MTR Corporation Limited

Northern Link
Consultancy Agreement No. C1602
Preliminary Design for Northern Link Phase 2

Deliverable No. 1.7P –
Sediment Quality Report

C1602-DED-AAE-ENV-000003

Revision E | 13 November 2023

Content

Tables

Figures

Appendices

1 Introduction

1.1 General

1.1.1 Arup AECOM Joint Venture was commissioned by the MTR Corporation to conduct a marine disposal of excavated sediment study for the proposed Northern Link (NOL) development between Kam Sheung Road (KSR) Station of the Tuen Ma Line (TML) and Kwu Tung (KTU) Station on the Lok Ma Chau Spur Line (LMCSL) of East Rail Line (EAL).

1.2 Project Background

1.2.1 The Northern Link (NOL) (hereinafter referred to as "the Project") is one of the seven railway schemes recommended to be taken under the Railway Development Strategy 2014 ("RDS-2014"). The Project will be a heavy underground railway line with a route length of about 10.7km between Kam Sheung Road (KSR) Station on the Tuen Ma Line (TML) and Kwu Tung (KTU) Station on the Lok Ma Chau Spur Line (LMCSL) of East Rail Line (EAL).

1.2.2 The Project connects the EAL and the TML, forming a railway loop in the Northern New Territories. Passengers will be able to interchange at KSR Station on TML and KTU Station on EAL. The Project will also serve the transportation needs of the potential New Development Areas (NDAs) in the Northern New Territories and enhance cross-boundary movement.

1.2.3 The NOL runs underground in tunnel between KSR(NOL) and KTU(NOL) Stations with three proposed intermediate stations at Au Tau (AUT), Ngau Tam Mei (NTM) and San Tin (SAT) to support the unleashing of the development potential along its alignment. An at-grade depot is proposed at NTM area, and also there would be other aboveground structures including station entrances and ancillary buildings, i.e. ventilation shafts/buildings, Emergency Access Points (EAPs) and Emergency Egress Points (EEPs), as well as enabling works to the south of KSR(NOL) Station, for potential southern extension, to the north of SAT Station for bifurcation to Lok Ma Chau Loop and Huanggang Port, and to the east of KTU(NOL) Station for potential eastern extension to Ping Che areas.

1.2.4 A Project Profile (No. PP-629/2021) for the Project was submitted to Environmental Protection Department (EPD) for application of an EIA Study Brief, which was subsequently issued on 9 August 2021 (No. ESB-346/2021).

1.2.5 The NOL alignment, stations and the associated works areas/works sites including a temporary explosive magazine site at Tai Shu Ha (Yuen Long) were developed by preliminary design consultant. The preferred alignment including works site and works area is shown in **Figure 1.1**.

1.2.6 In accordance with Appendix F of the EIA Study Brief (No. ESB-346/2021), appropriate field investigation, sampling and chemical and biological laboratory tests to characterise the sediment/ mud concerned shall be conducted for marine disposal option in case dredging/ excavation of sediment/ mud is anticipated.

1.3 Objectives of this Report

1.3.1 A Sediment Sampling Testing Plan (SSTP) (Rev C) was approved by EPD in April 2022. In addition, a supplementary letter of "Updates to Sediment Sampling and Testing Plan" of the number of drillholes and sampling method was also approved by EPD in July 2022.

1.3.2 After the approval of SSTP (Rev C), a land requirement plan (LRP) was derived which includes works sites and works areas, as well as some locations of the VBs/EAPs/EEPs have been changed due to the latest design. Therefore, the SSTP (Rev E) had been approved by EPD in May 2023. After the approval, an updated LRP in the Project Site was derived which includes works areas and works site, as well as the locations of VBs have been changed due to the latest design. Therefore, the SSTP (Rev G) is updated to seek approval from EPD.

1.3.3 The Preliminary Sediment Quality Report (PSQR) was also prepared to provide an evaluation/ categorization of the sediment quality conditions based on the chemical screening test results and propose biological screening test required for Category M and certain Category H sediments (i.e. sediment classified as Category H and with one or more contaminant levels exceeding 10 times Lower Chemical Exceedance Level (LCEL)). The PSQR (1st Batch) and PSQR (2nd Batch) were submitted to EPD and approved by EPD in August 2022 and August 2023 respectively.

1.3.4 This Sediment Quality Report (SQR) is prepared to provide an evaluation/ categorization of the sediment quality conditions based on the chemical screening test results and biological screening test results and propose disposal arrangement of the sediment to be generated for prior agreement by EPD.

1.3.5 This report incorporates all testing results received up to October 2023.

2 Legislative Requirements

2.1 Legislation and Guidelines

2.1.1 The Practice Note for Authorized Persons and Registered Structural Engineers on Management Framework for Disposal of Dredged/ Excavated Sediment (PNAP ADV-21) sets out the procedure for seeking approval to dredge/ excavate sediment and the management framework for marine disposal of dredge/ excavate sediment. It outlines the requirements to be followed in assessing and classifying the sediment and explains the marine disposal arrangement for the classified material.

2.2 Methodology for Sediment Quality Assessment

2.2.1 The management framework of dredged/excavated sediment in Hong Kong is implemented under a three-tiered approach as illustrated in **Appendix A** in accordance with the PNAP ADV-21, which also sets out the guidelines for the assessment, sampling, testing and classification of sediment. **Table 2.1** summarises the sediment quality criteria for sediment classification.

Table 2.1 Sediment quality criteria for 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) [1]	40	40
Lead (Pb)	75	110
Silver (Ag)	1	2
Zinc (Zn)	200	270
Metalloid (mg/kg dry wt.)		
Arsenic (As)	12	42
Organic- Polycyclic Aromatic Hydrocarbons (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 polychlorinated biphenyls (PCBs)	23	180
Organometallics (µg TBT/L in Interstitial water)		
Tributyltin [1]	0.15	0.15

Note:
[1] The contaminant level is considered to have exceeded the UCEL if it is greater than the value shown.

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

Category L	Sediment with all contaminant levels not exceeding the LCEL. The material must be dredged, transported and disposed of in a manner which minimises 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 environment upon the 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 the final disposal.

2.2.3 **Tier I Screening** is a desktop screening process to review the available information and determine whether the sediment of concern belonging to Category L material is suitable for open sea disposal. If there is insufficient information to arrive at such conclusion, Tier II chemical screening shall be proceeded accordingly.

2.2.4 **Tier II Screening** is a chemical screening process to categorise sediment based on its chemical contaminant levels and to determine whether the sediment is suitable for open sea disposal without further testing. Upon Tier II screening, the sediment shall be classified as Category L, M or H material. There are four types of disposal options: namely Type 1 for open sea disposal, Type 1 for open sea disposal (dedicated sites), Type 2 for confined marine disposal and Type 3 for special treatment/disposal respectively. Category L material is suitable for open sea disposal, but Category M and certain Category H sediments (i.e. sediment classified as Category H and with one or more contaminant levels exceeding 10 times LCEL) will require Tier III screening to further determine the disposal option.

2.2.5 **Tier III Screening** is a biological screening process to identify the most appropriate disposal option for Category M (either Type 1 (dedicated sites) or 2) and certain Category H sediment (i.e. sediment classified as Category H and with one or more contaminant levels exceeding 10 times LCEL) (either Type 2 or 3). Sediment classified as Category M shall be subjected to the following three toxicity tests:

- A 10-day burrowing amphipod toxicity test;
- A 20-day burrowing polychaete toxicity test;
- A 48-96 hour larvae (bivalve or echinoderm) toxicity test.

2.2.6 **Table 2.2** summarises test details of the test endpoints and failure criteria of the three toxicity tests. Sediment classified as Category H and with one or more contaminant levels exceeding 10 times LCEL shall also be subjected to the above three toxicity tests but in a diluted manner (dilution test). In case failure of biological test on Categories M material, Type 2 disposal will be required. Similarly, Type 3 disposal will be required for Category H material if biological test is failed.

Table 2.2 Test endpoints and decision criteria for Tier III biological screening test

Toxicity Test	Endpoints Measured	Test Methods	Failure Criteria
10-day amphipod	Survival	U.S. Environmental Protection Agency (U.S.EPA) Standard Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods	Mean survival in test sediment is significantly different ($p \leq 0.05$)[1] from mean survival in reference sediment **and** mean survival in test sediment <80% of mean survival in reference sediment.
20-day polychaete worm	Dry Weight [2]	Puget Sound Estuary Program (PSEP) Standard Recommended Guidelines for Conducting Laboratory Bioassays on the Puget Sound Sediments – Juvenil Polychaete Sediment Bioassay, 1995	Mean dry weight in test sediment is significantly different ($p \leq 0.05$)[1] from mean dry weight in reference sediment **and** mean dry weight in test sediment <90% of mean dry weight in reference sediment.
48-96 hour larvae (bivalve or echinoderm)	Normality Survival [3]	PSEP Standard Recommended Guidelines for Conducting Laboratory Bioassays on the Puget Sound Sediments – Bivalve Larvae Sediment Bioassay, 1995	Mean normality survival in test sediment is significantly different ($p \leq 0.05$)[1] from mean normality survival in reference sediment **and** mean normality survival in test sediment <80% of mean normality survival in reference sediment.

Notes:

[1] Statistically significant differences should be determined using appropriate two-sample comparisons (e.g., *t*-tests) at a probability of $p \leq 0.05$;

[2] Dry weight means total dry weight after deducting dead and missing worms;

[3] Normality survival integrates the normality and survival end points, and measures survival of only the normal larvae relative to the starting number.

3 Sediment Sampling

3.1 Sediment Sampling

3.1.1 The sediment site investigation (SI) works was carried out by Lam Geotechnics Limited and Tysan Foundation Limited from June 2022 to July 2023. The sediment sampling programme were divided into 2 batches due to the availability of site access. The SI works were conducted in accordance with the approved SSTP and were supervised by the on-site specialist. Total of 30 sediment sampling locations were finished during 2 batches out of 47 sediment sampling locations proposed in the approved SSTP. Due to the availability of site access, the remaining 17 sediment sampling locations could not be done during this stage, and it would be conducted after land resumption.

3.1.2 The 1st batch SI works were carried out from June 2022 to July 2022 covering 16 nos. of sediment sampling location including:

- 2 nos. at NTM (NTM-EDH(S)02 & NTM-EDH(S)04 (renamed to NTM-EDH(S)20(P)));
- 5 nos. at SAT (SAT-EDH(S)05, SAT-EDH(S)06, SAT-EDH(S)07, SAT-EDH(S)08 & SAT-EDH(S)09);
- 2 nos. at AUT (AUT-EDH(S)01 & AUT-EDH(S)02);
- 5 nos. at KSR (KSR-EDH(S)01, KSR-EDH(S)02, KSR-EDH(S)03, KSR-EDH(S)04 & KSR-EDH(S)06); and
- 2 nos. at EAP/EEP (SMA-EDH(S)01 & SMA-EDH(S)02).

3.1.3 The 2nd batch SI works were carried out from September 2022 to July 2023 covering 14 nos. of sediment sampling location including:

- 2 no. at NTM (NTM-EDH(S)01, NTM-EDH(S)05);
- 8 nos. at SAT (SAT-EDH(S)01, SAT-EDH(S)02, SAT-EDH(S)03 and SAT-EDH(S)04, SAT-EDH(S)11, SAT-EDH(S)15, SAT-EDH(S)17, SAT-EDH(S)18);
- 1 no. at KSR (KSR-EDH(S)05);
- 2 no. at AUT (AUT-EDH(S)03, AUT-EDH(S)06), and
- 1 no. at EAP/EEP (SMA-EDH(S)03).

3.1.4 Due to the site constraint of setting up the drill rigs, including site access declined by the landowner, warehouse in operation, located at the carriageway / vegetation land and soft soil, located at the traffic road and residential area, 29 sampling locations were shifted. The actual locations are summarized in **Table 3.1**. The as-built drawing showing the actual environmental sampling locations is given in **Figure 3.1**. All relocated sampling location are still located within the respective sampling grid except AUT-EDH(S)02. The whole sampling grid of AUT-EDH(S)02 are occupied by the warehouse covering several building structures which are in operation and the drilling cannot be conducted in these areas. The existing sampling location is the only available area which is slightly outside the sampling grid, and is considered still a representative location of AUT-EDH(S)02.

Table 3.1 Summary of sampling locations

Batch	Sampling ID	Proposed Coordinates		Actual Coordinates		Remark [2]
		Easting	Northing	Easting	Northing	
1st	KSR-EDH(S)01	824805	832569	824812	832590	Vegetation land with soft soil condition
	KSR-EDH(S)02	824868	832492	824896	832483	Vegetation land with soft soil condition
	KSR-EDH(S)03	824931	832414	824920	832445	Vegetation land with soft soil condition
	KSR-EDH(S)04	824969	832317	824970	832312	Vegetation and lope land with soft soil condition
	KSR-EDH(S)06	825050	832119	825019	832133	DSD drainage pipe
	AUT-EDH(S)01	823574	835441	823543	835439	Site access declined by the landowner
	AUT-EDH(S)02	823552	835347	823513	835305	Warehouse in operation
	NTM-EDH(S)02	824479	837337	824483	837337	Carriageway
	NTM-EDH(S)20(P) [1]	824355	837225	824366	837201	Carriageway
	SAT-EDH(S)05	825536	838719	825509	838696	Site access declined by the landowner
	SAT-EDH(S)06	825468	838653	825459	838647	Site access declined by the landowner
	SAT-EDH(S)07	825391	838583	825391	838583	Remain unchanged
	SAT-EDH(S)08	825318	838516	825299	838477	Warehouse in operation
	SAT-EDH(S)09	825267	838464	825263	838460	Site access declined by the landowner
	SMA-EDH(S)01[3]	823569	834470	823568	834479	Vegetation land with soft soil condition
	SMA-EDH(S)02[3]	823589	834415	823594	834406	Vegetation land with soft soil condition
2nd	KSR-EDH(S)05	825004	832214	825009	832202	Vegetation land with soft soil condition
	AUT-EDH(S)03	823530	835250	823505	835226	Requested by the landowner
	AUT-EDH(S)06	823462	835209	823467	835207	Obstructed by tree
	NTM-EDH(S)01	824525	837394	824521	837394	Requested by the landowner
	NTM-EDH(S)05	824616	837480	824606	837501	Requested by the landowner

Batch	Sampling ID	Proposed Coordinates		Actual Coordinates		Remark [2]
		Easting	Northing	Easting	Northing	
	SAT-EDH(S)01	825819	838993	825808	838991	Site access declined by the landowner
	SAT-EDH(S)02	825766	838933	825768	838931	Warehouse in operation
	SAT-EDH(S)03	825679	838859	825676	838855	Warehouse in operation
	SAT-EDH(S)04	825610	838786	825626	838807	Warehouse in operation
	SAT-EDH(S)11	825646	838734	825634	838726	Requested by the landowner
	SAT-EDH(S)15	825561	838644	825554	838654	Requested by the landowner
	SAT-EDH(S)17	825909	839072	825907	839076	Requested by the landowner
	SAT-EDH(S)18	825975	839139	825947	839123	Requested by the landowner
	SMA-EDH(S)03[3]	823507	834539	823505	834540	Requested by the landowner

Note:
[1] NTM-EDH(S)04 was relocated to geotechnical drillhole and renamed to NTM-EDH(S)20(P).
[2] Site constraint leads to relocation of proposed sediment sampling location.
[3] "SMA" formerly as "E05".

3.1.5 Before the sediment sampling, dry drilling was conducted until sediment was encountered. A total of 10 sediment samples were collected from 6 sampling locations including NTM-EDH(S)20 (P), AUT-EDH(S)01 and AUT-EDH(S)02, AUT-EDH(S)03, and SAT-EDH(S)04, SMA-EDH(S)03 during SI under supervision of on-site specialist and sent to laboratory. The collected sediment sampling depths are summarized in **Table 3.2**. No sediment was found at the remaining 24 sampling locations.

3.1.6 Details of the sampling location and other pertinent data were recorded. A chain-of-custody form was completed for the samples. All sediment samples have been stored at 4^{o}C during transportation and at the laboratory prior to testing. All sediment samples have been delivered to the laboratory on the same day of the collection.

Table 3.2 Sediment sampling depths at the sediment sampling locations

Sampling ID	Actual Coordinates		Marine Deposit		Termination Depth (mbgl) [1][2]	Actual Sampling Depth to Lab (mbgl) [1][4]
	Easting	Northing	Depth (mbgl) [1]			
			Beginning (mbgl) [1]	Ending (mbgl) [1]		
AUT-EDH(S)01	823543	835439	3.5	4.5	5.7	3.5 – 4.5
AUT-EDH(S)02	823513	835305	2.5	4.5	5.5	2.5 – 3.5, 3.5 – 4.5

Sampling ID	Actual Coordinates		Marine Deposit		Termination Depth (mbgl) [1][2]	Actual Sampling Depth to Lab (mbgl) [1][4]
	Easting	Northing	Depth (mbgl) [1]			
			Beginning (mbgl) [1]	Ending (mbgl) [1]		
AUT-EDH(S)03	823505	835226	2.5	4.5	5.5	2.5 – 3.5, 3.5 – 4.5
NTM-EDH(S)20 (P)	824366	837201	5.4	5.9	8.4 [3]	5.4 – 6.4
SAT-EDH(S)04	825626	838807	0.5	1.0	3.0	0.5 – 1.0
SMA-EDH(S)03	823505	834540	2.0	4.5	5.0	2.0 – 3.0, 3.0 – 4.0, 4.0 – 4.5

Notes:
[1] mbgl = metres below ground level
[2] The depth of drillhole ending. Drilling was terminated at least 500mm below the interface between marine deposit and alluvium.
[3] The termination depth of sediment sampling works. The drillhole was transferred to geotechnical drilling afterwards.
[4] Only those samples collected and sent to laboratory for subsequent tests are presented.

3.2 HOKLAS Accredited Laboratory

3.2.1 Laboratory testing works on sediment samples were undertaken by "ALS Technichem (HK) Pty Limited,". All laboratory testing methods were accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) or one of its Mutual Recognition Arrangement Partners. Accredited certification and scope of accreditation are shown in **Appendix B**.

3.3 Strata Logging

3.3.1 Strata logging records was taken during the course of drilling and sampling by qualified geologists. The logs including the general stratigraphic descriptions, depth of sediment sampling, and sample notation, etc. are given in **Appendix C.**

4 Analytical Methodology and Result Analysis for Chemical Screening Test

4.1 Analytical Parameters

4.1.1 According to the approved SSTP, the sediment quality has been assessed through laboratory analyses of sediment samples for the chemical parameters. The chemical screening parameters are summarised in **Table 4.1**.

Table 4.1 Chemical screening parameters for sediment quality assessment

Parameters	**Preparation Method** *US EPA Method* (i)	**Determination Method** *US EPA Method* (i)	**Reporting Limit** (ii)
Cadmium (Cd)	3050B	6020A or 7000A or 7131A	0.2
Chromium (Cr)	3050B	6010C or 7000A or 7190	8
Copper (Cu)	3050B	6010C or 7000A or 7210	7
Mercury (Hg)	7471A	7471A	0.05
Nickel (Ni)	3050B	6010C or 7000A or 7520	4
Lead (Pb)	3050B	6010C or 7000A or 7420	8
Silver (Ag)	3050B	6020A or 7000A or 7761	0.1
Zinc (Zn)	3050B	6010C or 7000A or 7950	20
Arsenic (As)	3050B	6020A or 7000A or 7061A	1
Low Molecular Weight PAHs+	3550B or 3540C and 3630C	8260B or 8270C	55
High Molecular Weight PAHs++	3550B or 3540C and 3630C	8260B or 8270C	170
Total PCBs+++	3550B or 3540C and 3665A	8082	3
Tributyltin	Krone et al. (1989)* - GC/MS UNEP/IOC/IAEA**	Krone et al. (1989)* - GC/MS UNEP/IOC/IAEA**	0.015

Notes :	
(i)	The preparation and determination methods shown in this table are practicable as confirmed by the testing laboratory.
(ii)	The reporting limits shown in this table are the most stringent limits and are practicable as confirmed by the testing laboratory.
(iii)	Any methodology for which the laboratory is accredited that will produce equivalent or better results/reporting limits as required may be used subject to approval by DEP.
+	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
+++	The reporting limit is for individual PCB congeners. Total PCBs include 2,4' diCB, 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 U.S.EPA).
*	Krone et al. (1989), A method for analysis of butyltin species and measurement of butyltins in sediment and English Sole livers from Puget Sound, Marine Environmental Research 27 (1989) 1-18. Interstitial water to be obtained by centrifuging the sediment and collecting the overlying water.
**	UNEP/ICO/IAEA refers to IAEA's Marine Environment Laboratory reference methods. These methods are available free of charge from UNEP/Water or Marine Environmental Studies Laboratory at IAEA's Marine Environment Laboratory. Interstitial water to be obtained by centrifuging the sediment and collecting the overlying water.

4.2 Chemical Screening Test Results

4.2.1 A total of 10 sediment samples had been collected from 6 sampling locations and tested. The testing period of chemical screening test was from 22 June 2022 to 28 July 2023. The testing results indicate that all the samples were below the LCEL for all contaminants, except arsenic and lead.

4.2.2 Based on the exceedance of arsenic and lead, 3 samples were classified as Category L, 5 samples were classified as Category M and 2 sample were classified as Category H. The chemical screening test results of all samples for arsenic and lead are tabulated in **Table 4.2**. Summary of all chemical screening tests results are given in **Appendix D** and the detailed testing reports are presented in **Appendix E**.

Table 4.2 Summary of chemical screening test results

Sampling ID	Sampling Depth (mbgl)	Arsenic Concentration (mg/kg dry wt.) [1]	Lead Concentration (mg/kg dry wt.) [1]	Category of Sediment [2]	Biological Testing Required (Y/N)
Lower Chemical Exceedance Level (LCEL)		12	75	-	-
Upper Chemical Exceedance Level (UCEL)		42	110	-	-
10 x (LCEL)		120	750	-	-
AUT-EDH(S)01	3.5 – 4.5	**54**	52	H	N
AUT-EDH(S)02	2.5 – 3.5	**23**	51	M	Y
	3.5 – 4.5	**40**	35	M	Y
AUT-EDH(S)03	2.5 – 3.5	11	17	L	N
	3.5 – 4.5	10	26	L	N
NTM-EDH(S)20(P)	5.4 – 6.4	11	65	L	N

Sampling ID	Sampling Depth (mbgl)	Arsenic Concentration (mg/kg dry wt.) [1]	Lead Concentration (mg/kg dry wt.) [1]	Category of Sediment [2]	Biological Testing Required (Y/N)
SAT-EDH(S)04	0.5 – 1.0	**32**	**371**	H	N
SMA-EDH(S)03	2.0 – 3.0	**13**	43	M	Y
	3.0 – 4.0	**16**	75	M	Y
	4.0 – 4.5	**14**	61	M	Y

Notes:

[1] **Bold** indicates exceedance of LCEL. **Bold and underline** indicates exceedance of UCEL.

[2] Category L sediment – no exceedance of either LCEL or UCEL.
Category M sediment – exceedance of LCEL.
Category H sediment – exceedance of UCEL
Category H sediment (>10 x LCEL) – sediment with any one or more contaminant levels exceeding 10 times of their LCEL.

4.2.3 Tier III biological screening test is not required for the sediment samples classified as Category L.

4.2.4 For the 5 sediment samples classified as Category M as mentioned above, Tier III biological screening are required.

4.2.5 For the 2 sediment samples classified as Category H, since 1 parameter exceeds UCEL and no parameter exceeds 10 times LCEL, Tier III biological screening test is also not required.

5 Analytical Methodology and Results Analysis for Biological Screening Test

5.1 Biological Screening Test

5.1.1 According to PNAP ADV-21, Tier III biological screening test will only be implemented for Category M sediment. Sediment classified as Category H and with one or more contaminant levels exceeding 10 × LCEL will also undergo the biological screening test but in a diluted manner (dilution test). The biological screening parameters are summarised in **Table 5.1**, and the preparation method for the dilution test is presented in **Table 5.2**.

Table 5.1 Biological screening* parameters for sediment quality assessment

Toxicity Test	Test Method	Endpoints Measured	Failure Criteria
10-day amphipod	U.S.EPA 600/R-94/025 June 1994 Test Method 100.4	Survival	Mean survival in test sediment is significantly different ($p \leq 0.05$)** from mean survival in reference sediment **and** mean survival in test sediment < 80% of mean survival in reference sediment.
20-day polychaete worm	Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, PSEP, July 1995	Dry weight***	Mean dry weight in test sediment is significantly different ($p \leq 0.05$)** from mean dry weight in reference sediment **and** mean dry weight in test sediment <90% of mean dry weight in reference sediment.
48-96 hour larvae (bivalve or echinoderm)	Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, PSEP, July 1995	Normality survival****	Mean normality survival in test sediment is significantly different ($p \leq 0.05$)** from mean normality survival in reference sediment **and** mean normality survival in test sediment <80% of mean normality survival in reference sediment.

Notes:

* Ancillary testing parameters to be analysed for all sediment samples include Moisture Content, Grain Size (<63 μm), Total Organic Carbon, Ammonia (as mg N/L), and Salinity in pore water.

** Statistically significantly differences should be determined using appropriate two-sample comparisons (e.g. t-tests) at a probability of $p \leq 0.05$.

*** Dry weight means total dry weight after deducting dead and missing worms.

**** Normality survival integrates the normality and survival end points, and measures survival of only the normal larvae relative to the starting number.

Table 5.2 Preparation method of dilution test

Sediment Characteristics	Preparation Method
Category H sediment (> 10 × LCEL)	Sample to be mixed with 9 portions of reference sediment
Category M sediment or Category H sediment (> 10 × LCEL) suspected of ammonia contamination	Additional set of sample (after dilution for Category H sediment) to be purged# for ammonia removal (for amphipod test only).

Note:

If the ammonia concentration in the overlaying water of the test system is ≥20mg/L, purging of sediment is required. This is performed by replacing the overlying water at a rate of 6 volume replacement / 24 h for 24 hours, and repeated once only if the ammonia level still exceeds 20mg/L.

5.1.2 Only ecologically relevant species should be used for carrying out the biological screening tests. The species to be used for each type of test are summarised in **Table 5.3**.

Table 5.3 Species to be used for biological screening test

Test Type	Species	Reference Test Conditions*
10-day burrowing amphipod toxicity test	*Ampelisca abdita* *Leptocheirus plumulosus* *Eohaustorius estuarius*	U.S.EPA(1994)/PSEP(1995) U.S.EPA(1994) U.S.EPA(1994)/PSEP(1995)
20-day burrowing polychaete toxicity test	*Neanthes arenaceodentata*	PSEP(1995)
48-96 hour larvae (bivalve or echinoderm) toxicity test	Bivalve: *Mytilus* spp. *Crassostrea gigas*	 PSEP(1995) PSEP(1995)
	Echinoderm: *Dendraster excentricus* *Strongylocentrotus* spp.	 PSEP(1995) PSEP(1995)

Note:

* U.S.EPA (U.S. Environmental Protection Agency) 1994. Methods for assessing the toxicity of sediment-associated contaminants with estuarine and marine amphipods. Office of Research and Development. U.S. Environmental Protection Agency, Cincinnati, OH. EPA/600/R94/025. PSEP (Puget Sound Estuary Program) 1995. Recommended guidelines for conducting laboratory bioassays on Puget Sound Sediments.

5.2 Arrangement for Biological Screening Test

5.2.1 As shown in **Table 4.2**, there are 5 Category M sediment samples requiring Tier III biological screening test. Considering those Category M samples were collected from 2 same sampling location (i.e. from AUT-EDH(S)02 and SMA-EDH(S)03) in continuous vertical profile, 1 composite sample for biological screening test was proposed in the approved PSQR (1st batch) in Aug 2022 and the approved PSQR (2nd batch) in Aug 2023. The biological screening test for SMA-EDH(S)03 was conducted compositely for 3 sediment samples during testing period from 25 August to 6 October 2023. However, the biological screening test for AUT-EDH(S)02 was conducted individually for 2 sediment samples for conservative purpose during testing period from 9 to 29 September 2022. Since both samples for AUT-EDH(S)02 were conducted according to the approved methodology, hence, both testing results were considered still representative and valid. The proposed sample subject to biological screening tests has been summarized in **Table 5.4** below.

Table 5.4 Proposed arrangement for biological screening test

Sampling Location	Sampling Depth of Sediment Samples (mbgl)	Category of Sediment	No. of Samples for Biological Screening Test
AUT-EDH(S)02	2.5 – 3.5	M	1
AUT-EDH(S)02	3.5 – 4.5	M	1
SMA-EDH(S)03	2.0 – 3.0, 3.0 – 4.0, 4.0 – 4.5	M	1
		Total	3

5.3 Reference Sample

5.3.1 Modified Van Veen grab (or equivalent) of capacity ~2L had been deployed from vessel and reference sediment (surface grab) of ~10L had been collected at Port Shelter (PS6, E850234, N820057). Individual grabs were composited on-site and split into portions for packing. The samples were stored at 4^{o}C during transportation and at the laboratory prior to testing.

5.4 Biological Screening Test Analysis

5.4.1 The levels of Total Organic Carbon (TOC) of the samples are all below 2%, while the levels of moisture content of the samples are ranged from 18.5% to 50.4%. 35.7% to 75.6% of grain in the samples are smaller than 63µg in size. The pH levels of porewater of the samples are ranged from 7.9 to 8.2, which are slightly alkaline. The levels of porewater salinity are ranged from 31 to 33 ppt. The levels of ammonia are ranged from 0.25 mgN/L to 3.62 mgN/L. The TOC, moisture content, grain size and porewater characteristics (pH, salinity and ammonia) of the composite samples are summarized in **Table 5.5**.

Table 5.5 TOC, moisture content, grain size and porewater characteristics of the composite samples

Location	Sample ID	TOC (%)	Moisture Content (%)	Grain Size (<63µg) (%)	pH	Porewater Salinity (ppt)	Ammonia (as mgN/L)
AUT	Reference Sediment	1.86	50.40	75.6	8.0	31	3.62
	AUT-EDH(S)02 2.5 – 3.5	0.51	22.90	51.7	7.9	33	0.99
	AUT-EDH(S)02 3.5 – 4.5	0.26	18.50	35.7	8.2	33	0.25
SMA	Reference Sediment	2.23	47.1	73.8	7.9	31	4.36
	SMA-EDH(S)03 2.0 – 4.5	0.68	28.3	53.5	8.1	32	7.08

5.4.2 Results of the Tier III biological screening test for the composite sample are summarized in **Table 5.6** and all sample has passed the biological screening test. The detailed biological screening test report is presented in **Appendix F**.

Table 5.6 Summary of the Tier III biological screening test results

Composite Sample ID	Overall Result	10-Day Amphipod Survival Test [1]			20-Day Polychaete Survival and Growth Test [2]			48-60-hour Bivalve Survival and Normality Test [3]		
		Survival (%)		Pass /Fail	Total Dry Weight (mg)		Pass /Fail	Normality Survival (%)		Pass /Fail
		Mean	SD		Mean	SD		Mean	SD	
AUT-EDH(S)02 2.5 – 3.5	Pass	*81.0	4.2	Pass	*48.6	1.9	Pass	*73.2	2.8	Pass
AUT-EDH(S)02 3.5 – 4.5	Pass	*81.0	7.4	Pass	*49.4	2.0	Pass	*73.5	2.2	Pass
SMA-EDH(S)03 2.0 – 4.5	Pass	*89.0	6.5	Pass	*47.5	1.4	Pass	*72.1	1.9	Pass

Notes:

Failure Criteria:

[1] Mean survival in test sediment is <80% of that in reference sediment

[2] Mean total dry weight in test sediment is <90% of that in reference sediment

[3] Mean normality survival in test sediment is <80% of that in reference sediment

* Mean survival in test sediment is significantly different ($p \leq 0.05$) from that in reference sediment

6 Proposed Disposal Arrangement

6.1.1 Based on the chemical and biological screening test results, the proposed disposal arrangement for the sediment in accordance with PNAP ADV-21 is summarized in **Table 6.1** below:

Table 6.1 Proposed disposal arrangement for the sediment to be generated

Sample ID	Sampling Depth (mbgl)	Category of Sediment	Proposed Disposal Arrangement
AUT-EDH(S)01	2.5 – 3.5	H	Type 2 – Confined Marine Disposal
AUT-EDH(S)02	2.5 – 3.5 & 3.5 – 4.5	Mp[1]	Type 1 – Open Sea Disposal (Dedicated Site)
AUT-EDH(S)03	2.5 – 3.5 & 3.5 – 4.5	L	Type 1 – Open Sea Disposal
NTM-EDH(S) 20(P)	5.4 – 5.9	L	Type 1 – Open Sea Disposal
SAT-EDH(S)04	0.5 – 1.0	H	Type 2 – Confined Marine Disposal
SMA-EDH(S)03	2.0 – 4.5	Mp[1]	Type 1 – Open Sea Disposal (Dedicated Site)

Note:

[1] Mp = Category M sediment passing the Tier III biological screening test.

6.1.2 Based on the latest design, the proposed NOL alignment would have stations and associated work areas/ work sites which would pass through the sediment level. Therefore, certain amount of sediment would be generated during the excavation of stations and associated work areas. The in-situ volume of sediment to be mucked out is estimated based on the latest information on the sediment depth and is summarized in **Table 6.2**.

Table 6.2 Estimated volume of sediment to be generated during excavation works

Sampling Location	Proposed Excavation Area [2][3] (m^2) (A)		Proposed Disposal Sediment Depth, (mbgl)	Estimated Thickness of Sediment (m) (B)	Estimated In-situ Volume of Sediment to be Excavated (m^3) [1] (C) = (A) x (B)	Total (m^3)	Proposed Disposal Arrangement
AUT-EDH(S)01	Station	2,480	3.5 – 4.5	1.0	2,480	2,480	Type 2 – Confined Marine Disposal
AUT-EDH(S)02	Station	3,730	2.5 – 3.5 & 3.5 – 4.5	2.0	7,460	7,460	Type 1 - Open Sea Disposal (Dedicated Site)
AUT-EDH(S)03	Station	3,730	2.5 – 3.5 & 3.5 – 4.5	2.0	7,460	7,460	Type 1 - Open Sea Disposal
SAT-EDH(S)04	Station	5,860	0.5 – 1.0	0.5	2, 930	3, 985	Type 2 – Confined Marine Disposal
	Work Site	2, 110			1,055		
NTM-EDH(S) 20(P)	Station	940	5.4 – 5.9	0.5	470	470	Type 1 - Open Sea Disposal
SMA-EDH(S)03	Ancillary building and Work Site	3,730	2.0 – 4.5	2.5	9,325	9,325	Type 1 - Open Sea Disposal (Dedicated Site)
					Total	**31,180**	**-**

Notes:

[1] The "Estimated Volume of Sediment to be Excavated" is calculated by "Proposed Excavation Area" x "Estimated Thickness of Sediment".

[2] Based on the preliminary design information, the excavation level of the station, Work Site, and ancillary building for SAT-EDH(S)04 and SMA-EDH(S)03 will be lower than the respective sediment level, therefore, sediment will be excavated and to be disposed. Details is shown in **Appendix G**.

[3] Since the excavation level for Work Site of NTM-EDH(S) 20(P), AUT-EDH(S)01, AUT-EDH(S)02, AUT-EDH(S)03, will not be encountered the respective sediment level, therefore, no sediment will be excavated and disposed in Work Site area. The final estimation of the sediment quantities subject to the review in construction stage. Details is shown in **Appendix G**.

6.1.3 The estimated volume of sediment suitable for each proposed disposal arrangement is summarized in **Table 6.3**. The proposed disposal arrangement for the sediment to be generated is shown in **Appendix G**.

Table 6.3 Estimated volume of sediment suitable for each proposed disposal arrangement

Proposed Disposal Arrangement	Estimated Total In-situ Volume of sediment to be Generated (m^3)	Percentage to the total volume (%)
Type 1 - Open Sea Disposal	7,930	25.4%
Type 1 - Open Sea Disposal (Dedicated Sites)	16,785	53.8%
Type 2 – Confined Marine Disposal	6,465	20.7%
Total	**31,180**	100%

Notes:

[1] Since the excavation level for Work Site of NTM-EDH(S) 20(P), AUT-EDH(S)01, AUT-EDH(S)02, and AUT-EDH(S)03 will not be encountered the respective sediment level, therefore, no sediment will be excavated and disposed in Work Site area. The final estimation of the sediment quantities subject to the review in construction stage. Details is shown in **Appendix G**.

7 Conclusion

7.1.1 This SQR has reviewed the sediment quality data and summarized the findings of the site investigation for sediment quality in relation to the NOL station and associated work areas. The sediment has been classified in accordance with PNAP ADV-21, and suitable disposal arrangement has been proposed for the agreement and approval by EPD.

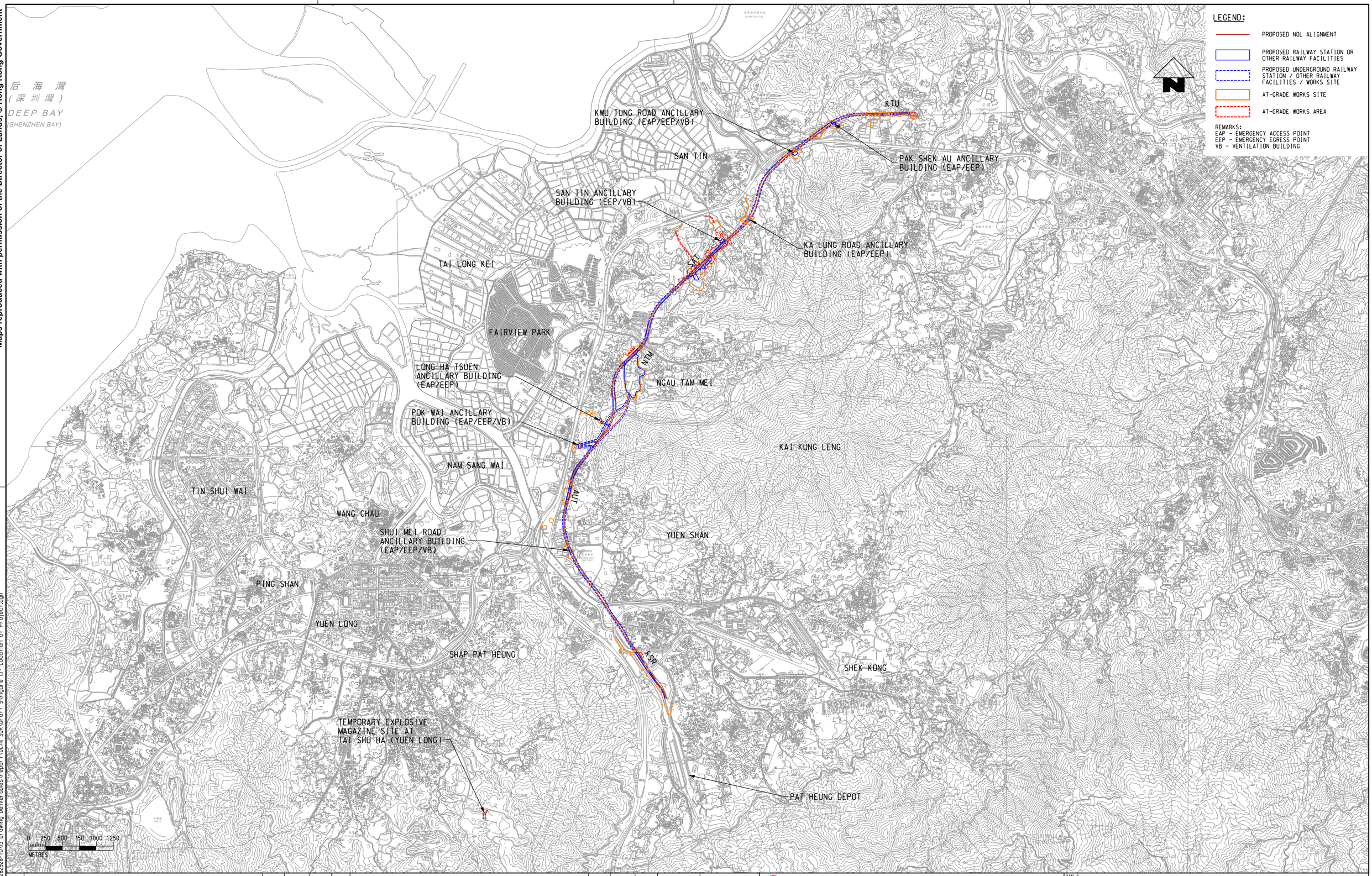
7.1.2 The sediment sampling programme were divided into 2 batches due to the availability of site access. The SI works were conducted in accordance with the approved SSTP and were supervised by the on-site specialist. Total of 30 sediment sampling locations were finished during 2 batches out of 47 sediment sampling locations proposed in the approved SSTP. Due to the availability of site access, the remaining 17 sediment sampling locations could not be done during this stage, and it would be conducted after land resumption.

7.1.3 Based on the latest programme, the design, build and operation contract of the NOL project which may generate sediment would be commenced in 2025. Prior to the commencement of the construction works that would generate dredged sediment, Rationale Report will be submitted to Marine Fill Committee (MFC) for the application of the Dumping at Sea Ordinance (DASO) Permit. Allocation of disposal capacity will be sought from MFC.

7.1.4 It is estimated that the total in-situ volume of sediment to be generated is approx. 31,180 m^3, amongst which approx. 25.4%, 53.8% and 20.7% of the sediment to be generated would be suitable for Type 1 – Open Sea Disposal, Type 1 – Open Sea Disposal (Dedicated Sites) and Type 2 – Confined Marine Disposal respectively

Figure 1.1

Location of Project



REV	DESCRIPTION	BY	DATE	APPROVED
E	FIFTH ISSUE	GL	19OCT23	FC
D	FOURTH ISSUE	GL	25AUG23	FC
C	THIRD ISSUE	GL	06JUL23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	GL	20JAN22	FC

DRAWN	GL
DESIGNED	GL
CHECKED	EL
APPROVED	FC
DATE	19/OCT/2023

MTR

NORTHERN LINK

ORIGINATOR

ARUP AECOM JV

In Association with Hassell Limited

CADD REF. $FILEA$

TITLE

CONSULTANCY AGREEMENT NO. C1602

PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2

LOCATION OF PROJECT

SCALE 1 : 50000 (A3)

DRAWING NO. FIGURE 1.1

REV. E

PLOT DRV: G:\common\Microstation standard\Plotdrv\HP_ArupHK_PDF-C_1603.plt
MODEL NAME: $MODEL$ PRINTED BY: richard-khluo 19/10/2023 14:55:06
FILENAME: G:\env\project\28298-TOWJ\Drawing Deliverables\report\TOWJ_SOR\Draft 5\Figure 1J- Location of Project.dgn

Figure 3.1

Drawing of Actual Sediment Sampling Locations

后 海 灣
(深 圳 灣)
DEEP BAY
(SHENZHEN BAY)

LEGEND:

- PROPOSED NOL ALIGNMENT
- PROPOSED RAILWAY STATION OR OTHER RAILWAY FACILITIES
- PROPOSED UNDERGROUND RAILWAY STATION / OTHER RAILWAY FACILITIES / WORKS SITE
- AT-GRADE WORKS SITE
- AT-GRADE WORKS AREA

REMARKS:
EAP - EMERGENCY ACCESS POINT
EEP - EMERGENCY EGRESS POINT
VB - VENTILATION BUILDING

KWU TUNG ROAD ANCILLARY BUILDING (EAP/EEP/VB)
KTU
PAK SHEK AU ANCILLARY BUILDING (EAP/EEP)
SAN TIN
SAN TIN ANCILLARY BUILDING (EEP/VB)
KA LUNG ROAD ANCILLARY BUILDING (EAP/EEP)
TAI LONG KEI
FIGURE 3.1e
FAIRVIEW PARK
FIGURE 3.1d
NTM
NGAU TAM MEI
LONG HA TSUEN ANCILLARY BUILDING (EAP/EEP)
POK WAI ANCILLARY BUILDING (EAP/EEP/VB)
FIGURE 3.1c
NAM SANG WAI
KAI KUNG LENG
AUT
TIN SHUI WAI
WANG CHAU
SHUI MEI ROAD ANCILLARY BUILDING (EAP/EEP/VB)
YUEN SHAN
FIGURE 3.1b
PING SHAN
YUEN LONG
SHAP PAT HEUNG
SHEK KONG
FIGURE 3.1a
TEMPORARY EXPLOSIVE MAGAZINE SITE AT TAI SHU HA (YUEN LONG)
PAT HEUNG DEPOT

0 200 400 600 800 1000
METRES

REV	DESCRIPTION	BY	DATE	APPROVED
F	SIXTH ISSUE	GL	19OCT23	FC
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	GL	20JAN22	FC

DRAWN	GL
DESIGNED	GL
CHECKED	EL
APPROVED	FC
DATE	19/OCT/2023

MTR
NORTHERN LINK
ORIGINATOR
ARUP AECOM JV
In Association with Hassell Limited
CADD REF. $FILEA$

TITLE
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
ACTUAL SEDIMENT SAMPLING LOCATIONS

SCALE 1 : 50000 (A3)
DRAWING NO. FIGURE 3.1
REV. F

PLOT DRV: G:\common\Microstation standard\Plotdrv\HP_ArupMN_PDF_C_1603.plt
MODEL#: $MODEL#
FILENAME: G:\env\project\282928-TOWJ Drawing Deliverables\report\TOWJN SOR\Draft\5\Figure 3.1- ActualSediment Sampling Locations.dgn
PRINTED BY: richard.khuau 19/10/2023 14:20:04

LEGEND:

- PROPOSED NOL ALIGNMENT
- PROPOSED RAILWAY STATION OR OTHER RAILWAY FACILITIES
- PROPOSED UNDERGROUND RAILWAY STATION / OTHER RAILWAY FACILITIES / WORKS SITE
- AT-GRADE WORKS SITE
- AT-GRADE WORKS AREA
- SAMPLING GRID
- PROPOSED DRILLHOLE
- ACTUAL SEDIMENT SAMPLING LOCATION

REMARKS:
EAP - EMERGENCY ACCESS POINT
EEP - EMERGENCY EGRESS POINT
VB - VENTILATION BUILDING

Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
KSR-EDH(S)01	824805	832569	KSR-EDH(S)01	824812	832590
KSR-EDH(S)02	824868	832492	KSR-EDH(S)02	824896	832483
KSR-EDH(S)03	824931	832414	KSR-EDH(S)03	824920	832445
KSR-EDH(S)04	824969	832317	KSR-EDH(S)04	824970	832312
KSR-EDH(S)05	825004	832214	KSR-EDH(S)05	825009	832202
KSR-EDH(S)06	825050	832119	KSR-EDH(S)06	825019	832133

PRINTED BY: $USER$ $DATE$ $TIME$
PLOT DRV: $PLTDRVL$
MODEL NAME: $MODEL$
FILENAME: $FILE$

REV	DESCRIPTION	BY	DATE	APPROVED
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	GL	20JAN22	FC

DRAWN	GL
DESIGNED	JC
CHECKED	EL
APPROVED	FC
DATE	25/AUG/2023

MTR

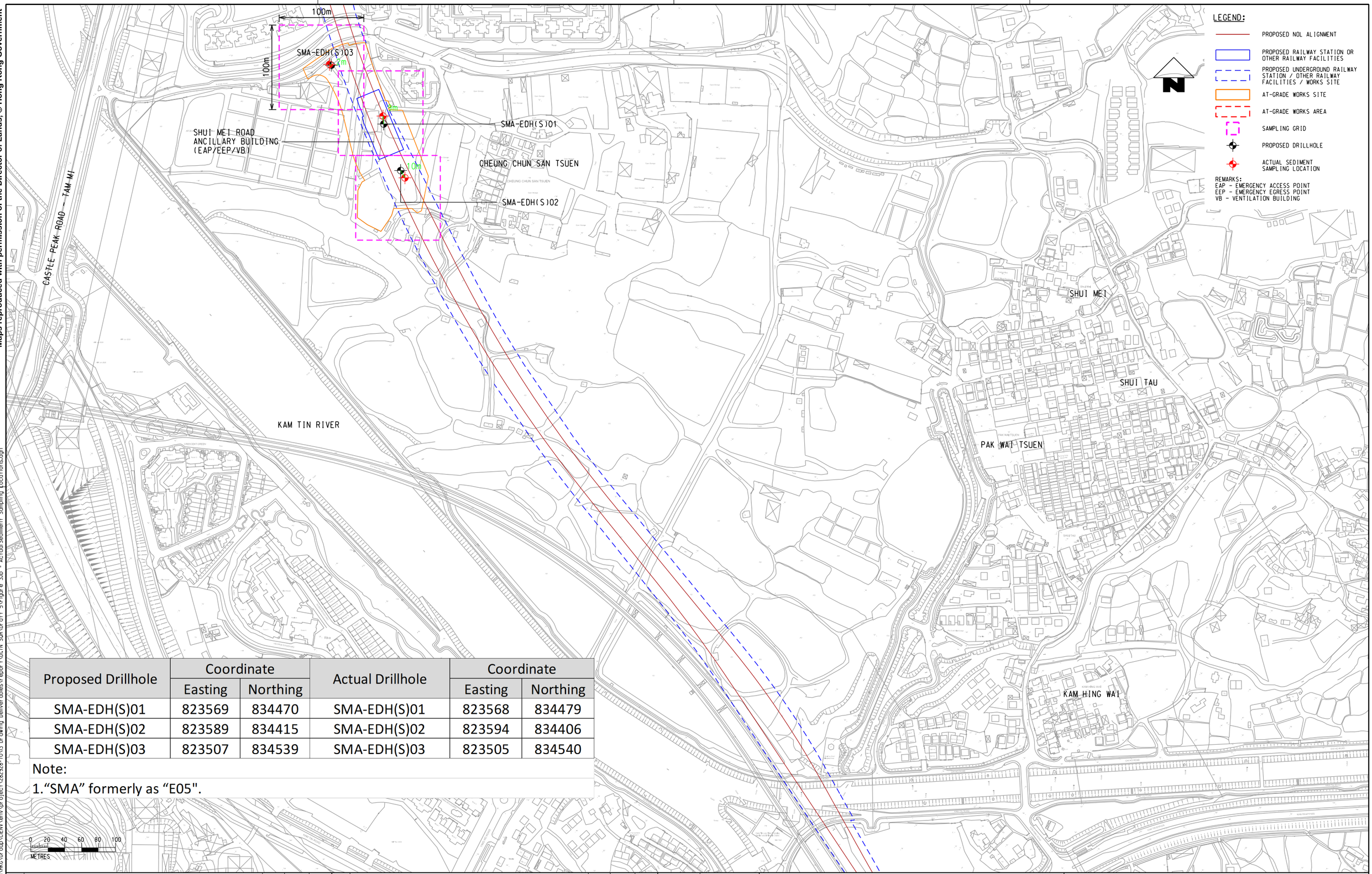
NORTHERN LINK

ORIGINATOR
ARUP AECOM JV
In Association with Hassell Limited

CADD REF. $FILES$

TITLE
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
ACTUAL SEDIMENT SAMPLING LOCATIONS

SCALE 1 : 4000 @A3
DRAWING NO. FIGURE 3.1a
REV. E



Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
SMA-EDH(S)01	823569	834470	SMA-EDH(S)01	823568	834479
SMA-EDH(S)02	823589	834415	SMA-EDH(S)02	823594	834406
SMA-EDH(S)03	823507	834539	SMA-EDH(S)03	823505	834540

Note:

1.“SMA” formerly as “E05".

REV	DESCRIPTION	BY	DATE	APPROVED
F	SIXTH ISSUE	GL	11OCT23	FC
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	GL	20JAN22	FC

DRAWN	GL
DESIGNED	JC
CHECKED	EL
APPROVED	FC
DATE	11/OCT/2023

MTR

NORTHERN LINK

ORIGINATOR

ARUP AECOM JV

In Association with Hassell Limited

CADD REF. Figure 3.1b - Actual Sediment Sampling Locations.dgn

TITLE

CONSULTANCY AGREEMENT NO. C1602

PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2

ACTUAL SEDIMENT SAMPLING LOCATIONS

SCALE	DRAWING NO.	REV.
1 : 4000 @A3	FIGURE 3.1b	F

PLOT DRV:
MODELNAME: $MODEL$
FILENAME: G:\common\Microstation standard\Plotdrv\HP_ArupHK_PDF.cplt
PRINTED BY: richard.kwbau 9/10/2023 14:11:41
\\global\EastAsia\HKG\Group\CIENV\env\project\284928-10\03 Drawing Deliverables\report\DL7N SGR\Draft 5\Figure 3.1b - Actual Sediment Sampling Locations.dgn

Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
AUT-EDH(S)01	823574	835441	AUT-EDH(S)01	823543	835439
AUT-EDH(S)02	823552	835347	AUT-EDH(S)02	823513	835305
AUT-EDH(S)03	823530	835250	AUT-EDH(S)03	823505	835226
AUT-EDH(S)04	823514	835181	AUT-EDH(S)04	Note 1	
AUT-EDH(S)05	823479	835369	AUT-EDH(S)05	Note 1	
AUT-EDH(S)06	823462	835209	AUT-EDH(S)06	823467	835207

Note:

1. Due to inaccessibility of the site, this drillhole will be conducted at a later stage.

LEGEND:

- PROPOSED NOL ALIGNMENT
- PROPOSED RAILWAY STATION OR OTHER RAILWAY FACILITIES
- PROPOSED UNDERGROUND RAILWAY STATION / OTHER RAILWAY FACILITIES / WORKS SITE
- AT-GRADE WORKS SITE
- AT-GRADE WORKS AREA
- SAMPLING GRID
- PROPOSED DRILLHOLE
- ACTUAL SEDIMENT SAMPLING LOCATION
- ALTERNATIVE SEDIMENT SAMPLING LOCATION

REMARKS:
EAP - EMERGENCY ACCESS POINT
EEP - EMERGENCY EGRESS POINT
VB - VENTILATION BUILDING

N

MO FAN HEUNG

FUNG KAT HEUNG

AUT

100m

100m

AUT-EDH(S)01

AUT-EDH(S)05

AUT-EDH(S)02

AUT-EDH(S)03

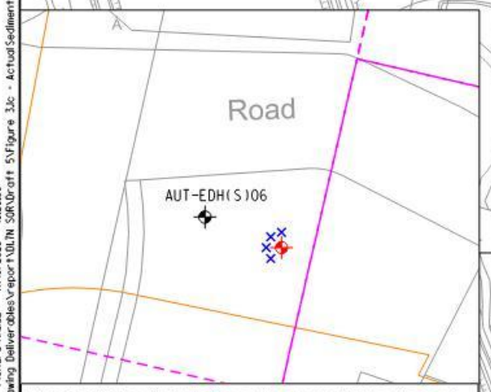
AUT-EDH(S)06

AUT-EDH(S)04

57m

34m

0 20 40 60 80 100
METRES



Note: 5 drillholes (4 alternative sediment sampling locations and 1 actual sediment sampling location) had been conducted but all sediment sampling locations were terminated at 1m due to encounter the underground cable.

REV	DESCRIPTION	BY	DATE	APPROVED
F	SIXTH ISSUE	GL	17OCT23	FC
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	GL	20JAN22	FC

DRAWN	GL
DESIGNED	JC
CHECKED	EL
APPROVED	FC
DATE	17/OCT/2023

MTR

NORTHERN LINK

ORIGINATOR

ARUP AECOM JV

In Association with Hassell Limited

CADD REF. Figure 3.1c - Actual Sediment Sampling Locations.dgn

TITLE

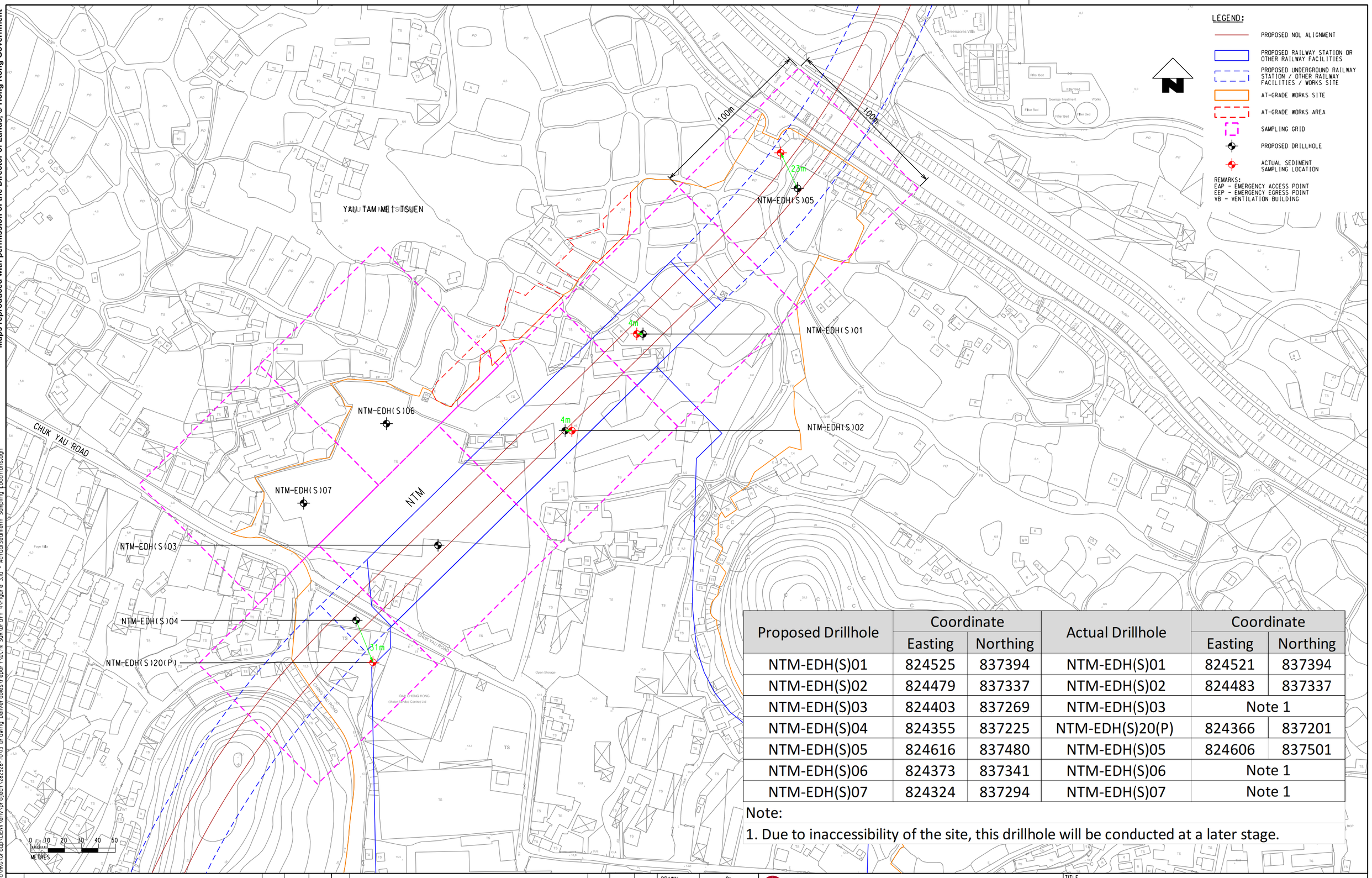
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
ACTUAL SEDIMENT SAMPLING LOCATIONS

SCALE 1 : 4000 @A3

DRAWING NO. FIGURE 3.1c

REV. F

PLOT DRV: G:\common\Microstation standard\Plotdrv\MP_Arup4M_PDF-C.plt
MODEL#: PRINTED BY: richard.hubau 17/10/2023 16:26:30
FILENAME: G:\env\project\N382928\7010 Drawing Deliverables\Report NOL\IN SOR\Draft SV\Figure 3.1c - Actual Sediment Sampling Locations.dgn



Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
NTM-EDH(S)01	824525	837394	NTM-EDH(S)01	824521	837394
NTM-EDH(S)02	824479	837337	NTM-EDH(S)02	824483	837337
NTM-EDH(S)03	824403	837269	NTM-EDH(S)03	Note 1	
NTM-EDH(S)04	824355	837225	NTM-EDH(S)20(P)	824366	837201
NTM-EDH(S)05	824616	837480	NTM-EDH(S)05	824606	837501
NTM-EDH(S)06	824373	837341	NTM-EDH(S)06	Note 1	
NTM-EDH(S)07	824324	837294	NTM-EDH(S)07	Note 1	

Note:

1. Due to inaccessibility of the site, this drillhole will be conducted at a later stage.

REV	DESCRIPTION	BY	DATE	APPROVED
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	BS	04JAN22	FC

DRAWN	GL
DESIGNED	JC
CHECKED	EL
APPROVED	FC
DATE	25/AUG/2023

MTR

NORTHERN LINK

ORIGINATOR

ARUP AECOM JV

In Association with Hassell Limited

CADD REF. Figure 3.1d - Actual Sediment Sampling Locations.dgn

TITLE

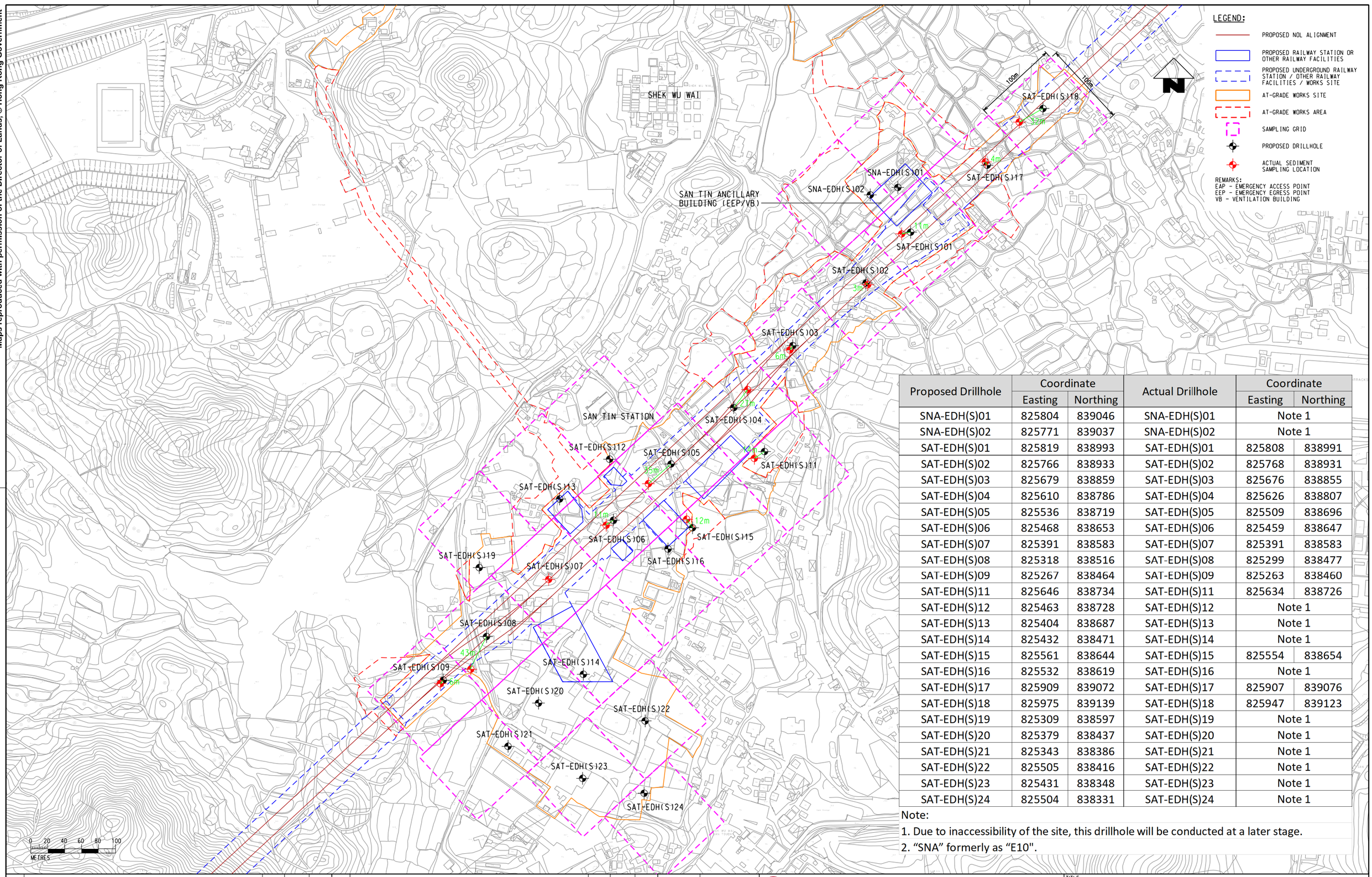
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
ACTUAL SEDIMENT SAMPLING LOCATIONS

SCALE 1 : 2000 @A3

DRAWING NO. FIGURE 3.1d

REV. E

PLOT DRV: G:\common\Microstation_standard\Plotdrv\HP_ArupHK.PDF.Cplt
MODEL: $MODEL
FILENAME: \\global\EastAsia\HKG\Group\CENV\env\project\282928-10\13 Drawing Deliverables\report\DLN SOR\Draft 4\Figure 3.1d - Actual Sediment Sampling Locations.dgn
PRINTED BY: richard.khuu
25/8/2023 11:25:59



Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
SNA-EDH(S)01	825804	839046	SNA-EDH(S)01	Note 1	
SNA-EDH(S)02	825771	839037	SNA-EDH(S)02	Note 1	
SAT-EDH(S)01	825819	838993	SAT-EDH(S)01	825808	838991
SAT-EDH(S)02	825766	838933	SAT-EDH(S)02	825768	838931
SAT-EDH(S)03	825679	838859	SAT-EDH(S)03	825676	838855
SAT-EDH(S)04	825610	838786	SAT-EDH(S)04	825626	838807
SAT-EDH(S)05	825536	838719	SAT-EDH(S)05	825509	838696
SAT-EDH(S)06	825468	838653	SAT-EDH(S)06	825459	838647
SAT-EDH(S)07	825391	838583	SAT-EDH(S)07	825391	838583
SAT-EDH(S)08	825318	838516	SAT-EDH(S)08	825299	838477
SAT-EDH(S)09	825267	838464	SAT-EDH(S)09	825263	838460
SAT-EDH(S)11	825646	838734	SAT-EDH(S)11	825634	838726
SAT-EDH(S)12	825463	838728	SAT-EDH(S)12	Note 1	
SAT-EDH(S)13	825404	838687	SAT-EDH(S)13	Note 1	
SAT-EDH(S)14	825432	838471	SAT-EDH(S)14	Note 1	
SAT-EDH(S)15	825561	838644	SAT-EDH(S)15	825554	838654
SAT-EDH(S)16	825532	838619	SAT-EDH(S)16	Note 1	
SAT-EDH(S)17	825909	839072	SAT-EDH(S)17	825907	839076
SAT-EDH(S)18	825975	839139	SAT-EDH(S)18	825947	839123
SAT-EDH(S)19	825309	838597	SAT-EDH(S)19	Note 1	
SAT-EDH(S)20	825379	838437	SAT-EDH(S)20	Note 1	
SAT-EDH(S)21	825343	838386	SAT-EDH(S)21	Note 1	
SAT-EDH(S)22	825505	838416	SAT-EDH(S)22	Note 1	
SAT-EDH(S)23	825431	838348	SAT-EDH(S)23	Note 1	
SAT-EDH(S)24	825504	838331	SAT-EDH(S)24	Note 1	

Note:
1. Due to inaccessibility of the site, this drillhole will be conducted at a later stage.
2. “SNA” formerly as “E10".

