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Strategic Environmental Assessment (SEA) Study Brief
(This is NOT the full brief for the study but an extract of those parts related to the SEA element of the Study)

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Agreement No. CE 35/2010 (CE)

Review and Update of the Second Railway Development Study – Feasibility Study

Strategic Environmental Assessment Study Brief

1. INTRODUCTION

1.1 Highways Department commissions a consultancy study (which is referred to as the "Main Study" below) to review and update the findings and recommendations of the Second Railway Development Study taking into account the latest development, and to formulate an updated territory-wide railway development strategy so as to achieve optimum benefits and meet the need for rail transport beyond 2031. The Main Study was commenced in March 2011 for completion in 2013. A Strategic Environmental Assessment (SEA) will be conducted as part of the study and in parallel with the Main Study.

1.2 The preferred railway network expansion plan to be formulated under the Main Study should be able to:

(i) facilitate timely accessibility to strategic growth areas such as the New Development Areas for housing and economic developments, and to stimulate further developments or redevelopment opportunities along the railway corridors;

(ii) relieve bottlenecks in the existing railway system and improve network robustness;

(iii) meet cross-boundary railway traffic demands and ensure railway planning would better meet the planning targets as promulgated in the land use planning and development strategies in both Hong Kong and the Pearl

River Delta; and

(iv) better amplify the planning objectives that rail be used as the backbone of the public transport passenger network, and also reduce the environmental impact of the road-based transport.

1.3 As part of the comprehensive evaluation of the different railway network development options, a Strategic Environmental Assessment (SEA) will be conducted to ensure that environmental considerations will be fully integrated into the network expansion strategy, with environmental benefits maximized and adverse environmental impacts avoided / minimized. Relevant parts of the requirements for the SEA as required under the Main Study are extracted below.

2. DESRIPTION OF STRATEGIC ENVIRONMENTAL ASSESSMENT STUDY

2.1 The objectives of the SEA are:

(i) To encourage integrated consideration of environmental factors together with other considerations in formulating the various railway network options to avoid potential environmental problems;

(ii) To provide information, including environmental justifications if appropriate, to justify the need for additional rail networks, and for adopting the preferred railway network(s);

(iii) To identify and rule out railway development and network options which are environmentally unacceptable even after implementation of all practical mitigation measures;

(iv) To identify the environmentally-preferred railway development and network options, and provide environmental input into the options selection process; and

(v) To evaluate at a strategic level the potential environmental impacts of the preferred railway network(s) and development(s) recommended by the Study, identify any environmental mitigation measures, and follow up investigations required.

Scope of the SEA Study

2.2 ‘Railway network’ to be considered in the SEA should include the network as a

whole, the individual railway lines and their alignments, and also the following elements:

(i) Basic railway infrastructure and facilities such as the tracks, tunnels and bridges for rail and those for crossing the rail lines, stations, depots, maintenance workshops, administrative buildings and earthwork;

(ii) Facilities supporting the railway such as public transportation interchanges, car parks for park-and-ride, and modifications to road network necessary to support the services of the rail operation;

(iii) All new developments proposed by the Study, in particular those along the railway lines and around stations;

(iv) Physical modifications to the existing transportation infrastructure, other developments and the environment necessary for the construction, provision and operation of the railway network(s); and

(v) New developments along the railway lines, around stations and within the catchment of the stations not proposed by the Study but likely to be stimulated by the new railway networks.

2.3 Four types of environmental evaluation are to be carried out:

(i) Justification of the need for the additional transportation networks and linkages identified, and why railway is the preferred mode, through general broad brush evaluation;

(ii) Comparison of the environmental performance of various railway network and development options and combinations to identify the environmentally-preferred options or combinations, and options or combinations which are environmentally unacceptable. The findings should then be considered in the overall evaluation of the network and development options;

(iii) Identification and evaluation of the potential key environmental implications of the preferred network and development option(s) recommended by the Study, including issues such as noise, ecology, visual, cultural heritage, water, waste, air (including greenhouse gases) and resources utilization wherever relevant, and identification of any mitigation measures and further investigations required. The evaluation should be able to illustrate the magnitude of the problems and whether or not mitigation measures could be provided to alleviate any potential environmental impacts to within established guidelines and standards; and

(iv) Discussion on the strategic implications of the preferred network

and development option(s) on Hong Kong environment, such as total amount of loss in recognized sites of conservation importance, important habitats, areas of heritage importance, any overall deterioration or improvement in the noise environment, any reduction in air pollutants and greenhouse gases emissions, and identification of appropriate mitigation measures, if appropriate. The selection of the strategic performance indicators and evaluation methodologies, and the actual comparison and evaluation should aim at meeting the objectives of the SEA. The level of details should be such that the conclusions on the environmental acceptability and preference of the options considered could be confirmed.

