Biological Testing

Amphipod Test

Lam Laboratories Limited

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Test report

Report No. **Project Name** Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains From West Kowloon to Sai Ying Pun -Investigation **Customer Name** Geotechnical Projects Division, Geotechnical Engineering Office, Civil Engineering and Development Department **Customer Address** 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong Contract No. GE/2005/47 Works Order No. GE/2005/47.19 Lab. Job No. J469 Lab. Sample Ref. No. 18263/1-9 No. of Sample(s) 10 no. of samples stated as sediment were received on chilled condition & Description 9 no. of samples were tested including VC4a (10.9m - 11.9m), VC7a (0.9m - 1.9m), VC8a (10.9m - 11.9m), VC11a (0.9m - 1.9m), VC12a (0.0m - 0.9m),

VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m), VC14a (0.0m - 0.9m),

VC15a (10.9m - 11.9m) & Reference Sediment

as per customer's instruction

6 -22 Sept, 2006

29 Oct - 8 Nov, 2006

Test Parameter

Test Date

Sample Receive Date

Parameter	Test Method
Amphipod Sediment Bioassay	USEPA 1994

Note(s):

- 1. Uncertainty is calculated as 2 SD.
- Standard Method: Methods for Assessing Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods. EPA/600/R-94/025, USEPA, 1994.
- 3. This is the final report and supersedes the draft report with the same report number.

Authorized signatory:

Date: 22-Dec-2006

Yi Zhang
(Ecotoxicologist)

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Lam Laboratories Limited Room 1412, Honour Industrial Centre, 6 Sun Yip Street, Chaiwan, Hong Kong.

Tel: (852) 2897 3282 Fax: (852) 2897 5509 Email: info@lamlab.com

Report no.:

Test report

101864N

1, Method

This 10-day toxicity test with Leptocheirus plumulosus was conducted using the USEPA method (1994) "Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods". Leptocheirus plumulosus is exposed to the test sediment overlaid with seawater for a 10-day test period and survival rate is determined as the primary endpoint.

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2. Sample storage and pretreatment

All samples were homogenized thoroughly. Debris and indigenous organisms present in the sediment were removed and the sediment samples were stored at 4°C in dark until analyzed.

3. Test organism

Species:

Leptocheirus plumulosus

Source:

Purchased from research organism supplier from USA, mortality during

shipping was 0.79%

Size/age:

3-4 mm in length

Acclimation:

under test conditions with feeding provided, as per USEPA 1994, mortality

during acclimation was 4.35%

Health condition:

healthy

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4, Summary of test particulars

Type of test:

Duration:

static

29 Oct - 8 Nov, 2006

mud and sand collected from a clean area on the eastern coast of the New Control sediment: Territories and Hong Kong Island respectively, shipped to the laboratory on the

same day, sieved through 425 micrometer mesh sieve, mixed and stored at

4°C in dark dark until use

Control seawater:

reconstituted seawater prepared with the Instant Ocean salt at 20 ppt, aerated

for two days after preparation

Test temperature:

25±1°C

Lighting:

continuous

Aeration:

provided (around 100 bubbles/min)

Test vessel:

1000ml glass jars

Volume of sediment:

175ml

Volume of overlying water:

775 ml

No. of replicates:

5

No. of organisms/replicate:

20

Feeding:

none

Monitoring:

temperature, DO, pH and salinity in overlying water everyday, ammonia in

overlying water at test initiation and termination

Reference toxicant test:

96 hour water only test with CdCl2

Report no.:

101864N

5. Summary of test results

Table 1. Survival of amphipods on Day 10

	Number of living amphipod on Day 10							
Sample ID	Replicate	Replicate	Replicate	Replicate	Replicate	Mean	SD	
	_ 1	2	3	4	5			
Negative Control with sediment	20	19	19	19	20	19.4	0.5	
VC4a (0.9m - 1.9m)	16	16	15	12	15	14.8	1.6	
VC7a (0.9m - 1.9m)	16	14	14	14	19	15.4	2.2	
VC8a (10.9m - 11.9m)	15	17	19	16	14	16.2	1.9	
VC11a (0.9m - 1.9m)	15	14	15	11	15	14.0	1.7	
VC12a (0.0m - 0.9m)	17	18	18	14	14	16.2	2.0	
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	14	12	16	15	14	14,2	1.5	
VC14a (0.0m - 0.9m)	15	18	14	19	17	16,6	2,1	
VC15a (10.9m - 11.9m)	9	7	10	11	12	9.8	1.9	
Reference sediment	16	19	16	17	17	17.0	1.2	

Table 2. Survival percentage of amphipods on Day 10

	Survival percentage of amphipod on Day 10 (%)						
Sample ID	Replicate	Replicate	Replicate	Replicate	Replicate	Mean	SD
	1	2	3	4	5		
Negative Control with sediment	100	95	95	95	100	97.0	2.7
VC4a (0.9m - 1.9m)	80	80	75	60	75.0	74.0	8.2
VC7a (0.9m - 1.9m)	80	70	70	70	95,0	77.0	11.0
VC8a (10.9m - 11.9m)	75	85	95	80	70.0	81.0	9.6
VC11a (0.9m - 1.9m)	75	70	75	55	75.0	70.0	8.7
VC12a (0.0m - 0.9m)	85	90	90	70	70.0	81.0	10.2
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	70	60	80	75	70.0	71.0	7.4
VC14a (0.0m - 0.9m)	75	90	70	95	85.0	83.0	10.4
VC15a (10.9m - 11.9m)	45	35	50	55	60.0	49.0	9,6
Reference sediment	80	95	80	85	85	85.0	6.1

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Table 3. Summary of the amphipod survival in relation to the reference sediment

Survival in relation	Difference between sample and
to reference site (%)	reference sediment (t-test)
87.1	NA ¹
90.6	NA ¹
95.3	NA ¹
82.4	NA ¹
95.3	NA ¹
83.5	NA ¹
97.6	NA ¹
57.6	Significantly different, t critical=1.86, t stat=-7.060, p<0.05 (one tail)
	to reference site (%) 87.1 90.6 95.3 82.4 95.3 83.5 97.6

reference sediment, statistical analysis is not required.

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6, Test validity

Table 3. Test validity criteria and water quality ranges in the amphipod test

Parameter	Minimum during	Maximum during	Acceptable Range	
	the test period	the test period	in USEPA 1994	
Overlying salinity	19 ppt	21 ppt	19-21 ppt	
Dissolved oxygen	6.4 mg/L	7.7 mg/L	>4.7 mg/L ¹	
Overlying pH	7.3	8.1 .	NA ²	
Temperature	24.2 °C	25.4 °C	22.0-28.0 °C	
			time-average 24.0-26.0 °C	
Total ammonia in overlying water (initiation / termination)	0.06 mg/L	2.31 mg/L	<60 mg/L ³	
Interstitial salinity (initiation)	27 ppt	32 ppt	1.5-32 ppt ⁴	
interstitial pH (initiation)	7.1	8.1	NA ²	
Amphipod survival in the negative control	95-100% ,	95-100% , averagely 97.0 %		
96-h LC ₅₀ obtained from the reference toxicant test		0.72 mg/L		

- 1. 60% of saturation level at 20 ppt
- 2. pH is not adjusted or controlled
- The acceptance level for overlying ammonia was < 20 mg/L in ETWB TCW 34/2002.
 When this level is exceeded, additional set of amphipod test is conducted with purging of sediment.
- VC4a(10.9m 11.9m), VC8a(10.9m 11.9m), VC11a(0.9m 1.9m), VC12a(0.0m 0.9m) and VC13a(0.0m - 0.9m) + VC13a(4.9m - 5.9m) were pre-mixed with 20 ppt reconstituted seawater, so that interstitial salinity was below 32 ppt at test initiation.

As shown in Table 3, the water quality parameters during the test period ranged within acceptable limits: temperature ranged from 24.2 to 25.4 °C, the dissolved oxygen level ranged from 6.4 to 7.7 mg/L, pH ranged from 7.3 to 8.1, the salinity ranged from 19 to 21 ppt. As a result, the data are interpretable.

The tests were validated by acceptable survival of control organisms. The average survival rate in controls was greater than 90% and survival rate in any control replicates greater than 80%.

The organisms also demonstrated comparable sensitivity to the reference toxicant (cadmium). The 96-hr LC $_{50}$ for Leptocheirus plumulosus obtained was 0.72 mgCd/L and found within the laboratory control limits (Mean \pm 2STD, i.e., 0.95 \pm 0.35 mgCd/L). Therefore, the data are acceptable.

End of report

 Polychaete Test

TEST REPORT

Report No. 101866N **Project Name** Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains From West Kowloon to Sai Ying Pun -Investigation Geotechnical Projects Division, Geotechnical Engineering **Customer Name** Office, Civil Engineering and Development Department **Customer Address** 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong Contract No. GE/2005/47 Works Order No. GE/2005/47.19 Lab. Job No. J469 Lab. Sample Ref. No. 18263/1-9 No. of Sample(s) 10 no. of samples stated as sediment were received on chilled condition & Description 9 no. of samples were tested including VC4a (10.9m - 11.9m), VC7a (0.9m - 1.9m), VC8a (10.9m - 11.9m), VC11a (0.9m - 1.9m), VC12a (0.0m - 0.9m), VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m), VC14a (0.0m - 0.9m), VC15a (10.9m - 11.9m) & Reference Sediment as per customer's instruction Sample Receive Date 6 -22 Sept, 2006 **Test Date** 26 Oct - 15 Nov, 2006

Test Parameter

Parameter	Test Method
Polychaete Sediment Bioassay	PSEP 1995

Note(s):

- 1. Results related to sample(s) as received.
- 2. NA = Not applicable.
- 3. Uncertainty is calculated as 2 SD.
- Standard method: Puget Sound Estuary Program Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, USEPA, Revised July 1995.
- 5. This is the final report and supersedes the draft report with the same report number.

