

查詢電話
 UR REF: (28) in AX(3) to EP2/G/A/124 (pt.4)
 傳真號碼
 OUR REF: C/HSD/SCL-NSL1/E1005/#040059
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By Post and Fax (fax: 2145 4269)
 11 March 2010

MTR Corporation Limited
 MTR Headquarters Building,
 Telford Plaza, Kowloon Bay,
 Kowloon, Hong Kong
 (Attn: Mr. Richard KWAN, Manager – Environmental)

Sustainability Development Department	
SP#	
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Dear Mr. Kwan,

Shatin to Central Link – Cross Harbour Section
(Phase I – Mong Kok East to Hung Hom) EIA Study Brief (ESB-192/2008)
Supplementary Contamination Assessment Plan (Version A)

I refer to your referenced letter dated 19.2.2010, submitting a copy of the Supplementary Contamination Assessment Plan (Version A) for our agreement as per Section 3.4.5.4 of the EIA Study Brief No. ESB-192/2008.

2. For the avoidance of doubt, I extract the relevant requirements of the concerned EIA Study Brief as follow:

3.4.5.4 – *During the course of the EIA study, the Applicant shall submit a Contamination Assessment Plan (CAP) to the Director for endorsement prior to conducting the contamination impact assessment of the relevant land or site(s). The CAP shall include proposal with details on representative sampling and analysis required to determine the nature and the extent of the contamination of the relevant land or site(s).*

3. Agreement on the Contamination Assessment Plan (CAP) (Version C) for Shatin to Central Link – Cross Harbour Section (Phase I – Mong Kok East to Hung Hom) has been granted on 8.10.2009 [ref : (12) in AX(3) to EP2/G/A/124 (pt.3)]. As a supplement to the

approved CAP, this Supplementary Contamination Assessment Plan (Version A) is prepared due to some proposed changes in sampling and testing plan at Area 2 and for the inclusion of the Mong Kok Freight Terminal (MFT) as a new works area.

4. Please note that our views /comments on the Supplementary Contamination Assessment Plan (Version A) for Shatin to Central Link - Cross Harbour Section (Phase I - Mong Kok East to Hung Hom) are only provided for the partial fulfillment of the specific requirements for agreement stipulated in the above-mentioned EIA study brief clauses and shall not pre-empt our future decisions to the EIA report approval process for the Shatin to Central Link - Cross Harbour Section (Phase I - Mong Kok East to Hung Hom) EIA under the EIA Ordinance. Our views below shall not absolve your responsibility to fulfill requirements in other statutory legislation.

5. Subject to the above caveats, I confirm that we have no comment on (i) the proposed changes in sampling and testing plan at Area 2 presented in Table 5.1; and (ii) the findings and conclusions of the site inspection for Area 5 (i.e. the additional works area in MFT) presented in the Supplementary Contamination Assessment Plan (Version A). However, please be reminded that the sampling and testing plan proposed for all other areas should be implemented in accordance with the previous approved CAP (Version C).

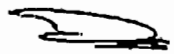
6. As indicated at Table 4.3 and Figure NEX2213/C/361/ENS/M57/504A of this Supplementary Contamination Assessment Plan (Version A), a new railway track will be built along the eastern side of site 5-01. Your attention is drawn to our letter [ref : (13) in AX(3) to EP2/G/A/124 (pt.4)] dated 30.11.2009, cautioning that if there is any key change in the project details and project scope during the course of the EIA study, you shall observe the requirement of clause 6.2 of the EIA Study Brief (No. ESB-192/2008) and seek our confirmation in writing. The newly identified railway track fulfils this requirement and shall be addressed by MTRC at the earliest opportunity.

7. For the avoidance of doubt, clause 6.2 of the EIA study brief is extracted as follow:

6.2 - *If there is any key change in the scope of the Project mentioned in Section 1.2 of this EIA study brief and in Project Profile (No. PP-357/2008), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA study brief can still cover the key changes, and the additional issues, if any, that the EIA study must also address. If the changes to the Project fundamentally alter the key scope of the EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief.*

8. Furthermore, whether or not this new railway track construction, and any other related works, at the existing MFT, a "goods yard" indicated in Drawing SCL(1)-G25 of the

2nd draft gazettal documents of the Shatin to Central Link, may constitute material change to an exempted Designated Project shall be assessed and clarified. If considered affirmative by the authority, the environmental impact due to the proposed changes shall be fully addressed by the future EIA report.



(Desmond CHAN)
Project Engineer (Metro Assessment)
for Director of Environmental Protection

c.c. Internal S(RA)4

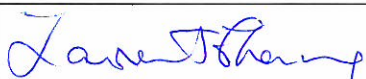
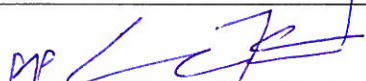
MTR Corporation Limited

**Shatin to Central Link -
Consultancy Agreement No. NEX/2213**

**Environmental Impact Assessment
(EIA) for Cross Harbour Section**

**Supplementary Contamination Assessment
Plan for Phase I –
Mong Kok East to Hung Hom**

Feb 2010

	Name	Signature
Prepared & Checked:	Laurent Cheung	
Reviewed & Approved:	Freeman Cheung	

Version:	A	Date:	12 Feb 2010
<p>The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and AECOM Environment accepts no responsibility for its use by others.</p> <p>This report is copyright and may not be reproduced in whole or in part without prior written permission.</p>			

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**Important Message
Rebranding as AECOM**

To better serve our clients, all Maunsell AECOM operations in Hong Kong have been integrated into one operating entity and rebranded as AECOM. The ENSR Asia (HK) Limited operation is now part of AECOM Asia Co. Ltd.

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1. INTRODUCTION

- 1.1 A Contamination Assessment Plan (CAP) for North South Line (NSL) Phase I under the Shatin to Central Link (SCL) has been prepared and was approved by the Environmental Protection Department (EPD) under the EIA Study Brief (ESB) No. ESB-192/2008 on 8 October 2009. The overall project layout based on the latest design is shown in **Figure no. NEX2213/C/361/ENS/M50/001**. During the preparation of the CAP, some land lots/ facilities within the development area were not fully surveyed and/ or assessed due to site constraints and current land use. Site investigation (SI) for potentially contaminated areas is, therefore, divided into two stages. Stage 2 SI is proposed to be carried out after decommissioning of the relevant facilities and prior to the commencement of the constructions works at respective sites. The majority of the facilities under Stage 2 SI are located in the covered section of Hung Hom Freight Terminal (HFT) as shown in **Figure no. NEX2213/C/361/ENS/M57/009, 010 and 012** extracted from the approved CAP in **Appendix A**.
- 1.2 To facilitate the overall Project program and potential remediation works (if contamination is detected through the SI), the Stage 2 SI is proposed to be advanced at sites within MTR property including the locomotive traverser, railway tracks, and the locomotive running shed along with its supporting facilities (e.g. the aboveground lubricating oil tank) in Area 2. The location of these areas is described in detail in the approved CAP. In this respect, part of the Stage 2 SI will be conducted prior to facility decommissioning and the sampling locations will therefore be relocated and assessed in this supplementary CAP, with the updated sampling and testing schedules based on the current site conditions. This advanced Stage 2 SI will be referred to as Post-Stage 1 SI in this report.
- 1.3 A new works area, Mong Kok Freight Terminal (MFT) located in Mong Kok East, as shown in **Figure no. NEX2213/C/361/ENS/M57/504A**, is included in the updated site layout plan. This area was not covered in the approved CAP and is therefore assessed in this supplementary CAP to identify any potential contamination.
- 1.4 This supplementary CAP is prepared to summarise the findings of further site appraisal at sites specified in Sections 1.1 through 1.3, as a supplement to the approved CAP. Supplementary Contamination Assessment Reports (CARs) and if contamination is found, a Remediation Action Plan (RAP) should be submitted to EPD for endorsement prior to the commencement of construction works at the respective site(s).

2. ENVIRONMENTAL LEGISLATION, STANDARDS AND GUIDELINES

- 2.1 Assessment of land contamination sources shall be conducted in accordance with the approved CAP as well as environmental standards and non-statutory guidelines recommended in the approved CAP which mainly include “*Guidance Note for Contaminated Land Assessment Remediation*” (Guidance Note 1) and “*Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshop*” (Guidance Note 2) issued by EPD. In addition, the Risk Based Remediation Goals (RBRGs) stipulated in the “*Guidance Manual for Use of Risk-based Remediation Goals for Contamination Management*” (The Guidance Manual) issued by EPD shall also be adopted as the criteria for assessing soil and groundwater contamination.

3. ADDITIONAL ASSESSMENT AREA

- 3.1 According to the latest information provided by MTR, MFT will be included as an additional works area under Phase I. To be consistent with the nomenclature system of the approved CAP, this additional assessment area, mainly covering Grand Century Place shopping mall and the Mong Kok East station, was named as Area 5. Works areas within Area 5 are listed in **Table 3.1** below.

Table 3.1 Works Area in Area 5 (Mong Kok Freight Terminal)

Land Ref. No.#	Location	Brief Description	Figure Reference
NSL-MTR-022	Northern section of Area 5, mainly covering the Grand Century Place	<ul style="list-style-type: none"> Tentative works area for modification of the existing goods yard at Grand Century Place 	NEX2213/C/361/ENS/M57/504A
NSL-MTR-021	Southern section of Area 5, south of the Grand Century Place	<ul style="list-style-type: none"> Tentative works site for modification of existing railway facilities 	NEX2213/C/361/ENS/M57/504A

#: As provided by MTR. The Land Ref. No. shall be revised as per any amendments to the scheme.

4. SITE APPRAISAL

Regional Geological Setting

- 4.1 The regional geological setting of Area 2 within the HFT has been covered in the approved CAP.
- 4.2 A review of the Hong Kong Geological Topography (Series: HGM20) – Sheet No. 11, 1: 20,000 Scale (1996) indicates that the regional geological conditions in Area 5 is likely to consist predominantly of medium grained granite bedrock (Jurassic-Cretaceous aged), with coverage of Quaternary-aged debris flow deposits (sand/ silt, gravel, cobbles and boulders; unsorted) present over a small area immediately west of this area.
- 4.3 Reviews of previous Ground Investigation (GI) reports were conducted at the Civil Engineering and Development Department's (CEDD's) Geotechnical Information Library to obtain information regarding the geological conditions at or in the vicinity of the Assessment Area. The GI reports reviewed are listed below:
- P.W.D. Contract No. 402181 Site Investigation Hong Kong and Kowloon (Term Contract) Final Report, Site Investigation Transport Interchange at Mong Kok Station, Works Order No. Q7/2/6.85 (1982) (CEDD's Geotechnical Information Unit Report No. 3261)*
 - Kowloon – Canton Railway Corporation Contract No. 2/IWM/1993 Noise Mitigation Measures, Site Investigation Final Report (Volume I) (1993) (CEDD's Geotechnical Information Unit Report No. 17777)*
 - Terms of Contract No.2/GCO/83, Works Order No. PW7/2/09.190, Additional Site Investigation; KCR, Construction of Mong Kok Goods Yard, Area Reference: 11NW14D6, D9, 11NW19B, 19B6 (1985) (CEDD's Geotechnical Information Unit Report No. 5979)*
 - Terms of Contract No. 2/GCO/1983, Works Order No.: PW7/2/9.115, Site Investigation Mong Kok Goods Yard, Area Reference: 11NE12A3 (1984) (CEDD's Geotechnical Information Unit Report No. 5577)*
- 4.4 Review of these reports indicated that no reclamation history was related to Area 5 within MFT. The majority of this area is covered by a layer of fill material composed of silty sand and gravel of approximately 1.5 m thick; underlying that is silty to coarse sand approximately 10-20 m thick. Moderately to slightly decomposed granite was likely to be present beneath the coarse sand.

Site Inspection and Appraisal

Sources of Historical Information

- 4.5 A review of historical information relating to Area 2 within HFT has been covered in the approved CAP. Historic information review is thus only undertaken for the additional works area, Area 5, in this supplementary CAP. Site inspection was carried out for both areas for the purpose of this report.

Sources of Historical Information

- 4.6 The assessment involved an initial review of the current and historic land use of all works areas along the construction profile.
- 4.7 A review of aerial photographs obtained from the Survey and Mapping Office, Lands Department was also undertaken. The aim of the review was to identify those lands within the project area which may have been contaminated through previous land uses. A list of aerial photographs which have been reviewed for Area 5 is provided in **Table 4.1**.

Table 4.1 Review of Aerial Photographs for Area 5

Year	Height (Feet)	Photograph Reference Number
1945	20000	4153
1961	30000	88
1976	2000	15262
1992	3000	CN3093
1996	4000	CN13585
2007	6000	CS05989

Source: Survey and Mapping Office, Lands Department

- 4.8 The existing land uses of the ground level of the inspected areas include low- and high-rise buildings, a railway station, open space and planted areas.

