

Implementation Schedule for Reprovisioning of Diamond Hill Crematorium

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
Air (Design)								
S.4.3.7	The proposed cremators should be designed with advanced technology in combustion as well as equipped with appropriate air pollution control system which meet the requirements of BPM 12/2 and the target emission levels set in Table 4.1.	New Cremators in New Crematorium / design stage	Arch SD	✓				BPM/APCO
S.4.3.8	Special air pollution control systems shall be installed and operate to reduce the emissions of air pollutants to acceptable levels	New cremators in New Crematorium / all stages	Arch SD	✓	✓	✓	✓	BPM/APCO
S.4.5.17	The efflux velocity of chimney shall be at least 15 m/s, the design chimney height shall be 101 mP.D. (28.5m above ground). The design diameter of the chimneys shall be 0.22 m and 0.30 m for 170 kg and 250 kg cremators respectively	Chimney of New Crematorium / design and construction stages	Arch SD	✓	✓			BPM/APCO
S4.5.18	New cremators shall have primary and secondary chambers, the temperature of secondary combustion chamber shall be at least 850°C and the residence time at least 2 seconds	New cremators in New Crematorium / design stage	Arch SD	✓				BPM/APCO
Air (Construction and Demolition)								
S.4.3.8	Special air pollution control systems shall be installed and operate to reduce the emissions of air pollutants to acceptable levels	New cremators in New Crematorium / all stages	Arch SD	✓	✓	✓	✓	BPM/APCO
S.4.2.5	FEHD shall apply for a Specified Process License under the APCO	New Cremators in the New Crematorium / prior to operation	FEHD		✓	✓	✓	APCO
S.4.5.17	The efflux velocity of chimney shall be at least 15 m/s, the design diameter of the chimneys shall be 0.22 m and 0.30 m, the design chimney height shall be 101mP.D. (28.5m above ground), for 170 kg and 250 kg cremators respectively	Chimney of New Crematorium / design and construction stages	Arch SD	✓	✓			BPM/APCO
S.4.5.30	If the interior wall of existing cremators and chimney are confirmed dioxins contaminated, special precautions shall be taken avoid fugitive emissions of dioxin contaminated materials	Cremator room and chimney in Existing Crematorium / demolition	Arch SD/Contractor			✓		

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S.4.6.2	Sufficient water spraying should be applied during the construction work, the fugitive dust generated from general construction dust would be reduced by 90%	Project site / construction and demolition stages	Arch SD, contractor		✓	✓		APCO
S.4.6.45	Carry out a confirmatory test of dioxins in the depositions on chimney wall, flue gas ducting and combustion chambers when the existing Crematorium is shut down	Chimney, flue and cremators in Existing Crematorium / decommissioning	FEHD, Arch SD			✓		
S.4.6.46	If the dioxin level of surface deposition is between 1 and 10 ppb I-TEQ, it is classified as moderately contaminated with dioxins. The demolition work site should be covered up to avoid emission of fugitive dust during demolition	Chimney, flue and cremators in Existing Crematorium / decommissioning	Arch SD			✓		
S.4.6.47	If the dioxin level of surface deposition exceeds 10 ppb I-TEQ, it is classified as severely dioxin-contaminated waste. If it is confirmed that the existing facilities are severely contaminated with dioxins, a special decommissioning method – Containment method – would be adopted	Chimney, flue and cremators in Existing Crematorium / decommissioning	Arch SD			✓		
S.4.6.49	All the demolition waste would be carefully handled, sealed and treated as chemical waste. The waste collector shall be responsible for preventing fugitive dust emission when handling the demolition waste	Chimney, flue and cremators in Existing Crematorium / demolition stage	Arch SD, contractor			✓		
S.4.6.54	Employ a registered asbestos contractor to remove asbestos containing material during the demolition of the existing crematorium building	Cremator room in Existing Crematorium / decommissioning	Arch SD, contractor			✓		APCO
S.4.6.54	Submit a formal AIR and Asbestos Abatement plan signed by a registered asbestos consultant to the Authority for approval under APCO 28 days prior to the start of any asbestos abatement work.	Cremator room in Existing Crematorium / decommissioning	Arch SD, consultant			✓		APCO
S.4.6.55	When removing asbestos containing materials, enclosure of the work area; containment and sealing for the asbestos containing waste; provision of personal decontamination facility; use of personal respiratory/protection equipment; use of vacuum cleaner equipped with high-efficiency air particulate (HEPA) filter for cleaning up the work area; and carry out air quality monitoring during the asbestos abatement work	Cremator room in Existing Crematorium / decommissioning	Arch SD, consultant			✓		APCO

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S.4.6.56	Appoint qualified personnel to carry out the asbestos containing material removal work, including a registered asbestos contractor to carry out the work; a registered asbestos supervisor to supervise the work; a registered asbestos laboratory to monitor the air quality, and a registered asbestos consultant to supervise and certify the asbestos abatement work.	Cremator room in Existing Crematorium / decommissioning	Arch SD, consultant			✓		APCO
S.4.7.2	Erect a site barrier with the height of no less than 2.4 m to enclose the construction site Apply frequent water spraying to ensure the surface of the construction site sufficiently wet to reduce fugitive dust due to wind erosion and transportation on unpaved haul road Cover up stockpiles of fill material and dusty material Install a vehicle-cleaning system at the main entrance of the construction site to clean up the vehicles before leaving the site The Air Pollution Control (Construction Dust) Regulation shall be followed for fugitive dust control	Project site / construction and demolition stages	Contractor		✓	✓		APCO, Air Pollution Control (Construction Dust) Regulation
Air (Testing and Commissioning)								
S.4.7.4 & S.4.7.5	No more than 6 cremators (including both the existing and new ones) are in operation during commissioning test of new cremators. The commissioning test of each new cremator shall be recorded by a log book	Existing and new cremators in Existing and New Crematorium / text and commissioning	Arch SD/FEHD/Contractor		✓			
S.4.5.9	Managerial arrangement should be made that no more than six cremators in operation at any time (including both existing and new cremators) during testing and commissioning period	New cremators in New Crematorium / testing and commissioning	FEHD				✓	-
Air (Operation)								
S.4.3.8	Special air pollution control systems shall be installed and operate to reduce the emissions of air pollutants to acceptable levels	New cremators in New Crematorium / all stages	Arch SD	✓	✓	✓	✓	BPM/APCO
S.4.6.7	Training on operation of the cremator system would be provided to the responsible staff., to ensure proper operation of the system	New Cremators in New Crematorium / testing and commissioning	FEHD, EMSD				✓	BPM/APCO
S.4.6.7	Air pollution control system and monitoring equipment would be tested and evaluated during testing and commissioning stage	New Cremators in New Crematorium / testing and commissioning	FEHD, EMSD				✓	BPM/APCO

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S.4.6.28	FEHD would implement stringent managerial programme to ensure proper operation and to provide adequate maintenance to the cremators in order to avoid emission of nuisance odour	New Cremators in New Crematorium / operation	FEHD				✓	BPM/APCO
S.4.6.30	FEHD will carry out regular odour patrol at the site boundary during the operation of the new Crematorium. Corrective actions will be carried out immediately if significant odour emission is detected by the odour patrol team	New Cremators in New Crematorium / operation	FEHD				✓	BPM/APCO
S.4.6.32	FEHD will limit the use of joss paper burners. Joss paper burners will be only allowed for the use of memorial ceremonies upon requested by the relatives. Other usage of joss paper burners will not be allowed	Joss burners in New Crematorium / operation	FEHD				✓	BPM/APCO
S.4.6.32	Guidance will be provided to users of joss paper burners to advise them to minimize the quantity of burning material	Joss burner in New Crematorium / operation	FEHD				✓	BPM/APCO
S.4.6.32	FEHD staff will advise users of joss paper burners to ensure better combustion of joss paper to reduce smoke emission	Joss burner in New Crematorium / operation	FEHD				✓	BPM/APCO
S.4.5.2	Ensuring proper operation of the Crematorium and the air pollution control system. In case of failure of any part of the cremator system, suspend the operation and rectify the failure as soon as possible.	Cremators in New Crematorium / operation	FEHD				✓	BPM/APCO
Air (EM&A for Construction and Demolition)								
S.11.2.2	Conduct baseline and regular 1-hour and 24-hour TSP monitoring.	A8 and A17 / baseline monitoring prior to Phase I & II works and regular monitoring throughout Phase I & II works	Contractor		✓	✓		APCO, EM&A Guidelines for Development Projects in Hong Kong
S.11.2.3	When the demolition material is confirmed to have ACM, monitoring for asbestos fibre would be carried out at the boundary of the construction site for reassurance purposes as per the requirement of future license for asbestos abatement, though it is not expected that asbestos fibre would be liberated from the demolition of the Existing Crematorium building.	Construction site boundary / demolition	Contractor			✓		Asbestos Study Report, AIR and AAP to be submitted under APCO, future licence for asbestos abatement (if any)

