



Expansion of Hong Kong International Airport into a Three-Runway System

Contamination Assessment Report for
Terminal 2 Emergency Power Supply System
No.1 (Volume 1)

January 2020

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**This Contamination Assessment Report for
Terminal 2 Emergency Power Supply System No.1 (Volume 1)
has been reviewed and certified by
the Environmental Team Leader (ETL)
In accordance with EP Condition 1.9 of the
Environmental Permit
No. EP-489/2014 and Section 7 of
Supplementary Contamination Assessment Plan (August 2018)**

Certified by:

A handwritten signature in black ink, appearing to read 'Terence Kong', written in a cursive style.

Terence Kong

Environmental Team Leader (ETL)
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Date

17 January 2020



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By Email

Airport Authority Hong Kong
HKIA Tower, 1 Sky Plaza Road
Hong Kong International Airport
Lantau, Hong Kong

Attn: Mr. Lawrence Tsui, Principal Manager

17 January 2020

Dear Sir,

Contract No. 3102
3RS Independent Environmental Checker Consultancy Services

Contamination Assessment Report for Terminal 2 Emergency Power Supply System No.1
(Volume 1)

Reference is made to the ET's submission of Contamination Assessment Report for Terminal 2 Emergency Power Supply System No.1 (Volume 1) under Section 7 of Supplementary Contamination Assessment Plan and Condition 2.32 (iv) of the Environmental Permit No. EP-489/2014. The subject report was certified by the ET Leader on 17 January 2020.

We would like to inform you that we have no adverse comment on the captioned submission and verify the captioned submission in accordance with the requirement stipulated in Condition 1.9 of EP - 489/2014.

Should you have any query, please feel free to contact the undersigned at 3922 937

Yours faithfully,
AECOM Asia Co. Ltd.

Jackel Law
Independent Environmental Checker

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1 Introduction

1.1 Background

The Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-185/2014) prepared for the “Expansion of Hong Kong International Airport into a Three-Runway System” (the project) has been approved by the Director of Environmental Protection, and an Environmental Permit (EP) (Permit No.: EP-489/2014) has been issued for the project under the Environmental Impact Assessment Ordinance. As part of the EIA study, a Contamination Assessment Plan (CAP) (hereafter referred to as the Approved CAP) was prepared and presented as Appendix 11.1 of the approved EIA Report. In accordance to Section 8.1.1.1 of the Updated Environmental Monitoring and Audit (EM&A) Manual, which was submitted under Condition 3.1 of the EP, and Section 11.10.1.2 of the EIA Report, six areas (i.e. fuel tank room within Terminal 2 (T2) building, fuel tank room to the west of Civil Aviation Department (CAD) antenna farm, seawater pump house, switching station, pumping station and fire training facility), were inaccessible for site reconnaissance at the time of preparing the EIA Report.

According to Sections 11.5.4.14 and 11.5.4.37 of the EIA Report, it is anticipated that any potential land contamination concern related to possible leakage/ spillage of fuel in the fuel tank room within T2 building and fuel tank room to the west of CAD antenna farm will not cause any insurmountable impact. Furthermore, as mentioned in Sections 11.5.4.38, 11.5.4.47 and 11.5.4.50 of the EIA Report, the seawater pump house, switching station, pumping station and fire training facility are not identified as potential contaminative land use types as given in Table 2.3 of the Practice Guide for Investigation and Remediation of Contaminated Land, hence no potential land contamination along these areas are anticipated.

As part of the ongoing detailed design of the project, relocation of the switching station is no longer required for the modification of existing North Runway. Hence site appraisal process for land contamination potential at the switching station is considered not necessary. Further site reconnaissance was conducted at the remaining five assessment areas (i.e. the fuel tank room within T2 building, fuel tank room to the west of CAD antenna farm, seawater pump house, pumping station and fire training facility) in third quarter of 2016 and May 2017.

In addition, further review of the as-built drawings when taking into account the latest design details of T2 Expansion project and planned site investigation (SI), as well as follow-up site reconnaissance at T2 building have been undertaken in January 2018 and February 2018 (i.e. fuel tanks and generators within the building). Findings and consideration of assessment results after EIA stage have been summarized in the Supplementary Contamination Assessment Plan (SCAP) being approved in August 2018.

To match with the construction programme, decommissioning/ demolition of the Emergency Power Supply System No.1 (hereafter referred as EPSS1) at T2 northern section have been scheduled in 2019. Mott MacDonald Hong Kong Limited (MMHK), as the project’s Environmental Team, was appointed by Airport Authority Hong Kong (AAHK) to prepare the Contamination Assessment Report (CAR) for Terminal 2 Emergency Power Supply System No.1 (Volume 1) to partially fulfil the SCAP’s recommendation. CAR(s) for the other areas of the Project Site will be submitted to EPD for endorsement in accordance with the SCAP and the updated Implementation Schedule of Land Contamination – Construction Phase is given in **Appendix A**.

1.2 Scope of this CAR

T2 building of the Hong Kong International Airport comprises northern and southern sections, where each section consists of number of Emergency Generator Rooms and Fuel Tank Rooms.

The Emergency Power Supply System No.1 was located at northern section of T2 Building as shown in **Appendix B**. This set of emergency power supply system comprises underground and above-ground section, with the following identified potential land contamination sources listed in **Table 1.1** below,

Table 1.1: Identified Potential Land Contamination Source of Emergency Power Supply System No.1

Potential Land Contamination Source Reference ID	Descriptions	Location
Underground Section		
BH1	A 2,500 L underground fuel tank	Please refer to Appendix C
BH2	53 m-in-length underground fuel pipelines connecting the 2,500 L underground fuel tank (i.e. BH1) and the 450 L above-ground fuel tank (i.e. BH3)	
Above-ground Section		
BH4	An emergency generator at Emergency Generator Room, connected to 450 L above-ground fuel tank (i.e. BH3)	
BH3	A 450 L above-ground fuel tank at Emergency Generator Room	

To match with the construction programme, scope of the CAR for Terminal 2 Emergency Power Supply System No.1 (Volume 1) is as follows,

- BH1
- Partial portion of BH2, which includes:
 - Segment running from BH1 to sampling point BH2-S3, i.e. BH2-S1, BH2 S2, BH2-S3; and
 - BH2-S6;
- BH3
- BH4

Soil sampling for BH1, BH2-S1, BH2-S2, BH2-S3 and BH2-S6 were planned in accordance with the approved SCAP, therefore, the laboratory testing results of BH2-S6 as well as the duplicate, equipment blank and field blank conducted in the event of BH2-S6 sampling are presented in this CAR as QA/QC. Construction works will only be conducted at (i) areas around BH1 and BH2-S3 and (ii) above-ground structures at BH3 and BH4 (see delineated areas by orange dotted-line for BH1, BH3 and BH4 in **Appendix F**). No works will be conducted in other areas within the Emergency Power Supply System No. 1 prior to the agreement of Vol. 2 of the CAR for T2 EPPS1, or Remediation Report for T2 EPPS1 (if remediation is required). No works will be conducted for BH2-S6 at current stage and the works for BH2-S6 will be conducted together with the system portion to be included in Vol. 2 of the CAR for T2 EPPS1.

Graphical illustration of the scope of this CAR is presented in **Appendix C**.

1.3 Objective

According to the approved SCAP, the Emergency Power Supply System No. 1 located in northern section of the T2 building have been identified as the potential land contamination source, which being proposed in EIA Report as sampling locations. As per the approved SCAP, for the above-ground section (i.e. BH3 and BH4), final inspection and record checking shall be conducted right before decommissioning/ demolition. While for the underground section (i.e. BH1 and BH2), enhanced SI programme shall be conducted along with decommissioning/demolition to confirm no potential land contamination taken place.

For the above-ground section (i.e. BH3 and BH4), demolition works have been scheduled in early April 2019. Final site inspection and record checking have been conducted on 19 March 2019. Photo records and findings have been included in this CAR. For underground section, enhanced SI programmes for BH1, segment of BH2 running from BH1 to sampling point BH2-S3, and the segment at BH2-S6 were carried out on 4 October 2019, 4 and 14 November 2019 respectively.

This Contamination Assessment Report for Terminal 2 Emergency Power Supply System No.1 (Volume 1) has been prepared to present the findings of final inspection and record checking of the above-ground section (i.e. BH3 and BH4), as well as the procedures and laboratory testing of enhanced SI for the underground section (including BH1, segment of BH2 running from BH1 to sampling point BH2-S3, and the segment at BH2-S6) under the scope presented in **Section 1.2**. The testing results have been interpreted based on the Guidance Manual for Use of Risk Based Remediation Goals (RBRGs) for Contaminated Land Management (Guidance Manual).

2 Summary of Sampling and Testing Strategy

2.1 Proposed Sampling Method in the SCAP

2.1.1 Proposed Sampling Method of BH1 and BH2

Grab sampling was proposed for the concerned underground facilities of T2 Building, including BH1 and BH2. The proposed sampling and testing plan in the SCAP, including the parameters to be tested, sampling locations and sampling depths are extracted and presented in **Table 2.1**. Sand and soil samples shall be grabbed manually during decommissioning/demolition process of concerned fuel tanks (i.e. BH1) and underground pipeline trench (i.e. BH2). The whole sampling process shall be under the supervision of on-site contamination specialist.

Sampling Selection of Underground Fuel Tank (i.e. BH1)

Sand and soil samples should be collected as follows:

- Sand samples should be collected at 0.5 m, 1.5 m and bottom level inside the concrete chamber of underground fuel tank;
- Soil sample should be collected right underneath concrete chamber of underground fuel tank.

Sampling Selection of Underground Fuel Pipelines (i.e. BH2)

Sand and soil samples should be collected as follows:

- Sand samples should be taken at every curvature of pipelines inside the concrete trench;
- Additional sampling points inside the concrete trench are set depending on length of pipeline segment (from curvature/connection to curvature):
 - If pipeline segment is ≤ 10 m, additional sample is considered not required;
 - If pipeline segment is > 10 m and ≤ 20 m, one sample shall be taken at segment mid-point;
 - If pipeline segment is > 20 m and ≤ 30 m, samples shall be collected at 2 points which are evenly spaced with each other and segment ends.
- Soil samples should be taken right underneath concrete trench at every curvature.

Sampling point annotation and indicative sampling point locations of BH1 and BH2 extracted from the SCAP are presented in **Table 2.2** and **Appendix D**.

Table 2.1: Enhanced Sampling and Testing Plan for BH1 and BH2 of Emergency Power Supply System No.1 in T2 Building

Proposed Sampling Locations	Sample Matrix	Sampling Point Annotation	Parameters to be Tested ^{1 & 2}				Rationale of Sampling	
			Heavy Metals	PCRs ³	VOCs ³	SVOCs ³		
BH1 ⁴	Sand ⁵	0.5 m, 1.5 m bgs ⁶ and bottom level inside the concrete chamber	/	Lead only	✓	BTEX ⁷ and MTBE ⁸	PAHs ⁹	Confirm no diesel leakage from underground fuel tank
	Soil	Right underneath concrete chamber	/	Lead only	✓	BTEX ⁷ and MTBE ⁸	PAHs ⁹	Confirm no leaked diesel (if any) penetrate the concrete chamber
BH2 ⁴	Sand ⁵	At the level of fuel pipelines	BH2S1 - BH2S7	Lead only	✓	BTEX ⁷ and MTBE ⁸	PAHs ⁹	Confirm no diesel leakage from underground fuel pipelines
	Soil	Right underneath concrete/brick trench	BH2S1, BH2S2, BH2S3, BH2S6	Lead only	✓	BTEX ⁷ and MTBE ⁸	PAHs ⁹	Confirm no leaked diesel (if any) penetrate the concrete /brick trench

Remarks:

¹ ✓ = testing proposed.

² Having reviewed the potentially polluting activities of the site (use of diesel fuel) and S2.4.3 of Practice Guide, it is recommended to analyse the key COCs (i.e. Lead, PCRs, BTEX, MTBE and PAHs) of "Petrol Filling Station" which is the most relevant land use type for the case of T2. The concerned diesel tanks and pipelines are used for storage and transfer of diesel fuel only and only diesel fuel is used for the generator. It is noted BTEX, MTBE and Lead present in gasoline but unlikely to be found in diesel fuel.

³ PCRs = Petroleum Carbon Ranges; VOCs = Volatile Organic Chemicals; SVOCs = Semi-volatile Organic Chemicals;

⁴ Exact sampling locations will be identified on site during the removal of sand/soil during fuel tank and pipelines decommissioning/ demolition.

⁵ All sand samples will be collected within the concrete chamber or concrete/brick trench.

⁶ bgs = Below Ground Surface.

⁷ BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes.

⁸ MTBE = Methyl Tert-Butyl Ether.

⁹ Polycyclic aromatic hydrocarbons (PAHs) in the RBRGs include, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene.

Table 2.2: Sampling Point Annotation of Underground Fuel Pipeline BH2

Proposed Sampling Locations	Annotation of Sampling Point	Type of Sampling Point (Curvature / Additional)	Figure No.
BH2	BH2-S1	Curvature	
	BH2-S2	Curvature	
	BH2-S3	Curvature	
	BH2-S4 ¹	Additional	Appendix D
	BH2-S5 ¹	Additional	
	BH2-S6	Curvature	
	BH2-S7 ¹	Additional	

Remarks:

¹ Not under the scope of this CAR. BH2-S4, BH2-S5 and BH2-S7 will be presented in Vol. 2 of the CAR for T2 EPPS1.

2.2 Alternative Sampling Method Formulated after Pre-demolition Survey

2.2.1 Alternative Sampling Method of BH1

Pre-demolition survey have been undertaken by the Contractor, AAHK and the land contamination specialist in early October 2019. Based on the site condition, it is observed that the concrete chamber structure was deviated from the as-built drawing, the revealed as illustrated in **Appendix E**. The fuel tank is still fully encased in a at least 300 mm thick concrete chamber, however, the top slab of the chamber located at around 2.4 m below ground level (bgl) rather than at the level right beneath the surface ground level. In such case, borehole sampling for BH1 is proposed by the Contractor, instead of grab sampling as proposed in SCAP. Agreement on the proposed alternative sampling method of BH1 has been sought between the Contractor, AAHK and the land contamination specialist.

Borehole has been undertaken by means of rotary drilling method, as agreed with the on-site contamination specialist. To inspect for any underground utilities at the proposed borehole location, an inspection pit has been excavated down to 2.0 m below ground surface (bgs).

Details of sampling depths please refer to **Section 3.1.1**.

2.3 Assessment Criteria

The chemicals of concern (COCs) listed in EPD's Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management were referred to when proposing the analytical parameters listed in **Table 2.1**. According to Section 5.3 of the SCAP, categories of Industrial has been adopted for evaluating the contamination level of T2 building.