Review of Historic and Current Land Uses

- 4.9 The northern part of Area 5 was mainly mountainous and was scattered with low-rise houses in 1945 while the southern part mainly included low-rise buildings and planted areas. The area then became vacant in 1961, and a major portion was later converted into an open space during 1976 to 1992. Building structures were noted in 1992 but those structures in the northern section were later demolished and became a works site. In 1996, a high-rise structure was noted in the northern section (Grand Century Place Blocks 1 and 2) and low-rise buildings currently occupied by Mongkok Government Offices and attached to the MKK station were observed in the southern section. No major land use changes were noted since then.

Site Inspection

- 4.10 A further site inspection at Area 2 was conducted on 23 December 2009. Facilities revisited were the locomotive traverser, the locomotive running shed and its ancillary facilities, and the railway tracks through the HFT. Results of this site inspection in comparison with the previous ones are listed in **Table 4.2** and illustrated in **Figure nos. NEX2213/C/361/ENS/M57/501A** through **NEX2213/C/361/ENS/M57/503A**. Site IDs for Area 2 were adopted from the approved CAP for consistency and easy reference.
- 4.11 Since drillholes are not permitted within the underground storage tank (UST) area (Site ID 2-05) northeast of the locomotive running shed, and no alternative locations can be proposed, sampling and testing at HUH-8 and HUH-10 (**Figure no. NEX2213/C/361/ENS/M57/501A**) will be conducted under the Stage 2 SI, as scheduled in the approved CAP.
- 4.12 Site inspection for Area 5 was undertaken on 23 December 2009 at MTR's Mong Kok Goods Yard. At the time of the inspection, the area was mainly used as storage for drinks by Carlsberg Group. Sites identified with potentially contaminating land use are indicated in **Table 4.3** and illustrated in

Figure no. NEX2213/C/361/ENS/M57/504A. For easy reference, a unique Site ID has been assigned to the sites in this area.

Table 4.2 Findings from the Further Site Inspection at Area 2 in Hung Hom Freight Terminal

Site ID (Description)	Approximate Area of the Site (m ²)	SI Proposed in the Approved CAP	Further Site Inspection Results	SI Proposed in the Supplementary CAP and Justification	Figure Reference
2-02 (Locomotive traverser)	<ul style="list-style-type: none"> • Total area occupied by the locomotive traverse: ~800 m² • Area of this site overlapping the cut & cover works area: < 100 m² 	<p>This site was in operation at the time of the site inspection. It was identified as a potentially contaminated area based on the observation of oil stains onsite and its historic land use.</p> <p>A sampling location (HUH-1) was proposed at the eastern side of the traverser.</p>	<p>The locomotive traverse transports and reverses the locomotive by moving between the tracks onsite. Due to the mechanical design of the traverser, it stops approx. 1 m from the eastern end of the site that overlaps the NSL cut & cover area.</p> <p>The headspace around this facility is about 4.8 m.</p> <p>The method of SI will be decided upon the confirmation from the operation staff.</p>	<p>The drillhole proposed under the approved CAP is suggested to be shifted to the southern edge of this site where SI will not disturb its operation.</p>	NEX2213/C/361 /ENS/M57/502A

Site ID (Description)	Approximate Area of the Site (m ²)	SI Proposed in the Approved CAP	Further Site Inspection Results	SI Proposed in the Supplementary CAP and Justification	Figure Reference
2-04 (Locomotive running shed)	<ul style="list-style-type: none"> Total area occupied by this facility ~1,100 m² Area of the workshop: ~200 m² Area of the locomotive maintenance area: ~800 m² Area of the chemical waste storage area: ~15 m² 	<p>This site was in operation at the time of the site inspection. Based on the historic and current land use, three hotspots were identified within it, namely the mechanical workshop, the locomotive maintenance area and the chemical waste storage area.</p> <p>A total of six sampling locations were proposed:</p> <ul style="list-style-type: none"> Workshop: HUH-2 (inside) and HUH-9 (outside) Servicing area: HUH-3, HUH-5 Chemical storage area: HUH-4 Waste oil storage area: HUH-6 	<p>This facility was in operation at the time of the further site inspection. According to the site personnel, it will be in operation until being demolished.</p>	<p>Based on the confirmation from the site personnel no drillhole shall be permitted within the premises (Sites 2-04, 2-06 and 2-07), a total of seven new SI locations are proposed around the perimeter of the Locomotive running shed to replace the old ones in the approved CAP.</p> <p>Based on the further site inspection and practical site constraints (e.g. entrance size, space for drilling machine), two SI locations were proposed at the upstream (north/ northwest) of these facilities; five downstream (south/ southeast) of the facilities.</p> <p>The proposed drillholes surrounding the running shed are deemed sufficient to investigate the potential for contamination at Sites 2-04, 2-06 and 2-07</p>	NEX2213/C/361 /ENS/M57/501A

Site ID (Description)	Approximate Area of the Site (m ²)	SI Proposed in the Approved CAP	Further Site Inspection Results	SI Proposed in the Supplementary CAP and Justification	Figure Reference
2-06 (Aboveground tank for lubricating oil storage)	~10 m ²	This site was in operation at the time of the site inspection. It was identified as a potentially contaminated area based on the review of its historic information and current land use. SI was proposed at the site (ETT102) and has been completed under Stage 1. All sample results indicated compliance. However, it should be noted that based on the analytical results, the concentration of longer-chained TPH (e.g. C9-C35) increased with the sampling depth, even though the detected level is lower than the relevant RBRGs. Further SI (i.e. borehole) was, therefore, recommended for this location under Stage 2 in the relevant CAR.	SI for this site under Stage 1 has been completed and the sampling location has been backfilled at the time of this further site inspection. No borehole could be drilled exactly at this site for further SI, due to site constraints (space) and current land use (tank under operation).	Refer to 2-04	NEX2213/C/361 /ENS/M57/501A
2-07 (Pumping areas west of the locomotive running shed)	Area of the pumping areas west of the locomotive running shed: ~10 m ²	This site was in operation at the time of the site inspection. Based on the site observation and review on the land use, it was identified as a potentially contaminated area. SI has been proposed at this site (HUH-7) in the approved CAP.	This facility was in operation at the time of the further site inspection. It will be in operation until being demolished. According to the confirmation from the facility personnel, no drillholes shall be permitted inside this facility.	Refer to 2-04	NEX2213/C/361 /ENS/M57/501A

Site ID (Description)	Approximate Area of the Site (m ²)	SI Proposed in the Approved CAP	Further Site Inspection Results	SI Proposed in the Supplementary CAP and Justification	Figure Reference
2-05 (Underground storage tanks, USTs)	~150 m ²	This site was in operation at the time of the site inspection. Three sampling locations were proposed: <ul style="list-style-type: none"> • Northwest of the USTs: 2209/SCL/EDH246 (drillhole). It was later changed to a trial pit due to underground utilities. SI for this sampling location has been completed and the trial pit backfilled. • West of the USTs: HUH-8 • Southeast of the USTs: HUH-10 	This facility was in operation at the time of the further site inspection. According to the site personnel, it will be in operation until being demolished.	SI for HUH-8 and HUH-10 as proposed in the approved CAP will be conducted during the SI under Stage 2 (after decommissioning of the facility).	NEX2213/C/361 /ENS/M57/501A

Site ID (Description)	Approximate Area of the Site (m ²)	SI Proposed in the Approved CAP	Further Site Inspection Results	SI Proposed in the Supplementary CAP and Justification	Figure Reference
2-08 (Railway tracks)	<ul style="list-style-type: none"> • Mainly railway tracks G10, G12, G13, G15, G17 and G18 are covered in this area, which will be a cut & cover construction site for this Project. • Total area covered: ~ 15,000 m² 	<p>This site was in operation and was not fully accessed and surveyed at the time of the site inspection. Based on the site observation, current land use and historic information review, five SI locations (RWT-1 through RWT-5) were proposed on a 100 m x 100 m grid for this site.</p>	<p>This site was fully accessed during the further site inspection.</p> <p>According to the site personnel, the height of overhead cables in this site is about 5 m.</p> <p>As reported by the Geotechnical Team of MTR, all previously proposed boreholes in this area were rejected by the Railway Protection Engineer (RPE) due to current land use (railway operations) and safety considerations. However, trial trenches inside the track area were possible, as informed by the site personnel.</p>	<p>Within the undercover railway tracks (G10, G12, G13, G15, G17, and G18) in HFT, trial trenches are now proposed to be excavated down to the water table (approx. 2.5 – 3 m bgs, based on SI results under Stage 1) in order to investigate the potential for contamination resulting from historical hydrocarbon leaks from trains and other vehicles in the area.</p> <p>Given that the investigation target is the presence of hydrocarbon contamination, which in its non-aqueous form will float on top of the water table and when dissolved into groundwater normally migrates at the top of the water column, the usage of trial trenches which intercept the top of the groundwater is considered an appropriate investigative technique to assess the presence of contamination in the railway tracks area.</p> <p>Changed locations in this facility can be referred to in the related figure.</p>	NEX2213/C/361 /ENS/M57/503A

Table 4.3 Findings of the Site Inspection for Area 5 in Mong Kok Freight Terminal

Land Ref. No.	Site ID	Historical Land Use	Current Land Use*	Site Appraisal Results	Necessary for Further Site Investigation?	Justification and Hotspots Identified	Figure Reference
NSL-MTR-022 and NSL-MTR-021	5-01	Vacant area, open storage, building structures, planted area	MTR goods yard operated by Carlsberg Group	<ul style="list-style-type: none"> According to the site personnel, this goods yard has been in operation for more than 10 years. It was initially occupied by Hop Cheong Paper Co. Ltd. (合昌紙行有限公司) for approx. 8-9 years as storage for paper and stainless steel. The site was then used as an open storage for non-liquid goods for more than 10 years. Storage of chemicals is not permitted onsite. At the time of the site inspection, Carlsberg Group has been occupying this site for approximately a year, as informed by the site personnel. The goods yard is currently used by Carlsberg Group mainly for storage of drinks (mainly beer) and containers, and as areas for loading and unloading. A mechanic workshop on concrete about one meter above ground was observed located on the western portion of this site. According to the site personnel, this workshop is mainly for the maintenance of storage equipment maintenance by Carlsberg Group. A temporary area for forklift mechanical maintenance was observed near the workshop. According to the site personnel, all forklifts in this goods yard are electricity-powered since Carlsberg Group's occupancy; battery charging for the forklifts is carried out above ground level. Two chambers for Liquefied Petroleum Gas (LPG) storage were found on the southwestern part of the site. Approx. 20 full LPG cylinders (approx. 16 kg each) were stored in the northern chamber at the time of the site inspection; according to the site personnel, the southern chamber is only used for storage of empty 	No	<p>No adverse contaminated land impacts are identified based on site appraisal.</p> <p>A new railway track will be built along the eastern side of this site; no significant soil excavation is expected to be involved.</p>	NEX2213/C/361/ENS/M57/504A

Land Ref. No.	Site ID	Historical Land Use	Current Land Use*	Site Appraisal Results	Necessary for Further Site Investigation?	Justification and Hotspots Identified	Figure Reference
				<p>cylinders.</p> <ul style="list-style-type: none"> • 3-5 buckets (approx. 5 L each) of ethanol were found stored on a shelf above the concrete-paved ground near the southern tip of this goods yard. A drum (approx. 200 L) of propylene glycol, an additive in food/ drug and coolant for beer glycol jacketed fermentation tanks, was observed next to the ethanol buckets. • Southeast of the above ethanol and propylene glycol, a temporary cleaning area was found, for the purpose of cleaning the beer containers using water prior to export. No chemical suspected to cause land contamination were observed onsite. • This site, entirely concrete-paved, is in a clean and tidy condition, with no observable oil stains or detected hydrocarbon odour. 			

Other Relevant Information

- 4.13 In order to evaluate the potential land contamination concerns from previous land uses, inquiries were made to the Environmental Protection Department (EPD), Fire Services Department (FSD) and the Lands Department (LandsD) on 5 January 2010 for:
- i. records on any chemical and chemical waste releases within the Additional Assessment Area,
 - ii. records of current and past registration of dangerous goods storages and reported accidents of spillage/leakage at the Additional Assessment Area, and
 - iii. historical land uses of the Additional Assessment Area.
- 4.14 The inquired government departments, i.e. EPD, FSD and LandsD, have not yet responded during the time of the submission of this report. This section will be updated as soon as the reply is obtained from these bodies.
- 4.15 Historical land use information was gathered through reviews of aerial photographs of the potential contaminated areas.
- 4.16 Standard Form Table 3.1 adopted from EPD's Guidance Manual summarising the past, current and future land uses of the potentially contaminating sites is provided in **Appendix B**.

