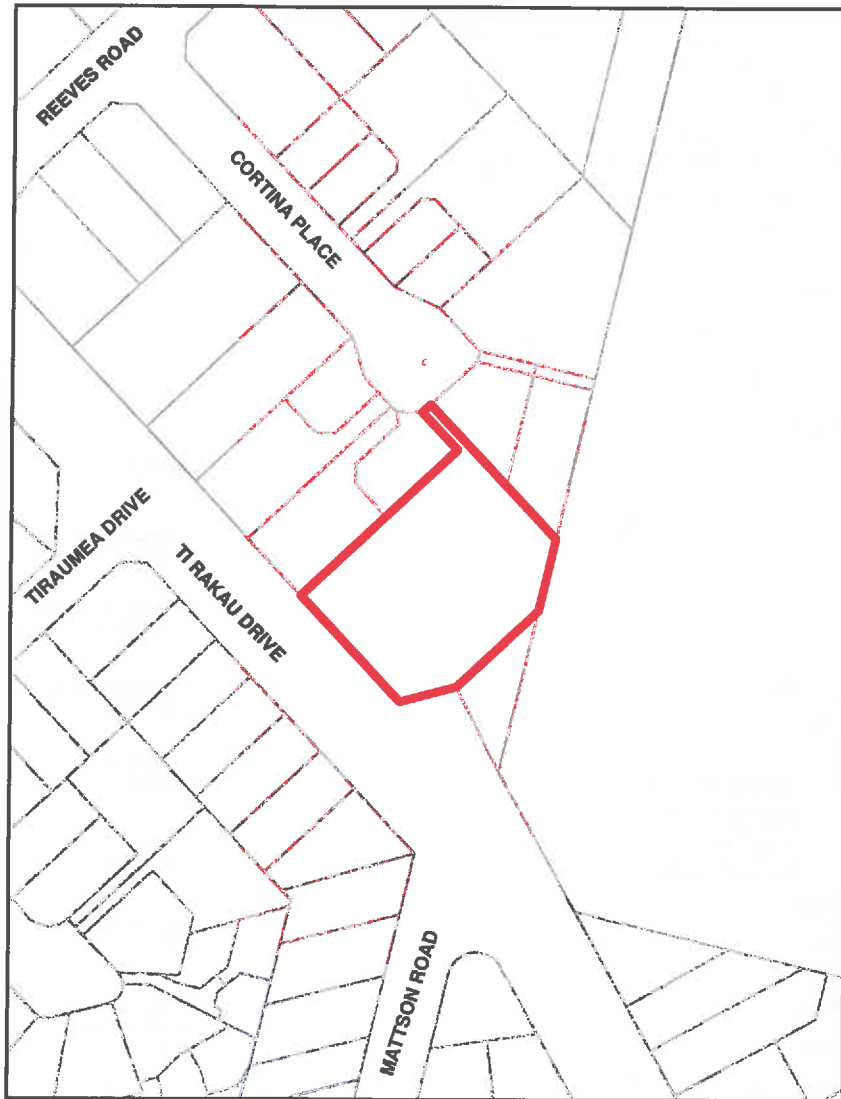
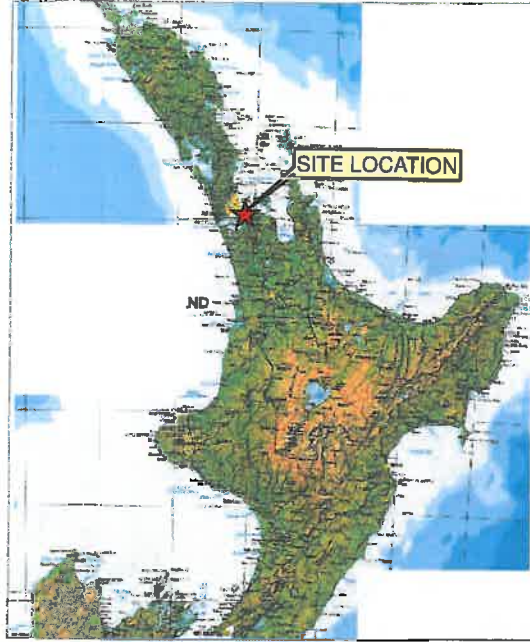


## Appendix A

# Figures 1 to 4

## Appendix A Figures



**64-66 TI RAKAU DRIVE, PAKURANGA**

Scale 1:2,500

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Note:

Approved	RC	Dets	16/05/2016
Designed	SS	Checked	NW
Drawn	SS		

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Map features depicted in terms of NZTM projection.

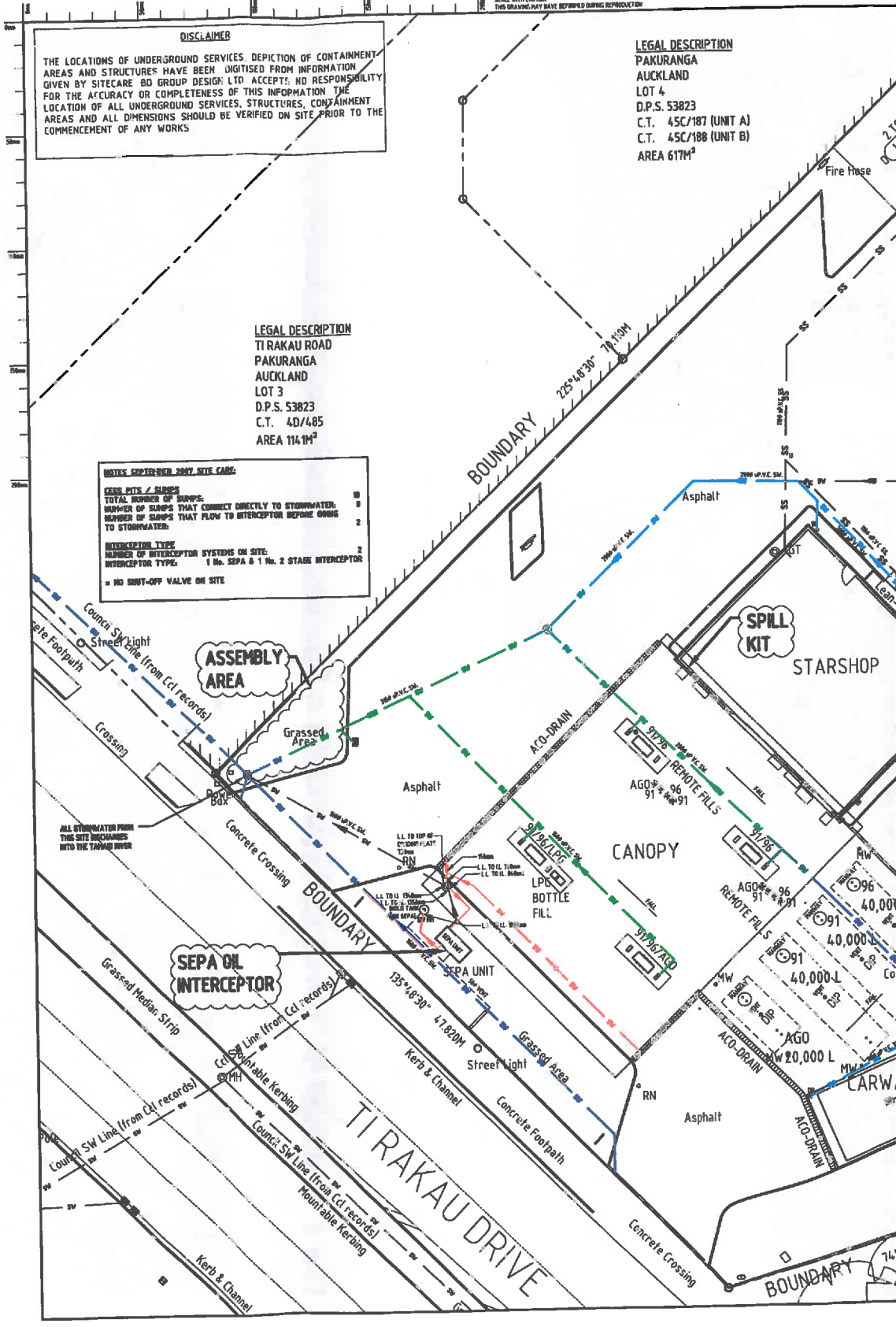
Data Source:  
 NZ Topographical Features - LINZ NZ National Topo Dataset 2014  
 Geospatial Boundaries - LINZ NZ Geospatial Dataset 2014

Rev	By	App	Description	Date





SCALE WITH CAUTION  
THIS DRAWING MAY HAVE BECOME OBSOLETE



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**LEGAL DESCRIPTION**  
 PAKURANGA  
 AUCKLAND  
 LOT 4  
 D.P.S. 53823  
 C.T. 45C/187 (UNIT A)  
 C.T. 45C/188 (UNIT B)  
 AREA 617M<sup>2</sup>

**LEGAL DESCRIPTION**  
 TIRAKAU ROAD  
 PAKURANGA  
 AUCKLAND  
 LOT 3  
 D.P.S. 53823  
 C.T. 4D/485  
 AREA 1141M<sup>2</sup>

**NOTES REFERRED TO BY SITE PLAN:**

CESS PITS / SINKS	10
TOTAL NUMBER OF SINKS	9
NUMBER OF SINKS THAT CONNECT DIRECTLY TO STORMWATER	9
NUMBER OF SINKS THAT FLOW TO INTERCEPTOR BEFORE GOING TO STORMWATER	2
INTERCEPTOR TYPE	2
NUMBER OF INTERCEPTOR SYSTEMS ON SITE	2
INTERCEPTOR TYPE	1 No. SEPA & 1 No. 2 STAGE INTERCEPTOR

\* NO BUNT-OFF VALVE ON SITE

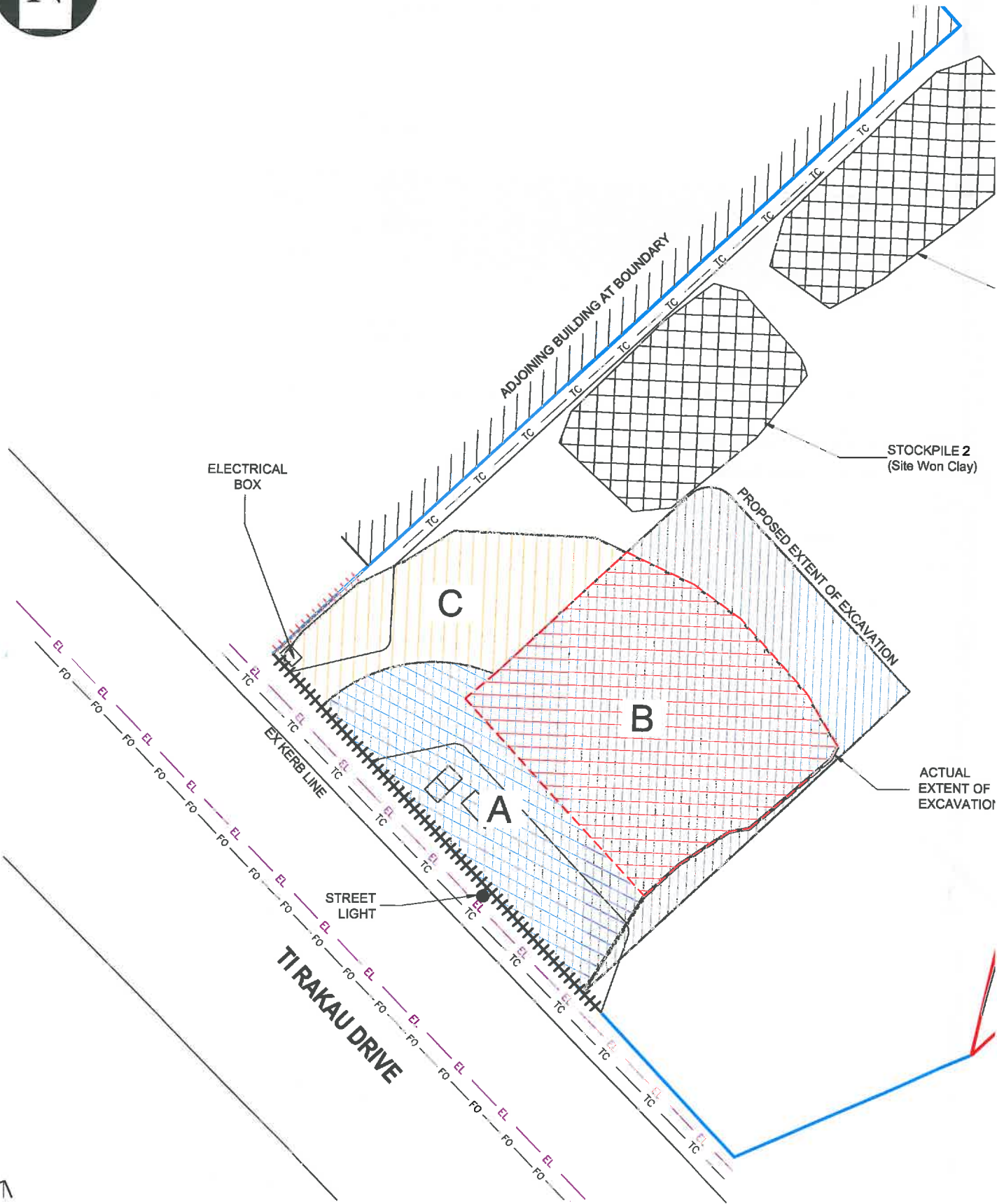
This drawing is confidential and shall not be used for the purpose of this project. The signing of this title block confirms the design and drafting of the project have been prepared and checked in accordance with the AECOM quality assurance system.