Authorized signatory:

Yi Zhang
(Ecotoxicologist)

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Report No.:

101866N

1. Method

This 20-day toxicity test on sediment with Neanthes arenaceodentata was conducted using the PSEP method (1995) "Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments". Neanthes arenaceodentata is exposed to the test sediment overlaid with seawater for a 20-day test period. The endpoints are survival and growth.

Sample storage and pretreatment

All samples were homogenized thoroughly. Debris and indigenous organisms present in the sediment were removed and the sediment samples were stored at 4oC in dark until analyzed.

3, Test organism

Species:

Neanthes arenaceodentata

Source:

Purchased from research organism supplier from USA, mortality during shipping was

0%

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Age/size:

2-3 weeks post emergence

Acclimation:

under test conditions with feeding provided, as per USEPA 1994, mortality during

acclimation was 0%

Health condition:

Mean initial dry weight:

healthy 0.63 mg/worm

4, Summary of test particulars

Type of test:

Duration:

renewal every three days

26 Oct - 15 Nov, 2006

Control sediment:

mud and sand collected from a clean area on the eastern coast of the New Territories and Hong Kong Island respectively, shipped to the laboratory on the same day, sieved through 425 micrometer mesh sieve, mixed and stored at 4°C in

dark dark until use

Control seawater:

reconstituted seawater prepared with the Instant Ocean salt at 28 ppt, aerated for

two days after preparation

Test temperature:

Lighting:

continuous

20±1°C

Aeration:

provided (around 100 bubbles/min)

Test vessel:

1000ml glass jars

Volume of sediment:

175ml

Volume of overlying water:

775 ml

No. of replicates:

5

No. of organisms/replicate:

Feeding: Monitoring: Tetramarin powder, 8 mg per worm each time, once every two days

temperature, DO, pH and salinity in overlying water everyday, ammonia in overlying

water at test initiation and termination

Reference toxicant test:

96 hour water only test with CdCl₂

Report No.:

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5, Summary of test results

Table 1. Survival of polychaetes on Day 20

	Number of living polychaete on Day 20							
Sample ID	Replicate	Replicate	Replicate	Replicate		Mean	SD	
	1	2	3	4	5			
Negative control with sediment	5	5	5	5	5	5.0	0.0	
VC4a (0.9m - 1.9m)	5	5	5	5	5	5.0	0.0	
VC7a (0.9m - 1.9m)	4	4	5	5	5	4.6	0.5	
VC8a (10.9m - 11.9m)	2	5	5	5	3	4.0	1.4	
VC11a (0.9m - 1.9m)	5	5	5	5	5	5.0	0.0	
VC12a (0.0m - 0.9m)	4	5	5	5	4	4.6	0.5	
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	5	5	5	5	5	5.0	0.0	
VC14a (0.0m - 0.9m)	5	5	5	5	5	5.0	0.0	
VC15a (10.9m - 11.9m)	5	5	4	5	5	4.8	0.4	
Reference sediment	5	5	5	5	3	4.6	0.9	

Table 2. Survival percentage of polychaetes on Day 20

	Survival percentage of polychaete on Day 20 (%)							
Sample ID	Replicate	Replicate	Replicate	Replicate	Replicate	Mean	SD	
	1 1	2	3	4	5			
Negative control with sediment	100	100	100	100	100	100.0	0.0	
VC4a (0.9m - 1.9m)	100	100	100	100	100	100.0	0.0	
VC7a (0.9m - 1.9m)	80	80	100	100	100	92.0	11.0	
VC8a (10.9m - 11.9m)	40	100	100	100	60	80.0	28.3	
VC11a (0.9m - 1.9m)	100	100	100	100	100	100.0	0.0	
VC12a (0.0m - 0.9m)	80	100	100	100	80	92,0	11.0	
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	100	100	100	100	100	100.0	0.0	
VC14a (0.0m - 0.9m)	100	100	100	100	100	100.0	0,0	
VC15a (10.9m - 11.9m)	100	100	80	100	100	96.0	8.9	
Reference sediment	100	100	100	100	60	92.0	17.9	

Table 3. Total dry weight of polychaetes on Day 20

	Total dry weight of polychaete on Day 20 (mg)							
Sample ID	Replicate	Replicate	Replicate	Replicate	Replicate	Mean	SD	
<u></u>	1	2	3	4	5			
Negative control with sediment	40.14	73.51	63,54	64.96	77.05	63.8	14.4	
VC4a (0.9m - 1.9m)	63.66	60.28	47.74	48.75	46.89	53,5	7.9	
VC7a (0.9m - 1.9m)	54.36	63.03	53.78	76.16	56.06	60.7	9.4	
VC8a (10.9m - 11.9m)	33.21	70.69	65,63	51.66	41.49	52.5	15.8	
VC11a (0.9m - 1.9m)	65.03	64,89	59.30	60.05	50.38	59.9	6,0	
VC12a (0.0m - 0.9m)	40.82	47.24	24.56	55.57	53.64	44.4	12.5	
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	67.49	63.49	71.87	55.23	55.99	62.8	7.2	
VC14a (0.0m - 0.9m)	60.45	53.08	49.84	56.45	62.14	56,4	5.1	
VC15a (10.9m - 11.9m)	62.97	58.20	62.03	48.32	70.17	60.3	8.0	
Reference sediment	58.07	51.14	2.16	78.82	61.06	50.3	28.8	

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Test report

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Table 4. Summary of the total dry weight of polychaetes in relation to the reference sediments

Total dry weight in relation to reference site (%)	Difference between sample and reference sediment (t-test)
106.4	NA ¹
120.8	NA ¹
104.5	NA 1
119.3	NA ¹
88.3	Insignificantly different, t critical=1.86, t stat=-0.420, p=0.3429 (one tail)
125.0	NA ¹
112.2	NA ¹
120.1	NA ¹
	in relation to reference site (%) 106.4 120.8 104.5 119.3 88.3 125.0 112.2

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Test report

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6, Test validity

Table 5. Test validity criteria and water quality ranges in the polychaete test

Parameter	Minimum during	Movingue dunin	T
	the test period	Maximum during the test period	Control Limit
Overlying salinity	26 ppt		
Dissolved oxygen	6.3 mg/L	30 ppt	26-30 ppt
Overlying pH	7.1	7.4 mg/L	not specified
Temperature		8.3	NA ¹
Unionized ammonia in	19.2 °C	20.4 °C	19-21°C
overlying water	<0.002 mg/L	0.287 mg/L	NA ²
(initiation/termination)			
Interstitial salinity			<u></u>
(initiation/termination)	26 ppt	30 ppt	>20ppt
Interstitial pH	7.0	 	
(initiation/termination)	7.0	8.1	NA 1
Polychaete survival		L	
n the negative control	All 100%	averagely 100.0%	≥ 90% average
	7.0070,	averagery 100.0%	≥ 80% in any
96-h LC ₅₀ obtained			individual replicate
rom the reference	0.00		
oxicant test	9.90	9.96 mg/L 10.10±2	
1. pH is not adjusted or	controlled	·····	<u> </u>
2. Overlying ammonia is	not controlled. Results could b	e gualified as passible	
false positive when un	nionized ammonia greater than	0.7 mg/l	

As shown in Table 5, the water quality parameters during the test period ranged within acceptable limits: temperature ranged from 19.2 to 20.4 °C, the salinity ranged from 26 to 30 ppt. As a result, the data are interpretable.

The tests were validated by acceptable survival of control organisms. The average survival rate in controls was greater than 90% and survival rate in any control replicates greater than 80%.

The organisms also demonstrated comparable sensitivity to the reference toxicant (cadmium). The 96-hr LC_{50} for Neanthes arenaceodentata obtained was 9.96 mgCd/L and found within the laboratory control limits (Mean \pm 2STD, i.e., 10.10 ± 2.95 mgCd/L).

End of report

Data entry checked by:

7-my Offwl Y-M.Choy W.K.Cheuk Bivalve Test

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TEST REPORT

Report No.	:	101865N
Project Name	:	Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains From West Kowloon to Sai Ying Pun - Investigation
Customer Name	:	Geotechnical Projects Division, Geotechnical Engineering Office, Civil Engineering and Development Department
Customer Address	:	8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong
Contract No.	:	GE/2005/47
Works Order No.	:	GE/2005/47.19
Lab. Job No.	:	J469
Lab. Sample Ref. No.	:	18263/1-9
No. of Sample(s)	:	10 no. of samples stated as sediment were received on chilled condition
& Description		9 no. of samples were tested including
		VC4a (10.9m - 11.9m), VC7a (0.9m - 1.9m), VC8a (10.9m - 11.9m),
		VC11a (0.9m - 1.9m), VC12a (0.0m - 0.9m),
		VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m), VC14a (0.0m - 0.9m),
,		VC15a (10.9m - 11.9m) & Reference Sediment
·		as per customer's instruction
Sample Receive Date	:	6 -22 Sept, 2006
Test Date		31 Oct - 2 Nov. 2006

Test Parameter

Parameter	Test Method
Bivalve Larvae Sediment Bioassay	PSEP 1995

Note(s):

- 1. Results related to sample(s) as received.
- 2. NA = Not applicable.
- 3. Uncertainty is calculated as 2 SD.
- 4. Standard method: Puget Sound Estuary Program Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, USEPA, Revised July 1995.
- 5. This is the final report and supersedes the draft report with the same report number.

Authorized signatory:

Date: 22-Dec-2006

Yi Zhang (Ecotoxicologist)

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Test report

Report No.:

101865N

1. Method

This bivalve larvae test with Crassostrea gigas was conducted using the PSEP method (1995) "Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments". Bivalve adults are induced to spawn and gametes are fertilized. After fertilization the embryos are immediately exposed to the test sediment overlaid with seawater and allowed to develop for 48-60 hours. The normality survival of larvae is determined as endpoint.

