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9 June 2021

By Registered Post & Fax

Highways Departments

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

**Project Title: Traffic Improvement Scheme in Tuen Mun – Widening and Addition of
Slip Roads at Lung Fu Road / Tuen Mun Road / Wong Chu Road / Hoi Wing Road
(Application No. ESB-339/2021)**

I refer to your above application received on 3 May 2021 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-339/2021) for your preparation of an EIA report.

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

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

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

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

Should you have any queries on the above application, please contact my colleague Dr. Tom TAM at 2835 1107.

Yours sincerely,



(Stanley C F LAU)

Acting Principal Environmental Protection Officer
for Director of Environmental Protection

cc. w/encl.

ACE EIA Subcommittee Secretariat (Attn.: Ms. Becky LAM)

Environmental Impact Assessment Ordinance (Cap. 499), Section 5 (7)

Environmental Impact Assessment Study Brief No. ESB-339/2021

**Project Title: Traffic Improvement Scheme in Tuen Mun – Widening
and Addition of Slip Roads at Lung Fu Road / Tuen Mun
Road / Wong Chu Road / Hoi Wing Road**
(hereinafter known as the “Project”)

Name of Applicant: Highways Department
(hereinafter known as the “Applicant”)

1. BACKGROUND

- 1.1 An application (No. ESB-339/2021) 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 3 May 2021 with a project profile (No. PP-620/2021) (the Project Profile).
- 1.2 This Project is to construct an elevated slip road connecting Tsing Wun Road and Lung Fu Road; to widen existing slip road connecting Tuen Mun Road (Town Centre Section) southbound to Wong Chu Road westbound; and to construct an additional slip road between Hoi Wing Road westbound and Tuen Mun Road northbound. The location of the Project is shown in **Appendix A** and the scope of works is described as follows:
- (i) Lung Fu Road Slip Road (Southbound) – this part includes the construction of a 10.3m wide elevated carriageway, of approximately 800 meters in length connecting Tsing Wun Road to Lung Fu Road southbound;
 - (ii) Lung Fu Road Slip Road (Northbound) – this part includes the construction of a 6.3m wide elevated carriageway, of approximately 600 meters in length connecting Lung Fu Road to Tsing Wun Road northbound;
 - (iii) Widening of existing slip road connecting Tuen Mun Road to Wong Chu Road – this part includes the widening of an approximately 300 meters long existing HyD Structure No. N568 by 4m to 5m to two traffic lanes connecting Tuen Mun Road (Town Centre Section) southbound to Wong Chu Road westbound; and
 - (iv) Depressed at-grade road linking Tuen Mun Road and Hoi Wing Road – this part includes the construction of a single lane carriageway, of approximately 550 meters in length connecting Tuen Mun Road northbound and Hoi Wing Road westbound.
- 1.3 Based on the information provided in the Project Profile, the Project will comprise the following designated projects:
- (i) Items A.1, Part I, Schedule 2 of the EIAO – “*A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing roads*”; and
 - (ii) Items A.8, Part I, Schedule 2 of the EIAO – “*A road or railway bridge more than 100 m in length between abutments*”.

- 1.4 Pursuant to Section 5(7)(a) of the EIAO, the Director of Environmental Protection (the Director) issues this EIA Study Brief to the Applicant to carry out an EIA study.
- 1.5 The purpose of the 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 potential waste management issues and impacts arising as a result of the construction activities of the Project;
- (v) to identify and quantify contaminated land within any Project Area for development works, and to propose measures to avoid disposal in the first instance;
- (vi) to identify, assess and quantify any potential ecological impacts arising from the construction and operation of the Project, including potential losses or damage to flora, fauna and natural habitats, and to propose measures to mitigate these impacts;
- (vii) to identify and evaluate any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- (viii) to identify any adverse impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- (ix) to propose the provision of infrastructure or mitigation measures so as to minimise pollution, environmental disturbance and nuisance during construction and operation of the Project;
- (x) to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- (xi) 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;
- (xii) to identify, assesses 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;

- (xiii) to investigate the extent of the secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification;
- (xiv) to design and specify the environmental monitoring and audit requirements to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted; and
- (xv) 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 This Study Brief is to set out the purpose and objectives of the EIA study, the scope of environmental issues which shall be addressed, the requirements that the EIA study shall need to fulfil, and the necessary procedural and reporting requirements. The Applicant shall demonstrate in the EIA report whether the criteria in the relevant sections of the Technical Memorandum on the Environmental Impact Assessment Process of the Environmental Impact Assessment Ordinance (hereinafter referred to as “the TM”), are fully complied with.

3.2 The Scope

- 3.2.1 The scope of this EIA study shall cover the Project and associated works mentioned in Section 1.2 of this EIA Study Brief. For the purpose of assessing whether the environmental impacts shall comply with the criteria of the TM, the EIA study shall address the key issues described below, together with any other key issues identified during the course of the EIA study:
- (i) environmental benefits and dis-benefits of different development options, alignments, design and construction methods of the Project with a view to deriving the preferred development option(s) that will avoid or minimise adverse environmental impact;
 - (ii) potential air quality impact on air sensitive receivers (ASRs) due to the construction and operation of the Project;
 - (iii) potential noise impact on noise sensitive receivers (NSRs) due to the construction and operation of the Project;
 - (iv) potential water quality impact on water sensitive receivers (WSRs) and the relevant water system(s) including Tuen Mun River Channel, Tuen Mun Typhoon Shelter, Castle Peak Beach etc. due to the construction and operation of the Project;
 - (v) potential waste management implications arising from the construction and operation of the Project, including proper handling and disposal of C&D materials generated; and the monitoring /management measures to prevent disposal of C&D materials at places other than designated outlets;
 - (vi) potential extent of land contamination within Project Area for development works and relevant mitigation measures;
 - (vii) potential ecological impact on ecological impacts arising from the construction and operation of the Project;

- (viii) potential cultural heritage impacts, in particular Shing Miu (Grade 2) in Sam Shing Hui, due to the construction and operation of the Project;
- (ix) potential landscape and visual impact due to the construction and operation of the Project; and
- (x) potential cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed and planned projects in the vicinity of the Project, and that those impacts may have a bearing on the environmental acceptability of the Project.

