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10 October 2017

Airport Authority Hong Kong, HKIA Tower

**Environmental Impact Assessment (EIA) Ordinance, Cap.499
Application for EIA Study Brief**

**Project Title: Intermodal Transfer Terminal – Bonded Vehicular Bridge
and Associated Roads**
(Application No. ESB-302/2017)

I refer to your above application received on 30 August 2017 for an EIA Study Brief under Section 5(1)(a) of the EIA Ordinance.

In accordance with Section 5(7)(a) of the EIA Ordinance and after public inspection of the project profile, I issue the attached EIA Study Brief (No. ESB-302/2017) 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/>).

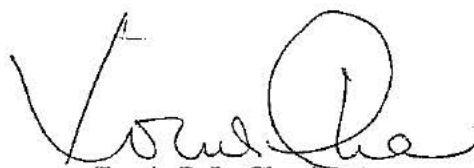
You may submit an application for approval of the EIA report in accordance with Section 6(2) of the EIA Ordinance after its completion. Upon receipt of your application, this department will decide under Section 6(3) of the EIA Ordinance whether the EIA report meets the requirements of the EIA Study Brief and Technical Memorandum on EIA Process, and accordingly advise you under Section 6(4) of the EIA 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 Secretariat of the EIA Subcommittee of the Council for selection for submission when you submit the EIA report to this department for approval. Please liaise with Ms. Becky LAM (Tel: 2594 6323) regarding the details in due course.

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 Advisory Council on the Environment*" 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 on the above application, please contact my colleague Mr. Lawrence Ngo at 2835 1751.

Yours sincerely,



(Louis P. L. Chan)

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-302/2017

**Project Title: Intermodal Transfer Terminal – Bonded Vehicular Bridge
and Associated Roads
(hereinafter known as the “Project”)
Name of Applicant: Airport Authority Hong Kong
(hereinafter known as the “Applicant”)**

1. BACKGROUND

- 1.1 An application (No. ESB-302/2017) for an Environmental Impact Assessment (EIA) study brief under Section 5(1)(a) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by the captioned Applicant on 30 August 2017 with a Project profile (No. PP -556/2017) (the Project Profile).
- 1.2 The Applicant proposes to construct a bonded vehicular bridge of about 360 m connecting the Hong Kong International Airport (HKIA) and the Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities (HKBCF) island, with several supporting piers in between. The location of the Project as given in the Project Profile is reproduced in Appendix A of this EIA Study Brief (SB).
- 1.3 Based on the information provided in the Project Profile, the works identified as Designated Projects in Part I, Schedule 2 of the EIAO, are mainly listed as follows:
- (i) *“A road bridge more than 100 m in length between abutments”* (Item A.8);
 - (ii) *“Reclamation works resulting in 5% decrease in cross sectional area calculated on the basis of 0.0 mPD in a sea channel”* (Item C.3(a))
- More items under Schedule 2 of the EIAO may be identified during the course of this EIA study.
- 1.4 Pursuant to Section 5(7)(a) of the EIAO, the Director of Environmental Protection (the Director) issues this SB 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 the construction and operation of the Project and the associated works that will take 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 proposed 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 provide information on the consideration of alternative design options of the Project including scale, extent, layout, configuration, design and type of design orientation and the construction methods with a view to avoiding and minimising potential environmental impacts to environmentally sensitive areas and sensitive uses; to compare the environmental benefits and dis-benefits of different options; to provide reasons for selecting the preferred option(s) and to describe the part environmental factors played in the selection of preferred option(s);
- (iv) to identify and quantify emission sources (including air quality, noise, water quality and waste, etc. as appropriate) and determine the significance of impacts on sensitive receivers and potential affected uses;
- (v) to identify and quantify any potential losses or damage to flora, fauna and natural habitats and to propose measures to mitigate these impacts;
- (vi) to identify any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- (vii) to propose the provision of infrastructure or mitigation measures so as to minimise pollution, environmental disturbance and nuisance during construction and operation of the Project;
- (viii) to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- (ix) 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 potential affected uses;
- (x) 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;
- (xi) to investigate the extent of the secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification; and

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

3. DETAILED REQUIREMENTS OF THE EIA STUDY

3.1 The Purpose

The purpose of this SB 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 above. For the purpose of assessing whether the environmental impacts 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) considerations on alternative design, construction method(s) and sequence(s) so as to avoid and minimise the environmental impacts arising from installing the bridge piles;
- (ii) potential air quality impact on the sensitive receivers due to the construction and operation of the Project and the associated works, in particular those arising from the emissions of the vehicles;
- (iii) potential noise impact on the sensitive receivers due to the construction of the Project and associated works, including impact from construction equipment during construction of the Project;
- (iv) potential water quality impacts caused by the Project and associated works arising from the construction and operation of the Project;
- (v) potential waste management issues and impacts arising from the construction and operation of the Project;
- (vi) potential marine ecological impacts during construction and operation of the Project;
- (vii) potential landscape and visual impacts on sensitive receivers during the construction and operation of the Project;
- (viii) the potential impacts on sites of cultural heritage including marine archaeological deposit in the seabed of the Project area likely to be affected during construction

of the Project;

- (ix) potential cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed and planned projects in the vicinity of the Project, and that those impacts may have a bearing on the environmental acceptability of the Project. Consideration shall be given to account for impacts from potential concurrent projects, including but not limited to the planned Tung Chung New Town Extension, Expansion of Hong Kong International Airport into 3-Runways system (3RS), HZMB HKBCF, Hong Kong Link Road (HKLR) and Tuen Mun-Chek Lap Kok Link (TMCLKL); and
- (x) identification of individual project(s) proposed under the Project that fall under Schedule 2 of the EIAO; to ascertain whether the findings of this EIA study have adequately addressed the environmental impacts of those project(s); and where necessary to identify the outstanding issues that need to be addressed in any further detailed EIA studies.