REV	DESCRIPTION	BY	DATE	APPROVED
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	GL	20JAN22	FC

DRAWN	GL
DESIGNED	JC
CHECKED	EL
APPROVED	FC
DATE	25/AUG/2023

MTR
NORTHERN LINK
ORIGINATOR
ARUP AECOM JV
In Association with Hassell Limited
CADD REF. $FILES$

TITLE
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
ACTUAL SEDIMENT SAMPLING LOCATIONS

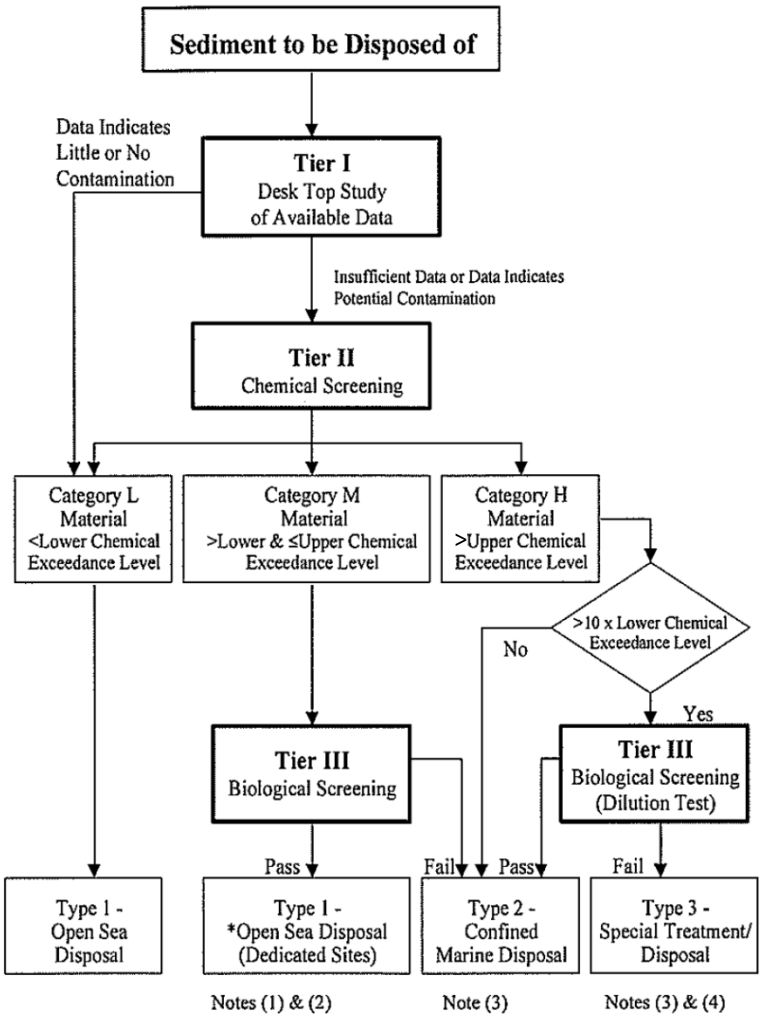
SCALE 1 : 4000 @A3
DRAWING NO. FIGURE 3.1e
REV. E

PLOT DRV: $PLTDRVL$
MODELNAME: $MODEL$
FILENAME: $FILES$
PRINTED BY: $USER$
$DATE$ $TIME$

Appendix A

Management Framework for Dredged / Excavated Sediment

Management Framework for Dredged/Excavated Sediment



Notes

(1) Most open sea disposal sites are multi-user facilities and as a consequence their management involves a flexibility to accommodate varying and unpredictable circumstances. Contract documents should include provisions to allow the same degree of flexibility should it be necessary to divert from one disposal site to another during the construction period of a contract.

(2) Dedicated Sites will be monitored to confirm that there is no adverse impact.

(3) For sediment requiring Type 2 or Type 3 disposal, contract documents shall state the allocation conditions of MFC and Director of Environmental Protection (DEP). At present, East Sha Chau mud pits are designated for confined marine disposal.

(4) If any sediment suitable for Type 3 disposal (Category H sediment failing the biological dilution test) is identified, it is the responsibility of the project proponent, in consultation with DEP, to identify and agree with him/her, the most appropriate treatment and/or disposal arrangement. Such a proposal is likely to be very site and project specific and therefore cannot be prescribed. This will not preclude treatment of this sediment to render it suitable for confined marine disposal.

(5) The allocation of disposal space may carry a requirement for the project proponent to arrange for chemical analysis of the sediment sampled from 5% of the vessels en-route to the disposal site. For Category M and certain Category H sediment, the chemical tests will be augmented by biological tests. Vessel sampling will normally entail mixing five samples to form a composite sample from the vessel and undertaking laboratory tests on this composite sample. All marine disposal sites will be monitored under the general direction of the Civil Engineering Department. However, exceptionally large allocations might require some additional disposal site monitoring. These will be stipulated at the time of allocation.

(6) Trailer suction hopper dredgers disposing of sediment at East Sha Chau mustuse a down-a-pipe disposal method, the design of which must be approved in advance by DCE. The dredging contractor must provide equipment for such disposal.

Appendix B

Accredited certification and scope of accreditation

Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ALS TECHNICHEM (HK) PTY LIMITED

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街1-3號忠信針織中心11樓

is accredited by the Hong Kong Accreditation Service (HKAS) to ISO/IEC 17025:2017
for performing specific laboratory activities as listed in the scope of accreditation within the test category of
獲香港認可處根據ISO/IEC 17025:2017認可
進行載於認可範圍內下述測試類別中的指定實驗所活動

Environmental Testing
環境測試

This accreditation to ISO/IEC 17025:2017 demonstrates technical competence for a defined scope and the implementation of a management system relevant to laboratory operation (see joint IAF-ILAC-ISO Communiqué).
此項 ISO/IEC 17025:2017 的認可資格證明此實驗所具備指定範疇內所須的技術能力並實施一套與實驗所運作相關的管理體系(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

The common seal of HKAS is affixed hereto by the authority of the HKAS Executive
現經香港認可處執行機關授權在此蓋上香港認可處的印章

SHUM Wai-leung, Executive Administrator
執行幹事 沈偉良
Issue Date : 28 February 2020
簽發日期：二零二零年二月二十八日

Registration Number : HOKLAS 066
註冊號碼：

Date of First Registration : 15 September 1995
首次註冊日期：一九九五年九月十五日

This certificate is issued subject to the terms and conditions laid down by HKAS
本證書按照香港認可處訂立的條款及條件發出

L001934

ALS Technichem (HK) Pty Limited
11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試

ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED 特定測試或量度的特性	SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED 規範、標準方法或應用技術
	Physical examination -	
Samples from ambient air, process emissions and surface emissions	Odour concentration measurement	BS EN 13725:2003 (By dynamic olfactometry) ***<Excluding the following >*** Section 7
Ambient air	Volatile Organic Compounds: -	In House Method AP074 (GC/MSD)
	Freon 12 (dichlorodifluoromethane) Chloromethane (Methyl chloride) Freon 114 (1,2-dichloro-1,1,2,2-tetrafluoroethane) Chloroethene (Vinyl chloride) Bromomethane Chloroethane Freon 11 (Trichlorofluoromethane) 1,1-Dichloroethene Dichloromethane (Methylene chloride) Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane) 1,1-Dichloroethane cis-1,2-dichloroethene Chloroform 1,2-Dichloroethane 1,1,1-Trichloroethane Benzene Carbon tetrachloride 1,2-Dichloropropane Trichloroethylene cis-1,3-dichloropropene trans-1,3-dichloropropene 1,1,2-trichloroethane Toluene 1,2-dibromoethane Tetrachloroethylene Chlorobenzene Ethylbenene m-/p-xylene Styrene 1,1,2,2-Tetrachloroethane o-xylene 1,3,5-trimethylbenzene 1,2,4-trimethylbenzene m-dichlorobenzene (1,3-dichlorobenzene)	

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Ambient air (cont'd)	Volatile Organic Compounds: - (cont'd)	In House Method AP074 (GC/MSD) (cont'd)
	p-dichlorobenzene (1,4-dichlorobenzene) o-dichlorobenzene (1,2-dichlorobenzene) 1,2,4-trichlorobenzene Hexachloro-1,3-butadiene	
	Xylene – Total (sum of o-/m-/p-xylene)	In House Method AP074 (By calculation)
Ambient air (Extractable components collected onto sorbent tubes)	Volatile Organic Compounds: - Isopropyl alcohol 1,1-Dichloroethylene Acrylonitrile Methylene chloride Carbon disulfide Methyl tert-butyl ether Vinyl acetate n-Hexane Chloroform 1,1,1-Trichloroethane Benzene Carbon tetrachloride Trichloroethylene Toluene Tetrachloroethylene Chlorobenzene Ethylbenzene m-/p-Xylene Styrene o-Xylene Phenol 1,4-Dichlorobenzene Naphthalene Xylenes (Total)	 In-house method AP077 (TD-GC/MS) (by calculation)
Ambient air (Extractable components collected onto adsorbent cartridges)	- Acetaldehyde - Formaldehyde	USPEA TO-11A (January 1999) (AP010-ACT) <***Excluding air sampling***>

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Indoor Air Quality Testing (Extractable components collected in passive samplers)	- Acetaldehyde	In-house method AP010 (By HPLC)
	- Formaldehyde	In-house method AP010 (By HPLC)
	- Nitrogen dioxide	In-house method AK057/EK057K (Discrete analyzer)
	Microbiological examinations: -	
Collectate sampled by Microbio Air Sampler MB2	- Airborne bacteria count (number of colonies & corrected of colonies on agar plate) (30℃ for 2 days)	In house method AM401
Collectate samples on agar plate	- Airborne bacteria count (number of colonies on agar plate) (30℃ for 2 days)	In house method AM401
Collectate samples on agar strip	- Airborne bacteria count (number of colonies on agar strip) (30℃ for 2 days)	In house method AM401
Collectate sampled by Microbio Air Sampler MB2	- Airborne fungi count (number of colonies & corrected number of colonies on agar plate) (25℃ for 5 days)	In house method AM405
Collectate samples on agar plate	- Airborne fungi count (number of colonies on agar plate) (25℃ for 5 days)	In house method AM405

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Stationary Source Emission	Air Quality Checking :-	40 CFR Part 60
	- Selection of sampling points and velocity traverse points	Appendix A-1 Test method 1, 1 July 2018 ***<Excluding the following>*** Cl. 11.5
	- Determination of the average stack gas velocity and the volumetric flow rate (by Type S Pitot Tube)	Appendix A-1 Test method 2, 1 July 2018
	- Determination of the dry molecular weight of stack gas (by Orsat analyzer)	Appendix A-2 Test method 3, 1 July 2018
	- Determination of the moisture content of stack gas	Appendix A-3 Test method 4, 1 July 2018 ***<Excluding the following>*** Cl. 8.2, 11.2, 12.2
	- Determination of particulate matter emissions	Appendix A-3 Test method 5, 1 July 2018
	- Determination of hydrogen halides and halogens emissions (isokinetic method)	Appendix A-8 Test method 26A, 1 July 2018, (excluding Cl. 10.2, 11.1) in conjunction with In-house method ED009 (Ion Chromatography) for determination of halide ions in acidic and alkaline absorbing solutions
	- Determination of mercury emissions	Appendix A-8 Test method 29, 1 July 2018

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Physical Examination :-	
Water and Wastewater	- Conductivity	APHA 23e 2510 (EA010)
	- pH Value	APHA 23e 4500-H^+ B (EA002)
	- Solids-Total	In-house Method EA030 (Gravimetric)
	- Solids-Total Suspended	APHA 23e 2540D (EA025B) In-house Method EA025 (Gravimetric)
	- Solids-Total Dissolved	In-house Method EA015 (Gravimetric)
	- Solids-Fixed and Volatile	In-house Method EA035 (Gravimetric)
	- Settleable solids	APHA 23e 2540F (EA034B)
	- Volatile and Fixed Suspended Solids	APHA 23e 2540E (EA035A)
	- Turbidity	APHA 23e 2130 (EA045)
	- Hardness	APHA 22e 2340 (By calculation) (EA065)
Drinking Water	- Colour	ISO 7887:1994 Section 4 (EA041)
Water and Wastewater	- Acidity	APHA 23e 2310 A & B (ED038)
	- Alkalinity-Total	APHA 23e 2320 A & B (ED037)
	- Alkalinity-Bicarbonate	APHA 23e 2320 A & B (ED035)
	- Alkalinity-Carbonate	APHA 23e 2320 A & B (ED030)
	- Alkalinity-Hydroxide	APHA 23e 2320 A & B (ED025)
	Non-metallic Constituents :-	
	- Bromide	In-house method ED009 (Ion Chromatography)
	- Bromate	In-house method ED013 (Ion Chromatography)
	- Carbon-Total Inorganic	In-house Method EP006 (NDIR)
	- Chlorine-Total Residual	APHA 23e 4500-Cl G (EK010) In-house Method EK010C
	- Chlorine-Free Residual	In-house Method EK011 In-house Method EK011C

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Non-metallic Constituents :- (cont'd)	
Water and Wastewater (cont'd)	- Chloride	In-house Method ED045K (Discrete analyzer) In-house method ED009 (Ion Chromatography)
	- Chlorite	In-house method ED013 (Ion Chromatography)
	- Chlorate	In-house method ED013 (Ion Chromatography)
	- Cyanide-Total	In-house Method EK026FIA (FIA)
	- Cyanide-Free	In-house Method EK025A (FIA)
	- Fluoride	APHA 23e 4500 F^- A&C (EK040) In-house method ED009 (Ion Chromatography)
	- Nitrate	In-house method ED009 (Ion Chromatography)
	- Nitrogen-Total	In-house Method EK062A (FIA) In-house Method EK062P (Persulphate method)
	- Nitrogen-Total Kjeldahl	In-house Method EK061A (FIA) In-house Method EK061P (By Calculation)
	- Nitrogen- Total Inorganic	In-house Method EK063A (By Calculation)
	- Nitrogen-Ammonia	In-house Method EK055A (FIA) In-house Method EK055K (Discrete analyzer)
	- Nitrogen-Nitrate	In-house Method EK058A (FIA)
	- Nitrogen-Nitrate+Nitrite	In-house Method EK059A (FIA)
	- Nitrogen-Nitrite	In-house Method EK057A (FIA) In-house Method EK057K (Discrete analyzer)
	- Oxygen-Dissolved	In-house Method EP025 (Titrimetric)
	- Perchlorate	In-house method ED013 (Ion Chromatography)
	- Phosphorus-Reactive	In-house Method EK071A (FIA) In-house Method EK071K (Discrete analyzer)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Non-metallic Constituents :- (cont'd)	
Water and Wastewater (cont'd)	- Phosphorus-Total	In-house Method EK067A (FIA) In-house Method EK067P (Persulphate method)
	- Silica	In-house Method EK053K (Discrete analyzer)
	- Sulphate	In-house Method ED041K (Discrete analyzer) In-house method ED009 (Ion Chromatography)
	- Sulphide	APHA 23e 4500 S^{2-} D (with modification) (EK085)
	- Soluble sulphide	APHA 23e 4500-S^{2-}, B, C & D (EK085F)
	Trace Metals (Soluble): -	
Water and Wastewater	- Sample preparation procedure	In-house method E-filter
	- Hexavalent Chromium (Cr^{6+})	In House Method EG050 (Colorimetric)
	- Trivalent Chromium (Cr^{3+})	In house method EG049 (by calculation)
	Trace Metals (Soluble and total): -	
Water and Wastewater	- Digestion procedure	In House Method E-3005 In House Method E-filter
	- Aluminium, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Chromium, Cobalt, Copper, Gold, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Tungsten, Vanadium, Zinc	In House Method EG020 (ICP-MS)
	- Mercury	In-house Method EG038 (By mercury analyzer)
	- Calcium, Magnesium, Iron, Potassium, Sodium	In-house method EG032 (ICP-AES)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :	
Water and Wastewater	- Biochemical Oxygen Demand (BOD)	In-house Method EP030 (5-Day Electrode) BS EN 1899-1:1998 & BS 6068: Section 2.63:1998 (EP030BS)
	- Chemical Oxygen Demand (COD)	In-house Method EP026 (Open Reflux-Titrimetric) APHA 23e 5220C (EP026C)
	- Carbon-Total	In-house Method EP007 (NDIR)
	- Carbon-Total Organic	In-house Method EP005 (NDIR)
	- Nitrogen-Organic	In-house Method EK060A (By Calculation)
	- Oil and Grease	In-house Method EP020 (Gravimetric)
	- Phenols-Total	APHA 23e 5530 A, B & D (with modification) (EP035)
	- Surfactants-Non-ionic (as CTAS)	In-house Method EP041 (Colorimetric)
	- Surfactants-Anionic (as MBAS)	APHA 23e 5540 A&C (without sublation) (EP050)
	- Surfactants-Total (Anionic and Non-ionic)	In-house Method EP051 (By Calculation)
	- Total Petroleum Hydrocarbon	In-house Method EP015 (Gravimetric)
	- Volatile acids (as Acetic Acid)	In-house Method EP045 (By steam distillation)
Water and Wastewater	Biological Examination:	
	- Chlorophyll a	In House Method EP008F

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :-	
Drinking Water	2,4-Dichlorophenoxyacetic acid (2,4-D) (Free acid)	In-house method EP306 (LC/MS/MS)
Water and Wastewater	- Polychlorinated biphenyl congeners 2,4'-Dichlorobiphenyl (8) 2,2',5 - Trichlorobiphenyl (18) 2,4,4' - Trichlorobiphenyl (28) 2,2',3,5' - Tetrachlorobiphenyl (44) 2,2', 5,5' - Tetrachlorobiphenyl (52) 2,3',4,4'-Tetrachlorobiphenly (66) 3,3',4,4'-Tetrachlorobiphenly (77) 3,4,4',5-Tetrachlorobiphenyl (81) 2,2'4,5,5' - Pentachlorobiphenyl (101) 2,3,3',4,4' - Pentachlorobiphenyl (105) 2,3,4,4',5 –Pentachlorobiphenyl (114) 2,3'4,4',5 - Pentachlorobiphenyl (118) 2,3',4,4',5'-Pentachlorobiphenyl (123) 3,3',4,4',5 - Pentachlorobiphenyl (126) 2,2',3,3',4,4' - Hexachlorobiphenyl (128) 2,2',3,4,4',5' - Hexachlorobiphenyl (138) 2,2',3,4',5',6 - Hexachlorobiphenyl (149) 2,2',4,4',5,5' - Hexachlorobiphenyl (153) 2,3,3',4,4',5 - Hexachlorobiphenyl (156) 2,3,3',4,4',5' - Hexachlorobiphenyl (157) 2,3',4,4',5,5' - Hexachlorobiphenyl (167) 3,3',4,4',5,5'- Hexachlorobiphenyl (169) 2,2',3,3',4,4',5 - Heptachlorobiphenyl (170) 2,2',3,4,4',5,5' - Heptachlorobiphenyl (180) 2,2',3,4',5,5',6 - Heptachlorobiphenyl (187) 2,3,3',4,4',5,5'-Heptachlorobiphenyl (189) 2,2',3,3',4,4',5,6 - Octachlorobiphenyl (195) 2,2',3,3',4,4',5,5',6 - Nonachlorobiphenyl (206)	In house method EP065 (GC/MSD)
	- Total PCB	In House Method EP066 (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont' d)	
Water and Wastewater (cont'd)	- Phenols: Phenol 2-Chlorophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 2,4-Dimethylphenol 2,4-Dichlorophenol 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol Pentachlorophenol	In House Method EP075A (GC/MSD)
	- Polycyclic Aromatic Hydrocarbons: Naphthalene 2-Methylnaphthalene 2-Chloronaphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene N-2-Fluorenylacetamide Benz(a)anthracene Chrysene Benzo(b) & (k) fluoranthene 7,12-Dimethylbenz(a)anthracene Benzo(a)pyrene 3-Methylcholanthrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In House Method EP075B (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Phthalate Esters: Dimethyl phthalate Diethyl phthalate Di-n-butyl phthalate Buty benzyl phthalate Bis(2-ethylhexyl) phthalate Di-n-octyl phthalate	In House Method EP075C (GC/MSD)
	- Nitrosamines: N-Nitrosomethylethylamine N-Nitrosodiethylamine N-Nitrosopyrrolidine N-Nitrosomorpholine N-Nitrosodi-n-propylamine N-Nitrosopiperidine N-Nitrosodibutylamine Diphenylamine & N-Nitrosodiphenylamine Diallate Methapyrilene	In House Method EP075D (GC/MSD)
	- Nitroaromatics and Ketones: 2-Picoline Acetophenone Nitrobenzene Isophorone 2,6-Dinitrotoluene 2,4-Dinitrotoluene 1-Naphthylamine 4-Nitroquinoline-N-oxide 5-Nitro-o-toluidine Azobenzene 1,3,5-Trinitrobenzene Phenacetin 4-Aminobiphenyl Pentachloronitrobenzene Pronamide Dimethylaminoazobenzene Chlorobenzilate	In House Method EP075E (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Haloethers: Bis(2-chloroethyl) ether Bis(2-chloroethoxy) methane 4-Chlorophenyl phenyl ether 4-Bromophenyl phenyl ether	In House Method EP075F (GC/MSD)
	- Chlorinated Hydrocarbons: 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene Hexachloroethane 1,2,4-Trichlorobenzene Hexachloropropylene Hexachlorobutadiene Hexachlorocyclopentadiene Pentachlorobenzene Hexachlorobenzene	In House Method EP075G (GC/MSD)
	- Anilines and Benzidines: Aniline 4-Chloroaniline 2-Nitroaniline 3-Nitroaniline Dibenzofuran 4-Nitroaniline Carbazole 3,3'Dichlorobenzidine	In House Method EP075H (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Organochlorine Pesticides: alpha-BHC beta-BHC & gamma BHC delta-BHC Heptachlor Aldrin Heptachlor epoxide Endosulfan 1 p,p'-DDE Dieldrin Endrin Endosulfan 2 p,p'-DDD p,p'-DDT Endosulfan sulfate	In House Method EP075I (GC/MSD)
	- Organophosphorus Pesticides: Methanesulfonate methyl Methanesulfonate ethyl Dichlorvos cis-Isosafrole trans-Isosafrole Safrole Dimethoate Diazinon Chlorpyrifos methyl Malathion Fenthion Chlorpyrifos Pirimiphos ethyl Chlorfenvinphos-E Chlorfenvinphos-Z Prothiofos Ethion	In House Method EP075J (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Polycyclic Aromatic Hydrocarbons: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b) fluoranthene Benzo(k) fluoranthene Benzo(b)&(k) fluoranthene Benzo(a)pyrene Benzo(e)pyrene Perylene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In house method EP076HK (GC/MSD)
	- Phenol - Hexachlorobenzene - Bis-(2-ethylhexyl)phthalate	In house method EP076HK (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Organochlorine Pesticides: alpha-BHC beta-BHC delta BHC gamma-BHC Heptachlor Aldrin Heptachlor epoxide Endosulfan 1 p,p'DDE Dieldrin Endrin Endosulfan 2 p,p'DDD Endrin aldehyde Endosulfan sulfate p,p'DDT Endrin Ketone Methoxychlor Cypermethrins Cis-Chlordane Trans-Chlordane Hexachlorobenzene	In House Method EP067A (GC/MSD)
	- Organophosphous Pesticides: Dichlorvos Dimethoate Diazinon Chlorpyrifos methyl Parathion methyl Malathion Fenthion Chlorpyrifos Parathion Pirimiphos ethyl Bromophos ethyl Chlorfenvinphos E Chlorfenvinphos Z Fenamiphos Prothiofos Ethion Carbofenthion Azinphos methyl	In House Method EP067B (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Triazine Pesticides:	In House Method EP067C (GC/MSD)
	Simazine	
	Atrazine	
	- TPH:	
	C6-C9	In House Method EP071_SR
	C10-C14	(Purge and Trap GC/MSD and GC/FID)
	C15-C28	
	C29-C36	
	C6 - C8	In-house method EP071HK_SR
	C9 - C16	(Purge and Trap GC/MSD and GC/FID)
	C17 - C35	
	- Monocyclic Aromatics:	In House Method EP074_SR – A
	Benzene	(Purge and Trap GC/MSD)
	Toluene	
	Ethylbenzene	
	meta- & para-Xylene	
	Styrene	
	ortho-Xylene	
	Isopropylbenzene	
	n-Propylbenzene	
	1,3,5-Trimethylbenzene	
	sec-Butylbenzene	
	1,2,4-Trimethylbenzene	
	tert-Butylbenzene	
	p-Isopropyltoluene	
	n-Butylbenzene	
	Xylenes (Total)	In House Method EP074_SR – A (By calculation)
	- Oxygenated Compounds:	In House Method EP074_SR – B
	2-Propanone (Acetone)	(Purge and Trap GC/MSD)
	Vinyl acetate	
	2-Butanone (MEK)	
	4-Methyl-2-pentanone (MIBK)	
	2-Hexanone (MBK)	
	- Sulfonated Compounds:	In House Method EP074_SR – C
	Carbon disulfide	(Purge and Trap GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Fumigants: 2,2-Dichloropropane 1,2-Dichloropropane cis-1,3-Dichloropropylene trans-1,3-Dichloropropylene 1,2-Dibromoethane	In House Method EP074_SR – D (Purge and Trap GC/MSD)
	- Halogenated Aliphatics: 1,1-Dichloroethene Methylene chloride trans-1,2-Dichloroethylene 1,1-Dichloroethane cis-1,2-Dichloroethene 1,1,1-Trichloroethane 1,1-Dichloroethane Carbon tetrachloride 1,2-Dichloroethane Trichloroethene Dibromomethane 1,1,2-Trichloroethane 1,3-Dichloropropane Tetrachloroethene 1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	In House Method EP074_SR – E (Purge and Trap GC/MSD)
	- Halogenated Aromatics: Chlorobenzene Bromobenzene 2-Chlorotoluene 4-Chlorotoluene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene	In House Method EP074_SR – F (Purge and Trap GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Water and Wastewater (cont'd)	- Trihalomethanes: Chloroform Bromodichloromethane Dibromochloromethane Bromoform	In House Method EP074_SR – G (Purge and Trap GC/MSD)
	- Naphthalene	In House Method EP074_SR – H (Purge and Trap GC/MSD)
	- Methyl-tert-butyl ether (MTBE)	In House Method EP074_SR – I (Purge and Trap GC/MSD)
	- BTEX: Benzene Toluene Chlorobenzene Ethylbenzene meta- & para-Xylene ortho-Xylene	In House Method EP080_SR (Purge and Trap GC/MSD)
	- Tributyl tin	In House Method EP390 (By LC-MS/MS)
	- Tributyl tin in interstitial water	In House Method EP390 (By LC-MS/MS)
	- Triphenyl tin	In House Method EP390 (By LC-MS/MS)
	- Triphenyl tin in interstitial water	In House Method EP390 (By LC-MS/MS)
	- Total polychlorinated biphenyls	In House Method EP066_67 (PTV-GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Microbiological examinations:-	
Water and Wastewater and saline water	- *E. coli*	DoE (1983) The Bacteriological Examination of Drinking Water Supplies, 1982 Sections 7.8 and 7.9 (Membrane Filtration Procedure: Section 7.8, 7.9.4.2 Bacterial Confirmation: Section 7.9.4.4 and urease test (Appl. Environ. Microbiol. 29, p826-833) (EM002) DoE (1983) The Bacteriological Examination of Drinking Water Supplies, 1982 Sections 7.8 and 7.9 (Membrane Filtration Procedure: Section 7.8, 7.9.4.2) Bacterial Confirmation: urease test (Appl. Environ. Microbiol. 29, p826-833) (EM002a)
Water and Wastewater	- Total Coliform	DoE (1983) The Bacteriological Examination of Drinking Water Supplies, 1982 Sections 7.8 and 7.9 (Membrane Filtration Procedure: Section 7.8, 7.9.4.1 Bacterial Confirmation: Section 7.9.4.3) (EM003)
	- Faecal Coliform	DoE (1983) The Bacteriological Examination of Drinking Water Supplies, 1982 Sections 7.8 and 7.9 (Membrane Filtration Procedure: Section 7.8, 7.9.4.2 Bacterial Confirmation: Section 7.7.6.3) (EM004)
	- Heterotrophic plate count (Colony count at 35°C) (Colony count at 37°C)	APHA 23e 9215A & B (EM001)
	- Enumeration of *Enterococci*	United States Environmental Protection Agency Method 1600: Enterococci in water by membrane filtration using membrane Enterococcus Indoxyl-β-D-Glucoside Agar (mEI) (EM010)
	- *Pseudomonas aeruginosa*	ISO 16266:2006 (E) (Membrane filtration) (EM009) BS EN ISO 16266:2008 (EM009) (Membrane filtration)
	- *Staphylococcus aureus*	Health Protection Agency (2007) National Standard Method, W10, Issue 3.3 (Membrane filtration) (EM008)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Microbiological examinations:- (cont'd)	
Water and Wastewater and saline water	- *Vibrio cholerae*	Centres for Disease Control and Prevention - Laboratory Methods for Diagnosis of *Vibrio cholerae* Ch. V & VI (EM011) <***Ecluding the following***> Ch. VI, Part C, Part D, Part E
	- *Vibrio parahaemolyticus*	APHA 23e 9260 H (EM018a)
Water and wastewater (excluding drinking water)	- Enumeration of *E. coli*	Environmental Microbiology Laboratory Test Method Manual TM09/EC/10/98 Issue 3, Environmental Protection Department, HK (EM019)
	- Faecal Coliform	Environmental Microbiology Laboratory Test Method Manual TM09/EC/10/98 Issue 3, Environmental Protection Department, HK (EM022)
Saline water	- Enumeration of *E. coli*	Environmental Microbiology Laboratory Test Method Manual TM09/EC/10/98 Issue 3, Environmental Protection Department, HK (EM019)
	- Faecal Coliform	Environmental Microbiology Laboratory Test Method Manual TM09/EC/10/98 Issue 3, Environmental Protection Department, HK (EM022)
Drinking Water, Treated Bathing Water, Water for human use and consumption	- *Legionella spp.* including *Legionella pneumophila*	ISO 11731:2017 (EM016B)
Water and wastewater, Cooling tower water and surface swab samples	- *Legionella spp.* including *Legionella pneumophila*	ISO 11731:2017 (EM039)
Water, Wastewater, and Cooling Tower Water	- *Legionella spp.* including *Legionella pneumophila*	AS/NZS 3896:1998 (EM016)
Water and Wastewater and Cooling tower water	- *Legionella spp.* including *Legionella pneumophila*	AS 3896:2017 (EM016a)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Physical Examination:-	
Saline water	- Solids-Total Suspended	APHA 23e 2540D (EA025B) In-house Method EA025
	- Volatile and Fixed Suspended Solids	APHA23e 2540E (EA035A)
	Non-metallic Constituents :-	
	- Carbon-Total Inorganic	In-house Method EP006 (NDIR)
	- Nitrogen-Ammonia	In-house Method EK055A (FIA) In-house Method EK055K (Discrete analyzer)
	- Nitrogen-Nitrate	In-house Method EK058A (FIA)
	- Nitrogen-Nitrate+Nitrite	In-house Method EK059A (FIA)
	- Nitrogen-Nitrite	In-house Method EK057A (FIA) In-house Method EK057K (Discrete analyzer)
	- Nitrogen-Total	In-house Method EK062P (Persulphate method) In-house Method EK062A (By calculation)
	- Nitrogen-Total Inorganic	In-house Method EK063A (By calculation)
	- Nitrogen- Total Kjeldahl	In-house Method EK061A (FIA) In-house method EK061P (By calculation)
	- Phosphorus-Reactive	In-house Method EK071A (FIA) In-house Method EK071K (Discrete analyzer)
	- Phosphorus-Total	In-house Method EK067A (FIA) In-house Method EK067P (Persulphate method)
	- Silica	In-house Method EK053K (Discrete analyzer)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Saline water (cont'd)	Trace metals (soluble and total):-	
	- Digestion procedure	In-house method E-filter In-house method E-3005
	- Arsenic, Aluminium, Antimony, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Silver, Thallium, Tin, Selenium, Vanadium, Zinc	In-house method EG029 (ICP-MS – He mode)
	- Mercury	In-house Method EG038 (By mercury analyzer)
	Organic Pollutants :-	
	- Carbon-Total	In-house Method EP007 (NDIR)
	- Carbon-Total Organic	In-house Method EP005 (NDIR)
	- Total polychlorinated biphenyls	In House Method EP066_67 (PTV-GC/MSD)
	- Organochlorine Pesticides: alpha-BHC beta-BHC delta BHC gamma-BHC Heptachlor Aldrin Heptachlor epoxide Endosulfan 1 p,p'DDE Dieldrin Endrin Endosulfan 2 p,p'DDD Endrin aldehyde Endosulfan sulfate p,p'DDT Endrin Ketone Methoxychlor Cypermethrins Cis-Chlordane Trans-Chlordane Hexachlorobenzene	In House Method EP067A (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Saline water (cont'd)	- Organophosphous Pesticides: Dichlorvos Dimethoate Diazinon Chlorpyrifos methyl Parathion methyl Malathion Fenthion Chlorpyrifos Parathion Pirimiphos ethyl Bromophos ethyl Chlorfenvinphos E Chlorfenvinphos Z Fenamiphos Prothiofos Ethion Carbofenthion Azinphos methyl	In House Method EP067B (GC/MSD)
	- Triazine Pesticides: Simazine Atrazine	In House Method EP067C (GC/MSD)
	- TPH: C6-C9 C10-C14 C15-C28 C29-C36	In House Method EP071_SR (Purge and Trap GC/MSD and GC/FID)
	C6 - C8 C9 - C16 C17 - C35	In-house method EP071HK_SR (Purge and Trap GC/MSD and GC/FID)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont' d)	
Saline water (cont'd)	- Phenols: Phenol 2-Chlorophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 2,4-Dimethylphenol 2,4-Dichlorophenol 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol Pentachlorophenol	In House Method EP075A (GC/MSD)
	- Polycyclic Aromatic Hydrocarbons: Naphthalene 2-Methylnaphthalene 2-Chloronaphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene N-2-Fluorenylacetamide Benz(a)anthracene Chrysene Benzo(b) & (k) fluoranthene 7,12-Dimethylbenz(a)anthracene Benzo(a)pyrene 3-Methylcholanthrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In House Method EP075B (GC/MSD)
	- Phthalate Esters: Dimethyl phthalate Diethyl phthalate Di-n-butyl phthalate Buty benzyl phthalate Bis(2-ethylhexyl) phthalate Di-n-octyl phthalate	In House Method EP075C (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Saline water (cont'd)	- Nitrosamines: N-Nitrosomethylethylamine N-Nitrosodiethylamine N-Nitrosopyrrolidine N-Nitrosomorpholine N-Nitrosodi-n-propylamine N-Nitrosopiperidine N-Nitrosodibutylamine Diphenylamine & N-Nitrosodiphenylamine Diallate Methapyrilene	In House Method EP075D (GC/MSD)
	- Nitroaromatics and Ketones: 2-Picoline Acetophenone Nitrobenzene Isophorone 2,6-Dinitrotoluene 2,4-Dinitrotoluene 1-Naphthylamine 4-Nitroquinoline-N-oxide 5-Nitro-o-toluidine Azobenzene 1,3,5-Trinitrobenzene Phenacetin 4-Aminobiphenyl Pentachloronitrobenzene Pronamide Dimethylaminoazobenzene Chlorobenzilate	In House Method EP075E (GC/MSD)
	- Haloethers: Bis(2-chloroethyl) ether Bis(2-chloroethoxy) methane 4-Chlorophenyl phenyl ether 4-Bromophenyl phenyl ether	In House Method EP075F (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Saline water (cont'd)	- Chlorinated Hydrocarbons: 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene Hexachloroethane 1,2,4-Trichlorobenzene Hexachloropropylene Hexachlorobutadiene Hexachlorocyclopentadiene Pentachlorobenzene Hexachlorobenzene	In House Method EP075G (GC/MSD)
	- Anilines and Benzidines: Aniline 4-Chloroaniline 2-Nitroaniline 3-Nitroaniline Dibenzofuran 4-Nitroaniline Carbazole 3,3'Dichlorobenzidine	In House Method EP075H (GC/MSD)
	- Organochlorine Pesticides: alpha-BHC beta-BHC & gamma BHC delta-BHC Heptachlor Aldrin Heptachlor epoxide Endosulfan 1 p,p'-DDE Dieldrin Endrin Endosulfan 2 p,p'-DDD p,p'-DDT Endosulfan sulfate	In House Method EP075I (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Saline water (cont'd)	- Organophosphorus Pesticides: Methanesulfonate methyl Methanesulfonate ethyl Dichlorvos cis-Isosafrole trans-Isosafrole Safrole Dimethoate Diazinon Chlorpyrifos methyl Malathion Fenthion Chlorpyrifos Pirimiphos ethyl Chlorfenvinphos-E Chlorfenvinphos-Z Prothiofos Ethion	In House Method EP075J (GC/MSD)
	- Polycyclic Aromatic Hydrocarbons: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b) fluoranthene Benzo(k) fluoranthene Benzo(b)&(k) fluoranthene Benzo(a)pyrene Benzo(e)pyrene Perylene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In house method EP076HK (GC/MSD)
	- Phenol - Hexachlorobenzene - Bis-(2-ethylhexyl)phthalate	In house method EP076HK (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Saline water (cont'd)	- Polychlorinated biphenyl congeners 2,4'-Dichlorobiphenyl (8) 2,2',5 - Trichlorobiphenyl (18) 2,4,4' - Trichlorobiphenyl (28) 2,2',3,5' - Tetrachlorobiphenyl (44) 2,2', 5,5' - Tetrachlorobiphenyl (52) 2,3',4,4'-Tetrachlorobiphenly (66) 3,3',4,4'-Tetrachlorobiphenly (77) 3,4,4',5-Tetrachlorobiphenyl (81) 2,2'4,5,5' - Pentachlorobiphenyl (101) 2,3,3',4,4' - Pentachlorobiphenyl (105) 2,3,4,4',5 –Pentachlorobiphenyl (114) 2,3'4,4',5 - Pentachlorobiphenyl (118) 2,3',4,4',5'-Pentachlorobiphenyl (123) 3,3',4,4',5 - Pentachlorophenyl (126) 2,2',3,3',4,4' - Hexachlorobiphenyl (128) 2,2',3,4,4',5' - Hexachlorobiphenyl (138) 2,2',3,4',5',6 - Hexachlorobiphenyl (149) 2,2',4,4',5,5' - Hexachlorobiphenyl (153) 2,3,3',4,4',5 - Hexachlorobiphenyl (156) 2,3,3',4,4',5' - Hexachlorobiphenyl (157) 2,3',4,4',5,5' - Hexachlorobiphenyl (167) 3,3',4,4',5,5'- Hexachlorobiphenyl (169) 2,2',3,3',4,4',5 - Heptachlorobiphenyl (170) 2,2',3,4,4',5,5' - Heptachlorobiphenyl (180) 2,2',3,4',5,5',6 - Heptachlorobiphenyl (187) 2,3,3',4,4',5,5'-Heptachlorobiphenyl (189) 2,2',3,3',4,4',5,6 - Octachlorobiphenyl (195) 2,2',3,3',4,4',5,5',6 - Nonachlorobiphenyl (206)	In house method EP065 (GC/MSD)
	- Tributyl tin	In-house Method EP390 (By LC-MS/MS)
	- Tributyl tin in interstitial water	In-house Method EP390 (By LC-MS/MS)
	-Triphenyl tin	In-house Method EP390 (By LC-MS/MS)
	-Triphenyl tin in interstitial water	In-house Method EP390 (By LC-MS/MS)
Marine water	Biological Examination:	
	- Chlorophyll a	In House Method EP008F

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Sediment and Soil	Trace Metals (Acid Leachable):	
	- Hexavalent Chromium Cr (VI)	In House Method EG3060 (ICP-MS)
	- Trivalent Chromium Cr (III)	In house method EG049 (by calculation)
	- Digestion procedure	In House Method E-ASTM D3974-09 (hydrochloric/nitric acid)
	- Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, Zinc, Mercury	In House Method EG020 (ICP-MS)
	- Digestion procedure	In House Method E-3051A (microwave)
	- Antimony, Arsenic, Barium, Beryllium, Bismuth, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Vanadium, Zinc, Mercury	In House Method EG020 (ICP-MS)
	- Digestion procedure	In House Method E-ASTM D3974-09 (hydrochloric/nitric acid)
	- Calcium, Iron, Magnesium, Potassium, Sodium	In House Method EG032 (ICP-AES)
	- Digestion procedure	In House Method E-ASTM D3974-09 (hydrochloric/nitric acid) In House Method E-3051A (microwave)
	- Mercury	In House Method EG036 (Cold vapour)
Sand	Trace Metals (Acid Leachable):	
	- Digestion procedure	In House Method E-ASTM(Sand) (hydrochloric/nitric acid)
	- Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Mercury Selenium, Silver, Thallium, Tin, Zinc	In House Method EG020 (ICP-MS)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Sediment and soil, ash, cement and the mixture of the above	TCLP Metals : (Toxicity Characteristic Leaching Procedures)	
	- Extraction procedure	USEPA SW-846 Method 1311 (E-TCLP)
	- Beryllium, Vanadium, Chromium, Copper, Manganese, Cobalt, Nickel, Cadmium, Zinc, Arsenic, Molybdenum, Selenium, Barium, Thallium, Lead, Silver, Tin, Antimony	In House Method EG020 (ICP-MS)
	- Mercury	In House Method EG036 (Cold vapour)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Physical Examination :	
Sediment and Soil	- Moisture (103 °C – 105 °C)	In-house Method EA055 (Gravimetric)
	- Solids-Total (103 °C – 105 °C)	In-house Method EA030A (Gravimetric)
Soil	- 1:5 Soil: Water Extraction Procedure	In-house method E-1:5P
	pH Value of 1:5 soil / water extract	In-house method EA002SOIL
	Conductivity of 1:5 soil /water extract	In-house method EA010SOIL
	Non-metallic Constituents:-	
Sediment and Soil	- Cyanide-Total	In-house Method EK026FIA (FIA)
	- Cyanide- Free	In-house Method EK025MD/EK026A (Colorimetric)
	- Carbon-Total Inorganic	In-house Method EP006 (NDIR)
Sediments	- Acid Volatile Sulphide	USEPA 821/R-91-100 (EK082)
Soil	- Nitrogen-Total Kjeldahl	In-house Method EK061A (FIA)
	- Total Phosphorus	In-house method EK067A
	Non-metallic Constituents (extractable): -	
	- 1:5 Solid: KCl solution Extraction Procedure	In-house method E-1:5 KCl PR
	- Nitrogen-Ammonia	In-house Method EK055S (Discrete analyser)
	- Nitrogen-Nitrate+Nitrite	In-house Method EK059A (FIA)
	- Nitrogen-Nitrate	In-house Method EK058A (FIA)
	- Nitrogen-Nitrite	In-house Method EK057A (FIA)
	Organic Pollutants :-	
Sediment and Soil	- Carbon-Total	In-house Method EP007 (NDIR)
	- Carbon-Total Organic	In-house Method EP005 (NDIR) In-house Method EP009 (Acid pre-treatment)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Polycyclic Aromatic Hydrocarbons: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b)&(k) fluoranthene Benzo(a)pyrene Benzo(e)pyrene Perylene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In House Method EP076 (GC/MSD)
	- Polycyclic Aromatic Hydrocarbons Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b)&(k) fluoranthene Benzo(b) fluoranthene Benzo(k) fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In house method EP076HK (GC/MSD)
	- Phenol, Hexachlorobenzene, Bis-(2-ethylhexyl)phthalate	In house method EP076HK (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Phenols: Phenol 2-Chlorophenol 2-Methylphenol 4-Methylphenol 2-Nitrophenol 2,4-Dimethylphenol 2,4-Dichlorophenol 4-Chloro-3-methylphenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol Pentachlorophenol	In House Method EP075A (GC/MSD)
	- Polycyclic Aromatic Hydrocarbons: Naphthalene 2-Methylnaphthalene 2-Chloronaphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene N-2-Fluorenylacetamide Benz(a)anthracene Chrysene Benzo(b)&(k) fluoranthene 7,12-Dimethylbenz(a)anthracene Benzo(a)pyrene 3-Methylcholanthrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In House Method EP075B (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Phthalate Esters: Dimethyl phthalate Diethyl phthalate Di-n-butyl phthalate Butyl benzyl phthalate Bis(2-ethylhexyl) phthalate Di-n-octyl phthalate	In House Method EP075C (GC/MSD)
	- Nitrosamines: N-Nitrosomethylethylamine N-Nitrosodiethylamine N-Nitrosopyrrolidine N-Nitrosomorpholine N-Nitrosodi-n-propylamine N-Nitrosopiperidine N-Nitrosodibutylamine Diphenylamine & N-Nitrosodiphenylamine Diallate Methapyrilene	In House Method EP075D (GC/MSD)
	- Nitroaromatics and Ketones: 2-Picoline Acetophenone Nitrobenzene Isophorone 2,6-Dinitrotoluene 2,4-Dinitrotoluene 1-Naphthylamine 4-Nitroquinoline-N-oxide 5-Nitro-o-toluidine Azobenzene 1,3,5-Trinitrobenzene Phenacetin 4-Aminobiphenyl Pentachloronitrobenzene Pronamide Dimethylaminoazobenzene Chlorobenzilate	In House Method EP075E (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Haloethers: Bis(2-chloroethyl) ether Bis(2-chloroethoxy) methane 4-Chlorophenyl phenyl ether 4-Bromophenyl phenyl ether	In House Method EP075F (GC/MSD)
	- Chlorinated Hydrocarbons: 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene Hexachloroethane 1,2,4-Trichlorobenzene Hexachloropropylene Hexachlorobutadiene Hexachlorocyclopentadiene Pentachlorobenzene Hexachlorobenzene	In House Method EP075G (GC/MSD)
	- Anilines and Benzidines: Aniline 4-Chloroaniline 2-Nitroaniline 3-Nitroaniline Dibenzofuran 4-Nitroaniline Carbazole 3,3'Dichlorobenzidine	In House Method EP075H (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Organochlorine Pesticides: alpha-BHC beta-BHC & gamma-BHC delta-BHC Heptachlor Aldrin Heptachlor epoxide Endosulfan 1 p,p'-DDE Dieldrin Endrin Endosulfan 2 p,p'-DDD Endosulfan sulfate p,p'-DDT	In House Method EP075I (GC/MSD)
	- Organophosphorus Pesticides: Methanesulfonate methyl Methanesulfonate ethyl Dichlorvos cis-Isosafrole trans-Isosafrole Safrole Dimethoate Diazinon Chlorpyrifos methyl Malathion Fenthion Chlorpyrifos Pirimiphos ethyl Chlorfenvinphos-E Chlorfenvinphos-Z Prothiofos Ethion	In House Method EP075J (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Sediment and Soil (cont'd)	Organic Pollutants :- (cont'd)	
	- Organochlorine Pesticides p,p'-DDE p,p'-DDD o,p'-DDT p,p'-DDT	In House Method EP066_67 (PTV-GC/MSD)
	- Total polychlorinated biphenyls	In House Method EP066 (GC/MSD) In House Method EP066_67 (PTV-GC/MSD)
	- Polychlorinated biphenyl congeners: 2,4'-Dichlorobiphenyl (8) 2,2'5 - Trichlorobiphenyl (18) 2,4,4' - Trichlorobiphenyl (28) 2,2',3,5' - Tetrachlorobiphenyl (44) 2,2', 5,5' - Tetrachlorobiphenyl (52) 2,3',4,4'-Tetrachlorobiphenly (66) 3,3',4,4'-Tetrachlorobiphenly (77) 2,2'4,5,5' - Pentachlorobiphenyl (101) 2,3,3'4,4' - Pentachlorobiphenyl (105) 2,3'4,4',5 - Pentachlorobiphenyl (118) 3,3',4,4',5-Pentachlorophenyl (126) 2,2',3,3',4,4' - Hexachlorobiphenyl (128) 2,2',3,4,4',5' - Hexachlorobiphenyl (138) 2,2',3,4',5',6-Hexachlorobiphenyl (149) 2,2',4,4',5,5' - Hexachlorobiphenyl (153) 2,3,3',4,4',5 - Hexachlorobiphenyl (156) 3,3',4,4',5,5'-Hexachlorobiphenyl (169) 2,2',3,3',4,4'5 - Heptachlorobiphenyl (170) 2,2',3,4,4',5,5' - Heptachlorobiphenyl (180) 2,2',3,4',5,5',6-Heptachlorobiphenyl (187) 2,2',3,3',4,4',5,6-Octachlorobiphenyl (195) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (206)	In house method EP065 (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Sediment and Soil (cont'd)	Organic Pollutants :- (cont'd)	
	- TPH: C6-C9 C10-C14 C15-C28 C29-C36	In House Method EP071_SR (Purge and Trap GC/MSD and GC/FID)
	C6 - C8 C9 - C16 C17 - C35	In-house method EP071HK_SR (Purge and Trap GC/MSD and GC/FID)
	- Monocyclic Aromatics: Benzene Toluene Ethylbenzene meta- & para-Xylene Styrene ortho-Xylene Isopropylbenzene n-Propylbenzene 1,3,5-Trimethylbenzene sec-Butylbenzene 1,2,4-Trimethylbenzene tert-Butylbenzene p-Isopropyltoluene n-Butylbenzene	In House Method EP074_SR – A (Purge and Trap GC/MSD)
	Xylenes (Total)	In House Method EP074_SR – A (Purge and Trap GC/MSD) (By calculation)
	- Oxygenated Compounds: 2-Propanone (Acetone) Vinyl acetate 2-Butanone (MEK) 4-Methyl-2-pentanone (MIBK) 2-Hexanone (MBK)	In House Method EP074_SR – B (Purge and Trap GC/MSD)
	- Sulfonated Compounds: Carbon disulfide	In House Method EP074_SR – C (Purge and Trap GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Fumigants: 2,2-Dichloropropane 1,2-Dichloropropane cis-1,3-Dichloropropylene trans-1,3-Dichloropropylene 1,2-Dibromoethane	In House Method EP074_SR – D (Purge and Trap GC/MSD)
	- Halogenated Aliphatics: 1,1-Dichloroethene Methylene chloride trans-1,2-Dichloroethylene 1,1-Dichloroethane cis-1,2-Dichloroethene 1,1,1-Trichloroethane 1,1-Dichloroethane Carbon tetrachloride 1,2-Dichloroethane Trichloroethene Dibromomethane 1,1,2-Trichloroethane 1,3-Dichloropropane Tetrachloroethene 1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	In House Method EP074_SR – E (Purge and Trap GC/MSD)
	- Halogenated Aromatics: Chlorobenzene Bromobenzene 2-Chlorotoluene 4-Chlorotoluene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene	In House Method EP074_SR – F (Purge and Trap GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Trihalomethanes: Chloroform Bromodichloromethane Dibromochloromethane Bromoform	In House Method EP074_SR – G (Purge and Trap GC/MSD)
	- Naphthalene	In House Method EP074_SR – H (Purge and Trap GC/MSD)
	- Methyl-tert-butyl ether (MTBE)	In House Method EP074_SR – I (Purge and Trap GC/MSD)
	- BTEX: Benzene Toluene Chlorobenzene Ethylbenzene meta- & para-Xylene ortho-Xylene	In House Method EP080_SR (Purge and Trap GC/MSD)
	- Organochlorine Pesticides alpha-BHC beta-BHC delta BHC gamma-BHC Heptachlor Aldrin Heptachlor epoxide Endosulfan 1 p,p'DDE Dieldrin Endrin Endosulfan 2 p,p'DDD Endrin aldehyde Endosulfan sulfate p,p'DDT Endrin Ketone Methoxychlor Cypermethrins Cis-Chlordane Trans-Chlordane Hexachlorobenzene	In House Method EP067A (GC/MSD)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Organic Pollutants :- (cont'd)	
Sediment and Soil (cont'd)	- Organophosphous Pesticides: Dichlorvos Monocrotophos Dimethoate Diazinon Chlorpyrifos methyl Parathion methyl Malathion Fenthion Chlorpyrifos Parathion Pirimiphos ethyl Bromophos ethyl Chlorfenvinphos E Chlorfenvinphos Z Fenamiphos Prothiofos Ethion Carbofenthion Azinphos methyl	In House Method EP067B (GC/MSD)
	- Triazine Pesticides: Simazine Atrazine	In House Method EP067C (GC/MSD)
	- Tributyl tin	In-house Method EP390 (By LC-MS/MS)
	- Tributyl tin oxide	In-house Method EP390 (By calculation)
	-Triphenyl tin	In-house Method EP390 (By LC-MS/MS)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Toxicity Tests :-	
Sediments	10-D Amphipod Survival Test - Leptocheirus plumulosus	USEPA 600/R-94/025 June 1994 Test Method 100.4 (ET001)
	20-D Polychaete Growth and Survival Test – *Neanthes arenaceodentata*	Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, PSEP, July 1995 (ET002)
	48-60 Hour Bivalve Larvae Survival and Normality Test – *Crassostrea gigas*	Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments, PSEP, July 1995 (ET012)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Trace Metals :-	
Biota	Digestion procedure	In House Method E-BIOTA (Microwave)
	Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Silver, Zinc, Mercury	In House Method EG020 (ICP-MS)
	Organic Pollutants :-	
	- Polycyclic Aromatic Hydrocarbons: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b)&(k) fluoranthene Benzo(a)pyrene Benzo(e)pyrene Perylene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	In House Method EP076 (GC/MSD)
	- Organochlorine Pesticides: p,p'-DDE p,p'-DDD o,p'-DDT p,p'-DDT	In House Method EP066_67 (PTV-GC/MSD)
	- Total polychlorinated biphenyls	In House Method EP066_67 (PTV-GC/MSD)
	- Tributyl tin	In-house Method EP390 (By LC-MS/MS)
	- Triphenyl tin	In-house Method EP390 (By LC-MS/MS)

ALS Technichem (HK) Pty Limited

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街 1-3 號忠信針織中心 11 樓

Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Biota (cont'd)	Organic Pollutants :- (cont'd) - Polychlorinated biphenyl congeners 2,4'-Dichlorobiphenyl (8) 2,2',5 - Trichlorobiphenyl (18) 2,4,4' - Trichlorobiphenyl (28) 2,2',3,5' - Tetrachlorobiphenyl (44) 2,2', 5,5' - Tetrachlorobiphenyl (52) 2,3',4,4'-Tetrachlorobiphenly (66) 3,3',4,4'-Tetrachlorobiphenly (77) 3,4,4',5-Tetrachlorobiphenyl (81) 2,2'4,5,5' - Pentachlorobiphenyl (101) 2,3,3',4,4' - Pentachlorobiphenyl (105) 2,3,4,4',5 –Pentachlorobiphenyl (114) 2,3'4,4',5 - Pentachlorobiphenyl (118) 2,3',4,4',5'-Pentachlorobiphenyl (123) 3,3',4,4',5 - Pentachlorophenyl (126) 2,2',3,3',4,4' - Hexachlorobiphenyl (128) 2,2',3,4,4',5' - Hexachlorobiphenyl (138) 2,2',3,4',5',6 - Hexachlorobiphenyl (149) 2,2',4,4',5,5' - Hexachlorobiphenyl (153) 2,3,3',4,4',5 - Hexachlorobiphenyl (156) 2,3,3',4,4',5' - Hexachlorobiphenyl (157) 2,3',4,4',5,5' - Hexachlorobiphenyl (167) 3,3',4,4',5,5'- Hexachlorobiphenyl (169) 2,2',3,3',4,4',5 - Heptachlorobiphenyl (170) 2,2',3,4,4',5,5' - Heptachlorobiphenyl (180) 2,2',3,4',5,5',6 - Heptachlorobiphenyl (187) 2,3,3',4,4',5,5'-Heptachlorobiphenyl (189) 2,2',3,3',4,4',5,6 - Octachlorobiphenyl (195) 2,2',3,3',4,4',5,5',6 - Nonachlorobiphenyl (206)	In house method EP065 (GC/MSD)

Appendix C

Drillhole Records

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD
CONTRACT No. 1632

DRILLHOLE No. **KSR-EDH(S)01**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR23	E 824 811.73 N 832 589.55	DATE from 14/07/2022 to 14/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +5.22 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.T. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
14/07/2022	PW									A 0.45–0.50 B 0.95–1.00 C 1.45–1.50 D 1.95–2.00 E 2.45–2.50	+2.72	2.50			Greyish brown, medium to coarse SAND. (FILL)
				89					26 bls	1 2.95–3.00					Grey, slightly silty medium to coarse SAND with occasional subangular fine quartz gravels. (ALLUVIUM)
				56					27 bls	3 3.45–3.50	+1.72	3.50			
				89					28 bls	5 3.95–4.00				V	Extremely weak, red spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Stiff, slightly sandy clayey SILT)
14/07/2022	4.50 PW			89					36 bls	7 4.45–4.50	+0.72	4.50			End of drillhole at 4.50m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
15/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
16/07/2022

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **KSR-EDH(S)02**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR15	E 824 895.98 N 832 483.12	DATE from 16/06/2022 to 18/06/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +5.60 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
16/06/2022	PW	Dry at 18:00 (16/06/2022)								INSPECTION PIT A 0.45–0.50; B 0.95–1.00; C 1.45–1.50; D 1.95–2.00; E 2.45–2.50					Greyish brown, silty medium to coarse SAND with occasional angular medium to coarse gravel sized rock fragments. (FILL)
17/06/2022		Dry at 08:00		0					74 bls	1 2.95–3.00	+2.60	3.00			Light grey, angular coarse GRAVEL sized moderately strong quartz. (FILL)
				89					42 bls	2 3.45–3.50	+2.10	3.50			Grey, coarse SAND with some subangular fine to medium quartz gravels. (ALLUVIUM)
				0					28 bls	3 3.95–4.00					Grey and white, subangular coarse GRAVEL sized moderately strong granite and quartz. (ALLUVIUM)
				0					39 bls	4 4.45–4.50	+1.10	4.50			
				0					39 bls	5 4.95–5.00					Light greyish brown, coarse SAND with some subangular fine to medium quartz gravels. (ALLUVIUM)
17/06/2022		Dry at 18:00 (17/06/2022)		44					48 bls	6 5.45–5.50	+0.10	5.50			
18/06/2022		Dry at 08:00		0					85 bls	7 5.95–6.00					Milky white and brown, subrounded to rounded coarse GRAVEL sized moderately strong quartz. (ALLUVIUM)
				89					102 bls	8 6.45–6.50					
				0					61 bls	9 6.95–7.00	-1.40	7.00			
				89					51 bls	10 7.45–7.50	-1.90	7.50			Olive, sandy clayey SILT. (RESIDUAL SOIL)
				89					79 bls	11 7.95–8.00				V	Extremely weak, yellowish RED spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Stiff, sandy clayey SILT)
18/06/2022	8.50 PW	Dry at 18:00 (18/06/2022)		89					86 bls	12 8.45–8.50	-2.90	8.50			
															End of drillhole at 8.50m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
20/06/2022

CHECKED BY
DESMOND CHEUNG

DATE
21/06/2022

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **KSR-EDH(S)03**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR15	E 824 920.00 N 832 445.26	DATE from 29/06/2022 to 30/06/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +5.78 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
29/06/2022	PW														Light brown, medium to coarse SAND with occasional angular coarse gravel sized tuff and concrete fragments. (FILL)
										A 0.45 0.50					
										B 0.95 1.00	+4.78	1.00			1.00- 1.50m: Coarse gravel sized granodiorite. (FILL)
										C 1.45 1.50	+4.28	1.50			
										D 1.95 2.00					
										E 2.45 2.50	+3.28	2.50			2.50- 3.00m: Coarse gravel sized concrete. (FILL)
				0					28 blows	1 2.95 3.00	+2.78	3.00			
		Dry at 18:00		89					43 blows	2 3.45 3.50					
29/06/2022															
30/06/2022		Dry at 08:00		0					44 blows	3 3.95 4.00	+1.78	4.00			
				0					59 blows	4 4.45 4.50	+1.28	4.50			4.00- 4.50m: Coarse gravel sized granodiorite. (FILL)
				78					77 blows	5 4.95 5.00	+0.78	5.00			Olive grey, slightly silty medium to coarse SAND with some subrounded to rounded moderately strong tuff and quartz. (ALLUVIUM)
				89					65 blows	6 5.45 5.50					Light yellowish brown, medium to coarse SAND with occasional rounded coarse gravel sized quartz. (ALLUVIUM)
				89					55 blows	7 5.95 6.00					
				67					61 blows	8 6.45 6.50	-0.72	6.50			
				0					94 blows	9 6.95 7.00					Milky white and dark grey, subangular and subrounded medium to coarse GRAVEL sized tuff and quartz. (ALLUVIUM)
				0					83 blows	10 7.45 7.50					
				0					77 blows	11 7.95 8.00					
				89					65 blows	12 8.45 8.50	-2.72	8.50			
				67					119 blows	13 8.95 9.00				V	Extremely weak, light yellowish brown spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Stiff, sandy clayey SILT)
		Dry at 18:00		89					78 blows	14 9.45 9.50	-3.72	9.50			
30/06/2022	9.50 PW														End of drillhole at 9.50m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
04/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
05/07/2022

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **KSR-EDH(S)04**

SHEET 1 of 2

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR15	E 824 969.88 N 832 312.17	DATE from 18/07/2022 to 19/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +6.52 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
18/07/2022	PW									INSPECTION PIT A 0.45 0.50					Greyish brown, medium to coarse SAND with occasional angular fine to medium gravel sized rock fragments. (FILL)
										B 0.95 1.00					
										C 1.45 1.50					
										D 1.95 2.00					
										E 2.45 2.50	+4.02	2.50			
				89					34 bls	1					Grey dappled yellowish brown, fine to medium SAND. (ALLUVIUM)
				89					60 bls	2 2.95 3.00					
										3					
				89					51 bls	4 3.45 3.50					
18/07/2022										5					
19/07/2022										6 3.95 4.00	+2.52	4.00			
				0					39 bls	7 4.45 4.50					Grey, medium to coarse SAND with some subrounded coarse gravel sized moderately strong quartz and tuff. (ALLUVIUM)
				89					42 bls	8					
										9 4.95 5.00	+1.52	5.00			
				0					48 bls						Yellowish brown, sandy subrounded coarse GRAVEL sized moderately strong quartz and tuff. (ALLUVIUM)
				0					57 bls	10 5.45 5.50					
										11 5.95 6.00	+0.52	6.00			
				44					44 bls	12					Dark grey, sandy subrounded medium to coarse GRAVEL sized moderately strong quartz and tuff. (ALLUVIUM)
				0					54 bls	13 6.45 6.50					
										14 6.95 7.00					
				67					66 bls	15					
										16 7.45 7.50	-0.98	7.50			Yellowish brown, medium to coarse SAND. (ALLUVIUM)
				0					58 bls	17 7.95 8.00	-1.48	8.00			Milky white, sandy subrounded medium to coarse GRAVEL sized moderately strong quartz. (ALLUVIUM)
				0					116 bls	18 8.45 8.50					
				0					146 bls	19 8.95 9.00	-2.48	9.00			
				66					47 bls	20					Extremely weak, light yellowish brown striped black, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Stiff, slightly sandy clayey SILT)
										21 9.45 9.50				V	
19/07/2022	10.00 PW			89					40 bls	22 9.95	-3.48	10.00			

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
20/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
21/07/2022

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **KSR-EDH(S)04**

SHEET 2 of 2

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR15	E 824 969.88 N 832 312.17	DATE from 18/07/2022 to 19/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +6.52 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
										23 10.00					End of drillhole at 10.00m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY BARRY YIU

DATE 20/07/2022

CHECKED BY DESMOND CHEUNG

DATE 21/07/2022

REMARKS

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD
CONTRACT No. 1632

DRILLHOLE No. **KSR-EDH(S)05**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. ML-2	E 825 008.82 N 832 202.31	DATE from 09/09/2022 to 13/09/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +7.26 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.T./ Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
09/09/2022	PW									A 0.45 0.50					Greyish brown, sandy clayey SILT with occasional angular fine to medium gravel. (FILL)
										B 0.95 1.00					
										C 1.45 1.50	+5.76	1.50			Yellowish brown, medium to coarse SAND. (FILL)
										D 1.95 2.00					
										E 2.45 2.50					
				89					39 bls	1 2 2.95 3.00	+4.26	3.00			Light grey to grey, medium to coarse SAND. (ALLUVIUM)
				89					45 bls	3 4 3.45 3.50					
				100					44 bls	5 6 3.95 4.00					
				89					47 bls	7 8 4.45 4.50					
				100					42 bls	9 10 4.95 5.00					
				89					40 bls	11 12 5.45 5.50					
				89					50 bls	13 14 5.95 6.00					
				89					55 bls	15 16 6.45 6.50					
09/09/2022		2.50m at 18:00													
13/09/2022		2.80m at 08:00		0					58 bls	17 18 6.95	+0.26	7.00			
13/09/2022	7.05 PW									19 7.00 7.05	+0.21	7.05		IV	Weak, yellowish brown, highly decomposed lapilli-bearing coarse ash crystal TUFF. (Medium to coarse GRAVEL sized rock fragments)
															End of drillhole at 7.05m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
14/09/2022

