Civil Engineering and Development Department

Kai Tak Development - Trunk Road T2 and Infrastructure at South Apron Investigation, Design and Construction

Agreement No.: CE 38/2008 (HY)

Environmental Permit: No. EP - 451/2013

Supplementary Contamination Assessment Report

(October 2014)

Certified by: _____

Environmental Team Leader

Verified by: _____

Independent Environmental Checker

土 木 工 程 拓 展 署
CEDD Civil Engineering and Development Department

Hyder MEINHARDT
Hyder-Meinhardt JV

Civil Engineering and Development Department

Agreement No. CE 38/2008 (HY)

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Supplementary Contamination Assessment Report

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Supplementary Contamination Assessment Report

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Checker	Helen COCHRANE	
Approver	James PENNY	

Report No	F0194-EB000560-HCL-HKR-00
Date	30 October 2014

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1 INTRODUCTION

1.1.1 On 31 July 2009, the Civil Engineering and Development Department (CEDD) of the Government of the Hong Kong Special Administrative Region appointed Hyder-Meinhardt JV (HMJV) under Agreement No CE38/2008 (HY) to provide professional services in respect of Kai Tak Development – Trunk Road T2 and Infrastructure at South Apron Investigation, Design and Construction. The date for commencement of the Assignment was 31 July 2009.

1.1.2 Trunk Road T2 involves the construction and operation of highways and the associated link roads and, thus, consists of designated project elements including Items A.1, A.7 and F.6 Part I under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO). The Project may also include changes to associated roads and other facilities that constitute material change(s) to exempted project(s) including relocation of existing breakwaters, and other designated project(s), e.g. dredging, temporary reclamation, to be identified during the course of this study. According to Section 5(1) of the EIAO, a project profile was submitted to the Environmental Protection Department (EPD) on 24 March 2009 for application of an EIA Study Brief, which was subsequently issued to the CEDD pursuant to Section 5(7)(a) of the EIAO (EIA Study Brief No: ESB-203/2009 dated 30 April 2009). In the EIA study, a land contamination assessment was carried out based on the Contamination Assessment Plan (CAP) approved by the EPD on 22 March 2011, and a Contamination Assessment Report (CAR) was included in the EIA Report approved on 19 September 2013. An Environmental Permit (No. EP - 451/2013) was also issued on 19 September 2013.

1.1.3 According to EP-451/2013 Condition 2.10, a supplementary site investigation (SI) to complete the land contamination assessment for locations EH01 and EH03 should be conducted in accordance with the requirement as set out in the approved CAP, and a Contamination Assessment Report (CAR) to document the findings of the supplementary land contamination investigation works and assessment on the nature and extent of land contamination should be submitted to the EPD for approval.

1.1.4 If land contamination is confirmed, a Remediation Action plan (RAP) to formulate the necessary remedial measures should be submitted to the EPD for approval. All remedial measures described in the approved RAP should be fully and properly implemented. If remediation is required, a Remediation Report (RR) to provide details on the remediation works carried out, types and volume of contaminated soil, standards and levels of treatment, and locations of all on-site and off-site disposal sites (including record of disposal) should be deposited to the EPD after the completion of the remediation works. No construction works should be carried out prior to the EPD's endorsement of the RR.

1.1.5 Before the submission to the EPD, the CAR, RAP and RR should be certified by the Environmental Team (ET) Leader and verified by the Independent Environmental Checker (IEC) as conforming to the information and recommendations contained in the EIA Report.

2 OBJECTIVES

2.1.1 This Supplementary CAR was prepared to present the findings of the supplementary land contamination SI works at EH01 (renamed as "EH1B" herein this report) and EH03 (renamed as "EH3B" herein this report) and to assess the nature, level and extent of contamination. If contamination is identified, remediation proposal of appropriate remediation actions for the contaminated area should be recommended in the RAP, and a Remediation Report (RR) should be prepared upon the completion of all remediation action.

3 CONTAMINATION ASSESSMENT

3.1 Summary of Site Investigation

3.1.1 **Table 3.1** summarises the details and status of the completed supplementary SI works. The as-built sampling locations are shown in **Figure 3.1**.

Table 3.1: Summary of SI Works

No	Naming in CAP	Type	Status	Co-ordinates	
				Easting	Northing
EH1B	BH1	Borehole	Completed in accordance with CAP	839763.19	819573.07
EH3B	BH3	Borehole	Completed in accordance with CAP	839734.91	819553.20

3.2 Assessment Methodology

3.2.1 Based on the initial site appraisal and a review of previous site investigation records and other relevant information, the potential sources of land contamination relevant to the study area were identified in the approved CAP. The contaminants of concern (COCs) for the study site were selected based on the historical land use information collected during the above initial site appraisal The broad groups of COCs for this investigation include volatile organic compounds (BTEX: benzene, toluene, ethylbenzene, xylene), semivolatile organic compounds (PAHs: polycyclic aromatic hydrocarbons), metals, PCBs, and petroleum hydrocarbon.

3.2.2 The SI works were carried out between 1 September 2014 and 8 September 2014, including the 2 boreholes listed in **Table 3.1** and as depicted in the as-built **Figure 3.1**. During the progress of the SI, there was some minor adjustment of locations of the boreholes to the approved CAP in order to suit the site specific conditions.

3.2.3 A preliminary metal detection survey was undertaken at each drilling location. Only metal (or utility) free locations were drilled. The concrete road pavement was removed before the actual fill material samples were taken from underneath. U-100 samplers were deployed for soil sampling at all boreholes.

3.2.4 No organic (carbon or petroleum based lubricants) or any kind of metal containing lubricants were allowed for use as drilling bit lubricant. When required, only minimum amount of clean fresh water was used as lubricating medium as instructed and agreed by the Contamination Specialist in order to avoid sample contamination.

3.2.5 Prior to drilling, a trail/inspection pit of 2.0m deep was constructed first (as described below). Drilling was then undertaken to a depth of ~9m below ground level or as instructed. From each borehole, continuous U100 samples were taken although only soil samples 0.5m, 3.0m, 6.0m and ~9.0m below ground level, or as instructed, were delivered to the testing laboratory. The exact location of the boreholes was adjusted on-site due to site conditions or unforeseeable underground conditions as instructed by the Contamination Specialist.

Soil Sampling

3.2.6 Sampling of soil was carried out with a stainless steel spoon. The samples were scooped directly from the sampling core box into the sample containers and the spoon was decontaminated by washing with distilled water between samples. If a gloved hand came into contact with the sample, new gloves were used for each new sample.

3.2.7 Field personnel washed hands before sampling and wore a new pair of clean PVC/latex disposable gloves before and during sampling. Field personnel avoided handling the samples directly and manipulated the samples into the appropriate laboratory sampling jars using the cleaned spoon(s). All sampling equipment was decontaminated in between each sampling. A clean area was established immediately adjacent to each drilling location with a portable table covered with a clean plastic sheet, on which all equipment was placed.

3.2.8 Each sample was labelled uniquely and unambiguously. The nature of the soil/fill material in the core was recorded at different depths for each core. Records were made of the details of depth and the sampling location and other pertinent data such as any non-standard sampling events. The description of soil samples included but not restricted to:

- Test site where the sample was collected;
- Sample identification number;
- Soil sampling depth (with respect to the lowest level of the concrete cover, if any);
- Estimated physical characteristics (clay, silt, sand, gravel, stone, cobble, colour, odour, moisture);
- Colour photograph; and
- Any other relevant information.

3.2.9 All samples for laboratory tests were stored in portable cool box with frozen chilled packs at 0-4°C whilst in the field or in transit and returned to the laboratory on the same evening as the day of sampling. A chain-of-custody form was completed for all the samples delivered.

3.2.10 Each sample tube was fully sealed, except that the tube ends were first covered by decontaminated metal foil so that the foil is the only material in direct contact with the soil sample collected. The sample tube was sealed tightly such that leakage into and out of the tube was minimised.

3.2.11 Strata logging for boreholes was conducted by a qualified geologist during the drilling and sampling. The logs included general stratigraphic description, soil sampling depth, sample notation and level of groundwater. The presence of rocks/boulders/cobbles and foreign objects (e.g. wood, metals and plastics) was recorded.

3.2.12 All equipment used for sample handling and storage was decontaminated before and after collection of each sample. Standard procedures for cleaning the drilling rig and sampling equipment is described below:

- Clean with fresh water and lab-grade detergent (use brush if necessary) to remove particulate matter and surface film;
- Rinse thoroughly with tap water (for drilling equipment) followed by steam cleaning, and then rinsing with distilled water (for sampling equipment);
- After field cleaning, the equipment was handled by personnel wearing clean gloves to avoid re-contamination. If the equipment was not to be used immediately, it was covered with clean plastic sheeting or put in a box to avoid re-contamination; and
- The drilling equipment and sampling equipment was cleaned according to the above procedures between sampling holes.

3.2.13 As the Toxicity Characteristic Leaching Procedure (TCLP) may be required for all soil samples if landfill disposal is selected as the remediation method, surplus soil samples were collected and stored for use.

Groundwater Sampling

3.2.14 Groundwater was encountered during drilling depending on the water table at the drilling locations. If groundwater was encountered, water sampling was carried out and samples were sent to the laboratory for analysis.

3.2.15 Purging of groundwater from the boreholes was undertaken prior to sampling to remove fine-grained materials and to collect freshly infiltrating representative samples. The boreholes were purged by removing not less than three times the original volume of groundwater within the boreholes with a pump.

3.2.16 At least two hours after purging, the depth to water table was measured. One groundwater sample was then collected at each borehole using a hand operated pump.

3.2.17 The groundwater in the boreholes was removed with the selected pump, decanted into a separate clear glass vessel and allowed to settle for five minutes. The presence of any

supernatant free product on the groundwater and the respective thickness was recorded. The presence of any emulsification of the groundwater was also noted. The floating layer was removed/recovered and analysed separately from the main aqueous phase of the groundwater (as far as reasonably practicable). All samples were uniquely labelled.

3.2.18 Between samples, all equipment used for sample handling and storage was thoroughly decontaminated with laboratory-grade detergent. Samples were stored in appropriate pre-washed containers (provided by the laboratory) and immediately put in an insulated cool box. The sample containers and the box were tightly closed and that sufficient chilling packs or ice were provided to maintain a temperature of 0-4°C inside the box.

3.2.19 Chilled groundwater samples were transferred to the custody of the HKOLAS accredited laboratory on the same day as sampling. A chain-of-custody system was operated in triplicate a part of the QA/QC procedure. The accredited laboratory QA/QC procedures were precisely followed.

3.3 Assessment Criteria

3.3.1 The assessment criteria followed the EPD's Guidance Note for Contaminated Land Assessment and Remediation, and Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management. Reference was made to the RBRGs criteria for assessing the extent of land contamination in the site based on the proposed future land use as re-cited in **Tables 3.2** and **3.3**.

3.3.2 There are 4 different post-restoration land use scenarios (Urban Residential, Rural Residential, Industrial, Public Parks) reflecting the typical physical settings in Hong Kong are categorised under which people could be exposed to contaminated soil and groundwater. The future land use of the study area for the trunk road inside the cut-and-cover tunnel with transport operation was classified as "Industrial". Also, with reference to the Outline Zoning Plan No. S/K22/2: Kowloon Planning Area No. 22 Kai Tak, the future land uses above the trunk road cut-and-cover tunnel would be "Open Space" and "Other Specified Use", so they were classified as "Public Park" for this contamination assessment. It would be based on these classifications that the land contamination assessment (and remediation if required) was carried out.

Table 3.2: Risk-Based Remediation Goals for Soil and Soil Saturation Limit

Chemical	Risk-Based Remediation Goals for Soil		Soil Saturation Limit (Csat) (mg/kg)
	Industrial (mg/kg)	Public Parks (mg/kg)	
VOCs			
Benzene	9.21E+00	4.22E+01	3.36E+02
Ethylbenzene	8.24E+03	1.00E+04*	1.38E+02
Toluene	1.00E+04*	1.00E+04*	2.35E+02
Xylenes (Total)	1.23E+03	1.00E+04*	1.50E+02
SVOCs			
Acenaphthene	1.00E+04*	1.00E+04*	6.02E+01
Acenaphthylene	1.00E+04*	1.00E+04*	1.98E+01
Anthracene	1.00E+04*	1.00E+04*	2.56E+00

Chemical	Risk-Based Remediation Goals for Soil		Soil Saturation Limit (Csat) (mg/kg)
	Industrial (mg/kg)	Public Parks (mg/kg)	
Benzo(a)anthracene	9.18E+01	3.83E+01	-
Benzo(a)pyrene	9.18E+00	3.83E+00	-
Benzo(b)fluoranthene	1.78E+01	2.04E+01	-
Benzo(g,h,i)perylene	1.00E+04*	5.74E+03	-
Benzo(k)fluoranthene	9.18E+02	3.83E+02	-
Chrysene	1.14E+03	1.54E+03	-
Dibenzo(a,h)anthracene	9.18E+00	3.83E+00	-
Fluoranthene	1.00E+04*	7.62E+03	-
Fluorene	1.00E+04*	7.45E+03	5.47E+01
Indeno(1,2,3-cd)pyrene	9.18E+01	3.83E+01	-
Naphthalene	4.53E+02	9.14E+02	1.25E+02
Phenanthrene	1.00E+04*	1.00E+04*	2.80E+01
Pyrene	1.00E+04*	5.72E+03	-
Metals			
Antimony	2.61E+02	9.79E+01	-
Arsenic	1.96E+02	7.35E+01	-
Barium	1.00E+04*	1.00E+04*	-
Cadmium	6.53E+02	2.45E+02	-
Chromium III	1.00E+04*	1.00E+04*	-
Chromium VI	1.96E+03	7.35E+02	-
Cobalt	1.00E+04*	4.90E+03	-
Copper	1.00E+04*	9.79E+03	-
Lead	2.29E+03	8.57E+02	-
Manganese	1.00E+04*	1.00E+04*	-
Mercury	3.84E+01	4.56E+01	-
Molybdenum	3.26E+03	1.22E+03	-
Nickel	1.00E+04*	4.90E+03	-
Tin	1.00E+04*	1.00E+04*	-
Zinc	1.00E+04*	1.00E+04*	-
Dioxins/PCBs			
PCBs	7.48E-01	7.56E-01	-
Petroleum Carbon Ranges			
C6 - C8	1.00E+04*	1.00E+04*	1.00E+03
C9 - C16	1.00E+04*	1.00E+04*	3.00E+03
C17 - C35	1.00E+04*	1.00E+04*	5.00E+03

Note: Soil saturation limits for petroleum carbon ranges taken from the Canada-Wide Standards for Petroleum Hydrocarbons in Soil, CCME 2000. * denotes a 'ceiling limit' concentration.

Table 3.3: Risk-Based Remediation Goals for Groundwater and Solubility Limit

Chemical	Risk-Based Remediation Goals for Groundwater	Solubility Limit (mg/L)
	Industrial (mg/L)	
VOCs		
Benzene	5.40E+01	1.75E+03

Chemical	Risk-Based Remediation Goals for Groundwater	Solubility Limit (mg/L)
	Industrial (mg/L)	
Ethylbenzene	1.00E+04*	1.69E+02
Toluene	1.00E+04*	5.26E+02
Xylenes (Total)	1.57E+03	1.75E+02
SVOCs		
Acenaphthene	1.00E+04*	4.24E+00
Acenaphthylene	1.00E+04*	3.93E+00
Anthracene	1.00E+04*	4.34E-02
Benzo(a)anthracene	-	-
Benzo(a)pyrene	-	-
Benzo(b)fluoranthene	7.53E+00	1.50E-03
Benzo(g,h,i)perylene	-	-
Benzo(k)fluoranthene	-	-
Chrysene	8.12E+02	1.60E-03
Dibenzo(a,h)anthracene	-	-
Fluoranthene	1.00E+04*	2.06E-01
Fluorene	1.00E+04*	1.98E+00
Indeno(1,2,3-cd)pyrene	-	-
Naphthalene	8.62E+02	3.10E+01
Phenanthrene	1.00E+04*	1.00E+00
Pyrene	1.00E+04*	1.35E-01
Metals		
Antimony	-	-
Arsenic	-	-
Barium	-	-
Cadmium	-	-
Chromium III	-	-
Chromium VI	-	-
Cobalt	-	-
Copper	-	-
Lead	-	-
Manganese	-	-
Mercury	6.79E+00	-
Molybdenum	-	-
Nickel	-	-
Tin	-	-
Zinc	-	-
Dioxins/PCBs		
PCBs	5.11E+00	3.10E-02
Petroleum Carbon Ranges		
C6 - C8	1.15E+03	5.23E+00
C9 - C16	9.98E+03	2.80E+00
C17 - C35	1.78E+02	2.80E+00

Notes: "-" denotes that RBRG could not be calculated because the toxicity or physical/chemical values were unavailable, or the condition of Henry's Law Constant>1.00E-05 was not met for the inhalation

pathway; Water solubilities for Petroleum Carbon Range aliphatic C9-C16 and greater than C16 generally are considered to be effectively zero and therefore the aromatic solubility for C9-C16 is used; * denotes a 'ceiling limit' concentration.

3.4 Interpretation of Results

Ground Condition

3.4.1 The general ground conditions were shown to be a top layer of fill materials, below a concrete paving of ~300mm, down to ~9m mainly consisting of silt to fine coarse sand and gravel of fill materials. Groundwater was encountered at all borehole locations during the course of drilling due to low groundwater table in the study area near the coastline. The strata logging records are included in **Appendix 3.1**.

Soil Contamination Assessment

3.4.2 A total of 8 soil samples were collected in this SI for land contamination (details of SI records as provided in **Appendix 3.1**). The soil samples collected from 4 depths of 2 boreholes namely EH1B and EH3B as shown in **Figure 3.1**.

3.4.3 A summary of laboratory results and laboratory reports for the tested COCs are provided in **Appendix 3.2**. For the soil samples collected, the concentrations of petroleum hydrocarbon, VOCs, SVOC and PCBs were all below the reporting limits of the laboratory. The concentrations of metals were mostly determined above the reporting limits but they were well below the RBRGs criteria. There was no exceedance of the RBRGs determined for all the soil samples collected in the SI.

Groundwater Contamination Assessment

3.4.4 There were 2 groundwater samples at the 2 borehole locations as shown in **Figure 3.1**. A summary of laboratory results and laboratory reports are provided in **Appendix 3.2**. All of the tested COCs in the groundwater sample were below the reporting limits of the laboratory, and there was no exceedance of the RBRGs criteria.

QA/QC Results

3.4.5 All QA/QC results were included in the laboratory analysis reports for soil and groundwater samples (**Appendix 3.2**). The results for the QA/QC requirements on field sampling were all determined to be below the corresponding reporting limits of individual parameters, which indicated that the field sampling procedures were unlikely subjected to cross-contamination during SI and sample delivery. The results for the QA/QC requirements on laboratory testing were all determined to be within the acceptable tolerance for normal laboratory operating procedures.

4 CONCLUSION AND RECOMMENDATION

4.1.1 A total of 8 soil samples and 2 groundwater samples were collected in this SI for land contamination. There was no exceedance of the corresponding RBRGs criteria. **Section 3.3.2** of this report stated the land use classification as "Industrial" and "Public Park", and the corresponding RBRGs adopted for the land contamination assessment are shown in **Tables 3.2** and **3.3**.

4.1.2 According to the EPD's Guidance Note for Contaminated Land Assessment and Remediation, Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management, and Practice Guide for Investigation and Remediation of Contaminated Land, no exceedance of RBRGs or NAPL assessment criteria were determined, hence remediation is not required.

Figures

LEGEND:

- STUDY AREA
- STUDY AREA COVED BY ARGEEMENT NO. KDO 02/05 ASSESSEMENT OF POSSIBLE LAND CONTAMINATION ASSOCISTED WITH DECOMMISSIONED FUEL PIPELINE AND HYDRANT SYSTEM AT SOUTH APRON OF FORMER KAI TAK AIRPORT
- PLAN OF HONG KONG INTERNATIONAL AIRPORT (PLAN NO. KM 9165g DATED 1.11.1994) (LANDS DEPT. LETTER REF: (20) IN LAD KEEP/103/13(II))
- BOUNDARY OF CONTRACT KL/2008/02 KAI TAK DEVDLEPMEMT - DECOMMISSIONING AND DECONTAMINATION WORKS AT THE SOUTH APRON OF THE FORMER KAI TAK AIRPORT
- PROPOSED TRUNK ROAD T2
- EH1 SAMPLING LOCATION

EH1B
EH3B
195m
48m
CHEUNG YIP STREET
祥業街
臨興街
LAM CHAK STREET
停車場 Car Park
工務中央試驗所大樓 Public Works Central Laboratory Building
PUBLIC WORK CENTRAL LABORATORY BUILDING
道路 Road
貨櫃場 Container Yard
嘉里（九龍灣）危險品貨倉 Kerry D. G. Godown (Kowloon Bay)
Open Storage
Seawall
政府物流服務署九龍灣貨物起卸區 Government Logistics Department Kowloon Bay Cargo Handling Area
TS

AS-BUILD COORDINATE:

NO.	X	Y
EH01B	839763.19	819573.07
EH03B	839734.91	819553.20

0 10 20 30 40m
SCALE 1 : 1000

PLOT DRV: K:\91164 Trunk Road T2\Cad Admin\A3_colour.plt 23/10/2014 10:56:08
PRINTED BY: kitchan

Rev.	Description	Date

Drawing title: AS-BUILT SAMPLING LOCATION

Original Size: A3
Scale 1 : 1000 (A3) | Date 11OCT2012
File name Figure 3.1.dgn

Drawing No. FIGURE 3.1
Rev. -

CAD FILE : K:\91164 Trunk Road T2\Contamination Assessment Plan\Figure 3.1.dgn

Appendices

Appendix 3.1

Strata Logging Records

CONTRACT NO.: KL/2013/02
SITE INVESTIGATION FOR TRUNK ROAD T2
AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)

FINAL FIELDWORK REPORT

(Section 1 – Environmental Drillholes)

CLIENT

KOWLOON DEVELOPMENT OFFICE
CIVIL ENGINEERING & DEVELOPMENT
DEPARTMENT

CONSULTING ENGINEER

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CONTRACTOR

GAMMON CONSTRUCTION LIMITED
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979 King's Road
Quarry Bay, Hong Kong

November 2014

Contract Data Summary

Project Name & No. **Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)**	Site Name **Kowloon Bay to Cha Kwo Ling**	Date : 26 February 2014 to 23 October 2014 Official Only
G.I Contractor **Gammon Construction Limited**	Client **HKSAR - CEDD**	G.E.O. Data Bank No.
Contract No. **KL/2013/02**		File Ref.

Field Work Summary

~~Drillholes~~ / Environmental Nos : 2	Method : Rotary	Date : 1 September 2014 to 8 September 2014
Pits / Trenches ~~/ Slope Strips~~ No. : NIL		
GCO Probing No. : NIL	Eastman No.: NIL	In-situ Density Test Nos. : NIL
Response Test No. NIL		
Insitu Test : No. NIL	Type : NIL	
Geophysics : ~~Traverses~~ NIL		

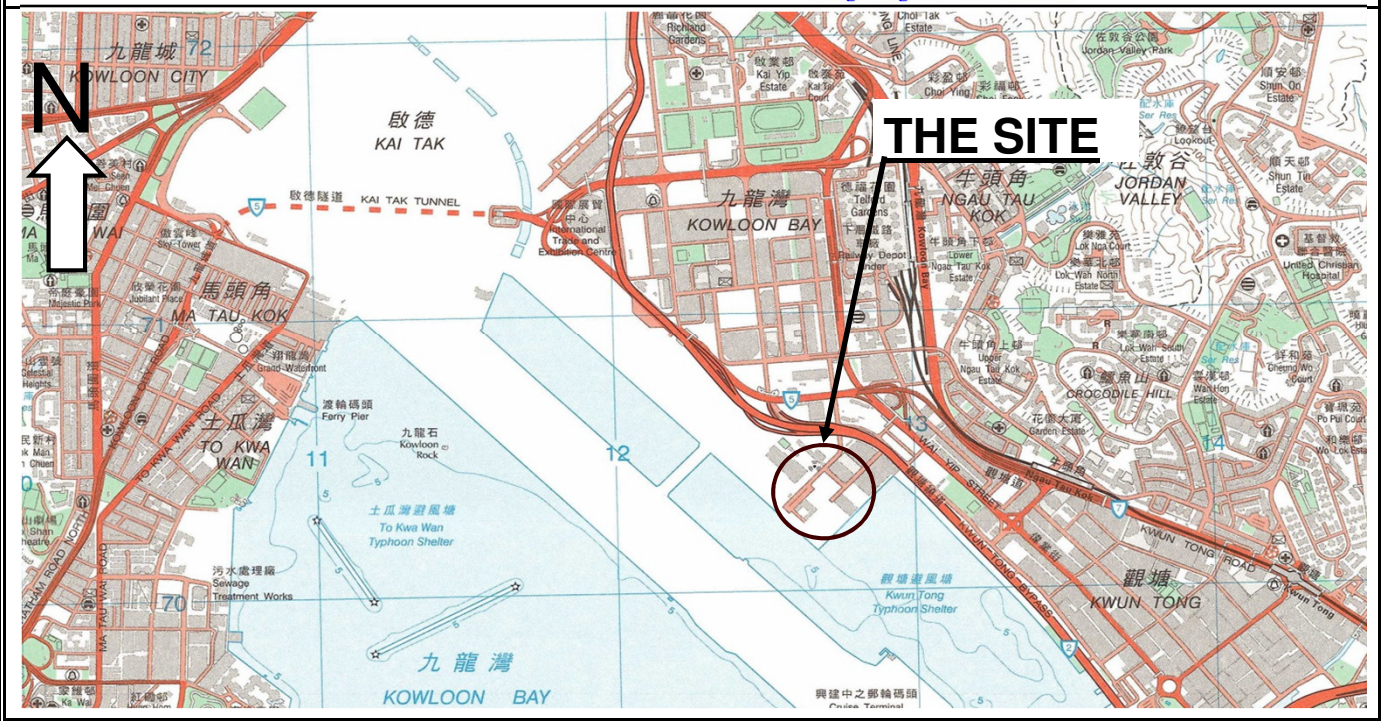
Laboratory Testing Summary

Total No. of Tests : Date to

Soil	Physical Properties	LL	PL	PSD	MC
		SG	γ_m/γ_d		
	Strength Tests	CU	CD	UU	Shear Box
	Compaction & CBR Tests	Standard	~~Modified~~		CBR
	Oedometer & Perm. Tests	Cv	k		
	Others :				
Rock	γ	Pt load	UC	Shear Box	US Vel.

Location Plans SCALE 1 : 20 000 Derived from : HM20C Series Sheet 11

Hong Kong Island & Kowloon



	G.I.	Client :
Contractor	**Gammon Construction Limited**	**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**
Contract No.	**KL/2013/02**	

Gammon

CONTRACT NO.: KL/2013/02
SITE INVESTIGATION FOR TRUNK ROAD T2
AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)

FINAL FIELDWORK REPORT

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TABLE

APPENDICES

Gammon

CONTRACT NO.: KL/2013/02
SITE INVESTIGATION FOR TRUNK ROAD T2
AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)

FINAL FIELDWORK REPORT

1.0 INTRODUCTION

In February 2014, Gammon Construction Limited was awarded a contract to carry out Contract No KL/2013/02 Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2). The site location is shown on the **Contract Data Summary.**

The overall scope of the ground investigation works includes land investigation and marine boreholes drilling, and trial pits excavation together with field and laboratory testing and preparing this factual report.

The ground investigation in the designated area was generally implemented in accordance with Geoguide 2: (GCO 2000): 'Guide to Site Investigation', BS1377: (BSI 1990): 'Methods of test for Soils for civil engineering purposes' and the Specification for this Contract. References to other standards and publications are given in the individual sections of the report corresponding to the relevant work conducted.

This report details a brief description of the site and the procedures adopted together with the findings of the fieldwork for the environmental Ground Investigation. The fieldwork consists of 2 nos of environmental drillholes. The fieldwork was carried out between 1 September 2014 and 8 September 2014 under the supervision of Hyder-Meinhardt Joint Venture.

2.0 THE SITE

The environmental drillholes are at Cheung Yip Street, Kowloon (see **Contract Data Summary**). The investigation stations are located within the area bounded by co-ordinates of:

- 839700 E and 819550 N
- 839700 E and 819600 N
- 839800 E and 819600 N
- 839800 E and 819550 N

The positions of the investigation stations are indicated on Investigation Stations Location Plan included in **Appendix 6**.

3.0 GEOLOGY

3.1 PUBLISHED GEOLOGY

The 1: 20000 scale HGM 20 series geological map of Hong Kong Sheet 11 (Hong Kong & Kowloon – Edition II, 2012) indicates the site is mainly underlain by QUATERNARY FILL and Cretaceous fine to medium grained GRANITE. According to the ground investigation works, the site is underlain by FILL.

3.2 GEOLOGICAL SUMMARY

For a full description of the materials encountered reference should be made to the individual drillhole records in **Appendix 3.**

4.0 FIELDWORK

4.1 SETTING OUT

The as-built locations were surveyed to the Hong Kong 1980 Grid and levelled to Hong Kong Principal Datum. The co-ordinates and levels of the investigation stations are summarized in **Table 1.**

4.2 INVESTIGATION STATIONS

4.2.1 Environmental Drillholes

Two drillholes (EH1B and EH3B) were carried out at the locations agreed with the Engineer and shown on the enclosed Investigation Stations Location Plan (**Appendix 6**). The co-ordinates and reduced levels of each individual drillhole are given in **Table 1**. The drillhole logs are presented in **Appendix 3**.

The drillholes were started by hand excavating inspection pits in order to expose underground utilities. The drillholes were advanced through common ground by rotating Sx (168mm diameter) and Px (140mm diameter) drill casing using fresh water as the flushing medium.

U100 samples were taken in specific drillholes at required depths as instructed by the Engineer. Small-disturbed samples were obtained from the cutting shoe of samplers. All sampling was reported at the relevant depths on the drillhole records.

As the samples were used for environmental laboratory analysis, decontamination procedures were employed to prevent cross-contamination in the drilling process and contamination of samples by extraneous material and/or pollutants. The drilling rig was thoroughly cleaned with water when it mobilized to a new Investigation Station. All down-the-hole equipment and samplers were cleaned before taking each sample.

The specific soil samples requiring environmental laboratory analysis should be kept in particular jar bottles and immediately stored in lightproof ice box at site, which shall be maintained at a temperature below 4 degree Celsius but not frozen.

