

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

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Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H010025  
Site : S1-1

Laboratory : ALS Technichem HK Pty Ltd  
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Quote number : HK/1313/2009\*\*

Page : 1 of 9  
Work Order : HK0924613  
Date Samples Received : 20-NOV-2009  
Issue Date : 04-JAN-2010  
No. of samples received : 2  
No. of samples analysed : 2

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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.

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A Campbell Brothers Limited Company



Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924613

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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924613**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S1-1	S1-1			
				0-0.9M	0.9-1.9M			
				20-NOV-2009 14:00	20-NOV-2009 14:00			
				HK0924613-001	HK0924613-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	29.9	33.7			
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	12.7	22.6			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	1	2			
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	15	23			
EG020: Copper	7440-50-8	1	mg/kg	6	8			
EG020: Lead	7439-92-1	1	mg/kg	14	19			
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	11	16			
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg	35	54			
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	473	440			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	206-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	----	550	µg/kg	<550	<550			
High M.W. PAHs	----	1700	µg/kg	<1700	<1700			

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT				Client sample ID	S1-1 0-0.9M	S1-1 0.9-1.9M		
Client sampling date / time				20-NOV-2009 14:00	20-NOV-2009 14:00			
Compound	CAS Number	LOR	Unit	HK0924613-001	HK0924613-002			
<b>EP-065: PCB Single Congeners - Continued</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3			
PCB 169	32774-16-6	3	µg/kg	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>								
Nitrobenzene -d5	4165-60-0	0.1	%	53.6	54.8			
4-Terphenyl-d14	1718-51-0	0.1	%	66.0	68.0			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>								
Decachlorobiphenyl	2051-24-3	0.1	%	65.7	65.2			
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>								
Tetrachlorometaxylene	877-09-8	0.1	%	68.5	60.5			
Dibutylchlorodate	1770-80-5	0.1	%	58.2	54.2			



### 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: 1172677)</b>								
HK0924581-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	44.3	6.6
HK0924646-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.6	48.4	0.3
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
HK0924522-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	40	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	25	6.5
		EG020: Nickel	7440-02-0	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
Fluorene	86-73-7	50	µg/kg	<50	<50	0.0		



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>								
HK0924522-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>													
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	---	85	115	---	---		
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>													
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	---	85	115	---	---		
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	---	85	115	---	---		
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	---	85	115	---	---		
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	---	85	115	---	---		
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	---	85	115	---	---		
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	---	85	115	---	---		
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	---	85	115	---	---		
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	---	85	115	---	---		
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	---	85	115	---	---		
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>													
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---		
				---	49.9 µg/kg	79.6	---	58	123	---	---		
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---		
				---	50.9 µg/kg	60.2	---	44	96	---	---		
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---		
				---	50.4 µg/kg	64.3	---	48	86	---	---		
Fluorene	86-73-7	50	µg/kg	<50	---	---	---	---	---	---	---		
				---	51.0 µg/kg	66.2	---	51	91	---	---		
Phenanthrene	85-01-8	5	µg/kg	<50	---	---	---	---	---	---	---		
				---	51.2 µg/kg	66.6	---	46	87	---	---		
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---		
				---	50.7 µg/kg	54.9	---	50	85	---	---		
Fluoranthene	206-44-0	5	µg/kg	<150	---	---	---	---	---	---	---		
				---	51.0 µg/kg	68.4	---	50	98	---	---		
Pyrene	129-00-0	5	µg/kg	<150	---	---	---	---	---	---	---		
				---	51.1 µg/kg	69.8	---	50	96	---	---		
Benz(a)anthracene	56-55-3	5	µg/kg	<150	---	---	---	---	---	---	---		
				---	50.1 µg/kg	77.5	---	55	114	---	---		
Chrysene	218-01-9	150	µg/kg	<150	---	---	---	---	---	---	---		
				---	50.8 µg/kg	78.2	---	45	118	---	---		
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	---	---	---	---	---	---	---		
				---	101.9 µg/kg	82.1	---	60	114	---	---		
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	---	---	---	---	---	---	---		
				---	50.7 µg/kg	78.7	---	46	118	---	---		
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	---	---	---	---	---	---	---		
				---	49.0 µg/kg	75.4	---	40	194	---	---		
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	---	---	---	---	---	---	---		
				---	50.2 µg/kg	68.0	---	14	188	---	---		
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---		





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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	77.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	---	52	150	---	---
beta- & gamma-BHC	319-85-7	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	---	6	144	---	---

**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



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: 1172530)</b>										
HK0924518-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 7
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0923837
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 11-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 28-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CV/2009/13			No. of samples analysed	: 3
C-O-C number	: H010001				
Site	: S2				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 26-NOV-2009

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: **HK0923837**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in a chilled condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except sample #1 S2 0.00-0.90M and sample #2 S2 0.90-1.90M.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S2	S2	S2
				0.00-0.90M	0.90-1.90M	1.90-2.90M
				11-NOV-2009 16:30	11-NOV-2009 16:30	11-NOV-2009 16:00
				HK0923837-001	HK0923837-002	HK0923837-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	55.9	51.8	22.1
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	204	327	13.8
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	11	11	4
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.6	0.7	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	72	80	23
EG020: Copper	7440-50-8	1	mg/kg	161	188	10
EG020: Lead	7439-92-1	1	mg/kg	51	52	28
EG020: Mercury	7439-97-6	0.05	mg/kg	0.18	0.23	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	38	42	7
EG020: Silver	7440-22-4	0.1	mg/kg	4.4	6.0	0.1
EG020: Zinc	7440-66-6	1	mg/kg	225	262	27
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	2970	3620	<5
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						



Sub-Matrix: SEDIMENT				Client sample ID	S2	S2	S2
				Client sampling date / time	0.00-0.90M	0.90-1.90M	1.90-2.90M
					11-NOV-2009 16:30	11-NOV-2009 16:30	11-NOV-2009 16:00
Compound	CAS Number	LOR	Unit	HK0923837-001	HK0923837-002	HK0923837-003	
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3	
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3	
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3	
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3	
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3	
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3	
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3	
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3	
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3	
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3	
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3	
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3	
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3	
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3	
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3	
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3	
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3	
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Surrogate control limits listed at end of this report.							
Nitrobenzene -d5	4165-60-0	0.1	%	73.7	72.4	73.7	
4-Terphenyl-d14	1718-51-0	0.1	%	64.5	51.0	71.0	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Surrogate control limits listed at end of this report.							
Decachlorobiphenyl	2051-24-3	0.1	%	88.3	80.3	102	
<b>EP-067S: Pesticide Surrogate</b>							
Surrogate control limits listed at end of this report.							
Tetrachlorometaxylene	877-09-8	0.1	%	52.4	53.5	52.5	
Dibutylchlorendate	1770-80-5	0.1	%	52.1	51.9	61.4	



### 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: 1170981)</b>								
HK0923837-001	S2 0.00-0.90M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	55.9	55.6	0.4
HK0923913-008	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	46.5	1.7
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>								
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9
<b>EG: Metals and Major Cations (QC Lot: 1168924)</b>								
HK0923837-002	S2 0.90-1.90M	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23	0.24	5.5
		EG020: Silver	7440-22-4	0.1	mg/kg	6.0	5.7	3.9
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.7	0.7	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	11	11	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	80	77	3.4
		EG020: Copper	7440-50-8	1	mg/kg	188	183	2.5
		EG020: Lead	7439-92-1	1	mg/kg	52	52	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	42	42	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	262	254	2.9
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	S2 0.00-0.90M	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4.4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
	4.4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1168924)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	88.1	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.9	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.1	----	85	115	----	----



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: 1168924) - Continued</b>											
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	99.8	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	106	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	96.1	----	85	115	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	111	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	38.2	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	146	----	54	147	----	----
4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	152	----	54	154	----	----
4.4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	50	142	----	----
4.4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	72.3	----	6	144	----	----

**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: 1168924)</b>										
HK0923837-001	S2 0.00-0.90M	EG020: Arsenic	7440-38-2	5 mg/kg	83.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	90.2	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	82.7	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.2	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	95.3	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**



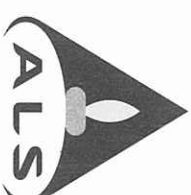
Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130

# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## ALS TECHNICHEM (HK) Pty Ltd

Environmental Division



### CERTIFICATE OF ANALYSIS

**CONTACT:** MR C M YEE  
**CLIENT:** LAM GEOTECHNICS LIMITED  
**ADDRESS:** 11/F., CENTRE POINT,  
181-185 GLOUCESTER ROAD,  
WANCHAI,  
HONG KONG.  
**PROJECT:** LG29024  
**SITE:** S2

**Batch:** HK0923837  
**Sub-batch:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 09/12/2009  
**DATE OF ISSUE:** 13/01/2010  
**SAMPLE TYPE:** WATER  
**No. of SAMPLES:** 2  
**ORDER:** CV/2009/13

### COMMENTS

Sample(s) were received in a chilled condition.  
Tributyl tin Oxide was subcontracted and tested by Hong Kong Productivity Council.  
Hong Kong Productivity Council details report was attached. The attached report contains a total of 2 pages.

### Sample Details

ALS Lab ID	Sample ID	Date of Sampling
HK0923837-001	S2	11/11/2009
HK0923837-002	S2	11/11/2009

### 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@alsenviro.com

  
Mr Chah Kwok Fai Godfrey  
Laboratory Manager - Hong Kong

### Other ALS Environmental Laboratories

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**AUSTRALIA**  
Brisbane  
Melbourne  
Sydney  
Newcastle

**AMERICAS**  
Vancouver  
Santiago  
Arimotagasta  
Limá

Abbreviations: % SPK REC denotes percentage spike recovery

CHK denotes duplicate check sample

LOR denotes limit of reporting

LCS % REC denotes Laboratory Control Sample percentage recovery

Part of the **ALS Technichem (HK) Pty Ltd**  
**ALS Technichem (HK) Pty Ltd**

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., H.K.  
Phone: 852-2610 1044 Fax: 852-2610 2021 [www.alsenviro.com](http://www.alsenviro.com)  
A Campbell Brothers Limited Company





**Environment & Product Innovation Laboratory**

**TEST REPORT**

Test Report No : T0020166  
Folder No : 0909146  
Page No : 1 of 2  
Date of Issue : 07/01/2010

Client : ALS Technichem (HK) Pty Ltd.  
Address : 11/F., Chung Shun Knitting Centre,  
1-3 Wing Yip Street,  
Kwai Chung,  
N.T. Hong Kong.

Sample Description : 2 interstitial water samples were delivered by the client.

Sample Received Date : 03/12/2009

Test Completed Date : 07/01/2010

Approved Signatory : Fung Kam Wing

Remarks : Contact Person : Mr. Ivan Leung. Acceptable range of surrogate compound recovery for water is 68-120%.

**Analytical Results:**

Sample Name	Parameter	Unit	Tribuyl tin	Surrogate Compound	Recovery (%)
	Method Code		(ng TBTL)	WTM-TBT-1	
	Sample No	Analysis Date			
HK0923837-1	WT-0912-0830	11/12/2009	19	WTM-TBT-1	82
HK0923837-2	WT-0912-0831		<15		97

**Approval Signatory:**

*Notes:* (1) This report may not be reproduced except with prior written approval from the issuing laboratory.

(2) Testing Conditions is shown at the back of this report and N.R. refers to test not required by the Client Company.

(3) Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.



## TESTING METHODS – ORGANICS

Parameter	Method	Reference	Parameter	Method	Reference
<b>I. Water/Wastewater</b>					
BTEX Petroleum Hydrocarbons	WTM-BTEX-1	USEPA 8260B	BTEX Petroleum Hydrocarbons	SEDIMENT-BTEX-1	USEPA 8260B
C <sub>6</sub> -C <sub>9</sub> Gasoline range organics (GRO)*	WTM-4-GRO-1	USEPA 801.5B	C <sub>6</sub> -C <sub>9</sub> Gasoline range organics (GRO)*	WTM-DRO-1	USEPA 801.5B
C <sub>10</sub> -C <sub>28</sub> Diesel range organics (DRO) ▲	WTM-DRO-1	USEPA 801.5B	C <sub>10</sub> -C <sub>28</sub> Diesel range organics (DRO) ▲	SEDIMENT-DRO-1	USEPA 801.5B
C <sub>10</sub> -C <sub>28</sub> Petroleum Hydrocarbons	WTM-4-DRO-2	USEPA 801.5B	C <sub>10</sub> -C <sub>28</sub> Petroleum Hydrocarbons	SEDIMENT-DRO-2	USEPA 801.5B
Organochlorine Pesticides (OCP)	WTM-OCP-1	USEPA 8081	Organochlorine Pesticides (OCP)	SEDIMENT-OCP-1	USEPA 8081
Organophosphosphate Pesticides (OPP)	WTM-O-PP-1	USEPA 8141	Organophosphosphate Pesticides (OPP)	SEDIMENT-OPP-1	USEPA 8141
Polynuclear Aromatic Hydrocarbons (PAHs)	WTM-4-PAH-1	USEPA 8270C	Polynuclear Aromatic Hydrocarbons (PAHs)	SEDIMENT-PAH-1	USEPA 8270C
Trihalomethane (THM)	WTM-VOC-1	USEPA 8260B	Trihalomethane (THM)	WTM-VOC-1	USEPA 8260B
Volatile Organic Compounds (VOCs)	WTM-VOC-1	USEPA 8260B	Volatile Organic Compounds (VOCs)	WTM-VOC-1	USEPA 8260B
Polychlorinated Biphenyls (PCBs)	WTM-4-PCB-1	USEPA 8082	Polychlorinated Biphenyls (PCBs)	SEDIMENT-PCB-2	USEPA 8082
Tributyl Tin (TBT)	WTM-TBT-1	Krone <i>et al</i>	Tributyl Tin (TBT)	SEDIMENT-TBT-1	Krone <i>et al</i>
Phenols	WTM-HENOL-1	USEPA 8270C	Phenols	SEDIMENT-PHENOL-1	USEPA 8270C
<b>II. Sediment/Soil</b>					
<b>III. Chinese Medicines</b>					
Pesticides Residues	TCM-OCP-1	In house method			
Organophosphorus Pesticide	SEDIMENT-OPP-1	In house based on USEPA 8141A			
Polychlorinated Biphenyls (PCBs)	SEDIMENT-PCB-2	In house based on USEPA 8082			
<b>IV. Degradable Containers &amp; Bags</b>					
	HS1004	HS1004, Testing Guideline on Degradable Containers and Bags			
<b>V. Food &amp; Biota Samples</b>					
Polynuclear Aromatic Hydrocarbons (PAHs)	FD-PAH-1	In house based on USEPA 8270C			
Organochlorinated Pesticides (OCPs)	FD-OCP-1	In house based on USEPA 8081B			

### Remarks:

\*C<sub>6</sub>-C<sub>9</sub> Gasoline range organics content is defined as the collective concentration of all organics which elute between 2-methylpentane (C<sub>6</sub>) and n-nonane (C<sub>9</sub>), ▲C<sub>10</sub>-C<sub>28</sub> Diesel range organics content is defined as the collective concentration of all organics which elute between n-decane (C<sub>10</sub>) and N-octacosane (C<sub>28</sub>).

### Reference Notes:

USEPA – United States Environmental Protection Agency  
Krone *et al* – Marine Environmental research, 27, 1-18, 1989

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924258
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 16-NOV-2009
Order number	: CV/2009/13			Issue Date	: 23-DEC-2009
C-O-C number	: H006853			No. of samples received	: 3
Site	: S3			No. of samples analysed	: 3

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

Trading Name: ALS Technichem (HK) Pty Ltd

11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong

Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsenviro.com

A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924258



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924258**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S3	S3	S3
				0-0.9M	0.9-1.9M	1.9-2.9M
				14-NOV-2009 15:00	14-NOV-2009 15:00	14-NOV-2009 15:00
				HK0924258-001	HK0924258-002	HK0924258-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	24.0	28.6	31.2
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	27.0	32.1	35.6
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	2	2	3
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	10	17	19
EG020: Copper	7440-50-8	1	mg/kg	5	6	6
EG020: Lead	7439-92-1	1	mg/kg	10	13	16
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	5	10	12
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	24	41	47
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	349	350	320
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT

Client sample ID

S3 0-0.9M	S3 0.9-1.9M	S3 1.9-2.9M
14-NOV-2009 15:00	14-NOV-2009 15:00	14-NOV-2009 15:00

Client sampling date / time

Compound	CAS Number	LOR	Unit	HK0924258-001	HK0924258-002	HK0924258-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Surrogate control limits listed at end of this report.						
Nitrobenzene -d5	4165-60-0	0.1	%	55.6	52.8	55.1
4-Terphenyl-d14	1718-51-0	0.1	%	50.7	50.8	57.7
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Surrogate control limits listed at end of this report.						
Decachlorobiphenyl	2051-24-3	0.1	%	78.5	59.0	103
<b>EP-067S: Pesticide Surrogate</b>						
Surrogate control limits listed at end of this report.						
Tetrachlorometaxylene	877-09-8	0.1	%	61.6	57.8	65.7
Dibutylchlorendate	1770-80-5	0.1	%	57.9	53.1	55.3



### 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: 1170983)</b>								
HK0924253-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.5	46.2	0.5
HK0924257-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.2	50.2	0.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>								
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>								
HK0924256-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0
HK0924259-003	Anonymous	EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8
		EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	3	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	15	14	7.7
		EG020: Copper	7440-50-8	1	mg/kg	5	5	0.0
		EG020: Lead	7439-92-1	1	mg/kg	12	12	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	9	8	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	36	36	0.0
		<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>						
HK0924256-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0





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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>								
HK0924256-002	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
n											





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	80.8	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	60.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	61.5	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	63.7	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.3	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	55.9	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	69.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.6	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	76.9	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.4	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.8	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	83.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	69.1	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	82.1	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	103	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	----	6	144	----	----

**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



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: 1171293)</b>										
HK0924256-002	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.4	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.7	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorodate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

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Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H006847  
Site : S4

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Quote number : HK/1313/2009\*\*

Page : 1 of 9  
Work Order : HK0924254  
Date Samples Received : 13-NOV-2009  
Issue Date : 28-DEC-2009  
No. of samples received : 7  
No. of samples analysed : 3

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924254



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924254**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except sample #1 S4 0-0.9M.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



**Analytical Results**

Sub-Matrix: SEDIMENT				Client sample ID		
				S4	S4	S4
				0-0.9M	0.9-1.9M	1.9-2.9M
Client sampling date / time				13-NOV-2009 10:30	13-NOV-2009 10:30	13-NOV-2009 10:30
Compound	CAS Number	LOR	Unit	HK0924254-001	HK0924254-002	HK0924254-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	51.8	48.9	24.2
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	144	41.5	17.6
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	9	8	6
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.5	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	68	43	22
EG020: Copper	7440-50-8	1	mg/kg	135	40	9
EG020: Lead	7439-92-1	1	mg/kg	52	41	20
EG020: Mercury	7439-97-6	0.05	mg/kg	0.28	0.17	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	34	29	11
EG020: Silver	7440-22-4	0.1	mg/kg	3.0	0.7	0.2
EG020: Zinc	7440-66-6	1	mg/kg	196	104	47
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	2140	1060	66
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						



Sub-Matrix: SEDIMENT				Client sample ID	S4	S4	S4
				Client sampling date / time	0-0.9M	0.9-1.9M	1.9-2.9M
				13-NOV-2009 10:30	13-NOV-2009 10:30	13-NOV-2009 10:30	
Compound	CAS Number	LOR	Unit	HK0924254-001	HK0924254-002	HK0924254-003	
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3	
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3	
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3	
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3	
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3	
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3	
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3	
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3	
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3	
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3	
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3	
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3	
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3	
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3	
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3	
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3	
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3	
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Surrogate control limits listed at end of this report.							
Nitrobenzene -d5	4165-60-0	0.1	%	50.6	61.5	59.4	
4-Terphenyl-d14	1718-51-0	0.1	%	57.8	52.1	60.5	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Surrogate control limits listed at end of this report.							
Decachlorobiphenyl	2051-24-3	0.1	%	100	96.1	94.2	
<b>EP-067S: Pesticide Surrogate</b>							
Surrogate control limits listed at end of this report.							
Tetrachlorometaxylene	877-09-8	0.1	%	56.2	52.1	53.2	
Dibutylchlorendate	1770-80-5	0.1	%	59.3	50.5	58.5	





**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: 1170983)</b>								
HK0924253-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.5	46.2	0.5
HK0924257-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.2	50.2	0.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>								
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>								
HK0924243-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0
		HK0924253-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	8	10	21.0
EG020: Chromium	7440-47-3			1	mg/kg	41	42	2.8
EG020: Copper	7440-50-8			1	mg/kg	13	14	0.0
EG020: Lead	7439-92-1			1	mg/kg	30	30	0.0
EG020: Nickel	7440-02-0			1	mg/kg	28	29	3.6
EG020: Zinc	7440-66-6			1	mg/kg	80	82	3.4
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>								
HK0924243-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0





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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777) - Continued</b>								
HK0924243-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
					Concentratio	LCS	DCS	Low	High	Value	Control Limit	
n												



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	92.4	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	68.8	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	68.9	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	60.6	----	51	91	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.0	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	57.5	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	67.7	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	70.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	70.2	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	74.3	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	71.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	64.6	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	71.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	56.2	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	73.4	----	25	182	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	106	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	86.1	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	105	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	84.1	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.8	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	107	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	82.8	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	81.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	81.6	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	90.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.0	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	88.6	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	88.8	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	111	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	38.2	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	146	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	152	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	72.3	----	6	144	----	----

**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



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: 1171292)</b>										
HK0924243-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorodate	1770-80-5	50	130

### CERTIFICATE OF ANALYSIS

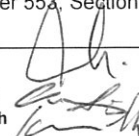
Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924581
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 20-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010024			No. of samples received	: 5
Site	: S5-2			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth



*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924581



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924581**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

S5-2  
0-0.9M

S5-2  
0.9-1.9M

Client sampling date / time

20-NOV-2009 12:00

20-NOV-2009 12:00

Compound	CAS Number	LOR	Unit	HK0924581-001	HK0924581-002
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	47.3	39.3
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	84.3	4.8
<b>EG: Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	12	13
EG020: Cadmium	7440-43-9	0.2	mg/kg	1.3	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	68	48
EG020: Copper	7440-50-8	1	mg/kg	62	16
EG020: Lead	7439-92-1	1	mg/kg	83	34
EG020: Mercury	7439-97-6	0.05	mg/kg	0.95	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	30	28
EG020: Silver	7440-22-4	0.1	mg/kg	1.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	224	102
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	827	1070
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700
<b>EP-065: PCB Single Congeners</b>					





Sub-Matrix: SEDIMENT

Client sample ID

S5-2

S5-2

0-0.9M

0.9-1.9M

Client sampling date / time

20-NOV-2009 12:00

20-NOV-2009 12:00

HK0924581-001

HK0924581-002

Compound	CAS Number	LOR	Unit	HK0924581-001	HK0924581-002
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 8	34883-43-7	3	µg/kg	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3
PCB 169	32774-16-6	3	µg/kg	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Nitrobenzene -d5	4165-60-0	0.1	%	54.7	57.6
4-Terphenyl-d14	1718-51-0	0.1	%	74.3	82.2
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Decachlorobiphenyl	2051-24-3	0.1	%	86.6	102
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Tetrachlorometaxylene	877-09-8	0.1	%	63.0	65.5
Dibutylchloroendate	1770-80-5	0.1	%	59.0	54.8



### 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: 1172677)</b>								
HK0924581-001	S5-2 0-0.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	44.3	6.6
HK0924646-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.6	48.4	0.3
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>								
HK0924449-002	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	2.8	2.9	0.0
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>								
HK0924446-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	31	28	8.8
		EG020: Copper	7440-50-8	1	mg/kg	10	9	0.0
		EG020: Lead	7439-92-1	1	mg/kg	18	17	9.6
		EG020: Nickel	7440-02-0	1	mg/kg	19	18	7.4
		EG020: Zinc	7440-66-6	1	mg/kg	71	66	7.6
HK0924582-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	14	14	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	46	45	3.7
		EG020: Copper	7440-50-8	1	mg/kg	16	15	0.0
		EG020: Lead	7439-92-1	1	mg/kg	37	36	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	26	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	98	95	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
n											



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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	98.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	103	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	99.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	98.0	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	90.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	94.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	96.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	67.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	81.7	----	25	182	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	91.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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





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: 1171295)</b>										
HK0924446-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	96.1	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	76.3	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	83.9	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	99.6	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	80.2	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.3	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924257
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 16-NOV-2009
Order number	: CV/2009/13			Issue Date	: 28-DEC-2009
C-O-C number	: H006851			No. of samples received	: 7
Site	: S6			No. of samples analysed	: 3

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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
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Chan Siu Ming, Vico	Chemist	Inorganics
Wong Wing, Kenneth	Assistant Supervisor	Inorganics

#### ALS Laboratory Group

Trading Name: ALS Technichem (HK) Pty Ltd

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A Campbell Brothers Limited Company



Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924257



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924257**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except sample #2 S6 0.9-1.9M and #3 1.9-2.9M.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S6	S6	S6
				0-0.9M	0.9-1.9M	1.9-2.9M
				14-NOV-2009 10:30	14-NOV-2009 10:30	14-NOV-2009 10:30
				HK0924257-001	HK0924257-002	HK0924257-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	50.2	49.5	47.0
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	70.4	54.7	51.0
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	7	8	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.3	0.2	0.3
EG020: Chromium	7440-47-3	1	mg/kg	45	46	46
EG020: Copper	7440-50-8	1	mg/kg	60	53	68
EG020: Lead	7439-92-1	1	mg/kg	32	32	36
EG020: Mercury	7439-97-6	0.05	mg/kg	0.10	0.08	0.17
EG020: Nickel	7440-02-0	1	mg/kg	25	26	25
EG020: Silver	7440-22-4	0.1	mg/kg	1.6	1.3	1.1
EG020: Zinc	7440-66-6	1	mg/kg	117	120	119
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1260	1240	931
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

S6 0-0.9M	S6 0.9-1.9M	S6 1.9-2.9M
14-NOV-2009 10:30	14-NOV-2009 10:30	14-NOV-2009 10:30
HK0924257-001	HK0924257-002	HK0924257-003

Compound	CAS Number	LOR	Unit	HK0924257-001	HK0924257-002	HK0924257-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>						
Nitrobenzene -d5	4165-60-0	0.1	%	52.4	55.5	58.1
4-Terphenyl-d14	1718-51-0	0.1	%	50.4	62.1	57.4
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>						
Decachlorobiphenyl	2051-24-3	0.1	%	62.6	104	80.0
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>						
Tetrachlorometaxylene	877-09-8	0.1	%	61.0	61.4	51.9
Dibutylchlorendate	1770-80-5	0.1	%	59.2	58.1	54.0



**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: 1170983)</b>								
HK0924253-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.5	46.2	0.5
HK0924257-001	S6 0-0.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.2	50.2	0.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177458)</b>								
HK0924259-003	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	21.6	22.9	5.6
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>								
HK0924256-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8
		HK0924259-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	3	4	0.0
EG020: Chromium	7440-47-3			1	mg/kg	15	14	7.7
EG020: Copper	7440-50-8			1	mg/kg	5	5	0.0
EG020: Lead	7439-92-1			1	mg/kg	12	12	0.0
EG020: Nickel	7440-02-0			1	mg/kg	9	8	0.0
EG020: Zinc	7440-66-6			1	mg/kg	36	36	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>								
HK0924256-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>								
HK0924256-002	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
n												



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 Concentratio n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177458)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	98.5	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	80.8	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	60.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	----	----	----	----	----
				---	50.4 µg/kg	61.5	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	---	51.0 µg/kg	63.7	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	---	---	----	----	----	----	----
				---	51.2 µg/kg	67.3	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	---	---	----	----	----	----	----
				---	50.7 µg/kg	55.9	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	----	----	----	----	----
				---	51.0 µg/kg	69.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	---	51.1 µg/kg	70.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	---	---	----	----	----	----	----
				---	50.1 µg/kg	77.6	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	76.9	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	---	101.9 µg/kg	81.4	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	77.8	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	---	49.0 µg/kg	83.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	---	---	----	----	----	----	----
				---	50.2 µg/kg	69.1	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	82.1	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	---	64	124	---	---
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	103	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	---	6	144	---	---

**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





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: 1171293)</b>										
HK0924256-002	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.4	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.7	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924259
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 16-NOV-2009
Order number	: CV/2009/13			Issue Date	: 23-DEC-2009
C-O-C number	: H006854			No. of samples received	: 7
Site	: S7			No. of samples analysed	: 3

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924259

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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924259**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S7	S7	S7
				0-0.9M	0.9-1.9M	1.9-2.9M
				14-NOV-2009 17:00	14-NOV-2009 17:00	14-NOV-2009 17:00
				HK0924259-001	HK0924259-002	HK0924259-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	28.3	28.6	27.9
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	26.2	21.6
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	2	3	3
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	15	14	15
EG020: Copper	7440-50-8	1	mg/kg	5	4	5
EG020: Lead	7439-92-1	1	mg/kg	11	11	12
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	8	8	9
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	36	33	36
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	200	224	303
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT

Client sample ID

S7 0-0.9M	S7 0.9-1.9M	S7 1.9-2.9M
14-NOV-2009 17:00	14-NOV-2009 17:00	14-NOV-2009 17:00

Client sampling date / time

Compound	CAS Number	LOR	Unit	HK0924259-001	HK0924259-002	HK0924259-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Surrogate control limits listed at end of this report.						
Nitrobenzene -d5	4165-60-0	0.1	%	56.9	54.2	51.1
4-Terphenyl-d14	1718-51-0	0.1	%	57.0	50.8	52.3
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Surrogate control limits listed at end of this report.						
Decachlorobiphenyl	2051-24-3	0.1	%	68.2	71.6	95.5
<b>EP-067S: Pesticide Surrogate</b>						
Surrogate control limits listed at end of this report.						
Tetrachlorometaxylene	877-09-8	0.1	%	58.3	61.2	51.6
Dibutylchlorodate	1770-80-5	0.1	%	51.4	52.0	53.2



### 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: 1170983)</b>								
HK0924253-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.5	46.2	0.5
HK0924257-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.2	50.2	0.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>								
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>								
HK0924256-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8
HK0924259-003	S7 1.9-2.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	3	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	15	14	7.7
		EG020: Copper	7440-50-8	1	mg/kg	5	5	0.0
		EG020: Lead	7439-92-1	1	mg/kg	12	12	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	9	8	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	36	36	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>								
HK0924256-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>								
HK0924256-002	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfat	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											





Matrix: SOIL		Method Blank (MB) Report				Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
Method: Compound	CAS Number										
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	80.8	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	60.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	61.5	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	63.7	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.3	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	55.9	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	69.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.6	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	76.9	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.4	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.8	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	83.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	69.1	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



Matrix: SOIL		Method Blank (MB) Report				Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
		CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	82.1	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	103	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	----	6	144	----	----

**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



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: 1171293)</b>										
HK0924256-002	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.4	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.7	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924243
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 12-NOV-2009
Order number	: CV/2009/13			Issue Date	: 18-DEC-2009
C-O-C number	: H006843			No. of samples received	: 5
Site	: S8			No. of samples analysed	: 2

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company



## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 26-NOV-2009  
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: **HK0924243**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT				Client sample ID		S8		S8	
				Client sampling date / time		0-0.9M		0.9-1.9M	
				12-NOV-2009 10:30		12-NOV-2009 10:30			
Compound	CAS Number	LOR	Unit	HK0924243-001	HK0924243-002				
<b>EA/ED: Physical and Aggregate Properties</b>									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	45.8	35.1				
<b>ED/EK: Inorganic Nonmetallic Parameters</b>									
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	40.2	14.1				
<b>EG: Metals and Major Cations</b>									
EG020: Arsenic	7440-38-2	1	mg/kg	9	13				
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2				
EG020: Chromium	7440-47-3	1	mg/kg	42	37				
EG020: Copper	7440-50-8	1	mg/kg	14	12				
EG020: Lead	7439-92-1	1	mg/kg	33	33				
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05				
EG020: Nickel	7440-02-0	1	mg/kg	28	24				
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1				
EG020: Zinc	7440-66-6	1	mg/kg	83	73				
<b>EP: Aggregate Organics</b>									
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	568	297				
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>									
Naphthalene	91-20-3	50	µg/kg	<50	<50				
Acenaphthylene	208-96-8	50	µg/kg	<50	<50				
Acenaphthene	83-32-9	50	µg/kg	<50	<50				
Fluorene	86-73-7	50	µg/kg	<50	<50				
Phenanthrene	85-01-8	50	µg/kg	<50	<50				
Anthracene	120-12-7	50	µg/kg	<50	<50				
Fluoranthene	206-44-0	150	µg/kg	<150	<150				
Pyrene	129-00-0	150	µg/kg	<150	<150				
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150				
Chrysene	218-01-9	150	µg/kg	<150	<150				
Benzo(b) & Benzo(k)fluoranthene	205-99-2	207-08-9	300	<300	<300				
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150				
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150				
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150				
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150				
Low M.W. PAHs	----	550	µg/kg	<550	<550				
High M.W. PAHs	----	1700	µg/kg	<1700	<1700				
<b>EP-065: PCB Single Congeners</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3				
PCB 18	37680-65-2	3	µg/kg	<3	<3				
PCB 28	7012-37-5	3	µg/kg	<3	<3				
PCB 52	35693-99-3	3	µg/kg	<3	<3				
PCB 44	41464-39-5	3	µg/kg	<3	<3				





Sub-Matrix: SEDIMENT

Client sample ID

**S8**  
**0-0.9M**  
 12-NOV-2009 10:30

**S8**  
**0.9-1.9M**  
 12-NOV-2009 10:30

Client sampling date / time

Compound	CAS Number	LOR	Unit	HK0924243-001	HK0924243-002
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 66	32598-10-0	3	µg/kg	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>					
Surrogate control limits listed at end of this report.					
Nitrobenzene -d5	4165-60-0	0.1	%	68.2	68.8
4-Terphenyl-d14	1718-51-0	0.1	%	60.5	67.4
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>					
Surrogate control limits listed at end of this report.					
Decachlorobiphenyl	2051-24-3	0.1	%	104	100
<b>EP-067S: Pesticide Surrogate</b>					
Surrogate control limits listed at end of this report.					
Tetrachlorometaxylene	877-09-8	0.1	%	50.3	53.2
Dibutylchlorodate	1770-80-5	0.1	%	52.8	53.3





### 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: 1170982)</b>								
HK0923913-018	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.9	48.7	2.6
HK0924250-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.5	49.0	1.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>								
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>								
HK0924243-002	S8 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0
		HK0924253-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	8	10	21.0
EG020: Chromium	7440-47-3			1	mg/kg	41	42	2.8
EG020: Copper	7440-50-8			1	mg/kg	13	14	0.0
EG020: Lead	7439-92-1			1	mg/kg	30	30	0.0
EG020: Nickel	7440-02-0			1	mg/kg	28	29	3.6
HK0924243-001	S8 0-0.9M	<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>						
		Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	S8 0-0.9M	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>												
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----	
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----	



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171292) - Continued</b>											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	92.4	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	68.8	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	68.9	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	60.6	----	51	91	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.0	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	57.5	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	67.7	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	70.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	70.2	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	74.3	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	71.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	64.6	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	71.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	56.2	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	73.4	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	----	68	122	----	----



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-065: PCB Single Congeners (QC Lot: 1168778) - Continued</b>												
PCB 66		32598-10-0	3	µg/kg	<3	5 µg/kg	106	----	69	113	----	----
PCB 101		37680-73-2	3	µg/kg	<3	5 µg/kg	86.1	----	68	121	----	----
PCB 77		32598-13-3	3	µg/kg	<3	5 µg/kg	105	----	41	142	----	----
PCB 118		31508-00-6	3	µg/kg	<3	5 µg/kg	84.1	----	62	122	----	----
PCB 153		35065-27-1	3	µg/kg	<3	5 µg/kg	83.8	----	60	122	----	----
PCB 105		32598-14-4	3	µg/kg	<3	5 µg/kg	107	----	64	126	----	----
PCB 138		35065-28-2	3	µg/kg	<3	5 µg/kg	82.8	----	60	124	----	----
PCB 126		57465-28-8	3	µg/kg	<3	5 µg/kg	81.8	----	57	133	----	----
PCB 187		52663-68-0	3	µg/kg	<3	5 µg/kg	81.6	----	65	121	----	----
PCB 128		38380-07-3	3	µg/kg	<3	5 µg/kg	90.2	----	61	121	----	----
PCB 180		35065-29-3	3	µg/kg	<3	5 µg/kg	89.0	----	64	124	----	----
PCB 169		60044-26-0	3	µg/kg	<3	5 µg/kg	88.6	----	66	121	----	----
PCB 170		35065-30-6	3	µg/kg	<3	5 µg/kg	88.8	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>												
alpha-BHC		319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC		319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC		319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	111	----	53	141	----	----
Heptachlor		76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	38.2	----	28	138	----	----
Aldrin		309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide		1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1		959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	146	----	54	147	----	----
4,4'-DDE		72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	152	----	54	154	----	----
4,4'-DDD		72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate		1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	50	142	----	----
4,4'-DDT		50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	72.3	----	6	144	----	----

**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: 1171292)</b>											
HK0924243-001	S8 0-0.9M	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----	----	
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----	----	
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----	
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----	----	
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----	----	
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----	
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----	----	
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----	----	



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: 1171292) - Continued</b>										
HK0924243-001	S8 0-0.9M	EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924582
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 20-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 04-JAN-2010
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 5
Order number	: CV/2009/13			No. of samples analysed	: 2
C-O-C number	: H010023				
Site	: S9				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924582



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924582**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**





### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Compound	CAS Number	LOR	Unit	S9	S9			
				0-0.9M	0.9-1.9M			
Client sampling date / time				20-NOV-2009 10:00	20-NOV-2009 10:00			
				HK0924582-001	HK0924582-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	42.4	35.2			
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	25.5	2.6			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	10	14			
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.3	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	46	46			
EG020: Copper	7440-50-8	1	mg/kg	43	16			
EG020: Lead	7439-92-1	1	mg/kg	44	37			
EG020: Mercury	7439-97-6	0.05	mg/kg	0.35	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	25	26			
EG020: Silver	7440-22-4	0.1	mg/kg	1.0	0.1			
EG020: Zinc	7440-66-6	1	mg/kg	124	98			
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1140	1060			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	206-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	----	550	µg/kg	<550	<550			
High M.W. PAHs	----	1700	µg/kg	<1700	<1700			
<b>EP-065: PCB Single Congeners</b>								



Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

S9  
0-0.9M  
20-NOV-2009 10:00

S9  
0.9-1.9M  
20-NOV-2009 10:00

HK0924582-001 HK0924582-002

Compound	CAS Number	LOR	Unit	HK0924582-001	HK0924582-002
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 8	34883-43-7	3	µg/kg	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3
PCB 169	32774-16-6	3	µg/kg	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Nitrobenzene -d5	4165-60-0	0.1	%	71.4	56.3
4-Terphenyl-d14	1718-51-0	0.1	%	87.7	71.6
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Decachlorobiphenyl	2051-24-3	0.1	%	95.5	116
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Tetrachlorometaxylene	877-09-8	0.1	%	64.9	64.8
Dibutylchlorendate	1770-80-5	0.1	%	58.6	56.7



