CHINA STATE
JOINT VENTURE

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Your ref :
Our ref : CDT/LT/GOV/2021/5372 15 October 2021

The EIA Ordinance Register Office
Environmental Protection Department
27th floor, Southern Centre,
130 Hennessy Road,
Wan Chai Hong Kong

Attn. : Mr. Nicholas Tsang **By Hand**

Dear Sir,

Contract No. DC/2018/05
Relocation of Sha Tin Sewage Treatment Works to Caverns –
Site Preparation and Access Tunnel Construction
Submission of Remediation Report (RR) for the Existing DSD Staff Quarters Site at Sha Tin Sewage Treatment Works (Revision 1.1) under Approved Remediation Action Plan (Revision 2.2) under EP-533/2017

We refer to your comments of the captioned RR by email on 28 September 2021 and 7 October 2021 and would like to submit herewith four hard copies and two electronic copies of the captioned report (Revision 1.1) for your approval.

.
Should you have any queries, please feel free to contact the undersigned at 9589 8156.

Thank you for your attention.

Yours faithfully,
For and on behalf of
China State Joint Venture

Kenny Poon
Site Agent

KP/KW/KF/sls

Encl.

cc DSD/CP (Attn: Mr. Stanley Hung – 1CD)
AECOM site office (Attn: Mr. Peter Poon – 1 CD)
(IEC) Acuity (Attn: Dr. C.F. Ng – 1 CD)
(ET) Lam Environmental Services Limited (Attn: Mr. Derek Lo – 1 CD)

ACUITY
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Nos. 37-39 Wing Hong Street,
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Tel. : (852) 2698 6833
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Date: 12 October 2021
Your ref:
Our ref: PL-202110007

AECOM Asia Limited
c/o Site Office
21 Hang Tai Road
Ma On Shan
New Territories

Attn: Mr. Simon Leung, CRE

Dear Mr. Leung,

Re: Contract No. DC/2018/05
Relocation of Sha Tin Sewage Treatment Works to Cavern - Site Preparation and Access Tunnel Construction
Verification of Remediation Report for the Existing Staff Quarters Site at Sha Tin Sewage Treatment Works (Rev. 1.1)

Reference is made to the captioned report received on 8 October 2021.

Please be informed that we have no comments on the captioned submission. We hereby verify the Report with reference to paragraph 4.11.2 of the approved Contamination Assessment Report and Remediation Action Plan for the Existing DSD Staff Quarter (Revision 1.1) and according to Conditions 1.9 and 2.4(ii) of Environmental Permit No. EP-533/2017.

Thank you for your attention.

Yours sincerely,
For and on behalf of
Acuity Sustainability Consulting Limited

Dr. C. F. Ng
Independent Environmental Checker

c.c.	DSD Cavern Projects Division	Attn.:	Mr. Stanley Hung	By e-mail
	ETL Lam Environmental Services Limited	Attn.:	Mr. Derek Lo	By e-mail

Our ref.: LES/J2021-03/CS/L026
Date : 8 October 2021

China State Joint Venture By Email & Hand

29/F, China Overseas Building,
139 Hennessy Road,
Hong Kong

Attn: Mr. Eddie TANG

Dear Mr. TANG,

Contract No. STW 01/2021
Environmental Team for
Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Submission of Remediation Report (RR) for Existing DSD Staff Quarter Site (Rev.1.1)

Referring to the captioned submission (Document No.: TE20030/RR_SQ (REV.1.1)) received through email on 8 October 2021, we have reviewed your submitted details and hereby certify the submission in accordance with Conditions 1.9 and 2.4(ii) of Environmental Permit (EP) No. EP-533/2017.

Should you have any queries, please contact the undersigned at 9108 0531.

Yours faithfully,
For and On Behalf Of
Lam Environmental Services Limited

Derek Lo
Environmental Team Leader

Encl.

c.c.	DSD	Mr. Stanley Hung	Via email
	AECOM (CRE Office)	Mr. Simon Leung	Via email
	Acuity Sustainability Consulting Limited	Mr. C.F Ng	Via email

RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS –
SITE PREPARATION & ACCESS TUNNEL CONSTRUCTION
(CONTRACT NO. DC/2018/05)

REMEDIATION REPORT

FOR THE EXISTING DSD STAFF QUARTERS SITE AT SHA TIN SEWAGE TREATMENT WORKS

DOCUMENT NO.: TE20030/RR_SQ (REV. 1.1)
OCTOBER 2021

CLIENT
DRAINAGE SERVICES DEPARTMENT
CONSULTANT
AECOM
INDEPENDENT ENVIRONMENTAL CHECKER
ACUITY SUSTAINABILITY CONSULTING LIMITED
ENVIRONMENTAL TEAM
LAM ENVIRONMENTAL SERVICES LIMITED
MAIN CONTRACTOR
CHINA STATE JOINT VENTURE
LAND DECONTAMINATION CONTRACTOR
TEEMWAY ENGINEERING LIMITED

PREPARED & ENDORSED BY:

THOMAS YEUNG – LAND DECONTAMINATION SPECIALIST

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1.0 INTRODUCTION

1.1 Background Information

1.1.1 This Remediation Report (RR) is for the Decontamination Works at the Existing DSD Staff Quarter Site (The Site) for the Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation & Access Tunnel Construction (Contract No. DC/2018/05)

1.1.2 For the project of the Relocation of Sha Tin Sewage Treatment Works to Caverns, Environmental Impact Assessment (EIA) Report was submitted and approved under EIAO in November 2016 (No. AEIAR-202/2016). The corresponding Environmental Permit was issued (EP No.: EP-533/2017) by the Director of Environmental Protection (DEP) in March 2017.

1.1.3 A Supplementary Contamination Assessment Plan (SCAP) was prepared to identify the potential land contamination issues at the Site for partial fulfilment of Condition 2.21 of the EP and recommended to conduct Site Investigation (SI) at ENV-G01(2) to identify potential land contamination issues.

1.1.4 A Contamination Assessment Report and Remediation Action Plan (CAR & RAP) (Revision 2.2) was prepared by Lam Environmental Services Limited to cover the assessment of the Existing DSD Staff Quarter Site. The CAR & RAP was submitted and agreed by Environmental Protection Department (EPD) on 02 March 2021.

1.1.5 For the agreed CAR & RAP, the details of the site investigation works and results of the laboratory analysis, estimation on the extent of contamination and the proposed approach of subsequent remediation were presented. The contamination hotspots at ENV-G01(2) at the Existing DSD Staff Quarter Site was identified. The Site Location Plan with Hotspot Location is shown in **Figure 1**.

1.1.6 Teemway Engineering Limited was appointed as the Land Decontamination Contractor (The Contractor) for carrying out the decontamination work at the Existing DSD Staff Quarter Site and submit the Remediation Report (RR) in accordance with the approved CAR/RAP.

1.2 Objectives of the Report

1.2.1 Objectives of this Remediation Report (RR) are to

- Summarize results of confirmatory testing results and confirm the extent of remediation at ENV-G01(2);
- Describe the remediation process for cement solidification at ENV-G01(2);
- Report the detail of remediation process conducted at ENV-G01(2), adequate clean-up of the contaminated soil has been completed and the test results to ensure the remediated soil has been treated properly to fulfil the treatment targets in accordance with the agreed CAR & RAP.

1.3 Report Structure

1.3.1 The remainder of this RR is structured as follow;

- Section 2 presents the guidelines used for the land contamination assessment;
- Section 3 presents the summary of contamination;
- Section 4 presents the remediation programme;
- Section 5 presents the health, safety and environmental precautions and;
- Section 6 presents the conclusions of this RR.

2.0 GUIDELINES

2.1 This RR has been prepared following the guidance and steps outlined in the EPD published guidelines listed below;

- Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management (hereafter refers as the "Guidance Manual"), dated December 2007;
- Guidance Note for Contaminated Land Assessment and Remediation, dated 15 August 2007; and
- Practice Guide for Investigation and Remediation of Contaminated Land, dated August 2011 (hereafter refers as the "Practice Guide")

2.2 As the Guidance Manual and the Practice Guide were the latest guidelines promulgated for use in August 2007 and August 2011 respectively, the RBRGs criteria and the requirements stated in the Practice Guide will be adopted in the RR.

3.0 SUMMARY OF CONTAMINATION

3.1 Site Investigation Results

3.1.1 As mentioned in the agreed CAR & RAP, a borehole at ENV-G01(2) was conducted for soil and groundwater sampling at Existing DSD Staff Quarter Site for site investigation stage.

3.1.2 For soil samples collected at 1.5m-1.95m and 3.0m-3.45m below ground level, the analytical results indicate that the concentration of Lead, are higher than the relevant RBRGs (Urban Residential Standard).

3.1.3 For all other soil and groundwater samples collected at ENV-G01(2) were tested within RBRGs (Urban Residential Standard). As no trace of NAPL was observed and all tested parameters in soil / groundwater samples were within C_{sat} / Solubility Limit respectively, the NAPL removal to soil saturation limit or solubility limit criterion is not required.

3.1.4 The detected levels of the parameters higher than that in RBRGs is shown in **Table 1**. The Previously Sampling Location at DSD Staff Quarter extracted from the agreed CAR & RAP can be referred to **Figure 1**.

Table 1 Soil Samples Exceeding RBRGs (Urban Residential Standard)

Sample ID	Parameters	Detected Concentrations (mg/kg)	RBRGs Standard (mg/kg)
ENV-G01(2) (1.5m-1.95m)	Lead	281	258
ENV-G01(2) (3.0m-3.45m)		379	

3.2 Extent of Contamination

3.2.1 For the contaminated soil identified in accordance with the agreed CAR & RAP, the estimated extent of contaminated soil at ENV-G01(2) for remediation is outlined by a 5m x 5m grid with the concerned sampling location located at the center of the grid. The vertical extent of initial contamination zone is assumed to be 0.5m above and below the sampling depth with contamination identified for conservation estimation. Further to the site investigation and soil sampling process, it was observed that the soil sample collected at 1.5m-1.95m and 3.0m-3.45m below ground level are in homogeneous nature. Therefore, the soil layer between 1.95m to 3.0m below ground level is considered to be contaminated.

3.2.2 Based on the above estimation approach, the estimated volume of contaminated soil for remediation should be approximate 74m^3. The detail of estimated contaminated soil volume is illustrated in **Table 3**.

Table 2 Estimated Volume of Contaminated Soil for Remediation

Sample ID	Sample Depth (m bgl)	Contaminant	Depth of Contaminated Soil (m bgl)	Horizontal Dimension (m)	Contaminated Soil Area (m^2)	Contaminated Soil Volume (m^3)
ENV-G01(2) (1.5m-1.95m)	1.5m – 1.95m	Lead	1.0m – 3.95m (2.95m thickness)	5.0m x 5.0m	25	~74
ENV-G01(2) (3.0m-3.45m)	3.0m – 3.45m					

3.3 Remediation Methods

3.3.1 In accordance with the agreed CAR & RAP, the proposed remediation method for the contaminated soil at ENV-G01(2) is summarized in **Table 3**.

Table 3 Proposed Remediation Method for the Contaminated Soil

Type of Contamination	Proposed Remediation Method
ENV-G01(2) – Soil (Lead)	Cement Solidification / Stabilization (S/S)

4.0 REMEDIATION PROGRAMME

4.1 Confirmatory Sampling at ENV-G01(2)

4.1.1 Sampling Locations & Depths

4.1.1.1 The soil samples were tested only for the contaminants exceeding RBRGs at the concerned location at ENV-G01(2) listed in **Table 1**. In case a confirmatory sample exceeded the RBRGs limits, additional samples were collected in 1.0m increments horizontally and 0.5m vertically, depending on the relative position of the confirmatory sample to the original contaminated sample. If the laboratory result of the confirmatory sample is higher than the RBRGs standards, additional confirmation samples will be collected until the concentrations are below the RBRGs standards.

4.1.2 Sampling Methodology

4.1.2.1 Soil samples at mentioned depths were collected by rotary dry drilling method (i.e. without the use of flushing medium). All equipment in contact with soil was decontaminated thoroughly between each two sampling events to prevent cross-contamination. The equipment was first cleaning with laboratory-grade (phosphate-free) detergent, rinsed with thoroughly by distilled water, finally steam cleaned by distilled water. A clean area immediately adjacent to the sampling location was established, using a plastic sheet or tarpaulin, on which all cleaned equipment was placed.

4.1.2.2 The soil samples were collected by stainless steel U76 sampler or glass jars provided by the laboratory, ALS Technichem (HK) Pty. Ltd. (ALS), which is accredited under Hong Kong Laboratory Accreditation Scheme (HOKLAS). The samples were stored within an ice chest between 0ºC and 4ºC but not frozen and delivered to the laboratory for analysis on the same day of collection.

4.1.3 Confirmatory Testing Results

4.1.3.1 Total of fourteen (14) samples (excluding duplicate sample) were collected at ENV-G01(2) during the period from 12 March 2021 to 31 March 2021. Testing of the confirmatory samples was performed by ALS. The confirmatory sampling locations are illustrated in **Figure 2**.

4.1.3.2 Confirmatory soil samples were collected and analysed until all collected samples are below RBRGs standards. The testing results of confirmatory samples are summarized in **Table 4** and the complete laboratory reports for confirmatory test are attached in **Appendix A**.