3 Site Investigation

3.1 Sand/Soil Sampling

3.1.1 Underground Fuel Tank BH1

Site investigation works of BH1 was carried out by DrillTech Ground Engineering Limited on 4 October 2019. As per on-site measurement, the revealed inner depth of the concrete chamber (i.e. depth from the bottom side of top concrete slab to upper side of the bottom concrete slab) is around 1.73 m.

Since there is a reduction of inner depth of concrete chamber (i.e. from ~3.9m as shown in the as-built drawing, to the on-site revealed depth 1.73m), as decided by the on-site contamination specialist, it is considered that 2 undisturbed sand samples collected at 0.7m and 1.6m below the top concrete slab of the concrete chamber is adequate and representative to confirm no land contamination issue at the underground fuel tank. Also, 1 undisturbed soil sample was collected at 0.5m right underneath the bottom of the concrete chamber. The entire SI programme was supervised by the on-site land contamination specialist. The actual sampling depths are summarized in **Table 3.1** and illustrated in **Appendix E**. All soil/sand samples were analyzed in accordance with the testing schedules detailed in **Table 2.1**.

Table 3.1: Summary of Sampling Depth of BH1

Sampling Locations	Sampling Depth	Sampling Date
BH1	0.7m below the top concrete slab of the concrete chamber	4 October 2019
	1.6m below the top concrete slab of the concrete chamber	4 October 2019
	0.5m below the bottom slab of the concrete chamber	4 October 2019

3.1.2 Underground Fuel Pipeline BH2

Soil sampling of BH2 segment between BH1 and sampling point BH2-S3 was carried out by Mott MacDonald HK Limited on 4 November 2019. Soil sampling at sampling point BH2-S6 was carried out by Mott MacDonald HK Limited on 14 November 2019.

BH2 segment between BH1 and sampling point BH2-S3

Soil sample was collected at sampling points BH2-S1, BH2-S2 and BH2-S3. According to site observation, the segment of underground pipeline located between BH1 and BH2-S1 are not laid inside the concrete trench, while the underground pipeline running from BH2-S1 to BH2-S3 is laid inside the concrete trench.

To confirm no diesel leakage from underground fuel pipelines from the no-concrete-trench segment, 1 soil sample have been taken right underneath the particular segment (i.e. NCTS1). Based on the sampling point selection strategy in the SCAP (i.e. If pipeline segment is ≤ 10 m, additional sample is considered not required;), together with the site observations where no oil stains being identified in the vicinity of NCTS1, and with reference to the laboratory testing result of soil sample taken at 0.5m below the bottom slab of the concrete chamber at BH1 (refer to Section 4.1.1) which is near to the location of NCTS1, therefore, it is considered that 1 sample collected at the depth right underneath the pipeline is deemed to be sufficient to represent and confirm if any diesel leakage from the <2m (as revealed on-site) no-concrete-trench segment.

While opening up the concrete trench from BH2-S1 to BH2-S3, it is observed that the concrete trench is filled with concrete rather than sand, which previously shown in the as-built drawings. Based on site situation, no sand samples could be taken at the level of fuel pipelines within the concrete trench.

No ground water was observed during soil sampling of NCTS1, BH2-S1, BH2-S2 and BH2-S3.

Sampling Point BH2-S6

Soil sample was collected at sampling point BH2-S6. With reference to on-site observation, it is observed that the concrete trench is filled with concrete rather than sand, which previously shown in the as-built drawings. Based on site situation, no sand samples could be taken at the level of fuel pipelines within the concrete trench.

No ground water was observed during soil sampling of BH2-S6.

The actual sampling points and on-site length measurement of the particular segment of underground pipeline BH2 are summarized in **Table 3.2** and illustrated in **Appendix F**. All soil samples were analyzed in accordance with the analysis schedules detailed in **Table 2.1**.

Table 3.2: Summary of Sampling Point of BH2

Sampling Locations	Sampling Point	Type of Sampling Point (Curvature/ Additional/ No-concrete-trench Segment)	Sampling Date
BH2	NCTS1	No-concrete-trench Segment	4 November 2019
	BH2-S1	Curvature	4 November 2019
	BH2-S2	Curvature	4 November 2019
	BH2-S3	Curvature	4 November 2019
	BH2-S6	Curvature	14 November 2019

3.2 Decontamination Procedures

Before drilling/ excavation/ sampling, all equipment in contact with the ground were thoroughly decontaminated between each excavation, drilling and sampling event to minimise the potential for cross contamination. The equipment should be decontaminated by steam cleaning or high-pressure hot water jet, then washed by phosphate-free detergent and finally rinsed by distilled water. During decontamination procedures and sampling, disposable latex gloves were worn to prevent the transfer of contaminants from other sources.

3.3 Quality Assurance (QA) / Quality Control (QC) Procedure

3.3.1 QA/QC Procedure

The soil samples taken were placed in sample containers provided by the HOKLAS laboratory. Sufficient sample size was collected for the laboratory analysis. Samples were marked with sampling date, sampling identification number and sampling depth with appropriate chain-of-custody form. Following sampling, samples were stored in a cool box at a temperature between 0°C and 4°C and transported to the laboratory immediately after completion of the sampling.

The chain-of-custody records are given in **Appendix G**.

3.3.2 QA/QC Analysis

In this enhanced SI programme, QA/QC samples were collected in accordance to the frequency proposed in the SCAP as follows, with a Chain of Custody protocol adopted:

- One equipment blank per 20 samples for full suite analysis*;
- One field blank per 20 samples for full suite analysis*;
- One duplicate sample per 20 samples for full suite analysis*; and
- One trip blank per trip for the analysis of volatile parameters#.

Note:

* For the purposes of this enhanced SI programme, the following parameters were tested in a 'full suite analysis'

-
- 1) Heavy Metals: Lead only.
- 2) PCRs: C6-C8; C9-C16; C17-C35.
- 3) VOCs: Benzene, Toluene, Ethylbenzene, Xylenes and Methyl Tert-Butyl Ether.
- 4) SVOCs: acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene.

For the purposes of this Project, the following parameters would be tested in the analysis of 'volatile parameters'

- Benzene, Toluene, Ethylbenzene, Xylenes, Methyl Tert-Butyl Ether and C6-C8.

The duplicate, equipment blank and field blank samples have been collected on 14 Nov 2019 during the sampling for BH2-S6.

The laboratory results for QA/QC samples are presented in **Appendix H**.

All testing parameters were not detected (below the limit of reporting) in all blank samples obtained. QA/QC procedures for sample collection and preparation are considered acceptable.

4 Interpretation of Laboratory Testing Results

4.1 Sand/Soil Contamination

4.1.1 Underground Fuel Tank BH1

A total of 2 sand and 1 soil samples were collected at BH1 for laboratory testing. The testing results are summarised in **Table 4.1** and the testing reports are presented in **Appendix H**. The testing results of all parameters indicated that all sand/ soil samples from BH1 were below the value of Risk-Based Remediation Goals (RBRGs) for Industrial.

Table 4.1: Laboratory Testing Results of Sand/ Soil Samples at BH1

Chemical	Concentration (mg/kg)			RBRGs for Industrial
	BH1 (0.7 m below the top concrete slab of the concrete chamber)	BH1 (1.6 m below the top concrete slab of the concrete chamber)	BH1 (0.5m below the bottom concrete slab of the concrete chamber)	
Heavy Metals				
Lead	9	8	38	2290
PCRs				
C6 - C8	<5	<5	<5	C6 - C8: 10,000
C9 - C16	<200	<200	<200	C9 - C16: 10,000
C17 - C35	<500	<500	<500	C17 - C35: 10,000
VOCs				
Benzene	<0.2	<0.2	<0.2	9.21
Toluene	<0.5	<0.5	<0.5	10,000
Ethylbenzene	<0.5	<0.5	<0.5	8,240
Xylenes (Total)	<2.0	<2.0	<2.0	1,230
Methyl tert-Butyl Ether	<0.2	<0.2	<0.2	70.1
SVOCs				
Naphthalene	<0.500	<0.500	<0.500	453
Acenaphthylene	<0.500	<0.500	<0.500	10,000
Acenaphthene	<0.500	<0.500	<0.500	10,000
Fluorene	<0.500	<0.500	<0.500	10,000
Phenanthrene	<0.500	<0.500	<0.500	10,000
Anthracene	<0.500	<0.500	<0.500	10,000
Fluoranthene	<0.500	<0.500	<0.500	10,000
Pyrene	<0.500	<0.500	<0.500	10,000
Benz(a)anthracene	<0.500	<0.500	<0.500	91.8
Chrysene	<0.500	<0.500	<0.500	1140
Benzo(b)fluoranthene	<0.500	<0.500	<0.500	17.8
Benzo(k)fluoranthene	<0.500	<0.500	<0.500	918
Benzo(a)pyrene	<0.500	<0.500	<0.500	9.18

Chemical	Concentration (mg/kg)			RBRGs for Industrial
	BH1 (0.7 m below the top concrete slab of the concrete chamber)	BH1 (1.6 m below the top concrete slab of the concrete chamber)	BH1 (0.5m below the bottom concrete slab of the concrete chamber)	
Indeno(1.2.3.cd)pyrene	<0.500	<0.500	<0.500	91.8
Dibenz(a.h)anthracene	<0.500	<0.500	<0.500	9.18
Benzo(g.h.i)perylene	<0.500	<0.500	<0.500	10,000

4.1.2 Underground Fuel Pipeline BH2

A total of 5 soil samples were collected within the scope of this CAR at BH2 for laboratory testing. The testing results are summarised in **Table 4.2** and the testing reports are presented in **Appendix H**. The testing results of all parameters indicated that all soil samples from BH2 were below the value of Risk-Based Remediation Goals (RBRGs) for Industrial.

Table 4.2: Laboratory Testing Results of Soil Samples at BH2

Compound	Concentration (mg/kg)					
	NCTS1	BH2-S1	BH2-S2	BH2-S3	BH2-S6	RBRGs for Industrial
Heavy Metals						
Lead	9	52	80	48	41	2290
PCRs						
C6 - C8	<5	<5	<5	<5	<5	C6 - C8: 10,000
C9 - C16	<200	<200	<200	<200	<200	C9 - C16: 10,000
C17 - C35	<500	<500	<500	<500	<500	C17 - C35: 10,000
VOCs						
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	9.21
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	10,000
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	8,240
Xylenes (Total)	<2.0	<2.0	<2.0	<2.0	<2.0	1,230
Methyl tert-Butyl Ether	<0.2	<0.2	<0.2	<0.2	<0.2	70.1
SVOCs						
Naphthalene	<0.500	<0.500	<0.500	<0.500	<0.500	453
Acenaphthylene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000
Acenaphthene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000
Fluorene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000
Phenanthrene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000
Anthracene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000
Fluoranthene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000
Pyrene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000
Benz(a)anthracene	<0.500	<0.500	<0.500	<0.500	<0.500	91.8
Chrysene	<0.500	<0.500	<0.500	<0.500	<0.500	1140
Benzo(b)fluoranthene	<0.500	<0.500	<0.500	<0.500	<0.500	17.8
Benzo(k)fluoranthene	<0.500	<0.500	<0.500	<0.500	<0.500	918
Benzo(a)pyrene	<0.500	<0.500	<0.500	<0.500	<0.500	9.18
Indeno(1.2.3.cd)pyrene	<0.500	<0.500	<0.500	<0.500	<0.500	91.8
Dibenz(a.h)anthracene	<0.500	<0.500	<0.500	<0.500	<0.500	9.18
Benzo(g.h.i)perylene	<0.500	<0.500	<0.500	<0.500	<0.500	10,000

5 Final Inspection and Record Checking Findings

5.1 General

According to Section 3.2.5 of the SCAP, it is recommended that final inspection and record checking should be conducted right before decommissioning/ demolition of the 450 L above-ground fuel tank equipped with drip tray (i.e. BH 3) and the above-ground emergency generator (i.e. BH 4) to ensure no contaminative activities during the period from the time of preparation of SCAP till the decommissioning.

BH3 and BH4 have been decommissioned/ demolished in early April 2019. Summary of final inspection and record checking are given in ensuing paragraphs.

5.1.1 Final Inspection Findings

Final inspection of the BH3 and BH4 was conducted on 19 March 2019. The demolition of Emergency Generator Room building structure was commenced in early April 2019 which leading to unsafe condition for further inspection of the facilities.

During our final inspection, BH 3 and BH 4 are at the same locations as for the time of preparation of SCAP in 2018. Both facilities are mounted on intact concrete floor with no oil stain. The above-ground fuel tank was surrounded by concrete curb and no oil stain was observed on its drip tray.

The fuel pipelines running through BH3 and BH4 are buried by sand inside a concrete and brick trench at floor level. 2 sections of the pipelines were checked by removing the chequer plate cover and no sign of leakage was observed.

Photo record of final inspection is presented in **Appendix I**.

5.1.2 Record Checking Findings

Available monthly maintenance records of BH3 and BH4 from the time of SCAP preparation (i.e. March 2018) to 23 February 2019 (date of last maintenance) has been checked in March 2019. No abnormality on fuel re-filling record have been observed and no fuel tank leakage was recorded, it is considered that no fuel leakage for the above-ground facilities BH3 and BH4 from the time of SCAP preparation till decommissioning/ demolition.

6 Conclusion

Enhanced SI programme have been conducted for the underground section, BH1, segment of BH2 running from BH1 to sampling point BH2-S3, and segment at BH2-S6, in October and November 2019 respectively. During the enhanced SI programme, a total of 2 sands and 6 soil samples were collected at BH1, the segment of BH2 running from BH1 to sampling point BH2-S3, and sampling point BH2-S6 and testing of CoCs was undertaken. From the testing results, it is concluded that all the samples at BH1 and the segment of BH2 were below the RBRGs standard for industrial. It is considered that there are no land contamination issues at BH1, the segment of BH2 running from BH1 to sampling point BH2-S3, and segment at BH2-S6, and therefore remediation works are not required.

Final inspection and record checking have been conducted right before decommissioning/demolition of the above-ground section of EPSS1 (i.e. BH3 and BH4). According to the inspection and record checking results, it is considered that no contaminative activities during the period from the preparation of SCAP till decommissioning/demolition of the above-ground facilities.

Construction works will only be conducted at (i) areas around BH1 and BH2-S3 and (ii) above-ground structures at BH3 and BH4 (see delineated areas by orange dotted-line for BH1, BH3 and BH4 in **Appendix F**). No works will be conducted in other areas within the Emergency Power Supply System No. 1 prior to the agreement of Vol. 2 of the CAR for T2 EPPS1, or Remediation Report for T2 EPPS1 (if remediation is required). No works will be conducted for BH2-S6 at current stage and the works for BH2-S6 will be conducted together with the system portion to be included in Vol. 2 of the CAR for T2 EPPS1.

