Architectural Services Department

Provision of Cremators at Wo Hop Shek Crematorium

Contamination Assessment Plan

Hyder Consulting

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1 Introduction

1.1 Background

Hyder Consulting Limited (Hyder) was commissioned by Architectural Services Department (ArchSD) to undertake an assessment of potential land contamination for the provision of cremators at Wo Hop Shek Crematorium – hereafter referred to as the "Project".

Wo Hop Shek Crematorium is located at Kiu Tau Road, North District – hereafter referred to as the "Site". It consists of a coffin crematorium with two twin cremators. In addition, a skeletal cremator building with a single cremator operates nearby for the cremation of skeletal remains from burial. The skeletal cremator and the coffin crematorium were commissioned in the 1960s and 1991 respectively. They are approaching the end of their serviceable life and beyond economic repair.

Within the Site area, a number of installations and previous land uses such as underground fuel tanks, cremators, places for dangerous goods storage may have imposed potential land contamination. This Contamination Assessment Plan (CAP) is thus prepared to present the first stage of land contamination assessment works which include site appraisal, outlining the potential of contamination, the need for site investigation and proposing appropriate methodologies for implementing site investigation works. This CAP is prepared in accordance with following documents:

- Annex 19 of the Technical Memorandum on Environmental Impact Assessment Process
- Practice Note for Professional Persons (ProPECC) PN 3/94 "Contaminated Land Assessment and Remediation"
- EPD's Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair/Dismantling Workshops

This CAP is also prepared in accordance with the Study Brief of the EIA study of the Project.

1.2 Site Description

The Site falls within the Wo Hop Shek Cemetery area which has been allocated to FEHD under a Government Land Allocation No. DN 81. The Site currently does not fall into any Outline Zoning Plan or any other relevant plan. The locations and boundaries of the existing and new crematorium are shown in Figure 1-1. The layout of existing Wo Hop Shek Crematorium is shown in Figures 1-2a and 1-2b.

The existing site of coffin crematorium is located to the immediate south of Kiu Tau Road. The main facilities of Wo Hop Shek Crematorium include

coffin cremators, service hall, carpark, office and dangerous goods store. Underground fuel tank and two rooms housing a day tank and fuel pumps are also located at the site.

The site of skeletal cremator is located approximate 90 m to the west of the existing coffin crematorium. The skeletal cremator building is adjacent to an access road which starts from the junction of Ming Yin Road and Kiu Tau Road uphill to grave areas. An underground fuel tank and a dangerous goods store for storing diesel oil drums are found next to the skeletal cremator building.

2 Site Appraisal

2.1 Site Walkover

The purpose of the site appraisal is to identify both current and historical usage of the site which have the potential to cause land contamination. By reviewing current and historical activities taken place on the site of concern, information can be obtained so as to clarify whether the former land uses have any potential to cause land contamination.

Site visits were conducted on 10 and 30 August 2005 and on 7 March 2006. The entire site area including both the coffin crematorium and skeletal cremator building was inspected.

The main objectives of the site visits are to understand the daily operation of the crematorium and to determine the current land uses of the Site in relation to potentially contaminating land uses. Site operators were interviewed during the site visits for obtaining verbal information on current and previous site practices and land uses. Site photos were taken and they are shown in Appendix 1.

2.1.1 Coffin Crematorium

The coffin crematorium building consists of office, service halls and cremator area. There is an open carpark outside the building. Dangerous goods store and rooms housing a day tank and fuel pumps are found at the ground floor of the building. There is an underground fuel tank at the EVA outside the rooms for the day tank and the fuel pumps and the dangerous goods store for storing diesel oil for the operation of the cremators. The fuel tank is placed inside a concrete chamber underground. Inside the cremator area, a sunken fuel pipe is installed above a concrete channel. A transformer room which is owned and managed by China Light and Power Co. Ltd. (CLP), is located to the immediate northwest of the coffin crematorium building. A new pump room, which was under construction, located to the northwest of the coffin crematorium building was also observed during the site visits. Apart from the western part of the both

existing coffin crematorium site area and the new site area and a small planting area adjacent Kiu Tau Road within the existing site area, the entire site area is concrete paved.

The floor of the dangerous goods store, rooms for the day tank and fuel pumps are concrete paved. As inspected and indicated by the Operator, diesel oil drums for the mower are stored in the dangerous goods store. In addition, it was found that the store is bunded by concrete. Inside the rooms of the day tank and fuel pump, it was observed that drip trays are provided for collecting leakage, if any. The floor slabs of the dangerous goods store and the rooms housing day tank and fuel pumps are free from oil stain and cracking.

2.1.2 Skeletal Cremator Building

There is a single storey building housing the skeletal cremator. A dangerous goods store which is used for diesel oil drums storage is located next to the building. As indicated by the operator, diesel oil is used for the operation of skeletal cremator. In addition, an unused underground fuel tank is located next to the building adjacent to the uphill access road to grave areas.

It was observed that the diesel oil drums are placed within an area with concrete bund in the dangerous goods store. No oil stain and crack were observed on the concrete floor of the store even within the bunded area. In addition, there was no oil stain within the site area of skeletal cremator outside the store and cremator.

Some cracks were observed on the concrete floor in the skeletal cremator building. However, no oil stain was observed inside the skeletal cremator building.

2.2 Site History

Historical land uses have been determined by examination of historical aerial photos and site plans, and by interviews with the site operators.

A total of six aerial photos taken in 1963, 1975, 1986, 1991, 1995 and 2004 have been examined. They are listed below and shown in Appendix 2.

- 17/2/63 – 3900' – Y09764
- 1/12/75 – 3000' – 11265
- 7/3/86 – 4000' – 4045704
- 12/9/91 – 4000' – A26923
- 4/6/95 – 3000' – CN9783
- 11/6/2004 – 2500' – CW57794

2.2.1 Coffin Crematorium

The 1963 photo reveals that the Site and surrounding hillsides were largely occupied by grave-like structures. Besides, a part of the Site was also covered with some pond-like structures. These ponds are believed to serve as water storage ponds for the downhill farmland. The 1975 photo shows that the pond-like structures disappeared and the entire site area was occupied by grave-like structures and roads. In addition, tree clumps and vegetated areas on the hillside to the south and west of the site are found. The 1986 photo reveals that the Site was surrounded by grave-like structures. However, most grave-like structures within the Site were subsequently removed. The existing coffin crematorium and related structures appears at the Site in 1991 photo. Afterwards, except the increasing in size of the tree clumps surrounding the Site, the layout of the site did not alter significantly as observed from the 1995 and 2004 photos.

2.2.2 Skeletal Cremator Building

The skeletal cremator building appears to be very small in aerial photos. 1963 photo shows a similar structure at the existing site. In aerial photos taken in subsequent years, this structure is difficult to be discriminated as the trees growing next to it obstruct the view to the building. In general, the existing site seems has been occupied by the skeletal crematorium and the surrounding area has been used as a cemetery zone since 1963 as observed from the photos of the subsequent years. Similar to the coffin crematorium, except the increasing in size of tree clumps surrounding the site, the layout of the site did not alter significantly during the past decades.