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Air (EM&A for Operation)								
S.11.3.2	Conduct continuous monitoring for the following pollutants and processes: <ul style="list-style-type: none">• Temperature inside the primary combustion zone;• Temperature at the outlet from the secondary combustion zone;• Oxygen concentration at the outlet from the secondary combustion zone;• Carbon Monoxide concentration at the outlet from the secondary combustion zone;• Smoke density at the chimney of the cremator; and• Other essential operating parameter(s) which may affect the performance of air pollution control measures.	Cremators and chimney of the New Crematorium / operation	FEHD				✓	APCO, BPM 12/2, future Specified Process Licence
S.11.3.10	Conduct regular monitoring for stack emissions as per the requirements of future Specified Process License to be issued by EPD.	Chimney of the New Crematorium / operation	FEHD				✓	APCO, BPM 12/2, future Specified Process Licence
Noise (Construction and Demolition)								
S.5.3.9	Select quiet plant, which is defined as PME with a sound power level lower than that specified in GW-TM. Examples of quiet plant can be referred to those listed in British Standard BS5228.	Project site / construction and demolition stages	Contractor		✓	✓		GW-TM
S.5.3.11 & S.5.3.12	Where practicable, use movable barriers of 3 to 5 m height with a small cantilevered upper portion and skid footing can be located within a few metres from a stationary plant (e.g. generator, compressor, etc.) and within about 5 m for a mobile equipment (e.g. breaker, excavator, etc.), especially in the vicinity of SR3, SR4 and SR6. The purpose-built noise barriers or screens shall be constructed of appropriate materials with a minimum superficial density of 15kg/m².		Contractor		✓	✓		NCO
S.5.3.13	<ul style="list-style-type: none">• Only well-maintained plant should be operated on site and plant should be regularly serviced during the construction works• Plant that is used intermittently should be turned off or throttled down when not in active use• Plant that is known to emit noise strongly in one direction should be oriented to face away from NSRs• Silencers, mufflers and enclosures for plant should be used where possible and maintained adequately throughout the works• Where possible mobile plant should be sited away from NSRs• Stockpiles of excavated materials and other structures such as site buildings should be used effectively to screen noise from the works		Contractor		✓	✓		NCO

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S.5.3.15 (iii)	Liaise with the school and the Examination Authority to ascertain the dates and times of examination periods during the course of the construction/ demolition works so as to avoid any noisy activities during these periods. Programme of the on-site works should hence be well programmed such that the noisier construction activities would not be coincided with the examination of the schools.	Project site / construction and demolition stages	Contractor		✓	✓		NCO
Noise (Operation)								
S.5.4.7	The quantities and the maximum sound power level of the fixed plants should not exceed the plant inventory information given by the project proponent as assessed in the EIA report.. In general, noise from the operation of the concerned fixed-noise sources can be reduced by locating it as far as practical from the NSRs, and/ or by orientating the noise emission points (e.g. discharge points of ventilation etc.) away from the NSRs, and/ or by implementation of silencers and acoustic barriers to the concerned system.	All fixed-noise sources in New Crematorium / design and operation stages	Arch SD and FEHD	✓			✓	NCO
Noise (EM&A for Construction and Demolition)								
S.11.2.4	Conduct regular noise monitoring.	SR 3, SR 4 and SR 6 / Phase I & II works	Contractor		✓	✓		NCO, EM&A Guidelines for Development Projects in Hong Kong

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Land Contamination (Construction and Demolition)								
S.6.8.4	Additional site investigations in areas of the site that are currently in use and cannot be readily accessed. These investigations will be carried out once the existing facility has been decommissioned. The additional site investigations are required in the vicinity of the existing CLP secondary substation, and around the cremators and flues inside the crematorium building. Once access to these areas is available, a sampling and analysis plan will be prepared for approval by EPD, additional investigations will take place, and the need for remedial works will be determined. Any remedial works required will be in addition to those described in this current report.	CLP secondary substation and cremator room/ demolition stage (Phase I – CLP secondary substation; Phase II – cremator room)	Contractor			✓		ProPECC PN 3/94
S.6.8.5	Once the Existing Crematorium has ceased operating during Phase II, confirmatory surface samples will be taken from the samples points S1 to S6 at a depth of 0.1m, and these samples will be analysed for the same suite of determinands (i.e. dioxins, metals and PAH) in order to confirm that no further contamination has occurred. The Remediation Action Plan will be revised on the basis of these results.	Locations S1 to S6 specified in the CAP/demolition	Contractor			✓		ProPECC PN 3/94
S.6.8.6	The underground fuel storage tank and associated pipework will be removed as part of the site formation works. The base of the excavations will be inspected during and after tank removal by a suitably experienced environmental specialist in order to determine whether there is any visual or olfactory evidence of fuel contamination. If such contamination is suspected, then confirmatory soil sampling will be carried out, and the samples analysed for TPH.	Underground fuel storage tank/during and after tank removal	Contractor			✓		ProPECC PN 3/94 and Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshops
Figure 6.3	Summary of remediation works at locations S3 and S5: 1. Mark out 5m radius around S3 and S5 2. Excavate to depth of 0.5m 3. Transport to landfill site for final disposal 4. Take 4 samples from edges of excavation and one sample from base of excavation, analyse for lead and tin 5. If the results exceed Dutch B Levels, extend excavation to a further 5 m radius and 0.5 m depth in the quadrant where the contaminated samples is encountered and repeat steps 3 and 4 6. If the results less than Dutch B Levels, then remediation completed	Locations S3 and S5 specified in CAP/demolition	Contractor			✓		ProPECC PN3/94

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S.6.10.5	During removal of the underground fuel storage tank, appropriate precautions should be taken to avoid contamination. All fuel tanks and associated pipework should be emptied prior to any demolition work being undertaken. Any remaining sludge or sediment in the tanks or pipework should be removed and disposed of as chemical waste in accordance with the appropriate regulations for disposal of such material.	Underground fuel storage tank / Phase II demolition	Contractor			✓		ProPECC PN 3/94 and Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshops
S.6.10.6 - S.6.10.8	Should contamination be encountered beneath the fuel tank or the CLP secondary substation, further remedial work will be required. Such potential contamination would consist of either TPH (in the case of the fuel tank) or PCBs (in the case of the CLP secondary substation). As a realistic worst-case estimate, the PCB contaminated soil at CLP secondary substation may require stabilisation with cement prior to disposal to landfill. A realistic worst case estimate is that the volume of TPH contaminated soil at underground storage tank would require landfill disposal.	CLP secondary substation /Phase I demolition and underground fuel tank / Phase II demolition	Contractor			✓		ProPECC PN 3/94 and Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshops
App. C2 4.7	<p>Health and Safety Precautions during Remedial Works</p> <p>The site workers engaged in the remedial works should be provided with adequate personal protective equipment, which should include:</p> <ul style="list-style-type: none"> • Protective footwear; • Gloves; • Dust masks; and • Overalls. <p>A clean area should be provided, equipped with washing facilities. Eating, drinking and smoking should only be permitted within designated “clean” areas after washing. Excavated material should not be stockpiled, but should immediately be treated/transported to landfill on a daily basis ..</p>	All areas requiring remedial works in Project site / demolition during Phases I and II	Contractor			✓		ProPECC PN 3/94 and Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshops

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App. C2 4.7	<p>Avoidance of Impacts on Water Quality during Remedial Works</p> <p>In order to avoid impacts on water quality during remedial works, care will be taken to minimise the mobilisation of sediment during excavation and transport. Measures to be adopted will be based on the recommendations set out in Practice Note for Professional Persons ProPECC PN1/94 “Construction Site Drainage”. The results of the site investigation suggest that there is unlikely to be any requirement for dewatering of excavations, since groundwater was not encountered in any of the exploratory holes.</p> <p>The contractor carrying out the remedial works will be required to submit a method statement detailing the measures to be taken to avoid water quality impacts. Typical measures would include;</p> <ul style="list-style-type: none"> • Carry out the works during the dry season (i.e. October to March) if possible; • Use bunds or perimeter drains to prevent run-off water entering excavations; • Sheet or otherwise cover excavations whenever rainstorms are expected to occur; • Minimise the requirements for stockpiling of material and ensure any stockpiles are covered; • Temporary on-wit stockpiling of contaminated materials should be avoided, and all excavated contaminated soils/materials should be disposed of on a daily basis; • Ensure that any discharges to storm drains pass through an appropriate silt trap. 	All areas requiring remedial works in Project site / demolition during Phases I and II	Contractor			✓		ProPECC PN 3/94, ProPECC PN1/94 and Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshops
App. C2 4.7	<p>Waste Disposal Requirements during Remedial Works</p> <p>An application for permission to dispose of excavated material should be made to the Facilities Management Group of EPD three months prior to disposal.</p> <p>A “trip-ticket” system should be implemented. Each load of contaminated soil despatched to landfill should be accompanied by an admission ticket.</p> <p>Vehicles leaving the site should be adequately sheeted to prevent dispersion of contaminated material during transport. The wheels of vehicles should be cleaned prior to leaving site, to prevent contaminated material leaving site on the wheels of vehicles.</p>	All areas requiring remedial works in Project site / demolition during Phases I and II	Contractor			✓		ProPECC PN 3/94, Waste Disposal Ordinance (Cap. 354), WBTC No. 21/2002 and Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshops

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App. C2 4.7	<p>Compliance Report for Remedial Works</p> <p>Following completion of remediation works, a Remediation Report should be compiled and submitted, to demonstrate that the remediation works have been carried out in accordance with the Remediation Action Plan. The Remediation Report should include details of the excavation works carried out, records of material taken to landfill, and results of confirmatory testing, and should be submitted to EPD for approval before the commencement of building works.</p>	All areas requiring remedial works in Project site / after completion of remediation works	Contractor			✓		ProPECC PN 3/94 and Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshops

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Land Contamination (Design and Operation)								
S.6.11.4	<p>The fuel storage facilities to be provided in the New Crematorium should be constructed, maintained and inspected in accordance with the provisions of the Dangerous Goods (General) Regulations (Cap. 295B) and the guidelines presented in “Guidance for the Design, Construction, Modification and Maintenance of Petrol Filling Stations” (Institute of Petroleum, 1999), and with the necessary approvals from the Fire Services Department. To mitigate the environmental impacts from operational land contamination, the following mitigation measures shall be implemented for installation and operation of any underground fuel tanks:</p> <ul style="list-style-type: none">• The underground fuel tank(s) shall be of a specified durability and placed within a concrete pit to avoid direct contact of the tank surface with soil.• The concrete pit shall be accessible to allow tank integrity test be carried out on an annual basis, or when deemed necessary by an independent qualified surveyor or structural engineer. Any potential problems such as potential cracking shall be rectified as far as practicable.• Diesel fuel pipelines are preferably to be installed above ground. If underground piping is unavoidable, concrete lined trenches shall be constructed to contain the pipelines. The distance between the cremators and the underground tanks shall be minimized as appropriate to avoid the need for long pipelines.• Proper installation and use of meters (e.g. at the two ends of any pipeline) would allow any unexpected pressure drop or difference and signs of leakage be detected from routine inspection or during diesel fuel pumping. Any identified leakage shall be reported to the plant manager in-charge.• Any spillage of fuel shall be removed immediately by portable pump when the quantity is large or by absorbing materials when the quantity is low or with similar effective tools as appropriate. Used absorbing material shall be properly stored and disposed of as chemical waste. <p>The underground tanks refueling (from tank trucks) shall only be undertaken by authorized staff of the fuel company using the company's standard procedures to avoid spillage of diesel fuel.</p>	Fuel storage tanks in New Crematorium, / design and operation stages	FEHD/Arsh SD	✓			✓	DGO

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Land Contamination (EM&A for Construction and Demolition)								
S.11.2.6	Conduct supplementary site investigation for TPH and PCB in soil samples.	CLP substation / after decommissioning but prior to demolition during Phase I work	Contractor			✓		CAR, RAP, future sampling and analysis plan
S.11.2.8	Conduct confirmatory testing of PAH, dioxins and metals (the “Dutch List”) in soil samples.	S1 to S6 / Phase II work	Contractor		✓	✓		CAR, RAP, future sampling and analysis plan
S.11.2.9	If fuel contamination underneath the underground fuel tank is suspected, confirmatory soil sampling will be carried out for analysis of TPH.	Underneath the underground fuel tank / Phase II	Contractor			✓		CAR, RAP, future sampling and analysis plan
S.11.2.13	Conduct confirmatory testing of tin and lead in soil samples to confirm all contaminated soil has been excavated.	S3 and S5 / during Phase II work following excavation at each location	Contractor		✓	✓		CAR, RAP, future sampling and analysis plan

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Waste Management (Construction and Demolition)								
S.7.7.1	<u>Good Site Practice</u> <ul style="list-style-type: none">Obtain relevant waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354) and the Land (Miscellaneous Provision) Ordinance (Cap. 28)Prepare a Waste Management Plan approved by the Engineers / Supervising Officer of the Project in accordance with Environment, Transport and Works Bureau Technical Circular (Works) (ETWBTC(W)) 15/2003, Waste Management On Construction SitesNominate an approved person, such as site manager, to be responsible for good site practice, arrangements for collection and effective disposal of all types of wastes generated on-site to appropriate facilityUse waste haulier authorized or licensed to collect specific category of wasteEstablish trip ticket system as contractual requirement (with reference to Works Branch Technical Circular (WBTC) No. 21/2002) for monitoring of public fill and C&D waste at public filling facilities and landfills. Such activities should be monitored by the Environmental TeamProvide training to site staff in terms of proper waste management and chemical waste handling proceduresSeparate chemical wastes for special handling and dispose them at licensed facility for treatmentEstablish routine cleaning and maintenance programme for drainage systems, sumps and oil interceptorsProvide sufficient waste disposal points and regular collection for disposalAdopt measures to minimize windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containersEstablish recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites)	Project site/ design, construction and demolition stages	Contractor	✓	✓	✓		Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354) Land (Miscellaneous Provision) Ordinance (Cap. 28) WDO, ETWBTC(W) 15/2003, WBTC No. 21/2002
S.7.7.2	<u>Waste Management Plan</u> <p>The contractor should submit the Waste Management Plan to Engineer/Supervising Officer of the Project for approval. The Waste Management Plan should describe the arrangements for avoidance, reuse, recovery and recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the activities of the Project and indicate the disposal location(s) of all waste. A trip ticket system shall be included in the Waste Management Plan.</p>	Project site / design, construction and demolition stages	Contractor	✓	✓	✓		Waste Disposal Ordinance (Cap. 354)

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S.7.7.3	<u>Waste Reduction Measures</u> <ul style="list-style-type: none"> Minimize the damage or contamination of construction material by proper storage and site practices Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste Prior to disposal of C&D waste, wood, steel and other metals should be separated for reuse and / or recycling to minimize the quantity of waste to be disposed of to landfill Minimize use of wood and reuse non-timber formwork to reduce the amount of C&D waste Recycle any unused chemicals or those with remaining functional capacity as far as practicable As far as practicable, segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal Encourage collection of aluminium cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors, separate labeled bins should be provided to help segregate this waste from other general refuse generated by the work force 	Project site / construction and demolition stages	Contractor		✓	✓		WBTC No. 32/92, 5/98 and 19/99
S.7.7.5	<u>Excavated Material</u> Rock and soil generated from excavation should be reused for site formation as far as possible. In addition, excavated material from foundation work can be reused for landscaping as far as practicable to avoid disposal off-site.	Project site / construction and demolition stages	Contractor		✓	✓		WBTC 12/2000
S.7.7.6 – S.7.7.8	<u>Construction and Demolition Material</u> Careful design, planning and good site management can minimize over-ordering and generation of waste materials such as concrete, mortar and cement grouts. Standard formwork should be used as far as practicable, wooden formwork should be replaced by metal ones whenever possible. Alternatives such as plastic fencing and reusable site office structures can also minimize C&D waste generation. The contractor should recycle as much as possible of the C&D material on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Materials such as concrete and masonry can be crushed and used as fill and steel reinforcing bar can be used by scrap steel mills. Different areas of sites should be designated for such segregation and storage.	Project site / construction and demolition stages	Contractor	✓	✓	✓		WBTC 5/98 and 19/99

