





CEDD Contract No. GE/2012/24

Chemical and Biological Testing (Service Contract)

Service Order No. GE/2012/24.13

Desalination Plant at Tseung Kwan O – Feasibility Study

Laboratory Chemical Testing Report (Draft Report)

Prepared for

Civil Engineering and Development Department

Prepared By

ALS Technichem (HK) Pty Ltd

26 November, 2013



CEDD Contract No. GE/2012/24

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Desalination Plant at Tseung Kwan O – Feasibility Study

Laboratory Chemical Testing Report (Draft Report)


CLIENT:

Civil Engineering and Development
Department
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Kowloon, Hong Kong
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CERTIFIED BY:



Mr Fung Lim Chee, Richard
Person Appointed to Act for the Contractor

Date: November 26, 2013



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Section 1

Summary Report

Date of Issue: 25/10/2013
Client: Civil Engineering and Development Department
Service Order No.: GE/2012/24.13
Project: Desalination Plant at Tseung Kwan O – Feasibility Study

ALS Lab ID		HK1327406001	HK1327406002	HK1327406003	HK1327406004
Client Sample ID		GS 1	GS 2	GS 3	GS 4
Sampling Date	Unit	2/10/2013	2/10/2013	2/10/2013	2/10/2013
Physical and Aggregate Properties					
Ammonia as N	mg/kg	11.5	13.4	13.8	15.1
Reactive Phosphorus as P (Sol.)	mg/kg	2.0	<0.1	0.6	0.6
Total Kjeldahl Nitrogen as N	mg/kg	2600	730	940	870
Total Phosphorus as P	mg/kg	1020	864	788	844
Nitrate as N (Sol.)	mg/kg	<1.0	<1.0	<1.0	<1.0
Nitrite as N (Sol.)	mg/kg	<1.0	<1.0	<1.0	<1.0
Organichlorine Pesticides (OC)					
alpha-BHC	mg/kg	<0.50	<0.50	<0.50	<0.50
beta-BHC	mg/kg	<0.50	<0.50	<0.50	<0.50
gamma-BHC	mg/kg	<0.50	<0.50	<0.50	<0.50
delta-BHC	mg/kg	<0.50	<0.50	<0.50	<0.50
Heptachlor	mg/kg	<0.50	<0.50	<0.50	<0.50
Aldrin	mg/kg	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	mg/kg	<0.50	<0.50	<0.50	<0.50
Endosulfan 1	mg/kg	<0.50	<0.50	<0.50	<0.50
4,4'-DDE	mg/kg	<0.50	<0.50	<0.50	<0.50
4,4'-DDD	mg/kg	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	mg/kg	<0.50	<0.50	<0.50	<0.50
4,4'-DDT	mg/kg	<0.50	<0.50	<0.50	<0.50

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Sediment Quality Report

Project: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O – FEASIBILITY STUDY

Order No.: CONTRACT NO. GE/2012/24.13

Analyte Description			Silver	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury	Total Polychlorinated biphenyls	Low M.W. PAHs	High M.W. PAHs	Tributyl Tin	Classification
Unit (In dry Wt basis)			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	ug TBT/L	
Reporting Limits			0.1	1	0.2	1	1	1	1	1	0.05	18	550	1700	0.015	
Lower Chemical Exceedance Level (LCEL)			1	12	1.5	80	65	40	75	200	0.5	23	550	1700	0.15	
Upper Chemical Exceedance Level (UCEL)			<u>2</u>	<u>42</u>	<u>4</u>	<u>160</u>	<u>110</u>	<u>40</u>	<u>110</u>	<u>270</u>	<u>1</u>	<u>180</u>	<u>3160</u>	<u>9600</u>	<u>0.15</u>	
10 x (LCEL)			10	120	15	800	650	400	750	2000	5	230	5500	17000	1.5	
Sample Description																
ALS Lab ID	Sample ID	Sampling Date														
HK1327374001	REFERENCE	05/10/2013	0.1	7	<0.2	32	13	21	36	85	<0.05	<18	<550	<1700	<0.015	L

Bold: Value that exceed LCEL

Bold italic and Underlined: Value that exceed UCEL

Bold and Underlined: Value that exceed 10 x LCEL

Total PCB: Total PCBs calculated through summation of the 18 PCB congeners, based on raw data above the limit of detection of 1ug/kg.
For detailed information on the individual congeners please refer to the certificate of analysis for the work order.

Category L: Analytical results less than or equal to Lower Chemical Exceedance Level (LCEL)

Category M: Analytical results greater than Lower Chemical Exceedance Level (LCEL), but less than or equal to Upper Chemical Exceedance Level (UCEL)

Category H: Analytical results greater than Upper Chemical Exceedance Level (UCEL)

Category 10xLCEL: Analytical results greater than 10x Lower Chemical Exceedance Level (10xLCEL)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
Sediment Quality Report
Project: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O – FEASIBILITY STUDY
Order No.: CONTRACT NO. GE/2012/24.13

Analyte Description			Silver	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury	Total Polychlorinated biphenyls	Low M.W. PAHs	High M.W. PAHs	Tributyl Tin	Classification
Unit (In dry Wt basis)			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	ug TBT/L	
Reporting Limits			0.1	1	0.2	1	1	1	1	1	0.05	18	550	1700	0.015	
Lower Chemical Exceedance Level (LCEL)			1	12	1.5	80	65	40	75	200	0.5	23	550	1700	0.15	
Upper Chemical Exceedance Level (UCEL)			<u>2</u>	<u>42</u>	<u>4</u>	<u>160</u>	<u>110</u>	<u>40</u>	<u>110</u>	<u>270</u>	<u>1</u>	<u>180</u>	<u>3160</u>	<u>9600</u>	<u>0.15</u>	
10 x (LCEL)			10	120	15	800	650	400	750	2000	5	230	5500	17000	1.5	
Sample Description																
ALS Lab ID	Sample ID	Sampling Date														
HK1327299001	GS 1	02/10/2013	0.4	8	<0.2	32	24	17	35	102	0.10	<18	<550	<1700	<0.015	L
HK1327299002	GS 2	02/10/2013	0.2	5	<0.2	23	17	12	28	79	0.08	<18	<550	<1700	<0.015	L
HK1327299003	GS 3	02/10/2013	0.2	4	<0.2	26	18	14	25	74	0.06	<18	<550	<1700	<0.015	L
HK1327299004	GS 4	02/10/2013	0.3	3	<0.2	25	18	13	22	68	0.07	<18	<550	<1700	<0.015	L

Bold: Value that exceed LCEL

Bold Italic and Underlined: Value that exceed UCEL

Bold and Underlined: Value that exceed 10 x LCEL

Total PCB: Total PCBs calculated through summation of the 18 PCB congeners, based on raw data above the limit of detection of 1ug/kg.
For detailed information on the individual congeners please refer to the certificate of analysis for the work order.

Category L: Analytical results less than or equal to Lower Chemical Exceedance Level (LCEL)

Category M: Analytical results greater than Lower Chemical Exceedance Level (LCEL), but less than or equal to Upper Chemical Exceedance Level (UCEL)

Category H: Analytical results greater than Upper Chemical Exceedance Level (UCEL)

Category 10xLCEL: Analytical results greater than 10x Lower Chemical Exceedance Level (10xLCEL)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Sediment Quality Report

Project: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O – FEASIBILITY STUDY

Order No.: CONTRACT NO. GE/2012/24.13

Analyte Description			Silver	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury	Total Polychlorinated biphenyls	Low M.W. PAHs	High M.W. PAHs	Tributyl Tin	Classification
Unit (in dry Wt basis)			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	ug TBT/L	
Reporting Limits			0.1	1	0.2	1	1	1	1	1	0.05	18	550	1700	0.015	
Lower Chemical Exceedance Level (LCEL)			1	12	1.5	80	65	40	75	200	0.5	23	550	1700	0.15	
Upper Chemical Exceedance Level (UCEL)			<u>2</u>	<u>42</u>	<u>4</u>	<u>160</u>	<u>110</u>	<u>40</u>	<u>110</u>	<u>270</u>	<u>1</u>	<u>180</u>	<u>3160</u>	<u>9600</u>	<u>0.15</u>	
10 x (LCEL)			10	120	15	800	650	400	750	2000	5	230	5500	17000	1.5	
Sample Description																
ALS Lab ID	Sample ID	Sampling Date														
HK1327131001	SD2 0.00-0.90M	02/10/2013	0.6	8	<0.2	40	30	22	38	113	0.19	<18	<550	<1700	<0.015	L
HK1327131002	SD2 0.90-1.90M	02/10/2013	<0.1	6	<0.2	36	11	24	25	84	<0.05	<18	<550	<1700	<0.015	L
HK1327131003	SD2 1.90-2.90M	02/10/2013	<0.1	3	<0.2	32	7	22	15	69	<0.05	<18	<550	<1700	<0.015	L
HK1327131004	SD2 4.90-5.90M	02/10/2013	<0.1	5	<0.2	40	10	26	22	79	<0.05	<18	<550	<1700	IS	L
HK1327131005	SD2 7.90-8.90M	02/10/2013	<0.1	8	<0.2	49	14	33	29	93	<0.05	<18	<550	<1700	IS	L
HK1327131006	SD2 10.90-11.90M	02/10/2013	<0.1	<u>14</u>	<0.2	36	12	23	29	78	<0.05	<18	<550	<1700	IS	M

Bold: Value that exceed LCEL

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Total PCB: Total PCBs calculated through summation of the 18 PCB congeners, based on raw data above the limit of detection of 1ug/kg.
For detailed information on the individual congeners please refer to the certificate of analysis for the work order.

IS Denoted: Insufficient interstitial water generated for TBT analysis.

