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Your Ref : (4) in EP2/N7/A/52 Ax(1) Pt.12
Our Ref : (CV/2012/08)/M45/010/(F01174)

7 August 2014

By Hand

Environmental Impact Assessment Ordinance Register Office
Environmental Protection Department
27/F, Southorn Centre,
130 Hennessy Road,
Wanchai, Hong Kong

Attn.: Mr. Charles Pang

Dear Sirs,

Contract No. CV/2012/08
Liantang / Heung Yuen Wai Boundary Control Point -
Site Formation and Infrastructures – Contract 2

Environmental Permit No. EP-404/2011/A
Condition 3.4 – Revised Contamination Assessment Plan (CAP)
– Po Kat Tsai and Loi Tung (Rev.5)

I refer to your above referenced letter dated 5 June 2014 and email to our Mr. Perry Yam dated 11 July 2014 enclosing comments on our Revised CAP – Po Kat Tsai and Loi Tung (Rev.4) submitted on 16 May 2014.

In response to the comments and with reference to Condition 3.4 of the Environmental Permit (EP) No. EP- 404/2011/A, on behalf of the Permit Holder, Civil Engineering and Development Department (CEDD), I would like to submit three hard copies of the revised CAP – Po Kat Tsai and Loi Tung (Rev.5) certified by the ET Leader and verified by the IEC for your approval.

Should you have any queries, please contact the undersigned or our Mr. Perry Yam at 2171 3350.

Yours faithfully,

Gregory Lo
Senior Resident Engineer
AECOM Asia Co. Ltd.

Encl.

c.c.	CEDD/BCP	- Attn: Mr. B. K. Chow	- 1 hard copy
	AECOM	- Attn: Mr. Francis Leong / Ms. Cherry Yau	- 1 CD copy
	SMEC(IEC)	- Attn: Mr. Anthony Wong	- 1 CD copy
	AUES(ET)	- Attn: Mr. T. W. Tam	- w/o encl.

CTW/SM/GL/GW/PY/LQR/ptk

JOB NO.: TCS00670/13

AGREEMENT NO. CE 45/2008 (CE)
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

REVISED CONTAMINATION ASSESSMENT PLAN (CAP) -
PO KAT TSAI AND LOI TUNG

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT (CEDD)

Quality Index

Date	Reference No.	Prepared By	Certified By
22 July 2014	TCS00670/13/600/R00132		
		Ben Tam (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Rev.	Date	Description
1	10 March 2014	First submission
2	14 March 2014	Amended against IEC comment on 14 March 2014
3	26 March 2014	Amended against IEC comment on 17 March 2014
4	15 May 2014	Amended against EPD comment on 24 April 2014
5	22 July 2014	Amended against EPD comment on 5 June 2014 and 11 July 2014

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6 August 2014

Our ref: 7076192/L16550/RY/AB/AW/WM/rw
Your ref:

AECOM
8/F, Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, N.T.

By Email & Post

Attention: Mr Gregory LO

Dear Sir

Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Contract No. CV/2012/08
Revised Contamination Assessment Plan – Po Kat Tsai and Loi Tung (Rev. 5)

With reference to the Revised Contamination Assessment Plan – Po Kat Tsai and Loi Tung (Revision 5) certified by the ET Leader provided to us on 29 July 2014, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 3.4 of the Environmental Permit No. EP-404/2011/A.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Ms Winnie MA on tel. 3995 8138 or by email to winnie.ma@smec.com.

Yours faithfully
For and on behalf of
SMEC Asia Limited

Antony WONG
Independent Environmental Checker

cc	CEDD/BCP	-	Mr B.K. CHOW/Mr Pui Sang LI	by fax: 2714 0103
	AECOM	-	Mr Francis LEONG / Mr Perry YAM	by email
	AUES	-	Mr TW TAM	by email

Item	EPD's Comment	Response to Comment
i)	Section 3.14 & 3.15:- "(SVOC)" should read as "(SVOCs)	Noted and Section 3.14 (now Section 3.13) and Section 3.15 (now Section 3.14) have been amended.
ii)	Section 3.16: – All soil excavation and sampling should be supervised by a land contamination specialist (not Resident Engineer)	As discussion and agreed with ER, pit excavation would be supervised by a land contamination specialist and Resident Engineer to ensure that no cross contamination or any other forms of interferences. Moreover, AUES would be also responsible to monitor and supervise all the soil and water sampling. Section 3.16 (now Section 3.15) has been amended as "*Soil sampling by pit excavation is recommended. During investigation, pit excavation will be supervised by a land contamination specialist and Resident Engineer to ensure that no cross contamination or any other forms of interferences. Moreover, a land contamination specialist would also be responsible to monitor and supervise all the soil and water sampling.*"
iii)	Table 3-5:- please check and proofread the reporting limit shown in Table 3-5, especially for Barium and Dibenzo(a,h)anthracene. In addition, Nickel is missing.	The testing laboratory confirmed that the reporting limit of Barium is 1mg/kg and Dibenzo(a,h)anthracene is 0.5mg/kg. The reporting limit of both parameters has been updated. Nickel has been re-provided in the table. Moreover, reporting limit of Benzo(a)pyrene is 0.5mg/kg and amended.
iv)	Table 3-6:- The name of chemicals/parameters used should be consistent with our guidelines and throughout the report, e.g. "Total Petroleum Hydrocarbons (TPH)" should read as "Petroleum Carbon Ranges". The figures of reporting limits of "Petroleum Carbon Ranges" should be in μg/L for groundwater. Please also check and proofread the reporting limit shown in Table 3-6, especially for Hexachlorobenzene.	Noted and amended. The testing laboratory confirmed the reporting limit of Hexachlorobenzene is 4μg/L. Therefore, the reporting limit of Hexachlorobenzene has been amended.
v)	Section 4.2 & 4.3:- "BETX" should read as "BTEX" and chemical names should be provided.	Noted and amended. Chemical name of BTEX including Benzene, Toluene, Ethylbenzene and Xylenes (total), has been incorporated.
vi)	Section 4:- To avoid any confusion, please state the number of all samples to be collected for laboratory testing, including the QA/QC samples, duplicate samples, blank samples, etc.	The number of trip blank depends on groundwater delivery event. The number of field blank sample collection depends on the number of days of groundwater sampling. Two duplicate soil samples and one duplicate groundwater sample are predicted for each area. Moreover, two equipment blank samples are predicted for each area. The statement has been incorporated in relevant sections. Table 4-1 is added to summarise the QA/QC sample collection.
vii)	Appendix H:- The two sets of Site Walkover Checklist are not in order. Some pages are missing in some copies.	Noted and amended.

Response to further comments given by EPD via email on 11 July 2014

Item	EPD's Further Comment	Response to Further Comment
i	Section 1.5:- The consultants have been appointed as the Specialist to carry out land contamination assessment including site supervision, chemical analysis and the related report submission. Please clarify how to carry out the chemical analysis.	The land contamination specialist will appoint a HOKLAS-accredited laboratory, ALS, for carrying out the chemical analysis. Please refer to Section 1.5.
ii	Section 1.7:- According to Section 1.7, this CAP has incorporated the detailed information e.g. site background and geology and hydrogeology, etc.; however, information on geology and hydrogeology are missing	Sections 2.11 to 2.14 have been added to provide information on geology and hydrogeology.
iii	Table 3-4:- The consultants should clarify the "Report Limit" for C6-C8 of PCRs.	The testing laboratory confirmed that the "Report Limit" for C6-C8 of Petroleum Carbon Ranges is 5mg/kg for soil and 20µg/L for water. Table 3-5 and Table 3-6 have been amended. The full set "Report Limit" provided by ALS is enclosed.
iv	Table 4-1:- In addition to the QA/QC samples, the consultants should also list out the proposed numbers of soil/groundwater samples to be collected and analyzed. The chemical testing to be conducted should also be indicated for each of the samples	Table 4-1 has been amended to include the proposed numbers of soil/water samples to be collected from both assessment sites.

Analytical Charges

RBRG: Land Contamination

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limit			Unit Cost (HK$)
			Soil (mg/kg)	Ground Water (µg/L)	Blanks (µg/L)	
Metals						
Lead	EG020*	USEPA6020	1	NR[@]	1	
Antimony			1	NR[@]	1	
Arsenic			1	NR[@]	10	
Barium			1	NR[@]	1	
Cadmium			0.2	NR[@]	0.2	
Cobalt			1	NR[@]	1	
Copper			1	NR[@]	1	
Manganese			1	NR[@]	1	
Molybdenum			1	NR[@]	1	
Nickel			1	NR[@]	1	
Tin			1	NR[@]	1	
Zinc			1	NR[@]	10	
Mercury	EG036*	APHA3112B	0.2	0.5	0.5	
Chromium III[^]	EG049*	By Calculation	1	NR[@]	20	
Chromium VI	EG3060* in soil EG050* in water	USEPA3060 APHA 3500 Cr: D	1	NR[@]	20	
Volatile Organic Compounds						
Acetone	EP074SR*	USEPA 8260	50	500	500	
Benzene			0.2	5	5	
Bromodichloromethane			0.1	5	5	
2-Butanone			5	50	50	
Chloroform			0.04	5	5	
Ethylbenzene			0.5	5	5	
Methyl tert-Butyl Ether			0.5	5	5	
Methylene Chloride			0.5	50	50	
Styrene			0.5	5	5	
Tetrachloroethene			0.04	5	5	
Toluene			0.5	5	5	
Trichloroethene			0.1	5	5	
Xylenes (sum of meta & para, ortho)			2	20	20	
Petroleum Carbon Ranges (PCR)						
C6 - C8	EP071HK_SR*	USEPA 8015/8260	5	20	20	
C9 – C16			200	500	500	
C17 – C35			500	500	500	

*The laboratory is HOKLAS accredited for the in-house method as quoted. The relevant method references are as listed.

[^] Chromium III = Total Chromium – Chromium VI

[@] NR = Not required

** QC groundwater sample shall be conducted Hg testing.

2) RBRG: Land Contamination

Analyte Description	ALS Method Code	In-house Method Reference	Reporting Limit			Unit Cost (HK$)
			Soil (mg/kg)	Ground Water (µg/L)	Blanks (µg/L)	
Semivolatile Organic Compounds						
Acenaphthene	EP076HK*	USEPA 8270	0.5	2	2	
Acenaphthylene			0.5	2	2	
Anthracene			0.5	2	2	
Benzo(a)anthracene			0.5	NR@	2	
Benzo(a)pyrene			0.5	NR@	2	
Benzo(b)fluoranthene			0.5	1	1	
Benzo(k)fluoranthene			0.5	NR@	2	
Benzo(g,h,i)perylene			0.5	NR@	2	
Bis(2-Ethylhexyl)phthalate			5	NR@	2	
Chrysene			0.5	1	1	
Dibenzo(a,h)anthracene			0.5	NR@	2	
Fluoranthene			0.5	2	2	
Fluorene			0.5	2	2	
Hexachlorobenzene			0.2	4	4	
Indeno(1,2,3-cd)pyrene			0.5	NR@	2	
Naphthalene			0.5	2	2	
Phenanthrene			0.5	2	2	
Phenol			0.5	NR@	2	
Pyrene			0.5	2	2	
Total PCBs	EP066*	USEPA8270	0.1	1	1	
Free Cyanide	EK025MD	APHA 4500CN:B,C, E & I	1	NR@	0.01 mg/L	

*The laboratory is HOKLAS accredited for the in-house method as quoted. The relevant method references are as listed.

^ Chromium III = Total Chromium – Chromium VI

@ NR = Not required

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LIST OF APPENDICES

1 INTRODUCTION

1.1 **Liantang/Heung Yuen Wai Boundary Control Point and Associated Works** (hereinafter called "The Project") is a Designated Projects (DPs) under the Environmental Impact Assessment (EIA) Ordinance. In accordance with the EIA Ordinance (EIAO), an EIA Report for the Project was approved and an Environmental Permit (EP) EP-404/2011 was issued by the Director of Environmental Protection (DEP) before construction and operation of the Project. The Project Layout Plan is enclosed in ***Appendix A***.

LAND CONTAMINATION DURING EIA STUDY

1.2 In order to fulfill the requirement set out in Clause 3.4.8.1(iv) of the EIA Study Brief, an initial Contamination Assessment Plan (CAP) based on the initial connecting road alignment was submitted on 31 August 2009 and accepted by the Environmental Protection Department (EPD) on 2 October 2009. A revised CAP was submitted on 31 May 2010 due to the refinement of the alignment and scope of works during the design stage and was accepted by EPD on 22 June 2010. Due to the further refinement of the alignment section at Sha Tau Kok Road, the CAP was updated and submitted on 14 July 2010 and accepted by EPD on 12 October 2010.

1.3 The land contamination assessment had been conducted by reviewing the historical/current land uses and carrying out desktop review as well as a site inspection. Other relevant information was also collected and reviewed from the related Government Departments. Based on the findings of the site appraisal on the existing and historical land uses in the Study Area, adverse land contamination impacts associated with the construction and operation of the proposed Liantang/Heung Yuen Wai Boundary Crossing Point (LT/HYW BCP), connecting roads and ventilation buildings are not expected, except the open area at Sha Tau Kok Road near Loi Tung, works sites of ventilation building in Po Kat Tsai and workshops in Fanling.

1.4 Site visit could not be performed at the three potential contamination areas when carrying out the EIA study. Therefore, site investigation to access the existing ground situation of the three areas was recommended in the EIA Report upon site access granted or land acquisition. Moreover, in accordance with EP-404/2011/A Condition 3.4, after resumption of private lands, site inspection shall be carried out to ascertain contaminative sources and hotspots of contamination. The revised CAP with sampling and testing schedule shall be certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC), and submitted to EPD for approval.

1.5 Action-United Environmental Services & Consulting (hereinafter referred to "AUES") has been appointed as the Land Contamination Specialist to carry out the land contamination assessment, including site supervision and relevant report submission. Sampling will be carried out by the Contractor under supervision by AUES and Resident Engineer. A Hong Kong Laboratory Accreditation Scheme (HOKLAS)-accredited laboratory will be appointed to carry out HOKLAS-accredited chemical analysis.

1.6 When preparing this CAP, one of the potential contamination areas, the car repair workshop and furniture workshop in Fanling, was unable to be accessed. Therefore, this submission only covers two potential contamination areas, the open area at Sha Tau Kok Road near Loi Tung and the work sites of the ventilation building in Po Kat Tsai.

1.7 This CAP is prepared with detailed information on site background, site geology and hydrogeology, proposed sampling and testing methodology, the locations of soil sampling points and groundwater monitoring wells, Quality Assurance/Quality Control (QA/QC) procedures and an implementation schedule for the site investigation in accordance with the EPD requirements.

1.8 The tentative schedule of site investigation (SI) would be undertaken for about two weeks. A Contamination Assessment Report (CAR) or/with Remediation Action Plan (RAP) (if remediation is required) will be submitted to EPD for approval within one month after completed site investigation work.

REPORT STRUCTURE

Section 1 Introduction
Section 2 General Information of the Designated Assessment Sites
Section 3 Sampling Locations and Methodology
Section 4 Quality Auditing (QA) and Quality Checking (QC) Procedure
Section 5 Health and Safety
Section 6 Reporting

2 GENERAL INFORMATION OF THE DESIGNATED ASSESSMENT SITES

ASSESSMENT SITE

2.1 *Sections 3.2.2 and 3.2.3 as well as Tables 3.3, 3.4 and 3.6 of Appendix 8.1 of the approved EIA Report* are relevant to this CAP. Three areas with potential contaminative land use in the Project were required to conduct site investigation to confirm the ground contamination conditions. The areas are listed below and shown in ***Appendix B***.

- The works sites of ventilation building in Po Kat Tsai
- The open area of the Project at Sha Tau Kok Road near Loi Tung
- The site of car repair workshop and furniture workshop in Fanling (not assessed in this report)

The works sites of ventilation building in Po Kat Tsai

2.2 According to the Project Layout Plan, the proposed South Tunnel at Lau Shui Heung runs through the hillside. Construction of the tunnel mid-ventilation building is designated to situate at Po Kai Tsai, near Lau Shui Heung. As refer to *Section 3.2.3, Table 3.4 and Table 3.6 of Appendix 8.1 of the approved EIA Report*, the assessment site in Po Kat Tsai should be agricultural uses before 1990. Since 1990, it was used as open storage and warehouse of construction materials until it was handed over to the Civil Engineering and Development Department (CEDD).

2.3 Site visit was undertaken by AUES on 24 January 2014. All building structures and concrete surface were removed to expose the ground condition. In accordance with the site observation, no oil stain was found at the existing ground surface. In addition, no stains or colours or special waste i.e. paint, dyes and other chemical product were observed on site.

The open area of the Project site at Sha Tau Kok Road near Loi Tung

2.4 According to *Section 3.3 (paragraph 6) of Appendix 8.1 of the approved EIA Report*, in the valley south of Loi Tung, the tunnel through Princess Hill will emerge at a low level portal and climb up to pass over Shan Tau Kok Road and the adjacent River Indus (Ng Tung River). During the EIA study, agricultural land, horticultural land and natural hillside were observed near Loi Tung. However, an open storage with construction materials and vehicle tyre fixing and replacement services were observed. Although no sign of land contamination was observed on the ground surface at the area, land contamination assessment is required in accordance with the EIA Report recommendation.

2.5 Site visit was undertaken on 24 January 2014. All structures and concrete surface were removed to expose the ground condition. During the visit, no oil stain was observed at the existing ground surface. However, general refuse was found on the nearby slope.

2.6 Representative Historical Aerial Photographs of Sha Tau Kok Road and Po Kat Tsai extracted from the EIA Report are enclosed in ***Appendix C***.

WASTE MANAGEMENT OF BOTH SITES

2.7 Since the occupiers of both assessment sites could not be contacted, no waste disposal record can be provided in this report.

2.8 Site walkover checklists for both sites are provided in ***Appendix H.***

ACCIDENT OF SPILLAGE/LEAKAGE OF THE CHEMICAL WASTE AND DG RECORD

2.9 According to the EIA Report, there were neither records of any accident that involved spillage/leakage of chemical waste nor Dangerous Goods (DG) storage and incidents of spillage/leakage of DG according to the records of EPD and the Fire Services Department (FSD).

2.10 The information shown in ***Appendix I*** is extracted from *Appendix 8.1 of the EIA Report*.

SITE GEOLOGY AND HYDROGEOLOGY

Site Geology

2.11 The assessment sites, Po Kat Tsai and Loi Tung, are located in Fanling, North-east New Territories. As extracted from Hong Kong Geological Survey Memoir No.5, Fanling formation is a mixed alluvial and colluvial formation of Holocene age. Alluvial components of the formation mainly occur in low-lying areas whereas colluvium is largely distributed on more steeply sloping ground. However, the alluvium and colluvium merge laterally and interdigitate, especially at the bases of slopes adjacent to floodplains.

2.12 Alluvial deposits of the formation typically consist of well-sorted to semi-sorted clay, silt, sand and gravel. Consistency is generally soft to firm, with many coarser deposits being loose and unstable in vertical sections. The colour usually ranges from light grey in areas of higher water table, indicating mild reducing conditions, to yellowish brown, indicating oxidising conditions above the permanent water table.

2.13 The Holocene colluvial deposits are generally poorly sorted and commonly comprise alight yellowish brown, slightly clayey sandy silt to gravelly silty sand matrix containing subangular to angular slightly decomposed boulders with thin weathering rinds a few millimetres thick. The grain size typically varies with the topography, parent rock type and distance transported from source.

Site Hydrogeology

2.14 According to Hong Kong Observatory Ta Kwu Ling Weather Station information (http://www.hko.gov.hk/cis/region_climat/TKL/TKL_mean_e.htm), the average year rainfall recorded between 1986 and 2013 at Fanling is about 1,841.7mm. Ng Tung River and Tan Shan River are located at the northern side of the assessment sites. Ng Tung River and Tan Shan River are major network of drainage lines towards the Sham Chun River, which collects surface runoff. The groundwater generally flows in a north-west direction to Ng Tung River and Tan Shan River. In-situ groundwater level measurements are to be conducted during site investigation as far as practicable to collect further information on groundwater level if groundwater is observed during the sampling process.

3 SAMPLING LOCATIONS AND METHODOLOGY

3.1 According to *Table 4.1 of Appendix 8.1 of the EIA Report*, the approved CAP should be updated and resubmitted to EPD for approval upon land acquisition and granting site access. The land contamination assessment will be undertaken based on the following documents:

- "*Guidance Note for Contaminated Land Assessment and Remediation*" issued by EPD on 15 August 2007; and
- "*Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management*" issued by EPD in December 2007; and
- "*Practice Guide for Investigation and Remediation of Contaminated Land*" issued by EPD in August 2011; and
- *Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works of the Environmental Impact Assessment (EIA) Report Appendix 8.1*.

