Drainage Services Department (DSD)

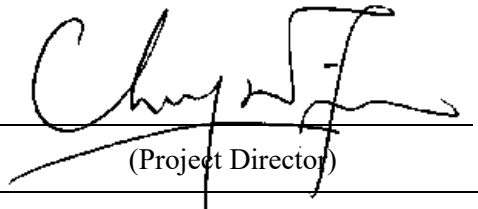
Agreement No. CE 93 / 2017 (DS)
Yuen Long Barrage Scheme – Investigation, Design and Construction

Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long

Sediment Quality Report

September 2020
(Version 1.0)

Approved By



(Project Director)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

WELLAB accepts no responsibility for changes made to this report by third parties.

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TABLE OF CONTENTS

Page

1 INTRODUCTION 1
2 SAMPLING METHODS 2
3 CHEMICAL SCREENING 4
4 CHEMICAL SCREENING RESULTS AND QUALITY CONTROL DATA 6
5 BIOLOGICAL SCREENING 9
6 CONCLUSION 9

List of Tables

Table 2.1 Size of Samples for Respective Test 2
Table 2.2 Types of Sampling Bottles and Pretreatment Methods 3
Table 3.1 Methodology of Tests for Chemical Analysis 4
Table 4.1 Sediment Quality Criteria for the Classification of Sediment 6
Table 4.2 Classification of Sediment and Range of Testing Results 8

List of Figures

Figure 1 Location of Sediment Sampling Stations at Channel of YLN

Appendices

Appendix A Sediment Sampling Field Records
Appendix B Chain of Custody Records
Appendix C Chemical Test Laboratory Reports

1 INTRODUCTION

Project Background

1.1 Drainage Services Department (DSD) intends to carry out the estimation and identification of the properties of dredged sediment for "Yuen Long Barrage Scheme – Investigation, Design and Construction" (hereinafter called "the Project"). The Project is to carry out the investigation, design and construction for the Yuen Long Barrage Scheme (YLBS), associated drainage improvement works and channel revitalization works in Yuen Long Nullah (YLN).

1.2 Wellab Limited was commissioned by DSD as the Contractor to undertake the sediment sampling and testing in Yuen Long under Contract No. PM 05/2020 for the Project. This Sediment Quality Report (SQR) is prepared by Wellab to assess the quality of the sediment to be excavated. The testing results presented in this SQR is for the Yuen Long Barrage Scheme Environmental Impact Assessment (EIA) study only and the final sediment quality classification and disposal option should be subject to the results of separate Sediment Sampling and Testing Plan (SSTP) and SQR submitted under the Dumping at Sea Ordinance (DASO) and allocated by relevant authority.

Sediment Quality Report (SQR)

1.3 Since the river sediment on the existing YLN may need to be removed from the works area for the proposed barrage, the contamination levels of the sediment to be excavated should be determined according to the Technical circular "*Management of Dredged / Excavated Sediment (ETWB TC (W) No. 34/2002),* under the Dumping at Sea Ordinance, Cap. 466 (DASO).

1.4 This SQR is to present the sediment monitoring results for the sediment samples collected at Channel of YLN.

1.5 Sediment samples were collected at the Channel of YLN on 7th September 2020. Due to the Tier III biological screening was not required according to the chemical screening results of the collected sediment samples, reference sediment sample is therefore not required to be collected for testing.

1.6 In the following sections, details are provided of the (a) sample collection and testing methods, (b) quality control procedures, (c) testing results and (d) classification of the sediment samples in accordance with *ETWB TC (W) No. 34/2002*.

2 SAMPLING METHODS

General

2.1 Reference has been made to the *ETWB TC (W) No. 34/2002* regarding the sediment sampling and testing requirements.

Details of Sampling

Sampling Stations

2.2 A total of twenty-two (22) sampling locations were proposed in the approved sediment sampling and testing plan (SSTP). The sampling locations are presented in **Figure 1**.

2.3 On 7th September 2020, a total of 11 surface grab sediment samples were collected at the locations (S10, S11, S14 to S22).

2.4 No sediment samples at S01 to S09, S12 and S13 were collected after several attempts, it is considered that no sediment are deposited at these locations.

2.5 The sediment sampling field records are shown in **Appendix A.**

Sampling Methodology

Surface Sediment Grab Sampling

2.6 The surface samples were collected by grab sampling method. Replicate grab samples were taken to collect about 10 L of wet sediment at each sampling location.

2.7 The sediment grab Van Veen sampler was made of stainless steel. The sampler (230x230X230mm) was capable of collecting 11 to 12kg of sediment in each operation. The sampling equipment was thoroughly washed in clean water prior to each sampling.

2.8 At each designated sampling point, the grab was lowered slowly through the water column. After sample is collected from the river channel, the grab was raised and carefully retrieved and examined to determine acceptability.

Method of Sample Handling Storage and Transportation

2.9 Samples were immediately placed in a cool box following bagging and labelling. Samples were stored and transported in insulated containers and maintained at 4ºC or lower without freezing. On transfer from site to the laboratory, samples were kept at below 4ºC, by regularly replacing the ice packs. **Table 2.1** summarizes the size of samples for respective tests.

Table 2.1 Size of Samples for Respective Test

Parameters to be tested	Sample size
Metals and metalloid	0.5 litre
Organic	0.5 litre
Biological response	6 litre

Quality Control Measures and Preservative Methods for Collected Sample

2.10 The sampling programme was undertaken using appropriate procedures to minimize the potential cross contamination between sampling locations and to preserve the samples for

subsequent tests. These methods include sample pretreatment, decontamination procedures and sample management as detailed below.

Sampling Bottles and Pretreatment Methods

2.11 **Table 2.2** summarizes the types of sampling bottles and pretreatment methods have been adopted. All sampling and subsampling containers were provided by HOKLAS Laboratory with guarantee of their sterilization and preservative contents.

Table 2.2 Types of Sampling Bottles and Pretreatment Methods

Parameters to be tested	Sampling Bottle	Pretreatment Procedure
Metals and metalloid	Heavy duty plastic bags	USEPA SW-846 Chapter 3
Organic	Wide mouth Borosilicate glass bottles with Teflon lined lid	USEPA SW-846 Chapter 4
Biological response	Heavy duty plastic bags	USEPA SW-846 Chapter 3 or Chapter 4 as appropriate

Decontamination Procedures

2.12 Sampling equipment used during the course of the investigation programme was decontaminated by manual washing and fresh water rinsing after each sampling event. All disposable equipment, if any was discarded after each use.

Sample Management

2.13 All sampling bottles were labeled with the station number, sample length, diameter and depth, sampling date and time

2.14 Field sampling was performed by qualified Wellab staff. All collected samples were kept at 4°C in the dark and not be frozen. The Samples were delivered to a HOKLAS laboratory on the same day of sampling. All samples were handled under chain of custody protocols (as shown in **Appendix B**) and relinquished to the laboratory representatives at locations specified by the laboratory.

3 CHEMICAL SCREENING

3.1 After collecting the sediment samples, all samples were sent to laboratories for testing the levels of chemical contaminants.

Information and Methodology of Testing Laboratory

3.2 Wellab Ltd. (HOKLAS Registration No.083) was commissioned to carry out all chemical testing for heavy metals, metalloid, organics (PAHs & PCBs) and Organometallics (Tributyltin).

Details of Testing

3.3 Eight heavy metals were tested (cadmium, chromium, copper, mercury, nickel, lead, silver and zinc), as well as arsenic, low and high molecular weight PAHs, total PCBs and TBT in accordance with *ETWB TC (W) No. 34/2002*. Details of the testing methods used are provided in **Table 3.1** below.

