

Your Ref : (4) in EP2/N7/A/52 Ax(1) Pt.14  
Our Ref : (CV/2012/09)/M45/200/D02155

8 December 2014

**By Hand**

Environmental Impact Assessment Ordinance Register Office  
Environmental Protection Department  
27/F, Southorn Centre,  
130 Hennessy Road,  
Wanchai, Hong Kong

Attn.: Mr. Charles Pang

Dear Sir,

**Contract No. CV/2012/09**  
**Liantang / Heung Yuen Wai Boundary Control Point**  
**Site Formation and Infrastructures – Contract 3**

**Environmental Permit No. EP-404/2011/A**  
**Condition 3.4 –Contamination Assessment Report (CAR)**  
**– Fanling (Rev.4)**

I refer to your above referenced letter dated 10 November 2014 enclosing comments on our Revised Contamination Assessment Report (CAR) – Fanling (Rev.3) submitted on 24 October 2014.

In response to the comments and with reference to Condition 3.4 of the Environmental Permit (EP) No. EP- 404/2011/A, on behalf of the Permit Holder, Civil Engineering and Development Department (CEDD), I would like to submit three hard copies of the Revised CAR – Fanling (Rev.4) certified by the ET Leader and verified by the IEC for your approval.

Should you have any queries, please contact the undersigned or our Mr. Perry Yam at tel. no. 2171 3350.

Yours faithfully,



Alan Lee  
Senior Resident Engineer  
AECOM Asia Co. Ltd.

Encl.

c.c. CEDD/BCP	- Attn: Mr. Chris Wong/ Mr. Desmond Lam	- 1 hard copy
AECOM	- Attn: Mr. Francis Leong	- 1 CD copy
SMEC(IEC)	- Attn: Mr. Anthony Wong	- 1 CD copy
AUES(ET)	- Attn: Mr. T. W. Tam	- w/o

~~CTW/AL/GW/PX/LQR/lps~~



**JOB NO.: TCS00670/13**

**AGREEMENT NO. CE 45/2008 (CE)  
LIANTANG/HEUNG YUEN WAI  
BOUNDARY CONTROL POINT AND ASSOCIATED WORKS**

**CONTAMINATION ASSESSMENT REPORT (CAR) –  
FANLING**

**PREPARED FOR  
CIVIL ENGINEERING AND DEVELOPMENT  
DEPARTMENT (CEDD)**

**Quality Index**

<b>Date</b>	<b>Reference No.</b>	<b>Prepared By</b>	<b>Certified By</b>
3 December 2014	TCS00670/13/600/R0245v4	 Ben Tam (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

<b>Rev.</b>	<b>Date</b>	<b>Description</b>
1	25 September 2014	First submission
2	6 October 2014	Amended against the IEC's comments on 29 Sep 2014
3	16 October 2014	Amended against the IEC's comments on 9 Oct 2014
4	3 December 2014	Amended against the EPD's comments on 10 Nov 2014



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4 December 2014

Our ref: 7076192/L17418/Ry/AB/AW/rw  
Your ref:

AECOM  
8/F, Grand Central Plaza, Tower 2  
138 Shatin Rural Committee Road  
Shatin, N.T.

**By Email & Post**

Attention: Mr Alan LEE

Dear Sir

**Agreement No. CE 45/2008 (CE)**  
**Liantang/Heung Yuen Wai Boundary Control Point and Associated Works**  
**Independent Environmental Checker – Investigation**  
**Contract No. CV/2012/09**  
**Revised Contamination Assessment Report (CAR) – Fanling (Rev.4)**

With reference to the revised Contamination Assessment Report (CAR) – Fanling Revision 4 (AUES ref.: TCS00670/13/600/R0245v4) certified by the ET Leader provided to us on 4 December 2014, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Section 8.10 of the Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works EIA report dated December 2010.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Mr Francis LEE on tel. 3995 8144 or by email to francis.lee@smec.com.

Yours faithfully  
For and on behalf of  
SMEC Asia Limited

**Antony WONG**  
Independent Environmental Checker

cc CEDD/BCP - Mr Desmond LAM / Mr Pui Sang LI  
AECOM - Mr Francis LEONG / Mr Perry YAM  
AUES - Mr TW TAM

by fax: 3547 1659  
by email  
by email



ISO 9001:2008 Registered Firm  
Certification No. Q0022

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**Contract No. CV/2002/08 - LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT**  
**Site Formation and Infrastructure Works – Contract 2**  
**Environmental Permit No. EP-404/2011/A**  
**Condition 3-4 – Revised Contamination Assessment Report -**  
**Po Kat Tsai and Loi Tung (TCS00670/13/600/R00245 ver.3)**  
**EPD comment received on 10 November 2014**

Item	Section / Table / Appendix	EPD's comment	Response to comment
i)	Section 2.6 and Table 2-2	Please clarify whether the classification of soil texture was carried out by the land contamination specialist. In addition, "Furthermore,... specialist" is duplicated. Please revise.	A land contamination specialist supervised all soil sampling process to ensure no cross contamination or any other forms of interferences occurred. Moreover, general description of the sampled soil would be given by land contamination specialist which described in Tables 2-2. <b>(refer to Main text Section 2.6)</b>
ii)	Table 2-7	Some of the RBRG figures shown in Table 2-7 are not consistent with those listed in our guideline (e.g. the RBRG figure of "Fluoranthene" for groundwater is not NA). Please double check and proofread.	The figures of Table 2-7 are double checked and the Industrial and Solubility Limits for Fluoranthene in groundwater should be 1.00E+4mg/L and 2.06E-01mg/L rather than "N/A". Other values in Table 2-9 are correct as compared with EPD's RBRG's limits and Table 2-7 has been amended accordingly. <b>(refer to Main text Table 2-7)</b>
iii)	Table 3-1	Some of the RBRG figures shown in Table 3-1 are not consistent with those listed in our guideline (e.g. the RBRG figure of "Naphthalene" is not 9.18E+1) Please double check and proofread.	<ul style="list-style-type: none"> <li>• The RBRG figure of "Naphthalene" should be <b><u>4.53E+02</u></b> instead of 9.18E+01 and the Csat should be <b><u>1.25E+02</u></b>.</li> <li>• The RBRG figure of "Indeno(1,2,3-cd)pyrene" should be <b><u>9.18E+01</u></b> instead of <b><u>5.82E-01</u></b>.</li> <li>• The Csat figure of "Fluorene" should be <b><u>5.47E+01</u></b> instead of "NA".</li> </ul> <b>(refer to Main text Table 3-1)</b>
iii)	Section 4.6	Please clarify whether the public fill facilities would accept the soil for disposal. In addition, the wording "clean" is confusing. Please revise.	According to findings of chemical analysis and soil texture, the existing soils of both assessment sites should be acceptable for retaining and using. If off-site disposal is required, the Contractor should follow the waste disposal ordinance and contractual requirements of the project. <b>(refer to Main text Section 4.6)</b>
iv)	---	Chain of Custody documentation for all of the samples delivered to the laboratory should be provided.	Chain of Custody documentation has been presented in <b>Appendix G. (refer to Appendix G)</b>
v)	Appendix D	Colour photographs should be provided.	Colour photographs will be provided in formal submission.
vi)	Appendix E	Summary of Soil Samples Chemical Testing Result: Some of the RBRG figures are not consistent with those listed in our guideline (e.g. the RBRG figure of "Fluorene" for the Soil Saturation Limit is not NA). Please double check	The RBRG figure of "Fluorene" for the Soil Saturation Limit should be <b><u>5.47E+01</u></b> instead of "NA"). <b>(refer to Appendix E)</b>

**Contract No. CV/2002/08 - LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT**  
**Site Formation and Infrastructure Works – Contract 2**  
**Environmental Permit No. EP-404/2011/A**  
**Condition 3-4 – Revised Contamination Assessment Report -**  
**Po Kat Tsai and Loi Tung (TCS00670/13/600/R00245 ver.3)**  
**EPD comment received on 10 November 2014**

Item	Section / Table / Appendix	EPD's comment	Response to comment
		and proofread.	
vii)	Appendix E	Summary of Groundwater Samples Chemical Testing Result: Some of the RBRG figures are not consistent with those listed in our guideline (e.g. the RBRG figure of "Fluoranthene" for the Solubility is not 1.98E+00). Please double check and proofread.	The RBRG figure of "Fluoranthene" for the Solubility should be <b><u>2.06E-01</u></b> instead of <b>1.98E+00</b> . ( <i>refer to Appendix E</i> )

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## 1 INTRODUCTION

- 1.1 **Liantang/Heung Yuen Wai Boundary Control Point and Associated Works** (hereinafter “The Project”) is a Designated Project (DP) to be implemented in accordance with the statutory Environmental Impact Assessment (EIA) which approved by the Director of Environmental Protection (DEP) in 24 March 2011. An Environmental Permit (EP) EP-404/2011 and EP-404/2011/A was obtained by the Civil Engineering & Development Department (CEDD) on 24 March 2011 and 28 October 2013 respectively for construction and operation of the Project. The Project Layout Plan is shown in *Appendix A*.

### LAND CONTAMINATION DURING EIA STUDY

- 1.2 In order to fulfill the requirement in Clause 3.4.8.1(iv) of the EIA Study Brief, an initial Contamination Assessment Plan (CAP) based on the initial connecting road alignment was submitted on 31 August 2009 which accepted by the Environmental Protection Department (EPD) on 2 October 2009. In 2010, due to refinement of the alignment and change of scope of works during the design stage, a revised CAP was submitted on 31 May 2010 which accepted by EPD on 22 June 2010. In view of the recent refinement of the alignment section at Sha Tau Kok Road, the CAP was further updated and submitted again on 14 July 2010 which has been accepted by EPD on 12 October 2010.
- 1.3 The land contamination assessment was conducted based on information from the review of the historical/current land uses, desktop study and site inspection. Besides, some information was also collected from related Government Departments. According to the findings on the site appraisal of existing and historical land uses in the Study Area, adverse land contamination impacts are not expected during construction and operation phase of the proposed Liantang/Heung Yuen Wai Boundary Crossing Point (LT/HYW BCP), connecting roads and ventilation buildings. However, potential land contamination impact are identified at three areas which included 1) open area at Sha Tau Kok Road near Loi Tung (hereinafter “Loi Tung”), 2) works sites of ventilation building in Po Kat Tsai (hereinafter “Po Kat Tsai”) and 3) workshops in Fanling (hereinafter “Fanling”).
- 1.4 Site visit could not be performed at these three potential contamination areas during EIA study as the lands were occupied by private owner. Site investigation of the existing ground at these three areas was recommended in the EIA Report when site access could be granted or land acquisition. In addition, as mentioned in the EP-404/2011/A Condition 3.4, “*after resumption of private lands, site inspection shall be carried out to ascertain contaminative sources and hotspots of contamination. The revised Contamination Assessment Plan (CAP) with sampling and testing schedule shall be certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC), and submitted to EPD for approval*” should be followed.
- 1.5 Action-United Environmental Services & Consulting (hereinafter referred to “AUES”) has been appointed as the Land Contamination Specialist to carry out the land contamination assessment including site supervision and relevant report submission. Moreover, all sampling is carried out by the Contractor under supervision by AUES and Resident Engineer (RE). A Hong Kong Laboratory Accreditation Scheme (HOKLAS)-accredited laboratory is appointed to carry out HOKLAS-accredited chemical analysis.
- 1.6 When the CAP was prepared, the potential contamination area in Fanling was unable to access. Since the construction works at potential contamination areas in Po Kat Tsai and Loi Tung are needed to be commenced as soon as possible to avoid any delay of the construction programme, the revised CAP was split into two separate reports for submission. The revised CAP (Ref: TCS00670/13/600/R00132) which covered two potential contamination areas, Loi Tung and Po Kat Tsai, has been verified by IEC and submitted to EPD for endorsement on **2 April 2014**. The revised CAP (Ref: TCS00670/13/600/R00163) for the potential contamination area in Fanling, has also been verified by IEC and submitted to EPD for endorsement on **20 May 2014**.
- 1.7 For ease of reporting, the Contamination Assessment Report (CAR) is also split into two submissions. This Contamination Assessment Report (CAR) presents the site investigation findings at Fanling. In this assessment, soil and water sampling was conducted on 14 and 15 July



2014 under supervision of AUES and RE.

- 1.8 During site investigation, a total of 20 soil samples (include 2 duplicate samples) and 2 groundwater samples (included 1 duplicate sample) were collected from the potential contamination area in Fanling. Finally, 19 original soil samples (include 1 duplicate sample) and 2 groundwater samples (included 1 duplicate groundwater sample) were delivered to ALS Technichem (HK) Pty Ltd carry out chemical analyses in accordance with the Revised CAP.

#### OBJECTIVES OF THE CONTAMINATION ASSESSMENT

- 1.9 The objective of this contamination assessment is to verify the existing ground soil condition of the potential contamination area in Fanling and procedure to dispose of the contamination soil, if identified.
- 1.10 The CAR was conducted based on the following the guidelines and the approved submissions:
- “Guidance Note for Contaminated Land Assessment and Remediation” as issued by EPD on 15 August 2007;
  - “Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management” as issued by EPD on December 2007;
  - “Practice Guide for Investigation and Remediation of Contaminated Land” dated August 2011;
  - Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works of the Environmental Impact Assessment (EIA) Report Appendix 8.1; and
  - The Revised Contamination Assessment Plan (Reference: TCS/00670/13/600/R0163 Rev.3 submitted on 8 August 2014.)