PROPOSED SAMPLING LOCATION

3.2 Based on the site visit on 24 January 2014, no obvious oil stain was observed at the existing ground surface and no other chemical waste i.e. paint, dyes and other chemical product was found at Po Kat Tsai and Loi Tung. However, general refuse was observed on nearby slope of Loi Tung.

3.3 According to Section 2.4.1 of the "*Practice Guide for Investigation and Remediation of Contaminated Land*" sampling criteria, if hot spot situation cannot be performed, a regular grid pattern shall be adopted for the sampling requirement. A minimum numbers of grid sampling points as recommended by the "*Practice Guide for Investigation and Remediation of Contaminated Land"*, is shown in Table 3-1.

Table 3-1 Minimum Number of Grid Sampling Points in accordance with the "Practice Guide for Investigation and Remediation of Contaminated Land"

Area of site (m^2)	Square grid size (m)	Minimum number of sampling points
100	6	3
500	13	3
1,000	13	6
2,000	13	12
4,000	17	14
5,000	17	17
8,000	17	28
10,000	19	29
30,000	31	32
90,000	51	35

3.4 As recommended in Appendix 8.1 of the EIA Report, the proposed sampling points for the assessment sites for carrying out land contamination assessment are listed in Table 3-2.

Table 3-2 EIA Report Recommended Sampling Number for the assessment sites

Assessment Site	Recommended Sampling Points
The works sites of ventilation building in Po Kat Tsai	8-10 trial pits of a regular grid pattern are proposed
The open area of the Project at Sha Tau Kok Road near Loi Tung	0-8 trial pits of a regular grid pattern are proposed

The works sites of ventilation building in Po Kat Tsai

3.5 According to the drawing enclosed in ***Appendix D***, the potential contamination site area at ventilation building in Po Kat Tsai is about 9,800m^2. "*Practice Guide for Investigation and Remediation of Contaminated Land"* suggested the numbers of sampling points are 29.

3.6 Nevertheless, based on the site visit on 24 January 2014, no trace of contamination was found at existing ground. No other chemical waste i.e. paint, dyes and other chemical product were observed

on site. Therefore, the ventilation building existing ground is very unlike been contaminated. As a result, ***Nine (9)*** sampling points following grid pattern based on site visit findings are proposed at **Po Kat Tsai** for land contamination assessment. The recommendation is considered suitable for confirmation of soil contamination. ***Table 3-3*** listed the proposed sampling locations with coordinates. A sketch showing the sampling locations is in ***Appendix E***.

Table 3-3 Coordinates of the Proposed Sampling Points at Po Kat Tsai

Potential Contamination Site	Sampling Point ID	Co-ordinates	
		Easting	Northing
The works sites of ventilation building in Po Kat Tsai (Potential Contamination Area is about 9,800m^2)	PKT-01	834 928	840 108
	PKT-02	834 905	840 165
	PKT-03	834 883	840 148
	PKT-04	834 925	840 149
	PKT-05	834 928	840 138
	PKT-06	834 903	840 120
	PKT-07	834 982	840 117
	PKT-08	834 951	840 102
	PKT-09	834 921	840 092

The open area of the Project site at Sha Tau Kok Road near Loi Tung

3.7 As shown in *Figure 4.3 of Appendix 8.1 of the EIA Report*, two areas were identified as the potential contamination area at the open area at Sha Tau Kok Road near Loi Tung. According to the drawing enclosed in ***Appendix D***, the areas of the two locations, namely A1(**car repair area**) and A2(**open storage area**), are about 150m^2 and 1,020m^2. *"Practice Guide for Investigation and Remediation of Contaminated Land"* suggested the minimum numbers of sampling points at A1 is 3 and A2 is 6. If two areas combined together, the suggested number of sampling points would not be more than 7.

3.8 It was observed during site visit on 24 January 2014 that all structures and concrete surface within the area were removed. No oil stain was found at the existing ground surface. However, general refuse were observed on nearby slope. Based on the site visit and observation, the assessment areas were very unlikely been contaminated. Therefore, **seven (7)** representative sampling points of grid pattern is proposed for land contamination assessment. ***Table 3-4*** listed the proposed sampling locations with coordinates. A sketch showing the sampling locations is in ***Appendix E***.

Table 3-4 Coordinates of the Proposed Sampling Points at Loi Tung

Potential Contamination Site	Sampling Point ID	Co-ordinates	
		Easting	Northing
The open area at Sha Tau Kok Road near Loi Tung (Potential Contamination Areas are about 1,170m^2)	STK-A1-1	836 522	842 388
	STK-A1-2	836 530	842 382
	STK-A2-1	836 540	842 365
	STK-A2-2	836 551	842 360
	STK-A2-3	836 563	842 368
	STK-A2-4	836 576	842 364
	STK-A2-5	836 587	842 361

3.9 Based on the site observation, both assessment sites ground surface were concrete paved. No trace of underground facility installation was found. Therefore, the proposed final sampling depth is 3m below the existing ground level for all sampling locations at both assessment sites.

3.10 Pit excavation with hand tools would be used at the proposed sampling locations to conduct soil sampling. During pit excavation, undisturbed soil samples would be collected using stainless steel hand-held trowel at the proposed depths. At each sampling location, soil samples will be collected at 0.5m, 1.5m and 3.0m below ground level. If groundwater is encountered at sampling pits, groundwater samples will be collected for the assessment.

3.11 If contaminant is revealed during site investigation, additional samples would be collected to estimate the extension of soil contamination.

POTENTIAL CONTAMINANTS

3.12 Chemical analysis for land contamination assessment would be carried out in accordance with Table 2-2 of Section 2 of the *"Practice Guide for Investigation and Remediation of Contaminated Land"*.

The works sites of ventilation building in Po Kat Tsai

3.13 According to the site history, the assessment site in Po Kat Tsai should be agricultural uses before 1990 and changed to open storage and warehouse of construction materials since 1990 until it was handed over to CEDD. The chemical analysis is therefore proposed for the assessment site in Po Kat Tsai as follows:

- Metals – Antimony, Arsenic, Barium, Cadmium, Chromium III & VI, Cobalt, Copper, Lead, Manganese, Mercury, Molybdenum, Nickel, Tin, Zinc; and
- Petroleum Carbon Ranges – Fractions C6-C8, Fractions C9-C16 and Fractions C17-C35; and
- Volatile Organic Compounds (VOCs) – Acetone, Benzene, Bromodichloromethane, 2-Butanone, Chloroform, Ethylbenzene, Methyl tert-Butyl Ether, Methylene Chloride, Styrene, Tetrachloroethene, Toluene, Trichloroethene, Xylenes (Total); and
- Semi-volatile Organic Compounds (SVOCs) –Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Bis(2-Ethylhexyl)phthalate, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Hexachlorobenzene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Phenol and Pyrene.

The open area of the Project site at Sha Tau Kok Road near Loi Tung

3.14 According to the site history, there should be an open storage of construction materials and vehicle tyre fixing and replacement services at the assessment site in Loi Tung. Chemical analysis is therefore proposed for the assessment areas A1 and A2 in Loi Tung as follows:

- Metals – Antimony, Arsenic, Barium, Cadmium, Chromium III & VI, Cobalt, Copper, Lead, Manganese, Mercury, Molybdenum, Nickel, Tin, Zinc; and
- Petroleum Carbon Ranges – Fractions C6-C8, Fractions C9-C16 and Fractions C17-C35; and
- Volatile Organic Compounds (VOCs) – Acetone, Benzene, Bromodichloromethane, 2-Butanone, Chloroform, Ethylbenzene, Methyl tert-Butyl Ether, Methylene Chloride, Styrene, Tetrachloroethene, Toluene, Trichloroethene, Xylenes (Total); and
- Semi-volatile Organic Compounds (SVOCs) – Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Bis(2-Ethylhexyl)phthalate, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Hexachlorobenzene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Phenol and Pyrene.

SOIL SAMPLING METHODOLOGY

3.15 Soil sampling by pit excavation is recommended. During investigation, pit excavation will be supervised by a land contamination specialist and Resident Engineer to ensure that no cross contamination or any other forms of interferences. Moreover, a land contamination specialist would be also responsible to monitor and supervise all the soil and water sampling.

3.16 Excavator or hand digging would be used for pit excavation. Sampling pit excavation would be from existing ground surface to the proposed final depth. All soil samples will be collected using a stainless steel hand-held trowel. Representative soil sample, at least three numbers will be collected from each sampling pit.

3.17 Visual and olfactory signs will be carried out during soil samples selection. Moreover, a photo-ionizing detector (PID) will be used to test the soil samples for initial screening. The

measurements will be recorded for reporting. If high readings of VOC occur at the deepest targeted sample depth, a decision will be made on site by the land contamination specialist to extend the final sampling depth with an additional 1m in depth and an additional sample will be collected. This process will continue until either organic vapour readings are below 100ppm or accepted by the land contamination specialist.

3.18 Furthermore, extra samples will be collected at sampling depth where changes in soil strata or notable changes in soil properties are observed. Simple soil texture classification will be logged by the contamination assessment team or a competent person. Soil description prepared in accordance with relevant guidelines such as GEO's Geoguide will be logged by the contamination assessment team or a competent person. Summary of sampling activities and procedures is presented as follows:

a) Identify the sampling locations;

b) For safety reason, underground utilities checking will be performed before pit excavate;

c) Samples will be collected and stored in an appropriately prepared and labeled sampling container or plastic bags provided by the laboratory for field screening and laboratory analysis;

d) All samples will be field-screened to determine the maximum contaminant concentrations and the vertical extent of contamination where possible, by:
   - Photo-ionizing detector (PID) reading; and
   - Supported by subjective assessment of headspace vapor concentrations.

e) At least three (3) soil samples will be collected from each sampling pit for laboratory analysis;

f) Each sub-sample collected will be put into a sample container or high-density polyethylene bag provided by the HOKLAS laboratory. All samples will be stored in a cool box maintained at a temperature of 4^{o}C without being frozen.

3.19 A Chain-Of-Custody (COC) protocol will be followed as part of QA/QC procedures and the completed COC forms will be delivered to the laboratory together with the samples for testing. Samples will be analyzed within 2 days of delivery or within the holding time as advised by the laboratory. Duplicate sample will also be taken at a frequency of 1 per every 20 samples.

3.20 Every sample container will carry a unique label containing the following information:

- Project title;
- Unique label number;
- Sampling date;
- Sampling interval length;
- Location number;
- Sampling depth; and
- Sample description.

3.21 All excavation pits will be logged. Information will include the following:

- Sampling point identification;
- Site sketch showing sample locations and measured distances;
- Actual depth of samples collected;
- Depth of the water table measured during sampling if groundwater present;
- Date and time of sample collection;
- Sample identification number;
- Description of sample condition such as soil type, colour, odour and staining, if present;
- Presence of free products in underground water if any; and
- Description of soil strata.

Prevent Cross Contamination

3.22 In order to prevent cross contamination, no excavation work would be undertaken during raining.

Work bund will be erected before commencing excavation at each sampling pit to prevent surface runoff flowing into the pit.

3.23 Furthermore, all soil excavated from the sampling pits will be stored nearby using impervious sheets to prevent cross contamination. Soil will be backfilled into the sampling pit immediately after sampling completed.

SOIL SAMPLE ANALYSIS

3.24 All samples and duplicate samples will be delivered to the HOKLAS-accredited laboratory for the chemical testing. As per the "*Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management*" requirements, all chemical analysis methods used for soil assessment should be accredited under HOKLAS. The chemicals analysis method and the reporting limits are shown in ***Table 3-5***.

Table 3-5 Testing Method and Reporting Limit of the Chemical Analysis – Soil Sample

Parameter	Methods	Reporting Limit (mg/kg)
a) Metals		
• Antimony	USEPA 6020	1
• Arsenic	USEPA 6020	1
• Barium	USEPA 6020	1
• Cadmium	USEPA 6020	0.2
• Chromium III	By Calculation	1
• Chromium VI	USEPA3060	1
• Cobalt	USEPA 6020	1
• Copper	USEPA 6020	1
• Lead	USEPA 6020	1
• Manganese	USEPA 6020	1
• Mercury	APHA3112B	0.2
• Molybdenum	USEPA 6020	1
• Tin	USEPA 6020	1
• Zinc	USEPA 6020	1
• Nickel	USEPA 6020	1
b) Petroleum Carbon Ranges	USEPA 8015/8260	
• Fractions C6 – C8		5
• Fractions C9 – C16		200
• Fractions C17 – C35		500
c) Volatile Organic Compounds (VOCs)	USEPA 8260	
• Acetone		50
• Benzene		0.2
• Bromodichloromethane		0.1
• 2-Butanone		5
• Chloroform		0.04
• Ethylbenzene		0.5
• Methyl tert-Butyl Ether		0.5
• Methylene Chloride		0.5
• Styrene		0.5
• Tetrachloroethene		0.04
• Toluene		0.5
• Trichloroethene		0.1
• Xylenes (total)		2
d) Semi-volatile Organic Compounds (SVOCs)	USEPA 8270	
• Acenaphthene		0.5
• Acenaphthylene		0.5
• Anthracene		0.5
• Benzo(a)anthracene		0.5
• Benzo(a)pyrene		0.5
• Benzo(b)fluoranthene		0.5

Parameter	Methods	Reporting Limit (mg/kg)
• Benzo(g,h,i)perylene		0.5
• Benzo(k)fluoranthene		0.5
• Bis(2-Ethylhexyl)phthalate		5
• Chrysene		0.5
• Dibenzo(a,h)anthracene		0.5
• Fluoranthene		0.5
• Fluorene		0.5
• Hexachlorobenzene		0.2
• Indeno(1,2,3-cd)pyrene		0.5
• Naphthalene		0.5
• Phenanthrene		0.5
• Phenol		0.5
• Pyrene		0.5

3.25 Extra soil samples will be stored and tested for Toxicity Characteristics Leaching Procedure (TCLP) of full suite of parameters if excavation and landfill disposal is indicated as last resort of remediation method. As advised by the Testing Laboratory (ALS), samples for TCLP analysis shall be undertaken within three months, if necessary.

GROUNDWATER SAMPLING METHODOLOGY

3.26 In according with *Section 4.2 of Appendix 8.1 of the EIA Report*, if groundwater observed at any sampling pit, water sampling would be undertaken. Water sample will be directly collected from the base of sampling pit.

Groundwater Sampling

3.27 Groundwater sample will be collected directly from the base of the pit after soil sampling completion. Field measurement including the temperature, electrical conductivity and pH value will be conducted with at least three consecutive stable readings to be obtained. A stainless steel hand-held bucket or a mechanical pump will be used to perform groundwater sampling.

3.28 Between sampling events, all sampling tools or equipment used will be thoroughly decontaminated with laboratory-grade detergent followed by demonized water. All groundwater samples collected will be treated and preserved in same as for soil samples. All laboratory QA/QC and chain of custody procedures will be followed. Duplicate sample will also be taken at a frequency of 1 per every 20 samples.

3.29 Every sample container will carry a unique label containing the following information:
- Project title;
- Unique label number;
- Sampling date; and
- Location number.

GROUNDWATER SAMPLE ANALYSIS

3.30 Groundwater samples will be delivered to laboratory within 24 hours and analyzed within 2 days of delivery or within the holding time as advised by the laboratory. As per the "*Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management*" requirements, all chemical analysis methods used for groundwater assessment should be accredited under HOKLAS. The chemicals analysis method and the reporting limits are shown in ***Table 3-6***.

Table 3-6 Testing Method and Reporting Limit of the Chemical Analysis – Groundwater Samples

Parameter	Methods	Reporting Limit (µg/L)
a) Metal - Mercury	APHA3112B	0.5
b) Petroleum Carbon Ranges	USEPA 8015	
• Fractions C6 – C8		20

Parameter	Methods	Reporting Limit (µg/L)
• Fractions C9 – C16		500
• Fractions C17 – C35		500
c) Volatile Organic Compounds (VOCs)	USEPA 8260	
• Acetone		500
• Benzene		5
• Bromodichloromethane		5
• 2-Butanone		50
• Chloroform		5
• Ethylbenzene		5
• Methyl tert-Butyl Ether		5
• Methylene Chloride		50
• Styrene		5
• Tetrachloroethene		5
• Toluene		5
• Trichloroethene		5
• Xylenes (total)		20
d) Semi-volatile Organic Compounds (SVOCs)	USEPA 8270	
• Acenaphthene		2
• Acenaphthylene		2
• Anthracene		2
• Benzo(b)fluoranthene		1
• Chrysene		1
• Fluoranthene		2
• Fluorene		2
• Hexachlorobenzene		4
• Naphthalene		2
• Phenanthrene		2
• Pyrene		2

ASSESSMENT GUIDELINES

3.31 According to the EIA Study, the potential land contamination sites involve storage of construction materials, vehicle maintenance and storage of furniture. Therefore "industrial" scenario under RBRG standard is recommended as the detection limit. The concentration of detection limit has adopted by EPD as local remediation new requirements with effective from 15 August 2007.

3.32 Based on the EIA Study recommendations, the soil and groundwater will be evaluated by the industrial Risk-based Remediation Goals limits which are listed in ***Table 3-7***.

Table 3-7 Industrial Risk-based Remediation Goals limits for Soil and Groundwater

Parameter		Soil		Groundwater	
		Industrial (mg/kg)	Soil Saturation Limit Csat (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
Metals	Antimony	2.61E+02	NA	NA	NA
	Arsenic	1.96E+02	NA	NA	NA
	Barium	1.00E+04*	NA	NA	NA
	Cadmium	6.53E+02	NA	NA	NA
	Chromium III	1.00E+04*	NA	NA	NA
	Chromium VI	1.96E+03	NA	NA	NA
	Cobalt	1.00E+04*	NA	NA	NA
	Copper	1.00E+04*	NA	NA	NA
	Lead	2.29E+03	NA	NA	NA
	Manganese	1.00E+04*	NA	NA	NA
	Mercury	3.84E+01	NA	6.79E+00	NA

Parameter		Soil		Groundwater	
		Industrial (mg/kg)	Soil Saturation Limit Csat (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
	Molybdenum	3.26E+03	NA	NA	NA
	Nickel	1.00E+04*	NA	NA	NA
	Tin	1.00E+04*	NA	NA	NA
	Zinc	1.00E+04*	NA	NA	NA
Petroleum Carbon Ranges	Fractions C6 – C8	1.00E+04*	1.00E+03	1.15E+03	5.23E+00
	Fractions C9 – C16	1.00E+04*	3.00E+03	9.98E+03	2.80E+00
	Fractions C17 – C35	1.00E+04*	5.00E+03	1.78E+02	2.80E+00
Volatile Organic Chemicals (VOCs)	Acetone	1.00E+04*	***	1.00E+04*	***
	Benzene	9.21E+00	3.36E+02	5.40E+01	1.75E+03
	Bromodichloromethane	2.85E+00	1.03E+03	2.62E+01	6.74E+03
	2-Butanone	1.00E+04*	***	1.00E+04*	***
	Chloroform	1.54E+00	1.10E+03	1.13E+01	7.92E+03
	Ethylbenzene	8.24E+03	1.38E+02	1.00E+04*	1.69E+02
	Methyl tert-Butyl Ether	7.01E+01	2.38E+03	1.81E+03	***
	Methylene Chloride	1.39E+01	9.21E+02	2.24E+02	***
	Styrene	1.00E+04*	4.97E+02	1.00E+04*	3.10E+02
	Tetrachloroethene	7.77E-01	9.71E+01	2.95E+00	2.00E+02
	Toluene	1.00E+04*	2.35E+02	1.00E+04*	5.26E+02
	Trichloroethene	5.68E+00	4.88E+02	1.42E+01	1.10E+03
	Xylenes (total)	1.23E+03	1.50E+02	1.57E+03	1.75E+02
Semi-Volatile Organic Chemicals (SVOCs)	Acenaphthene	1.00E+04*	6.02E+01	1.00E+04*	4.24E+00
	Acenaphthylene	1.00E+04*	1.98E+01	1.00E+04*	3.93E+00
	Anthracene	1.00E+04*	2.56E+00	1.00E+04*	4.34E-02
	Benzo(a)anthracene	9.18E+01	NA	NA	NA
	Benzo(a)pyrene	9.18E+00	NA	NA	NA
	Benzo(b)fluoranthene	1.78E+01	NA	7.53E+00	1.50E-03
	Benzo(g,h,i)perylene	1.00E+04*	NA	NA	NA
	Benzo(k)fluoranthene	9.18E+02	NA	NA	NA
	Bis(2-Ethylhexyl)phthalate	9.18E+01	NA	NA	NA
	Chrysene	1.14E+03	NA	8.12E+02	1.60E-03
	Dibenzo(a,h)anthracene	9.18E+00	NA	NA	NA
	Fluoranthene	1.00E+04*	NA	NA	NA
	Fluorene	1.00E+04*	5.47E+01	1.00E+04*	1.98E+00
	Hexachlorobenzene	5.82E-01	NA	6.95E-01	6.20E+00
	Indeno(1,2,3-cd)pyrene	9.18E+01	NA	NA	NA
	Naphthalene	4.53E+02	1.25E+02	8.62E+02	3.10E+01
	Phenanthrene	1.00E+04*	2.80E+01	1.00E+04*	1.00E+00
	Phenol	1.00E+04*	7.26E+03	NA	NA
	Pyrene	1.00E+04*	NA	1.00E+04*	1.35E-01

Remark:
(*) indicates a 'ceiling limit' concentration.
(***) indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

4 QA/QC PROCEDURES

4.1 The quality control samples will be collected in the course of soil and groundwater sampling. Duplicate soil samples will be taken. For the groundwater sample, one trip/travel blank, one field blank and duplicate sample will be taken.