Table 3.1 Methodology of Tests for Chemical Analysis

Parameters	Nature of Sample Tested	Determination Method (In House Method)*	Reporting Limit**
Metals (mg/kg dry wt.)			
Cadmium (Cd)	Sediment	In-house method SOP093 (digestion) (ICP-MS)	0.05
Chromium (Cr)	Sediment		0.1
Copper (Cu)	Sediment		0.2
Mercury (Hg)	Sediment		0.05
Nickel (Ni)	Sediment		0.2
Lead (Pb)	Sediment		0.1
Silver (Ag)	Sediment		0.1
Zinc (Zn)	Sediment		0.2
Metalloid (mg/kg dry wt.)			
Arsenic (As)	Sediment	In-house method SOP093 (digestion) (ICP-MS)	0.1
Organic-PAHs (µg/kg dry wt.)			
Low Molecular Weight PAH+	Sediment	In House Method SOP090 (GC/MSD)	8 / 10 (for individual compounds)
High Molecular Weight PAH++	Sediment		10 (for individual compounds)
Organic-non-PAHs (µg/kg dry wt.)			
Total PCBs+++	Sediment	In House Method SOP088 (GC/MSD)	1.0 (for individual PCB congeners)
Organometallics ((µg/L)			
Tributyltin	Interstitial Water	In house method SOP 065 (GC/FPD)	0.010

\+ *Low molecular weight PAHs include acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene*

++ *High molecular weight PAHs include benzo[a]anthracene, benzo[a]pyrene, chrysene, dibenzo[a,h]anthracene, fluoranthene, pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, indeno[1,2,3-c,d]pyrene and benzo[g,h,i]perylene*

+++ *Total PCBs include 2, 4' di CB, 2,2',5 triCB, 2,4,4' triCB, 2,2',3,5' tetraCB, 2,2',5,5' tetraCB, 2,3'4,4' tetraCB, 3,3'4,4' tetraCB, 2,2',4,5,5' pentaCB, 2,3,3'4,4' pentaCB, 2,3',4,4',5 pentaCB, 3,3',4,4',5 pentaCB, 2,2',3,3',4,4' hexaCB, 2,2',3,4,4',5' hexaCB, 2,2',4,4',5,5' hexaCB, 3,3'4,4',5,5' hexaCB, 2,2'3,3'4,4',5 heptaCB, 2,2',3,4,4',5,5' heptaCB, 2,2',3,4',5,5',6 heptaCB (ref: the "summation"*

column of Table 9.3 of Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual (The Inland Testing Manual) published by USEPA.

* *All parameters were tested at Wellab Limited which is a HOKLAS Accredited Organisation. All In House Method are accredited by Hong Kong Accreditation Service.*

** *Reporting Limit for the determination method are more precise than the requirement stated in ETWB TC (W) No. 34/2002*

Quality Control Measures for Sample Testing

3.4 The following Quality Control programme was performed by Wellab Ltd. for each batch of samples (every 20 samples or less):

i) Sample duplicate;
ii) Sample spike;
iii) Method quality control; and
iv) Method blank.

4 CHEMICAL SCREENING RESULTS AND QUALITY CONTROL DATA

4.1 Testing for chemical contaminant levels was completed according to the standards stated previously. The testing results and corresponding quality control data are presented as followed.

Classification Criteria

4.2 Sediments are classified according to their levels of contamination with reference to the Chemical Exceedance Levels (CEL) laid down in Appendix A of *ETWB TC (W) No. 34/2002*. The CELs are also summarized in **Table 4.1**.

Table 4.1 Sediment Quality Criteria for the Classification of Sediment

Contaminants	Lower Chemical Exceedance Level (LCEL)	Upper Chemical Exceedance Level (UCEL)
Metals *(mg/kg dry wt.)*		
Cadmium (Cd)	1.5	4
Chromium (Cr)	80	160
Copper (Cu)	65	110
Mercury (Hg)	0.5	1
Nickel (Ni)*	40	40
Lead (Pb)	75	110
Silver (Ag)	1	2
Zinc (Zn)	200	270
Metalloid *(mg/kg dry wt.)*		
Arsenic (As)	12	42
Organic-PAHs *(μg/kg dry wt.)*		
Low Molecular Weight PAHs+	550	3160
High Molecular Weight PAHs++	1700	9600
Organic-non-PAHs *(μg/kg dry wt.)*		
Total PCBs+++	23	180
Organometallics *(μg TBT/L in Interstitial water.)*		
Tributyltin*	0.15	0.15

* *The contaminant level is considered to have exceeded the UCEL if it is greater than the value shown.*

\+ *Low molecular weight PAHs include acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene*

++ *High molecular weight PAHs include benzo[a]anthracene, benzo[a]pyrene, chrysene, dibenzo[a,h]anthracene, fluoranthene, pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, indeno[1,2,3-c,d]pyrene and benzo[g,h,i]perylene*

+++ *Total PCBs include 2, 4' di CB, 2,2',5 triCB, 2,4,4' triCB, 2,2',3,5' tetraCB, 2,2',5,5' tetraCB, 2,3'4,4' tetraCB, 3,3'4,4' tetraCB, 2,2',4,5,5' pentaCB, 2,3,3'4,4' pentaCB, 2,3',4,4',5 pentaCB, 3,3',4,4',5 pentaCB, 2,2',3,3',4,4' hexaCB, 2,2',3,4,4',5' hexaCB, 2,2',4,4',5,5' hexaCB, 3,3'4,4',5,5' hexaCB, 2,2'3,3'4,4',5 heptaCB, 2,2',3,4,4',5,5' heptaCB, 2,2',3,4',5,5',6 heptaCB (ref: the "summation" column of Table 9.3 of Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Maunal (The Inland Testing Manual) published by USEPA.*

4.3 The sediment is classified into 3 categories based on its contaminant levels:

Category L: Sediment with all contaminant levels not exceeding the LCEL. Material must be dredged, transported and disposed of in a manner which minimizes the loss of contaminants either into solution or by resuspension.

Category M: Sediment with any one or more contaminant levels exceeding the LCEL and none exceeding the UCEL. The material must be dredged and transported with care, and must be effectively isolated from the environmental upon final disposal unless appropriate biological tests demonstrate that the material will not adversely affect the marine environment.

Category H: Sediment with any one or more contaminant levels exceeding the UCEL. The material must be dredged and transported with great care, and must be effectively isolated from the environment upon final disposal.

Testing Results and Classification of Sediments

4.4 A total of 11 samples, were taken for testing and quality control exercises.

4.5 The classification of sediments and range of testing results are presented in **Table 4.2** and the HOKLAS laboratory chemical test reports are presented in **Appendix C**.

Quality Control

4.6 The quality control results which are all within the acceptance range are presented in **Appendix C.**

Table 4.2 Classification of Sediment and Range of Testing Results

Sampling Date	Sample ID	Cd mg/kg	Cr mg/kg	Cu mg/kg	Hg mg/kg	Ni mg/kg	Pb mg/kg	Ag mg/kg	Zn mg/kg	As mg/kg	*LMW PAHs µg/kg	*HMW PAHs µg/kg	*Total PCBs µg/kg	TBT µg TBT/L	Category	>10x LCEL
7/9/2020	S10	**2.75**	44.6	***234.8***	0.22	33.8	***126.3***	***2.3***	***1052.2***	**14.7**	<50	<100	<18	<0.01	H	No
7/9/2020	S11	**2.35**	45.0	***218.8***	0.24	35.2	***123.7***	***2.2***	***1088.1***	**16.7**	<50	<100	<18	<0.01	H	No
7/9/2020	S14	**2.59**	51.0	***179.8***	0.20	31.5	***139.6***	**1.3**	***1695.2***	**21.5**	<50	<100	<18	<0.01	H	No
7/9/2020	S15	**1.66**	52.8	***150.9***	0.18	31.9	**107.3**	**1.6**	***1152.6***	**19.5**	<50	<100	<18	<0.01	H	No
7/9/2020	S16	**2.95**	45.6	***149.0***	0.18	29.9	***114.7***	**1.4**	***1269.0***	**20.0**	<50	<100	<18	<0.01	H	No
7/9/2020	S17	**1.94**	61.4	***201.2***	0.22	37.2	**109.2**	**1.9**	***1238.8***	**21.5**	<50	<100	<18	<0.01	H	No
7/9/2020	S18	**1.54**	54.3	***117.2***	0.22	31.8	**81.7**	**1.2**	***887.5***	**19.8**	<50	<100	<18	<0.01	H	No
7/9/2020	S19	**1.66**	60.6	***140.8***	0.20	34.5	**91.6**	**1.4**	***980.2***	**21.6**	<50	<100	<18	<0.01	H	No
7/9/2020	S20	**1.62**	56.4	***154.5***	0.33	33.7	**101.7**	**1.3**	***1120.4***	**22.0**	<50	<100	<18	<0.01	H	No
7/9/2020	S21	**2.40**	59.9	***191.7***	0.26	37.7	***115.7***	***2.1***	***1384.1***	**21.3**	<50	<100	<18	<0.01	H	No
7/9/2020	S22	0.52	60.5	**97.6**	0.22	35.4	**83.5**	0.96	***1212.8***	**22.6**	<50	<100	<18	<0.01	H	No
Lower Chemical Exceedance Level (LCEL)		1.5	80	65	0.5	40	75	1	200	12	550	1700	23	0.15		
Upper Chemical Exceedance Level (UCEL)		4	160	110	1	40	110	2	270	42	3160	9600	180	0.15		

* Remarks: Total PCBs results - The values are calculated from summation of the 18 PCB congeners, based on Limit of Reporting of 1 ug/kg.
Low M.W. PAHs is sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene;
High M.W. PAHs is sum of Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1.2.3.cd)pyrene, Dibenz(a.h)anthracene, Benzo(g.h.i)perylene.