Category L: Analytical results less than or equal to Lower Chemical Exceedance Level (LCEL)

Category M: Analytical results greater than Lower Chemical Exceedance Level (LCEL), but less than or equal to Upper Chemical Exceedance Level (UCEL)

Category H: Analytical results greater than Upper Chemical Exceedance Level (UCEL)

Category 10xLCEL: Analytical results greater than 10x Lower Chemical Exceedance Level (10xLCEL)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Sediment Quality Report

Project: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O – FEASIBILITY STUDY

Order No.: CONTRACT NO. GE/2012/24.13

Analyte Description			Silver	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury	Total Polychlorinated biphenyls	Low M.W. PAHs	High M.W. PAHs	Tributyl Tin	Classification
Unit (In dry Wt basis)			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	ug TBT/L	
Reporting Limits			0.1	1	0.2	1	1	1	1	1	0.05	18	550	1700	0.015	
Lower Chemical Exceedance Level (LCEL)			1	12	1.5	80	65	40	75	200	0.5	23	550	1700	0.15	
Upper Chemical Exceedance Level (UCEL)			<u>2</u>	<u>42</u>	<u>4</u>	<u>160</u>	<u>110</u>	<u>40</u>	<u>110</u>	<u>270</u>	<u>1</u>	<u>180</u>	<u>3160</u>	<u>9600</u>	<u>0.15</u>	
10 x (LCEL)			10	120	15	800	650	400	750	2000	5	230	5500	17000	1.5	
Sample Description																
ALS Lab ID	Sample ID	Sampling Date														
HK1327039001	SD4 0.00-0.90M	30/09/2013	<0.1	3	<0.2	24	8	15	19	54	<0.05	<18	<550	<1700	<0.015	L
HK1327039002	SD4 0.90-1.90M	30/09/2013	<0.1	<1	<0.2	11	3	5	7	21	<0.05	<18	<550	<1700	<0.015	L

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Sediment Quality Report

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Order No.: CONTRACT NO. GE/2012/24.13

Analyte Description			Silver	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury	Total Polychlorinated biphenyls	Low M.W. PAHs	High M.W. PAHs	Tributyl Tin	Classification
Unit (In dry Wt basis)			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	ug TBT/L	
Reporting Limits			0.1	1	0.2	1	1	1	1	1	0.05	18	550	1700	0.015	
Lower Chemical Exceedance Level (LCEL)			1	12	1.5	80	65	40	75	200	0.5	23	550	1700	0.15	
Upper Chemical Exceedance Level (UCEL)			<u>2</u>	<u>42</u>	<u>4</u>	<u>160</u>	<u>110</u>	<u>40</u>	<u>110</u>	<u>270</u>	<u>1</u>	<u>180</u>	<u>3160</u>	<u>9600</u>	<u>0.15</u>	
10 x (LCEL)			<u>10</u>	<u>120</u>	<u>15</u>	<u>800</u>	<u>650</u>	<u>400</u>	<u>750</u>	<u>2000</u>	<u>5</u>	<u>230</u>	<u>5500</u>	<u>17000</u>	<u>1.5</u>	
Sample Description																
ALS Lab ID	Sample ID	Sampling Date														
HK1324961001	SD1 0.00-0.30M	10/09/2013	0.2	7	<0.2	13	13	4	37	81	0.12	<18	<550	<1700	<0.015	L
HK1324961002	SD3 0.00-0.60M	10/09/2013	0.2	5	<0.2	28	18	14	24	65	0.11	<18	<550	<1700	<0.015	L

Bold: Value that exceed LCEL

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Bold and Underlined: Value that exceed 10 x LCEL

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Category M: Analytical results greater than Lower Chemical Exceedance Level (LCEL), but less than or equal to Upper Chemical Exceedance Level (UCEL)

Category H: Analytical results greater than Upper Chemical Exceedance Level (UCEL)

Category 10xLCEL: Analytical results greater than 10x Lower Chemical Exceedance Level (10xLCEL)

Section 2

Certificate of Analysis



CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR SUN NG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1324961
Address	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: sunng@cedd.gov.hk	E-mail	: Richard.Fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O - FEASIBILITY STUDY	Quote number	: ----	Date Samples Received	: 10-SEP-2013
Order number	: GE/2012/24.13			Issue Date	: 26-SEP-2013
C-O-C number	: H028782			No. of samples received	: 2
Site	: ----			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	Position	Authorised results for
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Tai Yuk Lun, Stephen	Senior Chemist - Organics	Organics
Wong Wing, Kenneth	Assistant Supervisor - Metals	Inorganics



General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 19-SEP-2013

Key: LO_R = 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: **HK1324961**

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 D3974-09 based on ASTM D3974-09, prior to determination of metals.

Total PCBs results (Method: EP065) are not HOKLAS accredited. The values are calculated from summation of the 18 PCB congeners, based on Limit of Detection (LOD) of 1 µg/kg.



Analytical Results

Sub-Matrix: SEDIMENT

Compound	CAS Number	LOR	Unit	Client sample ID	SD1	SD3			
				Client sampling date / time	0.00-0.30M	0.00-0.60M			
				10-SEP-2013 15:15	10-SEP-2013 15:15	10-SEP-2013 13:15			
				HK1324961-001	HK1324961-001	HK1324961-002			
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103° C)		0.1	%		44.5	39.5			
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		7	5			
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg		13	28			
EG020: Copper	7440-50-8	1	mg/kg		13	18			
EG020: Lead	7439-92-1	1	mg/kg		37	24			
EG020: Mercury	7439-97-6	0.05	mg/kg		0.12	0.11			
EG020: Nickel	7440-02-0	1	mg/kg		4	14			
EG020: Silver	7440-22-4	0.1	mg/kg		0.2	0.2			
EG020: Zinc	7440-66-6	1	mg/kg		81	65			
EP-065: PCB Single Congeners									
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 44	41464-39-5	3	µg/kg		<3	<3			
PCB 52	35693-99-3	3	µg/kg		<3	<3			
PCB 66	32598-10-0	3	µg/kg		<3	<3			
PCB 77	32598-13-3	3	µg/kg		<3	<3			
PCB 101	37680-73-2	3	µg/kg		<3	<3			
PCB 105	32598-14-4	3	µg/kg		<3	<3			
PCB 118	31508-00-6	3	µg/kg		<3	<3			
PCB 126	57465-28-8	3	µg/kg		<3	<3			
PCB 128	38380-07-3	3	µg/kg		<3	<3			
PCB 138	35065-28-2	3	µg/kg		<3	<3			
PCB 153	35065-27-1	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			
PCB 180	35065-29-3	3	µg/kg		<3	<3			
PCB 187	52663-68-0	3	µg/kg		<3	<3			
Total Polychlorinated biphenyls		18	µg/kg		<18	<18			
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)									
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	85-018	50	µg/kg		<50	<50			



Sub-Matrix: SEDIMENT

Client sample ID

SD1
0.00-0.30M

SD3
0.00-0.60M

Client sampling date / time

10-SEP-2013 15:15

10-SEP-2013 13:15

Compound	CAS Number	LOR	Unit	HK1324961-001	HK1324961-002
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued					
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	218-019	150	µg/kg	<150	<150
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150
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	19124-2	150	µg/kg	<150	<150
Low M.W. PAHs	---	550	µg/kg	<550	<550
High M.W. PAHs	---	1700	µg/kg	<1700	<1700
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates					
Surrogate control limits listed at end of this report.					
2-Fluorobiphenyl	32160-8	0.1	%	67.6	69.0
4-Terphenyl-d14	1718-510	0.1	%	76.6	78.8
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate					
Surrogate control limits listed at end of this report.					
Decachlorobiphenyl	205124-3	0.1	%	55.6	55.8

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 Client : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
 Work Order : HK1324961



Sub-Matrix: INTERSTITIAL WATER				Client sample ID	SD1 0.00-0.30M	SD3 0.00-0.60M			
				Client sampling date / time	10-SEP-2013 15:15	10-SEP-2013 13:15			
Compound	CAS Number	LOR	Unit		HK1324961-001	HK1324961-002			
EP-390: Triorganotins									
Tributyltin	56573-85-4	0.015	µg TBT /L		<0.015	<0.015			



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 (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3062556)								
HK1324792-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	21.8	20.1	7.9
HK1324806-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	13.3	12.9	3.0
EG: Metals and Major Cations (QC Lot: 3061717)								
HK1324966-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.13	0.12	9.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.7	0.7	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	14	14	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	25	26	0.0
		EG020: Copper	7440-50-8	1	mg/kg	40	41	0.0
		EG020: Lead	7439-92-1	1	mg/kg	108	107	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	10	10	0.0
		EG020: Silver	7440-22-4	1	mg/kg	<1	<1	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	193	207	7.0
		HK1324966-009	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.43
EG020: Cadmium	7440-43-9			0.2	mg/kg	4.4	4.0	8.1
EG020: Arsenic	7440-38-2			1	mg/kg	112	124	10.8
EG020: Chromium	7440-47-3			1	mg/kg	33	38	13.9
EG020: Copper	7440-50-8			1	mg/kg	1010	1020	0.7
EG020: Lead	7439-92-1			1	mg/kg	123	141	13.6
EG020: Nickel	7440-02-0			1	mg/kg	28	32	13.7
EG020: Silver	7440-22-4			1	mg/kg	<1	<1	0.0
EG020: Zinc	7440-66-6			1	mg/kg	283	292	2.9
EP-065: PCB Single Congeners (QC Lot: 3060196)								
HK1324961-001	SD1 0.00-0.30M	Total Polychlorinated biphenyls	---	18	µg/kg	<18	<18	0.0
		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 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	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
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3060197)								



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3060197) - Continued								
HK1324961-001	SD1 0.00-0.30M	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		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
		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: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 3068890)								
HK1324961-002	SD3 0.00-0.60M	Tributyltin	56573-85-4	6	ngSn/L	<6	<6	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	
EG: Metals and Major Cations (QC Lot: 3061717)												
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	92.2	---	77	109	---	---	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	93.9	---	86	110	---	---	
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	94.5	---	88	120	---	---	
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	94.6	---	85	109	---	---	
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	93.2	---	84	106	---	---	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	99.8	---	80	112	---	---	
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	93.1	---	87	111	---	---	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	86.8	---	83	105	---	---	
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	96.5	---	82	126	---	---	
EP-065: PCB Single Congeners (QC Lot: 3060196)												
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	117	---	40	142	---	---	
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	113	---	39	131	---	---	
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	107	---	26	134	---	---	
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	110	---	32	130	---	---	
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	106	---	42	126	---	---	



