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9 March 2018

Drainage Services Department

Environmental Impact Assessment (EIA) Ordinance, Cap. 499
Application for Environmental Impact Assessment Study Brief
Project Title: Yuen Long Barrage Scheme
Application No.: ESB – 307/2018

I refer to your application received on 25 January 2018 for an Environmental Impact Assessment (EIA) Study Brief for the above project under Section 5(1)(a) of the EIA Ordinance.

In accordance with Section 5(7)(a) of the Ordinance and after public inspection of the project profile, I issue the attached EIA Study Brief No. ESB-307/2018 for your preparation of an EIA report.

Under Section 15 of the EIA Ordinance, the EIA Study Brief will be placed on the EIA Ordinance Register. It will also be placed on the EIA Ordinance website (<http://www.epd.gov.hk/eia/>)

You may submit an application for approval of the EIA report in accordance with Section 6(2) of the Ordinance after its completion. Upon receipt of your application, this department will decide under Section 6(3) of the Ordinance whether the EIA report meets the requirements of the EIA Study Brief and Technical Memorandum on EIA Process, and accordingly advise you under Section 6(4) of the Ordinance whether a submission to the Advisory Council on the Environment (ACE) or its subcommittee is required. In this connection, you are required to provide sufficient copies of the Executive Summary of the EIA report to the Secretary of the EIA Subcommittee of ACE for selection for submission when you submit the EIA report to this department for approval. Please liaise with Ms Dora CHU (Tel: 2594 6324) of the ACE Secretariat regarding the details in due course.

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If the EIA report is selected by ACE for submission and presentation, you are expected to provide ACE with an account of the environmental issues arising from the project, major conclusions and recommendations of the EIA study. In particular, the main environmental concerns of the general public and interest groups who may be affected by the project should be identified and addressed in the EIA study. As such, you are strongly advised to engage the public and interest groups during the course of the EIA study. Please find attached a copy of the “Modus Operandi of the EIA Subcommittee of the ACE” for your reference.

Please note that if you are aggrieved by any of the content of this EIA Study Brief, you may appeal under Section 17 of the EIA Ordinance within 30 days of receipt of this EIA Study Brief.

Should you have any queries concerning the above, please contact Mr. Stanley LAU of this Department at 2835 1113.

Yours sincerely,



(Raymond WONG Wai Man)
Principal Environmental Protection Officer
for Director of Environmental Protection

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

ENVIRONMENTAL IMPACT ASSESSMENT STUDY BRIEF NO. ESB-307/2018

PROJECT TITLE: **YUEN LONG BARRAGE SCHEME**
(hereinafter known as the “Project”)

NAME OF APPLICANT: **DRAINAGE SERVICES DEPARTMENT**
(hereinafter known as the “Applicant”)

1. BACKGROUND

1.1 An application (No. ESB-307/2018) for an Environmental Impact Assessment (EIA) Study Brief under section 5(1)(a) of the Environmental Impact Assessment Ordinance (EIAO) was received from the Applicant on 25 January 2018 with a Project Profile (No. PP-564/ 2018) (hereinafter referred as the “Project Profile”).

1.2 The scope of the Project mainly comprises:

- (i) Construction of a barrage at the downstream end of Yuen Long Nullah (YLN) which includes the following components:
 - (a) A tidal barrier with gates spanning approximately 60m across YLN;
 - (b) A pumping station with large scale pumps that conveys storm water from upstream of the barrage to Shan Pui River during high tide and heavy rain;
 - (c) A low flow pumping station that conveys water from upstream of the barrage to Shan Pui River during normal dry weather days; and
 - (d) Local widening of the existing YLN at the proposed location of the barrage.
- (ii) Construction and modification of parapet walls along Kam Tin River, YLN, Yuen Long Bypass Floodway (YLBF) and Sham Chung River;
- (iii) Drainage works at the intersection of YLN and YLBF to divert additional flow to YLBF for flood protection of Yuen Long town centre; and
- (iv) Revitalizing the section of existing nullah between the proposed barrage and Shap Pat Heung Road.

The locations of the Project are shown in Appendix A of this EIA Study Brief.

1.3 The Project consists of the following designated projects under the following items of Part I, Schedule 2 of the EIAO:

- (i) Item C.12(a)(viii) - A dredging operation which is less than 500m from the nearest boundary of an existing conservation area;
- (ii) Item I.1(b) - A drainage channel or river training and diversion works which discharges or discharge into an area which is less than 300m from the nearest boundary of an existing or planned (i) site of special scientific interest; (ii) site of cultural heritage; (iii) marine park or marine reserve; (iv) fish cultural zone; (v) wild animal protection area; (vi) coastal protection area; or (vii) conservation area; and
- (iii) Item Q.1 - All projects including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest.

