Decommissioning and Demolition of the Castle Peak A Power Station

Project Profile

PREPARED FOR

Capco 青山發電有限公司 Castle Peak Power Co. Ltd.

Castle Peak Power Company Limited (CAPCO)

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Dr Jasmine Ng
Office Managing Partner

ERM-Hong Kong, Limited
2507, 25/F One Harbourfront,
18 Tak Fung Street,
Hunghom, Kowloon
Hong Kong
T +852 2271 3000

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1. BASIC INFORMATION

1.1 PROJECT TITLE

The title of the project is "Decommissioning and Demolition of the Castle Peak A Power Station" (hereafter referred to as "the Project").

1.2 NAME OF PROJECT PROPONENT

Castle Peak Power Company Limited (CAPCO).

1.3 PURPOSE AND NATURE OF PROJECT

CLP Power Hong Kong Limited (CLP) / CAPCO has been operating the Castle Peak A Power Station (CPA or the "Project site") of the Castle Peak Power Station (CPPS) since the 1980s, which is comprised of 4 coal-fired power generating units (A1 to A4 each with a capacity of 350MW). CLP has also been operating the Castle Peak B Power Station (CPB) of CPPS since the 1980s, which is comprised of 4 coal-fired power generating units (B1 to B4, each with a capacity of 677MW).

CPA is planned for progressive retirement. CLP proposes to decommission and demolish the CPA units as well as the associated equipment, buildings and structures as early as 2027 to render the area ready for future development. Potential future development within the Project site would be of industrial use related to power generation. The location of the Project site is shown in **Figure 1.1**.

This Project covers only the decommissioning and demolition works of CPA. In case of future development, separate study(ies) will be carried out to address any potential environmental impact associated with the future development as appropriate when relevant information is available.

1.4 LOCATION AND SCALE OF PROJECT

1.4.1 DETAILS OF THE PROJECT

The Project site has an area of approximately 94,000m^2 and is located within the CPPS (see **Figure 1.1**). The proposed works of the Project includes decommissioning and demolition of the coal-fired electricity generating Units A1, A2, A3 and A4, the boiler house, turbine hall, chimney stack, as well as the associated equipment and structures at CPA. General site clearance will also be carried out for the existing area of CPA. All work will be undertaken within the Project site boundary as shown in **Figure 1.1**. The major buildings and structures to be demolished and their relevant information is presented in **Table 1.1**, with locations shown in **Figure 1.2**.

TABLE 1.1 INFORMATION OF MAJOR BUILDINGS AND STRUCTURES TO BE DEMOLISHED

Major Buildings / Structures	Storeys of Buildings / Structures	Approx. Height of Buildings/ Structures (mPD)
Turbine Hall	1 storey	36
Electrical Annexes	1 storey	18
Mechanical Annexes	1 storey	41
Bunker Bay & Auxiliary Bay	2 storeys	46
Boiler House Structure	1 storey	61
215m Chimney	1 storey	215
Electrostatic Precipitators (8 No.)	-	-
Ash Plant Substation	1 storey	5
Compressor Plant House	1 storey	8
Fuel Oil Pumphouse	1 storey	7
Control Block Workshop & Stores	5 storeys	21
Administration Building	3 storeys	23
Generator Transformers (4 No.)	1 storey	18
Station Transformers (2 No.)	1 storey	6
Black Start Diesel Generator	1 storey	6
Unit Auxiliary Transformers (4 No.)	1 storey	4
Station Stand-by Transformer	1 storey	4
Station Auxiliary Transformers (2 No.)	1 storey	4
Electro-chlorination Plant House	1 storey	5
LPG Store	1 storey	4
Ash Plant Welfare Building	1 storey	4
Off-site Dust Disposal Compressor House (Off-site Dust Disposal Comp. House)	1 storey	6
Precipitator Control Buildings (4 No.)	1 storey	16
Sulphur Store	1 storey	8
Fire Fighting Workshop	1 storey	3
Junction House No. 4	1 storey	17
Oil Separator [b]	-	-
Ash Pits [b]	-	-

Notes:
(a) mPD – metres above Principal Datum
(b) Underground structures

1.4.2 DEMOLITION OF BUILDINGS AND ASSOCIATED EQUIPMENT

The preferred method of demolition at CPA shall be mechanised demolition, as it requires fewer personnel to be exposed to the hazards of the demolition workface (thereby lowering the risk of a health and safety incident), and benefits from increased production rates over manual demolition methods. Typical construction equipment such as electric/ mechanical breakers, flame cutting, grinder, hydraulic crusher, overhead crane and other powered mechanical hand tools will be used during demolition works.

Manual demolition techniques cannot be excluded entirely as it may be appropriate for precision demolition works; however, manual demolition methods will be considered only once alternative demolition methods are excluded.

The existing CPA units as well as its associated buildings and equipment (including aboveground and foundation structures) as mentioned in **Section 1.4.1** will be decommissioned and demolished in phases. The decommissioning and demolition of CPA would include the plant equipment, the buildings/ structures, the 215m chimney and finally the Hanging Boilers & Boiler House. The buildings and structures will be demolished down to footings and pile caps. Key items in the demolition process are generally described below, although the sequence and timeline may be subject to change during the working process:

Perimeter Demolition – Buildings and other facilities located on the west end of the Boiler House will be demolished. Concurrent to demolition of these above-ground facilities (i.e. Ash Plant Substation, Compressor Plant House, Off-site Dust Disposal Comp. House, Ash Plant Welfare Building, Station Auxiliary Transformers, and LPG Store), mechanical appurtenances, piping, pumps and other equipment, will be removed from the Oil Separator and Ash Pits, followed by the railings, steel stairs, and other steelwork. The pits will then be cored/broken at an elevation approximately equal to the groundwater table, and backfilled with either gravel/crushed concrete or foam concrete to the same elevation as the surrounding ground level. Once the pits have been backfilled to the appropriate elevation they could be used as part of the laydown area if needed.

Laydown Area – With no existing open area within the Project site or in the vicinity of the Project site, it will be necessary to create a laydown area within the demolition zone of the Project site. Given the Perimeter Demolition process described above, an initial laydown area will be created within the footprint of the Ash Plant Substation/Compressor Plant House, Ash Plant Welfare Building, and Off-Site Dust Disposal Comp. House after these buildings have been demolished. As space will be limited, demolition materials may be processed in place and directly loaded into trucks for transport to off-site recycling facilities, public fill facilities, and/ or landfill sites. After demolition of the coal conveyors, the laydown area may be expanded and relocated as necessary to improve the efficiency of material handling.

Coal Conveyor and Junction House No. 4 – Once demolition of perimeter buildings as mentioned above has been completed and laydown area established, demolition of the coal conveyors and Junction House No. 4 will commence. The demolition of the coal conveyors within the Project site would allow separation and restoration of Junction House No. 3.

Electrostatic Precipitators, Flues, and Ducting – Demolition of the Electrostatic Precipitators (including the associated flues and ducting) shall begin once the coal conveyors

have been removed to provide access. At this time the Precipitator Control Buildings, Sulphur Store, Firefighting Workshop, and Fuel Oil Pumphouse will also be demolished.

Main & Auxiliary Transformers – Once the Electrostatic Precipitators and the associated flues and ducting have been removed, and the Sulphur Store has been demolished, access to the transformers will be provided by means of a temporary road parallel to the Central Road West. The main and auxiliary transformers (i.e. Generator Transformers, Station Transformers, Unit Auxiliary Transformers, and Station Stand-by Transformer) will be demolished using excavators with shear attachments. The Black Start Diesel Generator will be demolished as well.

Turbine Hall – Demolition of the Turbine Hall, including the Electrical Annexes and Mechanical Annexes, will commence following demolition of the main and auxiliary transformers. Equipment, piping, ducting and other non-structural items will be removed from the Turbine Hall ground floor in order to provide access for heavy equipment. Thereafter the turbines, generators, turbine pedestals, and the overall structure will be demolished in sequence. The structure will be demolished starting from the east end and moving towards the west, moving one bay at a time.

Bunker Bay & Auxiliary Bay – Demolition of the Bunker Bay and Auxiliary Bay will proceed after demolition of the Turbine Hall structure (including the Electrical Annexes and Mechanical Annexes) is complete. The works will commence with removal of equipment, piping, ducting, and other internal, non-structural, items, followed by progressive, top-down, dismantlement of the structure, one bay at a time, starting at the east end and moving to the west.

215m Chimney – Demolition of the 215m Chimney will commence once the Electrostatic Precipitators have been demolished and the area beneath the crane is clear to allow safe execution of the tower crane lifting operations. The 215m Chimney will be demolished using a top-down method, allowing the stack to be dismantled in small pieces and individual pieces dropped into the chimney, so as to reduce dust generation.

Hanging Boilers and Boiler House – Once the Electrostatic Precipitators have been removed and the area south of the Boiler House has been cleared, excavators, cranes and other heavy equipment will be able to access the Boiler House to commence the demolition works. The preparation of the boilers for lowering using the hydraulic jacks will proceed in series and be executed in parallel with demolition of the Transformers, Turbine Hall, and Auxiliary and Bunker Bays. Transfer of the boiler load to the hydraulic jacks will be carried out for subsequent demolition of the boilers (combustion chamber and economizer to be lowered and demolished separately, in series). Demolition of the Boiler House structure would commence once demolition of the initial two boiler units has been completed.

Other Buildings and Structures – The Administration Building, and the Control Block Workshop & Stores will also be demolished by conventional top-down demolition method down to footings and pile caps. The Electro-chlorination Plant House (located further west) will also be demolished as part of this Project.

Concrete Slabs and Foundations – Removal of concrete slabs and foundations will be completed as part of the demolition process.

1.5 HISTORY OF THE PROJECT SITE

The CPA is located within the CPPS. CPPS is situated on a 62-hectare site at Tap Shek Kok of Tuen Mun, New Territories, which was gazetted and granted to CLP in June 1978. The CPA was developed in phases and comprises four coal-fired units of 350MW each at CPA (Units A1 to A4). The coal-fired units of CPA (A1, A2, A3 and A4) were commissioned in 1982, 1983, 1984 and 1985, respectively. Unit A1 of CPA was put into reserve to run only in emergency situations, after coming to the end of its asset life in 2022.

1.6 NUMBER AND TYPE OF DESIGNATED PROJECT TO BE COVERED BY THIS PROJECT PROFILE

The decommissioning and demolition of the coal-fired units (i.e. Units A1, A2, A3 and A4 of CPA) and the associated equipment and buildings/ structures at CPA are classified as a Designated Project under Schedule 2, Part II, Item 4 - "Decommissioning Projects: *An electricity power plant running on fossil fuel with a production capacity of more than 100 megawatts"* under the *Environmental Impact Assessment Ordinance* (EIAO) (Cap. 499).

This Project Profile was prepared to seek permission to apply directly for an Environmental Permit (EP) for the project under Section 5(11) of the EIAO. The environmental impact of the Project is unlikely to be adverse. Based on this, the Project shall meet the requirement of *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM) to apply directly for the EP.

1.7 NAME AND TELEPHONE NUMBERS OF CONTACT PERSONS

ERM-Hong Kong, Limited (ERM) has been appointed to undertake the environmental permitting for this Project on behalf of the Project proponent. All queries regarding the project can be addressed to:

ERM

Attention: Dr. Jasmine Ng, Managing Partner

Telephone: (852) 2271 3000

Fax: (852) 3015 8052

Or the Project Proponent:

CLP/ CAPCO

Attention: Ms. Hilda Chiu, Senior Project Manager

Telephone: (852) 2678 5205

Fax: (852) 2678 5219

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 PROJECT PLANNING AND IMPLEMENTATION

The decommissioning and demolition work of the CPA units and its associated equipment, buildings and structures will be carried out in phases tentatively starting from 2027. The tentative implementation milestones of the Project are summarised in **Table 2.1** below. The actual work programme will be subject to further engineering review.

TABLE 2.1 KEY IMPLEMENTATION MILESTONES

Key Milestones	Tentative Programme
Site Establishment / Preliminary Works	Q3 2027 – Q2 2028
Demolition of Building Superstructures and Substructure	Q3 2028 – Q4 2031
Demolition of 215m Chimney	Q2 2029 – Q4 2030
Demolition of Hanging Boilers	Q1 2030 – Q2 2031
Site Restoration / Clearance Works	Q3 2031 – Q2 2033

Decommissioning and demolition of CPA units and its associated equipment, buildings and structures as well as the overall site restoration/ clearance works is to be carried out in phases across a period of about 5-6 years to suit CLP's long-term strategic planning development. The time needed for undertaking land contamination site investigation (SI) works and subsequent remediation works (if required) has been taken into account in the overall project programme, where demolition of substructures involving excavation works will only be conducted upon completion of the SI works and remediation works (if required) and confirmation that the concerned areas are clear of land contamination.

The proposed decommissioning and demolition works will be planned with consideration of land usage constraints, technical feasibility, supply and security, health and safety, and environmental aspects by CLP's in-house engineers. Works of the Project will be carried out by the contractor appointed by CLP.

2.2 INTERACTIONS WITH OTHER SURROUNDING PROJECTS

There are no existing, committed or planned projects in the vicinity of the Project site which may potentially interface with this Project.

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

The existing environment of the Project site within 500m of the boundary of the Project and works areas is shown in **Figure 3.1**.

The Project will be implemented within the boundaries of the existing CPPS, which is zoned as "Other Specified Uses" and annotated "Power Station" on the approved Tuen Mun Outline Zoning Plan (OZP) No. S/TM/39. The restored Siu Lang Shui (SLS) Landfill lies to the north-east of the CPPS. The restored SLS Landfill is currently zoned "Green Belt" on the approved OZP. CPA is adjacent to the Castle Peak B Power Station of CPPS (CPB).

4. POTENTIAL IMPACTS ON THE ENVIRONMENT

4.1 OVERVIEW OF POTENTIAL ENVIRONMENTAL IMPACTS

The potential environmental impacts arising from the decommissioning and demolition of the Project have been investigated and discussed in this *Section*. An overview of the potential environmental impacts associated with the Project have been identified and summarised in **Table 4.1**.

The key potential impacts from the Project during decommissioning and demolition works are related to air quality, noise, water quality, waste management and land contamination. Further details on the consideration of the potential environmental impacts are provided in subsequent sections.

TABLE 4.1 POTENTIAL ENVIRONMENTAL IMPACTS ARISING FROM THE PROJECT DURING DECOMMISSIONING/ DEMOLITION PHASE

Potential Impacts	**Decommissioning/ Demolition Phase [a]**
Air Quality - Construction dust - Gaseous emissions - Odour	 ✓ ✓ —
Noise	✓
Night-time Operations	✓
Traffic Generation	✓
Liquid Effluents & Discharges	✓
Generation of Waste or By-products	✓
Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods	—
Hazard to Life	—
Disposal of Spoil Material, including Potentially Contaminated Materials	✓
Disruption of Water Movement or Bottom Sediment	—
Change in Visual Appearance	✓
Cultural & Heritage	—
Terrestrial Ecology	—
Marine Ecology & Fisheries	—

Note:
a) ✓ **=** Possible '—' = Not Expected

4.2 AIR QUALITY

4.2.1 AIR SENSITIVE RECEIVERS

One representative air sensitive receivers (ASRs) outside of CPPS have been identified within 500m from the Project site boundary as shown in **Figure 4.1** and listed in **Table 4.2**. The CPB Administration Building within CPPS is about 190m from the Project site.

TABLE 4.2 IDENTIFIED REPRESENTATIVE AIR SENSITIVE RECEIVERS OUTSIDE OF CPPS

ASR ID.	Description	Type of Use	Approximate Distance from the Project Site Boundary (m)
A1	Green Island Cement Plant Administration and Service Building	Industrial	493

4.2.2 POTENTIAL SOURCES OF IMPACTS

Potential sources of air quality impacts during decommissioning/ demolition phase include:

- fugitive dust emissions (key air pollutants including respirable suspended particulates (RSP) and fine suspended particulates (FSP)) generated from the demolition of the aboveground equipment and structures, and excavation works required for removal of these equipment and foundation structures;
- emissions from the on-site use of powered mechanical equipment (PMEs) (key air pollutants including nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), RSP and FSP);
- emissions from dump trucks and marine vessels (including NO_2, SO_2, CO, RSP and FSP) for transportation of C&D materials off-site from CPA; and
- Toxic Air Pollutant (TAP) emissions from the remediation works of contaminated materials (including the compounds of Heavy Metals, Volatile Organic Compounds (VOCs) and Semi Volatile Organic Compounds (SVOCs) that are regarded as TAPs), should land contamination be identified.

CPA units shall have been retired with the associated buildings/ structures listed in **Table 1.1** no longer in active operation prior to the carrying out the decommissioning/ demolition works. Any chemicals, furnace bottom ash and fly ash would be removed and handled in accordance with relevant regulations prior to the implementation of the Project. As such, there would be no potential release of air pollutants from stored chemicals, residual furnace bottom ash or fly ash during the demolition of the CPA units and the associated buildings/ structures under this Project. In addition, given that the Electrostatic Precipitators were in place to filter the flue gas and the fly ash was collected for disposal, fly ash adhering in the inner side of the chimney is not expected.

Asbestos containing materials (ACMs) may be present in the CPA units and the associated equipment and buildings/ structures. There is a potential the ACMs may be released from the decommissioning and demolition of these units and associated equipment and buildings/ structures, if not managed and controlled properly. A Registered Asbestos Consultant shall be employed to undertake an asbestos survey to identify the presence of ACMs, if any, in these units and associated equipment and buildings/ structures and submit an Asbestos Investigation

Report (AIR) to EPD for approval. Should any ACM be found present, an Asbestos Abatement Plan (AAP) shall be prepared by the Registered Asbestos Consultant in accordance with the *Air Pollution Control Ordinance* (Cap.311) and *Codes of Practice on Asbestos Control*, and submitted to EPD for approval. The ACM would subsequently be removed by a registered asbestos contractor in accordance with the approved AAP prior to the commencement of the decommissioning and demolition works of the Project. The registered asbestos contractor is required to strictly follow the precautionary and proper removal procedures given in the approved AAP and in accordance with the APCO and the *Codes of Practice on Asbestos Control*. With the proper implementation of regulatory procedures of handling ACMs, the release of asbestos from ACMs and its potential air quality impact is not envisaged.

4.2.3 EVALUATION OF IMPACTS

Fugitive Dust Emissions

Site clearance, decommissioning and demolition of the units and the associated equipment and buildings/ structures will all be carried out within the existing CPA and CPPS site. Most of the works associated with the Project will involve demolition of aboveground equipment and structures. No major site formation will be required, except for the excavation works required for removal of foundation structures.

The estimated total quantity of excavated material from the excavation works is conservatively estimated to be approximately 235,000 m^3, assuming a maximum excavation depth of 2.5m across the approximately 94,000 m^2 of the Project site. The excavation works will be carried out in phases throughout the construction period, with active excavation area of no more than 10,000 m^2 at any one time. Generation of fugitive dust emissions during decommissioning and demolition of the Project is expected to be localised within CPA. Considering that the nearest ASR outside of CPPS is approximately 493m away from the Project site boundary, adverse fugitive dust impact on ASRs outside of CPPS during decommissioning/demolition phase is not anticipated, provided that good construction site practices and relevant mitigation measures recommended in the *Air Pollution Control (Construction Dust) Regulation* are properly implemented.

It is noted that the CPB Administration Building is located approximately 190m south-east of the Project site within the CPPS. With the proper implementation of good construction site practices and relevant mitigation measures recommended in the *Air Pollution Control (Construction Dust) Regulation* and those listed in **Section 5.1**, CLP staff in the CPB Administration Building are not expected to be subject to adverse cumulative air quality impact arising from the demolition works under this Project. No other existing, committed or planned projects within 500m of the Project site may potentially interface with this Project, as confirmed by CLP. Furthermore, CLP will carry out administrative measures as appropriate and maintain good communication with their staff in the CPB Administration Building during the implementation of the Project to minimise any potential air quality impact to their staff as far as possible.

TAP Emissions from the Remediation Works of Contaminated Materials

Excavation of contaminated materials for remediation works may be required should land contamination be identified (see **Section 4.7.5**).

The excavation of contaminated materials may potentially lead to fugitive emission of TAPs. The TAP compounds that will potentially be emitted will depend on the contaminants in the soil, which will be analysed during the SI works.

Phasing of the excavation of contaminated materials and decontamination works will be considered as far as practicable. The excavation of the contaminated area will also be limited to no more than 10,000 m² at any one time. The excavation-related mitigation measures (e.g. dust suppression during excavation and covering stockpiles with impermeable sheet especially at the potentially contaminated areas and hotspots identified in Figure 4.1 of the Contamination Assessment Plan in **Appendix A**) will be implemented to suppress the fugitive release of TAPs from the contaminated excavated materials.

The contaminated materials will be treated eventually by bio-piling (for VOCs and SVOCs mitigation) and cement solidification (for Heavy Metal mitigation) as part of the mitigation measures for remediation works. Both bio-piling and cement solidification will be performed in an enclosed environment, such that fugitive release of TAPs during these remediation processes are unlikely. In particular to bio-piling, the vented emission will also pass through the activated carbon filter (with 99% VOC removal efficiency) to absorb VOCs. Adverse air quality impact from VOCs from the bio-pile discharge vent is thus not expected. Soil gas monitoring will also be conducted at the bio-pile discharge vents to ensure the activated carbon filter removal performance of VOCs.

Considering that the nearest ASR outside of CPPS is approximately 493m away from the Project site boundary, adverse TAP impact on ASRs outside of CPPS during decommissioning/demolition phase is not anticipated, provided that the excavation-related mitigation measures in **Section 5.1** and mitigation measures for remediation works in **Section 5.5** are properly implemented.

<u>Emissions from the On-site Use of PMEs</u>

It is estimated that no more than 40 pieces of on-site Power Mechanical Equipment (PMEs) will be operating at a time within the Project site. In view of the large separation distance between the nearest ASR outside of CPPS and the Project site (i.e. approximately 493m apart), adverse air quality impact from emissions from on-site PMEs to the ASRs outside of CPPS during decommissioning/ demolition phase is not anticipated.

With the proper implementation of the requirements stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation*, *Air Pollution Control (Fuel Restriction) Regulation* and *Air Pollution Control (Smoke) Regulation* to control the emissions from the on-site PMEs, air quality impact arising from the emissions from the on-site PMEs to CLP staff in the CPB Administration Building is expected to be limited. In addition, power supply for on-site machinery will be provided if feasible, avoiding the use of diesel generators and machinery as far as practicable. The use of exempted Non-Road Mobile Machinery (NRMMs) on site will also be avoided. In view of the above, adverse air quality impact from emissions from the on-site use of PMEs during decommissioning/ demolition phase is not anticipated.

<u>Emissions from Dump Trucks and Marine Vessels</u>

Dump trucks and marine vessels (e.g. barges, via the Heavy Loading Berth (HLB)) will be used for delivering C&D materials off-site to public fill reception facilities or landfill sites. With respect to C&D material delivery off-site, it is expected that there will be no more than 60

truck trips per day for road transportation, or no more than 3 vessel trips per week for marine transportation with only one vessel travelling to and from the CPA HLB at a time. Such estimate of maximum induced truck trips is not expected to significantly increase the traffic flow of the nearby roads [(1)]. The manoeuvring route of the vessels will be kept as far away as possible from the ASRs. The berthing at the HLB is more than 500m from the identified ASRs, including the CPB Administration Building. With the limited contribution of dump trucks to the traffic at nearby roads, limited number of marine vessels used and sufficient separation distances from the nearby ASRs, air quality impact due to emissions from the dump trucks and marine vessels is expected to be limited.

Furthermore, *Air Pollution Control (Marine Light Diesel) Regulation* and *Air Pollution Control (Fuel for Vessels) Regulation* will be followed to control the fuel use for marine vessels of the Project, including the limitation of 0.05% sulphur content in marine diesel fuel. In addition, when at berth, the main engine of marine vessels will be switched off, and only the auxiliary engine may be in use for the loading and unloading operation.

Taking into consideration of the above, adverse air quality impact due to emissions from dump trucks and marine vessels during the decommissioning/demolition phase of the Project is not anticipated.

4.3 NOISE

The demolition works for the Project will involve the use of PMEs, including those for concrete breaking works, which have the potential to cause elevated noise levels. There are no representative Noise Sensitive Receivers (NSRs) identified within 300m from the Project site, in accordance with the criteria stipulated in Annex 13 of the *EIAO-TM*. The closest existing residential uses are the villages nearby Lung Kwu Tan north of CPA approximately 570m away, also shown in **Figure 4.2**. Proper noise mitigation measures as discussed in **Section 5** will be implemented as far as practicable in all stages of the Project, and that the chimney demolition will only be carried out during non-restricted working hours, to minimise any potential noise disturbances to the identified NSRs.

Given the large separation distance between the Project site and the identified NSRs, adverse noise impact from the decommissioning and demolition of the Project is not expected with proper noise mitigation measures in place, including the use of quieter construction methods/ equipment.

4.3.1 NIGHT-TIME OPERATION

Decommissioning and demolition works of the Project are expected to be performed during non-restricted working hours, i.e. between 0700 and 1900 hours on any day not being a Sunday or general holiday. However, construction works during restricted working hours may potentially be required on an as-needed basis throughout the decommissioning/ demolition phase of the Project. Under such circumstances, a Construction Noise Permits (CNP) shall be obtained in accordance with the requirements of the *Noise Control Ordinance (NCO)*. The

(1) With reference to the Annual Traffic Census 2022 published by Transport Department, the Annual Average Daily Traffic (AADT) at the nearby roads are in the range of 6780 to 32810 (i.e. station 5481: 6780 and station 6656: 32810). The maximum induced traffic –120 per day (assuming 2-way flows as a return truck trip) contributes to 1.8% to <1% only.

Noise Control Authority will consider a well-justified CNP application, for construction works within restricted hours as guided by the relevant TMs issued under the NCO. The Noise Control Authority will take into account the contemporary situations/ conditions of the adjoining land uses and any previous complaints against construction activities at the site before making a decision. Nothing in this PP shall bind the Noise Control Authority in making its decision. The Noise Control Authority may include any conditions in a CNP that it considers appropriate. Failure to comply with any such conditions may lead to cancellation of the CNP and prosecution action under the NCO.

4.4 WATER QUALITY

The Project Site is located within the catchment of the North Western Water Control Zone under the *Water Pollution Control Ordinance (WPCO)* and fronts the marine waters on its south-western and western boundaries. The marine water quality data from the nearest EPD monitoring station (i.e. NM5) in 2022 is provided in **Table 4.3**. Water quality near CPA has achieved a high overall Water Quality Objectives (WQO) compliance rate in 2022, except for WQO exceedance of Total Inorganic Nitrogen (TIN), which is a result of both the relatively high contributions from the Pearl River as well as the stringent criterion for TIN at the North Western WCZ.

TABLE 4.3 SUMMARY OF EPD ROUTINE WATER QUALITY MONITORING DATA FROM STATION NM5 OF THE NORTH WESTERN WCZ IN 2022

Parameter	Unit	NM5
Temperature	°C	24.5
		(15.9 – 29.4)
Salinity		27.3
		(19.7 – 33.1)
Dissolved Oxygen	mg/L	5.5
		(4.1 – 6.8)
Dissolved Oxygen (Bottom)	mg/L	5.2
		(3.5 – 7.0)
Dissolved Oxygen	% Saturation	77
		(56 – 86)
Dissolved Oxygen (Bottom)	% Saturation	73
		(51 – 87)
pH		7.6
		(7.1 – 8.0)
Secchi Disc Depth	m	1.9
		(1.2 – 2.7)
Turbidity	NTU	32.8
		(4.1 – 120.0)

Parameter	Unit	NM5
Suspended Solids	mg/L	10.4
		(2.6 – 30.0)
5-Day Biochemical Oxygen Demand	mg/L	0.5
		(<0.1 – 0.9)
Ammonia Nitrogen	mg/L	0.094
		(0.034 - 0.177)
Unionised Ammonia	mg/L	0.002
		(<0.001 – 0.005)
Nitrite Nitrogen	mg/L	0.057
		(0.011 – 0.120)
Nitrate Nitrogen	mg/L	0.356
		(0.066 – 0.917)
Total Inorganic Nitrogen	mg/L	0.51
		(0.20 – 1.02)
Total Kjeldahl Nitrogen	mg/L	0.39
		(0.13 – 1.15)
Total Nitrogen	mg/L	0.81
		(0.42 – 1.23)
Orthophosphate Phosphorus	mg/L	0.016
		(0.005 – 0.038)
Total Phosphorus	mg/L	0.06
		(0.04 – 0.10)
Silica (as SiO_2)	mg/L	2.24
		(0.72 – 5.47)
Chlorophyll-*a*	µg/L	1.4
		(0.5 – 3.4)
E. coli	counts/100mL	41
		(4 – 770)
Faecal Coliforms	counts/100mL	89
		(8 – 1400)

Notes:
(a) Unless otherwise specified, data presented are depth-averaged (A) values calculated by taking the means of three depths: Surface (S), Mid-depth (M), Bottom (B).
(b) Data presented are annual arithmetic means of the depth-averaged results except for *E. coli* and faecal coliform which are annual geometric means.

Parameter	Unit	NM5

(c) Data in brackets indicate the ranges.
(d) During the periods of the special work arrangement under the COVID-19 pandemic in 2022, marine water quality monitoring frequency was adjusted and sampling at representative monitoring stations were maintained. Full scale monitoring was conducted in the periods of January to February and April to December 2022.

The water sensitive receivers (WSRs) that may be affected by changes in water quality arising from the Project have been identified in **Table 4.4** and shown in **Figure 4.3**. It is noted that the only WSR within the 500m Assessment Area for water quality is the CPPS Seawater Intake. The nearest bathing beach (a non-gazetted beach) is at Lung Kwu Tan approximately 640m away, while the second nearest (a gazetted beach) is Butterfly Beach at approximately 3.3 km away.

TABLE 4.4 WATER SENSITIVE RECEIVERS IN THE VICINITY OF THE PROJECT SITE

WSR ID.	Description	Type of Land Use	Approximate Distance from the Project Site Boundary (m)
W1	Castle Peak Power Station Intake	Industrial	167

The Project works primarily involve decommissioning and demolition of aboveground equipment and buildings/ structures and thus wastewater is expected to be generated from the construction site. Construction site discharge will be collected and treated on site before discharge following a discharge licence to be issued under the WPCO. In addition, sewage will be generated from the construction workforce during the decommissioning and demolition works. Temporary toilets will be provided to collect sewage from the construction workers for off-site disposal on a regular basis. With implementation of good construction site practice, including the *Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN2/23)* and other relevant guidelines and statutory requirements, unacceptable water quality impact from the decommissioning and demolition works is not anticipated.

4.5 WASTE MANAGEMENT

The site clearance, decommissioning and demolition activities of the Project will result in the following broad categories of waste:

- Construction and demolition (C&D) materials from site clearance and demolition of plant equipment and buildings, including excavated materials (soil and rock) from the demolition of building foundations;
- Chemical waste, such as ACMs, leftover diesel, petroleum products or chemicals from the equipment and oil tanks to be demolished, as well as from maintenance of construction vehicles and equipment during demolition works; and
- General refuse, including food waste from the on-site construction workforce and the packaging materials generated during demolition works.

4.5.1 C&D MATERIALS

The estimated quantity of C&D materials generated from the demolition of major plant equipment and buildings/ structures is summarised in **Tables 4.5** and **4.6.**

TABLE 4.5 ESTIMATED QUANTITY OF C&D MATERIALS GENERATED DURING THE DECOMMISSIONING AND DEMOLITION WORKS

Activity	Major Equipment / Buildings to be Demolished	Estimated Quantity
Demolition of Plant Equipment	Hanging boiler systems, condensate system, air & flue gas system, coal-firing system, lubrication oil system, oil pump system, generator/ unit/ auxiliary transformers, chemical dosing system, electrostatic precipitators, coal handling system, ash handling system, other associated system/ equipment	106,000 m^3
Demolition of Buildings/ Structures	Turbine Hall, Electrical Annexes, Mechanical Annexes, Bunker Bay & Auxiliary Bay, Boiler House Structure, 215m Chimney, Ash Plant Substation, Compressor Plant House, Fuel Oil Pumphouse, Control Block Workshop & Stores, Administration Building, Electro-chlorination Plant House, Ash Plant Welfare Building, Off-site Dust Disposal Comp. House, Precipitator Control Buildings, Sulphur Store, LPG Store, Fire Fighting Workshop, Junction No. 4	500,000 m^3
Excavated Materials	Excavated materials (e.g. soil, rock) arising from demolition of building/ structure foundations, assuming an excavation area of approximately 94,000m^2 with a depth of about 2.5m.	235,000m^3

TABLE 4.6 BREAKDOWN OF C&D MATERIALS TO BE GENERATED DURING THE DECOMMISSIONING AND DEMOLITION WORKS

Type of C&D Materials	Estimated Quantity			Proposed Handling/ Disposal Method
	Generated	On-site Reuse	Off-site Recycling/ Disposal	
Inert C&D Materials: Buildings/ Structures (e.g. broken concrete)	500,000 m^3	To be prioritised, subject to actual site condition and the operational requirements	Up to 500,000 m^3	• Reused on-site • Sent to public fill reception facilities (i.e. Tuen Mun Fill Bank, Tseung Kwan O Fill Bank) via road or marine transportation (a)
Inert C&D Materials: Excavated Materials (i.e. soil, rock)	235,000 m^3	To be prioritised, subject to actual site condition and the operational requirements	Up to 235,000 m^3	• Reused on-site • Sent to public fill reception facilities (i.e. Tuen Mun Fill Bank, Tseung Kwan O Fill Bank) via road or marine transportation (a)

Type of C&D Materials	Estimated Quantity			Proposed Handling/ Disposal Method
Non-inert C&D Materials (e.g. salvageable equipment, spare part inventories, scrap metals)	106,000 m^3	-	106,000 m^3	• Off-site recycling • Disposed of at landfill sites (e.g. West New Territories (WENT) Landfill) via road transportation [(b)]

Notes:
(a) The final destination of inert C&D materials is subject to the designation by the Public Fill Committee according to DEVB TC(W) No.6/2010.
(b) The disposal of non-inert C&D materials at the designated landfill shall be subject to agreement with the relevant section of the EPD.