2.2.3 Site Drawing and Information from Site Operators

A number of drawings dated from 1987 to 1988 have been provided by ASD. These drawings indicate the locations of the coffin crematorium, the underground fuel storage tank and the dangerous goods store. The drawings indicate that earthworks and disturbance of the natural topography would occur during the construction of these structures.

As indicated by the site operators, the Site of the existing coffin crematorium was mainly used as a cemetery area in the past. Regular check for spillage and monitoring of chemicals handled are carried out by Electrical and Mechanical Services Department (EMSD). Since the operation of the crematorium and associated facilities, no spillage or leakage of fuel oil or chemicals has been reported by EMSD. Diesel fuel is stored at the underground fuel tank for the operation of the cremators. Renovation works of fuel pump, which is used to transfer the fuel from the day tank to the cremators, was carried out in early 2005. No registered hazardous installation as defined under relevant ordinances is present in the crematorium. No notice of violation of environmental regulations or public complaint has been received.

There is no drawing available showing the details of the skeletal cremator building including the unused underground fuel tank. As indicated by the site operator, the Site has been used as a skeletal cremator since 1960s. The fuel type previously stored in the underground tank is unknown. There is no record of any spillage or accident related to this fuel tank. Major renovation of the facility was wall painting works. The existing dangerous goods store is used to store diesel oil for the operation of the cremator since the fuel tank was unused. No spillage of leakage has been recorded for this store.

3 Contamination Sources and Potential Contamination

3.1 Contamination Sources

Based on the historical information and current practices of the crematorium, and following the site visits, potential sources of contamination at the Site have been identified.

Contamination likely to be found on site from the crematorium operation includes:

- underground fuel tanks for both coffin crematorium and skeletal cremator;
- dangerous goods stores and day tank room, fuel pump room and sunken fuel pipes at coffin crematorium;
- cremators at coffin crematorium and skeletal cremator;
- transformer room; and
- areas impacted by aerial deposition from stack emissions.

3.1.1 Underground Fuel Tanks

There are two underground fuel tanks at the Site. Potential contaminants derived from these sources are:

- Petroleum hydrocarbons;
- Simple aromatics (e.g. BTEX); and
- Polyaromatic hydrocarbons (PAHs).

The fuel tank at the coffin crematorium is used for storing diesel rather than petrol. Thus, petroleum fractions of lighter ranges are not likely to be present at the fuel tank. Since the operation of the crematorium and associated facilities, no spillage or leakage of fuel oil or chemicals has been reported by EMSD. However, the interior of the concrete chamber for the underground fuel tank of the coffin crematorium is inaccessible, it is not

possible to confirm that there is no contamination by this underground fuel tank.

For the unused underground fuel tank at the site of skeletal cremator building, it is lack of information to confirm whether there is potential soil contamination due to the leakage of the underground fuel tank. In addition, the type of fuel previously stored in this tank is unknown.

3.1.2 Dangerous Goods Stores

There are two dangerous goods stores at the Site. One is located at the coffin crematorium and one is located next to the skeletal cremator. Potential contaminants are:

- Petroleum hydrocarbons; and
- PAHs.

As mentioned in Section 2, diesel oil is stored at these dangerous goods stores and thus, petroleum fractions of lighter ranges are not likely to be present at these stores.

The interior of the stores has been inspected during the site visits. As mentioned in Section 2, these stores are concrete paved and bunded with concrete and no oil stains and cracks were found on the floor slabs of these stores. Thus, potential soil contamination by the diesel oils stored in these dangerous goods stores is unlikely.

3.1.3 Day Tank Room, Fuel Pump Room and Sunken Fuel Pipe

Day tank room, fuel pump room and sunken fuel pipe have been identified in the coffin crematorium. Potential contaminants from the day tank room, fuel pump room and sunken fuel pipe are:

- Petroleum hydrocarbons; and
- PAHs.

As diesel oil is used for the operation of the coffin cremators, petroleum fractions of lighter ranges are not likely to be present.

Sunken pipe is placed above the concrete channel at the cremator area in the coffin crematorium. The floors of the day tank room and fuel pump room are concrete paved and no cracks were observed. Drip trays have been provided for collecting leakage, if any. There was no visual or olfactory evidence of any contamination (e.g. oil stain) in these rooms. In addition, no spillage or leakage of fuel oil or chemicals has been reported by EMSD since the operation of the crematorium. Thus, it is considered that the potential contamination due to the leakage of fuel oil from these facilities is unlikely.

3.1.4 Cremator

Potential contaminants derived from cremators are:

- PAHs;
- Dioxins; and
- Metals (Cr, Co, Ni, Cu, Zn, As, Mo, Cd, Sn, Ba, Hg, Pb)

Both cremators at the coffin crematorium and skeletal cremator are situated above concrete floor slabs. Since the potential contaminants are predominantly in solid phase, it is considered that the migration of contaminants through the slab into the soil underneath is unlikely. However, residual materials inside the cremators and the flues may contain contaminated materials and may pose waste management implication.

3.1.5 Transformer Room

There is a transformer room at the site. The type of transformer operating in this room is unknown as the access to the transformer is still being arranged. However, based on the nature of use of the transformer room, it is considered that the potential contaminant derived from this room is:

- Polychlorinated biphenyls (PCBs)

3.1.6 Area impacted by Aerial Deposition from Stack Emissions

Aerial deposition may appear around the stacks. Potential contaminants derived from this source are:

- Polyaromatic hydrocarbons;
- Dioxins; and
- Metals (Cr, Co, Ni, Cu, Zn, As, Mo, Cd, Sn, Ba, Hg, Pb)

It is considered unlikely that stack emissions would give rise to significantly elevated concentrations of soil contaminants under normal conditions. However, the possibility cannot be discounted. Since only the western part of the Site area which is vegetated is not covered with hardstanding, potential surface soil contamination by aerial deposition would only occur at this vegetated areas within the Site.

3.2 Potential Contamination

Summary of the potential soil contamination at the areas of concern within the Site is shown in Table 3-1.