CHECKED BY
DESMOND CHEUNG

DATE
15/09/2022

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **KSR-EDH(S)06**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR17	E 825 018.93 N 832 132.50	DATE from 22/07/2022 to 25/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +7.25 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
22/07/2022	PW														Greyish brown, sandy medium to coarse GRAVEL sized strong granite and tuff. (FILL)
										A 0.45 0.50					
										B 0.95 1.00	+6.25	1.00			Yellowish brown, medium to coarse SAND. (FILL)
										C 1.45 1.50					
										D 1.95 2.00					
		0.50m at 18:00								E 2.45 2.50					
22/07/2022										F 2.95 3.00	+4.25	3.00			
23/07/2022		0.80m at 08:00		0						1 3.45 3.50	+3.75	3.50			Grey, angular coarse GRAVEL sized strong granite and tuff. (FILL)
				67					34 blows	2					Grey to dark grey, medium to coarse SAND. (ALLUVIUM)
				44					33 blows	3 3.95 4.00					
		1.20m at 18:00		67					83 blows	4 5 4.45 4.50					
23/07/2022										6 7 4.95 5.00					
25/07/2022		0.50m at 08:00		67					69 blows	8 9 5.45 5.50					
				44					82 blows	10 11 5.95 6.00	+1.25	6.00			
				0					91 blows	12 6.45 6.50					Milky white and grey, subrounded medium to coarse GRAVEL sized moderately strong quartz and tuff. (ALLUVIUM)
				0					84 blows	13 6.95 7.00					
				0					91 blows	14 7.45 7.50					
				0					84 blows	15 7.95 8.00	-0.75	8.00			
	8.52 PW	0.80m at 18:00		44					93 blows (50/5mm ~~200/15mm~~) 200blows/15mm	16 17 8.45	-1.25	8.50		V	Extremely weak, olive spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Firm, sandy clayey SILT)
25/07/2022										18 8.50 8.52	-1.27	8.52		IV	Weak, grey and white, highly decomposed lapilli-bearing coarse ash crystal TUFF. (Medium GRAVEL sized rock and quartz)
															End of drillhole at 8.52m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
26/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
27/07/2022

REMARKS
1. Inspection pit excavated from 0.00m-3.00m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **E05-EDH(S)01**

SHEET 1 of 2

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. ML-2	E 823 568.17 N 834 478.92	DATE from 25/07/2022 to 26/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +3.43 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
25/07/2022	PW									A 0.45 0.50					Yellowish brown, silty medium to coarse SAND with occasional fine gravels. (FILL)
										B 0.95 1.00	+2.43	1.00			Soft, grey mottled olive, slightly sandy silty CLAY. (ALLUVIUM)
										INSPECTION PIT C 1.45 1.50					
										D 1.95 2.00					
										E 2.45 2.50					
										F 2.95 3.00	+0.43	3.00			Firm, olive mottled grey, sandy clayey SILT. (ALLUVIUM)
				100						1 3.45 3.50					
				100						2 3.95 4.00	-0.57	4.00			Grey mottled yellowish brown, clayey silty medium to coarse SAND. (ALLUVIUM)
				100						3 4.45 4.50	-1.07	4.50			Red mottled grey, sandy silty CLAY. (ALLUVIUM)
				100						4 4.95 5.00	-1.57	5.00			Red mottled grey, clayey silty medium to coarse SAND. (ALLUVIUM)
				100						5 5.45 5.50					
				100						6 5.95 6.00	-2.57	6.00			Firm to stiff, light grey mottled red and yellowish brown, slightly sandy silty CLAY. (ALLUVIUM)
									(2, 2, 2, 3, 3, 4) N = 12	7 6.45 6.50					
									(2, 2, 3, 3, 4, 5) N = 15	8 6.95 7.00					
									(2, 3, 3, 4, 4, 5) N = 16	9 7.45 7.50					
									(1, 1, 1, 2, 2, 3) N = 8	10 7.95 8.00					
									(1, 1, 2, 2, 2, 3) N = 9	11 8.45 8.50					
									(1, 2, 2, 2, 3, 3) N = 10	12 8.95 9.00					
									(1, 2, 2, 3, 3, 3) N = 11	13 9.45 9.50					
25/07/2022									(2, 2, 2, 3, 3, 5) N = 13	14 9.90 10.00	-6.57	10.00			Medium dense, light grey, fine to medium SAND. (ALLUVIUM)

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
27/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
28/07/2022

REMARKS
1. Inspection pit excavated from 0.00m-3.00m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **E05-EDH(S)01**

SHEET 2 of 2

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. ML-2	E 823 568.17 N 834 478.92	DATE from 25/07/2022 to 26/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +3.43 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
26/07/2022									(2, 3, 4, 4, 5, 6) N = 19	29 9.95 10.00 30 10.10 10.40					As Sheet 1 of 2.
									(2, 3, 4, 5, 6, 6) N = 21	31 10.45 10.50 32 10.60 10.90	-7.07	10.50			Medium dense to dense, light grey to grey, medium to coarse SAND. (ALLUVIUM)
									(3, 4, 5, 5, 6, 6) N = 22	33 10.95 11.00 34 11.10 11.40					
									(3, 4, 5, 6, 6, 7) N = 24	35 11.45 11.50 36 11.60 11.90					
									(4, 5, 6, 7, 7, 12) N = 32	37 11.95 12.00 38 12.10 12.40					
									(5, 5, 6, 8, 8, 13) N = 35	39 12.45 12.50 40 12.60 12.90	-9.57	13.00			Extremely weak, brown spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Stiff, slightly sandy very clayey SILT)
									(2, 2, 3, 3, 4, 5) N = 15	41 12.95 13.00 42 13.10 13.40				V	
26/07/2022	14.00 PW								(2, 3, 3, 4, 4, 7) N = 18	43 13.45 13.50 44 13.60 13.90	-10.57	14.00			End of drillhole at 13.95m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
27/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
28/07/2022

REMARKS

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **E05-EDH(S)02**

SHEET 1 of 2

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. ML-2	E 823 594.16 N 834 406.18	DATE from 19/07/2022 to 20/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +3.61 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
19/07/2022	PW									A 0.45 0.50					Greyish brown, sandy clayey SILT with some angular fine gravel sized rock fragments. (FILL)
										B 0.95 1.00	+2.61	1.00			
										C 1.45 1.50	+2.11	1.50			Light yellowish brown mottled grey, slightly sandy silty CLAY. (ALLUVIUM)
										D 1.95 2.00					Soft, grey mottled yellowish brown, slightly sandy silty CLAY. (ALLUVIUM)
										E 2.45 2.50					
										F 2.95 3.00					
				100						1 3.45 3.50					
				100						2 3.95 4.00					
				100						3 4.45 4.50	-0.89	4.50			
				100						4 4.95 5.00					Medium dense, grey and reddish yellow, clayey silty coarse SAND with occasional subangular fine quartz gravels. (ALLUVIUM)
				100						5 5.45 5.50					
				100						6 5.95 6.00					
				100						7 6.45 6.50					
				0						8 6.95 7.00					
		2.00m at 18:00		100						9 7.40 7.45					
19/07/2022										10 7.50 7.60					
20/07/2022		2.30m at 08:00							(2, 3, 4, 5, 5, 7) N = 21	11 7.90 7.95					
									(3, 4, 5, 5, 6, 7) N = 23	12 8.00 8.10					
									(3, 5, 6, 6, 7, 8) N = 27	13 8.40 8.45					
									(4, 5, 5, 7, 7, 9) N = 28	14 8.50 8.60					
									(4, 5, 6, 6, 8, 11) N = 31	15 8.90 8.95					
									(3, 5, 5, 8, 10, 12) N = 35	16 9.00 9.10					
										17 9.40 9.45					
										18 9.50 9.60					
										19 9.90	-6.39	10.00			

INSPECTION PIT

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
21/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
22/07/2022

REMARKS
1. Inspection pit excavated from 0.00m-3.00m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **E05-EDH(S)02**

SHEET 2 of 2

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. ML-2	E 823 594.16 N 834 406.18	DATE from 19/07/2022 to 20/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +3.61 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.T. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
									(4, 6, 7, 8, 10, 13) N = 38 (5, 6, 8, 9, 11, 14) N = 42 (5, 7, 7, 9, 12, 15) N = 43 (6, 7, 8, 10, 12, 16) N = 46 (5, 7, 8, 11, 13, 17) N = 49 (5, 6, 7, 9, 13, 18) N = 47 (4, 4, 5, 6, 6, 8) N = 25 (4, 5, 6, 7, 7, 10) N = 30	28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 9.95 10.00 10.10 10.40 10.45 10.50 10.60 10.90 10.95 11.00 11.10 11.40 11.45 11.50 11.60 11.90 11.95 12.00 12.10 12.40 12.45 12.50 12.60 12.90 12.95 13.00 13.10 13.40 13.45 13.50 13.60 13.90 13.95	-9.39	13.00			Dense, light yellowish brown, medium to coarse SAND. (ALLUVIUM)
20/07/2022	14.00 PW	2.30m at 18:00									-10.39	14.00		V	Extremely weak, light yellowish brown spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Stiff, sandy clayey SILT)
															End of drillhole at 14.00m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY BARRY YIU

DATE 21/07/2022

CHECKED BY DESMOND CHEUNG

DATE 22/07/2022

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1632-SMA-EDH(S)03**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (South)**

METHOD **IP+W+RC**	CO-ORDINATES E **823505.13** N **834540.39**	CONTRACT No. **1632**
MACHINE & No. **D05-TS**		DATE from **11/07/2023** to **11/07/2023**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 2.67 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No. Type Depth	Reduced Level	Length (m)	Legend	Grade	Description
11/07/2023	Pw										2.67	0.00			
										A 0.50					Firm, brown, slightly clayey SILT with occasional root and shell fragments (FILL)
										B 1.00					
										C 1.50					
										D 2.00	0.67	2.00			
										E 2.50					Firm, dark grey, slightly silty CLAY with occasional decomposed wood fragments (POND DEPOSIT)
										F 3.00	-0.33	3.00			
				78					30 blows	1 3.45					Soft, brownish grey, slightly clayey sandy SILT (POND DEPOSIT)
				100					34 blows	2 3.50	-0.83	3.50			
										3					Grey, slightly silty fine to coarse SAND (POND DEPOSIT)
				100					19 blows	4 3.95 4 5 4.00					
										5					
				100					17 blows	6 4.45 4.50 7	-1.78	4.45			Soft, grey, slightly silty CLAY (ALLUVIUM)
11/07/2023	Pw 5.00	0.20m at 18:00								8 4.95	-2.33	5.00			
															End of investigation hole at 5.00m
												10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **12/07/2023**

CHECKED **K.C.Wu**

DATE **12/07/2023**

REMARKS
1. Inspection pit excavated to 3.00m depth.

REVISED

G2107

PRELIMINARY

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **AUT-EDH(S)01**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR25	E 823 542.93 N 835 438.59	DATE from 24/06/2022 to 24/06/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +5.21 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.I. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
24/06/2022	PW									A 0.45 0.50 B 0.95 1.00 C 1.45 1.50 D 1.95 2.00 E 2.45	+2.71	2.50			Grey, COBBLE sized concrete fragments. (FILL)
				78					20 bls	1 2.50 2.95 3.00					Grey, medium to coarse SAND. (ALLUVIUM)
				56					23 bls	3 3.45	+1.71	3.50			
				78					23 bls	4 3.50 5 6 3.95 4.00					Soft, dark grey, slightly sandy silty CLAY. (ALLUVIUM/POND DEPOSIT)
				89					24 bls	7 8 4.45	+0.71	4.50			
				100					68 bls	4.50 9				VI	Soft to firm, red mottled light grey, sandy silty CLAY. (RESIDUAL SOIL)
				0					130 bls	10 4.95	+0.21	5.00			
24/06/2022	5.71 PW	Dry at 18:00							(6, 5, 5, 9, 10, 10) N = 34	5.00 11 5.21 5.26 5.36 12 5.66 13 5.71	-0.50	5.71		V	Extremely weak, red to reddish yellow spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Very stiff, slightly sandy very clayey SILT)
															End of drillhole at 5.71m.

INSPECTION PIT

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
27/06/2022

CHECKED BY
DESMOND CHEUNG

DATE
28/06/2022

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **AUT-EDH(S)02**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR25	E 823 513.10 N 835 305.47	DATE from 21/07/2022 to 22/07/2022
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +3.97 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.T. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
21/07/2022	PW										+3.67	0.30			CONCRETE slab.
										A 0.45 0.50					Yellowish brown, sandy, very clayey SILT. (FILL)
										B 0.95 1.00	+2.97	1.00			Grey mottled yellowish brown, sandy, very clayey SILT. (FILL)
										C 1.45 1.50					
										D 1.95 2.00					
21/07/2022										E 2.45 2.50	+1.47	2.50			
22/07/2022				100						1					Soft, dark grey, sandy silty CLAY. (ALLUVIUM/POND DEPOSIT)
				100						2 2.95 3.00					
				100						3					
				100						4 3.45 3.50	+0.47	3.50			Soft to firm, red mottled grey, sandy silty CLAY. (ALLUVIUM/POND DEPOSIT Interface)
				100						5					
				100						6 3.95 4.00					
				100						7					
				100						8 4.45 4.50	-0.53	4.50			Extremely weak, red to reddish yellow spotted white, completely decomposed lapilli-bearing coarse ash crystal TUFF. (Firm, slightly sandy very clayey SILT)
				100						9				V	
				100						10 4.95 5.00					
22/07/2022	5.50 PW									11					
										12 5.45 5.50	-1.53	5.50			End of drillhole at 5.50m.

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
25/07/2022

CHECKED BY
DESMOND CHEUNG

DATE
26/07/2022

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

PRELIMINARY

泰昇地基工程有限公司
TYSAN FOUNDATION LIMITED
（泰昇集團成員 A member of Tysan Group）

DRILLHOLE RECORD

CONTRACT No. 1632

DRILLHOLE No. **AUT-EDH(S)03**

SHEET 1 of 1

PROJECT GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

METHOD ROTARY CORED	CO-ORDINATES	W.O. No. -
MACHINE / No. DR25	E 823 504.74 N 835 225.91	DATE from 18/04/2023 to 19/04/2023
FLUSHING MEDIUM DRY	ORIENTATION Vertical	GROUND LEVEL +4.25 mP.D.

Drilling Progress	Casing depth/size	Water level (m) Shift start/ end	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	F.T. / Test Depth	Tests	Samples	Reduced Level (mPD)	Depth (m)	Legend	Grade	Description
18/04/2023	PW									A 0.45 0.50 B 0.95 1.00 C 1.45 1.50 D 1.95 2.00 E 2.45 2.50	+1.75	2.50			Grey, silty medium to coarse SAND with some angular medium to coarse gravel. (FILL)
18/04/2023 19/04/2023				100						1 2.95 3.00 2 3.45 3.50 3 3.95 4.00 4 4.45 4.50	-0.25	4.50			Soft, dark grey, sandy very clayey SILT with occasional shell fragments. (POND DEPOSIT)
19/04/2023	5.50 PW			100						5 4.95 5.00 6 5.45 5.50	-1.25	5.50			Soft, dark grey, slightly sandy silty CLAY with occasional shell fragments. (ALLUVIUM)
															End of drillhole at 5.50m.

INSPECTION PIT

- Small Disturbed Sample
- Large Disturbed Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Water Sample
- Standard Penetration Test
- Permeability Test
- Packer Test
- Borehole Televiewer Survey
- Pressuremeter Test
- Standpipe Tip
- Piezometer Tip
- In-situ Vane Shear Test

LOGGED BY
BARRY YIU

DATE
20/04/2023

CHECKED BY
DESMOND CHEUNG

DATE
21/04/2023

REMARKS
1. Inspection pit excavated from 0.00m-2.50m.

DRILLHOLE RECORD

DRILLHOLE No. **1632-AUT-EDH(S)06**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (South)**

METHOD **IP+W+RC**	CO-ORDINATES E **823467.31** N **835206.72**	CONTRACT No. **1632**
MACHINE & No. **Hand Dug**		DATE from **20/07/2023** to **20/07/2023**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 3.73 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
20/07/2023										A	INSPECTION PIT	0.50	3.73	0.00			Soft, brown, sandy SILT with some fine to medium gravels of rock fragments and occasional roots (FILL)
20/07/2023										B		1.00	2.73	1.00			End of investigation hole at 1.00m
														10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **20/07/2023**

CHECKED **K.C.Wu**

DATE **22/07/2023**

REMARKS
1. 5 drillholes have been conducted but all terminated at 1m due to underground cable.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No **NOL-1631-NTM-EDH(S)01**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES E **824521.32** N **837393.79**	CONTRACT No. **1631**
MACHINE & No. **Toho, D60**		DATE from **09/09/2022** to **10/09/2022**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 7.31 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
09/09/2022	Pw												7.31	0.00			
										A		0.50	6.81	0.50			Firm, grey, slightly silty CLAY (ALLUVIUM) 0.00-0.50m: brownish grey
										B		1.00					
										C	INSPECTION PIT	1.50	5.81	1.50			Firm, brown, mottled grey, slightly clayey SILT (ALLUVIUM)
													5.41	1.90			Brown, slightly silty fine to coarse SAND (ALLUVIUM)
										D		2.00					
										E		2.50					
										F		3.00					
									2,2 4,4,3,5 N=16	1							
										2		3.45 3.50	3.81	3.50			
									2,2 3,2,3,4 N=12	3							Firm, grey, slightly clayey slightly sandy SILT (ALLUVIUM)
				100					32 bls	4							
										5		3.95 4.00					
				100					34 bls	6		4.45 4.50					
										7							
				80					49 bls	8		4.95 5.00	2.31	5.00			
		Dry at 18:00								9							Firm, brown, slightly clayey, sandy SILT (ALLUVIUM)
09/09/2022 10/09/2022		Dry at 08:00		56					122 bls	10		5.45 5.50					
										11							
				64					106 bls	12		5.95 6.00	1.31	6.00			
										13							Grey, slightly silty fine to coarse SAND with some fine to coarse gravels of quartz fragments (ALLUVIUM)
				56					240 bls	14		6.45 6.50					
										15							
10/09/2022	Pw 7.00	Dry at 18:00								16		6.95 7.00	0.31	7.00			
														10.00			End of investigation hole at 7.00m

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **13/09/2022**

CHECKED **K.C.Wu**

DATE **19/09/2022**

REMARKS
1. Inspection pit excavated to 3.00m depth.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. NOL-1631-NTM-EDH(S)02

SHEET 1 of 1

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES E **824482.74** N **837336.72**	CONTRACT No. **1631**
MACHINE & No. **Longyear L38, D85**		DATE from **14/06/2022** to **16/06/2022**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 8.17 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
16/06/2022	Sw												8.17	0.00			
													7.77	0.40			Reinforced concrete
										A		0.50					Firm, light greyish brown, sandy, clayey SILT, with some gravels of rock and asphalt fragments (FILL)
										B		1.00					
										C	INSPECTION PIT	1.50	6.67	1.50			Firm, light brown, slightly silty CLAY (ALLUVIUM)
										D		2.00					
										E		2.50					
	Sw 3.00 Pw								2,2 3,3,3,4 N=13	F 1		3.00	5.17	3.00			3.00-4.00m: purplish brown
										2		3.45					
									1,1 2,2,4,6 N=14	3		4.00	4.17	4.00			Firm, brown, slightly sandy clayey SILT (ALLUVIUM)
										4		4.45					
									1,1 2,2,2,4 N=10	5		5.00	3.17	5.00			Firm, light grey, sandy silty CLAY (ALLUVIUM)
				33					23 bls	6 7		5.45	2.72	5.45			Firm, purplish brown, silty CLAY (ALLUVIUM)
				100					29 bls	8 9		5.90 5.95	2.22	5.95			Light grey to grey, slightly clayey silty fine SAND with some decayed wood materials (ALLUVIUM)
	Pw 6.45			91						10	T6116	6.40 6.45	1.72	6.45			Light yellowish brown, slightly silty, angular to subangular fine to coarse GRAVELS with some cobbles of quartz fragments (ALLUVIUM)
16/06/2022		Dry at 18:00										7.00	1.17	7.00			End of investigation hole at 7.00m
														10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **16/06/2022**

CHECKED **K.C.Wu**

DATE **20/06/2022**

REMARKS
1. Inspection pit excavated to 3.00m depth.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. NOL-1631-NTM-DH20(P)

SHEET 1 of 6

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES E **824365.80** N **837201.27**	CONTRACT No. **1631**
MACHINE & No. **Longyear L38, D85**		DATE from **21/06/2022** to **06/07/2022**
FLUSHING MEDIUM **Dry drilling / Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 11.97 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
22/06/2022	Sw	0.00m at 08:00											11.97	0.00			
													11.77	0.20			Reinforced CONCRETE
										A		0.50					Frim, brownish grey, slightly clayey, sandy SILT (FILL)
										B		1.00					
										C		1.50	10.47	1.50			
										D		2.00	9.97	2.00			Firm, light greyish brown, slightly sandy, clayey SILT (FILL) 2.00-2.50m: with some gravels of moderately strong rock fragments
				27					42 bls	E 1		2.50	9.47	2.50			Stiff, brown spotted red, slightly silty CLAY (ALLUVIUM)
				89					154 bls	2 3		2.85 2.90					
				82					66 bls	4 5		3.35 3.40					
				100					285 bls	6 7		3.85 3.90	8.07	3.90			Stiff, light greyish brown, slightly sandy clayey SILT (ALLUVIUM)
	Sw 4.40 Pw			29					71 bls	8 9		4.35 4.40					
				100					197 bls	10 11		4.85 4.90					
				100					60 bls	12 13		5.35 5.40 5.50	6.57	5.40			Firm, dark grey, silty CLAY (POND DEPOSIT)
				100					114 bls	14 15		5.85 5.90	6.07	5.90			Stiff, brown mottled light grey, sandy silty CLAY (ALLUVIUM)
				80					107 bls	16 17		6.35 6.40					
				100					173 bls	18 19		6.85 6.90	5.07	6.90			Stiff, light grey, slightly clayey, sandy SILT (ALLUVIUM)
				56					68 bls	20 21		7.35 7.40					
				100					365 bls	22 23		7.85 7.90	4.07	7.90			
22/06/2022		2.90m at 18:00															Brown, slightly clayey, sandy angular to subangular fine to coarse GRAVELS of quartz fragments (ALLUVIUM)
23/06/2022		2.93m at 08:00		0						24		8.35 8.40					
				85						25 26		9.40 9.50	2.47	9.50		V	Extremely weak, brown, completely decomposed META-TUFF (Slightly clayey SILT) 9.50-15.70m: light grey
													1.97	10.00			

INSPECTION PIT

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **15/07/2022**

CHECKED **K.C.Wu**

DATE **18/07/2022**

REMARKS

1. Inspection pit excavated to 2.50m depth.
2. Constant head permeability tests carried out at 6.90-8.40m and 25.80-27.30m depths.
3. Packer tests carried out at28.3-32.90m, 45.00-49.00m, 49.00-53.00m and 53.00-58.52m depths.
4. Televiewer test carried out at 25.50-32.90m depth.
5. Standpipe installed to 5.50m depth.
6. Piezometer installed at 23.00m depth.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. NOL-1631-NTM-DH20(P)

SHEET 2 of 6

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES	CONTRACT No. **1631**
MACHINE & No. **Longyear L38, D85**	E **824365.80** N **837201.27**	DATE from **21/06/2022** to **06/07/2022**
FLUSHING MEDIUM **Dry drilling / Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 11.97 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level (1.97)	Length (m) (10.00)	Legend	Grade	Description
									3,3 4,6,7,8 N=25	27 28		10.50 10.60					As sheet 1 of 6
										29		11.05					
				0								11.50					
										30		12.50	-0.53	12.50			
				50						31		12.60	-0.63	12.60			12.50-12.60m: with many fine to coarse gravels of quartz fragments
									2,3 4,4,6,8 N=22	32 33		13.60 13.70					
										34		14.15					
				85						35		14.60					
									3,3 4,6,8,8 N=26	36 37		15.60 15.70	-3.73	15.70			
										38		16.15					
				85						39		16.60					
									3,5 6,8,8,10 N=32	40 41		17.60 17.70					
										42		18.15					
				85						43		18.60					
		0.85m							4,6 7,9,9,11 N=36	44 45		19.60 19.70	-8.03	20.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **15/07/2022**

CHECKED **K.C.Wu**

DATE **18/07/2022**

REMARKS

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. NOL-1631-NTM-DH20(P)

SHEET 3 of 6

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES E **824365.80** N **837201.27**	CONTRACT No. **1631**
MACHINE & No. **Longyear L38, D85**		DATE from **21/06/2022** to **06/07/2022**
FLUSHING MEDIUM **Dry drilling / Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 11.97 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No. Type Depth	Reduced Level (-8.03)	Length (m) (20.00)	Legend	Grade	Description
23/06/2022 24/06/2022		at 18:00 2.90m at 08:00		90						46 20.15					As sheet 1 of 6
										47 20.60					
									3,6 8,8,10,12 N=38	48 21.60 49 21.70					
										50 22.15					
				90						51 22.60					
	Pw 23.70 Hw									23.00					
									4,6 8,10,12,13 N=43	52 23.60 53 23.70					
			70	100	73	73	NI	24.15		54 24.15	-12.18	24.15		III	Moderately strong, light yellowish brown, moderately decomposed META-TUFF with very closely to closely spaced, rough undulating, extremely narrow to very narrow, limonite and manganese stained joints, dipping at 0°-10° and 30°-40°
							5.6	24.51			-12.34	24.31			24.31-28.94m: with quartz vein (5-10mm thick)
							NI	25.05		AT3					
24/06/2022 27/06/2022		0.80m at 18:00 3.05m at 08:00		97	89	89	3.5	25.56		25.50 25.80					
										AT3	-14.20	26.17		IV	26.17-26.19m: moderately weak and highly decomposed
										26.30	-14.22	26.19		III	
				100	71	56	NI	26.98		26.90	-14.98	26.95		IV	26.95-27.30m: moderately weak and highly decomposed
							10.0	27.05 27.15							
							>20 3.4	27.26		27.30	-15.33	27.30		III	
										AT3					
							>20 2.7	28.13 28.19			-16.16	28.13		IV	28.13-28.19m: moderately weak and highly decomposed
				100	94	94				28.40	-16.22	28.19		III	
							>20 2.3	28.94 29.03			-16.97	28.94			28.94-29.03m: with quartz vein
										AT3	-17.06	29.03			29.03-31.38m: with quartz vein (10-50mm thick)
				100	100	100	6.7	29.90		29.87 AT3	-17.90	29.87 30.00		IV	

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **15/07/2022**

CHECKED **K.C.Wu**

DATE **18/07/2022**

REMARKS

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. NOL-1631-NTM-DH20(P)

SHEET 4 of 6

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES	CONTRACT No. **1631**
MACHINE & No. **Longyear L38, D85**	E **824365.80** N **837201.27**	DATE from **21/06/2022** to **06/07/2022**
FLUSHING MEDIUM **Dry drilling / Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 11.97 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples (No. Type Depth)	Reduced Level	Length (m)	Legend	Grade	Description
											-18.03	30.00			
							2.5	30.20			-18.20	30.17		III	29.87-29.97m: moderately weak and highly decomposed
											-18.28	30.25		IV	30.17-30.25m: with quartz veins
											-18.58	30.55		III	30.25-30.55m: moderately weak and highly decomposed
										AT3					
				100	93	90	>20	31.40			-19.41	31.38			
							4.8	31.43		31.38	-19.51	31.48		IV	31.48-32.52m: moderately weak and highly decomposed
										AT3					
							>20	32.47			-20.55	32.52		III	
		2.60m at 18:00					3.0	32.57							
27/06/2022		3.15m at 08:00		0				32.90		32.90	-20.93	32.90		IV	Very weak to weak, yellowish brown, highly decomposed META-TUFF (Slightly silty, slightly sandy fine to coarse GRAVELS of moderately weak rock fragments)
										55		33.90			
				95						56		34.00			
										57		35.00			
									21.29/30mm 122.78/20mm 200bls/95mm			35.10			
										58		35.30			
	Hw 35.57			100	64	53	>20	35.57		35.57	-23.60	35.57		III	Moderately strong, light grey and light brown, moderately decomposed META-TUFF with closely to medium, locally very closely spaced, rough undulating, smooth planar, very narrow to narrow, limonite stained calcite coated (1-2mm) joint, dipping at 0°-10°, 30°-40°, 50°-60° and 60°-70°
							7.7	35.97			-23.73	35.70		IV	35.70-35.96m: moderately weak and highly decomposed
							NI	36.23			-23.99	35.96		III	36.32-36.40m: moderately weak and highly decomposed
							3.8	36.33		AT3	-24.35	36.32		IV	37.13-37.23m: moderately weak and highly decomposed
											-24.43	36.40		III	
				100	79	62	>20	36.85		36.85					
							8.3	37.03			-25.16	37.13		IV	
							NI	37.15			-25.26	37.23		III	
							3.8	37.20							
							>20	38.00		AT3					
				100	50	0	13.3	38.30		38.30	-26.61	38.58		IV	38.58-39.45m: weak to moderately weak and highly decomposed
							>20	38.90		AT3					
				82	67	20				39.45	-27.48	39.45		III	
							NR	39.65			-27.68	39.65		V/IV	39.65-39.90m: core loss inferred to be completely to highly decomposed
							>20	39.90		AT3	-27.93	39.90			
											-28.03	40.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **15/07/2022**

CHECKED **K.C.Wu**

DATE **18/07/2022**

REMARKS

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. NOL-1631-NTM-DH20(P)

SHEET 5 of 6

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES E **824365.80** N **837201.27**	CONTRACT No. **1631**
MACHINE & No. **Longyear L38, D85**		DATE from **21/06/2022** to **06/07/2022**
FLUSHING MEDIUM **Dry drilling / Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 11.97 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No. Type Depth	Reduced Level	Length (m)	Legend	Grade	Description
											-28.03	40.00		III	As sheet 4 of 6
							9.1	40.33							
							2.0	40.55		AT3					
				100	64	50				40.85					
							>20	41.05							
							NI	41.22			-29.25	41.22		IV	41.22-41.57m: weak and highly decomposed
							4.3	41.57		AT3	-29.60	41.57		III	
											-29.78	41.75			41.75-41.85m: with quartz veins
											-29.88	41.85			
											-30.23	42.20		IV	42.20-43.11m: weak to moderately weak and highly decomposed
				97	59	43	10.0	42.27		42.27					
							NI	42.47							
							16.7	42.70							
							NI	42.82		AT3					
							4.7	43.11			-31.14	43.11		III	
				100	81	53	9.5	43.75		43.75	-31.91	43.88		IV	43.88-44.17m: moderately weak and highly decomposed
											-32.20	44.17		III	
							NI	44.70							
							5.7	44.82		AT3					
										45.00					
				100	92	76	>20	45.17		45.20					
							3.7	45.27							
										AT3					
		0.90m at 18:00					10.5	46.36			-34.51	46.48			
29/06/2022							>20	46.55							46.48-46.70m: with quartz vein
30/06/2022		3.10m at 08:00		100	92	45				46.65	-34.73	46.70			
							8.7	47.17							
							>20	47.40		AT3					
							6.0	47.50							
							>20	48.00							
				100	93	77	11.1	48.20		48.11					
							2.9	48.38							
										AT3					
										49.00					
							17.1	49.42							
				100	91	45				49.58					
										AT3					
											-38.03	50.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **15/07/2022**

CHECKED **K.C.Wu**

DATE **18/07/2022**

REMARKS

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. NOL-1631-NTM-DH20(P)

SHEET 6 of 6

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP+W+RC**	CO-ORDINATES E **824365.80** N **837201.27**	CONTRACT No. **1631**
MACHINE & No. **Longyear L38, D85**		DATE from **21/06/2022** to **06/07/2022**
FLUSHING MEDIUM **Dry drilling / Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 11.97 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No. Type Depth	Reduced Level	Length (m)	Legend	Grade	Description
											-38.03	50.00			
							7.3	50.12		AT3 51.07					As sheet 4 of 6
				100	87	45	>20	50.94							
							5.7	51.13							
							19.4	51.66		AT3					
							NI	51.97			-40.00	51.97			
							3.3	52.07			-40.10	52.07			51.97-52.07m: moderately weak to weak and highly decomposed
							20.0	52.37							
				100	94	75	2.2	52.57		52.57	-40.70	52.67			52.67-53.37m: with quartz vein (20-50mm thick)
										53.00					
										AT3	-41.40	53.37			
							14.7	53.50							
							7.1	53.84							
				100	91	56				54.07					
							>20	54.26							
							9.1	54.60							
							>20	54.74		AT3					
							6.2	54.84							
							20	55.00							
							8.5	55.10							
											-43.53	55.50			
				100	97	97	3.2	55.57		55.57					55.50-56.00m: with silicified
											-44.03	56.00			
							10.0	56.20		AT3	-44.34	56.31			
							2.7	56.40			-44.44	56.41			56.31-56.41m: with quartz vein
30/06/2022		1.10m at 18:00													
04/07/2022		3.10m at 08:00		100	89	60				57.02					
							10.4	57.15							
											-45.60	57.57			
										AT3	-45.67	57.64			57.57-57.64m: with quartz vein
							4.2	57.92							
											-46.11	58.08			
		1.10m at 18:00									-46.21	58.18			58.08-58.18m: with quartz vein
04/07/2022			70				16.7	58.40 58.52		58.52	-46.55	58.52			
															End of investigation hole at 58.52m
												60.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **15/07/2022**

CHECKED **K.C.Wu**

DATE **18/07/2022**

REMARKS

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **NOL-1631-NTM-EDH(S)05**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP**	CO-ORDINATES E **824606.25** N **837501.39**	CONTRACT No. **1631**
MACHINE & No. **Hand Dug**		DATE from **03/07/2023** to **03/07/2023**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 5.77 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
03/07/2023										A	INSPECTION PIT	0.50	5.77	0.00			Firm, brown, slightly gravelly, slightly clayey SILT (ALLUVIUM)
										B		1.00					
										C		1.50	4.27	1.50			Firm, brown, slightly clayey SILT (ALLUVIUM)
										D		2.00					
										E		2.50					
03/07/2023										F		3.00	2.77	3.00			End of investigation hole at 3.00m
														10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **05/07/2023**

CHECKED **K.C.Wu**

DATE **06/07/2023**

REMARKS
1. Inspection pit excavated to 3.00m depth.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No **NOL-1631-SAT-EDH(S)01**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP**	CO-ORDINATES E **825808.28** N **838990.88**	CONTRACT No. **1631**
MACHINE & No.		DATE from **06/10/2022** to **06/10/2022**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 7.13 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No. Type Depth	Reduced Level	Length (m)	Legend	Grade	Description
06/10/2022		0.00m at 08:00									7.13	0.00			
										A 0.50	6.63	0.50			Firm, brown, slightly clayey SILT (ALLUVIUM)
										B 1.00	6.13	1.00			Firm, grey, silty CLAY with occasional moderately weak rock fragments (ALLUVIUM)
										C 1.50					Firm, grey, silty CLAY (ALLUVIUM)
										D 2.00	5.13	2.00			
										E 2.50	4.63	2.50			Soft, grey, slightly silty CLAY (ALLUVIUM)
06/10/2022		0.00m at 18:00								F 3.00	4.13	3.00			Grey, slightly silty fine to coarse SAND (ALLUVIUM)
												10.00			End of investigation hole at 3.00m

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **11/10/2022**

CHECKED **K.C.Wu**

DATE **11/10/2022**

REMARKS
1. Average depth 3.00m.

G2107

PRELIMINARY

INSPECTION PIT RECORD

PIT No. **NOL-1631-SAT-EDH(S)02**

SHEET **1** of **1**

PROJECT **Ground Investigation for Northern Link (North)**

CONTRACT No. **1631**

DATE from **20/09/2022** to **20/09/2022**

CO-ORDINATES
E **825767.71**
N **838931.16**

GROUND LEVEL : **+ 7.85 mPD**

Water Level (m) Shift start/end	Samples No. Type Depth	Depth (m)	Legend	Grade	Description
	A ● 0.50 B ● 1.00 C ● 1.50 D ● 2.00 E ● 2.50 F ● 3.00	0.00			Firm, grey, spotted brown, slightly clayey SILT (ALLUVIUM)
		2.50			Firm, grey, slightly clayey SILT (ALLUVIUM)
		3.00			End of investigation hole at 3.00m

● Small Disturbed Sample
▲ Water Sample
U76 Undisturbed Sample
U100 Undisturbed Sample

LOGGED **H.K.Fung**
DATE **21/09/2022**
CHECKED **K.C.Wu**
DATE **26/09/2022**

REMARKS

1. Average depth 3.00m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m depths.

INSPECTION PIT RECORD

PIT No. **NOL-1631-SAT-EDH(S)03**

SHEET **1** of **1**

PROJECT **Ground Investigation for Northern Link (North)**

CONTRACT No. **1631**	CO-ORDINATES	GROUND LEVEL :
DATE from **20/09/2022** to **20/09/2022**	E **825675.79** N **838854.61**	**+ 7.98 mPD**

Water Level (m) Shift start/end	Samples No. Type Depth	Depth (m)	Legend	Grade	Description
		0.00			
0.00m at 08:00		0.15			Reinforced concrete
	A • 0.50				Firm, brown, mottled white and orange, slightl clayey SILT (ALLUVIUM)
	B • 1.00	1.00			Firm, reddish brown, spotted white, slightly clayey SILT (ALLUVIUM)
	C • 1.50				
	D • 2.00				
	E • 2.50				
0.00m at 18:00	F • 3.00	3.00			End of investigation hole at 3.00m

- ● Small Disturbed Sample
- ▲ Water Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample

LOGGED **H.K.Fung**

DATE **21/09/2022**

CHECKED **K.C.Wu**

DATE **26/09/2022**

REMARKS

1. Average depth 3.00m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m depths.

PRELIMINARY

INSPECTION PIT RECORD

PIT No. NOL-1631-SAT-EDH(S)04

SHEET 1 of 1

PROJECT **Ground Investigation for Northern Link (North)**

CONTRACT No. **1631**	CO-ORDINATES	GROUND LEVEL :
DATE from **20/09/2022** to **20/09/2022**	E **825625.80** N **838806.63**	**+ 7.36 mPD**

Water Level (m) Shift start/end	Samples No. Type Depth	Depth (m)	Legend	Grade	Description
		0.00			
0.00m at 08:00		0.10			Reinforced concrete
					Soft, grey, slightly silty, slightly sandy CLAY (ALLUVIUM)
	A • 0.50	0.50			Firm, dark grey, slightly silty CLAY with some decayed wood fragments (POND DEPOSIT)
	B • 1.00	1.00			Firm, grey, mottled brown, slightly clayey SILT (ALLUVIUM)
	C • 1.50				
	D • 2.00	2.00			Soft, grey, mottled brown, slightly clayey, slightly sandy SILT (ALLUVIUM)
	E • 2.50	2.50			Grey, slightly silty fine to coarse SAND (ALLUVIUM)
0.00m at 18:00	F • 3.00	3.00			End of investigation hole at 3.00m

- ● Small Disturbed Sample
- ▲ Water Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample

LOGGED **H.K.Fung**

DATE **21/09/2022**

CHECKED **K.C.Wu**

DATE **26/09/2022**

REMARKS

1. Average depth 3.00m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m depths.

PRELIMINARY

INSPECTION PIT RECORD

PIT No. **NOL-1631-SAT-EDH(S)05**

SHEET **1** of **1**

PROJECT **Ground Investigation for Northern Link (North)**

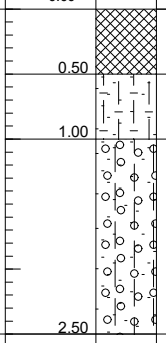
CONTRACT No. **1631**

DATE from **19/07/2022** to **25/07/2022**

CO-ORDINATES
E **825508.83**
N **838695.53**

GROUND LEVEL : **+ 10.11 mPD**

Water Level (m) Shift start/end	Samples No. Type Depth	Depth (m)	Legend	Grade	Description
	1 • 0.50	0.00			Medium dense, dark brown, silty fine to coarse SAND with some angular to subangular, fine to coarse gravels of strong tuff, asphalt and concrete fragments (FILL)
	2 • 1.00	0.50			Firm, grey, slightly clayey sandy SILT (ALLUVIUM)
	3 • 1.50	1.00			Light grey, slightly silty slightly sandy angular to subangular fine to coarse GRAVELS of strong tuff and quartz fragments (ALLUVIUM)
	4 • 2.00				
	5 • 2.50	2.50			End of investigation hole at 2.50m



- • Small Disturbed Sample
- ▲ Water Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample

LOGGED **H.K.Fung**

DATE **29/07/2022**

CHECKED **K.C.Wu**

DATE **01/08/2022**

REMARKS

1. Average depth 2.50m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m and 2.50m depths.

G2107

PRELIMINARY

INSPECTION PIT RECORD

PIT No. **NOL-1631-SAT-EDH(S)06**

SHEET **1** of **1**

PROJECT **Ground Investigation for Northern Link (North)**

CONTRACT No. **1631**

DATE from **25/07/2022** to **25/07/2022**

CO-ORDINATES
E **825458.57**
N **838647.28**

GROUND LEVEL : **+ 12.99 mPD**

Water Level (m) Shift start/end	Samples No.	Type	Depth	Depth (m)	Legend	Grade	Description
				0.00			
	1	●	0.50				Firm, yellowish brown, slightly clayey sandy SILT with some angular to subangular fine to coarse strong rock and asphalt fragments (FILL)
	2	●	1.00	1.00			
	3	●	1.50				Firm, yellowish brown, slightly clayey sandy SILT with some angular to subangular fine to coarse strong tuff fragments (COLLUVIUM)
	4	●	2.00				
	5	●	2.50	2.50			
	6	●	3.00				Firm, yellowish brown, mottled reddish brown, slightly clayey slightly sandy SILT (COLLUVIUM)
				3.00			End of investigation hole at 3.00m

● Small Disturbed Sample
▲ Water Sample
U76 Undisturbed Sample
U100 Undisturbed Sample

LOGGED **H.K.Fung**
DATE **29/07/2022**
CHECKED **K.C.Wu**
DATE **01/08/2022**

REMARKS

1. Average depth 3.00m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m depths.

PRELIMINARY

INSPECTION PIT RECORD

PIT No. **NOL-1631-SAT-EDH(S)07**

SHEET **1** of **1**

PROJECT **Ground Investigation for Northern Link (North)**

CONTRACT No. **1631**

DATE from **25/07/2022** to **25/07/2022**

CO-ORDINATES
E **825391.11**
N **838583.04**

GROUND LEVEL : **+ 12.97 mPD**

Water Level (m) Shift start/end	Samples No.	Type	Depth	Depth (m)	Legend	Grade	Description
				0.00			
	1	●	0.50				Firm, light orangish brown, slightly clayey sandy SILT with some angular to subangular fine to coarse gravels of strong rock and asphalt fragments (FILL)
				0.50			
	2	●	1.00				Soft, dark brown, slightly clayey, sandy SILT with some angular to subangular fine to coarse gravels of strong rock fragments (ALLUVIUM)
	3	●	1.50				
				1.50			
	4	●	2.00				Firm, yellowish brown, slightly clayey sandy SILT with some angular to subangular fine to coarse gravels of strong rock fragments (ALLUVIUM)
				2.00			
	5	●	2.50				Firm, yellowish brown, slightly clayey slightly sandy SILT (ALLUVIUM)
	6	●	3.00				
				3.00			End of investigation hole at 3.00m

● Small Disturbed Sample
▲ Water Sample
U76 Undisturbed Sample
U100 Undisturbed Sample

LOGGED **H.K.Fung**
DATE **29/07/2022**
CHECKED **K.C.Wu**
DATE **01/08/2022**

REMARKS

1. Average depth 3.00m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m depths.

PRELIMINARY

INSPECTION PIT RECORD

PIT No. **NOL-1631-SAT-EDH(S)08**

SHEET **1** of **1**

PROJECT **Ground Investigation for Northern Link (North)**

CONTRACT No. **1631**

DATE from **19/07/2022** to **19/07/2022**

CO-ORDINATES
E **825299.09**
N **838476.81**

GROUND LEVEL : **+ 21.30 mPD**

Water Level (m) Shift start/end	Samples No.	Type	Depth	Depth (m)	Legend	Grade	Description
				0.00			
	1	●	0.50				Firm, dark brown, slightly clayey sandy SILT with some angular to subangular fine to coarse gravels of strong tuff, quartz and concrete fragments (FILL)
	2	●	1.00	1.00			
	3	●	1.50				Firm, yellowish brown, slightly clayey sandy SILT with some angular to subangular fine to coarse gravels of strong tuff and quartz fragments (COLLUVIUM)
	4	●	2.00				
	5	●	2.50				
	6	●	3.00	3.00			
							End of investigation hole at 3.00m

● Small Disturbed Sample
▲ Water Sample
U76 Undisturbed Sample
U100 Undisturbed Sample

LOGGED **H.K.Fung**
DATE **26/07/2022**
CHECKED **K.C.Wu**
DATE **27/07/2022**

REMARKS

1. Average depth 3.00m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m depths.

PRELIMINARY

INSPECTION PIT RECORD

PIT No. **NOL-1631-SAT-EDH(S)09**

SHEET **1** of **1**

PROJECT **Ground Investigation for Northern Link (North)**

CONTRACT No. **1631**	CO-ORDINATES	GROUND LEVEL :
DATE from **19/07/2022** to **19/07/2022**	E **825263.03** N **838459.59**	**+ 24.97 mPD**

Water Level (m) Shift start/end	Samples No. Type Depth	Depth (m)	Legend	Grade	Description
	1 • 0.50 2 • 1.00 3 • 1.50 4 • 2.00 5 • 2.50 6 • 3.00	0.00 2.00 3.00			Firm, reddish brown, slightly clayey slightly sandy SILT with some angular to subangular fine to coarse gravels of strong tuff and quartz fragments (COLLUVIUM) 0.00-2.00m: light yellow
					End of investigation hole at 3.00m

- ● Small Disturbed Sample
- ▲ Water Sample
- ▨ U76 Undisturbed Sample
- ■ U100 Undisturbed Sample

LOGGED **H.K.Fung**

DATE **26/07/2022**

CHECKED **K.C.Wu**

DATE **27/07/2022**

REMARKS

1. Average depth 3.00m.
2. No seepage observed.
3. Small disturbed samples taken at 0.50m, 1.00m, 1.50m, 2.00m, 2.50m and 3.00m depths.

DRILLHOLE RECORD

DRILLHOLE No. **NOL-1631-SAT-EDH(S)11**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP**	CO-ORDINATES E **825634.21** N **838726.32**	CONTRACT No. **1631**
MACHINE & No. **Hand Dug**		DATE from **30/06/2023** to **30/06/2023**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 8.22 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
30/06/2023													8.22	0.00			
										A	•	0.50	7.72	0.50			Firm, brown, slightly silty CLAY (ALLUVIUM)
										B	•	1.00	7.22	1.00			Firm, light brown, sandy SILT (ALLUVIUM)
										C	•	1.50					Brown, slightly silty fine to coarse SAND (ALLUVIUM)
										D	•	2.00					
										E	•	2.50					
30/06/2023										F	•	3.00	5.22	3.00			
																	End of investigation hole at 3.00m
														10.00			

INSPECTION PIT

- ● Small Disturbed Sample
- ▲ Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **05/07/2023**

CHECKED **K.C.Wu**

DATE **06/07/2023**

REMARKS
1. Inspection pit excavated to 3.00m depth.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **NOL-1631-SAT-EDH(S)15**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP**	CO-ORDINATES E **825553.80** N **838653.80**	CONTRACT No. **1631**
MACHINE & No. **Hand Dug**		DATE from **30/06/2023** to **30/06/2023**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 9.96 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
													9.96	0.00			
30/06/2023													9.76	0.20			Reinforced concrete
										A	•	0.50					Firm, grey, slightly silty CLAY (ALLUVIUM)
										B	•	1.00	8.96	1.00			
											INSPECTION PIT						Firm, light grey, sandy SILT (ALLUVIUM)
										C	•	1.50	8.46	1.50			
																	Light brown, silty fine to medium SAND (ALLUVIUM)
										D	•	2.00					
										E	•	2.50					
30/06/2023										F	•	3.00	6.96	3.00			
																	End of investigation hole at 3.00m
														10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **05/07/2023**

CHECKED **K.C.Wu**

DATE **06/07/2023**

REMARKS
1. Inspection pit excavated to 3.00m depth.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **NOL-1631-SAT-EDH(S)17**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP**	CO-ORDINATES E **825907.11** N **839076.35**	CONTRACT No. **1631**
MACHINE & No. **Hand Dug**		DATE from **03/07/2023** to **03/07/2023**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 4.80 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
03/07/2023													4.80	0.00			
										A	•	0.50	4.30	0.50			Firm, brown, slightly clayey SILT (FILL)
										B	•	1.00	3.80	1.00			Firm, grey, silty CLAY (ALLUVIUM)
										C	•	1.50	3.30	1.50			Firm, dark grey, slightly sandy SILT (ALLUVIUM)
										D	•	2.00	2.80	2.00			Grey, slightly silty fine to coarse SAND (ALLUVIUM)
										E	•	2.50	2.30	2.50			Firm, light grey, slightly clayey SILT with occasional coarse gravels of quartz fragments (ALLUVIUM) 2.50-3.00m: slightly sandy
03/07/2023										F	•	3.00	1.80	3.00			
																	End of investigation hole at 3.00m
														10.00			

INSPECTION PIT

- ● Small Disturbed Sample
- ▲ Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **05/07/2023**

CHECKED **K.C.Wu**

DATE **06/07/2023**

REMARKS
1. Inspection pit excavated to 3.00m depth.

G2107

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **NOL-1631-SAT-EDH(S)18**

SHEET **1** of **1**

JOB TITLE **Ground Investigation for Northern Link (North)**

METHOD **IP**	CO-ORDINATES E **825947.32** N **839122.56**	CONTRACT No. **1631**
MACHINE & No. **Hand Dug**		DATE from **03/07/2023** to **03/07/2023**
FLUSHING MEDIUM **Dry drilling**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 4.68 mPD**

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	F.I. Depth	Tests	Samples No.	Type	Depth	Reduced Level	Length (m)	Legend	Grade	Description
													4.68	0.00			
03/07/2023										A	INSPECTION PIT	0.50	4.18	0.50			Firm, grey, slightly clayey SILT with occasional woodlets (FILL)
																	Firm, light grey, slightly silty CLAY (FILL)
03/07/2023										B		1.00	3.68	1.00			
																	End of investigation hole at 1.00m
														10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **05/07/2023**

CHECKED **K.C.Wu**

DATE **06/07/2023**

REMARKS
1. Inspection pit excavated to 1.00m depth.
2. 3 drillholes have been conducted but all terminated at 1m due to hard rock.

G2107

PRELIMINARY

Appendix D

Summary of Chemical Screening Test Results of Sediment Samples

Client: Lam Geotechnics Limited, Tysan Foundation Limited
Project: Ground Investigation for Northern Link

Analyte Description							Silver	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury	Total Polychlorinated biphenyls	Low M.W. PAHs	High M.W. PAHs	Tributyl Tin	PNAP ADV-21 Classification of Sediment
Unit (In dry Wt basis)							mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	ug TBT/L	
Reporting Limits							0.1	1	0.2	1	1	1	1	1	0.05	18	550	1700	0.015	
Lower Chemical Exceedance Level (LCEL)							1	12	1.5	80	65	40	75	200	0.5	23	550	1700	0.15	
Upper Chemical Exceedance Level (UCEL)							*2*	*42*	*4*	*160*	*110*	*40*	*110*	*270*	*1*	*180*	*3160*	*9600*	*0.15*	
10 x (LCEL)							10	120	15	800	650	400	750	2000	5	230	5500	17000	1.5	
ALS Lab ID	**Drilhole No.**	**Sampling Depth (mbgl)**		**No. of U100/ disturbed sample submitted**	**Date of Received**	**Date of Sampling**														
HK2224476001	NOL-1631-AUT-EDH(S)01	3.50-4.00	4.00-4.50	2 U100	25/06/2022	25/06/2022	0.1	*54*	<0.2	14	7	4	52	91	0.06	<18	<550	<1700	<0.015	*H*
HK2228652001	NOL-1631-AUT-EDH(S)02	2.50-3.00	3.00-3.50	2 U100	22/07/2022	22/07/2022	0.1	23	<0.2	13	8	6	51	59	<0.05	<18	<550	<1700	<0.015	M
HK2228652002	NOL-1631-AUT-EDH(S)02	3.50-4.00	4.00-4.50	2 U100	22/07/2022	22/07/2022	<0.1	40	<0.2	9	5	2	35	79	<0.05	<18	<550	<1700	<0.015	M
HK2315145001	NOL-1632-AUT-EDH(S)03	2.50-2.95	3.00-3.45	2 U100	19/04/2023	19/04/2023	0.1	11	<0.2	4	3	1	17	52	<0.05	<18	<550	<1700	<0.015	L
HK2315145002	NOL-1632-AUT-EDH(S)03	3.50-3.95	4.00-4.45	2 U100	19/04/2023	19/04/2023	<0.1	10	<0.2	9	5	5	26	45	<0.05	<18	<550	<1700	<0.015	L
HK2224073-001	NOL-1631-NTM-DH20(P)	5.40-5.85	5.90-6.35	2 U100	22/06/2022	22/06/2022	0.2	11	0.3	5	2	1	65	30	<0.05	<18	<550	<1700	IS	L
HK2237365001	NOL-1631-SAT-EDH(S)04	0.50-1.00	-	2 bags, 1 jar	20/09/2022	20/09/2022	0.6	32	<0.2	24	40	7	*371*	106	0.009	<18	<550	<1700	IS	*H*
HK2326302001	1632-SMA-EDH(S)03	2.00-3.00	-	2 bags, 1 jar	6/07/2023	6/07/2023	<0.1	13	<0.2	38	12	26	43	105	<0.05	<18	<550	<1700	IS	M
HK2327423001	1632-SMA-EDH(S)03	3.00-3.50	3.50-4.00	2 U100	11/07/2023	11/07/2023	0.1	16	<0.2	22	15	14	75	98	0.06	<18	<550	<1700	<0.015	M
HK2327423002	1632-SMA-EDH(S)03	4.00-4.50	-	1 U100	11/07/2023	11/07/2023	0.1	14	<0.2	9	7	4	61	77	<0.05	<18	<550	<1700	<0.015	M

Bold: Value that exceed LCEL

Bold Italic and Underlined: Value that exceed UCEL

Bold and Underlined: Value that exceed 10 x LCEL

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

IS Denoted: Insufficient interstitial water generated for TBT analysis.

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

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

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

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

Appendix E

Detailed Chemical Screening Test Reports

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 11
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2224073
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Jessewong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: MTRC CONTRACT NO 1631 GROUND INVESTIGATION FOR NORTHERN LINK (NORTH)			Date Samples Received	: 22-Jun-2022
Order number	: G2107/WO/011	Quote number	: HKE/1500/2021_V2	Issue Date	: 07-Jul-2022
C-O-C number	: ----			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics_ENV, Kwai Tsing
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics, Kwai Tsing
Wong Wing , Kenneth	Assistant Manager - Environmental	Metals_ENV, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 22-Jun-2022 to 06-Jul-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2224073

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

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

Low and High M.W. PAHs results (Method: EP076HK) are not HOKLAS accredited. 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.

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

Sample(s) as received, digested by in-house method E-ASTM D3974-09 prior to determination of metals. The in-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	LOR	Unit	Sample ID	NOL-1631-NTM-DH 20(P) 5.4-5.85, 5.9-6.35	---	---	---	---
				Sampling date / time	22-Jun-2022 11:00	----	----	----	----
					HK2224073-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		10.6	---	---	---	---
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		11	---	---	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg		0.3	---	---	---	---
EG020: Chromium	7440-47-3	1	mg/kg		5	---	---	---	---
EG020: Copper	7440-50-8	1	mg/kg		2	---	---	---	---
EG020: Lead	7439-92-1	1	mg/kg		65	---	---	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg		<0.05	---	---	---	---
EG020: Nickel	7440-02-0	1	mg/kg		1	---	---	---	---
EG020: Silver	7440-22-4	0.1	mg/kg		0.2	---	---	---	---
EG020: Zinc	7440-66-6	1	mg/kg		30	---	---	---	---
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	3	µg/kg		<3	---	---	---	---
EP065: PCB 18	37680-65-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 28	7012-37-5	3	µg/kg		<3	---	---	---	---
EP065: PCB 44	41464-39-5	3	µg/kg		<3	---	---	---	---
EP065: PCB 52	35693-99-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 66	32598-10-0	3	µg/kg		<3	---	---	---	---
EP065: PCB 77	32598-13-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 101	37680-73-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 105	32598-14-4	3	µg/kg		<3	---	---	---	---
EP065: PCB 118	31508-00-6	3	µg/kg		<3	---	---	---	---
EP065: PCB 126	57465-28-8	3	µg/kg		<3	---	---	---	---
EP065: PCB 128	38380-07-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 138	35065-28-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 153	35065-27-1	3	µg/kg		<3	---	---	---	---
EP065: PCB 169	32774-16-6	3	µg/kg		<3	---	---	---	---

Sub-Matrix: SEDIMENT				Sample ID	NOL-1631-NTM-DH 20(P) 5.4-5.85, 5.9-6.35	----	----	----	----
				Sampling date / time	22-Jun-2022 11:00	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2224073-001	------	------	------	------	
EP-065: PCB Single Congeners - Continued									
EP065: PCB 170	35065-30-6	3	µg/kg	<3	----	----	----	----	
EP065: PCB 180	35065-29-3	3	µg/kg	<3	----	----	----	----	
EP065: PCB 187	52663-68-0	3	µg/kg	<3	----	----	----	----	
EP065: Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	50	µg/kg	<50	----	----	----	----	
EP076HK: Acenaphthylene	208-96-8	50	µg/kg	<50	----	----	----	----	
EP076HK: Acenaphthene	83-32-9	50	µg/kg	<50	----	----	----	----	
EP076HK: Fluorene	86-73-7	50	µg/kg	<50	----	----	----	----	
EP076HK: Phenanthrene	85-01-8	50	µg/kg	<50	----	----	----	----	
EP076HK: Anthracene	120-12-7	50	µg/kg	<50	----	----	----	----	
EP076HK: Fluoranthene	206-44-0	150	µg/kg	<150	----	----	----	----	
EP076HK: Pyrene	129-00-0	150	µg/kg	<150	----	----	----	----	
EP076HK: Benz(a)anthracene	56-55-3	150	µg/kg	<150	----	----	----	----	
EP076HK: Chrysene	218-01-9	150	µg/kg	<150	----	----	----	----	
EP076HK: Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	----	----	----	----	
EP076HK: Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	----	----	----	----	
EP076HK: Benzo(a)pyrene	50-32-8	150	µg/kg	<150	----	----	----	----	
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	----	----	----	----	
EP076HK: Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	----	----	----	----	
EP076HK: Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	----	----	----	----	
EP076HK: Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	
EP076HK: High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	85.3	----	----	----	----	
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	81.8	----	----	----	----	
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.1	%	117	----	----	----	----	

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4425967)								
HK2224619-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	15.0	14.6	2.8
HK2224690-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	19.2	19.7	2.6
EP-065: PCB Single Congeners (QC Lot: 4426297)								
HK2223913-001	Anonymous	**Total Polychlorinated biphenyls**	----	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294)								
HK2223913-001	Anonymous	**Fluoranthene**	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294) - Continued								
HK2223913-001	Anonymous	**Indeno(1.2.3.cd)pyrene**	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4416606)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	10 mg/kg	107	----	87.2	110	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.5 mg/kg	102	----	85.0	113	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	10 mg/kg	106	----	87.7	111	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	10 mg/kg	114	----	92.0	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	10 mg/kg	96.2	----	86.7	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	108	----	86.6	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	10 mg/kg	110	----	90.6	111	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	10 mg/kg	104	----	85.0	109	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	10 mg/kg	108	----	90.9	115	----	----
EP-065: PCB Single Congeners (QC Lot: 4426297)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.4	----	52.0	111	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	94.1	----	51.0	120	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	77.7	----	73.0	122	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-065: PCB Single Congeners (QC Lot: 4426297) - Continued											
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	81.8	----	66.0	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.7	----	63.0	133	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	75.0	----	74.0	138	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	106	----	56.0	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	103	----	49.0	113	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	97.3	----	56.0	116	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	101	----	54.0	116	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	97.0	----	58.0	119	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	107	----	56.0	123	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	103	----	55.0	117	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	107	----	55.0	117	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	100	----	60.0	123	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	102	----	58.0	125	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	96.7	----	57.0	125	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	109	----	57.0	118	----	----
Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294)											
Naphthalene	91-20-3	50	µg/kg	<50	250 µg/kg	90.5	----	64.0	114	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	250 µg/kg	91.5	----	63.0	112	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	250 µg/kg	97.4	----	67.0	111	----	----
Fluorene	86-73-7	50	µg/kg	<50	250 µg/kg	95.7	----	64.0	110	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	250 µg/kg	96.8	----	63.0	109	----	----
Anthracene	120-12-7	50	µg/kg	<50	250 µg/kg	93.2	----	69.0	115	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	250 µg/kg	96.4	----	67.0	115	----	----
Pyrene	129-00-0	150	µg/kg	<150	250 µg/kg	94.7	----	66.0	116	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	250 µg/kg	95.5	----	59.0	105	----	----
Chrysene	218-01-9	150	µg/kg	<150	250 µg/kg	98.3	----	64.0	122	----	----
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	250 µg/kg	101	----	54.0	106	----	----
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	250 µg/kg	98.7	----	58.0	117	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294) - Continued											
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	250 µg/kg	90.8	----	52.0	110	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	250 µg/kg	79.4	----	48.0	85.0	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	250 µg/kg	81.3	----	50.0	90.0	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	250 µg/kg	80.6	----	49.0	92.0	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----

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

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4416606)										
HK2224073-001	NOL-1631-NTM-DH20(P) 5.4-5.85, 5.9-6.35	**EG020: Arsenic**	7440-38-2	10 mg/kg	106	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	90.1	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	10 mg/kg	97.0	----	75.0	125	----	----
		EG020: Copper	7440-50-8	10 mg/kg	113	----	75.0	125	----	----
		EG020: Lead	7439-92-1	10 mg/kg	# Not Determined	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	107	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	10 mg/kg	114	----	75.0	125	----	----
		EG020: Silver	7440-22-4	10 mg/kg	105	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	10 mg/kg	82.0	----	75.0	125	----	----
EP-065: PCB Single Congeners (QC Lot: 4426297)										
HK2223913-002	Anonymous	**PCB 8**	34883-43-7	5 µg/kg	89.2	----	50.0	130	----	----
		PCB 18	37680-65-2	5 µg/kg	98.0	----	50.0	130	----	----
		PCB 28	7012-37-5	5 µg/kg	71.2	----	50.0	130	----	----
		PCB 44	41464-39-5	5 µg/kg	78.7	----	50.0	130	----	----
		PCB 52	35693-99-3	5 µg/kg	83.0	----	50.0	130	----	----
		PCB 66	32598-10-0	5 µg/kg	70.0	----	50.0	130	----	----
		PCB 77	32598-13-3	5 µg/kg	101	----	50.0	130	----	----
		PCB 101	37680-73-2	5 µg/kg	113	----	50.0	130	----	----
		PCB 105	32598-14-4	5 µg/kg	107	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-065: PCB Single Congeners (QC Lot: 4426297) - Continued										
HK2223913-002	Anonymous	**PCB 118**	31508-00-6	5 µg/kg	110	----	50.0	130	----	----
		PCB 126	57465-28-8	5 µg/kg	107	----	50.0	130	----	----
		PCB 128	38380-07-3	5 µg/kg	107	----	50.0	130	----	----
		PCB 138	35065-28-2	5 µg/kg	115	----	50.0	130	----	----
		PCB 153	35065-27-1	5 µg/kg	118	----	50.0	130	----	----
		PCB 169	32774-16-6	5 µg/kg	108	----	50.0	130	----	----
		PCB 170	35065-30-6	5 µg/kg	114	----	50.0	130	----	----
		PCB 180	35065-29-3	5 µg/kg	116	----	50.0	130	----	----
		PCB 187	52663-68-0	5 µg/kg	121	----	50.0	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294)										
HK2223913-002	Anonymous	**Naphthalene**	91-20-3	250 µg/kg	75.5	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	76.7	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	81.8	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	78.9	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	79.1	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	79.8	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	80.3	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	79.4	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	80.4	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	81.1	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	85.3	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294) - Continued										
HK2223913-002	Anonymous	**Benzo(k)fluoranthene**	207-08-9	250 µg/kg	83.8	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	80.6	----	50.0	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	78.9	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	74.0	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	82.4	----	50.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 13
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2224476
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTH LINK (SOUTH)			Date Samples Received	: 24-Jun-2022
Order number	: ----	Quote number	: HKE/2648/2021	Issue Date	: 11-Jul-2022
C-O-C number	: ----			No. of samples received	: 1
Site	:			No. of samples analysed	: 1

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
 Anh Ngoc Huynh .	Senior Chemist	Organics_ENV, Kwai Tsing
 Chan Ka Yu , Karen	Manager - Organics	Organics_ENV, Kwai Tsing
 Chan Siu Ming , Vico	Manager - Inorganics	Inorganics, Kwai Tsing
 Wong Wing , Kenneth	Assistant Manager - Environmental	Metals_ENV, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 24-Jun-2022 to 06-Jul-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2224476

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

Low and High M.W. PAHs results (Method: EP076HK) are not HOKLAS accredited. 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.