Groundwater samples were collected by Teflon bailer and stored in a specific glass jar. All sampling was indicated at relevant depths on the drillhole records.

The collected samples together with a chain of custody documentation shall then be delivered to the accredited environmental testing laboratory within 24 hours.

4.0 FIELDWORK (Continued)

4.2.2 Rock and Soil Descriptions

Rock and Soil descriptions are in accordance with the general principles given in Geoguide 3: 'Guide to Rock and Soil Descriptions' (GCO 2000) with the exception of the use of Munsell Colour Charts and the descriptive terms for the additional constituents in composite soil types. The terms used are as follows:

'with occasional' for less than 5% additional materials
'with some' for between 5% and 20% additional materials
'with much' for between 20% and 50% additional materials

Soil descriptions and delineation of strata on the drillholes records were based primarily on the examination of samples obtained during drilling, to a lesser extent, on the daily site records. Non-destructive logging techniques have been employed in the preparation of rock descriptions.

4.2.3 Photography

Photographs taken of the drillholes are included in **Appendix 4.** The reference board shown in the photographs gives details of the photographs contents.

5.0 DIGITAL RECORDS

5.1 METHOD

Both the preliminary and final logs have been produced using gINT (Windows version 8.20), a commercially available software package capable of providing the ground investigation data in ASCII digital format. The data is provided in uncompressed form on the CD rom disk (formatted to WIN95 version) submitted with the Final Fieldwork Report. The data file format complies with the third edition of the Association of Geotechnical Specialists (AGS) publication "Electronic Transfer of Geotechnical Data from Ground Investigations". The data dictionary used for data field headings is recommended by the AGS with local variations as instructed by the GEO.

5.2 DATA INDEX

The media index record and the data CD-ROM are included in each copy of the Final Fieldwork Report in **Appendix 7**.

Prepared By: _____
Jason Lau
Geotechnical Engineer

Certified By: _____
B C Tam
The Person appointed to act for the Contractor

6.0 REFERENCES

AGS (1999): 'Electronic Transfer of Geotechnical and Geoenvironmental Data'. Association of Geotechnical and Geoenvironmental Specialists, United Kingdom.

British Standard BS 1377 : 1990, 'Method of Test for Soils for Civil Engineering Purposes'.

GEO (2000): Geoguide 2 'Guide to Site Investigation' (4th Reprint). Geotechnical Engineering Office, Hong Kong.

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GEO (2001): GEOSPEC 3 'Model Specification For Soil Testing'. Geotechnical Engineering Office, Hong Kong.

GEO (2012): Geological Sheet No. 11: 'Hong Kong Island & Kowloon Series HGM20: Edition 2 - 2012'. Geotechnical Engineering Office, Hong Kong.

Macbeth (1992): 'Munsell Soil Colour Charts'. Kollmorgen Instruments Corp, USA.

TABLE 1

Table of Co-ordinates and Levels of Investigation Stations

Gammon

Site Investigation for Trunk Road T2
and Infrastructure at South Apron (Stage 2)

Table 1. TABLE OF CO-ORDINATES AND LEVELS OF INVESTIGATION STATIONS

Environmental Nos.		Easting (m)	Northing (m)	Ground Level (mPD)	Termination Level (mPD)
1	EH1B	839763.19	819573.07	+4.12	-4.88
2	EH3B	839734.91	819553.20	+4.08	-4.92

Gammon

APPENDICES

Appendix 1
Rock and Soil Descriptions

CHECKLIST FOR ROCK DESCRIPTION

GEOTECHNICAL ENGINEERING OFFICE, HKSAR

1. STRENGTH

Term	Identification
Extremely weak	Easily crumbled by hand; indented deeply by thumbnail.
Very weak	Crumbled with difficulty; scratched easily by thumbnail; peeled easily by pocket knife.
Weak	Broken into pieces by hand; scratched by thumbnail; peeled by pocket knife; deep indentations (to 5 mm) by point of geological pick; hand-held specimen easily broken by single light hammer blow.
Moderately weak	Broken with difficulty in two hands; scratched with difficulty by thumbnail; difficult to peel but easily scratched by pocket knife; shallow indentations easily made by point of pick; hand-held specimen usually broken by single light hammer blow.
Moderately strong	Scratched by pocket knife; shallow indentations made by firm blow with point of pick; hand-held specimen usually broken by single firm hammer blow. Point load strength (PLS) 0.5 - 2 MPa.
Strong	Firm blows with point of pick cause only superficial surface damage; hand-held specimen requires more than one firm hammer blow to break. PLS 2 - 4 MPa.
Very strong	Many hammer blows required to break specimen. PLS 4 - 8 MPa.
Extremely strong	Specimen only chipped by hammer blows. PLS > 8 MPa.

2. COLOUR

Parameter	Terms
Value	Light, Dark
Chroma	Pinkish, Reddish, Yellowish, Orangish, Brownish, Greenish, Bluish, Purplish, Greyish
Hue	Pink, Red, Yellow, Orange, Brown, Green, Blue, Purple, White, Grey, Black

For uniform colour distribution, choose a hue, supplemented by a value and/or chroma if necessary.

For non-uniform distribution, repeat this procedure using one of the following descriptors: spotted, mottled, dappled, streaked, striped (e.g. light pinkish grey spotted with black).

State whether sample was wet or dry when described.

3. TEXTURE/FABRIC

Texture Terms (Applicable Mainly to Igneous Rocks)
Equigranular, Inequigranular, Megacrystic, Porphyritic, Crystalline, Cryptocrystalline, Aphanitic

Fabric
Describe preferred orientation of grains/crystals where apparent.

Describe intensity, spacing, continuity and any preferred orientation of microfractures where apparent.

4. MATERIAL WEATHERING/ALTERATION

Decomposition Term	Grade Symbol	Typical Characteristics
Residual Soil	VI	Original rock texture completely destroyed; can be crumbled by hand and finger pressure into constituent grains.
Completely Decomposed	V	Original rock texture preserved; can be crumbled by hand and finger pressure into constituent grains; easily indented by point of geological pick; slakes in water; completely discoloured compared with fresh rock.
Highly Decomposed	IV	Can be broken by hand into smaller pieces; makes a dull sound when struck by hammer; not easily indented by point of pick; does not slake in water; completely discoloured compared with fresh rock.
Moderately Decomposed	III	Cannot usually be broken by hand; easily broken by hammer; makes a dull or slight ringing sound when struck by hammer; completely stained throughout.
Slightly Decomposed	II	Not broken easily by hammer; makes a ringing sound when struck by hammer; fresh rock colours generally retained but stained near joint surfaces.
Fresh Rock	I	Not broken easily by hammer; makes a ringing sound when struck by hammer; no visible signs of decomposition (i.e. no discolouration).

This classification is applicable to igneous and volcanic rocks and other rocks of equivalent strength in fresh state.

Disintegration
Describe small-scale cracking and fracturing caused by mechanical weathering, where apparent.

Alteration
Describe state of alteration (e.g. mineralised, kaolinised) where apparent.

5. ROCK NAME (Including Grain Size)

Igneous	:	Coarse- (6-20 mm), Medium- (2-6 mm) & Fine- (0.06-2 mm) grained GRANITE; GRANODIORITE. Very Fine-grained (< 0.06 mm) RHYOLITE; BASALT. (Common types only, see Geoguide 3 for others).
Pyroclastic	:	PYROCLASTIC BRECCIA (> 60 mm), Lapilli TUFF (2-60 mm), Coarse ash TUFF (0.06-2 mm), Fine ash TUFF (< 0.06 mm).
Metamorphic	:	Foliated - SCHIST (> 0.06 mm), PHYLLITE (< 0.06 mm). Non-foliated - MARBLE, QUARTZITE, FAULT BRECCIA.
Sedimentary	:	CONGLOMERATE, BRECCIA (> 2 mm), SANDSTONE (0.06-2 mm), MUDSTONE (< 0.06 mm) = SILTSTONE (0.002-0.06 mm) + CLAYSTONE (< 0.002 mm). (Common types only).

If rock name cannot be identified, describe grain size quantitatively, including textural term where appropriate.

6. STRUCTURE

Structural Term	Rock Type
Bedded, Laminated, Massive	Sedimentary
Massive, Flow-banded	Igneous, Pyroclastic
Foliated, Banded, Cleaved	Metamorphic

Spacing of Planar Structures
Very thick (> 2 m), Thick (0.6-2 m), Medium (200-600 mm),
Thin (60-200 mm), Very thin (20-60 mm),
Thickly-laminated (Sedimentary) (6-20 mm) or Narrow (Igneous, Metamorphic) (6-20 mm),
Thinly-laminated (Sedimentary) (< 6 mm) or Very narrow (Igneous, Metamorphic) (< 6 mm).

Examples: Thickly-bedded SANDSTONE. Narrowly flow-banded RHYOLITE.

7. DISCONTINUITIES

Nature (Type of Discontinuity)

Fault zone	Cleavage	Fissure	Bedding
Fault	Schistocity	Tension crack	
Joint	Shear plane	Foliation	

Location and Orientation
Record location as co-ordinates or relative position along datum line, preferably on map or plan.

Record orientation as dip direction/dip in degrees (e.g. 032/55).

Spacing
Extremely widely-spaced (> 6 m), Very widely-spaced (2-6 m),
Widely-spaced (0.6-2 m), Medium-spaced (200-600 mm),
Closely-spaced (60-200 mm), Very closely-spaced (20-60 mm),
Extremely closely-spaced (< 20 mm).

In exposures, supplement spacing with description of rock block shape where possible. Descriptors: Blocky, Tabular, Columnar, Polyhedral.

Persistence (Areal extent or size of a discontinuity within a plane)
Measured maximum persistence dimension should be used where possible (e.g. the discontinuity trace length on the surfaces of rock exposures). For general descriptions of different discontinuity sets, relative terms should be used.

Roughness
Waviness (large-scale): Estimate/measure wavelength and amplitude in metres.
Unevenness (small-scale), use one term from the following:

Rough stepped	Smooth stepped	Slickensided stepped
Rough undulating	Smooth undulating	Slickensided undulating
Rough planar	Smooth planar	Slickensided planar

Aperture Size
Wide (> 200 mm), Moderately wide (60-200 mm), Moderately narrow (20-60 mm), Narrow (6-20 m), Very narrow (2-6 mm), Extremely narrow (> 0-2 mm), Tight (zero).

Infilling (Nature)

Clean	Surface staining	Decomposed/ disintegrated rock
Non-cohesive soil	Cohesive soil	
Calcite	Manganese	Quartz
Other (Specify)		Kaolin

Give full description of infill materials/minerals where appropriate.

Seepage
Dry Damp/wet Seepage present (estimate quantity in 1/sec or 1/min)

Fracture State
In borehole cores, measure the following: Total Core Recovery (TCR), Solid Core Recovery (SCR), Rock Quality Designation (RQD), Fracture Index (FI). See Geoguide 3 for definitions.

8. MASS WEATHERING

Term	Zone Symbol	Typical Characteristics
Residual Soil	RS	**Residual soil derived from insitu weathering; mass structure and material texture/fabric completely destroyed: 100% soil**
Partially Weathered Rock	PW	**Less than 30% rock**
	0/30	**Soil retains original mass structure and material texture/fabric (i.e. saprolite)** Rock content does not affect shear behaviour of mass, but relict discontinuities in soil may do so. Rock content may be significant for investigation and construction.
	PW	**30% to 50% rock**
	30/50	Both rock content and relict discontinuities may affect shear behaviour of mass.
	PW	**50% to 90% rock**
	50/90	Interlocked structure.
	PW	**Greater than 90% rock**
	90/100	Small amount of the material converted to soil along discontinuities.
Unweathered Rock	UW	**100% rock** May show slight discolouration along discontinuities.

9. ADDITIONAL GEOLOGICAL INFORMATION

Record geological formation name if known. Avoid conjecture. Refer to HKGS maps & memoirs for further information.

NOTES:

1. Rock material description normally includes: strength, colour, texture/fabric, material weathering/alteration and ROCK NAME.
2. Rock mass description normally includes: strength, colour, structure, mass weathering , ROCK NAME, discontinuities and additional geological information. Can be supplemented with more detailed information on texture/fabric and material weathering/alteration of different materials within the mass where necessary.

CHECKLIST FOR SOIL DESCRIPTION

GEOTECHNICAL ENGINEERING OFFICE, HKSAR

1. STRENGTH (Compactness & Consistency)

Soil Type	Term	Identification
Very Coarse (COBBLES & BOULDERS)	Loose	By inspection of voids and particle packing in the field.
	Dense	
Coarse (SANDS & GRAVELS)	Very loose	SPT 'N' value 0-4.
	Loose	SPT 4-10; can be excavated with spade; 50 mm peg easily driven.
	Medium dense	SPT 10-30.
	Dense	SPT 30-50; requires pick for excavation; 50 mm peg hard to drive.
	Very dense	SPT > 50.
Fine (CLAYS & SILTS)	Very soft	Undrained shear strength (USS) < 20 kPa; exudes between fingers when squeezed in hand.
	Soft	USS 20-40 kPa; moulded by light finger pressure.
	Firm	USS 40-75 kPa; can be moulded by strong finger pressure.
	Stiff	USS 75-150 kPa; cannot be moulded by fingers; can be indented by thumb.
	Very stiff or hard	USS > 150 kPa; can be indented by thumbnail.
Organic (ORGANIC CLAYS, SILTS SANDS & PEATS)	Compact	Fibres already compressed together.
	Spongy	Very compressible and open structure.
	Plastic	Can be moulded in hand and smears fingers.

Terms applicable only to transported soils. For soils derived from insitu rock weathering, record actual values of quantitative tests (e.g. SPT 'N' value) as part of the description, where appropriate.

2. COLOUR

Parameter	Terms
Value	Light, Dark
Chroma	Pinkish, Reddish, Yellowish, Orangish, Brownish, Greenish, Bluish, Purplish, Greyish
Hue	Pink, Red, Yellow, Orange, Brown, Green, Blue, Purple, White, Grey, Black

For uniform colour distribution, choose a hue, supplemented by a value and/or chroma if necessary.

For non-uniform distribution, repeat this procedure using one of the following descriptors: spotted, mottled, dappled, streaked, striped (e.g. light yellowish brown mottled with red).

State whether sample was wet or dry when described.

3. PARTICLE SHAPE & COMPOSITION

Characteristic	Terms
Form	Equidimensional, Flat, Elongate, Flat & Elongate
Angularity	Angular, Subangular, Subrounded, Rounded
Surface Texture	Smooth, Rough, Glassy, Honeycombed, Pitted, Striated

Describe composition of coarse particles where appropriate. Gravel and larger particles are usually rock fragments (e.g. granite, tuff); sand particles are usually individual minerals (e.g. quartz, feldspar).

4. STRUCTURE

Soil Type	Term	Identification
Coarse & Fine	Homogenous	Deposit consists essentially of one type.
	Interstratified (Interbedded or Interlaminated)	Alternating layers of varying types or with bands or lenses of other materials.
Coarse	Heterogenous	A mixture of types.
Fine	Fissured	Breaks into polyhedral fragments along fissures.
	Intact	No fissures.
Organic	Fibrous	Plant remains recognizable & retain some strength.
	Amorphous	No recognizable plant remains.

Describe spacing of bedding planes, fissures, shell bands, etc using the spacing terms given in items 6 & 7 for rock description (see other side).

Above terms applicable only to transported soils. For soils derived from insitu rock weathering, describe relict structures in accordance with item 6 of rock description (see other side).

5. WEATHERING

Soils Derived from Insitu Weathering of Rocks

There are two main types: saprolites (rock texture/structure retained) and residual soils (rock texture/structure completely destroyed). Describe state of weathering in accordance with items 4 & 8 for rock description (see other side).

Sedimentary (Transported) Soils

Coarse soils: Describe overall discolouration of soil and degree of decomposition of gravel and larger particles (see item 4, other side). Also note any signs of disintegration of large particles where apparent.

Fine Soils: Describe overall discolouration of soil where apparent.

6. SOIL NAME

A. Basic Soil Types

Soil Type	Particle Sizes (mm)		Identification
BOULDERS	--	> 200	Only seen complete in pits or exposures.
COBBLES	--	60 - 200	Often difficult to recover from boreholes.
GRAVELS	Coarse	20 - 60	Easily visible to naked eye; particle shape and grading can be described.
	Medium	6 - 20	Well-graded: wide range of grain sizes.
	Fine	2 - 6	Poorly-graded: not well-graded (split further into uniform or gap-graded).
SANDS	Coarse	0.6 - 2	Visible to naked eye; very little or no cohesion; grading can be described.
	Medium	0.2 - 0.6	May be well-graded or poorly-graded (uniform or gap-graded) as for gravel.
	Fine	0.06 - 0.2	
SILTS	Coarse	0.02 - 0.06	Only coarse silt barely visible to naked eye; exhibits little plasticity and marked dilatancy; slightly granular or silky to the touch. Disintegrates in water; lumps dry quickly; possesses cohesion but can be powdered easily between fingers.
	Medium	0.006 - 0.02	
	Fine	0.002 - 0.006	
CLAYS	--	< 0.002	Dry lumps can be broken by hand but not powdered between the fingers. Disintegrates in water more slowly than silt; smooth to the touch; exhibits plasticity but no dilatancy; sticks to the fingers and dries slowly; shrinks appreciably on drying, usually showing cracks. These properties more noticeable with increasing plasticity.
ORGANIC CLAYS, SILTS OR SANDS	--	varies	Contains much organic vegetable matter; often has a noticeable smell and changes colour on oxidation.
PEATS	--	varies	Predominantly plant remains; usually dark brown or black in colour, often with distinctive smell; low bulk density.

B. Composite Soil Types (Mixtures of Basic Types)

Principal Soil Type	Terminology Sequence	Term for Secondary Constituent	% of Secondary Constituent
Very coarse (BOULDERS & COBBLES) (> 50% of soil > 60 mm)	Secondary constituents (finer material) ▲ after principal	With a little	< 5
		With some	5 - 20
		With much	20 - 50
Coarse (GRAVELS & SANDS) (> 65% gravel & sand sizes)	Secondary constituents before principal (excluding cobbles & boulders) +	Slightly (silty, clayey or silty/clayey) ❋	< 5
		- (silty, clayey or silty/clayey) ❋	5 - 15
		Very (silty, clayey or silty/clayey) ❋ AND/OR	15 - 35
		Slightly (gravelly or sandy) ❋	< 5
		- (gravelly or sandy) ❋	5 - 20
		Very (gravelly or sandy) ❋	20 - 50
Fine (SILTS & CLAYS) (> 35% silt & clay sizes)	Secondary constituents before principal (excluding cobbles & boulders) +	Slightly (gravelly or sandy or both) ❋	< 35
		- (gravelly or sandy) ❋	35 - 65

▲ Full name of finer material should be given (see examples below).

❋ Secondary soil type as appropriate; use 'silty/clayey' when a distinction cannot be made between the two.

\+ If cobbles or boulders are also present in a coarse or fine soil, this can be indicated by using one of the following terms relating to the very coarse fraction after the principal: 'with occasional' (< 5), 'with some' (5-20), 'with many' (20-50), where figures in brackets are % very coarse material expressed as a fraction of the whole soil (see examples below).

Examples: Slightly silty/clayey, sandy GRAVEL. Slightly gravelly, sandy SILT. Very gravelly SAND. Sandy GRAVEL with occasional boulders. BOULDERS with much finer material (silty/clayey, very sandy gravel).

For fine soils, plasticity terms should also be described where possible, viz: 'non-plastic' (generally silts), 'intermediate plasticity' (lean clays), 'high plasticity' (fat clays).

7. DISCONTINUITIES

Full description of discontinuities, where necessary, should be made using the methods and terms given in item 7 for rock description (see other side).

8. ADDITIONAL GEOLOGICAL INFORMATION

Record geological name which indicates geological origin or soil type (e.g. Alluvium, Colluvium, Marine sand etc.). Refer to HKGS maps & memoirs for further information.

NOTES:

1. Mass characteristics of soils (i.e. structure, weathering, discontinuities) can only be described satisfactorily in undisturbed field exposures or large undisturbed samples.
2. For full descriptions of soils derived from insitu rock weathering:
   (a) saprolites - describe as rocks, supplemented by soil strength and soil name terms in brackets,
   (b) residual soils - describe as soils, supplemented by name of parent rock where apparent from field evidence.

Appendix 2
Material Code for Log Legend

Material Code for Log Legend

Name	Description
AGGLOM	Pyroclastic Breccia (volcanic ash, agglomerate)
ASPHALT	Asphalt
BASALT	Basalt
BEDROCK	Bedrock
BIOCLAST	Shells, Bioclastic Remains
BLANK	
BLDCBBCL	BOULDERS & COBBLES with clay matrix.
BLDCBBSD	BOULDERS & COBBLES with Sand matrix.
BLDCBBSS	BOULDERS & COBBLES with silty sand matrix.
BLDCBGCL	BOULDERS & COBBLES with clayey gravel.
BLDCBGSD	BOULDERS & COBBLES with gravelly sand matrix.
BLDR	BOULDERS
BLDRC	BOULDERS with clay
BLDRCBBL	BOULDERS and COBBLES
BLDRCG	BOULDERS with clayey gravel.
BLDRCGK	BOULDERS with clayey gravel and cobbles
BLDRCK	BOULDERS with clayey cobbles.
BLDRCZS	BOULDER with clayey silty sandy
BLDRG	BOULDERS with gravel.
BLDRGK	BOULDERS with gravel and cobbles
BLDRK	BOULDERS with cobbles
BLDRS	BOULDERS with sand.
BLDRSG	BOULDERS with sandy gravel.
BLDRSGK	BOULDERS with sandy gravel and cobbles.
BLDRSK	BOULDERS with sandy cobbles.
BLDRZG	BOULDERS with silty gravel.
BLDRZK	BOULDERS with silty cobbles.
BLDRZSG	BOULDERS with silty sandy gravel.
BLDRZSGK	BOULDERS with silty sandy gravel and cobbles.
BLDRZSK	BOULDERS with silty sand and Cobbles.
BRECCIA	Sedimentary Breccia
CBBDGCSS	COBBLES & BOULDERS with gravelly sandy silty clay.
CBBL	Cobbles
CBBLB	COBBLES with a little / some / much shells
CBBLC	COBBLES with clay.
CBBLCG	COBBLES with clayey gravel.
CBBLCO	COBBLES with clay and organic matter.
CBBLCS	COBBLES with clay and sand.
CBBLCSG	COBBLES with clay sandy gravel.
CBBLCSGO	COBBLES with clayey sandy gravel and organic matter.
CBBLCZ	COBBLES with silt and clay.
CBBLCZG	COBBLES with clayey silty gravel.
CBBLCZS	COBBLES with clayey silty sand.
CBBLCZSG	COBBLES & BOULDERS with silty, sandy gravel
CBBLG	COBBLES with gravel.
CBBLS	COBBLES with sand.
CBBLSG	COBBLES with sand and gravel.
CBBLSGO	COBBLES with sandy gravel and organic matter.
CBBLZ	COBBLES with silt.
CBBLZG	COBBLES with silt and gravel.
CBBLZS	COBBLES with silt and sand.
CBBLZSG	COBBLES with silty sandy gravel.
CBBLZSO	COBBLES with silty sand and organic matter.
CHALK	Chalk
CLAY	CLAY
CLAYB	Shelly CLAY
CLAYG	Gravelly CLAY
CLAYGB	Gravelly CLAY with shell.
CLAYGK	Gravelly CLAY with cobbles.
CLAYGKB	Gravelly CLAY with cobbles and shell.

Material Code for Log Legend

Name	Description
CLAYGKO	Gravelly CLAY with cobbles and organic matter.
CLAYGO	Gravelly CLAY with organic matter.
CLAYK	CLAY with cobbles.
CLAYKB	CLAY with cobbles and shell.
CLAYO	CLAY with organic matter.
CLAYOB	CLAY with organic matter and shell.
CLAYS	Sandy CLAY
CLAYSB	Sandy CLAY with shells.
CLAYSG	Gravelly sandy CLAY
CLAYSGB	Gravelly sandy CLAY with shell.
CLAYSGK	Gravelly sandy CLAY with cobbles.
CLAYSGO	Gravelly sandy CLAY with organic matter
CLAYSK	Sandy CLAY with cobbles.
CLAYSO	Sandy CLAY with organic matter.
CLAYSTON	Claystone
CLAYZ	Silty CLAY
CLAYZB	Silty CLAY with shells
CLAYZBO	Silty CLAY with shells and organic matter
CLAYZG	Gravelly silty CLAY.
CLAYZGB	Gravelly silty CLAY with shell.
CLAYZGK	Gravelly silty CLAY with cobbles.
CLAYZGO	Gravelly silty CLAY with organic matter.
CLAYZK	Silty CLAY with cobbles.
CLAYZO	Silty CLAY with organics
CLAYZS	Sandy silty CLAY
CLAYZSB	Sandy silty CLAY with shells
CLAYZSG	Gravelly sandy silty CLAY.
CLAYZSGB	Gravelly silty sandy CLAY with shells.
CLAYZSGK	Gravelly sandy silty CLAY with cobbles.
CLAYZSGO	CLAY with silty sandy gravelly with organic matter.
CLAYZSK	Sandy silty CLAY with cobbles.
CLAYZSO	Sandy silty CLAY with organics.
COAL	Coal
CONCRETE	Concrete
CONGLOM	Conglomerate
CORAL	Coral
DOLOMITE	Dolomitic, dolomitic limestone
FAULT	Fault rock (breccia, gouge, mylonite)
FILL	Artificial Fill; includes landfill, rock fill, masonry wall
FINE	SILT / CLAY (Geoguide 3 p.39)
FISSIN	Fissure Infill
GABBRO	Gabbro, Lamprophyre
GNEISS	Gneiss, Coarse-grained metamorphic rock
GRABLDSS	Sandy silty GRAVEL with occaional / some / many boulders
GRACBBBD	GRAVEL with occasional / some / many boulders & cobbles
GRANITE	Granite, Coarse-grained Acid Igneous Rock
GRAV	GRAVEL
GRAVB	GRAVEL with shell.
GRAVC	Clayey GRAVEL
GRAVCB	Clayey GRAVEL with shell.
GRAVCBBL	GRAVEL and COBBLES.
GRAVCK	Clayey GRAVEL with cobbles.
GRAVCS	Clayey sandy GRAVEL
GRAVCSB	Clayey sandy GRAVEL with shell.
GRAVCSK	Clayey sandy GRAVEL with cobbles.
GRAVCSO	Clayey sandy GRAVEL with organics.
GRAVCZ	Clayey silty GRAVEL.
GRAVCZB	Silty clayey GRAVEL with shells
GRAVCZK	Clayey silty GRAVEL with cobbles.
GRAVCZS	Clayey Silty Sandy GRAVEL

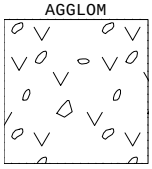
Material Code for Log Legend

Name	Description
GRAVCZSB	Sandy silty clayey GRAVEL with shells.
GRAVCZSK	Sandy silty clayey GRAVEL with cobbles.
GRAVK	GRAVEL with cobbles.
GRAVS	Sandy GRAVEL
GRAVSB	Sandy GRAVEL with shells.
GRAVSK	Sandy GRAVEL with cobbles.
GRAVSO	Sandy GRAVEL with organics.
GRAVZ	Silty GRAVEL
GRAVZK	Silty GRAVEL with cobbles.
GRAVZO	Silty GRAVEL with organic.
GRAVZS	Silty Sandy GRAVEL
GRAVZSB	Sandy silty GRAVEL with shells.
GRAVZSK	Silty sandy GRAVEL with cobbles.
GRAVZSKB	Silty sandy GRAVEL with cobbles & shells
GYPSUM	Gypsum, Rocksalt, etc.
LST	LIMESTONE
LSTSLT	Interbedded Limestone and Siltstone
MARBLE	Marble (pure or impure)
MDSTSLTS	Interbedded mudstone and siltstone
METACG	Coarse-grained Metamorphic Rock
METACON	Contact Metamorphic Rock
METAMG	Medium grained Metamorphic Rock
METAREG	Regional Metamorphic Rock
MUDSTONE	Mudstone
MUDSTONEST	Silty Mudstone
ORGANICS	Peat
PEATCL	BSI Clayey Peat
PEATGR	BSI Gravelly Peat
PEATSD	BSI Sandy Peat
PEATST	BSI Silty Peat
PEGMTITE	Pegmatite (Very Coarse-grained Igneous Rock)
PHYLLITE	Phyllite, Mylonite (fine grained metamorphic rock)
QUARTZIT	Quartzite, quartz (vein) Coarse-grained Metamorphic Rock
RHYOLITE	Rhyolite (feldsparphyric, quartzphyric), fine grained acid igneous rock
SAND	SAND
SANDB	Shelly SAND
SANDC	Clayey SAND
SANDCB	Clayey SAND with shell fragments
SANDCG	Clayey SAND with some / occassional gravel
SANDCGB	Gravelly clayey SAND with shell.
SANDCGK	Gravelly clayey SAND with cobbles.
SANDCGO	Gravelly clayey SAND with organics.
SANDCK	Clayey SAND with cobbles.
SANDCO	Clayey SAND with organics.
SANDCZ	Silty clayey SAND
SANDCZB	Silty clayey SAND with shells
SANDCZG	Silty clayey SAND with gravel
SANDCZGB	Silty clayey SAND with gravel & shells
SANDCZGK	Silty clayey SAND with gravel and cobbles
SANDCZK	Silty clayey SAND with cobbles.
SANDCZO	Clayey silty SAND with organics.
SANDG	Gravelly SAND
SANDGB	Gravelly SAND with shells.
SANDGK	SAND with occasional gravel and cobbles
SANDGO	Gravelly SAND with organics.
SANDK	SAND with cobbles.
SANDO	SAND with organics.
SANDSTON	SANDSTONE
SANDZ	Silty SAND
SANDZB	Silty SAND with shells.