Location	Potential Contaminant(s)	Potential of Soil Contamination
Coffin Crematorium		

Location	Potential Contaminant(s)	Potential of Soil Contamination
Underground fuel tank	• Petroleum hydrocarbons • PAHs	Uncertain
Dangerous goods store	• Petroleum hydrocarbons • PAHs	Unlikely
Daily tank room, fuel pump room and sunken fuel pipe	• Petroleum hydrocarbons • PAHs	Unlikely
Cremators	• PAHs • Dioxins • Metals (Cr, Co, Ni, Cu, Zn, As, Mo, Cd, Sn, Ba, Hg, Pb)	Unlikely
Transformer room	• PCBs	Uncertain
Area within site boundary impacted by aerial deposition from stack emissions	• PAHs • Dioxins • Metals (Cr, Co, Ni, Cu, Zn, As, Mo, Cd, Sn, Ba, Hg, Pb)	Possibly
Skeletal Cremator Building		
Underground fuel tank	• Petroleum hydrocarbons • Simple aromatics (e.g. BTEX) • PAHs	Uncertain
Dangerous goods store	• Petroleum hydrocarbons • PAHs	Unlikely
Cremator	• PAHs • Dioxins • Metals (Cr, Co, Ni, Cu, Zn, As, Mo, Cd, Sn, Ba, Hg, Pb)	Unlikely

Table 3-1 Summary of Potential Contamination

3.3 Potential Receiver and Pathway

The site is now almost entirely covered with hardstanding, buildings and vegetated areas. Only some small planting areas were found within the Site. There will be a similar site situation after the re-provisioning of the cremators at the Site. As most visitors would stay within the concrete paved areas and the building at the Site, direct contact with the soil by the

visitors is unlikely. Employees engaged for gardening may have the potential of direct contact with soil. In addition, construction workers will have the potential of direct contact with soil during demolition and construction as construction works such as excavation and earth works will be carried out. Construction dust generated may also increase the potential of transportation of contaminants. However, the implementation of general air quality mitigation measures to suppress the construction dust will be sufficient to keep this possibility minimal.

Groundwater may be contaminated by the downward migration of contaminants through the soil. The degree of contamination depends on the nature, concentration and extent of the contaminants. Nevertheless, the groundwater resource in the area is not likely to be utilized. Thus, impacts on groundwater are unlikely to affect human receptors.

Adjacent streams may be contaminated by the contaminated soil either by construction runoff or by direct transport of contaminated soil during the construction phase of the new crematorium. However, implementation of some general mitigation measures during the construction phase will be sufficient to prevent contaminated soil from directly entering the streams.

4 Site Investigation Methodology and Approach

4.1 Sampling Location and Depth

4.1.1 Underground Fuel Tank

In the vicinity of the underground fuel tank in the coffin crematorium area, two boreholes, BH1 and BH2, to a depth of approximately 3m below the base of the concrete chamber of the tank are proposed. As the base of the concrete chamber is approximately 4m below ground level, sampling will be undertaken at 4m, 5.5m and 7m below ground level at each borehole. If groundwater is encountered during the sampling, groundwater samples will be collected for analysis.

Due to the site constraints, only one borehole, BH3, to a depth of approximately 3m below the base of the unused underground fuel tank at the skeletal cremator is proposed. The depth of the underground fuel tank is unknown and this will be confirmed prior to sampling works. Sampling will be undertaken starting from the depth of the base of the fuel tank to 3m below the base of the tank with the interval of 1.5m.

The proposed boreholes locations are shown in Figures 4-3 and 4-4.

4.1.2 Dangerous Goods Stores

As mentioned in Section 3, the potential soil contamination due to the diesel oils stored in these dangerous goods stores is unlikely. Since it is not feasible to collect soil sample underneath the dangerous goods stores as the crematorium is still in operation, sampling and analysis will only possible be conducted after decommissioning of the crematorium to confirm there is no contamination. A sampling and analysis plan will be prepared by the demolition contractor after decommissioning and will be submitted to EPD for endorsement prior to sampling and analysis works.

4.1.3 Day Tank Room, Fuel Pump Room and Sunken Fuel Pipe

As mentioned in Section 3, the potential contamination due to the leakage of fuel oil from day tank, fuel pump and sunken fuel pipe is unlikely. Since it is not feasible to collect soil sample underneath these facilities as the crematorium is still in operation, sampling and analysis will only possible be conducted after decommissioning of the crematorium to confirm there is no contamination. A sampling and analysis plan will be prepared by the demolition contractor after decommissioning and will be submitted to EPD for endorsement prior to sampling and analysis works.

4.1.4 Cremator

As mentioned in Section 3, it is considered that the migration of contaminants through the slab into the soil underneath is unlikely. However, residual materials inside the cremators may contain contaminated materials and may pose waste management implication. Sampling and analysis of the residual materials may thus be required following decommissioning of the cremators and prior to demolition to determine the handling procedure and disposal option for such contaminated materials. A sampling and analysis plan is required to be prepared for a suite of parameters that will include metals, dioxins and PAHs. The plan will be prepared by demolition contractor after decommissioning and will be submitted to EPD separately for endorsement prior to sampling and analysis works.

4.1.5 Transformer Room

The access to the transformer room is still being arranged. In addition, sampling beneath the transformer room is not feasible as it is still in operation and thus, any sampling would lead to unacceptable risks. Thus, sampling and analysis will only possible be conducted after decommissioning of the transformer to confirm whether there is any contamination. A sampling and analysis plan will be submitted to EPD for endorsement once the transformer room is accessible.

4.1.6 Area impacted by Aerial Deposition from Stack Emissions

Vegetated areas to the west of the existing coffin crematorium will form part of the future crematorium. Any contaminants deposited on soil due to the stack emissions would thus pose an impact on the construction workers who may have potential of direct contact with soil. Since the contaminants of concern are likely to be relatively immobile, it is considered that the highest concentrations of these contaminants (if present) are likely to be in the superficial soil. Thus, two surface soil samples at this area are proposed to be taken from a depth of 0m to 0.1m below ground level in order to determine whether elevated concentrations of contaminants are present or not as a result of aerial deposition from stack emissions. The approximate locations, SS1 and SS2, for sampling the surface soil samples are shown in Figure 4-5.

4.1.7 Summary

Figures 4-3 and 4-4 show the locations of different type of and the following table summarizes the details of the proposed sampling regime.

Item	Location (Depth below ground)	Sampling Depth below Ground Level	Parameters to be Analysed
Underground Fuel Tank at Coffin Crematorium	BH1[1] (7m) BH2[1] (7m)	4m, 5.5m and 7m 4m, 5.5m and 7m	TPH PAHs
Underground Fuel Tank at Skeletal Crematorium Building	BH3[1] (3m below the base of the fuel tank)	3 sampling depths from the base of the fuel tank with the interval of 1.5m	TPH PAHs BTEX
Area impacted by Aerial Deposition from Stack Emissions	SS1 (0.1m) SS2 (0.1m)	0.1m 0.1m	Metals (Cr, Co, Ni, Cu, Zn, As, Mo, Cd, Sn, Ba, Hg, Pb) Dioxin PAHs
Transformer Room	A sampling and analysis plan will be submitted to EPD for endorsement once the transformer room is accessible.		
Dangerous Goods Stores, Day Tank Room, Fuel Pump Room and Sunken Fuel Pipe	In order to confirm there are no contamination, sampling and analysis plan(s) will be prepared by the demolition contractor after decommissioning and will be submitted to EPD for endorsement prior to sampling and analysis works.		

