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20 January 2020

Civil Engineering and Development Department

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

**Project Title: New Contaminated Sediment Disposal Facility
to the West of Lamma Island
(Application No. ESB-328/2019)**

I refer to your above application received on 09.12.2019 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-328/2019) 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.

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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 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 the undersigned.

Yours sincerely,



(Simon M.K. HO)

Acting 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-328/2019

PROJECT TITLE: **New Contaminated Sediment Disposal Facility to the West of Lamma Island**
(hereinafter known as the “Project”)

NAME OF APPLICANT: **Civil Engineering and Development Department**
(hereinafter known as the “Applicant”)

1. BACKGROUND

- 1.1 An application (No. ESB-328/2019) for an Environmental Impact Assessment (EIA) study brief under section 5(1)(a) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by the Applicant on 9 December 2019 with a project profile (No. PP-594/2019) (the Project Profile).
- 1.2 The Applicant proposes to construct and operate a new marine contaminated sediment disposal facility in the West Lamma Channel – in an area to the west of Lamma Island and to the east of the recommended Traffic Separation Scheme between south of Kau Yi Chau and Fan Lau (route via south of Cheung Chau). The new contaminated sediment disposal facility aims to meet the sediment disposal demand after 2027 arising from routine harbour / channel / river maintenance dredging works and other projects. The facility is intended to be capable of handling up to a minimum of 6 Mm³ of contaminated sediment in total. Thus, with an estimated annual disposal demand of 0.6 Mm³, the proposed facility is expected to be in service until late 2034. The location of the Project is shown in Appendix A and the scope of works is described as follow:
- (i) Dredging of the seabed for the formation of contaminated mud pits (CMPs);
 - (ii) Disposal of contaminated sediment in the formed CMP; and
 - (iii) Capping of the exhausted CMP by uncontaminated sediment up to the original seabed level.
- 1.3 The Project is a designated project by virtue of Item C.10 of Schedule 2, Part I of the EIAO, which specifies “A marine dumping area”, and Item C.12 of Schedule 2, Part I of the EIAO, which specifies “A dredging operation exceeding 500,000m³”.
- 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 the construction and operation of the Project and 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 identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- (iv) to identify and quantify any potential losses or damage and other potential impacts to fisheries , flora, fauna and natural habitats and to propose measures to mitigate these impacts;
- (v) to identify and quantify waste management requirements and to propose measures to mitigate these impacts;
- (vi) to propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during the construction and operation of the Project;
- (vii) to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- (viii) to identify, predict and evaluate the residual environmental impacts (i.e. after practicable mitigation) and the cumulative effects expected to arise during the

construction and operation phases of the Project in relation to the sensitive receivers and potential affected uses;

- (ix) 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;
- (x) to design and specify the environmental monitoring and audit requirements; and
- (xi) 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 sections 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, 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 water quality impacts caused by the Project and other associated activities during the construction and operation of the Project;
 - (iii) potential marine ecological impacts, in particular impacts on ecological sensitive receivers in the vicinity of the Project, including coral and benthic communities, Finless Porpoise and breeding of Green Sea Turtle, arising from the construction and operation of the Project;

- (iv) potential fisheries impacts, including the impacts on fishing and aquaculture activities, fisheries resources and habitats, and aquaculture sites arising from the construction and operation of the Project;
- (v) potential waste management implications arising from the construction and operation of the Project;
- (vi) potential cultural heritage impact including marine archaeological impact due to the Project;
- (vii) potential human health risk associated with consumption of seafood due to the Project;
- (viii) potential air quality impacts on air sensitive receivers (ASRs) due to the construction and operation of the Project;
- (ix) potential noise impacts on the noise sensitive receivers (NSRs) due to the construction and operation of the Project; and
- (x) 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.