Note:
Normal indicates Category L
Bold indicates Category M
Bold and *Italic* indicates Category H
Bold, *Italic* and underline indicates Category H (>10xLCEL)

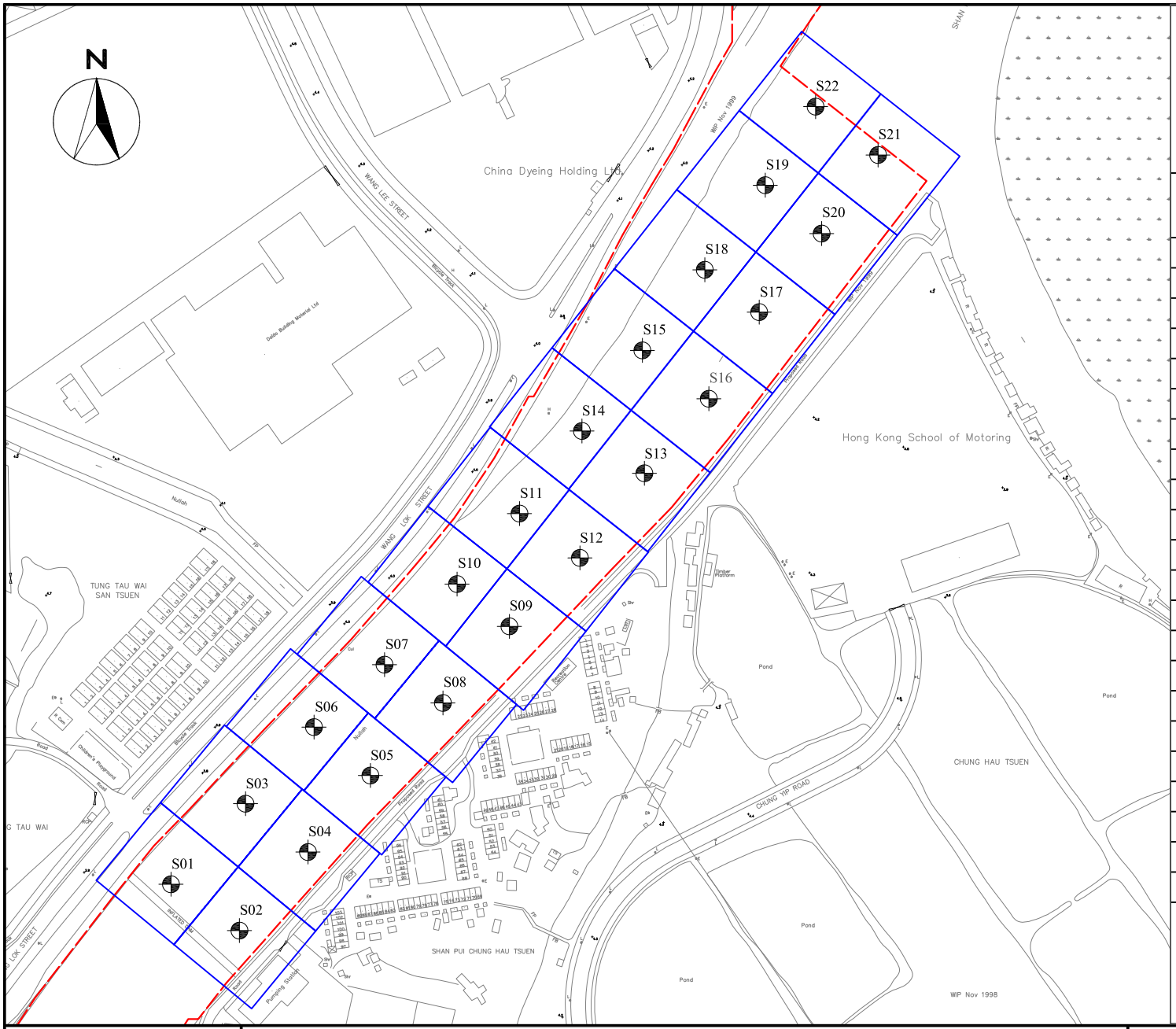
5 BIOLOGICAL SCREENING

5.1 According to the procedure stipulated in the *ETWB TC (W) No. 34/2002* and the approved SSTP, no further biological screening is required for the collected sediment samples. It is because all eleven (11) samples collected from the site are classified as Category H with no contaminant levels exceeding 10 times LCEL.

6 CONCLUSION

6.1 All sediment samples were tested for chemical contaminants in the HOKLAS accredited laboratories. Analysis of the sediment testing results indicates all the sediment should be classified as Category H as the contamination levels of some heavy metals which exceeding the UCEL but not exceed 10 times the LCEL for all samples.

FIGURES



LEGEND

- Project Boundary
- 50m X 50m Sampling Grid
- Sampling Location

Sampling Stations	Coordinates	
	Easting	Northing
S01	821052	834885
S02	821086	834862
S03	821089	834925
S04	821120	834901
S05	821151	834939
S06	821123	834963
S07	821158	834994
S08	821187	834975
S09	821220	835013
S10	821194	835034
S11	821225	835069
S12	821255	835047
S13	821287	835089
S14	821256	835110
S15	821286	835150
S16	821319	835126
S17	821344	835169
S18	821317	835190
S19	821347	835232
S20	821375	835208
S21	821403	835247
S22	821372	835271

Remarks:

1. Surface grab sediment samples were collected successfully at the locations (S10, S11, S14 to S22) on 7/9/2020.
2. No sediment samples could be collected at S01 to S09, S12 and S13 due to no sediment are deposited at these locations.

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Agreement No. CE 93 / 2017 (DS)
Yuen Long Barrage Scheme - Investigation, Design and Construction
Contract No. PM 05/2020 - Sediment Sampling Survey in Yuen Long
Proposed Sediment Sampling Locations

SCALE	1:7500 @A4	DATE	JULY 2020
CHECK	IT	DRAWN	ML
Proposal No.	WMS20014	FIGURE NO. 1	REV -

APPENDIX A
SEDIMENT SAMPLING FIELD RECORDS

Yuen Long Barrage Scheme - Investigation, Design and Construction
Sediment Sampling Survey in Yuen Long
Sediment Monitoring Field Record Sheet

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Sampling Date: 7 September 2020