3.3 Description of the Project

3.3.1 Purpose(s) and Objectives of the Project

The Applicant shall provide information on the Project, including the purpose(s), objectives and environmental benefits of the Project, and describe the 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 land corridor, vertical and horizontal alignment, need for tunnelling, layout and design, scale and height of the structures, construction methods, sequence of construction works and other major activities involved in the Project, using diagrams, plans and/or maps as necessary. The estimated duration of the construction phase and operational phase of the Project together with the programme within these phases shall be given. The land/premises to be taken by the Project, 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, interactions with other projects, and the consideration of different alignment and development options (including tunnelling), taking into account the principles of avoidance, minimizing and control of adverse environmental impacts. The options might include alignment, design, construction methods, sequence of construction works, any lessons learned from other similar projects and opportunities for social and recreational activities/facilities. The key reasons for selecting the preferred development option(s) and the part environmental factors played in the selection shall be described. The main environmental impacts of different development options shall be compared with those of the Project and with the likely future environmental conditions in the absence of the Project.

3.4 Technical Requirements

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

3.4.3 The EIA study shall follow the technical requirements specified below and in the Appendices of this EIA Study Brief.

3.4.4 Air Quality Impact

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

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 areas where the air quality may be potentially affected by the Project. The assessment shall be based on the best available information at the time of the assessment. The assessment shall also take into account the impacts of emission sources from nearby concurrent projects..

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 and road traffic noise 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 for the construction and operation of the Project shall follow the detailed technical requirements given in **Appendix C** of this EIA Study Brief.

3.4.6 Water Quality Impact

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 areas within 500 metres from the boundary of the Project and shall cover the North Western Water Control Zone as designated under the Water Pollution Control Ordinance (Cap. 358) and the water sensitive receivers (WSRs) in the vicinity of the Project. The assessment area shall be extended to include other areas such as water gathering grounds, 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 Waste Management Implications

3.4.7.1 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.

3.4.7.2 The assessment of the waste management implications arising from the construction and operation of the Project shall follow the detailed technical requirements given in **Appendix E** of this EIA Study Brief.

3.4.8 Land Contamination

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

3.4.8.2 The assessment of the potential land contamination issues shall follow the detailed technical requirements given in **Appendix F** of this EIA Study Brief

3.4.9 Ecological Impact (Terrestrial and Aquatic)

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

3.4.9.2 The assessment area for the purpose of the terrestrial ecological impact assessment shall include areas within 500 metres distance from the boundary of the Project and any other areas likely to be impacted by the Project. For aquatic ecological impact assessment, the assessment area shall be the same as the water quality impact assessment described in Section 3.4.6 of this EIA Study Brief.

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

3.4.9.4 If significant ecological impact is identified, the Applicant shall approach the Director for additional requirements for the assessment of ecological impact.

3.4.10 Landscape and Visual Impact

3.4.10.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing landscape and visual impacts as stated in Annexes 10 and 18 of the TM respectively, and the EIAO Guidance Note No. 8/2010 “Preparation of Landscape and Visual Impact Assessment under the EIAO”.

3.4.10.2 The assessment area for the landscape impact assessment shall include landscape character areas and landscape resources within 100 metres from the boundary of the Project Area. 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.

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

3.4.11 Impact on Cultural Heritage

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

3.4.11.2 The cultural heritage impact assessment (CHIA) shall include Built Heritage Impact Assessment (BHIA) and Archaeological Impact Assessment (AIA).

- 3.4.11.3 The assessments of the built heritage impact and archaeological impact arising from 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/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 EIA study, including design, scale, extent, layout and mode of operation as well as construction methods, disposal/treatment methods and sequences of works for the Project, with a view to avoiding, minimising and mitigating 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 in the EIA report the respective requirements of this EIA Study Brief and the TM (in particular Annexes 11 and 20) have been addressed and fulfilled.
- 5.2 The Applicant shall supply the Director with hard and electronic copies of the EIA report and the executive summary in accordance with the requirements given in **Appendix K** of this EIA Study Brief. The Applicant shall, upon request, make additional copies of the above documents available to the public, subject to payment by the interested parties of full costs of printing.

6. OTHER PROCEDURAL REQUIREMENTS

- 6.1 If there is any change in the name of 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 Section 3.2 of this EIA Study Brief and in Project Profile (No.PP-620/2021), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA Study Brief can still cover the key changes, and the additional issues, if any, that the EIA study must also address. If the changes to the Project fundamentally alter the key scope of the EIA Study Brief, the Applicant shall apply to the Director for a fresh EIA Study Brief.

7. LIST OF APPENDICES

- 7.1 This EIA Study Brief includes the following appendices:

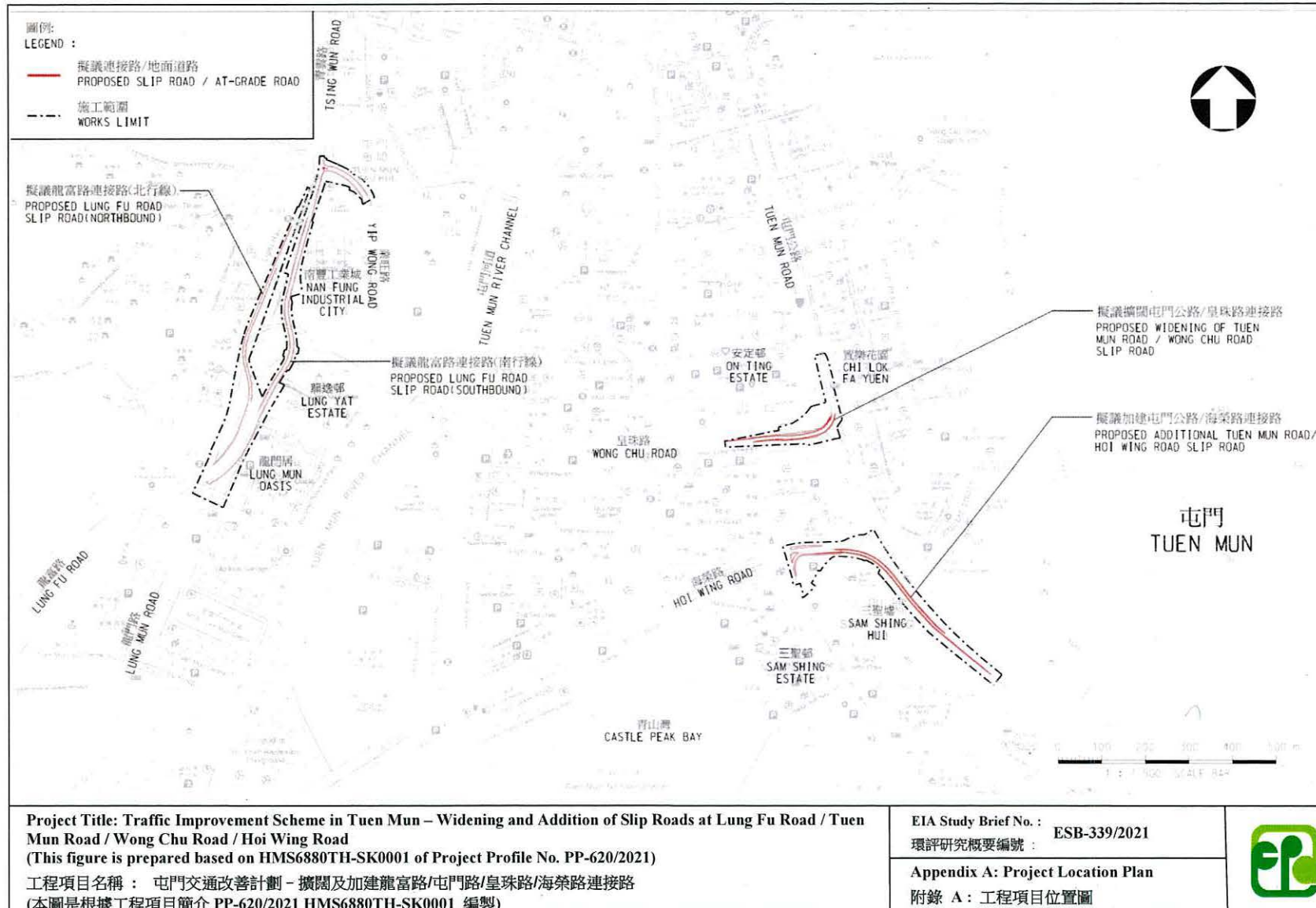
Appendix A	–	Project Location Plan
Appendix B	–	Requirements for Air Quality Impact Assessment
Appendix C	–	Requirements for Noise Impact Assessment
Appendix D	–	Requirements for Water Quality Impact Assessment
Appendix E	–	Requirements for Assessment of Waste Management Implications
Appendix F	–	Requirements for Land Contamination Assessment

- Appendix G – Requirements for Ecological Impact Assessment
- Appendix H – Requirements for Landscape and Visual Impact Assessment
- Appendix I – Requirements for Cultural Heritage Impact Assessment
- Appendix J – Implementation Schedule of Recommended Mitigation Measures
- Appendix K – Requirements for EIA Report Documents

END of EIA STUDY BRIEF

June 2021
Environmental Assessment Division
Environmental Protection Department

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 construction and operation stages of the Project.
 - (ii) Provision of an account, where appropriate, of the consideration/ measures that have been taken into consideration during the planning of the Project to avoid and minimise the air pollution impact. The Applicant shall consider alternative 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 operation stages of the Project. If the PATH model is used to estimate the future background air quality, details for the estimation of all emission sources to be adopted in the model runs should be clearly presented.

2. Identification of Air Sensitive Receivers (ASRs) and Examination of Emission/ Dispersion Characteristics
 - (i) Identification and description of existing, committed and planned ASRs that would likely be affected by the Project, including those earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans, Layout Plans and other relevant published land use plans, including plans and drawings published by Lands Department and any land use and development applications approved by the Town Planning Board. The Applicant shall select the assessment points of the identified ASRs that represent the worst impact point of these ASRs. A map clearly showing the location and description such as name of buildings, their uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources shall also be given.
 - (ii) Provision of a list of air pollution emission sources, including any nearby emission sources which are likely to have impact related to the Project based on the analysis of the construction and operation activities in Section 1 above. Examples of construction stage emission sources include site clearance, excavation, backfilling, vehicular movements, etc. Example of operational phase emission sources include chimneys, road vehicles. Confirmation regarding the validity of assumptions and the magnitude of activities (e.g. volume of construction material to be handled, etc.) shall be obtained from the relevant government departments/ authorities, where applicable, and documented in the EIA report. Validity of the traffic flow and traffic speed prediction shall be confirmed with Transport Department and documented in the EIA report.
 - (iii) Identification of chimneys and obtainment of relevant chimney emission data in the assessment area, where appropriate, by carrying out a survey for assessing the cumulative air quality impact of air pollutants through chimneys. The Applicant shall ensure and confirm the validity of the emission data used in their assessment. Any errors found in their emission data used may render the submission invalid.

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

3 Construction Phase Air Quality Impact

- (i) The Applicant shall follow the requirements stipulated under the Air Pollution Control (Construction Dust) Regulation to ensure that construction dust impacts are controlled within the relevant standards as stipulated in Section 1 of Annex 4 of the TM.
- (ii) If the Applicant anticipates that the Project will give rise to significant construction dust impacts likely to exceed recommended limits in the TM at the identified ASRs despite the incorporation of the dust control measures proposed, a quantitative assessment shall be carried out to evaluate the construction dust impact at the identified ASRs. The Applicant shall follow the methodology set out in Section 5 below when carrying out the quantitative assessment.
- (iii) Where necessary, the Applicant shall consider and evaluate direct mitigation measures, including but not limited to water-spraying, re-scheduling construction programme to minimise concurrent dust impact arising from different construction sites, for fugitive dust control. The Applicant shall also consider connecting construction plant and equipment to mains electricity supply and avoid use of diesel generators and diesel-powered equipment as far as practicable to minimize air quality impact arising from these equipment. The Applicant shall describe the means of transportation and their routings involved, with a view to addressing potential dust nuisance caused by transportation activities. Any mitigation measures recommended should be well documented in the EIA report.
- (iv) A monitoring and audit programme for the construction phase of the Project shall be devised to verify the effectiveness of the proposed control measures so as to ensure proper control of fugitive dust emission.