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

Sample(s) as received, digested by in-house method E-ASTM D3974-09 prior to determination of metals. The in-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SEDIMENT				Sample ID	AUT-EDH(S)01 3.50m to 4.00m, 4.00m to 4.50m	---	---	---	---
				Sampling date / time	25-Jun-2022	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2224476-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		25.2	---	---	---	---
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		54	---	---	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	---	---	---	---
EG020: Chromium	7440-47-3	1	mg/kg		14	---	---	---	---
EG020: Copper	7440-50-8	1	mg/kg		7	---	---	---	---
EG020: Lead	7439-92-1	1	mg/kg		52	---	---	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg		0.06	---	---	---	---
EG020: Nickel	7440-02-0	1	mg/kg		4	---	---	---	---
EG020: Silver	7440-22-4	0.1	mg/kg		0.1	---	---	---	---
EG020: Zinc	7440-66-6	1	mg/kg		91	---	---	---	---
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	3	µg/kg		<3	---	---	---	---
EP065: PCB 18	37680-65-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 28	7012-37-5	3	µg/kg		<3	---	---	---	---
EP065: PCB 44	41464-39-5	3	µg/kg		<3	---	---	---	---
EP065: PCB 52	35693-99-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 66	32598-10-0	3	µg/kg		<3	---	---	---	---
EP065: PCB 77	32598-13-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 101	37680-73-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 105	32598-14-4	3	µg/kg		<3	---	---	---	---
EP065: PCB 118	31508-00-6	3	µg/kg		<3	---	---	---	---
EP065: PCB 126	57465-28-8	3	µg/kg		<3	---	---	---	---
EP065: PCB 128	38380-07-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 138	35065-28-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 153	35065-27-1	3	µg/kg		<3	---	---	---	---
EP065: PCB 169	32774-16-6	3	µg/kg		<3	---	---	---	---

Sub-Matrix: SEDIMENT				Sample ID	AUT-EDH(S)01 3.50m to 4.00m, 4.00m to 4.50m	----	----	----	----
				Sampling date / time	25-Jun-2022	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2224476-001	----	----	----	----
EP-065: PCB Single Congeners - Continued									
EP065: PCB 170	35065-30-6	3	µg/kg		<3	----	----	----	----
EP065: PCB 180	35065-29-3	3	µg/kg		<3	----	----	----	----
EP065: PCB 187	52663-68-0	3	µg/kg		<3	----	----	----	----
EP065: Total Polychlorinated biphenyls	----	18	µg/kg		<18	----	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	50	µg/kg		<50	----	----	----	----
EP076HK: Acenaphthylene	208-96-8	50	µg/kg		<50	----	----	----	----
EP076HK: Acenaphthene	83-32-9	50	µg/kg		<50	----	----	----	----
EP076HK: Fluorene	86-73-7	50	µg/kg		<50	----	----	----	----
EP076HK: Phenanthrene	85-01-8	50	µg/kg		<50	----	----	----	----
EP076HK: Anthracene	120-12-7	50	µg/kg		<50	----	----	----	----
EP076HK: Fluoranthene	206-44-0	150	µg/kg		<150	----	----	----	----
EP076HK: Pyrene	129-00-0	150	µg/kg		<150	----	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	150	µg/kg		<150	----	----	----	----
EP076HK: Chrysene	218-01-9	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	150	µg/kg		<150	----	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg		<150	----	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	150	µg/kg		<150	----	----	----	----
EP076HK: Low M.W. PAHs	----	550	µg/kg		<550	----	----	----	----
EP076HK: High M.W. PAHs	----	1700	µg/kg		<1700	----	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		72.4	----	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		78.8	----	----	----	----
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.1	%		106	----	----	----	----

Sub-Matrix: INTERSTITIAL WATER				Sample ID	AUT-EDH(S)01 3.50m to 4.00m, 4.00m to 4.50m	----	----	----	----
				Sampling date / time	25-Jun-2022	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2224476-001	-------	-------	-------	-------
EP-390: Triorganotins									
EP390: Tributyltin	56573-85-4	0.015	µg TBT /L		<0.015	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4436855)								
HK2224919-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	98.5	98.5	0.0
EG: Metals and Major Cations (QC Lot: 4422939)								
HK2224439-001	Anonymous	**EG020: Mercury**	7439-97-6	0.05	mg/kg	0.06	0.06	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.2	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	5	4	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	15	15	0.0
		EG020: Copper	7440-50-8	1	mg/kg	30	28	6.2
		EG020: Lead	7439-92-1	1	mg/kg	85	74	13.9
		EG020: Nickel	7440-02-0	1	mg/kg	5	5	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	113	123	8.0
EP-065: PCB Single Congeners (QC Lot: 4426297)								
HK2223913-001	Anonymous	**Total Polychlorinated biphenyls**	----	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-065: PCB Single Congeners (QC Lot: 4426297) - Continued								
HK2223913-001	Anonymous	**PCB 187**	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294)								
HK2223913-001	Anonymous	**Fluoranthene**	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 4440980)								
HK2223692-001	Anonymous	**Tributyltin**	56573-85-4	0.0122	µg TBT /L	<0.015	<0.015	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4422939)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	10 mg/kg	107	----	87.2	110	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.5 mg/kg	102	----	85.0	113	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	10 mg/kg	106	----	87.7	111	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	10 mg/kg	111	----	92.0	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	10 mg/kg	99.3	----	86.7	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	109	----	86.6	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	10 mg/kg	106	----	90.6	111	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	10 mg/kg	103	----	85.0	109	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	10 mg/kg	109	----	90.9	115	----	----
EP-065: PCB Single Congeners (QC Lot: 4426297)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	96.4	----	52.0	111	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	94.1	----	51.0	120	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	77.7	----	73.0	122	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	81.8	----	66.0	132	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	84.7	----	63.0	133	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	75.0	----	74.0	138	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	106	----	56.0	113	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	103	----	49.0	113	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	97.3	----	56.0	116	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	101	----	54.0	116	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	97.0	----	58.0	119	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	107	----	56.0	123	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	103	----	55.0	117	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	107	----	55.0	117	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	100	----	60.0	123	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	102	----	58.0	125	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	96.7	----	57.0	125	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	109	----	57.0	118	----	----
Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	----	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294)											
Naphthalene	91-20-3	50	µg/kg	<50	250 µg/kg	90.5	----	64.0	114	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	250 µg/kg	91.5	----	63.0	112	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	250 µg/kg	97.4	----	67.0	111	----	----
Fluorene	86-73-7	50	µg/kg	<50	250 µg/kg	95.7	----	64.0	110	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	250 µg/kg	96.8	----	63.0	109	----	----
Anthracene	120-12-7	50	µg/kg	<50	250 µg/kg	93.2	----	69.0	115	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	250 µg/kg	96.4	----	67.0	115	----	----
Pyrene	129-00-0	150	µg/kg	<150	250 µg/kg	94.7	----	66.0	116	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	250 µg/kg	95.5	----	59.0	105	----	----
Chrysene	218-01-9	150	µg/kg	<150	250 µg/kg	98.3	----	64.0	122	----	----
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	250 µg/kg	101	----	54.0	106	----	----
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	250 µg/kg	98.7	----	58.0	117	----	----
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	250 µg/kg	90.8	----	52.0	110	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	250 µg/kg	79.4	----	48.0	85.0	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	250 µg/kg	81.3	----	50.0	90.0	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	250 µg/kg	80.6	----	49.0	92.0	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-390: Triorganotins (QC Lot: 4440980)											
Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.012	0.0122 µg TBT /L	102	----	70.0	130	----	----

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

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4422939)										
HK2224331-001	Anonymous	**EG020: Arsenic**	7440-38-2	10 mg/kg	103	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	103	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	10 mg/kg	92.5	----	75.0	125	----	----
		EG020: Copper	7440-50-8	10 mg/kg	108	----	75.0	125	----	----
		EG020: Lead	7439-92-1	10 mg/kg	94.4	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	107	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	10 mg/kg	118	----	75.0	125	----	----
		EG020: Silver	7440-22-4	10 mg/kg	100	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	10 mg/kg	96.6	----	75.0	125	----	----
EP-065: PCB Single Congeners (QC Lot: 4426297)										
HK2223913-002	Anonymous	**PCB 8**	34883-43-7	5 µg/kg	89.2	----	50.0	130	----	----
		PCB 18	37680-65-2	5 µg/kg	98.0	----	50.0	130	----	----
		PCB 28	7012-37-5	5 µg/kg	71.2	----	50.0	130	----	----
		PCB 44	41464-39-5	5 µg/kg	78.7	----	50.0	130	----	----
		PCB 52	35693-99-3	5 µg/kg	83.0	----	50.0	130	----	----
		PCB 66	32598-10-0	5 µg/kg	70.0	----	50.0	130	----	----
		PCB 77	32598-13-3	5 µg/kg	101	----	50.0	130	----	----
		PCB 101	37680-73-2	5 µg/kg	113	----	50.0	130	----	----
		PCB 105	32598-14-4	5 µg/kg	107	----	50.0	130	----	----
		PCB 118	31508-00-6	5 µg/kg	110	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-065: PCB Single Congeners (QC Lot: 4426297) - Continued										
HK2223913-002	Anonymous	**PCB 126**	57465-28-8	5 µg/kg	107	----	50.0	130	----	----
		PCB 128	38380-07-3	5 µg/kg	107	----	50.0	130	----	----
		PCB 138	35065-28-2	5 µg/kg	115	----	50.0	130	----	----
		PCB 153	35065-27-1	5 µg/kg	118	----	50.0	130	----	----
		PCB 169	32774-16-6	5 µg/kg	108	----	50.0	130	----	----
		PCB 170	35065-30-6	5 µg/kg	114	----	50.0	130	----	----
		PCB 180	35065-29-3	5 µg/kg	116	----	50.0	130	----	----
		PCB 187	52663-68-0	5 µg/kg	121	----	50.0	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294)										
HK2223913-002	Anonymous	**Naphthalene**	91-20-3	250 µg/kg	75.5	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	76.7	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	81.8	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	78.9	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	79.1	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	79.8	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	80.3	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	79.4	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	80.4	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	81.1	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	85.3	----	50.0	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	83.8	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	80.6	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4426294) - Continued										
HK2223913-002	Anonymous	**Indeno(1.2.3.cd)pyrene**	193-39-5	250 µg/kg	78.9	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	74.0	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	82.4	----	50.0	130	----	----

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-390: Triorganotins (QC Lot: 4440980)										
HK2223692-002	Anonymous	**Tributyltin**	56573-85-4	0.0122 µg TBT /L	109	----	70.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 13
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2228652
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 22-Jul-2022
Order number	: ----	Quote number	: HKE/2648/2021	Issue Date	: 05-Aug-2022
C-O-C number	: ----			No. of samples received	: 2
Site	:			No. of samples analysed	: 2

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
 Anh Ngoc Huynh .	Senior Chemist	Organics_ENV, Kwai Tsing
 Chan Ka Yu , Karen	Manager - Organics	Organics_ENV, Kwai Tsing
 Lin Wai Yu , Iris	Assistant Manager - Inorganics	Inorganics, Kwai Tsing
 Wong Wing , Kenneth	Assistant Manager - Environmental	Metals_ENV, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 22-Jul-2022 to 05-Aug-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2228652

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Low and High M.W. PAHs results (Method: EP076HK) are not HOKLAS accredited. 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.

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

Sample(s) as received, digested by in-house method E-ASTM D3974-09 prior to determination of metals. The in-house method is developed based on ASTM D3974-09 method.

TBT result(s) (Method: EP390) is/are reported on as received basis.

Analytical Results

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	LOR	Unit	Sample ID	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	----	----	----
				Sampling date / time	22-Jul-2022 11:45	22-Jul-2022 13:45	----	----	----
					HK2228652-001	HK2228652-002	-------	-------	-------
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		27.1	18.5	----	----	----
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		23	40	----	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	<0.2	----	----	----
EG020: Chromium	7440-47-3	1	mg/kg		13	9	----	----	----
EG020: Copper	7440-50-8	1	mg/kg		8	5	----	----	----
EG020: Lead	7439-92-1	1	mg/kg		51	35	----	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg		<0.05	<0.05	----	----	----
EG020: Nickel	7440-02-0	1	mg/kg		6	2	----	----	----
EG020: Silver	7440-22-4	0.1	mg/kg		0.1	<0.1	----	----	----
EG020: Zinc	7440-66-6	1	mg/kg		59	79	----	----	----
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	3	µg/kg		<3	<3	----	----	----
EP065: PCB 18	37680-65-2	3	µg/kg		<3	<3	----	----	----
EP065: PCB 28	7012-37-5	3	µg/kg		<3	<3	----	----	----
EP065: PCB 44	41464-39-5	3	µg/kg		<3	<3	----	----	----
EP065: PCB 52	35693-99-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 66	32598-10-0	3	µg/kg		<3	<3	----	----	----
EP065: PCB 77	32598-13-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 101	37680-73-2	3	µg/kg		<3	<3	----	----	----
EP065: PCB 105	32598-14-4	3	µg/kg		<3	<3	----	----	----
EP065: PCB 118	31508-00-6	3	µg/kg		<3	<3	----	----	----
EP065: PCB 126	57465-28-8	3	µg/kg		<3	<3	----	----	----
EP065: PCB 128	38380-07-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 138	35065-28-2	3	µg/kg		<3	<3	----	----	----
EP065: PCB 153	35065-27-1	3	µg/kg		<3	<3	----	----	----
EP065: PCB 169	32774-16-6	3	µg/kg		<3	<3	----	----	----
EP065: PCB 170	35065-30-6	3	µg/kg		<3	<3	----	----	----

Sub-Matrix: SEDIMENT				Sample ID	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	----	----	----
				Sampling date / time	22-Jul-2022 11:45	22-Jul-2022 13:45	----	----	----
Compound	CAS Number	LOR	Unit		HK2228652-001	HK2228652-002	-------	-------	-------
EP-065: PCB Single Congeners - Continued									
EP065: PCB 180	35065-29-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 187	52663-68-0	3	µg/kg		<3	<3	----	----	----
EP065: Total Polychlorinated biphenyls	----	18	µg/kg		<18	<18	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	50	µg/kg		<50	<50	----	----	----
EP076HK: Acenaphthylene	208-96-8	50	µg/kg		<50	<50	----	----	----
EP076HK: Acenaphthene	83-32-9	50	µg/kg		<50	<50	----	----	----
EP076HK: Fluorene	86-73-7	50	µg/kg		<50	<50	----	----	----
EP076HK: Phenanthrene	85-01-8	50	µg/kg		<50	<50	----	----	----
EP076HK: Anthracene	120-12-7	50	µg/kg		<50	<50	----	----	----
EP076HK: Fluoranthene	206-44-0	150	µg/kg		<150	<150	----	----	----
EP076HK: Pyrene	129-00-0	150	µg/kg		<150	<150	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	150	µg/kg		<150	<150	----	----	----
EP076HK: Chrysene	218-01-9	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	150	µg/kg		<150	<150	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg		<150	<150	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	150	µg/kg		<150	<150	----	----	----
EP076HK: Low M.W. PAHs	----	550	µg/kg		<550	<550	----	----	----
EP076HK: High M.W. PAHs	----	1700	µg/kg		<1700	<1700	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		79.1	85.6	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		94.9	102	----	----	----
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.1	%		69.5	80.5	----	----	----

Sub-Matrix: INTERSTITIAL WATER			Sample ID	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	----	----	----
			Sampling date / time	22-Jul-2022 11:45	22-Jul-2022 13:45	----	----	----
Compound	CAS Number	LOR	Unit	HK2228652-001	HK2228652-002	-------	-------	-------
EP-390: Triorganotins								
EP390: Tributyltin	56573-85-4	0.015	µg TBT /L	<0.015	<0.015	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4491008)								
HK2228622-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	9.4	9.6	2.0
HK2229481-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	15.8	15.8	0.0
EG: Metals and Major Cations (QC Lot: 4478272)								
HK2228436-002	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	8	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	37	36	2.7
		EG020: Copper	7440-50-8	1	mg/kg	15	14	0.0
		EG020: Lead	7439-92-1	1	mg/kg	34	32	6.6
		EG020: Nickel	7440-02-0	1	mg/kg	25	24	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	102	97	4.8
EP-065: PCB Single Congeners (QC Lot: 4483388)								
HK2228259-001	Anonymous	Total Polychlorinated biphenyls	----	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-065: PCB Single Congeners (QC Lot: 4483388) - Continued								
HK2228259-001	Anonymous	**PCB 180**	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4483387)								
HK2228259-001	Anonymous	**Fluoranthene**	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 4494972)								
HK2228263-001	Anonymous	**Tributyltin**	56573-85-4	0.0122	µg TBT /L	<0.015	<0.015	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4478272)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	10 mg/kg	106	----	87.2	110	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.5 mg/kg	104	----	85.0	113	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	10 mg/kg	106	----	87.7	111	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	10 mg/kg	112	----	92.0	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	10 mg/kg	97.3	----	86.7	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	102	----	86.6	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	10 mg/kg	109	----	90.6	111	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	10 mg/kg	103	----	85.0	109	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	10 mg/kg	112	----	90.9	115	----	----
EP-065: PCB Single Congeners (QC Lot: 4483388)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	81.0	----	57.0	105	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	68.9	----	58.0	104	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	108	----	64.0	114	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	101	----	56.0	121	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	93.9	----	57.0	118	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	111	----	55.0	129	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	82.3	----	57.0	110	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	74.6	----	59.0	106	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	81.4	----	60.0	107	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	74.4	----	58.0	107	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	78.9	----	63.0	108	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	74.5	----	61.0	112	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	75.7	----	60.0	110	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	73.3	----	56.0	113	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	80.0	----	67.0	107	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	74.3	----	63.0	110	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	72.9	----	62.0	108	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	74.3	----	57.0	113	----	----
Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	----	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4483387)											
Naphthalene	91-20-3	50	µg/kg	<50	250 µg/kg	89.9	----	64.0	114	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	250 µg/kg	97.9	----	63.0	112	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	250 µg/kg	95.1	----	67.0	111	----	----
Fluorene	86-73-7	50	µg/kg	<50	250 µg/kg	96.9	----	64.0	110	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	250 µg/kg	94.1	----	63.0	109	----	----
Anthracene	120-12-7	50	µg/kg	<50	250 µg/kg	97.1	----	69.0	115	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	250 µg/kg	98.3	----	67.0	115	----	----
Pyrene	129-00-0	150	µg/kg	<150	250 µg/kg	97.0	----	66.0	116	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	250 µg/kg	98.3	----	59.0	105	----	----
Chrysene	218-01-9	150	µg/kg	<150	250 µg/kg	94.4	----	64.0	122	----	----
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	250 µg/kg	93.8	----	54.0	106	----	----
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	250 µg/kg	92.6	----	58.0	117	----	----
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	250 µg/kg	97.7	----	52.0	110	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	250 µg/kg	81.9	----	48.0	85.0	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	250 µg/kg	86.6	----	50.0	90.0	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	250 µg/kg	80.2	----	49.0	92.0	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-390: Triorganotins (QC Lot: 4494972)											
Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.012	0.0122 µg TBT /L	88.0	----	70.0	130	----	----

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

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report							
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4478272)										
HK2228436-001	Anonymous	**EG020: Arsenic**	7440-38-2	10 mg/kg	107	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	107	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	10 mg/kg	80.4	----	75.0	125	----	----
		EG020: Copper	7440-50-8	10 mg/kg	113	----	75.0	125	----	----
		EG020: Lead	7439-92-1	10 mg/kg	91.4	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	105	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	10 mg/kg	93.2	----	75.0	125	----	----
		EG020: Silver	7440-22-4	10 mg/kg	103	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	10 mg/kg	# Not Determined	----	75.0	125	----	----
EP-065: PCB Single Congeners (QC Lot: 4483388)										
HK2228261-001	Anonymous	**PCB 8**	34883-43-7	5 µg/kg	70.5	----	50.0	130	----	----
		PCB 18	37680-65-2	5 µg/kg	62.0	----	50.0	130	----	----
		PCB 28	7012-37-5	5 µg/kg	109	----	50.0	130	----	----
		PCB 44	41464-39-5	5 µg/kg	103	----	50.0	130	----	----
		PCB 52	35693-99-3	5 µg/kg	98.5	----	50.0	130	----	----
		PCB 66	32598-10-0	5 µg/kg	114	----	50.0	130	----	----
		PCB 77	32598-13-3	5 µg/kg	73.3	----	50.0	130	----	----
		PCB 101	37680-73-2	5 µg/kg	65.0	----	50.0	130	----	----
		PCB 105	32598-14-4	5 µg/kg	69.9	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-065: PCB Single Congeners (QC Lot: 4483388) - Continued										
HK2228261-001	Anonymous	**PCB 118**	31508-00-6	5 µg/kg	67.3	----	50.0	130	----	----
		PCB 126	57465-28-8	5 µg/kg	72.8	----	50.0	130	----	----
		PCB 128	38380-07-3	5 µg/kg	68.4	----	50.0	130	----	----
		PCB 138	35065-28-2	5 µg/kg	66.5	----	50.0	130	----	----
		PCB 153	35065-27-1	5 µg/kg	65.7	----	50.0	130	----	----
		PCB 169	32774-16-6	5 µg/kg	70.9	----	50.0	130	----	----
		PCB 170	35065-30-6	5 µg/kg	68.6	----	50.0	130	----	----
		PCB 180	35065-29-3	5 µg/kg	67.6	----	50.0	130	----	----
		PCB 187	52663-68-0	5 µg/kg	64.6	----	50.0	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4483387)										
HK2228261-001	Anonymous	**Naphthalene**	91-20-3	250 µg/kg	77.7	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	84.9	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	79.6	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	82.4	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	85.2	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	85.9	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	89.0	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	86.8	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	85.7	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	80.5	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	84.7	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4483387) - Continued										
HK2228261-001	Anonymous	**Benzo(k)fluoranthene**	207-08-9	250 µg/kg	93.1	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	86.6	----	50.0	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	80.0	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	75.7	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	84.9	----	50.0	130	----	----

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-390: Triorganotins (QC Lot: 4494972)										
HK2228263-001	Anonymous	**Tributyltin**	56573-85-4	0.0122 µg TBT /L	90.4	----	70.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 13
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2315145
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 19-Apr-2023
Order number	: ----	Quote number	: HKE/2648/2021	Issue Date	: 04-May-2023
C-O-C number	: ----			No. of samples received	: 2
Site	:			No. of samples analysed	: 2

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics_ENV
Chan Ka Yu , Karen	Manager - Organics	Organics_ENV
Chan Siu Ming , Vico	Assistant Laboratory Manager	Inorganics
Wong Wing , Kenneth	Assistant Manager - Environmental	Metals_ENV

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 19-Apr-2023 to 02-May-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2315145

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

Analysis of Tributyltin in interstitial water was cancelled for HK2315145-001 due to insufficient volume of interstitial water.

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

Sample(s) as received, digested by in-house method E-ASTM D3974-09 prior to determination of metals. The in-house method is developed based on ASTM D3974-09 method.

TBT result(s) (Method: EP390) is/are reported on as received basis.

Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	Sample ID	AUT-EDH(S)03 (2.50-2.95m, 3.00-3.45m)	AUT-EDH(S)03 (3.50-3.95m, 4.00-4.45m)	----	----	----
				Sampling date / time	19-Apr-2023 10:45	19-Apr-2023 11:25	----	----	----
					HK2315145-001	HK2315145-002	-------	-------	-------
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		13.5	19.3	----	----	----
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		11	10	----	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	<0.2	----	----	----
EG020: Chromium	7440-47-3	1	mg/kg		4	9	----	----	----
EG020: Copper	7440-50-8	1	mg/kg		3	5	----	----	----
EG020: Lead	7439-92-1	1	mg/kg		17	26	----	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg		<0.05	<0.05	----	----	----
EG020: Nickel	7440-02-0	1	mg/kg		1	5	----	----	----
EG020: Silver	7440-22-4	0.1	mg/kg		0.1	<0.1	----	----	----
EG020: Zinc	7440-66-6	1	mg/kg		52	45	----	----	----
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	3	µg/kg		<3	<3	----	----	----
EP065: PCB 18	37680-65-2	3	µg/kg		<3	<3	----	----	----
EP065: PCB 28	7012-37-5	3	µg/kg		<3	<3	----	----	----
EP065: PCB 44	41464-39-5	3	µg/kg		<3	<3	----	----	----
EP065: PCB 52	35693-99-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 66	32598-10-0	3	µg/kg		<3	<3	----	----	----
EP065: PCB 77	32598-13-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 101	37680-73-2	3	µg/kg		<3	<3	----	----	----
EP065: PCB 105	32598-14-4	3	µg/kg		<3	<3	----	----	----
EP065: PCB 118	31508-00-6	3	µg/kg		<3	<3	----	----	----
EP065: PCB 126	57465-28-8	3	µg/kg		<3	<3	----	----	----
EP065: PCB 128	38380-07-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 138	35065-28-2	3	µg/kg		<3	<3	----	----	----
EP065: PCB 153	35065-27-1	3	µg/kg		<3	<3	----	----	----
EP065: PCB 169	32774-16-6	3	µg/kg		<3	<3	----	----	----

Sub-Matrix: SOIL				Sample ID	AUT-EDH(S)03 (2.50-2.95m, 3.00-3.45m)	AUT-EDH(S)03 (3.50-3.95m, 4.00-4.45m)	----	----	----
				Sampling date / time	19-Apr-2023 10:45	19-Apr-2023 11:25	----	----	----
Compound	CAS Number	LOR	Unit		HK2315145-001	HK2315145-002	-------	-------	-------
EP-065: PCB Single Congeners - Continued									
EP065: PCB 170	35065-30-6	3	µg/kg		<3	<3	----	----	----
EP065: PCB 180	35065-29-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 187	52663-68-0	3	µg/kg		<3	<3	----	----	----
EP065: Total Polychlorinated biphenyls	----	18	µg/kg		<18	<18	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	50	µg/kg		<50	<50	----	----	----
EP076HK: Acenaphthylene	208-96-8	50	µg/kg		<50	<50	----	----	----
EP076HK: Acenaphthene	83-32-9	50	µg/kg		<50	<50	----	----	----
EP076HK: Fluorene	86-73-7	50	µg/kg		<50	<50	----	----	----
EP076HK: Phenanthrene	85-01-8	50	µg/kg		<50	<50	----	----	----
EP076HK: Anthracene	120-12-7	50	µg/kg		<50	<50	----	----	----
EP076HK: Fluoranthene	206-44-0	150	µg/kg		<150	<150	----	----	----
EP076HK: Pyrene	129-00-0	150	µg/kg		<150	<150	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	150	µg/kg		<150	<150	----	----	----
EP076HK: Chrysene	218-01-9	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	150	µg/kg		<150	<150	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg		<150	<150	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	150	µg/kg		<150	<150	----	----	----
EP076HK: Low M.W. PAHs	----	550	µg/kg		<550	<550	----	----	----
EP076HK: High M.W. PAHs	----	1700	µg/kg		<1700	<1700	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		78.0	88.3	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		99.8	108	----	----	----
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.1	%		67.4	72.8	----	----	----

Sub-Matrix: INTERSTITIAL WATER								
			Sample ID	AUT-EDH(S)03 (3.50-3.95m, 4.00-4.45m)	----	----	----	----
			Sampling date / time	19-Apr-2023 11:25	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	HK2315145-002	-------	-------	-------	-------
EP-390: Triorganotins								
EP390: Tributyltin	56573-85-4	0.015	µg TBT /L	<0.015	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 5011587)								
HK2314795-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	3.6	3.7	0.0
HK2314795-011	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	2.0	1.9	0.0
EG: Metals and Major Cations (QC Lot: 5008557)								
HK2314946-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.08	0.10	19.7
		EG020: Silver	7440-22-4	0.1	mg/kg	0.2	0.3	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	16	17	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	40	42	2.8
		EG020: Copper	7440-50-8	1	mg/kg	30	32	5.4
		EG020: Lead	7439-92-1	1	mg/kg	48	49	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	27	28	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	110	113	2.5
EP-065: PCB Single Congeners (QC Lot: 5010543)								
HK2314946-001	Anonymous	Total Polychlorinated biphenyls	----	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-065: PCB Single Congeners (QC Lot: 5010543) - Continued								
HK2314946-001	Anonymous	PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5010542)								
HK2314946-001	Anonymous	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 5022700)								
HK2315655-003	Anonymous	Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.015	<0.015	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 5008557)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	10 mg/kg	99.5	----	87.2	110	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.5 mg/kg	99.1	----	85.0	113	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	10 mg/kg	102	----	87.7	111	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	10 mg/kg	109	----	92.0	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	10 mg/kg	97.0	----	86.7	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	109	----	86.6	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	10 mg/kg	107	----	90.6	111	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	10 mg/kg	101	----	85.0	109	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	10 mg/kg	108	----	90.9	115	----	----
EP-065: PCB Single Congeners (QC Lot: 5010543)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	113	----	45.0	116	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	110	----	41.0	132	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	105	----	51.0	146	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	105	----	36.0	168	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	104	----	43.0	155	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	106	----	38.0	163	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	110	----	65.0	115	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	105	----	66.0	118	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	108	----	67.0	114	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	109	----	69.0	111	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	113	----	63.0	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	112	----	67.0	117	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	106	----	67.0	115	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	107	----	69.0	114	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	109	----	61.0	124	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	103	----	64.0	122	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	104	----	65.0	120	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	107	----	66.0	117	----	----
Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	----	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5010542)											
Naphthalene	91-20-3	50	µg/kg	<50	250 µg/kg	112	----	74.0	117	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	250 µg/kg	116	----	64.0	135	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	250 µg/kg	114	----	73.0	121	----	----
Fluorene	86-73-7	50	µg/kg	<50	250 µg/kg	115	----	74.0	118	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	250 µg/kg	115	----	74.0	123	----	----
Anthracene	120-12-7	50	µg/kg	<50	250 µg/kg	116	----	75.0	118	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	250 µg/kg	113	----	79.0	115	----	----
Pyrene	129-00-0	150	µg/kg	<150	250 µg/kg	112	----	78.0	114	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	250 µg/kg	117	----	79.0	118	----	----
Chrysene	218-01-9	150	µg/kg	<150	250 µg/kg	114	----	87.0	114	----	----
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	250 µg/kg	118	----	79.0	120	----	----
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	250 µg/kg	120	----	77.0	125	----	----
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	250 µg/kg	115	----	79.0	117	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	250 µg/kg	114	----	62.0	114	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	250 µg/kg	109	----	70.0	111	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	250 µg/kg	111	----	62.0	126	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-390: Triorganotins (QC Lot: 5022700)											
Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.012	0.0122 µg TBT /L	119	----	70.0	130	----	----

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

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 5008557)										
HK2314941-011	Anonymous	EG020: Arsenic	7440-38-2	10 mg/kg	106	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	110	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	10 mg/kg	# Not Determined	----	75.0	125	----	----
		EG020: Copper	7440-50-8	10 mg/kg	# Not Determined	----	75.0	125	----	----
		EG020: Lead	7439-92-1	10 mg/kg	96.5	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	10 mg/kg	# Not Determined	----	75.0	125	----	----
		EG020: Silver	7440-22-4	10 mg/kg	100	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	10 mg/kg	# Not Determined	----	75.0	125	----	----
EP-065: PCB Single Congeners (QC Lot: 5010543)										
HK2314946-001	Anonymous	PCB 8	34883-43-7	5 µg/kg	86.4	----	50.0	130	----	----
		PCB 18	37680-65-2	5 µg/kg	87.2	----	50.0	130	----	----
		PCB 28	7012-37-5	5 µg/kg	81.8	----	50.0	130	----	----
		PCB 44	41464-39-5	5 µg/kg	87.2	----	50.0	130	----	----
		PCB 52	35693-99-3	5 µg/kg	100	----	50.0	130	----	----
		PCB 66	32598-10-0	5 µg/kg	86.8	----	50.0	130	----	----
		PCB 77	32598-13-3	5 µg/kg	84.2	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-065: PCB Single Congeners (QC Lot: 5010543) - Continued										
HK2314946-001	Anonymous	**PCB 101**	37680-73-2	5 µg/kg	83.8	----	50.0	130	----	----
		PCB 105	32598-14-4	5 µg/kg	84.6	----	50.0	130	----	----
		PCB 118	31508-00-6	5 µg/kg	87.2	----	50.0	130	----	----
		PCB 126	57465-28-8	5 µg/kg	90.2	----	50.0	130	----	----
		PCB 128	38380-07-3	5 µg/kg	91.2	----	50.0	130	----	----
		PCB 138	35065-28-2	5 µg/kg	84.3	----	50.0	130	----	----
		PCB 153	35065-27-1	5 µg/kg	84.3	----	50.0	130	----	----
		PCB 169	32774-16-6	5 µg/kg	84.7	----	50.0	130	----	----
		PCB 170	35065-30-6	5 µg/kg	82.7	----	50.0	130	----	----
		PCB 180	35065-29-3	5 µg/kg	81.3	----	50.0	130	----	----
		PCB 187	52663-68-0	5 µg/kg	84.5	----	50.0	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5010542)										
HK2314946-001	Anonymous	**Naphthalene**	91-20-3	250 µg/kg	90.2	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	96.9	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	92.5	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	96.4	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	97.8	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	100	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	96.6	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5010542) - Continued										
HK2314946-001	Anonymous	Pyrene	129-00-0	250 µg/kg	95.7	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	103	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	103	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	107	----	50.0	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	102	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	104	----	50.0	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	103	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	107	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	104	----	50.0	130	----	----

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-390: Triorganotins (QC Lot: 5022700)										
HK2315655-003	Anonymous	Tributyltin	56573-85-4	0.0122 µg TBT /L	110	----	70.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 12
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2237365
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Jessewong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: MTRC CONTRACT NO 1631 GROUND INVESTIGATION FOR NORTHERN LINK (NORTH)			Date Samples Received	: 20-Sep-2022
Order number	: G2107/WO/011	Quote number	: HKE/1500/2021_V2	Issue Date	: 06-Oct-2022
C-O-C number	: ----			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
 Anh Ngoc Huynh .	Senior Chemist	Organics_ENV, Kwai Tsing
 Chan Ka Yu , Karen	Manager - Organics	Organics_ENV, Kwai Tsing
 Chan Siu Ming , Vico	Manager - Inorganics	Inorganics, Kwai Tsing
 Wong Wing , Kenneth	Assistant Manager - Environmental	Metals_ENV, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 20-Sep-2022 to 05-Oct-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2237365

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

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

Low and High M.W. PAHs results (Method: EP076HK) are not HOKLAS accredited. 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.

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

Sample(s) as received, digested by in-house method E-ASTM D3974-09 prior to determination of metals. The in-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: SEDIMENT				Sample ID	NOL-1631-SAT-ED H(S)04 0.50-1.00M	---	---	---	---
				Sampling date / time	20-Sep-2022 13:00	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2237365-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		29.4	---	---	---	---
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		32	---	---	---	---
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	---	---	---	---
EG020: Chromium	7440-47-3	1	mg/kg		24	---	---	---	---
EG020: Copper	7440-50-8	1	mg/kg		40	---	---	---	---
EG020: Lead	7439-92-1	1	mg/kg		371	---	---	---	---
EG020: Mercury	7439-97-6	0.05	mg/kg		0.09	---	---	---	---
EG020: Nickel	7440-02-0	1	mg/kg		7	---	---	---	---
EG020: Silver	7440-22-4	0.1	mg/kg		0.6	---	---	---	---
EG020: Zinc	7440-66-6	1	mg/kg		106	---	---	---	---
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	3	µg/kg		<3	---	---	---	---
EP065: PCB 18	37680-65-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 28	7012-37-5	3	µg/kg		<3	---	---	---	---
EP065: PCB 44	41464-39-5	3	µg/kg		<3	---	---	---	---
EP065: PCB 52	35693-99-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 66	32598-10-0	3	µg/kg		<3	---	---	---	---
EP065: PCB 77	32598-13-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 101	37680-73-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 105	32598-14-4	3	µg/kg		<3	---	---	---	---
EP065: PCB 118	31508-00-6	3	µg/kg		<3	---	---	---	---
EP065: PCB 126	57465-28-8	3	µg/kg		<3	---	---	---	---
EP065: PCB 128	38380-07-3	3	µg/kg		<3	---	---	---	---
EP065: PCB 138	35065-28-2	3	µg/kg		<3	---	---	---	---
EP065: PCB 153	35065-27-1	3	µg/kg		<3	---	---	---	---
EP065: PCB 169	32774-16-6	3	µg/kg		<3	---	---	---	---

Sub-Matrix: SEDIMENT				Sample ID	NOL-1631-SAT-ED H(S)04 0.50-1.00M	----	----	----	----
				Sampling date / time	20-Sep-2022 13:00	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2237365-001	------	------	------	------
EP-065: PCB Single Congeners - Continued									
EP065: PCB 170	35065-30-6	3	µg/kg		<3	----	----	----	----
EP065: PCB 180	35065-29-3	3	µg/kg		<3	----	----	----	----
EP065: PCB 187	52663-68-0	3	µg/kg		<3	----	----	----	----
EP065: Total Polychlorinated biphenyls	----	18	µg/kg		<18	----	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	50	µg/kg		<50	----	----	----	----
EP076HK: Acenaphthylene	208-96-8	50	µg/kg		<50	----	----	----	----
EP076HK: Acenaphthene	83-32-9	50	µg/kg		<50	----	----	----	----
EP076HK: Fluorene	86-73-7	50	µg/kg		<50	----	----	----	----
EP076HK: Phenanthrene	85-01-8	50	µg/kg		<50	----	----	----	----
EP076HK: Anthracene	120-12-7	50	µg/kg		<50	----	----	----	----
EP076HK: Fluoranthene	206-44-0	150	µg/kg		<150	----	----	----	----
EP076HK: Pyrene	129-00-0	150	µg/kg		<150	----	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	150	µg/kg		<150	----	----	----	----
EP076HK: Chrysene	218-01-9	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	150	µg/kg		<150	----	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg		<150	----	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	150	µg/kg		<150	----	----	----	----
EP076HK: Low M.W. PAHs	----	550	µg/kg		<550	----	----	----	----
EP076HK: High M.W. PAHs	----	1700	µg/kg		<1700	----	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		**79.3**	----	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		**98.9**	----	----	----	----
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.1	%		**97.4**	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4602375)								
HK2237282-002	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	1.5	1.6	0.0
HK2237282-012	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	0.9	1.0	0.0
EG: Metals and Major Cations (QC Lot: 4595386)								
HK2237235-002	Anonymous	**EG020: Mercury**	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	9	9	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	12	13	0.0
		EG020: Copper	7440-50-8	1	mg/kg	4	4	0.0
		EG020: Lead	7439-92-1	1	mg/kg	30	28	6.7
		EG020: Nickel	7440-02-0	1	mg/kg	7	7	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	36	36	0.0
EP-065: PCB Single Congeners (QC Lot: 4602754)								
HK2238028-001	Anonymous	**Total Polychlorinated biphenyls**	----	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-065: PCB Single Congeners (QC Lot: 4602754) - Continued								
HK2238028-001	Anonymous	**PCB 180**	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4602755)								
HK2238028-001	Anonymous	**Fluoranthene**	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4595386)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	10 mg/kg	101	----	87.2	110	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.5 mg/kg	98.4	----	85.0	113	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	10 mg/kg	102	----	87.7	111	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4595386) - Continued											
EG020: Copper	7440-50-8	1	mg/kg	<1	10 mg/kg	111	----	92.0	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	10 mg/kg	113	----	86.7	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	108	----	86.6	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	10 mg/kg	108	----	90.6	111	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	10 mg/kg	101	----	85.0	109	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	10 mg/kg	105	----	90.9	115	----	----
EP-065: PCB Single Congeners (QC Lot: 4602754)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	73.2	----	57.0	105	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	67.2	----	58.0	104	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	92.2	----	64.0	114	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	103	----	56.0	121	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	99.7	----	57.0	118	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	108	----	55.0	129	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	80.4	----	57.0	110	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	84.0	----	59.0	106	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	87.0	----	60.0	107	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	86.4	----	58.0	107	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	89.3	----	63.0	108	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	96.6	----	61.0	112	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	93.5	----	60.0	110	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	92.4	----	56.0	113	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	102	----	67.0	107	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	105	----	63.0	110	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	102	----	62.0	108	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	98.6	----	57.0	113	----	----
Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4602755)											
Naphthalene	91-20-3	50	µg/kg	<50	250 µg/kg	91.7	----	74.0	107	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	250 µg/kg	92.5	----	70.0	111	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4602755) - Continued											
Acenaphthene	83-32-9	50	µg/kg	<50	250 µg/kg	91.7	----	71.0	111	----	----
Fluorene	86-73-7	50	µg/kg	<50	250 µg/kg	92.7	----	70.0	108	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	250 µg/kg	93.8	----	65.0	110	----	----
Anthracene	120-12-7	50	µg/kg	<50	250 µg/kg	94.0	----	73.0	110	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	250 µg/kg	96.5	----	71.0	111	----	----
Pyrene	129-00-0	150	µg/kg	<150	250 µg/kg	96.4	----	70.0	110	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	250 µg/kg	87.1	----	63.0	110	----	----
Chrysene	218-01-9	150	µg/kg	<150	250 µg/kg	90.8	----	64.0	115	----	----
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	250 µg/kg	91.7	----	59.0	114	----	----
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	250 µg/kg	96.7	----	67.0	115	----	----
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	250 µg/kg	93.6	----	62.0	110	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	250 µg/kg	86.6	----	47.0	98.0	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	250 µg/kg	85.1	----	52.0	103	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	250 µg/kg	83.0	----	49.0	104	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----

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

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4595386)										
HK2237235-001	Anonymous	**EG020: Arsenic**	7440-38-2	10 mg/kg	95.3	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	97.8	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	10 mg/kg	92.2	----	75.0	125	----	----
		EG020: Copper	7440-50-8	10 mg/kg	97.3	----	75.0	125	----	----
		EG020: Lead	7439-92-1	10 mg/kg	91.6	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	107	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	10 mg/kg	94.8	----	75.0	125	----	----
		EG020: Silver	7440-22-4	10 mg/kg	96.0	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	10 mg/kg	86.6	----	75.0	125	----	----
EP-065: PCB Single Congeners (QC Lot: 4602754)										
HK2238028-002	Anonymous	**PCB 8**	34883-43-7	5 µg/kg	70.2	----	50.0	130	----	----
		PCB 18	37680-65-2	5 µg/kg	71.4	----	50.0	130	----	----
		PCB 28	7012-37-5	5 µg/kg	95.0	----	50.0	130	----	----
		PCB 44	41464-39-5	5 µg/kg	94.4	----	50.0	130	----	----
		PCB 52	35693-99-3	5 µg/kg	92.2	----	50.0	130	----	----
		PCB 66	32598-10-0	5 µg/kg	93.4	----	50.0	130	----	----
		PCB 77	32598-13-3	5 µg/kg	74.0	----	50.0	130	----	----
		PCB 101	37680-73-2	5 µg/kg	78.1	----	50.0	130	----	----
		PCB 105	32598-14-4	5 µg/kg	82.5	----	50.0	130	----	----
		PCB 118	31508-00-6	5 µg/kg	81.3	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-065: PCB Single Congeners (QC Lot: 4602754) - Continued										
HK2238028-002	Anonymous	**PCB 126**	57465-28-8	5 µg/kg	85.6	----	50.0	130	----	----
		PCB 128	38380-07-3	5 µg/kg	90.3	----	50.0	130	----	----
		PCB 138	35065-28-2	5 µg/kg	89.1	----	50.0	130	----	----
		PCB 153	35065-27-1	5 µg/kg	87.4	----	50.0	130	----	----
		PCB 169	32774-16-6	5 µg/kg	94.8	----	50.0	130	----	----
		PCB 170	35065-30-6	5 µg/kg	97.0	----	50.0	130	----	----
		PCB 180	35065-29-3	5 µg/kg	95.5	----	50.0	130	----	----
		PCB 187	52663-68-0	5 µg/kg	92.6	----	50.0	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4602755)										
HK2238028-002	Anonymous	**Naphthalene**	91-20-3	250 µg/kg	83.1	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	85.7	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	84.7	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	86.9	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	88.5	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	91.4	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	93.6	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	94.1	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	86.3	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	89.4	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	91.4	----	50.0	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	91.4	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	92.4	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4602755) - Continued										
HK2238028-002	Anonymous	**Indeno(1.2.3.cd)pyrene**	193-39-5	250 µg/kg	88.3	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	92.7	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	81.9	----	50.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 12
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2326302
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (NORTH)			Date Samples Received	: 06-Jul-2023
Order number	: ----	Quote number	: HKE/1500/2021_V6	Issue Date	: 20-Jul-2023
C-O-C number	: ----			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics_ENV
Chan Ka Yu , Karen	Manager - Organics	Organics_ENV
Chan Siu Ming , Vico	Assistant Laboratory Manager	Inorganics
Wong Wing , Kenneth	Assistant Manager - Metals	Metals_ENV

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 06-Jul-2023 to 20-Jul-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2326302

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

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

Low and High M.W. PAHs results (Method: EP076HK) are not HOKLAS accredited. 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.

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

Sample(s) as received, digested by in-house method E-ASTM D3974-09 prior to determination of metals. The in-house method is developed based on ASTM D3974-09 method.

Analytical Results

Sub-Matrix: **SEDIMENT**

				Sample ID	1632-SMA-EDH(S) 03 2.00-3.00M	----	----	----	----
				Sampling date / time	06-Jul-2023 10:05	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2326302-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		38.7	----	----	----	----
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	1	mg/kg		13	----	----	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg		<0.2	----	----	----	----
EG020: Chromium	7440-47-3	1	mg/kg		38	----	----	----	----
EG020: Copper	7440-50-8	1	mg/kg		12	----	----	----	----
EG020: Lead	7439-92-1	1	mg/kg		43	----	----	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg		<0.05	----	----	----	----
EG020: Nickel	7440-02-0	1	mg/kg		26	----	----	----	----
EG020: Silver	7440-22-4	0.1	mg/kg		<0.1	----	----	----	----
EG020: Zinc	7440-66-6	1	mg/kg		105	----	----	----	----
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	3	µg/kg		<3	----	----	----	----
EP065: PCB 18	37680-65-2	3	µg/kg		<3	----	----	----	----
EP065: PCB 28	7012-37-5	3	µg/kg		<3	----	----	----	----
EP065: PCB 44	41464-39-5	3	µg/kg		<3	----	----	----	----
EP065: PCB 52	35693-99-3	3	µg/kg		<3	----	----	----	----
EP065: PCB 66	32598-10-0	3	µg/kg		<3	----	----	----	----
EP065: PCB 77	32598-13-3	3	µg/kg		<3	----	----	----	----
EP065: PCB 101	37680-73-2	3	µg/kg		<3	----	----	----	----
EP065: PCB 105	32598-14-4	3	µg/kg		<3	----	----	----	----
EP065: PCB 118	31508-00-6	3	µg/kg		<3	----	----	----	----
EP065: PCB 126	57465-28-8	3	µg/kg		<3	----	----	----	----
EP065: PCB 128	38380-07-3	3	µg/kg		<3	----	----	----	----
EP065: PCB 138	35065-28-2	3	µg/kg		<3	----	----	----	----
EP065: PCB 153	35065-27-1	3	µg/kg		<3	----	----	----	----
EP065: PCB 169	32774-16-6	3	µg/kg		<3	----	----	----	----

Sub-Matrix: SEDIMENT				Sample ID	1632-SMA-EDH(S) 03 2.00-3.00M	----	----	----	----
				Sampling date / time	06-Jul-2023 10:05	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2326302-001	-------	-------	-------	-------
EP-065: PCB Single Congeners - Continued									
EP065: PCB 170	35065-30-6	3	µg/kg		<3	----	----	----	----
EP065: PCB 180	35065-29-3	3	µg/kg		<3	----	----	----	----
EP065: PCB 187	52663-68-0	3	µg/kg		<3	----	----	----	----
EP065: Total Polychlorinated biphenyls	----	18	µg/kg		<18	----	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	50	µg/kg		<50	----	----	----	----
EP076HK: Acenaphthylene	208-96-8	50	µg/kg		<50	----	----	----	----
EP076HK: Acenaphthene	83-32-9	50	µg/kg		<50	----	----	----	----
EP076HK: Fluorene	86-73-7	50	µg/kg		<50	----	----	----	----
EP076HK: Phenanthrene	85-01-8	50	µg/kg		<50	----	----	----	----
EP076HK: Anthracene	120-12-7	50	µg/kg		<50	----	----	----	----
EP076HK: Fluoranthene	206-44-0	150	µg/kg		<150	----	----	----	----
EP076HK: Pyrene	129-00-0	150	µg/kg		<150	----	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	150	µg/kg		<150	----	----	----	----
EP076HK: Chrysene	218-01-9	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	150	µg/kg		<150	----	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg		<150	----	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	150	µg/kg		<150	----	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	150	µg/kg		<150	----	----	----	----
EP076HK: Low M.W. PAHs	----	550	µg/kg		<550	----	----	----	----
EP076HK: High M.W. PAHs	----	1700	µg/kg		<1700	----	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		**83.4**	----	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		**84.1**	----	----	----	----
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.1	%		**80.3**	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 5178893)								
HK2326154-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	16.9	16.5	2.3
HK2326478-004	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	19.4	19.5	0.0
EG: Metals and Major Cations (QC Lot: 5158737)								
HK2325456-001	Anonymous	EG020: Mercury	7439-97-6	0.05	mg/kg	0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.2	0.2	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	113	95	18.0
		EG020: Chromium	7440-47-3	1	mg/kg	14	13	9.5
		EG020: Copper	7440-50-8	1	mg/kg	14	12	15.2
		EG020: Lead	7439-92-1	1	mg/kg	124	112	9.7
		EG020: Nickel	7440-02-0	1	mg/kg	4	3	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	38	34	12.1
EP-065: PCB Single Congeners (QC Lot: 5175242)								
HK2326302-001	1632-SMA-EDH(S)03 2.00-3.00M	Total Polychlorinated biphenyls	----	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0
		PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-065: PCB Single Congeners (QC Lot: 5175242) - Continued								
HK2326302-001	1632-SMA-EDH(S)03 2.00-3.00M	PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5175241)								
HK2326302-001	1632-SMA-EDH(S)03 2.00-3.00M	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EG: Metals and Major Cations (QC Lot: 5158737)											

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 5158737) - Continued											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	10 mg/kg	101	----	87.2	110	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.5 mg/kg	99.4	----	85.0	113	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	10 mg/kg	100	----	87.7	111	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	10 mg/kg	111	----	92.0	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	10 mg/kg	98.6	----	86.7	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	104	----	86.6	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	10 mg/kg	106	----	90.6	111	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	10 mg/kg	104	----	85.0	109	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	10 mg/kg	105	----	90.9	115	----	----
EP-065: PCB Single Congeners (QC Lot: 5175242)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	88.4	----	45.0	116	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	88.9	----	41.0	132	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	92.5	----	51.0	146	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	92.2	----	36.0	168	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	94.0	----	43.0	155	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	97.7	----	38.0	163	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	97.7	----	65.0	115	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	94.9	----	66.0	118	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	96.4	----	67.0	114	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	96.6	----	69.0	111	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	98.6	----	63.0	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	97.6	----	67.0	117	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	94.4	----	67.0	115	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	95.8	----	69.0	114	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	95.8	----	61.0	124	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	96.0	----	64.0	122	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	93.7	----	65.0	120	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	94.2	----	66.0	117	----	----
Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	----	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5175241)											
Naphthalene	91-20-3	50	µg/kg	<50	250 µg/kg	85.8	----	69.0	123	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	250 µg/kg	84.2	----	66.0	135	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	250 µg/kg	86.2	----	64.0	128	----	----
Fluorene	86-73-7	50	µg/kg	<50	250 µg/kg	87.7	----	68.0	127	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	250 µg/kg	86.9	----	64.0	129	----	----
Anthracene	120-12-7	50	µg/kg	<50	250 µg/kg	89.6	----	63.0	130	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	250 µg/kg	90.4	----	73.0	125	----	----
Pyrene	129-00-0	150	µg/kg	<150	250 µg/kg	88.4	----	72.0	124	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	250 µg/kg	104	----	73.0	128	----	----
Chrysene	218-01-9	150	µg/kg	<150	250 µg/kg	108	----	78.0	129	----	----
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	250 µg/kg	81.1	----	68.0	133	----	----
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	250 µg/kg	74.7	----	66.0	147	----	----
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	250 µg/kg	65.5	----	65.0	136	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	250 µg/kg	78.6	----	48.0	136	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	250 µg/kg	78.9	----	61.0	131	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	250 µg/kg	69.0	----	68.0	131	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----

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

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 5158737)										
HK2325454-001	Anonymous	EG020: Arsenic	7440-38-2	10 mg/kg	107	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	104	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	10 mg/kg	88.6	----	75.0	125	----	----
		EG020: Copper	7440-50-8	10 mg/kg	107	----	75.0	125	----	----
		EG020: Lead	7439-92-1	10 mg/kg	86.1	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	99.0	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	10 mg/kg	123	----	75.0	125	----	----
		EG020: Silver	7440-22-4	10 mg/kg	105	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	10 mg/kg	94.7	----	75.0	125	----	----
EP-065: PCB Single Congeners (QC Lot: 5175242)										
HK2326302-001	1632-SMA-EDH(S)03 2.00-3.00M	PCB 8	34883-43-7	5 µg/kg	76.9	----	50.0	130	----	----
		PCB 18	37680-65-2	5 µg/kg	73.3	----	50.0	130	----	----
		PCB 28	7012-37-5	5 µg/kg	83.2	----	50.0	130	----	----
		PCB 44	41464-39-5	5 µg/kg	79.7	----	50.0	130	----	----
		PCB 52	35693-99-3	5 µg/kg	78.9	----	50.0	130	----	----
		PCB 66	32598-10-0	5 µg/kg	85.8	----	50.0	130	----	----
		PCB 77	32598-13-3	5 µg/kg	76.0	----	50.0	130	----	----
		PCB 101	37680-73-2	5 µg/kg	76.7	----	50.0	130	----	----
		PCB 105	32598-14-4	5 µg/kg	80.5	----	50.0	130	----	----
		PCB 118	31508-00-6	5 µg/kg	78.5	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-065: PCB Single Congeners (QC Lot: 5175242) - Continued										
HK2326302-001	1632-SMA-EDH(S)03 2.00-3.00M	PCB 126	57465-28-8	5 µg/kg	85.3	----	50.0	130	----	----
		PCB 128	38380-07-3	5 µg/kg	79.4	----	50.0	130	----	----
		PCB 138	35065-28-2	5 µg/kg	78.1	----	50.0	130	----	----
		PCB 153	35065-27-1	5 µg/kg	77.6	----	50.0	130	----	----
		PCB 169	32774-16-6	5 µg/kg	79.6	----	50.0	130	----	----
		PCB 170	35065-30-6	5 µg/kg	79.7	----	50.0	130	----	----
		PCB 180	35065-29-3	5 µg/kg	79.3	----	50.0	130	----	----
		PCB 187	52663-68-0	5 µg/kg	77.3	----	50.0	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5175241)										
HK2326302-001	1632-SMA-EDH(S)03 2.00-3.00M	Naphthalene	91-20-3	250 µg/kg	71.7	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	79.7	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	79.0	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	82.2	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	81.4	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	83.7	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	84.7	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	81.0	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	86.9	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	81.4	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	63.4	----	50.0	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	58.9	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	52.0	----	50.0	130	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 14
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2327423
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 11-Jul-2023
Order number	: ----	Quote number	: HKE/1500/2021_V6	Issue Date	: 28-Jul-2023
C-O-C number	: ----			No. of samples received	: 2
Site	: ----			No. of samples analysed	: 2

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Anh Ngoc Huynh .	Senior Chemist	Organics_ENV
Chan Ka Yu , Karen	Manager - Organics	Organics_ENV
Lin Wai Yu , Iris	Assistant Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Assistant Manager - Metals	Metals_ENV

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 11-Jul-2023 to 28-Jul-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2327423

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

Low and High M.W. PAHs results (Method: EP076HK) are not HOKLAS accredited. 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.

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

Sample(s) as received, digested by in-house method E-ASTM D3974-09 prior to determination of metals. The in-house method is developed based on ASTM D3974-09 method.

TBT result(s) (Method: EP390) is/are reported on as received basis.

Analytical Results

Sub-Matrix: SEDIMENT

			Sample ID	1632-SMA-EDH(S) 03 3.00-3.50M, 3.50-4.00M	1632-SMA-EDH(S) 03 4.00-4.50M	----	----	----
			Sampling date / time	11-Jul-2023 10:20	11-Jul-2023 11:15	----	----	----
Compound	CAS Number	LOR	Unit	HK2327423-001	HK2327423-002	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	39.0	18.1	----	----	----
EG: Metals and Major Cations								
EG020: Arsenic	7440-38-2	1	mg/kg	16	14	----	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	----	----	----
EG020: Chromium	7440-47-3	1	mg/kg	22	9	----	----	----
EG020: Copper	7440-50-8	1	mg/kg	15	7	----	----	----
EG020: Lead	7439-92-1	1	mg/kg	75	61	----	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	0.06	<0.05	----	----	----
EG020: Nickel	7440-02-0	1	mg/kg	14	4	----	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	----	----	----
EG020: Zinc	7440-66-6	1	mg/kg	98	77	----	----	----
EP-065: PCB Single Congeners								
EP065: PCB 8	34883-43-7	3	µg/kg	<3	<3	----	----	----
EP065: PCB 18	37680-65-2	3	µg/kg	<3	<3	----	----	----
EP065: PCB 28	7012-37-5	3	µg/kg	<3	<3	----	----	----
EP065: PCB 44	41464-39-5	3	µg/kg	<3	<3	----	----	----
EP065: PCB 52	35693-99-3	3	µg/kg	<3	<3	----	----	----
EP065: PCB 66	32598-10-0	3	µg/kg	<3	<3	----	----	----
EP065: PCB 77	32598-13-3	3	µg/kg	<3	<3	----	----	----
EP065: PCB 101	37680-73-2	3	µg/kg	<3	<3	----	----	----
EP065: PCB 105	32598-14-4	3	µg/kg	<3	<3	----	----	----
EP065: PCB 118	31508-00-6	3	µg/kg	<3	<3	----	----	----
EP065: PCB 126	57465-28-8	3	µg/kg	<3	<3	----	----	----
EP065: PCB 128	38380-07-3	3	µg/kg	<3	<3	----	----	----
EP065: PCB 138	35065-28-2	3	µg/kg	<3	<3	----	----	----
EP065: PCB 153	35065-27-1	3	µg/kg	<3	<3	----	----	----

Sub-Matrix: SEDIMENT				Sample ID	1632-SMA-EDH(S) 03 3.00-3.50M, 3.50-4.00M	1632-SMA-EDH(S) 03 4.00-4.50M	----	----	----
				Sampling date / time	11-Jul-2023 10:20	11-Jul-2023 11:15	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		HK2327423-001	HK2327423-002	-------	-------	-------
EP-065: PCB Single Congeners - Continued									
EP065: PCB 169	32774-16-6	3	µg/kg		<3	<3	----	----	----
EP065: PCB 170	35065-30-6	3	µg/kg		<3	<3	----	----	----
EP065: PCB 180	35065-29-3	3	µg/kg		<3	<3	----	----	----
EP065: PCB 187	52663-68-0	3	µg/kg		<3	<3	----	----	----
EP065: Total Polychlorinated biphenyls	----	18	µg/kg		<18	<18	----	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	50	µg/kg		<50	<50	----	----	----
EP076HK: Acenaphthylene	208-96-8	50	µg/kg		<50	<50	----	----	----
EP076HK: Acenaphthene	83-32-9	50	µg/kg		<50	<50	----	----	----
EP076HK: Fluorene	86-73-7	50	µg/kg		<50	<50	----	----	----
EP076HK: Phenanthrene	85-01-8	50	µg/kg		<50	<50	----	----	----
EP076HK: Anthracene	120-12-7	50	µg/kg		<50	<50	----	----	----
EP076HK: Fluoranthene	206-44-0	150	µg/kg		<150	<150	----	----	----
EP076HK: Pyrene	129-00-0	150	µg/kg		<150	<150	----	----	----
EP076HK: Benz(a)anthracene	56-55-3	150	µg/kg		<150	<150	----	----	----
EP076HK: Chrysene	218-01-9	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(b)fluoranthene	205-99-2	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(k)fluoranthene	207-08-9	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(a)pyrene	50-32-8	150	µg/kg		<150	<150	----	----	----
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg		<150	<150	----	----	----
EP076HK: Dibenz(a.h)anthracene	53-70-3	150	µg/kg		<150	<150	----	----	----
EP076HK: Benzo(g.h.i)perylene	191-24-2	150	µg/kg		<150	<150	----	----	----
EP076HK: Low M.W. PAHs	----	550	µg/kg		<550	<550	----	----	----
EP076HK: High M.W. PAHs	----	1700	µg/kg		<1700	<1700	----	----	----
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		79.8	82.3	----	----	----
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		60.8	67.7	----	----	----
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									

Sub-Matrix: SEDIMENT			Sample ID	1632-SMA-EDH(S) 03 3.00-3.50M, 3.50-4.00M	1632-SMA-EDH(S) 03 4.00-4.50M	----	----	----
			Sampling date / time	11-Jul-2023 10:20	11-Jul-2023 11:15	----	----	----
Compound	CAS Number	LOR	Unit	HK2327423-001	HK2327423-002	--------	--------	--------
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate - Continued								
EP065: Decachlorobiphenyl	2051-24-3	0.1	%	63.8	69.5	----	----	----

Sub-Matrix: INTERSTITIAL WATER				Sample ID	1632-SMA-EDH(S) 03 3.00-3.50M, 3.50-4.00M	1632-SMA-EDH(S) 03 4.00-4.50M	----	----	----
				Sampling date / time	11-Jul-2023 10:20	11-Jul-2023 11:15	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		HK2327423-001	HK2327423-002	-------	-------	-------
EP-390: Triorganotins									
EP390: Tributyltin	56573-85-4	0.015	µg TBT /L		<0.015	<0.015	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 5190164)								
HK2329108-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	13.0	12.8	1.9
HK2329174-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	19.2	18.9	1.6
EG: Metals and Major Cations (QC Lot: 5170812)								
HK2327423-002	1632-SMA-EDH(S)03 4.00-4.50M	EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	<0.05	0.0
		EG020: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	<0.2	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	14	15	0.0
		EG020: Chromium	7440-47-3	1	mg/kg	9	9	0.0
		EG020: Copper	7440-50-8	1	mg/kg	7	7	0.0
		EG020: Lead	7439-92-1	1	mg/kg	61	61	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	4	4	0.0
		EG020: Zinc	7440-66-6	1	mg/kg	77	81	5.5
EP-065: PCB Single Congeners (QC Lot: 5186834)								
HK2327423-001	1632-SMA-EDH(S)03 3.00-3.50M, 3.50-4.00M	Total Polychlorinated biphenyls	----	18	µg/kg	<18	<18	0.0
		PCB 8	34883-43-7	3	µg/kg	<3	<3	0.0
		PCB 18	37680-65-2	3	µg/kg	<3	<3	0.0
		PCB 28	7012-37-5	3	µg/kg	<3	<3	0.0
		PCB 44	41464-39-5	3	µg/kg	<3	<3	0.0
		PCB 52	35693-99-3	3	µg/kg	<3	<3	0.0
		PCB 66	32598-10-0	3	µg/kg	<3	<3	0.0
		PCB 77	32598-13-3	3	µg/kg	<3	<3	0.0
		PCB 101	37680-73-2	3	µg/kg	<3	<3	0.0
		PCB 105	32598-14-4	3	µg/kg	<3	<3	0.0
		PCB 118	31508-00-6	3	µg/kg	<3	<3	0.0
		PCB 126	57465-28-8	3	µg/kg	<3	<3	0.0
		PCB 128	38380-07-3	3	µg/kg	<3	<3	0.0
		PCB 138	35065-28-2	3	µg/kg	<3	<3	0.0
		PCB 153	35065-27-1	3	µg/kg	<3	<3	0.0

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-065: PCB Single Congeners (QC Lot: 5186834) - Continued								
HK2327423-001	1632-SMA-EDH(S)03 3.00-3.50M, 3.50-4.00M	PCB 169	32774-16-6	3	µg/kg	<3	<3	0.0
		PCB 170	35065-30-6	3	µg/kg	<3	<3	0.0
		PCB 180	35065-29-3	3	µg/kg	<3	<3	0.0
		PCB 187	52663-68-0	3	µg/kg	<3	<3	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5186833)								
HK2327423-001	1632-SMA-EDH(S)03 3.00-3.50M, 3.50-4.00M	Fluoranthene	206-44-0	150	µg/kg	<150	<150	0.0
		Pyrene	129-00-0	150	µg/kg	<150	<150	0.0
		Benz(a)anthracene	56-55-3	150	µg/kg	<150	<150	0.0
		Chrysene	218-01-9	150	µg/kg	<150	<150	0.0
		Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	<150	0.0
		Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	<150	0.0
		Benzo(a)pyrene	50-32-8	150	µg/kg	<150	<150	0.0
		Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	<150	0.0
		Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	<150	0.0
		Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	<150	0.0
		High M.W. PAHs	----	1700	µg/kg	<1700	<1700	0.0
		Naphthalene	91-20-3	50	µg/kg	<50	<50	0.0
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.0
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.0
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.0
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.0
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.0
		Low M.W. PAHs	----	550	µg/kg	<550	<550	0.0

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-390: Triorganotins (QC Lot: 5191058)								
HK2327985-002	Anonymous	Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.015	<0.015	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 5170812)											
EG020: Arsenic	7440-38-2	1	mg/kg	<1	10 mg/kg	100	----	87.2	110	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	0.5 mg/kg	102	----	85.0	113	----	----
EG020: Chromium	7440-47-3	1	mg/kg	<1	10 mg/kg	99.6	----	87.7	111	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	10 mg/kg	111	----	92.0	115	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	10 mg/kg	95.7	----	86.7	115	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	96.2	----	86.6	115	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	10 mg/kg	107	----	90.6	111	----	----
EG020: Silver	7440-22-4	0.1	mg/kg	<0.1	10 mg/kg	104	----	85.0	109	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	10 mg/kg	103	----	90.9	115	----	----
EP-065: PCB Single Congeners (QC Lot: 5186834)											
PCB 8	34883-43-7	3	µg/kg	<3	5 µg/kg	52.5	----	45.0	116	----	----
PCB 18	37680-65-2	3	µg/kg	<3	5 µg/kg	53.4	----	41.0	132	----	----
PCB 28	7012-37-5	3	µg/kg	<3	5 µg/kg	101	----	51.0	146	----	----
PCB 44	41464-39-5	3	µg/kg	<3	5 µg/kg	116	----	36.0	168	----	----
PCB 52	35693-99-3	3	µg/kg	<3	5 µg/kg	113	----	43.0	155	----	----
PCB 66	32598-10-0	3	µg/kg	<3	5 µg/kg	116	----	38.0	163	----	----
PCB 77	32598-13-3	3	µg/kg	<3	5 µg/kg	102	----	65.0	115	----	----
PCB 101	37680-73-2	3	µg/kg	<3	5 µg/kg	97.0	----	66.0	118	----	----
PCB 105	32598-14-4	3	µg/kg	<3	5 µg/kg	104	----	67.0	114	----	----
PCB 118	31508-00-6	3	µg/kg	<3	5 µg/kg	104	----	69.0	111	----	----
PCB 126	57465-28-8	3	µg/kg	<3	5 µg/kg	106	----	63.0	121	----	----
PCB 128	38380-07-3	3	µg/kg	<3	5 µg/kg	105	----	67.0	117	----	----
PCB 138	35065-28-2	3	µg/kg	<3	5 µg/kg	103	----	67.0	115	----	----
PCB 153	35065-27-1	3	µg/kg	<3	5 µg/kg	103	----	69.0	114	----	----
PCB 169	32774-16-6	3	µg/kg	<3	5 µg/kg	105	----	61.0	124	----	----
PCB 170	35065-30-6	3	µg/kg	<3	5 µg/kg	106	----	64.0	122	----	----
PCB 180	35065-29-3	3	µg/kg	<3	5 µg/kg	104	----	65.0	120	----	----
PCB 187	52663-68-0	3	µg/kg	<3	5 µg/kg	101	----	66.0	117	----	----
Total Polychlorinated biphenyls	----	18	µg/kg	<18	----	----	----	----	----	----	----

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5186833)											
Naphthalene	91-20-3	50	µg/kg	<50	250 µg/kg	102	----	69.0	123	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	250 µg/kg	93.1	----	66.0	135	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	250 µg/kg	98.8	----	64.0	128	----	----
Fluorene	86-73-7	50	µg/kg	<50	250 µg/kg	101	----	68.0	127	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	250 µg/kg	104	----	64.0	129	----	----
Anthracene	120-12-7	50	µg/kg	<50	250 µg/kg	81.1	----	63.0	130	----	----
Fluoranthene	206-44-0	150	µg/kg	<150	250 µg/kg	93.9	----	73.0	125	----	----
Pyrene	129-00-0	150	µg/kg	<150	250 µg/kg	89.8	----	72.0	124	----	----
Benz(a)anthracene	56-55-3	150	µg/kg	<150	250 µg/kg	105	----	73.0	128	----	----
Chrysene	218-01-9	150	µg/kg	<150	250 µg/kg	107	----	78.0	129	----	----
Benzo(b)fluoranthene	205-99-2	150	µg/kg	<150	250 µg/kg	82.5	----	68.0	133	----	----
Benzo(k)fluoranthene	207-08-9	150	µg/kg	<150	250 µg/kg	76.7	----	66.0	147	----	----
Benzo(a)pyrene	50-32-8	150	µg/kg	<150	250 µg/kg	88.4	----	65.0	136	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	150	µg/kg	<150	250 µg/kg	122	----	48.0	136	----	----
Dibenz(a.h)anthracene	53-70-3	150	µg/kg	<150	250 µg/kg	124	----	61.0	131	----	----
Benzo(g.h.i)perylene	191-24-2	150	µg/kg	<150	250 µg/kg	124	----	68.0	131	----	----
Low M.W. PAHs	----	550	µg/kg	<550	----	----	----	----	----	----	----
High M.W. PAHs	----	1700	µg/kg	<1700	----	----	----	----	----	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-390: Triorganotins (QC Lot: 5191058)											
Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.012	0.0122 µg TBT /L	113	----	70.0	130	----	----

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

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 5170812)										
HK2327423-001	1632-SMA-EDH(S)03 3.00-3.50M, 3.50-4.00M	EG020: Arsenic	7440-38-2	10 mg/kg	76.1	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.5 mg/kg	98.9	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	10 mg/kg	89.5	----	75.0	125	----	----
		EG020: Copper	7440-50-8	10 mg/kg	98.9	----	75.0	125	----	----
		EG020: Lead	7439-92-1	10 mg/kg	# Not Determined	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	97.0	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	10 mg/kg	95.1	----	75.0	125	----	----
		EG020: Silver	7440-22-4	10 mg/kg	102	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	10 mg/kg	# Not Determined	----	75.0	125	----	----
EP-065: PCB Single Congeners (QC Lot: 5186834)										
HK2327423-002	1632-SMA-EDH(S)03 4.00-4.50M	PCB 8	34883-43-7	5 µg/kg	58.3	----	50.0	130	----	----
		PCB 18	37680-65-2	5 µg/kg	80.3	----	50.0	130	----	----
		PCB 28	7012-37-5	5 µg/kg	84.1	----	50.0	130	----	----
		PCB 44	41464-39-5	5 µg/kg	88.7	----	50.0	130	----	----
		PCB 52	35693-99-3	5 µg/kg	88.6	----	50.0	130	----	----
		PCB 66	32598-10-0	5 µg/kg	87.1	----	50.0	130	----	----
		PCB 77	32598-13-3	5 µg/kg	77.8	----	50.0	130	----	----
		PCB 101	37680-73-2	5 µg/kg	74.4	----	50.0	130	----	----
		PCB 105	32598-14-4	5 µg/kg	78.7	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-065: PCB Single Congeners (QC Lot: 5186834) - Continued										
HK2327423-002	1632-SMA-EDH(S)03 4.00-4.50M	**PCB 118**	31508-00-6	5 µg/kg	77.4	----	50.0	130	----	----
		PCB 126	57465-28-8	5 µg/kg	82.4	----	50.0	130	----	----
		PCB 128	38380-07-3	5 µg/kg	78.7	----	50.0	130	----	----
		PCB 138	35065-28-2	5 µg/kg	75.6	----	50.0	130	----	----
		PCB 153	35065-27-1	5 µg/kg	76.0	----	50.0	130	----	----
		PCB 169	32774-16-6	5 µg/kg	80.2	----	50.0	130	----	----
		PCB 170	35065-30-6	5 µg/kg	80.8	----	50.0	130	----	----
		PCB 180	35065-29-3	5 µg/kg	77.1	----	50.0	130	----	----
		PCB 187	52663-68-0	5 µg/kg	75.3	----	50.0	130	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5186833)										
HK2327423-001	1632-SMA-EDH(S)03 3.00-3.50M, 3.50-4.00M	**Naphthalene**	91-20-3	250 µg/kg	71.2	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	67.8	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	72.3	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	72.2	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	73.0	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	70.8	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	67.3	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	65.7	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	77.0	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	71.8	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	62.7	----	50.0	130	----	----

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5186833) - Continued										
HK2327423-001	1632-SMA-EDH(S)03 3.00-3.50M, 3.50-4.00M	Benzo(k)fluoranthene	207-08-9	250 µg/kg	57.2	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	59.4	----	50.0	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	71.6	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	57.0	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	68.2	----	50.0	130	----	----

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-390: Triorganotins (QC Lot: 5191058)										
HK2327985-002	Anonymous	Tributyltin	56573-85-4	0.0122 µg TBT /L	102	----	70.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 5175241) - Continued										
HK2326302-001	1632-SMA-EDH(S)03 2.00-3.00M	Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	61.0	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	52.7	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	50.5	----	50.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130

Appendix F

Detailed Biological Screening Test Reports

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T: +852 2610 1044
F: +852 2610 2021
www.alsglobal.com

HOKLAS 066
TEST

SEDIMENT TOXICITY TESTS REPORT

10-day Amphipod Survival Test – Leptocheirus plumulosus

20-day Polychaete Growth and Survival Test – Neanthes arenaceodentata

48-60-hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas

20-October-2022

Project: Ground Investigation for Northen Link (South)

Biological Testing Report

Prepared for

Tysan Foundation Limited
Room 1219, Fo Tan Leader Industrial Cnetre,
Fo Tan, Hong Kong

Prepared by

ALS Technichem (HK) Pty Ltd

ALS Work Order Number HK2234393

20 October 22

Attention: Desmond Cheung

RE: Ground Investigation for Northen Link (South)

Dear Desmond Cheung,

Toxicity Test Result for Sediment Samples

We are pleased to provide the results of the toxicity testing performed on the sediment samples and reference sediment of the captioned project. The sediment samples were received within the period of 22 July 2022 to 05 August 2022. Each sample was assigned with an ALS identification (ID) code as stated in Table 1.2. The samples were tested with the three toxicity tests:

- 10-day Amphipod Survival Test – Leptocheirus plumulosus
- 20-day Polychaete Growth and Survival Test – Neanthes arenaceodentata
- 48-60-hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas

The Amphipod testing was performed according to the United States Environmental Protection Agency (US EPA) Methods for Assessing the Toxicity of the Sediment-associated Contaminants with Estuarine and Marine Amphipods (EPA/600/R-94/025, 1994). The Polychaete Survival and Growth and the Bivalve Larval Development testing were performed according to the Puget Sound Estuary Program (PSEP, 1995) protocol.

