TECHNICAL MEMORANDUM ON ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

TSE Chin Wan
Secretary for Environment and Ecology

This Technical Memorandum is published under Section 16(5) of the Environmental Impact Assessment Ordinance, and shall come into operation in accordance with Section 16(10) of that Ordinance.

TECHNICAL MEMORANDUM
ON ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

(ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE, CAP. 499, S.16)

TABLE OF CONTENTS

LIST OF ANNEXES

1. PRELIMINARY

1.1 Citation and Commencement

1.1.1 This technical memorandum is issued under section 16 of the Environmental Impact Assessment Ordinance (the Ordinance). It may be cited as the Technical Memorandum on Environmental Impact Assessment Process. This technical memorandum supersedes the technical memorandum issued by the then Secretary for Planning, Environment and Lands in 1997 and published in the gazette on 16 May 1997 under section 16 of the Ordinance. This technical memorandum shall come into operation in accordance with section 16(10) of the Ordinance.

1.2 Application and Scope

1.2.1 This technical memorandum sets out the principles, procedures, guidelines, requirements and criteria for:

(a) the technical content of a project profile;

(b) the technical content of an environmental impact assessment study brief or environmental impact assessment report;

(c) deciding whether a designated project is environmentally acceptable;

(d) deciding whether an environmental impact assessment report meets the requirements of the environmental impact assessment study brief;

(e) deciding whether the Director will permit an applicant to apply directly for an environmental permit under section 5(9), (10) or (11) of the Ordinance;

(f) resolving conflicts on the content of the environmental impact assessment study brief and the environmental impact assessment report;

(g) taking advice from other authorities;

(h) deciding what is a material change, addition or alteration to an environmental impact or to a designated project;

(i) the issue of environmental permits; and

(j) the imposition of environmental monitoring and audit requirements for designated projects as conditions in environmental permits.

1.2.2 This technical memorandum is a guide for the Director in deciding on matters under sections 5, 6, 8, 10, 12, 13 and 14 of the Ordinance. The Director is the Director of Environmental Protection. He will follow this technical memorandum according to the circumstances of a case.

1.3 Interpretation

1.3.1 This technical memorandum uses standard scientific terms. Where the Ordinance defines a term, that term applies.

2. PROJECT PROFILE

2.1 Purpose of a Project Profile

2.1.1 The purpose of the project profile is to enable the Director to determine:

(a) the scope of the environmental issues associated with a designated project which shall be addressed in the environmental impact assessment (EIA) study, together with the technical and procedural requirements that the EIA study shall meet; or

(b) whether the applicant can proceed directly to apply for an environmental permit.

2.2 Specified Information in Project Profile

2.2.1 A project profile shall contain the relevant specified information listed in Annex 1 or Annex 2. Annex 1 applies to project profile for designated projects, and Annex 2 applies to project profile for material changes to designated projects. In the case of specified information which is not applicable to the proposed project, the project profile shall contain an explicit statement to that effect. The descriptions and statements of applicability of the items should be sufficient for the Director to identify what issues are relevant and what matters the EIA study shall address.

3. ENVIRONMENTAL IMPACT ASSESSMENT STUDY BRIEF

3.1 The EIA study brief sets out the purposes and objectives of the EIA study, the scope of environmental issues which shall be addressed, the requirements that the EIA study shall need to fulfil, and the necessary procedural and reporting requirements. The methodologies or approaches that the EIA study needs to follow, or the matters that the EIA study shall take into account, may be prescribed.

3.2 In setting out the scope of the environmental issues to be addressed, the Director shall have due regard to the factors listed in Annex 3, other guidelines and criteria laid down in this technical memorandum, and the following criteria in limiting the scope of the EIA study:

(a) the scope of issues must be relevant to the project by virtue of its type, scale and location, or the likely emissions, discharges, waste generation, destruction, alteration or environmental changes that may result from the project;

(b) previous relevant EIA and environmental studies have identified such issues as being of relevance to the project and of having the potential for causing adverse environmental impacts;

(c) the issues under consideration have been causes of environmental complaints in the past;

(d) experiences on actual implementation of similar projects, scientific researches or overseas experiences show that a particular aspect of the project has potential to cause serious environmental effects.

3.3 The EIA study brief shall define the purposes, objectives and detailed requirements of the study and indicate the scope of issues, the timeframe of environmental issues, and the framework in which the applicant shall carry out an EIA study to meet the relevant requirements laid down in this technical memorandum. The study brief may stipulate the geographic and temporal boundaries of the assessment.

3.4 For a designated project under Item Q.1 of Part I of Schedule 2 to the Ordinance (i.e. a project involving works partly or wholly in the environmental sensitive areas mentioned in Item Q.1), which is not otherwise a designated project listed in items A to P of Schedule 2 to the Ordinance, the EIA study brief shall set out in such a way that the assessments and derivation of mitigation measures will focus on the environmental implications of the project on the environmental sensitive areas.

3.5 The EIA study brief may set out issues relating to the combined impacts of the entire project or the cumulative impacts of the existing, committed and planned developments in the vicinity of the project, but such issues shall be limited to those that may have a bearing on the environmental acceptability of the project. Such assessment shall be based on the best available information at the time of the assessment. Such information shall be that which the applicant has access to or is as provided or referred to by the Director in the EIA study brief.

3.6 The EIA study brief shall be limited to those issues for which compliance with the relevant guidelines or criteria in this technical memorandum has not been demonstrated or where there are doubts about their compliance with the relevant guidelines or criteria in this technical memorandum.

3.7 Where necessary, the Director may prescribe in the EIA study brief the assessment methodologies which are necessary for sound assessment of certain issues listed in the brief.

3.8 The EIA study brief may cover more than one designated project. The applicant shall state in the project profile the number and types of designated projects that shall be covered by the same EIA study.

3.9 The EIA study brief shall set out the duration of the validity of the study brief.

3.10 The Director shall specify the number of copies of the EIA reports and executive summaries and other reporting requirements, including any necessary appendix report, for the purpose of submission of the EIA report for approval, for the public exhibition of the EIA report, for the submission to the Advisory Council on the Environment where applicable, and for depositing the EIA report and the executive summary in the register. Generally, the number of copies of the EIA report, executive summary, other relevant or appendix reports required to be made available by the applicant free of charge is as set out below:

(a) for the purpose of review of the EIA report by the Director and other relevant departments, 30 copies of the EIA report and 50 copies of the executive summary may be required;

(b) for the purpose of public inspection of the report and the deposition of the report in the register, 40 copies of the EIA report and 80 copies of the executive summary may be required;

(c) for the purpose of consultation with the Advisory Council on the Environment, 20 copies of the EIA report and 50 copies of the executive summary may be required; and

(d) the number of reports as required by the relevant District Councils or other government consultative bodies.

3.11 Subject to the payment by the interested parties of the full costs of printing the EIA report and executive summary, the applicant is required to make additional copies available to interested parties.

4. ENVIRONMENTAL IMPACT ASSESSMENT REPORT

4.1 General

4.1.1 An EIA report shall comprise a document or series of documents providing a detailed assessment in quantitative terms, wherever possible, and in qualitative terms of the likely environmental impacts and environmental benefits of the project. The requirements for the EIA report shall be set out in accordance with this technical memorandum. The EIA report shall be produced in accordance with the EIA study brief issued by the Director to the applicant.

4.2 Objectives and Contents of an EIA Report

4.2.1 The project-specific study objectives and the detailed scope of any required EIA study shall be set out in a study brief issued by the Director. The purpose of the EIA study is to identify the potential environmental impacts, the residual impacts and the mitigation measures required for the project. Typical objectives/scopes of EIA study are as follows:

(a) to describe the proposed project(s) and associated works together with the requirements and environmental benefits for carrying out the proposed project(s);

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

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

(d) to identify and quantify any potential losses or damage to flora, fauna and natural habitats;

(e) to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;

(f) to propose the provision of infrastructure or mitigation measures to minimize pollution, environmental disturbance and nuisance during construction, operation (or decommissioning) of the project(s);

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

(h) to identify, predict and evaluate the residual (i.e. after practicable mitigation) environmental impacts and the cumulative effects expected to arise during the construction, operation (or decommissioning) phases of the project(s) in relation to the sensitive receivers and potential affected uses;

(i) to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction, operation (or decommissioning) of the project(s) which are necessary to mitigate these residual environmental impacts and cumulative effects and reduce them to acceptable levels;

(j) to design and specify the environmental monitoring and audit requirements; and

(k) to identify any additional studies necessary to implement the mitigation measures or monitoring and proposals recommended in the EIA report.

4.2.2 The contents of an EIA report shall fully meet the purposes and objectives set out in the EIA study brief issued by the Director, and shall adequately address all the issues set out in the EIA study brief.

4.2.3 Unless indicated otherwise in the EIA study brief, the contents of an EIA report shall include the relevant items listed in Annex 11.

4.3 General Approaches and Methodologies for Assessment

4.3.1 The EIA process aims at assessing the environmental impacts and identify mitigation measures required with respect to the designated project. This technical memorandum provides the standardized methodology and approach for assessing the environmental impacts arising from the designated project to enable evaluation of the performance and compliance with relevant criteria as well as identification of the mitigation measures required for the potential impacts. The general principles that the Director shall use in evaluating the assessment methodologies are described below:

(a) Description of the Environment: the characteristics of the existing environment shall be described in a way suitable for identification and prediction of environmental impacts. Where necessary, baseline environmental surveys shall be carried out to supplement existing information and results of relevant past studies to determine the environmental conditions on the site and in the environs likely to be affected by the proposed project. The issues described in the EIA study brief to be investigated would typically include existing water and sediment quality, air quality, noise environment, ecology, the cultural heritage and the man-made environment. These surveys shall include the site of the project, its access, and any other areas likely to be impacted during construction and operation (or decommissioning). The type and duration of baseline surveys shall be such that the baseline survey can provide a standardized methodology for predicting and evaluating the impacts from the project so that the study objectives can be met.

(b) Impact Prediction: the guidelines on assessment methodologies are given in Annexes 12 to 19. The assessment methodologies proposed shall be relevant to the issues to be addressed, shall have been used successfully in similar situations or be demonstrated as acceptable by recognized national/international organizations, and shall be capable of:

(i) identifying potential impacts which may be harmful or beneficial to the environment;

(ii) identifying receivers, habitats or resources which are vulnerable to change;

(iii) defining the project/environment interactions;

(iv) examining the chain of events or "pathways" linking cause with effect;

(v) describing and predicting the reasonable case scenario and/or the worst case scenario, or such scenarios as required in the EIA study brief; and

(vi) predicting the likely nature, extent and magnitude of the anticipated changes and effects such that an evaluation, in quantitative terms as far as possible, can be made with respect to the relevant criteria described in Annexes 4 to 10 inclusive.

(c) Impact Evaluation: an evaluation of the anticipated changes and effects shall be made with respect to the relevant criteria described in Annexes 4 to 10 inclusive. The methodologies for evaluating the environmental impact shall be capable of addressing the following issues:

(i) the existing or projected environmental conditions without the project in place;

(ii) the projected environmental conditions with the project in place and the cumulative environmental impacts taking into account all relevant existing, committed and planned projects;

(iii) a differentiation between the environmental impact caused by the project and that caused by other projects, and to what extent the project aggravates or improves the existing or projected environmental conditions;

(iv) the environmental impact during different phases of construction and development of the project; and

(v) the evaluation of the seriousness of the residual environmental impacts (see Section 4.4.3).

(d) Impact Mitigation: the methodologies proposed for mitigation shall give priority to avoidance of impacts. The assessment methods shall be capable of:

(i) identifying and evaluating mitigation measures in order to avoid, reduce or remedy the impacts;

(ii) assessing the effectiveness of mitigation measures; and

(iii) defining the residual environmental impacts, which are the net impacts remaining with the mitigation measures in place.

4.3.2 For cases in which the background environmental conditions have already exceeded the respective standards or criteria laid down in this technical memorandum, the evaluation should be based on the guidelines stated in the respective Annexes of this technical memorandum. Furthermore, in considering whether the environmental impact is acceptable, the following factors shall be taken into account:

(a) whether there are strategic action plans or policies to improve the background environmental conditions to comply with relevant standards or criteria; and

(b) whether the environmental impacts contributed from the project itself will materially affect the state and/or the programme of attainment of relevant standards or criteria.

4.3.3 For issues described in Annexes 12 to 19, the Director shall evaluate the assessment approaches and methodologies in accordance with the guidelines in these Annexes, unless otherwise stated in the study brief.

4.3.4 The applicant shall be required to evaluate the environmental impacts resulting from the project over a period of time, through interactions among different environmental pollutants or emissions, or in combination with other existing, committed and proposed developments. Any such requirements shall be clearly set out in the study brief and are only limited to those that is relevant to this technical memorandum and may have a bearing on the environmental acceptability of the project. The assessment methodologies shall allow for the assessment and evaluation of the cumulative environmental effects if the following circumstances apply:

(a) the impacts arising from the project are predicted to extend beyond the boundaries of the project or over a long period of time;

(b) there may be interactions between the environmental impacts of the project, affecting the cumulative environmental impacts; or

(c) there may be interactions between the environmental impacts of the project and the environmental impacts of other developments, resulting in accumulation of impacts and affecting the cumulative environmental impacts.

4.4 The Review of the EIA Report

The EIA report shall be reviewed according to the following steps:

4.4.1 Compliance with the Study Brief and Technical Memorandum: The coverage and approaches adopted in the EIA report shall be reviewed against the EIA study brief and the relevant guidelines and criteria in this technical memorandum.

4.4.2 Quality of the EIA Report: The EIA report shall be prepared, checked and signed by qualified professionals or experts. The quality of the EIA report shall be reviewed having regard to the guidelines in Annex 20 and in Section 4.3. The report shall be considered as adequate if there are no omissions or deficiencies identified which may affect the results and conclusions of the assessment. In particular, the following factors shall be considered:

(a) whether the scope and extent of the project as presented in the EIA report covers all the phases and key sequences of the project which the application under consideration is intended to cover;

(b) whether the information and descriptions in the EIA report are factually correct;

(c) whether the assessment methodologies adopted in the EIA report are consistent with the methodologies set out in Annexes 12 to 19 inclusive and with the general principles laid down in Section 4.3, and whether the evaluation of the predicted impacts are consistent with the relevant criteria listed in Annexes 4 to 10 inclusive. Where specific methodologies are not listed in the Annexes or where the methodologies for certain issues can only be established on a case-by-case basis, the Director will assess whether the proposed methodologies are consistent with the methodologies adopted for Hong Kong projects having similar issues or with methodologies accepted by recognized national/international organizations;

(d) whether the identification and descriptions of the potential environmental impacts in the EIA report are complete and whether all relevant criteria in Annexes 4 to 10 inclusive have been considered;

(e) whether the assumptions and methodologies used are sound and adequate;

(f) whether adverse environmental effects are avoided to the maximum practicable extent;

(g) whether the assessment has considered and compared the environmental benefits and disbenefits of various scenarios with or without the project;

(h) whether lessons learned from other similar projects are incorporated into the project;

(i) whether the report has sufficiently defined all environmental protection requirements and measures necessary to avoid or reduce the adverse environmental impacts to within the applicable standards or criteria;

(j) for impacts where there are no applicable quantitative standards or criteria, whether the report has defined the best practicable mitigation measures that shall be adopted for the project;

(k) whether the report has assessed and determined the feasibility, practicability, programming and effectiveness of the recommended mitigation measures;

(l) whether the report has adequately addressed the need for environmental monitoring and audit, and if it is considered to be necessary, whether it has sufficiently defined the required environmental monitoring and audit programme; and

(m) whether the report has listed out in a schedule the environmental protection requirements and mitigation measures that the applicant is prepared to implement.

4.4.3 Evaluation of the Residual Environmental Impacts: The residual environmental impacts refer to the net environmental impacts after mitigation, taking into account the background environmental conditions and the impacts from existing, committed and planned projects. When evaluating the residual environmental impacts (the net impacts with the mitigation measures in place), the following factors shall be considered:

(a) the importance of the residual environmental impacts in terms of the following factors:

(i) effects on public health and health of biota or risk to life: If the impacts may cause adverse public health effects and/or adverse impacts to the health of rare and/or endangered species or pose an unacceptable risk to life and/or survival of a wildlife species, they are considered as key concerns;

(ii) the magnitude of the adverse environmental impacts: Magnitude refers to the scale of the adverse environmental impacts. If the impacts are major, they are considered as key concerns. The extent to which the project would trigger or contribute to any cumulative environmental impacts when considered in conjunction with the

existing or potential impacts from other projects shall also be considered;

(iii) the geographic extent of the adverse environmental impacts: Widespread environmental impacts are of greater concern than localized adverse environmental impacts. The extent to which adverse environmental impacts may occur in areas away from the site for the designated project, including the long range transportation of pollutants shall also be considered;

(iv) the duration and frequency of the adverse environmental impacts: Normally more weight shall be given to long term, persistent and/or frequent environmental impacts in determining a project's environmental acceptability. Future adverse environmental impacts as well as their likelihood shall also be considered;

(v) the likely size of the community or the environment that may be affected by the adverse impacts: Those adverse impacts affecting larger numbers of people or greater areas of ecosystem shall be considered of greater importance;

(vi) the degree to which the adverse environmental impacts are reversible or irreversible: Irreversible adverse environmental impacts shall be considered as key concerns. The planned decommissioning or rehabilitation activities that may influence the degree to which the adverse environmental impacts are reversible or irreversible may be considered;

(vii) the ecological context: More weight shall be given to those adverse environmental impacts that occur in areas or regions that are ecologically fragile and/or rare or undisturbed or which have little resilience to imposed stresses;

(viii) the degree of disruption to sites of cultural heritage: Which means what disruptions would be caused to the site which would affect its archaeological, historical and/or palaeontological significance;

(ix) international and regional importance: Those adverse impacts which affect an issue of international or regional concern shall be regarded as important; and

(x) both the likelihood and degree of uncertainty of adverse environmental impacts: If the adverse environmental impacts are uncertain, they shall be treated more cautiously than impacts for which the effects are certain and the precautionary principle shall apply.