**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: 1172677)</b>								
HK0924581-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	44.3	6.6
HK0924646-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.6	48.4	0.3
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>								
HK0924449-002	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	2.8	2.9	0.0
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>								
HK0924446-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	31	28	8.8
		EG020: Copper	7440-50-8	1	mg/kg	10	9	0.0
		EG020: Lead	7439-92-1	1	mg/kg	18	17	9.6
		EG020: Nickel	7440-02-0	1	mg/kg	19	18	7.4
		EG020: Zinc	7440-66-6	1	mg/kg	71	66	7.6
		HK0924582-002	S9 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	0.1	0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	14	14	Not Determined
EG020: Chromium	7440-47-3			1	mg/kg	46	45	3.7
EG020: Copper	7440-50-8			1	mg/kg	16	15	0.0
EG020: Lead	7439-92-1			1	mg/kg	37	36	0.0
EG020: Nickel	7440-02-0			1	mg/kg	26	25	0.0
EG020: Zinc	7440-66-6			1	mg/kg	98	95	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	98.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	103	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	99.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	98.0	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	90.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	94.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	96.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	67.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	81.7	----	25	182	----	----





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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	91.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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



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: 1171295)</b>										
HK0924446-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	96.1	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	76.3	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	83.9	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	99.6	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	80.2	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.3	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924250
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 12-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 17-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CV/2009/13			No. of samples analysed	: 3
C-O-C number	: H006844				
Site	: S10				

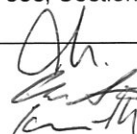
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Hong Kong Accreditation Service (HKAS) has accredited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. 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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth



*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

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Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924250



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## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 26-NOV-2009

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: **HK0924250**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S10	S10	S10		
				0-0.9M	0.9-1.9M	1.9-2.9M		
				12-NOV-2009 13:30	12-NOV-2009 13:30	12-NOV-2009 13:30		
				HK0924250-001	HK0924250-002	HK0924250-003		
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.5	47.8	48.6		
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	170	65.5	29.8		
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	9	11	12		
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	<0.2	<0.2		
EG020: Chromium	7440-47-3	1	mg/kg	66	46	44		
EG020: Copper	7440-50-8	1	mg/kg	167	24	16		
EG020: Lead	7439-92-1	1	mg/kg	46	36	38		
EG020: Mercury	7439-97-6	0.05	mg/kg	0.16	0.06	<0.05		
EG020: Nickel	7440-02-0	1	mg/kg	34	30	30		
EG020: Silver	7440-22-4	0.1	mg/kg	3.2	0.4	0.1		
EG020: Zinc	7440-66-6	1	mg/kg	196	96	92		
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1940	605	735		
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50		
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50		
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50		
Fluorene	86-73-7	50	µg/kg	<50	<50	<50		
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50		
Anthracene	120-12-7	50	µg/kg	<50	<50	<50		
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150		
Pyrene	129-00-0	150	µg/kg	<150	<150	<150		
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150		
Chrysene	218-01-9	150	µg/kg	<150	<150	<150		
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300		
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150		
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150		
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150		
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	<150		
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550		
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700		
<b>EP-065: PCB Single Congeners</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3		
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3		
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3		
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3		
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3		



Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S10	S10	S10		
				0-0.9M	0.9-1.9M	1.9-2.9M		
				12-NOV-2009 13:30	12-NOV-2009 13:30	12-NOV-2009 13:30		
				HK0924250-001	HK0924250-002	HK0924250-003		
<b>EP-065: PCB Single Congeners - Continued</b>								
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3		
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3		
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3		
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3		
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3		
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3		
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3		
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3		
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3		
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3		
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3		
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3		
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3		
<b>EP-067A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05		
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10		
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05		
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05		
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2		
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	64.3	71.5	70.1		
4-Terphenyl-d14	1718-51-0	0.1	%	66.3	69.8	64.9		
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							Surrogate control limits listed at end of this report.	
Decachlorobiphenyl	2051-24-3	0.1	%	74.6	108	90.4		
<b>EP-067S: Pesticide Surrogate</b>							Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%	53.2	50.3	50.6		
Dibutylchlorendate	1770-80-5	0.1	%	50.5	55.7	51.0		



### 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: 1170982)</b>								
HK0923913-018	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.9	48.7	2.6
HK0924250-001	S10 0-0.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.5	49.0	1.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>								
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>								
HK0924243-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0
HK0924253-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	10	21.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	42	2.8
		EG020: Copper	7440-50-8	1	mg/kg	13	14	0.0
		EG020: Lead	7439-92-1	1	mg/kg	30	30	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	28	29	3.6
		EG020: Zinc	7440-66-6	1	mg/kg	80	82	3.4
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>								
HK0924243-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0		
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>																
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----					
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>																
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----					
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----					
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----					
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----					



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171292) - Continued</b>											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	92.4	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	68.8	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	68.9	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	60.6	----	51	91	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.0	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	57.5	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	67.7	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	70.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	70.2	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	74.3	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	71.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	64.6	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	71.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	56.2	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	73.4	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	----	68	122	----	----





Method: Compound		CAS Number		LOR		Unit		Result		Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
										Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
										LCS	DCS	Low	High	Value	Control Limit	
<b>EP-065: PCB Single Congeners (QC Lot: 1168778) - Continued</b>																
PCB 66		32598-10-0		3		µg/kg		<3		5 µg/kg	106	----	69	113	----	----
PCB 101		37680-73-2		3		µg/kg		<3		5 µg/kg	86.1	----	68	121	----	----
PCB 77		32598-13-3		3		µg/kg		<3		5 µg/kg	105	----	41	142	----	----
PCB 118		31508-00-6		3		µg/kg		<3		5 µg/kg	84.1	----	62	122	----	----
PCB 153		35065-27-1		3		µg/kg		<3		5 µg/kg	83.8	----	60	122	----	----
PCB 105		32598-14-4		3		µg/kg		<3		5 µg/kg	107	----	64	126	----	----
PCB 138		35065-28-2		3		µg/kg		<3		5 µg/kg	82.8	----	60	124	----	----
PCB 126		57465-28-8		3		µg/kg		<3		5 µg/kg	81.8	----	57	133	----	----
PCB 187		52663-68-0		3		µg/kg		<3		5 µg/kg	81.6	----	65	121	----	----
PCB 128		38380-07-3		3		µg/kg		<3		5 µg/kg	90.2	----	61	121	----	----
PCB 180		35065-29-3		3		µg/kg		<3		5 µg/kg	89.0	----	64	124	----	----
PCB 169		60044-26-0		3		µg/kg		<3		5 µg/kg	88.6	----	66	121	----	----
PCB 170		35065-30-6		3		µg/kg		<3		5 µg/kg	88.8	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>																
alpha-BHC		319-84-6		0.05		mg/kg		<0.05		0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC		319-85-7	58-89-9	0.1		mg/kg		<0.10		0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC		319-86-8		0.05		mg/kg		<0.05		0.25 mg/kg	111	----	53	141	----	----
Heptachlor		76-44-8		0.05		mg/kg		<0.05		0.25 mg/kg	38.2	----	28	138	----	----
Aldrin		309-00-2		0.05		mg/kg		<0.05		0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide		1024-57-3		0.05		mg/kg		<0.05		0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1		959-98-8		0.05		mg/kg		<0.05		0.25 mg/kg	146	----	54	147	----	----
4,4'-DDE		72-55-9		0.05		mg/kg		<0.05		0.25 mg/kg	152	----	54	154	----	----
4,4'-DDD		72-54-8		0.05		mg/kg		<0.05		0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate		1031-07-8		0.05		mg/kg		<0.05		0.25 mg/kg	108	----	50	142	----	----
4,4'-DDT		50-29-3		0.2		mg/kg		<0.2		0.25 mg/kg	72.3	----	6	144	----	----

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

Matrix: SOIL				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>									
HK0924243-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----



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: 1171292) - Continued</b>										
HK0924243-001	Anonymous	EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924377
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 16-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 23-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 5
Order number	: CV/2009/13			No. of samples analysed	: 2
C-O-C number	: H006855				
Site	: S11				

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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
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Chan Siu Ming, Vico	Chemist	Inorganics
Wong Wing, Kenneth	Assistant Supervisor	Inorganics

#### ALS Laboratory Group

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924377



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924377**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT				Client sample ID	S11	S11			
				Client sampling date / time	0-0.9M	0.9-1.9M			
Compound	CAS Number	LOR	Unit	[16-NOV-2009]	[16-NOV-2009]				
				HK0924377-001	HK0924377-002				
<b>EA/ED: Physical and Aggregate Properties</b>									
EA055: Moisture Content (dried @ 103° C)	----	0.1	%		48.1	42.7			
<b>ED/EK: Inorganic Nonmetallic Parameters</b>									
EK055: Ammonia as N	7664-41-7	0.1	mg/kg		14.5	10.5			
<b>EG: Metals and Major Cations</b>									
EG020: Arsenic	7440-38-2	1	mg/kg		13	14			
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg		43	44			
EG020: Copper	7440-50-8	1	mg/kg		15	16			
EG020: Lead	7439-92-1	1	mg/kg		35	39			
EG020: Mercury	7439-97-6	0.05	mg/kg		<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg		28	27			
EG020: Silver	7440-22-4	0.1	mg/kg		0.1	0.1			
EG020: Zinc	7440-66-6	1	mg/kg		96	97			
<b>EP: Aggregate Organics</b>									
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg		901	870			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>									
Naphthalene	91-20-3	50	µg/kg		<50	<50			
Acenaphthylene	208-96-8	50	µg/kg		<50	<50			
Acenaphthene	83-32-9	50	µg/kg		<50	<50			
Fluorene	86-73-7	50	µg/kg		<50	<50			
Phenanthrene	85-01-8	50	µg/kg		<50	<50			
Anthracene	120-12-7	50	µg/kg		<50	<50			
Fluoranthene	206-44-0	150	µg/kg		<150	<150			
Pyrene	129-00-0	150	µg/kg		<150	<150			
Benzo(a)anthracene	56-55-3	150	µg/kg		<150	<150			
Chrysene	218-01-9	150	µg/kg		<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg		<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg		<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg		<150	<150			
Dibenz(a.h)anthracene	53-70-3	150	µg/kg		<150	<150			
Benzo(g,h,i)perylene	191-24-2	150	µg/kg		<150	<150			
Low M.W. PAHs	----	550	µg/kg		<550	<550			
High M.W. PAHs	----	1700	µg/kg		<1700	<1700			
<b>EP-065: PCB Single Congeners</b>									



Sub-Matrix: SEDIMENT				Client sample ID			
Client sampling date / time				S11	S11		
				0-0.9M	0.9-1.9M		
				[16-NOV-2009]	[16-NOV-2009]		
Compound	CAS Number	LOR	Unit	HK0924377-001	HK0924377-002		
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 8	34883-43-7	3	µg/kg	<3	<3		
PCB 18	37680-65-2	3	µg/kg	<3	<3		
PCB 28	7012-37-5	3	µg/kg	<3	<3		
PCB 52	35693-99-3	3	µg/kg	<3	<3		
PCB 44	41464-39-5	3	µg/kg	<3	<3		
PCB 66	32598-10-0	3	µg/kg	<3	<3		
PCB 101	37680-73-2	3	µg/kg	<3	<3		
PCB 77	32598-13-3	3	µg/kg	<3	<3		
PCB 118	31508-00-6	3	µg/kg	<3	<3		
PCB 153	35065-27-1	3	µg/kg	<3	<3		
PCB 105	32598-14-4	3	µg/kg	<3	<3		
PCB 138	35065-28-2	3	µg/kg	<3	<3		
PCB 126	57465-28-8	3	µg/kg	<3	<3		
PCB 187	52663-68-0	3	µg/kg	<3	<3		
PCB 128	38380-07-3	3	µg/kg	<3	<3		
PCB 180	35065-29-3	3	µg/kg	<3	<3		
PCB 169	60044-26-0	3	µg/kg	<3	<3		
PCB 170	35065-30-6	3	µg/kg	<3	<3		
<b>EP-067A: Organochlorine Pesticides (OC)</b>							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05		
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10		
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05		
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05		
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05		
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05		
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05		
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05		
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05		
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2		
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	75.9	61.0		
4-Terphenyl-d14	1718-51-0	0.1	%	75.4	59.5		
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						Surrogate control limits listed at end of this report.	
Decachlorobiphenyl	2051-24-3	0.1	%	90.5	112		
<b>EP-067S: Pesticide Surrogate</b>						Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%	68.6	50.6		
Dibutylchlorendate	1770-80-5	0.1	%	55.9	51.2		





**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: 1170984)</b>								
HK0924260-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.3	47.0	8.0
HK0924392-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.6	39.8	0.7
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>								
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>								
HK0924256-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8
		HK0924259-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	3	4	0.0
EG020: Chromium	7440-47-3			1	mg/kg	15	14	7.7
EG020: Copper	7440-50-8			1	mg/kg	5	5	0.0
EG020: Lead	7439-92-1			1	mg/kg	12	12	0.0
EG020: Nickel	7440-02-0			1	mg/kg	9	8	0.0
EG020: Zinc	7440-66-6			1	mg/kg	36	36	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>								
HK0924256-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>								
HK0924256-002	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	80.8	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	60.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	61.5	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	63.7	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.3	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	55.9	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	69.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.6	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	76.9	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.4	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.8	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	83.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	69.1	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	82.1	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	103	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	----	6	144	----	----

**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



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: 1171293)</b>										
HK0924256-002	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.4	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.7	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924253
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 13-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 17-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CV/2009/13			No. of samples analysed	: 3
C-O-C number	: H006848				
Site	: S12				

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company



Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924253

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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924253**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT				Client sample ID		
				S12 0-0.9M	S12 0.9-1.9M	S12 1.9-2.9M
				13-NOV-2009 13:00	13-NOV-2009 13:00	13-NOV-2009 13:00
Client sampling date / time				HK0924253-001	HK0924253-002	HK0924253-003
Compound	CAS Number	LOR	Unit			
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	43.5	46.6	46.5
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	22.8	28.5	31.5
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	8	13	11
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	41	50	50
EG020: Copper	7440-50-8	1	mg/kg	13	17	18
EG020: Lead	7439-92-1	1	mg/kg	30	36	39
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	28	32	33
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	80	97	102
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	500	614	466
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						



Sub-Matrix: SEDIMENT				Client sample ID	S12 0-0.9M	S12 0.9-1.9M	S12 1.9-2.9M		
Client sampling date / time				13-NOV-2009 13:00	13-NOV-2009 13:00	13-NOV-2009 13:00			
Compound	CAS Number	LOR	Unit	HK0924253-001	HK0924253-002	HK0924253-003			
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3			
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.		
Nitrobenzene -d5	4165-60-0	0.1	%	55.7	59.4	55.4			
4-Terphenyl-d14	1718-51-0	0.1	%	50.2	51.0	53.2			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							Surrogate control limits listed at end of this report.		
Decachlorobiphenyl	2051-24-3	0.1	%	102	85.5	97.0			
<b>EP-067S: Pesticide Surrogate</b>							Surrogate control limits listed at end of this report.		
Tetrachlorometaxylene	877-09-8	0.1	%	54.1	51.2	50.3			
Dibutylchlorendate	1770-80-5	0.1	%	59.2	54.9	53.8			



### 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: 1170982)</b>								
HK0923913-018	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.9	48.7	2.6
HK0924250-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.5	49.0	1.0
<b>EA/ED: Physical and Aggregate Properties (QC Lot: 1170983)</b>								
HK0924253-003	S12 1.9-2.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.5	46.2	0.5
HK0924257-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.2	50.2	0.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>								
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>								
HK0924243-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0
		HK0924253-001	S12 0-0.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	8	10	21.0
EG020: Chromium	7440-47-3			1	mg/kg	41	42	2.8
EG020: Copper	7440-50-8			1	mg/kg	13	14	0.0
EG020: Lead	7439-92-1			1	mg/kg	30	30	0.0
EG020: Nickel	7440-02-0			1	mg/kg	28	29	3.6
EG020: Zinc	7440-66-6			1	mg/kg	80	82	3.4
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>								
HK0924243-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777) - Continued</b>								
HK0924243-001	Anonymous	Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
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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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	92.4	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	68.8	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	68.9	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	60.6	----	51	91	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.0	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	57.5	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	67.7	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	70.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	70.2	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	74.3	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	71.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	64.6	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	71.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	56.2	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	73.4	----	25	182	----	----





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	106	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	86.1	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	105	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	84.1	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.8	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	107	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	82.8	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	81.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	81.6	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	90.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.0	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	88.6	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	88.8	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	111	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	38.2	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	146	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	152	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	72.3	----	6	144	----	----

**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



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: 1171292)</b>										
HK0924243-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924853
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ---	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 24-NOV-2009
Order number	: CV/2009/13			Issue Date	: 13-JAN-2010
C-O-C number	: H010033			No. of samples received	: 3
Site	: S14			No. of samples analysed	: 1

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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
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Chan Siu Ming, Vico	Chemist	Inorganics
Wong Wing, Kenneth	Assistant Supervisor	Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924853



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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924853**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

S14

Client sampling date / time

24-NOV-2009 09:00

Compound	CAS Number	LOR	Unit	HK0924853-001
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	37.0
<b>ED/EK: Inorganic Nonmetallic Parameters</b>				
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	9.5
<b>EP: Aggregate Organics</b>				
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	271
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	7
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	20
EG020: Copper	7440-50-8	1	mg/kg	8
EG020: Lead	7439-92-1	1	mg/kg	14
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	13
EG020: Silver	7440-22-4	0.1	mg/kg	0.1
EG020: Zinc	7440-66-6	1	mg/kg	46
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	----	550	µg/kg	<550
High M.W. PAHs	----	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3



Sub-Matrix: SEDIMENT			Client sample ID	S14				
			Client sampling date / time	24-NOV-2009 09:00				
Compound	CAS Number	LOR	Unit	HK0924853-001				
<b>EP-065: PCB Single Congeners - Continued</b>								
PCB 18	37680-65-2	3	µg/kg	<3				
PCB 28	7012-37-5	3	µg/kg	<3				
PCB 52	35693-99-3	3	µg/kg	<3				
PCB 44	41464-39-5	3	µg/kg	<3				
PCB 66	32598-10-0	3	µg/kg	<3				
PCB 101	37680-73-2	3	µg/kg	<3				
PCB 77	32598-13-3	3	µg/kg	<3				
PCB 118	31508-00-6	3	µg/kg	<3				
PCB 153	35065-27-1	3	µg/kg	<3				
PCB 105	32598-14-4	3	µg/kg	<3				
PCB 138	35065-28-2	3	µg/kg	<3				
PCB 126	57465-28-8	3	µg/kg	<3				
PCB 187	52663-68-0	3	µg/kg	<3				
PCB 128	38380-07-3	3	µg/kg	<3				
PCB 180	35065-29-3	3	µg/kg	<3				
PCB 169	32774-16-6	3	µg/kg	<3				
PCB 170	35065-30-6	3	µg/kg	<3				
<b>EP-067A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05				
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10				
delta-BHC	319-86-8	0.05	mg/kg	<0.05				
Heptachlor	76-44-8	0.05	mg/kg	<0.05				
Aldrin	309-00-2	0.05	mg/kg	<0.05				
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05				
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05				
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05				
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05				
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05				
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2				
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>								
Nitrobenzene -d5	4165-60-0	0.1	%	58.8				
4-Terphenyl-d14	1718-51-0	0.1	%	68.8				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>								
Decachlorobiphenyl	2051-24-3	0.1	%	98.1				
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>								
Tetrachlorometaxylene	877-09-8	0.1	%	54.3				
Dibutylchlorendate	1770-80-5	0.1	%	57.3				





**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: 1176918)</b>								
HK0924847-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.2	49.8	1.3
HK0924890-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.3	54.9	4.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>								
HK0925084-001	Anonymous	EK055: Ammonia as N	7664-41-7	10	mg/kg	4680	4700	0.3
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>								
HK0924847-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	43	3.9
		EG020: Copper	7440-50-8	1	mg/kg	14	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	25	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	29	28	4.3
		EG020: Zinc	7440-66-6	1	mg/kg	94	91	3.0
HK0924890-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23	0.24	4.7
		EG020: Silver	7440-22-4	0.1	mg/kg	3.0	2.9	5.7
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	12	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	59	56	6.1
		EG020: Copper	7440-50-8	1	mg/kg	115	109	5.7
		EG020: Lead	7439-92-1	1	mg/kg	40	37	7.6
		EG020: Nickel	7440-02-0	1	mg/kg	27	26	6.3
		EG020: Zinc	7440-66-6	1	mg/kg	186	168	10.3
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number				n	LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.2	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	90.6	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	90.1	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	93.6	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.9	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	63.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	68.2	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	60.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	68.5	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	60.8	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	70.8	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	73.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	69.6	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	79.7	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	76.3	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	72.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	69.2	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	60.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	77.2	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----

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

Matrix: SOIL		Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report							
		Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	MS	MSD	Low	High	Value	Control Limit



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: 1178675)</b>										
HK0924847-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	84.8	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.8	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	76.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	95.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 10
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924255
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 13-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 17-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CV/2009/13			No. of samples analysed	: 3
C-O-C number	: H006849				
Site	: S15				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company



Page Number : 2 of 10  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924255



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924255**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S15	S15	S15
				0-0.9M	0.9-1.9M	1.9-2.9M
				13-NOV-2009 15:00	13-NOV-2009 15:00	13-NOV-2009 15:00
				HK0924255-001	HK0924255-002	HK0924255-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	48.9	47.2	45.8
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	59.7	29.2	26.7
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	6	10	11
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	47	47	48
EG020: Copper	7440-50-8	1	mg/kg	50	17	17
EG020: Lead	7439-92-1	1	mg/kg	37	37	37
EG020: Mercury	7439-97-6	0.05	mg/kg	0.10	0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	28	31	32
EG020: Silver	7440-22-4	0.1	mg/kg	1.1	0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	111	95	96
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	708	564	878
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						



Sub-Matrix: SEDIMENT				Client sample ID				
Client sampling date / time				S15 0-0.9M	S15 0.9-1.9M	S15 1.9-2.9M		
				13-NOV-2009 15:00	13-NOV-2009 15:00	13-NOV-2009 15:00		
Compound	CAS Number	LOR	Unit	HK0924255-001	HK0924255-002	HK0924255-003		
<b>EP-065: PCB Single Congeners - Continued</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3		
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3		
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3		
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3		
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3		
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3		
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3		
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3		
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3		
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3		
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3		
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3		
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3		
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3		
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3		
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3		
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3		
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3		
<b>EP-067A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05		
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10		
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05		
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05		
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2		
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	63.3	53.3	56.1		
4-Terphenyl-d14	1718-51-0	0.1	%	53.5	51.4	64.6		
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							Surrogate control limits listed at end of this report.	
Decachlorobiphenyl	2051-24-3	0.1	%	58.8	103	91.1		
<b>EP-067S: Pesticide Surrogate</b>							Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%	50.9	62.1	53.4		
Dibutylchlorendate	1770-80-5	0.1	%	53.6	54.4	53.8		



**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: 1170983)</b>								
HK0924253-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.5	46.2	0.5
HK0924257-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.2	50.2	0.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>								
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177458)</b>								
HK0924259-003	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	21.6	22.9	5.6
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>								
HK0924243-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0
HK0924253-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	10	21.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	42	2.8
		EG020: Copper	7440-50-8	1	mg/kg	13	14	0.0
		EG020: Lead	7439-92-1	1	mg/kg	30	30	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	28	29	3.6
		EG020: Zinc	7440-66-6	1	mg/kg	80	82	3.4
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>								
HK0924243-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777) - Continued</b>								
HK0924243-001	Anonymous	Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	S15 0.9-1.9M	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	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-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786) - Continued</b>								
HK0924255-002	S15 0.9-1.9M	Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177458)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	98.5	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	92.4	----	58	123	----	----
				<50	---	---	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	----	----	----	----	----
				---	50.9 µg/kg	68.8	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	68.9	----	48	86	----	----
				<50	---	---	----	----	----	----	----
Fluorene	86-73-7	50	µg/kg	<50	---	---	----	---	---	----	----
				---	51.0 µg/kg	60.6	----	51	91	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	---	---	----	---	---	----	----
				---	51.2 µg/kg	67.0	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	---	---	----	---	---	----	----
				---	50.7 µg/kg	57.5	----	50	85	----	----





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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777) - Continued</b>											
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	---	---	---	---	---
					51.0 µg/kg	67.7	---	50	98	---	---
Pyrene	129-00-0	150	µg/kg	<150	---	---	---	---	---	---	---
					51.1 µg/kg	70.8	---	50	96	---	---
Benz(a)anthracene	56-55-3	150	µg/kg	<150	---	---	---	---	---	---	---
					50.1 µg/kg	70.2	---	55	114	---	---
Chrysene	218-01-9	5	µg/kg	<150	---	---	---	---	---	---	---
					50.8 µg/kg	74.3	---	45	118	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	<300	---	---	---	---	---	---	---
					101.9 µg/kg	71.0	---	60	114	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	---	---	---	---	---	---	---
					50.7 µg/kg	64.6	---	46	118	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	<150	---	---	---	---	---	---	---
					49.0 µg/kg	71.3	---	40	194	---	---
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	---	---	---	---	---	---	---
					50.2 µg/kg	56.2	---	14	188	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	---	---	---	---	---	---	---
					50.7 µg/kg	73.4	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	106	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	86.1	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	105	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	84.1	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.8	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	107	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	82.8	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	81.8	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	81.6	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	90.2	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.0	---	64	124	---	---
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	88.6	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	88.8	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>											



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-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774) - Continued</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	111	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	38.2	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	146	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	152	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	72.3	----	6	144	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	----	6	144	----	----

**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: 1171292)</b>										
HK0924243-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----	----



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: 1171292) - Continued</b>										
HK0924243-001	Anonymous	EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924252
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 12-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 17-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 5
Order number	: CV/2009/13			No. of samples analysed	: 2
C-O-C number	: H006846				
Site	: S17				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company



## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 26-NOV-2009

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: **HK0924252**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S17	S17			
				0-0.9M	0.9-1.9M			
				12-NOV-2009 17:00	12-NOV-2009 17:00			
				HK0924252-001	HK0924252-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.0	47.3			
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.8	50.0			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	5	4			
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	42	41			
EG020: Copper	7440-50-8	1	mg/kg	12	12			
EG020: Lead	7439-92-1	1	mg/kg	27	29			
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	28	29			
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg	84	83			
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	649	583			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	206-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	----	550	µg/kg	<550	<550			
High M.W. PAHs	----	1700	µg/kg	<1700	<1700			
<b>EP-065: PCB Single Congeners</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3			





Sub-Matrix: SEDIMENT

Client sample ID

S17  
0-0.9M

S17  
0.9-1.9M

Client sampling date / time

12-NOV-2009 17:00

12-NOV-2009 17:00

Compound	CAS Number	LOR	Unit	HK0924252-001	HK0924252-002
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 66	32598-10-0	3	µg/kg	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>					
Surrogate control limits listed at end of this report.					
Nitrobenzene -d5	4165-60-0	0.1	%	62.1	75.5
4-Terphenyl-d14	1718-51-0	0.1	%	64.2	65.7
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>					
Surrogate control limits listed at end of this report.					
Decachlorobiphenyl	2051-24-3	0.1	%	92.3	91.1
<b>EP-067S: Pesticide Surrogate</b>					
Surrogate control limits listed at end of this report.					
Tetrachlorometaxylene	877-09-8	0.1	%	60.5	55.0
Dibutylchlorendate	1770-80-5	0.1	%	53.7	55.1



### 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: 1170982)</b>									
HK0923913-018	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.9	48.7	2.6	
HK0924250-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.5	49.0	1.0	
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>									
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9	
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>									
HK0924243-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0	
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0	
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0	
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0	
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0	
HK0924253-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	8	10	21.0	
		EG020: Chromium	7440-47-3	1	mg/kg	41	42	2.8	
		EG020: Copper	7440-50-8	1	mg/kg	13	14	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	30	30	0.0	
		EG020: Nickel	7440-02-0	1	mg/kg	28	29	3.6	
		EG020: Zinc	7440-66-6	1	mg/kg	80	82	3.4	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>									
HK0924243-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0	
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0	
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0	
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0	
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0	
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0	
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0	
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0	
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0	
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0	
			207-08-9						
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0	
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0	
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0	
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0	
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0	
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0	
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0		
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9	58-89-9					
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>															
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----				
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>															
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----				
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----				
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----				
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----				



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171292) - Continued</b>											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	92.4	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	68.8	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	68.9	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	60.6	----	51	91	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.0	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	57.5	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	67.7	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	70.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	70.2	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	74.3	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	71.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	64.6	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	71.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	56.2	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	73.4	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	----	68	122	----	----





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-065: PCB Single Congeners (QC Lot: 1168778) - Continued</b>											
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	106	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	86.1	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	105	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	84.1	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.8	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	107	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	82.8	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	81.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	81.6	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	90.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.0	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	88.6	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	88.8	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	111	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	38.2	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	146	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	152	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	72.3	----	6	144	----	----

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

Matrix: SOIL		Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report								
		Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	MS	MSD	Low	High	Value	Control Limit	
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>										
HK0924243-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----	----



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: 1171292) - Continued</b>										
HK0924243-001	Anonymous	EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924251
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 12-NOV-2009
Order number	: CV/2009/13			Issue Date	: 17-DEC-2009
C-O-C number	: H006845			No. of samples received	: 7
Site	: S19			No. of samples analysed	: 3

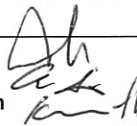
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Hong Kong Accreditation Service (HKAS) has accredited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. 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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth



*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924251



## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 26-NOV-2009

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: **HK0924251**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S19	S19	S19		
				0-0.9M	0.9-1.9M	1.9-2.9M		
				12-NOV-2009 15:00	12-NOV-2009 15:00	12-NOV-2009 15:00		
				HK0924251-001	HK0924251-002	HK0924251-003		
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.6	46.4	46.2		
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	59.8	56.9		
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	7	10	10		
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2		
EG020: Chromium	7440-47-3	1	mg/kg	45	44	44		
EG020: Copper	7440-50-8	1	mg/kg	13	15	16		
EG020: Lead	7439-92-1	1	mg/kg	32	32	37		
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05		
EG020: Nickel	7440-02-0	1	mg/kg	30	29	29		
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.1		
EG020: Zinc	7440-66-6	1	mg/kg	86	85	92		
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	727	728	592		
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50		
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50		
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50		
Fluorene	86-73-7	50	µg/kg	<50	<50	<50		
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50		
Anthracene	120-12-7	50	µg/kg	<50	<50	<50		
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150		
Pyrene	129-00-0	150	µg/kg	<150	<150	<150		
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150		
Chrysene	218-01-9	150	µg/kg	<150	<150	<150		
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300		
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150		
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150		
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150		
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150		
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550		
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700		
<b>EP-065: PCB Single Congeners</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3		
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3		
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3		
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3		
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3		



Sub-Matrix: SEDIMENT

Client sample ID

S19  
0-0.9M

S19  
0.9-1.9M

S19  
1.9-2.9M  
12-NOV-2009 15:00

Client sampling date / time

12-NOV-2009 15:00

12-NOV-2009 15:00

12-NOV-2009 15:00

Compound	CAS Number	LOR	Unit	HK0924251-001	HK0924251-002	HK0924251-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Surrogate control limits listed at end of this report.						
Nitrobenzene -d5	4165-60-0	0.1	%	76.6	65.4	76.1
4-Terphenyl-d14	1718-51-0	0.1	%	64.4	64.1	72.5
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Surrogate control limits listed at end of this report.						
Decachlorobiphenyl	2051-24-3	0.1	%	97.4	90.5	105
<b>EP-067S: Pesticide Surrogate</b>						
Surrogate control limits listed at end of this report.						
Tetrachlorometaxylene	877-09-8	0.1	%	54.4	51.8	55.0
Dibutylchlorodate	1770-80-5	0.1	%	50.7	56.2	56.5



### 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: 1170982)</b>									
HK0923913-018	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.9	48.7	2.6	
HK0924250-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.5	49.0	1.0	
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>									
HK0924259-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.1	34.0	5.9	
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>									
HK0924243-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0	
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0	
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0	
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0	
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0	
HK0924253-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	8	10	21.0	
		EG020: Chromium	7440-47-3	1	mg/kg	41	42	2.8	
		EG020: Copper	7440-50-8	1	mg/kg	13	14	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	30	30	0.0	
		EG020: Nickel	7440-02-0	1	mg/kg	28	29	3.6	
		EG020: Zinc	7440-66-6	1	mg/kg	80	82	3.4	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>									
HK0924243-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0	
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0	
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0	
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0	
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0	
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0	
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0	
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0	
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0	
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0	
			207-08-9						
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0	
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0	
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0	
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0	
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0	
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0	
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>								
HK0923837-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9	58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177457)</b>															
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	102	----	85	115	----	----				
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>															
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----				
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----				
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----				
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----				





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171292) - Continued</b>											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	92.4	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	68.8	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	68.9	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	60.6	----	51	91	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.0	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	57.5	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	67.7	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	70.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	70.2	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	74.3	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	71.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	64.6	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	71.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	56.2	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	73.4	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	----	68	122	----	----



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-065: PCB Single Congeners (QC Lot: 1168778) - Continued</b>											
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	106	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	86.1	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	105	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	84.1	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.8	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	107	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	82.8	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	81.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	81.6	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	90.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.0	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	88.6	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	88.8	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168774)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	124	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	77.5	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	111	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	38.2	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	100	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	139	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	146	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	152	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	122	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	72.3	----	6	144	----	----

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

Matrix: SOIL		Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report								
		Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	MS	MSD	Low	High	Value	Control Limit	
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>										
HK0924243-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----	----



Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171292) - Continued</b>										
HK0924243-001	Anonymous	EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924855
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Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 24-NOV-2009
Order number	: CV/2009/13			Issue Date	: 13-JAN-2010
C-O-C number	: H010034			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 1

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
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Senior Chemist - Organics  
Chemist  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924855



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924855**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

S18

Client sampling date / time

24-NOV-2009 10:00

Compound	CAS Number	LOR	Unit	HK0924855-001
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	51.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>				
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	82.4
<b>EP: Aggregate Organics</b>				
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	499
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	9
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	37
EG020: Copper	7440-50-8	1	mg/kg	19
EG020: Lead	7439-92-1	1	mg/kg	24
EG020: Mercury	7439-97-6	0.05	mg/kg	0.06
EG020: Nickel	7440-02-0	1	mg/kg	25
EG020: Silver	7440-22-4	0.1	mg/kg	0.4
EG020: Zinc	7440-66-6	1	mg/kg	88
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	----	550	µg/kg	<550
High M.W. PAHs	----	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3





Sub-Matrix: SEDIMENT

Client sample ID

S18

Client sampling date / time

24-NOV-2009 10:00

Compound	CAS Number	LOR	Unit	HK0924855-001
<b>EP-065: PCB Single Congeners - Continued</b>				
PCB 18	37680-65-2	3	µg/kg	<3
PCB 28	7012-37-5	3	µg/kg	<3
PCB 52	35693-99-3	3	µg/kg	<3
PCB 44	41464-39-5	3	µg/kg	<3
PCB 66	32598-10-0	3	µg/kg	<3
PCB 101	37680-73-2	3	µg/kg	<3
PCB 77	32598-13-3	3	µg/kg	<3
PCB 118	31508-00-6	3	µg/kg	<3
PCB 153	35065-27-1	3	µg/kg	<3
PCB 105	32598-14-4	3	µg/kg	<3
PCB 138	35065-28-2	3	µg/kg	<3
PCB 126	57465-28-8	3	µg/kg	<3
PCB 187	52663-68-0	3	µg/kg	<3
PCB 128	38380-07-3	3	µg/kg	<3
PCB 180	35065-29-3	3	µg/kg	<3
PCB 169	32774-16-6	3	µg/kg	<3
PCB 170	35065-30-6	3	µg/kg	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>				
alpha-BHC	319-84-6	0.05	mg/kg	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>				
Surrogate control limits listed at end of this report.				
Nitrobenzene -d5	4165-60-0	0.1	%	57.7
4-Terphenyl-d14	1718-51-0	0.1	%	69.4
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>				
Surrogate control limits listed at end of this report.				
Decachlorobiphenyl	2051-24-3	0.1	%	96.4
<b>EP-067S: Pesticide Surrogate</b>				
Surrogate control limits listed at end of this report.				
Tetrachlorometaxylene	877-09-8	0.1	%	59.6
Dibutylchlorendate	1770-80-5	0.1	%	56.1



**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: 1176918)</b>								
HK0924847-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.2	49.8	1.3
HK0924890-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.3	54.9	4.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>								
HK0925084-001	Anonymous	EK055: Ammonia as N	7664-41-7	10	mg/kg	4680	4700	0.3
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>								
HK0924847-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	43	3.9
		EG020: Copper	7440-50-8	1	mg/kg	14	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	25	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	29	28	4.3
		EG020: Zinc	7440-66-6	1	mg/kg	94	91	3.0
HK0924890-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23	0.24	4.7
		EG020: Silver	7440-22-4	0.1	mg/kg	3.0	2.9	5.7
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	12	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	59	56	6.1
		EG020: Copper	7440-50-8	1	mg/kg	115	109	5.7
		EG020: Lead	7439-92-1	1	mg/kg	40	37	7.6
		EG020: Nickel	7440-02-0	1	mg/kg	27	26	6.3
		EG020: Zinc	7440-66-6	1	mg/kg	186	168	10.3
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



Matrix: SOIL		Method Blank (MB) Report				Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
Method: Compound	CAS Number										
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.2	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	90.6	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	90.1	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	93.6	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.9	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	63.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	68.2	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	60.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	68.5	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	60.8	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	70.8	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	73.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	69.6	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	79.7	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	76.3	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	72.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	69.2	----	40	194	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	60.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	77.2	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----

**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



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: 1178675)</b>										
HK0924847-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	84.8	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.8	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	76.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	95.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924615
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
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Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 18-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010018			No. of samples received	: 1
Site	: S13			No. of samples analysed	: 1

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924615**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except sample #1 S13 (GRAB).**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



**Analytical Results**

Sub-Matrix: SEDIMENT		Client sample ID		S13	
		Client sampling date / time		18-NOV-2009 15:00	
Compound	CAS Number	LOR	Unit	HK0924615-001	
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	57.9	
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	60.8	
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1260	
<b>Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	9	
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.7	
EG020: Chromium	7440-47-3	1	mg/kg	71	
EG020: Copper	7440-50-8	1	mg/kg	164	
EG020: Lead	7439-92-1	1	mg/kg	42	
EG020: Mercury	7439-97-6	0.05	mg/kg	0.19	
EG020: Nickel	7440-02-0	1	mg/kg	34	
EG020: Silver	7440-22-4	0.1	mg/kg	5.0	
EG020: Zinc	7440-66-6	1	mg/kg	149	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	
Acenaphthylene	208-96-8	50	µg/kg	<50	
Acenaphthene	83-32-9	50	µg/kg	<50	
Fluorene	86-73-7	50	µg/kg	<50	
Phenanthrene	85-01-8	50	µg/kg	<50	
Anthracene	120-12-7	50	µg/kg	<50	
Fluoranthene	206-44-0	150	µg/kg	<150	
Pyrene	129-00-0	150	µg/kg	<150	
Benz(a)anthracene	56-55-3	150	µg/kg	<150	
Chrysene	218-01-9	150	µg/kg	<150	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	
Low M.W. PAHs	----	550	µg/kg	<550	
High M.W. PAHs	----	1700	µg/kg	<1700	
<b>EP-065: PCB Single Congeners</b>					
PCB 8	34883-43-7	3	µg/kg	<3	