Table 4 Confirmatory Testing Results

Concerned Location	Contaminant	Location	Sampling Date	Sample ID	Report ID	Result (mg/kg)	RBRG Limit (mg/kg)	Below RBRGs Limit? (Y/N)
ENV-G01(2)	Lead	Top	15/03/2021	ENV-G01(2)(T) (1.0m)	HK2110585-003	248	258	Y
		Bottom	15/03/2021	ENV-G01(2)(B) (3.95m-4.40m)	HK2110585-004	161	258	Y
		Sidewall	12/03/2021	ENV-G01(2)(ET) (1.50m-1.95m)	HK2110213-001	160	258	Y
			12/03/2021	ENV-G01(2)(EB) (3.00m-3.45m)	HK2110213-002	300		N (Extend to EB1)
			20/03/2021	ENV-G01(2)(EB1) (3.00m-3.45m)	HK2111450-001	323		N (Extend to EB3)*
			31/03/2021	ENV-G01(2)(EB3)* (3.00m-3.45m)	HK2112678-001	211		Y
		Sidewall	15/03/2021	ENV-G01(2)(ST) (1.50m-1.95m)	HK2110585-001	236	258	Y
			15/03/2021	ENV-G01(2)(SB) (3.00m-3.45m)	HK2110585-002	532		N (Extend to SB1)
			22/03/2021	ENV-G01(2)(SB1) (3.00m-3.45m)	HK2111599-001	98		Y
		Sidewall	13/03/2021	ENV-G01(2)(WT) (1.50m-1.95m)	HK2110323-002	217	258	Y
			13/03/2021	ENV-G01(2)(WB) (3.00m-3.45m)	HK2110323-003	1130		N (Extend to WB1)
			22/03/2021	ENV-G01(2)(WB1) (3.00m-3.45m)	HK2111603-001	199		Y
		Sidewall	12/03/2021	ENV-G01(2)(NT) (1.50m-1.95m)	HK2110213-003	156	258	Y
			13/03/2021	ENV-G01(2)(NB) (3.00m-3.45m)	HK2110323-001	148		Y

* *The sample at ENV-G01(2)(EB2) was cancelled due to the presence of underground water pipe.*

4.1.4 QA/QC Sample Results

4.1.4.1 A field quality assurance / quality control (QA/QC) programme was implemented, which comprised of 1 duplicate, 1 equipment blank and 1 field blank for every 20 samples collected. The QA/QC samples are collected on-site and then stored and delivered together with the soil confirmatory samples.

4.1.4.2 According to the QA/QC programme, one (1) duplicate sample, one (1) field blank sample and one (1) equipment blank sample were collected. A list of QA/QC samples is presented in **Table 5** and **Table 6** and the laboratory reports for the relevant QA/QC samples are attached in **Appendix B.**

Table 5 QA/QC Samples for Confirmatory Sampling

QA/QC Sample	Sampling Date	Sample ID	Report ID	Associated Sample(s)	Testing Parameter	Result
Duplicate Sample	15/03/2021	DUP-1	HK2110587-003	ENV-G01(2)(T)(1.0m)	Lead	236 mg/kg
Field Blank	15/03/2021	FB-1	HK2110587-001	ENV-G01(2)(T)(1.0m)	Lead	<1 ug/L
Equipment Blank	15/03/2021	EQ-1	HK2110587-002	ENV-G01(2)(T)(1.0m)	Lead	<1 ug/L

Table 6 Relative Percent Difference (RPD) Values for Confirmatory Sampling

Duplicate Sample			Associated Sample			Testing Parameter	RPD
Sample ID	Report ID	Result (mg/kg)	Sample ID	Report ID	Result (mg/kg)		
DUP-1	HK2110587-003	236	ENV-G01(2)(T)(1.0m)	HK2110585-003	248	Lead	4.96%

4.1.4.3 All parameters tested for field blank sample and equipment blank sample are below the laboratory reporting limits.

4.1.4.4 The laboratory QA/QC sample results included surrogate recoveries, matrix spike sample, laboratory duplicate samples and method blanks and met their respective requirements.

4.1.4.5 The relative percent difference (RPD) value calculated from the soil duplicate sample was below the 50% acceptable limit. Based on the review of QA/QC sample results, all laboratory results for the confirmatory samples are useable and reliable.

4.1.5 Confirmation of Contaminated Soil Extent

4.1.5.1 The excavation boundaries for contaminated soil were indicated on site in accordance with the results of the confirmatory samples to ensure that all agreed and confirmed contaminated soil should be excavated for treatment.

4.1.5.2 For Lead-Contaminated Soil found at ENV-G01(2), about 12.5m^3 of the contaminated soil was estimated from 1.00m to 1.50m below ground level with the corresponding area of 25m^2. About 132.3m^3 of the contaminated soil was estimated from 1.50m to 3.95m below ground level with the corresponding area of 54m^2. The excavation area of agreed and confirmed contaminated soil is shown in **Figure 3** and the confirmed volume of contaminated soil for remediation is shown in **Table 4**.

Table 7 Confirmed Volume of Contaminated Soil for Remediation

Location	Contaminant	Estimated Depth of Contaminated Soil (m bgl)	Estimated Area of Contaminated Soil (m^2)	Estimated Volume of Contaminated Soil (m^3)
ENV-G01(2)	Lead	1.00-1.50	25 (5.0m x 5.0m)	12.5
		1.50-3.95	54 (6.0m x 9.0m)	132.3
			Total Volume (m^3)	**144.8**

4.2 Cement Solidification / Stabilization at ENV-G01(2)

4.2.1 Trial Mixing

4.2.1.1 Trial mixing was performed under the supervision of Land Contamination Specialists from the Contractor to determine the optimal mixing ratio prior to full-scale cement solidification. Soil for trial mixing was collected from approximate 1.5m bgl at ENV-G01(2). Three cement/soil ratio by weight were tested, i.e. 5%, 10% and 15% respectively. Water was added at approx. 1:1 ratio to cement for mixing.

4.2.1.2 Samples were also collected for Toxicity Characteristic Leaching Procedure (TCLP) and Unconfined Compressive Strength (UCS) testing to examine whether the treated soil meets the required targets. TCLP testing was performed by ALS Technichem (HK) Pty. Ltd. (ALS) in accordance with the Universal Treatment Standards of U.S. and UCS testing was performed by Castco Testing Centre Ltd. (Castco) in accordance with Construction Standard CS1:1990 Testing Concrete of Civil Engineering and Development Department (CEDD), both are HOKLAS accredited laboratory.

4.2.1.3 All TCLP concentrations were below the TCLP remediation target and all the UCS test results were complied with the UCS requirement (i.e. ≥1.0 MPa) with 3-day settlement period. The laboratory results are summarized in **Table 8** & **Table 9** respectively and the complete laboratory reports for Trial Mix Tests are attached in **Appendix C**.

Table 8 Trial Mix Test Results for TCLP Testing

Location	Testing Parameter	Cement / Soil Ratio	Sampling Date	Sample ID	Report ID	TCLP Test Result (mg/L)	TCLP Limit (mg/L)	Below the TCLP Limit? (Y/N)
ENV-G01(2)	Lead (TCLP)	5%	29/06/2021	ENV-G01(2)-CS (TM) TCLP-5%	HK2126255-001	<0.1	<0.75	Y
		10%	29/06/2021	ENV-G01(2)-CS (TM) TCLP-10%	HK2126255-002	<0.1		Y
		15%	29/06/2021	ENV-G01(2)-CS (TM) TCLP-15%	HK2126255-003	<0.1		Y

Table 9 Trial Mix Test Results for UCS Testing

Location	Cement / Soil Ratio	Sampling Date	Sample ID	UCS Test Result (MPa)	UCS Requirement (MPa)	Meet the UCS Requirement? (Y/N)
ENV-G01(2)	5%	29/06/2021	ENV-G01(2)-CS (TM) UCS-5%	1.0	≥1.0	Y
	10%	29/06/2021	ENV-G01(2)-CS (TM) UCS-10%	3.0		Y
	15%	29/06/2021	ENV-G01(2)-CS (TM) UCS-15%	4.0		Y

4.2.1.4 According to the above results of trial mixing and more conservative approach, 5% cement / soil ratio was adopted with approximate 3-day curing time was adopted for full scale remediation.

4.2.2 Implementation of Cement Solidification

4.2.2.1 The excavation boundaries for contaminated soil were indicated on site in accordance with the as-built confirmatory sampling locations to ensure that all contaminated soil was excavated for treatment by cement solidification / stabilization. The layout plan for cement solidification / stabilization for contaminated soil extent is shown in **Figure 3**.

4.2.2.2 During the excavation of clean soil above the extent of Contaminated Soil, the excavation tools reached the soil approx. 0.3m above the contaminated area to avoid any potential contamination to the excavation equipment.

4.2.2.3 In order to prevent cross-contamination between contaminated soil and clean soil, the excavated Contaminated Soil was excavated and delivered to the container skip for treatment by cement solidification / stabilization process. After treatment, the stockpiled treated soil was covered by impermeable sheeting with clear labelling.

4.2.2.4 For the excavation equipment in contact with contaminated soil and clean soil, they should be washed by phosphate-free detergent and decontaminated by steam cleaning.

4.2.2.5 Oversize materials (i.e. cobble, boulder etc.) within the extent of contaminated soil should be sorted out and then steam-cleaned at 60^{o}C for material surface to remove surface contaminants and then handled with other treated soil

4.2.2.6 The contaminated soil was delivered to a container skip with measured dimension in for start cement solidification / stabilization process (i.e. not more than 10m^3 for each batch). The calculated quantity of cement and water were added for soil mixing. The treated soil then was delivered to the designated stockpiling area for waiting for the corresponding test results of TCLP and UCS testing as per **Figure 3**. Total of eighteen (18) verification samples (excluding duplicate sample) were collected for TCLP and UCS testing.

4.2.2.7 Finally, 144.8m^3 of Contaminated Soil at ENV-G01(2) was excavated and treated for cement solidification / stabilization during the period from 09 July 2021 to 31 July 2021.

4.2.3 Verification Test

4.2.3.1 As the treated soil will be backfilled on-site at ENV-G01(2), the Toxicity Characteristic Leaching Procedure (TCLP) requirement of Universal Treatment Standard (UTS) and the unconfined compressive strength (UCS) requirement should be met. The laboratory results are summarized in **Table 10** & **Table 11** respectively and the complete laboratory reports for Verification Tests are attached in **Appendix D**.

4.2.3.2 In considering the cement solidification / stabilization was conducted in difference batches, one sample was collected for every 10m^3 of solidified soil or for daily basis for laboratory analysis. Total of eighteen (18) verification samples (excluding duplicate sample) were collected for TCLP and UCS testing.

4.2.3.3 The sampling equipment was first cleaning with laboratory-grade (phosphate-free) detergent and then rinsed with thoroughly by distilled water. A clean area immediately adjacent to the sampling location was established, using a plastic sheet or tarpaulin, on which all cleaned equipment was placed.

4.2.3.4 Samples were collected for Toxicity Characteristic Leaching Procedure (TCLP) and Unconfined Compressive Strength (UCS) testing to examine whether the treated soil meets the required targets. TCLP testing was performed by ALS Technichem (HK) Pty. Ltd. (ALS) in accordance with the Universal Treatment Standards of U.S. and UCS testing was performed by Castco Testing Centre Ltd. (Castco) in accordance with Construction Standard CS1:1990 Testing Concrete of Civil Engineering and Development Department (CEDD), both are HOKLAS accredited laboratory.

Table 10 Verification Test Results for TCLP Testing

Location	Testing Parameter	Sampling Date	Sample ID	Report ID	TCLP Test Result (mg/L)	TCLP Limit (mg/L)	Below the TCLP Limit? (Y/N)
ENV-G01(2)	Lead (TCLP)	09/07/2021	ENV-G01(2)-CS TCLP-1	HK2127955-001	<0.1	<0.75	Y
			ENV-G01(2)-CS TCLP-2	HK2127955-002	<0.1		Y
			ENV-G01(2)-CS TCLP-3	HK2127955-003	<0.1		Y
	Lead (TCLP)	12/07/2021	ENV-G01(2)-CS TCLP-4	HK2128600-001	<0.1	<0.75	Y
			ENV-G01(2)-CS TCLP-5	HK2128600-002	<0.1		Y
			ENV-G01(2)-CS TCLP-6	HK2128600-003	<0.1		Y
	Lead (TCLP)	15/07/2021	ENV-G01(2)-CS TCLP-7	HK2129122-001	<0.1	<0.75	Y
			ENV-G01(2)-CS TCLP-8	HK2129122-002	<0.1		Y
			ENV-G01(2)-CS TCLP-9	HK2129122-003	<0.1		Y
	Lead (TCLP)	17/07/2021	ENV-G01(2)-CS TCLP-10	HK2129124-001	<0.1	<0.75	Y
			ENV-G01(2)-CS TCLP-11	HK2129124-002	<0.1		Y
			ENV-G01(2)-CS TCLP-12	HK2129124-003	<0.1		Y
	Lead (TCLP)	27/07/2021	ENV-G01(2)-CS TCLP-13	HK2130742-001	<0.1	<0.75	Y
			ENV-G01(2)-CS TCLP-14	HK2130742-002	<0.1		Y
			ENV-G01(2)-CS TCLP-15	HK2130742-003	<0.1		Y
	Lead (TCLP)	31/07/2021	ENV-G01(2)-CS TCLP-16	HK2131024-001	<0.1	<0.75	Y
			ENV-G01(2)-CS TCLP-17	HK2131024-002	<0.1		Y
			ENV-G01(2)-CS TCLP-18	HK2131024-003	<0.1		Y

Table 11 Verification Test Results for UCS Testing

Location	Sampling Date	Sample ID	Report ID	UCS Test Result (MPa)	UCS Requirement (MPa)	Meet the UCS Requirement? (Y/N)
ENV-G01(2)	09/07/2021	ENV-G01(2)-CS UCS-1	734517	3.0	≥1.0	Y
		ENV-G01(2)-CS UCS-2		4.5		Y
		ENV-G01(2)-CS UCS-3		3.0		Y
	12/07/2021	ENV-G01(2)-CS UCS-4	734490	3.0	≥1.0	Y
		ENV-G01(2)-CS UCS-5		4.0		Y
		ENV-G01(2)-CS UCS-6		5.5		Y
	15/07/2021	ENV-G01(2)-CS UCS-7	741135	3.0	≥1.0	Y
		ENV-G01(2)-CS UCS-8		3.0		Y
		ENV-G01(2)-CS UCS-9		3.5		Y
	17/07/2021	ENV-G01(2)-CS UCS-10	746321	4.5	≥1.0	Y
		ENV-G01(2)-CS UCS-11		4.5		Y
		ENV-G01(2)-CS UCS-12		3.5		Y
	27/07/2021	ENV-G01(2)-CS UCS-13	750716	3.5	≥1.0	Y
		ENV-G01(2)-CS UCS-14		3.0		Y
		ENV-G01(2)-CS UCS-15		3.0		Y

	31/07/2021	ENV-G01(2)-CS UCS-16	756980	2.5	≥1.0	Y
		ENV-G01(2)-CS UCS-17		2.0		Y
		ENV-G01(2)-CS UCS-18		2.0		Y

4.2.3.5 All TCLP concentrations were below TCLP limit, and thus the remediation of Contaminated Soil at ENV-G01(2) by cement solidification / stabilization method was completed successfully. UCS testing results of all tested samples were higher than the minimum requirement of 1.0 MPa, and hence the treated soil is deemed suitable for on-site backfilling.