#### CHEMICALS OF CONCERN

- 1.11 According to the revised CAP, the chemical testing parameters for the potential contamination area of Fanling are listed below:
- Metals – Chromium III & VI, Copper, Lead, Manganese, Nickel and Zinc;
  - Petroleum Carbon Ranges – Fractions C6-C8, Fractions C9-C16 and Fractions C17-C35;
  - Volatile Organic Compounds (VOCs) – Acetone, Benzene, Toluene, Ethylbenzene, Xylenes (Total), Methyl tert-Butyl Ether, and Trichloroethene;
  - Semi-volatile Organic Compounds (SVOCs) – Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene and Pyrene.
  - Polychlorinated Biphenyls (PCBs)

#### REPORT STRUCTURE

- 1.12 This CAR is structured into the following sections:-:

<b>Section 1</b>	Introduction
<b>Section 2</b>	Sampling Locations and Assessment Methodology
<b>Section 3</b>	Assessment Results
<b>Section 4</b>	Conclusions and Recommendation

## 2 SAMPLING LOCATIONS AND METHODOLOGY

### SOIL SAMPLING LOCATION

- 2.1 Based on the observations during site visit on 3 April 2014, a total of six (6) hot spot locations were proposed in the potential contamination area of Fanling for soil and groundwater sampling. The proposal has been agreed with the IEC and EPD. The sampling locations to be performed in Fanling are listed in *Table 2-1* and illustrated in *Appendix B*.

**Table 2-1 Sampling Location of the Potential Contamination Areas in Fanling**

Position Hot Spot of Sampling	Co-ordinates		Datum (mPD)	
	Easting	Northing		
FW-01	a	833921	837980	17.668
	b	833922	837980	17.669
	c	833922	837982	17.614
	d	833921	837982	17.620
CW-01	a	833902	837987	17.893
	b	833900	837987	18.038
	c	833900	837991	18.060
	d	833902	837991	17.885
CW-02	a	833900	837991	18.064
	b	833902	837991	17.910
	c	833902	837994	17.964
	d	833900	837994	18.086
CW-03	a	833906	837994	17.971
	b	833905	837996	17.969
	c	833908	837998	17.879
	d	833910	837996	17.879
CW-04	a	833908	837995	18.024
	b	833907	837997	17.955
	c	833911	837998	17.818
	d	833912	837996	17.822
CW-05	a	833919	837997	16.400
	b	833917	837999	16.408
	c	833918	838000	16.405
	d	833920	837998	16.462

### SOIL SAMPLING DEPTH

- 2.2 The proposed final sampling depth of each sampling point is 3m below the existing ground or above groundwater level.

### SOIL SAMPLING METHODOLOGY

- 2.3 Pit excavation with hand tools method was used to conduct soil sampling. The Contractor was responsible to conduct pit excavation and soil sampling, whereas a land contamination specialist and RE supervised all soil sampling process to ensure no cross contamination or any other forms of interferences occurred.
- 2.4 Excavator was used for pit excavation at existing ground until the proposed final depth reached. During soil sampling, the land contamination specialist identified the location for soil collection. According to the revised CAP, soil samples were collected at 3 proposed depths i.e. 0.5m, 1.5m and 3.0m bgl or the final depth in each pit. A stainless steel hand-held trowel was used for soil sample collection. Each collected soil sample with sufficient amount was then put into a sample container (glass jar) which provided by the HOKLAS laboratory (ALS Technichem (HK) Pty Ltd) and stored in a cool box and maintained at a temperature of 4°C.
- 2.5 To avoid cross contamination, no excavation work would be undertaken during raining day. All excavated soils from the pits were stored on the site and no offsite dispose was made.

***In-Situ Measurements***

2.6 For initial identification, soil samples were visually and olfactory inspected on the site. A photo-ionization detector (PID) was used for initial screening to detect the headspace vapor concentrations. The PID was calibrated by ALS Technichem (HK) Pty Ltd using standard gas isobutylene to ensure the accuracy of the equipment prior to site measurement and the calibration certificate is shown in **Appendix C**. A land contamination specialist supervised all soil sampling process to ensure no cross contamination or any other forms of interferences occurred. Moreover, general description of the sampled soil would be given by land contamination specialist as well. The in-situ measurement results and oil description are presented in **Tables 2-2**.

**Table 2-2 Summary Soil Sample Information, PID Measurement Results and Soil Description**

Pit No.	Sample ID	Depth, m bgl	Sampling Date / Time	Odour Intensity	PID, ppm	Soil Description	Remarks
FW-01	1	0.5	14-Jul-14 (13:25)	No odour perceived	0.0	Moist and dense. Reddish dark brown, slightly clayey silty gravelly SAND with cobbles and debris	Duplicate sample Dup-01 was collected.
	2	1.5	14-Jul-14 (13:40)	No odour perceived	0.0	Moist and dense. Reddish dark brown, slightly clayey silty gravelly SAND with some cobbles and	
	3	3.1	14-Jul-14 (14:00)	No odour perceived	0.1	Moist and loose. Yellowish brown, medium SAND with some gravel (FILL SAND)	
CW-01	1	0.5	14-Jul-14 (16:40)	No odour perceived	0.3	Moist and dense. Yellowish brown, silty clayey gravelly SAND with large debris (FILL)	
	2	1.5	14-Jul-14 (16:50)	No odour perceived	0.2	Moist and dense. Light yellowish brown, silty clayey gravelly SAND with debris (FILL)	
	3	3.0	14-Jul-14 (16:55)	No odour perceived	0.1	Moist and dense. Light yellowish brown, silty clayey gravelly SAND with debris (FILL)	
CW-02	1	0.5	14-Jul-14 (15:20)	No odour perceived	0.0	Moist and dense. Yellowish reddish brown, slightly silty clayey gravelly SAND with debris (FILL)	
	2	1.5	14-Jul-14 (15:25)	No odour perceived	0.1	Moist and dense. Brownish red, slightly clayey very silty SAND with some gravel (FILL)	
	3	3.0	14-Jul-14 (15:40)	No odour perceived	0.2	Moist and dense. Light yellowish brown, slightly silty clayey gravelly SAND with debris (FILL)	
CW-03	1	0.5	15-Jul-14 (14:30)	No odour perceived	0.5	Moist and dense. Light yellowish brown splot light red, slightly clayey silty gravelly SAND with debris	
	2	1.5	15-Jul-14 (14:40)	No odour perceived	0.0	Moist and dense. Light yellowish brown, slightly clayey silty gravelly SAND with debris (FILL)	
	3	3.1	15-Jul-14 (14:55)	No odour perceived	0.1	Moist and dense. Light yellowish brown, silty gravelly SAND with some cobbles and debris (FILL)	
CW-04	1	0.5	15-Jul-14 (10:40)	No odour perceived	0.1	Moist and dense. Yellowish greyish brown, clayey very silty gravel SAND with debris (FILL)	Duplicate sample Dup-02 was collected and sent to laboratory for testing.
	2	1.5	15-Jul-14 (10:55)	No odour perceived	0.1	Moist and dense. Reddish brown, clayey silty gravelly SAND (FILL)	
	3	3.1	15-Jul-14 (11:00)	No odour perceived	0.0	Moist and dense. Light yellowish greyish brown, clayey very silty gravel SAND with debris (FILL)	
CW-05	1	0.5	15-Jul-14 (13:15)	No odour perceived	0.1	Moist and dense. Yellowish brown, clayey silty gravelly SAND (FILL)	Groundwater observed at 2.4m below the existing ground. So, the last sample was collected above groundwater level.
	2	1.5	15-Jul-14 (13:25)	No odour perceived	0.0	Moist and dense. Yellowish brown, slightly clayey silty gravelly SAND (FILL)	

Pit No.	Sample ID	Depth, m bgl	Sampling Date / Time	Odour Intensity	PID, ppm	Soil Description	Remarks
	3	2.4	15-Jul-14 (13:40)	No odour perceived	0.0	Wet and dense. Light yellowish greyish brown, slightly clayey silty medium SAND with some	Furthermore, groundwater sample was collected on 15 July 2014

2.7 All soil samples were delivered to a local HOKLAS-accredited laboratory (ALS Technichem (HK) Pty Ltd) to carry out chemical analysis. The Chain-of custody (COC) form was completed as part of the chemical analysis requirement and delivered to the laboratory as well.

2.8 Photograph record of soil samples is provided in *Appendix D*.

#### SOIL SAMPLE ANALYSIS

2.9 There are a total of 20 soil samples (including 2 duplicate samples) collected from 6 sampling hot spots. For chemical analysis, 18 original soil samples and one duplicate sample (as split from CW-04/0.5m bgl) were analyzed in accordance with the requirement in the Revised CAP. According to "Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management", all chemical analysis methods for soil assessment are accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS). The testing method and the reporting limit provided by the laboratory is show in *Table 2-3*.

**Table 2-3 Testing Method and Reporting Limit of the Chemical Analysis- Soil**

Parameter	Methods	Reporting Limit (mg/kg)
a) Metals	USEPA 6020	
• Chromium III & VI		1
• Copper		1
• Lead		1
• Manganese		1
• Nickel		1
• Zinc		1
b) Petroleum Carbon Ranges	USEPA 8015	
• C6 – C8		5
• C9 – C16		200
• C17 – C35		500
c) Volatile Organic Compounds (VOCs)	USEPA 8260	
• Acetone		50
• Benzene		0.2
• Toluene		0.5
• Ethylbenzene		0.5
• Xylenes (total)		2
• Methyl tert-Butyl Ether		0.5
• Trichloroethene		0.1
d) Semi-volatile Organic Compounds (SVOCs)	USEPA 8270	
• Acenaphthene		0.5
• Acenaphthylene		0.5
• Anthracene		0.5
• Benzo(a)anthracene		0.5
• Benzo(a)pyrene		0.5
• Benzo(b)fluoranthene		0.5
• Benzo(g,h,i)perylene		0.5
• Benzo(k)fluoranthene		0.5
• Chrysene		0.5
• Dibenzo(a,h)anthracene		0.5
• Fluoranthene		0.5
• Fluorene		0.5
• Indeno(1,2,3-cd)pyrene		0.5
• Naphthalene		0.5
• Phenanthrene		0.5
• Pyrene		0.5
e) Polychlorinated Biphenyls (PCBs)	USEPA8270	0.1

## GROUNDWATER SAMPLING METHODOLOGY

- 2.10 Since groundwater was encountered in sampling hot spot CW-05 (below 2.4m existing ground level), groundwater sampling was undertaken. According to the Revised CAP, groundwater sample and the duplicate sample were directly collected from the base of sampling pit. The detailed information of groundwater samples is shown *Table 2-4*.

**Table 2-4 Groundwater Samples Collection information**

Sample ID	Date of Sampling	Come from Soil Sampling Pit	Sampling Depth, m bgl	Remarks
CW-W1	15 July 2014	CW-05	2.40 – 2.70	
CW-W2	15 July 2014	CW-05	2.40 – 2.70	Duplicate water sample

### Groundwater Sampling

- 2.11 The groundwater was collected at the base of the pits directly by an uPVC water sampler. Before groundwater sampling, field measurement including temperature, electrical conductivity and pH value were taken and at least three consecutive stable readings were obtained. The result of in-situ measurements are shown in *Table 2-5*.

**Table 2-5 Results of Groundwater Sampling of In-situ Measurement**

Sampling Day	Sampling Pit	Water Sample ID	In-situ Measurement		
			Temp. (°C)	pH	Conductivity (µS/m)
15 July 2014	CW-05	CW-W1 / CW-W2	25.7	7.77	497.8
			26.1	7.61	466.2
			25.4	7.34	451.9
			25.4	7.31	454.8
			25.4	7.26	451.7
			25.3	7.27	450.1

- 2.12 Between each sampling events, all sampling tools or equipment were washed thoroughly and decontaminated with laboratory-grade detergent and then rinsed by deionized water. All collected groundwater samples were preserved in the identical manner as that for soil samples. All laboratory QA/QC and chain of custody procedures was properly followed.

## GROUNDWATER SAMPLE ANALYSIS

- 2.13 The groundwater samples (including a duplicate sample) were delivered to a local HOKLAS-accredited laboratory (ALS Technichem (HK) Pty Ltd) on the same day to carry out chemical analysis. According to “Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management”, all chemical analysis methods for groundwater assessment are accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS). The chemicals analysis method and the reporting limit are shown in *Table 2-6*.

**Table 2-6 Testing Method and Reporting Limit of the Chemical Analysis - Groundwater**

Parameter	Methods	Reporting Limit (µg/L)
a) Petroleum Carbon Ranges <ul style="list-style-type: none"> <li>• C6 – C8</li> <li>• C9 – C16</li> <li>• C17 – C35</li> </ul>	USEPA 8015	20 500 500
b) Volatile Organic Compounds (VOCs) <ul style="list-style-type: none"> <li>• Acetone</li> <li>• Benzene</li> <li>• Toluene</li> <li>• Ethylbenzene</li> <li>• Xylenes (total)</li> <li>• Methyl tert-Butyl Ether</li> <li>• Trichloroethene</li> </ul>	USEPA 8260	500 5 5 5 20 5 5
c) Semi-volatile Organic Compounds (SVOCs) <ul style="list-style-type: none"> <li>• Acenaphthene</li> <li>• Acenaphthylene</li> <li>• Anthracene</li> </ul>	USEPA 8270	2 2 2

Parameter	Methods	Reporting Limit (µg/L)
• Benzo(b)fluoranthene		1
• Chrysene		1
• Fluoranthene		2
• Naphthalene		2
• Phenanthrene		2
• Pyrene		2
d) Polychlorinated Biphenyls (PCBs)	USEPA8270	1

#### ASSESSMENT GUIDELINES

- 2.14 According to EIA Study, the potential land contamination sites involve storage of construction materials, vehicle maintenance and storage of furniture, therefore “industrial” scenario under RBRG standard is recommended to apply as the detection limit. The concentration of detection limit is adopted by EPD as local remediation new requirements and effective on 15 August 2007.
- 2.15 The suggested limits including soil and groundwater under Risk-based Remediation Goals of “industrial” scenario lists in **Table 2-7**.

