

1 Background

This Technical Note has been prepared to present the results of the further site investigation (SI) works at the underground fuel oil tank for the Provision of Cremators at Wo Hop Shek Crematorium (the Project).

In accordance with the Contamination Assessment Plan (CAP) for the Project, which has been endorsed by EPD, soil and groundwater samples should be collected at locations BH1 and BH2, nearby the underground fuel oil tank at the coffin crematorium, as shown in **Figure 1-1**. The existing tank is located under the oil filling area as well as the driveway of the only access road of the crematorium.

Site investigation (SI) works for BH1 and BH2 were carried out in June 2006. Unfortunately, underground concrete structures were encountered at both BH1 and BH2 – these structures were not shown on any of the available record drawings. It was considered that they might be concrete surrounds for underground oil pipes and so it would be unwise to damage them with drilling rigs. Thus, no soil samples could be collected during these SI works.

Although soil samples could not be taken from beneath the slab, groundwater samples were taken from two trial pits above the underground concrete structures (at BH1 and BH2). The samples were analysed for Total Petroleum Hydrocarbon (TPH) and Polyaromatic Hydrocarbons (PAHs), as these are the contaminants that would be expected from leaking fuel. TPH was found presence in groundwater samples but no PAHs were detected.

The abovementioned results, together with recommendations for further SI and remedial measures, have already been included in the Interim Contamination Assessment Report (CAR) and the EIA Report.

2 Results and Findings of Further SI

As a result of discussions in November 2007 between EPD, FEHD, ArchSD and Hyder Consulting, it was decided to carry out a further site investigation for the underground fuel oil tank at alternative locations, designated BH1A and BH2A, as shown in **Figure 1-1**, to confirm the potential land contamination. The further site investigation for underground fuel oil tank was carried out in January 2008. Sampling depths and testing parameters were same as proposed in the CAP.

The analytical results are attached. From these it can be seen that no PAHs were detected in either the soil or groundwater samples from BH1A and BH2A. No TPHs were detected in the soil samples from BH1A and BH2A, but TPH (C17 – C35) was found in groundwater sample from BH2A.

Results for the TPH in groundwater samples are shown in **Table 2-1**, below, compared to the Risk Based Remediation Goals (RBRGs), which were introduced for soil and groundwater assessment on 15 August 2007.

TPH Fraction	RBRG Groundwater Limit (mg/L)	RBRG Groundwater Saturation Limit (mg/L)	BH1A (mg/L)	BH2A (mg/L)
C6 – C8	31.7	5.23	<0.02	<0.02
C9 – C16	276	2.8	<0.5	<0.5
C17 – C35	4.93	2.8	<0.5	0.6

Table 2-1 Groundwater Results

The concentration TPH (C17 – C35) in groundwater sample from BH2A is 0.6mg/L which is below the corresponding RBRG limit of 4.93mg/L. Thus, according to the RBRGs, the groundwater is not considered to be contaminated.