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**PROJECT**  
FORMER CALTEX  
PAKURANGA SERVICE  
STATION

**CLIENT**  
CHEVRON  
NEW ZEALAND



Lead saved by: SERGEY SOVKOLOV(2016-05-19) Last Plotted: 2016-05-19  
Filename: P:\06\AK\04\24756\_CAD\25-SKETCHES\042475\_003.DWG

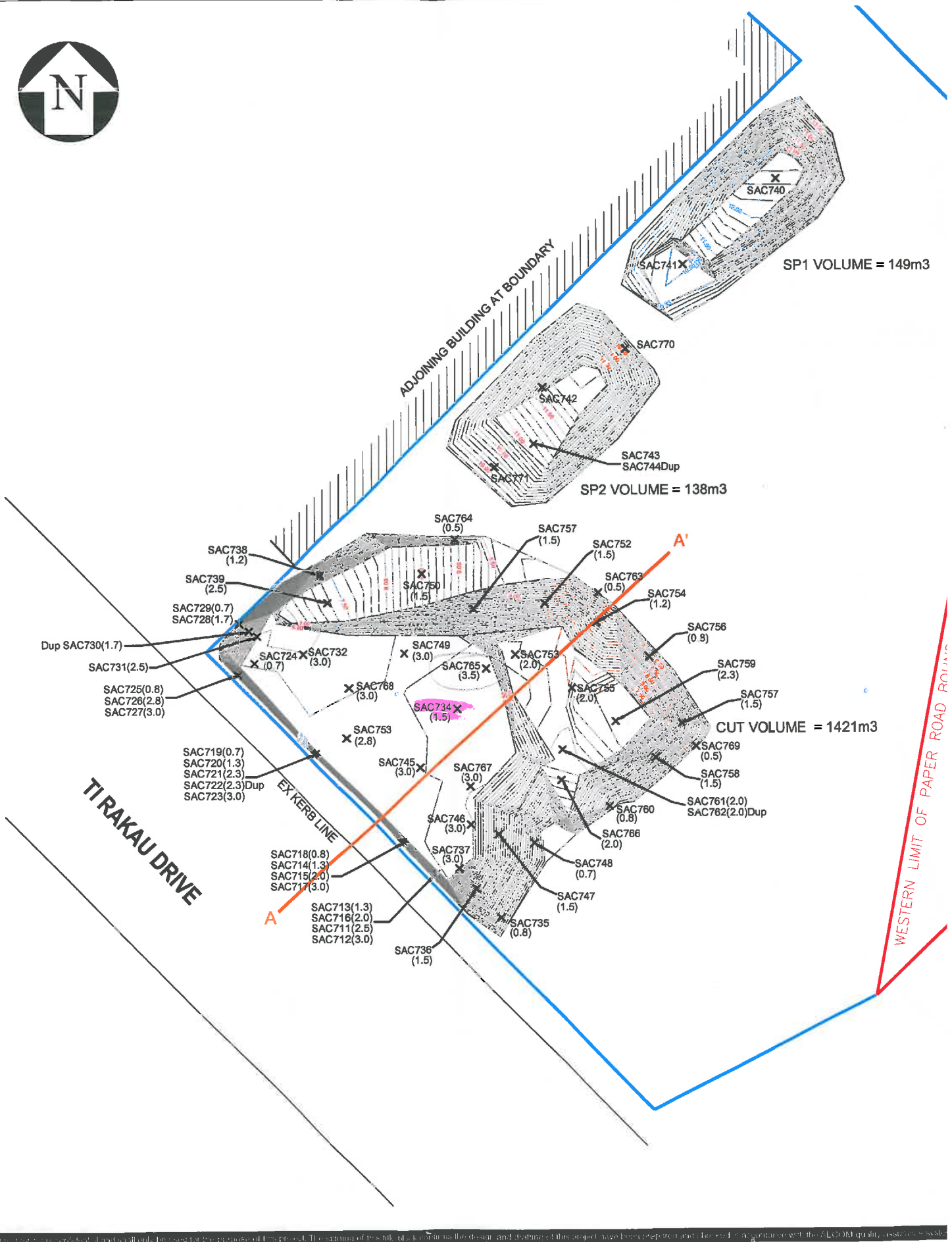
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Filename: P:\604\604924755\_CAD\25-SKETCHES\60492475\_002.DWG



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## Appendix B

# Resource Consents

## Appendix B Resource Consents



## Decision on application(s) for resource consent under the Resource Management Act 1991 & NES



Restricted Discretionary Activity under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

Controlled Activity under the Auckland Regional Plan (Air, Land & Water).

Controlled Activity under the Proposed Auckland Unitary Plan (PAUP).

Restricted Discretionary Activity under the Operative District Plan (Manukau Section).

**Application number(s):** 49495 (ODP & NES) and P-49517 (Regional - Contaminated Land)

**Applicant:** Chevron New Zealand

**Site address:** 11 Cortina Place, Pakuranga

**Legal description:** Section 4 Survey Office Plan 468793

**Proposal:**

For remediation of a former service station site to remove soils contaminated by petroleum hydrocarbon compounds in and around the historical fuel dispensers and stormwater interceptor locations.

The resource consents required are:

### Land use consents (s9)

#### Auckland Council Operative District Plan: Manukau Section

- Restricted Discretionary Activity under Rule 9.8.2 for earthworks exceeding 200m<sup>3</sup> being approximately 1600m<sup>3</sup>.

#### National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health ("NES")

- The relevant NES activity to this proposal is disturbing the soil. The proposal does not meet all permitted activity requirements; however, a Remedial Action Plan (RAP) has been submitted for identification and handling of contamination during the excavation works and off-site soil disposal protocols. Validation sampling will be undertaken for all imported soil and soil remaining on site. Therefore, the activity under NES is a Restricted Discretionary Activity as per Regulation 10.

## Discharge consents (s15)

### Auckland Council Regional Plan: Air, Land & Water

- Controlled Activity under Rule 5.5.44 of the Auckland Council Regional Plan: Air, Land and Water (ACRPALW) for land disturbance to contaminated land.

### Proposed Auckland Unitary Plan (PAUP)

- Controlled Activity for discharge of contaminants (due to the presence of petroleum hydrocarbon) from disturbing soil on the site.

## Decision

I have read the application(s), supporting documents, and the report and recommendations on the consent application(s). I am satisfied that I have sufficient information to consider the matters required by the Resource Management Act 1991 (RMA) and make a decision under delegated authority on the application(s).

Acting under delegated authority, under sections 104, 104A, 104C, 108 and Part 2 of the RMA, the application(s) are **GRANTED**.

## 1. Reasons

The reasons for this decision are:

The application satisfies the sustainable management purpose of Part 2 of the Resource Management Act 1991 by remedying the adverse effects of contamination of a physical resource, and meets the requirements of sections 104, 104A, 104C, 105, 107 & 108 of the Act.

In accordance with an assessment under s104(1)(a) of the Resource Management Act the actual and potential effects from the proposal will be mitigated or remedied as:

- Due to the flat topography of the area where the proposed works will be undertaken within the site, the effects from the earthworks will not undermine the stability of the land nor will the surrounding land become eroded as a result of the proposed works.
- Management of potential adverse effects such as runoff and dust can be adequately achieved with standard site (sedimentation) control techniques.
- All contaminated soil requiring off-site disposal is to be disposed of to an appropriately licensed landfill facility.
- Sampling of any contaminated stormwater or groundwater encountered during the excavation works will be undertaken to determine appropriate handling or disposal options for the water.
- Any level of discharge from the site containing contaminants will be adequately controlled and monitored. A Remedial Action Plan (RAP) is submitted as part of this application to manage potential human health/health & safety risks from exposure to contaminants.
- There will be no requirement to undertake road closures or interfere with pedestrian movements.
- The works will be undertaken during standard construction hours and in accordance with

relevant standards pertaining to construction.

- The land comprising the application site does not contain any recorded archaeological sites or other features of cultural heritage.
- In the long term, the proposed works are anticipated to result in improvements to the general quality of the receiving environment through the removal of contaminated soil from the site. In addition, the proposal will allow future unencumbered use of the land.

In accordance with an assessment under s104(1)(b) of the Resource Management Act, the proposed works are consistent with the relevant policy statements and plans or proposed plans. Specifically, through the remediation works the quality of the environment will be enhanced as contaminated soils will be removed, limiting potential future adverse effects on human health and groundwater. Overall, the works will result in a long term improvement to the site and to the receiving environment.

An assessment under s104(1)(c) of the Resource Management Act, other relevant matters, including discharge of contaminants to land and water, have been considered necessary in the determination of the application and conditions of consent are imposed accordingly to remedy or mitigate any adverse effects that may potentially arise.

## 2. Conditions

Under section 108 of the RMA, these consents are subject to the following conditions:

### General conditions applicable to all consents (49495 & P-49517)

#### Activity in accordance with information and plans

1. The remedial site works shall be carried out in accordance with the plans and all information submitted with the application, detailed below, and all referenced by the council.
  - Application Form, and Assessment of Environmental Effects prepared by AECOM, dated 19 February 2016 and titled "*Former Caltex Pakuranga Service Station - Resource Consent Application and Assessment of Effects*".

Plan title and reference	Author	Rev	Dated
Preliminary Works Project No. 60435537	AECOM	-	18/02/2016
Remedial Works Project No. 60435537	AECOM	-	18/02/2016

2. This consent (or any part thereof) shall not commence until such time as the following charges, which are owing at the time the council's decision is notified, have been paid in full:
  - a. All fixed charges relating to the receiving, processing and granting of this resource consent under section 36(1) of the Resource Management Act 1991 (RMA); and
  - b. All additional charges imposed under section 36(3) of the RMA to enable the council to recover its actual and reasonable costs in respect of this application, which are beyond challenge.

3. The consent holder shall pay any subsequent further charges imposed under section 36 of the RMA relating to the receiving, processing and granting of this resource consent within 20 days of receipt of notification of a requirement to pay the same, provided that, in the case of any additional charges under section 36(3) of the RMA that are subject to challenge, the consent holder shall pay such amount as is determined by that process to be due and owing, within 20 days of receipt of the relevant decision.
4. Under section 125 of the RMA, this consent lapses five years after the date it is granted unless:
  - a. The consent is given effect to; or
  - b. The council extends the period after which the consent lapses.
5. The consent holder shall pay the council an initial consent compliance monitoring charge of \$280 (inclusive of GST), plus any further monitoring charge or charges to recover the actual and reasonable costs that have been incurred to ensure compliance with the conditions attached to this consent.

### **Specific conditions – Earthworks (49495)**

#### **Pre-commencement meeting**

6. Prior to the commencement of the earthworks activity, the consent holder shall hold a pre-start meeting that:
  - is located on the subject site
  - is scheduled not less than five days before the anticipated commencement of earthworks
  - includes Auckland Council officer[s] from the Monitoring Team
  - includes representation from the contractors who will undertake the works

The meeting shall discuss the erosion and sediment control measures, and the earthworks methodology, and shall ensure all relevant parties are aware of, and familiar with, the applicable conditions of this consent.

The following information shall be made available at the pre-start meeting:

- Timeframes for key stages of the works authorised under this consent
- Approved Traffic Management Plan (TMP).

#### *Advice Note:*

*To arrange the pre-start meeting please contact the Team Leader Southern Monitoring to arrange this meeting on [monitoring@aucklandcouncil.govt.nz](mailto:monitoring@aucklandcouncil.govt.nz), or 09 301 0101. The conditions of consent should be discussed at this meeting. All additional information required by the Council should be provided 2 days prior to the meeting.*

7. Prior to the pre-start meeting, a finalised Traffic Management Plan (TMP) shall be submitted to, and approved by, the Council's Team Leader – Southern Monitoring. The TMP shall address the control of vehicle movements to and from the site. No earthworks activity shall commence until written confirmation of the TMP is provided by the Team Leader - Southern Monitoring.
8. There shall be no deposition of earth, mud, dirt or other debris on any road or footpath resulting from earthworks activity on the subject site. In the event that such deposition does occur, it shall

immediately be removed. In no instance shall roads or footpaths be washed down with water without appropriate erosion and sediment control measures in place to prevent contamination of the stormwater drainage system, watercourses or receiving waters.

**Advice Note:**

*In order to prevent sediment laden water entering waterways from the road, the following methods may be adopted to prevent or address discharges should they occur:*

- *provision of a stabilised entry and exit(s) point for vehicles*
- *provision of wheel wash facilities (where appropriate)*
- *ceasing of vehicle movement until materials are removed*
- *cleaning of road surfaces using street-sweepers*
- *silt and sediment traps*
- *catchpits or enviropods*

*In no circumstances should the washing of deposited materials into drains be advised or otherwise condoned.*

*Discharge from the site includes the disposal of water (e.g. perched groundwater or collected stormwater) from excavations.*

*It is recommended that you discuss any potential measures with the Council's monitoring officer who may be able to provide further guidance on the most appropriate approach to take. Please contact the Team Leader Southern Monitoring for more details. Alternatively, please refer to Auckland Regional Council, Technical Publication No. 90, Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region.*

9. Where earthworks on the site are creating vibrations, that in the opinion of the Team Leader – Southern Monitoring, constitute an unreasonable disturbance beyond the boundaries of the subject site, the consent holder shall engage a suitably qualified expert to undertake monitoring and provide confirmation that peak particle velocities measured on any foundation or uppermost full storey of any building not located on the subject site, do not exceed the limits set out in Table 1 of German Standard DIN 4150 Part 3:1986 "Structural Vibration in Buildings – Effects on Structures."