4.2.4 QA/QC Sample Result

4.2.4.1 A field quality assurance / quality control (QA/QC) programme was implemented, which comprised of 1 duplicate, 1 field blank and 1 equipment blank for every 20 samples collected. The QA/QC samples are prepared on-site and stored and delivered with the soil samples.

4.2.4.2 Since eighteen (18) verification test sample were collected. According to the QA/QC programme, one (1) duplicate sample, one (1) field blank sample and one (1) equipment blank sample were collected. A list of the QA/QC samples is presented in **Table 12** and **Table 13** and the complete laboratory analytical reports for QA/QC samples are attached in **Appendix E**.

Table 12 QA/QC Samples for Cement Solidification

QA/QC Sample	Sampling Date	Sample ID	Report ID	Result	Associated Sample
Duplicate Sample	27/07/2021	ENV-G01(2)-CS TCLP-DUP1	HK2130744-001	<0.1 mg/L	ENV-G01(2)-CS TCLP-14
		ENV-G01(2)-CS UCS-DUP1	750717	2.5 MPa	ENV-G01(2)-CS UCS-14
Field Blank	27/07/2021	ENV-G01(2)-CS FB1	HK2130256-001	<1 μg/L	ENV-G01(2)-CS TCLP-14
Equipment Blank	27/07/2021	ENV-G01(2)-CS EQ1	HK2130256-002	<1 μg/L	ENV-G01(2)-CS TCLP-14

Table 13 Relative Percent Difference (RPD) Values for Cement Solidification

Duplicate Sample			Associated Sample			Testing Parameter	RPD
Sample ID	Report ID	Result	Sample ID	Report ID	Result		
ENV-G01(2)-CS TCLP-DUP1	HK2130744	<0.1 mg/L	ENV-G01(2)-CS TCLP-14	HK2130742-002	<0.1 mg/L	Lead (TCLP)	0.0%
ENV-G01(2)-CS UCS-DUP1	750717	2.5 MPa	ENV-G01(2)-CS UCS-14	750716	3.0 MPa	UCS	18.2%

4.2.4.3 All parameters tested for field blank sample and equipment blank sample are below the laboratory reporting limits.

4.2.4.4 The laboratory QA/QC sample results included surrogate recoveries, matrix spike sample, laboratory duplicate samples and method blanks and met their respective requirements.

4.2.4.5 The relative percent difference (RPD) value calculated from the soil duplicate sample was below the 50% acceptable limit. Based on the review of QA/QC sample results, all laboratory results for the confirmatory samples are useable and reliable.

4.3 Backfilling of Treated Contaminated Soil

4.3.1 After the completion of cement solidification / stabilization process, the treated contaminated soil should be backfilled on-site at ENV-G01(2) with the following criteria;

- Located under a layer of clean fill of at least 0.5m thick (excluding any underground utilities);
- At a horizontal distance of more than 30m away from any stream or watercourse;
- Broken into materials of a maximum size of 250mm for backfilling;
- Not used for any structural or landscaping purposes.

4.3.2 The treated soil then was backfilled to the original position of the excavated pit at ENV-G01(2). According to the site measurement record, the bulk backfilling volume for Treated Contaminated Soil after cement solidification / stabilization is approx. 156.6m^3. All the treated contaminated soil was backfilled to the original location without any surplus disposal / reuse outside site boundary. The backfilling layout of treated contaminated soil is illustrated in **Figure 4** and the backfilling summary of treated soil is listed in **Table 14**.

Table 14 Backfilling Summary for Treated Soil

Ref.	Description	Approx. Depth of Backfilling (m bgl)	Horizontal Dimension (m)	Bulk Backfilling Volume (m^3)
1.	Treated Soil by Cement Solidification / Stabilization	1.05m-3.95m (2.90m Thickness)	6.0m x 9.0m	156.6

5.0 FIELDWORK HEALTH, SAFTEY AND ENVIRONMENTAL PRECAUTIONS

5.1.1 In accordance with the agreed CAR & RAP, the environmental mitigation and safety measures mentioned in Section 4.12 was adopted during the remediation process. The supplementary health, safety and environmental precautions are also illustrated in below section;

5.1.2 Spoil generated during excavation was placed on impermeable sheeting within the soil treatment area with appropriate temporarily covered with impermeable sheeting.

5.1.3 All excavation, transportation, remediation activities were carried out by persons appropriately trained in health and safety. Also, appropriate personal protective equipment was used by the persons engaged in decontamination activities. The following guidelines of health and safety were directly followed by all site personnel working at the contaminated areas at all time:

<u>General</u>

- Minimize the exposure to any contaminated material by wearing appropriate clothing and personal protective equipment (PPE) such as gloves, goggles, protective coveralls and safety boots (when interacting directly with the contaminated material);
- Provide information to all site personnel on the potential hazards in the vicinity of sampling locations and contaminated areas;
- Provide adequate hygiene and washing facilities;
- Prohibit smoking, eating or drinking during activities with exposure to the contaminated materials;
- Provide sufficient training on safety for on-site personnel;
- Provide first aid training and materials to site workers;

<u>Excavation of Contaminated Soil</u>

- Provide temporary fencing or warning ribbons to the boundary of excavation, slope crest and temporarily stockpiled areas. The exposed areas should be temporarily sheltered and covered with impermeable sheeting during heavy rainstorm if necessary;
- Bulk earth moving equipment shall be utilised as much as possible to minimize manual handling and contact of the contaminated soil;
- Relevant occupational health and safety regulations and guidelines during excavation should be observed;

Transportation of Contaminated Soil

- Excavated contaminated soil should be covered with impermeable sheeting during the transportation;
- Equipment used to transport the contaminated soil should be labelled with "For Contaminated Soil Only";

5.1.4 Apart from the above-mentioned guidelines of health and safety, the following precautions and mitigation measures were also conducted during the soil excavation, decontamination works, decommissioning works and transportation:

- Proper design and execute excavation profile;
- Fence off the treatment area throughout the period of decontamination works;
- Implement speed control for vehicles travelling on site to minimize dust emission;
- Proper decontaminate machineries and vehicles before excavating or taking remediated soil and contaminated soil ;
- Simultaneous operation of mixing facilities and other equipment should be avoided as far as possible to minimize unnecessary generation of noise nuisance;
- Housekeeping was maintained at all times at all decontamination facilities;
- Employ all necessary measures to prevent cross-contamination of different types of contaminated soil.

6.0 CONCLUSIONS

6.0.1 Site Investigation fieldwork for confirmatory sampling, laboratory analyses and subsequent decontamination works for contaminated soil at the Existing DSD Staff Quarter Site for the Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation & Access Tunnel Construction (Contract No. DC/2018/05) was implemented in according with the agreed CAR & RAP.

6.0.2 In accordance with the agreed CAR & RAP, the concentration of Lead was found to be higher than the relevant RBRGs (Urban Residential Standard) for the soil samples collected at 1.5m-1.95m and 3.0m-3.45m below ground level at ENV-G01(2). Cement Solidification / Stabilization was proposed to be the soil remediation method. Remediation Report (RR) should be submitted to EPD for agreement after completion of remediation work.

6.0.3 Confirmatory samples at ENV-G01(2) were collected from 12 March 2021 to 31 March 2021 prior to soil remediation works to determine the boundaries of contaminated soil. The remediation boundaries were confirmed at confirmatory samples that are below RBRGs (Urban Residential) criteria. The volume of contaminated soil for remediation (Treated by Cement Solidification / Stabilization) was confirmed to be 144.8m^3.

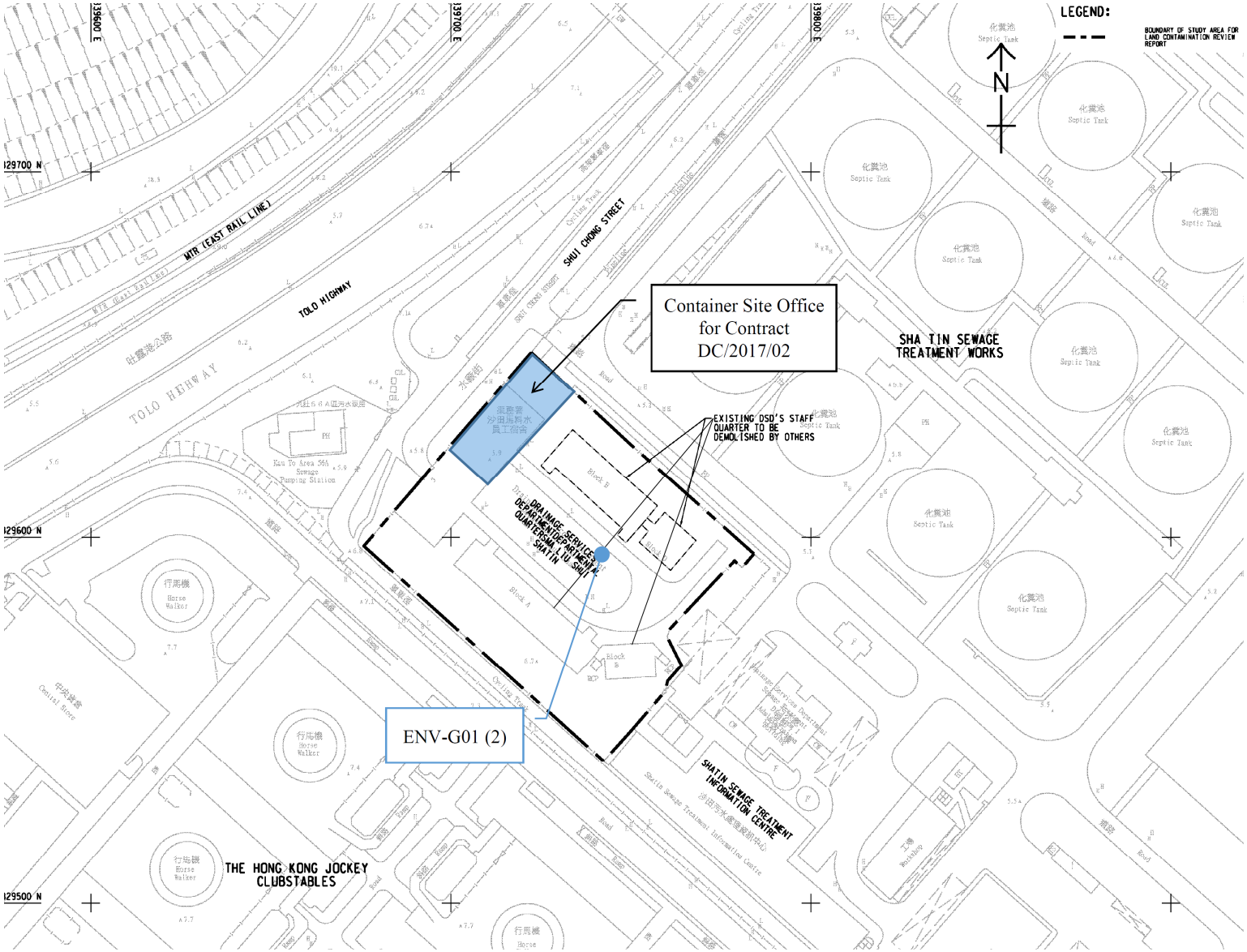
6.0.4 Cement Solidification / Stabilization for contaminated soil at ENV-G01(2) was carried out from 09 July 2021 to 31 July 2021 in accordance with the agreed CAR & RAP. Trial mixing was conducted prior to full-scale remediation works, and 5% of cement / soil ratio was implemented for full-scale remediation work.

6.0.5 One soil sample per every 10m^3 of the contaminated soil for cement solidification should be collected. Total 18 nos. verification test samples were collected, and the relevant results met the associated TCLP limit for Lead and UCS requirement. Finally, all the treated soil with approx. 156.6m^3 of bulk volume was backfilled to the original excavated trench at ENV-G01(2) area.

6.0.6 All identified contaminated soil within the site were remediated to be below the clean-up target agreed in the agreed CAR/RAP. All the treated contaminated soil was backfilled to the original location without any surplus disposal / reuse outside site boundary. Due to the completion of remediation work, the site area is considered to be suitable for carrying out the sequent construction works.