Trip/Travel Blank

4.2 The trip blank will be prepared in the laboratory using organic-free water. The trip blank will remain unopened and accompanied from the start of sampling to delivery of samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total). The trip blank would be collect and analysis for each groundwater samples delivery event. Number of trip blank depends on number of groundwater delivery trips.

Field Blank

4.3 The field blank will be prepared in field using organic-free water by passing the water from a full bottle to an empty bottle at the most contaminated location on site. The field blank accompanied the project samples to the laboratory and analyzed for BTEX i.e. Benzene, Toluene, Ethylbenzene and Xylenes (total). The field blank would be collect for each groundwater sampling date. Number of field blank sample collection depends on the number of days of groundwater sampling.

Duplicate Sample

4.4 The duplicate sample(s) will be collected as a split sample from soil and groundwater sample. Chemical analysis is equivalent to the original sample(s). These samples will be delivered to the laboratory as two individual samples without any indication to the laboratory that they have been duplicated. One duplicate sample will be collected for every twenty soil or groundwater samples. According to the estimated numbers of soil and groundwater samples to be collected from these two areas, two duplicate soil samples and one duplicate groundwater sample are predicted for each area.

PROCEDURE FOR DECONTAMINATING EQUIPMENT AND SAMPLING TOOLS

4.5 Tap water, phosphate-free detergent (Decon® 90) and distilled water will be used for cleaning the digging and sampling tools/equipment. The decontamination is required to be conducted as follows:

- All sampling tools/equipment decontamination will be perform before each sampling pit excavation to ensure no cross contamination;
- All sampling tools/equipment will be decontaminated before next sampling to prevent cross-contamination of samples; and
- All sampling tools/equipment will be decontaminated before leaving the potential contaminated areas to prevent potentially contaminated soil or water being transported off-site.

4.6 The land contamination specialist or his delegates will supervise all the decontamination work.

4.7 Furthermore, equipment blank will be collected to determine potential cross contamination between samples and potential influences from the sampling tools used. It will be collected from assessment site by the sampling tools/equipment rinse to verify the decontamination procedures and background or ambient airborne contaminants on the site. The equipment blank collection will be one per every twenty soil samples or groundwater samples. According to the estimated numbers of soil and groundwater samples to be collected from these two areas, two equipment blank samples are predicted for each area.

4.8 According to above procedures, Table 4-1 summarised the QA/QC sample(s) collection.

Table 4-1 QA/QC Sample(s) Collection

QA/QC Sample(s) to be collected from the site	Matrix	Chemical Testing	Po Kat Tsai (Proposed Numbers of Sample: *27* soil and *9* water samples)	Loi Tung (Proposed Numbers of Sample: *21* soil and *7* water samples)
Trip Blank	Soil	NA	NA	NA
	Water	BTEX	Depends the delivery event	Depends the delivery event
Field Blank	Soil	NA	NA	NA
	Water	BTEX	Depends on the number of days of sample collection	Depends on the number of days of sample collection
Duplicate Sample	Soil	Same with original sample	2	2
	Water		1	1
Equipment Blank	Water	Full chemical analysis	2	2

5 HEALTH AND SAFETY

5.1 In general, all personnel who are involved in carrying out site investigation works shall comply with the in-house health and safety precautions listed below:

- All site personnel will possess an approved Construction Industry Safety Training Certificate (Green Card);
- Safety helmets, safety boots, gloves and protective clothing will be provided to all personnel working on site;
- Eye and ear protector will be provided for concrete layer breaking;
- Briefing on health and safety requirements will be provided to the site personnel for daily before the SI works;
- No food, drink, alcohol or drugs will be consumed whilst conducting the SI works on site;
- Direct skin contact with the contaminated materials will be avoided;
- Hand-wash basins will be provided and made accessible to all personnel working for the captioned site SI works;
- The land contaminated specialist will be responsible for project implementation. The specialist will also supervise SI work on site.

5.2 The details of Health and Safety Plan (HASP) are shown in ***Appendix F***.

6 REPORTING

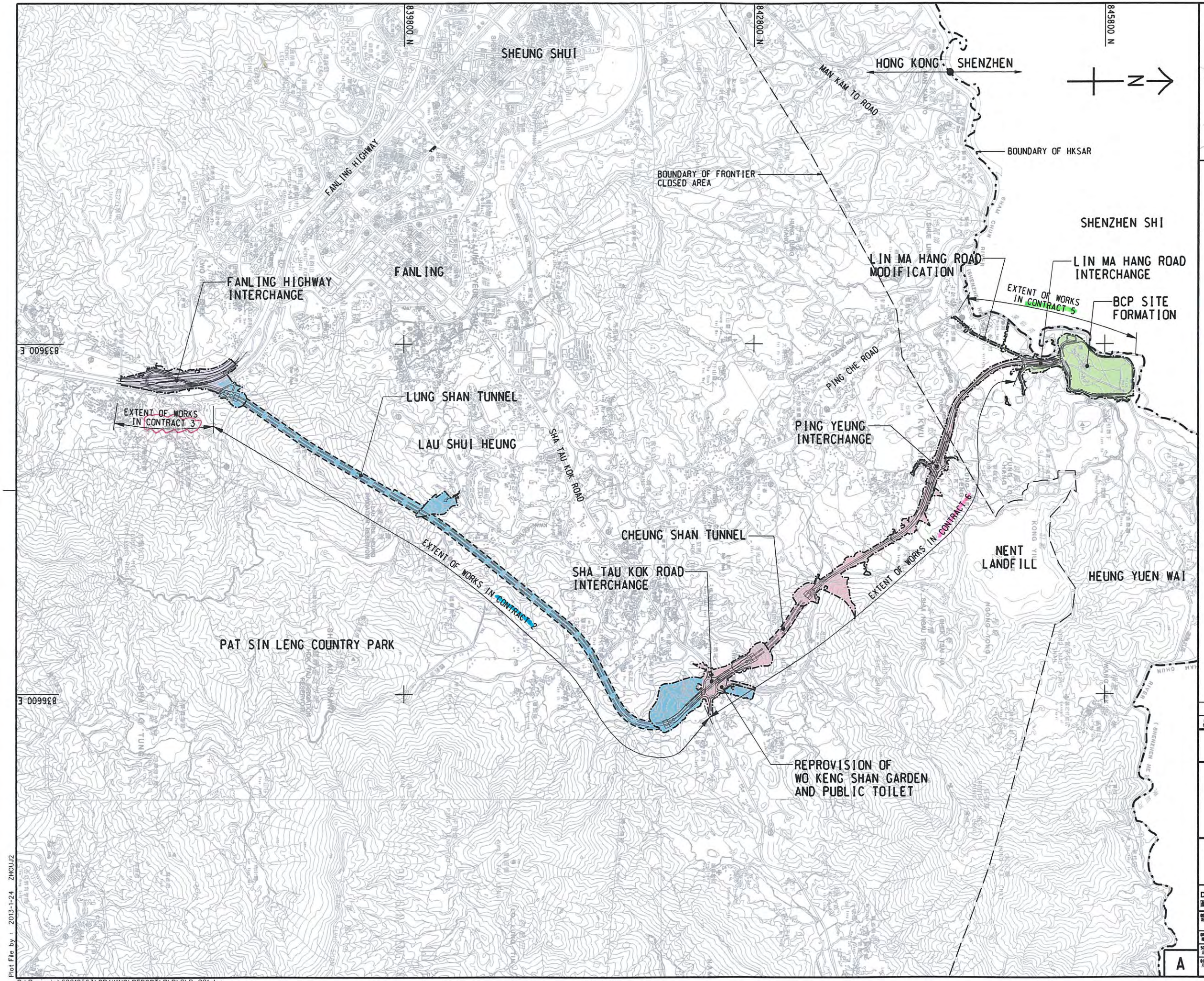
6.1 Upon completion of the site investigation (SI) works, a Contamination Assessment Report (CAR) will be prepared base on the findings of the SI. The chemical analysis results of the sampled soil and groundwater will be assessed in compliance with the requirements set out in the "*Guidance Note for Contaminated Land Assessment and Remediation"* and the "*Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management'*, issued by EPD.

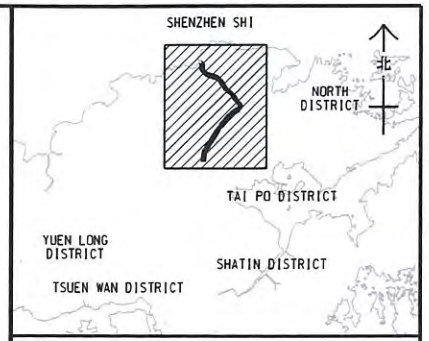
6.2 If any assessment area is identified with soil/groundwater contamination, remediation should be proposed to clean up the contaminated area. A Remediation Action Plan (RAP), if necessary, combined with CAR would be submitted to EPD for approval. After the remediation work, a Remediation Report (RR) would be prepared and submitted to EPD.

6.3 Meanwhile, no construction works shall be started at the contaminated area before the completion of the remediation works and the approval of the corresponding Remediation Report.

Appendix A

THE PROJECT LAYOUT PLAN





LOCATION PLAN
SCALE 1 : 30000

LEGEND:

- SITE BOUNDARY
- UNDERGROUND WORKS SITE BOUNDARY

REV. 修訂	DESCRIPTION 內容摘要	BY 由	CHECKED 審核	DATE 日期

CEDD 土木工程拓展署 Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROJECT LAYOUT PLAN

AECOM

DRG.NO. 圖紙編號 60212563/PLP/001

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 負責人
-	-	-
DRAWN BY 繪圖 ZJ	STATUS 階段	
SCALE 比例 A1 1 : 15000		
DIMENSIONS ARE IN 尺寸單位 METRES	© COPYRIGHT RESERVED 版權所有	

A

Plot File by : 2013-1-24 ZHOUJ2

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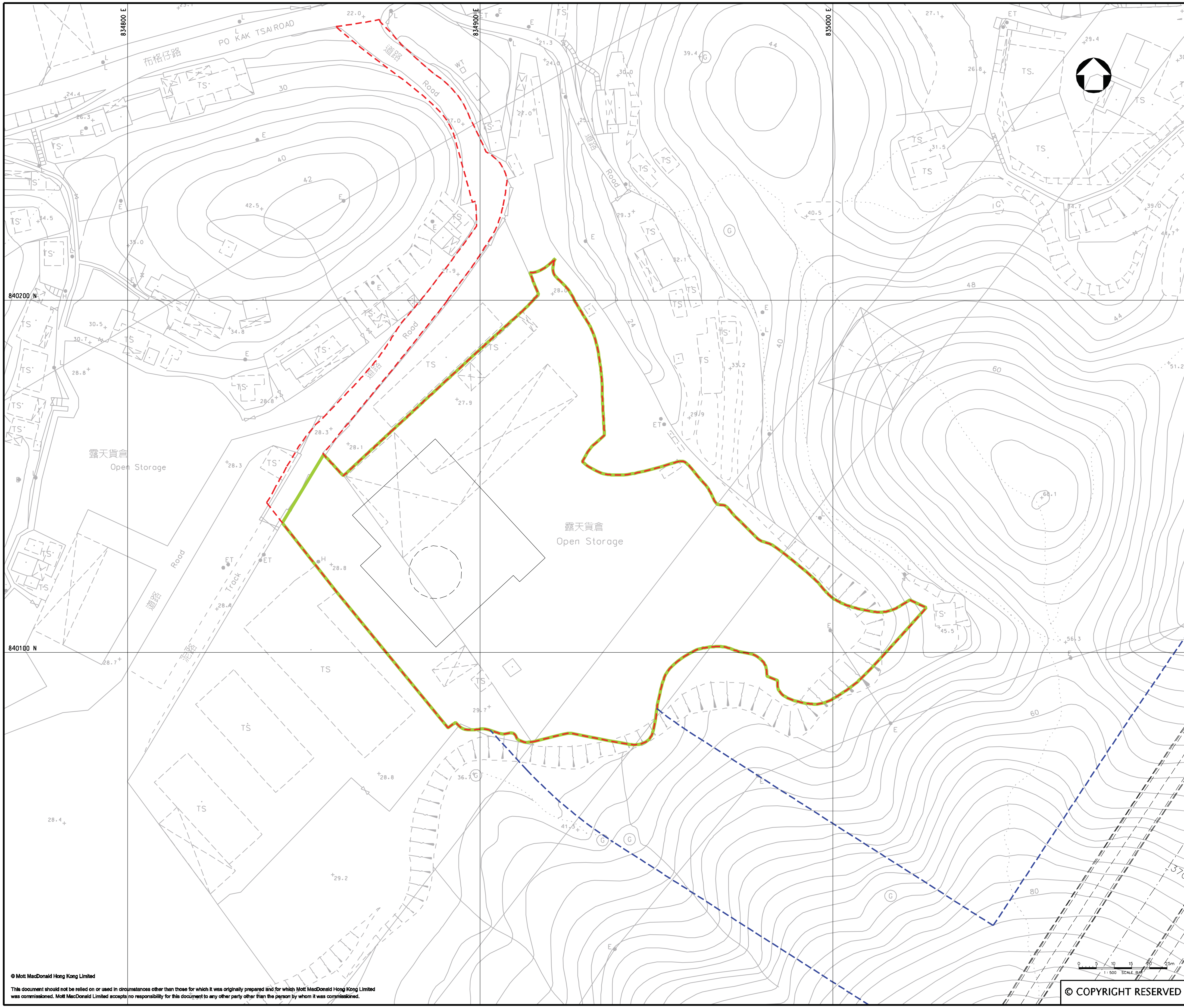
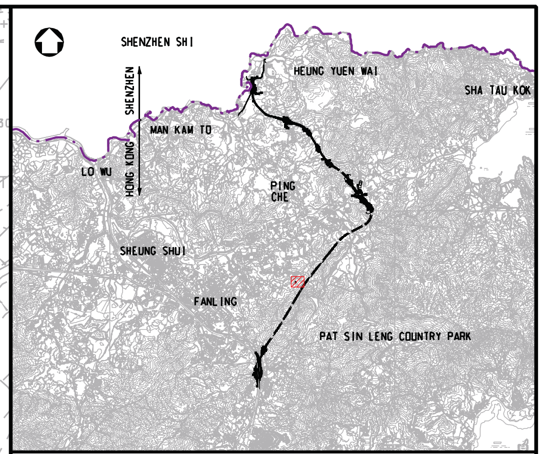
Appendix B

THE DESIGNATED POTENTIAL CONTAMINATION AREAS





KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 10	MING	GENERAL REVISION	FY	HT
P1	MAY 10	MING	FIRST ISSUE	FY	HT

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CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CROSSING POINT AND ASSOCIATED WORKS

Title

POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED IN PO KAI TSAI

Designed	HC	Eng.Chk.	EC
Drawn	MING	Coordination	EC
Dwg.Chk.	HC	Approved	HT
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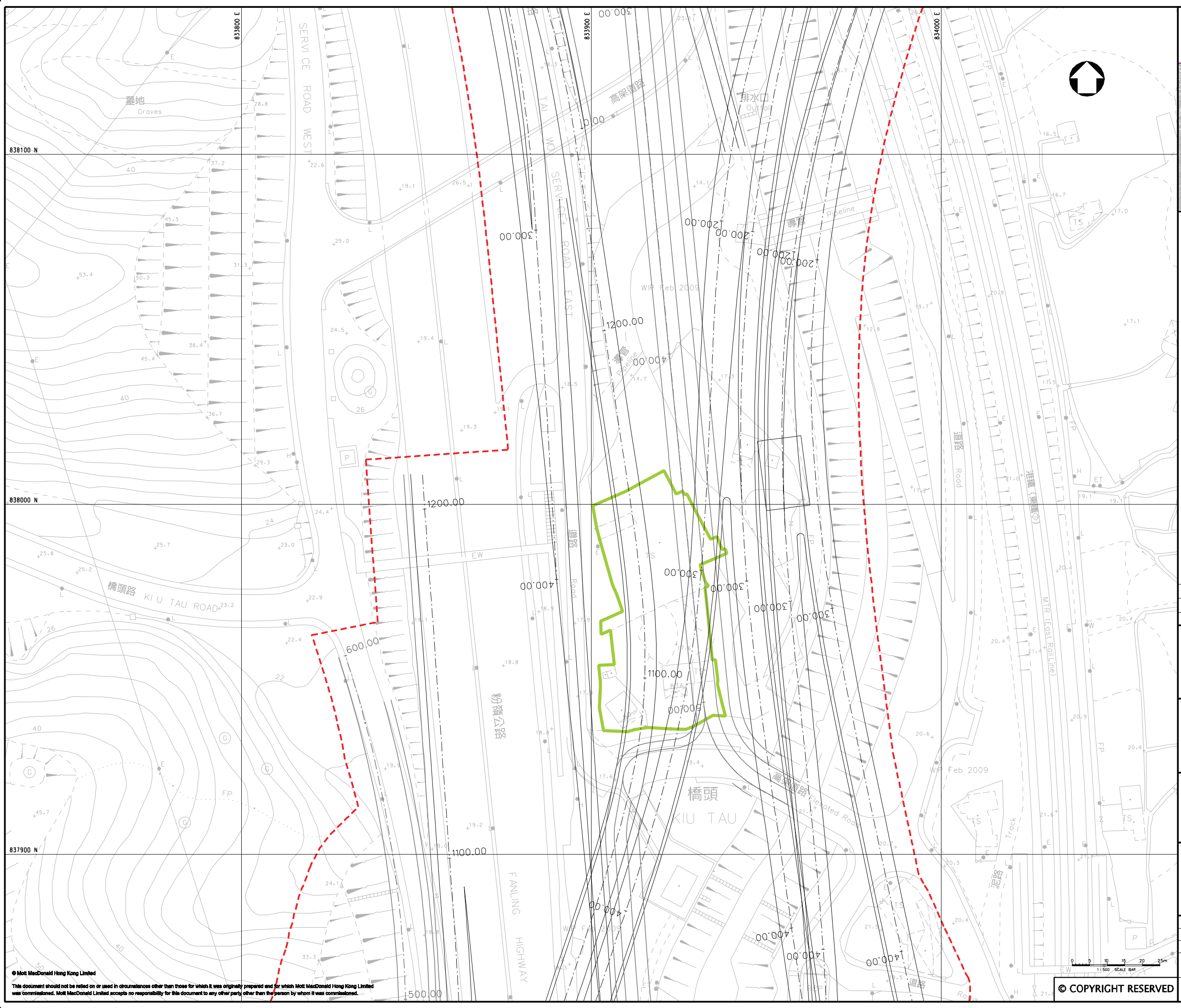
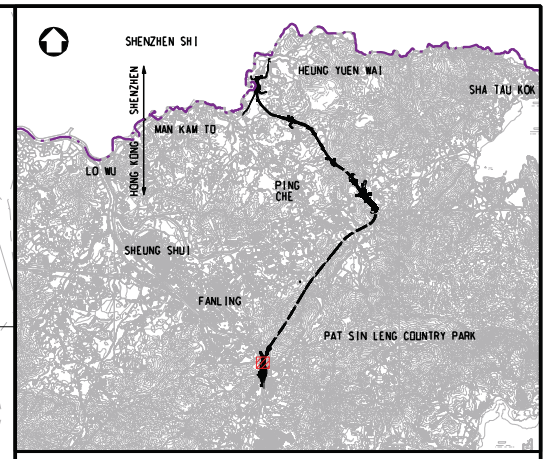
Drawing No	FIGURE 4.1	Rev	P2





KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 10	MING	GENERAL REVISION	FY	HT
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Project