Sampling Location	Sample Type	Co-ordination	Starting Time	Weather Condition	Water Depth (m)	Sediment Depth	Remarks
S01	Grab	E821052 N834885	13:13	Cloudy	1.8	0	No sediment sample was collected
S02	Grab	E821086 N834862	13:05	Cloudy	1.8	0	No sediment sample was collected
S03	Grab	E821089 N834925	12:56	Cloudy	1.8	0	No sediment sample was collected
S04	Grab	E821120 N834901	12:52	Cloudy	1.8	0	No sediment sample was collected
S05	Grab	E821151 N834939	12:48	Cloudy	1.9	0	No sediment sample was collected
S06	Grab	E821123 N834963	12:43	Cloudy	1.9	0	No sediment sample was collected
S07	Grab	E821158 N834994	12:37	Cloudy	1.9	0	No sediment sample was collected
S08	Grab	E821187 N834975	12:33	Cloudy	1.6	0	No sediment sample was collected
S09	Grab	E821220 N835013	12:30	Cloudy	1.5	0	No sediment sample was collected
S10	Grab	E821194 N835034	12:20	Cloudy	1.6	~0.3 m	N/A
S11	Grab	E821225 N835069	12:13	Cloudy	1.7	~0.3 m	N/A
S12	Grab	E821255 N835047	12:07	Cloudy	1.6	0	No sediment sample was collected
S13	Grab	E821287 N835089	12:00	Cloudy	1.6	0	No sediment sample was collected
S14	Grab	E821256 N835110	11:50	Cloudy	1.4	~0.5 m	N/A
S15	Grab	E821286 N835150	11:33	Cloudy	1.4	~0.5 m	N/A
S16	Grab	E821319 N835126	11:25	Cloudy	1.5	~0.5 m	N/A
S17	Grab	E821344 N835169	11:10	Cloudy	1.5	~0.5 m	N/A
S18	Grab	E821317 N835190	10:58	Cloudy	1.5	~0.5 m	N/A
S19	Grab	E821347 N835232	10:50	Cloudy	1.5	~0.5 m	N/A
S20	Grab	E821375 N835208	10:37	Cloudy	1.3	~0.5 m	N/A
S21	Grab	E821403 N835247	10:22	Cloudy	1.2	~0.5 m	N/A
S22	Grab	E821372 N835271	10:08	Cloudy	0.3	~0.5 m	N/A

APPENDIX B
CHAIN OF CUSTODY RECORDS

CHAIN OF CUSTODY

34023

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RECORD OF SEDIMENT SAMPLING & COLLECTION UNDER ETWB TC(W) NO. 34/2002/PNAP 252

(Sheet 1 of 2)

Project Name: Agreement No. CE 93 / 2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long	**Project No:** WMS20014
Name of Project Proponent: WELLAB LIMITED	
Address: Room 1701, Technology Park, 18 On Lai Street, Shatin, N.T., Hong Kong	
Contact Person: Ivy Tam	
Telephone No: 2151 2090	E-mail address: Ivy.Tam@WELLAB.COM.HK / **Fax No:** 2898 7076

Sediment Sampling

Sample ID No.	Sampling Date & Time	Sampling Location (Latitude / Longitude) or (Northing / Easting)	Sampling Depth (Starting & Finishing Levels)	Method of Collection (e.g. Grab, Vibrocore, etc)	Analysis requested							Remark
					Metals	Metalloid	LMW PAHs	HMW PAHs	Total PCBs	TBT	Other (please specify)	
S10	1220 7/9	N 835034 E 821194	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S11	1213 7/9	N 835069 E 821225	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S14	1150 7/9	N 835110 E 821256	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S15	1133 7/9	N 835150 E 821286	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S16	1125 7/9	N 835126 E 821319	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S17	1110 7/9	N 835169 E 821344	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S18	1048 7/9	N 835190 E 821317	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S19	1050 7/9	N 835232 E 821347	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S20	1037 7/9	N 835208 E 821375	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)

1 10
2 11
3 14
4 15
5 16
6 17
7 18
8 19
9 20

Sampling Conducted by: Ho Ka Chun	Sampling Supervised by (if any):	Sampling Supervised by (if any):	Samples Received by:
Company Name: WELLAB LIMITED (EM&A Department)	Company Name:	Company Name:	Name of Laboratory: Wellab Limited 匯力(顧問及檢測)有限公司
Address: Room 1701, Technology Park, 18 On Lai Street, Shatin, N.T., Hong Kong	Address:	Address:	Address: Rms 1701 & 1702, 17/F, Technology Park, 18 On Lai Street, Shatin, N.T., Hong Kong
Person-in-charge: Ho Ka Chun	Responsible Person:	Responsible Person:	Responsible Person: (收貨章) 來貨暫收，驗後作準
Phone No: 6351 3975	Phone No:	Phone No:	Phone No: 2888 7388
Date & Time: 7/9/2020 (18:00)	Date & Time:	Date & Time:	Date & Time: 經手人: 2020 年 9 月 7
Signature:	Signature:	Signature:	Signature:

CHAIN OF CUSTODY

3403

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RECORD OF SEDIMENT SAMPLING & COLLECTION UNDER ETWB TC(W) NO. 34/2002/PNAP 252

(Sheet 2 of 2)

Project Name: Agreement No. CE 93 / 2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long	**Project No:** WMS20014
Name of Project Proponent: WELLAB LIMITED	
Address: Room 1701, Technology Park, 18 On Lai Street, Shatin, N.T., Hong Kong	
Contact Person: Ivy Tam	
Telephone No: 2151 2090 / E-mail address: Ivy.Tam@WELLAB.COM.HK	**Fax No:** 2898 7076

Sediment Sampling

Sample ID No.	Sampling Date & Time	Sampling Location (Latitude / Longitude) or (Northing / Easting)	Sampling Depth (Starting & Finishing Levels)	Method of Collection (e.g. Grab, Vibrocore, etc)	Analysis requested							Remark
					Metals	Metalloid	LMW PAHs	HMW PAHs	Total PCBs	TBT	Other (please specify)	
S21	1022 7/9	N 835247 E 821403	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)
S22	1008 7/9	N 835271 E 82372	Surface	Grab	✓	✓	✓	✓	✓	✓	✓	Biological Screening (if necessary)

S21
22

Sampling Conducted by: Ho Ka Chun	Sampling Supervised by (if any):	Sampling Supervised by (if any):	Samples Received by:
Company Name: WELLAB LIMITED (EM&A Department)	Company Name:	Company Name:	Name of Laboratory: Wellab Limited
Address: Room 1701, Technology Park, 18 On Lai Street, Shatin, N.T., Hong Kong	Address:	Address:	Address: Rms 1214, 1502, 1701 & 1716 Technology Park, 18 On Lai Street, Shatin, N.T., Hong Kong
Person-in-charge: Ho Ka Chun	Responsible Person:	Responsible Person:	Responsible Person:
Phone No: 6357 3915	Phone No:	Phone No:	Phone No: 2838 7388
Date & Time: 7/9/2020 (1800)	Date & Time:	Date & Time:	Date & Time:
Signature:	Signature:	Signature:	Signature:

匯力(顧問及檢測有限公司 Wellab Limited (收貨章) 來貨暫收・驗後作貨 經手人: 2020年 7月 9

APPENDIX C
CHEMICAL TEST LABORATORY REPORTS

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Website:http://www.wellab.com.hk E-mail:wellab@wellab.com.hk

HKAS HOKLAS 083 TEST

TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
RM 1808, Technology Park,
18 On Lai Street,
Shatin, N.T., Hong Kong

ATTN: **Ms. Ivy Tam**

Report No.:	34023
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	1 of 3

Sample Description : 11 samples as received by customer said to be sediment
Laboratory No. : 34023
Project No. : WMS20014
Project Name : Agreement No. CE93/2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long
Sampling Date : 2020-09-07

Test Requested & Methodology:

Item	Parameters	Ref. Method	Limit of Reporting
1	Cadmium (Cd)	In-house method SOP053 (ICP-AES) & In-house method SOP093 (digestion) (ICP-MS)	0.05 mg/kg
2	Chromium (Cr)		0.1 mg/kg
3	Copper (Cu)		0.2 mg/kg
4	Mercury (Hg)		0.05 mg/kg
5	Nickel (Ni)		0.2 mg/kg
6	Lead (Pb)		0.1 mg/kg
7	Silver (Ag)		0.1 mg/kg
8	Zinc (Zn)		0.2 mg/kg
9	Arsenic (As)		0.1 mg/kg

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

Approved Signatory:
Tse Siu Kei, Patrick
General Manager

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Tel: 2898 7388 Fax: 2898 7076
Website:http://www.wellab.com.hk E-mail:wellab@wellab.com.hk

HKLAS 083
TEST

TEST REPORT

Report No.:	34023
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Test Results:

Sample ID	S10	S11	S14	S15
Sampling Location	N835034 E821194	N835069 E821225	N835110 E821256	N835150 E821286
Sampling Depth	Surface	Surface	Surface	Surface
Sample No.	34023-10	34023-11	34023-14	34023-15
Cadmium, mg/kg	2.75	2.35	2.59	1.66
Chromium, mg/kg	44.6	45.0	51.0	52.8
Copper, mg/kg	234.8	218.8	179.8	150.9
Mercury, mg/kg	0.22	0.24	0.20	0.18
Nickel, mg/kg	33.8	35.2	31.5	31.9
Lead, mg/kg	126.3	123.7	139.6	107.3
Silver, mg/kg	2.3	2.2	1.3	1.6
Zinc, mg/kg	1052.2	1088.1	1695.2	1152.6
Arsenic, mg/kg	14.7	16.7	21.5	19.5

Sample ID	S16	S17	S18	S19
Sampling Location	N835126 E821319	N835169 E821344	N835190 E821317	N835232 E821347
Sampling Depth	Surface	Surface	Surface	Surface
Sample No.	34023-16	34023-17	34023-18	34023-19
Cadmium, mg/kg	2.95	1.94	1.54	1.66
Chromium, mg/kg	45.6	61.4	54.3	60.6
Copper, mg/kg	149.0	201.2	117.2	140.8
Mercury, mg/kg	0.18	0.22	0.22	0.20
Nickel, mg/kg	29.9	37.2	31.8	34.5
Lead, mg/kg	114.7	109.2	81.7	91.6
Silver, mg/kg	1.4	1.9	1.2	1.4
Zinc, mg/kg	1269.0	1238.8	887.5	980.2
Arsenic, mg/kg	20.0	21.5	19.8	21.6

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1716, Technology Park, 18 On Lai Street, Shatin

****

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HOKLAS 083
TEST

TEST REPORT

Report No.:	34023
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	3 of 3

Test Results:

Sample ID	S20	S21	S22
Sampling Location	N835208 E821375	N835247 E821403	N835271 E82372
Sampling Depth	Surface	Surface	Surface
Sample No.	34023-20	34023-21	34023-22
Cadmium, mg/kg	1.62	2.40	0.52
Chromium, mg/kg	56.4	59.9	60.5
Copper, mg/kg	154.5	191.7	97.6
Mercury, mg/kg	0.33	0.26	0.22
Nickel, mg/kg	33.7	37.7	35.4
Lead, mg/kg	101.7	115.7	83.5
Silver, mg/kg	1.3	2.1	0.96
Zinc, mg/kg	1120.4	1384.1	1212.8
Arsenic, mg/kg	22.0	21.3	22.6

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1716, Technology Park, 18 On Lai Street, Shatin

**********END OF REPORT**********

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HOKLAS 083
TEST

TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
RM 1808, Technology Park,
18 On Lai Street,
Shatin, N.T., Hong Kong

ATTN: **Ms. Ivy Tam**

Report No.:	34023A
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	1 of 3

Sample Description : 11 samples as received by customer said to be sediment
Laboratory No. : 34023A
Project No. : WMS20014
Project Name : Agreement No. CE93/2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long
Sampling Date : 2020-09-07

Test Requested & Methodology:

Item	Parameters	Ref. Method	Limit of Reporting
1	Acenaphtene	In-house method SOP090 (GC/MSD)	8 µg/kg
2	Acenaphtylene		8 µg/kg
3	Anthracene		8 µg/kg
4	Fluorene		8 µg/kg
5	Naphthalene		10 µg/kg
6	Phenanthrene		8 µg/kg

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

Approved Signatory:
Tse Siu Kei, Patrick
General Manager

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HOKLAS 083
TEST

TEST REPORT

Report No.:	34023A
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Test Results:

Sample ID	S10	S11	S14	S15
Sampling Location	N835034 E821194	N835069 E821225	N835110 E821256	N835150 E821286
Sampling Depth	Surface	Surface	Surface	Surface
Sample No.	34023-10	34023-11	34023-14	34023-15
Acenaphtene, µg/kg	<8	<8	<8	<8
Acenaphtylene, µg/kg	<8	<8	<8	<8
Anthracene, µg/kg	<8	<8	<8	<8
Fluorene, µg/kg	<8	<8	<8	<8
Naphthalene, µg/kg	<10	<10	<10	<10
Phenanthrene, µg/kg	8	<8	<8	<8

Sample ID	S16	S17	S18	S19
Sampling Location	N835126 E821319	N835169 E821344	N835190 E821317	N835232 E821347
Sampling Depth	34023-16	34023-17	34023-18	34023-19
Sample No.	<8	<8	<8	<8
Acenaphtene, µg/kg	<8	<8	<8	<8
Acenaphtylene, µg/kg	<8	<8	<8	<8
Anthracene, µg/kg	<8	<8	<8	<8
Fluorene, µg/kg	<10	<10	<10	<10
Naphthalene, µg/kg	8	<8	<8	<8
Phenanthrene, µg/kg	<8	<8	<8	<8

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

****

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HOKLAS 083
TEST

TEST REPORT

Report No.:	34023A
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Test Results:

Sample ID	S20	S21	S22
Sampling Location	N835208 E821375	N835247 E821403	N835271 E82372
Sampling Depth	Surface	Surface	Surface
Sample No.	34023-20	34023-21	34023-22
Acenaphtene, µg/kg	<8	<8	<8
Acenaphtylene, µg/kg	<8	<8	<8
Anthracene, µg/kg	<8	<8	<8
Fluorene, µg/kg	<8	<8	<8
Naphthalene, µg/kg	<10	<10	<10
Phenanthrene, µg/kg	8	<8	<8

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

**********END OF REPORT**********

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HKAS HOKLAS 083 TEST

TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
RM 1808, Technology Park,
18 On Lai Street,
Shatin, N.T., Hong Kong

ATTN: **Ms. Ivy Tam**

Report No.:	34023B
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	1 of 3

Sample Description : 11 samples as received by customer said to be sediment
Laboratory No. : 34023B
Project No. : WMS20014
Project Name : Agreement No. CE93/2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long
Sampling Date : 2020-09-07

Test Requested & Methodology:

Item	Parameters	Ref. Method	Limit of Reporting
1	Benzo(a)anthracene	In-house method SOP090 (GC/MSD)	10 µg/kg
2	Benzo(a)pyrene		10 µg/kg
3	Benzo(b)fluoranthene		10 µg/kg
4	Benzo(k)fluoranthene		10 µg/kg
5	Benzo(g,h,i)perylene		10 µg/kg
6	Chrysene		10 µg/kg
7	Dibenzo(ah)anthracene		10 µg/kg
8	Fluoranthene		10 µg/kg
9	Indeno(1,2,3-cd)pyrene		10 µg/kg
10	Pyrene		10 µg/kg

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

Approved Signatory:
Tse Siu Kei, Patrick
General Manager

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HKAS HOKLAS 083 TEST

TEST REPORT

Report No.:	34023B
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Test Results:

Sample ID	S10	S11	S14	S15
Sampling Location	N835034 E821194	N835069 E821225	N835110 E821256	N835150 E821286
Sampling Depth	Surface	Surface	Surface	Surface
Sample No.	34023-10	34023-11	34023-14	34023-15
Benzo(a)anthracene, µg/kg	<10	<10	<10	<10
Benzo(a)pyrene, µg/kg	<10	<10	<10	<10
Benzo(b)fluoranthene, µg/kg	14	<10	<10	<10
Benzo(k)fluoranthene, µg/kg	<10	<10	<10	<10
Benzo(g,h,i)perylene, µg/kg	20	12	<10	11
Chrysene, µg/kg	<10	<10	<10	<10
Dibenzo(ah)anthracene, µg/kg	10	<10	<10	<10
Fluoranthene, µg/kg	15	<10	<10	<10
Indeno(1,2,3-cd)pyrene, µg/kg	15	10	10	<10
Pyrene, µg/kg	20	12	11	11