Material Code for Log Legend

Name	Description
SANDZG	Silty SAND with gravel.
SANDZGB	Silty gravelly SAND with shells.
SANDZGK	Gravelly silty SAND with cobbles.
SANDZGKB	Silty gravelly SAND with cobbles & shells
SANDZGO	Silty gravelly SAND with organic.
SANDZK	Silty SAND with cobbles.
SANDZO	Silty SAND with organics.
SCHIST	Schist (Medium grained Metamorphic Rock)
SHALE	Shale, Fissile Mudstone
SILT	SILT.
SILTB	Shelly SILT.
SILTBO	Shelly SILTwith organic.
SILTC	Clayey SILT.
SILTCB	Clayey SILT with shells.
SILTCG	Clayey SILT with gravel.
SILTCGB	Gravelly clayey SILT with shell.
SILTCGK	Gravelly clayey SILT with cobbles.
SILTCGKB	Gravelly clayey SILT with cobbles and shell.
SILTCGKO	Gravelly clayey SILT with cobbles and organic.
SILTCGO	Gravelly clayey SILT with organics.
SILTCK	Clayey SILT with cobbles.
SILTCO	Clayey SILT with organics.
SILTCS	Sandy clayey SILT.
SILTCSB	Sandy clayey SILT with shells.
SILTCSG	Sandy clayey SILT with gravel.
SILTCSGB	Gravelly clayey sandy SILT with shell.
SILTCSGK	Gravelly sandy clayey SILT with cobbles.
SILTCSGKB	Gravelly sandy clayey SILT with cobbles and shell
SILTCSGKO	Gravelly sandy clayey SILT with cobbles and orgainic
SILTCSGO	Gravelly sandy clayey SILT with organics.
SILTCSK	Sandy clayey SILT with cobbles.
SILTCSO	Sandy clayey SILT with organics.
SILTG	Gravelly SILT.
SILTGB	Gravelly SILT with shell.
SILTGK	SILT with some / occasional gravel and cobbles
SILTGO	Gravelly SILT with organics.
SILTK	SILT with cobbles.
SILTMUD	Siltstone & Mudstone
SILTO	Organic SILT
SILTS	Sandy SILT
SILTSB	Sandy SILT with shell.
SILTSG	Gravelly sandy SILT.
SILTSGB	Gravelly sandy SILT with shell.
SILTSGK	Gravelly sandy SILT with cobbles.
SILTSGO	Gravelly sandy SILT with organics.
SILTSK	Sandy SILT with occasional / some / many cobbles
SILTSKO	Sandy SILT with cobbles and organics.
SILTSO	Sandy SILT with organics.
SILTSTON	Siltstone (Hong Kong)
SYENITE	Granodiorite, Syenite, Monzonite
TOPSOIL	Topsoil
TRACHYTE	TRACHYTE, TRACHYANDESITE, ANDESITE, LATITE and DACITE.
TUFF	Coarse Ash Tuff, Lapilli Tuff (Fine-grained Igneous Rock)
TUFFFINE	Fine Ash Tuff
VOID	Void
WASHING	Wash Boring (No Sample recovered attempted)

AGGLOM



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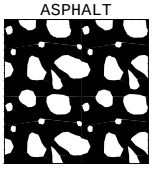

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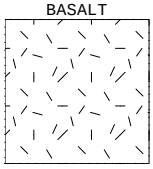

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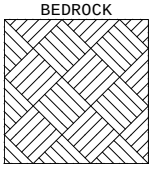

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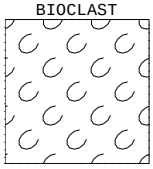

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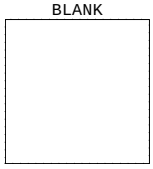

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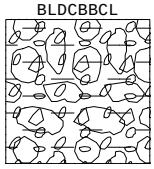

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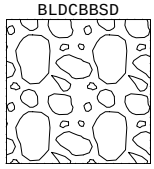

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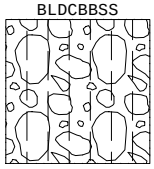

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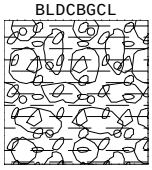

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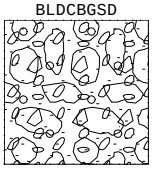

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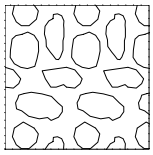

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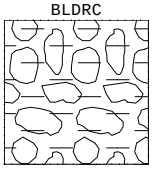

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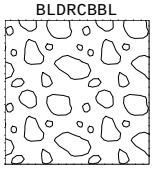

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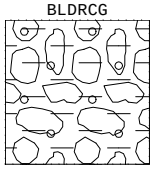

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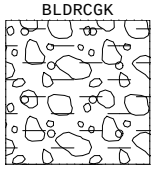

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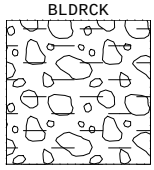

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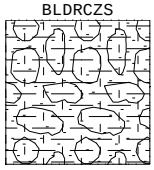

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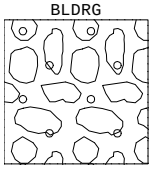

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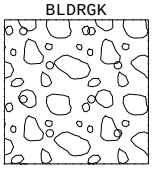

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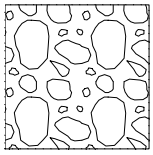

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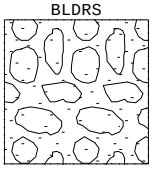

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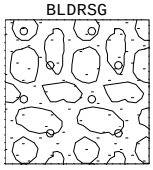

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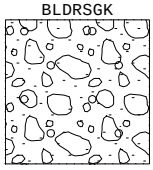

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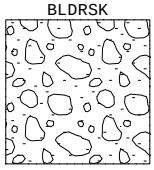

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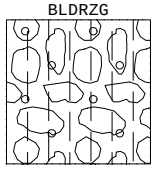

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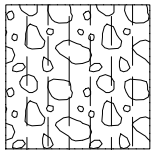

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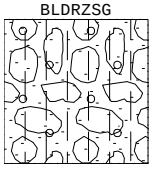

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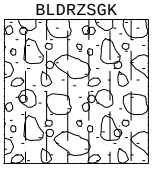

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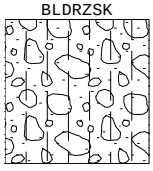

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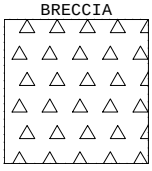

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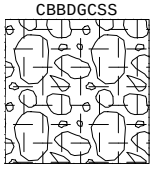

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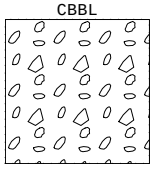

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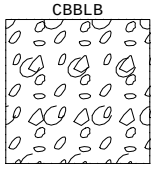

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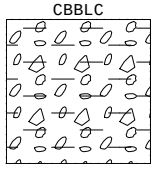

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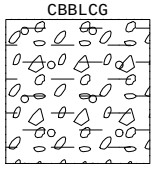

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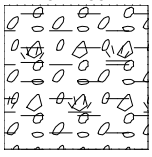

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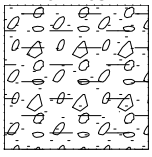

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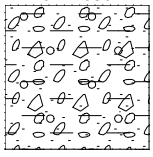

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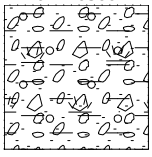

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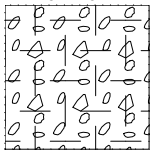

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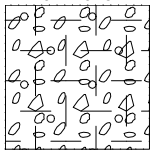

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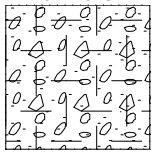

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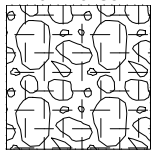

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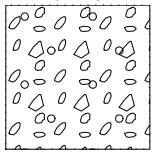

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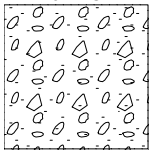

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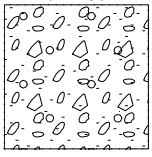

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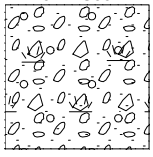

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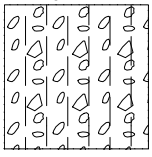

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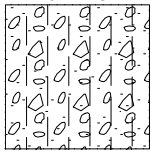

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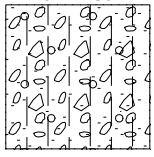

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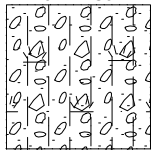

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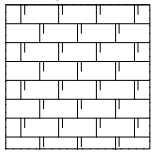

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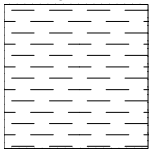

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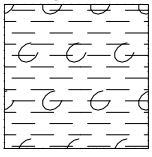

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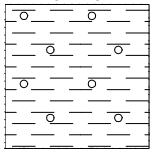

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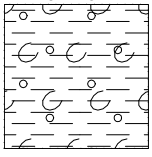

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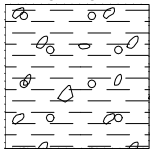

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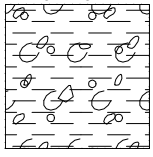

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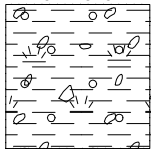

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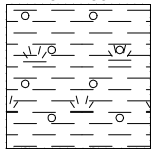

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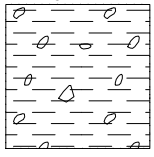

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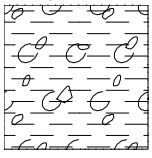

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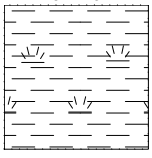

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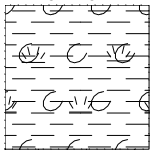

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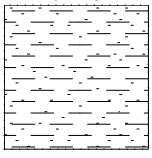

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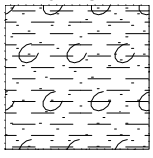

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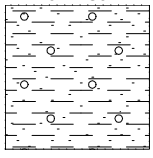

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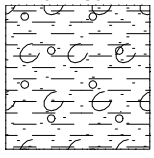

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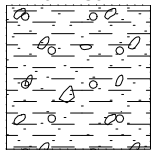

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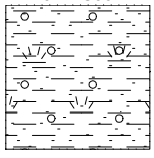

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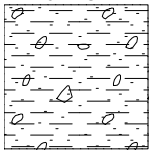

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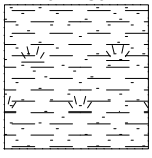

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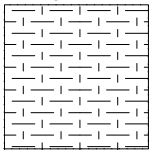

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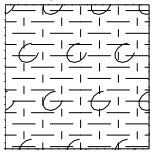

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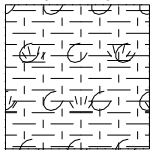

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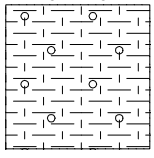

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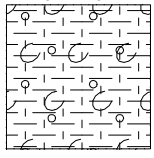

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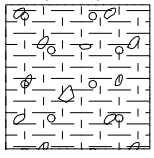

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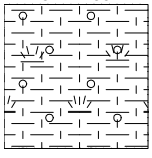

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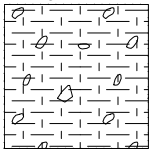

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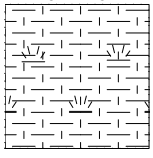

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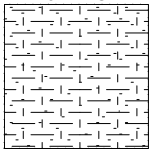

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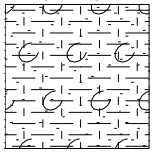

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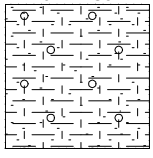

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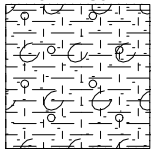

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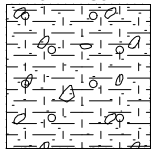

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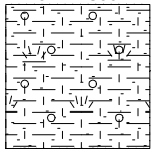
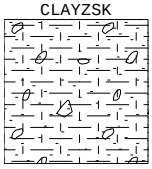
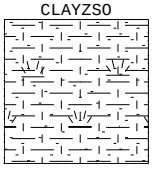
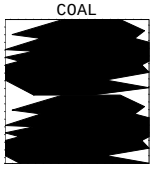
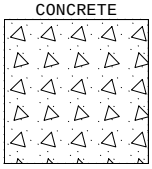
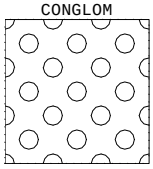
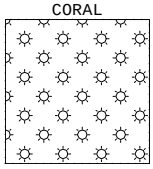
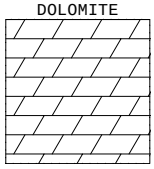
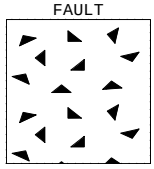
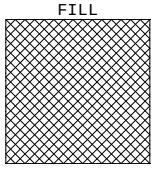
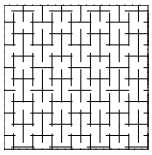
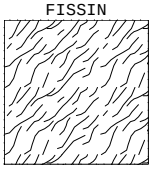
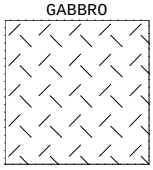
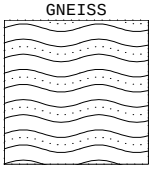
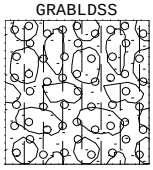
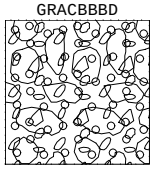
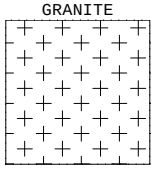
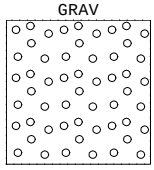
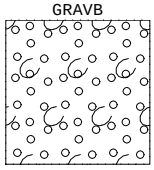
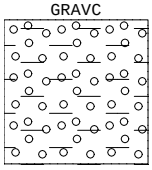
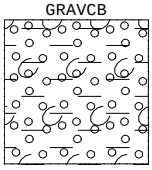
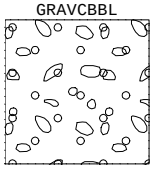
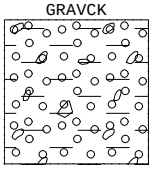
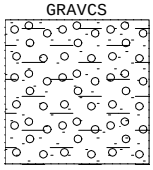
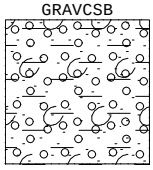
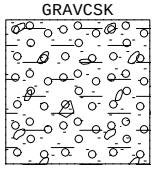
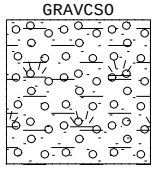
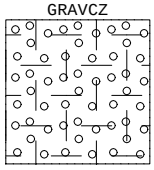
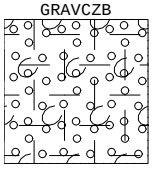
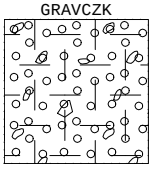
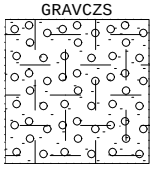
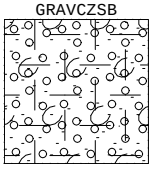
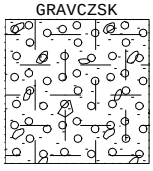
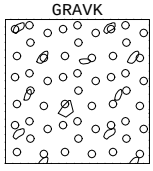
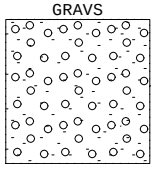
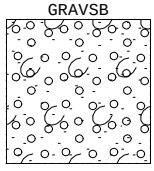
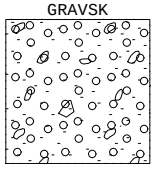
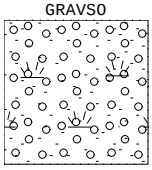
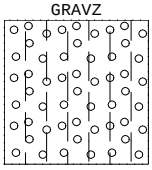
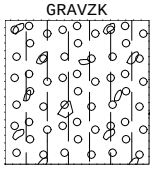
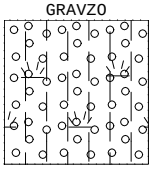
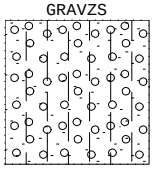
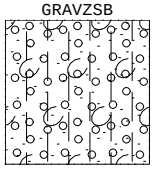
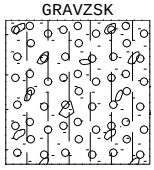
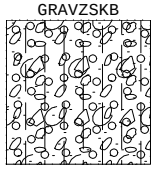
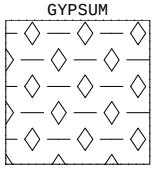


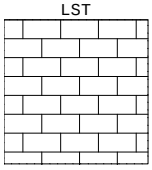
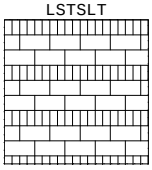
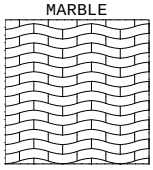
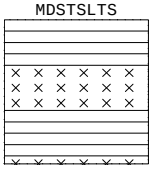
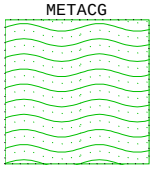
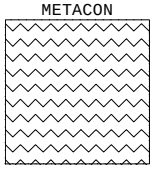
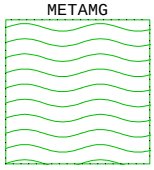
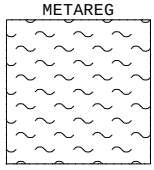
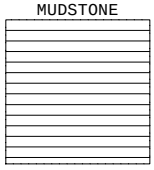
CLAYZSK 
CLAYZSO 
COAL 
CONCRETE 
CONGLOM 
CORAL 
DOLOMITE 
FAULT 
FILL 

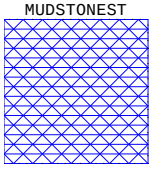
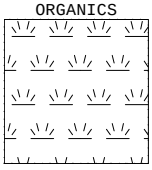
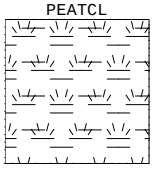
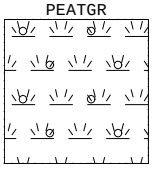
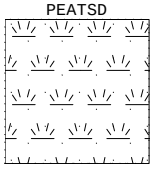
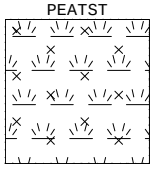
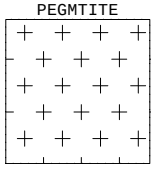
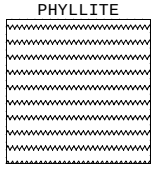
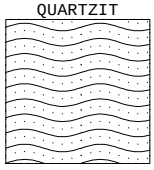
FINE 
FISSIN 
GABBRO 
GNEISS 
GRABLDSS 
GRACBBBD 
GRANITE 
GRAV 
GRAVB 

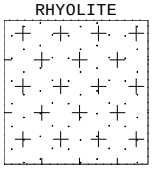
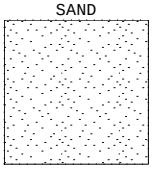
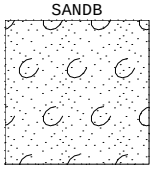
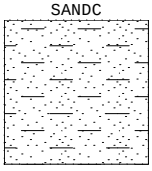
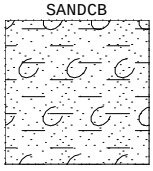
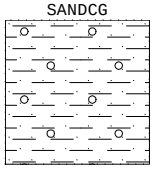
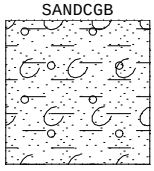
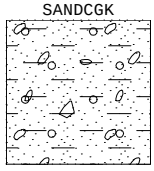
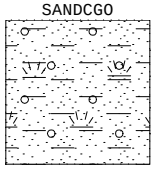
GRAVC 
GRAVCB 
GRAVCBBL 
GRAVCK 
GRAVCS 
GRAVCSB 
GRAVCSK 
GRAVCSO 
GRAVCZ 

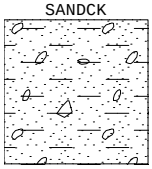
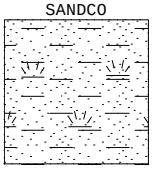
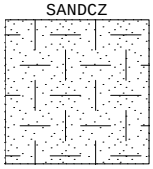
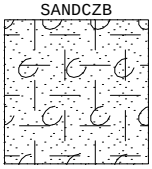
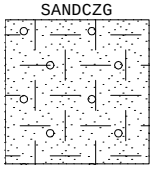
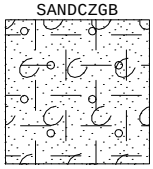
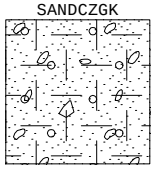
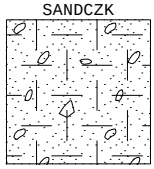
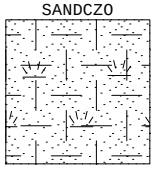
GRAVCZB 
GRAVCZK 
GRAVCZS 
GRAVCZSB 
GRAVCZSK 
GRAVK 
GRAVS 
GRAVSB 
GRAVSK 

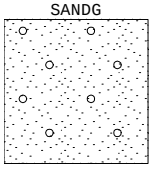
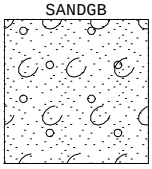
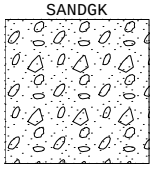
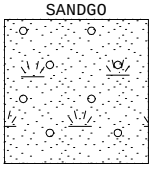
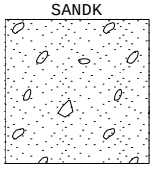
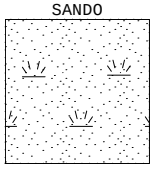
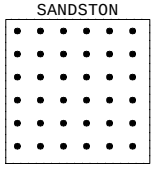
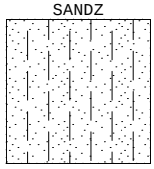
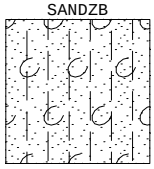
GRAVSO 
GRAVZ 
GRAVZK 
GRAVZO 
GRAVZS 
GRAVZSB 
GRAVZSK 
GRAVZSKB 
GYPSUM 

LST 
LSTSLT 
MARBLE 
MDSTSLTS 
METACG 
METACON 
METAMG 
METAREG 
MUDSTONE 

MUDSTONEST 
ORGANICS 
PEATCL 
PEATGR 
PEATSD 
PEATST 
PEGMTITE 
PHYLLITE 
QUARTZIT 

RHYOLITE 
SAND 
SANDB 
SANDC 
SANDCB 
SANDCG 
SANDCGB 
SANDCGK 
SANDCGO 

SANDCK 
SANDCO 
SANDCZ 
SANDCZB 
SANDCZG 
SANDCZGB 
SANDCZGK 
SANDCZK 
SANDCZO 

SANDG 
SANDGB 
SANDGK 
SANDGO 
SANDK 
SANDO 
SANDSTON 
SANDZ 
SANDZB 

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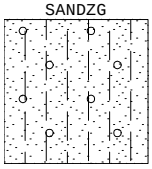

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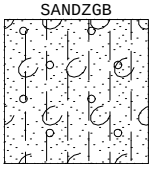

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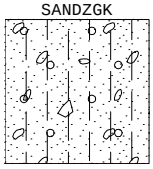

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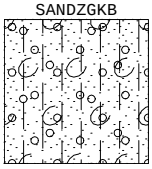

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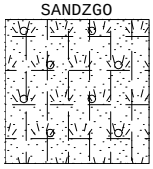

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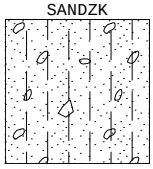

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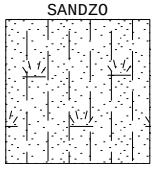

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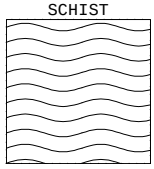

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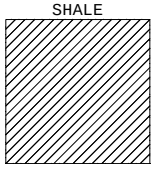

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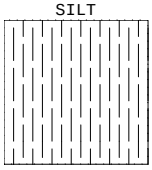

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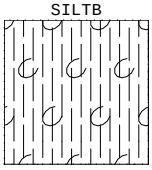

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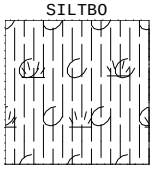

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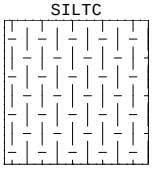

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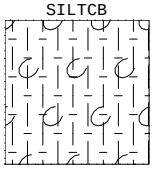

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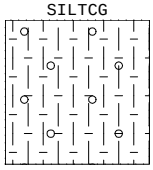

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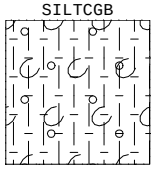

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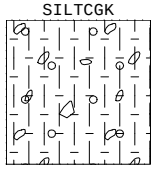

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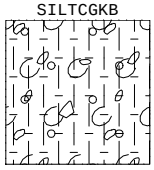

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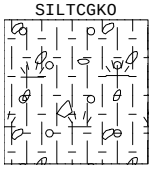

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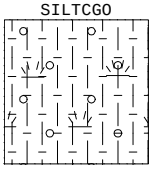

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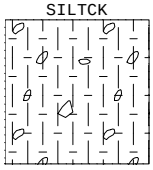

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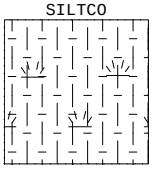

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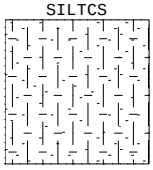

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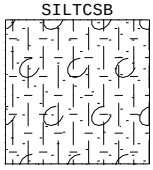

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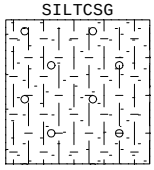

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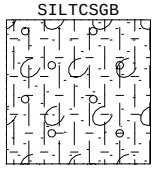

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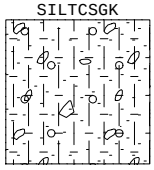

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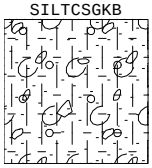

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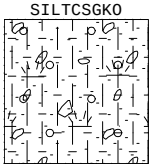

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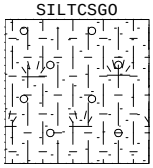

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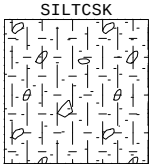

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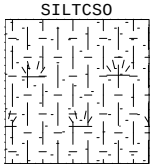

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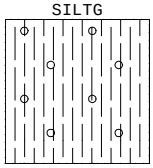

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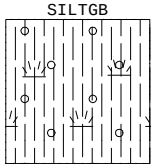

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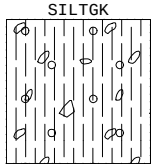

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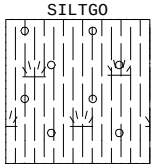

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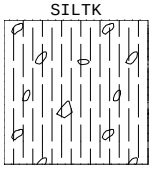

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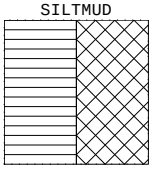

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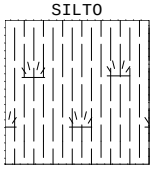

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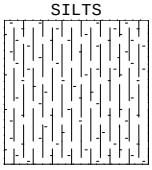

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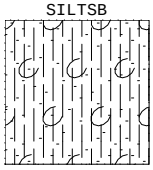

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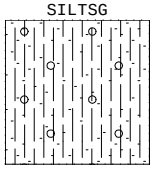

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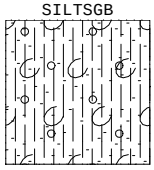

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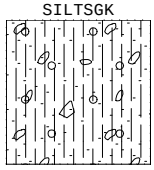

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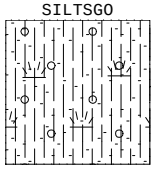

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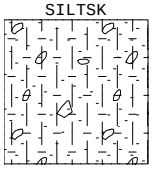

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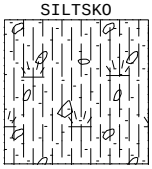

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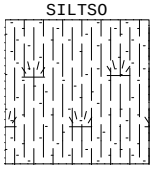

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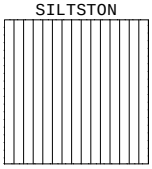

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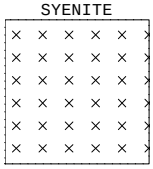

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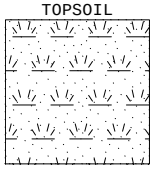

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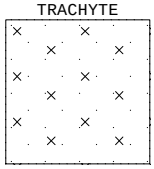

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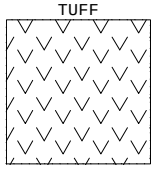

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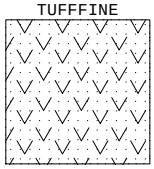

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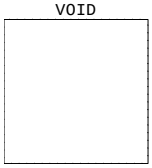
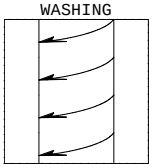


WASHING



Appendix 3
Drillhole Records

DRILLHOLE RECORD

Gammon

HOLE No. **EH1B**

CONTRACT No. KL/2013/02

SHEET 1 of 1

PROJECT Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

METHOD Rotary	CO-ORDINATES	PROJECT No. J3539
MACHINE & No. 20-111	E 839763.19 N 819573.07	DATE from 01/09/2014 to 03/09/2014
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 4.12 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
01/09/2014	SX	08:00										4.12	0.00			CONCRETE slab.
												3.82	0.30			Brown (10YR 5/4), fine to coarse SAND with some subangular fine to coarse gravel sized rock and concrete fragments. (FILL)
									A		0.45 0.50					
									C		0.95 1.00					
									D		1.45 1.50					
									E		1.95 2.00					
01/09/2014		Dry at 18:00							F		2.45 2.50	1.62	2.50			
03/09/2014		2.30m at 08:00		0				18 bls								Firm, greyish brown (10YR 5/2), sandy SILT with some subangular fine to medium gravel sized rock fragments. (FILL)
	SX 3.00								1/2		2.95 3.00					
	PX			67				21 bls	3							
									4		3.45 3.50	0.62	3.50			
				0				12 bls								Light brown (7.5YR 6/4), slightly silty fine to coarse SAND with some subangular fine to medium gravel sized rock fragments. (FILL)
									5		3.95 4.00	0.12	4.00			
				56				28 bls	6							Greyish brown (10YR 5/2), silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
									7		4.45 4.50	-0.38	4.50			
				0				26 bls								Light brown (7.5YR 6/4), dappled brownish orange, COBBLE with occasional subangular fine to coarse gravel sized rock and ceramic fragments in sandy matrix. (FILL)
									8		4.95 5.00	-0.88	5.00			
				56				40 bls	9							Brownish grey (5YR 5/2), silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
									10		5.45 5.50					
				44				50 bls	11							
									12/13		5.95 6.00	-1.88	6.00			
				27						T6116						Brownish orange (10R 5/8), orangish brown (5YR 5/8) and grey (N6), BOULDER with some subangular coarse gravel and cobble sized rock, concrete and brick fragments. (FILL)
											7.50	-3.38	7.50			
				0				64 bls	14		7.95 8.00	-3.88	8.00			Dark brownish grey (2.5YR 4/1), subangular fine to coarse GRAVEL and COBBLE sized rock fragments in sandy silty matrix. (FILL)
				0				28 bls								Light brown (7.5YR 6/4), slightly silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
	PX 8.50								15		8.45 8.50	-4.38	8.50			
				44				24 bls	16							Greyish brown (10YR 5/2), mottled grey, slightly silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
03/09/2014		1.95m at 18:00							17/18		8.95 9.00	-4.88	9.00			End of hole at 9.00m depth.