4 Operational Phase Air Quality Impact

- (i) The Applicant shall assess the expected air quality impact at the identified ASRs based on an assumed reasonably worst-case scenario under normal operating conditions. If the assessment indicates likely exceedances of the recommended limits in the TM at the ASRs, a quantitative assessment should be carried out to evaluate the operational phase air quality impacts at the identified ASRs. The Applicant shall follow the methodology set out in Section 5 below when carrying out the quantitative assessment.
- (ii) 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 the 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 assisted with tables and diagrams, to allow the readers of the EIA report to grasp how the model has been set up to simulate the situation under study without referring to the model input files. In case of doubt, prior agreement between the Applicant and the Director on specific modelling details should be sought.

- (ii) For the purpose of assessing the compliance with the criteria as stated in Section 1 of Annex 4 of the TM, the Applicant shall identify the key/representative air pollution parameters (types of pollutants and the averaging time concentrations) to be evaluated and provide explanation for selecting these parameters for assessing the impact of the Project.
- (iii) Calculation of the relevant pollutant emission rates for input to the model and map(s) showing road links and emission sources shall be presented in the EIA report. A summary table of the emission rates shall be presented in the EIA report. The Applicant shall ensure consistency between the text description and the model files at every stage of submission for review.
- (iv) For operational phase air quality impact assessment, the air pollution impacts of future road traffic shall be calculated based on the highest emission strength from the road vehicles in the assessment area within the next 15 years upon commissioning of operation of the proposed upgraded roads. The Applicant shall demonstrate that the selected year of assessment represents the highest emission scenario given the combination of vehicular emission factors and traffic flow for the selected year. For construction phase air quality impact assessment, the Applicant shall demonstrate the use of the emission data of the future road traffic represents the highest emission scenario within the construction phase concerned. The Applicant may use EMFAC-HK model released by the Director to determine the Fleet Average Emission Factors, taking into account vehicle fleet mix and other necessary data on each road section. Vehicle emissions, including running, start/idling emission, at parking sites that would contribute significantly to the overall cumulative air quality impact at nearby ASRs shall be taken into account in the assessment. Unless otherwise agreed by the Director, the latest version of the EMFAC-HK model shall be used. Use of any alternatives to the EMFAC-HK model shall be agreed with the Director. The traffic forecast data and assumptions, such as the hourly traffic volume, average speed, vehicle composition, number of trips and soaking time data, the exhaust technology fractions, vehicle age/population distribution, etc. that are used in the assessment shall be presented.
- (v) Emissions from road traffic, marine traffic, aircraft, other industrial sources and nearby concurrent projects within the assessment area, which contribute to the cumulative air quality impact of the identified ASRs, should be taken into account and be included in the dispersion models accepted by the Director.
- (vi) For projection of future background air quality, the Applicant may use the PATH model released by the Director, taking into consideration the major air pollutant emission sources projected for Hong Kong and nearby regions. Unless otherwise agreed by the Director, the latest version of the PATH model shall be used. If any modification is made to the emission sources in PATH model or an alternative model is used, details of the emission sources adopted should be clearly presented. In general, major point sources located within 4 km from the identified ASRs shall be reviewed if they have direct contributions of air quality impacts to the ASRs on the concerned pollutants of the assessment. In such case, these point sources shall be simulated by dispersion model to account for their induced sub-grid scale spatial variations in background air quality. The exact approach shall be determined according to the case specific situation and subject to the agreement by the Director.
- (vii) The Applicant shall calculate the cumulative air quality impact at the identified ASRs and compare these results against the criteria set out in Section 1 of Annex 4 in the TM. The Applicant shall also calculate the incremental air quality impact at the identified ASRs arising from the Project. The predicted air quality impacts (both unmitigated and mitigated) shall be presented in the form of summary table(s) and pollution contours, to be evaluated against the relevant air quality standards and on any effect they may have on the land use implications. Plans of a suitable scale shall be used to present pollution contours to allow buffer distance requirements to be determined properly.

- (viii) If vehicle tunnels and/or full enclosures are proposed in the Project, it is the responsibility of the Applicant to ensure that the air quality inside these proposed structures shall comply with EPD's "Practice Note on Control of Air Pollution in Vehicle Tunnels". When assessing air quality impact due to emissions from tunnels/full enclosures, the Applicant shall ensure prior agreement with the relevant ventilation design engineer over the amount and the types/kinds of pollutants emitted from these full enclosures; and such assumptions shall be clearly and properly documented in the EIA report.
- (ix) If there are any direct technical noise remedies recommended in the study, the air quality implication, i.e. comparison between with and without noise remedies scenario, due to these technical remedies shall be assessed. For instance, if barriers that may affect dispersion of air pollutants are proposed, then the implications of such remedies on air quality impact shall be assessed. If noise enclosure is proposed, then portal emissions of the enclosed road section shall also be assessed. The Applicant shall highlight clearly the locations and types of agreed noise mitigating measures (where applicable), be they noise barriers, road enclosures and their portals, and affected ASRs, on contour maps for reference.

6 Mitigation Measures for Air Quality Impact

Consideration for Mitigation Measures

- (i) When the predicted air quality impact exceeds the criteria set in Section 1 of Annex 4 in the TM, the Applicant shall consider mitigation measures including but not limited to road design measures (e.g. alternative road alignment/exit to increase separation distance from ASRs, underground road, tunnel, roadside barrier/enclosure, etc.) pollution control technology measures (e.g. installation of air purification system, etc.) and traffic management measures (e.g. setting up restriction zone for heavy duty vehicle, low/zero emission zone for existing trunk roads, etc.) to reduce the air quality impact on the identified ASRs. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed and documented in the EIA report. Specific reasons for not adopting certain workable mitigation measures to reduce the air quality to a level meeting the criteria in the TM or to maximise the protection of the ASRs as far as possible should be clearly substantiated and documented in the EIA report.

