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30 November 2016

MTR Corporation Limited

Dear Sir,

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

**Project Title: Siu Ho Wan Station and Siu Ho Wan Depot Replanning Works**

I refer to your above application received on 20 October 2016 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-296/2016 for your preparation of an EIA report.

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


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

Should you have any queries on the above application, please contact the undersigned at 2835 2164.

Yours faithfully,



(Clara U)

Ag. Principal Environmental Protection Officer  
for Director of Environmental Protection

Encl.

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**Environmental Impact Assessment Ordinance (Cap. 499), Section 5(7)****Environmental Impact Assessment Study Brief No. ESB-296/2016****Project Title:****Siu Ho Wan Station and Siu Ho Wan Depot Replanning Works  
(hereinafter known as the “Project”)****Name of Applicant: MTR Corporation Limited  
(hereinafter known as the “Applicant”)****1. BACKGROUND**

- 1.1 An application (No. ESB – [296/2016]) 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 20 October 2016 with a project profile (No. PP-[544/2016]) (the Project Profile).
- 1.2 The Applicant proposes to carry out railway replanning works at Siu Ho Wan Depot (SHD) to facilitate the construction of the SHD Topside Development. The existing SHD will undergo replanning works to make room for the construction of the concrete slab for podium decking and property enabling works for the SHD Topside Development. In addition, in order to meet the future transport needs of the SHD Topside Development, a new Siu Ho Wan Railway Station (SHO) is also proposed. The location of the Project and the Project Area are shown in the figure attached in the Project Profile which is reproduced as shown in Appendix A of this EIA Study Brief. The Project mainly comprises the following works:-
- (i) Railway depot replanning works within the existing site boundary;
  - (ii) Podium deck and property enabling works for the topside development;
  - (iii) A new Siu Ho Wan Railway Station and the associated track works, as well as local roads and emergency vehicular access (EVA); and
  - (iv) Reprovision of the sewerage network with sewage pumping station to cater for sewage generated by the Project.
- 1.3 The Siu Ho Wan Depot is classified as a designated project (DP) under Part I, Schedule 2, Item A.4 of the EIAO and exempted under section 9(2) of the EIAO. As the Project involves physical addition and alteration resulting in adverse environmental impacts, it constitutes a material change to an exempted designated project.
- 1.4 Also, based on the information provided in the Project Profile, the works identified as Designated Project in Part I, Schedule 2 of the EIAO, is listed as follows:
- (i) Item A.2 – Railway station.
- 1.5 Pursuant to section 5(7)(a) of the EIAO, the Director of Environmental Protection (the Director) issues this EIA Study Brief to the Applicant to carry out an EIA study.
- 1.6 The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and

associated works that 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 contaminated land within any project area for development works, and to propose measures to avoid disposal in the first instance;
- (v) to propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the Project;
- (vi) to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- (vii) 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;
- (viii) 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;
- (ix) to design and specify the environmental monitoring and audit requirements; and

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- (x) to identify any additional studies necessary to implement the mitigation measures of 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 mentioned in sections 1.2, 1.3 and 1.4 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) the objective comparison of the environmental benefits and dis-benefits of different development sitings and alignments of the new railway station, different development programme, construction methods and sequence including completion of podium deck over the existing SHD before intake of population at the residential development atop SHD, different system design and operational mode of the Project with a view to deriving option(s) that would avoid or minimize adverse environmental impact. Particular attention shall be given to the acceptability of the overall environmental performance of the Project and associated works at all stages of implementation and cumulative effects due to interfacing planned, committed and planned projects in the vicinity of the Project;
  - (ii) potential air quality impact on air sensitive receivers (ASRs) due to the construction and operation of the Project, including dust, gaseous emissions and odour (if applicable), in particular on the resident of the topside development upon population intake;
  - (iii) potential noise impact on noise sensitive receivers (NSRs), due to the construction and operation of the Project, including rail noise impact and fixed noise source impact. The Applicant shall explore at-source mitigation measures, including noise enclosure/barrier along the railway tracks and completion of podium deck before population intake, to avoid or minimize noise impact on the residents of the topside development;
  - (iv) potential water quality impact caused by the Project and associated works, such as site formation, sewerage provisions, and/or drainage diversion arising from the construction and operation of the Project;

