

Agreement No. CE33/2017(CE)
Study for Pier Improvement at
Leung Shuen Wan, Kau Sai
Village, Lai Chi Chong, Sham
Chung and Sam Mun Tsai –
Investigation

Executive Summary

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1 Introduction

1.1 General

1.1.1 On 17 November 2017, Mott MacDonald Hong Kong Limited (MM) was commissioned by the Civil Engineering and Development Department (CEDD) under Agreement No. CE 33/2017 (CE) Study for Pier Improvement at Leung Shuen Wan, Kau Sai Village, Lai Chi Chong, Sham Chung and Sam Mun Tsai – Investigation (the Assignment).

1.2 Background

- 1.2.1 Hong Kong is an international metropolis and comprises many natural scenic spots, rare geological features and hiking trails with rich biological diversity. Hong Kong Country Parks, Marine Parks, old temples, eco-tourism sites and beautiful beaches in coastal areas are some examples. Many attractions in Hong Kong are located at remote rural areas without land access and rely on marine transport. In recent years, number of tourists attracted to these remote destinations has been constantly increasing.
- 1.2.2 Public piers play an important role in accessing these remote destinations. There are about 120 public piers in Hong Kong. Majority of these piers are built, maintained and managed by the HKSAR Government. Although regular inspections and maintenance for the remote public piers are carried out by the Government to ensure its structural integrity, some public piers at remote rural areas are in place for many years and cannot cope with the current needs/ usages, such as:
 - (a) small or primitive piers leading to safety concerns during berthing and unsatisfactory boarding conditions especially for kids and elderly;
 - (b) inadequate water depth for berthing during low tide;
 - (c) limited berthing space or narrow accesses which cannot cater for the fluctuating utilisation during festive times or weekends; and
 - (d) aged pier structures with a need for improvement works.
- 1.2.3 Five piers in the northeast region of Hong Kong have been identified for carrying out investigation studies under this Assignment, namely Leung Shuen Wan Pier (NE1); Kau Sai Village Pier (NE2); Lai Chi Chong Pier (NE3); Sham Chung Pier (NE4); and Sam Mun Tsai Pier (NE5). Location plan of these five piers are shown in **Figure 1.1**.



Figure 1.1: Location Plan of Five Piers under Study

1.3 Objectives of the Assignment

- 1.3.1 The main objectives of this Assignment are to:
 - (a) Produce preliminary engineering studies for individual piers taking into account public aspiration and other constraints and prepare preliminary engineering layouts;
 - (b) Identify any Designated Project under Schedule 2 of EIAO (Cap. 499) and carry out preliminary environmental study. If there is any DP identified, the EIAO requirement should be followed to prepare a project profile for application for an EIA Study Brief or direct application for an Environmental Permit. In the event that the project confirmed not a DP, procedures stipulated in ETWB 13/2003 would be followed;
 - (c) Specify environmental monitoring and audit requirements to ensure the effective implementation of the recommended environmental protection and pollution control measures;
 - (d) Evaluate the feasibility of adopting innovative design elements for the piers, including but not limited to floating platform, barrier-free facilities, prefabrication design, etc;
 - (e) Produce a pilot innovative design using floating platform for one of the piers to be recommended by the Consultants;
 - (f) Collect and review opinions from stakeholders and the public on the Project; and
 - (g) Assist to gain support from stakeholders and the public through stakeholder consultation.

1.4 Structure of the Report

- 1.4.1 This Report contains the following sections in addition to this introduction:
 - Section 2 summaries the findings of Leung Shuen Wan Pier (NE1).
 - Section 3 summaries the findings of Kau Sai Village Pier (NE2).
 - Section 4 summaries the findings of Lai Chi Chong Pier (NE3).
 - Section 5 summaries the findings of Sham Chung Pier (NE4).
 - Section 6 summaries the findings of Sam Mun Tsai Pier (NE5).
 - Section 7 summaries the conclusion and way forward.