5. SAMPLING PLAN FOR SITE INVESTIGATION

Sampling Locations

- 5.1 Based on information from the approved CAP and results of the further site inspections at Area 2, a total of 9 boreholes and 4 trial pits are proposed in three major facilities (locomotive traverser, locomotive running shed and the railway tracks in Area 2), as a replacement of the proposed SI locations in the approved CAP. The location plans of the proposed Site Investigation (SI) sampling locations are illustrated in **Figure nos. NEX2213/C/361/ENS/M57/501A** through **NEX2213/C/361/ENS/M57/503A**.
- 5.2 No intrusive SI is proposed for Area 5, based on the site appraisal results.

Sampling Parameters

- 5.3 Chemicals of concern (COCs) recommended for laboratory analysis at each of the relocated sampling locations are based on the proposed sampling and testing plan from the approved CAP and the further site inspection. Reference is made to Guidance Notes 1 and 2 and the Guidance Manual. Where the desktop review and site investigation observed historical land use of a specific industry type, reference was also made to **Appendix C** "*Chemical Contaminants Listed by Industry Type*" of Australian Standard 4482.1-1997 "*Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*".
- 5.4 To be conservative, testing parameters for the relocated sampling locations around the perimeter of the locomotive running shed will generally include both the originally proposed parameters for the workshops and the locomotive servicing area (i.e. lead, chromium copper, BTEX, TPH, PAHs, VOCs and SVOCs).
- 5.5 The exact sampling locations of the SI shall be determined onsite and subject to fine adjustments due to site-specific conditions (e.g. headspace, presence of foundations, underground utilities, delivery pipes and services) and approval from relevant operation staff/ engineers.

- 5.6 If unexpected contamination is observed during the SI (i.e. extensive contamination observed beneath the removed concrete), an increased number of sample locations, sample depths or number of analytes would be recommended to MTR in order to further investigate the extent of contamination present. However, further investigation will only be undertaken upon MTR's written authorisation.
- 5.7 The testing locations, basis for further investigation, investigation techniques, proposed number of samples, together with the analytical regime is summarised in **Table 5.1**.
- 5.8 The sampling and testing plan is detailed in **Appendix D**.

Table 5.1 Changes in Sampling and Testing Plan at Area 2 in Hung Hom Freight Terminal

Site ID (Description)	Hotspot Identified (Based on the Approved CAP)	Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP)	Sampling Method (Based on This Supplementary CAP)	Sample Matrix (Based on This Supplementary CAP)	Parameters to Be Tested (Based on This Supplementary CAP)	Figure Reference	
2-02 (Locomotive traverser)	Locomotive traverse and the ground underneath Total approx. area ~800 m ² ; approx. area within the cut & cover area where excavation is expected: <100 m ²	HUH-1a : at the edge of the site due to current land use and site constraints (Original location under Stage 2 SI: HUH-1 at the centre of the site)	Borehole	Soil	<ul style="list-style-type: none"> Borehole: soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m 	Lead, BTEX, TPH, PAHs	NEX2213/C/3 61/ENS/M57/501A
				GW	One GW sample per location if encountered	BTEX, TPH, PAHs	
Locomotive running shed (LRS) and its affiliating facilities 2-04 (LRS), 2-06 (Aboveground lubricating oil tank), and 2-07 (Pumping area)	<u>LRS</u> : Total approx. area of this site: ~1,100 m ² The following potential hotspots identified are all located inside the Locomotive running shed: <ul style="list-style-type: none"> Workshop: ~ 300 m² Servicing area: ~500 m² Chemical storage: ~20 m² Waste oil storage: ~20 m² <u>Above ground lubricating oil tank</u> : Approx. area 10 m ² <u>Pumping area (west of LRS)</u> : Approx. area of 10 m ²	A total of seven boreholes (two up hydraulic gradient and five down hydraulic gradient) are proposed around the LRS. HUH-2a : northwest and upstream of LRS HUH-3a : north and upstream of LRS HUH-4a : upper southeast and downstream of LRS HUH-5a : lower south and downstream of LRS HUH-6a : south of LRS HUH-7a : lower	Borehole	Soil	Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m	Lead, Chromium, Copper, TPH, VOCs, SVOCs	NEX2213/C/3 61/ENS/M57/502A
				GW	One GW sample per location if encountered	TPH, VOCs, SVOCs	

Site ID (Description)	Hotspot Identified (Based on the Approved CAP)	Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP)	Sampling Method (Based on This Supplementary CAP)	Sample Matrix (Based on This Supplementary CAP)		Parameters to Be Tested (Based on This Supplementary CAP)	Figure Reference
		southwest and downstream of LRS HUH-8a: upper southwest and downstream of LRS (Original locations under Stage 2 SI: HUH-2 and HUH-9 for the workshop; HUH-3 and HUH-5 for the servicing area; HUH-4 for the chemical storage; HUH-6 for the waste oil storage area, and HUH-7 for the north dispenser)					
2-08 (Railway tracks)	Railway tracks Total approx. area: 15, 000 m ² (within the future cut & cover works area)	Sampling (RWT-1a through RWT-5a) generally based on a 100 m x 100 m grid. (These proposed sampling locations have been slightly shifted as compared to approved CAP due to site constraints.) (The original locations under Stage 2 SI: five sampling locations based on 100 m x 100 m grid pattern, between two neighbouring	Trial pit (for all locations in this site except RWT-3a, due to overhead constraints)	Soil Soil samples at depths of 0.5, 1.5 and 3.0 m bgs Since this site is within the works area and partly within the hoarding area where excavation/ ground works are expected, visual inspection should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation.	One GW sample per location if encountered.	Lead, BTEX, TPH, PAHs BTEX, TPH, PAHs	NEX2213/C/3 61/ENS/M57/ 503A

Site ID (Description)	Hotspot Identified (Based on the Approved CAP)	Proposed Sampling Location/ Sampling ID (Original Locations under Stage 2 SI in the Approved CAP)	Sampling Method (Based on This Supplementary CAP)	Sample Matrix (Based on This Supplementary CAP)		Parameters to Be Tested (Based on This Supplementary CAP)	Figure Reference
		railway tracks of G10, G12, G13, G15, G17 and G18)	Borehole (for RWT-3a only)	Soil	Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m	Lead, BTEX, TPH, PAHs	
				GW	One GW sample per location if encountered.	BTEX, TPH, PAHs	

Remarks:

1. bgs: below ground surface; GW = groundwater
2. VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
3. BTEX = *Benzene, Toluene, Ethylbenzene* and *Xylene*.
4. PAHs = The whole of COCs listed under group of SVOCs in the RBRGs Table except *bis-(2-Ethylhexyl)phthalate, Hexachlorobenzene* and *Phenol*. Since RBRGs value of *Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene* and *Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in groundwater sample.
5. Since the RBRGs value of *Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, bis-(2-Ethylhexyl)phthalate, Dibenzo(a,h)anthracene* and *Indeno(1,2,3-cd)pyrene* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
6. If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

Soil Sampling Method and Depth of Sampling

- 5.9 All soil boring / excavation and sampling should be supervised by a land contamination specialist.
- 5.10 Boreholes should be advanced by means of dry rotary drilling method, i.e. without the use of flushing medium as far as applicable. For safety reasons, an inspection pit should be excavated down to 1.5 m below ground to inspect for underground utilities at the proposed borehole location. If necessary, other forms (e.g. ground penetration radar, metal detection) of utilities checking should be performed to ensure clearance of underground structures. Disturbed soil samples should be collected at the depth of 0.5 m below ground surface (bgs), and 1.5 m bgs if inspection pit was excavated.
- 5.11 In areas with no excavation works not more than 6 m of soil boring should be undertaken to a depth of 6.0 m bgs. For sites where excavation deeper than 6 m is planned, drilling should be undertaken to the specified depth or upon encountering bedrock, whichever is shallower.
- 5.12 Soil boring using drill rigs should then be performed to 1 m to the maximum boring depth. Undisturbed soil samples shall be collected by sampler (e.g. U100/U76) made of stainless steel or other materials considered appropriate at 0.5 m, 1.5 m, 3 m and 6 m bgs and at 3 m intervals for deeper excavations. Where there are suspected signs of contamination, extra samples should be taken for laboratory analysis. If there are any spatial and/ or headroom constraints for the proposed borehole(s), trial pit(s) should be considered as an alternative to collecting the soil samples.
- 5.13 At each sampling location/ depth, sufficient quantity of soil sample (as specified by the laboratory) should be taken. All soil samples should be uniquely labelled and documented on a Chain of Custody form. Backup samples should be retained and stored at 0 - 4 °C in laboratory. Guidelines on sample size and handling for soil sample are given in **Table 5.2** below.

Table 5.2 Guidelines of Sample Size and Handling for Soil Sample

Matrix			Soil		
Container Per Sample			Parameters	Preservation	Temperature
No. of Bottles	Size	Type			
1	1 kg	Amber Glass	Full list of metals, VOCs & SVOCs, PAHs, TPH, MTBE, BTEX, cyanide	None	0-4°C

Strata Logging

- 5.14 Strata logging for boreholes should be undertaken during the course of drilling/ digging by a qualified geologist. The logs should include the general stratigraphic description, depth of soil sampling, sample notation and level of groundwater (if encountered). The presence of rocks/ boulders/ cobbles and foreign materials such as metals, wood and plastics should also be recorded.

Free Product and Groundwater Level Measurement

- 5.15 The thickness of any free product and ground water level if present at sampling locations should be measured with an interface probe. The free product if encountered in sufficient volume should be collected for laboratory analysis to determine the composition.

Groundwater Sampling

- 5.16 It is proposed to collect groundwater samples if groundwater is encountered in sufficient quantity at the both the trial pit and borehole sampling locations. Collection of groundwater from a trial pit will be undertaken using a disposal bailer or decontaminated bucket, where feasible.

- 5.17 For each proposed borehole sampling location of which groundwater is encountered, a groundwater well should be installed into the borehole if it is feasible upon considerations of engineering constraints. A typical design of the groundwater sampling well as shown in **Appendix E**, however installation of the well should take into account local conditions.
- 5.18 Each well should first be developed by removing approximately five well volumes of groundwater to remove silt and drilling fluid residue (if present) from the wells. The wells should then be allowed to stand for 24 hours to permit groundwater conditions to equilibrate. Groundwater levels and thickness of free product layer, if present, should be measured at each well before groundwater samples are taken.
- 5.19 In the case of more than one groundwater well being installed, the top of the casing of each groundwater well should first be surveyed to a recognized height datum. All groundwater wells should then be gauged at the same time in order to allow mapping of the groundwater flow regime present at the site.
- 5.20 Prior to groundwater sampling, the monitoring wells should be purged (at least three well volumes) to remove fine-grained materials and to collect freshly refilled representative groundwater samples. Time for each groundwater purging/recharge should be recorded as well as the estimated groundwater flow.
- 5.21 After purging, one groundwater sample should first be collected using a decontaminated stainless steel or Teflon bailer and placed into a decontaminated container with the following water quality parameters recorded using a water quality meter; temperature, pH, total dissolved solids, dissolved oxygen, and Redox potential.
- 5.22 One groundwater sample should then be collected at each well using a decontaminated stainless steel bailer and decanted into appropriate sample vials or bottles in a manner that minimizes agitation and volatilization of VOCs from the samples. All samples should be uniquely labelled.
- 5.23 Trial pits are to be considered as an alternative for sampling due to constraints such as overhead access. Groundwater samples should also be collected at all trial pits if it is encountered in sufficient volume during excavation. Groundwater from trial pits should be collected using a decontaminated bucket. Water quality parameters should also be recorded where the volume of water is great enough (priority should be placed on collecting a groundwater sampling for laboratory analysis).
- 5.24 Immediately after collection, groundwater samples should be transferred to new, clean, laboratory-supplied glass jars for sample storage/ transport. The sampling glass jars should be of “darken” type. Groundwater samples should be placed in the glass jars with zero headspace and promptly sealed with a septum-lined cap. Immediately following collection, samples should be placed in ice chests, cooled and maintained at a temperature of about 4°C until delivered to the analytical laboratory.

Sample Size and Decontamination Procedures

- 5.25 All equipment in contact with the ground or groundwater should be thoroughly decontaminated between each excavation, drilling and sampling event to minimize the potential for cross contamination. The equipment (including drilling pit, digging tools and soil/groundwater samplers) should be decontaminated by steam cleaning or high-pressure hot water jet, then washed by phosphate-free detergent and finally rinsed by distilled/ deionised water.
- 5.26 Prior to sampling, the laboratory responsible for analysis should be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis.
- 5.27 The sample containers should be laboratory cleaned, sealable, water-tight, made of glass or other suitable materials with aluminium or Teflon-lined lids, so that the container surface will not react with the sample or adsorb contaminants. No headspace should be allowed in the containers which contain samples to be analyzed for VOCs, Total Petroleum Hydrocarbon (TPH) fractions or other volatile chemicals.

