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

ENVIRONMENTAL IMPACT ASSESSMENT STUDY BRIEF NO. ESB-270/2014

PROJECT TITLE : PLANNING AND ENGINEERING STUDY ON FUTURE LAND USE AT EX-LAMMA QUARRY AREA AT SOK KWU WAN, LAMMA ISLAND – FEASIBILITY STUDY
(hereinafter known as the "Project")

NAME OF APPLICANT : CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
(hereinafter known as the "Applicant")

1. BACKGROUND

1.1 An application (No. ESB-270/2014) for an Environmental Impact Assessment (EIA) study brief under section 5(1)(a) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by the Applicant on 7 March 2014 with a project profile (No. PP-502/2014) (the Project Profile).

1.2 The Applicant proposes to conduct an engineering feasibility study, "Planning and Engineering Study on Future Land Use at Ex-Lamma Quarry Area at Sok Kwu Wan, Lamma Island – Feasibility Study (the Study)" to examine the development potential of the ex-Lamma quarry site for residential use with compatible developments. The Study has a land-base study area of about 59.9 hectares covering the ex-Lamma quarry site and adjoining areas zoned "Comprehensive Development Area", "Green Belt" and "Coastal Protection Area" in the Draft Lamma Island Outline Zoning Plan No. S/I-LI/10. The study area also cover open sea water adjacent to the ex-lamma quarry where a proposed submarine sewage outfall and any emergency sewage will discharge and affect, as well as a seawall extension for a new ferry pier, refuse transfer facility pier and two landing steps. A diagram showing the location of the designated project is shown in Figure 1 in Appendix A of this Study Brief.

1.3 The Project is a designated project under Item 1 of Schedule 3 of the EIAO, which specifies that "Engineering feasibility study of urban development projects with a study area covering more than 20ha or involving a total population of more than 100,000".

1.4 The Project also includes all individual project(s) that fall under Schedule 2 of the EIAO to be identified during the course of the EIA Study. Based on the information provided in the Project Profile, the Project may include the following designated projects under Part I, Schedule 2 of the EIAO:-

(i) Item F.2 – *Sewage treatment works with an installed capacity of more than 5 000 m3 per day; and a boundary of which is less than 200 m from the nearest boundary of an existing or planned residential area or fish culture zone*;

(ii) Item F.3(b) – *A sewage pumping station with an installed capacity of more than 2 000 m3 per day and a boundary of which is less than 150 m from an existing or planned residential area*;

(iii) Item F.6 – *A submarine sewage outfall*; and

(iv) Item G.2 – *A refuse transfer station*.

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

1.6 The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and associated works that take place concurrently. This information will contribute to decisions by the Director on :

(i) the acceptability of any adverse environmental consequences that are likely to arise as a result of the Project;

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

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

2. OBJECTIVES OF THE EIA STUDY

2.1 The objectives of the EIA study are as follows :

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

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

(iii) to provide information on the consideration of alternative layout options of the Project including scale, extent, layout, configuration, design and type of design orientation and the construction methods with a view to avoiding and minimizing potential environmental impacts to environmentally sensitive areas and sensitive uses; to compare the environmental benefits and disbenefits of different options; to provide reasons for selecting the preferred option(s) and to describe the part environmental factors played in the selection of preferred option(s);

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

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

(vi) to identify and quantify where possible any potential landscape and visual impacts and to propose measures to mitigate adverse impacts;

(vii) to identify any negative impacts on sites of cultural heritage and to propose

measures to mitigate these impacts;

(viii) to propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the Project;

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

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

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

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

(xiii) to identify, within the Study Area, any individual project(s) that fall under Schedule 2 of the EIAO, to ascertain whether the findings of this EIA Study have adequately addressed the environmental impacts of those projects; and where necessary, to identify the outstanding issues that need to be addressed in any further detailed EIA study; and

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

3. DETAILED REQUIREMENTS OF THE EIA STUDY

3.1 The Purpose

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

3.2 The Scope

3.2.1 The scope of this EIA study shall cover the Project and the associated works mentioned in sections 1.2, 1.3 and 1.4 of this study brief. The EIA study shall cover the combined impacts of the whole Project and the cumulative impacts of the existing,

committed and planned developments in the vicinity of the Project and associated works sites in accordance with the requirements laid down in section 3.4 of the TM. The environmental impacts of on-site and off-site works and facilities associated with the Project shall be addressed.

3.2.2 The EIA study shall address the likely key issues described below, together with any other key issues identified during the course of the EIA study:

(i) The potential air quality impact on the sensitive receivers of Luk Chau Village, Lamma Island Youth Hostel, Lo So Shing, Sok Kwu Wan, Ta Shui Wan and quarters in cement storage area southwest of the ex-quarry during the construction and operation of the Project and associated works, in particular the impacts arising from construction dust generation during construction phase, the gaseous emission from the marine vessels and ferries, the odour emission from the proposed on-site sewage treatment plants, sewage pumping station and refuse transfer station, as well as the vehicular emission from the Project (if any) during operational phase of the Project, and potential air quality impacts associated with the existing cement storage area (if co-exist with future developments);

(ii) The potential noise impact on the sensitive receivers of Luk Chau Village, Lamma Island Youth Hostel, Lo So Shing, Sok Kwu Wan, Ta Shui Wan and quarters in cement storage area southwest of the ex-quarry during construction and operation of the Project and associated works, in particular the impacts arising from construction equipment operation during construction phase, the operation of marine vessels and ferries, and vehicular noise (if any), as well as fixed plant noise (e.g., sewage treatment plant, sewage pumping station, refuse transfer facilities, etc.) during operational phase of the Project;

(iii) The potential water quality and hydrodynamic impact caused by the Project and associated works, in particular:-

(a) any discharge during construction and operation of the Project and associated works (such as sediment release from construction of the submarine sewage outfall / emergency discharge outfall and modification of existing seawall and pier, surface runoff from the site, etc.) that would cause increases in pollution loadings in receiving waters of Southern Water Control Zone, including the water bodies at Sok Kwu Wan and Lo Tik Wan;

(b) potential water quality impact due to increase in marine traffic;

(c) potential water quality impact on the artificial water system(s);

(d) discharge of wastewater from the Project and associated works during construction and operation of the Project;

(e) discharge of wastewater (untreated or partially treated) during emergency situation when the sewage treatment plant, pumping station(s) or associated works are not in normal operation;

(f) discharge of pollutants from point source(s) and non-point sources(s) to

channels, watercourses and water system(s) during construction and operation of the Project;

(g) potential water quality impacts associated with the existing cement storage area, future refuse collection points and refuse transfer facility;

(h) change of hydrodynamic regime, flushing capacity and current speeds due to the seawall and pier modifications (if any); and

(iv) The potential ecological impacts on terrestrial and aquatic habitats and associated wildlife arising from the construction and operation of the Project and associated works, in particular the impacts on:-

(a) the coastal protection area (CPA) on the north end of the Study Area and the conservation area (CA) in Southern Lamma;

(b) any off-site impacts to the South Lamma Island Site of Special Scientific Interest (SSSI) and Sham Wan SSSI

(c) inter-tidal, sub-tidal and benthic habitats, e.g., coral community;

(d) woodland, plantation, shrub land and wetland type habitat, including freshwater lakes / ponds and falcon nests on cliff face;

(e) fauna species of ecological importance including ardeids, Green Turtles, Romer's Tree Frog, White-bellied Sea Eagle and Finless Porpoises; and

(f) flora species of ecological importance at or in the vicinity of the Project;

(v) The potential fisheries impacts, in particular on the recognized spawning and nursery grounds, artificial reefs and Fish Culture Zone (FCZ) at Sok Kwu Wan and Lo Tik Wan, arising from construction and operation of the Project and associated works;

(vi) The potential landscape and visual impacts caused by construction and operation of the Project and associated works on sensitive receivers in the vicinity, such as Luk Chau Village, Lamma Island Youth Hostel, Lo So Shing, Sok Kwu Wan, Ta Shui Wan and quarters in cement storage area southwest of the ex-quarry including potential glare impact;

(vii) The potential cultural heritage impacts caused by the Project, in particular on the sites of archaeological interest;

(viii) The potential impact to marine archaeology and built heritage;

(ix) The potential impacts of various types of wastes to be generated from the construction and operation of the Project, in particular the excavated materials and dredged sediments arising from the construction works, and domestic waste generated, dredged sediment arising from maintenance dredging of the marina and screenings and sludge arising from the sewage treatment process from the

Project. The potential waste management issue associated with the use of filling materials such as inert construction and demolition material (C&DM) during construction of the Project shall be addressed;

(x) The potential land contamination impact on future occupants;

(xi) The potential health impacts during operation of the Project associated with possible radon emissions from the ex-quarry to future occupants;

(xii) The off-site ecological impacts of proposed supporting infrastructures, including the electricity cable tunnel from Yung Shue Wan to the project site, the water main upgrading works from the existing Lamma Island Fresh Water Service Reservoir to the project site, and any infrastructure relating to future provision of LPG Cylinder Stores.

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

3.3 Consideration of Alternatives

3.3.1 Need of the Project

The Applicant shall provide information on the need of the Project, including the purpose, objectives and environmental benefits of the Project, and describe the scenarios with and without the Project.

3.3.2 Consideration of Different Development Options

The Applicant shall present information on identified feasible alternatives and the proposed development option(s), taking into account any relevant studies relating to the proposed development, the relevant findings of those options addressed in previous studies as well as any studies conducted to reflect the latest changes and developments identified during the course of this EIA study. The Applicant shall provide information on the consideration of alternatives/options for alignment, scale, size, location, scope, shape, configuration and design of the Project.

3.3.3 Consideration of Alternative Construction Methods and Sequences of Works

Taking into consideration of the combined effect with respect to the severity and duration of the construction impacts to the affected sensitive receivers, alternatives and options shall be explored to avoid or minimize the potential adverse environmental impacts on the sensitive uses within and close to the Project area, e.g. different construction methods, sequences of works, phased implementation of the Project, work programme and methods for transportation of construction and demolition materials, to avoid or minimize adverse environmental impacts. A comparison of the environmental benefits and dis-benefits of applying different construction methods and sequences of works shall be included in the EIA study.

3.3.4 Selection of Preferred Scenarios

Taking into consideration of the findings in sections 3.3.2 and 3.3.3 above, the Applicant shall recommend with justifications the adoption of the preferred scenario that will avoid or minimise adverse environmental effects arising from the Project, and describe the part that environmental factors played in arriving at the final selection.

3.4 Technical Requirements

3.4.1 The Applicant shall conduct the EIA study to address the environmental aspects of the Project described in Section 3.2 above. The assessment shall be based on the best and latest information available during the course of the EIA study. The Applicant shall include in the EIA report details of the construction programme and methodologies. The Applicant shall assess the cumulative environmental impacts from the Project and interacting projects as identified in the EIA study. The EIA study shall include the following technical requirements on specific impacts.

3.4.2 Air Quality Impact

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

3.4.2.2 The assessment area for air quality impact assessment shall be defined by a distance of 500 meters from the boundary of the Study Area, with consideration to be extended to include major existing, planned and committed air pollutant emission sources that may have a bearing on the environmental acceptability of the Project. The assessment shall include the existing, committed and planned sensitive receivers within the assessment area.

3.4.2.3 The air quality impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendix B.

3.4.3 Noise Impact

3.4.3.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing noise impact as stated in Annexes 5 and 13 of the TM.

3.4.3.2 Assessment shall include construction noise, road traffic noise, and fixed noise sources, and marine traffic noise impact assessment of the existing, committed and planned NSRs earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans, Layout Plans and other relevant published land use plans, including plans and drawings published by the Lands Department and any land use and development applications approved by the Town Planning Board, in the vicinity of the project.

3.4.3.3 The noise impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendix C.

3.4.4 Water Quality Impact and Sewerage and Sewage Treatment Implication

Water Quality Impact

3.4.4.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing water pollution as stated in Annexes 6 and 14 of the TM.

3.4.4.2 The assessment area for the water quality impact assessment shall cover the Southern Water Control Zone as designated under the Water Pollution Control Ordinance (Cap 358) and water sensitive receivers in the vicinity of the Project, including the nearby water courses, the water bodies at Sok Kwu Wan and Lo Tik Wan. The assessment area shall be extended to include other areas if they are found also being impacted during the course of the EIA study and have a bearing on the environmental acceptability of the Project. The following sensitive receivers and other sensitive receivers identified during the course of the EIA study shall be included and assessed in the water quality impact assessment:

- natural streams and rivers at the vicinity of the assessment area;
- water bodies at Sok Kwu Wan and Lo Tik Wan (including the fish culture zones);
- areas of ecological or conservation value at Tung O and Luk Chau, including the Conservation Area near Lo So Shing and the Coastal Protection Area at the north end of the assessment area; and
- inland lake and ponds in the vicinity of the assessment area.

3.4.4.3 The water quality impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendices D and D-1.

Sewerage and Sewage Treatment Implication

3.4.4.4 The Applicant shall follow the criteria and guidelines for evaluating and assessing impacts on the public sewerage, sewage treatment and disposal facilities as stated in section 6.5 in Annex 14 of the TM.

3.4.4.5 Details of the technical requirements for the assessment of the Sewerage and Sewage Treatment Implication are shown in Appendix D-2.