Item	Location (Depth below ground)	Sampling Depth below Ground Level	Parameters to be Analysed
Cremator	A sampling and analysis plan which will be prepared by the demolition contractor will be submitted to EPD separately for endorsement following decommissioning and prior to demolition of the facility to determine the handling procedure and disposal option of the contaminated materials.		

Note:

1. Groundwater will be collected if encountered.

Table 4-2 Details of Proposed Sampling Regime

4.2 Analytical Requirements

The suite of analysis would examine the potential contaminants that have been identified above and are listed in the following table.

Parameter	Analytical Method	Detection Limit (mg/kg)
TPH	GC-FID with carbon banding (USEPA 8015 or similar)	2 (C6-C9) 50 (C10-C14) 100 (C15-C28) 100 (C29-C36)
PAHs	GC-MS (USEPA 8270 or similar) or GC-FID (USEPA 8100 or similar)	0.5 (Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthraoene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,I)preylene 1 (Benzo(b) & (k) fluoranthene)
BTEX	Purge & Trap GC-MS	0.2 (Benzene) 0.2 (Toluene) 0.2 (Ethylbenzene) 0.4 (meta- & para-Xylene) 0.2 (ortho-Xylene)

Parameter	Analytical Method	Detection Limit (mg/kg)
Dioxins (PCDDs/PCFDs)	GC-MS (USEPA 8290 or similar)	0.005 μg/kg (2,3,7,8-Tetrachlorodibenzo-p-Dioxin) 0.01 μg/kg (1,2,3,7,8-Pentachlorodibenzo-p-Dioxin) 0.05 μg/kg (1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin, 1,2,3,6,7,8-Hexachlorodibenzo-p-Dioxin, 1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin and 1,2,3,4,6,7,8-Heptachlorodibenzo-p-Dioxin) 0.2 μg/kg (1,2,3,4,5,6,7,8-Octachlorodibenzo-p-Dioxin) 0.01 μg/kg (2,3,7,8-Tetrachlorodibenzofuran, 1,2,3,7,8-Pentachlorodibenzofuran and 2,3,4,7,8-Pentachlorodibenzofuran) 0.05 μg/kg (1,2,3,4,7,8-Hexachlorodibenzofuran, 1,2,3,6,7,8-Hexachlorodibenzofuran, 1,2,3,7,8,9-Hexachlorodibenzofuran, 2,3,4,6,7,8-Hexachlorodibenzofuran, 1,2,3,4,6,7,8-Heptachlorodibenzofuran and 1,2,3,4,7,8,9-Heptachlorodibenzofuran) 0.2 μg/kg (1,2,3,4,5,6,7,8-Octachlorodibenzofuran)
Metals	ICP-AES (USEPA 6010 or similar) or ICP-MS (USEPA 6020 or similar)	0.5 (Cr, Co, Ni, Cu, Zn, As, Mo, Sn, Ba and Pb) 0.2 (Cd) 0.02 (Hg)

Table 4-3 Analytical Requirement

Analysis should be undertaken at a laboratory which either holds HOKLAS accreditation for the above parameters, or is accredited to a similar standard by a recognized national accreditation body.

If any samples are found to exceed the assessment criteria, and excavation and landfill disposal is selected as a remedial method as a last resort, TCLP testing of these samples will be required. Sufficient sample will thus be retained for TCLP analysis following completion of the laboratory testing of the above parameters.

4.3 Sampling, Handling and Transport of Samples

Where possible, undisturbed samples should be collected by driven an open-tube sampler into the side or base of the trial pits, or the base of the boreholes. The base of the sampler should be covered with a plastic or aluminium film and sealed with a plastic lid immediately following sampling.

If disturbed soil sample is collected, the soil samples should be contained in a sample container provided by the HOKLAS laboratory. Sufficient sample size should be collected for the laboratory analysis for the parameters as mentioned in Sections 4.1.7 and 4.2.

Samples should be marked with the name of the site, sampling identification number and sampling depth.

Following sampling, samples should be stored in a cool box at a temperature of between 0℃ and 4℃ and transported to the laboratory within the sample retention time which should be advised by the laboratory.

In order to avoid cross contamination, All sampling equipment must be thoroughly decontaminated or cleaned prior to sampling, by washing with non-phosphate detergent and rinsing with distilled water.

4.4 Interpretation of Results

Test results of soil and groundwater will be presented in a Contamination Assessment Report (CAR). The purpose of the CAR is to identify the need of site remediation so as to ensure the future occupants of the site would not be exposed to unacceptable risk. The *ProPECC Note PN3/94*, which follows the Dutch A, B, C Classification system will be followed for the interpretation of contamination status.