FIGURE 1

SITE LOCATION PLAN WITH HOTSPOT LOCATION



AS-BUILT COORDINATES OF SITE INVESTIGATION SAMPLING LOCATION

LOCATION	NORTHING	EASTING	CONTAMINANT
ENV-G01(2)	829593.66	839739.78	LEAD

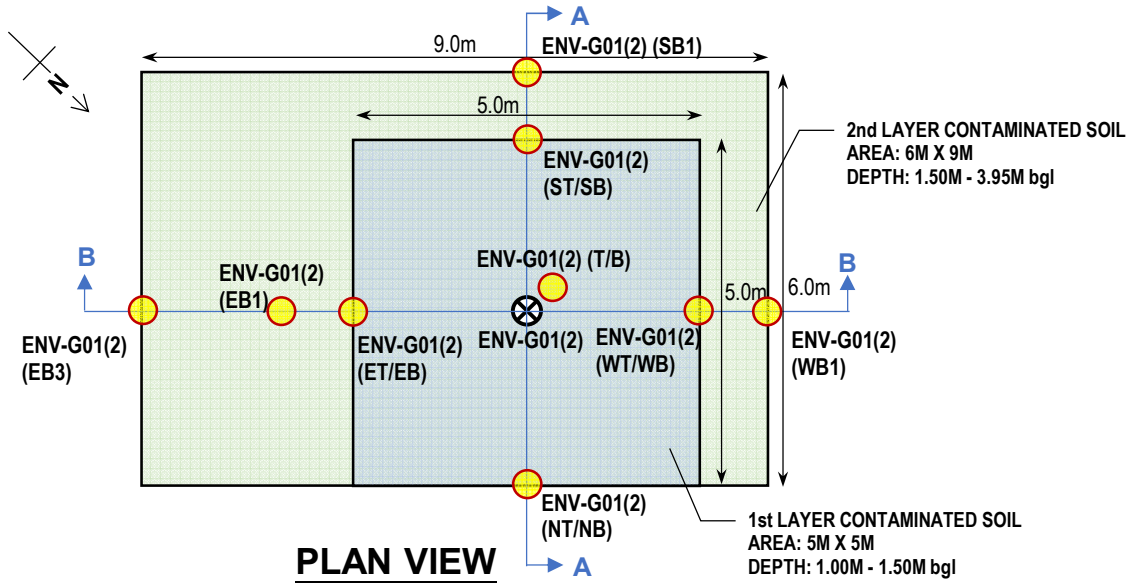
SOURCE: FIGURE 1-1 - SITE LOCATION MAP OF AGREED CAR & RAP

Title	**Decontamination Works for the Existing DSD Staff Quarters Site for Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Prepration & Access Tunnel Construction**	Scale **N.T.S.**	Project Ref. **TE20030**
	SITE LOCATION PLAN WITH HOTSPOT LOCATION	Date **Sep-21**	Figure No. **FIGURE 1**

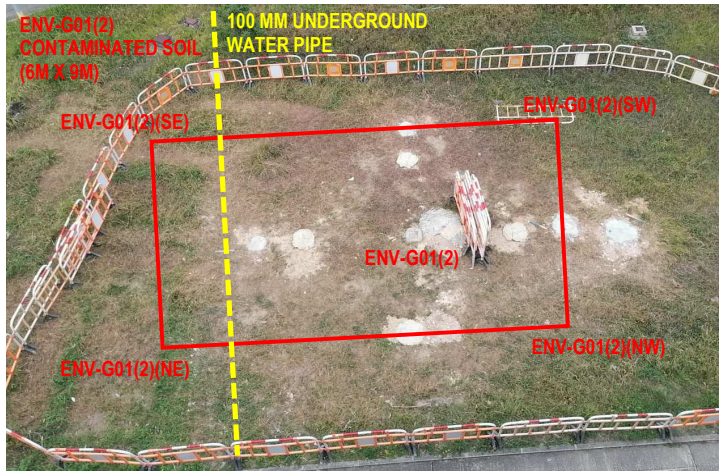
TEEMWAY

FIGURE 2

CONFIRMATORY SAMPLING LOCATIONS AND
CONTAMINATION EXTENT



PLAN VIEW



AS-BUILT COORDINATES OF DECONTAMINATION EXTENT

LOCATION	NORTHING	EASTING
ENV-G01(2)(NE)	829592.30	839745.69
ENV-G01(2)(NW)	829597.75	839738.53
ENV-G01(2)(SE)	829587.52	839742.06
ENV-G01(2)(SW)	829592.97	839734.90

CONTAMINATED SOIL (LEAD) - 1.00m - 1.50m bgl

CONTAMINATED SOIL (LEAD) - 1.50m - 3.95m bgl

SI SOIL SAMPLE (HAND-DIG) - BELOW RBRGs

CONFIRMATORY SAMPLE (HAND-DIG) - BELOW RBRGs

SI SOIL SAMPLE (U76) - BELOW RBRGs

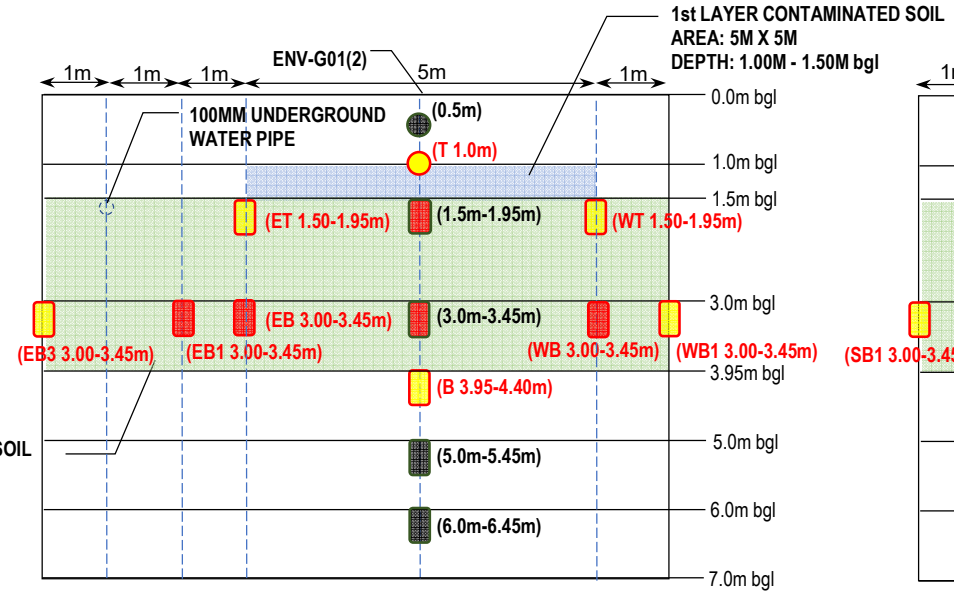
SI SOIL SAMPLE (U76) - EXCEED RBRGs

CONFIRMATORY SAMPLE (U76) - BELOW RBRGs

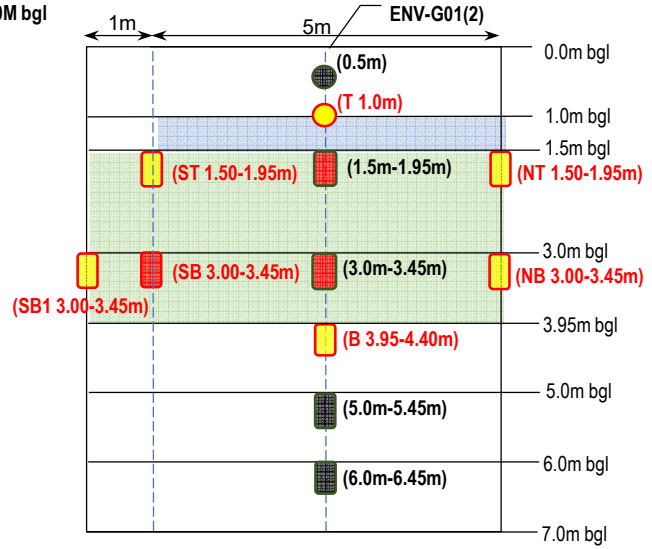
CONFIRMATORY SAMPLE (U76) - EXCEED RBRGs

2nd LAYER CONTAMINATED SOIL
AREA: 6M X 9M
DEPTH: 1.50M - 3.95M bgl

ENV-G01(2)



SECTION B-B



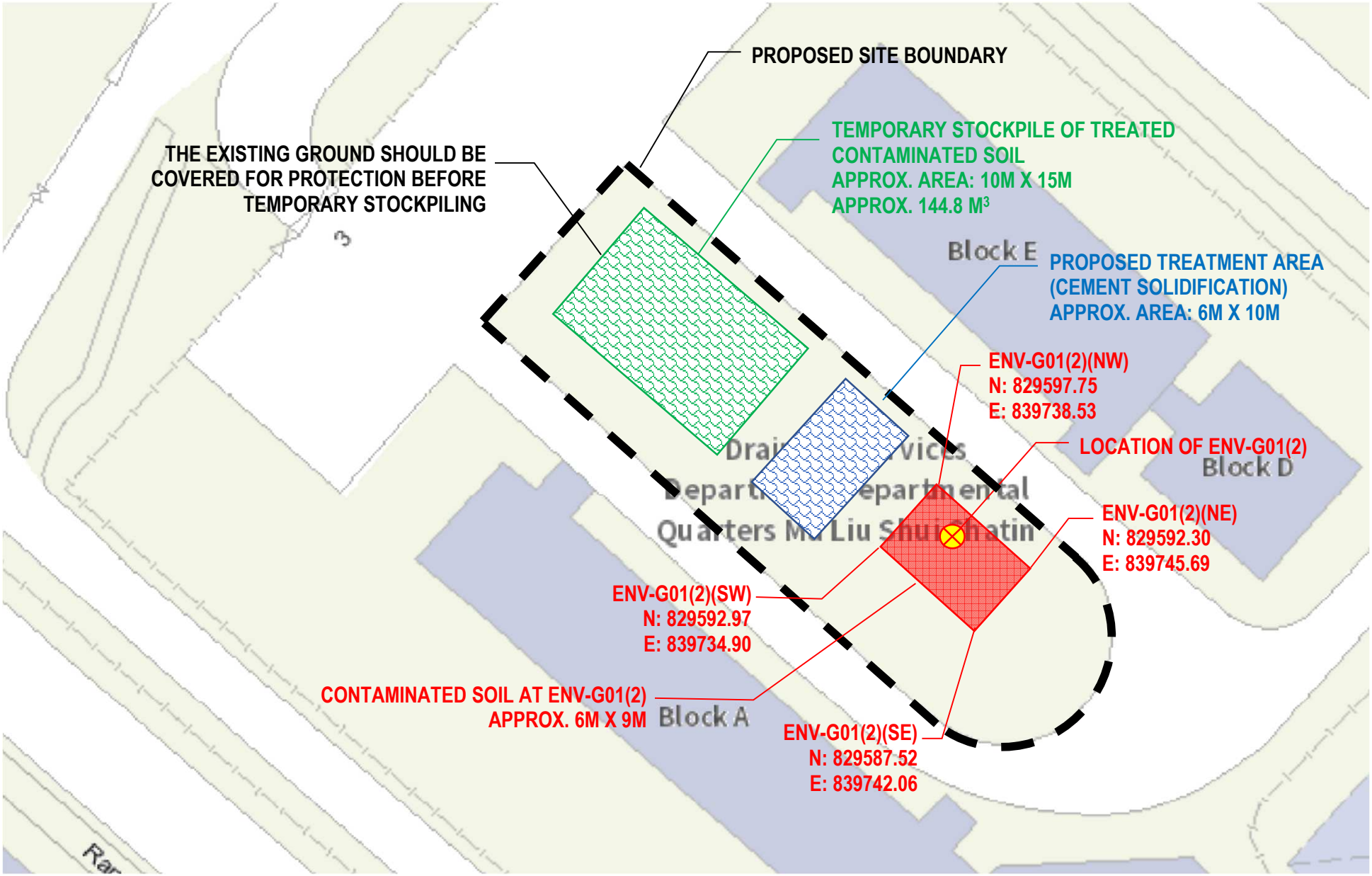
SECTION A-A

Title	Decontamination Works for the Existing DSD Staff Quarters Site for Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Prepration & Access Tunnel Construction	Scale	N.T.S.
		Project Ref.	TE20030
	CONFIRMATORY SAMPLING LOCATIONS AND CONTAMINATION EXTENT	Date	Sep-21
		Figure No.	FIGURE 2

TEEMWAY

FIGURE 3

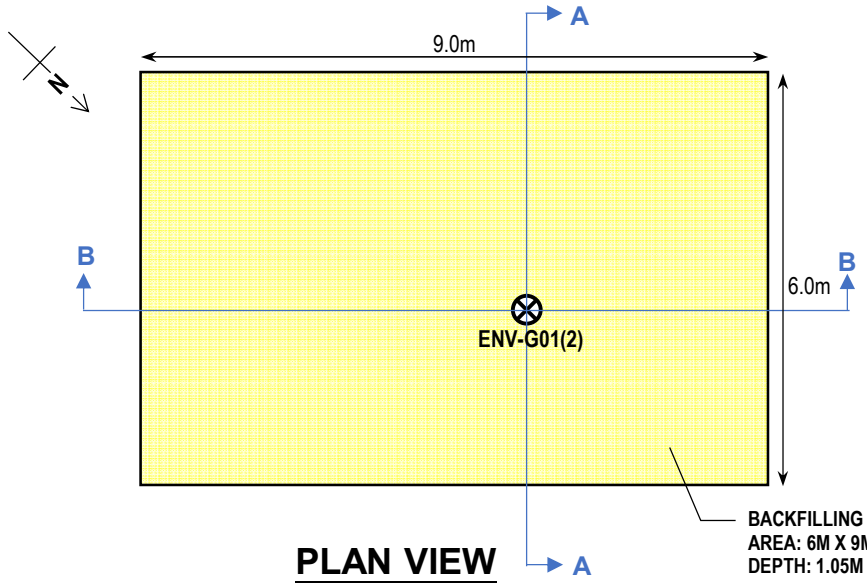
LAYOUT PLAN FOR CEMENT SOLIDIFCATION / STABILIZATION



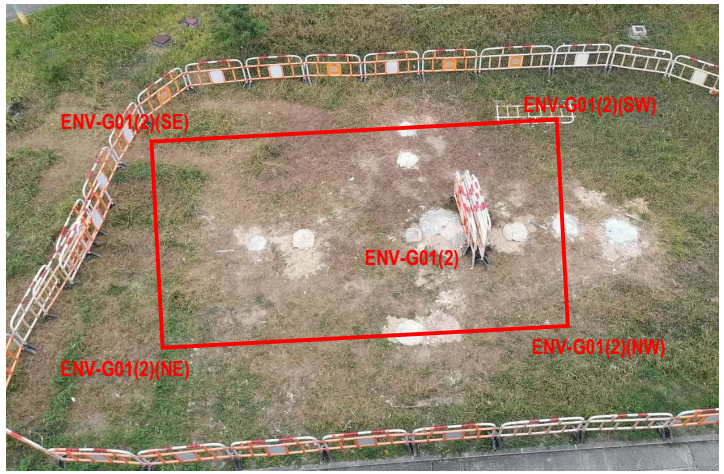
Title	Decontamination Works for the Existing DSD Staff Quarters Site for Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Prepration & Access Tunnel Construction LAYOUT PLAN FOR CEMENT SOLIDIFICATION / STABILIZATION	Scale	N.T.S.	Project Ref. TE20030
		Date	Sep-21	Figure No. FIGURE 3