Evaluation of Residual Air Quality Impact

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

7 Submission of Emission Calculation Details and Model Files

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

Appendix B-1

Air Quality Modelling Guidelines

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

Air quality modelling guidelines refer to the guidelines published on the website of the Environmental Protection Department

(https://www.epd.gov.hk/epd/english/environmentinhk/air/guide_ref/guide_aqa_model.html):

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.

2. Construction Noise Impact Assessment

2.1 Construction Noise Impact Assessment Methodology

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

2.1.2 To minimize the construction noise impact, alternative construction methods to replace percussive piling shall be proposed as far as practicable.

2.2 Identification of Construction Noise Impact

2.2.1 Identification of Assessment Area and Noise Sensitive Receivers (NSRs)

- (a) The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the construction noise impact assessment shall generally include areas within 300 metres from the boundary of the Project and the works of the Project.
- (b) The Applicant shall identify all existing NSRs in the assessment area and select assessment points to represent identified NSRs for carrying out quantitative construction noise impact assessment described below.
- (c) The assessment points shall be confirmed with the Director prior to the commencement of the quantitative construction noise impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.
- (d) A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.

2.2.2 Inventory of Noise Sources

The Applicant shall identify and quantify an inventory of noise sources for representative construction equipment for the purpose of construction noise impact assessment. Validity of the inventory shall be confirmed with the relevant government departments, authorities or the Applicant's construction professionals and documented in the EIA report

2.3 Prediction and Evaluation of Construction Noise Impact

2.3.1 Phases of Construction

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

2.3.2 Scenarios

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

2.3.3 Prediction of Noise Impact

- (a) The Applicant shall present the predicted noise levels in Leq (30 min) dB(A) at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.
- (b) The assessment shall cover the cumulative construction noise impact resulting from the construction works of the Project and other concurrent projects identified during the course of the EIA study on existing NSRs within the assessment area.
- (c) The potential construction noise impact under different phases of construction shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the TM.
- (d) The Applicant shall, as far as practicable, formulate a reasonable construction programme so that no work will be required in restricted hours as defined under the Noise Control Ordinance (NCO). In case the Applicant needs to evaluate whether construction works in restricted hours as defined under the NCO are feasible or not in the context of programming construction works, reference should be made to relevant technical memoranda issued under the NCO. Regardless of the results of construction noise impact assessment for restricted hours, the Noise Control Authority will process Construction Noise Permit (CNP) application, if necessary, based on the NCO, the relevant technical memoranda issued under the NCO, and the contemporary conditions/situations. This aspect should be explicitly stated in the noise chapter and the conclusions and recommendations chapter in EIA report.

2.4 Mitigation of Construction Noise Impact

2.4.1 *Direct Mitigation Measures*

Where the predicted construction noise impact exceeds the criteria set in Table 1B of Annex 5 of the TM, the Applicant shall consider and evaluate the use of quieter construction methods (e.g. non-explosive chemical expansion agent), quieter construction equipment and other direct mitigation measures including but not limited to, movable barriers, enclosures, 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.

2.6 Construction Noise Impact Monitoring and Audit

The Applicant shall, with reference to Section 8 and Annex 21 of the TM, propose a construction noise management plan so that both the verification of the inventory of noise sources, and the assessment of the effectiveness and practicality of all identified measures for mitigating the construction noise impact of the project, would be performed during the design, tendering and implementation stage of the construction works.

3. Road Traffic Noise Impact Assessment

3.1 Road Traffic Noise Impact Assessment Methodology

3.1.1 The Applicant shall carry out road traffic noise impact assessment in respect of each road section (within the meaning of Items A.1 and A.8 under Part I, Schedule 2 of the EIAO and other road sections) and the noise levels from combined road sections of the Project at the NSRs in accordance with methodology in paragraph 5.1 of Annex 13 of the TM.

3.1.2 *Input Data of Computational Model*

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

3.2 Identification of Road Traffic Noise Impact

3.2.1 *Identification of Assessment Area and Noise Sensitive Receivers*

- (a) The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the road traffic noise impact shall generally include areas within 300 metres from the boundary of the Project and the works of the Project.
- (b) The Applicant shall identify all existing, committed and planned NSRs in the assessment area and select assessment points to represent identified NSRs for carrying out quantitative road traffic noise impact assessment described below.
- (c) The assessment points shall be confirmed with the Director prior to the commencement of the quantitative road traffic noise impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.
- (d) A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.
- (e) For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant land use and planning parameters and conditions to work out representative site layouts for road traffic noise impact assessment purpose. However, such parameters and conditions together with any constraints identified shall be confirmed with the relevant responsible parties including Planning Department and Lands Department.

3.2.2 *Inventory of Noise Sources*

- (a) The Applicant shall analyse the scope of the proposed road alignment(s) to identify appropriate new and existing road sections for the purpose of road traffic noise impact assessment. Road sections to be included in road traffic noise impact assessment shall be confirmed with the Director prior to the commencement of the assessment. In determining whether the traffic noise impact due to road improvement project/works is considered significant, detailed information with respect to factors including at least the change of nature of road, change of alignment and change of traffic capacity or traffic composition, and change of traffic flow pattern in the associated road networks, shall be assessed. Figures showing extents of new/altered roads, existing roads and the associated road networks shall be provided in the EIA report.
- (b) Validity of the traffic flow prediction of road sections for the purpose of road traffic noise impact assessment shall be confirmed with Transport Department and documented in the EIA report.

3.3 Prediction and Evaluation of Road Traffic Noise Impact

3.3.1 *Scenarios*

- (a) The Applicant shall quantitatively assess the road traffic noise impact of the Project, with respect to the criteria set in Annex 5 of the TM, of unmitigated scenario and mitigated scenario at assessment year. The assessment year shall be made reference to Section 5.1 in Annex 13 of the TM.
- (b) The Applicant shall provide the input data sets of traffic noise model prediction model adopted in the EIA study as requested by the Director for the following scenarios:
 - (i) Unmitigated scenario at assessment year;
 - (ii) Mitigated scenario at assessment year; and
 - (iii) Prevailing scenario for indirect mitigated measures eligibility assessment.