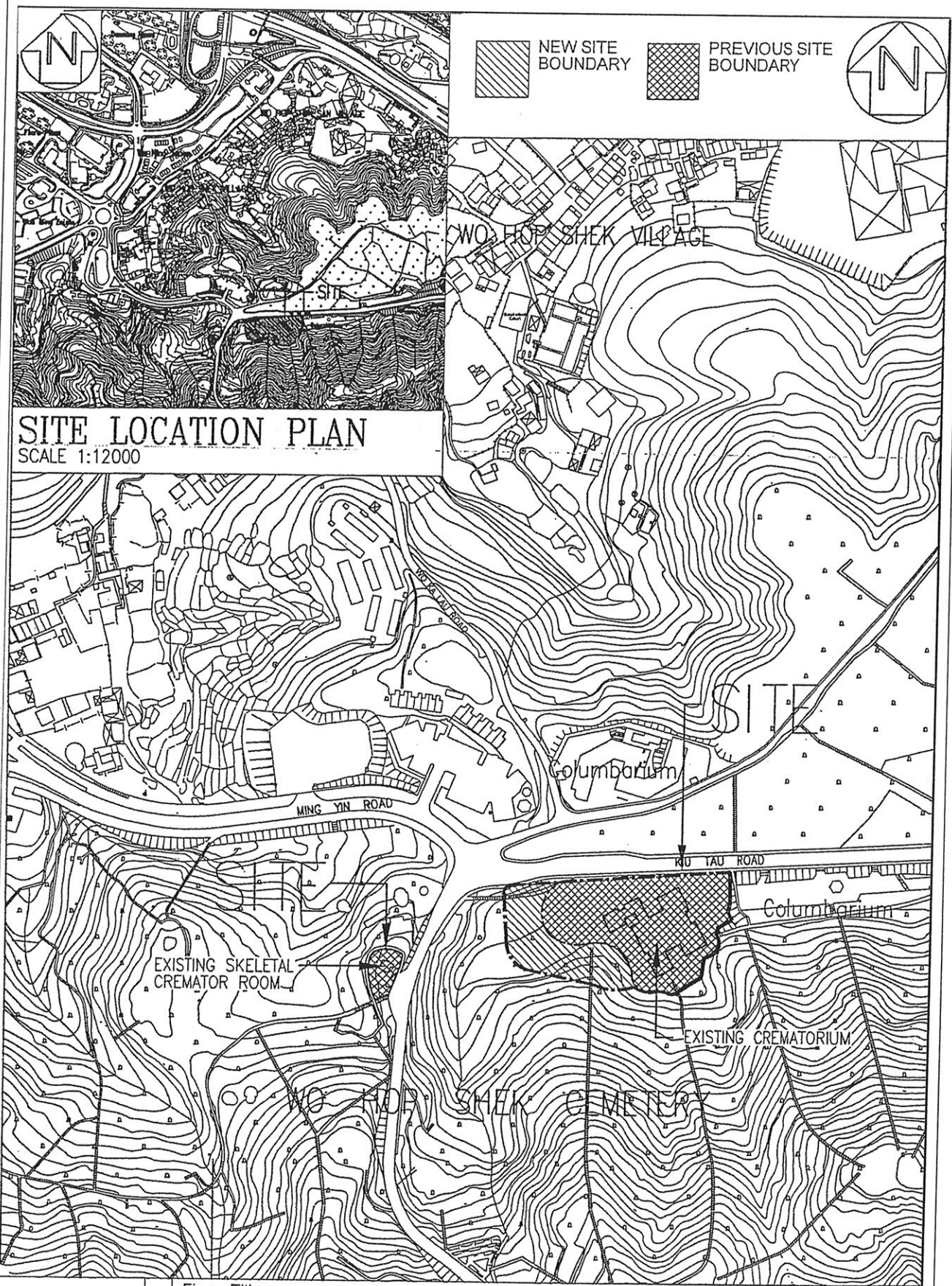
5 Work Programme

The existing coffin crematorium and skeletal cremator is anticipated to be decommissioned by the end of 2007.

The proposed site investigation works will be carried out at those areas where sampling by means of borehole and/or trial pit are feasible upon EPD endorsement of this CAP. The results from site investigation works will be presented in a contamination assessment report (CAR). The CAR will present the detailed methodology, observations and the analytical results from the site investigation works. If land contamination is found, a strategy for site remediation will be recommended in a remediation action plan (RAP). The CAR and RAP will be submitted for EPD endorsement.

A sampling and analysis plan for the transformer room where is inaccessible will be prepared once the transformer room is accessible for EPD endorsement.

Sampling and analysis plan(s) will also be prepared for the dangerous goods stores, day tank rooms by the demolition contractor after decommissioning of the crematorium and will be submitted to EPD for endorsement prior to sampling and analysis works to confirm there are no contamination.A sampling and analysis plan which will be prepared by the demolition contractor will be submitted to EPD separately for endorsement following decommissioning and prior to demolition of the facility to determine the handling procedure and disposal option of the contaminated materials in the cremators.