- 1.4 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.
- 1.5 The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from construction and operation of the Project and related activities taking place concurrently. This information will contribute to decisions by the Director on:
- (i) the overall acceptability of any adverse environmental consequences that are likely to arise as a result of the Project;
 - (ii) the conditions and requirements for the detailed design, construction and operation of the Project to mitigate against adverse environmental consequences wherever practicable; 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 and environmental benefits for carrying out the Project;
- (ii) to identify and describe the elements of the community and environment likely to be affected by the Project and/or likely to cause adverse impacts to the Project, including both the natural and man-made environment and the associated environmental constraints;
- (iii) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- (iv) to identify and quantify contaminated land within any project area for development works, and to propose measures to avoid disposal in the first instance;
- (v) to identify and quantify any potential losses or damage to flora, fauna and wildlife habitats;
- (vi) to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- (vii) to identify and evaluate any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- (viii) to propose the provision of infrastructure or mitigation measures to minimise pollution, environmental disturbance and nuisance during the construction and operation of the Project;
- (ix) to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- (x) to identify, predict and evaluate the residual (i.e. after practicable mitigation)

environmental impacts and the cumulative effects expected to arise during the construction and operation phases of the Project in relation to the sensitive receivers and potentially 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 residual environmental impacts and cumulative effects and reduce them to acceptable levels;
- (xii) to design and specify environmental monitoring and audit requirements; and
- (xiii) to identify any additional studies necessary to implement the mitigation measures or monitoring and proposals recommended in the EIA report.

3. DETAILED REQUIREMENTS OF THE EIA STUDY

3.1 The Purpose

3.1.1 The purpose of this study brief is to set out the purposes and objectives of the EIA study, the scope of environmental issues which shall be addressed, the requirements that the EIA study shall need to fulfil, and the necessary procedural and reporting requirements. The Applicant shall demonstrate in the EIA report whether the criteria in the relevant sections of the Technical Memorandum on the Environmental Impact Assessment Process of the Environmental Impact Assessment Ordinance (hereinafter referred to as “the TM”), are fully complied with.

3.2 The Scope

3.2.1 The scope of this EIA study shall cover the Project and associated works mentioned in section 1.2 of this EIA study brief. For the purpose of assessing whether the environmental impacts shall comply with the criteria of the TM, the EIA study shall address the key issues described below, together with any other key issues identified during the course of the EIA study:

- (i) environmental benefits and dis-benefits of different development options, siting, alignment, design and construction methods of the Project with a view to deriving the preferred development option(s) that will avoid or minimise adverse environmental impact;
- (ii) potential air quality impact on air sensitive receivers (ASRs) due to the construction of the Project and associated works;
- (iii) potential noise impact on noise sensitive receivers (NSRs) due to the construction and operation of the Project and associated works;
- (iv) potential water quality impact due to the construction and operation of the Project and associated works, including but not limited to site run-off and any other potential release to the aquatic environment due to works activities during construction and change in hydrology during operation;
- (v) potential waste management implications arising from the construction of the Project and associated works;

- (vi) potential extent of land contamination within project area for development works and relevant mitigation measures;
- (vii) potential ecological impact due to the construction and operation of the Project and associated works;
- (viii) potential fisheries impact due to the construction and operation of the Project and associated works;
- (ix) potential landscape and visual impacts due to the construction and operation of the Project and associated works;
- (x) potential cultural heritage impacts due to the Project; and
- (xi) potential cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed and planned projects that may have a bearing on the environmental acceptability of the Project and associated works.

3.3 Description of the Project

3.3.1 Purpose(s) and Objectives of the Project

3.3.1.1 The Applicant shall provide information on the purpose(s) and objectives of the Project, and describe the environmental benefits of the Project and scenarios with and without the Project.

3.3.2 Details of the Project

3.3.2.1 The Applicant shall indicate the nature and status of Project decision(s) for which the EIA study is undertaken. The Applicant shall describe the proposed land uses, siting, alignment, size, design, construction methods, sequence of construction works, access arrangements and other major activities involved in the Project, using diagrams, plans and/or maps as necessary. The estimated duration of the construction phase and operational phase of the Project together with the programme within these phases shall be given. The land taken by the Project site(s), construction sites and any associated access arrangements, auxiliary facilities and landscaping areas shall be shown on a scaled map. The uses of the Project shall be described and the different land use areas shall be demarcated as appropriate.

3.3.3 Background and History of the Project

3.3.3.1 The Applicant shall provide information on the site location and site history of the Project, interactions with other projects, and the consideration of different development options, taking into account the principles of avoidance, minimizing and control of adverse environmental impacts. The options might include siting, alignment, size, design, construction methods, sequence of construction works and access arrangements for the Project. The key reasons for selecting the preferred development option(s) and the part environmental factors played in the selection shall be described. The main environmental impacts of different development options shall be compared with those of the Project and with the likely future environmental conditions in the absence of the Project.

3.4 Technical Requirements

- 3.4.1 The Applicant shall conduct the EIA study to address all environmental aspects of the activities as described in the scope as set out above. The assessment shall be based on the best and latest information available during the course of the EIA study.
- 3.4.2 The Applicant shall include in the EIA report details of the construction programme and methodologies. The Applicant shall clearly state in the EIA report the time frame and work programmes of the Project and associated works and other concurrent projects, and assess the cumulative environmental impacts from the Project and associated works with all interacting projects, including staged implementation of the Project and associated works.
- 3.4.3 The EIA study shall follow the technical requirements specified below and in the Appendices of this EIA study brief.