### **Specific conditions – Discharge to land and NES (P-49517 & 49495)**

10. During the remediation/redevelopment works the Consent Holder shall ensure a suitably qualified environmental practitioner (SQEP) is available each day, during the hours of work. An Environmental Scientist shall be present on-site to supervise the works, excavation and removal of contaminated material, undertake soil sampling and undertake regular visual inspections of the excavations of the contaminated areas to ensure there are no uncontrolled discharges of contaminants. The Environmental Scientist shall be in daily contact with the SQEP and discuss and document the conditions encountered. The SQEP shall provide advice to the Environmental Scientist regarding all aspects of the proposed works and ensure they are carried out in general accordance with industry best practices.

11. Stockpiling of the excavated material shall be limited to overburden removed from above the contaminated material and stockpiled in accordance with Figure C-006 titled Remedial Works, included with the application report, and referenced in Condition 1. Temporary stockpiles shall be located on an impermeable surface within the catchment of erosion and sediment controls for the site. All stockpiles shall be covered with an impermeable material when the site is not being worked on and during periods of heavy rain.
12. All contaminated material removed from the site shall be disposed of at a landfill facility that holds a consent to accept the relevant level of contamination.
13. Any Separate Phase Hydrocarbons (SPH) and groundwater encountered during the remediation works shall be disposed of offsite to a licensed liquid facility authorised to accept such material.
14. Where contaminants that have not been anticipated by the application are identified, works in the area containing the unexpected contamination shall cease and be notified to the Team Leader - Southern Monitoring. The Suitably Qualified Environmental Practitioner (SQEP) shall ensure appropriate contingency measures are implemented. Works shall not recommence until confirmation has been received from the Team Leader - Southern Monitoring that disturbance of the unexpected contamination is within the scope of this consent. Any unexpected contamination and contingency measures shall be overseen by a SQEP and documented in the Site Validation Report required by condition 17.

**Advice Note:**

*Any unexpected contamination, may include contaminated soil, perched water, groundwater, or underground tanks. The consent holder is advised that where unexpected contamination is significantly different in extent and concentration from that anticipated in the original site investigations, handling the contamination may be outside the scope of this consent. Advice should be sought from the Team Leader - Southern Monitoring prior to carrying out any further work in the area of the unexpected contamination to ensure this is within scope of this consent.*

15. All sampling and testing for the characterisation of unexpected contaminated material, if encountered, characterisation of excavated overburden and validation sampling, as described in the Remediation Action Plan (Application Report) referenced in Condition 1, shall be overseen by a Suitably Qualified Environmental Practitioner (SQEP). All sampling shall be undertaken in accordance with Contaminated Land Management Guidelines, Number 5 – Site Investigation and Analysis of Soils, Ministry for the Environment, revised 2011.

**Advice Note:**

*In order to comply with the Ministry for the Environment's Contaminated Land Management Guidelines (revised 2011), all testing and analysis should be undertaken in a laboratory with suitable experience and ability to carry out the analysis. For more details on how to confirm the suitability of the laboratory please refer to Part 4: Laboratory Analysis, of Contaminated Land Management Guidelines No.5.*

16. All imported fill shall:
  - a. Comply with the definition of 'cleanfill', as per 'A Guide to the Management of Cleanfills', Ministry for the Environment (2002);
  - b. Be solid material of an inert nature; and

- c. Not contain hazardous substances or contaminants above natural background levels of the receiving site.

*Advice note:*

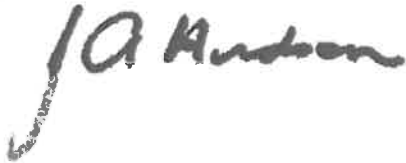
*Background levels for the Auckland Region can be found in the Auckland Regional Council technical publication "TP153, Background concentrations of inorganic elements in soils from the Auckland Region", (2001).*

17. Within three months of the completion of the proposed remediation works on site, a Site Validation Report (SVR) shall be provided to the Team Leader - Southern Monitoring for review. The SVR shall be prepared by a Suitably Qualified Environmental Practitioner (SQEP) in accordance with Schedule 13 (A5) of the Auckland Council Regional Plan: Air, Land and Water. The SVR shall contain sufficient detail to address the following matters:
  - a. a summary of the works undertaken, a statement confirming whether the remediation works have been completed in accordance with the approved Remediation Action Plan (Application Report).
  - b. the location and dimensions of the excavations carried out, including a relevant site plan.
  - c. records of any unexpected contamination encountered during the works, if applicable.
  - d. copies of the disposal dockets for the material, including SPH and groundwater removed from the site.
  - e. a summary of validation sampling undertaken, tabulated analytical results, and interpretation of the results in the context of the Contaminated Land Rules of the Auckland Council Regional Plan: Air, Land and Water, and the Proposed Auckland Unitary Plan.
  - f. details regarding any complaints and/or breaches of the procedures set out in the Remediation Action Plan and the conditions of this consent.
  - g. evidence of landfill disposal.
  - h. conditions of the final site ground surface.
  - i. scaled plans (plan and elevation views) showing the location and containment details (if any) of any contaminated materials exceeding acceptance criteria remaining on the site.

### **3. Advice notes**

1. *Please read the conditions of this resource consent carefully and make sure that you understand all the conditions that have been imposed before commencing the development.*
2. *If you disagree with any of the above conditions, or disagree with the additional charges relating to the processing of application, you have a right of objection under sections 357A and 357B of the Resource Management Act 1991. Any objection must be made in writing to Council within 15 working days of notification of the decision.*

3. *The consent holder is responsible for obtaining all other necessary consents, permits, and licences, including those under the Building Act 2004. This consent does not remove the need to comply with all other applicable Acts (including the Property Law Act 2007 and the Health and Safety in Employment Act 1992), regulations, relevant Bylaws, and rules of law. This consent does not constitute building consent approval.*
4. *Compliance with the consent conditions will be monitored by Council (section 35(d) of the Resource Management Act). This will typically include site visits to verify compliance (or non-compliance) and documentation (site notes and photographs) of the activity established under the resource consent. In order to recover actual and reasonable costs, inspections, in excess of those covered by the base fee paid, shall be charged at the relevant hourly rate applicable at the time. Only after all conditions of the resource consent have been met, will Council issue a letter on request of the consent holder.*

A handwritten signature in black ink, appearing to read 'JA Hudson', with a checkmark-like flourish on the left side.

**Jenny Hudson**

**Duty Commissioner**

**Date 23 March 2016**



## Appendix C

# Laboratory Results and Chain of Custody Documentation

## Appendix C Laboratory Results and Chain of Custody Documentation



## ANALYSIS REPORT

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1563593	SPv1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	06-Apr-2016	
		<b>Date Reported:</b>	12-Apr-2016	
		<b>Quote No:</b>		
		<b>Order No:</b>	60492475 1.1	
		<b>Client Reference:</b>	Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

Sample Type: Soil						
Sample Name:	SAC711	SAC712	SAC713	SAC714	SAC715	
Lab Number:	05-Apr-2016 1563593.1	05-Apr-2016 1563593.2	05-Apr-2016 1563593.3	05-Apr-2016 1563593.4	05-Apr-2016 1563593.5	
<b>Individual Tests</b>						
Dry Matter	g/100g as rcvd	56	69	76	68	75
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.09	< 0.07	0.13	< 0.07	0.06
Toluene	mg/kg dry wt	< 0.09	< 0.07	0.12	< 0.07	0.10
Ethylbenzene	mg/kg dry wt	< 0.09	< 0.07	< 0.06	< 0.07	0.10
m&p-Xylene	mg/kg dry wt	< 0.17	< 0.13	0.13	< 0.13	0.44
o-Xylene	mg/kg dry wt	< 0.09	< 0.07	0.08	< 0.07	0.10
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 12	< 10	< 9	< 10	< 9
C10 - C14	mg/kg dry wt	< 30	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 50	< 40	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 70	< 70	< 70	< 70

Sample Name:	SAC716	SAC717			
Lab Number:	05-Apr-2016 1563593.6	05-Apr-2016 1563593.7			
<b>Individual Tests</b>					
Dry Matter	g/100g as rcvd	75	57	-	-
<b>BTEX in Soil by Headspace GC-MS</b>					
Benzene	mg/kg dry wt	< 0.06	< 0.09	-	-
Toluene	mg/kg dry wt	< 0.06	< 0.09	-	-
Ethylbenzene	mg/kg dry wt	< 0.06	< 0.09	-	-
m&p-Xylene	mg/kg dry wt	< 0.12	< 0.17	-	-
o-Xylene	mg/kg dry wt	< 0.06	< 0.09	-	-
<b>Total Petroleum Hydrocarbons in Soil</b>					
C7 - C9	mg/kg dry wt	< 9	< 12	-	-
C10 - C14	mg/kg dry wt	< 20	< 30	-	-
C15 - C36	mg/kg dry wt	< 40	< 50	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 90	-	-

### 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.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No



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 are not accredited.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-7
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-7
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) . gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-7

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



# Hill Laboratories

A WORLD LEADER IN ANALYTICAL SERVICES

**Client** Consulting Services  
**Name** AECOM New Zealand Limited  
**Address** PO Box 4241, Shortland Street  
AUCKLAND 1140  
**Phone** 09 967 9200 **Fax** 09 960 9201  
**Client Reference** Cx Pakuranga  
**Quote No** \_\_\_\_\_ **Order Number** \_\_\_\_\_

**Primary Contact** Andrew Walker  
**Submitted By** Megan Baddiley  
**Charge To** AECOM New Zealand Limited

**Results To**  Mail Client  Mail Submitter  
 Fax Results  
 Email Results Andrew.f.walker@aecom.com

**ADDITIONAL INFORMATION**  
 All samples consist of 1x GFA1300.  
 Jobs 60492475 Table 1.1

**ANALY** Job No: \_\_\_\_\_ Date Recv: 08-Apr-16 15:02  
**156 3593**  
 R J Hill Laboratories Limit  
 1 Clyde Street  
 Private Bag 3205  
 Hamilton 3240, New Zeal  
 Received by: Ameka Phillips  
 3115635936

**Office use only Job No:** \_\_\_\_\_

**CHAIN OF CUSTODY RECORD**

**Sent to** Hill Laboratories **Date & Time:** \_\_\_\_\_  
**Name:** \_\_\_\_\_  
**Signature:** \_\_\_\_\_  
 Please tick if you require COC to be faxed back

**Received at** Hill Laboratories **Date & Time:** 6/4/16 16:45  
**Name:** Katie Taylor  
**Signature:** \_\_\_\_\_

**Condition**  Room Temp  Chilled  Frozen **Temp:** 7.3  
 Sample Analysis details checked  
**Signature:** \_\_\_\_\_

**Priority**  
 Low  Normal  High  
 **Urgent** (ASAP, extra charge applies, please contact the lab first)  
**Requested Reporting Date:** 5 working days.

**Sample Types**

<b>Waters</b>	<b>E</b> Effluent	<b>G</b> Geothermal	<b>Pot1</b> Potable Water (LAS/EU)	<b>Pot2</b> Potable Water (NZDWS)
	<b>GW</b> Ground Water	<b>L</b> Leachate	<input type="checkbox"/> Audit Monitoring	<b>Pot3</b> Potable Water (other)
	<b>SW</b> Surface Water	<b>S</b> Saline	<input type="checkbox"/> Check Monitoring	<b>Pool</b> Swimming/Spa Pool
	<b>TW</b> Trade Waste			
<b>Solids</b>	<b>ES</b> Soil	<b>SE</b> Sediment	<b>SL</b> Sludge	<b>PL</b> Plant
<b>Other</b>	<b>O</b> Oil	<b>M</b> Miscellaneous	<b>FS</b> FS Fish/shellfish/blota	<b>BM</b> BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	SAC711	5/4/16	ES	TPH & BTEX
2	SAC712	↓	↓	↓
3	SAC713	↓	↓	↓
4	SAC714	↓	↓	↓
5	SAC715	↓	↓	↓
6	SAC716	↓	↓	↓
7	SAC717	↓	↓	↓
8	SAC718	↓	↓	↓
9				
10				