3.4.5 Waste Management Implication and Land Contamination Impact

3.4.5.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing waste management implication as stated in Annexes 7 and 15 of the TM respectively. If any contaminated land uses as stated in Sections 3.1 and 3.2 of Annex 19 in the TM is identified, the Applicant shall carry out the land contamination assessment following the guidelines for evaluating and assessing land contamination issues at stated in Sections 3.1 and 3.2 of Annex 19 in the TM.

3.4.5.2 The assessment of the waste management implication arising from construction and operation of the Project and land contamination assessment shall follow the detailed technical requirements given in Appendix E.

3.4.6 Ecological Impact

3.4.6.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing ecological impact as stated in Annexes 8 and 16 of the TM.

3.4.6.2 The assessment area for the purpose of terrestrial ecological assessment shall include all areas within a 500m distance from the site boundary of the Project and any other areas likely to be impacted by the Project. For aquatic ecology, the assessment area shall be the same as the assessment area for water quality impact assessment and shall also include any other areas likely to be impacted by the Project. Areas of ecological or conservation values in the vicinity of the Project shall be included and assessed in the ecological impact assessment.

3.4.6.3 The ecological impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendix F.

3.4.7 Fisheries Impact

3.4.7.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing fisheries impact as stated in Annexes 9 and 17 of the TM.

3.4.7.2 The assessment area for fisheries impact assessment shall cover the Southern Water Control Zone as designated under the Water Pollution Control Ordinance (Cap 358) and include any other areas likely to be impacted by the Project. Special attention shall be given to the fishing activities and fishing spawning and nursery grounds within the assessment area, the Sok Kwu Wan Fish Culture Zone and Lo Tik Wan Fish Culture Zone.

3.4.7.3 The fisheries impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendix G.

3.4.8 Landscape and Visual Impacts

3.4.8.1 The Applicant shall follow the criteria and guidelines as stated in Annexes 10 and 18 of the TM and the EIAO Guidance Note No.8/2010 on "Preparation of Landscape and Visual Impact Assessment under the Environmental Impact Assessment Ordinance" for evaluating and assessing the landscape and visual impacts.

3.4.8.2 The assessment area for landscape impact assessment shall include areas within a 500m distance from the site boundary of the Project. The assessment area for the visual impact assessment shall be defined by the visual envelope of the Project.

3.4.8.3 The landscape and visual impact assessments for construction and operation of the Project shall follow the detailed technical requirements given in Appendix H.

3.4.9 Impact on Sites of Cultural Heritage

3.4.9.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing the cultural heritage impacts as stated in Annexes 10 and 19 of the TM.

3.4.9.2 The cultural heritage impact assessment shall include Built Heritage Impact Assessment (BHIA), Archaeological Impact Assessment (AIA) and Marine Archaeological Investigation (MAI) for construction and operation of the Project and shall follow the detailed technical requirements given in Appendix I.

3.4.10 Radon Assessment

3.4.10.1 A radon health risk assessment shall be conducted to assess the potential health impact associated with operation of the Project associated with potential radon emissions from the ex-quarry that may affect the health of future occupants of the future development.

3.4.10.2 The radon health risk assessment shall include the following key steps:

(a) a systematic identification of the risks from radon emissions from the ex-quarry site to future occupants;

(b) an assessment of the likelihood and consequences of exposure to radon emissions;

(c) an identification of means by which the risks could be further reduced; and

(d) recommendation of all reasonably practicable measures to reduce risks during the operation of the Project.

3.4.10.3 The radon health risk assessment shall be based on established practices in countries around the world. A literature search shall be carried out to determine the best approach for the risk assessment, including any codes of practices, guidelines etc. applied locally in Hong Kong and elsewhere in the world. The approach shall be agreed by the Director prior to the commencement of assessment.

3.4.10.4 A quantitative environmental health risk assessment for the risk of exposure to radon for future occupants shall be conducted. Any mitigation measures recommended should be aimed to minimize the environmental health risk from any release of radon to future occupants.

3.4.11 Summary of Environmental Outcomes

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

3.4.12 Environmental Monitoring and Audit (EM&A) Requirements

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

3.4.12.2 Subject to the confirmation of the EIA study findings, the Applicant shall follow the guidelines for an EM&A programme as stated in Annex 21 of the TM.

3.4.12.3 The Applicant shall prepare a Project Implementation Schedule in the form of a checklist as shown in Appendix J of this EIA study brief. It shall contain the EIA study recommendations and mitigation measures with reference to the implementation programme.

4. DURATION OF VALIDITY

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

5. REPORT REQUIREMENTS

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

5.2 The Applicant shall supply the Director with hard and electronic copies of the EIA report and the executive summary in accordance with the requirements given in Appendix K

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

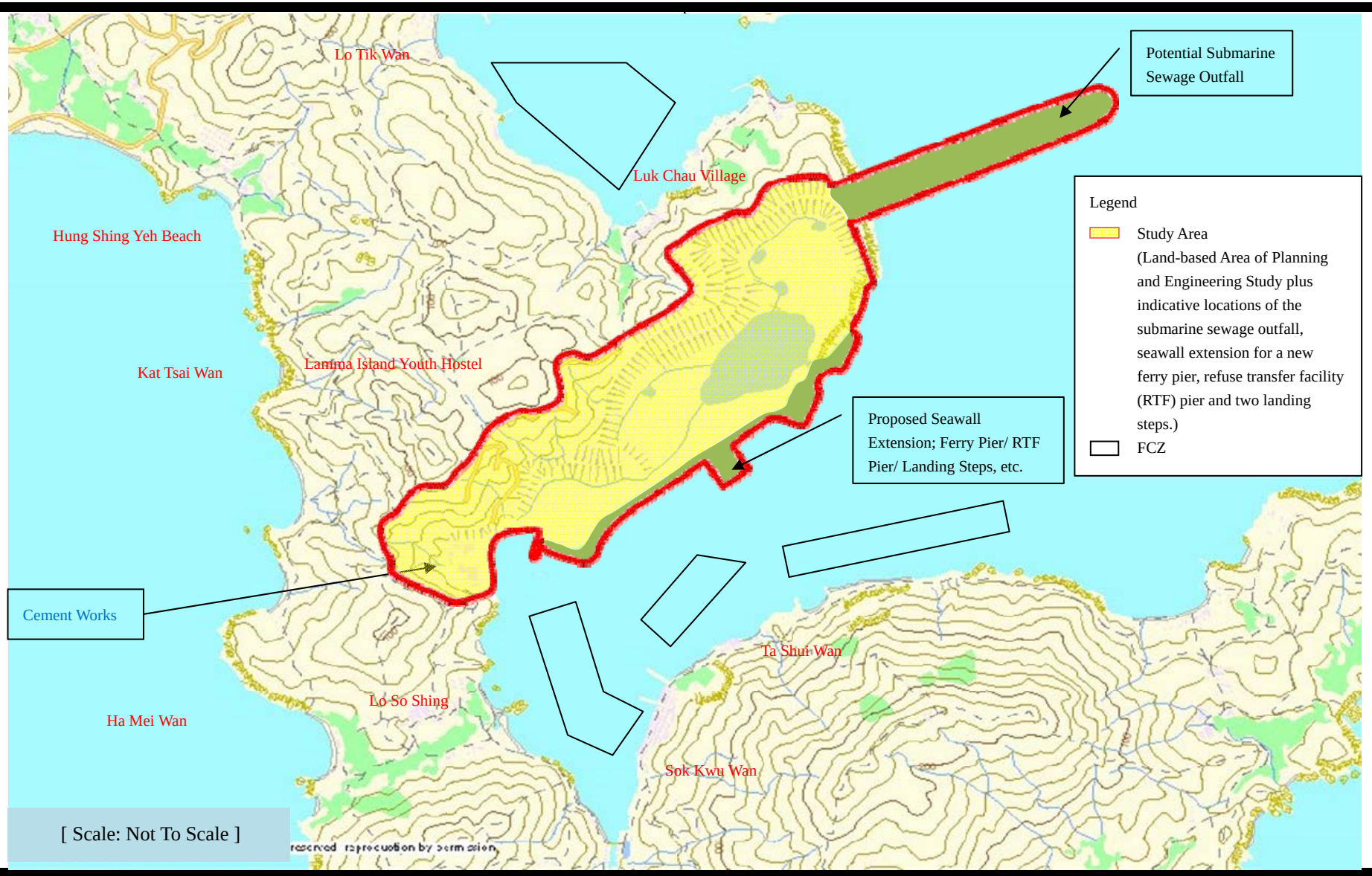
6. OTHER PROCEDURAL REQUIREMENTS

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

6.2 If there is any key change in the scope of the Project mentioned in Section 1.2 of this EIA study brief and in Project Profile (No. PP-502/2014), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA study brief can still cover the key changes, and the additional issues, if any, that the EIA study must also address. If the changes to the Project fundamentally alter the key scope of the EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief.

--- END OF EIA STUDY BRIEF ---

April 2014
Environmental Assessment Division
Environmental Protection Department



Project Title: Planning and Engineering Study on Future Land Use at Ex-Lamma Quarry Area at Sok Kwu Wan, Lamma Island - Feasibility Study

工程項目名稱：南丫島索罟灣前南丫石礦場地區未來土地用途發展計劃及工程研究 - 可行性研究

Location Plan (位置圖) [Originated from the Figure 1.1 of Project Profile No. PP- 502/2014]

EIA Study Brief No.: ESB-270/2014

Figure 1 of Appendix A

Appendix B

Requirements for Air Quality Impact Assessment

The air quality impact assessment shall include the following:

1. Background and Analysis of Activities

   (i) Provision of background information relating to air quality relevant to the Project, e.g. description of the types of activities of the Project that may affect air quality during construction and operation stages of the Project.

   (ii) Provision of an account, where appropriate, of the consideration/measures that have been taken into consideration in the planning of the Project to abate the air pollution impact. The Applicant shall consider alternative construction methods, phasing programmes and alternative modes of operation to minimise the construction and operational air quality impact respectively.

   (iii) Presentation of background air quality levels in the assessment area for the purpose of evaluating cumulative air quality impacts during construction and operational stages of the Project. If PATH model is used to estimate the background air quality, details for the estimation of the emission sources to be adopted in the model runs should be clearly presented.

2. Identification of Air Sensitive Receivers (ASRs) and Examination of Emission/ Dispersion Characteristics

   (i) Identification and description of existing, planned and committed ASRs that would likely be affected by the Project, including those earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans and other relevant published land use plans, including plans and drawings published by Lands Department and any land use and development applications approved by the Town Planning Board. The Applicant shall select the assessment points of the identified ASRs that represent the worst impact point of these ASRs. A map clearly showing the location and description such as name of buildings, their uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources shall also be given.

   (ii) Provision of a list of air pollutant emission sources, including any nearby emission sources which are likely to have impact related to the Project based on the analysis of the construction and operation activities in Section 1 above. Confirmation regarding the validity of the assumptions adopted and the magnitude of the activities (e.g. volume of construction material handled, volume of dredging material handled, traffic mix and volume of land-based vehicles and marine-based vessels etc.) shall be obtained from the relevant government departments / authorities and documented.

(iii) The emissions from any concurrent projects identified as relevant during the course of the EIA study shall be taken into account as contributing towards the overall cumulative air quality impacts. The impact at the existing, committed and planned ASRs within the assessment area shall be assessed, based on the best information available at the time of assessment.

3. Construction Phase Air Quality Impact

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

(ii) If the Applicant anticipates that the Project will give rise to significant construction dust impacts likely to exceed recommended limits in the TM at the ASRs despite the incorporation of the dust control measures proposed, a quantitative assessment should be carried out to evaluate the construction dust impact at the identified ASRs. The Applicant shall follow the methodology set out in Sections 5 to 7 below when carrying out the quantitative assessment.

4. Operational Phase Air Quality Impact

(i) The Applicant shall calculate the expected air pollutant concentrations at the identified ASRs based on an assumed reasonably worst-case scenario. The evaluation shall be based on the strength of the emission sources identified in Section 2 above. The Applicant shall follow the methodology set out in Sections 5 to 7 below when carrying out the assessment.

(ii) The air pollution impacts of future road traffic shall be calculated based on the highest emission strength from the road within the next 15 years upon commencement of operation of the proposed road. The Applicant shall demonstrate that the selected year of assessment represents the highest emission scenario given the combination of vehicular emission factors and traffic flow for the selected year. The Applicant shall propose any Fleet Average Emission Factors used in the assessment. If necessary, the Fleet Average Emission Factors shall be determined by a motor vehicle emission model such as EMFAC-HK model and documented in the EIA report. The traffic flow data and assumptions, such as the exhaust technology fractions, vehicle age/population distribution, traffic forecast and speed fractions, that are used in the assessment shall be presented in the form of both summary table(s) and graph(s).

(iii) If vehicle tunnels and/or full enclosures are proposed in the Project, it is the responsibility of the Applicant to ensure that the air quality inside these proposed structures shall comply with EPD's "Practice Note on Control of Air Pollution in Vehicle Tunnels". When assessing air quality impact due to emissions from tunnels/full enclosures, the Applicant shall ensure prior agreement with the relevant ventilation design engineer over the amount and the types/kinds of pollutants emitted from these full enclosures; and such assumptions shall be clearly and properly documented in the EIA report.