(b) the degree of compliance with relevant established principles and criteria as listed below:

(i) standards and criteria laid down in the ordinances and regulations applicable at the time of processing of the applications;

(ii) any guidelines, standards and criteria laid down in Annexes 4 to 10;

(iii) criteria and guidelines, other than (i) and (ii), published and adopted in Hong Kong in the conduct of EIA and in the application of the EIA process; and

(iv) where the matters are outside the jurisdiction of the Director and where there are no applicable ordinances and regulations, the principles, guidelines and criteria published by relevant authorities in Hong Kong.

4.5 Approval of the EIA Report

4.5.1 After the public inspection of the report and, if required, the consultation with the Advisory Council on the Environment, the EIA report shall be approved with or without conditions if

(a) the requirements in the EIA study brief have been met;

(b) the quality of the report meets the requirements as set out in Section 4.4 and the results and conclusions are technically sound and reliable;

(c) it addresses relevant environmental issues raised by the public and the Advisory Council on the Environment during the public inspection period; and

(d) all relevant environmental principles and criteria laid down in this technical memorandum can be met and the residual environmental impacts are acceptable.

4.5.2 In case the report requires certain amendments but such amendments will not affect the validity of the assessment and the overall results and conclusions of the report, the Director may approve the report with conditions.

5. PERMISSION TO PROCEED DIRECTLY TO APPLY FOR AN ENVIRONMENTAL PERMIT

5.1 The Director will permit an applicant to proceed directly for an environmental permit if the conditions set out in section 5(9) (a) and (b) of the Ordinance are satisfied. The environmental impact is considered to be adequately assessed in an EIA report in the register if the project is covered by that EIA report, the environmental impact of the project has been demonstrated to comply with the relevant guidelines and criteria adopted in that report, and the mitigation measures have been defined.

5.2 For a material change to an exempted project, the Director will permit the applicant to proceed directly to apply for an environmental permit if the conditions laid down in section 5(10) of the Ordinance are satisfied. If the environmental impact cannot be determined or if there are serious doubts or uncertainties on whether the mitigation measures can reduce the impacts to meet the criteria or guidelines, an EIA study shall be required to particularly address such issues.

5.3 By definition, the projects listed in Schedule 2 and 3 to the Ordinance have potential for causing adverse environmental impacts. Section 5(11) of the Ordinance applies to those projects which are proved beyond reasonable doubt that the environmental impact of the project falls well within the relevant guidelines and criteria laid down in this technical memorandum and the effectiveness of the mitigation measures has been demonstrated in practice. For the purpose of determining whether the environmental impact is likely to be adverse, it refers to the environmental impact of the project without mitigation measures in place. The Annexes 3 to 10 and other relevant factors in this technical memorandum shall be used to determine whether the environmental impact of the project is likely to be adverse. If the environmental impact of the project requires

detailed assessment to evaluate and confirm its acceptability, the Director will require an EIA study to be undertaken to particularly address such issues.

6. MATERIAL CHANGE TO A DESIGNATED PROJECT OR TO AN ENVIRONMENTAL IMPACT

6.1 The definition of "material change" in the Ordinance shall be used for a material change to a designated project. The material change shall only refer to significant changes which result in an adverse environmental impact. As a matter of principle, an environmental impact is considered to be adverse if any factor listed in Annex 3 applies and the criteria in Annexes 4 to 10 may be violated. As a general rule, changes under the following circumstances without additional mitigation measures in place are regarded as material changes to a designated project:

(a) a change to physical alignment, layout or design of the project causing an adverse environmental impact likely to affect existing or planned community, ecologically important areas or sites of cultural heritage;

(b) a physical change resulting in an increase in the extent of reclamation or dredging affecting water flow or quality likely to adversely affect ecologically important areas , or disrupting sites of cultural heritage;

(c) an increase in pollution emissions or discharges or waste generation likely to violate guidelines or criteria in this technical memorandum;

(d) an increase in throughput or scale of the project leading to physical additions or alterations that are likely to violate the guidelines or criteria in this technical memorandum; or

(e) a change resulting in physical works that are likely to adversely affect a rare, endangered or protected species, or an important ecological habitat, or a site of cultural heritage.

6.2 The environmental impact of a designated project, for which an environmental permit has been issued, is considered to be materially changed if the environmental requirements set out in the EIA report for this project (including relevant documents submitted under the Ordinance for that EIA report) may be exceeded or violated, even with the mitigation measures in place.

7. ISSUING ENVIRONMENTAL PERMIT

7.1 The Director will grant an environmental permit to the applicant if an EIA report covering the project has been approved with or without conditions under the Ordinance. For cases where permission is given to the applicant under section 5(9), 5(10) or 5(11) of the Ordinance to proceed directly to apply for environmental permit, the Director will grant an environmental permit if

(a) the applicant satisfies the conditions of approval under section 5(12) of the Ordinance that relate to the issue of environmental permit; and

(b) the applicant is prepared to implement the mitigation measures recommended in the previously approved EIA report referred to by the applicant, or the mitigation measures described in the project profile.

7.2 The Director will use the following criteria in determining the conditions to be imposed in an environmental permit:

(a) the mitigation measures set out in the project profile or the findings and conclusions of the approved EIA report, whichever is applicable;

(b) the conditions of approval of the EIA report;

(c) the conditions of approval for proceeding directly with the application for environmental permit;

(d) the advice given to him by other relevant authorities on matters within their jurisdiction as listed in Section 9 of this technical memorandum; or

(e) the measures that are necessary to meet the relevant guidelines, standards or criteria laid down in this technical memorandum; and

the Director will follow any advice received from the Secretary under Section 10 of this technical memorandum.

7.3 In addition, the following principles shall be followed when setting the conditions:

(a) conditions which would be imposed through other applicable ordinances or regulations shall not normally be imposed in environmental permits issued under the Ordinance;

(b) conditions may be imposed in addition to the requirements laid down in other applicable ordinances upon the advice of the relevant authorities, but this must be in accordance with section 10(8) of the Ordinance. There shall be adequate justification in the EIA report to demonstrate the need for such conditions to reduce the cumulative impacts of the project to avoid the violation of other applicable ordinances or exceedances of any applicable criteria, standards, guidelines or principles as defined in accordance with this technical memorandum.

7.4 Although the requirement for the EIA study for an industrial estate shall relate to the overall environmental impact of the entire estate, the Hong Kong Science and Technology Parks Corporation (HKSTPC) is not held responsible for the EIA studies for individual industrial factories listed as designated projects in the Ordinance. For an environmental permit to be issued to the HKSTPC, the Director shall not set conditions that are not within the control of the HKSTPC. The mitigation measures to be implemented by the HKSTPC shall be laid down in the EIA report. The conditions to be set in the environmental permit for an industrial estate shall not relate to individual factories and shall only be restricted to:

(a) the site formation, reclamation or the construction of the infrastructure of the industrial estate; or

(b) any mitigation measures for which it is the sole responsibility of the HKSTPC or within the control of the HKSTPC to implement during the operational phase.

7.5 The principles and criteria laid down in Section 7.4 shall apply to other statutory corporations similarly empowered by law with providing land for multiple private developments.

7.6 Any refusal of environmental permit shall only be on environmental grounds in accordance with the Ordinance and this technical memorandum, not on land use grounds.

8. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

8.1 The environmental permit may impose requirements for monitoring the environmental impacts of the project for verification of predictions or the effectiveness of measures to mitigate its environmental impacts, whether such impacts occur within or outside the physical boundary of the project. The environmental permit may also impose requirements for the formulation of environmental audit requirements, including any necessary compliance and post-project audit programme, in order to review the environmental monitoring data, assess compliance with regulatory requirements, policies and standards, and identify any remedial works required to redress unacceptable or unanticipated environmental impacts. In determining the need for and the scope of the environmental monitoring and audit programme, the Director shall have regard to the findings and recommendations in an approved EIA report.

8.2 In cases where any exceedances are likely to be limited either in time, space or magnitude and no environmentally sensitive uses shall be adversely affected in the long term, the Director may issue an environmental permit with appropriate conditions.

8.3 Implementation of environmental monitoring and auditing programme shall be required under the following circumstances:

(a) the project has the potential of causing environmental impacts which are or are likely to be prejudicial to the health or well being of people, the flora, fauna or ecosystem if the recommended mitigation measures are not properly implemented;

(b) the project is situated in any area of high conservation value;

(c) the project involves mitigation measures of which the effectiveness may require a long period to establish, e.g. compensatory planting of trees or mangroves;

(d) the project involves an unproven technology;

(e) the project involves unproven mitigation measures;

(f) an otherwise familiar or routine mitigation measure is proposed for a new or unfamiliar environmental setting;

(g) the analysis is based on a new technique or model, or there is other uncertainty about design assumptions and/or the conclusions; or

(h) project scheduling is subject to change such that significant environmental impacts could result.

8.4 The contents of a full environmental monitoring and auditing programme can include but are not limited to, the items listed in Annex 21.

9. TAKING ADVICE FROM OTHER RELEVANT AUTHORITIES

9.1 The Director shall take the advice from the following authorities on the matters prescribed below:

Director of Agriculture, Fisheries and Conservation	on	Nature conservation, ecological assessment, agriculture, animal and plant health, fisheries
Director of Planning	on	Landscaping and visual aspects
Director of Marine	on	Marine matters
Director of Electrical & Mechanical Services	on	Hazards associated with fuel gas dangerous goods; electromagnetic field
Director of Health	on	Human health matters
Director of Food and Environmental Hygiene	on	Collection of domestic waste and public cleansing; hazard to life related to food consumption
Director of Fire Services	on	Storage and conveyance of dangerous goods (except explosives) on land
Secretary for Development	on	Antiquities and monuments
Director of Drainage Services	on	Drainage matters
Director of Civil Aviation	on	Civil aviation matters
Director of Water Supplies	on	Developments or works within water gathering grounds or in the vicinity of waterworks installations
Commissioner for Transport	on	Traffic and transport matters

10. RESOLVING CONFLICTS UNDER SECTION 16(1)(f) OF THE ORDINANCE

10.1 The Director may seek and be authorized to follow the advice of the Secretary for cases referred to the Secretary by the Director under the following circumstances:

(a) where there is likely to be unresolved conflicts on the content of the EIA study brief or the EIA report under section 16(1)(f) of the Ordinance;

(b) where there is disagreement regarding the EIA findings and conclusions of the report between the Director and other Authorities listed under section 9 of this technical memorandum which requires resolution under section 16(1)(f) of the Ordinance; or

(c) where the mitigation measures described in the EIA report lead to conflicts which require resolution under section 16(1)(f) of the Ordinance.

10.2 In giving such advice, the Secretary shall ensure that the effect of his advice is to protect the environment.

10.3 Where the Secretary gives advice following the request under Section 10.1, the Director is required to follow such advice.

11. USE OF PREVIOUSLY APPROVED EIA REPORTS

11.1 Where a previous EIA report was prepared and deposited in the register, the applicant may make reference to or use the results of that report in his submissions. The applicant shall state in the project profile or the EIA report whether or not:

(a) the relevant findings of the report are still valid;

(b) the project is covered by that report, or is similar in nature, scale and locational characteristics of a project covered by that report; and

(c) necessary additions, amendments and adjustments have been made to take into account any changes in the environment, assessment criteria and methodologies, or in the nature, scale, location and design of the project.

11.2 Neither any previous submission nor prior approval of such material shall prejudice the need for an individual submission to fulfil the requirements either set out in this technical memorandum or under the Ordinance.

12. HAZARD ASSESSMENT

12.1 Hazard Assessment (HA) shall be conducted for projects if, and only if, risk to life is a key issue with respect to Hong Kong Government Risk Guidelines. Reference shall also be made to Section 4.4.3(a)(i) in so far as risk to life is concerned. The need for a HA and its technical requirements and procedures shall be considered by the Director subject to the advice of the authorities stated in Annex 22. The Risk Guidelines are set out in Annex 4 and Figure 1.

Annex 1

ANNEX 1: PROJECT PROFILE FOR DESIGNATED PROJECTS

Use of the following checklist for preparing a project profile shall ensure that the important environmental factors of a proposed project are to be considered by the Director in deciding what matters an EIA study shall address or whether the applicant can proceed directly to apply for an environmental permit.

2. If the applicant feels that additional or alternative types of information would also be useful, this information shall also be provided in the profile. The information shall include all existing and planned pollution sources or sensitive receivers or sensitive parts of the natural environment to the best knowledge of the applicant at the time of the submission. The provision of details may vary from case to case.

3. Wherever appropriate, the information shall be accompanied by relevant plans, process flowcharts, diagrams, illustrations and other information which may assist in deciding what matters an EIA study shall address and what requirements an EIA study shall meet, or whether an applicant can proceed directly to apply for an environmental permit.

BASIC INFORMATION

Project title

Purpose and nature of the project

Name of project proponent

Location and scale of project (include plans) and history of site

Number and types of designated projects to be covered by the project profile

Name and telephone number of contact person(s)

OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

How will the project be planned and implemented ? (consultant, contractor or in-house)

What is the project time-table ? (e.g. for appointment of consultants, finalizing of design, commencement of construction, commissioning and operation)

Are there any interactions with broader programme requirements or other projects which shall be considered ?

POSSIBLE IMPACT ON THE ENVIRONMENT

Outline any processes involved, including process flow diagrams, site plans, storage requirements, and information on emissions and discharges

Describe the environmental impacts or issues that may arise during the construction, operation or decommissioning of the project, where applicable:

- gaseous emissions
- dust
- odour
- noisy operations
- night-time operations
- traffic generation

- liquid effluents, discharges, or contaminated runoff
- generation of waste or by-products
- manufacture, storage, use, handling, transport, or disposal of dangerous goods, hazardous materials or wastes
- risk of accidents which would result in pollution or hazard
- disposal of spoil material, including potentially contaminated material
- disruption of water movement or bottom sediment
- unsightly visual appearance
- ecological and fisheries impacts

MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

a. Outline existing and planned sensitive receivers and sensitive parts of the natural environment which might be affected by the proposed project, such as:

- residential developments
- temporary housing areas
- educational institutions, including schools, kindergartens and nurseries
- health care facilities, including hospitals, clinics, and homes for the aged
- places of worship, including temples, churches, amphitheatre
- agricultural areas
- water courses, nullahs and confined bodies of water
- beaches, gazetted or otherwise
- water catchment areas and gathering grounds
- ground-water resources
- marine water resources including those for industrial uses, recreational uses or fisheries activities such as fishing grounds, shellfish harvesting/culture areas, fish spawning and nursery areas or fish culture zones
- industries which are sensitive to pollution
- airsheds with limited capacity to disperse pollution
- areas of conservation value, including Country Parks, Special Areas, Marine Reserves, Marine Parks, Ramsar Site, Sites of Special Scientific Interest, Conservation Area and ecologically significant areas such as woodland, wetland and other wildlife habitats
- places of high visual value
- sites of cultural heritage
- key public viewing points

b. Outline the major elements of the surrounding environment and existing and/or relevant past land use(s) on site which might affect the area in which the project is proposed to be located, such as:

- existing pollution blackspots
- nearby existing and/or discontinued industrial operations
- nearby trunk roads, and primary or secondary distributors
- nearby noisy commercial, community or recreational activities
- aircraft noise, helicopter noise, rail noise
- existing or planned waste handling, treatment and disposal facilities
- potentially hazardous installations
- noisy or dusty open storage uses
- existing and past land uses of the project site and environs

ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

a. Describe measures to minimize environmental impacts, including the following:
- pollution control technology
- source control
- waste management systems and practices
- potential for waste and wastewater minimization
- risk mitigation measures and accident emergency response plans
- acoustic barriers and insulation
- buffer zones and landscaping
- different siting of activities
- site layout and building design
- retention of natural environmental features
- control of construction work practices
- application of the Guidelines for dredging, reclamation & drainage works
- application of Chapters 9 and 10 of the Hong Kong Planning Standards & Guidelines

b. Comment on the possible severity, distribution and duration of environmental effects, where applicable:

- beneficial and adverse effects
- short and long term effects
- secondary and induced effects
- cumulative effects
- transboundary effects

c. Comment on any further implications, such as :

- history of similar projects
- public consultation to date
- public interest and political sensitivity

USE OF PREVIOUSLY APPROVED EIA REPORTS

Where a previous EIA report was prepared for a project of similar nature and the subject EIA report has been approved by the Director and deposited in the register under the Ordinance, the applicant may make reference to or use the results of that EIA report. The following information is to be provided:

- state the title of the approved EIA Report
- state the date of its approval
- state what environmental aspects of the project were addressed in that approved EIA report
- refer to the findings on environmental impacts, and state the relevance of such findings to this project
- state the measures recommended in the approved EIA report and their relevance to this project

Annex 2

ANNEX 2: PROJECT PROFILE FOR MATERIAL CHANGE TO A DESIGNATED PROJECT

Use of the following checklist for preparing a project profile shall ensure that the significant environmental factors of a proposed development are able to be considered by the Director in deciding what matters an EIA study shall address.

2. If the applicant feels that additional or alternative types of information would also be useful, this information shall be provided in the project profile. The information should include all existing and planned pollution sources and sensitive receivers to the best knowledge of the applicant at the time of the submission.

3. Wherever appropriate, the information shall be accompanied by relevant plans, process flowcharts, diagrams, illustrations and other information which may assist in deciding whether an applicant can proceed directly to apply for an environmental permit, or what matters an EIA study shall address and what requirements an EIA study shall meet.

BASIC INFORMATION

Project description

Nature of the project

Name of project proponent

Location of project (include plans)

Name and telephone number of contact person(s)

Proposed addition, modification and alteration

What is the time-table for the addition, modification or alteration (e.g. for appointment of consultants, finalizing of design, commencement of construction, commissioning and operation)

POSSIBLE IMPACT ON THE ENVIRONMENT

Comment on any activities associated with the proposed addition, modification or alteration which may result in environmental impacts, either during the construction or operation (or decommissioning) of the addition, modification or alterations:

(a) description of the environmental changes arising from the changes, additions or alterations;

(b) description of how the environment and the community might be affected by the above change;

(c) description of the findings or recommendations of any previous EIA report or environmental studies;

(d) description of possible environmental impacts arising from the proposed addition, modification or alteration;

(e) description on how these modification, addition or alteration deviate from or invalidates the previous assumptions in previous EIA reports.