2. Sample storage and pretreatment

All samples were homogenized thoroughly. Debris and indigenous organisms present in the sediment were removed and the sediment samples were stored at 4oC in dark until analyzed.

3, Test organism

Species:

Source:

Acclimation:

Crassostrea gigas

purchased from a research organism supplier in UK .

24 hours under test conditions, as per PSEP 1995, mortality during acclimation was 0

Conditions of eggs:

Conditions of sperms:

Fertilization rate:

Mean initial stocking:

mature and clean active

90.8%

27434 fertilized eggs per test chamber

4. Summary of test particulars

Type of test:

Duration:

static and non-renewal

Control seawater:

through 0.45 mm filter paper, adjusted to 28 ppt, aerated for two days after

Test temperature:

Lighting:

Aeration:

Test vessel:

Volume of sediment:

Volume of overlying water: No. of replicates:

Feeding:

Monitoring:

31 October - 2 November, 2006, 48 hours in total

collected from a clean area on the eastern coast of the Hong Kong Island, filtered

preparation

20±1°C

14h light: 10h dark cycle

provided (around 100 bubbles/min)

1000ml glass jars 18a

900 ml

5

temperature, DO, pH and salinity in overlying water everyday, and termination

ammonia in overlying water at test initiation

48 hour water only test with CdCl₂ Reference toxicant test:

Report No.:

101865N

5. Summary of test results

Table 1. Total number of normal larvae in each test chamber at test termination

	Number of normal larvae in each test chamber at test termination						
Sample ID	Replicate	Replicate	Replicate	Replicate	Replicate	Mean	SD
	1	2	3	4	5		1
Negative Control with Seawater I	19400	17800	20100	21400	19900	19720	1302.7
Negative Control with Seawater II	19700	19800	20100	21100	20900	20320	641.9
VC4a (0.9m - 1.9m)	16000	17400	18100	15400	17000	16780	1082.6
VC7a (0.9m - 1.9m)	12400	11600	10100	10100	9800	10800	1138.0
VC8a (10.9m - 11.9m)	17100	17000	17600	16900	17500	17220	311.4
VC11a (0.9m - 1.9m)	16100	15200	17000	17900	17000	16640	1026.2
VC12a (0.0m - 0.9m)	11500	9600	10200	11000	10600	10580	729.4
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	17000	18800	17700	16800	18000	17660	805.0
VC14a (0.0m - 0.9m)	14000	15800	15200	15300	14000	14860	817.3
VC15a (10.9m - 11.9m)	17000	16500	18100	17000	17100	17140	585.7
Reference sediment	19100	16800	20700	19400	18400	18880	1430.7

Table 2. Combined normality/survival of the bivalve larvae at test termination

	Normality survival of bivalve larvae at test termination (%)						
Sample ID	Replicate	Replicate	Replicate	Replicate	Replicate	Mean	SD
	1	2	3	4	5		
Negative Control with Seawater I	70.7	64.9	73,3	78.0	72.5	71,9	4.7
Negative.Control with Seawater II	71.8	72.2	73.3	76.9	76.2	74.1	2.3
VC4a (0.9m - 1.9m)	58.3	63,4	66.0	56.1	62.0	61.2	3.9
VC7a (0.9m - 1.9m)	45.2	42.3	36.8	36.8	35.7	39.4	4,1
VC8a (10.9m - 11.9m)	62.3	62.0	64.2	61.6	63.8	62.8	1.1
VC11a (0.9m - 1.9m)	58.7	55.4	62.0	65.2	62.0	60.7	3.7
VC12a (0.0m - 0.9m)	41.9	35.0	37.2	40.1	38.6	38.6	2.7
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	62.0	68.5	64.5	61.2	65.6	64.4	2,9
VC14a (0.0m - 0.9m)	51.0	57.6	55.4	55.8	51.0	54.2	3.0
VC15a (10.9m - 11.9m)	62.0	60.1	66.0	62.0	62.3	62.5	2.1
Reference sediment	69.6	61.2	75.5	70.7	67.1	68.8	5.2

End of Page

4 of 5

Test report

Report No.:

101865N

Table 3. Summary of the normality survival of bivalve larvae in relation to the reference sediments

ample ID	Normality survival	Difference between sample and
	in relation to	reference sediment (t-test)
	reference site (%)	
C4a (0.9m - 1.9m)	88,9	NA ¹
C7a (0.9m - 1.9m)	57.2	Significantly different, t critical=1.86,
· · ·		t stat=-9.883, p<0.05 (one tail)
C8a (10.9m = 11.9m)	91.2	
Broklin og har bigner i skriver i		NA 1
C11a (0.9m - 1.9m)	88.1	NA ¹
C12a (0.0m -0.9m)	56.0	Significantly different, t critical=1.86,
•		t stat=-11.557 p<0.05 (one tail)
C13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	93.5	NA ¹
C14a (0.0m - 0.9m)	78.7	Significantly different, t critical=1.86,
,		t stat=-5.455, p<0.05 (one tail)
C 15a (10.9m - 11.9m)	90.8	NA ¹

End of Page

Lam	Labor	ratories	Limited
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5 of 5

Test report

Report No.:

101865N

6, Test validity

Table 4. Test validity criteria and water quality ranges in the bivalve test

Parameter	Minimum during the test period	Maximum during the test period	Control Limit
Overlying salinity	27 ppt	29 ppt	27-29ppt
Dissolved oxygen	6.5 mg/L	7.3 mg/L	>4.5mg/L ¹
Overlying pH	6.8	7.9	NA ²
Temperature	19.2 ℃	20.6 °C	19.0-21.0°C
Unionized ammonia in overlying water (initiation/termination)	<0.002 mg/L	0.008 mg/L	NA ³
Larvae normality survival in the negative control	64.9 - 78.0	0% , averagely 73.4%	≥ 70% averagely
48-h EC ₅₀ obtained from the reference toxicant test	1.39	1.39 mg/L	

- 1. 60% of saturation level at 28 ppt
- 2. pH is not adjusted or controlled
- Overlying ammonia is not controlled. Results could be qualified as possible false positive when ammonia (unionized) is greater than 0.13 mg/L

As shown in Table 4, the water quality parameters during the test period ranged within control limits: temperature ranged from 19.2 to 20.6 °C, the dissolved oxygen level ranged from 6.5 to 7.3 mg/L, pH ranged from 6.8 to 7.9, the salinity ranged from 27 to 29 ppt. As a result, the data are interpretable.

The tests were validated by acceptable normality survival of control organisms. The average normality survival rate in controls was greater than 70%.

The organisms also demonstrated comparable sensitivity to the reference toxicant (cadmium). The 48-hr EC₅₀ for *Crassostrea gigas* obtained was 1.39 mgCd/L and found within the laboratory control limits (Mean±2STD, i.e., 1.44±0.52 mgCd/L). Therefore, the data are acceptable.

End of Report

Data entry checked by: The Children Y.M.Chouk

Ancillary Tests

Interstitial Ammonia

TEST REPORT

Report No.

:

101867N

Project Name

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main

and Associated Land Mains From West Kowloon to Sai Ying Pun -

Investigation

Customer Name

Geotechnical Projects Division, Geotechnical Engineering

Office, Civil Engineering and Development Department

Customer Address

8/F Civil Engineering and Development Building, 101 Princess

Margaret Road, Kowloon, Hong Kong

Contract No.

GE/2005/47 GE/2005/47.19

Works Order No.
Lab. Job No.

J469

Lab. Sample Ref. No.

18263/1-9

No. of Sample(s)
& Description

10 no. of samples stated as sediment were received on chilled condition

9 no. of samples were tested including

VC4a (10.9m - 11.9m), VC7a (0.9m - 1.9m), VC8a (10.9m - 11.9m),

VC11a (0.9m - 1.9m), VC12a (0.0m - 0.9m),

VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m), VC14a (0.0m - 0.9m),

VC15a (10.9m - 11.9m) & Reference Sediment

as per customer's instruction

Sample Receive Date

Test Date

6 -22 Sept, 2006

21-Oct-06

Test Parameter

Parameter	Test Method
Interstitial ammonia	APHA 4500-NH3 F. Phenate Method

Note(s):

- 1. Results related to sample(s) as received.
- NA = Not applicable.
- 3. This is the final report and supersedes the draft report with the same report number.

Authorized signatory:

Yi Zhang
(Ecotoxicologist)

Date: 22-Dec-2006

Remark(s): This report shall not be reproduced, except in full, without prior written approval from Lam Laboratories Ltd.

Lam Laboratories Limited Room 1412, Honour Industrial Centre, 6 Sun Yip Street, Chaiwan, Hong Kong.

Tel: (852) 2897 3282 Fax: (852) 2897 5509 Email: info@lamlab.com

Report no.:

101867N

Sample ID	Interstitial ammonia (mgNH ₃ /L)		
VC4a (0.9m - 1.9m)	See Note 1		
VC7a (0.9m - 1.9m)	See Note 1		
VC8a (10.9m - 11.9m)	21.9		
VC11a (0.9m - 1.9m)	9.2		
VC12a (0.0m - 0.9m)	16.4		
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	14.8		
VC14a (0.0m - 0.9m)	4,3		
VC15a (10.9m - 11.9m)	4.1		
Reference sediment	4.2		
Detection limit	0.03		
Note 1 - Analysis was not performed due to insufficient amou	unt of porewater obtained.		

Sample duplicate

Sample ID	Relative deviation (%)
Reference Sediment	-5.3
Control limits	±20% from the mean

Sample Spike

Sample ID	Spike recovery (%)
Reference Sediment	-89.9
Control limits	80-120% from the nominal value

End of Report

Then Cital
W.K. Cheuk / Y:M:Choy Data entry checked by:

Interstitial Salinity

TEST REPORT

Report No.

