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MaterialLab

Contamination Assessment Report (CAR)

Client : Sum Kee Construction Ltd.

Project : Contract No. DC/2006/01
Drainage Improvement Works in Sai Kung

Report No. : 075117EN80016

Prepared by : _____
Calvin K.F. Sze

Certified by : _____
Approved Signatory : HO Kin Man, John
Manager – Chemical & Environmental

Date : 7/1/2008

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CONTENT

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1. Project Background

1.1 Sai Kung River, Ho Chung River and Pak Kong River are the watercourses causing flooding problems in Sai Kung town centre, Ho Chung and Pak Kong. These watercourses remain natural with irregular cross sections along most of their lengths. Although engineering works have been locally carried out in some parts of the watercourses, flooding persists due to inadequate flow capacities of these rivers exacerbated by the development strain in Sai Kung.

1.2 Drainage Services Department (DSD) completed the "Stormwater Drainage Master Plan in Sai Kung, East Kowloon and Southern Lantau" (DMP Study) and "Preliminary Project Feasibility Study Report" for the drainage improvement in Sai Kung in September 2000 and October 2001 respectively.

1.3 The DMP Study identified deficiencies and flooding problems in the existing drainage systems within the study area. This proposed drainage improvement works in Sai Kung River, Pak Kong River and Ho Chung Channel are part of the recommendations in the DMP Study for upgrading three existing drainage capacity. The improvement works cover only a limited length at the downstream side of three rivers while the rest of the rivers will remain at the present conditions.

2. Introduction

2.1 Potential contaminative workshops have been identified close to the proposed site boundary of Pak Kong River based on the findings of the desktop study and site appraisal. As recommended in the Environmental Impact Assessment (EIA) report, further investigation shall be required to determine the presence and extent of contamination before the construction works taken place at the concerned areas. The contamination assessment shall be carried out in accordance with Environmental Protection Department (EPD)'s *Guidance Note for Contaminated Land Assessment and Remediation* and "*Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair / Dismantling Workshops*".

2.2 The contaminated sites shall be remediated before commencement of any construction work at the concerned sites which may disturb the ground. In all cases, contaminated soil remediation, treatment or disposal must be managed in an environmentally sound manner, including compliance with all relevant legislation and Government requirements.

Potential Areas Recommended for Further Investigation

2.3 An updated Contamination Assessment Plan (CAP) has been prepared and approved by the EPD. The CAP recommended that site investigation shall be conducted for the potential contaminated areas encroaching upon the proposed drainage works area of Pak Kong River. As shown in Appendix I, two potential zones (SI-1 and SI-2) have been confined for further investigation due to the presence of two potential contaminative workshops partially located within the proposed works area, including *Workshop A - Wah Shing Motor Repairing Factory* and *Workshop B - Wing Chong Car Repair*.

2.4 Upon receipt of EPD's approval on the updated CAP, the actual site investigation for land contamination impact assessment was conducted accordingly before any construction work started at the identified contaminated sites. Soil and / or groundwater samples were collected and tested as described in the approved CAP to provide site-specific information for the assessment. The soil and groundwater sampling and testing work was carried out by the Contractor or other drilling contractors under suitable contractual arrangement by the Project Proponent or ER. The field sampling work was supervised by the ET and audited by the Independent Environmental Checker (IEC).

2.5 This Contamination Assessment Report (CAR) is prepared by the ET to document the findings of the site investigation. Interpretation of laboratory testing results in accordance with the EPD's *Guidance Note for Contaminated Land Assessment and Remediation* and comparison of the findings with the Risk-based Remediation Goals (RBRGs) as appropriate are included in the CAR.

2.6 If land contamination is confirmed, a Remediation Action Plan (RAP) shall be prepared by the ET and drawn up to formulate necessary remedial measures, and potential water quality impact to the river shall be also addressed if necessary in the remediation measures. The subsequent CAR and RAP shall be endorsed by EPD before implementation of any remedial technology. The contaminated sites should be remediated before commencement of any construction work at the concerned sites which may disturb the ground. The duration of remediation should be taken into account by the Project Proponent or the Contractor as part of the construction programme.

3. Land Contamination Investigation

3.1 The proposed drainage improvement works at Pak Kong River include (1) reconstruction of one footbridge and one vehicular crossing to 3-cell box culverts, and (2) construction of a retaining wall for the purpose of stabilizing the existing riverbank adjacent to the Hiram's Highway. In regard to this, site clearance, excavation, construction of concrete structures would be carried out within the defined site boundary.

3.2 As aforementioned, the findings of the site inspection and desktop study indicated that there are two potential contaminative workshops located within the proposed site boundary of Pak Kong River. Activities mostly car repairing/servicing were undertaken by such workshops and stains were generally observed on the ground of the sites. Potential sensitive receivers which may come into contact with excavated contaminated soils are mainly construction workers via the principal exposure routes of (1) inhalation of dust, (2) direct ingestion through poor hygiene practices, such as eating or drinking on site as well as (3) dermal contact with the contaminated materials. As there may have potential adverse effects on the health and safety of workers during construction of Project, a detailed site investigation would be recommended for those areas falling within the Project boundary in order to assess the degree and extent of potential land contamination. Contaminated soil should be remediated before construction work could be started at the concerned areas.

3.3 There are two workshops, including *Workshop A - Wah Shing Motor Repairing Factory* and *Workshop B - Wing Chong Car Repair,* with part of the site areas encroaching upon the proposed drainage work area of Pak Kong River. The major concern associated with these workshops would be of lube oil, engine oil and/or solvents that could be inaptly be disposed of by workers or leaked from vehicles causing contamination in the site and its vicinity. According to EPD's "*Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair / Dismantling Workshops*" and EPD's *Guidance Note for Contaminated Land Assessment and Remediation*, where necessary, are required to avoid or minimise any risks or hazards associated with the sites prior to any construction works taken place. In regard to this, two potential zones, namely SI-1 and SI-2, are confined for conducting site contamination investigation, as shown in Appendix I.

3.4 Based on the requirement stated in EPD's "*Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards*", a full-scale site investigation is required for both workshops A and B. Eight trial pits for chemical analysis are conducted and the details are summarized in Table 3.1 and Appendix II. If contamination is encountered, extra samples at deeper sampling depths may be required. The testing methodology and detection limits are summarized in Table 3.2.

3.5 As ground water is not encounterd during sampling, only soil samples are taken at each sampling location. Details of sample location, sampling depth and sample ID are summarized in Table 3.3.

3.6 The sample containers are laboratory cleaned, sealable, water-tight, made of glass or other suitable materials with aluminium or teflon-lined lids, so that the container surface will not react with the sample or adsorb contaminants. The containers are marked with the sampling point codes and the depths at which the samples were taken. If the contents are hazardous, this should be clearly marked on the container and precautions taken during transport. Samples are stored between 0 – 4 °C.

Samplers are thoroughly cleaned in between sampling of individual samples to avoid cross contamination.