**Table 2-7 Industrial of Risk-based Remediation Goals limits for Soil and Groundwater**

Parameter	Soil		Groundwater		
	Industrial (mg/kg)	Soil Saturation Limit $C_{sat}$ (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)	
<b>Metals</b>	Chromium III	1.00E+04*	NA	NA	
	Chromium VI	1.96E+03	NA	NA	
	Copper (Cu)	1.00E+04	NA	NA	
	Lead (Pb)	2.29E+03	NA	NA	
	Manganese (Mn)	1.00E+04*	NA	NA	
	Nickel (Ni)	1.00E+04*	NA	NA	
	Zinc (Zn)	1.00E+04*	NA	NA	
<b>Petroleum Carbon Ranges</b>	C6 – C8	1.00E+04*	1.00E+03	1.15E+03	5.23E+00
	C9 – C16	1.00E+04*	3.00E+03	9.98E+03	2.80E+00
	C17 – C35	1.00E+04*	5.00E+03	1.78E+02	2.80E+00
<b>Volatile Organic Chemicals (VOCs)</b>	Acetone	1.00E+04*	***	1.00E+04*	***
	Benzene	9.21E+00	3.36E+02	5.40E+01	1.75E+03
	Toluene	1.00E+04*	2.35E+02	1.00E+04*	5.26E+02
	Ethylbenzene	8.24E+03	1.38E+02	1.00E+04*	1.69E+02
	Xylenes (total)	1.23E+03	1.50E+02	1.57E+03	1.75E+02
	Methyl tert-Butyl Ether	7.01E+01	2.38E+03	1.81E+03	***
	Trichloroethene	5.68E+00	4.88E+02	1.42E+01	1.10E+03
<b>Semi-volatile Organic Compounds (SVOCs)</b>	Acenaphthene	1.00E+04*	6.02E+01	1.00E+04*	4.24E+00
	Acenaphthylene	1.00E+04*	1.98E+01	1.00E+04*	3.93E+00
	Anthracene	1.00E+04*	2.56E+00	1.00E+04*	4.34E-02
	Benzo(a)anthracene	9.18E+01	NA	NA	NA
	Benzo(a)pyrene	9.18E+00	NA	NA	NA
	Benzo(b)fluoranthene	1.78E+01	NA	7.53E+00	1.50E-03
	Benzo(g,h,i)perylene	1.00E+04*	NA	NA	NA
	Benzo(k)fluoranthene	9.18E+02	NA	NA	NA
	Chrysene	1.14E+03	NA	8.12E+02	1.60E-03
	Dibenzo(a,h)anthracene	9.18E+00	NA	NA	NA
	Fluoranthene	1.00E+04*	NA	1.00E+04*	2.06E-01
	Fluorene	1.00E+04*	5.47E+01	1.00E+04*	1.98E+00
	Indeno(1,2,3-cd)pyrene	9.18E+01	NA	NA	NA
	Naphthalene	4.53E+02	1.25E+02	8.62E+02	3.10E+01
	Phenanthrene	1.00E+04*	2.80E+01	1.00E+04*	1.00E+00
	Pyrene	1.00E+04*	NA	1.00E+04*	1.35E-01
	<b>Polychlorinated Biphenyls (PCBs)</b>		7.48E-01	NA	5.11E+00

Remark:

(\*) indicates a 'ceiling limit' concentration.

(\*\*\*) indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

**PROCEDURE FOR EQUIPMENT DECONTAMINATION**

- 2.16 Tap water, phosphate-free detergent (Decon<sup>®</sup> 90) and distilled water were used to clean all sampling tools. The decontamination work was supervised by the RE and a land contamination specialist or his delegates. The decontamination procedure was conducted as follows:
- The bucket of the excavator was decontaminated before each pit excavation to ensure no cross contamination;
  - All sampling tools were decontaminated after sampling at each sampling locations to prevent cross-contamination of samples; and
  - Prior leaving the site, all sampling equipments were washed to prevent potentially contamination of soil or surface water to be brought off site.
- 2.17 To verify the decontamination procedures on the site, two equipment blanks were collected to determine potential cross contamination between each sampling from the sampling tools used. The soil or groundwater sampling tools were rinsed by organic-free water and the rinsed water was collected in the equipment blanks. Equipment blanks were collected on 14 and 15 July 2014 and then undertaken chemical analysis following *Section 1.11*.

**QA/QC PROCEDURES**

- 2.18 The quality control samples were collected during the course of soil and groundwater sampling. Duplicate soil samples were taken from potential contaminated areas. For soil sampling, a total of 4 duplicate samples were collected from two assessment areas. Moreover, one trip blank, one field blank and one duplicate sample were collected for groundwater sampling.

***Trip/Travel Blank***

- 2.19 The trip blank was prepared in the laboratory using organic-free water. The trip blank was brought to the site and remained unopened from the start of groundwater sampling to the delivery of samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total).

***Field Blank***

- 2.20 The field blank was prepared in field using organic-free water by passing the water from a full bottle to an empty bottle at the contaminated location on site. It would be collected for each groundwater sampling date. The field blank accompanied the project samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total). Number of field blank sample collection depends on the number of days of groundwater sampling. In this study, Field Blank was collected at CW-05 during groundwater sampling.

***Duplicate Sample***

- 2.21 The duplicate samples were collected as a split sample from soil and groundwater to carry out chemical analysis in accordance with *Section 1.11*. These samples were delivered to the laboratory as two individual samples without any indication to the laboratory that they are duplicates. Detailed information of duplicate sample collection is listed below:

**Table 2-8 Detailed Information of Duplicate Soil and Groundwater Samples**

Matrix	Duplicate Sample	Original Sample	Sampling Date
Soil	Dup-01	FW-01/1/0.5m bgl	14 July 2014
Soil	*Dup-02	CW-04/1/0.5m bgl	15 July 2014
Water	*CW-W2	CW-W1	15 July 2014

Remarks:

(\*) Duplicate sample is sent to testing laboratory carry out chemical analysis

- 2.22 According to *Section 4.4* of the Approved Revised Contamination Assessment Plan (CAP), it was proposed that “one duplicate sample will be collected for every twenty soil or groundwater samples for carrying out chemical analysis”. Since less than 20 soil samples were collected, only one soil duplicate sample (randomly selected) and one groundwater duplicate sample would be delivered to laboratory for chemical analysis.

### 3 ASSESSMENT RESULTS

#### SOIL AND GROUNDWATER SAMPLE LABORATORY RESULTS

- 3.1 In this assessment, 19 original soil samples (include 1 duplicate sample) and 2 groundwater samples (included 1 duplicate groundwater sample), were delivered to ALS Technichem (HK) Pty Ltd carry out chemical analyses in accordance with the Revised CAP. The assessment results were evaluated against the “industrial” scenario under Risk-based Remediation Goals limits as presented in *Table 2-7*.
- 3.2 Summary of soil and underground water analysis result and laboratory report are shown in *Appendix E* and *Appendix F* respectively.
- 3.3 The comparison of maximum detected concentrations for the “Industrial” scenario of RBRGs and Soil Saturation Limit are presented in *Table 3-1*.

**Table 3-1 Soil Data Summary and Comparison to RBRGs and C<sub>sat</sub>**

Chemical	Frequency of Detection (x/y)*			Range of Detected Concentration (mg/kg)		Industrial of Land Using (mg/kg)		Maximum Detected Concentration Exceeds
	X	Y	%	Max.	Min.	RBRGs	C <sub>sat</sub>	
<b><i>Volatile Organic Compounds (VOCs)</i></b>								
Acetone	0	19	0.0	BRL		1.00E+04*	***	BRL
Benzene	0	19	0.0	BRL		9.21E+00	3.36E+02	BRL
Ethylbenzene	0	19	0.0	BRL		8.24E+03	1.38E+02	BRL
Methyl tert-Butyl Ether	0	19	0.0	BRL		7.01E+01	2.38E+03	BRL
Toluene	0	19	0.0	BRL		1.00E+04*	2.35E+02	BRL
Trichloroethene	0	19	0.0	BRL		5.68E+00	4.88E+02	BRL
Xylenes (Total)	0	19	0.0	BRL		1.23E+03	1.50E+02	BRL
<b><i>Semi-Volatile Organic Compounds (SVOCs)</i></b>								
Acenaphthene	0	19	0.0	BRL		1.00E+04*	6.02E+01	BRL
Acenaphthylene	0	19	0.0	BRL		1.00E+04*	1.98E+01	BRL
Anthracene	0	19	0.0	BRL		1.00E+04*	2.56E+00	BRL
Benzo(a)anthracene	0	19	0.0	BRL		9.18E+01	NA	BRL
Benzo(a)pyrene	0	19	0.0	BRL		9.18E+00	NA	BRL
Benzo(b)fluoranthene	0	19	0.0	BRL		1.78E+01	NA	BRL
Benzo(g,h,i)perylene	0	19	0.0	BRL		1.00E+04*	NA	BRL
Benzo(k)fluoranthene	0	19	0.0	BRL		9.18E+02	NA	BRL
Chrysene	0	19	0.0	BRL		1.14E+03	NA	BRL
Dibenzo(a,h)anthracene	0	19	0.0	BRL		9.18E+00	NA	BRL
Fluoranthene	0	19	0.0	BRL		1.00E+04*	NA	BRL
Fluorene	0	19	0.0	BRL		1.00E+04*	5.47E+01	BRL
Indeno(1,2,3-cd)pyrene	0	19	0.0	BRL		9.18E+01	NA	BRL
Naphthalene	0	19	0.0	BRL		4.53E+02	1.25E+02	BRL
Phenanthrene	0	19	0.0	BRL		1.00E+04*	2.80E+01	BRL
Pyrene	0	19	0.0	BRL		1.00E+04*	NA	BRL
Polychlorinated Biphenyls	2	19	10.5	0.1		7.48E-01	NA	<RBRGs
<b><i>Petroleum Carbon Ranges</i></b>								
Fractions C6-C8	0	19	0.0	BRL		1.00E+04*	1.00E+03	BRL
Fractions C9-C16	0	19	0.0	BRL		1.00E+04*	3.00E+03	BRL
Fractions C17-C35	0	19	0.0	BRL		1.00E+04*	5.00E+03	BRL
<b><i>Heavy Metal</i></b>								
Chromium III	19	19	100.0	18	2	1.00E+04*	NA	<RBRGs
Chromium VI	0	19	0.0	BRL		1.96E+03	NA	BRL
Copper	19	19	100.0	50	1	1.00E+04*	NA	<RBRGs
Lead	19	19	100.0	153	10	2.29E+03	NA	<RBRGs



Chemical	Frequency of Detection (x/y)*			Range of Detected Concentration (mg/kg)		Industrial of Land Using (mg/kg)		Maximum Detected Concentration Exceeds
	X	Y	%	Max.	Min.	RBRGs	C <sub>sat</sub>	
Manganese	19	19	100.0	568	36.1	1.00E+04*	NA	<RBRGs
Nickel	17	19	89.5	12	1	1.00E+04*	NA	BRL
Zinc	19	19	100.0	174	9	1.00E+04*	NA	<RBRGs

Remarks:

x = number of samples in which chemical was found above the method reporting limit

y = number of samples analyzed for chemical

BRL = Below Reporting Limit

NA = Non-Applicable

(\*) indicates a 'ceiling limit' concentration.

(\*\*\*) indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

- 3.4 The comparison of maximum detected concentrations for the "Industrial" scenario of RBRGs and Solubility Limit are presented in **Table 3-2**.

**Table 3-2 Groundwater Data Summary and Comparison to RBRGs and Solubility Limit**

Chemical	Frequency of Detection (x/y)*			Range of Detected Concentration (mg/kg)		Industrial of Land Using (mg/L)		Maximum Detected Concentration Exceeds
	X	Y	%	Max.	Min.	RBRGs	Solubility Limit	
<b>Volatile Organic Compounds (VOCs)</b>								
Acetone	0	2	0.0	BRL		1.00E+04*	***	BRL
Benzene	0	2	0.0	BRL		5.40E+01	1.75E+03	BRL
Toluene	0	2	0.0	BRL		1.00E+04*	5.26E+02	BRL
Ethylbenzene	0	2	0.0	BRL		1.00E+04*	1.69E+02	BRL
Xylenes (total)	0	2	0.0	BRL		1.57E+03	1.75E+02	BRL
Methyl tert-Butyl Ether	0	2	0.0	BRL		1.81E+03	***	BRL
Trichloroethene	0	2	0.0	BRL		1.42E+01	1.10E+03	BRL
<b>Semi-Volatile Organic Compounds (SVOCs)</b>								
Acenaphthene	0	2	0.0	BRL		1.00E+04*	4.24E+00	BRL
Acenaphthylene	0	2	0.0	BRL		1.00E+04*	3.93E+00	BRL
Anthracene	0	2	0.0	BRL		1.00E+04*	4.34E-02	BRL
Benzo(b)fluoranthene	0	2	0.0	BRL		7.53E+00	1.50E-03	BRL
Chrysene	0	2	0.0	BRL		8.12E+02	1.60E-03	BRL
Fluoranthene	0	2	0.0	BRL		1.00E+04*	2.06E-01	BRL
Naphthalene	0	2	0.0	BRL		8.62E+02	3.10E+01	BRL
Phenanthrene	0	2	0.0	BRL		1.00E+04*	1.00E+00	BRL
Pyrene	0	2	0.0	BRL		1.00E+04*	1.35E-01	BRL
Polychlorinated Biphenyls	0	2	0.0	BRL		5.11E+00	3.10E-02	BRL
<b>Petroleum Carbon Ranges</b>								
Fractions C6 – C8	0	2	0.0	BRL		1.15E+03	5.23E+00	BRL
Fractions C9 – C16	0	2	0.0	BRL		9.98E+03	2.80E+00	BRL
Fractions C17 – C35	0	2	0.0	BRL		1.78E+02	2.80E+00	BRL

x = number of samples in which chemical was found above the method reporting limit

y = number of samples analyzed for chemical

BRL = Below Reporting Limit

NA = Non-Applicable

(\*) indicates a 'ceiling limit' concentration.