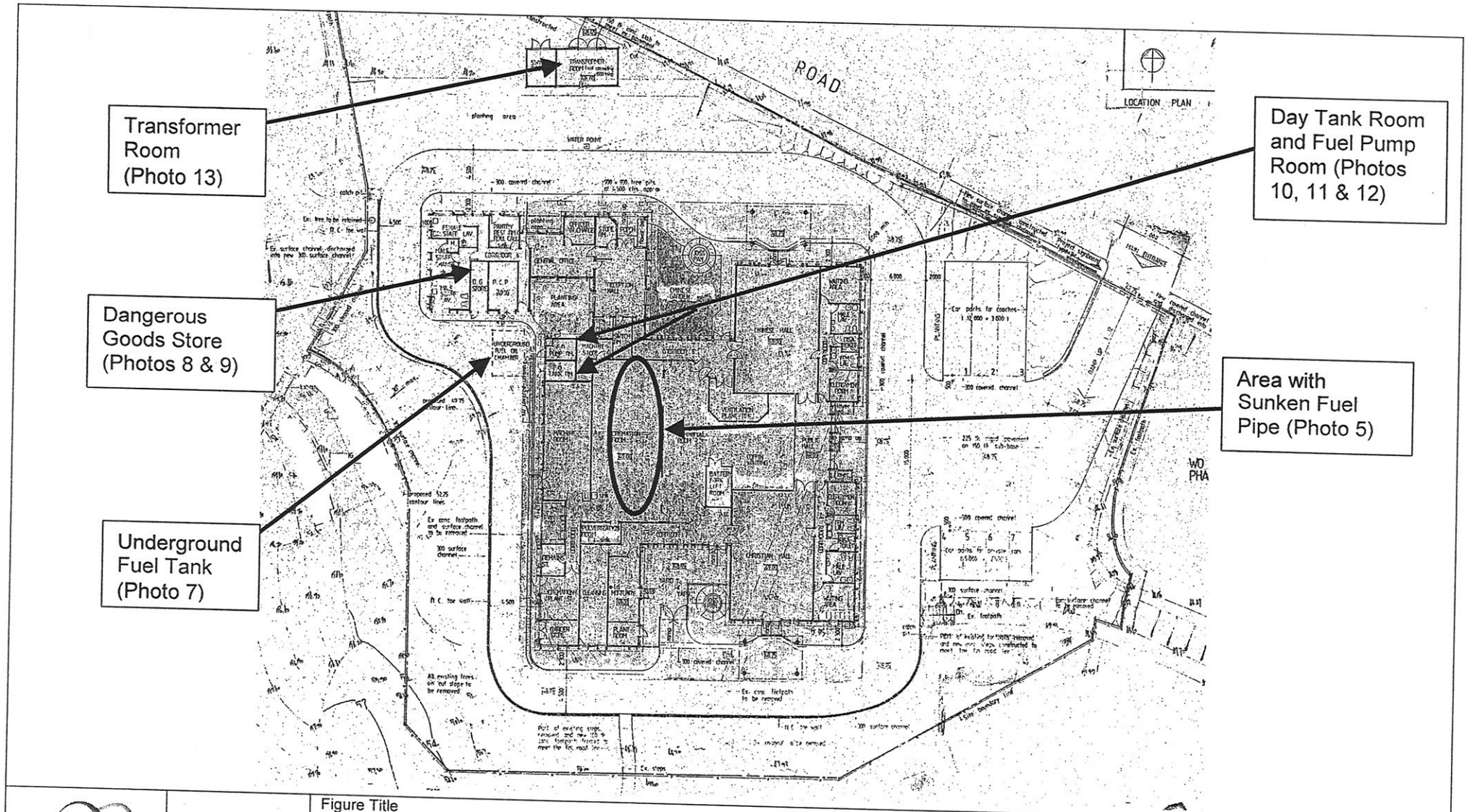
Hyder Consulting

Figure Title

Provision of Cremators at Wo Hop Shek Crematorium

The Project Site

Date	Mar 2006
Figure	1-1
Scale	NTS

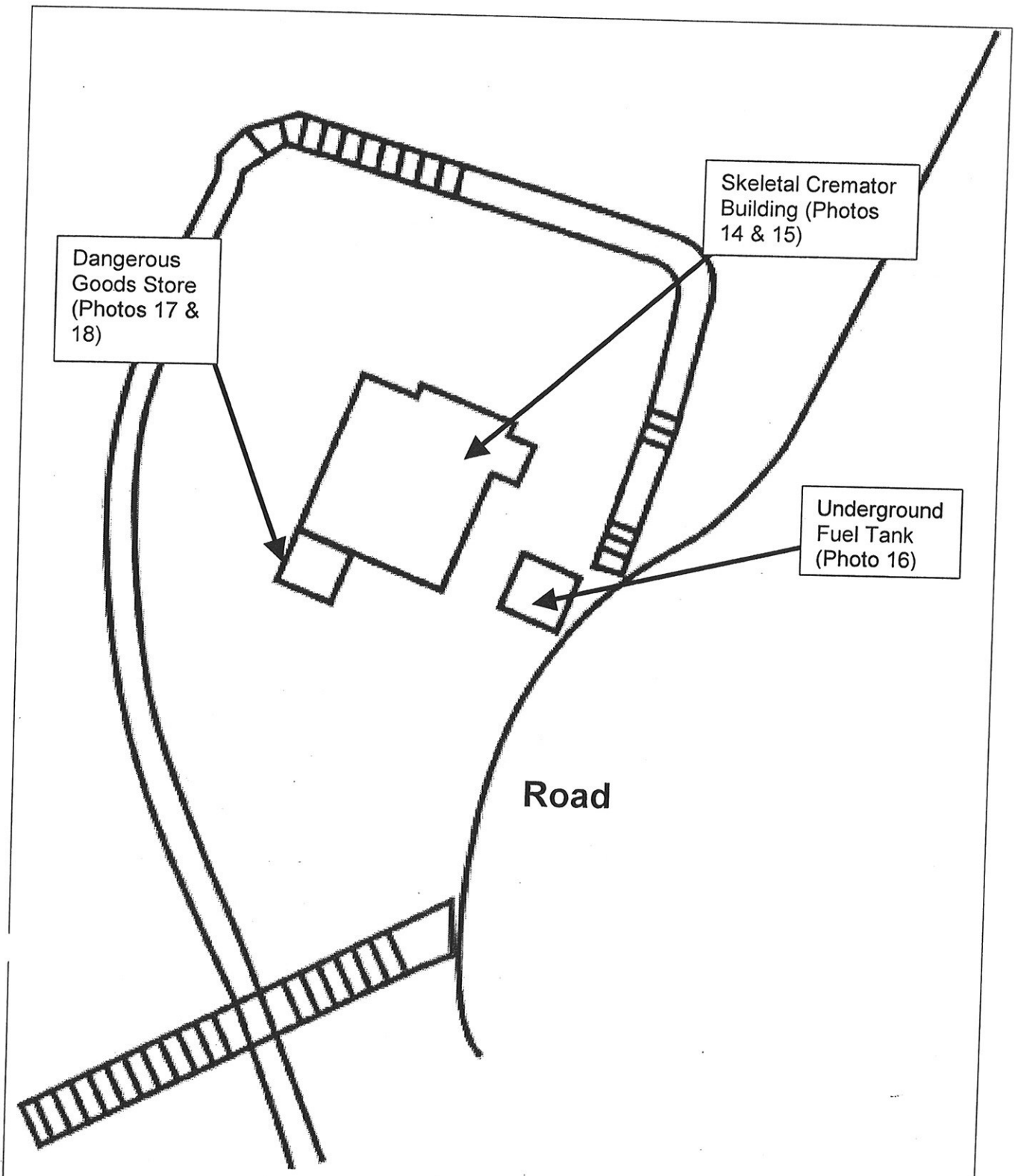


Hyder Consulting

Figure Title

Provision of Cremators at Wo Hop Shek Crematorium
Layout of Coffin Crematorium

Date	Mar 2006
Figure	1-2a
Scale	NTS

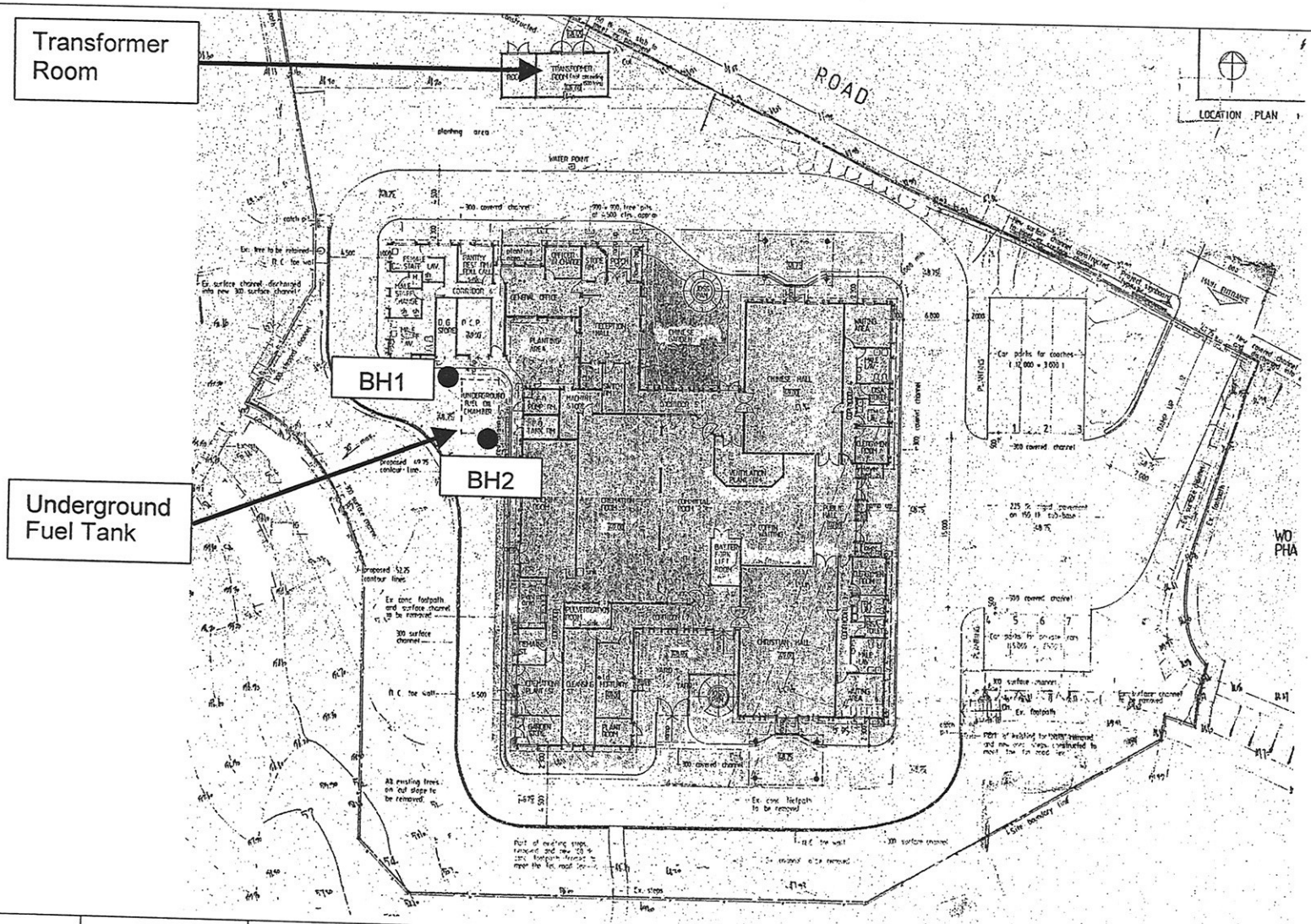


Hyder Consulting

Figure Title

Provision of Cremators at Wo Hop Shek Crematorium
Layout of Skeletal Cremator Building