Continued on next page

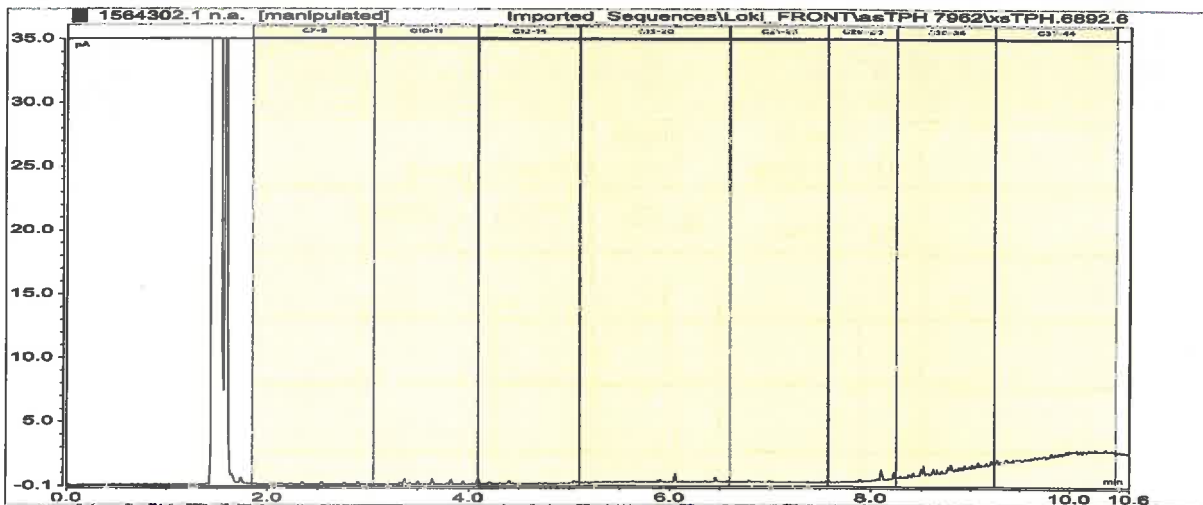


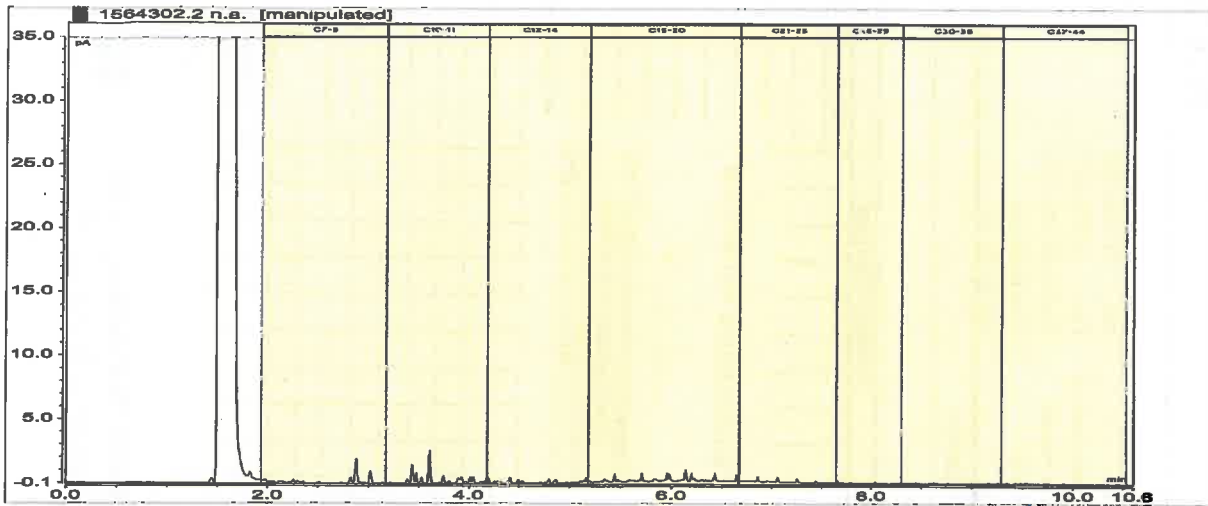
## ANALYSIS REPORT

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1564302	SPV1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	07-Apr-2016	
		<b>Date Reported:</b>	27-Apr-2016	
		<b>Quote No:</b>	72191	
		<b>Order No:</b>	60492475 1.1	
		<b>Client Reference:</b>	60492475 Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

Sample Type: Soil					
Sample Name:	SAC719	SAC720	SAC721	SAC722	
	06-Apr-2016	06-Apr-2016	06-Apr-2016	06-Apr-2016	
Lab Number:	1564302.1	1564302.2	1564302.3	1564302.4	
<b>Individual Tests</b>					
Dry Matter	g/100g as rcvd	86	70	77	78
<b>BTEX in Soil by Headspace GC-MS</b>					
Benzene	mg/kg dry wt	< 0.05	0.17	0.28	< 0.10
Toluene	mg/kg dry wt	< 0.05	1.49	0.59	< 0.10
Ethylbenzene	mg/kg dry wt	< 0.05	3.1	< 0.10	< 0.10
m&p-Xylene	mg/kg dry wt	0.12	14.8	< 0.19	< 0.19
o-Xylene	mg/kg dry wt	1.49	6.5	< 0.10	< 0.10
<b>Total Petroleum Hydrocarbons in Soil</b>					
C7 - C9	mg/kg dry wt	< 8	18	< 9	< 9
C10 - C14	mg/kg dry wt	< 20	36	< 20	< 20
C15 - C36	mg/kg dry wt	97	56	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	97	109	< 70	< 70

1564302.1  
 SAC719 06-Apr-2016  
 Client Chromatogram for TPH by FID





**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.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-4
Total Petroleum Hydrocarbons in Soil*	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-4
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvcd	1-4

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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Carole Rodgers-Carroll BA, NZCS  
 Client Services Manager - Environmental Division



**Form:**

**Chain of Custody & Analysis Request Form**

**AECOM - Auckland**  
 PO Box 4241  
 Auckland 1140  
 Tel: 64 9 967 9200  
 Fax: 64 9 967 9201  
 Email: \_\_\_\_\_

**Laboratory Details**  
 Tel: 07 858 2000  
 Fax: 07 858 2001  
 Lab. Name: R J Hill Laboratories Ltd  
 Lab. Address: 1 Clyde St, Hamilton  
 Contact Name: Jean Connick  
 Lab. Ref: \_\_\_\_\_  
 Preliminary Report by: \_\_\_\_\_  
 Final Report by: \_\_\_\_\_  
 Lab Quote No: \_\_\_\_\_

**Project Name:** Cx Pakuranga  
**Project Number:** 60492475  
**Sample collected by:** Megan Baddiley  
**Sample Results to be returned to:** Andrew Walker

**Specifications: Normal TAT** (Tick)

1. Urgent TAT required? (please circle: 24hr 48hr \_\_\_\_\_ days)  Yes  No  N/A  
 2. Fast TAT Guarantee Required?  Yes  No  N/A  
 3. Is any sediment layer present in waters to be excluded from extractions?  Yes  No  N/A  
 4. Special storage requirements?  Yes  No  N/A  
 5. Preservation requirements?  Yes  No  N/A  
 6. Other requirements?  Fax  Hard copy  Email

7. Report Format: Email: andrew.f.walker@aecom.com  
 8. Project Manager: andrew.f.walker@aecom.com tel: \_\_\_\_\_

Lab. ID	Sample ID	Sampling Date & Time (on)	Sampling Date & Time (off)	Matrix			Preservation			Container (No. & type)
				soil	water	other	filled	acid	ice	
	SACT19	6/04/2016		X						Gsoil300
	SACT20	6/04/2016		X						Gsoil300
	SACT21	6/04/2016		X						Gsoil300
	SACT22	6/04/2016		X						Gsoil300
	SACT23	6/04/2016		X						Gsoil300

**Relinquished By:** \_\_\_\_\_  
 Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 of: AECOM Time: \_\_\_\_\_

**Received by:** \_\_\_\_\_  
 Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 of: Hill Labs Time: 16:10

**Analysis Request**

Remarks & comments	
Temperature on Arrival	12.2 °C
Temperature was measured on arbitrarily chosen samples in this batch. The Microbiology sample temperature will be recorded at Melville Lab before testing.	

Job No: \_\_\_\_\_ Date Recv: 07-Apr-16 14:41  
**156 4302**  
 Received by: Arneka Phillips  
 3115643021





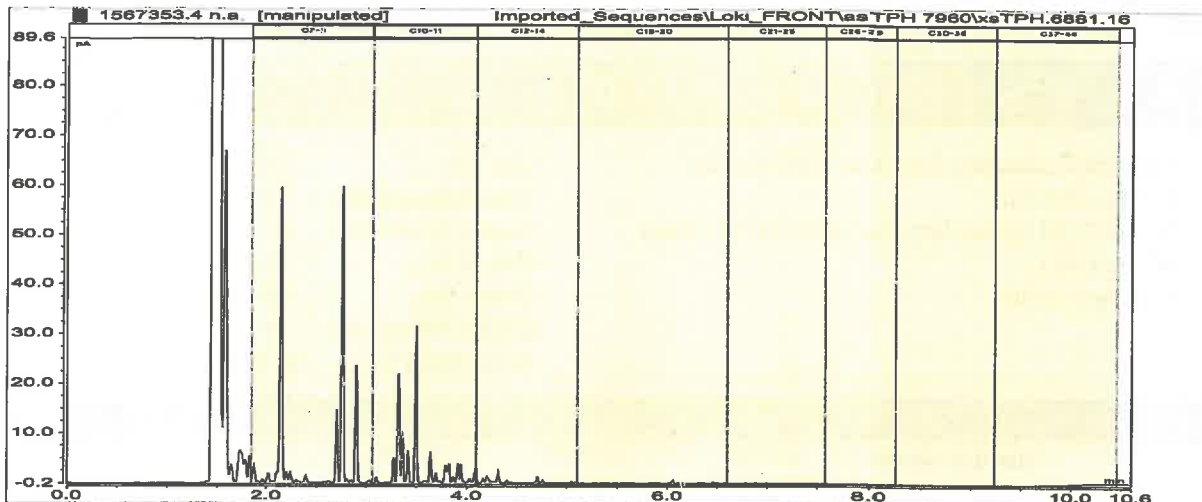
## ANALYSIS REPORT

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1567353	SPV1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	13-Apr-2016	
		<b>Date Reported:</b>	27-Apr-2016	
		<b>Quote No:</b>	72191	
		<b>Order No:</b>	60492475 1.1	
		<b>Client Reference:</b>	Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

Sample Type: Soil						
Sample Name:	SAC731	SAC732	SAC734	SAC735	SAC736	
Lab Number:	08-Apr-2016	12-Apr-2016	13-Apr-2016	13-Apr-2016	13-Apr-2016	
Lab Number:	1567353.1	1567353.2	1567353.4	1567353.5	1567353.6	
<b>Individual Tests</b>						
<b>Dry Matter</b>	g/100g as rcvd	71	46	71	58	72
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.07	< 0.12	14.8	< 0.09	< 0.06
Toluene	mg/kg dry wt	< 0.07	< 0.12	240	< 0.09	< 0.06
Ethylbenzene	mg/kg dry wt	< 0.07	< 0.12	49	< 0.09	< 0.06
m&p-Xylene	mg/kg dry wt	< 0.13	< 0.3	220	< 0.17	< 0.12
o-Xylene	mg/kg dry wt	< 0.07	< 0.12	81	< 0.09	< 0.06
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 10	< 14	710	< 12	< 10
C10 - C14	mg/kg dry wt	< 20	< 30	360	< 30	< 20
C15 - C36	mg/kg dry wt	< 40	< 60	< 40	< 50	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 100	1,070	< 80	< 70

Sample Name:	SAC737	SAC738				
Lab Number:	13-Apr-2016	13-Apr-2016				
Lab Number:	1567353.7	1567353.8				
<b>Individual Tests</b>						
<b>Dry Matter</b>	g/100g as rcvd	51	69	-	-	-
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.10	< 0.07	-	-	-
Toluene	mg/kg dry wt	< 0.10	< 0.07	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.10	< 0.07	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.2	< 0.13	-	-	-
o-Xylene	mg/kg dry wt	< 0.10	< 0.07	-	-	-
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 13	< 10	-	-	-
C10 - C14	mg/kg dry wt	< 30	< 20	-	-	-
C15 - C36	mg/kg dry wt	< 60	< 40	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 100	< 70	-	-	-





**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.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-2, 4-8
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-2, 4-8
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-2, 4-8

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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Graham Corban MSc Tech (Hons)  
 Client Services Manager - Environmental Division



# Hill Laboratories

A WORLD LEADER IN ANALYTICAL SERVICES

**Client**

Name AECOM Consulting Services Limited  
 Address PO Box 4241, Shortland Street  
AUCKLAND 1140  
 Phone 09 967 9200 Fax 09 960 9201  
 Client Reference Cx Patursanga  
 Quote No 60492475 Order Number 1.1

Primary Contact Andrew Walker  
 Submitted By Megan Baddiley  
 Charge To AECOM New Zealand Limited

Results To  Mail Client  Mail Submitter  
 Fax Results  
 Email Results andrew.f.walker@aecom.com

**ADDITIONAL INFORMATION**

All samples consist of 1x GSoil300.