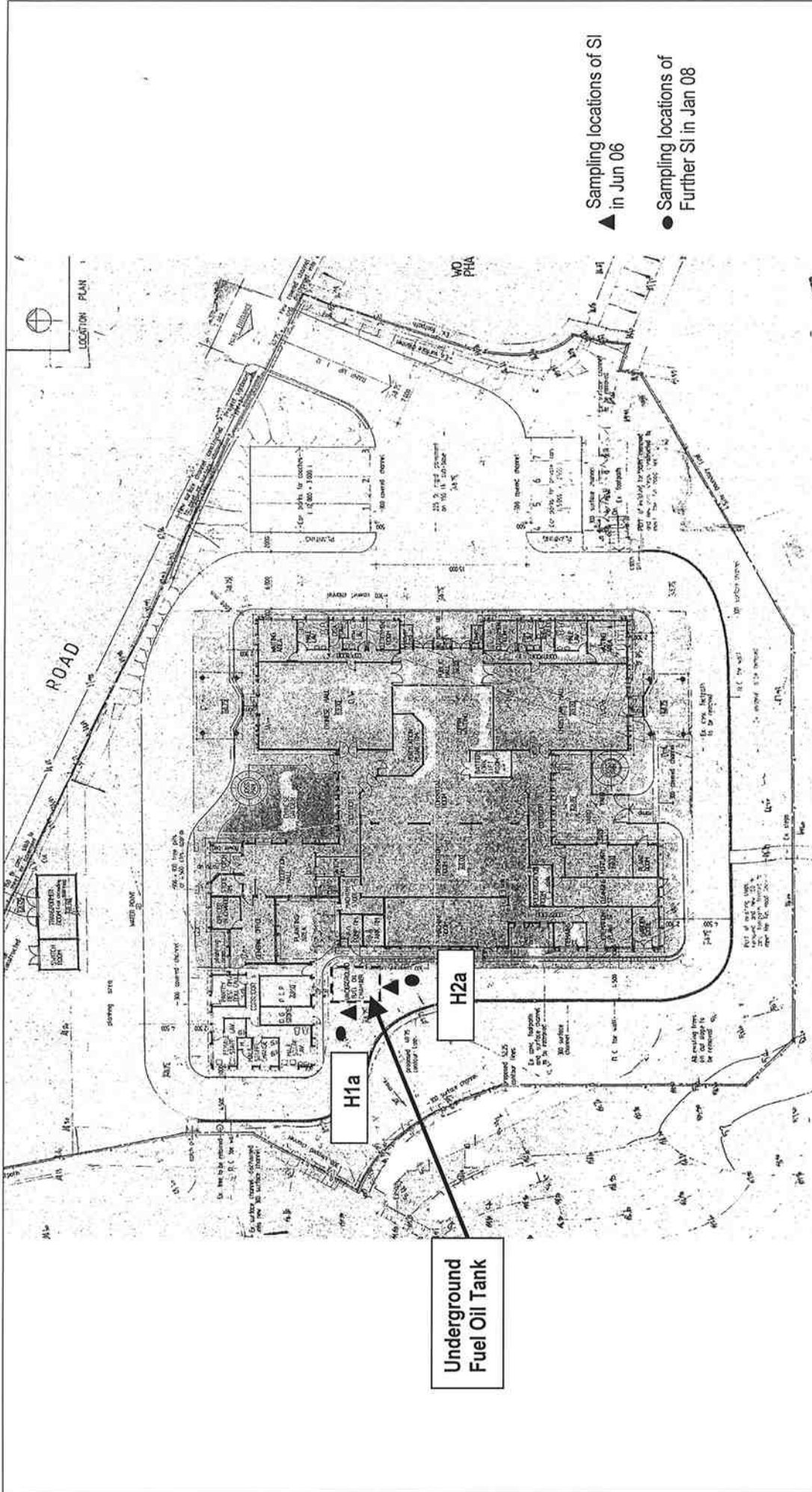
3 Findings and Conclusions


The results of the further site investigation reveal that there is no soil contamination around the underground fuel oil tank and, according to the RBRGs, the groundwater is also not contaminated. As such, no further SI or remediation works for the underground fuel oil tank at the site are warranted.

Therefore, only the following recommendation (from the Interim CAR and the EIA Report) remains applicable:

“The underground fuel tanks will be removed during the demolition phase of the Project. After removal of the underground fuel tanks, the soil underneath shall be inspected by experienced specialist in order to determine whether there is any visual or olfactory evidence of contamination due to fuel leakage. If contamination is likely, further sample(s) shall be collected from underneath the tank and the sample(s) shall be tested for TPH.”

Since further site investigation has been conducted, all other recommendations related to the underground fuel oil tank at the coffin crematorium shown on the submitted EIA Report are no longer applicable.



	Figure Title	Provision of Cremators at Wo Hop Shek Crematorium Sampling Location at Coffin Crematorium	
	Date	Feb 2008	
	Figure	1-1	
	Scale	NTS	

SUMMARY REPORT
Project Name : Provision of Cremators at Wo Hop Shek Crematorium Land Contamination Assessment

Site Investigation Plan for Underground Fuel Oil Tank at Coffin Crematorium

Customer : Lam Geotechnics Limited

Lab. Job No. : J640

Matrix : Sediment

Laboratory Sample ID	Sample Reference		PAHs (Low Molecular Weight)						PAHs (High Molecular Weight)										TPH		
	Drillhole No.	Depth (m)	Naphthalene	Acenaphylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Chrysene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Dibenz(ah)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Pyrene	Benzo(ghi)perylene	C6-C8	C9-C16	C17-C35
		From To	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		Report Limit	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5.0	200	500
20453/1	BH2A	4.00 - 4.45m	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5	<200	<500
20453/2	BH2A	5.50 - 5.95m	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5	<200	<500
20453/3	BH2A	7.00 - 7.45m	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5	<200	<500
20455/1	BH1A	4.00 - 4.45m	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5	<200	<500
20455/2	BH1A	5.50 - 5.95m	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5	<200	<500
20455/3	BH1A	7.00 - 7.45m	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5	<200	<500

SUMMARY REPORT

Project Name : Provision of Cremators at Wo Hop Shek Crematorium Land Contamination Assessment

Site Investigation Plan for Underground Fuel Oil Tank at Coffin Crematorium

Customer : Lam Geotechnics Limited

Lab. Job No. : J640

Matrix : water

Laboratory Sample ID	Sample Reference Drillhole No.	PAHs (Low Molecular Weight)						PAHs (High Molecular Weight)										TPH		
		Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Chrysene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Pyrene	Benzo(ghi)perylene	C6-C8	C9-C16	C17-C35
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	Report Limit	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.02	0.5	0.5
20455/4	BH2A	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.02	<0.5	0.6
20459/1	BH1A	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<0.02	<0.5	<0.5