FIGURE 4

BACKFILLING LAYOUT OF TREATED CONTAMINATED SOIL



PLAN VIEW

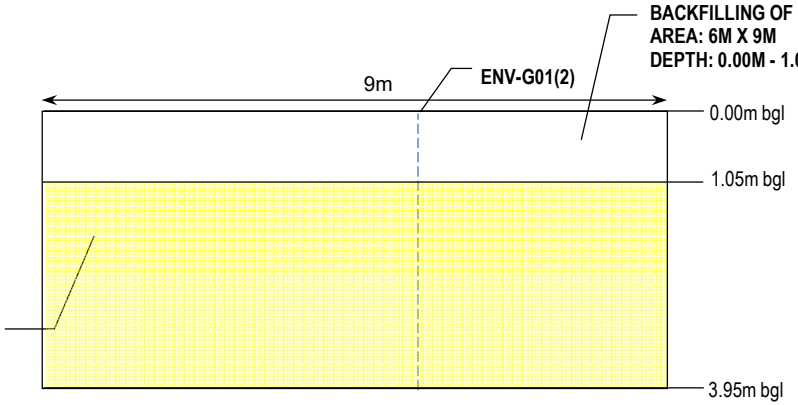


AS-BUILT COORDINATES OF DECONTAMINATION EXTENT

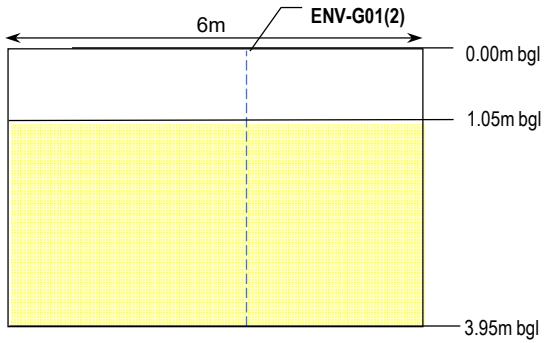
LOCATION	NORTHING	EASTING
ENV-G01(2)(NE)	829592.30	839745.69
ENV-G01(2)(NW)	829597.75	839738.53
ENV-G01(2)(SE)	829587.52	839742.06
ENV-G01(2)(SW)	829592.97	839734.90

☐ BACKFILLING OF TOP CLEAN SOIL - 0.00m - 1.05m bgl

BACKFILLING OF TREATED SOIL - 1.05m - 3.95m bgl



SECTION B-B



SECTION A-A

ENV-G01(2)

Title	Decontamination Works for the Existing DSD Staff Quarters Site for Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Prepration & Access Tunnel Construction	Scale: N.T.S.	Project Ref.: TE20030
	BACKFILLING LAYOUT OF TREATED CONTAMINATED SOIL	Date: Sep-21	Figure No.: FIGURE 4

TEEMWAY

APPENDIX A

LABORATORY REPORTS & COC FORMS FOR CONFIRMATORY TESTING

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2110213
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 12-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 17-Mar-2021
C-O-C number	: H038271			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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
Leung Chak Cheong , Mike	Senior Chemist	Metals_ENV

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 12-Mar-2021 to 17-Mar-2021.

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: HK2110213

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

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: SOIL			Sample ID	ENV-G01(2) (ET) 1.50m-1.95m	ENV-G01(2) (EB) 3.00m-3.45m	ENV-G01(2) (NT) 1.50m-1.95m	----	----
			Sampling date / time	12-Mar-2021 14:45	12-Mar-2021 15:15	12-Mar-2021 16:10	----	----
Compound	CAS Number	LOR	Unit	HK2110213-001	HK2110213-002	HK2110213-003	--------	--------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	19.0	17.7	17.5	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	160	300	156	----	----

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: 3563747)								
HK2109962-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	79.6	79.6	0.00
HK2110194-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	20.6	21.1	2.41
EG: Metals and Major Cations (QC Lot: 3563865)								
HK2110213-002	ENV-G01(2) (EB) 3.00m-3.45m	**EG020: Lead**	7439-92-1	1	mg/kg	300	257	15.2

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: 3563865)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	108	----	86.7	115	----	----

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: 3563865)										
HK2110213-001	ENV-G01(2) (ET) 1.50m-1.95m	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2110323
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 13-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 17-Mar-2021
C-O-C number	: H038281			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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
Leung Chak Cheong , Mike	Senior Chemist	Metals_ENV

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 13-Mar-2021 to 17-Mar-2021.

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: HK2110323

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

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: SOIL			Sample ID	ENV-G01(2) (NB) 3.00m-3.45m	ENV-G01(2) (WT) 1.50m-1.95m	ENV-G01(2) (WB) 3.00m-3.45m	----	----
			Sampling date / time	13-Mar-2021 10:40	13-Mar-2021 11:15	13-Mar-2021 11:50	----	----
Compound	CAS Number	LOR	Unit	HK2110323-001	HK2110323-002	HK2110323-003	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	20.8	16.6	18.9	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	148	217	1130	----	----

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: 3563751)								
HK2110294-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	8.0	8.2	2.54
EG: Metals and Major Cations (QC Lot: 3563865)								
HK2110213-002	Anonymous	**EG020: Lead**	7439-92-1	1	mg/kg	300	257	15.2

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: 3563865)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	108	----	86.7	115	----	----

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: 3563865)										
HK2110213-001	Anonymous	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2110585
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 15-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 18-Mar-2021
C-O-C number	: H038282			No. of samples received	: 4
Site	: ----			No. of samples analysed	: 4

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

Signatories	*Position*	*Authorised results for*
Leung Chak Cheong , Mike	Senior Chemist	Metals_ENV
Lin Wai Yu , Iris	Assistant Manager - Inorganics	Inorganics

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 15-Mar-2021 to 17-Mar-2021.

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: HK2110585

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

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: SOIL			Sample ID	ENV-G01(2) (ST) 1.50m-1.95m	ENV-G01(2) (SB) 3.00m-3.45m	ENV-G01(2) (T) 1.0m	ENV-G01(2) (B) 3.95m-4.40m	----
			Sampling date / time	15-Mar-2021 09:50	15-Mar-2021 10:50	15-Mar-2021 14:45	15-Mar-2021 16:20	----
Compound	CAS Number	LOR	Unit	HK2110585-001	HK2110585-002	HK2110585-003	HK2110585-004	--------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	17.5	17.5	14.3	19.1	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	236	532	248	161	----

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: 3566143)								
HK2110470-039	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	20.0	19.9	0.00
EG: Metals and Major Cations (QC Lot: 3566285)								
HK2110585-002	ENV-G01(2) (SB) 3.00m-3.45m	**EG020: Lead**	7439-92-1	1	mg/kg	532	449	17.0

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: 3566285)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	108	----	86.7	115	----	----

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: 3566285)										
HK2110585-001	ENV-G01(2) (ST) 1.50m-1.95m	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2111450
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 20-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 24-Mar-2021
C-O-C number	: H022082			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

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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
Wong Wing , Kenneth	Manager - Metals	Metals_ENV

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-Mar-2021 to 24-Mar-2021.

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: HK2111450

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) was / were reported on dry weight basis.

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: SOIL			Sample ID	ENV-G01(2) (EB1) 3.00m-3.45m	----	----	----	----
			Sampling date / time	20-Mar-2021 10:30	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2111450-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	17.8	----	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	323	----	----	----	----

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: 3577838)								
HK2111326-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	14.9	14.8	0.759
EG: Metals and Major Cations (QC Lot: 3580269)								
HK2111451-001	Anonymous	**EG020: Lead**	7439-92-1	1	mg/kg	590	517	13.1

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: 3580269)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	109	----	86.7	115	----	----

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: 3580269)										
HK2111450-001	ENV-G01(2) (EB1) 3.00m-3.45m	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2111599
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 22-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 25-Mar-2021
C-O-C number	: H022085			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

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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
Leung Chak Cheong , Mike	Senior Chemist	Metals_ENV

General Comments

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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: HK2111599

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

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: SOIL			Sample ID	ENV-G01(2) (SB1) 3.00m-3.45m	----	----	----	----
			Sampling date / time	22-Mar-2021 10:45	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2111599-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	12.4	----	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	98	----	----	----	----

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: 3582671)								
HK2111176-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	22.8	22.4	1.64
HK2111667-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	18.0	18.1	0.00
EG: Metals and Major Cations (QC Lot: 3580269)								
HK2111451-001	Anonymous	**EG020: Lead**	7439-92-1	1	mg/kg	590	517	13.1

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: 3580269)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	109	----	86.7	115	----	----

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: 3580269)										
HK2111450-001	Anonymous	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2111603
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 22-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 25-Mar-2021
C-O-C number	: H022087			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

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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
Leung Chak Cheong , Mike	Senior Chemist	Metals_ENV

General Comments

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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: HK2111603

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

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: SOIL			Sample ID	ENV-G01(2) (WB1) 3.00m-3.45m	----	----	----	----
			Sampling date / time	22-Mar-2021 15:30	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2111603-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	18.2	----	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	199	----	----	----	----

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: 3582671)								
HK2111176-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	22.8	22.4	1.64
HK2111667-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	18.0	18.1	0.00
EG: Metals and Major Cations (QC Lot: 3580269)								
HK2111451-001	Anonymous	**EG020: Lead**	7439-92-1	1	mg/kg	590	517	13.1

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: 3580269)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	109	----	86.7	115	----	----

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: 3580269)										
HK2111450-001	Anonymous	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2112678
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 31-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 08-Apr-2021
C-O-C number	: H022089			No. of samples received	: 1
Site	: ----			No. of samples analysed	: 1

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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
Leung Chak Cheong , Mike	Senior Chemist	Metals_ENV

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 31-Mar-2021 to 08-Apr-2021.

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: HK2112678

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) was / were reported on dry weight basis.

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: SOIL			Sample ID	ENV-G01(2) (EB3) 3.00m-3.45m	----	----	----	----
			Sampling date / time	31-Mar-2021 10:15	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2112678-001	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	15.0	----	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	211	----	----	----	----

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: 3599639)								
HK2112417-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	20.8	20.9	0.737
HK2112565-001	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	14.4	14.4	0.00
EG: Metals and Major Cations (QC Lot: 3599571)								
HK2112680-001	Anonymous	**EG020: Lead**	7439-92-1	1	mg/kg	205	208	1.50

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: 3599571)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	106	----	86.7	115	----	----

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: 3599571)										
HK2112678-001	ENV-G01(2) (EB3) 3.00m-3.45m	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

CHAIN OF CUSTODY DOCUMENTATION

H 038271

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD											
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1	ENV-G01(2)(ET) 1.50m - 1.95m	S	12/3/21	1445	U76	1	✓											3 DAYS EXPRESS
2	ENV-G01(2)(EB) 3.00m - 3.45m	S	12/3/21	1515	U76	1	✓											
3	ENV-G01(2)(NT) 1.50m - 1.95m	S	12/3/21	1610	U76	1	✓											3 DAYS EXPRESS

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 12/03/2021	Name:	Date: 12/3	Con' Note No:
Of: TEEMWAY	Time: 1630	Of:	Time:	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time: 16:30	

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

CHAIN OF CUSTODY DOCUMENTATION

H 038281

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation and Access Tunnel Construction (UC/2018/05)	EMAIL REPORT TO:
SITE: P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1	ENV-G01(2) (WB) 3.00m - 3.45m	S	13/3/21	10:40	476	1	✓
2	ENV-G01(2) (WT) 1.50m - 1.95m	S	13/3/21	11:15	476	1	✓
3	ENV-G01(2) (WB) 3.00m - 3.45m	S	13/3/21	11:50	476	1	✓

3 DAYS EXPRESS

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 13/03/2021		Name:	Date: 13/3		Con' Note No:
Of: TEEMWAY	Time: 12:00		Of:	Time:		
Name:	Date:		Name:	Date:		Transport Co:
Of:	Time:		Of:	Time: 12:10		

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

ALS Laboratory Group

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

CHAIN OF CUSTODY DOCUMENTATION

H 038282

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation and Access Tunnel Construction (DC/2018/05)	EMAIL REPORT TO:
SITE: P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD											Notes: e.g. Highly contaminated samples e.g. "High PAHs expected" Extra volume for QC or trace LORs etc.
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1	ENV-G01(2) (ST) 1.50m - 1.95m	S	15/3/21	09:50	U76	1	✓											3 DAYS EXPRESS
2	ENV-G01(2) (SB) ~~1.50m - 1.95m~~ 3.00m - 3.45m	S	15/3/21	10:50	U76	1	✓											
3	ENV-G01(2) (T) 1.0m	S	15/3/21	14:45	JAR	1	✓											
4	ENV-G01(2) (US) 3.95m - 4.40m	S	15/3/21	16:20	U76	1	✓											

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 15/03/2021	Name:	Date: 15/3	Con' Note No:
Of: TEEMWAY	Time: 16:45	Of:	Time:	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

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

ALS Laboratory Group

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

CHAIN OF CUSTODY DOCUMENTATION

H 022082

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED Including SUITES(note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1.	ENV-401(2) (EB1) 3.00m - 3.45m	S	20/3/21	10:30	W76	1	✓

3 DAYS EXPRESS

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 20/03/2021	Name: Jakuna	Date: 26-3-2021	Con' Note No:
Of: TEEMWAY	Time: 11:30	Of: ALS (HK)	Time: 11:40	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