INSPECTION PIT

- ● Small disturbed sample
- ▯ SPT liner sample
- ▨ U76 undisturbed sample
- ■ U100 undisturbed sample
- ▨ Mazier sample
- ▤ Piston sample
- ↓ Standard penetration test
- VIB Vibrocore sample
- ▲ Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- ⋁ In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 04/09/2014

CHECKED JASON LAU

DATE 05/09/2014

REMARKS

1. Inspection pit was dug to 2.50m depth.
2. Water sample was taken at 7.50m depth.
3. The jar samples 0.50m, 3.00m, 6.00m, 9.00m and water sample were sent to laboratory.

t:\gintw\library\1july2009.glb\3110 geo drillhole (1 jan 2012) (Section 1)

DRILLHOLE RECORD

Gammon

HOLE No. **EH3B**

CONTRACT No. KL/2013/02

SHEET 1 of 1

PROJECT Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

METHOD Rotary	CO-ORDINATES E 839734.91 N 819553.20	PROJECT No. J3539
MACHINE & No. 20-111		DATE from 01/09/2014 to 08/09/2014
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 4.08 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
01/09/2014	SX	08:00										4.08	0.00			CONCRETE slab.
												3.78	0.30			Greyish brown (10YR 5/2), fine to coarse SAND with much subangular fine to coarse gravel sized rock and concrete fragments. (FILL)
		Dry at 18:00							A		0.45 0.50					
									C	INSPECTION PIT	0.95 1.00					
									D		1.45 1.50					
01/09/2014									E		1.95 2.00	2.08	2.00			
06/09/2014		Dry at 08:00		36						T6II6						Grey (N6) and pink (2.5YR 6/4), subangular coarse GRAVEL and COBBLE sized rock fragments. (FILL)
06/09/2014		2.11m at 18:00									2.50	1.58	2.50			
08/09/2014		2.10m at 08:00		0				22 blS								Greyish brown (10YR 5/2), mottled black and pink, subangular fine to coarse GRAVEL and COBBLE sized rock fragments in sandy silty matrix. (FILL)
	SX 3.00								1/2		2.95 3.00					
	PX			0				14 blS								
									3		3.45 3.50					
				0				24 blS								
									4		3.95 4.00	0.08	4.00			
				0				74 blS								Light brown (7.5YR 6/4), silty fine to coarse SAND with much subangular fine to coarse gravel sized rock fragments. (FILL)
				56				136 blS	5		4.45 4.50					
									6							
				100				17 blS	7		4.95 5.00					
									8							
				0				21 blS	9		5.45 5.50					
									10/11		5.95 6.00	-1.92	6.00			
				20						T2IOI						Grey (N6) and pink (2.5YR 6/4), subangular medium to coarse GRAVEL and COBBLE sized rock and wood fragments. (FILL)
											7.00					
				31						T2IOI						
											7.90					
				30						T2IOI						
	PX 8.50										8.50	-4.42	8.50			
				0				117 blS								Greyish brown (10YR 5/2), slightly silty fine to coarse SAND with much subangular fine to medium gravel sized rock fragments. (FILL)
08/09/2014		1.80m at 18:00							12/13		8.95 9.00	-4.92	9.00			
																End of hole at 9.00m depth.

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 10/09/2014

CHECKED JASON LAU

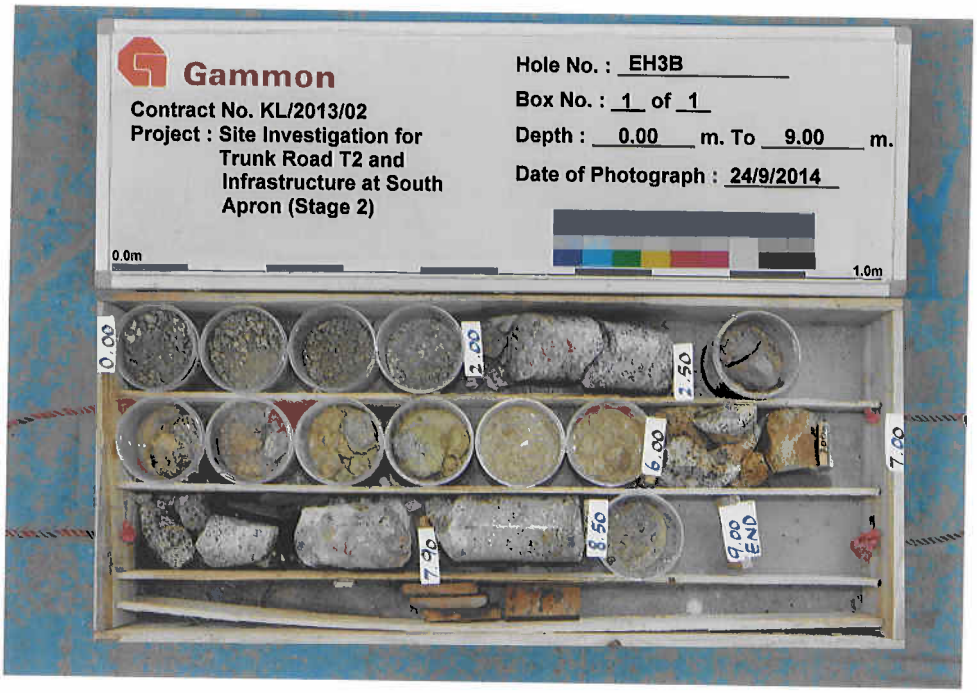
DATE 11/09/2014

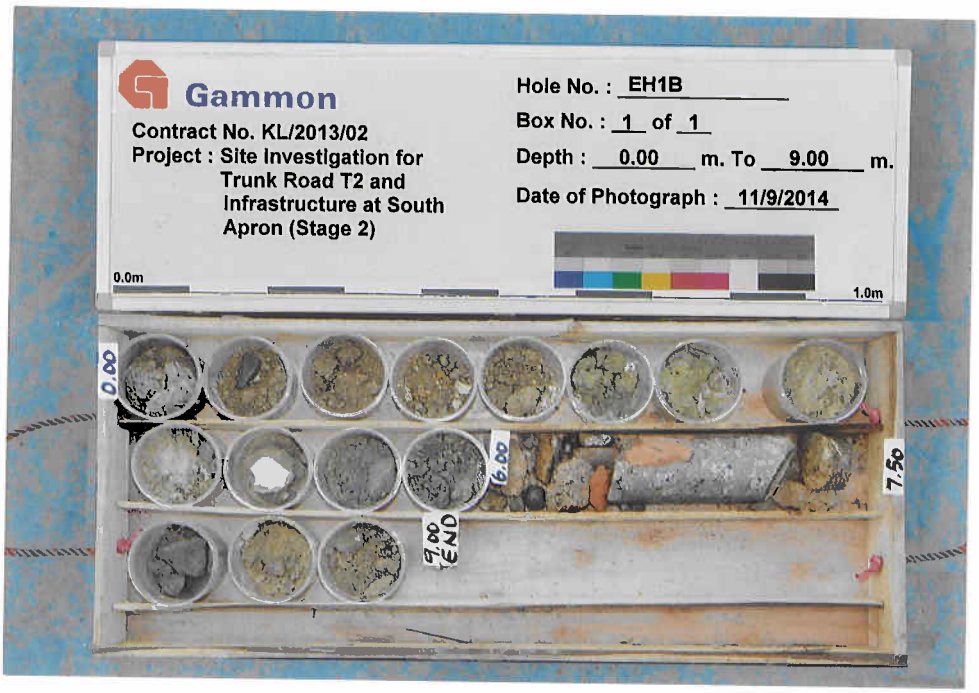
REMARKS

1. Inspection pit was dug to 2.00m depth.
2. Water sample was taken at 7.50m depth.
3. The jar samples 0.50m, 3.00m, 6.00m, 9.00m and water sample were sent to laboratory.

t:\gintw\library\1july2009.glb\3110 geo drillhole (1 jan 2012) (Section 1)

Appendix 4
Drillhole Photographs


Gammon
Contract No. KL/2013/02
Project : Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)
Hole No. : EH3B
Box No. : 1 of 1
Depth : 0.00 m. To 9.00 m.
Date of Photograph : 24/9/2014
0.0m
1.0m
0.00
2.00
2.50
6.00
7.00
7.90
8.50
9.00 END


Gammon
Contract No. KL/2013/02
Project : Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)
Hole No. : EH1B
Box No. : 1 of 1
Depth : 0.00 m. To 9.00 m.
Date of Photograph : 11/9/2014
0.0m
1.0m
0.00
6.00
7.50
9.00 END

Appendix 5
Environmental Samples Photographs

KL/2013/02
Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

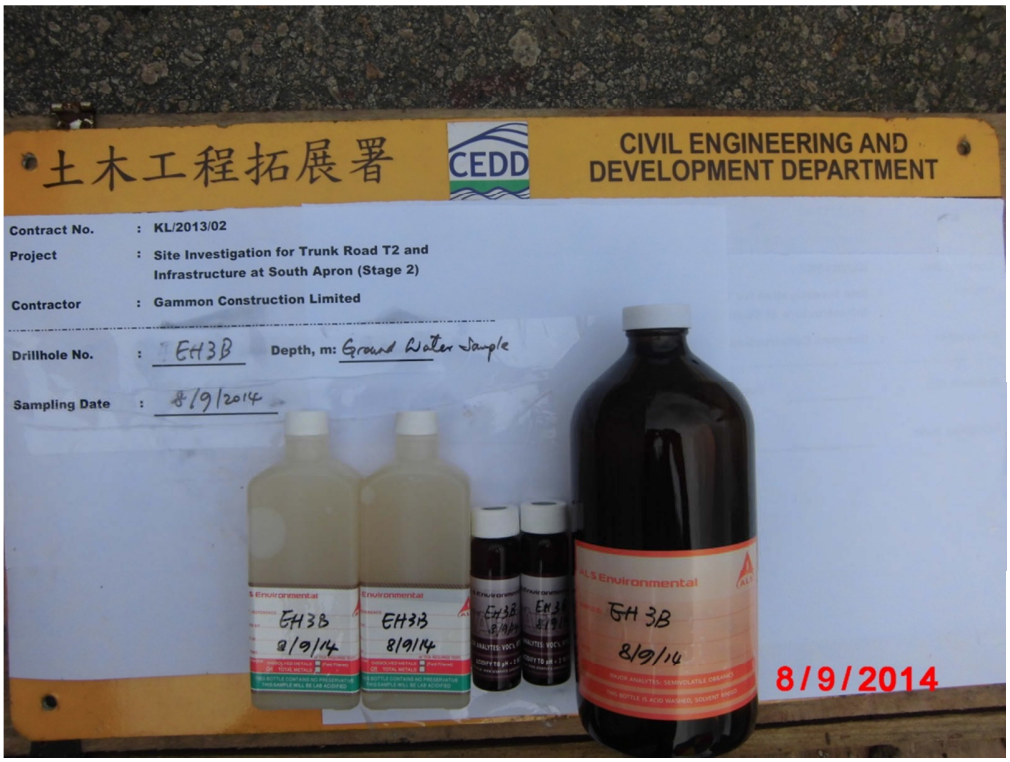
KL/2013/02
Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

KL/2013/02
Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

KL/2013/02
Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

KL/2013/02
Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

KL/2013/02
Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)



KL/2013/02
Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

Appendix 6
Investigation Stations Location Plan

TSUI HING ST

驗車中心
Vehicle Inspection C

施工中

施工中
Works in progress

Kowloon Bay Factory Estate

SHUN YIP ST

CHEUNG YIP STREET

KAI HING ROAD

Fence

Seawall

海堤

露天貨倉
Open Storage

EH1B

EH3B

819800 N

819600 N

839400 E

839600 E

840000 E

202

204

206

203

502

136

LEGEND

Environmental Hole

PROJECT TITLE

Site Investigation for
Trunk Road T2 and Infrastructure at
South Apron (Stage 2)

DRAWING TITLE

INVESTIGATION STATIONS LOCATION PLAN

DRAWING NO.

GCL_GE_J3539_SI01 (Section 1A)

DATE

October 2014

SCALE

1 : 2000 (A3)

Gammon

Appendix 7
Digital Records

Media Index Record

Contract No. : KL/2013/02

Project No.: J3539

Date of issue to the Engineer: 11/11/2014

Description: Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

File Name	*Creation Date*	*Creation Time*	*Size (Bytes)*	*Description*
J3539 Section 1. AGS	23/10/2014	15:54:00	10.5 KB	Project Information

Appendix 3.2

Summary of Laboratory Results

Standard Form 3.2
Soil Data Summary and Comparison to RBRGs and Csat

Chemical	Frequency of Detection[1] (x/y)	Range of Detected Concentration[2] (mg/kg)	Range of Method Reporting Limit[3] (mg/kg)	Analytical Method	Relevant Land Use Categories	Lowest RBRG(s) (mg/kg)	Csat (mg/kg)	Maximum Detected Concentration Exceeds (Check if applicable)	
								RBRG	Csat
Volatile Organic Chemicals									
Benzene	0/8	<0.2	0.2	USEPA 8260	Industrial, Public Parks	9.21E+00	3.36E+02	Nil	Nil
Toluene	0/8	<0.5	0.5			8.24E+03	1.38E+02	Nil	Nil
Ethylbenzene	0/8	<0.5	0.5			1.00E+04	2.35E+02	Nil	Nil
Xylenes (Total)	0/8	<2.0	2			1.23E+03	1.50E+02	Nil	Nil
Semi Volatile Organic Chemicals									
Acenaphthene	0/8	<0.5	0.5	USEPA 8270	Industrial, Public Parks	1.00E+04	6.02E+01	Nil	Nil
Acenaphthylene	0/8	<0.5	0.5			1.00E+04	1.98E+01	Nil	Nil
Anthracene	0/8	<0.5	0.5			1.00E+04	2.56E+00	Nil	Nil
Benzo(a)anthracene	0/8	<0.5	0.5			3.83E+01	-	Nil	Nil
Benzo(a)pyrene	0/8	<0.5	0.5			3.83E+00	-	Nil	Nil
Benzo(b)fluoranthene	0/8	<0.5	0.5			1.78E+01	-	Nil	Nil
Benzo(g,h,i)perylene	0/8	<0.5	0.5			5.74E+03	-	Nil	Nil
Benzo(k)fluoranthene	0/8	<0.5	0.5			3.83E+02	-	Nil	Nil
Chrysene	0/8	<0.5	0.5			1.14E+03	-	Nil	Nil
Dibenzo(a,h)anthracene	0/8	<0.5	0.5			3.83E+00	-	Nil	Nil
Fluoranthene	0/8	<0.5	0.5			7.62E+03	-	Nil	Nil
Fluorene	0/8	<0.5	0.5			7.45E+03	5.47E+01	Nil	Nil
Indeno(1,2,3-cd)pyrene	0/8	<0.5	0.5			3.83E+01	-	Nil	Nil
Naphthalene	0/8	<0.5	0.5			4.53E+02	1.25E+02	Nil	Nil
Phenanthrene	0/8	<0.5	0.5			1.00E+04	2.80E+01	Nil	Nil
Pyrene	0/8	<0.5	0.5			5.72E+03	-	Nil	Nil
Metals									
Antimony	1/8	<1 to 1	1	USEPA 6020A	Industrial, Public Parks	9.79E+01	-	Nil	Nil
Arsenic	5/8	<1 to 6	1			7.35E+01	-	Nil	Nil
Barium	8/8	10.3 to 27.7	0.5			1.00E+04	-	Nil	Nil
Cadmium	0/8	<0.2	0.2			2.45E+02	-	Nil	Nil
Chromium III	8/8	3 to 38	1			1.00E+04	-	Nil	Nil
Chromium VI	0/8	<1	1			7.35E+02	-	Nil	Nil
Cobalt	7/8	<1 to 6	1			4.90E+03	-	Nil	Nil
Copper	8/8	1 to 49	1			9.79E+03	-	Nil	Nil
Lead	8/8	20 to 88	1			8.57E+02	-	Nil	Nil

Standard Form 3.2
Soil Data Summary and Comparison to RBRGs and Csat

Chemical	Frequency of Detection[1] (x/y)	Range of Detected Concentration[2] (mg/kg)	Range of Method Reporting Limit[3] (mg/kg)	Analytical Method	Relevant Land Use Categories	Lowest RBRG(s) (mg/kg)	Csat (mg/kg)	Maximum Detected Concentration Exceeds (Check if applicable)	
								RBRG	Csat
Manganese	8/8	261 to 895	1			1.00E+04	-	Nil	Nil
Mercury	0/8	<0.2	0.2			3.84E+01	-	Nil	Nil
Molybdenum	4/8	<1 to 14	1			1.22E+03	-	Nil	Nil
Nickel	7/8	<1 to 18	1			4.90E+03	-	Nil	Nil
Tin	8/8	2 to 6	1			1.00E+04	-	Nil	Nil
Zinc	8/8	20 to 50	0.2			1.00E+04	-	Nil	Nil
Dioxins/PCBs									
PCBs	0/8	<0.1	0.1	USEPA 8270C	Industrial, Public Parks	7.48E-01	-	Nil	Nil
Petroleum Carbon Ranges									
C6 - C8	0/8	<5	5	USEPA 8015	Industrial, Public Parks	1.00E+04	1.00E+03	Nil	Nil
C9 - C16	0/8	<200	200			1.00E+04	3.00E+03	Nil	Nil
C17 - C35	0/8	<500	500			1.00E+04	5.00E+03	Nil	Nil

1. x = number of samples in which chemical was not found above the method reporting limit
   y = number of samples analysed for chemical
2. Minimum and maximum detected values
3. Minimum and maximum method reporting limits

Standard Form 3.3
Groundwater Data Summary and Comparison to RBRGs and Solubility Limits

Chemical	Frequency of Detection[1] (x/y)	Range of Detected Concentration[2] (µg/L)	Range of Method Reporting Limit[3] (µg/L)	Analytical Method	Relevant Land Use Categories	Lowest RBRG(s) (mg/L)	Solubility Limit (mg/L)	Maximum Detected Concentration Exceeds (Check if applicable)	
								RBRG	Solubility
Volatile Organic Chemicals									
Benzene	0/2	<5	5	USEPA 8260	Industrial	5.40E+01	1.75E+03	Nil	Nil
Toluene	0/2	<5	5			1.00E+04	1.69E+02	Nil	Nil
Ethylbenzene	0/2	<5	5			1.00E+04	5.26E+02	Nil	Nil
Xylenes (Total)	0/2	<20	20			1.57E+03	1.75E+02	Nil	Nil
Semi Volatile Organic Chemicals									
Acenaphthene	0/2	<2	2	USEPA 8270	Industrial	1.00E+04	4.24E+00	Nil	Nil
Acenaphthylene	0/2	<2	2			1.00E+04	3.93E+00	Nil	Nil
Anthracene	0/2	<2	2			1.00E+04	4.34E-02	Nil	Nil
Benzo(b)fluoranthene	0/2	<1	1			7.53E+00	1.50E-03	Nil	Nil
Chrysene	0/2	<1	1			8.12E+02	1.60E-03	Nil	Nil
Fluoranthene	0/2	<2	2			1.00E+04	2.06E-01	Nil	Nil
Fluorene	0/2	<2	2			1.00E+04	1.98E+00	Nil	Nil
Naphthalene	0/2	<2	2			8.62E+02	3.10E+01	Nil	Nil
Phenanthrene	0/2	<2	2			1.00E+04	1.00E+00	Nil	Nil
Pyrene	0/2	<2	2			1.00E+04	1.35E-01	Nil	Nil
Metals									
Mercury	0/2	<0.5	0.5	USEPA 6020A	Industrial	6.79E+00	-	Nil	Nil
Dioxins/PCBs									
PCBs	0/2	<1	1	USEPA 8270C	Industrial	5.11E+00	3.10E-02	Nil	Nil
Petroleum Carbon Ranges									
C6 - C8	0/2	<20	20	USEPA 8015	Industrial	1.15E+03	5.23E+00	Nil	Nil
C9 - C16	0/2	<500	500			9.98E+03	2.80E+00	Nil	Nil
C17 - C35	0/2	<500	500			1.78E+02	2.80E+00	Nil	Nil

1. x = number of samples in which chemical was not found above the method reporting limit
   y = number of samples analysed for chemical
2. Minimum and maximum detected values
3. Minimum and maximum method reporting limits

Standard Form 3.4

Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
Volatile Organic Chemicals						
Benzene	EH1B (BH1)	0.5m to 1.0m	<0.2	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.2	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.2	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.2	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.2	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.2	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.2	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.2	Not exceeded	Not exceeded	Not applicable
Toluene	EH1B (BH1)	0.5m to 1.0m	<0.5	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.5	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.5	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.5	Not exceeded	Not exceeded	Not applicable
Ethylbenzene	EH1B (BH1)	0.5m to 1.0m	<0.5	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.5	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.5	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.5	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.5	Not exceeded	Not exceeded	Not applicable
Xylenes (Total)	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Semi Volatile Organic Chemicals						
Acenaphthene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable

Standard Form 3.4
Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
Acenaphthylene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
Anthracene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
Benzo(a)anthracene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Benzo(a)pyrene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Benzo(b)fluoranthene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable

Standard Form 3.4
Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Benzo(g,h,i)perylene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Benzo(k)fluoranthene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Chrysene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Dibenzo(a,h)anthracene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Fluoranthene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable

Standard Form 3.4
Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Fluorene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
Indeno(1,2,3-cd)pyrene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Naphthalene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
Phenanthrene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not exceeded	Not applicable
Pyrene	EH1B (BH1)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable

Standard Form 3.4
Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
	EH3B (BH3)	0.5m to 1.0m	<0.500	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.500	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.500	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.500	Not exceeded	Not applicable	Not applicable
Metals						
Antimony	EH1B (BH1)	0.5m to 1.0m	<1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not applicable	Not applicable
Arsenic	EH1B (BH1)	0.5m to 1.0m	1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	2	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	6	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	2	Not exceeded	Not applicable	Not applicable
Barium	EH1B (BH1)	0.5m to 1.0m	10.3	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	25.4	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	12.4	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	13.3	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	27.7	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	15	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	21.6	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	13.9	Not exceeded	Not applicable	Not applicable
Cadmium	EH1B (BH1)	0.5m to 1.0m	<0.2	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.2	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.2	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.2	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.2	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.2	Not exceeded	Not applicable	Not applicable
Chromium III	EH1B (BH1)	0.5m to 1.0m	3	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	7	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	5	Not exceeded	Not applicable	Not applicable

Standard Form 3.4
Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
		9.0m to 9.45m	7	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	4	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	38	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	3	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	3	Not exceeded	Not applicable	Not applicable
Chromium VI	EH1B (BH1)	0.5m to 1.0m	<1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not applicable	Not applicable
Cobalt	EH1B (BH1)	0.5m to 1.0m	1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	1	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	4	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	6	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	3	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	2	Not exceeded	Not applicable	Not applicable
Copper	EH1B (BH1)	0.5m to 1.0m	1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	4	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	3	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	7	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	49	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	4	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	3	Not exceeded	Not applicable	Not applicable
Lead	EH1B (BH1)	0.5m to 1.0m	23	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	20	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	26	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	23	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	64	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	39	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	88	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	48	Not exceeded	Not applicable	Not applicable
Manganese	EH1B (BH1)	0.5m to 1.0m	759	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	895	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	526	Not exceeded	Not applicable	Not applicable

Standard Form 3.4
Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
		9.0m to 9.45m	321	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	639	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	355	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	487	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	261	Not exceeded	Not applicable	Not applicable
Mercury	EH1B (BH1)	0.5m to 1.0m	<0.2	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.2	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.2	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.2	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.2	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.2	Not exceeded	Not applicable	Not applicable
Molybdenum	EH1B (BH1)	0.5m to 1.0m	<1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	1	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	2	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	3	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	14	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not applicable	Not applicable
Nickel	EH1B (BH1)	0.5m to 1.0m	<1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	2	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	2	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	18	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	2	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	2	Not exceeded	Not applicable	Not applicable
Tin	EH1B (BH1)	0.5m to 1.0m	4	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	2	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	3	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	3	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	3	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	6	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	3	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	2	Not exceeded	Not applicable	Not applicable
Zinc	EH1B (BH1)	0.5m to 1.0m	20	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	24	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	21	Not exceeded	Not applicable	Not applicable

Standard Form 3.4

Soil Sample Concentrations and Exceedances of RBRGs and Csat

Chemical	List Samples		Concentration (mg/kg)	Check if RBRG Exceeded	Check if Csat Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
		9.0m to 9.45m	21	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	50	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	20	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	22	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	21	Not exceeded	Not applicable	Not applicable
Dioxins/PCBs						
PCBs	EH1B (BH1)	0.5m to 1.0m	<0.1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.1	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.1	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.1	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.1	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.1	Not exceeded	Not applicable	Not applicable
Petroleum Carbon Ranges						
C6 - C8	EH1B (BH1)	0.5m to 1.0m	<5	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<5	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5	Not exceeded	Not exceeded	Not applicable
C9 - C16	EH1B (BH1)	0.5m to 1.0m	<200	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<200	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<200	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<200	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<200	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<200	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<200	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<200	Not exceeded	Not exceeded	Not applicable
C17 - C35	EH1B (BH1)	0.5m to 1.0m	<500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<500	Not exceeded	Not exceeded	Not applicable

Standard Form 3.5

Groundwater Sample Concentrations and Exceedances of RBRGs and Solubility Limits

Chemical	List Samples		Concentration (µg/L)	Check if RBRG Exceeded	Check if Solubility Limit Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
Volatile Organic Chemicals						
Benzene	EH1B (BH1)	0.5m to 1.0m	<5.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<5.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5.0	Not exceeded	Not exceeded	Not applicable
Toluene	EH1B (BH1)	0.5m to 1.0m	<5.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<5.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5.0	Not exceeded	Not exceeded	Not applicable
Ethylbenzene	EH1B (BH1)	0.5m to 1.0m	<5.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<5.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<5.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<5.0	Not exceeded	Not exceeded	Not applicable
Xylenes (Total)	EH1B (BH1)	0.5m to 1.0m	<20	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<20	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<20	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<20	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<20	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<20	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<20	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<20	Not exceeded	Not exceeded	Not applicable
Semi Volatile Organic Chemicals						
Acenaphthene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable

Standard Form 3.5
Groundwater Sample Concentrations and Exceedances of RBRGs and Solubility Limits

Chemical	List Samples		Concentration (µg/L)	Check if RBRG Exceeded	Check if Solubility Limit Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Acenaphthylene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Anthracene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Benzo(b)fluoranthene	EH1B (BH1)	0.5m to 1.0m	<1.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<1.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<1.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<1.0	Not exceeded	Not exceeded	Not applicable
Chrysene	EH1B (BH1)	0.5m to 1.0m	<1.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<1.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<1.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<1.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<1.0	Not exceeded	Not exceeded	Not applicable
Fluoranthene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable

Standard Form 3.5
Groundwater Sample Concentrations and Exceedances of RBRGs and Solubility Limits

Chemical	List Samples		Concentration (µg/L)	Check if RBRG Exceeded	Check if Solubility Limit Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Fluorene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Naphthalene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Phenanthrene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Pyrene	EH1B (BH1)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<2.0	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<2.0	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<2.0	Not exceeded	Not exceeded	Not applicable
Metals						
Mercury	EH1B (BH1)	0.5m to 1.0m	<0.5	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.5	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.5	Not exceeded	Not applicable	Not applicable

Standard Form 3.5

Groundwater Sample Concentrations and Exceedances of RBRGs and Solubility Limits

Chemical	List Samples		Concentration (µg/L)	Check if RBRG Exceeded	Check if Solubility Limit Exceeded	Approximate Size of Affected Area
	Sample Number	Sample Depth				
		9.0m to 9.45m	<0.5	Not exceeded	Not applicable	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<0.5	Not exceeded	Not applicable	Not applicable
		3.0m to 3.45m	<0.5	Not exceeded	Not applicable	Not applicable
		6.0m to 6.45m	<0.5	Not exceeded	Not applicable	Not applicable
		9.0m to 9.45m	<0.5	Not exceeded	Not applicable	Not applicable
Dioxins/PCBs						
PCBs	EH1B (BH1)	0.5m to 1.0m	<1	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<1	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<1	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<1	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<1	Not exceeded	Not exceeded	Not applicable
Petroleum Carbon Ranges						
C6 - C8	EH1B (BH1)	0.5m to 1.0m	<20	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<20	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<20	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<20	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<20	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<20	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<20	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<20	Not exceeded	Not exceeded	Not applicable
C9 - C16	EH1B (BH1)	0.5m to 1.0m	<500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<500	Not exceeded	Not exceeded	Not applicable
C17 - C35	EH1B (BH1)	0.5m to 1.0m	<500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<500	Not exceeded	Not exceeded	Not applicable
	EH3B (BH3)	0.5m to 1.0m	<500	Not exceeded	Not exceeded	Not applicable
		3.0m to 3.45m	<500	Not exceeded	Not exceeded	Not applicable
		6.0m to 6.45m	<500	Not exceeded	Not exceeded	Not applicable
		9.0m to 9.45m	<500	Not exceeded	Not exceeded	Not applicable

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Project: J3539

Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

Test Report

Prepared for

Civil Engineering and Development Department

Kowloon Development Office

Prepared By

ALS Technichem (HK) Pty Ltd

04 November 2014

Project: J3539

Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)

Laboratory Testing Report (Final Report)

CLIENT:

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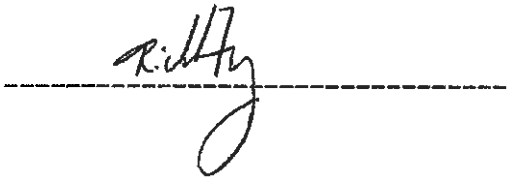