5.28 The containers should be marked with the sampling location codes and the depths at which the samples were taken. If the contents are hazardous, this should be clearly marked on the container and precautions taken during transport. Samples should be stored at between 0-4 °C but never frozen. Samples should be delivered to laboratory within 24 hours of the samples being collected and analyzed within the respective retention period for the requested analysis but should not more than 10 days. Guidelines on sample sizes and handling for groundwater samples are given in **Table 5.3** below

Table 5.3 Guidelines on Sample Size and Handling for Groundwater Sample

Matrix			Groundwater		
Container Per Sample			Parameters	Preservation	Temperature
No. of Bottles	Size (mL)	Type			
1	250	Plastic bottle	Full list of metals	HNO ₃	0-4°C
1	1000	Amber Glass	PAHs	None	0-4°C
1	1000	Amber Glass	PCBs	None	0-4°C
1	1000	Amber Glass	TPH	None	0-4°C
2	40	Brown vial	BTEX, Full list of VOCs & SVOCs	HCl	0-4°C
1	250	Plastic bottle	Cyanide	NaOH	0-4°C

QA/QC Procedures

5.29 QA/QC samples should be collected with reference to the following frequency criteria where appropriate during the SI Chain of Custody protocol should be adopted.

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

Laboratory Analysis

Laboratory analysis is proposed in order to screen the presence of potential contaminants that are of concern at the Assessment Area. **Table 5.4** summarises the parameters, the minimum requirement of the reporting limits and reference methods for the laboratory analyses of soil and groundwater samples for this land contamination study.

Table 5.4 Parameters, Reporting Limits and Reference Methods for Laboratory Analyses

Item	Parameter	Soil		Groundwater	
		Reporting Limit (mg/kg) or Otherwise Stated	Reference Method	Reporting Limit (µg/L) or Otherwise Stated	Reference Method
VOCs					
1	Acetone	5 [^]	USEPA 8260	50 [^]	USEPA 8260
2	Benzene	0.5		5	
3	Bromodichloromethane	0.5		5	
4	2-Butanone	5		50	

Item	Parameter	Soil		Groundwater			
		Reporting Limit (mg/kg) or Otherwise Stated	Reference Method	Reporting Limit (µg/L) or Otherwise Stated	Reference Method		
5	Chloroform	0.5		5			
6	Ethylbenzene	0.5		5			
7	Methyl tert-Butyl Ether	0.5 [^]		5 [^]			
8	Methylene Chloride	5 [^]		50 [^]			
9	Styrene	0.5		5			
10	Tetrachloroethene	0.5		5			
11	Toluene	0.5		5			
12	Trichloroethene	0.5		5			
13	Xylenes (Total)	1.5		15			
SVOCs							
14	Acenaphthene	0.5		USEPA 8270		2	USEPA 8270
15	Acenaphthylene	0.5				2	
16	Anthracene	0.5				2	
17	Benzo(a)anthracene	0.5	NA				
18	Benzo(a)pyrene	0.5	NA				
19	Benzo(b)fluoranthene& Benzo(k)fluoranthene	1	4				
20	Benzo(g,h,i)perylene	0.5	NA				
21	bis-(2-Ethylhexyl) phthalate	5	NA				
22	Chrysene	0.5	2				
23	Dibenzo(a,h)anthracen	0.5	NA				
24	Fluoranthene	0.5	2				
25	Fluorene	0.5	2				
26	Hexachlorobenzene	0.2 [^]	4				
27	Indeno(1,2,3-cd)pyrene	0.5	NA				
28	Naphthalene	0.5	2				
29	Phenanthrene	0.5	2				
30	Phenol	0.5	NA				
31	Pyrene	0.5	2				
Metals							
32	Antimony	1	USEPA 6020	NA	USEPA 6020		
33	Arsenic	1		NA			
34	Barium	1		NA			
35	Cadmium	0.2		NA			
36	Chromium III	0.5 [^]		NA			
37	Chromium VI	0.5		NA			
38	Cobalt	1		NA			
39	Copper	1		NA			
40	Lead	1		NA			
41	Manganese	1		NA			
42	Mercury	0.05		APHA 3112 Hg: B		0.5	
43	Molybdenum	1	USEPA 6020	NA			

Item	Parameter	Soil		Groundwater	
		Reporting Limit (mg/kg) or Otherwise Stated	Reference Method	Reporting Limit (µg/L) or Otherwise Stated	Reference Method
44	Nickel	1		NA	
45	Tin	1		NA	
46	Zinc	1		NA	
Petroleum Carbon Ranges					
47	C6 - C8	5	USEPA 8015	20	USEPA 8015
48	C9 - C16	200		500	
49	C17 - C35	500		500	
PCBs					
50	PCBs	0.1	USEPA 8270	1	USEPA 8270
Other Inorganic Compounds					
51	Cyanide, free	1 [^]	APHA 4500 CN	NA	APHA 4500 CN
Organometallics					
52	TBTO**	5	Krone <i>et al.</i> – Marine Environmental Research, 27, 1 – 18, 1989	0.1	Krone <i>et al.</i> – Marine Environmental Research, 27, 1 – 18, 1989

Notes:

[^]: The HOKLAS accreditation of the testing method of the COC is not available in major laboratories in Hong Kong; analyses and will be done with reference to the established protocol of the individual lab.

NA= Not Applicable

- 5.30 For sampling and laboratory analyses, Chain of Custody procedure should be included as QA/QC procedure.
- 5.31 All laboratory analysis for soil and groundwater samples should be conducted by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory. All laboratory test methods should be accredited by the HOKLAS or one of its Mutual Recognition Arrangement partners with reference to the Guidance Manual as far as possible, unless otherwise specified in **Table 5.6** or as agreed by EPD. It should be noted that alternative methods or similar reporting limits may be used subject to the laboratory availability and capability. The relevant supporting document of the laboratory to be employed for this study should be given in the future CAP or CAR/RAP.
- 5.32 Extra soil samples shall be stored at 0-4 °C and tested for Toxicity Characteristics Leaching Procedure (TCLP) before submission of Remediation Action Plan (RAP) if excavation and landfill disposal is identified as the last resort.
- 5.33 The criteria are set primarily in terms of TCLP limits shown in **Table 5.5**.

Table 5.5 Laboratory Testing Requirements for TCLP Analysis

Parameter	Test Methods*	Reporting Limit (mg/L)	Landfill Disposal Criteria TCLP Limit (ppm)
TCLP Leachate Preparation allowed by analysis for:			
Antimony (Sb)	USEPA1311 USEPA6020 & USEPA 7112	1	150
Arsenic (As)		1	50
Barium (Ba)		1	1,000
Beryllium (Be)		1	10
Cadmium (Cd)		0.2	10
Chromium (Cr)		1	50
Copper (Cu)		1	250
Lead (Pb)		1	50
Nickel (Ni)		1	250
Selenium (Se)		0.2	1
Silver (Ag)		1	50
Thallium (Tl)		1	50
Tin (Sn)		1	250
Vanadium (V)		1	250
Zinc (Zn)		1	250
Mercury (Hg)		0.2	1

* Equivalent internationally recognised standard methods could also be used.

6. INTERPRETATION OF RESULTS

6.1 With reference to the Guidance Note 1, interpretation of results should make reference to the Guidance Manual. The soil and groundwater samples collected for this study will be compared with Risk-based Remediation Goals (RBRGs) as stipulated in Table 2.1 and Table 2.2 of the Guidance Manual.

6.2 The RBRGs are developed based on a risk assessment approach to suit the local environmental conditions and community needs in Hong Kong. Decisions on contaminated soil and groundwater remediation are based on the nature and extent of the potential risks that are posed to human receptors as a result of exposure to chemicals in the soil and/or groundwater. Four types of land use scenarios are set under RBRGs to reflect the typical physical settings in Hong Kong under which people could be exposed to contaminated soil and groundwater. A description of each land use is as follows.

- Urban residential – Sites located in an urban area where main activities involve habitation by individuals. The typical physical setting is a high rise residential building situated in a housing estate that has amenity facilities such as landscaped yards and children’s playgrounds. The receptors are residents who stay indoors most of the time except for a short period each day, during which they are outdoors and have the chance of being in direct contact with soil at landscaping or play areas within the estate.
- Rural residential – Sites located in a rural area where the main activities involve habitation by individuals. These sites typically have village-type houses or low rise residential blocks surrounded by open space. The receptors are rural residents who stay at home and spend some time each day outdoors on activities such as gardening or light sports. The degree of contact with the soil under the rural setting is more than that under the urban setting both in terms of the intensity and frequency of contact.
- Industrial – Any site where activities involve manufacturing, chemical or petrochemical

processing, storage of raw materials, transport operations, energy production or transmission, etc. Receptors include those at sites where part of the operation is carried out directly on land and the workers are more likely to be exposed to soil than those working in multi-storey factory buildings.

- **Public parks** – Receptors include individuals and families who frequent parks and play areas where there is contact with soil present in lawns, walkways, gardens and play areas. Parks are considered to be predominantly hard covered with limited areas of predominantly landscaped soil. Furthermore, public parks are not considered to have buildings present on them.

6.3 In addition to the RBRGs, screening criteria (soil saturation limits, C_{sat}, developed for Non-aqueous Phase Liquid [NAPL] in soil and water solubility limits for NAPL in groundwater) for the more mobile organic chemicals must be considered to determine whether a site requires further action.

6.4 Since this Project involves the construction of a new railway, the Assessment Area is considered to be occupied for industrial purpose in the future and therefore RBRGs for Industrial Land Use will be adopted as the assessment criteria for this land contamination assessment. Relevant soil and groundwater RBRGs for this land contamination study including the Soil Saturation and Solubility Limits are presented in **Table 6.1**.

Table 6.1 Relevant RBRGs for Soil and Groundwater

Chemical	Soil (mg/kg)		Groundwater (µg/L)	
	RBRGs for Industrial	Soil Saturation Limits	RBRGs for Industrial	Solubility Limits
VOCs				
Acetone	10,000	***	10,000,000	***
Benzene	9.21	336	54,000	1,750,000
Bromodichloromethane	2.85	1,030	26,200	6,740,000
2-Butanone	10,000	***	10,000,000	***
Chloroform	1.54	1,100	11,300	7,920,000
Ethylbenzene	8,240	138	10,000,000	169,000
Methyl tert-Butyl Ether	70.1	2,380	1,810,000	***
Methylene Chloride	13.9	921	224,000	***
Styrene	10,000	497	10,000,000	310,000
Tetrachloroethene	0.777	97.1	2,950	200,000
Toluene	10,000	235	10,000,000	526,000
Trichloroethene	5.68	488	14,200	1,100,000
Xylenes (Total)	1,230	150	1,570,000	175,000
SVOCs				
Acenaphthene	10,000	60.2	10,000,000	4,240
Acenaphthylene	10,000	19.8	10,000,000	3,930
Anthracene	10,000	2.56	10,000,000	43.4
Benzo(a)anthracene	91.8	NA	NA	NA
Benzo(a)pyrene	9.18	NA	NA	NA
Benzo(b)fluoranthene	17.8	NA	7,530	1.5

Chemical	Soil (mg/kg)		Groundwater (µg/L)	
	RBRGs for Industrial	Soil Saturation Limits	RBRGs for Industrial	Solubility Limits
Benzo(g,h,i)perylene	10,000	NA	NA	NA
Benzo(k)fluoranthene	918	NA	NA	NA
bis-(2-Ethylhexyl)phthalate	91.8	NA	NA	NA
Chrysene	1,140	NA	812,000	1.6
Dibenzo(a,h)anthracene	9.18	NA	NA	NA
Fluoranthene	10,000	NA	10,000,000	206
Fluorene	10,000	54.7	10,000,000	1,980
Hexachlorobenzene	0.582	NA	695	6,200
Indeno(1,2,3-cd)pyrene	91.8	NA	NA	NA
Naphthalene	453	125	862,000	31,000
Phenanthrene	10,000	28	10,000,000	1000
Phenol	10,000	7,260	NA	NA
Pyrene	10,000	NA	10,000,000	135
Metals				
Chromium III	10,000	NA	NA	NA
Chromium VI	1,960	NA	NA	NA
Copper	10,000	NA	NA	NA
Lead	2,290	NA	NA	NA
Petroleum Carbon Ranges				
C6 - C8	10,000	1000	1,150,000	5,230
C9 - C16	10,000	3000	9,980,000	2,800
C17 - C35	10,000	5000	178,000	2,800