Sample ID	S16	S17	S18	S19
Sampling Location	N835126 E821319	N835169 E821344	N835190 E821317	N835232 E821347
Sampling Depth	Surface	Surface	Surface	Surface
Sample No.	34023-16	34023-17	34023-18	34023-19
Benzo(a)anthracene, µg/kg	<10	<10	<10	<10
Benzo(a)pyrene, µg/kg	<10	<10	<10	<10
Benzo(b)fluoranthene, µg/kg	<10	<10	<10	<10
Benzo(k)fluoranthene, µg/kg	<10	<10	<10	<10
Benzo(g,h,i)perylene, µg/kg	11	12	<10	<10
Chrysene, µg/kg	<10	<10	<10	<10
Dibenzo(ah)anthracene, µg/kg	<10	<10	<10	<10
Fluoranthene, µg/kg	<10	<10	<10	<10
Indeno(1,2,3-cd)pyrene, µg/kg	<10	<10	<10	<10
Pyrene, µg/kg	13	<10	<10	<10

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

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HOKLAS 083
TEST

TEST REPORT

Report No.:	34023B
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	3 of 3

Test Results:

Sample ID	S20	S21	S22
Sampling Location	N835208 E821375	N835247 E821403	N835271 E82372
Sampling Depth	Surface	Surface	Surface
Sample No.	34023-20	34023-21	34023-22
Benzo(a)anthracene, µg/kg	<10	<10	<10
Benzo(a)pyrene, µg/kg	<10	<10	<10
Benzo(b)fluoranthene, µg/kg	<10	<10	<10
Benzo(k)fluoranthene, µg/kg	<10	<10	<10
Benzo(g,h,i)perylene, µg/kg	<10	<10	<10
Chrysene, µg/kg	<10	<10	<10
Dibenzo(ah)anthracene, µg/kg	<10	<10	<10
Fluoranthene, µg/kg	<10	<10	<10
Indeno(1,2,3-cd)pyrene, µg/kg	<10	<10	<10
Pyrene, µg/kg	<10	<10	<10

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

**********END OF REPORT**********

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Website:http://www.wellab.com.hk E-mail:wellab@wellab.com.hk

HKAS HOKLAS 083 TEST

TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
RM 1808, Technology Park,
18 On Lai Street,
Shatin, N.T., Hong Kong

ATTN: **Ms. Ivy Tam**

Report No.:	34023C
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	1 of 4

Sample Description : 11 samples as received by customer said to be sediment
Laboratory No. : 34023C
Project No. : WMS20014
Project Name : Agreement No. CE93/2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long
Sampling Date : 2020-09-07

Test Requested & Methodology:

Item	Parameters		Ref. Method	Limit of Reporting
1	2,4'-Dichlorobiphenyl	PCB8	In-house method SOP088 (GC/MSD)	1 µg/kg
2	2,2',5-Trichlorobiphenyl	PCB18		1 µg/kg
3	2,4,4'-Trichlorobiphenyl	PCB28		1 µg/kg
4	2,2', 3,5'-Tetrachlorobiphenyl	PCB44		1 µg/kg
5	2,2', 5,5'-Tetrachlorobiphenyl	PCB52		1 µg/kg
6	2,3', 4,4'-Tetrachlorobiphenyl	PCB66		1 µg/kg
7	3,3', 4,4'-Tetrachlorobiphenyl	PCB 77		1 µg/kg
8	2,2', 4,5,5'-Pentachlorobiphenyl	PCB101		1 µg/kg
9	2,3,3', 4,4'-Pentachlorobiphenyl	PCB105		1 µg/kg
10	2,3', 4,4',5-Pentachlorobiphenyl	PCB118		1 µg/kg
11	3,3', 4,4',5-Pentachlorobiphenyl	PCB126		1 µg/kg
12	2,2', 3,3',4,4'-Hexachlorobiphenyl	PCB128		1 µg/kg
13	2,2', 3,4,4',5'-Hexachlorobiphenyl	PCB138		1 µg/kg
14	2,2', 4,4',5,5'-Hexachlorobiphenyl	PCB153		1 µg/kg
15	3,3', 4,4',5,5'-Hexachlorobiphenyl	PCB169		1 µg/kg
16	2,2', 3,3',4,4',5-Heptachlorobiphenyl	PCB170		1 µg/kg
17	2,2', 3,4,4',5,5'-Heptachlorobiphenyl	PCB180		1 µg/kg
18	2,2', 3,4',5,5',6-Heptachlorobiphenyl	PCB187		1 µg/kg

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

Approved Signatory: _____
Tse Siu Kei, Patrick
General Manager

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HKAS HOKLAS 083 TEST

TEST REPORT

Report No.:	34023C
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Test Results:

Sample ID	S10	S11	S14	S15
Sampling Location	N835034 E821194	N835069 E821225	N835110 E821256	N835150 E821286
Sampling Depth	Surface	Surface	Surface	Surface
Sample No.	34023-10	34023-11	34023-14	34023-15
2,4'-Dichlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2',5-Trichlorobiphenyl, µg/kg	<1	<1	<1	<1
2,4,4'-Trichlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,5'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 5,5'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
3,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 4,5,5'-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,3,3', 4,4'-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
3,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,3',4,4'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,4,4',5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
3,3', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,3',4,4',5-Heptachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,4,4',5,5'-Heptachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,4',5,5',6-Heptachlorobiphenyl, µg/kg	<1	<1	<1	<1

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

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HOKLAS 083
TEST

TEST REPORT

Report No.:	34023C
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	3 of 4

Test Results:

Sample ID	S16	S17	S18	S19
Sampling Location	N835126 E821319	N835169 E821344	N835190 E821317	N835232 E821347
Sampling Depth	Surface	Surface	Surface	Surface
Sample No.	34023-16	34023-17	34023-18	34023-19
2,4'-Dichlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2',5-Trichlorobiphenyl, µg/kg	<1	<1	<1	<1
2,4,4'-Trichlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,5'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 5,5'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
3,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 4,5,5'-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,3,3', 4,4'-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
3,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,3',4,4'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,4,4',5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
3,3', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,3',4,4',5-Heptachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,4,4',5,5'-Heptachlorobiphenyl, µg/kg	<1	<1	<1	<1
2,2', 3,4',5,5',6-Heptachlorobiphenyl, µg/kg	<1	<1	<1	<1

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

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HOKLAS 083
TEST

TEST REPORT

Report No.:	34023C
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Test Results:

Sample ID	S20	S21	S22
Sampling Location	N835208 E821375	N835247 E821403	N835271 E82372
Sampling Depth	Surface	Surface	Surface
Sample No.	34023-20	34023-21	34023-22
2,4'-Dichlorobiphenyl, µg/kg	<1	<1	<1
2,2',5-Trichlorobiphenyl, µg/kg	<1	<1	<1
2,4,4'-Trichlorobiphenyl, µg/kg	<1	<1	<1
2,2', 3,5'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 5,5'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1
2,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1
3,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 4,5,5'-Pentachlorobiphenyl, µg/kg	<1	<1	<1
2,3,3', 4,4'-Pentachlorobiphenyl, µg/kg	<1	<1	<1
2,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<1	<1	<1
3,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 3,3',4,4'-Hexachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 3,4,4',5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1
3,3', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 3,3',4,4',5-Heptachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 3,4,4',5,5'-Heptachlorobiphenyl, µg/kg	<1	<1	<1
2,2', 3,4',5,5',6-Heptachlorobiphenyl, µg/kg	<1	<1	<1

Remarks: 1) < = less than

2) Results reported as dry weight basis

3) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

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HKAS HOKLAS 083 TEST

TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
RM 1808, Technology Park,
18 On Lai Street,
Shatin, N.T., Hong Kong

ATTN: **Ms. Ivy Tam**

Report No.:	34023D
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	1 of 2

Sample Description : 11 samples as received by customer said to be sediment and were prepared for 11 interstitial water samples
Laboratory No. : 34023D
Project No. : WMS20014
Project Name : Agreement No. CE93/2017 (DS) Yuen Long Barrage Scheme – Investigation, Design and Construction Contract No. PM 05/2020 – Sediment Sampling Survey in Yuen Long
Sampling Date : 2020-09-07

Test Requested & Methodology:

Item	Parameters	Ref. Method	Limit of Reporting
1	Tributyltin (TBT)	In-house method SOP065 (GC/FPD)	0.010 µg/L

Test Results:

Sample ID	S10	S11	S14	S15	S16
Sampling Location	N835034 E821194	N835069 E821225	N835110 E821256	N835150 E821286	N835126 E821319
Sampling Depth	Surface	Surface	Surface	Surface	Surface
Sample No.	34023-10	34023-11	34023-14	34023-15	34023-16
Tributyltin, µg/L	<0.01	<0.01	<0.01	<0.01	<0.01