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Section 1
Summary Reports

Summary of Soil Analytical Results

		Analysis Description	Moisture Content (dried @ 103°C)	EG: Metals and Major Cations															EP-066: Polychlorinated Biphenyls
				Antimony	Hexavalent Chromium	Mercury	Trivalent Chromium	Arsenic	Barium	Cadmium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Tin	Zinc	Total Polychlorinated biphenyls
		Unit	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		LOR	0.1	1	1	0.2	1	1	0.5	0.2	1	1	1	1	1	1	1	1	0.1
ALS Lab ID	Sample ID	Date / Time of sampling																	
HK1428586001	EH1B 3.0M	03/09/2014 10:30	19.9	<1	<1	<0.2	7	<1	25.4	<0.2	2	2	20	895	<1	2	2	24	<0.1
HK1428586002	EH1B 6.0M	03/09/2014 14:15	13.8	<1	<1	<0.2	5	<1	12.4	<0.2	<1	4	26	526	<1	2	3	21	<0.1
HK1428586003	EH1B 9.0M	03/09/2014 15:20	14.8	<1	<1	<0.2	7	<1	13.3	<0.2	1	3	23	321	1	2	3	21	<0.1
HK1428555001	EH1B 0.5M	01/09/2014 14:00	9.0	<1	<1	<0.2	3	1	10.3	<0.2	1	1	23	759	<1	<1	4	20	<0.1
HK1428555002	EH3B 0.5M	01/09/2014 14:00	8.2	<1	<1	<0.2	4	2	27.7	<0.2	4	7	64	639	2	1	3	50	<0.1
HK1429117001	EH3B 3.0M	08/09/2014 09:00	18.7	1	<1	<0.2	38	6	15.0	<0.2	6	49	39	355	3	18	6	20	<0.1
HK1429117002	EH3B 6.0M	08/09/2014 10:30	19.5	<1	<1	<0.2	3	1	21.6	<0.2	3	4	88	487	14	2	3	22	<0.1
HK1429117003	EH3B 9.0M	08/09/2014 12:00	20.2	<1	<1	<0.2	3	2	13.9	<0.2	2	3	48	261	<1	2	2	21	<0.1

Summary of Soil Analytical Results

		Analysis Description	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)			EP-074_SR: Volatile Organic Compounds														
			C6 - C8 Fraction	C9 - C16 Fraction	C17 - C35 Fraction	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	Styrene	ortho-Xylene	Xylenes (Total)	2-Propanone (Acetone)	2-Butanone (MEK)	Methylene chloride	Trichloroethene	Tetrachloroethene	Chloroform	Bromodichloromethane	Methyl tert-Butyl Ether (MTBE)
		Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		LOR	5	200	500	0.2	0.5	0.5	1	0.5	0.5	2	50	5	0.5	0.1	0.04	0.04	0.1	0.5
ALS Lab ID	Sample ID	Date / Time of sampling																		
HK1428586001	EH1B 3.0M	03/09/2014 10:30	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5
HK1428586002	EH1B 6.0M	03/09/2014 14:15	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5
HK1428586003	EH1B 9.0M	03/09/2014 15:20	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5
HK1428555001	EH1B 0.5M	01/09/2014 14:00	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5
HK1428555002	EH3B 0.5M	01/09/2014 14:00	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5
HK1429117001	EH3B 3.0M	08/09/2014 09:00	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5
HK1429117002	EH3B 6.0M	08/09/2014 10:30	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5
HK1429117003	EH3B 9.0M	08/09/2014 12:00	<5	<200	<500	<0.2	<0.5	<0.5	<1.0	<0.5	<0.5	<2.0	<50	<5	<0.5	<0.1	<0.04	<0.04	<0.1	<0.5

Summary of Soil Analytical Results

ALS Lab ID	Sample ID	Analysis Description	EP-076A: Semivolitale Organic Compounds																	
			Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene	Phenol	Hexachlorobenzene (HCB)	Bis(2-ethylhexyl)phthalate
		Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		LOR	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.05	0.5	0.05	0.5	0.5	0.2	5
ALS Lab ID	Sample ID	Date / Time of sampling																			
HK1428586001	EH1B 3.0M	03/09/2014 10:30	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5
HK1428586002	EH1B 6.0M	03/09/2014 14:15	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5
HK1428586003	EH1B 9.0M	03/09/2014 15:20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5
HK1428555001	EH1B 0.5M	01/09/2014 14:00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5
HK1428555002	EH3B 0.5M	01/09/2014 14:00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5
HK1429117001	EH3B 3.0M	08/09/2014 09:00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5
HK1429117002	EH3B 6.0M	08/09/2014 10:30	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5
HK1429117003	EH3B 9.0M	08/09/2014 12:00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.2	<5

Summary of Groundwater and Blanks Analytical Results

		Analysis Description	EG: Metals and Major Cations														EP-066: Polychlorinated Biphenyls
			Antimony	Hexavalent Chromium	Mercury	Arsenic	Trivalent Chromium	Barium	Cadmium	Cobalt	Copper	Lead	Manganese	Molybdenum	Nickel	Tin	Zinc	Total Polychlorinated biphenyls
		Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		LOR	1	20	0.5	10	20	1	0.2	1	1	1	1	1	1	1	10	1
ALS Lab ID	Sample ID	Date / Time of sampling																
HK1428873001	EH1B	04/09/2014 12:30	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
HK1429117004	EH3B	08/09/2014 14:30	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1
HK1428873002	FIELD BLANK	04/09/2014 12:30	<1	<20	<0.5	<10	<20	<1	<0.2	<1	<1	<1	<1	<1	<1	<1	<10	<1
HK1428873003	EQUIPMENT BLANK	04/09/2014 12:30	<1	<20	<0.5	<10	<20	<1	<0.2	<1	<1	<1	<1	<1	<1	<1	<10	<1

N/A denotes Not Applicable

Summary of Groundwater and Blanks Analytical Results

		Analysis Description	EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)			EP-074_SR: Volatile Organic Compounds														
			C6 - C8 Fraction	C9 - C16 Fraction	C17 - C35 Fraction	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	Styrene	ortho-Xylene	Xylenes (Total)	2-Propanone (Acetone)	2-Butanone (MEK)	Methylene chloride	Trichloroethene	Tetrachloroethene	Chloroform	Bromodichloromethane	Methyl tert-Butyl Ether (MTBE)
		Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		LOR	20	500	500	5	5	5	10	5	5	20	500	50	50	5	5	5	5	5
ALS Lab ID	Sample ID	Date / Time of sampling																		
HK1428873001	EH1B	04/09/2014 12:30	<20	<500	<500	<5	<5	<5	<10	<5	<5	<20	<500	<50	<50	<5	<5	13	<5	<5
HK1429117004	EH3B	08/09/2014 14:30	<20	<500	<500	<5	<5	<5	<10	<5	<5	<20	<500	<50	<50	<5	<5	24.4	7.5	<5
HK1428873002	FIELD BLANK	04/09/2014 12:30	<20	<500	<500	<5	<5	<5	<10	<5	<5	<20	<500	<50	<50	<5	<5	<5	<5	<5
HK1428873003	EQUIPMENT BLANK	04/09/2014 12:30	<20	<500	<500	<5	<5	<5	<10	<5	<5	<20	<500	<50	<50	<5	<5	<5	<5	<5

N/A denotes Not Applicable

Summary of Groundwater and Blanks Analytical Results

ALS Lab ID	Sample ID	Analysis Description	EP-076A: Semivolitale Organic Compounds																	
			Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene	Phenol	Hexachlorobenzene (HCB)	Bis(2-ethylhexyl)phthalate
		Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		LOR	2	2	2	2	2	2	2	2	2	1	1	1	0.2	2	2	2	2	1	2
HK1428873001	EH1B	04/09/2014 12:30	<2	<2	<2	<2	<2	<2	<2	<2	N/A	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1	N/A
HK1429117004	EH3B	08/09/2014 14:30	<2	<2	<2	<2	<2	<2	<2	<2	N/A	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1	N/A
HK1428873002	FIELD BLANK	04/09/2014 12:30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1	<1	<1	<0.2	<2	<2	<2	<2	<1	2.3
HK1428873003	EQUIPMENT BLANK	04/09/2014 12:30	<2	<2	<2	<2	<2	<2	<2	<2	<2	<1	<1	<1	<0.2	<2	<2	<2	<2	<1	3.4

N/A denotes Not Applicable

Section 2
Certificate of Analysis

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 11
Contact	: HANNAH CHIU	Contact	: Fung Lim Chee, Richard	Work Order	: HK1428555
Address	: 7/F, EMPIRE CENTRE, 68 MODY ROAD, TSIM SHA TSUI EAST, KOWLOON, HONG KONG	Address	: 1/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: ----	E-mail	: Richard.Fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	Quote number	: ----	Date Samples Received	: 01-SEP-2014
Order number	: J3539			Issue Date	: 18-SEP-2014
C-O-C number	: H029001			No. of samples received	: 2
Site	: ----			No. of samples analysed	: 2

Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*	*Authorised results for*
Chan Ka Yu, Karen	Assistant Manager - Organics	Organics
Wong Wing, Kenneth	Manager - Metals	Inorganics

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 16-SEP-2014

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific comments for Work Order: **HK1428555**

Sample(s) were picked up from client by ALS Technichem (HK) staff in a chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 based on ASTM D3974-09, prior to determination of metals.

Dioxins was subcontracted to and analysed by ALS Czech Republic.

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: EH1B 0.5M Client sampling date / time: 01-SEP-2014 14:00 HK1428555-001	Client sample ID: EH3B 0.5M Client sampling date / time: 01-SEP-2014 14:00 HK1428555-002
EA/ED: Physical and Aggregate Properties					
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	9.0	8.2
EG: Metals and Major Cations					
EG020: Antimony	7440-36-0	1	mg/kg	<1	<1
EG020: Arsenic	7440-38-2	1	mg/kg	1	2
EG020: Barium	7440-39-3	0.5	mg/kg	10.3	27.7
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2
EG020: Cobalt	7440-48-4	1	mg/kg	1	4
EG020: Copper	7440-50-8	1	mg/kg	1	7
EG020: Lead	7439-92-1	1	mg/kg	23	64
EG020: Manganese	7439-96-5	1	mg/kg	759	639
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	2
EG020: Nickel	7440-02-0	1	mg/kg	<1	1
EG020: Tin	7440-31-5	1	mg/kg	4	3
EG020: Zinc	7440-66-6	1	mg/kg	20	50
EG036: Mercury	7439-97-6	0.2	mg/kg	<0.2	<0.2
EG049: Trivalent Chromium	16065-83-1	1	mg/kg	3	4
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1
EP-066: Polychlorinated Biphenyls					
Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)					
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.050	mg/kg	<0.050	<0.050
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500
Dibenz(a.h)anthracene	53-70-3	0.050	mg/kg	<0.050	<0.050
Benzo(g.h.i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate					
Phenol	108-95-2	0.50	mg/kg	<0.50	<0.50

Sub-Matrix: SOIL				Client sample ID	EH1B 0.5M	EH3B 0.5M		
				Client sampling date / time	01-SEP-2014 14:00	01-SEP-2014 14:00		
Compound	CAS Number	LOR	Unit		HK1428555-001	HK1428555-002		
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg		<0.200	<0.200		
Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg		<5.00	<5.00		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)								
C6 - C8 Fraction	---	5	mg/kg		<5	<5		
C9 - C16 Fraction	---	200	mg/kg		<200	<200		
C17 - C35 Fraction	---	500	mg/kg		<500	<500		
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)								
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2		
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5		
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5		
meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg		<1.0	<1.0		
Styrene	100-42-5	0.5	mg/kg		<0.5	<0.5		
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5		
Xylenes (Total)	---	2.0	mg/kg		<2.0	<2.0		
EP-074_SR-B: Oxygenated Compounds								
2-Propanone (Acetone)	67-64-1	50	mg/kg		<50	<50		
2-Butanone (MEK)	78-93-3	5	mg/kg		<5	<5		
EP-074_SR-E: Halogenated Aliphatics								
Methylene chloride	75-09-2	0.5	mg/kg		<0.5	<0.5		
Trichloroethene	79-01-6	0.1	mg/kg		<0.1	<0.1		
Tetrachloroethene	127-18-4	0.04	mg/kg		<0.04	<0.04		
EP-074_SR-G: Trihalomethanes (THM)								
Chloroform	67-66-3	0.04	mg/kg		<0.04	<0.04		
Bromodichloromethane	75-27-4	0.1	mg/kg		<0.1	<0.1		
EP-074_SR-I: Methyl-tert-butyl Ether								
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg		<0.5	<0.5		
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorobiphenyl	321-60-8	0.1	%		**89.2**	**84.7**		
4-Terphenyl-d14	1718-51-0	0.1	%		**99.4**	**93.2**		
EP-066S: PCB Surrogate							Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%		**102**	**102**		
Dibutylchlorendate	1770-80-5	0.1	%		**125**	**125**		
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%		**96.7**	**95.9**		
Toluene-D8	2037-26-5	0.1	%		**102**	**101**		
4-Bromofluorobenzene	460-00-4	0.1	%		**106**	**104**		
EP-074_SR-S: VOC Surrogates							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%		**96.7**	**95.9**		
Toluene-D8	2037-26-5	0.1	%		**102**	**101**		

Sub-Matrix: SOIL				Client sample ID	EH1B 0.5M	EH3B 0.5M			
				Client sampling date / time	01-SEP-2014 14:00	01-SEP-2014 14:00			
Compound	CAS Number	LOR	Unit		HK1428555-001	HK1428555-002			
EP-074_SR-S: VOC Surrogates - Continued									Surrogate control limits listed at end of this report.
4-Bromofluorobenzene	460-00-4	0.1	%		106	104			

Laboratory Duplicate (DUP) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3632420)								
HK1428555-001	EH1B 0.5M	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	9.0	9.1	0.0
HK1428803-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	32.6	31.1	4.8
EG: Metals and Major Cations (QC Lot: 3626540)								
HK1428018-003	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
HK1428555-002	EH3B 0.5M	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
EG: Metals and Major Cations (QC Lot: 3626873)								
HK1428478-006	Anonymous	EG036: Mercury	7439-97-6	0.02	mg/kg	<0.02	<0.02	0.0
HK1428555-002	EH3B 0.5M	EG036: Mercury	7439-97-6	0.2	mg/kg	<0.2	<0.2	0.0
EG: Metals and Major Cations (QC Lot: 3626881)								
HK1428555-002	EH3B 0.5M	EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Barium	7440-39-3	0.5	mg/kg	27.7	29.2	5.2
		EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	2	2	0.0
		EG020: Cobalt	7440-48-4	1	mg/kg	4	3	0.0
		EG020: Copper	7440-50-8	1	mg/kg	7	7	0.0
		EG020: Lead	7439-92-1	1	mg/kg	64	62	3.6
		EG020: Manganese	7439-96-5	1	mg/kg	639	538	17.2
		EG020: Molybdenum	7439-98-7	1	mg/kg	2	1	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	1	1	0.0
		EG020: Tin	7440-31-5	1	mg/kg	3	3	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	50	54	8.6
EP-066: Polychlorinated Biphenyls (QC Lot: 3621065)								
HK1428586-002	Anonymous	Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3621068)								
HK1428586-002	Anonymous	Benzo(a)pyrene	50-32-8	50	µg/kg	<50	<50	0.0
		Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<50	<50	0.0
		Naphthalene	91-20-3	500	µg/kg	<500	<500	0.0
		Acenaphthylene	208-96-8	500	µg/kg	<500	<500	0.0
		Acenaphthene	83-32-9	500	µg/kg	<500	<500	0.0
		Fluorene	86-73-7	500	µg/kg	<500	<500	0.0
		Phenanthrene	85-01-8	500	µg/kg	<500	<500	0.0
		Anthracene	120-12-7	500	µg/kg	<500	<500	0.0
		Fluoranthene	206-44-0	500	µg/kg	<500	<500	0.0
		Pyrene	129-00-0	500	µg/kg	<500	<500	0.0
		Benz(a)anthracene	56-55-3	500	µg/kg	<500	<500	0.0
		Chrysene	218-01-9	500	µg/kg	<500	<500	0.0
		Benzo(b)fluoranthene	205-99-2	500	µg/kg	<500	<500	0.0
		Benzo(k)fluoranthene	207-08-9	500	µg/kg	<500	<500	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	500	µg/kg	<500	<500	0.0
		Benzo(g.h.i)perylene	191-24-2	500	µg/kg	<500	<500	0.0
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3621068)								
HK1428586-002	Anonymous	Hexachlorobenzene (HCB)	118-74-1	200	µg/kg	<200	<200	0.0

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3621068) - Continued								
HK1428586-002	Anonymous	**Phenol**	108-95-2	500	µg/kg	<500	<500	0.0
		Bis(2-ethylhexyl)phthalate	117-81-7	5000	µg/kg	<5000	<5000	0.0
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621066)								
HK1428586-002	Anonymous	**C9 - C16 Fraction**	---	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	---	500	mg/kg	<500	<500	0.0
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621075)								
HK1428480-003	Anonymous	**C6 - C8 Fraction**	---	5	mg/kg	<5	<5	0.0
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3615502)								
HK1428018-002	Anonymous	**Benzene**	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0
		Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0
		Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0
		Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0
		ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0
		meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	0.0
		Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	0.0
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3615502)								
HK1428018-002	Anonymous	**2-Butanone (MEK)**	78-93-3	5	mg/kg	<5	<5	0.0
		2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	0.0
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3615502)								
HK1428018-002	Anonymous	**Tetrachloroethene**	127-18-4	0.04	mg/kg	<0.04	<0.04	0.0
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.0
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.0
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3615502)								
HK1428018-002	Anonymous	**Chloroform**	67-66-3	0.04	mg/kg	<0.04	<0.04	0.0
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.0
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3615502)								
HK1428018-002	Anonymous	**Methyl tert-Butyl Ether (MTBE)**	1634-04-4	0.5	mg/kg	<0.5	<0.5	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits (%) Low	High	RPD (%) Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3626540)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	103	---	92	122	---	---
EG: Metals and Major Cations (QC Lot: 3626873)											
EG036: Mercury	7439-97-6	0.02	mg/kg	<0.02	0.1 mg/kg	95.6	---	76	110	---	---
EG: Metals and Major Cations (QC Lot: 3626881)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	96.9	---	78	104	---	---
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.3	---	75	109	---	---
EG020: Barium	7440-39-3	1	mg/kg	<1	5 mg/kg	87.3	---	79	111	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.1	---	81	109	---	---

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3626881) - Continued											
EG020: Cobalt	7440-48-4	1	mg/kg	<1	5 mg/kg	95.6	---	77	107	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	96.2	---	79	105	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	93.2	---	80	104	---	---
EG020: Manganese	7439-96-5	1	mg/kg	<1	5 mg/kg	103	---	77	115	---	---
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	90.5	---	82	106	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.6	---	79	105	---	---
EG020: Tin	7440-31-5	1	mg/kg	<1	5 mg/kg	94.7	---	79	103	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	111	---	76	114	---	---
EP-066: Polychlorinated Biphenyls (QC Lot: 3621065)											
Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	0.5 mg/kg	104	---	46	133	---	---
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3621068)											
Naphthalene	91-20-3	25	µg/kg	<50	250 µg/kg	79.4	---	63	111	---	---
Acenaphthylene	208-96-8	25	µg/kg	<50	250 µg/kg	80.1	---	63	111	---	---
Acenaphthene	83-32-9	25	µg/kg	<50	250 µg/kg	82.0	---	67	108	---	---
Fluorene	86-73-7	25	µg/kg	<50	250 µg/kg	84.3	---	67	110	---	---
Phenanthrene	85-01-8	25	µg/kg	<50	250 µg/kg	86.2	---	67	108	---	---
Anthracene	120-12-7	25	µg/kg	<50	250 µg/kg	80.5	---	69	113	---	---
Fluoranthene	206-44-0	25	µg/kg	<50	250 µg/kg	87.3	---	71	114	---	---
Pyrene	129-00-0	25	µg/kg	<50	250 µg/kg	88.4	---	71	114	---	---
Benz(a)anthracene	56-55-3	25	µg/kg	<50	250 µg/kg	87.2	---	63	114	---	---
Chrysene	218-01-9	25	µg/kg	<50	250 µg/kg	88.4	---	67	122	---	---
Benzo(b)fluoranthene	205-99-2	25	µg/kg	<50	250 µg/kg	85.1	---	59	114	---	---
Benzo(k)fluoranthene	207-08-9	25	µg/kg	<50	250 µg/kg	88.0	---	64	119	---	---
Benzo(a)pyrene	50-32-8	25	µg/kg	<50	250 µg/kg	83.2	---	58	117	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	25	µg/kg	<50	250 µg/kg	88.4	---	51	115	---	---
Dibenz(a.h)anthracene	53-70-3	25	µg/kg	<50	250 µg/kg	86.4	---	59	114	---	---
Benzo(g.h.i)perylene	191-24-2	25	µg/kg	<50	250 µg/kg	90.1	---	58	120	---	---
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3621068)											
Phenol	108-95-2	25	µg/kg	<500	250 µg/kg	81.9	---	52	118	---	---
Hexachlorobenzene (HCB)	118-74-1	25	µg/kg	<50	250 µg/kg	85.2	---	54	113	---	---
Bis(2-ethylhexyl)phthalate	117-81-7	25	µg/kg	<1000	250 µg/kg	105	---	85	114	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621066)											
C9 - C16 Fraction	---	200	mg/kg	<200	32 mg/kg	77.3	---	55	121	---	---
C17 - C35 Fraction	---	500	mg/kg	<500	67.5 mg/kg	90.1	---	41	110	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621075)											
C6 - C8 Fraction	---	5	mg/kg	<5	4.5 mg/kg	107	---	71	119	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3615502)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	101	---	55	128	---	---
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	108	---	66	119	---	---
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	111	---	66	123	---	---
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.50 mg/kg	113	---	78	122	---	---

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3615502) - Continued											
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	104	----	87	111	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	110	----	72	125	----	----
Xylenes (Total)	----	1.0	mg/kg	<1.0	0.75 mg/kg	112	----	76	122	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3615502)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	92.1	----	81	129	----	----
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	87.1	----	61	133	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3615502)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	109	----	84	131	----	----
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	105	----	82	114	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	105	----	89	110	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3615502)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	98.4	----	77	113	----	----
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	97.7	----	71	125	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3615502)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	96.9	----	68	116	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations (QC Lot: 3626540)										
HK1428018-002	Anonymous	**EG3060: Hexavalent Chromium**	18540-29-9	2.5 mg/kg	110	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 3626873)										
HK1428478-005	Anonymous	**EG036: Mercury**	7439-97-6	0.1 mg/kg	103	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 3626881)										
HK1428555-001	EH1B 0.5M	**EG020: Antimony**	7440-36-0	5 mg/kg	102	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	94.8	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	78.3	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	92.7	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	97.3	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	94.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	92.0	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	98.2	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	88.8	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	95.1	----	75	125	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621066)										
HK1428484-001	Anonymous	**C9 - C16 Fraction**	----	32 mg/kg	73.8	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	99.8	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621075)										
HK1428482-002	Anonymous	**C6 - C8 Fraction**	----	4.5 mg/kg	114	----	50	130	----	----

Surrogate Control Limits

Sub-Matrix: SOIL

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			

Sub-Matrix: SOIL

Compound	CAS Number	Recovery Limits (%) Low	High
EP-074_SR-S: VOC Surrogates - Continued			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: HANNAH CHIU	WORK ORDER	: **HK1428555**
CLIENT	: **CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**		
ADDRESS	: 7/F, EMPIRE CENTRE, 68 MODY ROAD, TSIM SHA TSUI EAST, KOWLOON, HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 1-SEP-2014 : 18-SEP-2014
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	NO. OF SAMPLES CLIENT ORDER	: 2 : J3539

General Comments

- **Sample(s) were picked up from client by ALS Technichem (HK) staff in a chilled condition.**
- **Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.**
- **Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 based on ASTM D3974-09, prior to determination of metals.**
- **Dioxins was subcontracted to and analysed by ALS Czech Republic.**

Signatories

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

WORK ORDER	: HK1428555
SUB-BATCH	: 1
CLIENT	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1428555-001	EH1B 0.5M	SOIL	01-SEP-2014 14:00	PR1449686001
HK1428555-002	EH3B 0.5M	SOIL	01-SEP-2014 14:00	PR1449686002

CERTIFICATE OF ANALYSIS

Work Order	: **PR1449686**	Issue Date	: 16-SEP-2014
Client	: **ALS Technichem (HK) Pty Ltd.**	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Mr. Richard Fung	Contact	: Client Service
Address	: 11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street Kwai Chung Hong Kong	Address	: Na Harfe 336/9 Prague 9 - Vysocany Czech Republic 190 00
E-mail	: richard.fung@alsglobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: +852 26101044	Telephone	: +420 226 226 228
Facsimile	: +852 26102021	Facsimile	: +420 284 081 635
Project	: ----	Page	: 1 of 2
Order number	: ----	Date Samples Received	: 11-SEP-2014
C-O-C number	: ----	Quote number	: PR2011ALSTE-HK0268
Site	: ----	Date of test	: 12-SEP-2014 - 16-SEP-2014
Sampled by	: client	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.
The laboratory declares that the test results relate only to the listed samples.

Responsible for accuracy

Signatories		*Position*
Zdenek Jirak		Environmental Business Unit Manager

Testing Laboratory
Accredited by CAI

Analytical Results

Sub-Matrix: SOIL			Client sample ID	HK1428555-001 EH1B 0.5M		HK1428555-002 EH3B 0.5M		----	
			Laboratory sample ID	PR1449686001		PR1449686002		----	
			Client sampling date / time	01-SEP-2014 14:00		01-SEP-2014 14:00		----	
Parameter	Method	LOR	Unit	Result	MU	Result	MU	----	----
Physical Parameters									
Dry matter @ 105°C	S-DRY-GRCI	0.10	%	93.0	±5.0 %	91.9	±5.0 %	----	----
PCDDs and PCDFs (Dioxins and Furans)									
2378-TCDD	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
12378-PeCDD	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
123478-HxCDD	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
123678-HxCDD	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
123789-HxCDD	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
1234678-HpCDD	S-DFHMS03	-	ng/g DW	0.0260	±30.0 %	n.d.	----	----	----
OCDD	S-DFHMS03	-	ng/g DW	0.710	±30.0 %	0.350	±30.0 %	----	----
2378-TCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
12378-PeCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
23478-PeCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
123478-HxCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
123678-HxCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
123789-HxCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
234678-HxCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
1234678-HpCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
1234789-HpCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
OCDF	S-DFHMS03	-	ng/g DW	n.d.	----	n.d.	----	----	----
TEQ-Lowerbound	S-DFHMS03	-	ng/g DW	0.00097	----	0.00035	----	----	----
TEQ-Upperbound	S-DFHMS03	-	ng/g DW	0.0032	----	0.0031	----	----	----

If the client does not specify the date and time of sample collection, the laboratory will specify the date on sample delivery in parentheses, instead. If the time of sample collection is specified as 0:00 it means that the client did specify the date but not the time. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	Method Descriptions
Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02	
S-DFHMS03	CZ_SOP_D06_06_175 - except chap. 8.2.1.1 B,8.2.1.3 B, 8.2.1.5 B,C,D, 11.2.3.1, 11.2.3.6, 11.2.3.7, 11.2.5 (US EPA1613): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.
S-DRY-GRCI	CZ_SOP_D06_01_045, CZ_SOP_D06_07_046 (CSN ISO 11465, CSN EN 12880) Determination of dry matter by gravimetry and determination of moisture by calculation from measured values.

A '*' symbol preceeding any method indicates non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information.

The calculation methods of summation parameters are available on request in the client service.

ALS Group

Attachment no. 1 to the Certificate of Analysis for work order PR1449686

Sample: HK1428555-001 EH1B 0.5M

Measurement results:

Sample:	HK1428555-001 EH1B 0.5M				
			Final extract [µl]:		75
Sample weight [g]:	6.369		Injection volume [µl]:		4
Dry matter [%]:	93.0		Acquisition date [d.m.y h:m]:		15.9.14 13:24
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.00036	0.00071	1	0
1,2,3,7,8-PeCDD	n.d.	0.00058	0.0012	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	0.0011	0.0022	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0011	0.0022	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0011	0.0022	0.1	0
1,2,3,4,6,7,8-HpCDD	0.026	0.0015	0.003	0.01	0.00026
OCDD	0.71	0.0027	0.0054	0.001	0.00071
2,3,7,8-TCDF	n.d.	0.00046	0.00092	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.00093	0.0019	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.00093	0.0019	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	0.0015	0.003	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.0015	0.003	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.0015	0.003	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.0015	0.003	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.0035	0.007	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.0035	0.007	0.01	0
OCDF	n.d.	0.0032	0.0065	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.00097**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.00097
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.0022
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.0032**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	0.043	Hepta-CDFs	n.d.
OCDD	0.71	OCDF	n.d.
Total PCDDs	**0.75**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

ALS Group

Attachment no. 2 to the Certificate of Analysis for work order PR1449686

Sample: HK1428555-002 EH3B 0.5M

Measurement results:

Sample:	HK1428555-002 EH3B 0.5M				
			Final extract [µl]:		75
Sample weight [g]:	5.376		Injection volume [µl]:		4
Dry matter [%]:	91.9		Acquisition date [d.m.y h:m]:		15.9.14 15:26
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.00067	0.0013	1	0
1,2,3,7,8-PeCDD	n.d.	0.0011	0.0022	0.5	0
1,2,3,4,7.8-HxCDD	n.d.	0.0011	0.0022	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0011	0.0022	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0011	0.0022	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	0.0015	0.0029	0.01	0
OCDD	0.35	0.0026	0.0052	0.001	0.00035
2,3,7,8-TCDF	n.d.	0.00065	0.0013	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.0012	0.0024	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.0012	0.0024	0.5	0
1,2,3,4.7,8-HxCDF	n.d.	0.0011	0.0022	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.0011	0.0022	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.0011	0.0022	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.0011	0.0022	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.0012	0.0024	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.0012	0.0024	0.01	0
OCDF	n.d.	0.0026	0.0052	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.00035**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.00035
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.0028
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.0031**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	n.d.	Hepta-CDFs	n.d.
OCDD	0.35	OCDF	n.d.
Total PCDDs	**0.35**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

HOKLAS 066 TEST

CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 12
Contact	: HANNAH CHIU	Contact	: Fung Lim Chee, Richard	Work Order	: HK1428586
Address	: 7/F, EMPIRE CENTRE, 68 MODY ROAD, TSIM SHA TSUI EAST, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: ----	E-mail	: Richard.Fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	Quote number	: ----	Date Samples Received	: 03-SEP-2014
Order number	: J3539			Issue Date	: 19-SEP-2014
C-O-C number	: H029002			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*	*Authorised results for*
Chan Ka Yu, Karen	Assistant Manager - Organics	Organics
Wong Wing, Kenneth	Manager - Metals	Inorganics

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 17-SEP-2014

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific comments for Work Order: **HK1428586**

Sample(s) were picked up from client by ALS Technichem (HK) staff in a chilled condition.

Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 based on ASTM D3974-09, prior to determination of metals.

Dioxins was subcontracted to and analysed by ALS Czech Republic.

Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Client sample ID: EH1B 3.0M Client sampling date / time: 03-SEP-2014 10:30 HK1428586-001	EH1B 6.0M 03-SEP-2014 14:15 HK1428586-002	EH1B 9.0M 03-SEP-2014 15:20 HK1428586-003
EA/ED: Physical and Aggregate Properties						
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	19.9	13.8	14.8
EG: Metals and Major Cations						
EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	<1
EG020: Arsenic	7440-38-2	1	mg/kg	<1	<1	<1
EG020: Barium	7440-39-3	0.5	mg/kg	25.4	12.4	13.3
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Cobalt	7440-48-4	1	mg/kg	2	<1	1
EG020: Copper	7440-50-8	1	mg/kg	2	4	3
EG020: Lead	7439-92-1	1	mg/kg	20	26	23
EG020: Manganese	7439-96-5	1	mg/kg	895	526	321
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	<1	1
EG020: Nickel	7440-02-0	1	mg/kg	2	2	2
EG020: Tin	7440-31-5	1	mg/kg	2	3	3
EG020: Zinc	7440-66-6	1	mg/kg	24	21	21
EG036: Mercury	7439-97-6	0.2	mg/kg	<0.2	<0.2	<0.2
EG049: Trivalent Chromium	16065-83-1	1	mg/kg	7	5	7
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	<1
EP-066: Polychlorinated Biphenyls						
Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1	<0.1
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.050	mg/kg	<0.050	<0.050	<0.050
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500
Dibenz(a.h)anthracene	53-70-3	0.050	mg/kg	<0.050	<0.050	<0.050
Benzo(g.h.i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	<0.500
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate						
Phenol	108-95-2	0.50	mg/kg	<0.50	<0.50	<0.50

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Client sample ID: EH1B 3.0M Client sampling date / time: 03-SEP-2014 10:30 HK1428586-001	EH1B 6.0M 03-SEP-2014 14:15 HK1428586-002	EH1B 9.0M 03-SEP-2014 15:20 HK1428586-003	
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate - Continued							
Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg	<0.200	<0.200	<0.200	
Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg	<5.00	<5.00	<5.00	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)							
C6 - C8 Fraction	---	5	mg/kg	<5	<5	<5	
C9 - C16 Fraction	---	200	mg/kg	<200	<200	<200	
C17 - C35 Fraction	---	500	mg/kg	<500	<500	<500	
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)							
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	
meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	<1.0	
Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	
Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	<2.0	
EP-074_SR-B: Oxygenated Compounds							
2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	<50	
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	<5	
EP-074_SR-E: Halogenated Aliphatics							
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	<0.5	
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	<0.1	
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	<0.04	
EP-074_SR-G: Trihalomethanes (THM)							
Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	<0.04	
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	<0.1	
EP-074_SR-I: Methyl-tert-butyl Ether							
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	<0.5	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates							Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%	**82.3**	**78.7**	**75.9**	
4-Terphenyl-d14	1718-51-0	0.1	%	**90.7**	**85.0**	**81.9**	
EP-066S: PCB Surrogate							Surrogate control limits listed at end of this report.
Tetrachlorometaxylene	877-09-8	0.1	%	**98.8**	**101**	**76.4**	
Dibutylchlorendate	1770-80-5	0.1	%	**126**	**121**	**102**	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	**96.4**	**95.2**	**98.3**	
Toluene-D8	2037-26-5	0.1	%	**101**	**101**	**102**	
4-Bromofluorobenzene	460-00-4	0.1	%	**103**	**104**	**104**	
EP-074_SR-S: VOC Surrogates							Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	**96.4**	**95.2**	**98.3**	
Toluene-D8	2037-26-5	0.1	%	**101**	**101**	**102**	

Sub-Matrix: SOIL				Client sample ID	EH1B 3.0M	EH1B 6.0M	EH1B 9.0M		
				Client sampling date / time	03-SEP-2014 10:30	03-SEP-2014 14:15	03-SEP-2014 15:20		
Compound	CAS Number	LOR	Unit		HK1428586-001	HK1428586-002	HK1428586-003		
EP-074_SR-S: VOC Surrogates - Continued								Surrogate control limits listed at end of this report.	
4-Bromofluorobenzene	460-00-4	0.1	%		103	104	104		

Laboratory Duplicate (DUP) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3632420)								
HK1428555-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	9.0	9.1	0.0
HK1428803-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	32.6	31.1	4.8
EG: Metals and Major Cations (QC Lot: 3626876)								
HK1428478-015	Anonymous	EG036: Mercury	7439-97-6	0.02	mg/kg	0.04	0.05	0.0
HK1428830-001	Anonymous	EG036: Mercury	7439-97-6	0.2	mg/kg	<0.2	<0.2	0.0
EG: Metals and Major Cations (QC Lot: 3626881)								
HK1428555-002	Anonymous	EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Barium	7440-39-3	0.5	mg/kg	27.7	29.2	5.2
		EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	2	2	0.0
		EG020: Cobalt	7440-48-4	1	mg/kg	4	3	0.0
		EG020: Copper	7440-50-8	1	mg/kg	7	7	0.0
		EG020: Lead	7439-92-1	1	mg/kg	64	62	3.6
		EG020: Manganese	7439-96-5	1	mg/kg	639	538	17.2
		EG020: Molybdenum	7439-98-7	1	mg/kg	2	1	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	1	1	0.0
		EG020: Tin	7440-31-5	1	mg/kg	3	3	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	50	54	8.6
EG: Metals and Major Cations (QC Lot: 3628577)								
HK1428482-003	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
HK1428830-001	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
EP-066: Polychlorinated Biphenyls (QC Lot: 3621065)								
HK1428586-002	EH1B 6.0M	Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3621068)								
HK1428586-002	EH1B 6.0M	Benzo(a)pyrene	50-32-8	50	µg/kg	<50	<50	0.0
		Dibenz(a.h)anthracene	53-70-3	50	µg/kg	<50	<50	0.0
		Naphthalene	91-20-3	500	µg/kg	<500	<500	0.0
		Acenaphthylene	208-96-8	500	µg/kg	<500	<500	0.0
		Acenaphthene	83-32-9	500	µg/kg	<500	<500	0.0
		Fluorene	86-73-7	500	µg/kg	<500	<500	0.0
		Phenanthrene	85-01-8	500	µg/kg	<500	<500	0.0
		Anthracene	120-12-7	500	µg/kg	<500	<500	0.0
		Fluoranthene	206-44-0	500	µg/kg	<500	<500	0.0
		Pyrene	129-00-0	500	µg/kg	<500	<500	0.0
		Benz(a)anthracene	56-55-3	500	µg/kg	<500	<500	0.0
		Chrysene	218-01-9	500	µg/kg	<500	<500	0.0
		Benzo(b)fluoranthene	205-99-2	500	µg/kg	<500	<500	0.0
		Benzo(k)fluoranthene	207-08-9	500	µg/kg	<500	<500	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	500	µg/kg	<500	<500	0.0
		Benzo(g.h.i)perylene	191-24-2	500	µg/kg	<500	<500	0.0
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3621068)								
HK1428586-002	EH1B 6.0M	Hexachlorobenzene (HCB)	118-74-1	200	µg/kg	<200	<200	0.0

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3621068) - Continued								
HK1428586-002	EH1B 6.0M	Phenol	108-95-2	500	µg/kg	<500	<500	0.0
		Bis(2-ethylhexyl)phthalate	117-81-7	5000	µg/kg	<5000	<5000	0.0
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621066)								
HK1428586-002	EH1B 6.0M	C9 - C16 Fraction	---	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	---	500	mg/kg	<500	<500	0.0
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621075)								
HK1428480-003	Anonymous	C6 - C8 Fraction	---	5	mg/kg	<5	<5	0.0
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3615502)								
HK1428018-002	Anonymous	Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0
		Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0
		Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0
		Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0
		ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0
		meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	0.0
		Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	0.0
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3621076)								
HK1428586-002	EH1B 6.0M	Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0
		Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0
		Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0
		Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0
		ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0
		meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	0.0
		Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	0.0
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3615502)								
HK1428018-002	Anonymous	2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0
		2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	0.0
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3621076)								
HK1428586-002	EH1B 6.0M	2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0
		2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	0.0
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3615502)								
HK1428018-002	Anonymous	Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.0
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.0
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.0
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3621076)								
HK1428586-002	EH1B 6.0M	Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.0
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.0
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.0
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3615502)								
HK1428018-002	Anonymous	Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	0.0
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.0
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3621076)								

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3621076) - Continued								
HK1428586-002	EH1B 6.0M	Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	0.0
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.0
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3615502)								
HK1428018-002	Anonymous	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	0.0
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3621076)								
HK1428586-002	EH1B 6.0M	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits (%) Low	High	RPD (%) Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3626876)											
EG036: Mercury	7439-97-6	0.02	mg/kg	<0.02	0.1 mg/kg	90.5	----	76	110	----	----
EG: Metals and Major Cations (QC Lot: 3626881)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	96.9	----	78	104	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.3	----	75	109	----	----
EG020: Barium	7440-39-3	1	mg/kg	<1	5 mg/kg	87.3	----	79	111	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.1	----	81	109	----	----
EG020: Cobalt	7440-48-4	1	mg/kg	<1	5 mg/kg	95.6	----	77	107	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	96.2	----	79	105	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	93.2	----	80	104	----	----
EG020: Manganese	7439-96-5	1	mg/kg	<1	5 mg/kg	103	----	77	115	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	90.5	----	82	106	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.6	----	79	105	----	----
EG020: Tin	7440-31-5	1	mg/kg	<1	5 mg/kg	94.7	----	79	103	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	111	----	76	114	----	----
EG: Metals and Major Cations (QC Lot: 3628577)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	112	----	92	122	----	----
EP-066: Polychlorinated Biphenyls (QC Lot: 3621065)											
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	0.5 mg/kg	104	----	46	133	----	----
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3621068)											
Naphthalene	91-20-3	25	µg/kg	<50	250 µg/kg	79.4	----	63	111	----	----
Acenaphthylene	208-96-8	25	µg/kg	<50	250 µg/kg	80.1	----	63	111	----	----
Acenaphthene	83-32-9	25	µg/kg	<50	250 µg/kg	82.0	----	67	108	----	----
Fluorene	86-73-7	25	µg/kg	<50	250 µg/kg	84.3	----	67	110	----	----
Phenanthrene	85-01-8	25	µg/kg	<50	250 µg/kg	86.2	----	67	108	----	----
Anthracene	120-12-7	25	µg/kg	<50	250 µg/kg	80.5	----	69	113	----	----
Fluoranthene	206-44-0	25	µg/kg	<50	250 µg/kg	87.3	----	71	114	----	----
Pyrene	129-00-0	25	µg/kg	<50	250 µg/kg	88.4	----	71	114	----	----
Benz(a)anthracene	56-55-3	25	µg/kg	<50	250 µg/kg	87.2	----	63	114	----	----
Chrysene	218-01-9	25	µg/kg	<50	250 µg/kg	88.4	----	67	122	----	----
Benzo(b)fluoranthene	205-99-2	25	µg/kg	<50	250 µg/kg	85.1	----	59	114	----	----

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3621068) - Continued											
Benzo(k)fluoranthene	207-08-9	25	µg/kg	<50	250 µg/kg	88.0	----	64	119	----	----
Benzo(a)pyrene	50-32-8	25	µg/kg	<50	250 µg/kg	83.2	----	58	117	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	25	µg/kg	<50	250 µg/kg	88.4	----	51	115	----	----
Dibenz(a.h)anthracene	53-70-3	25	µg/kg	<50	250 µg/kg	86.4	----	59	114	----	----
Benzo(g.h.i)perylene	191-24-2	25	µg/kg	<50	250 µg/kg	90.1	----	58	120	----	----
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3621068)											
Phenol	108-95-2	25	µg/kg	<500	250 µg/kg	81.9	----	52	118	----	----
Hexachlorobenzene (HCB)	118-74-1	25	µg/kg	<50	250 µg/kg	85.2	----	54	113	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	25	µg/kg	<1000	250 µg/kg	105	----	85	114	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621066)											
C9 - C16 Fraction	----	200	mg/kg	<200	32 mg/kg	77.3	----	55	121	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	90.1	----	41	110	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621075)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	107	----	71	119	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3615502)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	101	----	55	128	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	108	----	66	119	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	111	----	66	123	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.50 mg/kg	113	----	78	122	----	----
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	104	----	87	111	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	110	----	72	125	----	----
Xylenes (Total)	----	1.0	mg/kg	<1.0	0.75 mg/kg	112	----	76	122	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3621076)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	103	----	55	128	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	96.1	----	66	119	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	97.5	----	66	123	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.50 mg/kg	103	----	78	122	----	----
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	96.7	----	87	111	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	96.8	----	72	125	----	----
Xylenes (Total)	----	1.0	mg/kg	<1.0	0.75 mg/kg	101	----	76	122	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3615502)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	92.1	----	81	129	----	----
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	87.1	----	61	133	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3621076)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	112	----	81	129	----	----
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	88.8	----	61	133	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3615502)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	109	----	84	131	----	----
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	105	----	82	114	----	----

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3615502) - Continued											
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	105	----	89	110	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3621076)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	104	----	84	131	----	----
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	97.3	----	82	114	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	98.6	----	89	110	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3615502)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	98.4	----	77	113	----	----
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	97.7	----	71	125	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3621076)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	97.1	----	77	113	----	----
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	92.2	----	71	125	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3615502)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	96.9	----	68	116	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3621076)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	90.9	----	68	116	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3626876)										
HK1428478-014	Anonymous	EG036: Mercury	7439-97-6	0.1 mg/kg	98.0	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 3626881)										
HK1428555-001	Anonymous	EG020: Antimony	7440-36-0	5 mg/kg	102	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	94.8	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	78.3	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	92.7	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	97.3	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	94.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	92.0	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	98.2	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	88.8	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	95.1	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 3628577)										
HK1428482-002	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	2.5 mg/kg	111	----	75	125	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621066)										
HK1428484-001	Anonymous	C9 - C16 Fraction	----	32 mg/kg	73.8	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	99.8	----	50	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3621075)										
HK1428482-002	Anonymous	C6 - C8 Fraction	----	4.5 mg/kg	114	----	50	130	----	----

Surrogate Control Limits

Sub-Matrix: SOIL

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			

Sub-Matrix: SOIL

Compound	CAS Number	Recovery Limits (%) Low	High
EP-074_SR-S: VOC Surrogates - Continued			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: HANNAH CHIU	WORK ORDER	: HK1428586
CLIENT	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT		
ADDRESS	: 7/F, EMPIRE CENTRE, 68 MODY ROAD, TSIM SHA TSUI EAST, KOWLOON, HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 3-SEP-2014 : 19-SEP-2014
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	NO. OF SAMPLES CLIENT ORDER	: 3 : J3539

General Comments

- **Sample(s) were picked up from client by ALS Technichem (HK) staff in a chilled condition.**
- **Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.**
- **Soil sample(s) as received, digested by in-house method E-ASTM D3974-09 based on ASTM D3974-09, prior to determination of metals.**
- **Dioxins was subcontracted to and analysed by ALS Czech Republic.**

Signatories

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

WORK ORDER	: HK1428586
SUB-BATCH	: 1
CLIENT	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1428586-001	EH1B 3.0M	SOIL	03-SEP-2014 10:30	PR1449685001
HK1428586-002	EH1B 6.0M	SOIL	03-SEP-2014 14:15	PR1449685002
HK1428586-003	EH1B 9.0M	SOIL	03-SEP-2014 15:20	PR1449685003

CERTIFICATE OF ANALYSIS

Work Order	: **PR1449685**	Issue Date	: 17-SEP-2014
Client	: **ALS Technichem (HK) Pty Ltd.**	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Mr. Richard Fung	Contact	: Client Service
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Project	: ----	Page	: 1 of 2
Order number	: ----	Date Samples Received	: 11-SEP-2014
C-O-C number	: ----	Quote number	: PR2011ALSTE-HK0268
Site	: ----	Date of test	: 12-SEP-2014 - 17-SEP-2014
Sampled by	: client	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.
The laboratory declares that the test results relate only to the listed samples.

Responsible for accuracy

Signatories		*Position*
Zdenek Jirak		Environmental Business Unit Manager

Testing Laboratory Accredited by CAI

L 1163

Analytical Results

Sub-Matrix: SOIL				Client sample ID	HK1428586-001 EH1B 3.0M		HK1428586-002 EH1B 6.0M		HK1428586-003 EH1B 9.0M	
				Laboratory sample ID	PR1449685001		PR1449685002		PR1449685003	
				Client sampling date / time	03-SEP-2014 10:30		03-SEP-2014 14:15		03-SEP-2014 15:20	
Parameter	*Method*	*LOR*	*Unit*		**Result**	**MU**	**Result**	**MU**	**Result**	**MU**
Physical Parameters										
Dry matter @ 105°C	S-DRY-GRCI	0.10	%		**80.4**	±5.0 %	**81.5**	±5.0 %	**78.2**	±5.0 %
PCDDs and PCDFs (Dioxins and Furans)										
2378-TCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
12378-PeCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123478-HxCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123678-HxCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123789-HxCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
1234678-HpCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
OCDD	S-DFHMS03	-	ng/g DW		**0.600**	±30.0 %	**0.660**	±30.0 %	**0.800**	±30.0 %
2378-TCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
12378-PeCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
23478-PeCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123478-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123678-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123789-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
234678-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
1234678-HpCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
1234789-HpCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
OCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
TEQ-Lowerbound	S-DFHMS03	-	ng/g DW		**0.0006**	---	**0.00066**	---	**0.0008**	---
TEQ-Upperbound	S-DFHMS03	-	ng/g DW		**0.0035**	---	**0.0036**	---	**0.0036**	---

If the client does not specify the date and time of sample collection, the laboratory will specify the date on sample delivery in parentheses, instead. If the time of sample collection is specified as 0:00 it means that the client did specify the date but not the time. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.
Key: LOR = Limit of reporting; MU = Measurement Uncertainty

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	*Method Descriptions*
Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02	
S-DFHMS03	CZ_SOP_D06_06_175 - except chap. 8.2.1.1 B,8.2.1.3 B, 8.2.1.5 B,C,D, 11.2.3.1, 11.2.3.6, 11.2.3.7, 11.2.5 (US EPA1613): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.
S-DRY-GRCI	CZ_SOP_D06_01_045, CZ_SOP_D06_07_046 (CSN ISO 11465, CSN EN 12880) Determination of dry matter by gravimetry and determination of moisture by calculation from measured values.

A '*' symbol preceeding any method indicates non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information.
The calculation methods of summation parameters are available on request in the client service.

Attachment no. 1 to the Certificate of Analysis for work order PR1449685

Sample: HK1428586-001 EH1B 3.0M

Measurement results:

Sample:	HK1428586-001 EH1B 3.0M				
			Final extract [µl]:		75
Sample weight [g]:	11.87		Injection volume [µl]:		4
Dry matter [%]:	80.4		Acquisition date [d.m.y h:m]:		15.9.14 16:29
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.0005	0.001	1	0
1,2,3,7,8-PeCDD	n.d.	0.00086	0.0017	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	0.0017	0.0033	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0017	0.0033	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0017	0.0033	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	0.016	0.032	0.01	0
OCDD	0.6	0.0079	0.016	0.001	0.0006
2,3,7,8-TCDF	n.d.	0.00047	0.00094	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.00084	0.0017	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.00084	0.0017	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	0.0018	0.0036	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.0018	0.0036	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.0018	0.0036	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.0018	0.0036	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.0028	0.0056	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.0028	0.0056	0.01	0
OCDF	n.d.	0.0063	0.013	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.0006**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.0006
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.0029
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.0035**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	< 0.032	Hepta-CDFs	n.d.
OCDD	0.6	OCDF	n.d.
Total PCDDs	**0.6**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

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Attachment no. 2 to the Certificate of Analysis for work order PR1449685

Sample: HK1428586-002 EH1B 6.0M

Measurement results:

Sample:	HK1428586-002 EH1B 6.0M				
			Final extract [µl]:		75
Sample weight [g]:	10.78		Injection volume [µl]:		4
Dry matter [%]:	81.5		Acquisition date [d.m.y h:m]:		15.9.14 17:31
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.00056	0.0011	1	0
1,2,3,7,8-PeCDD	n.d.	0.00098	0.002	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	0.0017	0.0033	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0017	0.0033	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0017	0.0033	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	0.0056	0.011	0.01	0
OCDD	0.66	0.01	0.021	0.001	0.00066
2,3,7,8-TCDF	n.d.	0.00041	0.00083	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.00092	0.0018	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.00092	0.0018	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	0.0019	0.0038	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.0019	0.0038	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.0019	0.0038	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.0019	0.0038	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.0034	0.0068	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.0034	0.0068	0.01	0
OCDF	n.d.	0.0083	0.017	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.00066**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.00066
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.003
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.0036**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	< 0.00083
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	n.d.	Hepta-CDFs	n.d.
OCDD	0.66	OCDF	n.d.
Total PCDDs	**0.66**	**Total PCDFs**	**< 0.00083**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

Attachment no. 3 to the Certificate of Analysis for work order PR1449685

Sample: HK1428586-003 EH1B 9.0M

Measurement results:

Sample:	HK1428586-003 EH1B 9.0M				
			Final extract [µl]:		75
Sample weight [g]:	11.61		Injection volume [µl]:		4
Dry matter [%]:	78.2		Acquisition date [d.m.y h:m]:		15.9.14 18:34
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.00046	0.00092	1	0
1,2,3,7,8-PeCDD	n.d.	0.00094	0.0019	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	0.0018	0.0036	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0018	0.0036	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0018	0.0036	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	0.01	0.021	0.01	0
OCDD	0.8	0.0063	0.013	0.001	0.0008
2,3,7,8-TCDF	n.d.	0.0005	0.001	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.00071	0.0014	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.00071	0.0014	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	0.0019	0.0037	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.0019	0.0037	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.0019	0.0037	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.0019	0.0037	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.0024	0.0048	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.0024	0.0048	0.01	0
OCDF	n.d.	0.005	0.01	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.0008**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.0008
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.0028
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.0036**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	< 0.021	Hepta-CDFs	n.d.
OCDD	0.8	OCDF	n.d.
Total PCDDs	**0.8**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

HOKLAS 066 TEST

CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 14
Contact	: HANNAH CHIU	Contact	: Fung Lim Chee, Richard	Work Order	: HK1429117
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Telephone	: ----	Telephone	: +852 2610 1044		
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Project	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	Quote number	: ----	Date Samples Received	: 08-SEP-2014
Order number	: J3539			Issue Date	: 23-SEP-2014
C-O-C number	: H029004			No. of samples received	: 4
Site	: ----			No. of samples analysed	: 4

Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*	*Authorised results for*
Chan Ka Yu, Karen	Assistant Manager - Organics	Organics
Wong Wing, Kenneth	Manager - Metals	Inorganics

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 22-SEP-2014

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific comments for Work Order: **HK1429117**

Sample(s) were received in a chilled condition.

Water sample(s) analysed and reported on an as received basis.

Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 based on ASTM D3974-09, prior to determination of metals.

Dioxins was subcontracted to and analysed by ALS Czech Republic.

Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Client sample ID: EH3B 3.0M Client sampling date / time: 08-SEP-2014 09:00 HK1429117-001	EH3B 6.0M 08-SEP-2014 10:30 HK1429117-002	EH3B 9.0M 08-SEP-2014 12:00 HK1429117-003
EA/ED: Physical and Aggregate Properties						
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	18.7	19.5	20.2
EG: Metals and Major Cations						
EG020: Antimony	7440-36-0	1	mg/kg	1	<1	<1
EG020: Arsenic	7440-38-2	1	mg/kg	6	1	2
EG020: Barium	7440-39-3	0.5	mg/kg	15.0	21.6	13.9
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Cobalt	7440-48-4	1	mg/kg	6	3	2
EG020: Copper	7440-50-8	1	mg/kg	49	4	3
EG020: Lead	7439-92-1	1	mg/kg	39	88	48
EG020: Manganese	7439-96-5	1	mg/kg	355	487	261
EG020: Molybdenum	7439-98-7	1	mg/kg	3	14	<1
EG020: Nickel	7440-02-0	1	mg/kg	18	2	2
EG020: Tin	7440-31-5	1	mg/kg	6	3	2
EG020: Zinc	7440-66-6	1	mg/kg	20	22	21
EG036: Mercury	7439-97-6	0.2	mg/kg	<0.2	<0.2	<0.2
EG049: Trivalent Chromium	16065-83-1	1	mg/kg	38	3	3
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	<1
EP-066: Polychlorinated Biphenyls						
Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1	<0.1
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.050	mg/kg	<0.050	<0.050	<0.050
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500
Dibenz(a.h)anthracene	53-70-3	0.050	mg/kg	<0.050	<0.050	<0.050
Benzo(g.h.i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	<0.500
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate						
Phenol	108-95-2	0.50	mg/kg	<0.50	<0.50	<0.50

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: EH3B 3.0M Client sampling date / time: 08-SEP-2014 09:00 HK1429117-001	EH3B 6.0M 08-SEP-2014 10:30 HK1429117-002	EH3B 9.0M 08-SEP-2014 12:00 HK1429117-003	
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate - Continued							
Hexachlorobenzene (HCB)	118-74-1	0.200	mg/kg	<0.200	<0.200	<0.200	
Bis(2-ethylhexyl)phthalate	117-81-7	5.00	mg/kg	<5.00	<5.00	<5.00	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)							
C6 - C8 Fraction	---	5	mg/kg	<5	<5	<5	
C9 - C16 Fraction	---	200	mg/kg	<200	<200	<200	
C17 - C35 Fraction	---	500	mg/kg	<500	<500	<500	
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)							
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	
meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	<1.0	
Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	
Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	<2.0	
EP-074_SR-B: Oxygenated Compounds							
2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	<50	
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	<5	
EP-074_SR-E: Halogenated Aliphatics							
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	<0.5	
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	<0.1	
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	<0.04	
EP-074_SR-G: Trihalomethanes (THM)							
Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	<0.04	
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	<0.1	
EP-074_SR-I: Methyl-tert-butyl Ether							
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	<0.5	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates							Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%	**71.0**	**78.6**	**80.4**	
4-Terphenyl-d14	1718-51-0	0.1	%	**77.4**	**83.3**	**84.2**	
EP-066S: PCB Surrogate							Surrogate control limits listed at end of this report.
Tetrachlorometaxylene	877-09-8	0.1	%	**81.6**	**70.2**	**86.0**	
Dibutylchlorendate	1770-80-5	0.1	%	**111**	**98.4**	**116**	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	**96.0**	**94.3**	**94.8**	
Toluene-D8	2037-26-5	0.1	%	**104**	**104**	**104**	
4-Bromofluorobenzene	460-00-4	0.1	%	**100**	**100**	**101**	
EP-074_SR-S: VOC Surrogates							Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	**96.0**	**94.3**	**94.8**	
Toluene-D8	2037-26-5	0.1	%	**104**	**104**	**104**	

Sub-Matrix: SOIL				Client sample ID	EH3B 3.0M	EH3B 6.0M	EH3B 9.0M		
				Client sampling date / time	08-SEP-2014 09:00	08-SEP-2014 10:30	08-SEP-2014 12:00		
Compound	CAS Number	LOR	Unit		HK1429117-001	HK1429117-002	HK1429117-003		
EP-074_SR-S: VOC Surrogates - Continued									Surrogate control limits listed at end of this report.
4-Bromofluorobenzene	460-00-4	0.1	%		100	100	101		

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: EH3B Client sampling date / time: 08-SEP-2014 14:30 HK1429117-004
EG: Metals and Major Cations - Filtered				
EG036: Mercury	7439-97-6	0.5	µg/L	<0.5
EP-066: Polychlorinated Biphenyls				
Total Polychlorinated biphenyls	---	1	µg/L	<1
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)				
Naphthalene	91-20-3	2.0	µg/L	<2.0
Acenaphthylene	208-96-8	2.0	µg/L	<2.0
Acenaphthene	83-32-9	2.0	µg/L	<2.0
Fluorene	86-73-7	2.0	µg/L	<2.0
Phenanthrene	85-01-8	2.0	µg/L	<2.0
Anthracene	120-12-7	2.0	µg/L	<2.0
Fluoranthene	206-44-0	2.0	µg/L	<2.0
Pyrene	129-00-0	2.0	µg/L	<2.0
Chrysene	218-01-9	1.0	µg/L	<1.0
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate				
Hexachlorobenzene (HCB)	118-74-1	1.0	µg/L	<1.0
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)				
C6 - C8 Fraction	---	20	µg/L	<20
C9 - C16 Fraction	---	500	µg/L	<500
C17 - C35 Fraction	---	500	µg/L	<500
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)				
Benzene	71-43-2	5.0	µg/L	<5.0
Toluene	108-88-3	5.0	µg/L	<5.0
Ethylbenzene	100-41-4	5.0	µg/L	<5.0
meta- & para-Xylene	108-38-3 106-42-3	10	µg/L	<10
Styrene	100-42-5	5.0	µg/L	<5.0
ortho-Xylene	95-47-6	5.0	µg/L	<5.0
Xylenes (Total)	---	20	µg/L	<20
EP-074_SR-B: Oxygenated Compounds				
2-Propanone (Acetone)	67-64-1	500	µg/L	<500
2-Butanone (MEK)	78-93-3	50	µg/L	<50
EP-074_SR-E: Halogenated Aliphatics				
Methylene chloride	75-09-2	50	µg/L	<50
Trichloroethene	79-01-6	5.0	µg/L	<5.0
Tetrachloroethene	127-18-4	5.0	µg/L	<5.0
EP-074_SR-G: Trihalomethanes (THM)				
Chloroform	67-66-3	5.0	µg/L	**24.4**
Bromodichloromethane	75-27-4	5.0	µg/L	**7.5**
EP-074_SR-I: Methyl-tert-butyl Ether				