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Table 3.1 Contamination Assessment Plan for Further Investigation of Identified Potential Sites

Potential Site	Potential Contaminating Area for SI	Workshops within the Potential Contaminating Areas for SI	Current Activities/Uses	Potential Contaminants	Size/Area of Concern to This Project	No. of Sampling Points	Parameters to be Analysed
Site A (Pak Kong River)	SI – 1	Workshop -A Wah Shing Motor Car Repairing Factory	Truck parking and maintenance	Lubricants, petroleum products, fuels, battery acid and cleansing solvents.	200 m^2	4	BTEX, TPH, halogenated and non-halogenated solvents, lead, copper, chromium, zinc & PAHs.
Site B (Pak Kong River)	SI – 2	Workshop -B Wing Cheong Car Repair	Repairing of private vehicles and mini-vans in majority	Lubricants, petroleum products, fuels, battery acid and cleansing solvents.	177 m^2	4	BTEX, TPH, halogenated and non-halogenated solvents, lead copper, chromium, zinc & PAHs.

TPH: Total petroleum hydrocarbons

BTEX: Benzene, toluene, ethlybenzene and xylenes

PAHs: Polycyclic aromatic hydrocarbons

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Report No. : 075117EN80016

Table 3.2 Methodology and Detection Limits of Chemical Analysis

Analyte Description	Reference Methods	Reporting Limits	
		Soil (mg/kg)	Water (µg/L)
Metals			
Lead	USEPA 6020	1	1
Chromium		1	1
Zinc		1	10
Copper		1	1
BTEX			
Benzene	USEPA 8260	0.2	2
Toluene		0.2	2
Ethylbenzene		0.2	2
Meta & Para Xylene		0.4	4
Ortho xylene		0.2	2
Non-halogenated Solvent			
Phenol	USEPA 8270	0.5	2
Halogenated Solvents			
Trichloroethene	USEPA 8260	0.04*	5
Tetrachloroethene		0.04*	5
Polyaromatic Hydrocarbons (PAH)			
Naphthalene	USEPA 8270 / GCMS	0.5	2
Acenaphthylene		0.5	2
Acenaphthene		0.5	2
Fluorene		0.5	2
Phenanthrene		0.5	2
Anthracene		0.5	2
Fluoranthene		0.5	2
Pyrene		0.5	2
Benzo(a) anthracene		0.5	2
Chrysene		0.5	2
Benzo(b) & (k) fluoranthene		1	4
Benzo(a)pyrene		0.5	2
Indeno(1,2,3-cd) pyrene		0.5	2
Dibenzo (a,h) anthracene		0.5	2
Benzo(g,h,i)perylene		0.5	2
Total Petroleum Hydrocarbons (TPH)*			
C6-C8	USEPA 8260	5	0.5 mg/L
C9-C16	USEPA 8015	200	0.5 mg/L
C17-C35		500	0.5 mg/L

* Parameters or reporting limits are not accredited

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Table 3.3 Details of Sampling Location, Sampling Depth and Sample ID

Sampling Location	Sampling Depth(m)	Sample ID	Matrix
A1	0.5	A1-0.5-S	Soil
	1.5	A1-1.5-S	
	1.9	A1-1.9-S	
A2	0.5	A2-0.5-S	
	1.2	A2-1.2-S	
A3	0.5	A3-0.5-S	
	1.1	A3-1.1-S	
A4	0.5	A4-0.5-S	
	1.5	A4-1.5-S	
	2.0	A4-2.0-S	
B1	0.5	B1-0.5-S	
	1.5	B1-1.5-S	
	2.9	B1-2.9-S	
B2	0.5	B2-0.5-S	
	1.5	B2-1.5-S	
	3.0	B2-3.0-S	
B3	0.5	B3-0.5-S	
	1.5	B3-1.5-S	
	3.0	B3-3.0-S	
B4	0.5	B4-0.5-S	
	1.5	B4-1.5-S	
	2.9	B4-2.9-S	

Sampling Date : 9 Nov 2007
Sampling Period : 10:00 – 14:00

4. Field and Laboratory Results

No direct evidence (visual and odour) of Non-Aqueous Phase Liquid (NAPL) was observed in field conditions.

Standard quality control / quality assurance (QA / QC) field procedures (e.g. chain of custody) are adopted during sampling and storage/ transport of the samples to the laboratory. Laboratory analytical data are reviewed to check that basic QA / QC protocols are followed.

Laboratory analytical data and quality control results are enclosed in Appendix III.

5. Results Interpretation

Laboratory analysis results are compared with the Risk-Based Remediation Goals (RBRGs) and Saturation Limit (C_{sat}) of soil to assess whether a site is contaminated or further action is required at the site . the RBRGs serve as the remediation targets if remediation is necessary. Whilst, the C_{sat} serve as trigger levels indicating the potential for NAPL to be present. The RBRGs were derived to suit Hong Kong conditions by following the international practice of adopting a risk-based methodology for contaminated land assessment and remediation. For this project, the post-restoration land use of the investigated area is rural residential. The relevant standard of RBRGs and C_{sat} is enclosed in Appendix IV.

The RBRGs have been developed for four different post-restoration land uses to reflect the typical physical settings in Hong Kong under which people could be exposed to contaminated soil or groundwater. A description of each land sue scenario is as follows:

Comparison of results to RBRGs and C_{sat} are shown in Tables 5.1 and 5.2.

As no exceedance was recorded for soil samples on RBRG and C_{sat}, and no direct evidence suggested that NAPL is of concern, remediation of the investigated site area is not required.

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Report No. : 075117EN80016

Table 5.1 Soil Data Summary and Comparison to RBRGs and C_{sat}

Chemical	Frequency of Detection[1] (x/ y)	Range of Detected Concentration[2] (mg / kg)	Range of Method Reporting Limit[3]	Analytical Method	Relevant Land Use Categories	Lowest RBRG(s) (mg/kg)	Maximum Detected Concentration Exceeds (check if applicable)	
							RBRG	C_{sat}
Volatile Organic Chemicals	0 / 154	NA	0.04 – 0.4	USEPA 8260	Rural Residential	0.0444	N/A	N/A
Semi-Volatile Organic Chemicals	0 / 352	NA	0.5 – 1	USEPA 8270 / GCMS	Rural Residential	1.14	N/A	N/A
Metals	84 / 88	1 - 190	NA	USEPA 6020	Rural Residential	255	N/A	N/A
Petroleum Carbon Ranges	1 / 66	NA	5 – 500	USEPA 8260 USEPA 8015	Rural Residential	545	N/A	N/A

1. X = number of samples in which chemical was found above the method reporting limit
   Y = number of samples analyzed for chemical
2. Give minimum and maximum detected values
3. Give minimum and maximum method reporting limits

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Table 5.2 Soil Sample Concentrations and Exceedances of RBRGs and C_{sat}

Chemical	List Samples		Concentration	Check if RBRG Exceeded	Check if C_{sat} Exceeded	Approximate size of Affected Area
	Sample Number	Sample Depth				
Volatile Organic Chemicals Semi-Volatile Organic Chemicals Metals Petroleum Carbon Ranges	Full Compliance of the RBRGs and C_{sat}					