**Sample Types**

<b>Waters</b>	<b>E</b> Effluent	<b>G</b> Geothermal	<b>Pot1</b> Potable Water (IAS/EU)	<b>Pot2</b> Potable Water (NZDWS)
	<b>GW</b> Ground Water	<b>L</b> Leachate	<input type="checkbox"/> Audit Monitoring	<b>Pot3</b> Potable Water (other)
	<b>SW</b> Surface Water	<b>S</b> Saline	<input type="checkbox"/> Check Monitoring	<b>Pot4</b> Swimming/Spa Pool
	<b>TW</b> Trade Waste			
<b>Solids</b>	<b>ES</b> Soil	<b>SE</b> Sediment	<b>SL</b> Sludge	<b>PL</b> Plant
<b>Other</b>	<b>O</b> Oil	<b>M</b> Miscellaneous	<b>FS</b> FS Fish/shellfish/biota	<b>BM</b> BM Biological Material

**ANALYSIS** Job No: 156 7353 Date Recv: 13-Apr-16 14:34  
 R J Hill Laboratories Limited  
 1 Clyde Street  
 Private Bag 3205  
 Hamilton 3240, New Zealand

Received by: Darryl Brown



**Office use only** Job: 3115673531

**CHAIN OF CUSTODY RECORD**

Sent to Hill Laboratories Date & Time: \_\_\_\_\_  
 Name: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Please tick if you require COC to be faxed back

Received at Hill Laboratories Date & Time 13/4/16 15:54  
 Name: [Signature]  
 Signature: [Signature]

Condition  
 Room Temp  Chilled  Frozen Temp: 1.5  
 Sample Analysis details checked  
 Signature: \_\_\_\_\_

Priority  
 Low  Normal  High  
 Urgent (ASAP, extra charge applies, please contact the lab first)

Requested Reporting Date: 5 working days

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	SACT31	8/4/16	ES	Cold hold - please contact Andrew Walker regarding testing. (TPH & STEK)
2	SACT32	12/4/16		
3	SACT33	↓		
4	SACT34	15/4/16		
5	SACT35			
6	SACT36			
7	SACT37			
8	SACT38			
9	SACT39			
10	SACT40			

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
11	SAC 741	13/4/16	ES	
12				
13				
14				
15				
16				
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39				
40				



## ANALYSIS REPORT

Page 1 of 2

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1567508	SPv1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	14-Apr-2016	
		<b>Date Reported:</b>	19-Apr-2016	
		<b>Quote No:</b>		
		<b>Order No:</b>	60492475 1.1	
		<b>Client Reference:</b>	Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

### Sample Type: Soil

Sample Name:	SAC724	SAC725	SAC726	SAC727	SAC728	
Lab Number:	07-Apr-2016 1567508.1	08-Apr-2016 1567508.2	08-Apr-2016 1567508.3	08-Apr-2016 1567508.4	08-Apr-2016 1567508.5	
<b>Individual Tests</b>						
<b>Dry Matter</b>	g/100g as rcvd	72	74	70	49	70
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.06	< 0.06	< 0.07	< 0.11	< 0.07
Toluene	mg/kg dry wt	< 0.06	< 0.06	< 0.07	< 0.11	< 0.07
Ethylbenzene	mg/kg dry wt	< 0.06	< 0.06	< 0.07	< 0.11	< 0.07
m&p-Xylene	mg/kg dry wt	< 0.12	< 0.12	< 0.13	< 0.3	< 0.13
o-Xylene	mg/kg dry wt	< 0.06	< 0.06	< 0.07	< 0.11	< 0.07
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 9	< 9	< 10	< 13	< 10
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 30	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	< 60	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	< 100	< 70

Sample Name:	SAC729	SAC730	SAC723			
Lab Number:	08-Apr-2016 1567508.6	08-Apr-2016 1567508.7	06-Apr-2016 1567508.8			
<b>Individual Tests</b>						
<b>Dry Matter</b>	g/100g as rcvd	60	70	62	-	-
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.08	< 0.07	1.03	-	-
Toluene	mg/kg dry wt	< 0.08	< 0.07	< 0.08	-	-
Ethylbenzene	mg/kg dry wt	< 0.08	< 0.07	< 0.08	-	-
m&p-Xylene	mg/kg dry wt	< 0.16	< 0.13	< 0.16	-	-
o-Xylene	mg/kg dry wt	< 0.08	< 0.07	< 0.08	-	-
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 11	< 10	< 11	-	-
C10 - C14	mg/kg dry wt	< 30	< 20	< 30	-	-
C15 - C36	mg/kg dry wt	< 50	< 40	< 50	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 70	< 80	-	-

### 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.

### Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
------	--------------------	-------------------------	-----------



Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-8
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-8
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-8

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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Martin Cowell - BSc  
Client Services Manager - Environmental Division



# Hill Laboratories

A WORLD LEADER IN ANALYTICAL SERVICES

Job No: **156 7508** Date Recv: 14-Apr-16 05:24

**ANALYSIS**

R J Hill Laboratories Limited  
 1 Clyde Street  
 Private Bag 3205  
 Hamilton 3240, New Zealand

Received by: Jennifer Singlewood



**Client**

Name **AECOM Consulting Services Limited**

Address **PO Box 4241, Shortland Street**

**AUCKLAND 1140**

Phone **09 967 9200** Fax **09 960 9201**

Client Reference **Cx Pakuranga**

Quote No **60492475** Order Number **1.1**

Primary Contact **Andrew Walker**

Submitted By **Megan Baddiley**

Charge To **AECOM New Zealand Limited**

Results To  Mail Client  Mail Submitter

Fax Results

Email Results **Andrew.f.walker@aecom.com**

**ADDITIONAL INFORMATION**

All samples consist of 1x GSoil300.

Office use only Job No:

**CHAIN OF CUSTODY RECORD**

Sent to **Hill Laboratories** Date & Time:

Name:

Please tick if you require COC to be faxed back Signature:

Received at **Hill Laboratories** Date & Time: **14/4/16 3:00**

Name: **Leas**

Signature:

Condition

Room Temp  Chilled  Frozen Temp: **10.3**

Sample Analysis details checked Signature:

**Priority**

Low  Normal  High  
 **Urgent** (ASAP, extra charge applies, please contact the lab first)

Requested Reporting Date: **5 working days**

**Sample Types**

<b>Waters</b>	<b>E</b> Effluent	<b>G</b> Geothermal	<b>Pot1</b> Potable Water (LAS/EU)	<b>Pot2</b> Potable Water (NZDWS)
	<b>GW</b> Ground Water	<b>L</b> Leachate	<input type="checkbox"/> Audit Monitoring	<b>Pot3</b> Potable Water (other)
	<b>SW</b> Surface Water	<b>S</b> Saline	<input type="checkbox"/> Check Monitoring	<b>Pool</b> Swimming/Spa Pool
	<b>TW</b> Trade Waste			
<b>Solids</b>	<b>ES</b> Soil	<b>SE</b> Sediment	<b>SL</b> Sludge	<b>PL</b> Plant
<b>Other</b>	<b>O</b> Oil	<b>M</b> Miscellaneous	<b>FS</b> FS Fish/shellfish/biota	<b>BM</b> BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	SAC724	7/04/2016	ES	TPH and BTEX
2	SAC725	8/04/2016	ES	TPH and BTEX
3	SAC726	8/04/2016	ES	TPH and BTEX
4	SAC727	8/04/2016	ES	TPH and BTEX
5	SAC728	8/04/2016	ES	TPH and BTEX
6	SAC729	8/04/2016	ES	TPH and BTEX
7	SAC730	8/04/2016	ES	TPH and BTEX
8	SAC731	8/04/2016	ES	TPH and BTEX
9	SAC723			
10				

Continued on next page

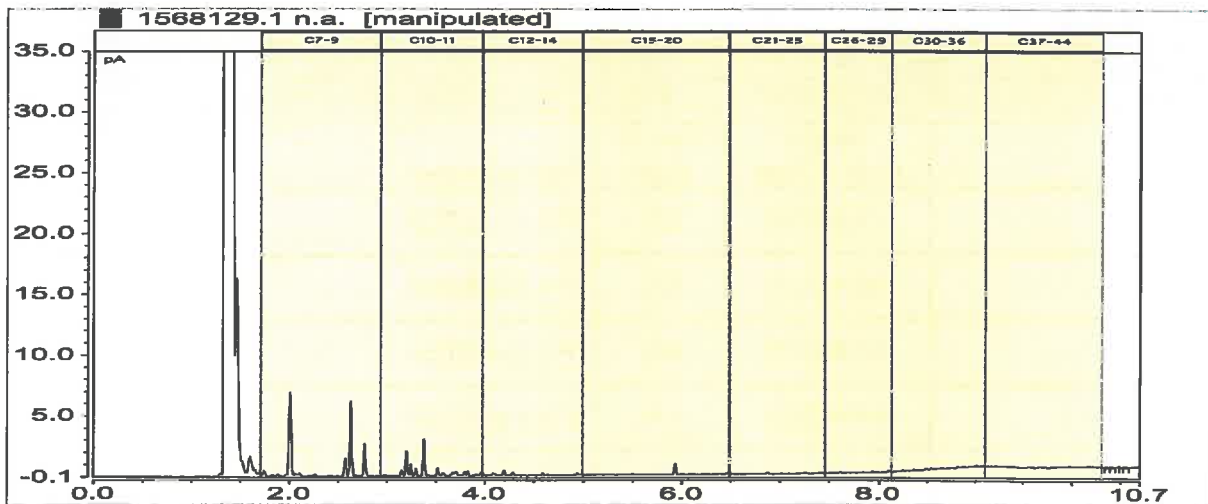


## ANALYSIS REPORT

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1568129	SPV1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	14-Apr-2016	
		<b>Date Reported:</b>	20-Apr-2016	
		<b>Quote No:</b>		
		<b>Order No:</b>	1.1	
		<b>Client Reference:</b>	Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

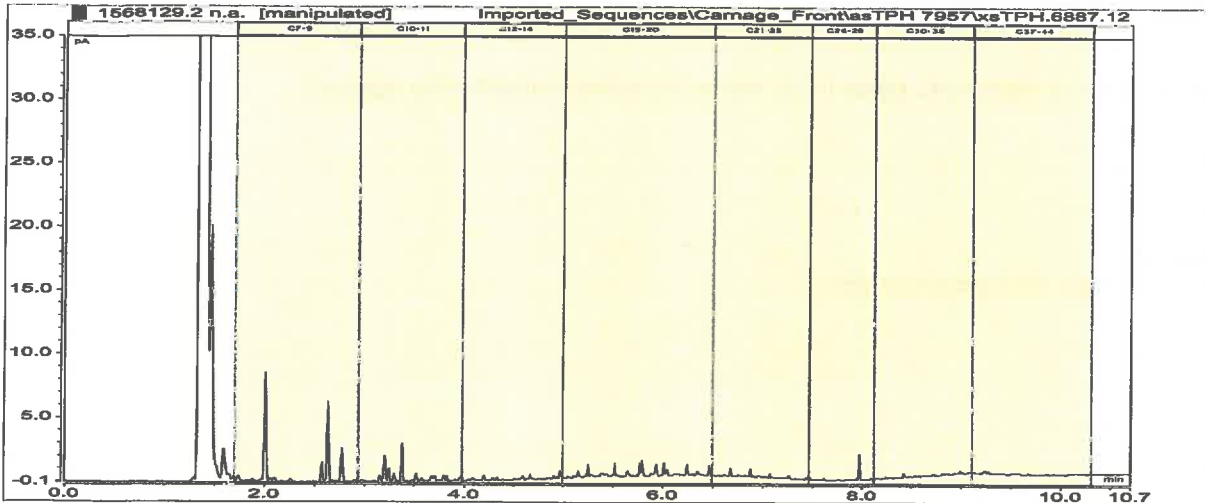
Sample Type: Soil						
Sample Name:		SAC742	SAC743	SAC744		
Lab Number:		14-Apr-2016	14-Apr-2016	14-Apr-2016		
		1568129.1	1568129.2	1568129.3		
<b>Individual Tests</b>						
Dry Matter	g/100g as rcvd	67	60	60	-	-
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	4.1	10.2	14.1	-	-
Toluene	mg/kg dry wt	34	53	86	-	-
Ethylbenzene	mg/kg dry wt	6.6	11.6	22	-	-
m&p-Xylene	mg/kg dry wt	32	53	78	-	-
o-Xylene	mg/kg dry wt	12.0	21	26	-	-
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	76	93	171	-	-
C10 - C14	mg/kg dry wt	28	59	122	-	-
C15 - C36	mg/kg dry wt	< 40	107	165	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	104	260	460	-	-

1568129.1  
 SAC742 14-Apr-2016  
 Client Chromatogram for TPH by FID

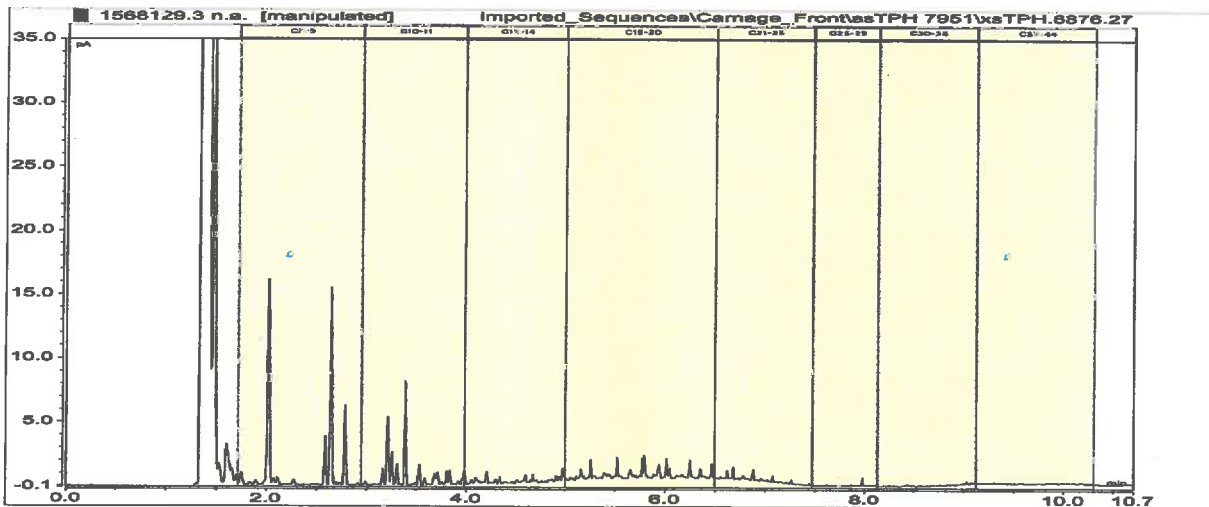




1568129.2  
 SAC743 14-Apr-2016  
 Client Chromatogram for TPH by FID



1568129.3  
 SAC744 14-Apr-2016  
 Client Chromatogram for TPH by FID



## SUMMARY OF METHODS

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-3
Total Petroleum Hydrocarbons in Soil*	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-3
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-3

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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Martin Cowell - BSc  
Client Services Manager - Environmental Division



## ANALYSIS REPORT

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1568136	SPv1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	14-Apr-2016	
		<b>Date Reported:</b>	26-Apr-2016	
		<b>Quote No:</b>		
		<b>Order No:</b>	1.1	
		<b>Client Reference:</b>	Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

Sample Type: Soil	
<b>Sample Name:</b>	SAC745 14-Apr-2016
<b>Lab Number:</b>	1568136.1
<b>Individual Tests</b>	
<b>Dry Matter</b>	g/100g as rcvd <b>52</b>
<b>BTEX in Soil by Headspace GC-MS</b>	
Benzene	mg/kg dry wt 4.5
Toluene	mg/kg dry wt 0.52
Ethylbenzene	mg/kg dry wt 0.15
m&p-Xylene	mg/kg dry wt 0.34
o-Xylene	mg/kg dry wt 0.18
<b>Total Petroleum Hydrocarbons in Soil</b>	
C7 - C9	mg/kg dry wt < 13
C10 - C14	mg/kg dry wt < 30
C15 - C36	mg/kg dry wt < 50
Total hydrocarbons (C7 - C36)	mg/kg dry wt < 90

### 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.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry), gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1



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

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A handwritten signature in blue ink, appearing to read 'Peter Robinson', with a long horizontal flourish extending to the right.