3.4.4 Air Quality Impact

- 3.4.4.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing air quality impact as stated in Annexes 4 and 12 of the TM respectively.
- 3.4.4.2 The assessment area for air quality impact assessment shall be defined by a distance of 500 metres from the boundary of the Project site or other project locations as identified in the EIA, which shall 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, planned and committed sensitive receivers within the assessment area as well as areas where air quality may be potentially affected by the Project. The assessment shall be based on the best/ latest available information at the time of the assessment.
- 3.4.4.3 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.
- 3.4.4.4 A monitoring and audit programme for the construction phase of the Project shall be devised to verify the effectiveness of the proposed control measures so as to ensure proper control of fugitive dust and odour emissions.
- 3.4.4.5 The assessment of the air quality impact arising from the construction and operation of the Project shall follow the detailed technical requirements given in Appendix B of this EIA Study Brief.

3.4.5 Noise Impact

- 3.4.5.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing noise impact as stated in Annexes 5 and 13 of the TM.
- 3.4.5.2 Assessment shall include the construction noise and fixed noise sources impact assessments of the existing, committed and planned Noise Sensitive Receivers (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.

3.4.5.3 The noise impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendix C of this EIA Study Brief.

3.4.6 Ecological Impact (Terrestrial and Aquatic)

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 this ecological impact assessment shall include all areas within 500 metres distance from site boundary of the Project and other areas likely to be impacted by the Project. For aquatic ecology, the assessment area shall be the same as the water quality impact assessment described in section 3.4.8.2.

3.4.6.3 The ecological impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendix D of this EIA Study Brief.

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 respectively.

3.4.7.2 The assessment area for fisheries impact shall include areas within 500 metres from the site boundary of the Project and associated works as well as any other areas likely to be impacted by the Project. Special attention should be given to pond culture resources and activities as well as any watercourses which serve as water sources for fish pond areas.

3.4.7.3 The fisheries impact assessment for the construction and operation of the Project shall follow the detailed technical requirements given in Appendix E of this EIA Study Brief.

3.4.8 Water Quality Impact

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

3.4.8.2 The study area for this water quality impact assessment shall include areas within 500 metres from the site boundary of the Project and shall cover the Deep Bay Water Control Zone as designated under the Water Pollution Control Ordinance (Cap. 358) and the water sensitive receivers in the vicinity of the Project. The study 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.

3.4.8.3 The water quality impact assessment for the Project shall follow the detailed technical requirements given in Appendix F of this EIA Study Brief.

3.4.9 Waste Management and Land Contamination

- 3.4.9.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing waste management implications as stated in Annexes 7 and 15 of the TM respectively.
- 3.4.9.2 The assessment of the waste management implications arising from the construction of the Project shall follow the detailed technical requirements given in Appendix G of this EIA Study Brief.
- 3.4.9.3 The Applicant shall follow the criteria and guidelines for evaluating and assessing potential land contamination issues as stated in sections 3.1 and 3.2 of Annex 19 of the TM.
- 3.4.9.4 The assessment of the potential land contamination issues shall follow the detailed technical requirements given in Appendix G of this EIA study brief.

3.4.10 Landscape and Visual Impacts

- 3.4.10.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing landscape and visual impacts as stated in Annexes 10 and 18 of the TM, and the EIAO Guidance Note No. 8/2010 “Preparation of Landscape and Visual Impact Assessment under the EIAO”.
- 3.4.10.2 The study area for the landscape impact assessment shall include areas within a distance of 100 metres from the site boundary of the Project while the study area for the visual impact assessment shall be defined by the visual envelop of the Project.
- 3.4.10.3 The landscape and visual impact assessment for the construction and operation of the Project shall follow the detailed technical requirements given in Appendix H of this EIA Study Brief.

3.4.11 Impact on Cultural Heritage

- 3.4.11.1 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 respectively.
- 3.4.11.2 The cultural heritage impact assessment shall include built heritage impact assessment (BHIA).
- 3.4.11.3 Details of the technical requirements of BHIA are shown in Appendix I.

3.5 Environmental Monitoring and Audit (EM&A) Requirements

- 3.5.1 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, to define the scope of the EM&A requirements for the Project in the EIA study.

- 3.5.2 Subject to the confirmation of the EIA study findings, the Applicant shall comply with the requirements as stipulated in Annex 21 of the TM.
- 3.5.3 The Applicant shall prepare a project implementation schedule (in the form of a checklist as shown in Appendix J) containing all the EIA study recommendations and mitigation measures with reference to the implementation programme.

3.6 Presentation of Summary Information

3.6.1 Summary of Environmental Outcomes

The EIA report shall contain a summary of key environmental outcomes arising from the EIA study, including estimated population protected from various environmental impacts, environmentally sensitive areas protected, environmentally friendly options considered and incorporated in the preferred option, environmental designs recommended, key environmental problems avoided, compensation areas included and the environmental benefits of environmental protection measures recommended.

3.6.2 Summary of Environmental Impacts

To facilitate effective retrieval of pertinent key information, the EIA report shall contain a summary table of environmental impacts showing the assessment points, results of impact predictions, relevant standards or criteria, extents of exceedances predicted, impact avoidance measures considered, mitigation measures proposed and residual impacts (after mitigation). This summary shall cover each individual impact and shall also form an essential part of the executive summary of the EIA report.