Note: NA - Not Available

*** indicates that the Csat value/ solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

7. REPORTING

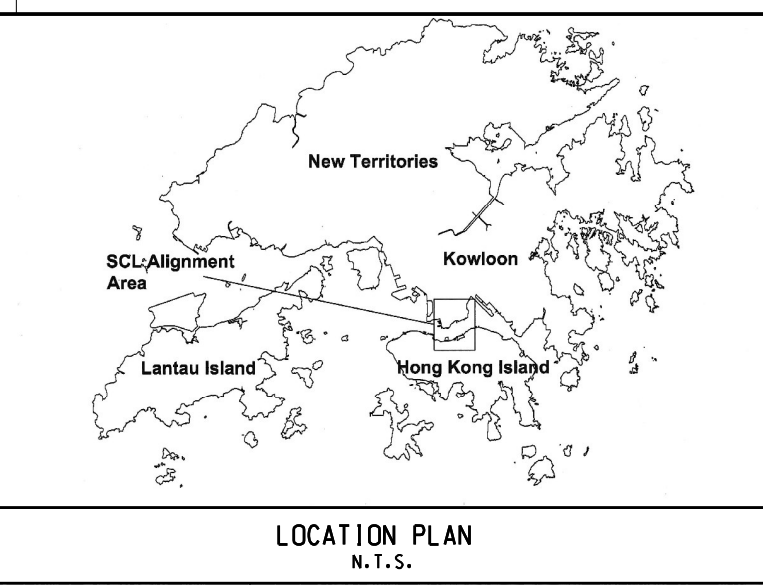
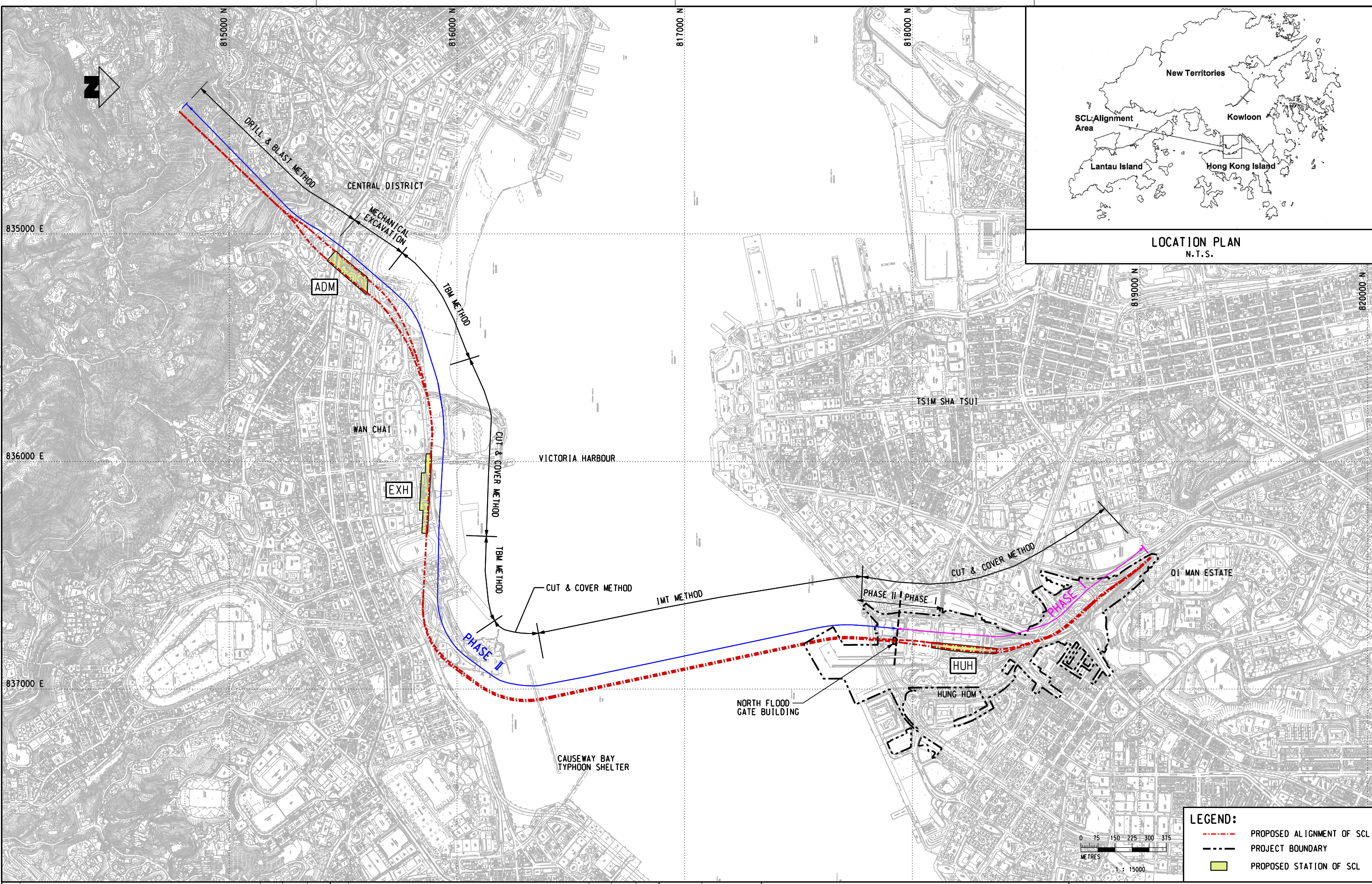
- 7.1 After completion of the post-Stage 1 SI, a CAR which summarises the detailed methodology of site investigation, assessment criteria, onsite observations and the analytical results from the site investigation works will be prepared for EPD endorsement.
- 7.2 Should significant contamination be identified within the works areas, a Remediation Action Plan (RAP) will be prepared. The RAP will set out.
- i. the objectives of remediation action,
 - ii. evaluation of different remediation alternatives and,
 - iii. the design and operation of the proposed remediation method.

- 7.3 The RAP will be submitted either separately or together with the CAR under different sections for EPD endorsement. Site cleanup will commence once the CAR/RAP are vetted and approved by EPD.
- 7.4 A Remediation Report (RR) for demonstration of adequate clean-up should be prepared and submitted to EPD for endorsement prior to the commencement of any construction/development works within the site(s)/ area(s). Construction/development works will only be carried out upon obtaining the endorsement of this RR from EPD.
- 7.5 If contamination is found and landfill disposal is identified as the last resort to remediate the contaminated soil, three impacted soil samples shall be conducted for TCLP test to determine whether they comply with the criteria for landfill disposal in accordance with the Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops before landfill disposal.

Figures

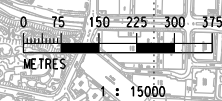
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Plot Date: 14/05/2009
 Model Name: NEX2213_C_361_ENS_M50_0010.dgn
 File Name: NEX2213_C_361_ENS_M50_0010.dgn



LEGEND:

- - - PROPOSED ALIGNMENT OF SCL
- PROJECT BOUNDARY
- PROPOSED STATION OF SCL



REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	WDF
DESIGNED	---
CHECKED	LCR
APPROVED	---
DATE	14/MAY/2009

MTR

SHATIN TO CENTRAL LINK

AECOM

CADD REF. NEX2213_C_361_ENS_M50_0010.dgn

TITLE: NEX/2213 - CROSS HARBOUR SECTION EIA STUDY SCL OVERALL ALIGNMENT (WITH PHASE I BOUNDARY)

SCALE: 1 : 15000 (A3)

FIGURE NO. NEX2213/C/361/ENS/M50/001

REV. D

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PLOT DRY: R:\ustmshet\NTR\PI\DRIVER\WINDOWS\33\COLOUR.dwg
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 FILE NAME: M7-01-01.dwg
 DATE: 2009-01-20
 DRAWN BY: GXH
 CHECKED BY: LCR
 APPROVED BY: ---
 DATE: 20/JAN/2009



SITE ID	
2-04	LOCOMOTIVE RUNNING SHED
2-05	UNDERGROUND STORAGE TANKS
2-06	ABOVEGROUND TANK
2-07	DISPENSERS

PROPOSED CO-ORDINATES UNDER POST-STAGE 1 SI		
LOCATION ID	EASTING	NORTHING
HUH-2a	836844.30	818400.02
HUH-3a	836856.60	818423.00
HUH-4a	836890.26	818349.11
HUH-5a	836891.51	818328.44
HUH-6a	836879.42	818318.62
HUH-7a	836861.51	818340.71
HUH-8a	836864.27	818350.94

PROPOSED CO-ORDINATES UNDER STAGE 2 SI		
LOCATION ID	EASTING	NORTHING
HUH-8	836882.62	818394.82
HUH-10	836901.31	818381.69

NOTE:
 1. THE PROJECT BOUNDARY IS SLIGHTLY CHANGED IN THE CAR AFTER THE APPROVAL OF THE RELEVANT CAP, BUT THE SITE INVESTIGATION HAS NOT BEEN AFFECTED.

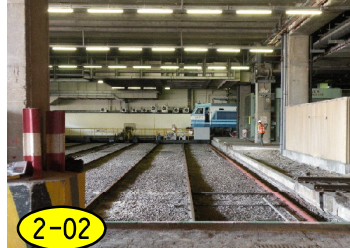
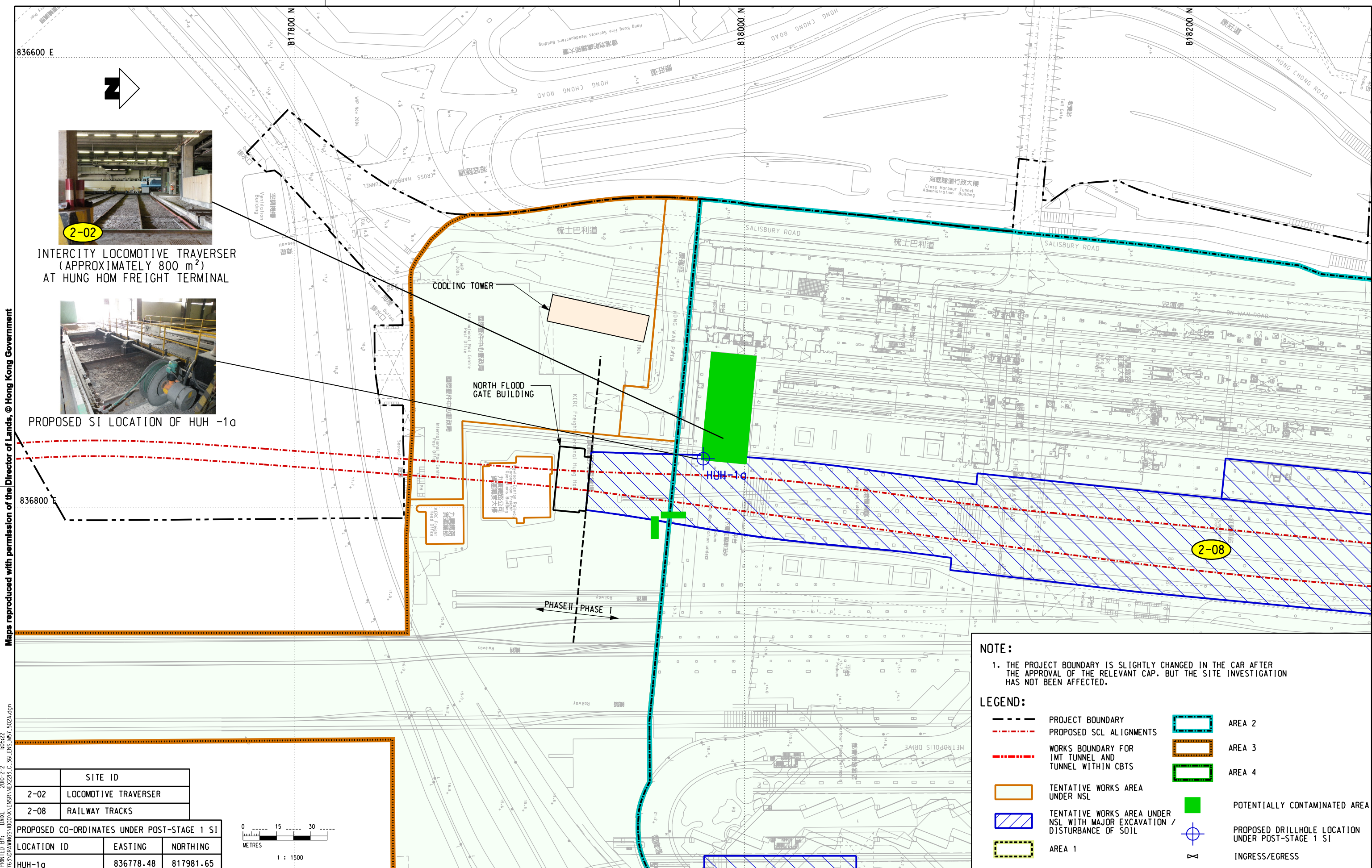
LEGEND:	
	PROJECT BOUNDARY
	PROPOSED SCL ALIGNMENTS
	WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
	TENTATIVE WORKS AREA UNDER NSL
	TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
	AREA 1
	AREA 2
	AREA 3
	AREA 4
	POTENTIALLY CONTAMINATED AREA
	PROPOSED DRILLHOLE LOCATION UNDER POST-STAGE 1 SI
	PROPOSED DRILLHOLE LOCATION UNDER STAGE 2 SI
	INGRESS/EGRESS

DRAWN	GXH		SHATIN TO CENTRAL LINK
DESIGNED	---		
CHECKED	LCR		
APPROVED	---		
DATE	20/JAN/2009		
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		CADD REF.	NEX2213_C_361_ENS_M57_501A.dgn

TITLE NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED POST-STAGE 1 SI LOCATION AT AREA 2 SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN		
SCALE	FIGURE NO.	REV.
1 : 1500 (A3)	NEX2213/C/361/ENS/M57/501	A

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 FILENAME: MEX2213_C_361_ENS_M57_502A.dgn



INTERCITY LOCOMOTIVE TRAVERSER
 (APPROXIMATELY 800 m²)
 AT HUNG HOM FREIGHT TERMINAL



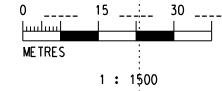
PROPOSED S1 LOCATION OF HUH -1a

NOTE:
 1. THE PROJECT BOUNDARY IS SLIGHTLY CHANGED IN THE CAR AFTER THE APPROVAL OF THE RELEVANT CAP. BUT THE SITE INVESTIGATION HAS NOT BEEN AFFECTED.