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A. Updated Implementation Schedule of Land Contamination – Construction Phase

Table C.1: Implementation Schedule (Extracted)

EIA Ref.	EM &A Ref.	EP Condi-tion	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Implementatio n Agent	Implementation Stage	Mitigation Measures Implemented?^	
							Yes	No
Land Contamination – Construction Phase								
11.1 0.1.2 to 11.1 0.1.3	8.1	2.32	<p>For areas inaccessible during site reconnaissance survey:</p> <ul style="list-style-type: none"> Further site reconnaissance would be conducted once the areas are accessible in order to identify any land contamination concern for the areas. Subject to further site reconnaissance findings, a supplementary Contamination Assessment Plan (CAP) for additional site investigation (SI) (if necessary) may be prepared and submitted to EPD for endorsement prior to the commencement of SI at these areas. After completion of SI, the Contamination Assessment Report (CAR) will be prepared and submitted to EPD for approval prior to start of the proposed construction works at the golf course, the underground and above-ground fuel storage tank areas, emergency power generation units, airside petrol filling station and fuel tank room. Should remediation be required, Remediation Action Plan (RAP) and Remediation Report (RR) will be prepared for EPD's approval prior to commencement of the proposed remediation and any construction works respectively. 	Project Site Area inaccessible during site reconnaissance / Q1 2020 onwards	AAHK/ Contractor	✓		
11.8. 1.2	8.1	-	<p>If contaminated soil is identified, the following mitigation measures are for the excavation and transportation of contaminated materials (if any):</p> <ul style="list-style-type: none"> To minimize the incidents of construction workers coming in contact with any contaminated materials, bulk earth-moving excavation equipment should be employed; Contact with contaminated materials can be minimised by wearing appropriate clothing and personal protective equipment such as gloves and masks (especially when working directly with contaminated material), provision of washing facilities and prohibition of smoking and eating on site; Stockpiling of contaminated excavated materials on site should be avoided as far as possible; The use of any contaminated soil for landscaping purpose should be avoided unless pre-treatment was carried out; 	Project Site Area / Q1 2020 onwards	Contractor	✓		

- Vehicles containing any excavated materials should be suitably covered to reduce dust emissions and/or release of contaminated wastewater;
 - Truck bodies and tailgates should be sealed to prevent any discharge;
 - Only licensed waste haulers should be used to collect and transport contaminated material to treatment/disposal site and should be equipped with tracking system to avoid fly tipping;
 - Speed control for trucks carrying contaminated materials should be exercised. 8km/h is the recommended speed limit;
 - Strictly observe all relevant regulations in relation to waste handling, such as Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354) and obtain all necessary permits where required; and
 - Maintain records of waste generation and disposal quantities and disposal arrangements.
-

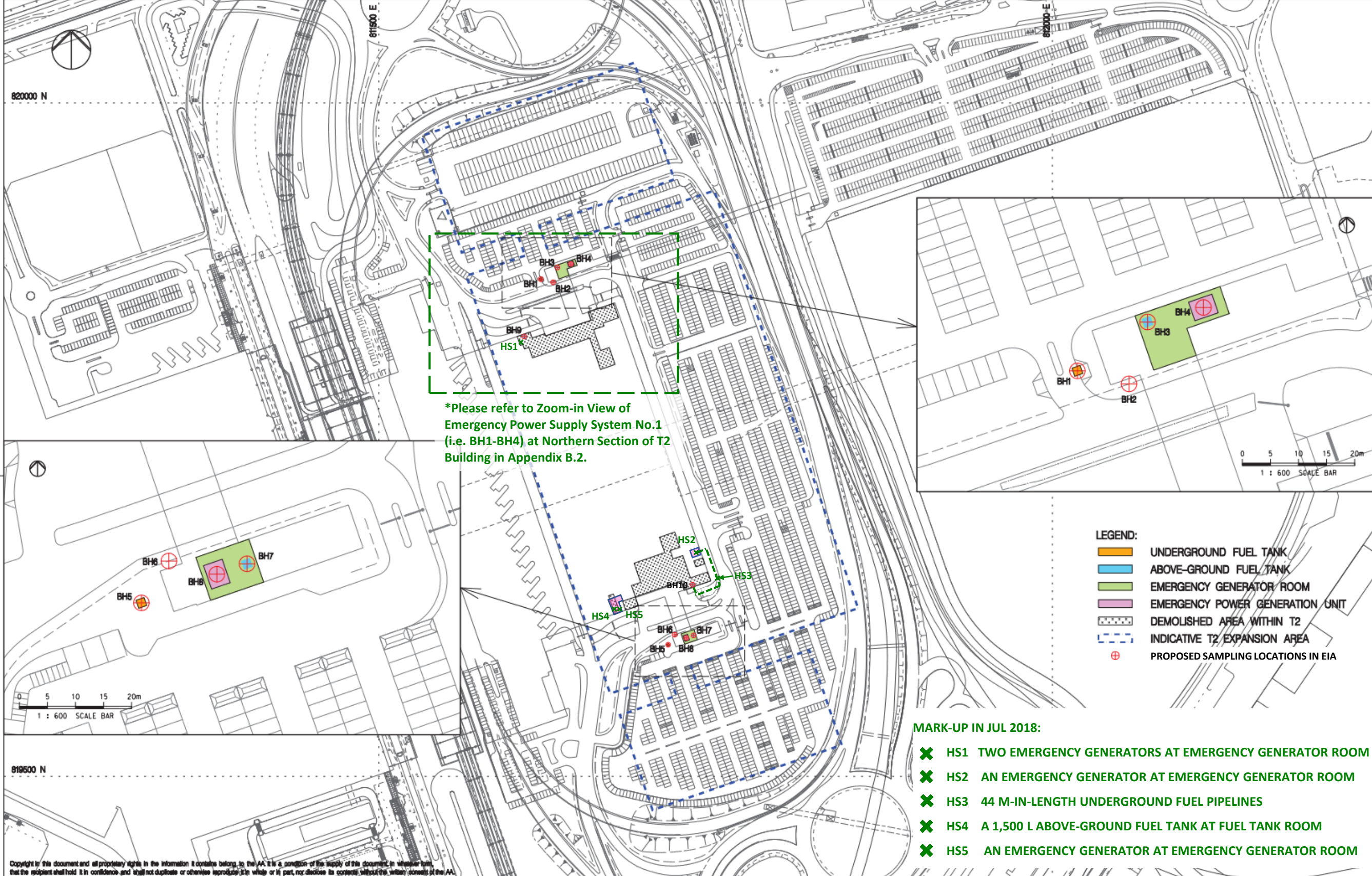
B. Location of Emergency Power Supply System No.1 of T2 Building Proposed SI Locations for Expansion of T2 Building

B.1 Location of Emergency Power Supply System No.1 of T2 Building (Overview)

B.2 Location of Emergency Power Supply System No.1 of T2 Building (Zoom-in View of Northern Section of T2 Building)

Appendix B.1

Location of Emergency Power Supply System No.1 of T2 Building (Overview)



*Please refer to Zoom-in View of Emergency Power Supply System No.1 (i.e. BH1-BH4) at Northern Section of T2 Building in Appendix B.2.

- LEGEND:**
- UNDERGROUND FUEL TANK
 - ABOVE-GROUND FUEL TANK
 - EMERGENCY GENERATOR ROOM
 - EMERGENCY POWER GENERATION UNIT
 - DEMOLISHED AREA WITHIN T2
 - INDICATIVE T2 EXPANSION AREA
 - ⊕ PROPOSED SAMPLING LOCATIONS IN EIA

- MARK-UP IN JUL 2018:**
- ✕ HS1 TWO EMERGENCY GENERATORS AT EMERGENCY GENERATOR ROOM
 - ✕ HS2 AN EMERGENCY GENERATOR AT EMERGENCY GENERATOR ROOM
 - ✕ HS3 44 M-IN-LENGTH UNDERGROUND FUEL PIPELINES
 - ✕ HS4 A 1,500 L ABOVE-GROUND FUEL TANK AT FUEL TANK ROOM
 - ✕ HS5 AN EMERGENCY GENERATOR AT EMERGENCY GENERATOR ROOM

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Rev.	Date	Description	Checked
A	23OCT13	FIRST ISSUE	EC
B	21NOV13	GENERAL REVISION	AM
C	17DEC13	GENERAL REVISION	AM



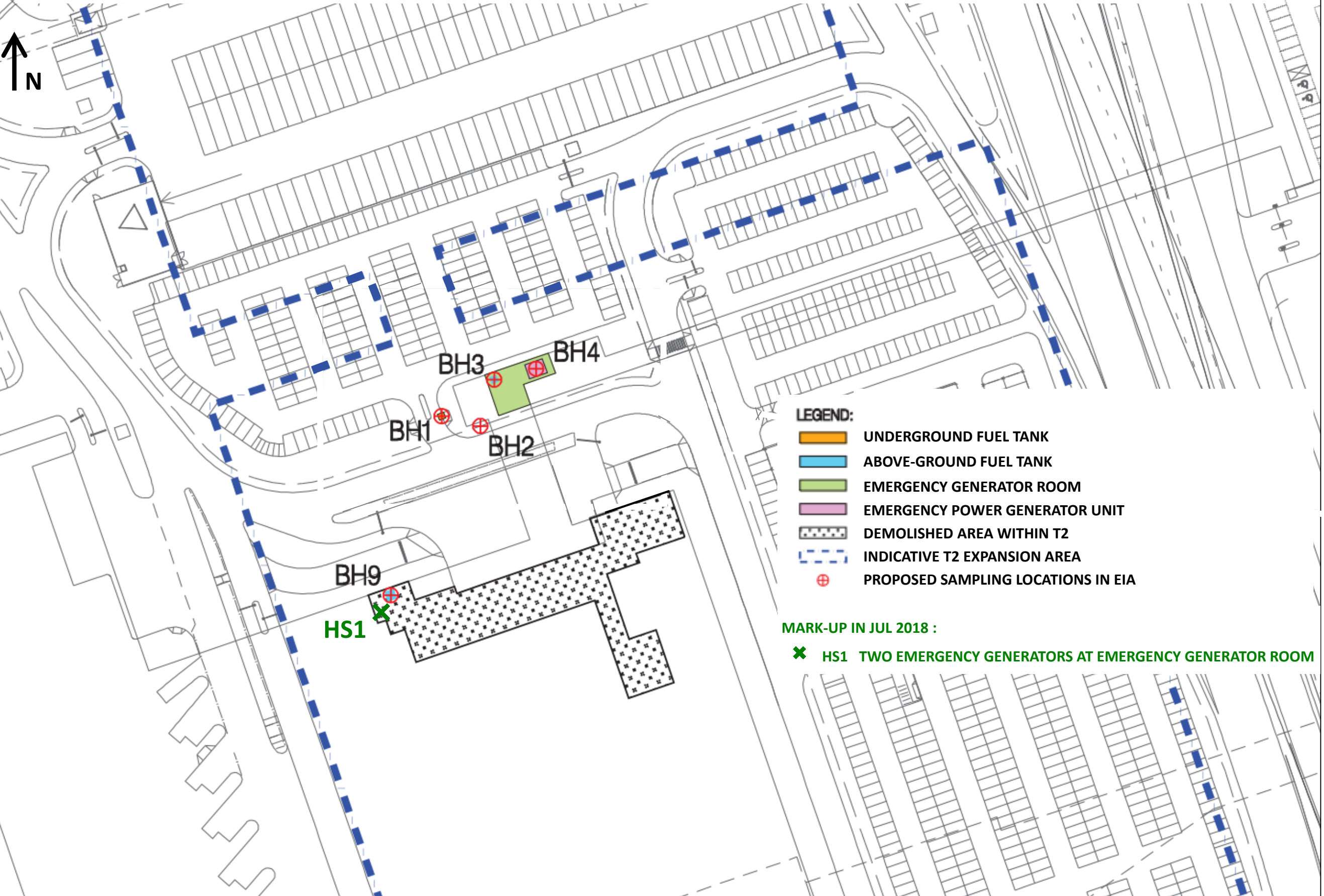
PROPOSED SAMPLING LOCATIONS FOR EXPANSION OF T2 BUILDING

Consultant's Signatures for Approval		Date
Design	AM	23OCT13
Checkers	AM	23OCT13
Design Supervisor	EC	21MAR14
Authorised Representative	AFK	21MAR14








EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM		Scale at A3
Drawing No.	MCL / P132 / EIA / 11-014	1 : 2500
Rev.	C	

Appendix B.2

Location of Emergency Power Supply System No.1 of T2 Building (Zoom-in View of Northern Section of T2 Building)



LEGEND:

-  UNDERGROUND FUEL TANK
-  ABOVE-GROUND FUEL TANK
-  EMERGENCY GENERATOR ROOM
-  EMERGENCY POWER GENERATOR UNIT
-  DEMOLISHED AREA WITHIN T2
-  INDICATIVE T2 EXPANSION AREA
-  PROPOSED SAMPLING LOCATIONS IN EIA

MARK-UP IN JUL 2018 :




