""><th>56</th><th>23</th><th>CF/FG41 CF/FG42</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>56</th><th>23</th><th>CF/FG41 CF/FG42</th><th>F</th></lod<></lod 	56	23	CF/FG41 CF/FG42	F
49	<lod <lod< th=""><th><lod <lod< th=""><th>54</th><th>18</th><th>CF/FG42 CF/FG43</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>54</th><th>18</th><th>CF/FG42 CF/FG43</th><th>F</th></lod<></lod 	54	18	CF/FG42 CF/FG43	F
50	<lod <lod< th=""><th><lod <lod< th=""><th>52</th><th><lod< th=""><th>CF/FG43</th><th>F</th></lod<></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>52</th><th><lod< th=""><th>CF/FG43</th><th>F</th></lod<></th></lod<></lod 	52	<lod< th=""><th>CF/FG43</th><th>F</th></lod<>	CF/FG43	F
51	<lod <lod< th=""><th><lod <lod< th=""><th>409</th><th>87</th><th></th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>409</th><th>87</th><th></th><th></th></lod<></lod 	409	87		
52	<lod <lod< th=""><th><lod <lod< th=""><th>198</th><th>88</th><th>CF/FG45</th><th>Α</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>198</th><th>88</th><th>CF/FG45</th><th>Α</th></lod<></lod 	198	88	CF/FG45	Α
JZ	\LUD	\LOD	130	00		

CLIENT: CPG New Zealand Ltd PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls12 Mar 10

XRF Data 12 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Type
53	<lod< th=""><th><lod< th=""><th>83</th><th>38</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>83</th><th>38</th><th></th><th></th></lod<>	83	38		
54	<lod< th=""><th><lod< th=""><th>116</th><th>62</th><th>Spot check of stock</th><th>pile to be</th></lod<></th></lod<>	<lod< th=""><th>116</th><th>62</th><th>Spot check of stock</th><th>pile to be</th></lod<>	116	62	Spot check of stock	pile to be
55	<lod< th=""><th>111</th><th>701</th><th>669</th><th>used to backfill aroun</th><th>d Cell F/G</th></lod<>	111	701	669	used to backfill aroun	d Cell F/G
56	<lod< th=""><th><lod< th=""><th>184</th><th>163</th><th>water main</th><th></th></lod<></th></lod<>	<lod< th=""><th>184</th><th>163</th><th>water main</th><th></th></lod<>	184	163	water main	
57	<lod< th=""><th><lod< th=""><th>85</th><th>80</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>85</th><th>80</th><th></th><th></th></lod<>	85	80		
58	<lod< th=""><th><lod< th=""><th>116</th><th>33</th><th>CF/FG46</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>116</th><th>33</th><th>CF/FG46</th><th>F</th></lod<>	116	33	CF/FG46	F
59	<lod< th=""><th><lod< th=""><th>85</th><th>29</th><th>CF/FG47</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>85</th><th>29</th><th>CF/FG47</th><th>F</th></lod<>	85	29	CF/FG47	F
60	<lod< th=""><th>41</th><th>93</th><th>37</th><th>CF/FG48</th><th>F</th></lod<>	41	93	37	CF/FG48	F
61	<lod< th=""><th><lod< th=""><th>104</th><th>40</th><th>CF/FG49</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>104</th><th>40</th><th>CF/FG49</th><th>F</th></lod<>	104	40	CF/FG49	F
62	<lod< th=""><th><lod< th=""><th>84</th><th>25</th><th>CF/FG50</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>84</th><th>25</th><th>CF/FG50</th><th>F</th></lod<>	84	25	CF/FG50	F
63			St	andardisati	on	
64	<lod< th=""><th><lod< th=""><th>97</th><th>32</th><th>CF/FG51</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>32</th><th>CF/FG51</th><th>F</th></lod<>	97	32	CF/FG51	F
65	<lod< th=""><th><lod< th=""><th>130</th><th>27</th><th>CF/FG52</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>130</th><th>27</th><th>CF/FG52</th><th>F</th></lod<>	130	27	CF/FG52	F
66	<lod< th=""><th><lod< th=""><th>80</th><th>44</th><th>CF/FG53</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>80</th><th>44</th><th>CF/FG53</th><th>F</th></lod<>	80	44	CF/FG53	F
67	<lod< th=""><th><lod< th=""><th>122</th><th>34</th><th>CF/FG54</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>122</th><th>34</th><th>CF/FG54</th><th>F</th></lod<>	122	34	CF/FG54	F
68	<lod< th=""><th><lod< th=""><th>89</th><th>32</th><th>CF/FG55</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>89</th><th>32</th><th>CF/FG55</th><th>F</th></lod<>	89	32	CF/FG55	F
69	<lod< th=""><th><lod< th=""><th>53</th><th>20</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>53</th><th>20</th><th></th><th></th></lod<>	53	20		

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls12 Mar 10

XRF Data 13 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре
1			Standar	disation		
2			Standar	disation		
3	<lod< th=""><th><lod< th=""><th>102</th><th>25</th><th>CF/FG56 - CF/FG59</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>102</th><th>25</th><th>CF/FG56 - CF/FG59</th><th>F</th></lod<>	102	25	CF/FG56 - CF/FG59	F
4	<lod< th=""><th><lod< th=""><th>57</th><th>15</th><th>CF/FG60</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>57</th><th>15</th><th>CF/FG60</th><th>F</th></lod<>	57	15	CF/FG60	F
5	<lod< th=""><th><lod< th=""><th>65</th><th>30</th><th>CF/FG61</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>30</th><th>CF/FG61</th><th>F</th></lod<>	65	30	CF/FG61	F
6	<lod< th=""><th><lod< th=""><th>170</th><th>105</th><th>CF/FG62</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>170</th><th>105</th><th>CF/FG62</th><th>F</th></lod<>	170	105	CF/FG62	F
7	<lod< th=""><th><lod< th=""><th>82</th><th>23</th><th>CF/FG63</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>23</th><th>CF/FG63</th><th>F</th></lod<>	82	23	CF/FG63	F
8	<lod< th=""><th><lod< th=""><th>119</th><th>58</th><th>CF/FG64</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>58</th><th>CF/FG64</th><th>F</th></lod<>	119	58	CF/FG64	F
9	<lod< th=""><th><lod< th=""><th>261</th><th>79</th><th>CF/FG65</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>261</th><th>79</th><th>CF/FG65</th><th>F</th></lod<>	261	79	CF/FG65	F
10	<lod< th=""><th><lod< th=""><th>38</th><th>13</th><th>CF/FG66</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>13</th><th>CF/FG66</th><th>F</th></lod<>	38	13	CF/FG66	F
11	<lod< th=""><th><lod< th=""><th>73</th><th>83</th><th>CF/FG67</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>83</th><th>CF/FG67</th><th>F</th></lod<>	73	83	CF/FG67	F
12	<lod< th=""><th><lod< th=""><th>56</th><th>16</th><th>CF/FG68</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>56</th><th>16</th><th>CF/FG68</th><th>F</th></lod<>	56	16	CF/FG68	F
13	<lod< th=""><th><lod< th=""><th>56</th><th>15</th><th>CF/FG69</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>56</th><th>15</th><th>CF/FG69</th><th>F</th></lod<>	56	15	CF/FG69	F
14	<lod< th=""><th><lod< th=""><th>40</th><th><lod< th=""><th>CF/FG70</th><th>F</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>40</th><th><lod< th=""><th>CF/FG70</th><th>F</th></lod<></th></lod<>	40	<lod< th=""><th>CF/FG70</th><th>F</th></lod<>	CF/FG70	F
15	<lod< th=""><th>39</th><th>252</th><th>185</th><th>CF/FG71</th><th>Α</th></lod<>	39	252	185	CF/FG71	Α
16	<lod< th=""><th><lod< th=""><th>123</th><th>102</th><th>01/1 0/1</th><th>٨</th></lod<></th></lod<>	<lod< th=""><th>123</th><th>102</th><th>01/1 0/1</th><th>٨</th></lod<>	123	102	01/1 0/1	٨
17	<lod< th=""><th><lod< th=""><th>112</th><th>62</th><th>CF/FG72</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>112</th><th>62</th><th>CF/FG72</th><th>F</th></lod<>	112	62	CF/FG72	F
18	<lod< th=""><th><lod< th=""><th>68</th><th>41</th><th>01/1/072</th><th>ı</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>41</th><th>01/1/072</th><th>ı</th></lod<>	68	41	01/1/072	ı
19	<lod< th=""><th><lod< th=""><th>61</th><th>23</th><th>CF/FG73</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>23</th><th>CF/FG73</th><th>F</th></lod<>	61	23	CF/FG73	F
20	<lod< th=""><th><lod< th=""><th>48</th><th>27</th><th>CF/FG74</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>48</th><th>27</th><th>CF/FG74</th><th>F</th></lod<>	48	27	CF/FG74	F
21	<lod< th=""><th><lod< th=""><th>137</th><th>684</th><th>CF/FG75</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>137</th><th>684</th><th>CF/FG75</th><th>Α</th></lod<>	137	684	CF/FG75	Α
22				disation		
23	<lod< th=""><th><lod< th=""><th>136</th><th>507</th><th>CF/FG75</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>136</th><th>507</th><th>CF/FG75</th><th>Α</th></lod<>	136	507	CF/FG75	Α
24	<lod< th=""><th>57</th><th>199</th><th>168</th><th>CF/FG76</th><th>F</th></lod<>	57	199	168	CF/FG76	F
25	<lod< th=""><th><lod< th=""><th>94</th><th>18</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>94</th><th>18</th><th></th><th></th></lod<>	94	18		
26	<lod< th=""><th><lod< th=""><th>78</th><th>55</th><th>CF/FG77</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>55</th><th>CF/FG77</th><th>F</th></lod<>	78	55	CF/FG77	F
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28	<lod< th=""><th><lod< th=""><th>140</th><th>104</th><th>CF/FG79</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>140</th><th>104</th><th>CF/FG79</th><th>Α</th></lod<>	140	104	CF/FG79	Α
29	<lod< th=""><th><lod< th=""><th>166</th><th>156</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>166</th><th>156</th><th></th><th></th></lod<>	166	156		
30	<lod< th=""><th><lod< th=""><th>123</th><th>107</th><th>CF/FG80</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>123</th><th>107</th><th>CF/FG80</th><th>F</th></lod<>	123	107	CF/FG80	F
31				disation		
32	<lod< th=""><th>47</th><th>135</th><th>161</th><th>CF/FG81</th><th>А</th></lod<>	47	135	161	CF/FG81	А
33	<lod< th=""><th><lod< th=""><th>149</th><th>128</th><th>CF/FG82</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>149</th><th>128</th><th>CF/FG82</th><th>F</th></lod<>	149	128	CF/FG82	F
34	<lod< th=""><th><lod< th=""><th>78</th><th>40</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>78</th><th>40</th><th></th><th></th></lod<>	78	40		
35	<lod< th=""><th><lod< th=""><th>98</th><th>48</th><th>CF/FG83</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>98</th><th>48</th><th>CF/FG83</th><th>F</th></lod<>	98	48	CF/FG83	F

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls13 Mar 10

XRF Data 15 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре
1	_		St	andardisati	•	71.
2	<lod< th=""><th><lod< th=""><th>151</th><th>110</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>151</th><th>110</th><th></th><th></th></lod<>	151	110		
3	<lod< th=""><th><lod< th=""><th>147</th><th>134</th><th>CF/FG84</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>147</th><th>134</th><th>CF/FG84</th><th>Α</th></lod<>	147	134	CF/FG84	Α
4	<lod< th=""><th><lod< th=""><th>98</th><th>35</th><th>CF/FG85</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>98</th><th>35</th><th>CF/FG85</th><th>F</th></lod<>	98	35	CF/FG85	F
5	<lod< th=""><th>42</th><th>164</th><th>127</th><th></th><th></th></lod<>	42	164	127		
6	<lod< th=""><th><lod< th=""><th>88</th><th>42</th><th>CF/FG86</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>88</th><th>42</th><th>CF/FG86</th><th>F</th></lod<>	88	42	CF/FG86	F
7	<lod< th=""><th><lod< th=""><th>152</th><th>87</th><th>CF/FG87</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>152</th><th>87</th><th>CF/FG87</th><th>F</th></lod<>	152	87	CF/FG87	F
8	<lod< th=""><th>37</th><th>137</th><th>97</th><th>CF/FG88</th><th>F</th></lod<>	37	137	97	CF/FG88	F
9	<lod< th=""><th><lod< th=""><th>167</th><th>62</th><th>CF/FG89</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>167</th><th>62</th><th>CF/FG89</th><th>F</th></lod<>	167	62	CF/FG89	F
10	<lod< th=""><th>101</th><th>305</th><th>320</th><th></th><th></th></lod<>	101	305	320		
11	<lod< th=""><th><lod< th=""><th>95</th><th>88</th><th>CF/FG90</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>95</th><th>88</th><th>CF/FG90</th><th>F</th></lod<>	95	88	CF/FG90	F
12	<lod< th=""><th><lod< th=""><th>92</th><th>60</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>92</th><th>60</th><th></th><th></th></lod<>	92	60		
13	<lod< th=""><th><lod< th=""><th>171</th><th>120</th><th>CF/FG91</th><th>Λ</th></lod<></th></lod<>	<lod< th=""><th>171</th><th>120</th><th>CF/FG91</th><th>Λ</th></lod<>	171	120	CF/FG91	Λ
14	<lod< th=""><th><lod< th=""><th>406</th><th>686</th><th>UF/FU91</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>406</th><th>686</th><th>UF/FU91</th><th>А</th></lod<>	406	686	UF/FU91	А
15	<lod< th=""><th><lod< th=""><th>87</th><th>39</th><th>CF/FG92</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>39</th><th>CF/FG92</th><th>F</th></lod<>	87	39	CF/FG92	F
16	<lod< th=""><th><lod< th=""><th>211</th><th>188</th><th>Checking material bei</th><th>ng used to</th></lod<></th></lod<>	<lod< th=""><th>211</th><th>188</th><th>Checking material bei</th><th>ng used to</th></lod<>	211	188	Checking material bei	ng used to
17	<lod< th=""><th><lod< th=""><th>101</th><th>110</th><th>fill streambe</th><th></th></lod<></th></lod<>	<lod< th=""><th>101</th><th>110</th><th>fill streambe</th><th></th></lod<>	101	110	fill streambe	
18			St	andardisati	on	
19	<lod< th=""><th><lod< th=""><th>97</th><th>74</th><th>Checking material bei</th><th>na used to</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>74</th><th>Checking material bei</th><th>na used to</th></lod<>	97	74	Checking material bei	na used to
20	<lod< th=""><th><lod< th=""><th>151</th><th>127</th><th>fill streamber</th><th></th></lod<></th></lod<>	<lod< th=""><th>151</th><th>127</th><th>fill streamber</th><th></th></lod<>	151	127	fill streamber	
21	<lod< th=""><th><lod< th=""><th>125</th><th>86</th><th>IIII Streamber</th><th>u.</th></lod<></th></lod<>	<lod< th=""><th>125</th><th>86</th><th>IIII Streamber</th><th>u.</th></lod<>	125	86	IIII Streamber	u.
22	<lod< th=""><th><lod< th=""><th>119</th><th>54</th><th>CF/FG93</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>54</th><th>CF/FG93</th><th>F</th></lod<>	119	54	CF/FG93	F
23	<lod< th=""><th><lod< th=""><th>39</th><th>21</th><th>CF/FG94</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>39</th><th>21</th><th>CF/FG94</th><th>F</th></lod<>	39	21	CF/FG94	F
24			St	andardisati		
25	<lod< th=""><th><lod< th=""><th>123</th><th>90</th><th>CF/FG95</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>123</th><th>90</th><th>CF/FG95</th><th>F</th></lod<>	123	90	CF/FG95	F
26	<lod< th=""><th><lod< th=""><th>118</th><th>102</th><th>CF/FG96</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>118</th><th>102</th><th>CF/FG96</th><th>F</th></lod<>	118	102	CF/FG96	F
27	<lod< th=""><th><lod< th=""><th>124</th><th>77</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>124</th><th>77</th><th></th><th></th></lod<>	124	77		
28	<lod< th=""><th><lod< th=""><th>104</th><th>62</th><th>CF/FG97</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>104</th><th>62</th><th>CF/FG97</th><th>F</th></lod<>	104	62	CF/FG97	F
29	<lod< th=""><th><lod< th=""><th>188</th><th>138</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>188</th><th>138</th><th></th><th></th></lod<>	188	138		
30	<lod< th=""><th><lod< th=""><th>90</th><th>64</th><th>CF/FG98</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>90</th><th>64</th><th>CF/FG98</th><th>F</th></lod<>	90	64	CF/FG98	F
31	<lod< th=""><th><lod< th=""><th>105</th><th>45</th><th>CF/FG99</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>105</th><th>45</th><th>CF/FG99</th><th>F</th></lod<>	105	45	CF/FG99	F
32	<lod< th=""><th><lod< th=""><th>82</th><th>42</th><th>CF/FG100</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>82</th><th>42</th><th>CF/FG100</th><th>F</th></lod<>	82	42	CF/FG100	F
33	<lod< th=""><th><lod< th=""><th>43</th><th><lod< th=""><th>CF/FG101</th><th>F</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>43</th><th><lod< th=""><th>CF/FG101</th><th>F</th></lod<></th></lod<>	43	<lod< th=""><th>CF/FG101</th><th>F</th></lod<>	CF/FG101	F
34	<lod< th=""><th><lod< th=""><th>101</th><th>55</th><th>CF/FG102</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>101</th><th>55</th><th>CF/FG102</th><th>F</th></lod<>	101	55	CF/FG102	F
35	<lod< th=""><th><lod< th=""><th>56</th><th>34</th><th>FG/210L</th><th></th></lod<></th></lod<>	<lod< th=""><th>56</th><th>34</th><th>FG/210L</th><th></th></lod<>	56	34	FG/210L	
36	<lod< th=""><th><lod< th=""><th>61</th><th>24</th><th>FG/210M</th><th></th></lod<></th></lod<>	<lod< th=""><th>61</th><th>24</th><th>FG/210M</th><th></th></lod<>	61	24	FG/210M	
37	<lod< th=""><th><lod< th=""><th>50</th><th>20</th><th>FG/210R</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>20</th><th>FG/210R</th><th></th></lod<>	50	20	FG/210R	
38	<lod< th=""><th><lod< th=""><th>90</th><th>81</th><th>FG/230L</th><th></th></lod<></th></lod<>	<lod< th=""><th>90</th><th>81</th><th>FG/230L</th><th></th></lod<>	90	81	FG/230L	
39	<lod< th=""><th><lod< th=""><th>68</th><th>26</th><th>FG/230M</th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>26</th><th>FG/230M</th><th></th></lod<>	68	26	FG/230M	
40	<lod< th=""><th><lod< th=""><th>48</th><th><lod< th=""><th>FG/230R</th><th>F</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>48</th><th><lod< th=""><th>FG/230R</th><th>F</th></lod<></th></lod<>	48	<lod< th=""><th>FG/230R</th><th>F</th></lod<>	FG/230R	F
41	<lod< th=""><th><lod< th=""><th>77</th><th>18</th><th>CF/FG103</th><th>F F</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>18</th><th>CF/FG103</th><th>F F</th></lod<>	77	18	CF/FG103	F F
42 43	<lod< th=""><th><lod< th=""><th>43 47</th><th><lod< th=""><th>CF/FG104</th><th>F</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>43 47</th><th><lod< th=""><th>CF/FG104</th><th>F</th></lod<></th></lod<>	43 47	<lod< th=""><th>CF/FG104</th><th>F</th></lod<>	CF/FG104	F
43	<lod <lod< th=""><th><lod <lod< th=""><th>30</th><th>30</th><th>CF/FG105</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>30</th><th>30</th><th>CF/FG105</th><th>F</th></lod<></lod 	30	30	CF/FG105	F
44	<lod <lod< th=""><th><lod <lod< th=""><th>87</th><th>20 34</th><th>CF/FG106 CF/FG107</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>87</th><th>20 34</th><th>CF/FG106 CF/FG107</th><th>F</th></lod<></lod 	87	20 34	CF/FG106 CF/FG107	F
45	<lod <lod< th=""><th><lod <lod< th=""><th>149</th><th>79</th><th>CF/FG107 CF/FG108</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>149</th><th>79</th><th>CF/FG107 CF/FG108</th><th>F</th></lod<></lod 	149	79	CF/FG107 CF/FG108	F
46	<lod <lod< th=""><th><lod <lod< th=""><th>119</th><th>79 78</th><th>CF/FG108 CF/FG109</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>119</th><th>79 78</th><th>CF/FG108 CF/FG109</th><th>F</th></lod<></lod 	119	79 78	CF/FG108 CF/FG109	F
48	<lod <lod< th=""><th><lod <lod< th=""><th>83</th><th>53</th><th>CF/FG109 CF/FG110</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>83</th><th>53</th><th>CF/FG109 CF/FG110</th><th>F</th></lod<></lod 	83	53	CF/FG109 CF/FG110	F
48	<lod <lod< th=""><th><lod <lod< th=""><th>78</th><th>26</th><th>CF/FG110 CF/FG111</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>78</th><th>26</th><th>CF/FG110 CF/FG111</th><th>F</th></lod<></lod 	78	26	CF/FG110 CF/FG111	F
49	<lud< th=""><th><lud< th=""><th>10</th><th>20</th><th>UF/FUIII</th><th>Г</th></lud<></th></lud<>	<lud< th=""><th>10</th><th>20</th><th>UF/FUIII</th><th>Г</th></lud<>	10	20	UF/FUIII	Г