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 Project details that may affect the potential environmental impacts, including the proposed siting, design, methods and sequence of construction works and other major activities involved in the construction and operation phases of the Project, using diagrams, plans and/or maps as necessary. The applicant shall also describe whether the Project will affect submarine gas pipeline/ utility from nearby facilities and suggest mitigation measures to minimize any potential environmental impacts if deemed necessary. The estimated duration of the construction phase and operational phase of the Project together with the programme within these phases, where appropriate, shall be given. The waters and/or land taken by the Project site(s), construction sites, operation sites and any associated access arrangements and auxiliary facilities shall

be shown on a scaled map. The uses of the Project shall be described and the different waters and/or 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 the different development options, taking into account the principles of avoidance, minimizing and control of adverse environmental impacts. The options might include siting, size, design, methods, sequence of construction works and access arrangements for the Project. The key reasons for selecting the proposed development options and siting and the part environmental factors played in the selection shall be described. The main environmental impacts of different development options and siting shall be compared with those of the Project and with the likely future environmental conditions in the absence of the Project.

3.3.4 Need for Marine Disposal of Contaminated Sediment and Site Selection

3.3.4.1 The Applicant shall provide information on different available contaminated sediment disposal options and the need for marine disposal. For the latter, background information on previous consideration of alternative marine disposal sites leading to the selection of the proposed marine disposal site at the west of Lamma Island, included the environmental factors played in the selection process, shall be provided.

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 EIA study shall follow the technical requirements specified below and in the Appendices of this EIA study brief.

3.4.3 **Water Quality Impact**

3.4.3.1 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.

3.4.3.2 The study area for the water quality impact assessment shall cover the Southern Water Control Zone and Western Buffer Water Control Zone as designated under the Water Pollution Control Ordinance (Cap. 358). 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. The assessment shall include water sensitive receivers in the vicinity of the Project.

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

3.4.4 Marine Ecological Impact

3.4.4.1 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.

3.4.4.2 The assessment area for the purpose of the marine ecological impact assessment shall be the same as the assessment area for Water Quality Impact Assessment described in Section 3.4.3.2. The assessment shall include potential impacts on ecological sensitive receivers in the vicinity of the Project, including coral and benthic communities, Finless Porpoise and breeding of Green Sea Turtle.

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

3.4.5 Fisheries Impact

3.4.5.1 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.

3.4.5.2 The assessment area shall be the same as the assessment area for Water Quality Impact Assessment described in Section 3.4.3.2. This assessment area shall be extended to include other areas if they are also found being impacted by the construction or operation of the Project during the course of the EIA study. Special attention should be given to loss or disturbance of fishing ground, water quality deterioration at sensitive receivers such as aquaculture sites and spawning and nursery ground of commercial fisheries resources in the southern waters of Hong Kong.

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

3.4.6 Waste Management Implication

3.4.6.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing waste management implication as stated in Annexes 7 and 15 of the TM respectively.

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 E of this EIA study brief.

3.4.7 Impact on Cultural Heritage

- 3.4.7.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing cultural heritage impacts as stated in Annexes 10 and 19 of the TM respectively.
- 3.4.7.2 A marine archaeological investigation (MAI) shall be conducted. It shall include area to be affected by the marine works associated with the proposed works. The MAI shall follow the detailed technical requirements in Appendix F.
- 3.4.7.3 The MAI shall be carried out by a qualified marine archaeologist and if field investigation is required, he/she shall obtain a licence in accordance with the Antiquities and Monuments Ordinance (Cap.53).

3.4.8 Hazard to Health

- 3.4.8.1 The Applicant shall carry out a risk assessment on human consumption of seafood from the project area due to increase of concentration and accumulation of heavy metals, PAHs, PCBs and TBT, etc. The risk assessment assessing the potential adverse effects due to changes in the food chain by the proposed disposal activity shall include the followings:
- (i) the applicant shall review local monitoring data and review the level of contaminants in the seafood in the vicinity of project site area. When interpreting the previous monitoring data, the applicant shall take into account the duration of the bioassay programme in relation to the entire monitoring period;
 - (ii) description and evaluation on the impact of the contaminant release from the dumped spoils;
 - (iii) prediction on the accumulation of contaminant in the tissue of fish and invertebrates due to the project, application shall also evaluate the cumulative effects due to the current disposal activities at project site area;
 - (iv) identification on the risk of inducing a toxic effect when organisms are exposed to given concentrations of contaminants; and
 - (v) address whether human consumption of seafood from the project area is predicted to result in exposures to contaminants that would give rise to concern for the general public and sensitive subpopulations.

3.4.9 Air Quality Impact

- 3.4.9.1 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.

