

1. INTRODUCTION

1.1 Background of the Study

The West Rail Phase I development will provide a domestic passenger train service linking Tuen Mun and West Kowloon. In association with the development of the new stations at Kam Tin, Yuen Long, Tin Shui Wai and Tuen Mun Centre, *Essential Public Infrastructure Works* (EPIWs) are to be undertaken to provide a new Eastern Access Road at Kam Tin, and, at the other locations, highway realignments to accommodate additional traffic flows arising from the development of West Rail.

The scope of works assessed within the current EIA Study comprises four designated projects as defined in Schedule 2 of *Environmental Impact Assessment Ordinance* (EIAO) (Section A1 of Part I):

- modification to Long Yat Road and Roads L1, L2, and L3 serving Yuen Long Station;
- modification to Tin Fuk Road, Ping Ha Road and Tin Yiu Road serving Tin Shui Wai Station;
- improvement to Tuen Mun Heung Sze Wui Road, Yan Ching Street, Pui To Road and Ho Pong Street serving Tuen Mun Centre Station; and
- construction of a new highway connecting Kam Tin Station with Kam Sheung Road and the Kam Tin Bypass.

The Kowloon-Canton Railway Corporation (KCRC) has commissioned Environmental Resources Management Limited (ERM) to undertake an Environmental Impact Assessment of the EPIWs.

1.2 Scope of the Environmental Impact Assessment

This EIA Report is submitted under the Environmental Impact Assessment Ordinance and in response to the EIA Study Brief No. ESB-009/1998 issued by the Hong Kong Government's Environmental Protection Department (EPD).

The EIA Report provides information on the nature and extent of environmental impacts arising from the construction and operational phases of the project and related activities taking place concurrently. The purpose of the EIA is to determine the acceptability of the EPIWs in terms of any adverse environmental impacts that may arise, provide mitigation requirements for the control of construction and operational consequences in the detailed design and determine the acceptability of any residual impacts after the application of mitigation measures.

1.3 Objectives of the Environmental Impact Assessment

The purpose of the study is to determine the acceptability of the EPIW's in terms of any adverse environmental impacts that may arise. Where impacts are identified during either the construction or the operational phases, the study will provide recommendations on appropriate mitigation requirements and determine the acceptability of any residual impacts after the application of these mitigation measures.

In line with the Study Brief issued by the EPD, this study includes the assessment of the following key areas:

- Construction and Operational Air Quality;
- Construction and Operational Noise;
- Water Quality;
- Waste Management;
- Cultural Heritage;
- Landscape and Visual Issues; and
- Environmental Monitoring and Audit Requirements.

In addition, to the key 'common areas of assessment' listed above, the Eastern Access Road Study Brief requires the additional assessment of:

- Land Contamination; and
- Ecological Resources.

The broad objectives of the EIA Study, as outlined in the Study Brief, are:

- to describe the EPIWs and associated works together with the requirements for carrying out their development;
- to identify and describe the elements of the community and environment likely to be affected by the proposed EPIWs;
- to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- to identify any negative impacts on sites of cultural heritage and to propose mitigation measures;
- to identify potential landscape and visual impacts and recommend appropriate mitigation measures;
- to propose the provision of infrastructure or mitigation measures so as to minimise pollution, environmental disturbance and nuisance during construction and operation of the EPIWs;
- to evaluate, 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 EPIWs in relation to sensitive receivers and potential affected uses;

- to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the EPIWs which are necessary to mitigate these impacts and reducing them to acceptable levels;
- to investigate the extent of side effects of the proposed mitigation measures that may lead to other forms of impacts;
- to identify constraints associated with the mitigation measures recommended; and
- to design and specify the environmental monitoring and audit requirements, if required, to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted.

1.4 The Project Design Focus

The KCRC has also engaged the services of engineering Design Consultants to develop design and engineering proposals for the three EPIWs in conjunction with the West Rail Phase 1 project. These engineering studies have been proceeding in parallel with the EIA study and involved the collaboration of the EIA Study Team and Design Consultants in determining constraints and opportunities to accommodate environmental mitigation.

In the preparation of the EIA Study, significant focus has been placed upon operational noise based upon a series of preliminary assessments which identified adverse impacts from road traffic noise in the baseline and future unmitigated scenarios. As a result, the requirement of the Project Proponent's assignment has been to ensure that sensitive property will continue to enjoy an "open windows" lifestyle. Consequently, this has placed considerable focus upon the engineering design of "at-source" (direct technical remedies) noise screening measures. The solutions presented in the EIA represent the result of a collaborative design by the Detailed Design Consultants, KCRC and Highways Department (HyD). With the "as-developed" solutions completed, the EIA Study has sought wherever possible to ameliorate the potential side effect of these measures while being cognisant of the design assignment to ensure direct physical adverse impacts are prioritised in the overall mitigation programme.