(\*\*\*) indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

## DATA QUALITY

- 3.5 In this assessment, the QA/QC of soil and groundwater sampling was conducted in accordance with the revised CAP. One soil and one groundwater duplicate samples were obtained for a full suite

analysis. Besides, two equipment blanks (Rinsate Blank), one field blank and one trip blank were collected during the soil and groundwater sampling process. The analysis for equipment blank to be tested is the same as representative groundwater sample, and field blank and trip blank were only tested for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total).

- 3.6 The Relative Percent Difference (RPD) of the field QA/QC for soil and groundwater sample is listed in **Table 3-3**. The RPD acceptance criteria are revised where the analytical results are less than 10 times of reporting limit for a particular analysis.

**Table 3-3 Acceptance Criteria for Field Quality Control Samples**

Quality Control Samples	Acceptable Relative Percent Difference (RPD)/Results
Trip Blanks	Result = Non Detectable
Field Blanks	Result = Non Detectable
Rinsate Blanks	Result = Non Detectable
Blind Duplicates	RPD = 0% to 50% of mean concentration determined by both tests

$$\text{The Relative Percent Difference (RPD)} = \frac{(\text{Result 1} - \text{Result 2}) \times 100}{\text{Mean of Results 1 \& 2}}$$

- 3.7 Analytical results including soil and water for the duplicate samples and original samples found that the VOCs, SVOCs, PCBs and Petroleum Carbon Ranges are below reporting limits. Furthermore, Relative Percent Difference of the heavy metals was indicated within acceptable percentage. Hence, the duplicate soil or groundwater samples are consistent with the original samples. A comparison of RPD values in heavy metal parameters among the soil duplicate is shown in **Table 3-4**.

**Table 3-4 Summary of Relative Percent Difference (RPD) Value – Soil**

Para.	Heavy Metal						
	Chromium III	Chromium VI	Copper	Lead	Manganese	Nickel	Zinc
CW-04 / 0.5m bgl	11	BRL	22	43	349	5	99
Dup-02	11	BRL	21	56	447	6	125
<b>RPD (%)</b>	<b>0.0</b>	<b>NA</b>	<b>4.7%</b>	<b>26.3%</b>	<b>24.6%</b>	<b>18.2%</b>	<b>23.2%</b>

Note: BRL = Below Reporting Limit NA = Non-Applicable

- 3.8 Trip blank, field blank and equipment blank were also found below reporting limits. The QA/QC results shown that all chemical testing results are acceptable and reliability. All the laboratory reports are shown in **Appendix F**.

#### CONCLUSION

- 3.9 According to **Tables 3-1** and **3-2**, no exceedance was found in all soils and groundwater samples collected from the potential contamination area Fanling in comparison with RBRG Industrial and Soil Saturation or Solubility Limits criteria. Moreover, no Non-Aqueous Phase Liquid (NAPL) was observed by visual inspection. It is concluded that the soil conditions in the assessment area of Fanling is fallen within the acceptable level in accordance with current remediation guidelines issued by HKSAR Government and no remediation action is therefore required.
- 3.10 During site investigation, only sampling pit CW-05 encountered groundwater. According to the sampling pit position and water level, the groundwater level located in the assessment site should be +14mPD. Besides, the direction of groundwater flow should be toward north-east Ma Wat River.

#### 4 CONCLUSIONS AND RECOMMENDATIONS

- 4.1 The objective of the land contamination assessment is to verify the soil condition of the site and whether remediation is required before the commencement of major construction activities. Site investigation work of the soil and groundwater at the potential contamination area Fanling were conducted on 14 and 15 July 2014. The site investigation works were carried out in accordance with the Revised CAP and performed in compliance with the relevant guidelines on land contamination assessment issued by EPD.
- 4.2 In this assessment, 19 original soil samples (include 1 duplicate sample) and 2 groundwater samples (included 1 duplicate groundwater sample), were delivered to ALS Technichem (HK) Pty Ltd carry out chemical analyses in accordance with the Revised CAP.
- 4.3 To ensure the collected groundwater is stable, in-situ measurement including temperature, pH and electrical conductivity was conducted during water sampling. Extra samples such as field blank, trip blank and equipment blank were also taken for the QA/QC control.
- 4.4 Overall analytical results of soil and groundwater duplicate are achieved the RPD acceptable criteria. Moreover, trip blank, field blank and equipment blank were also detected below reporting limit. The QA/QC results shown that all chemical testing results are acceptable and reliability.
- 4.5 For the soil samples collected from the potential contamination area of Fanling, the chemical testing results were all found within the RBRG Industrial and Soil Saturation Limit of remedial criteria. For the groundwater samples, all chemicals concentrations are below RBRG Industrial and Solubility Limit of remedial criteria. No Non-Aqueous Phase Liquid (NAPL) observed during soil and groundwater sampling.
- 4.6 Based on the soil and groundwater samples results at both assessment sites, remediation is not required in accordance with the “Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management”. Moreover, having checked that the soil test results are all below the RBRG limits for Urban Residential, Rural Residential and Public Parks. In conclusion, the existing soils in both assessment sites are acceptable for retaining and reusing. If off-site disposal is required, the Contractor should follow the waste disposal ordinance and contractual requirements of the project.

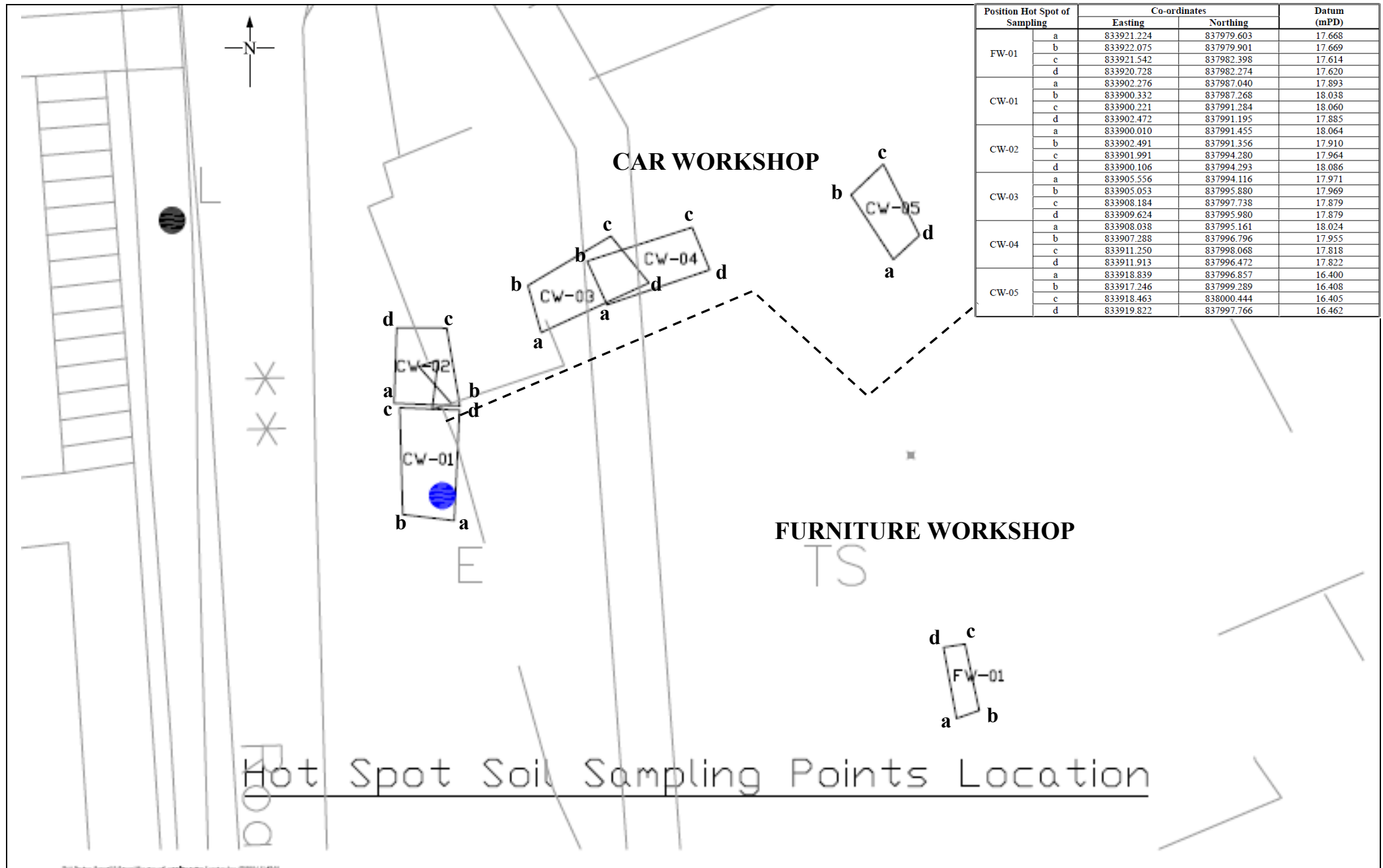
## **Appendix A**

### **PROJECT LAYOUT PLAN**



## **Appendix B**

### **SOIL/GROUNDWATER SAMPLING LOCATION**



## **Appendix C**

### **CALIBRATION CERTIFICATE OF PID**





ALS Technichem (HK) Pty Ltd  
11/F, Chung Shun Knitting Centre  
1-3 Wing Yip Street  
Kwai Chung, N.T., Hong Kong  
T: +852 2610 1044  
F: +852 2610 2021  
www.alsglobal.com

## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**CONTACT:** Mr Ivan Leung  
**CLIENT:** ALS Technichem (HK) PTY LTD  
**ADDRESS:** 11/F., Chung Shun Knitting Centre,  
No 1-3 Wing Yip Street,  
Kwai Chung, N.T.

**WORK ORDER:** HK1417502  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 05/06/2014  
**DATE OF ISSUE:** 05/06/2014  
**No of Equipment:** 1

**PROJECT:**  
**SITE:**

### COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

**Scope of Test:** PID Measurement  
**Description:** Photo-ionization Detector  
**Brand Name:** RAE  
**Model No.:** Mini RAE  
**Serial No.:** Ex-96.D.1328  
**Equipment No.:** Hk1054  
**Date of Calibration:** 05 June, 2014

### NOTES

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.

### ISSUING LABORATORY: HONG KONG

#### Address

ALS Technichem (HK) Pty Ltd  
11/F Chung Shun Knitting Centre  
1-3 Wing Yip Street  
Kwai Chung  
HONG KONG

**Phone:** 852-2610 1044  
**Fax:** 852-2610 2021  
**Email:** [hongkong@alsglobal.com](mailto:hongkong@alsglobal.com)

Mr Leung Sai Ho, Ivan  
Manager - Customer Services

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1417502  
Date of Issue: 05/06/2014  
Client: ALS Technichem (HK) PTY LTD



Description: Photo-ionization Detector  
Brand Name: RAE  
Model No.: Mini RAE  
Serial No.: Ex-96.D.1328  
Equipment No.: Hk1054  
Date of Calibration: 05 June, 2014

Date of next Calibration: 04 June, 2015

Parameters: **PID Measurement**

Expected Reading (ppm)	Displayed Reading (ppm)
100 ppm	102 ppm
Allowing Deviation	± 10%









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Mr Leung Sai Ho, Ivan  
Manager - Customer Services








## **Appendix D**

### **PHOTOGRAPH RECORD**

FW-01

			
<p><b>Photo 1:</b> Location of sampling pit</p>			<p><b>Photo 2:</b> Surface condition of Sampling Pit</p>
			
<p><b>Photo 3:</b> Status of the sampling pit at middle section</p>			<p><b>Photo 4:</b> Status of the sampling pit bottom (Final Depth)</p>
			
<p><b>Photo 5:</b> Final depth measurement</p>			<p><b>Photo 6:</b> Soil Sample FW-01/1/0.5m bgl</p>
			
<p><b>Photo 7:</b> Soil Sample FW-01/2/1.5m bgl</p>			<p><b>Photo 8:</b> Soil Sample FW-01/3/3.1m bgl</p>

**CW-01**

			
<p><b>Photo 1:</b> Location of sampling pit</p>		<p><b>Photo 2:</b> Sampling Pit excavation process</p>	
			
<p><b>Photo 3:</b> Status of the sampling pit bottom</p>		<p><b>Photo 4:</b> Soil sampling process</p>	
			
<p><b>Photo 5:</b> Soil Sample CW-01/1/0.5m bgl</p>		<p><b>Photo 6:</b> Soil Sample CW-01/2/1.5m bgl</p>	
			
<p><b>Photo 7:</b> Soil Sample CW-01/3/3.0m bgl</p>			

**CW-02**



**Photo 1:**  
Location of sampling pit

**Photo 2:**  
Surface condition of Sampling Pit



**Photo 3:**  
Status of the sampling pit at middle section

**Photo 4:**  
Final depth measurement



**Photo 5:**  
Soil Sample CW-02/1/0.5m bgl

**Photo 6:**  
Soil Sample CW-02/2/1.5m bgl



**Photo 7:**  
Soil Sample CW-02/3/3.0m bgl

**CW-03**



**Photo 1:**  
Location of sampling pit



**Photo 2:**  
Sampling Pit excavation process



**Photo 3:**  
Sampling depth measurement



**Photo 4:**  
Soil sample collection process



**Photo 5:**  
Status of the sampling pit bottom



**Photo 6:**  
Soil Sample CW-03/1/0.5m bgl



**Photo 7:**  
Soil Sample CW-03/2/1.5m bgl



**Photo 8:**  
Soil Sample CW-03/3/3.1m bgl

**CW-04**



**Photo 1:**  
Location of sampling pit



**Photo 2:**  
Sampling Pit excavation process



**Photo 3:**  
Status of the sampling pit bottom



**Photo 4:**  
Sampling Pit final depth measurement



**Photo 5:**  
Soil Sample CW-04/1/0.5m bgl and Duplicate Sample (Duplicate 02)



**Photo 6:**  
Soil Sample CW-04/2/1.5m bgl



**Photo 7:**  
Soil Sample CW-04/3/3.1m bgl



CW-05



**Photo 1:**  
Location of sampling pit



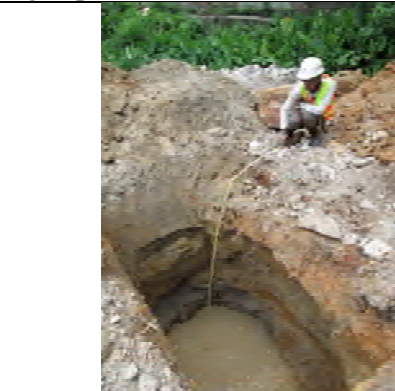
**Photo 2:**  
Sampling Pit excavation process



