ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP. 499)
SECTION 5(7)

ENVIRONMENTAL IMPACT ASSESSMENT STUDY BRIEF NO. ESB-177/2008

PROJECT TITLE : PHASED REPROVISIONING OF CAPE COLLINSON CREMATORIUM
(hereinafter known as the "Project")

NAME OF APPLICANT : ARCHITECTURAL SERVICES DEPARTMENT
(hereinafter known as the "Applicant")

1. BACKGROUND

1.1 An application (No. ESB-177/2007) for an Environmental Impact Assessment (EIA) study brief under section 5(1) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by the Applicant on 29 November 2007 with a Project Profile (No. PP-338/2007) (the Project Profile).

1.2 The Applicant proposes to replace all the existing twelve cremators at the Cape Collison Crematorium by providing ten new cremators with increased capacity at its adjoining car park area to the north and within the original site. The location of the Project is shown in Appendix A-1.

1.3 The crematorium shall be redeveloped in two phases under the Project. The phased development are shown in Appendices A-2 to A-3. The phasing and scope of the Project include:

Phase 1

(i) Site formation for Phase 1 new crematorium.
(ii) Provision of four new cremators with total capacity of 680 kg per hour approximately.
(iii) Provision of ancillary facilities including: (a) two multi-purpose service halls, (b) two joss paper burners, (c) underground fuel tank, (d) one ash storage room and one pulverization room with a bone cremulator and dust-proof cabinets, (e) storerooms and dangerous goods stores, (f) toilets, (g) parking spaces, (h) automatic guided vehicle, (i) anti-burglary devices, (j) anti-bumping devices, (k) CCTV system with recording device and (l) landscaping.
(iv) During the construction period of Phase 1, all the twelve cremators in the existing crematorium will remain in operation.

Phase 2

(v) Demolition of the existing twelve cremators after the satisfactory commissioning of the four new cremators and ancillary facilities under Phase 1.
(vi) Provision of six new cremators with total capacity of 1,100 kg per hour approximately.
(vii) Provision of ancillary facilities including: (a) one multi-purpose service hall, (b) mortuary, (c) office accommodation. (d) Refuse storage chamber and (e)

landscaping.

1.4 The Project is a designated project under Part I, Schedule 2, Item N.4 of the EIAO: "A crematorium".

1.5 Pursuant to section 5(7)(a) of the EIAO, the Director of Environmental Protection (the Director) issues this EIA study brief to the Applicant to carry out an EIA study.

1.6 The purpose of this EIA study is to provide information on the nature and extent of potential environmental impacts arising from the Project; and related activities that would take place concurrently. This information will contribute to decisions by the Director on:

(i) the overall acceptability of any adverse environmental consequences that is to arise as a result of the Project and the associated activities of the Project;

(ii) the conditions and requirements for the detailed design, demolition/construction and operation of the Project to mitigate against adverse environmental consequences; and

(iii) the acceptability of residual impacts after the proposed mitigation measures are implemented.

2. OBJECTIVES OF THE EIA STUDY

2.1 The objectives of the EIA study are as follows:

(i) to describe the Project and associated works together with the requirements for carrying out the Project;

(ii) to identify any individual Designated Project under Part I and Part II, Schedule 2 of the EIAO to be covered in the Project to ascertain whether the findings of this EIA Study have adequately addressed the environmental impacts of these projects;

(iii) to identify and describe the elements of the community and environment to be affected by the Project and/or to cause adverse impacts to the Project, including both the natural and man-made environment and the associated environmental constraints;

(iv) to present the considerations of alternatives with regard to avoiding and minimizing the potential environmental impacts on the sensitive receivers; to compare the environmental benefits and dis-benefits of the options (including project siting, layout, design, fuel to be adopted for the new cremators); to provide reasons for selecting the preferred option(s) and to describe the part of environmental factors played in the selection;

(v) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;

(vi) to investigate the feasibility, practicability, effectiveness and implications of the proposed mitigation measures;

(vii) to identify, predict and evaluate the residual environmental impacts (i.e. after practicable mitigation) and the cumulative effects expected to arise during the demolition/construction and operational phases in relation to the sensitive

receivers and potential affected uses;

(viii) to identify, assess and specify methods, measures and standards, to be included in the detailed design, demolition/construction and operational stages of the Project which are necessary to mitigate these environmental impacts and cumulative effects and reduce them to acceptable levels;

(ix) to investigate the extent of the secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification; and

(x) to design and specify the environmental monitoring and audit requirements to ensure the effective implementation of the recommended environmental protection and pollution control measures.

3. DETAILED REQUIREMENTS OF THE EIA STUDY

3.1 The Purpose

The purpose of this study brief is to scope the key issues of the EIA study and to specify the environmental issues that are required to be reviewed and assessed in the EIA report. The Applicant has to demonstrate in the EIA report that the criteria in the relevant sections of the Technical Memorandum on the Environmental Impact Assessment Process of the Environmental Impact Assessment Ordinance (hereinafter referred to as "the TM") are fully complied with.

3.2 The Scope

The scope of this EIA study shall cover the Project proposed in the Project Profile and shall include the major elements mentioned in Sections 1.2 and 1.3 above. The EIA study shall address the key issues and provide information as described below, together with any other key issues identified during the course of the EIA study:

(i) the potential air quality impacts on nearby air sensitive receivers, including but not limited to: King Tsui Court, Fung Wah Estate and Tai Tam Gap Correctional Institution during the demolition/construction and operational stages of the Project, including the potential impacts during the transitional stage of the Project i.e. scenario(s) for operating the new cremator(s) under Phase 1 concurrently with the existing cremator(s) remain in service (if any);

(ii) the potential impacts of various types of material/waste to be generated from the demolition/construction and operation of the Project, in particular the demolition materials from the existing crematorium including but not limited to chimneys, transformer room, underground fuel tank and fuel pipes, which may contain various contaminants such as hydrocarbons, dioxins and asbestos; and waste management issues associated with removal sequences, procedures and treatment/disposal arrangements to avoid cross contamination of the materials;

(iii) the potential land contamination resultant from the operation of the existing crematorium and its remediation, as well as the preventive measures for avoiding land contamination from the future operation of the new re-provisioned crematorium;

(iv) the potential visual impacts caused by the Project during the various

demolition/construction and operational stages of the Project;

(v) the potential noise impacts on nearby noise sensitive receivers during the various demolition/construction and operational stages of the Project;

(vi) the potential water quality impacts due to the site effluent generated from the demolition/construction activities and the discharges generated from sanitary facilities during operation of the new crematorium;

(vii) a general description on the submission requirements of asbestos investigation report and asbestos abatement plan and the relevant measures/statutory requirements to be undertaken for complying with the Air Pollution Control Ordinance (Cap.311); and

(viii) the potential cumulative environmental impacts of the Project, through interaction or combination with other existing, committed and planned developments in the vicinity of the Project, and that those impacts may have a bearing on the environmental acceptability of the Project.

3.3 Consideration of Alternative Project Options and Description of the Project

3.3.1 Need for the Project

The Applicant shall report on or provide information related to the need and justification for continually using the site for the Project. The Applicant shall explain clearly the purpose and objectives of the Project and describe the scenarios with and without the Project.

3.3.2 Consideration of Alternatives Options

The Applicant shall describe the considerations given to other possible siting(s), layout(s) within the proposed site, available technology including alternative fuel options for the new cremators, and alternative demolition/construction methods to minimise excessive nuisances to the nearby sensitive receivers. The Applicant shall also describe the environmental benefits and dis-benefits of applying new technology for the new cremators, different demolition/construction methods, sequence of works and any lessons learned from other similar projects with a view to recommending the preferred option to avoid adverse on-site and off-site environmental impact.

3.3.3 Selection of Preferred Options

Taking into consideration of the findings resulting from Sections 3.3.1 and 3.3.2 above, the Applicant shall provide the recommendations and justifications for the preferred option that has tried to avoid or minimize adverse environmental effects arising from the Project, and shall adequately describe the part that environmental factors played in arriving at the final selection.

3.3.4 Description of the Project

The Applicant shall describe the Project details which may affect the potential environmental impacts, including but not limited to: location of the Project, approximate scale/height of the structures and facilities/chimneys with layout plan(s), the capacity of the existing cremators to be replaced and the new cremators to be installed, the operating capacity of the new cremators in full load operation and

contingency situation (if any), fuel and new technology to be adopted for the new cremator, and phased development programme. The Applicant shall list out the designated project(s) as required under Section 2.1(ii) above, and removal of asbestos containing materials as required under Section 3.2 (vii) above.