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls15 Mar 10

XRF Data 16 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре
1	O.	•		tandardisati		. , p c
2	<lod< th=""><th><lod< th=""><th>78</th><th>16</th><th>CF/FG112</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>16</th><th>CF/FG112</th><th>F</th></lod<>	78	16	CF/FG112	F
3	<lod< th=""><th><lod< th=""><th>38</th><th>19</th><th>CF/FG113</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>19</th><th>CF/FG113</th><th>F</th></lod<>	38	19	CF/FG113	F
4	<lod< th=""><th><lod< th=""><th>31</th><th>16</th><th>CF/FG114</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>31</th><th>16</th><th>CF/FG114</th><th>F</th></lod<>	31	16	CF/FG114	F
5	158	<lod <lod< th=""><th>37</th><th>20</th><th>CF/FG115</th><th>F</th></lod<></lod 	37	20	CF/FG115	F
6	<lod< th=""><th><lod< th=""><th>53</th><th>23</th><th>CF/FG116</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>23</th><th>CF/FG116</th><th>F</th></lod<>	53	23	CF/FG116	F
7	<lod< th=""><th><lod< th=""><th>135</th><th>125</th><th>0171 0110</th><th>'</th></lod<></th></lod<>	<lod< th=""><th>135</th><th>125</th><th>0171 0110</th><th>'</th></lod<>	135	125	0171 0110	'
8	<lod< th=""><th><lod< th=""><th>263</th><th>95</th><th>CF/FG117</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>263</th><th>95</th><th>CF/FG117</th><th>F</th></lod<>	263	95	CF/FG117	F
9	<lod< th=""><th><lod< th=""><th>90</th><th>64</th><th>CF/FG118</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>90</th><th>64</th><th>CF/FG118</th><th>F</th></lod<>	90	64	CF/FG118	F
10	<lod< th=""><th><lod< th=""><th>44</th><th>22</th><th>CF/FG119</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>44</th><th>22</th><th>CF/FG119</th><th>F</th></lod<>	44	22	CF/FG119	F
11	<lod< th=""><th><lod< th=""><th>107</th><th>60</th><th>CF/FG120</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>107</th><th>60</th><th>CF/FG120</th><th>F</th></lod<>	107	60	CF/FG120	F
12	<lod< th=""><th><lod< th=""><th>52</th><th>40</th><th>CF/FG121</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>40</th><th>CF/FG121</th><th>F</th></lod<>	52	40	CF/FG121	F
13	<lod< th=""><th><lod< th=""><th>65</th><th>36</th><th>FG/130L</th><th></th></lod<></th></lod<>	<lod< th=""><th>65</th><th>36</th><th>FG/130L</th><th></th></lod<>	65	36	FG/130L	
14	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th>FG/130M</th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th>FG/130M</th><th></th></lod<></th></lod<>	32	<lod< th=""><th>FG/130M</th><th></th></lod<>	FG/130M	
15	<lod< th=""><th><lod< th=""><th>29</th><th>15</th><th>FG/130R</th><th></th></lod<></th></lod<>	<lod< th=""><th>29</th><th>15</th><th>FG/130R</th><th></th></lod<>	29	15	FG/130R	
16	<lod< th=""><th>48</th><th>98</th><th>47</th><th>CF/FG122</th><th>F</th></lod<>	48	98	47	CF/FG122	F
17	<lod< th=""><th><lod< th=""><th>103</th><th>66</th><th>CF/FG123</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>103</th><th>66</th><th>CF/FG123</th><th>F</th></lod<>	103	66	CF/FG123	F
18	<lod< th=""><th><lod< th=""><th>201</th><th>126</th><th>CF/FG124</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>201</th><th>126</th><th>CF/FG124</th><th>F</th></lod<>	201	126	CF/FG124	F
19	<lod< th=""><th>47</th><th>194</th><th>112</th><th>CF/FG125</th><th>F</th></lod<>	47	194	112	CF/FG125	F
20	<lod< th=""><th><lod< th=""><th>97</th><th>65</th><th>CF/FG126</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>65</th><th>CF/FG126</th><th>F</th></lod<>	97	65	CF/FG126	F
21	1202	1202		tandardisati		
22	<lod< th=""><th><lod< th=""><th>120</th><th>86</th><th>CF/FG127</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>120</th><th>86</th><th>CF/FG127</th><th>F</th></lod<>	120	86	CF/FG127	F
23	<lod< th=""><th><lod< th=""><th>119</th><th>59</th><th>CF/FG128</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>59</th><th>CF/FG128</th><th>F</th></lod<>	119	59	CF/FG128	F
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25	<lod< th=""><th><lod< th=""><th>130</th><th>71</th><th>3171 3123</th><th>-</th></lod<></th></lod<>	<lod< th=""><th>130</th><th>71</th><th>3171 3123</th><th>-</th></lod<>	130	71	3171 3123	-
26	<lod< th=""><th><lod< th=""><th>99</th><th>67</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>99</th><th>67</th><th></th><th></th></lod<>	99	67		
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28	<lod< th=""><th><lod< th=""><th>52</th><th><lod< th=""><th></th><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>52</th><th><lod< th=""><th></th><th></th></lod<></th></lod<>	52	<lod< th=""><th></th><th></th></lod<>		
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30	<lod< th=""><th><lod< th=""><th>126</th><th>77</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>126</th><th>77</th><th></th><th></th></lod<>	126	77		
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32	<lod< th=""><th><lod< th=""><th>148</th><th>168</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>148</th><th>168</th><th></th><th></th></lod<>	148	168		
33	<lod< th=""><th><lod< th=""><th>245</th><th>127</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>245</th><th>127</th><th></th><th></th></lod<>	245	127		
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35	<lod< th=""><th><lod< th=""><th>128</th><th>76</th><th>CF/FG130</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>128</th><th>76</th><th>CF/FG130</th><th>F</th></lod<>	128	76	CF/FG130	F
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38	<lod< th=""><th><lod< th=""><th>3046</th><th>48607</th><th>CF/FG132</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>3046</th><th>48607</th><th>CF/FG132</th><th>Α</th></lod<>	3046	48607	CF/FG132	Α
39	<lod< th=""><th><lod< th=""><th>401</th><th>1411</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>401</th><th>1411</th><th></th><th></th></lod<>	401	1411		
40	<lod< th=""><th><lod< th=""><th>102</th><th>57</th><th>CF/FG133</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>102</th><th>57</th><th>CF/FG133</th><th>F</th></lod<>	102	57	CF/FG133	F
41	<lod< th=""><th><lod< th=""><th>105</th><th>80</th><th>CF/FG134</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>105</th><th>80</th><th>CF/FG134</th><th>F</th></lod<>	105	80	CF/FG134	F
42	<lod< th=""><th><lod< th=""><th>77</th><th>88</th><th>CF/FG135</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>88</th><th>CF/FG135</th><th>F</th></lod<>	77	88	CF/FG135	F
43			Standaı	rdisation		
44	<lod< th=""><th><lod< th=""><th>60</th><th>38</th><th>CF/FG136</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>60</th><th>38</th><th>CF/FG136</th><th>F</th></lod<>	60	38	CF/FG136	F
45	<lod< th=""><th><lod< th=""><th>101</th><th>50</th><th>CF/FG137</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>101</th><th>50</th><th>CF/FG137</th><th>F</th></lod<>	101	50	CF/FG137	F
46	<lod< th=""><th>42</th><th>225</th><th>44</th><th>CF/FG138</th><th>F</th></lod<>	42	225	44	CF/FG138	F
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48	<lod< th=""><th><lod< th=""><th>110</th><th>33</th><th>CF/FG140</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>33</th><th>CF/FG140</th><th>F</th></lod<>	110	33	CF/FG140	F
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50	<lod< th=""><th><lod< th=""><th>162</th><th>123</th><th>FG/250M</th><th></th></lod<></th></lod<>	<lod< th=""><th>162</th><th>123</th><th>FG/250M</th><th></th></lod<>	162	123	FG/250M	
51	<lod< th=""><th><lod< th=""><th>28</th><th>14</th><th>FG/250R</th><th></th></lod<></th></lod<>	<lod< th=""><th>28</th><th>14</th><th>FG/250R</th><th></th></lod<>	28	14	FG/250R	
52	<lod< th=""><th><lod< th=""><th>372</th><th>173</th><th>FG/270L</th><th></th></lod<></th></lod<>	<lod< th=""><th>372</th><th>173</th><th>FG/270L</th><th></th></lod<>	372	173	FG/270L	

CLIENT: CPG New Zealand Ltd
PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls16 Mar 10

XRF Data 16 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Type
53	<lod< th=""><th><lod< th=""><th>118</th><th>129</th><th>FG/270M</th><th></th></lod<></th></lod<>	<lod< th=""><th>118</th><th>129</th><th>FG/270M</th><th></th></lod<>	118	129	FG/270M	
54	<lod< th=""><th><lod< th=""><th>42</th><th>33</th><th>FG/270R</th><th></th></lod<></th></lod<>	<lod< th=""><th>42</th><th>33</th><th>FG/270R</th><th></th></lod<>	42	33	FG/270R	
55	<lod< th=""><th><lod< th=""><th>182</th><th>93</th><th>CF/FG141</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>182</th><th>93</th><th>CF/FG141</th><th>F</th></lod<>	182	93	CF/FG141	F
56	<lod< th=""><th><lod< th=""><th>118</th><th>62</th><th>CF/FG142</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>118</th><th>62</th><th>CF/FG142</th><th>F</th></lod<>	118	62	CF/FG142	F
57	<lod< th=""><th><lod< th=""><th>37</th><th>15</th><th>CF/FG143</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>37</th><th>15</th><th>CF/FG143</th><th>F</th></lod<>	37	15	CF/FG143	F
58	<lod< th=""><th><lod< th=""><th>70</th><th>47</th><th>CF/FG144</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>47</th><th>CF/FG144</th><th>F</th></lod<>	70	47	CF/FG144	F
59	<lod< th=""><th><lod< th=""><th>146</th><th>71</th><th>CF/FG145</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>146</th><th>71</th><th>CF/FG145</th><th>F</th></lod<>	146	71	CF/FG145	F
60	<lod< th=""><th><lod< th=""><th>87</th><th>37</th><th>CF/FG146</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>37</th><th>CF/FG146</th><th>F</th></lod<>	87	37	CF/FG146	F
61	<lod< th=""><th><lod< th=""><th>121</th><th>33</th><th>CF/FG147</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>121</th><th>33</th><th>CF/FG147</th><th>F</th></lod<>	121	33	CF/FG147	F
62	<lod< th=""><th><lod< th=""><th>73</th><th>51</th><th>CF/FG148</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>51</th><th>CF/FG148</th><th>F</th></lod<>	73	51	CF/FG148	F
63	<lod< th=""><th><lod< th=""><th>108</th><th>72</th><th>CF/FG149</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>108</th><th>72</th><th>CF/FG149</th><th>F</th></lod<>	108	72	CF/FG149	F
64	<lod< th=""><th><lod< th=""><th>43</th><th><lod< th=""><th>CF/FG150</th><th>F</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>43</th><th><lod< th=""><th>CF/FG150</th><th>F</th></lod<></th></lod<>	43	<lod< th=""><th>CF/FG150</th><th>F</th></lod<>	CF/FG150	F
65	<lod< th=""><th><lod< th=""><th>44</th><th>202</th><th>CF/FG151</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>44</th><th>202</th><th>CF/FG151</th><th>Α</th></lod<>	44	202	CF/FG151	Α
66	<lod< th=""><th><lod< th=""><th>130</th><th>1496</th><th>CF/FG 151</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>130</th><th>1496</th><th>CF/FG 151</th><th>A</th></lod<>	130	1496	CF/FG 151	A
67	<lod< th=""><th><lod< th=""><th>45</th><th>80</th><th>CF/FG152</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>80</th><th>CF/FG152</th><th>F</th></lod<>	45	80	CF/FG152	F
68	<lod< th=""><th><lod< th=""><th>53</th><th>57</th><th>CF/FG153</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>57</th><th>CF/FG153</th><th>F</th></lod<>	53	57	CF/FG153	F
69	<lod< th=""><th><lod< th=""><th>164</th><th>83</th><th>CF/FG154</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>164</th><th>83</th><th>CF/FG154</th><th>F</th></lod<>	164	83	CF/FG154	F
70	<lod< th=""><th><lod< th=""><th>266</th><th>311</th><th>CF/FG155</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>266</th><th>311</th><th>CF/FG155</th><th>Α</th></lod<>	266	311	CF/FG155	Α
71	<lod< th=""><th><lod< th=""><th>44</th><th>17</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>44</th><th>17</th><th></th><th></th></lod<>	44	17		
72	<lod< th=""><th><lod< th=""><th>435</th><th>33</th><th>CF/FG156</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>435</th><th>33</th><th>CF/FG156</th><th>F</th></lod<>	435	33	CF/FG156	F
73	<lod< th=""><th><lod< th=""><th>203</th><th>41</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>203</th><th>41</th><th></th><th></th></lod<>	203	41		
74	<lod< th=""><th><lod< th=""><th>118</th><th>43</th><th>CF/FG157</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>118</th><th>43</th><th>CF/FG157</th><th>F</th></lod<>	118	43	CF/FG157	F
75	<lod< th=""><th><lod< th=""><th>144</th><th>93</th><th>GI /I G 157</th><th>Г</th></lod<></th></lod<>	<lod< th=""><th>144</th><th>93</th><th>GI /I G 157</th><th>Г</th></lod<>	144	93	GI /I G 157	Г
76				andardisati		
77			St	andardisati	on	

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls16 Mar 10

XRF Data 17 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре
1				disation		, , , , , , , , , , , , , , , , , , ,
2	<lod< th=""><th><lod< th=""><th>52</th><th>42</th><th>CF/FG158</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>42</th><th>CF/FG158</th><th>F</th></lod<>	52	42	CF/FG158	F
3	<lod< th=""><th><lod< th=""><th>94</th><th>41</th><th>CF/FG159</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>94</th><th>41</th><th>CF/FG159</th><th>F</th></lod<>	94	41	CF/FG159	F
4	<lod< th=""><th><lod< th=""><th>89</th><th>41</th><th>CF/FG160</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>89</th><th>41</th><th>CF/FG160</th><th>F</th></lod<>	89	41	CF/FG160	F
5	<lod< th=""><th><lod< th=""><th>135</th><th>96</th><th>CF/FG161</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>135</th><th>96</th><th>CF/FG161</th><th>F</th></lod<>	135	96	CF/FG161	F
6	<lod< th=""><th><lod< th=""><th>193</th><th>114</th><th>CF/FG162</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>193</th><th>114</th><th>CF/FG162</th><th>F</th></lod<>	193	114	CF/FG162	F
7	<lod< th=""><th><lod< th=""><th>95</th><th>50</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>95</th><th>50</th><th></th><th></th></lod<>	95	50		
8	<lod< th=""><th><lod< th=""><th>138</th><th>100</th><th>CF/FG163</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>138</th><th>100</th><th>CF/FG163</th><th>F</th></lod<>	138	100	CF/FG163	F
9	<lod< th=""><th>46</th><th>473</th><th>595</th><th>CF/FG164</th><th>Α</th></lod<>	46	473	595	CF/FG164	Α
10	<lod< th=""><th><lod< th=""><th>110</th><th>107</th><th>CF/FG165</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>107</th><th>CF/FG165</th><th>F</th></lod<>	110	107	CF/FG165	F
11	<lod< th=""><th><lod< th=""><th>93</th><th>87</th><th>CF/FG166</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>93</th><th>87</th><th>CF/FG166</th><th>F</th></lod<>	93	87	CF/FG166	F
12	<lod< th=""><th><lod< th=""><th>135</th><th>115</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>135</th><th>115</th><th></th><th></th></lod<>	135	115		
13	<lod< th=""><th><lod< th=""><th>97</th><th>81</th><th>CF/FG/167</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>81</th><th>CF/FG/167</th><th>F</th></lod<>	97	81	CF/FG/167	F
14	<lod< th=""><th><lod< th=""><th>417</th><th>533</th><th>CF/FG168</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>417</th><th>533</th><th>CF/FG168</th><th>Α</th></lod<>	417	533	CF/FG168	Α
15	<lod< th=""><th><lod< th=""><th>75</th><th>79</th><th>CF/FG169</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>79</th><th>CF/FG169</th><th>A</th></lod<>	75	79	CF/FG169	A
16	<lod< th=""><th>47</th><th>194</th><th>244</th><th>CF/FG170</th><th>A</th></lod<>	47	194	244	CF/FG170	A
17				disation	27,10	
18	<lod< th=""><th><lod< th=""><th>180</th><th>132</th><th>CF/FG171</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>180</th><th>132</th><th>CF/FG171</th><th>Α</th></lod<>	180	132	CF/FG171	Α
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20	<lod< th=""><th><lod< th=""><th>126</th><th>53</th><th>CF/FG172</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>126</th><th>53</th><th>CF/FG172</th><th>F</th></lod<>	126	53	CF/FG172	F
21	<lod< th=""><th><lod< th=""><th>121</th><th>142</th><th>07/70/70</th><th></th></lod<></th></lod<>	<lod< th=""><th>121</th><th>142</th><th>07/70/70</th><th></th></lod<>	121	142	07/70/70	
22	<lod< th=""><th><lod< th=""><th>227</th><th>233</th><th>CF/FG173</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>227</th><th>233</th><th>CF/FG173</th><th>A</th></lod<>	227	233	CF/FG173	A
23	<lod< th=""><th>45</th><th>400</th><th>427</th><th>CF/FG174</th><th>Α</th></lod<>	45	400	427	CF/FG174	Α
24	<lod< th=""><th><lod< th=""><th>87</th><th>59</th><th>CF/FG175</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>59</th><th>CF/FG175</th><th>F</th></lod<>	87	59	CF/FG175	F
25	<lod< th=""><th><lod< th=""><th>97</th><th>44</th><th>CF/FG176</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>44</th><th>CF/FG176</th><th>F</th></lod<>	97	44	CF/FG176	F
26	<lod< th=""><th><lod< th=""><th>260</th><th>227</th><th>CF/FG177</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>260</th><th>227</th><th>CF/FG177</th><th>A</th></lod<>	260	227	CF/FG177	A
27	<lod< th=""><th>75</th><th>1412</th><th>2183</th><th>CF/FG178</th><th>А</th></lod<>	75	1412	2183	CF/FG178	А
28			Standar	disation		
29			Standar	disation		
30	<lod< th=""><th><lod< th=""><th>119</th><th>90</th><th>CF/FG179</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>90</th><th>CF/FG179</th><th>F</th></lod<>	119	90	CF/FG179	F
31	<lod< th=""><th><lod< th=""><th>124</th><th>122</th><th>05/50400</th><th>۸</th></lod<></th></lod<>	<lod< th=""><th>124</th><th>122</th><th>05/50400</th><th>۸</th></lod<>	124	122	05/50400	۸
32	<lod< th=""><th>49</th><th>316</th><th>206</th><th>CF/FG180</th><th>Α</th></lod<>	49	316	206	CF/FG180	Α
33	<lod< th=""><th><lod< th=""><th>77</th><th>77</th><th>CF/FG181</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>77</th><th>CF/FG181</th><th>F</th></lod<>	77	77	CF/FG181	F
34	<lod< th=""><th><lod< th=""><th>192</th><th>192</th><th>CE/EC400</th><th>۸</th></lod<></th></lod<>	<lod< th=""><th>192</th><th>192</th><th>CE/EC400</th><th>۸</th></lod<>	192	192	CE/EC400	۸
35	<lod< th=""><th><lod< th=""><th>150</th><th>131</th><th>CF/FG182</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>150</th><th>131</th><th>CF/FG182</th><th>Α</th></lod<>	150	131	CF/FG182	Α
36	<lod< th=""><th><lod< th=""><th>178</th><th>311</th><th>CF/FG183</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>178</th><th>311</th><th>CF/FG183</th><th>А</th></lod<>	178	311	CF/FG183	А
37	<lod< th=""><th><lod< th=""><th>459</th><th>548</th><th>UF/FU 103</th><th>^</th></lod<></th></lod<>	<lod< th=""><th>459</th><th>548</th><th>UF/FU 103</th><th>^</th></lod<>	459	548	UF/FU 103	^
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39	<lod< th=""><th><lod< th=""><th>154</th><th>134</th><th>UF/FU 104</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>154</th><th>134</th><th>UF/FU 104</th><th>A</th></lod<>	154	134	UF/FU 104	A
40	<lod< th=""><th><lod< th=""><th>169</th><th>117</th><th>CF/FG185</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>169</th><th>117</th><th>CF/FG185</th><th>F</th></lod<>	169	117	CF/FG185	F
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43	<lod< th=""><th><lod< th=""><th>238</th><th>66</th><th>01/1/010/</th><th></th></lod<></th></lod<>	<lod< th=""><th>238</th><th>66</th><th>01/1/010/</th><th></th></lod<>	238	66	01/1/010/	
44	<lod< th=""><th><lod< th=""><th>172</th><th>108</th><th>CF/FG188</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>172</th><th>108</th><th>CF/FG188</th><th>F</th></lod<>	172	108	CF/FG188	F
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46	<lod< th=""><th><lod< th=""><th>88</th><th>61</th><th>CF/FG190</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>88</th><th>61</th><th>CF/FG190</th><th>F</th></lod<>	88	61	CF/FG190	F
47	<lod< th=""><th><lod< th=""><th>110</th><th>84</th><th>CF/FG191</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>84</th><th>CF/FG191</th><th>F</th></lod<>	110	84	CF/FG191	F
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50	<lod< th=""><th><lod< th=""><th>119</th><th>149</th><th>CF/FG194</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>149</th><th>CF/FG194</th><th>F</th></lod<>	119	149	CF/FG194	F
51	<lod< th=""><th><lod< th=""><th>117</th><th>71</th><th>CF/FG195</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>117</th><th>71</th><th>CF/FG195</th><th>F</th></lod<>	117	71	CF/FG195	F
52	<lod< th=""><th><lod< th=""><th>117</th><th>89</th><th>0171 0100</th><th></th></lod<></th></lod<>	<lod< th=""><th>117</th><th>89</th><th>0171 0100</th><th></th></lod<>	117	89	0171 0100	