101868N

Project Name

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains From West Kowloon to Sai Ying Pun - Investigation

Customer Name

Geotechnical Projects Division, Geotechnical Engineering Office, Civil Engineering and Development Department

Customer Address

8/F Civil Engineering and Development Building, 101 Princess

Margaret Road, Kowloon, Hong Kong

Contract No. Works Order No.

GE/2005/47 GE/2005/47.19

Lab. Job No. Lab. Sample Ref. No.

J469 18263/1-9

No. of Sample(s) & Description

10 no. of samples stated as sediment were received on chilled condition

9 no. of samples were tested including

VC4a (10.9m - 11.9m), VC7a (0.9m - 1.9m), VC8a (10.9m - 11.9m),

VC11a (0.9m - 1.9m), VC12a (0.0m - 0.9m),

VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m), VC14a (0.0m - 0.9m),

VC15a (10.9m - 11.9m) & Reference Sediment

as per customer's instruction

Sample Receive Date **Test Date**

6 -22 Sept, 2006

17-Oct-06

Test Parameter

Parameter	Test Method
Interstitial salinity	APHA 2502 B

Note(s):

- 1. Results related to sample(s) as received.
- 2. NA = Not applicable.
- 3. This is the final report and supersedes the draft report with the same report number.

Authorized signatory: 22-Dec-2006 Yi Zhang (Ecotoxicologist) This report shall not be reproduced, except in full, without prior written approval from Lam Laboratories Ltd. Lam Laboratories Limited Room 1412, Honour Industrial Centre, 6 Sun Yip Street, Chaiwan, Hong Kong.

Tel: (852) 2897 3282 Fax: (852) 2897 5509 Email: info@lamlab.com

Report no.:

101868N

Sample ID	Interstitial salinity (ppt)				
VC4a (0.9m - 1.9m)	35				
	29				
VC7a (0.9m - 1.9m)	34				
VC8a (10.9m - 11.9m)	33				
VC11a (0.9m - 1.9m)	33				
VC12a (0.0m - 0.9m)	35				
VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m)	30				
VC14a (0.0m - 0.9m)	31				
VC15a (10.9m - 11.9m)	30				
Reference Sediment	NA NA				
Detection limit	107				

Sample duplicate

Sample ID	Relative deviation (%)
Reference sediment	-11.2
Control limits	±20% from the mean

Standard check

Sample ID	Recovery (%)
Sample ID Reference standard	100.6
Control limits	80-120% from the nominal value

End of Report

TOC, Grains Size & Moisture Content

TEST REPORT

Report No.	: 101869N
Project Name	 Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains From West Kowloon to Sai Ying Pun - Investigation
Customer Name	: Geotechnical Projects Division, Geotechnical Engineering Office, Civil Engineering and Development Department
Customer Address	 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong
Contract No.	: GE/2005/47
Works Order No.	: GE/2005/47.19
Lab. Job No.	: J469
Lab. Sample Ref. No.	: 18263/1-9
No. of Sample(s)	: 10 no. of samples stated as sediment were received on chilled condition
& Decription	: 9 no. of samples were tested including
	VC4a (10.9m - 11.9m), VC7a (0.9m - 1.9m), VC8a (10.9m - 11.9m),
	VC11a (0.9m - 1.9m), VC12a (0.0m - 0.9m),
	VC13a (0.0m - 0.9m) + VC13a (4.9m - 5.9m), VC14a (0.0m - 0.9m),
	VC15a (10.9m - 11.9m) & Reference Sediment
	as per customer's instruction
Sample Receive Date	: 6 -22 Sept, 2006
Test Date	: 17-Oct-06

Parameter	Test Method
Grain size	Geospec 3: Test 8.1
Moisture content	Geospec 3: Test 5.2
Total Organic Carbon	ALS Method Code EP-009

Note(s):

- 1. Results related to sample(s) as received.
- 2. NA = Not applicable,
- 3. The TOC samples were subcontracted to ALS Technichem (HK) Pty Ltd.
- 4. This is the final report and supersedes the draft report with the same report number.

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Tel: (852) 2897 3282 Fax: (852) 2897 5509 Email: info@lamlab.com

Report No.

: 101869N

Project Name

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main

and Associated Land Mains From West Kowloon to Sai Ying Pun - Investigation

Customer Name

: Geotechnical Projects Division, Geotechnical Engineering

Office, Civil Engineering and Development Department

Contract No.

GE/2005/47

Works Order No.

: GE/2005/47,19

Lab. Sample Ref. No.

18263/1-9

Grain Size < 63 mm (%)	Moisture Content ¹ (%)	TOC (% Wet Weight)	TOC (% Dry Weight) ²	
37	22	0.65	0.79	
44	51	0,49	0.74	
95	57	0.60	0.94	
62	- 53	0,66	1,01	
18	40	0.40	0.56	
40	59	0.62	0,99	
83	93	0,70	1.35	
87	54	0.35	0.54	
69	98	0.64	1.27	
NA	NA	0.05	0.10	
	(%) 37 44 95 62 18 40 83 87 69 NA	(%) (%) 37 22 44 51 95 57 62 53 18 40 40 59 83 93 87 54 69 98 NA NA	(%) (%) (% Wet Weight) 37 22 0.65 44 51 0.49 95 57 0.60 62 53 0.66 18 40 0.40 40 59 0.62 83 93 0.70 87 54 0.35 69 98 0.64	

End of Report

Data entry checked by:

W. K. Cheuk / Y.M. Chox

TEST|GE036\PSDA (19970811)

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 1 of 2)

Chemical and Biological Testing of Sediment(Term Contract) Report No: 101887N Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to Project Sai Ying Pung-Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples Client Name: Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department & Address 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong Lab Job No : J469 Works Order No: GE/2005/47.19 Lab. Sample Ref. No: 18263/1 Composite Sample No: Depth m: 10.90 Specimen Sample No. : VC4a -11.90Depth m: Sample Type: Bulk Spec. Ref: Geological Origin: Sediment Description: Grey, gravelly, silty, very clayey SAND Date Sample: 13/10/2006 Date Tested: 21/10/06 Tested By: H. W. Chu Received Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Method A BS Sieve Aperture Size, mm 63µm 150um 100 600 80 Percentage Passing 60 40 20 0 0.001 0.01 0.1 Sieving 10 100 Particle Size mm - Sedimentation FINE MEDIUM COARSE FINE MEDIUM COARSE FINE MEDIUM COARSE CLAY COB-SILT SAND GRAVEL Remarks: SUMMARY: **GRAVEL** 10 % Approved Signatory: Lo Kam chuen SAND 53 % SILT & 37 % CLAY Date: 27-11-2006 Lam Laboratories Limited Rm 1412, Honour Industrial Centre, 6 Sun Yip Street, Chaiwan, Hong Kong Tel: 28973282

TEST REPORT ON DETERMINATION (Page 2 of 2) OF PARTICLE SIZE DISTRIBUTION Chemical and Biological Testing of Sediment(Term Contract) Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to Sai Ying Pung-Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples **Project** Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department Customer 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong & Address Lab. Sample Ref. No: Works Order No: GE/2005/47.19 Lab Job No: J469 Depth m: 10.90 Sample No: Composite - 11.90 VC4a Sample No. : Geological Origin: Sediment Spec. Ref: Bulk Sample Type: Grey, gravelly, silty, very clayey SAND Description: H. W. Chu Tested By: 21/10/06 Date Tested: 13/10/2006 Date Sample: Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Received SIEVE ANALYSIS

Report No: 101887N

Specimen

Depth m:

Method A

18263/1

103.07 Initial Dry Mass of Soil m1 g: Corr. Mass Percent Mass Retained % Passing % Retained g Retained g BS Test Sieve mm 100.0 0.0 75.0 100.0 0.0 37.5 100.0 0.0 20.0 103.07 103.07 cum. mass ret. + m2 = 20.0 Passing m2 103.07 difference from m1 % = 0.00 20.0 Riffled m3 Note: m4 = mass >63um Washed m4 100.0 0.00 0.0 10.0 0.001 0.00 0.0 6.3 cum. mass ret. + m5 = 64.84 Passing m5 6.3 difference from m4 % = 0.00 64.84 Riffled m6 6.3 0.00 0.0 100.0 5,00 9.6 90.4 2.00 9.93 9.93 0.08 10.4 10.72 10.72 1.18 70.9 9.30 9.0 0.600 9.30 62.7 8,50 8.2 8.50 0.300 13.1 49.6 13.48 13.48 0.150 37.3 12.67 12.67 0.063 0.17 Pan mE cum. mass ret. + mE = 64.77

0.11

<u>difference from m6 % ≂</u>

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Approved Signa	tory: 🕠 🔊	Vain	there	~			Date: 2	7-11-2	006	Ì
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TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 1 of 2)

Chemical and Biological Testing of Sediment(Term Contract)

Report No: 101888N

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

Project Sai Ying Pung - Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples

Client Name: Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

& Address 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

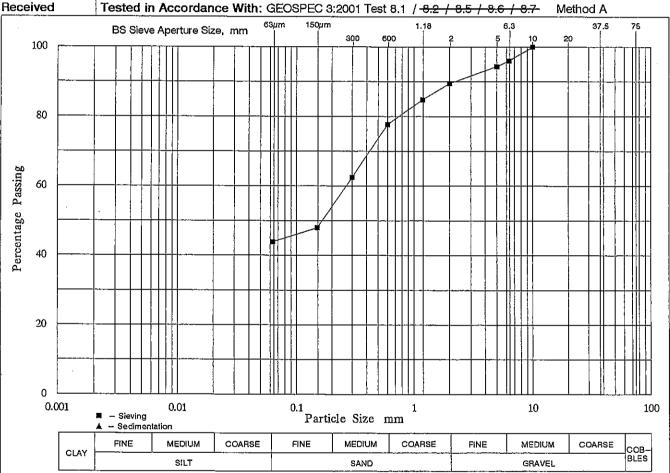
Lab Job No: J469 Works Order No: GE/2005/47.19 Lab. Sample Ref. No: 18263/2 Composite Sample No: Depth m: 0.90