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines															
				Des	Con	Dem	Ope																
	To maximize landfill life, government policy discourages the disposal of C&D materials with more than 20% inert material by volume (or 30% inert material by weight) at landfill. Inert C&D material (public fill) should be directed to an approved public filling area, where it has the added benefit of offsetting the need for removal of materials from borrow areas for reclamation purposes.																						
S.7.7.9-S.7.7.14	<p><u>Contaminated Material – Further Contamination Investigation</u></p> <p>After decommissioning but prior to demolition of the Existing Crematorium, further contamination investigation should be carried out to confirm the quality and quantity of ash waste, building structures and contaminated soil requiring treatment and disposal. Further contamination investigation shall provide information on the extent of contamination (DCM / HMCN / PAHMCN) at cremators /flues / chimney as well as the quantity of contaminated materials requiring treatment and disposal. Regarding ACM, future AIR, AMP/AAP should be submitted to EPD for approval under the APCO. Asbestos investigation / abatement (including the preparation of AIR and AAP) should be carried out by registered asbestos consultant and contractor. A summary of requirement is given below:</p> <table><tr><th>Location</th><th>Investigation Parameter</th><th>Investigation Period</th></tr><tr><td>Cremators/flue/chimney and surrounding areas</td><td>Asbestos (building structure)</td><td>Phase II</td></tr><tr><td>CLP secondary substation</td><td>PCB, TPH (soil samples)</td><td>Phase I</td></tr><tr><td>Cremators/flue/chimney and surrounding areas</td><td>Dioxins, heavy metals, PAH (ash waste)</td><td>Phase II</td></tr><tr><td>Surface soil around Existing Crematorium</td><td>Dioxins, heavy metals, PAH (soil sample)</td><td>Phase II</td></tr></table> <p>Further contamination investigation shall provide information on the extent of contamination at cremators /flues / chimney as well as the quantity of contaminated materials requiring treatment and disposal.</p>	Location	Investigation Parameter	Investigation Period	Cremators/flue/chimney and surrounding areas	Asbestos (building structure)	Phase II	CLP secondary substation	PCB, TPH (soil samples)	Phase I	Cremators/flue/chimney and surrounding areas	Dioxins, heavy metals, PAH (ash waste)	Phase II	Surface soil around Existing Crematorium	Dioxins, heavy metals, PAH (soil sample)	Phase II	CLP secondary substation / prior to Phase I demolition; cremator room in Existing Crematorium / prior to Phase II demolition	Contractor			✓		ProPECC PN 3/94 APCO (for asbestos)
Location	Investigation Parameter	Investigation Period																					
Cremators/flue/chimney and surrounding areas	Asbestos (building structure)	Phase II																					
CLP secondary substation	PCB, TPH (soil samples)	Phase I																					
Cremators/flue/chimney and surrounding areas	Dioxins, heavy metals, PAH (ash waste)	Phase II																					
Surface soil around Existing Crematorium	Dioxins, heavy metals, PAH (soil sample)	Phase II																					

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
	Samples of ash/particulate matters should be collected from within the cremators (including the bottom ash), chimney walls, flues and surrounding area of the Existing Crematorium for analysis of dioxin, heavy metals and PAHs by a HOKLAS accredited laboratory. A consultant experienced in the abatement of chemical wastes particularly the handling of DCM, should be appointed in order to assist with the evaluation of the information and prepare an abatement plan for the ash waste. Such a plan shall be submitted to EPD and the Labour Department (LD) to establish an acceptable and safe method for these potentially hazardous wastes. The abatement plan should identify the method of abatement, the performance criteria for the protection of workers and the environment and any emergency procedures and contingency measures required.							
	It must be ensured that the treatment of ash wastes will comply with all routine construction site safety procedures would apply as well as statutory requirements under the Occupational Safety and Health Ordinance and Factories and Industrial Undertakings Ordinance. Due to the difficulties in establishing permanent and effective engineering controls, the protection of workers is likely to be at the worker level. A safe system of work must be provided, and training and suitable personal protective equipment as well as hygienic decontamination facilities should be provided. It is recommended that the methods to be adopted by the contractor for disposal of the ash waste should be agreed with LD and EPD.	Cremator room in Existing Crematorium / before demolition and after decommission	Contractor			✓		ProPECC PN 3/94
	Sufficient time should be allocated to abate all ash waste with DCM/HMCM/PAHCM. The contractor should ensure the implications of dust containing DCM/HMCM on air quality and workers health during the clean up work are mitigated.							
	Since DCM is chemically related to Polychlorinated Biphenyl (PCB) wastes, the requirements of the <i>Code of Practice on the Handling, Transportation and Disposal of (PCB) Wastes</i> should be referenced when developing the abatement plan.							ProPECC PN 3/94 Code of Practice on the Handling, Transportation and Disposal of (PCB) Wastes
	A land contamination site investigation was carried out under this EIA to determine disposal requirements for contaminated soil. Further site investigation on soil around CLP secondary substation is needed when decommissioned, which will be during Phase I of the works. In addition, confirmatory testing on DCM level in locations S1 to S6 will be required to identify the appropriate remediation and disposal requirements during Phase II of the works.	Locations S1 to S6 in CAP / prior to Phase II demolition				✓		

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines		
				Des	Con	Dem	Ope			
S.7.7.16	<u>Asbestos Containing Materials (ACM)</u> Further asbestos assessment should be carried out when access to the cremators /flue /chimney is accessible after decommissioning and before demolition. An AMP should be prepared. The AAP should be prepared and submitted to EPD for approval prior to commencement of demolition works in accordance to the APCO. It is preferable to remove all ACM before actual demolition. A registered asbestos removal contractor should be employed to remove all ACM in accordance with the approved AAP which will be prepared in due course in accordance with the <i>Code of Practice (COP) on Asbestos Control for Safe Handling of Low Risk ACM and Asbestos Work Using Full Containment or Mini Containment Method</i> published by EPD. A registered asbestos consultant should also be employed to supervise abatement works. For the disposal of ACM, the contractor should observe the <i>COP on Handling, Transportation and Disposal of Asbestos Waste</i> under the <i>Waste Disposal (Chemical Waste) (General) Regulation</i> .	Cremator room in Existing Crematorium / before demolition and after decommission	Contractor			✓		Code of Practice (COP) on Asbestos Control for Safe Handling of Low Risk ACM and Asbestos Work Using Full Containment or Mini Containment Method COP on Handling, Transportation and Disposal of Asbestos Waste under the Waste Disposal (Chemical Waste) (General) Regulation APCO		
S.7.7.17	<u>Dioxin Containing Materials (DCM) / Heavy Metal Containing Materials (HMCM) / Polyaromatic Hydrocarbon Containing Materials (PAHCM) from Demolition of the Existing Crematorium</u> Proposed Contamination Classification for Ash Waste with DCM/HMCM		Cremator room in Existing Crematorium / before demolition and after decommission	Contractor			✓		ProPECC PN3/94 USEPA dioxin assessment criterion	
	Classification of Contamination	Dioxin Level in Ash Waste								Heavy Metal Level in Ash Waste
	Low/Non Contaminated by DCM / HMCM / PAHCM	< 1 ppb TEQ								< Dutch “B” List
	Moderately/Severely Contaminated HMCM / PAHCM	< 1 ppb TEQ								Dutch “B” List
	Moderately Contaminated DCM	1 and <10 ppb TEQ								Any level
	Severely Contaminated DCM	10 ppb TEQ								Any level