3.3 Description of the Project

3.3.1 Purpose(s) and Objectives of the Project

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

3.3.2 Details of the Project

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 design, size, construction methods, and other major activities involved in operation of 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 provided. The land taken by the Project site, construction site, associated access arrangements, auxiliary facilities and landscaping areas shall be shown on a scaled map.

3.3.3 Background and History of the Project

The Applicant shall provide information on the site location and site history of the Project. The main environmental impacts of the different practicable design options shall be compared with those of the proposed 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 the environmental aspects of the activities as described in Section 3.2 above. The assessment shall be based on the best and latest information available during the course of the EIA study. The Applicant shall include in the EIA report details of the construction and operational programme and

methodologies for assessing environmental impacts of the Project. The Applicant shall clearly state the time frame, staged implementation programme and works programmes of the Project and other concurrent projects, for assessing the cumulative environmental impacts from the Project and interacting projects as identified in the EIA study.

3.4.2 The EIA study shall follow the technical requirements specified below and in the Appendices of this EIA SB.

3.4.3 Air Quality Impact

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

3.4.3.2 The assessment area for air quality impact assessment shall be defined by a distance of 500 meters from the boundary of the Project site, with consideration to be extended to include major existing, planned and committed air pollutant emission sources identified to have a bearing on the environmental acceptability of the Project. The assessment shall include the existing, committed and planned sensitive receivers within the assessment area. The assessment shall also take into account the impacts of emission sources from nearby concurrent projects, if any. The assessment shall be based on the best available information at the time of the assessment.

3.4.3.3 The Applicant shall propose the air sensitive receivers for agreement of the Director. The air quality impact assessment for construction and operation of the Project shall follow the detailed technical requirements given in Appendix B.

3.4.4 Noise Impact

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

3.4.4.2 Assessment shall include construction noise and operation noise, impact assessment of the existing, committed and planned noise sensitive receivers 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.

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

3.4.4.4 If noise sensitive receivers which rely on opened windows for ventilation are identified within the assessment area, quantitative noise impact assessment shall be carried out, otherwise only a qualitative noise impact assessment will be necessary. The Applicant shall propose methodology for agreement of the Director, with reference to Section 4.4.2 of the TM, prior to the commencement of the quantitative assessment.

3.4.5 Water Quality Impact

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

3.4.5.2 The assessment area for the water quality impact assessment shall include the North Western 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 assessment area can be extended to include other areas such as existing and new drainage systems and other water system(s) in the vicinity, if they are found also being affected by the Project during the EIA study and have a bearing on the environmental acceptability of the Project.

3.4.5.3 The water quality impact assessment for the construction and operation of the Project shall follow the detailed technical requirements given in Appendix C of this EIA SB.

3.4.6 Waste Management Implications

3.4.6.1 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.

3.4.6.2 The assessment of the waste management implications arising from the construction and operation of the Project shall follow the detailed technical requirements given in Appendix D of this EIA SB.

3.4.7 Marine Ecological Impact

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

3.4.7.2 The assessment area shall be the same as the assessment area for Water Quality Impact Assessment described in Section 3.4.5.2 of this EIA SB or the areas likely to be impacted by the Project.

3.4.7.3 The marine ecological impact assessment for the construction and operation of the Project shall follow the detailed technical requirements give in Appendix E of this EIA SB.

3.4.8 Landscape and Visual Impact

3.4.8.1 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 respectively, and the EIAO Guidance Note No. 8/2010 “Preparation of Landscape and Visual Impact Assessment under the EIAO” and the report of “Landscape Value Mapping in HK”.

3.4.8.2 The assessment area for the landscape impact assessment shall include landscape character areas and landscape resources within 500 metres from the boundary of the Project Area and the works of the Project within the Study Area as identified in the EIA, while the assessment area for the visual impact assessment shall be defined by the visual

envelope of the Project. The extent of the defined visual envelope shall be shown on a plan and documented in the EIA report.

- 3.4.8.3 The landscape and visual impact assessment for the construction and operation of the Project shall follow the detailed technical requirements given in Appendix F of this EIA SB.

3.4.9 Impact of Cultural Heritage

- 3.4.9.1 The Applicant shall follow the criteria and guideline for evaluating and assessing the cultural heritage impacts as staged in Annexes 10 and 19 of the TM respectively.

- 3.4.9.2 A marine archaeological investigation (MAI) in the area to be affected by the marine works associated with the construction of the proposed infrastructure such as the pedestrian/vehicular connection/link between the HKIA and the HKBCF shall be conducted. In the event that potential adverse impacts on cultural heritage are identified, the Applicant shall approach the Director for additional specific requirements on the assessment of cultural heritage impact. The MAI shall follow the detailed technical requirements given in Appendix G.

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 H) 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.

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 SB, 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 the EIA report the respective requirements of this EIA SB and 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 I of this EIA SB. 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 the Applicant for this EIA SB during the course of 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 SB and in Project Profile (No. PP-556/2017), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA SB 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 SB, the Applicant shall apply to the Director for a fresh EIA study brief.

