

1. INTRODUCTION

Project Background

- 1.1 In 2000, the Northshore Lantau Development Feasibility Study (NLDFS) recommended that northeast Lantau Island (Yam O, which has been renamed as Sunny Bay recently) be developed as a tourism and recreation development theme with scope for international standard tourism facilities. The NLDFS also recommended that construction of a parallel route to North Lantau Highway (NLH) extending from the Airport to Sunny Bay providing regional access to North Lantau New Town and the airport and local access to Sunny Bay and Penny's Bay is necessary.
- 1.2 Route 10 – North Lantau to Yuen Long Highway forms an integral part of the strategic Western Highway between North Lantau and Shenzhen. The Route 10 alignment is divided into two parts, Southern and Northern Sections. The construction of Route 10 Southern Section, which was formerly know as the Route 10 Lantau East Coastal Section (hereinafter referred to as "Route 10 Southern Section"), extending from North Lantau to So Kwun Wat, aims to support the developments in Lantau and provide the security of a second strategic road link to Lantau and the airport.
- 1.3 Based on the latest development schedule, the construction of Road P1 and Route 10 would be deferred. In early 2002, Civil Engineering Department (CED) carried out a study on the implication of the deferment of the construction of Route 10 Southern Section and the Pa Tau Kwu Section of Chok Ko Wan Link Road (hereinafter referred to as "CKWLR") to beyond 2016 on the proposed Penny's Bay development including Hong Kong Disneyland Development. The study report concluded that it was acceptable from the point of view of road capacity, and recommended that the construction of a part of the Road P1 between Sham Shui Kok and Sunny Bay (part of Slip Roads 5 and 6) would need to be advanced to ensure that a second entrance/exit is provided to and from the proposed theme park in Penny's Bay for relieving large number of park visitors during emergency situation. [Figure 1.1](#) shows the location of the proposed Project.
- 1.4 In April 2000, Maunsell Consultants Asia Limited (MCAL) was commissioned by CED as the consultant to undertake the design and construction assignment for the Infrastructure for Penny's Bay Development (Agreement No. CE 68/99). The services have subsequently extended to cover the Road P1 Advance Works at Sunny Bay on Lantau Island (hereinafter referred to as "the Project"). Maunsell Environmental Management Consultants Limited (MEMCL) is responsible for the Environmental Impact Assessment (EIA) study.

Objectives of the EIA Study

- 1.5 This EIA Study will identify and quantify various potential environmental impacts associated with the construction and operation of the Project and will recommend effective mitigation measures to ameliorate any potentially negative impacts on the environment.
- 1.6 The specific objectives of this EIA Study as set out in the EIA Study Brief are listed as follows:
- To describe the Project and associated works together with the requirements for carrying out the Project;
 - 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;
 - To identify and quantify emission sources and determine the significance of impacts on existing and planned sensitive receivers and potential affected existing and planned uses and propose measures to mitigate these impacts;

- To identify, describe and quantify any potential losses and damage to flora, fauna and wildlife habitats, ecological impacts and fisheries impacts during construction and operation phases including the loss of fishing grounds and impacts on the Ma Wan fish culture zone;
- To identify, describe and quantify any potential landscape and visual impacts, propose feasible mitigation measures and evaluate the significance of impacts on existing and planned sensitive receivers;
- To identify any negative impacts on the sites of cultural heritage and to propose measures to mitigate these impacts;
- To propose the provision of mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the Project;
- To investigate the feasibility, practicability, effectiveness and implications of the proposed mitigation measures;
- To identify, predict and evaluate the residual environmental impacts (i.e. after practicable mitigation) and the cumulative effects expected to arise during the construction and operation phases of the Project in relation to the existing and planned sensitive receivers and potential affected existing and planned uses;
- To identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the Project which are necessary to mitigate these environmental impacts and cumulative effects and reduce them to acceptable levels;
- To identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification; and
- To design and specify the environmental monitoring and audit requirements, if required, to ensure the effective implementation of the recommended environmental protection and pollution control measures.

The Approach

- 1.7 The present study has been conducted in accordance with the guidelines on assessment methodologies provided in Annexes 12 to 19 of the EIAO-TM. The general approaches and methodologies adopted for the assessment are described below.