Lab tested

XRF Data 18 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре
1	<u> </u>	Ou		tandardisati		Турс
2	<lod< th=""><th><lod< th=""><th>120</th><th>91</th><th>CF/FG196</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>120</th><th>91</th><th>CF/FG196</th><th>F</th></lod<>	120	91	CF/FG196	F
3	<lod <lod< th=""><th><lod <lod< th=""><th>98</th><th>57</th><th>CF/FG197</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>98</th><th>57</th><th>CF/FG197</th><th>F</th></lod<></lod 	98	57	CF/FG197	F
4	<lod <lod< th=""><th><lod <lod< th=""><th>149</th><th>122</th><th>CF/FG197 CF/FG198</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>149</th><th>122</th><th>CF/FG197 CF/FG198</th><th>F</th></lod<></lod 	149	122	CF/FG197 CF/FG198	F
5	<lod <lod< th=""><th><lod <lod< th=""><th>103</th><th>61</th><th>CF/FG198</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>103</th><th>61</th><th>CF/FG198</th><th>F</th></lod<></lod 	103	61	CF/FG198	F
6	<lod <lod< th=""><th><lod <lod< th=""><th>146</th><th>85</th><th>CF/FG199 CF/FG200</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>146</th><th>85</th><th>CF/FG199 CF/FG200</th><th>F</th></lod<></lod 	146	85	CF/FG199 CF/FG200	F
7	<lod <lod< th=""><th><lod <lod< th=""><th>115</th><th>71</th><th>CF/FG200</th><th>Г</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>115</th><th>71</th><th>CF/FG200</th><th>Г</th></lod<></lod 	115	71	CF/FG200	Г
8	<lod <lod< th=""><th><lod <lod< th=""><th>114</th><th>84</th><th>CF/FG201</th><th>F</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>114</th><th>84</th><th>CF/FG201</th><th>F</th></lod<></lod 	114	84	CF/FG201	F
9	<lod< th=""><th><lod< th=""><th></th><th>tandardisati</th><th><u> </u></th><th><u> </u></th></lod<></th></lod<>	<lod< th=""><th></th><th>tandardisati</th><th><u> </u></th><th><u> </u></th></lod<>		tandardisati	<u> </u>	<u> </u>
10	<lod< th=""><th><lod< th=""><th>92</th><th>92</th><th>CF/FG202</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>92</th><th>92</th><th>CF/FG202</th><th>F</th></lod<>	92	92	CF/FG202	F
11			59 59			F
12	<lod< th=""><th><lod< th=""><th></th><th>34</th><th>CF/FG203</th><th>F F</th></lod<></th></lod<>	<lod< th=""><th></th><th>34</th><th>CF/FG203</th><th>F F</th></lod<>		34	CF/FG203	F F
	<lod< th=""><th><lod< th=""><th>91</th><th>68</th><th>CF/FG204</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>91</th><th>68</th><th>CF/FG204</th><th>F</th></lod<>	91	68	CF/FG204	F
13	<lod< th=""><th><lod< th=""><th>162</th><th>66</th><th>CF/FG205</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>162</th><th>66</th><th>CF/FG205</th><th>F</th></lod<>	162	66	CF/FG205	F
14	<lod< th=""><th><lod< th=""><th>136</th><th>77</th><th>CF/FG206</th><th></th></lod<></th></lod<>	<lod< th=""><th>136</th><th>77</th><th>CF/FG206</th><th></th></lod<>	136	77	CF/FG206	
15	<lod< th=""><th><lod< th=""><th>99</th><th>52</th><th>CF/FG207</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>99</th><th>52</th><th>CF/FG207</th><th>F</th></lod<>	99	52	CF/FG207	F
16	<lod< th=""><th><lod< th=""><th>32</th><th>48</th><th>CF/FG208</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>32</th><th>48</th><th>CF/FG208</th><th>F</th></lod<>	32	48	CF/FG208	F
17	<lod< th=""><th><lod< th=""><th>103</th><th>73</th><th>CF/FG209</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>103</th><th>73</th><th>CF/FG209</th><th>F</th></lod<>	103	73	CF/FG209	F
18	<lod< th=""><th><lod< th=""><th>108</th><th>81</th><th>CF/FG210</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>108</th><th>81</th><th>CF/FG210</th><th>F</th></lod<>	108	81	CF/FG210	F
19	<lod< th=""><th><lod< th=""><th>79</th><th>43</th><th>CF/FG211</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>79</th><th>43</th><th>CF/FG211</th><th>F</th></lod<>	79	43	CF/FG211	F
20	<lod< th=""><th><lod< th=""><th>84</th><th>76</th><th>CF/FG212</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>84</th><th>76</th><th>CF/FG212</th><th>F</th></lod<>	84	76	CF/FG212	F
21	<lod< th=""><th><lod< th=""><th>68</th><th>76</th><th>CF/FG213</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>68</th><th>76</th><th>CF/FG213</th><th>F</th></lod<>	68	76	CF/FG213	F
22	<lod< th=""><th><lod< th=""><th>133</th><th>81</th><th>CF/FG214</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>133</th><th>81</th><th>CF/FG214</th><th>F</th></lod<>	133	81	CF/FG214	F
23	<lod< th=""><th><lod< th=""><th>98</th><th>61</th><th>CF/FG215</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>98</th><th>61</th><th>CF/FG215</th><th>F</th></lod<>	98	61	CF/FG215	F
24	<lod< th=""><th><lod< th=""><th>107</th><th>68</th><th>CF/FG216</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>107</th><th>68</th><th>CF/FG216</th><th>F</th></lod<>	107	68	CF/FG216	F
25	<lod< th=""><th>41</th><th>161</th><th>102</th><th>CF/FG217</th><th rowspan="2">F</th></lod<>	41	161	102	CF/FG217	F
26	<lod< th=""><th><lod< th=""><th>117</th><th>75</th><th></th></lod<></th></lod<>	<lod< th=""><th>117</th><th>75</th><th></th></lod<>	117	75		
27	<lod< th=""><th>48</th><th>240</th><th>197</th><th>CF/FG218</th><th>F</th></lod<>	48	240	197	CF/FG218	F
28	<lod< th=""><th><lod< th=""><th>112</th><th>107</th><th>05/50040</th><th>ļ</th></lod<></th></lod<>	<lod< th=""><th>112</th><th>107</th><th>05/50040</th><th>ļ</th></lod<>	112	107	05/50040	ļ
29	<lod< th=""><th><lod< th=""><th>101</th><th>78</th><th>CF/FG219</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>101</th><th>78</th><th>CF/FG219</th><th>F</th></lod<>	101	78	CF/FG219	F
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31	<lod< th=""><th><lod< th=""><th>96</th><th>70</th><th>CF/FG221</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>70</th><th>CF/FG221</th><th>F</th></lod<>	96	70	CF/FG221	F
32	<lod< th=""><th><lod< th=""><th>130</th><th>108</th><th>CF/FG222</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>130</th><th>108</th><th>CF/FG222</th><th>Α</th></lod<>	130	108	CF/FG222	Α
33	<lod< th=""><th><lod< th=""><th>197</th><th>157</th><th>05/50000</th><th></th></lod<></th></lod<>	<lod< th=""><th>197</th><th>157</th><th>05/50000</th><th></th></lod<>	197	157	05/50000	
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35	<lod< th=""><th><lod< th=""><th>84</th><th>58</th><th>CF/FG224</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>84</th><th>58</th><th>CF/FG224</th><th>F</th></lod<>	84	58	CF/FG224	F
36				rdisation	05/50005	
37	<lod< th=""><th><lod< th=""><th>114</th><th>81</th><th>CF/FG225</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>81</th><th>CF/FG225</th><th>F</th></lod<>	114	81	CF/FG225	F
38	<lod< th=""><th><lod< th=""><th>208</th><th>111</th><th>CF/FG226</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>208</th><th>111</th><th>CF/FG226</th><th>F</th></lod<>	208	111	CF/FG226	F
39	<lod< th=""><th><lod< th=""><th>141</th><th>83</th><th>CF/FG227</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>141</th><th>83</th><th>CF/FG227</th><th>F</th></lod<>	141	83	CF/FG227	F
40	<lod< th=""><th>39</th><th>151</th><th>155</th><th>CF/FG228</th><th>F</th></lod<>	39	151	155	CF/FG228	F
41	<lod< th=""><th><lod< th=""><th>143</th><th>116</th><th>CF/FG229</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>143</th><th>116</th><th>CF/FG229</th><th>F</th></lod<>	143	116	CF/FG229	F
42	<lod< th=""><th><lod< th=""><th>110</th><th>75</th><th>CF/FG230</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>75</th><th>CF/FG230</th><th>F</th></lod<>	110	75	CF/FG230	F
43	<lod< th=""><th><lod< th=""><th>51</th><th>19</th><th>CF/FG231</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>19</th><th>CF/FG231</th><th>F</th></lod<>	51	19	CF/FG231	F
44	<lod< th=""><th><lod< th=""><th>105</th><th>51</th><th>CF/FG232</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>105</th><th>51</th><th>CF/FG232</th><th>F</th></lod<>	105	51	CF/FG232	F
45	<lod< th=""><th><lod< th=""><th>96</th><th>59</th><th>CF/FG233</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>59</th><th>CF/FG233</th><th>F</th></lod<>	96	59	CF/FG233	F
46	<lod< th=""><th><lod< th=""><th>94</th><th>74</th><th>CF/FG234</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>94</th><th>74</th><th>CF/FG234</th><th>F</th></lod<>	94	74	CF/FG234	F
47	<lod< th=""><th><lod< th=""><th>136</th><th>117</th><th>CF/FG235</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>136</th><th>117</th><th>CF/FG235</th><th>F</th></lod<>	136	117	CF/FG235	F
48		I '		rdisation		
49	<lod< th=""><th><lod< th=""><th>168</th><th>98</th><th>CF/FG236</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>168</th><th>98</th><th>CF/FG236</th><th>F</th></lod<>	168	98	CF/FG236	F
50	<lod< th=""><th><lod< th=""><th>69</th><th><lod< th=""><th>CF/FG237</th><th>F</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>69</th><th><lod< th=""><th>CF/FG237</th><th>F</th></lod<></th></lod<>	69	<lod< th=""><th>CF/FG237</th><th>F</th></lod<>	CF/FG237	F
51	<lod< th=""><th><lod< th=""><th>133</th><th>92</th><th>CF/FG238</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>133</th><th>92</th><th>CF/FG238</th><th>F</th></lod<>	133	92	CF/FG238	F
52	<lod< th=""><th><lod< th=""><th>153</th><th>117</th><th>CF/FG239</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>153</th><th>117</th><th>CF/FG239</th><th>F</th></lod<>	153	117	CF/FG239	F

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls18 Mar 10

XRF Data 18 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Type
53	<lod< th=""><th><lod< th=""><th>231</th><th>143</th><th>CF/FG240</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>231</th><th>143</th><th>CF/FG240</th><th>F</th></lod<>	231	143	CF/FG240	F
54	<lod< th=""><th><lod< th=""><th>136</th><th>89</th><th>GF/FG240</th><th></th></lod<></th></lod<>	<lod< th=""><th>136</th><th>89</th><th>GF/FG240</th><th></th></lod<>	136	89	GF/FG240	
55	<lod< th=""><th><lod< th=""><th>97</th><th>74</th><th>CF/FG241</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>74</th><th>CF/FG241</th><th>F</th></lod<>	97	74	CF/FG241	F
56	<lod< th=""><th><lod< th=""><th>73</th><th>29</th><th>CF/FG242</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>29</th><th>CF/FG242</th><th>F</th></lod<>	73	29	CF/FG242	F
57	<lod< th=""><th><lod< th=""><th>64</th><th>40</th><th>CF/FG243</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>40</th><th>CF/FG243</th><th>F</th></lod<>	64	40	CF/FG243	F
58	<lod< th=""><th><lod< th=""><th>70</th><th>41</th><th>CF/FG244</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>41</th><th>CF/FG244</th><th>F</th></lod<>	70	41	CF/FG244	F
59	<lod< th=""><th><lod< th=""><th>52</th><th>20</th><th>CF/FG245</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>20</th><th>CF/FG245</th><th>F</th></lod<>	52	20	CF/FG245	F
60	<lod< th=""><th><lod< th=""><th>81</th><th>71</th><th>CF/FG246</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>71</th><th>CF/FG246</th><th>F</th></lod<>	81	71	CF/FG246	F
61	<lod< th=""><th><lod< th=""><th>92</th><th>46</th><th>CF/FG247</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>92</th><th>46</th><th>CF/FG247</th><th>F</th></lod<>	92	46	CF/FG247	F
62	<lod< th=""><th><lod< th=""><th>78</th><th>35</th><th>CF/FG248</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>35</th><th>CF/FG248</th><th>F</th></lod<>	78	35	CF/FG248	F
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65	<lod< th=""><th><lod< th=""><th>66</th><th>36</th><th>CF/FG251</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>66</th><th>36</th><th>CF/FG251</th><th>F</th></lod<>	66	36	CF/FG251	F
66	<lod< th=""><th><lod< th=""><th>85</th><th>40</th><th>CF/FG252</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>85</th><th>40</th><th>CF/FG252</th><th>F</th></lod<>	85	40	CF/FG252	F
67	<lod< th=""><th><lod< th=""><th>76</th><th>40</th><th>CF/FG253</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>40</th><th>CF/FG253</th><th>F</th></lod<>	76	40	CF/FG253	F
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69	<lod< th=""><th><lod< th=""><th>78</th><th>43</th><th>CF/FG255</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>43</th><th>CF/FG255</th><th>F</th></lod<>	78	43	CF/FG255	F

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls18 Mar 10

XRF Data 19 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре
1			St	andardisati	•	71
2	<lod< th=""><th><lod< th=""><th>81</th><th>43</th><th>CF/FG256</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>43</th><th>CF/FG256</th><th>F</th></lod<>	81	43	CF/FG256	F
3	<lod< th=""><th><lod< th=""><th>80</th><th>57</th><th>CF/FG257</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>80</th><th>57</th><th>CF/FG257</th><th>F</th></lod<>	80	57	CF/FG257	F
4	<lod< th=""><th><lod< th=""><th>77</th><th>39</th><th>CF/FG258</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>77</th><th>39</th><th>CF/FG258</th><th>F</th></lod<>	77	39	CF/FG258	F
5	<lod< th=""><th><lod< th=""><th>154</th><th>32</th><th>CF/FG259</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>154</th><th>32</th><th>CF/FG259</th><th>F</th></lod<>	154	32	CF/FG259	F
6	<lod< th=""><th><lod< th=""><th>75</th><th>55</th><th>CF/FG260</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>55</th><th>CF/FG260</th><th>F</th></lod<>	75	55	CF/FG260	F
7	<lod< th=""><th><lod< th=""><th>114</th><th>114</th><th>CF/FG261</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>114</th><th>CF/FG261</th><th>F</th></lod<>	114	114	CF/FG261	F
8	<lod< th=""><th><lod< th=""><th>99</th><th>51</th><th>CF/FG262</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>99</th><th>51</th><th>CF/FG262</th><th>F</th></lod<>	99	51	CF/FG262	F
9	<lod< th=""><th><lod< th=""><th>79</th><th>41</th><th>CF/FG263</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>79</th><th>41</th><th>CF/FG263</th><th>F</th></lod<>	79	41	CF/FG263	F
10	<lod< th=""><th><lod< th=""><th>96</th><th>54</th><th>CF/FG264</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>54</th><th>CF/FG264</th><th>F</th></lod<>	96	54	CF/FG264	F
11	<lod< th=""><th><lod< th=""><th>143</th><th>69</th><th>CF/FG265</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>143</th><th>69</th><th>CF/FG265</th><th>F</th></lod<>	143	69	CF/FG265	F
12	<lod< th=""><th><lod< th=""><th>84</th><th>53</th><th>CF/FG266</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>84</th><th>53</th><th>CF/FG266</th><th>F</th></lod<>	84	53	CF/FG266	F
13	<lod< th=""><th><lod< th=""><th>119</th><th>74</th><th>CF/FG267</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>74</th><th>CF/FG267</th><th>F</th></lod<>	119	74	CF/FG267	F
14	<lod< th=""><th><lod< th=""><th>89</th><th>34</th><th>CF/FG268</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>89</th><th>34</th><th>CF/FG268</th><th>F</th></lod<>	89	34	CF/FG268	F
15			St	andardisati	on	
16	<lod< th=""><th><lod< th=""><th>87</th><th>53</th><th>CF/FG268</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>53</th><th>CF/FG268</th><th>F</th></lod<>	87	53	CF/FG268	F
17	<lod< th=""><th><lod< th=""><th>158</th><th>91</th><th>CF/FG269</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>158</th><th>91</th><th>CF/FG269</th><th>F</th></lod<>	158	91	CF/FG269	F
18	<lod< th=""><th><lod< th=""><th>43</th><th>20</th><th>CF/FG270</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>20</th><th>CF/FG270</th><th>F</th></lod<>	43	20	CF/FG270	F
19	<lod< th=""><th><lod< th=""><th>74</th><th>47</th><th>CF/FG271</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>74</th><th>47</th><th>CF/FG271</th><th>F</th></lod<>	74	47	CF/FG271	F
20	<lod< th=""><th><lod< th=""><th>81</th><th>50</th><th>CF/FG272</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>50</th><th>CF/FG272</th><th>F</th></lod<>	81	50	CF/FG272	F
21	<lod< th=""><th><lod< th=""><th>79</th><th>46</th><th>CF/FG273</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>79</th><th>46</th><th>CF/FG273</th><th>F</th></lod<>	79	46	CF/FG273	F
22	<lod< th=""><th><lod< th=""><th>75</th><th>36</th><th>CF/FG274</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>36</th><th>CF/FG274</th><th>F</th></lod<>	75	36	CF/FG274	F
23	<lod< th=""><th><lod< th=""><th>26</th><th><lod< th=""><th>CF/FG275</th><th>F</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>26</th><th><lod< th=""><th>CF/FG275</th><th>F</th></lod<></th></lod<>	26	<lod< th=""><th>CF/FG275</th><th>F</th></lod<>	CF/FG275	F
24	<lod< th=""><th><lod< th=""><th>92</th><th>54</th><th>CF/FG276</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>92</th><th>54</th><th>CF/FG276</th><th>F</th></lod<>	92	54	CF/FG276	F
25	<lod< th=""><th><lod< th=""><th>70</th><th>42</th><th>CF/FG277</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>70</th><th>42</th><th>CF/FG277</th><th>F</th></lod<>	70	42	CF/FG277	F
26	<lod< th=""><th><lod< th=""><th>109</th><th>100</th><th>CF/FG278</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>109</th><th>100</th><th>CF/FG278</th><th>F</th></lod<>	109	100	CF/FG278	F
27				andardisati		
28	<lod< th=""><th><lod< th=""><th>95</th><th>73</th><th>CF/FG279</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>95</th><th>73</th><th>CF/FG279</th><th>F</th></lod<>	95	73	CF/FG279	F
29	<lod< th=""><th><lod< th=""><th>48</th><th>33</th><th>CF/FG280</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>48</th><th>33</th><th>CF/FG280</th><th>F</th></lod<>	48	33	CF/FG280	F
30	<lod< th=""><th><lod< th=""><th>114</th><th>91</th><th>CF/FG281</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>91</th><th>CF/FG281</th><th>F</th></lod<>	114	91	CF/FG281	F
31	<lod< th=""><th><lod< th=""><th>171</th><th>183</th><th>CF/FG282</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>171</th><th>183</th><th>CF/FG282</th><th>F</th></lod<>	171	183	CF/FG282	F
32	<lod< th=""><th><lod< th=""><th>138</th><th>217</th><th>CF/FG283</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>138</th><th>217</th><th>CF/FG283</th><th>Α</th></lod<>	138	217	CF/FG283	Α
33	<lod< th=""><th><lod< th=""><th>226</th><th>299</th><th>5.,. 5255</th><th>, ,</th></lod<></th></lod<>	<lod< th=""><th>226</th><th>299</th><th>5.,. 5255</th><th>, ,</th></lod<>	226	299	5.,. 5255	, ,
34	<lod< th=""><th><lod< th=""><th>226</th><th>163</th><th>CF/FG284</th><th>l F</th></lod<></th></lod<>	<lod< th=""><th>226</th><th>163</th><th>CF/FG284</th><th>l F</th></lod<>	226	163	CF/FG284	l F
35	<lod< th=""><th><lod< th=""><th>181</th><th>119</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>181</th><th>119</th><th></th><th></th></lod<>	181	119		
36	<lod< th=""><th><lod< th=""><th>215</th><th>314</th><th>CF/FG285</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>215</th><th>314</th><th>CF/FG285</th><th>Α</th></lod<>	215	314	CF/FG285	Α
37	<lod< th=""><th><lod< th=""><th>171</th><th>122</th><th>CF/FG286</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>171</th><th>122</th><th>CF/FG286</th><th>A</th></lod<>	171	122	CF/FG286	A
38	<lod< th=""><th><lod< th=""><th>107</th><th>75</th><th>CF/FG287</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>107</th><th>75</th><th>CF/FG287</th><th>F</th></lod<>	107	75	CF/FG287	F
39	<lod< th=""><th><lod< th=""><th>67</th><th>30</th><th>CF/FG288</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>67</th><th>30</th><th>CF/FG288</th><th>F</th></lod<>	67	30	CF/FG288	F
40	<lod< th=""><th><lod< th=""><th>130</th><th>126</th><th>CF/FG289</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>130</th><th>126</th><th>CF/FG289</th><th>F</th></lod<>	130	126	CF/FG289	F
41	<lod< th=""><th><lod< th=""><th>447</th><th>362</th><th>CF/FG290</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>447</th><th>362</th><th>CF/FG290</th><th>Α</th></lod<>	447	362	CF/FG290	Α
42	<lod< th=""><th><lod< th=""><th>68</th><th>68</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>68</th><th>68</th><th></th><th></th></lod<>	68	68		
43	<lod< th=""><th><lod< th=""><th>876</th><th>162</th><th>CF/FG291</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>876</th><th>162</th><th>CF/FG291</th><th>А</th></lod<>	876	162	CF/FG291	А
44	<lod< th=""><th><lod< th=""><th>31</th><th>16</th><th>CF/FG292</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>31</th><th>16</th><th>CF/FG292</th><th>F</th></lod<>	31	16	CF/FG292	F
45	<lod< th=""><th><lod< th=""><th>80</th><th>37</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>37</th><th></th><th></th></lod<>	80	37		

Lab tested

CLIENT: CPG New Zealand Ltd PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls19 Mar 10