7. LIST OF APPENDICES

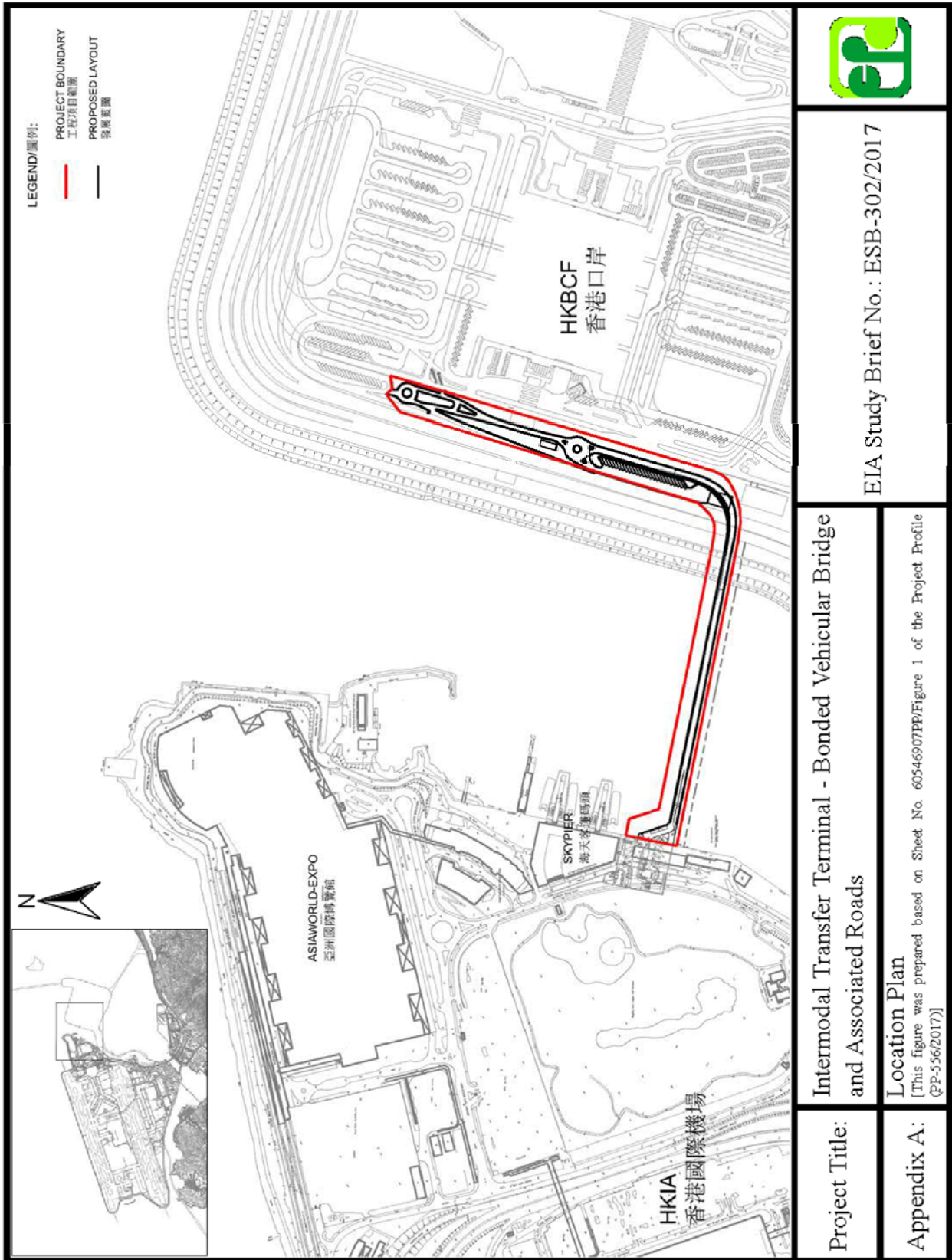
7.1 This EIA SB includes the following appendices:

- Appendix A – Location map of Project Area
- Appendix B – Requirement for Air Quality Impact Assessment
- Appendix C – Requirements for Water Quality Impact Assessment
- Appendix D – Requirements for Waste Management
- Appendix E – Requirements for Marine Ecological Impact Assessment
- Appendix F – Requirements for Landscape and Visual Impact Assessment
- Appendix G – Requirements for Cultural Heritage Impact Assessment
- Appendix H – Implementation Schedule
- Appendix I – Requirements for EIA Report Documents

END of EIA STUDY BRIEF

October 2017
Environmental Assessment Division
Environmental Protection Department

Appendix A



EIA Study Brief No.: ESB-302/2017

Intermodal Transfer Terminal - Bonded Vehicular Bridge
and Associated Roads

Location Plan
[This figure was prepared based on Sheet No. 60546907PP/Figure 1 of the Project Profile
(GP-56/2017)]

Project Title:

Appendix A:

Appendix B

Requirements for Air Quality Impact Assessment

The air quality impact assessment shall include the following:

1. Background and Analysis of Activities

- (i) Provision of background information relating to air quality issues relevant to the Project, e.g. description of the types of activities of the Project that may affect air quality during both construction and operational stages.
- (ii) Provision of an account, where appropriate, of the consideration/measures that have been taken into consideration in the planning of the Project to avoid and minimise the air pollution impact. The Applicant shall consider alternative construction methods, phasing programmes and alternative modes of operation to minimise the air quality impact during construction and operational stages of the Project.
- (iii) Presentation of background air quality levels in the assessment area for the purpose of evaluating cumulative air quality impacts during construction and operational stages of the Project. If PATH model is used to estimate the background air quality, details for the estimation of the emission sources to be adopted in the model runs should be clearly presented.

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

- (i) Identification and description of the existing, committed and planned 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, 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. 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 the buildings, uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources during both the construction and operational stages shall also be given. For phased development, the Applicant shall review the development programme and, where appropriate, to include occupiers of earlier phases as ASRs of construction phase impact if they may be affected by works of later phases.
- (ii) Provision of a list of air pollutant emission sources, including any nearby emission sources which are likely to have impact related to the Project based on the analysis of the construction and operation activities in Section 1 above. Examples of construction stage emission sources include material handling and vehicular movements on site, etc. Examples of operational stage emission sources include exhaust emissions from vehicles, etc. Confirmation regarding the validity of

assumptions and the magnitude of activities (e.g. volume of construction materials to be handled) shall be obtained from the relevant government departments/authorities and documented in the EIA report.

- (iii) Identification of chimneys and obtainment of relevant chimney emission data in the assessment area, where appropriate, by carrying out a survey for assessing the cumulative air quality impact of air pollutants through chimneys. The Applicant shall ensure and confirm the validity of the emission data used in their assessment. Any errors found in their emission data used may render the submission invalid.
- (iv) 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 impacts at the existing, committed and planned ASRs within the assessment area shall be assessed, based on the best information available at the time of assessment.