3.6.3 Documentation of Key Assessment Assumptions, Limitation of Assessment Methodologies and related Prior Agreement(s) with the Director

The EIA report shall contain a summary including the assessment methodologies and key assessment assumptions adopted in the EIA study, the limitations of these assessment(s) methodologies/assumptions, if any, plus relevant prior agreement(s) with the Director or other Authorities on individual environmental media assessment components. The proposed use of any alternative assessment tool(s) or assumption(s) have to be justified by the Applicant, with supporting documents based on cogent, scientific and objectively derived reason(s) before seeking the Director's agreement. The supporting documents shall be provided in the EIA report.

3.6.4 Summary of Alternative Mitigation Measures

The EIA report shall contain a summary of alternative development options and mitigation measures considered during the course of the EIA study, including but not limited to the alternative siting and alignment options, size, design, construction methods and sequence of construction works with a view to avoiding or minimizing adverse environmental impacts. A comparison of the environmental benefits and dis-benefits of applying different development options, and/or mitigation measures shall be made.

3.6.5 Documentation of Public Concerns

The EIA report shall contain a summary of the main concerns of the general public, special interest groups and the relevant statutory or advisory bodies received and

identified by the Applicant during the course of the EIA study, and describe how the relevant concerns have been taken into account.

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. REPORTING 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. When submitting the EIA report to the Director, the Applicant shall provide a summary, pointing out where in the EIA report the respective requirements of this EIA study brief and the TM (in particular Annexes 11 and 20) have been addressed and fulfilled.
- 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 of this EIA Study Brief. The Applicant shall, upon request, make additional copies of the above 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-564/2018), 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 this EIA Study Brief, the Applicant shall apply to the Director for a fresh EIA study brief.