Sub-Matrix: WATER				Client sample ID	EH3B			
				Client sampling date / time	08-SEP-2014 14:30			
Compound	CAS Number	LOR	Unit		HK1429117-004			
EP-074_SR-I: Methyl-tert-butyl Ether - Continued								
Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L		<5.0			
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates								Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%		104			
4-Terphenyl-d14	1718-51-0	0.1	%		110			
EP-066S: PCB Surrogate								Surrogate control limits listed at end of this report.
Tetrachlorometaxylene	877-09-8	0.1	%		80.4			
Dibutylchlorendate	1770-80-5	0.1	%		123			
EP-080_SRS: TPH(Volatile)/BTEX Surrogate								Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%		108			
Toluene-D8	2037-26-5	0.1	%		104			
4-Bromofluorobenzene	460-00-4	0.1	%		101			
EP-074_SR-S: VOC Surrogates								Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%		108			
Toluene-D8	2037-26-5	0.1	%		104			
4-Bromofluorobenzene	460-00-4	0.1	%		101			

Laboratory Duplicate (DUP) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3632421)								
HK1428850-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	13.9	13.5	2.9
HK1428954-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	45.4	45.9	1.1
EG: Metals and Major Cations (QC Lot: 3632375)								
HK1428830-001	Anonymous	EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	3	2	0.0
		EG020: Barium	7440-39-3	1	mg/kg	14	12	8.1
		EG020: Cobalt	7440-48-4	1	mg/kg	3	3	0.0
		EG020: Copper	7440-50-8	1	mg/kg	14	12	16.8
		EG020: Lead	7439-92-1	1	mg/kg	11	10	15.4
		EG020: Manganese	7439-96-5	1	mg/kg	302	316	4.7
		EG020: Molybdenum	7439-98-7	1	mg/kg	1	<1	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	6	5	0.0
		EG020: Tin	7440-31-5	1	mg/kg	2	1	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	27	24	13.7
HK1429150-002	Anonymous	EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Antimony	7440-36-0	1	mg/kg	<1	<1	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	2	2	0.0
		EG020: Barium	7440-39-3	1	mg/kg	5	6	17.3
		EG020: Cobalt	7440-48-4	1	mg/kg	2	2	0.0
		EG020: Copper	7440-50-8	1	mg/kg	5	4	0.0
		EG020: Lead	7439-92-1	1	mg/kg	6	6	0.0
		EG020: Manganese	7439-96-5	1	mg/kg	142	134	6.1
		EG020: Molybdenum	7439-98-7	1	mg/kg	<1	<1	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	3	3	0.0
		EG020: Tin	7440-31-5	1	mg/kg	<1	<1	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	179	166	7.7
EG: Metals and Major Cations (QC Lot: 3638979)								
HK1429117-002	EH3B 6.0M	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
HK1429619-001	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
EP-066: Polychlorinated Biphenyls (QC Lot: 3621065)								
HK1428586-002	Anonymous	Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3628453)								
HK1428930-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3628453) - Continued								
HK1428930-001	Anonymous	Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3628453)								
HK1428930-001	Anonymous	Bis(2-ethylhexyl)phthalate	117-81-7	1000	µg/kg	<1000	<1000	0.0
		Hexachlorobenzene (HCB)	118-74-1	50	µg/kg	<50	<50	0.0
		Phenol	108-95-2	500	µg/kg	<500	<500	0.0
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3629316)								
HK1429138-006	Anonymous	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.0
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3629317)								
HK1429138-006	Anonymous	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.0
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3621076)								
HK1428586-002	Anonymous	Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0
		Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0
		Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0
		Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0
		ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0
		meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	0.0
		Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	0.0
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3621076)								
HK1428586-002	Anonymous	2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0
		2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	0.0
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3621076)								
HK1428586-002	Anonymous	Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.0
		Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.0
		Methylene chloride	75-09-2	0.5	mg/kg	<0.5	<0.5	0.0
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3621076)								
HK1428586-002	Anonymous	Chloroform	67-66-3	0.04	mg/kg	<0.04	<0.04	0.0
		Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	<0.1	0.0
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3621076)								
HK1428586-002	Anonymous	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits (%) Low	High	RPD (%) Value	Control Limit

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3632375)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	88.1	----	78	104	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	92.5	----	75	109	----	----
EG020: Barium	7440-39-3	1	mg/kg	<1	5 mg/kg	87.9	----	79	111	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	87.5	----	81	109	----	----
EG020: Cobalt	7440-48-4	1	mg/kg	<1	5 mg/kg	89.1	----	77	107	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	88.3	----	79	105	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	87.9	----	80	104	----	----
EG020: Manganese	7439-96-5	1	mg/kg	<1	5 mg/kg	82.3	----	77	115	----	----
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	87.7	----	82	106	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	88.0	----	79	105	----	----
EG020: Tin	7440-31-5	1	mg/kg	<1	5 mg/kg	88.2	----	79	103	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	104	----	76	114	----	----
EG: Metals and Major Cations (QC Lot: 3632467)											
EG036: Mercury	7439-97-6	0.02	mg/kg	<0.02	0.1 mg/kg	97.5	----	76	110	----	----
EG: Metals and Major Cations (QC Lot: 3638979)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	102	----	92	122	----	----
EP-066: Polychlorinated Biphenyls (QC Lot: 3621065)											
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	0.5 mg/kg	104	----	46	133	----	----
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3628453)											
Naphthalene	91-20-3	25	µg/kg	<50	250 µg/kg	84.7	----	63	111	----	----
Acenaphthylene	208-96-8	25	µg/kg	<50	250 µg/kg	90.9	----	63	111	----	----
Acenaphthene	83-32-9	25	µg/kg	<50	250 µg/kg	85.4	----	67	108	----	----
Fluorene	86-73-7	25	µg/kg	<50	250 µg/kg	89.4	----	67	110	----	----
Phenanthrene	85-01-8	25	µg/kg	<50	250 µg/kg	89.8	----	67	108	----	----
Anthracene	120-12-7	25	µg/kg	<50	250 µg/kg	91.7	----	69	113	----	----
Fluoranthene	206-44-0	25	µg/kg	<50	250 µg/kg	92.3	----	71	114	----	----
Pyrene	129-00-0	25	µg/kg	<50	250 µg/kg	91.5	----	71	114	----	----
Benz(a)anthracene	56-55-3	25	µg/kg	<50	250 µg/kg	98.7	----	63	114	----	----
Chrysene	218-01-9	25	µg/kg	<50	250 µg/kg	94.4	----	67	122	----	----
Benzo(b)fluoranthene	205-99-2	25	µg/kg	<50	250 µg/kg	102	----	59	114	----	----
Benzo(k)fluoranthene	207-08-9	25	µg/kg	<50	250 µg/kg	91.3	----	64	119	----	----
Benzo(a)pyrene	50-32-8	25	µg/kg	<50	250 µg/kg	93.8	----	58	117	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	25	µg/kg	<50	250 µg/kg	97.5	----	51	115	----	----
Dibenz(a.h)anthracene	53-70-3	25	µg/kg	<50	250 µg/kg	92.4	----	59	114	----	----
Benzo(g.h.i)perylene	191-24-2	25	µg/kg	<50	250 µg/kg	95.8	----	58	120	----	----
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3628453)											
Phenol	108-95-2	25	µg/kg	<500	250 µg/kg	78.7	----	52	118	----	----
Hexachlorobenzene (HCB)	118-74-1	25	µg/kg	<50	250 µg/kg	83.6	----	54	113	----	----
Bis(2-ethylhexyl)phthalate	117-81-7	25	µg/kg	<1000	250 µg/kg	107	----	85	114	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3629316)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	116	----	71	119	----	----

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits (%) Low	High	RPD (%) Value	Control Limit
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3629317)											
C9 - C16 Fraction	---	200	mg/kg	<200	32 mg/kg	77.9	---	55	121	---	---
C17 - C35 Fraction	---	500	mg/kg	<500	67.5 mg/kg	83.0	---	41	110	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3621076)											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	103	---	55	128	---	---
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	96.1	---	66	119	---	---
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	97.5	---	66	123	---	---
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.50 mg/kg	103	---	78	122	---	---
Styrene	100-42-5	0.2	mg/kg	<0.2	0.25 mg/kg	96.7	---	87	111	---	---
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	96.8	---	72	125	---	---
Xylenes (Total)	---	1.0	mg/kg	<1.0	0.75 mg/kg	101	---	76	122	---	---
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3621076)											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	112	---	81	129	---	---
2-Butanone (MEK)	78-93-3	2	mg/kg	<2	2.5 mg/kg	88.8	---	61	133	---	---
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3621076)											
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	0.25 mg/kg	104	---	84	131	---	---
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	97.3	---	82	114	---	---
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.25 mg/kg	98.6	---	89	110	---	---
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3621076)											
Chloroform	67-66-3	0.04	mg/kg	<0.04	0.25 mg/kg	97.1	---	77	113	---	---
Bromodichloromethane	75-27-4	0.1	mg/kg	<0.1	0.25 mg/kg	92.2	---	71	125	---	---
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3621076)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	90.9	---	68	116	---	---

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits (%) Low	High	RPD (%) Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 3631639)											
EG036: Mercury	7439-97-6	0.05	µg/L	<0.05	2 µg/L	102	---	77	117	---	---
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 3629313)											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	57.4	---	50	98	---	---
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	60.0	---	47	97	---	---
Acenaphthene	83-32-9	0.2	µg/L	<0.2	0.5 µg/L	54.6	---	49	93	---	---
Fluorene	86-73-7	0.2	µg/L	<0.2	0.5 µg/L	57.9	---	52	92	---	---
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	62.5	---	51	91	---	---
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	64.3	---	48	95	---	---
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	76.0	---	68	109	---	---
Pyrene	129-00-0	0.2	µg/L	<0.2	0.5 µg/L	76.4	---	69	111	---	---
Chrysene	218-01-9	0.2	µg/L	<0.2	0.5 µg/L	84.3	---	50	124	---	---
Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	0.5 µg/L	92.6	---	54	124	---	---
EP-066: Polychlorinated Biphenyls (QC Lot: 3626644)											

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-066: Polychlorinated Biphenyls (QC Lot: 3626644) - Continued											
Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	94.2	----	35	123	----	----
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3629313)											
Hexachlorobenzene (HCB)	118-74-1	5	µg/L	<5.0	0.5 µg/L	54.8	----	51	96	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3626646)											
C9 - C16 Fraction	----	0.5	mg/L	<0.5	0.21 mg/L	74.7	----	12	119	----	----
C17 - C35 Fraction	----	0.5	mg/L	<0.5	0.45 mg/L	100	----	3	116	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3633066)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	107	----	62	131	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3633062)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	110	----	59	125	----	----
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	105	----	64	121	----	----
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	104	----	69	120	----	----
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	112	----	76	119	----	----
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	106	----	80	116	----	----
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	107	----	72	122	----	----
Xylenes (Total)	----	2	µg/L	<2	6 µg/L	110	----	75	120	----	----
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3633062)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	106	----	81	130	----	----
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	99.9	----	63	127	----	----
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3633062)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	110	----	80	126	----	----
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	102	----	77	114	----	----
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	103	----	82	113	----	----
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3633062)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	109	----	72	118	----	----
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	95.8	----	74	115	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3633062)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	97.5	----	64	119	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3632375)										
HK1429145-001	Anonymous	EG020: Antimony	7440-36-0	5 mg/kg	91.3	---	75	125	---	---
		EG020: Arsenic	7440-38-2	5 mg/kg	99.6	---	75	125	---	---
		EG020: Barium	7440-39-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	98.0	---	75	125	---	---
		EG020: Cobalt	7440-48-4	5 mg/kg	109	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Molybdenum	7439-98-7	5 mg/kg	104	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	108	---	75	125	---	---
		EG020: Tin	7440-31-5	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---
EG: Metals and Major Cations (QC Lot: 3632467)										
HK1429117-001	EH3B 3.0M	EG036: Mercury	7439-97-6	0.1 mg/kg	117	---	75	125	---	---
EG: Metals and Major Cations (QC Lot: 3638979)										
HK1429117-001	EH3B 3.0M	EG3060: Hexavalent Chromium	18540-29-9	2.5 mg/kg	100	---	75	125	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3629316)										
HK1429150-002	Anonymous	C6 - C8 Fraction	---	4.5 mg/kg	123	---	50	130	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3629317)										
HK1429150-002	Anonymous	C9 - C16 Fraction	---	32 mg/kg	50.2	---	50	130	---	---
		C17 - C35 Fraction	---	67.5 mg/kg	55.1	---	50	130	---	---

Surrogate Control Limits

Sub-Matrix: SOIL

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120

Sub-Matrix: SOIL

Compound	CAS Number	Recovery Limits (%) Low	High
EP-080_SRS: TPH(Volatile)/BTEX Surrogate - Continued			
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: WATER

Compound	CAS Number	Recovery Limits (%) Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: HANNAH CHIU	WORK ORDER	: HK1429117
CLIENT	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT		
ADDRESS	: 7/F, EMPIRE CENTRE, 68 MODY ROAD, TSIM SHA TSUI EAST, KOWLOON, HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 8-SEP-2014 : 23-SEP-2014
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	NO. OF SAMPLES CLIENT ORDER	: 4 : J3539

General Comments

- **Sample(s) were received in a chilled condition.**
- **Water sample(s) analysed and reported on an as received basis.**
- **Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.**
- **Water sample(s) were filtered prior to dissolved metal analysis.**
- **Soil sample(s) as received, digested by In-house method E-ASTM D3974-09 based on ASTM D3974-09, prior to determination of metals.**
- **Dioxins was subcontracted to and analysed by ALS Czech Republic.**

Signatories

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Trading Name: ALS Technichem (HK) Pty Ltd
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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com
A Campbell Brothers Limited Company

WORK ORDER	: HK1429117
SUB-BATCH	: 1
CLIENT	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1429117-001	EH3B 3.0M	SOIL	08-SEP-2014 09:00	PR1449687001
HK1429117-002	EH3B 6.0M	SOIL	08-SEP-2014 10:30	PR1449687002
HK1429117-003	EH3B 9.0M	SOIL	08-SEP-2014 12:00	PR1449687003
HK1429117-004	EH3B	WATER	08-SEP-2014 14:30	PR1449687004

CERTIFICATE OF ANALYSIS

Work Order	: **PR1449687**	Issue Date	: 22-SEP-2014
Client	: **ALS Technichem (HK) Pty Ltd.**	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Mr. Richard Fung	Contact	: Client Service
Address	: 11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street Kwai Chung Hong Kong	Address	: Na Harfe 336/9 Prague 9 - Vysocany Czech Republic 190 00
E-mail	: richard.fung@alsglobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: +852 26101044	Telephone	: +420 226 226 228
Facsimile	: +852 26102021	Facsimile	: +420 284 081 635
Project	: ----	Page	: 1 of 3
Order number	: ----	Date Samples Received	: 11-SEP-2014
C-O-C number	: ----	Quote number	: PR2011ALSTE-HK0268
Site	: ----	Date of test	: 12-SEP-2014 - 22-SEP-2014
Sampled by	: client	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.
The laboratory declares that the test results relate only to the listed samples.

Responsible for accuracy

Signatories		*Position*
Zdenek Jirak		Environmental Business Unit Manager

Testing Laboratory Accredited by CAI

L 1163

Analytical Results

Sub-Matrix: **SOIL**

				Client sample ID	HK1429117-001 EH3B 3.0M		HK1429117-002 EH3B 6.0M		HK1429117-003 EH3B 9.0M	
				Laboratory sample ID	PR1449687001		PR1449687002		PR1449687003	
				Client sampling date / time	08-SEP-2014 09:00		08-SEP-2014 10:30		08-SEP-2014 12:00	
Parameter	*Method*	*LOR*	*Unit*		**Result**	**MU**	**Result**	**MU**	**Result**	**MU**
Physical Parameters										
Dry matter @ 105°C	S-DRY-GRC	0.10	%		**74.5**	±5.0 %	**72.1**	±5.0 %	**75.8**	±5.0 %
PCDDs and PCDFs (Dioxins and Furans)										
2378-TCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
12378-PeCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123478-HxCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123678-HxCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123789-HxCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
1234678-HpCDD	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
OCDD	S-DFHMS03	-	ng/g DW		**1.00**	±30.0 %	**1.30**	±30.0 %	**0.790**	±30.0 %
2378-TCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
12378-PeCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
23478-PeCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123478-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123678-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
123789-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
234678-HxCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
1234678-HpCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
1234789-HpCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
OCDF	S-DFHMS03	-	ng/g DW		**n.d.**	---	**n.d.**	---	**n.d.**	---
TEQ-Lowerbound	S-DFHMS03	-	ng/g DW		**0.001**	---	**0.0013**	---	**0.00079**	---
TEQ-Upperbound	S-DFHMS03	-	ng/g DW		**0.0039**	---	**0.004**	---	**0.0035**	---

Sub-Matrix: **WATER**

				Client sample ID	HK1429117-004 EH3B		---		---	
				Laboratory sample ID	PR1449687004		---		---	
				Client sampling date / time	08-SEP-2014 14:30		---		---	
Parameter	*Method*	*LOR*	*Unit*		**Result**	**MU**	---	---	---	---
PCDDs and PCDFs (Dioxins and Furans)										
2378-TCDD	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
12378-PeCDD	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
123478-HxCDD	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
123678-HxCDD	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
123789-HxCDD	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
1234678-HpCDD	W-DFHMS01	-	pg/L		**35.0**	±30.0 %	---	---	---	---
OCDD	W-DFHMS01	-	pg/L		**2600**	±30.0 %	---	---	---	---
2378-TCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
12378-PeCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
23478-PeCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
123478-HxCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
123678-HxCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
123789-HxCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
234678-HxCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
1234678-HpCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
1234789-HpCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
OCDF	W-DFHMS01	-	pg/L		**n.d.**	---	---	---	---	---
TEQ-Lowerbound	W-DFHMS01	-	pg/L		**3**	---	---	---	---	---
TEQ-Upperbound	W-DFHMS01	-	pg/L		**5.9**	---	---	---	---	---

If the client does not specify the date and time of sample collection, the laboratory will specify the date on sample delivery in parentheses, instead. If the

time of sample collection is specified as 0:00 it means that the client did specify the date but not the time. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	*Method Descriptions*
Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02	
S-DFHMS03	CZ_SOP_D06_06_175 - except chap. 8.2.1.1 B,8.2.1.3 B, 8.2.1.5 B,C,D, 11.2.3.1, 11.2.3.6, 11.2.3.7, 11.2.5 (US EPA1613): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.
S-DRY-GRCI	CZ_SOP_D06_01_045, CZ_SOP_D06_07_046 (CSN ISO 11465, CSN EN 12880) Determination of dry matter by gravimetry and determination of moisture by calculation from measured values.
W-DFHMS01	CZ_SOP_D06_06_175 - except chap. 8.2.1.1 B, 8.2.1.3 B, 8.2.1.5 B,C,D, 11.2.3.2- 11.2.3.7, 11.2.4, 11.2.5 (US EPA 1613): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.

A '*' symbol preceeding any method indicates non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information.

The calculation methods of summation parameters are available on request in the client service.

ALS Group

Attachment no. 1 to the Certificate of Analysis for work order PR1449687

Sample: HK1429117-001 EH3B 3.0M

Measurement results:

Sample:	HK1429117-001 EH3B 3.0M				
			Final extract [µl]:		75
Sample weight [g]:	12.31		Injection volume [µl]:		4
Dry matter [%]:	74.5		Acquisition date [d.m.y h:m]:		16.9.14 3:15
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.00056	0.0011	1	0
1,2,3,7,8-PeCDD	n.d.	0.00075	0.0015	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	0.0017	0.0034	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0017	0.0034	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0017	0.0034	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	0.006	0.012	0.01	0
OCDD	1	0.0097	0.019	0.001	0.001
2,3,7,8-TCDF	n.d.	0.0004	0.0008	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.0008	0.0016	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.0008	0.0016	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	0.002	0.0041	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.002	0.0041	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.002	0.0041	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.002	0.0041	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.0042	0.0084	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.0042	0.0084	0.01	0
OCDF	n.d.	0.0077	0.015	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.001**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.001
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.0029
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.0039**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	n.d.	Hepta-CDFs	n.d.
OCDD	1	OCDF	n.d.
Total PCDDs	**1**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

ALS Group

Attachment no. 2 to the Certificate of Analysis for work order PR1449687

Sample: HK1429117-002 EH3B 6.0M

Measurement results:

Sample:	HK1429117-002 EH3B 6.0M				
			Final extract [µl]:		75
Sample weight [g]:	7.542		Injection volume [µl]:		4
Dry matter [%]:	72.1		Acquisition date [d.m.y h:m]:		16.9.14 4:18
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.0004	0.00081	1	0
1,2,3,7,8-PeCDD	n.d.	0.00073	0.0015	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	0.0013	0.0027	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0013	0.0027	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0013	0.0027	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	0.015	0.029	0.01	0
OCDD	1.3	0.022	0.045	0.001	0.0013
2,3,7,8-TCDF	n.d.	0.0004	0.0008	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.00075	0.0015	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.00075	0.0015	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	0.0017	0.0034	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.0017	0.0034	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.0017	0.0034	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.0017	0.0034	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.012	0.023	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.012	0.023	0.01	0
OCDF	n.d.	0.018	0.036	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.0013**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.0013
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.0027
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.004**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	0.064	Hepta-CDFs	n.d.
OCDD	1.3	OCDF	n.d.
Total PCDDs	**1.4**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

Attachment no. 3 to the Certificate of Analysis for work order PR1449687

Sample: HK1429117-003 EH3B 9.0M

Measurement results:

HK1429117-003 EH3B 9.0M					
			Final extract [µl]:		75
Sample weight [g]:		14.20	Injection volume [µl]:		4
Dry matter [%]:		75.8	Acquisition date [d.m.y h:m]:		16.9.14 16:00
2,3,7,8-PCDD/Fs	Content [ng/g dw]	Limit of Detection [ng/g dw]	Limit of Quantification [ng/g dw]	[1]I-TEFs	I-TEQ [ng/g dw]
2,3,7,8-TCDD	n.d.	0.00047	0.00095	1	0
1,2,3,7,8-PeCDD	n.d.	0.00078	0.0016	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	0.0015	0.0031	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	0.0015	0.0031	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	0.0015	0.0031	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	0.0062	0.012	0.01	0
OCDD	0.79	0.011	0.022	0.001	0.00079
2,3,7,8-TCDF	n.d.	0.0005	0.001	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.00065	0.0013	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.00065	0.0013	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	0.0021	0.0041	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	0.0021	0.0041	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	0.0021	0.0041	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	0.0021	0.0041	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	0.0029	0.0058	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	0.0029	0.0058	0.01	0
OCDF	n.d.	0.0088	0.018	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]-"Lowerbound"					**0.00079**
I-TEQ from quantified 2,3,7,8-PCDDs [ng 2,3,7,8-TCDD/g dw]					0.00079
I-TEQ from quantified 2,3,7,8-PCDFs [ng 2,3,7,8-TCDD/g dw]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [ng 2,3,7,8-TCDD/g dw]					0.0027
Maximum possible I-TEQ [ng 2,3,7,8-TCDD/g dw]-"Upperbound"					**0.0035**

PCDDs	Content [ng/g dw]	**PCDFs**	Content [ng/g dw]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	n.d.	Hepta-CDFs	n.d.
OCDD	0.79	OCDF	n.d.
Total PCDDs	**0.79**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

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Attachment no. 4 to the Certificate of Analysis for work order PR1449687

Sample: HK1429117-004 EH3B

Measurement results:

Sample:	HK1429117-004 EH3B				
			Final extract [µl]:		60
Sample volume [ml]:	900		Injection volume [µl]:		4
			Acquisition date [d.m.y h:m]:		16.9.14 2:13
2,3,7,8-PCDD/Fs	Content [pg/l]	Limit of Detection [pg/l]	Limit of Quantification [pg/l]	[1]I-TEFs	I-TEQ [pg/l]
2,3,7,8-TCDD	n.d.	0.61	1.2	1	0
1,2,3,7,8-PeCDD	n.d.	0.89	1.8	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	1.8	3.5	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	1.8	3.5	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	1.8	3.5	0.1	0
1,2,3,4,6,7,8-HpCDD	35	5.9	12	0.01	0.35
OCDD	2600	10	20	0.001	2.6
2,3,7,8-TCDF	n.d.	0.66	1.3	0.1	0
1,2,3,7,8-PeCDF	n.d.	0.72	1.4	0.05	0
2,3,4,7,8-PeCDF	n.d.	0.72	1.4	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	1.7	3.5	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	1.7	3.5	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	1.7	3.5	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	1.7	3.5	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	11	22	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	11	22	0.01	0
OCDF	n.d.	8	16	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]-"Lowerbound"					**3**
I-TEQ from quantified 2,3,7,8-PCDDs [pg 2,3,7,8-TCDD/l]					3
I-TEQ from quantified 2,3,7,8-PCDFs [pg 2,3,7,8-TCDD/l]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]					3
Maximum possible I-TEQ [pg 2,3,7,8-TCDD/l]-"Upperbound"					**5.9**

PCDDs	Content [pg/l]	**PCDFs**	Content [pg/l]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	35	Hepta-CDFs	n.d.
OCDD	2600	OCDF	n.d.
Total PCDDs	**2700**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

HOKLAS 066 TEST

CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 8
Contact	: HANNAH CHIU	Contact	: Fung Lim Chee, Richard	Work Order	: HK1428873
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Project	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	Quote number	: ----	Date Samples Received	: 04-SEP-2014
Order number	: J3539			Issue Date	: 19-SEP-2014
C-O-C number	: H029003			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

Hong Kong Accreditation Service (HKAS) has accedited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. The results shown in this certificate were determined by this laboratory in accordance with its terms of accreditation.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*	*Authorised results for*
Chan Ka Yu, Karen	Assistant Manager - Organics	Organics
Wong Wing, Kenneth	Manager - Metals	Inorganics

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 15-SEP-2014

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific comments for Work Order: **HK1428873**

Sample(s) were picked up from client by ALS Technichem (HK) staff in a chilled condition.
Water sample(s) analysed and reported on an as received basis.
Water sample(s) were filtered prior to dissolved metal analysis.
Dioxins was subcontracted to and analysed by ALS Czech Republic.