3. Construction Phase Air Quality Impact

- (i) The Applicant shall follow the requirements stipulated under the Air Pollution Control (Construction Dust) Regulation to ensure that construction dust impacts are controlled within the relevant standards as stipulated in Section 1 of Annex 4 of the TM.
- (ii) If the Applicant anticipates that the Project will give rise to significant construction dust impacts likely to exceed recommended limits in the TM at the ASRs identified within the assessment area despite the incorporation of the dust control measures proposed, a quantitative assessment shall be carried out to evaluate the construction dust impact at the identified ASRs. The Applicant shall follow the methodology set out in Section 5 below when carrying out the quantitative assessment.
- (iii) Where necessary, the Applicant shall consider and evaluate direct mitigation measures, including but not limited to water-spraying, re-scheduling construction programme to minimise concurrent dust impact arising from different construction sites, for fugitive dust control. Any mitigation measures recommended for fugitive dust control should be well documented in the EIA report.
- (iv) 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 emission.

4. Operational Phase Air Quality Impact

- (i) The Applicant shall assess the expected air quality impact at the identified ASRs within the assessment area as defined in section 3.4.3.2 of this SB based on an assumed reasonably worst-case scenario under normal operating conditions of the Project.
- (ii) If the assessment indicates likely exceedances of the recommended limits in the TM at the ASRs identified within the assessment area, 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 assessment.

- (iii) A monitoring and audit programme for the operational phase of the Project shall be devised to verify the effectiveness of the proposed control measures so as to ensure proper control of operational air quality impacts.

5. Quantitative Assessment Methodology

- (i) The Applicant shall conduct quantitative assessment by applying the general principles enunciated in the modelling 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 associated with tables and diagrams, to allow the readers of the EIA report to grasp how the model has been set up to simulate the situation under study without referring to the model input files. In case of doubt, prior agreement between the Applicant and the Director on specific modelling details should be sought.
- (ii) For the purpose of assessing the compliance with the criteria as stated in Section 1 of Annex 4 of the TM, the Applicant shall identify the key/representative air pollution parameters (types of pollutants and the averaging time concentrations) to be evaluated and provide explanation for selecting these parameters for assessing the impact of the Project.
- (iii) Calculation of the relevant pollutant emission rates for input to the model and a map(s) showing the road links and emission sources shall be presented in the EIA report. A summary table of the emission rates shall be presented in the EIA report. The Applicant shall ensure consistency between the text description and the model files at every stage of submission for review.
- (iv) The air pollution impacts of future road traffic shall be calculated based on the highest emission strength from the road vehicles in the assessment area within the next 15 years upon commencement of operation of the proposed road. The Applicant shall demonstrate that the selected year of assessment represents the highest emission scenario given the combination of vehicular emission factors and traffic flow for the selected year. The Applicant may use EMFAC-HK model released by the Director to determine the Fleet Average Emission Factors, taking into account vehicle fleet mix and other necessary data. Unless otherwise agreed by the Director, the latest version of the EMFAC-HK model shall be used. Use of any alternatives to the EMFAC-HK model shall be agreed with the Director. The traffic flow data and assumptions, such as the exhaust technology fractions, vehicle age/population distribution, traffic forecast and speed fractions, that are used in the assessment shall be presented.
- (v) For estimating the future background air quality, the Applicant may use the PATH model released by the Director, taking into consideration the major air pollutant emission sources projected for Hong Kong and nearby regions. Unless otherwise agreed by the Director, the latest version of the PATH model shall be used. Use of

any alternatives to the PATH model shall be agreed with the Director. Details of the adopted emission sources should be presented.

- (vi) Ozone Limiting Method (OLM) or Discrete Parcel Method (DPM) or other appropriate method shall be used to estimate the conversion ratio of NO_x to NO₂ if NO₂ has been identified as a key/representative air pollutant.
- (vii) The Applicant shall calculate the cumulative air quality impact at the identified ASRs and compare these results against the criteria set out in Section 1 of Annex 4 in the TM. The Applicant shall also calculate the incremental air quality impact at the identified ASRs arising from the Project. 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 shall be used to present pollution contours to allow buffer distance requirements to be determined properly.
- (viii) If vehicle tunnels and/or full enclosures are proposed in the Project, it is the responsibility of the Applicant to ensure that the air quality inside these proposed structures shall comply with EPD's "Practice Note on Control of Air Pollution in Vehicle Tunnels". When assessing air quality impact due to emissions from tunnels/full enclosures, the Applicant shall ensure prior agreement with the relevant ventilation design engineer over the amount and the types/kinds of pollutants emitted from these full enclosures; and such assumptions shall be clearly and properly documented in the EIA report.
- (ix) If there are any direct technical noise remedies recommended in the study, the air quality implication due to these technical remedies shall be assessed. For instance, if barriers that may affect dispersion of air pollutants are proposed, then the implications of such remedies on air quality impact shall be assessed. If noise enclosure is proposed, then portal emissions of the enclosed road section shall also be assessed. The Applicant shall highlight clearly the locations and types of agreed noise mitigating measures (where applicable), be they noise barriers, road enclosures and their portals, and affected ASRs, on contour maps for reference.

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

Appendix B-1

Air Quality Modelling Guidelines

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

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)

- i) Guidelines on Choice of Models and Model Parameters (Revised);
- ii) Guidelines on Assessing the “Total” Air Quality Impact (Revised);
- iii) Guidelines on the Use of Alternative Computer Models in Air Quality Assessment;
- iv) Guidelines on the Estimation of PM_{2.5} for Air Quality Assessment in Hong Kong; and
- v) Guidelines on the Estimation of 10-minute Average SO₂ Concentration for Air Quality Assessment in Hong Kong.