For each of the proposed EPIWs, drainage studies have been undertaken as part of the initial feasibility studies and subsequently during the engineering design works. Each of the EPIWs and the associated drainage systems have been designed, and will be constructed, to appropriate drainage design standards to ensure that any potential drainage or flooding concerns will be suitably controlled. It is envisaged that the proposed EPIW works will improve the drainage in each of the areas. As drainage and flooding issues are not areas requiring specific study under the EIAO, this EIA Report does not specifically address these areas, however, it is not envisaged that these issues should give rise to any specific environmental concerns.

1.5 Compatibility with West Rail Phase I

As the majority of the EPIWs are within the gazetted boundary of the West Rail Phase I, the Design Consultants have been planning the works in accordance with the recommendations of the West Rail Final Assessment Report (FAR) dated 11 February 1998. The FAR has provided full reference to all potential construction related issues such as noise, dust, water and waste management as well as cultural resources within the boundary of the EPIWs. As such, the findings of the FAR for water quality, waste management and cultural heritage have been used as a basis within this report for assessing the impacts to these media and for recommending appropriate mitigation measures. Specific quantitative and detailed assessment of construction and operational noise, air quality, landscape and visual issues and the review of all environmental monitoring and audit recommendations form the substantial focus of this EIA Study.

The relevant conclusions of the FAR are described below for the issues of water quality, waste management and cultural heritage.

For water quality, the FAR described the Water Sensitive Receivers in the Yuen Long, Tin Shui Wai, Tuen Mun Centre and Kam Tin areas, potential sources of impact and recommends mitigation measures. The Study recommends that measures are to be implemented during construction to prevent suspended solid loadings from entering the water courses through proper site management to minimise surface runoff and soil erosion. These recommendations, including the implementation of the EPD's Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94), will be required for the EPIWs together with all conditions specified in the West Rail Environmental Permit relating to works within the gazetted boundary. With the implementation of these permit controls on all construction activities and proper site management procedures, residual water quality impacts will be to acceptable levels. The FAR concluded that on the basis of the mitigation measures to be implemented there will be no insurmountable water quality impacts.

The FAR described the volume and content of waste arising in the Western Section of West Rail including Yuen Long, Tin Shui Wai, Tuen Mun Centre and Kam Tin. The key issues identified are the need to implement effective waste management planning during the construction phase with a strong preference for reuse of clean surplus material rather than disposal at public dumps. The FAR provided waste management methods and practices and other mitigation measures to ensure that potential impacts will either be avoided or residual impacts controlled to acceptable levels.

For cultural heritage, the FAR provided an inventory of existing historic buildings located within 100 m of the railway alignment. Of these, the Tsui Shing Lau Pagoda is in close vicinity of the EPIW at Tin Shui Wai and the FAR recommended sensitive treatment of the adjacently proposed environs and construction mitigation measures to ensure the preservation of the Pagoda structure. As a direct result of the FAR, and agreement with Antiquities and Monument Office (AMO), the setting of the Pagoda has been preserved within the design of the railway and this will not be encroached by the EPIW alignment and construction works.

1.6 Requirements of the Study

The assessment of impacts arising from the EPIWs has been undertaken in accordance with the requirements stated in the Study Brief issued on 18 September 1998. ESB-009/1998 of the EIA Register established under the EIAO.

The key source of potential impact will be from road traffic noise in the operational phase and the introduction of mitigation measures may give rise to side effects in terms of air quality and landscape and visual effects. Having examined the available noise mitigation requirements and an appropriate engineering design from an exhaustive inventory of control strategies in conjunction with physical engineering constraints, the EIA is to provide an assessment of air quality, landscape and visual effects to develop recommendations that ensure any residual impacts will be acceptable or ameliorated as far as is possible. Assessments have also been undertaken to determine the potential impacts to ecological resources from both the construction and operation of the Eastern Access Road (EAR), and to ascertain the presence of current and former landuses in the study area that may have the potential to result in contaminated land; where necessary, appropriate mitigation measures have been proposed. Broad reference has been made to the West Rail FAR in the assessment of the acceptability of waste, water and cultural heritage impacts, and in the determination of appropriate mitigation measures to protect these resources.