XRF Data 20 March 2010



Reading	Cr	Cu	Zn	Pb	Description	Туре	
1			St	andardisati			
2	<lod< th=""><th><lod< th=""><th>120</th><th>55</th><th>CF/FG293</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>120</th><th>55</th><th>CF/FG293</th><th>F</th></lod<>	120	55	CF/FG293	F	
3	<lod< th=""><th><lod< th=""><th>538</th><th>394</th><th>CF/FG294</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>538</th><th>394</th><th>CF/FG294</th><th>F</th></lod<>	538	394	CF/FG294	F	
4	<lod< th=""><th><lod< th=""><th>79</th><th><lod< th=""><th>CF/FG294</th><th>Г</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>79</th><th><lod< th=""><th>CF/FG294</th><th>Г</th></lod<></th></lod<>	79	<lod< th=""><th>CF/FG294</th><th>Г</th></lod<>	CF/FG294	Г	
5	<lod< th=""><th><lod< th=""><th>172</th><th>165</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>172</th><th>165</th><th></th><th></th></lod<>	172	165			
6	<lod< th=""><th><lod< th=""><th>217</th><th>195</th><th>CF/FG295</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>217</th><th>195</th><th>CF/FG295</th><th>Α</th></lod<>	217	195	CF/FG295	Α	
7	<lod< th=""><th><lod< th=""><th>94</th><th>87</th><th>CF/FG296</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>94</th><th>87</th><th>CF/FG296</th><th>F</th></lod<>	94	87	CF/FG296	F	
8	<lod< th=""><th><lod< th=""><th>143</th><th>99</th><th>CF/FG297</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>143</th><th>99</th><th>CF/FG297</th><th>F</th></lod<>	143	99	CF/FG297	F	
9	<lod< th=""><th>167</th><th>116</th><th>105</th><th></th><th></th></lod<>	167	116	105			
10	<lod< th=""><th>157</th><th>446</th><th>251</th><th>CF/FG298</th><th>Α</th></lod<>	157	446	251	CF/FG298	Α	
11	<lod< th=""><th>68</th><th>115</th><th>94</th><th></th><th></th></lod<>	68	115	94			
12	<lod< th=""><th><lod< th=""><th>181</th><th>152</th><th>CF/FG299</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>181</th><th>152</th><th>CF/FG299</th><th>Α</th></lod<>	181	152	CF/FG299	Α	
13	<lod< th=""><th>49</th><th>248</th><th>320</th><th>0171 0299</th><th></th></lod<>	49	248	320	0171 0299		
14	<lod< th=""><th><lod< th=""><th>490</th><th>273</th><th>CF/FG300</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>490</th><th>273</th><th>CF/FG300</th><th>Α</th></lod<>	490	273	CF/FG300	Α	
15	<lod< th=""><th><lod< th=""><th>407</th><th>187</th><th>0171 0300</th><th></th></lod<></th></lod<>	<lod< th=""><th>407</th><th>187</th><th>0171 0300</th><th></th></lod<>	407	187	0171 0300		
16	<lod< th=""><th><lod< th=""><th>150</th><th>139</th><th>CF/FG301</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>150</th><th>139</th><th>CF/FG301</th><th>Α</th></lod<>	150	139	CF/FG301	Α	
17	<lod< th=""><th><lod< th=""><th>484</th><th>147</th><th>3171 3001</th><th>,,</th></lod<></th></lod<>	<lod< th=""><th>484</th><th>147</th><th>3171 3001</th><th>,,</th></lod<>	484	147	3171 3001	,,	
18	<lod< th=""><th><lod< th=""><th>163</th><th>53</th><th>CF/FG302</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>163</th><th>53</th><th>CF/FG302</th><th>F</th></lod<>	163	53	CF/FG302	F	
19	<lod< th=""><th>52</th><th>215</th><th>94</th><th>51,11 550<u>—</u></th><th></th></lod<>	52	215	94	51,11 550 <u>—</u>		
20	<lod< th=""><th><lod< th=""><th>193</th><th>91</th><th>CF/FG303</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>193</th><th>91</th><th>CF/FG303</th><th>F</th></lod<>	193	91	CF/FG303	F	
21	<lod< th=""><th>52</th><th>158</th><th>94</th><th>CF/FG304</th><th>F</th></lod<>	52	158	94	CF/FG304	F	
22	<lod< th=""><th>53</th><th>187</th><th>86</th><th>0171 0001</th><th>·</th></lod<>	53	187	86	0171 0001	·	
23	<lod< th=""><th><lod< th=""><th>344</th><th>189</th><th>CF/FG305</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>344</th><th>189</th><th>CF/FG305</th><th>Α</th></lod<>	344	189	CF/FG305	Α	
24	<lod< th=""><th><lod< th=""><th>240</th><th>125</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>240</th><th>125</th><th></th><th></th></lod<>	240	125			
25	<lod< th=""><th><lod< th=""><th>217</th><th>133</th><th>CF/FG306</th><th>A</th></lod<></th></lod<>	<lod< th=""><th>217</th><th>133</th><th>CF/FG306</th><th>A</th></lod<>	217	133	CF/FG306	A	
26	<lod< th=""><th><lod< th=""><th>162</th><th>55</th><th>CF/FG307</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>162</th><th>55</th><th>CF/FG307</th><th>F</th></lod<>	162	55	CF/FG307	F	
27	<lod< th=""><th><lod< th=""><th>221</th><th>76</th><th>CF/FG308</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>221</th><th>76</th><th>CF/FG308</th><th>F</th></lod<>	221	76	CF/FG308	F	
28	<lod< th=""><th><lod< th=""><th>200</th><th>90</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>200</th><th>90</th><th></th><th></th></lod<>	200	90			
29	<lod< th=""><th><lod< th=""><th>159</th><th>54</th><th>CF/FG309</th><th>F</th></lod<></th></lod<>	<lod< th=""><th>159</th><th>54</th><th>CF/FG309</th><th>F</th></lod<>	159	54	CF/FG309	F	
30	<lod< th=""><th>46</th><th>450</th><th>202</th><th>CF/FG310</th><th>А</th></lod<>	46	450	202	CF/FG310	А	
31 32	<lod< th=""><th>47</th><th>178</th><th>andardisati 82</th><th>CF/FG312</th><th>F</th></lod<>	47	178	andardisati 82	CF/FG312	F	
33	<lod <lod< th=""><th><lod< th=""><th>339</th><th>150</th><th>CF/FG312 CF/FG311</th><th>F</th></lod<></th></lod<></lod 	<lod< th=""><th>339</th><th>150</th><th>CF/FG312 CF/FG311</th><th>F</th></lod<>	339	150	CF/FG312 CF/FG311	F	
34	<lod <lod< th=""><th><lod <lod< th=""><th>463</th><th>485</th><th>CF/FG311</th><th>A</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>463</th><th>485</th><th>CF/FG311</th><th>A</th></lod<></lod 	463	485	CF/FG311	A	
35	<lod <lod< th=""><th>50</th><th>326</th><th>135</th><th>0171 0313</th><th></th></lod<></lod 	50	326	135	0171 0313		
36	<lod <lod< th=""><th><lod< th=""><th>98</th><th>29</th><th>Spot Check material I</th><th>neing used</th></lod<></th></lod<></lod 	<lod< th=""><th>98</th><th>29</th><th>Spot Check material I</th><th>neing used</th></lod<>	98	29	Spot Check material I	neing used	
37	<lod <lod< th=""><th><lod <lod< th=""><th>238</th><th>102</th><th>to raise bed of ce</th><th>•</th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>238</th><th>102</th><th>to raise bed of ce</th><th>•</th></lod<></lod 	238	102	to raise bed of ce	•	
38	<lod< th=""><th><lod< th=""><th>115</th><th>42</th><th>10 14100 504 01 00</th><th> 1 70</th></lod<></th></lod<>	<lod< th=""><th>115</th><th>42</th><th>10 14100 504 01 00</th><th> 1 70</th></lod<>	115	42	10 14100 504 01 00	1 70	
39	<lod< th=""><th><lod< th=""><th>244</th><th>193</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>244</th><th>193</th><th></th><th></th></lod<>	244	193			
40	<lod< th=""><th><lod< th=""><th>272</th><th>171</th><th>CF/FG314</th><th>Α</th></lod<></th></lod<>	<lod< th=""><th>272</th><th>171</th><th>CF/FG314</th><th>Α</th></lod<>	272	171	CF/FG314	Α	
41	<lod< th=""><th><lod< th=""><th>416</th><th>144</th><th></th><th>1</th></lod<></th></lod<>	<lod< th=""><th>416</th><th>144</th><th></th><th>1</th></lod<>	416	144		1	
42	<lod< th=""><th><lod< th=""><th>344</th><th>175</th><th>1</th><th></th></lod<></th></lod<>	<lod< th=""><th>344</th><th>175</th><th>1</th><th></th></lod<>	344	175	1		
43	<lod< th=""><th><lod< th=""><th>557</th><th>221</th><th>1</th><th></th></lod<></th></lod<>	<lod< th=""><th>557</th><th>221</th><th>1</th><th></th></lod<>	557	221	1		
44	<lod< th=""><th><lod< th=""><th>346</th><th>144</th><th>1</th><th></th></lod<></th></lod<>	<lod< th=""><th>346</th><th>144</th><th>1</th><th></th></lod<>	346	144	1		
45	<lod< th=""><th><lod< th=""><th>261</th><th>94</th><th>Chat Chack master !-!</th><th>anina</th></lod<></th></lod<>	<lod< th=""><th>261</th><th>94</th><th>Chat Chack master !-!</th><th>anina</th></lod<>	261	94	Chat Chack master !-!	anina	
46	<lod< th=""><th><lod< th=""><th>490</th><th>202</th><th colspan="3" rowspan="2"> Spot Check material being used to raise bed of cell F/G </th></lod<></th></lod<>	<lod< th=""><th>490</th><th>202</th><th colspan="3" rowspan="2"> Spot Check material being used to raise bed of cell F/G </th></lod<>	490	202	 Spot Check material being used to raise bed of cell F/G 		
47	<lod< th=""><th><lod< th=""><th>280</th><th>112</th></lod<></th></lod<>	<lod< th=""><th>280</th><th>112</th></lod<>	280	112			
48	<lod< th=""><th><lod< th=""><th>230</th><th>88</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>230</th><th>88</th><th></th><th></th></lod<>	230	88			
49	<lod< th=""><th><lod< th=""><th>293</th><th>244</th><th></th><th></th></lod<></th></lod<>	<lod< th=""><th>293</th><th>244</th><th></th><th></th></lod<>	293	244			
50	194	40	373	303			
51	<lod< th=""><th><lod< th=""><th>206</th><th>403</th><th colspan="2"></th></lod<></th></lod<>	<lod< th=""><th>206</th><th>403</th><th colspan="2"></th></lod<>	206	403			
52	<lod< th=""><th><lod< th=""><th>283</th><th>240</th><th>CF/FG315</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>283</th><th>240</th><th>CF/FG315</th><th>А</th></lod<>	283	240	CF/FG315	А	
53	<lod< th=""><th>64</th><th>188</th><th>157</th><th>CF/FG316</th><th>Α</th></lod<>	64	188	157	CF/FG316	Α	
54	<lod< th=""><th><lod< th=""><th>219</th><th>118</th><th>Spot Check material I</th><th>-</th></lod<></th></lod<>	<lod< th=""><th>219</th><th>118</th><th>Spot Check material I</th><th>-</th></lod<>	219	118	Spot Check material I	-	
55	<lod< th=""><th><lod< th=""><th>239</th><th>72</th><th>to raise bed of ce</th><th>ell F/G</th></lod<></th></lod<>	<lod< th=""><th>239</th><th>72</th><th>to raise bed of ce</th><th>ell F/G</th></lod<>	239	72	to raise bed of ce	ell F/G	
56	<lod< th=""><th><lod< th=""><th>230</th><th>89</th><th>CF/FG317</th><th>А</th></lod<></th></lod<>	<lod< th=""><th>230</th><th>89</th><th>CF/FG317</th><th>А</th></lod<>	230	89	CF/FG317	А	

Lab tested

XRF Data 22 March 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	,
2	<lod< th=""><th><lod< th=""><th>133</th><th>44</th><th>FG/30L</th></lod<></th></lod<>	<lod< th=""><th>133</th><th>44</th><th>FG/30L</th></lod<>	133	44	FG/30L
3	<lod< th=""><th><lod< th=""><th>35</th><th><lod< th=""><th>FG/30M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>35</th><th><lod< th=""><th>FG/30M</th></lod<></th></lod<>	35	<lod< th=""><th>FG/30M</th></lod<>	FG/30M
4	<lod< th=""><th><lod< th=""><th>35</th><th>13</th><th>FG/30R</th></lod<></th></lod<>	<lod< th=""><th>35</th><th>13</th><th>FG/30R</th></lod<>	35	13	FG/30R
5	166	<lod< th=""><th>124</th><th>63</th><th>FG/50R</th></lod<>	124	63	FG/50R
6	<lod< th=""><th><lod< th=""><th>129</th><th>66</th><th>FG/50R</th></lod<></th></lod<>	<lod< th=""><th>129</th><th>66</th><th>FG/50R</th></lod<>	129	66	FG/50R
7	<lod< th=""><th><lod< th=""><th>85</th><th>23</th><th>FG/50M</th></lod<></th></lod<>	<lod< th=""><th>85</th><th>23</th><th>FG/50M</th></lod<>	85	23	FG/50M
8	<lod< th=""><th><lod< th=""><th>145</th><th>81</th><th>FG/50L</th></lod<></th></lod<>	<lod< th=""><th>145</th><th>81</th><th>FG/50L</th></lod<>	145	81	FG/50L
9	<lod< th=""><th><lod< th=""><th>34</th><th><lod< th=""><th>FG/70L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>34</th><th><lod< th=""><th>FG/70L</th></lod<></th></lod<>	34	<lod< th=""><th>FG/70L</th></lod<>	FG/70L
10	<lod< th=""><th><lod< th=""><th>57</th><th>21</th><th>FG/70M</th></lod<></th></lod<>	<lod< th=""><th>57</th><th>21</th><th>FG/70M</th></lod<>	57	21	FG/70M
11	<lod< th=""><th><lod< th=""><th>44</th><th>20</th><th>FG/70R</th></lod<></th></lod<>	<lod< th=""><th>44</th><th>20</th><th>FG/70R</th></lod<>	44	20	FG/70R
12	<lod< th=""><th><lod< th=""><th>39</th><th>15</th><th>FG/90R</th></lod<></th></lod<>	<lod< th=""><th>39</th><th>15</th><th>FG/90R</th></lod<>	39	15	FG/90R
13	<lod< th=""><th><lod< th=""><th>50</th><th>18</th><th>FG/90M</th></lod<></th></lod<>	<lod< th=""><th>50</th><th>18</th><th>FG/90M</th></lod<>	50	18	FG/90M
14	<lod< th=""><th><lod< th=""><th>41</th><th><lod< th=""><th>FG/90L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>41</th><th><lod< th=""><th>FG/90L</th></lod<></th></lod<>	41	<lod< th=""><th>FG/90L</th></lod<>	FG/90L
15	<lod< th=""><th><lod< th=""><th>58</th><th>19</th><th>FG/110L</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>19</th><th>FG/110L</th></lod<>	58	19	FG/110L
16	<lod< th=""><th><lod< th=""><th>51</th><th>15</th><th>FG/110M</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>15</th><th>FG/110M</th></lod<>	51	15	FG/110M
17	200	<lod< th=""><th>52</th><th>20</th><th>FG110R</th></lod<>	52	20	FG110R
18	<lod< th=""><th><lod< th=""><th>43</th><th><lod< th=""><th>1011010</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>43</th><th><lod< th=""><th>1011010</th></lod<></th></lod<>	43	<lod< th=""><th>1011010</th></lod<>	1011010
19	<lod< th=""><th><lod< th=""><th>56</th><th>36</th><th>FG/130R</th></lod<></th></lod<>	<lod< th=""><th>56</th><th>36</th><th>FG/130R</th></lod<>	56	36	FG/130R
20	<lod< th=""><th><lod< th=""><th>73</th><th>28</th><th>FG/130M</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>28</th><th>FG/130M</th></lod<>	73	28	FG/130M
21	<lod< th=""><th><lod< th=""><th>46</th><th>16</th><th>FG/130L</th></lod<></th></lod<>	<lod< th=""><th>46</th><th>16</th><th>FG/130L</th></lod<>	46	16	FG/130L
22	<lod< th=""><th><lod< th=""><th>78</th><th>50</th><th>FG/150R</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>50</th><th>FG/150R</th></lod<>	78	50	FG/150R
23	<lod< th=""><th><lod< th=""><th>97</th><th><lod< th=""><th>FG/150M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>97</th><th><lod< th=""><th>FG/150M</th></lod<></th></lod<>	97	<lod< th=""><th>FG/150M</th></lod<>	FG/150M
24	<lod< th=""><th><lod< th=""><th>52</th><th>134</th><th>FG/150L</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>134</th><th>FG/150L</th></lod<>	52	134	FG/150L
25	<lod< th=""><th><lod< th=""><th>45</th><th>16</th><th>FG/170R</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>16</th><th>FG/170R</th></lod<>	45	16	FG/170R
26	<lod< th=""><th><lod< th=""><th>42</th><th>23</th><th>FG/170M</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>23</th><th>FG/170M</th></lod<>	42	23	FG/170M
27	<lod< th=""><th><lod< th=""><th>102</th><th>60</th><th>FG/170L</th></lod<></th></lod<>	<lod< th=""><th>102</th><th>60</th><th>FG/170L</th></lod<>	102	60	FG/170L
28	<lod< th=""><th><lod< th=""><th>96</th><th>36</th><th>FG/190R</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>36</th><th>FG/190R</th></lod<>	96	36	FG/190R
29	<lod< th=""><th><lod< th=""><th>85</th><th>25</th><th>FG/190M</th></lod<></th></lod<>	<lod< th=""><th>85</th><th>25</th><th>FG/190M</th></lod<>	85	25	FG/190M
30	<lod< th=""><th><lod< th=""><th>79</th><th>37</th><th>FG/190L</th></lod<></th></lod<>	<lod< th=""><th>79</th><th>37</th><th>FG/190L</th></lod<>	79	37	FG/190L
31	<lod< th=""><th><lod< th=""><th>69</th><th>35</th><th>FG/210R</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>35</th><th>FG/210R</th></lod<>	69	35	FG/210R
32	<lod< th=""><th><lod< th=""><th>72</th><th>37</th><th>FG/210M</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>37</th><th>FG/210M</th></lod<>	72	37	FG/210M
33	<lod< th=""><th><lod< th=""><th>28</th><th>20</th><th>FG/210L</th></lod<></th></lod<>	<lod< th=""><th>28</th><th>20</th><th>FG/210L</th></lod<>	28	20	FG/210L
34	<lod< th=""><th><lod< th=""><th>30</th><th><lod< th=""><th>FG/230R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>30</th><th><lod< th=""><th>FG/230R</th></lod<></th></lod<>	30	<lod< th=""><th>FG/230R</th></lod<>	FG/230R
35	<lod< th=""><th><lod< th=""><th>58</th><th>24</th><th>FG/230M</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>24</th><th>FG/230M</th></lod<>	58	24	FG/230M
36	<lod< th=""><th><lod< th=""><th>75</th><th>24</th><th>FG/230L</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>24</th><th>FG/230L</th></lod<>	75	24	FG/230L
37	<lod< th=""><th><lod< th=""><th>38</th><th>19</th><th>FG/250L</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>19</th><th>FG/250L</th></lod<>	38	19	FG/250L
38	<lod< th=""><th><lod< th=""><th>96</th><th>63</th><th>FG/250M</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>63</th><th>FG/250M</th></lod<>	96	63	FG/250M
39	<lod< th=""><th><lod< th=""><th>33</th><th>14</th><th>FG/250R</th></lod<></th></lod<>	<lod< th=""><th>33</th><th>14</th><th>FG/250R</th></lod<>	33	14	FG/250R
40	<lod< th=""><th>82</th><th>196</th><th>156</th><th></th></lod<>	82	196	156	
41	<lod< th=""><th><lod< th=""><th>164</th><th>101</th><th></th></lod<></th></lod<>	<lod< th=""><th>164</th><th>101</th><th></th></lod<>	164	101	
42 43	<lod< th=""><th><lod <lod< th=""><th>123 147</th><th>96</th><th></th></lod<></lod </th></lod<>	<lod <lod< th=""><th>123 147</th><th>96</th><th></th></lod<></lod 	123 147	96	
43	<lod <lod< th=""><th>_</th><th></th><th>85 57</th><th></th></lod<></lod 	_		85 57	
44	<lod <lod< th=""><th>58 46</th><th>108 182</th><th>57 88</th><th></th></lod<></lod 	58 46	108 182	57 88	
46	<lod <lod< th=""><th><lod< th=""><th>195</th><th>163</th><th></th></lod<></th></lod<></lod 	<lod< th=""><th>195</th><th>163</th><th></th></lod<>	195	163	
46	<lod <lod< th=""><th><lod <lod< th=""><th>98</th><th>189</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>98</th><th>189</th><th></th></lod<></lod 	98	189	
48	<lod <lod< th=""><th><lod <lod< th=""><th>140</th><th>143</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>140</th><th>143</th><th></th></lod<></lod 	140	143	
48	<lod <lod< th=""><th><lod <lod< th=""><th>132</th><th>127</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>132</th><th>127</th><th></th></lod<></lod 	132	127	
50	<lod <lod< th=""><th><lod <lod< th=""><th>215</th><th>150</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>215</th><th>150</th><th></th></lod<></lod 	215	150	
50 51	<lod <lod< th=""><th><lod <lod< th=""><th>117</th><th>115</th><th></th></lod<></lod </th></lod<></lod 	<lod <lod< th=""><th>117</th><th>115</th><th></th></lod<></lod 	117	115	
IJΙ	<lud< th=""><th><lud< th=""><th>117</th><th>110</th><th></th></lud<></th></lud<>	<lud< th=""><th>117</th><th>110</th><th></th></lud<>	117	110	

Not validation, but checking material deposited to raise stream bed.