Appendix C

Requirements for 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, quantify and assess any water quality impacts arising from the construction and operation of the Project by appropriate mathematical modelling and/or other techniques proposed by the Applicant and approved by the Director. The mathematical modelling requirements are set out in Appendix C-1. Possible impacts due to the dredging, other marine works activities, effluent discharge, thermal/cooling water discharges and biocide discharge (if any), discharge including emergency overflow from the sewage pumping stations and sewage treatment works (if any), and site runoff shall include but not limited to changes in hydrology, flow regime, sediment erosion and deposition patterns, morphological change of seabed profile, water and sediment quality, marine and freshwater organisms/community. The prediction shall include possible different construction and operational stages or sequences of the Project. Affected sensitive receivers shall be identified by the assessment tool with indications of degree of severity.
3. The assessment shall include, but not limited to the following:
 - (i) the water quality impacts of the site run-off and marine works including but not limited to impacts on suspended solid level, dissolved oxygen and contaminant release, during the construction stage;
 - (ii) the water quality impacts of road runoff containing oil/grease and suspended solids during the operational stage;
 - (iii) the water quality impacts on sea channel between the HKIA and HKBCF island due to the formation of bridge structure during the operational stage; and
 - (iv) the water quality impacts on water sensitive receivers around the Project sites.
4. The Applicant shall address water quality impacts due to the construction phase and operational phase of the Project. Essentially, the assessment shall address the following :
 - (i) collect and review background information on affected existing and planned water system(s), their respective catchments and sensitive receivers which might be affected by the Project;
 - (ii) characterise water and sediment quality of the water system(s) 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 and sediment 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 alteration of any drainage system(s), change of water holding/flow regimes, change of catchment types or areas and any other hydrological changes in the study area;
- (vii) identify and quantify existing and likely future water and sediment pollution sources, including point discharges and non-point sources to surface water runoff, sewage from workforce, and future occupants/users, possible maintenance dredging (if any), based on future land use and other polluted discharge generated from the Project;
- (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 their sensitive receivers due to the alterations, changes and the pollution sources identified above. Possible impacts include change in hydrology, flow regime, water quality and release of contaminants, etc. 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 so as to reduce the water quality impacts to within standards. Measures to prevent and reduce water quality impact of bridge piles during construction and operation of the Project. 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) recommend appropriate mitigation measures to avoid or minimise the impact identified above; and
- (xv) 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. If the mitigated water quality impact still exceeds the relevant criteria in Annex 6 of TM, the Applicant shall identify, predict and evaluate the residual water quality impact and estimate the significance of the residual impact to the water system(s) and the water sensitive receivers.

Appendix C-1

Hydrodynamic and Water Quality Modelling Requirements

Modelling Software General

1. The modelling software shall be fully 3-dimensional capable of accurately simulating the stratified condition, salinity transport, and effects of wind and tide on the water body within the model area.
2. The modelling software shall consist of hydrodynamic, water quality, sediment transport, thermal and particle dispersion modules. All modules shall have been proven with successful applications locally and overseas.
3. The hydrodynamic, water quality, sediment transport and thermal modules shall be strictly mass conserved at all levels.
4. An initial dilution model shall be used to characterize the initial mixing of the effluent discharge, and to feed the terminal level and size of the plume into the far field water quality modules where necessary. The initial dilution model shall have been proven with successful applications locally and overseas.

Model Details – Calibration and Validation

1. The models shall be properly calibrated and validated against applicable existing and/or newly collected field data before their use in this study in the Hong Kong waters, the Pearl Estuary and the Dangan (Lema) Channel. The field data set for calibration and validation shall be agreed with the Director.
2. Tidal data shall be calibrated and validated in both frequency and time domain manner.
3. For the purpose of calibration and validation, the model shall run for not less than 15 days of real sequence of tide (excluding model spin up) in both dry and wet seasons with due consideration of the time required to establish initial conditions.
4. In general the hydrodynamic models shall be calibrated to the following criteria:

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

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

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

Model Details – Simulation

1. The water quality modelling results shall be qualitatively explainable and any identifiable trend and variations in water quality shall be reproduced by the model. The water quality model shall be able to simulate and take account of the interaction of dissolved oxygen, phytoplankton, organic and inorganic nitrogen, phosphorus, silicate, BOD, temperature, suspended solids, contaminants release of dredged and disposed material, air-water exchange, *E. coli* and benthic processes. It shall also simulate salinity. Salinity results simulated by hydrodynamic models and water quality models shall be demonstrated to be consistent.
2. The sediment transport module for assessing impacts of sediment loss due to marine works shall include the processes of settling, deposition and re-erosion. The values of the modelling parameters shall be agreed with the Director. Contaminants release and DO depletion during bridge piles installation shall be simulated by the model.
3. The thermal model shall be based on the flow field produced by the hydrodynamic model. It shall incorporate the physical processes of thermal / cooled water discharge and abstraction flow, buoyancy effect of the thermal plume, and surface heat exchange. Dispersion of biocides in the discharge shall also be simulated with appropriate decay rates.
4. The models shall at least cover the Hong Kong waters, the Pearl Estuary and the Dangan Channel to incorporate all major influences on hydrodynamic and water quality. A fine grid model may be used for detailed assessment of this study. It shall either be linked to a far field model or form part of a larger model by gradual grid refinement. The coverage of the fine grid model shall be properly designed such that it is remote enough so that the boundary conditions will not be affected by the Project. The model coverage area shall be agreed with the Director.
5. In general, grid size at the area affected by the Project shall be less than 400 m in open waters and less than 75 m around sensitive receivers. The grid shall also be able to reasonably represent coastal features existing and proposed in the Project. The grid schematization shall be agreed with the Director.