- 3.4.9.2 The assessment area for air quality impact assessment shall be defined by a distance of 500 meters from the boundary of the Project site 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 study area as well as areas where air quality may be potentially affected by the Project. The assessment shall also take into account the impacts of emission sources from nearby concurrent projects, if any.
- 3.4.9.3 The air quality impact assessment shall follow the detailed technical requirements given in Appendix G.

3.4.10 Noise Impact

- 3.4.10.1 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.
- 3.4.10.2 Assessment shall include the construction noise impact assessment 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.
- 3.4.10.3 The noise impact assessment for the construction of the Project shall follow the detailed technical requirements given in Appendix H.

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 I) 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 measures considered during the course of EIA study, including location, size/scale, design, construction methods for the Project, with a view to avoiding or minimising and mitigating adverse environmental impacts. A comparison of the environmental benefits and dis-benefits of applying different development options, and/or mitigation measures shall be made. This summary shall cover the key impacts and shall also form an essential part of the executive summary of the EIA report.

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 J. The Applicant shall, upon request, make additional copies 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 the Project Profile (No. PP-594/2019), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA study brief can still cover the key changes, and the additional issues, if any, that the EIA study must also address. If the changes to the Project fundamentally alter the key scope of the EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief.

7. LIST OF APPENDICES

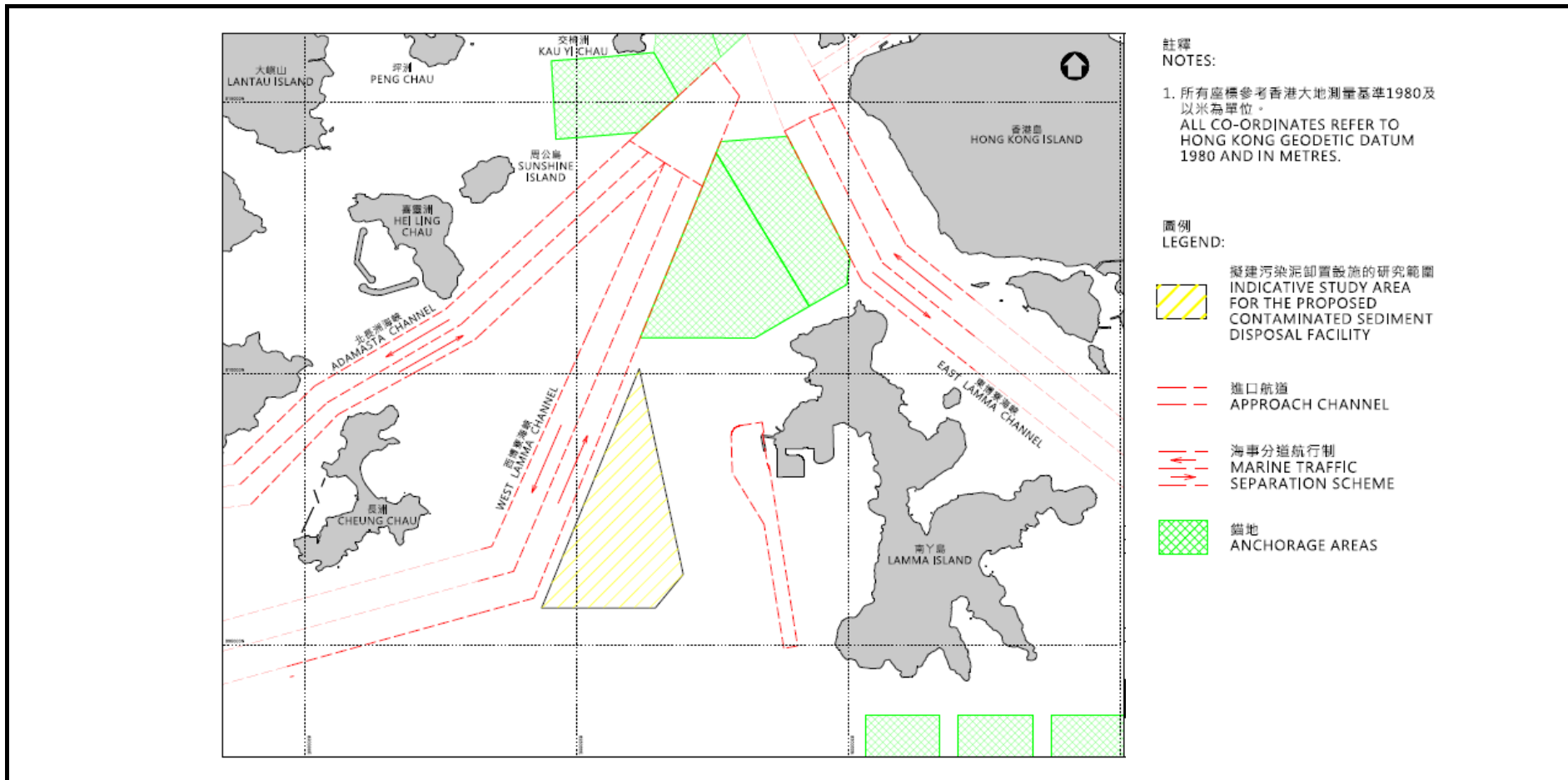
7.1 This EIA study brief includes the following appendices:

- Appendix A – Project Location Plan
- Appendix B – Requirements for Water Quality Impact Assessment
- Appendix B-1 - Hydrodynamic and Water Quality Modelling Requirements
- Appendix C – Requirements for Marine Ecological Impact Assessment
- Appendix D – Requirements for Fisheries Impact Assessment
- Appendix E – Requirements for Assessment of Waste Management Implications
- Appendix F – Requirements for Marine Archaeological Investigation
- Appendix G – Requirements for Air Quality Impact Assessment
- Appendix G-1 - Air Quality Modelling Guidelines
- Appendix H – Requirements for Noise Impact Assessment
- Appendix I – Implementation Schedule
- Appendix J – Requirements for EIA Report Documents

--- END OF EIA STUDY BRIEF ---

January 2020
Environmental Assessment Division
Environmental Protection Department

Appendix A



Project Title : New Contaminated Sediment Disposal Facility to the West of Lamma Island

工程項目名稱 : 南丫島以西一帶的新污染泥卸置設施

(This figure is prepared based on Figure 1 of Project Profile No.: PP-594/2019)

(本圖是根據工程項目簡介 PP-594/2019 圖 1 編製)

**EIA Study Brief No. :
環評研究概要編號 :**

ESB-328/2019

**Appendix A: Project Location Plan
附錄 A: 工程項目位置圖**



Appendix B**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 agreed with the Director. The mathematical modelling requirements are set out in Appendix B-1. Possible impacts due to, including but not limited to, dredging, disposal of contaminated sediment, capping of the exhausted CMPs by uncontaminated sediment, and other marine works activities shall include changes in hydrology, flow and thermal regime, sediment erosion and deposition patterns, morphological change of seabed or coastal profile, water and sediment quality and marine organisms/community. The prediction shall include cumulative water impacts arising from construction and operation of multiple CMPs, and possible different works 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) cumulative water quality impacts arising from the construction and operation of multiple CMPs including dredging, disposal of contaminated sediment and capping of the exhausted CMPs by uncontaminated sediment. The impacts shall include change in suspended solids and dissolved oxygen concentration, sediment plume dispersion and sedimentation, other contaminants release, change in hydrological condition and any impacts which may be resulted in changing of water quality;
 - (ii) water quality impacts on existing, planned or potential Marine Parks, designated area for secondary contact recreation, beaches, seawater intake points, typhoon shelters, Fish Culture Zones, Sites of Special Scientific Interest, coral and benthic communities, breeding of Green Sea Turtle, Finless Porpoises (*Neophocaena phocaenoides*), other marine organisms and habitats, etc.
4. The Applicant shall address water quality impacts due to the construction and operation of the Project. Essentially, the assessment shall address the following :
 - (i) collect and review background information on affected existing and planned water systems and sensitive receivers which may be affected by the Project;
 - (ii) characterize water quality of the water systems and sensitive receivers, which may be affected by the Project based on existing best available information and through