EIA ref.	Environmental Protection Measures/Mitigation Measures		Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
					Des	Con	Dem	Ope	
		If ACM is identified in building structures where moderately contaminated DCM or moderately/severely contaminated HMCM / PAHCM is found, relevant abatement measures for building structures described in the AAP (see 7.7.16) should be implemented prior to the above site preparation.							
	Decontamination, demolition and handling	The cremators/flue/chimney shall be removed from top down starting from the chimney. Any ash or residues attached to the cremators/flue/chimney or any other building structures shall be removed by scrubbing and HEPA vacuuming. Wastes generated from the containment or decontamination unit including the protection clothing of the workers such as the coverall, nitrile glove, rubber boots and materials used for wet wiping shall be disposed of at landfill site.	Cremator room in Existing Crematorium / demolition	Contractor			✓		Waste Disposal (Chemical Waste) (General) Regulation
		After completion of removal, decontaminate all surfaces by HEPA vacuum.							
		If ACM is identified in building structures where moderately contaminated DCM or moderately/severely contaminated HMCM / PAHCM is found, relevant abatement measures for building structures described in the AAP (see 7.7.16) should be implemented prior to the above decontamination, demolition and handling measures.							
	Treatment	The ash waste contains dioxin/heavy metals and in its untreated state would be classified as a chemical waste under the <i>Waste Disposal (Chemical Waste) (General) Regulation</i> . While the quantity of DCM/HMCM is not expected to be significant, the levels of dioxin and heavy metals would affect the treatment option. Immobilization of the contaminated materials by mixing with cement followed by disposal at landfill (if landfill disposal criteria can be met) would be the most preferable option.							
		Rather than treating the already incinerated ash waste by incineration, the ash waste with moderately contaminated DCM or moderately/severely contaminated HMCM / PAHCM should be collected and stabilized to meet landfill disposal criteria of the Facilities Management Group (FMG) of EPD. In this case it is envisaged that the process would involve collection and mixing of the ash waste with cement. Pilot mixing and TCLP tests should be carried out to establish the appropriate ratio of cement to ash waste to the satisfaction of EPD. It is envisaged that the pilot tests would involve the mixing of say 5%, 10% and 15% ratios of cement to ash waste and three replicate of 300 mm cube blocks for each ratio. TCLP tests should then be used to establish the correct ratio of cement to ash waste to the satisfaction of EPD.							

EIA ref.	Environmental Protection Measures/Mitigation Measures		Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
					Des	Con	Dem	Ope	
	Disposal	<p>After immobilization of the ash waste by mixing with cement in the correct ratio as determined by the pilot mixing and TCLP test, the waste materials should be placed inside polyethene lined steel drums for disposal at landfill. Transparent plastic sheeting of 0.15 mm thickness low-density polyethene or PVC should be employed. The drums should be 16 gauge steel or thicker and fitted with double bung fixed ends adequately sealed and well labelled in new or good condition. The drums should be clearly marked “DANGEROUS CHEMICAL WASTE” in English and Chinese. Prior agreement of the disposal criteria from the FMG of EPD and agreement to disposal from the landfill operator must be obtained.</p> <p>As a fall back option, if the landfill disposal criteria cannot be met after immobilization of the ash waste, disposal at the CWTC should be considered.</p> <p>The building structures will be disposal of at landfill.</p> <p>If ACM is identified in building structures where moderately contaminated DCM or moderately/severely contaminated HMCM / PAHCM is found, relevant disposal measures for building structures described in the AAP (see 7.7.16) should be implemented instead.</p>	Cremator room in Existing Crematorium / demolition	Contractor			✓		Waste Disposal (Chemical Waste) (General) Regulation

EIA ref.	Environmental Protection Measures/Mitigation Measures		Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
					Des	Con	Dem	Ope	
S.7.7.21	<i>Demolition, Handling, Treatment and Disposal of Severely Contaminated DCM from Demolition of the Existing Crematorium</i> Procedure for demolition, handling, treatment and disposal of Severely Contaminated DCM is listed below		Cremator room in Existing Crematorium / demolition	Contractor			✓		Waste Disposal (Chemical Waste) (General) Regulation
	Item	Procedure							
	Site Preparation	Except the cremators/flue/chimney, all removable items where severely contaminated DCM is identified should be removed from the cremator room as far as practicable to avoid obstructing the decontamination activities. Preliminary site decontamination of all debris shall be carried out using HEPA vacuum cleaner. The walls, floor and ceiling of the cremator room where severely contaminated DCM located shall be lined with 3 layers of fire retardant polyethene sheets. The top portion of the chimney above the roof shall be enclosed by a chamber with three layers of polyethene sheets. At the entrance to the cremators/flues/chimney, a 3-chamber decontamination unit shall be constructed for entry and exit from the work area. The 3-chamber decontamination unit shall comprise a dirty room, a shower room and a clean room of at least 1m x 1m base each with 3 layers of fire retardant polyethene sheet where all workers shall carry out decontamination procedures before leaving the work area. Warning signs in both Chinese and English should be put up in conspicuous areas.							
		Air movers should be installed at the cremator room, and at the bottom of the chimney to exhaust air from the work area. A stand-by air mover shall also be installed with each of the air movers. Sufficient air movement shall be maintained to give a minimum of 6 air changes per hour to the work area, and maintain a negative pressure of 0.05-0.15 inches of water within the work area throughout the entire course of the decommissioning works. A pressure monitor with printout records and audible alarm shall be installed at an easily accessible location to demonstrate that negative pressure is maintained. New pre-filters and HEPA filters shall be used on the air movers.							
		A copy of the maintenance records of the air movers should be kept on site for inspection upon request. The appointed contractor shall also check the differential pressure of the air mover to make sure the filter is not blocked. A differential pressure above 0.2 inches of water indicates that the filters would need to be changed.							

EIA ref.	Environmental Protection Measures/Mitigation Measures		Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
					Des	Con	Dem	Ope	
	Item	Procedure							
S.7.7.21 cont'		Smoke Test: before commencement of the decommissioning work, a smoke test with non-toxic smoke shall be carried out to ensure the air-tightness of the containment. Also check whether there are stagnant air pockets indicated by an aggregate of smoke that cannot effectively be extracted. After a successful test, switch on the air mover to exhaust smoke from the containment and to give a minimum of 6 air changes per hour, and check visually to see that the filters screen out the smoke effectively and if the pressure gauges read normal. If not, the air mover shall be sealed up and returned to the supplier workshop for necessary servicing, and replaced by a tested air mover. The normal reading pressure range for maintaining 6 air changes per hour shall be 1.5-4 mm/0.05-0.15 inches of water or equivalent (negative pressure). The audible alarm's integrity should also be checked and the trigger shall be at <1.5 mm/0.05 inches of water (negative pressure). Otherwise securely seal up all openings before switching off the air mover.	Cremator room in Existing Crematorium / demolition	Contractor			✓		Waste Disposal (Chemical Waste) (General) Regulation
		Treatment of Waste/Workers Safety Protection: the contractor shall be required to register as a Chemical Waste Producer. All workers shall wear full protective equipment, disposable protective coverall (such as Tyvek) (with hood and shoe covers), nitrile gloves, rubber boots (or boot covers), and full-face positive pressure respirators equipped with a combination cartridge that filters particulate and removes organic vapour. The organic vapour protection is an added protection against the unlikely exposure to any vapour as a necessary measure.							
		If ACM is identified in building structures where severely contaminated DCM is found, relevant abatement measures for building structures described in the AAP (see 7.7.16) should be implemented prior to the above site preparation.							
	Decontamination, demolition and handling	The cremators/flue/chimney shall be removed from top down starting from the chimney. Any ash or residues attaching to the cremators/flue/chimney or any other building structures shall be removed by scrubbing and HEPA vacuuming. The detached sections of the building structures where severely contaminated DCM is located shall be wrapped with 2 layers of fire retardant polyethene sheets. A third layer shall then be wrapped and secured with duct tape. Decontaminate the outer layer of the wrapped flue sections by wet wiping.							