Peter Robinson MSc (Hons), PhD, FNZIC  
Client Services Manager - Environmental Division



**ANALYSIS** Job No: Date Recv: 14-Apr-16 15:17  
 R J Hill Laboratories Limited  
 1 Clyde Street  
 Private Bag 3205  
 Hamilton 3240, New Zealand

**156 8136**

Received by: Darryl Brown



3115881363

**Office use only Job** **CHAIN OF CUSTODY RECORD**

**Sent to** Hill Laboratories **Date & Time:**  
**Name:**

Please tick if you require COC to be faxed back **Signature:**

**Received at** Hill Laboratories **Date & Time:** 14/4/16 15:03  
**Name:** [Signature]

**Signature:** [Signature]

**Condition** **Temp:**  
 Room Temp  Chilled  Frozen **0 2**

Sample Analysis details checked  
**Signature:**

**Priority**  
 Low  Normal  High  
 **Urgent** (ASAP, extra charge applies, please contact the lab first)

**Requested Reporting Date:** ASAP where indicated 5 working days

**Client**  
**Name** AECOM Consulting Services Limited  
**Address** PO Box 4241, Shortland Street  
 AUCKLAND 1140  
**Phone** 09 967 9200 **Fax** 09 960 9201  
**Client Reference** Cx Pakuranga  
**Quote No** 60492475 **Order Number** 1.1

**Primary Contact** Andrew Walker  
**Submitted By** Megan Baddiley  
**Charge To** AECOM New Zealand Limited

**Results To**  Mail Client  Mail Submitter  
 Fax Results  
 Email Results andrew.f.walker@aecom.com

**ADDITIONAL INFORMATION**  
 All samples consist of 1x GSoll300.

**Sample Types**

<b>Waters</b>	<b>E</b> Effluent	<b>G</b> Geothermal	<b>Pot1</b> Potable Water (LAS/EU)	<b>Pot2</b> Potable Water (NZDWS)
	<b>GW</b> Ground Water	<b>L</b> Leachate	<input type="checkbox"/> Audit Monitoring	<b>Pot3</b> Potable Water (other)
	<b>SW</b> Surface Water	<b>S</b> Saline	<input type="checkbox"/> Check Monitoring	<b>Pool</b> Swimming/Spa Pool
	<b>TW</b> Trade Waste			
<b>Solids</b>	<b>ES</b> Soil	<b>SE</b> Sediment	<b>SL</b> Sludge	<b>PL</b> Plant
<b>Other</b>	<b>D</b> Oil	<b>M</b> Miscellaneous	<b>FS</b> FS Fish/shellfish/biota	<b>BM</b> BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	SACT42	14/4/16	ES	TPH/BTEX ASAP
2	SACT43	↓	↓	TPH/BTEX ASAP
3	SACT44	↓	↓	TPH/BTEX ASAP
4	SACT45	↓	↓	TPH/BTEX 5 working days.
5				
6				
7				
8				
9				
10				

Continued on next page



## ANALYSIS REPORT

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1568803	SPV1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	15-Apr-2016	
		<b>Date Reported:</b>	22-Apr-2016	
		<b>Quote No:</b>		
		<b>Order No:</b>	1.1	
		<b>Client Reference:</b>	Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

### Sample Type: Soil

Sample Name:	SAC733	SAC739	SAC740	SAC741	
Lab Number:	1568803.1	1568803.2	1568803.3	1568803.4	
<b>Individual Tests</b>					
<b>Dry Matter</b>	g/100g as rcvd	50	76	78	83
<b>BTEX in Soil by Headspace GC-MS</b>					
Benzene	mg/kg dry wt	4.1	< 0.06	< 0.06	< 0.05
Toluene	mg/kg dry wt	0.31	< 0.06	< 0.06	< 0.05
Ethylbenzene	mg/kg dry wt	3.1	< 0.06	< 0.06	< 0.05
m&p-Xylene	mg/kg dry wt	5.4	< 0.12	< 0.11	< 0.10
o-Xylene	mg/kg dry wt	0.46	< 0.06	< 0.06	< 0.05
<b>Total Petroleum Hydrocarbons in Soil</b>					
C7 - C9	mg/kg dry wt	< 14	< 9	< 9	< 8
C10 - C14	mg/kg dry wt	< 30	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 60	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 100	< 70	< 70	< 70

### 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	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-4
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-4
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-4



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A handwritten signature in blue ink that reads "Carole Rodgers-Carroll". The signature is written in a cursive style with a large initial 'C'.

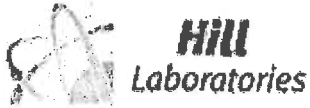
Carole Rodgers-Carroll BA, NZCS  
Client Services Manager - Environmental Division

156 8803

4/15/2016

Hill Laboratories Mail - RE: Hill Laboratories Job Request Form and Summary Page for Job I

Received by: Greg Brittan



Greg Brittan <greg



**RE: Hill Laboratories Job Request Form and Summary Page for Job Number 1567353**

**Baddiley, Megan** <megan.baddiley@aecom.com>

15 April 2016 at 14:18

To: Kim Harrison <kim.harrison@hill-labs.co.nz>

Cc: "sample.reception@hill-labs.co.nz" <sample.reception@hill-labs.co.nz>, "Walker, Andrew (Auckland)" <andrew.f.walker@aecom.com>, "Coombe, Richard" <richard.coombe@aecom.com>

Hi Kim,

Please could you please put the following samples on 48hrs turn around:

SAC733 in batch 1567353

SAC739 (1567353)

SAC740 (1567353)

SAC741 (1567353)

Kind Regards,

Megan Baddiley

**From:** Kim Harrison [mailto:kim.harrison@hill-labs.co.nz]

**Sent:** Friday, 15 April 2016 10:13 a.m.

**To:** Walker, Andrew (Auckland)

**Cc:** Arneka Phillips; Baddiley, Megan; Sample.Reception@hill-labs.co.nz

**Subject:** Re: Hill Laboratories Job Request Form and Summary Page for Job Number 1567353

[Quoted text hidden]

**Attention:**

The information in this email and in any attachments is confidential. If you are not the intended recipient then please do not distribute, copy or use this information. Please notify us immediately and then delete the message from your computer. Any views or opinions presented are solely those of the author.





## ANALYSIS REPORT

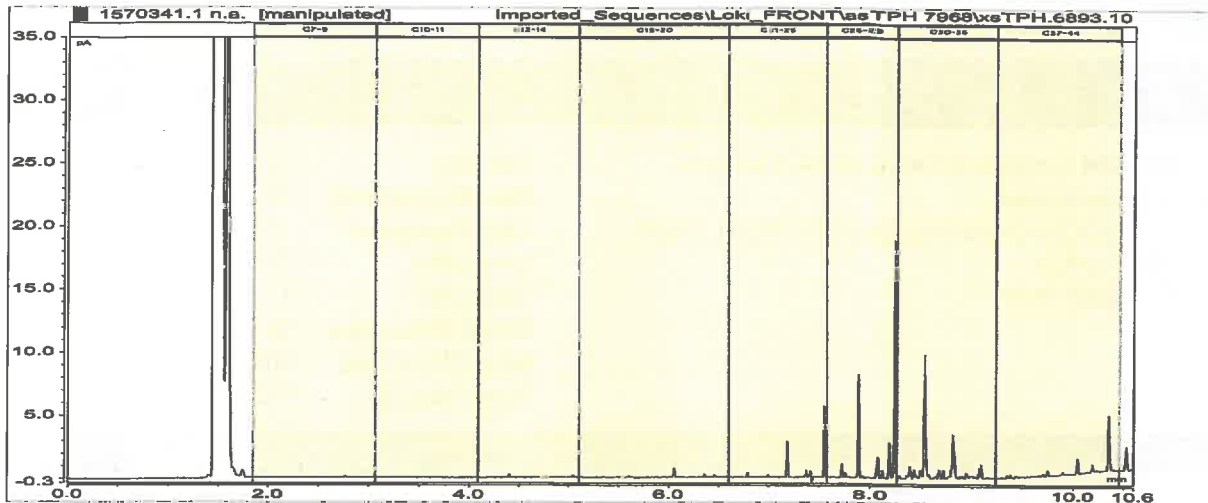
<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1570341	SPv1
<b>Contact:</b>	Andrew Walker C/- AECOM Consulting Services (NZ) Limited PO Box 821 Auckland 1140	<b>Date Registered:</b>	19-Apr-2016	
		<b>Date Reported:</b>	28-Apr-2016	
		<b>Quote No:</b>	72191	
		<b>Order No:</b>	1.1	
		<b>Client Reference:</b>	Cx Pakuranga	
		<b>Add. Client Ref:</b>	60492475	
		<b>Submitted By:</b>	M Baddiley	

Sample Type: Soil						
Sample Name:	SAC746	SAC747	SAC748	SAC749	SAC750	
Lab Number:	1570341.1	1570341.2	1570341.3	1570341.4	1570341.5	
<b>Individual Tests</b>						
Dry Matter	g/100g as rcvd	47	76	63	56	75
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.12	< 0.06	< 0.08	< 0.09	0.08
Toluene	mg/kg dry wt	< 0.12	< 0.06	< 0.08	< 0.09	0.18
Ethylbenzene	mg/kg dry wt	< 0.12	< 0.06	< 0.08	< 0.09	< 0.06
m&p-Xylene	mg/kg dry wt	< 0.3	< 0.12	< 0.15	< 0.18	< 0.12
o-Xylene	mg/kg dry wt	< 0.12	< 0.06	< 0.08	< 0.09	< 0.06
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 15	< 9	< 11	< 12	< 9
C10 - C14	mg/kg dry wt	< 30	< 20	< 30	< 30	< 20
C15 - C36	mg/kg dry wt	117	< 40	< 50	< 50	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	117	< 70	< 80	< 90	< 70

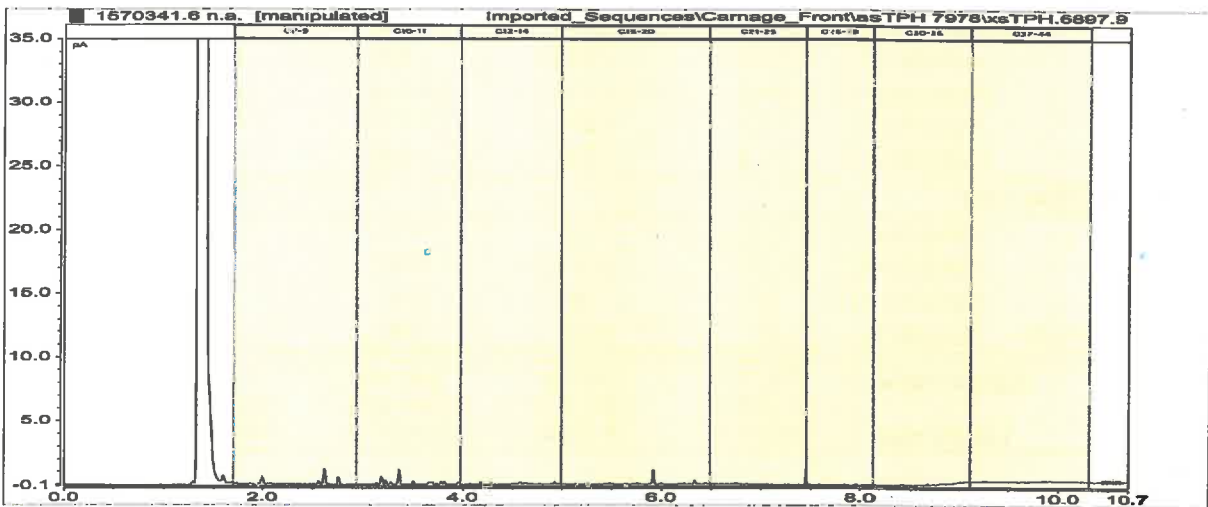
Sample Name:	SAC751	SAC752	SAC753	SAC754	SAC755	
Lab Number:	1570341.6	1570341.7	1570341.8	1570341.9	1570341.10	
<b>Individual Tests</b>						
Dry Matter	g/100g as rcvd	70	74	77	75	77
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	0.30	< 0.06	< 0.06	0.14	< 0.06
Toluene	mg/kg dry wt	4.5	0.06	< 0.06	0.56	0.10
Ethylbenzene	mg/kg dry wt	2.7	< 0.06	< 0.06	< 0.06	< 0.06
m&p-Xylene	mg/kg dry wt	13.0	< 0.12	< 0.11	0.12	< 0.11
o-Xylene	mg/kg dry wt	5.2	< 0.06	< 0.06	0.10	< 0.06
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	14	< 9	< 9	< 9	< 9
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	< 70	< 70



1570341.1  
 SAC746 18-Apr-2016  
 Client Chromatogram for TPH by FID



1570341.6  
 SAC751 19-Apr-2016  
 Client Chromatogram for TPH by FID



**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.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Client Chromatogram for TPH by FID*	.	-	6
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-10
Total Petroleum Hydrocarbons in Soil*	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-10
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-10

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

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A handwritten signature in blue ink, appearing to read 'Peter Robinson', with a long horizontal flourish extending to the right.