**Photo 3:**  
Sampling depth measurement



**Photo 4:**  
Groundwater was observed at the sampling pit



**Photo 5:** Groundwater table measurement



**Photo 6:**  
Soil Sample CW-05/1/0.5m bgl



**Photo 7:**  
Soil Sample CW-05/2/1.5m bgl



**Photo 8:**  
Soil Sample CW-05/3/2.4m bgl

CW-05



**Photo 9:**  
Groundwater sampling in-situ measurement



**Photo 10:**  
Groundwater collection



**Photo 11:**  
Groundwater sampling process



**Photo 12:**  
Groundwater Sampling CW-W1 and Duplicate Sample CW-W2

**Other Photograph Records**



**Photo 1:**  
 Perform an excavator decontamination



**Photo 2:**  
 Conduct equipment blank collection



**Photo 3:**  
 An equipment blank collected on 14 July 2014



**Photo 4:**  
 A field blank collected on 15 July 2014



**Photo 5:**  
 An equipment blank collected on 15 July 2014



**Photo 6:**  
 Photo-ionization Detector (PID) was used to measure headspace vapor concentration

## **Appendix E**

### **CHEMICAL RESULT SUMMARY**

Agreement No. CE 45/2008 (CE) - Liantang/Heung Yuen Wai Boundary Control Point and Associated Works  
Land Contamination Assessment Location: Fanling

Summary of Soil Samples Chemical Testing Results

Chemicals Analytical		Unit	Reporting Limit	Risk-based Remediation Goals limits (mg/kg)		FW-01			CW-01			CW-02			CW-03			CW-04			CW-05			Dup-2 (CW-04 / 1 / 0.5m bgl)
				Industrial	Soil Saturation Limit	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
						0.5m bgl	1.5m bgl	3.1m bgl	0.5m bgl	1.5m bgl	3.0m bgl	0.5m bgl	1.5m bgl	3.0m bgl	0.5m bgl	1.5m bgl	3.1m bgl	0.5m bgl	1.5m bgl	3.1m bgl	0.5m bgl	1.5m bgl	3.1m bgl	
Heavy Metal	Chromium III	mg/kg	1	1.00E+04*	NA	14	13	2	13	16	6	13	13	4	18	16	2	11	13	3	5	4	4	11
	Chromium VI	mg/kg	1	1.96E+03	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Copper	mg/kg	1	1.00E+04*	NA	20	18	4	4	50	4	6	13	10	6	22	1	22	6	2	5	3	4	21
	Lead	mg/kg	1	2.29E+03	NA	55	48	65	46	105	40	64	54	102	20	66	10	43	21	19	71	50	153	56
	Manganese	mg/kg	0.5	1.00E+04*	NA	515	339	36.1	258	303	568	361	310	201	93.2	277	54.0	349	47.0	42.4	112	350	261	447
	Nickel	mg/kg	1	1.00E+04*	NA	5	5	2	5	12	2	5	3	3	1	6	<1	5	2	<1	2	2	1	6
	Zinc	mg/kg	1	1.00E+04*	NA	124	162	26	36	174	40	89	37	86	37	51	9	99	155	16	32	24	24	125
Petroleum Carbon Ranges	Fractions C6-C8	mg/kg	5	1.00E+04*	1.00E+03	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Fractions C9-C16	mg/kg	200	1.00E+04*	3.00E+03	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
	Fractions C17-C35	mg/kg	500	1.00E+04*	5.00E+03	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500
Volatile Organic Compounds	Acetone	mg/kg	50	1.00E+04*	***	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	Benzene	mg/kg	0.2	9.21E+00	3.36E+02	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	8.24E+03	1.38E+02	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methyl tert-Butyl Ether	mg/kg	0.5	7.01E+01	2.38E+03	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	1.00E+04*	2.35E+02	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Trichloroethene	mg/kg	0.1	5.68E+00	4.88E+02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylenes (Total)	mg/kg	2	1.23E+03	1.50E+02	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Semi-volatile Organic Compounds	Acenaphthene	mg/kg	0.5	1.00E+04*	6.02E+01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	1.00E+04*	1.98E+01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5	1.00E+04*	2.56E+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	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5	9.18E+01	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5	9.18E+00	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b)fluoranthene	mg/kg	0.5	1.78E+01	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(g,h,i)perylene	mg/kg	0.5	1.00E+04*	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5	9.18E+02	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5	1.14E+03	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenzo(a,h)anthracene	mg/kg	0.5	9.18E+00	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	1.00E+04*	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5	1.00E+04*	5.47E+01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-cd)pyrene	mg/kg	0.5	9.18E+01	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5	4.53E+02	1.25E+02	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	1.00E+04*	2.80E+01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	0.5	1.00E+04*	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Polychlorinated Biphenyls	mg/kg	0.1	7.48E-01	NA	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	

Remark

(\*) indicates a 'ceiling limit' concentration

(\*\*\*) indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

Agreement No. CE 45/2008 (CE) - Liantang/Heung Yuen Wai Boundary Control Point and Associated Works  
Land Contamination Assessment Location: Fanling

Summary of Groundwater Samples Chemical Testing Results

Chemicals Analytical		Unit	Reporting Limit	Risk-based Remediation Goals limits (mg/L)		CW-W1	CW-W2	QA/QC samples			
						Collected from CW-05	Collected from CW-05 as Duplicate Sample	Rinsate Blank collected from Soil Sampling Tools	Rinsate Blank collected from Water Sampling Tools	Trip Blank	Field Blank
				Industrial	Solubility			14-Jul-14	15-Jul-14		
Petroleum Carbon Ranges	Fractions C6-C8	µg/L	20	1.15E+03	5.23E+00	<20	<20	<20	<20	---	---
	Fractions C9-C16	µg/L	500	9.98E+03	2.80E+00	<500	<500	<500	<500	---	---
	Fractions C17-C35	µg/L	500	1.78E+02	2.80E+00	<500	<500	<500	<500	---	---
Volatile Organic Compounds	Acetone	µg/L	500	1.00E+04*	***	<500	<500	<500	<500	---	---
	Benzene	µg/L	5	5.40E+01	1.75E+03	<5	<5	<5	<5	<5	<5
	Toluene	µg/L	5	1.00E+04*	5.26E+02	<5	<5	<5	<5	<5	<5
	Ethylbenzene	µg/L	5	1.00E+04*	169	<5	<5	<5	<5	<5	<5
	Xylenes (total)	µg/L	20	1.57E+03	1.75E+02	<20	<20	<20	<20	<20	<20
	Methyl tert-Butyl Ether	µg/L	5	1.81E+03	***	<5	<5	<5	<5	---	---
	Trichloroethene	µg/L	5	1.42E+01	1100	<5	<5	<5	<5	---	---
Semi-volatile Organic Compounds	Acenaphthene	µg/L	2	1.00E+04*	4.24E+00	<2	<2	<2	<2	---	---
	Acenaphthylene	µg/L	2	1.00E+04*	3.93E+00	<2	<2	<2	<2	---	---
	Anthracene	µg/L	2	1.00E+04*	4.34E-02	<2	<2	<2	<2	---	---
	Benzo(b)fluoranthene	µg/L	1	7.53E+00	1.50E-03	<1	<1	<1	<1	---	---
	Chrysene	µg/L	1	8.12E+02	1.60E-03	<1	<1	<1	<1	---	---
	Fluoranthene	µg/L	2	1.00E+04*	2.06E-01	<2	<2	<2	<2	---	---
	Naphthalene	µg/L	2	8.62E+02	3.10E+01	<2	<2	<2	<2	---	---
	Phenanthrene	µg/L	2	1.00E+04*	1.00E+00	<2	<2	<2	<2	---	---
Pyrene	µg/L	2	1.00E+04*	1.35E-01	<2	<2	<2	<2	---	---	
Polychlorinated Biphenyls		µg/L	1	5.11E+00	3.10E-02	<1	<1	<1	<1	---	---

Remark

(\*) indicates a 'ceiling limit' concentration

(\*\*\*) indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

## **Appendix F**

### **LABORATORY DATA REPORT**

## CERTIFICATE OF ANALYSIS

Client	: ACTION UNITED ENVIRO SERVICES	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 16
Contact	: MR BEN TAM	Contact	: Fung Lim Chee, Richard	Work Order	: HK1422836
Address	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Bentam@fordbusiness.com	E-mail	: Richard.Fung@alsglobal.com	Date Samples Received	: 15-JUL-2014
Telephone	: +852 2959 6059	Telephone	: +852 2610 1044	Issue Date	: 29-JUL-2014
Facsimile	: +852 2959 6079	Facsimile	: +852 2610 2021	No. of samples received	: 19
Project	: TCS00670_13	Quote number	: ----	No. of samples analysed	: 19
Order number	: ----				
C-O-C number	: H026702-H026703				
Site	: LIAN TANG - C3				

### 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: 25-JUL-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: **HK1422836**

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.

**This report may not be reproduced except with prior written approval from the testing laboratory. Hong Kong Accreditation Service (HKAS) has accredited 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  
Wong Wing, Kenneth

Assistant Manager - Organics  
Manager - Metals

Organics  
Inorganics





**Analytical Results**

Sub-Matrix: SOIL

				Client sample ID	FW-01 (0.5M)	FW-01 (1.5M)	FW-01 (3.1M)	CW-02 (0.5M)	CW-02 (1.5M)
				Client sampling date / time	14-JUL-2014 13:25	14-JUL-2014 13:40	14-JUL-2014 14:00	14-JUL-2014 15:20	14-JUL-2014 15:25
Compound	CAS Number	LOR	Unit	Client sample ID	FW-01 (0.5M)	FW-01 (1.5M)	FW-01 (3.1M)	CW-02 (0.5M)	CW-02 (1.5M)
				Client sampling date / time	HK1422836-001	HK1422836-002	HK1422836-003	HK1422836-004	HK1422836-005
<b>EA/ED: Physical and Aggregate Properties</b>									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		14.6	17.8	7.2	10.5	18.8
<b>EG: Metals and Major Cations</b>									
EG020: Copper	7440-50-8	1	mg/kg		20	18	4	6	13
EG020: Lead	7439-92-1	1	mg/kg		55	48	65	64	54
EG020: Manganese	7439-96-5	0.5	mg/kg		515	339	36.1	361	310
EG020: Nickel	7440-02-0	1	mg/kg		5	5	2	5	3
EG020: Zinc	7440-66-6	1	mg/kg		124	162	26	89	37
EG049: Trivalent Chromium	16065-83-1	1	mg/kg		14	13	2	13	13
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg		<1	<1	<1	<1	<1
<b>EP-066: Polychlorinated Biphenyls</b>									
Total Polychlorinated biphenyls	----	0.1	mg/kg		0.1	0.1	<0.1	<0.1	<0.1
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)</b>									
Naphthalene	91-20-3	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Dibenz(a,h)anthracene	53-70-3	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg		<0.500	<0.500	<0.500	<0.500	<0.500
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)</b>									
C6 - C8 Fraction	----	5	mg/kg		<5	<5	<5	<5	<5
C9 - C16 Fraction	----	200	mg/kg		<200	<200	<200	<200	<200
C17 - C35 Fraction	----	500	mg/kg		<500	<500	<500	<500	<500
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)</b>									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<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	<1.0	<1.0



Sub-Matrix: SOIL				Client sample ID	FW-01 (0.5M)	FW-01 (1.5M)	FW-01 (3.1M)	CW-02 (0.5M)	CW-02 (1.5M)
				Client sampling date / time	14-JUL-2014 13:25	14-JUL-2014 13:40	14-JUL-2014 14:00	14-JUL-2014 15:20	14-JUL-2014 15:25
Compound	CAS Number	LOR	Unit		HK1422836-001	HK1422836-002	HK1422836-003	HK1422836-004	HK1422836-005
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) - Continued</b>									
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes (Total)	---	2.0	mg/kg		<2.0	<2.0	<2.0	<2.0	<2.0
<b>EP-074_SR-B: Oxygenated Compounds</b>									
2-Propanone (Acetone)	67-64-1	50	mg/kg		<50	<50	<50	<50	<50
<b>EP-074_SR-E: Halogenated Aliphatics</b>									
Trichloroethene	79-01-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
<b>EP-074_SR-I: Methyl-tert-butyl Ether</b>									
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>								Surrogate control limits listed at end of this report.	
2-Fluorobiphenyl	321-60-8	0.1	%		85.8	97.6	82.1	92.9	89.1
4-Terphenyl-d14	1718-51-0	0.1	%		93.7	97.4	90.9	97.2	91.9
<b>EP-066S: PCB Surrogate</b>								Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%		79.0	80.4	60.6	68.0	52.0
Dibutylchloroendate	1770-80-5	0.1	%		112	92.0	105	117	119
<b>EP-080_SRS: TPH(Volatile)/BTEX Surrogate</b>								Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%		91.1	90.1	90.7	90.8	90.9
Toluene-D8	2037-26-5	0.1	%		99.7	99.3	96.0	100	99.7
4-Bromofluorobenzene	460-00-4	0.1	%		95.1	94.4	97.2	95.0	94.3
<b>EP-074_SR-S: VOC Surrogates</b>								Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%		91.1	90.1	90.7	90.8	90.9
Toluene-D8	2037-26-5	0.1	%		99.7	99.3	96.0	100	99.7
4-Bromofluorobenzene	460-00-4	0.1	%		95.1	94.4	97.2	95.0	94.3