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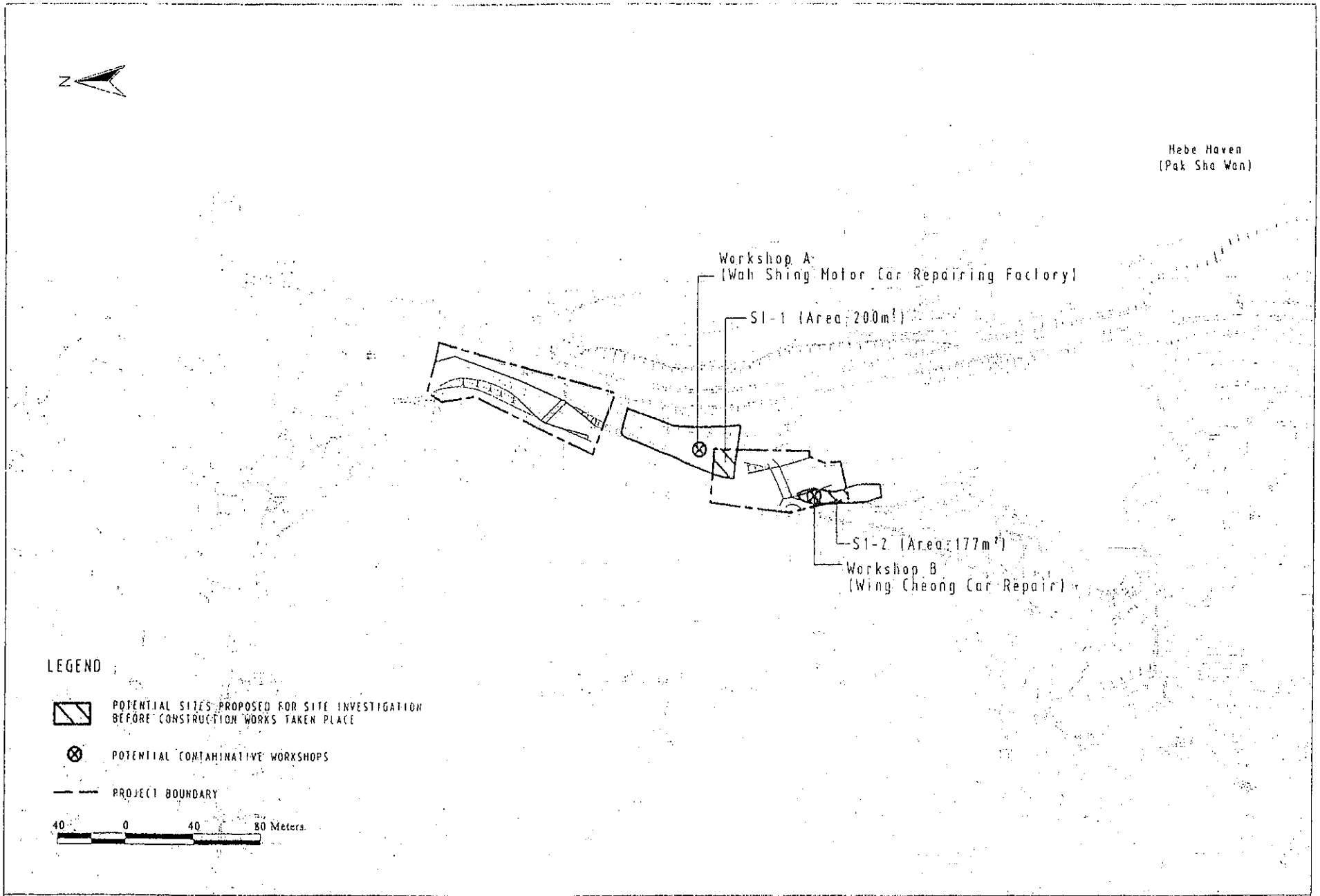
Appendix I

Location of Concerned Potential Zones for Size Investigation near Pak Kong River



Title: Agreement No. CE 11/2002 (DS) Drainage Improvement in Sai Kung - Design and Construction Location of Concerned Potential Zones for Site Investigation near Pak Kong River	Scale: As Shown Date: Nov 2004	Project No. A05602 Figure No. 6.1	Maunsell MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

K:\A05602\Drawing\Report\EM&A\Final-Nov04\POT-PKR.dgn

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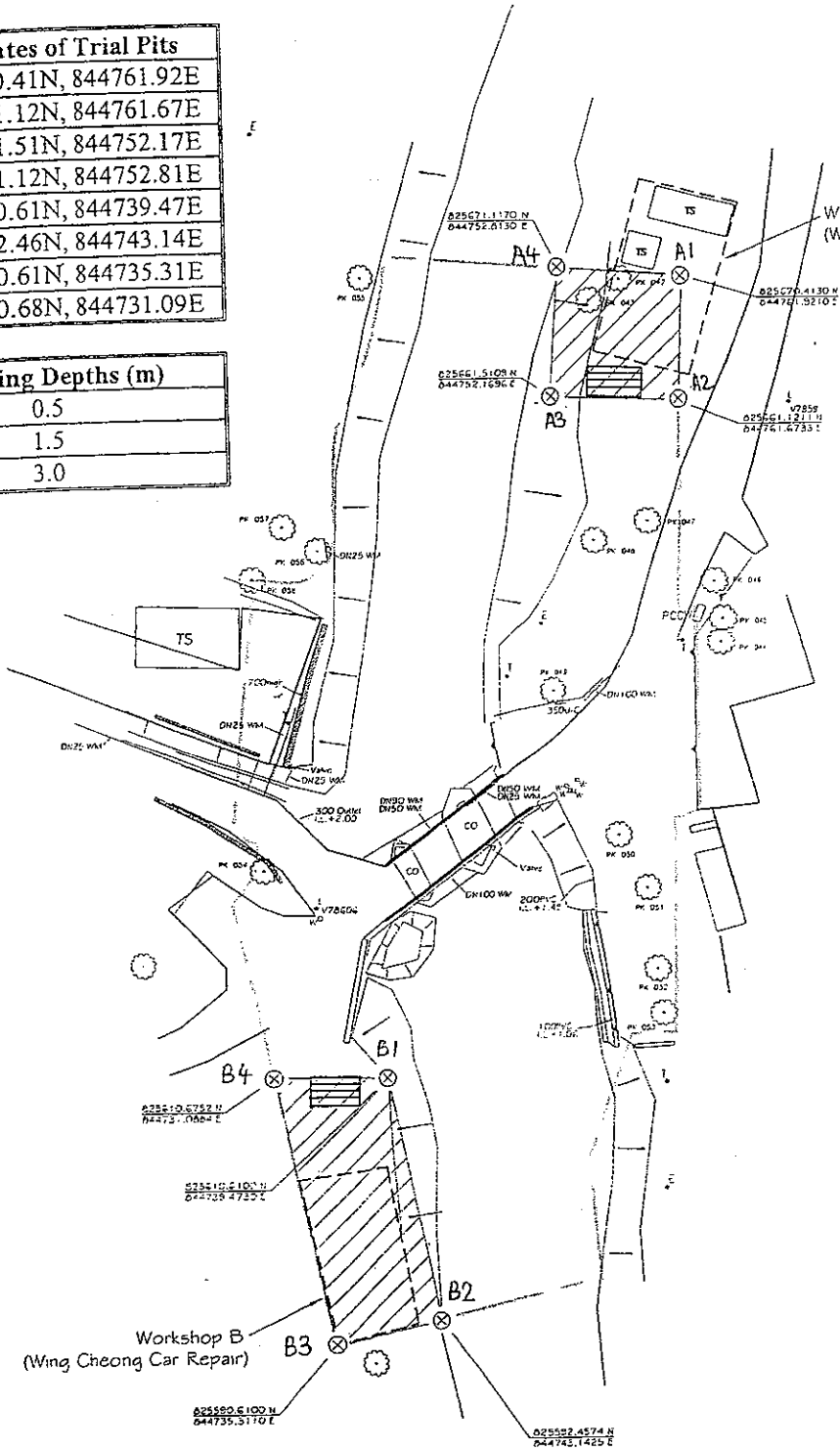
Appendix II