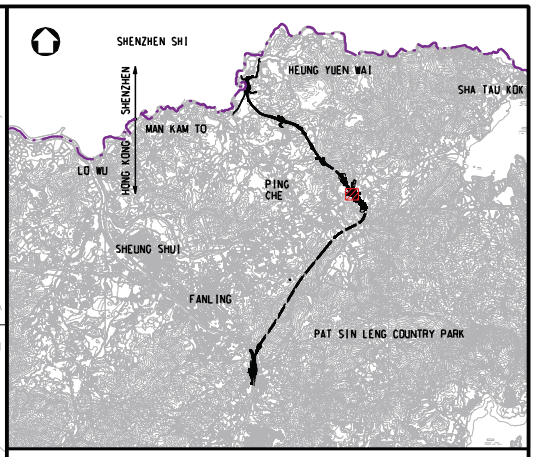
AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED IN FANLING

Designed	HC		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	HC		Approved	HT	
Scale at A1 1:500		Project 255228		Status PRE	
		CAD file J:\255228\REPORT\ENV\CAP\I0072\FIG 4-2.dgn			
Drawing No FIGURE 4.2				Rev P2	

1:500 SCALE BAR



KEY PLAN

SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND)
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 10	MING	FIRST ISSUE	EC	HT

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Client

CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED IN THE OPEN AREA AT SHA TAU KOK ROAD

Designed	HC		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	HC		Approved	HT	

Scale at A1: 1:500

Project: 255228

CAD file: J:\255228\REPORT\ENV\CAP\00712\FIG 4-3.dgn

Status: PRE

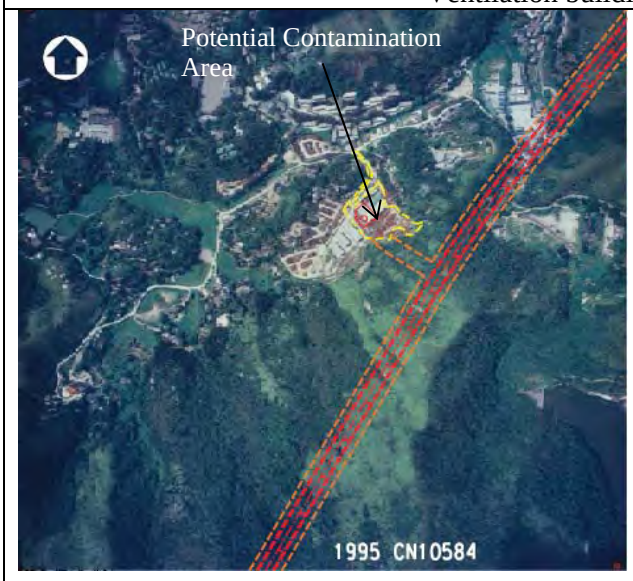
Drawing No: FIGURE 4.3

Rev: P1

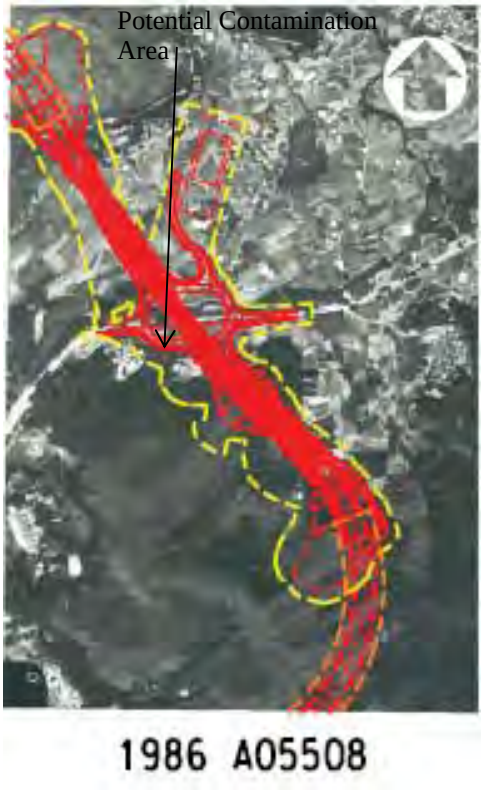
Appendix C

REPRESENTATIVE HISTORICAL AERIAL PHOTOGRAPHS (Extract From EIA Report)

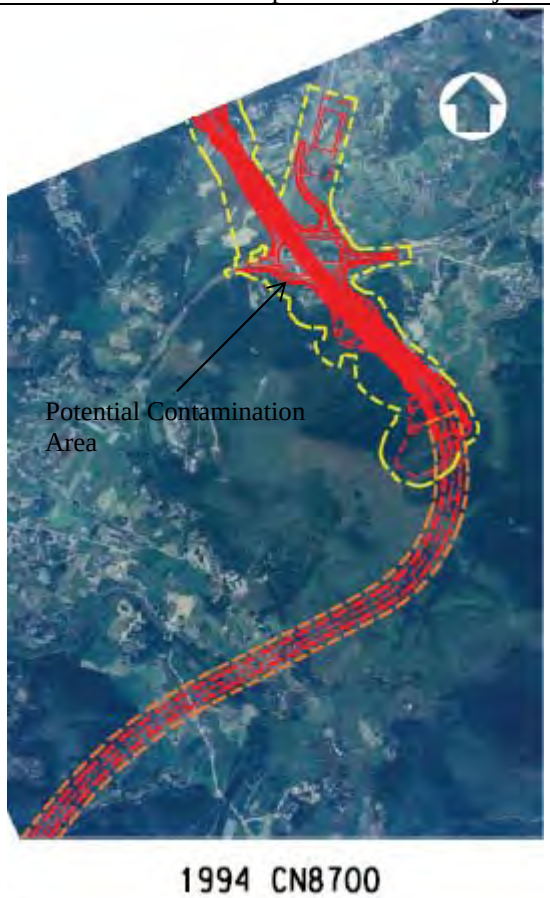
Ventilation building in Po Kat Tsai



Ventilation building in Po Kat Tsai



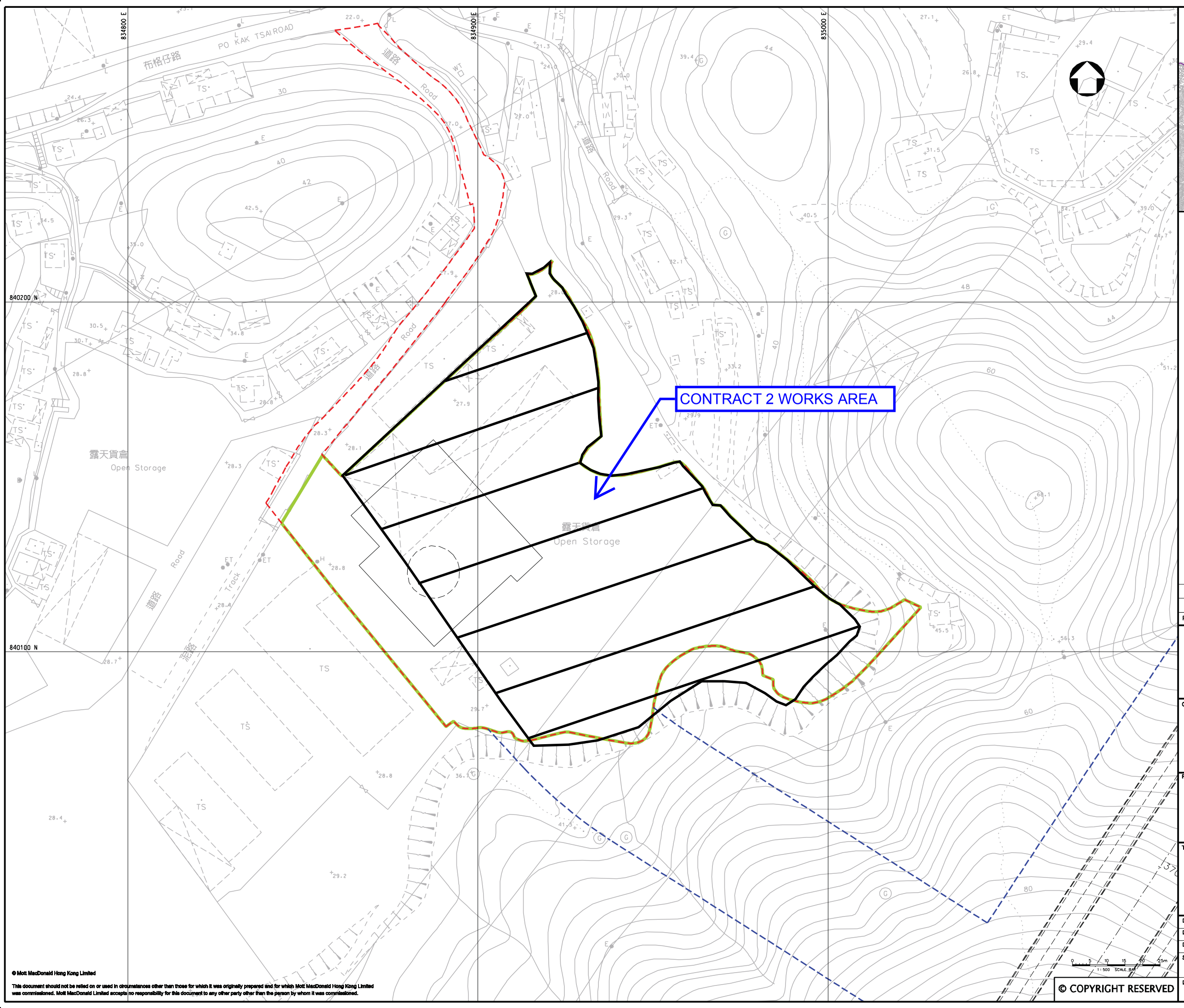
The open area of the Project at Sha Tau Kok Road near Loi Tung

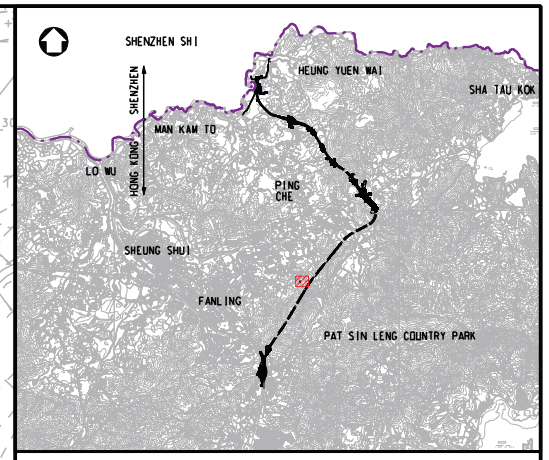


The open area of the Project at Sha Tau Kok Road near Loi Tung

Appendix D

Update the designated Potential Contamination Areas Located at the Project Site - Po Kat Tsai and Loi Tung





KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	JUL 10	MING	GENERAL REVISION	FY	HT
P1	MAY 10	MING	FIRST ISSUE	FY	HT

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Project

AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CROSSING POINT AND ASSOCIATED WORKS

Title

POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED IN PO KAI TSAI

Designed	HC		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	HC		Approved	HT	
Scale at A1	1:500	Project	255228	Status	PRE
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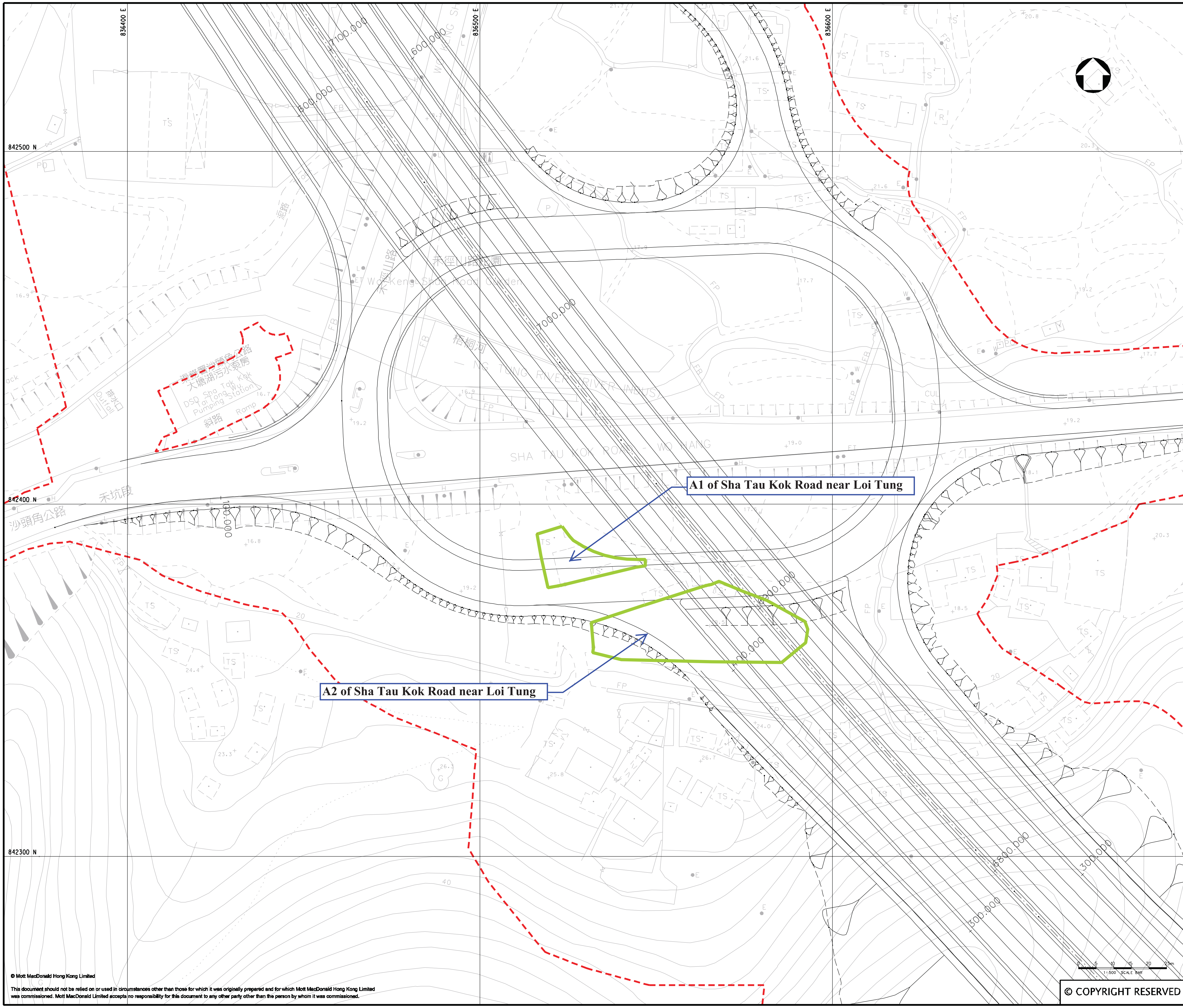
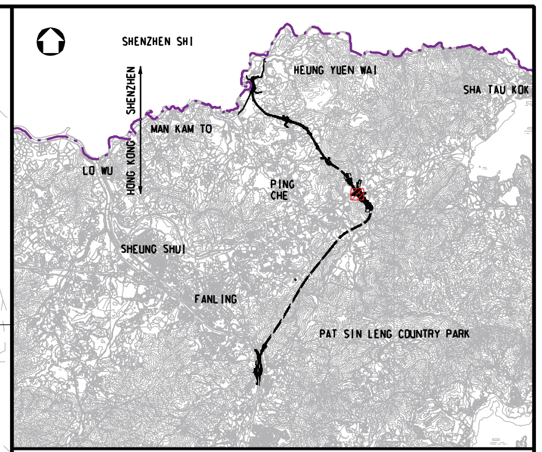
Drawing No	FIGURE 4.1			Rev	P2





KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND) — red dashed line
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION) — green line

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	JUL 10	MING	FIRST ISSUE	EC	HT

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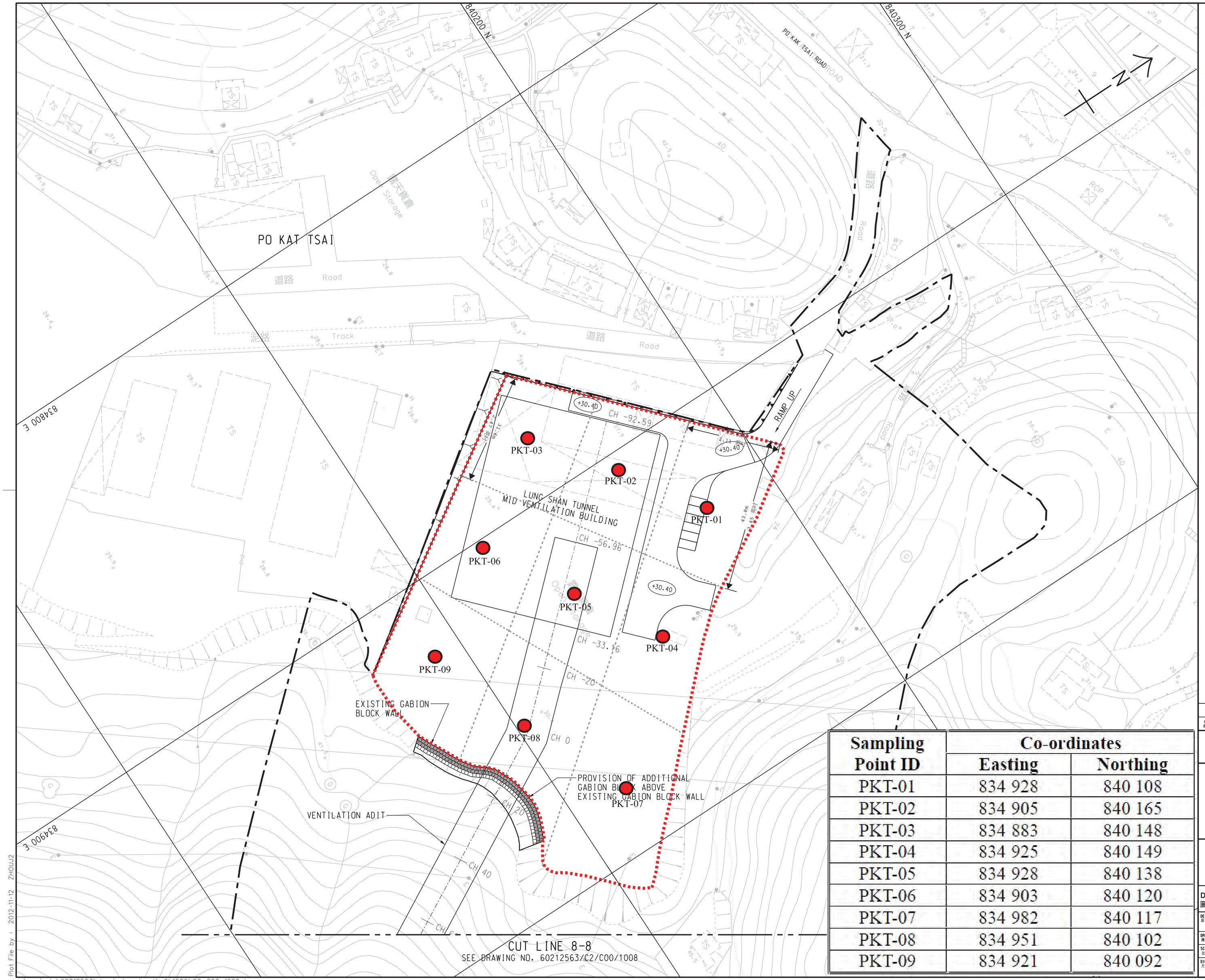
Project
AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title
POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED IN THE OPEN AREA AT SHA TAU KOK ROAD

Designed	HC	Eng.Chk.	EC
Drawn	MING	Coordination	EC
Dwg.Chk.	HC	Approved	HT
Scale at A1	1:500	Project	255228
Status	PRE	CAD file	J:\255228\REPORT\ENV\CAP\0072\FIG 4-3.dgn
Drawing No	FIGURE 4.3	Rev	P1

Appendix E

PROPOSED SOIL SAMPLING LOCATION



NOTE:

1. FOR NOTE AND LEGEND REFER TO DRAWING NO. 60212563/C2/C00/1001.

Working Site Boundary

Boundary of Potential Contamination Area

PKT-01 Proposed Sampling Point Location

Sampling Point ID	Co-ordinates	
	Easting	Northing
PKT-01	834 928	840 108
PKT-02	834 905	840 165
PKT-03	834 883	840 148
PKT-04	834 925	840 149
PKT-05	834 928	840 138
PKT-06	834 903	840 120
PKT-07	834 982	840 117
PKT-08	834 951	840 102
PKT-09	834 921	840 092