Sub-Matrix: SOIL			Client sample ID	CW-02 (3.0M)	CW-01 (0.5M)	CW-01 (1.5M)	CW-01 (3.0M)	CW-04 (0.5M)
			Client sampling date / time	14-JUL-2014 15:40	14-JUL-2014 16:40	14-JUL-2014 16:50	14-JUL-2014 16:50	15-JUL-2014 10:40
Compound	CAS Number	LOR	Unit	HK1422836-006	HK1422836-007	HK1422836-008	HK1422836-009	HK1422836-010
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103°C)	---	0.1	%	16.2	13.3	16.0	17.0	11.2
<b>EG: Metals and Major Cations</b>								
EG020: Copper	7440-50-8	1	mg/kg	10	4	50	4	22
EG020: Lead	7439-92-1	1	mg/kg	102	46	105	40	43
EG020: Manganese	7439-96-5	0.5	mg/kg	201	258	303	568	349
EG020: Nickel	7440-02-0	1	mg/kg	3	5	12	2	5
EG020: Zinc	7440-66-6	1	mg/kg	86	36	174	40	99
EG049: Trivalent Chromium	16065-83-1	1	mg/kg	4	13	16	6	11
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	<1	<1	<1
<b>EP-066: Polychlorinated Biphenyls</b>								
Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Dibenz(a,h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)</b>								
C6 - C8 Fraction	---	5	mg/kg	<5	<5	<5	<5	<5
C9 - C16 Fraction	---	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	---	500	mg/kg	<500	<500	<500	<500	<500
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)</b>								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<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	<1.0	<1.0
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



Sub-Matrix: SOIL			Client sample ID	CW-02 (3.0M)	CW-01 (0.5M)	CW-01 (1.5M)	CW-01 (3.0M)	CW-04 (0.5M)
			Client sampling date / time	14-JUL-2014 15:40	14-JUL-2014 16:40	14-JUL-2014 16:50	14-JUL-2014 16:50	15-JUL-2014 10:40
Compound	CAS Number	LOR	Unit	HK1422836-006	HK1422836-007	HK1422836-008	HK1422836-009	HK1422836-010
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) - Continued</b>								
Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
<b>EP-074_SR-B: Oxygenated Compounds</b>								
2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	<50	<50	<50
<b>EP-074_SR-E: Halogenated Aliphatics</b>								
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EP-074_SR-I: Methyl-tert-butyl Ether</b>								
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>								
Surrogate control limits listed at end of this report.								
2-Fluorobiphenyl	321-60-8	0.1	%	89.4	100	95.6	87.1	94.9
4-Terphenyl-d14	1718-51-0	0.1	%	95.2	103	96.5	101	93.9
<b>EP-066S: PCB Surrogate</b>								
Surrogate control limits listed at end of this report.								
Tetrachlorometaxylene	877-09-8	0.1	%	61.8	61.8	68.0	58.2	72.0
Dibutylchloroendate	1770-80-5	0.1	%	108	108	120	99.0	95.0
<b>EP-080_SRS: TPH(Volatile)/BTEX Surrogate</b>								
Surrogate control limits listed at end of this report.								
Dibromofluoromethane	1868-53-7	0.1	%	90.4	91.7	93.2	92.1	90.7
Toluene-D8	2037-26-5	0.1	%	99.1	95.4	100	96.0	101
4-Bromofluorobenzene	460-00-4	0.1	%	100	95.8	99.7	97.0	95.3
<b>EP-074_SR-S: VOC Surrogates</b>								
Surrogate control limits listed at end of this report.								
Dibromofluoromethane	1868-53-7	0.1	%	90.4	91.7	93.2	92.1	90.7
Toluene-D8	2037-26-5	0.1	%	99.1	95.4	100	96.0	101
4-Bromofluorobenzene	460-00-4	0.1	%	100	95.8	99.7	97.0	95.3



Sub-Matrix: SOIL			Client sample ID	CW-04 (1.5M)	CW-04 (3.1M)	CW-05 (0.5M)	CW-05 (1.5M)	CW-05 (2.4M)
			Client sampling date / time	15-JUL-2014 10:55	15-JUL-2014 11:00	15-JUL-2014 13:15	15-JUL-2014 13:25	15-JUL-2014 13:40
Compound	CAS Number	LOR	Unit	HK1422836-011	HK1422836-012	HK1422836-013	HK1422836-014	HK1422836-015
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103°C)	---	0.1	%	19.5	18.3	16.1	14.6	16.1
<b>EG: Metals and Major Cations</b>								
EG020: Copper	7440-50-8	1	mg/kg	6	2	5	3	4
EG020: Lead	7439-92-1	1	mg/kg	21	19	71	50	153
EG020: Manganese	7439-96-5	0.5	mg/kg	47.0	42.4	112	350	261
EG020: Nickel	7440-02-0	1	mg/kg	2	<1	2	2	1
EG020: Zinc	7440-66-6	1	mg/kg	155	16	32	24	24
EG049: Trivalent Chromium	16065-83-1	1	mg/kg	13	3	5	4	4
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	<1	<1	<1
<b>EP-066: Polychlorinated Biphenyls</b>								
Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Dibenz(a,h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	<0.500
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)</b>								
C6 - C8 Fraction	---	5	mg/kg	<5	<5	<5	<5	<5
C9 - C16 Fraction	---	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	---	500	mg/kg	<500	<500	<500	<500	<500
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)</b>								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<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	<1.0	<1.0
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



Sub-Matrix: SOIL			Client sample ID	CW-04 (1.5M)	CW-04 (3.1M)	CW-05 (0.5M)	CW-05 (1.5M)	CW-05 (2.4M)
			Client sampling date / time	15-JUL-2014 10:55	15-JUL-2014 11:00	15-JUL-2014 13:15	15-JUL-2014 13:25	15-JUL-2014 13:40
Compound	CAS Number	LOR	Unit	HK1422836-011	HK1422836-012	HK1422836-013	HK1422836-014	HK1422836-015
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) - Continued</b>								
Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
<b>EP-074_SR-B: Oxygenated Compounds</b>								
2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	<50	<50	<50
<b>EP-074_SR-E: Halogenated Aliphatics</b>								
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EP-074_SR-I: Methyl-tert-butyl Ether</b>								
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>								
Surrogate control limits listed at end of this report.								
2-Fluorobiphenyl	321-60-8	0.1	%	97.8	87.6	99.4	88.3	95.6
4-Terphenyl-d14	1718-51-0	0.1	%	101	92.8	103	102	100
<b>EP-066S: PCB Surrogate</b>								
Surrogate control limits listed at end of this report.								
Tetrachlorometaxylene	877-09-8	0.1	%	95.6	71.0	80.2	86.2	92.4
Dibutylchloroendate	1770-80-5	0.1	%	104	93.8	83.0	108	121
<b>EP-080_SRS: TPH(Volatile)/BTEX Surrogate</b>								
Surrogate control limits listed at end of this report.								
Dibromofluoromethane	1868-53-7	0.1	%	93.7	90.1	91.1	93.6	91.4
Toluene-D8	2037-26-5	0.1	%	96.5	95.7	101	96.7	100
4-Bromofluorobenzene	460-00-4	0.1	%	95.4	95.8	100	95.6	95.7
<b>EP-074_SR-S: VOC Surrogates</b>								
Surrogate control limits listed at end of this report.								
Dibromofluoromethane	1868-53-7	0.1	%	93.7	90.1	91.1	93.6	91.4
Toluene-D8	2037-26-5	0.1	%	96.5	95.7	101	96.7	100
4-Bromofluorobenzene	460-00-4	0.1	%	95.4	95.8	100	95.6	95.7



Sub-Matrix: SOIL			Client sample ID	CW-03 (0.5M)	CW-03 (1.5M)	CW-03 (3.1M)	DUPLICATE - 02
			Client sampling date / time	15-JUL-2014 14:30	15-JUL-2014 14:40	15-JUL-2014 14:55	[15-JUL-2014]
Compound	CAS Number	LOR	Unit	HK1422836-016	HK1422836-017	HK1422836-018	HK1422836-019
<b>EA/ED: Physical and Aggregate Properties</b>							
EA055: Moisture Content (dried @ 103°C)	---	0.1	%	16.8	12.2	10.4	10.2
<b>EG: Metals and Major Cations</b>							
EG020: Copper	7440-50-8	1	mg/kg	6	22	1	21
EG020: Lead	7439-92-1	1	mg/kg	20	66	10	56
EG020: Manganese	7439-96-5	0.5	mg/kg	93.2	277	54.0	447
EG020: Nickel	7440-02-0	1	mg/kg	1	6	<1	6
EG020: Zinc	7440-66-6	1	mg/kg	37	51	9	125
EG049: Trivalent Chromium	16065-83-1	1	mg/kg	18	16	2	11
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	<1	<1
<b>EP-066: Polychlorinated Biphenyls</b>							
Total Polychlorinated biphenyls	---	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)</b>							
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Dibenz(a,h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)</b>							
C6 - C8 Fraction	---	5	mg/kg	<5	<5	<5	<5
C9 - C16 Fraction	---	200	mg/kg	<200	<200	<200	<200
C17 - C35 Fraction	---	500	mg/kg	<500	<500	<500	<500
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)</b>							
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<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	<1.0
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5



Sub-Matrix: SOIL			Client sample ID	CW-03 (0.5M)	CW-03 (1.5M)	CW-03 (3.1M)	DUPLICATE - 02	
			Client sampling date / time	15-JUL-2014 14:30	15-JUL-2014 14:40	15-JUL-2014 14:55	[15-JUL-2014]	
Compound	CAS Number	LOR	Unit	HK1422836-016	HK1422836-017	HK1422836-018	HK1422836-019	
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) - Continued</b>								
Xylenes (Total)	---	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	
<b>EP-074_SR-B: Oxygenated Compounds</b>								
2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	<50	<50	
<b>EP-074_SR-E: Halogenated Aliphatics</b>								
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	
<b>EP-074_SR-I: Methyl-tert-butyl Ether</b>								
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.	
2-Fluorobiphenyl	321-60-8	0.1	%	96.3	101	89.9	96.1	
4-Terphenyl-d14	1718-51-0	0.1	%	96.2	107	95.9	96.0	
<b>EP-066S: PCB Surrogate</b>							Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%	85.4	97.8	73.0	70.8	
Dibutylchloroendate	1770-80-5	0.1	%	97.2	112	82.4	72.8	
<b>EP-080_SRS: TPH(Volatile)/BTEX Surrogate</b>							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	90.1	92.5	92.2	90.4	
Toluene-D8	2037-26-5	0.1	%	100	96.1	101	100	
4-Bromofluorobenzene	460-00-4	0.1	%	94.5	95.4	95.2	96.1	
<b>EP-074_SR-S: VOC Surrogates</b>							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	90.1	92.5	92.2	90.4	
Toluene-D8	2037-26-5	0.1	%	100	96.1	101	100	
4-Bromofluorobenzene	460-00-4	0.1	%	94.5	95.4	95.2	96.1	





**Laboratory Duplicate (DUP) Report**

Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
<b>EA/ED: Physical and Aggregate Properties (QC Lot: 3548081)</b>								
HK1422097-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	52.8	53.4	1.1
HK1422836-004	CW-02 (0.5M)	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	10.5	10.1	3.6
<b>EA/ED: Physical and Aggregate Properties (QC Lot: 3548082)</b>								
HK1422836-014	CW-05 (1.5M)	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	14.6	14.9	2.5
HK1422924-025	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	10.4	10.6	1.8
<b>EG: Metals and Major Cations (QC Lot: 3548139)</b>								
HK1420299-002	Anonymous	EG020: Manganese	7439-96-5	0.5	mg/kg	3150	2870	9.1
		EG020: Copper	7440-50-8	1	mg/kg	92	82	11.5
		EG020: Lead	7439-92-1	1	mg/kg	126	111	12.8
		EG020: Nickel	7440-02-0	1	mg/kg	35	33	5.0
		EG020: Zinc	7440-66-6	1	mg/kg	1440	1240	14.8
HK1422836-005	CW-02 (1.5M)	EG020: Manganese	7439-96-5	0.5	mg/kg	310	264	15.9
		EG020: Copper	7440-50-8	1	mg/kg	13	15	15.4
		EG020: Lead	7439-92-1	1	mg/kg	54	60	10.6
		EG020: Nickel	7440-02-0	1	mg/kg	3	3	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	37	40	8.3
<b>EG: Metals and Major Cations (QC Lot: 3548140)</b>								
HK1422836-016	CW-03 (0.5M)	EG020: Manganese	7439-96-5	0.5	mg/kg	93.2	82.0	12.9
		EG020: Copper	7440-50-8	1	mg/kg	6	6	0.0
		EG020: Lead	7439-92-1	1	mg/kg	20	18	10.8
		EG020: Nickel	7440-02-0	1	mg/kg	1	1	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	37	34	8.7
<b>EG: Metals and Major Cations (QC Lot: 3548143)</b>								
HK1422836-002	FW-01 (1.5M)	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
HK1422836-012	CW-04 (3.1M)	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
<b>EP-066: Polychlorinated Biphenyls (QC Lot: 3535994)</b>								
HK1421904-001	Anonymous	Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0
<b>EP-066: Polychlorinated Biphenyls (QC Lot: 3547150)</b>								
HK1422836-005	CW-02 (1.5M)	Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3541000)</b>								
HK1421217-003	Anonymous	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