Locations of Trial Pits

Coordinates of Trial Pits
A1: 825670.41N, 844761.92E
A2: 825661.12N, 844761.67E
A3: 825661.51N, 844752.17E
A4: 825671.12N, 844752.81E
B1: 825610.61N, 844739.47E
B2: 825592.46N, 844743.14E
B3: 825590.61N, 844735.31E
B4: 825610.68N, 844731.09E

Sampling Depths (m)
0.5
1.5
3.0



LEGEND : ▤ WASHING AREA OF TRUCK AND EQUIPMENT

NOTE : EXCAVATOR WILL MOBILIZE IN THE SITE AREA.

Proposed Locations of Trial Pits (A1 to A4 and B1 to B4)

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Appendix III

Laboratory Analytical Data and Quality Control Results

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: FUGRO TECHNICAL SERVICES LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 17
Contact	: MR CALVIN SZE	Contact	: Alice Wong	Work Order	: HK0716420
Address	: FUGRO TECHNICAL SERVICES LIMITED, FUGRO DEVELOPMENT CENTRE, NO 5 LOK YI STREET, 17 M.S. CASTLE PEAK ROAD, TAI LAM, TUEN MUN N.T., HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: csze@fugro.com.hk	E-mail	: Alice.Wong@alsenviro.com		
Telephone	: 2452 7142	Telephone	: +852 2610 1044		
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Project	: DC_2006_01	Quote number	: ----	Date received	: 9 Nov 2007
Order number	: ----			Date of issue	: 29 Nov 2007
C-O-C number	: H000673-H000674			No. of samples	- Received : 22
Site	: SAI KUNG				- Analysed : 22

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK0716420 supersedes any previous reports with this reference. The completion date of analysis is 21 Nov 2007. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK0716420 : **Sample(s) were received 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 D3974-81 based on ASTM D3974-81, prior to the determination of metals.

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.

Signatory	Position	Authorised results for:-
Anh Ngoc Huynh	Senior Chemist	Organics
Fung Lim Chee, Richard	General Manager	Inorganics

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: A1-0.5-S Laboratory Sample ID: HK0716420-001 Sample Date / Time: [9 Nov 2007]	A1-1.5-S HK0716420-002 [9 Nov 2007]	A1-1.9-S HK0716420-003 [9 Nov 2007]	A2-0.5-S HK0716420-004 [9 Nov 2007]	A2-1.2-S HK0716420-005 [9 Nov 2007]
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	13.6	9.4	6.6	12.9	8.0
EG: Metals and Major Cations								
EG020: Chromium	7440-47-3	1	mg/kg	9	10	8	20	10
EG020: Copper	7440-50-8	1	mg/kg	8	6	17	27	8
EG020: Lead	7439-92-1	1	mg/kg	159	105	76	190	68
EG020: Zinc	7440-66-6	1	mg/kg	105	104	134	162	95
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C8 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5
EP-071: Total Petroleum Hydrocarbons (TPH)								
C9 - C16 Fraction	----	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	----	500	mg/kg	<500	<500	850	<500	<500
EP-080: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	90.4	92.7	93.5	95.9	93.8
Toluene-D8	2037-26-5	0.1	%	98.7	99.2	98.2	98.8	99.4
4-Bromofluorobenzene	460-00-4	0.1	%	94.4	94.0	92.9	91.5	93.4
EP-074E: Halogenated Aliphatics								
Trichloroethene	79-01-6	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
EP-074S: VOC Surrogates							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	90.4	92.7	93.5	95.9	93.8
Toluene-D8	2037-26-5	0.1	%	98.7	99.2	98.2	98.8	99.4
4-Bromofluorobenzene	460-00-4	0.1	%	94.4	94.0	92.9	91.5	93.4
EP-075A: Phenols								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: A1-0.5-S Laboratory Sample ID: HK0716420-001 Sample Date / Time: [9 Nov 2007]	A1-1.5-S HK0716420-002 [9 Nov 2007]	A1-1.9-S HK0716420-003 [9 Nov 2007]	A2-0.5-S HK0716420-004 [9 Nov 2007]	A2-1.2-S HK0716420-005 [9 Nov 2007]
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	<1	<1	<1
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075S: Acid Extractable Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorophenol	367-12-4	0.1	%	**58.3**	**62.2**	**49.4**	**62.3**	**80.4**
Phenol-d6	13127-88-3	0.1	%	**86.4**	**77.3**	**66.2**	**79.8**	**80.2**
2.4.6-Tribromophenol	118-79-6	0.1	%	**77.7**	**75.5**	**80.8**	**91.1**	**80.1**
EP-075T: Base/Neutral Extractable Surrogates							Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	**98.0**	**92.7**	**79.5**	**96.3**	**100**
2-Fluorobiphenyl	321-60-8	0.1	%	**75.6**	**84.7**	**64.5**	**87.6**	**102**
4-Terphenyl-d14	1718-51-0	0.1	%	**96.5**	**36.9**	**34.5**	**46.2**	**43.8**

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: A3-0.5-S Laboratory Sample ID: HK0716420-006 Sample Date / Time: [9 Nov 2007]	A3-1.1-S HK0716420-007 [9 Nov 2007]	A4-0.5-S HK0716420-008 [9 Nov 2007]	A4-1.5-S HK0716420-009 [9 Nov 2007]	A4-2.0-S HK0716420-010 [9 Nov 2007]
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	6.5	11.6	5.9	11.5	6.1
EG: Metals and Major Cations								
EG020: Chromium	7440-47-3	1	mg/kg	7	11	6	9	7
EG020: Copper	7440-50-8	1	mg/kg	9	4	11	7	7
EG020: Lead	7439-92-1	1	mg/kg	54	100	64	81	52
EG020: Zinc	7440-66-6	1	mg/kg	124	96	152	110	89
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C8 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5
EP-071: Total Petroleum Hydrocarbons (TPH)								
C9 - C16 Fraction	----	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	----	500	mg/kg	<500	<500	<500	<500	<500
EP-080: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	94.4	85.0	94.2	97.6	94.7
Toluene-D8	2037-26-5	0.1	%	98.4	98.5	98.2	97.8	97.0
4-Bromofluorobenzene	460-00-4	0.1	%	92.3	93.8	93.1	91.2	91.2
EP-074E: Halogenated Aliphatics								
Trichloroethene	79-01-6	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
EP-074S: VOC Surrogates							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	94.4	85.0	94.2	97.6	94.7
Toluene-D8	2037-26-5	0.1	%	98.4	98.5	98.2	97.8	97.0
4-Bromofluorobenzene	460-00-4	0.1	%	92.3	93.8	93.1	91.2	91.2
EP-075A: Phenols								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: A3-0.5-S Laboratory Sample ID: HK0716420-006 Sample Date / Time: [9 Nov 2007]	A3-1.1-S HK0716420-007 [9 Nov 2007]	A4-0.5-S HK0716420-008 [9 Nov 2007]	A4-1.5-S HK0716420-009 [9 Nov 2007]	A4-2.0-S HK0716420-010 [9 Nov 2007]
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	<1	<1	<1
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075S: Acid Extractable Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorophenol	367-12-4	0.1	%	**82.0**	**61.4**	**53.8**	**64.1**	**67.2**
Phenol-d6	13127-88-3	0.1	%	**88.8**	**74.9**	**78.5**	**84.9**	**82.7**
2.4.6-Tribromophenol	118-79-6	0.1	%	**79.3**	**54.7**	**67.2**	**74.9**	**88.7**
EP-075T: Base/Neutral Extractable Surrogates							Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	**94.8**	**85.9**	**89.4**	**94.5**	**85.7**
2-Fluorobiphenyl	321-60-8	0.1	%	**76.2**	**79.8**	**84.0**	**84.6**	**61.1**
4-Terphenyl-d14	1718-51-0	0.1	%	**99.8**	**37.4**	**43.7**	**43.4**	**48.9**