- (v) potential sewerage and sewage treatment implications to cope with discharges arising from the construction and operation of the Project, taking into account the capacity requirements for the existing, committed and planned developments within the same sewage catchment;
- (vi) potential waste management implications arising from the construction and operation of the Project;
- (vii) potential extent of land contamination within any project area for development works and relevant mitigation measures;
- (viii) potential landscape and visual impacts due to the construction and operation of the Project;
- (ix) potential hazard to life impact on construction workers and future occupants for this Project;
- (x) potential cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed and planned projects, that may have a bearing on the environmental acceptability of the Project. Consideration shall be given to account for impacts from potential concurrent projects, including but not limited to the Comprehensive Residential and Commercial Development atop SHD, Construction of additional sewerage rising mains and rehabilitation of the existing sewerage rising main between Tung Chung and Siu Ho Wan, Tung Chung New Town Extension and its associated infrastructures, Organic Waste Treatment Facilities Phase 1 (OWTF), Expansion of HKIA into 3RS, Hong Kong Boundary Crossing Facilities (HKBCF) of Hong Kong-Zhuhai-Macau Bridge (HZMB), Topside Development at the HKBCF Island, HZMB Hong Kong Link Road, Tuen Mun-Chek Lap Kok Link, North Commercial District at the HKIA, Development at Siu Ho Wan and the Associated Transport Infrastructures, proposed columbarium developments at Sham Shui Kok Drive (eastern and western sites) and Sunny Bay Development; and
- (xi) to demonstrate that no ancillary works such as works area, vehicle parking, equipment storage and accesses, whether permanent or temporary, would affect any recognized sites of conservation importance in the Project Area and its vicinity.

### **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 objectives of the Project, and describe the benefit 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 land uses, design, size, construction methods, the nature and methods of production or 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 given. The land taken by the Project site(s), construction sites, and any associated access arrangements, auxiliary facilities and landscaping areas shall be shown on a scaled map. The uses of the Project shall be described and the different land use areas shall be demarcated as appropriate.

### 3.3.3 Background and History of the Project

The Applicant shall provide information on the site location and site history of the Project, any related projects, and the consideration of the different development options comprising parameters, land use / layout options of the proposed development, and the practicable siting for the supporting infrastructures at available locations as well as its compatibility with the surrounding landscape context. The key reasons for selecting the proposed development option of the Project and the part environmental factors played in the selection shall be described. The main environmental impacts of the different practicable siting and layout options shall be compared with those of the proposed Project and with the likely future environmental conditions in the absence of the Project.

### 3.4.1 **Technical Requirements**

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

### 3.4.4 **Air Quality Impact**

- 3.4.4.1 The Applicant shall follow the criteria and guidelines as stated in section 1 of Annexes 4 and 12 of the TM respectively, for evaluating and assessing air quality impact.
- 3.4.4.2 The assessment area for the air quality impact assessment shall be defined by a distance of 500 metres from the boundary of the Project Area and the works of the Project as identified in the EIA, which shall be extended to include major existing, committed and planned 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 as well as any proposed ASRs within the proposed development site as identified in the EIA and areas where the air quality may be significantly affected by the Project. The assessment shall be based on the best available information at the time of the assessment. Odour impact from the operation of new sewage pumping station proposed under this Project shall also be assessed. The assessment shall also take into account the impacts of emission sources

from nearby concurrent projects, if any. The Applicant shall describe the transportation routings and frequency of the construction trucks involved with a view to addressing potential nuisance caused by construction truck movements. Marine emission shall also be considered if construction materials are transported to the site by vessel.

- 3.4.4.3 The assessment of the air quality impact arising from the construction and operation of the Project shall follow the detailed technical requirements given in Appendix B of this EIA Study Brief.

### **3.4.5 Noise Impact**

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

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

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

### **3.4.6 Water Pollution**

- 3.4.6.1 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.

- 3.4.6.2 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 stream courses, 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.

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

### **3.4.7 Sewerage and Sewage Treatment Implications**

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

- 3.4.7.2 The assessment of the sewerage and sewage treatment implications for the Project shall follow the detailed technical requirements given in Appendix E of this EIA Study Brief.



### **3.4.8 Waste Management Implications**

3.4.8.1 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.

3.4.8.2 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 F of this EIA Study Brief.

### **3.4.9 Hazard To Life**

3.4.9.1 The Applicant shall follow the criteria for evaluating hazard to life as stated in section 2 of Annex 4 of the TM.

3.4.9.2 The hazard to life assessment shall follow the detailed technical requirements given in Appendix G.

### **3.4.10 Land Contamination**

3.4.10.1 The Applicant shall follow the guidelines for evaluating and assessing potential land contamination issues as stated in Section 3.1 and 3.2 of Annex 19 of the TM.

3.4.10.2 The assessment of the potential land contamination issues shall follow the detailed requirements given in Appendix H.

### **3.4.11 Landscape and Visual Impact**

3.4.11.1 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”.

3.4.11.2 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 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.