-  **HS1 TWO EMERGENCY GENERATORS AT EMERGENCY GENERATOR ROOM**

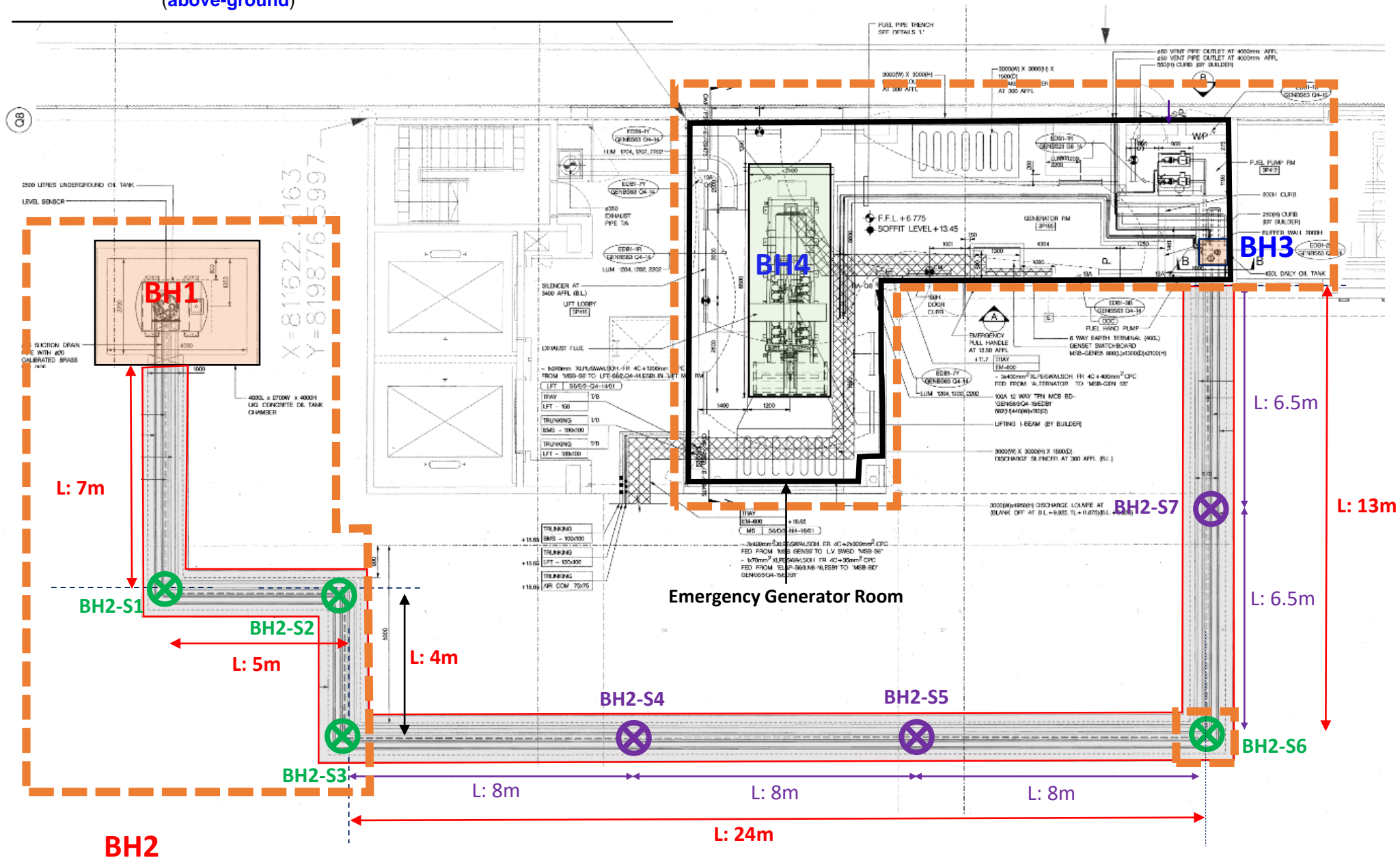
C. Identified Potential Land Contaminated Source of Emergency Power Supply System No.1 (EPSS1) in SCAP

Appendix C Identified Potential Land Contaminated Source of Emergency Power Supply System No.1 (EPSS1) in SCAP

Reference ID	Description
BH1	A 2,500 L underground fuel tank
BH3	A 450 L above-ground fuel tank at Emergency Generator Room
BH2	53 m-in-length underground fuel pipelines connecting the 2,500 L underground fuel tank (i.e. BH1) and the 450 L above-ground fuel tank (i.e. BH3)
BH4	An emergency generator at Emergency Generator Room (above-ground)

LEGEND:

-  Curvature Sampling Point - Indicative Sampling Point Selection of Underground Pipeline Trench of EPSS1 (i.e. BH2) in SCAP
-  Additional Sampling Point - Indicative Sampling Point Selection of Underground Pipeline Trench of EPSS1 (i.e. BH2) in SCAP
-  Scope of this Contamination Assessment Report (CAR)





Total Length: Approx. 53 m

D. Indicative Sampling Point Selection of BH1 and BH2 - BH2-S1, BH2-S2, BH2-S3, BH2-S6 in SCAP

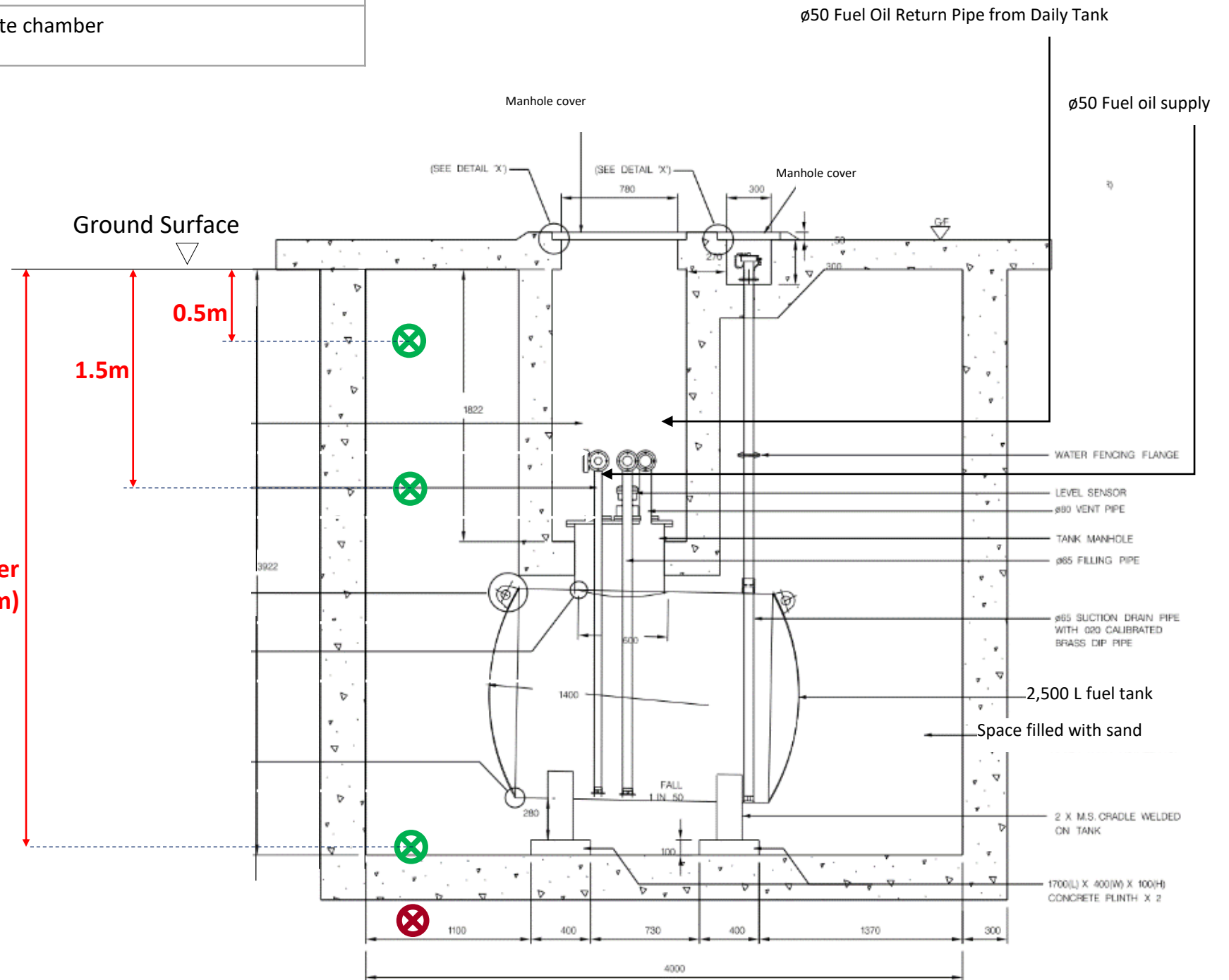
Appendix D.1 Indicative Sampling Point Selection of **BH1** and **BH2 - BH2-S1, BH2-S2, BH2-S3, BH2-S6)** in SCAP - **BH1**

Sample	Sampling Point Selection Strategy
Sand	0.5 m, 1.5 m Below Ground Surface and bottom level inside the concrete chamber
Soil	Right underneath concrete chamber

Legend:

-  Sand Sampling Point
-  Soil Sampling Point

Depth of concrete chamber (~3.9 m)



Indicative Sampling Point Selection of 2,500 L Underground Fuel Tank of Emergency Power Supply System No.1 (i.e. **BH1**)

Appendix D.2 Indicative Sampling Point Selection of **BH1** and **BH2 - BH2-S1, BH2-S2, BH2-S3, BH2-S6**) in SCAP - **BH2 - BH2-S1, BH2-S2, BH2-S3**

Annotation of Sampling Point	Type of Sampling Point (Curvature/ Additional)	Sample		Remarks
		At the level of fuel pipelines (Within Concrete Trench)	Right underneath concrete trench	
BH2-S1	Curvature	Sand	Soil	Under the scope of this CAR
BH2-S2	Curvature		Soil	
BH2-S3	Curvature		Soil	
BH2-S6	Curvature		Soil	
BH2-S4	Additional	Sand	-	NOT under the scope of this CAR (BH2-S4, BH2-S5 and BH2-S7 will be presented in Vol. 2 of the CAR for T2 EPPS1.)
BH2-S5	Additional		-	
BH2-S7	Additional		-	

LEGEND:



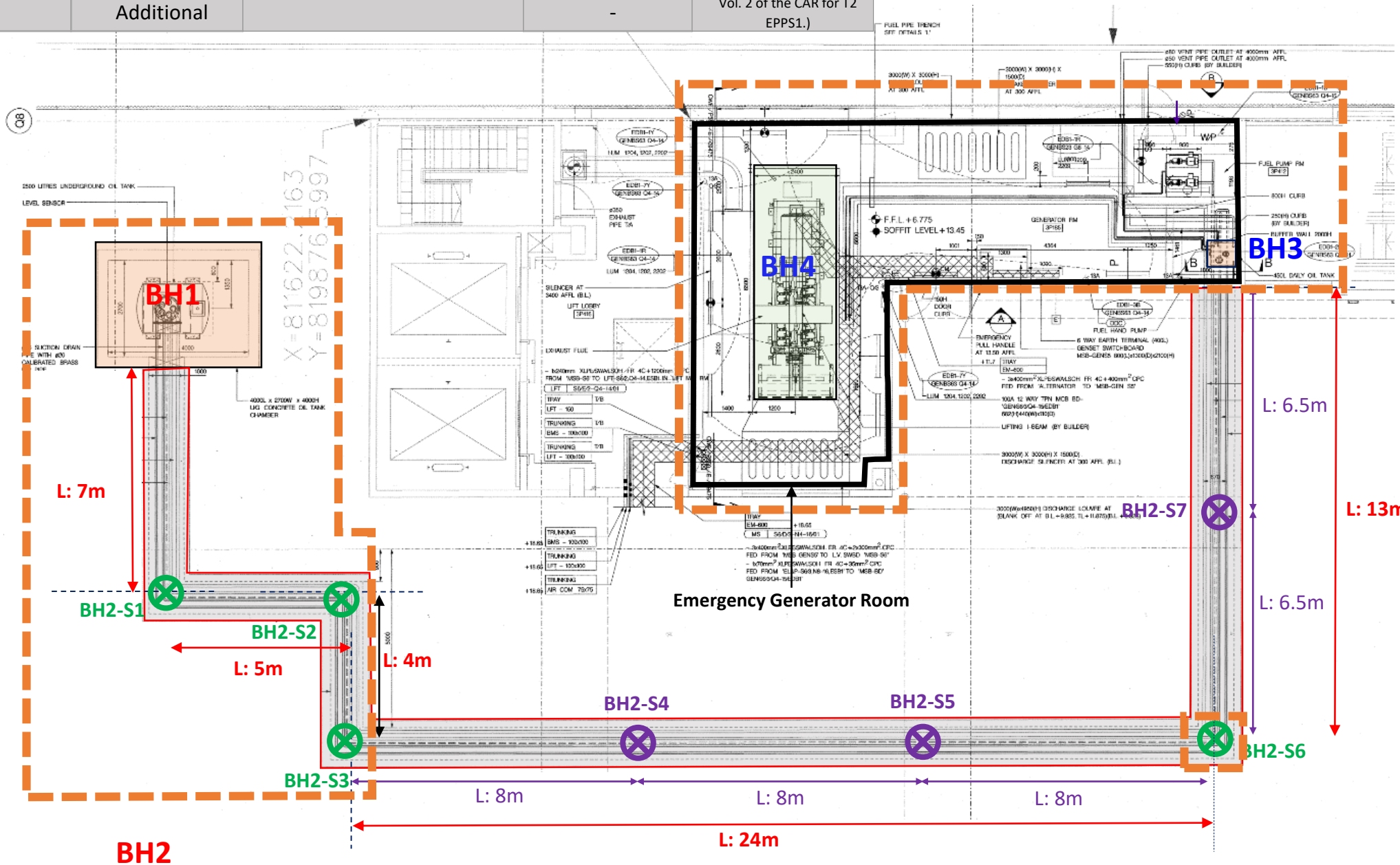
Curvature Sampling Point - Indicative Sampling Point Selection of Underground Pipeline Trench of EPSS1 (i.e. **BH2**) in SCAP



Additional Sampling Point - Indicative Sampling Point Selection of Underground Pipeline Trench of EPSS1 (i.e. **BH2**) in SCAP



Scope of this Contamination Assessment Report (CAR)



BH2
Total Length: Approx. 53 m

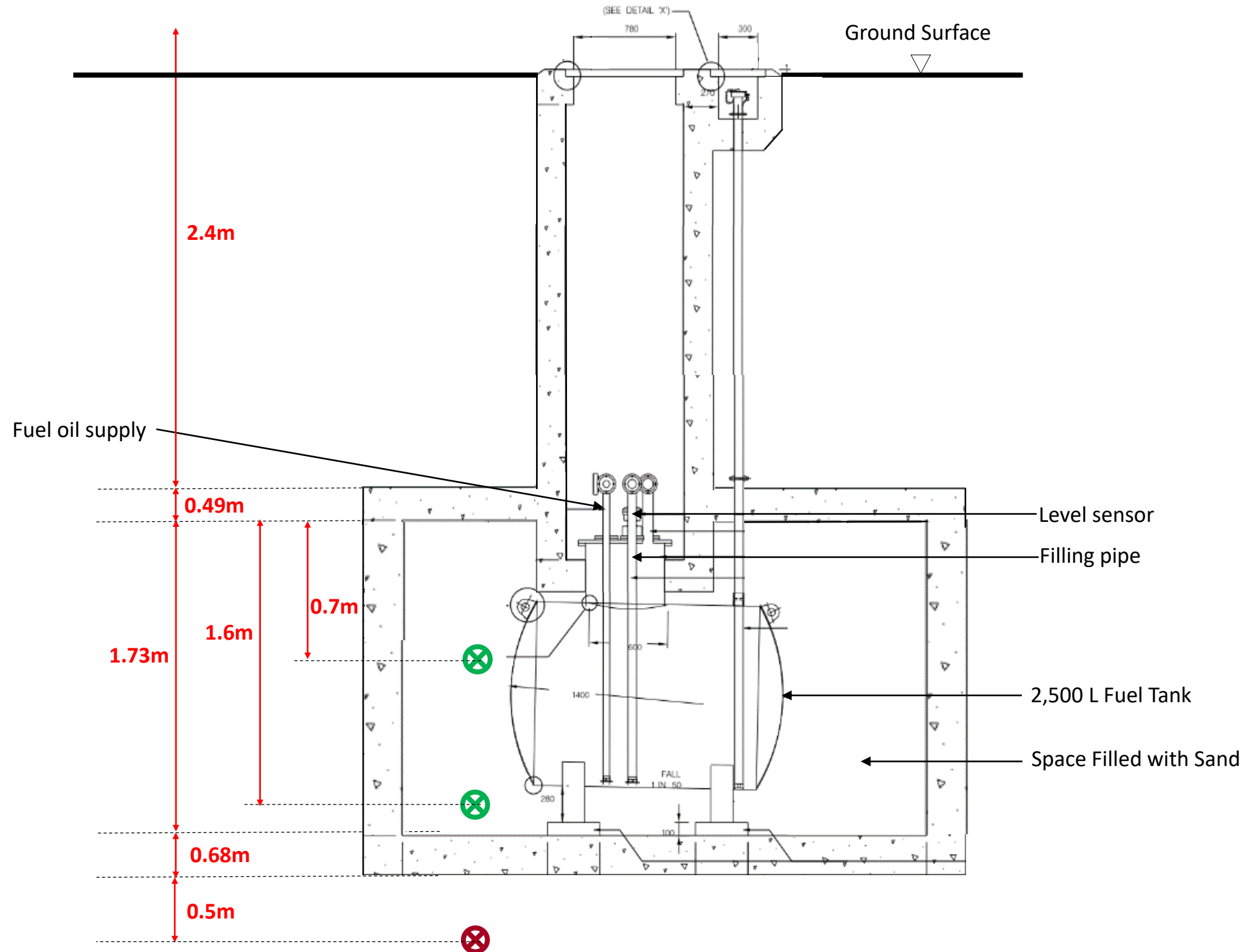
E. Structure and Actual Sampling Depth of 2,500 L Underground Fuel Tank of EPPS1 (i.e. BH1)