REV. 修訂	DESCRIPTION 內容摘要	D.E.	P.E. CHECKED 審核	DATE 日期
-	TENDER DRAWING			

CEDD 土木工程拓展署 Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT
SITE FORMATION AND INFRASTRUCTURE WORKS

PROPOSED SOIL SAMPLING LOCATION

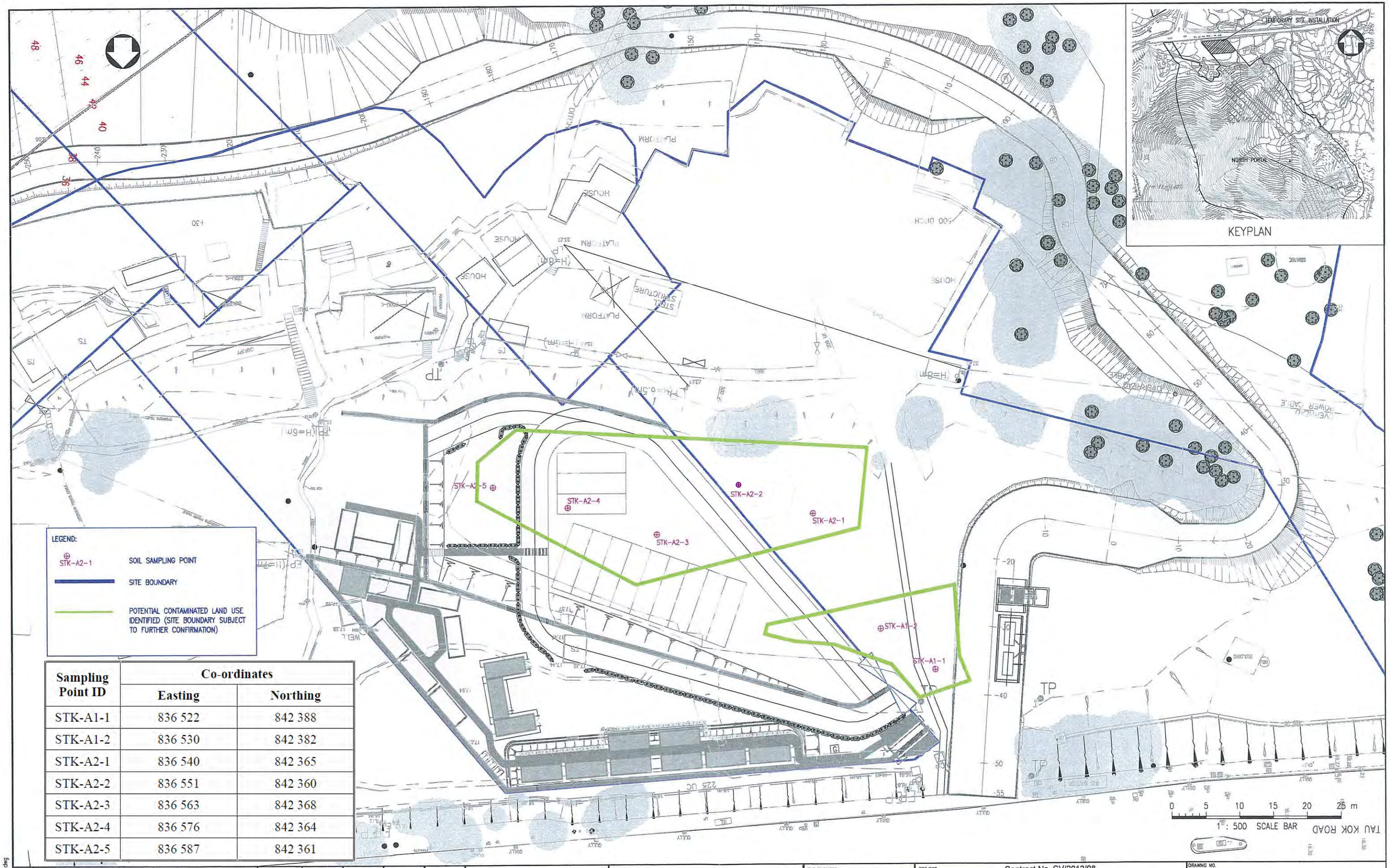
AECOM

DRG.NO. 圖紙編號

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 批准人
DRAWN BY 繪圖	STATUS 階段	
SCALE 比例 A1 1 : 500		
DIMENSIONS ARE IN 尺寸單位 METRES		

Plot File by : 2012-11-12 ZHOUJ2

p:\projects\60212563\drawing\contract\c2\1000\C2_C00_1009.dgn



LEGEND:

- STK-A2-1 — SOIL SAMPLING POINT
- SITE BOUNDARY
- POTENTIAL CONTAMINATED LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)

Sampling Point ID	Co-ordinates	
	Easting	Northing
STK-A1-1	836 522	842 388
STK-A1-2	836 530	842 382
STK-A2-1	836 540	842 365
STK-A2-2	836 551	842 360
STK-A2-3	836 563	842 368
STK-A2-4	836 576	842 364
STK-A2-5	836 587	842 361

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	IN-CHARGE
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
A1	First Issue	18/03/2014	JGa	YYa	VTR	VTR

MAIN CONTRACTOR: 香寶嘉 Dragages Hong Kong — A member of the Bouygues Construction group

CLIENT: 土木工程拓展署 CEDD Civil Engineering and Development Department

THE ENGINEER: AECOM

CONTRACTOR'S DESIGNER: ATKINS

PROJECT: Contract No. CV/2012/08
Liantang/Heung Yuen Wai Boundary Control Point
Site Formation and Infrastructure Works Contract 2

DRAWING TITLE: NORTH PORTAL
POTENTIAL CONTAMINATIVE LAND USE
IDENTIFIED IN THE OPEN AREA AT
SHAU TAU KOK ROAD

DRAWING NO.: LTH / DHK / MD / NPO / SI / 00009

ISSUE STATUS	CREATION DATE	REVISION
FOR REVIEW	18/03/2014	A1

PAPER SIZE	SCALE	PAGE
A3	1:500	1/1

lth_dhk_md_npo_si_00009_a1.dwg

Appendix F

HEALTH AND SAFETY PLAN

Health And Safety Plan (HASP) of Land Contamination Assessment Work

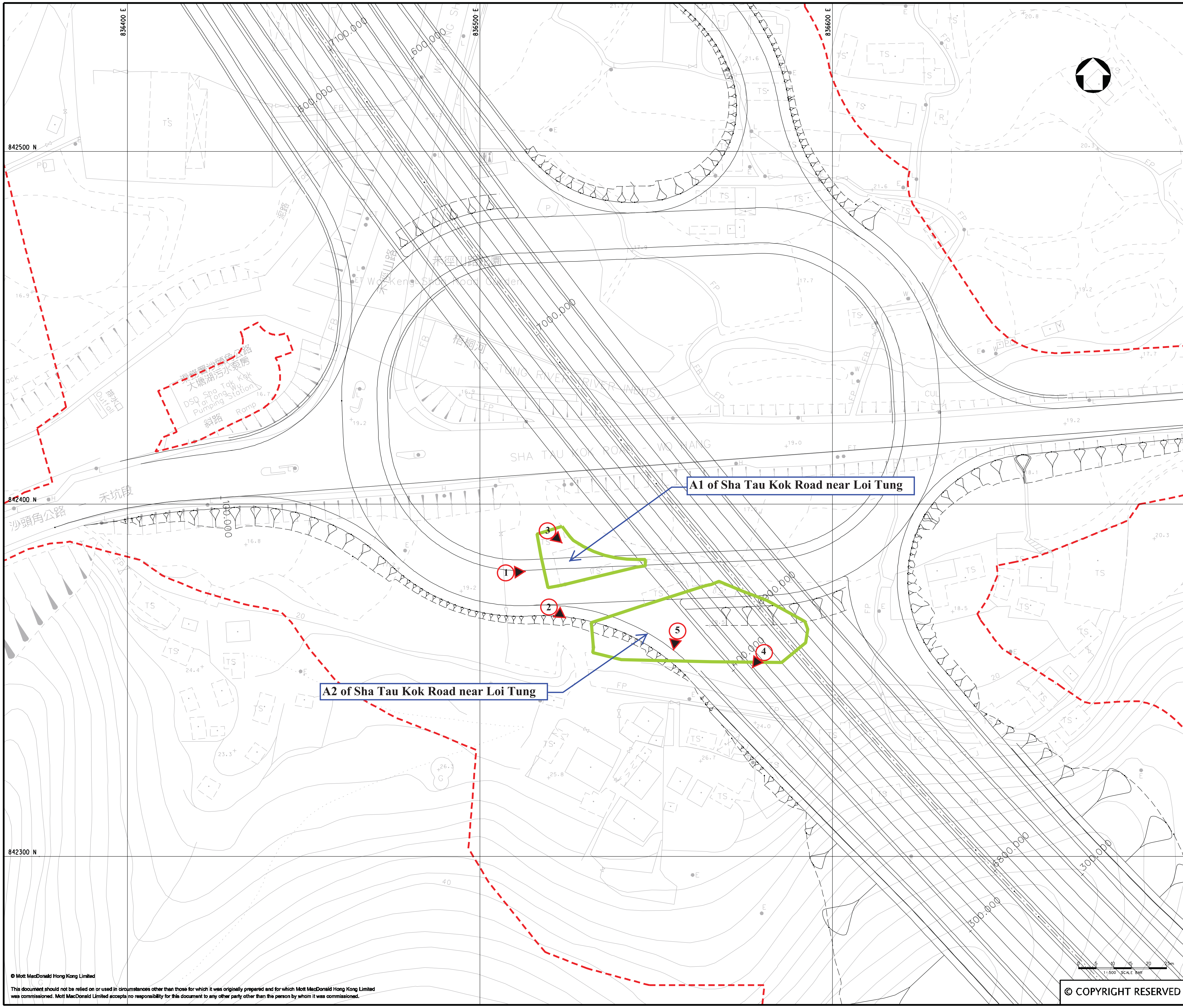
1	**Project Description:**	The assessment is intended to determine whether the sites is contaminated and if so assess the extent of contamination before commencement of any major works on site. The work will involve collection and analysis of representative soil and groundwater samples.
2	**Site History:**	As refer to relevant sections of the revised CAP incorporated the site histories extracted from the EIA Report.
3	**H&S Hazards:**	• Supervision of SI work: (inhalation of contaminants, eye irritation, noise nuisance, body injury by equipment, muscle fatigue by prolonged standing, mosquito borne diseases, sunstroke due to hot weather) • On-Site Assessment: (inhalation of contaminant, poisoning by ingestion, eye irritation, muscle fatigue by prolonged standing, mosquito borne diseases, sunstroke due to hot weather) • On-Site Sampling: (inhalation of contaminants, eye irritation, poisoning by ingestion, muscle fatigue by prolonged standing, mental stress by repetitive movement, mosquito borne diseases, sunstroke due to hot weather) • In-Situ Measurement: (inhalation of contaminants, poisoning by ingestion, eye irritation, body injury by equipment, muscle fatigue by prolonged standing, mental stress by repetitive movement, mosquito borne diseases, sunstroke due to hot weather)
4	**Key Personnel:**	• T.W. Tam (Land Contamination Specialist) • Edwin Au (the Site Agent of Contract 5) • Perry Yam (Resident Engineer)
5	**Receptor**	The worker
6	**Level of Protection:**	Level 2* • Hard hat; • Safety shoes; • Eye Protector; • Ear Protector; • Full protective clothing; • Respirator; and • Rubber glove. * *Depending on actual site conditions, the assessment specialist will determine and see if the protection level can be adjusted.*
7	**Decontamination Procedures:**	The decontamination procedures will be implemented in accordance with the final approved Contaminated Assessment Plan (CAP).
8	**Designation Work Areas**	The assessment works will be carried out in accordance with the final approved Contaminated Assessment Plan (CAP).
9	**Types & Levels of Expected Contamination:**	Potential contamination may relate to products available at the assessment area including BTEX, TPH, PAHs and Heavy metals. Significant of other contaminant is not expected on site.
10	**Monitoring Requirements:**	Potential contamination on site is monitored by Photo-Ionizing Detector (PID) as well as visual inspection by qualified assessor.

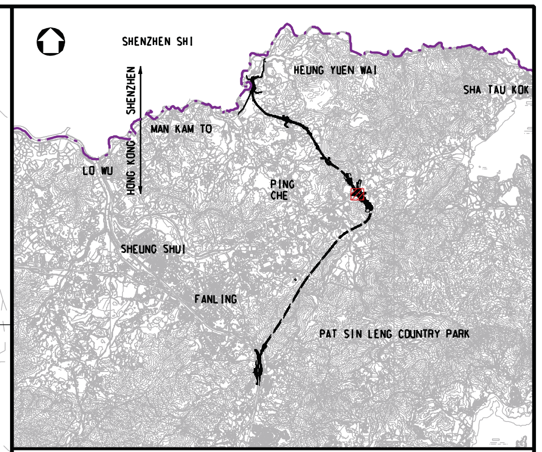
Health And Safety Plan (HASP) of Land Contamination Assessment Work

11	**Emergency Phone No:**	• Police: 999 or Sheung Shui Division (Tel: 3661 1672) • Fire: Sheung Shui Fire Station (Tel:2670 7682) • Hospital: North District Hospital: (Tel: 2683 8888)
12	**Location & Routes to the Nearest Medical Facility:**	Fanling Ambulance Depot (Tel: 2669 2250)

Appendix G

PHOTOGRAPH RECORD





KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND)
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)
- Photograph taken location and direction

Rev	Date	Drawn	Description	Ch'k'd	App'd
			FIRST ISSUE		

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Project
AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

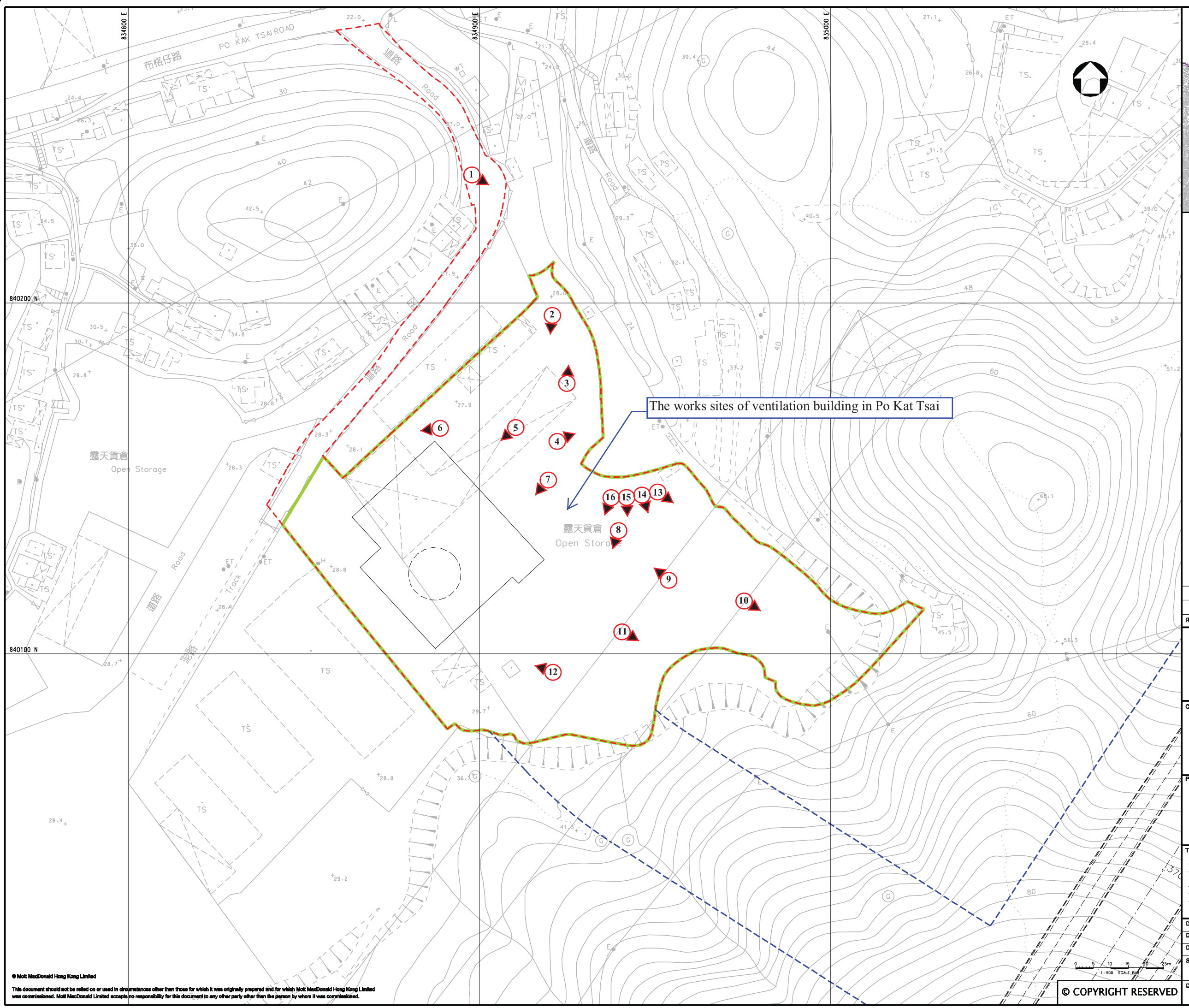
Title
Photograph Record in Potential Contamination Area at Sha Tau Kok Road near Loi Tung

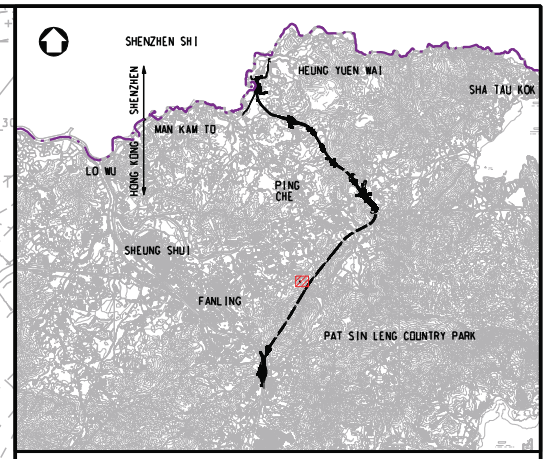
Designed		Eng.Chk.	
Drawn		Coordination	
Dwg.Chk.		Approved	
Scale at A1 1:500	Project 255228	CAD file	Status
Drawing No			Rev

Potential Contamination Area at Sha Tau Kok Road near Loi Tung

Photograph extracted from EIA Report (taken on 28 June 2010)	
	
Photo 1 – The entrance of A1 assessment area	**Photo 2 –** The entrance of A2 assessment area

Photograph taken by AUES in January 2014	
	
Photo 3 – Full view of both Areas A1 and A2 in January 2014	**Photo 4 –** General Refuse was located at the assessment site
	
Photo 5 – General refuse was located at the assessment site	





KEY PLAN
SCALE 1:100000

LEGEND:

- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- POTENTIAL CONTAMINATIVE LAND USE IDENTIFIED (SITE BOUNDARY SUBJECT TO FURTHER CONFIRMATION)
- 1 Photograph taken location and direction

Rev	Date	Drawn	Description	Ch'k'd	App'd

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CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CROSSING POINT AND ASSOCIATED WORKS

Title

Photograph Record in Potential Contamination Area at the proposed ventilation building in Po Kat Tsai

Designed			Eng.Chk.		
Drawn			Coordination		
Dwg.Chk.			Approved		
Scale at A1 1:500		Project	255228		Status
		CAD file			
Drawing No					Rev

Potential Contamination Area at the proposed ventilation building in Po Kat Tsai

Photograph taken on 3 January 2014 (provided by the ER)	
	
Photo 1 – The assessment site entrance	**Photo 2** – A structure of depot located at the potential contamination site.
	
Photo 3 – North side of the contamination assessment site situation	**Photo 4** – East side of the potential contamination site situation
	
Photo 5 – The depot internal condition	**Photo 6** – The depot internal condition
	
Photo 7 – Existing ground condition of the open storage area	**Photo 8** - South side of the potential contamination site situation

Photograph taken on 3 January 2014 (provided by the ER)	
	
Photo 9 – Existing ground condition of open area of the assessment site	**Photo 10** – The potential contamination site of southeast side situation
	
Photo 11 – The potential contamination site of southeast side situation	**Photo 12** – The potential contamination site of northwest side situation

Photograph taken by AUES in January 2014	
	
Photo 13 – The existing ground condition during site inspection in January 2014	**Photo 14 –** The existing ground condition during site inspection in January 2014
	
Photo 15 - The existing ground condition during site inspection in January 2014	**Photo 16 -** The existing ground condition during site inspection in January 2014

Appendix H

Site Walkover Checklist

Location: Open area of the Project at Sha Tau Kok Road near Loi Tung

Date of site visit: 24 January 2014

GENERAL SITE DETAILS

Site Owner / Client:	Unknown
Property Address:	Unknown
Person conducting the questionnaire:	NA

SITE ACTIVITIES

No information can be to provide since the occupier has been unable to contact.