Modelling Assessment

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

2. Hydrodynamic, sediment transport and thermal modules, where appropriate, shall be run for (with proper model spin up) at least a real sequence of 15 days spring-neap tidal cycle in both the dry season and the wet season.
3. Water quality module shall run for (with proper model spin up) a complete year incorporating monthly variations in Pearl River discharges, solar radiation, water temperature and wind velocity in the operational stage. Construction stage impacts, cooling water discharge and floating refuse and debris entrapment may be assessed by simulating typical spring-neap cycles in the dry and wet seasons.
4. The results shall be assessed for compliance of Water Quality Objectives. Any changes in hydrodynamic regime shall be assessed. Daily erosion / sedimentation rate shall be computed and its ecological impact shall be assessed.
5. The impact on all sensitive receivers shall be assessed.
6. Cumulative impacts due to other projects, activities or pollution sources within a boundary to the agreement of the Director shall also be predicted and quantified.

Appendix D

Requirements for Assessment of Waste Management Implications

The assessment of waste management implications shall cover the following:

1. Analysis of Activities and Waste Generation

- (i) The Applicant shall identify the quantity, quality and timing of the wastes arising as a result of the construction and operation 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, floating refuse and other wastes which would be generated during construction and/or operation stage.
- (ii) The Applicant shall adopt appropriate design, general layout, construction methods and programme to minimise the generation of public fill/inert C&D materials and maximise 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 maximising waste reduction shall be separately considered.
- (ii) The Applicant shall consider alternative project designs/measures to avoid/minimise floating refuse accumulation/entrapment and measures/proposals for the potential floating refuse problem, e.g. streamlining the shoreline design; measures to improve the tidal flushing capacity; alternative seawall design to facilitate floating refuse collection; and regular collection of the floating refuse along the shoreline. Regarding the potential trapping of floating refuse along the shoreline of the Project, the Applicant shall estimate as far as practicable the amount of floating refuse to be found/trapped along the shoreline of the Project in construction stage and after the completion of the Project. The Applicant shall develop an effective plan/design to avoid/minimise the trapping of floating refuse. If floating refuse is identified and needs to be dealt with, the Applicant shall propose appropriate measures to deal with this floating refuse in a proper and acceptable manner e.g. to collect, recycle, reuse, store, transport and dispose of.
- (iii) After considering the opportunities for reducing waste generation and maximising re-use, the types and quantities of the wastes required to be disposed of as a consequence shall be estimated and the disposal methods/options for each type of wastes shall be described in detail. The disposal methods/options recommended for each type of wastes shall take into account the result of the assessment in (v) below.

- (iv) 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.
- (v) 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. The assessment shall cover the following areas :
 - air and odour emissions;
 - noise; and
 - wastewater discharge.

3. Excavation/Dredging and Dumping

- (i) The Applicant shall identify and estimate dredging/excavation, dredged/excavated 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 characterise the sediment/mud concerned shall be conducted. The ranges of parameters to be analysed; 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 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 dredging/excavation methods to minimise 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.

Appendix E

Requirements for Marine Ecological Impact Assessment

1. The Applicant shall examine the flora, fauna and other components of the ecological habitats within the assessment area. The aim shall be to protect, maintain or rehabilitate the natural environment. In particular, the Project shall avoid or minimise impacts on recognised sites of conservation importance and other ecologically sensitive areas. The assessment shall identify and quantify as far as possible the potential ecological impacts associated with the Project, both directly by physical disturbance and indirectly by change of water quality and hydrodynamic regime to important habitats and the associated wildlife groups/species.
2. The assessment shall include the following major tasks:
 - (i) review the findings of relevant studies/surveys, including but not limited to the 3RS, HZMB HKBCF and HKLR EIA/EM&A, and the Tung Chung New Town Extension (TCNTE) EIA, and collate the available information regarding the ecological characters of the assessment area;
 - (ii) evaluate the information collected, identify any information gap relating to the assessment of potential ecological impact, and determine the ecological field surveys and investigations that are needed for an impact assessment as required in the following sub-sections;
 - (iii) carry out necessary ecological field surveys with a duration of at least four months, and investigation to verify the information collected, fill the information gaps as identified in sub-section (ii) above, and to fulfil the objectives of the EIA study. The field surveys shall cover but not be limited to flora, fauna and any other habitats/species of conservation importance, and shall include benthic community survey, and underwater dive survey for coral communities;
 - (iv) establish the ecological profile of the assessment area based on information collected in the tasks mentioned in sub-section (i) to (iii) above, and describe the characteristics of each habitat found, the data set should be comprehensive and representative, and is up to date and valid for the purpose of this assessment. Major information to be provided shall include:
 - (a) description of the physical environment, including all recognised sites of conservation importance and ecologically sensitive areas;
 - (b) habitats maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats and species of conservation interest in the assessment area;
 - (c) ecological characteristics of each habitat type such as size, vegetation and/or substrate type, species present, dominant species found, species richness and abundance of major taxa groups, community structure, seasonal patterns, ecological value, 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;
 - (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 various habitats with special attention to those wildlife groups and habitats with conservation interest, including but not limited to the following:
 - corals;
 - benthic communities;
 - Chinese White Dolphin (CWDs); and
 - any other habitats and wildlife groups identified as having special conservation interest by this EIA study.
- (vi) using suitable methodologies (including but not limited to those adopted in other relevant EIA studies in Hong Kong), and considering also any works activities from other projects reasonably likely to occur at the time, 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 identified such as direct loss of habitats, potential diversion or modification of stream courses, disturbance to wildlife, destruction of habitats, reduction of species abundance/diversity, loss of feeding and breeding grounds, reduction of ecological carrying capacity and habitat fragmentation, in particular the following:
 - (a) impacts to subtidal organisms especially corals during construction and operation phases due to habitat loss, potential changes in water quality and hydrodynamics properties;
 - (b) impacts to CWDs and their prey resources during construction and operation phases due to potential changes in water quality, hydrodynamic properties, marine traffic volume, and underwater noise; and
 - (c) cumulative impacts due to other planned and committed concurrent development projects (e.g. 3RS, HKBCF, HKLR, TCNTE) at or near the Project area.
- (vii) evaluate ecological impact based on the best and latest information available during the course of the EIA study, using quantitative approach as far as practicable and covering construction and operational phases of the Project;
- (viii) recommend possible and practicable mitigation measures to avoid, minimise and/or compensate for the adverse ecological impacts identified during construction and operation of the Project;
- (ix) evaluate the feasibility and effectiveness of the recommended mitigation measures and define the scope, type, location, implementation arrangement, resource requirement, subsequent management and maintenance of such measures;
- (x) determine and quantify as far as possible the residual ecological impacts after

implementation of the proposed mitigation measures;

- (xi) evaluate the significance and acceptability of the residual ecological impacts using well-defined criteria in Annex 8 of the TM; and
- (xii) review the need for and recommend any ecological monitoring programme required.