2.4 The following implications, if relevant, should be considered during the four types of environmental evaluation to meet the study objectives:

(i) impacts or development constraints due to all activities caused by the construction, operation and maintenance of the railway networks and developments considered or proposed in the Study on the environment and other existing or potential sensitive receivers and developments likely to be affected. Examples of impacts include rail noise impacts, ecological and cultural heritage impacts due to land clearance, any air quality and greenhouse gases implications, and water quality impacts due to reclamation and tunnel construction (especially across the harbour) for the railway development, and constraints imposed by railways on development potential of sites affected;

(ii) strategic implications such as reduction in air pollutant emissions, including Volatile Organic Compounds (VOCs) and greenhouse gas emissions associated with transport modal changes, disturbances caused by developments stimulated by the network on specific recognized sites of conservation importance or important habitats;

(iii) cumulative impacts and individual impacts due to the railway links and developments considered in the Study;

(iv) any cumulative impacts with existing or any other planned rail, road or other developments if relevant, and through modelling for noise assessment. In order to consider the implications of cumulative noise impacts due to the above ground sections of the new railway network and new development options, noise mappings with separate layers for individual rails and various road traffic patterns may be required; and

(v) any short-term impacts due to staged or partial development of the preferred network and development option(s).

Task 1: Baseline Review

2.5 The Consultants shall collect and update relevant background environmental information relating to those areas likely to be affected by the railway and development options to be considered in the Study. The baseline condition should be established using appropriate strategic parameters to such a level of details that the conclusions on the environmental acceptability and preference of the strategic options under consideration could be confirmed. The information should also be able to provide a foundation for assessing the nature and extent of potential implications which could arise from different railway development scenarios.

2.6 The Consultants shall carry out desktop study to review and establish the ecological baseline conditions of the proposed railway by making use of the available information from government studies, relevant baseline reviews and research findings. For this purpose, the following major tasks shall be undertaken:

(i) compile, review, evaluate and consolidate existing information regarding the ecological characters of the proposed railway; The ecological surveys , where necessary, should be general in nature and are not intended to provide exhaustive ecological information or species list of the proposed railway;

(ii) establish the general ecological profile of the proposed railway based on the information collected in paragraph item (i) above, describe the general characteristics of each habitat found, including sites of high ecological value which are worthy of protection and conservation; and

(iii) prepare habitat maps of suitable scale showing the distribution and extent of various habitats found in the proposed railway, and annotating on the maps specific locations which are of conservation interest or ecological importance, in particular, recognized sites of conservation importance such as Site of Special Scientific Interest, country parks, marine parks and marine reserve or important habitats such as wetlands, fung shui woods, natural woodlands, natural streams, egretries, etc.

2.7 The Consultants shall review and establish the baseline conditions for agricultural and fisheries resources by making use of existing available information and identified sites important for capture and culture fisheries.

2.8 The Consultants shall also prepare a baseline of the environmental (such as air quality, water quality, noise, hazards, sewage, waste, etc) and cultural heritage conditions of the proposed railway based on the existing available information and examine whether the environmental, ecological and cultural heritage conditions of the proposed railway may be influenced by various local and regional factors.

2.9 The Consultants shall identify the limitations of the existing environmental capital stock and inventory of the existing and planned infrastructures (such as road networks, sewerage provision and water supply) and assess the committed demand to derive the broad reserve capacity as basis for the formulation and evaluation railway development strategy under the Main Study.

Task 2: Identification of Constraints, Opportunities and Key Issues

2.10 The Consultants shall identify the key environmental concerns and implications relevant to the rail network and associated developments; establish appropriate strategic performance indicators, criteria and evaluation methodologies on the key concerns and implications for environmental acceptance testing and performance comparison. Examples of potential concern are rail noise level, scale and extent of rail noise mitigation measures required, population exposed to rail noise, potential encroachment on recognized sites of conservation importance, loss of important habitats and areas of heritage importance, any reduction in air pollutants and greenhouse gas emissions, and any water quality impacts due to reclamation or other works. The SEA Study shall also identify the areas of special conservation importance with a view to developing a broad framework for protection and conservation. The key concerns and implications should be identified, taking into account both the characteristics of the impact generators and impact receivers, such as the railway network and development as generators and the environment and sensitive land uses as receivers.