C&D materials generated from demolition of plant equipment and buildings/ structures would be primarily inert (e.g. broken concrete, excavated soil, etc.) and non-inert (e.g. salvageable equipment, spare part inventories, scrap metals). Given the excavation depth of only about 2.5 m across the site, no land-based sediment is anticipated from the excavated materials. Before commencing the plant demolition activities, all salvageable equipment with commercial value shall be removed and placed into storage for subsequent sale. This may include spare part inventories, pumps, motors, compressors, valves, and similar equipment. The lifting crane are available in a number of buildings (e.g. ground level of the Boiler House, Turbine Hall, etc.) for maintenance of the plant and equipment of CPA and the lifting crane may be utilised for moving the dismantled or cut equipment.

The C&D materials (inert and non-inert) will be segregated at source and temporarily stored on site. Temporary stockpiling locations within the laydown area will be set up within the south-western corner of the Project site, as shown in **Figure 4.4** and may be used for temporarily stockpiling the C&D materials, though the actual locations would depend on site conditions during construction phase and will be subject to engineering conditions. Non-inert C&D materials such as scrap metals will be recovered for recycling. The C&D materials will be reused on-site as a first priority, while any excess C&D materials shall be delivered off-site for recycling at the public fill reception facilities (inert) or disposal at landfills (non-inert). It is estimated that a total of 841,000 m^3 of C&D materials (i.e. 500,000 m^3 from demolition of buildings/ structures, 235,000 m^3 from excavated soil materials and 106,000 m^3 from non-inert C&D materials) will be generated. The inert C&D materials will be prioritised for recycling or reuse for backfilling, but in view of the limited available space within the Project site for crushing, sorting and handling of C&D materials on site, as well as the potential for generation of air emissions from such C&D material handling activities, it is expected that the inert C&D materials will primarily be sent to public fill reception facilities, either the Tuen Mun Fill Bank (TMFB) by truck via Lung Mun Road (travelling distance is about 3.5km) or by barge (about 3 km from CPA), or the Tseung Kwan O Fill Bank (TKOFB) (about 40 km from CPA).

It is estimated that the delivery of the C&D materials off-site would require no more than 60 truck trips per day or 3 barge trips per week. In view of the limited number of truck/ barge trips required, adverse road and marine traffic impact as well as environmental impact (including dust, noise, water quality) arising from the Project is not expected with implementation of good construction site practices.

4.5.2 CHEMICAL WASTE

Chemical waste will be primarily generated from maintenance of construction vehicles and equipment during demolition works. The exact amount of such chemical waste is difficult to quantify since it will be highly dependent on the contractor's on-site maintenance activities and the quantity and/ or types of plant and equipment utilised. As an initial estimation, it is anticipated that the quantity of chemical waste to be generated from maintenance of construction vehicles and equipment during demolition works is in the order of few hundred litres per month throughout the decommissioning and demolition works of the Project. The amount of chemical waste to be generated shall be quantified in the Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) to be prepared by the Contractor in the subsequent construction stage.

The chemical waste generated from the Project will be collected by licensed chemical waste collectors and delivered to the licensed chemical waste treatment facilities for disposal (i.e. Chemical Waste Treatment Centre (CWTC) in Tsing Yi). The contractor will register with EPD as a chemical waste producer as appropriate in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*. With the incorporation of suitable arrangements for the storage, handling, transportation and disposal of chemical wastes under the requirements stated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*, no adverse environmental impact or other hazards is anticipated to arise from the handling, transportation and disposal of chemical waste of the Project.

4.5.3 GENERAL REFUSE

It is conservatively estimated that a maximum of 300-400 construction workers will be working on site at any one time during the decommissioning and demolition works of the Project. With a general refuse generation rate of 0.65 kg per worker per day, the maximum amount of general refuse to be generated by the construction workforce will be about 195-260 kg per day. To reduce the quantity of general refuse to be disposed of at landfill, recyclable materials (i.e. paper, plastic bottles, aluminium cans and glass bottles) and food waste will be segregated on-site for off-site recycling. Adequate number of enclosed waste containers and recycling bins will be provided in prominent places to avoid over-spillage of waste and/ or recyclable materials and to promote source separation of waste. The non-recyclable refuse will be placed in bags and collected together with other general refuse generated from the CPPS by existing waste management contractor at CPPS, and subsequently disposed of at the landfills directly or via Outlying Island Transfer Facilities on a daily basis. Given that the quantity of general refuse to be disposed of at the landfills is small, no adverse impact on the operation of the landfills is anticipated. With proper housekeeping measures and refuse collection in place, no adverse environmental impacts (including air and odour, noise, water quality) caused by storage, handling, transport and disposal of general refuse are expected.

4.6 LAND CONTAMINATION

4.6.1 SITE APPRAISAL

The site appraisal comprising desktop review and site walkover has been carried out to review the current and past land uses, historical aerial photographs and maps historical spillage and

leakage records, (hydro) geology and underground soil profile to identify the potential for causing land contamination at the Project. A Contamination Assessment Plan (CAP) has been prepared to present the details of the site appraisal and necessary SI works and testing plan for the Project. The CAP is presented in detail in **Appendix A**.

4.6.2 POTENTIAL CONTAMINATION ISSUES

According to the *Practice Guide for Investigation and Remediation of Contaminated Land* (the *Practice Guide*) issued by the EPD, based on the findings of the site appraisal presented Section 3 of the CAP (**Appendix A**), the potentially polluting activities of a power plant include: storage, transfer and use of fuels, oils and chemicals; storage, treatment and disposal of combustion residues; and storage and handling of coal. These activities are mainly located at the CPA Station Building, electrostatic precipitator system area and the areas consisting of other auxiliary plants. Furthermore, the open storage area, scrap yard and maintenance areas involve potentially polluting activities such as release of oil, fuel and lubricants from equipment maintenance, refueling and scrap metals, as well as the use of chemicals in maintenance activities. Therefore, these areas within the Project site are considered as potentially contaminated area.

As per the *Practice Guide*, it is recommended to investigate the potentially contaminated area in a regular grid pattern to have a comprehensive study on the potential land contamination site. Apart from the regular grid pattern, the *Practice Guide* also requires that attention should be paid to those locations where potential land contamination could occur. These are regarded as "hot spots" for investigation.

The hot spots are identified at the potential contaminated area and Project site during the site walkover are detailed in the CAP (**Appendix A**).

4.6.3 SAMPLING PLAN

The CPA Station Building, electrostatic precipitator system area, areas consisting of other auxiliary plants, open storage areas, scrap yard and the Control Block, Workshop and Store Building are considered as the potentially contaminated area, with an area of approximately 75,500m^2. With reference to the *Practice Guide*, a regular grid pattern with a square size of 46m x 46m and a minimum of thirty-five (35) sampling locations are required to be proposed for the potentially contaminated area. Additional sampling locations are proposed at the identified hot spots. Some regular grid sampling locations are adjusted to the nearby represented facilities (i.e., electrostatic precipitator units, plant rooms), as well as the nearby hot spots to serve as sampling locations for both the regular grid and hot spots. A total of thirty-five (35) regular grid sampling locations (namely Grid-BH-1 to Grid-BH-35) and forty-nine (49) hot spot sampling locations (namely HS-BH1 to HS-BH49) are proposed within the Project site.

A total of twenty (20) coal grinding mills and twenty (20) transformers have been identified as land contamination hot spots within the Project site. These units are located adjacent to each other in clusters. Given the similarity in nature of each individual unit and their close proximity in location, only one sampling location is proposed for these clusters within each sampling grid, rather than one sampling location for each individual unit. If contamination is identified during the SI at any of the selected coal grinding mills or transformers, then

additional sampling will be performed as required at the remaining coal grinding mills or transformer units in all sampling grid.

The details of the proposed sampling locations, sampling and testing plan, as well as the detailed sampling methodology are presented in Sections 5 and 6 of the CAP (**Appendix A**).

4.6.4 RECOMMENDED FURTHER WORKS

The Project will tentatively commence in Q3 2027. The demolition of building superstructures and substructures will tentatively commence in Q3 2028. Since CPA equipment / facilities are still in place and some units are still in operation, it is not feasible to carry out SI works at this stage. Upon the cease of operation and prior to the implementation of the Project, site re-appraisal of the Project site should be carried in order to address any new contamination issues. The supplementary CAP(s), incorporating the findings of the site reappraisal and the updated sampling and testing strategy, should be prepared and submitted to EPD for agreement prior to the commencement of SI works. The SI and sampling shall be carried out when the proposed sampling locations are accessible after the demolition of the aboveground structures.

Sampling and testing works shall be carried out according to the EPD agreed supplementary CAP and will be supervised by a Land Contamination Specialist. Upon the receipt of laboratory testing reports, the results will be compared against the RBRGs for industrial land use, soil saturation and solubility limit. Although the future use of the Project site is unplanned, as the Project site is within the CPPS, it is believed the future land use will remain as industrial use, RBRGs for industrial land use is considered most appropriate set of RBRGs for further testing and analysis.

If contamination is confirmed, the Contamination Assessment Report (CAR) will be accompanied by a Remediation Action Plan (RAP). The CAR and RAP will be a combined report for EPD's agreement. The RAP will be prepared to evaluate the needs of a remediation, and if so, identify appropriate remediation methods suitable for the site conditions and the contaminants requiring remediation.

The contamination extent (both horizontal and vertical) will be estimated in the RAP. The confirmation of such contamination extent, the implementation of remediation action, and the preparation of Remediation Report (RR) will be conducted according to the approved RAP by the demolition contractor.

Upon completion of remediation works (if necessary), a RR will be prepared and submitted to EPD to demonstrate that the decontamination works have been carried out in accordance with the approved CAR and RAP. No removal of substructures or excavation works within the contaminated area should be carried out before the agreement of the RR by EPD.

4.6.5 EVALUATION OF LAND CONTAMINATION IMPACTS

The findings of site appraisals and the evaluation of potential contaminated areas are detailed in Section 3 and 4 of the CAP. Since the Project site has been used as a power plant with coal handling facilities, open storage areas, scrap yard, maintenance area etc., the associated potential contaminants, chemicals of concern (COCs) are considered to include metals, VOCs, SVOCs, Petroleum Carbon Ranges (PCRs) and free cyanide. Free cyanide is only considered as the potential contaminant for soil at the coal griding mills. Polychlorinated Biphenyls (PCBs)

will be analysed for soil and groundwater samples collected at scrap yard. As confirmed by CLP, the chemicals used for the transformers are PCBs-free, therefore, analysis of PCBs for soil and groundwater samples collected at transformers are excluded. Intrusive SI and sampling works are considered necessary. The SI sampling methodology and testing plan are presented in Sections 5 and 6 of the CAP (**Appendix A**).

Provided that any soil and groundwater contamination identified during the SI, if any, are properly treated using the appropriate remediation techniques in accordance with the approved RAP, adverse land contamination impacts associated with the Project is not anticipated. The possible remediation measures are outlined in **Section 5.5**.

4.7 OTHER ENVIRONMENTAL IMPACTS

4.7.1 TERRESTRIAL ECOLOGY

As the CPA Project site is located within the existing boundaries of the CPPS site, there will be no disturbance to terrestrial ecological resources (e.g. recognised sites of conservation importance, habitats, vegetation and wildlife).

No impact to terrestrial ecology is thus expected during the decommissioning and demolition works of the Project.

4.7.2 MARINE ECOLOGY AND FISHERIES

The Project does not involve marine works and no dredging and backfilling of marine sediment will be required. No impact to marine ecology and fisheries is thus expected during the decommissioning and demolition works of the Project.

Off-site recycling and disposal of C&D materials may occur in part via marine transportation using works vessels and barges at the HLB. The use of fuel/chemicals associated with the works vessels and construction plants would mean there is a potential of spillage or leakage of such materials if not properly managed. It is expected that chemicals used on the works vessels would be held in low quantities. Fuel spill or leaks would tend to float on the water surface and will evaporate into the atmosphere and dissipate rapidly. The potential for impact to specific biota would depend on the nature and degree of exposure received by a particular individual. However, given the risk of spillage and leakage would generally be limited to minor volumes, no significant impacts would be expected in the event that an unplanned accidental spill or leak occurred. Measures would be implemented for the safe storage, handling and disposal of chemicals and oils to prevent the release into the marine environment. Precautionary measures such as bunding of machinery areas and availability of spill clean-up kits would be in place to prevent spillage or leakage of fuel/chemical to reach the marine environment. Unacceptable impacts on marine ecological resources and fisheries are thus not expected.

4.7.3 LANDSCAPE AND VISUAL

Existing roads within the CPPS to the CPA Project site will be used for transport of construction materials during the implementation of the Project. No new haul road is required as a result of the Project.

The Project involves demolition of existing units and structures within the CPPS, with no addition of new structures or buildings under this Project. No adverse visual impact is envisaged with the implementation of the Project.

All existing trees/ vegetation within the Project site will be retained. Impact to landscape resources is not anticipated. The Project only involves works within the CPPS and will not impact landscape resources outside of the CPPS.

It is anticipated that the Project will not cause unacceptable visual and landscape impacts during the decommissioning and demolition of the Project.

4.7.4 CULTURAL HERITAGE

The Project site is located within the CPPS which was formed by reclamation with no previous settlement or development other than the CPPS. Therefore, there will be no impact to cultural heritage/ archaeological resources. Cultural heritage impact is thus not expected due to the decommissioning and demolition works of the Project.

4.7.5 HAZARD TO LIFE

The decommissioning and demolition works are limited to within the existing area of CPA of the CPPS only (i.e. the Project site) and will not involve transport or handling of hazardous materials. The existing safety management measures of the CPPS operation will continue to be implemented, and the labour ordinance requirement for the protection of workers during the Project shall be adopted. Hazard to life concerns to existing CPPS facilities or construction workers of the Project during the decommissioning and demolition works are therefore not anticipated.

4.8 CUMULATIVE IMPACTS

There are no potential concurrent projects located in the vicinity of the Project site and adverse cumulative impacts are not anticipated.

5. DESCRIPTION OF ENVIRONMENTAL PROTECTION MEASURES

5.1 AIR QUALITY

The following mitigation measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* will be implemented to minimise air quality nuisance during the decommissioning and demolition works:

- Appropriate plant and equipment will be employed to demolish the chimney stack to minimise dust generation;
- The area at which demolition of concrete structures takes place will be sprayed with water immediately prior to, during and immediately after the demolition activities so as to keep the entire surface wet;
- Any dusty materials remaining after a stockpile is removed will be wetted with water and cleared from the surface of roads;
- All demolished items that may dislodge dust particles will be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition;
- Every main haul road will be sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet;
- All areas involving site clearance and excavations works will be sprayed with water before, during and after the operations to maintain the entire surface wet;
- The portion of any road leading only to works site that is within 30m of a discernible or designated vehicle entrance or exit shall be kept clear of dusty materials;
- Appropriate plant and equipment will be employed to demolish the chimney stack from the top down, dropping each piece of concrete debris down through the chimney to reduce dust generation;
- Appropriate plant and equipment will be used around the top of the chimney to enclose the concrete stack, which helps to reduce potential dust emissions to the surrounding environment. A ring working platform around the top of the chimney with surrounding dust screen erected will be employed, while the spider excavator within the enclosed ring working platform will be used to demolish the chimney concrete structures in a top-down demolition method. The enclosed ring working platform, along with the spider excavator inside, will be lowered down progressively during the top-down demolition process such that the potential fugitive dust generated during the demolition works would be controlled within the enclosed ring working platform as much as possible to minimise fugitive dust emissions;
- Any stockpile of dusty materials on-site will be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 3-sides. They should also be sprayed with water immediately prior to any loading, unloading or transfer operation to dampen the dusty materials; and
- Where a vehicle leaving the works site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.

The following mitigation measures will be implemented to minimise air quality impact from emissions of PMEs and marine vessels during the decommissioning and demolition works:

- Provide power supply for on-site machinery if feasible, and avoid the use of diesel generators and machinery as far as practicable;
- Exempted NRMMs shall be avoided; and
- Marine vessels fuelled in Hong Kong are required to operate using marine light diesel with sulphur content lower than 0.05% in accordance with the Air Pollution Control (Marine Light Diesel) Regulation.

5.2 NOISE

The following good site practices will be adopted by the Contractor to minimise noise emissions during the decommissioning and demolition works:

- Only well-maintained equipment will be operated on-site and equipment will be serviced regularly during the works;
- Machines and equipment that are in intermittent use will be shut down between work periods or will be throttled down to a minimum;
- Silencers or mufflers on demolition equipment will be utilised as far as practicable and should be properly maintained during the demolition works;
- Noise and/or vibration pads will be used to reduce the noise impact of dropping debris during the demolition process.
- With reference to *Preparation of Construction Noise Impact Assessment Under the Environmental Impact Assessment Ordinance (*GN 9/2023), quieter construction methods/ equipment such as electric breaker, hydraulic crusher, soundless non-explosive chemical expansion demolition agent, and/or use of quieter saw types (noise reducing diamond blade saw) will be used as far as practicable instead of the conventional ones, e.g., excavator-mounted breaker for large scale building demolition, etc;
- With reference to *Minimizing Noise from Construction Activities* (ProPECC PN1/24), proper application and deployment of quieter construction methods and equipment will be performed through incorporation of particular specifications in construction contracts;
- Where necessary, noise enclosures will be used to cover the noisy plant items, and mobile noise barriers will be positioned within a few metres of noisy plant items;
- Mobile plant, if any, will be sited as far from NSRs as possible;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise will be directed away from the nearby NSRs;
- Material stockpiles will be effectively utilized, wherever practicable, in screening noise from on-site construction activities; and
- EPD's "Recommended Pollution Control Clauses for Construction Contracts" shall be adopted in the Works Contracts so as to ensure proper implementation of the noise mitigation measures by the Contractor(s) and to minimise the potential construction noise impact.

5.3 WATER QUALITY

Appropriate measures will be implemented during the decommissioning and demolition of the Project to control potential contaminated run-off, thereby minimising suspended solids and potential impacts on water quality, including the following:

- Proper site management measures will be implemented to minimise surface water run-off, soil erosion and the impacts of sewage effluents (e.g. channels, earth bund, sandbag barriers, etc. to properly direct stormwater);
- Existing on-site silt removal facilities, channels and manholes, if any, will be maintained and the deposited silt and grit will be removed regularly;
- Other manholes, if any, including any newly constructed ones will be adequately covered and temporarily sealed so as to prevent silt, construction materials, or debris from getting into the drainage system;
- Open stockpiles of materials on site will be avoided, or where unavoidable covered with tarpaulin or similar fabric during rainstorms;
- Vehicle washing facilities will be drained into desilting facilities before discharge, and water recycles on-site wherever possible;
- Desilting facilities will be checked and the deposited silt and grit will be removed regularly to ensure proper functioning;
- Construction site discharge will be collected and treated on site before discharge following a discharge licence to be issued under the WPCO; and
- Temporary toilets will be provided to collect sewage from the construction workers workforce during the decommissioning and demolition works for off-site disposal on a regular basis.

Appropriate measures will be implemented during the decommissioning and demolition of the Project to control accidental spillage, including the following:

- All fuel tanks and chemical storage will be sited on sealed and bunded areas and provided with locks;
- If necessary, the storage areas will be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and
- Oil and grease removal facilities will be provided where appropriate, for example in an area near plant workshop/ maintenance areas, if any.

Site run-off and drainage impacts will be controlled in accordance with the guidelines stipulated in the EPD's *Professional Persons Environmental Consultative Committee Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 2/23)*. The implementation of good housekeeping and best management practices will ensure that WPCO standards are met and that no unacceptable impacts on the WSRs arise during the implementation of the Project.

5.4 WASTE MANAGEMENT

The contractors employed for the decommissioning and demolition of the Project will be required to incorporate recommendations on waste recycling, storage, transportation and disposal measures into a comprehensive on site waste management plan. Such a waste management plan should incorporate site-specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.

In the waste management plan to be prepared, the hierarchy presented below (in descending order of preference) will be used to evaluate waste management options, thus allowing maximum waste reduction and often reducing costs:

- Avoidance and minimisation, i.e. not generating waste through changing practices;
- Reuse of materials, thus avoiding disposal (generally with only limited reprocessing);
- Recovery and recycling, thus avoiding disposal (although reprocessing may be required); and
- Treatment and disposal, according to relevant laws, guidelines and good practice.

To further minimise waste arising and keep environmental impacts within acceptable levels, careful design, planning and good site management practice will be adopted, including:

- Approved personnel, such as site manager, will be nominated to be responsible for implementation of good site practices, arrangements for waste collection and effective disposal of all wastes generated at the site to appropriate facilities;
- Training on appropriate waste management procedures, including waste reduction, reuse and recycling and chemical waste handling procedures will be provided to the workers and site personnel;
- Sufficient waste disposal points will be provided and collection of waste for disposal will be arranged regularly;
- Different types of waste will be properly segregated and stored on-site to increase the feasibility of recycling certain components of the waste streams, such as steel; and
- Waste will be transported in enclosed containers or skips to minimise windblown litter and dust/odour nuisance during the transportation of waste.

With reference to Section 4.1.3 of Chapter 4 of the Project Administration Handbook (PAH) for Civil Engineering Works (2022 Edition), projects generating more than 50,000 m^3 C&D materials shall draw up a Construction & Demolition Material Management Plan (C&DMMP). A C&DMMP will be drawn up and provided to the contractors employed for the decommissioning and demolition of the Project, to minimise C&D material generation and encourage proper management of such material. All C&D materials generated will be sorted on-site for recycling and inert C&D material will be prioritised for reuse as fill materials using a balanced cut-and-fill approach prior to delivering to public fill reception facilities and landfills. The stockpiling areas will be minimised and covered during heavy rainfall to minimise potential air quality, water quality and visual impact. In case more than 300,000 m^3 of surplus inert C&D material is generated, the C&DMMP shall be prepared and submitted to the Public Fill Committee (PFC) for approval.

A trip ticket system will be implemented with reference to the *Development Bureau Technical Circular (Works) DEVB TC(W)) No.6/2010 "Trip Ticket System for Disposal of Construction & Demolition Materials"* for the recycling and disposal of C&D materials.

Chemical waste generated during the decommissioning and demolition of the Project will be properly stored in accordance with EPD's *Code of Practice on the Packaging, Labelling and Storage of Chemical Waste* for subsequent collection and disposal by a licensed Chemical Waste Collector. General refuse generated on site will be stored in enclosed bins and collected by waste collector on regular basis.

5.5 LAND CONTAMINATION

The land contamination issues of the Project site that are identified as potentially contaminated would be considered surmountable to the construction workers during the decommissioning/ demolition phase of the Project, provided the recommended actions outlined in below were followed.

Possible Remediation Measures

The actual remediation methods should be confirmed after completion of the SI works and based on the approved CAR and RAP. The RAP will provide details of the remedial actions for any identified contaminated soil and groundwater.

For soil, there are several technologies commercially available to tackle these contaminants. Technologies that are commonly used in Hong Kong include biopiling and cement solidification/ stabilization. These ex-situ methods have been proven to be effective in treating the target Chemicals of Concern (COCs) (cement solidification/stabilization on metals and biopiling on hydrocarbons).

For groundwater, some examples of remediation techniques of contaminated groundwater (e.g., air sparging, recovery trenches / wells, in-ground containment/capping and permeable reactive barriers) are shown in the Practice Guide from EPD.

Mitigation Measures for Remediation Works

Mitigation measures for the remediation works would depend on the nature / extent of contamination and the method of treatment. The mitigation measures will be recommended in the RAP and would typically include the following:

- Excavation profiles must be properly designed and executed with attention to the relevant requirements for environment, health and safety;
- Supply of suitable clean backfill material (or treated soil) after excavation;
- Stockpiling site(s) shall be lined with impermeable sheeting and bunded. Stockpiles shall be fully covered by impermeable sheeting to reduce dust emission;
- Vehicles containing any excavated materials shall be suitably covered to limit potential dust emissions or contaminated wastewater run-off, and truck bodies and tailgates shall be sealed to prevent any discharge during transport or during wet conditions;
- Speed control for the trucks carrying contaminated materials shall be enforced;
- Vehicle wheel and body washing facilities at the site's exit points shall be established and used;
- Pollution control measures for air emissions (e.g., from biopile blower and handling of cement), noise emissions (e.g., from blower or earthmoving equipment), and water discharges (e.g. runoff control from treatment facility) shall be implemented and complied with relevant regulations and guidelines;
- In case any cement solidification remediation works are required, the processes shall be fully enclosed and associated storage bins or storage piles covered;
- In case any biopiling remediation works are required, mitigation measures shall be adopted including fully covering the biopile along with the use of an activated carbon filter fitted to

the outlet of the biopile with an installed efficiency of at least 99% removal efficiency [(2)] and regular replacement schedule to minimise VOC emissions from the remediation system; and

- Any skimmed free product from the contaminated groundwater should be properly handled and disposed of as chemical waste. The handling, storage and disposal of skimmed free product should follow the requirements stipulated in *Waste Disposal (Chemical Waste) (General) Regulation*. The decontamination contractor who will be responsible for the remediation of the groundwater and recovery of free product should register with the EPD as a chemical waste producer.

Handling and Disposal Arrangement of Removed Diesel / Petroleum Products and Spill Prevention Measures during Demolition

Prior to commencement of demolition in the Project site area, the leftover diesel or other petroleum products in the equipment to be demolished shall be removed as much as possible. The removed diesel and other petroleum products shall be considered as chemical waste and are controlled under the *Waste Disposal (Chemical Waste) (General) Regulation*.

The demolition contractor who will generate chemical waste or cause it to be produced should register with the EPD as a chemical waste producer.

Removed diesel and petroleum products shall be labelled and stored in accordance with the requirement stipulated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* issued by EPD. Removed diesel and petroleum products shall be collected by a licensed chemical waste collector and to be disposed of at licensed chemical waste treatment facilities (i.e. CWTC in Tsing Yi).

5.6 MARINE ECOLOGY AND FISHERIES

In order to minimise the potential disturbances on marine ecology and fishery resources arising from the Project, good site/ construction practice should be adopted as follows:

- A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced;
- Safe storage, handling and disposal of chemicals and oils to prevent the release into the marine environment;
- Bunding of machinery areas and availability of spill clean-up kits would be in place to prevent spillage or leakage of fuel/chemical to reach the marine environment;

The demolition works will be designed to confirm compliance with the assessment criteria at sensitive receivers and control water quality impacts to within acceptable levels. Water quality mitigation measures will be implemented to further avoid/reduce potential impacts. These

(2) Data from USEPA's Office of Research and Development (ORD) and Emissions Standards Division's performance testing of various carbon adsorption beds for various industries is presented in the USEPA (1988) *Report on Carbon Adsorption for Control of VOC Emissions: Theory and Full Scale System Performance*. Such removal efficiency of activated carbon filter was also adopted in the approved EIA report (AEIAR-188/2015) for Alternative Ground Decontamination Works at the Proposed Kennedy Town Comprehensive Development Area Site. Additionally, with reference to the soil gas monitoring results in the *Biopile Operation Monitoring and Cleanup Report* under Appendix 3.1 of this approved EIA report (AEIAR-199/2015), the VOC concentration at the exhaust of biopile (with activated carbon filter), was recorded to be 0 ppm, indicating minimal VOC discharge is expected from biopile with activated carbon filter in place.

measures are expected to control and reduce potential impacts to marine ecology and fisheries resources as well.

6. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

The potential environmental impacts (e.g. air quality, noise, water quality, waste management, land contamination, etc) due to the implementation of the Project have been evaluated. With proper implementation of recommended mitigation measures, adverse environmental impact during the decommissioning and demolition works of the Project is not anticipated and thus environmental monitoring is considered not necessary. Nevertheless, it is recommended to have an Environmental Monitoring and Audit (EM&A) programme in place where environmental site inspections will be conducted regularly (i.e. on a weekly basis) throughout the decommissioning/ demolition phase such that the implementation of the recommended mitigation measures as mentioned in **Section 5** can be tracked and their effectiveness assessed.

6.1 ORGANISATION OF EM&A

The EM&A will require the involvement of CLP, an Environmental Team (ET), an Independent Environmental Checker (IEC) and the Contractor(s). CLP will appoint an ET to conduct the regular environmental site inspections, and to provide specialist advice on the undertaking and implementation of environmental responsibilities. The ET will be led and managed by the ET Leader. The ET Leader shall be a person who has at least 7 years of experience in EM&A or environmental management. Suitably qualified staff will be included in the ET, and the ET should not be in any way an associated body of the Contractor(s) for the Project.

To maintain strict control of the EM&A process, CLP will independently appoint an environmental consultant to act as an IEC to verify and validate/ audit the environmental performance of the Contractor(s) during the decommissioning/ demolition of the Project and effectiveness of ET. The IEC will have previous relevant experience with checking and auditing similarly sized EM&A programmes. The IEC shall be a person who has at least 7 years of experience in EM&A or environmental management. Sufficient and suitably qualified professional and technical staff will be employed by the IEC, and the IEC should not be in any way an associated body of the Contractor(s) for the Project.

6.2 MONITORING

No adverse dust impact is anticipated to arise from the chimney demolition works. However, as a precautionary measure, dust monitoring during the demolition works of the 215m Chimney is recommended. Dust monitoring location(s) will be set up at the representative ASR(s). Dust monitoring requirements (including monitoring location(s), monitoring parameters and frequency, monitoring methodology and equipment used) should be in accordance with the prevailing *EIAO-TM*, and is subject to further review and agreement with EPD. A Dust Monitoring Plan will be submitted to EPD for review and approval prior to the commencement of the demolition works of the 215m Chimney.

6.3 REPORTING

The results and findings of the EM&A works during the decommissioning/ demolition phase will be recorded in the Monthly EM&A Reports prepared by the ET Leader. The EM&A reports will be prepared and submitted within 2 weeks of the end of each reporting month, with the first

report due the month after construction commences. Each monthly EM&A report will be submitted to the following parties: the Contractor(s), the IEC, CLP and the EPD, as well as to other relevant departments as required. Before submission of the first EM&A Report, the ET will liaise with the parties on the exact number of copies and format of the reports in both hard copy and electronic medium.

6.3.1 CONTENTS OF MONTHLY EM&A REPORTS

(1) Executive summary (1-2 pages), including:

- complaint log;
- notifications of any summons and successful prosecutions; and
- reporting changes

(2) Basic project information including a synopsis of the project organisation, programme and management structure, and a drawing of the Project area showing the environmentally sensitive receivers, programme, management structure and the work undertaken during the month.

(3) A brief summary of EM&A requirements including:

- environmental mitigation measures, as recommended in the Project Profile; and
- environmental requirements in contract documents.

(4) Environmental issues and actions, comprising:

- review issues carried forward and any follow-up procedures related to earlier non-compliance (complaints and deficiencies);
- description of the actions taken in the event of non-compliance and deficiency reporting;
- recommendations (should be specific and target the appropriate party for action); and
- implementation status of the mitigation measures and the corresponding effectiveness of the measures.

(5) A summary record of complaints received (written or verbal) for each media, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken and summary of complaints.

(6) A summary record of notifications of summons, successful prosecutions for breaches of environmental protection/pollution control legislation and actions to rectify such breaches.

(7) A forecast of the works programme for the next one month; and

(8) Comments, recommendations and conclusions for the reporting period.

6.3.2 FINAL EM&A REVIEW REPORT

A final EM&A review report will be prepared by the ET at the end of the decommissioning/ demolition phase of the Project. The final EM&A Review Report will contain at least the following information:

(1) Executive Summary (1-2 pages).

(2) Drawing(s) showing the Project site area and any environmental sensitive receivers.

(3) Basic project information including a synopsis of the project organisation, contacts for key management staff and a synopsis of work undertaken during the course of the Project.