3.3.2 *Prediction of Noise Impact*

- (a) The Applicant shall present the predicted noise levels in L_{10} (1 hour) dB(A) at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.
- (b) The assessment shall cover the cumulative road traffic noise impact resulting from the road traffic noise due to the Project and existing road network on existing, committed and planned NSRs within the assessment area.
- (c) The potential road traffic noise impact under different scenarios shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the TM.

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3.4 Mitigation of Road Traffic Noise Impact

3.4.1 *Direct Mitigation Measures*

- (a) Where the predicted road traffic noise impact exceeds the criteria set in Annex 5 of the TM, the Applicant shall consider and evaluate direct mitigation measures including but not limited to low noise road surface, noise barrier/enclosure, etc. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed. Any direct mitigation measures recommended should be well

documented in the report. Specific reasons for not adopting certain direct mitigation measures to reduce the noise to a level meeting the criteria in the TM or to maximize the protection for the NSRs as far as possible should be clearly quantified and documented in the EIA report.

- (b) The total number of NSRs that will be benefited from and be protected by the provision of direct mitigation measures should be provided. The total number of other noise sensitive receivers that will still be exposed to noise above the criteria with the implementation of all recommended direct mitigation measures shall be quantified.
- (c) For planned noise sensitive uses which will still be affected even with practicable direct mitigation measures in place, the Applicant shall propose, evaluate and confirm the practicability of additional direct mitigation measures within the planned noise sensitive uses and shall make recommendations on how these noise sensitive uses will be designed for the information of relevant parties.
- (d) The Applicant shall take into account agreed environmental requirements/ constraints identified in the EIA study to assess the development potential of concerned sites which shall be made known to the relevant parties.

3.4.2 *Indirect Mitigation Measures*

- (a) Upon exhaust of direct mitigation measures, where the predicted road traffic noise impact still exceeds the criteria set in Table 1A of Annex 5 of the TM, the Applicant shall consider indirect mitigation measures in the form of window insulation and air-conditioning and evaluate in accordance with Section 6.2 in Annex 13 of the TM.
- (b) The Applicant shall identify and estimate the total number of existing dwellings, classrooms and other noise sensitive elements which may qualify for indirect mitigation measures, the associated costs and any implications for such implementation.
- (c) For the purpose of determining eligibility of the affected premises for indirect mitigation measures, reference shall be made to methodology accepted by the recognized national/international organization or methodologies adopted for Hong Kong projects having similar issues on proposing an assessment methodology for determining eligibility of the indirect mitigation measures which shall be confirmed with the Director with reference to Section 4.4.2 of the TM, prior to the commencement of the assessment.

3.5 Evaluation of Residual Road Traffic Noise Impact

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

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 and assess any water quality impacts arising from the construction and operation of the Project.
3. The assessment shall include, but not be limited to the following:
 - (i) the water quality impacts of the site run-off generated during the construction stage such as the effluents generated from dewatering associated with piling activities, grouting and concrete washing and those specified in the ProPECC Practice Note 1/94;
 - (ii) the water quality impacts of the road runoff containing oil/grease and suspended solids during the operational stage; and
 - (iii) the water quality impacts on water gathering ground, river courses, drainages and other water sensitive receivers which may be affected by the Project.
4. The Applicant shall address water quality impacts due to the construction phase and operational phase of the Project. Essentially, the assessment shall address the following :
 - (i) collect and review background information on affected existing and planned water systems, their respective catchments and sensitive receivers which might be affected by the Project;
 - (ii) characterise water quality of the water systems and sensitive receivers, which might be affected by the Project based on existing best available information or through appropriate site survey and tests;
 - (iii) identify and analyse relevant existing and planned future activities, beneficial uses and water sensitive receivers related to the affected water system(s). The Applicant should refer to, inter alia, those developments and uses earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans, and any other relevant published landuse plans;
 - (iv) identify pertinent water quality objectives and establish other appropriate water quality criteria or standards for the water system(s) and the sensitive receivers identified in (i), (ii) & (iii) above;
 - (v) review the specific construction methods and configurations, and operation of the Project to identify and predict the likely water quality impacts arising from the Project;
 - (vi) identify any alternation of any water courses, natural streams, ponds, wetlands, change of water holding/flow regimes of water bodies, change of catchment types or areas, erosion or sedimentation due to the Project and any other hydrological changes in the assessment area;
 - (vii) identify and quantify existing and likely future water pollution sources, including point discharges and non-point sources to surface water runoff, sewage from workforce and polluted discharge generated from the Project, contaminant release from works on sediment and sediment release or re-suspension from works into water bodies;
 - (viii) provide an emission inventory on the quantities and characteristics of those existing and

future pollution sources in the assessment area. Field investigation and laboratory test, shall be conducted as appropriate to fill relevant information gaps;

- (ix) predict and quantify the impacts on the water system(s) and its/their sensitive receivers due to those alternations and changes identified in (vi) above, and the pollution sources identified in (vii) above. The prediction shall take into account and include possible different construction and operation stages of the Project;
- (x) assess the cumulative impacts due to other related concurrent and planned projects, activities or pollution sources within the assessment area that may have a bearing on the environmental acceptability of the Project;
- (xi) analyse the provision and adequacy of existing and planned future facilities to reduce pollution arising from the point and non-point sources identified in (vii) above.
- (xii) develop effective infrastructure upgrading or provision, contingency plan, water pollution prevention and mitigation measures to be implemented during construction and operation stages so as to reduce the water quality impacts to within standards. Requirements to be incorporated in the Project contract document shall also be proposed;
- (xiii) investigate and develop best management practices to reduce storm water and non-point source pollution during construction and operation of the Project as appropriate; and
- (xiv) 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 E

Requirements for Assessment of Waste Management Implications

The assessment of waste management implications shall cover the following:

1. Analysis of Activities and Waste Generation

- (i) The Applicant shall identify the quantity, quality and timing of the wastes arising as a result of the construction and operational activities of the Project based on the sequence and duration of these activities, e.g. any dredged/excavated sediment/mud, construction and demolition (C&D) materials and other wastes which will be generated during construction and operational stages.
- (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 maximizing waste reduction shall be separately considered;
- (ii) After considering the opportunities for reducing waste generation and maximizing re-use, the types and quantities of wastes required to be disposed of as a consequence shall be estimated and the disposal methods/options for each type of wastes shall be described in detail. The disposal methods/options recommended for each type of wastes shall take into account the result of the assessment in item (iv) below;
- (iii) The EIA report shall also state clearly the transportation routings and the frequency of the trucks/vessels involved, any barging point or conveyor system to be used, the stockpiling areas and the disposal outlets for the wastes identified;
- (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.
- (v) In addition to the above, the EIA report shall also identify practicable means of avoiding illegal dumping and landfilling.