LEGEND:

- PROJECT BOUNDARY
- - - PROPOSED SCL ALIGNMENTS
- WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- TENTATIVE WORKS AREA UNDER NSL
- TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- POTENTIALLY CONTAMINATED AREA
- PROPOSED DRILLHOLE LOCATION UNDER POST-STAGE 1 SI
- INGRESS/EGRESS

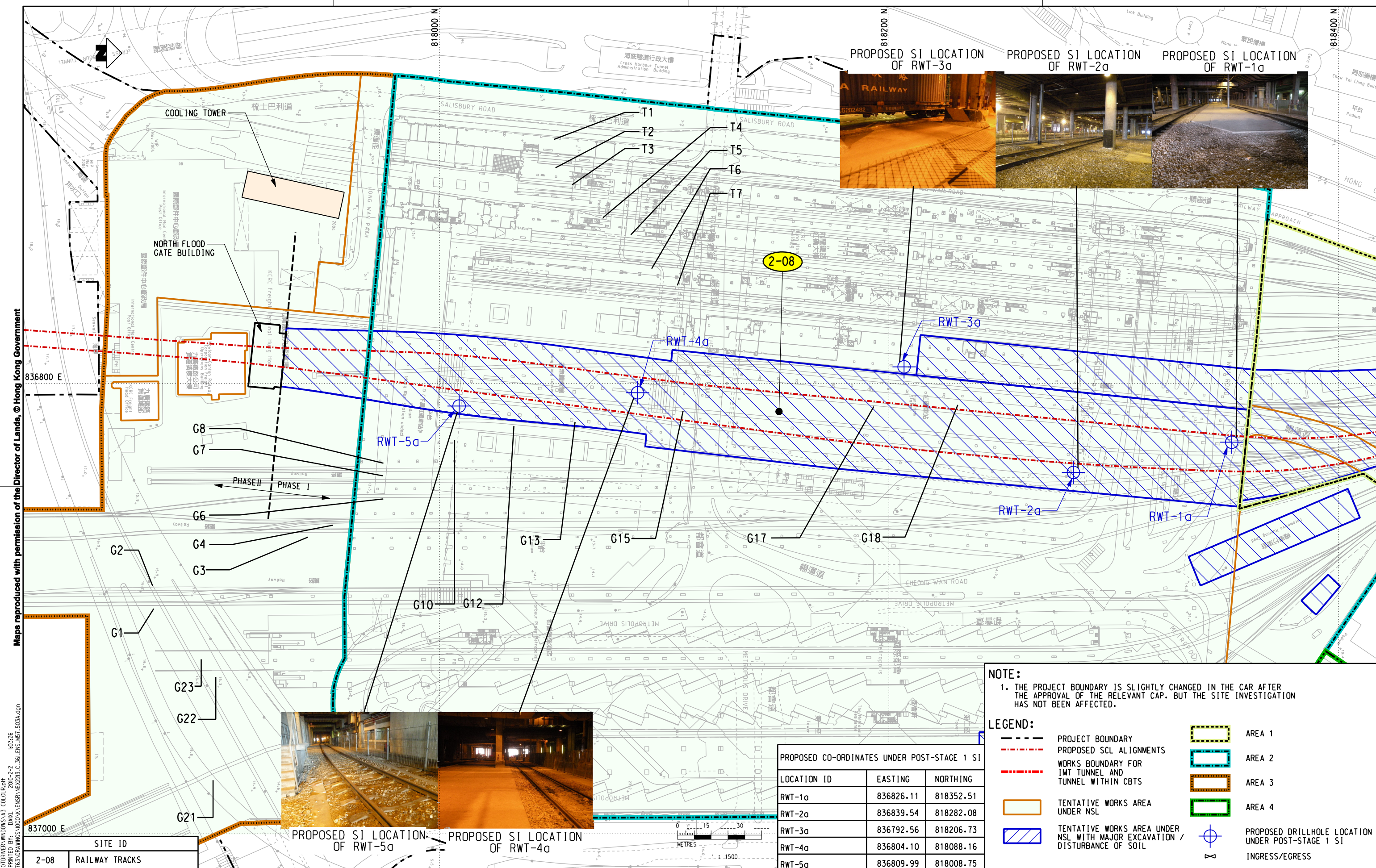
SITE ID		
2-02	LOCOMOTIVE TRAVERSER	
2-08	RAILWAY TRACKS	
PROPOSED CO-ORDINATES UNDER POST-STAGE 1 SI		
LOCATION ID	EASTING	NORTHING
HUH-1a	836778.48	817981.65



REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	YJP		SHATIN TO CENTRAL LINK
DESIGNED	---		
CHECKED	LCR		
APPROVED	---		
DATE	11/JAN/2010	ORIGINATOR	
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CADD REF.		NEX2213_C_361_ENS_M57_502A.dgn	

NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED POST-STAGE 1 SI LOCATION AT AREA 2 SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN			
SCALE	FIGURE NO.	REV.	
1 : 1500 (A3)	NEX2213/C/361/ENS/M57/502	A	



NOTE:
 1. THE PROJECT BOUNDARY IS SLIGHTLY CHANGED IN THE CAR AFTER THE APPROVAL OF THE RELEVANT CAP. BUT THE SITE INVESTIGATION HAS NOT BEEN AFFECTED.

LEGEND:

- PROJECT BOUNDARY
- - - - PROPOSED SCL ALIGNMENTS
- . - . - WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- TENTATIVE WORKS AREA UNDER NSL
- ▨ TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- ⊕ PROPOSED DRILLHOLE LOCATION UNDER POST-STAGE 1 SI
- ∞ INGRESS/EGRESS

PROPOSED CO-ORDINATES UNDER POST-STAGE 1 SI

LOCATION ID	EASTING	NORTHING
RWT-1a	836826.11	818352.51
RWT-2a	836839.54	818282.08
RWT-3a	836792.56	818206.73
RWT-4a	836804.10	818088.16
RWT-5a	836809.99	818008.75

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 160326
 2008-2-2
 160326

SITE ID	
2-08	RAILWAY TRACKS

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	YJP
DESIGNED	---
CHECKED	LCR
APPROVED	---
DATE	12/JAN/2010

MTR

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AECOM

ORIGINATOR

CADD REF. NEX2213_C_361_ENS_M57_503A.dgn

TITLE

NEX/2213 - CROSS HARBOUR SECTION EIA STUDY

PROPOSED POST-STAGE 1 SI LOCATION AT AREA 2

SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN

SCALE 1 : 1500 (A3)

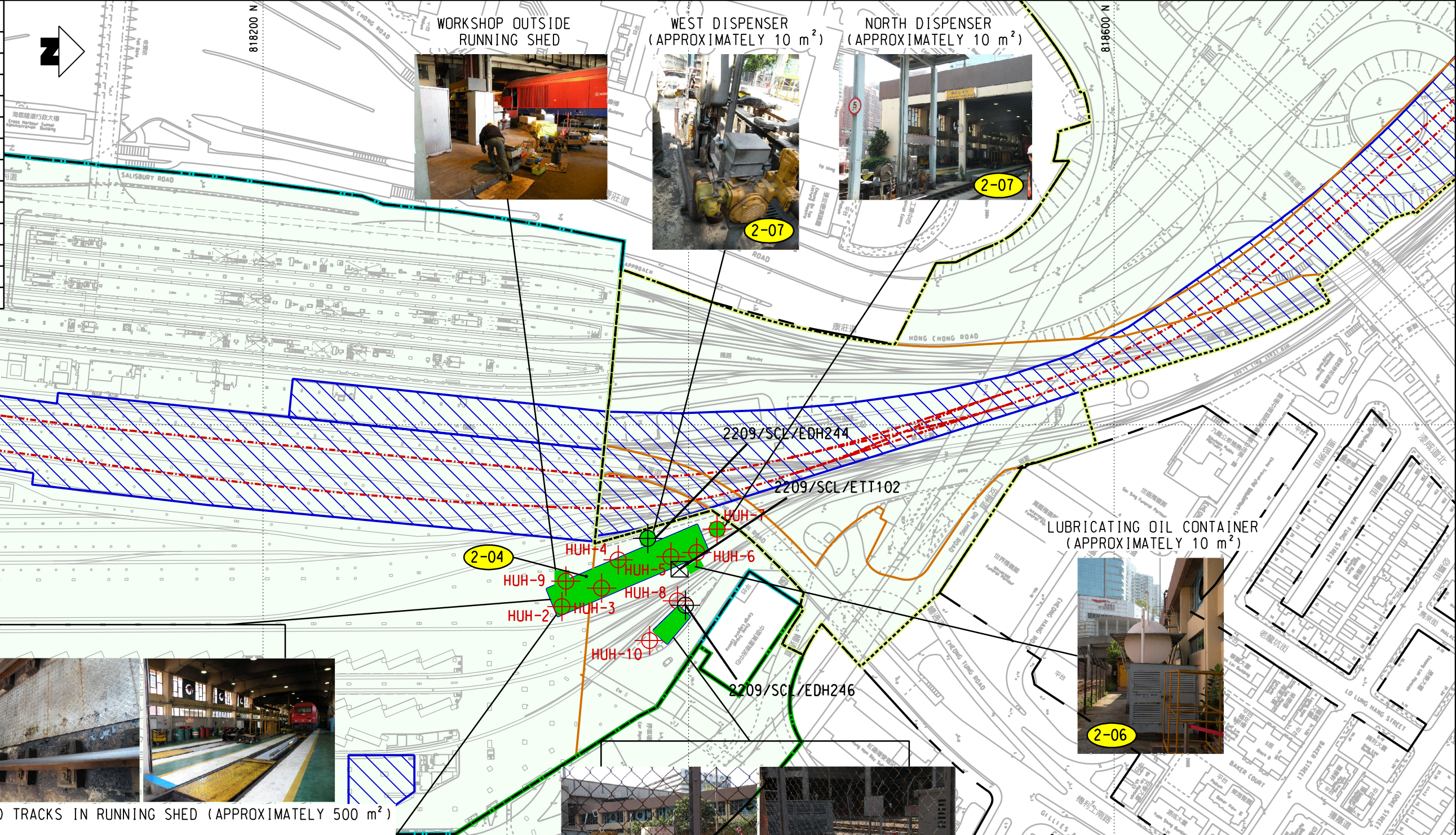
FIGURE NO. NEX2213/C/361/ENS/M57/503

REV. A

Appendix A

**Extracted Figures from the Approved
Contamination Assessment Plan**

PROPOSED CO-ORDINATES FOR SAMPLING LOCATIONS		
LOCATION ID	EASTING	NORTHING
2209/SCL/EDH244	836853.33	818380.84
2209/SCL/EDH246	836884.75	818398.59
2209/SCL/ETT102	836867.78	818395.79
HUH-2	836885.33	818340.53
HUH-3	836876.66	818359.14
HUH-4	836863.38	818366.93
HUH-5	836861.94	818391.74
HUH-6	836859.92	818403.88
HUH-7	836849.00	818413.45
HUH-8	836882.62	818394.82
HUH-9	836873.35	818342.38
HUH-10	836901.31	818381.69



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SITE ID	
2-04	LOCOMOTIVE RUNNING SHED
2-05	UNDERGROUND STORAGE TANKS
2-06	ABOVEGROUND TANK
2-07	DISPENSERS