3.4 Technical Requirements

The Applicant shall conduct the EIA study to address the environmental aspects as described in Sections 3.1, 3.2 and 3.3 above. The assessment shall be based on the best and latest information available during the course of the EIA study. The Applicant shall include maps/figures in the EIA study report showing the boundary of study area, internal layout and details of the construction programme for different phases.

3.4.1 Air Quality Impact

3.4.1.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing the air quality impacts as stated in section 1 of Annex 4 and Annex 12 of the TM respectively.

3.4.1.2 The Applicant shall address the potential air quality impacts, including but not limited to the following major areas of concern:

(i) the potential air quality impacts on nearby air sensitive receivers (ASRs), including but not limited to: King Tsui Court, Fung Wah Estate and Tai Tam Gap Correctional Institution, arising from (a) the full operation of re-provisioned crematorium with total ten new cremators and ancillary facilities, and (b) the potential transitional stage of the Project i.e. scenario(s) for operating the new cremator(s) under Phase 1 concurrently with the existing cremator(s) remain in service (if any); and

(ii) the potential dust impacts on the nearby ASRs generated from demolition and construction activities of the Project.

3.4.1.3 The air quality impact assessment shall include the following:

(i) <u>Determination of Study Area</u>

The study area for air quality impact assessment shall generally be defined by a distance of 500 metres from the boundary of the project site; with consideration be given to extend the area to include major emission sources that may have a bearing on the environmental acceptability of the Project. The emissions from associated works of the Project shall also be included in determining the cumulative impacts. Besides, if any other concurrent projects are identified relevant during the course of the EIA study, its possible emissions shall also be taken into account in the air quality impact assessment.

(ii) <u>Background and Analysis of Activities</u>

(a) Provide background information relating to air quality issues relevant to the Project, e.g. description of the types of activities of the Project that may affect

air quality during both demolition/construction and operational stages.

(b) Present background air quality levels in the study area for the purpose of evaluating the cumulative air quality impacts during demolition/construction and operational stage of the project.

(c) Consider alternative demolition/construction methods, alternative modes of operation/phasing development and alternative fuel(s) to minimize the constructional and operational air quality impact.

(iii) Identification of Air Sensitive Receivers and Examination of Emission/ Dispersion Characteristics

(a) Identify and describe existing and planned/committed ASRs that would be affected by the Project, including those indicated on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans. The Applicant shall select the assessment points of the identified ASRs that represent the worst impact point of these ASRs. A map showing the location and description such as name of buildings, their uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources shall also be given.

(b) Provide a list of air pollutant emission sources, and their respective emission strength within the study area for both demolition/construction and operation stages based on constructional and operational activities identified in Section 3.4.1.3(ii)(a) above. Confirmation of validity of the assumptions and magnitude of the activities (e.g. installed capacity of the cremators and volume of construction material handled) shall be obtained from the relevant government departments/authorities and documented.

(iv) Operational Phase Air Quality Impact

(a) In addition to preparing a list of emission sources required in Section 3.4.1.3(iii)(b) above, the Applicant shall state the target emission levels for the new cremators, and compare them with the standards specified in the latest set of Guidance Note on the Best Practicable Means for Crematoria issued by EPD, and other relevant overseas standards. The target emission levels for the cremators, including but not limited to that for dioxins, should be agreed with the Director prior to the carrying out of the quantitative assessment on operational air quality impact.

(b) The Applicant shall calculate the expected air pollutant concentrations at the identified ASRs based on an assumed reasonably worst-case scenario under normal operating conditions for the full operation of the re-provisioned crematorium (i.e. total 10 new cremators). If the potential transitional stage of the Project exists, the Applicant shall calculate the cumulative emissions of air pollutants arising from the new cremator(s) under Phase 1 in addition to the existing cremator(s) that remain in service and being operated concurrently with the new ones. The evaluation shall be based on the strength of the emission sources identified in sub-section 3.4.1.3 (iii) (b) and 3.4.1.3 (iv) (a) above. The Applicant shall follow sub-section 3.4.1.3 (v)

below when carrying out quantitative assessment.

(v) Quantitative Assessment Methodology

(a) The Applicant shall apply the general principles enunciated in the modelling guidelines in Appendices B-1 to B-3 while making allowance for the specific characteristics of the Project. This specific methodology must be documented in such level of details (preferably with tables and diagrams) to allow the readers of the assessment report to grasp how the model is set up to simulate the situation at hand without referring to the model input files. Details of the calculation of the emission rates of air pollutants for input to the modelling shall be presented in the report. The Applicant must ensure consistency between the text description and the model files. In case of doubt, prior agreement between the Applicant and the Director on the specific modelling details should be sought.

(b) The Applicant shall identify the key/representative air pollutant parameters (types of pollutants and the averaging time concentration) to be evaluated and provide explanation for choosing these parameters for the assessment of the impact of the Project.

(c) The Applicant shall calculate the cumulative air quality impact at the identified ASRs identified under Section 3.4.1.3(iii) above and compare these results against the criteria set out in Section 1 of Annex 4 in the TM. The predicted air quality impacts (both unmitigated and mitigated) shall be presented in the form of summary table and pollution contours, to be evaluated against the relevant air quality standards and on any effect they may have on the land use implications. Plans of a suitable scale should be used to present pollution contour to allow buffer distance requirements to be determined properly. In order to get a full picture of air emissions in particular dioxins and mercury from the Project, an inventory figure (in g I-TEQ/year for dioxins) should be estimated and presented.

(vi) Construction Phase Air Quality Impact

(a) The Applicant shall follow the requirements stipulated under the Air Pollution Control (Construction Dust) Regulation to ensure that construction dust which may arise as a result of the works are controlled within the relevant standards as stipulated in Section 1 of Annex 4 of the TM. A monitoring and audit programme for the construction phase shall be devised to verify the effectiveness of the control measures.

(b) If the Applicant anticipates that the Project will give rise to significant construction dust impacts likely to exceed the recommended limits in the TM and the ASRs despite the incorporation of the dust control measures proposed in accordance with sub-section 3.4.1.3 (vi)(a) above, a quantitative assessment should be carried out to evaluate the construction dust impact at the identified ASRs. The Applicant shall follow the methodology set out in sub-section 3.4.1.3 (v) above when carrying out the quantitative assessment.

(vii) Mitigation Measure for Non-Compliance

The Applicant shall propose remedial mitigation measures where the predicted air quality impact exceeds the criteria set in Section 1 of Annex 4 in the TM. These measures and any constraints on future land use planning shall with agreed with the relevant government departments, authorities and documented. The Applicant shall demonstrate quantitatively that the resultant impacts after incorporation of the proposed mitigation measures shall comply with the criteria stipulated in Section 1 of Annex 4 in the TM.

(viii) Submission of Model Files

Input and output file(s) of the model run(s) shall be submitted to the Director in electronic format.

3.4.2 Waste Management

3.4.2.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing waste management implications as stated in Annexes 7 and 15 of the TM respectively, in particular the potential contaminated materials including but not limited to: asbestos containing materials and dioxin containing materials arising from the demolition of the existing crematorium.

3.4.2.2 The assessment of waste management implications shall cover the following:

(i) Analysis of Activities and Waste Generation

The Applicant shall identify the quantity, quality and timing of the waste and chemical waste arising as a result of the demolition/construction and operation activities of the Project, based on the sequence and duration of these activities. The Applicant shall adopt design, general layout, demolition/construction methods and programme to minimize the generation of public fill/inert construction and demolition material (C&DM) and maximise the use of public fill/inert C&DM for other construction works.

(ii) Proposal for Waste Management

(a) Prior to considering the disposal options for various types of wastes, opportunities for reducing waste generation, on-site or off-site re-use and recycling shall be evaluated. Measures that can be taken in the planning and design stages e.g. by modifying the design approach and in the construction stage for maximizing waste reduction shall be separately considered.

(b) After considering the opportunities for reducing waste generation and maximizing re-use, the types and quantities of the wastes required to be disposed of as a consequence shall be estimated and the disposal options for the wastes shall be described in detail. The disposal options recommended for each type of wastes shall take into account the result of the assessment in item (c) below. Specific plans for the removal sequences, procedures and treatment/disposal arrangements shall be prepared for the waste containing dioxin contaminated materials or/and asbestos contaminated materials. Steps and precautionary measures shall be developed to avoid cross-contamination of these two materials;

and

(c) The impact caused by handling (including stockpiling, labelling, packaging & storage), collection, transportation and disposal of wastes shall be addressed in detail and appropriate mitigation measures shall be proposed. This assessment shall cover the following areas :

- potential hazard;
- air and odour emissions;
- noise;
- wastewater discharge; and
- public transport.