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: B1-0.5-S Laboratory Sample ID: HK0716420-011 Sample Date / Time: [9 Nov 2007]	B1-1.5-S HK0716420-012 [9 Nov 2007]	B1-2.9-S HK0716420-013 [9 Nov 2007]	B2-0.5-S HK0716420-014 [9 Nov 2007]	B2-1.5-S HK0716420-015 [9 Nov 2007]
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	9.2	2.2	5.5	10.0	9.9
EG: Metals and Major Cations								
EG020: Chromium	7440-47-3	1	mg/kg	6	2	2	3	3
EG020: Copper	7440-50-8	1	mg/kg	4	<1	<1	2	<1
EG020: Lead	7439-92-1	1	mg/kg	45	6	5	112	8
EG020: Zinc	7440-66-6	1	mg/kg	125	13	14	34	17
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C8 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5
EP-071: Total Petroleum Hydrocarbons (TPH)								
C9 - C16 Fraction	----	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	----	500	mg/kg	<500	<500	<500	<500	<500
EP-080: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	**97.2**	**97.8**	**100**	**98.9**	**101**
Toluene-D8	2037-26-5	0.1	%	**98.0**	**99.3**	**97.8**	**98.6**	**99.1**
4-Bromofluorobenzene	460-00-4	0.1	%	**91.1**	**91.2**	**92.2**	**92.3**	**91.6**
EP-074E: Halogenated Aliphatics								
Trichloroethene	79-01-6	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
EP-074S: VOC Surrogates							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	**97.2**	**97.8**	**100**	**98.9**	**101**
Toluene-D8	2037-26-5	0.1	%	**98.0**	**99.3**	**97.8**	**98.6**	**99.1**
4-Bromofluorobenzene	460-00-4	0.1	%	**91.1**	**91.2**	**92.2**	**92.3**	**91.6**
EP-075A: Phenols								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: B1-0.5-S Laboratory Sample ID: HK0716420-011 Sample Date / Time: [9 Nov 2007]	B1-1.5-S HK0716420-012 [9 Nov 2007]	B1-2.9-S HK0716420-013 [9 Nov 2007]	B2-0.5-S HK0716420-014 [9 Nov 2007]	B2-1.5-S HK0716420-015 [9 Nov 2007]
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	<1	<1	<1
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075S: Acid Extractable Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorophenol	367-12-4	0.1	%	**56.4**	**55.0**	**59.2**	**59.8**	**54.6**
Phenol-d6	13127-88-3	0.1	%	**78.3**	**62.4**	**77.5**	**77.6**	**72.9**
2.4.6-Tribromophenol	118-79-6	0.1	%	**75.1**	**45.4**	**53.3**	**63.3**	**57.8**
EP-075T: Base/Neutral Extractable Surrogates							Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	**85.4**	**71.8**	**85.4**	**87.3**	**85.0**
2-Fluorobiphenyl	321-60-8	0.1	%	**78.0**	**70.4**	**65.0**	**65.5**	**72.5**
4-Terphenyl-d14	1718-51-0	0.1	%	**49.0**	**43.0**	**46.0**	**48.2**	**46.2**

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: B2-3-S Laboratory Sample ID: HK0716420-016 Sample Date / Time: [9 Nov 2007]	B3-0.5-S HK0716420-017 [9 Nov 2007]	B3-1.5-S HK0716420-018 [9 Nov 2007]	B3-3-S HK0716420-019 [9 Nov 2007]	B4-0.5-S HK0716420-020 [9 Nov 2007]
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	10.3	14.8	4.8	16.7	14.1
EG: Metals and Major Cations								
EG020: Chromium	7440-47-3	1	mg/kg	7	5	2	3	4
EG020: Copper	7440-50-8	1	mg/kg	2	2	<1	1	2
EG020: Lead	7439-92-1	1	mg/kg	9	112	8	8	89
EG020: Zinc	7440-66-6	1	mg/kg	28	34	16	24	49
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C8 Fraction	----	5	mg/kg	<5	<5	<5	<5	<5
EP-071: Total Petroleum Hydrocarbons (TPH)								
C9 - C16 Fraction	----	200	mg/kg	<200	<200	<200	<200	<200
C17 - C35 Fraction	----	500	mg/kg	<500	<500	<500	<500	<500
EP-080: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	99.4	104	101	102	99.7
Toluene-D8	2037-26-5	0.1	%	98.6	99.3	100	99.4	98.8
4-Bromofluorobenzene	460-00-4	0.1	%	91.4	91.0	91.3	90.7	90.8
EP-074E: Halogenated Aliphatics								
Trichloroethene	79-01-6	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
EP-074S: VOC Surrogates							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	99.4	104	101	102	99.7
Toluene-D8	2037-26-5	0.1	%	98.6	99.3	100	99.4	98.8
4-Bromofluorobenzene	460-00-4	0.1	%	91.4	91.0	91.3	90.7	90.8
EP-075A: Phenols								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: B2-3-S Laboratory Sample ID: HK0716420-016 Sample Date / Time: [9 Nov 2007]	B3-0.5-S HK0716420-017 [9 Nov 2007]	B3-1.5-S HK0716420-018 [9 Nov 2007]	B3-3-S HK0716420-019 [9 Nov 2007]	B4-0.5-S HK0716420-020 [9 Nov 2007]
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	<1	<1	<1
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP-075S: Acid Extractable Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorophenol	367-12-4	0.1	%	**52.7**	**34.2**	**55.3**	**69.2**	**69.3**
Phenol-d6	13127-88-3	0.1	%	**67.8**	**46.6**	**68.9**	**78.3**	**81.3**
2.4.6-Tribromophenol	118-79-6	0.1	%	**54.1**	**32.0**	**42.5**	**49.9**	**70.2**
EP-075T: Base/Neutral Extractable Surrogates							Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	**70.0**	**50.2**	**82.0**	**85.9**	**90.7**
2-Fluorobiphenyl	321-60-8	0.1	%	**54.4**	**47.8**	**77.2**	**60.6**	**96.0**
4-Terphenyl-d14	1718-51-0	0.1	%	**56.6**	**36.7**	**57.0**	**59.9**	**64.8**