Appendix F

Requirements for Land Contamination Assessment

1. The Applicant shall identify the potential land contamination site(s) within the Project Area and, if any, within the boundaries of associated areas (e.g. work areas) (**Appendix A** refers) 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 measure to avoid disposal -:
 - (i) During the course of the EIA study, the Applicant shall submit a Contamination Assessment Plan (CAP) to the Director for endorsement prior to conducting an actual contamination impact assessment of the land or site(s). The CAP shall include proposal with details on representative sampling and analysis required to determine the nature and the extent of the contamination of the land or site(s). Alternatively, the Applicant may refer to other previously agreed and still relevant and valid CAP(s) for the concerned site(s). The CAP shall be documented in the EIA report.
 - (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 Remediation 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 CAR and RAP, if available, 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 G

Requirements for Ecological Impact Assessment (Terrestrial and Aquatic)

The ecological impact assessment shall cover both terrestrial and aquatic ecology and shall include the following:

1. The Applicant shall examine the flora, fauna and other components of the ecological habitats within the assessment area. The aim shall be to protect, maintain or rehabilitate the natural environment. In particular, the Project shall avoid or minimise impacts on recognized sites of conservation importance, conservation areas and other ecological sensitive areas. The assessment shall identify and quantify as far as possible the potential ecological impacts arising from the construction and operation of the Project and associated works, both directly by physical disturbance and indirectly by potential impacts such as change of water quality and hydrodynamic regime to the natural environment and the associated wildlife groups and habitats/species.
2. The assessment shall include the following major tasks:
 - (i) review the findings of relevant studies/surveys and collate the available information regarding the ecological characters of the assessment area;
 - (ii) evaluate the information collected, identify any information gap relating to the assessment of potential ecological impacts to terrestrial and aquatic environment, and determine the scope of the rapid site survey needed for a comprehensive assessment as required under the following sections;
 - (iii) carry out a rapid site survey in wet season that covers the potentially affected terrestrial habitats, and investigations to verify the information collected, fill in the information gaps as identified under sub-section (ii) above, if any, and to fulfil the objectives of the EIA study. The rapid site survey shall cover flora, fauna and any other sites/habitats/species of conservation importance, such as Tai Lam Country Park;
 - (iv) establish the ecological profile of the assessment area based on information collected in the tasks mentioned in sub-sections (i) to (iii) above, and describe the characteristics of each habitat found. The data set should be up to date and valid for the purpose of this assessment. Major information to be provided shall include:
 - (a) description of the physical environment, including all recognized sites of conservation importance, conservation areas and other ecological sensitive areas, and assessment whether these sites/areas will be affected by the Project and associated works;
 - (b) habitat maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats and species of conservation interest in the assessment area;
 - (c) ecological characteristics of each habitat type such as size, vegetation type, species present, dominant species found, species richness and abundance of major taxa groups, community structure, seasonal patterns, ecological value, inter-dependence of the habitats and species, and presence of any features of ecological importance;
 - (d) representative colour photos of each habitat type and any important ecological features identified; and
 - (e) species found that are rare, endangered and/or listed under local legislation, international conventions for conservation of wildlife/habitats or Red Data Books.

- (v) investigate and describe the existing wildlife uses of various habitats with special attention to those wildlife groups and habitats with conservation interest, including but not limited to the following:
 - (a) woodlands and plantations;
 - (b) watercourses especially Tuen Mun River Channel;
 - (c) avifauna;
 - (d) mammals and their breeding/roosting sites;
 - (e) herpetofauna;
 - (f) other wildlife, including but not limited to fish, butterflies and odonates; and
 - (g) any other habitats/species identified as having special conservation interest by this EIA study.
- (vi) using suitable methodology, and considering also any works activities from other projects reasonably likely to occur at the time, identify and quantify as far as possible any direct, indirect, on-site, off-site, primary, secondary and cumulative ecological impacts on the wildlife groups and habitats identified such as destruction of habitats, disturbance to wildlife, reduction of species abundance/diversity, loss of feeding and breeding grounds, reduction of ecological carrying capacity and habitat fragmentation, in particular the following:
 - (a) habitats loss due to construction and operation of the Project;
 - (b) impacts arising from and/or associated with the proposed works e.g. direct mortality of fauna (e.g. road-kill), barrier effect on mobile species, disturbance impacts and impacts on birds due to collision to noise barriers;
 - (c) indirect impacts due to increased human activities and disturbance during the construction and operation stages of the Project such as increase in light intensity, noise, glare, dust, traffic; and
 - (d) cumulative impacts due to other planned and committed concurrent development projects at or near the Project Area.
- (vii) evaluate the significance and acceptability of ecological impact using defined criteria in the TM and based on the best and latest information available during the course of the EIA study, using quantitative approach as far as practicable and covering construction and operational phases of the Project as well as the subsequent management and maintenance requirement of the Project;
- (viii) recommend possible alternatives such as modification of alignment, design and/or construction methods, and practicable mitigation measures such as wildlife crossings and restriction of works at specified season or time to avoid, minimize and/or compensate for the adverse ecological impacts identified during construction and operation of the Project;
- (ix) evaluate feasibility and effectiveness of the recommended mitigation measures and define the scope, type, location, implementation arrangement, resources requirement, subsequent management and maintenance of such measures;
- (x) determine and quantify as far as possible of the residual ecological impacts after implementation of the proposed mitigation measures;
- (xi) evaluate the significance and acceptability of the residual ecological impacts using well-defined criteria in Annex 8 of the TM and determine if off-site mitigation measures are necessary to mitigate the residual impacts and if affirmative, guidelines and requirements laid down in Annex 16 of the TM should be followed; and
- (xii) review the need for and recommend any ecological monitoring programme required.