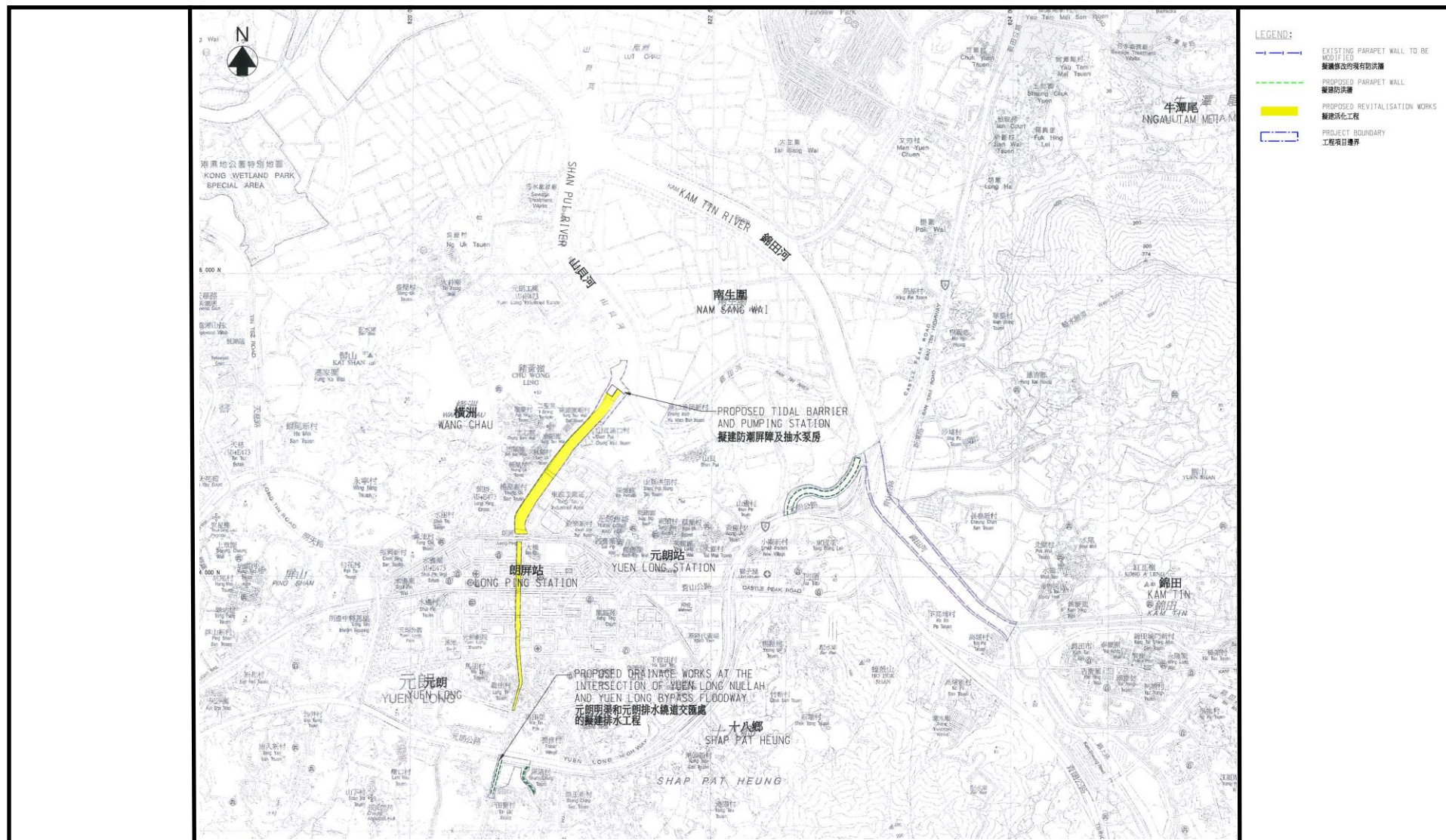
7. LIST OF APPENDICES

7.1 This EIA Study Brief includes the following appendices:

- Appendix A - Project Location Plan
- Appendix B - Requirements for Air Quality Impact Assessment
- Appendix C - Requirements for Noise Impact Assessment
- Appendix D - Requirements for Ecological Impact Assessment
- Appendix E - Requirements for Fisheries Impact Assessment
- Appendix F - Requirements for Water Quality Impact Assessment
- Appendix G - Requirements for Assessment of Waste Management Implications and Land Contamination
- Appendix H - Requirements for Landscape and Visual Impact Assessment
- Appendix I - Requirements for Cultural Heritage Impact Assessment
- Appendix J - Implementation Schedule
- Appendix K - Requirements for EIA Report Documents

--- END OF EIA STUDY BRIEF ---

March 2018
Environmental Assessment Division
Environmental Protection Department



Project Title : Yuen Long Barrage Scheme
 (This figure is prepared based on Figure 1 of Project Profile No.: PP-564/2018)
 工程項目名稱 : 元朗防洪壩計劃
 (本圖是根據工程項目簡介PP-564/2018 圖則編號 圖1編製)

EIA Study Brief No. : ESB-307/2018
 環評研究概要編號 :
Appendix A: Project Location Plan
 附錄A: 工程項目位置圖



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 issues 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 during the planning of the Project to avoid and minimize the air pollution impact. The Applicant shall consider alternative construction methods to minimize the air quality impact during construction stage of the Project.
 - (iii) Presentation of background air quality levels in the study area for the purpose of evaluating cumulative air quality impacts during construction and operation stages, where appropriate, of the Project.
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 pollution 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 to be handled, etc.) shall be obtained from the relevant government departments/ authorities, where applicable, and documented in the EIA report.
 - (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 impact. The impact as affecting the existing, committed and planned ASRs within the study 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 evaluate the likely construction dust and odour impact that may arise from the construction and associated activities of the Project, and propose suitable measure to control/ minimize potential fugitive dust and odour nuisance.
- (ii) A monitoring and audit programme for the construction phase of the Project shall be devised to verify the effectiveness of the proposed control measures so as to ensure proper control of fugitive dust and odour emissions.

4. Operational Phase Air Quality Impact

- (i) The Applicant shall assess the potential air quality impact arising from the activities in the proposed Project site, including odour from the screened debris collected as a result of the screening operation conducted at the inlet chamber of the pumping facilities, during the operational phase based on assumed reasonably worst case scenario under normal operating condition.
- (ii) If the Applicant anticipates that the Project will give rise to significant operational phase air quality impacts likely to exceed the recommended limits in the TM at the ASRs, a quantitative assessment should be carried out to evaluate the operational phase air quality impacts at the identified ASRs. The Applicant shall follow the methodology set out in Section 5 below when carrying out the quantitative assessment. A monitoring and audit programme for the operational stage shall be devised to verify the effectiveness of the control measures proposed so as to ensure proper operational odour control.

5. Quantitative Assessment Methodology

- (i) The Applicant shall apply the general principles enunciated in the modeling guidelines in Appendix B-1 while making allowance for the specific characteristic of the Project. This specific methodology must be documented in such level of details, preferably assisted 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 model 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 between the Applicant and the Director on the specific modelling details should be sought.
- (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.
- (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.

- (iv) For the quantitative assessment of the odour emission impact upon the identified ASRs, the odour emission strength/ rates shall be based on the results of odorous air sampling/ measurement conducted directly at the odour emission sources within the Project boundary. The details of such odorous air sampling/ measurement, including the methodology and calculation of the odour emission strength/rates, shall be presented in the EIA report.

6. Mitigation Measures for Air Quality Impact

Consideration for Mitigation Measures

- (i) When the predicted air quality impact exceeds the criteria set in section 1 of Annex 4 in the TM, the Applicant shall consider mitigation measures to reduce the air quality impact on the identified ASRs. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed and documented in the EIA report. Specific reasons for not adopting certain workable mitigation measures to reduce the air quality to a level meeting the criteria in the TM or to maximise the protection of the ASRs as far as possible should be clearly substantiated and documented in the EIA report.

Evaluation of Residual Air Quality Impact

- (ii) Upon consideration of mitigation measures, if the mitigated air quality impact still exceeds the relevant criteria in Annex 4 of the TM, the Applicant shall identify, predict, and evaluate the residual air quality impact in accordance with Section 4.4.3 and Section 4.5.1(d) of the TM.

7. Submission of Emission Calculation Details and Model Files

Input and output files of the model run(s), including those files for the generation of pollution contours as well as the emissions calculation worksheets, shall be submitted to the Director in electronic format together with the submission of the EIA report.

Appendix B-1**Air Quality Modelling Guidelines**

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

The air quality modelling 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):

1. Guidelines on Choice of Models and Model Parameters (Revised);
2. Guidelines on Assessing the “Total” Air Quality Impacts (Revised);
3. Guidelines on the Use of Alternative Computer Models in Air Quality Assessment;
4. Guidelines on the Estimation of PM_{2.5} for Air Quality Assessment in Hong Kong; and
5. 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. 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.