(4) A brief summary of EM&A requirements including environmental mitigation measures as recommended in the Project Profile.

(5) A summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the Project Profile and summarised in the updated implementation schedule.

(6) A summary of environmental non-compliance.

(7) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate.

(8) A description of the actions taken in the event of non-compliance.

(9) A summary record of complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken.

(10) A summary record of notifications of summonses and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches investigation, follow-up actions taken and results.

(11) A review of the success of the EM&A programme, including a review of the effectiveness and efficiency of the mitigation measures, and recommendations for any improvements in the EM&A programme. A clear cut statement on the environmental acceptability of the project should be made.

7. USE OF PREVIOUSLY APPROVED EIA REPORTS/ DIRECT APPLICATIONS FOR AN ENVIRONMENTAL PERMIT

The approved EIA reports/ direct applications for an environmental permit of projects that are of relevance to the Project are listed in **Table 7.1**.

TABLE 7.1 PREVIOUSLY APPROVED EIA REPORTS/ DIRECT APPLICATIONS FOR AN ENVIRONMENTAL PERMIT RELEVANT TO THE PROJECT

Register No.	Project Title	Date of Approval	Aspect of Relevance	Summary of the Findings and Recommended Measures of Relevance to the Project
PP-667/2024	Decommissioning and Demolition of Units L1 to L3 at Lamma Power Station	24 May 2024	• Nature of the Project • Potential environmental impacts of the Project, and the appropriate mitigation measures	• Air quality, noise, water quality, waste management and land contamination impacts related to decommissioning and demolition works • No unacceptable environmental impact related to air quality, noise, water quality, waste management and land contamination is anticipated with the implementation of mitigation measures • Implementation of mitigation measures and good site practices related to air quality, noise, water quality, waste management and land contamination
AEIAR-234/2022	Re-provision of Open Cycle Gas Turbines at Lamma Power Station	1 April 2022	• Nature of the Project • Potential environmental impacts of the Project, and the appropriate mitigation measures	• Air quality, noise, water quality, waste management and land contamination impacts related to decommissioning and demolition works of the existing old open cycle gas turbine units • No unacceptable environmental impact related to air quality, noise, water quality, waste management and land contamination is anticipated with the implementation of mitigation measures • Implementation of mitigation measures and good site practices related to air quality, noise, water quality, waste management and land contamination
AEIAR-102/2006	Emissions Control Project at Castle Peak Power Station "B" Units	25 October 2006	• Surrounding environment and sensitive receivers	N/A

8. CONCLUSION

The Project will involve the decommissioning and demolition of the CPA units as well as its associated equipment and buildings/ structures (aboveground and foundation) in phases within the CPPS. Environmental impacts likely to arise as a result of the decommissioning and demolition works of the Project have been critically assessed and are considered acceptable with reference to the relevant assessment standards/criteria of the *EIAO-TM*. With the implementation of appropriate environmental control measures discussed in the preceding sections, no unacceptable environmental impacts are anticipated.

Legend

Project Site Location

NORTHERN ROAD WEST
CONTROL BLOCK
WORKSHOP AND STORES
ADMINISTRATION BUILDING
行政大樓
ELECTRICAL ANNEXES
TURBINE HALL
MECHNICAL ANNEXES
BUNKER BAY
AUXILIARY BAY
BOILER HOUSE STRUCTURE
ASH PITS
輸送帶
WESTERN ROAD
BOILER ROAD
1A 1B 2A 2B 3A 3B 4A 4B
ELECTROSTATIC PRECIPITATOR(S)
CHIMNEY
輸送帶 Conveyor
OIL TANK ROAD WEST
EASTERN ROAD

Heavy Loading Berth (HLB)

Electro-chlorination Plant House

Metres
0 100 200

Figure 1.1

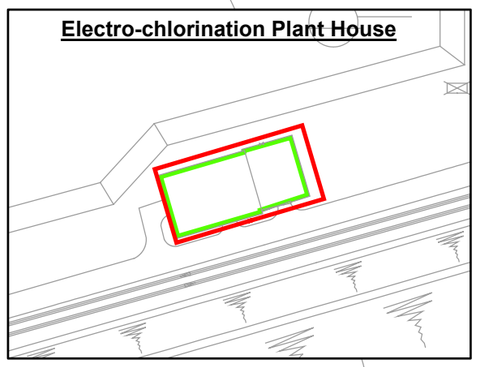
Location of Project Site at CPA

ERM

File: T:\GIS\CONTRACT\0617637\mxd\0617637_Project_Site.mxd
Date: 19/9/2024

Legend

- Project Site Location
- Unit A1- A4
- Laydown Area (Indicative)
- Administration Building
- Ash Pits
- Ash Plant Substation
- Ash Plant Welfare Building
- Black Start Diesel Generator
- Boiler House Structure
- Bunker Bay & Auxiliary Bay
- Coal Conveyer
- Compressor Plant House
- Control Block Workshop & Stores
- Electrical Annexes
- Electro-chlorination Plant House
- Fire Fighting Workshop
- Fuel Oil Pumphouse
- Generator Transformers (4 No.)
- Junction House No. 4
- LPG Store
- Mechanical Annexes
- Off-site Dust Disposal Comp. House
- Oil Separator
- Precipitator Control Buildings (4 No.)
- Electrostatic Precipitators (8 No.)
- Station Auxiliary Transformers (2 No.)
- Station Stand-by Transformer
- Station Transformers (2 No.)
- Sulphur Store
- Turbine Hall
- Unit Auxiliary Transformers (4 No.)
- 215m Chimney



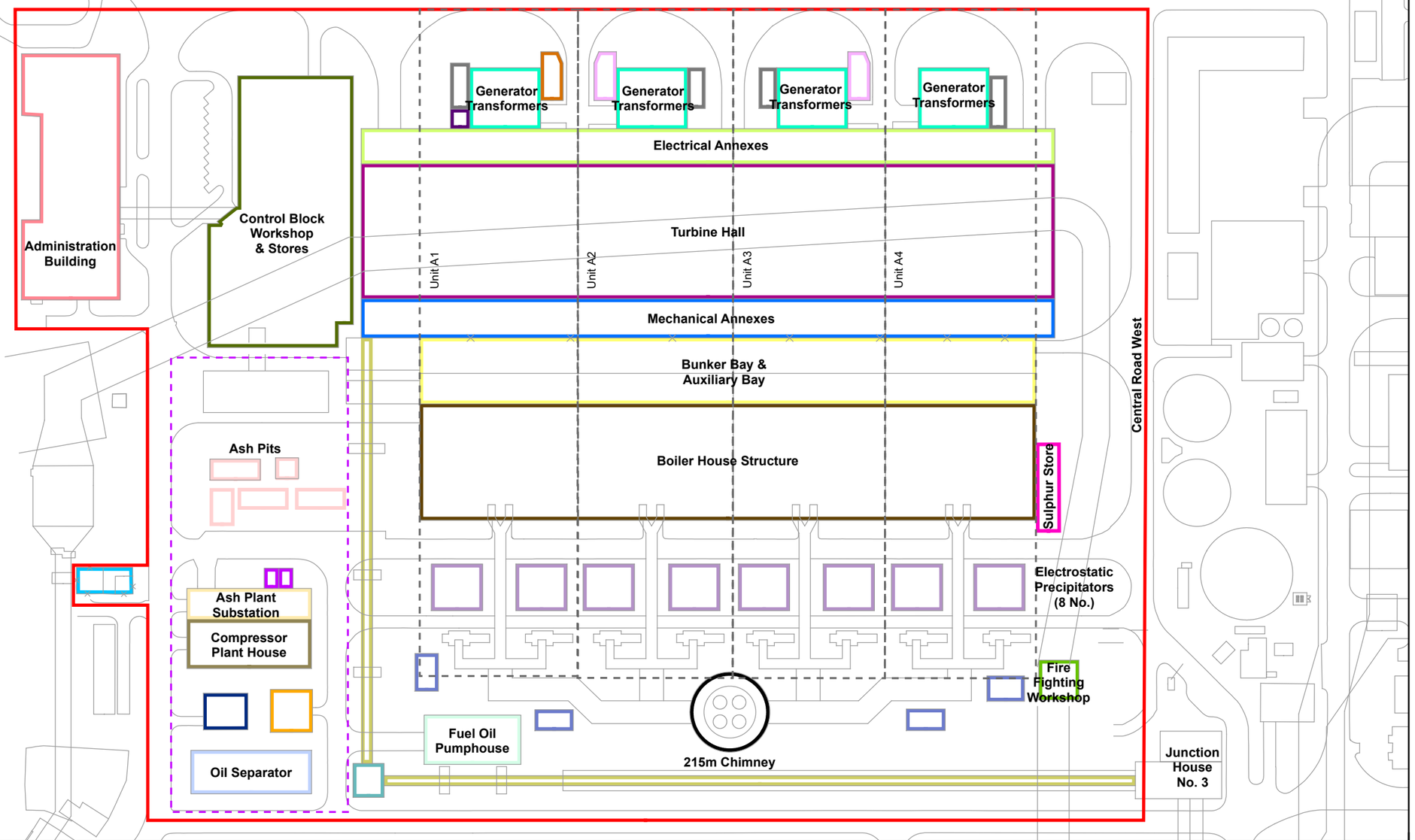


Figure 1.2

Location of Major Buildings and Structures to be Demolished

ERM

File: T:\GIS\CONTRACT\0617637\mxd\0617637_Project_Site_zoom-in.mxd
Date: 21/9/2024

Legend

- Project Site Location
- 500m Assessment Area

Outline Zoning Plan (OZP)

- Green Belt (GB)
- Major Road and Junction
- Open Space
- Other Specified Uses (OU)

N

Metres

0 125 250

Figure 3.1

Project Site and Surrounding Environment

ERM

File: T:\GIS\CONTRACT\0617637\mxd\0617637_OZP.mxd
Date: 8/4/2024

Legend

- Air Sensitive Receiver (ASR)
- Project Site Location
- 500m Assessment Area

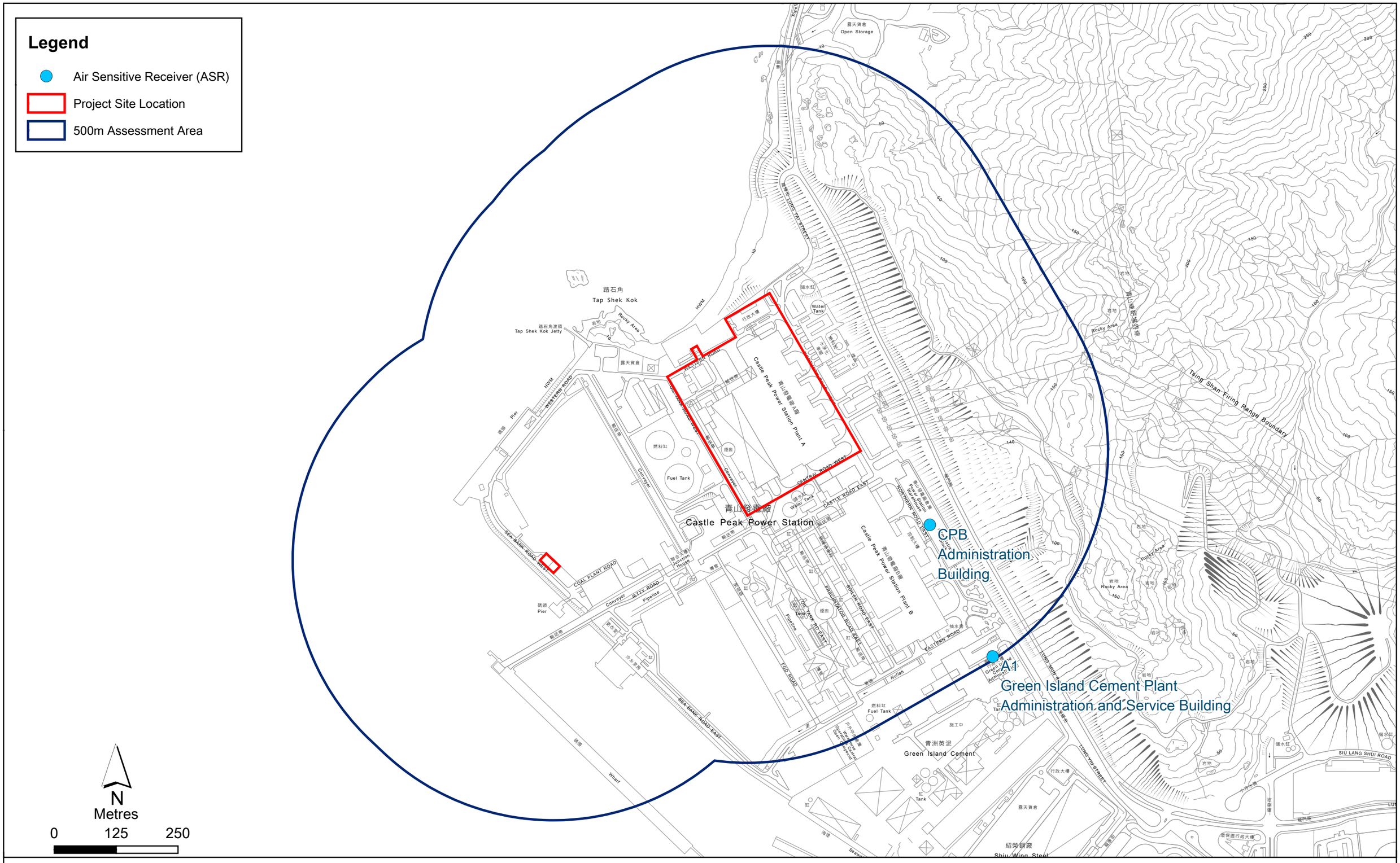


Figure 4.1

Locations of Representative Air Sensitive Receivers (ASRs)

ERM

File: T:\GIS\CONTRACT\0617637\mxd\0617637_ASR.mxd
Date: 8/4/2024

Legend

- Noise Sensitive Receivers (NSRs)
- Project Site Location
- 300m Assessment Area

N01

Village Houses in Lung Tsai

N

Metres

0 125 250

Figure 4.2

Locations of Representative Noise Sensitive Receivers (NSRs)

ERM

File: T:\GIS\CONTRACT\0617637\mxd\0617637_NSR.mxd
Date: 8/4/2024

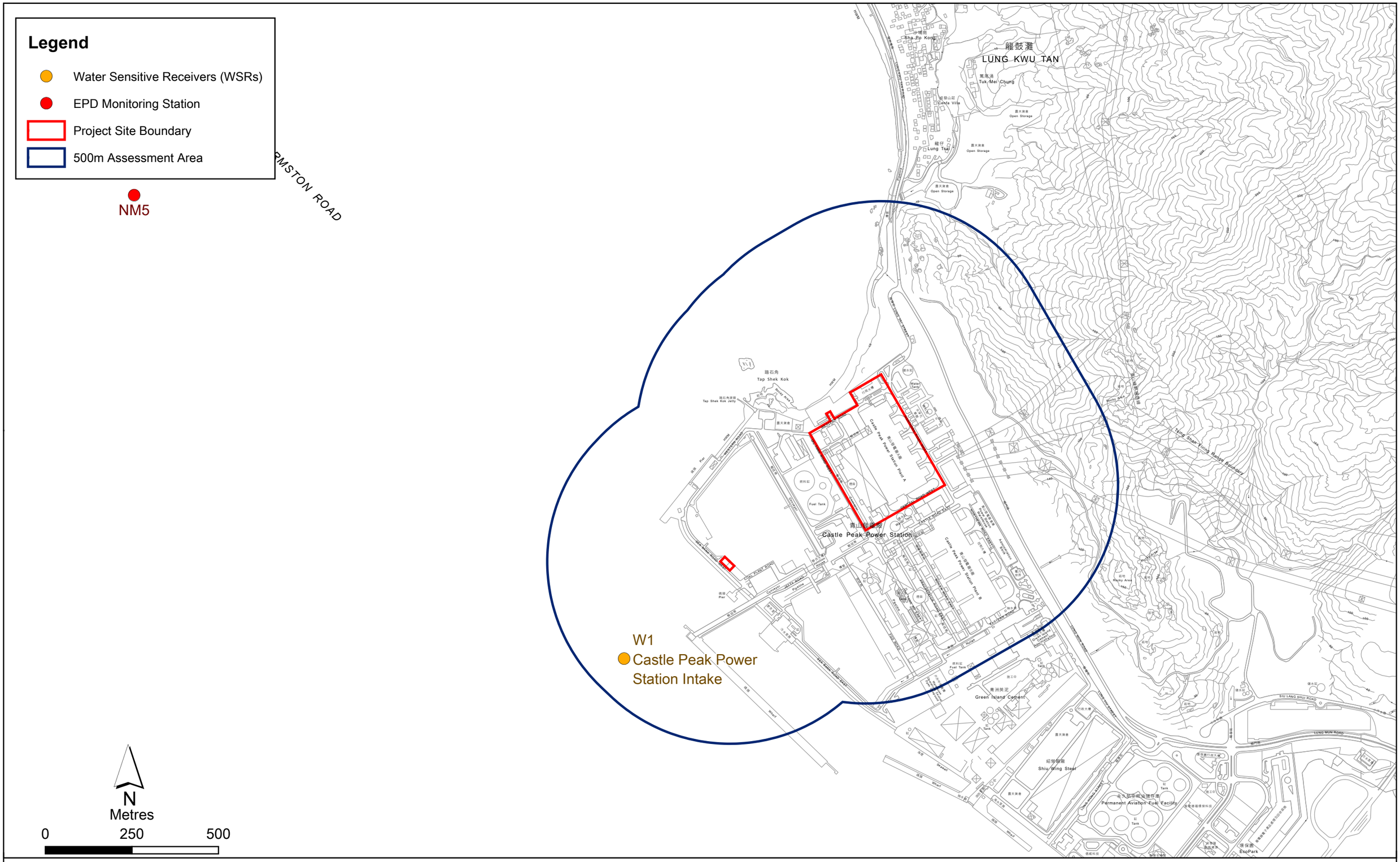


Figure 4.3

Locations of Representative Water Sensitive Receivers (WSRs)

File: T:\GIS\CONTRACT\0617637\mxd\0617637_WSR.mxd
Date: 8/4/2024

Legend

- Project Site Location
- Tentative Temporary Material Stockpiling Area

NORTHERN ROAD WEST
CONTROL BLOCK
WORKSHOP AND STORES
ADMINISTRATION BUILDING
行政大樓
ELECTRICAL ANNEXES
TURBINE HALL
MECHNICAL ANNEXES
BUNKER BAY
AUXILIARY BAY
BOILER HOUSE STRUCTURE
ASH PITS
WESTERN ROAD
BOILER ROAD
1A 1B 2A 2B 3A 3B 4A 4B
ELECTROSTATIC PRECIPITATORS
CHIMNEY
輸送帶 Conveyor
OIL TANK ROAD WEST

Heavy Loading Berth (HLB)

Electro-chlorination Plant House

Key Plan

電力廠 Power Station
爛角咀 Black Point
龍鼓上灘 Lung Kwu Sheung Tan
大欖水 TAI LANG SHUI
北朗 Pak Long
楊小坑 Yeung Siu Hang
屯門 TUEN MUN
青山 CASTLE PEAK
龍鼓灘 LUNG KWU TAN
踏石角 Tap Shek Kok
Power Station
小欖水 SIU LANG SHUI
青山灣 CASTLE PEAK BAY
望后石 PILLAR POINT
麒麟圍 Kei Lun Wai
N

Metres
0 100 200

Figure 4.4

Location of Tentative Temporary Material Stockpiling Area

ERM

File: T:\GIS\CONTRACT\0617637\mxd\0617637_Tentative_Temporary_Material_Stockpiling_Area.mxd
Date: 7/10/2024

APPENDIX A CONTAMINATION ASSESSMENT PLAN (CAP)

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1. INTRODUCTION

1.1 BACKGROUND

CLP has been operating the Castle Peak A Power Station and the electrochlorination plant area located further west (CPA or the "Project site") of the Castle Peak Power Station (CPPS) since the 1980s, which is comprised of 4 coal-fired power generating units (A1 to A4 each with a capacity of 350MW). CLP has also been operating the Castle Peak B Power Station (CPB) of CPPS since the 1980s, which is comprised of 4 coal-fired power generating units (B1 to B4, each with a capacity of 677MW).

CPA is planned for progressive retirement. CLP proposes to decommission and demolish the CPA units as well as the associated equipment, buildings and structures as early as 2027 to render the area ready for future development. The location of the Project and the Project boundary are presented in **Figure 1.1**.

1.2 PURPOSE OF THIS PROJECT PROFILE

The Contamination Assessment Plan (CAP) aims to identify the presence of potential land contamination sites within the Project site and determine whether potential land contamination sites, if any, are within the boundaries of work areas. The land history of the Project site area in relation to possible contamination would be reviewed in the CAP. This CAP would also determine the need for an intrusive land contamination site investigation (SI) at the Project site to close the data gaps for the desk top review. If it is considered necessary to conduct SI, this CAP would describe the approach and methodology to identify the nature and extent of on-site contamination (if any).

1.3 STRUCTURE OF THIS CAP

Following this introduction section, the subsequent sections of the CAP are structured as follows.

- **Section 2** outlines the statutory requirements and the evaluation criteria for land contamination assessment;
- **Section 3** presents the findings of the site appraisal, including site survey, information on the past and present land uses;
- **Section 4** presents potential contamination evaluation for the Project site;
- **Section 5** proposes the sampling and testing plan;
- **Section 6** proposes the proposed sampling methodology; and
- **Section 7** presents the conclusion and recommendations.

2. STATUTORY REQUIREMENTS AND EVALUATION CRITERIA

2.1 STATUTORY FRAMEWORK

The following EPD's guiding documents are referenced for this land contamination assessment:

- Annex 19 of the *Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO), Guidelines for Assessment of Impact On Sites of Cultural Heritage and Other Impacts (Section 3: Potential Contaminated Land Issues)*, Environment Protection Department (EPD), 2023;
- *Guidance Note for Contaminated Land Assessment and Remediation* (the *Guidance Note*), Revised in April 2023;
- *Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management* (the *Guidance Manual*), Revised in April 2023; and
- *Practice Guide for Investigation and Remediation of Contaminated Land* (the *Practice Guide*), Revised in April 2023.

The following legislation, documents and guidelines may cover or have some bearing upon the assessment of contamination and the handling, treatment and disposal of contaminated materials for this Project:

- *Water Pollution Control Ordinance* (WPCO) (CAP 358);
- *Waste Disposal Ordinance* (WDO) (CAP 354);
- *Waste Disposal (Chemical Waste) (General) Regulation* (CAP 354C); and
- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.*

2.2 SELECTION OF RBRGS LAND USE SCENARIO

In accordance with Section 2 of the *Guidance Note*, the Project site's future land use and the appropriate set of Risk-based Remediation Goals (RBRGs) corresponding to the land use scenarios should be determined prior to the site appraisal. The Hong Kong RBRGs are developed for four different post-restoration land use scenarios, namely urban residential, rural residential, industrial, and public parks.

Although the future use of the Project site is unplanned, as the Project site is within the CPPS, it is believed the future land use will remain as industrial use, and so the RBRGs conceptual site model under industrial land use scenarios will be adopted. Therefore, the RBRGs for industrial land use shall be adopted in this Project. The adopted RBRGs for soil and groundwater are presented in **Table 2.1**.

TABLE 2.1 RBRGS FOR INDUSTRIAL LAND USE FOR SOIL AND GROUNDWATER & SOIL SATURATION LIMIT / SOLUBILITY LIMIT

Chemical	RBRGs for Soil		RBRGs for Groundwater	
	Industrial (mg/kg)	Soil Saturation Limit (C_{sat}) (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
Metals				
Lead	2,290	-	-	-
Antimony	261	-	-	-
Arsenic	196	-	-	-
Barium	1.00E+04[a]	-	-	-
Cadmium	653	-	-	-
Cobalt	1.00E+04[a]	-	-	-
Copper	1.00E+04[a]	-	-	-
Manganese	1.00E+04[a]	-	-	-
Molybdenum	3,260	-	-	-
Nickel	1.00E+04[a]	-	-	-
Tin	1.00E+04[a]	-	-	-
Zinc	1.00E+04[a]	-	-	-
Chromium III	1.00E+04[a]	-	-	-
Chromium VI	1,960	-	-	-
Mercury	38.4	-	6.79	-
Petroleum Carbon Ranges (PCRs)				
C6 - C8	1.00E+04[a]	1,000	1,150	5.23
C9 - C16	1.00E+04[a]	3,000	9,980	2.8
C17 - C35	1.00E+04[a]	5,000	178	2.8
Volatile Organic Compounds (VOCs)				
Acetone	1.00E+04[a]	[b]	1.00E+04[a]	[b]
Benzene	9.21	336	54	1,750
Bromodichloromethane	2.85	1,030	26.2	6,740
2-Butanone	1.00E+04[a]	[b]	1.00E+04[a]	[b]
Chloroform	1.54	1,100	11.3	7,920
Ethylbenzene	8,240	138	1.00E+04[a]	169
Methyl tert-Butyl Ether	70.1	2,380	1,810	[b]
Methylene Chloride	13.9	921	224	[b]
Styrene	1.00E+04[a]	497	1.00E+04[a]	310
Tetrachloroethene	0.777	97.1	2.95	200
Toluene	1.00E+04[a]	235	1.00E+04[a]	526
Trichloroethene	5.68	488	14.2	1,100
Xylenes (Total)	1,230	150	1,570	175
Semi Volatile Organic Compounds (SVOCs)				
Acenaphthene	1.00E+04[a]	60.2	1.00E+04[a]	4.24
Acenaphthylene	1.00E+04[a]	19.8	1.00E+04[a]	3.93
Anthracene	1.00E+04[a]	2.56	1.00E+04[a]	0.0434
Benzo(a)anthracene	91.8	-	-	-
Benzo(a)pyrene	9.18	-	-	-
Benzo(b)fluoranthene	17.8	-	7.53	0.0015

Chemical	RBRGs for Soil		RBRGs for Groundwater	
	Industrial (mg/kg)	Soil Saturation Limit (C_{sat}) (mg/kg)	Industrial (mg/L)	Solubility Limit (mg/L)
Benzo(g,h,i)perylene	1.00E+04[(a)]	-	-	-
Benzo(k)fluoranthene	918	-	-	-
bis-(2-Ethylhexyl)phthalate	91.8	-	-	-
Chrysene	1,140	-	812	0.0016
Dibenzo(a,h)anthracene	9.18	-	-	-
Fluoranthene	1.00E+04[(a)]	-	1.00E+04[(a)]	0.206
Fluorene	1.00E+04[(a)]	54.7	1.00E+04[(a)]	1.98
Hexachlorobenzene	0.582	-	0.695	6.2
Indeno(1,2,3-cd)pyrene	91.8	-	-	-
Naphthalene	453	125	862	31
Phenanthrene	1.00E+04[(a)]	28	1.00E+04[(a)]	1
Phenol	1.00E+04[(a)]	7,260	-	-
Pyrene	1.00E+04[(a)]	-	1.00E+04[(a)]	0.135
Dioxins / Polychlorinated Biphenyls (PCBs)				
Dioxins (I-TEQ)	0.005	-	-	-
PCBs	0.748	-	5.1100	0.031
Other Inorganic Compounds				
Cyanide, free	1.00E+04[(a)]	-	-	-
Organometallics				
TBTO	196	-	-	-

Notes:

(a) Indicates a 'ceiling limit' concentration.

(b) Indicates that the C_{sat} value / solubility limit exceeds the 'ceiling limit' therefore the RBRG applies.

3. SITE APPRAISAL

The site appraisal, which comprises desktop review and site walkover, has been carried out to review the current and past land uses, historical aerial photographs and maps, historical spillage and leakage records, (hydro) geology and underground soil profile to identify the potential for causing land contamination at the Project site.

3.1 PROJECT SITE ENVIRONMENT AND SITE SETTING

The Project site is situated within the CPPS with an area of approximate 94,000m^2. The whole Project site is generally concrete paved except the planter areas. The Project site mainly comprises the CPA Station Building (including the boiler house and turbine house) with four (4) coal-fired electricity generating units A1 to A4, electrostatic precipitators, a chimney, Administration Building, Control Block & Workshop and Stores Building, and other auxiliary plants.

The Project site is bounded by the gas turbine units and other axuliary plants to the east, CPB Station to the south, fuel oil tank area to the west and open sea to the north.

3.2 REVIEW OF HISTORICAL LAND USES

A review of past land uses at the Project site was conducted based on information provided by CLP and a review of aerial photographs in the years of 1978, 1980, 1982, 1983, 1984, 1985, 1995, 2005, 2015 and 2022. The historical land use of the Project site is summarised in **Table 3.1**. The aerial photographs were obtained from the Lands Department (LandsD). The referenced aerial photographs of Project site are attached in **Annex A**.

TABLE 3.1 SUMMARY OF HISTORICAL LAND USES

Year	Ref. No. of the Aerial Photographs	Description of Land Uses [(a)]	Owner or Occupier	Off-site Property Affected?
1978	22547	The Project site was undeveloped with natural landscape. The western tip of Castle Peak A Power Station (main Project site) and the small portion of the Project site at west (electrochlorination plant area) were located in the open sea.	N/A	No
1980	30418	The construction of CPPS and CPA were underway.	CLP	No
1982	43602	The construction of the coal-fired electricity generating unit A1 and the electrochlorination plant area were completed and commissioned.	CLP	No
1983	47835	The construction of the coal-fired electricity generating unit A2 was completed and commissioned.	CLP	No

Year	Ref. No. of the Aerial Photographs	Description of Land Uses [(a)]	Owner or Occupier	Off-site Property Affected?
1984	55174	The construction of the coal-fired electricity generating unit A3 was completed and commissioned.	CLP	No
1985	A00199	The construction of the coal-fired electricity generating unit A4 was completed and commissioned.	CLP	No
1985-2022	1995: A40869 2005: CN13139 2015: CS60336	There was no significant change of land use.	CLP	No
2022	E153832C	The overall structures of A1, A2, A3 and A4 remained unchanged, but the CPA has planned for progressive retirement since 2022.	CLP	No

Note:
(a) The information of construction completion and commissioning year of each unit was provided by CLP.

3.3 SITE INSPECTION AND OBSERVATION

A site walkover covering the Project site was conducted on 5 March 2024 to observe the current land uses of the Project site and its conditions. From the land contamination perspective, only the at-grade level of Project site and units were assessed in the site walkover and this study. The observations of the Project site are summarised below.

CPA Station Building for Coal-fired Electricity Generating Units A1 to A4

During the site walkover inside the CPA Station Building, the four (4) coal-fired electricity generation units A1 to A4 with the following associated equipment / system were observed:

- Ash handling system at the boiler house: one ash hopper for furnace bottom ash for each of units A1 to A4 (Photo 1 to Photo 4 of **Annex B**);
- Oil recovery tank at the boiler house for each of units A1 to A4 (Photo 5 of **Annex B**);
- A series of coal grinding mills along the CPA Station Building for units A1 to A4 (Photo 6 to Photo 8 of **Annex B**);
- Chemical dosing system (hydrazine, ammonia and sodium hydroxide caustic soda tank) for each of units A1 to A4 at the turbine house (Photo 9 to Photo 12 of **Annex B**);
- Seal oil system, lubrication oil purifier and lubrication oil cooler for each of units A1 to A4 (Photo 13 to Photo 17 of **Annex B**);
- Maintenance area at the turbine house at units A2 and A4 (Photo 18 to Photo 19 of **Annex B**);
- Condensate systems for each of units A1 to A4 at the turbine house (Photo 20 of **Annex B**);

- Ferrous sulphate tanks next to the condensate system for each unit A1 to A4 at the turbine house (Photo 21 of **Annex B**);
- Series of primary air fans and forced draft fans (Photo 22 to Photo 23 of **Annex B**);
- Transformers (Photo 24 to Photo 40 of **Annex B**);
- A transformer maintenance area at units A2 and A4 (Photo 27, Photo 29, Photo 41 to Photo 42 of **Annex B**);
- A black start diesel generator (Photo 43 of **Annex B**); and
- Other auxiliary systems (Photo 44 to Photo 50 of **Annex B**).

The CPA Station Building was paved with concrete. Oil stains were generally observed throughout the CPA Station Building and at the transformer at unit A1. The chemical dosing system was bund-walled and daily visual inspection was performed by the operator before performing daily chemical dosing to ensure there was no malfunctioning or leakage of the system. The seal oil system and lubrication oil system are located at the drain sump. A chemical drum storage area with oil stains was observed at unit A1 in the boiler house (Photo 51 of **Annex B**). The transformer maintenance areas were laid with impervious sheets along with several oil drums on drip trays observed. Besides, no other signs of suspected contamination such as abnormal odour or clear damage of ground surface (i.e. cracks) were observed.