Sub-Matrix: SEDIMENT				Client sample ID	S13				
				Client sampling date / time	18-NOV-2009 15:00				
Compound	CAS Number	LOR	Unit	HK0924615-001					
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 18	37680-65-2	3	µg/kg	<3					
PCB 28	7012-37-5	3	µg/kg	<3					
PCB 52	35693-99-3	3	µg/kg	<3					
PCB 44	41464-39-5	3	µg/kg	<3					
PCB 66	32598-10-0	3	µg/kg	<3					
PCB 101	37680-73-2	3	µg/kg	<3					
PCB 77	32598-13-3	3	µg/kg	<3					
PCB 118	31508-00-6	3	µg/kg	<3					
PCB 153	35065-27-1	3	µg/kg	<3					
PCB 105	32598-14-4	3	µg/kg	<3					
PCB 138	35065-28-2	3	µg/kg	<3					
PCB 126	57465-28-8	3	µg/kg	<3					
PCB 187	52663-68-0	3	µg/kg	<3					
PCB 128	38380-07-3	3	µg/kg	<3					
PCB 180	35065-29-3	3	µg/kg	<3					
PCB 169	32774-16-6	3	µg/kg	<3					
PCB 170	35065-30-6	3	µg/kg	<3					
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05					
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10					
delta-BHC	319-86-8	0.05	mg/kg	<0.05					
Heptachlor	76-44-8	0.05	mg/kg	<b>0.06</b>					
Aldrin	309-00-2	0.05	mg/kg	<0.05					
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05					
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05					
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05					
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05					
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05					
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2					
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>									
Nitrobenzene -d5	4165-60-0	0.1	%	<b>52.2</b>					
4-Terphenyl-d14	1718-51-0	0.1	%	<b>84.6</b>					
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>									
Decachlorobiphenyl	2051-24-3	0.1	%	<b>79.2</b>					
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>									
Tetrachlorometaxylene	877-09-8	0.1	%	<b>65.5</b>					
Dibutylchlorendate	1770-80-5	0.1	%	<b>64.5</b>					



**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: 1172677)</b>								
HK0924581-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	44.3	6.6
HK0924646-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.6	48.4	0.3
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
HK0924522-002	Anonymous	EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
		EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	40	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	25	6.5
		EG020: Nickel	7440-02-0	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
Fluorene	86-73-7	50	µg/kg	<50	<50	0.0		



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>								
HK0924522-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											





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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	----	----	----	----	----	----	----
				----	49.9 µg/kg	79.6	----	58	123	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	60.2	----	44	96	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	64.3	----	48	86	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	66.2	----	51	91	----	----
Phenanthrene	85-01-8	5	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	66.6	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	54.9	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	68.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	69.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.5	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	78.2	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	82.1	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	----	----	----	----	----	----	----
				----	50.7 µg/kg	78.7	----	46	118	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	75.4	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	68.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	77.6	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	----	6	144	----	----

**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



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: 1172530)</b>										
HK0924518-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 12
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924256
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 13-NOV-2009
Order number	: CV/2009/13			Issue Date	: 17-DEC-2009
C-O-C number	: H006850			No. of samples received	: 7
Site	: S21			No. of samples analysed	: 3

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 12  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924256



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924256**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S21	S21	S21
				0-0.9M	0.9-1.9M	1.9-2.9M
				13-NOV-2009 17:00	13-NOV-2009 17:00	13-NOV-2009 17:00
				HK0924256-001	HK0924256-002	HK0924256-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	46.2	46.3	40.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	51.5	56.6	48.9
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	10	13	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	46	46	42
EG020: Copper	7440-50-8	1	mg/kg	16	16	28
EG020: Lead	7439-92-1	1	mg/kg	33	34	42
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.40
EG020: Nickel	7440-02-0	1	mg/kg	31	30	26
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.4
EG020: Zinc	7440-66-6	1	mg/kg	90	100	118
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	700	787	514
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners





Sub-Matrix: SEDIMENT				Client sample ID	S21 0-0.9M	S21 0.9-1.9M	S21 1.9-2.9M		
Client sampling date / time					13-NOV-2009 17:00	13-NOV-2009 17:00	13-NOV-2009 17:00		
Compound	CAS Number	LOR	Unit	HK0924256-001	HK0924256-002	HK0924256-003			
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3			
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.		
Nitrobenzene -d5	4165-60-0	0.1	%	52.9	52.5	57.5			
4-Terphenyl-d14	1718-51-0	0.1	%	65.4	51.9	61.9			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							Surrogate control limits listed at end of this report.		
Decachlorobiphenyl	2051-24-3	0.1	%	72.2	98.0	82.3			
<b>EP-067S: Pesticide Surrogate</b>							Surrogate control limits listed at end of this report.		
Tetrachlorometaxylene	877-09-8	0.1	%	55.3	55.4	57.0			
Dibutylchlorodate	1770-80-5	0.1	%	53.5	56.4	54.1			



**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: 1170983)</b>								
HK0924253-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	46.5	46.2	0.5
HK0924257-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	50.2	50.2	0.0
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177458)</b>								
HK0924259-003	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	21.6	22.9	5.6
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>								
HK0924243-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	13	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	0.0
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	33	33	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	24	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	73	75	2.0
HK0924253-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	10	21.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	42	2.8
		EG020: Copper	7440-50-8	1	mg/kg	13	14	0.0
		EG020: Lead	7439-92-1	1	mg/kg	30	30	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	28	29	3.6
		EG020: Zinc	7440-66-6	1	mg/kg	80	82	3.4
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>								
HK0924256-003	S21 1.9-2.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8
HK0924259-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	3	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	15	14	7.7
		EG020: Copper	7440-50-8	1	mg/kg	5	5	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>EG: Metals and Major Cations (QC Lot: 1171293) - Continued</b>								
HK0924259-003	Anonymous	EG020: Lead	7439-92-1	1	mg/kg	12	12	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	9	8	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	36	36	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>								
HK0924243-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>								
HK0924256-002	S21 0.9-1.9M	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168778)</b>								
HK0924243-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	S21 0.9-1.9M	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	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-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786) - Continued</b>								
HK0924255-002	Anonymous	Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177458)</b>												
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	98.5	----	85	115	----	----	
<b>EG: Metals and Major Cations (QC Lot: 1171292)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.1	----	85	115	----	----	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	86.4	----	85	115	----	----	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	88.5	----	85	115	----	----	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.1	----	85	115	----	----	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	88.5	----	85	115	----	----	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.1	----	85	115	----	----	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.8	----	85	115	----	----	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----	
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	----	85	115	----	----	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	----	85	115	----	----	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	----	85	115	----	----	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	----	85	115	----	----	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	----	85	115	----	----	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777)</b>												
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	92.4	----	58	123	----	----	
				<50	----	----	----	----	----	----	----	
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----	





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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168777) - Continued</b>											
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	68.8	---	44	96	---	---
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	68.9	---	48	86	---	---
				<50	---	---	---	---	---	---	---
Fluorene	86-73-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	51.0 µg/kg	60.6	---	51	91	---	---
Phenanthrene	85-01-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	51.2 µg/kg	67.0	---	46	87	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.7 µg/kg	57.5	---	50	85	---	---
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.0 µg/kg	67.7	---	50	98	---	---
Pyrene	129-00-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.1 µg/kg	70.8	---	50	96	---	---
Benz(a)anthracene	56-55-3	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.1 µg/kg	70.2	---	55	114	---	---
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	74.3	---	45	118	---	---
				<150	---	---	---	---	---	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	---	101.9 µg/kg	71.0	---	60	114	---	---
				<300	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	64.6	---	46	118	---	---
				<150	---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	---	49.0 µg/kg	71.3	---	40	194	---	---
				<150	---	---	---	---	---	---	---
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	---	50.2 µg/kg	56.2	---	14	188	---	---
				<150	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	73.4	---	25	182	---	---
				<150	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	80.8	---	58	123	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	60.4	---	44	96	---	---
				<50	---	---	---	---	---	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.4 µg/kg	61.5	---	48	86	---	---
Fluorene	86-73-7	5	µg/kg	---	51.0 µg/kg	63.7	---	51	91	---	---
				<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	51.2 µg/kg	67.3	---	46	87	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>											
Anthracene	120-12-7	5	µg/kg	---	50.7 µg/kg	55.9	---	50	85	---	---
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.0 µg/kg	69.4	---	50	98	---	---
Pyrene	129-00-0	5	µg/kg	---	51.1 µg/kg	70.9	---	50	96	---	---
				<150	---	---	---	---	---	---	---
Benz(a)anthracene	56-55-3	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.1 µg/kg	77.6	---	55	114	---	---
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	76.9	---	45	118	---	---
				<150	---	---	---	---	---	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	---	101.9 µg/kg	81.4	---	60	114	---	---
				<300	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	77.8	---	46	118	---	---
				<150	---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	---	49.0 µg/kg	83.3	---	40	194	---	---
				<150	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.2 µg/kg	69.1	---	14	188	---	---
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.7 µg/kg	82.1	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1168778)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.1	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	87.4	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	106	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	86.1	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	105	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	84.1	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.8	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	107	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	82.8	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	81.8	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	81.6	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	90.2	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.0	---	64	124	---	---
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	88.6	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	88.8	---	70	122	---	---



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-065: PCB Single Congeners (QC Lot: 1168788)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	103	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	----	6	144	----	----

**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: 1171292)</b>										
HK0924243-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	86.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	91.3	----	75	125	----	----



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: 1171292) - Continued</b>										
HK0924243-001	Anonymous	EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	78.0	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	80.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>										
HK0924256-002	S21 0.9-1.9M	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.4	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.7	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

### CERTIFICATE OF ANALYSIS

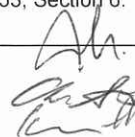
Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924388
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 16-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 24-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CV/2009/13			No. of samples analysed	: 3
C-O-C number	: H006856				
Site	: D174				

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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*

Anh Ngoc Huynh  
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Wong Wing, Kenneth



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Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

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A Campbell Brothers Limited Company



### 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924388**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except sample #1 D174 0-0.9M.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D174	D174	D174
				0-0.9M [16-NOV-2009] HK0924388-001	0.9-1.9M [16-NOV-2009] HK0924388-002	1.9-2.9M [16-NOV-2009] HK0924388-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	45.6	46.7	45.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	29.2	34.4	32.0
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	11	11	14
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	41	43	42
EG020: Copper	7440-50-8	1	mg/kg	13	15	15
EG020: Lead	7439-92-1	1	mg/kg	28	32	34
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	27	28	28
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	84	92	93
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	766	1050	801
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						





Sub-Matrix: SEDIMENT				Client sample ID	D174 0-0.9M	D174 0.9-1.9M	D174 1.9-2.9M		
				Client sampling date / time	[16-NOV-2009]	[16-NOV-2009]	[16-NOV-2009]		
Compound	CAS Number	LOR	Unit	HK0924388-001	HK0924388-002	HK0924388-003			
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3			
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
Nitrobenzene -d5	4165-60-0	0.1	%	69.0	77.1	68.5			
4-Terphenyl-d14	1718-51-0	0.1	%	65.4	73.1	71.2			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Surrogate control limits listed at end of this report.									
Decachlorobiphenyl	2051-24-3	0.1	%	92.7	90.3	89.1			
<b>EP-067S: Pesticide Surrogate</b>									
Surrogate control limits listed at end of this report.									
Tetrachlorometaxylene	877-09-8	0.1	%	58.0	50.8	55.6			
Dibutylchlorendate	1770-80-5	0.1	%	55.2	56.7	54.7			



**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: 1170984)</b>								
HK0924260-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.3	47.0	8.0
HK0924392-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.6	39.8	0.7
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>								
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>								
HK0924256-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8
HK0924259-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	3	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	15	14	7.7
		EG020: Copper	7440-50-8	1	mg/kg	5	5	0.0
		EG020: Lead	7439-92-1	1	mg/kg	12	12	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	9	8	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	36	36	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>								
HK0924256-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>								
HK0924256-002	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>								
HK0924388-001	D174 0-0.9M	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	80.8	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	60.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	61.5	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	63.7	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.3	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	55.9	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	69.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.6	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	76.9	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.4	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.8	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	83.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	69.1	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	82.1	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	103	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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



Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>										
HK0924256-002	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.4	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.7	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

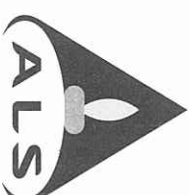
Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorodate	1770-80-5	50	130



# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

**ALS TECHNICHEM (HK) Pty Ltd**  
Environmental Division



## CERTIFICATE OF ANALYSIS

**CONTACT:** MR C M YEE  
**CLIENT:** LAM GEOTECHNICS LIMITED  
**ADDRESS:** 11/F., CENTRE POINT,  
181-185 GLOUCESTER ROAD,  
WANCHAI,  
HONG KONG.  
**PROJECT:** LG29024  
**SITE:** D174

**Batch:** HK0924388  
**Sub-batch:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 16/11/2009  
**DATE OF ISSUE:** 13/01/2010  
**SAMPLE TYPE:** WATER  
**No. of SAMPLES:** 1  
**ORDER:** CV/2009/13

### COMMENTS

Sample(s) were received in an ambient condition.  
Tributyl tin Oxide was subcontracted and tested by Hong Kong Productivity Council.  
Hong Kong Productivity Council details report was attached. The attached report contains a total of 2 pages.

### Sample Details

ALS Lab ID	Sample ID	Date of Sampling
HK0924388-001	D174	16/11/2009

### 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@alsenviro.com

### **Other ALS Environmental Laboratories**

#### AUSTRALIA

Brisbane  
Melbourne  
Sydney  
Newcastle

Hong Kong  
Singapore  
Kuala Lumpur  
Bogor

#### AMERICAS

Vancouver  
Santiago  
Arimatagasta  
Lima

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Mr Chan Kwok Fai, Godfrey  
Laboratory Manager - Hong Kong

*Abbreviations: % SPK REC denotes percentage spike recovery*

*CHK denotes duplicate check sample*

*LOR denotes limit of reporting*

*LCS % REC denotes Laboratory Control Sample percentage recovery*

Part of the **ALS Technichem (HK) Pty Ltd**  
**ALS Technichem (HK) Pty Ltd**

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., H.K.  
Phone: 852-2610 1044 Fax: 852-2610 2021 [www.alsenviro.com](http://www.alsenviro.com)  
A Campbell Brothers Limited Company



Environment & Product Innovation Laboratory

**TEST REPORT**

Test Report No : T0020096  
Folder No : 0909055  
Page No : 1 of 2  
Date of Issue : 07/01/2010

Client : ALS Technichem (HK) Pty Ltd.  
Address : 11/F., Chung Shun Knitting Centre,  
1-3 Wing Yip Street,  
Kwai Chung,  
N.T. Hong Kong.

Sample Description : 1 interstitial water sample was delivered by the client.

Sample Received Date : 01/12/2009

Test Completed Date : 07/01/2010

Approved Signatory : Fung Kam Wing

Remarks : Contact Person : Mr. Ivan Leung. Acceptable range of surrogate compound recovery for water is 68-120%.

**Analytical Results:**

Sample Name	Parameter	Unit	Tributyl tin (ng TBTT/L)	Surrogate Compound Recovery (%)
HK0924388-1	Method Code	WTM-TBT-1	WTM-TBT-1	WTM-TBT-1
	Sample No	WT-0912-0351	11/12/2009	11/12/2009
	Analysis Date		<15	110

Approval Signatory:

Notes: (1) This report may not be reproduced except with prior written approval from the issuing laboratory.  
(2) Testing Conditions is shown at the back of this report and N.R. refers to test not required by the Client Company.  
(3) Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.



## TESTING METHODS – ORGANICS

Parameter	Method	Reference	Parameter	Method	Reference
<b>I. Water/Wastewater</b>					
BTEX	WTM-BTEX-1	USEPA 8260B	BTEX	SEDIMENT-BTEX-1	USEPA 8260B
Petroleum Hydrocarbons			Petroleum Hydrocarbons		
C <sub>6</sub> -C <sub>9</sub> Gasoline range organics (GRO)*	WTM-GRO-1	USEPA 8015B	C <sub>6</sub> -C <sub>9</sub> Gasoline range organics (GRO)*	WTM-DRO-1	USEPA 8015B
C <sub>10</sub> -C <sub>28</sub> Diesel range organics (DRO) ▶	WTM-DRO-1	USEPA 8015B	C <sub>10</sub> -C <sub>28</sub> Diesel range organics (DRO) ▶	SEDIMENT-DRO-1	USEPA 8015B
C <sub>10</sub> -C <sub>26</sub> Petroleum Hydrocarbons	WTM-DR0-2	USEPA 8015B	C <sub>10</sub> -C <sub>26</sub> Petroleum Hydrocarbons	SEDIMENT-DRO-2	USEPA 8015B
Organochlorine Pesticides (OCP)	WTM-OCP-1	USEPA 8081	Organochlorine Pesticides (OCP)	SEDIMENT-OCP-1	USEPA 8081
Organophosphosphate Pesticides (OPP)	WTM-OPP-1	USEPA 8141	Organophosphosphate Pesticides (OPP)	SEDIMENT-OPP-1	USEPA 8141
Polynuclear Aromatic Hydrocarbons (PAHs)	WTM-PAH-1	USEPA 8270C	Polynuclear Aromatic Hydrocarbons (PAHs)	SEDIMENT-PAH-1	USEPA 8270C
Trihalomethane (THM)	WTM-VOC-1	USEPA 8260B	Trihalomethane (THM)	WTM-VOC-1	USEPA 8260B
Volatile Organic Compounds (VOCs)	WTM-VOC-1	USEPA 8260B	Volatile Organic Compounds (VOCs)	WTM-VOC-1	USEPA 8260B
Polychlorinated Biphenyls (PCBs)	WTM-PCB-1	USEPA 8082	Polychlorinated Biphenyls (PCBs)	SEDIMENT-PCB-2	USEPA 8082
Tributyl Tin (TBT)	WTM-TBT-1	Krone <i>et al</i>	Tributyl Tin (TBT)	SEDIMENT-TBT-1	USEPA 8082
Phenols	WTM-HENOL-1	USEPA 8270C	Phenols	SEDIMENT-PHENOL-1	USEPA 8270C
<b>II. Sediment/Soil</b>					
<b>III. Chinese Medicines</b>					
Pesticides Residues	TCM-OCP-1	In house method			
Organophosphorus Pesticide	SEDIMENT-OPP-1	In house based on USEPA 8141A			
Polychlorinated Biphenyls (PCBs)	SEDIMENT-PCB-2	In house based on USEPA 8082			
<b>IV. Degradable Containers &amp; Bags</b>					
			HS1004	HS1004 Testing Guideline on Degradable Containers and Bags	
<b>V. Food &amp; Biota Samples</b>					
Polynuclear Aromatic Hydrocarbons (PAHs)	FD-PAH-1	In house based on USEPA 8270C			
Organochlorinated Pesticides (OCPs)	FD-OCP-1	In house based on USEPA 8081B			

### Remarks:

\*C<sub>6</sub>-C<sub>9</sub> Gasoline range organics content is defined as the collective concentration of all organics which elute between 2-methylpentane (C<sub>6</sub>) and n-nonane(C<sub>9</sub>).  
▶C<sub>10</sub>-C<sub>28</sub> Diesel range organics content is defined as the collective concentration of all organics which elute between n-decane(C<sub>10</sub>) and N-octacosane(C<sub>28</sub>).

### Reference Notes:

USEPA – United States Environmental Protection Agency  
Krone *et al* – Marine Environmental research,27, 1-18, 1989

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED

Contact : MR C M YEE

Address : 11/F., CENTRE POINT,  
181-185 GLOUCESTER ROAD,  
WANCHAI, HONG KONG

E-mail : Samuel@Lamconstruct.com.hk

Telephone : +852 2839 5633

Facsimile : ----

Project : LG29024

Order number : CV/2009/13

C-O-C number : H006858

Site : D196

Laboratory : ALS Technichem HK Pty Ltd

Contact : Chan Kwok Fai, Godfrey

Address : 11/F., Chung Shun Knitting Centre,  
1 - 3 Wing Yip Street,  
Kwai Chung, N.T., Hong Kong

E-mail : Godfrey.Chan@alsenviro.com

Telephone : +852 2610 1044

Facsimile : +852 2610 2021

Quote number : HK/1313/2009\*\*

Page : 1 of 9

Work Order : HK0924392

Date Samples Received : 16-NOV-2009

Issue Date : 23-DEC-2009

No. of samples received : 7

No. of samples analysed : 3

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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*

Anh Ngoc Huynh

Chan Siu Ming, Vico

Wong Wing, Kenneth

*Position*

Senior Chemist - Organics

Chemist

Assistant Supervisor

*Authorised results for*

Organics

Inorganics

Inorganics

**ALS Laboratory Group**

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924392



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924392**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

D196

D196

D196

0-0.9M

0.9-1.9M

1.9-2.9M

[16-NOV-2009]

[16-NOV-2009]

[16-NOV-2009]

HK0924392-001

HK0924392-002

HK0924392-003

Compound	CAS Number	LOR	Unit	HK0924392-001	HK0924392-002	HK0924392-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	45.3	42.5	39.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	16.9	16.6	18.3
<b>EG: Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	9	15	16
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	33	39	38
EG020: Copper	7440-50-8	1	mg/kg	30	16	16
EG020: Lead	7439-92-1	1	mg/kg	63	35	35
EG020: Mercury	7439-97-6	0.05	mg/kg	0.78	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	21	25	24
EG020: Silver	7440-22-4	0.1	mg/kg	0.6	0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	132	91	89
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	593	811	842
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners





Sub-Matrix: SEDIMENT				Client sample ID	D196 0-0.9M [16-NOV-2009]	D196 0.9-1.9M [16-NOV-2009]	D196 1.9-2.9M [16-NOV-2009]
Client sampling date / time				HK0924392-001	HK0924392-002	HK0924392-003	
Compound	CAS Number	LOR	Unit				
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3	
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3	
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3	
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3	
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3	
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3	
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3	
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3	
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3	
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3	
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3	
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3	
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3	
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3	
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3	
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3	
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3	
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Surrogate control limits listed at end of this report.							
Nitrobenzene -d5	4165-60-0	0.1	%	72.8	71.9	69.5	
4-Terphenyl-d14	1718-51-0	0.1	%	72.1	73.9	66.6	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Surrogate control limits listed at end of this report.							
Decachlorobiphenyl	2051-24-3	0.1	%	86.2	92.3	82.4	
<b>EP-067S: Pesticide Surrogate</b>							
Surrogate control limits listed at end of this report.							
Tetrachlorometaxylene	877-09-8	0.1	%	57.3	64.2	62.8	
Dibutylchloroendate	1770-80-5	0.1	%	53.0	57.3	53.8	



**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: 1170984)</b>								
HK0924260-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.3	47.0	8.0
HK0924392-003	D196 1.9-2.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.6	39.8	0.7
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>								
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>								
HK0924392-002	D196 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	15	15	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0
		EG020: Copper	7440-50-8	1	mg/kg	16	16	0.0
		EG020: Lead	7439-92-1	1	mg/kg	35	35	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	25	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	91	91	0.0
		HK0924423-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	4	4	0.0
EG020: Chromium	7440-47-3			1	mg/kg	35	36	3.0
EG020: Copper	7440-50-8			1	mg/kg	11	11	0.0
EG020: Lead	7439-92-1			1	mg/kg	23	23	0.0
EG020: Nickel	7440-02-0			1	mg/kg	24	25	0.0
EG020: Zinc	7440-66-6			1	mg/kg	75	77	1.8
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>								
HK0924392-001	D196 0-0.9M	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793) - Continued</b>								
HK0924392-001	D196 0-0.9M	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>								
HK0924392-001	D196 0-0.9M	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>								
HK0924388-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
n											



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	86.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	93.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.1	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	65.2	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	64.4	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	65.6	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	66.7	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	56.2	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	68.7	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.3	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	76.9	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	75.1	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	78.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	78.5	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	68.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	78.3	----	25	182	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793) - Continued</b>												
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----	
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----	
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----	
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>												
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.8	----	63	120	----	----	
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	91.5	----	61	121	----	----	
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	85.6	----	55	132	----	----	
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----	
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	84.3	----	68	122	----	----	
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	89.8	----	69	113	----	----	
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	80.9	----	68	121	----	----	
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	98.2	----	41	142	----	----	
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	82.2	----	62	122	----	----	
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.4	----	60	122	----	----	
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	82.1	----	64	126	----	----	
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	83.6	----	60	124	----	----	
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	91.2	----	57	133	----	----	
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	83.1	----	65	121	----	----	
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	83.4	----	61	121	----	----	
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	86.4	----	64	124	----	----	
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	83.2	----	66	121	----	----	
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	86.0	----	70	122	----	----	
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>												
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----	
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----	
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----	

**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



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: 1171294)</b>										
HK0924392-001	D196 0-0.9M	EG020: Arsenic	7440-38-2	5 mg/kg	97.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.6	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	86.8	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.6	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	83.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	85.6	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924518
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Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 18-NOV-2009
Order number	: CV/2009/13			Issue Date	: 29-DEC-2009
C-O-C number	: H010011			No. of samples received	: 7
Site	: D202			No. of samples analysed	: 3

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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*

Anh Ngoc Huynh  
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Senior Chemist - Organics  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924518

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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924518**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT				Client sample ID		
				D202	D202	D202
				0-0.9M	0.9-1.9M	1.9-2.9M
				18-NOV-2009 09:30	18-NOV-2009 09:30	18-NOV-2009 09:30
Client sampling date / time				HK0924518-001	HK0924518-002	HK0924518-003
Compound	CAS Number	LOR	Unit			
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	44.1	43.5	45.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	39.2	60.2	76.1
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	732	968	669
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	5	9	14
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	39	40	44
EG020: Copper	7440-50-8	1	mg/kg	12	13	17
EG020: Lead	7439-92-1	1	mg/kg	23	25	35
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	27	27	29
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	75	75	90
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						



Sub-Matrix: SEDIMENT				Client sample ID	D202	D202	D202
				Client sampling date / time	0-0.9M	0.9-1.9M	1.9-2.9M
				18-NOV-2009 09:30	18-NOV-2009 09:30	18-NOV-2009 09:30	
Compound	CAS Number	LOR	Unit	HK0924518-001	HK0924518-002	HK0924518-003	
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3	
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3	
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3	
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3	
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3	
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3	
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3	
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3	
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3	
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3	
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3	
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3	
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3	
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3	
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3	
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3	
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3	
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Surrogate control limits listed at end of this report.							
Nitrobenzene -d5	4165-60-0	0.1	%	53.6	59.3	54.0	
4-Terphenyl-d14	1718-51-0	0.1	%	50.6	53.0	54.4	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Surrogate control limits listed at end of this report.							
Decachlorobiphenyl	2051-24-3	0.1	%	105	59.4	95.2	
<b>EP-067S: Pesticide Surrogate</b>							
Surrogate control limits listed at end of this report.							
Tetrachlorometaxylene	877-09-8	0.1	%	59.4	62.5	61.7	
Dibutylchlorendate	1770-80-5	0.1	%	67.6	67.9	65.2	



**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: 1172676)</b>								
HK0924515-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	42.1	41.0	2.6
HK0924520-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	44.5	44.7	0.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>								
HK0924444-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	D202 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
		HK0924522-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	6	6	0.0
EG020: Chromium	7440-47-3			1	mg/kg	41	40	0.0
EG020: Copper	7440-50-8			1	mg/kg	13	13	0.0
EG020: Lead	7439-92-1			1	mg/kg	27	25	6.5
EG020: Nickel	7440-02-0			1	mg/kg	28	28	0.0
EG020: Zinc	7440-66-6			1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
Fluorene	86-73-7	50	µg/kg	<50	<50	0.0		



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
n												





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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	67.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	81.7	----	25	182	----	----



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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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



Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>										
HK0924518-001	D202 0-0.9M	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
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Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 18-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010012			No. of samples received	: 7
Site	: D214			No. of samples analysed	: 3

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

Organics  
Inorganics  
Inorganics

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924520

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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924520**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D214	D214	D214
				0-0.9M	0.9-1.9M	1.9-2.9M
				18-NOV-2009 11:30	18-NOV-2009 11:30	18-NOV-2009 11:30
				HK0924520-001	HK0924520-002	HK0924520-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	48.5	42.8	44.5
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	37.1	42.6	68.9
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	652	538	1080
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	6	7	14
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	43	39	42
EG020: Copper	7440-50-8	1	mg/kg	13	12	16
EG020: Lead	7439-92-1	1	mg/kg	26	25	33
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	30	27	28
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	86	73	85
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners





Sub-Matrix: SEDIMENT

Client sample ID

D214  
0-0.9M

D214  
0.9-1.9M

D214  
1.9-2.9M

Client sampling date / time

18-NOV-2009 11:30

18-NOV-2009 11:30

18-NOV-2009 11:30

Compound	CAS Number	LOR	Unit	HK0924520-001	HK0924520-002	HK0924520-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	32774-16-6	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Surrogate control limits listed at end of this report.						
Nitrobenzene -d5	4165-60-0	0.1	%	52.5	55.9	50.8
4-Terphenyl-d14	1718-51-0	0.1	%	59.4	50.7	58.0
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Surrogate control limits listed at end of this report.						
Decachlorobiphenyl	2051-24-3	0.1	%	91.9	70.9	64.4
<b>EP-067S: Pesticide Surrogate</b>						
Surrogate control limits listed at end of this report.						
Tetrachlorometaxylene	877-09-8	0.1	%	62.4	60.6	68.3
Dibutylchlorendate	1770-80-5	0.1	%	54.2	66.2	71.2



### 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: 1172676)</b>								
HK0924515-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	42.1	41.0	2.6
HK0924520-003	D214 1.9-2.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	44.5	44.7	0.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>								
HK0924444-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
HK0924522-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	40	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	25	6.5
		EG020: Nickel	7440-02-0	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



Matrix: SOIL		Method Blank (MB) Report				Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
		LOR	Unit	Result	Spike Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	67.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	81.7	----	25	182	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	---	6	144	---	---

**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





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: 1172530)</b>										
HK0924518-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924384
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 16-NOV-2009
Order number	: CV/2009/13			Issue Date	: 23-DEC-2009
C-O-C number	: H006857			No. of samples received	: 5
Site	: D221			No. of samples analysed	: 2

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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.

<i>Signatories</i>	<i>Position</i>	<i>Authorised results for</i>
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Chan Siu Ming, Vico	Chemist	Inorganics
Wong Wing, Kenneth	Assistant Supervisor	Inorganics

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924384



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924384**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

D221

D221

0-0.9M

0.9-1.9M

[16-NOV-2009]

[16-NOV-2009]

Client sampling date / time

Compound	CAS Number	LOR	Unit	HK0924384-001	HK0924384-002
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	46.1	47.7
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	8.2	13.1
<b>EG: Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	6	15
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	38	41
EG020: Copper	7440-50-8	1	mg/kg	11	16
EG020: Lead	7439-92-1	1	mg/kg	24	36
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	25	26
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	81	95
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	824	954
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT				Client sample ID	D221	D221
				0-0.9M	0.9-1.9M	
				[16-NOV-2009]	[16-NOV-2009]	
				HK0924384-001	HK0924384-002	
Compound	CAS Number	LOR	Unit			
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	
PCB 18	37680-65-2	3	µg/kg	<3	<3	
PCB 28	7012-37-5	3	µg/kg	<3	<3	
PCB 52	35693-99-3	3	µg/kg	<3	<3	
PCB 44	41464-39-5	3	µg/kg	<3	<3	
PCB 66	32598-10-0	3	µg/kg	<3	<3	
PCB 101	37680-73-2	3	µg/kg	<3	<3	
PCB 77	32598-13-3	3	µg/kg	<3	<3	
PCB 118	31508-00-6	3	µg/kg	<3	<3	
PCB 153	35065-27-1	3	µg/kg	<3	<3	
PCB 105	32598-14-4	3	µg/kg	<3	<3	
PCB 138	35065-28-2	3	µg/kg	<3	<3	
PCB 126	57465-28-8	3	µg/kg	<3	<3	
PCB 187	52663-68-0	3	µg/kg	<3	<3	
PCB 128	38380-07-3	3	µg/kg	<3	<3	
PCB 180	35065-29-3	3	µg/kg	<3	<3	
PCB 169	60044-26-0	3	µg/kg	<3	<3	
PCB 170	35065-30-6	3	µg/kg	<3	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						Surrogate control limits listed at end of this report.
Nitrobenzene -d5	4165-60-0	0.1	%	71.4	69.5	
4-Terphenyl-d14	1718-51-0	0.1	%	70.3	71.0	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						Surrogate control limits listed at end of this report.
Decachlorobiphenyl	2051-24-3	0.1	%	93.5	103	
<b>EP-067S: Pesticide Surrogate</b>						Surrogate control limits listed at end of this report.
Tetrachlorometaxylene	877-09-8	0.1	%	55.7	53.4	
Dibutylchlorendate	1770-80-5	0.1	%	63.0	62.5	



### 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: 1170984)</b>								
HK0924260-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.3	47.0	8.0
HK0924392-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.6	39.8	0.7
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>								
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>								
HK0924256-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8
		HK0924259-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	3	4	0.0
EG020: Chromium	7440-47-3			1	mg/kg	15	14	7.7
EG020: Copper	7440-50-8			1	mg/kg	5	5	0.0
EG020: Lead	7439-92-1			1	mg/kg	12	12	0.0
EG020: Nickel	7440-02-0			1	mg/kg	9	8	0.0
EG020: Zinc	7440-66-6			1	mg/kg	36	36	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>								
HK0924256-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>								
HK0924256-002	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4.4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4.4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
n											





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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	80.8	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	60.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	61.5	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	63.7	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	67.3	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	55.9	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	69.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.6	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	76.9	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.4	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.8	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	83.3	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	69.1	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	82.1	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	103	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	----	6	144	----	----

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

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)
				MS	MSD	Low	High	Value	Control Limit



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: 1171293)</b>										
HK0924256-002	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.4	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.4	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.7	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924521
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 18-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010013			No. of samples received	: 7
Site	: D234			No. of samples analysed	: 3

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924521



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### 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924521**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D234	D234	D234
				0-0.9M	0.9-1.9M	1.9-2.9M
				18-NOV-2009 13:30	18-NOV-2009 13:30	18-NOV-2009 13:30
				HK0924521-001	HK0924521-002	HK0924521-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	45.2	45.9	42.8
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	41.7	62.8	72.0
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	738	1170	1200
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	7	13	16
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	39	45	44
EG020: Copper	7440-50-8	1	mg/kg	12	16	17
EG020: Lead	7439-92-1	1	mg/kg	24	31	36
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	27	30	29
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	74	87	92
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners





Sub-Matrix: SEDIMENT				Client sample ID	D234 0-0.9M	D234 0.9-1.9M	D234 1.9-2.9M		
Client sampling date / time					18-NOV-2009 13:30	18-NOV-2009 13:30	18-NOV-2009 13:30		
Compound	CAS Number	LOR	Unit	HK0924521-001	HK0924521-002	HK0924521-003			
<b>EP-066: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3			
PCB 169	32774-16-6	3	µg/kg	<3	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.		
Nitrobenzene -d5	4165-60-0	0.1	%	52.6	54.1	51.8			
4-Terphenyl-d14	1718-51-0	0.1	%	53.0	55.6	51.2			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							Surrogate control limits listed at end of this report.		
Decachlorobiphenyl	2051-24-3	0.1	%	89.7	95.3	95.7			
<b>EP-067S: Pesticide Surrogate</b>							Surrogate control limits listed at end of this report.		
Tetrachlorometaxylene	877-09-8	0.1	%	67.9	72.4	68.0			
Dibutylchlorendate	1770-80-5	0.1	%	69.3	76.1	67.2			



### 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: 1172676)</b>								
HK0924515-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	42.1	41.0	2.6
HK0924520-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	44.5	44.7	0.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>								
HK0924444-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>								
HK0924449-002	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	2.8	2.9	0.0
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
HK0924522-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	40	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	25	6.5
		EG020: Nickel	7440-02-0	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	Anonymous	Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	D234 0-0.9M	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
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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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	98.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	---	50.2 µg/kg	67.6	---	14	188	---	---
				<150	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	81.7	---	25	182	---	---
				<150	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	---	6	144	---	---

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

Matrix: SOIL

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





Matrix: SOIL				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number							
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>										
HK0924518-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924425
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 17-NOV-2009
Order number	: CV/2009/13			Issue Date	: 29-DEC-2009
C-O-C number	: H006233			No. of samples received	: 7
Site	: D238			No. of samples analysed	: 3

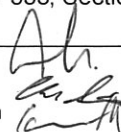
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Hong Kong Accreditation Service (HKAS) has accredited this laboratory (ALS Technichem (HK) Pty Ltd) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories. 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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth



*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924425



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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924425**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D238	D238	D238
				0-0.9M	0.9-1.9M	1.9-2.9M
				17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00
				HK0924425-001	HK0924425-002	HK0924425-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	41.2	45.7	42.8
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	75.5	109	97.6
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	715	883	942
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	8	13	12
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	37	43	39
EG020: Copper	7440-50-8	1	mg/kg	12	16	15
EG020: Lead	7439-92-1	1	mg/kg	24	32	31
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	25	29	26
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	75	91	87
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3



Sub-Matrix: SEDIMENT

Client sample ID

**D238**  
**0-0.9M**

**D238**  
**0.9-1.9M**

**D238**  
**1.9-2.9M**

Client sampling date / time

17-NOV-2009 10:00

17-NOV-2009 10:00

17-NOV-2009 10:00

Compound	CAS Number	LOR	Unit	HK0924425-001	HK0924425-002	HK0924425-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						Surrogate control limits listed at end of this report.
Nitrobenzene -d5	4165-60-0	0.1	%	66.1	66.8	51.0
4-Terphenyl-d14	1718-51-0	0.1	%	69.8	73.5	51.8
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						Surrogate control limits listed at end of this report.
Decachlorobiphenyl	2051-24-3	0.1	%	84.1	102	106
<b>EP-067S: Pesticide Surrogate</b>						Surrogate control limits listed at end of this report.
Tetrachlorometaxylene	877-09-8	0.1	%	57.6	66.7	67.8
Dibutylchlorodate	1770-80-5	0.1	%	59.3	50.6	55.2



### 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: 1170985)</b>								
HK0924423-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.6	44.3	1.7
HK0924446-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	37.5	36.1	3.8
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>								
HK0924425-003	D238 1.9-2.9M	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	97.6	110	12.0
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>								
HK0924392-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	15	15	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0
		EG020: Copper	7440-50-8	1	mg/kg	16	16	0.0
		EG020: Lead	7439-92-1	1	mg/kg	35	35	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	25	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	91	91	0.0
HK0924423-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	4	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	35	36	3.0
		EG020: Copper	7440-50-8	1	mg/kg	11	11	0.0
		EG020: Lead	7439-92-1	1	mg/kg	23	23	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	1.8
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>								
HK0924392-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168794)</b>								
HK0924392-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>								
HK0924388-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>												
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	95.6	----	85	115	----	----	
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.6	----	85	115	----	----	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	86.5	----	85	115	----	----	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----	