XRF Data 25 March 2010



Reading	Cr	Cu	Zn	Pb	Description				
1		Standardisation							
2	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th>SiO2 blank</th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th>SiO2 blank</th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>SiO2 blank</th></lod<></th></lod<>	<lod< th=""><th>SiO2 blank</th></lod<>	SiO2 blank				
3	288	92	426	134	NIST xx				
4	176	523	1145	178	NIST xx				
5			Standa	rdisation					
6	<lod< th=""><th><lod< th=""><th>46</th><th>15</th><th>Salt Marsh Brown</th></lod<></th></lod<>	<lod< th=""><th>46</th><th>15</th><th>Salt Marsh Brown</th></lod<>	46	15	Salt Marsh Brown				
7	<lod< th=""><th>55</th><th>915</th><th>1548</th><th>Salt Marsh Black</th></lod<>	55	915	1548	Salt Marsh Black				

XRF Data 31 March 2010



Reading	Cr	Cu	Zn	Pb	Description				
1		Standardisation							
2	<lod< th=""><th>52</th><th>181</th><th>297</th><th></th></lod<>	52	181	297					
3	<lod< th=""><th>72</th><th>145</th><th>102</th><th></th></lod<>	72	145	102					
4	<lod< th=""><th><lod< th=""><th>76</th><th>46</th><th>Screen of stockpile TLB</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>46</th><th>Screen of stockpile TLB</th></lod<>	76	46	Screen of stockpile TLB				
5	<lod< th=""><th><lod< th=""><th>220</th><th>169</th><th>of Cell D around where</th></lod<></th></lod<>	<lod< th=""><th>220</th><th>169</th><th>of Cell D around where</th></lod<>	220	169	of Cell D around where				
6	<lod< th=""><th>65</th><th>185</th><th>141</th><th>John Rays are doing</th></lod<>	65	185	141	John Rays are doing				
7	164	<lod< th=""><th>125</th><th>37</th><th>drainage works (D/S of</th></lod<>	125	37	drainage works (D/S of				
8	<lod< th=""><th><lod< th=""><th>96</th><th>29</th><th>culvert)</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>29</th><th>culvert)</th></lod<>	96	29	culvert)				
9	<lod< th=""><th><lod< th=""><th>196</th><th>186</th><th></th></lod<></th></lod<>	<lod< th=""><th>196</th><th>186</th><th></th></lod<>	196	186					
10	<lod< th=""><th>80</th><th>222</th><th>172</th><th></th></lod<>	80	222	172					
11	<lod< th=""><th><lod< th=""><th>189</th><th>84</th><th>Screen of stockpile TLB</th></lod<></th></lod<>	<lod< th=""><th>189</th><th>84</th><th>Screen of stockpile TLB</th></lod<>	189	84	Screen of stockpile TLB				
12	<lod< th=""><th>41</th><th>172</th><th>85</th><th>of Cell D around where</th></lod<>	41	172	85	of Cell D around where				
13	<lod< th=""><th>105</th><th>471</th><th>212</th><th>HCC contractors are</th></lod<>	105	471	212	HCC contractors are				
14	<lod< th=""><th><lod< th=""><th>828</th><th>724</th><th>doing drainage works</th></lod<></th></lod<>	<lod< th=""><th>828</th><th>724</th><th>doing drainage works</th></lod<>	828	724	doing drainage works				
15	<lod< th=""><th>50</th><th>298</th><th>251</th><th>(U/S of culvert</th></lod<>	50	298	251	(U/S of culvert				

XRF Data 07 April 2010



Reading	Cr	Cu	Zn	Pb	Description		
1			Standar	disation			
2			Standar	disation			
3			Standar	disation			
4	<lod< th=""><th><lod< th=""><th>53</th><th>17</th><th>Spot Check Cell H</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>17</th><th>Spot Check Cell H</th></lod<>	53	17	Spot Check Cell H		
5	<lod< th=""><th><lod< th=""><th>57</th><th><lod< th=""><th>top transects</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>57</th><th><lod< th=""><th>top transects</th></lod<></th></lod<>	57	<lod< th=""><th>top transects</th></lod<>	top transects		
6	<lod< th=""><th><lod< th=""><th>28</th><th><lod< th=""><th>top transects</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>28</th><th><lod< th=""><th>top transects</th></lod<></th></lod<>	28	<lod< th=""><th>top transects</th></lod<>	top transects		
7		Standardisation					
8	<lod< th=""><th><lod< th=""><th>69</th><th>29</th><th>Spot Check Cell H</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>29</th><th>Spot Check Cell H</th></lod<>	69	29	Spot Check Cell H		
9	<lod< th=""><th><lod< th=""><th>99</th><th>39</th><th>top transects</th></lod<></th></lod<>	<lod< th=""><th>99</th><th>39</th><th>top transects</th></lod<>	99	39	top transects		

XRF Data 08 April 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2	<lod< th=""><th><lod< th=""><th>31</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>31</th><th><lod< th=""><th></th></lod<></th></lod<>	31	<lod< th=""><th></th></lod<>	
3	<lod< th=""><th><lod< th=""><th>24</th><th><lod< th=""><th>Spot Check top 3</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>24</th><th><lod< th=""><th>Spot Check top 3</th></lod<></th></lod<>	24	<lod< th=""><th>Spot Check top 3</th></lod<>	Spot Check top 3
4	<lod< th=""><th><lod< th=""><th>135</th><th>71</th><th>transects of Cell H</th></lod<></th></lod<>	<lod< th=""><th>135</th><th>71</th><th>transects of Cell H</th></lod<>	135	71	transects of Cell H
5	<lod< th=""><th><lod< th=""><th>99</th><th>54</th><th></th></lod<></th></lod<>	<lod< th=""><th>99</th><th>54</th><th></th></lod<>	99	54	
6	<lod< th=""><th><lod< th=""><th>34</th><th><lod< th=""><th>H/10L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>34</th><th><lod< th=""><th>H/10L</th></lod<></th></lod<>	34	<lod< th=""><th>H/10L</th></lod<>	H/10L
7	<lod< th=""><th><lod< th=""><th>36</th><th>13</th><th>H/10M</th></lod<></th></lod<>	<lod< th=""><th>36</th><th>13</th><th>H/10M</th></lod<>	36	13	H/10M
8	<lod< th=""><th><lod< th=""><th>73</th><th>24</th><th>H/10R</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>24</th><th>H/10R</th></lod<>	73	24	H/10R
9	<lod< th=""><th><lod< th=""><th>36</th><th><lod< th=""><th>H/30L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>36</th><th><lod< th=""><th>H/30L</th></lod<></th></lod<>	36	<lod< th=""><th>H/30L</th></lod<>	H/30L
10	<lod< th=""><th><lod< th=""><th>38</th><th><lod< th=""><th>H/30M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>38</th><th><lod< th=""><th>H/30M</th></lod<></th></lod<>	38	<lod< th=""><th>H/30M</th></lod<>	H/30M
11	<lod< th=""><th><lod< th=""><th><lod< th=""><th><lod< th=""><th>H/30R</th></lod<></th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th><lod< th=""><th>H/30R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th><lod< th=""><th>H/30R</th></lod<></th></lod<>	<lod< th=""><th>H/30R</th></lod<>	H/30R
12	<lod< th=""><th><lod< th=""><th>62</th><th>32</th><th>H/50L</th></lod<></th></lod<>	<lod< th=""><th>62</th><th>32</th><th>H/50L</th></lod<>	62	32	H/50L
13	<lod< th=""><th><lod< th=""><th>22</th><th><lod< th=""><th>H/50M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>22</th><th><lod< th=""><th>H/50M</th></lod<></th></lod<>	22	<lod< th=""><th>H/50M</th></lod<>	H/50M
14	<lod< th=""><th><lod< th=""><th>22</th><th><lod< th=""><th>H/50R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>22</th><th><lod< th=""><th>H/50R</th></lod<></th></lod<>	22	<lod< th=""><th>H/50R</th></lod<>	H/50R

Validation

XRF Data 09 April 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2			Standar	disation	
3			Standar	disation	
4	<lod< th=""><th><lod< th=""><th>121</th><th>73</th><th></th></lod<></th></lod<>	<lod< th=""><th>121</th><th>73</th><th></th></lod<>	121	73	
5	<lod< th=""><th><lod< th=""><th>127</th><th>129</th><th></th></lod<></th></lod<>	<lod< th=""><th>127</th><th>129</th><th></th></lod<>	127	129	
6	<lod< th=""><th><lod< th=""><th>171</th><th>596</th><th></th></lod<></th></lod<>	<lod< th=""><th>171</th><th>596</th><th></th></lod<>	171	596	
7	<lod< th=""><th>54</th><th>389</th><th>493</th><th></th></lod<>	54	389	493	
8	<lod< th=""><th><lod< th=""><th>243</th><th>1164</th><th>Checking material</th></lod<></th></lod<>	<lod< th=""><th>243</th><th>1164</th><th>Checking material</th></lod<>	243	1164	Checking material
9	<lod< th=""><th>50</th><th>364</th><th>1923</th><th>being removed from</th></lod<>	50	364	1923	being removed from
10	<lod< th=""><th><lod< th=""><th>87</th><th>50</th><th>Cell M</th></lod<></th></lod<>	<lod< th=""><th>87</th><th>50</th><th>Cell M</th></lod<>	87	50	Cell M
11	<lod< th=""><th>38</th><th>65</th><th>74</th><th>Cell IVI</th></lod<>	38	65	74	Cell IVI
12	<lod< th=""><th><lod< th=""><th>27</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>27</th><th><lod< th=""><th></th></lod<></th></lod<>	27	<lod< th=""><th></th></lod<>	
13	<lod< th=""><th><lod< th=""><th>99</th><th>51</th><th></th></lod<></th></lod<>	<lod< th=""><th>99</th><th>51</th><th></th></lod<>	99	51	
14	<lod< th=""><th>45</th><th>124</th><th>65</th><th></th></lod<>	45	124	65	
15	<lod< th=""><th><lod< th=""><th>60</th><th>27</th><th></th></lod<></th></lod<>	<lod< th=""><th>60</th><th>27</th><th></th></lod<>	60	27	

XRF Data 12 April 2010



Reading	Cr	Cu	Zn	Pb	Description			
1			Standar	disation				
2			Standar	disation				
3			Standar	disation				
4			Standar	disation				
5			Standar	disation				
6			Standar	disation				
7			Standar	disation				
8			Standar	disation				
9	<lod< th=""><th><lod< th=""><th>117</th><th>57</th><th>PR1</th></lod<></th></lod<>	<lod< th=""><th>117</th><th>57</th><th>PR1</th></lod<>	117	57	PR1			
10	<lod< th=""><th colspan="6"><lod< th=""></lod<></th></lod<>	<lod< th=""></lod<>						
11	<lod< th=""><th colspan="7"><lod 1496="" 30="" <lod="" pr3<="" th=""></lod></th></lod<>	<lod 1496="" 30="" <lod="" pr3<="" th=""></lod>						
12	<lod< th=""><th><lod< th=""><th>81</th><th>34</th><th>PR4</th></lod<></th></lod<>	<lod< th=""><th>81</th><th>34</th><th>PR4</th></lod<>	81	34	PR4			

XRF Data 13 April 2010



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2			Standar	disation				
3			Standar	disation				
4	<lod< th=""><th><lod< th=""><th>64</th><th>27</th><th>Spot check Cell H</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>27</th><th>Spot check Cell H</th></lod<>	64	27	Spot check Cell H			
5	<lod< th=""><th><lod< th=""><th>51</th><th>33</th><th>sewer X-ing backfill</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>33</th><th>sewer X-ing backfill</th></lod<>	51	33	sewer X-ing backfill			
6	<lod< th=""><th><lod< th=""><th>121</th><th>74</th><th></th></lod<></th></lod<>	<lod< th=""><th>121</th><th>74</th><th></th></lod<>	121	74				
7	<lod< th=""><th><lod< th=""><th>81</th><th>23</th><th></th></lod<></th></lod<>	<lod< th=""><th>81</th><th>23</th><th></th></lod<>	81	23				
8	<lod< th=""><th><lod< th=""><th>2208</th><th>2896</th><th></th></lod<></th></lod<>	<lod< th=""><th>2208</th><th>2896</th><th></th></lod<>	2208	2896				
9	<lod< th=""><th><lod< th=""><th>92</th><th>28</th><th></th></lod<></th></lod<>	<lod< th=""><th>92</th><th>28</th><th></th></lod<>	92	28				
10	<lod< th=""><th><lod< th=""><th>53</th><th>40</th><th>Spot check Cell H</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>40</th><th>Spot check Cell H</th></lod<>	53	40	Spot check Cell H			
11	<lod< th=""><th><lod< th=""><th>59</th><th>47</th><th>transects 110, 130</th></lod<></th></lod<>	<lod< th=""><th>59</th><th>47</th><th>transects 110, 130</th></lod<>	59	47	transects 110, 130			
12	<lod< th=""><th><lod< th=""><th>95</th><th>27</th><th>and 150. Also ooze</th></lod<></th></lod<>	<lod< th=""><th>95</th><th>27</th><th>and 150. Also ooze</th></lod<>	95	27	and 150. Also ooze			
13	<lod< th=""><th><lod< th=""><th>261</th><th>182</th><th>layer beneath</th></lod<></th></lod<>	<lod< th=""><th>261</th><th>182</th><th>layer beneath</th></lod<>	261	182	layer beneath			
14	<lod< th=""><th><lod< th=""><th>54</th><th>21</th><th>boardwalk.</th></lod<></th></lod<>	<lod< th=""><th>54</th><th>21</th><th>boardwalk.</th></lod<>	54	21	boardwalk.			
15	<lod< th=""><th><lod< th=""><th>35</th><th>19</th><th>]</th></lod<></th></lod<>	<lod< th=""><th>35</th><th>19</th><th>]</th></lod<>	35	19]			
16	<lod< th=""><th>45</th><th>357</th><th>290</th><th>]</th></lod<>	45	357	290]			
17	<lod< th=""><th>41</th><th>225</th><th>144</th><th></th></lod<>	41	225	144				
18	<lod< th=""><th><lod< th=""><th>143</th><th>115</th><th></th></lod<></th></lod<>	<lod< th=""><th>143</th><th>115</th><th></th></lod<>	143	115				

XRF Data 14 April 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2			Standar	disation	
3			Standar	disation	
4	<lod< th=""><th><lod< th=""><th>35</th><th>21</th><th>H/110L</th></lod<></th></lod<>	<lod< th=""><th>35</th><th>21</th><th>H/110L</th></lod<>	35	21	H/110L
5	<lod< th=""><th><lod< th=""><th>53</th><th>18</th><th>H/110M</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>18</th><th>H/110M</th></lod<>	53	18	H/110M
6	<lod< th=""><th><lod< th=""><th>36</th><th>19</th><th>H/130L</th></lod<></th></lod<>	<lod< th=""><th>36</th><th>19</th><th>H/130L</th></lod<>	36	19	H/130L
7	<lod< th=""><th><lod< th=""><th>50</th><th><lod< th=""><th>H/130RM</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>50</th><th><lod< th=""><th>H/130RM</th></lod<></th></lod<>	50	<lod< th=""><th>H/130RM</th></lod<>	H/130RM
8	<lod< th=""><th><lod< th=""><th>52</th><th>14</th><th>H/130M</th></lod<></th></lod<>	<lod< th=""><th>52</th><th>14</th><th>H/130M</th></lod<>	52	14	H/130M
9	<lod< th=""><th><lod< th=""><th>29</th><th><lod< th=""><th>H/130LM</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>29</th><th><lod< th=""><th>H/130LM</th></lod<></th></lod<>	29	<lod< th=""><th>H/130LM</th></lod<>	H/130LM
10	<lod< th=""><th>62</th><th>198</th><th>799</th><th></th></lod<>	62	198	799	
11	<lod< th=""><th><lod< th=""><th>67</th><th>30</th><th>Checking material up</th></lod<></th></lod<>	<lod< th=""><th>67</th><th>30</th><th>Checking material up</th></lod<>	67	30	Checking material up
12	<lod< th=""><th><lod< th=""><th>71</th><th>50</th><th>against panels on</th></lod<></th></lod<>	<lod< th=""><th>71</th><th>50</th><th>against panels on</th></lod<>	71	50	against panels on
13	<lod< th=""><th><lod< th=""><th>79</th><th>34</th><th>TRB of Cell H.</th></lod<></th></lod<>	<lod< th=""><th>79</th><th>34</th><th>TRB of Cell H.</th></lod<>	79	34	TRB of Cell H.
14	<lod< th=""><th><lod< th=""><th>96</th><th>152</th><th>TIND OF CEILTI.</th></lod<></th></lod<>	<lod< th=""><th>96</th><th>152</th><th>TIND OF CEILTI.</th></lod<>	96	152	TIND OF CEILTI.
15	<lod< th=""><th><lod< th=""><th>114</th><th>296</th><th></th></lod<></th></lod<>	<lod< th=""><th>114</th><th>296</th><th></th></lod<>	114	296	

Validation

XRF Data 15 April 2010



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2			Standar	disation				
3			Standar	disation				
4	<lod< th=""><th><lod< th=""><th>61</th><th>23</th><th>PRSP1</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>23</th><th>PRSP1</th></lod<>	61	23	PRSP1			
5	<lod< th=""><th><lod< th=""><th>69</th><th>29</th><th>PRSP2</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>29</th><th>PRSP2</th></lod<>	69	29	PRSP2			
6	<lod< th=""><th><lod< th=""><th>53</th><th>19</th><th>PRSP3</th></lod<></th></lod<>	<lod< th=""><th>53</th><th>19</th><th>PRSP3</th></lod<>	53	19	PRSP3			
7	<lod< th=""><th><lod< th=""><th>55</th><th>14</th><th>PRSP4</th></lod<></th></lod<>	<lod< th=""><th>55</th><th>14</th><th>PRSP4</th></lod<>	55	14	PRSP4			
8	<lod< th=""><th><lod< th=""><th>67</th><th>18</th><th>PRSP5</th></lod<></th></lod<>	<lod< th=""><th>67</th><th>18</th><th>PRSP5</th></lod<>	67	18	PRSP5			
9	<lod< th=""><th><lod< th=""><th>51</th><th>21</th><th>PRSP6</th></lod<></th></lod<>	<lod< th=""><th>51</th><th>21</th><th>PRSP6</th></lod<>	51	21	PRSP6			
10	<lod< th=""><th><lod< th=""><th>42</th><th>16</th><th>PRSP7</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>16</th><th>PRSP7</th></lod<>	42	16	PRSP7			
11	<lod< th=""><th><lod< th=""><th>75</th><th>26</th><th>PRSP8</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>26</th><th>PRSP8</th></lod<>	75	26	PRSP8			
12	<lod< th=""><th><lod< th=""><th>53</th><th><lod< th=""><th>PRSP9</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>53</th><th><lod< th=""><th>PRSP9</th></lod<></th></lod<>	53	<lod< th=""><th>PRSP9</th></lod<>	PRSP9			
13	<lod< th=""><th><lod< th=""><th>78</th><th>54</th><th>PRSP10</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>54</th><th>PRSP10</th></lod<>	78	54	PRSP10			
14	<lod< th=""><th><lod< th=""><th>326</th><th>310</th><th></th></lod<></th></lod<>	<lod< th=""><th>326</th><th>310</th><th></th></lod<>	326	310				
15			Standar	disation				
16	<lod< th=""><th><lod< th=""><th>22</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>22</th><th><lod< th=""><th></th></lod<></th></lod<>	22	<lod< th=""><th></th></lod<>				
17	<lod< th=""><th><lod< th=""><th>199</th><th>150</th><th></th></lod<></th></lod<>	<lod< th=""><th>199</th><th>150</th><th></th></lod<>	199	150				
18	<lod< th=""><th><lod< th=""><th>285</th><th>113</th><th></th></lod<></th></lod<>	<lod< th=""><th>285</th><th>113</th><th></th></lod<>	285	113				
19	<lod< th=""><th><lod< th=""><th>231</th><th>72</th><th></th></lod<></th></lod<>	<lod< th=""><th>231</th><th>72</th><th></th></lod<>	231	72				

Lab tested

XRF Data 16 April 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Stand	ardisation	
2			Stand	ardisation	
3	<lod< th=""><th><lod< th=""><th>53</th><th><lod< th=""><th>Check of Port Road</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>53</th><th><lod< th=""><th>Check of Port Road</th></lod<></th></lod<>	53	<lod< th=""><th>Check of Port Road</th></lod<>	Check of Port Road
4	<lod< th=""><th><lod< th=""><th>76</th><th>26</th><th>stockpile of material in</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>26</th><th>stockpile of material in</th></lod<>	76	26	stockpile of material in
5	<lod< th=""><th><lod< th=""><th>75</th><th>26</th><th>compound for possible</th></lod<></th></lod<>	<lod< th=""><th>75</th><th>26</th><th>compound for possible</th></lod<>	75	26	compound for possible
6	<lod< th=""><th><lod< th=""><th>83</th><th>31</th><th>use as backfill.</th></lod<></th></lod<>	<lod< th=""><th>83</th><th>31</th><th>use as backfill.</th></lod<>	83	31	use as backfill.

