



**Works Division
Highways Department**

New Wang Tong River Bridge

Environmental Impact Assessment

Executive Summary

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Agreement No. CE 14/2014 (HY) – New Wang Tong River Bridge, Mui Wo Environmental Impact Assessment and Drainage Impact Assessment
Executive Summary

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1. INTRODUCTION

1.1 Background

- 1.1.1 Silver Mine Bay is a popular bathing beach in Mui Wo, Lantau that attracted 4,550 visitors on a peak day and over 69,000 visitors utilized the beach in 2012. During holidays, people enjoy cycling around Mui Wo for sightseeing. They travel between Mui Wo Center and the beach via Wang Tong River Bridge. As the bridge is only about 1.5m wide, overcrowding problem occurs and pedestrians and cyclists are often crossing the bridge shoulder to shoulder.
- 1.1.2 In order to relieve road safety concern of Wang Tong Bridge (hereafter called “Old Bridge”), a replacement bridge is proposed to replace the Old Bridge. The Project Profile and EIA Brief were prepared based on a single replacement bridge. In the course of the EIA Study, a twin bridge proposal consists of a new pedestrian bridge and a new cycle bridge (hereafter called “New Bridge”) are also designed to align with the future amenity development on the northern side of the Old Bridge. The location of the project site is shown in **Figure 1**.
- 1.1.3 This Project mainly comprises the following works:
- i. Construction of a new cycle bridge next to the existing bridge
 - ii. Demolition of the existing bridge
 - iii. Construction of a new footbridge on the same site of the existing bridge
- 1.1.4 The Project consists of the following designated projects under Part I, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO):
- Item C.12 – (a)...a dredging operation which is less than 500m from the nearest boundary of an existing... (iii) bathing beach...
- 1.1.5 A project profile (PP-478/2013) has been submitted to Environmental Protection Department in 28 January 2013 and a study brief (ESB- 256/2013) has been issued to HyD in March 2013.
- 1.1.6 As an environmental impact assessment (EIA) is required under the Environmental Impact Assessment Ordinance (EIAO), HyD appointed the Joint Venture of Maurice Lee and Associates Ltd. and Cinotech Consultants Ltd. (hereinafter called the JV) to perform the EIA study accordingly.
- 1.1.7 This Executive Summary summarizes the key findings in the EIA Report, including design selection, identification of sensitive receivers, assessment and evaluation of environmental impacts during construction and operational phases, recommendations on mitigation of major impacts, degree of residual impact and overall conclusion.

2. PROJECT DESCRIPTIONS

2.1 Need of the Project

2.1.1 As mentioned in **Section 1.1.1**, there is conflict between pedestrians and cyclists on Wang Tong River Bridge. The Old Bridge was not constructed up to the current design standards. After its service for over 40 years, its condition is in general poor. Mere widening and upgrading of the Old Bridge are therefore not cost effective and technically practical. Therefore, the Old Bridge is proposed to be replaced by a new bridge.

2.2 Benefits of Project

2.2.1 Three bridge design schemes have been considered in the EIA Report.

- Option 1: A single bridge with two intermediate piers below high water mark (design in the project profile PP-478/2013);
- Option 2: A single truss bridge with no intermediate piers; and
- Option 3: Twin bridges with one intermediate pier each above high water mark.

2.2.2 The twin bridges scheme (Option 3) is the preferred scheme in design and adopted in the EIA Report. This design comprises two separated bridges with intermediate supports above high water mark. This design is beneficial in terms of the following aspects:

Environmental Aspects

- No permanent damage on riverbed or obstruction of river flow. In addition, river flow would be improved in operational phase (vs two piers below high water mark in Option 1);
- Fewer trees will be affected during construction (vs larger works area for site formation required in Option 1); and
- Lower landscape and visual impact by having low profile and design that matches with surrounding rural environment (vs bulky design in Option 2).

Engineering Aspects

- Complete segregation of pedestrian and cyclist and thus improving traffic safety and efficiency (vs single bridge with two-way flow in Option 1); and
- Sufficient deck height that is capable of passing 1 in 100 year flooding.