Appendix F

Requirements for Landscape and Visual Impact Assessment

1. The Applicant shall review relevant outline development plan(s), outline zoning plan(s), layout plan(s) and/or studies which may identify areas of high landscape value, open space, amenity area, conservation area and green belt designations. Any guidelines on landscape and urban design strategies and frameworks that may affect the appreciation of the Project shall also be reviewed. The aim is to gain an insight to the future outlook of the area affected so as to assess whether the Project can fit into the surrounding setting based on a comparison of the scenarios with and without the Project. Any conflict with the statutory town plan(s) and any published land use plan(s) shall be highlighted and appropriate follow-up action shall be recommended. A system shall be derived for judging the landscape and visual impact significance as required under the Annexes 10 and 18 of the EIAO-TM and the EIAO Guidance Note No. 8/2010 “Preparation of Landscape and Visual Impact Assessment under the EIAO”. Cumulative landscape and visual impacts of the Project with other existing, committed and planned developments in the assessment area shall be assessed.
2. The Applicant shall assess the landscape impact of the Project. The Applicant shall describe, appraise, analyse and evaluate the existing and planned landscape resources and characters of the assessment area including those landscape design proposed under the HKBCF and 3RS Projects. Annotated oblique aerial photographs and plans of suitable scale showing the baseline landscape resources and landscape character areas and mapping of impact assessment shall be extensively used to present the findings of impact assessment. Descriptive text shall provide a concise and reasoned judgment from a landscape point of view. The assessment shall be particularly focused on the sensitivity of the landscape framework and its ability to accommodate change. The Applicant shall identify the degree of compatibility of the Project with the existing and planned landscape setting and scenic spot. The landscape impact assessment shall quantify potential landscape impact as far as possible, so as to illustrate the significance of such impact arising from the Project. Clear mapping of the landscape impact is required.
3. The Applicant shall assess the visual impact of the Project. Clear illustrations including mapping of visual impact is required. Descriptive text shall provide a concise and reasoned judgment from a visual point of view. Cumulative visual impact of the Project with other existing, committed and planned developments in the assessment area shall be assessed. 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 sea level, ground level and elevated vantage points;
 - (iii) description of the visual compatibility of the Project with the surrounding and the existing and planned setting, and its obstruction and interference with the key views within the visual envelope;

- (iv) identification and description of the severity of visual impact in terms of nature, distance and number of sensitive receivers. The visual impact of the Project with and without mitigation measures shall be included and illustrated so as to demonstrate the effectiveness of the proposed mitigation measures across time; and
 - (v) evaluations and explanations of factors considered in arriving the significance thresholds of visual impact.
4. The Applicant shall evaluate the merits of preservation in totality, in parts or total destruction of existing landscape and the establishment of a new landscape character area. In addition, alternative location, site layout, development options, design and construction methods that would avoid or reduce the identified landscape and visual impacts shall be considered and 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 minimise adverse effects identified above, including provision of a landscape design and a landscape/visual impact mitigation measure plan.
5. The mitigation measures shall include preservation of vegetation, and natural landscape resources, transplanting of mature trees, provision of screen planting using native trees, provisioning/reprovisioning of amenity areas and open spaces, design and layout of structures, provision of finishes to structures, colour scheme and texture of material used and any measures to mitigate the impact on existing and planned land uses and sensitive receivers. Parties shall be identified for the ongoing management and maintenance of the proposed mitigation works to ensure their effectiveness throughout the construction phase and operational phase of the Project. A practical programme for the implementation of the recommended measures shall be provided.
6. Annotated illustrations such as coloured perspective drawings, plans and section/elevation diagrams, oblique aerial photographs, photographs taken at vantage points, and computer-generated photomontage shall be adopted to fully illustrate the landscape and visual impacts of the Project. The landscape and visual impacts of the Project with and without mitigation measures from representative viewpoints, particularly from views of the most severely affected visually sensitive receivers (i.e. worst-case scenario), shall be properly illustrated in existing and planned setting at four stages (existing condition, Day 1 with no mitigation measures, Day 1 with mitigation measures and Year 10 with mitigation measures) by computer-generated photomontage so as to demonstrate the comparison of scenarios with and without the Project and the effectiveness of the proposed mitigation measures. Computer graphics shall be compatible with Microstation DGN file format. The Applicant shall record the technical details in preparing the illustrations, which may need to be submitted for verification of the accuracy of the illustrations.

Appendix G

Requirements for Cultural Heritage Impact Assessment

Marine Archaeological Investigation (MAI)

- (a) The Applicant shall engage a qualified marine archaeologist to conduct a marine archaeological review based on the best available information to identify whether there is any potential existence of sites or objects of cultural heritage within the seabed that will be affected by the marine works of the Project, whether the identified issues can be mitigated and whether there is a need for more detailed investigation. The review can take into account the scope and nature of proposed marine works, the results of previous marine archaeological investigations, the dredging history and other diving records, etc. The assessment area shall include all areas to be affected by the marine works of the Project.
 - (b) If marine archaeological potential is identified and the need for further investigation is confirmed, a MAI shall be carried out to ascertain the archaeological value of the affected seabed area. The Applicant shall propose a programme of investigation, including the scope of works, methodology and time schedule, etc. for agreement with the Director. The MAI shall be carried out by a qualified marine archaeologist who shall obtain a licence from the Antiquities Authority under the provision of the Antiquities and Monuments Ordinance (Cap. 53). If significant archaeological remains are identified, mitigation measures shall be designed and implemented in consultation with the Antiquities and Monuments Office.
2. The Applicant shall draw necessary reference to relevant sections of the “Guidelines for Marine Archaeological Investigation” at Appendix G-1 for detailed requirement.