SITE DESCRIPTION

What is the total site area:	• A1 assessment site covered area is about 150m^2 ;and • A2 assessment site coved area is about 1,020m^2.
What area of the site is covered by buildings (%):	All buildings should be located at northwest of the assessment site. About 60% area of the site is covered by buildings
Please list all current and previous owners/occupiers if possible.	According to *EIA Report Appendix 8.1*, the agricultural land, horticultural land and natural hillside observed near Loi Tung. However, an open storage of construction materials and vehicle tyre fixing and replacement services were observed within the open area.
Is a site plan available? If yes, please attach	A site plan has provided in Appendix D of this CAP
Are there any other parties on site as tenants or sub-tenants?	No information can be to provide
Surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.	North: Wo Keng Shan Garden South: Loi Tung Tsuen East: Loi Tung Tsuen West: Tai Tong Wu
The topography of the area	The assessment site is flat terrain and located at hillside
The size and location of the nearest residential communities	Small villages.
Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?	Ng Tung River and Princess Hill

Site Walkover Checklist for Land Contamination Assessment

Questionnaire with Existing/Previous Site Owner or Occupier

		Yes/No	Notes
1.	What are the main activities/operations at the above address?	NA	--
2.	How long have you been occupying the site?	NA	--
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	NA	--
4.	Prior to your occupancy, who occupied the site?	NA	--
5.	What were the main activities/operations during their occupancy?	NA	--
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	NA	--
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	NA	--
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	NA	--
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	NA	--
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	NA	--
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	NA	--
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	NA	--
13.	Has the facility produced a separate hazardous substance inventory?	NA	--
14.	14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	NA	--
15.	How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	NA	--
16.	Do you have any underground storage tanks? (If yes, please provide details.) • How many underground storage tanks do you have on site? • What are the tanks constructed of? • What are the contents of these tanks? • Are the pipelines above or below ground? • If the pipelines are below ground, has any leak and integrity testing been performed? • Have there been any spills associated with these tanks?	No	--
17.	Are there any disused underground storage tanks?	No	--
18.	Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	NA	--
19.	How are the wastes disposed of?	NA	--

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No	Notes
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	NA	--
21. Have any spills occurred on site? (If yes, please provide details.) • When did the spill occur? • What were the substances spilled? • What was the quantity of material spilled? • Did you notify the relevant departments of the spill? • What were the actions taken to clean up the spill? • What were the areas affected?	NA	--
22. Do you have any records of major renovation of your site or rearrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	NA	--
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	NA	--
24. Are there any known contaminations on site? (If yes, please provide details.)	NA	--
25. Has the site ever been remediated? (If yes, please provide details.)	NA	--

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	NA	Unknown. Within the assessment site, all structures and facilities has been removal.
2.	What are the conditions of the bund walls and floors?	NA	The previous of the designated assessment location should be paved with concrete on ground surface. Currently, a concrete layer has been removed.
3.	Are any surface water drains located near to drum storage and unloading areas?	NA	Unknown. Within the assessment site, all building structures with depots were dismantled
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	Yes	Not observed.
5.	Is there a storage site for the wastes?	No	Not observed.
6.	Is there an on-site landfill?	No	General refuse was observed to dispose nearby the slope at A1 assessment area.
7.	Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	Not observed.
8.	Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	No oil stain observed at the existing ground surface.
9.	Are there any potential off-site sources of contamination?	No	Not observed.
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	NA	Unknown. Within the assessment site, all structures and facilities has been removal.
11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	No	Not observed.
12.	Any noticeable odours during site walkover?	No	Not observed.
13.	Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	NA	Unknown. Within the assessment site, all structures and facilities has been removal.

Location: a works sites of ventilation building in Po Kat Tsai

Date of site visit: 24 January 2014

GENERAL SITE DETAILS

Site Owner / Client:	Unknown
Property Address:	Unknown
Person conducting the questionnaire:	NA

SITE ACTIVITIES

No information can be to provide since the occupier has been unable to contact.

SITE DESCRIPTION

What is the total site area:	The assessment site covered area is about 9,800m^2.
What area of the site is covered by buildings (%):	All buildings should be located at northwest of the assessment site. About 20% area of the site is covered by buildings
Please list all current and previous owners/occupiers if possible.	As information extracted from the *Approved EIA Report Appendix 8.1 Section 3.2.3* with *Tables 3.4 and 3.6*, Po Kat Tsai of assessment site is from abandoned agricultural land formed in the 1990's and was first used as open storage. It then turned into open storage and warehouse of construction materials until it was handover to the Project.
Is a site plan available? If yes, please attach	A site plan has provided in Appendix D of this CAP
Are there any other parties on site as tenants or sub-tenants?	No information can be to provide
Surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.	North: Residential South: Hill East: Hill West: Open storage depots
The topography of the area	The assessment site is flat terrain and located at hill side
The size and location of the nearest residential communities	Small village houses.
Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?	NA

Site Walkover Checklist for Land Contamination Assessment

Questionnaire with Existing/Previous Site Owner or Occupier

		Yes/No	Notes
1.	What are the main activities/operations at the above address?	NA	--
2.	How long have you been occupying the site?	NA	--
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	NA	--
4.	Prior to your occupancy, who occupied the site?	NA	--
5.	What were the main activities/operations during their occupancy?	NA	--
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	NA	--
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	NA	--
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	NA	--
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	NA	--
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	NA	--
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	NA	--
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	NA	--
13.	Has the facility produced a separate hazardous substance inventory?	NA	--
14.	14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	NA	--
15.	How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	NA	--
16.	Do you have any underground storage tanks? (If yes, please provide details.) • How many underground storage tanks do you have on site? • What are the tanks constructed of? • What are the contents of these tanks? • Are the pipelines above or below ground? • If the pipelines are below ground, has any leak and integrity testing been performed? • Have there been any spills associated with these tanks?	No	--
17.	Are there any disused underground storage tanks?	No	--
18.	Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	NA	--
19.	How are the wastes disposed of?	NA	--

Questionnaire with Existing/Previous Site Owner or Occupier

	Yes/No	Notes
20. Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	NA	--
21. Have any spills occurred on site? (If yes, please provide details.) • When did the spill occur? • What were the substances spilled? • What was the quantity of material spilled? • Did you notify the relevant departments of the spill? • What were the actions taken to clean up the spill? • What were the areas affected?	NA	--
22. Do you have any records of major renovation of your site or rearrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	NA	--
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	NA	--
24. Are there any known contaminations on site? (If yes, please provide details.)	NA	--
25. Has the site ever been remediated? (If yes, please provide details.)	NA	--

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	NA	Unknown. Within the assessment site, all building structures with depots were dismantled.
2.	What are the conditions of the bund walls and floors?	NA	The previous Po Kat Tsai ground surface should be paved concrete. During the visit observed that the concrete layer has been removed. Currently the existing ground is loose surface.
3.	Are any surface water drains located near to drum storage and unloading areas?	NA	Unknown. Within the assessment site, all building structures with depots were dismantled
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	Not observed.
5.	Is there a storage site for the wastes?	No	Not observed.
6.	Is there an on-site landfill?	No	Not observed.
7.	Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	Not observed.
8.	Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	No oil stain is found at the existing ground surface. Addition, no any stains or colours or special waste i.e. paint, dyes and other chemical product were observed on site.
9.	Are there any potential off-site sources of contamination?	No	Not observed.
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	NA	Unknown. Within the assessment site, all building structures with depots were dismantled
11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	No	Not observed.
12.	Any noticeable odours during site walkover?	No	Not observed.
13.	Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	NA	Unknown. Within the assessment site, all building structures with depots were dismantled.

Appendix I

RECORDS FROM GOVERNMENT (EXTRACTED FROM EIA REPORT)

Chan, Joseph

From: Liu, Benny
Sent: Wednesday, July 29, 2009 17:33
To: Chan, Joseph
Subject: FW: Liantang/Heung Yuen Wai Boundary Control Point & Associated Works
Attachments: ESB(199)(2008).xls

From: wsyuen@epd.gov.hk [mailto:wsyuen@epd.gov.hk]
Sent: 29 July 2009 17:17
To: Cheng, HT
Cc: Liu, Benny; "CI[RN]32"@epd.gov.hk
Subject: Fw: Liantang/Heung Yuen Wai Boundary Control Point & Associated Works

Dear Mr. Cheng,

I refer to your letter (ref:PEJ/HTC/IL/il/T255228/30/L0181) dated 23.07.09 requesting information on chemical waste producers (CWPs) within / in the proximity of your proposed project site.

As requested, please see below attached file showing details of the current (active) / past (inactive) registration of CWPs within / in the proximity of the areas as depicted in sketch 032 - 035.

Please also note that we have no record of any accident involving spillage / leakage of chemical waste within / in the proximity of the above-mentioned areas.

Regards,

William YUEN
Tel. 21585831

No.	TPU	eIE File Reference No	Polluter Name	Premises Address	WPN	Nature of Business	Major Chemical Waste
1	634	EP/RN/0000038335	MAN LEE FORK LIFT SERVICE COMPANY	LOT 463, DD85 LAU SHUI HEUNG ROAD FANLING NT	9513-634-M1020-01	VEHICLE MAINTENANCE	SPENT LUBRICATING OIL
2	634	EP/RN/0000038978	GRAND NATION INVESTMENT LIMITED	LOT 4308 BRP & PROTION 4313 BRP IN DD51 KAU LUNG HANG	6202-634-G1019-01	PETROL FILLING STATION	WASTE LUBE OIL, WASTE LUBRICATION OIL BOTTLES
3	634	EP/RN/0000038634	SHUI ON PLANT AND EQUIPMENT SERVICES LTD.	SECT A LOT 609-611 & SECT F 612 DEMARCATION DIST 85 FANLING NT	5213-634-S3011-02	CONSTRUCTION MACHINE	SPENT PUMP OIL, SPENT ENGINE OIL
4	634	EP/RN/0000053038	LEE SUI HAR	LAU SHUI HEUNG PO KAR CHAI TSUEN DD85, LOT 607R.P., & 606, NORTH DISTRICT, NEW TERRITORIES	6322-634-L1133-01	WASTE METAL, WASTE PLASTIC	
5	634	EP/RN/0000052601	LEE SUI HAR JESSICA	LAU SHUI HEUNG PO KAR CHAI TSUEN, DD85, LOT 601, NORTH DISTRICT, NEW TERRITORIES	6322-634-L1133-03	WASTE METAL, WASTE PLASTIC	
6	634	EP/RN/0000038420	HOP KWAN MOTOR SERVICE	LOT 463A IN DD85 TAI WO TSUEN FANLING NT	9513-634-H2484-02	MOTOR REPAIR	WASTE LUBRICATING OIL, BRAKE LINING
7	634	EP/RN/0000044546	KAI FA INTERNATION LTD.	PO KAK TSAI TSUEN NORTH NT	6318-634-K1110-01	COMPUTER WASTE RECYCLE	SPENT GLASS FRAGMENT, IC BOARD
8	634	EP/RN/0000042319	YIU HING AUTO REPAIR	DD 76LOT T37SA-SCSS (SITE A) LAU SHUI HEUNG RD FANLING NT	9513-634-Y1055-01	AUTO REPAIRING	SPENT LUBE OIL
9	634	EP/RN/0000035785	TRULY METAL WORKS LTD	LAU SHUI HEUNG RD, DD 85 FANLING NT	3819-634-T2032-01	MFG OF METAL CONTAINERS	OILY SLUDGE, PAINT, KEROSENE
10	634	EP/RN/0000045252	VANNEX INTERNATIONAL LIMITED	LOT 567 SECT D(PARTIAL), LAU SHUI HEUNG RD., FANLING, NORTH DISTRICT, NEW TERRITORIES	6318-634-V2108-01	MATERIAL REPROCESSING	TV & CRT GLASS
11	634	EP/RN/0000052578	LEE SUI HAR	LAU SHUI HEUNG PO KAR CHAI TSUEN DD85, LOT 531R.P., NORTH DISTRICT, NEW TERRITORIES	6322-634-L1133-02		WASTE METAL,WASTE PLASTIC
12	634	EP/RN/0000052525	HANG CANG MACHINERY ENGINEERING CO. LTD.	25A TAI WO VILLAGE, LAU SHEUNG HEUNG ROAD, FANLING, NORTH DISTRICT, NEW TERRITORIES	9519-634-H1163-01	MACHINERY SELLING OR RENTING	WASTE LUBE OIL, PUMP OIL
13	634	EP/RN/0000039367	CHUN WO HOLDINGS LTD.	LOT 612G IN DD85 PO KAT TSAI FANLING NT	9519-634-C1059-01	MACHINE MAINTENANCE	SPENT LUBE OIL, SPENT GEAR OIL&HYDRAULIC OIL, WASTE BATTERY
14	634	EP/RN/0000085938	P&A ENGINEERING LTD	HEUNG ROAD, FANLING, NORTH DISTRICT, NEW TERRITORIES	5517-634-P2759-03	HYDROLICAL ELECTRICAL	SURPLUS PAINT
15	651	EP/RN/0000044577	MING HING WATERWORKS ENGINEERING CO LTD	WANG SHAN KUK SAN TSUEN FANLING NT	5213-651-M2606-02	CONSTRUCTION	SPENT LUBRICATING OIL
16	652	EP/RN/0000045459	THAI & METAL (HK) LTD.	LOT NOS 758BRP & 767B IN D.D.46, SHA TAU KOK ROAD, FANLING, NORTH DISTRICT, NEW TERRITORIES	6322-652-T2839-02	TRADING	SPENT LUBRICATING OIL

No.	TPU	eIE File Reference No	Polluter Name	Licensee Name (Eng)	Premises Address	WPN	Nature of Business	Major Chemical Waste
1	652	EP/RN/0000052696	UNIGREEN ENTERPRISE CO.	UNIGREEN ENTERPRISE CO.	NORTH DISTRICT, NEW TERRITORIES, DD38, 171RP,172 & 173	6322-652-U1026-02	ELECTRIC APPLIANCE	SPENT CIRCUIT BOARD, SPENT BATTERY CONTAINING MERCURY & ACIDIC ELECTROLYTE & LUBRICATING
2	652	EP/RN/0000052904	UNIGREEN PROCESSING MATERIAL TRADING CO.	UNIGREEN ENTERPRISE CO.	NORTH DISTRICT, NEW TERRITORIES, DD38, 171, RP	6322-652-U1026-01	ELECTRIC APPLIANCE	BOARD,BATTERY CONTAINING MERCURY,BATTERY CONTAINING ACIDIC ELECTROLYTE & LUBRICATING
3	652	EP/RN/0000183436	THAI & METAL TRADING CO.	THAI & METAL TRADING CO.	LOT NO.758BRP & 767 IN DD 46 SHA TAU KOK SHA TAU KOK RD.,LOI NT	6308-652-T2839-01	TRADING	SPENT LUBRICATING OIL

消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防總部大廈

FIRE SERVICES DEPARTMENT
FIRE SERVICES HEADQUARTERS BUILDING,
No.1 Hong Chong Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong.

本處檔號 OUR REF. : (35) in FSD/GR AI 4/07 III
來函檔號 YOUR REF. : PEJ/HTC/IL/il/T255228/30/L0179
電訊掛號 Telex : hkfsdenq@hkfsd.gov.hk
圖文傳真 FAX: : 2739 5879
電 話 TEL NO. : 2733 7741

6 August 2009

Mott MacDonald.
7th Floor, West Wing Office Building
New World Centre
20 Salisbury Road
Tsim Sha Tsui, Kowloon
Hong Kong.
(Attn: Mr. H.T. CHENG, Project Manager)

By fax (2827 1823) only

Dear Mr.Cheng,

Environmental Impact Assessment
Liantang/Heung Yuen Wai Boundary Control Point & Associated Works
Request for Information of Dangerous Goods

I refer to your letter dated 23 July 2009 regarding the captioned subject.

Please be advised that neither records of dangerous goods licence nor incidents of spillage/leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

Should you have further questions, please feel free to contact the undersigned at 2733 7741.

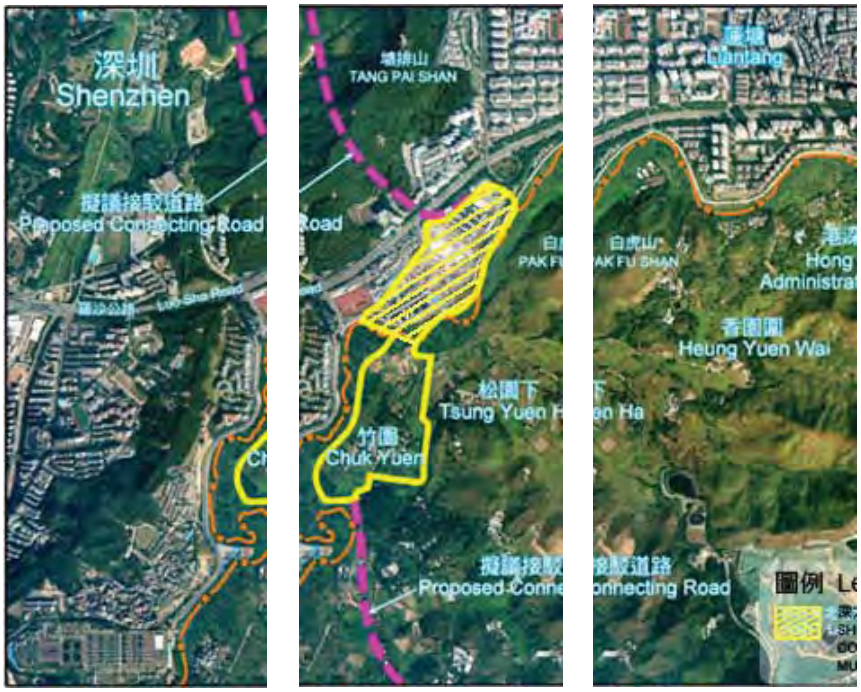
Yours faithfully,

(TSANG Wing-hung)
for Director of Fire Services

Ref. number and date should be quoted in reference to this letter
凡 提 及 本 信 時 請 引 述 編 號 及 日 期

Appendix J

Text of Appendix 8.1 of Environmental Impact Assessment Report



Agreement CE45/2008(CE) Liantang/Heung Yuen Wai Boundary Crossing Point and Associated Works

Contamination Assessment Plan (Updated)

July 2010

Civil Engineering and Development Department

Agreement CE45/2008(CE)
Liantang/Heung Yuen Wai Boundary Crossing Point and Associated Works

Contamination Assessment Plan (Updated)

July 2010

Civil Engineering and Development Department

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	Aug 2009	Various	Dr. Anne Kerr	Dr. H. T. Cheng	Draft
B	May 2010	Various	Dr. Anne Kerr	Dr. H.T. Cheng	Revised
C	Jul 2010	Various	Dr. Anne Kerr	Dr. H.T. Cheng	Updated

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Content

Tables

Figures

Appendices

1. Introduction

1.1 Project Background

There are currently four existing boundary crossing points (BCPs) that provide vehicular crossing at the Hong Kong – Shenzhen boundary within the Hong Kong Special Administrative Region (HKSAR). These existing BCPs include Shenzhen Bay and Lok Ma Chau on the western side of the New Territories, as well as Man Kam To and Sha Tau Kok on the eastern side. The existing vehicular crossing points at Man Kam To and Sha Tau Kok have already reached their capacity limits, but scope for desirable expansion to enhance their capacities is limited by site constraints and the capacity of connecting roads on both Hong Kong and Shenzhen sides.

It is anticipated that the volume of cross-boundary traffic will continue to increase with the closer ties of Hong Kong-Shenzhen and the completion of the planned Eastern Corridor in Shenzhen. Therefore, it was identified necessary to establish a new BCP in the eastern part of Hong Kong-Shenzhen boundary to meet the future traffic demand and re-distribute cross-boundary traffic amongst the crossings in the east.

In December 2006, the Hong Kong and Shenzhen Governments jointly commissioned a study entitled "Preliminary Planning Study on Developing Liantang/Heung Yuen Wai Control Point" (hereafter referred to as "the Joint Study") to examine the need, benefit and function of a new BCP at LT/HYW. The Joint Study confirmed the need for a new BCP at LT/HYW.