3.4.3 Land Contamination

3.4.3.1 The Applicant shall follow the guidelines for evaluating and assessing potential land contamination issues as stated in Sections 3.1 and 3.2 of Annex 19 of the TM.

3.4.3.2 The study area for the land contamination impact shall include any potential land contamination site(s) within the Project area, in particular areas used for underground fuel storage and transformer which will be demolished for the Phase 2 development and any other potential contaminated site(s) identified in this EIA study.

3.4.3.3 The Applicant shall provide a clear and detailed account of the present land use (including description of the activities, chemicals and hazardous substances handled, with clear indication of their storage and location, by reference to a site map) and the relevant land use history in relation to possible land contamination (including accident records and change of land use(s) and the like).

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

3.4.3.5 Based on the endorsed CAP, the Applicant shall conduct a land contamination impact assessment and submit a Contamination Assessment Report (CAR) to the Director for endorsement. If land contamination is confirmed, a Remedial Action Plan (RAP) shall also be submitted to the Director for endorsement to formulate necessary remedial measures.

3.4.3.6 If there is/are potential contaminated site(s) that is/are inaccessible for preparing sampling and analysis during the course of the EIA study to meet the Section 3.4.3.5, e.g. due to site access problem, the Applicant's CAP shall include:

(i) a review of the available information;
(ii) an initial contamination evaluation of this/these site(s) and possible remediation methods;
(iii) a confirmation of whether the contamination problem at this/these site(s) would be surmountable
(iv) a sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of this/these site(s); and

(v) a schedule of submission of revised CAP (if necessary), CAR and RAP upon this/these site(s) is/are accessible.

3.4.3.7 The Applicant shall complete land contamination assessment and remediation (if necessary) at the potential contaminated site(s) prior to the commencement of the construction works at the respective site(s).

3.4.3.8 To prevent contamination problems arising from the new crematorium in future, the Applicant shall identify the possible source of contamination, including but not limited to hydrocarbons from the fuel tanks and dioxin in their operation; and formulate suitable structural/engineering design(s) and adopt appropriate operational practices, waste management strategies and precautionary measures for prevention of contamination problems.

3.4.4 **Visual Impact**

3.4.4.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing visual impacts as stated in Section 1 of Annex 10 and Annex 18 of the TM respectively, in particular the potential visual impacts on the nearby sensitive receivers, including but not limited to: King Tsui Court, Fung Wah Estate and users of nearby country parks during the demolition/construction and operation stages.

3.4.4.2 The study area for the visual impact assessment shall be defined by the visual envelope of the Project.

3.4.4.3 The Applicant shall review relevant outline zoning plans, outline development plans, layout plans, planning briefs, studies and guidelines on landscape frameworks, urban design concepts, designated view corridors, open space networks, landscape links that may affect the appreciation of the Project. The aim is to gain an insight to the future outlook of the area so as to assess whether the project can fit into surrounding setting. Any conflict with published land use plans shall be highlighted and appropriate follow-up action shall be recommended.

3.4.4.4 The Applicant shall assess the visual impacts of the Project. A system shall be derived for judging visual impact significance as required under the TM. Clear illustrations of visual impact assessment are required. The assessment shall include the following:

(i) identification and plotting of visibility contours[1] of the Project within the study area;

(ii) identification of the key groups of sensitive receivers within the visibility contours and their views at both ground level and elevated vantage points;

[1] Visibility Contour (VC) is the graduation of potential visibility of a development as viewed from surrounding contours. It refers to the altitude or elevation of the derived by projecting the height of the proposed development across a contour map of the surrounding area to show the extent of areas from where the development can be viewed and at which locations the development will be screened by the landform or by existing woodland. The VC map can be established by creating a sector of 5 or 10 degree in a radial pattern and projecting from the highest point of the development to the land profile generated from the contours within the sector to show the exposed and screened areas. Visual screening offered by existing woodlands can be determined by adding tree heights to altitude to show the true height of the trees. The accuracy of the VC should be verified by field survey.

(ii) description of the visual compatibility of the Project with the surrounding and the planned setting, and its obstruction and interference with the key views of the adjacent areas. Among other receivers, sensitive receivers shall include nearby residents and users of country parks; and

(iii) description of the severity of visual impacts in terms of distance, nature and number of sensitive receivers. The visual impacts of the Project with and without mitigation measures shall also be included so as to demonstrate the effectiveness of the proposed mitigation measures.

3.4.4.5 Alternative layout, design and construction methods that would avoid or reduce the identified visual impacts shall be evaluated for comparison before adopting other mitigation or compensatory measures to alleviate the impacts. The mitigation measures proposed shall not only be concerned with damage reduction but shall also include consideration of potential enhancement of existing visual quality.

3.4.4.6 The mitigation measures shall include sensitive design of structures/chimneys, colour scheme and texture of materials used, provisions of screen planting, amenity areas and open spaces, re-vegetation of disturbed land, compensatory planting, and any measures to mitigate the impact on existing land uses. Parties shall be identified for the on going management and maintenance of the proposed mitigation works to ensure their effectiveness throughout the operation phase of the Project. A practical programme and funding proposal for the implementation of the recommended measures shall be provided.

3.4.4.7 Annotated illustration such as coloured perspective drawings, plans and section/elevation diagrams, oblique aerial photographs, photographs taken at vantage points and computer-generated photomontage shall be adopted to illustrate the significance of the visual impacts of the Project.

3.4.5 Noise Impact

3.4.5.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing the noise impacts arising from demolition/construction and operational stages of the Project as stated in Annexes 5 and 13 of the TM, respectively, in particular the potential noise impacts on nearby noise sensitive receivers including but not limited to: King Tsui Court, Fung Wah Estate and Tai Tam Gap Correctional Institution.

3.4.5.2 The Applicant shall provide a quantitative noise impact assessment during the demolition/construction and operational stages of the Project. The Applicant may apply the general principles for the assessment with reference to the guidelines in Appendix C.

3.4.6 Water Quality Impact

3.4.6.1 The Applicant shall provide a general description of any air pollution control system and any scrubbing system for the new cremators as background to illustrate whether the system will generate effluent. Unless the Applicant and the general description confirms that there will be no effluent discharge from the new cremators or any associated air pollution control/scrubbing system, nor increase in sewage load due to the Project, the Applicant shall demonstrate that there would be no adverse impact

due to the effluent discharges, including an assessment to evaluate the impact on the sewerage system downstream of the Project area and propose mitigation measures (if required). In the event that effluent discharges shall be generated from the air pollution control/scrubbing system, the Applicant shall demonstrate that the effluent discharges from the air pollution control/scrubbing system could comply with the Water Pollution Control Ordinance.

3.4.6.2 The Applicant shall propose water pollution prevention and mitigation measures to be implemented during the demolition/construction stage of the Project. Attention shall be made to the water quality control and mitigation measures recommended in the Professional Persons Environmental Consultative Committee (ProPECC) Note PN1/94 on construction site drainage.

3.4.7 Summary of Environmental Outcomes

3.4.7.1 The EIA report shall contain a summary of the key environmental outcomes arising from the EIA study, including the population and environmentally sensitive areas protected, environmentally friendly designs recommended, key environmental problems avoided, compensation areas included and the environmental benefits of environmental protection measures recommended.

3.4.8 Environmental Monitoring and Audit (EM&A) Requirements

3.4.8.1 The Applicant shall identify and justify in the EIA study whether there is any need for EM&A activities during construction and operation phases of the Project and, if affirmative, to define the scope of EM&A requirements for the Project.

3.4.8.2 Subject to confirmation of EIA findings, the Applicant shall comply with requirements as stipulated in Annex 21 of the TM. The Applicant shall also propose real-time reporting of monitoring data for the Project through a dedicated internet website.

3.4.8.3 The Applicant shall prepare a project implementation schedule (in the form of a checklist as shown in Appendix D to this EIA study brief) containing the EIA study recommendations and mitigation measures with reference to the implementation programme.

4. DURATION OF VALIDITY

4.1 The Applicant shall notify the Director of the commencement of the EIA study. If the EIA study does not commence within 36 months after the date of issue of this EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief before commencement of the EIA study.

5. REPORT REQUIREMENTS

5.1 In preparing the EIA report, the Applicant shall refer to Annex 11 of the TM for the contents of an EIA report. The Applicant shall also refer to Annex 20 of the TM, which stipulates the guidelines for the review of an EIA report.