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
EP-065: PCB Single Congeners (QC Lot: 3060196) - Continued											
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	115	---	33	123	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	114	---	59	125	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	110	---	60	119	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	116	---	56	121	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	115	---	60	119	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	116	---	60	117	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	116	---	58	117	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	115	---	59	128	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	114	---	61	120	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	115	---	50	123	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	116	---	50	130	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	114	---	56	124	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	110	---	56	122	---	---
Total Polychlorinated biphenyls	---	18	µg/kg	<18	---	---	---	---	---	---	---
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3060197)											
Napthalene	91-20-3	25	µg/kg	---	25 µg/kg	102	---	63	117	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	99.9	---	54	119	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	90.8	---	59	122	---	---
Fluorene	86-73-7	25	µg/kg	---	25 µg/kg	92.3	---	60	126	---	---
				<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	99.2	---	60	127	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	92.3	---	56	124	---	---
Fluoranthene	206-44-0	25	µg/kg	---	25 µg/kg	101	---	61	132	---	---
				<50	---	---	---	---	---	---	---
Pyrene	129-00-0	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	101	---	61	133	---	---
Benz(a)anthracene	56-55-3	25	µg/kg	---	25 µg/kg	95.5	---	57	124	---	---
				<50	---	---	---	---	---	---	---
Chrysene	218-01-9	25	µg/kg	---	25 µg/kg	101	---	60	128	---	---
				<50	---	---	---	---	---	---	---
Benzo(b)fluoranthene	205-99-2	25	µg/kg	---	25 µg/kg	99.9	---	48	135	---	---
				<50	---	---	---	---	---	---	---
Benzo(k)fluoranthene	207-08-9	25	µg/kg	---	25 µg/kg	98.5	---	58	133	---	---
				<50	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	25	µg/kg	---	25 µg/kg	90.0	---	50	124	---	---
				<50	---	---	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	193-39-5	25	µg/kg	---	25 µg/kg	98.0	---	48	134	---	---
				<50	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	25	µg/kg	---	25 µg/kg	95.7	---	50	137	---	---



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
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3060197) - Continued											
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<50	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	25	µg/kg	---	25 µg/kg	97.5	---	55	140	---	---
				<50	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---

Matrix: WATER		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
EP-390: Triorganotins (QC Lot: 3068890)											
Tributyltin	56573-85-4	5	ngSn/L	<5	2 ngSn/L	103	---	73	152	---	---

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
EG: Metals and Major Cations (QC Lot: 3061717)										
HK1324961-001	SD1 0.00-0.30M	EG020: Arsenic	7440-38-2	5 mg/kg	85.9	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	94.0	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	87.7	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	75.1	---	75	125	---	---
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	75.4	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	85.0	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	85.7	---	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
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR SUN NG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1327039
Address	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: sunng@cedd.gov.hk	E-mail	: Richard.Fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044	Date Samples Received	: 30-SEP-2013
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O - FEASIBILITY STUDY	Quote number	: ----	Issue Date	: 17-OCT-2013
Order number	: GE/2012/24.13			No. of samples received	: 2
C-O-C number	: H018128			No. of samples analysed	: 2
Site	: ----				

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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
Tai Yuk Lun, Stephen
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Position

Senior Chemist - Organics
Senior Chemist - Organics
Assistant Supervisor - Metals

Authorised results for

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A Campbell Brothers Limited Company

Page Number : 2 of 9
Client : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
Work Order : HK1327039



General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 11-OCT-2013

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: **HK1327039**

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 D3974-09 based on ASTM D3974-09, prior to determination of metals.

Total PCBs results (Method: EP065) are not HOKLAS accredited. The values are calculated from summation of the 18 PCB congeners, based on Limit of Detection (LOD) of 1 µg/kg.



Analytical Results

Sub-Matrix: SEDIMENT

				Client sample ID	SD4	SD4			
					0.00-0.90M	0.90-1.90M			
				Client sampling date / time	30-SEP-2013 13:40	30-SEP-2013 13:40			
Compound	CAS Number	LOR	Unit		HK1327039-001	HK1327039-002			
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103° C)		0.1	%		40.3	35.2			
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		3	<1			
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg		24	11			
EG020: Copper	7440-50-8	1	mg/kg		8	3			
EG020: Lead	7439-92-1	1	mg/kg		19	7			
EG020: Mercury	7439-97-6	0.05	mg/kg		<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg		15	5			
EG020: Silver	7440-22-4	0.1	mg/kg		<0.1	<0.1			
EG020: Zinc	7440-66-6	1	mg/kg		54	21			
EP-065: PCB Single Congeners									
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 44	41464-39-5	3	µg/kg		<3	<3			
PCB 52	35693-99-3	3	µg/kg		<3	<3			
PCB 66	32598-10-0	3	µg/kg		<3	<3			
PCB 77	32598-13-3	3	µg/kg		<3	<3			
PCB 101	37680-73-2	3	µg/kg		<3	<3			
PCB 105	32598-14-4	3	µg/kg		<3	<3			
PCB 118	31508-00-6	3	µg/kg		<3	<3			
PCB 126	57465-28-8	3	µg/kg		<3	<3			
PCB 128	38380-07-3	3	µg/kg		<3	<3			
PCB 138	35065-28-2	3	µg/kg		<3	<3			
PCB 153	35065-27-1	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			
PCB 180	35065-29-3	3	µg/kg		<3	<3			
PCB 187	52663-68-0	3	µg/kg		<3	<3			
Total Polychlorinated biphenyls		18	µg/kg		<18	<18			
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)									
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	85-01-9	50	µg/kg		<50	<50			



Sub-Matrix: SEDIMENT			Client sample ID	SD4 0.00-0.90M	SD4 0.90-1.90M			
			Client sampling date / time	30-SEP-2013 13:40	30-SEP-2013 13:40			
Compound	CAS Number	LOR	Unit	HK1327039-001	HK1327039-002			
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) -Continued								
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)fluoranthene	205-99-2	150	µg/kg	<150	<150			
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150			
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	160	µg/kg	<150	<150			
Benzo(g,h,i)perylene	19124-2	150	µg/kg	<150	<150			
Low M.W. PAHs	---	550	µg/kg	<550	<550			
High M.W. PAHs	---	1700	µg/kg	<1700	<1700			
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates						Surrogate control limits listed at end of this report.		
2-Fluorobiphenyl	32160-8	0.1	%	96.2	105			
4-Terphenyl-d14	1718-51-0	0.1	%	97.4	95.4			
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate						Surrogate control limits listed at end of this report.		
Decachlorobiphenyl	205124-3	0.1	%	54.0	57.5			



Sub-Matrix: INTERSTITIAL WATER

				Client sample ID	SD4 0.00-0.90M	SD4 0.90-1.90M			
				Client sampling date / time	30-SEP-2013 13:40	30-SEP-2013 13:40			
Compound	CAS Number	LOR	Unit		HK1327039-001	HK1327039-002			
EP-390: Triorganotins									
Tributyltin	56573-85-4	0.015	µg TBT /L		<0.015	<0.015			



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 (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3097645)								
HK1326937-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	36.0	34.9	3.3
HK1326938-004	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	35.0	35.2	0.6
EG: Metals and Major Cations (QC Lot: 3097552)								
HK1326772-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	1.21	1.22	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	2.1	1.7	19.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.8	0.8	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	14	12	12.1
		EG020: Chromium	7440-47-3	1	mg/kg	72	67	7.7
		EG020: Copper	7440-50-8	1	mg/kg	109	113	3.9
		EG020: Lead	7439-92-1	1	mg/kg	206	233	12.2
		EG020: Nickel	7440-02-0	1	mg/kg	31	31	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	248	265	6.9
HK1327039-001	SD4 0.00-0.90M	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	3	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	24	22	8.7
		EG020: Copper	7440-50-8	1	mg/kg	8	8	0.0
		EG020: Lead	7439-92-1	1	mg/kg	19	18	6.7
		EG020: Nickel	7440-02-0	1	mg/kg	15	13	9.6
		EG020: Zinc	7440-66-6	1	mg/kg	54	49	9.1
EP-065: PCB Single Congeners (QC Lot: 3088810)								
HK1326772-001	Anonymous	Total Polychlorinated biphenyls	---	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	∆	∆	0.0
		PCB 18	37680-65-2	3	µg/kg	∆	∆	0.0
		PCB 28	7012-37-5	3	µg/kg	∆	∆	0.0
		PCB 44	41464-39-5	3	µg/kg	∆	∆	0.0
		PCB 52	35693-99-3	3	µg/kg	∆	∆	0.0
		PCB 66	32598-10-0	3	µg/kg	∆	∆	0.0
		PCB 77	32598-13-3	3	µg/kg	∆	∆	0.0
		PCB 101	37680-73-2	3	µg/kg	∆	∆	0.0
		PCB 105	32598-14-4	3	µg/kg	∆	∆	0.0
		PCB 118	31508-00-6	3	µg/kg	∆	∆	0.0
		PCB 126	57465-28-8	3	µg/kg	∆	∆	0.0
		PCB 128	38380-07-3	3	µg/kg	∆	∆	0.0
		PCB 138	35065-28-2	3	µg/kg	∆	∆	0.0
		PCB 153	35065-27-1	3	µg/kg	∆	∆	0.0
		PCB 169	32774-16-6	3	µg/kg	∆	∆	0.0
		PCB 170	35065-30-6	3	µg/kg	∆	∆	0.0
		PCB 180	35065-29-3	3	µg/kg	∆	∆	0.0
		PCB 187	52663-68-0	3	µg/kg	∆	∆	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811)								



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811) - Continued								
HK1326772-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		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
		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: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 3102282)								
HK1327374-001	Anonymous	Tributyltin	56573-85-4	6	ngSn/L	<6	<6	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
EG: Metals and Major Cations (QC Lot: 3097552)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	95.2	---	77	109	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	103	---	86	110	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	98.7	---	88	120	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	93.4	---	85	109	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	93.3	---	84	106	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	89.0	---	80	112	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.3	---	87	111	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.3	---	83	105	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	100	---	82	126	---	---
EP-065: PCB Single Congeners (QC Lot: 3088810)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	102	---	40	142	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	104	---	39	131	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	114	---	26	134	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	115	---	32	130	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	110	---	42	126	---	---