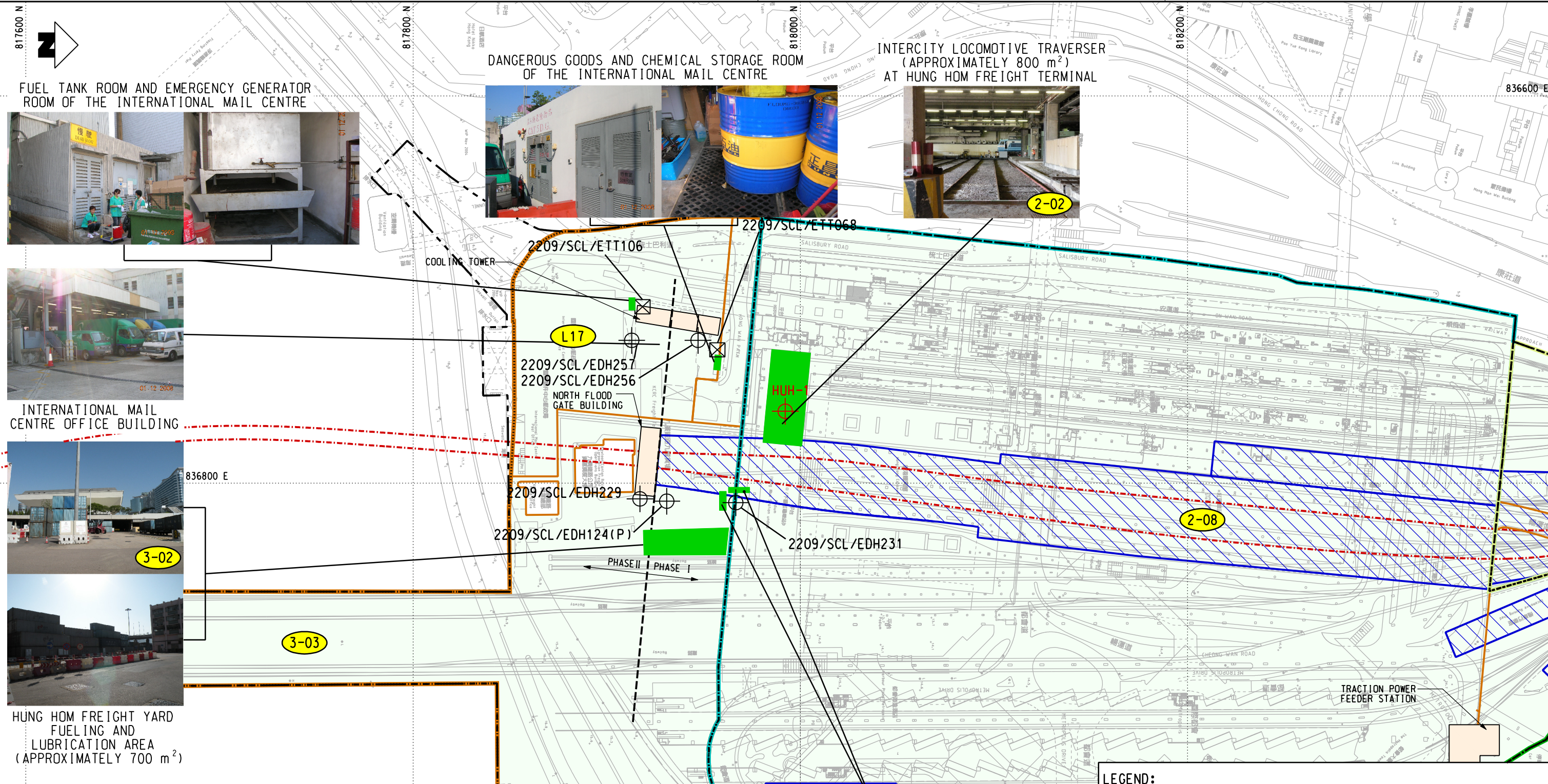
LEGEND:

- PROJECT BOUNDARY
- - - - PROPOSED SCL ALIGNMENTS
- . - . - WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- - - - TENTATIVE WORKS AREA UNDER NSL
- ▨ TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- ▨ AREA 1
- ▨ AREA 2
- ▨ AREA 3
- ▨ AREA 4
- ⊗ PROPOSED TRIAL PIT LOCATION
- POTENTIALLY CONTAMINATED AREA
- ⊕ PROPOSED DRILLHOLE LOCATION
- ⊕ PROPOSED DRILLHOLE LOCATION FOR SITE UPON DECOMMISSIONING
- ⊕ INGRESS/EGRESS

DRAWN: GXH DESIGNED: --- CHECKED: LCR APPROVED: --- DATE: 20/JAN/2009				TITLE: NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED SAMPLING LOCATIONS AT AREA 2 PHASE 1 - MONKG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN	
ORIGINATOR: AECOM		SCALE: 1 : 2000 (A3)		FIGURE NO.: NEX2213/C/361/ENS/M57/009	
CADD REF.: NEX2213_C_361_ENS_M57_009A.dgn		REVISIONS:		REV. A	

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 MODEL NAME: 2009-9-11
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FUEL TANK ROOM AND EMERGENCY GENERATOR ROOM OF THE INTERNATIONAL MAIL CENTRE



DANGEROUS GOODS AND CHEMICAL STORAGE ROOM OF THE INTERNATIONAL MAIL CENTRE



INTERCITY LOCOMOTIVE TRAVERSER (APPROXIMATELY 800 m²) AT HUNG HOM FREIGHT TERMINAL



INTERNATIONAL MAIL CENTRE OFFICE BUILDING



HUNG HOM FREIGHT YARD FUELING AND LUBRICATION AREA (APPROXIMATELY 700 m²)



DANGEROUS GOODS STORE CONTAINERS (APPROXIMATELY 20 m²)

LEGEND:

- PROJECT BOUNDARY
- PROPOSED SCL ALIGNMENTS
- WORKS BOUNDARY FOR IMT TUNNEL AND TUNNEL WITHIN CBTS
- TENTATIVE WORKS AREA UNDER NSL
- TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- AREA 1
- AREA 2
- AREA 3
- AREA 4
- X PROPOSED TRIAL PIT LOCATION
- POTENTIALLY CONTAMINATED AREA
- + PROPOSED DRILLHOLE LOCATION
- + PROPOSED DRILLHOLE LOCATION FOR SITE UPON DECOMMISSIONING
- + INGRESS/EGRESS

PROPOSED CO-ORDINATES FOR SAMPLING LOCATIONS				
LOCATION ID	EASTING	NORTHING		
2209/SCL/ETT068	836731.12	817957.16		
2209/SCL/ETT106	836708.88	817918.50		
2209/SCL/EDH256	836726.23	817947.19	2-02	LOCOMOTIVE TRAVERSER
2209/SCL/EDH257	836726.23	817912.97	2-08	RAILWAY TRACKS
2209/SCL/EDH229	836808.11	817917.21	2-09	D.G. STORE
2209/SCL/EDH124(P)	836809.32	817931.05	L17	INTERNATIONAL MAIL CENTRE
2209/SCL/EDH231	836810.08	817966.73	3-02	HUNG HOM FREIGHT YARD
HUH-1	836762.87	817992.25	3-03	PIER AND FINGER PIER



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REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	GXH
DESIGNED	---
CHECKED	LCR
APPROVED	---
DATE	20/JAN/2009

MTR

SHATIN TO CENTRAL LINK

AECOM

CADD REF. NEX2213_C_361_ENS_M57_010A.dgn

TITLE		
NEX/2213 - CROSS HARBOUR SECTION EIA STUDY PROPOSED SAMPLING LOCATIONS AT AREAS 2 AND 3 PHASE I - MONKG KOK EAST TO HUNG HOM CONTAMINATION ASSESSMENT PLAN		
SCALE	FIGURE NO.	REV.
1 : 2000 (A3)	NEX2213/C/361/ENS/M57/010	A

Appendix B

**Standard Form 3.1 – Summary of On-Site Land Use Adopted
from Guidance Manual for Use of Risk-based Remediation
Goals for Contaminated Land Management**

Appendix B Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Property Name: SCL Alignment

Current Use

ID	Type of facility/business	On-site property land use	Date began ¹	Description of business process/primary products	Owner or Occupier	Approximately size of on-site property	Off-site property affected?	
							Yes	No
2-02	Locomotive traverser	Industrial	-	Traversing the first car of the train and certain maintenance works (e.g. lubrication)	MTR	800 m ²		No
2-04	Locomotive Running Shed for locomotive maintenance	Industrial	1973	Maintenance and repair of locomotives; welding and testing motors	MTR	1,100 m ² (whole Locomotive Running Shed area)		No
2-05	Underground storage tanks	Industrial	1973	Storage of diesel and connected to the locomotive running shed through underground pipelines	MTR	150 m ²		No
2-06	Aboveground lubricating oil tank	Industrial	-	Storage of lubricating oil	MTR	10 m ²		No
2-07	Pumping area north of the Locomotive Running Shed	Industrial	1973	Pump station/ dispensers serving the running shed	MTR	10 m ² (north dispensers)		No
2-08	Railway tracks	Industrial	-	For depot, platform and cargo transport in the freight terminal	MTR	15,000 m ²		No

¹ Specify the approximate year in which the current use of the on-site property began

Appendix B Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Past Use

Are past uses different from current uses? Yes No If Yes, complete this section.

Complete this table with each different operation, use or status of the on-site property. Include all operations back to pre-commercial or pre-industrial time if this information is necessary to characterize the site. Specify the status of the property at each stage, including times it may have been vacant. Start with the most recent use and list in chronological order backwards through time.

ID	Type of facility/business	On-site property land use	Date began ²	Date ended ³	Description of business process/primary products	Owner or Occupier	Approximately size of on-site property (if different from current size)	Off-site property affected? Yes No
2-02, 2-08	Industrial	Industrial	1964	1989	Vacant, open storage	-	-	No
2-04 through 2-07	Industrial	Industrial	1967	1973	Structures of the locomotive running shed and the affiliated structures	-	-	No

Future Use

Will future uses be different from current uses? Yes No If Yes, complete this section.

ID	Type of facility/business	On-site property land use	Description of business process/primary products	Owner or Occupier	Approximately size of on-site property
2-02, 2-04, through 2-08	Railway	Industrial	Railway operations	MTR	17,070 m ²

² Specify the approximate year in which the past use of the on-site property began

³ Specify the approximate year in which the past use of the on-site property ended

Appendix C

**Chemical Contaminants Listed by Industry Type, of Australian
Standard 4482.1-1997 "Guide to the sampling and
investigation of potentially contaminated soil. Part 1:
Non-volatile and semi-volatile compounds"**

APPENDIX I
CHEMICAL CONTAMINANTS LISTED BY INDUSTRY TYPE

Table II lists chemicals used in various industries. The exact nature of the contaminant associated with the particular industry is site specific, depending on the standard of management and the practice and safety procedures employed at each site.

This is not an all inclusive list of industries using chemicals and some of the chemicals mentioned are no longer used (e.g. carbon tetrachloride in the dry cleaning industry).

TABLE II
LIST OF INDUSTRIES

Industry	Type of chemical	Associated chemicals
Agricultural/horticultural activities		See fertilizer, insecticides, fungicides, herbicides under chemicals manufacture and use
Airports	Hydrocarbons Metals	Aviation fuels Particularly aluminium, magnesium, chromium
Asbestos production and disposal		Asbestos
Battery manufacture and recycling	Metals Acids	Lead, manganese, zinc, cadmium, nickel, cobalt, mercury, silver, antimony Sulfuric acid
Breweries/distilleries	Alcohol	Ethanol, methanol, esters

(continued)

TABLE II (continued)

Industry	Type of chemical	Associated chemicals
Chemicals manufacture and use	Acid/alkali	Mercury (chlor/alkali), sulfuric, hydrochloric and nitric acids, sodium and calcium hydroxides
	Adhesives/resins	Polyvinyl acetate, phenols, formaldehyde, acrylates, phthalates
	Dyes	Chromium, titanium, cobalt, sulfur and nitrogen organic compounds, sulfates, solvents
	Explosives	Acetone, nitric acid, ammonium nitrate, pentachlorophenol, ammonia, sulfuric acid, nitroglycerine, calcium cyanamide, lead, ethylene glycol, methanol, copper, aluminium, bis(2-ethylhexyl) adipate, dibutyl phthalate, sodium hydroxide, mercury, silver
	Fertilizer	Calcium phosphate, calcium sulfate, nitrates, ammonium sulfate, carbonates, potassium, copper, magnesium, molybdenum, boron, cadmium
	Flocculants	Aluminium
	Foam production	Urethane, formaldehyde, styrene
	Fungicides	Carbamates, copper sulfate, copper chloride, sulfur, chromium, zinc
	Herbicides	Ammonium thiocyanate, carbamates, organochlorines, organophosphates, arsenic, mercury, triazines
	Paints	
	Heavy metals	Arsenic, barium, cadmium, chromium, cobalt, lead, manganese, mercury, selenium, zinc
	Solvents	Titanium
	Pesticides	Toluene oils natural (e.g. pine oil) or synthetic
	Active ingredients	Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulfur, synthetic pyrethroids
	Solvents	Xylene, kerosene, methyl isobutyl ketone, amyl acetate, chlorinated solvents
	Pharmaceutical	
	Solvents	Acetone, cyclohexane, methylene chloride, ethyl acetate, butyl acetate, methanol, ethanol, isopropanol, butanol, pyridine methyl ethyl ketone, methyl isobutyl ketone, tetrahydrofuran
	Photography	Hydroquinone, sodium carbonate, sodium sulfite, potassium bromide, monomethyl para-aminophenol sulfate, ferricyanide, chromium, silver, thiocyanate, ammonium compounds, sulfur compounds, phosphate, phenylene diamine, ethyl alcohol, thiosulfates, formaldehyde
	Plastics	Sulfates, carbonates, cadmium, solvents, acrylates, phthalates, styrene
	Rubber	Carbon black
Soap/detergent		
General	Potassium compounds, phosphates, ammonia, alcohols, esters, sodium hydroxide, surfactants (sodium lauryl sulfate), silicate compounds	
Acids	Sulfuric acid and stearic acid	
Oils	Palm, coconut, pine, teatree	
Solvents		
General	Ammonia	
Hydrocarbons	e.g. BTEX (benzene, toluene, ethylbenzene, xylene)	
Chlorinated organics	e.g., trichloroethane, carbon tetrachloride, methylene chloride	