A QA/QC review confirmed that the tests met all acceptability criteria for test validity as outlined in the respective protocols. Reference toxicant results for all three species were within warning limits (Mean ±2SD) based on historical laboratory performance, indicating that the relative health and sensitivity of the test organisms were consistent with previous batches of test organisms.

Should you have any questions or comments related to the report, please feel free to contact the undersigned.

Yours sincerely,

Ms Ng Sin Kou, May
Laboratory Manager
ALS Technichem (HK) Pty Ltd
Phone: +852 2610 1044
email: may.ng@alsglobal.com

TABLE OF CONTENTS

1 SAMPLE INFORMATION

Table 1.1 Sample Details

ALS work order number:	HK2234393
Number of sample(s) for Testing:	2 testing samples, 1 reference sample
Condition of sample(s) at receipt:	Temperature: CHILLED - Ice Present
	Container: Miscellaneous Plastic Bag and Vibrocore
Quantity of each sample(s) at receipt:	Various
Sample storage after receipt:	Stored in dark at 4°C

Table 1.2 Sample Identifications

Lab ID	Client ID	Lab ID (Ecotox. Section)	Date Sampled	Date Received	[b] Category
HK2232563001	REFERENCE SEDIMENT	HK2234393002	05-Aug-22	05-Aug-22	L
HK2228652001	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	HK2234393003	22-Jul-22	22-Jul-22	M
HK2228652002	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	HK2234393004	22-Jul-22	22-Jul-22	M

Comments

This report supersedes any previous report(s) with same work order number.

Testing period is from 09-Sep-2022 to 29-Sep-2022.

Sample(s) was/ were picked up from client by ALS staff. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

ALS Technichem (HK) Pty Ltd is HOKLAS accredited for the testing provided in this report. The sampling activity involved is not covered by the laboratory HOKLAS accreditation.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

[b] Sediments are categorized according to ETWB TCW No. 34/2002 - Management of Dredged/ Excavated Sediment.

Table 1.3 Total Organic Carbon (TOC), Moisture Content and Porewater characteristics (pH, Salinity and Ammonia) of Testing Sediments

Client ID	ALS ID (Ecotox. Section)	Total Organic Carbon (TOC) (%)	Moisture Content (%)	Grain Size (<63µm) (%)	pH	Porewater # Salinity (ppt)	Porewater # *Ammonia (as mgN/L)
REFERENCE SEDIMENT	HK2234393002	1.86	50.40	75.6	8.0	31	3.62
AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	HK2234393003	0.51	22.90	51.7	7.9	33	0.99
AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	HK2234393004	0.26	18.50	35.7	8.2	33	0.25

NA is reported when no porewater could be extracted from sample.

* Ammonia is reported as mgN/L

Table 1.4 Summary of Test Results

ALS ID	Sample ID	Overall Result[1]	10-Day Amphipod Survival Test			20-Day Polychaete Survival and Growth Test			48-60-hour Bivalve larvae Survival and Normality Test		
			Survival (%)		Pass / Fail	Total Dry Weight (mg)		Pass / Fail	Normality Survival (%)		Pass / Fail
			Mean	SD		Mean	SD		Mean	SD	
HK2234393002	REFERENCE SEDIMENT	**NA**	91.0	4.2	NA	51.8	1.1	NA	84.5	2.4	NA
HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	**Pass**	*81.0	4.2	Pass	*48.6	1.9	Pass	*73.2	2.8	Pass
HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	**Pass**	*81.0	7.4	Pass	*49.4	2.0	Pass	*73.5	2.2	Pass

* Mean survival in test sediment is significantly different ($p \leq 0.05$) from that in reference sediment

[1] Overall result is concluded according to ETWB TCW No. 34/2002 - Management of Dredged/ Excavated Sediment.

For Amphipod Survival Test, # Mean survival in test sediment is <80% of that in reference sediment

For Polychaete Survival and Growth Test, # Mean total dry weight in test sediment is <90% of that in reference sediment

For Bivalve Survival and Normality Test, # Mean normality survival in test sediment is <80% of that in reference sediment

2 10-DAY AMPHIPOD SURVIVAL TEST - Leptocheirus plumulosus

Table 2.1 Test Methodology for the 10-day Amphipod Survival Test – *Leptocheirus plumulosus*

	Parameter	Conditions
1	Reference protocols:	USEPA (1994) & ALS QWI-HK/ET001 (Ref. 3 & 4)
2	Organism source:	Collected from Environmental Enterprises USA; body length 2-4 mm; no mature males or females
3	Testing periods:	09 Sep 2022 - 19 Sep 2022
4	Test type:	Sediment toxicity test, static, non-renewal
5	Test duration:	10 days
6	Temperature:	25 ± 1°C
7	Salinity:	20 ± 1 ppt
8	Light quality:	Wide-spectrum fluorescent lights
9	Illuminance:	500-1000 lux
10	Photoperiod:	24h : 0h (Light : Dark)
11	Test chamber:	1L glass jar with 10cm internal diameter; 175mL sediment; 800mL overlying seawater; position of test container randomized
12	Number of organisms per chamber:	20
13	Number of replicates:	5
14	Feeding regime:	None
15	Aeration:	Overlying water aerated overnight before the start of test and throughout the test at approximately 100 bubbles/min; maintains ≥60% dissolved oxygen saturation
16	Overlying water:	Reconstituted seawater made up from artificial sea salt (Brand: Red Sea®); filtered through a 0.45µm filter; sterilized by ultraviolet light
17	Overlying water quality monitoring:	Temperature, pH, salinity and dissolved oxygen measured daily; total ammonia and sulfide content taken at 0 d and 10 d
18	Control sediment:	Collected from Port Shelter at PS6 (E850234 N820057) on 05 August 2022 by grab sampler; expires on 01 February 2023; stored at -20°C after collection; sieved with 0.5mm sieve before testing; ALS Ref ID: HK2230634001
19	Endpoints:	Emergence[1] (recorded daily); survival; reburial[2]
20	Statistical analysis:	Data tested for normality and homogeneity of variance; Statistically significant differences between the mean survivals in testing sediments and reference sediment determined at a probability of $p \leq 0.05$ using ToxCalc 5.0 (Ref 7)
21	Test acceptability criterion:	≥90% mean survival in control sediment

		Reference Toxicant Test
22	Test type:	Water only test, static
23	Toxicant:	Cadmium
24	Test duration:	96 hours
25	Photoperiod:	0h : 24h (Light : Dark)
26	Test Chamber:	1L glass jar with 10cm internal diameter; 900 mL
27	Number of organisms per chamber:	10
28	Number of replicates:	2
29	Overlying seawater quality monitoring:	Temperature, pH, salinity and dissolved oxygen of the seawater measured at test initiation and termination
30	Endpoints:	Survival
31	Statistical analysis:	96-h LC50 for Cadmium determined by ToxCalc 5.0
32	Test acceptability criterion:	≥ 90% mean survival in control seawater
33	Other testing conditions are the same as in the sediment test	

[1] Number of amphipods appearing on the sediment surface or water column
[2] Number of surviving amphipods that rebury within 1 h in a separate container containing a 2-cm layer of control sediment and overlying clean seawater

Table 2.2 Results Summary of the 10-day Amphipod Survival Test *–Leptocheirus plumulosus*

Lab ID	Sample ID	Survival (%)		Avoidance (amphipod/jar/day)		Reburial (%)
		Mean	SD	Mean	SD	Mean
Control	Control	97.0	4.5	0.00	0.00	97.0
HK2234393002	REFERENCE SEDIMENT	91.0	4.2	0.00	0.00	91.0
HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	*81.0	4.2	0.00	0.00	80.0
HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	*81.0	7.4	0.00	0.00	77.0

* Mean survival in test sediment is significantly different ($p \leq 0.05$) from that in reference sediment

Table 2.3 Water Quality Summary of 10-day amphipod survival test – *Leptocheirus plumulosus*

Lab ID	Sample ID	Ammonia (Total, mg/L)		Sulfide (mg/L)		Temp(°C)		pH		Salinity (ppt)		DO (mg/L)	
		Day 0	Day 10	Day 0	Day 10	min	max	min	max	min	max	min	max
Control	CONTROL	<1.0	<0.1	<0.1	<0.1	25	25	7.8	8.2	20	20	6.8	7.2
HK2234393002	REFERENCE SEDIMENT	<1.0	<0.1	<0.1	<0.1	25	25	7.8	8.2	20	20	6.8	7.2
HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	<1.0	<1.0	<0.1	<0.1	25	25	7.8	8.1	20	20	6.8	7.2
HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	<1.0	<0.1	<0.1	<0.1	25	25	7.8	8.2	20	20	6.8	7.2

Table 2.4 Summary of Quality Control Data of the 10-day Amphipod Survival Test – *Leptocheirus plumulosus*

Date of Test	Sediment Test		Reference Toxicant Test			
	Mean survival (%) in control sediment		Mean survival (%) in 0 mg Cd/L		96-h [a]LC50 (mgCd / L)	
	Result	Acceptability	Result	Acceptability	Result	Acceptability
09 Sep 2022 - 19 Sep 2022	97.0%	≥ 90%	100.0%	≥ 90%	0.73	0.67 - 0.79

[a]Median Lethal Concentration, a concentration which kills 50% of the testing population

3 20-DAY POLYCHAETE GROWTH AND SURVIVAL TEST – *Neanthes arenaceodentata*

Table 3.1 Test Methodology for the 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

	Parameter	Conditions
1	Reference protocols:	PSEP (1995) & ALS QWI-HK/ET002 (Ref. 2 & 5)
2	Organism source:	Collected from Aquatic Toxicology Support; 2-3 weeks post emergence; dry weight 0.5-1.0 mg
3	Organism acclimation:	Polychaetes were acclimated in the aquarium (30cm x 20cm x 20cm) at 20 ± 1°C with 28 ± 2ppt aerated seawater of 16h : 8h (light : dark) photoperiod Powdered alga(Ulva sp.) covered the bottom of the aquarium. Overlying seawater renewed; water quality (temperature, pH, salinity and dissolved oxygen) measured; organisms fed by grounded TetraMarin® in slurry form three times a week Temperature and salinity adjusted to testing condition at <3°C and <5ppt per day respectively
4	Testing periods:	09 Sep 2022 - 29 Sep 2022
5	Test type:	Sediment toxicity test; static; renewal
6	Test duration:	20 days
7	Temperature:	20 ± 1°C
8	Salinity:	28 ± 1 ppt
9	Light quality:	Wide-spectrum fluorescent lights
10	Illuminance:	500-1000 lux
11	Photoperiod:	24h : 0h (Light : Dark)
12	Test chamber:	1L glass jar with 10cm internal diameter; 175mL sediment; 800mL overlying seawater; position of test container randomized
13	Number of organisms per chamber:	5
14	Number of replicates:	5
15	Feeding regime:	Fed every second day (from day 0) with 40mg (dry weight) grounded TetraMarin® in slurry form in each testing chamber
16	Aeration:	Overlying water aerated overnight before the start of test and throughout the test at approximately 100 bubbles/min; maintains >60% dissolved oxygen saturation
17	Overlying water:	Reconstituted seawater made up from artificial sea salt (Brand: Red Sea®); filtered through a 0.45µm filter; sterilized by ultraviolet light
18	Overlying water quality monitoring:	Temperature monitored daily; pH, salinity and dissolved oxygen measured every third day before water renewal; total ammonia and sulfide taken at 0 d and 20 d
19	Control sediment:	Collected from Port Shelter at PS6 (E850234 N820057) on 05 August 2022 by grab sampler; expires on 01 February 2023; stored at -20°C after collection; sieved with 0.5mm sieve before testing; ALS Ref ID: HK2230634001

20	Endpoints:	Survival; total biomass[1]; average individual biomass[2]; average individual growth rate[3]
21	Statistical analysis:	Data tested for normality and homogeneity of variance; Statistically significant differences between the mean total dry weight in testing sediments and reference sediment determined at a probability of $p \leq 0.05$ using ToxCalc 5.0 (Ref 7)
22	Test acceptability criterion:	≥90% mean survival and ≥0.38mg/ind/day individual growth rate in control sediment

Reference Toxicant Test		
23	Test type:	Water only test, static
24	Toxicant:	Cadmium
25	Test duration:	96 hours
26	Photoperiod:	0h : 24h (Light : Dark)
27	Test Chamber:	1L glass jar with 10cm internal diameter; 900 mL seawater; position of test container randomized
28	Number of organisms per chamber:	10
29	Number of replicates:	2
30	Overlying seawater quality monitoring:	Temperature, pH, salinity and dissolved oxygen of the seawater measured at test initiation and termination
31	Endpoints:	Survival
32	Statistical analysis:	96-h LC50 for Cadmium determined by ToxCalc 5.0 (Ref 7)
33	Test acceptability criterion:	≥90% mean survival in control seawater
34	Other testing conditions are the same as in the sediment test	

[1] the total dry weight of the surviving worms.

[2] the total dry weight of the surviving worms, divided by the number of surviving worms.

[3] the difference between the average initial and final dry weights, divided by the length of exposure (20 days).

Table 3.2 Results Summary of the 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

Lab ID	Sample ID	Survival (%)		Individual Dry Weight (mg)		Individual Growth Rate (mg/ind/day)		Total Dry Weight (mg)	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Control	CONTROL	100.0	0.0	11.1	0.1	0.52	0.01	55.7	0.7
HK2234393002	REFERENCE SEDIMENT	100.0	0.0	10.4	0.2	0.48	0.01	51.8	1.1
HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	100.0	0.0	9.7	0.4	0.45	0.02	*48.6	1.9
HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	100.0	0.0	9.9	0.4	0.46	0.02	*49.4	2.0

*Mean total dry weight in test sediment is significantly different ($p \leq 0.05$) from that in reference sediment

Table 3.3 Water Quality Summary of 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

Lab ID	Sample ID	Ammonia (Total, mg/L)		Sulfide (mg/L)		Temp(°C)		pH		Salinity (ppt)		DO (mg/L)	
		Day 0	Day 20	Day 0	Day 20	min	max	min	max	min	max	min	max
Control	CONTROL	<1.0	<0.1	<0.1	<0.1	20	20	7.8	8.2	28	28	6.8	7.2
HK2234393002	REFERENCE SEDIMENT	<1.0	<1.0	<0.1	<0.1	20	20	7.8	8.2	28	28	6.8	7.1
HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	<1.0	<0.1	<0.1	<0.1	20	20	7.8	8.1	28	28	6.9	7.2
HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	<1.0	<0.1	<0.1	<0.1	20	20	7.9	8.2	28	28	6.8	7.2

Table 3.4 Summary of Quality Control Data of the 20-day Polychaete Growth and Survival test – *Neanthes arenaceodentata*

Date of Test	Sediment Test						Reference Toxicant Test			
	Initial dry weight (mg/ind)	Acceptability Criterion	Mean survival (%) in control sediment	Acceptability Criterion	Mean ind growth rate (mg/ind/day) in control sediment	Acceptability Criterion	Mean survival (%) in 0 mgCd / L seawater	Acceptability Criterion	96-h [a]LC50 (mgCd / L)	Acceptability Criterion
09 Sep 2022 - 29 Sep 2022	0.69	0.5-1.0 (mg/ind)	100.0	≥ 90%	0.52	> 0.38 (mg/ind/day)	100.0	≥ 90%	7.65	7.05 - 7.81

[a] Median Lethal Concentration, a concentration which kills 50% of the testing population

4.0 48-60-HOUR BIVALVE LARVAE SURVIVAL AND NORMALITY TEST – Crassostrea gigas

Table 4.1 Test Methodology for the 48-60-hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas

	Parameter	Condition
1	Reference protocols:	PSEP (1995) and ALS QWI-HK/ET012 (Ref 2 and 6)
2	Organism Source:	Collected from Guernsey Sea Farm
3	Organism acclimation:	Organisms are stored in individual chambers at 20°C with aerated clean seawater for a night prior to testing.
4	Initiation and termination dates:	14 Sep 2022 - 16 Sep 2022
5	Test type:	Static; non-renewal
6	Test duration:	48 hours
7	Temperature:	20 ± 1°C
8	Salinity:	28 ± 1 ppt
9	Light quality:	Wide-spectrum fluorescent lights
10	Illuminance:	500 – 1000 lux
11	Photoperiod:	14h : 10h (Light : Dark)
12	Test chamber:	1L glass jar with 10cm internal diameter; 18.0 ± 0.5 g of sediment; 900mL overlying seawater; sediment stirred for 10sec and allowed to settle for 4h prior to the inoculation of embryos; position of test container randomized
13	Method for obtaining gametes:	Organisms were dissected to obtain the gametes
14	Life stage of organism:	<2h post–fertilization
15	Number of organisms per chamber:	20,000 – 40,000 (around 30 embryos / mL)
16	Number of replicates:	6 (5 for testing, 1 for water quality measurement)
17	Feeding regime:	None
18	Aeration:	100 bubbles/minute if dissolved oxygen drops to <60% saturation
19	Overlying water:	Natural seawater collected from uncontaminated area in Sai Kung; Filtered through a 0.45µm; sterilized by ultraviolet light; salinity adjusted to 28ppt with fresh water or artificial sea salt (Brand: Red Sea®)
20	Overlying water quality monitoring:	Temperature, pH, salinity and dissolved oxygen were recorded daily
21	Negative control:	Seawater without sediment
22	Endpoints:	Survival, normal development, and normality survival[1]
23	Statistical analysis:	Data tested for normality and homogeneity of variance; Statistically significant differences between the mean normality survival in testing sediments and reference sediment determined at a probability of p≤0.05 using ToxCalc 5.0 (Ref 7)
24	Test acceptability criterion:	>70% mean normal survival in seawater control
	Reference Toxicant Test	
25	Toxicant:	Copper
26	Test chamber:	1L glass jar with 10cm internal diameter; 900mL seawater; position of test container randomized
27	Number of replicates:	4 (3 for testing; 1 for water quality measurement)
28	Endpoints:	Normal Survival
29	Statistical analysis:	48-60-h EC50 (and 95% confidence interval) for Cu calculated using ToxCalc 5.0 (Ref. 7)
30	Other testing conditions are the same as in the sediment samples test	

[1] Normality survival integrates the normality and survival end points, and measures survival of only the normal larvae relative to the starting number

Table 4.2 Results Summary of the 48-60-hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas

Lab ID	Sample ID	Survival (%)		Normality (%)		Normality Survival (%)	
		Mean	SD	Mean	SD	Mean	SD
Control	CONTROL	94.0	2.3	94.2	1.3	88.5	1.7
HK2234393002	REFERENCE SEDIMENT	90.6	3.4	93.4	2.2	84.5	2.4
HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	82.5	3.3	88.8	2.3	*73.2	2.8
HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	81.2	2.0	90.5	1.2	*73.5	2.2

* Mean percentage in test sediment is significantly different ($p \leq 0.05$) from that in reference sediment

Table 4.3 Water Quality Summary of 48-60-h bivalve larvae Survival and Normality Test – Crassostrea gigas

Lab ID	Sample ID	Ammonia (Total, mg/L)		Sulfide (mg/L)		Temp(°C)		pH		Salinity (ppt)		DO (mg/L)	
		Day 0	Day 2	Day 0	Day 2	min	max	min	max	min	max	min	max
Control	CONTROL	<1.0	<1.0	<0.1	<0.1	20	20	7.8	8.2	28	28	6.8	7.2
HK2234393002	REFERENCE SEDIMENT	<1.0	<1.0	<0.1	<0.1	20	20	7.8	8.2	28	28	6.8	7.2
HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	<1.0	<1.0	<0.1	<0.1	20	20	7.9	8.2	28	28	6.8	7.1
HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	<1.0	<1.0	<0.1	<0.1	20	20	7.8	8.1	28	28	6.9	7.2

Table 4.4 Summary of Quality Control Data of the 48-60-hour Bivalve Larvae Survival and Normality test – Crassostrea gigas

Date of Test	Water Control		Reference Toxicant Test			
	Mean Normality survival (%) in control		Mean Normality survival (%) in 0 µg		48-60-h EC50 (µgCu / L)	
	Result	Acceptability Criterion	Result	Acceptability Criterion	Result	Acceptability Criterion
14 Sep 2022 - 16 Sep 2022	88.5%	≥70.0%	88.5%	≥70.0%	5.32	4.92 - 5.87

5 References

(1) APHA (American Public Health Association) 1995. Standard Methods for the Examination of Water and Wastewater. 19th edition. American Public Health Association, American Water Works Association and Water Environment Federation, Washington, DC.

(2) PSEP (Puget Sound Estuary Program) 1995. Recommended guidelines for conducting laboratory bioassays on Puget Sound sediments. U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Seattle WA.

(3) USEPA (U.S. Environmental Protection Agency) 1994. Methods for assessing the toxicity of sediment-associated contaminants with estuarine and marine amphipods. Office of Research and Development. U.S. Environmental Protection Agency, Cincinnati, OH. EPA/600/R94/025.

(4) QWI-HK/ET001: 10-Day Amphipod Survival Test – Leptocheirus plumulosus. In: Ecotoxicology Work Instruction. ALS Technichem (HK) Pty Ltd, Hong Kong.

(5) QWI-HK/ET002: 20-Day Polychaete Growth and Survival Test – Neanthes arenaceodentata. In: Ecotoxicology Work Instruction. ALS Technichem (HK) Pty Ltd, Hong Kong.

(6) QWI-HK/ET012: 48 Hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas. In: Ecotoxicology Work Instruction. ALS Technichem (HK) Pty Ltd, Hong Kong.

(7) TOXCALC™-Toxicity Data Analysis Software (v5.0.32) User's Guide. 1994-2008. Tidepool Scientific Software, NcKinleyville, CA 95519.

APPENDIX A

Sediment Description

Table A.1: Sample Identification

[a]Lot ID	Lab ID	Client ID	Lab ID (Ecotox. Section)
J 1	HK2230634001	Control	Control
J 2	HK2232563001	REFERENCE SEDIMENT	HK2234393002
J 3	HK2228652001	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	HK2234393003
J 4	HK2228652002	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	HK2234393004

[a] Lot ID is identification used during testing

SEDIMENT POREWATER QUALITY

Client: Tysan Foundation Limited

Date: 09-Sep-2022

Batch No.: HK2234393

Test Type: Sediment Toxicity Test

Sample ID: 2 - 4

Sample ID	pH	Salinity (ppt)		Initial
REFERENCE SEDIMENT(HK2234393002)	8.0	31		gf
AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m(HK2234393003)	7.9	33		gf
AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m(HK2234393004)	8.2	33		gf

Sample ID	NH3 (mg/L)	Sam Dup	Spike (mg/L)	RPD	% Rec
--	--	--	--	--	--

Sample ID	pH	Salinity (ppt)	Ammonia (mg/L)	Initial

Sample ID	NH3 (mg/L)	Sam Dup	Spike (mg/L)	RPD	% Rec
--	--	--	--	--	--

WQ Instrument Ammonia: -- pH meter: HK1782 Refractometer: HK1582

Comments :

Data Verified by: Date Verified: 19/10/22

FET040-1

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 5
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2235522
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: —	Telephone	: +852 2610 1044		
Facsimile	: —	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 09-Sep-2022
Order number	: —	Quote number	: HKE/2648/2021	Issue Date	: 26-Sep-2022
C-O-C number	: —			No. of samples received	: 6
Site	:			No. of samples analysed	: 6

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 09-Sep-2022 to 20-Sep-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2235522

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Analytical Results

Sub-Matrix: SEDIMENT				Sample ID	REFERENCE SEDIMENT	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	—	—
				Sampling date / time	09-Sep-2022	09-Sep-2022	09-Sep-2022	---	---
Compound	CAS Number	LOR	Unit		HK2235522-001	HK2235522-002	HK2235522-003	———	———
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	---	0.1	%		50.4	22.9	18.5	—	—
EP: Aggregate Organics									
EP005: Total Organic Carbon	---	0.05	%		1.86	0.51	0.26	—	—

Sub-Matrix: SEAWATER				Sample ID	REFERENCE SEDIMENT Porewater	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m Porewater	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m Porewater	—	—
				Sampling date / time	09-Sep-2022	09-Sep-2022	09-Sep-2022	---	---
Compound	CAS Number	LOR	Unit		HK2235522-004	HK2235522-005	HK2235522-006	———	———
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	---	0.1	mg/L		4.4	1.2	0.3	—	—

Laboratory Duplicate (DUP) Report

Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4576070)								
HK2235419-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	20.8	20.5	1.4
HK2235673-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	---	0.1	%	45.7	45.5	0.6
EP: Aggregate Organics (QC Lot: 4581957)								
HK2235419-002	Anonymous	EP005: Total Organic Carbon	---	0.05	%	14.2	12.4	13.7

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP: Aggregate Organics (QC Lot: 4581957)											
EP005: Total Organic Carbon	---	0.05	%	<0.05	40 %	101	---	92.1	112	---	---

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4576260)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---

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

Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EP: Aggregate Organics (QC Lot: 4581957)										
HK2235419-001	Anonymous	EP005: Total Organic Carbon	---	1.48423 %	86.1	---	75.0	125	---	---

APPENDIX B

Complete Data for the 10-day Amphipod Survival Test – *Leptocheirus plumulosus*

Client: Tysan Foundation Limited

Batch No.: HK2234393

Initiation Date: 09-Sep-22

ID	Rep		Group	Clinet ID	Initial no.	Final no.	Avoidance	No.Not Reburying	Duration (Days)	Survival (%) S %	Survival (%) S Mean	Survival (%) S SD	Avoidance (%) A %	Avoidance (%) A Mean	Avoidance (%) A SD	Reburial (%) R %	Reburial (%) R Mean
-	1	A	Control	CONTROL	20	20	0	0	10	100	97.0	4.5	0.00	0.00	0.00	100.0	97.0
-	2	B	Control	CONTROL	20	19	0	1	10	95			0.00			94.7	
-	3	C	Control	CONTROL	20	20	0	0	10	100			0.00			100.0	
-	4	D	Control	CONTROL	20	20	0	0	10	100			0.00			100.0	
-	5	E	Control	CONTROL	20	18	0	2	10	90			0.00			88.9	
1	1	A	HK2234393002	REFERENCE SEDIMENT	20	18	0	2	10	90	91.0	4.2	0.00	0.00	0.00	88.9	91.0
2	2	B	HK2234393002	REFERENCE SEDIMENT	20	19	0	1	10	95			0.00			94.7	
3	3	C	HK2234393002	REFERENCE SEDIMENT	20	17	0	3	10	85			0.00			82.4	
4	4	D	HK2234393002	REFERENCE SEDIMENT	20	18	0	1	10	90			0.00			94.4	
5	5	E	HK2234393002	REFERENCE SEDIMENT	20	19	0	1	10	95			0.00			94.7	
6	1	A	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	15	0	4	10	75	81.0	4.2	0.00	0.00	0.00	73.3	80.0
7	2	B	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	16	0	4	10	80			0.00			75.0	
8	3	C	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	17	0	2	10	85			0.00			88.2	
9	4	D	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	16	0	3	10	80			0.00			81.3	
10	5	E	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	17	0	3	10	85			0.00			82.4	
11	1	A	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	16	0	4	10	80	81.0	7.4	0.00	0.00	0.00	75.0	77.0
12	2	B	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	17	0	3	10	85			0.00			82.4	
13	3	C	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	14	0	5	10	70			0.00			64.3	
14	4	D	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	16	0	4	10	80			0.00			75.0	
15	5	E	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	18	0	2	10	90			0.00			88.9	

Reviewed by: _____

Test: AP
Species: LP
Sample ID: VA
Start Date: 9/9/2022 End Date: 9/19/2022

Test ID: HK2234393a
Protocol: EPA 94
Sample Type: MSE
Lab ID: ALS

Pos	ID	Rep	Group	Initial no.	Final no.	Avoidance	Reburying	T. Duration (Days)	Notes
	1	1	REFERENCE	20	18	0	2	10	
	2	2	REFERENCE	20	19	0	1	10	
	3	3	REFERENCE	20	17	0	3	10	
	4	4	REFERENCE	20	18	0	1	10	
	5	5	REFERENCE	20	19	0	1	10	
	6	1	2234393-03	20	16	0	4	10	
	7	2	2234393-03	20	15	0	4	10	
	8	3	2234393-03	20	17	0	2	10	
	9	4	2234393-03	20	16	0	3	10	
	10	5	2234393-03	20	17	0	3	10	
	11	1	2234393-04	20	16	0	4	10	
	12	2	2234393-04	20	17	0	3	10	
	13	3	2234393-04	20	14	0	5	10	
	14	4	2234393-04	20	16	0	4	10	
	15	5	2234393-04	20	18	0	2	10	

Comments:

-Survival

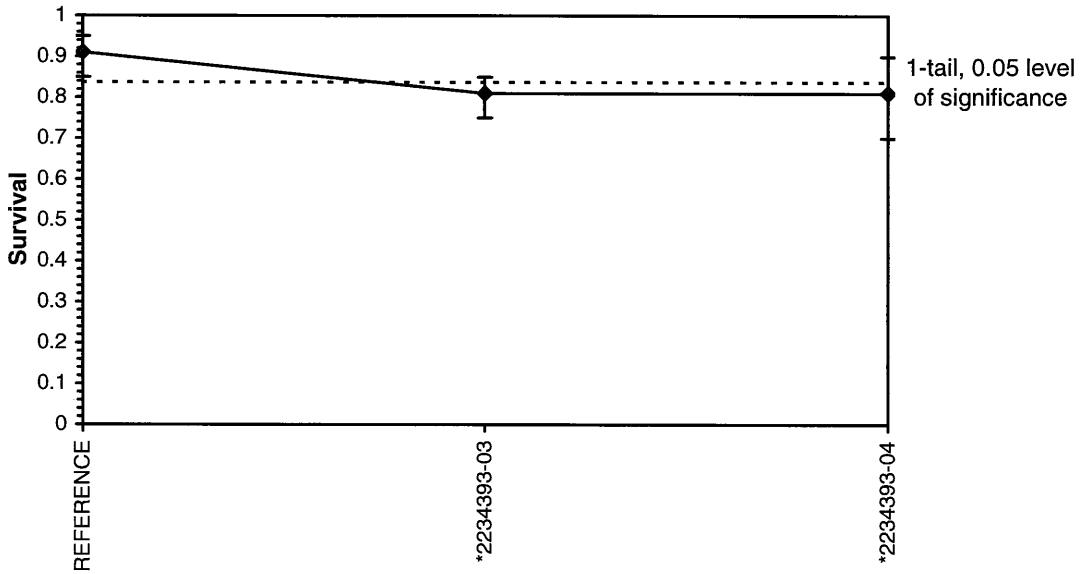
Start Date:	9/9/2022	Test ID:	HK2234393a	Sample ID:	VA
End Date:	9/19/2022	Lab ID:	ALS	Sample Type:	MSE
Sample Date:		Protocol:	EPA 94	Test Species:	LP
Comments:					

Conc-	1	2	3	4	5
REFERENCE	0.9000	0.9500	0.8500	0.9000	0.9500
2234393-03	0.8000	0.7500	0.8500	0.8000	0.8500
2234393-04	0.8000	0.8500	0.7000	0.8000	0.9000

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
REFERENCE	0.9100	1.0000	0.9100	0.8500	0.9500	4.597	5			
*2234393-03	0.8100	0.8901	0.8100	0.7500	0.8500	5.165	5	2.887	2.110	0.0731
*2234393-04	0.8100	0.8901	0.8100	0.7000	0.9000	9.156	5	2.887	2.110	0.0731

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.91572		0.881		-0.4551	0.39886
Bartlett's Test indicates equal variances (p = 0.43)	1.69869		9.21034			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test indicates significant differences Treatments vs REFERENCE	0.07309	0.08032	0.01667	0.003	0.0196	2, 12

Dose-Response Plot



Test: AP						Test ID: RTLPCD208			
Species: LP						Protocol: EPA 94			
Sample ID: REF						Sample Type: CDCL			
Start Date: 9/9/2022			End Date: 9/13/2022			Lab ID: ALS			
Pos	ID	Rep	Group	Initial no.	Final no.	Avoidance	Reburying	T. Duration (Days)	Notes
	1	1	D-Control	10	10			4	
	2	2	D-Control	10	10			4	
	3	1	0.15	10	9			4	
	4	2	0.15	10	9			4	
	5	1	0.6	10	6			4	
	6	2	0.6	10	5			4	
	7	1	1.25	10	4			4	
	8	2	1.25	10	3			4	
	9	1	2.5	10	2			4	
	10	2	2.5	10	2			4	
	11	1	5	10	0			4	
	12	2	5	10	0			4	

Comments:

Reviewed by:_____

-Survival

Start Date:	9/9/2022	Test ID:	RTLPCD208	Sample ID:	REF
End Date:	9/13/2022	Lab ID:	ALS	Sample Type:	CDCL
Sample Date:		Protocol:	EPA 94	Test Species:	LP
Comments:					

Conc-	1	2
D-Control	1.0000	1.0000
0.15	0.9000	0.9000
0.6	0.6000	0.5000
1.25	0.4000	0.3000
2.5	0.2000	0.2000
5	0.0000	0.0000

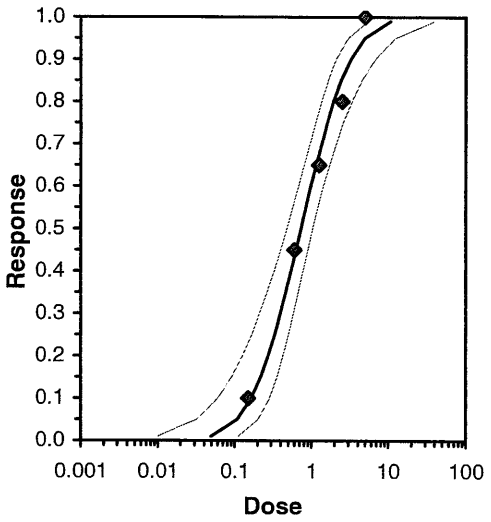
			Transform: Untransformed					Number	Total
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.000	2	0	20
0.15	0.9000	0.9000	0.9000	0.9000	0.9000	0.000	2	2	20
0.6	0.5500	0.5500	0.5500	0.5000	0.6000	12.856	2	9	20
1.25	0.3500	0.3500	0.3500	0.3000	0.4000	20.203	2	13	20
2.5	0.2000	0.2000	0.2000	0.2000	0.2000	0.000	2	16	20
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	2	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	1.98557	0.34364	1.31205	2.6591	0	1.68082	7.81473	0.64121	-0.1393	0.50363	3
Intercept	5.27655	0.15189	4.97885	5.57424							
TSCR											

Point	Probits		95% Fiducial Limits	
EC01	2.674	0.04888	0.00993	0.11043
EC05	3.355	0.10773	0.03223	0.20308
EC10	3.718	0.16417	0.06001	0.28266
EC15	3.964	0.21814	0.0909	0.35476
EC20	4.158	0.27343	0.12599	0.42648
EC25	4.326	0.33191	0.16612	0.50123
EC40	4.747	0.54091	0.32576	0.77077
EC50	5.000	0.72564	0.47578	1.02516
EC60	5.253	0.97346	0.67446	1.40478
EC75	5.674	1.58642	1.11979	2.55146
EC80	5.842	1.92571	1.34116	3.30127
EC85	6.036	2.41382	1.63827	4.50315
EC90	6.282	3.20741	2.08449	6.72828
EC95	6.645	4.88794	2.93747	12.3724
EC99	7.326	10.7733	5.46279	39.6932



ToxCalc v5.0.23

Reviewed by:_____

REFERENCE TOXICANT CONTROL CHART

Leptocheirus plumulosus - 96-h Survival LC50 Values (mg Cd / L)

	Log	Antilog
Mean	-0.14	0.73
SD	0.02	1.04
2 x SD	0.04	1.09
UCL	-0.08	0.82
UWL	-0.10	0.79
LWL	-0.17	0.67
LCL	-0.19	0.64
CV(%)	-13	

WARNING / CONTROL LIMIT CALCULATIONS

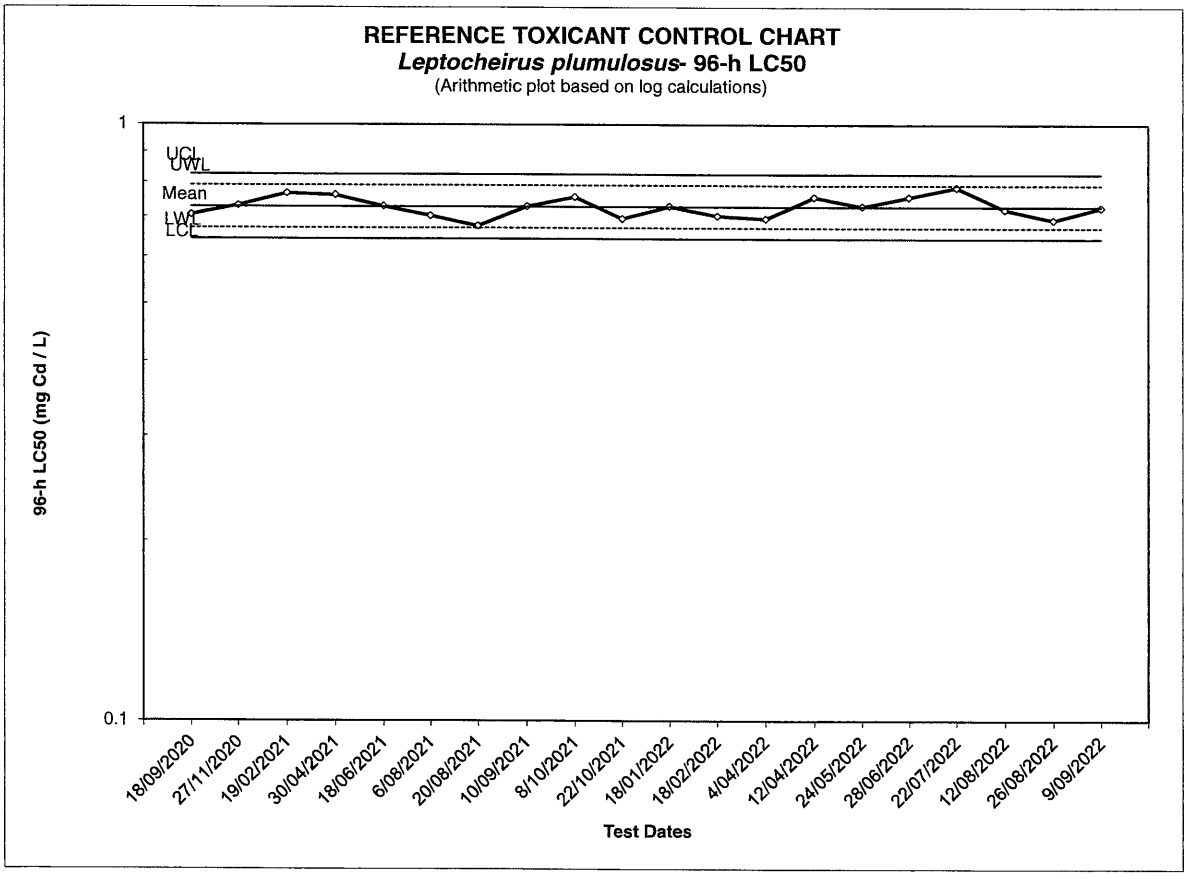
Mean: Mean is calculated for the last 20 logarithms of EC50, convert to antilogarithm to give Geomean
SD: Standard deviation is calculated for the last 20 logarithms of EC50

UCL: Upper Control Limit = Mean + 3 x SD, illustrated as antilogarithms in Control Chart
UWL: Upper Warning Limit = Mean + 2 x SD, illustrated as antilogarithms in Control Chart
LWL: Lower Warning Limit = Mean - 2 x SD, illustrated as antilogarithms in Control Chart
LCL: Lower Control Limit = Mean - 3 x SD, illustrated as antilogarithms in Control Chart

Point No.	LC50	log LC50
0	0.76	-0.12
1	0.71	-0.15
2	0.73	-0.14
3	0.77	-0.12
4	0.76	-0.12
5	0.73	-0.14
6	0.70	-0.15
7	0.68	-0.17
8	0.73	-0.14
9	0.76	-0.12
10	0.69	-0.16
11	0.73	-0.14
12	0.70	-0.15
13	0.69	-0.16
14	0.76	-0.12
15	0.73	-0.14
16	0.76	-0.12
17	0.78	-0.11
18	0.72	-0.14
19	0.69	-0.16

CONTROL CHART - DATA PLOT

Point No.	Test Date	96-h LC50	Acceptable Result?	Calculation Method
0	09/04/2009	0.76	-------	Trimmed Spearman Karber
1	09/18/2020	0.71	OK	Maximum Likelihood-Probit
2	11/27/2020	0.73	OK	Maximum Likelihood-Probit
3	02/19/2021	0.77	OK	Maximum Likelihood-Probit
4	04/30/2021	0.76	OK	Maximum Likelihood-Probit
5	06/18/2021	0.73	OK	Maximum Likelihood-Probit
6	08/06/2021	0.70	OK	Maximum Likelihood-Probit
7	08/20/2021	0.68	OK	Maximum Likelihood-Probit
8	09/10/2021	0.73	OK	Maximum Likelihood-Probit
9	10/08/2021	0.76	OK	Maximum Likelihood-Probit
10	10/22/2021	0.69	OK	Maximum Likelihood-Probit
11	01/18/2022	0.73	OK	Maximum Likelihood-Probit
12	02/18/2022	0.70	OK	Maximum Likelihood-Probit
13	04/04/2022	0.69	OK	Maximum Likelihood-Probit
14	04/12/2022	0.76	OK	Maximum Likelihood-Probit
15	05/24/2022	0.73	OK	Maximum Likelihood-Probit
16	06/28/2022	0.76	OK	Maximum Likelihood-Probit
17	07/22/2022	0.78	OK	Maximum Likelihood-Probit
18	08/12/2022	0.72	OK	Maximum Likelihood-Probit
19	08/26/2022	0.69	OK	Maximum Likelihood-Probit
20	09/09/2022	0.73	OK	Maximum Likelihood-Probit



10-d MARINE AMPHIPOD SEDIMENT TOXICITY TEST – DAILY WATER QUALITY

Client: Tysan Foundation Limited
Batch No.: HK2234393
Sample ID: 2-4
Test Initiation Date (Day 0): 09-Sep-22
Test Termination Date (Day 10): 19-Sep-22
Test Species/Date Collected: Leptocheirus plumulosus-09/Sep/22

Day	0	1	2	3	4	5	6	7	8	9	10
Sample ID	Salinity (ppt)										
J 1	20	20	20	20	20	20	20	20	20	20	20
Initial											
Sample ID	pH										
J 1	8.1	7.9	7.8	8.0	7.9	7.9	8.1	8.0	8.2	7.9	8.1
Initial											
Sample ID	Temperature (°C)										
J 1	25	25	25	25	25	25	25	25	25	25	25
Initial											
Sample ID	Dissolved Oxygen (mg/L)										
J 1	6.8	7.0	7.1	7.2	6.9	7.2	7.0	6.8	6.9	7.1	7.0
Initial											

WQ insturment
pH: HK1782
temp.: HK890
DO: HK1187
Salanity: HK1582

Comment

Test Set up By
Data verifed by
Date Verified 19/9

10-d MARINE AMPHIPOD SEDIMENT TOXICITY TEST – DAILY WATER QUALITY

Client	Tysan Foundation Limited	Test Initiation Date (Day 0)	09-Sep-22
Batch No.	HK2234393	Test Termination Date (Day 10)	19-Sep-22
Sample ID	2 - 4	Test Species/Date Collected	Leptocheirus plumulosus-09/Sep/22

Day	0	1	2	3	4	5	6	7	8	9	10
Sample ID	Salinity (ppt)										
J 2	20	20	20	20	20	20	20	20	20	20	20
J 3	20	20	20	20	20	20	20	20	20	20	20
J 4	20	20	20	20	20	20	20	20	20	20	20
Initial											
Sample ID	pH										
J 2	7.9	7.8	7.9	8.1	8.2	8.0	7.9	8.1	7.8	7.9	8.1
J 3	8.1	7.9	7.8	7.9	8.0	7.9	8.1	7.9	8.0	8.0	7.9
J 4	8.0	8.1	7.9	8.0	8.1	7.8	7.9	8.2	8.1	7.8	8.0
Initial											
Sample ID	Temperature (°C)										
J 2	25	25	25	25	25	25	25	25	25	25	25
J 3	25	25	25	25	25	25	25	25	25	25	25
J 4	25	25	25	25	25	25	25	25	25	25	25
Initial											
Sample ID	Dissolved Oxygen (mg/L)										
J 2	6.8	6.9	7.1	7.0	6.8	7.2	7.1	7.0	6.9	6.8	7.1
J 3	7.0	7.1	6.9	7.2	7.1	6.8	6.9	6.9	7.1	6.9	6.8
J 4	7.2	7.0	7.1	7.2	7.0	6.9	7.1	6.8	6.9	7.0	7.2
Initial											

WQ insturment	pH	HK1782	temp. HK890
	DO	HK1187	Salanity HK1582

Comment

Test Set up By _____ Data verifed by _____ Date Verified 19/10

10-d AMPHIPOD SEDIMENT TOXICITY TEST
EMERGENCE, SURVIVAL AND DAY 10 WATER QUALITY

Client: Tysan Foundation Limited.
Batch No.: HK2234393

Test Initiation Date (Day 0): 09-Sep-22
Test Termination Date (Day 10): 19-Sep-22
Test Species: *Leptocheirus plumulosus*
Source/Collection Date: Environmental Enterprises USA-09/Sep/22

SAMPLE ID: J 1

Rep.	NO. REMOVED/ REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A	0	0	0	0	0	0	0	0	0	0	0	20	W	0	25	7.8	20	6.9
B	0	0	0	0	0	0	0	0	0	0	0	19	[illegible]	1	25	8.1	20	7.2
C	0	0	0	0	0	0	0	0	0	0	0	20	W	0	25	7.9	20	7.1
D	0	0	0	0	0	0	0	0	0	0	0	20	[illegible]	0	25	7.9	20	6.9
E	0	0	0	0	0	0	0	0	0	0	0	18	W	2	25	8.2	20	7.0
Initial	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]

(# dead: # missing) - A (0 : 0) B (0 : 1) C (0 : 0) D (0 : 0) E (0 : 2)

SAMPLE ID

Rep.		Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

SAMPLE ID

Rep.		Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

SAMPLE ID

Rep.		Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

WQ Instruments Used:
Temp. HK890 Salinity HK1582 pH HK1782 DO HK1187

Data Verified By [signature] Date Verified 19/10

10-d AMPHIPOD SEDIMENT TOXICITY TEST
EMERGENCE, SURVIVAL AND DAY 10 WATER QUALITY

Client: Tysan Foundation Limited
Batch No.: HK2234393

Test Initiation Date (Day 0): 09-Sep-22
Test Termination Date (Day 10): 19-Sep-22
Test Species: *Leptocheirus plumulosus*
Source/Collection Date: Environmental Enterprises USA-09/Sep/22

SAMPLE ID: J 2

Rep.	NO. REMOVED/ REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A	0	0	0	0	0	0	0	0	0	0	0	18		2	25	7.9	20	6.8
B	0	0	0	0	0	0	0	0	0	0	0	19		1	25	8.1	20	6.9
C	0	0	0	0	0	0	0	0	0	0	0	17		3	25	8.0	20	7.1
D	0	0	0	0	0	0	0	0	0	0	0	18		1	25	7.9	20	7.0
E	0	0	0	0	0	0	0	0	0	0	0	19		1	25	8.2	20	7.2
Initial																		

(# dead: # missing) - A (0 : 2) B (0 : 1) C (0 : 3) D (0 : 2) E (0 : 1)

SAMPLE ID: J 3

Rep.	NO. REMOVED/ REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A	0	0	0	0	0	0	0	0	0	0	0	15		4	25	7.8	20	6.9
B	0	0	0	0	0	0	0	0	0	0	0	16		4	25	7.9	20	6.8
C	0	0	0	0	0	0	0	0	0	0	0	17		2	25	8.1	20	7.1
D	0	0	0	0	0	0	0	0	0	0	0	16		3	25	8.0	20	7.2
E	0	0	0	0	0	0	0	0	0	0	0	17		3	25	8.1	20	6.8
Initial																		

(# dead: # missing) - A (0 : 4) B (0 : 5) C (0 : 3) D (0 : 4) E (0 : 3)

SAMPLE ID: J 4

Rep.	NO. REMOVED/ REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A	0	0	0	0	0	0	0	0	0	0	0	16		4	25	8.1	20	7.1
B	0	0	0	0	0	0	0	0	0	0	0	17		3	25	8.0	20	7.0
C	0	0	0	0	0	0	0	0	0	0	0	14		5	25	7.8	20	6.8
D	0	0	0	0	0	0	0	0	0	0	0	16		4	25	8.0	20	7.2
E	0	0	0	0	0	0	0	0	0	0	0	18		2	25	7.9	20	6.9
Initial																		

(# dead: # missing) - A (0 : 4) B (0 : 3) C (0 : 6) D (0 : 4) E (0 : 2)

SAMPLE ID:

Rep.	NO. REMOVED/ REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

WQ Instruments Used:
Temp. HK890 Salinity HK1582 pH HK1782 DO HK1187

Data Verified By [signature] Date Verified 19/10

MARINE SPECIES REFERENCE TOXICANT TEST DATA

Test Species: *Leptocheirus plumulosus*

Test Initiation Date (Time): 09-Sep-22 Client: Tyson Foundation Limited. Reference Toxicant: Cd Source/Collection Date: Environmental Enterprises USA-09/Sep/22

Test Termination Date (Time): 13-Sep-22 Batch No./Sample ID: H1422343B3 Stock ID: HK2234886-002 No. Organisms/Test Volume: 10, 900ml

Rep	Ref. Toxicant Conc. (mg/L)	Number of Survivors (24 to 96 hours)				Dissolved Oxygen (mg/L)					Temperature (°C)					pH					Salinity (ppt)	
		24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
A	0.00				10	6.9				7.2	25				25	7.9				8.1	20	20
	0.15				9	6.8				7.0	25				25	8.1				7.9	20	20
	0.60				6	7.2				7.1	25				25	8.0				7.8	20	20
	1.25				3	7.0				6.9	25				25	8.2				8.0	20	20
	2.50				2	6.8				7.1	25				25	7.8				8.2	20	20
	5.00				0	7.2				6.8	25				25	7.9				8.1	20	20
B	0.00				10	7.1				6.8	25				25	7.8				8.2	20	20
	0.15				9	7.0				7.2	25				25	8.1				7.9	20	20
	0.60				5	6.9				7.1	25				25	8.1				7.8	20	20
	1.25				4	6.8				7.0	25				25	8.0				8.2	20	20
	2.50				2	7.2				6.9	25				25	7.9				7.8	20	20
	5.00				0	7.1				7.2	25				25	8.0				8.1	20	20
	Initials				MJ	MJ				MJ	MJ				MJ	MJ				MJ	MJ	MJ

Instruments Used:

Auto Pipette HK903,HK338

Temperature HK890

pH HK1782

DO HK1187

Salinity HK1582

Balance HK1571

Test Set Up By: CT

Data Verified By: MJ

Date Verified: 19/10

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2235526
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: —	Telephone	: +852 2610 1044		
Facsimile	: —	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 09-Sep-2022
Order number	: —	Quote number	: HKE/2648/2021	Issue Date	: 21-Sep-2022
C-O-C number	: —			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 09-Sep-2022 to 21-Sep-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2235526

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control AMPHIPOD 0 DAY	REFERENCE SEDIMENT AMPHIPOD 0 DAY	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m AMPHIPOD 0 DAY	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m AMPHIPOD 0 DAY	—
				Sampling date / time	09-Sep-2022	09-Sep-2022	09-Sep-2022	09-Sep-2022	---
Compound	CAS Number	LOR	Unit		HK2235526-001	HK2235526-002	HK2235526-003	HK2235526-004	———
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	---	0.1	mg/L		0.3	0.2	0.3	0.2	—
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L		0.009	0.008	0.012	0.005	—
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	—

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4576260)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4579351)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	91.0	---	85.0	115	---	---

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

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

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2235528
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: —	Telephone	: +852 2610 1044		
Facsimile	: —	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 19-Sep-2022
Order number	: —	Quote number	: HKE/2648/2021	Issue Date	: 26-Sep-2022
C-O-C number	: —			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 19-Sep-2022 to 26-Sep-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2235528

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control AMPHIPOD 10 DAY	REFERENCE SEDIMENT AMPHIPOD 10 DAY	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m AMPHIPOD 10 DAY	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m AMPHIPOD 10 DAY	—
				Sampling date / time	19-Sep-2022	19-Sep-2022	19-Sep-2022	19-Sep-2022	----
Compound	CAS Number	LOR	Unit		HK2235528-001	HK2235528-002	HK2235528-003	HK2235528-004	——
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	----	0.1	mg/L		<0.1	<0.1	0.1	<0.1	—
EK055K: Unionized Ammonia (as N)	----	0.001	mg/L		<0.001	<0.001	0.008	<0.001	—
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	—

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4590507)											
EK055K: Ammonia as NH3	----	0.1	mg/L	<0.1	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4593584)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	93.8	----	85.0	115	----	----

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

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

APPENDIX C

Complete Data for the 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

Client: Tysan Foundation Limited

Batch No.: HK2234393

Initiation Date: 09-Sep-22

Termination Date: 29-Sep-22

Summary Results for the 20-d Polychaete Growth and Survival Test - *Neanthes arenaceodentata*

ID	Rep	Group	Clinet ID	Duration (Days)	Initial no.	Final no.	No. weighed	Initial weight (mg)	pan weight (mg)	pan + worm weight (mg)	Survival (%)			Total Dry Weight (mg)			Ind. Dry Weight (mg)			Ind. Growth Rate (mg/d)		
											S (%)	S Mean	S SD	TDW (mg)	TDW Mean	TDW SD	IDW (mg)	IDW Mean	IDW SD	IGR (mg/d)	IGR Mean	IGR SD
-	1	Control	Control	20	5	5	5	0.71	1185.71	1241.68	100.0	100.0	0.0	55.97	55.7	0.7	11.2	11.1	0.1	0.52	0.52	0.01
-	2	Control	Control	20	5	5	5	0.71	1185.16	1240.47	100.0			55.31			11.1			0.52		
-	3	Control	Control	20	5	5	5	0.71	1183.64	1238.46	100.0			54.82			11.0			0.51		
-	4	Control	Control	20	5	5	5	0.71	1196.21	1252.80	100.0			56.59			11.3			0.53		
-	5	Control	Control	20	5	5	5	0.71	1186.37	1242.25	100.0			55.88			11.2			0.52		
1	1	HK2234393002	REFERENCE SEDIMENT	20	5	5	5	0.71	1187.01	1239.59	100.0	100.0	0.0	52.58	51.8	1.1	10.5	10.4	0.2	0.49	0.48	0.01
2	2	HK2234393002	REFERENCE SEDIMENT	20	5	5	5	0.71	1191.07	1243.46	100.0			52.39			10.5			0.49		
3	3	HK2234393002	REFERENCE SEDIMENT	20	5	5	5	0.71	1187.28	1237.51	100.0			50.23			10.0			0.47		
4	4	HK2234393002	REFERENCE SEDIMENT	20	5	5	5	0.71	1198.07	1250.94	100.0			52.87			10.6			0.49		
5	5	HK2234393002	REFERENCE SEDIMENT	20	5	5	5	0.71	1193.43	1244.42	100.0			50.99			10.2			0.47		
6	1	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	5	5	5	0.71	1194.34	1245.00	100.0	100.0	0.0	50.66	48.6	1.9	10.1	9.7	0.4	0.47	0.45	0.02
7	2	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	5	5	5	0.71	1190.14	1238.43	100.0			48.29			9.7			0.45		
8	3	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	5	5	5	0.71	1188.47	1238.86	100.0			50.39			10.1			0.47		
9	4	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	5	5	5	0.71	1194.68	1240.78	100.0			46.10			9.2			0.43		
10	5	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	20	5	5	5	0.71	1186.16	1233.88	100.0			47.72			9.5			0.44		
11	1	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	5	5	5	0.71	1185.21	1233.95	100.0	100.0	0.0	48.74	49.4	2.0	9.7	9.9	0.4	0.45	0.46	0.02
12	2	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	5	5	5	0.71	1199.76	1245.87	100.0			46.11			9.2			0.43		
13	3	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	5	5	5	0.71	1185.20	1235.99	100.0			50.79			10.2			0.47		
14	4	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	5	5	5	0.71	1185.15	1235.33	100.0			50.18			10.0			0.47		
15	5	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	20	5	5	5	0.71	1194.49	1245.47	100.0			50.98			10.2			0.47		

Reviewed by: _____

Test: NA
Species: NA
Sample ID: VA
Start Date: 9/9/2022 End Date: 9/29/2022

Test ID: hk2234393b
Protocol: PSEP 1995
Sample Type: MS
Lab ID: ALS

Pos	ID	Rep	Group	T. Duration (Days)	Initial no.	Final no.	No. weighed	Initital weight	pan weight (mg)	pan + worm weight (mg)
	1	1	REFERENCE	20	5	5	5	0.71	1187.01	1239.59
	2	2	REFERENCE	20	5	5	5	0.71	1191.07	1243.46
	3	3	REFERENCE	20	5	5	5	0.71	1187.28	1237.51
	4	4	REFERENCE	20	5	5	5	0.71	1198.07	1250.94
	5	5	REFERENCE	20	5	5	5	0.71	1193.43	1244.42
	6	1	2234393-03	20	5	5	5	0.71	1194.34	1245
	7	2	2234393-03	20	5	5	5	0.71	1190.14	1238.43
	8	3	2234393-03	20	5	5	5	0.71	1188.47	1238.86
	9	4	2234393-03	20	5	5	5	0.71	1194.68	1240.78
	10	5	2234393-03	20	5	5	5	0.71	1186.16	1233.88
	11	1	2234393-04	20	5	5	5	0.71	1185.21	1233.95
	12	2	2234393-04	20	5	5	5	0.71	1199.76	1245.87
	13	3	2234393-04	20	5	5	5	0.71	1185.2	1235.99
	14	4	2234393-04	20	5	5	5	0.71	1185.15	1235.33
	15	5	2234393-04	20	5	5	5	0.71	1194.49	1245.47