Electrostatic Precipitator Systems

The structures of the electrostatic precipitator systems including ash hoppers for fly ash and induced draft fans were observed connecting from the boiler house of CPA Station Building to each of the units (Photo 52 to Photo 57 of **Annex B**). Moreover, a chimney for exhausting the flue gas from units A1 to A4 was observed (Photo 58 of **Annex B**). The area of electrostatic precipitator systems was observed paved with concrete and without obvious oil stain. Besides, no other sign of suspected contamination such as abnormal odour or clear ground damage (i.e. cracks) was observed.

Administration Building

The Administration Building is located at the north of the Project site. Various laboratories, offices and conference rooms were located at the ground floor of the Administration Building (Photo 59 to Photo 61 of **Annex B**). Dangerous goods stores for compressed gas and refrigerated liquefied gas were also observed at the ground floor of the Administration Building (Photo 62 to Photo 63 of **Annex B**). The Administration Building was concrete paved without ground damage (i.e. cracks).

Control Block, Workshop and Stores Building

The Control Block, Workshop and Stores Building were located immediately adjacent to the turbine house of the CPA station Building. A training workshop area was observed, and according to the CLP representative, the workshop area had been used for maintenance activities in the past (Photo 64 of **Annex B**). Stores of mechanical parts, tools, and chemical drums were observed, with secondary containments in place for the chemical drums (Photo 65 to Photo 67 of **Annex B**). Oil stains were generally observed at the concrete paved store area without ground damage (i.e. cracks).

Other Auxiliary Plants

Ash pits were observed at the north of the Project site next to the boiler house of the CPA Station Building (Photo 68 to Photo 71 of **Annex B**). As advised by the CLP representative, the ash pits were connected to the ash hoppers for furnace bottom ash, furnace bottom ash was removed by water jet from the ash hopper, drained to the ash pits, and then disposed of off-site (i.e. sold to another contractor).

An oil separator system for wastewater/oily water treatment was observed at the west of the project site. The wastewater/oil water system conveys rainwater that may contain small traces of oil from within the transformer containment bunds and pumps it to the oil separator for treatment before discharge (Photo 72 to Photo 73 of **Annex B**).

A welfare building for the ash plant workers (Ash Plant Welfare Building) was observed next to the oil separator system. The welfare building consists of changing rooms and lavatories (Photo 74 of **Annex B**). A compressor plant house was located nearby, housing a series of compressors and blowers (Photo 75 of **Annex B**). The ash plant substation was adjacent to the compressor plant house, with various electrical control boards and panels (Photo 76 to Photo 77 of **Annex B**).

Outside the ash plant substation, a temporary chemical waste storage area for solid chemical waste (including oil rags, absorbent sheets, hand gloves, and paint tins) and liquid chemical waste of spent lubrication oil was observed. The temporary chemical waste storage area is equipped with secondary containment and a concrete bund, and oil stains were noticeable (Photo 78 to Photo 79 of **Annex B**). A Liquified Petroleum Gas (LPG) store with two (2) aboveground tanks and a vaporizer room was located at the far west of the Project site (Photo 80 to Photo 81 of **Annex B**).

A fuel oil pump house was observed near the electrostatic precipitator systems. A series of fuel oil pumps and heaters were observed inside. Leakages and oil stains were noticeable in the fuel oil heaters area (Photo 82 to Photo 84 of **Annex B**). Precipitator control buildings with control panels were observed in the electrostatic precipitator area (Photo 85 of **Annex B**). A firefighting workshop with storage of fire extinguishers and support of firefighting equipment was observed near the electrostatic precipitator system at unit A4 (Photo 86 of **Annex B**). Bags of solid sulfur were kept at the sulphur store, and two (2) sulphur melting tanks were observed next to the sulfur store in the southeast of the Project site. No spillage of solid sulfur or leakage from the sulphur melting tanks were observed (Photo 87 to Photo 90 of **Annex B**).

An electrochlorination plant house (a dangerous goods manufacturing installation) and two (2) aboveground tanks for storing sodium hypochlorite solution (dangerous goods stores) were located further south of the project site (Photo 91 to Photo 92 of **Annex B**).

The other auxiliary plants were paved with concrete, and apart from the noticeable oil stains as described above, no other sign of suspected contamination such as oil staining, abnormal odour and/or distress vegetation or clear ground damage (i.e. cracks) was observed.

Open Storage Area and Scrap Yard

Along the east and southeast boundary of the Project site, several open storage areas for construction materials and a scrap yard were observed, with storage of construction material included pipes, metal scaffolding, metal fencing, etc. (Photo 93 to Photo 96 of **Annex B**). The open storage area and scrap yard were paved with concrete, and no other sign of suspected contamination such as oil staining, abnormal odour and/or distress vegetation or clear ground damage (i.e. cracks) was observed.

Vegetation/Planters, Vehicle Access and Parking Spaces

A sitting out area with planters was observed at the east of the Project site, and vegetation was observed along the northeast and east of the Project site boundary. Parking spaces were available next to the ash pit and the Control Block, Workshop and Stores Building. The parking spaces were concrete paved without oil stains, and no other sign of suspected contamination such as abnormal odour and/or distress vegetation or clear ground damage was observed. (Photo 97 to Photo 102 of **Annex B**)

The available photo records taken during the site walkover and the completed site walkover checklist are presented in **Annex B** and **Annex C,** respectively.

3.4 INFORMATION FROM GOVERNMENT DEPARTMENTS

Apart from the above-mentioned information reviewed, the following enquires to the HKSAR Government Departments listed in **Table 3.2** have been made to obtain the latest information regarding the records of land contamination and/or spillage at the Project site. A summary of correspondence is presented in **Table 3.2** below. Copies of the relevant replies from various Government Departments are included in **Annex D** for reference.

TABLE 3.2 ENQUIRES AND RESPONSES ON LAND CONTAMINATION RELATED RECORDS

Department	Responses Letter Ref.	Response Date	Summary of Responses
Environmental Protection Department (EPD)	Via email	27 February 2024	There are no reported incidents of chemical spillage / leakage within the Project site in the past 3 years.
Fire Services Department (FSD)	53) in FSD GR 6-5/4 R Pt. 52	25 March 2024	A total of twenty-four (24) Dangerous Goods licenses have been issued for CPA by FSD since 1990. Details are presented in **Annex D**. A total of one (1) incident was recorded within CPA which include: 1) Vegetation fire on hillside of CPPS on 18 January 2024.

An enquiry has been made to the registry of chemical waste producers maintained in the Territorial Control Office of EPD at Wan Chai on 29 February 2024. The registry record is updated as of 13 October 2023. The records of the registered chemical waste producers related to the CPPS and nature of business are listed in **Annex E**.

A total of twenty-six (26) active chemical waste producers ("Valid Records") and seven (7) inactive chemical waste producers ("Invalid Records") were registered with addresses at the CPPS. According to the on-site observation and further confirmation with CLP, only one (1) temporary chemical waste storage area has been established within the Project site boundary; other chemical waste storage areas are outside the Project site boundary.

From the EPD's responses, there is no record of chemical spillage or leakage, or any land contamination within the Project site for the past three years. CLP also further confirmed that there was no major spillage/leakage of chemical in the Project site's history. The chemical waste stored in the area should be handled according to the Waste Disposal (Chemical Waste) (General) Regulation. However, potential land contamination issue associated with the oil stains at temporary chemical waste storage area within the Project site boundary is anticipated.

An information request was sent to FSD regarding any historical dangerous goods license records and incident records within the CPPS. According to FSD letter correspondence dated 25 March 2024, a total of twenty-four (24) Dangerous Goods License records were identified within the CPA. Based on site observations and further enquiries made to CLP regarding the actual number of licensed dangerous goods store/installation located within the Project site, CLP confirmed that only six (6) licensed dangerous goods stores/installations are located with Project site boundary. Details of the dangerous goods licenses within the Project site are presented in **Table 3.3**.

In addition, one (1) incident was found in FSD's record, which involved a vegetation fire on hillside of CPPS on 18 January 2024. The incident took place outside the Project site boundary. Information provided by FSD is included in **Annex D**.

TABLE 3.3 MANUFACTURE LICENSES AND STORAGE LICENSES OF DG WITHIN THE PROJECT SITE

Manufacture or DG Storage License No.	Description	Location	Type of DG	Quantity
L007158	Class 2.2: Argon, Refrigerated Liquid	Chemical Laboratory Dangerous Goods Store No.3 (Administration Building)	Liquified gas	305 Litres
L007159	Class 2.2: Air, Compressed	Chemical Laboratory Dangerous Goods Store No.2 (Administration Building)	Compressed gas	96 Litres
	Class 2.2: Argon, Compressed			100 Litres
	Class 2.2: Compressed Gas, N.O.S			60 Litres
	Class 2.2: Helium, Compressed			192 Litres

Manufacture or DG Storage License No.	Description	Location	Type of DG	Quantity
	Class 2.2: Nitrogen, Compressed			150 Litres
	Class 2.2: Oxygen, Compressed			100 Litres
L007160	Category 2.1: Compressed Gas, Flammable, N.O.S	Chemical Laboratory Dangerous Goods Store No.1 (Administration Building)	Compressed gas	78 Litres
	Category 2.2: Compressed Gas, N.O.S			50 Litres
	Category 2.1: Hydrogen, compressed			455 Litres
11028	Class 4.1: Sodium Hypochlorite Solution	Aboveground tank outside the electro chlorination plant house	Hypochlorite Solution	15,000 Litres
11029	Class 4.1: Sodium Hypochlorite Solution	Aboveground tank outside the electrochlorination plant house	Hypochlorite Solution	15,000 Litres
M/185	Class 4.1: Sodium Hypochlorite Solution	Electrochlorination plant house	Hypochlorite Solution	Manufacturing

Storage License (L007158 to L007160) was permitted to the dangerous goods stores at Chemical Laboratory inside the Administration Building. These licenses are for storage of Class 2.1 and Class 2.2 dangerous goods. These types of dangerous goods are in gaseous form and classified as flammable gases or flammable, non-toxic gases. Therefore, no land contamination issue associated with these licenses is anticipated.

A Manufacture License(M/185) was also permitted to the hypochlorite solution at the electrochlorination plant house. The electrochlorination plant generates sodium hypochlorite through onsite electrolysis of seawater, which is then dosed to seawater to prevent fouling of equipment by marine growth. Sodium hypochlorite is produced as needed. The byproduct from the electrolysis process is hydrogen, which is vented to the open atmosphere. Therefore, land contamination issue associated with the Manufacture License for the electrochlorination plant house at Project site is not anticipated. However, the storage licenses (11028 and 11029) for the aboveground tanks of sodium hypochlorite solution outside the electrochlorination plant house are considered to have potential land contamination issues.

3.5 (HYDRO) GEOLOGY AND UNDERGROUND SOIL PROFILE

Previous Ground Investigation (GI) records within the CPPS were reviewed. According to the previous drillhole records available at and near the Project site, the geological strata mainly consist of fill material of boulder/cobble/rock at range of approximately 1.0m to

8.0 m below ground level (bgl), and generally followed by Grade III and above granite (bedrock). Bedrock is encountered at the range of 1.5m to 7.5m bgl at several boreholes. The east and southeast of the Project site has a higher rockhead level, potentially rockhead will be encountered just beneath underground structures or concrete slabs without presence of soil. Groundwater presents at a range of 1.3m to 5.2m bgl, and it is anticipated to be flowing to the southwest (towards the shoreline). Copies of the previous drillhole records are attached in **Annex F**.

4. REVIEW OF POTENTIALLY CONTAMINATED AREA AND HOT SPOTS

4.1 POTENTIAL CONTAMINATED AREA

The Project site mainly comprises the CPA Station Building for four (4) coal-fired electricity generating units A1 to A4, the other auxiliary systems within the CPA Station Building, electrostatic precipitators, a chimney, Administration Building, Control Block & Workshop and Stores Building, and other auxiliary plants. According to the *Practice Guide* and based on the findings of the site appraisal presented in **Section 3**, the potentially polluting activities of a power plant include: storage, transfer and use of fuels, oils and chemicals; storage, treatment and disposal of combustion residues; and storage and handling of coal. These activities are mainly located at the CPA Station Building, electrostatic precipitator system area and the areas consisting of other auxiliary plants. Furthermore, the open storage area, scrap yard and maintenance areas involve potentially polluting activities such as release of oil, fuel and lubricants from equipment maintenance, refueling and scrap metals, as well as the use of chemicals in maintenance activities. Therefore, these areas within the Project site are considered as potentially contaminated area.

The Administration Building, carpark and vegetation areas do not involve any potential polluting activities, and are therefore excluded from the potentially contaminated area.

The CPB is a potential off-site contamination source located southeast of the main Project site. Considering that the separation distance between the Project site and CPB is approximately 80m, any migration contaminants originating from the CPB to the Project site is unlikely.

4.2 IDENTIFICATION OF HOT SPOTS

As per the *Practice Guide*, it is recommended to investigate the potentially contaminated area in a regular grid pattern in order to have a comprehensive study on the potential land contamination site. Apart from the regular grid pattern, the *Practice Guide* also requires attention be paid to those locations where potential land contamination could occur. These are regarded as "hot spots" for investigation.

The SI for land contamination should include hot spots that have the potential for land contamination due to various previous site activities, locations of any leakage events, stains observed and/or former storage locations for chemicals and chemical wastes. During site walkover, attention was paid to any signs of obvious/suspected contamination, such as oil staining, abnormal odour and/or distress vegetation, and these were identified as hot spots.

As mentioned in **Section 3.3**, the following hot spots are identified at the potentially contaminated area of the Project site during the site walkover. The additional sampling locations should be proposed at the identified hot spots.

CPA Station Building for Coal-fired Electricity Generating Units A1 to A4

- Ash handling system at the boiler house: a ash hopper for furance bottom ash at each of units A1 to A4;
- Oil recovery tank at the boiler house for each of units A1 to A4;
- A series of coal grinding mills along the CPA Station Building for units A1 to A4;
- Chemical dosing system for each of units A1 to A4 at turbine house;
- Seal oil system, lubrication oil system for each of units A1 to A4;
- Maintenance area at the turbine house at unit A2 to A4;
- Ferrous sulphate tanks next to the condensate system for each of units A1 to A4 at the turbine house;
- Transformers;
- Transformer maintenance area at units A2 and A4;
- Black start diesel generator; and
- Oil staining.

Other Auxiliary Plants

- Ash pits;
- Oil separator system;
- Temporary chemical waste storage area;
- LPG store;
- Fuel oil pump house;
- Sulphur Store (including Sulphur melting tanks);
- Storage area for sodium hypochlorite solution;
- Oil sump pit;
- Scrap yard;
- Chemical drums storage area inside Control Block, Workshop and Stores Building; and
- Oil staining.

The locations of the potentially contaminated area and the hot spots are presented in **Figures 4.1**.

4.3 CHEMICALS OF CONCERN (COCS)

The selection of potential COCs recommended for laboratory analysis is based on the information collected during the site reconnaissance and the nature of historical and current land uses / activities of each potentially contaminated area which was accessible / visually accessible for the site inspections, and also the *Guidance Manual* and *Practice Guide*. Since the Project site has been used as a power plant with coal handling facilities open storage areas, scrap yard, maintenance area etc., COCs including metal, VOCs, SVOCs, PCRs, PCBs and free cyanide, a total of fifty-two (52) chemicals, are selected for laboratory analysis. Free cyanide will be analysed only for soil samples collected at the coal griding mills. PCBs will be analysed for soil and groundwater samples collected at

scrap yard. As confirmed by CLP, the chemicals used for the transformers are PCBs-free, therefore, analysis of PCBs for soil and groundwater samples collected at transformers are excluded.

5. SAMPLING AND TESTING PLAN

5.1 PROPOSED SITE INVESTIGATION (SI) STRATEGIES

As mentioned in **Section 4.1**, the CPA Station Building, electrostatic precipitator system area, areas consisting of other auxiliary plants, open storage areas, scrap yard, and the Control Block, Workshop and Stores Building are considered as the potentially contaminated area, with an area of approximately 75,500m^2. With reference to the *Practice Guide*, a regular grid pattern with a square size of 46m x 46m and a minimum of thirty-five (35) sampling locations are required to be proposed for the potentially contaminated area. Additional sampling locations are proposed at the identified hot spots. Some regular grid sampling locations are adjusted to the nearby represented facilities (i.e., electrostatic precipitator units, plant rooms), as well as the nearby hot spots to serve as sampling locations for both the regular grid and hot spots. A total of thirty-five (35) regular grid sampling locations (namely Grid-BH-1 to Grid-BH-35) and forty-nine (49) hot spot sampling locations (namely HS-BH1 to HS-BH49) are proposed within the Project site.

A total of twenty (20) coal grinding mills and twenty (20) transformers have been identified as land contamination hot spots within the Project site. These units are located adjacent to each other in clusters. Given the similarity in nature of each individual unit and their close proximity in location, only one sampling location is proposed for these clusters within each sampling grid, rather than one sampling location for each individual unit. If contamination is identified during the SI at any of the selected coal grinding mills or transformers, then additional sampling will be performed as required at the remaining coal grinding mills or transformer units in all sampling grid.

The furnace bottom ash from the ash hopper and ash pit, and the fly ash from the electrostatic precipitator will be removed and handled in accordance with relevant regulations. As a precautionary measure, CLP will perform a final inspection prior to the implementation of the Project to confirm all furnace bottom ash and fly ash has been removed completely from the civil structures. Therefore, the presence of furnace bottom ash or fly ash is not anticipated during SI, and collection of ash sample is unnecessary.

The Project will tentatively commence in Q3 2027. The demolition of building superstructures and substructures will tentatively commence in Q3 2028. Since CPA equipment / facilities are still in place and some units are still in operation, it is not feasible to carry out SI works at this stage. Upon the cease of operation and prior to the implementation of the Project, site re-appraisal of Project site should be carried in order to address any new contamination issues. The supplementary CAP, incorporating the findings of the site reappraisal and the updated sampling and testing strategy, should be prepared and submitted to EPD for agreement prior to the commencement of SI works. The SI and sampling shall be carried out when the proposed sampling locations are accessible after the demolition of the aboveground structures.

During the SI and sampling stage, a Land Contamination Specialist shall oversee the entire process and record any new visual signs of potential contamination such as oil

leakage or oil stains. The Land Contamination Specialist shall also review the need for additional sampling to capture potential contamination observed during the work.

Table 5.1 summarises the details of the sampling plan, including the number of sampling locations, the sampling methods, the number of samples, the selected RBRGs land use scenario, and the parameters that will be analysed. The proposed sampling locations are presented in **Figures 5.1**.

Table 5.2 presents the laboratory analytical methods and reporting limits proposed for the soil and groundwater samples.

TABLE 5.1 SUMMARY OF PROPOSED SAMPLING LOCATIONS

Potential Contaminated Area / Hot Spots	Sampling Location ID	Drill Depth and Method [b]	Soil Sampling		Groundwater		RBRGs Land Use Scenario
			Sampling Depths (m bgl) [b], [c]	Parameter to be Analysed [d], [e], [f], [g], [k],[j]	Sampling Depths (m bgl)	Parameter to be Analysed [e], [f], [h], [i], [j]	
Potentially Contaminated Area	Grid-BH1 to Grid-BH35[k]	Borehole constructed by rotary drilling to 3.0m below ground level (bgl) and 2.0m below ground water level. For sampling location has high rockhead level, rotary drilling to 1.0m below rockhead level and 2.0m below ground water level.	Manual excavation of Inspection Pit (0-1.5m bgl): • To collect disturbed sample at 0.5m and 1.5m bgl Rotary drilling of boreholes from: • Continuous drilling from bottom of the inspection pit and collected disturbed samples at 2.5m bgl. • For sampling location has high rockhead level, the number of soil sample and sample depth can be adjusted, subject to the agreement with land contamination specialist.	Metal, PCRs, VOCs, SVOCs, PCBs, free Cyanide	Collect one (1) groundwater sample at static groundwater level, if groundwater is encountered before end of borehole.	Mercury, PCRs, VOCs, SVOCs, PCBs	Industrial
Ash hopper for furnace bottom ash at each of units A1 to A4	Grid-BH17 to Grid-BH20[k]						
Oil recovery tank at the boiler house for each of units A1 to A4	HS-BH36 to HS-BH39						
Coal grinding mills	HS-BH24 to HS-BH29						
Chemical dosing system for each of units A1 to A4	HS-BH20 to HS-BH23						
Seal oil system, lubrication oil system for each of units A1 to A4	HS-BH16 to HS-BH19						
Maintenance area at the turbine house at unit A2 to A4	HS-BH9 to HS-BH11						
Ferrous sulphate tanks for each unit A1 to A4	HS-BH12 to HS-BH15						
Transformers	HS-BH1, HS-BH4, HS-BH5, HS-BH7, HS-BH43						
Chemical drums storage area at transformer maintenance area at units A2 and A4	HS-BH3 to HS-BH6						
Black start diesel generator	HS-BH2						
Chemical drums storage area at boiler house	HS-BH33						
Ash pits	HS-BH30 to HS-BH32						
Oil separator system	HS-BH-42						
Temporary chemical waste storage area	HS-BH41						
LPG store	HS-BH40						
Fuel oil pump house	HS-BH44 to HS-BH45						
Sulphur Store (including Sulphur melting tanks)	HS-BH34 to HS-BH35						
Aboveground tanks for sodium hypochlorite solution	HS-BH46						
Oil sump pit	HS-BH8						
Scrap yard	Grid-BH21[k]						
Chemical drums storage area inside Control Block, Workshop and Stores Building	HS-BH47						
Oil stain at storage area inside Control Block, Workshop and Stores Building	Grid-BH1[k]						
Transformer maintenance area at units A2 and A4	HS-BH48 to HS-BH49						

Notes:

(a) Exact coordinates to be confirmed by contractor after sub-surface utility scanning and will be provided in the Contamination Assessment Report.

(b) In case any below ground structure (i.e. sump pit, ash pit, oil separator) and thick surface concrete layer, sampling depth shall be adjusted (i.e. sampling from below the sump pit or below the concrete layer).

(c) Sampling depths may be changed if there is presence of rock/big boulders during rotary drilling. Exact sampling locations shall be subject to the instructions of land contamination specialist during supervision.

(d) Metals for soil samples: Antimony, Arsenic, Barium, Cadmium, Chromium III, Chromium VI, Cobalt Copper, Lead, Manganese, Mercury, Molybdenum, Nickel, Tin and Zinc, all-inclusive as listed in **Annex G**.

(e) Petroleum Carbon Ranges: C6-C8, C9-C16, C17-C35, all-inclusive as listed in **Annex G**.

(f) VOCs: Acetone, Benzene, Bromodichloromethane, 2- Butanone, Chloroform, Ethylbenzene, Methyl tert-Butyl Ether, Methylene Chloride, Styrene, Tetrachloroethene, Toluene, Trichloroethene, and Xylenes (Total).

(g) SVOCs for Soil: 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.

(h) SVOCs for Groundwater: Acenaphthene, Acenaphthylene, Anthracene, Benzo(b)fluoranthene, Chrysene, Fluoranthene, Fluorene, Hexachlorobenzene, Naphthalene, Phenanthrene, and Pyrene.

(i) Mercury will be analysed for groundwater samples.

(j) Free cyanide will be analysed for soil samples collected at hot spot locations at coal grinding mills. PCBs will be analysed for soil and groundwater samples collected at scrap yard.

(k) The regular grid sampling location is adjusted to the nearby hot spots to serve as sampling locations for both regular grid and hot spots.

TABLE 5.2 LABORATORY TESTING METHODS AND REPORTING LIMITS

Test Parameter	Soil		Groundwater	
	Reference Method	Reporting Limit (mg/kg)	Reference Method	Reporting Limit (μg/L)
Metals [b]				
Lead	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Antimony	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Arsenic	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Barium	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Cadmium	USEPA 6020	0.2	USEPA 6020	Not to be tested [a]
Cobalt	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Copper	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Manganese	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Molybdenum	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Nickel	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Tin	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Zinc	USEPA 6020	1	USEPA 6020	Not to be tested [a]
Chromium III	By Calculation	1	By Calculation	Not to be tested [a]
Chromium VI	USEPA3060	1	APHA3500 Cr:D	Not to be tested [a]
Mercury	APHA3500Cr:D	0.05	APHA3112B	0.5
PCRs [b]				
C6-C8	USEPA 8015	5	USEPA 8015	20
C9-C16	USEPA 8015	200	USEPA 8015	500
C17-C35	USEPA 8015	500	USEPA 8015	500
VOCs [b]				
Benzene	USEPA 8260	0.2	USEPA 8260	5
Toluene	USEPA 8260	0.5	USEPA 8260	5
Ethylbenzene	USEPA 8260	0.5	USEPA 8260	5
Stryene	USEPA 8260	0.5	USEPA 8260	5
Xylenes (Total)	USEPA 8260	2	USEPA 8260	20
Acetone	USEPA 8260	50	USEPA 8260	500
2-Butanone	USEPA 8260	5	USEPA 8260	50
Methylene chloride	USEPA 8260	0.5	USEPA 8260	50
Trichloroethene	USEPA 8260	0.1	USEPA 8260	5
Tetrachloroethene	USEPA 8260	0.04	USEPA 8260	5
Chloroform	USEPA 8260	0.04	USEPA 8260	5
Bromodichloromethane	USEPA 8260	0.1	USEPA 8260	5
Methyl tert-Butyl Ether	USEPA 8260	0.5	USEPA 8260	5
SVOCs [b]				
Acenaphthene	USEPA 8270	0.5	USEPA 8270	2
Acenaphthylene	USEPA 8270	0.5	USEPA 8270	2
Anthracene	USEPA 8270	0.5	USEPA 8270	2
Benzo(a)anthracene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]
Benzo(a)pyrene	USEPA 8270	0.5	USEPA 8270	Not to be tested[a]
Benzo(b)fluoranthene	USEPA 8270	0.5	USEPA 8270	1
Benzo(k)fluoranthene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]
Benzo(g,h,i)perylene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]

Test Parameter	Soil		Groundwater	
	Reference Method	Reporting Limit (mg/kg)	Reference Method	Reporting Limit (μg/L)
Bis-(2-Ethylhexyl)phthalate	USEPA 8270	5	USEPA 8270	Not to be tested [a]
Chrysene	USEPA 8270	0.5	USEPA 8270	1
Dibenzo(a,h)anthracene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]
Fluoranthene	USEPA 8270	0.5	USEPA 8270	2
Fluorene	USEPA 8270	0.5	USEPA 8270	2
Hexachlorobenzene	USEPA 8270	0.2	USEPA 8270	4
Indeno(1,2,3-cd)pyrene	USEPA 8270	0.5	USEPA 8270	Not to be tested [a]
Napththalene	USEPA 8270	0.5	USEPA 8270	2
Phenanthrene	USEPA 8270	0.5	USEPA 8270	2
Pyrene	USEPA 8270	0.5	USEPA 8270	2
Polychlorinated Biphenyls (PCBs) [b]				
PCBs	USEPA 8270	0.1	USEPA 8270	1
Other Inorganic Compounds [b]				
Cyanide, free	APHA 45000CN:B,C,E & I ISO 17380	1	APHA 45000CN: B & N	Not to be tested [a]

Notes:

(a) Not to be tested – No corresponding RBRGs was established for groundwater.

(b) All analysis shall be conducted according to the reference test methods accredited by HOKLAS or one of its Mutual Recognition Arrangement partners, along with laboratory internal Quality Assurance/Quality Control (QA/QC) procedures.

6. SAMPLING METHODOLOGY

6.1 OVERVIEW

Borehole drilling is proposed as the means of sampling to investigate and determine the presence of potential soil and groundwater contamination. The drilling works and soil and groundwater sampling will be supervised by a Land Contamination Specialist. The soil sampling methodologies are based on the *Practice Guide*. These methods include decontamination procedures, sample collection, preparation and preservation, and chain-of-custody documentation as described in the following sections.

6.2 ROLE OF LAND CONTAMINATION SPECIALIST DURING THE SITE INVESTIGATION

The Land Contamination Specialist will be responsible for management and oversight of the SI and sampling works. The Land Contamination Specialist shall:

- Provide on-site supervision and management of the whole SI and sampling works; and
- Prepare on-site records (e.g. photo records, site field records) to demonstrate the SI works and sampling works meet the requirements stated in agreed CAP and the land contamination guidelines published by EPD

6.3 SAMPLING LOCATIONS

Sampling locations are proposed to be conducted at the potential land contaminated area. The proposed sampling location is presented in **Figures 5.1**.

The exact sampling locations of the SI will be determined on site and subject to fine adjustment due to site specific conditions (e.g., exact oil stain locations, presence of foundations, underground utilities, delivery pipes and services, etc.). Relocation of sampling locations will be considered within the same sampling grid for regular grid sampling locations and as close as possible to the contamination hot spots for the hot spot sampling locations.

6.4 SOIL SAMPLING

The maximum excavation depth across the Project site is about 2.5m below ground level. The borehole will be advanced by means of dry rotary drilling method, i.e., without the use of a flushing medium, as far as practicable. Adjustment of sampling locations or depth will be considered in order to facilitate the drilling if rocks / large boulders are encountered during the drilling.

For safety reasons and to inspect for underground utilities, utility scanning will be performed at all proposed borehole locations to ensure sufficient clearance from underground utilities prior to excavation. In addition, an inspection pit will be excavated down manually to about 1.5m bgl to perform underground utility clearance at each of the borehole locations before drilling commences.

Disturbed soil samples will be collected at the depth of 0.5 m and 1.5m from the inspection pits using a hand-driven decontaminated sampler then be taken by stainless steel spoon and placed into the containers provided by the HOKLAS accredited laboratory. Soil boring using rotary drill rigs will then be performed from 1.5m bgl to a maximum depth of 3.0m bgl and 2

m below static groundwater level. For sampling location has high rockhead level, rotary drilling to 1.0m below rockhead level and 2.0m below ground water level.

During soil sampling, as a preliminary scanning for boreholes, soil colour, odour, visual inspection will be used as in-situ measure for determining the vertical extent of contamination.

For soil sampling using boreholes, boreholes will be drilled down to 3m bgl and 2.0m below ground water level or as advised by the Land Contamination Specialist. Disturbed soil samples at 0.5m, 1.5m and 2.5m bgl will be collected for laboratory analysis.

For sampling location has high rockhead level, where without presence of soil or with limited soil depth the number of soil sample and sample depth can be adjusted subject to the agreement with land contamination specialist.

In addition to the samples collected for laboratory analysis, a strata log will be kept for record of additional data to aid in the interpretation of results. Information on the general structure of the subsurface strata including grain size, colour, wetness, and the depth and thickness of each soil/rock layer will be noted. The presence of any foreign material such as metals, wood, or plastics will also be recorded.

6.5 GROUNDWATER SAMPLING

One (1) groundwater monitoring well should be installed at each borehole, if groundwater is present. One (1) groundwater sample will be collected from all of the boreholes when the groundwater table is first encountered during soil sampling for contamination investigation.

A groundwater monitoring well will be installed at each trial pit / borehole by making reference to Section 2.4.5 of the *Practice Guide*. The borehole to be used for groundwater monitoring will be drilled to a minimum depth of two meters below the water table and/or suspected contamination depth and installed with well materials to allow for groundwater sampling. A PVC pipe will be used for the groundwater sampling well. All PVC pipes will be decontaminated prior to installation. A PVC pipe sections should be connected together using appropriate methods such as pre-fabricated threaded joints or rivets and not connected using solvent based glues. Empty voids between the PVC pipe and the borehole will be packed with clean gravels and/or sand. The groundwater sampling wells should be secured to prevent contamination from the surface. Bentonite and cement will be used to fill up the top of the void and well caps will be used to close the pipe.

Upon completion of installation of monitoring wells, approximately five times volume of well will be flushed to remove silt and drilling fluid residue from the wells. The wells will then be allowed to stand for a day to permit groundwater conditions to equilibrate. Prior to sampling, the groundwater will be purged three times the volume of groundwater within the borehole to remove fine-grained materials and to collect freshly recharged representative samples using a Teflon / stainless steel bailer, stainless steel spoon or mechanical pump or similar device. Groundwater level and thickness of free product layer, if present, will be measured by dip meter and interface probe respectively, measurement will be taken after 2 hours of purging and before the collection of groundwater samples. Prior to sampling, at least three consecutive stable readings of temperature, electrical conductivity and pH value will be obtained. The free-product, if present, will be sampled to allow identification by the laboratory. The field measurements of groundwater level, temperature, electrical conductivity,

pH value, presence of free product and thickness of free product layer will be recorded and reported in the Contamination Assessment Report (CAR).

If the permeability of the surrounding strata and storage is low, dewatering by purging may dry up the hole, in which case the on-site Land Contamination Specialist will decide whether the requirement to purge three times the liquid volume is to be waived.

The free-product layer, if any, 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.

6.6 DECONTAMINATION PROCEDURES

Equipment in contact with the ground should be thoroughly decontaminated between each sampling event to minimise the potential for cross contamination. The equipment should be decontaminated by steam cleaning, washed with phosphate-free detergent and rinsed with water. A clean area immediately adjacent to the sample location should be established with a clean plastic sheet where all cleaned and foil wrapped equipment should be placed.