Description of the Environment

- 1.8 The characteristics of the environment were described for identification and prediction of environmental impacts. Baseline environmental surveys were carried out to determine the existing environmental conditions on the site and in all environs likely to be affected by the proposed Project. The baseline conditions on key issues identified in the EIA Study Brief including the existing noise environment, air quality, water and sediment quality, marine and terrestrial ecology, fisheries, cultural heritage and the landscape and visual quality were described in the assessment.
- 1.9 Relevant reports and drawings were reviewed and findings from past studies were incorporated where appropriate in this EIA Report. Previous studies relevant to this Study are listed below:
- Northshore Lantau Development Feasibility Study, Environmental Impact Assessment Final Report (February 2000) (hereinafter referred to as the “NLDFS EIA”)
 - Construction of an International Theme Park in Penny’s Bay of North Lantau together with its Essential Associated Infrastructures, Final EIA Report (February 2000) (hereinafter referred to as the “Theme Park EIA”)

- Route 10 – North Lantau to Yuen Long Highway Investigation and Preliminary Design EIA Final Assessment report (September 1999)

Impact Prediction

- 1.10 The present Study has been undertaken following the guidelines on assessment methodologies given in Annexes 12 to 19 of the EIAO-TM. Quantitative predictive tools were employed for the prediction of environmental impacts in respects of construction noise, traffic noise and air quality, and water quality. The predictions were based on internationally recognised methods. For instance, the United States Environmental Protection Agency (USEPA) approved air dispersion model, *California Line Source Dispersion Model*, CALINE 4, was used to predict vehicle exhaust pollutants from open road emissions due to the proposed Project and surrounding road network. Besides, the methodology described in the United Kingdom Department of Transport's "Calculation of Road Traffic Noise"(1988) and the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM) under the Noise Control Ordinance (NCO) was adopted to predict the road traffic and construction noise impact respectively. As for water quality impact, a near field model of sediment dispersion developed by R. E. Wilson¹ was used to assess the impacts from suspended sediment plumes formed during construction of the Sunny Bay Reclamation.
- 1.11 These methodologies had previously been applied in similar situations in other EIA studies (e.g. NLDFS EIA and Theme Park EIA). They have generally been accepted for use in assessing environmental impacts and comparison of prediction results with EIAO-TM standards. There would be some limitations of methodologies such as the accuracy of the predictive base data for future e.g. traffic flow forecasts and weather conditions. Quantitative uncertainties in the assessment of impacts should be considered when drawing conclusions from the assessment. In carrying out the assessment, realistic worst case assumptions have been made in order to provide a conservative assessment of environmental impacts including: noise and air quality impact assessment are based on the peak hourly traffic flows; water quality impact assessment is based on the maximum dredging rate; and the calculation of loss rate of sediment to suspension is based on conservative estimates for the types of plant and methods of working.

Impact Evaluation

- 1.12 The anticipated changes and effects as a result of the proposed Project were evaluated with respect to the criteria described in Annexes 4 to 10 of the EIAO-TM, and in quantitative terms as far as possible and as appropriate.

Impact Mitigation

- 1.13 Mitigation measures would be identified and evaluated to avoid, reduce or remedy the impacts. The avoidance of impacts were given with priority as a mitigation. The effectiveness of mitigation measures was assessed and residual environmental impacts were defined.
- 1.14 The effectiveness of the proposed mitigation The anticipated changes and effects as a result of the proposed Project were evaluated with respect to the criteria described in Annexes 4 to 10 of the EIAO-TM, and in quantitative terms as far as possible and as appropriate.

Report Structure

- 1.15 This EIA Report comprises thirteen sections and each section was briefly described below:

Section 1 presents the introduction of this EIA Study

¹ R E Wilson. A Model for the Estimation of the Concentrations and Spatial Extent of Suspended Sediment Plumes. *Estuarine and Marine Coastal Science* (1979), Vol 9, pp 65-78.

Section 2 presents a description of the Project, including the project location, EIA Study Area and the construction activities

Section 3 identifies and assesses potential noise impacts arising from the construction and operation of the Project, and recommends effective mitigation measures, wherever necessary

Section 4 identifies and assesses potential air quality impacts arising from the construction and operation of the Project, and recommends effective mitigation measures, wherever necessary

Section 5 identifies and assesses potential water quality impacts associated with the construction and operation of the Project and recommends mitigation measures to meet the established water quality standards of effluents

Section 6 identifies and assesses potential impacts associated with waste generation during construction and recommends mitigation measures, wherever necessary

Section 7 identifies and assesses potential ecological impacts on terrestrial and marine environment arising from the construction and operation of the project and recommends mitigation measures to alleviate the impacts to minimum

Section 8 identifies and assesses potential fisheries impact arising from the construction and operation of the project and recommends mitigation measures, wherever necessary

Section 9 identifies and assesses potential impacts on cultural heritage arising from the project and recommends mitigation measures, wherever necessary

Section 10 identifies and assesses potential landscape and visual impacts arising from the project and recommends mitigation measures

Section 11 presents the Environmental Monitoring and Audit (EM&A) requirements

Section 12 reviews the findings and presents the overall conclusions of this EIA study

Section 13 presents the Implementation Schedules of recommended mitigation measures for various environmental issues.

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Figure 1.1 Location of the Project Site