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3541000) - Continued</b>								
HK1421217-003	Anonymous	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
		Benzo(a)pyrene	50-32-8	500	µg/kg	<500	<500	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	500	µg/kg	<500	<500	0.0
		Dibenz(a.h)anthracene	53-70-3	500	µg/kg	<500	<500	0.0
		Benzo(g.h.i)perylene	191-24-2	500	µg/kg	<500	<500	0.0
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3547149)</b>								
HK1422836-005	CW-02 (1.5M)	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
		Benzo(a)pyrene	50-32-8	500	µg/kg	<500	<500	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	500	µg/kg	<500	<500	0.0
		Dibenz(a.h)anthracene	53-70-3	500	µg/kg	<500	<500	0.0
Benzo(g.h.i)perylene	191-24-2	500	µg/kg	<500	<500	0.0		
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3540997)</b>								
HK1421217-003	Anonymous	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.0
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3540999)</b>								
HK1421217-003	Anonymous	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.0
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3547146)</b>								
HK1422836-005	CW-02 (1.5M)	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.0
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3547148)</b>								
HK1422836-005	CW-02 (1.5M)	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.0
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3541016)</b>								
HK1422250-014	Anonymous	Benzene	71-43-2	0.1	mg/kg	<0.1	<0.1	0.0
		Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0
		Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0
		ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3541016) - Continued</b>								
HK1422250-014	Anonymous	meta- & para-Xylene	108-38-3	0.4	mg/kg	<0.4	<0.4	0.0
			106-42-3					
		Xylenes (Total)	----	1.0	mg/kg	<1.0	<1.0	0.0
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3547147)</b>								
HK1422836-005	CW-02 (1.5M)	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
		ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0
		meta- & para-Xylene	108-38-3	1.0	mg/kg	<1.0	<1.0	0.0
			106-42-3					
Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	0.0		
<b>EP-074_SR-B: Oxygenated Compounds (QC Lot: 3541016)</b>								
HK1422250-014	Anonymous	2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	<2	0.0
<b>EP-074_SR-B: Oxygenated Compounds (QC Lot: 3547147)</b>								
HK1422836-005	CW-02 (1.5M)	2-Propanone (Acetone)	67-64-1	50	mg/kg	<50	<50	0.0
<b>EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3541016)</b>								
HK1422250-014	Anonymous	Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.0
<b>EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3547147)</b>								
HK1422836-005	CW-02 (1.5M)	Trichloroethene	79-01-6	0.1	mg/kg	<0.1	<0.1	0.0
<b>EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3541016)</b>								
HK1422250-014	Anonymous	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	<0.2	0.0
<b>EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3547147)</b>								
HK1422836-005	CW-02 (1.5M)	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 Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
<b>EG: Metals and Major Cations (QC Lot: 3548139)</b>												
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.7	----	79	105	----	----	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.5	----	80	104	----	----	
EG020: Manganese	7439-96-5	1	mg/kg	<1.0	5 mg/kg	96.5	----	77	115	----	----	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.0	----	79	105	----	----	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	76	114	----	----	
<b>EG: Metals and Major Cations (QC Lot: 3548140)</b>												
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	93.3	----	79	105	----	----	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	93.0	----	80	104	----	----	
EG020: Manganese	7439-96-5	1	mg/kg	<1.0	5 mg/kg	106	----	77	115	----	----	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	94.5	----	79	105	----	----	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	103	----	76	114	----	----	



Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 3548143)</b>											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	112	----	92	122	----	----
<b>EP-066: Polychlorinated Biphenyls (QC Lot: 3535994)</b>											
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	0.5 mg/kg	113	----	46	133	----	----
<b>EP-066: Polychlorinated Biphenyls (QC Lot: 3547150)</b>											
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	0.5 mg/kg	88.5	----	46	133	----	----
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3541000)</b>											
Naphthalene	91-20-3	25	µg/kg	<50	25 µg/kg	101	----	63	111	----	----
Acenaphthylene	208-96-8	25	µg/kg	<50	25 µg/kg	87.7	----	63	111	----	----
Acenaphthene	83-32-9	25	µg/kg	<50	25 µg/kg	96.4	----	67	108	----	----
Fluorene	86-73-7	25	µg/kg	<50	25 µg/kg	96.0	----	67	110	----	----
Phenanthrene	85-01-8	25	µg/kg	<50	25 µg/kg	102	----	67	108	----	----
Anthracene	120-12-7	25	µg/kg	<50	25 µg/kg	92.5	----	69	113	----	----
Fluoranthene	206-44-0	25	µg/kg	<50	25 µg/kg	103	----	71	114	----	----
Pyrene	129-00-0	25	µg/kg	<50	25 µg/kg	98.2	----	71	114	----	----
Benz(a)anthracene	56-55-3	25	µg/kg	<50	25 µg/kg	99.4	----	63	114	----	----
Chrysene	218-01-9	25	µg/kg	<50	25 µg/kg	112	----	67	122	----	----
Benzo(b)fluoranthene	205-99-2	25	µg/kg	<50	25 µg/kg	98.0	----	59	114	----	----
Benzo(k)fluoranthene	207-08-9	25	µg/kg	<50	25 µg/kg	115	----	64	119	----	----
Benzo(a)pyrene	50-32-8	25	µg/kg	<50	25 µg/kg	102	----	58	117	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	25	µg/kg	<50	25 µg/kg	95.2	----	51	115	----	----
Dibenz(a,h)anthracene	53-70-3	25	µg/kg	<50	25 µg/kg	98.5	----	59	114	----	----
Benzo(g,h,i)perylene	191-24-2	25	µg/kg	<50	25 µg/kg	117	----	58	120	----	----
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3547149)</b>											
Naphthalene	91-20-3	25	µg/kg	<50	250 µg/kg	76.3	----	63	111	----	----
Acenaphthylene	208-96-8	25	µg/kg	<50	250 µg/kg	80.3	----	63	111	----	----
Acenaphthene	83-32-9	25	µg/kg	<50	250 µg/kg	79.8	----	67	108	----	----
Fluorene	86-73-7	25	µg/kg	<50	250 µg/kg	82.1	----	67	110	----	----
Phenanthrene	85-01-8	25	µg/kg	<50	250 µg/kg	85.3	----	67	108	----	----
Anthracene	120-12-7	25	µg/kg	<50	250 µg/kg	84.2	----	69	113	----	----
Fluoranthene	206-44-0	25	µg/kg	<50	250 µg/kg	89.1	----	71	114	----	----
Pyrene	129-00-0	25	µg/kg	<50	250 µg/kg	89.3	----	71	114	----	----
Benz(a)anthracene	56-55-3	25	µg/kg	<50	250 µg/kg	86.5	----	63	114	----	----
Chrysene	218-01-9	25	µg/kg	<50	250 µg/kg	89.6	----	67	122	----	----
Benzo(b)fluoranthene	205-99-2	25	µg/kg	<50	250 µg/kg	88.1	----	59	114	----	----
Benzo(k)fluoranthene	207-08-9	25	µg/kg	<50	250 µg/kg	91.9	----	64	119	----	----
Benzo(a)pyrene	50-32-8	25	µg/kg	<50	250 µg/kg	85.6	----	58	117	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	25	µg/kg	<50	250 µg/kg	86.7	----	51	115	----	----
Dibenz(a,h)anthracene	53-70-3	25	µg/kg	<50	250 µg/kg	85.6	----	59	114	----	----
Benzo(g,h,i)perylene	191-24-2	25	µg/kg	<50	250 µg/kg	92.0	----	58	120	----	----



Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3540997)</b>											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	95.6	----	71	119	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3540999)</b>											
C9 - C16 Fraction	----	200	mg/kg	<200	32 mg/kg	80.4	----	51	122	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	85.0	----	11	129	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3547146)</b>											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	95.6	----	71	119	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3547148)</b>											
C9 - C16 Fraction	----	200	mg/kg	<200	32 mg/kg	86.4	----	51	122	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	87.9	----	11	129	----	----
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3541016)</b>											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	104	----	55	128	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	93.2	----	66	119	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	100	----	66	123	----	----
meta- & para-Xylene	108-38-3	0.4	mg/kg	<0.4	0.50 mg/kg	104	----	78	122	----	----
	106-42-3										
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	99.0	----	72	125	----	----
Xylenes (Total)	----	1.0	mg/kg	<1.0	0.75 mg/kg	102	----	76	122	----	----
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3547147)</b>											
Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	92.3	----	55	128	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	99.8	----	66	119	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	98.7	----	66	123	----	----
meta- & para-Xylene	108-38-3	0.4	mg/kg	<0.4	0.50 mg/kg	102	----	78	122	----	----
	106-42-3										
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	100	----	72	125	----	----
Xylenes (Total)	----	1.0	mg/kg	<1.0	0.75 mg/kg	101	----	76	122	----	----
<b>EP-074_SR-B: Oxygenated Compounds (QC Lot: 3541016)</b>											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	102	----	81	129	----	----
<b>EP-074_SR-B: Oxygenated Compounds (QC Lot: 3547147)</b>											
2-Propanone (Acetone)	67-64-1	2	mg/kg	<2	2.5 mg/kg	106	----	81	129	----	----
<b>EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3541016)</b>											
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	92.3	----	82	114	----	----
<b>EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3547147)</b>											
Trichloroethene	79-01-6	0.1	mg/kg	<0.1	0.25 mg/kg	92.8	----	82	114	----	----
<b>EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3541016)</b>											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	91.0	----	68	116	----	----
<b>EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3547147)</b>											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	97.1	----	68	116	----	----



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

Matrix: SOIL

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 3548139)</b>										
HK1420299-001	Anonymous	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: Nickel	7440-02-0	5 mg/kg	88.2	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
<b>EG: Metals and Major Cations (QC Lot: 3548140)</b>										
HK1422836-015	CW-05 (2.4M)	EG020: Copper	7440-50-8	5 mg/kg	85.7	----	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: Nickel	7440-02-0	5 mg/kg	91.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
<b>EG: Metals and Major Cations (QC Lot: 3548143)</b>										
HK1422836-001	FW-01 (0.5M)	EG3060: Hexavalent Chromium	18540-29-9	2.5 mg/kg	116	----	75	125	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3540997)</b>										
HK1421217-008	Anonymous	C6 - C8 Fraction	----	4.5 mg/kg	94.0	----	50	130	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3540999)</b>										
HK1421217-008	Anonymous	C9 - C16 Fraction	----	32 mg/kg	76.6	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	88.7	----	50	130	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3547146)</b>										
HK1422836-006	CW-02 (3.0M)	C6 - C8 Fraction	----	4.5 mg/kg	93.3	----	50	130	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3547148)</b>										
HK1422836-006	CW-02 (3.0M)	C9 - C16 Fraction	----	32 mg/kg	71.9	----	50	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	72.9	----	50	130	----	----

**Surrogate Control Limits**

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
2-Fluorobiphenyl	321-60-8	50	130



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

## CERTIFICATE OF ANALYSIS

Client	: ACTION UNITED ENVIRO SERVICES	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 6
Contact	: MR BEN TAM	Contact	: Fung Lim Chee, Richard	Work Order	: HK1422838
Address	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong	Amendment	: 1
E-mail	: Bentam@fordbusiness.com	E-mail	: Richard.Fung@alsglobal.com	Date Samples Received	: 15-JUL-2014
Telephone	: +852 2959 6059	Telephone	: +852 2610 1044	Issue Date	: 06-AUG-2014
Facsimile	: +852 2959 6079	Facsimile	: +852 2610 2021	No. of samples received	: 6
Project	: TCS00670_13	Quote number	: ----	No. of samples analysed	: 6
Order number	: ----				
C-O-C number	: H026704				
Site	: LIAN TANG - C3				

### 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: 28-JUL-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: **HK1422838**

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.

**This report may not be reproduced except with prior written approval from the testing laboratory. Hong Kong Accreditation Service (HKAS) has accredited 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





**Analytical Results**

Sub-Matrix: WATER

Compound	CAS Number	LOR	Unit	Client sample ID	CW-W1	CW-W2	RINSATE BLANK	RINSATE BLANK	TRIP BLANK
				Client sampling date / time	[15-JUL-2014]	[15-JUL-2014]	[14-JUL-2014]	[15-JUL-2014]	[15-JUL-2014]
					HK1422838-001	HK1422838-002	HK1422838-003	HK1422838-004	HK1422838-005
<b>EP-066: Polychlorinated Biphenyls</b>									
Total Polychlorinated biphenyls	----	1	µg/L		<1	<1	<1	<1	----
<b>EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)</b>									
Naphthalene	91-20-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Acenaphthylene	208-96-8	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Acenaphthene	83-32-9	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Fluorene	86-73-7	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Phenanthrene	85-01-8	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Anthracene	120-12-7	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Fluoranthene	206-44-0	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Pyrene	129-00-0	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(b)fluoranthene	205-99-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)</b>									
C6 - C8 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C9 - C16 Fraction	----	500	µg/L		<500	<500	<500	<500	----
C17 - C35 Fraction	----	500	µg/L		<500	<500	<500	<500	----
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)</b>									
Benzene	71-43-2	5.0	µg/L		<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	108-88-3	5.0	µg/L		<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	100-41-4	5.0	µg/L		<5.0	<5.0	<5.0	<5.0	<5.0
meta- & para-Xylene	108-38-3 106-42-3	10	µg/L		<10	<10	<10	<10	<10
ortho-Xylene	95-47-6	5.0	µg/L		<5.0	<5.0	<5.0	<5.0	<5.0
Xylenes (Total)	----	20	µg/L		<20	<20	<20	<20	<20
<b>EP-074_SR-B: Oxygenated Compounds</b>									
2-Propanone (Acetone)	67-64-1	500	µg/L		<500	<500	<500	<500	----
<b>EP-074_SR-E: Halogenated Aliphatics</b>									
Trichloroethene	79-01-6	5.0	µg/L		<5.0	<5.0	<5.0	<5.0	----
<b>EP-074_SR-I: Methyl-tert-butyl Ether</b>									
Methyl tert-Butyl Ether (MTBE)	1634-04-4	5.0	µg/L		<5.0	<5.0	<5.0	<5.0	----
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
2-Fluorobiphenyl	321-60-8	0.1	%		51.0	56.4	52.8	63.0	----
4-Terphenyl-d14	1718-51-0	0.1	%		84.9	70.0	81.2	120	----
<b>EP-066S: PCB Surrogate</b>									
Surrogate control limits listed at end of this report.									
Tetrachlorometaxylene	877-09-8	0.1	%		53.6	53.0	64.2	65.6	----
Dibutylchlorendate	1770-80-5	0.1	%		91.8	82.0	93.0	121	----
<b>EP-080_SRS: TPH(Volatile)/BTEX Surrogate</b>									
Surrogate control limits listed at end of this report.									
Dibromofluoromethane	1868-53-7	0.1	%		96.3	93.9	95.4	93.4	----