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

CHAIN OF CUSTODY DOCUMENTATION

H 022085

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1	ENV-601(2)(SB1)	S	22/03/21	10:45	W76	1	✓
	3.00m - 3.45m						

3 DAYS EXPRESS

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name:	Thomas YEUNG	Date: 22/03/2021	Name:	HUGO NG	Date: 22/3/21	Con' Note No:
Of:	TEEMWAY	Time: 16:00	Of:	ALS	Time: 16:22	
Name:		Date:	Name:		Date:	Transport Co:
Of:		Time:	Of:		Time:	

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

CHAIN OF CUSTODY DOCUMENTATION

H 022087

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation and Access Tunnel Construction (DC/2018/05)	EMAIL REPORT TO:
SITE: P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

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

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD											
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
	~~ENV-G01 (1)~~																	
1.	ENV-G01 (2) (WB1)	S	22/03/21	15:30	W76	1	✓											3 DAYS EXPRESS
	3.00m - 3.45m																	

RELINQUISHED BY:

Name:	Thomas YEUNG	Date:	22/03/2021
Of:	TEEMWAY	Time:	16:00
Name:		Date:	
Of:		Time:	

RECEIVED BY

Name:	HUGO	Date:	22/3/21
Of:	MG	Time:	16:20
Name:		Date:	
Of:		Time:	

METHOD OF SHIPMENT

Con' Note No:

Transport Co:

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

CHAIN OF CUSTODY DOCUMENTATION

H 022089

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation and Access Tunnel Construction (DC/2018/05)	EMAIL REPORT TO:
SITE: P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1	ENV-G01(2) (EB3) 3.00m - 3.45m	S	31/3/21	10:15	~~LEAD~~ U76	1	✓

3 DAYS EXPRESS

RELINQUISHED BY:			
Name:	Thomas YEUNG	Date:	31/03/2021
Of:	TEEMWAY	Time:	12:00
Name:		Date:	
Of:		Time:	

RECEIVED BY			
Name:		Date:	31/3/21
Of:	ALS (HK)	Time:	12:45
Name:		Date:	
Of:		Time:	

METHOD OF SHIPMENT

Con' Note No:

Transport Co:

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

APPENDIX B

LABORATORY REPORTS & COC FORMS FOR QA/QC CONFIRMATORY TESTING

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 6
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2110587
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 15-Mar-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 24-Mar-2021
C-O-C number	: H022083			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
Lin Wai Yu , Iris	Assistant Manager - Inorganics	Inorganics
Wong Wing , Kenneth	Manager - Metals	Metals_ENV

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 15-Mar-2021 to 23-Mar-2021.

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: HK2110587

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

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: SOIL			Sample ID	DUP-1	----	----	----	----
			Sampling date / time	15-Mar-2021 14:45	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2110587-003	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	14.3	----	----	----	----
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	1	mg/kg	236	----	----	----	----

Sub-Matrix: WATER			Sample ID	FB-1	EQ-1	----	----	----
			Sampling date / time	15-Mar-2021	15-Mar-2021	----	----	----
Compound	CAS Number	LOR	Unit	HK2110587-001	HK2110587-002	-------	-------	-------
EG: Metals and Major Cations - Filtered								
EG020: Lead	7439-92-1	1	µg/L	<1	<1	----	----	----

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: 3566143)								
HK2110470-039	Anonymous	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	20.0	19.9	0.00
EG: Metals and Major Cations (QC Lot: 3566285)								
HK2110585-002	Anonymous	**EG020: Lead**	7439-92-1	1	mg/kg	532	449	17.0

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 3566251)								
HK2110587-002	EQ-1	**EG020: Lead**	7439-92-1	1	µg/L	<1	<1	0.00

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: 3566285)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	108	----	86.7	115	----	----

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
EG: Metals and Major Cations - Filtered (QC Lot: 3566251)											
EG020: Lead	7439-92-1	1	µg/L	<1	50 µg/L	102	----	86.9	110	----	----

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

Matrix: **SOIL**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report											
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number		MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 3566285)										
HK2110585-001	Anonymous	**EG020: Lead**	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----

Matrix: **WATER**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report											
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number		MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 3566251)										
HK2110587-001	FB-1	**EG020: Lead**	7439-92-1	50 µg/L	103	----	75.0	125	----	----

CHAIN OF CUSTODY DOCUMENTATION

H 022083

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD											Notes: e.g. Highly contaminated samples e.g. "High PAHs expected" Extra volume for QC or trace LORs etc.
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1	FB-1	W	15/3/21		BOTTLE	1	✓											
2	EQ-1	W	15/3/21		BOTTLE	1	✓											
3	DUP-1	S	15/3/21	16:45	JAR	1	✓											

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 15/03/2021		Name:	Date:	15/3	Con' Note No:
Of: TEEMWAY	Time: 16:45		Of:	Time:		
Name:	Date:		Name:	Date:		Transport Co:
Of:	Time:		Of:	Time:		

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

APPENDIX C

LABORATORY REPORTS & COC FORMS FOR TRIAL MIX TEST

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2126255
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 02-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 07-Jul-2021
C-O-C number	: H022281			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
Leung Chak Cheong , Mike	Assistant Manager - Metals	Metals_ENV

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 02-Jul-2021 to 07-Jul-2021.

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: HK2126255

Sample(s) was/ were submitted by client. 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.

Water sample(s) were filtered prior to dissolved metal analysis.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98.

Analytical Results

Sub-Matrix: TCLP LEACHATE				Sample ID	ENV-G01(2)-CS (TM) TCLP-5%	ENV-G01(2)-CS (TM) TCLP-10%	ENV-G01(2)-CS (TM) TCLP-15%	----	----
				Sampling date / time	29-Jun-2021	29-Jun-2021	29-Jun-2021	----	----
Compound	CAS Number	LOR	Unit		HK2126255-001	HK2126255-002	HK2126255-003	--------	--------
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	0.1	mg/L		<0.1	<0.1	<0.1	----	----
Sample Preparation Method									
E-TCLP: Extraction Fluid Number	----	1	--		1	1	1	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3779204)								
HK2125878-001	Anonymous	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3779204)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	96.2	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3779204)										
HK2125726-001	Anonymous	**EG020: Lead**	7439-92-1	0.5 mg/L	96.2	----	75.0	125	----	----

CHAIN OF CUSTODY DOCUMENTATION

H 022281

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)												
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
1-	ENV-G01(2) - CS (TM)	S	29/06/21		BAG	1	✓												
	TCLP - 5%																		
2-	ENV-G01(2) - CS (TM)	S	29/06/21		BAG	1	✓												3 DAYS EXPRESS
	TCLP - 10%																		
3-	ENV-G01(2) - CS (TM)	S	29/06/21		BAG	1	✓												
	TCLP - 15%																		

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 02/07/2021	Name:	Date:	Con' Note No:
Of: TEEMWAY	Time: 11:00	Of:	Time:	
Name:	Date:	Name: Kotsin Law	Date: 2-July-2021	Transport Co:
Of:	Time:	Of: ALS HK	Time: 14:05	

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

CASTCO
香港粉嶺安居街33號
香港粉嶺安全街29A號
Email: info@castco.com.hk

佳力高試驗中心有限公司
CASTCO TESTING CENTRE LIMITED
33, On Kui Street, Fanling, Hong Kong. Tel : 2597 8333
29A, On Chuen Street, Fanling, Hong Kong Fax: 2597 8399
Website: www.castco.com.hk

HKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210708-2088
Report No.:728723

Date of issue: 16/07/2021
Page 1 of 1 page(s)

CASTCO TESTING CENTRE LIMITED ORIGINAL COPY

Audit No.: --
Customer's Ref. No.: --

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 29-06-2021 Time of water added to cement: --
Place of sampling: ENV-G01(2)
Place and time of making cubes: ON SITE / --
No. of cubes: 3
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 3 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 02-07-2021 Date of Test: 02-07-2021 Age at tests: 3 days
Laboratory curing method: WATER CURING TANK Moisture condition at test: WET
Tank No.: G Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01(2)-CS(TM)UCS-		5%	10%	15%
Mould No	-	NA	NA	NA
Weight in air	kg	1.635	1.680	1.695
Weight in water	kg	–	–	–
Height	mm	102.0	102.3	102.4
Width	mm	100.1	100.3	100.4
Length	mm	100.4	100.1	100.3
As- Received density (Vol. by calculation)	kg/m³	1590	1640	1640
As- Received density (Vol. by water disp.)	kg/m³	–	–	–
Load at Failure	kN	12.4	28.8	39.4
Compressive Strength	MPa	1.0	3.0	4.0
Observation Code	-	–	E	E
Type of Fracture	-	K	K	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME: 11:38

Checked By:

WAI Po Yi
Assistant Supervisor

Approved Signatory:

K.M.WONG

WONG Ka Man
Senior Manager

End Of Report

APPENDIX D

LABORATORY REPORTS & COC FORMS FOR VERIFICATION TESTING

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2127955
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 12-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 15-Jul-2021
C-O-C number	: ----			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
Leung Chak Cheong , Mike	Assistant Manager - Metals	Metals_ENV

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 12-Jul-2021 to 15-Jul-2021.

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: HK2127955

Sample(s) was/ were submitted by client. 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) was / were reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98.

Analytical Results

Sub-Matrix: **TCLP LEACHATE**

Compound	CAS Number	LOR	Unit	Sample ID	ENV-G01(2)-CS TCLP-1	ENV-G01(2)-CS TCLP-2	ENV-G01(2)-CS TCLP-3	----	----
				Sampling date / time	09-Jul-2021	09-Jul-2021	09-Jul-2021	----	----
					HK2127955-001	HK2127955-002	HK2127955-003	--------	--------
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	0.1	mg/L		<0.1	<0.1	<0.1	----	----
Sample Preparation Method									
E-TCLP: Extraction Fluid Number	----	1	--		1	1	1	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3791821)								
HK2127955-002	ENV-G01(2)-CS TCLP-2	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3791821)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	95.0	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3791821)										
HK2127955-001	ENV-G01(2)-CS TCLP-1	**EG020: Lead**	7439-92-1	0.5 mg/L	92.5	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2128600
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS - SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 15-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 20-Jul-2021
C-O-C number	: H022283			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
Leung Chak Cheong , Mike	Assistant Manager - Metals	Metals_ENV

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 15-Jul-2021 to 20-Jul-2021.

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: HK2128600

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98.

Analytical Results

Sub-Matrix: **TCLP LEACHATE**

Compound	CAS Number	LOR	Unit	Sample ID	ENV-G01(2)-CS TCLP-4	ENV-G01(2)-CS TCLP-5	ENV-G01(2)-CS TCLP-6	----	----
				Sampling date / time	12-Jul-2021	12-Jul-2021	12-Jul-2021	----	----
					HK2128600-001	HK2128600-002	HK2128600-003	--------	--------
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	0.1	mg/L		<0.1	<0.1	<0.1	----	----
Sample Preparation Method									
E-TCLP: Extraction Fluid Number	----	1	--		1	1	1	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3801423)								
HK2128600-002	ENV-G01(2)-CS TCLP-5	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3801423)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	99.6	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3801423)										
HK2128600-001	ENV-G01(2)-CS TCLP-4	**EG020: Lead**	7439-92-1	0.5 mg/L	95.2	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2129122
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS - SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 19-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 22-Jul-2021
C-O-C number	: H022285			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
Leung Chak Cheong , Mike	Assistant Manager - Metals	Metals_ENV

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-Jul-2021 to 22-Jul-2021.

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: HK2129122

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98.

Analytical Results

Sub-Matrix: **TCLP LEACHATE**

Compound	CAS Number	LOR	Unit	Sample ID	ENV-G01(2)-CS TCLP-7	ENV-G01(2)-CS TCLP-8	ENV-G01(2)-CS TCLP-9	----	----
				Sampling date / time	15-Jul-2021	15-Jul-2021	15-Jul-2021	----	----
					HK2129122-001	HK2129122-002	HK2129122-003	--------	--------
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	0.1	mg/L		<0.1	<0.1	<0.1	----	----
Sample Preparation Method									
E-TCLP: Extraction Fluid Number	----	1	--		1	1	1	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3804264)								
HK2129122-002	ENV-G01(2)-CS TCLP-8	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3804264)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	102	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3804264)										
HK2129122-001	ENV-G01(2)-CS TCLP-7	**EG020: Lead**	7439-92-1	0.5 mg/L	100	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2129124
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS - SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 19-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 22-Jul-2021
C-O-C number	: H022286			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
Leung Chak Cheong , Mike	Assistant Manager - Metals	Metals_ENV

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-Jul-2021 to 22-Jul-2021.

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: HK2129124

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.

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

Result(s) of soil/sediment sample(s) was / were reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98.

Analytical Results

Sub-Matrix: **TCLP LEACHATE**

Compound	CAS Number	LOR	Unit	Sample ID	ENV-G01(2)-CS TCLP-10	ENV-G01(2)-CS TCLP-11	ENV-G01(2)-CS TCLP-12	----	----
				Sampling date / time	17-Jul-2021	17-Jul-2021	17-Jul-2021	----	----
					HK2129124-001	HK2129124-002	HK2129124-003	--------	--------
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	0.1	mg/L		<0.1	<0.1	<0.1	----	----
Sample Preparation Method									
E-TCLP: Extraction Fluid Number	----	1	--		1	1	1	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3804264)								
HK2129122-002	Anonymous	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3804264)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	102	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3804264)										
HK2129122-001	Anonymous	**EG020: Lead**	7439-92-1	0.5 mg/L	100	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2130742
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS - SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 30-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 04-Aug-2021
C-O-C number	: H022288			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
Wong Wing , Kenneth	Manager - Metals	Metals_ENV

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 30-Jul-2021 to 04-Aug-2021.

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: HK2130742

Sample(s) was/ were submitted by client. 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) was / were reported on dry weight basis.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98.