EIA ref.	Environmental Protection Measures/Mitigation Measures		Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
					Des	Con	Dem	Ope	
		<p>Wastes generated from the containment or decontamination unit including the fire retardant polyethylene sheets, protection clothing of the workers such as the coverall, nitrile glove, rubber boots and materials used for wet wiping shall be disposed of at landfill site.</p> <p>The quantity of wastewater generated from the decontaminated process will be very small but the contractor should take precautionary measures as to minimize the quantity of contaminated water arising. Nevertheless, if any contaminated wastewater needs to be discharged out of the site, it has to be properly treated to WPCO requirements with prior agreement from EPD on discharge standards.</p> <p>After completion of removal, decontaminate the surface where severely contaminated DCM was located, including the wrapped incinerator furnace and flue sections left within the containment, by wet wiping and HEPA vacuum. Then spray the innermost layer of the fire retardant polyethylene sheet covering the wall, ceiling and floor with PVA. Upon drying, peel off this innermost layer of the polyethylene sheet covering the containment and dispose of at landfill site.</p> <p>Repeat the above decontamination procedure for the second innermost layer of fire retardant polyethylene sheet by wet wiping and HEPA vacuuming. After spraying with PVA, peel off this second innermost layer of the polyethylene sheet covering the wall, ceiling and floor and dispose of at landfill site. Finally, the last layer of polyethylene sheet shall then be taken down after spraying with PVA and be disposed as contaminated wastes.</p> <p>If ACM is identified in building structures where severely contaminated DCM is found, relevant abatement measures for building structures described in the AAP (see 7.7.16) should be implemented prior to the above decontamination, demolition and handling measures.</p>	Cremator room in Existing Crematorium / demolition	Contractor			✓		Waste Disposal (Chemical Waste) (General) Regulation
	Treatment and disposal	Waste to be disposed to CWTC: all contaminated ash waste with severely contaminated DCM removed and the used HEPA filters shall be sent to CWTC in Tsing Yi. The total volume should be confirmed by further site investigation.							

EIA ref.	Environmental Protection Measures/Mitigation Measures		Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
					Des	Con	Dem	Ope	
		<p>Waste to be Disposed of at Landfill: other wastes including the building structures and its associated panels as well as wastes generated from this decommissioning works are also considered as contaminated waste and shall be disposed of at a designated landfill. Wastes generated from this decommissioning works refer to the polyethene wrapping sheets for the building structures, waste generated from the dismantlement of the containment and decontamination units, and cloth used in wet wrapping, etc. as previously described in this section. They shall be placed into appropriate containers such as drums, jerricans, or heavy duty and leak-proof plastic as a prudent approach. A disposal permit has to be obtained from the Authority. The disposal trip ticket is required to be made available as record after disposal.</p> <p>If ACM is identified in building structures where severely contaminated DCM is found, relevant disposal measures for building structures described in the AAP (see 7.7.16) should be implemented in prior to the above disposal measures.</p>	Cremator room in Existing Crematorium / demolition	Contractor			✓		Waste Disposal (Chemical Waste) (General) Regulation
S.7.7.22 - S.7.7.24	<p><i>Dioxin Containing Materials (DCM) / Heavy Metal Containing Materials (HMCM) / Polyaromatic Hydrocarbon Containing Materials (PAHCM) / Total Petroleum Hydrocarbon Containing Materials (TPHCM) / Polychlorinated Biphenyls Containing Materials (PCBCM) from Soil Remediation at the Project Site</i></p> <p>According to the CAR and RAP, less than 100 m³ of soil would require disposal at landfill. Relevant health and safety procedure, waste disposal requirements and compliance report are as detailed in Figure 6.3. Mitigation measures to avoid fugitive dust emission mentioned in S.4.7.2 should also be observed.</p> <p>In addition, after decommissioning but before demolition of the Existing Crematorium, further investigations during Phase I of the works at the vicinity of CLP secondary substation should also be carried out to determine if additional remediation (in addition to the current RAP) is required. Confirmatory test on levels of DCM, HMCM and PAHCM in locations S1 to S6 during Phase II of the works is also required to determine any further remediation /treatment/disposal. In addition, the ash waste in cremator/chimney/flues should also be collected for the testing of DCM/HMCM/PAHCM during Phase II of the works. The sampling and analysis plan should be prepared and submitted to EPD for approval.</p> <p>All the aforementioned ACM / DCM / HMCM / PAHCM / TPHCM / PCBCM are classified as chemical waste. In addition to the measures mentioned above, the packaging, labelling and storage practices of chemical waste as stipulated in the following paragraphs should also be applied to these contaminated materials.</p>		Locations S3 and S5 of CAP / demolition	Contractor			✓		ProPECC PN3/94 APCO
			CLP secondary substation / after decommission and before demolition	Contractor			✓		ProPECC PN3/94
			Project site / demolition	Contractor			✓		Waste Disposal (Chemical Waste) (General) Regulation

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.7.7.25 - S.7.7.27	<p><u>Chemical Waste</u></p> <p>All the chemical waste should be handled according to the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>. The Contractor should register as a chemical waste producer. The chemical waste should be stored and collected by an approved contractor for disposal at a licensed facility in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i>. Containers used for the storage of chemical waste should:</p> <ul style="list-style-type: none"> • Be suitable for the substance they are holding, resistant to corrosion, maintained in good condition, and securely closed; • Have a capacity of less than 450 L unless the specifications have been approved by the EPD; and • Display a label in English and Chinese in accordance with instructions prescribed in <i>Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation</i>. <p>The storage area for chemical waste should:</p> <ul style="list-style-type: none"> • Be clearly labeled and used solely for the storage of chemical waste; • Be enclosed on at least 3 sides; • Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest; • Have adequate ventilation; • Be covered to prevent rainfall from entering (water collected within the bund must be tested and disposal as chemical waste if necessary); and • Be properly arranged so that incompatible materials are adequately separated. 	Project site / demolition	Contractor			✓		Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Waste Disposal (Chemical Waste) (General) Regulation.
	<p>The chemical waste should be disposed of by:</p> <ul style="list-style-type: none"> • A licensed waste collector; • A facility licensed to receive chemical waste, such as the CWTC at Tsing Yi, which offers chemical waste collection service and can supply the necessary storage containers; and/or • A waste recycling plant as approved by EPD. 	Project site / demolition	Contractor			✓		Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Waste Disposal (Chemical Waste) (General) Regulation.

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.7.7.28 - S.7.7.29	<p><u>General Refuse</u></p> <p>General refuse should be stored in enclosed bins or compaction units separated from C&D and chemical wastes. A reliable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D and chemical wastes, on a daily or every second day basis to minimize odour, pest and litter impacts. The burning of refuse on construction sites is prohibited by law.</p> <p>Aluminum cans are often recovered from the waste stream by individual collectors if they are segregated or easily accessible. Therefore, separately labeled bins for deposit of these cans should be provided if feasible. Similarly, plastic bottles and carton package material generated on-site should be separated for recycling as far as practicable. Site office waste should be reduced through recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered if one is available.</p>	Project site / construction and demolition stages	Contractor		✓	✓		
Waste Management (Operation)								
S.7.8.1	<p><u>Ash and Non-combustible Residues</u></p> <p>The disposal of bone ash and non-combustible residues should be properly collected and handled to avoid dust emissions. In line with the current practices, the bone ash will be stored in covered containers for collection by the deceased's relatives within 2 months upon appointment while the non-combustible residues will be collected in sealed heavy-duty polyethylene bags for disposal at landfill.</p>	New Crematorium / operation	FEHD				✓	
S.7.8.2- S.7.8.3	<p><u>Chemical Waste</u></p> <p>The operator should register as chemical waste producer. The chemical wastes generated from the air pollution control system would mainly include used activated carbon and un-reacted lime and collected particulate matter. To prevent health hazards to operators, all such chemical wastes should be carefully collected and handled to avoid dust emissions.</p> <p>All the chemical wastes generated from the air pollution control system as well as from machinery maintenance and servicing should be dealt with according to the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i> under the provisions of the <i>Waste Disposal (Chemical Waste)(General) Regulation</i>. The chemical wastes should be collected by drum-type containers and removed by a licensed chemical waste contractor. In addition, the relevant measures as provided in S.7.7.22-S.7.7.24 should be followed.</p>	New Crematorium / operation	FEHD				✓	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Waste Disposal (Chemical Waste) (General) Regulation.