2.3 Major Construction Activities

- 2.3.1 Construction of New Bridge and demolition of Old Bridge involves the following major activities:
- Demolition works;
 - Minipiling;
 - Excavation and backfilling, with some conducted below high water mark within fully enclosed cofferdam; and
 - Bridge building (formation of bridge structure and concreting).
- 2.3.2 To minimize the number of concurrent activities, construction and demolition works will be carried out separately in the following order:
- (1) Construction of New Cycle Bridge
 - (2) Demolition of Old Bridge
 - (3) Construction of New Pedestrian Bridge
- 2.3.3 The construction work is expected to last for two years from mid-2017 to mid-2019. No project that involves heavy construction activity is known to be carried out concurrently with the construction work of this Project.

3. SUMMARY OF IMPACT ASSESMENT

3.1 Air Quality

- 3.1.1 Silvermine Beach Resort and village house located at 1 Tung Wan Tau Road are the most affected air sensitive receivers within 500m study boundary.
- 3.1.2 The main source of construction phase air quality impacts come from dust generated from site clearance, excavation, foundation and site formation works. To avoid cumulative dust impacts, construction of Cycle/Pedestrian Bridges and demolition of Old Bridge will be carried out in different phases through adoption of a longer work programme. Given the small work site and localized work area, the use of standard dust suppression measures and good site practices are considered sufficient to minimize dust impact on nearby air sensitive receivers. With these mitigation measures in places, no unacceptable air quality impact in construction phase is expected. Nevertheless, dust monitoring and audit programme has been recommended in construction phase to ensure that air quality impact is within acceptable level.
- 3.1.3 Since the proposed bridges are designed for pedestrians and cyclists instead of motorized vehicle, no traffic emission is expected during operation. Therefore, no air pollutants listed under the Air Quality Objectives will be generated during the operational phase of the Project.

3.2 Noise

- 3.2.1 Village house located at 1 Tung Wan Tau Road is the most affected noise sensitive receiver (NSR) within 300m study boundary.
- 3.2.2 The main source of construction phase noise impact comes from operation of powered mechanical equipment. Typical construction method, sequence of work and the plant inventory were examined in the EIA Study.
- 3.2.3 With the implementation of standard noise mitigation practices including the use of quality plants, use of mobile noise barriers, and adoption of good site practice, construction noise during non-restricted hours at the representative NSR is predicted to be well within the assessment criterion.

Table 3.1 Summary of Mitigated Construction Noise

NSR	Description	Land Use	Predicted Maximum Noise Level from the Project, dB(A)	Noise Criteria, dB(A)	Exceedance, dB(A)
NSR1	1 Tung Wan Tau Road	Village	72	75	-

- 3.2.4 As no fixed plant will be installed and operated in operational phase, no operational noise impact is anticipated.

3.3 Water Quality

- 3.3.1 Water sensitive receivers most likely to be affected by the Project within the 500m study boundary include Wang Tong River, Silver Mine Bay Beach and Silver Mine Bay.
- 3.3.2 The main source of water quality impacts arising from construction activities are release of suspended solids during excavation and falling of debris into water during demolition of Old Bridge and construction of New Bridge. These will be minimized by carrying out excavating activities within fully enclosed cofferdam and provision of solid working platform with toe board below work site. The cofferdam will be implemented in a way that will not affect the water flow in Wang Tong River during construction.
- 3.3.3 Site runoff from exposed soil, earthworks and stockpiles during rainstorms and sewage generated from construction workforce will be minimized by implementing appropriate mitigation measures and good site management practices, such as covering by impermeable sheeting and provision and regular maintenance of chemical toilet. With the implementation of these mitigation measures, no unacceptable water quality impact is expected.
- 3.3.4 No operational phase water quality impact is expected from the New Bridge.

3.4 Waste Management Implication and Land Contamination

- 3.4.1 Waste arising during construction shall be handled and disposed of properly to prevent causing damage to the environment. During construction phase, major construction & demolition (C&D) materials will mainly be broken concrete and metal bar from demolition of Old Bridge, excavated materials and marine sediment generated from piling works. Inert C&D materials will be reused onsite as far as possible for backfilling. Excess portion will be disposed at public fill reception facilities. Non-inert ones will be recycled or disposed at landfill. Marine sediment extracted from minipiles will be treated by cement solidification and backfilled on land. Alternatively, the solidified sediment shall be delivered to public fill reception facilities for beneficial reuse as the last resort.
- 3.4.2 Other wastes include chemical waste from maintenance of plant equipment and general refuse from workforce. They will be collected, stored and disposed of properly. With implementation of the recommended measures and site practices, no unacceptable impact due to waste management is expected.
- 3.4.3 No waste generation activity is expected during the operational phase.
- 3.4.4 Based on historical aerial photos, site visit and government record, land uses nearby Wang Tong River Bridge have been and remain as residential (village), agricultural, tourism and/or recreational uses. No industrial activity was identified and hence land contamination at the Site is not expected.