Specimen Sample No. : VC7a -1.90Depth m:

Sample Type: Bulk Spec. Ref: Geological Origin: Sediment

Description: Grey, sandy CLAY with some shell fragments

Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H. W. Chu



Remarks:

SUMMARY:

GRAVEL

11 %

SAND

45 %

SILT & 44 %

CLAY

Approved Signatory: Lo Kam Chue

Date: 27-11-2006

Lam Laboratories Limited Rm 1412, Honour Industrial Centre, 6 Sun Yip Street, Chaiwan, Hong Kong Tel: 28973282

TEST|GE036|PSDA (19970811)

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 2 of 2)

OF PARTICL	E SIZE	DISTRI	BUTION	<u> </u>				
	Chemical and l	Report No: 101888N						
	Agreement No.	CE 42/2005	(WS) Layin	g of Wester	n Cross Harbour	Main and Asso	ciated Land Mains West Ko	wloon to
roject :	Sai Ying Pung-	-Investigatio	n Chemical	l, Elutriate a	nd Biological Tes	sting of Marine	Sediment and Seawater Sa	mples
Customer :	Geotechnical F	rojects Divis	ion, Geotec	hnical Engir	neering office, Ci	vil Engineering	and Development Departm	ent
							wloon, Hong Kong	
	J469		Norks Ord		GE/2005/47.19	_	ab, Sample Ref. No:	18263/2
Composite			Sample		Dep	oth m: 0.90	Specimen	
-	VC7a				•	- 1.90	Depth m:	
	Bulk	Spec	. Ref:		Geological C	origin: Sedim	ent	
	Grey, sandy	-		fragments	- •	Ū		
	13/10/2006	Date Te		21/10/2006		Tested By:	H. W. Chu	 **
_					3:2001 Test 8.1			<u> </u>
Received		CCOIdano	e with. G	LOGFLO	N 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7 0.2 7 0.0	7 0.0 7 0.1 111001007	,
SIEVE ANALYSIS		101.55						
Initial Dry Mass of S	Soil m1 g: Mass	Corr. Mass	Percent	Percent			e ete	
BS Test Sieve mm		I	Retained %	:				
75.0	, , campa y		0.0	100.0	1			
37.5	-		0.0	100.0] \			
20.0			0.0	100.0]		. /	
Passing m2 20.0	101.55	cum. mass r	ret. + m2 =	101.55	•			
Riffled m3 20.0	101.55	difference fro	om m1 % =	0.00				
Washed m4	57.04	Note: m4 =	= mass >63	um				
10.0	ļ <u>'</u>	. 0,00	0.0	100.0				
6.3	4.00	4.00	3.9	96,1	-			
Passing m5 6.3		cum. mass i		57.04				
Riffled m6 6.3	1 -	difference fr		0.00	₹	,		
5.00	1.71	1.71	1.7 5,0	94.4 89.4				
2.00	5.03 4.72	5.03 4.72	4.6	84.8	7			
0.600	***************************************	7.20	7.1	77.7				
0.300	 	15.42	15.2	62.5	- 1			
0.150		14.79	14.6	47.9				\
0.063	4,11	4.11	4.0	43.8				
Pan mi	0.01		<u> </u>	<u> </u>	_ /			
		cum. mass	ret. + mE =					1
		difference fi	rom m6 % =	0.09	<u> </u>	-		`.
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Approved Sign	natory: \bigvee	Lo Kam-	r Chu	en		Date	27-11-200	26

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 1 of 2)

Chemical and Biological Testing of Sediment(Term Contract)

Report No: 101889N

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

Project

Sai Ying Pung - Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

Client Name:

& Address

8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

Works Order No: GE/2005/47.19 Lab. Sample Ref. No:

18263/3

Composite

Depth m: 10.90

Specimen

Sámple No:

Sample No. :

Lab Job No:

VC8a

J469

-11.90

Depth m:

Description:

Sample Type: Bulk

Spec. Ref:

Geological Origin: Sediment

Grey, slightly sandy CLAY

Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H. W. Chu Received Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Method A BS Sieve Aperture Size, mm 300 100 80 Percentage Passing 60 40 20

Particle Size mm

MEDIUM

SAND

Remarks:

0 0.001

SUMMARY:

CLAY

GRAVEL

0.01

MEDIUM

SILT

Sleving

FINE

Sedimentation

0 %

FINE

SAND

5 %

SILT & 95 %

COARSE

CLAY.

Approved Signatory:

COARSE

Lo Kam Chuen

10

MEDIUM

GRAVEL

100

COB-BLES

COARSE

Date: 27-11-2006

FINE

Lam Laboratories Limited Rm 1412, Honour Industrial Centre, 6 Sun Yip Street, Chaiwan, Hong Kong Tel: 28973282

TEST|GE036|PSDA (19970811)

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 2 of 2)

OI I AITHOL	<u> </u>	<u> </u>		<u> </u>					l
	Chemical and I	-	-	-		Main and Asse		Report No: 101889 us West Kowloon to	
							Sediment and Se	is West Kowloon to awater Samples	
							and Developmen		į
							wloon, Hong Kon		ſ
	J469		Norks Ord		GE/2005/47.19	_	ab. Sample R	ef. No: 18263	/3
Composite	·		Sample	e No:	Dep	oth m: 10.90	Spe	cimen	
•	VC8a				-	- 11.90	Dej	oth m:	J
	Bulk	Spec	Ref:		Geological C	Origin: Sedim	nent		[
Description:	Grey, slightly	sandy CLA	AY						
Date Sample:	13/10/2006	Date Te	ested:	21/10/2006		Tested By:	H. W. Chu		
Received	Tested in A	ccordanc	e With: G	EOSPEC 3	:2001 Test 8.1	/ 8.2 / 8.5	/ 8.6 / 8.7	Method A	
SIEVE ANALYSIS									71
Initial Dry Mass of S		102.85						/	
no = 10	Mass	Corr. Mass	1.00	Percent			•		
BS Test Sieve mm 75,0	Retained g	Retained g	0.0	Passing % 100.0					1
37.5			0.0	100.0					
20.0			0.0	100.0					1
Passing m2 20.0		cum, mass i		102.85				/	
Riffled m3 20,0		difference fr		0.00				•	
Washed m4	5.37		= mass >63		}				1
10.0	<u> </u>	00.00	0.0	100.0	-				
Passing m5 6,3	5.37	cum. mass i		5.37	1		X		
Riffled m6 6.3	,	difference fr		0.00					i
5.00		0.00	0.0	100,0]	/			
2.00	0,07	0.07	0.1	99,9	_				
1.18	0.09	0.09	0.1	99.8 99.6	+				
0.600	0.27	0.27	0.8	98.8					ļ
0.150		0.99	1.0	97.8] /				
0,063	3.10	3.10	3,0	94.8] /				
Pan m	0.01		<u> </u>	L	- /				
			ret. + mE =		1 /				
		<u>amerence n</u>	rom m6 % =	0,37	∜/				1
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Approved Sigr	natory:	Kam	Mue	m		Dale	3:27-11-	406	
	A (10070811)	Lo Kam-	chuen						

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 1 of 2)

Chemical and Biological Testing of Sediment(Term Contract)

Report No: 101891N

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

Project Client Name:

Sai Ying Pung - Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples

& Address

Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

Lab Job No:

8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

Works Order No:

GE/2005/47.19

Lab. Sample Ref. No: 18263/4

Composite

Sample No:

Depth m: 0.90

Specimen

Sample No. :

VC11a

-1.90

Depth m:

Sample Type:

Bulk

Spec. Ref:

Geological Origin: Sediment

Description: Date Sample: Grey, slightly gravelly, slightly sandy CLAY with occasional shell fragments 13/10/2006

Date Tested:

21/10/2006

Tested By:

H. W. Chu

Received Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Method A 63µm 150µm 1.18 BS Sieve Aperture Size, mm 300 100

80 Percentage Passing 60 40

20

Sleving Particle Size mm - Sedimentation FINE MEDIUM COARSE FINE MEDIUM COARSE MEDIUM COARSE COB-CLAY SILT SAND GRAVEL

Remarks:

0 0.001

SUMMARY:

GRAVEL

&

10 %

SAND SILT

0.01

28 %

62 %

CLAY

Approved Signatory:

10

100

Vo Can chuen Lo Kam-chuen

Date:

27-11-2006

Lam Laboratories Limited Rm 1412, Honour Industrial Centre, 6 Sun Yip Street, Chaiwan, Hong Kong Tel: 28973282

TEST|GE036|PSDA (19970811)

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 2 of 2)