Date	Mar 2006
Figure	1-2b
Scale	NTS

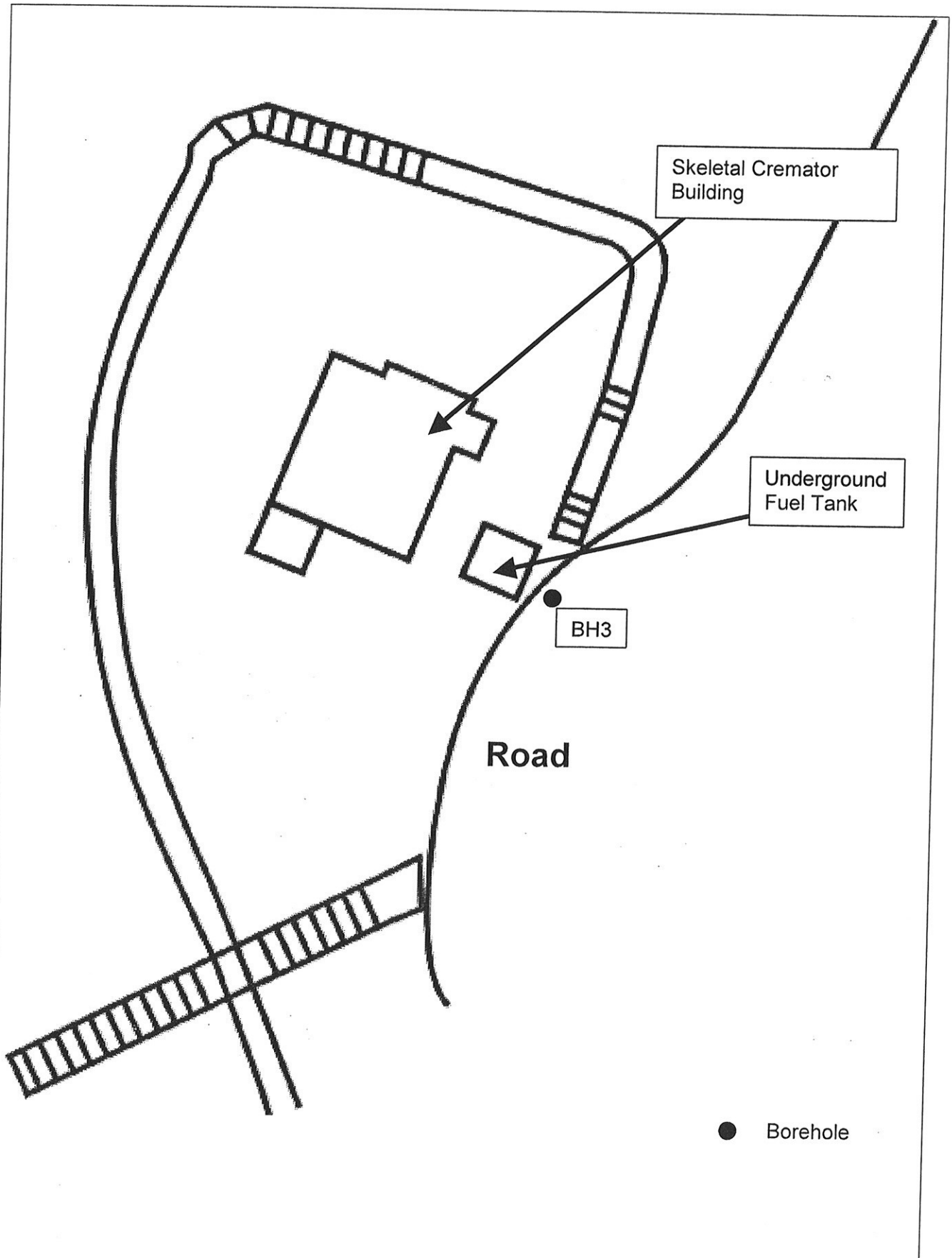


Hyder Consulting

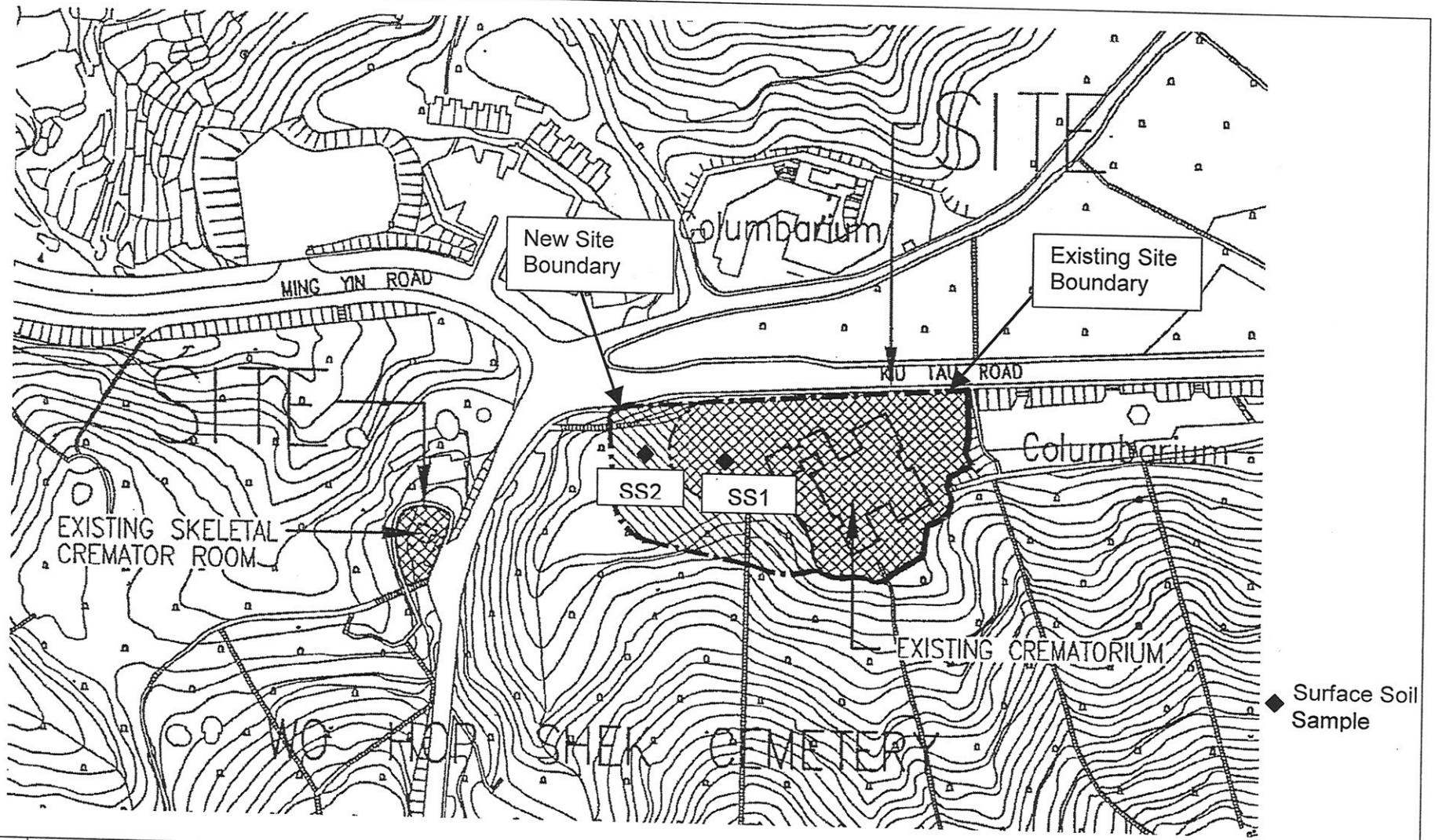
Figure Title

Provision of Cremators at Wo Hop Shek Crematorium
Sampling Location at Coffin Crematorium

Date	Mar 2006
Figure	4-3
Scale	NTS



Hyder Consulting	Figure Title Provision of Cremators at Wo Hop Shek Crematorium Sampling Locations at Skeletal Cremator Building	Date Mar 2006	
		Figure 4-4	
		Scale NTS	



Hyder Consulting

Figure Title

Provision of Cremators at Wo Hop Shek Crematorium
Sampling Location for Surface Sample at Coffin Crematorium

Date	Mar 2006
Figure	4-5
Scale	NTS

Appendix 1

Photos

Photo 1 – Coffin Crematorium

Photo 2 – Coffin Crematorium

Photo 3 – Coffin Crematorium

Photo 4 – Coffin Crematorium

Photo 5 – Interior of Coffin Crematorium and Area with Sunken Fuel Pipe

Photo 6 – Interior of Coffin Crematorium