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
EP-065: PCB Single Congeners (QC Lot: 3088810) - Continued											
PCB 66	32598-10-0	3	µg/kg	<Δ	5 µg/kg	110	---	33	123	---	---
PCB 77	32598-13-3	3	µg/kg	<Δ	5 µg/kg	115	---	59	125	---	---
PCB 101	37680-73-2	3	µg/kg	<Δ	5 µg/kg	108	---	60	119	---	---
PCB 105	32598-14-4	3	µg/kg	<Δ	5 µg/kg	78.4	---	56	121	---	---
PCB 118	31508-00-6	3	µg/kg	<Δ	5 µg/kg	78.7	---	60	119	---	---
PCB 126	57465-28-8	3	µg/kg	<Δ	5 µg/kg	103	---	60	117	---	---
PCB 128	38380-07-3	3	µg/kg	<Δ	5 µg/kg	104	---	58	117	---	---
PCB 138	35065-28-2	3	µg/kg	<Δ	5 µg/kg	106	---	59	128	---	---
PCB 153	35065-27-1	3	µg/kg	<Δ	5 µg/kg	105	---	61	120	---	---
PCB 169	32774-16-6	3	µg/kg	<Δ	5 µg/kg	91.0	---	50	123	---	---
PCB 170	35065-30-6	3	µg/kg	<Δ	5 µg/kg	106	---	50	130	---	---
PCB 180	35065-29-3	3	µg/kg	<Δ	5 µg/kg	89.6	---	56	124	---	---
PCB 187	52663-68-0	3	µg/kg	<Δ	5 µg/kg	100	---	56	122	---	---
Total Polychlorinated biphenyls	---	18	µg/kg	<18	---	---	---	---	---	---	---
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811)											
Naphthalene	91-20-3	25	µg/kg	---	25 µg/kg	94.0	---	63	117	---	---
				<50	---	---	---	---	---	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	86.9	---	54	119	---	---
Acenaphthene	83-32-9	25	µg/kg	---	25 µg/kg	91.8	---	59	122	---	---
				<50	---	---	---	---	---	---	---
Fluorene	86-73-7	25	µg/kg	---	25 µg/kg	97.3	---	60	126	---	---
				<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	25	µg/kg	---	25 µg/kg	93.5	---	60	127	---	---
				<50	---	---	---	---	---	---	---
Anthracene	120-12-7	25	µg/kg	---	25 µg/kg	86.0	---	56	124	---	---
				<50	---	---	---	---	---	---	---
Fluoranthene	206-44-0	25	µg/kg	---	25 µg/kg	102	---	61	132	---	---
				<50	---	---	---	---	---	---	---
Pyrene	129-00-0	25	µg/kg	---	25 µg/kg	101	---	61	133	---	---
				<50	---	---	---	---	---	---	---
Benzo(a)anthracene	56-55-3	25	µg/kg	---	25 µg/kg	85.4	---	57	124	---	---
				<50	---	---	---	---	---	---	---
Chrysene	218-01-9	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	92.0	---	60	128	---	---
Benzo(b)fluoranthene	205-99-2	25	µg/kg	---	25 µg/kg	99.9	---	48	135	---	---
				<50	---	---	---	---	---	---	---
Benzo(k)fluoranthene	207-08-9	25	µg/kg	---	25 µg/kg	95.9	---	58	133	---	---
				<50	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	77.4	---	50	124	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	---	---	---	---	---	---	---
				---	25 µg/kg	87.7	---	48	134	---	---
Dibenz(a,h)anthracene	53-70-3	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
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811) - Continued											
Dibenz(a,h)anthracene	53-70-3	25	µg/kg	---	25 µg/kg	87.5	---	50	137	---	---
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<50	---	---	---	---	---	---	---
					25 µg/kg	78.0	---	55	140	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---

Matrix: WATER		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
EP-390: Triorganotins (QC Lot: 3102282)											
Tributyltin	56573-85-4	5	ngSn/L	<5	5 ngSn/L	114	---	73	152	---	---

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
EG: Metals and Major Cations (QC Lot: 3097552)										
HK1326772-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	85.3	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	101	---	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	# Not Determined	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	90.0	---	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
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES



CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 12
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Telephone	: ----	Telephone	: +852 2610 1044	Issue Date	: 18-OCT-2013
Facsimile	: ----	Facsimile	: +852 2610 2021	No. of samples received	: 6
Project	: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O - FEASIBILITY STUDY	Quote number	: ----	No. of samples analysed	: 6
Order number	: GE/2012/24.13				
C-O-C number	: H018129				
Site	: ----				

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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
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Tai Yuk Lun, Stephen	Senior Chemist - Organics	Organics
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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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 11-OCT-2013

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: **HK1327131**

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 D3974-09 based on ASTM D3974-09, prior to determination of metals.

Analysis of Tributyltin in interstitial water was cancelled due to insufficient volume of interstitial water except Sample #1 SD2 0.00-0.90M, Sample #2 SD2 0.90-1.90M and Sample #3 SD2 1.90-2.90M.

Total PCBs results (Method: EP065) are not HOKLAS accredited. The values are calculated from summation of the 18 PCB congeners, based on Limit of Detection (LOD) of 1 µg/kg.



Analytical Results

Sub-Matrix: SEDIMENT

Compound	CAS Number	LOR	Unit	Client sample ID	Client sampling date / time	SD2	SD2	SD2	SD2	SD2			
				0.00-0.90M	0.90-1.90M	1.90-2.90M	4.90-5.90M	7.90-8.90M					
				HK1327131-001	[02-OCT-2013]	HK1327131-002	[02-OCT-2013]	HK1327131-003	[02-OCT-2013]	HK1327131-004	[02-OCT-2013]	HK1327131-005	[02-OCT-2013]
EA/ED: Physical and Aggregate Properties													
EA055: Moisture Content (dried @ 103° C)		0.1	%			52.7	43.5	34.2	45.2	48.9			
EG: Metals and Major Cations													
EG020: Arsenic	7440-38-2	1	mg/kg			8	6	3	5	8			
EG020: Cadmium	7440-43-9	0.2	mg/kg			<0.2	<0.2	<0.2	<0.2	<0.2			
EG020: Chromium	7440-47-3	1	mg/kg			40	36	32	40	49			
EG020: Copper	7440-50-8	1	mg/kg			30	11	7	10	14			
EG020: Lead	7439-92-1	1	mg/kg			38	25	15	22	29			
EG020: Mercury	7439-97-6	0.05	mg/kg			0.19	<0.05	<0.05	<0.05	<0.05			
EG020: Nickel	7440-02-0	1	mg/kg			22	24	22	26	33			
EG020: Silver	7440-22-4	0.1	mg/kg			0.6	<0.1	<0.1	<0.1	<0.1			
EG020: Zinc	7440-86-6	1	mg/kg			113	84	69	79	93			
EP-065: PCB Single Congeners													
PCB 8	34883-43-7	3	µg/kg			<3	<3	<3	<3	<3			
PCB 18	37680-65-2	3	µg/kg			<3	<3	<3	<3	<3			
PCB 28	7012-37-5	3	µg/kg			<3	<3	<3	<3	<3			
PCB 44	41464-39-5	3	µg/kg			<3	<3	<3	<3	<3			
PCB 52	35693-99-3	3	µg/kg			<3	<3	<3	<3	<3			
PCB 66	32598-10-0	3	µg/kg			<3	<3	<3	<3	<3			
PCB 77	32598-13-3	3	µg/kg			<3	<3	<3	<3	<3			
PCB 101	37680-73-2	3	µg/kg			<3	<3	<3	<3	<3			
PCB 105	32598-14-4	3	µg/kg			<3	<3	<3	<3	<3			
PCB 118	31508-00-6	3	µg/kg			<3	<3	<3	<3	<3			
PCB 126	57465-28-8	3	µg/kg			<3	<3	<3	<3	<3			
PCB 128	38380-07-3	3	µg/kg			<3	<3	<3	<3	<3			
PCB 138	35065-28-2	3	µg/kg			<3	<3	<3	<3	<3			
PCB 153	35065-27-1	3	µg/kg			<3	<3	<3	<3	<3			
PCB 169	32774-16-6	3	µg/kg			<3	<3	<3	<3	<3			
PCB 170	35065-30-6	3	µg/kg			<3	<3	<3	<3	<3			
PCB 180	35065-29-3	3	µg/kg			<3	<3	<3	<3	<3			
PCB 187	52663-68-0	3	µg/kg			<3	<3	<3	<3	<3			
Total Polychlorinated biphenyls		18	µg/kg			<18	<18	<18	<18	<18			
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)													
Naphthalene	91-20-3	50	µg/kg			<50	<50	<50	<50	<50			
Acenaphthylene	208-96-8	50	µg/kg			<50	<50	<50	<50	<50			
Acenaphthene	83-32-9	50	µg/kg			<50	<50	<50	<50	<50			
Fluorene	86-73-7	50	µg/kg			<50	<50	<50	<50	<50			
Phenanthrene	85-01-8	50	µg/kg			<50	<50	<50	<50	<50			



Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SD2	SD2	SD2	SD2	SD2
				0.00-0.90M [02-OCT-2013] HK1327131-001	0.90-1.90M [02-OCT-2013] HK1327131-002	1.90-2.90M [02-OCT-2013] HK1327131-003	4.90-5.90M [02-OCT-2013] HK1327131-004	7.90-8.90M [02-OCT-2013] HK1327131-005
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued								
Anthracene	120-12-7	50	µg/kg	<50	<50	<50	<50	<50
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150	<150	<150
Benzo(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150	<150	<150
Chrysene	218-019	150	µg/kg	<150	<150	<150	<150	<150
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	<150	<150	<150
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	<150	<150	<150
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150	<150	<150
Benzo(g,h,i)perylene	19124-2	150	µg/kg	<150	<150	<150	<150	<150
Low M.W. PAHs	----	550	µg/kg	<550	<550	<550	<550	<550
High M.W. PAHs	----	1700	µg/kg	<1700	<1700	<1700	<1700	<1700
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorobiphenyl	32160-8	0.1	%	88.6	93.3	96.8	103	89.2
4-Terphenyl-d14	1718-510	0.1	%	91.0	102	107	98.2	97.9
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate							Surrogate control limits listed at end of this report.	
Decachlorobiphenyl	205124-3	0.1	%	53.6	58.3	54.7	51.5	54.9



Sub-Matrix: SEDIMENT		Client sample ID		SD2	
		Client sampling date / time		10.90-11.90M	
				[02-OCT-2013]	
Compound	CAS Number	LOR	Unit	HK1327131-006	
EA/ED: Physical and Aggregate Properties					
EA055: Moisture Content (dried @ 103° C)	---	0.1	%	43.7	
EG: Metals and Major Cations					
EG020: Arsenic	7440-38-2	1	mg/kg	14	
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	
EG020: Chromium	7440-47-3	1	mg/kg	36	
EG020: Copper	7440-50-8	1	mg/kg	12	
EG020: Lead	7439-92-1	1	mg/kg	29	
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	
EG020: Nickel	7440-02-0	1	mg/kg	23	
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	
EG020: Zinc	7440-86-6	1	mg/kg	78	
EP-065: PCB Single Congeners					
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 44	41464-39-5	3	µg/kg	△	
PCB 52	35693-99-3	3	µg/kg	△	
PCB 66	32598-10-0	3	µg/kg	△	
PCB 77	32598-13-3	3	µg/kg	△	
PCB 101	37680-73-2	3	µg/kg	△	
PCB 105	32598-14-4	3	µg/kg	△	
PCB 118	31508-00-6	3	µg/kg	△	
PCB 126	57465-28-8	3	µg/kg	△	
PCB 128	38380-07-3	3	µg/kg	△	
PCB 138	35065-28-2	3	µg/kg	△	
PCB 153	35065-27-1	3	µg/kg	△	
PCB 169	32774-16-6	3	µg/kg	△	
PCB 170	35065-30-6	3	µg/kg	△	
PCB 180	35065-29-3	3	µg/kg	△	
PCB 187	52663-68-0	3	µg/kg	△	
Total Polychlorinated biphenyls	---	18	µg/kg	<18	
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)					
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	