Analytical Results

Sub-Matrix: TCLP LEACHATE			Sample ID	ENV-G01(2)-CS TCLP-13	ENV-G01(2)-CS TCLP-14	ENV-G01(2)-CS TCLP-15	----	----
			Sampling date / time	27-Jul-2021	27-Jul-2021	27-Jul-2021	----	----
Compound	CAS Number	LOR	Unit	HK2130742-001	HK2130742-002	HK2130742-003	--------	--------
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Sample Preparation Method								
E-TCLP: Extraction Fluid Number	----	1	--	1	1	1	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3825786)								
HK2130742-002	ENV-G01(2)-CS TCLP-14	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3825786)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	99.9	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3825786)										
HK2130742-001	ENV-G01(2)-CS TCLP-13	**EG020: Lead**	7439-92-1	0.5 mg/L	96.8	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2131024
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS - SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 02-Aug-2021
Order number	: ----	Quote number	: HKE/1680/2020_V3	Issue Date	: 05-Aug-2021
C-O-C number	: H022293			No. of samples received	: 3
Site	: ----			No. of samples analysed	: 3

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*
		
Wong Wing , Kenneth	Assistant Manager - Environmental	Metals_ENV

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 02-Aug-2021 to 05-Aug-2021.

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: HK2131024

Sample(s) was/ were submitted by client. 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.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98. E

Analytical Results

Sub-Matrix: **TCLP LEACHATE**

			Sample ID	ENV-G01(2)-CS TCLP-16	ENV-G01(2)-CS TCLP-17	ENV-G01(2)-CS TCLP-18	----	----
			Sampling date / time	31-Jul-2021	31-Jul-2021	31-Jul-2021	----	----
Compound	CAS Number	LOR	Unit	HK2131024-001	HK2131024-002	HK2131024-003	--------	--------
EG: Metals and Major Cations								
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	----	----
Sample Preparation Method								
E-TCLP: Extraction Fluid Number	----	1	--	1	1	1	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3828741)								
HK2131024-001	ENV-G01(2)-CS TCLP-16	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3828741)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	101	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3828741)										
HK2130977-001	Anonymous	**EG020: Lead**	7439-92-1	0.5 mg/L	97.4	----	75.0	125	----	----

CHAIN OF CUSTODY DOCUMENTATION

H 022282

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation and Access Tunnel Construction (DC/2018/05)	EMAIL REPORT TO:
SITE: P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)											Notes: e.g. Highly contaminated samples e.g. "High PAHs expected" Extra volume for QC or trace LORs etc.
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1	ENV-G01(2)-CS TCLP-1	S	09/07/21		BAG	1	✓											3 DAYS EXPRESS
2	ENV-G01(2)-CS TCLP-2	S	09/07/21		BAG	1	✓											
3	ENV-G01(2)-CS TCLP-3	S	09/07/21		BAG	1	✓											

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 09/07/2021	Name: Sanna	Date: 12-7-2021	Con' Note No:
Of: TEEMWAY	Time:	Of: ALS (HK)	Time: 16:35	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

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

CHAIN OF CUSTODY DOCUMENTATION

H 022283

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES**(note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)											
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1	ENV-G01(2)-CS TCLP-4	S	12/07/21		BAG	1	✓											
2	ENV-G01(2)-CS TCLP-5	S	12/07/21		BAG	1	✓											
3	ENV-G01(2)-CS TCLP-6	S	12/07/21		BAG	1	✓											

3 DAYS EXPRESS

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 12/07/2021	Name:	Date:	Con' Note No:
Of: TEEMWAY	Time:	Of:	Time: 17	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

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

ALS Laboratory Group

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YELLOW - CUSTOMER COPY
PINK - BOOK COPY

CHAIN OF CUSTODY DOCUMENTATION

H 022285

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)											
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1	ENV-G01(2)-CS TCLP-7	S	15/07/21		BAG	1	✓											
2	ENV-G01(2)-CS TCLP-8	S	15/07/21		BAG	1	✓											3 DAYS EXPRESS
3	ENV-G01(2)-CS TCLP-9	S	15/07/21		BAG	1	✓											

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 15/07/2021		Name:	Date:		Con' Note No:
Of: TEEMWAY	Time:		Of:	Time: 18/7		
Name:	Date:		Name:	Date:		Transport Co:
Of:	Time:		Of:	Time:		

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

CHAIN OF CUSTODY DOCUMENTATION

H 022286

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation and Access Tunnel Construction (DC/2018/06)	EMAIL REPORT TO:
SITE: P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1	ENV-601(2)-CS TCLP-10	S	17/07/21		BAG	1	✓
2	ENV-601(2)-CS TCLP-11	S	17/07/21		BAG	1	✓
3	ENV-601(2)-CS TCLP-12	S	17/07/21		BAG	1	✓

3 DAYS EXPRESS
PLEASE START ON 20/07/21

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 17/07/2021		Name:	Date: 19/7		Con' Note No:
Of: TEEMWAY	Time:		Of:	Time:		
Name:	Date:		Name:	Date:		Transport Co:
Of:	Time:		Of:	Time:		

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

ALS Laboratory Group

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PINK - BOOK COPY

CHAIN OF CUSTODY DOCUMENTATION

H 022288

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. No.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)												
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
1	ENV-G01(2)-CS TCLP-13	S	27/07/21		BAG	1	✓												
2	ENV-G01(2)-CS TCLP-14	S	27/07/21		BAG	1	✓												
3	ENV-G01(2)-CS TCLP-15	S	27/07/21		BAG	1	✓												

3 DAYS EXPRESS

RELINQUISHED BY:				RECEIVED BY				METHOD OF SHIPMENT
Name:	Thomas YEUNG	Date:	27/07/2021	Name:	ALS (CHK)	Date:	30/7/21	Con' Note No:
Of:	TEEMWAY	Time:	16:00	Of:		Time:	1405	
Name:		Date:		Name:		Date:		Transport Co:
Of:		Time:		Of:		Time:		

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

CHAIN OF CUSTODY DOCUMENTATION

H 022293

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)	Notes: e.g. Highly contaminated samples e.g. "High PAHs expected" Extra volume for QC or trace LORs etc.
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles		
1	ENV-G01(2)-CS TCLP-16	S	31/07/21		BAG	1	✓	3 DAYS EXPRESS PLEASE START THE TEST ON 03/08/2021
2	ENV-G01(2)-CS TCLP-17	S	31/07/21		BAG	1	✓	
3	ENV-G01(2)-CS TCLP-18	S	31/07/21		BAG	1	✓	

RELINQUISHED BY:			
Name:	Thomas YEUNG	Date:	31/07/2021
Of:	TEEMWAY	Time:	16:00
Name:		Date:	
Of:		Time:	

RECEIVED BY			
Name:	(illegible)	Date:	2/8/21
Of:	ALS (HK)	Time:	17:37
Name:		Date:	
Of:		Time:	

METHOD OF SHIPMENT
Con' Note No:
Transport Co:

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

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Website: www.castco.com.hk

HOKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210716-2896
Report No.:734517

Date of issue: 23/07/2021

CASTCO TESTING CENTRE LIMITED ORIGINAL COPY

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Audit No.: --
Customer's Ref. No.: --

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 09-07-2021 Time of water added to cement: --
Place of sampling: ENV-G01(2)
Place and time of making cubes: ON SITE / --
No. of cubes: 3
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 3 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 12-07-2021 Date of Test: 12-07-2021 Age at tests: 3 days
Laboratory curing method; WATER CURING TANK Moisture condition at test: WET
Tank No.: G Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01(2)-CS UCS-		1	2	3
Mould No	-	NA	NA	NA
Weight in air	kg	1.730	1.825	1.750
Weight in water	kg	–	–	–
Height	mm	103.7	102.0	101.0
Width	mm	100.1	100.1	100.1
Length	mm	100.7	100.0	100.2
As- Received density (Vol. by calculation)	kg/m³	1660	1790	1730
As- Received density (Vol. by water disp.)	kg/m³	–	–	–
Load at Failure	kN	30.4	46.4	30.7
Compressive Strength	MPa	3.0	4.5	3.0
Observation Code	-	E	–	–
Type of Fracture	-	K	K	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME :

Checked By:

SHEK Ka Fung
Assistant Technical Officer

Approved Signatory:

K.K.WONG

WONG Ka Man
Senior Manager

End Of Report

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Website: www.castco.com.hk

HOKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210721-2021
Report No.:734490

Date of issue: 23/07/2021

ORIGINAL COPY

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Audit No.: --
Customer's Ref. No.: --

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 12-07-2021 Time of water added to cement: --
Place of sampling: ENV-G01 (2)
Place and time of making cubes: ON SITE / --
No. of cubes: 3
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 3 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 15-07-2021 Date of Test: 15-07-2021 Age at tests: 3 days
Laboratory curing method: WATER CURING TANK Moisture condition at test: WET
Tank No.: G Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01(2)-CS UCS-		4	5	6
Mould No	-	NA	NA	NA
Weight in air	kg	1.780	1.785	1.865
Weight in water	kg	–	–	–
Height	mm	102.3	102.9	102.0
Width	mm	99.8	99.6	99.8
Length	mm	100.1	99.9	100.1
As- Received density (Vol. by calculation)	kg/m³	1740	1740	1830
As- Received density (Vol. by water disp.)	kg/m³	–	–	–
Load at Failure	kN	29.0	43.2	57.7
Compressive Strength	MPa	3.0	4.0	5.5
Observation Code	-	E	E	–
Type of Fracture	-	K	K	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME : 16:04

Checked By:

SHEK Ka Fung
Assistant Technical Officer

Approved Signatory:

K.K.WONG K.M.WONG

WONG Ka Man
Senior Manager

End Of Report

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Website: www.castco.com.hk

HKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210726-2187
Report No.:741135

Date of issue: 02/08/2021
Page 1 of 1 page(s)

TESTING CENTRE LIMITED ORIGINAL COPY CASTCO

Audit No.: --
Customer's Ref. No.: --

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 15-07-2021 Time of water added to cement: --
Place of sampling: ENV-G01 (2)
Place and time of making cubes: ON SITE / --
No. of cubes: 3
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 4 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 19-07-2021 Date of Test: 19-07-2021 Age at tests: 4 days
Laboratory curing method: WATER CURING TANK Moisture condition at test: WET
Tank No.: A Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01-(2)-CS UCS-		7	8	9
Mould No	-	NA	NA	NA
Weight in air	kg	1.830	1.955	1.840
Weight in water	kg	–	–	–
Height	mm	99.7	100.2	100.4
Width	mm	100.4	100.3	100.1
Length	mm	100.1	100.1	100.2
As- Received density (Vol. by calculation)	kg/m³	1830	1940	1830
As- Received density (Vol. by water disp.)	kg/m³	–	–	–
Load at Failure	kN	28.1	28.4	36.4
Compressive Strength	MPa	3.0	3.0	3.5
Observation Code	-	–	–	–
Type of Fracture	-	K	K	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME : 16:41

Checked By:

SHEK Ka Fung
Assistant Technical Officer

Approved Signatory:

K.F.WONG K.M.WONG

WONG Ka Man
Senior Manager

End Of Report

Form No.CUBE COMP_STR_LIMS(CS1:1990)_T1 dd 10/08/2020

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HOKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210726-2188
Report No.:746321

Date of issue: 10/08/2021
Page 1 of 1 page(s)

TESTING CENTRE CASTCO LIMITED ORIGINAL COPY

Audit No.: --
Customer's Ref. No.: --

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 17-07-2021 Time of water added to cement: --
Place of sampling: ENV-G01 (2)
Place and time of making cubes: ON SITE / --
No. of cubes: 3
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 3 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 19-07-2021 Date of Test: 20-07-2021 Age at tests: 3 days
Laboratory curing method; WATER CURING TANK Moisture condition at test: WET
Tank No.: G Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01-(2)-CS UCS-		10	11	12
Mould No	-	NA	NA	NA
Weight in air	kg	1.920	1.925	1.940
Weight in water	kg	–	–	–
Height	mm	101.3	100.9	101.1
Width	mm	100.2	100.5	99.7
Length	mm	99.6	99.5	99.9
As- Received density (Vol. by calculation)	kg/m³	1900	1910	1930
As- Received density (Vol. by water disp.)	kg/m³	–	–	–
Load at Failure	kN	48.1	44.7	36.9
Compressive Strength	MPa	4.5	4.5	3.5
Observation Code	-	–	–	–
Type of Fracture	-	K	K	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME : 14:34

Checked By:

SHEK Ka Fung
Assistant Technical Officer

Approved Signatory:

K.K.WONG

WONG Ka Man
Senior Manager

End Of Report

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HOKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210806-2123
Report No.:750716

Date of issue: 16/08/2021

CASTCO TESTING CENTRE LIMITED ORIGINAL COPY

Audit No.: --
Customer's Ref. No.: --

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 27-07-2021 Time of water added to cement: --
Place of sampling: ENV-G01 (2)
Place and time of making cubes: ON SITE / --
No. of cubes: 3
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 3 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 30-07-2021 Date of Test: 30-07-2021 Age at tests: 3 days
Laboratory curing method: WATER CURING TANK Moisture condition at test: WET
Tank No.: G Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01(2)-CS-UCS-		13	14	15
Mould No	-	NA	NA	NA
Weight in air	kg	1.905	1.935	1.925
Weight in water	kg	–	–	–
Height	mm	101.7	104.7	103.4
Width	mm	100.8	99.9	100.2
Length	mm	99.7	100.0	100.1
As- Received density (Vol. by calculation)	kg/m³	1860	1850	1860
As- Received density (Vol. by water disp.)	kg/m³	–	–	–
Load at Failure	kN	35.4	31.5	33.0
Compressive Strength	MPa	3.5	3.0	3.0
Observation Code	-	–	E	E
Type of Fracture	-	K	K	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME : 11:29

Checked By:

WAI Po Yi
Assistant Supervisor

Approved Signatory:

K.K. WONG

WONG Ka Man
Senior Manager

End Of Report

CASTCO
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HOKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210809-2087
Report No.:756980

Date of issue: 25/08/2021
Page 1 of 1 page(s)

CASTCO TESTING CENTRE LIMITED ORIGINAL COPY

Audit No.: --
Customer's Ref. No.: --

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 31-07-2021 Time of water added to cement: --
Place of sampling: ENV-G01(2)
Place and time of making cubes: ON SITE / --
No. of cubes: 3
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 3 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 03-08-2021 Date of Test: 03-08-2021 Age at tests: 3 days
Laboratory curing method: WATER CURING TANK Moisture condition at test: WET
Tank No.: G Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01(2)-CS UCS-		16	17	18
Mould No	-	NA	NA	NA
Weight in air	kg	1.935	1.930	1.970
Weight in water	kg	–	–	–
Height	mm	101.7	102.7	101.6
Width	mm	100.3	100.1	100.2
Length	mm	100.3	100.1	100.3
As- Received density (Vol. by calculation)	kg/m³	1890	1880	1930
As- Received density (Vol. by water disp.)	kg/m³	–	–	–
Load at Failure	kN	25.5	21.1	21.9
Compressive Strength	MPa	2.5	2.0	2.0
Observation Code	-	–	E	–
Type of Fracture	-	K	K	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME: 16:08

Checked By:

SHEK Ka Fung
Assistant Technical Officer

Approved Signatory:

K.K.WONG

WONG Ka Man
Senior Manager

End Of Report

Form No.CUBE COMP_STR_LIMS(CS1:1990)_T1 dd 10/08/2020

APPENDIX E

LABORATORY REPORTS & COC FORMS FOR QA/QC VERIFICATION TESTING

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2130256
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS - SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 27-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 04-Aug-2021
C-O-C number	: H022290			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*
		
Wong Wing , Kenneth	Manager - Metals	Metals_ENV

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 27-Jul-2021 to 04-Aug-2021.