5.2 The Applicant shall supply the Director with the following number of copies of the EIA report and the executive summary:

(i) 30 copies of the EIA report in English and 50 copies of the executive summary (each bilingual in both English and Chinese) as required under section 6(2) of the EIAO to be supplied at the time of application for approval of the EIA report.

(ii) when necessary, addendum to the EIA report and the executive summary submitted in 5.2 (i) above as required under section 7(1) of the EIAO, to be supplied upon advice by the Director for public inspection.

(iii) 20 copies of the EIA report in English and 50 copies of the executive summary (each bilingual in both English and Chinese) with or without Addendum as required under section 7(5) of the EIAO, to be supplied upon advice by the Director for consultation with the Advisory Council on the Environment.

5.3 The Applicant shall, upon request, make additional copies of above documents available to the public, subject to payment by the interested parties of full costs of printing.

5.4 In addition, to facilitate public inspection of the EIA report via the EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA report and the executive summary prepared in HyperText Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 1.3 or later), unless otherwise agreed by the Director. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EIA report and the executive summary shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EIA report and executive summary shall be provided in the main text from where the respective references are made. All graphics in the report shall be in interlaced GIF format unless otherwise agreed by the Director.

5.5 The electronic copies of the EIA report and the executive summary shall be submitted to the Director at the time of application for approval of the EIA report.

5.6 When the EIA report and the executive summary are made available for public inspection under s.7(1) of the EIAO, the content of the electronic copies of the EIA report and the executive summary must be the same as the hard copies and the Director shall be provided with the most updated electronic copies.

5.7 To promote environmentally friendly and efficient dissemination of information, both hardcopies and electronic copies of future EM&A reports recommended by the EIA study shall be required and their format shall be agreed by the Director.

6. OTHER PROCEDURAL REQUIREMENTS

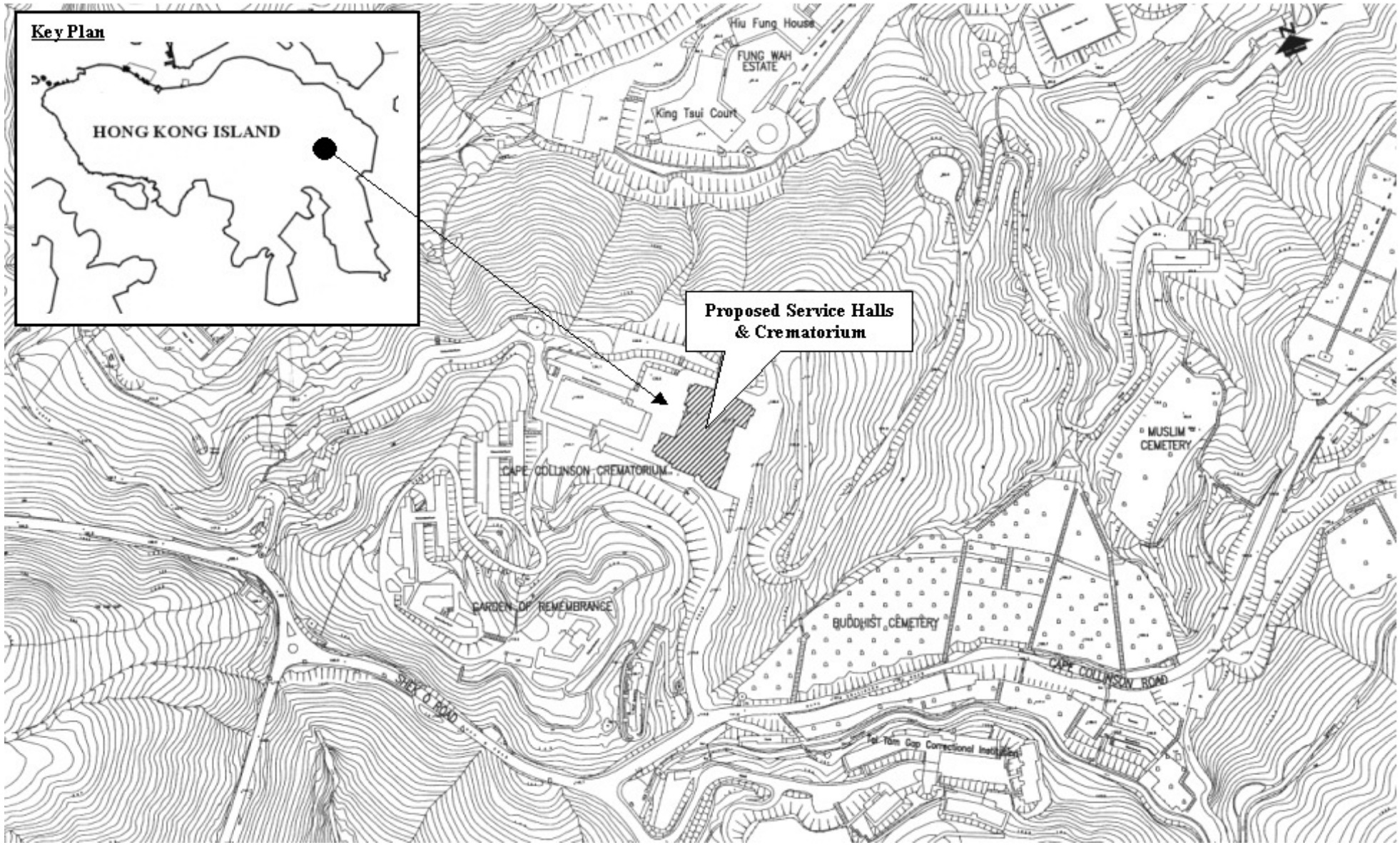
6.1 If there is any change in the name of Applicant for this EIA study brief during the course of the EIA study, the Applicant must notify the Director immediately.

6.2 If there is any key change in the scope of the Project mentioned in Sections 1.2 and 1.3 of this EIA study brief and in Project Profile (No. PP-338/2007), the Applicant must seek confirmation from the Director in writing on whether or not the scope of

issues covered by this EIA study brief can still cover the key changes, and the additional issues, if any, that the EIA study must also address. If the changes to the Project fundamentally alter the key scope of the EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief.

--- END OF EIA STUDY BRIEF ---

January 2008
Environmental Assessment Division,
Environmental Protection Department