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171294) - Continued</b>											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	93.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.1	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	65.2	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	64.4	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	65.6	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	66.7	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	56.2	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	68.7	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.3	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	76.9	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	75.1	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	78.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	78.5	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	68.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	78.3	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.8	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	91.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	85.6	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	84.3	----	68	122	----	----



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-065: PCB Single Congeners (QC Lot: 1168794) - Continued</b>											
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	89.8	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	80.9	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	98.2	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	82.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	82.1	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	83.6	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	91.2	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	83.1	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	83.4	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	86.4	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	83.2	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	86.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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: 1171294)</b>										
HK0924392-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	97.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.6	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	86.8	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.6	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	83.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	85.6	----	75	125	----	----



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: 1171294) - Continued</b>										
HK0924392-001	Anonymous	EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924422
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 17-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 29-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CV/2009/13			No. of samples analysed	: 3
C-O-C number	: H006232				
Site	: S30				

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
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#### Authorised results for

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company



## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924422**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S30	S30	S30
				0-0.9M	0.9-1.9M	1.9-2.9M
				17-NOV-2009 11:30	17-NOV-2009 11:30	17-NOV-2009 11:30
				HK0924422-001	HK0924422-002	HK0924422-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	41.1	46.8	44.3
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	55.8	99.9	107
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	689	659	823
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	3	14	14
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	29	41	41
EG020: Copper	7440-50-8	1	mg/kg	9	16	15
EG020: Lead	7439-92-1	1	mg/kg	20	33	32
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	20	27	28
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	59	90	90
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2	207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3





Sub-Matrix: SEDIMENT

Client sample ID

S30 0-0.9M	S30 0.9-1.9M	S30 1.9-2.9M
17-NOV-2009 11:30	17-NOV-2009 11:30	17-NOV-2009 11:30

Client sampling date / time

Compound	CAS Number	LOR	Unit	HK0924422-001	HK0924422-002	HK0924422-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Surrogate control limits listed at end of this report.						
Nitrobenzene -d5	4165-60-0	0.1	%	72.8	67.6	69.7
4-Terphenyl-d14	1718-51-0	0.1	%	74.1	73.2	68.1
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Surrogate control limits listed at end of this report.						
Decachlorobiphenyl	2051-24-3	0.1	%	95.8	83.3	78.8
<b>EP-067S: Pesticide Surrogate</b>						
Surrogate control limits listed at end of this report.						
Tetrachlorometaxylene	877-09-8	0.1	%	56.5	58.8	52.8
Dibutylchlorodate	1770-80-5	0.1	%	53.5	58.6	51.5



### 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: 1170984)</b>									
HK0924260-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.3	47.0	8.0	
HK0924392-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.6	39.8	0.7	
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>									
HK0924425-003	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	97.6	110	12.0	
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>									
HK0924392-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	15	15	0.0	
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0	
		EG020: Copper	7440-50-8	1	mg/kg	16	16	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	35	35	0.0	
		EG020: Nickel	7440-02-0	1	mg/kg	25	25	0.0	
		EG020: Zinc	7440-66-6	1	mg/kg	91	91	0.0	
		HK0924423-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0	
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0	
EG020: Arsenic	7440-38-2			1	mg/kg	4	4	0.0	
EG020: Chromium	7440-47-3			1	mg/kg	35	36	3.0	
EG020: Copper	7440-50-8			1	mg/kg	11	11	0.0	
EG020: Lead	7439-92-1			1	mg/kg	23	23	0.0	
EG020: Nickel	7440-02-0			1	mg/kg	24	25	0.0	
EG020: Zinc	7440-66-6			1	mg/kg	75	77	1.8	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>									
HK0924392-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0	
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0	
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0	
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0	
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0	
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0	
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0	
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0	
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0	
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0	
			207-08-9						
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0	
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0	
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0	
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0	
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0	
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0	
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168794)</b>								
HK0924392-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>								
HK0924388-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	95.6	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	86.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----



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: 1171294) - Continued</b>											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	93.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.1	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	65.2	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	64.4	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	65.6	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	66.7	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	56.2	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	68.7	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.3	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	76.9	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	75.1	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	78.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	78.5	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	68.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	78.3	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.8	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	91.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	85.6	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	84.3	----	68	122	----	----



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	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					Concentration	LCS	DCS	Low	High	Value	Control Limit
<b>EP-065: PCB Single Congeners (QC Lot: 1168794) - Continued</b>											
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	89.8	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	80.9	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	98.2	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	82.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	82.1	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	83.6	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	91.2	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	83.1	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	83.4	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	86.4	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	83.2	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	86.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
				Concentration	MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>										
HK0924392-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	97.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.6	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	86.8	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.6	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	83.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	85.6	----	75	125	----	----





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: 1171294) - Continued</b>										
HK0924392-001	Anonymous	EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924856
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 24-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 13-JAN-2010
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 3
Order number	: CV/2009/13			No. of samples analysed	: 1
C-O-C number	: H010035				
Site	: S29				

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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
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Chan Siu Ming, Vico	Chemist	Inorganics
Wong Wing, Kenneth	Assistant Supervisor	Inorganics

### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924856



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924856**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



### Analytical Results

Sub-Matrix: SEDIMENT		Client sample ID		S29	
		Client sampling date / time		24-NOV-2009 11:00	
Compound	CAS Number	LOR	Unit	HK0924856-001	
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	45.5	
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	14.0	
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	772	
<b>Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	10	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	
EG020: Chromium	7440-47-3	1	mg/kg	27	
EG020: Copper	7440-50-8	1	mg/kg	14	
EG020: Lead	7439-92-1	1	mg/kg	24	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	
EG020: Nickel	7440-02-0	1	mg/kg	17	
EG020: Silver	7440-22-4	0.1	mg/kg	0.2	
EG020: Zinc	7440-66-6	1	mg/kg	88	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	
Acenaphthylene	208-96-8	50	µg/kg	<50	
Acenaphthene	83-32-9	50	µg/kg	<50	
Fluorene	86-73-7	50	µg/kg	<50	
Phenanthrene	85-01-8	50	µg/kg	<50	
Anthracene	120-12-7	50	µg/kg	<50	
Fluoranthene	206-44-0	150	µg/kg	<150	
Pyrene	129-00-0	150	µg/kg	<150	
Benz(a)anthracene	56-55-3	150	µg/kg	<150	
Chrysene	218-01-9	150	µg/kg	<150	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	
Low M.W. PAHs	----	550	µg/kg	<550	
High M.W. PAHs	----	1700	µg/kg	<1700	
<b>EP-065: PCB Single Congeners</b>					
PCB 8	34883-43-7	3	µg/kg	<3	



Sub-Matrix: SEDIMENT		Client sample ID		S29	
		Client sampling date / time		24-NOV-2009 11:00	
Compound	CAS Number	LOR	Unit	HK0924856-001	
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 18	37680-65-2	3	µg/kg	<3	
PCB 28	7012-37-5	3	µg/kg	<3	
PCB 52	35693-99-3	3	µg/kg	<3	
PCB 44	41464-39-5	3	µg/kg	<3	
PCB 66	32598-10-0	3	µg/kg	<3	
PCB 101	37680-73-2	3	µg/kg	<3	
PCB 77	32598-13-3	3	µg/kg	<3	
PCB 118	31508-00-6	3	µg/kg	<3	
PCB 153	35065-27-1	3	µg/kg	<3	
PCB 105	32598-14-4	3	µg/kg	<3	
PCB 138	35065-28-2	3	µg/kg	<3	
PCB 126	57465-28-8	3	µg/kg	<3	
PCB 187	52663-68-0	3	µg/kg	<3	
PCB 128	38380-07-3	3	µg/kg	<3	
PCB 180	35065-29-3	3	µg/kg	<3	
PCB 169	32774-16-6	3	µg/kg	<3	
PCB 170	35065-30-6	3	µg/kg	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>				Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	56.9	
4-Terphenyl-d14	1718-51-0	0.1	%	65.3	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>				Surrogate control limits listed at end of this report.	
Decachlorobiphenyl	2051-24-3	0.1	%	77.3	
<b>EP-067S: Pesticide Surrogate</b>				Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%	69.2	
Dibutylchlorendate	1770-80-5	0.1	%	64.0	



**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: 1176918)</b>								
HK0924847-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.2	49.8	1.3
HK0924890-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.3	54.9	4.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>								
HK0925084-001	Anonymous	EK055: Ammonia as N	7664-41-7	10	mg/kg	4680	4700	0.3
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>								
HK0924847-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	43	3.9
		EG020: Copper	7440-50-8	1	mg/kg	14	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	25	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	29	28	4.3
		EG020: Zinc	7440-66-6	1	mg/kg	94	91	3.0
HK0924890-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23	0.24	4.7
		EG020: Silver	7440-22-4	0.1	mg/kg	3.0	2.9	5.7
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	12	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	59	56	6.1
		EG020: Copper	7440-50-8	1	mg/kg	115	109	5.7
		EG020: Lead	7439-92-1	1	mg/kg	40	37	7.6
		EG020: Nickel	7440-02-0	1	mg/kg	27	26	6.3
		EG020: Zinc	7440-66-6	1	mg/kg	186	168	10.3
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											





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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.2	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	90.6	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	90.1	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	93.6	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.9	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	63.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	68.2	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	60.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	68.5	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	60.8	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	70.8	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	73.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	69.6	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	79.7	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	76.3	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	72.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	69.2	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	60.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	77.2	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	----	52	150	----	----
beta- & gamma-BHC	319-85-7	58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	----	55	149	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----

**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



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: 1178675)</b>										
HK0924847-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	84.8	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.8	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	76.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	95.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924857
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 24-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 13-JAN-2010
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 3
Order number	: CV/2009/13			No. of samples analysed	: 1
C-O-C number	: H010036				
Site	: D272				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924857



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924857**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

D272

Client sampling date / time

24-NOV-2009 12:00

Compound	CAS Number	LOR	Unit	HK0924857-001
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	42.4
<b>ED/EK: Inorganic Nonmetallic Parameters</b>				
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	16.5
<b>EP: Aggregate Organics</b>				
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	320
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	12
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	29
EG020: Copper	7440-50-8	1	mg/kg	18
EG020: Lead	7439-92-1	1	mg/kg	26
EG020: Mercury	7439-97-6	0.05	mg/kg	0.08
EG020: Nickel	7440-02-0	1	mg/kg	17
EG020: Silver	7440-22-4	0.1	mg/kg	0.2
EG020: Zinc	7440-66-6	1	mg/kg	75
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	----	550	µg/kg	<550
High M.W. PAHs	----	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3





Sub-Matrix: SEDIMENT		Client sample ID		D272	
		Client sampling date / time		24-NOV-2009 12:00	
Compound	CAS Number	LOR	Unit	HK0924857-001	
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 18	37680-65-2	3	µg/kg	<3	
PCB 28	7012-37-5	3	µg/kg	<3	
PCB 52	35693-99-3	3	µg/kg	<3	
PCB 44	41464-39-5	3	µg/kg	<3	
PCB 66	32598-10-0	3	µg/kg	<3	
PCB 101	37680-73-2	3	µg/kg	<3	
PCB 77	32598-13-3	3	µg/kg	<3	
PCB 118	31508-00-6	3	µg/kg	<3	
PCB 153	35065-27-1	3	µg/kg	<3	
PCB 105	32598-14-4	3	µg/kg	<3	
PCB 138	35065-28-2	3	µg/kg	<3	
PCB 126	57465-28-8	3	µg/kg	<3	
PCB 187	52663-68-0	3	µg/kg	<3	
PCB 128	38380-07-3	3	µg/kg	<3	
PCB 180	35065-29-3	3	µg/kg	<3	
PCB 169	32774-16-6	3	µg/kg	<3	
PCB 170	35065-30-6	3	µg/kg	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>					
Surrogate control limits listed at end of this report.					
Nitrobenzene -d5	4165-60-0	0.1	%	51.4	
4-Terphenyl-d14	1718-51-0	0.1	%	79.0	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>					
Surrogate control limits listed at end of this report.					
Decachlorobiphenyl	2051-24-3	0.1	%	89.3	
<b>EP-067S: Pesticide Surrogate</b>					
Surrogate control limits listed at end of this report.					
Tetrachlorometaxylene	877-09-8	0.1	%	59.6	
Dibutylchlorendate	1770-80-5	0.1	%	54.8	



### 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: 1176918)</b>								
HK0924847-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.2	49.8	1.3
HK0924890-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.3	54.9	4.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>								
HK0925084-001	Anonymous	EK055: Ammonia as N	7664-41-7	10	mg/kg	4680	4700	0.3
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>								
HK0924847-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	43	3.9
		EG020: Copper	7440-50-8	1	mg/kg	14	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	25	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	29	28	4.3
		EG020: Zinc	7440-66-6	1	mg/kg	94	91	3.0
HK0924890-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23	0.24	4.7
		EG020: Silver	7440-22-4	0.1	mg/kg	3.0	2.9	5.7
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	12	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	59	56	6.1
		EG020: Copper	7440-50-8	1	mg/kg	115	109	5.7
		EG020: Lead	7439-92-1	1	mg/kg	40	37	7.6
		EG020: Nickel	7440-02-0	1	mg/kg	27	26	6.3
		EG020: Zinc	7440-66-6	1	mg/kg	186	168	10.3
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
Fluorene	86-73-7	50	µg/kg	<50	<50	0.0		



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.2	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	90.6	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	90.1	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	93.6	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.9	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	63.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	68.2	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	60.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	68.5	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	60.8	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	70.8	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	73.8	----	50	96	----	----
Benzo(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	69.6	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	79.7	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	76.3	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	72.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	69.2	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	60.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	77.2	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----

**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



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: 1178675)</b>										
HK0924847-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	84.8	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.8	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	76.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	95.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924420
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E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 17-NOV-2009
Order number	: CV/2009/13			Issue Date	: 23-DEC-2009
C-O-C number	: H006231			No. of samples received	: 7
Site	: S32			No. of samples analysed	: 3

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

Organics  
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Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924420



## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924420**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



## Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S32	S32	S32
				0-0.9M	0.9-1.9M	1.9-2.9M
				17-NOV-2009 13:30	17-NOV-2009 13:30	17-NOV-2009 13:30
				HK0924420-001	HK0924420-002	HK0924420-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	45.4	38.6	39.1
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	47.3	61.7	42.1
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	814	567	602
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	6	4	7
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	36	30	37
EG020: Copper	7440-50-8	1	mg/kg	12	9	11
EG020: Lead	7439-92-1	1	mg/kg	31	20	23
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	25	21	25
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	78	65	74
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2	207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3



Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S32	S32	S32
				0-0.9M	0.9-1.9M	1.9-2.9M
				17-NOV-2009 13:30	17-NOV-2009 13:30	17-NOV-2009 13:30
				HK0924420-001	HK0924420-002	HK0924420-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Surrogate control limits listed at end of this report.						
Nitrobenzene -d5	4165-60-0	0.1	%	79.0	71.3	77.4
4-Terphenyl-d14	1718-51-0	0.1	%	72.9	67.4	77.3
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Surrogate control limits listed at end of this report.						
Decachlorobiphenyl	2051-24-3	0.1	%	101	98.3	82.7
<b>EP-067S: Pesticide Surrogate</b>						
Surrogate control limits listed at end of this report.						
Tetrachlorometaxylene	877-09-8	0.1	%	51.7	63.9	61.2
Dibutylchlorendate	1770-80-5	0.1	%	62.2	57.6	52.8



### 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: 1170984)</b>								
HK0924260-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.3	47.0	8.0
HK0924392-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.6	39.8	0.7
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>								
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>								
HK0924425-003	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	97.6	110	12.0
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>								
HK0924392-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	15	15	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0
		EG020: Copper	7440-50-8	1	mg/kg	16	16	0.0
		EG020: Lead	7439-92-1	1	mg/kg	35	35	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	25	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	91	91	0.0
HK0924423-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	4	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	35	36	3.0
		EG020: Copper	7440-50-8	1	mg/kg	11	11	0.0
		EG020: Lead	7439-92-1	1	mg/kg	23	23	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	1.8
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>								
HK0924392-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0





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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793) - Continued</b>									
HK0924392-001	Anonymous	Anthracene	120-12-7	50	µg/kg	<50	<50	0.0	
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0	
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>									
HK0924392-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0	
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0	
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0	
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0	
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0	
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0	
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0	
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0	
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0	
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0	
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0	
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0	
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0	
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0	
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0	
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0	
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0	
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0	
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>									
HK0924388-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0	
			58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>												
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	----	85	115	----	----	
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>												
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	95.6	----	85	115	----	----	





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	86.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	93.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.1	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	50.9 µg/kg	65.2	----	44	96	----	----
				----	50.4 µg/kg	64.4	----	48	86	----	----
Acenaphthene	83-32-9	5	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	65.6	----	51	91	----	----
Fluorene	86-73-7	5	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	66.7	----	46	87	----	----
Phenanthrene	85-01-8	5	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	56.2	----	50	85	----	----
Anthracene	120-12-7	50	µg/kg	<50	51.0 µg/kg	68.7	----	50	98	----	----
				----	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	<150	51.1 µg/kg	70.3	----	50	96	----	----
				----	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	<150	50.1 µg/kg	76.9	----	55	114	----	----
				----	50.8 µg/kg	75.1	----	45	118	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	101.9 µg/kg	81.0	----	60	114	----	----
				----	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	<150	50.7 µg/kg	78.2	----	46	118	----	----
				----	49.0 µg/kg	78.5	----	40	194	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	<300	50.2 µg/kg	68.6	----	14	188	----	----
				----	50.7 µg/kg	78.3	----	25	182	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	78.5	----	40	194	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	<150	50.2 µg/kg	68.6	----	14	188	----	----
				----	50.7 µg/kg	78.3	----	25	182	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	----	----	----	----	----	----	----
				----	50.7 µg/kg	78.3	----	25	182	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	----	----	----	----	----	----	----
				----	50.7 µg/kg	78.3	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.8	----	63	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-065: PCB Single Congeners (QC Lot: 1168794) - Continued</b>											
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	91.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	85.6	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	84.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	89.8	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	80.9	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	98.2	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	82.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	82.1	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	83.6	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	91.2	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	83.1	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	83.4	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	86.4	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	83.2	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	86.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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: 1171294)</b>										
HK0924392-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	97.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.6	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	86.8	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.6	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----



Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1171294) - Continued</b>										
HK0924392-001	Anonymous	EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	83.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	85.6	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924522
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Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 18-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010014			No. of samples received	: 7
Site	: D298			No. of samples analysed	: 3

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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*

Anh Ngoc Huynh  
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*Position*

Senior Chemist - Organics  
Chemist  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924522



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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924522**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D298	D298	D298
				0-0.9M	0.9-1.9M	1.9-2.9M
				18-NOV-2009 15:30	18-NOV-2009 15:30	18-NOV-2009 15:30
				HK0924522-001	HK0924522-002	HK0924522-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	47.4	47.7	43.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	39.1	65.9	80.3
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	956	1010	1290
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	5	6	13
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	36	41	44
EG020: Copper	7440-50-8	1	mg/kg	13	13	16
EG020: Lead	7439-92-1	1	mg/kg	24	27	32
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	24	28	29
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	77	84	87
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners





Sub-Matrix: SEDIMENT				Client sample ID	D298 0-0.9M	D298 0.9-1.9M	D298 1.9-2.9M		
Client sampling date / time				18-NOV-2009 15:30	18-NOV-2009 15:30	18-NOV-2009 15:30			
Compound	CAS Number	LOR	Unit	HK0924522-001	HK0924522-002	HK0924522-003			
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3			
PCB 169	32774-16-6	3	µg/kg	<3	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.		
Nitrobenzene -d5	4165-60-0	0.1	%	56.0	53.3	51.5			
4-Terphenyl-d14	1718-51-0	0.1	%	52.9	68.0	62.8			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							Surrogate control limits listed at end of this report.		
Decachlorobiphenyl	2051-24-3	0.1	%	96.9	95.4	83.6			
<b>EP-067S: Pesticide Surrogate</b>							Surrogate control limits listed at end of this report.		
Tetrachlorometaxylene	877-09-8	0.1	%	68.3	65.0	63.1			
Dibutylchlorendate	1770-80-5	0.1	%	70.2	62.1	63.3			



**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: 1172676)</b>								
HK0924515-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	42.1	41.0	2.6
HK0924520-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	44.5	44.7	0.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>								
HK0924449-002	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	2.8	2.9	0.0
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
HK0924522-002	D298 0.9-1.9M	EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
		EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	40	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	25	6.5
		EG020: Nickel	7440-02-0	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	D298 0-0.9M	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
Fluorene	86-73-7	50	µg/kg	<50	<50	0.0		



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>								
HK0924522-001	D298 0-0.9M	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	D298 0-0.9M	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	98.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	----	----	----	----	----	----	----
					49.9 µg/kg	79.6	----	58	123	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
					50.9 µg/kg	60.2	----	44	96	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
					50.4 µg/kg	64.3	----	48	86	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
					51.0 µg/kg	66.2	----	51	91	----	----
Phenanthrene	85-01-8	5	µg/kg	<50	----	----	----	----	----	----	----
					51.2 µg/kg	66.6	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
					50.7 µg/kg	54.9	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	<150	----	----	----	----	----	----	----
					51.0 µg/kg	68.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	<150	----	----	----	----	----	----	----
					51.1 µg/kg	69.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	<150	----	----	----	----	----	----	----
					50.1 µg/kg	77.5	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
					50.8 µg/kg	78.2	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
					101.9 µg/kg	82.1	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	----	----	----	----	----	----	----
					50.7 µg/kg	78.7	----	46	118	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
					49.0 µg/kg	75.4	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	----	----	----	----	----	----	----
					50.2 µg/kg	68.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	77.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	---	6	144	---	---

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

Matrix: SOIL

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





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: 1172530)</b>										
HK0924518-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

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Project : LG29024

Order number : CV/2009/13

C-O-C number : H006230

Site : S34

Laboratory : ALS Technichem HK Pty Ltd

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Quote number : HK/1313/2009\*\*

Page : 1 of 9

Work Order : HK0924423

Date Samples Received : 17-NOV-2009

Issue Date : 29-DEC-2009

No. of samples received : 7

No. of samples analysed : 3

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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*

Anh Ngoc Huynh  
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*Position*

Senior Chemist - Organics  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company



## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924423**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except sample #1 S34 0-0.9M.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S34	S34	S34
				0-0.9M	0.9-1.9M	1.9-2.9M
				17-NOV-2009 15:30	17-NOV-2009 15:30	17-NOV-2009 15:30
				HK0924423-001	HK0924423-002	HK0924423-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	53.3	45.1	43.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	36.8	58.0	58.1
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	994	541	435
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	8	4	7
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	40	35	37
EG020: Copper	7440-50-8	1	mg/kg	42	11	11
EG020: Lead	7439-92-1	1	mg/kg	32	23	24
EG020: Mercury	7439-97-6	0.05	mg/kg	0.12	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	24	24	26
EG020: Silver	7440-22-4	0.1	mg/kg	1.2	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	117	75	76
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3



Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S34	S34	S34
				0-0.9M	0.9-1.9M	1.9-2.9M
				17-NOV-2009 15:30	17-NOV-2009 15:30	17-NOV-2009 15:30
				HK0924423-001	HK0924423-002	HK0924423-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Nitrobenzene -d5	4165-60-0	0.1	%	52.2	65.9	69.4
4-Terphenyl-d14	1718-51-0	0.1	%	82.1	71.7	76.0
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Decachlorobiphenyl	2051-24-3	0.1	%	95.7	72.1	77.7
<b>EP-067S: Pesticide Surrogate</b>						
Tetrachlorometaxylene	877-09-8	0.1	%	64.7	53.5	51.4
Dibutylchlorendate	1770-80-5	0.1	%	50.9	55.3	50.3

Surrogate control limits listed at end of this report.

Surrogate control limits listed at end of this report.

Surrogate control limits listed at end of this report.



**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: 1170984)</b>								
HK0924260-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.3	47.0	8.0
HK0924392-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.6	39.8	0.7
<b>EA/ED: Physical and Aggregate Properties (QC Lot: 1170985)</b>								
HK0924423-003	S34 1.9-2.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.6	44.3	1.7
HK0924446-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	37.5	36.1	3.8
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>								
HK0924425-003	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	97.6	110	12.0
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>								
HK0924392-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	15	15	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0
		EG020: Copper	7440-50-8	1	mg/kg	16	16	0.0
		EG020: Lead	7439-92-1	1	mg/kg	35	35	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	25	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	91	91	0.0
		HK0924423-002	S34 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	4	4	0.0
EG020: Chromium	7440-47-3			1	mg/kg	35	36	3.0
EG020: Copper	7440-50-8			1	mg/kg	11	11	0.0
EG020: Lead	7439-92-1			1	mg/kg	23	23	0.0
EG020: Nickel	7440-02-0			1	mg/kg	24	25	0.0
EG020: Zinc	7440-66-6			1	mg/kg	75	77	1.8
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>								
HK0924392-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793) - Continued</b>								
HK0924392-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>								
HK0924392-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>								
HK0924388-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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	LCS	DCS	Low	High	Value	Control Limit			
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177866)</b>															
EK055: Ammonia as N		7664-41-7	1	mg/kg	<1	10 mg/kg	95.6	----	85	115	----	----			
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>															





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: 1171294) - Continued</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	86.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	93.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.1	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	50.9 µg/kg	65.2	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	64.4	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	65.6	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	66.7	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	50.7 µg/kg	56.2	----	50	85	----	----
				----	51.0 µg/kg	68.7	----	50	98	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.1 µg/kg	70.3	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	50.1 µg/kg	76.9	----	55	114	----	----
				<150	50.8 µg/kg	75.1	----	45	118	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	101.9 µg/kg	81.0	----	60	114	----	----
				----	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	----	50.7 µg/kg	78.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	49.0 µg/kg	78.5	----	40	194	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.2 µg/kg	68.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	50.7 µg/kg	78.3	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	----	50.7 µg/kg	78.3	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	78.3	----	25	182	----	----
				<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.8	----	63	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-065: PCB Single Congeners (QC Lot: 1168794) - Continued</b>											
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	91.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	85.6	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	84.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	89.8	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	80.9	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	98.2	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	82.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	82.1	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	83.6	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	91.2	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	83.1	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	83.4	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	86.4	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	83.2	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	86.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7	58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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: 1171294)</b>										
HK0924392-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	97.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.6	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	86.8	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.6	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----



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: 1171294) - Continued</b>										
HK0924392-001	Anonymous	EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	83.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	85.6	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

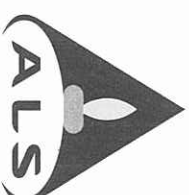
**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130

# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

**ALS TECHNICHEM (HK) Pty Ltd**  
Environmental Division



## CERTIFICATE OF ANALYSIS

**CONTACT:** MR C M YEE  
**CLIENT:** LAM GEOTECHNICS LIMITED  
**ADDRESS:** 11/F., CENTRE POINT,  
181-185 GLOUCESTER ROAD,  
WANCHAI,  
HONG KONG.  
**PROJECT:** LG29024  
**SITE:** S34

**Batch:** HK0924423  
**Sub-batch:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 17/11/2009  
**DATE OF ISSUE:** 13/01/2010  
**SAMPLE TYPE:** WATER  
**No. of SAMPLES:** 1  
**ORDER:** CV/2009/13

### COMMENTS

Sample(s) were received in an ambient condition.  
Tributyl tin Oxide was subcontracted and tested by Hong Kong Productivity Council.  
Hong Kong Productivity Council details report was attached. The attached report contains a total of 2 pages.


### Sample Details

ALS Lab ID	Sample ID	Date of Sampling
HK0924423-001	S34	17/11/2009

### 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@alsenviro.com

  
Mr Chan Kwok Fai, Godfrey  
Laboratory Manager - Hong Kong

### Other ALS Environmental Laboratories

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**AUSTRALIA**  
Brisbane Hong Kong  
Melbourne Singapore  
Sydney Kuala Lumpur  
Newcastle Bogor

**AMERICAS**  
Vancouver Santiago  
Arimafagasta Lima

*Abbreviations:* % SPK REC denotes percentage spike recovery

CHK denotes duplicate check sample

LOR denotes limit of reporting

LCS % REC denotes Laboratory Control Sample percentage recovery

Part of the **ALS Technichem (HK) Pty Ltd**  
**ALS Technichem Group**

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., H.K.  
Phone: 852-2610 1044 Fax: 852-2610 2021 [www.alsenviro.com](http://www.alsenviro.com)  
A Campbell Brothers Limited Company



**Environment & Product Innovation Laboratory**

**TEST REPORT**

Test Report No : T0020090  
Folder No : 0909049  
Page No : 1 of 2  
Date of Issue : 07/01/2010

Client : ALS Technichem (HK) Pty Ltd.  
Address : 11/F., Chung Shun Knitting Centre,  
1-3 Wing Yip Street,  
Kwai Chung,  
N.T. Hong Kong.

Sample Description : 1 interstitial water sample was delivered by the client.

Sample Received Date : 01/12/2009

Test Completed Date : 07/01/2010

Approved Signatory : Fung Kam Wing

Remarks : Contact Person : Mr. Ivan Leung. Acceptable range of surrogate compound recovery for water is 68-120%.

**Analytical Results:**

Sample Name	Parameter	Unit	Tributyl tin	Surrogate Compound
	Method Code		(ng TBTL)	Recovery (%)
HK0924423-1	WTM-TBT-1	WTM-TBT-1	11/12/2009	WTM-TBT-1
	Sample No	Analysis Date		
	WT-0912-0345		<15	100

Approval Signatory:

*Notes:* (1) This report may not be reproduced except with prior written approval from the issuing laboratory.  
(2) Testing Conditions is shown at the back of this report and N.R. refers to test not required by the Client Company.  
(3) Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.



## TESTING METHODS – ORGANICS

Parameter	Method	Reference	Parameter	Method	Reference
<b>I. Water/Wastewater</b>					
BTEX Petroleum Hydrocarbons	WTM-BTEX-1	USEPA 8260B	BTEX Petroleum Hydrocarbons	SEDIMENT-BTEX-1	USEPA 8260B
C <sub>6</sub> -C <sub>9</sub> Gasoline range organics (GRO)*	WTM-GRO-1	USEPA 8015B	C <sub>6</sub> -C <sub>9</sub> Gasoline range organics (GRO)*	WTM-DRO-1	USEPA 8015B
C <sub>10</sub> -C <sub>28</sub> Diesel range organics (DRO) ▲	WTM-DR0-1	USEPA 8015B	C <sub>10</sub> -C <sub>28</sub> Diesel range organics (DRO) ▲	SEDIMENT-DRO-1	USEPA 8015B
C <sub>10</sub> -C <sub>28</sub> Petroleum Hydrocarbons	WTM-DR0-2	USEPA 8015B	C <sub>10</sub> -C <sub>28</sub> Petroleum Hydrocarbons	SEDIMENT-DR0-2	USEPA 8015B
Organochlorine Pesticides (OCP)	WTM-OCP-1	USEPA 8081	Organochlorine Pesticides (OCP)	SEDIMENT-OCP-1	USEPA 8081
Organophosphorus Pesticides (OPP)	WTM-OPP-1	USEPA 8141	Organophosphorus Pesticides (OPP)	SEDIMENT-OPP-1	USEPA 8141
Polynuclear Aromatic Hydrocarbons (PAHs)	WTM-PAH-1	USEPA 8270C	Polynuclear Aromatic Hydrocarbons (PAHs)	SEDIMENT-PAH-1	USEPA 8270C
Trihalomethane (THM)	WTM-VOC-1	USEPA 8260B	Trihalomethane (THM)	WTM-VOC-1	USEPA 8260B
Volatile Organic Compounds (VOCs)	WTM-VOC-1	USEPA 8260B	Volatile Organic Compounds (VOCs)	SEDIMENT-PCB-2	USEPA 8082
Polychlorinated Biphenyls (PCBs)	WTM-PCB-1	USEPA 8082	Polychlorinated Biphenyls (PCBs)	SEDIMENT-TPCB-1	USEPA 8082
Tributyl Tin (TBT)	WTM-TBT-1	Krone <i>et al</i>	Tributyl Tin (TBT)	SEDIMENT-TBT-1	Krone <i>et al</i>
Phenols	WTM-HENOL-1	USEPA 8270C	Phenols	SEDIMENT-PHENOL-1	USEPA 8270C
<b>III. Chinese Medicines</b>					
Pesticides Residues	TCM-OCP-1	In house method	<b>IV. Degradable Containers &amp; Bags</b>		
Organophosphorus Pesticide	SEDIMENT-OPP-1	In house based on USEPA 8141A	HS1004	HS1004	HS1004, Testing Guideline on Degradable Containers and Bags
Polychlorinated Biphenyls (PCBs)	SEDIMENT-PCB-2	In house based on USEPA 8082			
<b>V. Food &amp; Biota Samples</b>					
Polynuclear Aromatic Hydrocarbons (PAHs)	FD-PAH-1	In house based on USEPA 8270C			
Organochlorinated Pesticides (OCPs)	FD-OCP-1	In house based on USEPA 8081B			

**Remarks:**

\*C<sub>6</sub>-C<sub>9</sub> Gasoline range organics content is defined as the collective concentration of all organics which elute between 2-methylpentane (C<sub>6</sub>) and n-nonane(C<sub>9</sub>),  
▲ C<sub>10</sub>-C<sub>28</sub> Diesel range organics content is defined as the collective concentration of all organics which elute between n-decane(C<sub>10</sub>) and N-octacosane(C<sub>28</sub>).