Sub-Matrix: SEDIMENT		Client sample ID		SD2					
		Client sampling date / time		10.90-11.90M					
				[02-OCT-2013]					
Compound	CAS Number	LOR	Unit	HK1327131-006					
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued									
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)fluoranthene	205-99-2	150	µg/kg	<150					
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150					
Benzo(a)pyrene	50-32-6	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					
EP-076S: Polycyclic Aromatic Hydrocarbons (PAHs) Surrogates								Surrogate control limits listed at end of this report.	
2-Fluorobiphenyl	321-60-8	0.1	%	81.1					
4-Terphenyl-d14	1718-51-0	0.1	%	86.6					
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate								Surrogate control limits listed at end of this report.	
Decachlorobiphenyl	2051-24-3	0.1	%	52.8					

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 Client : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
 Work Order : HK1327131



Sub-Matrix: INTERSTITIAL WATER				Client sample ID			
				SD2	SD2	SD2	
				0.00-0.90M	0.90-1.90M	1.90-2.90M	
				[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]	
Compound	CAS Number	LOR	Unit	Client sampling date / time			
EP-390: Triorganotins							
Tributyltin	56573-85-4	0.015	µg TBT /L	HK1327131-001	HK1327131-002	HK1327131-003	
				<0.015	<0.015	<0.015	



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 (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3097645)								
HK1326937-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	36.0	34.9	3.3
HK1326938-004	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	35.0	35.2	0.6
EG: Metals and Major Cations (QC Lot: 3097552)								
HK1326772-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	1.21	1.22	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	2.1	1.7	19.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.8	0.8	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	14	12	12.1
		EG020: Chromium	7440-47-3	1	mg/kg	72	67	7.7
		EG020: Copper	7440-50-8	1	mg/kg	109	113	3.9
		EG020: Lead	7439-92-1	1	mg/kg	206	233	12.2
		EG020: Nickel	7440-02-0	1	mg/kg	31	31	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	248	265	6.9
HK1327039-001	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	3	3	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	24	22	8.7
		EG020: Copper	7440-50-8	1	mg/kg	8	8	0.0
		EG020: Lead	7439-92-1	1	mg/kg	19	18	6.7
		EG020: Nickel	7440-02-0	1	mg/kg	15	13	9.6
		EG020: Zinc	7440-66-6	1	mg/kg	54	49	9.1
EG: Metals and Major Cations (QC Lot: 3097554)								
HK1327131-004	SD2 4.90-5.90M	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	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.8
		EG020: Copper	7440-50-8	1	mg/kg	10	11	0.0
		EG020: Lead	7439-92-1	1	mg/kg	22	22	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	26	27	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	79	81	2.5
EP-065: PCB Single Congeners (QC Lot: 3088810)								
HK1326772-001	Anonymous	Total Polychlorinated biphenyls	---	18	µg/kg	<18	<18	0.0
		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 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	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 (%)
EP-065: PCB Single Congeners (QC Lot: 3088810) - Continued								
HK1326772-001	Anonymous	PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	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
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811)								
HK1326772-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		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
		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: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 3102282)								
HK1327374-001	Anonymous	Tributyltin	56573-85-4	6	ngSn/L	<6	<6	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
EG: Metals and Major Cations (QC Lot: 3097552)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	95.2	---	77	109	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	103	---	86	110	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	98.7	---	88	120	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	93.4	---	85	109	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	93.3	---	84	106	---	---



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
EG: Metals and Major Cations (QC Lot: 3097552) - Continued											
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	89.0	---	80	112	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	92.3	---	87	111	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	85.3	---	83	105	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	100	---	82	126	---	---
EG: Metals and Major Cations (QC Lot: 3097554)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	90.4	---	77	109	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	99.4	---	86	110	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.6	---	88	120	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	---	85	109	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	88.3	---	84	106	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	85.5	---	80	112	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	88.0	---	87	111	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	86.6	---	83	105	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.8	---	82	126	---	---
EP-065: PCB Single Congeners (QC Lot: 3088810)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	102	---	40	142	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	104	---	39	131	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	114	---	26	134	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	115	---	32	130	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	110	---	42	126	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	110	---	33	123	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	115	---	59	125	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	108	---	60	119	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	78.4	---	56	121	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	78.7	---	60	119	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	103	---	60	117	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	104	---	58	117	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	106	---	59	128	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	105	---	61	120	---	---
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	91.0	---	50	123	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	106	---	50	130	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.6	---	56	124	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	100	---	56	122	---	---
Total Polychlorinated biphenyls	---	18	µg/kg	<18	---	---	---	---	---	---	---
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811)											
Naphthalene	91-20-3	25	µg/kg	---	25 µg/kg	94.0	---	63	117	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
Acenaphthene	83-32-9	25	µg/kg	---	25 µg/kg	86.9	---	54	119	---	---
Fluorene	86-73-7	25	µg/kg	<50	---	---	---	59	122	---	---
				<50	25 µg/kg	97.3	---	60	126	---	---



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
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811) - Continued											
Phenanthrene	85-01-8	25	µg/kg	<50	25 µg/kg	93.5	---	60	127	---	---
Anthracene	120-12-7	25	µg/kg	<50	25 µg/kg	86.0	---	56	124	---	---
Fluoranthene	206-44-0	25	µg/kg	<50	25 µg/kg	102	---	61	132	---	---
Pyrene	129-00-0	25	µg/kg	<50	25 µg/kg	101	---	61	133	---	---
Benz(a)anthracene	56-55-3	25	µg/kg	<50	25 µg/kg	85.4	---	57	124	---	---
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	---	---	---	---	---	---
Benzo(b)fluoranthene	205-99-2	25	µg/kg	<50	25 µg/kg	92.0	---	60	128	---	---
Benzo(k)fluoranthene	207-08-9	25	µg/kg	<50	25 µg/kg	99.9	---	48	135	---	---
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	95.9	---	58	133	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	77.4	---	50	124	---	---
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	87.7	---	48	134	---	---
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	87.5	---	50	137	---	---
Low M.W. PAHs	---	550	µg/kg	<550	25 µg/kg	78.0	---	55	140	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
Matrix: WATER											
Matrix: WATER		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
EP-390: Triorganotins (QC Lot: 3102282)											
Tributyltin	56573-85-4	5	ngSn/L	<5	5 ngSn/L	114	---	73	152	---	---



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

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3097552)										
HK1326772-001	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	85.3	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	101	---	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	# Not Determined	---	75	125	---	---
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	90.0	---	75	125	---	---
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	---	75	125	---	---
EG: Metals and Major Cations (QC Lot: 3097554)										
HK1327131-003	SD2 1.90-2.90M	EG020: Arsenic	7440-38-2	5 mg/kg	105	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	104	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	78.4	---	75	125	---	---
		EG020: Lead	7439-92-1	50 mg/kg	88.2	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	96.5	---	75	125	---	---
		EG020: Nickel	7440-02-0	50 mg/kg	89.2	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	78.7	---	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
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES



CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR SUN NG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1327299
Address	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
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Project	: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O - FEASIBILITY STUDY	Quote number	: ----	Date Samples Received	: 02-OCT-2013
Order number	: GE/2012/24.13			Issue Date	: 21-OCT-2013
C-O-C number	: H018129			No. of samples received	: 4
Site	: ----			No. of samples analysed	: 4

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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
Tai Yuk Lun, Stephen	Senior Chemist - Organics	Organics
Wong Wing, Kenneth	Assistant Supervisor - Metals	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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 17-OCT-2013

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: **HK1327299**

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 D3974-09 based on ASTM D3974-09, prior to determination of metals.

Total PCBs results (Method: EP065) are not HOKLAS accredited. The values are calculated from summation of the 18 PCB congeners, based on Limit of Detection (LOD) of 1 µg/kg.



Analytical Results

Sub-Matrix: SEDIMENT

Compound	CAS Number	Client sample ID		GS 1	GS 2	GS 3	GS 4
		LOR	Unit	[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]
		Client sampling date / time		HK1327299-001	HK1327299-002	HK1327299-003	HK1327299-004
EA/ED: Physical and Aggregate Properties							
EA055: Moisture Content (dried @ 103°C)		0.1	%	52.9	38.0	37.6	44.9
EG: Metals and Major Cations							
EG020: Arsenic	7440-38-2	1	mg/kg	8	5	4	3
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	mg/kg	32	23	26	25
EG020: Copper	7440-50-8	1	mg/kg	24	17	18	18
EG020: Lead	7439-92-1	1	mg/kg	35	28	25	22
EG020: Mercury	7439-97-8	0.05	mg/kg	0.10	0.08	0.06	0.07
EG020: Nickel	7440-02-0	1	mg/kg	17	12	14	13
EG020: Silver	7440-22-4	0.1	mg/kg	0.4	0.2	0.2	0.3
EG020: Zinc	7440-66-6	1	mg/kg	102	79	74	68
EP-065: PCB Single Congeners							
PCB 8	34883-43-7	3	µg/kg	<3	<3	<3	<3
PCB 18	37680-65-2	3	µg/kg	<3	<3	<3	<3
PCB 28	7012-37-5	3	µg/kg	<3	<3	<3	<3
PCB 44	41464-39-5	3	µg/kg	<3	<3	<3	<3
PCB 52	35693-99-3	3	µg/kg	<3	<3	<3	<3
PCB 66	32598-10-0	3	µg/kg	<3	<3	<3	<3
PCB 77	32598-13-3	3	µg/kg	<3	<3	<3	<3
PCB 101	37680-73-2	3	µg/kg	<3	<3	<3	<3
PCB 105	32598-14-4	3	µg/kg	<3	<3	<3	<3
PCB 118	31509-00-6	3	µg/kg	<3	<3	<3	<3
PCB 126	57465-28-8	3	µg/kg	<3	<3	<3	<3
PCB 128	38380-07-3	3	µg/kg	<3	<3	<3	<3
PCB 138	35085-28-2	3	µg/kg	<3	<3	<3	<3
PCB 153	35085-27-1	3	µg/kg	<3	<3	<3	<3
PCB 169	32774-16-6	3	µg/kg	<3	<3	<3	<3
PCB 170	35065-30-6	3	µg/kg	<3	<3	<3	<3
PCB 180	35065-29-3	3	µg/kg	<3	<3	<3	<3
PCB 187	52663-66-0	3	µg/kg	<3	<3	<3	<3
Total Polychlorinated biphenyls		18	µg/kg	<18	<18	<18	<18
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)							
Naphthalene	91-20-3	50	µg/kg	<50	<50	<50	<50
Acenaphthylene	208-96-8	50	µg/kg	<50	<50	<50	<50
Acenaphthene	83-32-9	50	µg/kg	<50	<50	<50	<50
Fluorene	86-73-7	50	µg/kg	<50	<50	<50	<50
Phenanthrene	85-01-8	50	µg/kg	<50	<50	<50	<50
Anthracene	120-12-7	50	µg/kg	<50	<50	<50	<50