3.4.11.3 The landscape and visual impact assessment for the construction and operation of the Project shall follow the detailed technical requirements given in Appendix I of this EIA Study Brief.

### **3.5 Environmental Monitoring and Audit (EM&A) Requirements**

- 3.5.1 The Applicant shall identify and justify in the EIA study whether there is any need for EM&A activities during the construction and operation phases of the Project and, if affirmative, to define the scope of the EM&A requirements for the Project in the EIA study.
- 3.5.2 Subject to the confirmation of the EIA study findings, the Applicant shall comply with the requirements as stipulated in Annex 21 of the TM.
- 3.5.3 The Applicant shall prepare a project implementation schedule (in the form of a checklist as shown in Appendix J) containing all the EIA study recommendations and mitigation measures with reference to the implementation programme.

### **3.6 Presentation of Summary Information**

#### **3.6.1 Summary of Environmental Outcomes**

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

#### **3.6.2 Summary of Environmental Impacts**

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

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

The EIA report shall contain a summary including the assessment methodologies and key assessment assumptions adopted in the EIA study, the limitations of these assessment(s) methodologies/ key 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 mitigation measures considered during the course of the EIA study, including design, scale, extent, land use / layout

options of the proposed new railway station and depot replanning, the sewage treatment / disposal methods, and mode of operation as well as construction methods, sequences of works for the Project, with a view to avoiding or minimizing adverse environmental impacts. A comparison of the environmental benefits and dis-benefits of applying different mitigation options 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 the EIA report the respective requirements of this EIA Study Brief 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 K of this EIA Study Brief. The Applicant shall, upon request, make additional copies of the above documents available to the public, subject to payment by the interested parties of full costs of printing.

### **6. OTHER PROCEDURAL REQUIREMENTS**

- 6.1 If there is any change in the name of the Applicant for this EIA Study Brief 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 sections 1.2, 1.3 and 1.4 of this EIA Study Brief and in Project Profile (No.PP-544/2016), 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.