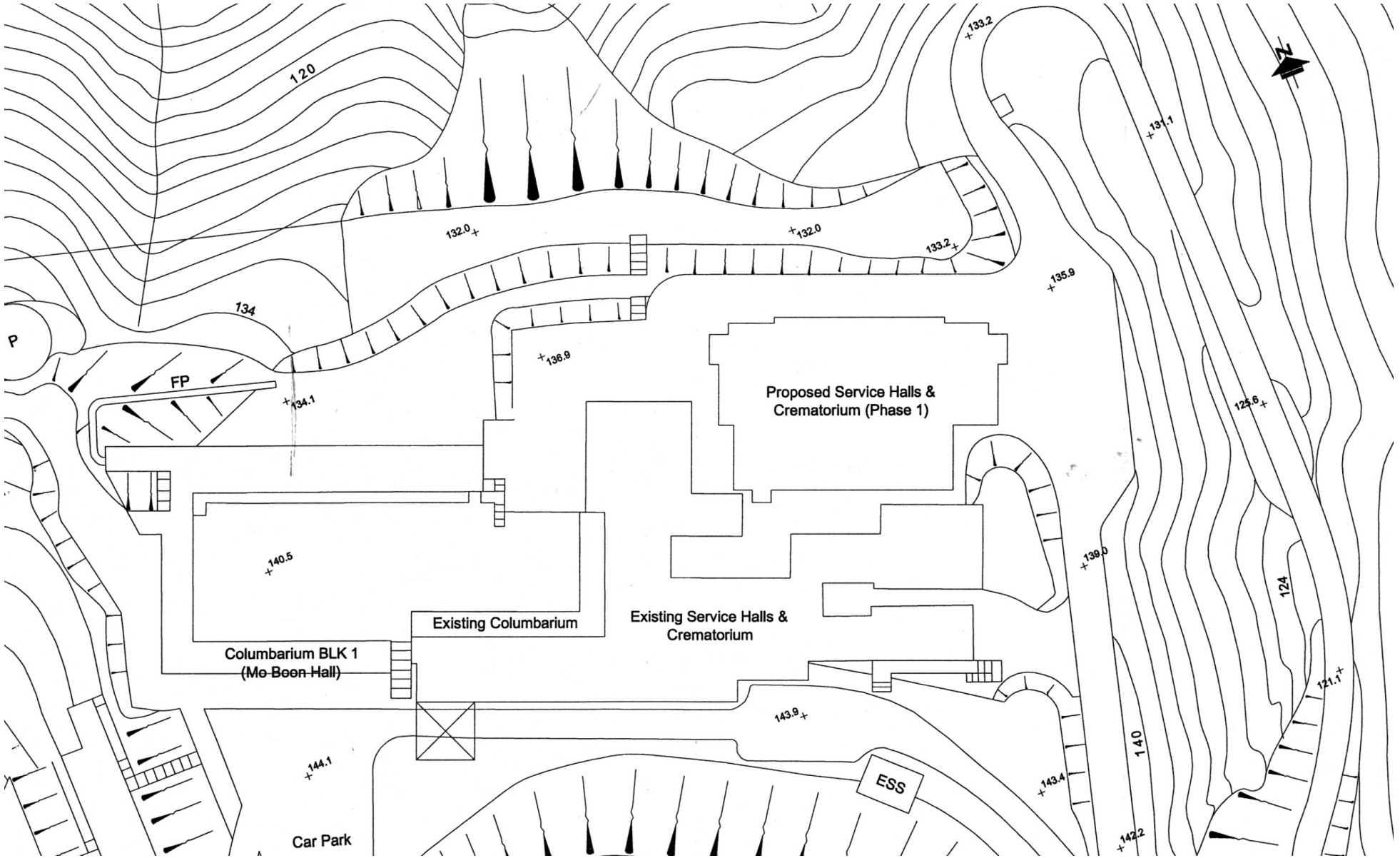


Appendix A-1: Location Plan

Project Title: Phased Reprovisioning of Cape Collinson Crematorium

EIA Study Brief No.: ESB-177/2008

Note:
This figure is prepared based on Figure No. 1.1 of the Project Profile PP-388/2007

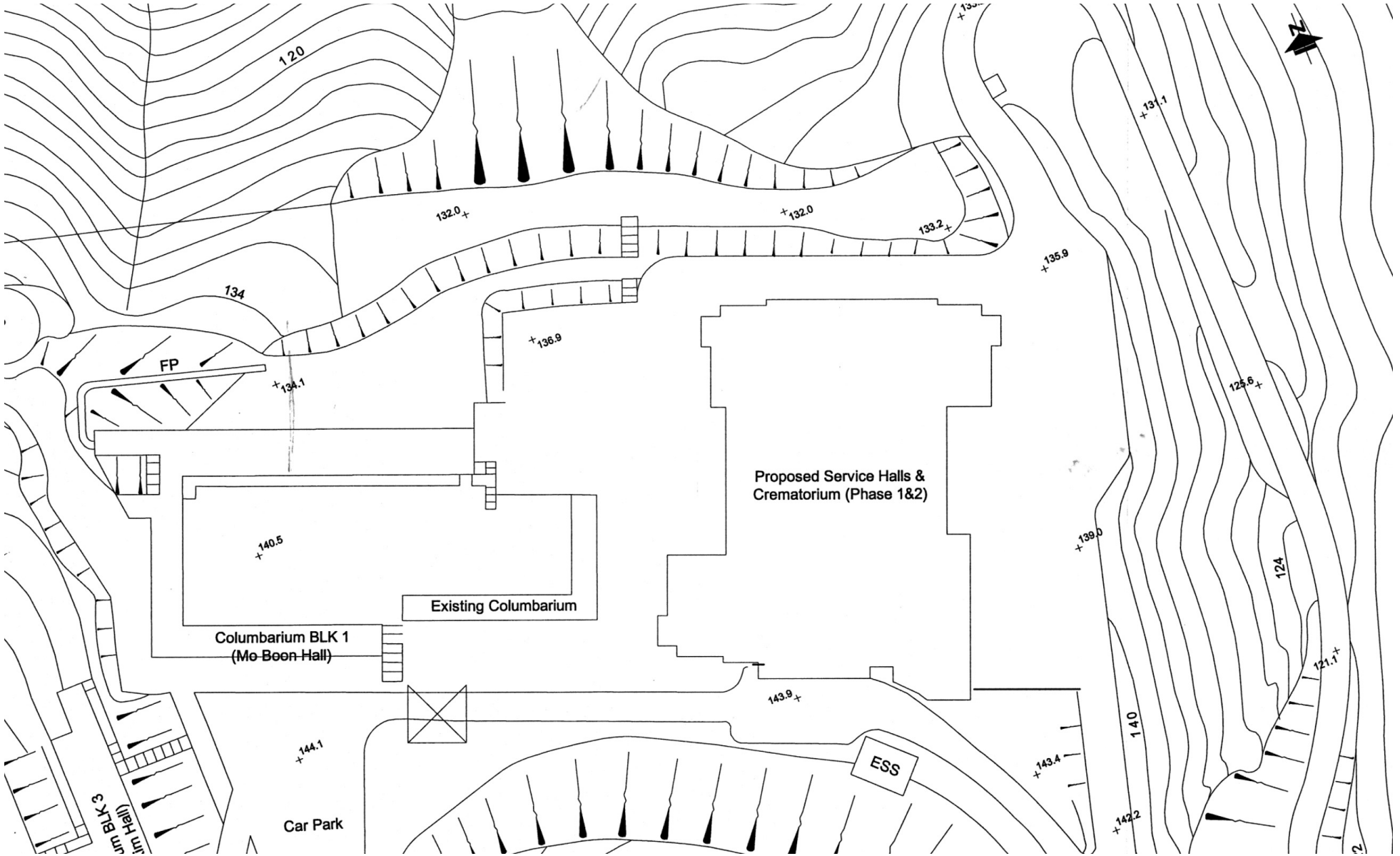


Appendix A-2: Block Plan (Phase 1)

Project Title: Phased Reprovisioning of Cape Collinson Crematorium

EIA Study Brief No.: ESB-177/2008

Note:
This figure is prepared based on Figure No. 1.2 of the Project Profile PP-388/2007



Appendix A-3: Block Plan (Phase 1 and Phase 2)

Project Title: Phased Reprovisioning of Cape Collinson Crematorium

EIA Study Brief No.: ESB-177/2008

Note:
This figure is prepared based on Figure No. 1.3 of the Project Profile PP-388/2007

Appendix B-1

Guidelines on Choice of Models and Model Parameters

[The information contained in this Appendix is only meant to assist the Applicant in performing the air quality assessment. The Applicant must exercise professional judgment in applying this general information for the Project.]

1. Introduction

1.1 To expedite the review process by the Authority and to assist project proponents or environmental consultants with the conduct of air quality modelling exercise which are frequently called for as part of environmental impact assessment studies, this paper describes the usage and requirements of a few commonly used air quality models.

2. Choice of Models

2.1 The models which have been most commonly used in air quality impact assessments, due partly to their ease of use and partly to the quick turn-around time for results, are of Gaussian type and designed for use in simple terrain under uniform wind flow. There are circumstances when these models are not suitable for ambient concentration estimates and other types of models such as physical, numerical or mesoscale models will have to be used. In situations where topographic, terrain or obstruction effects are minimal between source and receptor, the following Gaussian models can be used to estimate the near-field impacts of a number of source types including dust, traffic and industrial emissions.

Model	Applications
FDM	for evaluating fugitive and open dust source impacts (point, line and area sources)
CALINE4	for evaluating mobile traffic emission impacts (line sources)
ISCST3	for evaluating industrial chimney releases as well as area and volumetric sources (point, area and volume sources); line sources can be approximated by a number of volume sources.

These frequently used models are also referred to as Schedule 1 models (see attached list).

2.2 Note that both FDM and CALINE4 have a height limit on elevated sources (20 m and 10m, respectively). Source of elevation above these limits will have to be modelled using the

ISCST3 model or suitable alternative models. In using the latter, reference should be made to the 'Guidelines on the Use of Alternative Computer Models in Air Quality Assessment' in Appendix B-3.

2.3 The models can be used to estimate both short-term (hourly and daily average) and long-term (annual average) ambient concentrations of air pollutants. The model results, obtained using appropriate model parameters (refer to Section 3) and assumptions, allow direct comparison with the relevant air quality standards such as the Air Quality Objectives (AQOs) for the relevant pollutant and time averaging period.

3. Model Input Requirements

3.1 Meteorological Data

3.1.1 At least 1 year of recent meteorological data (including wind speed, wind direction, stability class, ambient temperature and mixing height) from a weather station either closest to or having similar characteristics as the study site should be used to determine the highest short-term (hourly, daily) and long-term (annual) impacts at identified air sensitive receivers in that period. The amount of valid data for the period should be no less than 90 percent.