5. Quantitative Assessment Methodology

(i) The Applicant shall conduct the quantitative assessment by applying the general principles enunciated in the modeling guidelines in Appendices B-1 while making allowance for the specific characteristic of the Project. This specific methodology must be documented in such level of details, preferably associated with tables and diagrams, to allow the readers of the EIA report to grasp how the model has been set up to simulate the situation under study without referring to the model input files. Detailed calculations of air pollutants emission rates for input to the modeling shall be presented in the EIA report. The Applicant must ensure consistency between the text description and the model files at every stage of submissions for review. In case of doubt, prior agreement from the Director on the specific modelling details.

(ii) The Applicant shall identify the key/representative air pollution parameters (types of pollutants and averaging time concentrations) to be evaluated and provide explanation for selecting such parameters for assessing the impact from the Project. Ozone Limiting Method (OLM) or Discrete Parcel Method (DPM) or other method to be agreed with the Director shall be used to estimate the conversion ratio of NO_x to NO_2 if NO_2 has been identified as a key air pollutant.

(iii) The Applicant shall calculate the overall cumulative air quality impact at the ASRs identified under Section 2 above and compare these results against the criteria set out in Section 1 of Annex 4 in the TM. The predicted air quality impacts (both unmitigated and mitigated) shall be presented in the form of summary table(s) and pollution contours, to be evaluated against the relevant air quality standards and on any effect they may have on the land use implications. Plans of a suitable scale should be used to present pollution contours to allow buffer distance requirements to be determined properly.

6. Mitigation Measures for Non-compliance

The Applicant shall propose remedies and mitigating measures where the predicted air quality impact exceeds the criteria set in Section 1 of Annex 4 in the TM. These measures and any constraints on future land use planning shall be agreed with the relevant government departments/authorities and documented. The Applicant shall demonstrate quantitatively whether the residual impacts after incorporation of the proposed mitigating measures will comply with the criteria stipulated in Section 1 of Annex 4 in the TM.

7. Submission of Model Files

Input and output file(s) of model run(s) including those files for generating the pollution contours and emission calculations work sheets shall be submitted to the Director in electronic format together with the submission of the EIA report.

-END-

Appendix B-1

Guidelines on Choice of Models and Model Parameters

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

The air quality modeling guidelines shall include the following guidelines as published on the website of the Environmental Protection Department (http://www.epd.gov.hk/epd/english/environmentinhk/air/guide_ref/guide_aqa_model.html):

(i) Guidelines on Choice of Models and Model Parameters;

(ii) Guidelines on Assessing the 'Total' Air Quality Impact (Revised);

(iii) Guidelines on the Use of Alternative Computer Models in Air Quality Assessment (Revised);

(iv) Guidelines on the Estimation of PM2.5 for Air Quality Assessment in Hong Kong; and

(v) Guidelines on the Estimation of 10-minute Average SO2 Concentration for Air Quality Assessment in Hong Kong.

Appendix C

Requirements for Noise Impact Assessment

The noise impact assessment shall include the following:

1 Description of the Noise Environment

1.1 The Applicant shall describe the prevailing noise environment in the EIA report.

1.2 The Applicant shall conduct prevailing background noise surveys to determine the standards for evaluating noise impact from fixed noise source and marine traffic noise sources. The respective noise environment should be documented in the EIA report.

2 Construction Noise Impact Assessment

2.1 Construction Noise Impact Assessment Methodology

2.1.1 The Applicant shall carry out construction noise impact assessment (excluding percussive piling) of the Project during daytime, i.e. 7am to 7pm, on weekdays other than general holidays in accordance with methodology in paragraphs 5.3 and 5.4 of Annex 13 of the TM.

2.1.2 For ground-borne construction noise impact, the Applicant shall propose assessment methodology and computational model which shall be confirmed with the Director, with reference to Section 4.4.2 of the TM, prior to the commencement of the assessment. Site measurements at appropriate locations may be required in order to obtain the empirical input parameters required in the computational model.

2.2 Identification of Construction Noise Impact

2.2.1 *Identification of Assessment Area and Noise Sensitive Receivers*

a. The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the construction noise impact assessment shall generally include areas within 300 metres from the boundary of the Project and the works of the Project.

b. The Applicant shall identify all existing NSRs in the assessment area and select assessment points to represent identified NSRs for carrying out quantitative construction noise impact assessment described below.

c. The assessment points shall be confirmed with the Director prior to the commencement of the quantitative construction noise impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.

d. A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.

2.2.2 *Inventory of Noise Sources* The Applicant shall identify and quantify an inventory of noise sources for representative construction equipment for the purpose of construction noise impact assessment.

2.3 Prediction and Evaluation of Construction Noise Impact

2.3.1 *Phases of Construction*

The Applicant shall identify representative phases of construction that would have noticeable varying construction noise emissions at existing NSRs at the assessment area for agreement of the Director before commencing the construction noise impact assessment.

2.3.2 *Scenarios*

The Applicant shall quantitatively assess the construction noise impact, with respect to criteria set in Annex 5 of the TM, of unmitigated scenario and mitigated scenario at different phases of construction of the Project.

2.3.3 *Prediction of Noise Impact*

a. The Applicant shall present the predicted noise levels in Leq (30 min) dB(A) at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.

b. The assessment shall cover the cumulative construction noise impact resulting from the construction works of the Project and other concurrent projects identified during the course of the EIA study on existing NSRs within the assessment area.

c. The potential construction noise impact under different phases of construction shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the TM.

d. The Applicant shall, as far as practicable, formulate a reasonable construction programme so that no work will be required in restricted hours as defined under the Noise Control Ordinance (NCO). In case the Applicant needs to evaluate whether construction works in restricted hours as defined under the NCO are feasible or not in the context of programming construction works, reference should be made to relevant technical memoranda issued under the NCO. Regardless of the results of construction noise impact assessment for restricted hours, the Noise Control Authority will process Construction Noise Permit (CNP) application, if necessary, based on the NCO, the relevant technical memoranda issued under the NCO, and the contemporary conditions/situations. This aspect should be explicitly stated in the noise chapter and the conclusions and recommendations chapter in EIA report.

2.4 Mitigation of Construction Noise Impact

Direct Mitigation Measures

Where the predicted construction noise impact exceeds the criteria set in Table 1B of Annex 5, TM, the Applicant shall consider and evaluate direct mitigation measures including but not limited to, movable barriers, enclosures, quieter alternative methods, re-scheduling, restricting hours of operation of noisy tasks, etc. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed. Any direct mitigation measures recommended should be well documented in the report. Specific reasons for not adopting certain direct mitigation measures to reduce the noise to a level meeting the criteria in the TM or to maximize the protection for the NSRs as far as possible should be clearly substantiated and documented in the EIA report.

2.5 Evaluation of Residual Construction Noise Impact

Upon exhaust of direct mitigation measures, if the mitigated noise impact still exceeds the relevant criteria in Annex 5 of TM, the Applicant shall identify, predict, evaluate the residual construction noise impact in accordance with Section 4.4.3 of the TM and estimate the total number of existing dwellings, classrooms and other noise sensitive elements that will be exposed to residual noise impact exceeding the criteria set in Annex 5 in the TM.

3 **Road Traffic Noise Impact Assessment**

3.1 Road Traffic Noise Impact Assessment Methodology

3.1.1 The Applicant shall carry out road traffic noise impact assessment in respect of each road

section (within the meaning of Items A.1, A.7 and A.8 under Part I, Schedule 2 of the EIAO and other road sections) and the noise levels from combined road sections of the Project at the NSRs in accordance with methodology in paragraphs 5.1 of Annex 13 of the TM.

3.1.2 *Input Data of Computational Model*

The Applicant shall provide the input data set of the road traffic noise computational model adopted in the assessment for various scenarios. The data shall be in electronic text file (ASCII format) containing road segments, barriers and noise sensitive receivers information. CD-ROM(s) containing the above data shall be submitted together with the EIA report.

3.2 Identification of Road Traffic Noise Impact

3.2.1 *Identification of Assessment Area and Noise Sensitive Receivers*

a. The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the road traffic noise impact shall generally include areas within 300 metres from the boundary of the Project and the works of the Project.

b. The Applicant shall identify all existing, committed and planned NSRs in the assessment area and select assessment points to represent identified NSRs for carrying out quantitative road traffic noise impact assessment described below.

c. The assessment points shall be confirmed with the Director prior to the commencement of the quantitative road traffic noise impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.

d. A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.

e. For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant landuse and planning parameters and conditions to work out representative site layouts for road traffic noise impact assessment purpose. However, such parameters and conditions together with any constraints identified shall be confirmed with the relevant responsible parties including Planning Department and Lands Department.

3.2.2 *Inventory of Noise Sources*

a. The Applicant shall analyse the scope of the proposed road alignment(s) to identify road sections for the purpose of road traffic noise impact assessment. Road sections to be included in road traffic noise impact assessment shall be confirmed with the Director prior to the commencement of the assessment.

b. Validity of the traffic flow prediction of road sections for the purpose of road traffic noise impact assessment shall be confirmed with Transport Department and documented in the EIA report.

3.3 Prediction and Evaluation of Road Traffic Noise Impact

3.3.1 *Scenarios*

a. The Applicant shall quantitatively assess the road traffic noise impact of the Project, with respect to the criteria set in Annex 5, TM, of unmitigated scenario and mitigated scenario at assessment year. The assessment year shall be made reference to Section 5.1 in Annex 13 of the TM.

b. The Applicant shall provide the input data sets of traffic noise model prediction model adopted in the EIA study as requested by the Director for the following scenarios:

i. unmitigated scenario at assessment year;

ii. mitigated scenario at assessment year; and

iii. prevailing scenario for indirect mitigated measures eligibility assessment.

3.3.2 *Prediction of Noise Impact*

a. The Applicant shall present the predicted noise levels in L10 (1 hour) dB(A) at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.

b. The assessment shall cover the cumulative road traffic noise impact resulting from the road traffic noise due to the Project and existing road network on existing, committed and planned NSRs within the assessment area.

c. The potential road traffic noise impact under different scenarios shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5

in the TM.

3.4 Mitigation of Road Traffic Noise Impact

3.4.1 *Direct Mitigation Measures*

a. Where the predicted road traffic noise impact exceeds the criteria set in Annex 5, TM, the Applicant shall consider and evaluate direct mitigation measures including but not limited to noise barrier/enclosure, screening by noise tolerant buildings etc. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed. Any direct mitigation measures recommended should be well documented in the report. Specific reasons for not adopting certain direct mitigation measures to reduce the noise to a level meeting the criteria in the TM or to maximize the protection for the NSRs as far as possible should be clearly quantified and documented in the EIA report.

b. The total number of noise sensitive receivers that will be benefited from and be protected by the provision of direct mitigation measures should be provided. The total number of other noise sensitive receivers that will still be exposed to noise above the criteria with the implementation of all recommended direct mitigation measures shall be quantified.

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

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

3.4.2 *Indirect Mitigation Measures*

a. Upon exhaust of direct mitigation measures, where the predicted road traffic noise impact still exceeds the criteria set in Table 1A of Annex 5, TM, the Applicant shall consider indirect mitigation measures in the form of window insulation and air-conditioning and evaluate in accordance with Section 6.2 in Annex 13 of TM.

b. The Applicant shall identify and estimate the total number of existing dwellings, classrooms and other noise sensitive elements which may qualify for indirect mitigation measures, the associated costs and any implications for such

implementation.

c. For the purpose of determining eligibility of the affected premises for indirect mitigation measures, reference shall be made to methodology accepted by the recognized national/international organization or methodologies adopted for Hong Kong projects having similar issues on proposing an assessment methodology for determining eligibility of the indirect mitigation measures which shall be confirmed with the Director with reference to Section 4.4.2 of the TM, prior to the commencement of the assessment.

3.5 Evaluation of Residual Road Traffic Noise Impact

Upon exhaust of direct and indirect mitigation measures, if the mitigated noise impact still exceeds the relevant criteria in Annex 5 of TM, the Applicant shall identify, predict and evaluate the residual road traffic noise impact in accordance with Section 4.4.3 of the TM and Section 6.2 in Annex 13 of the TM.

4 **Fixed Noise Sources Impact Assessment**

4.1 Fixed Noise Sources Impact Assessment Methodology

The Applicant shall carry out fixed noise sources impact assessment from the Project in accordance with methodology in paragraph 5.2 of Annex 13 of the TM.

4.2 Identification of Fixed Noise Sources Impact

4.2.1 *Identification of Assessment Area and Noise Sensitive Receivers*

a. The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the fixed noise impact shall generally include areas within 300 metres from the boundary of the Project and the works of the Project.

b. The Applicant shall identify all existing, committed and planned NSRs in the assessment area and select assessment points to represent identified NSRs for carrying out fixed noise sources impact assessment described below.

c. The assessment points shall be confirmed with the Director prior to the commencement of the quantitative fixed noise sources impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.

d. A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.

e. For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant landuse and planning parameters and conditions to work out representative site layouts for fixed noise sources assessment purpose. However, such parameters and conditions together with any constraints identified shall be confirmed with the relevant responsible parties including Planning Department and Lands Department.

4.2.2 *Inventory of Noise Sources*

a. The Applicant shall identify and quantify an inventory of noise sources for fixed noise sources impact assessment. The inventory of noise sources shall include, but not limited to noise associated with the possible theme park, any permanent and temporary industrial noise sources including ventilation system(s) of building(s) and/or tunnel(s), ventilation shafts of railway, sewage pumping station(s), seawater pumping station(s) and electricity substation(s), etc.

b. The Applicant shall provide document or certificate, accepted by recognized national/international organization, for the sound power level of each type of fixed noise sources.

c. Validity of the inventory shall be confirmed with the relevant government departments/authorities and documented in the EIA report.