DESCRIPTIONS OF MITIGATION MEASURES

(a) description on how the currently adopted measures address the likely environmental impacts arising from the changes;

(b) description of additional measures proposed to deal with such changes and whether this technical memorandum's requirements can be met.

USE OF PREVIOUSLY APPROVED EIA REPORTS

Where a previous EIA report was prepared for the project or a project of similar nature and the subject EIA report has been approved by the Director and deposited in the register, the applicant may make reference to or use the results of that EIA report. The following information is to be provided :

- title of the approved EIA report
- time of its approval
- whether the EIA report is approved under the EIA Ordinance or by other means
- the environmental aspects of the project that have been addressed in that approved EIA report
- the findings with regard to environmental impacts, and the relevance of such findings to this project
- the measures recommended in the approved EIA report and their relevance to this project

Annex 3

ANNEX 3: FACTORS FOR CONSIDERATION IN IDENTIFYING ADVERSE ENVIRONMENTAL IMPACTS

Environmental Changes	Effects Resulting from Environmental Changes
(a) negative effects on the quality and/or quantity of the chemical, physical and biological environment including - marine waters - surface water - groundwater - soil - land - air - marine bottom sediments	(a) negative effects on human health, including increases in mortality or morbidity, and/or decreases in personal well-being
(b) emissions, discharges or releases to the environment, including - persistent and/or toxic chemicals - sediments - biological or microbial agents - nutrients - agricultural wastes - domestic or industrial liquid/ semi-solid/solid wastes - electromagnetic field - noise - gaseous emissions, dust, odour - thermal energy	(b) disruptions to normal learning, sleeping, and communication activities
(c) threats to, loss of, or damage to flora and fauna and/or their habitats including habitat fragmentation	(c) reduction of the quality or quantity of recreational opportunities, amenities or perceived aesthetics
(d) disruption of food webs	(d) loss of, or damage to commercial species or renewable or non-renewable resources
(e) negative effects on the health of biota including flora and fauna	(e) foreclosure of future resource use or production
(f) the removal of resource materials from the environment	(f) reduction in biodiversity and/or extinction of species in the area/region concerned
(g) reduction in productivity of operations involved in primary or secondary production	(g) loss of or risk to human lives
(h) changes to existing landscapes	(h) effects of deposits on materials, material corrosion and damage (including nuisance and discomfort), and reduction in visibility
(i) obstruction of migration, or passage of wildlife	(i) disruption to social activities
(j) negative effects on the protection of cultural heritage	(j) temporary or permanent loss of recreational area
	(k) acute and chronic toxicity effects on biota due to discharge of pollutants
	(l) bioaccumulation and biomagnification of toxic substances in biota especially on commercial food supplies
	(m) long term and short term change on population size of biota including mortality, reproduction, maturity and distribution
	(n) temporal and spatial cumulative effects resulting from environmental changes

Annex 4

ANNEX 4: CRITERIA FOR EVALUATING AIR QUALITY IMPACT AND HAZARD TO LIFE

1. Air Quality Impact

1.1 The criteria for evaluating air quality impact include the following:

(a) meet the Air Quality Objectives and other standards established under the Air Pollution Control Ordinance (Cap. 311);

(b) meet 5 odour units based on an averaging time of 5 seconds for odour prediction assessment;

(c) for air pollutants not established under the Air Pollution Control Ordinance nor above: meet the standards or criteria adopted by recognized international organizations such as the World Health Organization or the United States Environmental Protection Agency as to be agreed with the Director.

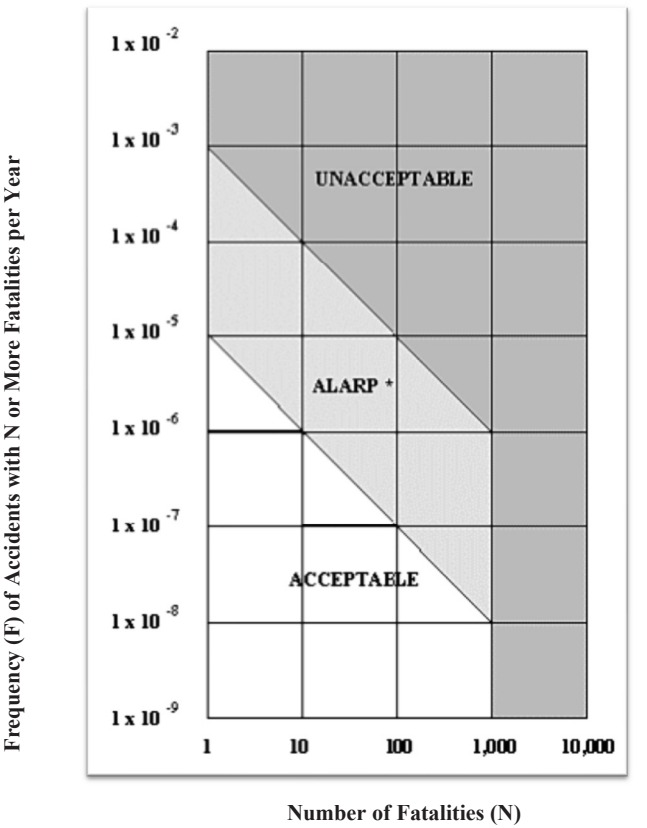
2. Hazard to Life

2.1 The criterion for hazard to human life is to meet the Risk Guidelines, as shown in Figure 1.

Figure 1: RISK GUIDELINES

1. **INDIVIDUAL RISK GUIDELINE FOR ACCEPTABLE RISK LEVELS**
   Maximum level of off-site individual risk should not exceed 1 in 100000 per year, ie. 1 x 10^{-5}/ year

2. **SOCIETAL RISK GUIDELINES FOR ACCEPTABLE RISK LEVELS**
   Societal risk for off-site population should conform to the following societal risk guideline:



*** ALARP Means As Low As Reasonably Practicable. Risk within ALARP Region Should Be Mitigated To As Low As Reasonably Practicable**

ANNEX 5: CRITERIA FOR EVALUATING NOISE IMPACT

Summary of Noise Criteria

Table 1 gives a summary of criteria for evaluating noise impact of designated projects. The Director would apply these criteria in the following manner:

(a) noise criteria laid down in relevant technical memoranda issued under the Noise Control Ordinance (Cap. 400) must be met;

(b) noise criteria, as listed in Table 1A, for planning and design of designated projects shall be met, unless it can be demonstrated by the applicant that the residual noise impact exceeding the criteria as listed in Table 1A would not have long term adverse implications for the environment and community. The Director would use the criteria listed in Section 4.4.3 (a)(ii)-(v), (x) and Section 4.4.3 (b) of this technical memorandum to evaluate whether there would be long term, adverse environmental noise implications;

(c) noise criteria, as listed in Table 1B, for construction or decommissioning of designated projects shall be met as far as practicable. All practicable mitigation measures shall be exhausted and the residual impacts are minimized;

(d) for noise matters not fully listed in this Annex, the criteria for evaluating such noise impacts shall be determined on a case by case basis;

(e) wherever such terms exist in the relevant technical memoranda issued under the Noise Control Ordinance, the definitions of such terms shall apply to this technical memorandum.

Table 1 : A Summary of Noise Criteria

Table 1A

Noise Standards for Planning Purposes

Noise Sources Noise Standards Common Uses	Aircraft Noise (Noise Exposure Forecast: NEF)	Helicopter Noise L_{max} dB(A) 0700 to 1900 Hours	Road Traffic Noise Peak Hour Traffic L_{10} (1 hour) dB(A)	Rail Noise	Fixed Noise Sources
• All domestic premises • Temporary housing accommodation • Hostels • Convalescent homes, and • Homes for the aged	25	85	70	The appropriate Acceptable Noise Levels shown in the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites	(a) 5 dB(A) below the appropriate Acceptable Noise Levels (ANL) shown in the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites, or (b) the prevailing background noise levels (For quiet areas with level 5 dB(A) below the ANL)
• Educational institutions (including kindergartens and nurseries) • Places of public worship, and • Courts of law	25	85	65		
• Hospitals and medical clinics	25	85	55		

Notes:

(1) The above standards, or equivalent, apply to uses which rely on opened windows for ventilation and are assessed at 1m from the external façade.

Table 1B

Noise Standards
for
Daytime Construction Activities

Uses	0700 to 1900 hours on any day not being a Sunday or general holiday Leq (30 mins) dB(A)
• All domestic premises, • Temporary housing accommodation, • Hostels • Convalescent homes, and • Homes for the aged	75
• Places of public worship, • Courts of law, and • Hospitals and medical clinics	70
• Educational institutions (including kindergartens and nurseries)	70 65 (during examinations)

Notes:

(1) The above standards apply to uses which rely on opened windows for ventilation and are assessed at 1m from the external façade.

(2) A Construction Noise Permit shall be required for carrying out relevant construction work during restricted hours under the Noise Control Ordinance. In case the applicant would like to evaluate whether carrying out relevant construction works during restricted hours under the Noise Control Ordinance is feasible or not in the context of programming construction works, reference should be made to relevant technical memoranda issued under the Noise Control Ordinance.

Table 2 : Suitable Window Types for Noise Insulation

Suitable window type when the estimated noise level will exceed the relevant standard by β value.

Window types / Exceedance over standard / Noise source	I	II	III
Road Traffic	$\beta < 10$	$10 \leq \beta < 15$	$\beta \geq 15$
Aircraft	-	$\beta < 10$	$\beta \geq 10$
Helicopter	$\beta < 5$	$5 \leq \beta < 10$	$\beta \geq 10$

Window Types and Noise Insulation Performance

I - openable well-gasketted window, transmission loss (TL) of 28dB or above in 250 Hz octave-band and sound transmission class (STC) 31 or above.

II - openable well-gasketted window, TL of 32 dB or above in 250 Hz octave-band and STC 34 or above.

III - openable well-gasketted windows, TL of 33 dB or above in 250 Hz octave-band and STC 38 or above.

Annex 6

ANNEX 6: CRITERIA FOR EVALUATING WATER POLLUTION

1. General Criteria

1.1 The Aquatic Environment

1.1.1 Criteria for protection of the aquatic environment against water pollution include consideration of the relevant aquatic components: **water, sediments** and **aquatic life**.

1.2 The Water Quality Objectives

1.2.1 Under the Water Pollution Control Ordinance (Cap. 358), the Water Quality Objectives (WQOs) are established in terms of measurements of physical, chemical and microbiological water quality in each Water Control Zone (WCZ) to achieve the required level of protection of the beneficial uses. Based on the beneficial uses, the WQOs can be broadly categorized as follows:

(a) Aesthetic Enjoyment: criteria concerning these aesthetic characteristics are general and descriptive. They depend on subjective senses of sight and smell. Criteria generally include:

- not to cause objectionable odours or discolouration of the water;
- not to cause visible matters on the water surface.

(b) Human Health: criteria concerning the quality of waters for bathing and secondary contact recreation uses, fish culture zones, mariculture subzones, and inland waters for abstraction of water for potable water supply. Key criteria include:

- to limit the maximum levels of bacteria in waters used for, bathing and secondary contact recreation activities, fish culture zones, mariculture subzones, etc.

(c) Aquatic Life: criteria concerning protection of the water quality to maintain the integrity and balance of the aquatic ecosystem. Criteria include:

- not to alter the physico-chemical properties e.g. turbidity, suspended solids, temperature, salinity, pH and dissolved oxygen of the water to such an extent that will cause unacceptable water quality impact on aquatic life;
- to control nutrient inputs so as to help reduction of eutrophication or excessive algal growth;
- to prevent concentration of toxic substances from reaching unacceptable levels.

(d) Industrial Use: criteria concerning prevention of deleterious chemicals, floatables and settleable matters affecting industrial uses of the water such as that for cooling systems, flushing water supply, etc.

1.3 The Mixing Zone Criteria

1.3.1 A mixing zone is therefore a region of a water body where the initial dilution of a discharge or input to the water body takes place and where water quality criteria can be exceeded. It generally consists of a zone of initial dilution (ZID), where initial mixing and dilution by momentum and buoyancy of the discharge occur, and the

subsequent dilution zone which is extended to cover the secondary mixing from the ZID out to the edge of the mixing zone where water quality criteria need to be met.

1.3.2 It has been a well-established international practice to allow a mixing zone not fully meet all water quality criteria. The characteristics of a mixing zone such as the size, siting, shape and quality, depend on the quantities and properties of the effluent discharge and the characteristics of the receiving water body, and should be determined on a case-by-case basis. In general, the criteria for acceptance of a mixing zone are that:

(a) it shall not impair the integrity of the water body as a whole;
(b) it shall not endanger or diminish areas of sensitive beneficial uses, e.g. gazetted beaches and ecologically sensitive sites;
(c) it shall not result in the accumulation of substances to such levels as to produce unacceptable toxic effects in aquatic organisms;
(d) within a mixing zone the following basic water quality criteria shall be met
- materials not in such concentrations that settle to form objectionable deposits;
- floating debris, oil, scum, and other matter not in such concentrations that form nuisances; and
- substances not in such concentrations that produce objectionable colour, odour, or turbidity.
(e) at the boundary of the mixing zone, the discharge of any effluent shall not cause the WQOs or applicable criteria for pH, 5-day Biochemical Oxygen Demand (BOD_5), dissolved oxygen, suspended solids, ammonia nitrogen, bacteria and ecotoxicity to be exceeded; and
(f) for total inorganic nitrogen (TIN), which is set to prevent undesirable algal bloom, as the level is heavily influenced by the background seasonal estuarine input, the criteria should be assessed such that the discharge will not cause any further deterioration by more than 30% of the annual average levels, if their existing levels have exceeded or are close to the established WQO.

1.4 Cumulative Impacts

1.4.1 Cumulative impacts occur when multiple inputs of pollutants enter the same aquatic environment, leading to overlapping zones of influence, or where there is potential cumulative reduction in assimilative capacity caused by marked reduction in water exchange following sequential implementation of projects over a period of time. Criteria for evaluation are based on identification of the relevant pollution inputs and their impact zones, and consideration of the assimilative capacity of the water body that encompasses the relevant overlapping zones of influence over a certain period of time.

2. <u>Activity/Project Specific Criteria</u>

These criteria are to supplement and to be considered in conjunction with the General Criteria.

2.1 Discharges of Wastewater and Treated Sewage Effluent

2.1.1 It should be noted that the effluent standards of discharges are set by the Authority under the Water Pollution Control Ordinance . The purpose of the EIA study is to assess whether the proposed discharge can meet the criteria as stated in Section 1.3.2 through quantitative or qualitative analysis such as water quality modelling based on the hydrodynamics and

assimilative capacity of the receiving water body, as well as the average effluent quality of the treatment level adopted.

2.1.2 Nutrients (i.e. TIN and phosphorus), though essential to aquatic life, may lead to eutrophication if over-enrichment occurs, causing increases in undesirable algal blooms. However, algal blooms in coastal waters (including Hong Kong) are generally controlled by a combination of natural hydrodynamic, weather and biological factors, such as water current, wind speed and direction, sunlight intensity, turbidity, temperature, water stratification, biological grazing or consumption, etc., in addition to nutrients. Moreover, the nutrient levels in Hong Kong waters are heavily influenced by the background seasonal estuarine input. Hence, it is acceptable to adopt an applicable benchmark treatment level as an alternative acceptance criteria to the TIN criteria and prevention of undesirable algal blooms set out in Section 1.3.2 for discharges of treated sewage effluent, which is a common practice worldwide. The acceptable treatment levels for discharges from sewage treatment facilities are listed in the table below. In general, submarine discharge outfall may not be necessary for discharges already undergoing secondary treatment plus disinfection, provided that its mixing zone would not encroach into water sensitive receivers (WSRs) such as gazetted beaches, fish culture zones, mariculture subzones, ecological sensitive sites, etc.

Water Control Zone/Waters Receiving the discharge	**Acceptable Sewage Treatment Level**[1]
Tolo Harbour and Channel, Deep Bay[2]	Secondary treatment, nitrogen removal[3], phosphorus removal[4], and disinfection[5]
Other Water Control Zones	Secondary treatment, nitrogen removal[3] and disinfection[5]

Notes:
1. Subject to feasibility investigation and water quality assessment, other alternative treatment level can be proposed and considered.
2. The phosphorus removal requirement shall not be applied for temporary discharges into Deep Bay and Tolo Harbour, for example due to maintenance of the effluent export systems.
3. For nitrogen removal, the target is 75% total inorganic nitrogen reduction with respect to the annual average influent nitrogen loads or concentrations.
4. For phosphorus removal, the target is 80% phosphorus reduction with respect to the annual average influent phosphorus loads or concentrations.
5. Disinfection may not be required if membrane filtration is provided which can meet the relevant discharge standards for bacteria.

2.2 Dumping of Wastes

2.2.1 Criteria for acceptability and control of dumping of wastes in the aquatic environment are governed by the Dumping at Sea Ordinance (Cap. 466). The criteria laid down in the annexes to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) and its Protocol also apply.

2.3 Stormwater Runoff

2.3.1 Criteria for control of diffuse pollution shall be based on measures to control pollution at source and to abate pollutants in the stormwater runoff. These criteria are to be met

through the implementation of stormwater management practices which include, but not be limited to:

(a) erosion and sedimentation control;
(b) runoff quantity and quality control;
(c) identification and minimization of point source discharges;
(d) prevention of "first flush" pollution;
(e) avoidance of discharges into poor flushing areas except artificial wetlands designed for pollution abatement;
(f) filtration of polluted stormwater or diversion for further treatment.

2.4 Toxic and Prohibited Substances

2.4.1 The criteria are that there shall be no threat to aquatic life through control of toxic substances mainly at source by pollution prevention, pretreatment, and recycle and reuse. Substances that are toxic, persistent and accumulative in water, sediment or biota, and that cannot be rendered harmless by dilution, dispersion and other natural processes of the aquatic system and for which no numerical water quality criteria are available shall be controlled at source. Discharges of radioactive substances are prohibited.