3.5 Ecology

- 3.5.1 While some flora and fauna which are of conservation importance are identified within 500m from the Project boundary, none of which are within the Project Site. The areas within the Project site that will be affected directly during construction include a small area of Sandy Shore, Developed Area and Wang Tong River and all of which are of low or low to moderate ecological value (as summarized in **Table 3.2** below). The ecological impact during construction is therefore minor and acceptable.

Table 3.2 Summary of Habitat Loss

Habitats	Ecological Value	Directly Impacted Area (m ²)		
		Permanent	Temporary	Total
Watercourse – Wang Tong River	Low - Moderate	-	91	91
Developed Area	Low	-	204	204
Sandy Shore	Low	226	676	902
Total		226	971	1197

- 3.5.2 With proper implementation of mitigation measures during construction, adverse residual impact is not expected. The overall impact on terrestrial and aquatic ecology is acceptable.

3.6 Landscape and Visual

- 3.6.1 The proposed development will generate some landscape and visual impacts. However, there are opportunities, during the project's design, construction and operation stages, for incorporating mitigation measures which will contribute to reducing landscape and visual impacts to acceptable levels. These include designing and implementing new bridges which are sensitively integrated into the existing environment and protecting trees in construction phase.
- 3.6.2 **Figure 2** shows that the views of Wang Tong River Bridge from Chung Hau and Silvermine Bay Beach after realization of proposed mitigation measures in Year 10 of operation. None of the landscape resources, landscape character areas or visually sensitive receivers will experience adverse residual impacts following mitigation during the operation phase. The overall residual landscape and visual impacts of the proposed development are acceptable with mitigation during the construction and operation phases.