**Reference Notes:**

USEPA – United States Environmental Protection Agency  
Krone *et al* – Marine Environmental research,27, 1-18, 1989



# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924523
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 18-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 04-JAN-2010
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CVI/2009/13			No. of samples analysed	: 3
C-O-C number	: H010015				
Site	: S35				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

Trading Name: **ALS Technichem (HK) Pty Ltd**

11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong

Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsenviro.com

A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924523



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924523**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S35	S35	S35
				0-0.9M	0.9-1.9M	1.9-2.9M
				18-NOV-2009 17:30	18-NOV-2009 17:30	18-NOV-2009 17:30
				HK0924523-001	HK0924523-002	HK0924523-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	41.9	44.1	43.9
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	66.3	104	108
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1090	1200	1240
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	5	2	14
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	34	19	42
EG020: Copper	7440-50-8	1	mg/kg	10	7	17
EG020: Lead	7439-92-1	1	mg/kg	20	17	35
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	24	14	28
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	65	44	91
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

S35  
0-0.9M

S35  
0.9-1.9M

S35  
1.9-2.9M

18-NOV-2009 17:30

18-NOV-2009 17:30

18-NOV-2009 17:30

Compound	CAS Number	LOR	Unit	HK0924523-001	HK0924523-002	HK0924523-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	32774-16-6	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-067S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>						
Nitrobenzene -d5	4165-60-0	0.1	%	53.3	56.1	60.3
4-Terphenyl-d14	1718-51-0	0.1	%	65.7	73.1	66.8
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>						
Decachlorobiphenyl	2051-24-3	0.1	%	91.4	102	95.4
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>						
Tetrachlorometaxylene	877-09-8	0.1	%	62.3	66.7	67.1
Dibutylchlorendate	1770-80-5	0.1	%	57.7	66.1	65.0



**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: 1172676)</b>								
HK0924515-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	42.1	41.0	2.6
HK0924520-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	44.5	44.7	0.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>								
HK0924449-002	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	2.8	2.9	0.0
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
HK0924522-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	40	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	25	6.5
		EG020: Nickel	7440-02-0	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>								
HK0924522-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											





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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182578)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	98.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	----	----	----	----	----	----	----
					49.9 µg/kg	79.6	----	58	123	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
					50.9 µg/kg	60.2	----	44	96	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
					50.4 µg/kg	64.3	----	48	86	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
					51.0 µg/kg	66.2	----	51	91	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	66.6	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
					50.7 µg/kg	54.9	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	68.4	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	69.8	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	77.5	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
					50.8 µg/kg	78.2	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
					101.9 µg/kg	82.1	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	78.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
					49.0 µg/kg	75.4	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	68.0	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	77.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	---	6	144	---	---

**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



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: 1172530)</b>										
HK0924518-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924428
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 17-NOV-2009
Order number	: CV/2009/13			Issue Date	: 29-DEC-2009
C-O-C number	: H006234			No. of samples received	: 7
Site	: D320			No. of samples analysed	: 3

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

Trading Name: ALS Technichem (HK) Pty Ltd

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A Campbell Brothers Limited Company



## 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924428**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D320	D320	D320
				0-0.9M	0.9-1.9M	1.9-2.9M
				17-NOV-2009 17:30	17-NOV-2009 17:30	17-NOV-2009 17:30
				HK0924428-001	HK0924428-002	HK0924428-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.7	38.9	40.5
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	34.1	52.7	54.6
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	454	363	454
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	6	4	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	35	30	36
EG020: Copper	7440-50-8	1	mg/kg	12	9	11
EG020: Lead	7439-92-1	1	mg/kg	25	20	23
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	24	21	25
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	77	64	73
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3





Sub-Matrix: SEDIMENT

Client sample ID

D320  
0-0.9M

D320  
0.9-1.9M

D320  
1.9-2.9M

Client sampling date / time

17-NOV-2009 17:30

17-NOV-2009 17:30

17-NOV-2009 17:30

Compound	CAS Number	LOR	Unit	HK0924428-001	HK0924428-002	HK0924428-003
<b>EP-065: PCB Single Congeners - Continued</b>						
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>						
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05
4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05
4.4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05
4.4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						
Surrogate control limits listed at end of this report.						
Nitrobenzene -d5	4165-60-0	0.1	%	69.4	68.1	59.5
4-Terphenyl-d14	1718-51-0	0.1	%	71.7	74.1	63.3
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						
Surrogate control limits listed at end of this report.						
Decachlorobiphenyl	2051-24-3	0.1	%	90.1	79.9	89.9
<b>EP-067S: Pesticide Surrogate</b>						
Surrogate control limits listed at end of this report.						
Tetrachlorometaxylene	877-09-8	0.1	%	74.6	53.5	60.3
Dibutylchlorodate	1770-80-5	0.1	%	52.5	53.2	55.4



### 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: 1170985)</b>								
HK0924423-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.6	44.3	1.7
HK0924446-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	37.5	36.1	3.8
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>								
HK0924444-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>								
HK0924392-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	15	15	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0
		EG020: Copper	7440-50-8	1	mg/kg	16	16	0.0
		EG020: Lead	7439-92-1	1	mg/kg	35	35	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	25	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	91	91	0.0
		HK0924423-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	4	4	0.0
EG020: Chromium	7440-47-3			1	mg/kg	35	36	3.0
EG020: Copper	7440-50-8			1	mg/kg	11	11	0.0
EG020: Lead	7439-92-1			1	mg/kg	23	23	0.0
EG020: Nickel	7440-02-0			1	mg/kg	24	25	0.0
EG020: Zinc	7440-66-6			1	mg/kg	75	77	1.8
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>								
HK0924392-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1168794)</b>								
HK0924392-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>								
HK0924388-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	D320 1.9-2.9M	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	86.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	93.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.1	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	50.9 µg/kg	65.2	----	44	96	----	----
				----	50.4 µg/kg	64.4	----	48	86	----	----
Acenaphthene	83-32-9	5	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	65.6	----	51	91	----	----
Fluorene	86-73-7	5	µg/kg	<50	----	----	----	----	----	----	----
				----	51.2 µg/kg	66.7	----	46	87	----	----
Phenanthrene	85-01-8	5	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	56.2	----	50	85	----	----
Anthracene	120-12-7	50	µg/kg	<50	51.0 µg/kg	68.7	----	50	98	----	----
				----	51.1 µg/kg	70.3	----	50	96	----	----
Fluoranthene	206-44-0	5	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	76.9	----	55	114	----	----
Pyrene	129-00-0	5	µg/kg	<150	50.8 µg/kg	75.1	----	45	118	----	----
				----	101.9 µg/kg	81.0	----	60	114	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.7 µg/kg	78.2	----	46	118	----	----
Chrysene	218-01-9	5	µg/kg	<150	49.0 µg/kg	78.5	----	40	194	----	----
				----	50.2 µg/kg	68.6	----	14	188	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	<300	50.7 µg/kg	78.3	----	25	182	----	----
				----	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	50.7 µg/kg	78.2	----	46	118	----	----
				----	49.0 µg/kg	78.5	----	40	194	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	<150	50.2 µg/kg	68.6	----	14	188	----	----
				----	50.7 µg/kg	78.3	----	25	182	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	----	----	----	----	----	----	----
				----	50.7 µg/kg	78.3	----	25	182	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	----	----	----	----	----	----	----



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793) - Continued</b>											
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.8	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	91.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	85.6	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	84.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	89.8	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	80.9	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	98.2	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	82.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	82.1	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	83.6	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	91.2	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	83.1	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	83.4	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	86.4	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	83.2	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	86.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168792)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4.4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4.4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----





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-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682) - Continued</b>												
4.4'-DDD		72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate		1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4.4'-DDT		50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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: 1171294)</b>											
HK0924392-001		Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	97.7	----	75	125	----	----
			EG020: Cadmium	7440-43-9	5 mg/kg	97.6	----	75	125	----	----
			EG020: Chromium	7440-47-3	5 mg/kg	86.8	----	75	125	----	----
			EG020: Copper	7440-50-8	5 mg/kg	83.6	----	75	125	----	----
			EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
			EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
			EG020: Nickel	7440-02-0	5 mg/kg	83.6	----	75	125	----	----
			EG020: Silver	7440-22-4	5 mg/kg	85.6	----	75	125	----	----
			EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924449
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 19-NOV-2009
Facsimile	: ---	Facsimile	: +852 2610 2021	Issue Date	: 29-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 5
Order number	: CV/2009/13			No. of samples analysed	: 2
C-O-C number	: H010019				
Site	: D330				

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

Trading Name: ALS Technichem (HK) Pty Ltd

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A Campbell Brothers Limited Company



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924449**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

D330

D330

0-0.9M

0.9-1.9M

19-NOV-2009 10:30

19-NOV-2009 10:30

Client sampling date / time

HK0924449-001

HK0924449-002

Compound	CAS Number	LOR	Unit	HK0924449-001	HK0924449-002
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	31.9	49.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	3.2	2.8
<b>EG: Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	7	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	27	41
EG020: Copper	7440-50-8	1	mg/kg	9	13
EG020: Lead	7439-92-1	1	mg/kg	18	25
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	17	26
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	0.1
EG020: Zinc	7440-66-6	1	mg/kg	67	95
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	441	919
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT				Client sample ID		D330		D330	
				0-0.9M		0.9-1.9M			
				19-NOV-2009 10:30		19-NOV-2009 10:30			
				Client sampling date / time		HK0924449-001		HK0924449-002	
Compound	CAS Number	LOR	Unit						
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3				
PCB 18	37680-65-2	3	µg/kg	<3	<3				
PCB 28	7012-37-5	3	µg/kg	<3	<3				
PCB 52	35693-99-3	3	µg/kg	<3	<3				
PCB 44	41464-39-5	3	µg/kg	<3	<3				
PCB 66	32598-10-0	3	µg/kg	<3	<3				
PCB 101	37680-73-2	3	µg/kg	<3	<3				
PCB 77	32598-13-3	3	µg/kg	<3	<3				
PCB 118	31508-00-6	3	µg/kg	<3	<3				
PCB 153	35065-27-1	3	µg/kg	<3	<3				
PCB 105	32598-14-4	3	µg/kg	<3	<3				
PCB 138	35065-28-2	3	µg/kg	<3	<3				
PCB 126	57465-28-8	3	µg/kg	<3	<3				
PCB 187	52663-68-0	3	µg/kg	<3	<3				
PCB 128	38380-07-3	3	µg/kg	<3	<3				
PCB 180	35065-29-3	3	µg/kg	<3	<3				
PCB 169	60044-26-0	3	µg/kg	<3	<3				
PCB 170	35065-30-6	3	µg/kg	<3	<3				
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05				
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10				
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05				
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05				
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05				
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05				
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05				
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05				
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2				
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
Nitrobenzene -d5	4165-60-0	0.1	%	57.6	53.5				
4-Terphenyl-d14	1718-51-0	0.1	%	76.0	85.4				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Surrogate control limits listed at end of this report.									
Decachlorobiphenyl	2051-24-3	0.1	%	91.2	98.7				
<b>EP-067S: Pesticide Surrogate</b>									
Surrogate control limits listed at end of this report.									
Tetrachlorometaxylene	877-09-8	0.1	%	59.4	66.9				
Dibutylchloredate	1770-80-5	0.1	%	58.3	61.5				



**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: 1170985)</b>								
HK0924423-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.6	44.3	1.7
HK0924446-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	37.5	36.1	3.8
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>								
HK0924444-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>								
HK0924446-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	31	28	8.8
		EG020: Copper	7440-50-8	1	mg/kg	10	9	0.0
		EG020: Lead	7439-92-1	1	mg/kg	18	17	9.6
		EG020: Nickel	7440-02-0	1	mg/kg	19	18	7.4
		EG020: Zinc	7440-66-6	1	mg/kg	71	66	7.6
HK0924582-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	14	14	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	46	45	3.7
		EG020: Copper	7440-50-8	1	mg/kg	16	15	0.0
		EG020: Lead	7439-92-1	1	mg/kg	37	36	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	26	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	98	95	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											





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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	103	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	99.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	98.0	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	90.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	94.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	96.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	67.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	81.7	----	25	182	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	---	64	124	---	---
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	---	52	150	---	---
beta- & gamma-BHC	319-85-7	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	---	6	144	---	---

**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



Matrix: SOIL				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number							
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>										
HK0924446-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	96.1	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	76.3	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	83.9	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	99.6	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	80.2	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	89.3	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

### CERTIFICATE OF ANALYSIS

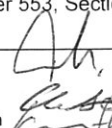
Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924452
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 19-NOV-2009
Order number	: CV/2009/13			Issue Date	: 29-DEC-2009
C-O-C number	: H010020			No. of samples received	: 7
Site	: D337			No. of samples analysed	: 3

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth



*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inoganics

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924452



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924452**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT		Client sample ID			D337	D337	D337
		Client sampling date / time			0-0.9M	0.9-1.9M	1.9-2.9M
					19-NOV-2009 12:30	19-NOV-2009 12:30	19-NOV-2009 12:30
Compound	CAS Number	LOR	Unit	HK0924452-001	HK0924452-002	HK0924452-003	
<b>EA/ED: Physical and Aggregate Properties</b>							
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	30.3	48.8	48.0	
<b>ED/EK: Inorganic Nonmetallic Parameters</b>							
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	2.1	3.4	9.4	
<b>EP: Aggregate Organics</b>							
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	428	964	622	
<b>Metals and Major Cations</b>							
EG020: Arsenic	7440-38-2	1	mg/kg	4	6	6	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2	
EG020: Chromium	7440-47-3	1	mg/kg	18	41	42	
EG020: Copper	7440-50-8	1	mg/kg	9	13	13	
EG020: Lead	7439-92-1	1	mg/kg	18	25	24	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05	
EG020: Nickel	7440-02-0	1	mg/kg	11	26	26	
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	<0.1	
EG020: Zinc	7440-66-6	1	mg/kg	60	94	94	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>							
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50	
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50	
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50	
Fluorene	86-73-7	50	µg/kg	<50	<50	<50	
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50	
Anthracene	120-12-7	50	µg/kg	<50	<50	<50	
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150	
Pyrene	129-00-0	150	µg/kg	<150	<150	<150	
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150	
Chrysene	218-01-9	150	µg/kg	<150	<150	<150	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300	
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150	
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150	
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	<150	
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	<150	
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550	
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700	
<b>EP-065: PCB Single Congeners</b>							





Sub-Matrix: SEDIMENT				Client sample ID	D337	D337	D337
				0-0.9M	0.9-1.9M	1.9-2.9M	
				19-NOV-2009 12:30	19-NOV-2009 12:30	19-NOV-2009 12:30	
Client sampling date / time				HK0924452-001	HK0924452-002	HK0924452-003	
Compound	CAS Number	LOR	Unit				
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3	
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3	
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3	
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3	
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3	
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3	
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3	
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3	
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3	
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3	
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3	
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3	
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3	
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3	
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3	
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3	
PCB 169	60044-26-0	3	µg/kg	<3	<3	<3	
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3	
<b>EP-067A: Organochlorine Pesticides (OC)</b>							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	
4.4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	
4.4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Surrogate control limits listed at end of this report.							
Nitrobenzene -d5	4165-60-0	0.1	%	56.8	58.3	55.4	
4-Terphenyl-d14	1718-51-0	0.1	%	74.0	81.0	75.9	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Surrogate control limits listed at end of this report.							
Decachlorobiphenyl	2051-24-3	0.1	%	83.3	93.9	104	
<b>EP-067S: Pesticide Surrogate</b>							
Surrogate control limits listed at end of this report.							
Tetrachlorometaxylene	877-09-8	0.1	%	63.6	64.3	70.6	
Dibutylchlorendate	1770-80-5	0.1	%	60.2	59.8	66.6	



### 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: 1170985)</b>								
HK0924423-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.6	44.3	1.7
HK0924446-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	37.5	36.1	3.8
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>								
HK0924444-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>								
HK0924446-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	31	28	8.8
		EG020: Copper	7440-50-8	1	mg/kg	10	9	0.0
		EG020: Lead	7439-92-1	1	mg/kg	18	17	9.6
		EG020: Nickel	7440-02-0	1	mg/kg	19	18	7.4
		EG020: Zinc	7440-66-6	1	mg/kg	71	66	7.6
		HK0924582-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	0.1	0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	14	14	Not Determined
EG020: Chromium	7440-47-3			1	mg/kg	46	45	3.7
EG020: Copper	7440-50-8			1	mg/kg	16	15	0.0
EG020: Lead	7439-92-1			1	mg/kg	37	36	0.0
EG020: Nickel	7440-02-0			1	mg/kg	26	25	0.0
EG020: Zinc	7440-66-6			1	mg/kg	98	95	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
n											



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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	103	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	99.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	98.0	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	90.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	94.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	96.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	67.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	81.7	----	25	182	----	----



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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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



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: 1171295)</b>										
HK0924446-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	96.1	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	76.3	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	83.9	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	99.6	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	80.2	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.3	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd



## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924444
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 19-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 29-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 5
Order number	: CV/2009/13			No. of samples analysed	: 2
C-O-C number	: H010021				
Site	: S40				

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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
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Chan Siu Ming, Vico	Chemist	Inorganics
Wong Wing, Kenneth	Assistant Supervisor	Inorganics

#### ALS Laboratory Group

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924444



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924444**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT				Client sample ID			
				S40	S40		
				0-0.9M	0.9-1.9M		
				19-NOV-2009 14:30	19-NOV-2009 14:30		
				HK0924444-001	HK0924444-002		
Compound	CAS Number	LOR	Unit	Client sampling date / time			
<b>EA/ED: Physical and Aggregate Properties</b>							
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	48.1	29.9		
<b>ED/EK: Inorganic Nonmetallic Parameters</b>							
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	3.8		
<b>EG: Metals and Major Cations</b>							
EG020: Arsenic	7440-38-2	1	mg/kg	6	6		
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2		
EG020: Chromium	7440-47-3	1	mg/kg	39	17		
EG020: Copper	7440-50-8	1	mg/kg	12	5		
EG020: Lead	7439-92-1	1	mg/kg	26	13		
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05		
EG020: Nickel	7440-02-0	1	mg/kg	26	12		
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1		
EG020: Zinc	7440-66-6	1	mg/kg	87	39		
<b>EP: Aggregate Organics</b>							
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	711	219		
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>							
Naphthalene	91-20-3	50	µg/kg	<50	<50		
Acenaphthylene	208-96-8	50	µg/kg	<50	<50		
Acenaphthene	83-32-9	50	µg/kg	<50	<50		
Fluorene	86-73-7	50	µg/kg	<50	<50		
Phenanthrene	85-01-8	50	µg/kg	<50	<50		
Anthracene	120-12-7	50	µg/kg	<50	<50		
Fluoranthene	206-44-0	150	µg/kg	<150	<150		
Pyrene	129-00-0	150	µg/kg	<150	<150		
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150		
Chrysene	218-01-9	150	µg/kg	<150	<150		
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300		
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150		
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150		
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150		
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150		
Low M.W. PAHs	----	550	µg/kg	<550	<550		
High M.W. PAHs	----	1700	µg/kg	<1700	<1700		
<b>EP-065: PCB Single Congeners</b>							



Sub-Matrix: SEDIMENT

Client sample ID

S40

S40

0-0.9M

0.9-1.9M

Client sampling date / time

19-NOV-2009 14:30

19-NOV-2009 14:30

Compound	CAS Number	LOR	Unit	HK0924444-001	HK0924444-002
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 8	34883-43-7	3	µg/kg	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3
PCB 169	60044-26-0	3	µg/kg	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>					
Surrogate control limits listed at end of this report.					
Nitrobenzene -d5	4165-60-0	0.1	%	54.6	59.2
4-Terphenyl-d14	1718-51-0	0.1	%	74.2	73.3
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>					
Surrogate control limits listed at end of this report.					
Decachlorobiphenyl	2051-24-3	0.1	%	94.1	91.8
<b>EP-067S: Pesticide Surrogate</b>					
Surrogate control limits listed at end of this report.					
Tetrachlorometaxylene	877-09-8	0.1	%	52.3	54.6
Dibutylchlorendate	1770-80-5	0.1	%	56.5	52.2



### 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: 1170985)</b>										
HK0924423-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.6	44.3	1.7		
HK0924446-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	37.5	36.1	3.8		
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>										
HK0924444-001	S40 0-0.9M	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6		
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>										
HK0924392-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0		
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.0		
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0		
		EG020: Arsenic	7440-38-2	1	mg/kg	15	15	0.0		
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0		
		EG020: Copper	7440-50-8	1	mg/kg	16	16	0.0		
		EG020: Lead	7439-92-1	1	mg/kg	35	35	0.0		
		EG020: Nickel	7440-02-0	1	mg/kg	25	25	0.0		
		EG020: Zinc	7440-66-6	1	mg/kg	91	91	0.0		
		EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0		
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0		
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0		
		EG020: Arsenic	7440-38-2	1	mg/kg	4	4	0.0		
		EG020: Chromium	7440-47-3	1	mg/kg	35	36	3.0		
HK0924423-002	Anonymous	EG020: Copper	7440-50-8	1	mg/kg	11	11	0.0		
		EG020: Lead	7439-92-1	1	mg/kg	23	23	0.0		
		EG020: Nickel	7440-02-0	1	mg/kg	24	25	0.0		
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	1.8		
		<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>								
		HK0924392-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
				Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
				Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
				Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
				Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
Indeno(1.2.3.cd)pyrene	193-39-5			150	µg/kg	<150	<150	0.0		
Dibenz(a,h)anthracene	53-70-3			150	µg/kg	<150	<150	0.0		
Benzo(g,h,i)perylene	191-24-2			150	µg/kg	<150	<150	0.0		
High M.W. PAHs	----			1700	µg/kg	<1700	<1700	0.0		
Benzo(b) & Benzo(k)fluoranthene	205-99-2			300	µg/kg	<300	<300	0.0		
	207-08-9									
Naphthalene	91-20-3			50	µg/kg	<50	<50	0.0		
Acenaphthylene	208-96-8			50	µg/kg	<50	<50	0.0		
Acenaphthene	83-32-9			50	µg/kg	<50	<50	0.0		
Fluorene	86-73-7	50	µg/kg	<50	<50	0.0				



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793) - Continued</b>								
HK0924392-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>								
HK0924392-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					Concentratio	LCS	DCS	Low	High	Value	Control Limit
n											





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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171294)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	99.6	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	86.5	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	93.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	91.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.1	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	65.2	----	44	96	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	64.4	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	65.6	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	66.7	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	56.2	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	68.7	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	70.3	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	76.9	----	55	114	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	75.1	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.0	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	78.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	78.5	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	68.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	78.3	----	25	182	----	----



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168793) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1168794)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.8	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	91.5	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	85.6	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	84.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	89.8	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	80.9	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	98.2	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	82.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.4	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	82.1	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	83.6	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	91.2	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	83.1	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	83.4	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	86.4	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	83.2	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	86.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

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

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)
				MS	MSD	Low	High	Value	Control Limit



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: 1171294)</b>										
HK0924392-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	97.7	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	97.6	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	86.8	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	83.6	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	83.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	85.6	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT			
Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloroendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924446
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 19-NOV-2009
Order number	: CV/2009/13			Issue Date	: 29-DEC-2009
C-O-C number	: H010022			No. of samples received	: 5
Site	: D355			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924446



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924446**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

D355

D355

0-0.9M

0.9-1.9M

Client sampling date / time

19-NOV-2009 16:30

19-NOV-2009 16:30

Compound	CAS Number	LOR	Unit	HK0924446-001	HK0924446-002
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.3	37.5
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	5.0	2.8
<b>EG: Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	6	6
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	40	31
EG020: Copper	7440-50-8	1	mg/kg	12	10
EG020: Lead	7439-92-1	1	mg/kg	23	18
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	25	19
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	90	71
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	516	459
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700
<b>EP-065: PCB Single Congeners</b>					





Sub-Matrix: SEDIMENT				Client sample ID	D355 0-0.9M	D355 0.9-1.9M			
Client sampling date / time					19-NOV-2009 16:30	19-NOV-2009 16:30			
Compound	CAS Number	LOR	Unit	HK0924446-001	HK0924446-002				
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3				
PCB 18	37680-65-2	3	µg/kg	<3	<3				
PCB 28	7012-37-5	3	µg/kg	<3	<3				
PCB 52	35693-99-3	3	µg/kg	<3	<3				
PCB 44	41464-39-5	3	µg/kg	<3	<3				
PCB 66	32598-10-0	3	µg/kg	<3	<3				
PCB 101	37680-73-2	3	µg/kg	<3	<3				
PCB 77	32598-13-3	3	µg/kg	<3	<3				
PCB 118	31508-00-6	3	µg/kg	<3	<3				
PCB 153	35065-27-1	3	µg/kg	<3	<3				
PCB 105	32598-14-4	3	µg/kg	<3	<3				
PCB 138	35065-28-2	3	µg/kg	<3	<3				
PCB 126	57465-28-8	3	µg/kg	<3	<3				
PCB 187	52663-68-0	3	µg/kg	<3	<3				
PCB 128	38380-07-3	3	µg/kg	<3	<3				
PCB 180	35065-29-3	3	µg/kg	<3	<3				
PCB 169	60044-26-0	3	µg/kg	<3	<3				
PCB 170	35065-30-6	3	µg/kg	<3	<3				
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05				
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10				
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05				
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05				
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05				
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05				
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05				
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05				
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2				
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
Nitrobenzene -d5	4165-60-0	0.1	%	52.3	51.6				
4-Terphenyl-d14	1718-51-0	0.1	%	83.1	60.2				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Surrogate control limits listed at end of this report.									
Decachlorobiphenyl	2051-24-3	0.1	%	87.9	99.8				
<b>EP-067S: Pesticide Surrogate</b>									
Surrogate control limits listed at end of this report.									
Tetrachlorometaxylene	877-09-8	0.1	%	57.0	64.2				
Dibutylchlorendate	1770-80-5	0.1	%	52.9	57.2				



### 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: 1170985)</b>								
HK0924423-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	43.6	44.3	1.7
HK0924446-002	D355 0.9-1.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	37.5	36.1	3.8
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>								
HK0924444-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	7.3	6.3	15.6
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>								
HK0924446-002	D355 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	31	28	8.8
		EG020: Copper	7440-50-8	1	mg/kg	10	9	0.0
		EG020: Lead	7439-92-1	1	mg/kg	18	17	9.6
		EG020: Nickel	7440-02-0	1	mg/kg	19	18	7.4
		EG020: Zinc	7440-66-6	1	mg/kg	71	66	7.6
		HK0924582-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	0.1	0.1	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	14	14	Not Determined
EG020: Chromium	7440-47-3			1	mg/kg	46	45	3.7
EG020: Copper	7440-50-8			1	mg/kg	16	15	0.0
EG020: Lead	7439-92-1			1	mg/kg	37	36	0.0
EG020: Nickel	7440-02-0			1	mg/kg	26	25	0.0
EG020: Zinc	7440-66-6			1	mg/kg	98	95	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>								
HK0924446-001	D355 0-0.9M	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>								
HK0924446-001	D355 0-0.9M	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>								
HK0924446-001	D355 0-0.9M	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>								
HK0924428-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											



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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1182577)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	100 mg/kg	100	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1171295)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	103	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.6	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	99.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	98.0	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.3	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	90.9	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	94.5	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	96.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	102	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	85.0	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	72.8	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	5	µg/kg	----	50.4 µg/kg	78.0	----	48	86	----	----
				<50	----	----	----	----	----	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	69.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	77.9	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	5	µg/kg	----	50.7 µg/kg	73.7	----	50	85	----	----
				<50	----	----	----	----	----	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	82.1	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	85.9	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.1 µg/kg	77.1	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	85.6	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	----	101.9 µg/kg	81.6	----	60	114	----	----
				<300	----	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	77.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	----	49.0 µg/kg	72.8	----	40	194	----	----
				<150	----	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	67.6	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	81.7	----	25	182	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1171684) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1171685)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	83.9	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	102	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	90.2	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	83.5	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	88.3	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	82.0	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	95.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	84.8	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	91.2	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	93.0	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.9	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	89.9	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	90.8	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.0	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	91.2	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	88.3	----	64	124	----	----
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	89.4	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1171682)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	71.0	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	82.8	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	59.6	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.3	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	92.3	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	88.8	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	94.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	54.4	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	50.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	120	----	6	144	----	----

**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





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: 1171295)</b>										
HK0924446-001	D355 0-0.9M	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	96.1	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	76.3	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	83.9	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	99.6	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	80.2	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.3	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloroendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924648
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 23-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010026			No. of samples received	: 5
Site	: D362			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924648



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924648**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D362	D362			
				0-0.9M	0.9-1.9M			
				21-NOV-2009 11:00	21-NOV-2009 11:00			
				HK0924648-001	HK0924648-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	48.2	46.8			
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	32.4	39.2			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	4	5			
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	38	37			
EG020: Copper	7440-50-8	1	mg/kg	12	12			
EG020: Lead	7439-92-1	1	mg/kg	25	24			
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	26	26			
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg	80	78			
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	976	873			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	206-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	----	550	µg/kg	<550	<550			
High M.W. PAHs	----	1700	µg/kg	<1700	<1700			
<b>EP-065: PCB Single Congeners</b>								



Sub-Matrix: SEDIMENT				Client sample ID		D362		D362	
				0-0.9M		0.9-1.9M			
				21-NOV-2009 11:00		21-NOV-2009 11:00			
Client sampling date / time				HK0924648-001		HK0924648-002			
Compound	CAS Number	LOR	Unit						
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3				
PCB 18	37680-65-2	3	µg/kg	<3	<3				
PCB 28	7012-37-5	3	µg/kg	<3	<3				
PCB 52	35693-99-3	3	µg/kg	<3	<3				
PCB 44	41464-39-5	3	µg/kg	<3	<3				
PCB 66	32598-10-0	3	µg/kg	<3	<3				
PCB 101	37680-73-2	3	µg/kg	<3	<3				
PCB 77	32598-13-3	3	µg/kg	<3	<3				
PCB 118	31508-00-6	3	µg/kg	<3	<3				
PCB 153	35065-27-1	3	µg/kg	<3	<3				
PCB 105	32598-14-4	3	µg/kg	<3	<3				
PCB 138	35065-28-2	3	µg/kg	<3	<3				
PCB 126	57465-28-8	3	µg/kg	<3	<3				
PCB 187	52663-68-0	3	µg/kg	<3	<3				
PCB 128	38380-07-3	3	µg/kg	<3	<3				
PCB 180	35065-29-3	3	µg/kg	<3	<3				
PCB 169	32774-16-6	3	µg/kg	<3	<3				
PCB 170	35065-30-6	3	µg/kg	<3	<3				
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05				
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10				
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05				
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05				
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05				
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05				
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05				
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05				
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2				
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
Nitrobenzene -d5	4165-60-0	0.1	%	63.9	57.5				
4-Terphenyl-d14	1718-51-0	0.1	%	85.4	84.6				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Surrogate control limits listed at end of this report.									
Decachlorobiphenyl	2051-24-3	0.1	%	67.8	88.9				
<b>EP-067S: Pesticide Surrogate</b>									
Surrogate control limits listed at end of this report.									
Tetrachlorometaxylene	877-09-8	0.1	%	67.7	61.8				
Dibutylchlorodate	1770-80-5	0.1	%	55.2	53.4				



### 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: 1172677)</b>								
HK0924581-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	44.3	6.6
HK0924646-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.6	48.4	0.3
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1172531)</b>								
HK0924646-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	5	5	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	12	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	26	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	26	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	82	82	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	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-065: PCB Single Congeners (QC Lot: 1174465) - Continued</b>								
HK0924522-001	Anonymous	PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172531)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	90.4	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	94.5	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	89.7	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	95.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	94.0	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	99.3	----	85	115	----	----





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: 1172531) - Continued</b>											
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	95.6	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	90.8	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.9	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---
				---	49.9 µg/kg	79.6	---	58	123	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.9 µg/kg	60.2	---	44	96	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.4 µg/kg	64.3	---	48	86	---	---
Fluorene	86-73-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	51.0 µg/kg	66.2	---	51	91	---	---
Phenanthrene	85-01-8	5	µg/kg	---	---	---	---	---	---	---	---
				<50	51.2 µg/kg	66.6	---	46	87	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.7 µg/kg	54.9	---	50	85	---	---
Fluoranthene	206-44-0	5	µg/kg	---	---	---	---	---	---	---	---
				<150	51.0 µg/kg	68.4	---	50	98	---	---
Pyrene	129-00-0	5	µg/kg	---	---	---	---	---	---	---	---
				<150	51.1 µg/kg	69.8	---	50	96	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	---	---	---	---	---	---	---	---
				<150	50.1 µg/kg	77.5	---	55	114	---	---
Chrysene	218-01-9	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.8 µg/kg	78.2	---	45	118	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	---	---	---	---	---	---	---
				---	101.9 µg/kg	82.1	---	60	114	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	---	---	---	---	---	---	---
				<150	50.7 µg/kg	78.7	---	46	118	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	---	---	---	---	---	---	---
				---	49.0 µg/kg	75.4	---	40	194	---	---
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	---	---	---	---	---	---	---	---
				<150	50.2 µg/kg	68.0	---	14	188	---	---
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.7 µg/kg	77.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	---	68	121	---	---



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-065: PCB Single Congeners (QC Lot: 1174465) - Continued</b>											
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	----	6	144	----	----

**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: 1172531)</b>										
HK0924646-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	91.4	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	96.4	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.7	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.0	----	75	125	----	----



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: 1172531) - Continued</b>										
HK0924646-001	Anonymous	EG020: Mercury	7439-97-6	0.1 mg/kg	95.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	89.7	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	92.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924646
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 23-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010027			No. of samples received	: 5
Site	: S44			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924646

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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924646**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S44	S44			
				0-0.9M	0.9-1.9M			
				21-NOV-2009 13:00	21-NOV-2009 13:00			
				HK0924646-001	HK0924646-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	47.4	48.6			
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	57.0	59.2			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	5	5			
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	39	39			
EG020: Copper	7440-50-8	1	mg/kg	13	13			
EG020: Lead	7439-92-1	1	mg/kg	25	27			
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	27	27			
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg	82	82			
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	811	866			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	206-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	----	550	µg/kg	<550	<550			
High M.W. PAHs	----	1700	µg/kg	<1700	<1700			

EP-065: PCB Single Congeners





Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

S44  
0-0.9M

S44  
0.9-1.9M

21-NOV-2009 13:00

21-NOV-2009 13:00

HK0924646-001

HK0924646-002

Compound	CAS Number	LOR	Unit	HK0924646-001	HK0924646-002
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 8	34883-43-7	3	µg/kg	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3
PCB 169	32774-16-6	3	µg/kg	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Nitrobenzene -d5	4165-60-0	0.1	%	53.3	52.3
4-Terphenyl-d14	1718-51-0	0.1	%	76.8	72.5
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Decachlorobiphenyl	2051-24-3	0.1	%	90.9	80.8
<b>EP-067S: Pesticide Surrogate</b> <span style="float: right;">Surrogate control limits listed at end of this report.</span>					
Tetrachlorometaxylene	877-09-8	0.1	%	66.3	53.3
Dibutylchlorodate	1770-80-5	0.1	%	58.9	53.3



**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: 1172677)</b>									
HK0924581-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	44.3	6.6	
HK0924646-002	S44 0.9-1.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.6	48.4	0.3	
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>									
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1	
<b>EG: Metals and Major Cations (QC Lot: 1172531)</b>									
HK0924646-002	S44 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	5	5	0.0	
		EG020: Chromium	7440-47-3	1	mg/kg	39	39	0.0	
		EG020: Copper	7440-50-8	1	mg/kg	13	12	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	27	26	0.0	
		EG020: Nickel	7440-02-0	1	mg/kg	27	26	0.0	
EG020: Zinc	7440-66-6	1	mg/kg	82	82	0.0			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>									
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0	
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0	
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0	
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0	
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0	
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0	
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0	
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0	
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0	
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0	
			207-08-9						
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0	
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0	
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0	
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0	
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0	
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0	
Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0			
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>									
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0	
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0	
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0	
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0	
		PCB 44	41464-39-5	3	µg/kg	<3	<3	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-065: PCB Single Congeners (QC Lot: 1174465) - Continued</b>								
HK0924522-001	Anonymous	PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
		<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>						
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1172531)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	90.4	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	94.5	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	89.7	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	95.3	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	94.0	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	99.3	----	85	115	----	----



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: 1172531) - Continued</b>											
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	95.6	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	90.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	91.9	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	----	----	----	----	----	----	----
				----	49.9 µg/kg	79.6	----	58	123	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.9 µg/kg	60.2	----	44	96	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	64.3	----	48	86	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	51.0 µg/kg	66.2	----	51	91	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	66.6	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	54.9	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	----	51.0 µg/kg	68.4	----	50	98	----	----
				<150	----	----	----	----	----	----	----
Pyrene	129-00-0	5	µg/kg	----	51.1 µg/kg	69.8	----	50	96	----	----
				<150	----	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	77.5	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.8 µg/kg	78.2	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	82.1	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	78.7	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	75.4	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	----	50.2 µg/kg	68.0	----	14	188	----	----
				<150	----	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.7 µg/kg	77.6	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	----	68	121	----	----



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-065: PCB Single Congeners (QC Lot: 1174465) - Continued</b>											
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	----	6	144	----	----

**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: 1172531)</b>										
HK0924646-001	S44 0-0.9M	EG020: Arsenic	7440-38-2	5 mg/kg	91.4	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	96.4	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	75.7	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	86.0	----	75	125	----	----





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: 1172531) - Continued</b>										
HK0924646-001	S44 0-0.9M	EG020: Mercury	7439-97-6	0.1 mg/kg	95.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	89.7	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	92.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924638
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 23-NOV-2009
Order number	: CV/2009/13			Issue Date	: 04-JAN-2010
C-O-C number	: H010028			No. of samples received	: 5
Site	: D374			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924638



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924638**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

D374

D374

0-0.9M

0.9-1.9M

Client sampling date / time

21-NOV-2009 15:00

21-NOV-2009 15:00

HK0924638-001

HK0924638-002

Compound	CAS Number	LOR	Unit	D374 0-0.9M 21-NOV-2009 15:00 HK0924638-001	D374 0.9-1.9M 21-NOV-2009 15:00 HK0924638-002
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	46.5	50.2
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	47.9	13.7
<b>EG: Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	5	5
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	38	39
EG020: Copper	7440-50-8	1	mg/kg	12	13
EG020: Lead	7439-92-1	1	mg/kg	26	26
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	26	26
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	80	84
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	820	986
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700
<b>EP-065: PCB Single Congeners</b>					



Sub-Matrix: SEDIMENT				Client sample ID	D374 0-0.9M	D374 0.9-1.9M		
				Client sampling date / time	21-NOV-2009 15:00	21-NOV-2009 15:00		
Compound	CAS Number	LOR	Unit	HK0924638-001	HK0924638-002			
<b>EP-065: PCB Single Congeners - Continued</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3			
PCB 169	32774-16-6	3	µg/kg	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						Surrogate control limits listed at end of this report.		
Nitrobenzene -d5	4165-60-0	0.1	%	58.9	54.9			
4-Terphenyl-d14	1718-51-0	0.1	%	78.8	79.2			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						Surrogate control limits listed at end of this report.		
Decachlorobiphenyl	2051-24-3	0.1	%	95.8	101			
<b>EP-067S: Pesticide Surrogate</b>						Surrogate control limits listed at end of this report.		
Tetrachlorometaxylene	877-09-8	0.1	%	58.8	56.6			
Dibutylchlorodate	1770-80-5	0.1	%	55.2	51.4			



### 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: 1172677)</b>								
HK0924581-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.3	44.3	6.6
HK0924646-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	48.6	48.4	0.3
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>								
HK0924518-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.5
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	27	6.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	75	77	2.4
HK0924522-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	41	40	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	25	6.5
		EG020: Nickel	7440-02-0	1	mg/kg	28	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	84	82	1.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>								
HK0924522-001	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 Concentratio	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
n											





Matrix: SOIL		Method Blank (MB) Report				Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
							LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>												
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	LCS	DCS	Low	High	Value	Control Limit	
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)												
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----	
<b>EG: Metals and Major Cations (QC Lot: 1172530)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	89.9	----	85	115	----	----	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.6	----	85	115	----	----	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.3	----	85	115	----	----	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.9	----	85	115	----	----	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	86.6	----	85	115	----	----	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	91.8	----	85	115	----	----	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	96.3	----	85	115	----	----	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	92.0	----	85	115	----	----	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	90.9	----	85	115	----	----	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>												
Naphthalene	91-20-3	50	µg/kg	<50	----	----	----	----	----	----	----	
					49.9 µg/kg	79.6	----	58	123	----	----	
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----	
					50.9 µg/kg	60.2	----	44	96	----	----	
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----	
					50.4 µg/kg	64.3	----	48	86	----	----	
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----	
					51.0 µg/kg	66.2	----	51	91	----	----	
Phenanthrene	85-01-8	5	µg/kg	<50	----	----	----	----	----	----	----	
					51.2 µg/kg	66.6	----	46	87	----	----	
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----	
					50.7 µg/kg	54.9	----	50	85	----	----	
Fluoranthene	206-44-0	5	µg/kg	<150	----	----	----	----	----	----	----	
					51.0 µg/kg	68.4	----	50	98	----	----	
Pyrene	129-00-0	5	µg/kg	<150	----	----	----	----	----	----	----	
					51.1 µg/kg	69.8	----	50	96	----	----	
Benz(a)anthracene	56-55-3	5	µg/kg	<150	----	----	----	----	----	----	----	
					50.1 µg/kg	77.5	----	55	114	----	----	
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----	
					50.8 µg/kg	78.2	----	45	118	----	----	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----	
					101.9 µg/kg	82.1	----	60	114	----	----	
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	----	----	----	----	----	----	----	
					50.7 µg/kg	78.7	----	46	118	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----	
					49.0 µg/kg	75.4	----	40	194	----	----	
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	----	----	----	----	----	----	----	
					50.2 µg/kg	68.0	----	14	188	----	----	
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----	



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	77.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	---	6	144	---	---

**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



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: 1172530)</b>										
HK0924518-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	92.2	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	94.3	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	77.2	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	87.7	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	85.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	97.6	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	93.5	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924848
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
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Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 24-NOV-2009
Order number	: CV/2009/13			Issue Date	: 13-JAN-2010
C-O-C number	: H010041			No. of samples received	: 5
Site	: S47			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
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Senior Chemist - Organics  
Chemist  
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*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924848



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924848**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S47	S47			
				0-0.9M	0.9-1.9M			
				24-NOV-2009 12:00	24-NOV-2009 12:00			
				HK0924848-001	HK0924848-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	49.6	46.2			
<b>ED/EK: Inorganic Nonmetallic Parameters</b>								
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	21.8	47.1			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	10	8			
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	40	40			
EG020: Copper	7440-50-8	1	mg/kg	12	12			
EG020: Lead	7439-92-1	1	mg/kg	26	24			
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	26	26			
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg	88	88			
<b>EP: Aggregate Organics</b>								
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	586	1540			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	206-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	----	550	µg/kg	<550	<550			
High M.W. PAHs	----	1700	µg/kg	<1700	<1700			
<b>EP-065: PCB Single Congeners</b>								





Sub-Matrix: SEDIMENT				Client sample ID		S47		S47	
				0-0.9M		0.9-1.9M			
				24-NOV-2009 12:00		24-NOV-2009 12:00			
				HK0924848-001		HK0924848-002			
Compound	CAS Number	LOR	Unit	Client sampling date / time					
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3				
PCB 18	37680-65-2	3	µg/kg	<3	<3				
PCB 28	7012-37-5	3	µg/kg	<3	<3				
PCB 52	35693-99-3	3	µg/kg	<3	<3				
PCB 44	41464-39-5	3	µg/kg	<3	<3				
PCB 66	32598-10-0	3	µg/kg	<3	<3				
PCB 101	37680-73-2	3	µg/kg	<3	<3				
PCB 77	32598-13-3	3	µg/kg	<3	<3				
PCB 118	31508-00-6	3	µg/kg	<3	<3				
PCB 153	35065-27-1	3	µg/kg	<3	<3				
PCB 105	32598-14-4	3	µg/kg	<3	<3				
PCB 138	35065-28-2	3	µg/kg	<3	<3				
PCB 126	57465-28-8	3	µg/kg	<3	<3				
PCB 187	52663-68-0	3	µg/kg	<3	<3				
PCB 128	38380-07-3	3	µg/kg	<3	<3				
PCB 180	35065-29-3	3	µg/kg	<3	<3				
PCB 169	32774-16-6	3	µg/kg	<3	<3				
PCB 170	35065-30-6	3	µg/kg	<3	<3				
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05				
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10				
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05				
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05				
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05				
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05				
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05				
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05				
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2				
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
Nitrobenzene -d5	4165-60-0	0.1	%	51.1	51.6				
4-Terphenyl-d14	1718-51-0	0.1	%	51.2	70.5				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Surrogate control limits listed at end of this report.									
Decachlorobiphenyl	2051-24-3	0.1	%	101	99.0				
<b>EP-067S: Pesticide Surrogate</b>									
Surrogate control limits listed at end of this report.									
Tetrachlorometaxylene	877-09-8	0.1	%	62.2	69.6				
Dibutylchlorendate	1770-80-5	0.1	%	56.9	62.8				