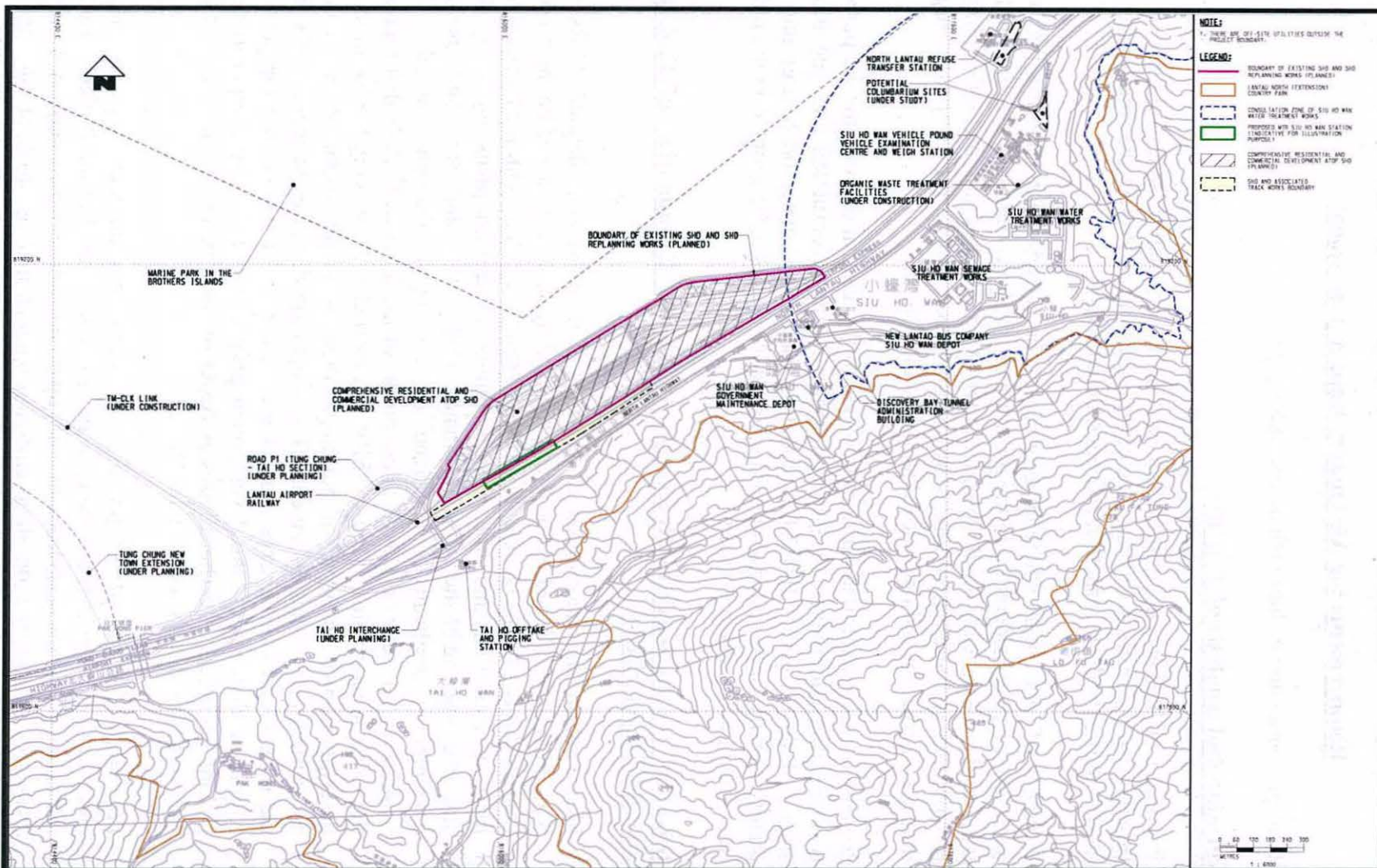
## 7. LIST OF APPENDICES

7.1 This EIA Study Brief includes the following appendices:

- Appendix A – Location map of Project Area
- Appendix B – Requirements for Air Quality Impact Assessment
- Appendix C – Requirements for Noise Impact Assessment
- Appendix D – Requirements for Water Quality Impact Assessment
- Appendix E – Requirements for Assessment of Sewerage and Sewage Treatment Implication
- Appendix F – Requirements for Assessment of Waste Management Implication
- Appendix G – Requirements for Assessment of Hazard to Life
- Appendix H – Requirements for Land Contamination Assessment
- Appendix I – Requirements for Landscape and Visual Impact Assessment
- Appendix J – Implementation Schedule
- Appendix K – Requirements for EIA Report Documents

END of EIA STUDY BRIEF

[November 2016]  
Environmental Assessment Division  
Environmental Protection Department



Project Title:	Siu Ho Wan Station and Siu Ho Wan Depot Replanning Works
Appendix A:	Location Plan [This figure was prepared based on Drawing No. NEX1062/S/SHD/ACM/Z10/001 of the Project Profile (PP-544/2016)]

EIA Study Brief No.: ESB-296/2016



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 abate 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 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 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. 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 stock piling, material handling and vehicular movements on unpaved haul roads on site, etc. Examples of operational stage emission sources include exhaust emissions from vehicles; marine vessels; aircraft, Organic Waste Treatment Facilities, odour emissions from the proposed sewage treatment/disposal facilities etc.

Confirmation regarding the validity of assumptions and the magnitude of activities (e.g. volume of construction material to be handled, odour emission strength, etc.) 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 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 as well as at the proposed air sensitive uses within the proposed development site 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 and the proposed development site as defined in section 3.4.4.2 of this Study Brief 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 minimize 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 pollutant and odour concentrations at the identified ASRs within the assessment area and the proposed development site as defined in section 3.4.4.2 of this Study Brief based on an assumed reasonable worst-case scenario under normal operation conditions of the Project.

- (ii) If the assessment indicates likely exceedances of the recommended limits in the TM at the development and the nearby 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 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 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 showing the 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) For estimating the air quality impacts of road traffic, the Applicant may use the EMFAC-HK model to determine the Fleet Average Emission Factors, taking into account vehicle fleet mix and other necessary data, or other models as agreed by 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 in the form of both summary table(s) and graph(s).
- (v) For estimating the future background air quality, the Applicant may use EPD's PATH model or results, taking into consideration the major air pollutant emission sources projected for Hong Kong and nearby regions, or other models as agreed by 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<sub>x</sub> to NO<sub>2</sub> if NO<sub>2</sub> has been identified as a key/representative air pollutant.



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- (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 cumulative 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, i.e. comparison between with and without noise remedies scenario, due to these technical noise 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 and air quality inside the enclosed road section shall also be addressed. 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 ASR's, 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 of the TM and estimate the total number of existing dwellings, classrooms and other air sensitive elements that will be exposed to residual air quality impacts exceeding the criteria set in Annex 4 in 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](http://www.epd.gov.hk/epd/english/environmentinhk/air/guide_ref/guide_aqa_model.html))