Appendix G-1

Guidelines for Marine Archaeological Investigation (MAI)
(As at October 2010)

The standard practice for MAI should consist of four separate tasks, i.e. (1) Baseline Review, (2) Geophysical Survey, (3) Establishing Archaeological Potential and (4) Remote Operated Vehicle (ROV)/Visual Diver Survey/Watching Brief. Marine archaeologists should make reference to the standard and guidance of the Institute for Archaeologists and English Heritage to carry out MAI.

1. Baseline Review

- 1.1 A baseline review should be conducted to collate the existing information in order to identify the potential for archaeological resources and, if identified, their likely character, extent, quality and value.
- 1.2 The baseline review will focus on known sources of archive data. It will include:
 - (a) Geotechnical Engineering Office (GEO) – the Department holds extensive seabed survey data collected from previous geological research.
 - (b) Marine Department, Hydrographic Office - the Department holds a substantial archive of hydrographic data and charts.
 - (c) The Royal Naval Hydrographic Department in the UK - the Department maintains an archive of all survey data collected by naval hydrographers.
 - (d) Relevant government departments should be consulted in order to obtain the information of dredging history (if any) on the proposed Project area. Area for sand dredging, mud disposal and allocated marine borrow area within Hong Kong should also be considered during the review.
- 1.3 The above data sources will provide historical records and more detailed geological analysis of submarine features which may have been subsequently masked by more recent sediment deposits and accumulated debris.

2. Geophysical Survey

- 2.1 Extensive geophysical survey of the study area should deploy high resolution boomer, side scan sonar, an echo sounder and high resolution multi beam sonar. The multi beam data must be presented as processed digital terrain models to facilitate the archaeological analysis. The data received from the survey would be analysed in detail to provide:
 - (a) Exact definition of the areas of greatest archaeological potential.
 - (b) Assessment of the depth and nature of the seabed sediments to define which areas consist of suitable material to bury and preserve archaeological material.

- (c) Detailed examination of the boomer and side scan sonar records to map anomalies in and on the seabed which may be archaeological material.
- (d) Detailed examination of the multi beam sonar data to assess the archaeological potential of the sonar contacts.

3. Establishing Archaeological Potential

- 3.1 The data examined during Task 1 and 2 will be analysed to provide an indication of the likely character and extent of archaeological resources within the study area. This would facilitate formulation of a strategy for investigation.
- 3.2 The results would be presented as a written report and charts. If there is no indication of archaeological material there would be no need for further work.
- 3.3 Charts should be presented at the most appropriate scale and show each survey contact. Its dimensions and exact location should also be shown.

4. ROV/Visual Diver Survey/Watching Brief

- 4.1 Subject to the outcome of Task 1, 2 and 3, accepted marine archaeological practice would be to plan a field evaluation programme to acquire more detailed data on areas identified as having archaeological potential. The areas of archaeological interest can be inspected by ROV or divers. ROV or a team of divers with both still and video cameras would be used to record all seabed features of archaeological interest.
- 4.2 Owing to the heavy marine traffic in Hong Kong, the ROV/visual diver survey may not be feasible to achieve the target. If that is the case, an archaeological watching brief is the most appropriate way to monitor the dredging operations in areas of identified high potential to obtain physical archaeological information.
- 4.3 A sampling strategy for an archaeological watching brief would be prepared based on the results of Task 1, 2 and 3 to focus work on the areas of greatest archaeological potential. Careful monitoring of the dredging operations would enable immediate identification and salvage of archaeological material. If archaeological material is found, the AMO should be contacted immediately to seek guidance on its significance and appropriate mitigation measures would be prepared.
- 4.4 If Task 4 is undertaken, the results would be presented in a written report with charts.

5. Report

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

Appendix I

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 executive summary (each bilingual in both English and Chinese) as required under Section 6(2) of the EIAO to be supplied at the time of application for approval of the EIA report.
 - (ii) When necessary, addendum to the EIA report and the executive summary submitted in 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 executive summary (each bilingual in both English and Chinese) with or without Addendum as required under Section 7(5) of the EIAO, to be supplied upon advice by the Director for consultation with the Advisory Council on the Environment.
2. In addition, to facilitate public inspection of EIA report via EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA report and executive summary prepared in Hyper Text Markup Language (HTML) and in Portable Document Format (PDF), unless otherwise agreed by the Director. For both of the HTML and PDF versions, a content page capable of providing hyperlink to each section and sub-section of the EIA report and executive summary shall be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the EIA report and executive summary shall be provided in the main text from where respective references are made. The EIA report, including drawings, tables, figures and appendices shall be viewable by common web-browsers including Internet Explorer 8, Firefox 23, Chrome and Safari 8 or later versions as agreed by the Director, and support languages including Traditional Chinese, Simplified Chinese and English.
3. The electronic copies of the EIA report and the executive summary shall be submitted to the Director at the time of application for approval of the EIA report.
4. When the EIA report and the executive summary are made available for public inspection under Section 7(1) of the EIAO, the content of the electronic copies of the EIA report and the executive summary must be the same as the hard copies and the Director shall be provided with the most updated electronic copies.
5. To promote environmentally friendly and efficient dissemination of information, both hardcopies and electronic copies of future EM&A reports recommended by the EIA study shall be required and their format shall be agreed by the Director.