Sub-Matrix: SEDIMENT				GS 1	GS 2	GS 3	GS 4
Client sample ID				[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]
Client sampling date / time				HK1327299-001	HK1327299-002	HK1327299-003	HK1327299-004
Compound	CAS Number	LOR	Unit				
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued							
Fluoranthene	206-44-0	150	µg/kg	<150	<150	<150	<150
Pyrene	129-00-0	150	µg/kg	<150	<150	<150	<150
Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	<150	<150
Chrysene	218-019	150	µg/kg	<150	<150	<150	<150
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	<150	<150
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	<150	<150
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	<150	<150
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	<150	<150
Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	<150	<150
Benzo(g,h,i)perylene	191-24-2	150	µg/kg	<150	<150	<150	<150
Low M.W. PAHs	---	550	µg/kg	<550	<550	<550	<550
High M.W. PAHs	---	1700	µg/kg	<1700	<1700	<1700	<1700
EP-076S: Polycyclic Aromatic Hydrocarbons (PAHs) Surrogates							
				Surrogate control limits listed at end of this report.			
2-Fluorobiphenyl	321-60-8	0.1	%	83.2	75.7	82.3	70.6
4-Terphenyl-d14	1718-510	0.1	%	93.5	88.6	92.0	80.6
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate							
				Surrogate control limits listed at end of this report.			
Decachlorobiphenyl	2051-24-3	0.1	%	54.7	50.7	64.5	51.8

Page Number : 5 of 9
 Client : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
 Work Order : HK1327299



Sub-Matrix: INTERSTITIAL WATER			Client sample ID	GS 1	GS 2	GS 3	GS 4
			Client sampling date / time	[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]
Compound	CAS Number	LOR	Unit	HK1327299-001	HK1327299-002	HK1327299-003	HK1327299-004
EP-390: Triorganotins							
Tributyltin	56573-85-4	0.015	µg TBT /L	<0.015	<0.015	<0.015	<0.015



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 (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3110109)								
HK1327374-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	53.2	53.3	0.2
HK1327803-009	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	10.6	9.3	13.1
EG: Metals and Major Cations (QC Lot: 3097554)								
HK1327131-004	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	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.8
		EG020: Copper	7440-50-8	1	mg/kg	10	11	0.0
		EG020: Lead	7439-92-1	1	mg/kg	22	22	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	26	27	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	79	81	2.5
EP-065: PCB Single Congeners (QC Lot: 3088810)								
HK1326772-001	Anonymous	Total Polychlorinated biphenyls	---	18	µg/kg	<18	<18	0.0
		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 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	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
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811)								
HK1326772-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 308811) - Continued								
HK1326772-001	Anonymous	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
		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: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LDR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 3102282)								
HK1327374-001	Anonymous	Tributyltin	56573-85-4	6	ngSn/L	<6	<6	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
EG: Metals and Major Cations (QC Lot: 3097554)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	90.4	---	77	109	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	99.4	---	86	110	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.6	---	88	120	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	---	85	109	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	88.3	---	84	106	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	85.5	---	80	112	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	88.0	---	87	111	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	86.6	---	83	105	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.8	---	82	126	---	---

EP-065: PCB Single Congeners (QC Lot: 308810)											
Compound	CAS Number	LOR	Unit	Result	Spike Concentration	LCS	DCS	Low	High	Value	Control Limit
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	102	---	40	142	---	---
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	104	---	39	131	---	---
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	114	---	26	134	---	---
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	115	---	32	130	---	---
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	110	---	42	126	---	---
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	110	---	33	123	---	---
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	115	---	59	125	---	---
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	108	---	60	119	---	---
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	78.4	---	56	121	---	---
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	78.7	---	60	119	---	---
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	103	---	60	117	---	---
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	104	---	58	117	---	---
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	106	---	59	128	---	---
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	105	---	61	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
EP-065: PCB Single Congeners (QC Lot: 3088810) - Continued											
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	91.0	---	50	123	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	106	---	50	130	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	89.6	---	56	124	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	100	---	56	122	---	---
Total Polychlorinated biphenyls	---	18	µg/kg	<18	---	---	---	---	---	---	---
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3088811)											
Naphthalene	91-20-3	25	µg/kg	---	25 µg/kg	94.0	---	63	117	---	---
Acenaphthylene	208-96-8	50	µg/kg	<50	---	---	---	---	---	---	---
Acenaphthene	83-32-9	25	µg/kg	---	25 µg/kg	86.9	---	54	119	---	---
Fluorene	86-73-7	25	µg/kg	<50	---	---	---	---	---	---	---
Phenanthrene	85-01-8	25	µg/kg	---	25 µg/kg	91.8	---	59	122	---	---
Anthracene	120-12-7	25	µg/kg	<50	---	---	---	---	---	---	---
Fluoranthene	206-44-0	25	µg/kg	---	25 µg/kg	97.3	---	60	126	---	---
Pyrene	129-00-0	25	µg/kg	<50	---	---	---	---	---	---	---
Benz(a)anthracene	56-55-3	25	µg/kg	---	25 µg/kg	93.5	---	60	127	---	---
Chrysene	218-01-9	50	µg/kg	<50	---	---	---	---	---	---	---
Benzo(b)fluoranthene	205-99-2	25	µg/kg	---	25 µg/kg	86.0	---	56	124	---	---
Benzo(k)fluoranthene	207-08-9	25	µg/kg	<50	---	---	---	---	---	---	---
Benzo(a)pyrene	50-32-8	50	µg/kg	---	25 µg/kg	102	---	61	132	---	---
Indeno(1,2,3-cd)pyrene	193-39-5	50	µg/kg	<50	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	---	25 µg/kg	101	---	61	133	---	---
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<50	---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
Matrix: WATER											
Matrix: WATER		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



Matrix: WATER		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
EP-390: Triorganotins (QC Lot: 3102282)											
Tributyltin	56573-85-4	5	ngSn/L	<5	5 ngSn/L	114	---	73	152	---	---

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
EG: Metals and Major Cations (QC Lot: 3097554)										
HK1327131-003	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	105	---	75	125	---	---
		EG020: Cadmium	7440-43-9	5 mg/kg	104	---	75	125	---	---
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---
		EG020: Copper	7440-50-8	5 mg/kg	78.4	---	75	125	---	---
		EG020: Lead	7439-92-1	50 mg/kg	88.2	---	75	125	---	---
		EG020: Mercury	7439-97-6	0.1 mg/kg	96.5	---	75	125	---	---
		EG020: Nickel	7440-02-0	50 mg/kg	89.2	---	75	125	---	---
		EG020: Silver	7440-22-4	5 mg/kg	78.7	---	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
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130



CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 9
Contact	: MR SUN NG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1327374
Address	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
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Project	: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O - FEASIBILITY STUDY	Quote number	: ----	Date Samples Received	: 05-OCT-2013
Order number	: GE/2012/24.13			Issue Date	: 21-OCT-2013
C-O-C number	: H018131			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

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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	Position	Authorised results for
Anh Ngoc Huynh	Senior Chemist - Organics	Organics
Tai Yuk Lun, Stephen	Senior Chemist - Organics	Organics
Wong Wing, Kenneth	Assistant Supervisor - Metals	Inorganics

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A Campbell Brothers Limited Company

Page Number : 2 of 9
Client : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
Work Order : HK1327374



General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 17-OCT-2013

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: **HK1327374**

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 D3974-09 based on ASTM D3974-09, prior to determination of metals.

Total PCBs results (Method: EP065) are not HOKLAS accredited. The values are calculated from summation of the 18 PCB congeners, based on Limit of Detection (LOD) of 1 µg/kg.



Analytical Results

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	LDR	Unit	Client sample ID	REFERENCE			
				Client sampling date / time	05-OCT-2013 09:30			
					HK1327374-001			
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103° C)	---	0.1	%		53.2			
EG: Metals and Major Cations								
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		32			
EG020: Copper	7440-50-8	1	mg/kg		13			
EG020: Lead	7439-92-1	1	mg/kg		36			
EG020: Mercury	7439-97-6	0.05	mg/kg		<0.05			
EG020: Nickel	7440-02-0	1	mg/kg		21			
EG020: Silver	7440-22-4	0.1	mg/kg		0.1			
EG020: Zinc	7440-66-6	1	mg/kg		85			
EP-065: PCB Single Congeners								
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 44	41464-39-5	3	µg/kg		<3			
PCB 52	35693-99-3	3	µg/kg		<3			
PCB 66	32598-10-0	3	µg/kg		<3			
PCB 77	32598-13-3	3	µg/kg		<3			
PCB 101	37680-73-2	3	µg/kg		<3			
PCB 105	32598-14-4	3	µg/kg		<3			
PCB 118	31508-00-6	3	µg/kg		<3			
PCB 126	57465-28-8	3	µg/kg		<3			
PCB 128	38380-07-3	3	µg/kg		<3			
PCB 138	35065-28-2	3	µg/kg		<3			
PCB 153	35065-27-1	3	µg/kg		<3			
PCB 169	32774-16-6	3	µg/kg		<3			
PCB 170	35065-30-6	3	µg/kg		<3			
PCB 180	35065-29-3	3	µg/kg		<3			
PCB 187	52863-68-0	3	µg/kg		<3			
Total Polychlorinated biphenyls	---	18	µg/kg		<18			
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs)								
Naphthalene	9120-3	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			



Sub-Matrix: SEDIMENT			Client sample ID	REFERENCE				
			Client sampling date / time	05-OCT-2013 09:30				
Compound	CAS Number	LOR	Unit	HK1327374-001				
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued								
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	218-019	150	µg/kg	<150				
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150				
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150				
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				
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates								
								Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	32160-8	0.1	%	92.1				
4-Terphenyl-d14	1718-510	0.1	%	106				
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate								
								Surrogate control limits listed at end of this report.
Decachlorobiphenyl	2051-24-3	0.1	%	54.2				



Sub-Matrix: INTERSTITIAL WATER				Client sample ID	REFERENCE				
				Client sampling date / time	05-OCT-2013 09:30				
Compound	CAS Number	LOR	Unit		HK1327374-001				
EP-390: Triorganotins									
Tributyltin	56573-85-4	0.015	µg TBT /L		<0.015				