- (i) Guidelines on Choice of Models and Model Parameters;
- (ii) Guidelines on Assessing the “Total” Air Quality Impact (Revised);
- (iii) Guidelines on the Use of Alternative Computer Models in Air Quality Assessment (Revised);
- (iv) Guidelines on the Estimation of PM<sub>2.5</sub> for Air Quality Assessment in Hong Kong; and
- (v) Guidelines on the Estimation of 10-minute Average SO<sub>2</sub> Concentration for Air Quality Assessment in Hong Kong

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**Appendix C****Requirements for Noise Impact Assessment**

The noise impact assessment shall include the following:

**1. Description of the Noise Environment**

- 1.1 The Applicant shall describe the prevailing noise environment in the EIA report.
- 1.2 The Applicant shall conduct prevailing background noise surveys to determine the standards for evaluating noise impact from fixed noise source. The respective noise environment should be documented in the EIA report.
- 1.3 The Applicant shall consider and compare the noise environment with respect to the benefits and disbenefits of various scenarios with or without the Project.

**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***

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

## 2.5 Evaluation of Residual Construction Noise Impact

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

## 3. Fixed Noise Sources Impact Assessment

### 3.1 Fixed Noise Sources Impact Assessment Methodology

The Applicant shall carry out fixed noise sources impact assessment from the Project in accordance with 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*

- (a) The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the fixed noise impact shall generally include areas within 300 metres from the boundary of the Project and the works of the Project.
- (b) The Applicant shall identify all existing, committed and planned NSRs in the assessment area and select assessment points to represent identified NSRs for carrying out fixed noise sources impact assessment described below.
- (c) The assessment points shall be confirmed with the Director prior to the commencement of the quantitative fixed noise sources impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.
- (d) A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.
- (e) For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant landuse and planning parameters and conditions to work out representative site layouts for fixed noise sources assessment purpose. However, such parameters and conditions together with 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 the train depot, any permanent and temporary industrial noise sources including ventilation system(s) of building(s) and/or tunnel(s), ventilation shafts of railway, sewage pumping station(s), seawater pumping station(s) and electricity substation(s), etc.

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

### 3.3 Prediction and Evaluation of Fixed Noise Sources Impact

#### 3.4.2 *Scenarios*

- (a) The Applicant shall quantitatively assess the fixed noise sources impact with respect to criteria set in Annex 5 of the TM, of unmitigated scenario and mitigated scenario at assessment years of various operation modes including, but not limited to,
  - (i) the worst operation mode which represents the maximum noise emission in connection of identified noise sources of the Project; and
  - (ii) any other operation modes as confirmed with the Director.
- (b) Validity of the above operational modes shall be confirmed with relevant departments/authorities and documented in the EIA report.

#### 3.4.3 *Prediction of Noise Impact*

- (a) The Applicant shall present the predicted noise levels in Leq (30 min) at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.
- (b) The assessment shall cover the cumulative fixed noise sources impact associated with the operation of the proposed project on existing, committed and planned NSRs within the assessment area.
- (c) The potential fixed noise sources impact under different scenarios shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the TM.

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

### 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.

#### 4. Rail Noise Assessment

##### 1.4.1 Rail Noise Impact Assessment Methodology

The Applicant shall propose methodology and computational model for agreement of the Director, with reference to Section 4.4.2 of the TM, prior to the commencement of the assessment.

#### 4.2 Identification of Rail Noise Impact

##### 4.2.1 *Identification of Assessment Area and Noise Sensitive Receivers*

- (a) The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the rail 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 on the proposed Project in the assessment area and select assessment points to represent identified NSRs for carrying out rail noise impact assessment described below.
- (c) The assessment points shall be confirmed with the Director prior to the commencement of the quantitative rail noise impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.
- (d) A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.
- (e) For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant landuse and planning parameters and conditions to work out representative site layouts for rail noise 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.

##### 4.2.2 *Inventory of Noise Sources*

- (a) The Applicant shall identify and quantify an inventory of noise sources for rail noise impact assessment. The inventory of noise sources shall include, but not limited to, the existing and planned railways within assessment area.
- (b) The Applicant shall allow for deterioration in rail and rolling stock condition from brand new to an operating level in the prediction of noise impact.

#### 4.3 Prediction and Evaluation of Rail Noise Impact

##### 4.3.1 *Scenarios*

- (a) The Applicant shall quantitatively assess the rail noise impact, with respect to the criteria set in Annex 5 of the TM, of unmitigated scenario and mitigated scenario at assessment years of various operation modes including, but not limited to,



- (i) the worst operation mode which represents the maximum noise emission in connection of identified railways taking into account any other planned noise sources; and
- (ii) any other operation modes as confirmed with the Director.