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: B4-1.5-S Laboratory Sample ID: HK0716420-021 Sample Date / Time: [9 Nov 2007]	Client Sample ID: B4-2.9-S Laboratory Sample ID: HK0716420-022 Sample Date / Time: [9 Nov 2007]			
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	7.9	11.2			
EG: Metals and Major Cations								
EG020: Chromium	7440-47-3	1	mg/kg	6	12			
EG020: Copper	7440-50-8	1	mg/kg	2	1			
EG020: Lead	7439-92-1	1	mg/kg	28	14			
EG020: Zinc	7440-66-6	1	mg/kg	54	26			
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C8 Fraction	----	5	mg/kg	<5	<5			
EP-071: Total Petroleum Hydrocarbons (TPH)								
C9 - C16 Fraction	----	200	mg/kg	<200	<200			
C17 - C35 Fraction	----	500	mg/kg	<500	<500			
EP-080: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2			
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2			
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2			
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	<0.4			
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2			
EP-080S: TPH(Volatile)/BTEX Surrogate								Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	101	94.8			
Toluene-D8	2037-26-5	0.1	%	99.8	98.4			
4-Bromofluorobenzene	460-00-4	0.1	%	92.6	92.4			
EP-074E: Halogenated Aliphatics								
Trichloroethene	79-01-6	0.04	mg/kg	<0.04	<0.04			
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04			
EP-074S: VOC Surrogates								Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%	101	94.8			
Toluene-D8	2037-26-5	0.1	%	99.8	98.4			
4-Bromofluorobenzene	460-00-4	0.1	%	92.6	92.4			
EP-075A: Phenols								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5			
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5			
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5			
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5			
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5			

Analytical Results

Submatrix: SOIL

Method: Analysis Description	CAS number	LOR	Units	Client Sample ID: B4-1.5-S Laboratory Sample ID: HK0716420-021 Sample Date / Time: [9 Nov 2007]	Client Sample ID: B4-2.9-S Laboratory Sample ID: HK0716420-022 Sample Date / Time: [9 Nov 2007]			
EP-075B: Polyaromatic Hydrocarbons (PAHs)								
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5			
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5			
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5			
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5			
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5			
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1			
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5			
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5			
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5			
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5			
EP-075S: Acid Extractable Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorophenol	367-12-4	0.1	%	**54.8**	**64.0**			
Phenol-d6	13127-88-3	0.1	%	**65.0**	**81.1**			
2.4.6-Tribromophenol	118-79-6	0.1	%	**49.6**	**57.0**			
EP-075T: Base/Neutral Extractable Surrogates							Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	**73.4**	**85.6**			
2-Fluorobiphenyl	321-60-8	0.1	%	**65.4**	**69.4**			
4-Terphenyl-d14	1718-51-0	0.1	%	**65.6**	**71.0**			

Quality Control - Laboratory Duplicate (DUP) Results

Matrix Type: SOIL				Duplicate (DUP) Results				
Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	LOR	Units	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 533840)								
HK0716397-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	13.2	13.1	0.0
HK0716420-010	A4-2.0-S	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	6.1	5.6	7.9
EA/ED: Physical and Aggregate Properties (QC Lot: 533841)								
HK0716420-020	B4-0.5-S	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	14.1	12.3	14.3
HK0716423-008	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	11.7	11.7	0.0
EG: Metals and Major Cations (QC Lot: 534837)								
HK0716420-002	A1-1.5-S	EG020: Lead	7439-92-1	1	mg/kg	105	104	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	104	104	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	10	11	0.0
		EG020: Copper	7440-50-8	1	mg/kg	6	7	0.0
HK0716420-012	B1-1.5-S	EG020: Lead	7439-92-1	1	mg/kg	6	6	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	13	13	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	2	2	0.0
		EG020: Copper	7440-50-8	1	mg/kg	<1	<1	0.0
EG: Metals and Major Cations (QC Lot: 534838)								
HK0716420-021	B4-1.5-S	EG020: Lead	7439-92-1	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	54	48	10.6
		EG020: Chromium	7440-47-3	1	mg/kg	6	5	0.0
		EG020: Copper	7440-50-8	1	mg/kg	2	3	0.0
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 533917)								
HK0716420-001	A1-0.5-S	C6 - C8 Fraction		5	mg/kg	<5	<5	0.0
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 533919)								
HK0716420-021	B4-1.5-S	C6 - C8 Fraction		5	mg/kg	<5	<5	0.0
EP-071: Total Petroleum Hydrocarbons (TPH) (QC Lot: 533902)								
HK0716420-021	B4-1.5-S	C9 - C16 Fraction		200	mg/kg	<200	<200	0.0
		C17 - C35 Fraction		500	mg/kg	<500	<500	0.0
EP-080: BTEX (QC Lot: 533917)								
HK0716420-001	A1-0.5-S	Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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
		meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	<0.4	0.0
		ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0
EP-080: BTEX (QC Lot: 533919)								
HK0716420-021	B4-1.5-S	Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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
		meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	<0.4	0.0
		ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0

Matrix Type: SOIL				Duplicate (DUP) Results				
Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	LOR	Units	Original Result	Duplicate Result	RPD (%)
EP-080: BTEX (QC Lot: 533919) - continued								
HK0716420-021	B4-1.5-S							
EP-074E: Halogenated Aliphatics (QC Lot: 533916)								
HK0716420-001	A1-0.5-S	Trichloroethene	79-01-6	0.04	mg/kg	<0.04	<0.04	0.0
		Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.0
EP-074E: Halogenated Aliphatics (QC Lot: 533918)								
HK0716420-021	B4-1.5-S	Trichloroethene	79-01-6	0.04	mg/kg	<0.04	<0.04	0.0
		Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	<0.04	0.0
EP-075A: Phenols (QC Lot: 530656)								
HK0716126-001	Anonymous	Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0
EP-075A: Phenols (QC Lot: 533901)								
HK0716420-021	B4-1.5-S	Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0
EP-075B: Polyaromatic Hydrocarbons (PAHs) (QC Lot: 530656)								
HK0716126-001	Anonymous	Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0
		Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0
		Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0
		Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0
		Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0
		Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0
		Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0
		Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0
		Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0
		Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.0
		Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0
		Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0
		Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0
EP-075B: Polyaromatic Hydrocarbons (PAHs) (QC Lot: 533901)								
HK0716420-021	B4-1.5-S	Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0
		Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0
		Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0
		Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0
		Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0
		Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0
		Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0
		Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0
		Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0
		Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.0
		Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0

Matrix Type: SOIL				Duplicate (DUP) Results				
Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	LOR	Units	Original Result	Duplicate Result	RPD (%)
EP-075B: Polyaromatic Hydrocarbons (PAHs) (QC Lot: 533901) - continued								
HK0716420-021	B4-1.5-S	Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0
		Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0
		Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0

Quality Control - Method Blank (MB), Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results