3.1.2 Alternatively, the meteorological conditions as listed below can be used to examine the worst case short-term impacts:

Day time:
stability class D; wind speed 1 m/s (at 10m height); worst-case wind angle; mixing height 500 m

Night time:
stability class F; wind speed 1 m/s (at 10m height); worst case wind angle; mixing height 500 m

This is a common practice with using the CALINE4 model due to its inability to handle lengthy data set.

3.1.3 For situations where, for example, (i) the model (such as CALINE4) does not allow easy handling of one full year of meteorological data; or (ii) model run time is a concern, the followings can be adopted in order to determine the daily and annual average impacts:

(i) perform a frequency occurrence analysis of one year of meteorological data to

determine the actual wind speed (to the nearest unit of m/s), wind direction (to the nearest 10^o) and stability (classes A to F) combinations and their frequency of occurrence;

(ii) determine the short term hourly impact under all of the identified wind speed, wind direction and stability combinations; and

(iii) apply the frequency data with the short term results to determine the long term (daily / annual) impacts.

Apart from the above, any alternative approach that will capture the worst possible impact values (both short term and long term) may also be considered.

3.1.4 Note that the anemometer height (relative to a datum same for the sources and receptors) at which wind speed measurements were taken at a selected station should be correctly entered in the model. These measuring positions can vary greatly from station to station and the vertical wind profile employed in the model can be grossly distorted from the real case if incorrect anemometer height is used. This will lead to unreliable concentration estimates.

3.1.5 An additional parameter, namely, the standard deviation of wind direction, σ_Θ, needs to be provided as input to the CALINE4 model. Typical values ofσ_Θ range from 12^o for rural areas to 24^o for highly urbanised areas under 'D' class stability. For semi-rural such as new development areas, 18^o is more appropriate under the same stability condition. The following reference can be consulted for typical ranges of standard deviation of wind direction under different stability categories and surface roughness conditions.

Ref.(1): Guideline On Air Quality Models (Revised), EPA-450/2-78-027R, United States Environmental Protection Agency, July 1986.

3.2 Emission Sources

All the identified sources relevant to a process plant or a study site should be entered in the model and the emission estimated based on emission factors compiled in the AP-42 (Ref. 2) or other suitable references. The relevant sections of AP-42 and any parameters or assumptions used in deriving the emission rates (in units g/s, g/s/m or g/s/m^2) as required by the model should be clearly stated for verification. The physical dimensions, location, release height and any other emission characteristics such as efflux conditions and emission pattern of the sources input to the model should also correspond to site data.

If the emission of a source varies with wind speed, the wind speed-dependent factor should be entered.

Ref.(2): Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition, United States Environmental Protection Agency, January 1995.

3.3 Urban/Rural Classification

Emission sources may be located in a variety of settings. For modelling purposes these are classed as either rural or urban so as to reflect the enhanced mixing that occurs over urban areas due to the presence of buildings and urban heat effects. The selection of either rural or urban dispersion coefficients in a specific application should follow a land use classification procedure. If the land use types including industrial, commercial and residential uses account for 50% or more of an area within 3 km radius from the source, the site is classified as urban; otherwise, it is classed as rural.

3.4 Surface Roughness Height

This parameter is closely related to the land use characteristics of a study area and associated with the roughness element height. As a first approximation, the surface roughness can be estimated as 3 to 10 percent of the average height of physical structures. Typical values used for urban and new development areas are 370 cm and 100 cm, respectively.

3.5 Receptors

These include discrete receptors representing all the identified air sensitive receivers at their appropriate locations and elevations and any other discrete or grid receptors for supplementary information. A receptor grid, whether Cartesian or Polar, may be used to generate results for contour outputs.

3.6 Particle Size Classes

In evaluating the impacts of dust-emitting activities, suitable dust size categories relevant to the dust sources concerned with reasonable breakdown in TSP (< 30 μm) and RSP (< 10 μm) compositions should be used.

3.7 NO_2 to NO_x Ratio

The conversion of NO_x to NO_2 is a result of a series of complex photochemical reactions and has implications on the prediction of near field impacts of traffic emissions. Until further data are available, three approaches are currently acceptable in the determination of NO_2:

(a) Ambient Ratio Method (ARM) - assuming 20% of NO_x to be NO_2; or

(b) Discrete Parcel Method (DPM, available in the CALINE4 model); or

(c) Ozone Limiting Method (OLM) - assuming the tailpipe NO_2 emission to be 7.5% of NO_x and the background ozone concentration to be in the range of 57 to 68 $\mu g/m^3$ depending on the land use type (see also the EPD reference paper 'Guidelines on Assessing the 'TOTAL' Air Quality Impacts' in Appendix B-2).

3.8 Odour Impact

In assessing odour impacts, a much shorter time-averaging period of 5 seconds is required due to the shorter exposure period tolerable by human receptors. Conversion of model computed hourly average results to 5-second values is therefore necessary to enable comparison against recommended standard. The hourly concentration is first converted to 3-minute average value according to a power law relationship which is stability dependent (Ref. 3) and a result of the statistical nature of atmospheric turbulence. Another conversion factor (10 for unstable conditions and 5 for neutral to stable conditions) is then applied to convert the 3-minute average to 5-second average (Ref. 4). In summary, to convert the hourly results to 5-second averages, the following factors can be applied:

Stability Category	1-hour to 5-sec Conversion Factor
A & B	45
C	27
D	9
E & F	8

Under 'D' class stability, the 5-second concentration is approximately 10 times the hourly average result. Note, however, that the combined use of such conversion factors together with the ISCST results may not be suitable for assessing the extreme close-up impacts of odour sources.

Ref.(3): Richard A. Duffee, Martha A. O'Brien and Ned Ostojic, 'Odor Modeling – Why and How', Recent Developments and Current Practices in Odor Regulations, Controls and Technology, Air & Waste Management Association, 1991.

Ref.(4): A.W.C. Keddie, 'Dispersion of Odours', Odour Control – A Concise Guide, Warren Spring Laboratory, 1980.

3.9 Plume Rise Options

The ISCST3 model provides by default a list of the U.S. regulatory options for concentration

calculations. These are all applicable to the Hong Kong situations except for the 'Final Plume Rise' option. As the distance between sources and receptors are generally fairly close, the non-regulatory option of 'Gradual Plume Rise' should be used instead to give more accurate estimate of near-field impacts due to plume emission. However, the 'Final Plume Rise' option may still be used for assessing the impacts of distant sources.

3.10 Portal Emissions

These include traffic emissions from tunnel portals and any other similar openings and are generally modelled as volume sources according to the PIARC 91 (or more up-to-date version) recommendations (Ref. 5, section III.2). For emissions arising from underpasses or any horizontal openings of the like, these are treated as area or point sources depending on the source physical dimensions. In all these situations, the ISCST3 model or more sophisticated models will have to be used instead of the CALINE4 model. In the case of portal emissions with significant horizontal exit velocity which cannot be handled by the ISCST3 model, the impacts may be estimated by the TOP model (Ref. 6) or any other suitable models subject to prior agreement with EPD. The EPD's 'Guidelines on the Use of Alternative Computer Models in Air Quality Assessment' should also be referred to in Appendix B-3.

Ref.(5): XIXth World Road Congress Report, Permanent International Association of Road Congresses (PIARC), 1991.

Ref.(6): N. Ukegunchi, H. Okamoto and Y. Ide "Prediction of vehicular emission pollution around a tunnel mouth", Proceedings 4th International Clean Air Congress, pp. 205-207, Tokyo, 1977.

3.10 Background Concentrations

Background concentrations are required to account for far-field sources which cannot be estimated by the model. These values, to be used in conjunction with model results for assessing the total impacts, should be based on long term average of monitoring data at location representative of the study site. Please make reference to the paper 'Guidelines on Assessing the 'TOTAL' Air Quality Impacts' in Appendix B-2 for further information.

3.11 Output

The highest short-term and long-term averages of pollutant concentrations at prescribed receptor locations are output by the model and to be compared against the relevant air quality standards specified for the relevant pollutant. Contours of pollutant concentration are also

required for indicating the general impacts of emissions over a study area.

Copies of model files in electronic format should also be provided for EPD's reference.

Schedule 1

Air Quality Models Generally Accepted by Hong Kong Environmental Protection Department for Regulatory Applications as at 1 July 1998*

Industrial Source Complex Dispersion Model - Short Term Version 3 (ISCST3) or the latest version developed by U.S. Environmental Protection Agency

California Line Source Dispersion Model Version 4 (CALINE4) or the latest version developed by Department of Transportation, State of California, U.S.A.