2.2 Identification of Construction Noise Impact**2.2.1 *Identification of Assessment Area and Noise Sensitive Receivers (NSRs)***

- (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.
- (e) The assessment shall cover the cumulative noise impacts due to the construction works of the Project and other concurrent projects identified during the course of the EIA study.

2.4 Mitigation of Construction Noise Impact

2.4.1 *Direct Mitigation Measures*

Where the predicted construction noise impact exceeds the criteria set in Table 1B of Annex 5 of the 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 the 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. Fixed Noise Sources Impact Assessment

3.1 Fixed Noise Sources Impact Assessment Methodology

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

3.2 Identification of Fixed Noise Sources Impact

3.2.1 *Identification of Assessment Area and Noise Sensitive Receivers (NSRs)*

- (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 impact assessment purpose. However, such parameters and conditions together with the representative site layouts and 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 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 any permanent and temporary industrial noise sources.
- (b) The Applicant shall provide document or certificate, with a methodology accepted by recognized national/international organisation, 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.

3.3 Prediction and Evaluation of Fixed Noise Sources Impact

3.3.1 *Scenarios*

- (a) The Applicant shall quantitatively assess the fixed noise sources impact of the Project, with respect to the criteria set in Annex 5 of the TM, of unmitigated scenario and mitigated scenario at assessment year 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 operation modes shall be confirmed with relevant departments/authorities and documented in the EIA report.

3.3.2 *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 fixed noise sources impact associated with the operation of the 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.

3.4 Mitigation of Fixed Noise Sources Impact

3.4.1 *Direct Mitigation Measures*

Where the predicted fixed noise sources impact exceeds the criteria set in Table 1A of Annex 5 of the 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 shall 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.

3.5 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 the 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.

Appendix D**Requirements for Ecological Impact Assessment (Terrestrial and Aquatic)**

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 respectively.
2. The assessment area for the purpose of terrestrial ecological assessment shall include all areas within 500 metres from the Project boundary and any associated works as well as the areas likely to be impacted by the Project. For aquatic ecology, the assessment area shall be the same as the water quality impact assessment described in section 3.4.4.2 in the Study Brief.
3. In the ecological impact assessment, 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 recognised sites of conservation importance and other ecologically sensitive areas such as the Mai Po Inner Deep Bay Ramsar Site, Wetland Conservation Area (WCA) and Wetland Buffer Area (WBA) as defined in Town Planning Board Guideline 12C and mudflats / mangrove at Kam Tin River and Shan Pui River. The assessment shall identify and quantify as far as possible the potential ecological impacts arising from the Project including its construction and operation phases as well as the subsequent management and maintenance of the proposals.
4. The assessment shall include the following major tasks;
 - (i) review the findings of relevant studies/surveys and collate all available information on the ecological characters of the assessment area;
 - (ii) evaluate the information collected and identify any information gap relating to the assessment of potential ecological impacts to the aquatic and terrestrial environment, and determine the ecological field surveys and investigations that are needed for an impact assessment as required in the following sections;
 - (iii) carry out any necessary field surveys of at least 12 months covering both dry and wet season and investigations to fill in the information gaps identified, and to fulfill the objectives of the EIA study;
 - (iv) establish an ecological profile of the assessment area based on data of relevant previous studies/surveys and results of ecological field surveys. Major information to be provided shall include:
 - (a) description of the physical environment;
 - (b) habitats maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats in the assessment area;
 - (c) ecological characteristics of each habitat type such as size, vegetation type, species present, dominant species found, species richness and abundance,

- community structure, seasonal patterns, inter-dependence of the habitats and species, and presence of any features of ecological importance;
- (d) representative colour photographs 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) investigate and describe the existing wildlife uses of the various habitats with special attention to those wildlife groups and habitats with conservation interests, including but not limited to:
- (a) natural and man-made wetland habitats including mudflats, mangrove, streams, drainage channels, fishponds, freshwater ponds, reedbeds, marshes and others, in particular the mudflats at Shan Pui River and Kam Tin River exposed during low tide, as well as roosting areas of Black-faced Spoonbill and Great Cormorant;
 - (b) migratory and overwintering waterbirds roosting and/ or feeding in the wetland habitats above;
 - (c) the active egretty at Tung Shing Lei and the egrets and herons breeding there;
 - (d) intertidal/benthic communities;
 - (e) mammals, in particular Eurasian Otter;
 - (f) fireflies in particular Bent-winged Firefly; and
 - (g) any other habitats and species identified as having special conservation interests by this study.
- (vi) describe all recognized sites of conservation importance within and in the vicinity of the Project and assess whether these sites will be affected by the Project and associated works;
- (vii) using suitable methodology to identify and quantify as far as possible any direct, indirect, on-site, off-site, primary, secondary and cumulative ecological impacts on the wildlife groups and habitats, such as destruction of habitats, reduction of species abundance/ richness, loss of roosting, breeding and feeding grounds, reduction of ecological carrying capacity, loss in ecological linkage and function, habitat fragmentation and any other possible disturbance cause by the Project; and in particular the following:
- (a) loss/ change of intertidal mudflat habitat upstream of the barrage at Yuen Long Nullah;
 - (b) noise, glare and other human disturbance to wildlife, in particular, waterbirds

and sensitive wetland habitats in the vicinity such as mudflats/ mangrove at Kam Tin River and Shan Pui River as well as fishpond/ wetland habitats at Nam Sang Wai and WCA during construction and operation phases;