Chemical and Biological Testing of Sediment(Term Contract)	to
Project Sai Ying Pung -Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples	
Customer Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong ab Job No J469 Works Order No: GE/2005/47.19 Lab. Sample Ref. No: 1826/2005/47.19 Lab. Sample Ref. No: 1826/2005/4	3/4
Address ab Job No : J469	3/4
Lab Job No : J469	3/4
Sample No. VC11a Sample No. Depth m: 0.90 Depth m: 0	3/4
Sample No. : VC11a	
Sample Type: Bulk Spec. Ref: Geological Origin: Sediment	
Description : Grey, slightly gravelly, slightly sandy CLAY with occasional shell fragments	
Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H. W. Chu	
Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H. W. Chu	
Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 8.2 8.5 8.6 8.7 Method A	
Sieve Analysis Initial Dry Mass of Soil m1 g: 104.73	/.
Initial Dry Mass of Soil m1 g: 104.73 Mass Corr. Mass Percent Percent	/.
Mass Corr. Mass Percent Percent	
75.0	
37.5	
20.0	
Passing m2 20.0 104.73 cum. mass ret. + m2 = 104.73 Riffled m3 20.0 104.73 difference from m1 % = 0.00 Washed m4 39.33 Note: m4 = mass >63um 10.0 0.00 0.0 100.0 6.3 2.60 2.5 97.5 Passing m5 6.3 36.73 cum. mass ret. + m5 = 39.33 Riffled m6 6.3 36.73 difference from m4 % = 0.00 5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
Riffled m3 20.0 104.73 difference from m1 % = 0.00 Washed m4 39.33 Note: m4 = mass >63um 10.0 0.00 0.0 100.0 6.3 2.60 2.5 97.5 Passing m5 6.3 36.73 cum. mass ret. + m5 = 39.33 Riffled m6 6.3 36.73 difference from m4 % = 0.00 5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
Washed m4 39.33 Note: m4 = mass > 63 um 10.0 0.00 0.0 100.0 6.3 2.60 2.5 97.5 Passing m5 6.3 36.73 cum. mass ret. + m5 = 39.33 Riffled m6 6.3 36.73 difference from m4 % = 0.00 5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
10.0 0.00 0.0 100.0 6.3 2.60 2.60 2.5 97.5 Passing m5 6.3 36.73 cum. mass ret. + m5 = 39.33 Riffled m6 6.3 36.73 difference from m4 % = 0.00 5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
6.3 2.60 2.5 97.5 Passing m5 6.3 36.73 cum. mass ret. + m5 = 39.33 Riffled m6 6.3 36.73 difference from m4 % = 0.00 5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
Passing m5 6.3 36.73 cum. mass ret. + m5 = 39.33 Riffled m6 6.3 36.73 difference from m4 % = 0.00 5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
Riffled m6 6.3 36.73 difference from m4 % = 0.00 5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
5.00 1.55 1.55 1.5 96.0 2.00 6.03 6.03 5.8 90.3	
2.00 6.03 6.03 5.8 90.3	
1.18 4.25 4.25 4.1 86.2	
0.600 4.74 4.74 4.5 81.7	
0.300 6.15 6.15 5.9 75.8	
0.150 6.87 6.8 69.3	
0.063 7.04 7.04 6.7 62.5	
Pan mE	
difference from m6 % = 0.25	1
difference from the 70 - 5.25	
V	
Approved Signatory: No 1 Cam when Date: 27-11-2006	
Approved Signatory: Wolfam huen Date: 27-11-2006	

(Page 1 of 2)

Chemical and Biological Testing of Sediment(Term Contract)

Report No: 101892N

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

Project : Sai Ying Pung-Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples

Client Name: Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

& Address 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

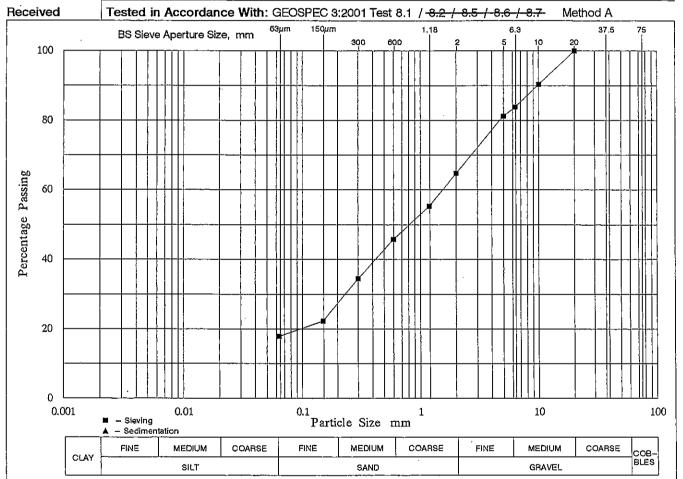
 Lab Job No :
 J469
 Works Order No:
 GE/2005/47.19
 Lab. Sample Ref. No:
 18263/5

Composite Sample No: Depth m: 0.00 Specimen Sample No. : VC12a Depth m: 0.00 Depth m:

Sample Type: Bulk Spec. Ref: Geological Origin; Sediment

Description: Black, grey, clayey, gravelly SAND with some shell fragments

Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H. W. Chu



Remarks:

SUMMARY:

GRAVEL

35 %

SAND

47 %

SILT &

18 %

CLAY

8%

Date: 27-11-2006

Approved Signatory:

Lo Kan Chuen

TEST|GE036|PSDA (19970811)

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 2 of 2)

Report No: 101892N Chemical and Biological Testing of Sediment(Term Contract) Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to Sai Ying Pung-Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples Project Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department Customer 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong & Address Lab. Sample Ref. No: 18263/5 Works Order No: GE/2005/47.19 Lab Job No: Specimen Depth m: 0.00 Composite Sample No: Depth m: -0.90Sample No. : VC12a Geological Origin: Sediment Spec. Ref: Sample Type: Bulk Black, grey, clayey, gravelly SAND with some shell fragments Description: H. W. Chu 21/10/2006 Tested By: 13/10/2006 Date Tested: Date Sample: Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Method A Received SIEVE ANALYSIS 126.20 Initial Dry Mass of Soil m1 Corr. Mass Percent Percent Mass Passing % BS Test Sieve mm Retained g Retained g Retained % 100.0 75.0 0.0 0.0 100.0 37.5 0.0 100.0 20.0 126,20 126.20 cum. mass ret. + m2 = Passing m2 20.0 0.00 20.0 126.20 difference from m1 % = Riffled m3 Washed m4 Note: m4 = mass >63um 103.71 12.09 9.6 90.4 10.0 12.09 6.6 83.8 6,3 8,33 8.33 103.71 6.3 83.29 cum. mass ret. + m5 = Passing m5 Riffled m6 83.29 difference from m4 % = 0.00 6.3 3.19 2.5 81.3 5.00 3.19 20.90 20.90 16.6 64.7 2.00 11.82 9.4 55.4 11.82 1.18 45.8 12.07 9.6 0.600 12.07 34.5 0.300 14.25 14.25 11.3 22.3 0.150 15.43 15.43 12.2 0.063 5.45 5.45 17.9 Pan mE 0.09 cum. mass ret. + mE = 83.20 difference from m6 % = Date: 27-11-2006 Approved Signatory: N

(Page 1 of 2)

Chemical and Biological Testing of Sediment(Term Contract)

Report No: 101893N

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

Project : Sai Ying Pung - Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples

Client Name: Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

& Address 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

Lab Job No : J469 Works Order No: GE/2005/47.19 Lab. Sample Ref. No: 18263/6

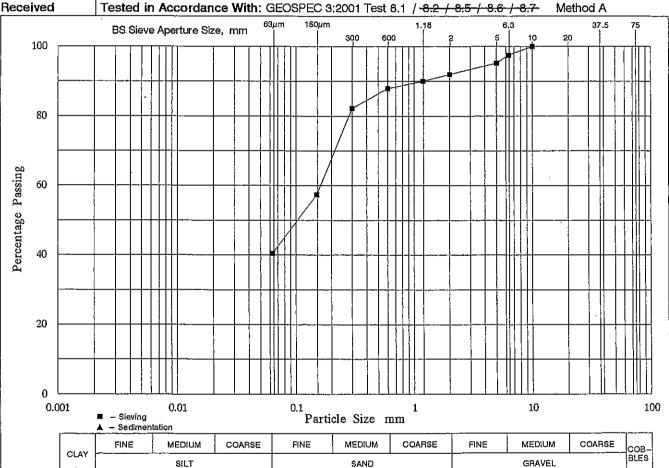
 Composite
 Sample No:
 Depth m: 0.00 & 4.90
 Specimen

 Sample No. : VC13a
 - 0.90
 5.90
 Depth m:

Sample Type: Bulk Spec. Ref: Geological Origin: Sediment

Description : Dark grey, slightly gravelly, silty, very clayey SAND with occasional shell fragments

Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H. W. Chu



Remarks:

SUMMARY:

GRAVEL

8 %

SAND

52 %

SILT &

40 %

CLAY

40 %

Lo Kam thuen

Date: 27-11-2006

Approved Signatory:

TEST\GEO36\PSDA (19970811)

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 2 of 2)

Report No: 101893N Chemical and Biological Testing of Sediment(Term Contract) Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to Sai Ying Pung-Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples **Project** Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department Customer 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong & Address 18263/6 Lab. Sample Ref. No: Works Order No: GE/2005/47.19 Lab Job No: Specimen Depth m: 0.00 & 4.90 Sample No: Composite Depth m: - 0.90 5.90 Sample No. : VC13a Geological Origin: Sediment Spec. Ref: Bulk Sample Type: Dark grey, slightly gravelly, silty, very clayey SAND with occasional shell fragments Description: 21/10/2006 Tested By: Date Tested: Date Sample: 13/10/2006 Method A Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Received SIEVE ANALYSIS Initial Dry Mass of Soil m1 107.02 g: Mass Corr. Mass Percent Percent Retained q Retained g Retained % Passing % BS Test Sieve mm 0.0 100.0 75.0 0.0 100.0 37,5 0.0 100.0 20.0 107.02 cum, mass ret. + m2 = 107.02 Passing m2 20.0 0.00 Riffled m3 20.0 107.02 difference from m1 % = Note: m4 = mass >63um Washed m4 63,76 100.0 10.0 0.00 0.0 2,63 2.63 2.5 97.5 6.3 cum. mass ret. + m5 = 63,76 61.13 Passing m5 difference from m4 % = 0.00 Riffled m6 61.13 6.3 2.47 2.47 95.2 5.00 2.3 91.9 3,53 2.00 3.53 3,3 90.0 1.18 2.08 2.08 1,9 0.600 2.28 2.28 2.1 87.9 0.300 6.11 6.11 5.7 82.2 0.150 26,55 26.55 24.8 57.3 17.98 17.98 16.8 40.5 0.063 0.04 Pan mE cum. mass ret. + mE = 61.04 <u>difference from m6 % =</u> Date: 27-11-2006 Lam Chu Lo Kam-chuen Approved Signatory:

(Page 1 of 2)

Chemical and Biological Testing of Sediment(Term Contract)

Report No: 101894N

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

Project Sai Ying Pung ~Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples

Client Name: Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

& Address 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

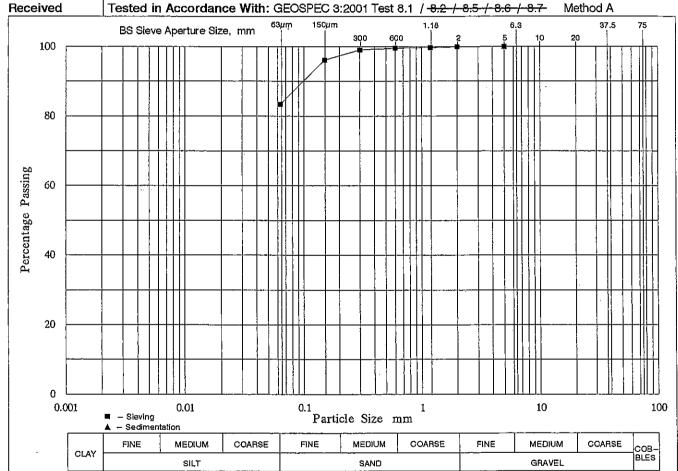
18263/7 Lab Job No: Works Order No: GE/2005/47.19 Lab. Sample Ref. No:

Composite Sample No: Depth m: 0.00 Specimen Depth m: Sample No. : VC14a -0.90

Sample Type: Bulk Spec. Ref: Geological Origin: Sediment

Description: Grey, slightly sandy CLAY

13/10/2006 H, W, Chu Date Sample: Date Tested: 21/10/2006 Tested By:



Remarks:

SUMMARY:

GRAVEL

0 %

SAND

17 %

SILT & 83 %

CLAY

Approved Signatory:

TEST|GE036|PSDA (19970811)

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION

(Page 2 of 2)

Report No: 101894N Chemical and Biological Testing of Sediment(Term Contract) Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to Sai Ying Pung -Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples **Project** Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department Customer 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong & Address Lab. Sample Ref. No: 18263/7 Works Order No: GE/2005/47.19 Lab Job No: Specimen Depth m: 0.00 Sample No: Composite Depth m: -0.90Sample No. : VC14a Geological Origin: Sediment Sample Type: Bulk Spec. Ref: Description: Grey, slightly sandy CLAY Tested By: H. W. Chu 13/10/2006 Date Tested: 21/10/2006 Date Sample: Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Method A Received SIEVE ANALYSIS Initial Dry Mass of Soil m1 106,12 a: Corr. Mass Percent Percent Retained g Retained of Retained % Passing % BS Test Sieve mm 100.0 75.0 0.0 100.0 0.0 37.5 100.0 0.0 20.0 106 12 Passing m2 20.0 106.12 cum. mass ret. + m2 = Riffled m3 20.0 106.12 difference from m1 % = 0.00 Washed m4 Note: m4 = mass >63um 17.73 10.0 00.0 0,0 100.0 0.00 100.0 6.3 0.0 17.73 6.3 17.73 cum, mass ret. + m5 = Passing m5 Riffled m6 6.3 17.73 difference from m4 % = 0.00 100.0 5.00 0.00 0.0 0.10 0.10 0.1 99.9 2.00 0.23 0.2 99.7 0.23 1.18 99.5 0.21 0.21 0.2 0.600 99.1 0.300 0.40 0.40 0.4 0.150 3.20 3.20 3.0 96.1 0.063 13.49 13.49 12.7 83,3 Pan mE 0.05 cum. mass ret. + mE = 17.68 difference from m6 % = 27-11-2006 Approved Signatory:

TEST REPORT ON DETERMINATION

(Page 1 of 2)

OF PARTICLE SIZE DISTRIBUTION Chemical and Biological Testing of Sediment(Term Contract) Report No: 101890N Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to Project Sai Ying Pung - Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples Client Name: Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department & Address 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong Lab Job No: J469 Works Order No: GE/2005/47.19 Lab. Sample Ref. No: 18263/8 Composite Sample No: Depth m: 10.90 Specimen Sample No. VC15a _ 11,90 Depth m: Sample Type: Bulk Spec. Ref: Geological Origin: Sediment Description: Grey, slightly sandy CLAY Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H. W. Chu Received Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Method A BS Sieve Aperture Size, mm 300 600 100 80 Percentage Passing 60 40 20 0 0.001 0.01 10 100 - Sieving Particle Size mm - Sedimentation FINE MEDIUM COARSE FINE MEDIUM COARSE FINE MEDIUM COARSE сов-CLAY SILT SAND GRAVEL Remarks: **SUMMARY: GRAVEL** 0 % Approved Signatory: Lo Kam-chuen SAND 13 % SILT & 87 % 27-11-206 CLAY

(Page 2 of 2)

Report No: 101890N Chemical and Biological Testing of Sediment(Term Contract) Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to **Project** Sai Ying Pung-Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department Customer 8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong & Address 18263/8 Lab. Sample Ref. No: Lab Job No: Works Order No: GE/2005/47.19 Sample No: Depth m: 10.90 Specimen Composite Depth m: VC15a - 11.90 Sample No. : Sample Type: Bulk Spec. Ref: Geological Origin: Sediment Description: Grey, slightly sandy CLAY Date Sample: 13/10/2006 Date Tested: 21/10/2006 Tested By: H, W. Chu Tested in Accordance With: GEOSPEC 3:2001 Test 8.1 / 8.2 / 8.5 / 8.6 / 8.7 Method A Received SIEVE ANALYSIS Initial Dry Mass of Soil m1 100.64 g: Corr. Mass Mass Percent Percent Retained g Retained g Retained % Passing % BS Test Sieve mm 0.0 100.0 75.0 100.0 37.5 0.0 0.0 100.0 20.0 100.64 cum. mass ret. + m2 = Passing m2 20.0 100.64 Riffled m3 100.64 difference from m1 % 0.00 Washed m4 13.48 Note: m4 = mass >63um 10.0 0.00 100.0 6.3 0.00 0,0 100.0 13.48 cum. mass ret. + m5 = 13,48 Passing m5 6.3 Riffled m6 0.00 6,3 13.48 difference from m4 % = 5,00 100.0 0.00 0.0 2.00 0.00 100.0 0.0 0.07 99.9 0.07 0.1 1.18 0.09 99.8 0.600 0.09 0.1 0.300 0.20 0.20 0.2 99.6 0.150 1.29 1.29 1.3 98.4 0.063 11.64 11.64 11.6 86.7 0.10 Pan mE 13,39 cum. mass ret. + mE = difference from m6 % = 0.67 Lan Chuen Lo Kam-chuen Date: Approved Signatory: 27-11-2006

(Page 1 of 2)

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(Page 2 of 2)

		Biological Te CE 42/2005		•	rn Cross Harbour	Main and Acce	ociated I and M	Report No: 1 ains West Kow	
Project :					nn Cross Harbour and Biological Tes				
					ineering office, Ci				
& Address				_	ineering onice, Cr 101 Princess Marg	-	•		••
ab Job No :	J469		Works Or	-	GE/2005/47.19		.ab. Sample		18263/9
Composite	-0.00		Sample	•		oth m:	-	pecimen	10200/9
Sample No. :	Reference Se	ediment	Campi	C NO.	Deb			pecimen Depth m:	
Sample Type:	Bulk		:. Ref:		Geological C	rigin: Sedim		/epui III.	
Description :		-		cacional ch	nell fragments	rigiti. Occili	CIT		
Date Sample:	13/10/2006	Date Te				Tested By:	H. W. Ch		
Received			**	21/10/2006					
SIEVE ANALYSIS		4CCOTGATIC	e with G	EOOFEC 3	3:2001 Test 8.1	1 0,2 1 0,5	7 0.0 7 0.7	Method A	
Initial Dry Mass of		104.98			-				/
indui Dry Muss or	Mass	Corr. Mass	Percent	Percent			. · ·		
BS Test Sieve mm	7	V I	Retained %	1	,				
75.0			0.0	100.0	٦ \			/	
37.5			0.0	100.0	┦ \				
20.0	ļ		0.0	100.0]				
Passing m2 20.0		cum. mass r		104.98					
Riffled m3 20.0		difference fro			<u></u>				
Washed m4	33.01		= mass >63		-			•	
10.0	1	0,00	0.0	100.0	7				
6.3 Passing m5 6.3	1	0,00 cum, mass r	0.0	100.0	┪		\searrow		
Riffled m6 6,3		difference fro		33,01 0.00					
5.00		0.02	0.0	100.0	₹	/			
2.00		0.22	0.2	99.8	¬				
1.18		0.62	0,6	99.2	7				
0.600	1,53	1.53	1.5	97.7					
0.300		2.82	2.7	95.0	4				
0.150	1	1	5,3	89.7	7 /	,			
0.063	1	22.12	21.1	68.6	4 /				
Pan mi	0.03	AUD MASS	*at / ~ *	20.00					
		cum, mass r difference fro			1 /				
		amerence III	<i> 1110 7</i> 0 ⊆	0.15	4/				`
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		<u> </u>			1			·	
			,						
Approved Sign		La Kam-ch					27-11		