- appropriate site survey and tests when existing data are insufficient;
- (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 land use 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 flow regimes and sedimentation due to the Project and any other hydrological changes in the assessment area;
 - (vii) identify and quantify existing and likely future water pollution sources, including sewage from workforce and polluted discharge generated from the Project, sediment plume dispersion and sedimentation, and other contaminants release from works into water bodies;
 - (viii) provide an emission inventory on the quantities and characteristics of those existing and future pollution sources in the assessment 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 systems and water sensitive receivers due to those pollution sources identified in 3(i) and 4(vii), and those alternations identified in 4(vi). The prediction shall take into account cumulative impacts of construction and operation of multiple CMPs and 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 in the vicinity of the assessment 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 identified in 3(i) and 4(vii);
 - (xii) develop effective construction methods, contingency plan, water pollution prevention and mitigation measures to be implemented during construction and

operation stages including marine transportation of sediment, so as to handle any wastewater discharge from the Project and to reduce the water quality impacts to within standards ;

(xiii) investigate and develop best management practices to reduce pollution as appropriate; and

(xiv) evaluate and quantify residual impacts on water systems and the sensitive receivers with regard to the appropriate water quality objectives, criteria, standards or guidelines.

Appendix B-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.

Model details – Calibration & Validation

1. The models shall be properly calibrated and validated against applicable existing and/or newly collected field data before their use in this study in the Hong Kong waters, including the Victoria Harbour, Western Buffer, Eastern Buffer and Southern Water Control Zones, defined under the Water Pollution Control Ordinance.. The field data set for calibration and validation shall be agreed with EPD.
2. Tidal data shall be calibrated and validated in both frequency and time domain manner.
3. For the purpose of calibration and validation, the model shall run for not less than 15 days of real sequence of tide (excluding model spin up) in both dry and wet seasons with due consideration of the time required to establish initial conditions.
4. In general the hydrodynamic models shall be calibrated to the following criteria:

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

Model details – Simulation

1. The water quality modelling results shall be qualitatively explainable, and any identifiable trend and variations in water quality shall be reproduced by the model. The water quality model shall be able to simulate and take account of the interaction of dissolved oxygen, phytoplankton, organic and inorganic nitrogen, phosphorus, silicate, BOD, temperature, suspended solids, contaminants release of dredged and disposed material, air-water exchange, *E. coli* and benthic processes. It shall also simulate salinity. Salinity results simulated by hydrodynamic models and water quality models shall be demonstrated to be consistent.
2. The sediment transport module for assessing impacts of sediment loss due to marine works shall include the processes of settling, deposition and re-erosion. The values of the modelling parameters shall be agreed with EPD. Contaminants release and DO depletion during dredging, disposal of contaminated sediment and capping of the exhausted CMPs shall be simulated by the model.
3. The models shall at least cover the eastern Pearl Estuary, Ma Wan Channel, Cheung Chau, East Lamma Channel, Victoria Harbour, Tathong Channel, Po Toi Islands, and have sufficient coverage of the South China Sea to incorporate all major influences on hydrodynamic and water quality. When fine model grids are used for detailed assessment of this study, they shall form part of a larger model by gradual grid refinement. The coverage of the model shall be properly designed such that it is remote enough so that the boundary conditions will not be affected by the project. The model coverage area shall be agreed with EPD.
4. In general, grid size at the area affected by the project shall be less than 400 m in open waters and less than 75 m around sensitive receivers. The grid shall also be able to reasonably represent coastal features existing and proposed in the project. The grid schematisation shall be agreed with EPD.
5. The Applicant shall submit a Water Quality Modelling Plan for agreement with EPD before proceeding to modelling assessment. The Plan shall at least demonstrate that the models meet the requirements as set out under the sections of Modelling software general, Model details – Calibration & Validation and Model details – Simulation in this Appendix.

Modelling assessment

1. The assessment shall include the construction and operation phases 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 and thermal modules, where appropriate, shall be run for at least a real sequence of 15 days spring-neap tidal cycle in both the dry season and the wet season. Water quality and sediment transport modules shall be run for at least a complete year incorporating monthly variations in Pearl River discharges, solar radiation, water temperature and wind velocity in the operational stage. If necessary, construction stage impacts may be assessed by simulating typical spring-neap cycles in the dry and wet seasons. All model simulations should be initialised with proper model spin up.
3. The results shall be assessed for compliance of Water Quality Objectives.
4. The impact on all sensitive receivers shall be assessed.
5. Cumulative impacts due to other projects, activities or pollution sources within a boundary to the agreement of EPD shall also be predicted and quantified.
6. All modelling input data and results shall be submitted in digital media to EPD upon request.