Task 3: Examination of Key Issues

2.11 The Consultants shall investigate the key environmental issues identified, including those identified in Task 2 above. The Consultants shall suggest a list of strategic environmentally friendly alternatives and/or mitigation

proposals to address the key environmental issues identified.

2.12 The SEA Study shall examine the suitability of the areas of natural / cultural heritage high landscape value and high agricultural and fisheries potential / value in the proposed railway in order to safeguard these areas. The SEA Study shall also address and highlight heritage preservation as one of the factors to be considered in the formulation of railway development strategy under the Main Study.

Task 4: Evaluation of Draft Railway Development Strategy

2.13 The Consultants shall broadly identify, evaluate and compare the potential implications of the proposed railway options on the environment. This shall include the predicted changes in the environmental conditions of the proposed railway, changes in the pressure on the environmental capital and resources of the proposed railway and changes in the values of recognized sites of conservation importance and other ecologically sensitive areas in the proposed railway. The key environmentally favourable and unfavourable features and any particular problematic areas of the proposed railway should be identified in order to facilitate the selection of the preferred railway development plan.

2.14 Appropriate qualitative and/or quantitative methods / tools should be adopted in the evaluation. The evaluation methods / tools and criteria shall be clearly specified and agreed beforehand. In the evaluation process, the issues and consequences of the "do-nothing" scenario should also be identified, serving as a benchmark for evaluation in this task.

Task 5: Strategic Environmental Performance of Recommended Railway Development Strategy

2.15 The SEA Study shall adopt appropriate assessment methods / tools to examine the recommended railway development strategy to be formulated under Task 4 of the Main Study in respect of its environmental sustainability implications and strategic environmental implications. The level and magnitude of impacts should be specified in quantitative terms where appropriate. Feasible mitigation measures should be recommended to reduce the impacts to acceptable levels.

2.16 The potential issues to be examined in the SEA Study shall include, but not

limited to, ecology, fisheries, water quality, air quality, hazard, noise implications as well as resources of landscape and heritage value. The use of appropriate model and methodology shall be agreed with the Director's Representative beforehand.

2.17 Appropriate qualitative and/or quantitative methods / tools, which may include indicators, environmental mapping, appraisal checking, sensitivity testing, educated guess, specific criteria and measurement, etc, shall be used for the assessments. The assessments shall meet the following technical requirements, as appropriate to the level of details.

Task 6: Relevant Technical Requirements to Refine the Recommended Railway Development Strategy

(A) Air Quality Impact

2.18 The Consultants shall assess the air quality impacts to all the air sensitive receivers (ASRs) (including existing, committed and planned uses) in areas within 500m radius of the above ground sections of the new developments / new emission sources where there are usually pollutant emitting activities contributing further to local air quality impacts are proposed under the Main Study and in the vicinity of the proposed developments during operation phase. In the cases where there are one or more significant sources nearby, the study area of the air quality impact shall be extended or alternative estimation approach shall be employed to ensure these impacts are reasonably accounted for. If the above ground sections of the new railway network and new development options will result in adverse operational air quality impact to the surrounding sensitive receivers, the Consultants shall conduct an air quality impact assessment to cover the following tasks:

(i) presentation of the existing and background air quality for the purpose of evaluating the cumulative impacts of all the proposed developments;

(ii) description of the topographical and man-made features which may affect the dispersion characteristics of air pollutants;

(iii) identification of representative ASRs and/or potential affected uses;

(iv) identification of emission characteristics and provision of an emission inventory of all air pollution sources (including

existing, committed and planned uses). The air pollution sources shall include road traffic emissions to be estimated based on the traffic data and vehicle emission factor, emissions from polluting land uses and other air pollution sources identified in the course of the SEA;

(v) description of the assessment method and the associated assumptions, validity of the method and limits of application. If necessary, the vehicle emission factors shall be determined by the motor vehicle emission model to be agreed with EPD;

(vi) characterization, assessment and evaluation of the net and cumulative air quality impacts of the proposed developments;

(vii) presentation of the assessment results in the form of summary table and pollution contours for comparison with relevant air quality standards and the examination of the land use implications of these impacts; and

(viii) proposals of cost-effective mitigation measures to reduce the cumulative air pollution impacts to meet the established standards and assessment of the air quality implications of other environmental mitigation measures such as noise canopy and address their air quality impacts, if any.