Sub-Matrix: WATER				Client sample ID	CW-W1	CW-W2	RINSATE BLANK	RINSATE BLANK	TRIP BLANK
				Client sampling date / time	[15-JUL-2014]	[15-JUL-2014]	[14-JUL-2014]	[15-JUL-2014]	[15-JUL-2014]
Compound	CAS Number	LOR	Unit	HK1422838-001	HK1422838-002	HK1422838-003	HK1422838-004	HK1422838-005	
<b>EP-080_SRS: TPH(Volatile)/BTEX Surrogate - Continued</b>				Surrogate control limits listed at end of this report.					
Toluene-D8	2037-26-5	0.1	%	97.8	97.5	97.9	98.2		----
4-Bromofluorobenzene	460-00-4	0.1	%	97.2	95.6	96.4	94.9		----
<b>EP-074_SR-S: VOC Surrogates</b>				Surrogate control limits listed at end of this report.					
Dibromofluoromethane	1868-53-7	0.1	%	96.3	93.9	95.4	93.4		92.9
Toluene-D8	2037-26-5	0.1	%	97.8	97.5	97.9	98.2		98.1
4-Bromofluorobenzene	460-00-4	0.1	%	97.2	95.6	96.4	94.9		95.4



Sub-Matrix: WATER				Client sample ID	FIELD BLANK			
				Client sampling date / time	[15-JUL-2014]			
Compound	CAS Number	LOR	Unit	HK1422838-006				
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)</b>								
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				
ortho-Xylene	95-47-6	5.0	µg/L	<5.0				
Xylenes (Total)	---	20	µg/L	<20				
<b>EP-074_SR-S: VOC Surrogates</b>								
Surrogate control limits listed at end of this report.								
Dibromofluoromethane	1868-53-7	0.1	%	94.4				
Toluene-D8	2037-26-5	0.1	%	98.0				
4-Bromofluorobenzene	460-00-4	0.1	%	96.4				



**Laboratory Duplicate (DUP) Report**

- No Laboratory Duplicate (DUP) Results are required to be reported.

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

Matrix: WATER

Method: Compound		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 (%)	
CAS Number						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 3536673)</b>											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	63.4	----	50	98	----	----
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	59.8	----	47	97	----	----
Acenaphthene	83-32-9	0.2	µg/L	<0.2	0.5 µg/L	54.2	----	49	93	----	----
Fluorene	86-73-7	0.2	µg/L	<0.2	0.5 µg/L	56.8	----	52	92	----	----
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	58.4	----	51	91	----	----
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	52.1	----	48	95	----	----
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	69.9	----	68	109	----	----
Pyrene	129-00-0	0.2	µg/L	<0.2	0.5 µg/L	70.6	----	69	111	----	----
Chrysene	218-01-9	0.2	µg/L	<0.2	0.5 µg/L	81.5	----	50	124	----	----
Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	0.5 µg/L	87.0	----	54	124	----	----
<b>EP-066: Polychlorinated Biphenyls (QC Lot: 3547162)</b>											
Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	78.4	----	35	123	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3536674)</b>											
C9 - C16 Fraction	----	0.5	mg/L	<0.5	0.21 mg/L	52.0	----	12	119	----	----
C17 - C35 Fraction	----	0.5	mg/L	<0.5	0.45 mg/L	92.7	----	3	116	----	----
<b>EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 3553808)</b>											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	104	----	62	131	----	----
<b>EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 3543542)</b>											
Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	90.8	----	59	125	----	----
Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	91.1	----	64	121	----	----
Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	91.4	----	69	120	----	----
meta- & para-Xylene	108-38-3	1	µg/L	<1	4 µg/L	98.6	----	76	119	----	----
ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	88.2	----	72	122	----	----
Xylenes (Total)	----	2	µg/L	<2	6 µg/L	95.1	----	75	120	----	----
<b>EP-074_SR-B: Oxygenated Compounds (QC Lot: 3543542)</b>											
2-Propanone (Acetone)	67-64-1	5	µg/L	<5	20 µg/L	100	----	81	130	----	----
<b>EP-074_SR-E: Halogenated Aliphatics (QC Lot: 3543542)</b>											
Trichloroethene	79-01-6	0.5	µg/L	<0.5	2 µg/L	92.7	----	77	114	----	----
<b>EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 3543542)</b>											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	86.5	----	64	119	----	----

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

- No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



**Surrogate Control Limits**

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

## **Appendix G**

### **CHAIN OF CUSTODY FORM**

**CHAIN OF CUSTODY DOCUMENTATION**

**H 026702**



ALS Laboratory Group

CLIENT: ALES  
 ADDRESS / OFFICE:  
 PROJECT MANAGER (PM): Bon Tam  
 PROJECT ID: TK00670 / B  
 SITE: San Tung - C3 P.O. NO.:

SAMPLER:  
 MOBILE:  
 PHONE:  
 EMAIL REPORT TO:  
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.:

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:

Metals	P CR	VOCS	PAHS	PCBS																
--------	------	------	------	------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	FW-01 (0.5m)	Soil	14/7	13:25		
2	FW-01 (1.5m)	"	"	13:40		
3	FW-01 (3.1m)	"	"	14:00		
4	<del>FW</del> CW-02 (0.5m)	"	"	15:20		
5	CW-02 (1.5m)	"	"	15:25		
6	CW-02 (3.0m)	"	"	15:40		
7	CW-01 (0.5m)	"	"	16:40		
8	CW-01 (1.5m)	"	"	16:50		
9	CW-01 (3.0m)	"	"	16:50		
10	CW-04 (0.5m)	"	15/7	10:40		
11	CW-04 (1.5m)	"	"	10:55		
12	CW-04 (3.1m)	"	"	11:00		

ALS Technichem HK Pty Ltd  
 Work Order  
**HK1422836**



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RELINQUISHED BY:  
 Name: [Signature] Date:  
 Of:  
 Name: Date:  
 Of: Time:

RECEIVED BY:  
 Name: Kefu Date: 16 JUL 2014  
 Of: ALS HK Time: 17:45  
 Name: Date:  
 Of: Time:

METHOD OF SHIPMENT  
 Con' Note No:  
 Transport Co:

**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 = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric 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 026703



ALS Laboratory Group

CLIENT: **AUES**  
 ADDRESS / OFFICE:  
 PROJECT MANAGER (PM): **Ben Tan**  
 PROJECT ID: **T16670 / 13**  
 SITE: **Kean Tang - C3** P.O. NO.:

SAMPLER:  
 MOBILE:  
 PHONE:  
 EMAIL REPORT TO:  
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.:

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
13	(W-05 (0.5m))	Soil	15/7	13:25		
14	(W-05 (1.5m))	"	"	13:25		
15	(W-05 (2.4m))	"	"	13:40		
16	(W-03 (0.5m))	"	15/7	14:30		
17	(W-03 (1.5m))	"	"	14:40		
18	(W-03 (3.1m))	"	"	14:55		
19	DUPLICATE - DL	"	15/7			

Metals  
 Petrochem (Carbon Petrol)  
 VOCs  
 PAHs  
 PCBs

RELINQUISHED BY:  
 Name: [Signature] Date:  
 Of: Time:

RECEIVED BY: Name: **Kefu** Date: **16 JUL 2014**  
 Of: **ALS HK** Time: **17:45**  
 Name: Date: Method of Shipment:  
 Of: Time: Transport Co:

**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 026704



ALS Laboratory Group

CLIENT: HOES  
 ADDRESS / OFFICE:  
 PROJECT MANAGER (PM): Ben Tubb  
 PROJECT ID: TCS 676 / 13  
 SITE: Lean Tang - CS. P.O. NO.:

SAMPLER:  
 MOBILE:  
 PHONE:  
 EMAIL REPORT TO:  
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): ✓ QUOTE NO.:

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:

Petroleum Carbon Range	VOCS	PAHS	PCBS	Benzene	Toluene	Ethylbenzene	Xylenes (total)												
------------------------	------	------	------	---------	---------	--------------	-----------------	--	--	--	--	--	--	--	--	--	--	--	--

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	CW-W1	Water	15/7			
2	CW-W2		15/7			
3	<del>CS</del> Rinse Blank	}	14/7			
4	Rinse Blank		15/7			
5	trip Blank		15/7			
6	Field Blank					

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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 Work Order  
**HK1422838**



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RELINQUISHED BY:  
 Name: [Signature]  
 Of:  
 Date:  
 Time:

RECEIVED BY:  
 Name: Kelsu  
 Of: ALS HK  
 Date: 16 JUL 2014  
 Time: 17:45

METHOD OF SHIPMENT  
 Con' Note No:  
 Transport Co:

**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.

Water  
 →

Parameter	Methods	Reporting Limit (µg/L)
a) Petroleum Carbon Ranges • C6 – C8 • C9 – C16 • C17 – C35	USEPA 8015	20 500 500
b) Volatile Organic Compounds (VOCs) • Acetone • Benzene • Toluene • Ethylbenzene • Xylenes (total) • Methyl tert-Butyl Ether • Trichloroethene	USEPA 8260	500 5 5 5 20 5 5
c) Polyaromatic hydrocarbons (PAHs) • Acenaphthene • Acenaphthylene • Anthracene • Benzo(b)fluoranthene • Chrysene • Fluoranthene • Naphthalene • Phenanthrene • Pyrene	USEPA 8270	2 2 2 1 1 2 2 2 2
d) Polychlorinated Biphenyls (PCBs)	USEPA8270	1

**ASSESSMENT GUIDELINES**

- 3.32 According to EIA Study, the potential land contamination sites involve storage of construction materials, vehicle maintenance and storage of furniture, therefore “industrial” scenario under RBRG standard is recommended to apply as the detection limit. The concentration of detection limit is adopted by EPD as local remediation new requirements and effective on 15 August 2007.
- 3.33 Based on EIA Study recommendation, the soil and groundwater will be evaluated the industrial of Risk-based Remediation Goals limits and is listed in *Table 3-5*.

**Table 3-5 Industrial of Risk-based Remediation Goals limits for Soil and Groundwater**

Parameter	Soil		Groundwater	
	Industrial (mg/kg)	Soil Saturation Limit $C_{sat}$ (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
<b>Metals</b>	Chromium III	1.00E+04*	NA	NA
	Chromium VI	1.96E+03	NA	NA
	Copper (Cu)	1.00E+04	NA	NA
	Lead (Pb)	2.29E+03	NA	NA
	Manganese (Mn)	1.00E+04*	NA	NA
	Nickel (Ni)	1.00E+04*	NA	NA
	Zinc (Zn)	1.00E+04*	NA	NA
<b>Petroleum Carbon Ranges</b>	C6 – C8	1.00E+04*	1.00E+03	1.15E+03
	C9 – C16	1.00E+04*	3.00E+03	9.98E+03
	C17 – C35	1.00E+04*	5.00E+03	1.78E+02
<b>Volatile Organic Chemicals (VOCs)</b>	Acetone	1.00E+04*	***	1.00E+04*
	Benzene	9.21E+00	3.36E+02	5.40E+01
	Toluene	1.00E+04*	2.35E+02	1.00E+04*
	Ethylbenzene	8.24E+03	1.38E+02	1.00E+04*
	Xylenes (total)	1.23E+03	1.50E+02	1.57E+03

**4 QA/QC PROCEDURES**

4.1 The quality control samples will be collected in the course of soil and groundwater sampling. Duplicate soil samples will be taken from potential contaminated areas. For the groundwater sample, one trip/travel blank, one field blank and duplicate sample will be taken respectively.

*Trip/Travel Blank*

4.2 The trip blank will be prepared in the laboratory using organic-free water. The trip blank will remain unopened and accompanied from the start of sampling to delivery of samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total). The trip blank would be collect and analysis for each groundwater samples delivery event.

*Field Blank*

4.3 The field blank will be prepared in field using organic-free water by passing the water from a full bottle to an empty bottle at the most contaminated location on site. The field blank accompanied the project samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total). The field blank would be collect for each groundwater sampling date.

*Rinse Blank*

*Duplicate Sample*

*Same As Water*

*Sample Testing*

*Full Test*

4.4 The duplicate sample(s) will be collected as a split sample from soil and groundwater; and also chemical analysis is equivalent to the original sample(s). These samples will be delivered to the laboratory as two individual samples without any indication to the laboratory that they have been duplicated. The duplicate sample(s) will be one per twenty soil and groundwater samples to collect.

**PROCEDURE FOR DECONTAMINATING EQUIPMENT AND SAMPLING TOOLS**

4.5 Tap water, phosphate-free detergent (Decon® 90) and distilled water would be used for cleaning the digging and sampling tools/equipment. The decontamination required to be conducted as follows:

- All using equipment/tools decontamination will be perform before each sampling pit excavation to ensure no cross contamination;
- All sampling tools will be decontaminated between sampling locations to prevent cross-contamination of samples; and
- All sampling equipment will be washed down prior to leaving site to prevent potentially contaminated soil or surface water being transported off-site

4.6 The land contamination specialist or his delegates or the appointed competent person of Engineer Representative would be monitored and supervised all decontamination work.

4.7 Furthermore, equipment blank will be collected to determine potential cross contamination between samples and potential influences from the sampling tools used. It will collect from assessment site by the sampling equipment rinse to verify decontamination procedures and background or ambient airborne contaminants on the site. The equipment blank collection will be one per twenty soil samples or groundwater samples to conduct.

4.8 According to above sections, QA/QC sample(s) would be collected for laboratory testing below:

**Table 4-1 QA/QC Sample(s) Collection**

QA/QC Sample(s) to be collected from the site	Matrix	Chemical Testing	Total 12 soil and 4 water representative Samples collection
Trip Blank	Soil	NA	NA
	Water	BTEX	Depend on water sample delivery event
Field Blank	Soil	NA	NA
	Water	BTEX	Depend on how many day for water sample collection