During sampling and decontamination activities, disposable latex gloves should be worn to prevent the transfer of contaminants from other sources. Disposable accessories, such as latex gloves, will be discarded properly after use.

6.7 SAMPLE SIZE

Prior to sampling, the laboratory responsible for chemical analysis will be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis. **Table 6.1** lists the recommended sample container types, sizes and preservation method.

TABLE 6.1 SUMMARY OF SAMPLE CONTAINER TYPE, SIZES AND PRESERVATION METHOD

Test Parameters	Container Type, Size and Preservation Method
Soil	
Metals	1 x 250 ml glass jar with Teflon-lined cap
VOCs / PCRs	1 x 250 ml glass jar with Teflon-lined cap
SVOCs	1 x 250ml glass jar with Teflon-lined cap
PCBs	1 x 250ml glass jar with Teflon-lined cap
Free Cyanide	1 x 250ml glass jar with Teflon-lined cap
Groundwater	
Metals (Mercury)	1 x 250 ml plastic (nitric acid)
VOCs / PCRs (C6-C8)	2 x 40 ml amber glass vials (hydrochloric acid)
SVOCs / PCRs (C9-C35)/ PCBs	1 x 1,000 ml amber glass (no preservative)

6.8 SAMPLE HANDLING AND LABORATORY ANALYSIS

The soil and groundwater sampling should be conducted by an experienced sampling technician and supervised by an on-site Land Contamination Specialist, and appropriate procedures should be adhered to. Sampling methodologies are based on the techniques developed by the USEPA. Sampling tools should be cleaned thoroughly before, in-between and after each sampling. Special care would be taken to prevent any cross contamination of samples during collection, handling and storage.

All soil samples are to be taken by stainless steel spoon and placed into the containers provided by the HOKLAS accredited laboratory. A sufficient volume of soil as per the advice of the HOKLAS accredited laboratory shall be obtained. Chain-of-custody documentation will be initiated immediately after samples are collected. Containers will be labelled in the field with the date, well designation, project name, time of collection and analysis to be performed. The samples will be properly stored at a temperature range between 0°C and 4ºC in the dark but not frozen, labelled and delivered to the HOKLAS accredited laboratory on the same day for chemical analyses. All analysis will be conducted according to the test methods accredited by HOKLAS or one of its Mutual Recognition Arrangement partners, along with laboratory internal QA/QC procedures.

Similarly, all groundwater samples collected will be treated and preserved in the identical manner as that for soil samples.

All the chain-of-custody forms will be recorded and reported in the CAR.

6.9 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

QA/QC samples will be collected to allow an assessment of the quality of data collected. The QA/QC samples required are listed below. The estimated total number of QA/QC samples are presented in **Table 6.2**.

- One (1) field duplicate sample for every twenty (20) soil samples and every twenty (20) groundwater samples. Precision will be calculated as the relative percent difference (RPD) between the original sample and the blind duplicate. The testing parameters of the duplicate sample will be same as the associated soil and groundwater samples. The United States Environemnt Protection Authority (USEPA) acceptable limits for RPD are less than 30% for groundwater and less than 50% for soil. RPD is only applicable for the results that are more than double of the labortory reporting limit;
- One (1) field blank for every twenty (20) soil samples and every twenty (20) groundwater samples. The testing parameters of the field blank will be same as the associated soil or groundwater samples;
- One (1) equipment blank per for every twenty (20) soil samples and every twenty (20) groundwater samples. The testing parameters of the equipment blank will be same as the associated soil or groundwater samples; and
- One (1) trip blank for every twenty (20) soil samples and every twenty (20) groundwater samples. The testing parameters of the trip blank will be PCRs (C6-C8) and relevant VOC parameters same as the associated soil or groundwater samples to detect any cross contamination during transport. Laboratory prepared spiked VOC samples should be stored, handled and transported in exactly the same way as the soil and groundwater samples collected.

TABLE 6.2 ESTIMATION OF TOTAL QA/QC SITE SAMPLES

Type of Sample	Number of Sample [a]
(1) For Soil Sample (for 84 boreholes)	
Soil Sample + Duplicate Sample	252 + 13
Trip Blank Sample	13
Field Blank Sample	13
Equipment Blank Sample	13
(2) For Groundwater Sample (for 84 boreholes)	
Groundwater Sample + Duplicate Sample	84 + 5
Trip Blank Sample	5
Field Blank Sample	5
Equipment Blank Sample	5

Note:

(a) Number of each type of QA/QC sample is subject to the actual number of soil and groundwater samples collected during the SI works.

6.10 FIELDWORK HEALTH AND SAFETY PRECAUTIONS

The following measures are to be implemented to minimise risks to all field personnel during the SI stage:

- Sweep at and in the vicinity of the sampling locations with a metal detector to check for the presence of any unexploded ordnance and underground utilities prior to soil sampling works. If there is any metal scrap discovered under the ground during the course of SI, the SI Contractor is to cease work immediately until the identity is confirmed. For areas suspect of ordnance, the SI Contractor is to inform engineer immediately for necessary notification to the Hong Kong Police Force for subsequent action;
- Minimise the exposure to any contaminated material by wearing appropriate clothing and personal protective equipment (PPE) such as gloves, goggles, protective coveralls and safety boots (when interacting directly with suspected contaminated material);
- Provide information to all workers on the potential hazards in the vicinity of sampling locations;
- Provide adequate hygiene and washing facilities; and
- Prohibit smoking or eating during activities with potential exposure to contaminated soil and/or groundwater.

6.11 REINSTATEMENT

The proposed SI for soil and groundwater contamination assessment involve earthwork including excavation of inspection pits and drilling of boreholes. In order to minimise the import and use of fill material, it is recommended to backfill inspection pits and boreholes with the original material from corresponding inspection pits and boreholes.

Since the proposed locations for SI are potential contaminated and to avoid possible cross-contamination, it is also recommended to place the excavated material on impervious sheeting adjacent to inspection pits/ boreholes. For each individual inspection pit and borehole, it can only be backfilled with excavated material from its own corresponding inspection pit/ borehole. No backfilling with cross inspection pits/ boreholes shall be allowed.

7. CONCLUSION AND RECOMMENDATIONS

7.1 CONCLUSION

Based on the site appraisal findings, the CPA Station Building, electrostatic precipitator system area, areas consist of other auxiliary plants, open storage areas, scrap yard, and the Control Block, Workshop and Stores Building are considered as the potentially contaminated area, with an area of approximately 75,500m^2. With reference to the *Practice Guide*, a regular grid pattern with a square size of 46m x 46m shall be adopted for sampling. Additional sampling locations are proposed at the identified hot spots. A total of thirty-five (35) regular grid sampling locations (namely Grid-BH-1 to Grid-BH-35) and forty-nine (49) hot spots sampling locations (namely HS-BH1 to HS-BH49) are proposed within the Project site for SI to collect soil and groundwater samples for laboratory testing.

Since CPA equipment / facilities are still in place and not feasible to carry out SI works at this stage, SI and sampling shall be carried out when the proposed sampling locations are available after the demolition of the aboveground structures.

During the site investigation and sampling stage, a Land Contamination Specialist shall oversee the entire process and record any new visual signs of potential contamination such as oil leakage or oil stains. The Land Contamination Specialist shall also review the need for additional sampling to capture potential contamination observed during the work.

7.2 WAY FORWARD AND RECOMMENDATIONS FOR THE PROJECT

The Project will tentatively commence in Q3 2027. The demolition of building superstructures and substructures will tentatively commence in Q3 2028. Since CPA equipment / facilities are still in place and some units are still in operation, it is not feasible to carry out SI works at this stage. Upon the cease of operation and prior to the implementation of the Project, site re-appraisal of the Project site should be carried in order to address any new contamination issues. The supplementary CAP(s), incorporating the findings of the site reappraisal and the updated sampling and testing strategy, should be prepared and submitted to EPD for agreement prior to the commencement of SI works. The SI and sampling shall be carried out when the proposed sampling locations are accessible after the demolition of the aboveground structures.

Sampling and testing works shall be carried out according to the EPD agreed supplementary CAP and will be supervised by a Land Contamination Specialist. Upon the receipt of laboratory testing reports, the results will be compared against the RBRGs for industrial land use, soil saturation and solubility limit (see **Annex G**) and a CAR will be prepared and submitted to EPD for agreement.

If contamination is confirmed, the CAR will be accompanied by a Remediation Action Plan (RAP). The CAR and RAP will be a combined report for EPD's agreement. The RAP will be prepared to evaluate the needs of remediation, and if so, identify appropriate remediation methods suitable for the site conditions and the contaminants requiring remediation.

The contamination extent (both horizontal and vertical) will be estimated in the RAP. The confirmation of such contamination extent, the implementation of remediation action, and the preparation of a Remediation Report (RR) will be conducted according to the approved RAP by the demolition contractor.

Upon completion of remediation works (if necessary), a RR will be prepared and submitted to EPD to demonstrate that the decontamination works have been carried out in accordance with the approved CAR and RAP. No removal of substructure and excavation works within the contaminated area should be carried out before the agreement of the RR by EPD.

7.3 HANDLING AND DISPOSAL ARRANGEMENT OF REMOVED DIESEL / PETROLEUM PRODUCTS AND SPILL PREVENTION MEASURES DURING DEMOLITION

Prior to commencement of demolition in the Project area, the leftover diesel, other petroleum products in the equipment to be demolished or potential skimmed-free product from the groundwater shall be removed as much as possible. The removed diesel, other petroleum products and skimmed-free product shall be considered as chemical waste and are controlled under the *Waste Disposal (Chemical Waste) (General) Regulation*.

The demolition contractor who will generate chemical waste or cause it to be produced should register with the EPD as a chemical waste producer.

Removed diesel and petroleum products shall be labelled and stored in accordance with the requirement stipulated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* issued by EPD.

The removed petrol and petroleum products are required to be collected by licensed chemical waste collector and to be disposed of at licensed chemical waste treatment facilities (i.e. the Chemical Waste Treatment Centre (CWTC) in Tsing Yi). Trip tickets system shall be implemented during the collection and disposal of removed petrol and diesel.

The following mitigations measures shall be implemented to ensure that risk of ground contamination as a result of oil spills or leaks is kept to a practical minimum:

- Regular visual inspections to detect any signs of fuel leakage prior to demolition;
- Provision of impermeable lining or absorbent materials to contain leaks;
- Provision of secondary containment for the temporary storage of removed diesel or petroleum products, demolished structures and pipes; and
- Provision of spill control materials and equipment.

Legend

Project Site Location

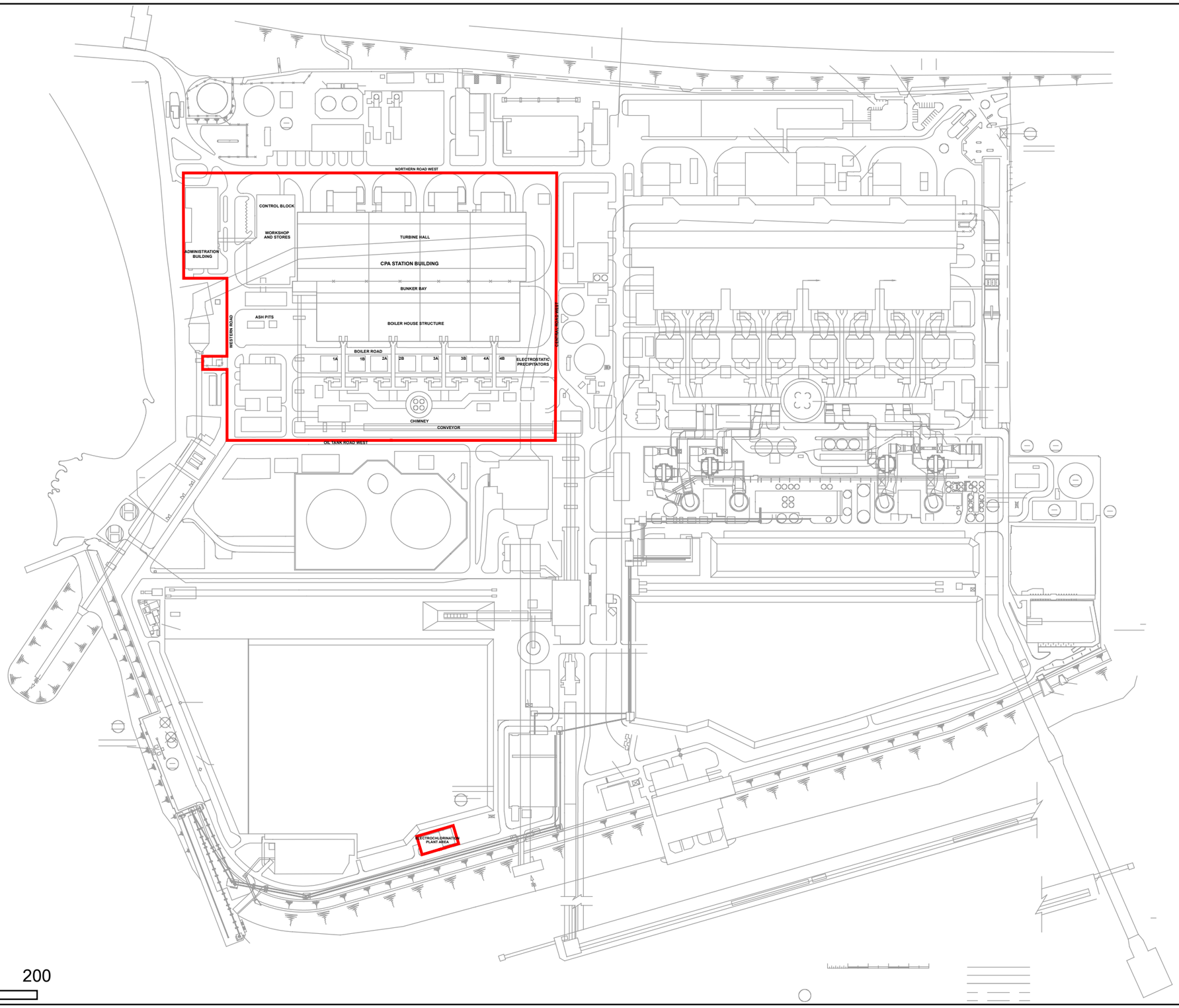


Figure 1.1

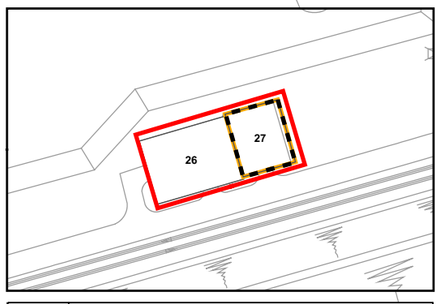
Location of Project Site at CPA

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Landcon\0617637_Project_Site_v3.mxd
Date: 20/9/2024

Legend

- Project Site Location
- Potentially Contaminated Areas
- Hotspots



Number	Structure
1	Ash Hopper
2	Oil Recovery Tank
3	Coal Grinding Mill
4	Chemical Dosing System
5	Seal Oil System, Lubrication Oil System
6	Maintenance Area
7	Ferrous Sulphate Tank
8	Transformer
9	Black Start Diesel Generator
10	Chemical Drums Storage Area
11	Electrostatic Precipitator
12	Induced Draft Fan
13	Chimney
14	Ash Pit
15	Oil Sump Pit
16	Oil Separator System
17	Ash Plant Welfare Building
18	Compressor Plant House
19	Ash Plant Substation
20	Temporary Chemical Waste Storage Area
21	LPG Store
22	Fuel Oil Pumphouse
23	Precipitator Control Building
24	Fire Fighting Workshop
25	Sulphur Store (including Sulphur Melting Tanks)
26	Electrochlorination Plant House
27	Aboveground Tanks for Sodium Hypochlorite Solution
28	Open Storage Area
29	Scrap Yard
30	Parking Spaces
31	Sitting Out Area
32	Vegetation/Planters
33	Oil Staining

Remark:
The units and equipment indicated in the CPA Station Building in the figure are the key units/equipment with use of chemical, oil and ash handling unit.

Figure 4.1

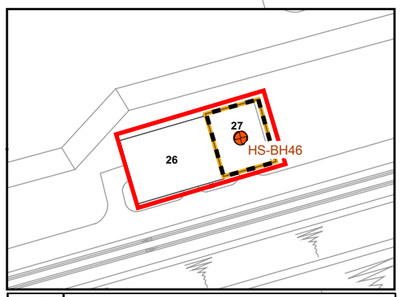
Potential Contaminated Area and Location of Hot Spots

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Landcon\0617637_Potentially_Contaminated_Areas.mxd
Date: 23/9/2024

Legend

- Project Site Location
- Potentially Contaminated Areas
- Proposed Sampling Grid (46m x 46m)
- Grid Boreholes
- Hotspot Boreholes
- Hotspots



Number	Structure
1	Ash Hopper
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15	Oil Sump Pit
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17	Ash Plant Welfare Building
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19	Ash Plant Substation
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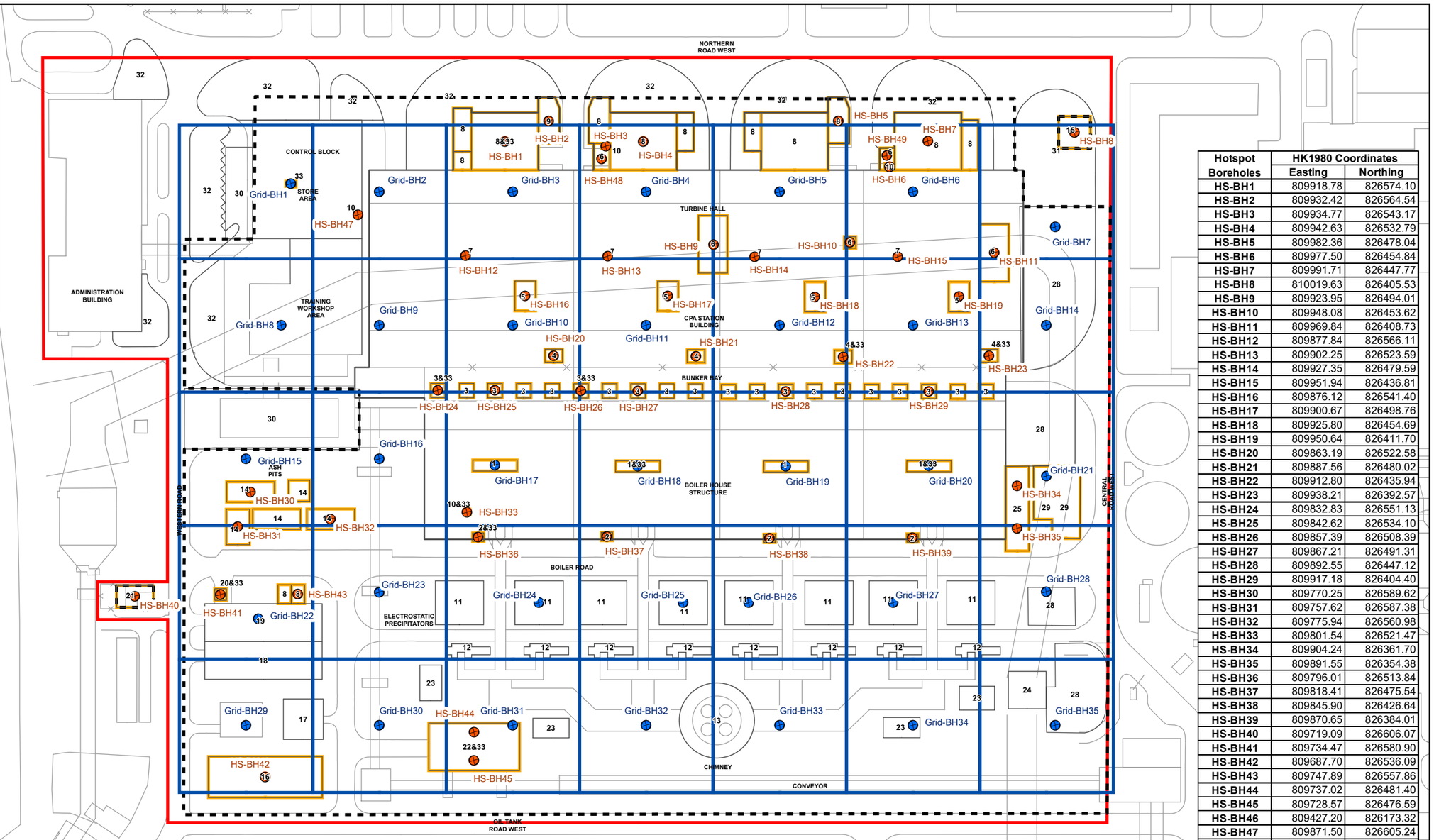
29	Scrap Yard
30	Parking Spaces
31	Sitting Out Area
32	Vegetation/Planters
33	Oil Staining



Hotspot Boreholes	HK1980 Coordinates	
	Easting	Northing
HS-BH1	809918.78	826574.10
HS-BH2	809932.42	826564.54
HS-BH3	809934.77	826543.17
HS-BH4	809942.63	826532.79
HS-BH5	809982.36	826478.04
HS-BH6	809977.50	826454.84
HS-BH7	809991.71	826447.77
HS-BH8	810019.63	826405.53
HS-BH9	809923.95	826494.01
HS-BH10	809948.08	826453.62
HS-BH11	809969.84	826408.73
HS-BH12	809877.84	826566.11
HS-BH13	809902.25	826523.59
HS-BH14	809927.35	826479.59
HS-BH15	809951.94	826436.81
HS-BH16	809876.12	826541.40
HS-BH17	809900.67	826498.76
HS-BH18	809925.80	826454.69
HS-BH19	809950.64	826411.70
HS-BH20	809863.19	826522.58
HS-BH21	809887.56	826480.02
HS-BH22	809912.80	826435.94
HS-BH23	809938.21	826392.57
HS-BH24	809832.83	826551.13
HS-BH25	809842.62	826534.10
HS-BH26	809857.39	826508.39
HS-BH27	809867.21	826491.31
HS-BH28	809892.55	826447.12
HS-BH29	809917.18	826404.40
HS-BH30	809770.25	826589.62
HS-BH31	809757.62	826587.38
HS-BH32	809775.94	826560.98
HS-BH33	809801.54	826521.47
HS-BH34	809904.24	826361.70
HS-BH35	809891.55	826354.38
HS-BH36	809796.01	826513.84
HS-BH37	809818.41	826475.54
HS-BH38	809845.90	826426.64
HS-BH39	809870.65	826384.01
HS-BH40	809719.09	826606.07
HS-BH41	809734.47	826580.90
HS-BH42	809687.70	826536.09
HS-BH43	809747.89	826557.86
HS-BH44	809737.02	826481.40
HS-BH45	809728.57	826476.59
HS-BH46	809427.20	826173.32
HS-BH47	809871.50	826605.24
HS-BH48	809930.11	826542.09
HS-BH49	809980.34	826457.49

Grid Boreholes	HK1980 Coordinates		Grid Boreholes	HK1980 Coordinates		Grid Boreholes	HK1980 Coordinates	
	Easting	Northing		Easting	Northing		Easting	Northing
Grid-BH1	809869.11	826630.64	Grid-BH13	809934.22	826420.47	Grid-BH25	809811.78	826441.30
Grid-BH2	809882.05	826602.82	Grid-BH14	809957.22	826380.63	Grid-BH26	809823.11	826421.68
Grid-BH3	809905.05	826562.98	Grid-BH15	809779.38	826596.65	Grid-BH27	809848.02	826378.54
Grid-BH4	809928.05	826523.14	Grid-BH16	809802.38	826556.82	Grid-BH28	809877.54	826334.63
Grid-BH5	809951.05	826483.31	Grid-BH17	809820.28	826521.18	Grid-BH29	809699.70	826550.65
Grid-BH6	809974.05	826443.47	Grid-BH18	809844.68	826478.41	Grid-BH30	809722.70	826510.82
Grid-BH7	809988.03	826394.87	Grid-BH19	809870.15	826434.13	Grid-BH31	809745.70	826470.98
Grid-BH8	809825.17	826609.08	Grid-BH20	809894.89	826391.49	Grid-BH32	809768.70	826431.14
Grid-BH9	809842.22	826579.82	Grid-BH21	809912.13	826354.56	Grid-BH33	809791.70	826391.31
Grid-BH10	809865.22	826539.98	Grid-BH22	809733.65	826565.37	Grid-BH34	809814.70	826351.47
Grid-BH11	809888.22	826500.14	Grid-BH23	809762.54	826533.82	Grid-BH35	809839.22	826308.95
Grid-BH12	809911.22	826460.31	Grid-BH24	809786.91	826484.38			

Remark:
The units and equipment indicated in the CPA Station Building in the figure are the key units/equipment with use of chemical, oil and ash handling unit.

Metres
0 30 60

Figure 5.1

Proposed Sampling Locations

File: T:\GIS\CONTRACT\0617637\mxd\Landcon\0617637_Proposed_Sampling_Locations.mxd
Date: 23/9/2024

ANNEX A HISTORICAL AERIAL PHOTOS

Annex A

Historical Aerial Photo (1978)

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Aerial_Photo\0617637_Aerial_Photo_1978.mxd
Date: 2/7/2024

Annex A

Historical Aerial Photo (1980)

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Aerial_Photo\0617637_Aerial_Photo_1980.mxd
Date: 5/4/2024

Annex A

Historical Aerial Photo (1982)

ERM

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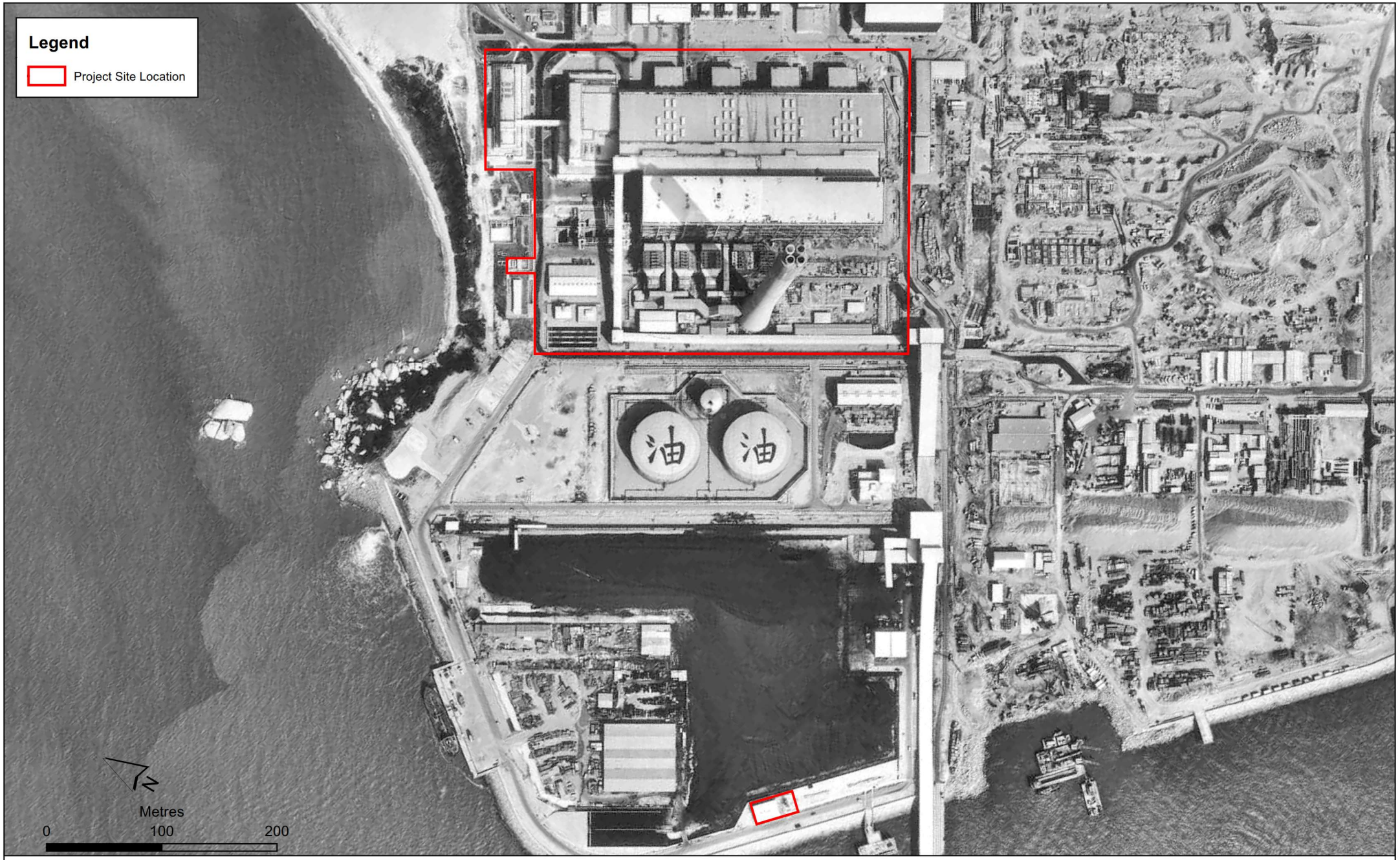
Date: 5/4/2024



Annex A

Historical Aerial Photo (1983)

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Aerial_Photo\0617637_Aerial_Photo_1983.mxd
Date: 5/4/2024

Annex A

Historical Aerial Photo (1984)

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Aerial_Photo\0617637_Aerial_Photo_1984.mxd
Date: 5/4/2024

Annex A

Historical Aerial Photo (1985)

ERM

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Date: 5/4/2024

Annex A

Historical Aerial Photo (1995)

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Aerial_Photo\0617637_Aerial_Photo_1995_1.mxd
Date: 5/4/2024

Annex A

Historical Aerial Photo (2005)

ERM

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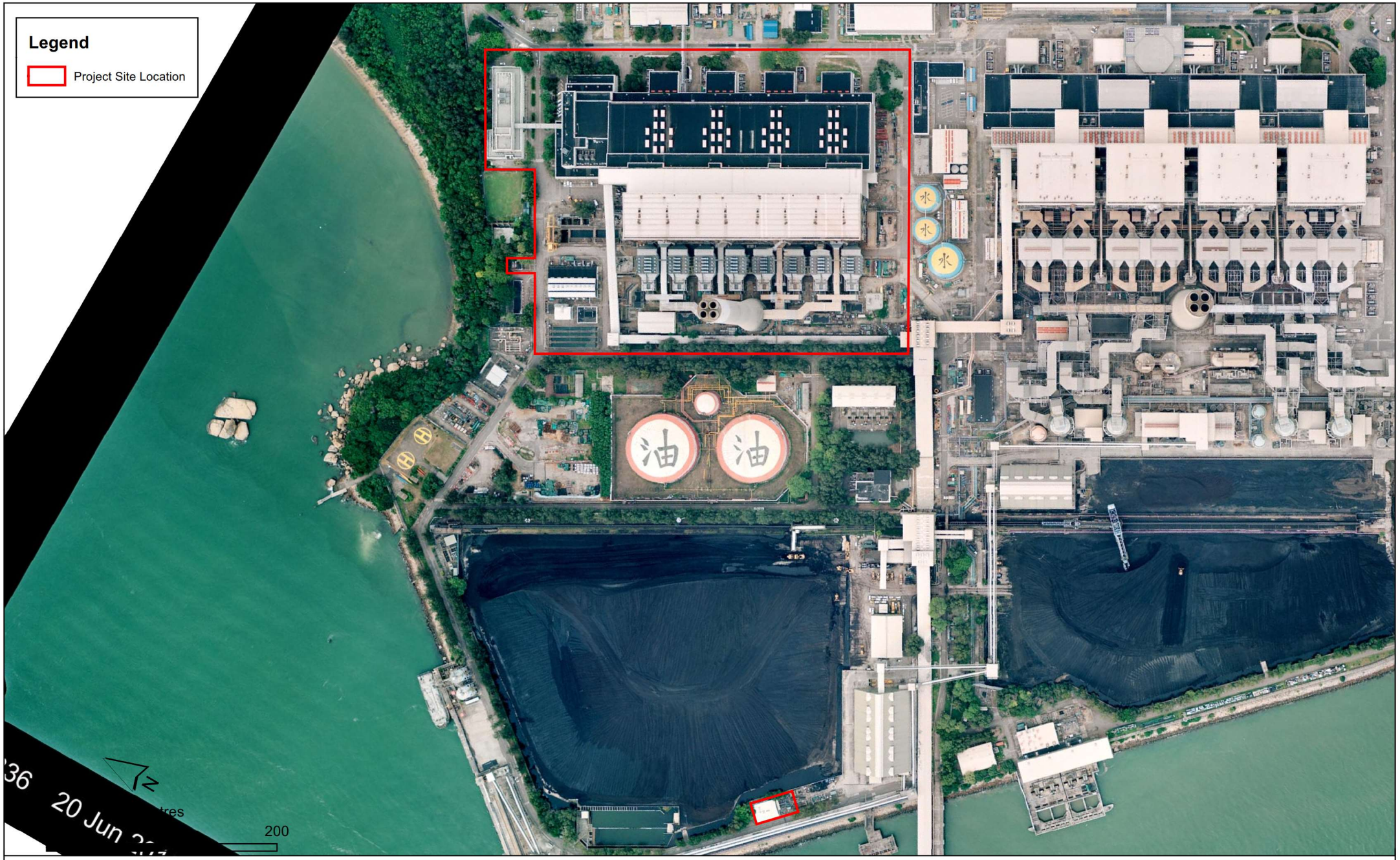
Date: 5/4/2024



Annex A

Historical Aerial Photo (2015)

ERM

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Date: 5/4/2024

Annex A

Historical Aerial Photo (2022)

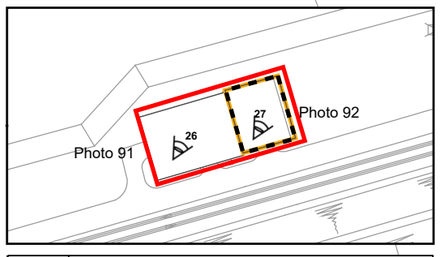
ERM

File: T:\GIS\CONTRACT\0617637\mxd\Aerial_Photo\0617637_Aerial_Photo_2022.mxd
Date: 5/4/2024

ANNEX B PHOTO RECORDS OF SITE WALKOVER

Legend

- Project Site Location
- Potentially Contaminated Areas
- Hotspots
- Photo Taken Angle



Number	Structure
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2	Oil Recovery Tank
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4	Chemical Dosing System
5	Seal Oil System, Lubrication Oil System
6	Maintenance Area
7	Ferrous Sulphate Tank
8	Transformer
9	Black Start Diesel Generator
10	Chemical Drums Storage Area
11	Electrostatic Precipitator
12	Induced Draft Fan
13	Chimney
14	Ash Pit
15	Oil Sump Pit
16	Oil Separator System
17	Ash Plant Welfare Building
18	Compressor Plant House
19	Ash Plant Substation
20	Temporary Chemical Waste Storage Area
21	LPG Store
22	Fuel Oil Pumphouse
23	Precipitator Control Building
24	Fire Fighting Workshop
25	Sulphur Store (including Sulphur Melting Tanks)
26	Electrochlorination Plant House
27	Aboveground Tanks for Sodium Hypochlorite Solution
28	Open Storage Area
29	Scrap Yard
30	Parking Spaces
31	Sitting Out Area
32	Vegetation/Planters
33	Oil Staining

Remark:
The units and equipment indicated in the CPA Station Building in the figure are the key units/equipment with use of chemical, oil and ash handling unit.