Remarks: 1) < = less than
2) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

Approved Signatory:
Tse Siu Kei, Patrick
General Manager

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HOKLAS 083
TEST

TEST REPORT

Report No.:	34023D
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Test Results:

Sample ID	S17	S18	S19	S20	S21
Sampling Location	N835169 E821344	N835190 E821317	N835232 E821347	N835208 E821375	N835247 E821403
Sampling Depth	Surface	Surface	Surface	Surface	Surface
Sample No.	34023-17	34023-18	34023-19	34023-20	34023-21
Tributyltin, µg/L	<0.01	<0.01	<0.01	<0.01	<0.01

Sample ID	S22
Sampling Location	N835271 E82372
Sampling Depth	Surface
Sample No.	34023-22
Tributyltin, µg/L	<0.01

Remarks: 1) < = less than

2) The above testing is performed at Rm1502 & 1516, Technology Park, 18 On Lai Street, Shatin

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TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
RM 1808, Technology Park,
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Report No.:	QC34023
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

ATTN: **Ms. Ivy Tam**

QC report:

Method Blank

Parameter	Method Blank 1	Method Blank 2	Acceptance
Cadmium (Cd), µg/L	<0.1	<0.1	<0.1
Chromium (Cr), µg/L	<0.2	<0.2	<0.2
Copper (Cu), µg/L	<0.2	<0.2	<0.2
Mercury (Hg), µg/L	<0.2	<0.2	<0.2
Nickel (Ni), µg/L	<0.2	<0.2	<0.2
Lead (Pb), µg/L	<0.2	<0.2	<0.2
Silver (Ag), µg/L	<0.2	<0.2	<0.2
Zinc (Zn), µg/L	<0.4	<0.4	<0.4
Arsenic (As), µg/L	<0.2	<0.2	<0.2

Method QC

Parameter	MQC 1	MQC 2	Acceptance
Cadmium (Cd), %	92	104	80-120%
Chromium (Cr), %	97	98	80-120%
Copper (Cu), %	97	105	80-120%
Mercury (Hg), %	98	98	80-120%
Nickel (Ni), %	105	93	80-120%
Lead (Pb), %	100	103	80-120%
Silver (Ag), %	100	95	80-120%
Zinc (Zn), %	97	95	80-120%
Arsenic (As), %	98	96	80-120%

Remarks: 1) < = less than
2) N/A = Not applicable
3) This report is the summary of quality control data for report number 34023.

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

PATRICK TSE
General Manager

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TEST REPORT

Report No.:	QC34023
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Sample Spike

Parameter	34023-10 spk	34023-22 spk	Acceptance
Cadmium (Cd), %	92	89	80-120%
Chromium (Cr), %	96	100	80-120%
Copper (Cu), %	90	94	80-120%
Mercury (Hg), %	95	95	80-120%
Nickel (Ni), %	95	91	80-120%
Lead (Pb), %	92	96	80-120%
Silver (Ag), %	98	95	80-120%
Zinc (Zn), %	91	94	80-120%
Arsenic (As), %	94	96	80-120%

Sample Duplicate

Parameter	34023-10 chk	34023-22 chk	Acceptance
Cadmium (Cd), %	7	7	RPD≤20
Chromium (Cr), %	3	5	RPD≤20
Copper (Cu), %	3	7	RPD≤20
Mercury (Hg), %	8	6	RPD≤20
Nickel (Ni), %	5	7	RPD≤20
Lead (Pb), %	1	2	RPD≤20
Silver (Ag), %	3	5	RPD≤20
Zinc (Zn), %	4	1	RPD≤20
Arsenic (As), %	4	5	RPD≤20

Remarks: 1) < = less than

2) N/A = Not applicable

3) This report is the summary of quality control data for report number 34023.

**********END OF REPORT**********

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TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
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Shatin, N.T., Hong Kong

Report No.:	QC34023A
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

ATTN: **Ms. Ivy Tam**

QC report:
Method Blank

Parameter	Method Blank 1	Method Blank 2	Acceptance
Acenaphtene, µg/kg	<2	<2	<2
Acenaphtylene, µg/kg	<2	<2	<2
Anthracene, µg/kg	<2	<2	<2
Fluorene, µg/kg	<2	<2	<2
Naphthalene, µg/kg	<2	<2	<2
Phenanthrene, µg/kg	<2	<2	<2
Benzo(a)anthracene, µg/kg	<2	<2	<2
Benzo(a)pyrene, µg/kg	<2	<2	<2
Benzo(b)fluoranthene, µg/kg	<2	<2	<2
Benzo(k)fluoranthene, µg/kg	<2	<2	<2
Benzo(g,h,i)perylene, µg/kg	<2	<2	<2
Chrysene, µg/kg	<2	<2	<2
Dibenzo(ah)anthracene, µg/kg	<2	<2	<2
Fluoranthene, µg/kg	<2	<2	<2
Indeno(1,2,3-cd)pyrene, µg/kg	<2	<2	<2
Pyrene, µg/kg	<2	<2	<2

Remarks: 1) < = less than
2) N/A = Not applicable
3) This report is the summary of quality control data for report number 34023A, 34023B.

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

PATRICK TSE
General Manager

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TEST REPORT

Report No.:	QC34023A
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Method QC

Parameter	MQC 1	MQC 2	Acceptance
Acenaphtene, %	99	97	80-120%
Acenaphtylene, %	99	94	80-120%
Anthracene, %	96	95	80-120%
Fluorene, %	98	96	80-120%
Naphthalene, %	104	98	80-120%
Phenanthrene, %	101	95	80-120%
Benzo(a)anthracene, %	99	98	80-120%
Benzo(a)pyrene, %	95	104	80-120%
Benzo(b)fluoranthene, %	98	98	80-120%
Benzo(k)fluoranthene, %	101	91	80-120%
Benzo(g,h,i)perylene, %	104	100	80-120%
Chrysene, %	95	104	80-120%
Dibenzo(ah)anthracene, %	94	101	80-120%
Fluoranthene, %	104	104	80-120%
Indeno(1,2,3-cd)pyrene, %	101	103	80-120%
Pyrene, %	97	92	80-120%

Remark: 1) < = less than

2) N/A = Not applicable

3) This report is the summary of quality control data for report number 34023A, 34023B.

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TEST REPORT

Report No.:	QC34023A
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Sample Spike

Parameter	34023-10 spk	34023-22 spk	Acceptance
Acenaphtene, %	94	94	80-120%
Acenaphtylene, %	90	96	80-120%
Anthracene, %	99	88	80-120%
Fluorene, %	99	89	80-120%
Naphthalene, %	92	98	80-120%
Phenanthrene, %	98	90	80-120%
Benzo(a)anthracene, %	99	95	80-120%
Benzo(a)pyrene, %	100	94	80-120%
Benzo(b)fluoranthene, %	92	94	80-120%
Benzo(k)fluoranthene, %	97	92	80-120%
Benzo(g,h,i)perylene, %	93	98	80-120%
Chrysene, %	97	97	80-120%
Dibenzo(ah)anthracene, %	92	95	80-120%
Fluoranthene, %	100	97	80-120%
Indeno(1,2,3-cd)pyrene, %	96	101	80-120%
Pyrene, %	97	91	80-120%

Remarks: 1) < = less than

2) N/A = Not applicable

3) This report is the summary of quality control data for report number 34023A, 34023B.

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TEST REPORT

Report No.:	QC34023A
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Sample Spike Duplicate

Parameter	34023-10 spk dup	34023-22 spk dup	Acceptance
Acenaphtene, %	3	3	≤15%
Acenaphtylene, %	4	6	≤15%
Anthracene, %	9	10	≤15%
Fluorene, %	2	4	≤15%
Naphthalene, %	11	2	≤15%
Phenanthrene, %	2	5	≤15%
Benzo(a)anthracene, %	5	3	≤15%
Benzo(a)pyrene, %	9	8	≤15%
Benzo(b)fluoranthene, %	2	3	≤15%
Benzo(k)fluoranthene, %	4	2	≤15%
Benzo(g,h,i)perylene, %	2	8	≤15%
Chrysene, %	9	6	≤15%
Dibenzo(ah)anthracene, %	3	5	≤15%
Fluoranthene, %	2	3	≤15%
Indeno(1,2,3-cd)pyrene, %	2	5	≤15%
Pyrene, %	11	7	≤15%

Remarks: 1) < = less than

2) N/A = Not applicable

3) This report is the summary of quality control data for report number 34023A, 34023B.