Fugitive Dust Model (FDM) or the latest version developed by U.S. Environmental Protection Agency

* EPD is continually reviewing the latest development in air quality models and will update this Schedule accordingly.

Appendix B-2

Guidelines on Assessing the 'TOTAL' Air Quality Impacts

[The information contained in this Appendix is only meant to assist the Applicant in performing the air quality assessment. The Applicant must exercise professional judgment in applying this general information for the Project.]

1. Total Impacts - 3 Major Contributions

1.1 In evaluating the air quality impacts of a proposed project upon air sensitive receivers, contributions from three classes of emission sources depending on their distance from the site should be considered. These are:

Primary contributions:	project induced
Secondary contributions:	pollutant-emitting activities in the immediate neighbourhood
Other contributions: (Background contributions)	pollution not accounted for by the previous two

2. Nature of Emissions

2.1 Primary contributions

In most cases, the project-induced emissions are fairly well defined and quite often (but not necessarily) the major contributor to local air quality impacts. Examples include those due to traffic network, building or road construction projects.

2.2 Secondary contributions

Within the immediate neighbourhood of the project site, there are usually pollutant emitting activities contributing further to local air quality impacts. For most local scale projects, any emission sources in an area within 500m radius of the project site with notable impacts should be identified and included in an air quality assessment to cover the short-range contributions. In the exceptional cases where there is one or more significant sources nearby, the study area may have to be extended or alternative estimation approach employed to ensure these impacts are reasonably accounted for.

2.3 Background contributions

The above two types of emission contributions should account for, to a great extent, the air quality impacts upon local air sensitive receivers, which are often amenable to estimation by the 'Gaussian Dispersion' type of models. However, a background air quality level should be prescribed to indicate the baseline air quality in the region of the project site, which would account for any pollution not covered by the two preceding contributions. The emission sources contributing to the background air quality would be located further afield and not easy to identify. In addition, the transport mechanism by which pollutants are carried over long distances (ranging from 1km up to tens or hundreds of kms) is rather complex and cannot be adequately estimated by the 'Gaussian' type of models.

3. Background Air Quality - Estimation Approach

3.1 The approach

In view of the difficulties in estimating background air quality using the air quality models currently available, an alternative approach based on monitored data is suggested. The essence of this approach is to adopt the long-term (5-year) averages of the most recent monitored air quality data obtained by EPD. These background data would be reviewed yearly or biennially depending on the availability of the monitored data. The approach is a first attempt to provide a reasonable estimate of the background air quality level for use in conjunction with EIA air quality assessment to address the cumulative impacts upon a locality. This approach may be replaced or supplemented by superior modelling efforts such as that entailed in PATH (Pollutants in the Atmosphere and their Transport over Hong Kong), a comprehensive territory-wide air quality modelling system currently being developed for Hong Kong. Notwithstanding this, the present approach is based on measured data and their long term regional averages; the background values so derived should therefore be indicative of the present background air quality. In the absence of any other meaningful way to estimate a background air quality for the future, this present background estimate should also be applied to future projects as a first attempt at a comprehensive estimate until a better approach is formulated.

3.2 Categorisation

The monitored air quality data, by 'district-averaging' are further divided into three categories, viz, Urban, Industrial and Rural/New Development. The background pollutant concentrations to be adopted for a project site would depend on the geographical constituency to which the site belongs. The categorisation of these constituencies is given in Section 3.4. The monitoring stations suggested for the 'district-averaging'(arithmetic means) to derive

averages for the three background air quality categories are listed as follows:

Urban:	Kwun Tong, Sham Shui Po, Tsim Sha Tsui and Central/Western
Industrial:	Kwun Tong, Tsuen Wan and Kwai Chung
Rural/New Development:	Sha Tin, Tai Po, Junk Bay, Hong Kong South and Yuen Long

The averaging would make use of data from the above stations wherever available. The majority of the monitoring stations are located some 20m above ground.

3.3 Background pollutant values

Based on the above approach, background values for the 3 categories have been obtained for a few major air pollutants as follows:

POLLUTANT	URBAN	INDUSTRIAL	RURAL / NEW DEVELOPMENT
NO_2	59	57	39
SO_2	21	26	13
O_3	62	68	57
TSP	98	96	87
RSP	60	58	51

All units are in micrograms per cubic metre. The above values are derived from 1992 to 1996 annual averages with the exception of ozone which represent annual average of daily hourly maximum values for year 1996.

In cases where suitable air quality monitoring data representative of the study site such as those obtained from a nearby monitoring station or on-site sampling are not available for the prescription of background air pollution levels, the above tabulated values can be adopted instead. Strictly speaking, the suggested values are only appropriate for long term assessment. However, as an interim measure and until a better approach is formulated, the same values can also be used for short term assessment. This implies that the short term background values will be somewhat under-estimated, which compensates for the fact that some of the monitoring data are inherently influenced by secondary sources because of the monitoring station location.

Indeed, if good quality on-site sampling data which cover at least one year period are available, these can be used to derive both the long term (annual) and short term (daily / hourly) background values, the latter are usually applied on an hour to hour, day to day basis.

3.4 Site categories

The categories to which the 19 geographical constituencies belong are listed as follows:

DISTRICT	AIR QUALITY CATEGORY
Islands	Rural / New Development
Southern	Rural / New Development
Eastern	Urban
Wan Chai	Urban
Central & Western	Urban
Sai Kung	Rural / New Development
Kwun Tong	Industrial
Wong Tai Sin	Urban
Kowloon City	Urban
Yau Tsim	Urban
Mong Kok	Urban
Sham Shui Po	Urban
Kwai Tsing	Industrial
Sha Tin	Rural / New Development
Tsuen Wan	Industrial
Tuen Mun	Rural / New Development
Tai Po	Rural / New Development
Yuen Long	Rural / New Development
Northern	Rural / New Development

3.5 Provisions for 'double-counting'

The current approach is, by no means, a rigorous treatment of background air quality but aims to provide an as-realistic-as-possible approximation based on limited field data. 'Double-counting' of 'secondary contributions' may be apparent through the use of such 'monitoring-based' background data as some of the monitoring stations are of close proximity to existing emission sources. 'Primary contributions' due to a proposed project (which is yet to be realized) will not be double-counted by such an approach. In order to avoid over-estimation of background pollutant concentrations, an adjustment to the values given in Section 3.3 is possible and optional by multiplying the following factor:

$$(1.0 - E_{\text{Secondary contributions}}/E_{\text{Territory}})$$

where E stands for emission.

The significance of this factor is to eliminate the fractional contribution to background pollutant level of emissions due to 'secondary contributions' out of those from the entire territory. In most cases, this fractional contribution to background pollutant levels by the

secondary contributions is minimal.

4. Conclusions

4.1 The above described approach to estimating the total air quality impacts of a proposed project, in particular the background pollutant concentrations for air quality assessment, should be adopted with immediate effect. Use of short term monitoring data to prescribe the background concentrations is no longer acceptable.

Appendix B-3

Guidelines on the Use of Alternative Computer Models in Air Quality Assessment

[The information contained in this Appendix is only meant to assist the Applicant in performing the air quality assessment. The Applicant must exercise professional judgment in applying this general information for the Project.]

1. Background

1.1 In Hong Kong, a number of Gaussian plume models are commonly employed in regulatory applications such as application for specified process licences and environmental impact assessments (EIAs). These frequently used models (as listed in Schedule 1 attached; hereafter referred to as Schedule 1 models) have no regulatory status but form the basic set of tools for local-scale air quality assessment in Hong Kong.

1.2 However, no single model is sufficient to cover all situations encountered in regulatory applications. In order to ensure that the best model available is used for each regulatory application and that a model is not arbitrarily applied, the project proponent (and/or its environmental consultants) should assess the capabilities of various models available and adopt one that is most suitable for the project concerned.

1.3 Examples of situations where the use of an alternative model is warranted include:

(i) the complexity of the situation to be modelled far exceeds the capability of the Schedule 1 models; and

(ii) the performance of an alternative model is comparable or better than the Schedule 1 models.

1.4 This paper outlines the demonstration / submission required in order to support the use of an alternative air quality model for regulatory applications for Hong Kong.