(B) Green House Gas Reduction

2.19 The Consultants shall assess the implication of the recommended railway strategy on the greenhouse gas emissions by means of comparing the greenhouse gas emissions arising from the strategy with a baseline scenario. For completing this assessment, reference shall be made, but not limited to, the latest version of the following standards / guidelines:

(i) the Guidelines for National Greenhouse Gas Inventories published by the Intergovernmental Panel on Climate Change;

(ii) the relevant standards published by the International Organization for Standardization (in particular, ISO 14064-2 “Greenhouse gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements);

(iii) the relevant guidelines published by the World Business Council for Sustainable Development / World Resources Institute under the Greenhouse Gas Protocol Initiative (in particular, the Greenhouse Gas Protocol for Project Accounting);

(iv) the relevant approved methodologies published by the Executive Board of the Clean Development Mechanism under the United Nations Framework Convention on Climate Change (in particular, the approved consolidated baseline and monitoring methodology ACM0016 "Baseline Methodology for Mass Rapid Transit Projects");

(v) the relevant standards published by the British Standards Institute (in particular, PAS 2050 – Assessing the life cycle greenhouse gas emissions of goods and services); and

(vi) the relevant standards, guidelines, emissions factors published by local companies and government departments.

(C) Noise Impact Assessment

2.20 The Consultants shall examine all desktop information / studies relevant to the proposed railway developments. In order to assess the cumulative noise impacts of the above ground sections of the new railway network and new development options, 3-dimensional (3-D) noise mappings with separate layers for railways and the associated utility buildings as well as various road traffic patterns shall be provided. The study area for the noise impact assessment shall generally include areas within a distance of 300m from the boundary of the new above-ground railway network and new development options. In identifying the noise sensitive receivers (NSRs) for those above ground sections of the proposed railways, reference should be made to the Hong Kong Planning Standards and Guidelines (HKPSG), Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and relevant Guidance Notes. The NSRs shall include existing NSRs and planned / committed noise sensitive developments and uses. The Consultants shall gather necessary information and produce 3-D noise mappings for carrying out quantitative noise assessment. The assessment methodology shall be agreed with EPD prior to the quantitative noise assessment.

2.21 If new roads are proposed, the Consultants shall gather necessary information and use suitable assessment models such as Calculation of Road Traffic Noise (CRTN), Lima, CadnaA, or the equivalent to produce 3-D noise mappings for carrying out quantitative noise assessment. The information to be gathered shall include existing NSRs and planned / committed noise sensitive developments and uses within the study area, road traffic data, and confirmation of the validity of the

information shall be obtained from the relevant government departments / authorities. Reference can be made to the EIAO Guidance Note No. 12/2005 titled "*Road Traffic Noise Impact Assessment Under the Environmental Impact Assessment Ordinance*".

2.22 The 3-D noise mappings in the noise assessment shall cover the noise impacts of railway noise, fixed noise sources and road traffic noise. The Consultants shall gather necessary information and use appropriate computer models to produce the 3-D noise maps. Reference can be made to the following web sites:

- http://www.bksv.com/doc/Bp1962.pdf,
- http://www.environmental-expert.com/stse_resulteach_product.aspx?cid=33189&idproduct=65548&codi=65548,
- http://www.acu-vib.com.au/cadna.htm.

The noise levels at the NSRs shall be presented on 3-D noise maps, and on tables and plans (or other forms) of suitable scale at various representative floors (in mPD). Unless required for determining the planning standards according to HKPSG, such as those for planning of fixed noise sources, gathering of existing noise levels are not required.

2.23 In case of any identified adverse noise impacts, the Consultants shall study the feasible mitigation measures to reduce the impacts to an acceptable level. Direct measures including avoidance of the adverse impact through alternative siting shall be adopted as the first priority. In order to clearly present the extents / locations of the recommended noise mitigation measures due to the above ground sections of the new railway network and new development options, plans of appropriate scale showing the measures with their information (e.g. types, dimensions at different cross-section, extents / locations, lengths, mPD levels, etc) shall be given. For planned noise sensitive uses which will still be affected even with all practicable direct technical remedies in place, the Consultants shall propose, evaluate and confirm the practicality of additional measures within the planned noise sensitive uses.