Appendix E Structure and Actual Sampling Depth of 2,500 L Underground Fuel Tank of EPPS1 (i.e. **BH1**)

Legend:

⊗ Sand Sampling Point

⊗ Soil Sampling Point






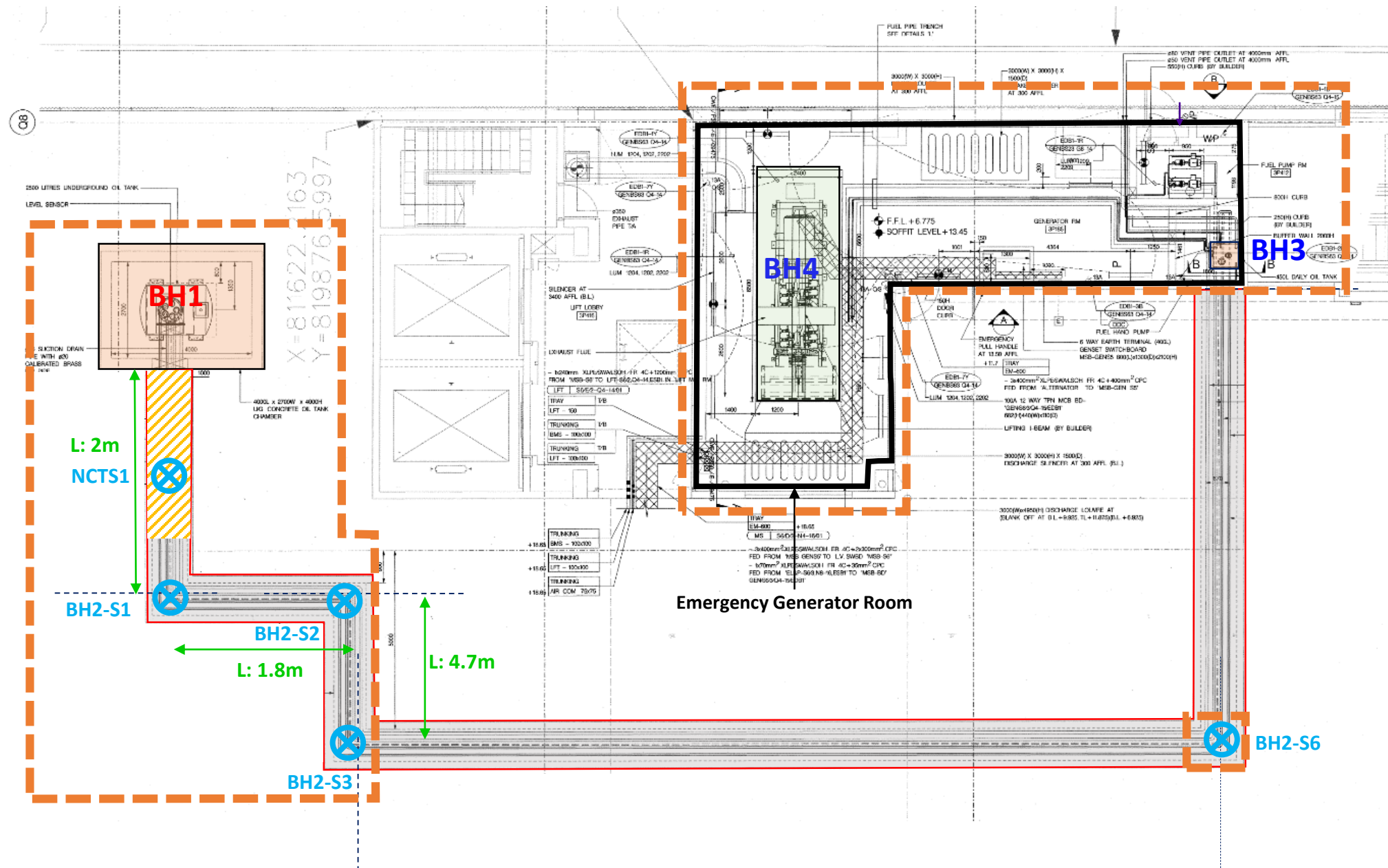
F. Actual Sampling Point of Underground Pipeline Trench of EPSS1 (i.e. BH2 - BH2-S1, BH2-S2, BH2-S3, BH2-S6)

Appendix F Actual Sampling Point of Underground Pipeline Trench of EPSS1 (i.e. **BH2 - BH2-S1, BH2-S2, BH2-S3, BH2-S6**)

Annotation of Sampling Point	Type of Sampling Point	Sampling Elevation	Type of Sample	Remarks
NCTS1	Newly added according to on-site condition	Right underneath the segment of underground pipeline	Soil	Newly added according to on-site condition (Segment of underground pipeline not laid in concrete trench)
BH2-S1	Curvature	Right underneath concrete trench corner		Same sampling point selection in SCAP
BH2-S2	Curvature			
BH2-S3	Curvature			
BH2-S6	Curvature			

LEGEND:

-  Actual Sampling Point
- TEXT On-site Measurement of Underground Pipeline/Concrete Trench
-  Segment of underground pipeline not laid in concrete trench
-  Scope of this Contamination Assessment Report (CAR)



G. Chain-of-Custody Record

CHAIN OF CUSTODY DOCUMENTATION

H 037888



ALS Laboratory Group

CLIENT: Mott MacDonald HK Limited
 ADDRESS / OFFICE: Mott MacDonald, 3/F International Trade Tower, 348 Queen Tong Road, Kowloon, HK
 PROJECT MANAGER (PM): Thomas Chan
 PROJECT ID: Soil Testing at Hong Kong Airport
 SITE: Contract No. 3503 T2 Foundation & SW P.O. NO.:

SAMPLER:
 MOBILE: 93079680 (Liz Lo)
 PHONE: 2828 5751 (Liz Lo)
 EMAIL REPORT TO: liz_lo@mottmac.com
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.: HKF11866/2018

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	BH1-700MBS	S	4/10/2019		Glass Jar	1
2	BH1-1600MBS	S	4/10/2019		Glass Jar	1
3	BH1-UNDERS500	S	4/10/2019		Glass Jar	1
4	Trip Blank	W	4/10/2019		Vials	2

Lead	TPH	BTEX	MTBE	PAH	C6-C8
✓	✓	✓	✓	✓	
✓	✓	✓	✓	✓	
✓	✓	✓	✓	✓	
		✓	✓		✓

RELINQUISHED BY:
 Name: Thomas Chan Date: 4 Oct 2019
 Of: Mott MacDonald Time: 13:30

RECEIVED BY:
 Name: Kefun Lam Date: 4-Oct-2019
 Of: ALS HK Time: 13:40

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 037995/



ALS Laboratory Group

CLIENT: Mott MacDonald HK Limited
 ADDRESS/OFFICE: Mott MacDonald, 31E International Trade Tower, 348 Kowloon Road, Kowloon, HK
 PROJECT MANAGER (PM): Thomas Chan

SAMPLER:
 MOBILE: 9307 9680 (Liz Lo)
 PHONE: 2828 5751 (Liz Lo)

PROJECT ID: Soil Testing at Hong Kong Airport
 SITE: Contract No. 3503 T2 Foundation & SW P.O. NO.:

EMAIL REPORT TO: liz.lo@mottmac.com
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.: HK E/1861c/2018

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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Lead	TPH	BTX	MTBE	PAHs	16-cs
1	NCTSI	S	4/11/2019		Glass Jar	1	✓	✓	✓	✓	✓	
2	BH2-S3	S	4/11/2019		Glass Jar	1	✓	✓	✓	✓	✓	
3	BH2-S1	S	4/11/2019		Glass Jar	1	✓	✓	✓	✓	✓	
4	BH2-S2	S	4/11/2019		Glass Jar	1	✓	✓	✓	✓	✓	
5	Trip Blank	W	4/11/2019		Vials	2			✓	✓	✓	

RELINQUISHED BY:
 Name: Thomas Chan
 Of: Mott MacDonald HK Limited
 Date: 4 Nov 2019
 Time:

RECEIVED BY:
 Name: Liz Lo (ALS)
 Of: ALS (CHK)
 Date: 4-11-2019
 Time: 17:25

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 037996



ALS Laboratory Group

CLIENT: Mott MacDonald HK Limited
 ADDRESS / OFFICE: Mott MacDonald, 3/F International Trade Tower, 348 King's Road, Kowloon, HK
 PROJECT MANAGER (PM): Thomas Chan
 PROJECT ID: Soil Testing at Hong Kong Airport
 SITE: Contract No. 3503 T2 Foundation & SW

SAMPLER:
 MOBILE: 9307 9680 (Liz Lo)
 PHONE: 2828 5751 (Liz Lo)
 EMAIL REPORT TO: liz.lo@mottmac.com
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.: HKE 118610/2018

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 (MA)
 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

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Lead	TPH	BETX	MTBE	PAH (6-18)										
1.	BH2-S6	S	14/11/2019		Glass Jar	1	✓	✓	✓	✓	✓										
2.	Trip Blank	W	14/11/2019		Vials	2			✓	✓		✓									
3.	Equipment Blank	W	14/11/2019		1 Amber, 2 vials, 1 plastic		✓	✓	✓	✓	✓										
4.	Field Blank	W	14/11/2019		1 Amber, 2 vials, 1 plastic		✓	✓	✓	✓	✓										
5.	BH2-S6 (Duplicate)	S	14/11/2019		Glass Jar	1	✓	✓	✓	✓	✓										

RELINQUISHED BY:
 Name: Thomas Chan
 Of: Mott MacDonald
 Date: 14 Nov 2019
 Time:

RECEIVED BY:
 Name: Kekin Lau
 Of: ALS HK
 Date: 14-Nov-2019
 Time: 19:00

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.

H. Laboratory Testing Results of BH1 and BH2

H.1 Laboratory Testing Results of BH1

H.2 Laboratory Testing Results of BH2




**CERTIFICATE OF ANALYSIS**

Client	: MOTT MACDONALD HONG KONG LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 12
Contact	: THOMAS CHAN	Contact	: Richard Fung	Work Order	: HK1942798
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E-mail	: thomas.chan@mottmac.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 2828 5933	Telephone	: +852 2610 1044	Date Samples Received	: 04-Oct-2019
Facsimile	: +852 2828 1823	Facsimile	: +852 2610 2021	Issue Date	: 16-Oct-2019
Project	: SOIL TESTING AT HONG KONG AIRPORT			No. of samples received	: 4
Order number	: ---	Quote number	: HKE/1861c/2018	No. of samples analysed	: 4
C-O-C number	: H037888				
Site	: CONTRACT NO. C3503 TERMINAL 2 FOUNDATION AND SUBSTRUCTURE WORKS				

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

<i>Signatories</i>	<i>Position</i>	<i>Authorised results for</i>
 Anh Ngoc Huynh .	Senior Chemist	Organics_ENV
 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. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 04-Oct-2019 to 15-Oct-2019.

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: HK1942798

Sample(s) were received in chilled condition.

Water sample(s) analysed and reported on as received basis.