Photo 7 – Underground Fuel Tank in Coffin Crematorium

Photo 8 – Dangerous Goods Store in Coffin Crematorium

Photo 9 – Dangerous Goods Store in Coffin Crematorium

Photo 10 – Day Tank Room

Photo 11 – Day Tank Room

Photo 12 – Fuel Pump Room

Photo 13 – Transformer Room

Photo 14 – Skeletal Cremator Building

Photo 15 – Skeletal Cremator Building

Photo 16 – Underground Fuel Tank in Skeletal Cremator Building

Photo 17 – Dangerous Goods Store in Skeletal Cremator Building

Photo 18 – Interior of Dangerous Goods Store of Skeletal Cremator Building

Photo 19 – Interior of Skeletal Cremator Building

Photo 20 – Interior of Skeletal Cremator Building

Photo 21 – Interior of Skeletal Cremator Building

Photo 22 – Interior of Skeletal Cremator Building

Appendix 2

Aerial Photos

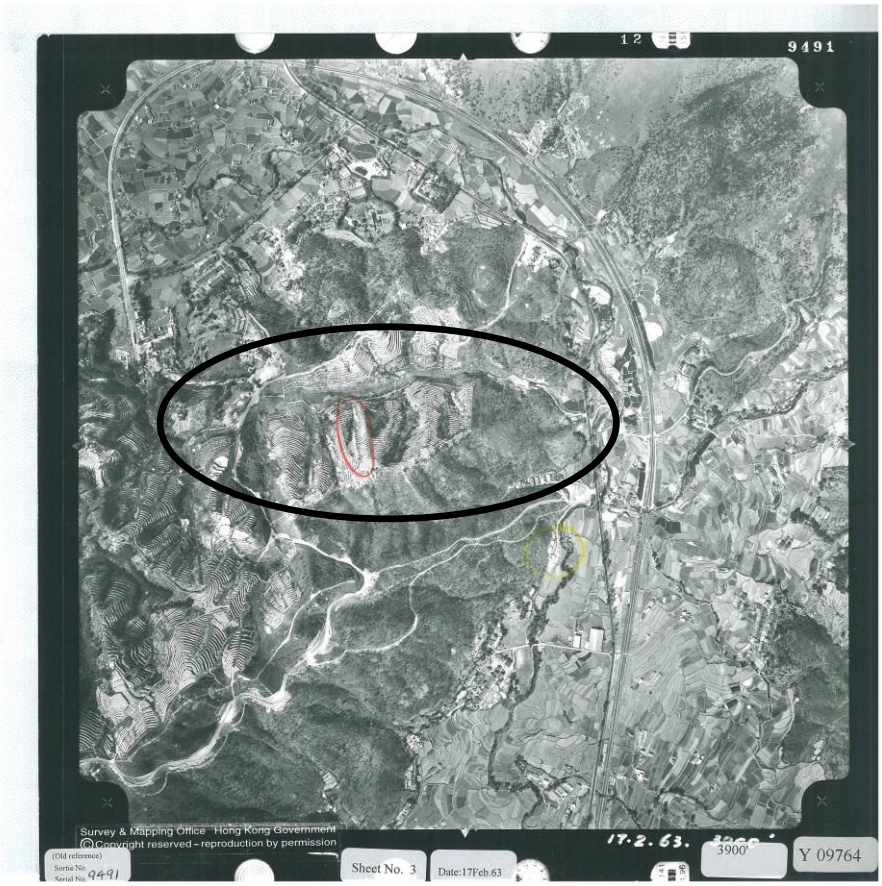


Photo 1 – 1963

Photo 2 – 1975

Photo 3 – 1986

Photo 4 – 1991

Photo 5 – 1995

Photo 6 – 2004