(D) Water Quality Impact Assessment

2.24 The Consultants shall collect and update relevant background information on the existing water systems relating to those areas likely to be affected by

the railway options to be considered in the Study. The direct short-term and long-term impacts due to the construction and provision of these works on the existing water systems should be considered at the strategic planning stage to avoid and minimize the impacts, and to ensure that there would be no insurmountable problem. If the new railway network and new development options will result operational water quality impact to the surrounding sensitive receivers, the Consultants shall conduct a water quality impact assessment to cover the following tasks:

(i) desktop review of background information on the existing water systems and the respective catchments;

(ii) characterization of water quality based on existing information or site surveys/tests as appropriate;

(iii) identification and analysis of all existing and future activities and beneficial uses related to the water system(s) and identification of all water sensitive receivers;

(iv) establishment of pertinent water quality objectives, criteria and standards for the water systems and all the sensitive receivers;

(v) identification of any alteration of water courses, natural streams/ponds, wetlands, change of shoreline or bathometry, change of flow regimes, change of ground water levels, change of catchment types or areas;

(vi) identification, analysis and quantification of all existing and future water pollution sources, including point discharges and non-point sources to surface water runoff. Field investigation and tests shall be conducted as appropriate. An emission inventory on the quantities and characteristics of all the pollution sources in the assessment area shall also be provided;

(vii) prediction and quantification, by mathematical modelling or other technique approved by the EPD, of the impacts on the water systems and the sensitive receivers. Possible impacts include changes in hydrology, flow regime, water quality and the effects on the aquatic organism due to such changes. Cumulative impacts due to other projects, activities or pollution sources in the vicinity shall also be predicted and quantified;

(viii) assessment and quantification of all existing and future waste water generation activities and analysis on the adequacy of existing and future sewerage infrastructure to cope with the recommended railway development strategy;

(ix) assessment and quantification of all existing and future water pollutants from non-point sources and analysis on the provision and adequacy of existing and future facilities to reduce pollutants;

(x) recommendation of mitigation measures to reduce the water quality impacts to acceptable levels; and

(xi) evaluation and quantification of residual impacts on the water systems and the sensitive receivers with regard to the appropriate water quality objectives, criteria, standards, guidelines or government policies.

(E) Hazards

2.25 The Consultants shall identify the Potentially Hazardous Installations (PHIs) and existing / old landfills and proposed landfill extensions and avoid proposing any railway developments within or adjacent to these facilities. In case that such developments are unavoidable, the Consultants shall examine if these facilities may affect or be affected by the proposed railway developments, conduct board term hazard assessments, quantify the hazard risks if appropriate, and recommend feasible risk mitigation measures. If the new railway network and new development options will affect / be affected by any existing or planned hazard installations, the Consultants shall conduct a hazard assessment to cover the following tasks:

(E1) Hazard Assessment for Potentially Hazardous Installations

2.26 Hazard assessment for PHIs shall be carried out to evaluate the degree of risk associated with the proposed developments if there is an increase in the number of persons within the Consultation Zone of the PHIs. The assessment shall include the following tasks:

(i) identify all credible and applicable hazardous scenarios requiring Quantitative Risk Assessment (QRA) associated with transport, storage and handling of dangerous goods within the Consultation Zone of PHIs;

(ii) carry out a cumulative QRA 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 Technical Memorandum issued under section 16 of the EIAO;

(iv) assess and recommend practicable and cost effective risk mitigation measures; and

(v) report the findings of the QRA in a Hazard Assessment Report and Co-ordinating Committee on Land Use Planning and Control Relating to Potentially Hazardous Installations Paper.

(E2) Landfill Gas Hazard Assessment

2.27 Landfill gas hazard assessment shall be carried out to evaluate the degree of risk associated with the proposed developments if they are affected by existing/old landfills and proposed landfill extensions. The assessment shall include:

(i) identify the affected proposed developments for the purpose of providing adequate safety and precautionary measures to avoid or minimize the risks due to landfill gas, migration or leachate contamination;

(ii) desktop review of background information and studies related to the relevant landfills;

(iii) identify the sources, nature and likely quantities/concentrations of hazardous emissions which have the potential to affect the proposed developments;

(iv) identify the elements (targets) of the proposed developments which are sensitive to the effects of the hazardous emissions and qualitatively assess the degree of risk involved; and

(v) propose suitable types of gas protection measures to mitigate the identified hazards to an acceptable level and to render the proposed developments as safe as reasonably practicable.