Appendix C**Requirements for Marine Ecological Impact Assessment**

1. 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. The assessment shall identify and quantify as far as possible the potential ecological impacts to the natural environment and the associated wildlife groups and habitats/species arising from the Project including its construction and operation phases as well as the subsequent management and maintenance of the proposals.
2. The assessment shall include the followings:
 - (i) Review of the findings of relevant studies/surveys and collection of the available information regarding the ecological characters of the assessment area;
 - (ii) Evaluation of information collected and identification of any information gap relating to the assessment of potential ecological impact, and determine the ecological field surveys and investigations that are needed for an impact assessment as required in the following sections;
 - (iii) Carrying out necessary field surveys of at least 6 months and investigations to verify the information collected in sub-section (ii) above, to fill the information gaps identified and to fulfill the objectives of the EIA study. The field surveys shall cover flora, fauna and any other habitats/ species of conservation importance, and shall include surveys for intertidal/ benthic communities;
 - (iv) Establishment of the general ecological profile of the assessment area based on data of relevant previous studies/surveys and results of the ecological field surveys, if any, and description of the characteristics of each habitat found. Major information to be provided shall include :
 - (a) description of the physical environment, including all recognised sites of conservation importance and other ecologically sensitive areas, and assessment of whether these sites/areas will be affected by the Project or not;
 - (b) habitat maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats/species in the assessment area;
 - (c) ecological characteristics of each habitat type such as size, type, species

- present, dominant species found, species diversity and abundance, community structure, seasonal pattern, ecological value and inter-dependence of the habitats and species, and presence of any features of ecological importance;
- (d) representative colour photos of each habitat type and any important ecological features identified; and
 - (e) species found that are rare, endangered and/or listed under local legislation, international conventions for conservation of wildlife/ habitats or Red Data Books.
- (v) Investigation and description of the existing wildlife uses of the various habitats with special attention to those wildlife groups and habitats with conservation interests, including but not limited to:
- (a) corals communities;
 - (b) benthic communities;
 - (c) Finless Porpoise (*Neophocaena phocaenoides*);
 - (d) Green Sea Turtle; and
 - (e) any other habitats or species identified as having special conservation interests by this EIA study.
- (vi) Using suitable methodology and considering also other projects in the vicinity of the Project area reasonably likely to occur at the same time, identification and quantification as far as possible of any direct, indirect, on-site, off-site, primary, secondary and cumulative ecological impacts, such as destruction of habitats, reduction of species abundance/diversity, 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 caused by the Project, and in particular the followings :
- (a) noise, glare, dust and other human disturbance to wildlife during construction and operation phases of the Project;
 - (b) indirect ecological impacts due to changes in the water quality and hydrology, as a result of surface run-off, discharge of treated effluent and any associated disinfection activities, temporary sewage overflow, accidental discharge of untreated sewage, etc. in the waterbodies in the assessment area during construction and operation phases;

- (c) disturbance due to operation of construction plants; and
 - (d) disturbance of finless porpoise.
 - (e) cumulative impacts due to development of South of Cheung Chau Open Sea Sediment Disposal Area and other concurrent projects.
- (vii) Assess the impacts on Finless Porpoises (*Neophocaena phocaenoides*)
- (a) review and incorporate the findings of relevant studies including the previous marine mammal studies and collate all the available information;
 - (b) evaluate the information collected and identify any information gap relating to the assessment of potential impacts on Finless Porpoises;
 - (c) carry out necessary field surveys and investigations to verify the information collected, fill the information gaps identified, if any, and to fulfill the objectives of the EIA study;
 - (d) assess the impacts on Finless Porpoises due to disturbance, loss of habitat and food supply;
 - (e) assess whether the levels of contaminants present in prey species in the project area are likely to pose unacceptable risks, through the food chain to Finless Porpoises;
 - (f) present all relevant survey findings including previous studies together with surveys, if any, carried out under this study;
 - (g) assess the cumulative impacts on the porpoises due to this project and any nearby dredging/reclamation works and other existing or planned projects during construction;
 - (h) assess the disturbance to the habitat of Finless Porpoises, such as underwater noise generated by vessels and equipment using suitable methodology (e.g. underwater noise propagation modelling), change in marine traffic pattern and frequency in the vicinity of the facility during construction and operation of the disposal facility, and the consequential risk of collision between porpoises and vessels; and
 - (i) identify precautionary and mitigation measures for protection of the Finless Porpoises.
- (viii) Evaluation of ecological impact based on the best and latest information available during the course of the EIA study, using quantitative approach as

far as practicable and covering construction and operation phases of the Project as well as the subsequent management and maintenance requirement of the Project;