**********END OF REPORT**********

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TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
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Report No.:	QC34023B
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

ATTN: **Ms. Ivy Tam**

Page: 1 of 4

QC report:
Method Blank

Parameter	Method Blank 1	Method Blank 2	Acceptance
2,4'-Dichlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2',5-Trichlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,4,4'-Trichlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 3,5'-Tetrachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 5,5'-Tetrachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
3,3', 4,4'-Tetrachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 4,5,5'-Pentachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,3,3', 4,4'-Pentachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
3,3', 4,4',5-Pentachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 3,3',4,4'-Hexachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 3,4,4',5'-Hexachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
3,3', 4,4',5,5'-Hexachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 3,3',4,4',5-Heptachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 3,4,4',5,5'-Heptachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4
2,2', 3,4',5,5',6-Heptachlorobiphenyl, µg/kg	<0.4	<0.4	<0.4

Remarks: 1) < = less than
2) N/A = Not applicable
3) This report is the summary of quality control data for report number 34023C.

****

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

PATRICK TSE
General Manager

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TEST REPORT

Report No.:	QC34023B
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Method QC

Parameter	MQC 1	MQC 2	Acceptance
2,4'-Dichlorobiphenyl, %	97	100	80-120%
2,2',5-Trichlorobiphenyl, %	98	91	80-120%
2,4,4'-Trichlorobiphenyl, %	99	98	80-120%
2,2', 3,5'-Tetrachlorobiphenyl, %	98	100	80-120%
2,2', 5,5'-Tetrachlorobiphenyl, %	98	102	80-120%
2,3', 4,4'-Tetrachlorobiphenyl, %	100	95	80-120%
3,3', 4,4'-Tetrachlorobiphenyl, %	102	96	80-120%
2,2', 4,5,5'-Pentachlorobiphenyl, %	93	95	80-120%
2,3,3', 4,4'-Pentachlorobiphenyl, %	100	101	80-120%
2,3', 4,4',5-Pentachlorobiphenyl, %	95	101	80-120%
3,3', 4,4',5-Pentachlorobiphenyl, %	95	99	80-120%
2,2', 3,3',4,4'-Hexachlorobiphenyl, %	94	99	80-120%
2,2', 3,4,4',5'-Hexachlorobiphenyl, %	100	101	80-120%
2,2', 4,4',5,5'-Hexachlorobiphenyl, %	98	102	80-120%
3,3', 4,4',5,5'-Hexachlorobiphenyl, %	94	98	80-120%
2,2', 3,3',4,4',5-Heptachlorobiphenyl, %	96	97	80-120%
2,2', 3,4,4',5,5'-Heptachlorobiphenyl, %	101	97	80-120%
2,2', 3,4',5,5',6-Heptachlorobiphenyl, %	96	101	80-120%

Remarks: 1) < = less than

2) N/A = Not applicable

3) This report is the summary of quality control data for report number 34023C.

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TEST REPORT

Report No.:	QC34023B
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Sample Spike

Parameter	34023-10 spk	34023-22 spk	Acceptance
2,4'-Dichlorobiphenyl, %	99	99	80-120%
2,2',5-Trichlorobiphenyl, %	101	93	80-120%
2,4,4'-Trichlorobiphenyl, %	89	96	80-120%
2,2', 3,5'-Tetrachlorobiphenyl, %	90	91	80-120%
2,2', 5,5'-Tetrachlorobiphenyl, %	100	99	80-120%
2,3', 4,4'-Tetrachlorobiphenyl, %	96	93	80-120%
3,3', 4,4'-Tetrachlorobiphenyl, %	98	93	80-120%
2,2', 4,5,5'-Pentachlorobiphenyl, %	94	91	80-120%
2,3,3', 4,4'-Pentachlorobiphenyl, %	102	98	80-120%
2,3', 4,4',5-Pentachlorobiphenyl, %	91	95	80-120%
3,3', 4,4',5-Pentachlorobiphenyl, %	98	93	80-120%
2,2', 3,3',4,4'-Hexachlorobiphenyl, %	95	94	80-120%
2,2', 3,4,4',5'-Hexachlorobiphenyl, %	97	89	80-120%
2,2', 4,4',5,5'-Hexachlorobiphenyl, %	99	88	80-120%
3,3', 4,4',5,5'-Hexachlorobiphenyl, %	101	101	80-120%
2,2', 3,3',4,4',5-Heptachlorobiphenyl, %	95	90	80-120%
2,2', 3,4,4',5,5'-Heptachlorobiphenyl, %	95	101	80-120%
2,2', 3,4',5,5',6-Heptachlorobiphenyl, %	99	98	80-120%

Remarks: 1) < = less than

2) N/A = Not applicable

3) This report is the summary of quality control data for report number 34023C.

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TEST REPORT

Report No.:	QC34023B
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14

Sample Spike Duplicate

Parameter	34023-10 spk dup	34023-22 spk dup	Acceptance
2,4'-Dichlorobiphenyl, %	1	2	≤20%
2,2',5-Trichlorobiphenyl, %	9	2	≤20%
2,4,4'-Trichlorobiphenyl, %	4	7	≤20%
2,2', 3,5'-Tetrachlorobiphenyl, %	1	2	≤20%
2,2', 5,5'-Tetrachlorobiphenyl, %	3	3	≤20%
2,3', 4,4'-Tetrachlorobiphenyl, %	2	6	≤20%
3,3', 4,4'-Tetrachlorobiphenyl, %	4	5	≤20%
2,2', 4,5,5'-Pentachlorobiphenyl, %	4	6	≤20%
2,3,3', 4,4'-Pentachlorobiphenyl, %	4	8	≤20%
2,3', 4,4',5-Pentachlorobiphenyl, %	2	3	≤20%
3,3', 4,4',5-Pentachlorobiphenyl, %	8	10	≤20%
2,2', 3,3',4,4'-Hexachlorobiphenyl, %	2	4	≤20%
2,2', 3,4,4',5'-Hexachlorobiphenyl, %	5	2	≤20%
2,2', 4,4',5,5'-Hexachlorobiphenyl, %	2	6	≤20%
3,3', 4,4',5,5'-Hexachlorobiphenyl, %	11	4	≤20%
2,2', 3,3',4,4',5-Heptachlorobiphenyl, %	7	2	≤20%
2,2', 3,4,4',5,5'-Heptachlorobiphenyl, %	8	1	≤20%
2,2', 3,4',5,5',6-Heptachlorobiphenyl, %	10	3	≤20%

Remarks: 1) < = less than

2) N/A = Not applicable

3) This report is the summary of quality control data for report number 34023C.

**********END OF REPORT**********

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TEST REPORT

APPLICANT: **Wellab Limited (EM&A)**
RM 1808, Technology Park,
18 On Lai Street,
Shatin, N.T., Hong Kong

ATTN: **Ms. Ivy Tam**

Report No.:	QC34023C
Date of Issue:	2020-09-14
Date Received:	2020-09-07
Date Tested:	2020-09-07
Date Completed:	2020-09-14
Page:	1 of 1

QC report:

Method Blank

Parameter	Method Blank 1	Method Blank 2	Acceptance
Tributyltin, µg/L	<0.005	<0.005	<0.005

Method QC

Parameter	MQC 1	MQC 2	Acceptance
Tributyltin, %	95	96	90-110%

Sample Spike

Parameter	34023-10 spk	34023-22 spk	Acceptance
Tributyltin, %	94	95	90-110%

Sample Spike Duplicate

Parameter	34023-10 spk dup	34023-22 spk dup	Acceptance
Tributyltin, %	2	3	≤15%

Remarks: 1) < = less than
2) This report is the summary of quality control data for report number 34023D

**********END OF REPORT**********

PREPARED AND CHECKED BY:
For and On Behalf of **WELLAB Ltd.**

PATRICK TSE
General Manager