**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: 1176918)</b>								
HK0924847-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.2	49.8	1.3
HK0924890-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.3	54.9	4.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>								
HK0925084-001	Anonymous	EK055: Ammonia as N	7664-41-7	10	mg/kg	4680	4700	0.3
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>								
HK0924847-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	43	3.9
		EG020: Copper	7440-50-8	1	mg/kg	14	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	25	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	29	28	4.3
		EG020: Zinc	7440-66-6	1	mg/kg	94	91	3.0
HK0924890-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23	0.24	4.7
		EG020: Silver	7440-22-4	0.1	mg/kg	3.0	2.9	5.7
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	12	12	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	59	56	6.1
		EG020: Copper	7440-50-8	1	mg/kg	115	109	5.7
		EG020: Lead	7439-92-1	1	mg/kg	40	37	7.6
		EG020: Nickel	7440-02-0	1	mg/kg	27	26	6.3
		EG020: Zinc	7440-66-6	1	mg/kg	186	168	10.3
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		58-89-9						
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
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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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	---	85	115	---	---
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	---	85	115	---	---
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	---	85	115	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.2	---	85	115	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.3	---	85	115	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	90.6	---	85	115	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	90.1	---	85	115	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.2	---	85	115	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.3	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	93.6	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	87.9	---	58	123	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	63.4	---	44	96	---	---
				<50	---	---	---	---	---	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.4 µg/kg	68.2	---	48	86	---	---
Fluorene	86-73-7	5	µg/kg	---	51.0 µg/kg	60.5	---	51	91	---	---
				<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	5	µg/kg	---	51.2 µg/kg	68.5	---	46	87	---	---
				<50	---	---	---	---	---	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.7 µg/kg	60.8	---	50	85	---	---
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.0 µg/kg	70.8	---	50	98	---	---
Pyrene	129-00-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.1 µg/kg	73.8	---	50	96	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	---	50.1 µg/kg	69.6	---	55	114	---	---
				<150	---	---	---	---	---	---	---
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	79.7	---	45	118	---	---
				<150	---	---	---	---	---	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	---	---	---	---	---	---	---
				---	101.9 µg/kg	76.3	---	60	114	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	72.2	---	46	118	---	---
				<150	---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	---	---	---	---	---	---	---
				---	49.0 µg/kg	69.2	---	40	194	---	---



Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	---	---	---	---	---	---	---
					50.2 µg/kg	60.0	---	14	188	---	---
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---
					50.7 µg/kg	77.2	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	---	6	144	---	---

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

Matrix: SOIL

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: 1178675)</b>										
HK0924847-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	84.8	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.8	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	76.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	95.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924847
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Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 24-NOV-2009
Order number	: CV/2009/13			Issue Date	: 11-JAN-2010
C-O-C number	: H010042			No. of samples received	: 5
Site	: D378			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924847



### 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924847**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except Sample #1 D378 (0.00 - 0.90M).**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



**Analytical Results**

Sub-Matrix: SEDIMENT		Client sample ID		D378	D378		
				0-0.9M	0.9-1.9M		
		Client sampling date / time		24-NOV-2009 14:30	24-NOV-2009 14:30		
Compound	CAS Number	LOR	Unit	HK0924847-001	HK0924847-002		
<b>EA/ED: Physical and Aggregate Properties</b>							
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	49.2	48.5		
<b>ED/EK: Inorganic Nonmetallic Parameters</b>							
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	89.3		
<b>EG: Metals and Major Cations</b>							
EG020: Arsenic	7440-38-2	1	mg/kg	8	8		
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2		
EG020: Chromium	7440-47-3	1	mg/kg	36	44		
EG020: Copper	7440-50-8	1	mg/kg	24	14		
EG020: Lead	7439-92-1	1	mg/kg	22	25		
EG020: Mercury	7439-97-6	0.05	mg/kg	0.06	<0.05		
EG020: Nickel	7440-02-0	1	mg/kg	23	29		
EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.1		
EG020: Zinc	7440-66-6	1	mg/kg	92	94		
<b>EP: Aggregate Organics</b>							
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	924	1140		
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>							
Naphthalene	91-20-3	50	µg/kg	<50	<50		
Acenaphthylene	208-96-8	50	µg/kg	<50	<50		
Acenaphthene	83-32-9	50	µg/kg	<50	<50		
Fluorene	86-73-7	50	µg/kg	<50	<50		
Phenanthrene	85-01-8	50	µg/kg	<50	<50		
Anthracene	120-12-7	50	µg/kg	<50	<50		
Fluoranthene	206-44-0	150	µg/kg	<150	<150		
Pyrene	129-00-0	150	µg/kg	<150	<150		
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150		
Chrysene	218-01-9	150	µg/kg	<150	<150		
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300		
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150		
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150		
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150		
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150		
Low M.W. PAHs	----	550	µg/kg	<550	<550		
High M.W. PAHs	----	1700	µg/kg	<1700	<1700		
<b>EP-065: PCB Single Congeners</b>							



Sub-Matrix: SEDIMENT				Client sample ID			
				D378	D378		
				0-0.9M	0.9-1.9M		
Client sampling date / time				24-NOV-2009 14:30	24-NOV-2009 14:30		
Compound	CAS Number	LOR	Unit	HK0924847-001	HK0924847-002		
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 8	34883-43-7	3	µg/kg	<3	<3		
PCB 18	37680-65-2	3	µg/kg	<3	<3		
PCB 28	7012-37-5	3	µg/kg	<3	<3		
PCB 52	35693-99-3	3	µg/kg	<3	<3		
PCB 44	41464-39-5	3	µg/kg	<3	<3		
PCB 66	32598-10-0	3	µg/kg	<3	<3		
PCB 101	37680-73-2	3	µg/kg	<3	<3		
PCB 77	32598-13-3	3	µg/kg	<3	<3		
PCB 118	31508-00-6	3	µg/kg	<3	<3		
PCB 153	35065-27-1	3	µg/kg	<3	<3		
PCB 105	32598-14-4	3	µg/kg	<3	<3		
PCB 138	35065-28-2	3	µg/kg	<3	<3		
PCB 126	57465-28-8	3	µg/kg	<3	<3		
PCB 187	52663-68-0	3	µg/kg	<3	<3		
PCB 128	38380-07-3	3	µg/kg	<3	<3		
PCB 180	35065-29-3	3	µg/kg	<3	<3		
PCB 169	32774-16-6	3	µg/kg	<3	<3		
PCB 170	35065-30-6	3	µg/kg	<3	<3		
<b>EP-067A: Organochlorine Pesticides (OC)</b>							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05		
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10		
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05		
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05		
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05		
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05		
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05		
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05		
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05		
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2		
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>						Surrogate control limits listed at end of this report.	
Nitrobenzene -d5	4165-60-0	0.1	%	59.0	51.2		
4-Terphenyl-d14	1718-51-0	0.1	%	67.9	71.9		
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>						Surrogate control limits listed at end of this report.	
Decachlorobiphenyl	2051-24-3	0.1	%	112	95.0		
<b>EP-067S: Pesticide Surrogate</b>						Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%	62.0	66.4		
Dibutylchlorendate	1770-80-5	0.1	%	54.7	57.3		



**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: 1176918)</b>								
HK0924847-001	D378 0-0.9M	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	49.2	49.8	1.3
HK0924890-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.3	54.9	4.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	D378 0-0.9M	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>								
HK0924847-002	D378 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	43	3.9
		EG020: Copper	7440-50-8	1	mg/kg	14	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	25	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	29	28	4.3
		EG020: Zinc	7440-66-6	1	mg/kg	94	91	3.0
		HK0924890-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23
EG020: Silver	7440-22-4			0.1	mg/kg	3.0	2.9	5.7
EG020: Cadmium	7440-43-9			0.2	mg/kg	0.4	0.4	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	12	12	0.0
EG020: Chromium	7440-47-3			1	mg/kg	59	56	6.1
EG020: Copper	7440-50-8			1	mg/kg	115	109	5.7
EG020: Lead	7439-92-1			1	mg/kg	40	37	7.6
EG020: Nickel	7440-02-0			1	mg/kg	27	26	6.3
EG020: Zinc	7440-66-6			1	mg/kg	186	168	10.3
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4.4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4.4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4.4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
n											





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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.2	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.3	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	90.6	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	90.1	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.3	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	93.6	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.9	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	63.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	68.2	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	60.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	68.5	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	60.8	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	70.8	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	73.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	69.6	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	79.7	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	76.3	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	72.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	69.2	----	40	194	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	60.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	----	50.7 µg/kg	77.2	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----

**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



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: 1178675)</b>										
HK0924847-001	D378 0-0.9M	EG020: Arsenic	7440-38-2	5 mg/kg	84.8	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.8	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	76.3	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	95.9	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

Surrogate Control Limits

Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924731
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 23-NOV-2009
Order number	: CV/2009/13			Issue Date	: 11-JAN-2010
C-O-C number	: H010030			No. of samples received	: 7
Site	: D381			No. of samples analysed	: 3

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

### Authorised results for

Organics  
Inorganics  
Inorganics

### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924731



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924731**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT				Client sample ID		
				D381 0-0.9M	D381 0.9-1.9M	D381 1.9-2.9M
				23-NOV-2009 11:00	23-NOV-2009 11:00	23-NOV-2009 11:00
Client sampling date / time				HK0924731-001	HK0924731-002	HK0924731-003
Compound	CAS Number	LOR	Unit			
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	48.2	47.4	48.1
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	25.4	61.9	86.0
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1060	975	1260
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	7	5	5
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	40	39	41
EG020: Copper	7440-50-8	1	mg/kg	12	12	13
EG020: Lead	7439-92-1	1	mg/kg	24	24	24
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	24	24	26
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	90	87	89
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700
<b>EP-065: PCB Single Congeners</b>						





Sub-Matrix: SEDIMENT				Client sample ID	D381 0-0.9M	D381 0.9-1.9M	D381 1.9-2.9M	
Client sampling date / time				23-NOV-2009 11:00	23-NOV-2009 11:00	23-NOV-2009 11:00		
Compound	CAS Number	LOR	Unit	HK0924731-001	HK0924731-002	HK0924731-003		
<b>EP-065: PCB Single Congeners - Continued</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3		
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3		
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3		
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3		
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3		
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3		
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3		
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3		
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3		
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3		
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3		
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3		
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3		
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3		
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3		
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3		
PCB 169	32774-16-6	3	µg/kg	<3	<3	<3		
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3		
<b>EP-067A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05		
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10		
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05		
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05		
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05		
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2		
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>								
Surrogate control limits listed at end of this report.								
Nitrobenzene -d5	4165-60-0	0.1	%	55.0	51.7	61.3		
4-Terphenyl-d14	1718-51-0	0.1	%	73.3	64.2	65.1		
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>								
Surrogate control limits listed at end of this report.								
Decachlorobiphenyl	2051-24-3	0.1	%	99.7	88.4	93.5		
<b>EP-067S: Pesticide Surrogate</b>								
Surrogate control limits listed at end of this report.								
Tetrachlorometaxylene	877-09-8	0.1	%	53.7	53.4	68.1		
Dibutylchlorodate	1770-80-5	0.1	%	54.1	54.3	60.4		



**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: 1174226)</b>								
HK0924557-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	62.4	61.6	1.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1174207)</b>								
HK0924731-002	D381 0.9-1.9M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	5	5	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	39	41	4.1
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	24	24	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	25	4.4
		EG020: Zinc	7440-66-6	1	mg/kg	87	90	3.6
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	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-065: PCB Single Congeners (QC Lot: 1174465) - Continued</b>								
HK0924522-001	Anonymous	PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>								
HK0924521-001	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	D381 1.9-2.9M	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
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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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1174207)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	100	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	94.7	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.8	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	96.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.2	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	97.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	108	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	----	----	----	----	----	----	----
					49.9 µg/kg	79.6	----	58	123	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	----	----	----
					50.9 µg/kg	60.2	----	44	96	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
					50.4 µg/kg	64.3	----	48	86	----	----
Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	----	----	----
					51.0 µg/kg	66.2	----	51	91	----	----
Phenanthrene	85-01-8	5	µg/kg	<50	----	----	----	----	----	----	----
					51.2 µg/kg	66.6	----	46	87	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
					50.7 µg/kg	54.9	----	50	85	----	----
Fluoranthene	206-44-0	5	µg/kg	<150	----	----	----	----	----	----	----
					51.0 µg/kg	68.4	----	50	98	----	----
Pyrene	129-00-0	5	µg/kg	<150	----	----	----	----	----	----	----
					51.1 µg/kg	69.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	<150	----	----	----	----	----	----	----
					50.1 µg/kg	77.5	----	55	114	----	----
Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	----	----	----
					50.8 µg/kg	78.2	----	45	118	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
					101.9 µg/kg	82.1	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	----	----	----	----	----	----	----
					50.7 µg/kg	78.7	----	46	118	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
					49.0 µg/kg	75.4	----	40	194	----	----
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	----	----	----	----	----	----	----
					50.2 µg/kg	68.0	----	14	188	----	----
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	77.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174463)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.3	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.0	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	83.7	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	53.7	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	84.9	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	88.9	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.3	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	92.5	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	108	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.0	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	29.3	---	6	144	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	---	54	142	---	---





Matrix: SOIL					Method Blank (MB) Report		Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit	
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468) - Continued</b>												
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----	

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

Matrix: SOIL					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1174207)</b>											
HK0924731-001	D381 0-0.9M	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	----	75	125	----	----	
		EG020: Cadmium	7440-43-9	5 mg/kg	95.1	----	75	125	----	----	
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----	
		EG020: Copper	7440-50-8	5 mg/kg	86.8	----	75	125	----	----	
		EG020: Lead	7439-92-1	5 mg/kg	83.5	----	75	125	----	----	
		EG020: Mercury	7439-97-6	0.1 mg/kg	94.9	----	75	125	----	----	
		EG020: Nickel	7440-02-0	5 mg/kg	81.4	----	75	125	----	----	
		EG020: Silver	7440-22-4	5 mg/kg	89.4	----	75	125	----	----	
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----	

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130



# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 11
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0924732
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 23-NOV-2009
Facsimile	: ----	Facsimile	: +852 2610 2021	Issue Date	: 11-JAN-2010
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 7
Order number	: CV/2009/13			No. of samples analysed	: 3
C-O-C number	: H010031				
Site	: S50				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 11  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924732



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924732**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	S50	S50	S50
				0-0.9M	0.9-1.9M	1.9-2.9M
				23-NOV-2009 13:30	23-NOV-2009 13:30	23-NOV-2009 13:30
				HK0924732-001	HK0924732-002	HK0924732-003
<b>EA/ED: Physical and Aggregate Properties</b>						
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	45.7	47.9	47.6
<b>ED/EK: Inorganic Nonmetallic Parameters</b>						
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	61.7	70.8	87.9
<b>EP: Aggregate Organics</b>						
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1090	2310	823
<b>Metals and Major Cations</b>						
EG020: Arsenic	7440-38-2	1	mg/kg	7	6	6
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	38	42	44
EG020: Copper	7440-50-8	1	mg/kg	11	13	13
EG020: Lead	7439-92-1	1	mg/kg	24	25	26
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	<0.05
EG020: Nickel	7440-02-0	1	mg/kg	24	26	28
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1
EG020: Zinc	7440-66-6	1	mg/kg	86	91	94
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>						
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700

EP-065: PCB Single Congeners



Sub-Matrix: SEDIMENT				Client sample ID	S50 0-0.9M	S50 0.9-1.9M	S50 1.9-2.9M		
				Client sampling date / time	23-NOV-2009 13:30	23-NOV-2009 13:30	23-NOV-2009 13:30		
Compound	CAS Number	LOR	Unit	HK0924732-001	HK0924732-002	HK0924732-003			
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3			
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3			
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3			
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3			
PCB 118	31508-00-6	3	µg/kg	<3	<3	<3			
PCB 153	35065-27-1	3	µg/kg	<3	<3	<3			
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3			
PCB 138	35065-28-2	3	µg/kg	<3	<3	<3			
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3			
PCB 187	52663-68-0	3	µg/kg	<3	<3	<3			
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3			
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3			
PCB 169	32774-16-6	3	µg/kg	<3	<3	<3			
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3			
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05			
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10	<0.10			
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05			
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05			
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05			
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							Surrogate control limits listed at end of this report.		
Nitrobenzene -d5	4165-60-0	0.1	%	50.7	55.9	51.8			
4-Terphenyl-d14	1718-51-0	0.1	%	53.2	54.0	67.4			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							Surrogate control limits listed at end of this report.		
Decachlorobiphenyl	2051-24-3	0.1	%	112	99.8	88.3			
<b>EP-067S: Pesticide Surrogate</b>							Surrogate control limits listed at end of this report.		
Tetrachlorometaxylene	877-09-8	0.1	%	52.8	60.3	56.5			
Dibutylchlorodate	1770-80-5	0.1	%	52.1	56.2	56.6			



### 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: 1174226)</b>								
HK0924557-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	62.4	61.6	1.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1174207)</b>								
HK0924731-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	5	5	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	39	41	4.1
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	24	24	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	25	4.4
		EG020: Zinc	7440-66-6	1	mg/kg	87	90	3.6
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>								
HK0924522-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>								
HK0924522-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	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-065: PCB Single Congeners (QC Lot: 1174470) - Continued</b>								
HK0924731-003	Anonymous	PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1174207)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	100	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	94.7	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.8	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	96.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.2	----	85	115	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	97.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	108	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464)</b>											



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174464) - Continued</b>											
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---
					49.9 µg/kg	79.6	---	58	123	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
					50.9 µg/kg	60.2	---	44	96	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
					50.4 µg/kg	64.3	---	48	86	---	---
Fluorene	86-73-7	50	µg/kg	<50	---	---	---	---	---	---	---
					51.0 µg/kg	66.2	---	51	91	---	---
Phenanthrene	85-01-8	5	µg/kg	<50	---	---	---	---	---	---	---
					51.2 µg/kg	66.6	---	46	87	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
					50.7 µg/kg	54.9	---	50	85	---	---
Fluoranthene	206-44-0	5	µg/kg	<150	---	---	---	---	---	---	---
					51.0 µg/kg	68.4	---	50	98	---	---
Pyrene	129-00-0	5	µg/kg	<150	---	---	---	---	---	---	---
					51.1 µg/kg	69.8	---	50	96	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	<150	---	---	---	---	---	---	---
					50.1 µg/kg	77.5	---	55	114	---	---
Chrysene	218-01-9	150	µg/kg	<150	---	---	---	---	---	---	---
					50.8 µg/kg	78.2	---	45	118	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	---	---	---	---	---	---	---
					101.9 µg/kg	82.1	---	60	114	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	---	---	---	---	---	---	---
					50.7 µg/kg	78.7	---	46	118	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	---	---	---	---	---	---	---
					49.0 µg/kg	75.4	---	40	194	---	---
Dibenz(a.h)anthracene	53-70-3	5	µg/kg	<150	---	---	---	---	---	---	---
					50.2 µg/kg	68.0	---	14	188	---	---
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---
					50.7 µg/kg	77.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	<50	49.9 µg/kg	87.9	---	58	123	---	---
					---	---	---	---	---	---	---
Acenaphthylene	208-96-8	5	µg/kg	<50	50.9 µg/kg	63.4	---	44	96	---	---
					---	---	---	---	---	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
					50.4 µg/kg	68.2	---	48	86	---	---
Fluorene	86-73-7	5	µg/kg	<50	51.0 µg/kg	60.5	---	51	91	---	---
					---	---	---	---	---	---	---



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Phenanthrene	85-01-8	5	µg/kg	---	51.2 µg/kg	68.5	---	46	87	---	---
				<50	---	---	---	---	---	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.7 µg/kg	60.8	---	50	85	---	---
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.0 µg/kg	70.8	---	50	98	---	---
Pyrene	129-00-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.1 µg/kg	73.8	---	50	96	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	---	50.1 µg/kg	69.6	---	55	114	---	---
				<150	---	---	---	---	---	---	---
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	79.7	---	45	118	---	---
				<150	---	---	---	---	---	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	---	---	---	---	---	---	---
				---	101.9 µg/kg	76.3	---	60	114	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	72.2	---	46	118	---	---
				<150	---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	---	---	---	---	---	---	---
				---	49.0 µg/kg	69.2	---	40	194	---	---
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.2 µg/kg	60.0	---	14	188	---	---
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.7 µg/kg	77.2	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174465)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	85.4	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	103	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	89.2	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.8	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	94.0	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	81.5	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.4	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	92.5	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	91.2	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	90.4	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	96.0	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.7	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	93.6	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	94.4	---	64	124	---	---



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-065: PCB Single Congeners (QC Lot: 1174465) - Continued</b>											
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	90.7	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	93.3	----	70	122	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	----	68	122	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	----	69	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	----	68	121	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	----	62	122	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	----	60	122	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	----	64	126	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	----	60	124	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	----	57	133	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	----	65	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	----	61	121	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	----	64	124	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	----	66	121	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	----	70	122	----	----
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	----	52	150	----	----
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	----	55	149	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	----	53	141	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	----	28	138	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	----	54	142	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----

**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



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: 1174207)</b>										
HK0924731-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.1	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	86.8	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	83.5	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	94.9	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	81.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.4	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

### Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
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Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H010032  
Site : D386

Laboratory : ALS Technichem HK Pty Ltd  
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Quote number : HK/1313/2009\*\*

Page : 1 of 9  
Work Order : HK0924735  
Date Samples Received : 23-NOV-2009  
Issue Date : 11-JAN-2010  
No. of samples received : 5  
No. of samples analysed : 2

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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*

Anh Ngoc Huynh  
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*Position*

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Assistant Supervisor

*Authorised results for*

Organics  
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Inorganics

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A Campbell Brothers Limited Company





### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 30-NOV-2009

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: **HK0924735**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT				Client sample ID		Client sampling date / time	
				D386 0-0.9M	D386 0.9-1.9M		
				23-NOV-2009 15:00	23-NOV-2009 15:00		
Compound	CAS Number	LOR	Unit	HK0924735-001	HK0924735-002		
<b>EA/ED: Physical and Aggregate Properties</b>							
EA055: Moisture Content (dried @ 103° C)	----	0.1	%	47.3	48.3		
<b>ED/EK: Inorganic Nonmetallic Parameters</b>							
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	67.5	41.7		
<b>EG: Metals and Major Cations</b>							
EG020: Arsenic	7440-38-2	1	mg/kg	6	5		
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2		
EG020: Chromium	7440-47-3	1	mg/kg	40	38		
EG020: Copper	7440-50-8	1	mg/kg	12	11		
EG020: Lead	7439-92-1	1	mg/kg	25	24		
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05		
EG020: Nickel	7440-02-0	1	mg/kg	26	24		
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1		
EG020: Zinc	7440-66-6	1	mg/kg	89	87		
<b>EP: Aggregate Organics</b>							
EP025S: Sediment Oxygen Demand (20 Days)	----	5	mg/kg	1000	724		
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>							
Naphthalene	91-20-3	50	µg/kg	<50	<50		
Acenaphthylene	208-96-8	50	µg/kg	<50	<50		
Acenaphthene	83-32-9	50	µg/kg	<50	<50		
Fluorene	86-73-7	50	µg/kg	<50	<50		
Phenanthrene	85-01-8	50	µg/kg	<50	<50		
Anthracene	120-12-7	50	µg/kg	<50	<50		
Fluoranthene	206-44-0	150	µg/kg	<150	<150		
Pyrene	129-00-0	150	µg/kg	<150	<150		
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150		
Chrysene	218-01-9	150	µg/kg	<150	<150		
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300		
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150		
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150		
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150		
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150		
Low M.W. PAHs	----	550	µg/kg	<550	<550		
High M.W. PAHs	----	1700	µg/kg	<1700	<1700		
<b>EP-065: PCB Single Congeners</b>							



Sub-Matrix: SEDIMENT				Client sample ID		D386		D386	
				0-0.9M		0.9-1.9M			
Client sampling date / time				23-NOV-2009 15:00		23-NOV-2009 15:00			
Compound	CAS Number	LOR	Unit	HK0924735-001	HK0924735-002				
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 8	34883-43-7	3	µg/kg	<3	<3				
PCB 18	37680-65-2	3	µg/kg	<3	<3				
PCB 28	7012-37-5	3	µg/kg	<3	<3				
PCB 52	35693-99-3	3	µg/kg	<3	<3				
PCB 44	41464-39-5	3	µg/kg	<3	<3				
PCB 66	32598-10-0	3	µg/kg	<3	<3				
PCB 101	37680-73-2	3	µg/kg	<3	<3				
PCB 77	32598-13-3	3	µg/kg	<3	<3				
PCB 118	31508-00-6	3	µg/kg	<3	<3				
PCB 153	35065-27-1	3	µg/kg	<3	<3				
PCB 105	32598-14-4	3	µg/kg	<3	<3				
PCB 138	35065-28-2	3	µg/kg	<3	<3				
PCB 126	57465-28-8	3	µg/kg	<3	<3				
PCB 187	52663-68-0	3	µg/kg	<3	<3				
PCB 128	38380-07-3	3	µg/kg	<3	<3				
PCB 180	35065-29-3	3	µg/kg	<3	<3				
PCB 169	32774-16-6	3	µg/kg	<3	<3				
PCB 170	35065-30-6	3	µg/kg	<3	<3				
<b>EP-067A: Organochlorine Pesticides (OC)</b>									
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05				
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10				
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05				
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05				
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05				
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05				
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05				
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05				
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05				
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2				
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
Nitrobenzene -d5	4165-60-0	0.1	%	51.8	58.6				
4-Terphenyl-d14	1718-51-0	0.1	%	54.2	65.3				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Surrogate control limits listed at end of this report.									
Decachlorobiphenyl	2051-24-3	0.1	%	89.5	92.5				
<b>EP-067S: Pesticide Surrogate</b>									
Surrogate control limits listed at end of this report.									
Tetrachlorometaxylene	877-09-8	0.1	%	53.8	55.8				
Dibutylchlorendate	1770-80-5	0.1	%	50.8	57.3				



**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: 1174226)</b>								
HK0924557-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	62.4	61.6	1.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>								
HK0924847-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	30.2	29.5	2.1
<b>EG: Metals and Major Cations (QC Lot: 1174207)</b>								
HK0924731-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	5	5	Not Determined
		EG020: Chromium	7440-47-3	1	mg/kg	39	41	4.1
		EG020: Copper	7440-50-8	1	mg/kg	12	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	24	24	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	24	25	4.4
		EG020: Zinc	7440-66-6	1	mg/kg	87	90	3.6
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	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-065: PCB Single Congeners (QC Lot: 1174470) - Continued</b>								
HK0924731-003	Anonymous	PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187810)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	99.0	----	85	115	----	----
<b>EG: Metals and Major Cations (QC Lot: 1174207)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	100	----	85	115	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	94.7	----	85	115	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.2	----	85	115	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.9	----	85	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.8	----	85	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	96.2	----	85	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.2	----	85	115	----	----



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: 1174207) - Continued</b>											
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	97.8	----	85	115	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	108	----	85	115	----	----
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>											
Naphthalene	91-20-3	5	µg/kg	----	49.9 µg/kg	87.9	----	58	123	----	----
				<50	----	----	----	----	----	----	----
Acenaphthylene	208-96-8	5	µg/kg	----	50.9 µg/kg	63.4	----	44	96	----	----
				<50	----	----	----	----	----	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.4 µg/kg	68.2	----	48	86	----	----
Fluorene	86-73-7	5	µg/kg	----	51.0 µg/kg	60.5	----	51	91	----	----
				<50	----	----	----	----	----	----	----
Phenanthrene	85-01-8	5	µg/kg	----	51.2 µg/kg	68.5	----	46	87	----	----
				<50	----	----	----	----	----	----	----
Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	----	----	----
				----	50.7 µg/kg	60.8	----	50	85	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.0 µg/kg	70.8	----	50	98	----	----
Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	----	----	----
				----	51.1 µg/kg	73.8	----	50	96	----	----
Benz(a)anthracene	56-55-3	5	µg/kg	----	50.1 µg/kg	69.6	----	55	114	----	----
				<150	----	----	----	----	----	----	----
Chrysene	218-01-9	5	µg/kg	----	50.8 µg/kg	79.7	----	45	118	----	----
				<150	----	----	----	----	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	----	----	----	----	----	----	----
				----	101.9 µg/kg	76.3	----	60	114	----	----
Benzo(a)pyrene	50-32-8	5	µg/kg	----	50.7 µg/kg	72.2	----	46	118	----	----
				<150	----	----	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	----	----	----
				----	49.0 µg/kg	69.2	----	40	194	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.2 µg/kg	60.0	----	14	188	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	----	----	----
				----	50.7 µg/kg	77.2	----	25	182	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	----	63	120	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	85.9	----	61	121	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	55	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	----	68	121	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	----	68	122	----	----





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-065: PCB Single Congeners (QC Lot: 1174470) - Continued</b>												
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	----	69	113	----	----	
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	----	68	121	----	----	
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	----	41	142	----	----	
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	----	62	122	----	----	
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	----	60	122	----	----	
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	----	64	126	----	----	
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	----	60	124	----	----	
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	----	57	133	----	----	
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	----	65	121	----	----	
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	----	61	121	----	----	
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	----	64	124	----	----	
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	----	66	121	----	----	
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	----	70	122	----	----	
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>												
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	----	52	150	----	----	
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	----	55	149	----	----	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	----	53	141	----	----	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	----	28	138	----	----	
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	----	54	142	----	----	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	----	54	145	----	----	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	----	54	147	----	----	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	----	54	154	----	----	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	----	52	157	----	----	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	----	50	142	----	----	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	----	6	144	----	----	

**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: 1174207)</b>										
HK0924731-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	95.1	----	75	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	86.8	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	83.5	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	94.9	----	75	125	----	----



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: 1174207) - Continued</b>										
HK0924731-001	Anonymous	EG020: Nickel	7440-02-0	5 mg/kg	81.4	----	75	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	89.4	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: <b>HK0924260</b>
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 16-NOV-2009
Facsimile	: ---	Facsimile	: +852 2610 2021	Issue Date	: 11-JAN-2010
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 5
Order number	: CV/2009/13			No. of samples analysed	: 2
C-O-C number	: H006852				
Site	: S1-2				

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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
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Chan Siu Ming, Vico	Chemist	Inorganics
Wong Wing, Kenneth	Assistant Supervisor	Inorganics

### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924260



### 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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: HK0924260

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except sample #1 S1-2 0-0.9M.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

S1-2  
0-0.9M

S1-2  
0.9-1.9M

Client sampling date / time

14-NOV-2009 12:30

14-NOV-2009 12:30

HK0924260-001

HK0924260-002

Compound	CAS Number	LOR	Unit	S1-2 0-0.9M 14-NOV-2009 12:30 HK0924260-001	S1-2 0.9-1.9M 14-NOV-2009 12:30 HK0924260-002
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103°C)	---	0.1	%	51.0	43.3
<b>ED/EK: Inorganic Nonmetallic Parameters</b>					
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	27.9	23.8
<b>EG: Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	10	9
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.6	0.4
EG020: Chromium	7440-47-3	1	mg/kg	52	54
EG020: Copper	7440-50-8	1	mg/kg	101	101
EG020: Lead	7439-92-1	1	mg/kg	46	47
EG020: Mercury	7439-97-6	0.05	mg/kg	0.18	0.17
EG020: Nickel	7440-02-0	1	mg/kg	26	26
EG020: Silver	7440-22-4	0.1	mg/kg	3.4	2.6
EG020: Zinc	7440-66-6	1	mg/kg	174	171
<b>EP: Aggregate Organics</b>					
EP025S: Sediment Oxygen Demand (20 Days)	---	5	mg/kg	1760	496
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150
Chrysene	218-01-9	150	µg/kg	<150	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150
Low M.W. PAHs	---	550	µg/kg	<550	<550
High M.W. PAHs	---	1700	µg/kg	<1700	<1700
<b>EP-065: PCB Single Congeners</b>					



Sub-Matrix: SEDIMENT

Client sample ID

S1-2

S1-2

0-0.9M

0.9-1.9M

Client sampling date / time

14-NOV-2009 12:30

14-NOV-2009 12:30

HK0924260-001

HK0924260-002

Compound	CAS Number	LOR	Unit	HK0924260-001	HK0924260-002
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 8	34883-43-7	3	µg/kg	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3
PCB 118	31508-00-6	3	µg/kg	<3	<3
PCB 153	35065-27-1	3	µg/kg	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3
PCB 138	35065-28-2	3	µg/kg	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3
PCB 187	52663-68-0	3	µg/kg	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3
PCB 169	32774-16-6	3	µg/kg	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>					
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2
Surrogate control limits listed at end of this report.					
<b>EP-066S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>					
Nitrobenzene -d5	4165-60-0	0.1	%	50.3	51.1
4-Terphenyl-d14	1718-51-0	0.1	%	50.1	57.5
Surrogate control limits listed at end of this report.					
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>					
Decachlorobiphenyl	2051-24-3	0.1	%	72.9	84.5
Surrogate control limits listed at end of this report.					
<b>EP-067S: Pesticide Surrogate</b>					
Tetrachlorometaxylene	877-09-8	0.1	%	62.6	65.7
Dibutylchlorendate	1770-80-5	0.1	%	58.5	61.0





**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: 1170983)</b>									
HK0924253-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	46.5	46.2	0.5	
HK0924257-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	50.2	50.2	0.0	
<b>EA/ED: Physical and Aggregate Properties (QC Lot: 1170984)</b>									
HK0924260-002	S1-2 0.9-1.9M	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	43.3	47.0	8.0	
HK0924392-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	39.6	39.8	0.7	
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>									
HK0924251-001	Anonymous	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	52.4	54.4	3.8	
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>									
HK0924256-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.40	0.40	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	8	7	0.0	
		EG020: Chromium	7440-47-3	1	mg/kg	42	41	0.0	
		EG020: Copper	7440-50-8	1	mg/kg	28	26	9.0	
		EG020: Lead	7439-92-1	1	mg/kg	42	37	11.8	
		EG020: Nickel	7440-02-0	1	mg/kg	26	26	0.0	
		EG020: Zinc	7440-66-6	1	mg/kg	118	113	4.8	
		HK0924259-003	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0	
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0	
EG020: Arsenic	7440-38-2			1	mg/kg	3	4	0.0	
EG020: Chromium	7440-47-3			1	mg/kg	15	14	7.7	
EG020: Copper	7440-50-8			1	mg/kg	5	5	0.0	
EG020: Lead	7439-92-1			1	mg/kg	12	12	0.0	
EG020: Nickel	7440-02-0			1	mg/kg	9	8	0.0	
EG020: Zinc	7440-66-6			1	mg/kg	36	36	0.0	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>									
HK0924256-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0	
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0	
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0	
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0	
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0	
		Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0	
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0	
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0	
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0	
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0	
			207-08-9						
		Naphthalene	91-20-3	50	µg/kg	<50	<50	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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>								
HK0924256-002	Anonymous	Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	—	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>								
HK0924256-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>								
HK0924255-002	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
		4,4'-DDT	58-89-9 50-29-3	0.2	mg/kg	<0.2	<0.2	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 Blank (MB) Report					Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method; Compound	CAS Number	LOR	Unit	Result	Spike Concentration n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1177865)</b>											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	---	85	115	---	---
<b>EG: Metals and Major Cations (QC Lot: 1171293)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	93.2	---	85	115	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	96.4	---	85	115	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.1	---	85	115	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.3	---	85	115	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.2	---	85	115	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.6	---	85	115	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.9	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	94.8	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.2	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	80.8	---	58	123	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	60.4	---	44	96	---	---
				<50	---	---	---	---	---	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.4 µg/kg	61.5	---	48	86	---	---
Fluorene	86-73-7	5	µg/kg	---	51.0 µg/kg	63.7	---	51	91	---	---
				<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	51.2 µg/kg	67.3	---	46	87	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.7 µg/kg	55.9	---	50	85	---	---
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	---	---	---	---	---
				---	51.0 µg/kg	69.4	---	50	98	---	---
Pyrene	129-00-0	5	µg/kg	---	51.1 µg/kg	70.9	---	50	96	---	---
				<150	---	---	---	---	---	---	---
Benz(a)anthracene	56-55-3	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.1 µg/kg	77.6	---	55	114	---	---
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	76.9	---	45	118	---	---
				<150	---	---	---	---	---	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	---	101.9 µg/kg	81.4	---	60	114	---	---
				<300	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	77.8	---	46	118	---	---
				<150	---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	---	49.0 µg/kg	83.3	---	40	194	---	---
				<150	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	---	---	---	---	---	---	---
				---	50.2 µg/kg	69.1	---	14	188	---	---
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1168787) - Continued</b>												
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	—	50.7 µg/kg	82.1	—	25	182	—	—	
Low M.W. PAHs	—	550	µg/kg	<550	—	—	—	—	—	—	—	
High M.W. PAHs	—	1700	µg/kg	<1700	—	—	—	—	—	—	—	
<b>EP-065: PCB Single Congeners (QC Lot: 1168788)</b>												
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	98.9	—	63	120	—	—	
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	82.5	—	61	121	—	—	
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	102	—	55	132	—	—	
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	111	—	68	121	—	—	
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	—	68	122	—	—	
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.2	—	69	113	—	—	
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	81.6	—	68	121	—	—	
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	93.5	—	41	142	—	—	
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.5	—	62	122	—	—	
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	83.4	—	60	122	—	—	
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	109	—	64	126	—	—	
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	97.9	—	60	124	—	—	
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.7	—	57	133	—	—	
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.4	—	65	121	—	—	
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	102	—	61	121	—	—	
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	109	—	64	124	—	—	
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	103	—	66	121	—	—	
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	—	70	122	—	—	
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1168786)</b>												
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	80.0	—	52	150	—	—	
beta- & gamma-BHC	319-85-7	0.1	mg/kg	<0.10	0.50 mg/kg	67.6	—	55	149	—	—	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	81.7	—	53	141	—	—	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	48.6	—	28	138	—	—	
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	90.1	—	54	142	—	—	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	97.1	—	54	145	—	—	
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	92.2	—	54	147	—	—	
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	105	—	54	154	—	—	
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	87.8	—	52	157	—	—	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	85.7	—	50	142	—	—	
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	122	—	6	144	—	—	

**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



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: 1171293)</b>										
HK0924256-002	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	88.5	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	97.5	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	83.4	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	86.4	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	101	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	86.9	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	89.7	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd

## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



### CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
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Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H010038  
Site : S1-3

Laboratory : ALS Technichem HK Pty Ltd  
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Quote number : HK/1313/2009\*\*

Page : 1 of 9  
Work Order : HK0924890  
Date Samples Received : 24-NOV-2009  
Issue Date : 13-JAN-2010  
No. of samples received : 1  
No. of samples analysed : 1

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

#### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

#### Authorised results for

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Inorganics

#### ALS Laboratory Group

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A Campbell Brothers Limited Company



Page Number : 2 of 9  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0924890



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 27-NOV-2009

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: **HK0924890**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**

**The testing of Ammonia (Method: EK055) and Sediment Oxygen Demand (Method: EP025S) are not HOKLAS accredited.**

**Tributyl tin was subcontracted and tested by Hong Kong Productivity Council.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