Site specific construction related impacts in respect of noise and air emissions are to be assessed and appropriate mitigation measures recommended to ensure the construction programme will not result in unacceptable impacts: where appropriate, EM&A requirements are to be defined.

1.7 Data Sources

In compiling this report, the Consultants have drawn upon existing data sources, and used information gathered whilst researching and undertaking the EIA for the related West Rail. Additionally, use has also been made of the EIA Report produced in February 1997 by Binnie Consultants Limited for the *Tin Shui Wai Development: Engineering Investigations for Development of Areas 3, 30 & 31 of the Development Zone and the Reserve Zone*.

1.8 Structure of EIA Report

This EIA Report has been organised into three parts:

- **Part A** provides common introductory sections to the EIA Study and comprises *Sections 1, 2 and 3* as described below.
- **Part B** presents *Sections 4 to 13* as described below. These Sections comprise the technical content of the EIA Report for the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre, which was undertaken under a separate EIA Study Brief (ESB-014/1998). At the time of the submission of this EIA Report, the EIA Report for the

EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre has been approved for public inspection by the EPD and has been reviewed and approved by the Advisory Council on the Environment (ACE).

- **Part C** presents the technical assessment of the environmental impacts associated with the construction and operation of the Eastern Access Road (EAR) to the West Rail Kam Tin Station and comprises *Sections 14 to 25* as described below.

In addition to this introductory section, the EIA Report is organised as follows:

Part A comprises this introductory section and the following:

- *Section 2* provides a description of the works assessed within this Report; and
- *Section 3* details the criteria stipulated by Government legislation and environmental standards relevant to the study, which have been adopted in the evaluation of potential environmental impacts.

Part B comprises:

- *Section 4* describes the existing environment and identifies sensitive receivers potentially affected by the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre;
- *Section 5* examines the potential noise impacts arising from the construction and operation of the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre and, where appropriate, recommends practical mitigation measures;
- *Section 6* examines the potential air quality impacts arising from the construction and operation of the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre and, where appropriate, recommends practicable mitigation measures;
- *Section 7* describes the existing water sensitive receivers, the likelihood of impact during the construction and operational phases and recommends appropriate methods of control;
- *Section 8* examines the potential landscape and visual impacts arising during the “as-built” operational phase of the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre and, where appropriate, recommends practical mitigation measures;
- *Section 9* describes the potential for waste arisings and recommends handling and disposal techniques to ensure impacts will be minimised;
- *Section 10* reviews the likelihood of cultural heritage impacts and describes measures to be taken to ensure no loss to these resources;
- *Section 11* outlines the requirement of Environmental Monitoring and Audit for the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre;

- *Section 12* summarises the findings of the EIA of the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre and presents the implementation schedule of any environmental mitigation measures proposed; and;
- *Section 13* presents the conclusions of the EIA Study of the EPIWs at Yuen Long, Tin Shui Wai and Tuen Mun Centre.

Part C comprises:

- *Section 14* describes the existing environment and identifies sensitive receivers potentially affected by the Eastern Access Road;
- *Section 15* examines the potential noise impacts arising from the construction and operation of the Eastern Access Road and, where appropriate, recommends practicable mitigation measures;
- *Section 16* examines the potential air quality impacts arising from the construction and operation of the Eastern Access Road and, where appropriate, recommends practicable mitigation measures;
- *Section 17* describes the existing water sensitive receivers, the likelihood of impact during the construction and operational phases and recommends appropriate methods of control;
- *Section 18* examines the potential landscape and visual impacts arising during the “as-built” operational phase of the Eastern Access Road and, where appropriate, recommends practical mitigation;
- *Section 19* describes the potential for waste arisings and recommends handling and disposal techniques to ensure impacts will be minimised;
- *Section 20* describes the potential contaminated land concerns related to the current and former uses of the Eastern Access Road worksite and alignment, and recommends appropriate mitigation measures;
- *Section 21* describes the potential for ecological impacts and recommends appropriate mitigation measures for the Eastern Access Road.
- *Section 22* reviews the likelihood of cultural heritage impacts and describes measures to be taken to ensure no loss to these resources;
- *Section 23* outlines the requirement of Environmental Monitoring and Audit for the Eastern Access Road;
- *Section 24* summarises the findings of the EIA of the Eastern Access Road and presents the implementation schedule of any environmental mitigation measures proposed; and;
- *Section 25* presents the conclusions for the EIA Study of the Eastern Access Road.

In addition, technical annexes have been employed to provide additional detailed or supporting information; these are referenced in the appropriate sections of the Report.