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 (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3110109)								
HK1327374-001	REFERENCE	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	53.2	53.3	0.2
HK1327803-009	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	10.6	9.3	13.1
EG: Metals and Major Cations (QC Lot: 3097554)								
HK1327131-004	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	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	41	2.8
		EG020: Copper	7440-50-8	1	mg/kg	10	11	0.0
		EG020: Lead	7439-92-1	1	mg/kg	22	22	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	26	27	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	79	81	2.5
EP-065: PCB Single Congeners (QC Lot: 3094434)								
HK1327374-001	REFERENCE	Total Polychlorinated biphenyls	---	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	∅	∅	0.0
		PCB 18	37680-65-2	3	µg/kg	∅	∅	0.0
		PCB 28	7012-37-5	3	µg/kg	∅	∅	0.0
		PCB 44	41464-39-5	3	µg/kg	∅	∅	0.0
		PCB 52	35693-99-3	3	µg/kg	∅	∅	0.0
		PCB 66	32598-10-0	3	µg/kg	∅	∅	0.0
		PCB 77	32598-13-3	3	µg/kg	∅	∅	0.0
		PCB 101	37680-73-2	3	µg/kg	∅	∅	0.0
		PCB 105	32598-14-4	3	µg/kg	∅	∅	0.0
		PCB 118	31508-00-6	3	µg/kg	∅	∅	0.0
		PCB 126	57465-28-8	3	µg/kg	∅	∅	0.0
		PCB 128	38380-07-3	3	µg/kg	∅	∅	0.0
		PCB 138	35065-28-2	3	µg/kg	∅	∅	0.0
		PCB 153	35065-27-1	3	µg/kg	∅	∅	0.0
		PCB 169	32774-16-6	3	µg/kg	∅	∅	0.0
		PCB 170	35065-30-6	3	µg/kg	∅	∅	0.0
		PCB 180	35065-29-3	3	µg/kg	∅	∅	0.0
		PCB 187	52663-68-0	3	µg/kg	∅	∅	0.0
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3094435)								
HK1327374-001	REFERENCE	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a,h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3094435) - Continued								
HK1327374-001	REFERENCE	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
		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: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 3102282)								
HK1327374-001	REFERENCE	Tributyltin	56573-85-4	6	ngSn/L	<6	<6	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
EG: Metals and Major Cations (QC Lot: 3097554)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	90.4	---	77	109	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	99.4	---	86	110	---	---
EG020: Chromium	7440-47-3	1	mg/kg	<1	5 mg/kg	93.6	---	88	120	---	---
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	91.2	---	85	109	---	---
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	88.3	---	84	106	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	85.5	---	80	112	---	---
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	88.0	---	87	111	---	---
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	5 mg/kg	86.6	---	83	105	---	---
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	97.8	---	82	126	---	---
EP-065: PCB Single Congeners (QC Lot: 3094434)											
PCB 8	34883-43-7	3	µg/kg	△	5 µg/kg	102	---	40	142	---	---
PCB 18	37680-65-2	3	µg/kg	△	5 µg/kg	118	---	39	131	---	---
PCB 28	7012-37-5	3	µg/kg	△	5 µg/kg	80.7	---	26	134	---	---
PCB 44	41464-39-5	3	µg/kg	△	5 µg/kg	100	---	32	130	---	---
PCB 52	35693-99-3	3	µg/kg	△	5 µg/kg	93.6	---	42	126	---	---
PCB 66	32598-10-0	3	µg/kg	△	5 µg/kg	102	---	33	123	---	---
PCB 77	32598-13-3	3	µg/kg	△	5 µg/kg	104	---	59	125	---	---
PCB 101	37680-73-2	3	µg/kg	△	5 µg/kg	86.9	---	60	119	---	---
PCB 105	32598-14-4	3	µg/kg	△	5 µg/kg	94.8	---	56	121	---	---
PCB 118	31508-00-6	3	µg/kg	△	5 µg/kg	106	---	60	119	---	---
PCB 126	57465-28-8	3	µg/kg	△	5 µg/kg	99.7	---	60	117	---	---
PCB 128	38380-07-3	3	µg/kg	△	5 µg/kg	84.4	---	58	117	---	---
PCB 138	35065-28-2	3	µg/kg	△	5 µg/kg	98.1	---	59	128	---	---
PCB 153	35065-27-1	3	µg/kg	△	5 µg/kg	102	---	61	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
EP-065: PCB Single Congeners (QC Lot: 3094434) - Continued											
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	78.0	---	50	123	---	---
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	102	---	50	130	---	---
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	84.3	---	56	124	---	---
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	92.2	---	56	122	---	---
Total Polychlorinated biphenyls	---	18	µg/kg	<18	---	---	---	---	---	---	---
EP-076A: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 3094435)											
Naphthalene	91-20-3	50	µg/kg	<50	---	---	---	---	---	---	---
					25 µg/kg	63.0	---	63	117	---	---
Acenaphthylene	208-96-8	25	µg/kg	<50	25 µg/kg	61.1	---	54	119	---	---
Acenaphthene	83-32-9	50	µg/kg	<50	---	---	---	---	---	---	---
					25 µg/kg	62.5	---	59	122	---	---
Fluorene	86-73-7	25	µg/kg	<50	25 µg/kg	67.4	---	60	126	---	---
					---	---	---	---	---	---	---
Phenanthrene	85-01-8	25	µg/kg	<50	25 µg/kg	64.5	---	60	127	---	---
					---	---	---	---	---	---	---
Anthracene	120-12-7	50	µg/kg	<50	---	---	---	---	---	---	---
					25 µg/kg	60.6	---	56	124	---	---
Fluoranthene	206-44-0	25	µg/kg	<50	25 µg/kg	67.6	---	61	132	---	---
					---	---	---	---	---	---	---
Pyrene	129-00-0	25	µg/kg	<50	25 µg/kg	66.8	---	61	133	---	---
					---	---	---	---	---	---	---
Benz(a)anthracene	56-55-3	25	µg/kg	<50	25 µg/kg	66.7	---	57	124	---	---
					---	---	---	---	---	---	---
Chrysene	218-01-9	50	µg/kg	<50	---	---	---	---	---	---	---
					25 µg/kg	67.7	---	60	128	---	---
Benzo(b)fluoranthene	205-99-2	25	µg/kg	<50	25 µg/kg	69.5	---	48	135	---	---
					---	---	---	---	---	---	---
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	---	---	---	---	---	---	---
					25 µg/kg	66.4	---	58	133	---	---
Benzo(a)pyrene	50-32-8	25	µg/kg	<50	25 µg/kg	60.4	---	50	124	---	---
					---	---	---	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	25	µg/kg	<50	25 µg/kg	61.6	---	48	134	---	---
					---	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	25	µg/kg	<50	25 µg/kg	65.3	---	50	137	---	---
					---	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	25	µg/kg	<50	25 µg/kg	62.3	---	55	140	---	---
					---	---	---	---	---	---	---
Low M.W. PAHs	---	550	µg/kg	<550	---	---	---	---	---	---	---
High M.W. PAHs	---	1700	µg/kg	<1700	---	---	---	---	---	---	---
Matrix: WATER											
Matrix: WATER		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



Matrix: WATER		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
EP-390: Triorganotins (QC Lot: 3102282)											
Tributyltin	56573-85-4	5	ngSn/L	<5	5 ngSn/L	114	---	73	152	---	---

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	
EG: Metals and Major Cations (QC Lot: 3097554)											
HK1327131-003	Anonymous	EG020: Arsenic	7440-38-2	5 mg/kg	105	---	75	125	---	---	
		EG020: Cadmium	7440-43-9	5 mg/kg	104	---	75	125	---	---	
		EG020: Chromium	7440-47-3	5 mg/kg	# Not Determined	---	75	125	---	---	
		EG020: Copper	7440-50-8	5 mg/kg	78.4	---	75	125	---	---	
		EG020: Lead	7439-92-1	50 mg/kg	88.2	---	75	125	---	---	
		EG020: Mercury	7439-97-6	0.1 mg/kg	96.5	---	75	125	---	---	
		EG020: Nickel	7440-02-0	50 mg/kg	89.2	---	75	125	---	---	
		EG020: Silver	7440-22-4	5 mg/kg	78.7	---	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
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130



CERTIFICATE OF ANALYSIS

Client	: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Laboratory	: ALS Technichem HK Pty Ltd	Page	: 1 of 4
Contact	: MR SUN NG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1327406
Address	: GEOTECHNICAL PROJECTS DIVISION, GEOTECHNICAL ENGINEERING OFFICE, 23/F., KWUN TONG VIEW, 410 KWUN TONG ROAD, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: sunng@cedd.gov.hk	E-mail	: Richard.Fung@alsglobal.com	Date Samples Received	: 02-OCT-2013
Telephone	: -----	Telephone	: +852 2610 1044	Issue Date	: 21-OCT-2013
Facsimile	: -----	Facsimile	: +852 2610 2021	No. of samples received	: 4
Project	: AGREEMENT NO CE 21_2012 (WS) DESALINATION PLANT AT TSEUNG KWAN O - FEASIBILITY STUDY	Quote number	: -----	No. of samples analysed	: 4
Order number	: GE/2012/24.13				
C-O-C number	: H018129				
Site	: -----				

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 21-OCT-2013

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: **HK1327406**

Reactive Phosphorus, Nitrate and Nitrite determined and reported on a 1:5 soil / water extract.

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.