#### 4.3.2 *Prediction of Noise Impact*

- (a) The Applicant shall present the noise levels in Leq(30min) and Lmax during the day and at night at the NSRs at various representative floor levels (in mPD) on tables and plans of suitable scale.
- (b) The assessment shall cover the cumulative rail noise impact associated with the existing and planned railways on existing, committed and planned NSRs within the assessment area.
- (c) The potential rail noise impact under different scenarios and operation modes shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the TM.

#### 4.4 Mitigation of Rail Noise Impact

##### 4.4.1 *Direct Mitigation Measures*

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

##### 4.5 Evaluation of Residual Rail 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 rail 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.

**Appendix D****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 D-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 changes in hydrology, flow regime, sediment erosion and deposition patterns, morphological change of seabed profile, water and sediment quality, marine and freshwater organisms/community. The prediction shall include possible different construction stages or sequences of the Project. Affected sensitive receivers shall be identified by the assessment tool with indications of degree of severity.
3. The assessment shall include, but not limited to the following:
  - (i) the water quality impacts of the site run-off and marine works (if any) 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 any runoff containing oil/grease or other chemicals and suspended solids during the operational stage;
  - (iii) the water quality impacts on fish culture zones, corals, mangroves, seagrasses, horseshoe crab habitats, beaches, seawater intake points, river courses (including Tai Ho Stream and its estuary), drainages; proposed and existing marine parks (including the proposed Marine Park at the Brothers and the proposed Marine Park under the Expansion of HKIA into 3RS project); and other water sensitive receivers around the project sites;
  - (iv) the water quality impacts of emergency discharge from any proposed sewage pumping station and water reclamation plant (if any), emergency discharge and discharge under normal operation from any proposed new sewage treatment works during operation stage of the Project (if any); thermal/cooling water discharges from the cooling system (if any), which shall include the impact on the receiving water bodies and water sensitive receivers ; and
  - (v) the water quality impacts due to construction and operation of any new submarine sewage outfall (if any).
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

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- water system(s), their respective catchments and sensitive receivers which might be affected by the Project;
- (ii) characterize water 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 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 water courses, natural streams, ponds, 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 pollution sources, including point discharges and non-point sources to surface water runoff, sewage from workforce and future occupants/users, thermal/cooling water discharge, discharge containing biocide, possible maintenance dredging, industrial wastewater from construction and operation phases, 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 likely future pollution sources in the study area. Field investigation and laboratory test, shall be conducted as appropriate to fill relevant information gaps;
  - (ix) assess the adequacy of the existing sewerage and sewage treatment facilities for the handling, treatment and disposal of wastewater arising from the Project as required in section 3.4.7;
  - (x) subject to the findings and recommendations under section 3.4.7 of this Study Brief, the applicant shall identify and quantify the water quality impacts based on the Sewerage and Sewage Treatment Implications Assessment. The water quality concerns shall include, but not limited to, possible sewage overflow or emergency discharge during emergencies arising from the Project;
  - (xi) 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

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quality and release of contaminants (including fuel, oil and other chemicals) and land decontamination works, etc. The prediction shall take into account and include possible different construction and operation stages of the Project;

- (xii) assess the cumulative impacts due to other concurrent and planned projects, activities or pollution sources within the study area that may have a bearing on the environmental acceptability of the Project;
- (xiii) analyze 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;
- (xiv) 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. Identify measures to prevent and reduce water quality impact of chemical spillage during construction and operation of the Project. Requirements to be incorporated in the project contract document shall also be proposed;
- (xv) investigate and develop best management practices to reduce storm water and non-point source pollution as appropriate;
- (xvi) recommend appropriate mitigation measures, including a contingency plan, to minimise the duration and impact of emergency discharges or chemical spillage during operation stage of the Project; and
- (xvii) 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 the TM, the Applicant shall identify, predict and evaluate the residual water quality impact in accordance with Section 4.4.3 of the TM and estimate the significance of the residual impact to the water system(s) and the water sensitive receivers.

**Appendix D-1****Hydrodynamic and Water Quality Modelling Requirements****Modelling Software General**

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

**Model Details – Calibration 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:

**Criteria****Level of fitness  
with field data**

- |   |              |
|---|--------------|
| • tidal elevation (@)                             | < 8 %        |
| • maximum phase error at high water and low water | < 20 minutes |
| • maximum current speed deviation                 | < 30 %       |
| • maximum phase error at peak speed               | < 20 minutes |
| • maximum direction error at peak speed           | < 15 degrees |
| • maximum salinity deviation                      | < 2.5 ppt    |

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

5. The consultants shall be responsible for acquiring/developing and calibration of the models for use in this study themselves. They may make reference to the models

developed under the Update on Cumulative Water Quality and Hydrological Effect of Coastal Developments and Upgrading of Assessment Tool (Agreement No. CE 42/97). They may also propose to use other models subject to agreement with 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 dredging and dumping 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.