TEST REPORT ON DETERMINATION OF MOISTURE CONTENT

(By oven drying at $105^{\circ}C \pm 5^{\circ}C$)

Chemical and Biological Testing of Sediment(Term Contract)

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

Project Customer Sai Ying Pung –Investigation Chemical, Elutriate and Biological Testing of Marine Sediment and Seawater Samples
 Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

& Address

8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

Lab Job No:

J469

Works Order No:

GE/2005/47.19

Date Samples Received:

13/10/2006

Tested in Accordance With: GEOSPEC 3: 2001 Test 5.2

Composite		Sa	mple		Lab.					Moisture
Sample		Depth	Туре	Specimen	Sample	Date	Tested	Description	Geological	Content
No.	No.	m_		Depth m	Ref. No.	Tested	Ву		Origin	%
VC4a		10.90-11.90	Bulk		18263/1	13/10/06	HWC	Grey, gravelly, silty, very clayey SAND	Sediment	22
	40 F/4									• 4.
VC7a		0.90-1.90	Bulk		18263/2	13/10/06	HWC	Grey, sandy CLAY with some shell fragments	Sediment	51
e (10) % 1	Miss									
VC8a		10.90-11.90	Bulk	:	18263/3	13/10/06	HWC	Grey, slightly sandy CLAY	Sediment	57
										in the second
VC11a		0,90-1.90	Bulk		18263/4	13/10/06	HWC	Grey, slightly gravelly, slightly sandy CLAY with occasional shell	Sediment	53
	800 m							fragments	San San	i ·
VC12a	- VIV.47000-01	0.00-0.90	Bulk		18263/5	13/10/06	HWC	Black, grey, clayey, gravelly SAND with some shell fragments	Sediment	40
										N .
VC13a		0.00 0.90 & 4.90 5.90	Bulk		18263/6	13/10/06	HWC	Dark grey, slightly gravelly, silty, very clayey SAND with occasional	Sediment	59
				:				shell fragménts		
VC14a		0.00-0.90	Bulk		18263/7	13/10/06	HWC	Grey, slightly sandy CLAY	Sediment	93
									Sidosia, var si	
VC15a		10.90-11.90	Bulk		18263/8	13/10/06	HWC	Grey, slightly sandy CLAY	Sediment	54

Remarks:

Approved Signatory:

La Kam chuen

Date: 27-11-200 6

Report No: 101896N

TEST REPORT ON **DETERMINATION OF MOISTURE CONTENT**

(By oven drying at $105^{\circ}C \pm 5^{\circ}$	(Bv	oven	drvina	at 105°	С±	5°C
---	-----	------	--------	---------	----	-----

Chemical and Biological Testing of Sediment(Term Contract)

Agreement No. CE 42/2005 (WS) Laying of Western Cross Harbour Main and Associated Land Mains West Kowloon to

GE/2005/47.19

Project

Sai Ying Pung -Investigation Chemical, Eiutriate and Biological Testing of Marine Sediment and Seawater Samples

Customer

Geotechnical Projects Division, Geotechnical Engineering office, Civil Engineering and Development Department

& Address

8/F Civil Engineering and Development Building, 101 Princess Margaret Road, Kowloon, Hong Kong

Works Order No:

Lab Job No:

Date Samples Received:

J469

13/10/2006

Tested in Accordance With: GEOSPEC 3: 2001 Test 5.2

Composite		Sai	mple		Lab.	,			<u> </u>	Moisture
Sample		Depth	Туре	Specimen	Sample	Date	Tested	Description	Geological	Content
™ No.	No.	m		Depth m	Ref. No.	Tésted	Ву	and the second s	Origin	%
Reference Sediment			Bulk		18263/9	13/10/06	HWC	Grey, slightly sandy CLAY with occasional shell fragments	Sediment	98
										\$ 4 m
ું કરે પુરાનું જોઇ જોઇ પ્રસ્તુ પુરાનું જોઇ જોઇ પ્રસ્તુ	: 74g K									

|--|

Approved Signatory:

o lan chuen

Date: 27-11-2006

Report No: 101897N

ALS Technichem (HK) Pty Ltd



ANALYTICAL CHEMISTRY & TESTING SERVICES

11/F., Chung Shun Knitting Centre, ALS Technichem (HK) Pty Ltd Alice Wong / Ivan Leung aboratory Contact LAM LABORATORIES LIMITED MS MAUREEN CHANG

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maureenchang@lamlab.com CHAI WAN, HONG KONG

elephone ⁻acsimile

E-mail

J469 SO19

Project

CERTIFICATE OF ANALYSIS

- 3 Wing Yip Street, Kwai Chung,

: HK0605630

Work Order

1 of 6

N.T. Hong Kong

alice.wong@alsenviro.com +852 2610 2021 +852 2610 1044 į Quote number Telephone Facsimile E-mail

9

No. of samples

31 Oct 2006 7 Nov 2006 Received Analysed

Date received Date of issue

Report Comments

C-O-C number Ordernumber

This report for ALS Technichem (HK) Py Ltd work order reference HK0605630 supersedes any previous reports with this reference. The completion date of analysis is 3 Nov 2006. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for sample(s) as submitted. All pages of this report have been checked and approved for release. process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK0605630 : Sample(s) analysed and reported on an as received basis.

Samples were received in an ambient condition.

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Electronic signing has been carried out in compliance with procedures specified in the 'Electronic Transactions Ordinance' of This document has been electronically signed by those names that appear on this report and are the authorised signatories. Authorised results for:-Inorganics General Manager Position Hong Kong, Chapter 553, Section 6. Fung Lim Chee, Richard Signatory

ALS Laboratory Group

Trading Name: ALS Technichen (HK) Ply Ltd.
1/1F., Chung Shun Kniting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T. Hong Kong, 1-3 Wing Yip Street, Kwai Chung, N.T. Hong Kong, Tet +852 2610 1044 Fax: +852 2610 2021 http://www.alsanviro.com/ A Campbell Brothers Linited Company



Page Number Client

HK0605630-005 [31 Oct 2006] 18263/5 0.40 HK0605630-004 [31 Oct 2006] 18263/4 99.0 HK0605630-003 [31 Oct 2006] 18263/3 0.60 18263/2 HK0605630-002 [31 Oct 2006] 0.49 HK0605630-001 [31 Oct 2006] 18263/1 0.65 Client Sample ID : Sample Date / Time : Laboratory Sample ID: 8 LOR 0.05 : 2 of 6 : LAM LABORATORIES LIMITED HK0605630 CAS number EP: Aggregate Organics EP009: Total Organic Carbon Analytical Results Method: Analysis Description Submatrix: SOIL Work Order

HK0605630-010 [31 Oct 2006] 18263/9 0.64 HK0605630-009 [31 Oct 2006] 18263/8 0.35 *18263/7 HK0605630-008 [31 Oct 2006] 0.70 HK0605630-006 18263/6 [31 Oct 2006] 0.62 Laboratory Sample ID: Sample Date / Time: Client Sample ID: % Units 10R 0.05 : 3 of 6 : LAM LABORATORIES LIMITED HK0605630 CAS number EP: Aggregate Organics EP009: Total Organic Carbon Analytical Results Method: Analysis Description Submatrix: SOIL. Work Order

Page Number Client



Page Number : 4 of 6
Client
Work Order HK0605630
Quality Control - Laboratory Duplicate (DUP) Results

Matrix Tuno: SOII			L			Duplicate (DUP) Results	Results	
many type. Soil			240	9	Haite	Original Docult	Directo Poeriff	(%) Uda
I ahoratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	צטן	Cinic	Original Nesant	Dapineare research	60 000
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HK0605629_001	Anonymous	EP009: Total Organic Carbon	1	0.05	%	0.20	CZ:0	0.0
1000000	Control of the contro			200	/0	60.0	1 07	12 B
HK0605629-003	Anonymous	EP009: Total Organic Carbon		0.03	-/0	0.93	70.1	0.01
2000000	, 111011.j.iii.c.c.							



	(ALS)	itrol Spike (SCS) and Duplicate Control Spike (DCS) Results	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results
		<u>pike (I</u>	uplicate Cor
		itrol S	(SCS) and Di
		te Cor	ontrol Spike
		uplica	Single Co
		and D	
		(SCS)	
$\bigg]$		Spike	ılts
		ontrol	nk (MB) Results
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		B). Sii	
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	5 of 6 LAM LABORATORIES LIMITED HK0605630	- Meth	
	: 5 of 6 : LAM : HK06	ntrol)/L
	Page Number Client Work Order	Quality Control <u>- Method Blank (MB), Single Con</u>	Matrix Type: SOIL
	≥0°£	U	M.

Matrix Type: SOIL	1.	N	Method Blank (MB) Results	3) Results		Single Contro	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results	plicate Con	trol Spike (I	DCS) Results	
					Spike	Spike Recovery (%)	overy (%)	Recovery Limits (%)	Imits (%)	RPL	RPDs (%)
Method: Analysis Description	CAS number	TOR	Units	Result	Concentration	SCS	SOO	тот Т	High	Value	Control Limit
EP: Aggregate Organics (QCLot: 3006	980)	· · · · · · · · · · · · · · · · · · ·		の表情が発生して		。 第二章 第二章					
EP009: Total Organic Carbon	-	0.05	%	<0.05	40 %	102	1	85	115		



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

: 6 of 6 : LAM LABORATORIES LIMITED HK0605630 Page Number Client Work Order

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

Matrix Type: SOIL

				Spire	Spike Recovery (%	covery (%)	Recovery Limits ((%) SHILLS	KPDS (%)	70)
Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Concentration	MS	MSD	Том	High	Value	Control Limi
EP: Augregate Organ	EP: Aggregate Organics (QCLot: 300680)				では、これは、これは、			台灣中 後		March 19
HK0605630-001	18263/1	EP009: Total (40 %	101		75	125	1	1
1										