(F) Solid Waste

2.28 The assessment shall examine the implications of the proposed developments on material consumption and waste generation, and existing and planned waste reduction, collection, treatment and disposal measures or facilities for various solid waste reduction and disposal options. The need for and the costs of additional facilities to handle the solid wastes should be roughly estimated. The implications of construction and demolition materials arising from the proposed developments,

their collection, recycle/reuse and disposal shall also be examined.

2.29 The implications of chemical wastes, if any, arising from industrial or chemical processes and their collection, treatment and disposal shall also be examined.

(G) Land Contamination

2.30 The Consultants shall address the potential land contamination associated with the historical land uses which have the potential to cause or have caused land contamination. The Consultants shall provide a brief account of the present land use (including description of the activities, chemicals and hazardous substances handled) and a key past land uses history in relation to possible land contamination.

(H) Ecological Impact Assessment (including Terrestrial, Aquatic and Marine)

2.31 The Consultants shall confirm as far as possible the acceptability of the residual and cumulative impacts of the proposed railway developments and shall undertake the following tasks:

(i) review and incorporate the findings of the baseline review and where necessary, carry out additional field surveys so as to provide further information to fulfil the objectives of the SEA and the Main Study. The field surveys, where justified, shall comprise general habitat surveys, and wildlife surveys for an appropriate duration at suitable survey seasons with reference to relevant EIAO guidance notes or other relevant guidelines. The need of such surveys is dependent on the sufficiency of existing information and ecological importance of the area to be surveyed.;

(ii) based on the information gathered above, refine relevant parts of the ecological profile and relevant habitat maps produced from Task 1 of the SEA Study for the proposed development areas. The major information to be provided in the ecological profile shall include:

- habitat type and the presence of any areas / species of conservation importance and features of ecological importance;

- general description of the existing wildlife uses of various habitats with special attention to various wildlife groups and habitats with conservation importance and interests;

- habitat maps of suitable scale showing the various habitats of the proposed development areas. Colour photos of important habitats or features of ecological importance identified shall be provided;

(iii) identify, predict and quantify as far as possible any ecological impacts with particular emphasis on significant ecological impacts such as encroachment into recognized site of conservation importance, destruction of important habitats, or impact on species of conservation concerns. . An overlay of the recommended railway development strategy on the habitat maps shall be prepared to provide an overview of the impacts;

(iv) evaluate the significance and acceptability of the ecological impacts identified using well-defined criteria and rule out options which are not acceptable from ecological perspective;

(v) consider and recommend the type and nature of mitigation measures in broad sense to avoid, minimize and/or compensate for the adverse ecological impacts identified in a preferential order.

(vi) identify unresolved key issues and recommend further investigations to be taken up in the subsequent planning and design stage of individual projects.

(I) Fisheries Impact Assessment

2.32 The Consultants shall assess potential impacts on capture and culture fisheries arising from the proposed railway developments and shall undertake the following tasks:

(i) describe the physical environmental background;

(ii) review existing information and describe the baseline condition of capture and culture fisheries resources and activities. Field survey shall be conducted, where justified, to provide necessary data for filling any data gap identified;

(i) identify parameters (e.g. water quality parameters) and areas that will be affected by the proposed developments;

(ii) identify and evaluate any direct and indirect, short and long-term fisheries impacts as far as possible; and

(v) recommend measures for impact mitigation.

(J) Cultural Heritage Impact Assessment

2.33 The Consultants shall engage archaeologists and historical building experts to carry out a board term desktop Cultural Heritage Impact Assessment on the proposed railway development areas. In conducting the board term Cultural Heritage Impact Assessment, the Consultants shall make reference to the available information from relevant studies, baseline reviews and research findings; and the assessment shall be supported with illustrative materials such as photographic records and location plans. The Consultants shall identify the potential impacts on cultural heritage which shall include

(i) all archaeological sites (including marine and terrestrial archaeological sites);

(ii) built heritages (including all pre-1950 buildings and structures and selected post-1950 buildings and structures of high architectural and historical significance and interest); and

(iii) cultural landscapes (including places associated with historic event, activity, or person or exhibiting other cultural or aesthetic values, such as sacred religious sites, battlefields, a setting for buildings or structures of architectural or archaeological importance, historic field patterns, clan graves, old tracks, fung shui woodlands and ponds, and etc.)

and recommend feasible mitigation measures and/or areas of archaeological and heritage potential for further study/survey.