2. Required Demonstration / Submission

2.1 Any model that is proposed for air quality applications and not listed amongst the Schedule 1 models will be considered by EPD on a case-by-case basis. In such cases, the proponent will have to provide the followings for EPD's review:

(i) Technical details of the proposed model; and

(ii) Performance evaluation of the proposed model

Based on the above information, EPD will determine the acceptability of the proposed model for a specific or general applications. The onus of providing adequate supporting materials rests entirely with the proponent.

2.2 To provide technical details of the proposed model, the proponent should submit documents containing at least the following information:

(i) mathematical formulation and data requirements of the model;

(ii) any previous performance evaluation of the model; and

(iii) a complete set of model input and output file(s) in commonly used electronic format.

2.3 On performance evaluation, the required approach and extent of demonstration varies depending on whether a Schedule 1 model is already available and suitable in simulating the situation under consideration. In cases where no Schedule 1 model is found applicable, the proponent must demonstrate that the proposed model passes the screening test as set out in USEPA Document "Protocol for Determining the Best Performing Model" (Ref. 1).

2.4 For cases where a Schedule 1 model is applicable to the project under consideration but an alternative model is proposed for use instead, the proponent must demonstrate either that

(i) the highest and second highest concentrations predicted by the proposed model are within 2 percent of the estimates obtained from an applicable Schedule 1 model (with appropriate options chosen) for all receptors for the project under consideration; or

(ii) the proposed model has superior performance against an applicable Schedule 1 model based on the evaluation procedure set out in USEPA Document "Protocol for Determining the Best Performing Model" (Ref. 1).

2.5 Should EPD find the information on technical details alone sufficient to indicate the acceptability of the proposed model, information on further performance evaluation as specified in Sections 2.3 and 2.4 above would not be necessary.

2.6 If the proposed model is an older version of one of the Schedule 1 models or was previously included in Schedule 1, the technical documents mentioned in Section 2.2 are

normally not required. However, a performance demonstration of equivalence as stated in Section 2.4 (i) would become necessary.

2.7 If EPD is already in possession of some of the documents that describe the technical details of the proposed model, submission of the same by the proponent is not necessary. The proponent may check with EPD to avoid sending in duplicate information.

Schedule 1
Air Quality Models Generally Accepted by
Hong Kong Environmental Protection Department for
Regulatory Applications as at 1 July 1998*

Industrial Source Complex Dispersion Model - Short Term Version 3 (ISCST3) or the latest version developed by U.S. Environmental Protection Agency

California Line Source Dispersion Model Version 4 (CALINE4) or the latest version developed by Department of Transportation, State of California, U.S.A.

Fugitive Dust Model (FDM) or the latest version developed by U.S. Environmental Protection Agency

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Ref. (1): William M. Cox, "Protocol for Determining the Best Performing Model" Publication No. EPA-454/R-92-025; U.S. Environmental Protection Agency, Research Triangle Park, NC.

* EPD is continually reviewing the latest development in air quality models and will update this Schedule accordingly.

Appendix C

Guidelines on Noise Impacts Assessment

(i) Determination of Assessment Area

The study area for the noise impact assessment shall generally be defined by a distance of 300m from the boundary of the project site; with consideration be given to extend the area to include major emission sources that may have a bearing on the environmental acceptability of the Project. Subject to the agreement of the Director, the assessment area could be reduced accordingly if the first layer of noise sensitive receivers (NSRs), closer than 300m from the outer project limit, provides acoustic shielding to those receivers at further distance behind. Similarly, subject to the agreement of the Director, the assessment area shall be expanded to include NSRs at distance >300m which would be affected by the demolition/construction and operation of the Project.

(ii) Provision of Background Information and Existing Noise Levels

The Applicant shall provide all background information relevant to the Project, including relevant previous or current studies. Unless required for determining the planning standards, such as those for planning of fixed noise sources, no existing noise levels are required except as set out below.

(iii) Identification of Noise Sensitive Receivers

(a) The Applicant shall refer to Annex 13 of the TM when identifying the NSRs. The NSRs shall include all existing NSRs and all planned/committed noise sensitive developments and uses earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans, Layout Plans and other relevant published land use plans. Photographs of all existing NSRs shall be appended to the EIA report.

(b) The Applicant shall select assessment points to represent all identified NSRs for carrying out quantitative noise assessment described below. The assessment points shall be agreed with the Director prior to the quantitative noise assessment and may be varied subject to the best and latest information available during the course of the EIA study. A map showing the location and description such as name of building, use, and floors of each and every selected assessment point shall be given. For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant planning parameters to work out representative site layouts for operational noise assessment purpose.

(iv) Provision of an Emission Inventory of the Noise Sources

The Applicant shall provide an inventory of noise sources including representative construction equipment for construction noise assessment, and fixed plant equipment, as appropriate, for operational noise assessment. Confirmation on the validity of the inventory shall be obtained from the relevant government departments/authorities and documented.

(v) Construction Noise Assessment

(a) The assessment shall cover the cumulative noise impacts due to the demolition/construction works of the Project and other likely concurrent projects identified during the course of the EIA study.
(b) The Applicant shall carry out assessment of noise impact from construction (excluding percussive piling) of the Project during day time, i.e. 7 a.m. to 7 p.m., on weekdays other than general holidays in accordance with the methodology stipulated in paragraphs 5.3. and 5.4 of Annex 13 of the TM. The criteria in Table 1B of Annex 5 of the TM shall be adopted in the assessment.
(c) To minimize the construction noise impact, alternative construction methods to replace percussive piling shall be proposed as far as practicable. In case blasting works will be involved, it should be carried out, as far as practicable, outside the sensitive hours of 7 p.m. to 7 a.m. on Monday to Saturday and any time on a general holiday, including Sunday. For blasting that must be carried out during the above-mentioned sensitive hours, the noise impact in associated with the removal of debris and rocks should be fully assessed and adequate mitigation measures should be recommended to reduce the noise impact as appropriate.
(d) If the unmitigated construction noise levels are found exceeding the relevant criteria, the Applicant shall propose practicable direct mitigation measures (including movable barriers, enclosures, quieter alternative methods, re-scheduling and restricting hours of operation of noisy task) to minimize the impact. If the mitigated noise levels still exceed the relevant criteria, the duration of the noise exceedance shall be given.
(e) The Applicant shall formulate a reasonable construction programme as far as practicable such that no work will be required in the restricted hours as defined under the Noise Control Ordinance (NCO). In case the Applicant needs to evaluate whether construction works in restricted hours as defined under the NCO are feasible or not in the context of programming construction works, reference should be made to the relevant technical memoranda issued under the NCO. Regardless of the results of the construction noise impact assessment for restricted hours, the Noise Control Authority

will process the Construction Noise Permit (CNP) application, if necessary, based on the NCO, the relevant technical memoranda issued under the NCO, and the contemporary conditions/situations. This aspect should be explicitly stated in the noise chapter and the conclusions and recommendations chapter in the EIA report.

(vi) Operational Noise Assessment

(a) Fixed Noise Sources

(a1) Assessment of Fixed Source Noise Levels

The Applicant shall calculate the expected noise using standard acoustics principles. Calculations for the expected noise shall be based on assumed plant inventories and utilization schedule for the worst case scenario. The Applicant shall calculate the noise levels taking into account correction of tonality, impulsiveness and intermittency in accordance with the Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites.

(a2) Presentation of Noise Levels

The Applicant shall present the existing and future noise levels in L_{eq} (30 min) at the NSRs at various representative floor levels (in m P.D.) on tables and plans of suitable scale.

A quantitative assessment at the NSRs for the proposed fixed noise source(s) shall be carried out and compared against the criteria set out in Table 1A of Annex 5 of the TM.

(a3) Proposals for Noise Mitigation Measures

The Applicant shall propose direct technical remedies within the project limits in all situations where the predicted noise level exceeds the criteria set out in Table 1A of Annex 5 of the TM to protect the affected NSRs.

(vii) Assessment of Side Effects and Constraints

The Applicant shall identify, assess and propose means to minimize any side effects and to resolve any potential constraints due to the inclusion of any recommended direct technical remedies.

(viii) Evaluation of Constraints on Planned Noise Sensitive Developments/Landuses

For planned noise sensitive uses which will still be affected even with all practicable direct technical remedies in place, the Applicant shall propose, evaluate and confirm the practicality of additional measures within the planned noise sensitive uses and shall make recommendations on how these noise sensitive uses will be designed for the information of relevant parties.

The Applicant shall take into account agreed environmental requirements / constraints identified by the study to assess the development potential of concerned sites which shall be made known to the relevant parties.

Appendix D

Implementation Schedule

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure ?	Location of the measure	When to implement the measure ?	What requirements or standards for the measure to achieve ?