4.3 Prediction and Evaluation of Fixed Noise Sources Impact

4.3.1 *Scenarios*

a. The Applicant shall quantitatively assess the fixed noise sources impact with respect to criteria set in Annex 5 of the TM, of unmitigated scenario and mitigated scenario at assessment years of various operation modes including, but not limited to,
    i. the worst operation mode which represents the maximum noise emission in connection of identified noise sources of the Project; and
    ii. any other operation modes as confirmed with the Director.

b. Validity of the above operational modes shall be confirmed with relevant departments/authorities and documented in the EIA report.

4.3.2 *Prediction of Noise Impact*

a. The Applicant shall present the predicted noise levels in Leq (30 min) at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.

b. The assessment shall cover the cumulative fixed noise sources impact associated with the operation of the proposed project on existing, committed and planned NSRs within the assessment area.

c. The potential fixed noise sources impact under different scenarios shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the TM.

4.4 Mitigation of Fixed Noise Sources Impact

Direct Mitigation Measures

Where the predicted fixed noise sources impact exceeds the criteria set in Table 1A of Annex 5, TM, the Applicant shall consider and evaluate direct mitigation measures including but not limited to noise barrier/enclosure, screening by noise tolerant buildings, etc. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed. Any direct mitigation measures recommended should be well documented in the report. Specific reasons for not adopting certain direct mitigation measures to reduce the noise to a level meeting the criteria in the TM or to maximize the protection for the NSRs as far as possible should be clearly substantiated and documented in the EIA report.

4.5 Evaluation of Residual Fixed Noise Sources Impact

Upon exhaust of direct mitigation measures, if the mitigated noise impact still exceeds the relevant criteria in Annex 5 of TM, the Applicant shall identify, predict, evaluate the residual fixed noise sources impact in accordance with Section 4.4.3 of the TM and estimate the total number of existing dwellings, classrooms and other noise sensitive elements that will be exposed to residual noise impact exceeding the criteria set in Annex 5 in the TM.

5 **Marine Traffic Noise Impact Assessment**

5.1 Marine Traffic Noise Impact Assessment Methodology

The Applicant shall propose methodology and computation model which shall be agreed with the Director, with reference to Section 4.4.2 of the TM, prior to the commencement of the assessment.

5.2 Identification of Marine Traffic Noise Impact

5.2.1 *Identification of Assessment Area and Noise Sensitive Receivers*

a. The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment.

b. The Applicant shall identify all existing, committed and planned NSRs on the proposed Project in the assessment area and select assessment points to represent identified NSRs for carrying out marine traffic noise impact assessment described below.

c. In case the Applicant proposes ferry pier/berth in the Project, the Applicant shall also assess the marine traffic noise on existing, committed and planned NSRs outside the Project in the assessment area The assessment points shall be confirmed with the Director prior to the commencement of the marine traffic noise impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.

d. A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.

e. For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant landuse and planning parameters and conditions to work out representative site layouts for marine traffic noise assessment purpose. However, such parameters and conditions together with any constraints identified shall be confirmed with the relevant responsible parties including Planning Department and Lands Department.

5.2.2 *Inventory of Noise Sources*

The Applicant shall identify and quantify any marine traffic noise sources including but not limited to noise from operation activities on the moored vessels; manoeuvring of

vessels using existing pier etc within the assessment area.

5.3 Prediction and Evaluation of Marine Traffic Noise Impact

5.3.1 *Scenarios*

The Applicant shall assess the marine traffic noise impact, with respect to proposed criteria which the applicant shall submit for agreement with the Director (with reference to section 4.4.2(c) of the TM), of unmitigated scenario and mitigated scenario at assessment years of various operation modes including, but not limited to,

i. the worst operation mode which represents the maximum noise emission in connection of identified noise sources; and
ii. any other operation modes as confirmed with the Director.

5.3.2 *Prediction of Noise Impact*

a. The Applicant shall present the predicted noise levels at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.

b. The assessment shall cover the cumulative marine traffic noise impact associated with the operation of the proposed project on existing, committed and planned NSRs within the assessment area.

c. The potential marine traffic noise impact under different scenarios shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the adopted criteria.

5.4 Mitigation of Marine Traffic Noise Impact

Direct Mitigation Measures

Where the predicted marine traffic noise impact exceeds the proposed criteria, the Applicant shall consider and evaluate direct mitigation measures including but not limited to noise barrier/enclosure, screening by noise tolerant buildings etc. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed. Any direct mitigation measures recommended should be well documented in the report. Specific reasons for not adopting certain direct mitigation measures to reduce the noise to a level meeting the proposed criteria should be clearly substantiated and documented in the EIA report.

5.5 Evaluation of Residual Marine Traffic Noise Impact

Upon exhaust of direct mitigation measures, if the mitigated noise impact still exceeds the adopted criteria, the Applicant shall identify, predict, evaluate the residual marine traffic noise impact in accordance with Section 4.4.3 of the TM and estimate the total number of existing dwellings, classrooms and other noise sensitive elements that will be exposed to residual noise impact exceeding the adopted criteria.

-END-

Appendix D

Requirements for Water Quality Impact Assessment

1. The Applicant shall identify and analyse physical, chemical and biological disruptions to the artificial and natural water system(s), the associated catchment area(s) and coastal water arising from construction and operation of the Project.

2. The Applicant shall predict, quantify and assess any water quality impacts arising from the Project on the water system(s) and the sensitive receivers by appropriate mathematical modelling and/or other techniques proposed by the Applicant and approved by the Director. The mathematical modelling requirements are set out in Appendix D-1. Possible impacts due to the dredging, fill extraction, backfilling, transportation and disposal of dredged materials, other marine works activities, effluent discharge and site runoff shall include changes in hydrology, flow regime, sediment erosion and deposition patterns, morphological change of seabed profile, water and sediment quality, marine and freshwater organisms/community. The prediction shall include possible different construction stages or sequences of the Project. Affected sensitive receivers shall be identified by the assessment tool with indications of degree of severity.

3. The assessment shall include, but not limited to the following:

   (i) the water quality impacts of the site run-off generated during the construction stage such as the effluents generated from dewatering associated with piling activities, grouting and concrete washing and those specified in the ProPECC Practice Note 1/94;

   (ii) the water quality impacts of the road runoff containing oil/grease and suspended solids during the operational stage; and

   (iii) the water quality impacts on beaches, fish culture zones, coral communities, sea water intakes, river courses, inland lakes, marine mammal and green turtle habitats, drainages and other water sensitive receivers around the work sites.

4. The Applicant shall address water quality impacts due to the construction phase and operational phase of the Project. Essentially, the assessment shall address the following :

5. The water quality impact assessment shall cover the following, but not limited to, major areas of concern:

   General

   (i) Collection and review of background information on the existing water system(s) and their respective catchments, and sensitive receivers which may be affected by the Project during construction and operational stage;

(ii) Characterization of water and sediment quality of the related water system(s) and sensitive receivers, which may be affected by the Project during construction and operational stage, based on existing information or appropriate site survey/tests;

(iii) Identification and analysis of the existing and future activities and change in beneficial uses related to the water system(s) and identification of the water sensitive receivers. The Applicant shall refer to those developments and uses earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans;

(iv) Identification of pertinent water and sediment quality objectives, criteria and standards for the water system(s) and the sensitive receivers;

(v) Assessment on the need of any reclamation, pond or lake filling; identification and quantification of all activities, including review of the construction sequences and methods of the Project to identify any change of water courses, natural stream, shoreline or bathymetry, flow regimes and catchment types or areas. The selected method shall take into consideration the need to protect relevant water sensitive receivers and let the marine sediments be left in place and not be disturbed as far as possible;

(vi) Identification, analysis and quantification of existing and future water and sediment pollution sources, including point and non-point discharges to surface water and runoff of any sandy material generated by the Project and discharged to the marine waters in relevant Water Control Zone(s) as designated under the Water Pollution Control Ordinance (Cap358), existing and planned drainage systems and water courses, and maintenance dredging of marine sediment for the adjacent navigation channel.

(vii) Establishment and provision of an emission inventory on the quantities and characteristics of these existing and future pollution sources in the assessment area. Field investigation and laboratory tests, as appropriate, shall be conducted to fill in any relevant information gaps;

Impact Prediction

(viii) Prediction and quantification, by mathematical modelling or other technique approved by the Director, of construction and operational impacts on the water system(s) and the sensitive receivers due to those alterations and changes identified in (v) above and the pollution sources identified in (vi) above. The mathematical modelling requirements are set out in Appendix D-1 of this study brief. Possible impacts include changes in hydrology, flow regime, sediment erosion or deposition, water quality and the effects on the marine organisms due to such changes. The location, nature, extent and rate of such works for the Project shall be clearly identified and evaluated. The prediction shall include possible different construction stages or sequences and different operation stages of the Project;

(ix) Identification and quantification of all dredging, backfilling, reclamation, mud/sediment transportation and disposal activities and requirements. The

potential for the release of contaminants during dredging and other marine works shall be addressed using the chemical test results derived from sediment and marine water samples collected on site and relevant historic data. The Applicant shall also address the pattern of the sediment deposition and the potential increase in turbidity and suspended solid levels in the water column and at the sensitive receivers due to the disturbance of sediments during dredging, backfilling and reclamation. The prediction and quantification of impacts on the hydrodynamic regime, and impact caused by sediment re-suspension and contaminants release shall be carried out by techniques to be approved by the Director;

(x) Report on the adequacy of the existing/planned sewerage and sewage treatment facilities for the handling, treatment and disposal of wastewater arising from the Project as required in Appendix D-2 of this study brief;

(xi) Subject to the assessment findings and recommendations from the Sewerage and Sewage Treatment Implications under Appendix D-2 of this study brief, the Applicants shall identify and quantify the water quality impacts due to such findings and recommendations and select suitable outfall locations to avoid water quality impact to water sensitive receivers. The water quality concerns could include, but not limited to, possible sewage overflow or emergency bypass due to capacity constraints of the sewerage system, emergencies arising from the Project;

(xii) Assessment of the cumulative impacts due to other related concurrent and planned projects, activities or pollution sources along the identified water system(s) and sensitive receivers that may have a bearing on the environmental acceptability of the Project;

(xiii) The Applicant shall devise mitigation measures to avoid or minimize the impacts identified above, including identification and evaluation of the best practicable dredging methods to minimize dredging and dumping requirements, demand for fill sources and non-point source pollution as far as possible. The residual impacts on the water system(s) and the sensitive receivers with regard to the relevant water and sediment quality objectives, criteria, standards or guidelines shall be assessed and quantified using appropriate mathematical models set out in Appendix D-1 to this study brief.

-END-

Appendix D-1

Hydrodynamic and Water Quality Modelling Requirements

Modelling software general

1. The modelling software shall be fully 3-dimensional capable of accurately simulating the stratified condition, salinity transport, and effects of wind and tide on the water body within the model area.

2. The modelling software shall consist of hydrodynamic, water quality, sediment transport, thermal and particle dispersion modules. All modules shall have been proven with successful applications locally and overseas.

3. The hydrodynamic, water quality, sediment transport and thermal modules shall be strictly mass conserved at all levels.

4. An initial dilution model shall be used to characterize the initial mixing of the effluent discharge, and to feed the terminal level and size of the plume into the far field water quality modules where necessary. The initial dilution model shall have been proven with successful applications locally and overseas.

Model details – Calibration & Validation

1. The models shall be properly calibrated and validated against applicable existing and/or newly collected field data before their use in this study in the Hong Kong waters, the Pearl Estuary and the Dangan (Lema) Channel. The field data set for calibration and validation shall be agreed with EPD.

2. Tidal data shall be calibrated and validated in both frequency and time domain manner.

3. For the purpose of calibration and validation, the model shall run for not less than 15 days of real sequence of tide (excluding model spin up) in both dry and wet seasons with due consideration of the time required to establish initial conditions.

4. In general the hydrodynamic models shall be calibrated to the following criteria:

Criteria	Level of fitness with field data
• tidal elevation (@)	< 8 %
• maximum phase error at high water and low water	< 20 minutes
• maximum current speed deviation	< 30 %
• maximum phase error at peak speed	< 20 minutes
• maximum direction error at peak speed	< 15 degrees
• maximum salinity deviation	< 2.5 ppt

@ Root mean square of the error including the mean and fluctuating components shall meet the criteria at no less than 80% of the monitoring stations in the model domain

5. The consultants shall be responsible for acquiring/developing and calibration of the models for use in this study themselves. They may make reference to the models developed under the Update on Cumulative Water Quality and Hydrological Effect of Coastal Developments and Upgrading of Assessment Tool (Agreement No. CE 42/97). They may also propose to use other models subject to agreement with EPD.

Model details – Simulation

1. The water quality modelling results shall be qualitatively explainable, and any identifiable trend and variations in water quality shall be reproduced by the model. The water quality model shall be able to simulate and take account of the interaction of dissolved oxygen, phytoplankton, organic and inorganic nitrogen, phosphorus, silicate, BOD, temperature, suspended solids, contaminants release of dredged and disposed material, air-water exchange, *E. coli* and benthic processes. It shall also simulate salinity. Salinity results simulated by hydrodynamic models and water quality models shall be demonstrated to be consistent.