Peter Robinson MSc (Hons), PhD, FNZIC  
Client Services Manager - Environmental Division



Job No: Date Recv: 19-Apr-16 12:26

**ANAL 157 0341**

R J Hill Laboratories Lim  
1 Clyde Street  
Private Bag 3205  
Hamilton 3240, New Zea

Received by: Karl Prendergast



**Client**

Name AECOM Consulting Services Limited  
Address PO Box 4241, Shortland Street  
AUCKLAND 1140  
Phone 09 967 9200 Fax 09 960 9201  
Client Reference CA PAKMADQA  
Quote No 60492475 Order Number 1.1

Primary Contact Andrew Walker  
Submitted By Megan Baddiley  
Charge To AECOM New Zealand Limited

Results To  Mail Client  Mail Submitter  
 Fax Results  
 Email Results andrew.f.walker@aecom.com

**Office use only** Job No: \_\_\_\_\_

**CHAIN OF CUSTODY RECORD**

Sent to Hill Laboratories Date & Time: \_\_\_\_\_  
Name: \_\_\_\_\_  
Signature: \_\_\_\_\_  
 Please tick if you require COC to be faxed back

Received at Hill Laboratories Date & Time: 19/4/16 15:00  
Name: Shor Murray  
Signature: \_\_\_\_\_

Condition  Room Temp  Chilled  Frozen Temp: 38  
 Sample Analysis details checked  
Signature: \_\_\_\_\_

Priority  Low  Normal  High  
 **Urgent** (ASAP, extra charge applies, please contact the lab first)

Requested Reporting Date: 5 working days

**ADDITIONAL INFORMATION**  
All samples consist of 1x GSoil300.

**Sample Types**

<b>Waters</b>	E Effluent	G Geothermal	Pot1 Potable Water (LAS/EU)	Pot2 Potable Water (NZDWS)
	GW Ground Water	L Leachate	<input type="checkbox"/> Audit Monitoring	Pot3 Potable Water (other)
	SW Surface Water	S Saline	<input type="checkbox"/> Check Monitoring	Pool Swimming/Spa Pool
	TW Trade Waste			
<b>Solids</b>	ES Soil	SE Sediment	SL Sludge	PL Plant
<b>Other</b>	O Oil	M Miscellaneous	FS Fish/shellfish/biota	BM BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	SAC746	18/4/16	ES	BTEX / TPH
2	SAC747	↓	↓	↓
3	SAC748	↓	↓	↓
4	SAC749	↓	↓	↓
5	SAC750	19/4/16	↓	↓
6	SAC751	↓	↓	↓
7	SAC752	↓	↓	↓
8	SAC753	↓	↓	↓
9	SAC754	↓	↓	↓
10	SAC755	↓	↓	↓

Continued on next page



## ANALYSIS REPORT

Page 1 of 3

<b>Client:</b>	AECOM Consulting Services (NZ) Limited	<b>Lab No:</b>	1572894	SPv1
<b>Contact:</b>	Andrew Walker	<b>Date Registered:</b>	22-Apr-2016	
	C/- AECOM Consulting Services (NZ) Limited	<b>Date Reported:</b>	04-May-2016	
	PO Box 821	<b>Quote No:</b>	42967	
	Auckland 1140	<b>Order No:</b>	60492475 1.1	
		<b>Client Reference:</b>	60492475 Cx Pakuranga	
		<b>Submitted By:</b>	M Baddiley	

### Sample Type: Soil

Sample Name:	SAC756	SAC757	SAC758	SAC759	SAC760
	20-Apr-2016	20-Apr-2016	20-Apr-2016	20-Apr-2016	20-Apr-2016
Lab Number:	1572894.1	1572894.2	1572894.3	1572894.4	1572894.5

#### Individual Tests

<b>Dry Matter</b>	g/100g as rcvd	74	72	70	77	72
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#### BTEX in Soil by Headspace GC-MS

	mg/kg dry wt	< 0.06	< 0.06	< 0.07	< 0.06	< 0.06
Benzene	mg/kg dry wt	< 0.06	< 0.06	< 0.07	< 0.06	< 0.06
Toluene	mg/kg dry wt	< 0.06	0.29	< 0.07	< 0.06	0.31
Ethylbenzene	mg/kg dry wt	< 0.06	0.19	< 0.07	< 0.06	0.09
m&p-Xylene	mg/kg dry wt	0.23	1.29	< 0.13	< 0.11	0.44
o-Xylene	mg/kg dry wt	0.11	0.54	< 0.07	< 0.06	0.27

#### Total Petroleum Hydrocarbons in Soil

C7 - C9	mg/kg dry wt	< 9	< 9	< 10	< 9	< 10
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	< 70	< 70

Sample Name:	SAC761	SAC762	SAC763	SAC764	SAC765
	20-Apr-2016	20-Apr-2016	20-Apr-2016	20-Apr-2016	20-Apr-2016
Lab Number:	1572894.6	1572894.7	1572894.8	1572894.9	1572894.10

#### Individual Tests

<b>Dry Matter</b>	g/100g as rcvd	76	76	81	78	76
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#### BTEX in Soil by Headspace GC-MS

	mg/kg dry wt	< 0.06	< 0.06	< 0.05	< 0.06	< 0.06
Benzene	mg/kg dry wt	< 0.06	< 0.06	< 0.05	< 0.06	< 0.06
Toluene	mg/kg dry wt	< 0.06	< 0.06	< 0.05	< 0.06	< 0.06
Ethylbenzene	mg/kg dry wt	< 0.06	< 0.06	< 0.05	< 0.06	< 0.06
m&p-Xylene	mg/kg dry wt	< 0.11	< 0.11	< 0.10	< 0.11	< 0.11
o-Xylene	mg/kg dry wt	< 0.06	< 0.06	< 0.05	< 0.06	< 0.06

#### Total Petroleum Hydrocarbons in Soil

C7 - C9	mg/kg dry wt	< 9	< 9	< 8	< 9	< 9
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	< 70	< 70

Sample Name:	SAC766	SAC767	SAC768	SAC769	SAC770
	20-Apr-2016	20-Apr-2016	20-Apr-2016	20-Apr-2016	21-Apr-2016
Lab Number:	1572894.11	1572894.12	1572894.13	1572894.14	1572894.15

#### Individual Tests

<b>Dry Matter</b>	g/100g as rcvd	66	52	51	93	71
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**Sample Type: Soil**

Sample Name:		SAC766	SAC767	SAC768	SAC769	SAC770
20-Apr-2016		20-Apr-2016	20-Apr-2016	20-Apr-2016	20-Apr-2016	21-Apr-2016
Lab Number:		1572894.11	1572894.12	1572894.13	1572894.14	1572894.15
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.07	0.65	< 0.10	< 0.05	< 0.07
Toluene	mg/kg dry wt	< 0.07	< 0.10	< 0.10	< 0.05	1.06
Ethylbenzene	mg/kg dry wt	< 0.07	< 0.10	< 0.10	< 0.05	0.33
m&p-Xylene	mg/kg dry wt	< 0.14	< 0.19	< 0.2	< 0.10	1.49
o-Xylene	mg/kg dry wt	< 0.07	< 0.10	< 0.10	< 0.05	0.67
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 10	< 13	< 13	< 8	< 9
C10 - C14	mg/kg dry wt	< 20	< 30	< 30	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 50	< 60	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 90	< 90	< 70	< 70

Sample Name:		SAC771				
21-Apr-2016		21-Apr-2016				
Lab Number:		1572894.16				

Individual Tests						
Dry Matter	g/100g as rcvd	71	-	-	-	-
<b>BTEX in Soil by Headspace GC-MS</b>						
Benzene	mg/kg dry wt	< 0.06	-	-	-	-
Toluene	mg/kg dry wt	< 0.06	-	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.06	-	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.12	-	-	-	-
o-Xylene	mg/kg dry wt	< 0.06	-	-	-	-
<b>Total Petroleum Hydrocarbons in Soil</b>						
C7 - C9	mg/kg dry wt	< 9	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	< 40	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	-	-	-	-

**Analyst's Comments**

It was observed that the containers for samples 1572894/3, 8 & 14 were not completely filled. Volatile loss may have occurred due to the headspace created in the container.

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.

**Sample Type: Soil**

Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1-16
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1-16
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-16

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.

This report must not be reproduced, except in full, without the written consent of the signatory.

A handwritten signature in blue ink that reads "Carole Rodgers-Carroll". The signature is written in a cursive style.

Carole Rodgers-Carroll BA, NZCS  
Client Services Manager - Environmental Division



# Hill Laboratories

A WORLD LEADER IN ANALYTICAL SERVICES

**ANALYSIS** Job No:      Date Recv: 22-Apr-16 14:57

**157 2894**

Received by: Darryl Brown

R J Hill Laboratories Limited  
1 Clyde Street  
Private Bag 3205  
Hamilton 3240, New Zealand

3115728945

**Client**  
Name AECOM Consulting Services Limited  
Address PO Box 4241, Shortland Street  
AUCKLAND 1140  
Phone 09 967 9200 Fax 09 960 9201  
Client Reference C. Takuranga  
Quote No 60492475 Order Number 1.1

Primary Contact Andrew Walker  
Submitted By Megan Baddiley  
Charge To AECOM New Zealand Limited

Results To  Mail Client  Mail Submitter  
 Fax Results  
 Email Results andrew.f.walker@aecom.com

Office use only Job No. **CHAIN OF CUSTODY RECORD**

Sent to Hill Laboratories Date & Time: \_\_\_\_\_  
Name: \_\_\_\_\_  
Signature: \_\_\_\_\_  
 Please tick if you require COC to be faxed back

Received at Hill Laboratories Date & Time: 22/4/16 4:57  
Name: Kim Thorne  
Signature: KT

Condition  Room Temp  Chilled  Frozen Temp: 7.4  
 Sample Analysis details checked  
Signature: \_\_\_\_\_

Priority  Low  Normal  High  
 Urgent (ASAP, extra charge applies, please contact the lab first)

Requested Reporting Date: 5 working days

**ADDITIONAL INFORMATION**  
All samples consist of 1x GSoil300.

**Sample Types**

<b>Waters</b>	<b>E</b> Effluent	<b>G</b> Geothermal	<b>Pot1</b> Potable Water (LAS/EU)	<b>Pot2</b> Potable Water (NZDWS)
	<b>GW</b> Ground Water	<b>L</b> Leachate	<input type="checkbox"/> Audit Monitoring	<b>Pot3</b> Potable Water (other)
	<b>SW</b> Surface Water	<b>S</b> Saline	<input type="checkbox"/> Check Monitoring	<b>Pool</b> Swimming/Spa Pool
	<b>TW</b> Trade Waste			
<b>Solids</b>	<b>ES</b> Soil	<b>SE</b> Sediment	<b>SL</b> Sludge	<b>PL</b> Plant
<b>Other</b>	<b>O</b> Oil	<b>M</b> Miscellaneous	<b>FS</b> Fish/shellfish/biota	<b>BM</b> BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	SAC756	20/4/16	ES	TPH / BTEX
2	SAC757	↓	↓	↓
3	SAC758			
4	SAC759			
5	SAC760			
6	SAC761			
7	SAC762			
8	SAC763			
9	SAC764			
10	SAC765			

Continued on next page



No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
11	SAC767	20/4/16	ES	TPH / BTEX
12	SAC768	↓	↓	↓
13	SAC769	↓	↓	↓
14	SAC770	21/4/16	↓	↓
15	SAC771	↓	↓	↓
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Appendix D