XRF Data 19 April 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2	<lod< th=""><th><lod< th=""><th>61</th><th>49</th><th>CF/CW1</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>49</th><th>CF/CW1</th></lod<>	61	49	CF/CW1
3	<lod< th=""><th><lod< th=""><th>97</th><th>123</th><th>CF/CW2</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>123</th><th>CF/CW2</th></lod<>	97	123	CF/CW2
4	<lod< th=""><th><lod< th=""><th>73</th><th>33</th><th>CF/CW3</th></lod<></th></lod<>	<lod< th=""><th>73</th><th>33</th><th>CF/CW3</th></lod<>	73	33	CF/CW3
5	<lod< th=""><th><lod< th=""><th>63</th><th>104</th><th>CF/CW4</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>104</th><th>CF/CW4</th></lod<>	63	104	CF/CW4
6	<lod< th=""><th><lod< th=""><th>97</th><th>102</th><th>CF/CW5</th></lod<></th></lod<>	<lod< th=""><th>97</th><th>102</th><th>CF/CW5</th></lod<>	97	102	CF/CW5
7	<lod< th=""><th><lod< th=""><th>64</th><th>76</th><th>CF/CW6</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>76</th><th>CF/CW6</th></lod<>	64	76	CF/CW6
8	<lod< th=""><th><lod< th=""><th>78</th><th>74</th><th>CF/CW7</th></lod<></th></lod<>	<lod< th=""><th>78</th><th>74</th><th>CF/CW7</th></lod<>	78	74	CF/CW7
9	<lod< th=""><th><lod< th=""><th>58</th><th>24</th><th>CF/CW8</th></lod<></th></lod<>	<lod< th=""><th>58</th><th>24</th><th>CF/CW8</th></lod<>	58	24	CF/CW8
10	<lod< th=""><th><lod< th=""><th>124</th><th>88</th><th>CF/CW9</th></lod<></th></lod<>	<lod< th=""><th>124</th><th>88</th><th>CF/CW9</th></lod<>	124	88	CF/CW9
11	<lod< th=""><th><lod< th=""><th>170</th><th>139</th><th>CF/CW10</th></lod<></th></lod<>	<lod< th=""><th>170</th><th>139</th><th>CF/CW10</th></lod<>	170	139	CF/CW10

Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls19 April

XRF Data 20 April 2010



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardization						
2			Standar	dization				
3			Standar	dization				
4	<lod< th=""><th colspan="6">LOD <lod 106="" 93<="" th=""></lod></th></lod<>	LOD <lod 106="" 93<="" th=""></lod>						
5	<lod< th=""><th><lod< th=""><th>78</th><th>13</th><th></th></lod<></th></lod<>	<lod< th=""><th>78</th><th>13</th><th></th></lod<>	78	13				

XRF Data 22 April 2010



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2			Standar	disation				
3			Standar	disation				
4	<lod< th=""><th><lod< th=""><th>46</th><th>18</th><th></th></lod<></th></lod<>	<lod< th=""><th>46</th><th>18</th><th></th></lod<>	46	18				
5	<lod< th=""><th><lod< th=""><th>36</th><th>16</th><th></th></lod<></th></lod<>	<lod< th=""><th>36</th><th>16</th><th></th></lod<>	36	16				
6	<lod< th=""><th>54</th><th>863</th><th>688</th><th></th></lod<>	54	863	688				
7	<lod< th=""><th><lod< th=""><th>272</th><th>137</th><th></th></lod<></th></lod<>	<lod< th=""><th>272</th><th>137</th><th></th></lod<>	272	137				
8	<lod< th=""><th><lod< th=""><th>372</th><th>214</th><th></th></lod<></th></lod<>	<lod< th=""><th>372</th><th>214</th><th></th></lod<>	372	214				
9	<lod< th=""><th><lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>32</th><th><lod< th=""><th></th></lod<></th></lod<>	32	<lod< th=""><th></th></lod<>				
10	<lod< th=""><th><lod< th=""><th>37</th><th>21</th><th></th></lod<></th></lod<>	<lod< th=""><th>37</th><th>21</th><th></th></lod<>	37	21				
11	<lod< th=""><th><lod< th=""><th>30</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>30</th><th><lod< th=""><th></th></lod<></th></lod<>	30	<lod< th=""><th></th></lod<>				
12	<lod< th=""><th><lod< th=""><th>44</th><th>17</th><th></th></lod<></th></lod<>	<lod< th=""><th>44</th><th>17</th><th></th></lod<>	44	17				
13	<lod< th=""><th><lod< th=""><th>91</th><th>38</th><th></th></lod<></th></lod<>	<lod< th=""><th>91</th><th>38</th><th></th></lod<>	91	38				
14	<lod< th=""><th>42</th><th>136</th><th>102</th><th></th></lod<>	42	136	102				
15			Standar	disation				
16	<lod< th=""><th><lod< th=""><th>55</th><th>33</th><th></th></lod<></th></lod<>	<lod< th=""><th>55</th><th>33</th><th></th></lod<>	55	33				
17	<lod< th=""><th><lod< th=""><th>511</th><th>671</th><th></th></lod<></th></lod<>	<lod< th=""><th>511</th><th>671</th><th></th></lod<>	511	671				
18	<lod< th=""><th><lod< th=""><th>817</th><th>704</th><th></th></lod<></th></lod<>	<lod< th=""><th>817</th><th>704</th><th></th></lod<>	817	704				
19	<lod< th=""><th><lod< th=""><th>193</th><th>161</th><th></th></lod<></th></lod<>	<lod< th=""><th>193</th><th>161</th><th></th></lod<>	193	161				
20	<lod< th=""><th><lod< th=""><th>60</th><th>31</th><th></th></lod<></th></lod<>	<lod< th=""><th>60</th><th>31</th><th></th></lod<>	60	31				
21	<lod< th=""><th><lod< th=""><th>193</th><th>154</th><th></th></lod<></th></lod<>	<lod< th=""><th>193</th><th>154</th><th></th></lod<>	193	154				

XRF Data 23 April 2010



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2			Standar	disation				
3			Standar	disation				
4			Standar	disation				
5	<lod< th=""><th><lod< th=""><th>49</th><th>35</th><th>M/110L</th></lod<></th></lod<>	<lod< th=""><th>49</th><th>35</th><th>M/110L</th></lod<>	49	35	M/110L			
6	<lod< th=""><th><lod< th=""><th>48</th><th>22</th><th>M/110M</th></lod<></th></lod<>	<lod< th=""><th>48</th><th>22</th><th>M/110M</th></lod<>	48	22	M/110M			
7	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>M/110R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>M/110R</th></lod<></th></lod<>	33	<lod< th=""><th>M/110R</th></lod<>	M/110R			
8	<lod< th=""><th><lod< th=""><th>43</th><th>14</th><th>M/130L</th></lod<></th></lod<>	<lod< th=""><th>43</th><th>14</th><th>M/130L</th></lod<>	43	14	M/130L			
9	<lod< th=""><th><lod< th=""><th>42</th><th>17</th><th>M/130M</th></lod<></th></lod<>	<lod< th=""><th>42</th><th>17</th><th>M/130M</th></lod<>	42	17	M/130M			
10	<lod< th=""><th><lod< th=""><th>29</th><th>16</th><th>M/130R</th></lod<></th></lod<>	<lod< th=""><th>29</th><th>16</th><th>M/130R</th></lod<>	29	16	M/130R			
11	<lod< th=""><th><lod< th=""><th>31</th><th><lod< th=""><th>MBS</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>31</th><th><lod< th=""><th>MBS</th></lod<></th></lod<>	31	<lod< th=""><th>MBS</th></lod<>	MBS			
12	<lod< th=""><th><lod< th=""><th>61</th><th>21</th><th>H/110L</th></lod<></th></lod<>	<lod< th=""><th>61</th><th>21</th><th>H/110L</th></lod<>	61	21	H/110L			
13	<lod< th=""><th><lod< th=""><th>65</th><th>33</th><th>H/110M</th></lod<></th></lod<>	<lod< th=""><th>65</th><th>33</th><th>H/110M</th></lod<>	65	33	H/110M			
14	<lod< th=""><th><lod< th=""><th>45</th><th>17</th><th>H/110R</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>17</th><th>H/110R</th></lod<>	45	17	H/110R			
15	<lod< th=""><th><lod< th=""><th>23</th><th><lod< th=""><th>H/130M</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>23</th><th><lod< th=""><th>H/130M</th></lod<></th></lod<>	23	<lod< th=""><th>H/130M</th></lod<>	H/130M			
16	<lod< th=""><th><lod< th=""><th>47</th><th><lod< th=""><th>H/130MR</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>47</th><th><lod< th=""><th>H/130MR</th></lod<></th></lod<>	47	<lod< th=""><th>H/130MR</th></lod<>	H/130MR			
17	<lod< th=""><th><lod< th=""><th>20</th><th><lod< th=""><th>H/130R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>20</th><th><lod< th=""><th>H/130R</th></lod<></th></lod<>	20	<lod< th=""><th>H/130R</th></lod<>	H/130R			
18	<lod< th=""><th><lod< th=""><th>25</th><th>14</th><th>H/150ML</th></lod<></th></lod<>	<lod< th=""><th>25</th><th>14</th><th>H/150ML</th></lod<>	25	14	H/150ML			
19	<lod< th=""><th><lod< th=""><th>31</th><th>15</th><th>H/150M</th></lod<></th></lod<>	<lod< th=""><th>31</th><th>15</th><th>H/150M</th></lod<>	31	15	H/150M			
20	<lod< th=""><th><lod< th=""><th>44</th><th>15</th><th>H/150MR</th></lod<></th></lod<>	<lod< th=""><th>44</th><th>15</th><th>H/150MR</th></lod<>	44	15	H/150MR			
21	<lod< th=""><th><lod< th=""><th>64</th><th>20</th><th>H/150R</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>20</th><th>H/150R</th></lod<>	64	20	H/150R			
22	<lod< th=""><th><lod< th=""><th>59</th><th>26</th><th></th></lod<></th></lod<>	<lod< th=""><th>59</th><th>26</th><th></th></lod<>	59	26				
23	<lod< th=""><th><lod< th=""><th>82</th><th>42</th><th></th></lod<></th></lod<>	<lod< th=""><th>82</th><th>42</th><th></th></lod<>	82	42				
24	<lod< th=""><th>76</th><th>916</th><th>735</th><th></th></lod<>	76	916	735				
25	<lod< th=""><th>37</th><th>143</th><th>150</th><th></th></lod<>	37	143	150				

Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls23 April

XRF Data 26 April 2010



Reading	Cr	Cu	Zn	Pb	Description		
1			Standar	disation			
2			Standar	disation			
3			Standar	disation			
4			Standar	disation			
5	<lod< th=""><th>42</th><th>416</th><th>582</th><th></th></lod<>	42	416	582			
6			Standar	disation			
7	<lod< th=""><th><lod< th=""><th>44</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>44</th><th><lod< th=""><th></th></lod<></th></lod<>	44	<lod< th=""><th></th></lod<>			
8	<lod< th=""><th>51</th><th>517</th><th>497</th><th></th></lod<>	51	517	497			
9	<lod< th=""><th colspan="6"><lod< th=""></lod<></th></lod<>	<lod< th=""></lod<>					
10	<lod< th=""><th><lod< th=""><th>117</th><th>88</th><th></th></lod<></th></lod<>	<lod< th=""><th>117</th><th>88</th><th></th></lod<>	117	88			
11	<lod< th=""><th><lod< th=""><th>38</th><th>12</th><th></th></lod<></th></lod<>	<lod< th=""><th>38</th><th>12</th><th></th></lod<>	38	12			

XRF Data 27 April 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2	227	42	52	28	
3	<lod< th=""><th><lod< th=""><th>241</th><th>73</th><th></th></lod<></th></lod<>	<lod< th=""><th>241</th><th>73</th><th></th></lod<>	241	73	
4	<lod< th=""><th>102</th><th>2641</th><th>1263</th><th></th></lod<>	102	2641	1263	
5	<lod< th=""><th><lod< th=""><th>236</th><th>272</th><th></th></lod<></th></lod<>	<lod< th=""><th>236</th><th>272</th><th></th></lod<>	236	272	

XRF Data 28 April 2010



Reading	Cr	Cu	Zn	Pb	Description			
1		Standardisation						
2	<lod< th=""><th><lod< th=""><th>80</th><th>55</th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>55</th><th></th></lod<>	80	55				
3	<lod< th=""><th><lod< th=""><th>98</th><th>55</th><th></th></lod<></th></lod<>	<lod< th=""><th>98</th><th>55</th><th></th></lod<>	98	55				
4	<lod< th=""><th><lod< th=""><th>132</th><th>105</th><th></th></lod<></th></lod<>	<lod< th=""><th>132</th><th>105</th><th></th></lod<>	132	105				
5	<lod< th=""><th><lod< th=""><th>127</th><th>92</th><th></th></lod<></th></lod<>	<lod< th=""><th>127</th><th>92</th><th></th></lod<>	127	92				
6	<lod< th=""><th><lod< th=""><th>114</th><th>85</th><th>Spot check Cell H</th></lod<></th></lod<>	<lod< th=""><th>114</th><th>85</th><th>Spot check Cell H</th></lod<>	114	85	Spot check Cell H			
7	<lod< th=""><th><lod< th=""><th>137</th><th>84</th><th>130 - 150, Cell M10</th></lod<></th></lod<>	<lod< th=""><th>137</th><th>84</th><th>130 - 150, Cell M10</th></lod<>	137	84	130 - 150, Cell M10			
8	<lod< th=""><th><lod< th=""><th>91</th><th>71</th><th>transects</th></lod<></th></lod<>	<lod< th=""><th>91</th><th>71</th><th>transects</th></lod<>	91	71	transects			
9	<lod< th=""><th><lod< th=""><th>108</th><th>56</th><th></th></lod<></th></lod<>	<lod< th=""><th>108</th><th>56</th><th></th></lod<>	108	56				
10	<lod< th=""><th><lod< th=""><th>126</th><th>69</th><th></th></lod<></th></lod<>	<lod< th=""><th>126</th><th>69</th><th></th></lod<>	126	69				
11	<lod< th=""><th><lod< th=""><th>118</th><th>53</th><th></th></lod<></th></lod<>	<lod< th=""><th>118</th><th>53</th><th></th></lod<>	118	53				
12	<lod< th=""><th><lod< th=""><th>121</th><th>92</th><th></th></lod<></th></lod<>	<lod< th=""><th>121</th><th>92</th><th></th></lod<>	121	92				
13	<lod< th=""><th><lod< th=""><th>57</th><th><lod< th=""><th>H/130L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>57</th><th><lod< th=""><th>H/130L</th></lod<></th></lod<>	57	<lod< th=""><th>H/130L</th></lod<>	H/130L			
14	<lod< th=""><th><lod< th=""><th>33</th><th><lod< th=""><th>H/130LM</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>33</th><th><lod< th=""><th>H/130LM</th></lod<></th></lod<>	33	<lod< th=""><th>H/130LM</th></lod<>	H/130LM			
15	<lod< th=""><th><lod< th=""><th>42</th><th><lod< th=""><th>H/150L</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>42</th><th><lod< th=""><th>H/150L</th></lod<></th></lod<>	42	<lod< th=""><th>H/150L</th></lod<>	H/150L			
16	<lod< th=""><th><lod< th=""><th>46</th><th><lod< th=""><th>M/10LM</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>46</th><th><lod< th=""><th>M/10LM</th></lod<></th></lod<>	46	<lod< th=""><th>M/10LM</th></lod<>	M/10LM			
17	<lod< th=""><th><lod< th=""><th>100</th><th>72</th><th>M/10M</th></lod<></th></lod<>	<lod< th=""><th>100</th><th>72</th><th>M/10M</th></lod<>	100	72	M/10M			
18	<lod< th=""><th><lod< th=""><th>22</th><th><lod< th=""><th>M/10R</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>22</th><th><lod< th=""><th>M/10R</th></lod<></th></lod<>	22	<lod< th=""><th>M/10R</th></lod<>	M/10R			

Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls28 April

XRF Data 29 April 2010



Reading	Cr	Cu	Zn	Pb	Description				
1		Standardisation							
2	<lod< th=""><th><lod< th=""><th>50</th><th><lod< th=""><th></th></lod<></th></lod<></th></lod<>	<lod< th=""><th>50</th><th><lod< th=""><th></th></lod<></th></lod<>	50	<lod< th=""><th></th></lod<>					
3	<lod< th=""><th><lod< th=""><th>154</th><th>39</th><th></th></lod<></th></lod<>	<lod< th=""><th>154</th><th>39</th><th></th></lod<>	154	39					
4	<lod< th=""><th><lod< th=""><th>91</th><th>51</th><th></th></lod<></th></lod<>	<lod< th=""><th>91</th><th>51</th><th></th></lod<>	91	51					
5	<lod< th=""><th><lod< th=""><th>990</th><th>6938</th><th></th></lod<></th></lod<>	<lod< th=""><th>990</th><th>6938</th><th></th></lod<>	990	6938					
6	<lod< th=""><th><lod< th=""><th>120</th><th>98</th><th></th></lod<></th></lod<>	<lod< th=""><th>120</th><th>98</th><th></th></lod<>	120	98					
7	<lod< th=""><th><lod< th=""><th>115</th><th>152</th><th></th></lod<></th></lod<>	<lod< th=""><th>115</th><th>152</th><th></th></lod<>	115	152					
8	<lod< th=""><th><lod< th=""><th>132</th><th>476</th><th></th></lod<></th></lod<>	<lod< th=""><th>132</th><th>476</th><th></th></lod<>	132	476					
9	<lod< th=""><th><lod< th=""><th>69</th><th>101</th><th>Checking Cell after</th></lod<></th></lod<>	<lod< th=""><th>69</th><th>101</th><th>Checking Cell after</th></lod<>	69	101	Checking Cell after				
10	<lod< th=""><th><lod< th=""><th>38</th><th>17</th><th>rain event 27 April</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>17</th><th>rain event 27 April</th></lod<>	38	17	rain event 27 April				
11	<lod< th=""><th><lod< th=""><th>64</th><th>91</th><th>Taill event 21 April</th></lod<></th></lod<>	<lod< th=""><th>64</th><th>91</th><th>Taill event 21 April</th></lod<>	64	91	Taill event 21 April				
12	<lod< th=""><th><lod< th=""><th>91</th><th>70</th><th></th></lod<></th></lod<>	<lod< th=""><th>91</th><th>70</th><th></th></lod<>	91	70					
13	<lod< th=""><th><lod< th=""><th>79</th><th>55</th><th></th></lod<></th></lod<>	<lod< th=""><th>79</th><th>55</th><th></th></lod<>	79	55					
14	<lod< th=""><th><lod< th=""><th>266</th><th>154</th><th></th></lod<></th></lod<>	<lod< th=""><th>266</th><th>154</th><th></th></lod<>	266	154					
15	<lod< th=""><th><lod< th=""><th>40</th><th>28</th><th></th></lod<></th></lod<>	<lod< th=""><th>40</th><th>28</th><th></th></lod<>	40	28					
16	<lod< th=""><th>42</th><th>697</th><th>160</th><th></th></lod<>	42	697	160					
17	<lod< th=""><th><lod< th=""><th>69</th><th>39</th><th></th></lod<></th></lod<>	<lod< th=""><th>69</th><th>39</th><th></th></lod<>	69	39					
18	<lod< th=""><th><lod< th=""><th>55</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>55</th><th>20</th><th></th></lod<>	55	20					

XRF Data 30 April 2010



Reading	Cr	Cu	Zn	Pb	Description
1			Standar	disation	
2			Standar	disation	
3			Standar	disation	
4	<lod< th=""><th><lod< th=""><th>110</th><th>73</th><th></th></lod<></th></lod<>	<lod< th=""><th>110</th><th>73</th><th></th></lod<>	110	73	
5	<lod< th=""><th><lod< th=""><th>116</th><th>81</th><th></th></lod<></th></lod<>	<lod< th=""><th>116</th><th>81</th><th></th></lod<>	116	81	
6	<lod< th=""><th><lod< th=""><th>106</th><th>89</th><th>Spot check Urupa</th></lod<></th></lod<>	<lod< th=""><th>106</th><th>89</th><th>Spot check Urupa</th></lod<>	106	89	Spot check Urupa
7	<lod< th=""><th><lod< th=""><th>110</th><th>84</th><th>causeway material</th></lod<></th></lod<>	<lod< th=""><th>110</th><th>84</th><th>causeway material</th></lod<>	110	84	causeway material
8	<lod< th=""><th><lod< th=""><th>122</th><th>78</th><th>being taken as Type</th></lod<></th></lod<>	<lod< th=""><th>122</th><th>78</th><th>being taken as Type</th></lod<>	122	78	being taken as Type
9	<lod< th=""><th><lod< th=""><th>119</th><th>75</th><th>F.</th></lod<></th></lod<>	<lod< th=""><th>119</th><th>75</th><th>F.</th></lod<>	119	75	F.
10	<lod< th=""><th><lod< th=""><th>76</th><th>60</th><th>ļ ''</th></lod<></th></lod<>	<lod< th=""><th>76</th><th>60</th><th>ļ ''</th></lod<>	76	60	ļ ''
11	<lod< th=""><th><lod< th=""><th>75</th><th>65</th><th></th></lod<></th></lod<>	<lod< th=""><th>75</th><th>65</th><th></th></lod<>	75	65	
12	<lod< th=""><th><lod< th=""><th>76</th><th>48</th><th></th></lod<></th></lod<>	<lod< th=""><th>76</th><th>48</th><th></th></lod<>	76	48	
13	,		Standar		
14	<lod< th=""><th><lod< th=""><th>61</th><th>30</th><th></th></lod<></th></lod<>	<lod< th=""><th>61</th><th>30</th><th></th></lod<>	61	30	
15	<lod< th=""><th><lod< th=""><th>44</th><th>16</th><th></th></lod<></th></lod<>	<lod< th=""><th>44</th><th>16</th><th></th></lod<>	44	16	
16	<lod< th=""><th><lod< th=""><th>80</th><th>61</th><th></th></lod<></th></lod<>	<lod< th=""><th>80</th><th>61</th><th></th></lod<>	80	61	
17	<lod< th=""><th><lod< th=""><th>82</th><th>22</th><th></th></lod<></th></lod<>	<lod< th=""><th>82</th><th>22</th><th></th></lod<>	82	22	
18	<lod< th=""><th><lod< th=""><th>38</th><th>13</th><th>Spot check Urupa</th></lod<></th></lod<>	<lod< th=""><th>38</th><th>13</th><th>Spot check Urupa</th></lod<>	38	13	Spot check Urupa
19	<lod< th=""><th><lod< th=""><th>40</th><th><lod< th=""><th>causeway material</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>40</th><th><lod< th=""><th>causeway material</th></lod<></th></lod<>	40	<lod< th=""><th>causeway material</th></lod<>	causeway material
20	<lod< th=""><th><lod< th=""><th>46</th><th>31</th><th>being taken as Type</th></lod<></th></lod<>	<lod< th=""><th>46</th><th>31</th><th>being taken as Type</th></lod<>	46	31	being taken as Type
21	<lod< th=""><th><lod< th=""><th>40</th><th>25</th><th>F.</th></lod<></th></lod<>	<lod< th=""><th>40</th><th>25</th><th>F.</th></lod<>	40	25	F.
22	<lod< th=""><th><lod< th=""><th>109</th><th>139</th><th></th></lod<></th></lod<>	<lod< th=""><th>109</th><th>139</th><th></th></lod<>	109	139	
23	<lod< th=""><th><lod< th=""><th>52</th><th>32</th><th></th></lod<></th></lod<>	<lod< th=""><th>52</th><th>32</th><th></th></lod<>	52	32	
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25	<lod< th=""><th><lod< th=""><th>49</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>49</th><th>24</th><th></th></lod<>	49	24	
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28	1.00	1.05	Standar		1100440
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				14 -LOD	M/50R
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	<lod< th=""><th><lod< th=""><th></th><th></th><th>M/90L M/90M</th></lod<></th></lod<>	<lod< th=""><th></th><th></th><th>M/90L M/90M</th></lod<>			M/90L M/90M
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Validation Lab tested

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls30 April

XRF Data 03 May 2010



Reading	Cr Cu <lod< td=""> 61 <lod< td=""> 57 <lod< td=""> <lod< td=""></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<></lod<>		Zn	Pb	Description
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2	<lod< th=""><th>61</th><th>379</th><th>2322</th><th></th></lod<>	61	379	2322	
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22			Standar	disation	
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26	<lod< th=""><th><lod< th=""><th>74</th><th>176</th><th>TLB was removed</th></lod<></th></lod<>	<lod< th=""><th>74</th><th>176</th><th>TLB was removed</th></lod<>	74	176	TLB was removed
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31	<lod< th=""><th><lod< th=""><th>60</th><th>53</th><th>M/70L</th></lod<></th></lod<>	<lod< th=""><th>60</th><th>53</th><th>M/70L</th></lod<>	60	53	M/70L
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Validation

CLIENT: CPG New Zealand Ltd

PROJECT: Waiwhetu Stream Remediation

FILE: J:\Jobs\42771630\5 Works\Field notes - Sampling - Lab\Lab and XRF analysis\XRF data\XRF Data 2010 Master.xls3 May