2. The sediment transport module for assessing impacts of sediment loss due to marine works shall include the processes of settling, deposition and re-erosion. The values of the modelling parameters shall be agreed with EPD. Contaminants release and DO depletion during dredging and dumping shall be simulated by the model.

3. The models shall at least cover the Hong Kong waters, the Pearl Estuary and the Dangan Channel to incorporate all major influences on hydrodynamic and water quality. A fine grid model may be used for detailed assessment of this study. It shall either be linked to a far field model or form part of a larger model by gradual grid refinement. The coverage of the fine grid model shall be properly designed such that it is remote enough so that the boundary conditions will not be affected by the Project. The model coverage area shall be agreed with EPD.

4. In general, grid size at the area affected by the Project shall be less than 400 m in open waters and less than 75 m around sensitive receivers. The grid shall also be able to reasonably represent coastal features existing and proposed in the Project. The grid schematization shall be agreed with EPD.

Modelling assessment

1. The assessment shall include the construction and operational phase of the Project. Where appropriate, the assessment shall also include maintenance dredging. Scenarios to be assessed shall cover the baseline condition and scenarios with various different options proposed by the Applicant in order to quantify the environmental impacts and improvements that will be brought about by these options. Corresponding pollution load, bathymetry and coastline shall be adopted in the model set up.

2. Hydrodynamic, water quality, sediment transport and thermal modules, where appropriate, shall be run for (with proper model spin up) at least a real sequence of 15 days spring-neap tidal cycle in both the dry season and the wet season.

3. For assessing temporary discharges via the emergency outfall, the Applicant shall estimate discharge loading, pattern and duration. The worst case scenario shall include

discharge near slack water of neap tide. A period of at least 15 days spring-neap cycle in wet season, but long enough for recovery of the receiving water, shall be simulated. Detailed methodology shall be agreed with EPD.

4. The results shall be assessed for compliance of Water Quality Objectives.

5. The impact on all sensitive receivers shall be assessed.

6. Cumulative impacts due to other projects, activities or pollution sources within a boundary to the agreement of EPD shall also be predicted and quantified.

-END-

Appendix D-2

Requirements for Assessment of Sewerage and Wastewater Treatment Implication

1. The Applicant shall estimate the wastewater arising associated with the development of the proposed project, assess the impacts of the wastewater arising to the sewerage system and environment, propose mitigation measure and demonstrate the acceptability of the residual impacts with timely implementation of the mitigation measures. The assessment shall include, inter alia, the following :

   (i) delineation of the wastewater catchment;

   (ii) estimate the peak wastewater arising from the residential and non-residential discharges, with flow build-up, within the catchment up to an ultimate development year agreed by EPD;

   (iii) assess the impact of the wastewater arising associated with the development on the sewerage system, including the sewerage networks, wastewater treatment and disposal facilities, and to the environment;

   (iv) identify mitigating measures to remedy the impacts such as improvements to the existing and provision of a new sewerage network, wastewater treatment and disposal facilities;

   (v) obtain endorsement of the mitigation measures from the relevant government departments / authorities. Establish the feasibility of the timely implementation of the mitigation measures for remedying the impacts; and

   (vi) demonstrate the acceptability of the residual impacts with the timely commissioning of the mitigation measures.

-END-

Appendix E

Requirements for Assessment of Waste Management Implication

The assessment of waste management implication and land contamination shall cover the following:

1. Analysis of Activities and Waste Generation

   (i) The Applicant shall identify the quantity, quality and timing of the wastes arising as a result of the construction and operation (if any) activities of the Project based on the sequence, duration, method and process of these activities e.g. any dredged/excavated sediment/mud, construction and demolition materials, floating refuse and other wastes which will be generated during construction and operational (if any) stages. The Applicant shall adopt appropriate design, general layout, construction methods and programme to minimize the generation of public fill/inert construction and demolition (C&D) materials and maximize the use of public fill / inert C&D materials for other construction works.

   (ii) The Applicant shall consider alternative project designs/ measures to avoid/ minimize floating refuse accumulation / entrapment and measures/ proposals for the potential floating refuse problem, e.g. regular collection of the floating refuse along the coast. Regarding the potential trapping of floating refuse along the shoreline of the Project, the Applicant shall estimate as far as practicable the amount of floating refuse to be found/trapped along the shoreline of the Project in construction stage and after the completion of the Project (if any). The Applicant shall develop an effective plan / design to avoid/ minimize the trapping of floating refuse. If floating refuse problem is identified and needs to be dealt with, the Applicant shall propose appropriate measures to deal with this floating refuse in a proper and acceptable manner e.g. to collect, recycle, reuse, store, transport and dispose of.

2. Proposal for Waste Management

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

   (ii) After considering the opportunities for reducing waste generation and maximizing re-use, the types and quantities of the wastes required to be disposed of as a consequence shall be estimated and the disposal methods/ options for each type of wastes shall be described in detail. The disposal methods/ options recommended for each type of wastes shall take into account the result of the assessment in Section 2 (iv) below;

   (iii) The EIA report shall state the transportation routings and the frequency of the trucks/ vessels involved, any barging point or conveyor system to be used, the stockpiling areas and the disposal outlets for the wastes identified; and

   (iv) The impact caused by handling (including stockpiling, labelling, packaging &

storage), collection, transportation and re-use/ disposal of wastes shall be addressed in detail and appropriate mitigation measures shall be proposed. This assessment shall cover the following areas:

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

3. Dredging/Excavation, Filling and Dumping

(i) Identification and quantification all excavation/dredging, excavated/dredged sediment/mud transportation and disposal activities and requirements. Potential dumping ground to be involved shall also be identified. Appropriate field investigation, sampling and chemical and biological laboratory tests to characterize the sediment / mud concerned shall be conducted. The ranges of parameters to be analyzed; the number, type and methods of sampling; sample preservation; chemical and biological laboratory test methods to be used shall be agreed with the Director (with reference to Section 4.4.2(c) of the TM) prior to the commencement of the tests and document in the EIA report for consideration. The categories of sediment/mud which are to be disposed of in accordance with a permit granted under the Dumping at Sea Ordinance (DASO) shall be identified by both chemical and biological tests and their quantities shall be estimated. If the presence of any serious contamination of sediment/mud which requires special treatment/disposal is confirmed, the Applicant shall identify the most appropriate treatment and/or disposal arrangement and demonstrate its feasibility. The Applicant shall provide supporting document, such as agreement by the relevant facilities management authorities, to demonstrate the viability of any treatment/disposal plan.

(ii) The Applicant shall identify and evaluate the best practicable excavation/dredging methods to minimize dredging/excavation and dumping requirements based on the criterion that existing sediment/mud shall be left in place and not to be disturbed as far as possible.

4. Land Contamination

(i) The Applicant shall identify the potential land contamination site(s) within the entire Study Area (Figure 1 of Appendix A refers) and, if any, within the boundaries of all associated areas (e.g. work areas) of the Project.

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

(iii) During the course of the EIA study, the Applicant shall submit a Contamination Assessment Plan (CAP) to the Director for endorsement prior to conducting an

actual contamination impact assessment of the land or site(s). The CAP shall include proposal with details on representative sampling and analysis required to determine the nature and the extent of the contamination of the land or site(s). Alternatively, the Applicant may refer to other previously agreed and still relevant and valid CAP(s) for the concerned site(s).

(iv) Based on the endorsed CAP, the Applicant shall conduct a land contamination impact assessment and submit a Contamination Assessment Report (CAR) to the Director for endorsement. If land contamination is confirmed, a Remedial Action Plan (RAP) to formulate viable remedial measures with supporting documents, such as agreement by the relevant facilities management authorities, shall be submitted to the Director for approval. The Applicant shall then clean up the contaminated land or site(s) according to the approved RAP, and a Remediation Report (RR) to demonstrate adequate clean-up should be prepared and submitted to the Director for endorsement prior to the commencement of any development or redevelopment works within the Study Area. The CAP, CAR and RAP shall be documented in the EIA report.

(v) If there are potential contaminated sites which are inaccessible for conducting sampling and analysis during the course of the EIA study, e.g. due to site access problem, the Applicant's CAP shall include:

(a) a review of the available relevant information;

(b) an initial contamination evaluation of these sites and possible remediation methods;

(c) a confirmation of whether the contamination problem at these sites would be surmountable;

(d) a sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of these sites; and

(e) where appropriate, a schedule of submission of revised or supplementary CAP, CAR, RAP and RR as soon as these sites become accessible.

-END-

Appendix F

Requirements for Ecological Impact Assessment (Terrestrial and Aquatic)

1. The Applicant shall examine the flora, fauna and other components of the ecological habitats within the assessment area. The aim shall be to protect, maintain or rehabilitate the natural environment. In particular, the Project shall avoid or minimise impacts on conservation areas, sites of special scientific interest and other ecologically sensitive areas. The assessment shall identify and quantify as far as possible the potential ecological impacts, both directly (e.g., physical disturbance) and indirectly (e.g., changes of water quality, hydrodynamic regime, glare and ambient light level) to the natural environment and the associated wildlife groups and habitats / species arising from the Project including its construction phases as well as the subsequent management and maintenance of the proposals.

2. The assessment shall include the followings:

   (i) Review of the findings of relevant studies / surveys and collection of the available information regarding the ecological characters of the assessment area;

   (ii) Evaluation of information collected and identification of any information gap relating to the assessment of potential ecological impact;

   (iii) Carrying out necessary field surveys (the duration of which shall be at least 6 months covering wet and dry seasons) and investigations to verify the information collected in (ii) above, to fill the information gaps identified and to fulfill the objectives of the EIA study. The field surveys shall include but not be limited to flora, fauna and any other habitats/species of conservation importance and shall also include subtidal and intertidal survey, benthic community survey, underwater dive survey for coral community;

   (iv) Establishment of the general ecological profile of the assessment area based on data of relevant previous studies / surveys and results of the ecological field surveys, and description of the characteristics of each habitat found; major information to be provided shall include :

      (a) description of the physical environment, including all recognized sites of conservation importance, and assessment of whether these sites will be affected by the Project or not;

      (b) habitat maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats and species of conservation interest in the assessment area;

      (c) ecological characteristics of each habitat type such as extent, substrate, size, type, species present, dominant species found, species diversity and abundance, community structure, ecological value and inter-dependence of the habitats and species, and presence of any features of ecological importance;

(d) representative colour photos of each habitat type and any important ecological features identified; and

(e) species found that are rare, endangered and/or listed under local legislation, international conventions for conservation of wildlife/ habitats or red data books.

(v) Investigation and description of the existing wildlife uses of the various habitats with special attention to those wildlife groups and habitats with conservation interests, including

(a) natural stream courses, rivers and associated riparian habitats, freshwater lakes / ponds and inter-tidal, sub-tidal and benthic habitats;

(b) woodlands, plantation, shrub land and wetland;

(c) vertebrates (e.g. avifauna, mammals, fish and herpetofauna in particular the White-bellied Sea Eagle, falcon nests on the rock cliff faces and any small burrowing mammals);

(d) macroinvertebrates (e.g. butterflies, odonates, gastropods, corals and crustaceans); and

(e) any other habitats/species identified as having special conservation interest by this EIA study.

(vi) Using suitable methodology and considering also other works activities from other projects reasonably likely to occur at the same time, identification and quantification as far as possible of any direct (e.g. loss of habitats due to various elements such as dredging / reclamation, excavation works, access road and other associated works of the Project, physical disturbance of marine mammals by increased marine traffic, lighting, etc.), indirect (e.g. changes in water qualities, hydrodynamics properties, hydrology, accidental discharge of untreated sewage, noise, glare, ambient light level and other disturbance generated by the construction and operational activities, etc, including increase in underwater noise), on-site, off-site, primary, secondary and cumulative ecological impacts such as destruction of habitats, reduction of species abundance / diversity, loss of feeding and breeding grounds, reduction of ecological carrying capacity, habitat fragmentation, and in particular the followings:

(a) Potential destruction or disturbance to ecological habitats, e.g., woodland, plantation, shrubland, wetland, falcon nests on cliff face, etc.;

(b) Disturbance to animals and plants (e.g. human activities, traffic, lighting, tree and slope cutting);

(c) Impacts due to potential changes in water quality, hydrodynamics properties in natural stream courses, rivers and associated riparian habitats, freshwater lakes / ponds and marine water bodies;

(d) Impacts to marine fauna during construction and operation phases due to dredging works, formation of submarine sewage outfall / pier /

landing steps, and disturbance associated with possible increased in marine traffic volume / change of marine traffic pattern; and

(e) Potential impacts to woodland and any others habitats / species of conservation value discovered during the course of the EIA study;

(vii) Evaluation of ecological impact based on the best and latest information available during the course of the EIA study, using quantitative approach as far as practicable and covering construction and operational phases of the Project as well as the subsequent management and maintenance requirement of the Project. Potential cumulative ecological impact on habitats and species of conservation interest arising from the Project and interacting projects as identified in the EIA study shall be evaluated;

(viii) Recommendations for possible alternatives, such as layout, design and alignment of the Project and modification / change of construction methods, and practicable mitigation measures to avoid, minimize and/or compensate for the adverse ecological impacts identified during construction and operation of the Project;

(ix) Evaluation of the feasibility and effectiveness of the recommended mitigation measures and definition of the scope, type, location, implementation arrangement, resources requirement, subsequent management and maintenance of such measures;

(x) Determination and quantification as far as possible of the residual ecological impacts after implementation of the proposed mitigation measures;

(xi) Evaluation of the significance and acceptability of the residual ecological impacts by making reference to the criteria in Annex 8 of the TM; and

(xii) Review of the need for and recommendation on any ecological monitoring programme required.