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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. For assessing temporary discharges via the emergency outfall, the Applicant shall estimate discharge loading, pattern and duration. The worst case scenario shall include but not limited to discharge near slack water of neap tide. A period of at least 15 days spring-neap cycle in wet season, but long enough for recovery of the receiving water, shall be simulated. Detailed methodology shall be agreed with the Director.
  5. 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 assessed.
  6. The impact on all sensitive receivers shall be assessed.
  7. 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 E****Requirements for Assessment of Sewerage and Sewage Treatment Implications**

1. The Applicant shall study and assess the impacts of discharging sewage to the existing/planned sewerage systems in North Lantau. The assessment shall include the following:
  - (i) investigate and review to establish whether there is adequate capacity in the existing, committed and planned sewerage systems in North Lantau for the Project, taking into account the sewage arising from the existing sources, and committed and planned developments within the sewage catchment. The Applicant shall estimate the sewage arising from the residential and non-residential discharges, with flow build-up, within the catchment up to an ultimate development year agreed by the Authority. The Applicant shall quantitatively address the impacts of the Maximum Development Flows on the sewerage system under different development phases. The appropriate treatment level of effluent discharge and the water quality impacts arising from the effluent discharge shall be assessed;
  - (ii) employ the latest version of the computer model "InfoWorks" or equivalent computer model to be agreed by the Director to assess the impacts of future development under different development phases on existing and planned sewerage networks in North Lantau;
  - (iii) propose and undertake all required measures to mitigate any forecast shortfalls in the sewerage system as a result of the Project under different development phases and demonstrate the proposed measures would be adequate for the Maximum Development Flows and under different development phases. Any proposed sewerage system and/or on-site sewage treatment facility should be designed to meet standards and requirements endorsed by DSD and approved by EPD;
  - (iv) identify, assess and quantify the water quality due to the emergency discharge from on-site sewage treatment plant if provided, pumping stations, and sewer bursting discharge, and to propose adequate measures to mitigate these impacts;
  - (v) identify the appropriate alignment and layouts of the new sewerage to connect to the existing/planned/future sewerage systems in North Lantau, and investigate and assess the technical feasibility of connection (e.g. technical feasibility and details for connection to public sewer, sewage pumping station, and/or sewage treatment works);
  - (vi) twin rising mains should be provided for each pumping station to make sure that the proposed sewage rising mains are maintainable without shutting down and discharging untreated sewage into the natural stream or drainage channel;
  - (vii) assess and manage the septicity impacts to the sewerage system including inter alia the sewage pumping stations and sewage treatment plant. Provide electrical and mechanical equipment at sewage pumping stations and/or sewage treatment plant, which should including but not limited to on-line monitoring of sewage septicity and active septic treatment/control to actively monitor, manage and eliminate the problem of septicity which may affect the sewerage system;



- (viii) set out the design, operation and maintenance requirements and undertake or obtain agreement to undertake the construction and maintenance of any proposed sewerage and sewage treatment facilities, such as pumping station and sewage treatment plant inlet facilities, including electrical and mechanical components to actively monitor, manage and eliminate the problem of septicity and to facilitate maintenance. All of the above assessments and proposed works shall be endorsed by DSD and approved by EPD; and
- (ix) arrange for the timely implementation and commissioning of the mitigation measures. Demonstrate the acceptability of the residual impacts, if any.

**Appendix F****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 operational 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 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) After considering the opportunities for reducing waste generation and maximising re-use, the types and quantities of wastes required to be disposed of as a consequence shall be estimated and the disposal methods/options for each type of wastes shall be described in detail. The disposal methods/options recommended for each type of wastes shall take into account the result of the assessment in (iv) below.
- (iii) The EIA report shall also state clearly the transportation routings and the frequency of the trucks/vessels involved, any barging point or conveyor system to be used, the stockpiling areas and the disposal outlets for the wastes identified; and
- (iv) The impact caused by handling (including stockpiling, labelling, packaging and storage), collection, transportation and re-use/disposal of wastes shall be addressed in detail and appropriate mitigation measures shall be proposed. This assessment shall cover the following areas:
  - potential hazard;
  - air and odour emissions;
  - noise;
  - wastewater discharge; and
  - public transport.

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**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 practicable 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.