Comments:

-Total Dry Weight (mg)

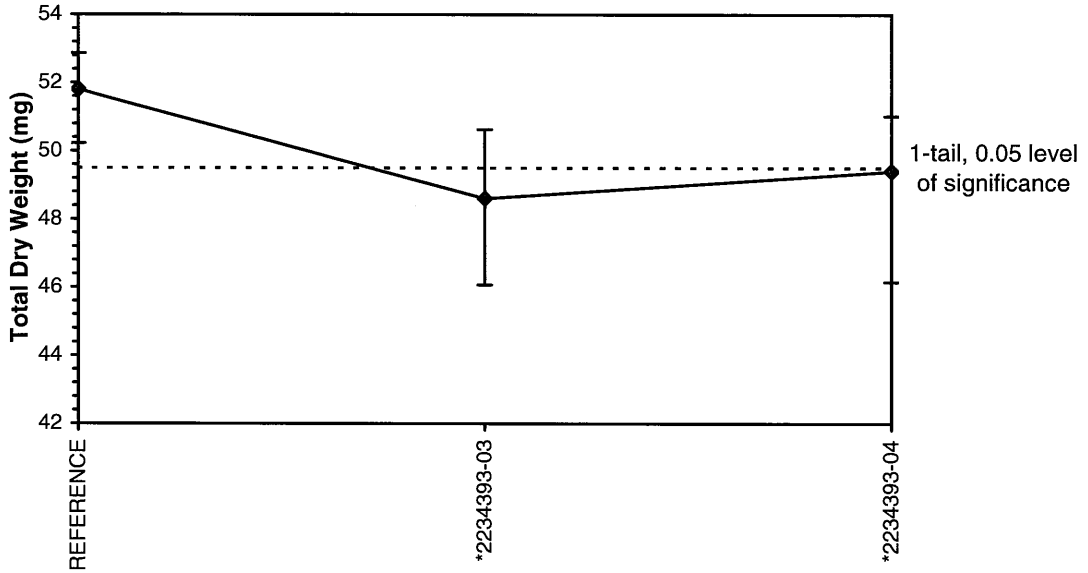
Start Date:	9/9/2022	Test ID:	hk2234393b	Sample ID:	VA
End Date:	9/29/2022	Lab ID:	ALS	Sample Type:	MS
Sample Date:		Protocol:	PSEP 1995	Test Species:	NA
Comments:					

Conc-	1	2	3	4	5
REFERENCE	52.580	52.390	50.230	52.870	50.990
2234393-03	50.660	48.290	50.390	46.100	47.720
2234393-04	48.740	46.110	50.790	50.180	50.980

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
REFERENCE	51.812	1.0000	51.812	50.230	52.870	2.205	5			
*2234393-03	48.632	0.9386	48.632	46.100	50.660	3.924	5	2.900	2.110	2.314
*2234393-04	49.360	0.9527	49.360	46.110	50.980	4.088	5	2.236	2.110	2.314

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.93393		0.881		-0.6532	-0.4599
Bartlett's Test indicates equal variances (p = 0.54)	1.22059		9.21034			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test indicates significant differences Treatments vs REFERENCE	2.31374	0.04466	13.8789	3.00611	0.03258	2, 12

Dose-Response Plot



Test: NA
Species: NA
Sample ID: REF
Start Date: 9/9/2022 End Date: 9/13/2022

Test ID: RTNACD203
Protocol: PSEP 1995
Sample Type: CDCL
Lab ID: ALS

Pos	ID	Rep	Group	T. Duration (Days)	Initial no.	Final no.	No. weighed	Initital weight	pan weight (mg)	pan + worm weight (mg)
	1	1	D-Control	4	10	10				
	2	2	D-Control	4	10	10				
	3	1	2.4	4	10	9				
	4	2	2.4	4	10	9				
	5	1	6.9	4	10	6				
	6	2	6.9	4	10	5				
	7	1	9.8	4	10	4				
	8	2	9.8	4	10	3				
	9	1	14	4	10	2				
	10	2	14	4	10	1				
	11	1	20	4	10	0				
	12	2	20	4	10	0				

Comments:

-Survival

Start Date:	9/9/2022	Test ID:	RTNACD203	Sample ID:	REF
End Date:	9/13/2022	Lab ID:	ALS	Sample Type:	CDCL
Sample Date:		Protocol:	PSEP 1995	Test Species:	NA
Comments:					

Conc-mg/L	1	2
D-Control	1.0000	1.0000
2.4	0.9000	0.9000
6.9	0.6000	0.5000
9.8	0.4000	0.3000
14	0.2000	0.1000
20	0.0000	0.0000

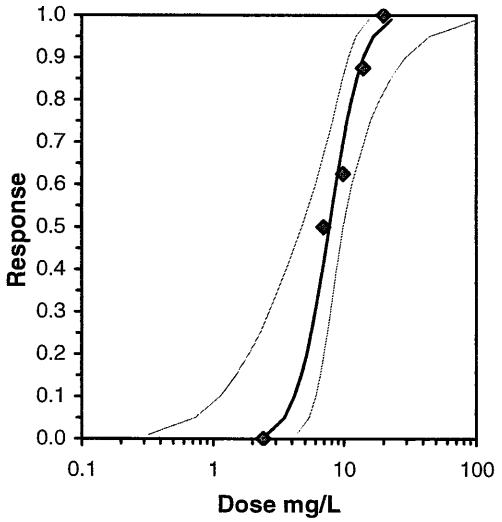
			Transform: Untransformed					Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.000	2	0	8
2.4	0.9000	0.9000	0.9000	0.9000	0.9000	0.000	2	0	8
6.9	0.5500	0.5500	0.5500	0.5000	0.6000	12.856	2	4	8
9.8	0.3500	0.3500	0.3500	0.3000	0.4000	20.203	2	5	8
14	0.1500	0.1500	0.1500	0.1000	0.2000	47.140	2	7	8
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	2	8	8

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	4.86268	1.51096	1.9012	7.82417	0	0.73897	7.81473	0.864	0.88364	0.20565	5
Intercept	0.70313	1.4894	-2.2161	3.62237							
TSCR											

Point	Probits	mg/L	95% Fiducial Limits	
EC01	2.674	2.54233	0.32315	4.32186
EC05	3.355	3.51059	0.72869	5.34675
EC10	3.718	4.16958	1.11998	6.01098
EC15	3.964	4.68274	1.49299	6.5216
EC20	4.158	5.13527	1.8721	6.97349
EC25	4.326	5.55819	2.26819	7.40235
EC40	4.747	6.78485	3.62273	8.73683
EC50	5.000	7.64963	4.70951	9.84126
EC60	5.253	8.62464	5.9597	11.3878
EC75	5.674	10.528	8.08153	15.831
EC80	5.842	11.3951	8.85973	18.5717
EC85	6.036	12.4963	9.72181	22.693
EC90	6.282	14.0342	10.7696	29.6277
EC95	6.645	16.6687	12.3226	44.7423
EC99	7.326	23.017	15.4744	99.3951



Reviewed by: _____

REFERENCE TOXICANT CONTROL CHART

Neanthes arenaceodentata - 96-h Survival LC50 Values (mg Cd / L)

	Log	Antilog
Mean	0.87	7.44
SD	0.01	1.03
2 x SD	0.02	1.05
UCL	0.90	8.02
UWL	0.89	7.82
LWL	0.85	7.08
LCL	0.84	6.90
CV(%)	1.25	

WARNING / CONTROL LIMIT CALCULATIONS

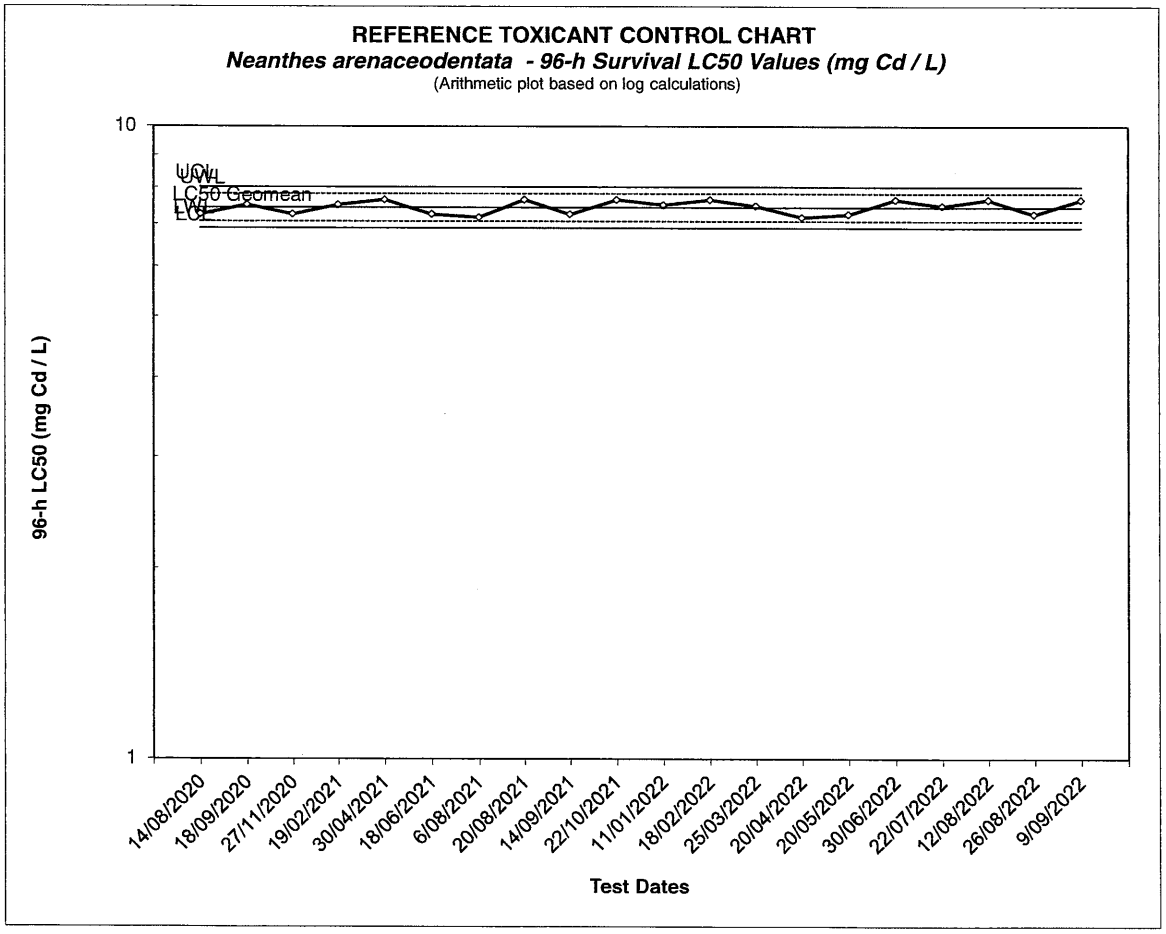
Mean: Mean is calculated for the last 20 logarithms of EC50, convert to antilogarithm to give Geomean
SD: Standard deviation is calculated for the last 20 logarithms of EC50

UCL: Upper Control Limit = Mean + 3 x SD, illustrated as antilogarithms in Control Chart
UWL: Upper Warning Limit = Mean + 2 x SD, illustrated as antilogarithms in Control Chart
LWL: Lower Warning Limit = Mean - 2 x SD, illustrated as antilogarithms in Control Chart
LCL: Lower Control Limit = Mean - 3 x SD, illustrated as antilogarithms in Control Chart

Point No.	LC50	log LC50
0	7.60	0.88
1	7.26	0.86
2	7.51	0.88
3	7.26	0.86
4	7.51	0.88
5	7.65	0.88
6	7.26	0.86
7	7.17	0.86
8	7.65	0.88
9	7.26	0.86
10	7.65	0.88
11	7.51	0.88
12	7.65	0.88
13	7.48	0.87
14	7.17	0.86
15	7.26	0.86
16	7.65	0.88
17	7.48	0.87
18	7.65	0.88
19	7.26	0.86

CONTROL CHART - DATA PLOT

Point No.	Test Date	96-h LC50	Acceptable Result?	Calculation Method
0	17/07/2009	7.60	-------	Trimmed Spearman Karber
1	14/08/2020	7.26	OK	Maximum Likelihood-Probit
2	18/09/2020	7.51	OK	Maximum Likelihood-Probit
3	27/11/2020	7.26	OK	Maximum Likelihood-Probit
4	19/02/2021	7.51	OK	Maximum Likelihood-Probit
5	30/04/2021	7.65	OK	Maximum Likelihood-Probit
6	18/06/2021	7.26	OK	Maximum Likelihood-Probit
7	06/08/2021	7.17	OK	Maximum Likelihood-Probit
8	20/08/2021	7.65	OK	Maximum Likelihood-Probit
9	14/09/2021	7.26	OK	Maximum Likelihood-Probit
10	22/10/2021	7.65	OK	Maximum Likelihood-Probit
11	11/01/2022	7.51	OK	Maximum Likelihood-Probit
12	18/02/2022	7.65	OK	Maximum Likelihood-Probit
13	25/03/2022	7.48	OK	Maximum Likelihood-Probit
14	20/04/2022	7.17	OK	Maximum Likelihood-Probit
15	20/05/2022	7.26	OK	Maximum Likelihood-Probit
16	30/06/2022	7.65	OK	Maximum Likelihood-Probit
17	22/07/2022	7.48	OK	Maximum Likelihood-Probit
18	12/08/2022	7.65	OK	Maximum Likelihood-Probit
19	26/08/2022	7.26	OK	Maximum Likelihood-Probit
20	09/09/2022	7.65	OK	Maximum Likelihood-Probit



20-d Neanthes SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client Tysan Foundation Limited.
Batch No. HK2234393
Sample ID 2-4

Test Species *Neanthes arenaceodentata*
Source/Date Received Aquatic Toxicology Support-05/Sep/22
Test Initiation Date (Day 0) 09-Sep-22
Test Termination Date (Day 20) 29-Sep-22

Date	0	3	6	9	12	15	18	20
Sample ID	Salinity (ppt)							
J 1	28	28	28	28	28	28	28	28
Initial	af	af	af	af	af	af	af	af
Sample ID	pH							
J 1	7.9	7.8	7.8	8.1	8.2	8.0	7.9	7.9
Initial	af	af	af	af	af	af	af	af
Sample ID	DO (mg/L)							
J 1	6.9	7.2	6.8	7.1	6.9	7.2	7.1	6.9
Initial	af	af	af	af	af	af	af	af

WQ Instrument: pH HK1782 Sal. HK1582 DO HK1187

Comments

Test Set Up By af Data Verified By [signature] Date Verified 14/10

20-d Neanthes SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client	Tysan Foundation Limited	Test Species	*Neanthes arenaceodentata*
Batch No.	HK2234393	Source/Date Received	Aquatic Toxicology Support-05/Sep/22
Sample ID	2 - 4	Test Initiation Date (Day 0)	09-Sep-22
		Test Termination Date (Day 20)	29-Sep-22

Date	0	3	6	9	12	15	18	20
Sample ID	Salinity (ppt)							
J 2	28	28	28	28	28	28	28	28
J 3	28	28	28	28	28	28	28	28
J 4	28	28	28	28	28	28	28	28
Initial								
Sample ID	pH							
J 2	7.9	7.8	8.1	8.1	8.2	7.8	8.2	8.1
J 3	8.0	7.8	7.8	7.9	8.1	8.0	7.9	7.8
J 4	7.9	7.9	8.2	8.0	8.0	8.1	7.9	8.2
Initial								
Sample ID	DO (mg/L)							
J 2	6.8	7.1	7.0	6.9	6.8	7.0	7.1	7.1
J 3	7.0	7.1	7.2	7.2	6.9	7.0	7.2	6.9
J 4	6.8	7.0	7.0	6.9	7.2	6.9	7.0	7.0
Initial								

WQ Instrument: pH HK1782 Sal. HK1582 DO HK1187

Comments

Test Set Up By (H) Data Verified By Date Verified 19/10

20-d *Neanthes* SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client: Tysan Foundation Limited.
Batch No.: HK2234393
Sample ID: 2-4

Test Species: *Neanthes arenaceodentata*
Source/Date Received: Aquatic Toxicology Support-05/Sep/22
Test Initiation Date (Day 0): 09-Sep-22
Test Termination Date (Day 20): 29-Sep-22

Sample ID	Temperature (°C)																				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Control	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Technician Initials																					

WQ Instruments Used: Temp. HK890

Comments

Test Set Up By _____ Data Verified By _____ Date Verified 19/10

20-d *Neanthes* SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client	Tysan Foundation Limited	Test Species	*Neanthes arenaceodentata*
Batch No.	HK2234393	Source/Date Received	Aquatic Toxicology Support-05/Sep/22
Sample ID	2 - 4	Test Initiation Date (Day 0)	09-Sep-22
		Test Termination Date (Day 20)	29-Sep-22

Sample ID	Temperature (°C)																				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
J 2	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
J 3	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
J 4	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Technician Initials																					

WQ Instruments Used: Temp. HK890

Comments

Test Set Up By _____ Data Verified By _____ Date Verified 19/10

POLYCHAETE SEDIMENT TOXICITY TESTS – SURVIVAL, DRY WEIGHT AND FINAL WATER QUALITY DATA

Ensure that another technician carries out one of the tear down replicates

Client: Tysan Foundation Limited.
Batch No.: HK2234393
Sample ID: 2-4

Test Species/Test Type: *Neanthes arenaceodentata / Static; Renewal*
Test Initiation Date (Day 0): 09-Sep-2022
Test Termination Date (Day 20): 29-Sep-2022

Sample ID	Rep.	Pan No.	Pan Weight (g)	Final Weight (g)	No. Alive	No. Dead	Food or sediment in the digestive tract (Y/N)	Total Recovered	No. Missing	Init.	Temp. (°C)	pH	Salinity (ppt)	DO (mg/L)
J 1	A	1	1.18571	1.24168	5	0	Y	5	0	W	20	7.9	28	6.9
	B	2	1.18516	1.24047	5	0	Y	5	0	gf	20	8.1	28	6.8
	C	3	1.18364	1.23846	5	0	Y	5	0	W	20	7.8	28	7.0
	D	4	1.19621	1.25280	5	0	Y	5	0	gf	20	8.2	28	7.1
	E	5	1.18637	1.24225	5	0	N	5	0	W	20	7.9	28	6.9
										Initials	gf	gf	gf	gf

WQ Instruments Us Temp. HK890 pH HK1782 Sal. HK1582 DO HK1187 Balance HK1571, HK658

Data Verified By: W Date Verified: 19/10

Main technician performing tear down: W Second technician performing replicate tear down: gf

POLYCHAETE SEDIMENT TOXICITY TESTS – SURVIVAL, DRY WEIGHT AND FINAL WATER QUALITY DATA

Ensure that another technician carries out one of the tear down replicates

Client: Tysan Foundation Limited

Batch No.: HK2234393

Sample ID: 2 - 4

Test Species/Test Type: *Neanthes arenaceodentata / Static; Renewal*

Test Initiation Date (Day 0): 09-Sep-2022

Test Termination Date (Day 20): 29-Sep-2022

Sample ID	Rep.	Pan No.	Pan Weight (g)	Final Weight (g)	No. Alive	No. Dead	Food or sediment in the digestive tract (Y/N)	Total Recovered	No. Missing	Init.	Temp. (°C)	pH	Salinity (ppt)	DO (mg/L)
J 2	A	6J	1.18701	1.23959	5	0	Y	5	0	YJ	20	7.9	28	7.1
	B	7J	1.19107	1.24346	5	0	Y	5	0	W	20	8.1	28	7.2
	C	8J	1.18728	1.23751	5	0	Y	5	0	YJ	20	8.0	28	6.9
	D	9J	1.19807	1.25094	5	0	Y	5	0	W	20	7.8	28	7.0
	E	10J	1.19343	1.24442	5	0	Y	5	0	YJ	20	7.9	28	6.9
J 3	A	11J	1.19434	1.24500	5	0	Y	5	0	W	20	8.1	28	6.8
	B	12J	1.19014	1.23843	5	0	Y	5	0	YJ	20	8.0	28	7.1
	C	13J	1.18847	1.23886	5	0	Y	5	0	W	20	8.2	28	7.1
	D	14J	1.19468	1.24078	5	0	N	5	0	YJ	20	7.9	28	6.9
	E	15J	1.18616	1.23388	5	0	Y	5	0	W	20	7.8	28	6.8
J 4	A	16J	1.18521	1.23395	5	0	N	5	0	YJ	20	7.9	28	7.2
	B	17J	1.19976	1.24587	5	0	Y	5	0	W	20	7.9	28	7.0
	C	18J	1.18520	1.23599	5	0	Y	5	0	YJ	20	8.1	28	7.1
	D	19J	1.18515	1.23533	5	0	N	5	0	W	20	8.1	28	6.9
	E	20J	1.19449	1.24547	5	0	Y	5	0	YJ	20	8.0	28	6.9
									Initials		YJ	YJ	YJ	YJ

WQ Instruments Us Temp. HK890 pH HK1782 Sal. HK1582 DO HK1187 Balance HK1571, HK658

Data Verified By MJ Date Verified 19/10

Main technician performing tear down W Second technician performing replicate tear down YJ

MARINE SPECIES REFERENCE TOXICANT TEST DATA

Test Species *Neanthes arenaceodentata*

Test Initiation Date (Time) 09-Sep-22 Client Tysan Foundation Limited Reference Toxicant Cd Source/Collection Date Aquatic Toxicology Support-05/Sep/22

Test Termination Date (Time) 13-Sep-22 Batch No./Sample ID HK 2234393. Stock ID HK2234886-002 No. Organisms/Test Volume 10, 900ml

Rep	Ref. Toxicant	Number of Survivors (24 to 96 hours)				Dissolved Oxygen (mg/L)					Temperature (°C)					pH					Salinity (ppt)	
	Conc. (mg/L)	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
A	0.0				10	6.9				7.2	20				20	8.1				7.8	28	28
	2.4				9	7.1				7.2	20				20	7.9				7.8	28	28
	6.9				6	7.0				6.8	20				20	8.0				8.1	28	28
	9.8				3	6.8				7.1	20				20	8.0				7.8	28	28
	14.0				2	6.9				7.0	20				20	7.8				8.0	28	28
	20.0				0	7.1				6.8	20				20	7.9				8.2	28	28
B	0.0				10	7.0				7.2	20				20	7.9				8.1	28	28
	2.4				9	7.2				7.0	20				20	8.0				7.8	28	28
	6.9				5	6.9				7.2	20				20	7.8				8.1	28	28
	9.8				0	6.8				7.1	20				20	7.9				7.8	28	28
	14.0				1	7.1				7.0	20				20	8.1				8.2	28	28
	20.0				0	7.2				6.8	20				20	8.0				8.2	28	28
	Initials				cy	cy				cy	cy				cy	cy				cy	cy	cy

Instruments Used:

Auto Pipette	HK903,HK338
Temperature	HK890
pH	HK1782
DO	HK1187
Salinity	HK1582
Balance	HK1571, HK658

Dry Weight (g) Determination of Organism

rep	org. no.	wt pan	wt pan+org.	dry wt of pan + org.	dry wt of each org.	mean dry wt of each org.
1	5	1.18410	1.18770	1.18769	0.00072	0.00071
2	5	1.18675	1.19016	1.19015	0.00068	
3	5	1.19135	1.19506	1.19505	0.00074	

Test Set Up By LY

Data Verified By

Date Verified 19/10

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2235529
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: —	Telephone	: +852 2610 1044		
Facsimile	: —	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 09-Sep-2022
Order number	: —	Quote number	: HKE/2648/2021	Issue Date	: 21-Sep-2022
C-O-C number	: —			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Fung Lim Chee, Richard	**Managing Director**	**Inorganics, Kwai Tsing**

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 09-Sep-2022 to 21-Sep-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2235529

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control POLYCHATE 0 DAY	REFERENCE SEDIMENT POLYCHATE 0 DAY	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m POLYCHATE 0 DAY	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m POLYCHATE 0 DAY	---
				Sampling date / time	09-Sep-2022	09-Sep-2022	09-Sep-2022	09-Sep-2022	---
Compound	CAS Number	LOR	Unit		HK2235529-001	HK2235529-002	HK2235529-003	HK2235529-004	------
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	---	0.1	mg/L		0.8	0.4	0.2	0.2	---
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L		0.025	0.013	0.005	0.006	---
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	---

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4576260)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4579351)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	91.0	---	85.0	115	---	---

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

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

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2235530
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: —	Telephone	: +852 2610 1044		
Facsimile	: —	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 29-Sep-2022
Order number	: —	Quote number	: HKE/2648/2021	Issue Date	: 05-Oct-2022
C-O-C number	: —			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Fung Lim Chee, Richard	**Managing Director**	**Inorganics, Kwai Tsing**

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 29-Sep-2022 to 05-Oct-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2235530

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control POLYCHATE 20 DAY	REFERENCE SEDIMENT POLYCHATE 20 DAY	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m POLYCHATE 20 DAY	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m POLYCHATE 20 DAY	—
				Sampling date / time	29-Sep-2022	29-Sep-2022	29-Sep-2022	29-Sep-2022	---
Compound	CAS Number	LOR	Unit		HK2235530-001	HK2235530-002	HK2235530-003	HK2235530-004	———
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	---	0.1	mg/L		<0.1	0.1	<0.1	<0.1	—
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L		<0.001	0.003	<0.001	<0.001	—
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	—

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4611049)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4618250)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	101	---	85.0	115	---	---

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

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

APPENDIX D

Complete Data for the 48-60-hour Bivalve Larvae Survival and Normality Test – *Crassostrea gigas*

Client: Tysan Foundation Limited

Batch No.: HK2234393

Initiation Date: 14-Sep-22

Summary of Results for the 48-60-hr Bivalve Larval Survival and Development Test - Crassostrea gigas

ID	Rep	Group	Clinet ID	Initial Density	Number Normal	Number Abnormal	Normality Survival%			Survival %			Normality %		
							NS (%)	NS Mean	NS SD	S (%)	S Mean	S SD	N (%)	N Mean	N SD
-	1	Control	Control	361	315	26	87.3	88.5	1.7	94.5	94.0	2.3	92.4	94.2	1.3
-	2	Control	Control	361	319	16	88.4			92.8			95.2		
-	3	Control	Control	361	318	21	88.1			93.9			93.8		
-	4	Control	Control	361	316	14	87.5			91.4			95.8		
-	5	Control	Control	361	330	22	91.4			97.5			93.8		
1	1	HK2234393002	REFERENCE SEDIMENT	361	314	27	87.0	84.5	2.4	94.5	90.6	3.4	92.1	93.4	2.2
2	2	HK2234393002	REFERENCE SEDIMENT	361	311	25	86.2			93.1			92.6		
3	3	HK2234393002	REFERENCE SEDIMENT	361	309	13	85.6			89.2			96.0		
4	4	HK2234393002	REFERENCE SEDIMENT	361	296	30	82.0			90.3			90.8		
5	5	HK2234393002	REFERENCE SEDIMENT	361	296	14	82.0			85.9			95.5		
6	1	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	361	253	33	70.1	73.2	2.8	79.2	82.5	3.3	88.5	88.8	2.3
7	2	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	361	279	36	77.3			87.3			88.6		
8	3	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	361	258	37	71.5			81.7			87.5		
9	4	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	361	264	40	73.1			84.2			86.8		
10	5	HK2234393003	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m	361	268	21	74.2			80.1			92.7		
11	1	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	361	275	28	76.2	73.5	2.2	83.9	81.2	2.0	90.8	90.5	1.2
12	2	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	361	262	28	72.6			80.3			90.3		
13	3	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	361	257	33	71.2			80.3			88.6		
14	4	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	361	260	25	72.0			79.0			91.2		
15	5	HK2234393004	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m	361	273	25	75.6			82.6			91.6		

Reviewed by: _____

Test: BV-Bivalve Larval Survival and Development Te					Test ID: HK2234393c		
Species: CG-Crassostrea gigas					Protocol: CG		
Sample ID: VA					Sample Type: MS		
Start Date: 9/14/2022			End Date: 9/16/2022		Lab ID: ALS		
Pos	ID	Rep	Group	Initial Density	Normal Count	Abnormal Count	Notes
	1	1	2234393-02	361	314	27	
	2	2	2234393-02	361	311	25	
	3	3	2234393-02	361	309	13	
	4	4	2234393-02	361	296	30	
	5	5	2234393-02	361	296	14	
	6	1	2234393-03	361	253	33	
	7	2	2234393-03	361	279	36	
	8	3	2234393-03	361	258	37	
	9	4	2234393-03	361	264	40	
	10	5	2234393-03	361	268	21	
	11	1	2234393-04	361	275	28	
	12	2	2234393-04	361	262	28	
	13	3	2234393-04	361	257	33	
	14	4	2234393-04	361	260	25	
	15	5	2234393-04	361	273	25	

Comments:

Bivalve Larval Survival and Development Test-Normality Survival

Start Date:	9/14/2022	Test ID:	HK2234393c	Sample ID:	VA
End Date:	9/16/2022	Lab ID:	ALS	Sample Type:	MS
Sample Date:		Protocol:	CG	Test Species:	CG-Crassostrea gigas
Comments:					

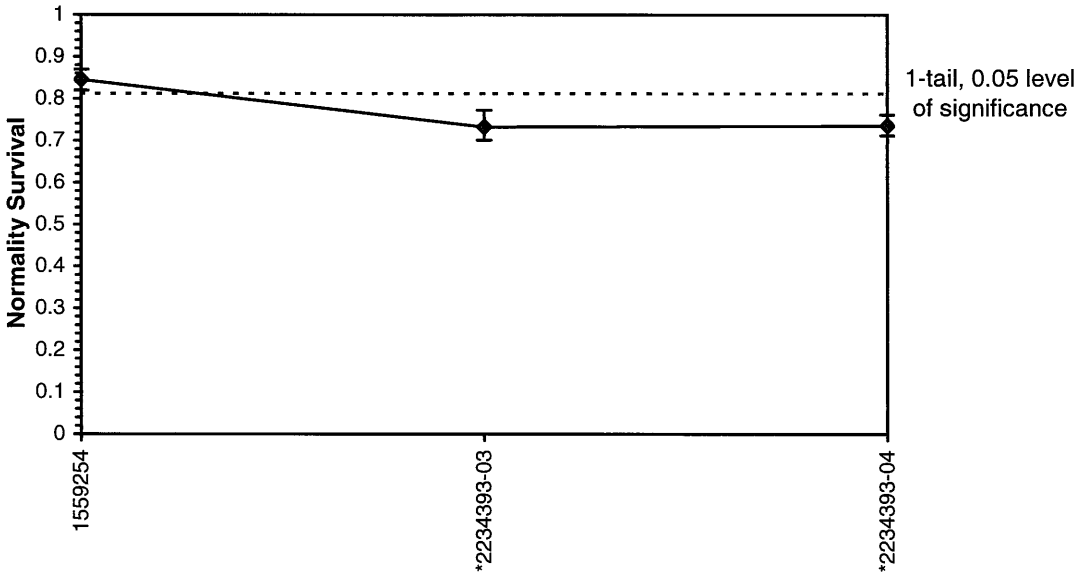
Conc-	1	2	3	4	5
2234393-02	0.8698	0.8615	0.8560	0.8199	0.8199
2234393-03	0.7008	0.7729	0.7147	0.7313	0.7424
2234393-04	0.7618	0.7258	0.7119	0.7202	0.7562

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
2234393-02	0.8454	1.0000	0.8454	0.8199	0.8698	2.813	5			
*2234393-03	0.7324	0.8663	0.7324	0.7008	0.7729	3.769	5	7.238	2.110	0.0329
*2234393-04	0.7352	0.8696	0.7352	0.7119	0.7618	3.045	5	7.061	2.110	0.0329

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.93567	0.881	0.19414	-1.3126
Bartlett's Test indicates equal variances (p = 0.92)	0.17141	9.21034		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences Treatments vs 2234393-02	0.03295	0.03897	0.02078	0.00061	1.1E-05	2, 12

Dose-Response Plot



Test: BV-Bivalve Larval Survival and Development Te Test ID: RTCGCU133
Species: CG-Crassostrea gigas Protocol: CG
Sample ID: REF Sample Type: CUCL
Start Date: 9/14/2022 End Date: 9/16/2022 Lab ID: ALS

Pos	ID	Rep	Group	Initial Density	Normal Count	Abnormal Count	Notes
	1	1	D-Control	361	315	26	
	2	2	D-Control	361	319	16	
	3	3	D-Control	361	318	21	
	4	4	D-Control	361	316	14	
	5	5	D-Control	361	330	22	
	6	1	1	361	338	10	
	7	2	1	361	348	23	
	8	3	1	361	350	23	
	9	1	5	361	168	45	
	10	2	5	361	173	34	
	11	3	5	361	174	31	
	12	1	10	361	68	69	
	13	2	10	361	66	67	
	14	3	10	361	72	58	
	15	1	20	361	39	87	
	16	2	20	361	44	80	
	17	3	20	361	42	81	
	18	1	50	361	3	113	
	19	2	50	361	5	113	
	20	3	50	361	2	120	

Comments:

Bivalve Larval Survival and Development Test-Normality Survival

Start Date:	9/14/2022	Test ID:	RTCGCU133	Sample ID:	REF
End Date:	9/16/2022	Lab ID:	ALS	Sample Type:	CUCL
Sample Date:		Protocol:	CG	Test Species:	CG-Crassostrea gigas
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	0.8726	0.8837	0.8809	0.8753	0.9141
1	0.9363	0.9640	0.9695		
5	0.4654	0.4792	0.4820		
10	0.1884	0.1828	0.1994		
20	0.1080	0.1219	0.1163		
50	0.0083	0.0139	0.0055		

			Transform: Untransformed					Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	0.8853	1.0000	0.8853	0.8726	0.9141	1.885	5	12	99
1	0.9566	1.0805	0.9566	0.9363	0.9695	1.862	3	3	56
5	0.4755	0.5371	0.4755	0.4654	0.4820	1.873	3	58	110
10	0.1902	0.2149	0.1902	0.1828	0.1994	4.449	3	157	194
20	0.1154	0.1304	0.1154	0.1080	0.1219	6.040	3	220	248
50	0.0092	0.0104	0.0092	0.0055	0.0139	45.826	3	342	346

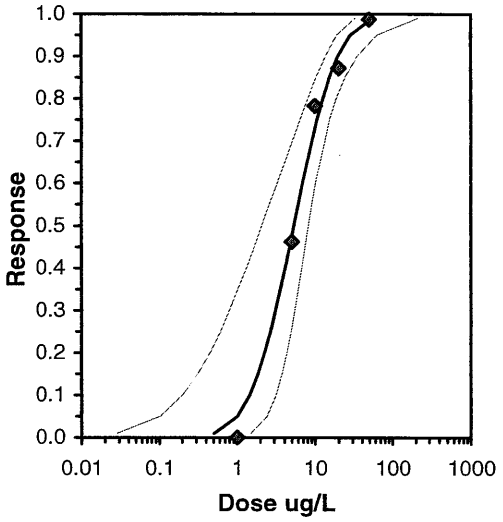
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96253	0.905	0.68855	1.68449
Bartlett's Test indicates equal variances (p = 0.42)	4.94693	15.0863		

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	2.27721	0.3333	1.21651	3.3379	0.12121	8.34891	7.81473	3.9E-02	0.72562	0.43913	5
Intercept	3.34761	0.37748	2.14629	4.54894							
TSCR	0.09428	0.04487	-0.0485	0.23707							

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	0.50587	0.02803	1.4922
EC05	3.355	1.00765	0.10068	2.41453
EC10	3.718	1.45494	0.19855	3.12905
EC15	3.964	1.86417	0.3134	3.73336
EC20	4.158	2.27005	0.44985	4.3017
EC25	4.326	2.68799	0.6126	4.86398
EC40	4.747	4.11497	1.32313	6.68222
EC50	5.000	5.31643	2.08344	8.16396
EC60	5.253	6.86868	3.23934	10.1014
EC75	5.674	10.5151	6.38292	15.2117
EC80	5.842	12.451	8.08986	18.4805
EC85	6.036	15.1619	10.3464	23.8985
EC90	6.282	19.4264	13.4999	34.4949
EC95	6.645	28.0499	18.8323	63.1925
EC99	7.326	55.8727	32.2325	214.609

Significant heterogeneity detected (p = 3.93E-02)



Reviewed by:

REFERENCE TOXICANT CONTROL CHART

Crassostrea gigas - 48-60-h Survival EC50 Values (ug Cu / L)

	Log	Antilog
Mean	0.73	5.38
SD	0.02	1.04
2 x SD	0.04	1.09
UCL	0.79	6.13
UWL	0.77	5.87
LWL	0.69	4.93
LCL	0.67	4.71
CV(%)	3	

WARNING / CONTROL LIMIT CALCULATIONS

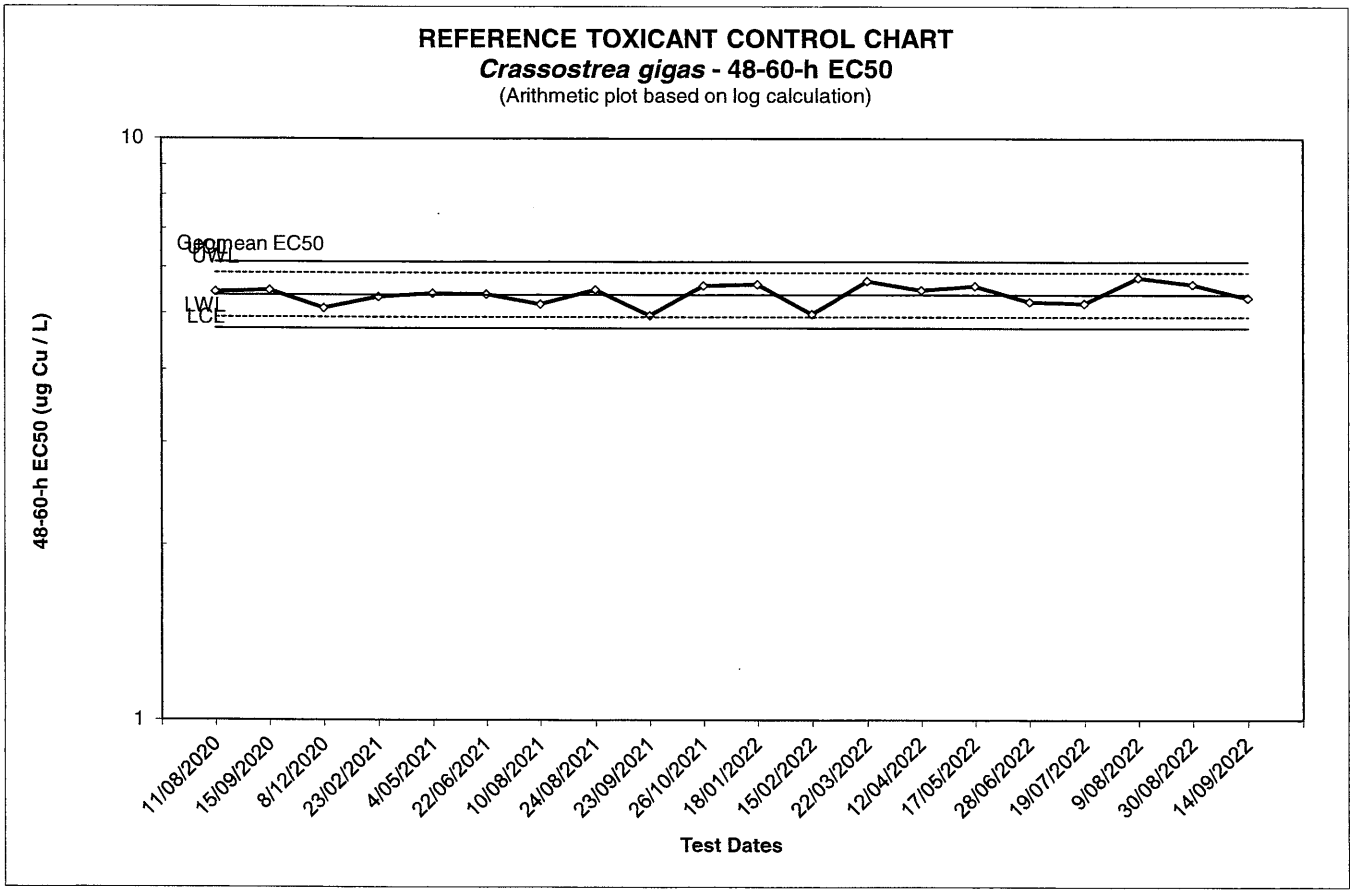
Mean: Mean is calculated for the last 20 logarithms of EC50, convert to antilogarithm to give Geomean
SD: Standard deviation is calculated for the last 20 logarithms of EC50

UCL: Upper Control Limit = Mean + 3 x SD, illustrated as antilogarithms in Control Chart
UWL: Upper Warning Limit = Mean + 2 x SD, illustrated as antilogarithms in Control Chart
LWL: Lower Warning Limit = Mean - 2 x SD, illustrated as antilogarithms in Control Chart
LCL: Lower Control Limit = Mean - 3 x SD, illustrated as antilogarithms in Control Chart

Point No.	EC50	log EC50
0	5.10	0.71
1	5.45	0.74
2	5.49	0.74
3	5.10	0.71
4	5.34	0.73
5	5.41	0.73
6	5.39	0.73
7	5.18	0.71
8	5.49	0.74
9	4.96	0.70
10	5.58	0.75
11	5.61	0.75
12	4.99	0.70
13	5.68	0.75
14	5.48	0.74
15	5.57	0.75
16	5.23	0.72
17	5.21	0.72
18	5.76	0.76
19	5.61	0.75

CONTROL CHART - DATA PLOT

Point No.	Test Date	48-60-h EC50	Acceptable Result?	Calculation Method
0	28/07/2009	5.10	-------	Maximum Likelihood-Probit
1	11/08/2020	5.45	OK	Maximum Likelihood-Probit
2	15/09/2020	5.49	OK	Maximum Likelihood-Probit
3	8/12/2020	5.10	OK	Maximum Likelihood-Probit
4	23/02/2021	5.34	OK	Maximum Likelihood-Probit
5	4/05/2021	5.41	OK	Maximum Likelihood-Probit
6	22/06/2021	5.39	OK	Maximum Likelihood-Probit
7	10/08/2021	5.18	OK	Maximum Likelihood-Probit
8	24/08/2021	5.49	OK	Maximum Likelihood-Probit
9	23/09/2021	4.96	OK	Maximum Likelihood-Probit
10	26/10/2021	5.58	OK	Maximum Likelihood-Probit
11	18/01/2022	5.61	OK	Maximum Likelihood-Probit
12	15/02/2022	4.99	OK	Maximum Likelihood-Probit
13	22/03/2022	5.68	OK	Maximum Likelihood-Probit
14	12/04/2022	5.48	OK	Maximum Likelihood-Probit
15	17/05/2022	5.57	OK	Maximum Likelihood-Probit
16	28/06/2022	5.23	OK	Maximum Likelihood-Probit
17	19/07/2022	5.21	OK	Maximum Likelihood-Probit
18	9/08/2022	5.76	OK	Maximum Likelihood-Probit
19	30/08/2022	5.61	OK	Maximum Likelihood-Probit
20	14/09/2022	5.32	OK	Maximum Likelihood-Probit



LARVAL DEVELOPMENT TOXICITY TEST - DAILY WATER QUALITY DATA

Client	Tysan Foundation Limited	Test Initiation Date/Time	14-Sep-22/14:00
Batch No.	HK2234393	Test Termination Date	16-Sep-22/14:00
Sample ID	2 - 4	Test Species / Date Collected	Crassostrea gigas-13/Sep/22

Sample ID	Temperature (°C)			pH			Salinity (ppt)			Dissolved Oxygen (mg/L)		
	0	24	48	0	24	48	0	24	48	0	24	48
J 1	20	20	20	7.8	8.2	8.0	28	28	28	7.2	6.8	7.0
initials	cy	cy	cy	cy	cy	cy	cy	cy	cy	cy	cy	cy

WQ Instruments Used:

Temp. HK890 pH HK1782 Salinity HK1582 DO HK1187

Comments _____

Test Set Up By _____ Data Verified By _____ Date Verified 19/10

LARVAL DEVELOPMENT TOXICITY TEST - DAILY WATER QUALITY DATA

Client	Tysan Foundation Limited	Test Initiation Date/Time	14-Sep-22/14:00
Batch No.	HK2234393	Test Termination Date	16-Sep-22/14:00
Sample ID	2 - 4	Test Species / Date Collected	Crassostrea gigas-13/Sep/22

Sample ID	Temperature (°C)			pH			Salinity (ppt)			Dissolved Oxygen (mg/L)		
	0	24	48	0	24	48	0	24	48	0	24	48
J 2	20	20	20	7.8	8.1	8.2	28	28	28	7.2	6.9	6.8
J 3	20	20	20	8.0	7.9	8.2	28	28	28	7.0	6.8	7.1
J 4	20	20	20	8.1	7.8	7.9	28	28	28	6.9	7.1	7.2
initials												

WQ Instruments Used:

Temp. HK890 pH HK1782 Salinity HK1582 DO HK1187

Comments _____

Test Set Up By _____ Data Verified By _____ Date Verified 19/10

LARVAL DEVELOPMENT TOXICITY TEST - SEDIMENT (SAMPLES)

Client	Tysan Foundation Limited	Test Initiation Date	14-Sep-22
Batch No.	HK2234393	Test Termination Date	16-Sep-22
		Fertilization initiation time	12:00
Initial Embryo Density	361	Inoculation time	14:00
Test Volume (mL)	900	Test Species	*Crassostrea gigas*
Aliquot Size (mL)	10	Source/Date Received	Guernsey Sea Farm-13/Sep/22

Sample ID	Rep.	Primary Count		Backup Count		Comments	Tech. Init.
		Normal Larvae	Abnormal Larvae	Normal Larvae	Abnormal Larvae		
J 1	A	315	26				W
	B	319	16				g
	C	318	21				W
	D	316	14				g
	E	330	22				W

	Rep.	Count / 10 mL		Backup Count		Comments	Tech. Init.
		Fertilized Egg	Unfertilized Egg	Normal Larvae	Abnormal Larvae		
Day 0 Count	A	379	16				g
	B	351	8				W
	C	371	4				g
	D	350	7				W
	E	354	5				g

* Embryo must be inoculated within 2 hours after initiation of fertilization

Data Verified By _____ Date Verified 19/10

LARVAL DEVELOPMENT TOXICITY TEST - SEDIMENT (SAMPLES)

Client	Tysan Foundation Limited	Test Initiation Date	14-Sep-22
Batch No.	HK2234393	Test Termination Date	16-Sep-22
		Fertilization initiation time	12:00
Initial Embryo Density	361	Inoculation time	14:00
Test Volume (mL)	900	Test Species	*Crassostrea gigas*
Aliquot Size (mL)	10	Source/Date Received	Guernsey Sea Farm-13/Sep/22

Sample ID	Rep.	Primary Count		Backup Count		Comments	Tech. Init.
		Normal Larvae	Abnormal Larvae	Normal Larvae	Abnormal Larvae		
HK2234393002	A	314	27				W
	B	311	25				g
J 2	C	309	13				W
	D	296	30				g
	E	296	14				W
HK2234393003	A	253	33				g
	B	279	36				W
J 3	C	258	37				g
	D	264	40				W
	E	268	21				g
HK2234393004	A	275	28				W
	B	262	28				g
J 4	C	257	33				W
	D	260	25				g
	E	273	25				W
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

* Embryo must be inoculated within 2 hours after initiation of fertilization

Data Verified By _____ Date Verified 19/10

LARVAL DEVELOPMENT TOXICITY TEST - REFERENCE TOXICANT TEST DATA

Client: Tyson Foundation Limited
Batch No.: HK2234393
Sample ID: 2-4

Initial Embryo Density: 361

Test Initiation Date/Time: 14-Sep-22/14:00
Test Termination Date: 16-Sep-22/14:00
Test Species: *Crassostrea gigas*
Source/Date Received: Guernsey Sea Farm / 13/Sep/22
Test Volume (mL): 900
Aliquot Size (mL): 10

Concentration (µg/L)	Dissolved Oxygen (mg/L)					Temperature (°C)					pH					Salinity (ppt)	
	0	24	48	60		0	24	48	60		0	24	48	60		0	48
0.0	6.9		7.2			20		20			7.9		8.1			28	28
1.0	7.0		7.2			20		20			7.8		8.1			28	28
5.0	7.1		6.8			20		20			8.1		7.8			28	28
10.0	6.8		7.2			20		20			8.0		7.8			28	28
20.0	7.0		7.1			20		20			7.8		8.2			28	28
50.0	7.2		6.9			20		20			8.2		7.9			28	28
Technician																	

WQ Instruments Used:

Temp. HK890 pH HK1782 Salinity HK1582 DO HK1187

Comments

Test Set Up By _____ Data Verified By _____ Date Verified 14/10/22

LARVAL DEVELOPMENT TOXICITY TEST - SEDIMENT (CONTROLS)

Client	Tysan Foundation Limited	Test Initiation Date/Time	14-Sep-22/14:00
Batch No.	HK2234393	Test Termination Date/Time	16-Sep-22/14:00
Reference Toxicant	Cu	Fertilization initiation Time	12:00
Stock ID	HK2234886-001	Inoculation Time	14:00
Initial Embryo Density	361	Test Species	*Crassostrea gigas*
Test Volume (mL)	900	Source/Date Received	Guernsey Sea Farm-13/Sep/22
Aliquot Size (mL)	10		

Concentraiton (µg/L)	Rep.	Primary Count		Backup Count		Comments	Tech. Init.
		Normal Larvae	Abnormal Larvae	Normal Larvae	Abnormal Larvae		
Reference Toxicant							
1.0	A	338	10				W
	B	348	23				g
	C	350	23				W
5.0	A	168	45				g
	B	173	34				W
	C	174	31				g
10.0	A	68	69				W
	B	66	67				g
	C	72	58				W
20.0	A	39	87				g
	B	44	80				W
	C	42	81				g
50.0	A	3	113				W
	B	5	113				g
	C	2	120				W
Control Seawater							
0.0	A	315	26				g
	B	319	16				W
	C	318	21				g
	D	316	14				W
	E	330	22				g

Data Verified By _____ Date Verified 19/10

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2235533
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: —	Telephone	: +852 2610 1044		
Facsimile	: —	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 14-Sep-2022
Order number	: —	Quote number	: HKE/2648/2021	Issue Date	: 22-Sep-2022
C-O-C number	: —			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsglobal.com

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 14-Sep-2022 to 22-Sep-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2235533

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control BIVALVE 0 HOUR	REFERENCE SEDIMENT BIVALVE 0 HOUR	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m BIVALVE 0 HOUR	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m BIVALVE 0 HOUR	---
				Sampling date / time	14-Sep-2022	14-Sep-2022	14-Sep-2022	14-Sep-2022	---
Compound	CAS Number	LOR	Unit		HK2235533-001	HK2235533-002	HK2235533-003	HK2235533-004	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	---	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	---
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	---
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	---

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4581934)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4593585)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	97.2	---	85.0	115	---	---

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

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

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TYSAN FOUNDATION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: DESMOND CHEUNG	Contact	: Richard Fung	Work Order	: HK2235534
Address	: ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Desmondcheung.si@tysan.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: —	Telephone	: +852 2610 1044		
Facsimile	: —	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 16-Sep-2022
Order number	: —	Quote number	: HKE/2648/2021	Issue Date	: 26-Sep-2022
C-O-C number	: —			No. of samples received	: 4
Site	:			No. of samples analysed	: 4

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Siu Ming , Vico	Manager - Inorganics	Inorganics, Kwai Tsing

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 16-Sep-2022 to 26-Sep-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2235534

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control BIVALVE 48 HOUR	REFERENCE SEDIMENT BIVALVE 48 HOUR	AUT-EDH(S)02 2.5-3.0m, 3.0-3.5m BIVALVE 48 HOUR	AUT-EDH(S)02 3.5-4.0m, 4.0-4.5m BIVALVE 48 HOUR	—
				Sampling date / time	16-Sep-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	---
Compound	CAS Number	LOR	Unit		HK2235534-001	HK2235534-002	HK2235534-003	HK2235534-004	——
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	---	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	—
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	—
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	0.2	<0.1	<0.1	—

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4588047)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4593585)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.5 mg/L	97.2	---	85.0	115	---	---

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

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

APPENDIX E

Analytical Reports

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

CERTIFICATE OF ANALYSIS

CONTACT:	DESMOND CHEUNG	**WORK ORDER:**	HK2235522
CLIENT:	TYSAN FOUNDATION LTD		
ADDRESS:	ROOM 1219, 12/F LEADER INDUSTRIAL CENTRE, NOS. 57-59 AU PUI WAN STREET, FO TAN, HONG KONG	**SUB BATCH:**	1
		LABORATORY:	HONG KONG
		DATE RECEIVED:	09-Sep-2022
		DATE OF ISSUE:	26-Sep-2022
PROJECT:	GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)	**SAMPLE TYPE:**	SEDIMENT
		NO. OF SAMPLES:	3

SPECIFIC COMMENTS

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.
The result(s) related only to the item(s) tested. Result(s) were reported on dry weight basis.
Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.
The results of particle size distribution were shown on next page.
Test method: In-house method reference as BS 1377 part 2: 1990

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Mr Chan Siu Ming, Vico
Manager - Inorganics

CERTIFICATE OF ANALYSIS

Work Order: HK2235522
Sub-Batch: 1
Date of Issue: 26-Sep-2022
Client: TYSAN FOUNDATION LTD
Client Reference: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)

Particle Size Distribution

Weight Retained

Sample	Lab no.	Total dry weight (gram)	Sieve Size							
			+2mm	+710µm	+300µm	+150µm	+106µm	+75µm	+63µm	-63µm
REFERENCE SEDIMENT	HK2235522-001	155.9	< 0.1	8.2	7.5	5.3	4.9	9.6	2.6	117.8
AUT-EDH(S)02 2.5-3.0M, 3.0-3.5M	HK2235522-002	230.5	8.6	36.7	30.6	16.6	9.6	7.3	2.0	119.2
AUT-EDH(S)02 3.5-4.0M, 4.0-4.5M	HK2235522-003	244.5	17.5	61.6	45.8	20.4	6.5	4.7	0.8	87.4

Percent Retained

Sample	Lab no.	Total dry weight (%)	Sieve Size							
			+2mm	+710µm	+300µm	+150µm	+106µm	+75µm	+63µm	-63µm
REFERENCE SEDIMENT	HK2235522-001	100.0	< 1	5.2	4.8	3.4	3.1	6.2	1.6	75.6
AUT-EDH(S)02 2.5-3.0M, 3.0-3.5M	HK2235522-002	100.0	3.7	15.9	13.3	7.2	4.1	3.1	< 1	51.7
AUT-EDH(S)02 3.5-4.0M, 4.0-4.5M	HK2235522-003	100.0	7.1	25.2	18.7	8.3	2.6	1.9	< 1	35.7

Cumulative Percentage Retained

Sample	Lab no.	Total dry weight (%)	Sieve Size							
			+2mm	+710µm	+300µm	+150µm	+106µm	+75µm	+63µm	-63µm
REFERENCE SEDIMENT	HK2235522-001	--	< 1	5.2	10.0	13.5	16.6	22.8	24.4	100.0
AUT-EDH(S)02 2.5-3.0M, 3.0-3.5M	HK2235522-002	--	3.7	19.6	32.9	40.1	44.3	47.4	48.3	100.0
AUT-EDH(S)02 3.5-4.0M, 4.0-4.5M	HK2235522-003	--	7.1	32.3	51.1	59.4	62.0	63.9	64.3	100.0

ALS Technichem (HK) Pty Ltd
11/F., Chung Shun Knitting Centre,
1 - 3 Wing Yip Street,
Kwai Chung, N.T., Hong Kong
T: +852 2610 1044
F: +852 2610 2021
www.alsglobal.com

HOKLAS 066
TEST

SEDIMENT TOXICITY TESTS REPORT

10-day Amphipod Survival Test – Leptocheirus plumulosus

20-day Polychaete Growth and Survival Test – Neanthes arenaceodentata

48-60-hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas

06-October-2023

Project: Ground Investigation for Northern Link (South)

Biological Testing Report

Prepared for

Lam Geotechnics Limited
19/F, Remex Centre, 42 Wong Chuk Hang Road, Hong Kong

Prepared by

ALS Technichem (HK) Pty Ltd

ALS Work Order Number HK2331931

Hong Kong Accreditation Service (HKAS) has accredited this laboratory, ALS Technichem (HK) Pty Ltd (Reg. No. HOKLAS 066) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS Directory of Accredited Laboratories.

This document has been signed by those names that appear on this report and are the authorised signatories

06 October 23

Attention: Mr. Wong Pak Hung

RE: Ground Investigation for Northern Link (South)

Dear Mr. Wong Pak Hung,

Toxicity Test Result for Sediment Samples

We are pleased to provide the results of the toxicity testing performed on the sediment samples and reference sediment of the captioned project. The sediment samples were received within the period of 06 July 2023 to 03 August 2023. Each sample was assigned with an ALS identification (ID) code as stated in Table 1.2. The samples were tested with the three toxicity tests:

- 10-day Amphipod Survival Test – Leptocheirus plumulosus
- 20-day Polychaete Growth and Survival Test – Neanthes arenaceodentata
- 48-60-hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas

The Amphipod testing was performed according to the United States Environmental Protection Agency (US EPA) Methods for Assessing the Toxicity of the Sediment-associated Contaminants with Estuarine and Marine Amphipods (EPA/600/R-94/025, 1994). The Polychaete Survival and Growth and the Bivalve Larval Development testing were performed according to the Puget Sound Estuary Program (PSEP, 1995) protocol.

A QA/QC review confirmed that the tests met all acceptability criteria for test validity as outlined in the respective protocols. Reference toxicant results for all three species were within warning limits (Mean ±2SD) based on historical laboratory performance, indicating that the relative health and sensitivity of the test organisms were consistent with previous batches of test organisms.

Should you have any questions or comments related to the report, please feel free to contact the undersigned.

Yours sincerely,

Ms Ng Sin Kou, May
Laboratory Manager
ALS Technichem (HK) Pty Ltd
Phone: +852 2610 1044
email: may.ng@alsglobal.com

TABLE OF CONTENTS

1 SAMPLE INFORMATION

Table 1.1 Sample Details

ALS work order number:	HK2331931	
Number of sample(s) for Testing:	1 testing sample, 1 reference sample	
Condition of sample(s) at receipt:	Temperature:	CHILLED - Ice Present
	Container:	Miscellaneous Plastic Bag and Vibrocore
Quantity of each sample(s) at receipt:	Various	
Sample storage after receipt:	Stored in dark at 4°C	

Table 1.2 Sample Identifications

Lab ID	Client ID	Lab ID (Ecotox. Section)	Date Sampled	Date Received	[b] Category
HK2330959001	REFERENCE SEDIMENT	HK2331931002	03-Aug-23	03-Aug-23	L
HK2326302001, HK2327423001 & HK2327423002	1632-SMA-EDH(S)03 2.00-4.50M	HK2331931003	06 & 11-Jul-23	06 & 11-Jul-23	M

Comments

This report supersedes any previous report(s) with same workorder number.

Testing period is from 25-Aug-2023 to 6-Oct-2023.

Reference Sediment sample was submitted by client. Sample arrived laboratory in chilled condition.

Other sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. .

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) related only to the item(s) tested.

ALS Technichem (HK) Pty Ltd is HOKLAS accredited for the testing provided in this report. The sampling activity involved is not covered by the laboratory HOKLAS accreditation.

[b] Sediments are categorized according to ETWB TCW No. 34/2002 - Management of Dredged/ Excavated Sediment.

Table 1.3 Total Organic Carbon (TOC), Moisture Content and Porewater characteristics (pH, Salinity and Ammonia) of Testing Sediments

Client ID	ALS ID (Ecotox. Section)	Total Organic Carbon (TOC) (%)	Moisture Content (%)	Grain Size (<63µm) (%)	pH	Porewater # Salinity (ppt)	*Ammonia (as mgN/L)
REFERENCE SEDIMENT	HK2331931002	2.23	47.1	73.8	7.9	31	4.36
1632-SMA-EDH(S)03 2.00-4.50M	HK2331931003	0.68	28.3	53.5	8.1	32	7.08

NA is reported when no porewater could be extracted from sample.
* Ammonia is reported as mgN/L

Table 1.4 Summary of Test Results

ALS ID	Sample ID	Overall Result[1]	10-Day Amphipod Survival Test			20-Day Polychaete Survival and Growth Test			48-60-hour Bivalve larvae Survival and Normality Test		
			Survival (%) Mean	SD	Pass / Fail	Total Dry Weight (mg) Mean	SD	Pass / Fail	Normality Survival (%) Mean	SD	Pass / Fail
HK2331931002	REFERENCE SEDIMENT	**NA**	95.0	3.5	NA	48.9	1.3	NA	83.6	1.9	NA
HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	**Pass**	89.0	6.5	Pass	47.5	1.4	Pass	*72.1	1.9	Pass

* Mean survival in test sediment is significantly different ($p \leq 0.05$) from that in reference sediment

[1] Overall result is concluded according to ETWB TCW No. 34/2002 - Management of Dredged/ Excavated Sediment.

For Amphipod Survival Test, # Mean survival in test sediment is <80% of that in reference sediment

For Polychaete Survival and Growth Test, # Mean total dry weight in test sediment is <90% of that in reference sediment

For Bivalve Survival and Normality Test, # Mean normality survival in test sediment is <80% of that in reference sediment

2 10-DAY AMPHIPOD SURVIVAL TEST - Leptocheirus plumulosus

Table 2.1 Test Methodology for the 10-day Amphipod Survival Test - *Leptocheirus plumulosus*

	Parameter	Conditions
1	Reference protocols:	USEPA (1994) & ALS QWI-HK/ET001 (Ref. 3 & 4)
2	Organism source:	Collected from Environmental Enterprises USA; body length 2-4 mm; no mature males or females
3	Testing periods:	25 Aug 2023 - 04 Sep 2023
4	Test type:	Sediment toxicity test, static, non-renewal
5	Test duration:	10 days
6	Temperature:	25 ± 1°C
7	Salinity:	20 ± 1 ppt
8	Light quality:	Wide-spectrum fluorescent lights
9	Illuminance:	500-1000 lux
10	Photoperiod:	24h : 0h (Light : Dark)
11	Test chamber:	1L glass jar with 10cm internal diameter; 175mL sediment; 800mL overlying seawater; position of test container randomized
12	Number of organisms per chamber:	20
13	Number of replicates:	5
14	Feeding regime:	None
15	Aeration:	Overlying water aerated overnight before the start of test and throughout the test at approximately 100 bubbles/min; maintains ≥60% dissolved oxygen saturation
16	Overlying water:	Reconstituted seawater made up from artificial sea salt (Brand: Red Sea®); filtered through a 0.45µm filter; sterilized by ultraviolet light
17	Overlying water quality monitoring:	Temperature, pH, salinity and dissolved oxygen measured daily; total ammonia and sulfide content taken at 0 d, 3d and 10 d
18	Control sediment:	Collected from Port Shelter at PS6 (E850234 N820057) on 23 June 2023 by grab sampler; expires on 20 December 2023; stored at -20°C after collection; sieved with 0.5mm sieve before testing; ALS Ref ID: HK2324596001
19	Endpoints:	Emergence[1] (recorded daily); survival; reburial[2]
20	Statistical analysis:	Data tested for normality and homogeneity of variance; Statistically significant differences between the mean survivals in testing sediments and reference sediment determined at a probability of $p \leq 0.05$ using ToxCalc 5.0 (Ref 7)
21	Test acceptability criterion:	≥90% mean survival in control sediment

		Reference Toxicant Test
22	Test type:	Water only test, static
23	Toxicant:	Cadmium
24	Test duration:	96 hours
25	Photoperiod:	0h : 24h (Light : Dark)
26	Test Chamber:	1L glass jar with 10cm internal diameter; 900 mL
27	Number of organisms per chamber:	10
28	Number of replicates:	2
29	Overlying seawater quality monitoring:	Temperature, pH, salinity and dissolved oxygen of the seawater measured at test initiation and termination
30	Endpoints:	Survival
31	Statistical analysis:	96-h LC50 for Cadmium determined by ToxCalc 5.0
32	Test acceptability criterion:	≥ 90% mean survival in control seawater
33	Other testing conditions are the same as in the sediment test	

[1] Number of amphipods appearing on the sediment surface or water column
[2] Number of surviving amphipods that rebury within 1 h in a separate container containing a 2-cm layer of control sediment and overlying clean seawater

Table 2.2 Results Summary of the 10-day Amphipod Survival Test
-Leptocheirus plumulosus

Lab ID	Sample ID	Survival (%)		Avoidance (amphipod/jar/day)		Reburial (%)
		Mean	SD	Mean	SD	Mean
Control	Control	95.0	5.0	0.00	0.00	96.0
HK2331931002	REFERENCE SEDIMENT	95.0	3.5	0.00	0.00	95.0
HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	89.0	6.5	0.00	0.00	94.0

Table 2.3 Water Quality Summary of 10-day amphipod survival test – *Leptocheirus plumulosus*

Lab ID	Sample ID	Ammonia (Total, mg/L)		Sulfide (mg/L)		Temp(°C)		pH		Salinity (ppt)		DO (mg/L)	
		Day 0	Day 10	Day 0	Day 10	min	max	min	max	min	max	min	max
Control	CONTROL	<1.0	<1.0	<0.1	<0.1	25	25	7.8	8.2	20	20	6.8	7.2
HK2331931002	REFERENCE SEDIMENT	<1.0	<1.0	<0.1	<0.1	25	25	7.8	8.1	20	20	6.8	7.2
HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	4.8	10.8	<0.1	<0.1	25	25	7.8	8.2	20	20	6.8	7.2

Table 2.4 Summary of Quality Control Data of the 10-day Amphipod Survival Test – *Leptocheirus plumulosus*

Date of Test	Sediment Test		Reference Toxicant Test			
	Mean survival (%) in control sediment		Mean survival (%) in 0 mg Cd/L		96-h [a]LC50 (mgCd / L)	
	Result	Acceptability	Result	Acceptability	Result	Acceptability
25 Aug 2023 - 04 Sep 2023	95.0%	≥ 90%	100.0%	≥ 90%	0.69	0.67 - 0.79

[a]Median Lethal Concentration, a concentration which kills 50% of the testing population

3 20-DAY POLYCHAETE GROWTH AND SURVIVAL TEST – *Neanthes arenaceodentata*

Table 3.1 Test Methodology for the 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

	Parameter	Conditions
1	Reference protocols:	PSEP (1995) & ALS QWI-HK/ET002 (Ref. 2 & 5)
2	Organism source:	Collected from Aquatic Toxicology Support; 2-3 weeks post emergence; dry weight 0.5-1.0 mg
3	Organism acclimation:	Polychaetes were acclimated in the aquarium (30cm x 20cm x 20cm) at 20 ± 1°C with 28 ± 2ppt aerated seawater of 16h : 8h (light : dark) photoperiod Powdered alga(Ulva sp.) covered the bottom of the aquarium. Overlying seawater renewed; water quality (temperature, pH, salinity and dissolved oxygen) measured; organisms fed by grounded TetraMarin® in slurry form three times a week Temperature and salinity adjusted to testing condition at <3°C and <5ppt per day respectively
4	Testing periods:	25 Aug 2023 - 14 Sep 2023
5	Test type:	Sediment toxicity test; static; renewal
6	Test duration:	20 days
7	Temperature:	20 ± 1°C
8	Salinity:	28 ± 1 ppt
9	Light quality:	Wide-spectrum fluorescent lights
10	Illuminance:	500-1000 lux
11	Photoperiod:	24h : 0h (Light : Dark)
12	Test chamber:	1L glass jar with 10cm internal diameter; 175mL sediment; 800mL overlying seawater; position of test container randomized
13	Number of organisms per chamber:	5
14	Number of replicates:	5
15	Feeding regime:	Fed every second day (from day 0) with 40mg (dry weight) grounded TetraMarin® in slurry form in each testing chamber
16	Aeration:	Overlying water aerated overnight before the start of test and throughout the test at approximately 100 bubbles/min; maintains >60% dissolved oxygen saturation
17	Overlying water:	Reconstituted seawater made up from artificial sea salt (Brand: Red Sea®); filtered through a 0.45µm filter; sterilized by ultraviolet light
18	Overlying water quality monitoring:	Temperature monitored daily; pH, salinity and dissolved oxygen measured every third day before water renewal; total ammonia and sulfide taken at 0 d and 20 d

19	Control sediment:	Collected from Port Shelter at PS6 (E850234 N820057) on 23 June 2023 by grab sampler; expires on 20 December 2023; stored at -20°C after collection; sieved with 0.5mm sieve before testing; ALS Ref ID: HK2324596001
20	Endpoints:	Survival; total biomass[1]; average individual biomass[2]; average individual growth rate[3]
21	Statistical analysis:	Data tested for normality and homogeneity of variance; Statistically significant differences between the mean total dry weight in testing sediments and reference sediment determined at a probability of p ≤0.05 using ToxCalc 5.0 (Ref 7)
22	Test acceptability criterion:	≥90% mean survival and ≥0.38mg/ind/day individual growth rate in control sediment
	Reference Toxicant Test	
23	Test type:	Water only test, static
24	Toxicant:	Cadmium
25	Test duration:	96 hours
26	Photoperiod:	0h : 24h (Light : Dark)
27	Test Chamber:	1L glass jar with 10cm internal diameter; 900 mL seawater; position of test container randomized
28	Number of organisms per chamber:	10
29	Number of replicates:	2
30	Overlying seawater quality monitoring:	Temperature, pH, salinity and dissolved oxygen of the seawater measured at test initiation and termination
31	Endpoints:	Survival
32	Statistical analysis:	96-h LC50 for Cadmium determined by ToxCalc 5.0 (Ref 7)
33	Test acceptability criterion:	≥90% mean survival in control seawater
34	Other testing conditions are the same as in the sediment test	

[1] the total dry weight of the surviving worms.
[2] the total dry weight of the surviving worms, divided by the number of surviving worms.
[3] the difference between the average initial and final dry weights, divided by the length of exposure (20 days).