Soil sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

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

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				Client sample ID	BH1-700MBS	BH1-1600MBS	BH1-UNDERS500	---	---
				Client sampling date / time	04-Oct-2019	04-Oct-2019	04-Oct-2019	---	---
Compound	CAS Number	LOR	Unit	HK1942798-001	HK1942798-002	HK1942798-003	-----	-----	-----
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	20.2	19.4	13.6	---	---	---
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	1	mg/kg	9	8	38	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Dibenz(a,h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP076HK: Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	<0.500	---	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	<5	<5	---	---	---
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	<200	<200	---	---	---
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	<500	<500	<500	---	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	---	---	---
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	---	---	---
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	---	---	---



Sub-Matrix: SOIL				Client sample ID	BH1-700MBS	BH1-1600MBS	BH1-UNDERS500	---	---
				Client sampling date / time	04-Oct-2019	04-Oct-2019	04-Oct-2019	---	---
Compound	CAS Number	LOR	Unit	HK1942798-001	HK1942798-002	HK1942798-003	---	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) - Continued									
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	<1.0	---	---	---
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	---	---	---
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	<2.0	---	---	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	<0.2	<0.2	---	---	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	79.6	83.7	88.5	---	---	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	90.1	89.9	87.5	---	---	---
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	94.2	94.4	93.1	---	---	---
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	105	105	106	---	---	---
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	102	102	100	---	---	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	94.2	94.4	93.1	---	---	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%	105	105	106	---	---	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	102	102	100	---	---	---



Sub-Matrix: WATER				Client sample ID	Trip Blank	---	---	---	---
				Client sampling date / time	04-Oct-2019	---	---	---	---
Compound	CAS Number	LOR	Unit	HK1942798-004	---	---	---	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	20	µg/L	<20	---	---	---	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: Toluene	108-88-3	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L	<10	---	---	---	---	---
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: Xylenes (Total)	----	20	µg/L	<20	---	---	---	---	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	---	---	---	---	---
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	107	---	---	---	---	---
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	108	---	---	---	---	---
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	101	---	---	---	---	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	107	---	---	---	---	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%	108	---	---	---	---	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	101	---	---	---	---	---



Laboratory Duplicate (DUP) Report

Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2630253)								
HK1942798-001	BH1-700MBS	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	20.2	20.0	1.14
HK1943120-005	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	12.6	12.6	0.00
EG: Metals and Major Cations (QC Lot: 2631832)								
HK1942473-001	Anonymous	EG020: Lead	7439-92-1	1	mg/kg	57	52	9.04
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2627021)								
HK1942736-001	Anonymous	Naphthalene	91-20-3	50	µg/kg	<50	<50	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.00
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.00
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.00
		Phenanthrene	85-01-8	50	µg/kg	<50	<50	0.00
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.00
		Fluoranthene	206-44-0	50	µg/kg	<150	<150	0.00
		Pyrene	129-00-0	50	µg/kg	<150	<150	0.00
		Benz(a)anthracene	56-55-3	50	µg/kg	<150	<150	0.00
		Chrysene	218-01-9	50	µg/kg	<150	<150	0.00
		Benzo(b)fluoranthene	205-99-2	50	µg/kg	<150	<150	0.00
		Benzo(k)fluoranthene	207-08-9	50	µg/kg	<150	<150	0.00
		Benzo(a)pyrene	50-32-8	50	µg/kg	<150	<150	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<150	<150	0.00
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<150	<150	0.00		
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<150	<150	0.00		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2618554)								
HK1941870-001	Anonymous	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2627023)								
HK1942736-001	Anonymous	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.00
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2627026)								
HK1942798-001	BH1-700MBS	EP074_SR: Benzene	71-43-2	0.1	mg/kg	<0.2	<0.2	0.00
		EP074_SR: Toluene	108-88-3	0.2	mg/kg	<0.5	<0.5	0.00
		EP074_SR: Ethylbenzene	100-41-4	0.2	mg/kg	<0.5	<0.5	0.00



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2627026) - Continued								
HK1942798-001	BH1-700MBS	EP074_SR: ortho-Xylene	95-47-6	0.2	mg/kg	<0.5	<0.5	0.00
		EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<1.0	<1.0	0.00
		EP074_SR: Xylenes (Total)	----	1	mg/kg	<2.0	<2.0	0.00
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2627026)								
HK1942798-001	BH1-700MBS	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	<0.2	0.00

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

Matrix: SOIL				Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
EG: Metals and Major Cations (QC Lot: 2631832)												
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	99.0	----	92.0	115	----	----	
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2627021)												
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	76.6	----	52.0	116	----	----	
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	86.4	----	48.0	107	----	----	
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	79.6	----	55.0	109	----	----	
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	81.7	----	53.0	119	----	----	
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	80.6	----	70.0	106	----	----	
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	82.4	----	35.0	108	----	----	
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	84.4	----	60.0	125	----	----	
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	84.1	----	60.0	124	----	----	
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	79.0	----	53.0	120	----	----	
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	79.6	----	56.0	133	----	----	
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	81.0	----	56.0	130	----	----	
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	78.6	----	64.0	128	----	----	
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	77.7	----	24.0	119	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	81.9	----	47.0	128	----	----	
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	77.3	----	55.0	114	----	----	
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	77.7	----	44.0	128	----	----	



Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2618554)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	103	----	78.0	131	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2627023)											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	104	----	70.0	118	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	81.0	----	50.0	111	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2627026)											
EP074_SR: Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	104	----	86.0	122	----	----
EP074_SR: Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	105	----	86.0	123	----	----
EP074_SR: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	103	----	87.0	121	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.5 mg/kg	94.8	----	83.0	118	----	----
EP074_SR: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	104	----	85.0	117	----	----
EP074_SR: Xylenes (Total)	----	1	mg/kg	<1.0	0.75 mg/kg	98.0	----	85.0	116	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2627026)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	90.3	----	77.0	104	----	----
Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2627962)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	87.0	----	74.0	120	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2627961)											
EP074_SR: Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	117	----	80.0	127	----	----
EP074_SR: Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	117	----	76.0	128	----	----
EP074_SR: Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	118	----	74.0	121	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	107	----	77.0	107	----	----
EP074_SR: ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	118	----	82.0	124	----	----
EP074_SR: Xylenes (Total)	----	2	µg/L	<2	6 µg/L	110	----	82.0	113	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2627961)											



Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2627961) - Continued											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	107	----	61.0	120	----	----



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

Matrix: SOIL

					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2631832)										
HK1941888-001	Anonymous	EG020: Lead	7439-92-1	5 mg/kg	84.6	----	75.0	125	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2627021)										
HK1941888-001	Anonymous	Naphthalene	91-20-3	250 µg/kg	77.2	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	85.8	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	79.0	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	82.4	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	81.4	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	82.4	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	84.2	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	84.1	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	76.8	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	77.1	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	79.1	----	50.0	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	75.1	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	73.9	----	50.0	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	79.2	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	74.0	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	76.2	----	50.0	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2618554)										
HK1941871-001	Anonymous	C6 - C8 Fraction	----	4.5 mg/kg	100	----	50.0	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2627023)										
HK1942736-001	Anonymous	C9 - C16 Fraction	----	31.5 mg/kg	94.7	----	50.0	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	64.1	----	50.0	130	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2627026)										
HK1942798-002	BH1-1600MBS	EP074_SR: Benzene	71-43-2	0.25 mg/kg	94.2	----	50.0	130	----	----
		EP074_SR: Toluene	108-88-3	0.25 mg/kg	102	----	50.0	130	----	----
		EP074_SR: Ethylbenzene	100-41-4	0.25 mg/kg	105	----	50.0	130	----	----



Matrix: SOIL				<i>Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report</i>						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2627026) - Continued										
HK1942798-002	BH1-1600MBS	EP074_SR: meta- & para-Xylene	108-38-3	0.5 mg/kg	96.7	----	50.0	130	----	----
			106-42-3							
		EP074_SR: ortho-Xylene	95-47-6	0.25 mg/kg	104	----	50.0	130	----	----
		EP074_SR: Xylenes (Total)	----	0.75 mg/kg	99.3	----	50.0	130	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2627026)										
HK1942798-002	BH1-1600MBS	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.25 mg/kg	78.8	----	50.0	130	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			



Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-074_SR-S: VOC Surrogates - Continued			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115




**CERTIFICATE OF ANALYSIS**

Client	: MOTT MACDONALD HONG KONG LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 12
Contact	: THOMAS CHAN	Contact	: Richard Fung	Work Order	: HK1947016
Address	: 3/F INTERNATIONAL TRADE TOWER, 348 KWUN TONG ROAD, KWUN TONG, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: thomas.chan@mottmac.com	E-mail	: richard.fung@alsglobal.com	Date Samples Received	: 04-Nov-2019
Telephone	: +852 2828 5933	Telephone	: +852 2610 1044	Issue Date	: 13-Nov-2019
Facsimile	: +852 2828 1823	Facsimile	: +852 2610 2021	No. of samples received	: 5
Project	: SOIL TESTING AT HONG KONG AIRPORT	Quote	: HKE/1861c/2018	No. of samples analysed	: 5
Order number	: ---				
C-O-C number	: H037995				
Site	: CONTRACT NO. C3503 TERMINAL 2 FOUNDATION AND SUBSTRUCTURE WORKS				

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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.

<i>Signatories</i>	<i>Position</i>	<i>Authorised results for</i>
 Anh Ngoc Huynh .	Senior Chemist	Organics_ENV
 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. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 04-Nov-2019 to 12-Nov-2019.

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: HK1947016

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., if any) is provided by client.

The result(s) of soil 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				Client sample ID	NCTS1	BH2-S3	BH2-S1	BH2-S2	---
Client sampling date / time					04-Nov-2019	04-Nov-2019	04-Nov-2019	04-Nov-2019	---
Compound	CAS Number	LOR	Unit	HK1947016-001	HK1947016-002	HK1947016-003	HK1947016-004	-----	
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	8.8	12.2	15.1	12.6	---	
EG: Metals and Major Cations									
EG020: Lead	7439-92-1	1	mg/kg	9	48	52	80	---	
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP076HK: Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	<0.500	<0.500	---	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	<5	<5	<5	---	
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	<200	<200	<200	---	
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	<500	<500	<500	<500	---	
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	---	
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	---	
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	---	



Sub-Matrix: SOIL				Client sample ID	NCTS1	BH2-S3	BH2-S1	BH2-S2	---
				Client sampling date / time	04-Nov-2019	04-Nov-2019	04-Nov-2019	04-Nov-2019	----
Compound	CAS Number	LOR	Unit	HK1947016-001	HK1947016-002	HK1947016-003	HK1947016-004	-----	
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) - Continued									
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	---
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	---
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	90.6	96.6	80.4	79.0	79.0	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	89.2	94.6	77.1	75.9	75.9	---
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	96.7	100	98.6	96.3	96.3	---
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	97.5	96.8	97.0	96.5	96.5	---
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	108	107	103	106	106	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	96.7	100	98.6	96.3	96.3	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%	97.5	96.8	97.0	96.5	96.5	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	108	107	103	106	106	---



Sub-Matrix: WATER				Client sample ID	Trip Blank	---	---	---	---
				Client sampling date / time	04-Nov-2019	---	---	---	---
Compound	CAS Number	LOR	Unit	HK1947016-005	---	---	---	---	---
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	20	µg/L	<20	---	---	---	---	---
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: Toluene	108-88-3	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L	<10	---	---	---	---	---
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L	<5.0	---	---	---	---	---
EP074_SR: Xylenes (Total)	----	20	µg/L	<20	---	---	---	---	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	---	---	---	---	---
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	100	---	---	---	---	---
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	102	---	---	---	---	---
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	104	---	---	---	---	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	100	---	---	---	---	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%	102	---	---	---	---	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	104	---	---	---	---	---



Laboratory Duplicate (DUP) Report

Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2688419)								
HK1947016-001	NCTS1	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	8.8	8.9	1.56
EG: Metals and Major Cations (QC Lot: 2682979)								
HK1946899-002	Anonymous	EG020: Lead	7439-92-1	1	mg/kg	64	71	11.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2681400)								
HK1946725-001	Anonymous	Naphthalene	91-20-3	50	µg/kg	<50	<50	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<50	<50	0.00
		Acenaphthene	83-32-9	50	µg/kg	<50	<50	0.00
		Fluorene	86-73-7	50	µg/kg	<50	<50	0.00
		Phenanthrene	85-01-8	50	µg/kg	104	94	10.6
		Anthracene	120-12-7	50	µg/kg	<50	<50	0.00
		Fluoranthene	206-44-0	50	µg/kg	<150	<150	0.00
		Pyrene	129-00-0	50	µg/kg	162	158	2.12
		Benz(a)anthracene	56-55-3	50	µg/kg	<150	<150	0.00
		Chrysene	218-01-9	50	µg/kg	<150	<150	0.00
		Benzo(b)fluoranthene	205-99-2	50	µg/kg	<150	<150	0.00
		Benzo(k)fluoranthene	207-08-9	50	µg/kg	<150	<150	0.00
		Benzo(a)pyrene	50-32-8	50	µg/kg	<150	<150	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<150	<150	0.00
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<150	<150	0.00		
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<150	<150	0.00		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2683067)								
HK1947016-001	NCTS1	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2683069)								
HK1947016-001	NCTS1	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.00
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2683070)								
HK1947016-001	NCTS1	EP074_SR: Benzene	71-43-2	0.1	mg/kg	<0.2	<0.2	0.00
		EP074_SR: Toluene	108-88-3	0.2	mg/kg	<0.5	<0.5	0.00
		EP074_SR: Ethylbenzene	100-41-4	0.2	mg/kg	<0.5	<0.5	0.00
		EP074_SR: ortho-Xylene	95-47-6	0.2	mg/kg	<0.5	<0.5	0.00



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2683070) - Continued								
HK1947016-001	NCTS1	EP074_SR: meta- & para-Xylene	108-38-3	0.4	mg/kg	<1.0	<1.0	0.00
			106-42-3					
		EP074_SR: Xylenes (Total)	----	1	mg/kg	<2.0	<2.0	0.00
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2683070)								
HK1947016-001	NCTS1	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	<0.2	0.00

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

Matrix: SOIL				Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)		
						LCS	DCS	Low	High	Value	Control Limit	
EG: Metals and Major Cations (QC Lot: 2682979)												
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	96.6	----	92.0	115	----	----	
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2681400)												
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	95.9	----	68.0	119	----	----	
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	86.9	----	59.0	123	----	----	
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	92.5	----	68.0	121	----	----	
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	97.2	----	70.0	128	----	----	
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	102	----	69.0	125	----	----	
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	71.4	----	35.0	131	----	----	
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	104	----	72.0	128	----	----	
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	102	----	70.0	128	----	----	
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	90.7	----	46.0	142	----	----	
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	80.2	----	55.0	134	----	----	
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	93.0	----	59.0	136	----	----	
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	104	----	68.0	126	----	----	
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	64.8	----	30.0	126	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	94.1	----	55.0	133	----	----	
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	94.0	----	52.0	134	----	----	
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	101	----	45.0	144	----	----	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2683067)												



Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2683067) - Continued											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	104	----	70.0	118	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	82.4	----	50.0	111	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2683069)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	108	----	78.0	131	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2683070)											
EP074_SR: Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	102	----	86.0	122	----	----
EP074_SR: Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	104	----	86.0	123	----	----
EP074_SR: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	115	----	87.0	121	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<0.4	0.5 mg/kg	100	----	83.0	118	----	----
EP074_SR: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	112	----	85.0	117	----	----
EP074_SR: Xylenes (Total)	----	1	mg/kg	<1.0	0.75 mg/kg	104	----	85.0	116	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2683070)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	87.4	----	77.0	104	----	----
Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2688516)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	89.8	----	74.0	120	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2688515)											
EP074_SR: Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	95.4	----	80.0	127	----	----
EP074_SR: Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	108	----	76.0	128	----	----
EP074_SR: Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	109	----	74.0	121	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	95.9	----	77.0	107	----	----
EP074_SR: ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	106	----	82.0	124	----	----
EP074_SR: Xylenes (Total)	----	2	µg/L	<2	6 µg/L	99.4	----	82.0	113	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2688515)											



Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2688515) - Continued											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	85.8	----	61.0	120	----	----



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

Matrix: SOIL

					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2682979)										
HK1946899-001	Anonymous	EG020: Lead	7439-92-1	5 mg/kg	83.7	----	75.0	125	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2681400)										
HK1946805-001	Anonymous	Naphthalene	91-20-3	250 µg/kg	80.0	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	84.9	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	80.6	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	80.8	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	83.0	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	83.0	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	79.1	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	79.3	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	75.1	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	76.8	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	67.4	----	50.0	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	81.3	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	72.9	----	50.0	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	79.6	----	50.0	130	----	----
		Dibenz(a.h)anthracene	53-70-3	250 µg/kg	77.2	----	50.0	130	----	----
		Benzo(g.h.i)perylene	191-24-2	250 µg/kg	75.4	----	50.0	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2683067)										
HK1947016-002	BH2-S3	C9 - C16 Fraction	----	31.5 mg/kg	82.4	----	50.0	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	60.4	----	50.0	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2683069)										
HK1947016-002	BH2-S3	C6 - C8 Fraction	----	4.5 mg/kg	105	----	50.0	130	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2683070)										
HK1947016-003	BH2-S1	EP074_SR: Benzene	71-43-2	0.25 mg/kg	104	----	50.0	130	----	----
		EP074_SR: Toluene	108-88-3	0.25 mg/kg	106	----	50.0	130	----	----
		EP074_SR: Ethylbenzene	100-41-4	0.25 mg/kg	112	----	50.0	130	----	----