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.7.8.4-S.7.8.6	<p><u>General Refuse</u></p> <p>Waste generated in offices should be reduced through segregation and collection of recyclable waste materials (such as paper and carton packages) if the volumes are large enough to warrant collection. Participation in a local collection scheme should be considered if one is available.</p> <p>To promote recycling of waste paper, aluminum cans and plastic bottles by the visitors, it is recommended to place clearly labeled recycling bins (such as those available from EPD) at convenient locations within the New Crematorium area. The recyclable waste materials should then be collected by reliable waste recycling agents on a regular basis.</p> <p>The general refuse (other than those segregated recyclable wastes) should be separated from any chemical wastes and stored in covered waste skips. FEHD should remove general refuse from the site, separately from chemical wastes, on daily basis to minimize odour, pest and litter impacts. Burning of refuse must be strictly prohibited.</p>	New Crematorium / operation	FEHD				✓	
Waste Management (EM&A for Construction and Demolition)								
S.11.2.16	Conduct supplementary site investigation for asbestos in building structures and for dioxins, metals (the “Dutch List”) and PAH in ash/particular matter samples.	Around existing cremators, chimney and flues inside cremator room / after decommissioning but prior to demolition during Phase II work	Contractor			✓		AIR, AMP/AAP to be submitted under APCO, future supplementary site investigation plan

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
Landscape and Visual Impact Assessment								
S.8.1.21	<p>The identification of the landscape and visual impacts will highlight those sources of conflict requiring design solutions or modifications to reduce the impacts and, if possible, blend the development with the surrounding landscape. The proposed landscape mitigation measures will be described and illustrated by means of site plans and photomontage and take into account factors including:</p> <ul style="list-style-type: none">• Screen planting• Transplanting of mature trees with good amenity value where appropriate• Conservation of topsoil for reuse• Sensitive alignment of structures to minimise disturbance to surrounding vegetation• Reinstatement of areas disturbed during construction• The design and finishes / colours of architectural and engineering structures such as terminals and pylons• Existing views, views of the development with no mitigation, views with mitigation at day one of operation and after 10 years of operation	Project site / design, construction and demolition stages	Contractor/FEH D/Arch SD	✓	✓	✓		EIAO-TM

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.8.2.15 - S.8.2.19	<p>Tree transplanting: The tree survey has identified the trees which will be affected by the development and which could be considered for transplanting prior to commencement of construction work. Felling is considered as a last resort and every effort should be made to transplant the many good trees of high amenity value to either nearby suitable sites within the cemetery or to available space in FEHD's Wo Hop Shek Crematorium pending identification of an alternative site. The feasibility of transplanting will depend on a number of factors such as size, health and species of the tree. Adequate time (a minimum of 4 months) should be allowed for preparing trees for transplanting. Weekly inspection of tree protection measures as well as monitoring of tree transplant operations during both phases should be implemented. Particular care should be taken to save the 9 nos. mature and semi-mature protected tree species and 12 nos. protected shrub and immature tree species identified. To give the protected species the best possible chance of survival it is recommended that they are relocated to sheltered and well maintained planted areas within the cemetery. The following measures for tree transplanting should be adopted:</p> <p>(a) Appoint a landscape contractor for the establishment and maintenance of the transplanted trees as well as any new tree planting for 12 months upon completion of the works.</p> <p>(b) Careful co-ordination of Phase I and II works to allow tree transplanting from Phase II site directly to Phase I site.</p> <p>Tree protection: Trees to be retained adjacent to works areas will be carefully protected by strong hoarding and if necessary additional protection to individual tree trunks to avoid damage by machinery. The hoarding will also prevent contractors from compacting soil around tree roots or dumping materials. Reference should be made to the guidelines for tree protection in the Government publication "Tree Planting and Maintenance in Hong Kong".</p> <p>Topsoil conservation: Any topsoil excavated during construction will be carefully saved and stored to one side of the works area for reuse upon completion.</p> <p>Replanting: Upon completion planting of ornamental trees and shrubs will be provided to the periphery of the new crematorium building to help screen and soften the overall appearance of the structure. In addition, a reprovisioned memorial garden with a lotus pond and ornamental planting will be incorporated in the deck area of the building. Since the majority of the new planting will be on the deck structure the selection of species will be more limited with emphasis on smaller trees and ornamental shrubs to comply with loading restrictions. Notwithstanding this site constraint on tree selection, a minimum of 1.2m soil depth will be</p>	Project site / construction and demolition as well as operation stages	Contractor/Arch SD		✓	✓	✓	WBTC 7/2002, WBTC 14/2002, EIAO-TM
		Project site / construction and demolition stages	Arch SD					
		Project site / upon completion of construction works for each phase	Arch SD Arch SD					

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
	provide for tree planting on the podium / roof structure for healthy establishment of the new tree planting. <u>Crematorium Architecture</u> : The building profile has been designed in response to the site terraced topography to minimise site formation which greatly reduces the overall visual impact, (refer to <i>Figures 2.2-2.5</i> and <i>8.3</i> for building plan and master landscape plan). In addition, it is recommended that the material finishes be non-reflective and low-key in nature using predominantly recessive tones to blend in as far as possible with the surrounding vegetation.	Whole Project site during design stage	Arch SD	✓				
Landscape and Visual Impact Assessment (EM&A)								
S.11.3.14	Weekly inspections of tree protection measures as well as monitoring of tree transplant operations.	Project site / Phase I & II works	Project Landscape Architect		✓	✓		Landscape Master Plan, Tree Planting and Maintenance in Hong Kong
S.11.3.14	Regular inspection of landscape maintenance work.	Project site / during the 1 st , 6 th and 12 th month after completion of all recommended planting work	Project Landscape Architect				✓	Landscape Master Plan, Tree Planting and Maintenance in Hong Kong
Water Quality								
S.9.6.1	<u>Construction and Demolition Phases – General</u> To safeguard the water quality of the WSRs potentially affected by the Project works, the contractor should implement appropriate mitigation measures with reference to the <i>Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94)</i> published by EPD. Such measures are highlighted as follows.	Project site / construction and demolition stages	Contractor		✓	✓		ProPECC PN 1/94
S.9.6.2-S.9.6.5	<u>Construction and Demolition Phases - Construction and Demolition Run-off and Drainage</u> Exposed soil areas should be minimized to reduce the potential for increased siltation, contamination of run-off and erosion. Any effluent discharge from the Project site is subject to the control of Water Pollution Control Ordinance (WPCO) discharge license and should be treated to meet the discharge standard set out in the relevant license. In addition, no site run-off should enter the stream on the eastern side of the Project site. Run-off impacts associated with the construction and demolition activities can be readily controlled through the use of appropriate mitigation measures, which include:	Project site / construction and demolition stages	Contractor		✓	✓		ProPECC PN 1/94

	<ul style="list-style-type: none"> • Use of sediment traps wherever necessary • Maintenance of drainage systems to prevent flooding and overflow <p>All temporary drainage pipes and culverts provided to facilitate run-off discharge should be adequately designed to facilitate rapid discharge of storm flows. All sediment traps should be regularly cleaned and maintained. The temporarily diverted drainage should be reinstated to its original condition, when the construction/demolition work is completed.</p>							
	Sand and silt in wash water from wheel washing facilities should be settled out and removed from discharge into temporary drainage pipes or culverts. A section of the haul road between the wheel washing bay and the public road should be paved with backfill to prevent wash water or other site run-off from entering public road drains.							
S.9.6.2-S.9.6.5 cont'	Oil interceptors should be provided in the drainage system downstream of any significant oil and grease sources. They should be regularly maintained to prevent the release of oil and grease into the storm water drainage system after accidental spillage. The inceptor should have a bypass to prevent flooding during periods of heavy rain, as specified in <i>ProPECC PN 1/94</i> .	Project site / construction and demolition stages	Contractor		✓	✓		ProPECC PN 1/94
S.9.6.6	<u>Construction and Demolition Phases - General Construction and Demolition Activities</u> All the solid waste and chemical waste generated on site should be collected, handled and disposed of properly to avoid affecting the water quality of the nearby WSRs. The proper waste management measures are detailed in S.7.7.5-S.7.7.6.	Project site / construction and demolition stages	Contractor		✓	✓		ProPECC PN 1/94
S.9.6.7	<u>Construction and Demolition Phases - Sewage Generated from On-site Workforce</u> The sewage from construction work force is expected to be handled by portable chemical toilets if the existing toilets in the Project site are not adequate. Appropriate and adequate portable toilets should be provided by licensed contractors who will be responsible for appropriate disposal and maintenance of these facilities.	Project site / construction and demolition stages	Contractor		✓	✓		ProPECC PN 1/94