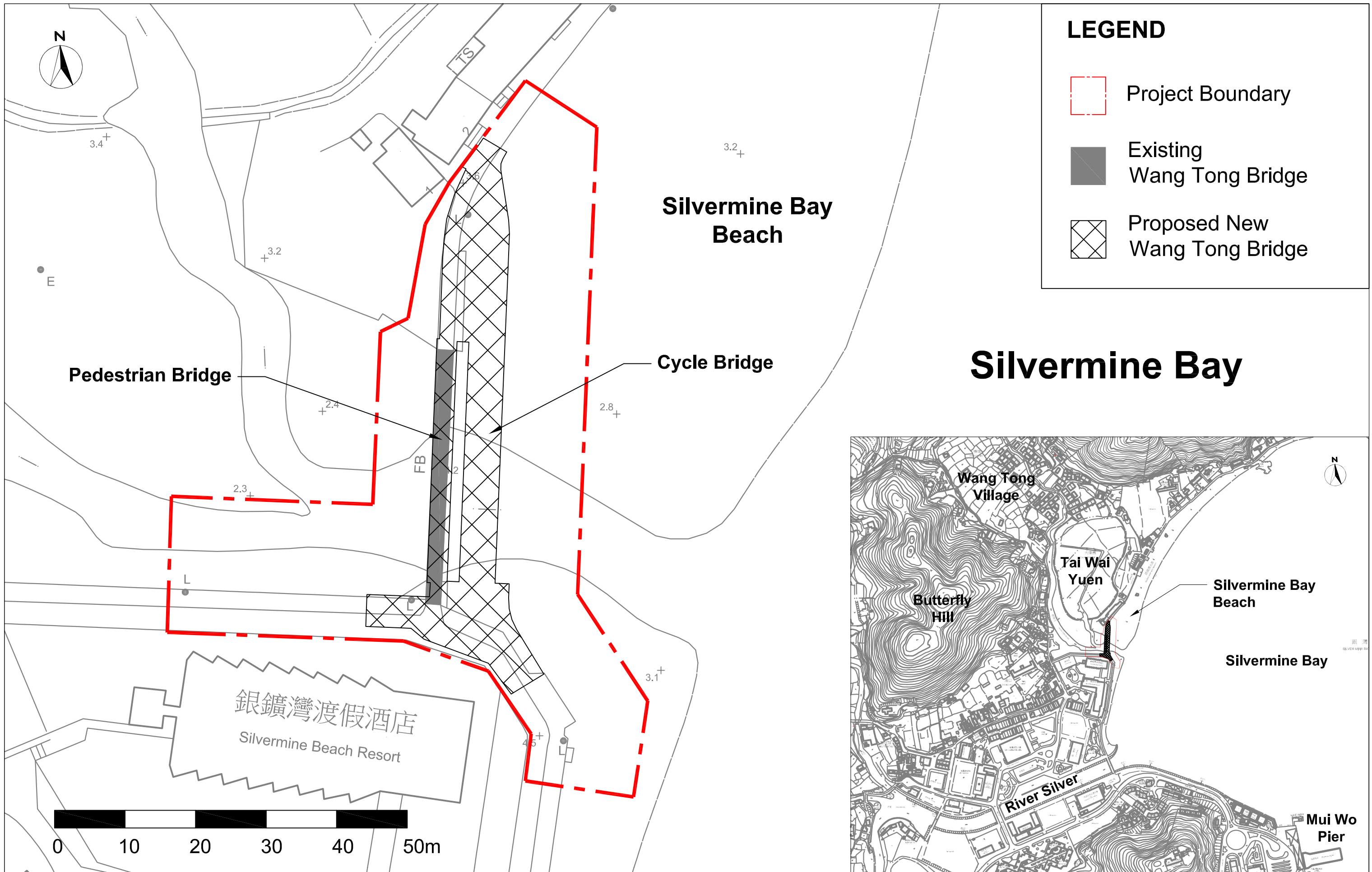
3.7 Environmental Monitoring and Audit

- 3.7.1 Environmental monitoring and audit requirements have been identified and recommended to ensure the effectiveness of the recommended mitigation measures. These requirements are specified in the *EM&A Manual* and cover the area of air quality (dust), noise, water quality, ecology, landscape and visual and waste management. Regular site audits throughout the construction of the Project have also been recommended.


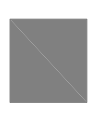
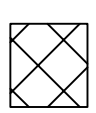
4. CONCLUSION

- 4.1.1 Upon completion of the proposed New Wang Tong River Bridge, the public is benefited from improved traffic safety on the bridge and drainage performance of the river. Mitigation measures have been proposed to avoid or minimize environmental nuisances from dust, noise, water quality, waste management, ecology and landscape and visual aspects during demolition of Old Bridge and construction of New Bridge. Due to small project scale and temporary nature, the overall degree of impact is considered acceptable.

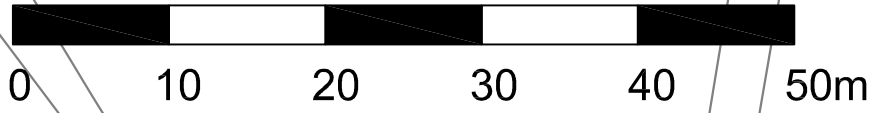
Figures



LEGEND

-  Project Boundary
-  Existing Wang Tong Bridge
-  Proposed New Wang Tong Bridge

Silvermine Bay



The joint venture of
Maurice Lee & Associates Ltd. and
Cinotech Consultants Ltd.



PROJECT:
 AGREEMENT NO. CE 14/2014(HY) NEW WANG TONG RIVER BRIDGE, MUI MO - ENVIRONMENTAL IMPACT ASSESSMENT & DRAINAGE IMPACT ASSESSMENT STUDIES - INVESTIGATION

DRAWING TITLE:
Location of Project Site

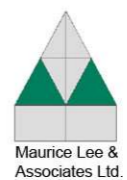


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Approved by	BC	08/15	FIG 1	-



View from Silvermine Bay Beach



View from Chung Hau

						Job Title Agreement No. CE 14/2014 (HY) New Wang Tong River Bridge, Mui Wo Environmental Impact Assessment and Drainage Impact Studies – Investigation	Figure No. 2	The joint venture of Maurice Lee & Associates Ltd. and Cinotech Consultants Ltd.		
						Drawing Title Photomontage of Wang Tong River Bridge in Year 10 after Operation (Mitigated Scenario)	Scale N.T.S.	  		
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