In January 2007, the Planning Department commissioned a consultancy study entitled "Planning Study on Liantang/Heung Yuen Wai Cross-boundary Control Point and its Associated Connecting Roads in Hong Kong – Feasibility Study" (hereafter referred to as "the Feasibility Study") to examine the land, planning, traffic and engineering implications and its associated connecting road within Hong Kong territory for the LT/HYW BCP. With evaluation of a number of alternative options, the Feasibility Study (FS) put forward a preferred layout of the LT/HYW BCP and preferred alignment of the LT/HYW BCP connecting road.

On 18 September 2008, at the second meeting of the Hong Kong-Shenzhen Joint Task Force on Boundary District Development, the two Governments endorsed the major findings of the joint study and jointly announced to implement the LT/HYW BCP after the meeting on the following basis:

a. the LT/HYW BCP would adopt the separate-location model but design of the BCP should maximize convenience to users including the construction of an integrated passenger hall over the Shenzhen River;

b. the LT/HYW BCP on Hong Kong side would require resumption and resite of Chuk Yuen Village;

c. the connecting road with the LT/HYW BCP on Hong Kong side would adopt the alignment leading to Tolo/Fanling Highway in the eastern direction which comprises 3 sections of tunnels with a total length of about 3.5 km; and

d. the design and construction of the LT/HYW BCP should be packaged with the improvement works of Liantang section of the Shenzhen River

1.2 The Project

1.2.1 Original Scope as Defined in the EIA Study Brief

The Assignment comprises the LT/HYW BCP and its connecting road with associated works. The scope of the Project to be covered in the EIA study, as defined under Section 1.3 of the EIA Study Brief, comprises:

(i) site formation of about 18.3 hectares of land for the construction of a BCP building in the area of Chuk Yuen Village;

(ii) re-alignment of Kong Yiu Channel in association with the above site formation and drainage facilities discharging into the Shenzhen River associated with the BCP;

(iii) cargo processing facilities including processing kiosks for clearance of goods vehicles, vehicle holding areas, customs inspection platforms, cargo examination buildings, X-ray building, weigh stations etc.;

(iv) passenger related facilities including processing kiosks and examination facilities for private cars and coaches, passenger clearance building and halls, etc.;

(v) accommodation for and facilities of the Government departments providing services in connection with the BCP;

(vi) provision of transport related facilities inside the BCP including public transport interchange, and transport drop-off and pick-up areas;

(vii) other peripheral structures and supporting facilities such as bridges across Shenzhen River, border road and fences, water supply system, utilities, culvert, drainage and sewerage etc.;

(viii) construction of a dual two-lane trunk road with traffic control and surveillance system connecting the BCP with Fanling Highway adjacent to Wo Hop Shek - which comprises a 6.5km of viaduct, three tunnel sections totaling 3.5km in length, tunnel administration building and tunnel ventilation system;

(ix) associated diversion/modification works at Lin Ma Hang Road to cope with the BCP development;

(x) associated environmental mitigation measures, landscaping works, drainage/sewerage, waterworks, utilities and traffic engineering works; and

(xi) collection, treatment and disposal of sewage generated from the BCP - one of the following two tentative sewage treatment options will be recommended for adoption during the course of the EIA study

- Option 1 – convey the sewage generated from the BCP to the Shek Wu Hui Sewage Treatment Works through an existing village pumping main;
- Option 2 – provide an on-site sewage treatment facility to a tertiary level with provision of reedbeds.

1.2.2 Changes to the Original Scope

Following from the preliminary planning and design of the BCP and connecting road and taking into account engineering feasibility, stakeholder consultation and investigation into alternative design and

construction methodologies, a number of changes have been made since the original scope presented in the EIA Study Brief. The major changes to the original scope include:

(a) EIA Study Brief Section 1.3(ii) - Re-alignment of Kong Yiu Channel is no longer required as further design investigation has revealed that the BCP can be accommodated without the need to modify the channel, and the presence of the BCP is not anticipated to impact the hydrological function of the existing channel;

(b) EIA Study Brief Section 1.3(viii) - As an outcome from the alignment options selection, the current preferred alignment will consist of two tunnel sections totalling 5.7km in length (instead of three tunnel sections totalling 3.5km in length) and 5.2km of viaduct and/or at grade sections (instead of 6.5km of viaduct), and total length will increase from 10km to 10.9km;

(c) EIA Study Brief Section 1.3(xi) - Confirmation of provision of on-site sewage treatment facility with proposed Membrane Bioreactor (MBR) treatment and effluent reuse.

1.2.3 Current Scope of the Project

Based on the changes made to the original scope of the Project, the current scope comprises:

(i) site formation of about 18.3 hectares of land for the construction of a BCP building in the area of Chuk Yuen Village;

(ii) drainage facilities discharging into the Shenzhen River associated with the BCP;

(iii) cargo processing facilities including processing kiosks for clearance of goods vehicles, vehicle holding areas, customs inspection platforms, cargo examination buildings, X-ray building, weigh stations etc.;

(iv) passenger related facilities including processing kiosks and examination facilities for private cars and coaches, passenger clearance building and halls, etc.;

(v) accommodation for and facilities of the Government departments providing services in connection with the BCP;

(vi) provision of transport related facilities inside the BCP including public transport interchange, and transport drop-off and pick-up areas;

(vii) other peripheral structures and supporting facilities such as bridges across Shenzhen River, border road and fences, water supply system, utilities, culvert, drainage and sewerage etc.;

(viii) construction of a dual two-lane trunk road with traffic control and surveillance system connecting the BCP with Fanling Highway adjacent to Wo Hop Shek - which comprises approximately 5.2km of viaduct and/or at grade sections, and two tunnel sections totalling 5.7km in length, tunnel administration building and tunnel ventilation system;

(ix) associated diversion / modification works at Lin Ma Hang Road to cope with the BCP development;

(x) associated environmental mitigation measures, landscaping works, drainage/ sewerage, waterworks, utilities and traffic engineering works; and

(xi) collection, treatment and disposal of sewage generated from the BCP via provision of an on-site sewage treatment facility to a tertiary level with proposed Membrane Bioreactor (MBR) treatment and effluent reuse.

1.3 Designated Projects under EIA Ordinance

The Project originally comprised the following Designated Projects (DPs) based on items A.1 and I.1 in Part 1 of Schedule 2 to the Environmental Impact Assessment (EIA) Ordinance:

- Re-alignment of Kong Yiu Channel and drainage facilities discharging into the Shenzhen River associated with the BCP (item I.1); and
- A dual two-lane trunk road connecting the BCP with Tolo/Fanling Highway – about 6.5km on viaduct and 3.5km in tunnels (item A.1).

However, following a consideration of design alternatives, re-alignment of Kong Yiu Channel is no longer required, but a new DP based on item F.4 has been added. Hence the current Project, which has undergone notable modification since the EIA Study Brief, now comprises the following DPs:

- A dual two-lane trunk road connecting the BCP with Tolo/Fanling Highway – about 5.3km on viaduct or at grade and 5.7km in tunnels (item A.1); and
- Reuse of treated sewage effluent from a tertiary treatment plant for irrigation at the BCP.

In accordance with the EIA Ordinance (EIAO), an EIA report has to be prepared and approved by Director of Environmental Protection (DEP) before an Environmental Permit (EP) will be issued for construction and operation of the Project.

On 3 November 2008, the Civil Engineering and Development Department (CEDD) submitted a Project Profile (EIAO Register No. PP-372/2008) to apply for an EIA Study Brief under Section 5(1) of the EIA Ordinance. DEP issued on 12 December 2008 an EIA Study Brief (EIAO Register No. ESB-199/2008) to CEDD for undertaking of the EIA Study.

1.4 Structure of the Report

A Contamination Assessment Plan (CAP) was submitted based on initial connecting road alignment on 31 August 2009 and accepted by EPD on 2 October 2009. A revised CAP was submitted on 31 May 2010 due to the refining of alignment and scope of works during the design stage and was accepted by EPD on 22 June 2010. However, due to further refining of the alignment section at Sha Tau Kok Road, this updated CAP is prepared for the submission to DEP for endorsement in accordance with the requirement set out in Clause 3.4.8.1(iv) of the EIA Study Brief.

After this introductory section, Section 2 presents the assessment objectives, criteria and methodology. Section 3 presents findings of the site appraisal, which included a desk-top study and a site reconnaissance survey. Section 4 presents the site investigation plan for the potential contaminated sites. Section 5 presents the assessment conclusion.

2. Assessment Objectives, Criteria and Methodology

2.1 Objectives

The objectives of this CAP are to:

- review the present and historical land uses in relation to possible land contamination within or in the proximity of the Project area;
- identify any potential hot spots of land contamination;
- evaluate the environmental impacts associated with the potential contamination identified from implementation of the Project; and
- propose, where necessary, sampling and laboratory chemical analysis required to determine the nature and extent of any potential land contamination identified

2.2 Relevant Standards, Guidelines and Requirements

The relevant standards and guidelines on land contamination assessment and remediation include the following:

- Section 3 of Annex 19 to the EIAO-TM;
- Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops;
- Guidance Notes for Contaminated Land Assessment and Remediation; and
- Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

In accordance with the requirement specified in Clause 3.4.8.1 of the EIA Study Brief, if any contaminated land uses as stated in Sections 3.1 and 3.2 of Annex 19 in the Technical Memorandum on EIA Process (EIAO-TM) of the EIAO are identified, the carrying out of a land contamination assessment is required and measures shall be proposed to avoid disposal.

The uses that may have the potential to cause land contamination include among others:

- oil installations including oil depots and petrol filling stations;
- gas works;
- power plants;
- shipyards/boatyards;
- chemical manufacturing/processing plants;
- steel mills/metal workshops;
- car repairing and dismantling workshops; and
- scrap yards.

2.3 Assessment Methodology

Desktop appraisal and site reconnaissance were undertaken to identify the presence of any potentially contaminative land within or in the proximity of the Project area.

Relevant information were collected and reviewed as part of the desktop study, including:

- historical aerial photographs along the Project alignment;
- records of active (current) and inactive (past) registered chemical waste producers in the areas of interest from the Environmental Protection Department (EPD);
- records of current and past dangerous good (DG) licences in the areas of interest from the Fire Services Department (FSD);
- records of accidents that involved spillage/leakage of chemical waste or DG from EPD and FSD

Site reconnaissance surveys were undertaken to identify current land uses along the Project alignment and verify the findings of the desktop appraisal.

3. Site Appraisal

3.1 Project Alignment and its Environs

The Project consists of two main components, construction of a Boundary Crossing Point; and construction of a connecting road alignment.

The proposed BCP is located at the boundary with Shenzhen near the existing Chuk Yuen Village. The site is approximately 18.3 ha and will be comprised of a main passenger building with passenger and cargo processing facilities and associated customs, transport and ancillary facilities. Connection to Shenzhen side will be via several bridges over the Shenzhen River.

The connecting road alignment consists of six main sections:

1. Lin Ma Hang to Frontier Closed Area (FCA) Boundary – this section comprises at-grade and viaducts and includes the improvement works at Lin Ma Hang Road;

2. Ping Yeung to Wo Keng Shan – this section stretches from the Frontier Closed Area Boundary to the tunnel portal at Wo Keng Shan and comprises at-grade and viaducts including an interchange at Ping Yeung;

3. North Tunnel – this section comprises the tunnel segment at Wo Keng Shan and includes a ventilation building at the portals on either end of the tunnel;

4. Sha Tau Kok Road – this section stretches from the tunnel portal at Wo Keng Shan to the tunnel portal south of Loi Tung and comprises at-grade and viaducts including an interchange at Sha Tau Kok and an administration building;

5. South Tunnel – this section comprises a tunnel segment that stretches from Loi Tung to Fanling and includes a ventilation building at the portals on either end of the tunnel as well as a ventilation building in the middle of the tunnel near Lau Shui Heung;

6. Fanling – this section comprises the at-grade, viaducts and interchange connection to the existing Fanling Highway.

Figure 3.1 and **3.1a-k** shows the Project layout and corresponding works areas.

3.2 Desktop Study

3.2.1 Review of Historical Aerial Photographs and Previous Approved Studies

Relevant historical aerial photographs taken between 1924 and 2005, where available, were collected and reviewed. The aerial photos cover the land requirement limit of the Project, taking into account the refined alignment of the BCP connecting road. Part of the BCP and Lin Ma Hang Road were studied in the CAP of the Regulation of Shenzhen River Regulations Stage IV EIA Study, approved in December 2009 by EPD. The Contamination Assessment Report (CAR) was also submitted to EPD in March 2010. The CAP and CAR were reviewed for this assignment. The historical land uses identified from the review are summarised below for evaluation of potential land contamination.

3.2.1.1 Proposed BCP at Chuk Yuen Village

The proposed LT/HYW BCP will be built in the area of Chuk Yuen Village, which is inside the Closed Area. A review of the aerial photos suggested that the area that will be occupied by the BCP was agricultural land since 1940's until 1970's. Abandoned agricultural land started to appear in 1970's but the area was reduced in 1980's. Woodland can be seen from the aerial photos taken in 1980's and larger area of abandoned agricultural land was found since late 1990's. The land use of the study area has not changed much since then.

Table 3.1 presents a summary of the historical land use identified at the area of Chuk Yuen Village. Representative aerial photos reviewed are presented in **Figure A1** of **Appendix A**.

Table 3.1 Historical land use in the area of Chuk Yuen Village

Date	Ref. no.	Height (ft)	Land Use
6/11/1945	Y00963	20,000	Active agricultural land, village houses
17/11/1954	Y02912	29,200	Active agricultural land, village houses
20/12/1973	7827R	12,500	Active and abandoned agricultural land, village houses
23/11/1976	16345	12,500	Active and abandoned agricultural land, village houses
5/8/1986	A05594	4,000	Active and abandoned agricultural land, village houses, woodland
28/4/1992	A30725R	4,000	Active and abandoned agricultural land, village houses, woodland
9/12/1999	CN25141R	8,000	Active and abandoned agricultural land, village houses, woodland
21/11/2005	CW68388R	8,000	Active and abandoned agricultural land, village houses, woodland

3.2.1.2 Sections of BCP Connecting Road between Lin Ma Hang and Frontier Closed Area and between Ping Yeung and Wo Keng Shan

The proposed BCP connecting road around Ta Kwu Ling partly falls within the Closed Area Boundary, including part of the existing Lin Ma Hang Road. A review of the historical aerial photographs revealed that the Project Area involves land that was primarily agricultural land until the 1970's. Village houses at Ping Yeung and Lin Ma Hang Road were mostly developed in the 1970's. Aside from the progressive abandonment of agricultural land and slight expansion of village areas, the land use in the area has changed very little.

Table 3.2 presents a summary of the historical land use identified in the region. Representative aerial photos reviewed are presented in **Figure A1** and **A2** of **Appendix A**.

Table 3.2 Historical land use along connecting road between Lin Ma Hang and Wo Keng Shan

Date	Ref. no.	Height (ft)	Land Use
6/11/1945	Y00963	20,000	Agricultural land, hillside shrubland
17/11/1954	Y02912	23,200	Agricultural land, hillside shrubland
16/5/1969	Y15864	3,000	Agricultural land, hillside shrubland
23/11/1976	16345	12,500	Agricultural land, hillside shrubland, village houses
3/8/1986	A05560, A05562, A05594	4,000	Agricultural land, hillside shrubland, village houses
7/11/1994	CN8665	4,000	Agricultural land, village houses, hillside grassland and shrubland, bareground
19/11/2004	CW61736, CW63140R	4,000	Active and abandoned agricultural land, village houses, hillside grassland and shrubland

Date	Ref. no.	Height (ft)	Land Use
21/11/2005	CW68388R	8,000	Active and abandoned agricultural land, village houses, hillside shrubland

3.2.2 North Tunnel at Wo Keng Shan and Sha Tau Kok Road Section of the BCP Connecting Road

This portion of the BCP connecting road involves a roundabout at Loi Tung and connecting road emerges at the tunnel portals at Princess Hill and Cheung Shan.

Review of historical aerial photographs suggests that the land use in the area has generally changed very little. Sha Tau Kok Road can be seen in the aerial photo taken in 1954. In the 1950's and 1960's, the land in the region was mainly for agricultural use, except for the hillside areas which were not cultivated. Some of the agricultural land was abandoned in the 1990's. Part of the area within the land requirement limit turned into open area while other parts have been converted to horticulture.

Table 3.3 presents a summary of aerial photographs reviewed and the historical land use identified in the region. Representative aerial photos reviewed are presented in **Figure A3** of **Appendix A**.

Table 3.3 Historical land use along connecting road in Sha Tau Kok Road Section

Date	Ref. no.	Height (ft)	Land Use
17/11/1954	Y02912	29,200	Agricultural land, hillside shrubland
1963	Y10132	-	Agricultural land, hillside shrubland, village houses
20/12/1973	7838	12,500	Agricultural land, hillside shrubland, village houses
3/8/1986	A05508	4,000	Agricultural land, hillside shrubland, village houses
7/11/1994	CN8700	4,000	Active and abandoned agricultural land, hillside shrubland and woodland, village houses, open area
29/3/2001	CW30301	3,500	Active and abandoned agricultural land, horticulture, hillside shrubland and woodland, village houses, open area

3.2.3 South Tunnel at Lau Shui Heung and Proposed Mid-tunnel Ventilation Building at Po Kai Tsai

The proposed South Tunnel at Lau Shui Heung runs through the hillside. Construction of the tunnel mid-ventilation building is proposed at Po Kai Tsai, near Lau Shui Heung, where the South Tunnel locates. The area was used as agricultural land in 1970's, which was later on abandoned and turned into bareground in 1980's. The area has then been used as open storage and warehouse for construction materials until now.

The historical land use identified from a review of relevant aerial photos are summarised in **Table 3.4**. Representative aerial photos at Lau Shui Heung and Po Kai Tsai reviewed are presented in **Figure A4** and **A5** of **Appendix A**.

Table 3.4 Historical land use of the location of proposed ventilation building at Po Kai Tsai

Date	Ref no.	Height (ft)	Land Use
22/2/1963	Y09973	3,900	Agricultural land, access road
23/11/1978	23416	4,000	Agricultural land, access road
13/1/1981	35589	10,000	Abandoned agricultural land, access road
7/3/1986	A04656	4,000	Bare ground, access road
18/10/1990	A23492	4,000	Open storage, access road

Date	Ref no.	Height (ft)	Land Use
20/7/1995	CN10584	3,000	Open storage and warehouse, access road
24/9/2001	CW33835, CW33898	4,000	Open storage and warehouse, access road, agricultural land, hillside shrubland

3.2.4 Fanling Section of BCP Connecting Road

The proposed BCP connecting road will be constructed as a viaduct structure spanning over a new drainage channel at the village of Kiu Tau and the MTR East Rail and bore into Lung Shan near Fanling Highway.

Aerial photo taken in 1924 revealed that the railway already existed and the surrounding area was used as agricultural land. In the early 60's, the area was mostly agricultural land with some scattered houses and low rise buildings. In the 80's, part of the study area became bare ground and more houses and low rise buildings were built in the area. In the late 1990's early 2000's, some of the discrete area next to Fanling Highway was turned into construction sites, and a significant area of the land has been used in carrying works for drainage improvement. The land to the south of Kiu Tau village between Fanling Highway and the railway has been turned into plantation.

Table 3.5 presents a summary of relevant aerial photographs reviewed and the historical land use identified within or in the proximity of the Project alignment in Fanling. Representative aerial photos reviewed are presented in **Figure A6** of **Appendix A**.

Table 3.5 Historical land use along the proposed BCP connecting road in Fanling

Date	Ref. No.	Height (ft)	Land Use
1924	Y00190	12,500	Agricultural land, railway
17/2/1963	Y09766	3,900	Agricultural land, village, low rise buildings
7/3/1986	A04594	4,000	Agricultural land, bare ground, village, low rise buildings
4/6/1995	CN9781	3,000	Agricultural land, plantation, bare ground, village, construction sites, low rise buildings
24/9/2001	CW33687	4,000	Agricultural land, plantation, village, construction sites, low rise buildings

3.2.5 Review of Records from Government Departments

Relevant data, including records of active and inactive registered chemical waste producers, records of current and past DG licences, and records of any accident that involved spillage/leakage of chemical waste or DG in the areas of interest were collected from EPD and FSD. Replies from the two Government departments in response to the Consultants' requests are presented in **Appendix B** for reference.

A review of the records from EPD revealed that while there are a number of registered chemical waste producers in the area, the Project alignment will not encroach onto these existing facilities. There was also no record of any accident that involved spillage/leakage of chemical waste within or in the proximity of the areas of interest.

Reply from FSD also revealed that there were neither records of DG licence nor incidents of spillage/leakage of DG in the areas of interest.