2.4.2 The whole effluent toxicity criteria for discharge of treated sewage effluent should not exceed 0.3 Acute Toxic Unit (TUa) after the ZID and 1.0 Chronic Toxic Unit (TUc) after the mixing zone, respectively.

Annex 7

ANNEX 7: CRITERIA FOR EVALUATING WASTE MANAGEMENT IMPLICATIONS

1. General

1.1 The criteria for assessing waste management implications are:

(a) provide waste handling, storage, collection, transfer, treatment and disposal facilities to deal with waste arising from the development;

(b) meet relevant requirements under the Waste Disposal Ordinance (Cap. 354) and the subsidiary legislation made thereunder;

(c) provide handling, storage, collection and disposal of waste generated during construction phase in accordance with the requirements of the Waste Disposal Ordinance and the Dumping at Sea Ordinance;

(d) provide facilities to facilitate waste reduction and explore beneficial use of waste generated, taking into account :

- the quantity of waste arising
- the physical and chemical nature of the waste materials
- the practicality of on-site measures to render the waste acceptable for beneficial use
- the availability of outlets for beneficial use of the waste in Hong Kong
- the environmental effect in any waste reduction practice and additional handling of waste for beneficial use

(e) explore alternatives which generate minimal amount of waste through design modifications and programming of works;

(f) for residential and community developments close to existing landfills, safety and precautionary measures to minimize the risks due to landfill gas (LFG) migration or leachate contamination. In particular, for development or re-development that is within 250 m of the edge of waste, a landfill gas hazard assessment is typically required to assess the risk associated with LFG and, where necessary, design practical precautionary/mitigation measures to protect the proposed development against the associated risk.

Annex 8

ANNEX 8: CRITERIA FOR EVALUATING ECOLOGICAL IMPACT

Ecological impact refers to the effect on a habitat or species due to direct or indirect changes (such as light impact, loss of natural light) in the environment brought about by a project. Besides magnitude and scale, the significance of an ecological impact is also related to the asserted importance of the habitat or species to be affected. In general, the impact on an important habitat or species will be more significant in comparison to other less important ones.

2. The following are some general criteria that can be used for evaluation of the significance of an ecological impact and the ecological importance of a site/habitat or a species. These criteria are not exhaustive and may carry different weight in different cases.

Table (1) Evaluating the significance of an ecological impact

Criteria	Remarks
Habitat quality	The impact will be more significant if ecologically important habitats are affected. The criteria used for evaluating the ecological importance of a site/habitat are shown in Table (2). Habitat types that are considered as important in the territory are listed in Note below.
Species	The impact will be more significant if ecologically important species are affected. The criteria used for evaluating the ecological importance of a species are shown in Table (3).
Size/Abundance	The impact will be greater if larger area of a habitat or greater numbers of organisms are affected. (e.g. The impact of indiscriminate clearance of woodland is more severe than that of selective felling of trees at the same site.)
Duration	Long term impacts are usually more significant than short term ones.
Reversibility	Permanent and irreversible impacts are usually more significant than temporary and reversible ones.
Magnitude	Usually the greater the magnitude of the environmental changes (e.g. increase in pollution loads, decrease in food supply), the more significant is the impact.
Regional significance	The impact will be more significant if the habitats and species affected constitute a higher proportion of such habitats or species in the territory. Habitats or species with restricted distribution will be subject to greater impact than those with wider occurrence, particularly if they are rare in the territory or region. The distribution of habitats or species and the connectivity among different habitat patches or populations in the territory or region should be considered in assessing the significance of impacts.

Note : Important habitat types in the territory

1. mature native woodland and secondary woodland dominated by native species larger than one hectare
2. undisturbed natural coastal area larger than one hectare or longer than 500 metres in linear measurement

3 intertidal mudflats larger than one hectare
4 established mangrove stands of any size
5. brackish or freshwater marshes larger than one hectare
6 established seagrass bed of any size
7 natural stream courses and rivers longer than 500 metres
8. established coral communities of any size
9. other habitats found to have special conservation importance by documented scientific studies

Table (2) Evaluating a site/habitat

Criteria	Remarks
Naturalness	Truly natural habitats (i.e. not modified by man) are usually highly valued. However, most areas of the territory have been modified. Generally, those habitats less modified will tend to be rated higher.
Size	In general larger area of habitat(s) shall be more valuable than smaller ones, all else being equal.
Diversity	The more diverse the species assemblages and communities of a site, the higher is its conservation value.
Rarity	Rarity can apply to habitats as well as species. The presence of one or more rare habitats and species will give a site higher value than those without rarity.
Re-creatability	Habitats which are difficult to be re-created naturally or artificially are usually valued higher.
Fragmentation	In general, the more fragmented habitat, the lower is its value.
Ecological linkage	The value of a habitat increases if it lies in close proximity and/or links functionally to a highly valued habitat of any type.
Potential value	Certain sites, through active management or natural processes, may eventually develop a nature conservation interest substantially greater than that existing at present. Factors limiting such potential being achieved shall be noted.
Nursery/breeding ground	Such areas are very important for the regeneration and long term survival of many organisms and their populations
Age	Ancient natural or semi-natural habitats are normally highly valued. For some habitats such as woodlands, older ones are normally valued much higher than recent ones.
Abundance/Richness of wildlife	In general sites supporting more wildlife will be rated higher.

Table (3) Evaluating species found within a site/habitat

Criteria	Remarks
Protection status	Species listed in threatened categories or protected under local legislation and international conventions for conservation of wildlife shall be given special attention. References shall also be made to those protected by law in Mainland China, especially Guangdong Province.
Distribution	Species with restricted distribution (locally or regionally) will be rated higher than those more widespread ones. More weight shall be given to species which are endemic to Hong Kong or South China.
Rarity	Normally the rarer the species, the more value it has. However care shall be taken in assessing exotic weeds, escaped cultivars or captive species, vagrants and introduced species which have lower value. Greater weight shall be given to those which are internationally rare, then to regionally rare (within South China) and finally locally rare (within Hong Kong) species. Reference could be made to Red Lists and species lists of international conventions for conservation of wildlife.

ANNEX 9: CRITERIA FOR EVALUATING FISHERIES IMPACT

The following table is some general criteria that can be used for evaluation of fisheries impact of a proposed project:

Criteria	Conditions under which the fisheries impacts of a project would be rated higher.
Nature of impact	Impacts are permanent, irreversible or long term.
Size of affected area	The area of fisheries habitats, fishing grounds or aquaculture sites affected constitutes a high proportion of the total area of fisheries habitats, fishing grounds or aquaculture sites in Hong Kong.
Loss of fisheries resources/production	The loss of fisheries resources/production (including capture fisheries and aquaculture production) constitutes a high proportion of total fisheries resources/production in Hong Kong.
Destruction and disturbance of nursery and spawning grounds	Nursery and spawning grounds of commercially important species are disturbed or destroyed, affecting the recruitment of juveniles and hence the adult population in future.
Impact on fishing activity	Large number of fishermen or fishing vessels are affected.
Impact on aquaculture activity	Large number of aquaculturists or aquaculture farms are affected.

Annex 10

ANNEX 10: CRITERIA FOR EVALUATING LANDSCAPE AND VISUAL IMPACT, AND IMPACT ON SITES OF CULTURAL HERITAGE

1. Criteria for Assessment of Landscape and Visual Impact

1.1 The evaluation of landscape and visual impact may be classified into five levels of significance based on type and extent of the effects concluded in the EIA study:

(a) The impact is beneficial if the project will complement the landscape and/or visual character of its setting, and/or will improve overall landscape and visual quality;

(b) The impact is negligible if the assessment indicates that there will be no noticeable effects or there will be insignificant effects on landscape with distinctive character/resources and/or there will be no noticeable effects or insignificant visual effects caused by the project;

(c) The impact is slight if there will be slight adverse effects on landscape with distinctive character/resources and/or there will be slight adverse visual effects caused by the project;

(d) The impact is moderate if there will be some adverse effects on landscape with distinctive character/resources, and/or there will be some adverse visual effects caused by the project, but these can be eliminated, reduced or moderated to a certain extent by design/mitigation measures; and

(e) The impact is substantial if the adverse effects are considered too excessive and obstructive, and significant modification is required to mitigate the impacts.

2. Criteria for Assessment of Impact on Sites of Cultural Heritage

2.1 The criteria for evaluating impact on sites of cultural heritage include:

(a) The general presumption in favour of the protection and conservation of all sites of cultural heritage because they provide an essential, finite and irreplaceable link between the past and the future and are points of reference and identity for culture and tradition.

(b) Adverse impacts on sites of cultural heritage shall be kept to the absolute minimum.

ANNEX 11: CONTENTS OF AN ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EXECUTIVE SUMMARY IN ENGLISH AND CHINESE

- Summary of main issues, findings, conclusions and recommendations

INTRODUCTION

- Background of the project
- Purpose of the EIA study
- The approach

DESCRIPTION OF THE PROJECT

- Key project requirements
- Site location and site history
- Nature, scope and benefits of the project
- Size or scale, shape and design of the project
- Project timetable and phasing of the project
- Means by which the project will be implemented
- Any related projects
- Type, scope, scale, frequency and duration of the construction, operational or decommissioning (if relevant) activities
- Background and history of the project, including considerations given to different options, and the project's different siting or alignment
- Description of scenarios with or without the project

ENVIRONMENTAL LEGISLATION, POLICIES, PLANS, STANDARDS AND CRITERIA

- Applicable environmental ordinances and regulations
- Applicable government environmental policies and plans
- Applicable environmental standards and criteria
- Other references

DESCRIPTION OF THE ENVIRONMENT

- Baseline environmental conditions
- Environmental trends

DESCRIPTION OF ASSESSMENT METHODOLOGIES

- Assessment methodologies, assumptions and criteria, including sample calculations and input and output files of a typical model run for all mathematical modelling

IDENTIFICATION OF ENVIRONMENTAL IMPACTS

- Potential environmental impacts including the types, characteristics and estimated quantities of emissions, discharges, wastes, potential risks, disturbances or displacement associated with the activities relating to the project during construction, operation and decommissioning phases
- Description of resources or receivers which are vulnerable to change or environmental impacts

PREDICTION AND EVALUATION OF ENVIRONMENTAL IMPACTS

- Prediction of environmental impacts (including beneficial or adverse; direct or indirect; short term or long term; reversible or irreversible; transboundary; cumulative)
- Evaluation of predicted environmental impacts against relevant environmental legislation, policies, plans, standards and criteria

MITIGATION OF ADVERSE ENVIRONMENTAL IMPACTS

- Measures to eliminate, reduce or remedy adverse environmental impacts

DEFINITION AND EVALUATION OF RESIDUAL ENVIRONMENTAL IMPACTS

- Definition and evaluation of net environmental impacts with mitigation measures in place

ENVIRONMENTAL MONITORING AND AUDIT

- Need for and scope of monitoring and audit
- Environmental monitoring and audit requirements, if found to be necessary, and the related environmental monitoring and audit programme

CONCLUSIONS AND RECOMMENDATIONS

SCHEDULE OF RECOMMENDED MITIGATION MEASURES

- A schedule of all mitigation measures recommended in the EIA report, listing out what the mitigation measures are, by whom, when, where and to what requirements, and including the key environmental monitoring and audit requirements

APPENDIX

- Responses to comments received

ANNEX 12: GUIDELINES FOR AIR QUALITY ASSESSMENT

1. General

1.1 This Annex describes the commonly adopted approaches and methodologies for assessment of air quality impact arising from designated projects. The methodologies may vary from case to case, depending on the nature of air quality issues and the latest development in methods and techniques.

2. Determination of Air Sensitive Receiver

2.1 Any domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre shall be considered to be air sensitive receiver. Places/premises in which exposure is transient in nature (for example, cycle track, pedestrian walkway, bus stop, mini-bus stop, and taxi stand) are not considered to be air sensitive receivers.

2.2 Any other premises or place with which, in terms of duration or number of people affected, has a similar sensitivity to the air pollutants as the aforelisted premises and places shall also be considered to be a sensitive receiver.

3. Assessment Methodology

The air quality assessment shall take into consideration the following aspects:

3.1 Identification of Emission Characteristics

It involves the identification of emission characteristics for major sources (including new source(s) proposed in the EIA study, if any) within the study area including, but not limited to, the following elements:

(a) emission rates, exit velocity and exit temperature as a function of load, time and air pollutants emitted for maximum, average and nominal operating/design conditions;

(b) location, height of emission, grade level above mean sea level and physical dimensions (areas, volumes and lines) of emission points;

(c) anticipated growth changes over the time horizon of the EIA study.

3.2 Description of Study Area

The study area for assessing air quality impact may vary from case to case and the EIA study brief may prescribe the study area. It involves the description of the topographical and man-made features which may affect the dispersion characteristics of air pollutants within the study area. This includes terrain height, existing and potential land use within the study area.

3.3 Description of Air Sensitive Receivers

It involves the description of locations, height, and grade level of air sensitive receivers.

3.4 Baseline Study

It involves the description of the existing air quality based on, but not limited to, existing air quality monitoring on-site or quality assured measured data which can be obtained from government agencies, companies or institutions. The baseline study involves a discussion of background air quality value due to other non-project emission sources in the study area and contributions from sources outside the study area.

3.5 Meteorological Conditions

Assessment shall use recent and representative sequential hourly meteorological data obtained from monitoring site or numerical weather simulation. When meteorological data from a monitoring site is adopted, justification is required to demonstrate the representativeness of the monitoring site for the study area. When meteorological data from numerical weather simulation is adopted, it shall refer to EPD Guidelines for Local-Scale Air Quality Assessment Using Models.

3.6 Impact Prediction and Assessment

(a) Quantitative assessment results shall provide information on the areas of maximum impacts in the study area and cumulative impacts due to background and identified sources.

(b) Presentation of quantitative assessment results shall be assisted by summary tables and contour map of pollutant concentration.

(c) Quantitative assessment results shall be compared with acceptable air quality standards as defined according to Annex 4.

(d) Dust emission from a construction site is controlled under the Air Pollution Control (Construction Dust) Regulation, which sets out effective construction dust control requirements including but not limited to covering the dusty materials and keeping ground surface wet by water spraying to suppress the release of construction dust. Construction dust assessment shall be conducted qualitatively to ensure that the Air Pollution Control (Construction Dust) Regulation is complied with.

ANNEX 13: GUIDELINES FOR NOISE ASSESSMENT

1. General

1.1 The Annex describes the commonly adopted approaches and methodologies for assessment of noise impacts arising from designated projects. The methodologies may vary from case to case, depending on the nature of noise issues and the latest development in methods and techniques.

2. Potential Noise Sources

2.1 The potential noise sources could be, but not limited to, the following:

(a) aircraft noise

(b) helicopter noise

(c) road traffic noise

(d) rail noise

(e) fixed noise sources (including, but not limited to, general industrial noise sources, concrete batching plants, pump houses, gas pressure reduction plants, rock crushing plants, quarries, railway depots/marshalling yards, airport facilities, wholesale markets, bus depots/termini, open car/lorry parks, vehicle pounding areas, refuse handling areas, abattoirs, container terminals, sand depots, public cargo working areas, multi-purpose terminals, fire stations, ambulance depots, tram depots)

(f) construction noise

3. Noise Sensitive Receivers

3.1 The potential noise sensitive receivers, including existing, committed and planned, could be, but not limited to, the following:

- all domestic premises
- temporary housing accommodation
- hostels
- convalescent homes
- homes for the aged
- educational institutions (including kindergarten and nurseries) .
- places of public worship
- courts of law
- hospitals
- medical clinics, and
- any other premises or places that are considered by the Director to have similar sensitivity to noise as the above

4. Noise Tolerant Uses

4.1 The potential noise tolerant uses could be, but not limited to, the following:

(a) multi-storey carparks
(b) multi-storey markets
(c) warehouses
(d) community uses (e.g. sports complexes, community centres)
(e) commercial centres/premises, or
(f) other premises (which do not rely on opened windows for ventilation)

5. Assessment Methodology

Road Traffic Noise

5.1 The assessment methodology shall be agreed with the Director prior to the commencement of assessment. Predictions shall normally be based on the design traffic conditions or the maximum traffic projections within 15 years upon operation of the roadworks or occupation of the noise sensitive receivers or uses, whichever appropriate, and shall take into consideration future (both committed and planned) as well as existing roadworks and land uses.

Fixed Noise Sources

5.2 The EIA study shall identify the potential sources and implications for mitigation measures at operation phase. The applicant shall, unless otherwise agreed by the Director, qualitatively demonstrate no adverse fixed noise impact in association with the project in the EIA study. During the pre-tender stage, if any, and before commencement of the project, the applicant shall submit the quantitative fixed noise sources impact assessment for approval, unless otherwise agreed by the Director. The assessment methodology shall be agreed with the Director prior to the commencement of assessment. For assessment point and correction of tonality, impulsiveness and intermittency, reference shall be made to the Technical Memorandum for the Assessment of Noise from places other than Domestic Premises, Public Places or Construction Sites, issued under the Noise Control Ordinance.

Construction Noise

5.3 The applicant shall, unless otherwise agreed by the Director, qualitatively demonstrate no adverse construction noise impact would be associated with the project in the EIA study by adopting quieter construction method and equipment. During the pre-tender stage, if any, and before commencement of the project, the applicant shall submit the quantitative construction noise impact assessment with the project implementation details and proposed noise mitigation measures for approval, unless otherwise agreed by the Director. The assessment methodology shall be agreed with the Director prior to the commencement of assessment.

5.4 In case the proponent or consultant would like to assess whether a Construction Noise Permit could be issued or not in the context of programming construction works, reference should be made to the relevant technical memoranda issued under the Noise Control Ordinance. Where no sound power levels can be found in the technical memoranda under the Noise Control Ordinance, reference shall be made to sound power levels adopted in previous projects in Hong Kong or agreed with the Director. However, whether the Noise Control Authority would issue a Construction Noise Permit would depend on the application submitted according to the procedures laid down in the relevant technical memoranda issued under the Noise Control Ordinance rather than under the EIA process.

Rail Noise

5.5 The assessment methodology shall be agreed with the Director prior to the commencement of the assessment.

Aircraft/Helicopter Noise (Civil Aviation)

5.6 The assessment methodology shall be agreed with the Director, in consultation with the Director-General of Civil Aviation, prior to the commencement of the assessment.