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), other published land use plan(s), planning brief(s) and/or studies which may identify areas of high landscape value e.g. country park, conservation area, woodland areas. 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 and vegetation survey shall be carried out and the impacts on existing trees and vegetation 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) appraisal of existing visual resources and characters as well as future outlook of the visual system of the assessment area;
 - (iii) identification and justification of the key groups of existing and planned sensitive receivers within the visual envelope with regard to views from ground level and elevated vantage points, and clearly indicate the sensitive receivers on a plan of appropriate scale;
 - (iv) description of the visual compatibility of the Project with the existing and planned visual context, and its obstruction and interference with the key views within the visual envelop;
 - (v) 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; and

- (vi) evaluations and explanations with supportive arguments of factors considered in arriving the significance thresholds of visual impact. The visual impacts should include presentation of an evaluation matrix derived for judging impact significance.
- 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 development options, alignment, 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 applicant shall recommend mitigation measures which shall not only focus on damage reduction but also potential enhancement of existing landscape and visual quality of the area. The recommendations shall also be illustrated in landscape design and landscape/visual impact mitigation measure plan.
- 5 The mitigation measures shall include preservation of vegetation and natural landscape resources (e.g. maintaining buffer for wetland/natural streams, retaining existing trees (including *Ficus virens*), transplanting of mature trees), wetland restoration, provision of screen planting, re-vegetation of disturbed land, woodland restoration, compensatory planting, erection of decorative screen hoarding compatible with surrounding setting, 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 operation phase of the Project. Besides agreement from relevant authorities which should be obtained before including into the LVIA, a practical programme for the implementation of the recommended measures shall be provided.
- 6 Annotated illustration materials such as colour perspective drawings, plans and section/elevation diagrams, annotated oblique aerial photographs, photographs taken at vantage points, and computer-generated photomontage shall be adopted to fully illustrate the landscape and visual impacts of the Project. 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 effectiveness of the proposed mitigation measures. Computer graphics shall be compatible with Microstation DGN file format. The Applicant shall record the technical details in preparing the illustration, which may need to be submitted for verification of the accuracy of the illustration. If any noise barriers/enclosures are proposed, the choice of their colours, design and materials should be compatible with the surrounding buildings and development context and their aesthetic designs should be considered.

Appendix I

Requirements for Cultural Heritage Impact Assessment

1. Built heritage impact assessment (BHIA)

The Applicant shall conduct a built heritage impact assessment (BHIA), taking the results of the previous studies and other background of the site into account, to identify known and unknown built heritage items built in 1969 or before within the assessment area that may be affected by the Project and its associated works and to assess the direct and indirect impacts on built heritage items. The impacts include visual impact, impacts on the fung shui/visual corridor of the historic buildings and structures through change of water-table, vibration caused by the Project. Assessment of impacts on cultural heritage shall also take full account of, and allow where appropriate, the Guidelines for Landscape and Visual Impact Assessment of Annex 18 of the TM. The Applicant shall demonstrate that all reasonable efforts have been made to avoid or keep the adverse impacts of built heritage items to the minimum through modification of design of the Project, or use of latest construction / engineering techniques. For those built heritage items that might still be directly and indirectly affected by the Project, the Applicant shall recommend practicable mitigation measures and monitoring to avoid or keep the adverse impact to the minimum. A checklist including all the affected sites of cultural heritage, impacts identified, recommended mitigation measures as well as the implementation agent and period shall also be included in the EIA report.

2. Archaeological impact assessment (AIA)

The Applicant shall engage qualified archaeologist(s) to conduct an archaeological impact assessment (AIA), taking the results of previous studies and other background of the site into account, to evaluate the archaeological impact imposed by the Project and its associated works. The scope of the AIA study, shall be submitted to the Antiquities and Monuments Office (AMO) and the Director prior to the commencement of the assessment for consideration. In case the existing information is inadequate or where the assessment area has not been adequately studied before, the archaeologists shall conduct archaeological field investigations to assemble data. If necessary, the archaeologists shall obtain licences from the Antiquities Authority prior to the commencement of archaeological field investigations. Based on existing and collected data, the Applicant shall evaluate whether the proposed developments and works associated with the Project are acceptable from archaeological preservation point of view. In case adverse impact on archaeological heritage cannot be avoided, appropriate mitigation measures should be designed and recommended in the EIA report. If archaeological field investigation is required, it shall follow detailed technical requirements to be given by the AMO and the Director on archaeological survey, archaeological report and handling of archaeological finds and archives. The Applicant shall draw necessary reference to relevant sections of the “Guidelines for Cultural Heritage Impact Assessment” issued by the AMO for detailed requirement.

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. In addition, to facilitate public inspection of EIA report via EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA report and executive summary prepared in Hyper Text Markup Language (HTML) and in Portable Document Format (PDF), unless otherwise agreed by the Director. For both of the HTML and PDF versions, a content page capable of providing hyperlink to each section and sub-section of the EIA report and executive summary shall be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the EIA report and executive summary shall be provided in the main text from where respective references are made. The EIA report, including drawings, tables, figures and appendices shall be viewable by common web-browsers including Internet Explorer 8, Firefox 23, Chrome and Safari 8 or later versions as agreed by the Director, and support languages including Traditional Chinese, Simplified Chinese and English.
3. The electronic copies of the EIA report and the executive summary shall be submitted to the Director at the time of application for approval of the EIA report.
4. When the EIA report and the executive summary are made available for public inspection under Section 7(1) of the EIAO, the content of the electronic copies of the EIA report and the executive summary must be the same as the hard copies and the Director shall be provided with the most updated electronic copies.
5. To promote environmentally friendly and efficient dissemination of information, both hardcopies and electronic copies of future EM&A reports recommended by the EIA study shall be required and their format shall be agreed by the Director.