- (c) indirect ecological impacts due to changes in benthic food supply, hydrodynamic properties, hydrology, salinity, sedimentation rates and patterns and deterioration of the water quality in the watercourses and other wetland habitats in the vicinity and downstream of the proposed works during construction and operation phases, in particular the Shan Pui River and Deep Bay area;
 - (d) disturbance and obstruction of flight lines of birds from major breeding/ roosting sites to foraging grounds; and
 - (e) cumulative impacts due to the upgrading of Yuen Long Sewage Treatment Works;
- (viii) evaluate the significance and acceptability of the ecological impacts identified using well-defined criteria;
- (ix) recommend practicable mitigation measures (such as modification/ change in locations of the Project, restriction of works at specified season or time, adoption of appropriate construction methods and programme, etc.) to avoid, minimize and/or compensate for the adverse ecological impacts identified;
- (x) evaluate the feasibility and effectiveness of the recommended mitigation measures and define the scope, type, location, implementation arrangement, resources requirement, subsequent management and maintenance of such measures;
- (xi) determine and quantify as far as possible the residual ecological impacts after implementation of the proposed mitigation measures;
- (xii) evaluate the severity and acceptability of the residual ecological impacts using well-defined criteria. If off-site mitigation measures are considered necessary to mitigate the residual impacts, the guidelines and requirements laid down in the TM shall be followed; and
- (xiii) review the need for and recommend any ecological monitoring programme required.

Appendix E**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 to collect adequate and updated baseline information. If field surveys are considered necessary, the assessment shall recommend appropriate methodology, duration and timing for such surveys.
2. The fisheries impact assessment shall cover any potential direct, indirect, short-term and long-term impacts on culture fisheries during the construction and operation stages of the Project.
3. The fisheries impact assessment shall provide the following information:-
 - (i) description of the physical environmental background;
 - (ii) description and quantification of the existing aquaculture activities, with special attention on fish ponds around Yuen Long;
 - (iii) description and quantification of the existing aquaculture resources;
 - (iv) identification of parameters (e.g. water quality parameters) and areas that are important to aquaculture activities;
 - (v) prediction and evaluation of any other direct/ indirect, onsite/ offsite impacts on aquaculture activities / resources such as potential loss or disturbance of fish ponds and water quality deterioration caused by the Project;
 - (vi) evaluation of cumulative impacts on aquaculture due to other planned and committed concurrent development projects at or near the assessment area;
 - (vii) proposals of practicable mitigation measures with details on justification, description of and programme feasibility as well as staff and financial implications including those related to subsequent management and maintenance requirements of the measures; and
 - (viii) review for the need of monitoring during the construction and operation stages of the Project and, if necessary, proposal for a monitoring and audit programme.

Appendix F**Requirements for Water Quality Impact Assessment**

1. The Applicant shall identify and analyse physical, chemical and biological disruptions of the water system(s) arising from the construction and operation of the Project.
2. The Applicant shall predict and assess any water quality impacts arising from the construction and operation of the Project.
3. The assessment shall include, but not be 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; and
 - (ii) the water quality impacts on the sensitive receivers which may be affected by the Project.
4. Should dredging be required in open water of the river channel or streams, the Applicant shall assess the water quality impact using appropriate mathematical model. The modeling software shall include hydrodynamic and sediment transport modules for assessing impacts of sediment loss taking into account the processes of settling, deposition and re-suspension of sediment. The modeling assessment shall include contaminant release from works on sediment and sediment loss from works into water bodies. In general, for river channels under tidal influence, the model simulation shall cover a minimal period of a spring-neap cycle each in the dry season and the wet season.
5. 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 :
 - (i) collect and review background information on affected existing and planned water systems, their respective catchments and sensitive receivers which might be affected by the Project;
 - (ii) characterize water quality of the water systems and sensitive receivers, which might be affected by the Project based on existing best available information or through appropriate site survey and tests;
 - (iii) identify and analyse relevant existing and planned future activities, beneficial uses and water sensitive receivers related to the affected water system(s). The Applicant should refer to, *inter alia*, those developments and uses earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans, and any other relevant published landuse plans;
 - (iv) identify pertinent water quality objectives and establish other appropriate water quality criteria or standards for the water system(s) and the sensitive receivers identified in (i), (ii) & (iii) above;