Table 3.2 Results Summary of the 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

Lab ID	Sample ID	Survival (%)		Individual Dry Weight (mg)		Individual Growth Rate (mg/ind/day)		Total Dry Weight (mg)	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Control	CONTROL	100.0	0.0	11.0	0.1	0.52	0.01	55.0	0.6
HK2331931002	REFERENCE SEDIMENT	100.0	0.0	9.8	0.3	0.45	0.01	48.9	1.3
HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	100.0	0.0	9.5	0.3	0.44	0.01	47.5	1.4

Table 3.3 Water Quality Summary of 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

Lab ID	Sample ID	Ammonia (Total, mg/L)		Sulfide (mg/L)		Temp(°C)		pH		Salinity (ppt)		DO (mg/L)	
		Day 0	Day 20	Day 0	Day 20	min	max	min	max	min	max	min	max
Control	CONTROL	<1.0	1.3	<0.1	<0.1	20	20	7.8	8.2	28	28	6.8	7.2
HK2331931002	REFERENCE SEDIMENT	<1.0	<1.0	<0.1	<0.1	20	20	7.8	8.1	28	28	6.8	7.2
HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	5.3	8.8	<0.1	<0.1	20	20	7.8	8.2	28	28	6.8	7.2

Table 3.4 Summary of Quality Control Data of the 20-day Polychaete Growth and Survival test – *Neanthes arenaceodentata*

Date of Test	Sediment Test						Reference Toxicant Test			
	Initial dry weight (mg/ind)	Acceptability Criterion	Mean survival (%) in control sediment	Acceptability Criterion	Mean ind growth rate (mg/ind/day) in control sediment	Acceptability Criterion	Mean survival (%) in 0 mgCd / L seawater	Acceptability Criterion	96-h [a]LC50 (mgCd / L)	Acceptability Criterion
25 Aug 2023 - 14 Sep 2023	0.68	0.5-1.0 (mg/ind)	100.0	≥ 90%	0.52	> 0.38 (mg/ind/day)	100.0	≥ 90%	7.26	7.05 - 7.84

[a] Median Lethal Concentration, a concentration which kills 50% of the testing population

4 48-60-HOUR BIVALVE LARVAE SURVIVAL AND NORMALITY TEST – Crassostrea gigas

Table 4.1 Test Methodology for the 48-60-hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas

	Parameter	Condition
1	Reference protocols:	PSEP (1995) and ALS QWI-HK/ET012 (Ref 2 and 6)
2	Organism Source:	Collected from Guernsey Sea Farm
3	Organism acclimation:	Organisms are stored in individual chambers at 20°C with aerated clean seawater for a night prior to testing.
4	Initiation and termination dates:	29 Aug 2023 - 31 Aug 2023
5	Test type:	Static; non-renewal
6	Test duration:	48 hours
7	Temperature:	20 ± 1°C
8	Salinity:	28 ± 1 ppt
9	Light quality:	Wide-spectrum fluorescent lights
10	Illuminance:	500 – 1000 lux
11	Photoperiod:	14h : 10h (Light : Dark)
12	Test chamber:	1L glass jar with 10cm internal diameter; 18.0 ± 0.5 g of sediment; 900mL overlying seawater; sediment stirred for 10sec and allowed to settle for 4h prior to the inoculation of embryos; position of test container randomized
13	Method for obtaining gametes:	Organisms were dissected to obtain the gametes
14	Life stage of organism:	<2h post-fertilization
15	Number of organisms per chamber:	20,000 – 40,000 (around 30 embryos / mL)
16	Number of replicates:	6 (5 for testing, 1 for water quality measurement)
17	Feeding regime:	None
18	Aeration:	100 bubbles/minute if dissolved oxygen drops to <60% saturation
19	Overlying water:	Natural seawater collected from uncontaminated area in Sai Kung; Filtered through a 0.45µm; sterilized by ultraviolet light; salinity adjusted to 28ppt with fresh water or artificial sea salt (Brand: Red Sea®)
20	Overlying water quality monitoring:	Temperature, pH, salinity and dissolved oxygen were recorded daily
21	Negative control:	Seawater without sediment
22	Endpoints:	Survival, normal development, and normality survival[1]
23	Statistical analysis:	Data tested for normality and homogeneity of variance; Statistically significant differences between the mean normality survival in testing sediments and reference sediment determined at a probability of p≤0.05 using ToxCalc 5.0 (Ref 7)
24	Test acceptability criterion:	>70% mean normal survival in seawater control
	Reference Toxicant Test	
25	Toxicant:	Copper
26	Test chamber:	1L glass jar with 10cm internal diameter; 900mL seawater; position of test container randomized
27	Number of replicates:	4 (3 for testing; 1 for water quality measurement)
28	Endpoints:	Normal Survival
29	Statistical analysis:	48-60-h EC50 (and 95% confidence interval) for Cu calculated using ToxCalc 5.0 (Ref. 7)
30	Other testing conditions are the same as in the sediment samples test	

[1] Normality survival integrates the normality and survival end points, and measures survival of only the normal larvae relative to the starting number

Table 4.2 Results Summary of the 48-60-hour Bivalve Larvae Survival and Normality Test - Crassostrea gigas

Lab ID	Sample ID	Survival (%)		Normality (%)		Normality Survival (%)	
		Mean	SD	Mean	SD	Mean	SD
Control	CONTROL	93.9	3.1	94.9	1.5	89.1	1.9
HK2331931002	REFERENCE SEDIMENT	90.3	3.1	92.5	2.0	83.6	1.9
HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	80.1	2.7	90.1	2.2	*72.1	1.9

* Mean percentage in test sediment is significantly different ($p \leq 0.05$) from that in reference sediment

Table 4.3 Water Quality Summary of 48-60-h bivalve larvae Survival and Normality Test – Crassostrea gigas

Lab ID	Sample ID	Ammonia (Total, mg/L)		Sulfide (mg/L)		Temp(°C)		pH		Salinity (ppt)		DO (mg/L)	
		Day 0	Day 2	Day 0	Day 2	min	max	min	max	min	max	min	max
Control	CONTROL	<1.0	<1.0	<0.1	<0.1	20	20	7.9	8.2	28	28	6.8	7.2
HK2331931002	REFERENCE SEDIMENT	<1.0	<1.0	<0.1	<0.1	20	20	7.9	8.2	28	28	6.8	7.1
HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	<1.0	<1.0	<0.1	<0.1	20	20	7.8	8.1	28	28	7.0	7.2

Table 4.4 Summary of Quality Control Data of the 48-60-hour Bivalve Larvae Survival and Normality test – Crassostrea gigas

Date of Test	Water Control		Reference Toxicant Test		
	Mean Normality survival (%) in control		Mean Normality survival (%) in 0 µg		48-60-h EC50 (µgCu / L)
	Result	Acceptability Criterion	Result	Acceptability Criterion	Result	Acceptability Criterion
29 Aug 2023 - 31 Aug 2023	89.1%	≥70.0%	89.1%	≥70.0%	5.39	4.95 - 6.06

5 References

(1) APHA (American Public Health Association) 1995. Standard Methods for the Examination of Water and Wastewater. 19th edition. American Public Health Association, American Water Works Association and Water Environment Federation, Washington, DC.

(2) PSEP (Puget Sound Estuary Program) 1995. Recommended guidelines for conducting laboratory bioassays on Puget Sound sediments. U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Seattle WA.

(3) USEPA (U.S. Environmental Protection Agency) 1994. Methods for assessing the toxicity of sediment-associated contaminants with estuarine and marine amphipods. Office of Research and Development. U.S. Environmental Protection Agency, Cincinnati, OH. EPA/600/R94/025.

(4) QWI-HK/ET001: 10-Day Amphipod Survival Test – Leptocheirus plumulosus. In: Ecotoxicology Work Instruction. ALS Technichem (HK) Pty Ltd, Hong Kong.

(5) QWI-HK/ET002: 20-Day Polychaete Growth and Survival Test – Neanthes arenaceodentata. In: Ecotoxicology Work Instruction. ALS Technichem (HK) Pty Ltd, Hong Kong.

(6) QWI-HK/ET012: 48 Hour Bivalve Larvae Survival and Normality Test – Crassostrea gigas. In: Ecotoxicology Work Instruction. ALS Technichem (HK) Pty Ltd, Hong Kong.

(7) TOXCALC™-Toxicity Data Analysis Software (v5.0.32) User's Guide. 1994-2008. Tidepool Scientific Software, NcKinleyville, CA 95519.

APPENDIX A

Sediment Description

Table A.1: Sample Identification

[a]Lot ID	Lab ID	Client ID	Lab ID (Ecotox. Section)
J 1	HK2324596001	Control	Control
J 29	HK2330959001	REFERENCE SEDIMENT	HK2331931002
J 30	HK2326302001, HK2327423001 & HK2327423002	1632-SMA-EDH(S)03 2.00-4.50M	HK2331931003

[a] Lot ID is identification used during testing

SEDIMENT POREWATER QUALITY

Client: Lam Geotechnics Limited

Batch No.: HK2331931

Sample ID: 2 - 3

Date: 25-Aug-2023

Test Type: Sediment Toxicity Test

Sample ID	pH	Salinity (ppt)		Initial
REFERENCE SEDIMENT(HK2331931002)	7.9	31		KL
1632-SMA-EDH(S)03 ~~2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00~~-4.50M(HK2331931003) (2.00 H7)	8.1	32		CW

Sample ID	NH3 (mg/L)	Sam Dup	Spike (mg/L)	RPD	% Rec
--	--	--	--	--	--

Sample ID	pH	Salinity (ppt)	Ammonia (mg/L)	Initial

Sample ID	NH3 (mg/L)	Sam Dup	Spike (mg/L)	RPD	% Rec
--	--	--	--	--	--

WQ Instrument Ammonia: -- pH meter: HK1782 Refractometer: HK1582

Comments :

Data Verified by: Date Verified: 06 OCT 2023

FET040-1

APPENDIX B

Complete Data for the 10-day Amphipod Survival Test – *Leptocheirus plumulosus*

Client: Lam Geotechnics Limited

Batch No.: HK2331931

Initiation Date: 25-Aug-23

ID	Rep		Group	Clinet ID	Initial no.	Final no.	Avoidance	Reburying	Duration (Days)	Survival (%) S %	Survival (%) S Mean	Survival (%) S SD	Avoidance (%) A %	Avoidance (%) A Mean	Avoidance (%) A SD	Reburial (%) R %	Reburial (%) R Mean
-	1	A	Control	CONTROL	20	20	0	1	10	100	95.0	5.0	0.00	0.00	0.00	95.0	96.0
-	2	B	Control	CONTROL	20	20	0	0	10	100			0.00			100.0	
-	3	C	Control	CONTROL	20	19	0	0	10	95			0.00			100.0	
-	4	D	Control	CONTROL	20	18	0	1	10	90			0.00			94.4	
-	5	E	Control	CONTROL	20	18	0	2	10	90			0.00			88.9	
1	1	A	HK2331931002	REFERENCE SEDIMENT	20	19	0	2	10	95	95.0	3.5	0.00	0.00	0.00	89.5	95.0
2	2	B	HK2331931002	REFERENCE SEDIMENT	20	19	0	1	10	95			0.00			94.7	
3	3	C	HK2331931002	REFERENCE SEDIMENT	20	18	0	1	10	90			0.00			94.4	
4	4	D	HK2331931002	REFERENCE SEDIMENT	20	19	0	0	10	95			0.00			100.0	
5	5	E	HK2331931002	REFERENCE SEDIMENT	20	20	0	1	10	100			0.00			95.0	
6	1	A	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	16	0	1	10	80	89.0	6.5	0.00	0.00	0.00	93.8	94.0
7	2	B	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	18	0	1	10	90			0.00			94.4	
8	3	C	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	17	0	1	10	85			0.00			94.1	
9	4	D	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	19	0	2	10	95			0.00			89.5	
10	5	E	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	19	0	0	10	95			0.00			100.0	

Reviewed by: _____

Test: LP-10-Day Amphipod Survival Test						Test ID: HK2331931a			
Species: LP-Leptocheirus plumulosus						Protocol: -EPA600 R-94/025			
Sample ID: VA-Various						Sample Type: MS-Marine Sediment			
Start Date: 8/25/2023			End Date: 9/4/2023			Lab ID: ALS-ALS Technichem (HK)			
Pos	ID	Rep	Group	Initial no.	Final no.	Avoidance	Reburying	T. Duration (Days)	Notes
	1	1	REFERENCE	20	19	0	2	10	
	2	2	REFERENCE	20	19	0	1	10	
	3	3	REFERENCE	20	18	0	1	10	
	4	4	REFERENCE	20	19	0	0	10	
	5	5	REFERENCE	20	20	0	1	10	
	6	1	2331931-03	20	16	0	1	10	
	7	2	2331931-03	20	18	0	1	10	
	8	3	2331931-03	20	17	0	1	10	
	9	4	2331931-03	20	19	0	2	10	
	10	5	2331931-03	20	19	0	0	10	

Comments:

Reviewed by:

10-Day Amphipod Survival Test-Survival

Start Date:	8/25/2023	Test ID:	HK2331931a	Sample ID:	VA-Various
End Date:	9/4/2023	Lab ID:	ALS-ALS Technichem (HK)	Sample Type:	MS-Marine Sediment
Sample Date:		Protocol:	-EPA600 R-94/025	Test Species:	LP-Leptocheirus plumulosus
Comments:					

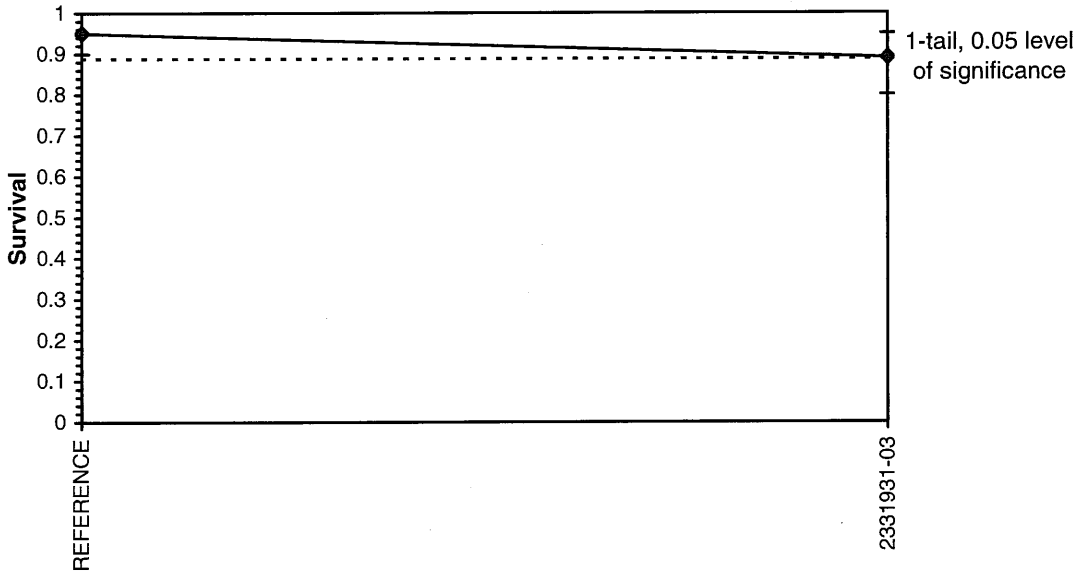
Conc-	1	2	3	4	5
REFERENCE	0.9500	0.9500	0.9000	0.9500	1.0000
2331931-03	0.8000	0.9000	0.8500	0.9500	0.9500

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
REFERENCE	0.9500	1.0000	0.9500	0.9000	1.0000	3.722	5			
2331931-03	0.8900	0.9368	0.8900	0.8000	0.9500	7.325	5	1.809	1.860	0.0617

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.92663	0.842	-0.4137	-0.4456
F-Test indicates equal variances (p = 0.26)	3.4	23.1545		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences Treatments vs REFERENCE	0.06169	0.06494	0.009	0.00275	0.10804	1, 8

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by:

Test: SURVIVAL						Test ID: RTLPCD220			
Species: LP-Leptocheirus plumulosus						Protocol: EPA 94			
Sample ID: REF-Ref Toxicant						Sample Type: CDCL-Cadmium chloride			
Start Date: 8/25/2023			End Date: 8/29/2023			Lab ID: ALS-ALS Technichem (HK)			
Pos	ID	Rep	Group	Initial no.	Final no.	Avoidance	Reburying	T. Duration (Days)	Notes
	1	1	D-Control	10	10			4	
	2	2	D-Control	10	10			4	
	3	1	0.15	10	9			4	
	4	2	0.15	10	9			4	
	5	1	0.6	10	5			4	
	6	2	0.6	10	5			4	
	7	1	1.25	10	4			4	
	8	2	1.25	10	3			4	
	9	1	2.5	10	2			4	
	10	2	2.5	10	2			4	
	11	1	5	10	0			4	
	12	2	5	10	0			4	

Comments:

Reviewed by:

-Survival

Start Date:	8/25/2023	Test ID:	RTLPCD220	Sample ID:	REF-Ref Toxicant
End Date:	8/29/2023	Lab ID:	ALS-ALS Technichem (HK)	Sample Type:	CDCL-Cadmium chloride
Sample Date:		Protocol:	EPA 94	Test Species:	LP-Leptocheirus plumulosus
Comments:					

Conc-	1	2
D-Control	1.0000	1.0000
0.15	0.9000	0.9000
0.6	0.5000	0.5000
1.25	0.4000	0.3000
2.5	0.2000	0.2000
5	0.0000	0.0000

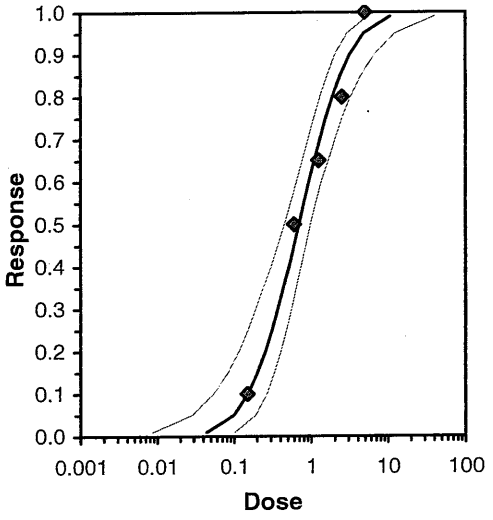
			Transform: Untransformed					Number	Total
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.000	2	0	20
0.15	0.9000	0.9000	0.9000	0.9000	0.9000	0.000	2	2	20
0.6	0.5000	0.5000	0.5000	0.5000	0.5000	0.000	2	10	20
1.25	0.3500	0.3500	0.3500	0.3000	0.4000	20.203	2	13	20
2.5	0.2000	0.2000	0.2000	0.2000	0.2000	0.000	2	16	20
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	2	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	1.94788	0.33879	1.28385	2.61191	0	1.96999	7.81473	0.57866	-0.1603	0.51338	3
Intercept	5.31233	0.15172	5.01496	5.60969							
TSCR											

Point	Probits		95% Fiducial Limits	
EC01	2.674	0.04419	0.00854	0.10208
EC05	3.355	0.09891	0.02845	0.18973
EC10	3.718	0.15196	0.05371	0.26558
EC15	3.964	0.20304	0.08214	0.33459
EC20	4.158	0.25562	0.11471	0.40343
EC25	4.326	0.31145	0.15224	0.47535
EC40	4.747	0.51238	0.30351	0.73561
EC50	5.000	0.69129	0.44765	0.98222
EC60	5.253	0.93265	0.64052	1.35189
EC75	5.674	1.53436	1.07723	2.47992
EC80	5.842	1.86951	1.29552	3.22456
EC85	6.036	2.35364	1.58935	4.42612
EC90	6.282	3.14469	2.03212	6.66902
EC95	6.645	4.83158	2.88263	12.425
EC99	7.326	10.8132	5.42267	40.8894



Reviewed by:

REFERENCE TOXICANT CONTROL CHART

Leptocheirus plumulosus - 96-h Survival LC50 Values (mg Cd / L)

	Log	Antilog
Mean	-0.14	0.73
SD	0.02	1.05
2 x SD	0.04	1.09
UCL	-0.08	0.83
UWL	-0.10	0.79
LWL	-0.18	0.67
LCL	-0.20	0.64
CV(%)	-14	

WARNING / CONTROL LIMIT CALCULATIONS

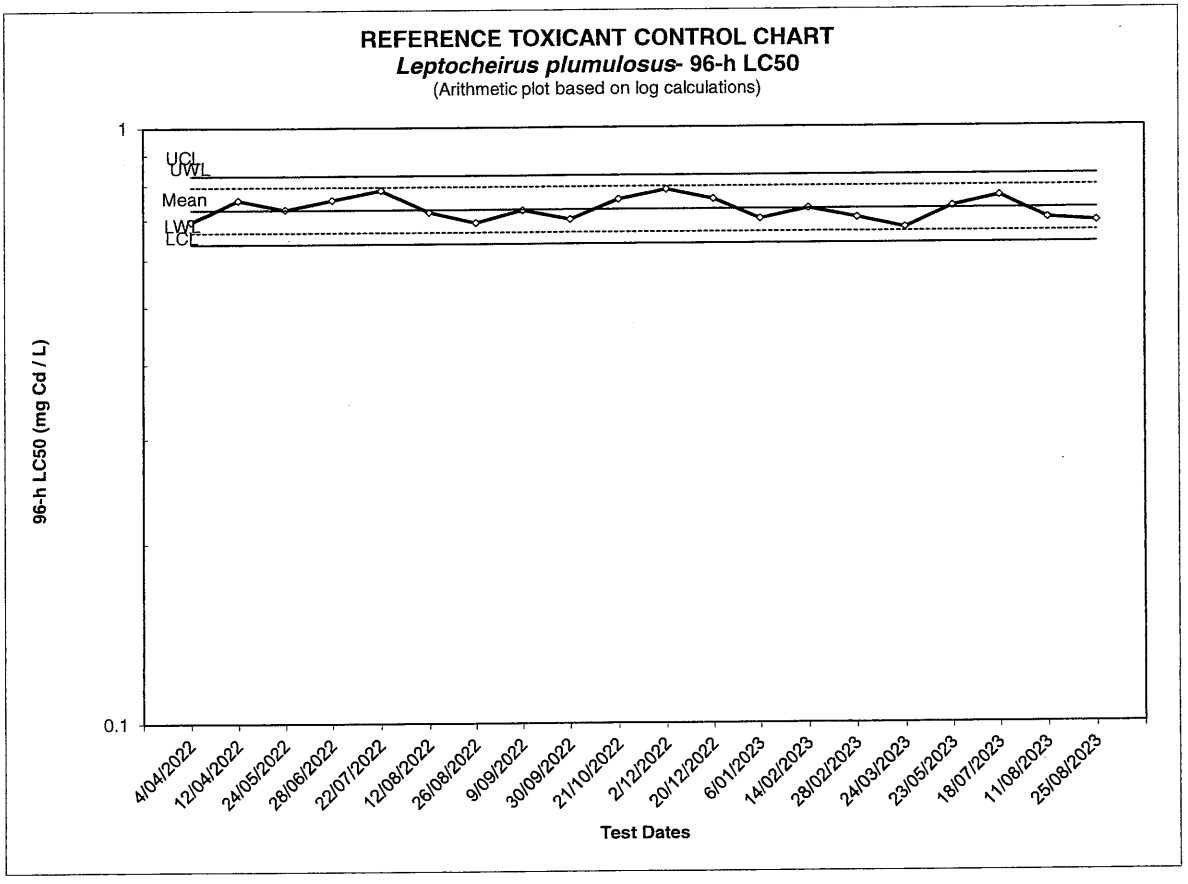
Mean: Mean is calculated for the last 20 logarithms of EC50, convert to antilogarithm to give Geomean
SD: Standard deviation is calculated for the last 20 logarithms of EC50

UCL: Upper Control Limit = Mean + 3 x SD, illustrated as antilogarithms in Control Chart
UWL: Upper Warning Limit = Mean + 2 x SD, illustrated as antilogarithms in Control Chart
LWL: Lower Warning Limit = Mean - 2 x SD, illustrated as antilogarithms in Control Chart
LCL: Lower Control Limit = Mean - 3 x SD, illustrated as antilogarithms in Control Chart

Point No.	LC50	log LC50
0	0.70	-0.15
1	0.69	-0.16
2	0.76	-0.12
3	0.73	-0.14
4	0.76	-0.12
5	0.78	-0.11
6	0.72	-0.14
7	0.69	-0.16
8	0.73	-0.14
9	0.70	-0.15
10	0.76	-0.12
11	0.78	-0.11
12	0.76	-0.12
13	0.70	-0.15
14	0.73	-0.14
15	0.70	-0.15
16	0.68	-0.17
17	0.73	-0.13
18	0.76	-0.12
19	0.70	-0.15

CONTROL CHART - DATA PLOT

Point No.	Test Date	96-h LC50	Acceptable Result?	Calculation Method
0	02/18/2022	0.70	-------	Maximum Likelihood-Probit
1	04/04/2022	0.69	OK	Maximum Likelihood-Probit
2	04/12/2022	0.76	OK	Maximum Likelihood-Probit
3	05/24/2022	0.73	OK	Maximum Likelihood-Probit
4	06/28/2022	0.76	OK	Maximum Likelihood-Probit
5	07/22/2022	0.78	OK	Maximum Likelihood-Probit
6	08/12/2022	0.72	OK	Maximum Likelihood-Probit
7	08/26/2022	0.69	OK	Maximum Likelihood-Probit
8	09/09/2022	0.73	OK	Maximum Likelihood-Probit
9	09/30/2022	0.70	OK	Maximum Likelihood-Probit
10	10/21/2022	0.76	OK	Maximum Likelihood-Probit
11	12/02/2022	0.78	OK	Maximum Likelihood-Probit
12	12/20/2022	0.76	OK	Maximum Likelihood-Probit
13	01/06/2023	0.70	OK	Maximum Likelihood-Probit
14	02/14/2023	0.73	OK	Maximum Likelihood-Probit
15	02/28/2023	0.70	OK	Maximum Likelihood-Probit
16	03/24/2023	0.68	OK	Maximum Likelihood-Probit
17	05/23/2023	0.73	OK	Maximum Likelihood-Probit
18	07/18/2023	0.76	OK	Maximum Likelihood-Probit
19	08/11/2023	0.70	OK	Maximum Likelihood-Probit
20	08/25/2023	0.69	OK	Maximum Likelihood-Probit



10-d MARINE AMPHIPOD SEDIMENT TOXICITY TEST – DAILY WATER QUALITY

Client: Lam Geotechnics Limited
Batch No.: HK2331931
Sample ID: 2-3

Test Initiation Date (Day 0): 25-Aug-23
Test Termination Date (Day 10): 04-Sep-23
Test Species/Date Collected: Leptocheirus plumulosus-24/Aug/23

Day	0	1	2	3	4	5	6	7	8	9	10
Sample ID	Salinity (ppt)										
J 1	20	20	20	20	20	20	20	20	20	20	20
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL
Sample ID	pH										
J 1	7.8	8.2	7.9	8.0	7.9	8.1	8.2	8.0	7.9	7.8	7.9
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL
Sample ID	Temperature (°C)										
J 1	25	25	25	25	25	25	25	25	25	25	25
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL
Sample ID	Dissolved Oxygen (mg/L)										
J 1	6.8	7.1	7.2	6.9	7.0	6.9	7.2	7.1	7.2	6.9	6.9
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL

WQ insturment
pH: HK1782
DO: HK1187
temp.: HK890
Salanity: HK1582

Comment:

Test Set up By: KY
Data verifed by: W
Date Verified: 06 OCT 2023

10-d MARINE AMPHIPOD SEDIMENT TOXICITY TEST - DAILY WATER QUALITY

Client	Lam Geotechnics Limited	Test Initiation Date (Day 0)	25-Aug-23
Batch No.	HK2331931	Test Termination Date (Day 10)	04-Sep-23
Sample ID	2 - 3	Test Species/Date Collected	Leptocheirus plumulosus-24/Aug/23

Day	0	1	2	3	4	5	6	7	8	9	10
Sample ID	Salinity (ppt)										
J 29	20	20	20	20	20	20	20	20	20	20	20
J 30	20	20	20	20	20	20	20	20	20	20	20
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL
Sample ID	pH										
J 29	7.8	8.0	7.9	8.1	8.0	8.1	7.9	8.0	7.8	7.9	8.1
J 30	7.9	7.8	7.9	8.0	7.8	7.9	8.0	8.1	7.9	7.8	8.2
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL
Sample ID	Temperature (°C)										
J 29	25	25	25	25	25	25	25	25	25	25	25
J 30	25	25	25	25	25	25	25	25	25	25	25
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL
Sample ID	Dissolved Oxygen (mg/L)										
J 29	6.9	6.9	7.1	7.2	6.8	7.1	6.8	7.1	6.8	6.9	7.1
J 30	6.8	6.9	7.0	6.9	7.0	7.0	7.2	6.8	6.9	7.0	7.0
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL

WQ insturment	pH	HK1782	temp.	HK890	
	DO	HK1187	Salanity	HK1582	

Comment

Test Set up By KL Data verifed by [signature] Date Verified 06 OCT 2023

10-d AMPHIPOD SEDIMENT TOXICITY TEST
EMERGENCE, SURVIVAL AND DAY 10 WATER QUALITY

Client: Lam Geotechnics Limited
Batch No.: HK2331931

Test Initiation Date (Day 0): 25-Aug-23
Test Termination Date (Day 10): 04-Sep-23
Test Species: *Leptocheirus plumulosus*
Source/Collection Date: Environmental Enterprises USA-24/Aug/23

SAMPLE ID: J 1

Rep.	NO. REMOVED/REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A	0	0	0	0	0	0	0	0	0	0	0	20	Kl	1	25	8.0	20	6.8
B	0	0	0	0	0	0	0	0	0	0	0	20	Ch	0	25	8.1	20	7.1
C	0	0	0	0	0	0	0	0	0	0	0	19	Kl	0	25	7.9	20	7.1
D	0	0	0	0	0	0	0	0	0	0	0	18	Ch	1	25	7.9	20	6.8
E	0	0	0	0	0	0	0	0	0	0	0	18	Kl	2	25	7.8	20	6.9
Initial	Kl	Ch	Kl	Ch	Kl	Ch	Kl	Ch	Kl	Ch	Kl	Ch		Kl	Ch	Kl	Ch	Kl

(# dead: # missing) - A (0 : 0) B (0 : 0) C (0 : 1) D (0 : 2) E (0 : 2)

SAMPLE ID

Rep.		Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

SAMPLE ID

Rep.		Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

SAMPLE ID

Rep.		Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

WQ Instruments Used:
Temp. HK890 Salinity HK1582 pH HK1782 DO HK1187

Data Verified By ____________ Date Verified 06 OCT 2023

10-d AMPHIPOD SEDIMENT TOXICITY TEST
EMERGENCE, SURVIVAL AND DAY 10 WATER QUALITY

Client: Lam Geotechnics Limited
Batch No.: HK2331931

Test Initiation Date (Day 0): 25-Aug-23
Test Termination Date (Day 10): 04-Sep-23
Test Species: *Leptocheirus plumulosus*
Source/Collection Date: Environmental Enterprises USA-24/Aug/23

SAMPLE ID: J 29

Rep.	NO. REMOVED/REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A	0	0	0	0	0	0	0	0	0	0	0	19	KL	2	25	7.9	20	6.8
B	0	0	0	0	0	0	0	0	0	0	0	19	Ch	1	25	8.1	20	6.9
C	0	0	0	0	0	0	0	0	0	0	0	18	KL	1	25	7.9	20	7.2
D	0	0	0	0	0	0	0	0	0	0	0	19	Ch	0	25	7.9	20	7.1
E	0	0	0	0	0	0	0	0	0	0	0	20	KL	1	25	8.1	20	7.0
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch		KL	Ch	KL	Ch	KL

(# dead: # missing) - A (0 : 1) B (0 : 1) C (0 : 2) D (0 : 1) E (0 : 0)

SAMPLE ID: J 30

Rep.	NO. REMOVED/REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A	0	0	0	0	0	0	0	0	0	0	0	16	KL	1	25	7.8	20	6.9
B	0	0	0	0	0	0	0	0	0	0	0	18	Ch	1	25	7.9	20	6.8
C	0	0	0	0	0	0	0	0	0	0	0	17	KL	1	25	8.0	20	7.0
D	0	0	0	0	0	0	0	0	0	0	0	19	Ch	2	25	8.1	20	7.2
E	0	0	0	0	0	0	0	0	0	0	0	19	KL	0	25	7.9	20	7.0
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch		KL	Ch	KL	Ch	KL

(# dead: # missing) - A (0 : 4) B (0 : 2) C (0 : 3) D (0 : 1) E (0 : 1)

SAMPLE ID:

Rep.	NO. REMOVED/REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

SAMPLE ID:

Rep.	NO. REMOVED/REPLACED AT DAY 0	Number of Amphipods Emerged From Sediment at Days 1-10										NUMBER ALIVE AT DAY 10	initial	NO. NOT REBURYING AT DAY 10	Water Chemistry at Day 10			
		1	2	3	4	5	6	7	8	9	10				Temp. (°C)	pH	Sal. (ppt)	DO (mg/L)
A																		
B																		
C																		
D																		
E																		
Initial																		

(# dead: # missing) - A (:) B (:) C (:) D (:) E (:)

WQ Instruments Used:
Temp. HK890 Salinity HK1582 pH HK1782 DO HK1187

Data Verified By

Date Verified 06 OCT 2023

MARINE SPECIES REFERENCE TOXICANT TEST DATA

Test Species: *Leptocheirus plumulosus*

Test Initiation Date (Time): 25-Aug-23 Client: Lamb Geotechnics Limited Reference Toxicant: Cd Source/Collection Date: Environmental Enterprises USA-24/Aug/23

Test Termination Date (Time): 29-Aug-23 Batch No./Sample ID: HK2331931/2-3 Stock ID: HK2309350-002 No. Organisms/Test Volume: 10, 900ml

Rep	Ref. Toxicant Conc. (mg/L)	Number of Survivors (24 to 96 hours)				Dissolved Oxygen (mg/L)					Temperature (°C)					pH					Salinity (ppt)	
		24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
A	0.00				10	6.9				7.1	25				25	7.9				8.0	20	20
	0.15				9	6.8				7.1	25				25	7.8				8.1	20	20
	0.60				5	7.1				6.9	25				25	7.8				8.0	20	20
	1.25				4	7.1				7.2	25				25	8.1				7.9	20	20
	2.50				2	7.0				7.1	25				25	8.0				8.1	20	20
	5.00				0	6.9				7.2	25				25	7.8				7.9	20	20
B	0.00				10	6.9				6.8	25				25	8.1				7.8	20	20
	0.15				9	6.8				7.2	25				25	7.8				8.0	20	20
	0.60				5	7.1				7.0	25				25	7.9				8.0	20	20
	1.25				3	6.9				6.8	25				25	8.0				7.9	20	20
	2.50				2	7.0				7.1	25				25	8.1				8.0	20	20
	5.00				0	7.1				7.2	25				25	7.8				7.9	20	20
	Initials				CH	KL				CH	KL				CH	KL				CH	CH	KL

Instruments Used:

Auto Pipette HK903,HK338

Temperature HK890

pH HK1782

DO HK1187

Salinity HK1582

Balance HK1571

Test Set Up By: HT

Data Verified By: LY

Date Verified: 06 OCT 2023

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2334094
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 25-Aug-2023
Order number	: ----	Quote number	: HKE/1500/2021_V6	Issue Date	: 04-Sep-2023
C-O-C number	: ----			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**
11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsglobal.com

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 25-Aug-2023 to 04-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2334094

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

EK055K - Result of Unionized Ammonia was calculated from Ammoniacal Nitrogen (NH3-N), in-situ measurement of temperature, pH and Salinity. Ammoniacal Nitrogen results are determined by the laboratory. In-situ measurement results were provided by Ecotoxicity test.

Analytical Results

Sub-Matrix: SEAWATER			Sample ID	Control AMPHIPOD 0 DAY	REFERENCE SEDIMENT AMPHIPOD 0 DAY	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M AMPHIPOD 0 DAY	---	---
			Sampling date / time	25-Aug-2023	25-Aug-2023	25-Aug-2023	---	---
Compound	CAS Number	LOR	Unit	HK2334094-001	HK2334094-002	HK2334094-003	---	---
ED/EK: Inorganic Nonmetallic Parameters								
EK055K: Ammonia as NH3	---	0.1	mg/L	0.4	0.3	4.8	---	---
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L	0.012	0.011	0.232	---	---
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	---	---

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5262172)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5262173)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5269562)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.527 mg/L	94.7	---	85.0	115	---	---

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

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

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2334095
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 28-Aug-2023
Order number	: ----	Quote number	: HKE/1500/2021_V6	Issue Date	: 04-Sep-2023
C-O-C number	: ----			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 28-Aug-2023 to 04-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2334095

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

EK055K - Result of Unionized Ammonia was calculated from Ammoniacal Nitrogen (NH3-N), in-situ measurement of temperature, pH and Salinity. Ammoniacal Nitrogen results are determined by the laboratory. In-situ measurement results were provided by Ecotoxicity test.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control AMPHIPOD 3 DAY	REFERENCE SEDIMENT AMPHIPOD 3 DAY	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M AMPHIPOD 3 DAY	---	---
				Sampling date / time	28-Aug-2023	28-Aug-2023	28-Aug-2023	---	---
Compound	CAS Number	LOR	Unit		HK2334095-001	HK2334095-002	HK2334095-003	---	---
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	----	0.1	mg/L		1.4	1.8	9.0	---	---
EK055K: Unionized Ammonia (as N)	----	0.001	mg/L		0.055	0.055	0.347	---	---
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	---	---

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5262520)											
EK055K: Ammonia as NH3	----	0.1	mg/L	<0.1	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5269562)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.527 mg/L	94.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5269563)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.527 mg/L	92.2	----	85.0	115	----	----

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

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

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2334098
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 04-Sep-2023
Order number	: ----	Quote number	: HKE/1500/2021_V6	Issue Date	: 07-Sep-2023
C-O-C number	: ----			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**
11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsglobal.com

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 04-Sep-2023 to 06-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2334098

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

EK055K - Result of Unionized Ammonia was calculated from Ammoniacal Nitrogen (NH3-N), in-situ measurement of temperature, pH and Salinity. Ammoniacal Nitrogen results are determined by the laboratory. In-situ measurement results were provided by Ecotoxicity test.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control AMPHIPOD 10 DAY	REFERENCE SEDIMENT AMPHIPOD 10 DAY	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M AMPHIPOD 10 DAY	---	---
				Sampling date / time	04-Sep-2023	04-Sep-2023	04-Sep-2023	----	----
Compound	CAS Number	LOR	Unit		HK2334098-001	HK2334098-002	HK2334098-003	------	------
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	----	0.1	mg/L		<0.1	<0.1	10.8	---	---
EK055K: Unionized Ammonia (as N)	----	0.001	mg/L		<0.001	<0.001	0.336	---	---
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	---	---

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5276041)											
EK055K: Ammonia as NH3	----	0.1	mg/L	<0.1	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5279903)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.518 mg/L	89.6	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5279904)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.518 mg/L	91.4	----	85.0	115	----	----

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

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

APPENDIX C

Complete Data for the 20-day Polychaete Growth and Survival Test – *Neanthes arenaceodentata*

Client: Lam Geotechnics Limited

Batch No.: HK2331931

Initiation Date: 25-Aug-23

Termination Date: 14-Sep-23

Summary Results for the 20-d Polychaete Growth and Survival Test - *Neanthes arenaceodentata*

ID	Rep	Group	Clinet ID	Duration (Days)	Initial no.	Final no.	No. weighed	Initial weight (mg)	pan weight (mg)	pan + worm weight (mg)	Survival (%)			Total Dry Weight (mg)			Ind. Dry Weight (mg)			Ind. Growth Rate (mg/d)		
											S (%)	S Mean	S SD	TDW (mg)	TDW Mean	TDW SD	IDW (mg)	IDW Mean	IDW SD	IGR (mg/d)	IGR Mean	IGR SD
-	1	Control	Control	20	5	5	5	0.68	1184.37	1239.49	100.0	100.0	0.0	55.12	55.0	0.6	11.0	11.0	0.1	0.52	0.52	0.01
-	2	Control	Control	20	5	5	5	0.68	1197.11	1252.80	100.0			55.69			11.1			0.52		
-	3	Control	Control	20	5	5	5	0.68	1191.43	1246.56	100.0			55.13			11.0			0.52		
-	4	Control	Control	20	5	5	5	0.68	1191.85	1246.75	100.0			54.90			11.0			0.51		
-	5	Control	Control	20	5	5	5	0.68	1183.93	1238.00	100.0			54.07			10.8			0.51		
1	1	HK2331931002	REFERENCE SEDIMENT	20	5	5	5	0.68	1195.03	1244.44	100.0	100.0	0.0	49.41	48.9	1.3	9.9	9.8	0.3	0.46	0.45	0.01
2	2	HK2331931002	REFERENCE SEDIMENT	20	5	5	5	0.68	1190.86	1237.86	100.0			47.00			9.4			0.44		
3	3	HK2331931002	REFERENCE SEDIMENT	20	5	5	5	0.68	1183.42	1233.17	100.0			49.75			10.0			0.46		
4	4	HK2331931002	REFERENCE SEDIMENT	20	5	5	5	0.68	1198.75	1246.80	100.0			48.05			9.6			0.45		
5	5	HK2331931002	REFERENCE SEDIMENT	20	5	5	5	0.68	1197.99	1248.10	100.0			50.11			10.0			0.47		
6	1	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	5	5	5	0.68	1198.98	1245.74	100.0	100.0	0.0	46.76	47.5	1.4	9.4	9.5	0.3	0.43	0.44	0.01
7	2	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	5	5	5	0.68	1188.27	1235.26	100.0			46.99			9.4			0.44		
8	3	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	5	5	5	0.68	1187.07	1233.97	100.0			46.90			9.4			0.43		
9	4	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	5	5	5	0.68	1194.50	1244.48	100.0			49.98			10.0			0.47		
10	5	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	20	5	5	5	0.68	1187.56	1234.52	100.0			46.96			9.4			0.44		

Reviewed by: _____

Test: NA-20-Day Polychaete Growth and Survival Test						Test ID: HK2331931b				
Species: NA-Neanthes arenaceodentata						Protocol: PSEP 1995				
Sample ID: VA-Various						Sample Type: MS-Marine Sediment				
Start Date: 8/25/2023			End Date: 9/14/2023			Lab ID: ALS-ALS Technichem (HK)				
Pos	ID	Rep	Group	T. Duration (Days)	Initial no.	Final no.	No. weighed	Initital weight	pan weight (mg)	pan + worm weight (mg)
	1	1	REFERENCE	20	5	5	5	0.66	1195.03	1244.44
	2	2	REFERENCE	20	5	5	5	0.66	1190.86	1237.86
	3	3	REFERENCE	20	5	5	5	0.66	1183.42	1233.17
	4	4	REFERENCE	20	5	5	5	0.66	1198.75	1246.8
	5	5	REFERENCE	20	5	5	5	0.66	1197.99	1248.1
	6	1	2331931-03	20	5	5	5	0.66	1198.98	1245.74
	7	2	2331931-03	20	5	5	5	0.66	1188.27	1235.26
	8	3	2331931-03	20	5	5	5	0.66	1187.07	1233.97
	9	4	2331931-03	20	5	5	5	0.66	1194.5	1244.48
	10	5	2331931-03	20	5	5	5	0.66	1187.56	1234.52

Comments:

20-Day Polychaete Growth and Survival Test-Total Dry Weight (mg)

Start Date:	8/25/2023	Test ID:	HK2331931b	Sample ID:	VA-Various
End Date:	9/14/2023	Lab ID:	ALS-ALS Technichem (HK)	Sample Type:	MS-Marine Sediment
Sample Date:		Protocol:	PSEP 1995	Test Species:	NA-Neanthes arenaceodentata
Comments:					

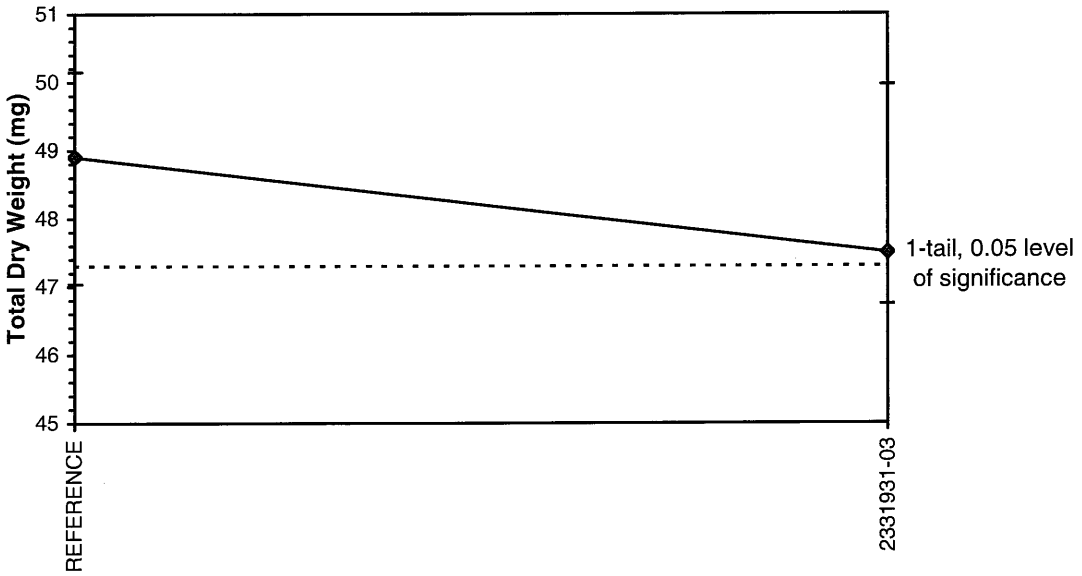
Conc-	1	2	3	4	5
REFERENCE	49.410	47.000	49.750	48.050	50.110
2331931-03	46.760	46.990	46.900	49.980	46.960

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
REFERENCE	48.864	1.0000	48.864	47.000	50.110	2.663	5			
2331931-03	47.518	0.9725	47.518	46.760	49.980	2.902	5	1.587	1.860	1.577

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.9296	0.842	0.66753	0.19289
F-Test indicates equal variances (p = 0.91)	1.12334	23.1545		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	1.57683	0.03227	4.52929	1.7976	0.1511	1, 8
Treatments vs REFERENCE						

Dose-Response Plot



Reviewed by:

Test: SURVIVAL
Species: NA-Neanthes arenaceodentata
Sample ID: REF-Ref Toxicant
Start Date: 8/25/2023 End Date: 8/29/2023

Test ID: RTNACD214
Protocol: PSEP 1995
Sample Type: CDCL-Cadmium chloride
Lab ID: ALS-ALS Technichem (HK)

Pos	ID	Rep	Group	T. Duration (Days)	Initial no.	Final no.	No. weighed	Initital weight	pan weight (mg)	pan + worm weight (mg)
	1	1	D-Control	4	10	10				
	2	2	D-Control	4	10	10				
	3	1	2.4	4	10	9				
	4	2	2.4	4	10	9				
	5	1	6.9	4	10	6				
	6	2	6.9	4	10	5				
	7	1	9.8	4	10	3				
	8	2	9.8	4	10	3				
	9	1	14	4	10	2				
	10	2	14	4	10	1				
	11	1	20	4	10	0				
	12	2	20	4	10	0				

Comments:

Reviewed by:

-Survival

Start Date:	8/25/2023	Test ID:	RTNACD214	Sample ID:	REF-Ref Toxicant
End Date:	8/29/2023	Lab ID:	ALS-ALS Technichem (HK)	Sample Type:	CDCL-Cadmium chloride
Sample Date:		Protocol:	PSEP 1995	Test Species:	NA-Neanthes arenaceodentata
Comments:					

Conc-mg/L	1	2
D-Control	1.0000	1.0000
2.4	0.9000	0.9000
6.9	0.6000	0.5000
9.8	0.3000	0.3000
14	0.2000	0.1000
20	0.0000	0.0000

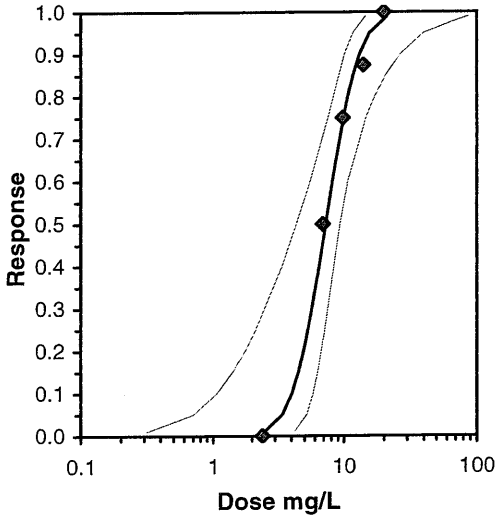
			Transform: Untransformed					Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.000	2	0	8
2.4	0.9000	0.9000	0.9000	0.9000	0.9000	0.000	2	0	8
6.9	0.5500	0.5500	0.5500	0.5000	0.6000	12.856	2	4	8
9.8	0.3000	0.3000	0.3000	0.3000	0.3000	0.000	2	6	8
14	0.1500	0.1500	0.1500	0.1000	0.2000	47.140	2	7	8
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	2	8	8

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	4.97797	1.55123	1.93756	8.01839	0	0.49586	7.81473	0.9198	0.86068	0.20088	5
Intercept	0.71556	1.50583	-2.2359	3.667							
TSCR											

Point	Probits	mg/L	95% Fiducial Limits	
EC01	2.674	2.47372	0.31348	4.19848
EC05	3.355	3.39041	0.69611	5.16832
EC10	3.718	4.01083	1.06131	5.79423
EC15	3.964	4.49236	1.40729	6.27384
EC20	4.158	4.91598	1.75742	6.69701
EC25	4.326	5.31109	2.12211	7.09727
EC40	4.747	6.45335	3.36528	8.3314
EC50	5.000	7.25569	4.36458	9.33572
EC60	5.253	8.15779	5.52584	10.7163
EC75	5.674	9.91228	7.5424	14.6154
EC80	5.842	10.709	8.29021	17.016
EC85	6.036	11.7188	9.11581	20.6285
EC90	6.282	13.1257	10.111	26.7023
EC95	6.645	15.5276	11.5694	39.8881
EC99	7.326	21.2817	14.4909	87.0522



ToxCalc v5.0.23

Reviewed by:

REFERENCE TOXICANT CONTROL CHART

Neanthes arenaceodentata - 96-h Survival LC50 Values (mg Cd / L)

	Log	Antilog
Mean	0.87	7.43
SD	0.01	1.03
2 x SD	0.02	1.05
UCL	0.91	8.05
UWL	0.89	7.84
LWL	0.85	7.05
LCL	0.84	6.86
CV(%)	1.33	

WARNING / CONTROL LIMIT CALCULATIONS

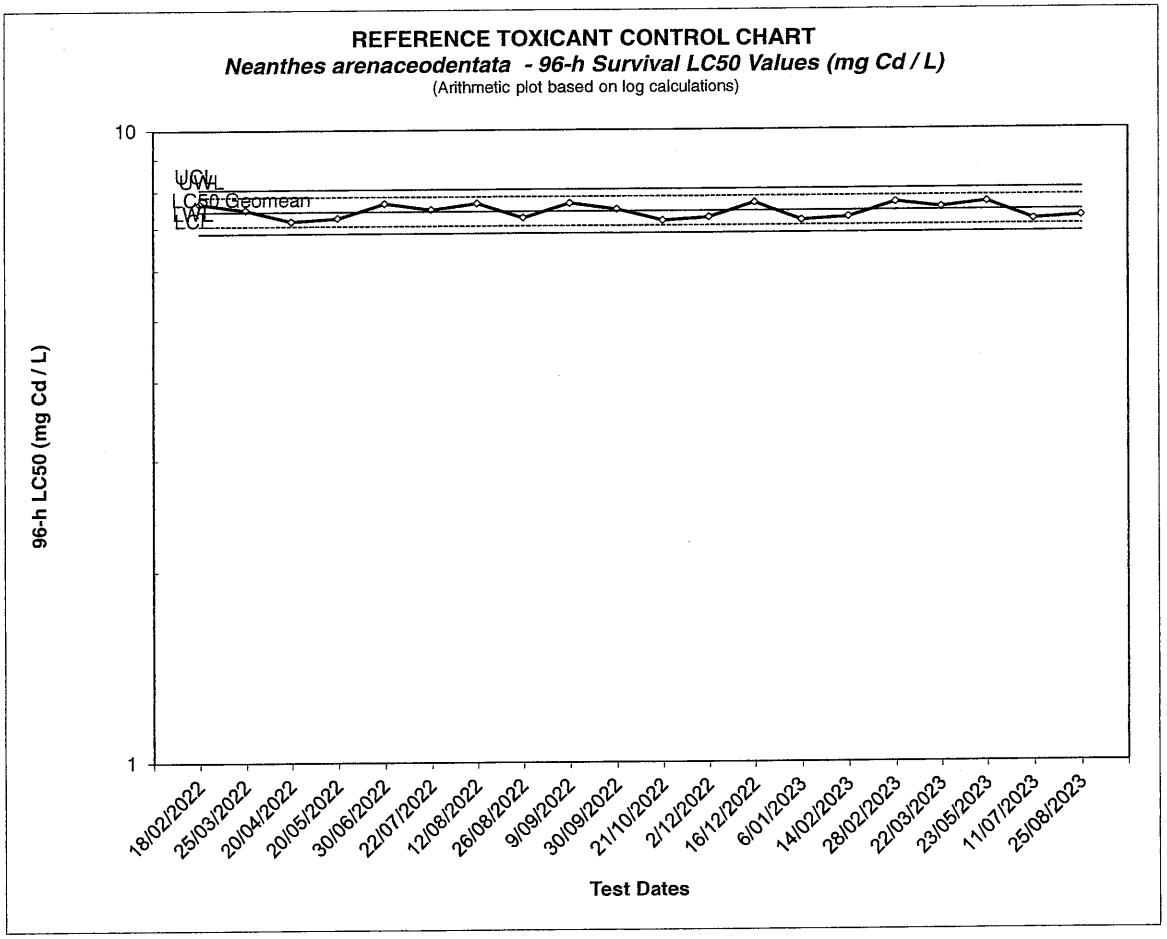
Mean: Mean is calculated for the last 20 logarithms of EC50, convert to antilogarithm to give Geomean
SD: Standard deviation is calculated for the last 20 logarithms of EC50

UCL: Upper Control Limit = Mean + 3 x SD, illustrated as antilogarithms in Control Chart
UWL: Upper Warning Limit = Mean + 2 x SD, illustrated as antilogarithms in Control Chart
LWL: Lower Warning Limit = Mean - 2 x SD, illustrated as antilogarithms in Control Chart
LCL: Lower Control Limit = Mean - 3 x SD, illustrated as antilogarithms in Control Chart

Point No.	LC50	log LC50
0	7.51	0.88
1	7.65	0.88
2	7.48	0.87
3	7.17	0.86
4	7.26	0.86
5	7.65	0.88
6	7.48	0.87
7	7.65	0.88
8	7.26	0.86
9	7.65	0.88
10	7.48	0.87
11	7.17	0.86
12	7.26	0.86
13	7.65	0.88
14	7.17	0.86
15	7.26	0.86
16	7.65	0.88
17	7.51	0.88
18	7.65	0.88
19	7.17	0.86

CONTROL CHART - DATA PLOT

Point No.	Test Date	96-h LC50	Acceptable Result?	Calculation Method
0	11/01/2022	7.51	-------	Maximum Likelihood-Probit
1	18/02/2022	7.65	OK	Maximum Likelihood-Probit
2	25/03/2022	7.48	OK	Maximum Likelihood-Probit
3	20/04/2022	7.17	OK	Maximum Likelihood-Probit
4	20/05/2022	7.26	OK	Maximum Likelihood-Probit
5	30/06/2022	7.65	OK	Maximum Likelihood-Probit
6	22/07/2022	7.48	OK	Maximum Likelihood-Probit
7	12/08/2022	7.65	OK	Maximum Likelihood-Probit
8	26/08/2022	7.26	OK	Maximum Likelihood-Probit
9	09/09/2022	7.65	OK	Maximum Likelihood-Probit
10	30/09/2022	7.48	OK	Maximum Likelihood-Probit
11	21/10/2022	7.17	OK	Maximum Likelihood-Probit
12	02/12/2022	7.26	OK	Maximum Likelihood-Probit
13	16/12/2022	7.65	OK	Maximum Likelihood-Probit
14	06/01/2023	7.17	OK	Maximum Likelihood-Probit
15	14/02/2023	7.26	OK	Maximum Likelihood-Probit
16	28/02/2023	7.65	OK	Maximum Likelihood-Probit
17	22/03/2023	7.51	OK	Maximum Likelihood-Probit
18	23/05/2023	7.65	OK	Maximum Likelihood-Probit
19	11/07/2023	7.17	OK	Maximum Likelihood-Probit
20	25/08/2023	7.26	OK	Maximum Likelihood-Probit



20-d Neanthes SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client: Lam Geotechnics Limited
Batch No.: HK2331931
Sample ID: 2-3

Test Species: *Neanthes arenaceodentata*
Source/Date Received: Aquatic Toxicology Support-24/Aug/23
Test Initiation Date (Day 0): 25-Aug-23
Test Termination Date (Day 20): 14-Sep-23

Date	0	3	6	9	12	15	18	20
Sample ID	Salinity (ppt)							
J 1	28	28	28	28	28	28	28	28
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch
Sample ID	pH							
J 1	7.8	8.2	7.9	7.8	7.9	8.1	8.1	8.0
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch
Sample ID	DO (mg/L)							
J 1	6.9	6.8	7.1	7.0	6.9	6.8	7.0	7.2
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch

WQ Instrumen: pH HK1782 Sal. HK1582 DO HK1187

Comments:

Test Set Up By: HT Data Verified By: [illegible] Date Verified: 06 OCT 2023

20-d Neanthes SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client: Lam Geotechnics Limited
Batch No.: HK2331931
Sample ID: 2 - 3

Test Species: *Neanthes arenaceodentata*
Source/Date Received: Aquatic Toxicology Support-24/Aug/23
Test Initiation Date (Day 0): 25-Aug-23
Test Termination Date (Day 20): 14-Sep-23

Date	0	3	6	9	12	15	18	20
Sample ID	Salinity (ppt)							
J 29	28	28	28	28	28	28	28	28
J 30	28	28	28	28	28	28	28	28
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch
Sample ID	pH							
J 29	8.1	7.9	8.1	7.8	7.9	7.9	8.1	8.1
J 30	8.2	7.8	8.1	8.0	7.9	8.0	7.8	7.9
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch
Sample ID	DO (mg/L)							
J 29	6.9	7.1	6.9	7.2	7.0	7.1	7.2	6.8
J 30	7.0	7.2	6.8	7.2	6.8	7.0	6.8	6.9
Initial	KL	Ch	KL	Ch	KL	Ch	KL	Ch

WQ Instrumen: pH HK1782 Sal. HK1582 DO HK1187

Comments:

Test Set Up By: KY Data Verified By: [signature] Date Verified: 06 OCT 2023

20-d *Neanthes* SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client: Lam Geotechnics Limited
Batch No.: HK2331931
Sample ID: 2-3

Test Species: *Neanthes arenaceodentata*
Source/Date Received: Aquatic Toxicology Support-24/Aug/23
Test Initiation Date (Day 0): 25-Aug-23
Test Termination Date (Day 20): 14-Sep-23

Sample ID	Temperature (°C)																				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Control	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Technician Initials	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL

WQ Instruments Used: Temp. HK890

Comments _____

Test Set Up By KL Data Verified By _____ Date Verified 06 OCT 2023

20-d *Neanthes* SEDIMENT TOXICITY TEST - DAILY WATER QUALITY MONITORING

Client: Lam Geotechnics Limited

Batch No.: HK2331931

Sample ID: 2 - 3

Test Species: *Neanthes arenaceodentata*

Source/Date Received: Aquatic Toxicology Support-24/Aug/23

Test Initiation Date (Day 0): 25-Aug-23

Test Termination Date (Day 20): 14-Sep-23

Sample ID	Temperature (°C)																				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
J 29	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
J 30	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Technician Initials	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL	Ch	KL

WQ Instruments Used: Temp. HK890

Comments

Test Set Up By: [signature]

Data Verified By: [signature]

Date Verified: 06 OCT 2023

POLYCHAETE SEDIMENT TOXICITY TESTS – SURVIVAL, DRY WEIGHT AND FINAL WATER QUALITY DATA

Ensure that another technician carries out one of the tear down replicates

Client: Lam Geotechnics Limited
Batch No.: HK2331931
Sample ID: 2-3

Test Species/Test Type: *Neanthes arenaceodentata / Static; Renewal*
Test Initiation Date (Day 0): 25-Aug-2023
Test Termination Date (Day 20): 14-Sep-2023

Sample ID	Rep.	Pan No.	Pan Weight (g)	Final Weight (g)	No. Alive	No. Dead	Food or sediment in the digestive tract (Y/N)	Total Recovered	No. Missing	Init.	Temp. (°C)	pH	Salinity (ppt)	DO (mg/L)
J 1	A	1	1.18437	1.23949	5	0	Y	5	0	KL	20	7.9	28	6.9
	B	2	1.19711	1.25280	5	0	Y	5	0	LH	20	7.8	28	6.8
	C	3	1.19143	1.24656	5	0	N	5	0	KL	20	8.0	28	7.1
	D	4	1.19185	1.24675	5	0	Y	5	0	LH	20	8.1	28	7.0
	E	5	1.18393	1.23800	5	0	Y	5	0	KL	20	7.9	28	6.9
										Initials				

WQ Instruments Used: Temp. HK890 pH HK1782 Sal. HK1582 DO HK1187 Balance HK1571, HK658

Data Verified By [signature] Date Verified 06 OCT 2023

Main technician performing tear down LH Second technician performing replicate tear down KL

POLYCHAETE SEDIMENT TOXICITY TESTS – SURVIVAL, DRY WEIGHT AND FINAL WATER QUALITY DATA

Ensure that another technician carries out one of the tear down replicates

Client: Lam Geotechnics Limited

Batch No.: HK2331931

Sample ID: 2 - 3

Test Species/Test Type: *Neanthes arenaceodentata / Static; Renewal*

Test Initiation Date (Day 0): 25-Aug-2023

Test Termination Date (Day 20): 14-Sep-2023

Sample ID	Rep.	Pan No.	Pan Weight (g)	Final Weight (g)	No. Alive	No. Dead	Food or sediment in the digestive tract (Y/N)	Total Recovered	No. Missing	Init.	Temp. (°C)	pH	Salinity (ppt)	DO (mg/L)
J 29	A	141J	1.19503	1.24444	5	0	Y	5	0	KL	20	7.8	28	6.8
	B	142J	1.19086	1.23786	5	0	Y	5	0	Ch	20	8.0	28	6.9
	C	143J	1.18342	1.23317	5	0	N	5	0	KL	20	8.2	28	7.0
	D	144J	1.19875	1.24680	5	0	Y	5	0	Ch	20	7.9	28	7.0
	E	145J	1.19799	1.24810	5	0	Y	5	0	KL	20	8.1	28	6.8
J 30	A	146J	1.19898	1.24574	5	0	Y	5	0	Ch	20	7.8	28	7.1
	B	147J	1.18827	1.23526	5	0	Y	5	0	KL	20	8.1	28	6.9
	C	148J	1.18707	1.23397	5	0	N	5	0	Ch	20	8.1	28	6.8
	D	149J	1.19450	1.24448	5	0	Y	5	0	KL	20	7.9	28	6.8
	E	150J	1.18756	1.23452	5	0	Y	5	0	Ch	20	7.8	28	7.0
	A													
	B													
	C													
	D													
	E													
									Initials		KL	Ch	KL	Ch

WQ Instruments Used: Temp. HK890 pH HK1782 Sal. HK1582 DO HK1187 Balance HK1571, HK658

Data Verified By [signature] Date Verified 06 OCT 2023

Main technician performing tear down [signature] Second technician performing replicate tear down KL

MARINE SPECIES REFERENCE TOXICANT TEST DATA

Test Species: *Neanthes arenaceodentata*

Test Initiation Date (Time): 25-Aug-23 Client: Lam Geotechnics Limited Reference Toxicant: Cd Source/Collection Date: Aquatic Toxicology Support-24/Aug/23

Test Termination Date (Time): 29-Aug-23 Batch No./Sample ID: HK231931 / 2-3 Stock ID: HK2309350-002 No. Organisms/Test Volume: 10, 900ml

Rep	Ref. Toxicant Conc. (mg/L)	Number of Survivors (24 to 96 hours)				Dissolved Oxygen (mg/L)					Temperature (°C)					pH					Salinity (ppt)	
		24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
A	0.0				10	6.9				6.9	20				20	7.8				8.1	28	28
	2.4				9	6.8				7.0	20				20	8.1				8.0	28	28
	6.9				6	7.0				6.8	20				20	8.2				7.9	28	28
	9.8				3	7.1				7.2	20				20	7.9				7.8	28	28
	14.0				2	7.2				6.9	20				20	7.8				8.0	28	28
	20.0				0	6.9				6.8	20				20	8.0				8.1	28	28
B	0.0				10	6.9				6.9	20				20	8.1				8.0	28	28
	2.4				9	6.8				7.0	20				20	8.1				7.9	28	28
	6.9				5	7.0				7.1	20				20	7.9				7.8	28	28
	9.8				3	7.1				7.2	20				20	8.1				7.8	28	28
	14.0				1	7.2				6.8	20				20	8.2				8.1	28	28
	20.0				0	6.9				7.0	20				20	8.1				7.9	28	28
	Initials				CL	KL				CL	KL				CL	KL				CL	KL	CL

Instruments Used:

Auto Pipette	HK903,HK338
Temperature	HK890
pH	HK1782
DO	HK1187
Salinity	HK1582
Balance	HK1571, HK658

Dry Weight (g) Determination of Organism

rep	org. no.	wt pan	wt pan+org.	dry wt of pan + org.	dry wt of each org.	mean dry wt of each org.
1	5	1.19847	1.20215	1.20214	0.00073	0.00068
2	5	1.19912	1.20203	1.20202	0.00058	
3	5	1.18591	1.18948	1.18947	0.00071	

Test Set Up By: HT

Data Verified By: L

Date Verified: 06 OCT 2023

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: **HK2334099**
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: **JesseWong@lamgeo.com**	E-mail	: **richard.fung@alsglobal.com**		
Telephone	: ----	Telephone	: **+852 2610 1044**		
Facsimile	: **+852 2882 3331**	Facsimile	: **+852 2610 2021**		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date received	: **25-Aug-2023**
Order number	: ---	Quote number	: HKE/1500/2021_V6	Date of issue	: **04-Sep-2023**
C-O-C number	: ---			No. of samples	- Received : 3
Site	: ---				- Analysed : 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatory	Position	Authorised results for:
Fung Lim Chee, Richard	**Managing Director**	**Inorganics**

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**
11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsglobal.com

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 25-Aug-2023 to 04-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order HK2334099 :

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

EK055K - Result of Unionized Ammonia was calculated from Ammoniacal Nitrogen (NH3-N), in-situ measurement of temperature, pH and Salinity. Ammoniacal Nitrogen results are determined by the laboratory. In-situ measurement results were provided by Ecotoxicity test.