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: EH1B Client sampling date / time: 04-SEP-2014 12:30 HK1428873-001	Client sample ID: FIELD BLANK Client sampling date / time: 04-SEP-2014 12:30 HK1428873-002	Client sample ID: EQUIPMENT BLANK Client sampling date / time: 04-SEP-2014 12:30 HK1428873-003
EG: Metals and Major Cations - Filtered						
EG020: Antimony	7440-36-0	1	µg/L	----	<1	<1
EG020: Arsenic	7440-38-2	10	µg/L	----	<10	<10
EG020: Barium	7440-39-3	1	µg/L	----	<1	<1
EG020: Cadmium	7440-43-9	0.2	µg/L	----	<0.2	<0.2
EG020: Cobalt	7440-48-4	1	µg/L	----	<1	<1
EG020: Copper	7440-50-8	1	µg/L	----	<1	<1
EG020: Lead	7439-92-1	1	µg/L	----	<1	<1
EG020: Manganese	7439-96-5	1	µg/L	----	<1	<1
EG020: Molybdenum	7439-98-7	1	µg/L	----	<1	<1
EG020: Nickel	7440-02-0	1	µg/L	----	<1	<1
EG020: Tin	7440-31-5	1	µg/L	----	<1	<1
EG020: Zinc	7440-66-6	10	µg/L	----	<10	<10
EG036: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	<0.5
EG049: Trivalent Chromium	16065-83-1	20	µg/L	----	<20	<20
EG050: Hexavalent Chromium	18540-29-9	20	µg/L	----	<20	<20
EP-066: Polychlorinated Biphenyls						
Total Polychlorinated biphenyls	---	1	µg/L	<1	<1	<1
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	91-20-3	2.0	µg/L	<2.0	<2.0	<2.0
Acenaphthylene	208-96-8	2.0	µg/L	<2.0	<2.0	<2.0
Acenaphthene	83-32-9	2.0	µg/L	<2.0	<2.0	<2.0
Fluorene	86-73-7	2.0	µg/L	<2.0	<2.0	<2.0
Phenanthrene	85-01-8	2.0	µg/L	<2.0	<2.0	<2.0
Anthracene	120-12-7	2.0	µg/L	<2.0	<2.0	<2.0
Fluoranthene	206-44-0	2.0	µg/L	<2.0	<2.0	<2.0
Pyrene	129-00-0	2.0	µg/L	<2.0	<2.0	<2.0
Benz(a)anthracene	56-55-3	2.0	µg/L	----	<2.0	<2.0
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	----	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.2	µg/L	----	<0.2	<0.2
Indeno(1.2.3.cd)pyrene	193-39-5	2.0	µg/L	----	<2.0	<2.0
Dibenz(a.h)anthracene	53-70-3	2.0	µg/L	----	<2.0	<2.0
Benzo(g.h.i)perylene	191-24-2	2.0	µg/L	----	<2.0	<2.0
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate						
Phenol	108-95-2	2.0	µg/L	----	<2.0	<2.0
Hexachlorobenzene (HCB)	118-74-1	1.0	µg/L	<1.0	<1.0	<1.0
Bis(2-ethylhexyl)phthalate	117-81-7	2.0	µg/L	----	**2.3**	**3.4**
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)						

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID / Client sampling date / time: EH1B 04-SEP-2014 12:30 HK1428873-001	FIELD BLANK 04-SEP-2014 12:30 HK1428873-002	EQUIPMENT BLANK 04-SEP-2014 12:30 HK1428873-003	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) - Continued							
C6 - C8 Fraction	----	20	µg/L	<20	<20	<20	
C9 - C16 Fraction	----	500	µg/L	<500	<500	<500	
C17 - C35 Fraction	----	500	µg/L	<500	<500	<500	
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)							
Benzene	71-43-2	5.0	µg/L	<5.0	<5.0	<5.0	
Toluene	108-88-3	5.0	µg/L	<5.0	<5.0	<5.0	
Ethylbenzene	100-41-4	5.0	µg/L	<5.0	<5.0	<5.0	
meta- & para-Xylene	108-38-3 106-42-3	10	µg/L	<10	<10	<10	
Styrene	100-42-5	5.0	µg/L	<5.0	<5.0	<5.0	
ortho-Xylene	95-47-6	5.0	µg/L	<5.0	<5.0	<5.0	
Xylenes (Total)	----	20	µg/L	<20	<20	<20	
EP-074_SR-B: Oxygenated Compounds							
2-Propanone (Acetone)	67-64-1	500	µg/L	<500	<500	<500	
2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50	<50	
EP-074_SR-E: Halogenated Aliphatics							
Methylene chloride	75-09-2	50	µg/L	<50	<50	<50	
Trichloroethene	79-01-6	5.0	µg/L	<5.0	<5.0	<5.0	
Tetrachloroethene	127-18-4	5.0	µg/L	<5.0	<5.0	<5.0	
EP-074_SR-G: Trihalomethanes (THM)							
Chloroform	67-66-3	5.0	µg/L	**13.0**	<5.0	<5.0	
Bromodichloromethane	75-27-4	5.0	µg/L	<5.0	<5.0	<5.0	
EP-074_SR-I: Methyl-tert-butyl Ether							
Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L	<5.0	<5.0	<5.0	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates							Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%	**81.5**	**58.9**	**53.7**	
4-Terphenyl-d14	1718-51-0	0.1	%	**87.4**	**63.5**	**101**	
EP-066S: PCB Surrogate							Surrogate control limits listed at end of this report.
Tetrachlorometaxylene	877-09-8	0.1	%	**108**	**55.8**	**61.8**	
Dibutylchlorendate	1770-80-5	0.1	%	**117**	**88.4**	**122**	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	**106**	**101**	**103**	
Toluene-D8	2037-26-5	0.1	%	**102**	**102**	**101**	
4-Bromofluorobenzene	460-00-4	0.1	%	**101**	**102**	**101**	
EP-074_SR-S: VOC Surrogates							Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	**106**	**101**	**103**	
Toluene-D8	2037-26-5	0.1	%	**102**	**102**	**101**	
4-Bromofluorobenzene	460-00-4	0.1	%	**101**	**102**	**101**	

Laboratory Duplicate (DUP) Report

Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 3622541)								
HK1428873-003	EQUIPMENT BLANK	EG036: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 3622542)								
HK1428873-003	EQUIPMENT BLANK	EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.0
		EG020: Antimony	7440-36-0	1	µg/L	<1	<1	0.0
		EG020: Barium	7440-39-3	1	µg/L	<1	<1	0.0
		EG020: Cobalt	7440-48-4	1	µg/L	<1	<1	0.0
		EG020: Copper	7440-50-8	1	µg/L	<1	<1	0.0
		EG020: Lead	7439-92-1	1	µg/L	<1	<1	0.0
		EG020: Manganese	7439-96-5	1	µg/L	<1	<1	0.0
		EG020: Molybdenum	7439-98-7	1	µg/L	<1	<1	0.0
		EG020: Nickel	7440-02-0	1	µg/L	<1	<1	0.0
		EG020: Tin	7440-31-5	1	µg/L	<1	<1	0.0
		EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	0.0
		EG020: Zinc	7440-66-6	10	µg/L	<10	<10	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 3622543)								
HK1428873-003	EQUIPMENT BLANK	EG050: Hexavalent Chromium	18540-29-9	20	µg/L	<20	<20	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 3622541)											
EG036: Mercury	7439-97-6	0.05	µg/L	<0.05	2 µg/L	106	----	77	117	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 3622542)											
EG020: Antimony	7440-36-0	1	µg/L	<1	100 µg/L	90.2	----	77	105	----	----
EG020: Arsenic	7440-38-2	10	µg/L	<10	100 µg/L	104	----	76	116	----	----
EG020: Barium	7440-39-3	1	µg/L	<1	100 µg/L	87.2	----	82	108	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	100 µg/L	93.5	----	81	107	----	----
EG020: Cobalt	7440-48-4	1	µg/L	<1	100 µg/L	98.8	----	82	106	----	----
EG020: Copper	7440-50-8	1	µg/L	<1	100 µg/L	99.4	----	79	113	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	100 µg/L	102	----	82	108	----	----
EG020: Manganese	7439-96-5	1	µg/L	<1	100 µg/L	104	----	80	112	----	----
EG020: Molybdenum	7439-98-7	1	µg/L	<1	100 µg/L	97.6	----	83	109	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	100 µg/L	98.1	----	77	113	----	----
EG020: Tin	7440-31-5	10	µg/L	<10	100 µg/L	94.1	----	76	108	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	100 µg/L	105	----	77	115	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 3622543)											
EG050: Hexavalent Chromium	18540-29-9	20	µg/L	<20	100 µg/L	102	----	80	106	----	----
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 3626645)											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	53.3	----	50	98	----	----
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	58.1	----	47	97	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 3626645) - Continued											
Acenaphthene	83-32-9	0.2	µg/L	<0.2	0.5 µg/L	50.6	---	49	93	---	---
Fluorene	86-73-7	0.2	µg/L	<0.2	0.5 µg/L	53.8	---	52	92	---	---
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	60.3	---	51	91	---	---
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	63.0	---	48	95	---	---
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	79.1	---	68	109	---	---
Pyrene	129-00-0	0.2	µg/L	<0.2	0.5 µg/L	80.5	---	69	111	---	---
Benz(a)anthracene	56-55-3	0.2	µg/L	<0.2	0.5 µg/L	93.5	---	64	119	---	---
Chrysene	218-01-9	0.2	µg/L	<0.2	0.5 µg/L	87.8	---	50	124	---	---
Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	0.5 µg/L	97.9	---	54	124	---	---
Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<0.2	0.5 µg/L	85.7	---	54	130	---	---
Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.2	0.5 µg/L	91.6	---	60	120	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<0.2	0.5 µg/L	95.4	---	60	119	---	---
Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<0.2	0.5 µg/L	89.1	---	48	120	---	---
Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<0.2	0.5 µg/L	92.4	---	52	125	---	---
EP-066: Polychlorinated Biphenyls (QC Lot: 3626644)											
Total Polychlorinated biphenyls	---	1	µg/L	<1	10 µg/L	94.2	---	35	123	---	---
EP-076B: Phenol, Hexachlorobenzene and Bis(2-ethylhexyl) Phthalate (QC Lot: 3626645)											
Phenol	108-95-2	5	µg/L	<5.0	0.5 µg/L	56.9	---	39	86	---	---
Hexachlorobenzene (HCB)	118-74-1	5	µg/L	<5.0	0.5 µg/L	54.8	---	51	96	---	---
Bis(2-ethylhexyl)phthalate	117-81-7	10	µg/L	<10.0	0.5 µg/L	110	---	78	123	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3616637)											
C6 - C8 Fraction	---	0.02	mg/L	<0.02	0.03 mg/L	95.4	---	62	131	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3626646)											
C9 - C16 Fraction	---	0.5	mg/L	<0.5	0.21 mg/L	74.7	---	12	119	---	---
C17 - C35 Fraction	---	0.5	mg/L	<0.5	0.45 mg/L	100	---	3	116	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3612911)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	101	---	59	125	---	---
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	97.3	---	64	121	---	---
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	94.4	---	69	120	---	---
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	101	---	76	119	---	---
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	92.3	---	80	116	---	---
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	95.8	---	72	122	---	---
Xylenes (Total)	---	2	µg/L	<2	6 µg/L	99.1	---	75	120	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3622544)											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	114	---	59	125	---	---
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	111	---	64	121	---	---
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	109	---	69	120	---	---
meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	103	---	76	119	---	---
Styrene	100-42-5	0.5	µg/L	<0.5	2 µg/L	114	---	80	116	---	---
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	106	---	72	122	---	---

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3622544) - Continued											
Xylenes (Total)	---	2	µg/L	<2	6 µg/L	104	---	75	120	---	---
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3612911)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	111	---	81	130	---	---
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	110	---	63	127	---	---
EP-074_SR-B: Oxygenated Compounds (QC Lot: 3622544)											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	111	---	81	130	---	---
2-Butanone (MEK)	78-93-3	5	µg/L	<5	20 µg/L	106	---	63	127	---	---
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3612911)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	96.2	---	80	126	---	---
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	88.0	---	77	114	---	---
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	88.4	---	82	113	---	---
EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3622544)											
Methylene chloride	75-09-2	5	µg/L	<5	2 µg/L	112	---	80	126	---	---
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	105	---	77	114	---	---
Tetrachloroethene	127-18-4	0.5	µg/L	<0.5	2 µg/L	111	---	82	113	---	---
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3612911)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	96.1	---	72	118	---	---
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	84.3	---	74	115	---	---
EP-074_SR-G: Trihalomethanes (THM) (QC Lot: 3622544)											
Chloroform	67-66-3	0.5	µg/L	<0.5	2 µg/L	117	---	72	118	---	---
Bromodichloromethane	75-27-4	0.5	µg/L	<0.5	2 µg/L	105	---	74	115	---	---
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3612911)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	97.8	---	64	119	---	---
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3622544)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	110	---	64	119	---	---

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 3622541)										
HK1428873-002	FIELD BLANK	EG036: Mercury	7439-97-6	2 µg/L	103	----	75	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 3622542)										
HK1428873-002	FIELD BLANK	EG020: Antimony	7440-36-0	100 µg/L	94.3	----	75	125	----	----
		EG020: Arsenic	7440-38-2	100 µg/L	106	----	75	125	----	----
		EG020: Barium	7440-39-3	100 µg/L	91.9	----	75	125	----	----
		EG020: Cadmium	7440-43-9	100 µg/L	97.7	----	75	125	----	----
		EG020: Cobalt	7440-48-4	100 µg/L	104	----	75	125	----	----
		EG020: Copper	7440-50-8	100 µg/L	101	----	75	125	----	----
		EG020: Lead	7439-92-1	100 µg/L	99.5	----	75	125	----	----
		EG020: Manganese	7439-96-5	100 µg/L	107	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	100 µg/L	102	----	75	125	----	----
		EG020: Nickel	7440-02-0	100 µg/L	101	----	75	125	----	----
		EG020: Tin	7440-31-5	100 µg/L	96.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	100 µg/L	109	----	75	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 3622543)										
HK1428873-002	FIELD BLANK	EG050: Hexavalent Chromium	18540-29-9	100 µg/L	95.6	----	75	125	----	----

Surrogate Control Limits

Sub-Matrix: WATER

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: HANNAH CHIU	WORK ORDER	: HK1428873
CLIENT	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT		
ADDRESS	: 7/F, EMPIRE CENTRE, 68 MODY ROAD, TSIM SHA TSUI EAST, KOWLOON, HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 4-SEP-2014 : 19-SEP-2014
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)	NO. OF SAMPLES CLIENT ORDER	: 3 : J3539

General Comments

- **Sample(s) were picked up from client by ALS Technichem (HK) staff in a chilled condition.**
- **Water sample(s) analysed and reported on an as received basis.**
- **Water sample(s) were filtered prior to dissolved metal analysis.**
- **Dioxins was subcontracted to and analysed by ALS Czech Republic.**

Signatories

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the Electronic Transactions Ordinance of Hong Kong, Chapter 553, Section 6.

Signatories	*Position*
Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

WORK ORDER	: HK1428873
SUB-BATCH	: 1
CLIENT	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
PROJECT	: SITE INVESTIGATION FOR TRUNK ROAD T2 AND INFRASTRUCTURE AT SOUTH APRON (STAGE 2)

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1428873-001	EH1B	WATER	04-SEP-2014 12:30	PR1449688001
HK1428873-002	FIELD BLANK	WATER	04-SEP-2014 12:30	PR1449688002
HK1428873-003	EQUIPMENT BLANK	WATER	04-SEP-2014 12:30	PR1449688003

CERTIFICATE OF ANALYSIS

Work Order	: **PR1449688**	Issue Date	: 18-SEP-2014
Client	: **ALS Technichem (HK) Pty Ltd.**	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Mr. Richard Fung	Contact	: Client Service
Address	: 11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street Kwai Chung Hong Kong	Address	: Na Harfe 336/9 Prague 9 - Vysocany Czech Republic 190 00
E-mail	: richard.fung@alsglobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: +852 26101044	Telephone	: +420 226 226 228
Facsimile	: +852 26102021	Facsimile	: +420 284 081 635
Project	: ---	Page	: 1 of 2
Order number	: ---	Date Samples Received	: 11-SEP-2014
C-O-C number	: ---	Quote number	: PR2011ALSTE-HK0268
Site	: ---	Date of test	: 12-SEP-2014 - 18-SEP-2014
Sampled by	: client	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.
The laboratory declares that the test results relate only to the listed samples.

Responsible for accuracy

Signatories		*Position*
Zdenek Jirak		Environmental Business Unit Manager

Testing Laboratory
Accredited by CAI

L 1163

Analytical Results

Sub-Matrix: WATER	Client sample ID	HK1428873-001 EH1B		HK1428873-002 FIELD BLANK		HK1428873-003 EQUIPMENT BLANK	
	Laboratory sample ID	PR1449688001		PR1449688002		PR1449688003	
	Client sampling date / time	04-SEP-2014 00:00		04-SEP-2014 00:00		04-SEP-2014 00:00	

Parameter	Method	LOR	Unit	Result	MU	Result	MU	Result	MU
PCDDs and PCDFs (Dioxins and Furans)									
2378-TCDD	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
12378-PeCDD	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
123478-HxCDD	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
123678-HxCDD	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
123789-HxCDD	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
1234678-HpCDD	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
OCDD	W-DFHMS01	-	pg/L	860	±30.0 %	n.d.	---	n.d.	---
2378-TCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
12378-PeCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
23478-PeCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
123478-HxCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
123678-HxCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
123789-HxCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
234678-HxCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
1234678-HpCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
1234789-HpCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
OCDF	W-DFHMS01	-	pg/L	n.d.	---	n.d.	---	n.d.	---
TEQ-Lowerbound	W-DFHMS01	-	pg/L	0.86	---	0	---	0	---
TEQ-Upperbound	W-DFHMS01	-	pg/L	4.5	---	4.6	---	4.3	---

If the client does not specify the date and time of sample collection, the laboratory will specify the date on sample delivery in parentheses, instead. If the time of sample collection is specified as 0:00 it means that the client did specify the date but not the time. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	Method Descriptions
Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02	
W-DFHMS01	CZ_SOP_D06_06_175 - except chap. 8.2.1.1 B, 8.2.1.3 B, 8.2.1.5 B,C,D, 11.2.3.2- 11.2.3.7, 11.2.4, 11.2.5 (US EPA 1613): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.

A '*' symbol preceeding any method indicates non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information.

The calculation methods of summation parameters are available on request in the client service.

ALS Group

Attachment no. 1 to the Certificate of Analysis for work order PR1449688

Sample: HK1428873-001 EH1B

Measurement results:

Sample:	HK1428873-001 EH1B		
		Final extract [µl]:	60
Sample volume [ml]:	960	Injection volume [µl]:	4
		Acquisition date [d.m.y h:m]:	15.9.14 22:03

2,3,7,8-PCDD/Fs	Content [pg/l]	Limit of Detection [pg/l]	Limit of Quantification [pg/l]	[1]I-TEFs	I-TEQ [pg/l]
2,3,7,8-TCDD	n.d.	0.94	1.9	1	0
1,2,3,7,8-PeCDD	n.d.	1.3	2.6	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	1.6	3.2	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	1.6	3.2	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	1.6	3.2	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	2.4	4.7	0.01	0
OCDD	860	3.8	7.6	0.001	0.86
2,3,7,8-TCDF	n.d.	0.76	1.5	0.1	0
1,2,3,7,8-PeCDF	n.d.	1.2	2.3	0.05	0
2,3,4,7,8-PeCDF	n.d.	1.2	2.3	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	1.9	3.9	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	1.9	3.9	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	1.9	3.9	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	1.9	3.9	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	1.5	3	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	1.5	3	0.01	0
OCDF	n.d.	3	6	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]-"Lowerbound"					**0.86**
I-TEQ from quantified 2,3,7,8-PCDDs [pg 2,3,7,8-TCDD/l]					0.86
I-TEQ from quantified 2,3,7,8-PCDFs [pg 2,3,7,8-TCDD/l]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]					3.6
Maximum possible I-TEQ [pg 2,3,7,8-TCDD/l]-"Upperbound"					**4.5**

PCDDs	Content [pg/l]	PCDFs	Content [pg/l]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	n.d.	Hepta-CDFs	n.d.
OCDD	860	OCDF	n.d.
Total PCDDs	**860**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

ALS Group

Attachment no. 2 to the Certificate of Analysis for work order PR1449688

Sample: HK1428873-002 FIELD BLANK

Measurement results:

Sample:	HK1428873-002 FIELD BLANK				
			Final extract [µl]:		60
Sample volume [ml]:	890		Injection volume [µl]:		4
			Acquisition date [d.m.y h:m]:		15.9.14 23:05
2,3,7,8-PCDD/Fs	Content [pg/l]	Limit of Detection [pg/l]	Limit of Quantification [pg/l]	[1]I-TEFs	I-TEQ [pg/l]
2,3,7,8-TCDD	n.d.	1.3	2.6	1	0
1,2,3,7,8-PeCDD	n.d.	1.9	3.7	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	2.1	4.3	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	2.1	4.3	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	2.1	4.3	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	2.3	4.6	0.01	0
OCDD	n.d.	3.2	6.4	0.001	0
2,3,7,8-TCDF	n.d.	0.98	2	0.1	0
1,2,3,7,8-PeCDF	n.d.	1.6	3.2	0.05	0
2,3,4,7,8-PeCDF	n.d.	1.6	3.2	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	1.8	3.5	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	1.8	3.5	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	1.8	3.5	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	1.8	3.5	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	2.2	4.3	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	2.2	4.3	0.01	0
OCDF	n.d.	3.4	6.8	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]-"Lowerbound"					**0**
I-TEQ from quantified 2,3,7,8-PCDDs [pg 2,3,7,8-TCDD/l]					0
I-TEQ from quantified 2,3,7,8-PCDFs [pg 2,3,7,8-TCDD/l]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]					4.6
Maximum possible I-TEQ [pg 2,3,7,8-TCDD/l]-"Upperbound"					**4.6**

PCDDs	Content [pg/l]	**PCDFs**	Content [pg/l]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	n.d.	Hepta-CDFs	n.d.
OCDD	n.d.	OCDF	n.d.
Total PCDDs	**n.d.**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

ALS Group

Attachment no. 3 to the Certificate of Analysis for work order PR1449688

Sample: HK1428873-003 EQUIPMENT BLANK

Measurement results:

Sample:	HK1428873-003 EQUIPMENT BLANK				
			Final extract [µl]:		60
Sample volume [ml]:	890		Injection volume [µl]:		4
			Acquisition date [d.m.y h:m]:		16.9.14 0:08
2,3,7,8-PCDD/Fs	Content [pg/l]	Limit of Detection [pg/l]	Limit of Quantification [pg/l]	[1]I-TEFs	I-TEQ [pg/l]
2,3,7,8-TCDD	n.d.	1.3	2.6	1	0
1,2,3,7,8-PeCDD	n.d.	1.3	2.6	0.5	0
1,2,3,4,7,8-HxCDD	n.d.	2.2	4.4	0.1	0
1,2,3,6,7,8-HxCDD	n.d.	2.2	4.4	0.1	0
1,2,3,7,8,9-HxCDD	n.d.	2.2	4.4	0.1	0
1,2,3,4,6,7,8-HpCDD	n.d.	2.7	5.5	0.01	0
OCDD	n.d.	3.1	6.3	0.001	0
2,3,7,8-TCDF	n.d.	1.1	2.1	0.1	0
1,2,3,7,8-PeCDF	n.d.	1.2	2.3	0.05	0
2,3,4,7,8-PeCDF	n.d.	1.2	2.3	0.5	0
1,2,3,4,7,8-HxCDF	n.d.	2.2	4.4	0.1	0
1,2,3,6,7,8-HxCDF	n.d.	2.2	4.4	0.1	0
1,2,3,7,8,9-HxCDF	n.d.	2.2	4.4	0.1	0
2,3,4,6,7,8-HxCDF	n.d.	2.2	4.4	0.1	0
1,2,3,4,6,7,8-HpCDF	n.d.	2.8	5.6	0.01	0
1,2,3,4,7,8,9-HpCDF	n.d.	2.8	5.6	0.01	0
OCDF	n.d.	3.3	6.7	0.001	0
I-TEQ from quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]-"Lowerbound"					**0**
I-TEQ from quantified 2,3,7,8-PCDDs [pg 2,3,7,8-TCDD/l]					0
I-TEQ from quantified 2,3,7,8-PCDFs [pg 2,3,7,8-TCDD/l]					0
I-TEQ from n.d. and non quantified 2,3,7,8-PCDD/Fs [pg 2,3,7,8-TCDD/l]					4.3
Maximum possible I-TEQ [pg 2,3,7,8-TCDD/l]-"Upperbound"					**4.3**

PCDDs	Content [pg/l]	**PCDFs**	Content [pg/l]
Tetra-CDDs	n.d.	Tetra-CDFs	n.d.
Penta-CDDs	n.d.	Penta-CDFs	n.d.
Hexa-CDDs	n.d.	Hexa-CDFs	n.d.
Hepta-CDDs	n.d.	Hepta-CDFs	n.d.
OCDD	n.d.	OCDF	n.d.
Total PCDDs	**n.d.**	**Total PCDFs**	**n.d.**

[1]I-TEF according to NATO.

The limits of quantification are defined as the double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% interval of reliability.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility. Results marked "<" are situated in the interval of the limit of detection and the limit of quantification and are not quantified.

Results marked "n.d." are lower than the limit of detection.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

Section 3
Summary of Sample Receipt Condition, Analysis Date and Method Reference

Summary of Sample Receipt Condition, Analysis Date and Method Reference

Date of Issue: 04/11/2014
Client: Civil Engineering and Development Department
Project: Site Investigation for Trunk Road T2 and Infrastructure at South Apron (Stage 2)
Infrastructure at South Apron (Stage 2)

ALS Lab ID	Client Sample ID	Sampling Date / Time	Matrix	Receipt Details			Storage Condition*	Testing Date					
				Date	Time	Condition		Moisture	Metals	TPHs	PCB	VOCs	SVOC
HK1428586001	EH1B 3.0M	03/09/2014 10:30	Soil	03/09/2014	17:30	Chilled	4°C	15/09/2014	17/09/2014	10/9/2014	10/09/2014	10/09/2014	10/09/2014
HK1428586002	EH1B 6.0M	03/09/2014 14:15	Soil	03/09/2014	17:30	Chilled	4°C	15/09/2014	17/09/2014	10/9/2014	10/09/2014	10/09/2014	10/09/2014
HK1428586003	EH1B 9.0M	03/09/2014 15:20	Soil	03/09/2014	17:30	Chilled	4°C	15/09/2014	17/09/2014	10/9/2014	10/09/2014	10/09/2014	10/09/2014
HK1428555001	EH1B 0.5M	01/09/2014 14:00	Soil	01/09/2014	18:15	Chilled	4°C	15/09/2014	13/09/2014	10/9/2014	10/09/2014	10/9/2014	10/09/2014
HK1428555002	EH3B 0.5M	01/09/2014 14:00	Soil	01/09/2014	18:15	Chilled	4°C	15/09/2014	13/09/2014	10/9/2014	10/09/2014	10/9/2014	10/09/2014
HK1429117001	EH3B 3.0M	08/09/2014 09:00	Soil	08/09/2014	16:05	Chilled	4°C	15/09/2014	22/09/2014	17/09/2014	17/09/2014	17/09/2014	17/09/2014
HK1429117002	EH3B 6.0M	08/09/2014 10:30	Soil	08/09/2014	16:05	Chilled	4°C	15/09/2014	22/09/2014	17/09/2014	17/09/2014	17/09/2014	17/09/2014
HK1429117003	EH3B 9.0M	08/09/2014 12:00	Soil	08/09/2014	16:05	Chilled	4°C	15/09/2014	22/09/2014	17/09/2014	17/09/2014	17/09/2014	17/09/2014
HK1428873001	EH1B	04/09/2014 12:30	Groundwater	04/09/2014	17:25	Chilled	4°C	N/A	11/09/2014	10/09/2014	15/09/2014	10/09/2014	15/09/2014
HK1429117004	EH3B	08/09/2014 14:30	Groundwater	08/09/2014	16:05	Chilled	4°C	N/A	18/09/2014	17/09/2014	16/09/2014	17/09/2014	16/09/2014
HK1428873002	FIELD BLANK	04/09/2014 12:30	Blank	04/09/2014	17:25	Chilled	4°C	N/A	11/09/2014	10/09/2014	15/09/2014	10/09/2014	15/09/2014
HK1428873003	EQUIPMENT BLANK	04/09/2014 12:30	Blank	04/09/2014	17:25	Chilled	4°C	N/A	11/09/2014	10/09/2014	15/09/2014	10/09/2014	15/09/2014

Section 4
Chain of Custody (COC) Form

CHAIN OF CUSTODY DOCUMENTATION

H 029001

ALS Laboratory Group

CLIENT: Gammon Construction Ltd.	SAMPLER: Samuel LAI
ADDRESS / OFFICE: M/F, 23-25, Chun Wang St, Tseung Kwan O Ind Est,	MOBILE: 96767577
PROJECT MANAGER (PM): Jason LAU	PHONE
PROJECT ID: J3539	EMAIL REPORT TO: jason.lau@gammonconstruction.com / samuel.lai@gammon Construction.com
SITE: SI for Trunk Rd. T2 P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): asap QUOTE NO.: HK/1597a/13	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water) | CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Metals	VOCs	SVOCs	Dioxins / PBCs	Petroleum Carbon Range	TCLP (*)
1.	EH1B 0.5m	S	1/9/14	14:00	Bottle	1	✓	✓	✓	✓	✓	✓
2.	EH3B 0.5m	S	1/9/14	14:00	Bottle	1	✓	✓	✓	✓	✓	✓

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

(* TCLP will be carried out if required.

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: LAI CHI KONG Samuel	Date: 01/09/2014		Name:	Date:		Con' Note No:
Of: Gammon Construction Ltd	Time: 14:00		Of:	Time:	18:15	
Name: Cecilia POON	Date: 01/09/2014		Name:	Date:	1/9	Transport Co:
Of: HMJV	Time: 14:00		Of:	Time:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

ALS Laboratory Group

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CHAIN OF CUSTODY DOCUMENTATION

H 029002

ALS Laboratory Group

CLIENT: Gammon Construction Ltd.	SAMPLER: Samuel LAI
ADDRESS / OFFICE: M/F. 23-25, Chun Cheng St., TKO Industrial Estate	MOBILE: 96762577
PROJECT MANAGER (PM): Jason Lau	PHONE
PROJECT ID: J3539	EMAIL REPORT TO: Jason.lau@gammonconstruction Ltd.
SITE: S.I. for Trunk Road T2 P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): ASAP. QUOTE NO.: HK/1597a/13	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		Metals	VOCs	SVOCs	Dioxins/PBCs	Petroleum Carbon Ranges	TCLP#	Notes
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles							
1.	EHIB 3.0m	S	3/9	10:30		2	✓	✓	✓	✓	✓	✓#	TCLP# test to be carried out if required.
2.	EHIB 6.0m	S	3/9	14:15		2	✓	✓	✓	✓	✓	✓#	
3.	EHIB 9.0m	S	3/9	15:20		2	✓	✓	✓	✓	✓	✓#	

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Samuel LAI	Date: 3/9/14	Name:	Date:	Con' Note No:
Of: Gammon Construction LTD.	Time: 16:00	Of:	Time: 3/ 17:30	
Name: Ocilia Poon	Date: 3/9/14	Name:	Date: 3/	Transport Co:
Of: HMJV	Time: 16:00	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 029003

ALS Laboratory Group

CLIENT: Gammon Construction Ltd.	SAMPLER: Samuel Lau
ADDRESS / OFFICE: M/F. 23-25. Chun Wang St. TKO Ind. Est.	MOBILE: 96762577
PROJECT MANAGER (PM): Jason Lau.	PHONE
PROJECT ID: J3539 / KL/2013/02	EMAIL REPORT TO:
SITE: SJ. for Trunk Rd. T2. P.O. NO.: -	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): ASAP. QUOTE NO.: HK/1572/13	

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact Yes No (N/A)
SAMPLE TEMPERATURE
CHILLED (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water) | CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Metals	VOCs	SVOCs	Dioxins/PBCs	Petroleum Carbon Ranges	TCLP *	Notes: e.g. Highly contaminated samples; e.g. "High PAHs expected"; Extra volume for QC or trace LORs etc.
1	ZH1B	W	4/9	12:30		5	✓	✓	✓	✓	✓	✓	* TCLP test to be carried out if required
2	Field Blank	W	4/9	11:30		5	✓	✓	✓	✓	✓	✓	
3	Equipment Blank	W	4/9	TP 12:30		5	✓	✓	✓	✓	✓	✓	

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Samuel Lau	Date: 4/9/14		Name:	Date:		Con' Note No:
Of: Gammon Construction Ltd.	Time: 14:00		Of:	Time: 4/8		
Name: Cecilia Poon	Date: 4/9/14		Name:	Date:		Transport Co:
Of: HMJV	Time: 14:00		Of:	Time: 17:25		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

H 029004

ALS Laboratory Group

CLIENT: Gammon Construction Ltd.	SAMPLER: Samuel Lai
ADDRESS / OFFICE: M/F. 23-25, Chun Wang St., Tseung Kwan O Ind Est.	MOBILE: 96762577
PROJECT MANAGER (PM): Jason Lau	PHONE
PROJECT ID: EL/2013/02 (J3539)	EMAIL REPORT TO: Jason.lau@gammonconstruction.com.
SITE: S.I. for Tsunk Rd. Tz P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): ASAP QUOTE NO.: HK/0536/13	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water) | CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Metals	VOCs	SVOCs	Dioxins / PBCs	Petroleum Carbon Ranges	TCLP *
1.	EH3B 3.0m	S	8/9	9:00		2	✓	✓	✓	✓	✓	√*
2.	EH3B 6.0m	S		10:30		2	✓	✓	✓	✓	✓	√*
3.	EH3B 9.0m	S		12:00		2	✓	✓	✓	✓	✓	√*
4	EH3B	W		14:30		5	✓	✓	✓	✓	✓	√*

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected"
Extra volume for QC or trace LORs etc.

* TCLP test to be carried out if required.

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Samuel Lai	Date: 8/9/14	Name: Kelvin	Date: 8-Sep-2014	Con' Note No:
Of: Gammon	Time: 15:00	Of: ALS HK	Time: 16:20	
Name: Cecilia Poon	Date: 8/9/14	Name:	Date:	Transport Co:
Of: HMJV	Time: 15:00	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soil; B = Unpreserved Bag.

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