Metres
0 30 60

Annex B

Photographs Taken Location and Angle

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Landcon\0617637_Photo_Records_Taken.mxd
Date: 7/10/2024

Photo 1: Ash hopper for furnace bottom ash at unit A1 inside boiler house

Photo 2: Ash hopper for furnace bottom ash at unit A2 inside boiler house

Photo 3: Ash hopper for furnace bottom ash at unit A3 inside boiler house

Photo 4: Ash hopper for furnace bottom ash at unit A4 inside boiler house

Photo 5: Oil recovery tank at unit A1 inside boiler house

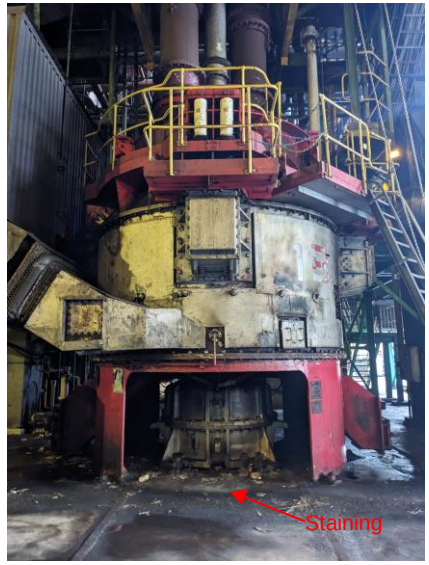


Photo 6: A coal grinding mill at unit A1

Photo 7: A coal grinding mill at unit A4

Photo 8: A series of coal grinding mills along CPA Station Building

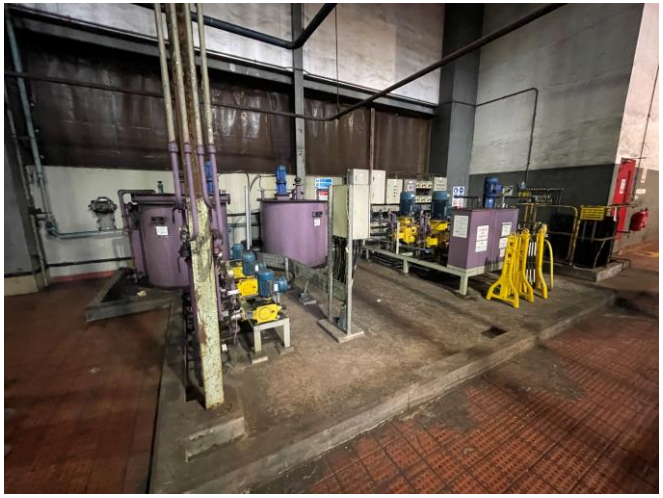


Photo 9: Chemical dosing system of unit A1 at turbine house

Photo 10: Chemical dosing system of unit A2 at turbine house

Photo 11: Chemical dosing system of unit A3 at turbine house

Photo 12: Chemical dosing system of unit A4 at turbine house

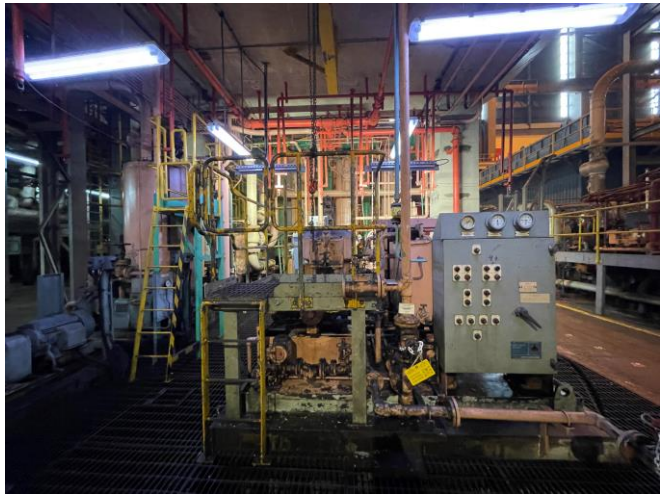


Photo 13: Seal oil system and lubrication oil system at unit A1

Photo 14: Seal oil system and lubrication oil system located at the drain sump

Photo 15: A seal oil unit

Photo 16: A lubrication oil cooler at unit A3 Photo 17_sea lub A4

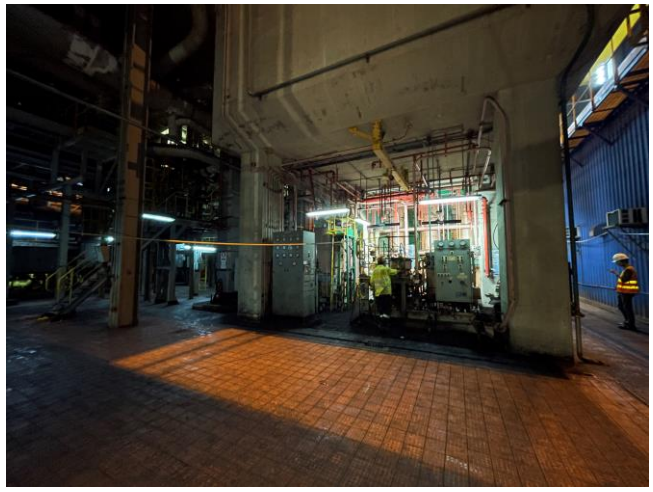


Photo 17: Seal oil system and lubrication oil system at unit A1

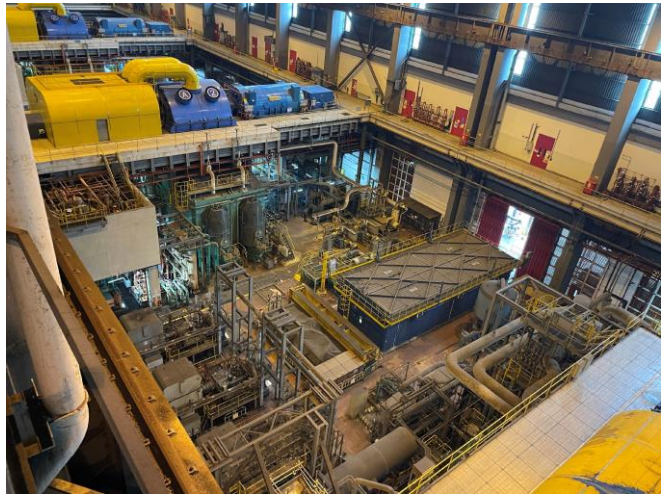


Photo 18: Overall view of the turbine house and maintenance area at unit A4

Photo 19: Maintenance area at unit A2 at turbine house

Photo 20: Condensate systems

Photo 21: Ferrous sulphate tanks

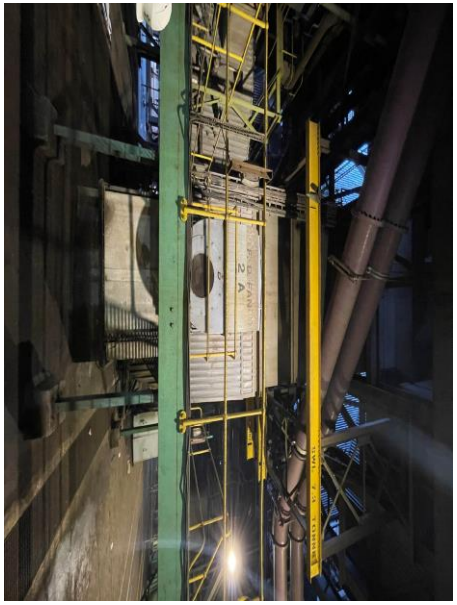


Photo 22: Forced draft fans of unit A2

Photo 23: Forced draft fans of unit A2

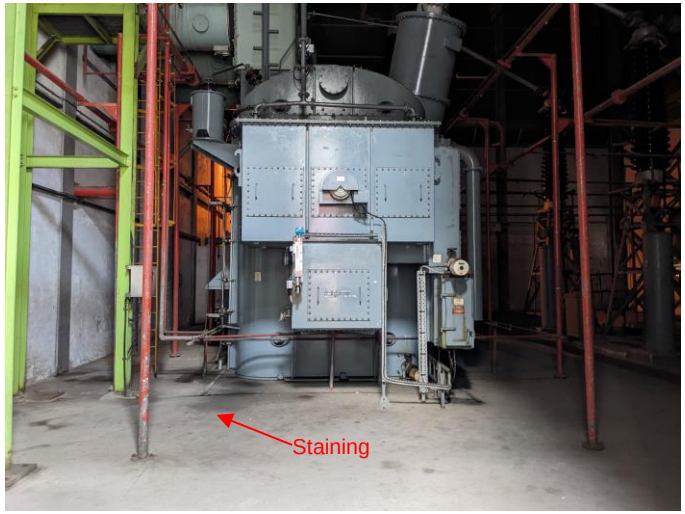


Photo 24:Generator transformer of unit A1

Photo 25: Generator transformer of unit A1

Photo 26: Generator transformer of unit A3

Photo 27: Generator transformer of unit A4 and maintenance area

Photo 28: Station stand-by transformer and unit auxiliary transformer of unit A1

Photo 29: Station transformer and transformer maintenance area of unit A2

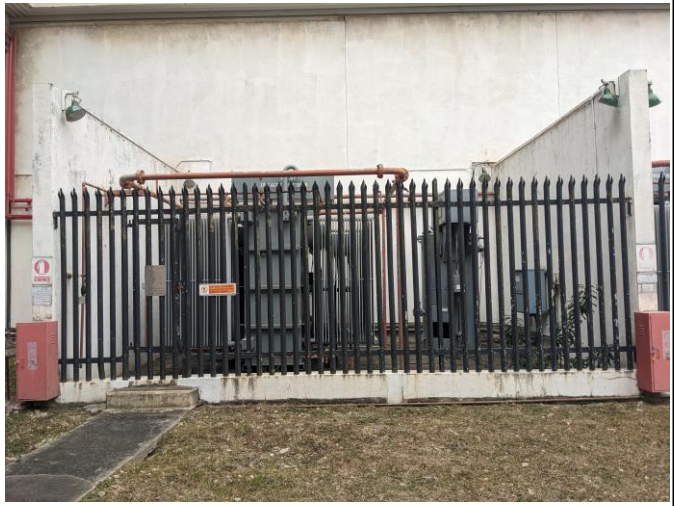


Photo 30: Unit auxiliary transformer of unit A2

Photo 31: Unit auxiliary transformer of unit A2

Photo 32: : Unit auxiliary transformer of unit A3

Photo 33: Unit auxiliary transformer of unit A3

Photo 34: Unit auxiliary transformer of unit A4

Photo 35: Unit auxiliary transformer of unit A4

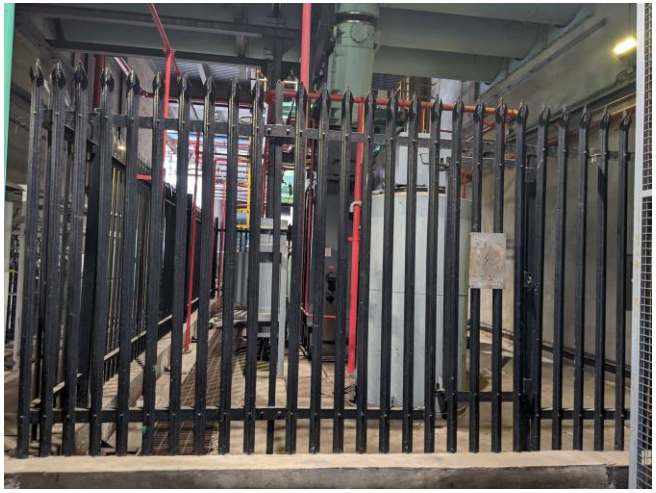


Photo 36: Unit transformer of unit A2

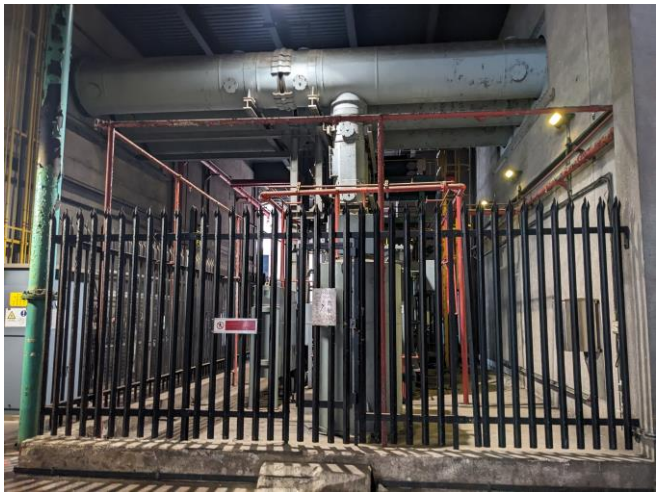


Photo 37: Unit transformer of unit A3

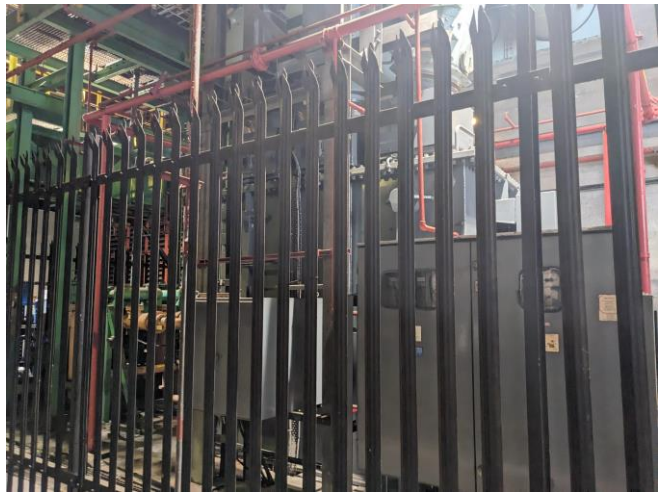


Photo 38: Unit transformer of unit A4

Photo 39: Station auxiliary transformer at ash plant

Photo 40: Station auxiliary transformer at ash plant

Photo 41: Transformer maintenance area at units A2

Photo 42: Transformer maintenance area at units A4

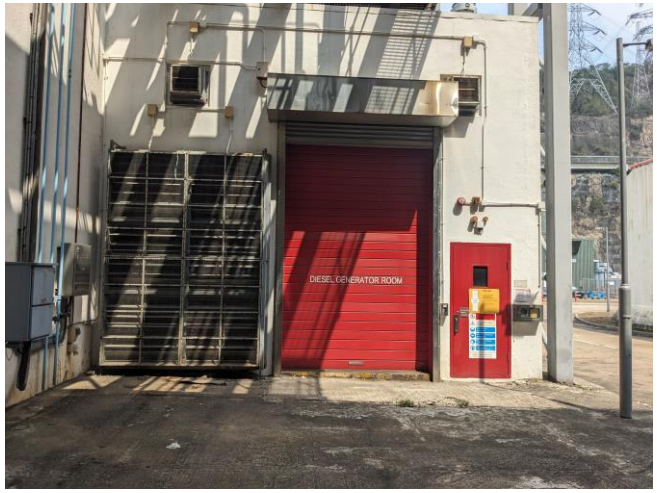


Photo 43: Black start diesel generator room

Photo 44: Other auxiliary system at the CPA Station Building

Photo 45: Other auxiliary system at the CPA Station Building

Photo 46: Other auxiliary system at the CPA Station Building

Photo 47: Other auxiliary system at the CPA Station Building

Photo 48: Other auxiliary system at the CPA Station Building

Photo 49: Water Analysis Laboratory of Unit A1

Photo 50: Water Analysis Laboratory of Unit A1

Photo 51: A chemical drum storage area was observed at unit A1 in the boiler house

Photo 52: Electrostatic precipitator systems and induced draft fans

Photo 53: Electrostatic precipitator systems including ash hoppers for fly ash

Photo 54: Electrostatic precipitator systems including ash hoppers for fly ash

Photo 55: Bottom of electrostatic precipitator ash hopper structures

Photo 56: Induced draft fan of unit A4

Photo 57: Induced draft fan of unit A1

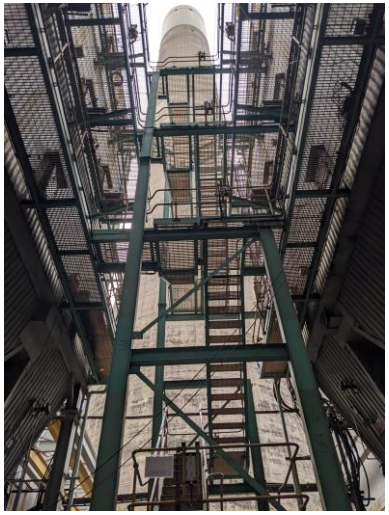


Photo 58:Chimney stack

Photo 59: Entrance of the administration building

Photo 60: Lobby of the administration building

Photo 61: Metallurgy laboratory in administration building

Photo 62: Dangerous goods store No.1 and No.2 in administration building

Photo 63: Dangerous goods store No.1 and No.2 in administration building

Photo 64: A training workshop area in the control block, workshop and store building

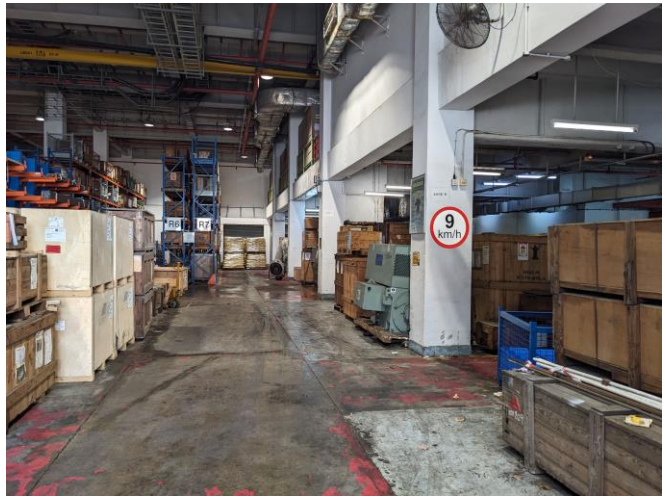


Photo 65: Store area in the control block, workshop and store building

Photo 66: Store area in the control block, workshop and store building

Photo 67: Store area in the control block, workshop and store building

Photo 68: Ash pits area

Photo 69: Ash pit

Photo 70: Ash pit

Photo 71: Ash pit

Photo 72: Oil separator system

Photo 73: Oil separator system

Photo 74: Welfare building for the ash plant workers

Photo 75: A compressor plant house with a series of compressors and blowers

Photo 76: Ash plant substation

Photo 77: Ash plant substation

Photo 78: Temporary chemical waste storage area

Photo 79: Temporary chemical waste storage area

Photo 80: Liquified Petroleum Gas (LPG) Store

Photo 81: Liquified Petroleum Gas (LPG) Store

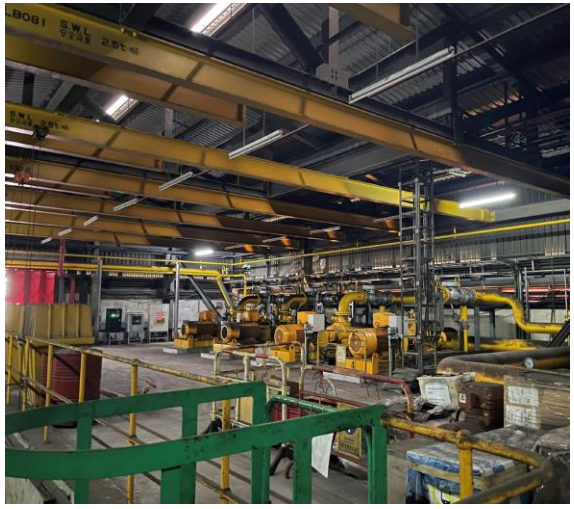


Photo 82: Fuel oil pumps inside in the fuel oil pump house

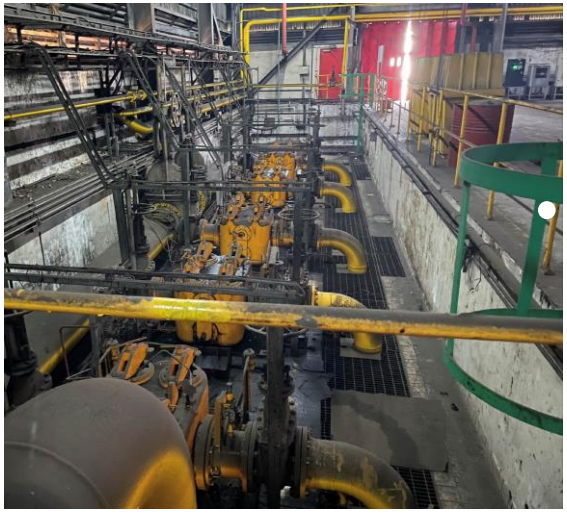


Photo 83: Fuel oil heaters in the fuel oil pump house

Photo 84: Fuel oil pump house

Photo 85: Precipitator Control Buidling

Photo 86: Firefighting workshop

Photo 87: Bags of solid sulfur were kept at the sulphur store

Photo 88: Sulphur melting tanks next to the sulfur store

Photo 89: Sulphur melting tanks next to the sulfur store

Photo 90: Sulphur melting tanks next to the sulfur store

Photo 91: An electrochlorination plant house

Photo 92: Two (2) aboveground tanks for storing sodium hypochlorite solution

Photo 93: Open storage area at southeast boundary of the Project site

Photo 94: Open storage area at southeast boundary of the Project site

Photo 95: Open storage area at east boundary of the Project site

Photo 96: Scrap yard at southeast boundary of the Project site

Photo 97: A sitting out area at the east of the Project site

Photo 98: A sitting out area at the east of the Project site

Photo 99: Access road and vegetations along northeast of the Project site boundary

Photo 100: Vegetations and parking spaces outside the control block, workshop and store building

Photo 101: Planter and access road outside the administration building

Photo 102: Access road along the northwest of the Project site boundary

ANNEX C SITE WALKOVER CHECKLIST

Annex C1

Site Walkover Checklist (Site Walkover conducted on 05 March 2024)

GENERAL SITE DETAILS

SITE OWNER/CLIENT	Castle Peak Power Company Limited (CAPCO) / CLP Power Hong Kong Limited (CLP)
PROPERTY ADDRESS	Castle Peak Power Station, Lung Yiu Street, Tuen Mun, New Territories, Hong Kong

PERSON CONDUCTING THE QUESTIONNAIRE

NAME	Kisten Ma
POSITION	Consultant

AUTHORIZED OWNER/CLIENT REPRESENTATIVE (IF APPLICABLE)

NAME	Ms. Hilda CHIU Chi Ching
POSITION	Senior Project Manger
TELEPHONE	(852) 2678 5205

SITE ACTIVITIES

Briefly describe activities carried out on site, including types of products/chemicals/materials handled.

Obtain a flow schematic if possible.

Number of employees:	Full-time:	Approximately 500
	Part-time:	Nil
	Temporary/Seasonal:	N/A
Maximum no. of people on site at any time:		N/A
Typical hours of operation:		24 hrs
Number of shifts:		2-3 shifts
Days per week:		7
Weeks per year:		52
Scheduled plant shut-down:		N/A

Detail the main sources of energy at the site:

Gas	~~Yes~~/No
Electricity	Yes/~~No~~
Coal	~~Yes~~/No
Oil	~~Yes~~/No
Other	~~Yes~~/No

SITE DESCRIPTION

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: 94,000m^2

What area of the site is covered by buildings (%): Approximately 90%

Please list all current and previous owners/occupiers if possible.
Previous: N/A; Current: CAPCO / CLP

Is a site plan available? **Yes**/No

Are there any other parties on site as tenants or sub-tenants? ~~Yes~~/No

If yes, identify those parties:

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North:	Residential: Lung Kwu Tan Village area (1km)
South:	Industrial: CLP Castle Peak B Power Station, other industrial sites further south (steel, cement manufacturing, fuel storage)
East:	Industrial: Other CLP CPA facilities (fuel tanks, water treatment plant, gas turbine units 400kV and 132kV substations, Towns water tank)
West:	Industrial: Other CLP CPA facilities (fuel oil tanks, foul water treatment, coal stores, Jetty and conveyors, DG storage)

Annex C1 – Site Walkover Checklist

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).

Flat concrete paved terrain.

State the size and location of the nearest residential communities.

Village houses located about 650m away to the North (Lung Kwu Tan village area)

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

Siu Lang Shui Butterfly Habitat (SSSI) located about 800m away to the Southeast

Questionnaire with Existing/Previous Site Owner or Occupier

Ref.		Yes/No	Notes
1.	What are the main activities/operations at the above address?	Yes	Power Generation
2.	How long have you been occupying the site?	Yes	About 44 years since 1980
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy?)	Yes	-
4.	Prior to your occupancy, who occupied the site?	N/A	No previous occupant
5.	What were the main activities/operations during their occupancy?	N/A	No previous occupant
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	No	No major changes in operation in last 10 years
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	Yes	Other power generation facilities
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	No	No petrol filling nor car service garage
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	No	
10	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	Yes	DG Storage, Chemical Waste collection/disposal
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	Yes	Fuel oil, Light oil, Lube oil, Seal oil, Ammonia, Hydrazine (Sodium Hydroxide), Caustic Soda, Ferrous Sulphate, Sodium Hypochlorite, Hydrochloric Acid

	• Where do you store these chemicals?		Aboveground fuel oil tanks (out of study area), individual overhead oil tanks for each unit, chemical dosing pits with storage tanks, Sulphur Store, Electrochlorination Plant
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)		Stock items are monitored using SAP, which has a 'live' inventory list, to store materials information including quantity and location
13.	Has the facility produced a separate hazardous substance inventory?	No	
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.)	No	No major incident or accident in the Project site boundary's history.
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)?	Yes	Via marine, air and trucks. Stored on-site in tanks, drums, etc.
16.	Do you have any underground storage tanks? (If yes, please provide details.)	No	
	▪ How many underground storage tanks do you have on site?	No	
	▪ What are the tanks constructed of?	No	
	▪ What are the contents of these tanks?	No	
	▪ Are the pipelines above or below ground?	No	
	▪ If the pipelines are below ground, has any leak and integrity testing been performed?	No	
	▪ 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.)	Yes	Operator has visual inspection daily before performing daily chemicals dosing.
19.	How are the wastes disposed of?		Coal ash removed by water jet, drained to ash pit, disposed off-site (i.e. sold to Contractor).

			Chemical wastes are disposed based on legislation requirements.
20.	Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	No	
21.	Have any spills occurred on site? (If yes, please provide details.)	No	No major spillage incident or accident in the Project site boundary's history.
	• When did the spill occur?	No	
	• What were the substances spilled?	No	
	• What was the quantity of material spilled?	No	
	• Did you notify the relevant departments of the spill?	No	
	• What were the actions taken to clean up the spill?	No	
	• What were the areas affected?	No	
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.)		
23.	Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	No	
24.	Are there any known contaminations on site? (If yes, please provide details.)	No	
25.	Has the site ever been remediated? (If yes, please provide details.)	No	

Observations

1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	Yes	
2.	What are the conditions of the bund walls and floors?	Yes	Concrete paved without clear damage of ground surface (i.e. cracks). concrete. Oil stains were observed at chemical dosing systems and the chemical drums storage area in the boiler house.
3.	Are any surface water drains located near to drum storage and unloading areas?	Yes	
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	Yes	Solid chemical waste (including oil rags, absorbent sheets, hand gloves, and paint tins) and liquid chemical waste of

			spent lubrication oil. Scrap metal.
5.	Is there a storage site for the wastes?	Yes	Ash pit and chemical waste storage areas (on-site), scrap metal yard.
6.	Is there an on-site landfill?	No	
7.	Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	
8.	Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	Yes	Oil stains were observed at Boiler House and Turbine House (such as at the ash hopper for furnace bottom ash, oil recovery tank, coal grinding mills, chemical dosing systems, transformer, chemical drums storage area). Oil stains were also observed at the store area in the control block, workshop and store building, fuel oil pump house, temporary chemical waste storage area.
9.	Are there any potential off-site sources of contamination?	Yes	Other power generation unit in close vicinity of the Project area (Castle Peak B Power Station)
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	
11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	Yes	Sump pits, oil-water separator
12.	Any noticeable odours during site walkover?	No	
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?	Yes	Fuel oil, Light oil, Lube oil, Seal oil, Ammonia, Hydrazine (Sodium Hydroxide), Caustic Soda, Ferrous Sulphate, Sodium Hypochlorite, Hydrochloric Acid

ANNEX D COPY OF THE RELEVANT REPLIES FROM VARIOUS GOVERNMENT DEPARTMENTS

Kisten Ma

From: Alex Waheed
Sent: Monday, February 26, 2024 4:05 PM
To: hotline_w@epd.gov.hk
Cc: Chris Hoi; Kisten Ma
Subject: Request for Information of Chemical Waste Producers Registry and Spillage / Leakage Records _ Decommissioning and Demolition of the Castle Peak A Power Station
Attachments: Attachment 1_Project site boundary.pdf; Attachment 2_Appointment Record.pdf

Dear Sir/Madam,

We, ERM-Hong Kong, Ltd., are appointed by CLP Power Hong Kong Limited (CLP) for the captioned project of preparing the Project Profile for the Direct Environmental Permit (EP) Application for Decommissioning and Demolition of the Castle Peak A Power Station (CPA) of the Castle Peak Power Station (CPPS).

As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the project location is required as part of the vetting process. In this regard, we kindly request your assistance in providing the following information related to the Project site for our assessment:

1. Current and past (as early as the records are available) registered Chemical Water Producer(s) within the Project site (preferably with the registration date, status (valid or invalid), nature of the major chemical waste); and
2. Reported accidents of spillage/leakage of chemicals within the Project site.

We have enclosed a map showing the Project site boundary at CPA (see attachment 1) and the appointment record from CLP (see attachment 2) for your reference. Due to the tight project schedule, we would very much appreciate if you could provide the requested information by 12 March 2024.

Should you have any queries, please contact the undersigned. Thank you for your attention to this matter.

ERM
Sustainability is our business

Alex Khawaja Waheed
Consultant

Hong Kong
+852 2271 3344

erm.com

Scope of Project

Location of the Project

Kisten Ma

From: mhtang@epd.gov.hk
Sent: Tuesday, February 27, 2024 5:30 PM
To: Alex Waheed
Cc: Chris Hoi; Kisten Ma
Subject: Re: Request for Information of Chemical Waste Producers Registry and Spillage / Leakage Records _ Decommissioning and Demolition of the Castle Peak A Power Station
Attachments: Attachment 1_Project site boundary.pdf; Attachment 2_Appointment Record.pdf

Dear Alex Khawaja Waheed,

Decommissioning and Demolition of the Castle Peak A Power Station - Request for Information of Chemical Waste Producers Registry and Spillage / Leakage Records

I refer to your preceding email dated 26 February 2024 concerning the captioned matter.