- (v) review the specific construction methods and configurations, and operation of the Project to identify and predict the likely water quality impacts arising from the Project;
- (vi) identify any alternation of any water courses, natural streams, ponds, wetlands, change of water holding/flow regimes of water bodies, change of catchment types or areas, erosion or sedimentation due to the Project and any other hydrological changes in the study area;
- (vii) identify and quantify existing and likely future water pollution sources, including point discharges and non-point sources to surface water runoff, sewage from workforce and polluted discharge generated from the Project, contaminant release from works on sediment and sediment release or re-suspension from works into water bodies;
- (viii) provide an emission inventory on the quantities and characteristics of those existing and future pollution sources in the study area. Field investigation and laboratory test, shall be conducted as appropriate to fill relevant information gaps;
- (ix) predict and quantify the impacts on the water system(s) and its/their sensitive receivers due to those alternations and changes identified in (vi) above, and the pollution sources identified in (vii) above. The prediction shall take into account and include possible different construction and operation stages of the Project;
- (x) assess the cumulative impacts due to other related concurrent and planned projects, activities or pollution sources within the study area that may have a bearing on the environmental acceptability of the Project;
- (xi) analyse the provision and adequacy of existing and planned future facilities to reduce pollution arising from the point and non-point sources identified in (vii) above.
- (xii) develop effective infrastructure upgrading or provision, contingency plan, water pollution prevention and mitigation measures to be implemented during construction and operation stages, including emergency sewage discharge in the case of sewage treatment works and sewage pumping stations, so as to reduce the water quality impacts to within standards. Requirements to be incorporated in the Project contract document shall also be proposed;
- (xiii) investigate and develop best management practices to reduce storm water and non-point source pollution as appropriate;
- (xiv) evaluate the need of operational maintenance works such as maintenance desilting/ dredging at different operation stages of the Project. The cumulative water quality impacts arising from maintenance desilting/ dredging and other interfacing projects within the study area shall be assessed with reference to the frequency and rate of maintenance desilting/ dredging required; and
- (xvi) evaluate and quantify residual impacts on water system(s) and the sensitive receivers with regard to the appropriate water quality objectives, criteria, standards or guidelines.

Appendix G**Requirements for Assessment of Waste Management Implications
and Land Contamination**

The assessment of waste management implications 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 operational activities of the Project based on the sequence and duration of these activities, e.g. any dredged/ excavated sediment/mud, construction and demolition (C&D) materials and other wastes which will be generated during construction and operational stages. The Applicant shall adopt appropriate design, general layout, construction methods and programme to minimise the generation of public fill/inert C&D materials and maximize the use of public fill/inert C&D materials for other construction works.

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 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 item (iv) below;
- (iii) The EIA report shall also state clearly 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 and 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;
 - wastewater discharge; and
 - public transport.

3. Excavation/ Dredging and Dumping

- (i) The Applicant shall identify and quantify 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 for marine disposal option. 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 contamination of sediment/ mud which requires special treatment/ disposal is confirmed, the Applicant shall identify the appropriate treatment and/ or disposal arrangement and demonstrate its viability in consultation with relevant authorities.

- (ii) The Applicant shall identify and evaluate the practical 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

The Applicant shall identify the potential land contamination site(s) within the Study Area and, if any, within the boundaries of associated areas (e.g. work areas) of the Project.

4.1 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).

4.2 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 as detailed from sub-section (i) to (iii) below and propose measure to avoid disposal -:

- (i) 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).

- (ii) 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.

(iii) 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 and 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.

Appendix H**Requirements for Landscape and Visual Impact Assessment**

1. 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 the landscape impact significance as required under the TM and the EIAO Guidance Note No. 8/2010 “Preparation of Landscape and Visual Impact Assessment under the EIAO”. Clear illustrations of the landscape impact assessment are required.
2. 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 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 of the study areas;
 - (iv) description of the severity of visual impacts in terms of distance, nature and number of sensitive receivers. The visual impacts of the Project with and without mitigation measures shall be included so as to demonstrate the effectiveness of the proposed mitigation measures;
3. 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. In addition, alternative location, layout, design, built-form 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 landscape mitigation plan.
4. The mitigation measures shall also include the preservation of vegetation and other landscape features, transplanting trees in good condition and value, provision of screen planting, re-vegetation of disturbed lands, compensatory planting, design of structure, provision of finishes to structure, 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 operation 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.

5. 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 proposed pumping station which is a newly added above ground structure. 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 by computer-generated photomontage so as to demonstrate the effectiveness of the proposed mitigation measures.
6. All computer graphics shall be compatible with Microstation DGN file format. The Applicant shall record the technical details such as system set-up, software, data files and function in preparing the illustration, which may need to be submitted for verification of the accuracy of the illustration.

Appendix I**Requirements for Cultural Heritage Impact Assessment**1. **Built heritage impact assessment (BHIA)**

The Applicant shall conduct a built heritage impact assessment (BHIA), taking the results of the previous studies 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 and to assess the direct and indirect impacts on 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 demonstrate that all reasonable efforts have been made to avoid or keep the adverse impacts of built heritage items to the minimum through modification of design of the Project, or use of latest construction / engineering techniques. For those built heritage items that might still be directly and indirectly affected by the Project, the Applicant shall recommend practicable mitigation measures and monitoring to avoid or keep the adverse impact to the minimum. A checklist including all the affected sites of cultural heritage, impacts identified, recommended mitigation measures as well as the implementation agent and period shall also be included in the EIA report.

2. The Applicant shall draw necessary reference to relevant sections of the “Guidelines for Cultural Heritage Impact Assessment” at Appendix I-1 for detailed requirement.

Appendix I-1**Guidelines for Cultural Heritage Impact Assessment**

(as at 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; and
 - (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 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.
- b. 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.
- c. 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.

1.6 Safety Issue

1.6.1 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.

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

1.7 Information Disclosure

- 1.7.1 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.*

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) 30 copies of the EIA report and 30 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 the executive summary prepared in HyperText Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 1.3 or later). For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EIA report and the executive summary shall be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the EIA report and the 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.
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.