3.3 Site Reconnaissance Survey

Site reconnaissance surveys were carried out in May, July and October 2009 and May 2010 to identify current land uses along the Project alignment and to verify the findings of desktop appraisal.

The proposed LT/HYW BCP will be built over the area of Chuk Yuen Village (see **Photo 1** in **Appendix C**) after its relocation. The reconnaissance site surveys revealed that the area is occupied by village houses and agricultural fields. No potentially contaminative facilities such as car repairing workshops or scrap yards has been observed on site.

At the further north of BCP connecting road, the viaduct will span over a site that is occupied by an abandoned pigsty (see **Photo 2** in **Appendix C**) to the west of Nga Yiu Ha. No sign of land contamination was observed on the paved ground surface at this abandoned site.

Site inspections confirmed that running further northwest the viaduct will pass over areas occupied by agricultural fields, woodlands, River Ganges (Ping Yuen River) and scattered village houses (see **Photo 3** in **Appendix C**). No potentially contaminative land uses were observed within or in the proximity of the Project alignment.

At the north portal of the North Tunnel section, the BCP connecting road emerges at the northern side of Cheung Sha along Wo Keng Shan Road. Site observations confirmed that an existing recycling compound (see **Photo 4** in **Appendix C**) in Ping Che is situated on the opposite side of Ng Chow Road at more than 50m from the proposed viaduct. No sign of land contamination was observed during the site visits along the Project area.

In the valley south of Loi Tung, the bored tunnel through Princess Hill will emerge at a low level portal and climb up to pass over Shan Tau Kok Road and the adjacent River Indus (Ng Tung River). **Photos 5 and 6** in **Appendix C** illustrate the agricultural land, horticultural land and natural hillside observed near Loi Tung. Construction site office at the Wo Keng Shan Road and an open area at the Sha Tau Kok Road were identified within the land requirement limit. Open storage of construction materials and vehicle tyre fixing and replacement services were observed within the open area (**Photo 12 and 13** in **Appendix C**). Although no sign of land contamination was observed on the ground surface, further site visits are suggested to be conducted after land acquisition and access to the area is granted to assess the land contamination potential.

The works area for the proposed ventilation building at Po Kai Tsai is currently used as open storage. It was observed during the site visit that the area is mainly used as storage of construction materials, with the land surface concrete-paved. Provided with no records of possible land contamination due to chemical spillage in the area according to EPD and FSD, it is considered that the possible land contamination within the area is low. Due to the inaccessibility of the area during the course of this assignment, it is considered further site visits are to be arranged after land acquisition to assess land contamination potential.

As observed on site, the areas involved in the construction of the proposed BCP connecting road at the east and southwest sides Fanling Highway are currently occupied by construction sites (see **Photos 7 and 8** in **Appendix C**), drainage channel, and village houses (see **Photo 9** in **Appendix C**). No sign of contamination was identified at these existing land uses.

However, a car workshop and a furniture workshop were identified near the Tai Wo Service Road East. It is observed that the land surfaces of both workshops are concrete-paved. The furniture workshop was

actually found to be used as storage during site investigation (see **Photo 10** in **Appendix C**). It is anticipated that potential of land contamination is insignificant for furniture storage. Car maintenance service was observed in the car workshop indicating certain degree of land contamination (see **Photo 11** in **Appendix C**). Due to the inaccessibility of the area during the course of this assignment, the extant of land contamination is suggested to be further assessed by site visits after land acquisition.

3.4 Prediction and Evaluation of Environmental Impacts

Based on the findings from the desktop study and the site reconnaissance survey, the current land uses, including potentially contaminative uses, within or in the vicinity of the Project area have been identified and are summarised in **Table 3.6**.

Table 3.6: Summary of Site Appraisal Results

Areas	Current Land Use	Historical Land Use	Potential Land Contamination Impact on the Project Area	Need for Further Site Investigation	Photos (in Appendix C)
Area of the proposed BCP at Chuk Yuen Village	Agricultural land, village houses, woodland	Agricultural land, village	No contaminative land uses were identified	No	1
Viaduct section that encroach onto a site occupied by an abandoned pigsty	Abandoned pigsty	Agricultural land	No adverse contaminated land impacts are identified based on site appraisal	No	2
Along viaduct section near Ping Yeung and Nga Yiu Ha	Agricultural fields, woodlands, village houses	Agricultural fields, woodlands, village houses	No contaminative land uses were identified	No	3
Site at opposite side of Ng Chow Road, Ping Che	Recycling compound of metals and plastic with storage of construction equipment	Agricultural land	Proposed viaduct will not encroach onto these existing facilities; no adverse contaminated land impacts are identified based on site appraisal	No	4
Along north tunnel under Cheung Shan	Hillside shrubland and grassland	Hillside shrubland and grassland	No contaminative land uses were identified	No	--
Works areas at Sha Tau Kok Road (near Loi Tung)	Agricultural land, horticulture, village houses, shrubland, open area, construction site office	Agricultural land, village, shrubland	Potential of land contamination at the open storage and vehicle tyre fixing and replacement services were identified	Yes after land acquisition due to current inaccessibility	5, 6, 12, 13
Ventilation building in Po Kai Tsai	Open storage, warehouse, access road	Agricultural land, bare ground	Potential of land contamination at the open storage and warehouse was identified	Yes after land acquisition due to current inaccessibility	--
Along south tunnel under Lung Shan and Lau Shui Heung	Hillside shrubland and grassland	Hillside shrubland and grassland	No contaminative land uses were identified	No	--
Sites to the east and southwest of Fanling Highway	Construction sites, drainage channel, village houses, workshops	Agricultural land, plantation, village, bare ground	Possible contaminative land uses were identified at the car and furniture workshops	Yes after land acquisition due to current inaccessibility	7, 8, 9, 10, 11

4. Site Investigation Plan

4.1 Purpose of Site Investigation

The proposed geo-environmental investigations intend to identify the presence (if any) and the extent of contamination (ground/groundwater) for the works areas of the ventilation building at Po Kai Tsai and sites to the east and southeast of Fanling Highway. A sampling and analytical programme is proposed based on the RBRGs Guidance note and the EPD's Guidance Notes. The site investigation programme will be implemented upon site access is granted and EPD endorsement, prior to the commencement of construction.

The proposed sampling locations will be reviewed when the access of sites or land acquisition is granted. Any additional locations, if needed, will be submitted to EPD for endorsement before the site investigation works begins.

Table 4.1 summarizes the review of potential contaminated sites and the corresponding sampling and analysis proposal.

Table 4.1 Summary of Potential Contaminated Sites

Location I.D.	Review of available information	Initial contamination evaluation of site(s) and possible remediation methods	Confirmation of whether the contamination problem at site(s) would be surmountable	Sampling and analysis proposal which shall ain at determining the nature and the extent of the contamination of site(s)	Schedule of submission of revised CAP (if necessary), CAR, RAP and RR upon this/these site(s) is/are accessible
Ventilation building in Po Kai Tsai	Historical land use of the area was found to be agricultural land and bareground. The area is currently used as access road, open storage and warehouse. Access of the site is currently impossible.	Initial Contamination Evaluation Potential concern due to possible industrial activities within the site. Possible Contaminants Petroleum hydrocarbons, metals and organic solvents Possible Remediation Upon the contaminated soil quantity and quality, possible remediation included: • Stabilization/solidification for heavy metals • Bioremediation for organic contaminants	During site inspection, the area was used as construction materials storage. It is not likely to cause insurmountable impacts, provided there are available and adopted remediation methods for the potential contaminants.	Due to inaccessibility of the site, specific hotspots of contamination cannot be determined during the course of this assignment. 8-10 trial pits based on a regular grid pattern are proposed at this stage.	Revised CAP Upon land acquisition and access is granted, site inspection would be carried out to identify any contaminative sources and hotspot of contamination within the site area. A revised CAP would be prepared and submitted to EPD for endorsement. CAR and Remedial Action Plan (RAP) CAR would be submitted to EPD for endorsement upon the completion of site investigation and laboratory testing. RAP would also be submitted if contamination is identified. Remediation Report(RR) A RR would be submitted to demonstrate completion of remediation works prior to the commencement of construction works.
Works sites to the east and southwest of Fanling Highway	Historical land use of the area was found to be agricultural land, plantation, village and bareground. The area is currently used as construction sites, drainage channel, village houses and workshops. Possible contaminative land uses were identified at the car and furniture workshops. Access of the sites is currently impossible.	Initial Contamination Evaluation Potential concern due to vehicle repair/maintenance activities and furniture storage/manufacturing within the sites. Possible Contaminants Petroleum hydrocarbons, metals and organic solvents Possible Remediation Upon the contaminated soil quantity and quality, possible remediation included: • Stabilization/solidification for heavy metals • Bioremediation for organic contaminants	The sites would have been used for vehicle maintenance and furniture storage/manufacturing only. It is not likely to cause insurmountable impacts, provided there are available and adopted remediation methods for the potential contaminants.	Due to inaccessibility of the site, specific hotspots of contamination cannot be determined during the course of this assignment. 0-4 trial pits based on a regular grid pattern are proposed at this stage.	

Location I.D.	Review of available information	Initial contamination evaluation of site(s) and possible remediation methods	Confirmation of whether the contamination problem at site(s) would be surmountable	Sampling and analysis proposal which shall ain at determining the nature and the extent of the contamination of site(s)	Schedule of submission of revised CAP (if necessary), CAR, RAP and RR upon this/these site(s) is/are accessible
Open area at Sha Tau Kok Road (near Loi Tung)	Historical land use of the area was found to be agricultural land, village and shrubland. The area is currently used as access road, open storage and tyre fixing and replacement services. Access of the site is currently impossible.	Initial Contamination Evaluation Potential concern due to possible industrial activities within the site. Possible Contaminants Petroleum hydrocarbons, metals and organic solvents Possible Remediation Upon the contaminated soil quantity and quality, possible remediation included: • Stabilization/solidification for heavy metals • Bioremediation for organic contaminants	During site inspection, part of the area was used as construction materials storage and tyre fixing and replacement services. It is not likely to cause insurmountable impacts, provided there are available and adopted remediation methods for the potential contaminants.	Due to inaccessibility of the site, specific hotspots of contamination cannot be determined during the course of this assignment. 0-8 trial pits based on a regular grid pattern are proposed at this stage.	

4.2 Scope of Site Investigations

The following sampling locations and depths are recommended based on the best available information acquired and have made reference to the guidelines on sampling and analysis recommended in the Guidance Notes (**Section 2.2**).

The proposed site investigation programme will be undertaken as follows in **Table 4-2**:

Table 4.2 Contaminated Land Site Investigation

Investigation Approach	**Trial Pits** (Trial pits based on a regular grid pattern are proposed at this stage. Tentative sampling locations are shown in **Figure 4.1**, **4.2** and **4.3**)
Excavation Method	Excavation will be done by preferably hand digging. Trial pits digging will be undertaken by separate hand digging tools to geotechnical investigations. Strict protocols and 'chain-of-custody' procedures will be employed to prevent cross-contamination and deterioration of recovered samples, which will include steam cleaning between each investigation location, sterilisation of sampling equipment between each depth, and the use of cool boxes for storage of recovered samples.
Provisional Depth	3m
Field/In-situ Testing	In-situ testing of Volatile Organic Carbon (VOC) using Photo Ionizing Detector (PID) (where applicable)
Sampling Method	Collect soil samples with a clean knife or spatula and placed within relevant containers or U100 samples and groundwater sample (if encountered) from each trial pit.

Soil samples will be taken to identify the potential contamination vertical profile taking into consideration the proposed excavation levels. Sub-samples will be taken from recovered undisturbed samples at nominally 0.5, 1.5 & 3.0 m below ground level (or below concrete pavement) with depth variations made to suit proposed excavation depths. Groundwater samples will be taken from the base of all trial pits (if encountered).

Field testing will encompass head space tests by use of a Photo Ionizing Detector (PID) (where applicable) to identify the presence of any potential Volatile Organic Chemicals (VOCs), and identification of any significant free-product thickness lying above the groundwater table by use of an interface meter.

4.3 Quality Assurance / Quality Control

4.3.1 Soil Sampling

Soil samples will be labelled uniquely and unambiguously. The nature of soil material sampled will be recorded at different depths. Information such as depth, sampling location and other information such as any non-standard sampling events will be recorded as well. The description of soil samples will include but not limited to:

- Test site where the sample is collected.

- Sample identification number.
- Soil sampling depth (with respect to the lowest level of concert pavement/cover, if any)
- Estimated physical characteristics
- Colour photographs

All samples will be stored in portable cool box with frozen chilled packs at 0-4℃ whilst in the field or in transit. Samples will be returned to the laboratory on the same evening as the day of sampling. A chain-of-custody form will be completed for all the samples delivered. Each sample tube will be sealed such that leakage into and out of the tube is minimized.

Strata logging for boreholes will be conducted by a qualified geologist during the drilling and sampling. The logs will include general stratigraphic description, soil sampling depth, sample notation and level of groundwater. The presence of rocks/boulders/cobbles and foreign objects (e.g. wood, metals and plastics) will also be recorded.

All equipment used for sample handling and storage will be decontaminated before and after collection of each sample. Standard procedures for cleaning the drilling rig and sampling equipment is described below:

- Clean with fresh water and lab-grade detergent (use brush if necessary) to remove particulate matter and surface film
- Rinse thoroughly with tap water (for drilling equipment) or distilled water (for sampling equipment);
- After field cleaning, the equipment will be handled by personnel wearing clean gloves to avoid re-contamination. If the equipment is not to be used immediately, it should be covered with clean plastic sheeting or put in a box to avoid re-contamination; and
- The drilling equipment and sampling equipment will be cleaned according to the above procedures between sampling holes.

4.3.2 Groundwater Sampling

If groundwater is encountered during excavation, groundwater samples should also be collected at all trial pits. The trail pit should be pumped to near dry and allowed to stand for 24 hours. Groundwater samples should then be collected using a decontaminated bucket/bailer.

Groundwater samples should be immediately transferred to new, clean, laboratory-supplied “darken” type glass jars for sample storage/transport after collection. Groundwater samples should be placed in the glass jars with zero headspace and promptly sealed with a septum-lined cap. The samples should be placed in ice chests, cooled and maintained at a temperature of about 4℃ until delivered to the analytical laboratory immediately after collection.

The floating layer will be removed/recovered and analysed separately from the main aqueous phase of the groundwater (as far as is reasonably practicable). All samples will be uniquely labelled.

Between samples, all equipment used for sample handling and storage will be thoroughly decontaminated with laboratory-grade detergent. Samples will be stored in appropriate pre-washed containers (provided by the laboratory) and immediately put in an insulated cool box. It will be ensured that the sample containers and the box are tightly closed and that sufficient chilling packs or ice are provided to maintain a temperature of 0-4℃ inside the box.

Chilled groundwater samples will be transferred to the custody of the HKOLAS accredited laboratory or one of its Mutual Recognition Arrangement Partners on the same day as sampling. A chain-of-custody system will be operated in triplicate as part of the QA/QC procedure. The accredited laboratory QA/QC procedures will be precisely followed.

4.3.3 Quality Control (QC) Samples

The following QC samples for soil and groundwater will be collected for laboratory analysis during the sampling process:

- ONE equipment blank (i.e. equipment “rinsate”) per 20 samples
- ONE field blank per 20 samples
- ONE set of duplicate sample per 20 samples

4.3.4 Health and Safety Measures

All field personnel should wear appropriate Personal Protective Equipment (PPE) while performing site investigation, such as eye goggles, masks, safety helmet, protective gloves, protective clothing, safety shoes, etc. All personnel should always maintain basic personal hygiene standard and be responsible for maintaining and storing their own PPE in a secure location before leaving the site.

Eating, drinking and smoking are prohibited within the site area. The specific safety measures to be taken depend on the site conditions, the nature and magnitude of contamination, and relevant regulations related to site safety.

4.4 Scope of Laboratory Testing

Laboratory testing will be undertaken as follows:

- The ground investigation contractor transports soil samples (or groundwater samples) in appropriate storage containers on the same day of recovery to the testing laboratory.
- Samples shall be tested at a HOKLAS accredited laboratory or one of its Mutual Recognition Arrangement partners
- All laboratory testing methods must be accredited by the HOKLAS or one of its Mutual Recognition Arrangement partners.
- The Laboratory will take relevant soil subsamples for laboratory testing.
- The Laboratory will carry out the laboratory tests as detailed in **Tables 4.3** and **4.4** below.

- The Laboratory will report laboratory test results from recovered soil/groundwater (where applicable) sampling during the site investigation period. **Table 4.3** sets out the proposed investigation and laboratory testing for the proposed site investigation.

- The accredited laboratory QA/QC procedures will be precisely followed.

Table 4.3 Laboratory Testing Methods for Soil Samples

Chemical Category	Referenced Method	Testing Parameters	"Industrial" scenario Detection Limit (mg/kg)*	Laboratory Limit of Reporting (mg/kg)
Petroleum Carbon Ranges	USEPA 8260/8015	C_6-C_8	1.00E+04	5.0
		C_9-C_{16}	1.00E+04	200
		C_{17}- C_{35}	1.00E+04	500
Volatile Organic Chemicals (VOCs)	USEPA 8260	Benzene	9.21E+00	0.5
		Toluene	1.00E+04	0.5
		Ethylbenzene	8.24E+03	0.5
		Xylene (Total)	1.23E+03	2.0
Semi-Volatile Organic Chemicals (SVOCs)	USEPA 8270	Anthracene	1.00E+04	0.5
		Benzo(a)pyrene	9.18E+00	0.5
		Phenanthrene	1.00E+04	0.5
		Fluoranthene	1.00E+04	0.5
		Napthalene	4.53E+02	0.5
		Pyrene	1.00E+04	0.5
	USEPA 8270	Phenols	1.00E+04	0.5
Heavy Metals	USEPA 6020	Copper (Cu)	1.00E+04	1.0
		Lead (Pb)	2.29E+03	1.0
		Zinc (Zn)	1.00E+04	1.0
	APHA 3500CR: D (By subtracting Cr^{6+} from total Cr	Chromium III (Cr^{3+})	1.00E+04	1.0
	APHA 3500CR: D	Chromium VI (Cr^{6+})	1.96E+03	1.0

* Detection limits under currently HOKLAS accredited scheme may differ from the RBRG criteria detection limits

Table 4.4 Laboratory testing methods for groundwater samples

Parameter	Reference Method	Testing Parameters	"Industrial" Scenario Detection Limit (mg/L)*	Limit of Reporting (mg/L)
Petroleum Carbon Ranges	USEPA 8015 and 8260	C6-C8	1.15E+03	0.2
		C9-C16	9.98E+03	0.5
		C17- C35	1.78E+02	0.5
Volatile Organic Chemicals (VOCs)	USEPA 8260	Benzene	5.40E+01	0.005
		Toluene	1.00E+04	0.005
		Ethylbenzene	1.00E+04	0.005
		Xylene (Total)	1.57E+03	0.2
Semi-Volatile Organic Chemicals (SVOCs)	USEPA 8270	Anthracene	1.00E+04	0.002
		Phenanthrene	1.00E+04	0.002
		Fluoranthene	1.00E+04	0.002
		Napthalene	8.62E+02	0.002
		Pyrene	1.00E+04	0.002

* Detection limits under currently HOKLAS accredited scheme may differ from the RBRG criteria detection limits

4.5 Interpretation of results and reporting

As the potential land contamination sites involve storage of construction materials, vehicle maintenance and storage of furniture, “industrial” scenario under RBRG standard will be applied and the detection limit is included in **Table 4.4**.

Laboratory test results will be mainly assessed against EPD’s RBRGs requirements, which will be adopted for soil and groundwater risk assessment. If any chemicals, which are not listed in the RBRG list, were found, the relevant USEPA risk-based screening level will be adopted for soil and groundwater risk assessment respectively.

The assessments of potential contamination will be presented in a Contamination Assessment Report (CAR) and, if necessary, a Remediation Action Plan (RAP), for approval by EPD.

5. Conclusion

In accordance with the requirement set out in Clause 3.4.8.1(iv) of the EIA Study Brief, this updated Contamination Assessment Plan is prepared due to the further refining of the alignment section at Sha Tau Kok Road for submission to DEP for endorsement.

An investigation into the current and historical land uses in respect to the potential land contamination has been undertaken, including a desktop study and a reconnaissance survey. Based on the findings of the site appraisal on the existing and historical land uses in the Study Area, adverse land contamination impacts associated with the construction and operation of the proposed project are not anticipated except at the open area at Sha Tau Kok Road, work areas of ventilation building in Po Kai Tsai and sites to the east and southwest of Fanling Highway. No site investigations and laboratory chemical analysis can be carried out during the course of this assignment due to inaccessibility of these sites. Further site investigation is therefore proposed upon land acquisition and site access is granted.