S1-3

Client sampling date / time

24-NOV-2009 15:00

Compound	CAS Number	LOR	Unit	HK0924890-001
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	57.3
<b>ED/EK: Inorganic Nonmetallic Parameters</b>				
EK055: Ammonia as N	7664-41-7	0.1	mg/kg	33.3
<b>EP: Aggregate Organics</b>				
EP025S: Sediment Oxygen Demand (20 Days)	---	5	mg/kg	1790
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	12
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4
EG020: Chromium	7440-47-3	1	mg/kg	59
EG020: Copper	7440-50-8	1	mg/kg	115
EG020: Lead	7439-92-1	1	mg/kg	40
EG020: Mercury	7439-97-6	0.05	mg/kg	0.23
EG020: Nickel	7440-02-0	1	mg/kg	27
EG020: Silver	7440-22-4	0.1	mg/kg	3.0
EG020: Zinc	7440-66-6	1	mg/kg	186
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1,2,3,cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	---	550	µg/kg	<550
High M.W. PAHs	---	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3



Sub-Matrix: SEDIMENT

Client sample ID

S1-3

Client sampling date / time

24-NOV-2009 15:00

HK0924890-001

Compound	CAS Number	LOR	Unit	Result
<b>EP-065: PCB Single Congeners - Continued</b>				
PCB 18	37680-65-2	3	µg/kg	<3
PCB 28	7012-37-5	3	µg/kg	<3
PCB 52	35693-99-3	3	µg/kg	<3
PCB 44	41464-39-5	3	µg/kg	<3
PCB 66	32598-10-0	3	µg/kg	<3
PCB 101	37680-73-2	3	µg/kg	<3
PCB 77	32598-13-3	3	µg/kg	<3
PCB 118	31508-00-6	3	µg/kg	<3
PCB 153	35065-27-1	3	µg/kg	<3
PCB 105	32598-14-4	3	µg/kg	<3
PCB 138	35065-28-2	3	µg/kg	<3
PCB 126	57465-28-8	3	µg/kg	<3
PCB 187	52663-68-0	3	µg/kg	<3
PCB 128	38380-07-3	3	µg/kg	<3
PCB 180	35065-29-3	3	µg/kg	<3
PCB 169	32774-16-6	3	µg/kg	<3
PCB 170	35065-30-6	3	µg/kg	<3
<b>EP-067A: Organochlorine Pesticides (OC)</b>				
alpha-BHC	319-84-6	0.05	mg/kg	<0.05
beta- & gamma-BHC	319-85-7 58-89-9	0.10	mg/kg	<0.10
delta-BHC	319-86-8	0.05	mg/kg	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>				
Nitrobenzene -d5	4165-60-0	0.1	%	53.5
4-Terphenyl-d14	1718-51-0	0.1	%	65.4
Surrogate control limits listed at end of this report.				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>				
Decachlorobiphenyl	2051-24-3	0.1	%	101
Surrogate control limits listed at end of this report.				
<b>EP-067S: Pesticide Surrogate</b>				
Tetrachlorometaxylene	877-09-8	0.1	%	63.5
Dibutylchloredate	1770-80-5	0.1	%	65.2



**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: 1176918)</b>								
HK0924847-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	49.2	49.8	1.3
HK0924890-001	S1-3	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	57.3	54.9	4.4
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>								
HK0925084-001	Anonymous	EK055: Ammonia as N	7664-41-7	10	mg/kg	4680	4700	0.3
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>								
HK0924847-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	43	3.9
		EG020: Copper	7440-50-8	1	mg/kg	14	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	25	25	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	29	28	4.3
		EG020: Zinc	7440-66-6	1	mg/kg	94	91	3.0
		HK0924890-001	S1-3	EG020: Mercury	7439-97-6	0.05	mg/kg	0.23
EG020: Silver	7440-22-4			0.1	mg/kg	3.0	2.9	5.7
EG020: Cadmium	7440-43-9			0.2	mg/kg	0.4	0.4	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	12	12	0.0
EG020: Chromium	7440-47-3			1	mg/kg	59	56	6.1
EG020: Copper	7440-50-8			1	mg/kg	115	109	5.7
EG020: Lead	7439-92-1			1	mg/kg	40	37	7.6
EG020: Nickel	7440-02-0			1	mg/kg	27	26	6.3
EG020: Zinc	7440-66-6			1	mg/kg	186	168	10.3
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>								
HK0924731-003	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>								
HK0924731-003	Anonymous	Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>								
HK0924731-003	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>								
HK0924731-003	Anonymous	alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0
		delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0
		Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0
		Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0
		4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0
		Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0
		beta- & gamma-BHC	319-85-7	0.10	mg/kg	<0.10	<0.10	0.0
			58-89-9					
		4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	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
					n						



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
							LCS	DCS	Low	High	Value	Control Limit
<b>ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 1187811)</b>												
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration n	LCS	DCS	Low	High	Value	Control Limit	
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	103	---	85	115	---	---	
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	104	---	85	115	---	---	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.2	---	85	115	---	---	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.3	---	85	115	---	---	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	90.6	---	85	115	---	---	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	90.1	---	85	115	---	---	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	87.2	---	85	115	---	---	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	90.3	---	85	115	---	---	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.2	---	85	115	---	---	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	93.6	---	85	115	---	---	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469)</b>												
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	87.9	---	58	123	---	---	
				<50	---	---	---	---	---	---	---	
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	63.4	---	44	98	---	---	
				<50	---	---	---	---	---	---	---	
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---	
				---	50.4 µg/kg	68.2	---	48	86	---	---	
Fluorene	86-73-7	5	µg/kg	---	51.0 µg/kg	60.5	---	51	91	---	---	
				<50	---	---	---	---	---	---	---	
Phenanthrene	85-01-8	5	µg/kg	---	51.2 µg/kg	68.5	---	46	87	---	---	
				<50	---	---	---	---	---	---	---	
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---	
				---	50.7 µg/kg	60.8	---	50	85	---	---	
Fluoranthene	206-44-0	150	µg/kg	<150	---	---	---	---	---	---	---	
				---	51.0 µg/kg	70.8	---	50	98	---	---	
Pyrene	129-00-0	150	µg/kg	<150	---	---	---	---	---	---	---	
				---	51.1 µg/kg	73.8	---	50	96	---	---	
Benz(a)anthracene	56-55-3	5	µg/kg	---	50.1 µg/kg	69.6	---	55	114	---	---	
				<150	---	---	---	---	---	---	---	
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	79.7	---	45	118	---	---	
				<150	---	---	---	---	---	---	---	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	---	---	---	---	---	---	---	
				---	101.9 µg/kg	76.3	---	60	114	---	---	
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	72.2	---	46	118	---	---	
				<150	---	---	---	---	---	---	---	
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	---	---	---	---	---	---	---	
				---	49.0 µg/kg	69.2	---	40	194	---	---	
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	---	---	---	---	---	---	---	
				---	50.2 µg/kg	60.0	---	14	188	---	---	
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	---	---	---	---	---	---	---	





Matrix: SOIL		Method Blank (MB) Report				Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
		CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)
Method: Compound						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1174469) - Continued</b>											
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	77.2	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1174470)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	101	---	63	120	---	---
PCB 18	37680-85-2	3	µg/kg	<3	5 µg/kg	85.9	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	102	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	93.5	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	85.6	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	98.3	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.1	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	98.0	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	84.9	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	98.6	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	98.2	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	102	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	97.2	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	98.1	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	101	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	99.9	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	98.0	---	70	122	---	---
<b>EP-067A: Organochlorine Pesticides (OC) (QC Lot: 1174468)</b>											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	---	52	150	---	---
beta- & gamma-BHC	319-85-7 58-89-9	0.1	mg/kg	<0.10	0.50 mg/kg	79.3	---	55	149	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	67.0	---	53	141	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	33.1	---	28	138	---	---
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.6	---	54	142	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	61.7	---	54	145	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	66.2	---	54	147	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.1	---	54	154	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	57.2	---	52	157	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	51.8	---	50	142	---	---
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.25 mg/kg	109	---	6	144	---	---

**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



Matrix: SOIL				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number		MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1178675)</b>										
HK0924847-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	84.8	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	95.8	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	76.3	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	95.9	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-066S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130
<b>EP-067S: Pesticide Surrogate</b>			
Tetrachlorometaxyfene	877-09-8	50	130
Dibutylchloredate	1770-80-5	50	130

# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 8
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0925522
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 02-DEC-2009
Facsimile	: ---	Facsimile	: +852 2610 2021	Issue Date	: 23-DEC-2009
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 1
Order number	: CVI/2009/13			No. of samples analysed	: 1
C-O-C number	: H008066				
Site	: D1-2				

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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*

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

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A Campbell Brothers Limited Company

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0925522



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 08-DEC-2009

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: **HK0925522**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by in-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 149, PCB 169, PCB 187, PCB 195 and PCB 206 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

D1-2

Client sampling date / time

02-DEC-2009 13:00

HK0925522-001

Compound	CAS Number	LOR	Unit	
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	—	0.1	%	59.5
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	7
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.6
EG020: Chromium	7440-47-3	1	mg/kg	60
EG020: Copper	7440-50-8	1	mg/kg	159
EG020: Lead	7439-92-1	1	mg/kg	40
EG020: Mercury	7439-97-6	0.05	mg/kg	0.14
EG020: Nickel	7440-02-0	1	mg/kg	35
EG020: Silver	7440-22-4	0.1	mg/kg	3.4
EG020: Zinc	7440-66-6	1	mg/kg	170
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1,2,3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	—	550	µg/kg	<550
High M.W. PAHs	—	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3
PCB 18	37680-65-2	3	µg/kg	<3
PCB 28	7012-37-5	3	µg/kg	<3
PCB 52	35693-99-3	3	µg/kg	<3
PCB 44	41464-39-5	3	µg/kg	<3
PCB 66	32598-10-0	3	µg/kg	<3

Page Number : 4 of 8  
 Client : LAM GEOTECHNICS LIMITED  
 Work Order : HK0925522



Sub-Matrix: SEDIMENT			Client sample ID	D1-2			
			Client sampling date / time	02-DEC-2009 13:00			
Compound	CAS Number	LOR	Unit	HK0925522-001			
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 101	37680-73-2	3	µg/kg	△			
PCB 77	32598-13-3	3	µg/kg	△			
PCB 118	31508-00-6	3	µg/kg	△			
PCB 153	35065-27-1	3	µg/kg	△			
PCB 105	32598-14-4	3	µg/kg	△			
PCB 138	35065-28-2	3	µg/kg	△			
PCB 126	57465-28-8	3	µg/kg	△			
PCB 187	52663-68-0	3	µg/kg	△			
PCB 128	38380-07-3	3	µg/kg	△			
PCB 180	35065-29-3	3	µg/kg	△			
PCB 169	60044-26-0	3	µg/kg	△			
PCB 170	35065-30-6	3	µg/kg	△			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Surrogate control limits listed at end of this report.							
Nitrobenzene -d5	4165-60-0	0.1	%	52.7			
4-Terphenyl-d14	1718-51-0	0.1	%	62.0			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Surrogate control limits listed at end of this report.							
Decachlorobiphenyl	2051-24-3	0.1	%	78.8			





**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: 1184239)</b>								
HK0925520-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	—	0.1	%	55.4	55.6	0.4
<b>EG: Metals and Major Cations (QC Lot: 1186452)</b>								
HK0925519-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.5	0.5	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	32	33	3.9
		EG020: Copper	7440-50-8	1	mg/kg	27	26	4.8
		EG020: Lead	7439-92-1	1	mg/kg	22	24	6.4
		EG020: Nickel	7440-02-0	1	mg/kg	22	25	9.5
		EG020: Zinc	7440-66-6	1	mg/kg	80	87	9.2
HK0925531-010	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.2	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	29	29	0.0
		EG020: Copper	7440-50-8	1	mg/kg	10	11	0.0
		EG020: Lead	7439-92-1	1	mg/kg	35	32	7.3
		EG020: Nickel	7440-02-0	1	mg/kg	22	24	5.9
		EG020: Zinc	7440-66-6	1	mg/kg	76	74	2.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>								
HK0925559-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	—	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	—	550	µg/kg	<550	<550	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-065: PCB Single Congeners (QC Lot: 1185102)</b>								
HK0925559-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0

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

Matrix: SOIL					Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method Blank (MB) Report					Spike Concentration						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
					LCS	DCS	Low	High	Value	Control Limit	
<b>EG: Metals and Major Cations (QC Lot: 1186452)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	88.3	---	85	115	---	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	92.6	---	85	115	---	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.4	---	85	115	---	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	103	---	85	115	---	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	97.4	---	85	115	---	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	107	---	85	115	---	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	108	---	85	115	---	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	99.8	---	85	115	---	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	98.4	---	85	115	---	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	
					49.9 µg/kg	79.2	---	58	123	---	
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	
					50.9 µg/kg	68.9	---	44	96	---	
Acenaphthene	83-32-9	5	µg/kg	<50	---	---	---	---	---	---	
					50.4 µg/kg	73.3	---	48	86	---	
Fluorene	86-73-7	5	µg/kg	<50	---	---	---	---	---	---	
					51.0 µg/kg	70.3	---	51	91	---	



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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>											
Fluorene	86-73-7	50	µg/kg	<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	5	µg/kg	---	51.2 µg/kg	72.9	---	46	87	---	---
				<50	---	---	---	---	---	---	---
Anthracene	120-12-7	5	µg/kg	---	50.7 µg/kg	59.8	---	50	85	---	---
				<50	---	---	---	---	---	---	---
Fluoranthene	206-44-0	5	µg/kg	---	51.0 µg/kg	77.2	---	50	98	---	---
				<150	---	---	---	---	---	---	---
Pyrene	129-00-0	5	µg/kg	---	51.1 µg/kg	79.4	---	50	96	---	---
				<150	---	---	---	---	---	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	---	50.1 µg/kg	82.2	---	55	114	---	---
				<150	---	---	---	---	---	---	---
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	82.4	---	45	118	---	---
				<150	---	---	---	---	---	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	---	101.9 µg/kg	85.3	---	60	114	---	---
				<300	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	82.8	---	46	118	---	---
				<150	---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	---	49.0 µg/kg	72.8	---	40	194	---	---
				<150	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	---	50.2 µg/kg	67.3	---	14	188	---	---
				<150	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	80.6	---	25	182	---	---
				<150	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.6	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	84.5	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	91.8	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	89.0	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	99.7	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	108	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	82.1	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	85.6	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.4	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.8	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.8	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	81.3	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	83.4	---	57	133	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	96.3	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	85.5	---	61	121	---	---



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-065: PCB Single Congeners (QC Lot: 1185102) - Continued</b>											
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	83.3	---	64	124	---	---
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	83.7	---	70	122	---	---

**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: 1186452)</b>										
HK0925516-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	78.2	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	100	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	90.0	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	96.3	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	92.8	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
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Project : LG29024  
Order number : CV/2009/13  
C O C number : H008066  
Site : D6-1

Laboratory : ALS Technichem HK Pty Ltd  
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Quote number : HK/1313/2009\*\*

Page : 1 of 8  
Work Order : HK0925516  
Date Samples Received : 02-DEC-2009  
Issue Date : 23-DEC-2009  
No. of samples received : 1  
No. of samples analysed : 1

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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*

Anh Ngoc Huynh  
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A Campbell Brothers Limited Company

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0925516



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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 08-DEC-2009

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: **HK0925516**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 149, PCB 169, PCB 187, PCB 195 and PCB 206 (Method: EP065) are not HOKLAS accredited.**





**Analytical Results**

Compound	CAS Number	LOR	Unit	Result
Sub-Matrix: SEDIMENT				
Client sample ID			D6-1	
Client sampling date / time			02-DEC-2009 17:00	
HK0925516-001				
<b>EAJED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	54.6
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	33
EG020: Copper	7440-50-8	1	mg/kg	50
EG020: Lead	7439-92-1	1	mg/kg	27
EG020: Mercury	7439-97-6	0.05	mg/kg	0.12
EG020: Nickel	7440-02-0	1	mg/kg	22
EG020: Silver	7440-22-4	0.1	mg/kg	1.1
EG020: Zinc	7440-66-6	1	mg/kg	99
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	----	550	µg/kg	<550
High M.W. PAHs	----	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	△
PCB 18	37680-65-2	3	µg/kg	△
PCB 28	7012-37-5	3	µg/kg	△
PCB 52	35693-99-3	3	µg/kg	△
PCB 44	41464-39-5	3	µg/kg	△
PCB 66	32598-10-0	3	µg/kg	△



Sub-Matrix: SEDIMENT		Client sample ID		D6-1	
		Client sampling date / time		02-DEC-2009 17:00	
Compound	CAS Number	LOR	Unit	HK0925516-001	
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 101	37680-73-2	3	µg/kg	<3	
PCB 77	32598-13-3	3	µg/kg	<3	
PCB 118	31508-00-6	3	µg/kg	<3	
PCB 153	35065-27-1	3	µg/kg	<3	
PCB 105	32598-14-4	3	µg/kg	<3	
PCB 138	35065-28-2	3	µg/kg	<3	
PCB 126	57465-28-8	3	µg/kg	<3	
PCB 187	52663-68-0	3	µg/kg	<3	
PCB 128	38380-07-3	3	µg/kg	<3	
PCB 180	35065-29-3	3	µg/kg	<3	
PCB 169	60044-26-0	3	µg/kg	<3	
PCB 170	35065-30-6	3	µg/kg	<3	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>					
Nitrobenzene -d5	4165-60-0	0.1	%	55.4	
4-Terphenyl-d14	1718-51-0	0.1	%	73.6	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>					
Decachlorobiphenyl	2051-24-3	0.1	%	80.9	

Surrogate control limits listed at end of this report.

Surrogate control limits listed at end of this report.



**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>EAJED: Physical and Aggregate Properties (QC Lot: 1184238)</b>								
HK0925409-004	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	21.0	21.3	1.4
HK0925462-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	27.3	28.6	4.6
<b>EG: Metals and Major Cations (QC Lot: 1186452)</b>								
HK0925519-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.5	0.5	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	6	6	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	32	33	3.9
		EG020: Copper	7440-50-8	1	mg/kg	27	26	4.8
		EG020: Lead	7439-92-1	1	mg/kg	22	24	6.4
		EG020: Nickel	7440-02-0	1	mg/kg	22	25	9.5
		EG020: Zinc	7440-66-6	1	mg/kg	80	87	9.2
		HK0925531-010	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05
EG020: Silver	7440-22-4			0.1	mg/kg	0.2	0.2	0.0
EG020: Cadmium	7440-43-9			0.2	mg/kg	<0.2	<0.2	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	9	8	0.0
EG020: Chromium	7440-47-3			1	mg/kg	29	29	0.0
EG020: Copper	7440-50-8			1	mg/kg	10	11	0.0
EG020: Lead	7439-92-1			1	mg/kg	35	32	7.3
EG020: Nickel	7440-02-0			1	mg/kg	22	24	5.9
EG020: Zinc	7440-66-6			1	mg/kg	76	74	2.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>								
HK0925559-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>									
HK0925559-002	Anonymous	Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0	
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>									
HK0925559-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0	
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0	
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0	
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0	
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0	
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0	
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0	
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0	
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0	
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0	
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0	
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0	
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0	
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0	
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0	
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0	
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0	
		PCB 170	35065-30-6	3	µg/kg	<3	<3	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: 1186452)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	88.3	---	85	115	---	---	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	92.6	---	85	115	---	---	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.4	---	85	115	---	---	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	103	---	85	115	---	---	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	97.4	---	85	115	---	---	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	107	---	85	115	---	---	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	108	---	85	115	---	---	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	99.8	---	85	115	---	---	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	98.4	---	85	115	---	---	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>												
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---	
					49.9 µg/kg	79.2	---	58	123	---	---	
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---	
					50.9 µg/kg	68.9	---	44	96	---	---	
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	73.3	---	48	86	---	---	



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>												
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---	---
Fluorene	86-73-7	5	µg/kg	---	51.0 µg/kg	70.3	---	---	51	91	---	---
Phenanthrene	85-01-8	5	µg/kg	<50	---	---	---	---	---	---	---	---
Anthracene	120-12-7	5	µg/kg	---	51.2 µg/kg	72.9	---	---	46	87	---	---
Fluoranthene	206-44-0	5	µg/kg	<50	---	---	---	---	---	---	---	---
Pyrene	129-00-0	5	µg/kg	---	50.7 µg/kg	59.8	---	---	50	85	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	<150	---	---	---	---	50	98	---	---
Chrysene	218-01-9	5	µg/kg	---	51.0 µg/kg	77.2	---	---	50	96	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	<150	---	---	---	---	55	114	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	<300	---	---	---	---	45	118	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	---	50.8 µg/kg	82.4	---	---	60	114	---	---
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	---	---	---	---	46	118	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	101.9 µg/kg	85.3	---	---	60	114	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	40	194	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	14	188	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>												
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.6	---	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	84.5	---	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	91.8	---	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	89.0	---	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	99.7	---	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	108	---	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	82.1	---	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	85.6	---	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.4	---	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.8	---	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.8	---	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	81.3	---	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	83.4	---	---	57	133	---	---



Matrix: SOIL					Method Blank (MB) Report		Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)		
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit	
<b>EP-065: PCB Single Congeners (QC Lot: 1185102) - Continued</b>												
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	96.3	---	65	121	---	---	
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	85.5	---	61	121	---	---	
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	83.3	---	64	124	---	---	
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---	
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	83.7	---	70	122	---	---	

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

Matrix: SOIL					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1186452)</b>											
HK0925516-001	D6-1	EG020: Arsenic	7440-38-2	5 mg/kg	78.2	---	75	125	---	---	
		EG020: Cadmium	7440-43-9	5 mg/kg	100	---	75	125	---	---	
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Mercury	7439-97-6	0.1 mg/kg	90.0	---	75	125	---	---	
		EG020: Nickel	7440-02-0	5 mg/kg	96.3	---	75	125	---	---	
		EG020: Silver	7440-22-4	5 mg/kg	92.8	---	75	125	---	---	
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---	

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130



# ALS Technichem (HK) Pty Ltd



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 8
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0927708
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044		
Facsimile	: ---	Facsimile	: +852 2610 2021		
Project	: LG29024	Quote number	: HK/1313/2009**	Date Samples Received	: 28-DEC-2009
Order number	: CV/2009/13			Issue Date	: 22-JAN-2010
C-O-C number	: H008370			No. of samples received	: 2
Site	: D7-2			No. of samples analysed	: 2

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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*

Anh Ngoc Huynh  
Wong Wing, Kenneth

*Position*

Senior Chemist - Organics  
Assistant Supervisor

*Authorised results for*

Organics  
Inorganics

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0927708



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 16-JAN-2010

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: **HK0927708**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



### Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D7-2	D7-2			
				0-0.9M	0.9-1.9M			
				28-DEC-2009 10:45	28-DEC-2009 10:45			
				HK0927708-001	HK0927708-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103°C)	---	0.1	%	29.6	32.6			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	2	3			
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	21	26			
EG020: Copper	7440-50-8	1	mg/kg	7	8			
EG020: Lead	7439-92-1	1	mg/kg	16	19			
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	13	17			
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg	47	64			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	206-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	---	550	µg/kg	<550	<550			
High M.W. PAHs	---	1700	µg/kg	<1700	<1700			
<b>EP-065: PCB Single Congeners</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3			



Sub-Matrix: SEDIMENT				Client sample ID	D7-2 0-0.9M	D7-2 0.9-1.9M			
Client sampling date / time					28-DEC-2009 10:45	28-DEC-2009 10:45			
Compound	CAS Number	LOR	Unit	HK0927708-001	HK0927708-002				
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 66	32598-10-0	3	µg/kg	<3	<3				
PCB 101	37680-73-2	3	µg/kg	<3	<3				
PCB 77	32598-13-3	3	µg/kg	<3	<3				
PCB 118	31508-00-6	3	µg/kg	<3	<3				
PCB 153	35065-27-1	3	µg/kg	<3	<3				
PCB 105	32598-14-4	3	µg/kg	<3	<3				
PCB 138	35065-28-2	3	µg/kg	<3	<3				
PCB 126	57465-28-8	3	µg/kg	<3	<3				
PCB 187	52663-68-0	3	µg/kg	<3	<3				
PCB 128	38380-07-3	3	µg/kg	<3	<3				
PCB 180	35065-29-3	3	µg/kg	<3	<3				
PCB 169	32774-16-6	3	µg/kg	<3	<3				
PCB 170	35065-30-6	3	µg/kg	<3	<3				
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Surrogate control limits listed at end of this report.									
Nitrobenzene -d5	4165-60-0	0.1	%	51.6	50.7				
4-Terphenyl-d14	1718-51-0	0.1	%	76.7	78.1				
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Surrogate control limits listed at end of this report.									
Decachlorobiphenyl	2051-24-3	0.1	%	112	119				



**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: 1210626)</b>								
HK0927705-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	43.0	43.6	1.4
HK0927705-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	45.0	43.9	2.4
<b>EG: Metals and Major Cations (QC Lot: 1215750)</b>								
HK0927707-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	2	2	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	17	16	7.8
		EG020: Copper	7440-50-8	1	mg/kg	6	5	0.0
		EG020: Lead	7439-92-1	1	mg/kg	13	12	9.5
		EG020: Nickel	7440-02-0	1	mg/kg	10	9	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	36	35	3.9
HK0927875-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	4	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	44	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	26	4.1
		EG020: Nickel	7440-02-0	1	mg/kg	31	30	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	99	97	1.9
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209939)</b>								
HK0927685-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209939) - Continued</b>								
HK0927685-002	Anonymous	Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1209940)</b>								
HK0927685-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1215750)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	95.0	---	85	115	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	94.8	---	85	115	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	102	---	85	115	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	102	---	85	115	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	94.5	---	85	115	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	95.0	---	85	115	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	99.0	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.7	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	99.5	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209939)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	64.4	---	44	117	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	52.5	---	45	98	---	---
				<50	---	---	---	---	---	---	---
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	59.7	---	50	98	---	---



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209939) - Continued</b>											
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
Fluorene	86-73-7	50	µg/kg	<50	51.0 µg/kg	63.4	---	37	110	---	---
Phenanthrene	85-01-8	5	µg/kg	<50	51.2 µg/kg	65.6	---	43	108	---	---
Anthracene	120-12-7	50	µg/kg	<50	50.7 µg/kg	61.5	---	41	103	---	---
Fluoranthene	206-44-0	150	µg/kg	<150	51.0 µg/kg	73.1	---	51	113	---	---
Pyrene	129-00-0	150	µg/kg	<150	51.1 µg/kg	72.5	---	48	1121	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	<150	50.1 µg/kg	63.0	---	45	115	---	---
Chrysene	218-01-9	5	µg/kg	<150	50.8 µg/kg	72.9	---	48	122	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	101.9 µg/kg	67.4	---	50	119	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	50.7 µg/kg	76.7	---	40	119	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	<150	49.0 µg/kg	84.1	---	24	128	---	---
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	50.2 µg/kg	82.9	---	22	117	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	50.7 µg/kg	75.7	---	35	120	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1209940)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	92.2	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	94.5	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	93.1	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.0	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	83.1	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	90.0	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	103	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	102	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	110	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	110	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	93.7	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	86.9	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	104	---	57	133	---	---





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-065: PCB Single Congeners (QC Lot: 1209940) - Continued</b>											
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	81.3	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	101	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	93.9	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	93.9	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	118	---	70	122	---	---

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

Matrix: SOIL				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number		MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1215750)</b>										
HK0927707-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	94.7	---	75	125	---	---
		EG020: Cadmium	7440-43-8	5 mg/kg	94.1	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	100	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	99.2	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	86.6	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	95.0	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	105	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	92.6	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
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Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H008067  
Site : D25-4

Laboratory : ALS Technichem HK Pty Ltd  
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Quote number : HK/1313/2009\*\*

Page : 1 of 8  
Work Order : HK0925758  
Date Samples Received : 03-DEC-2009  
Issue Date : 23-DEC-2009  
No. of samples received : 1  
No. of samples analysed : 1

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
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### Position

Senior Chemist - Organics  
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### Authorised results for

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A Campbell Brothers Limited Company

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0925758



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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 10-DEC-2009

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: **HK0925758**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 149, PCB 169, PCB 187, PCB 195 and PCB 206 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

D25-4

Client sampling date / time

03-DEC-2009 09:45

HK0925758-001

Compound	CAS Number	LOR	Unit	
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	56.1
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4
EG020: Chromium	7440-47-3	1	mg/kg	59
EG020: Copper	7440-50-8	1	mg/kg	119
EG020: Lead	7439-92-1	1	mg/kg	39
EG020: Mercury	7439-97-6	0.05	mg/kg	0.20
EG020: Nickel	7440-02-0	1	mg/kg	28
EG020: Silver	7440-22-4	0.1	mg/kg	2.6
EG020: Zinc	7440-66-6	1	mg/kg	161
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	---	550	µg/kg	<550
High M.W. PAHs	---	1700	µg/kg	<1700
<b>EP-066: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3
PCB 18	37680-65-2	3	µg/kg	<3
PCB 28	7012-37-5	3	µg/kg	<3
PCB 52	35693-99-3	3	µg/kg	<3
PCB 44	41464-39-5	3	µg/kg	<3
PCB 66	32598-10-0	3	µg/kg	<3



Sub-Matrix: SEDIMENT				Client sample ID	D25-4			
				Client sampling date / time	03-DEC-2009 09:45			
Compound	CAS Number	LOR	Unit	HK0925758-001				
<b>EP-065: PCB Single Congeners - Continued</b>								
PCB 101	37680-73-2	3	µg/kg	<3				
PCB 77	32598-13-3	3	µg/kg	<3				
PCB 118	31508-00-6	3	µg/kg	<3				
PCB 153	35065-27-1	3	µg/kg	<3				
PCB 105	32598-14-4	3	µg/kg	<3				
PCB 138	35065-28-2	3	µg/kg	<3				
PCB 126	57465-28-8	3	µg/kg	<3				
PCB 187	52663-68-0	3	µg/kg	<3				
PCB 128	38380-07-3	3	µg/kg	<3				
PCB 180	35065-29-3	3	µg/kg	<3				
PCB 169	60044-26-0	3	µg/kg	<3				
PCB 170	35065-30-6	3	µg/kg	<3				
Surrogate control limits listed at end of this report.								
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>								
Nitrobenzene -d5	4165-60-0	0.1	%	53.5				
4-Terphenyl-d14	1718-51-0	0.1	%	53.8				
Surrogate control limits listed at end of this report.								
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>								
Decachlorobiphenyl	2051-24-3	0.1	%	80.5				



**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: 1187287)</b>								
HK0925684-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	38.1	39.6	3.8
HK0925751-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	57.9	56.9	1.7
<b>EG: Metals and Major Cations (QC Lot: 1187836)</b>								
HK0925750-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.13	0.14	7.7
		EG020: Silver	7440-22-4	0.1	mg/kg	2.6	2.5	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	54	53	2.3
		EG020: Copper	7440-50-8	1	mg/kg	105	105	0.0
		EG020: Lead	7439-92-1	1	mg/kg	37	32	14.3
		EG020: Nickel	7440-02-0	1	mg/kg	26	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	159	142	11.4
		HK0925759-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.16
EG020: Silver	7440-22-4			0.1	mg/kg	2.6	2.8	7.2
EG020: Cadmium	7440-43-9			0.2	mg/kg	0.4	0.5	0.0
EG020: Arsenic	7440-38-2			1	mg/kg	9	10	0.0
EG020: Chromium	7440-47-3			1	mg/kg	64	65	0.0
EG020: Copper	7440-50-8			1	mg/kg	126	126	0.0
EG020: Lead	7439-92-1			1	mg/kg	40	40	0.0
EG020: Nickel	7440-02-0			1	mg/kg	30	30	0.0
EG020: Zinc	7440-66-6			1	mg/kg	173	180	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>								
HK0925559-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>								
HK0925559-002	Anonymous	Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>								
HK0925559-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 138	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 126	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 187	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 128	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 180	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 169	35065-30-6	3	µg/kg	<3	<3	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: 1187836)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.9	---	85	115	---	---	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.3	---	85	115	---	---	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	89.8	---	85	115	---	---	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.0	---	85	115	---	---	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	88.5	---	85	115	---	---	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	101	---	85	115	---	---	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	93.2	---	85	115	---	---	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	90.5	---	85	115	---	---	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	89.0	---	85	115	---	---	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>												
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---	
					49.9 µg/kg	79.2	---	58	123	---	---	
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---	
					50.9 µg/kg	68.9	---	44	96	---	---	
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	73.3	---	48	86	---	---	





Matrix: SOIL		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 (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>											
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
Fluorene	86-73-7	5	µg/kg	---	51.0 µg/kg	70.3	---	51	91	---	---
				<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	5	µg/kg	---	51.2 µg/kg	72.9	---	46	87	---	---
				<50	---	---	---	---	---	---	---
Anthracene	120-12-7	5	µg/kg	---	50.7 µg/kg	59.8	---	50	85	---	---
				<50	---	---	---	---	---	---	---
Fluoranthene	206-44-0	5	µg/kg	---	51.0 µg/kg	77.2	---	50	98	---	---
				<150	---	---	---	---	---	---	---
Pyrene	129-00-0	5	µg/kg	---	51.1 µg/kg	79.4	---	50	96	---	---
				<150	---	---	---	---	---	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	---	50.1 µg/kg	82.2	---	55	114	---	---
				<150	---	---	---	---	---	---	---
Chrysene	218-01-9	5	µg/kg	---	50.8 µg/kg	82.4	---	45	118	---	---
				<150	---	---	---	---	---	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	---	101.9 µg/kg	85.3	---	60	114	---	---
				<300	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	---	50.7 µg/kg	82.8	---	46	118	---	---
				<150	---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	---	49.0 µg/kg	72.8	---	40	194	---	---
				<150	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	---	50.2 µg/kg	67.3	---	14	188	---	---
				<150	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	50.7 µg/kg	80.6	---	25	182	---	---
				<150	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.6	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	84.5	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	91.8	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	89.0	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	99.7	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	108	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	82.1	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	85.6	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.4	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.8	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.8	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	81.3	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	83.4	---	57	133	---	---



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-065: PCB Single Congeners (QC Lot: 1185102) - Continued</b>											
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	96.3	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	85.5	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	83.3	---	64	124	---	---
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	83.7	---	70	122	---	---

**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: 1187836)</b>										
HK0925749-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	89.8	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	93.8	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	95.0	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	80.0	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-066S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 8
Contact	: MR C M YEE	Contact	: Chan Kwok Fai, Godfrey	Work Order	: HK0927881
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Samuel@Lamconstruct.com.hk	E-mail	: Godfrey.Chan@alsenviro.com		
Telephone	: +852 2839 5633	Telephone	: +852 2610 1044	Date Samples Received	: 30-DEC-2009
Facsimile	: ---	Facsimile	: +852 2610 2021	Issue Date	: 25-JAN-2010
Project	: LG29024	Quote number	: HK/1313/2009**	No. of samples received	: 2
Order number	: CVI/2009/13			No. of samples analysed	: 2
C-O-C number	: H008375				
Site	: D26-1				

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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*  
Anh Ngoc Huynh  
Wong Wing, Kenneth

*Position*  
Senior Chemist - Organics  
Assistant Supervisor

*Authorised results for*  
Organics  
Inorganics

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0927881



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 16-JAN-2010

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: **HK0927881**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by in-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 169 and PCB 187 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	D26-1	D26-1			
				0-0.9M	0.9-1.9M			
				30-DEC-2009 11:00	30-DEC-2009 11:00			
				HK0927881-001	HK0927881-002			
<b>EA/ED: Physical and Aggregate Properties</b>								
EA055: Moisture Content (dried @ 103° C)	—	0.1	%	35.9	42.0			
<b>EG: Metals and Major Cations</b>								
EG020: Arsenic	7440-38-2	1	mg/kg	3	4			
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg	22	38			
EG020: Copper	7440-50-8	1	mg/kg	7	12			
EG020: Lead	7439-92-1	1	mg/kg	16	26			
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg	15	27			
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg	53	92			
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>								
Naphthalene	91-20-3	50	µg/kg	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg	<50	<50			
Acenaphthene	83-32-9	50	µg/kg	<50	<50			
Fluorene	86-73-7	50	µg/kg	<50	<50			
Phenanthrene	85-01-8	50	µg/kg	<50	<50			
Anthracene	120-12-7	50	µg/kg	<50	<50			
Fluoranthene	208-44-0	150	µg/kg	<150	<150			
Pyrene	129-00-0	150	µg/kg	<150	<150			
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150			
Chrysene	218-01-9	150	µg/kg	<150	<150			
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	<300			
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150			
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150			
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150			
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150			
Low M.W. PAHs	—	550	µg/kg	<550	<550			
High M.W. PAHs	—	1700	µg/kg	<1700	<1700			
<b>EP-065: PCB Single Congeners</b>								
PCB 8	34883-43-7	3	µg/kg	<3	<3			
PCB 18	37680-65-2	3	µg/kg	<3	<3			
PCB 28	7012-37-5	3	µg/kg	<3	<3			
PCB 52	35693-99-3	3	µg/kg	<3	<3			
PCB 44	41464-39-5	3	µg/kg	<3	<3			



Sub-Matrix: SEDIMENT				Client sample ID	D26-1 0-0.9M	D26-1 0.9-1.9M			
Client sampling date / time					30-DEC-2009 11:00	30-DEC-2009 11:00			
Compound	CAS Number	LOR	Unit	HK0927881-001	HK0927881-002				
<b>EP-065: PCB Single Congeners - Continued</b>									
PCB 66	32598-10-0	3	µg/kg	<3	<3				
PCB 101	37680-73-2	3	µg/kg	<3	<3				
PCB 77	32598-13-3	3	µg/kg	<3	<3				
PCB 118	31508-00-6	3	µg/kg	<3	<3				
PCB 153	35065-27-1	3	µg/kg	<3	<3				
PCB 105	32598-14-4	3	µg/kg	<3	<3				
PCB 138	35065-28-2	3	µg/kg	<3	<3				
PCB 126	57465-28-8	3	µg/kg	<3	<3				
PCB 187	52663-68-0	3	µg/kg	<3	<3				
PCB 128	38380-07-3	3	µg/kg	<3	<3				
PCB 180	35065-29-3	3	µg/kg	<3	<3				
PCB 169	32774-16-6	3	µg/kg	<3	<3				
PCB 170	35065-30-6	3	µg/kg	<3	<3				
Surrogate control limits listed at end of this report.									
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>									
Nitrobenzene -d5	4165-60-0	0.1	%	52.1	77.1				
4-Terphenyl-d14	1718-51-0	0.1	%	63.6	73.7				
Surrogate control limits listed at end of this report.									
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>									
Decachlorobiphenyl	2051-24-3	0.1	%	100	101				



**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: 1210630)</b>								
HK0927819-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	49.6	50.5	1.8
HK0927821-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	52.6	54.9	4.3
<b>EG: Metals and Major Catlons (QC Lot: 1215750)</b>								
HK0927707-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	2	2	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	17	16	7.8
		EG020: Copper	7440-50-8	1	mg/kg	6	5	0.0
		EG020: Lead	7439-92-1	1	mg/kg	13	12	9.5
		EG020: Nickel	7440-02-0	1	mg/kg	10	9	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	36	35	3.9
HK0927875-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	4	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	44	44	0.0
		EG020: Copper	7440-50-8	1	mg/kg	13	13	0.0
		EG020: Lead	7439-92-1	1	mg/kg	27	26	4.1
		EG020: Nickel	7440-02-0	1	mg/kg	31	30	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	99	97	1.9
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209964)</b>								
HK0927878-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0