5.7 For designated projects specified in Items B.1 and B.2 in Part I of the Schedule 2 to the Ordinance, noise sensitive receivers, located under or close to the aircraft flight paths of the Hong Kong International Airport (including those outside NEF 25 contour of the Hong Kong International Airport) and/or any helicopter routes, shall be assessed by making reference to the relevant information, including but not limited to aircraft flight paths and helicopter routes published in the Hong Kong Aeronautical Information Publication.

6. Consideration of Mitigation Measures

6.1 Where the predicted noise impacts exceed the applicable noise criteria, direct mitigation measures as shown below shall be considered and evaluated in an appropriate manner :

(a) treatment of source
(b) low noise road surfacing
(c) quieter construction method and quieter construction equipment
(d) alternative land use arrangement
(e) setback of buildings
(f) screening by noise tolerant buildings
(g) noise barrier/enclosure
(h) decking over
(i) extended podium
(j) building orientation
(k) architectural features
(l) acoustic windows/balconies [Note 1]
(m) special building design

Note 1: When adopting direct mitigation measures on the façade of noise sensitive receivers, the mitigated noise levels shall take into account the noise reduction performance of the measures.

6.2 If mitigation measures are required on the planned land uses even after adoption of all practicable direct measures on the noise sources not controlled under the Noise Control Ordinance, the practicality of these mitigation measures shall be evaluated and confirmed with relevant authorities.

6.3 Upon exhaust of direct mitigation measures, indirect mitigation measures in the form of window insulation and air-conditioning is often the "last resort" in an attempt to abate the residual impact from noise sources not controlled under the Noise Control Ordinance, such as aircraft, road traffic and helicopter, because it will practically deprive the receivers of outdoor activities and an "open-window" life style. If a compromise is necessary when there are overriding constraints on the location and design of a development, which prevent full compliance with the appropriate noise standards laid down in Annex 5, an attempt shall be made to maximize the proportion of receivers protected, using effective noise mitigation measures at sources, at path or building layout designs of the development. The remaining unprotected receivers shall be insulated using the suitable single frame double pane window types described in Table 2 of Annex 5. The acoustic insulation shall also require the provision of air-conditioning systems because of the warm and humid climate in Hong Kong.

ANNEX 14: GUIDELINES FOR ASSESSMENT OF WATER POLLUTION

1. General

1.1 The Annex describes the commonly adopted approaches and methodologies for assessment of water pollution arising from designated projects.

2. Aquatic System subject to Water Pollution Impact

2.1 In identifying and evaluating water pollution impacts on the aquatic environment, the following aspects shall be considered:

(a) **Water** as characterized in terms of:

(i) physical and chemical properties such as temperature, salinity, conductivity, pH, colour, dissolved oxygen, turbidity, suspended solids, and organic material concentration measured by 5-day Biochemical Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD) or Total Organic Carbon (TOC);
(ii) pathogenic indicator organisms;
(iii) toxic substances such as ammonia, heavy metals, residual chlorine, pesticides and industrial chemicals/by-products; and
(iv) eutrophication related factors and indicators reflected by dissolved oxygen, nutrients, chlorophyll-a, frequency of red tide occurrence, and marked changes in density and composition of key phytoplankton groups such as diatoms and dinoflagellates.

(b) **Sediments** as characterized in terms of physical and chemical properties and constituents, including parameters such as pH, organic contents, nutrients, sulphide, toxic substances, etc.

3. Beneficial Uses Sensitive to Water Pollution

3.1 Existing or potential beneficial uses that are sensitive to water pollution shall include, but not be limited to:

(a) areas of ecological or conservation values including existing or gazetted proposed marine parks and marine reserves, aquatic systems of the sites of special scientific interest (SSSI), and existing or gazetted proposed country parks and special areas, wetlands, conservation area, mangroves and important freshwater habitats;
(b) areas for abstraction of water for potable water supply, aquaculture and irrigation;
(c) fish spawning and nursery grounds, fish culture zones, mariculture subzones including shellfish culture site and brackish/freshwater fish ponds;
(d) gazetted beaches and other secondary contact recreation areas;
(e) water abstraction for cooling, flushing and other industrial purposes;
(f) enclosed or sheltered water bodies including typhoon shelters, marinas and boat parks.

4. Assessment Approach

4.1 Assessment shall rely on the concept of assimilative capacity of the receiving water body and Water Quality Objectives (WQOs). Assimilative capacity will depend on the characteristics of each site, the type and number of discharges or activities as well as the beneficial uses in question. Evaluation of the assimilative capacity of the receiving waters shall take into account the relevant physical, chemical and biological processes. Sensitive receivers based on beneficial uses shall be identified and the water quality impact shall be assessed with reference to the WQOs or other relevant criteria covered in Annex 6. The implementation of the project shall not result in

exceedance of the relevant WQOs for turbidity, suspended solids, temperature, salinity, pH, dissolved oxygen and bacteria for the beneficial uses to be protected for the water body.

4.2 For nutrient and prevention of undesirable algal bloom, as the level of total inorganic nitrogen (TIN) is largely influenced by the estuarine background inputs, the criteria may be assessed such that the discharge of wastewater or treated sewage effluent shall not cause any further deterioration by more than 30% of the annual average TIN levels, if the background levels have exceeded or are close to the established WQO, as set out in Section 1.3.2 of Annex 6. Alternatively, the nutrient requirement for any sewage treatment facilities can be met through adopting the acceptable treatment level set out in Section 2.1.2 of Annex 6, for the purpose of preventing undesirable algal bloom.

4.3 The discharge of wastewater and treated sewage effluent shall not cause any toxic impact that may affect aquatic life. The whole effluent toxicity criteria for such discharge should not exceed 0.3 Acute Toxic Unit (TUa) after the zone of initial dilution (ZID) and 1.0 Chronic Toxic Unit (TUc) after the mixing zone, respectively.

4.4 In evaluating water pollution impacts, both point and non-point sources of water pollutants shall be considered. Non-point pollutants refer to those substances which can be introduced into the receiving water body as a result of urban or rural runoff. Point sources are related to specific discharges from municipal or industrial facilities.

5. Assessment Methodology

5.1 Assessment methodology shall be site- and activity-specific. Assessment framework shall include the following elements:

Identification of Impact-causing Factors

5.2 It involves the identification and characterization of the impact-causing factors associated with a project. Information shall be based on specific features of the project, including coastline and river modifications, construction activities such as dredging and dumping, quality and quantity of wastewater and thermal discharges, changes in land-use and drainage, maritime wastes, waste disposal facilities and leachates, and non-point pollution sources. Consideration shall also include threat to aquatic life from exposure to toxic substances, and reduction in flushing or assimilative capacities of the water body.

Determination of the Impact Boundary

5.3 An essential first step in assessing the impact of an activity on the water body is the determination of the impact boundaries. The impacted area can be defined as the near-field and far-field. The near-field is where the initial dilution occurs and is determined by physical or hydrodynamic processes. The far-field refers to the subsequent, more complicated dilution which depends on water transport, physio-chemical processes, biological processes, etc. Estimating the impact area has to be carried out at the early stage of the assessment but may have to be revised in the light of information that emerges during the assessment process.

Baseline Study

5.4 It involves the compilation of existing information in the database characterising the relevant water body with emphasis on water quality parameters including turbidity, suspended solids, temperature, salinity, pH, dissolved oxygen, BOD_5, COD, nitrogen, phosphorus, bacteria, etc. Field surveys shall be carried out to supplement existing information in situations when existing data are outdated or insufficient. Baseline study involves the development of a survey and sampling programme which shall cover aspects of meteorological, geological and hydrodynamic

factors, water quality characteristics, and beneficial uses of the water body. The study should also consider changes that may arise from seasonal variations and impacts from other current or proposed developments in the area.

Impact Prediction and Assessment

5.5 Assessment shall make use of the scientific knowledge of near-field and far-field transport and dispersion of pollutants coupled with modelling and information obtained from the baseline study. Both construction and operation aspects of the project shall be considered. Assessment shall be based on quantitative techniques which can range from the use of simple mass balance approaches to sophisticated computer models. Models to be selected shall be well proven and be satisfactorily calibrated and verified with field data. The modelling capabilities and approach shall meet the relevant prevailing government requirements.

5.6 To conduct water quality modelling for effluent discharges from domestic and municipal sewage treatment facilities, reference should be made to the average effluent quality of relevant local sewage treatment facilities or the parameters and data given in the prevailing government guidelines or database.

5.7 The predictions will provide information which can be used as the basis for determining whether the aquatic resources and beneficial uses are at risk, or if there is any unacceptable impact on water sensitive receivers (WSRs) or beneficial uses as a result of implementation of the project.

Mitigation Measures

5.8 Mitigation shall aim to minimize any potential impact. Consideration shall also be given to opportunity to enhance existing conditions. The principle shall be to prevent rather than to rectify environmental damage at source. The approach shall be to minimize the risk of impairment to the beneficial uses, and to apply relevant solutions to prevent and rectify pollution problems.

Monitoring

5.9 Monitoring is generally conducted to gather information about compliance with regulations and licence requirements, model verification, and trends. Monitoring is required when there is uncertainty about the level, extent or duration of impacts, or the effectiveness of proposed mitigation measures. Monitoring provides the information for the validation process and the feedback needed for verifying the predictions and improving the monitoring programme as well as to justify any later changes to a project.

6. Activity/Project Specific Guidelines

Discharge of Wastewater and Treated Sewage Effluent

6.1 Wastewater discharges shall be pretreated to levels sufficient to protect the sewerage system downstream and the receiving water. The near-field and far-field effects shall be addressed by quantitative modelling techniques. Model for predicting the physical, chemical and microbiological processes which determine the transport and fate of pollutants associated with outfalls shall include initial dilution, effects of water stratification, advection towards shore, coliform die-off, dissolved oxygen depletion, dissolution of metals, particles settling, biotransformation, etc.

6.2 To control the organic and nutrient loads entering various waters with different environmental settings, the assessment criteria and approaches for discharges as detailed in Sections 1.3.2 and 2.1.2 of Annex 6 of this technical memorandum should be followed. Connection of wastewater discharges to public sewers leading to a public sewage treatment facility is always

the preferred solution. Discharge into public sewerage systems shall not overload the hydraulic capacities nor contain substances that will cause damage to the sewerage systems.

6.3 Assessment of wastewater discharges shall address the potential toxicity to aquatic life. Toxic substances that may interfere with or pass through the treatment processes shall be controlled at source. For wastewater discharge of complex nature or containing constituents of unknown aquatic toxicity, the whole effluent toxicity test (WETT) in line with the prevailing guidelines and procedures shall be conducted to assess the potential toxicity to aquatic environment. The whole effluent toxicity criteria for the discharge should not exceed 0.3 TUa after the ZID and 1.0 TUc after the mixing zone, respectively. Sewage shall be discharged at a distance away from gazetted beaches, secondary contact recreation waters, fish culture zones and mariculture subzones. The use of chlorination disinfection shall be carefully evaluated as it can result in increase in effluent toxicity and has its own adverse effects on the aquatic environment. If disinfection by chlorination is unavoidable, the chlorinated effluent shall meet the relevant discharge standards or otherwise de-chlorination facilities shall be provided.

6.4 On-site treatment and disposal facilities shall include stand-by power and equipment and other provisions to prevent and minimize breaking down of the facilities, to facilitate rapid repair and to avoid by-pass of wastewater discharge. By-pass outfall designed to cope with emergency and unavoidable maintenance situations shall be located away from any WSRs. With the implementation of the above-mentioned standard preventive and mitigation measures as set out in the Sewerage Manual issued by the Drainage Services Department, discharges from facilities under emergency and unavoidable maintenance should be rare, and the associated water quality impact, if any, would be transient and insignificant. Water quality monitoring programmes covering pre-identified locations for the protection of WSRs should be developed for the unavoidable maintenance situations leading to the discharge of untreated sewage to the receiving water body.

Breakwaters, Reclamations and Other Works Involving Coastline and Bathometry Modifications

6.5 Assessment shall focus on the impacts on overall reduction in assimilative capacity of the affected flow channels, hydrology, and water quality of the water body within and outside the structures (e.g. typhoon shelter). Modelling shall be used to quantify these effects with a view to assessing potential water quality impact within and outside the structures as being acceptable.

Dredging, Sand Filling, and Dumping

6.6 Simulation modelling can be used to determine the short-term as well as the long-term fate of sediments. The size of the plume depends on type of dredging equipment used, quantities of sediments suspended and hydrodynamic conditions at the sites. The nature of the sediments is the first factor to consider to predict sediment suspension. When toxic or harmful constituents are found present in the sediments, the chemical effects shall also be addressed. Contaminants in the sediments shall be determined and analysed by bulk sediments, elutriate and pore water tests. In some special circumstances, assessment on the toxicity effects may be necessary. The principle in managing contaminated sediments is to minimize disturbance and isolate them from contact with the aquatic environment. If dredging cannot be avoided, a survey and sampling of potential contamination of bottom sediments shall be undertaken before dredging. The proposal should cover detailed assessment of the characteristics of the sediments, objective comparison of relevant alternatives for disposal, careful selection of site and disposal methods, and careful selection of dredging methods and equipment, while making reference to the prevailing government technical circulars and the guidelines under the London Convention as mentioned in Section 2.2.1 of Annex 6.

Thermal Discharges

6.7 Assessment shall be based on mathematical model studies using plume model to characterize the near-field and hydrodynamic and advection-diffusion model to characterize the far-field to predict the extent of the impacted area which can be defined by criteria based on temperature change and the residual of chemical additives (e.g. biocides, anti-fouling agents, anti-foaming agents, etc.) used. The assessment shall also cover and address cumulative impacts, if present. Mitigation shall include minimization of the use of chemical additives or by the use of alternative means of chemical dosage control.

Toxic Substances

6.8 Toxic substances can be classified into five subcategories: (a) non-metallic inorganic toxicants (e.g. ammonia, cyanide); (b) heavy metals and sub-metallic inorganic substances (e.g. mercury, cadmium); (c) easily degradable organic toxicants (e.g., volatile phenols, benzene); (d) refractory organic substances (e.g., DDT, PCBs, PAHs); and (e) radioactive substances. The Water Pollution Control Ordinance prohibits discharge or disposal of toxic and certain harmful substances into the water environment. The most effective and viable approach is to reduce at source the amount of these substances entering the sewer or discharging to the environmental waters. The four basic source control alternatives are pollution prevention, pretreatment, recycle and reuse.

6.9 If the project involves making a waste or wastewater discharge of complex nature or containing constituents of unknown aquatic toxicity, the WETT in line with the prevailing guidelines and procedures shall be included in the assessment to ensure that the discharge will not impose unacceptable toxicity impact on the receiving water environment.

Non-point Pollution Sources and Stormwater Discharges

6.10 Non-point or diffuse sources include inputs that are not point sources. Assessment shall include: (i) identifying these sources including surface runoff from construction sites, urban areas, livestock farms and agricultural lands; and (ii) quantifying the pollution levels where necessary. For prediction and assessment of the impacts on the aquatic environment, models shall be used where necessary and shall take into account the pollution loads from non-point sources.

6.11 The strategy to control non-point source pollution is to minimize the potential of pollutants coming into contact with rainfall or runoff. The most common source reduction measures include removal of expedient connections, prevention of illegal dumping of wastes, covering of chemical storage areas, prevention and containment of spills, minimization of chemical applications, catch basin cleaning, erosion control, and land use control. Devices designed to control pollution in a drainage system include, minimization of directly-connected impervious areas, provision of filter strips, trenches, road-side gully traps, petrol interceptors, dry weather flow interceptors, detention facilities, infiltration basins, swales, artificial wetlands, etc.

Annex 15

ANNEX 15: GUIDELINES FOR ASSESSMENT OF WASTE MANAGEMENT IMPLICATIONS

1. General

1.1 This Annex describes the commonly adopted approaches and methodologies for assessment of waste management implications arising from the project. The methodologies may vary from case to case, depending upon the nature of wastes and the latest development in methods and techniques.

2. Uses with Special Requirements for Waste Disposal

2.1 The uses that need special requirements for waste disposal shall be, but not be limited to, the following:

(a) Offensive Trades:

as declared under section 48 of the Public Health and Municipal Services Ordinance (Cap. 132)

(b) Chemical Waste Producing Industries:

- electricity and gas generation
- metal finishing
- electroplating
- printed circuit board production and electronics
- tannery and leather finishing
- textile (involving dyeing, bleaching or finishing)
- chemical processing and formulation
- land transport and shipping
- manufacture of professional and scientific equipment

(c) Livestock Rearing: pigs, chickens, ducks, geese, pigeons and quails

(d) Community Facilities with Special Requirements for Waste Disposal:

- abattoirs
- hospitals/clinics and other health care premises
- other community facilities which generate radioactive waste, use ozone depleting substances or include incinerators may need special attention in the EIA processes

3. Waste Management

3.1 Prior to considering the disposal options for various types of wastes, opportunities for reducing waste generation shall be evaluated taking into account the following factors:

- avoiding or minimising waste generation through changing the design approach in the project planning stage;
- adopting management practices on site to reduce cross contamination and promote waste segregation during construction stage;
- reusing or recycling waste materials in other construction activities in the construction stage;
- diverting waste to other construction sites or to the public fill reception facilities for beneficial use in the construction stage, and monitoring the transportation of construction waste by means of dump trucks equipped with real-time tracking and monitoring devices;

- using recycled materials for construction where practicable in the construction stage;
- installing facilities for segregation of various types of wastes during the operational stage; and
- arranging and facilitating collection of wastes by relevant waste recyclers where practicable in the operational stage.

3.2 Having taken into account the factors in Section 3.1 above, the types and quantities of the wastes generated as a consequence shall be estimated, with the transportation and disposal options and methods for each type of waste described in detail.

3.3 The impact caused by handling (including labelling, packaging and storage), collection, and disposal of wastes shall be addressed in detail. When large quantities of wastes are identified, the impact on the capacity of waste collection, transfer and disposal facilities, especially the existing or strategic solid waste disposal facilities have to be assessed.