(continued)

TABLE 11 (continued)

Industry	Type of chemical	Associated chemicals
Defence works		See explosives under chemicals manufacture and use, foundries, engine works, service stations
Drum reconditioning		See chemicals manufacture and use
Dry cleaning		Trichloroethylene and 1, 1, 1 - trichloroethane Carbon tetrachloride Perchloroethylene
Electrical		PCBs (transformers and capacitors), solvents, tin, lead, copper, mercury
Engine works	Hydrocarbons Metals Solvents Acids/alkalis Refrigerants Antifreeze	Chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons Ethylene glycol, nitrates, phosphates, silicates
Foundries	Metals Acids	Particularly aluminium, manganese, iron, copper, nickel, chromium zinc, cadmium and lead and oxides, chlorides, fluorides and sulfates of these metals Sulfuric and phosphoric Phenolics and amines Coke/graphite dust
Gas works	Inorganics Organics	Ammonia, cyanide, nitrate, sulfide, thiocyanate Aluminium, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium, zinc BTEX, phenolics, PAHs and coke
Iron and steel works		BTEX, phenolics, PAHs, Metals and oxides of iron, nickel, copper, chromium, magnesium manganese and graphite
Landfill sites		Alkanes and ammonia, sulfides, heavy metals, organic acids
Marinas	Antifouling paints	See engine works, electroplating metals under metal treatments Copper, tributyltin (TBT)
Metal treatments	Electroplating Metals Acids General Liquid carburizing baths	Nickel, chromium, zinc, aluminium, copper, lead, cadmium, tin Sulfuric, hydrochloric, nitric, phosphoric Sodium hydroxide, 1,1,1-trichloroethane, tetrachloroethylene, toluene, ethylene glycol, cyanide compounds Sodium, cyanide, barium, chloride, potassium chloride, sodium chloride, sodium carbonate, sodium cyanate
Mining and extractive industries		Arsenic, mercury and cyanides and also refer to explosives. Aluminium, arsenic, copper, chromium, cobalt, lead, manganese, nickel, selenium, zinc and radio-radionuclides. The list of heavy metals should be decided according to the composition of the deposit and known impurities

(continued)

TABLE II (continued)

Industry	Type of chemical	Associated chemicals
Power stations		Asbestos, PCBs, fly ash metals, water treatment chemicals
Printing shops		Acids, alkalis, solvents, chromium (see photography)
Railway yards		Hydrocarbons, arsenic, phenolics (creosote), heavy metals, nitrates and ammonia
Scrap yards		Hydrocarbons, metals, solvents
Service stations and fuel storage facilities		Aliphatic hydrocarbons BTEX (i.e., benzene, toluene, ethylbenzene, xylene) PAHs Phenols Lead
Sheep and cattle dips		Arsenic, organochlorines and organophosphates, carbamates, and synthetic pyrethroids
Smelting and refining		Metals and the fluorides, chlorides and oxides of copper, tin, silver, gold, selenium, lead, aluminium
Tanning and associated trades	Metals General	Chromium, manganese, aluminium Ammonium sulfate, ammonia, ammonium nitrate, arsenic phenolics, formaldehyde, sulfide, tannic acid
Water and sewerage treatment plant	Metals	Aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, fluoride, lime and zinc
Wood preservation	Metals General	Chromium, copper, arsenic Naphthalene, ammonia, pentachlorophenol, dibenzofuran, anthracene, biphenyl, ammonium sulfate, quinoline, boron, creosote, organochlorine pesticides

Appendix D
Sampling and Testing Schedule

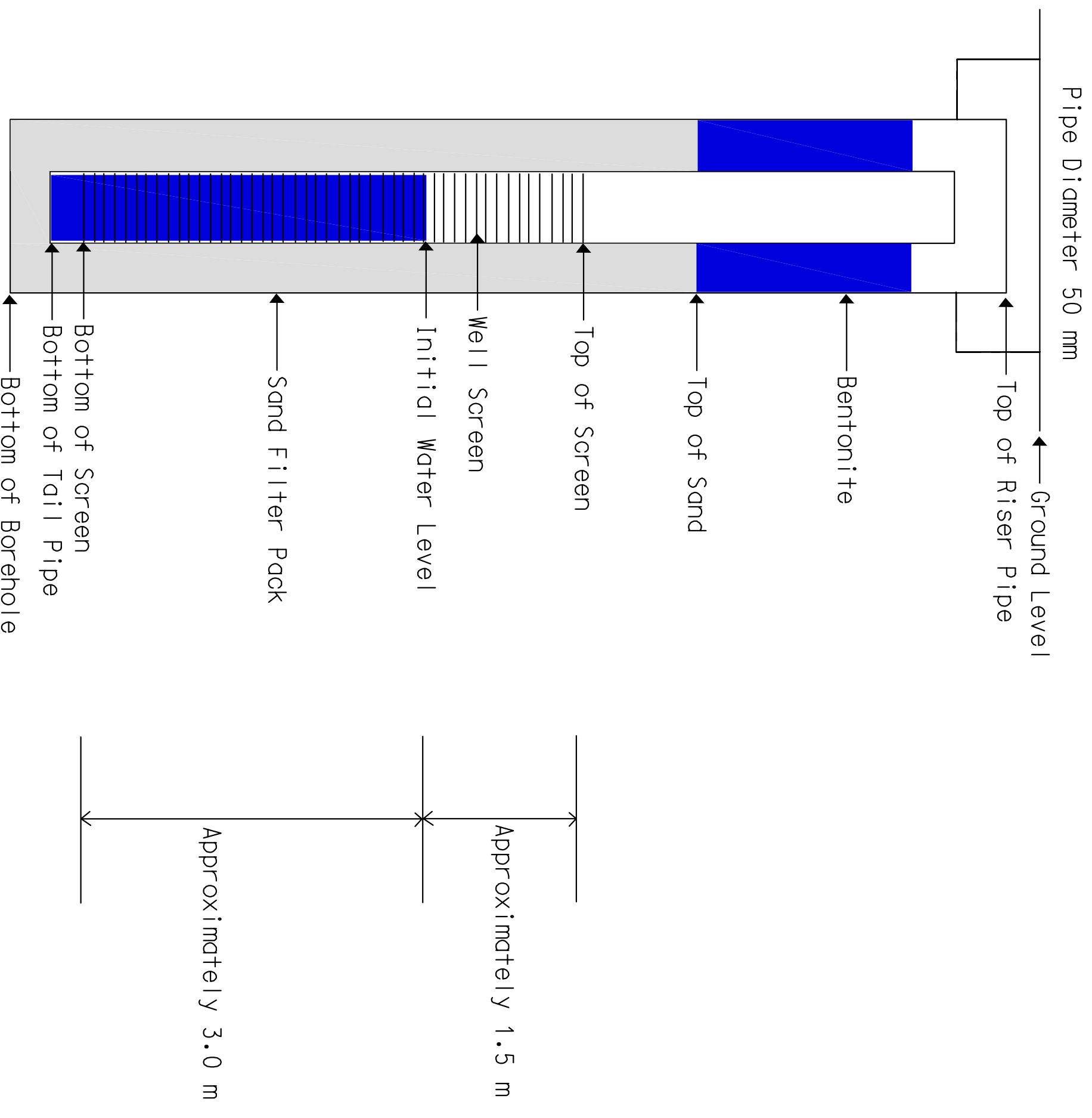
Locations and Testing Parameters of Soil Sampling for Phase I under Post-Stage I Site Investigation

Sample ID	Lead	Chromium	Copper	BTEX	TPH	PAHs	Full List of VOCs	Full List of SVOCs
HUH-1a	✓			✓	✓	✓		
HUH-2a	✓	✓	✓		✓		✓	✓
HUH-3a	✓	✓	✓		✓		✓	✓
HUH-4a	✓	✓	✓		✓		✓	✓
HUH-5a	✓	✓	✓		✓		✓	✓
HUH-6a	✓	✓	✓		✓		✓	✓
HUH-7a	✓	✓	✓		✓		✓	✓
HUH-8a	✓	✓	✓		✓		✓	✓
RWT-1a	✓			✓	✓	✓		
RWT-2a	✓			✓	✓	✓		
RWT-3a	✓			✓	✓	✓		
RWT-4a	✓			✓	✓	✓		
RWT-5a	✓			✓	✓	✓		

Locations and Testing Parameters of Groundwater Sampling for Phase I under Post-Stage I Site Investigation

Sample ID	BTEX	TPH	PAHs	Full List of VOCs	Full List of SVOCs
HUH-1a	✓	✓	✓		
HUH-2a		✓		✓	✓
HUH-3a		✓		✓	✓
HUH-4a		✓		✓	✓
HUH-5a		✓		✓	✓
HUH-6a		✓		✓	✓
HUH-7a		✓		✓	✓
HUH-8a		✓		✓	✓
RWT-1a	✓	✓	✓		
RWT-2a	✓	✓	✓		
RWT-3a	✓	✓	✓		
RWT-4a	✓	✓	✓		
RWT-5a	✓	✓	✓		

Appendix E
Typical Design of the Groundwater Monitoring Well



REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED																																																																																																														
<table border="1"> <tr> <td>DRAWN</td> <td>VTHL</td> <td colspan="8"> </td> </tr> <tr> <td>DESIGNED</td> <td> </td> <td colspan="8"> </td> </tr> <tr> <td>CHECKED</td> <td> </td> <td colspan="8"> </td> </tr> <tr> <td>APPROVED</td> <td> </td> <td colspan="8"> <small>ORIGINATOR</small> </td> </tr> <tr> <td>DATE</td> <td>08/Jan/2010</td> <td colspan="8"> <small>DATE</small> </td> </tr> <tr> <td colspan="10"> <small>DO NOT SCALE DIMENSIONS. ALL DIMENSIONS SHALL BE VERIFIED ON SITE. THE USER SHALL BE RESPONSIBLE FOR THE ACCURACY OF THIS DRAWING. THIS DOCUMENT IS OWNED BY THE USER AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM THE USER OR THE COMPANY THAT ISSUED THIS DOCUMENT TO THE USER.</small> </td> </tr> <tr> <td colspan="2">TITLE</td> <td colspan="8"> NEX2213 - CROSS HARBOUR SECTION </td> </tr> <tr> <td colspan="2">SCALE</td> <td colspan="8"> EIA STUDY </td> </tr> <tr> <td colspan="2">N.T.S.</td> <td colspan="8"> TYPICAL DESIGN OF THE GROUNDWATER MONITORING WELL </td> </tr> <tr> <td colspan="2">DRAWING NO.</td> <td colspan="8"> PHASE 1 - MONG KOK EAST TO HUNG HOK SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN </td> </tr> <tr> <td colspan="2">REV.</td> <td colspan="8"> </td> </tr> </table>										DRAWN	VTHL									DESIGNED										CHECKED										APPROVED		<small>ORIGINATOR</small>								DATE	08/Jan/2010	<small>DATE</small>								<small>DO NOT SCALE DIMENSIONS. ALL DIMENSIONS SHALL BE VERIFIED ON SITE. THE USER SHALL BE RESPONSIBLE FOR THE ACCURACY OF THIS DRAWING. THIS DOCUMENT IS OWNED BY THE USER AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM THE USER OR THE COMPANY THAT ISSUED THIS DOCUMENT TO THE USER.</small>										TITLE		NEX2213 - CROSS HARBOUR SECTION								SCALE		EIA STUDY								N.T.S.		TYPICAL DESIGN OF THE GROUNDWATER MONITORING WELL								DRAWING NO.		PHASE 1 - MONG KOK EAST TO HUNG HOK SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN								REV.									
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