-END-

Appendix G

Requirements for Fisheries Impact Assessment

1. Existing information regarding the assessment area shall be reviewed. Based on the review results, the assessment shall identify data gap and determine if there is any need for field surveys. If field surveys are considered necessary, the assessment shall recommend appropriate methodology, duration and timing for such surveys.

2. The fisheries impact assessment shall provide the following information:

   (i) Description of the physical environmental background;

   (ii) Description and quantification of the existing capture and culture fisheries activities;

   (iii) Description and quantification of the existing fisheries resources;

   (iv) Identification of parameters (e.g. water quality parameters) and areas of fisheries importance;

   (v) Prediction and evaluation of any direct / indirect, onsite / offsite impacts on fisheries such as loss or disturbance of fishing ground, fisheries habitat, spawning and nursery ground, water quality deterioration at sensitive receivers such as fish culture zones or artificial reefs;

   (vi) Evaluation of cumulative impacts on fisheries particularly loss of fishing ground and water quality deterioration at sensitive receivers;

   (vii) Proposal of environmental mitigation measures with details on justification, feasibility, scope and programme, as well as staff and financial implications including those related to the subsequent management and maintenance requirements of such measures; and

   (viii) Review of the need for monitoring during the construction and operation phases of the Project and, if necessary, proposal of a monitoring and auditing programme.

-END-

Appendix H

Requirements for Landscape and Visual Impact Assessments

1. The Applicant shall review relevant plan(s) and/or studies which may identify areas of high landscape value and recommend country park, coastal protection area, green belt and conservation area designations. Any guidelines on landscape and urban design strategies and frameworks that may affect the appreciation of the Project shall also be reviewed. The aim is to gain an insight to the future outlook of the area affected so as to assess whether the Project can fit into the surrounding setting and comparison of the baseline condition with and without the Project. Any conflict with the statutory town plan(s) and any published land use plans shall be highlighted and assessed.

2. The Applicant shall describe, appraise, analyse and evaluate the existing and planned landscape resources and character of the assessment area. A system shall be derived for judging landscape and visual impact significance. Annotated oblique aerial photographs and plans of suitable scale showing the baseline landscape character areas and landscape resources and mapping of impact assessment shall be extensively used to present the findings of impact assessment. Descriptive text shall provide a concise and reasoned judgment from a landscape and visual point of view. The sensitivity of the landscape framework and its ability to accommodate change shall be particularly focused on. The Applicant shall identify the degree of compatibility of the Project with the existing and planned landscape setting, recreation and tourism related uses, and scenic spot. The landscape impact assessment shall quantify the potential landscape impact as far as possible so as to illustrate the significance of such impacts arising from the proposed development. Clear mapping of the landscape impact is required. Where applicable, broad brush tree survey shall be carried out and the impacts on existing trees shall be addressed. Cumulative landscape and visual impacts of the Project with other committed and planned developments shall be assessed.

3. The Applicant shall assess the visual impacts of the Project. Clear illustration including mapping of visual impact is required. The assessment shall include the following:

   (i) identification and plotting of visual envelope of the Project;

   (ii) identification of the key groups of existing and planned sensitive receivers including, but not limited to, tourists , hikers, workers and residents in the vicinity of the Project within the visual envelope with regard to views from ground level, sea level and elevated vantage points;

   (iii) description of the visual compatibility of the Project with the surrounding and the planned setting, and its obstruction and interference with the key views within the visual envelope;

   (iv) identification of the severity of visual impacts in terms of distance, nature and number of sensitive receivers. The visual impacts of the Project with and without mitigation measures shall be included and illustrated so as to demonstrate the effectiveness of the proposed mitigation measures across time; and

   (v) evaluations and explanations of the factors considered in arriving the significance

thresholds of visual impact.

4. The Applicant shall evaluate the merits of preservation in totality, in parts or total destruction of existing landscape and the establishment of a new landscape character area if it will be affected by the Project. In addition, alternative site layout, design and construction method that will avoid or reduce the identified landscape and visual impacts shall be evaluated for comparison before adopting other mitigation or compensatory measures to alleviate the impacts. The mitigation measures proposed shall not only be concerned with damage reduction but shall also include consideration of potential enhancement of existing landscape and visual quality. The Applicant shall recommend mitigation measures to minimize adverse effects identified above, including provision of a master landscape plan and a landscape / visual impact mitigation measures plan.

5. The mitigation measures shall also include design and layout of structures, colour scheme and texture of material used and any measures to mitigate the impact on the existing and planned land use and visually sensitive receivers. Parties shall be identified for the on going management and maintenance of the proposed mitigation works to ensure their effectiveness throughout the construction phase and operational phase of the Project, associated works, supporting facilities and essential infrastructures. A practical programme and funding proposal for the implementation of the recommendation measures shall be provided.

6. Annotated illustration materials such as colour perspective drawings, plans and section/elevation diagrams, annotated oblique aerial photographs, photographs taken at vantage points, and computer-generated photomontage shall be adopted to fully illustrate the landscape and visual impacts of the Project. A comparison shall be provided on the baseline condition, including committed planned development with and without the Project. In particular, the landscape and visual impacts of the Project with and without mitigation measures from representative viewpoints, particularly from views of the most severely affected visually sensitive receivers (i.e. worst case scenario), shall be properly illustrated in existing and planned setting for at least four stages (existing condition, Day 1 with no mitigation measures, Day 1 with mitigation measures and Year 10 with mitigation measures) by computer-generated photomontage so as to demonstrate the comparison of with and without the Project and the effectiveness of the proposed mitigation measures. Computer graphics shall be compatible with Microstation DGN file format. The Applicant shall record the technical details in preparing the illustration, which may need to be submitted for verification of the accuracy of the illustration.

-END-

Appendix I

Requirements for Built Heritage Impact Assessment, Archaeological Impact Assessment and Marine Archaeological Investigation under Cultural Heritage Impact Assessment

1. Built Heritage Impact Assessment (BHIA) – The applicant shall conduct a BHIA, taking the result of previous BHIA and other background of the site into account, to identify known and unknown built heritage items within the assessment area that may be affected by the Project and its associated works to assess the direct and indirect impacts on the built heritage items. The impacts include visual impact, impacts on the fung shui/visual corridor of the historic buildings and structures through change of water-table, vibration caused by the Project. Assessment of impacts on cultural heritage shall also take full account of, and allow where appropriate, the Guidelines for Landscape and Visual Impact Assessment of Annex 18 of the TM. The Applicant shall draw necessary reference to relevant sections of the Guidelines for Culture Heritage Impact Assessment in Appendix I-1 of this study brief.

2. Archaeological Impact Assessment (AIA) - The Applicant shall engage qualified archaeologist(s) to review the archaeological potential of the Project sites taking the results of previous studies and other background of the sites into account. In case the existing information is inadequate or where the Project sites have not been adequately studied before, the archaeologist(s) shall conduct archaeological investigations to assemble data. The archaeologist(s) shall obtain licence(s) from the Antiquities Authority prior to commencement of archaeological investigations. The scope of the archaeological impact assessment shall be submitted to the Antiquities and Monuments Office and the Director prior to the commencement of the assessment for consideration. The Applicant shall draw necessary reference to relevant sections of the Guidelines for Cultural Heritage Impact Assessment at Appendix I-1 of this study brief.

3. The Applicant shall demonstrate that the disturbances to those sites of cultural heritage are avoided to the maximum practicable extent by modification of the design of the Project. For those identified sites of cultural heritage that may still be directly and indirectly affected by the Project, the Applicant shall recommend practicable mitigation measures and monitoring to avoid or minimise the adverse impacts on the sites of cultural heritage. A checklist including the affected sites of cultural heritage, identified impacts, recommended mitigation measures as well as the implementation agent and period shall be given in the EIA report.

4. Marine Archaeological Investigation (MAI) –The Applicant shall engage a qualified marine archaeologist to review available information to identify whether there is any possible existence of sites or objects of cultural heritage, for example shipwreck, within seabed that will be affected by the marine and dredging works of the Project. The information shall include the information as stipulated in Task 1 – Baseline Review and Task 2 – Geophysical Survey according to the Guidelines for Marine Archaeological Investigation at Appendix I-2 of this study brief. The result of the review shall be presented as a written report and charts. If sites or objects of cultural

heritage are found, Task 4 – Remote Operated Vehicle/Visual Diver Survey/Watching Brief is required within the said area. The MAI shall be carried out by a qualified marine archaeologist who shall obtain a License from the Antiquities Authority under the provision of the Antiquities and Monuments Ordinance (Cap 53)."

Appendix I-1

Guidelines for Cultural Heritage Impact Assessment

(as at 12 January 2012)

Introduction

The purpose of the guidelines is to assist the understanding of the requirements in assessing impact on archaeological and built heritage. The guidelines which will be revised by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department from time to time, where appropriate, and when required should be followed in the interest of professional practice.

A comprehensive Cultural Heritage Impact Assessment (CHIA) includes a baseline study, an impact assessment study associated with the appropriate mitigation measures proposed and to be implemented by project proponents.

(1) Baseline Study

1.1 A baseline study shall be conducted:

a. to compile a comprehensive inventory of heritage sites within the proposed project area, which include:

(i) all recorded sites of archaeological interest (both terrestrial and marine);
(ii) all declared monuments;
(iii) all proposed monuments;
(iv) all buildings/ structures/ sites graded or proposed to be graded by the Antiquities Advisory Board (AAB);
(v) Government historic sites identified by AMO;
(vi) buildings/ structures/ sites of high architectural / historical significance and interest which are not included in items (i) to (v) above.
(vii) cultural landscapes include places associated with historic event, activity, or person or exhibiting other cultural or aesthetic values, such as sacred religious sites, battlefields, a setting for buildings or structures of architectural or archaeological importance, historic field patterns, clan graves, old tracks, *fung shui* woodlands and ponds, and etc.

b. to identify the direct and indirect impacts on the heritage sites at the planning stage in order to avoid causing any negative effects. The impacts include the direct loss, destruction or disturbance of an element of cultural heritage, impact on its settings or impinging on its character through inappropriate sitting or design, potential damage to the physical fabric of archaeological remains and historic buildings/ structures/ sites through air pollution, change of ground water level, vibration, ecological damage, new recreation or other daily needs to be caused by the new development. The impacts listed are merely to illustrate the range of potential impacts and not intended to be exhaustive.

1.2 The baseline study shall also include a desk-top research and a field evaluation.

1.3. Desk-top Research

1.3.1 Desk-top research should be conducted to analyse, collect and collate the best available information. It shall include (if applicable) but not limited to:

a. List of declared and proposed monuments protected by the Antiquities and Monuments Ordinance (Chapter 53).
b. Graded and proposed graded historic buildings/ structures/ sites.
c. Government historic sites identified by AMO.
d. Lists and archives kept in the Reference Library of AMO including sites of archaeological interest, declared monuments, proposed monuments and recorded historic buildings/ structures/ sites identified by AMO.
e. Publications on local historical, architectural, anthropological, archaeological and other cultural studies, such as, Journals of the Royal Asiatic Society (Hong Kong Branch), Journals of the Hong Kong Archaeological Society, AMO Monograph Series and so forth.
f. Other unpublished papers, records, archival and historical documents through public libraries, archives, and the tertiary institutions, such as the Hong Kong Collection and libraries of the Department of Architecture of the University of Hong Kong and the Chinese University of Hong Kong, Public Records Office, photographic library of the Information Services Department and so forth.
g. Any other unpublished archaeological investigation and excavation reports kept by AMO.
h. Relevant information from AMO's website.
i. Historical documents in the Public Records Office, the Land Registry,

District Lands Office, District Office and the Hong Kong Museum of History and so forth.

j. Cartographic and pictorial documents. Old and recent maps and aerial photos searched in the Map and Aerial Photo Library of the Lands Department.
k. Existing geological and topographic information (for archaeological desk-top research).
l. Discussion with local informants.

1.4 Field Evaluation

1.4.1 General

The potential value of the project area with regard the cultural heritage could be established easily where the area is well-documented. However, it does not mean that the area is devoid of interest if it lacks information. In these instances, site inspections and consultations with appropriate individuals or organisations should be conducted by those with expertise in local heritage to clarify the situation.

1.4.2 Field survey on historic buildings/ structures/ sites

a. Field scan of all the historic buildings/ structures/ sites within the project area.
b. Photographic recording of each historic building/ structure/ site including the exterior (the elevations of all faces of the building premises, the roof, close up for the special architectural details) and the interior (special architectural details), if possible, as well as the surroundings, the associated cultural landscape features and the associated intangible cultural heritage (if any) of each historic building/ structure/ site.
c. Interview with local elders and other informants on local historical, architectural, anthropological and other cultural information related to the historic buildings/ structures/ sites.
d. Historical and architectural appraisal of the historic buildings/ structures/ sites, their associated cultural landscape and intangible cultural elements.