Matrix Type: SOIL		Method Blank (MB) Results			Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results						
					Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Method: Analysis Description	CAS number	LOR	Units	Result	Concentration	SCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QCLot: 534837)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	97.3	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	99.8	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	113	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----
EG: Metals and Major Cations (QCLot: 534838)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	100	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	107	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	98.5	----	85	115	----	----
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 533917)											
C6 - C8 Fraction		5	mg/kg	<5	3 mg/kg	65.8	----	50	130	----	----
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 533919)											
C6 - C8 Fraction		5	mg/kg	<5	3 mg/kg	70.4	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 533900)											
C9 - C16 Fraction		200	mg/kg	<200	32 mg/kg	87.6	----	50	130	----	----
C17 - C35 Fraction		500	mg/kg	<500	75 mg/kg	101	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 533902)											
C9 - C16 Fraction		200	mg/kg	----	32 mg/kg	90.3	----	50	130	----	----
C17 - C35 Fraction		500	mg/kg	----	75 mg/kg	85.1	----	50	130	----	----
EP-080: BTEX (QCLot: 533917)											
Benzene	71-43-2	0.2	mg/kg	<0.2	0.2 mg/kg	91.2	----	50	130	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.2 mg/kg	87.5	----	50	130	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.2 mg/kg	97.5	----	50	130	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.4 mg/kg	85.0	----	50	130	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.2 mg/kg	95.6	----	50	130	----	----
EP-080: BTEX (QCLot: 533919)											
Benzene	71-43-2	0.2	mg/kg	<0.2	0.2 mg/kg	95.6	----	50	130	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	0.2 mg/kg	91.2	----	50	130	----	----

Matrix Type: SOIL		Method Blank (MB) Results			Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results						
					Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Method: Analysis Description	CAS number	LOR	Units	Result	Concentration	SCS	DCS	Low	High	Value	Control Limit
EP-080: BTEX (QCLot: 533919) - continued											
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.2 mg/kg	98.8	----	50	130	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.4 mg/kg	88.8	----	50	130	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.2 mg/kg	95.0	----	50	130	----	----
EP-074E: Halogenated Aliphatics (QCLot: 533916)											
Trichloroethene	79-01-6	0.04	mg/kg	<0.04	0.16 mg/kg	106	----	104	143	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.16 mg/kg	104	----	90	148	----	----
EP-074E: Halogenated Aliphatics (QCLot: 533918)											
Trichloroethene	79-01-6	0.04	mg/kg	<0.04	0.16 mg/kg	110	----	104	143	----	----
Tetrachloroethene	127-18-4	0.04	mg/kg	<0.04	0.16 mg/kg	106	----	90	148	----	----
EP-075A: Phenols (QCLot: 530656)											
Phenol	108-95-2	0.5	mg/kg	<0.5	0.25 mg/kg	72.0	----	56	117	----	----
EP-075A: Phenols (QCLot: 533901)											
Phenol	108-95-2	0.5	mg/kg	<0.5	0.25 mg/kg	85.6	----	56	117	----	----
EP-075B: Polyaromatic Hydrocarbons (PAHs) (QCLot: 530656)											
Naphthalene	91-20-3	0.5	mg/kg	<0.5	0.25 mg/kg	80.9	----	68	110	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	0.25 mg/kg	82.0	----	73	112	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	0.25 mg/kg	79.0	----	74	107	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	0.25 mg/kg	82.0	----	76	110	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	0.25 mg/kg	80.1	----	77	111	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	0.25 mg/kg	78.5	----	69	111	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	0.25 mg/kg	88.1	----	75	114	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	0.25 mg/kg	82.7	----	74	114	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	0.25 mg/kg	76.4	----	62	125	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	0.25 mg/kg	81.6	----	57	125	----	----
Benzo(b) & Benzo(k)fluoranthen	205-99-2 207-08-9	1	mg/kg	<1	0.50 mg/kg	101	----	66	136	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	0.25 mg/kg	74.1	----	60	138	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	0.25 mg/kg	68.7	----	58	136	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	0.25 mg/kg	73.3	----	73	136	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	0.25 mg/kg	68.3	----	68	135	----	----
EP-075B: Polyaromatic Hydrocarbons (PAHs) (QCLot: 533901)											
Naphthalene	91-20-3	0.5	mg/kg	<0.5	0.25 mg/kg	86.2	----	68	110	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	0.25 mg/kg	84.0	----	73	112	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	0.25 mg/kg	83.2	----	74	107	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	0.25 mg/kg	84.3	----	76	110	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	0.25 mg/kg	85.6	----	77	111	----	----

Matrix Type: SOIL		Method Blank (MB) Results			Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results						
					Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Method: Analysis Description	CAS number	LOR	Units	Result	Concentration	SCS	DCS	Low	High	Value	Control Limit
EP-075B: Polyaromatic Hydrocarbons (PAHs) (QCLot: 533901) - continued											
Anthracene	120-12-7	0.5	mg/kg	<0.5	0.25 mg/kg	85.6	----	69	111	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	0.25 mg/kg	88.0	----	75	114	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	0.25 mg/kg	93.5	----	74	114	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	0.25 mg/kg	74.6	----	62	125	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	0.25 mg/kg	93.7	----	57	125	----	----
Benzo(b) & Benzo(k)fluoranthen	205-99-2 207-08-9	1	mg/kg	<1	0.50 mg/kg	86.6	----	66	136	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	0.25 mg/kg	81.4	----	60	138	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	0.25 mg/kg	73.2	----	58	136	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	0.25 mg/kg	64.0	----	73	136	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	0.25 mg/kg	74.8	----	68	135	----	----

Quality Control - Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results

Matrix Type: SOIL				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QCLot: 534837)										
HK0716420-001	A1-0.5-S	EG020: Lead	7439-92-1	5 mg/kg	Not Determined	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	Not Determined	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	88.0	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	86.0	----	75	125	----	----
EG: Metals and Major Cations (QCLot: 534838)										
HK0716420-021	B4-1.5-S	EG020: Lead	7439-92-1	5 mg/kg	Not Determined	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	Not Determined	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	85.8	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	85.3	----	75	125	----	----
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 533917)										
HK0716420-002	A1-1.5-S	C6 - C8 Fraction		9.375 mg/kg	70.4	----	50	130	----	----
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 533919)										
HK0716420-022	B4-2.9-S	C6 - C8 Fraction		9.375 mg/kg	77.6	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 533900)										
HK0716420-002	A1-1.5-S	C9 - C16 Fraction		32 mg/kg	95.9	----	50	130	----	----
		C17 - C35 Fraction		75 mg/kg	91.6	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 533902)										
HK0716420-022	B4-2.9-S	C9 - C16 Fraction		32 mg/kg	81.8	----	50	130	----	----
		C17 - C35 Fraction		75 mg/kg	71.3	----	50	130	----	----
EP-080: BTEX (QCLot: 533917)										
HK0716420-002	A1-1.5-S	Benzene	71-43-2	0.625 mg/kg	94.6	----	50	130	----	----