As far as records of registered Chemical Waste Producer(s) within the project site are concerned, a registry of chemical waste producers is available in the Territory Control Office of this department in Wan Chai. Please contact Mr. Gordon KWAN at tel. 2835 1027 for making an appointment to view the records.

According to the records of this office, there is no reported incidents of chemical spillage / leakage within the project site in the past 3 years as indicated in the location plan enclosed in your email. You may like to consider checking with other relevant parties / government department(s), which are responsible for handling chemical leakage / spillage incidents, for such information as appropriate if required.

Please be reminded that the record of this office may not be exhaustive. While we have made a reasonable effort to ensure the completeness and accuracy of the information provided, you should comprehend that the information is provided as is and this office is not responsible or liable for any claim, loss or damage resulting from the use of this information. Should you have any query on the matter, please contact the undersigned at tel. 2417 6137.

Yours sincerely,

(TANG Ming-hang)
Regional Office (West) / Tuen Mun
for Director of Environmental Protection

----- Forwarded by CF CHANG/EPD/HKSARG on 26/02/2024 16:29 -----

From: Alex Waheed <alex.waheed@erm.com>
To: "hotline_w@epd.gov.hk" <hotline_w@epd.gov.hk>
Cc: Chris Hoi <Chris.Hoi@erm.com>, Kisten Ma <kisten.ma@erm.com>

Scope of Project

Location of the Project

Kisten Ma

From: Alex Waheed
Sent: Monday, February 26, 2024 4:08 PM
To: hkfsdenq@hkfsd.gov.hk; ado_mg_1@hkfsd.gov.hk
Cc: Chris Hoi; Kisten Ma
Subject: Request for Information of Dangerous Goods, Spillage / Leakage Incidents and Fire Records _ Decommissioning and Demolition of the Castle Peak A Power Station
Attachments: Attachment 1_Project site boundary.pdf; Attachment 2_Appointment Record.pdf

Dear Sir/Madam,

We, ERM-Hong Kong, Ltd., are appointed by CLP Power Hong Kong Limited (CLP) for the captioned project of preparing the Project Profile for the Direct Environmental Permit (EP) Application for Decommissioning and Demolition of the Castle Peak A Power Station (CPA) of the Castle Peak Power Station (CPPS).

As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* published by the Environmental Protection Department of the HKSAR (EPD), information pertaining to the change of land uses/past activities/incidents/accidents at the project location is required as part of the vetting process. In this regard, we kindly request your assistance in providing the following information related to the Project Site for our assessment:

1. Past and present Dangerous Goods Records;
2. Past and present spillage/leakage/incident records of the Project site; and
3. Past and present fire records of the Project site.

We have enclosed a map showing the Project site boundary at CPA (see attachment 1) and the appointment record from CLP (see attachment 2) for your reference. Due to the tight project schedule, we would very much appreciate if you could provide the requested information by 12 March 2024.

Should you have any queries, please contact the undersigned. Thank you for your attention to this matter.

ERM
Sustainability is our business

Alex Khawaja Waheed
Consultant

Hong Kong
+852 2271 3344

erm.com

消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防處總部大廈

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.** : (53) in FSD GR 6-5/4 R Pt. 52
來函檔號 **YOUR REF.** :
電子郵件 **E-mail** : hkfsdenq@hkfsd.gov.hk
圖文傳真 **FAX NO.** : 2739 5879
電　　話 **TEL NO.** : 2733 7570

25 March 2024

ERM-Hong Kong, Limited
2501, 2507-10, 25/F, Office Tower One,
The Harbourfront,18 Tak Fung Street,
Kowloon, Hong Kong
(Attn: Mr. Alex Khawaja WAHEED, Consultant)

Dear Mr. WAHEED,

Decommissioning and Demolition of the Castle Peak A Power Station
Request for Information of Dangerous Goods & Incident Records

I refer to your email of 26.02.2024 regarding the captioned request and reply below in response to your questions:-

1. According to our record, from the year of 1990 to present moment, dangerous goods licenses have been issued by this department to the subject address, with details as shown in **Appendix A**.

2. A total of one incident record was found at the subject location. Please refer to **Appendix B** for details.

If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(LAI Kin-man)
for Director of Fire Services

Decommissioning and Demolition of the Castle Peak A Power Station
Request for Information of Dangerous Goods & Incident Records

Item	Type of dangerous goods	Quantity	Location of storage
1.	Diesel	3,000,000 Litres	Castle Peak A Power Station, Lung Yiu Street, Tap Shek Kok, Tuen Mun
2.	Diesel	50,000,000 Litres	
3.	Diesel	50,000,000 Litres	
4.	Diesel	5,000,000 Litres	
5.	Diesel	3,000,000 Litres	
6.	- Paint Related Material - Turpentine	8,600 Litres 400 Litres	
7.	Argon, Refrigerated Liquid	305 Litres	
8.	- Air, Compressed - Argon, Compressed - Compressed Gas, N.O.S. - Helium, Compressed - Nitrogen, Compressed - Oxygen, Compressed	96 Litres 100 Litres 60 Litres 192 Litres 150 Litres 100 Litres	
9.	- Compressed Gas, Flammable, N.O.S. - Compressed Gas, N.O.S. - Hydrogen, Compressed	78 Litres 50 Litres 455 Litres	
10.	Hypochlorite Solution	2,520 Litres	
11.	Carbon Dioxide	8,000 Litres	
12.	- Compressed Gas, N.O.S. - Argon, Compressed - Hydrogen, Compressed - Compressed Gas, Flammable, N.O.S.	2,270 Litres 1,000 Litres 135 Litres 20 Litres	
13.	Acetylene, Dissolved	3,000 Litres	
14.	- Nitrogen, Compressed - Helium, Compressed	4,800 Litres 200 Litres	
15.	- Oxygen, Compressed - Compressed Gas, N.O.S.	3,000 Litres 3,000 Litres	
16.	Ammonia Solution	3,600 Litres	
17.	Hydrazine, Aqueous Solution	2,400 Litres	

Item	Type of dangerous goods	Quantity	Location of storage
18.	Diesel	18,200 Litres	Castle Peak A Power Station, Lung Yiu Street, Tap Shek Kok, Tuen Mun
19.	Sulphuric Acid	48,024 Litres	
20.	Sodium Hydroxide Solution	76,960 Litres	
21.	Hypochlorite Solution	15,000 Litres	
22.	Hypochlorite Solution	15,000 Litres	
23.	Hypochlorite Solution	Manufacturing	
24.	Diesel	22,730 Litres	Coal Stock Yard, Castle Peak A Power Station, Lung Yiu Street, Tap Shek Kok, Tuen Mun

Decommissioning and Demolition of the Castle Peak A Power Station
Request for Information of Dangerous Goods & Incident Records

No.	Date	Type of Incident	Address
1	18/1/2024	Vegetation Fire	Hillside of Castle Peak Power Station

ANNEX E DETAILS OF CHEMICAL WASTE PRODUCERS RECORD

EPD CHEMICAL WASTE PRODUCERS REGISTRY – CASTLE PEAK A POWER STATION

SOUTHORN CENTRE 25/F, WAN CHAI (INSPECTED ON 29 FEB 2024)

TABLE 1 – VALID RECORDS (EPD DOCUMENT AS AT 2023 10 13)

NO.	COMPANY NAME	ADDRESS	NATURE OF BUSINESS
1.	Tong Kee Engineering Limited	Jetty of Castle Peak Power Station, Lung Yiu Street, Tuen Mun, NT	Power Supply
2.	ABB (Hong Kong) Limited	Castle Peak Power Station Lung Yiu Street, Tap Shek Kok Tuen Mun	Mechanical Electrical Engineering
3.	Thermo Engineering and Consultants Limited	Castle Peak Power Station, Lung Yiu Street, Tuen Mun, New Territories	Corporate
4.	Latech Engineering Co. Ltd	Castle Peak Power Station Tuen Mun NT	Engineering Work and Consultant for Power Station
5.	Sea Genius Limited	8 Lung Yiu Street, Lung Kwu Tan, Castle Peak Power Station	Architecture and Engineering
6.	Dunwell VMAT Co Ltd	Castle Peak Power Station, Tuen Mun	Environmental Engineering
7.	Cape Hong Kong Fuji Company Limited	Castle Peak Power Station, Tuen Mun, NT	Maintenance
8.	Fuji I – Tec Co., Ltd	Castle Peak Power Station	Engineering
9.	Wing Hop Iron Work Ltd	Castle Peak Power Station, Lung Yiu Street Tuen Mun NT	Engineering
10.	Fortune (H.K.) Engineering & Materials Limited	Castle Peak Power Station, Lung Yiu Street, Tuen Mun, N.T.	Electrical Engineering
11.	China Geo-engineering Corporation	Castle Peak Power Station, Lung Yiu Street, Tuen Mun, N.T.	Slope Improvement and Maintenance Works
12.	Chevalier (Envirotech) Limied (sic)	Castle Peak Power Station, Emission Control Project, Lung Yiu Street, Tuen Mun, New Territories	Water Treatment
13.	Powerrich Engineering Company Limited	Castle Peak Power Station at 5 Lung Yiu Street, Tuen Mun, N.T.	Mechanical and Electrical Engineering
14.	Chevalier (Envirotech) Limited	Castle Peak Power Station, Lung Yiu Street, Tuen Mun, N.T.	Water Treatment
15.	Associated Engineers, Limited	Castle Peak Power Station, 8 Lung Yiu Street, Lung Kwu Tan, Tuen Mun, N.T.	Boiler Tubes Chemical Passivation

NO.	COMPANY NAME	ADDRESS	NATURE OF BUSINESS
16.	Thorn Security (Hong Kong) Limited	Castle Peak Power Station, Lung Yiu Street, Tuen Mun, N.T.	Security/Fire Protection System
17.	Alstom Power Service (Hong Kong) Limited	Castle Peak Power Station, Lung Yiu Street, Tuen Mun, N.T.	Fuel oil pipe replacement
18.	Atlantic Projects Company (HK) Limited	Castle Peak Power Station "A" Station, Lung Yiu Street, Tuen Mun, New Territories	Engineering Construction
19.	Wai Luen Development Limited	Castle Peak Power Station, 7 Lung Yiu Street, Tuen Mun, N.T.	Building Const & Eng
20.	China Geo-Engineering Corporation	No. 7 Lung Yiu Street, Tap Shek Kok, Tuen Mun, N.T.	Foundation Works
21.	CNQC Intelligent Construction (HK) Limited	5 Lung Yiu Street, Tuen Mun Area 38, N.T.	Construction-MIC (Mobile Integrated Construction Method)
22.	CLP Power Hong Kong Limited	Castle Peak 'A' & 'B' Power Station Tap Shek Kok TMTL 220 Tuen Mun	Electricity Generation
23.	BEC Specialist (Hong Kong) Limited	Castle Peak 'B' Power Station, Tap Shek Kok, Tuen Mun, New Territories	Installation
24.	Square Point Electrical and Mechanical Engineering Company Limited	Castle Peak B Power Station, Tuen Mun, NT	Air-conditioning/Ventilation Systems Installation and Maintenance
25.	Kum Shing E & M Limited	TMTL 220, Castle Peak "B" Power Station, Tuen Mun, N.T.	Electric Power Generation
26.	Lucky Fame Engineering Limited	The Castle Peak "A" Power Station TMTL 220 Tap Shek Kok	Mechanical and Electrical Engineering

TABLE 2 – INVALID RECORDS (EPD DOCUMENT AS AT 2023 10 13)

NO.	COMPANY NAME	ADDRESS	NATURE OF BUSINESS
1.	China Harbour Engineering Company Limited	Construction Site and Barge for Contract No. CPBEC-SWAI-TS-4-81JC-09-0101 Emission Control Material Handling Berth of Castle Peak "B" Power Station, Tuen Mun, New Territories	Dredging and Piling Works
2.	Barclay Mowlem (Hong Kong) Limited	Castle Peak 'A' Power Station Tap Shek Kok, TMTL 220 Tuen Mun NT	Construction
3.	Citic Guo Hua Trading (Overseas) Ltd.	Castle Peak Power Station Tap Shek Kok, TMTL 220 Transformer No. EH1 & EH3 NT	Trading
4.	Wai Luen Company	Castle Peak Power Station Castle Peak NT	E & M Equipment Installation & Maintenance
5.	Gammon Construction Limited	TMTL 220, Lung Yiu Street, Tuen Mun, New Territories	Site Formation, Foundation and Road Works
6.	Grand Hope Fire Plumbing Electrical Engineering Co.	G/F Lung Yiu Street, Tap Shek Kok Tuen Mun NT	Fire Services Installation
7.	Wan Chung Construction Company Limited	Castle Peak 'B' Power Station, Tuen Mun, New Territories	Construction

ANNEX F PREVIOUS GROUND INVESTIGATION (GI) RECORD

Legend

- Project Site Location
- Previous Drillhole Record Locations

BH1
BH2
BH3
BH4
BH5
BH6
BH7
BH8
BH9
BH10
BH11
BH12
BH13
BH14
BH15
BH18/BH18A
BH19
BH20
BH21
BH22/BH22A
BH23

NORTHERN ROAD WEST
CONTROL BLOCK
WORKSHOP AND STORES
ADMINISTRATION BUILDING
ELECTRICAL ANNEXE
TURBINE HALL
MECHNICAL ANNEXE
BUNKER BAY
AUXILIARY BAY
BOILER HOUSE STRUCTURE
ASH PITS
WESTERN ROAD
BOILER ROAD
1A 1B 2A 2B 3A 3B 4A 4B
ELECTROSTATIC PRECIPITATORS
CHIMNEY
CONVEYOR
OIL TANK ROAD WEST
MARINA VIEW ROAD

Heavy Loading Berth (HLB)

Metres
0 100 200

Annex F

Previous Drillhole Record Locations

ERM

File: T:\GIS\CONTRACT\0617637\mxd\Landcon\0617637_Previous_Drillhole_Record_Locations_v2.mxd
Date: 23/9/2024

PO NO. 4500365566
PR960 CASTLE PEAK POWER STATION
BOREHOLE DRILLING FOR
CONTAMINATION MATERIAL 2006

Table 1 - Survey Data

Drillhole No.	Easting (m)	Northing (m)	Ground Level (m.P.D.)
BH1	809895.71	826657.99	6.98
BH2	809974.03	826651.97	7.23
BH3	809646.14	826552.14	7.01
BH4	809497.94	826557.28	7.03
BH5	809353.77	826457.39	5.13
BH6	809302.66	826274.72	5.73
BH7	809487.48	826086.53	5.63
BH8	809745.57	825837.51	5.65
BH9	809976.04	825845.13	6.95
BH10	810262.91	826048.80	6.93
BH11	809630.61	826473.07	7.16
BH12	809718.71	826437.60	7.19
BH13	809726.23	826497.55	7.19
BH14	809741.34	826354.09	7.02
BH15	809854.33	826279.49	7.11
BH18	809593.61	826399.79	6.93
BH18A	809593.61	826399.79	6.93
BH19	809580.16	826146.85	6.81
BH20	809686.26	826159.95	6.92
BH21	809780.12	826664.27	6.95
BH22	809636.08	826326.28	6.94
BH22A	809636.08	826326.28	6.94
BH23	810116.41	826365.81	6.86

Notes:

1. Co-ordinates related to Hong Kong (1980) Metric Grid
2. Reduced levels related to Hong Kong Principal Datum

DRILLHOLE RECORD

DRILLHOLE No. **BH1**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D51**		DATE from **28/11/2006** to **29/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
28/11/2006	Pw		70						1		0.50		0.00			Light yellowish brown, silty fine to coarse SAND with some angular fine to medium gravel sized strong rock fragments (FILL)
									2	INSPECTION PIT	1.00		1.00			Firm, brown, sandy clayey SILT (FILL)
									3							
									4		2.40					
	Pw 3.40 Hw								5		3.40					
28/11/2006		3.50m at 18:00							6		4.40		4.40			
29/11/2006		5.05m at 08:00							7		4.90		4.90			Firm, light grey, sandy SILT (FILL)
									8		5.00 5.05					Light grey, angular fine to coarse GRAVEL sized strong rock fragments (FILL)
									9		5.40					
				25					10		6.40 6.50		6.50			Light grey, angular fine to coarse GRAVEL with occasional cobble sized strong rock fragments (FILL)
										T2101	7.10		7.10			
29/11/2006	Hw 7.22	5.00m at 18:00	70										7.22			Wash drilling
																End of investigation hole at 7.22m
													10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **30/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.40m depth.
2. Groundwater monitoring well installed to 7.00m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH2**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D67**	E N	DATE from **07/12/2006** to **08/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples (No. Type Depth)	Reduced Level	Depth (m)	Legend	Grade	Description
07/12/2006	Hw		0						1 0.50 2 1.00 3 1.50 INSPECTION PIT		0.00			Loose, dark grey, silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments (FILL)
	Hw 2.29			87					T2101 2.29		1.50			Grey, CONCRETE
				100					T2101 2.94					
		1.20m at 18:00		87					T2101 3.24		3.24		II	Strong, grey spotted black, slightly decomposed medium grained GRANITE with no joints
07/12/2006 08/12/2006		1.30m at 08:00		100	100	100	0		T2101 3.47					
				100	100	100			T2101 4.27					
				100	100	100			T2101 4.81					
				100	100	100			T2101 5.23					
08/12/2006		1.30m at 18:00	0						T2101 6.00		6.00			End of investigation hole at 6.00m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **12/12/2006**

CHECKED **I.S.McGlen**

DATE **14/12/2006**

REMARKS

1. Inspection pit excavated to 1.50m depth.
2. Groundwater monitoring well installed to 6.00m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH3**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D51**		DATE from **08/12/2006** to **08/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
08/12/2006	Pw		70										0.00			Loose, grey, fine to coarse SAND with some angular fine to coarse gravel sized rock fragments (FILL)
									1		0.50		0.50			Firm, yellowish red, clayey sandy SILT with occasional angular fine gravel sized quartz fragments (FILL)
									2	INSPECTION PIT	1.00					
									3		1.50					
									4		2.00		2.00		V	Extremely weak, yellowish red mottled white, completely decomposed medium grained GRANITE (Firm, silty sandy CLAY with some fine gravel sized quartz fragments)
	Pw 3.34		70						5		3.00					
	Hw		80	97	92	92	2.5			T2101	3.34		3.40		III	Moderately strong, grey and reddish brown spotted black, moderately decomposed medium grained GRANITE (CORESTONE)
				100	100	100				T2101	3.72					
				82	76	76				T2101	4.21					
											4.55		4.55		V	Extremely weak, reddish yellow mottled white, completely decomposed medium grained GRANITE (Very stiff, silty sandy CLAY with some fine gravel sized quartz fragments)
				100				37 bls	6		5.00					
									7		5.40 5.45		5.45		V	Extremely weak, red spotted yellow, completely decomposed medium grained GRANITE (Very stiff, clayey sandy SILT with some fine gravel sized quartz fragments)
		3.90m at 18:00		100				80 bls	8		6.20					
08/12/2006	Hw 6.65		80						9		6.60 6.65		6.65			End of investigation hole at 6.65m
													10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **12/12/2006**

CHECKED **I.S.McGlen**

DATE **13/12/2006**

REMARKS

1. Inspection pit excavated to 2.00m depth.
2. Groundwater monitoring well installed to 6.00m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH4**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D51**	E N	DATE from **09/12/2006** to **09/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
09/12/2006	Pw		0						1	INSPECTION PIT	0.50		0.00			Loose, light grey, silty fine to coarse SAND with some angular fine to coarse gravel sized quartz fragments (FILL)
									2		1.00					
									3		1.30		1.30			
				97						T2101	1.60					Brown and grey, angular COBBLE and BOULDER sized strong to moderately strong granite fragments with some angular coarse gravel (FILL)
				100						T2101	2.10					
	Pw 2.44			79						T2101	2.44					
	Hw			73						T2101	2.70					
				78						T2101	3.10					
				74						T2101	3.80					
				78						T2101	4.21					
				67						T2101	4.70					
				74						T2101	5.42		5.42			
				81						T2101	6.15					Grey, angular COBBLE and BOULDER sized strong to moderately strong granite fragments with some coarse gravel (FILL)
				66						T2101	6.80					
	Hw 6.80			78						T2101	7.25		7.25			
09/12/2006		3.50m at 18:00	0													End of investigation hole at 7.25m
													10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **12/12/2006**

CHECKED **I.S.McGlen**

DATE **13/12/2006**

REMARKS

1. Inspection pit excavated to 1.30m depth.
2. Groundwater monitoring well installed to 7.00m depth.

PRELIMINARY

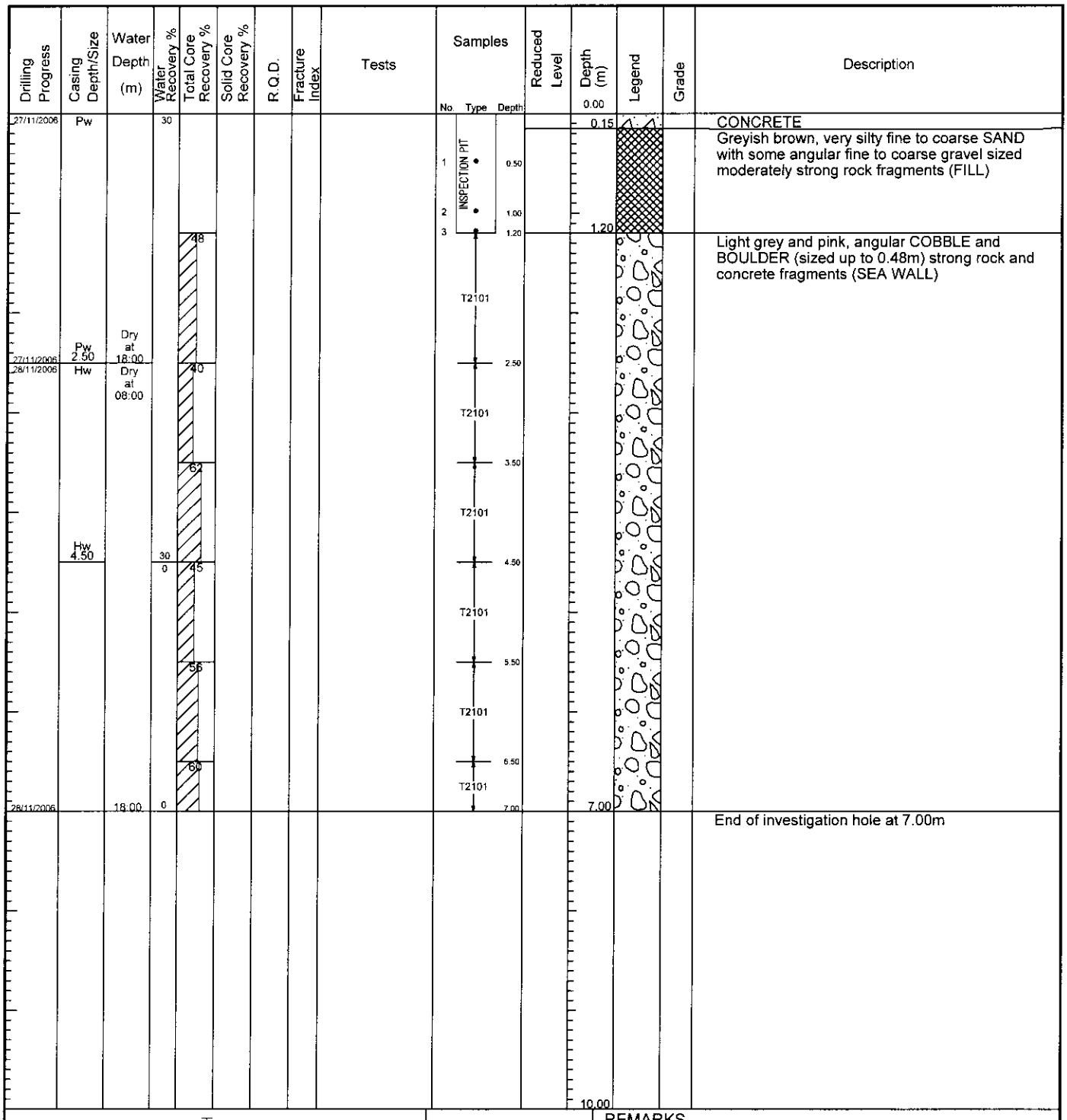
DRILLHOLE RECORD

DRILLHOLE No. **BH5**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D42**		DATE from **27/11/2006** to **28/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD



- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **29/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.20m depth.
2. Groundwater monitoring well installed to 7.00m depth.

PRELIMINARY

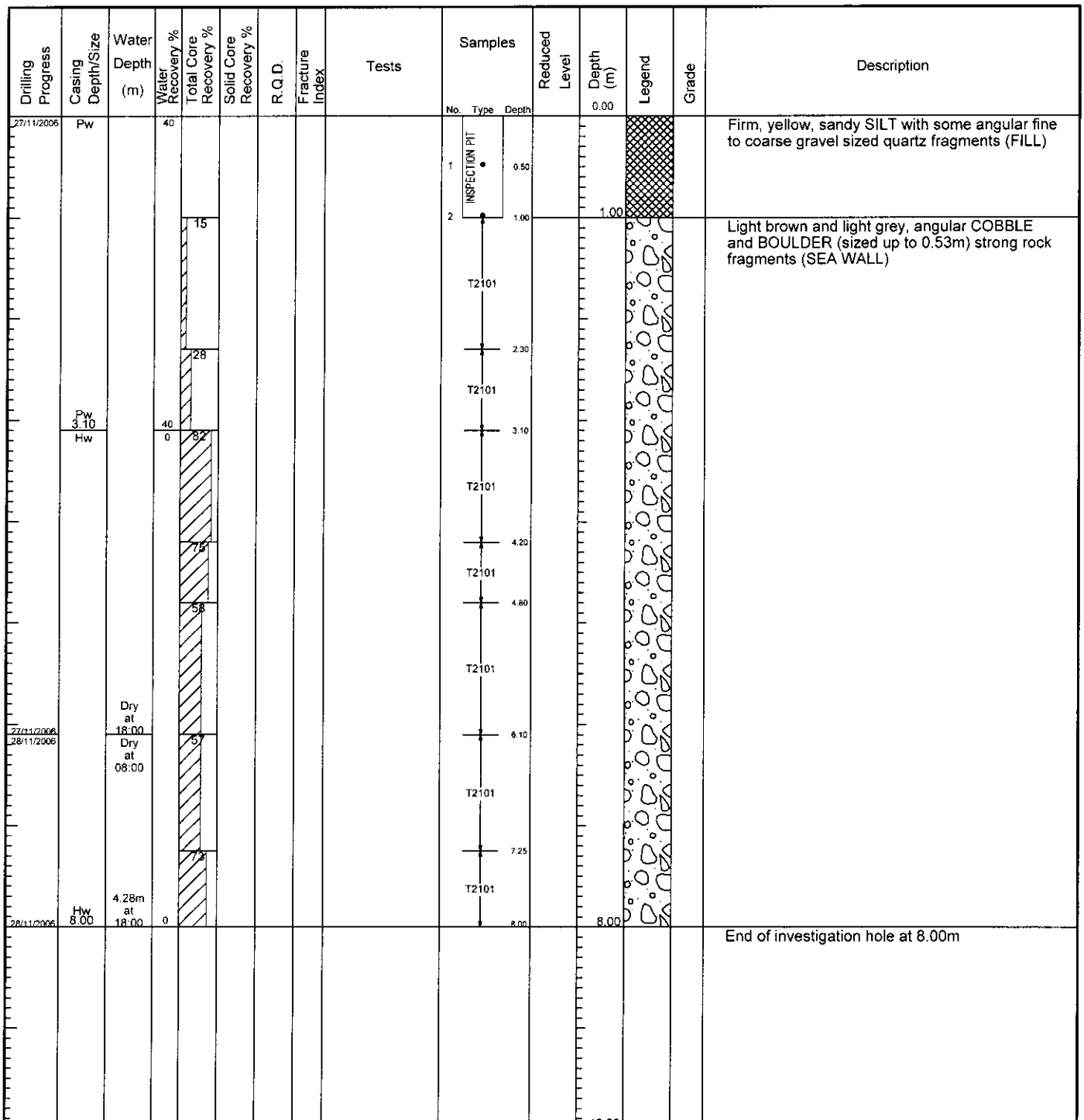
DRILLHOLE RECORD

DRILLHOLE No. **BH6**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **D103**	E N	DATE from **27/11/2006** to **28/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD



- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **29/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.00m depth.
2. Groundwater monitoring well installed to 8.00m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH7**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Edeco H40, D79**	E N	DATE from **27/11/2006** to **28/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
27/11/2006	Pw		70						1	INSPECTION PIT	0.50		0.00			Brown, very silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL)
	Pw 1.30								2		1.00					
	Hw			70					3		1.30		1.30			Light grey and brown, angular COBBLE with some fine to coarse gravel sized moderately strong to strong rock fragments (SEA WALL)
				90					T2101		1.90					
				86					T2101		2.20					
				78					T2101		2.70					
				83					T2101		3.40					
				69					T2101		3.70					
27/11/2006		Dry at 18:00							T2101		4.50					
28/11/2006		5.00m at 08:00		55					T2101		5.10					
				69					T2101		5.50					
				58					T2101		5.90					
				60					T2101		6.40					
				58					T2101		7.00					
				84					T2101		7.50					
				94					T2101		8.00					
28/11/2006	Hw 8.00	5.10m at 18:00	70										8.00			
																End of investigation hole at 8.00m
													10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **29/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.30m depth.
2. Groundwater monitoring well installed to 8.00m depth.

PRELIMINARY

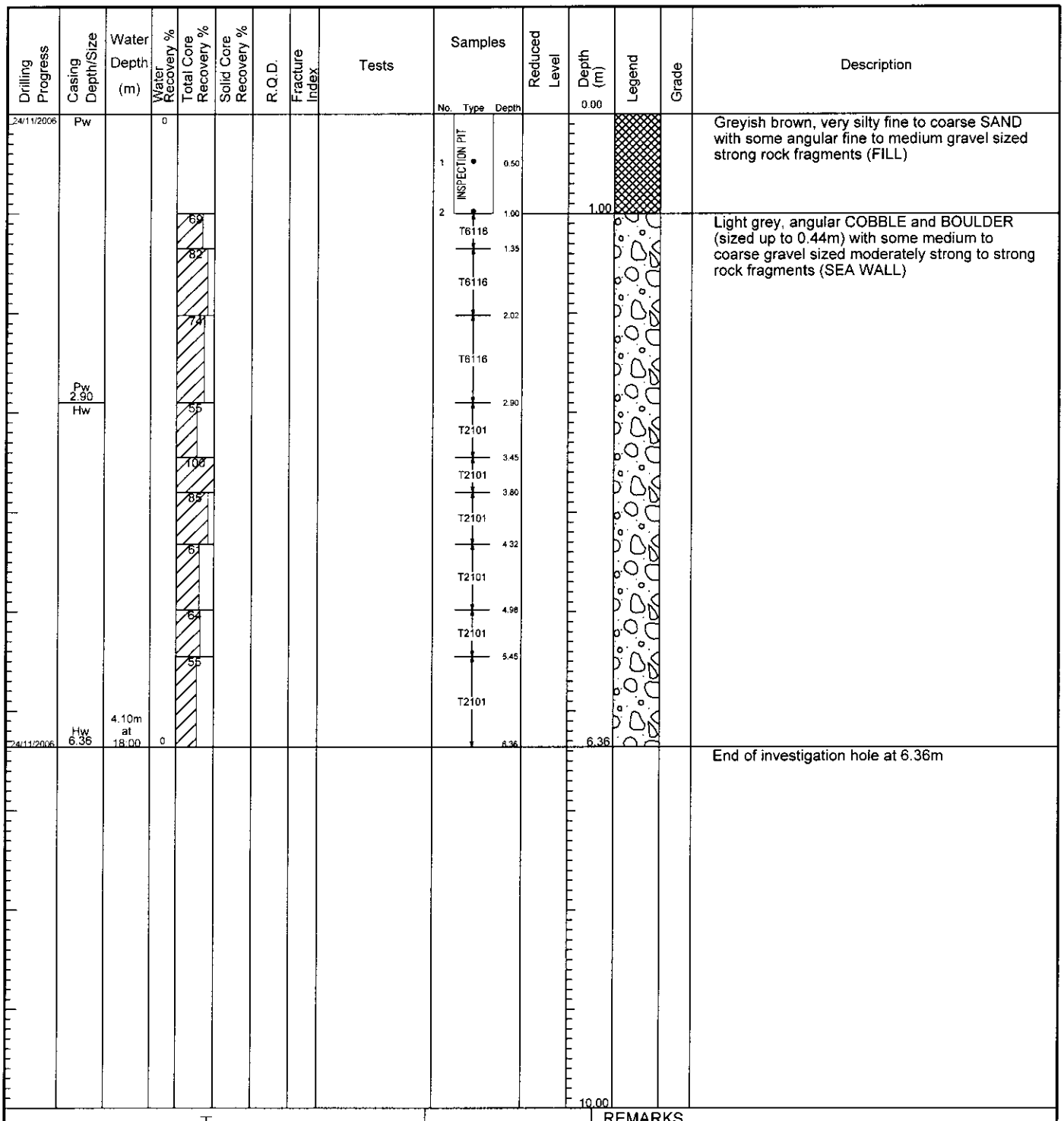
DRILLHOLE RECORD

DRILLHOLE No. **BH8**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D68**		DATE from **24/11/2006** to **24/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD



- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **29/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.00m depth.
2. Groundwater monitoring well installed to 6.00m depth.