1.4.3 Archaeological Survey

a. Appropriate methods for pricing and valuation of the archaeological survey, including by means of a Bill of Quantities or a Schedule of Rates should be

adopted when appropriate in preparing specifications and relevant documents for calling tenders to carry out the archaeological survey. The specifications and relevant documents should be sent to AMO for agreement prior to calling tenders to conduct the archaeological survey.

b. For archaeologists involved in contract archaeological works, they should adhere to recognized standards for professional practice and ethical conduct in undertaking commissioned archaeological works under contracts. They should make themselves fully understand recognized principles and guidelines regarding contract archaeological works, such as those of the Institute for Archaeologists, European Associations of Archaeologists and in Mainland China.

c. A licence shall be obtained from the Antiquities Authority for conducting archaeological field work. It takes at least two months to process an application.

d. An archaeological brief/proposal, as an outline framework of the proposed archaeological works, should be prepared. The brief/proposal should clearly state the project and archaeological background, address necessary archaeological works required, elaborate the strategy and methodology adopted, including what particular research question(s) will be resolved, how the archaeological data will be collected and recorded, how the evidence will be analysed and interpreted and how the archaeological finds and results will be organized and made available. Effective field techniques including method and sampling details are required to be demonstrated clearly in the brief/proposal. Monitoring arrangement, reporting, contingency plan for field and post-excavation works and archive deposition (including finds, field and laboratory records, etc.) should also be addressed in the brief/proposal. The brief/proposal should be submitted to AMO for agreement prior to applying for a licence. Prior site visit to the project site before the submission of the brief/proposal is required so as to ascertain the feasibility of the proposed strategy and methodology as well as the availability of the proposed locations for auger survey and test pitting.

e. The following methods of archaeological survey (but not limited to) should be applied to assess the archaeological potential of the project area:

(i) Definition of areas of natural land undisturbed in the recent past.

(ii) Field scan of the natural land undisturbed in the recent past in detail with special attention paid to areas of exposed soil which were searched for artifacts.

(iii) Conduct systematic auger survey and test pitting. The data collected from auger survey and test pitting should be able to establish the horizontal spread of cultural materials deposits.

(iv) Excavation of test pits to establish the vertical sequence of cultural materials. The hand digging of 1 x 1 m or 1.5 x 1.5 m test pits to determine the presence or absence of deeper archaeological deposits and their cultural history.

(v) The quantity and location of auger holes and test pits should be agreed with AMO prior to applying for a licence. Additional auger holes and test pits may be required to ascertain and demarcate the extent of archaeological deposits and remains.

(vi) A qualified land surveyor should be engaged to record reduced levels and coordinates as well as set base points and reference lines in the course of the field survey.

(vii) All archaeological works should be properly completed and recorded to agreed standards.

f. Archaeologists should adhere to all the agreed professional and ethical standards for archaeological works, such as the standards and guidelines of the Institute for Archaeologists, English Heritage, European Associations of Archaeologists, Society for American Archaeology and in Mainland China.

g. A Marine Archaeological Investigation (MAI) following *Guidelines for MAI* may be required for projects involving disturbance of seabed.

1.4.4 If the field evaluation identifies any additional heritage sites within the study area which are of potential historic or archaeological importance/interest and not recorded by AMO, the findings should be reported to AMO as soon as possible.

1.5 The Report of Baseline Study

1.5.1 The study report should unequivocally include all the direct and concrete evidence to show that the process of the above desk-top and field survey has been satisfactorily completed. This should take the form of a detailed inventory of the heritage sites supported by full description of their significance. The description should contain detailed geographical, historical, archaeological,

architectural, anthropological, ethnographic and other relevant data supplemented with illustrations below and photographic and cartographic records, if required.

1.5.2 A master layout plan showing all the identified archaeological and built heritage sites within the study area should be provided in the report. All the identified heritage sites should be properly numbered with their locations indicated on the master layout plan.

1.5.3 Historic Buildings/ Structures/ Sites

a. A map in 1:1000 scale showing the boundary of each historic item.
b. Photographic records of each historic item.
c. Detailed recording form of each historic item including its construction year, previous and present uses, architectural characteristics, as well as legends, historic persons and events, cultural landscape features and cultural activities associated with the structure.
d. A cross-referenced checklist including the reference number of each historic item, their photo and drawing reference, as well as the page number of the detailed recording form of each identified historic item for easy cross-checking of individual records.

1.5.4 Sites of Archaeological Interest

a. A map showing the boundary of each site of archaeological interest as supported and delineated by field walking, augering and test-pitting.
b. Drawing of stratigraphic section of test-pits excavated which shows the cultural sequence of a site.
c. Reduced levels, coordinates, base points and reference lines should be clearly defined and certified by a qualified land surveyor.
d. *Guidelines for Archaeological Reports* should be followed (Annex 1).

1.5.5 A full bibliography and the source of information consulted should be provided to assist the evaluation of the quality of the evidence, including the title of the relevant material, its author(s), publisher, publication place and date. To facilitate verification of the accuracy, AMO will reserve the right to examine the full details of the research materials collected under the baseline study.

1.6 Finds and Archives

1.6.1 Archaeological finds and archives should be handled following *Guidelines for Handling of Archaeological Finds and Archives* (Annex 2).

1.7 Safety Issue

1.7.1 During the course of the CHIA Study, all participants shall comply with all Ordinances, Regulations and By-laws which may be relevant or applicable in safety aspect in connection with the carrying out of the CHIA Study, such as site safety, insurance for personal injuries, death and property damage as well as personal safety apparatuses, etc.

1.7.2 A Risk Assessment for the fieldwork shall be carried out with full consideration to all relevant Ordinances, Regulations and By-laws.

1.8 Information Disclosure

1.8.1 For releasing any information on the CHIA Study, the archaeologist/expert involved should strictly comply with the terms and conditions set in the contract/agreement and avoid conflict of interest.

(2) Impact Assessment Study

2.1 Identification of impact on heritage

2.1.1 The impact assessment study must be undertaken to identify the impacts on the heritage sites which will be affected by the proposed development subject to the result of desktop research and field evaluation. The prediction of impacts and an evaluation of their significance must be undertaken by expert(s) in local heritage.

2.1.2 During the assessment, both the direct impacts such as loss or damage of important features as well as indirect impacts should be clearly stated, such as adverse visual impact on heritage sites, landscape change to the associated cultural landscape features of the heritage sites, temporary change of access to the heritage sites during the work period, change of ground level or water level which may affect the preservation of the archaeological and built heritage *in- situ* during the implementation stage of the project.

2.1.3 The evaluation of cultural heritage impact assessment may be classified into five levels of significance based on type and extent of the effects concluded in the CHIA study:

a. Beneficial impact: the impact is beneficial if the project will enhance the preservation of the heritage site(s) such as improving the flooding problem of the historic building after the sewerage project of the area;
b. Acceptable impact: if the assessment indicates that there will be no significant effects on the heritage site(s);
c. Acceptable impact with mitigation measures: if there will be some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures, such as conduct a follow-up Conservation Proposal or Conservation Management Plan for the affected heritage site(s) before commencement of work in order to avoid any inappropriate and unnecessary interventions to the building;
d. Unacceptable impact: if the adverse effects are considered to be too excessive and are unable to mitigate practically;
e. Undetermined impact: if the significant adverse effects are likely, but the extent to which they may occur or may be mitigated cannot be determined from the study. Further detailed study will be required for the specific effects in question.

2.1.4 Preservation in totality must be taken as the first priority as it will be a beneficial impact and will enhance the cultural and socio-economical environment if suitable measures to integrate the heritage site into the proposed project are carried out.

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

2.1.6 Total destruction must 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 local heritage as against that of the community as a whole. Assessment of impacts on heritage sites shall also take full account of, and follow where appropriate, paragraph 4.3.1(c), item 2 of Annex 10, items 2.6 to 2.9 of Annex 19 and other relevant parts of the Technical Memorandum on Environmental Impact Assessment (EIA) Process (Technical Memorandum).

2.2 Mitigation Measures

2.2.1 It is always a good practice to recognize the heritage site early in the planning stage and site selection process, and to avoid it, i.e. preserve it *in-situ*, or leaving a buffer zone around the site with full justifications demonstrating the best practice of heritage conservation.

2.2.2 Mitigation is not only concerned with minimizing adverse impact on the heritage site but also should give consideration of potential enhancement if possible (such as to improve the access to the heritage site or enhance the landscape and visual quality of the heritage site).

2.2.3 Mitigation measures shall not be recommended or taken as *de facto* means to avoid preservation of heritage sites. They must be proved beyond all possibilities to be the only practical course of action. Heritage sites are to be in favour of preservation unless it can be demonstrated that there is a need for a particular development which is of paramount importance and outweighs the significance of a heritage site.

2.2.4 If avoidance of the heritage site is not possible, amelioration can be achieved by minimizing the potential impacts and the preservation of the heritage site, such as physically relocating it. Measures like amendments of the sitting, screening and revision of the detailed design of the development are required to lessen its degree of exposure if it causes visual intrusion to the heritage site and affects the character and integrity of the heritage site.

2.2.5 A rescue programme, when required, may involve preservation of the historic building or structure together with the relics inside, and its historic environment through relocation, detailed cartographic and photographic survey or preservation of site of archaeological interest “by record”, i.e. through excavation to extract the maximum data as the very last resort.

2.3 The Impact Assessment Report

2.3.1 A detailed description and plans should be provided to elaborate on the heritage site(s) to be affected. Besides, please also refer to paragraph 4.3.1(d), items 2.10 to 2.14 of Annex 19 and other relevant parts of the Technical Memorandum and the Guidance Notes, other appropriate presentation methods for mitigation

proposals like elevations, landscape plan and photomontage shall be used in the report extensively for illustrating the effectiveness of the measures.

2.3.2 To illustrate the landscape and visual impacts on heritage sites, 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, photographs on scaled physical models, photo-retouching and photomontage. These methods shall be used extensively to facilitate communication among the concerned parties.

2.3.3 The implementation programme for the agreed mitigation measures should be able to be executed and should be clearly set out in the report together with the funding proposal. These shall form an integral part of the overall redevelopment project programme and financing of the proposed redevelopment project. Competent professionals must be engaged to design and carry out the mitigation measures.

2.3.4 For contents of the implementation programme, reference can be made to Annex 20 of the Technical Memorandum and the Guidance Notes. In particular, item 6.7 of Annex 20 requires to define and list out clearly the proposed mitigation measures to be implemented, by whom, when, where, to what requirements and the various implementation responsibilities. A comprehensive plan and programme for the protection and conservation of the preserved heritage site, if any, during the planning and design stage of the proposed project must be addressed in details.

2.3.5 Supplementary information to facilitate the verification of the findings shall be provided in the report including but not limited to:

a. layout plan(s) in a proper scale illustrating the location of all heritage sites within the study area, the extent of the work area together with brief description of the proposed works;
b. all the heritage sites within the study area should be properly numbered, cross-reference to the relevant drawings and plans.
c. an impact assessment cross-referenced checklist of all the heritage sites within the study area including heritage site reference, distance between the heritage site and work area, summary of the possible impact(s), impact level, summary of the proposed mitigation measure(s), as well as references of the relevant plans, drawings and photos; and

d. a full implementation programme of the mitigation measures for all affected heritage sites to be implemented with details, such as by whom, when, where, to what requirements and the various implementation responsibilities of individual parties.

** This Guidelines for Cultural Heritage Impact Assessment was first set out in August 2008 based on the Criteria for Cultural Heritage Impact Assessment and revised subsequently in December 2008, July 2010, October 2010, March 2011, April 2011 and January 2012.*

Annex 1 to Appendix I-1

Guidelines for Archaeological Reports
(As at April 2011)

I. General

1. All reports should be written in a clear, concise and logical style.
2. All the constituent parts (text, figures, photos and specialist reports (if any)) should provide full cross-reference. Readers should be able to find their way around the report without difficulty.
3. The reports should be submitted in A4 size and accompanying drawings of convenient sizes.
4. Draft reports should be submitted to the Antiquities and Monuments Office (AMO) for comments within two months after completion of archaeological work unless otherwise approved by AMO.
5. The draft reports should be revised as required by AMO and relevant parties. The revised reports should be submitted to AMO within three weeks after receiving comments from AMO and relevant parties.
6. At least 5 hard copies of the final reports should be submitted to AMO for record purpose.
7. At least 2 digital copies of the final reports in both Microsoft Word format and Acrobat (.PDF) format without loss of data and change of appearance compared with the corresponding hard copy should be submitted to AMO. The digital copies should be saved in a convenient medium, such as compact discs with clear label on the surface and kept in protective pockets.
8. Errors are the responsibilities of the author(s) and should so far as possible be identified and rectified before submission to AMO.
9. The guidelines which will be revised by the AMO of the Leisure and Cultural Services Department from time to time, where appropriate, and when required should be followed in the interest of professional practice.

II. Suggested Format of Reports

1. Front page:
   - Project/Site name
   - Nature of the report
     e.g. (Draft/Final)
     Archaeological Investigation/Survey Report
     Archaeological Impact Assessment Report
     Watching Brief Report
     Rescue Excavation Report
     Post-excavation Report
   - Organization
   - Date of report

2. Contents list
   Page number of each section should be given.

3. Non-technical summary (both in English and Chinese with approximate 150 - 300 words each)
   This should outline in plain, non-technical language, the principal reasons for the archaeological work, its aims and main results, and should include reference to authorship and commissioning body.

4. Introduction
   This should set out background leading to the commission of the reports. The location, area, scope and date of conducting the archaeological work must be given. The location of archaeological work should be shown on maps in appropriate scales and with proper legends.