3.4 In addition to the waste management practices recommended for the project, the handling, collection and disposal of wastes shall comply with the Waste Disposal Ordinance and the Dumping at Sea Ordinance.

ANNEX 16: GUIDELINES FOR ECOLOGICAL ASSESSMENT

1. Introduction

1.1 This Annex describes the general approach and methodology for assessment of ecological impact arising from a project.

1.2 An ecological assessment is part of an EIA study for a designated project which may have an impact on the natural environment including existing flora, fauna and wildlife habitats. The term "ecology" includes both marine and terrestrial ecology. The main objective of ecological assessment is to make an objective identification, prediction and evaluation of the potential ecological impacts, based on ecological information collected through literature review and samplings that are essential for evaluating the ecological impact in accordance with the criteria laid down in Annex 8 of this technical memorandum. The methodology used may vary from case to case depending on the natural environment to be affected and the nature and scale of the project.

2. The Need for Ecological Assessment

2.1 The procedures for determining the need for ecological assessment are outlined in Appendix A. The key factors to be considered are described in Notes 1 to 3 attached to Appendix A.

3. General Principle

3.1 The guiding principle for ecological assessment shall be that:

(a) areas and/or habitats of ecological importance (e.g. those listed in Note 1 and 2 of Appendix A) shall be conserved as far as possible. Any project that is likely to result in adverse ecological impacts in areas of ecological importance shall not normally be permitted unless the impacts can be minimized and/or compensated;

(b) both on-site and off-site impacts shall be identified and evaluated;

(c) both on-site and off-site mitigation measures shall be considered as integral parts of the EIA process;

(d) an applicant is required to mitigate any adverse environmental impacts arising from his project and to implement the necessary on-site and off-site measures. Where site constraints preclude the possibility of implementing on-site ecological mitigation measures, the feasibility of implementing off-site measures should be explored on a territory-wide basis;

(e) any mitigation measures shall be determined during the EIA study in accordance with the guidelines laid down in this technical memorandum, in particular this Annex and Annex 8.

4. The Scope and Content of Ecological Assessment

4.1 An ecological assessment shall consist of 5 parts of equal importance:

(a) provision of comprehensive and accurate information on the ecological baseline;

(b) identification and prediction of potential ecological impacts;

(c) evaluation of the significance of the impacts identified;

(d) recommendations of effective and practicable alternatives and mitigation measures; and

(e) recommendations of the need for and the scope of ecological monitoring and audit programme.

5. Assessment Methodology

5.1 Ecological Baseline Information

5.1.1 The main objective of the baseline study of an ecological assessment is to provide adequate and accurate ecological baseline information of the proposed development and its vicinity for

(a) evaluation of the ecological importance of the flora, fauna and habitats found;

(b) identification, prediction and evaluation of impacts; and

(c) formulation of mitigation measures and monitoring programme.

5.1.2. The baseline study shall include at least the following:

5.1.2.1 Review of existing information

Existing information regarding the proposed development site and its vicinity shall be reviewed. Such information includes both published materials (books, journals, reports, registers, etc.) and those made available by government and non-government bodies. Due weight should be given to published data of recognized sources.

The accuracy and usefulness of the ecological information obtained must be carefully evaluated and verified before adopting its use in the ecological assessment report. Aspects such as time of survey (e.g. is the information out of date?), methodology, etc., shall be taken into account. Unless the information obtained is determined to be still valid, they shall be verified by on-site survey(s).

5.1.2.2 Habitat survey

A habitat map of suitable scale showing the various habitats of the site and its surrounding area (500 m from the site boundary or the area likely to be impacted by the project) shall be prepared. Characteristics of each habitat type shall be fully described with such information as species list, dominant flora and fauna found, presence of species of conservation importance, etc. Any habitat features of particular value to various ecological groups shall also be identified and described. Important habitats (Note 2 of Appendix A) shall be highlighted and described. Colour photos of each habitat type and any features of ecological importance identified shall be provided.

To ensure that the baseline information obtained is accurate, reproducible and can be easily verified, the methodology used must be clearly stated in the ecological assessment report. The methods employed must be sound and scientific. References shall be made to those standardized or accepted internationally. Results of survey shall be recorded in specifically designed standard forms wherever applicable. Data obtained shall be quantified and statistical analysis shall be applied wherever applicable.

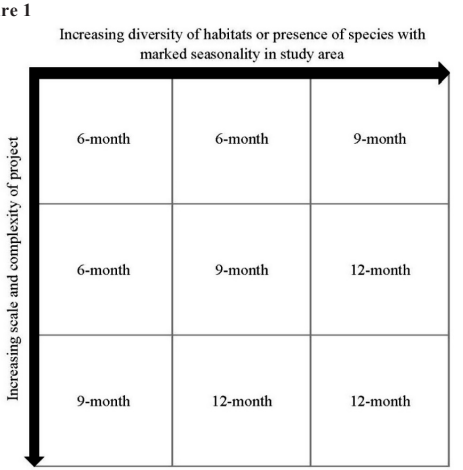
5.1.2.3. Description of recognized sites of conservation importance

All recognized sites of conservation importance (Note 1 of Appendix A) within, and in the vicinity of the proposed development site should be described. Whether these sites will be affected by the proposed development or not shall be assessed.

5.1.3 All field surveys carried out must not cause any unnecessary stress or damage to the existing habitats and wildlife. Relevant permits for collecting specimens must be obtained from the Agriculture, Fisheries and Conservation Department prior to the surveys. Results of all relevant field surveys, the names and relevant experience of the persons leading and conducting the surveys, shall be documented in field survey reports prepared, checked and signed by relevant professionals or experts.

5.1.4 To establish the ecological profile of the study area, an ecological baseline survey of at least 6-month and up to 12-month duration shall be conducted. The actual duration of such surveys shall be determined by considering the diversity of habitats of the study area, presence of species with marked seasonality, as well as scale and complexity of the project according to Figure 1 below.

Figure 1



5.1.5 The faunal and floral groups that are relevant to the study area should be determined through a review on the findings of relevant studies/surveys, or specified in the study brief. Optimal time of the year, minimum survey frequency and optimal time of the day

for conducting the ecological baseline surveys shall be determined according to Appendix B, unless otherwise agreed by the Director.

5.1.6 The information gathered from the ecological baseline surveys shall be valid for 36 months upon their completion, after which the information should be verified through field surveys to confirm its validity for the purpose of ecological impact assessment.

5.2 Impact Identification and Prediction

5.2.1 Based on the project profile and ecological baseline information gathered, the ecological assessment shall identify and predict potential ecological impacts caused by the proposed development. There may be direct or primary impacts such as loss of habitats and loss of species. However many ecological impacts are induced or secondary such as loss of feeding grounds. Hence an ecosystem perspective highlighting the existing key relationships between different species and the surrounding environment shall be adopted.

5.2.2 An overlay of the project layout on the habitat map of the site (Section 5.1.2.2) shall be prepared to provide an overview of the impacts to local habitats.

5.2.3 All potential impacts, including direct, indirect, on-site, off-site, primary, secondary, induced, additional, synergistic, cumulative impacts, etc. shall be listed out. Suitable methodology such as checklists (descriptive, scaling, etc.), matrices, networks, features mapping, etc. shall be used and clearly stated whenever applicable. Predictions must be made with sound scientific basis.

5.3 Evaluation of Impacts

5.3.1 Impact significance is a product of the magnitude and scale of an impact and the asserted importance of the species or habitat(s) likely to be affected. However, it shall be noted that evaluating nature conservation interest is a difficult and complex process. Value or professional judgement is involved. Nevertheless the conservation value of a site or species and hence the significance of an impact shall be evaluated systematically using well defined criteria. The general criteria used are shown in Annex 8.

5.3.2 Impact significance shall be evaluated on a suitable geographical scale. The importance of the species or habitat(s) to be affected in the territory-wide scale should be considered.

5.4 Impact Mitigation

5.4.1 The general policy for mitigating impacts on important habitats and wildlife, in the order of priority, are :

(a) Avoidance

Potential impacts shall be avoided to the maximum extent practicable such as adopting suitable alternatives (e.g. change of site, design, construction method, alignment, layout, programme, etc.). In cases when the ecological assessment identifies significant impacts, modification of the project shall be considered first.

(b) Minimizing

In case the impacts could not be avoided, such impacts shall be minimized by practicable measures such as translocating important animal and plant specimens, confining works in specific area or season, restoration of disturbed areas, etc.

(c) Compensation

The loss of important species and habitats, if assessed to be significant, shall be compensated by measures such as re-provision of similar species/habitats or enhancement of existing habitats.

5.4.2 All mitigation measures recommended shall be feasible to implement within the context of Hong Kong. The effectiveness of the proposed mitigation measures shall be carefully evaluated and the significance of any residual impacts after implementing them shall be clearly stated.

5.4.3. From an ecological point of view, mitigation measures for ecological impact shall preferably be carried out on-site, and well in advance of the works rather than off-site, and after the completion of works.

5.4.4 Where off-site mitigation measures are involved, they shall be considered along with other alternatives e.g. change of site, layout, etc., including modifying the project.

5.4.5 The need for and the type and scope of the off-site ecological mitigation measures to be adopted for a particular project shall be determined according to the following guidelines:

(a) all relevant design measures and all practicable on-site ecological mitigation measures shall be investigated in the EIA study and exhausted to minimize the loss or the damage caused by the project to the ecological habitats or species;

(b) with the on-site ecological mitigation measures in place, the residual impacts on ecological habitats or species shall be defined, quantified and evaluated according to the methods and criteria laid down in this Annex and Annex 8. Before off-site ecological mitigation measures are to be adopted, the EIA study needs to confirm that it is necessary to mitigate the residual ecological impacts based on ecological considerations set out in this Annex and Annex 8, and that such residual impacts arise from the Project in question;

(c) if the residual ecological impacts require mitigation and all practicable on-site ecological mitigation measures have been exhausted, off-site ecological mitigation measures shall be provided;

(d) the off-site mitigation measures shall be on a "like for like" basis, to the extent that this is practicable. That is to say, any compensatory measures to be adopted for mitigating the residual ecological impacts must be directly related to the habitats or species to be protected. Either the same kind of species or habitats of the same size shall be compensated, or the applicant shall demonstrate that the same kind of ecological function and capacity can be achieved through the measures to compensate for the ecological impacts. For example, the loss of a natural woodland shall be compensated by the replanting of native trees to form a woodland of a similar size where possible;

(e) the off-site ecological mitigation measures shall only be implemented within the boundaries of Hong Kong, and must be technically feasible and practicable;

(f) the extent of such mitigation measures shall be limited to what is necessary to mitigate the residual ecological impacts arising from the project; and

(g) any proposed off-site mitigation measures shall not require further EIA study for their implementation. Their feasibility, constraints, reliability, design and method of construction, time scale, monitoring, management and maintenance shall be confirmed during the EIA study.

5.5 Ecological Monitoring and Audit Programme

5.5.1 The purposes of ecological monitoring and audit are :

(a) to verify the accuracy of the predictions of the ecological assessment study;

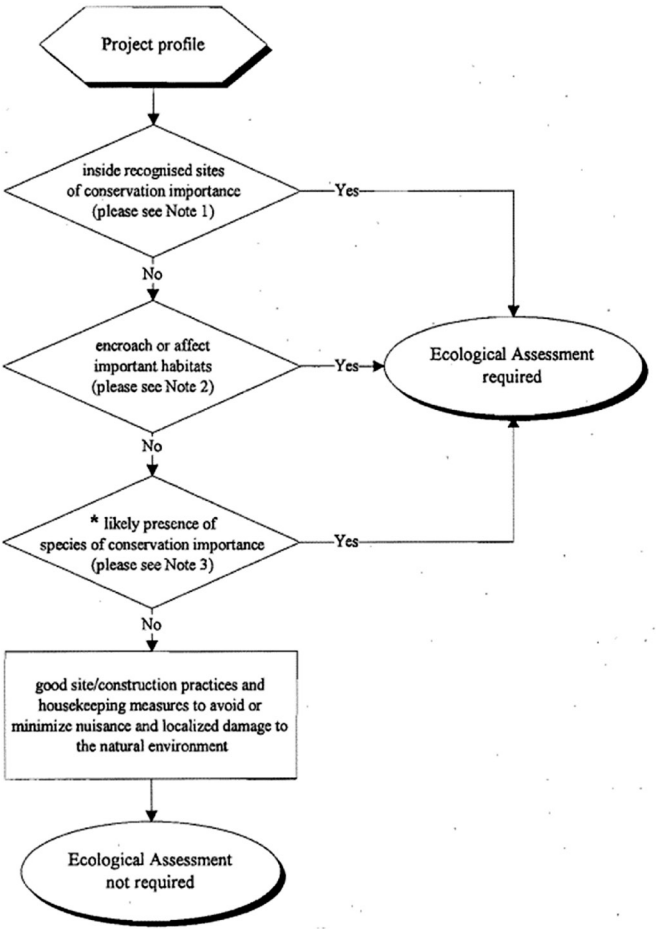
(b) to detect any unpredicted ecological impacts arising from the proposed development;

(c) to monitor the effectiveness of the mitigation measures; and

(d) to recommend action plans in response to unpredicted impacts, and/or failed mitigation.

Appendix A

The flow chart below summarizes the general procedures in determining the need for an ecological assessment for a designated project.* A literature review and/or a preliminary site visit may be required for checking the "likely presence of species of conservation importance."



Note 1 : Recognized Sites of Conservation Importance

1. existing or gazetted proposed Special Areas
2. existing or gazetted proposed Country Parks
3. existing or gazetted proposed Marine Reserves
4. existing or gazetted proposed Marine Parks
5. Wild Animals Protection Area
6. Sites of Special Scientific Interest
7. Ramsar Site
8. Inner Deep Bay and Deep Bay Buffer Zones
9. any other areas declared by the Government as having special conservation importance

Note 2 : Important Habitats Where an Ecological Assessment Will Be Necessary

An ecological assessment will be needed if a proposed development will affect

1. over one hectare of woodland
2. over one hectare/500 metres of undisturbed natural coast
3. over 0.5 hectare of intertidal mudflats
4. established mangrove stands of any size
5. over 0.5 hectare of freshwater or brackish marshes
6. established seagrass (*Zostera* or *Halophila* or *Ruppia* species) bed of any size
7. over 100 metres of natural stream courses and rivers of significant length
8. over one hectare of wetlands (as defined by the Ramsar Convention) other than those mentioned in 2 to 7 above
9. established coral communities of any size
10. other habitats considered as having special conservation importance by documented scientific studies

Note 3 : Species of Conservation Importance

An ecological assessment will be needed if the proposed development will affect habitats supporting significant population of wild fauna or flora that are :

1. listed in Threatened Categories of IUCN Red List or those of the South China region;

2. listed in international conventions for conservation of wildlife;

3. endemic to Hong Kong or South China;

4. listed under the legislation of Hong Kong:
   (a) The Forestry Regulations (under the Forests and Countryside Ordinance, Cap. 96);
   (b) The Wild Animals Protection Ordinance (Cap. 170);
   (c) The Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586);
   (d) Other relevant ordinances or subsidiary legislation including but not limited to the Marine Parks and Marine Reserves Regulation (under the Marine Parks Ordinance, Cap. 476);

   (References shall also be made to species protected by legislation in Mainland China, especially the Guangdong Province.)

5. considered as rare in the territory or having special conservation importance by scientific studies other than those listed above.

Appendix B

The figure below provides the optimal time of the year, minimum frequency and optimal time of the day for conducting surveys of major faunal and floral groups, unless otherwise agreed by the Director.

Major faunal or floral groups		Optimal time of the year	Minimum frequency	Optimal time of the day
Month		J F M A M J J A S O N D		
Season		Dry / Wet / Dry		
Terrestrial				
Vegetation and higher plants			Half-yearly	Daytime
Mammals			Monthly	Daytime for diurnal species. Night-time for noctural species. Dusk for bats.
Birds	Overwintering		Monthly	Early morning and dusk. Night-time for noctural species.
	Oversummering			
	Passage migrant			
	Resident			
Reptiles			Every two months	Daytime for diurnal species. Night-time for noctural species.
Amphibians			Every two months	Night-time.
Butterflies			Every two months	Daytime.
Odonates			Every two months	Daytime.
Fireflies			Monthly	Dusk and night-time.
Freshwater				
Fish			Every two months	Daytime for diurnal species. Night-time for noctural species.
Freshwater invertebrates			Every two months	Daytime.
Marine				
Cetaceans			Monthly	Daytime.
Hard-bottom communities			Half-yearly	Daytime.
Soft-bottom communities			Half-yearly	Daytime.
Intertidal communities			Half-yearly	Ebbing tides.
Horseshoe crabs			Half-yearly	Ebbing tides.

ANNEX 17: GUIDELINES FOR FISHERIES IMPACT ASSESSMENT

1. General

1.1 This Annex describes the general approach and methodology for conducting a fisheries impact assessment study, which may vary from case to case depending on the nature of the fisheries issues and the latest development in methods and techniques.

1.2 A fisheries impact assessment is part of the EIA study for a designated project which may affect capture and culture fisheries. It aims at providing adequate and accurate data to allow a complete and objective prediction and evaluation of the potential fisheries impacts.

2. Determination on the Need for Fisheries Impact Assessment

2.1 The types of projects that may require a fisheries impact assessment include:

(a) proposed projects which involve the marine and intertidal environment and inland fish ponds, and may affect fishing grounds and aquaculture sites, fishing and aquaculture activities, as well as fisheries resources and habitats; or

(b) proposed projects with direct or indirect discharges of any kind which may affect fishing grounds and aquaculture sites, fishing and aquaculture activities, as well as fisheries resources and habitats.

3. Fisheries Impact Assessment Study

3.1 A fisheries impact assessment study shall consist of 5 parts of equal importance:

(a) provision of comprehensive and accurate baseline information on fisheries;

(b) identification and prediction of potential fisheries impacts;

(c) evaluation of the significance of the impacts predicted;

(d) recommendations of effective and practicable alternatives and mitigation measures;

(e) recommendations of the need for and the scope of fisheries monitoring and audit programme.