XRF Data 05 May 2010



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2			Standar	disation	
3			Standar	disation	
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5	<lod< th=""><th><lod< th=""><th>79</th><th>28</th><th></th></lod<></th></lod<>	<lod< th=""><th>79</th><th>28</th><th></th></lod<>	79	28	
6	237	<lod< th=""><th>51</th><th>48</th><th></th></lod<>	51	48	
7	<lod< th=""><th><lod< th=""><th>74</th><th>42</th><th></th></lod<></th></lod<>	<lod< th=""><th>74</th><th>42</th><th></th></lod<>	74	42	
8	<lod< th=""><th><lod< th=""><th>59</th><th>31</th><th></th></lod<></th></lod<>	<lod< th=""><th>59</th><th>31</th><th></th></lod<>	59	31	
9	<lod< th=""><th><lod< th=""><th>88</th><th>48</th><th>Screening of Port Rd</th></lod<></th></lod<>	<lod< th=""><th>88</th><th>48</th><th>Screening of Port Rd</th></lod<>	88	48	Screening of Port Rd
10	<lod< th=""><th><lod< th=""><th>72</th><th><lod< th=""><th>material being</th></lod<></th></lod<></th></lod<>	<lod< th=""><th>72</th><th><lod< th=""><th>material being</th></lod<></th></lod<>	72	<lod< th=""><th>material being</th></lod<>	material being
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14	<lod< th=""><th><lod< th=""><th>56</th><th>24</th><th></th></lod<></th></lod<>	<lod< th=""><th>56</th><th>24</th><th></th></lod<>	56	24	
15	<lod< th=""><th><lod< th=""><th>50</th><th>23</th><th></th></lod<></th></lod<>	<lod< th=""><th>50</th><th>23</th><th></th></lod<>	50	23	
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18	<lod< th=""><th><lod< th=""><th>48</th><th>20</th><th></th></lod<></th></lod<>	<lod< th=""><th>48</th><th>20</th><th></th></lod<>	48	20	
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27	<lod< th=""><th><lod< th=""><th>138</th><th>137</th><th></th></lod<></th></lod<>	<lod< th=""><th>138</th><th>137</th><th></th></lod<>	138	137	
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30			Standar		
31	<lod< th=""><th><lod< th=""><th>67</th><th>37</th><th></th></lod<></th></lod<>	<lod< th=""><th>67</th><th>37</th><th></th></lod<>	67	37	
32	<lod< th=""><th><lod< th=""><th>63</th><th>20</th><th>Spot check of</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>20</th><th>Spot check of</th></lod<>	63	20	Spot check of
33	<lod< th=""><th><lod< th=""><th>122</th><th>73</th><th>material backfilled</th></lod<></th></lod<>	<lod< th=""><th>122</th><th>73</th><th>material backfilled</th></lod<>	122	73	material backfilled
34	<lod< th=""><th><lod< th=""><th>45</th><th>32</th><th>into saltmarsh</th></lod<></th></lod<>	<lod< th=""><th>45</th><th>32</th><th>into saltmarsh</th></lod<>	45	32	into saltmarsh
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36	<lod< th=""><th><lod< th=""><th>35</th><th>34</th><th></th></lod<></th></lod<>	<lod< th=""><th>35</th><th>34</th><th></th></lod<>	35	34	

XRF Data 06 May 2010



Reading	Cr	Cu	Zn	Pb	Description
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2	<lod< th=""><th><lod< th=""><th>59</th><th>48</th><th>Spot check Salt</th></lod<></th></lod<>	<lod< th=""><th>59</th><th>48</th><th>Spot check Salt</th></lod<>	59	48	Spot check Salt
3	<lod< th=""><th><lod< th=""><th>72</th><th>20</th><th>marsh</th></lod<></th></lod<>	<lod< th=""><th>72</th><th>20</th><th>marsh</th></lod<>	72	20	marsh
4	<lod< th=""><th><lod< th=""><th>63</th><th>43</th><th>11101511</th></lod<></th></lod<>	<lod< th=""><th>63</th><th>43</th><th>11101511</th></lod<>	63	43	11101511

Appendix E Comparison of XRF to Laboratory Data



Appendix E

Comparison of XRF screening and laboratory results

The purpose of using the portable XRF was to provide rapid screening data in the field, to assist in determining the end point of the excavation of contaminated material, and to a lesser extent, the classification of some material at the landfill.

All validation samples collected during the works were screened with the portable XRF analyser prior to being submitted to the laboratory. A detailed statistical analysis of the correlation between the two sets of results (XRF and laboratory) has not been carried out as part of this report, however some general comments are included here.

Reference Material

The key reference documents used to develop appropriate testing procedures were:

- Instruction manual: Innov-X Systems, Alpha Series[™], X-Ray Fluorescence Spectrometers, August 2005, Version 2.1.
- Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental
 Concentrations in Soil and Sediment Method 6200 of SW-846 (Test Methods for Evaluating Solid
 Waste, Physical/Chemical Methods), US EPA. This will be referred to as 'Method 6200'.

The latter is not a training manual, however it provides general information on the application of the instrument which can be used as a basic starting point for generating a testing procedure.

Interferences

Interferences, generally user or application related, can cause error in the data, and are the main sources of variance from laboratory data.

Sources of interference relevant to this project were:

- Variation in the physical character of the sample, eg. particle size, uniformity, homogeneity and surface condition
- Moisture content
- Position of sample during testing

Correction factor for moisture content

A correction factor must be applied to the XRF results, to account for moisture content (as the laboratory results are cited as per unit dry weight). The correction factor was developed from the XRF instruction manual, which states that:

"The results will be higher [than the laboratory results] by the amount of moisture content in the sample. For example, laboratory results will be 10% higher compared to XRF results, if the sample contained 10% by weight water when it was tested with XRF."

The XRF value was therefore adjusted as follows:

XRF Reading x
$$\frac{100}{100 - \% \text{ moisture}}$$

Measurement times

The measurement times for the tests carried out during the works were developed in general accordance with Method 6200, and are presented in **Table E-1**:

Table E-1 Measurement times

Test type	Measurement time
In-situ screen/hot-spot delineation	30 seconds
Screen of validation sample prior to laboratory analysis	3 x 30 seconds. Values averaged.

Comparison of results

The XRF screening and laboratory results have been tabulated together and are presented in this appendix. In general after application of the correction factor for moisture content, the XRF and laboratory results showed a reasonably good comparison for lead and zinc results. The comparison was good enough to give confidence that the application of the portable XRF in the field during the project would yield useful and reasonably accurate data.

Concentrations of chromium and copper were not as well represented by the portable XRF as lead and zinc. Reasons for this could be attributed to:

- Detection limits: The detection limit for chromium was approximately 130 ppm for a 30 second test, which was significantly higher than for the other three metals. Therefore, a result would not have been given unless the concentration of chromium in the sample was above 130 ppm.
- Interference: Method 6200 states that the intensities of both copper and chromium measured by the analyser will be affected by the presence of iron (Fe) in the sample.





									Validat	ion Sample	Details and	Analytical	Results						1	
URS Sample Reference	A/:	10R	A/1	10M	Α/	10L	Α/.	30R	A/.	30M	A/.	30L	Α/	50R	A/:	50M	A/	50L	ANZECC Se	diment Quality
Laboratory Sample Reference	SA12	964-J	SA12	2964-J	SA12	2964-I	SA12	2964-J	SA12	2964-J	SA12	2964-I	SA12	2964-J	SA12	2964-J	SA1	2964-I	Guid	lelines ¹
Date Sampled	20-N	ov-09	20-N	lov-09	17-N	lov-09	20-N	ov-09	20-N	lov-09	17-N	ov-09	20-N	lov-09	20-N	lov-09	17-N	lov-09		
Sample Location		10m transect, true right rank 10m transect, middl of stream bed Lab XRF* Lab XRF*				ect, true left ank		ct, true right ink		ect, middle eam bed		ect, true left ink		ect, true righ		sect, middle eam bed		ect, true left ank	ISQG-Low	ISQG-High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		
Chromium	36	0	32	0	39	0	39	0	36	0	50	0	45	0	41	0	42	0	80	370
Copper	7	0	2	0	7	0	4	0	2	0	12	0	12	0	5	0	12	0	65	270
Zinc	82	85	64	48	61	49	71	58	64	43	131	98	123	107	68	49	143	95	200	410
Lead	31	19	21	0	20	17	24	0	18	0	61	45	54	53	20	16	65	44	50	220
Moisture content (%)	13	7.7	10	6.7	30	6.3	2:	1 2.7	1.	5.8	3′	1	2	8.0	1	2.8	1	9.1	NA	NA
Moisture correction	1.	22	1.	.20	1.	.57	1.	.29	1	.19	1.	61	1	.39	1	.15	1	.24	NA	NA

			T				T		Validat	ion Sample	Details and	Analytical	Results		1				
URS Sample Reference	Α/′	70R	Α/	70M	A/	70L	A/	90R	A/9	90M	A/9	90L	A/1	10R	A/1	10M	A/110L	ANZECC Sec	diment Quality
Laboratory Sample Reference	SA12	2964-J	SA1	2964-J	SA12	2964-I	SA12	2964-J	SA12	2964-J	SA12	2964-I	SA12	2964-J	SA12	2964-J	N/A		elines ¹
Date Sampled	20-N	ov-09	20-N	Nov-09	17-N	lov-09	20-N	lov-09	20-N	lov-09	17-N	ov-09	20-N	ov-09	20-N	lov-09	N/A		
Sample Location		ct, true right ink		sect, middle eam bed		ect, true left ank		ect, true right ank		sect, middle eam bed		ect, true left ink		nsect, true		sect, middle eam bed	110m transect, true left bank	ISQG-Low	ISQG-High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*			
Chromium	42	0	41	0	49	0	54	0	40	0	40	0	36	0	73	0		80	370
Copper	12	0	8	0	19	0	14	0	10	0	4	0	2	0	36	0	Not sampled. Sampling	65	270
Zinc	108	85	79	117	149	119	95	73	122	51	66	49	58	50	382	326	point is in pump intake		410
Lead	58	44	28	51	65	52	33	0	50	0	21	0	17	0	164	133	area.	50	220
Moisture content (%)	23	3.5	2	3.2	22	2.7	4	6.9	2	9.0	14	1.0	18	3.3	50	6.4		NA	NA
Moisture correction	1.	.31	1	.30	1.	.29	1	.88	1	.41	1.	16	1.	22	2.	.29		NA	NA

Moisture correction
All units mg/kg dry weight

Bold - exceeds the ANZECC Sediment Guidelines
1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

A Exceeds ISQG-Low
B Exceeds ISQG-High
* XRF values have been corrected for moisture



										V	alidation S	ample Detai	ls and Ana	lytical Resu	ılts									
URS Sample Reference	В/	10R	B/1	0M	В/	10L	В/.	30R	B/	30M	В/	30L	В/:	50R	B/5	50M	B/	50L	B/	70R	В/7	70M	ANZECO	Sediment
Laboratory Sample Reference	SA12	964-D	SA12	964-D	SA12	964-D	SA12	964-D	SA12	2964-D	SA12	964-D	SA12	964-E	SA12	2964-E	SA12	2964-E	SA12	2964-E	SA12	2964-E	Quality (Guidelines ¹
Date Sampled	7-N	ov-09	7-No	ov-09	7-No	ov-09	7-No	ov-09	7-N	ov-09	7-N	ov-09	9-No	ov-09	9-N	ov-09	9-N	ov-09	9-N	ov-09	9-N	ov-09		
Sample Location		sect, true bank		m transect, middle of stream bed		ect, true left ink		sect, true bank		ect, middle am bed		ect, true left ink	50m tran right			ect, middle eam bed		ect, true left ank		nsect, true t bank	70m trans of stre	ect, middle eam bed	ISQG-Low	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		
Chromium	48	0	42	0	38	0	42	0	32	0	52	0	39	0	44	0	43	0	42	0	39	0	80	370
Copper	10	0	7	0	6	0	13	0	5	0	17	0	3	0	8	0	9	0	7	0	4	0	65	270
Zinc	96	68	110	162	73	49	161	124	65	62	244	225	54	51	87	56	102	48	63	49	63	33	200	410
Lead	36	21	38	48	21	0	64	49	17	0	99	84	14	15	28	19	36	0	18	0	16	15	50	220
Moisture content (%)	2	0.1	27	7.7	20).6	19	9.1	1	9.1	20	0.6	14	1.3	2:	2.8	2	2.4	2	0.4	13	8.2	NA	NA
Moisture correction	1.	25	1.	38	1.	26	1.	24	1	.24	1.	26	1.	17	1.	.30	1	.29	1	.26	1.	.22	NA	NA

										V	alidation Sa	ample Detai	ls and Ana	vtical Resu	ılts								
URS Sample Reference	B/7	70L	B/9	90R	B/9	90М	В/	90L	B/1	10R	B/1	10M	B/1	10L	B/1	30R	B/1	30M	В/	130L		ANZECC	Sediment
Laboratory Sample Reference	SA12	964-E	SA12	964-F	SA12	964-F	SA12	2964-F	SA12	2964-J	SA12	2964-J	SA12	964-J	SA12	2964-K	SA12	2964-K	SA12	2964-K		Quality C	uidelines1
Date Sampled	9-No	ov-09	11-N	ov-09	11-N	ov-09	11-N	ov-09	25-N	ov-09	25-N	ov-09	25-N	ov-09	26-N	lov-09	26-N	lov-09	26-N	lov-09	oses		
Sample Location	70m transe ba			0m transect, true right bank Lab XRF*		ect, middle am bed	90m transe ba	ect, true left ink		nsect, true bank		ect, middle am bed		nsect, true bank		nsect, true bank		sect, middle eam bed		nsect, true bank	ormatting purp	ISQG-Low	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	or fo		
Chromium	54	0	43	0	43	0	42	0	42	0	46	0	37	0	33	0	33	0	44	0	ıık 1	80	370
Copper	11	0	8	0	8	0	8	0	12	0	10	0	4	0	1	0	2	0	5	0	t bi	65	270
Zinc	181	142	65	55	80	75	65	51	127	99	133	155	67	65	47	49	51	38	63	48	Lef	200	410
Lead	70	43	20	0	28	21	19	0	44	25	56	59	31	21	11	0	15	0	20	0		50	220
Moisture content (%)	20).4	25	.1	22	2.2	20	0.9	24	1.2	20	5.9	3	.8	2	1.1	2	1.2	1	9.3		NA	NA
Moisture correction	1.	26	1.	34	1.	29	1.	.26	1.	32	1.	37	1.	04	1.	.27	1.	.27	1	.24		NA	NA

All units mg/kg dry weight

Bold exceeds the ANZECC Sediment Guidelines
1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1 A Exceeds ISQG-Low B Exceeds ISQG-High



			1		1							/alidation S	ımple Deta	ils and Ana	lytical Resu	ults	1				1		1			
URS Sample Reference	CD)/10R	CD	/10M	CE	/10L	CI	D/30R	CE)/30M	CD)/30L	CD	/50R	CD	/50M	CD	/50L	CI	D/70R	CD	D/70M	CD	/70L	ANZECC	□ Sedimer
Laboratory Sample Reference	SA13	3074-C	SA13	3074-C	SA1	074-C	SA1	3074-C	SA1	3074-C	SA13	3074-C	SA13	074-D	SA13	3074-D	SA13	3074-D	SA1	3074-D	SA1	3074-D	SA13	3074-D	Quality (Guidelines ^l
Date Sampled	13-J	Jan-10	13-J	an-10	13-J	an-10	13	Jan-10	13	Jan-10	13-J	an-10	14-J	an-10	14-J	Jan-10	14-J	an-10	14	Jan-10	14	Jan-10	14-J	an-10	1	
Sample Location		ect, true right ank		sect, middle eam bed		ect, true left ank		ect, true right ank		sect, middle eam bed		ect, true left ank		ct, true righ	l l	sect, middle eam bed		ect, true left ank		sect, true righ oank		sect, middle ream bed	70m trans	ect, true left ank	t ISQG-Low	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	†	
Chromium	34	0	34	0	29	0	35	0	36	0	37	0	28	0	33	0	32	0	25	0	26	0	24	0	80	370
Copper	6	0	3	0	1	0	4	0	2	0	2	0	1	0	1	0	< 1	0	< 1	0	< 1	0	1	0	65	270
Zinc	95	51	51	35	49	39	62	54	50	50	55	49	45	34	56	72	45	36	43	40	47	46	44	33	200	410
Lead	44	19	16	0	16	15	28	23	14	0	18	20	13	0	20	18	11	0	12	0	14	0	17	0	50	220
Moisture content (%)	1	7.4	6	5.0	1	2.6	1	6.5	1	5.2	2	0.6	1	8.8	5	5.9	1:	5.9	2	20.9	1	16.9	1	6.3	NA	NA
Moisture correction	1	.21	1	.06	1	14	1	.20	j	.18	1	.26	1.	23	1	.06	1.	.19	1	1.26	1	1.20	1	.19	NA	NA
												Validation S	ımple Deta	ils and Ana	lytical Resu	ults										
URS Sample Reference	CD	990R	CD	/90M	CE	/90L	CD	/110R	CD	/110M	CD	/110L	CD/	130R	CD/	/130M	CD/	/130L							ANZEC(C Sedimen
Laboratory Sample Reference	SA1	3074-E	SA13	3074-E	SA1	6074-Е	SA1	3074-E	SA1	3074-E	SA1	3074-E	SA13	6074-Е	SA13	3074-E	SA13	3074-E								Guidelines ¹
Date Sampled	15-J	fan-10	15-J	an-10	15-J	an-10	15	Jan-10	15	Jan-10	15-J	an-10	15-J	an-10	15-J	Jan-10	15-J	an-10				seso				
Sample Location		ect, true right ank		sect, middle eam bed		ect, true left ank		ansect, true at bank		nsect, middle eam bed		sect, true left ank		nsect, true bank		nsect, middle eam bed	130m trans	sect, true lef ank	ît			ormatting purp			ISQG-Low	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*				for fo				
Chromium	29	0	35	0	32	0	28	0	33	0	27	0	36	0	35	0	33	0				ank			80	370
Copper	< 1	0	1	0	1	0	1	0	1	0	1	0	4	0	2	0	3	0				ft bl			65	270
Zinc	46	31	51	45	48	28	47	44	49	42	47	61	56	39	56	48	54	32	1			Left			200	410

	40	31	31	43	40	20	4/	44	49	42	4/	01	30	37	30		34	32		200	410
Lead	13	0	14	0	13	0	14	0	13	0	17	22	17	0	15	17	16	0		50	220
Moisture content (%)	1	9.9	1	9.4	1	8.9	2	0.5	1	9.6	19	9.2	1	8.6	1	6.0	2	1.6	1	NA	NA
Moisture correction	1	.25	1.	.24	1.	.23	1	26	1	.24	1.	24	1	.23	1	.19	1	.28		NA	NA
											v	alidation S	ampla Data	ils and Ana	lytical Dass	ulte					
URS Sample Reference	CD	/150R	CD/	150M	CD/	150L	CD/	170R	CD/	170M		170L		190R		/190M	CD/	/190L		ANZEC	CC Sediment
Laboratory Sample Reference	SA1	3074-E	SA13	3074-E	SA13	3074-E	SA13	3074-F	SA1	3074-F	SA13	3074-F	SA13	3074-F	SA1	3074-F	SA13	3074-F			Guidelines
Date Sampled	15-J	Jan-10	15-J	Jan-10	15-J	an-10	15-J	an-10	15-J	an-10	15-J	an-10	15-J	an-10	15	Jan-10	15-J	an-10	ses		
Sample Location		ect, true left ank	90m transe	ect, true righ ank		ect, middle am bed		ect, true left ank		nsect, true t bank		sect, middle am bed		sect, true left ank		ansect, true at bank		sect, middle eam bed	ormatting purpo	ISQG-Lo	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	for fc		
Chromium	27	0	29	0	34	0	31	0	26	0	26	0	28	0	31	0	28	0	ank	80	370
Copper	2	0	2	0	3	0	1	0	1	0	1	0	< 1	0	2	0	1	0	ft bla	65	270
Zinc	62	84	47	38	59	53	59	93	52	43	46	35	49	55	66	52	48	42	Lei	200	410
Lead	69	31	12	0	18	0	100	146	75	20	21	0	17	15	176	100	16	14		50	220
Moisture content (%)	1	6.6	11	2.3	2:	1. 2.2	1	1	1	8.4	1	1	1	1	2	23.1	9	<u>l</u> 9.7	-	NA	NA
Moisture correction	1	.20	1.	.14	1.	.29	1	.20	1	.23	1.	.21	1	.23	1	.30	1	.11	1	NA	NA

Moisture correction
All units mg/kg dry weight
Bold - exceeds the ANZECC Sediment Guidelines

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1

A Exceeds ISQG-Low

B Exceeds ISQG-High



										V	alidation Sa	ample Detai	ls and Anal	lytical Resu	ılts						
URS Sample Reference	E/	10R	E/1	0M	E/	10L	E/3	30R	E/3	0M	E/:	30L	E/5	50R	E/5	50M	E/	50L	E/70R E/70M	ANZECO	CC Sediment
Laboratory Sample Reference	SA1	3074-I	SA13	3074-I	SA1	3074-I	SA13	3074-I	SA13	3074-I	SA13	3074-I	SA13	3074-I	SA13	3074-I	SA1	3074-I	•	Quality ($Guidelines^1$
Date Sampled	28-J	an-10	28-Ja	an-10	28-J	an-10	28-J	an-10	28-J	an-10	28-J	an-10	28-Ja	an-10	28-J	Jan-10	28-J	an-10			
Sample Location		nsect, true bank	of stream bed			ect, true left ank		sect, true bank		ect, middle am bed		ect, true left ink	50m tran right	sect, true bank		sect, middle eam bed		ect, true left ank	Not validated as per CPG instruction	ISQG-Lov	ISQG- High
ult type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Transects were beneath area to be covered to the co		1
Chromium	31	0	32		32	0	31	0	30	0	32	0	36	0	35	0	29	0	with reno matresses.	80	370
Copper	1	0	4	0	22	0	< 1	0	1	0	2	0	1	0	2	0	2	0		65	270
Zinc	51	45	69	50	70	48	52	36	59	41	50	30	52	41	55	57	52	20		200	410
Lead	13	21	142	79	200	168	21	16	22	17	15	0	13	0	13	18	13	30		50	220
Moisture content (%)	1	<u>1</u> 5.4	14	1.0	5	5.5	18	<u>l</u> 3.7	10).3	5	.6	23	B.5	22	2.5	2	1.0		NA	NA
Moisture correction	1	.18	1.	16	1.	.06	1.	23	1.	11	1.	06	1	31	1	.29	1	.27	1	NA	NA