5. Aims of archaeological work
   These should reflect the aims set in the project design.

6. Archaeological, historical, geological and topographical background of the site
   Supporting aerial photos and maps (both old and present) in appropriate scales, with proper legends and with the site locations clearly marked on should be provided.

7. Methodology
   The methods used including any variation to the agreed project design should be set out clearly and explained as appropriate.

8. Results
   - The results should outline the findings, known and potential archaeological interests by period and/or type. Their significance and value with reference/inclusion of supporting evidence should be indicated. If more than one interpretation is possible, the alternatives should also be presented, at least in summary.
   - The results should be amplified by the use of drawings and photographs.
   - Tables summarizing features and artifacts by trench/grid/test pit together with their interpretation should be included.
   - The method, sampling details, results and interpretation as well as appropriate supporting data of the analysis for the environmental materials, e.g. ecofacts identified and/or collected during the fieldwork should be included.
   - For impact assessment, the likely effect of the proposed development on the known or potential archaeological resource should be outlined.

9. Conclusion
   This should include summarization and interpretation of the result.

10. Recommendation
    Recommendations on further work and the responsible party as well as a brief planning framework should be outlined.

11. Reference and bibliography
A list of all primary and secondary sources including electronic sources used should be given in full detail, including the title of the relevant material, its author(s), publisher, publication place and date.

12. Archaeological team
The director and members of the archaeological team and the author(s) of the report should be clearly specified.

13. Copyright and dissemination
The copyright of the report should be clearly identified. To facilitate future research studies, please specify that the report can be made available to the public in the Reference Library of the Heritage Discovery Centre.

14. Supporting illustrations
They should be clearly numbered and easily referenced to the text. They should be scanned and saved in TIFF or JPEG formats.

A. Maps
A location plan of the project site should be included. Archaeological work locations, such as auger hole and test pit locations (with relevant coordinates certified by a qualified land surveyor), should be clearly shown on maps in appropriate scales, with proper legends, grid references (in 8 digits) and captions.

B. Drawings of test pits, archaeological features, special finds[1], selected representative samples from general finds
Drawings of all excavated test pits (at least one cross section of each test pit), all excavated archaeological features (both plan and cross section of each archaeological feature), all special finds identified in the excavation and selected representative samples from general finds (at least front view and section of each finds) should be included. All drawings should be clearly numbered and easily referenced to the text. The drawing scales stipulated below should be followed:

Cross section and profile drawings of test pits	1:20
Archaeological feature drawings	1:10
Finds drawings	1:1

If drawings of the above stated scales are not appropriate to be incorporated into the report under certain occasions, reduced copy of the drawings with the same scales are acceptable. Proper captions, legends and indication of reduced size should be given.

C. Photos of project site and the surrounding area, test pits, archaeological features, special finds, selected representative samples from general finds

[1] Special finds are sometimes known as small finds (小件) in Chinese or registered finds. Drawings and photos of the special/small/registered finds should be included in the archaeological report.

Photos of project site and the surrounding area, all excavated test pits (at least one cross section of each test pit), all excavated archaeological features (both plan and cross section of each archaeological feature), all special finds identified in the excavation and selected representative samples from general finds (at least front view of each of the finds) should be included. All photos should be at least in 3R size with proper captions and scales. They should be clearly numbered and easily referenced to the text. They should be scanned and saved in TIFF or JPEG formats.

15. Supporting data in appendices
These should consist of essential technical details to support the result. These may include stratigraphic record of test pits and auger holes, records of general and special finds as well as ecofacts discovered with description, quantity and context number/stratigraphic sequence, result of laboratory testing, index of field archives.

16. Other professional views/comments
This can reflect any issues/difficulties regarding the archaeological project observed/encountered by the archaeological team.

17. Comment and response
All comments and responses from AMO and relevant parties should be attached in full.

III. Green Measures

1. All reports should be of single line spacing and printed on both sides of the paper.

2. Excessive page margins should be avoided. A top/bottom margin of 2 cm and left/right margin of 2.5 cm are sufficient.

3. Use of blank paper should be avoided as far as possible.

4. Suitable font type of font size 12 should be used generally in balancing legibility and waste reduction objective.

Annex 2 to Appendix I-1

Guidelines for Handling of Archaeological Finds and Archives

(As at November 2011)

I. General Remark

1. The guidelines which will be revised by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department from time to time, where appropriate, and when required should be followed in the interest of professional practice.

2. Please use the site code (_____)** for the archaeological project, namely _____. Licensee must use this unique site code for the whole project.

   ** If an archaeological project covers more than one archaeological site/location, licensee should contact the Central Archaeological Repository (CAR) at 2384 5446 or aciamoar@lcsd.gov.hk to obtain relevant site codes.

3. Licensee should contact the CAR at 2384 5446 or aciamoar@lcsd.gov.hk regarding the handover of archaeological finds and archives when post-excavation research and excavation report have been completed and accepted by the AMO.

4. If a huge quantity of similar general finds was discovered from a single archaeological project, licensee is advised to consult the AMO regarding the collecting strategy as early as possible.

5. For the preparation of archaeological finds and archives for long-term curation by the CAR, the guidelines as set out below should be followed.

6. If the licensee does not handle the finds and archives in accordance with this guidelines, the AMO may inform the project proponent to revise the relevant data. The arrangement of handover may subsequently be deferred.

II. Archaeological Finds

7. Cleaning

The excavated finds should be properly cleaned with water, except: (i) the finds are identified for scientific analysis; (ii) metal & organic objects (e.g. bone, wood, leather, textile objects and etc.) should not be cleaned with water. Licensee is advised to consult the AMO if in doubt.

8. Marking

- The excavated finds should be cleaned before marking object number.
- "Sandwich" technique[1] should be adopted for marking permanent object number.
- Each special find should be marked with site code, context number and SF number, etc.
- Any representative samples selected from the general finds for discussion on the excavation report should be marked with site code, context number, sample number and bagged separately.
- The general finds should be marked with site code and context number.
- For the finds which are too small, organic objects (e.g. bone, wood, leather, textile objects and etc.) or have unstable surface, object number should not be marked on the object directly. These finds should be bagged separately and attached with a label containing information about the site code, context number, find number and description of find.

9. Labeling and bagging

- Two labels should be provided for each bag which contains finds, one is adhered on the surface of the bag while the other is kept inside the bag for easy reference.
- The label inside the bag should be kept separately with a smaller plastic bag so that the label can be kept much longer.
- Information about the site code, context number, test-pit number, object number (or bag number) and description of finds should be written clearly on the label.
- Finds under the same context should be bagged together. If those finds, however, have been categorized according to their typology, materials or characteristics, separate bagging is required.

10. Conservation

- To refit and reconstruct pottery vessels with appropriate adhesive. A heat and waterproof adhesive, e.g. product of H. Marcel Guest Ltd., is recommended.
- Any adhesives which are not reversible or would damage the finds should not be applied on the finds. Archaeologist is advised to consult the AMO if in doubt.

11. Finds register

A standard finds register, for both special finds and general finds, with

[1] ***Steps for "Sandwich" technique***

1. First of all, the find number should be marked in appropriate area and size that does not impact important diagnostic or aesthetic parts of the find.
2. Clean the area to be marked.
3. Apply a thin coat of clear reversible lacquer on the area. Use white lacquer if the object is dark in colour. Let the base coat dry completely.
4. Use a permanent water-based ink to write the find number on top of the base coat. Let ink dry completely.
5. Apply a top coat of clear varnish.
6. Let the marking dry completely before packing.

information about the find's number, name, description, quantity, type, weight, dimensions and field data should be duly filled in. Licensee should contact the CAR at 2384 5446 or aciamoar@lcsd.gov.hk to obtain the standard finds register (in Excel format). Special finds and general finds should be inputted in individual register. Both hard & soft copies (in Excel format) of the duly completed register should be handed over.

12. Sample register of eco-facts

A clear sample register with information about the description of the sample, quantity, type and weight should be prepared for handover.

III. Field Records and Finds Processing Records

13. Field records include field diary, site record for individual test pit/trench/square, context recording sheet, special finds recording sheet, soil sample & eco-facts sample recording sheet, map, survey sheet, photograph/ audio-visual records, etc.

14. Finds processing records include conservation record, measured drawings and photographs, laboratory reports, etc.

15. Measured drawing, both hard & soft copies (in pdf format), and photograph (in jpg format) of each special find should be handed over.

16. All the aforesaid records stated in paragraphs 12 to 14 should be handed over to the CAR when post-excavation research and excavation report have been completed. Please note:

- all the field records should be submitted together with indexes.
- the video footage should be submitted together with index describing the content of the video footage.
- all the slides, colour/ black & white negatives or digital photographs should be submitted together with photo register.

IV. Handover of Finds

17. Packing

- Each special find should be packed and protected with tissue paper, bubble sheet or P.E. foam to avoid shocking when transporting to the repository. No packing material other than the aforesaid items should be used.
- The general finds should be protected with bubble sheet or P.E. foam and packed in heavy duty plastic container.
- The heavy duty plastic container, e.g. product of the Star Industrial Co., Ltd. (No. 1849 or 1852), is recommended.
- For oversized finds, prior advice on packing method should be sought from the AMO.

18. Handover procedure

- The licensee should make an appointment with the CAR for the handover

and arrange to transport the finds and archives to the repository.

- Prior to handover, licensee is required to supply with the aforesaid finds register, field records register and associated records to the CAR for checking at least three working days in advance. Exact date of handover will be arranged subsequently.
- Handover forms for finds and archives should be signed by the representatives of the licensee and the AMO.

Appendix I-2

Guidelines for Marine Archaeological Investigation (MAI)

The standard practice for MAI should consist of four separate tasks, i.e. (1) Baseline Review, (2) Geophysical Survey, (3) Establishing Archaeological Potential and (4) Remote Operated Vehicle (ROV)/Visual Diver Survey/Watching Brief.

(1) Baseline Review

1.1 A baseline review should be conducted to collate the existing information in order to identify the potential for archaeological resources and, if identified, their likely character, extent, quality and value.

1.2 The baseline review will focus on known sources of archive data. It will include:

a. Geotechnical Engineering Office (GEO) – the Department holds extensive seabed survey data collected from previous geological research.

b. Marine Department, Hydrographic Office - the Department holds a substantial archive of hydrographic data and charts.

c. The Royal Naval Hydrographic Department in the UK - the Department maintains an archive of all survey data collected by naval hydrographers.

d. Relevant government departments should be consulted in order to obtain the information of dredging history (if any) on the proposed project area. Area for sand dredging, mud disposal and allocated marine borrow area within Hong Kong should also be considered during the review.

1.3 The above data sources will provide historical records and more detailed geological analysis of submarine features which may have been subsequently masked by more recent sediment deposits and accumulated debris.

(2) Geophysical Survey

2.1 Extensive geophysical survey of the study area should deploy high resolution boomer, side scan sonar, an echo sounder and high resolution multi beam sonar. The multi beam data must be presented as processed digital terrain models to facilitate the archaeological analysis. The data received from the survey would be analysed in detail to provide:

a. Exact definition of the areas of greatest archaeological potential.

b. Assessment of the depth and nature of the seabed sediments to define which areas consist of suitable material to bury and preserve archaeological material.

c. Detailed examination of the boomer and side scan sonar records to map anomalies in and on the seabed which may be archaeological material.

d. Detailed examination of the multi beam sonar data to assess the archaeological potential of the sonar contacts.

(3) Establishing Archaeological Potential

3.1 The data examined during Task 1 and 2 will be analysed to provide an indication of the likely character and extent of archaeological resources within the study area. This would facilitate formulation of a strategy for investigation.

3.2 The results would be presented as a written report and charts. If there is no indication of archaeological material there would be no need for further work.

3.3 Charts should be presented at 1:500 scale and show each survey contact. Its dimensions and exact location should also be shown.

(4) Remote Operated Vehicle (ROV)/Visual Diver Survey/Watching Brief

4.1 Subject to the outcome of Task 1, 2 and 3, accepted marine archaeological practice would be to plan a field evaluation programme to acquire more detailed data on areas identified as having archaeological potential. The areas of archaeological interest can be inspected by ROV or divers. ROV or a team of divers with both still and video cameras would be used to record all seabed features of archaeological interest.

4.2 Owing to the heavy marine traffic in Hong Kong, the ROV/visual diver survey may not be feasible to achieve the target. If that is the case, an archaeological watching brief is the most appropriate way to monitor the dredging operations in areas of identified high potential to obtain physical archaeological information.

4.3 A sampling strategy for an archaeological watching brief would be prepared based on the results of Task 1, 2 and 3 to focus work on the areas of greatest archaeological potential. Careful monitoring of the dredging operations would enable immediate identification and salvage of archaeological material. If archaeological material is found, the AMO should be contacted immediately to seek guidance on its significance and appropriate mitigation measures would be prepared.

4.4 If Task 4 is undertaken, the results would be presented in a written report with charts.

Report

Five copies of the final report should be submitted to the AMO for record.

Appendix J

Implementation Schedule of Recommended Mitigation Measures

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

-END-

Appendix K

Requirements for EIA Report Documents

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

   (i) 50 copies of the EIA report and 80 copies of the bilingual (in both English and Chinese) executive summary as required under section 6(2) of the EIAO to be supplied at the time of application for approval of the EIA report.

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

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

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

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

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

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