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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209964) - Continued</b>								
HK0927878-001	Anonymous	Low M.W. PAHs		550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1209953)</b>								
HK0927799-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	Δ	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	Δ	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	Δ	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	Δ	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	Δ	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	Δ	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	Δ	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	Δ	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	Δ	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	Δ	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	Δ	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	Δ	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	Δ	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	Δ	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	Δ	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	Δ	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	Δ	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	Δ	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: 1215750)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	95.0	---	85	115	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	94.8	---	85	115	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	102	---	85	115	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	102	---	85	115	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	94.5	---	85	115	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	95.0	---	85	115	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	99.0	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	98.7	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	99.5	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209964)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	80.8	---	44	117	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	5	µg/kg	---	50.9 µg/kg	71.4	---	45	98	---	---
				<50	---	---	---	---	---	---	---
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	77.1	---	50	98	---	---



Matrix: SOIL		Method Blank (MB) Report				Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
							LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1209964) - Continued</b>												
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---	
Fluorene	86-73-7	5	µg/kg	<50	51.0 µg/kg	81.7	---	37	110	---	---	
Phenanthrene	85-01-8	5	µg/kg	<50	51.2 µg/kg	83.1	---	43	108	---	---	
Anthracene	120-12-7	5	µg/kg	<50	50.7 µg/kg	89.9	---	41	103	---	---	
Fluoranthene	206-44-0	5	µg/kg	<150	51.0 µg/kg	97.2	---	51	113	---	---	
Pyrene	129-00-0	150	µg/kg	<150	51.1 µg/kg	92.9	---	48	1121	---	---	
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	50.1 µg/kg	85.0	---	45	115	---	---	
Chrysene	218-01-9	150	µg/kg	<150	50.8 µg/kg	79.0	---	48	122	---	---	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	101.9 µg/kg	91.0	---	50	119	---	---	
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	50.7 µg/kg	59.8	---	40	119	---	---	
Indeno(1,2,3.cd)pyrene	193-39-5	5	µg/kg	<150	49.0 µg/kg	85.7	---	24	128	---	---	
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	50.2 µg/kg	50.7	---	22	117	---	---	
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	50.7 µg/kg	72.8	---	35	120	---	---	
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---	
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---	
<b>EP-065: PCB Single Congeners (QC Lot: 1209953)</b>												
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.9	---	63	120	---	---	
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	79.0	---	61	121	---	---	
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	82.9	---	55	132	---	---	
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	77.4	---	68	121	---	---	
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	75.1	---	69	113	---	---	
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	75.8	---	69	113	---	---	
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	82.6	---	68	121	---	---	
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	65.6	---	41	142	---	---	
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	83.9	---	62	122	---	---	
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	78.3	---	60	122	---	---	
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	83.3	---	64	126	---	---	
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	73.1	---	60	124	---	---	
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	86.3	---	57	133	---	---	



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
n													
<b>EP-065: PCB Single Congeners (QC Lot: 1209953) - Continued</b>													
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	73.5	---	65	121	---	---		
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	78.6	---	61	121	---	---		
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	74.2	---	64	124	---	---		
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	77.7	---	66	121	---	---		
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	75.1	---	70	122	---	---		

**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: 1215750)</b>															
HK0927707-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	94.7	---	75	125	---	---					
		EG020: Cadmium	7440-43-9	5 mg/kg	94.1	---	75	125	---	---					
		EG020: Chromium	7440-47-3	5 mg/kg	100	---	75	125	---	---					
		EG020: Copper	7440-50-8	5 mg/kg	99.2	---	75	125	---	---					
		EG020: Lead	7439-92-1	5 mg/kg	86.6	---	75	125	---	---					
		EG020: Mercury	7439-97-6	0.1 mg/kg	95.0	---	75	125	---	---					
		EG020: Nickel	7440-02-0	5 mg/kg	105	---	75	125	---	---					
		EG020: Silver	7440-22-4	5 mg/kg	92.6	---	75	125	---	---					
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---					

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
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Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H008067  
Site : D26-2

Laboratory : ALS Technichem HK Pty Ltd  
Contact : Chan Kwok Fai, Godfrey  
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Quote number : HK/1313/2009\*\*

Page : 1 of 8  
Work Order : HK0925757  
Date Samples Received : 03-DEC-2009  
Issue Date : 23-DEC-2009  
No. of samples received : 1  
No. of samples analysed : 1

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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

Anh Ngoc Huynh  
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Position

Senior Chemist - Organics  
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Authorised results for

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A Campbell Brothers Limited Company

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0925757



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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 10-DEC-2009

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: **HK0925757**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 149, PCB 169, PCB 187, PCB 195 and PCB 206 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT		Client sample ID		D26-2	
		Client sampling date / time		03-DEC-2009 10:15	
Compound	CAS Number	LOR	Unit	HK0925757-001	
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	54.0	
<b>Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	8	
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	
EG020: Chromium	7440-47-3	1	mg/kg	58	
EG020: Copper	7440-50-8	1	mg/kg	112	
EG020: Lead	7439-92-1	1	mg/kg	37	
EG020: Mercury	7439-97-6	0.05	mg/kg	0.11	
EG020: Nickel	7440-02-0	1	mg/kg	27	
EG020: Silver	7440-22-4	0.1	mg/kg	3.0	
EG020: Zinc	7440-66-6	1	mg/kg	149	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	
Acenaphthylene	208-96-8	50	µg/kg	<50	
Acenaphthene	83-32-9	50	µg/kg	<50	
Fluorene	86-73-7	50	µg/kg	<50	
Phenanthrene	85-01-8	50	µg/kg	<50	
Anthracene	120-12-7	50	µg/kg	<50	
Fluoranthene	206-44-0	150	µg/kg	<150	
Pyrene	129-00-0	150	µg/kg	<150	
Benz(a)anthracene	56-55-3	150	µg/kg	<150	
Chrysene	218-01-9	150	µg/kg	<150	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	
Low M.W. PAHs	---	550	µg/kg	<550	
High M.W. PAHs	---	1700	µg/kg	<1700	
<b>EP-065: PCB Single Congeners</b>					
PCB 8	34883-43-7	3	µg/kg	△	
PCB 18	37680-65-2	3	µg/kg	△	
PCB 28	7012-37-5	3	µg/kg	△	
PCB 52	35693-99-3	3	µg/kg	△	
PCB 44	41464-39-5	3	µg/kg	△	
PCB 66	32598-10-0	3	µg/kg	△	



Sub-Matrix: SEDIMENT		Client sample ID	D26-2				
		Client sampling date / time	03-DEC-2009 10:15				
Compound	CAS Number	LOR	Unit	HK0925757-001			
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 101	37680-73-2	3	µg/kg	<3			
PCB 77	32598-13-3	3	µg/kg	<3			
PCB 118	31508-00-6	3	µg/kg	<3			
PCB 153	35065-27-1	3	µg/kg	<3			
PCB 105	32598-14-4	3	µg/kg	<3			
PCB 138	35065-28-2	3	µg/kg	<3			
PCB 126	57465-28-8	3	µg/kg	<3			
PCB 187	52663-68-0	3	µg/kg	<3			
PCB 128	38380-07-3	3	µg/kg	<3			
PCB 180	35065-29-3	3	µg/kg	<3			
PCB 169	60044-26-0	3	µg/kg	<3			
PCB 170	35065-30-6	3	µg/kg	<3			
Surrogate control limits listed at end of this report.							
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Nitrobenzene -d5	4165-60-0	0.1	%	52.4			
4-Terphenyl-d14	1718-51-0	0.1	%	61.9			
Surrogate control limits listed at end of this report.							
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Decachlorobiphenyl	2051-24-3	0.1	%	75.5			





**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: 1187287)</b>								
HK0925684-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	—	0.1	%	38.1	39.6	3.8
HK0925751-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	—	0.1	%	57.9	56.9	1.7
<b>EG: Metals and Major Cations (QC Lot: 1187836)</b>								
HK0925750-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.13	0.14	7.7
		EG020: Silver	7440-22-4	0.1	mg/kg	2.6	2.5	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	54	53	2.3
		EG020: Copper	7440-50-8	1	mg/kg	105	105	0.0
		EG020: Lead	7439-92-1	1	mg/kg	37	32	14.3
		EG020: Nickel	7440-02-0	1	mg/kg	26	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	159	142	11.4
HK0925759-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.16	0.15	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	2.6	2.8	7.2
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.5	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	64	65	0.0
		EG020: Copper	7440-50-8	1	mg/kg	126	126	0.0
		EG020: Lead	7439-92-1	1	mg/kg	40	40	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	30	30	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	173	180	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>								
HK0925559-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	—	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>								
HK0925559-002	Anonymous	Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>								
HK0925559-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	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: 1187836)</b>												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.9	---	85	115	---	---	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.3	---	85	115	---	---	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	89.8	---	85	115	---	---	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.0	---	85	115	---	---	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	88.5	---	85	115	---	---	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	101	---	85	115	---	---	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	93.2	---	85	115	---	---	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	90.5	---	85	115	---	---	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	89.0	---	85	115	---	---	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>												
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---	
					49.9 µg/kg	79.2	---	58	123	---	---	
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---	
					50.9 µg/kg	68.9	---	44	96	---	---	
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	73.3	---	48	86	---	---	



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 n	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>											
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
Fluorene	86-73-7	5	µg/kg	<50	51.0 µg/kg	70.3	---	51	91	---	---
Phenanthrene	85-01-8	5	µg/kg	<50	51.2 µg/kg	72.9	---	46	87	---	---
Anthracene	120-12-7	5	µg/kg	<50	50.7 µg/kg	59.8	---	50	85	---	---
Fluoranthene	206-44-0	5	µg/kg	<150	51.0 µg/kg	77.2	---	50	98	---	---
Pyrene	129-00-0	5	µg/kg	<150	51.1 µg/kg	79.4	---	50	96	---	---
Benz(a)anthracene	56-55-3	5	µg/kg	<150	50.1 µg/kg	82.2	---	55	114	---	---
Chrysene	218-01-9	5	µg/kg	<150	50.8 µg/kg	82.4	---	45	118	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	<300	101.9 µg/kg	85.3	---	60	114	---	---
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	50.7 µg/kg	82.8	---	46	118	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	<150	49.0 µg/kg	72.8	---	40	194	---	---
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	50.2 µg/kg	67.3	---	14	188	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	50.7 µg/kg	80.6	---	25	182	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.6	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	84.5	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	91.8	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	89.0	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	99.7	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	108	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	82.1	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	85.6	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.4	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.8	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.8	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	81.3	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	83.4	---	57	133	---	---



Method Blank (MB) Report					Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Matrix: SOIL					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
<b>EP-065: PCB Single Congeners (QC Lot: 1185102) - Continued</b>											
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	96.3	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	85.5	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	83.3	---	64	124	---	---
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	83.7	---	70	122	---	---

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

Matrix: SOIL					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
Matrix: SOIL					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Result		MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1187836)</b>											
HK0925749-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	89.8	---	75	125	---	---	
		EG020: Cadmium	7440-43-9	5 mg/kg	93.8	---	75	125	---	---	
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Mercury	7439-97-6	0.1 mg/kg	95.0	---	75	125	---	---	
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Silver	7440-22-4	5 mg/kg	80.0	---	75	125	---	---	
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---	

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT			
Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-066S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
Contact : MR C M YEE  
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Telephone : +852 2839 5633  
Facsimile : ---  
Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H008067  
Site : D39-1

Laboratory : ALS Technichem HK Pty Ltd  
Contact : Chan Kwok Fai, Godfrey  
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Quote number : HK/1313/2009\*\*

Page : 1 of 8  
Work Order : HK0925751  
Date Samples Received : 03-DEC-2009  
Issue Date : 23-DEC-2009  
No. of samples received : 1  
No. of samples analysed : 1

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

### Authorised results for

Organics  
Inorganics  
Inorganics

### ALS Laboratory Group

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A Campbell Brothers Limited Company

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0925751



### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 10-DEC-2009

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: **HK0925751**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 149, PCB 169, PCB 187, PCB 195 and PCB 206 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID : D39-1  
 Client sampling date / time : 03-DEC-2009 15:00

HK0925751-001

Compound	CAS Number	LOR	Unit	
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	57.9
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4
EG020: Chromium	7440-47-3	1	mg/kg	59
EG020: Copper	7440-50-8	1	mg/kg	118
EG020: Lead	7439-92-1	1	mg/kg	37
EG020: Mercury	7439-97-6	0.05	mg/kg	0.15
EG020: Nickel	7440-02-0	1	mg/kg	28
EG020: Silver	7440-22-4	0.1	mg/kg	2.5
EG020: Zinc	7440-66-6	1	mg/kg	158
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	---	550	µg/kg	<550
High M.W. PAHs	---	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3
PCB 18	37680-65-2	3	µg/kg	<3
PCB 28	7012-37-5	3	µg/kg	<3
PCB 52	35693-99-3	3	µg/kg	<3
PCB 44	41464-39-5	3	µg/kg	<3
PCB 66	32598-10-0	3	µg/kg	<3



Page Number : 4 of 8  
 Client : LAM GEOTECHNICS LIMITED  
 Work Order : HK0925751



Sub-Matrix: SEDIMENT

Client sample ID

D39-1

Client sampling date / time

03-DEC-2009 15:00

HK0925751-001

Compound	CAS Number	LOR	Unit				
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 101	37680-73-2	3	µg/kg	<3			
PCB 77	32598-13-3	3	µg/kg	<3			
PCB 118	31508-00-6	3	µg/kg	<3			
PCB 153	35065-27-1	3	µg/kg	<3			
PCB 105	32598-14-4	3	µg/kg	<3			
PCB 138	35065-28-2	3	µg/kg	<3			
PCB 126	57465-28-8	3	µg/kg	<3			
PCB 187	52663-68-0	3	µg/kg	<3			
PCB 128	38380-07-3	3	µg/kg	<3			
PCB 180	35065-29-3	3	µg/kg	<3			
PCB 169	60044-26-0	3	µg/kg	<3			
PCB 170	35065-30-6	3	µg/kg	<3			
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Surrogate control limits listed at end of this report.							
Nitrobenzene -d5	4165-60-0	0.1	%	55.0			
4-Terphenyl-d14	1718-51-0	0.1	%	58.4			
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Surrogate control limits listed at end of this report.							
Decachlorobiphenyl	2051-24-3	0.1	%	85.8			



**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: 1187287)</b>								
HK0925684-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	38.1	39.6	3.8
HK0925751-001	D39-1	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	57.9	56.9	1.7
<b>EG: Metals and Major Cations (QC Lot: 1187836)</b>								
HK0925750-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.13	0.14	7.7
		EG020: Silver	7440-22-4	0.1	mg/kg	2.6	2.5	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	54	53	2.3
		EG020: Copper	7440-50-8	1	mg/kg	105	105	0.0
		EG020: Lead	7439-92-1	1	mg/kg	37	32	14.3
		EG020: Nickel	7440-02-0	1	mg/kg	26	25	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	159	142	11.4
HK0925759-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.16	0.15	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	2.6	2.8	7.2
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.5	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	64	65	0.0
		EG020: Copper	7440-50-8	1	mg/kg	126	126	0.0
		EG020: Lead	7439-92-1	1	mg/kg	40	40	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	30	30	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	173	180	3.7
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>								
HK0925559-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3-cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
Anthracene	120-12-7	50	µg/kg	<50	<50	0.0		



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>								
HK0925559-002	Anonymous	Low M.W. PAHs	---	550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>								
HK0925559-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1187836)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.9	---	85	115	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.3	---	85	115	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	89.8	---	85	115	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.0	---	85	115	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	88.5	---	85	115	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	101	---	85	115	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	93.2	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	90.5	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	89.0	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---
					49.9 µg/kg	79.2	---	58	123	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
					50.9 µg/kg	68.9	---	44	96	---	---
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	73.3	---	48	86	---	---



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>												
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---	
Fluorene	86-73-7	5	µg/kg	<50	51.0 µg/kg	70.3	---	---	51	91	---	
Phenanthrene	85-01-8	5	µg/kg	<50	51.2 µg/kg	72.9	---	---	46	87	---	
Anthracene	120-12-7	5	µg/kg	<50	50.7 µg/kg	59.8	---	---	50	85	---	
Fluoranthene	206-44-0	5	µg/kg	<150	51.0 µg/kg	77.2	---	---	50	98	---	
Pyrene	129-00-0	5	µg/kg	<150	51.1 µg/kg	79.4	---	---	50	96	---	
Benz(a)anthracene	56-55-3	5	µg/kg	<150	50.1 µg/kg	82.2	---	---	55	114	---	
Chrysene	218-01-9	5	µg/kg	<150	50.8 µg/kg	82.4	---	---	45	118	---	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	<300	101.9 µg/kg	85.3	---	---	60	114	---	
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	50.7 µg/kg	82.8	---	---	46	118	---	
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	<150	49.0 µg/kg	72.8	---	---	40	194	---	
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	50.2 µg/kg	67.3	---	---	14	188	---	
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	50.7 µg/kg	80.6	---	---	25	182	---	
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---	
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---	
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>												
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.6	---	---	63	120	---	
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	84.5	---	---	61	121	---	
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	91.8	---	---	55	132	---	
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	89.0	---	---	68	121	---	
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	99.7	---	---	68	122	---	
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	108	---	---	69	113	---	
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	82.1	---	---	68	121	---	
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	85.6	---	---	41	142	---	
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.4	---	---	62	122	---	
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.8	---	---	60	122	---	
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.8	---	---	64	126	---	
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	81.3	---	---	60	124	---	
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	83.4	---	---	57	133	---	



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-065: PCB Single Congeners (QC Lot: 1185102) - Continued</b>												
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	96.3	---	65	121	---	---	
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	85.5	---	61	121	---	---	
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	83.3	---	64	124	---	---	
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---	
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	83.7	---	70	122	---	---	

**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: 1187836)</b>											
HK0925749-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	89.8	---	75	125	---	---	
		EG020: Cadmium	7440-43-9	5 mg/kg	93.8	---	75	125	---	---	
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Mercury	7439-97-6	0.1 mg/kg	95.0	---	75	125	---	---	
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Silver	7440-22-4	5 mg/kg	80.0	---	75	125	---	---	
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---	

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT			Recovery Limits (%)	
Compound	CAS Number	Low	High	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>				
Nitrobenzene -d5	4165-60-0	50	130	
4-Terphenyl-d14	1718-51-0	50	130	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>				
Decachlorobiphenyl	2051-24-3	50	130	

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
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Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H008067  
Site : D39-2

Laboratory : ALS Technichem HK Pty Ltd  
Contact : Chan Kwok Fai, Godfrey  
Address : 11/F., Chung Shun Knitting Centre,  
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Quote number : HK/1313/2009\*\*

Page : 1 of 8  
Work Order : HK0925750  
Date Samples Received : 03-DEC-2009  
Issue Date : 23-DEC-2009  
No. of samples received : 1  
No. of samples analysed : 1

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

Authorised results for

Organics  
Inorganics  
Inorganics

**ALS Laboratory Group**

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company

Page Number : 2 of 8  
Client : LAM GEOTECHNICS LIMITED  
Work Order : HK0925750

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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 10-DEC-2009

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: HK0925750

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by In-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 149, PCB 169, PCB 187, PCB 195 and PCB 206 (Method: EP065) are not HOKLAS accredited.**





**Analytical Results**

Sub-Matrix: SEDIMENT

Client sample ID

D39-2

Client sampling date / time

03-DEC-2009 15:45

HK0925750-001

Compound	CAS Number	LOR	Unit	
<b>EA/ED: Physical and Aggregate Properties</b>				
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	53.6
<b>Metals and Major Cations</b>				
EG020: Arsenic	7440-38-2	1	mg/kg	8
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4
EG020: Chromium	7440-47-3	1	mg/kg	54
EG020: Copper	7440-50-8	1	mg/kg	105
EG020: Lead	7439-92-1	1	mg/kg	37
EG020: Mercury	7439-97-6	0.05	mg/kg	0.13
EG020: Nickel	7440-02-0	1	mg/kg	26
EG020: Silver	7440-22-4	0.1	mg/kg	2.6
EG020: Zinc	7440-66-6	1	mg/kg	159
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>				
Naphthalene	91-20-3	50	µg/kg	<50
Acenaphthylene	208-96-8	50	µg/kg	<50
Acenaphthene	83-32-9	50	µg/kg	<50
Fluorene	86-73-7	50	µg/kg	<50
Phenanthrene	85-01-8	50	µg/kg	<50
Anthracene	120-12-7	50	µg/kg	<50
Fluoranthene	206-44-0	150	µg/kg	<150
Pyrene	129-00-0	150	µg/kg	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150
Chrysene	218-01-9	150	µg/kg	<150
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300
Benzo(a)pyrene	50-32-8	150	µg/kg	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150
Low M.W. PAHs	----	550	µg/kg	<550
High M.W. PAHs	----	1700	µg/kg	<1700
<b>EP-065: PCB Single Congeners</b>				
PCB 8	34883-43-7	3	µg/kg	<3
PCB 18	37680-65-2	3	µg/kg	<3
PCB 28	7012-37-5	3	µg/kg	<3
PCB 52	35693-99-3	3	µg/kg	<3
PCB 44	41464-39-5	3	µg/kg	<3
PCB 66	32598-10-0	3	µg/kg	<3

Page Number : 4 of 8  
 Client : LAM GEOTECHNICS LIMITED  
 Work Order : HK0925750



Sub-Matrix: SEDIMENT				Client sample ID	D39-2
				Client sampling date / time	03-DEC-2009 15:45
Compound	CAS Number	LOR	Unit	HK0925750-001	
<b>EP-065: PCB Single Congeners - Continued</b>					
PCB 101	37680-73-2	3	µg/kg	Δ	
PCB 77	32598-13-3	3	µg/kg	Δ	
PCB 118	31508-00-6	3	µg/kg	Δ	
PCB 153	35065-27-1	3	µg/kg	Δ	
PCB 105	32598-14-4	3	µg/kg	Δ	
PCB 138	35065-28-2	3	µg/kg	Δ	
PCB 126	57465-28-8	3	µg/kg	Δ	
PCB 187	52663-68-0	3	µg/kg	Δ	
PCB 128	38380-07-3	3	µg/kg	Δ	
PCB 180	35065-29-3	3	µg/kg	Δ	
PCB 169	60044-26-0	3	µg/kg	Δ	
PCB 170	35065-30-6	3	µg/kg	Δ	
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>					
Nitrobenzene -d5	4165-60-0	0.1	%	54.8	Surrogate control limits listed at end of this report.
4-Terphenyl-d14	1718-51-0	0.1	%	66.9	
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>					
Decachlorobiphenyl	2051-24-3	0.1	%	83.2	Surrogate control limits listed at end of this report.



**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: 1187287)</b>									
HK0925684-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	38.1	39.6	3.8	
HK0925751-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.9	56.9	1.7	
<b>EG: Metals and Major Cations (QC Lot: 1187836)</b>									
HK0925750-001	D39-2	EG020: Mercury	7439-97-6	0.05	mg/kg	0.13	0.14	7.7	
		EG020: Silver	7440-22-4	0.1	mg/kg	2.6	2.5	0.0	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.4	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	8	8	0.0	
		EG020: Chromium	7440-47-3	1	mg/kg	54	53	2.3	
		EG020: Copper	7440-50-8	1	mg/kg	105	105	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	37	32	14.3	
		EG020: Nickel	7440-02-0	1	mg/kg	26	25	0.0	
HK0925759-001	Anonymous	EG020: Zinc	7440-66-6	1	mg/kg	159	142	11.4	
		EG020: Mercury	7439-97-6	0.05	mg/kg	0.16	0.15	0.0	
		EG020: Silver	7440-22-4	0.1	mg/kg	2.6	2.8	7.2	
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.4	0.5	0.0	
		EG020: Arsenic	7440-38-2	1	mg/kg	9	10	0.0	
		EG020: Chromium	7440-47-3	1	mg/kg	64	65	0.0	
		EG020: Copper	7440-50-8	1	mg/kg	126	126	0.0	
		EG020: Lead	7439-92-1	1	mg/kg	40	40	0.0	
		EG020: Nickel	7440-02-0	1	mg/kg	30	30	0.0	
		EG020: Zinc	7440-66-6	1	mg/kg	173	180	3.7	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>									
HK0925559-002	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0	
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0	
		Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0	
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0	
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0	
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0	
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0	
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0	
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0	
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0	
			207-08-9						
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0	
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0	
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0	
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0	
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0	
Anthracene	120-12-7	50	µg/kg	<50	<50	0.0			



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>									
HK0925559-002	Anonymous	Low M.W. PAHs		550	µg/kg	<550	<550	0.0	
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>									
HK0925559-002	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0	
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0	
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0	
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0	
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0	
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0	
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0	
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0	
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0	
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0	
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0	
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0	
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0	
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0	
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0	
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0	
		PCB 169	60044-26-0	3	µg/kg	<3	<3	0.0	
		PCB 170	35065-30-6	3	µg/kg	<3	<3	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: 1187836)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	87.9	---	85	115	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	90.3	---	85	115	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	89.8	---	85	115	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.0	---	85	115	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	88.5	---	85	115	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	101	---	85	115	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	93.2	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	90.5	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	89.0	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101)</b>											
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---
					49.9 µg/kg	79.2	---	58	123	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
					50.9 µg/kg	68.9	---	44	96	---	---
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	73.3	---	48	86	---	---



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1185101) - Continued</b>													
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---	---	
Fluorene	86-73-7	5	µg/kg	<50	51.0 µg/kg	70.3	---	---	51	91	---	---	
Phenanthrene	85-01-8	5	µg/kg	---	51.2 µg/kg	72.9	---	---	46	87	---	---	
Anthracene	120-12-7	5	µg/kg	<50	50.7 µg/kg	59.8	---	---	50	85	---	---	
Fluoranthene	206-44-0	5	µg/kg	<150	51.0 µg/kg	77.2	---	---	50	98	---	---	
Pyrene	129-00-0	5	µg/kg	<150	51.1 µg/kg	79.4	---	---	50	96	---	---	
Benz(a)anthracene	56-55-3	5	µg/kg	<150	50.1 µg/kg	82.2	---	---	55	114	---	---	
Chrysene	218-01-9	5	µg/kg	<150	50.8 µg/kg	82.4	---	---	45	118	---	---	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	5	µg/kg	<300	101.9 µg/kg	85.3	---	---	60	114	---	---	
Benzo(a)pyrene	50-32-8	5	µg/kg	<150	50.7 µg/kg	82.8	---	---	46	118	---	---	
Indeno(1.2.3.cd)pyrene	193-39-5	5	µg/kg	<150	49.0 µg/kg	72.8	---	---	40	194	---	---	
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	<150	50.2 µg/kg	67.3	---	---	14	188	---	---	
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	<150	50.7 µg/kg	80.6	---	---	25	182	---	---	
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---	---	
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---	---	
<b>EP-065: PCB Single Congeners (QC Lot: 1185102)</b>													
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.6	---	---	63	120	---	---	
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	84.5	---	---	61	121	---	---	
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	91.8	---	---	55	132	---	---	
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	89.0	---	---	68	121	---	---	
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	99.7	---	---	68	122	---	---	
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	108	---	---	69	113	---	---	
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	82.1	---	---	68	121	---	---	
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	85.6	---	---	41	142	---	---	
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	85.4	---	---	62	122	---	---	
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	82.8	---	---	60	122	---	---	
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	90.8	---	---	64	126	---	---	
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	81.3	---	---	60	124	---	---	
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	83.4	---	---	57	133	---	---	



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-065: PCB Single Congeners (QC Lot: 1185102) - Continued</b>												
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	96.3	---	65	121	---	---	
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	85.5	---	61	121	---	---	
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	83.3	---	64	124	---	---	
PCB 169	60044-26-0	3	µg/kg	<3	5 µg/kg	91.7	---	66	121	---	---	
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	83.7	---	70	122	---	---	

**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: 1187836)</b>										
HK0925749-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	89.8	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	93.8	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	95.0	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	80.0	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT			
Compound	CAS Number	Recovery Limits (%)	
		Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130

# ALS Technichem (HK) Pty Ltd

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES



## CERTIFICATE OF ANALYSIS

Client : LAM GEOTECHNICS LIMITED  
Contact : MR C M YEE  
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Telephone : +852 2839 5633  
Facsimile : ---  
Project : LG29024  
Order number : CV/2009/13  
C-O-C number : H008076  
Site : D45-1

Laboratory : ALS Technichem HK Pty Ltd  
Contact : Chan Kwok Fai, Godfrey  
Address : 11/F., Chung Shun Knitting Centre,  
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Quote number : HK/1313/2009\*\*

Page : 1 of 8  
Work Order : HK0926577  
Date Samples Received : 14-DEC-2009  
Issue Date : 18-JAN-2010  
No. of samples received : 1  
No. of samples analysed : 1

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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

Anh Ngoc Huynh  
Chan Siu Ming, Vico  
Wong Wing, Kenneth

### Position

Senior Chemist - Organics  
Chemist  
Assistant Supervisor

### Authorised results for

Organics  
Inorganics  
Inorganics

### ALS Laboratory Group

Trading Name: **ALS Technichem (HK) Pty Ltd**

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A Campbell Brothers Limited Company





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### **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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client. The completion date of analysis is: 17-DEC-2009

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: **HK0926577**

**Particular samples required dilution prior to PCB analysis due to matrix interference. LOR values have been adjusted accordingly.**

**Project Name: Kwai Tsing Container Basin - Marine Ground Investigation.**

**Sample(s) were received in an ambient condition.**

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

**Sediment sample(s) as received, digested by in-house method E-ASTM D3974-81 based on ASTM D3974-81, prior to the determination of metals.**

**The testing of PCB 8, PCB 66, PCB 77, PCB 126, PCB 149, PCB 169, PCB 187, PCB 195 and PCB 206 (Method: EP065) are not HOKLAS accredited.**



**Analytical Results**

Sub-Matrix: SEDIMENT		Client sample ID		D45-1	
		Client sampling date / time		14-DEC-2009 10:00	
Compound	CAS Number	LOR	Unit	HK0926577-001	
<b>EA/ED: Physical and Aggregate Properties</b>					
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	57.5	
<b>Metals and Major Cations</b>					
EG020: Arsenic	7440-38-2	1	mg/kg	10	
EG020: Cadmium	7440-43-9	0.2	mg/kg	0.9	
EG020: Chromium	7440-47-3	1	mg/kg	120	
EG020: Copper	7440-50-8	1	mg/kg	253	
EG020: Lead	7439-92-1	1	mg/kg	64	
EG020: Mercury	7439-97-6	0.05	mg/kg	0.52	
EG020: Nickel	7440-02-0	1	mg/kg	52	
EG020: Silver	7440-22-4	0.1	mg/kg	7.0	
EG020: Zinc	7440-66-6	1	mg/kg	245	
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs)</b>					
Naphthalene	91-20-3	50	µg/kg	<50	
Acenaphthylene	208-96-8	50	µg/kg	<50	
Acenaphthene	83-32-9	50	µg/kg	<50	
Fluorene	86-73-7	50	µg/kg	<50	
Phenanthrene	85-01-8	50	µg/kg	<50	
Anthracene	120-12-7	50	µg/kg	<50	
Fluoranthene	206-44-0	150	µg/kg	<150	
Pyrene	129-00-0	150	µg/kg	<150	
Benz(a)anthracene	56-55-3	150	µg/kg	<150	
Chrysene	218-01-9	150	µg/kg	<150	
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	
Low M.W. PAHs	---	550	µg/kg	<550	
High M.W. PAHs	---	1700	µg/kg	<1700	
<b>EP-065: PCB Single Congeners</b>					
PCB 8	34883-43-7	3	µg/kg	<12	
PCB 18	37680-65-2	3	µg/kg	<12	
PCB 28	7012-37-5	3	µg/kg	<12	
PCB 52	35693-99-3	3	µg/kg	<12	
PCB 44	41464-39-5	3	µg/kg	<12	
PCB 66	32598-10-0	3	µg/kg	<12	

Page Number : 4 of 8  
 Client : LAM GEOTECHNICS LIMITED  
 Work Order : HK0926577



Sub-Matrix: SEDIMENT		Client sample ID	D45-1				
		Client sampling date / time	14-DEC-2009 10:00				
Compound	CAS Number	LOR	Unit	HK0926577-001			
<b>EP-065: PCB Single Congeners - Continued</b>							
PCB 101	37680-73-2	3	µg/kg	<12			
PCB 77	32598-13-3	3	µg/kg	<12			
PCB 118	31508-00-6	3	µg/kg	<12			
PCB 153	35065-27-1	3	µg/kg	<12			
PCB 105	32598-14-4	3	µg/kg	<12			
PCB 138	35065-28-2	3	µg/kg	<12			
PCB 126	57465-28-8	3	µg/kg	<12			
PCB 187	52663-68-0	3	µg/kg	<12			
PCB 128	38380-07-3	3	µg/kg	<12			
PCB 180	35065-29-3	3	µg/kg	<12			
PCB 169	32774-16-6	3	µg/kg	<12			
PCB 170	35065-30-6	3	µg/kg	<12			
Surrogate control limits listed at end of this report.							
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>							
Nitrobenzene -d5	4165-60-0	0.1	%	62.6			
4-Terphenyl-d14	1718-51-0	0.1	%	86.4			
Surrogate control limits listed at end of this report.							
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>							
Decachlorobiphenyl	2051-24-3	0.1	%	Not Determined			



**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: 1198089)</b>								
HK0926565-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	48.2	48.6	0.7
HK0926571-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	22.0	21.1	3.9
<b>EG: Metals and Major Cations (QC Lot: 1210594)</b>								
HK0926577-001	D45-1	EG020: Mercury	7439-97-6	0.05	mg/kg	0.52	0.52	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	7.0	7.5	7.8
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.9	0.9	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	10	10	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	120	123	1.7
		EG020: Copper	7440-50-8	1	mg/kg	253	259	2.2
		EG020: Lead	7439-92-1	1	mg/kg	64	63	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	52	55	4.4
		EG020: Zinc	7440-66-6	1	mg/kg	245	248	1.2
HK0927023-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.13	0.12	8.5
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	2	2	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	16	14	10.0
		EG020: Copper	7440-50-8	1	mg/kg	8	7	0.0
		EG020: Lead	7439-92-1	1	mg/kg	23	19	16.6
		EG020: Nickel	7440-02-0	1	mg/kg	9	9	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	43	40	6.0
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1197387)</b>								
HK0926565-007	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1,2,3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	---	1700	µg/kg	<1700	<1700	0.0
		Benzo(b) & Benzo(k)fluoranthene	205-99-2	300	µg/kg	<300	<300	0.0
			207-08-9					
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0



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-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1197387) - Continued</b>								
HK0926565-007	Anonymous	Low M.W. PAHs		550	µg/kg	<550	<550	0.0
<b>EP-065: PCB Single Congeners (QC Lot: 1197388)</b>								
HK0926576-001	Anonymous	PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	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 (%)	
					n	LCS	DCS	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1210594)</b>											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	90.5	---	85	115	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	95.6	---	85	115	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	91.2	---	85	115	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	97.6	---	85	115	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	91.0	---	85	115	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	101	---	85	115	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	97.0	---	85	115	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	95.8	---	85	115	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	106	---	85	115	---	---
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1197387)</b>											
Naphthalene	91-20-3	5	µg/kg	---	49.9 µg/kg	71.5	---	53	107	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	50.9 µg/kg	53.0	---	44	86	---	---
Acenaphthene	83-32-9	5	µg/kg	---	50.4 µg/kg	54.0	---	45	89	---	---



Matrix: SOIL					Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method Blank (MB) Report					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
<b>EP-076: Polycyclic Aromatics Hydrocarbons (PAHs) (QC Lot: 1197387) - Continued</b>											
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
Fluorene	86-73-7	50	µg/kg	<50	---	---	---	---	---	---	---
					51.0 µg/kg	51.2	---	44	86	---	---
Phenanthrene	85-01-8	5	µg/kg	---	51.2 µg/kg	57.8	---	48	88	---	---
				<50	---	---	---	---	---	---	---
Anthracene	120-12-7	5	µg/kg	---	50.7 µg/kg	69.3	---	33	86	---	---
				<50	---	---	---	---	---	---	---
Fluoranthene	208-44-0	150	µg/kg	<150	---	---	---	---	---	---	---
					51.0 µg/kg	63.3	---	51	93	---	---
Pyrene	129-00-0	150	µg/kg	<150	---	---	---	---	---	---	---
					51.1 µg/kg	65.2	---	53	97	---	---
Benz(a)anthracene	56-55-3	150	µg/kg	<150	---	---	---	---	---	---	---
					50.1 µg/kg	61.0	---	57	92	---	---
Chrysene	218-01-9	150	µg/kg	<150	---	---	---	---	---	---	---
					50.8 µg/kg	67.4	---	57	98	---	---
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	300	µg/kg	<300	---	---	---	---	---	---	---
					101.9 µg/kg	63.6	---	63	96	---	---
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	---	---	---	---	---	---	---
					50.7 µg/kg	60.0	---	52	98	---	---
Indeno(1,2,3.cd)pyrene	193-39-5	5	µg/kg	---	---	---	---	---	---	---	---
				<150	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	5	µg/kg	---	---	---	---	---	---	---	---
				<150	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	5	µg/kg	---	---	---	---	---	---	---	---
				<150	50.7 µg/kg	55.6	---	46	100	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
<b>EP-065: PCB Single Congeners (QC Lot: 1197388)</b>											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	88.3	---	63	120	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	107	---	61	121	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	106	---	55	132	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	116	---	68	121	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	108	---	68	122	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	100	---	69	113	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	97.8	---	68	121	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	94.8	---	41	142	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	100	---	62	122	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	101	---	60	122	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	100	---	64	126	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	110	---	60	124	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	106	---	57	133	---	---



Method Blank (MB) Report					Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
<b>EP-065: PCB Single Congeners (QC Lot: 1197388) - Continued</b>											
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	104	---	65	121	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	107	---	61	121	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	108	---	64	124	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	109	---	66	121	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	108	---	70	122	---	---

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

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report											
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			MS	MSD	Low	High	Value	Control Limit
<b>EG: Metals and Major Cations (QC Lot: 1210594)</b>											
HK0926576-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	94.9	---	75	125	---	---	
		EG020: Cadmium	7440-43-9	5 mg/kg	92.5	---	75	125	---	---	
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Lead	7439-92-1	5 mg/kg	95.6	---	75	125	---	---	
		EG020: Mercury	7439-97-6	0.1 mg/kg	94.6	---	75	125	---	---	
		EG020: Nickel	7440-02-0	5 mg/kg	102	---	75	125	---	---	
		EG020: Silver	7440-22-4	5 mg/kg	85.3	---	75	125	---	---	
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---	

**Surrogate Control Limits**

Sub-Matrix: SEDIMENT			
Recovery Limits (%)			
Compound	CAS Number	Low	High
<b>EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates</b>			
Nitrobenzene -d5	4165-60-0	50	130
4-Terphenyl-d14	1718-51-0	50	130
<b>EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate</b>			
Decachlorobiphenyl	2051-24-3	50	130