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-080: BTEX (QCLot: 533917) - continued										
HK0716420-002	A1-1.5-S	Toluene	108-88-3	0.625 mg/kg	85.6	----	50	130	----	----
		Ethylbenzene	100-41-4	0.625 mg/kg	90.0	----	50	130	----	----
		meta- & para-Xylene	108-38-3 106-42-3	1.25 mg/kg	87.1	----	50	130	----	----
		ortho-Xylene	95-47-6	0.625 mg/kg	88.2	----	50	130	----	----
EP-080: BTEX (QCLot: 533919)										
HK0716420-022	B4-2.9-S	Benzene	71-43-2	0.625 mg/kg	107	----	50	130	----	----
		Toluene	108-88-3	0.625 mg/kg	91.4	----	50	130	----	----
		Ethylbenzene	100-41-4	0.625 mg/kg	93.8	----	50	130	----	----
		meta- & para-Xylene	108-38-3 106-42-3	1.25 mg/kg	92.1	----	50	130	----	----
		ortho-Xylene	95-47-6	0.625 mg/kg	93.8	----	50	130	----	----

Surrogate Control Limits

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	%	80	120
Toluene-D8	%	81	117
4-Bromofluorobenzene	%	74	121
EP-074S: VOC Surrogates			
Dibromofluoromethane	%	80	120
Toluene-D8	%	81	117
4-Bromofluorobenzene	%	74	121
EP-075S: Acid Extractable Surrogates			
2-Fluorophenol	%	25	121
Phenol-d6	%	24	113
2.4.6-Tribromophenol	%	20	122
EP-075T: Base/Neutral Extractable Surrogates			
Nitrobenzene -d5	%	23	120
2-Fluorobiphenyl	%	30	115
4-Terphenyl-d14	%	20	137

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Appendix IV

Risk-Based Remediation Goals (RBRGs) for Soil and Soil Saturation Limit

Table 1 Risk-Based Remediation Goals (RBRGs) for Soil & Soil Saturation Limit

Chemical	Risk-Based Remediation Goals for Soil				
	Urban Residential (mg/kg)	Rural Residential (mg/kg)	Industrial (mg/kg)	Public Parks (mg/kg)	Soil Saturation Limit (Csat) (mg/kg)
VOCs					
Acetone	9.59E+03	4.26E+03	1.00E+04*	1.00E+04*	***
Benzene	7.04E-01	2.79E-01	9.21E+00	4.22E+01	3.36E+02
Bromodichloromethane	3.17E-01	1.29E-01	2.85E+00	1.34E+01	1.03E+03
2-Butanone	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	***
Chloroform	1.32E-01	5.29E-02	1.54E+00	2.53E+02	1.10E+03
Ethylbenzene	7.09E+02	2.98E+02	8.24E+03	1.00E+04*	1.38E+02
Methyl tert-Butyl Ether	6.88E+00	2.80E+00	7.01E+01	5.05E+02	2.38E+03
Methylene Chloride	1.30E+00	5.29E-01	1.39E+01	1.28E+02	9.21E+02
Styrene	3.22E+03	1.54E+03	1.00E+04*	1.00E+04*	4.97E+02
Tetrachloroethene	1.01E-01	4.44E-02	7.77E-01	1.84E+00	9.71E+01
Toluene	1.44E+03	7.05E+02	1.00E+04*	1.00E+04*	2.35E+02
Trichloroethene	5.23E-01	2.11E-01	5.68E+00	6.94E+01	4.88E+02
Xylenes (Total)	9.50E+01	3.68E+01	1.23E+03	1.00E+04*	1.50E+02
SVOCs					
Acenaphthene	3.51E+03	3.28E+03	1.00E+04*	1.00E+04*	6.02E+01
Acenaphthylene	2.34E+03	1.51E+03	1.00E+04*	1.00E+04*	1.98E+01
Anthracene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	2.56E+00
Benzo(a)anthracene	1.20E+01	1.14E+01	9.18E+01	3.83E+01	
Benzo(a)pyrene	1.20E+00	1.14E+00	9.18E+00	3.83E+00	
Benzo(b)fluoranthene	9.88E+00	1.01E+01	1.78E+01	2.04E+01	
Benzo(g,h,i)perylene	1.80E+03	1.71E+03	1.00E+04*	5.74E+03	
Benzo(k)fluoranthene	1.20E+02	1.14E+02	9.18E+02	3.83E+02	
bis-(2-Ethylhexyl)phthalate	3.00E+01	2.80E+01	9.18E+01	9.42E+01	
Chrysene	8.71E+02	9.19E+02	1.14E+03	1.54E+03	
Dibenzo(a,h)anthracene	1.20E+00	1.14E+00	9.18E+00	3.83E+00	
Fluoranthene	2.40E+03	2.27E+03	1.00E+04*	7.62E+03	
Fluorene	2.38E+03	2.25E+03	1.00E+04*	7.45E+03	5.47E+01
Hexachlorobenzene	2.43E-01	2.20E-01	5.82E-01	7.13E-01	
Indeno(1,2,3-cd)pyrene	1.20E+01	1.14E+01	9.18E+01	3.83E+01	
Naphthalene	1.82E+02	8.56E+01	4.53E+02	9.14E+02	1.25E+02
Phenanthrene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	2.80E+01
Phenol	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	7.26E+03
Pyrene	1.80E+03	1.71E+03	1.00E+04*	5.72E+03	
Metals					
Antimony	2.95E+01	2.91E+01	2.61E+02	9.79E+01	
Arsenic	2.21E+01	2.18E+01	1.96E+02	7.35E+01	
Barium	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Cadmium	7.38E+01	7.28E+01	6.53E+02	2.45E+02	
Chromium III	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Chromium VI	2.21E+02	2.18E+02	1.96E+03	7.35E+02	
Cobalt	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Copper	2.95E+03	2.91E+03	1.00E+04*	9.79E+03	
Lead	2.58E+02	2.55E+02	2.29E+03	8.57E+02	
Manganese	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Mercury	1.10E+01	6.52E+00	3.84E+01	4.56E+01	
Molybdenum	3.69E+02	3.64E+02	3.26E+03	1.22E+03	
Nickel	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Tin	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Zinc	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Dioxins / PCBs					
Dioxins (I-TEQ)	1.00E-03	1.00E-03	5.00E-03	1.00E-03	
PCBs	2.36E-01	2.26E-01	7.48E-01	7.56E-01	
Petroleum Carbon Ranges					
C6 - C8	1.41E+03	5.45E+02	1.00E+04*	1.00E+04*	1.00E+03
C9 - C16	2.24E+03	1.33E+03	1.00E+04*	1.00E+04*	3.00E+03
C17 - C35	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	5.00E+03
Other Inorganic Compounds					
Cyanide, free	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Organometallics					
TBTO	2.21E+01	2.18E+01	1.96E+02	7.35E+01	

Notes:

(1) For Dioxins, the cleanup levels in USEPA Office of Solid Waste and Emergency Response (OSWER) Directive of 1998 have been adopted. The OSWER Directive value of 1 ppb for residential use has been applied to the scenarios of "Urban Residential", "Rural Residential", and "Public Parks", while the low end of the range of values for industrial, 5 ppb, has been applied to the scenario of "Industrial".

(2) Soil saturation limits for petroleum carbon ranges taken from the Canada-Wide Standards for Petroleum Hydrocarbons in Soil, CCME 2000.

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

(4) *** indicates that the Csat value exceeds the 'ceiling limit' therefore the RBRG applies.