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.9.6.8- S.9.6.10	<p>Construction and Demolition Phases - Soil Remediation Activities</p> <p>Mitigation measures will need to be implemented during the currently identified soil remediation activities. If further land contamination investigation results (at CLP secondary substation during Phase I and at locations S1 to S6 during Phase II) confirm the needs for further soil remediation prior to demolition of the Existing Crematorium, relevant water quality mitigation measures (in addition to the current RAP) will need to be identified and implemented by the contractor. In addition, the mitigation measures recommended for minimizing water quality impacts for construction and demolition run-off and drainage as well as for general construction and demolition activities should also be adopted where applicable.</p> <p>In order to avoid impacts on water quality during further remedial works, care will be taken to minimise the mobilisation of sediment during excavation and transport. Measures to be adopted will be based on the recommendations set out in <i>Practice Note for Professional Persons ProPECC PN1/94 "Construction Site Drainage"</i>. The results of the site investigation suggest that there is unlikely to be any requirement for dewatering of excavations, since groundwater was not encountered in any of the exploratory holes. The contractor carrying out the remedial works will be required to submit a method statement detailing the measures to be taken to avoid water quality impacts. Typical measures would include:</p> <ul style="list-style-type: none"> • Carry out the works during the dry season (i.e. October to March) if possible • Use bunds or perimeter drains to prevent run-off water entering excavations • Sheet or otherwise cover excavations whenever rainstorms are expected to occur • Minimise the requirements for stockpiling of material and ensure any stockpiles are covered • Temporary on-site stockpiling of contaminated materials should be avoided, all excavated contaminated soils/materials should be disposed of on a daily basis • Ensure that any discharges to storm drains pass through an appropriate silt trap 	Project site / construction and demolition stages	Contractor		✓	✓		ProPECC PN 1/94
S.9.6.11	Arch SD will, during detail design stage, ensure the public sewer where the connection will be made is capable of handling the extra sewage (i.e., 14 m ³ per day) generated by the New Crematorium.	Public sewerage connection / design stage	Arch SD	✓				
Hazard to Life								
S.10.3.2	<p>Fuel Tank Design – Underground Fuel Tank for Cremators (30,000 L)</p> <p>The underground fuel tank will be buried underground in concrete chamber with vent pipe (vent pipe outlet will be at a level about 4 m above ground)</p>	Fuel tank in the New Crematorium / design stage	Arch SD	✓				Dangerous Goods Ordinance (Cap 295)

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.10.3.2	<u>Fuel Tank Design – Daily Service Fuel Tank for Cremators and Fuel Tank for Emergency Generator (2,000 L each)</u> <ul style="list-style-type: none"> For generator, vent pipe with outlet will be at a distance of 1.5 m from other air intake louvers and public access For cremators installation, the daily services fuel tank will be located at roof top Door louvers quipped with electro-thermal link will be provided at the fuel tank room (with door sill) for natural ventilation Fire services installations including heat detection system, auto-spray unit and sand buckets will be provided for genset room Quick closing mechanism (fuel shut off valve) will be installed outside the fuel tank room of generator to cut the diesel supply in case of fire at fuel tank room /generator room 	Fuel tank in the New Crematorium / design stage	Arch SD	✓				Dangerous Goods Ordinance (Cap 295)
S.10.3.3	<u>Fuel Storage and Transportation</u> The storage, transportation and handling of diesel fuel is under the control of DGO (Cap 295) and compliance with the DGO requirements should be ensured. Diesel leaks from the diesel fuel tanks or pipework systems may seep into the ground and enter chambers such as tunnels, drains and sewers. The undetected build-up of diesel in a confined space will create a fire hazard. The following safety measures should be observed around the diesel storage tanks during operation of the New Crematorium: <ul style="list-style-type: none"> Inventory check should be conducted by staff regularly to identify any signs of fuel leakage Regular visual inspections to detect any early signs of fuel spillage Precautionary exercises, including fire drills, should be regularly undertaken to enhance staff capability to handle emergencies 	New Crematorium / operation	FEHD				✓	Dangerous Goods Ordinance (Cap 295)
S.10.3.4	<u>DG Storage</u> The design of DG store and its operation must comply with the requirements set in Cap 295. Precautionary measures mentioned below should also be followed, when relevant chemical is stored at the dangerous goods storage:	New Crematorium / operation	FEHD				✓	Dangerous Goods Ordinance (Cap 295)

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.10.3.4	<u>DG Storage -Handling and Labeling</u> <ul style="list-style-type: none"> Obtain details for the handling, storage and control of impurities and spills from supplier or manufacturer (e.g. MSDS⁽¹⁾). Obtain details of the chemical composition of the substances, and correct treatment with eyes, skin, ingestion, etc from the supplier or manufacturer (usually available in a MSDS) Ensure the correct and complete labelling and classification of chemical substances and guidelines are adopted (see Labour Department's reference booklet on "Labelling and Classification of Dangerous Substances Commonly used in Industry") Ensure that the information is up to date, provided to the relevant staff, and easily accessible in case of emergency in accordance with the site safety guidelines Register dates (receiving date, manufacturing date, expiry date, shelf life where applicable) and quantities of all purchases on receipt to minimise surplus and spoilt orders 	New Crematorium / operation	FEHD				✓	Dangerous Goods Ordinance (Cap 295) Labelling and Classification of Dangerous Substances Commonly used in Industry
S.10.3.5	<u>DG Storage -Containers for Storage of Chemicals and Dangerous Goods (DGs)</u> The following practices shall be followed in ensuring the use of suitable containers for chemicals . <ul style="list-style-type: none"> Designed to minimise spills Ensure container is appropriate for its contents, resistant to corrosions, maintained in good conditions and securely closed Provide proper labelling 	New Crematorium / operation	FEHD				✓	Dangerous Goods Ordinance (Cap 295) Labelling and Classification of Dangerous Substances Commonly used in Industry

⁽¹⁾ Material Safety Data Sheet

EIA ref.	Environmental Protection Measures/Mitigation Measures	Location/Timing	Implementation Agent	Implementation Stages				Relevant Legislation and Guidelines
				Des	Con	Dem	Ope	
S.10.3.6	<u>DG Storage - Storage Requirements</u> The following practices shall be followed in ensuring suitable storage (including temporary store for goods to be delivered) and transportation of chemicals and DGs. <ul style="list-style-type: none"> No smoking in storage areas No naked light and no heating equipment shall be used in any store. No electrical equipment shall be used or installed in any store other than equipment of a type approved by the Authority. There shall be at all times conspicuously displayed outside any store a notice, in English and Chinese, prohibiting smoking and the use of naked light Segregate chemical substances to prevent reaction and contamination Use proper racks, storage bins and shelves to contain leaks Storage areas must be locked to prevent unauthorised access, clearly labelled and solely for the storage (except for the temporary store for goods to be delivered) of chemicals/dangerous goods Adequate ventilation in storage areas as necessary Provide appropriate equipment and manpower to avoid the likelihood of spillage DGs must be stored in the designated stores and the storage quantities must be within limits All containers shall be kept upright to minimise the likelihood of spillage 	New Crematorium / operation	FEHD				✓	Dangerous Goods Ordinance (Cap 295) Labelling and Classification of Dangerous Substances Commonly used in Industry
S.10.3.7	<u>DG Storage – Handling and Spill Prevention</u> The following practices shall be followed in ensuring suitable handling and spill prevention of chemicals and dangerous goods: <ul style="list-style-type: none"> Follow the safety instructions provided by site management and chemical label Do not misuse or interfere with safety equipment or appliance provided Do not smoke, eat or drink in any place where chemical substances / DGs are stored or used 	New Crematorium / operation	FEHD				✓	Dangerous Goods Ordinance (Cap 295) Labelling and Classification of Dangerous Substances Commonly used in Industry
S.11.5.1	The New Crematorium operator should adopt environmental management plan for the operation of New Crematorium as a means to ensure satisfactory environmental performance of the facilities at all times.	New Crematorium / operation	FEHD				✓	

Des – Design, Con – Construction, Dem – Demolition and Ope – Operation