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**Appendix G****Requirements for Hazard to Life Assessment**

1. The Applicant shall investigate methods to avoid and/or minimize chlorine risk. The Applicant shall carry out hazard assessment to evaluate potential hazard to life during construction and operation stages due to Siu Ho Wan Water Treatment Works (SHWWTW). The hazard assessment shall include the following:
  - (i) Identify hazardous scenarios associated with the on-site transport, storage and use of chlorine at the SHWWTW with a view to determining a set of relevant scenarios to be included in a Quantitative Risk Assessment (QRA);
  - (ii) Execute a QRA of the set of hazardous scenarios determined in 1(i), expressing population risks in both individual and societal terms;
  - (iii) Compare individual and societal risks with the criteria for evaluating hazard to life stipulated in Annex 4 of the TM; and
  - (iv) Identify and assess practicable and cost-effective risk mitigation measures.
2. The methodology to be used in the hazard assessment shall be consistent with previous studies having similar issues (e.g. Organic Waste Treatment Facilities, Phase 1).

**Appendix H****Requirements for Land Contamination Assessment**

1. The Applicant shall identify the potential land contamination site(s) within the Project Area (Appendix A refers) and, if any, within the boundaries of associated areas (e.g. work areas) of the Project.
2. The Applicant shall provide a clear and detailed account of the present land use (including description of the activities, chemicals and hazardous substances handled, with clear indication of their storage and location, by reference to a site layout plan) and a complete past land uses history, in chronological order, in relation to possible land contamination (including accident records and change of land use(s) and the like).
3. If any contaminated land uses as stated in Sections 3.1 and 3.2 of Annex 19 in the TM is identified, the Applicant shall carry out the land contamination assessment as detailed from sub-section (i) to (iii) below and propose measures to avoid disposal:
  - (i) During the course of the EIA study, the Applicant shall submit a Contamination Assessment Plan (CAP) to the Director for endorsement prior to conducting an actual contamination impact assessment of the land or site(s). The CAP shall include proposal with details on representative sampling and analysis required to determine the nature and the extent of the contamination of the land or site(s). Alternatively, the Applicant may refer to other previously agreed and still relevant and valid CAP(s) for the concerned site(s).
  - (ii) Based on the endorsed CAP, the Applicant shall conduct a land contamination impact assessment and submit a Contamination Assessment Report (CAR) to the Director for endorsement. If land contamination is confirmed, a Remedial Action Plan (RAP) to formulate viable remedial measures with supporting documents, such as agreement by the relevant facilities management authorities, shall be submitted to the Director for approval. The Applicant shall then clean up the contaminated land or site(s) according to the approved RAP, and a Remediation Report (RR) to demonstrate adequate clean-up should be prepared and submitted to the Director for endorsement prior to the commencement of any development or redevelopment works within the Project Area. The CAP, CAR and RAP shall be documented in the EIA report.
  - (iii) If there are potential contaminated sites which are inaccessible for conducting sampling and analysis during the course of the EIA study, e.g. due to site access problem, the Applicant's CAP shall include:
    - (a) a review of the available and relevant information;
    - (b) an initial contamination evaluation of these sites and possible remediation methods;
    - (c) a confirmation of whether the contamination problem at these sites would be surmountable;
    - (d) a sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of these sites; and
    - (e) where appropriate, a schedule of submission of revised or supplementary CAP, CAR, RAP and RR as soon as these sites become accessible.

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

1. The Applicant shall review relevant outline development plan(s), outline zoning plan(s), development permission area 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 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. 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 and qualify 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. Broad brush tree survey shall be carried out and the impacts on existing trees shall be addressed.
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; and

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- (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.
    - (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, re-vegetation of disturbed land, woodland restoration, compensatory 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. Agreement from relevant authorities responsible for funding, implementation, management and maintenance of proposed mitigation measures have to be obtained before including into the LVIA. 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.





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**Appendix K****Requirements for EIA Report Documents**

1. The Applicant shall supply the Director with the following number of copies of the EIA report and the executive summary:
  - (i) 30 copies of the EIA report and 30 copies of the 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. To facilitate public inspection of EIA report via EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA report and the executive summary prepared in HyperText Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 1.3 or later). For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EIA report and the executive summary shall be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the EIA report and the executive summary shall be provided in the main text from where respective references are made. Graphics in the report shall be in interlaced GIF format or in suitable formats accepted by the Director.
3. The electronic copies of the EIA report and the executive summary shall be submitted to the Director at the time of application for approval of the EIA report.
4. When the EIA report and the executive summary are made available for public inspection under section 7(1) of the EIAO, the content of the electronic copies of the EIA report and the executive summary must be the same as the hard copies and the Director shall be provided with the most updated electronic copies.
5. To promote environmentally friendly and efficient dissemination of information, both hardcopies and electronic copies of future EM&A reports recommended by the EIA study shall be required and their format shall be agreed by the Director.