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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
Fung Lim Chee, Richard

Position

Senior Chemist
General Manager

Authorised results for

Organics
Inorganics



Analytical Results

Sub-Matrix: SEDIMENT

Compound	CAS Number	LOR	Unit	Client sample ID	GS 1	GS 2	GS 3	GS 4
				Client sampling date / time	[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]	[02-OCT-2013]
					HK1327406-001	HK1327406-002	HK1327406-003	HK1327406-004
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	---	0.1	%		52.9	38.0	37.6	44.9
ED/EK: Inorganic Nonmetallic Parameters								
EK055: Ammonia as N	7664-417	0.1	mg/kg		11.5	13.4	13.8	15.1
EK057A: Nitrite as N (Sol.)	---	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0
EK058A: Nitrate as N (Sol.)	---	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0
EK061A: Total Kjeldahl Nitrogen as N	---	50	mg/kg		2600	730	940	870
EK067A: Total Phosphorus as P	---	10	mg/kg		1020	864	788	844
EK071K: Reactive Phosphorus as P (Sol.)	14265-44-2	0.1	mg/kg		2.0	<0.1	0.6	0.6
EP-067_SR-A: Organichlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
Aldrin	309-00-2	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
Endosulfan 1	959-98-8	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
4,4'-DDE	72-55-6	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
4,4'-DDD	72-54-8	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	103107-8	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
4,4'-DDT	50-29-3	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50
EP-067_SR-S: Pesticide Surrogate								
Tetrachlorometaxylene	877-09-8	0.1	%		110	98.8	105	105
Dibutylchlorendate	1770-80-5	0.1	%		82.0	83.8	81.2	79.8

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 (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 3110109)								
HK1327374-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	53.2	53.3	0.2
HK1327803-009	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	10.6	9.3	13.1
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3101011)								
HK1326548-001	Anonymous	EK061A: Total Kjeldahl Nitrogen as N	---	20	mg/kg	1170	1200	2.6
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3101012)								
HK1326548-001	Anonymous	EK067A: Total Phosphorus as P	---	20	mg/kg	828	947	13.4
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3117444)								
HK1327406-001	GS 1	EK055: Ammonia as N	7664-41-7	0.1	mg/kg	11.5	12.8	11.2
EP-067 SR-A: Organichlorine Pesticides (OC) (QC Lot: 3109403)								
HK1327406-001	GS 1	alpha-BHC	319-84-6	0.50	mg/kg	<0.50	<0.50	0.0
		beta-BHC	319-85-7	0.50	mg/kg	<0.50	<0.50	0.0
		gamma-BHC	58-89-9	0.50	mg/kg	<0.50	<0.50	0.0
		delta-BHC	319-86-8	0.50	mg/kg	<0.50	<0.50	0.0
		Heptachlor	76-44-8	0.50	mg/kg	<0.50	<0.50	0.0
		Aldrin	309-00-2	0.50	mg/kg	<0.50	<0.50	0.0
		Heptachlor epoxide	1024-57-3	0.50	mg/kg	<0.50	<0.50	0.0
		Endosulfan 1	959-98-8	0.50	mg/kg	<0.50	<0.50	0.0
		4,4'-DDE	72-55-9	0.50	mg/kg	<0.50	<0.50	0.0
		4,4'-DDD	72-54-8	0.50	mg/kg	<0.50	<0.50	0.0
		Endosulfan sulfate	1031-07-8	0.50	mg/kg	<0.50	<0.50	0.0
		4,4'-DDT	50-29-3	0.50	mg/kg	<0.50	<0.50	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
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3097909)											
EK057A: Nitrite as N (Sol.)	---	0.1	mg/kg	<0.1	2 mg/kg	99.8	---	85	115	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3101011)											
EK061A: Total Kjeldahl Nitrogen as N	---	20	mg/kg	<20	1000 mg/kg	89.6	---	85	115	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3101012)											
EK067A: Total Phosphorus as P	---	20	mg/kg	<20	320 mg/kg	89.6	---	85	115	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 3117444)											
EK055: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	100	---	85	115	---	---
EP-067 SR-A: Organichlorine Pesticides (OC) (QC Lot: 3109403)											
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	88.0	---	56	126	---	---
beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.25 mg/kg	85.6	---	43	133	---	---
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.25 mg/kg	88.2	---	47	128	---	---
delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	95.0	---	61	119	---	---
Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	90.2	---	43	119	---	---



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
EP-067_SR-A: Organichlorine Pesticides (OC) (QC Lot: 3109403) - Continued											
Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	86.6	---	67	113	---	---
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	87.6	---	58	116	---	---
Endosulfan 1	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	89.6	---	56	117	---	---
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	86.4	---	49	129	---	---
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	80.8	---	53	119	---	---
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	86.0	---	39	132	---	---
4,4'-DDT	50-29-3	0.05	mg/kg	<0.05	0.25 mg/kg	93.8	---	32	126	---	---

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

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

Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-067_SR-S: Pesticide Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

Section 3

Summary of Sample Receipt Condition and Analysis Date

Summary of Sample Receipt Condition and Analysis Date

Date of Issue: 25/11/2013
Client: Civil Engineering and Development Department
Service Order No.: GE/2012/24.13
Project: Desalination Plant at Tseung Kwan O – Feasibility Study

ALS Lab ID	Client Sample ID	Sampling Date	Receipt Details			Storage Condition*	Testing Date		
			Date	Time	Condition		Metals	Inorganic	Organics
HK1324961001	SD1 0.00-0.30M	10/09/2013	10/09/2013	17:20	chilled	4oC	19/09/2013	--	19/09/2013
HK1324961002	SD3 0.00-0.60M	10/09/2013	10/09/2013	17:20	chilled	4oC	19/09/2013	--	19/09/2013
HK1327039001	SD4 0.00-0.90M	30/09/2013	30/09/2013	16:50	chilled	4oC	10/10/2013	--	11/10/2013
HK1327039002	SD4 0.90-1.90M	30/09/2013	30/09/2013	16:50	chilled	4oC	10/10/2013	--	11/10/2013
HK1327131001	SD2 0.00-0.90M	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327131002	SD2 0.90-1.90M	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327131003	SD2 1.90-2.90M	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327131004	SD2 4.90-5.90M	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327131005	SD2 7.90-8.90M	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327131006	SD2 10.90-11.90M	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327299001	GS 1	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327299002	GS 2	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327299003	GS 3	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327299004	GS 4	02/10/2013	02/10/2013	16:45	chilled	4oC	10/10/2013	--	11/10/2013
HK1327374001	REFERENCE	05/10/2013	05/10/2013	10:55	chilled	4oC	10/10/2013	--	11/10/2013
HK1327406001	GS 1	02/10/2013	02/10/2013	16:45	chilled	4oC	--	16/10/2013	16/10/2013
HK1327406002	GS 2	02/10/2013	02/10/2013	16:45	chilled	4oC	--	16/10/2013	16/10/2013
HK1327406003	GS 3	02/10/2013	02/10/2013	16:45	chilled	4oC	--	16/10/2013	16/10/2013
HK1327406004	GS 4	02/10/2013	02/10/2013	16:45	chilled	4oC	--	16/10/2013	16/10/2013

* Container for sample storage: 250ml Glass Jar with Teflon Lined Lid for soil / sediment sample.

Section 4

Chain of Custody (COC) Form

CHAIN OF CUSTODY DOCUMENTATION

H 028782



ALS Laboratory Group

CLIENT: CEDD (6E/2012/03.27)
 ADDRESS / OFFICE:
 PROJECT MANAGER (PM): Lo Wing Fun (Samon)

SAMPLER: Vibro Core
 MOBILE: 9273 885
 PHONE:

PROJECT ID:
 SITE: Desalination Plant at Tsing Kwan O P.O. NO.:

EMAIL REPORT TO:
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.:

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

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Cd	Cu	Cu	Hg	Ni	Pb	Ag	Zn	As	PAHs	Total PCBs	TST
----	----	----	----	----	----	----	----	----	------	------------	-----

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

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	S01 0.30-0.30m		10/9/13	15:15	V100	
2	S03 0.30-0.60m		10/9/13	15:15	V100	

✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
---	---	---	---	---	---	---	---	---	---	---	---

RELINQUISHED BY:
 Name: Kwok Wai Lam (65465403) Date: 10/9/13
 Of: Samon Time: 17:15
 Name: Mr. Lo (69035050) Date: 10/9/13
 Of: RV Time: 17:15

RECEIVED BY:
 Name: Wai Wai Date: 10/9/13
 Of: ALS Time: 17:20

METHOD OF SHIPMENT
 Con' Note No:
 Transport Co.:

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

CHAIN OF CUSTODY DOCUMENTATION

H 018129



ALS Laboratory Group

CLIENT: CEDD (57812012/03.27)
 ADDRESS / OFFICE:
 PROJECT MANAGER (PM): Lo Wing Fan
 PROJECT ID:
 SITE: Desalination Plant AT P.O. NO.:

SAMPLER: VC100 & Grab Sample
 MOBILE: 9273 9890
 PHONE: 3191 5227
 EMAIL REPORT TO:
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.:

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

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Cd	Cr	Cu	Hg	Ni	Pb	Ag	ZA	As	PAHs	Total PCBs	TBT
----	----	----	----	----	----	----	----	----	------	------------	-----

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

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
	SD2	0.00 - 0.40 0.90 - 1.40 1.90 - 2.40 4.90 - 5.40 7.40 - 8.40 9.40 - 11.40	02/10/2013		VC100	
	G S 1		02/10/2013		Grab	
	G S 2					
	G S 3					
	G S 4					

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RELINQUISHED BY:
 Name: Leung Wai Kenny (92759206) Date: 02/10/2013
 Of: Granman Time:
 Name: Mr Law 6903 5050 Date:
 Of: DV Time:

RECEIVED BY:
 Name: Lo Wing Fan Date: 02/10/2013
 Of: ALS Time:
 Name: Date:
 Of: Time:

METHOD OF SHIPMENT
 Con. Note No:
 Transport Co:

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

CHAIN OF CUSTODY DOCUMENTATION

H 018130



ALS Laboratory Group

CLIENT: CEPD GE/2012/03.27
 ADDRESS / OFFICE:
 PROJECT MANAGER (PM): Lo Wing Fan
 PROJECT ID:
 SITE: Desalination Plant at the P.O. NO.:

SAMPLER: VCI00
 MOBILE: 9273 9890
 PHONE: 3191 5227
 EMAIL REPORT TO:
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.:
 FOR LABORATORY USE ONLY
 COOLER SEAL (circle appropriate)
 Intact: Yes No N/A
 SAMPLE TEMPERATURE
 CHILLED: Yes No No

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

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

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
	<u>SP2 2.90m - 3.90m</u>		<u>02/10/2013</u>		<u>VCI00</u>	
	<u>3.90m - 4.90m</u>					
	<u>5.90m - 6.90m</u>					
	<u>8.90m - 9.90m</u>					
	<u>9.90m - 10.90m</u>					
	<u>12.90m - 13.90m</u>					

For Storage

ALS TECHNICAL SERVICES LTD
 17/12/2013
 2 OCT 2013
 RECEIVED

RELINQUISHED BY:
 Name: Lo Wing Fan (9273 9206) Date: 2/10/2013
 Of: Grammon Time:
 Name: Mr Law 6903 5050 Date:
 Of: BV Time:

RECEIVED BY:
 Name: Lo Wing Fan Date: 2/10/13
 Of: ALS Time: 1645
 Name: Date:
 Of: Time:

METHOD OF SHIPMENT
 Con' Note No:
 Transport Co:

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

ALS Laboratory Group

WHITE - LAB COPY
 YELLOW - CUSTOMER COPY
 PINK - BOOK COPY

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