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: HK2130256

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.

Water sample(s) were filtered prior to dissolved metal analysis.

Analytical Results

Sub-Matrix: WATER			Sample ID	ENV-G01(2)-CS FB1	ENV-G01(2)-CS EQ1	----	----	----
			Sampling date / time	27-Jul-2021	27-Jul-2021	----	----	----
Compound	CAS Number	LOR	Unit	HK2130256-001	HK2130256-002	-------	-------	-------
EG: Metals and Major Cations - Filtered								
EG020: Lead	7439-92-1	1	µg/L	<1	<1	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 3815917)								
HK2130196-001	Anonymous	**EG020: Lead**	7439-92-1	1	µg/L	<1	<1	0.0

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

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
EG: Metals and Major Cations - Filtered (QC Lot: 3815917)											
EG020: Lead	7439-92-1	1	µg/L	<1	50 µg/L	98.0	----	86.9	110	----	----

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

Matrix: **WATER**

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 - Filtered (QC Lot: 3815917)										
HK2130114-011	Anonymous	**EG020: Lead**	7439-92-1	50 µg/L	98.8	----	75.0	125	----	----

CERTIFICATE OF ANALYSIS

Client	: TEEMWAY ENGINEERING LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: THOMAS YEUNG	Contact	: Richard Fung	Work Order	: HK2130744
Address	: RM 1008, 10/F, CHEVALIER COMMERCIAL CENTRE, 8 WANG HOI ROAD, KOWLOON BAY, KOWLOON	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: Works@teemway.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2796 2268	Telephone	: +852 2610 1044		
Facsimile	: +852 2796 2217	Facsimile	: +852 2610 2021		
Project	: DECONTAMINATION WORKS OF GROUNDWATER AND SOIL FOR RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS - SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (CONTRACT NO. DC/2018/05)			Date Samples Received	: 30-Jul-2021
Order number	: ----	Quote number	: HKE/1680/2020_V2	Issue Date	: 06-Aug-2021
C-O-C number	: H022289			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*
		
Wong Wing , Kenneth	Assistant Manager - Environmental	Metals_ENV

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 30-Jul-2021 to 04-Aug-2021.

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: HK2130744

Sample(s) was/ were submitted by client. 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) was / were reported on dry weight basis.

Water sample(s) were filtered prior to dissolved metal analysis.

The metal concentrations reported are those determined on the TCLP leachate. Extraction Fluid #1 pH 4.88 - 4.98.

Analytical Results

Sub-Matrix: TCLP LEACHATE				Sample ID	ENV-G01(2)-CS TCLP-DUP1	----	----	----	----
				Sampling date / time	27-Jul-2021	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2130744-001	-------	-------	-------	-------
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	0.1	mg/L		<0.1	----	----	----	----
Sample Preparation Method									
E-TCLP: Extraction Fluid Number	----	1	--		1	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 3825786)								
HK2130742-002	Anonymous	**EG020: Lead**	7439-92-1	0.1	mg/L	<0.1	<0.1	0.0

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

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
EG: Metals and Major Cations (QC Lot: 3825786)											
EG020: Lead	7439-92-1	0.1	mg/L	<0.1	0.5 mg/L	99.9	----	85.0	114	----	----

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

Matrix: **WATER**

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: 3825786)										
HK2130742-001	Anonymous	**EG020: Lead**	7439-92-1	0.5 mg/L	96.8	----	75.0	125	----	----

CHAIN OF CUSTODY DOCUMENTATION

H 022290

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No (N/A)

SAMPLE TEMPERATURE

CHILLED: (Yes) No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		LEAD
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	
1	ENV-G01(2)-CS FB1	W	27/07/21		BOTTLE	1	✓
2	ENV-G01(2)-CS EQ1	W	27/07/21		BOTTLE	1	✓

RELINQUISHED BY:			RECEIVED BY		METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 27/07/2021	Name:	Date: 27/7/21	Con' Note No:	
Of: TEEMWAY	Time: 16:00	Of: ALS (HK)	Time: 1800		
Name:	Date:	Name:	Date:	Transport Co:	
Of:	Time:	Of:	Time:		

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

ALS Laboratory Group

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

CHAIN OF CUSTODY DOCUMENTATION

H 022289

ALS Laboratory Group

CLIENT: TEEMWAY	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM): Thomas YEUNG	PHONE
PROJECT ID: Relocation of Sha Tin Sewage Treatment Works to Caverns - Site	EMAIL REPORT TO:
SITE: Preparation and Access Tunnel Construction (DC/2018/05) P.O. NO.:	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): QUOTE NO.:	**ANALYSIS REQUIRED including SUITES** (note - suite codes must be listed to attract suite prices)

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

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

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		TCLP (LEAD)	LEAD										
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles												
1	ENV-G01(2)-CS TCLP-DUP	S	27/07/21		BAG	1	✓											
	ENV-G01(2)-CS FB1	W	27/07/21		BOTTLE	1		✓										
	ENV-G01(2)-CS EQ1	W	27/07/21		BOTTLE	1		✓										

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name: Thomas YEUNG	Date: 27/07/2021		Name:	Date: 30/7/21		Con' Note No:
Of: TEEMWAY	Time: 16:00		Of: ALS (HK)	Time: 1407		
Name:	Date:		Name:	Date:		Transport Co:
Of:	Time:		Of:	Time:		

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

CASTCO
香港粉嶺安居街33號
香港粉嶺安全街29A號
Email: info@castco.com.hk

佳力高試驗中心有限公司
CASTCO TESTING CENTRE LIMITED
33, On Kui Street, Fanling, Hong Kong. Tel : 2597 8333
29A, On Chuen Street, Fanling, Hong Kong Fax: 2597 8399
Website: www.castco.com.hk

HOKLAS 032 TEST

Test Report
Concrete - Compressive Strength of Concrete Cubes
(CS1 : 1990 Section 12 + Amd. 1201, 1202 & 1203)

Castco Lab. Ref No.: 210806-2124
Report No.:750717

Date of issue: 16/08/2021
Page 1 of 1 page(s)

CASTCO TESTING CENTRE LIMITED ORIGINAL COPY

1. SAMPLE DETAILS AS SUPPLIED BY CUSTOMER

Audit No.: --
Customer's Ref. No.: --

Customers: Teemway Engineering Limited
Address: Room 1008, 10/F, Chevalier Commercial Centre, 8 Wang Hoi Raod, Kowloon Bay, Kowloon

Contract No.: DC/2018/05 Job Title: Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

Location in works of concrete batch sampled:

Concrete mix ID: --
Grade: --
Designed/ Measured slump: -- / -- mm
W/C ratio: -- A/C ratio: --
Cement content (OPC/PFA): -- / -- kg/m³
Supplier:
Plant:
Source of coarse aggregate: --
Cement brand: --
Source of fine aggregate: --
Admixture brand: --
Dosage: --/m³
Date of sampling: 27-07-2021 Time of water added to cement: --
Place of sampling: ENV-G01 (2)
Place and time of making cubes: ON SITE / --
No. of cubes: 1
Name of person making cubes:
Method of Compaction:
Nominal size: 100.0 mm
Test at: 3 days
Site curing method:
Max./ Min. temp: -- / -- °C

2. CERTIFICATE OF SAMPLING, SLUMP TEST, CUBE MAKING AND CURING

A certificate of sampling, slump test, cube make and curing [ ] is available and a copy is attached [X] is not available

3. LABORATORY TEST RESULT

Date received: 30-07-2021 Date of Test: 30-07-2021 Age at tests: 3 days
Laboratory curing method: WATER CURING TANK Moisture condition at test: WET
Tank No.: G Max./ Min. temp: 30.0 / 24.0°C

Cube Mark - ENV-G01(2)-CS-UCS-		DUP1
Mould No	-	NA
Weight in air	kg	1.930
Weight in water	kg	–
Height	mm	102.0
Width	mm	99.9
Length	mm	100.0
As- Received density (Vol. by calculation)	kg/m³	1890
As- Received density (Vol. by water disp.)	kg/m³	–
Load at Failure	kN	25.8
Compressive Strength	MPa	2.5
Observation Code	-	–
Type of Fracture	-	K

Observation Legend: A - Dry on Receipt B - Irregular shape C - Damaged corners D - Damaged edges E - Oversize F - Undersize
G - Segregation H - Honeycombing I - Voids J - Abnormal fracture K - Satisfactory Failures

Remark(s): -
1. Test result relates only to the specimen tested. Loading rate 22 MPa/ minute
2. Laboratory curing commenced from date cubes received.
3. The time of water added to cement has not been given by client, the exact age at test is therefore not determined to Cl.10.4 of CS1:1990.
4. TESTING TIME : 11:32

Checked By:

WAI Po Yi
Assistant Supervisor

Approved Signatory:

K.K. WONG

WONG Ka Man
Senior Manager

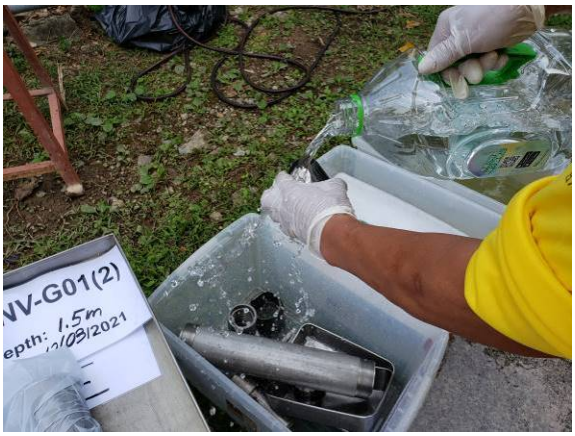
End Of Report

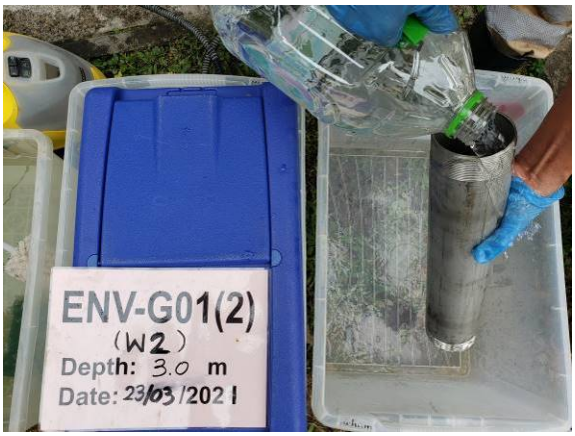
APPENDIX F

PHOTO RECORD

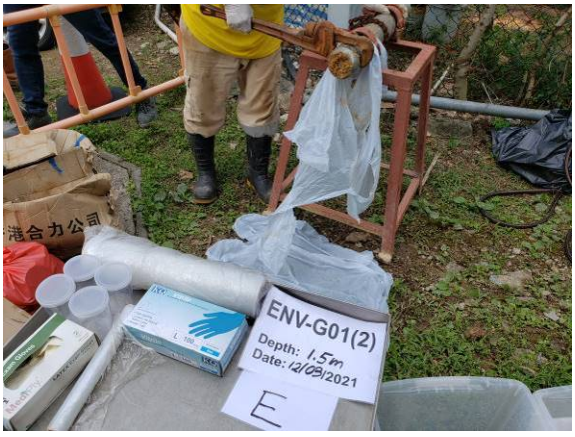
CONFIRMATORY SAMPLING

Site Setup & Decontamination of Sampling Tools





Collection of Confirmatory Sampling



QA/QC Sampling for Confirmatory Sampling

SOIL REMEDIATION WORK

Site Setup & Installation of ELS Work

Trial Mix Test for Cement Solidification / Stabilization

Excavation of Contaminated Soil (1.00m – 1.50m bgl)

Excavation of Contaminated Soil (1.50m – 3.95m bgl)

Implementation of Cement Solidification / Stabilization

Verification Sampling for Cement Solidification / Stabilization

Temporary Storage for Treated Soil

QA/QC Sampling for Verification Sampling

Decontamination of Excavation Bucket



Backfilling & Compaction of Treated Soil (1.05m – 3.95m bgl)



Backfilling & Compaction of Top Clean Soil (0.00m – 1.05m bgl)