		1		1		V	alidation Sa	ımple Detai	ils and Ana	ılytical Resu	lts		1		1		1	1	
URS Sample Reference	E/70L	E/90R	E/90M	E/90L	E/1	10R	E/1	10M	E/	110L	E/1	30R	E/1	30M	E/	130L		ANZECO	C Sedimen
Laboratory Sample Reference		1	-	l	SA13	118-A	SA13	118-A	SA1	3118-A	SA13	3118-A	SA13	3118-A	SA1	3118-A		Quality C	
Date Sampled					3-Fe	eb-10	3-Fe	eb-10	3-F	eb-10	3-Fe	eb-10	3-F	eb-10	3-F	eb-10			
Sample Location					110m tra right	nsect, true bank		ect, middle am bed		nnsect, true bank		insect, true t bank		sect, middle eam bed		insect, true bank	Left blank for	ISQG-Low	ISQG- High
Result type	Not validated as per		ects were beneath area to resses.	be covered with reno	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	formatting purposes		
Chromium		man	.03303.		38	0	42	0	31	0	34	0	37	0	34	0		80	370
Copper					5	0	8	0	2	0	2	0	5	0	5	0		65	270
Zinc Lead					90 65	75 75	73 28	52 24	54 14	41 17	54 14	33 22	62 23	45 21	54 15	36 14		200 50	410 220
Moisture content (%)					22	2.7		5.0	2	2.4	1'	7.2	2	0.7	1	5.7]	NA	NA
Moisture correction					1.	29	1.	33	1	.29	1.	.21	1	.26	1	.19		NA	NA

					,		1			V	alidation Sa	ımple Detai	ls and Ana	lytical Resu	ılts		1				
URS Sample Reference	E/1	50R	E/1	50M	E/1	50L	E/1	70R	E/1	70M	E/1	70L	E/1	90R	E/1	90M	E/1	190L		ANZECO	C Sediment
Laboratory Sample Reference	SA13	70m transect, true left 90m transec				118-A	SA13	3118-B	SA13	3118-A	SA13	118-A	SA13	118-B	SA13	3118-A	SA13	3118-A		Quality C	
Date Sampled	3-Fe	70m transect, true left 90m transec				eb-10	4-Fe	eb-10	3-F	eb-10	3-Fe	eb-10	4-F	eb-10	3-F	eb-10	3-F	eb-10			
Sample Location		3-Feb-10 70m transect, true left bank Lab XRF* Lab XRI				ect, middle am bed	90m transe	ect, true left ank	1	nsect, true t bank	110m trans	ect, middle am bed		nsect, true bank		nsect, true t bank		sect, middle eam bed	Left blank for formatting purposes	ISQG-Low	ISQG- High
Result type	Lab	bank righ Lab XRF* Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*				
Chromium	32	Lab XRF* Lab	29	0	32	0	31	0	30	0	29	0	36	0	34	0	36	0		80	370
Copper	2	0	3	0	3	0	1	0	5	0	2	0	7	0	2	0	3	0		65	270
Zinc	49	32	47	32	52	40	49	32	62	60	53	27	186	119	106	85	150	144		200	410
Lead	14	0	13	16	14	17	13	0	20	19	15	0	91	64	39	31	15	0		50	220
Moisture content (%)	1:	13.8 13.1		3.1	12	2.7	1	1.8	1	2.8	9	.7	14	4.4	g	9.5	1	6.0		NA	NA
Moisture correction	1	13.8 13.1				15	1	.13	1	.15	1.	11	1	.17	1	.10	1	.19		NA	NA

All units mg/kg dry weight **Bold** - exceeds the ANZECC Sediment Guidelines

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1
A Exceeds ISQG-Low
B Exceeds ISQG-High



		T		1		r		,					V	alidation S	ample Deta	ils and Ana	lytical Resu	ults		,		,		,				·			
URS Sample Reference	FG/10R	FC	/10M	FG	6/10L	FG	/30R	FG	/30M	FG	/30L	FG	/50R	FG/	50M	FG	/50L	FG	/70R	FG/	70M	FC	G/70L	F	G/90R	FC	G/90M	FG	/90L	ANZEC	C Sediment
Laboratory Sample Reference	SA13206-D	SA1	3206-A	SA1	3206-A	SA13	3206-A	SA13	3206-A	SA13	206-A	SA13	206-D	SA13	206-A	SA13	3206-A	SA1	3206-В	SA13	3206-B	SA1	3206-В	SA	13206-A	SA1	3206-A	SA13	3206-A		Guidelines ¹
Date Sampled	11-Mar-10	10-	Mar-10	10-N	Mar-10	10-N	1ar-10	10-N	1ar-10	10-N	far-10	11-N	far-10	10-N	far-10	10-N	1ar-10	10-N	/Iar-10	10-N	1ar-10	10-1	Mar-10	10-	-Mar-10	10-	Mar-10	10-N	1ar-10	<u> </u>	
Sample Location	10m transect, true right bank		sect, middle eam bed		ect, true left ank		nsect, true t bank		ect, middle eam bed		ect, true left ank		nsect, true bank		ect, middle am bed	50m transe	ect, true left ank		nsect, true t bank		ect, middle eam bed		sect, true left pank		ansect, true tht bank	90m tran of sti	sect, middle ream bed	90m transe	ect, true left ank	ISQG-Lov	ISQG- High
Result type	Lab XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		
Chromium	33	36	0	32	0	34	0	32	0	33	0	33		34	0	37	0	39	0	35	0	32	0	38	0	36	0	33	0	80	370
Copper Zinc	3 48 Not XRFd	1 54	0 30	4 106	0 65	2 84	0 64	3 85	0 97	2 51	0 40	2 50	Not XRFd	1 48	0 31	3 82	0 47	4 122	0 34	3 74	0 74	2 51	0 39	5 87	0 81	3 51	0 67	3 51	0 37	65 200	270 410
Lead	14	13	0	15	0	34	23	18	14	19	0	14		12	0	39	0	72	15	30	40	14	0	46	35	13	23	13	0	50	220
Moisture content (%)	15.7		5.4	1	5.0	1-	4.3	1-	4.2	6	.0	1-	4.8	7	.9	5	5.5	1	5.1	13	3.1		1.5		10.7		14.4	7	7.1	NA	NA
Moisture correction	1.19		.18	1	.18	1	.17	1	.17	1.	.06	1	.17	1.	.09	1.	.06	1	.18	1.	.15	1	1.02		1.12	1	1.17	1.	.08	NA	NA

					•									V	alidation S	ample Deta	ils and Ana	lytical Resu	ults													
URS Sample Reference	FC	3/110R	FG	/110M	FG/	110L	FG/	/130R	FG	/130M	FG	/130L	FG/	150R	FG/	150M	FG/	150L	FG/	170R	FG/1	170M	FG/	170L	FC	G/190R	FG/	190M	FG/	/190L	ANZEC	C Sediment
Laboratory Sample Reference	SA1	3206-A	SA1	3206-A	SA1	3206-A	SA1	3206-F	SA1	3206-F	SA1	3206-F	SA13	3206-A	SA1	3206-A	SA13	3206-A	SA13	3206-A	SA13	3206-A	SA13	3206-A	SA	13206-A	SA13	3206-A	SA13	3206-A		Guidelines ¹
Date Sampled	10-	Mar-10	10-1	Mar-10	10-N	far-10	16-N	Mar-10	16-1	Mar-10	16-1	Mar-10	10-N	1ar-10	10-N	1ar-10	10-N	Iar-10	10-N	1ar-10	10-N	ſar-10	10-N	1ar-10	10-	Mar-10	10-N	/lar-10	10-N	Mar-10	1	
Sample Location		ansect, true nt bank		nsect, middle ream bed		nsect, true bank		ansect, true t bank		sect, middle eam bed		ansect, true t bank		ect, true left ank		nsect, true t bank		ect, middle eam bed	90m transe	ect, true left ank		nsect, true t bank		sect, middle am bed		ransect, true ft bank		insect, true t bank		sect, middle eam bed	E ISQG-Low	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		1
Chromium	38	0	32	0	35	0	34	0	38	0	36	0	43	0	41	0	33	0	37	0	35	0	44	0	54	0	36	0	39	0	80	370
Copper	3	0	1	0	2	0	1	0	2	0	6	0	6	0	6	0	3	0	5	0	3	0	10	0	14	0	3	0	1	0	65	270
Zinc	65	49	58	49	60	42	55	41	53	34	95	71	110	66	82	95	51	43	79	75	76	45	130	122	183	88	55	29	57	41	200	410
Lead	27	23	25	22	16	0	17	16	16	0	46	39	63	26	37	42	11	0	34	32	38	22	49	46	116	56	17	0	16	14	50	220
Moisture content (%)		4.3	1	12.3	1	6.5		5.8		5.6		8.4	1	0.0	1	6.6	4	1.5	5	5.9	8	3.3	20	0.2		4	2	2.3	Ģ	9.7	NA	NA
Moisture correction		1.04	1	1.14	1	.20	1	.06	1	.06	1	1.09	1	.11	1	.20	1.	.05	1.	.06	1.	.09	1.	.25	1	1.04	1	.02	1	.11	NA	NA

														V	alidation S	ample Deta	ils and Ana	lytical Resi	ults								
URS Sample Reference	FG/210R	t	FG/2	210M	FG/	210L	FG/	230R	FG/	230M	FG/	230L	FG/	/250R	FG/2	250M	FG/	250L	FG	/270R	FG/2	270M	FG	/270L		ANZECC Sed	diment
Laboratory Sample Reference	SA13206-	-E	SA13	3206-E	SA1	3206-E	SA1	3206-E	SA13	3206-E	SA13	3206-E	SA13	3206-E	SA13	206-E	SA13	3206-E	SA	13206	SA1	13207	SA	13208		Quality Guide	
Date Sampled	15-Mar-1	0	15-Mar-10 15-Mar-10 15-Mar-10 18 130m transect, middle 130m transect, true 70m transect, true							far-10	15-N	/lar-10	15-N	Aar-10	15-N	far-10	15-N	far-10	16-N	Mar-10	17-N	/lar-10	18-1	Mar-10			
Sample Location	130m transect right bank							ect, true left ank		nsect, true t bank		ect, middle eam bed		ect, true left ank		nsect, true bank		sect, middle am bed		ansect, true bank		nsect, true t bank		nsect, middle eam bed	Left blank for formatiing purposes	ISOCi-Low	ISQG- High
Result type	Lab X	KRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*			
Chromium	40	0	37	0	43	0	36	0	36	0	43	0	31	0	43	0	43	0	43	0	39	0	47	0		80	370
Copper	9	0	4	0	8	0	2	0	3	0	7	0	2	0	10	0	6	0	6	0	9	0	11	0		65	270
Zinc	88	52	75	64	144	59	53	50	64	70	129	95	54	29	131	186	124	126	129	49	130	133	203	418		200	410
Lead	167	21	33	25	85	36	14	0	23	27	82	86	16	15	86	141	89	94	98	39	102	146	153	195		50	220
Moisture content (%)	3.0		4	1.1		5.7	3	3.6	2	2.7	5	5.5	3	3.5	12	2.8	8	3.7	1	4.7	1	1.5	1	1.1		NA	NA
Moisture correction	1.03		1.	.04	1	.06	1	.04	1	.03	1.	.06	1	.04	1.	.15	1.	.10	1	.17	1	.13	1	.12		NA	NA

All units mg/kg dry weight

Bold - exceeds the ANZECC Sediment Guidelines

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1

A Exceeds ISQG-Low

B Exceeds ISQG-High

* XRF values have been corrected for moisture



										V	alidation S	ample Deta	ils and Ana	ılytical Resu	ılts									
URS Sample Reference	H	10R	H/:	10M	H	/10L	H/	30R	H/	30M	H/	30L	Н	/50R	H/.	50M	H/	50L	H	/70R	H	/70M	ANZECO	C Sediment
Laboratory Sample Reference	SA1	3287-A	SA13	287-A	SA13	3287-A	SA13	3287-A	SA13	3287-A	SA13	287-A	SA1	3287-A	SA13	3287-A	SA13	3287-A	SA1	3287-E	SA1	3287-E	Quality (Guidelines ¹
Date Sampled	8-A	pr-10	8-A	pr-10	8-A	.pr-10	8-A	.pr-10	8-A	pr-10	8-A	pr-10	8-A	pr-10	8-A	pr-10	8-A	pr-10	19-7	Apr-10	19-7	Apr-10		
Sample Location	8-Apr-10 10m transect, tr		10m trans of stre	ect, middle am bed		ect, true left ank		nsect, true t bank		ect, middle eam bed		ect, true left ink		nsect, true t bank		sect, middle eam bed		ect, true left ank		nsect, true at bank	70m trans	sect, middle eam bed	ISQG-Low	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		
Chromium	36	0	33	0	35	0	32	0	33	0	29	0	37	0	34	0	39	0	36		40		80	370
Copper	4	0	3	0	1	0	1	0	3	0	2	0	4	0	4	0	4	0	6		5		65	270
Zinc	93	81	57	37	48	35	51	0	53	40	49	37	71	24	57	27	94	67	83	Not XRFd	78	Not XRFd	200	410
Lead	33	23	18	13	13	0	13	0	15	0	13	0	31	0	17	0	37	35	39		41		50	220
Moisture content (%)	9	9.6	3	.5	3	3.1	10	0.9	4	5.2	2	.8	!	9.3	1	7.3	7	7.5	,	7.9		8.9	NA	NA
Moisture correction	1	.11	1.	04	1	.03	1.	.12	1	.05	1.	03	1	.10	1	.21	1	.08	1	.09	1	1.10	NA	NA

			1						1	V	alidation S	ample Deta	ils and An	alytical Resu	ılts		1		1					
URS Sample Reference	Н	/70L	H/	90R	H	/90M	Н	/90L	H/:	110R	H/1	10M	H	110L	H/:	130R	H/1	30MR	H/1	130M	H/13	30ML	ANZECO	C Sediment
Laboratory Sample Reference	SA1	3287-E	SA13	3287-E	SA1	3287-Е	SA1	3287-E	SA1	3287-F	SA1	3287-F	SA1	3287-F	SA1	3287-F	SA1	3287-F	SA1	3287-F	SA13	3287-G		Guidelines ¹
Date Sampled	19-7	Apr-10	19- <i>A</i>	Apr-10	19-	Apr-10	19-7	Apr-10	22-4	Apr-10	22-A	Apr-10	22	Apr-10	22-4	Apr-10	22-4	Apr-10	22-1	Apr-10	26-A	Apr-10		
Sample Location		ect, true left ank		nsect, true t bank		sect, middle eam bed		ect, true left ank		nsect, true t bank		sect, middle am bed		ansect, true bank		insect, true t bank		sect, middle eam bed		ansect, true bank		nsect, true bank	ISQG-Lov	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		
Chromium	33		49		59		37		33	0	36	0	34	0	30	0	36	0	30	0	31	0	80	370
Copper	4		15		21		4		2	0	3	0	2	0	2	0	5	0	1	0	3	0	65	270
Zinc	82	Not XRFd	219	Not XRFd	223	Not XRFd	86	Not XRFd	59	51	76	74	56	68	47	23	64	51	51	27	54	35	200	410
Lead	35		160		182		51		23	19	35	37	21	23	13	0	24	0	13	0	16	0	50	220
Moisture content (%)		3.4	1	1.6	1	1.1	1	5.4	1	1.4	1	1.9	1	0.4	1	3.3	1	7.9	1	4.1	4	1.7	NA	NA
Moisture correction	1	1.04				.12	1	.18	1	.13	1	.14	1	.12	1	.15	1	.09	1	.16	1.	.05	NA	NA

								•	V	alidation S	ımple Detai	ls and Analytical Results	
URS Sample Reference	H/130L	H/150	50R	H/15	50MR	H/1	50M	H/1:	50ML	H/	50L		
Laboratory Sample Reference	SA13287-G	SA132	287-F	SA13	3287-F	SA13	3287-F	SA13	3287-F	SA13	287-G		
Date Sampled	26-Apr-10	22-Apr	or-10	22-A	pr-10	22-A	Apr-10	22-A	pr-10	26-A	pr-10		
Sample Location	70m transect, true left bank right bank 90m transect, middle of stream bed 90m transect, true left bank right bank 110m transect, true of stream bed Left blank for formatting purposes Lab XRF*												
Result type	Lab XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		
Chromium	30 0	36	0	35	0	31	0	28	0	29	0		
Copper	2 0	16	0	5	0	4	0	0	0	3	0		
Zinc	57 61	83	73	60	46	61	33	45	26	58	44		
Lead	22 0	51	23	24	16	25	16	12	14	12	0		
Moisture content (%)	6.2	12.8	8	4	.2	6	5.8	3	.3	3	.8		
Moisture correction	1.07	1.15	5	1.	04	1	.07	1.	.03	1	04		

All units mg/kg dry weight **Bold** - exceeds the ANZECC Sediment Guidelines

1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1
A Exceeds ISQG-Low
B Exceeds ISQG-High

Appendix E - Cell M Validation Sediment Sample Laboratory Results Compared with Corrected portable XRF results and ANZECC Sediment Quality Guideliness

			T		1		1		1		V	alidation S	ample Deta	ils and Ana	lytical Resu	ılts	ı		1		,			•	
URS Sample Reference	M	10R	M/	10M	M/1	0ML	M/	10L	M/.	30R	M/	30M	M/	30L	M/	/50R	M/:	50M	M	/50L	M/70R	M	70M	ANZECO	C Sediment
Laboratory Sample Reference	SA13	3287-G	SA13	287-G	SA13	287-G	SA13	347-A	SA13	287-Н	SA13	287-Н	SA13	287-Н	SA13	3287-Н	SA13	3287-H	SA13	3287-H		SA1	3347-A		Guidelines ¹
Date Sampled	26-A	26-Apr-10 26-Apr-10 10m transect, true right 10m transect, midden		pr-10	26-A	pr-10	3-M	ay-10	30-A	pr-10	30-A	pr-10	30-A	.pr-10	30-A	Apr-10	30-A	pr-10	30-A	Apr-10		3-N	lay-10		
Sample Location	26-Apr-10 26-Apr-10 10m transect, true right bank 10m transect, mid of stream bed Lab XRF* Lab XRF		-	middle/le	ransect, ft of stream ed		ect, true left ink	30m transec			ect, middle am bed		ect, true left ink		ect, true right ank		ect, middle eam bed		ect, true let ank	ft 70m transect, true right bank	70m tran	sect, middle eam bed	ISQG-Low	ISQG- High	
Result type	Lab	bank of stream bed Lab XRF* Lab XRF		XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*		Lab	XRF*		
Chromium	34	0	44	0	31	0	33	0	33	0	32	0	35	0	33	0	31	0	29	0	Validation sample not	30	0	80	370
Copper	34	0	12	0	3	0	4	0	4	0	3	0	6	0	2	0	1	0	2	0	collected as sample	3	0	65	270
Zinc	48	23	136	106	72	48	70	50	58	63	58	51	76	54	50	41	55	45	48	31	point was located on	60	39	200	410
Lead	13	0	98	76	12	0	13	0	16	16	22	0	58	62	14	15	22	0	13	0	top of ch280 sewer crossing concrete slab	79	18	50	220
Moisture content (%)	4	1.7	5	5.5	3	.2	1	0.4	8	.8	4	.6	5	.2	3	3.9	6	5.8	4	1.5		1	0.3	NA	NA
Moisture correction	1	.05	1.	.06	1	.03	1.	12	1.	10	1.	.05	1.	05	1	.04	1.	.07	1	.05		1	.11	NA	NA

										Valida	tion Sample	e Details an	Analytica	Results									
URS Sample Reference	M	/70L	M/	/90R	M/	90M	M	/90L	M/1	10R	M/1	110M	M/	10L	M/	130R	M/1	30M	M/	130L		ANZECO	C Sediment
Laboratory Sample Reference	SA13	347-A-2	SA13	3287-Н	SA13	3287-Н	SA13	3287-Н	SA13	3287-F	SA1	3287-F	SA13	287-F	SA1	3287-F	SA13	3287-F	SA1	3287-F			Guidelines ¹
Date Sampled	4-N	4-May-10 30-Apr-10 70m transect, true left 90m transect, true ri		Apr-10	30-4	Apr-10	30-A	Apr-10	22-A	pr-10	22-1	Apr-10	22-A	pr-10	22-1	Apr-10	22-A	pr-10	22-1	Apr-10			
Sample Location		4-May-10 30-Apr-10 m transect, true left bank 90m transect, true r				sect, middle eam bed		ect, true left ank		nsect, true bank		sect, middle eam bed		ect, true left ink		ansect, true at bank		sect, middle am bed		sect, true left ank	Left blank for formatting purposes	ISQG-Low	ISQG- High
Result type	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Lab	XRF*	Sp. Pill		
Chromium	33	0	35	0	33	0	36	0	37	0	40	0	47	0	42	0	38	0	37	0		80	370
Copper	3	0	3	0	3	0	3	0	4	0	5	0	10	0	6	0	6	0	4	0		65	270
Zinc	61	35	56	48	55	29	64	67	56	40	65	51	77	63	59	37	59	44	58	46		200	410
Lead	25	24	18	0	15	0	23	16	18	0	26	23	41	45	19	20	18	18	18	15		50	220
Moisture content (%)		5.7	1	8.6	1	6.5	1	4.6	10	5.5	(5.2	2	l.7	2	20.6	4	.0	(5.3		NA	NA
Moisture correction	1	.07	1	.23	1	.20	1	.17	1.	20	1	.07	1.	28	1	.26	1.	.04	1	.07		NA	NA

All units mg/kg dry weight

Bold - exceeds the ANZECC Sediment Guidelines

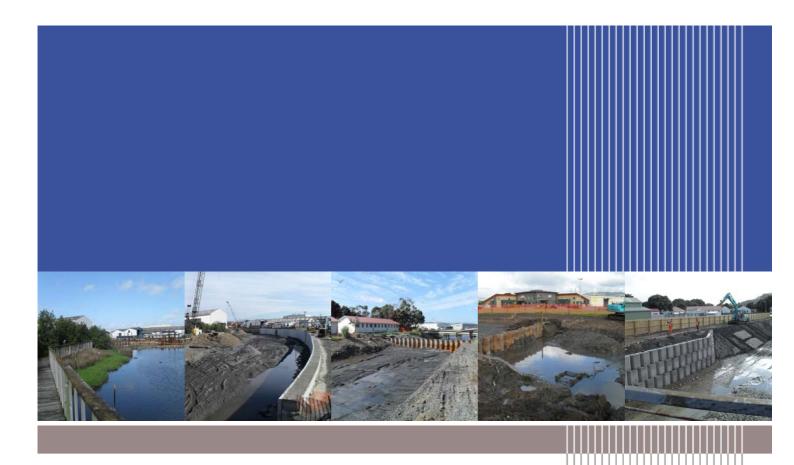
1 ANZECC, 2000. National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.

Values taken from Table 3.5.1

A Exceeds ISQG-Low

P. Fresheld ISQG-Likely

B Exceeds ISQG-High



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