Matrix: SOIL				<i>Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report</i>						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2683070) - Continued										
HK1947016-003	BH2-S1	EP074_SR: meta- & para-Xylene	108-38-3	0.5 mg/kg	107	----	50.0	130	----	----
			106-42-3							
		EP074_SR: ortho-Xylene	95-47-6	0.25 mg/kg	118	----	50.0	130	----	----
		EP074_SR: Xylenes (Total)	----	0.75 mg/kg	111	----	50.0	130	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2683070)										
HK1947016-003	BH2-S1	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.25 mg/kg	85.2	----	50.0	130	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			



Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-074_SR-S: VOC Surrogates - Continued			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115






CERTIFICATE OF ANALYSIS

Client	: MOTT MACDONALD HONG KONG LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 13
Contact	: THOMAS CHAN	Contact	: Richard Fung	Work Order	: HK1948580
Address	: 3/F INTERNATIONAL TRADE TOWER, 348 KWUN TONG ROAD, KWUN TONG, KOWLOON, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: thomas.chan@mottmac.com	E-mail	: richard.fung@alsglobal.com	Date Samples Received	: 14-Nov-2019
Telephone	: +852 2828 5933	Telephone	: +852 2610 1044	Issue Date	: 25-Nov-2019
Facsimile	: +852 2828 1823	Facsimile	: +852 2610 2021	No. of samples received	: 5
Project	: SOIL TESTING AT HONG KONG AIRPORT	Quote	: HKE/1861c/2018	No. of samples analysed	: 5
Order number	: ---				
C-O-C number	: H037996				
Site	: CONTRACT NO. C3503 TERMINAL 2 FOUNDATION AND SUBSTRUCTURE WORKS				

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

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

Signatories	Position	Authorised results for
 Anh Ngoc Huynh .	Senior Chemist	Organics_ENV
 Chan 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. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 14-Nov-2019 to 25-Nov-2019.

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: HK1948580

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., if any) is provided by client.

The result(s) of soil 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

Client sample ID

				BH2-S6	BH2-S6 (Duplicate)	---	---	---
				14-Nov-2019	14-Nov-2019	----	----	----
Compound	CAS Number	LOR	Unit	HK1948580-001	HK1948580-005	-----	-----	-----

EA/ED: Physical and Aggregate Properties

EA055: Moisture Content (dried @ 103°C)	----	0.1	%	10.3	10.2	---	---	---
---	------	-----	---	------	------	-----	-----	-----

EG: Metals and Major Cations

EG020: Lead	7439-92-1	1	mg/kg	41	47	---	---	---
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EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)

EP076HK: Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Acenaphthylene	208-96-8	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Acenaphthene	83-32-9	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Fluorene	86-73-7	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Phenanthrene	85-01-8	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Fluoranthene	206-44-0	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Pyrene	129-00-0	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Chrysene	218-01-9	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Benzo(k)fluoranthene	207-08-9	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.500	mg/kg	<0.500	<0.500	---	---	---
EP076HK: Benzo(g,h,i)perylene	191-24-2	0.500	mg/kg	<0.500	<0.500	---	---	---

EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)

EP070HK_SR: C6 - C8 Fraction	----	5	mg/kg	<5	<5	---	---	---
EP071HK_SR: C9 - C16 Fraction	----	200	mg/kg	<200	<200	---	---	---
EP071HK_SR: C17 - C35 Fraction	----	500	mg/kg	<500	<500	---	---	---

EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)

EP074_SR: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	---	---	---
EP074_SR: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	---	---	---
EP074_SR: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	---	---	---



Sub-Matrix: SOIL				Client sample ID	BH2-S6	BH2-S6 (Duplicate)	---	---	---
Client sampling date / time				14-Nov-2019	14-Nov-2019	---	---	---	
Compound	CAS Number	LOR	Unit	HK1948580-001	HK1948580-005	---	---	---	
EP-074 SR-A: Monocyclic Aromatic Hydrocarbons (MAH) - Continued									
EP074_SR: meta- & para-Xylene	108-38-3	1.0	mg/kg	<1.0	<1.0	---	---	---	
	106-42-3								
EP074_SR: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	---	---	---	
EP074_SR: Xylenes (Total)	----	2.0	mg/kg	<2.0	<2.0	---	---	---	
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	<0.2	---	---	---	
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	98.2	90.8	---	---	---	
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	97.0	90.4	---	---	---	
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	96.8	90.4	---	---	---	
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	103	101	---	---	---	
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	93.6	93.2	---	---	---	
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	96.8	90.4	---	---	---	
EP074_SR: Toluene-D8	2037-26-5	0.1	%	103	101	---	---	---	
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	93.6	93.2	---	---	---	



Sub-Matrix: WATER				Client sample ID	Trip Blank	Equipment Blank	Field Blank	---	---
Client sampling date / time				14-Nov-2019	14-Nov-2019	14-Nov-2019	---	---	
Compound	CAS Number	LOR	Unit	HK1948580-002	HK1948580-003	HK1948580-004	---	---	
EG: Metals and Major Cations - Filtered									
EG020: Lead	7439-92-1	1	µg/L	---	<1	<1	---	---	
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Acenaphthylene	208-96-8	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Acenaphthene	83-32-9	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Fluorene	86-73-7	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Phenanthrene	85-01-8	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Anthracene	120-12-7	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Fluoranthene	206-44-0	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Pyrene	129-00-0	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Benz(a)anthracene	56-55-3	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Chrysene	218-01-9	1.0	µg/L	---	<1.0	<1.0	---	---	
EP076HK: Benzo(b)fluoranthene	205-99-2	1.0	µg/L	---	<1.0	<1.0	---	---	
EP076HK: Benzo(k)fluoranthene	207-08-9	1.0	µg/L	---	<1.0	<1.0	---	---	
EP076HK: Benzo(a)pyrene	50-32-8	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Indeno(1,2,3.cd)pyrene	193-39-5	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Dibenz(a,h)anthracene	53-70-3	2.0	µg/L	---	<2.0	<2.0	---	---	
EP076HK: Benzo(g,h,i)perylene	191-24-2	2.0	µg/L	---	<2.0	<2.0	---	---	
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH)									
EP070HK_SR: C6 - C8 Fraction	----	20	µg/L	<20	<20	<20	---	---	
EP071HK_SR: C9 - C16 Fraction	----	500	µg/L	---	<500	<500	---	---	
EP071HK_SR: C17 - C35 Fraction	----	500	µg/L	---	<500	<500	---	---	
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH)									
EP074_SR: Benzene	71-43-2	5.0	µg/L	<5.0	<5.0	<5.0	---	---	
EP074_SR: Toluene	108-88-3	5.0	µg/L	<5.0	<5.0	<5.0	---	---	
EP074_SR: Ethylbenzene	100-41-4	5.0	µg/L	<5.0	<5.0	<5.0	---	---	
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	10	µg/L	<10	<10	<10	---	---	
EP074_SR: ortho-Xylene	95-47-6	5.0	µg/L	<5.0	<5.0	<5.0	---	---	
EP074_SR: Xylenes (Total)	----	20	µg/L	<20	<20	<20	---	---	



Sub-Matrix: WATER				Client sample ID	Trip Blank	Equipment Blank	Field Blank	---	---
				Client sampling date / time	14-Nov-2019	14-Nov-2019	14-Nov-2019	---	---
Compound	CAS Number	LOR	Unit	HK1948580-002	HK1948580-003	HK1948580-004	---	---	---
EP-074_SR-I: Methyl-tert-butyl Ether									
EP074_SR: Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	<0.5	<0.5	---	---	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	---	74.4	86.5	---	---	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	---	110	127	---	---	---
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									
EP070HK_SR: Dibromofluoromethane	1868-53-7	0.1	%	91.0	93.2	94.6	---	---	---
EP070HK_SR: Toluene-D8	2037-26-5	0.1	%	102	104	105	---	---	---
EP070HK_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	95.6	94.0	93.4	---	---	---
EP-074_SR-S: VOC Surrogates									
EP074_SR: Dibromofluoromethane	1868-53-7	0.1	%	91.0	93.2	94.6	---	---	---
EP074_SR: Toluene-D8	2037-26-5	0.1	%	102	104	105	---	---	---
EP074_SR: 4-Bromofluorobenzene	460-00-4	0.1	%	95.6	94.0	93.4	---	---	---



Laboratory Duplicate (DUP) Report

Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2711939)								
HK1948118-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	79.3	79.9	0.716
HK1948535-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	22.2	21.7	2.12
EG: Metals and Major Cations (QC Lot: 2707753)								
HK1948580-005	BH2-S6 (Duplicate)	EG020: Lead	7439-92-1	1	mg/kg	47	48	0.00
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2696863)								
HK1947956-001	Anonymous	Naphthalene	91-20-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthylene	208-96-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Acenaphthene	83-32-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluorene	86-73-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Phenanthrene	85-01-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Anthracene	120-12-7	50	µg/kg	<0.500 mg/kg	<500	0.00
		Fluoranthene	206-44-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Pyrene	129-00-0	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benz(a)anthracene	56-55-3	50	µg/kg	<0.500 mg/kg	<500	0.00
		Chrysene	218-01-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(b)fluoranthene	205-99-2	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(k)fluoranthene	207-08-9	50	µg/kg	<0.500 mg/kg	<500	0.00
		Benzo(a)pyrene	50-32-8	50	µg/kg	<0.500 mg/kg	<500	0.00
		Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<0.500 mg/kg	<500	0.00
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<0.500 mg/kg	<500	0.00		
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<0.500 mg/kg	<500	0.00		
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2696862)								
HK1947956-001	Anonymous	C9 - C16 Fraction	----	200	mg/kg	<200	<200	0.00
		C17 - C35 Fraction	----	500	mg/kg	<500	<500	0.00
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2696866)								
HK1947956-001	Anonymous	C6 - C8 Fraction	----	5	mg/kg	<5	<5	0.00
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2696865)								
HK1947956-001	Anonymous	EP074_SR: Benzene	71-43-2	0.1	mg/kg	<0.2	<0.2	0.00
		EP074_SR: Toluene	108-88-3	0.2	mg/kg	<0.5	<0.5	0.00
		EP074_SR: Ethylbenzene	100-41-4	0.2	mg/kg	<0.5	<0.5	0.00



Matrix: SOIL				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2696865) - Continued								
HK1947956-001	Anonymous	EP074_SR: ortho-Xylene	95-47-6	0.2	mg/kg	<0.5	<0.5	0.00
		EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	0.4	mg/kg	<1.0	<1.0	0.00
		EP074_SR: Xylenes (Total)	----	1	mg/kg	<2.0	<2.0	0.00
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2696865)								
HK1947956-001	Anonymous	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.5	<0.5	0.00
Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 2707740)								
HK1948580-004	Field Blank	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 Blank (MB) Report		Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2707753)											
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	96.8	----	92.0	115	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2696863)											
Naphthalene	91-20-3	50	µg/kg	<50	25 µg/kg	95.6	----	68.0	119	----	----
Acenaphthylene	208-96-8	50	µg/kg	<50	25 µg/kg	71.6	----	59.0	123	----	----
Acenaphthene	83-32-9	50	µg/kg	<50	25 µg/kg	86.8	----	68.0	121	----	----
Fluorene	86-73-7	50	µg/kg	<50	25 µg/kg	101	----	70.0	128	----	----
Phenanthrene	85-01-8	50	µg/kg	<50	25 µg/kg	100	----	69.0	125	----	----
Anthracene	120-12-7	50	µg/kg	<50	25 µg/kg	57.2	----	35.0	131	----	----
Fluoranthene	206-44-0	50	µg/kg	<50	25 µg/kg	107	----	72.0	128	----	----
Pyrene	129-00-0	50	µg/kg	<50	25 µg/kg	96.1	----	70.0	128	----	----
Benz(a)anthracene	56-55-3	50	µg/kg	<50	25 µg/kg	57.1	----	46.0	142	----	----
Chrysene	218-01-9	50	µg/kg	<50	25 µg/kg	98.2	----	55.0	134	----	----
Benzo(b)fluoranthene	205-99-2	50	µg/kg	<50	25 µg/kg	91.4	----	59.0	136	----	----



Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2696863) - Continued											
Benzo(k)fluoranthene	207-08-9	50	µg/kg	<50	25 µg/kg	97.8	----	68.0	126	----	----
Benzo(a)pyrene	50-32-8	50	µg/kg	<50	25 µg/kg	52.5	----	30.0	126	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	50	µg/kg	<50	25 µg/kg	112	----	55.0	133	----	----
Dibenz(a,h)anthracene	53-70-3	50	µg/kg	<50	25 µg/kg	118	----	52.0	134	----	----
Benzo(g,h,i)perylene	191-24-2	50	µg/kg	<50	25 µg/kg	110	----	45.0	144	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2696862)											
C9 - C16 Fraction	----	200	mg/kg	<200	31.5 mg/kg	92.6	----	70.0	118	----	----
C17 - C35 Fraction	----	500	mg/kg	<500	67.5 mg/kg	94.2	----	50.0	111	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2696866)											
C6 - C8 Fraction	----	5	mg/kg	<5	4.5 mg/kg	96.7	----	78.0	131	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2696865)											
EP074_SR: Benzene	71-43-2	0.1	mg/kg	<0.1	0.25 mg/kg	103	----	86.0	122	----	----
EP074_SR: Toluene	108-88-3	0.2	mg/kg	<0.2	0.25 mg/kg	106	----	86.0	123	----	----
EP074_SR: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	0.25 mg/kg	104	----	87.0	121	----	----
EP074_SR: meta- & para-Xylene	108-38-3	0.4	mg/kg	<0.4	0.5 mg/kg	99.9	----	83.0	118	----	----
	106-42-3										
EP074_SR: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	0.25 mg/kg	106	----	85.0	117	----	----
EP074_SR: Xylenes (Total)	----	1	mg/kg	<1.0	0.75 mg/kg	102	----	85.0	116	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2696865)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.2	mg/kg	<0.2	0.25 mg/kg	85.0	----	77.0	104	----	----
Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
						LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 2707740)											
EG020: Lead	7439-92-1	1	µg/L	<1	100 µg/L	96.2	----	85.0	113	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2713644)											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	92.0	----	19.0	144	----	----
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	0.5 µg/L	97.7	----	32.0	140	----	----



Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number					LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2713644) - Continued											
Acenaphthene	83-32-9	0.2	µg/L	<0.2	0.5 µg/L	85.7	----	13.0	153	----	----
Fluorene	86-73-7	0.2	µg/L	<0.2	0.5 µg/L	93.2	----	35.0	151	----	----
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	87.3	----	49.0	128	----	----
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	79.7	----	60.0	103	----	----
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	87.6	----	65.0	131	----	----
Pyrene	129-00-0	0.2	µg/L	<0.2	0.5 µg/L	86.5	----	64.0	131	----	----
Benz(a)anthracene	56-55-3	0.2	µg/L	<0.2	0.5 µg/L	91.1	----	66.0	142	----	----
Chrysene	218-01-9	0.2	µg/L	<0.2	0.5 µg/L	80.2	----	78.0	144	----	----
Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	0.5 µg/L	90.8	----	67.0	144	----	----
Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<0.2	0.5 µg/L	93.7	----	73.0	139	----	----
Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.2	0.5 µg/L	78.4	----	64.0	127	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<0.2	0.5 µg/L	77.8	----	62.0	141	----	----
Dibenz(a,h)anthracene	53-70-3	0.2	µg/L	<0.2	0.5 µg/L	81.6	----	59.0	136	----	----
Benzo(g,h,i)perylene	191-24-2	0.2	µg/L	<0.2	0.5 µg/L	85.2	----	56.0	147	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2709235)											
C6 - C8 Fraction	----	0.02	mg/L	<0.02	0.03 mg/L	94.5	----	74.0	120	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2713645)											
C9 - C16 Fraction	----	0.5	mg/L	<0.5	0.21 mg/L	103	----	59.0	124	----	----
C17 - C35 Fraction	----	0.5	mg/L	<0.5	0.45 mg/L	94.1	----	58.0	116	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2702526)											
EP074_SR: Benzene	71-43-2	0.5	µg/L	<0.5	2 µg/L	108	----	80.0	127	----	----
EP074_SR: Toluene	108-88-3	0.5	µg/L	<0.5	2 µg/L	109	----	76.0	128	----	----
EP074_SR: Ethylbenzene	100-41-4	0.5	µg/L	<0.5	2 µg/L	113	----	74.0	121	----	----
EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	1	µg/L	<1	4 µg/L	102	----	77.0	107	----	----
EP074_SR: ortho-Xylene	95-47-6	0.5	µg/L	<0.5	2 µg/L	111	----	82.0	124	----	----
EP074_SR: Xylenes (Total)	----	2	µg/L	<2	6 µg/L	105	----	82.0	113	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2702526)											
Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.5	µg/L	<0.5	2 µg/L	91.4	----	61.0	120	----	----



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

Matrix: SOIL

					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 2707753)										
HK1948580-001	BH2-S6	EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75.0	125	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 2696863)										
HK1947961-001	Anonymous	Naphthalene	91-20-3	250 µg/kg	85.0	----	50.0	130	----	----
		Acenaphthylene	208-96-8	250 µg/kg	89.3	----	50.0	130	----	----
		Acenaphthene	83-32-9	250 µg/kg	87.8	----	50.0	130	----	----
		Fluorene	86-73-7	250 µg/kg	87.9	----	50.0	130	----	----
		Phenanthrene	85-01-8	250 µg/kg	90.2	----	50.0	130	----	----
		Anthracene	120-12-7	250 µg/kg	90.9	----	50.0	130	----	----
		Fluoranthene	206-44-0	250 µg/kg	94.8	----	50.0	130	----	----
		Pyrene	129-00-0	250 µg/kg	93.9	----	50.0	130	----	----
		Benz(a)anthracene	56-55-3	250 µg/kg	84.8	----	50.0	130	----	----
		Chrysene	218-01-9	250 µg/kg	88.1	----	50.0	130	----	----
		Benzo(b)fluoranthene	205-99-2	250 µg/kg	82.4	----	50.0	130	----	----
		Benzo(k)fluoranthene	207-08-9	250 µg/kg	85.6	----	50.0	130	----	----
		Benzo(a)pyrene	50-32-8	250 µg/kg	81.0	----	50.0	130	----	----
		Indeno(1.2.3.cd)pyrene	193-39-5	250 µg/kg	83.2	----	50.0	130	----	----
		Dibenz(a,h)anthracene	53-70-3	250 µg/kg	81.7	----	50.0	130	----	----
		Benzo(g,h,i)perylene	191-24-2	250 µg/kg	91.4	----	50.0	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2696862)										
HK1947956-002	Anonymous	C9 - C16 Fraction	----	31.5 mg/kg	94.2	----	50.0	130	----	----
		C17 - C35 Fraction	----	67.5 mg/kg	94.9	----	50.0	130	----	----
EP-071HK_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 2696866)										
HK1947956-002	Anonymous	C6 - C8 Fraction	----	4.5 mg/kg	115	----	50.0	130	----	----
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2696865)										
HK1947961-001	Anonymous	EP074_SR: Benzene	71-43-2	0.25 mg/kg	107	----	50.0	130	----	----
		EP074_SR: Toluene	108-88-3	0.25 mg/kg	105	----	50.0	130	----	----
		EP074_SR: Ethylbenzene	100-41-4	0.25 mg/kg	105	----	50.0	130	----	----



Matrix: SOIL				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-074_SR-A: Monocyclic Aromatic Hydrocarbons (MAH) (QC Lot: 2696865) - Continued										
HK1947961-001	Anonymous	EP074_SR: meta- & para-Xylene	108-38-3 106-42-3	0.5 mg/kg	101	----	50.0	130	----	----
		EP074_SR: ortho-Xylene	95-47-6	0.25 mg/kg	111	----	50.0	130	----	----
		EP074_SR: Xylenes (Total)	----	0.75 mg/kg	104	----	50.0	130	----	----
EP-074_SR-I: Methyl-tert-butyl Ether (QC Lot: 2696865)										
HK1947961-001	Anonymous	Methyl tert-Butyl Ether (MTBE)	1634-04-4	0.25 mg/kg	89.5	----	50.0	130	----	----

Matrix: WATER				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 2707740)										
HK1948580-003	Equipment Blank	EG020: Lead	7439-92-1	100 µg/L	95.6	----	75.0	125	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
Sub-Matrix: WATER		Recovery Limits (%)	

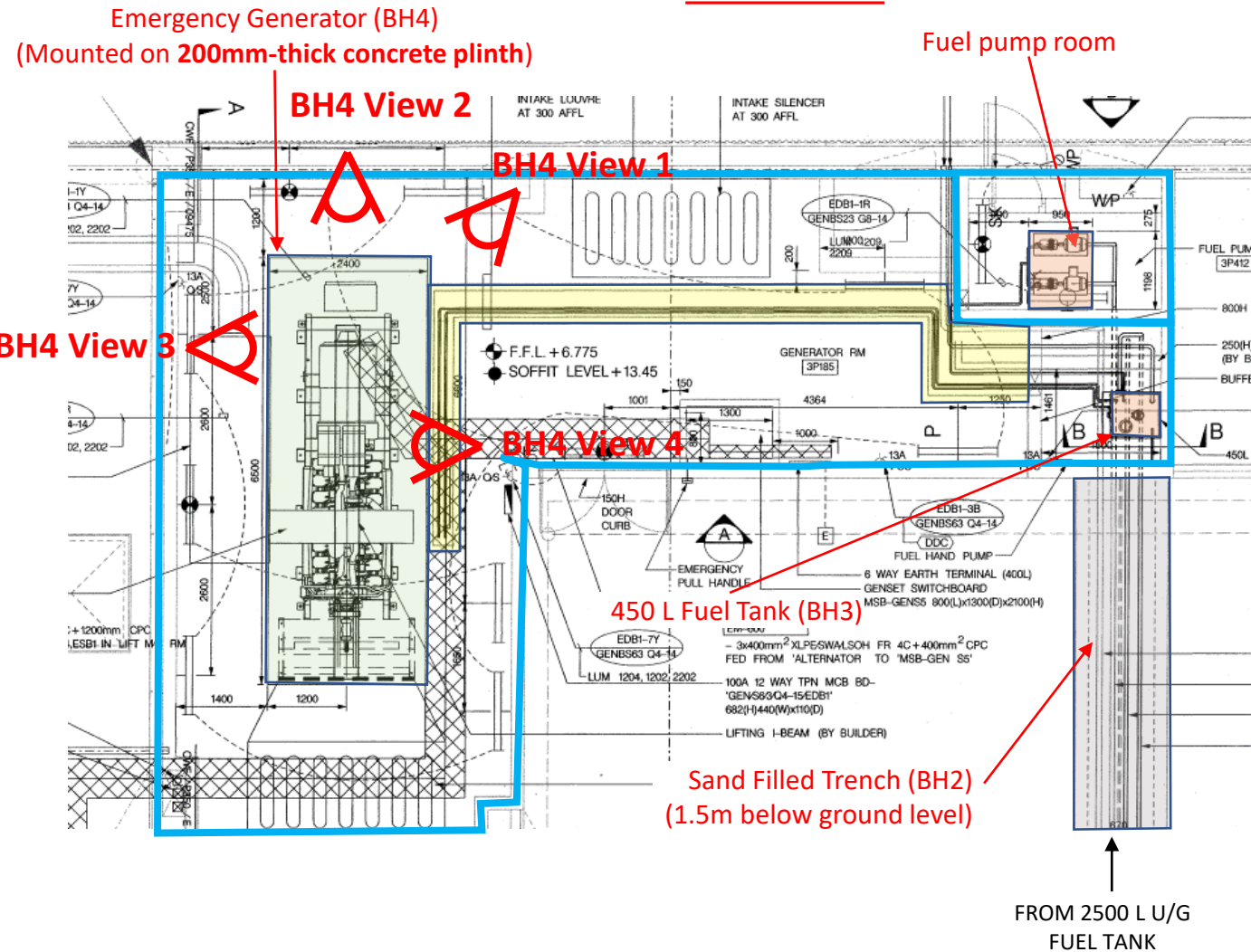


Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115
EP-074_SR-S: VOC Surrogates			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

I. Photo Record of Final Inspection for BH3 and BH4

Appendix I Photo Record of Final Inspection for BH3 and BH4 (**BH4: Above-ground** Emergency Generator)

PLAN VIEW



BH4 View 3 - concrete floor condition underneath Emergency Generator



BH4 View 4 - concrete floor condition underneath Emergency Generator

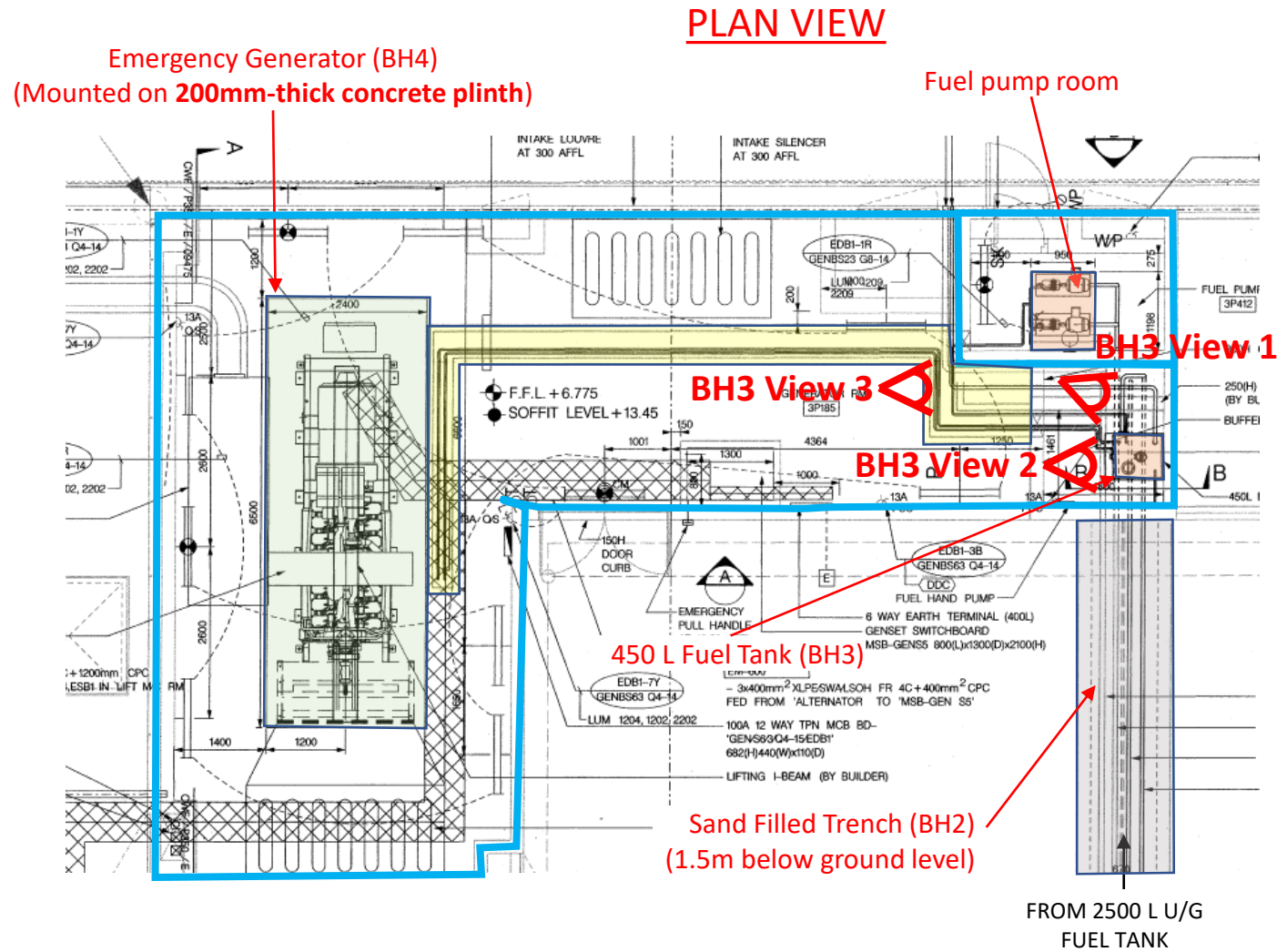


BH4 View 1 - Emergency Generator (BH4) (Mounted on 200mm-thick concrete plinth)



BH4 View 2 - concrete floor condition underneath Emergency Generator

Appendix I Photo Record of Final Inspection for BH3 and BH4 (**BH3**: 450 L Above-ground Fuel Tank)



BH3 View 1 – Metal drip tray and concrete curb surrounding fuel tank



BH3 View 2 – concrete floor condition underneath 450 L fuel tank



BH3 View 3 – Concrete curb surrounding fuel tank