PRELIMINARY

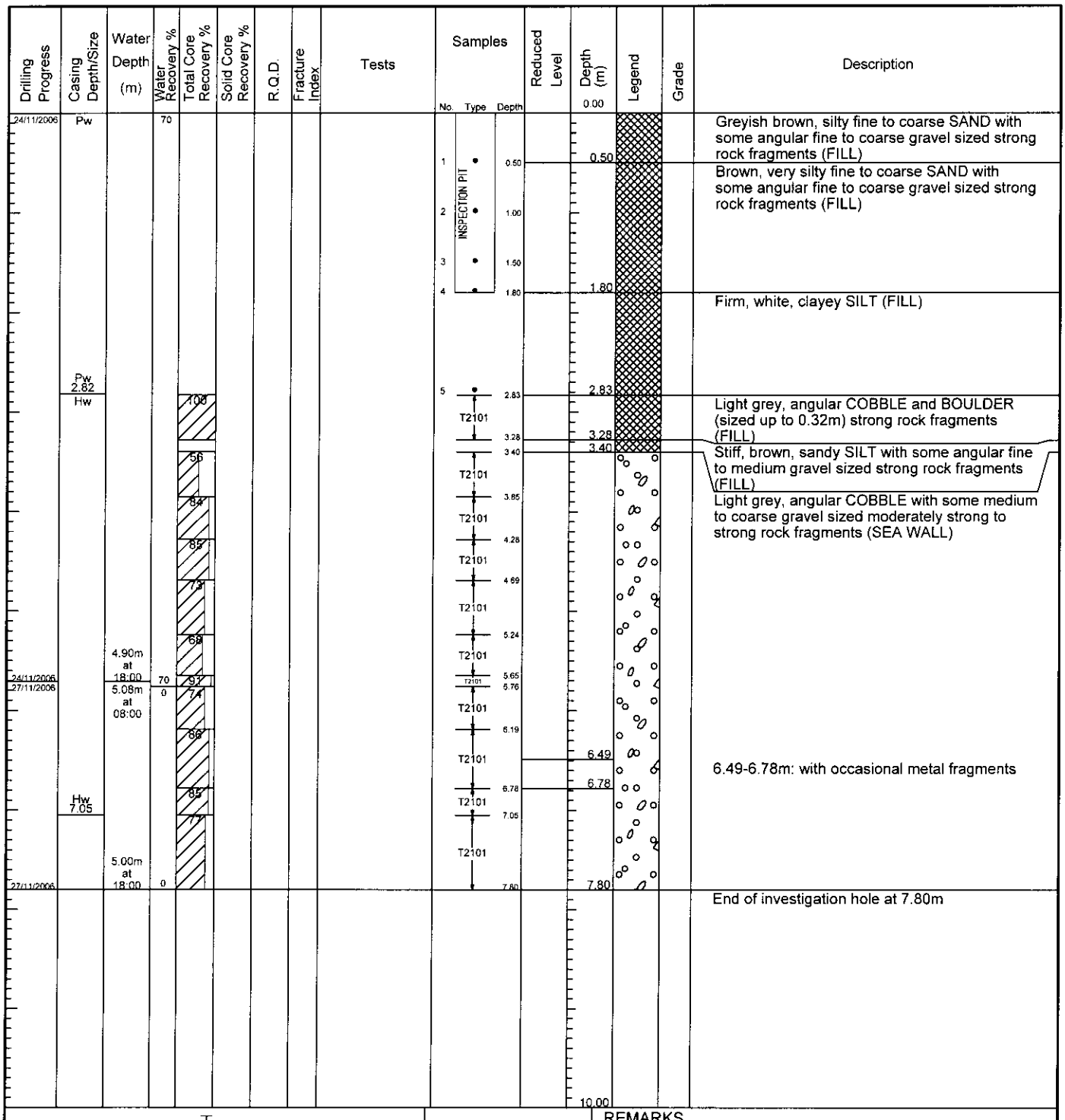
DRILLHOLE RECORD

DRILLHOLE No. **BH9**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D51**	E N	DATE from **24/11/2006** to **27/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD



- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **29/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.80m depth.
2. Groundwater monitoring well installed to 7.30m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH10**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D42**	E N	DATE from **05/12/2006** to **06/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Samples Type	Samples Depth	Reduced Level	Depth (m)	Legend	Grade	Description
05/12/2006	Pw		50										0.00			
									1	INSPECTION PIT	0.50		0.15			ASPHALT Greyish brown, slightly clayey very silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL)
									2		1.00					
				54					3		1.30		1.30			Pink and light grey, angular COBBLE with some coarse gravel sized strong rock and concrete fragments (FILL)
										T2101						
05/12/2006	Pw 2.50	Dry at 18:00									2.50					
06/12/2006	Hw	Dry at 08:00		35						T2101						
											3.50					
				83						T2101						
	Hw 4.10										4.10					
				100	57	0	NA			T2101			4.15		III/II	Moderately strong to strong, light grey and brown spotted black and grey, moderately to slightly decomposed medium grained GRANITE with closely to medium, locally very closely to medium, locally very closely spaced, rough planar and undulating, kaolin coated, limonite stained joints, dipping at 35°-45° and 60°-70° 4.15-4.70m: highly fractured 5.05-5.60m: with kaolin (3-5mm thick) infill along joints, dipping at 75°
				100	90	72	>20				4.40		4.70			
							3.6			T2101			5.05			
											5.40					
		2.80m at 18:00		100	86	86				T2101			5.60			
06/12/2006			50								5.82		5.82			End of investigation hole at 5.82m
													10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **06/12/2006**

CHECKED **I.S.McGlen**

DATE **13/12/2006**

REMARKS

1. Inspection pit excavated to 1.30m depth.
2. Groundwater monitoring well installed to 5.82m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH11**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D68**		DATE from **28/11/2006** to **29/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
28/11/2006	Pw		0								0.00			Brown, very silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL)
									1 0.50 INSPECTION PIT					
									2 1.00					
				67					3 1.40		1.40			Light grey, angular COBBLE sized strong rock fragments (FILL)
									T2101 2.00		2.00			Firm, yellow, sandy clayey SILT (FILL)
	Pw 2.75								4 2.50					
	Hw			66					2.75		2.75			Light grey, angular COBBLE sized strong rock fragments FILL)
									T2101 3.60		3.60			Yellowish brown, clayey silty fine to coarse gravel sized moderately strong rock fragments (FILL)
								32 bls	5 4.10					
				89					6					
		3.20m at 18:00							7 4.55 4.60					
28/11/2006											5.10			
29/11/2006		3.30m at 08:00		91				24 bls	8 5.10					Firm, brown, sandy clayey SILT (FILL)
	Hw 5.70		0						9 5.55 5.60 5.70		5.70			Light grey, angular COBBLE sized strong rock fragments (FILL)
			70	53					T2101 6.30		6.30		II	Strong, light greyish pink. slightly decomposed medium grained GRANITE with medium spaced, rough undulating, limonite stained joints, dipping at 25° (CORESTONE)
		4.46m at 18:00	70	100	100	100			T2101 7.15		7.15			
29/11/2006														End of investigation hole at 7.15m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **30/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.40m depth.
2. Groundwater monitoring well installed to 7.15m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH12**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **D103**	E N	DATE from **29/11/2006** to **29/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
29/11/2006	Pw		70						1	INSPECTION PIT	0.50		0.00			Brown, very silty fine to coarse SAND (FILL)
									2		1.00					
									3		1.20		1.20			
				62						T6116						Light grey, angular COBBLE and BOULDER (sized up to 0.21m) strong rock fragments (FILL)
	Pw 2.50										2.50		2.50			
	Hw								4		2.60					Firm, light greyish brown, sandy clayey SILT (FILL)
									5		3.60					
				87					6		4.60		4.60			
										T2101						Light pink, angular BOULDER (sized up to 0.48m) strong rock fragments (FILL)
											5.15		5.15			
									7		5.60					Soft, reddish and greyish brown, sandy silty CLAY with occasional angular fine to coarse gravel sized strong rock fragments (FILL)
				100				22 bls	8		6.00					
									9		6.45 6.50					
				100				21 bls	10		7.00					
29/11/2006	Hw 7.50	1.23m at 18:00	70						11		7.45 7.50		7.50			
													10.00			End of investigation hole at 7.50m

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **30/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.20m depth.
2. Groundwater monitoring well installed to 7.15m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH13**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D68**	E N	DATE from **04/12/2006** to **04/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
04/12/2006	Pw		70						1 INSPECTION PIT 0.50		0.00			Brown, slightly clayey very silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL)
				64					2 0.80		0.80			
	Pw 1.35								T6116 1.35					Pink, angular COBBLE with some coarse gravel sized strong rock fragments (FILL)
	Hw			46					T6116 2.00		2.00			
									3 2.50					Loose to medium dense, brown, clayey silty fine to coarse SAND with some angular fine to coarse gravel sized moderately strong to strong rock fragments (FILL)
									4 3.50					
				89				28 bls	5 6 4.50					
									7 4.95 5.00					
				93				129 bls	8 6.00		6.00			
04/12/2006	Hw 6.50	3.42m at 18:00	70						9 6.45 6.50		6.50			Medium dense, brown, slightly clayey silty fine to coarse SAND (FILL)
														End of investigation hole at 6.50m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **06/12/2006**

CHECKED **I.S.McGlen**

DATE **07/12/2006**

REMARKS

1. Inspection pit excavated to 0.80m depth.
2. Groundwater monitoring well installed to 5.50m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH14**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D42**		DATE from **02/12/2006** to **04/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/12/2006	Pw		0								0.00			
											0.15			Reinforced CONCRETE
									1 INSPECTION PIT 0.50					Greyish brown, slightly clayey silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL)
									2 1.00					
									3 1.30		1.30			
				43					T2101					Light grey, angular COBBLE and BOULDER (sized up to 0.35m) strong rock fragments (FILL)
02/12/2006	Pw 2.00	Dry at 18:00							2.00					
04/12/2006	Hw	Dry at 08:00		64					T2101					
				56					3.00					
									T2101					
									4.50		4.50			
									4 5.00					Firm, yellow, slightly clayey sandy SILT (FILL)
									5.50		5.50			
				46					T2101					Light grey, angular COBBLE and BOULDER (sized up to 0.28m) strong rock fragments (FILL)
				59					6.00					
04/12/2006	Hw 6.68	5.30m at 18:00	0						T2101 6.68		6.68			
														End of investigation hole at 6.68m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **06/12/2006**

CHECKED **I.S.McGlen**

DATE **07/12/2006**

REMARKS

1. Inspection pit excavated to 1.30m depth.
2. Groundwater monitoring well installed to 6.68m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH15**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D68**	E N	DATE from **04/12/2006** to **05/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
04/12/2006	Pw		80						1 0.50 2 1.00 3 1.50 4 2.00 INSPECTION PIT		0.00			Brown, slightly clayey very silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL) 0.00-0.50m: grey
		Dry at 18:00									0.50			
04/12/2006 05/12/2006		Dry at 08:00		73					2.05 T2101		2.05			Pink, angular fine to coarse GRAVEL with some cobble sized moderately strong to strong rock fragments (FILL)
	Pw 2.60			100	88	88			2.60 T2101		2.60		II	Strong, pink spotted grey and black, slightly decomposed medium grained GRANITE with closely to medium spaced, rough undulating, limonite stained joints, dipping at 30°-40° and 60°-70° 2.60-3.37m: subvertical to vertical joints
				96	92	81			3.73 T2101		3.37			
				100	100	100			5.09 T2101					
05/12/2006		3.40m at 18:00	80						6.11		6.11			End of investigation hole at 6.11m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **06/12/2006**

CHECKED **I.S.McGlen**

DATE **07/12/2006**

REMARKS

1. Inspection pit excavated to 2.00m depth.
2. Groundwater monitoring well installed to 6.11m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH18**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **D103**		DATE from **04/12/2006** to **04/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
04/12/2006	Hw		80						1 0.50 2 1.00 3 1.50 4 2.00		0.00			Brownish yellow, very silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL)
									INSPECTION PIT		1.00			Firm, red and brown, slightly clayey sandy SILT with some angular fine to coarse gravel sized strong rock fragments (FILL)
				78					Hw		2.00			CONCRETE
04/12/2006	Hw 2.80	2.50m at 18:00	80						2.80		2.80			End of investigation hole at 2.80m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **06/12/2006**

CHECKED **I.S.McGlen**

DATE **07/12/2006**

REMARKS

1. Inspection pit excavated to 2.00m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH19**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Edeco H40, D79**	E N	DATE from **28/11/2006** to **29/11/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
28/11/2006	Pw		70						1 INSPECTION PIT 0.50		0.00			Greyish brown, very silty fine to coarse SAND with some angular fine to coarse gravel sized moderately strong to strong rock fragments (FILL)
				100 63					2 T6116 1.10 1.26		1.10			Light grey, angular COBBLE and BOULDER (sized up to 0.22m) moderately strong to strong rock fragments (FILL)
28/11/2006	Pw 2.10	5.00m at 18:00							T2101 2.10					
29/11/2006	Hw	4.00m at 08:00		76					T2101 2.80					
				77					T2101 3.50					
				73					T2101 4.25		4.25			4.25-4.85m: with some sandy SILT matrix
				70					T2101 4.85		4.85			
				77					T2101 5.50					
				64					T2101 6.20		6.20			Loose, greyish yellow, clayey silty fine to coarse with some angular fine to coarse gravel sized strong rock fragments (FILL)
				100				39 bls	3 6.50					
29/11/2006	Hw 6.95	4.05m at 18:00	70						4 6.90 6.95		6.95			End of investigation hole at 6.95m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **30/11/2006**

CHECKED **I.S.McGlen**

DATE **04/12/2006**

REMARKS

1. Inspection pit excavated to 1.10m depth.
2. Groundwater monitoring well installed to 6.00m depth.

PRELIMINARY

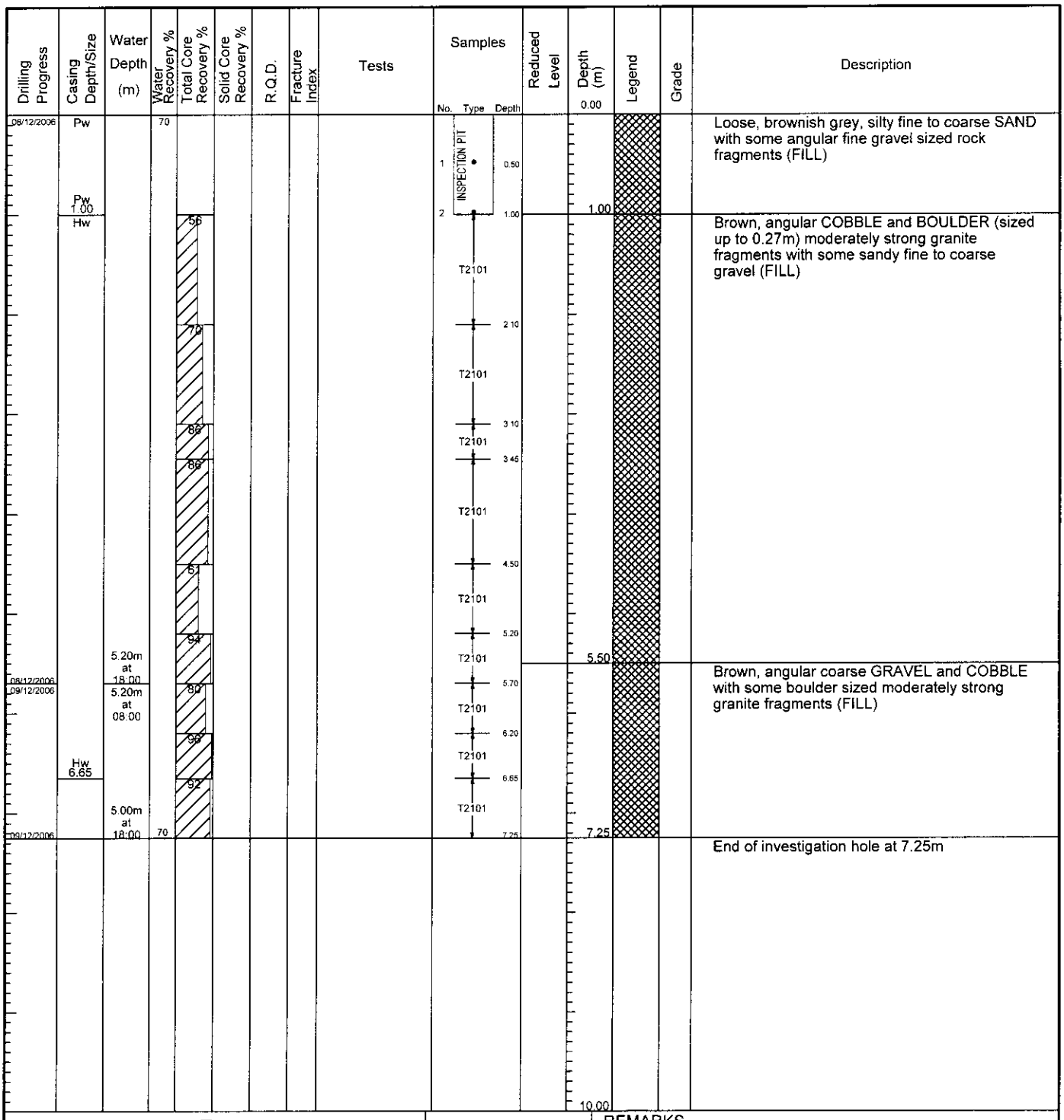
DRILLHOLE RECORD

DRILLHOLE No. **BH20**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Edeco H40, D79**	E N	DATE from **08/12/2006** to **09/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD



- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **12/12/2006**

CHECKED **I.S.McGlen**

DATE **13/12/2006**

REMARKS

1. Inspection pit excavated to 1.00m depth.
2. Groundwater monitoring well installed to 7.25m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH21**

SHEET 1 of 1

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D67**	E N	DATE from **08/12/2006** to **09/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
08/12/2006	Hw		50						1 0.50 2 1.00 3 1.50 4 2.00		0.00			Loose, light grey, silty fine to coarse SAND with some angular fine gravel sized rock fragments (FILL)
									INSPECTION PIT		1.50			Loose, pinkish grey, silty fine to coarse SAND with some angular fine gravel sized rock fragments (FILL)
				89					T2101		2.00			Light grey, sandy angular fine to coarse GRAVEL and COBBLE sized rock and concrete fragments (FILL)
		3.00m at 18:00		89				51 blows	5 3.50 6 3.95 4.00		3.50			Loose, pink spotted white, slightly clayey silty fine to coarse SAND with some angular fine gravel sized quartz fragments (FILL)
08/12/2006 09/12/2006		3.30m at 08:00									4.50			
				89				94 blows	7 4.50 8 4.95 5.00 5.02		5.02			Loose, grey, silty fine to coarse SAND with some angular to subangular fine to coarse gravel sized quartz fragments (FILL)
	Hw 5.02			100	95	85			T2101				III	Moderately strong, grey spotted black and white, moderately decomposed medium grained GRANITE with closely to medium spaced, rough planar and undulating, limonite stained joints, dipping at 15° and 60°
09/12/2006		3.30m at 18:00	50						6.00		6.00			End of investigation hole at 6.00m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **13/12/2006**

CHECKED **I.S.McGlen**

DATE **14/12/2006**

REMARKS

1. Inspection pit excavated to 2.00m depth.
2. Groundwater monitoring well installed to 6.00m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH22**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Edeco H40, D79**		DATE from **05/12/2006** to **05/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
05/12/2006	Hw		70						1 0.50 2 1.00 3 1.30 INSPECTION PIT		0.00			Yellow, very silty fine to coarse SAND with some angular fine to coarse gravel sized strong rock fragments (FILL)
				82					T2101 1.90		1.30			Pink and light grey, angular COBBLE with some coarse gravel sized strong rock fragments (FILL)
	Hw 1.90			100					T2101 2.36		2.10			CONCRETE
05/12/2006		Dry at 18:00	70								2.36			End of investigation hole at 2.36m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **06/12/2006**

CHECKED **I.S.McGlen**

DATE **12/12/2006**

REMARKS

1. Inspection pit excavated to 1.30m depth.

PRELIMINARY

DRILLHOLE RECORD

DRILLHOLE No. **BH23**

SHEET **1** of **1**

JOB TITLE **PO No. 4500365566 PR960 CPPS Borehole Drilling for Contaminated Material 2006**

METHOD **IP+W+RC**	CO-ORDINATES E N	PROJECT No. **LG24009/39**
MACHINE & No. **Longyear L38, D51**		DATE from **04/12/2006** to **05/12/2006**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing Depth/Size	Water Depth (m)	Water Recovery %	Total Core Recovery %	Solid Core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
04/12/2006	Hw		0								0.00			Brown, silty fine to coarse SAND with some angular fine to coarse gravel sized moderately strong to strong rock fragments (FILL)
	Hw 0.70			100					1 INSPECTION PIT 0.50 2 0.70		0.70			Pink, angular COBBLE sized strong rock fragments (FILL)
				100					T2101 1.20					
				100	26	0	>20		T2101 1.50		1.50		II	Strong, pink spotted grey and black, slightly decomposed medium grained GRANITE with medium to widely, locally closely spaced, smooth and rough planar and undulating, kaolin and chlorite coated joints, dipping at 45°-55° and 60°-70°
				100	78	0			T2101 1.77					
				99	91	91	2.9		T2101 2.13		2.32			1.50-2.32m: highly fractured
				100	100	100	1.2		T2101 2.90					
		2.85m at 18:00							T2101					
04/12/2006 05/12/2006		2.91m at 08:00		100	100	100			3.91					
									T2101					
				100	100	100			5.07					
							4.2		T2101		5.57			5.57-6.15m: subvertical to vertical joints
		3.00m at 18:00	0						6.15		6.15			
05/12/2006														End of investigation hole at 6.15m
											10.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **H.K.Fung**

DATE **06/12/2006**

CHECKED **I.S.McGlen**

DATE **07/12/2006**

REMARKS

1. Inspection pit excavated to 0.70m depth.
2. Groundwater monitoring well installed to 6.15m depth.

PRELIMINARY

ANNEX G RISK-BASED REMEDIATION GOALS (RBRGS) CRITERIA

Table 2.1
Risk-Based Remediation Goals (RBRGs) for Soil & Soil Saturation Limit

Chemical	Risk-Based Remediation Goals for Soil				Soil Saturation Limit (C_{sat}) (mg/kg)
	Urban Residential (mg/kg)	Rural Residential (mg/kg)	Industrial (mg/kg)	Public Parks (mg/kg)	
VOCs					
Acetone	9.59E+03	4.26E+03	1.00E+04*	1.00E+04*	***
Benzene	7.04E-01	2.79E-01	9.21E+00	4.22E+01	3.36E+02
Bromodichloromethane	3.17E-01	1.29E-01	2.85E+00	1.34E+01	1.03E+03
2-Butanone	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	***
Chloroform	1.32E-01	5.29E-02	1.54E+00	2.53E+02	1.10E+03
Ethylbenzene	7.09E+02	2.98E+02	8.24E+03	1.00E+04*	1.38E+02
Methyl tert-Butyl Ether	6.88E+00	2.80E+00	7.01E+01	5.05E+02	2.38E+03
Methylene Chloride	1.30E+00	5.29E-01	1.39E+01	1.28E+02	9.21E+02
Styrene	3.22E+03	1.54E+03	1.00E+04*	1.00E+04*	4.97E+02
Tetrachloroethene	1.01E-01	4.44E-02	7.77E-01	1.84E+00	9.71E+01
Toluene	1.44E+03	7.05E+02	1.00E+04*	1.00E+04*	2.35E+02
Trichloroethene	5.23E-01	2.11E-01	5.68E+00	6.94E+01	4.88E+02
Xylenes (Total)	9.50E+01	3.68E+01	1.23E+03	1.00E+04*	1.50E+02
SVOCs					
Acenaphthene	3.51E+03	3.28E+03	1.00E+04*	1.00E+04*	6.02E+01
Acenaphthylene	2.34E+03	1.51E+03	1.00E+04*	1.00E+04*	1.98E+01
Anthracene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	2.56E+00
Benzo(a)anthracene	1.20E+01	1.14E+01	9.18E+01	3.83E+01	
Benzo(a)pyrene	1.20E+00	1.14E+00	9.18E+00	3.83E+00	
Benzo(b)fluoranthene	9.88E+00	1.01E+01	1.78E+01	2.04E+01	
Benzo(g,h,i)perylene	1.80E+03	1.71E+03	1.00E+04*	5.74E+03	
Benzo(k)fluoranthene	1.20E+02	1.14E+02	9.18E+02	3.83E+02	
bis-(2-Ethylhexyl)phthalate	3.00E+01	2.80E+01	9.18E+01	9.42E+01	
Chrysene	8.71E+02	9.19E+02	1.14E+03	1.54E+03	
Dibenzo(a,h)anthracene	1.20E+00	1.14E+00	9.18E+00	3.83E+00	
Fluoranthene	2.40E+03	2.27E+03	1.00E+04*	7.62E+03	
Fluorene	2.38E+03	2.25E+03	1.00E+04*	7.45E+03	5.47E+01
Hexachlorobenzene	2.43E-01	2.20E-01	5.82E-01	7.13E-01	
Indeno(1,2,3-cd)pyrene	1.20E+01	1.14E+01	9.18E+01	3.83E+01	
Naphthalene	1.82E+02	8.56E+01	4.53E+02	9.14E+02	1.25E+02
Phenanthrene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	2.80E+01
Phenol	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	7.26E+03
Pyrene	1.80E+03	1.71E+03	1.00E+04*	5.72E+03	
Metals					
Antimony	2.95E+01	2.91E+01	2.61E+02	9.79E+01	
Arsenic	2.21E+01	2.18E+01	1.96E+02	7.35E+01	
Barium	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Cadmium	7.38E+01	7.28E+01	6.53E+02	2.45E+02	
Chromium III	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Chromium VI	2.21E+02	2.18E+02	1.96E+03	7.35E+02	
Cobalt	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Copper	2.95E+03	2.91E+03	1.00E+04*	9.79E+03	
Lead	2.58E+02	2.55E+02	2.29E+03	8.57E+02	
Manganese	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Mercury	1.10E+01	6.52E+00	3.84E+01	4.56E+01	
Molybdenum	3.69E+02	3.64E+02	3.26E+03	1.22E+03	
Nickel	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Tin	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Zinc	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	
Dioxins / PCBs					
Dioxins (I-TEQ)	1.00E-03	1.00E-03	5.00E-03	1.00E-03	
PCBs	2.36E-01	2.26E-01	7.48E-01	7.56E-01	
Petroleum Carbon Ranges					
C6 - C8	1.41E+03	5.45E+02	1.00E+04*	1.00E+04*	1.00E+03
C9 - C16	2.24E+03	1.33E+03	1.00E+04*	1.00E+04*	3.00E+03
C17 - C35	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+04*	5.00E+03
Other Inorganic Compounds					
Cyanide, free	1.48E+03	1.46E+03	1.00E+04*	4.90E+03	
Organometallics					
TBTO	2.21E+01	2.18E+01	1.96E+02	7.35E+01	

Notes:
(1) For Dioxins, the cleanup levels in USEPA Office of Solid Waste and Emergency Response (OSWER) Directive of 1998 have been adopted. The OSWER Directive value of 1 ppb for residential use has been applied to the scenarios of "Urban Residential", "Rural Residential", and "Public Parks", while the low end of the range of values for industrial, 5 ppb, has been applied to the scenario of "Industrial".
(2) Soil saturation limits for petroleum carbon ranges taken from the Canada-Wide Standards for Petroleum Hydrocarbons in Soil, CCME 2000.
(3) * indicates a 'ceiling limit' concentration.
(4) *** indicates that the C_{sat} value exceeds the 'ceiling limit' therefore the RBRG applies.

Table 2.2
Risk-Based Remediation Goals (RBRGs) for Groundwater and Solubility Limit

Chemical	Risk-Based Remediation Goals for Groundwater			Solubility Limit (mg/L)
	Urban Residential (mg/L)	Rural Residential (mg/L)	Industrial (mg/L)	
VOCs				
Acetone	1.00E+04*	1.00E+04*	1.00E+04*	***
Benzene	3.86E+00	1.49E+00	5.40E+01	1.75E+03
Bromodichloromethane	2.22E+00	8.71E-01	2.62E+01	6.74E+03
2-Butanone	1.00E+04*	1.00E+04*	1.00E+04*	***
Chloroform	9.56E-01	3.82E-01	1.13E+01	7.92E+03
Ethylbenzene	1.02E+03	3.91E+02	1.00E+04*	1.69E+02
Methyl tert-Butyl Ether	1.53E+02	6.11E+01	1.81E+03	***
Methylene Chloride	1.90E+01	7.59E+00	2.24E+02	***
Styrene	3.02E+03	1.16E+03	1.00E+04*	3.10E+02
Tetrachloroethene	2.50E-01	9.96E-02	2.95E+00	2.00E+02
Toluene	5.11E+03	1.97E+03	1.00E+04*	5.26E+02
Trichloroethene	1.21E+00	4.81E-01	1.42E+01	1.10E+03
Xylenes (Total)	1.12E+02	4.33E+01	1.57E+03	1.75E+02
SVOCs				
Acenaphthene	1.00E+04*	7.09E+03	1.00E+04*	4.24E+00
Acenaphthylene	1.41E+03	5.42E+02	1.00E+04*	3.93E+00
Anthracene	1.00E+04*	1.00E+04*	1.00E+04*	4.34E-02
Benzo(a)anthracene				
Benzo(a)pyrene				
Benzo(b)fluoranthene	5.39E-01	2.03E-01	7.53E+00	1.50E-03
Benzo(g,h,i)perylene				
Benzo(k)fluoranthene				
bis-(2-Ethylhexyl)phthalate				
Chrysene	5.81E+01	2.19E+01	8.12E+02	1.60E-03
Dibenzo(a,h)anthracene				
Fluoranthene	1.00E+04*	1.00E+04*	1.00E+04*	2.06E-01
Fluorene	1.00E+04*	1.00E+04*	1.00E+04*	1.98E+00
Hexachlorobenzene	5.89E-02	2.34E-02	6.95E-01	6.20E+00
Indeno(1,2,3-cd)pyrene				
Naphthalene	6.17E+01	2.37E+01	8.62E+02	3.10E+01
Phenanthrene	1.00E+04*	1.00E+04*	1.00E+04*	1.00E+00
Phenol				
Pyrene	1.00E+04*	1.00E+04*	1.00E+04*	1.35E-01
Metals				
Antimony				
Arsenic				
Barium				
Cadmium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Lead				
Manganese				
Mercury	4.86E-01	1.84E-01	6.79E+00	
Molybdenum				
Nickel				
Tin				
Zinc				
Dioxins / PCBs				
Dioxins (I-TEQ)				
PCBs	4.33E-01	1.71E-01	5.11E+00	3.10E-02
Petroleum Carbon Ranges				
C6 - C8	8.22E+01	3.17E+01	1.15E+03	5.23E+00
C9 - C16	7.14E+02	2.76E+02	9.98E+03	2.80E+00
C17 - C35	1.28E+01	4.93E+00	1.78E+02	2.80E+00
Other Inorganic Compounds				
Cyanide, free				
Organometallics				
TBTO				

Notes:
(1) Blank indicates that RBRG could not be calculated because the toxicity or physical/chemical values were unavailable, or the condition of Henry's Law Constant>1.00E-05 was not met for the inhalation pathway.
(2) Water solubilities for Petroleum Carbon Range aliphatic C9-C16 and greater than C16 generally are considered to be effectively zero and therefore the aromatic solubility for C9-C16 is used.
(3) * indicates a 'ceiling limit' concentration.
(4) *** indicates that the solubility limit exceeds the 'ceiling limit' therefore the RBRG applies.

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ERM's Hong Kong Office
2509, 25/F One Harbourfront,
18 Tak Fung Street,
Hunghom, Kowloon
Hong Kong

T: +852 2271 3000
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