(K) Broad Visual Impact Assessment

2.34 With a view to evaluating the acceptability of the recommended railway development strategy from visual impact perspective, the Consultants shall carry out a broad Visual Impact Assessment to identify the visual impacts of the proposed developments on the visual envelope, recommend feasible visual enhancement/mitigation measures and assess the residual impacts after implementation of the feasible measures.

(L) Broad Landscape Impact Assessment

2.35 The Consultants shall carry out a broad landscape impact appraisal with a view to producing a broad landscape framework to prevent and minimize adverse impacts of the proposed developments on the landscape resources of sensitive areas and potential conservation areas, and to look for positive opportunities for environmental enhancement.

Task 7: Strategic Environmental Performance of Revised Recommended Railway Development Strategy and Mitigation Measures

2.36 The Consultants shall define areas of non-development, taking into account areas / sites with high landscape, environmental, ecological, cultural heritage and archaeological value that merit conservation and protection, natural terrain, and recommend actions / proposals for their preservation and enhancement.

2.37 The Consultants shall agree with the relevant Director's Representative on the numbers of design years and model runs to be carried out for the SEA and to collect all information and input assumptions for the SEA model runs. The Consultants shall prepare all input files, carry out all the SEA model runs and prepare a set of procedures for presenting the SEA results in tabular and/or graphical form. The Consultants shall also analyze and review the SEA results for various design years to ensure that they are reasonable and acceptable.

2.38 The Consultants shall provide information to establish the need for additional transportation network, and, if appropriate, justify the use of rail from environmental implications points of view. The environmental justification could be provided by general broad-brush comparisons, followed by quantitative evaluation where appropriate, of the environmental implications of using rail instead of motor vehicles or other practicable transportation means to meet the transportation demand. If the provision of additional rail cannot be justified on environmental ground, information on other non-environmental considerations which support the proposal should be provided as reference.

2.39 The Consultants shall evaluate and compare the environmental performance of the rail network and development options considered in the Study. If

appropriate, the options could be refined or alternative options developed based on the evaluation results to improve the options' environmental performance and acceptability and/or to optimize both their transportation and environmental benefits. Options which fail to meet the criteria and therefore environmentally unacceptable should be identified. The environmentally-preferred option(s) should also be stated. The findings and conclusions on the strategic environmental comparisons of the network and development options should then be provided to the overall Study for inclusion into the overall comparison of the network and development options.

2.40 After the preferred network and development option(s) has been selected for the whole Study, the Consultants shall confirm its environmental feasibility by identifying and evaluating the potential environmental impacts and any mitigation measures and follow-up investigations required. This includes potential concerns due to developments likely to be stimulated by the proposed option(s). In situations where certain mitigation measures must be exercised, such as the use of special rolling stocks, track design, covered railway sections for rail noise control, land use planning control and constraints to be imposed on nearby and/or future developments, noise barriers and covered rail sections, compensatory tree planting and restoration / replacement of carbon sink and important habitats at specific locations, further environmental investigation before other developments can proceed, and special phasing and timing of works, the measures should be described clearly and included as an essential component of the proposed strategy. The need for any further study to examine specific strategic environmental issues for the later stages of planning and implementation of the option(s) should be identified with its scopes defined. All the mitigation measures and follow up studies identified should also be covered in a summary action plan to facilitate future monitoring and auditing of the strategy.

2.41 The Consultants shall summarize and discuss the strategic implications of the proposed railway network and development option(s) on Hong Kong's environment. The discussion can be based on the work carried out to meet the requirements above. Strategic environmental issues specific to the proposed option(s) should also be included, such as the extent of any deterioration or improvement in acoustic environment, amount of

natural conservation area loss and loss of important habitats, and any reduction in air pollutant emissions and greenhouse gas emissions due to transport modal changes and its consequential air quality implications. Potential measures to improve the strategic environmental performance of the proposed network and development options should be identified if appropriate.

2.42 The Consultants shall develop an appropriate framework and methodology for a strategic environmental monitoring and auditing mechanism for the proposed strategy and development to ensure that the environmental recommendations and mitigation measures identified in the SEA would be carried forward and implemented at the subsequent stages of the strategy and development. For avoidance of doubt, the actual monitoring and auditing work is not part of the SEA, but a commitment to be stated in the proposed strategy and development.

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