Analytical Results

Sub-Matrix: SEAWATER		Compound	EK055K: Ammonia as NH3	EK085: Sulphide as S2-	EK055K: Unionized Ammonia (as N)	----	----
		LOR Unit	0.1 mg/L	0.1 mg/L	0.001 mg/L	----	----
Sample ID	Sampling date / time	Laboratory sample ID	ED/EK: Inorganic Nonmetallic Parameters	ED/EK: Inorganic Nonmetallic Parameters	ED/EK: Inorganic Nonmetallic Parameters	----	----
Control POLYCHATE 0 DAY	25-Aug-2023	HK2334099-001	0.3	<0.1	0.005	----	----
REFERENCE SEDIMENT POLYCHATE 0 DAY	25-Aug-2023	HK2334099-002	0.3	<0.1	0.007	----	----
1632-SMA-EDH(S)03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M POLYCHATE 0 DAY	25-Aug-2023	HK2334099-003	5.3	<0.1	0.111	----	----

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 5262173)											
EK055K: Ammonia as NH3	----	0.1	mg/L	<0.1	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 5269563)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.527 mg/L	92.2	----	85.0	115	----	----

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

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

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2334100
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ---	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 14-Sep-2023
Order number	: ---	Quote number	: HKE/1500/2021_V6	Issue Date	: 21-Sep-2023
C-O-C number	: ---			No. of samples received	: 3
Site	: ---			No. of samples analysed	: 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 14-Sep-2023 to 20-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2334100

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

EK055K - Result of Unionized Ammonia was calculated from Ammoniacal Nitrogen (NH3-N), in-situ measurement of temperature, pH and Salinity. Ammoniacal Nitrogen results are determined by the laboratory. In-situ measurement results were provided by Ecotoxicity test.

Analytical Results

Sub-Matrix: SEAWATER

				Sample ID	Control POLYCHATE 20 DAY	REFERENCE SEDIMENT POLYCHATE 20 DAY	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M POLYCHATE 20 DAY	---	---
				Sampling date / time	14-Sep-2023	14-Sep-2023	14-Sep-2023	---	---
Compound	CAS Number	LOR	Unit		HK2334100-001	HK2334100-002	HK2334100-003	------	------
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	---	0.1	mg/L		1.3	0.4	8.8	---	---
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L		0.034	0.012	0.285	---	---
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	---	---

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5298575)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5309552)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.527 mg/L	85.4	---	85.0	115	---	---

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

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

APPENDIX D

Complete Data for the 48-60-hour Bivalve Larvae Survival and Normality Test – *Crassostrea gigas*

Client Lam Geotechnics Limited

Batch No. HK2331931

Initiation Date: 29-Aug-23

Summary of Results for the 48-60-hr Bivalve Larval Survival and Development Test - Crassostrea gigas

ID	Rep	Group	Clinet ID	Initial Density	Number Normal	Number Abnormal	Normality Survival% NS (%)	NS Mean	NS SD	Survival % S (%)	S Mean	S SD	Normality % N (%)	N Mean	N SD
-	**1**	**Control**	**Control**	**366**	**324**	**21**	**88.5**	**89.1**	**1.9**	**94.3**	**93.9**	**3.1**	**93.9**	**94.9**	**1.5**
-	**2**	**Control**	**Control**	**366**	**338**	**24**	**92.4**			**98.9**			**93.4**		
-	**3**	**Control**	**Control**	**366**	**324**	**9**	**88.5**			**91.0**			**97.3**		
-	**4**	**Control**	**Control**	**366**	**320**	**17**	**87.4**			**92.1**			**95.0**		
-	**5**	**Control**	**Control**	**366**	**324**	**18**	**88.5**			**93.4**			**94.7**		
1	1	HK2331931002	REFERENCE SEDIMENT	366	300	30	82.0	83.6	1.9	90.2	90.3	3.1	90.9	92.5	2.0
2	2	HK2331931002	REFERENCE SEDIMENT	366	307	24	83.9			90.4			92.8		
3	3	HK2331931002	REFERENCE SEDIMENT	366	317	31	86.6			95.1			91.1		
4	4	HK2331931002	REFERENCE SEDIMENT	366	301	26	82.2			89.3			92.1		
5	5	HK2331931002	REFERENCE SEDIMENT	366	304	13	83.1			86.6			95.9		
6	1	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	366	263	21	71.9	72.1	1.9	77.6	80.1	2.7	92.6	90.1	2.2
7	2	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	366	268	22	73.2			79.2			92.4		
8	3	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	366	272	37	74.3			84.4			88.0		
9	4	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	366	263	33	71.9			80.9			88.9		
10	5	HK2331931003	1632-SMA-EDH(S)03 2.00-4.50M	366	253	33	69.1			78.1			88.5		

Reviewed by: _____

Test: BV-48-96 Hour Bivalve Larval Survival and Dev Test ID: HK2331931c
Species: CG-Crassostrea gigas Protocol: CG-PSEP 1995
Sample ID: VA-Various Sample Type: MS-Marine Sediment
Start Date: 8/29/2023 End Date: 8/31/2023 Lab ID: ALS-ALS Technichem (HK)

Pos	ID	Rep	Group	Initial Density	Normal Count	Abnormal Count	Notes
	1	1	2331931-02	366	300	30	
	2	2	2331931-02	366	307	24	
	3	3	2331931-02	366	317	31	
	4	4	2331931-02	366	301	26	
	5	5	2331931-02	366	301	13	
	6	1	2331931-03	366	263	21	
	7	2	2331931-03	366	259	22	
	8	3	2331931-03	366	272	37	
	9	4	2331931-03	366	263	33	
	10	5	2331931-03	366	253	33	

Comments:

48-96 Hour Bivalve Larval Survival and Development Test-Normality Survival

Start Date:	8/29/2023	Test ID:	HK2331931c	Sample ID:	VA-Various
End Date:	8/31/2023	Lab ID:	ALS-ALS Technichem (HK)	Sample Type:	MS-Marine Sediment
Sample Date:		Protocol:	CG-PSEP 1995	Test Species:	CG-Crassostrea gigas
Comments:					

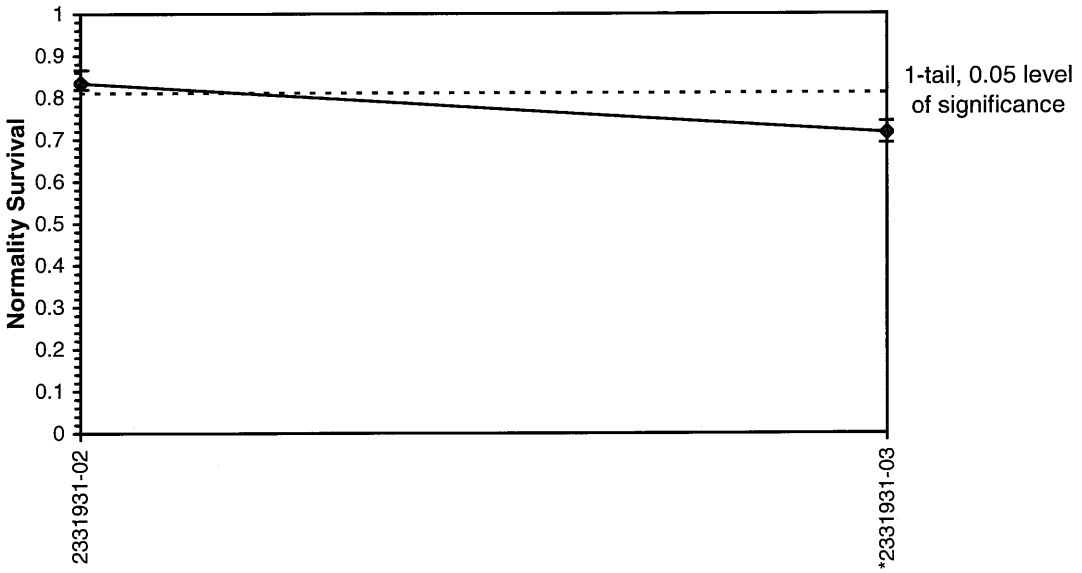
Conc-	1	2	3	4	5
2331931-02	0.8197	0.8388	0.8661	0.8224	0.8224
2331931-03	0.7186	0.7077	0.7432	0.7186	0.6913

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
2331931-02	0.8339	1.0000	0.8339	0.8197	0.8661	2.345	5			
*2331931-03	0.7158	0.8585	0.7158	0.6913	0.7432	2.644	5	9.699	1.860	0.0226

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.91171	0.842	0.76198	-0.1405
F-Test indicates equal variances (p = 0.95)	1.06667	23.1545		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences Treatments vs 2331931-02	0.02264	0.02715	0.03483	0.00037	1.1E-05	1, 8

Dose-Response Plot



ToxCalc v5.0.23

Reviewed by:

Test: BV-48-96 Hour Bivalve Larval Survival and Dev Test ID: RTCGCU141
Species: CG-Crassostrea gigas Protocol: CG-PSEP 1995
Sample ID: REF-Ref Toxicant Sample Type: CUCL-Copper chloride
Start Date: 8/29/2023 End Date: 8/31/2023 Lab ID: ALS-ALS Technichem (HK)

Pos	ID	Rep	Group	Initial Density	Normal Count	Abnormal Count	Notes
	1	1	D-Control	365.8	324	21	
	2	2	D-Control	365.8	338	24	
	3	3	D-Control	365.8	324	9	
	4	4	D-Control	365.8	320	17	
	5	5	D-Control	365.8	324	18	
	6	1	1	365.8	318	15	
	7	2	1	365.8	311	14	
	8	3	1	365.8	305	19	
	9	1	5	365.8	184	32	
	10	2	5	365.8	179	38	
	11	3	5	365.8	178	44	
	12	1	10	365.8	88	69	
	13	2	10	365.8	78	68	
	14	3	10	365.8	82	66	
	15	1	20	365.8	36	88	
	16	2	20	365.8	50	92	
	17	3	20	365.8	38	95	
	18	1	50	365.8	5	111	
	19	2	50	365.8	4	115	
	20	3	50	365.8	7	119	

Comments:

Reviewed by:_____

48-96 Hour Bivalve Larval Survival and Development Test-Normality Survival

Start Date:	8/29/2023	Test ID:	RTCGCU141	Sample ID:	REF-Ref Toxicant
End Date:	8/31/2023	Lab ID:	ALS-ALS Technichem (HK)	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	CG-PSEP 1995	Test Species:	CG-Crassostrea gigas
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	0.8857	0.9240	0.8857	0.8748	0.8857
1	0.8693	0.8502	0.8338		
5	0.5030	0.4893	0.4866		
10	0.2406	0.2132	0.2242		
20	0.0984	0.1367	0.1039		
50	0.0137	0.0109	0.0191		

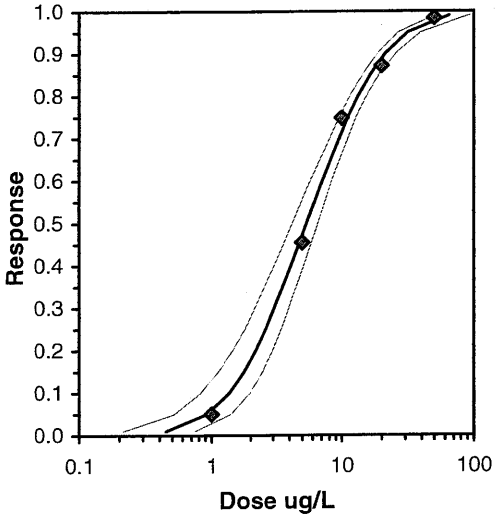
			Transform: Untransformed					Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	0.8912	1.0000	0.8912	0.8748	0.9240	2.125	5	9	89
1	0.8511	0.9550	0.8511	0.8338	0.8693	2.090	3	7	48
5	0.4930	0.5532	0.4930	0.4866	0.5030	1.783	3	58	114
10	0.2260	0.2536	0.2260	0.2132	0.2406	6.089	3	157	203
20	0.1130	0.1268	0.1130	0.0984	0.1367	18.319	3	243	275
50	0.0146	0.0164	0.0146	0.0109	0.0191	28.641	3	340	345

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.90883	0.905	0.9965	0.49033
Bartlett's Test indicates equal variances (p = 0.49)	4.41933	15.0863		

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	2.14503	0.18695	1.77861	2.51146	0.10112	1.914	7.81473	0.59045	0.73169	0.46619	3
Intercept	3.43051	0.2168	3.00559	3.85543							
TSCR	0.09918	0.02933	0.04169	0.15667							

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	0.44377	0.21366	0.7481
EC05	3.355	0.92229	0.51419	1.40307
EC10	3.718	1.36218	0.8204	1.96379
EC15	3.964	1.77218	1.12373	2.46533
EC20	4.158	2.18438	1.44226	2.95523
EC25	4.326	2.61363	1.78579	3.45399
EC40	4.747	4.1075	3.05078	5.13111
EC50	5.000	5.39121	4.19708	6.5312
EC60	5.253	7.07612	5.74971	8.34856
EC75	5.674	11.1206	9.5339	12.7779
EC80	5.842	13.3059	11.5406	15.2762
EC85	6.036	16.4008	14.2923	18.9776
EC90	6.282	21.3372	18.4674	25.2554
EC95	6.645	31.5142	26.4959	39.3097
EC99	7.326	65.4961	50.6816	92.7567



Reviewed by:

REFERENCE TOXICANT CONTROL CHART

Crassostrea gigas - 48-60-h Survival EC50 Values (ug Cu / L)

	Log	Antilog
Mean	0.74	5.46
SD	0.02	1.05
2 x SD	0.04	1.11
UCL	0.80	6.36
UWL	0.78	6.05
LWL	0.69	4.94
LCL	0.67	4.70
CV(%)	3	

WARNING / CONTROL LIMIT CALCULATIONS

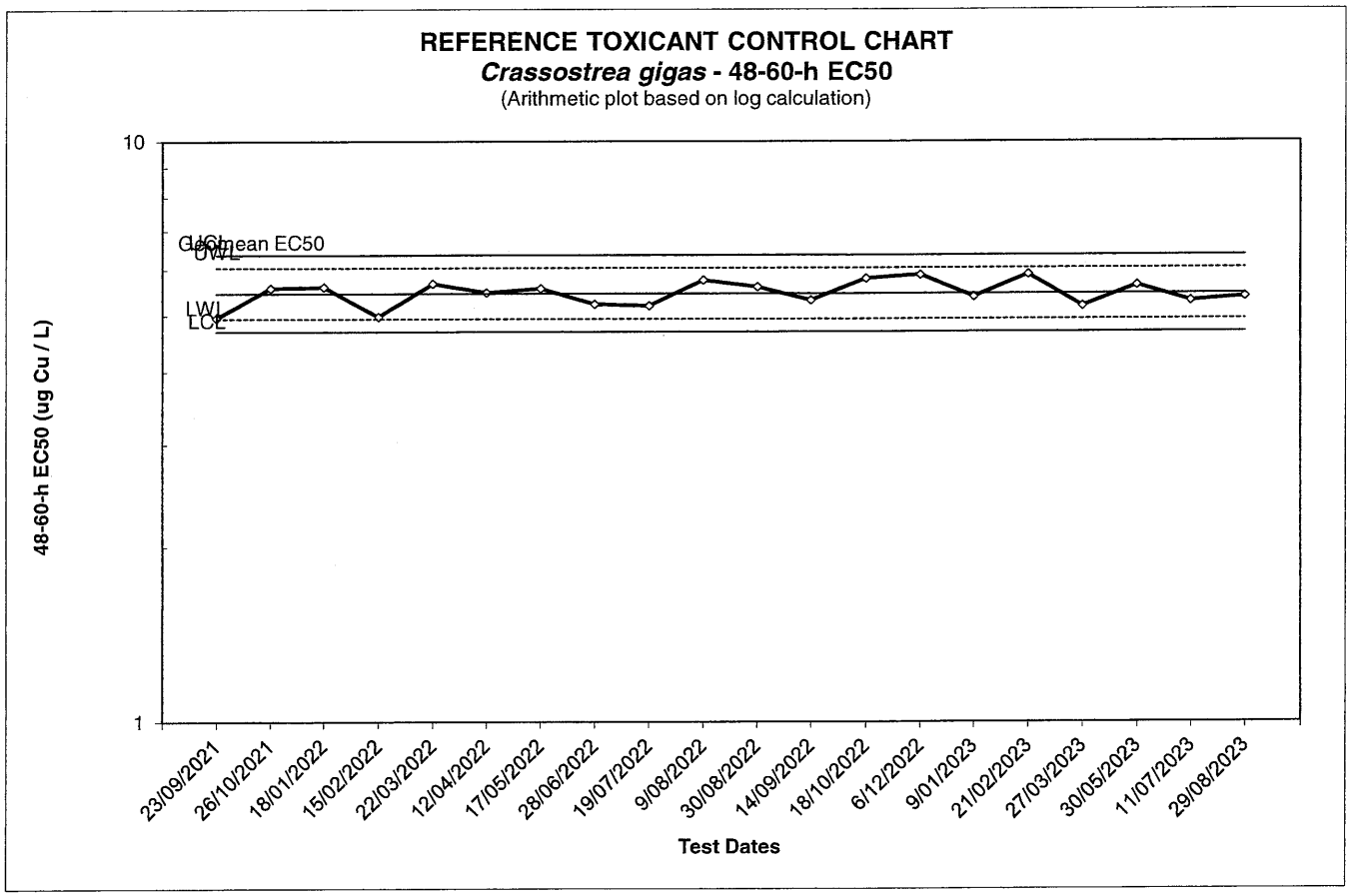
Mean: Mean is calculated for the last 20 logarithms of EC50, convert to antilogarithm to give Geomean
SD: Standard deviation is calculated for the last 20 logarithms of EC50

UCL: Upper Control Limit = Mean + 3 x SD, illustrated as antilogarithms in Control Chart
UWL: Upper Warning Limit = Mean + 2 x SD, illustrated as antilogarithms in Control Chart
LWL: Lower Warning Limit = Mean - 2 x SD, illustrated as antilogarithms in Control Chart
LCL: Lower Control Limit = Mean - 3 x SD, illustrated as antilogarithms in Control Chart

Point No.	EC50	log EC50
0	5.49	0.74
1	4.96	0.70
2	5.58	0.75
3	5.61	0.75
4	4.99	0.70
5	5.68	0.75
6	5.48	0.74
8	5.23	0.72
9	5.21	0.72
10	5.76	0.76
11	5.61	0.75
12	5.32	0.73
13	5.80	0.76
14	5.88	0.77
15	5.39	0.73
16	5.89	0.77
17	5.20	0.72
18	5.65	0.75
19	5.30	0.72
20	5.39	0.73

CONTROL CHART - DATA PLOT

Point No.	Test Date	48-60-h EC50	Acceptable Result?	Calculation Method
0	24/08/2021	5.49	-------	Maximum Likelihood-Probit
1	23/09/2021	4.96	OK	Maximum Likelihood-Probit
2	26/10/2021	5.58	OK	Maximum Likelihood-Probit
3	18/01/2022	5.61	OK	Maximum Likelihood-Probit
4	15/02/2022	4.99	OK	Maximum Likelihood-Probit
5	22/03/2022	5.68	OK	Maximum Likelihood-Probit
6	12/04/2022	5.48	OK	Maximum Likelihood-Probit
7	17/05/2022	5.57	OK	Maximum Likelihood-Probit
8	28/06/2022	5.23	OK	Maximum Likelihood-Probit
9	19/07/2022	5.21	OK	Maximum Likelihood-Probit
10	9/08/2022	5.76	OK	Maximum Likelihood-Probit
11	30/08/2022	5.61	OK	Maximum Likelihood-Probit
12	14/09/2022	5.32	OK	Maximum Likelihood-Probit
13	18/10/2022	5.80	OK	Maximum Likelihood-Probit
14	6/12/2022	5.88	OK	Maximum Likelihood-Probit
15	9/01/2023	5.39	OK	Maximum Likelihood-Probit
16	21/02/2023	5.89	OK	Maximum Likelihood-Probit
17	27/03/2023	5.20	OK	Maximum Likelihood-Probit
18	30/05/2023	5.65	OK	Maximum Likelihood-Probit
19	11/07/2023	5.30	OK	Maximum Likelihood-Probit
20	29/08/2023	5.39	OK	Maximum Likelihood-Probit



LARVAL DEVELOPMENT TOXICITY TEST - DAILY WATER QUALITY DATA

Client: Lam Geotechnics Limited
Batch No.: HK2331931
Sample ID: 2 - 3

Test Initiation Date/Time: 29-Aug-23/14:00
Test Termination Date: 31-Aug-23/14:00
Test Species / Date Collected: Crassostrea gigas-28/Aug/23

Sample ID	Temperature (°C)			pH			Salinity (ppt)			Dissolved Oxygen (mg/L)		
	0	24	48	0	24	48	0	24	48	0	24	48
J 1	20	20	20	8.2	8.1	7.9	28	28	28	7.2	7.0	6.8
initials	ICL	Ch	ICL	Ch	ICL	Ch	ICL	Ch	ICL	Ch	ICL	Ch

WQ Instruments Used:
Temp. HK890 pH HK1782 Salinity HK1582 DO HK1187

Comments

Test Set Up By [signature] Data Verified By [signature] Date Verified 06 OCT 2023

LARVAL DEVELOPMENT TOXICITY TEST - DAILY WATER QUALITY DATA

Client: Lam Geotechnics Limited
Batch No.: HK2331931
Sample ID: 2 - 3

Test Initiation Date/Time: 29-Aug-23/14:00
Test Termination Date: 31-Aug-23/14:00
Test Species / Date Collected: Crassostrea gigas-28/Aug/23

Sample ID	Temperature (°C)			pH			Salinity (ppt)			Dissolved Oxygen (mg/L)		
	0	24	48	0	24	48	0	24	48	0	24	48
J 29	20	20	20	8.2	8.0	7.9	28	28	28	7.1	6.9	6.8
J 30	20	20	20	8.1	8.1	7.8	28	28	28	7.2	7.1	7.0
initials	CL	KL	CL	KL	CL	KL	CL	KL	CL	KL	CL	KL

WQ Instruments Used:
Temp. HK890 pH HK1782 Salinity HK1582 DO HK1187

Comments

Test Set Up By KL Data Verified By CL Date Verified 06 OCT 2023

LARVAL DEVELOPMENT TOXICITY TEST - SEDIMENT (SAMPLES)

Client	Lam Geotechnics Limited	Test Initiation Date	29-Aug-23
Batch No.	HK2331931	Test Termination Date	31-Aug-23
		Fertilization initiation time	12:00
Initial Embryo Density	366	Inoculation time	14:00
Test Volume (mL)	900	Test Species	*Crassostrea gigas*
Aliquot Size (mL)	10	Source/Date Received	Guernsey Sea Farm-28/Aug/23

Sample ID	Rep.	Primary Count		Backup Count		Comments	Tech. Init.
		Normal Larvae	Abnormal Larvae	Normal Larvae	Abnormal Larvae		
J 1	A	324	21				KL
	B	338	26				Ch
	C	324	9				KL
	D	320	17				Ch
	E	314	18				KL

	Rep.	Count / 10 mL		Backup Count		Comments	Tech. Init.
		Fertilized Egg	Unfertilized Egg	Normal Larvae	Abnormal Larvae		
Day 0 Count	A	376	4				Ch
	B	360	15				KL
	C	365	10				Ch
	D	375	5				KL
	E	353	14				Ch

* Embryo must be inoculated within 2 hours after initiation of fertilization

Data Verified By _____ Date Verified 06 OCT 2023

LARVAL DEVELOPMENT TOXICITY TEST - SEDIMENT (SAMPLES)

Client: Lam Geotechnics Limited
Batch No.: HK2331931

Initial Embryo Density: 306
Test Volume (mL): 900
Aliquot Size (mL): 10

Test Initiation Date: 29-Aug-23
Test Termination Date: 31-Aug-23
Fertilization initiation time: 12:00
Inoculation time: 14:00
Test Species: *Crassostrea gigas*
Source/Date Received: Guernsey Sea Farm-28/Aug/23

Sample ID	Rep.	Primary Count		Backup Count		Comments	Tech. Init.
		Normal Larvae	Abnormal Larvae	Normal Larvae	Abnormal Larvae		
HK2331931002	A	300	30				KL
	B	307	24				Ch
J 29	C	317	31				KL
	D	301	26				Ch
	E	304	13				KL
HK2331931003	A	263	21				Ch
	B	268	22				KL
J 30	C	272	37				Ch
	D	263	33				KL
	E	253	33				Ch
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

* Embryo must be inoculated within 2 hours after initiation of fertilization

Data Verified By: [signature]
Date Verified: 06 OCT 2023

LARVAL DEVELOPMENT TOXICITY TEST - REFERENCE TOXICANT TEST DATA

Client: Lam Geotechnics Limited
Batch No.: HK231931
Sample ID: 2-3

Initial Embryo Density: 366

Test Initiation Date/Time: 29-Aug-23/14:00
Test Termination Date: 31-Aug-23/14:00
Test Species: *Crassostrea gigas*
Source/Date Received: Guernsey Sea Farm / 28/Aug/23
Test Volume (mL): 900
Aliquot Size (mL): 10

Concentration (mg/L)	Dissolved Oxygen (mg/L)					Temperature (°C)					pH					Salinity (ppt)	
	0	24	48	60		0	24	48	60		0	24	48	60		0	48
0.0	7.1		6.9			20		20			8.1		7.9			28	28
1.0	7.2		6.8			20		20			8.2		7.8			28	28
5.0	7.0		6.8			20		20			8.1		8.0			28	28
10.0	7.1		7.0			20		20			8.0		7.9			28	28
20.0	7.0		7.0			20		20			8.2		7.9			28	28
50.0	7.2		6.8			20		20			8.1		7.8			28	28
Technician	KL		Ch			KL		Ch			KL		Ch			KL	Ch

WQ Instruments Used:

Temp. HK890 pH HK1782 Salinity HK1582 DO HK1187

Comments

Test Set Up By [signature] Data Verified By [signature] Date Verified 06 OCT 2023

LARVAL DEVELOPMENT TOXICITY TEST - SEDIMENT (CONTROLS)

Client	Lam Geotechnics Limited	Test Initiation Date/Time	29-Aug-23/14:00
Batch No.	HK2331931	Test Termination Date/Time	31-Aug-23/14:00
Reference Toxicant	Cu	Fertilization initiation Time	12:00
Stock ID	HK2309350-001	Inoculation Time	14:00
Initial Embryo Density	366	Test Species	*Crassostrea gigas*
Test Volume (mL)	900	Source/Date Received	Guernsey Sea Farm-28/Aug/23
Aliquot Size (mL)	10		

Concentraiton (mg/L)	Rep.	Primary Count		Backup Count		Comments	Tech. Init.
		Normal Larvae	Abnormal Larvae	Normal Larvae	Abnormal Larvae		
Reference Toxicant							
1.0	A	318	15				
	B	311	14				
	C	305	19				
5.0	A	184	32				
	B	179	38				
	C	178	44				
10.0	A	88	69				
	B	78	68				
	C	82	66				
20.0	A	36	88				
	B	50	92				
	C	38	95				
50.0	A	5	111				
	B	4	115				
	C	7	119				
Control Seawater							
0.0	A	324	21				
	B	338	24				
	C	324	9				
	D	320	17				
	E	324	18				

Data Verified By _____ Date Verified 06 OCT 2023

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2334101
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ---	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 29-Aug-2023
Order number	: ---	Quote number	: HKE/1500/2021_V6	Issue Date	: 05-Sep-2023
C-O-C number	: ---			No. of samples received	: 3
Site	: ---			No. of samples analysed	: 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 29-Aug-2023 to 04-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2334101

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

EK055K - Result of Unionized Ammonia was calculated from Ammoniacal Nitrogen (NH3-N), in-situ measurement of temperature, pH and Salinity. Ammoniacal Nitrogen results are determined by the laboratory. In-situ measurement results were provided by Ecotoxicity test.

Analytical Results

Sub-Matrix: SEAWATER

Compound	CAS Number	LOR	Unit	Sample ID: Control BIVALVE 0 HOUR	REFERENCE SEDIMENT BIVALVE 0 HOUR	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M BIVALVE 0 HOUR	---	---
Sampling date / time				29-Aug-2023	29-Aug-2023	29-Aug-2023	---	---
				HK2334101-001	HK2334101-002	HK2334101-003	---	---
ED/EK: Inorganic Nonmetallic Parameters								
EK055K: Ammonia as NH3	---	0.1	mg/L	0.3	0.4	0.8	---	---
EK055K: Unionized Ammonia (as N)	---	0.001	mg/L	0.008	0.011	0.020	---	---
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	<0.1	<0.1	---	---

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5265013)											
EK055K: Ammonia as NH3	---	0.1	mg/L	<0.1	---	---	---	---	---	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5269563)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.527 mg/L	92.2	---	85.0	115	---	---

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

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

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2334102
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ---	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 31-Aug-2023
Order number	: ---	Quote number	: HKE/1500/2021_V6	Issue Date	: 06-Sep-2023
C-O-C number	: ---			No. of samples received	: 3
Site	: ---			No. of samples analysed	: 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 31-Aug-2023 to 06-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2334102

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

EK055K - Result of Unionized Ammonia was calculated from Ammoniacal Nitrogen (NH3-N), in-situ measurement of temperature, pH and Salinity. Ammoniacal Nitrogen results are determined by the laboratory. In-situ measurement results were provided by Ecotoxicity test.

Analytical Results

Sub-Matrix: SEAWATER				Sample ID	Control BIVALVE 48 HOUR	REFERENCE SEDIMENT BIVALVE 48 HOUR	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M BIVALVE 48 HOUR	—	—
				Sampling date / time	31-Aug-2023	31-Aug-2023	31-Aug-2023	----	----
Compound	CAS Number	LOR	Unit		HK2334102-001	HK2334102-002	HK2334102-003	———	———
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as NH3	----	0.1	mg/L		<0.1	<0.1	0.4	—	—
EK055K: Unionized Ammonia (as N)	----	0.001	mg/L		<0.001	<0.001	0.008	----	—
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L		<0.1	<0.1	<0.1	----	----

Laboratory Duplicate (DUP) Report

- No Laboratory Duplicate (DUP) Results are required to be reported.

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5275093)											
EK055K: Ammonia as NH3	----	0.1	mg/L	<0.1	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5279904)											
EK085: Sulphide as S2-	18496-25-8	0.1	mg/L	<0.1	0.518 mg/L	91.4	----	85.0	115	----	----

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

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

APPENDIX E

Analytical Reports

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: LAM GEOTECHNICS LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 5
Contact	: MR JESSE PAK HUNG WONG	Contact	: Richard Fung	Work Order	: HK2334093
Address	: 19/F, REMEX CENTRE, 42 WONG CHUK HANG ROAD, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: JesseWong@lamgeo.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: +852 2882 3331	Facsimile	: +852 2610 2021		
Project	: GROUND INVESTIGATION FOR NORTHERN LINK (SOUTH)			Date Samples Received	: 25-Aug-2023
Order number	: ----	Quote number	: HKE/1500/2021_V6	Issue Date	: 05-Sep-2023
C-O-C number	: ----			No. of samples received	: 4
Site	: ----			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**
11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong
Tel: +852 2610 1044 Fax: +852 2610 2021 www.alsglobal.com

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 25-Aug-2023 to 05-Sep-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2334093

Sample(s) was/ were sampled by ALS staff. Sample(s) arrived laboratory in ambient condition.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.

Result(s) of soil/sediment sample(s) is/are reported on dry weight basis.

Analytical Results

Sub-Matrix: SEDIMENT			Sample ID	REFERENCE SEDIMENT	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M	---	---	---
			Sampling date / time	25-Aug-2023	25-Aug-2023	---	---	---
Compound	CAS Number	LOR	Unit	HK2334093-001	HK2334093-002	---	---	---
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	---	0.1	%	47.1	28.3	---	---	---
EA105: Particle size (<63µm)	---	1.0	%	73.8	53.5	---	---	---
EP: Aggregate Organics								
EP009: Total Organic Carbon	---	0.05	%	2.23	0.68	---	---	---

Sub-Matrix: SEAWATER			Sample ID	REFERENCE SEDIMENT Porewater	1632-SMA-EDH(S) 03 2.00-3.00M, 3.00-3.50M, 3.50-4.00M & 4.00-4.50M Porewater	---	---	---
			Sampling date / time	25-Aug-2023	25-Aug-2023	---	---	---
Compound	CAS Number	LOR	Unit	HK2334093-003	HK2334093-004	---	---	---
ED/EK: Inorganic Nonmetallic Parameters								
EK055K: Ammonia as NH3	---	0.1	mg/L	5.3	8.6	---	---	---

Laboratory Duplicate (DUP) Report

Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 5260328)								
HK2334084-008	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	61.1	59.3	3.0
HK2333147-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	19.7	18.8	4.6
EP: Aggregate Organics (QC Lot: 5266500)								
HK2334084-010	Anonymous	EP009: Total Organic Carbon	----	0.05	%	1.36	1.39	2.7

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EP: Aggregate Organics (QC Lot: 5266500)											
EP009: Total Organic Carbon	----	0.05	%	<0.05	40 %	101	----	94.2	113	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 5264217)											
EK055K: Ammonia as NH3	----	0.1	mg/L	<0.1	----	----	----	----	----	----	----

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

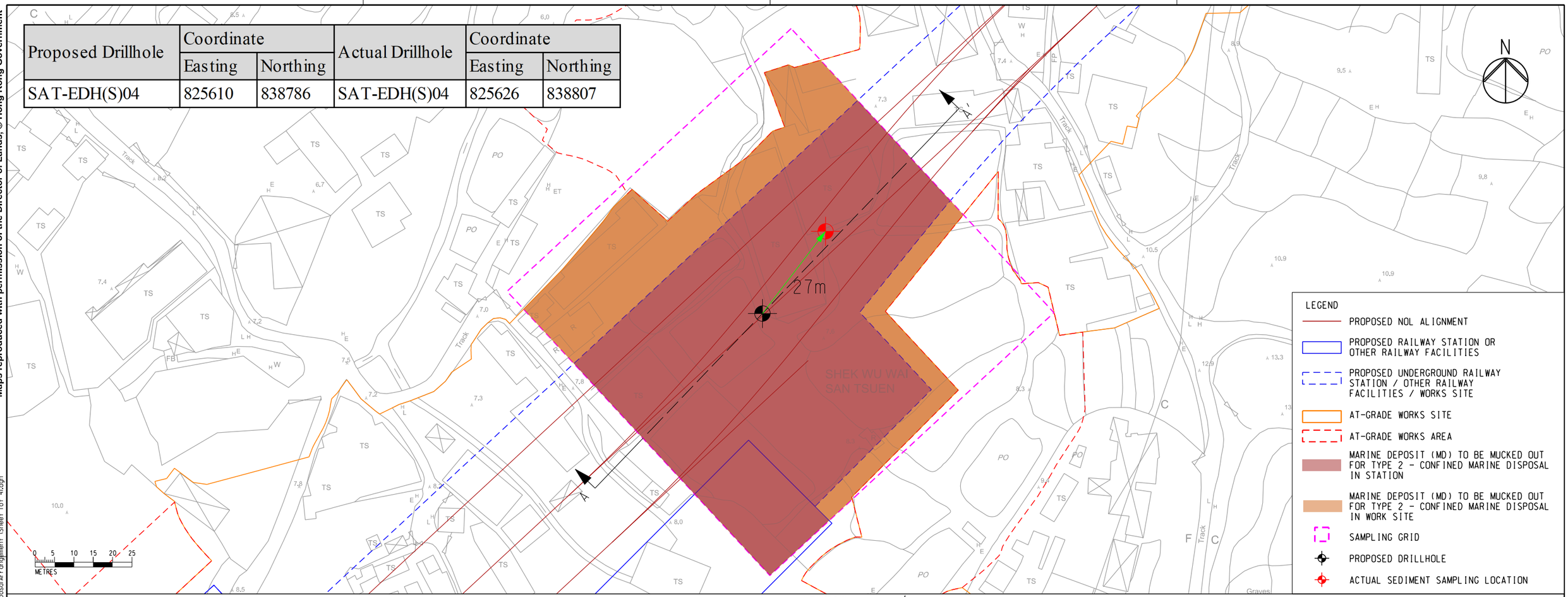
Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	MSD	Recovery Limits (%): Low	High	RPD (%): Value	Control Limit
EP: Aggregate Organics (QC Lot: 5266500)										
HK2334084-008	Anonymous	EP009: Total Organic Carbon	----	0.2158 %	98.8	----	75.0	125	----	----

Appendix G

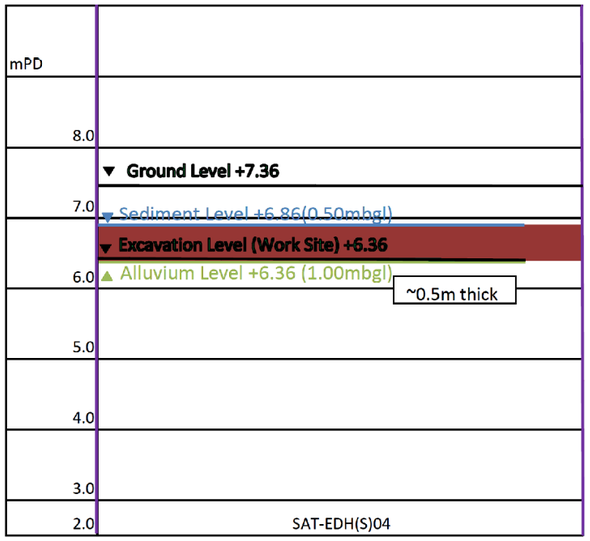
Proposed Disposal Arrangement

Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
SAT-EDH(S)04	825610	838786	SAT-EDH(S)04	825626	838807



Sampling Location	Proposed Excavation Area (A)		Proposed Disposal Sediment Depth	Estimated Thickness of Sediment	Estimated In-situ Volume of Sediment to be Excavated	Total	Proposed Disposal Arrangement
	(m^2)		(mbgl)	(m)	(C) = (A) x (B) (m^3)	(m^3)	
SAT-EDH(S)04	Station	5,860	0.5 – 1.0	0.5	2,930	3,985	Type 2 – Confined Marine Disposal
	Work Site	2,110			1,055		

SECTION A – A'



Legend
- Marine Deposit (MD) to be mucked out for Type 2 – Confined Marine Disposal
- Sampling Grid Boundary
- mbgl m below ground level

NOTE: THE EXCAVATION LEVEL WILL BE LOWER THAN +6.36mPD. THE EXACT LEVEL WILL BE CONFIRMED AT LATER STAGE.

REV	DESCRIPTION	BY	DATE	APPROVED
F	SIXTH ISSUE	GL	03OCT23	FC
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	AY	24OCT22	FC

DRAWN GL | DESIGNED JC | CHECKED EL | APPROVED FC | DATE 03/OCT/2023

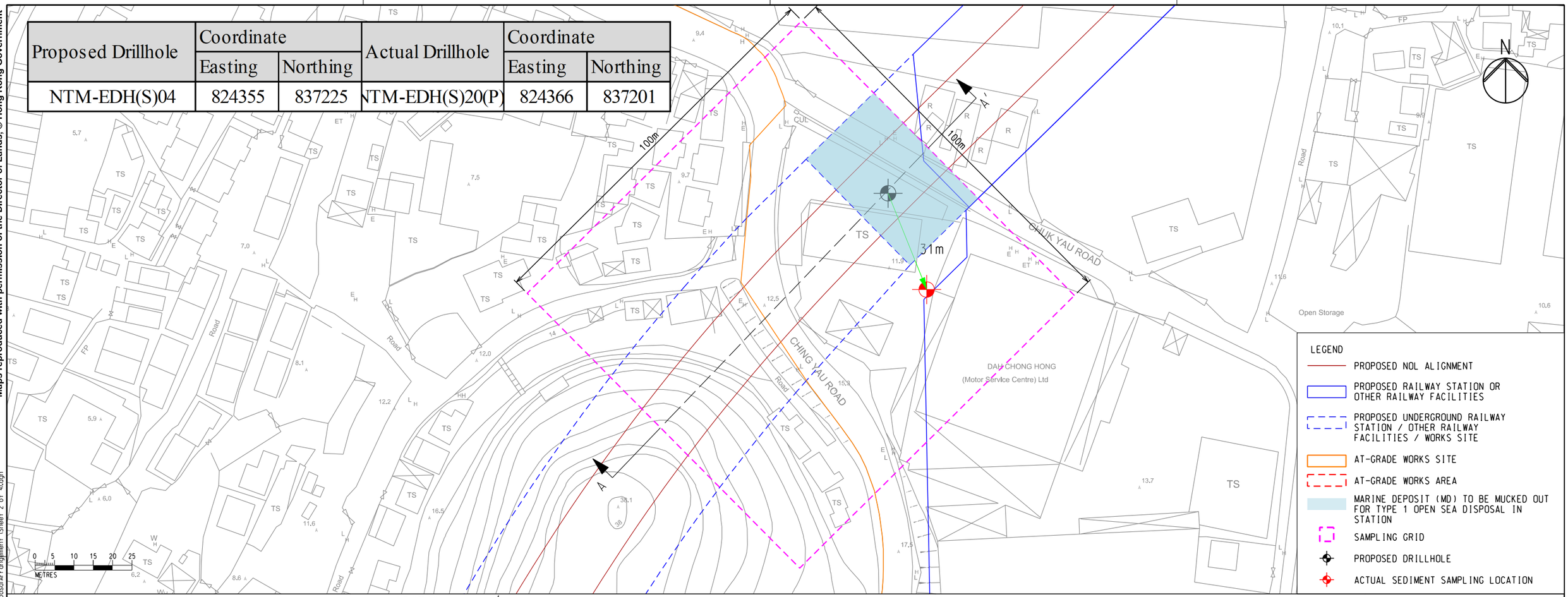
MTR
NORTHERN LINK
ORIGINATOR
ARUP AECOM JV
In Association with Hassell Limited
CADD REF. Appendix G - Proposed Disposal Arrangement

TITLE
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
PROPOSED DISPOSAL ARRANGEMENT (SHEET 1 OF 4)

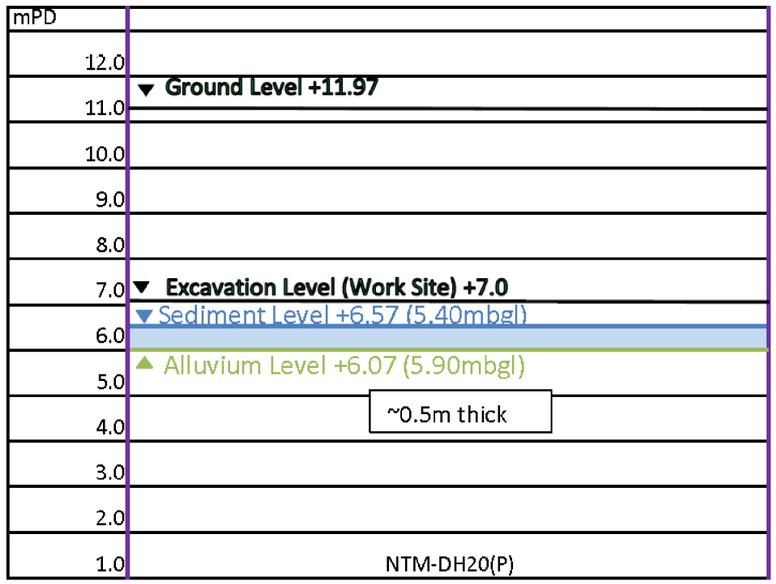
SCALE 1 : 1000 @A3 | DRAWING NO. APPENDIX G | REV. F

PLOT DRV:
MODEL\$:
FILENAME: \\global\EastAsia\HKG\Group\CIENV\env\Project\284928-10\03 Drawing Deliverables\Report\0L7N SQR\Draft 5\Appendix G - Proposed Disposal Arrangement (Sheet 1 of 4).dgn
G:\common\Microstation standard\Plotdrv\MP_ArupHK.PDF.CptPRINTED BY: richard.kuba 27/10/2023 13:56:37

Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
NTM-EDH(S)04	824355	837225	NTM-EDH(S)20(P)	824366	837201



SECTION A – A'



Sampling Location	Proposed Excavation Area (A) (m^2)		Proposed Disposal Sediment Depth (mbgl)	Estimated Thickness of Sediment (B) (m)	Estimated In-situ Volume of Sediment to be Excavated (C) = (A) x (B) (m^3)	Total (m^3)	Proposed Disposal Arrangement
NTM-EDH(S) 20(P)	Station	940	5.4 – 5.9	0.5	470	470	Type 1 - Open Sea Disposal

Legend

Marine Deposit (MD) to be mucked out for Type 1 open sea disposal

Sampling Grid Boundary

mbgl m below ground level

NOTE:
SINCE THE EXCAVATION LEVEL FOR WORK SITE OF NTM-EDH(S) 20(P) WILL NOT BE ENCOUNTERED THE RESPECTIVE SEDIMENT LEVEL, THEREFORE, NO SEDIMENT WILL BE EXCAVATED AND DISPOSED IN WORK SITE AREA.

REV	DESCRIPTION	BY	DATE	APPROVED
F	SIXTH ISSUE	GL	03OCT23	FC
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	AY	24OCT22	FC

DRAWN GL | DESIGNED JC | CHECKED EL | APPROVED FC | DATE 03/OCT/2023

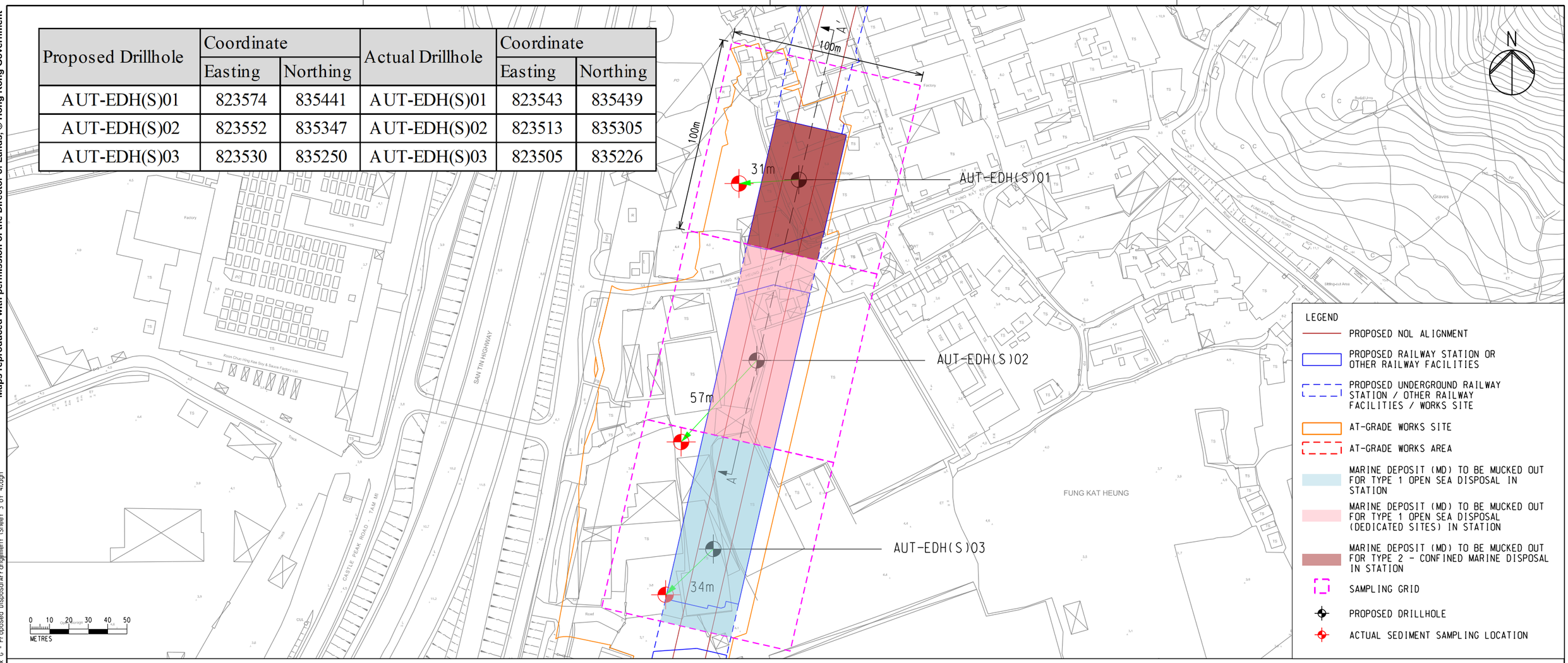
MTR
NORTHERN LINK
ORIGINATOR
ARUP AECOM JV
In Association with Hassell Limited
CADD REF. Appendix G - Proposed Disposal Arrangement

TITLE
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
PROPOSED DISPOSAL ARRANGEMENT (SHEET 2 OF 4)

SCALE 1 : 1000 @A3 | DRAWING NO. APPENDIX G | REV. F

PLOT DRV:
MODEL\$:
FILENAME: \\global\east\Asia\HKG\Group\CIENV\env\project\284928-10\03 Drawing Deliverables\Report\00.TN SQR\Draft 5\Appendix G - Proposed Disposal Arrangement (Sheet 2 of 4).dgn
G:\common\Microstation standard\Plotdrv\HP_ArupHK.PDF.cpH
PRINTED BY: richard.kuba 31/07/2023 14:26:38

Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
AUT-EDH(S)01	823574	835441	AUT-EDH(S)01	823543	835439
AUT-EDH(S)02	823552	835347	AUT-EDH(S)02	823513	835305
AUT-EDH(S)03	823530	835250	AUT-EDH(S)03	823505	835226

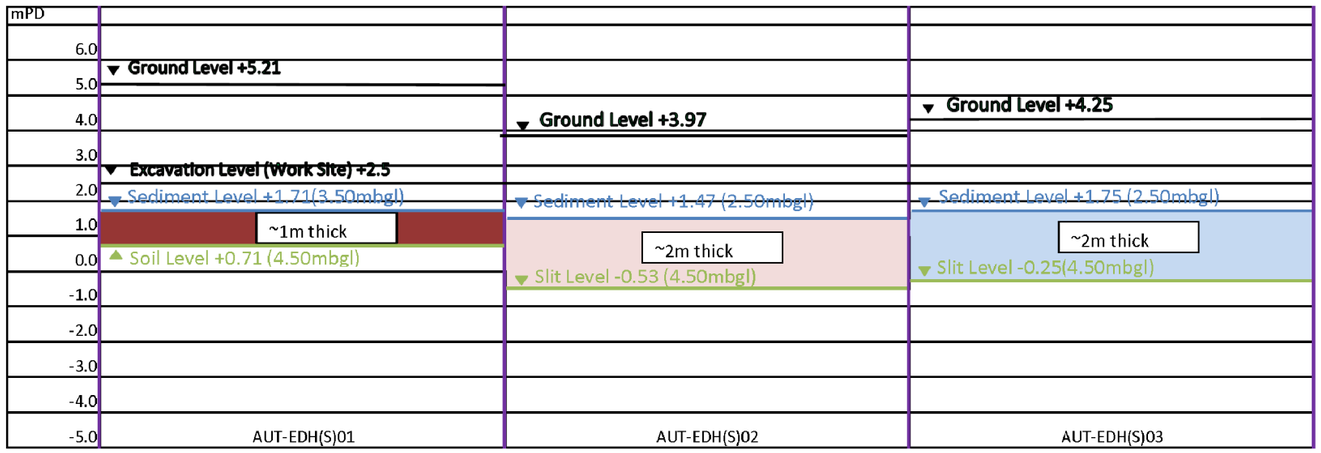


SECTION A – A'

Legend

- Marine Deposit (MD) to be mucked out for Type 1 open sea disposal
- Marine Deposit (MD) to be mucked out for Type 1 open sea disposal (Dedicated Sites)
- Marine Deposit (MD) to be mucked out for Type 2 – Confined Marine Disposal
- Sampling Grid Boundary

mbgl m below ground level



Sampling Location	Proposed Excavation Area (A) (m^2)		Proposed Disposal Sediment Depth (mbgl)	Estimated Thickness of Sediment (B) (m)	Estimated In-situ Volume of Sediment to be Excavated (C) = (A) x (B) (m^3)	Total (m^3)	Proposed Disposal Arrangement
AUT-EDH(S)01	Station	2,480	3.5 – 4.5	1.0	2,480	2,480	Type 2 – Confined Marine Disposal
AUT-EDH(S)02	Station	3,730	2.5 – 3.5 & 3.5-4.5	2.0	7,460	7,460	Type 1 - Open Sea Disposal (Dedicated Site)
AUT-EDH(S)03	Station	3,730	2.5 – 3.5 & 3.5-4.5	2.0	7,460	7,460	Type 1 - Open Sea Disposal

NOTE:
SINCE THE EXCAVATION LEVEL FOR WORK SITE OF AUT-EDH(S)01, AUT-EDH(S)02, AND AUT-EDH(S)03 WILL NOT BE ENCOUNTERED THE RESPECTIVE SEDIMENT LEVEL, THEREFORE, NO SEDIMENT WILL BE EXCAVATED AND DISPOSED IN WORK SITE AREA.

REV	DESCRIPTION	BY	DATE	APPROVED
F	SIXTH ISSUE	GL	03OCT23	FC
E	FIFTH ISSUE	GL	25AUG23	FC
D	FOURTH ISSUE	GL	06JUL23	FC
C	THIRD ISSUE	GL	05JUN23	FC
B	SECOND ISSUE	GL	14FEB23	FC
A	FIRST ISSUE	AY	24OCT22	FC

DRAWN	GL
DESIGNED	JC
CHECKED	EL
APPROVED	FC
DATE	03/OCT/2023

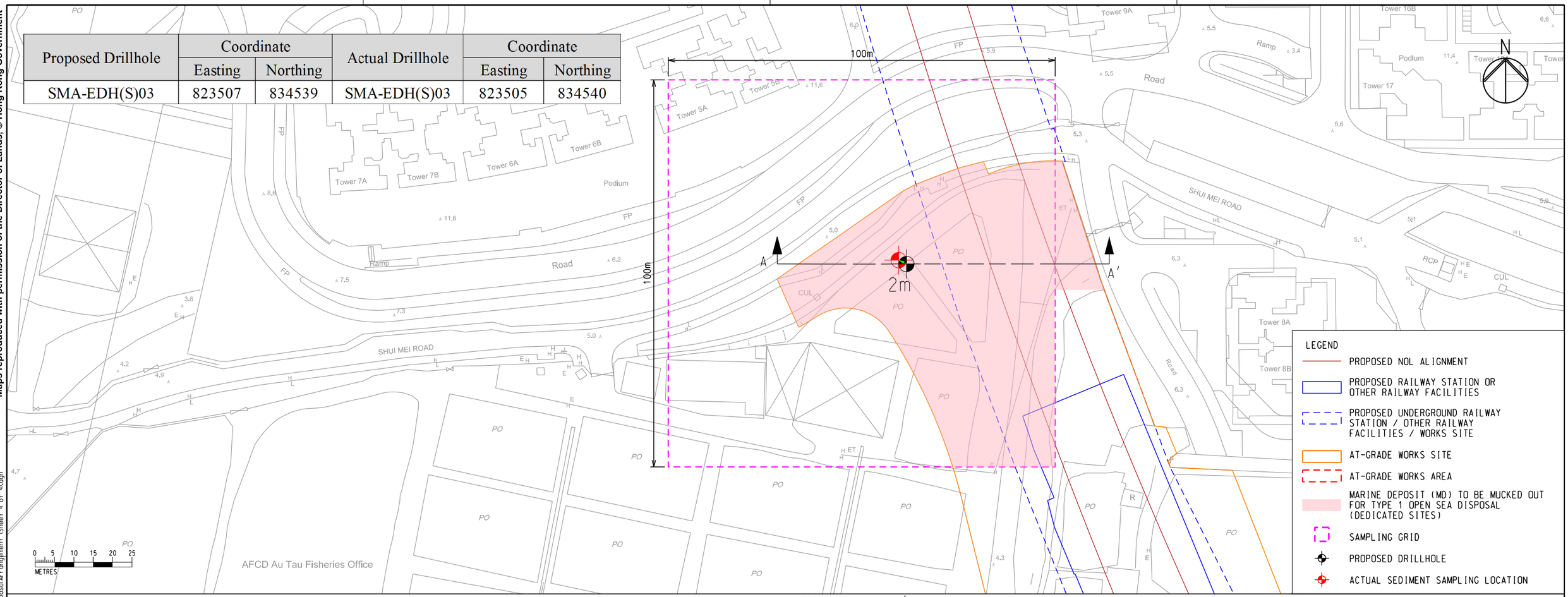
MTR
NORTHERN LINK
ORIGINATOR
ARUP AECOM JV
In Association with Hassell Limited
CADD REF.
Appendix G - Proposed Disposal Arrangement

TITLE
CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
PROPOSED DISPOSAL ARRANGEMENT (SHEET 3 OF 4)

SCALE 1 : 2000 @A3
DRAWING NO. APPENDIX G
REV. F

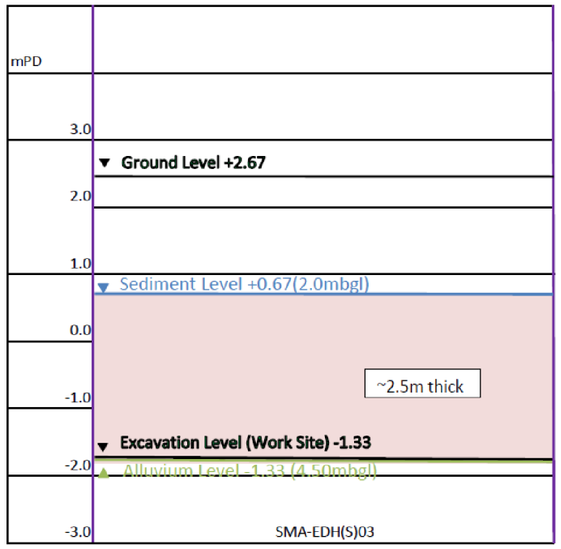
PLOT DRN: G:\common\Microstation standard\Plotdrv\HP_ArupHK_PDF.cpit
MODELNAME: $MODEL$ PRINTED BY: richard.hk.lau 11/07/2023 14:26:48
FILENAME: \\global\EastAsia\HKG\Group\CIENV\env\project\282928-TONJ\Drawing Deliverables\report\DLTN SOR\Draft 5\Appendix G - Proposed Disposal Arrangement (Sheet 3 of 4).dgn

Proposed Drillhole	Coordinate		Actual Drillhole	Coordinate	
	Easting	Northing		Easting	Northing
SMA-EDH(S)03	823507	834539	SMA-EDH(S)03	823505	834540



SECTION A - A'

Sampling Location	Proposed Excavation Area (A) (m^2)		Proposed Disposal Sediment Depth (mbgl)	Estimated Thickness of Sediment (B) (m)	Estimated In-situ Volume of Sediment to be Excavated (C) = (A) x (B) (m^3)	Total (m^3)	Proposed Disposal Arrangement
SMA-EDH(S)03	Railway Facility and Work Site	3,730	2.0– 4.5	2.5	9,325	9,325	Type 1 - Open Sea Disposal (Dedicated Site)



Legend

Marine Deposit (MD) to be mucked out for Type 1 open sea disposal (Dedicated Sites)

Sampling Grid Boundary

mbgl m below ground level

NOTE: THE EXCAVATION LEVEL WILL BE LOWER THAN -1.33. THE EXACT LEVEL WILL BE CONFIRMED AT LATER STAGE.

REV	DESCRIPTION	BY	DATE	APPROVED
F	SIXTH ISSUE	GL	03OCT23	FC
A	FIRST ISSUE	GL	12OCT23	FC

DRAWN	GL
DESIGNED	JC
CHECKED	EL
APPROVED	FC
DATE	12/OCT/2023

MTR

NORTHERN LINK

ORIGINATOR

ARUP AECOM JV

In Association with Hassell Limited

CADD REF. Appendix G - Proposed Disposal Arrangement

TITLE

CONSULTANCY AGREEMENT NO. C1602
PRELIMINARY DESIGN FOR NORTHERN LINK PHASE 2
PROPOSED DISPOSAL ARRANGEMENT (SHEET 4 OF 4)

SCALE	DRAWING NO.	REV.
1 : 1000 @A3	APPENDIX G	A

PLOT DRV:
MODELNAME:
FILENAME: \\global\EastAsia\HKG\Group\CIENV\env\Project\284928-10\03 Drawing Deliverables\Report\DLTN SQR\Draft 5\Appendix G - Proposed Disposal Arrangement (Sheet 4 of 4).dgn
G:\common\Microstation_standard\Plotdrv\MP_ArupHK_PDF-C.plt
$MODEL$
PRINTED BY: richard.kuba 27/10/2023 13:58:30