3.2 Fisheries Baseline Information

3.2.1 The baseline study of a fisheries assessment shall provide adequate and accurate fisheries baseline data of a proposed project site and its adjacent area of probable impact (the study area) for accurate prediction and evaluation of fisheries impacts. The baseline study shall include at least the following:

(i) Review and Collation of Existing Information

Existing information regarding the study area shall be reviewed. The most recent and updated information should be used and due weight should be given to published data of recognized sources. Useful information can also be obtained from consultation of local fishermen/aquaculturists, marine and fisheries scientists, and relevant government departments.

The accuracy and usefulness of the fisheries information obtained must be carefully evaluated and verified before adopting it in the EIA report. Unless the information obtained is determined to be still valid, field survey(s) shall be conducted to verify the information.

(ii) Fisheries Baseline Surveys

Based on the results of (i) above, the study shall determine if there is any need for fisheries baseline surveys taking into account the location, scale and potential impacts of the project. The aim of the fisheries baseline surveys is to gather adequate information for subsequent fisheries impact prediction and evaluation, formulation of proposed mitigation measures and monitoring requirements. If fisheries baseline surveys are considered necessary, the surveys shall cover fisheries resources and habitats and/or fisheries activities of the study area. The study shall recommend methodology, duration and timing for the surveys that are suitable for collecting the required data. The field surveys and data analyses must be undertaken by adequately trained and competent personnel with adequate knowledge and experience in fisheries. The data obtained shall be quantified and statistical analyses shall be applied wherever applicable. Results of all relevant field surveys, the names and relevant experience of the competent personnel undertaking the surveys, shall be documented in field survey reports prepared, checked and signed by relevant professionals or experts.

Where fisheries baseline surveys are considered necessary for a project, the duration shall be at least 6 months and up to 12 months. A project of larger scale and higher complexity or with a study area with higher importance in fisheries resources/production shall normally require a longer duration of survey. The minimum duration of the surveys shall be defined in the relevant EIA study brief.

3.2.2 Fisheries information required for fisheries impact assessment shall include, but not be limited to -

(i) level of fisheries resources/production and composition of commercially important species in the study area;

(ii) the level and pattern of fishing and aquaculture activities in the study area;

(iii) sites of fisheries importance such as aquaculture sites, fisheries habitats, nursery and spawning grounds of commercially important species, and any known seasonal occurrence of juvenile and spawning stocks in the study area;

3.3 Identification and Prediction of Impacts

3.3.1 Based on the project profile and fisheries baseline information gathered, the fisheries impact study shall identify and predict potential fisheries impacts caused by a proposed project. All potential impacts, including direct, indirect, long term, short term, on-site, off-site, primary, secondary, induced, additional, synergistic, cumulative impacts, etc, shall be listed out. Suitable methodology such as checklists (descriptive, scaling, etc.), matrices, networks, features mapping, etc, shall be used and clearly described whenever applicable. The nature and extent of impacts on aquaculture and capture fisheries shall be described and quantified.

3.3.2 Identification and prediction of impacts on fisheries shall take into account, but not exclusively rely upon, assessments for water quality and ecological impacts.

3.4 Evaluation of Impacts

3.4.1 The significance of the predicted impacts of a proposed project on aquaculture and capture fisheries shall be evaluated as systematically as practicable using well defined criteria. The general criteria used are presented in Annex 9.

3.5 Mitigation of Impacts

3.5.1 The general policy for mitigating impacts on fisheries, in order of priority, are:

(i) Avoidance

Potential impacts shall be avoided to the maximum extent as practicable such as adopting suitable alternatives (e.g. change of site, design, construction method, alignment, layout, programme, etc.). In cases where the fisheries impact assessment study identifies very serious impacts that cannot be mitigated, modification of the project shall be considered.

(ii) Minimizing

Unavoidable impacts shall be minimized by practicable measures such as confining works in specific area or season, restoration of disturbed fisheries resources and habitats, etc.

(iii) Compensation

The loss of fisheries resources and habitats and aquaculture sites, if assessed to be significant, shall be compensated by measures such as enhancement of fisheries resources and habitats and re-provisioning of aquaculture sites.

3.5.2 All mitigation measures recommended shall be practicable and effective within the context of Hong Kong. The effectiveness of the proposed mitigation measures shall be carefully evaluated and the significance of any residual impacts after implementing them shall be clearly stated.

3.6 Fisheries Monitoring and Audit Programme

3.6.1 The purpose of fisheries monitoring and audit are:

(i) to verify the accuracy of the predictions of the fisheries impact assessment study;

(ii) to detect any unpredicted fisheries impacts arising from the proposed project;

(iii) to monitor the effectiveness of the mitigation measures; and

(iv) to recommend action plans in response to unpredicted impacts, and/or ineffective mitigation.

ANNEX 18: GUIDELINES FOR LANDSCAPE AND VISUAL IMPACT ASSESSMENT

1. General

1.1. Landscape and visual impact assessment shall be directed towards the predicting and judging the significance of the effects that new development may have on landscape and visual resources, landscape with distinctive character and visual amenity. This Annex describes the general approach and methodology for assessment of landscape and visual impacts. The methodology may vary from case to case, depending on the nature of the issues. However, it must be admitted that such an assessment involves subjective judgement and preference. The perception and aspiration of the community on particular landscape features must be taken into account.

2. The Need for Landscape and Visual Impact Assessment

2.1 The procedures for determining the need for landscape impact assessment and visual impact assessment are outlined in Appendix A and Appendix B respectively. The landscape with distinctive character/resources to be considered are described in Note 1 to Appendix A.

2.2 The need for landscape impact assessment and visual impact assessment will be considered independently following the approach as set out in the Appendix A and Appendix B .

3. Study Process

3.1 A landscape and visual impact assessment shall cover the following:

(1) defining the scope and contents of the study;

(2) a baseline study to provide for a comprehensive and accurate description of the baseline landscape and visual characters and resources;

(3) impact studies to identify the potential landscape and visual impacts and predict their magnitude and potential significance; and

(4) recommendations on design and/or mitigation measures and implementation programme.

4. Scope and Contents

4.1 In setting the scope of the study, the following aspects shall be considered:

- limits of the assessment area;
- key issues to be addressed;
- level of details required for baseline studies;
- key public viewing points to be covered;
- approach and methodology to be used for impact assessment and judging impact significance;

- alternatives;

- other development if cumulative impacts are to be assessed.

5. Baseline Study

5.1 The main objective of the baseline study is to provide an understanding of the landscape in the area that may be affected, and to establish a visual envelope or a zone of visual influence in which the development might be visible, the visual amenity which might be affected, and public viewers who may experience views towards the development.

5.2 The baseline study shall present a brief account of the landscape and visual characters and resources of the assessment area. Their levels of details should be appropriate and proportional to the scale and type of development and the significance of the landscape and visual impacts likely to occur. It shall focus particularly on the sensitivity of the landscape and visual system and its ability to accommodate change.

6. Landscape Impact Assessment Study

6.1 Landscape impact assessment shall assess :

- direct impacts upon specific landscape elements, in particular on landscape with special interest, distinctive quality and value;

- the overall pattern of landscape elements that give rise to landscape character, and local and regional distinctiveness.

6.2 Examples of landscape with distinctive character/resources are set out in Note 1 to Appendix A.

7. Visual Impact Assessment Study

7.1 Visual impact assessment shall focus on permanent impacts and assess the significance thresholds including magnitude of changes and sensitivity of viewers.

7.1.1 Magnitude of Changes

- Visual composition – Impacts on visual balance, compatibility, harmony, unity or contrast;

- Visual obstruction – Impacts on condition, quality and character of visual resources;

- Visual change – Impacts on changes with direct sightlines (considering degree of visibility and viewing distance) to the existing and future public views by comparing before and after the proposed development.

7.1.2 Sensitivity of Viewers

- Type of viewers and value of existing views (if applicable).

8. Design and Mitigation Measures

8.1 Alternative design that would avoid or reduce the identified impacts on landscape; and/or visual amenity shall be thoroughly examined before adopting other mitigation or compensatory measures to alleviate the impacts.

8.2 Possible measures that may mitigate or compensate the impacts include:

- remedial - e.g. facade treatment, design elements/features and buffer plantings; and
- compensatory - e.g. landscape treatment, compensatory planting, creation of interesting landscape or visual features.

8.3 A practical programme for the implementation of the recommended mitigation measures with responsible parties shall be worked out. These shall be integrated with the overall development programme of the whole project.

8.4 While design that would enhance the landscape and visual quality shall be encouraged and adopted, architectural design and landscaping arrangement would normally be revised or further developed in the detailed design stage. Flexibility would be allowed for applicant to enhance the landscape and visual design at later stages of the project.

8.5 For a project under Schedule 3 to the Ordinance which does not involve designated projects under Schedule 2 or if detailed information for the designated projects under Schedule 2 is not available, the landscape impact assessment and the visual impact assessment should contain a broad assessment of the potential landscape and visual impacts arising from the project.

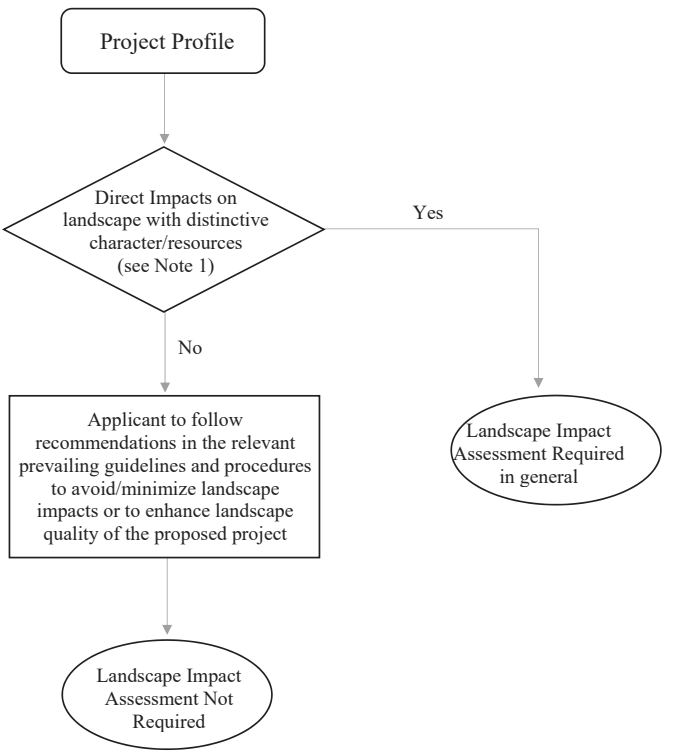
9. Presentation Methods

9.1 To illustrate the landscape and visual impacts of a project, as well as effects of the mitigation measures, choice of appropriate presentation methods is important. These methods include perspective drawings, plans and section/elevation diagrams and photomontage to demonstrate the relationship with the setting. These methods shall be used extensively to facilitate communication among the concerned parties.

9.2 The technical details of preparing the illustrations shall be recorded. To facilitate verification of the accuracy, the Authority will reserve the right to examine the full details.

Appendix A

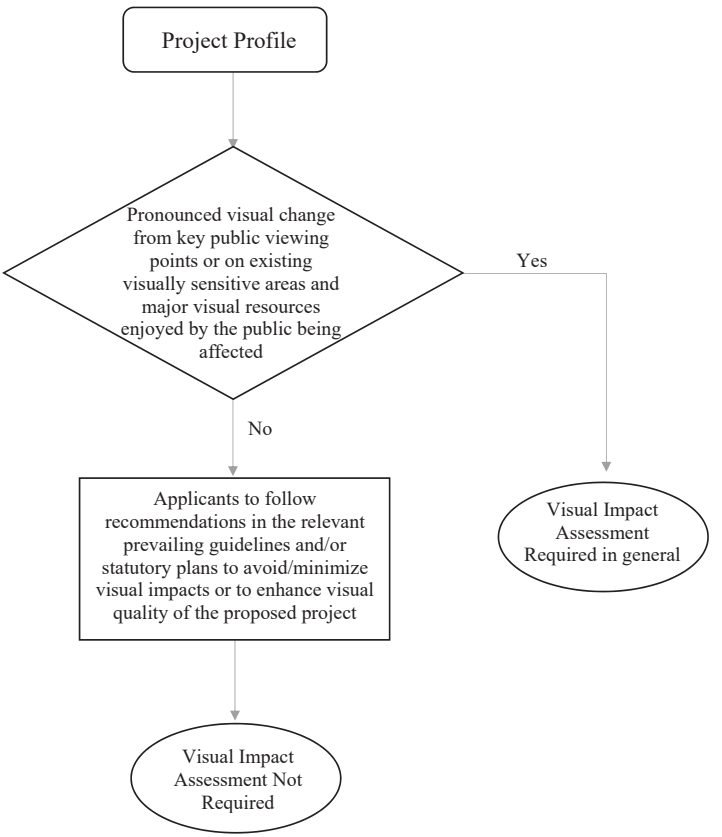
The flow chart below summarizes the general procedures in determining the need for a landscape impact assessment for a designated project. A literature review and/or preliminary site visit may be required for checking whether there will be any direct impact of special landscape significance.



Note 1: Examples of Landscape with Distinctive Character/Resources
Country Parks, coastal protection areas, conservation areas, wetlands, areas of high landscape value, scenic spots, hilltops, ridgeline, rivers, mature woodlands, special water features, nature reserves, Sites of Special Scientific Interest, historic landscapes, sites of cultural heritage, sites with Old and Valuable Tree, stone wall tree, tree of particular interest, etc.

Appendix B

The flow chart below summarizes the general procedures in determining the need for a visual impact assessment to identify and predict the permanent impacts of a designated project.



ANNEX 19: GUIDELINES FOR ASSESSMENT OF IMPACT ON SITES OF CULTURAL HERITAGE AND OTHER IMPACTS

1. General

1.1 The Annex describes the commonly adopted approaches and methodologies for assessment of impact on sites of cultural heritage and other environmental issues. The methodologies may vary from case to case, depending on the nature of the issues and the latest development in methods and techniques.

2. Impact on Sites of Cultural Heritage

2.1 There is no quantitative standard in deciding the relative importance of these sites, but in general, sites of unique archaeological, **historical or architectural value will be considered as highly significant.**

Baseline Study

2.2 A baseline study shall be conducted

(a) to compile an inventory of all known places, buildings, sites and structures of architectural, archaeological and historical value within the proposed project area; and

(b) to identify possible threats of, and their physical extent, destruction in whole or in part of sites of cultural heritage arising from the proposed project.

Methodology

2.3 The best available information shall be assembled for the assessment of the identified sites of cultural heritage. The entry point shall be the Antiquities and Monuments Office, public libraries and archives and tertiary institutions.

2.4 The assessment shall provide detailed geographical, historical, archaeological, ethnographical and other cultural data. Published papers, records, archival and historical documents as well as oral legends shall also be consulted.

2.5 In cases where the above sources of information prove to be inadequate or where the proposed project area has not been adequately studied before, field surveys and site investigations shall be conducted to assemble the necessary data.

Impact Assessment

2.6 Preservation in totality will be a beneficial impact and will enhance the cultural and socio-economic environment if suitable measures to integrate the sites of cultural heritage into the proposed project are carried out.

2.7 If, due to site constraints and other factors, only preservation in part is possible, this shall be fully justified with alternative proposals or layout designs which confirm the impracticability of total preservation.

2.8 Total destruction shall be taken as the very last resort in all cases and shall only be recommended with a meticulous and careful analysis balancing the interest of preserving the archaeological, historical, architectural and other cultural values as against that of the community as a whole.

Mitigation Measures

2.9 Mitigation measures shall not be recommended or taken as *de facto* means to avoid conservation and preservation of sites of cultural heritage. They must be proved beyond all possibilities to be the only practical course of action.

2.10 Designs, layouts, external treatments, colour and texture of materials, but not limiting to such, shall be worked out for the integration of the sites of cultural heritage to be preserved in whole or in part into the proposed project.

2.11 For total destruction, a comprehensive and practical rescue plan must be worked out. This is also applicable to sites of cultural heritage where only partial preservation is proposed.

2.12 A practical programme proposal for the implementation of the recommended mitigation measures shall be included as part of the assessment. This shall form an integral part of the overall development programme of the proposed project. Competent professionals or experts must be engaged to design and carry out the mitigation measures.

3. Potential Contaminated Land Issues

3.1 Existence of pollutants on land may be due to natural occurrence or contamination by anthropogenic activities. For all development and redevelopment projects listed under Part I of Schedule 2 and Schedule 3, the applicant who is preparing an EIA report shall give consideration to historical land uses which have the potential to cause or have caused land contamination. Such uses include, but are not limited to, the following:

(a) oil installations including oil depots and petrol filling stations
(b) gas works for production of flammable or fuel gas from fossil fuel
(c) power plants
(d) shipyards/boatyards
(e) chemical manufacturing/processing plants
(f) steel mills/metal workshops
(g) car repairing and dismantling workshops
(h) municipal solid waste dumping ground and landfill

3.1.1 If the above land uses are identified, the applicant shall conduct a site appraisal to identify the potential contamination sources that may have impacted the site. If potential land contamination sources are identified at the site, the applicant shall plan and conduct site investigation for contamination assessment, and then compile a Contamination Assessment Report (CAR) revealing the site investigation findings for the Director's review. During the preparation of the CAR, if land contamination due to anthropogenic activities is confirmed, a Remediation Action Plan (RAP) shall be prepared. The CAR and RAP can be submitted as a combined report to the Director for endorsement.

3.1.2 The applicant shall, prior to any development or redevelopment of the site, follow the endorsed RAP to remediate the contaminated site by means of the "Source-Pathway-Receptor Paradigm" by adopting one or a combination of the following control methods:

- **Source control**: remove or contain the source(s) of contamination by soil extraction or excavation followed by adequate treatment/ disposal; or modify the source(s) of contamination by using bioremediation, extraction, solidification, immobilization or other proven soil treatment methods, to remove or immobilize the contaminants or prevent any further release of contaminants to the environment.

- **Pathway control**: inhibit or control the potential pathways by proper capping the source(s) of contamination by soil or concrete slabs or by the use of membranes or solidification, etc., to prevent migration of contaminants, to reduce the ability of the contaminant source(s) from posing a threat to receptors.