- (ix) Recommendations for possible alternatives and practicable mitigation measures, such as restriction of works at specified season or time, adoption of appropriate construction methods and/or programme, to avoid, minimise and/or compensate for the adverse ecological impacts identified during construction and operation of the Project;
- (x) Evaluation of the feasibility and effectiveness of the recommended mitigation measures and definition of the scope, type, location, implementation arrangement, resources requirement, subsequent management and maintenance of such measures;
- (xi) Review the need for and recommendation on any ecological monitoring programme required, in particular on exploring the feasibility of real time acoustic technique for monitoring Finless Porpoises.;
- (xii) Evaluation of the significance and acceptability of the residual ecological impacts by making reference to the criteria in Annex 8 of the TM; and
- (xiii) Review of the need for and recommendation on any ecological monitoring programme required.

Appendix D**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 capture and 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 fisheries activities;
 - (iii) description and quantification of the existing fisheries resources;
 - (iv) identification of parameters (e.g. water quality parameters) and areas that are important to fisheries and will be affected;
 - (v) prediction and evaluation of any direct/indirect, onsite/offsite impacts on fisheries, such as potential loss and disturbance of fishing ground, fisheries habitat, spawning and nursery ground of commercial fisheries resources and aquaculture sites caused by the project ;
 - (vi) evaluation of cumulative impacts on fisheries 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 E**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 and other wastes which will be generated during construction and operation stages.
- (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 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) 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 section (iv) below;
- (iii) The EIA report shall state the transportation routings and the frequency of the trucks/vessels involved, any barging point or conveyor system to be used, the stockpiling areas and the disposal outlets for the wastes identified; and
- (iv) The impact caused by handling (including stockpiling, labelling, packaging & storage), collection, transportation and re-use/disposal of wastes shall be addressed in detail and appropriate mitigation measures shall be proposed. This assessment shall cover the following areas:
 - potential hazard;
 - air and odour emissions;
 - noise;

- wastewater discharge; and
- public transport.

3. Dredging/Excavation 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 for marine disposal option. 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 F**Guidelines for Marine Archaeological Investigation**

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

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

Report

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

Appendix G**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 minimise the air pollution impact. The Applicant shall consider alternative locations of the new treatment facilities, alternative sewage treatment processes, alternative construction methods and phasing programmes to minimise the air quality impact during construction and operation stages 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 of the Project. If the PATH (Pollutants in the Atmosphere and their Transport over Hong Kong) model is used to estimate the future background air quality, details for the estimation of all emission sources to be adopted in the model runs should be clearly presented.
2. **Identification of Air Sensitive Receivers (ASRs) and Examination of Emission/Dispersion Characteristics**
 - (i) Identification and description of existing, 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 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) 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 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 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 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. The Applicant shall describe the means of transportation and their routings involved, with a view to addressing potential dust nuisance caused by transportation activities. 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 arising from the activities in the proposed Project site during the operational phase based on assumed reasonably worst case scenario under normal operating condition.
- (ii) If the assessment indicates likely exceedances of 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.
- (iii) 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 control of operational air quality impacts.

5. Quantitative Assessment Methodology

- (i) The Applicant shall conduct the quantitative assessment by applying the general principles enunciated in the modelling guidelines in Appendix G-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. In case of doubt, prior agreement between the Applicant and the Director on the 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 averaging time concentrations) to be evaluated and provide explanation for selecting such parameters for assessing the impact from the Project.
- (iii) 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.
- (iv) 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.

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

6. Mitigation Measures for 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

All input and output file(s) 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 G-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 judgment 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

(https://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 Impacts (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 H**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.

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 maximise 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 land use 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 recognised 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 maximise 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 J**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) 30 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) 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 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. 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.