# Soil Validation Result Tables

## Appendix D Soil Validation Result Tables

1

Sample Details and Analytical Results									
AECOM Sample Reference	SAC747	SAC748	SAC749	SAC750	SAC751	SAC752	SAC753	SAC754	SAC755
Lab Sample Reference	1570341.2	1570341.3	1570341.4	1570341.5	1570341.6	1570341.7	1570341.8	1570341.9	1570342.0
Date Sampled	18-Apr-16	18-Apr-16	18-Apr-16	19-Apr-16	19-Apr-16	19-Apr-16	19-Apr-16	19-Apr-16	19-Apr-16
Sample Location	South eastern batter - Eastern end		Base of excavation	North batter - Centre	North batter - East end	North batter - East end	Excavation base - North end	North eastern batter - North end	Eastern - Centre
Sample Depth (m below ground level)	1.5	0.7	3.0	1.5	1.3	1.3	2.0	1.2	
Sample Soil Type	Silty SAND	Silty CLAY	Clayey PEAT	Silty SAND	Silty SAND	Silty SAND	Silty SAND	Silty SAND	Silty SAND
Guideline Soil Type <sup>2</sup>	SAND	Silty CLAY	PEAT	SAND	SAND	SAND	SAND	SAND	SAND
Sample of soil remaining or removed	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining
Units (dry weight)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<b>Total Petroleum Hydrocarbons (TPH)</b>									
C <sub>7</sub> -C <sub>9</sub>	<9	<11	<12	<9	14	<9	<9	<9	<9
C <sub>10</sub> -C <sub>14</sub>	<20	<30	<30	<20	<20	<20	<20	<20	<20
C <sub>15</sub> -C <sub>36</sub>	<40	<50	<50	<40	<40	<40	<40	<40	<40
Total hydrocarbons (C <sub>7</sub> - C <sub>36</sub> )	<70	<80	<90	<70	<70	<70	<70	<70	<70
<b>BTEX Compounds</b>									
Benzene	<0.06	<0.08	<0.09	0.08	0.3	<0.06	<0.06	0.14	<0.06
Toluene	<0.06	<0.08	<0.09	0.18	4.5	0.06	<0.06	0.56	<0.06
Ethylbenzene	<0.06	<0.06	<0.09	<0.06	2.7	<0.06	<0.06	<0.06	<0.06
m & p xylenes	<0.12	<0.15	<0.18	<0.12	13	<0.12	<0.11	0.12	<0.12
o - xylenes	<0.06	<0.08	<0.09	<0.06	5.2	<0.06	<0.06	0.1	<0.06
Total xylenes	<0.18	<0.23	<0.27	<0.18	18.2	<0.18	<0.17	0.22	<0.18

Sample Details and Analytical Results									
AECOM Sample Reference	SAC762 (DUP)	SAC763	SAC764	SAC765	SAC766	SAC767	SAC768	SAC769	SAC770
Lab Sample Reference	1572894.7	1572894.8	1572894.9	1572894.10	1572894.11	1572894.12	1572894.13	1572894.14	1572894.15
Date Sampled	20-Apr-16	20-Apr-16	20-Apr-16	20-Apr-16	20-Apr-16	20-Apr-16	20-Apr-16	20-Apr-16	20-Apr-16
Sample Location	Excavation base - East corner	North eastern batter - North end	North batter - Centre	Excavation base - North end	South eastern batter - Centre	Excavation base - South end	Excavation base - North end	South eastern batter - East end	Stoc
Sample Depth (m below ground level)	2.0	0.5	0.5	3.5	2.0	3.0	3.0	0.5	
Sample Soil Type	Silty SAND	Clayey SILT	Silty CLAY	Silty CLAY	Silty SAND	Clayey PEAT	Clayey PEAT	Silty GRAVEL	Silty SAND
Guideline Soil Type <sup>2</sup>	SAND	Sandy SILT	Silty CLAY	Silty CLAY	SAND	PEAT	PEAT	SAND	Silty SAND
Sample of soil remaining or removed	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining
Units (dry weight)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<b>Total Petroleum Hydrocarbons (TPH)</b>									
C <sub>7</sub> -C <sub>9</sub>	<9	<8	<9	<9	<10	<13	<13	<8	<9
C <sub>10</sub> -C <sub>14</sub>	<20	<20	<20	<20	<20	<30	<30	<20	<20
C <sub>15</sub> -C <sub>36</sub>	<40	<40	<40	<40	<40	<50	<60	<40	<40
Total hydrocarbons (C <sub>7</sub> - C <sub>36</sub> )	<70	<70	<70	<70	<70	<90	<90	<70	<70
<b>BTEX Compounds</b>									
Benzene	<0.06	<0.05	<0.06	<0.06	<0.07	0.65	<0.10	<0.05	<0.06
Toluene	<0.06	<0.05	<0.06	<0.06	<0.07	<0.10	<0.10	<0.05	<0.06
Ethylbenzene	<0.06	<0.05	<0.06	<0.06	<0.07	<0.10	<0.10	<0.05	<0.06
m & p xylenes	<0.11	<0.10	<0.11	<0.11	<0.14	<0.19	<0.2	<0.10	<0.11
o - xylenes	<0.06	<0.05	<0.06	<0.06	<0.07	<0.10	<0.10	<0.05	<0.06
Total xylenes	<0.17	<0.15	<0.17	<0.17	<0.21	<0.29	<0.30	<0.15	<0.17

**Notes:**

All results and criteria are expressed in mg/kg dry weight

**Bold** - exceeds the Tier 1 Soil Acceptance Criteria.

1 Ministry for the Environment, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 1999 Guidelines).

2 Values taken from Table 4.11 and 4.14 of the MfE 1999 Guidelines.

NA - indicates contaminant is not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site.

Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.

The following notes indicate the limiting pathway for each criterion:

v - volatilisation, s - soil ingestion, d - dermal exposure, p - produce ingestion, m - maintenance/excavation worker exposure, x - PAH surrogate.

**Table 8 - Quality Assurance Quality Control Relative Percentage Difference Calculations  
Former Caltex Pakuranga Remediation**

AECOM Sample Reference	SAC721		SAC722 (DUP)		SAC728		SAC730 (DUP)		SAC743		SAC744 (DUP)		SAC761		SAC762 (DUP)		RPD (%)
	Lab Sample Reference	1564302.3	1564302.4	1567508.5	1567508.7	1568129.2	1568129.3	1572894.6	1572894.7								
Date Sampled	6-Apr-16		8-Apr-16		14-Apr-16		20-Apr-16		20-Apr-16		20-Apr-16		20-Apr-16		20-Apr-16		RPD (%)
Sample Location	Ti Rakau Drive boundary - Centre		North western batter - West end		Stockpile 2 - Clay material		Excavation base - East corner		Excavation base - East corner		Excavation base - East corner		Excavation base - East corner		Excavation base - East corner		
Sample Depth (m)	2.3		1.7		1.7		1.7		2.0		2.0		2.0		2.0		RPD (%)
Sample Soil Type	Silty SAND		SAND		Silty SAND		SAND		Silty CLAY		Silty CLAY		Silty SAND		SAND		
Guideline Soil Type <sup>1</sup>	SAND		SAND		SAND		SAND		Silty CLAY		Silty CLAY		SAND		SAND		RPD (%)
Sample of soil remaining or removed	Remaining		Remaining		Remaining		Remaining		Remaining		Remaining		Remaining		Remaining		
Units (dry weight)	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		RPD (%)
<b>Total Petroleum Hydrocarbons (TPH)</b>																	
C <sub>7</sub> -C <sub>9</sub>	<9	<9	NC	<10	<10	NC	<10	<10	NC	93	171	59.09	<9	<9	<9	NC	
C <sub>10</sub> -C <sub>14</sub>	<20	<20	NC	<20	<20	NC	<20	<20	NC	59	122	69.61	<20	<20	<20	NC	
C <sub>15</sub> -C <sub>36</sub>	<40	<40	NC	<40	<40	NC	<40	<40	NC	107	165	42.65	<40	<40	<40	NC	
Total hydrocarbons (C <sub>7</sub> - C <sub>36</sub> )	<70	<70	NC	<70	<70	NC	<70	<70	NC	260	460	55.56	<70	<70	<70	NC	
<b>BTEX Compounds</b>																	
Benzene	0.28	<0.1	94.74	<0.07	<0.07	NC	<0.07	<0.07	NC	10.2	14.1	32.10	<0.06	<0.06	<0.06	NC	
Toluene	0.59	<0.1	142.03	<0.07	<0.07	NC	<0.07	<0.07	NC	53	86	47.48	<0.06	<0.06	<0.06	NC	
Ethylbenzene	<0.10	<0.10	NC	<0.07	<0.07	NC	<0.07	<0.07	NC	11.6	22	61.90	<0.06	<0.06	<0.06	NC	
m & p xylenes	<0.19	<0.19	NC	<0.13	<0.13	NC	<0.13	<0.13	NC	53	78	38.17	<0.11	<0.11	<0.11	NC	
o - xylenes	<0.10	<0.10	NC	<0.07	<0.07	NC	<0.07	<0.07	NC	21	26	21.28	<0.06	<0.06	<0.06	NC	
Total xylenes	<0.29	<0.29	NC	<0.20	<0.20	NC	<0.20	<0.20	NC	74	104	33.71	<0.17	<0.17	<0.17	NC	

Notes:

NC - Not calculated, below detection limits.

**Bold** - Exceedence of variability range of up to 50% (MfE, 2004, revised 2011).

1 - Values taken from Tables 4.11 and 4.14 of the MfE 1999 guidelines (Ministry for the Environment, 1999, Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand)

Appendix E

# Project Photographic Record

## Appendix E Project Photographic Record

**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**1**

**Date:**  
10/02/16

**Direction Photo Taken:**

Facing west.

**Description:**

Site prior to works commencing.



**Photo No.**  
**2**

**Date:**  
10/02/16

**Direction Photo Taken:**

Facing north.

**Description:**

Site prior to works commencing.





**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**

**3**

**Date:**  
31/03/16

**Direction Photo Taken:**

Facing west.

**Description:**

Service mark out along Ti Rakau Drive footpath.  
Two of three exploration trenches visible.



**Photo No.**

**4**

**Date:**  
01/04/16

**Direction Photo Taken:**

Facing north.

**Description:**

Unloading first load of sheet piles.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**5**

**Date:**  
04/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Sheet piling across the south western border.



**Photo No.**  
**6**

**Date:**  
04/04/16

**Direction Photo Taken:**

Facing south east.

**Description:**

Site office set up.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 6049275

**Photo No.**  
**7**

**Date:**  
06/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Beginning of excavation and adopted method of sheet piling along south western border.



**Photo No.**  
**9**

**Date:**  
06/04/16

**Direction Photo Taken:**

Facing north.

**Description:**

Stockpile set up.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**10**

**Date:**  
08/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation as at 08-Apr-16.



**Photo No.**  
**11**

**Date:**  
08/04/16

**Direction Photo Taken:**

Facing south.

**Description:**

Excavation as at 08-Apr-16.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**12**

**Date:**  
12/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation as at 12-Apr-16. Sump (lower left corner) created to capture groundwater.



**Photo No.**  
**13**

**Date:**  
12/04/16

**Direction Photo Taken:**

Facing south.

**Description:**

Excavation as at 12-Apr-16.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**14**

**Date:**  
13/04/16

**Direction Photo Taken:**

Facing north west.

**Description:**

Excavation as at 13-Apr-16. Extension to the east and north.



**Photo No.**  
**15**

**Date:**  
15/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation as at 15-Apr-16. Further extension to the north east.



**PHOTOGRAPHIC LOG**

<b>Client Name:</b> Chevron EMC	<b>Site Location:</b> Cx Pakuranga 11 Cortina Place, Pakuranga, Auckland	<b>Project No.</b> 60492475
---------------------------------	---	-----------------------------

<b>Photo No.</b> <b>16</b>	<b>Date:</b> 15/04/16
-------------------------------	--------------------------

**Direction Photo Taken:**  
  
Facing south.

**Description:**  
  
Excavation as at 15-Apr-16.



<b>Photo No.</b> <b>17</b>	<b>Date:</b> 18/04/16
-------------------------------	--------------------------

**Direction Photo Taken:**  
  
Facing west.

**Description:**  
  
Excavation as at 18-Apr-16. After weekend of moderate rainfall. Water was removed via sucker truck.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**18**

**Date:**  
18/04/16

**Direction Photo Taken:**

Facing south east.

**Description:**

Product lines with residual product. Lines found in the south eastern corner of excavation towards the edge of the former forecourt.



**Photo No.**  
**19**

**Date:**  
18/04/16

**Direction Photo Taken:**

Facing north.

**Description:**

Stockpiles as at 18-Apr-16. Photo showing method of covering.





**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**20**

**Date:**  
19/04/16

**Direction Photo Taken:**

Facing north west.

**Description:**

Excavation access ramp  
Final extent of Stockpile 1  
- Topsoil.



**Photo No.**  
**21**

**Date:**  
19/04/16

**Direction Photo Taken:**

Facing north west.

**Description:**

Final extent of Stockpile 2  
- Clay.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**22**

**Date:**  
20/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation access ramp.



**Photo No.**  
**23**

**Date:**  
20/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation as at 20-Apr-16. Final extent of excavation.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**24**

**Date:**  
20/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Placing geo-fabric on base of excavation.



**Photo No.**  
**25**

**Date:**  
20/04/16

**Direction Photo Taken:**

Facing south west.

**Description:**

Excavation as at 20-Apr-16. Geo-fabric being laid at depth.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**26**

**Date:**  
26/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation as at 26-Apr-16. Monitoring well installation in progress to the left of photograph.



**Photo No.**  
**27**

**Date:**  
26/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Temporary stockpiles of imported aggregate.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**28**

**Date:**  
27/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation as at 27-Apr-16. Imported aggregate placed in excavation.



**Photo No.**  
**29**

**Date:**  
27/04/16

**Direction Photo Taken:**

Facing west.

**Description:**

Excavation as at 27-Apr-16. Stockpiled clay material placed at depth.



**PHOTOGRAPHIC LOG**

**Client Name:** Chevron EMC

**Site Location:** Cx Pakuranga  
11 Cortina Place, Pakuranga, Auckland

**Project No.** 60492475

**Photo No.**  
**30**

**Date:**  
09/05/16

**Direction Photo Taken:**

Facing west.

**Description:**

Sheet piling in NW corner cut off at approximately and abandoned in-situ.



**Photo No.**  
**31**

**Date:**  
11/05/16

**Direction Photo Taken:**

Facing south east.

**Description:**

Finished ground conditions.