- **Receptor control**: alter the likelihood of receptors coming into contact with the contaminants by changing the site layout or by preventing receptors' accessibility to the contaminated areas.

3.1.3 For contaminations due to natural occurrence such as arsenic, the applicant shall consider pathway or receptor control instead of source control to minimize secondary contamination or generation of significant amount of waste due to cleaning up of the naturally occurring materials.

3.1.4 Upon completion of remediation, a Remediation Report (RR) shall be prepared and submitted to the Director for endorsement.

3.1.5 The land contamination assessment and remediation, including the planning and implementation of site investigation, preparation and submission of various deliverables including CAR, RAP and RR, etc. shall be pursued in accordance with relevant guidelines issued by the Director. If the project site is not available during the EIA stage, the EIA report may be approved with condition(s), for example, that the land contamination assessment submissions will be made after the site is resumed or made accessible for the required investigation and assessment.

3.2 For all decommissioning projects under Part II of Schedule 2, the above requirements apply regardless of the historical land use.

3.3 For development or re-development projects adjacent to landfill, the applicant shall note the following additional specific requirements when the need for a landfill gas (LFG) hazard assessment is confirmed:

(a) carry out a LFG hazard assessment to evaluate the degree of risk associated with the proposed development;

(b) design suitable precautionary/protection measures to render the proposed development as safe as reasonably practicable;

(c) ensure that the precautionary/protection measures will be implemented and constructed in accordance with the design;

(d) establish a maintenance and monitoring programme for ensuring the continued performance of the implemented protection measures.

The LFG hazard assessment shall be carried out and completed for submission to the Director for vetting at the early planning stage of the project. The early completion of the assessment study will ensure that the identified protection measures be considered and incorporated in to the overall design process for the proposed development.

Annex 20

ANNEX 20: GUIDELINES FOR THE REVIEW OF AN EIA REPORT

1. General Approach

Organization of the Information

1.1 Is information logically arranged in sections ?

1.2 Is the location of information identified in an index or table of contents ?

1.3 When information from external sources has been introduced, has a full reference to the source been included ?

Presentation of Information

1.4 Has information and analysis been offered to support all conclusions drawn ?

1.5 Has information and analysis been presented so as to be comprehensible to the non-specialist using maps, tables and graphical material?

1.6 Are all the important data and results discussed in an integrated fashion within the information ?

1.7 Has superfluous information (i.e. information not needed for the decision) been avoided ?

1.8 Has the information been presented in a concise form with a consistent terminology and are there logical links between different sections ?

1.9 Have prominence and emphasis been given to severe adverse impacts, to substantial environmental benefits, and to controversial issues ?

1.10 Is the information objective ?

Public Concerns

1.11 Does the information identify and address the main concerns of the general public and special interest groups (clubs, societies etc.) who may be affected by the project?

1.12 Does the information take account of the main concerns of the relevant statutory or advisory bodies?

2. Description of the Project

Features of the Project

2.1 Are the purpose(s) and objectives of the project explained ?

2.2 Are the nature and status of project decision(s), for which the EIA study is undertaken, clearly indicated ?

2.3 Is the estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase given, together with the programme within these phases ?

2.4 Is the design and size of the project described, using diagrams, plans and/or maps necessary ?

2.5 Are the methods of construction described ?

2.6 Are the nature and methods of production or other types of activity involved in operation of the project described ?

2.7 Has the land taken up by the project site(s), construction sites, and any associated access arrangements, auxiliary facilities and landscaping areas, been clearly shown on a scaled map?

2.8 For a linear project, has the land corridor, vertical and horizontal alignment and need for tunnelling, and earthworks been described ?

2.9 Have the uses to which the project will be put been described and the different land use areas demarcated ?

Residues and Emissions

2.10 Have the types and quantities of waste matter, energy (noise, vibration, light, heat, radiation etc.) and residual materials generated during construction and operation of the project, and the rate at which these will be produced, been estimated ?

2.11 Have the ways in which it is proposed to handle and/or treat these wastes and residual materials prior to release/disposal been indicated, together with the routes by which they will eventually be disposed of to the environment ?

2.12 Have any special or hazardous wastes which will be produced been identified as such and the methods for their disposal been described, as regards their likely main environmental impacts?

2.13 Have the means by which the quantities of residuals and wastes were estimated been indicated and has uncertainty been acknowledged and ranges provided where appropriate ?

3. Background and History of the Project

3.1 Where appropriate does the information include reference to the consideration of the project's siting or alignment by the applicant?

3.2 Are the reasons for selecting the proposed project or its siting and alignment, and the part environmental factors played in the selection, adequately described ?

3.3 Have the main environmental impacts of different siting or alignment options been compared clearly and objectively with those of the proposed project and with the likely future environmental conditions in the absence of the project ?

4. Description of the Environment

Description of the Area Occupied by and Surrounding the Project

4.1 Have the areas expected to be significantly affected by the various aspects of the project been indicated with the aid of suitable maps ?

4.2 Have the land uses on the site(s) and in the surrounding areas been described ?

4.3 Has the affected environment been defined broadly enough to include any potentially significant effects occurring away from the immediate areas of construction and operation ?

Baseline Conditions

4.4 Have the components of the environment potentially affected by the project been identified and described sufficiently for the prediction of impacts ?

4.5 Were the methods used to investigate the affected environment appropriate to the size and complexity of the assessment task ?

4.6 Has a prediction of the likely future environmental conditions in the absence of the project been developed ?

4.7 Have existing technical data sources, including local records and studies carried out for environmental agencies and/or interest groups been searched ?

4.8 Have local, regional and national plans and policies been reviewed and other data collected as necessary to predict future environmental conditions ?

4.9 Have relevant departments and agencies holding information on baseline environmental conditions been approached ?

5. Description of Impacts

5.1 Have the direct and indirect/secondary effects of constructing, operating and, where relevant, after use or decommissioning of the project been considered (including both positive and negative effects) ?

5.2 Does the information include consideration of whether effects will arise as a result of "consequential" development i.e. whether additional development, which it would be difficult to resist, will be included in the area, leading to further environmental effects ? For a project with multiple stages, are the impacts caused by overlapping of different stages considered and determined ?

5.3 Have the above types of impacts been investigated in so far as they affect the following:

- air and climate
- water and soils
- noise
- landscape
- ecology
- historic and cultural heritage
- land use
- impacts on people and communities
- impacts on agriculture and fisheries activities

5.4 If any of the above are not of concern in relation to the specific project and its location is this clearly stated in the information ?

5.5 Is the investigation of each type of impact appropriate to its importance for the decision, avoiding unnecessary information and concentrating on the key issues ?

5.6 Are impacts which may not be themselves significant, but which may contribute incrementally to a significant effect considered ?

5.7 Does the information include a description of the methods/approaches used to identify impacts and the rationale for using them ?

5.8 If the nature of the project is such that accidents are possible which might cause severe damage within the surrounding environment, has an assessment of the risk and likely consequences of such events been carried out and the main findings reported ?

Magnitude of Impacts

5.9 Are impacts described in terms of the nature and magnitude of the change occurring and the nature (i.e. location, number, value, sensitivity) of the affected receiver ?

5.10 Has the timescale over which the effects will occur been predicted such that it is clear whether impacts are short, medium or long term, temporary or permanent, reversible or irreversible?

5.11 Where possible, have predictions of impacts been expressed in quantitative terms ? Otherwise, have qualitative descriptions been defined ?

5.12 Where quantitative predictions have been provided is the level of uncertainty attached to the results described ?

Data and Methods

5.13 Have the methods used to predict the nature, size and scale of impacts been described and to indicate the importance of each projected impact ?

5.14 Are the data used to estimate the size and scale of the main impacts sufficient for the task, are they clearly described and have their sources been clearly identified ?

6. Mitigation

Description of Mitigating Measures

6.1 Has the mitigation of significant negative impacts been considered and, where feasible, have specific measures been proposed to address each impact ?

6.2 Have the reasons for choosing the particular type of mitigation measures been described ?

6.3 Where mitigating measures are proposed, has the significance of any impact remaining after mitigation been described ?

6.4 Where appropriate, do mitigation methods considered include modification of project design, construction and operation, the replacement of facilities/resources, and the creation of new resources, as well as "end-of-pipe" technologies for pollution control ?

6.5 Is it clear to what extent the mitigation methods will be effective ?

6.6 Where the effectiveness is uncertain or depends on assumptions about operating procedures, climatic conditions, etc, or where there is a risk that mitigation will not work, is this made clear and has data been introduced to justify the acceptance of the assumptions ?

Implementation of Mitigation Measures

6.7 Have details of how the mitigation measures will be implemented and function over the time span for which they are necessary been presented ? Does the report list out clearly what mitigation measures would be implemented, by whom, when, where and to what requirements ? Is the responsibility for implementing the recommended mitigation measures clearly defined ?

Environmental Effects of Mitigation

6.8 Have any adverse environmental effects of mitigation measures been investigated and described ?

6.9 Has the potential for conflict between the benefits of mitigating measures and their adverse impacts been considered ?

7. Evaluation of Residual Impacts

7.1 Have the available standards, assumptions and criteria which can be used to evaluate the impacts been discussed ?

7.2 Have the predicted impacts been compared to the relevant standards and criteria ?

7.3 Have the residual impacts, which are the net impacts with the mitigation measures in place, been described and evaluated against the relevant Government policies, standards and criteria ?

7.4 Have the residual impacts been discussed and evaluated in terms of the impact on the health and welfare of the local community and on the protection of environmental resources ?

7.5 Have the magnitude, location and duration of the residual impacts been discussed in conjunction with the value, sensitivity and rarity of the resource ?

7.6 Where there are no generally accepted standards or criteria for the evaluation of residual impacts, have alternative approaches been discussed and, if so, is a clear distinction made between fact, assumption and professional judgement ?

7.7 Have the residual impacts, if any, arising from the implementation of the proposed mitigation measures, been considered ?

8. Environmental Monitoring and Audit Proposals

8.1 If impacts are uncertain, have monitoring arrangements been proposed to check the environmental impacts resulting from the implementation of the project and their conformity with the predictions made ?

8.2 Does the scale of any proposed monitoring arrangements correspond to the potential scale and significance of deviations from expected impacts ?

8.3 Is the need for and the scope of the monitoring and audit requirements defined in the report ?

8.4 Does the report contain an Environmental Monitoring and Audit programme, as prescribed in Annex 21, if it is found to be needed ?

9. Difficulties Compiling the Information

9.1 Have any gaps in the required data been indicated and the means used to deal with them in the assessment been explained ?

9.2 Have any difficulties in assembling or analysing the data needed to predict impacts been acknowledged and explained ?

10. Executive Summary

10.1 Does the executive summary contain at least a brief description of the project and the environment, an account of the main mitigation measures to be implemented by the developer, and a description of any remaining or residual impacts ?

10.2 Have technical jargons been avoided as far as possible in the executive summary ?

10.3 Does the executive summary present the main findings of the assessment and cover all the main issues ?

10.4 Does the executive summary include a brief explanation of the overall approach to the assessment ?

10.5 Does the executive summary provide an indication of the confidence which can be placed in the results ?

10.6 Is the executive summary presented in both English and Chinese ?

11. Quality Assurance

11.1 Has the relevant part of the report been prepared, checked and signed by relevant professionals or experts?

11.2 Has the report provided the names, relevant experience and any other required information of the competent persons as required in study brief ?

Annex 21

ANNEX 21: CONTENTS OF AN ENVIRONMENTAL MONITORING AND AUDIT (EM&A) PROGRAMME

This Annex describes the commonly adopted approaches for carrying out an EM&A programme. The following are the key steps in an EM&A programme:

Environmental Monitoring

(a) the systematic collection of environmental data through a series of repetitive measurements. A number of different monitoring activities are identified below:

  (i) **Baseline Monitoring** refers to the measurement of environmental parameters during a representative pre-project period for the purpose of determining the nature and ranges of natural variation and to establish, where appropriate, the nature of change;

  (ii) **Impact Monitoring** involves the measurement of environmental parameters during project construction and implementation so as to detect changes in these parameters which can be attributed to the project; and

  (iii) **Compliance Monitoring** unlike the previous monitoring activities, takes the form of periodic sampling and/or continuous measurement of environmental parameters, levels of waste discharge or process emissions to ensure that regulatory requirements are observed and standards met (Surveillance and inspection may also form a part of this activity but need not necessarily involve measurement of a repetitive activity).

(b) the organization and interpretation of the environmental monitoring data to establish a record of change associated with the implementation of a project or the operation of an organization;

(c) the process of verification that all or selected parameters measured by an environmental monitoring programme are in compliance with regulatory requirements, policies, relevant standards and criteria of this technical memorandum, and established environmental quality performance limits;

(d) the comparison of project impact predictions with actual impacts for the purpose of assessing the accuracy of predictions;

(e) the assessment of the effectiveness of the environmental management systems, practices and procedures;

(f) event and action plans shall be included and linked to the environmental quality performance. The determination of the degree and scope of any necessary remedial measures in case of exceedance of compliance, for which environmental monitoring forms the basis, or the recommendation of environmental controls and operations measures in the event that the organization's environmental objectives are not achieved;

(g) for projects which are assessed to have potential impacts on nearby fish culture zones, the part of EM&A programme to address such impacts shall be approved by Director of Agriculture, Fisheries and Conservation. A copy of the EM&A manual as well as the regular and summary reports shall be made available to Director of Agriculture, Fisheries and Conservation; and

(h) the environmental monitoring and audit work shall be carried out by qualified personnel.

Environmental Quality Performance Limits

For the purpose of environmental monitoring and audit, environmental quality performance limits are normally in the form of a set of action/limit levels, which are defined as:

(i) **Action Levels** - the levels beyond which there is an indication of a deteriorating ambient environmental quality. Appropriate remedial actions may be necessary to prevent the environmental quality from going beyond the limit levels, which would be unacceptable.

(ii) **Limit Levels** - the levels stipulated in relevant pollution control or environmental ordinances, this technical memorandum, or the Hong Kong Planning Standards and Guidelines, or other appropriate criteria established by the Director for a particular project, beyond which the works shall not proceed without appropriate remedial action, including a critical review of plant and work methods.

In addition to the action/limit levels, a trigger level below the action level may be set up to provide early warning of deteriorating environmental quality that may exceed the action level.

Environmental Monitoring and Audit Documentation

For the purpose of EM&A, the following documents are normally required by the Director:

(a) **EM&A Manual**

The Manual shall be a stand-alone document and shall include the following:

(i) project background including organization and programme;

(ii) purpose of the manual;

(iii) an implementation schedule, summarizing all recommended environmental mitigation measures with reference to the programme for their implementation. The measures shall include those identified at detailed design, contract preparation, construction, and operation stages of the project;

(iv) drawings showing all environmentally sensitive receivers;

(v) an EM&A programme for the construction of the project including:

- responsibility for EM&A work;
- EM&A organization and management structure;
- EM&A methodology;
- equipment to be used and calibration required;
- locations, parameters, frequency and duration for baseline, impact and compliance monitoring;
- environmental quality performance limits (Action and Limit levels);
- Event-Action Plans and decision audit flow charts;
- procedures for reviewing the monitoring results;
- compliance audit procedures and follow-up;

(vi) implementation programme and impact prediction review procedures;

(vii) site inspection, deficiency and action reporting procedures;

(viii) complaint/consultation procedures; and

(ix) reporting format and procedures.

(b) **Baseline Monitoring Report**

The report shall include at least the following:

(i) drawings showing locations of the baseline monitoring stations;

(ii) monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- equipment used and calibration details;
- parameters monitored;
- monitoring locations (and depth);
- monitoring date, time, frequency and duration;

(iii) details on influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period;
- other factors which might affect the results;

(iv) determination of the action and limit levels for each monitoring parameter and statistical analysis of the baseline data;

(v) revisions for inclusion in the EM&A Manual.

(c) **Regular and Summary EM&A Reports**

The results and findings of each audit shall be documented in regular EM&A reports prepared by the Applicant. EM&A reports shall include at least the following :

(* Where applicable, items which have already been included in the EM&A Manual need not be repeated in each EM&A report unless there are substantial amendments.)

(i) 1-2 pages executive summary;

(ii) * basic project information including a synopsis of the project organization, programme and management structure, and the work undertaken during the month;

(iii) * a brief summary of EM&A requirements including:

- all monitoring parameters;
- environmental quality performance limits;

- Event-Action Plans;
- environmental mitigation measures, as recommended in the EIA report;
- environmental requirements in contract documents.

(iv) advice on the implementation status of environmental protection, mitigation and pollution control measures, as recommended in the project EIA report, summarized in the updated implementation schedule;

(v) * drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(vi) monitoring results (in both hard and soft copies) together with the following information:

- monitoring methodology;
- equipment used and calibration details;
- parameters monitored;
- monitoring locations (and depth);
- monitoring date, time, frequency, and duration;

(vii) graphical plots of trends of monitored parameters over the past four reporting periods for representative monitoring stations annotated against the following:

- major activities being carried out on site during the period;
- weather conditions during the period;
- any other factors which might affect the monitoring results;

(viii) a summary of non-compliance (exceedances) of the environmental quality performance limits;

(ix) a review of the reasons for and the implications of noncompliance including review of pollution sources and working procedures;

(x) a description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance;

(xi) a summary record of all complaints received (written or verbal) for each media, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken and summary of complaints;

(xii) a summary record of notification of summons, successful prosecutions for breaches of environmental protection/pollution control legislation, and actions taken to rectify such breaches;

(xiii) a forecast of the works programme, impact predictions and monitoring schedule for the next three months; and

(xiv) comments, recommendations and conclusions for the monitoring period.

Annex 22

ANNEX 22: RELEVANT AUTHORITIES FOR HAZARD ASSESSMENT

Source of Risk		Authority
The manufacture, storage, use, or transport of dangerous goods (DGs):		
-	Fuel gas DGs (Note 1)	DEMS
-	Other DGs (Note 2)	DEP

Notes :

1. Cover “gas” as defined in the Gas Safety Ordinance (Cap. 51).

2. Cover “dangerous goods” as defined in the Dangerous Goods Ordinance (Cap. 295), but exclude any “gas” as defined in the Gas Safety Ordinance (Cap. 51).