1.5 Abbreviations

1.5.1 The following abbreviations are used in this Report:

Abbreviation	Description
CEDD	Civil Engineering and Development Department
CA	Conservation Area
EM&A	Environmental Monitoring and Auditing
Geopark	Hong Kong UNESCO Global Geopark
MM	Mott MacDonald
SSSI	Site of Special Scientific Interest
UNESCO	United Nations Educational, Scientific and Cultural Organization

2 NE1 - Leung Shuen Wan Pier

2.1 Opportunities, Constraints and Key Issues

- 2.1.1 Leung Shuen Wan Pier is about 100m away from Sai Kung East Country Park. There is only one berthing space and the pier has shallow water depth of about 1m during low tide which cannot be berthed by larger vessels. There are alternative primitive piers/jetties nearby without sufficient water depth for the berthing of larger vessels.
- 2.1.2 The pier is subject to large surges of patronage during religious ceremonies and holidays, including the ceremonious float procession to celebrate the Tin Hau Festival once every two years, which lasts for six days each time with thousands of tourists/ worshippers visiting the Tin Hau Temple daily during the period. Due to the shallow water depth, tourists / worshippers have to rely on small vessels for transfer from a larger vessel to the pier and wait for a long time before they can land on the pier. There is currently no scheduled kaito ferry services. During the festival, worshippers will deliver their large celebration equipment and offerings to the temple. The longer time required for loading and unloading also causes congestion at the pier due to limited berthing space.
- 2.1.3 In-situ concrete forms the pier head and staircase which are founded on concrete seawall blocks. Reinforced concrete deck and beam are used as catwalk linking between existing seawall and pier head. The structural condition of the pier is deteriorating due to aging.
- 2.1.4 Air and noise sensitive receivers exist within 500m from the pier, including the Tin Hau Temple, village houses and the Leung Shuen Wan Committee Office. The Tin Hau Temple was identified as an important and unique landscape feature to worshippers and villagers. The pier is also within the spawning and nursery grounds of commercial fisheries resources.



Figure 2.1: General View of Existing Leung Shuen Wan Pier

2.1.5 There are opportunities to provide barrier-free facilities and smart city initiatives at the pier and better berthing conditions for berthing by extending the pier outward to deeper water. The improvement works will also enhance the capacity of the pier to scope with high demands during festive occasions, to provide sufficient waiting area and space for passenger loading and unloading.

2.2 Proposed Pier Improvement

2.2.1 Layout and photomontages illustrating the preliminary design of the proposed pier improvement works are shown in **Figure 2.2**.

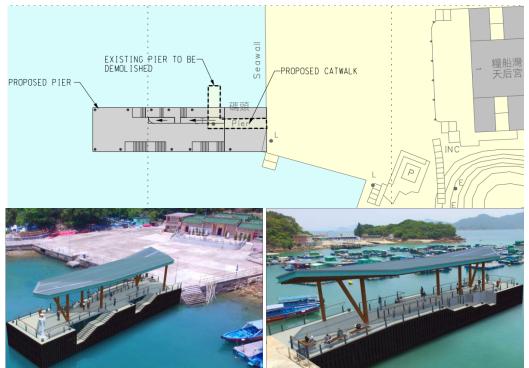


Figure 2.2: Layout and Photomontages of Proposed Leung Shuen Wan Pier

- 2.2.2 The improved pier will comprise a reinforced concrete pier head about 27m long and 9m wide. The level of the pier head is designed to be 4.05mPD at its highest point.
- 2.2.3 Part of the pier head will be covered with a shelter/canopy structure. A reinforced concrete catwalk about 9m wide and 8.7m long will be provided to connect the pier head to the shore.
- 2.2.4 The improved pier will provide two berthing faces, including two sets of landing steps on one side; and one set of landing steps with two landings connected with a fixed ramp on the other side to facilitate the loading and unloading of passengers from ferries/vessels.
- 2.2.5 The following innovative / user friendly design features are recommended for the proposed pier improvement, details of which are subject to the detailed design:
 - (a) A fixed ramp connecting two landing platforms to facilitate the general public loading and unloading at the pier, particularly for people in need
 - (b) Photovoltaic panels and/or small wind turbines to be mounted on the shelter for renewable energy
 - (c) Shelter on the pier with lightning protection system
 - (d) Bollards, fenders and navigational lights
 - (e) Handrails, seats and lightings
 - (f) Tactile paving and braille for visually impaired persons
 - (g) Interactive information kiosks with public address system, mobile charge hubs and WiFi connection
 - (h) Drinking water fountain / dispenser
 - (i) CCTV to facilitate the future maintenance of the pier

2.3 Preliminary Environmental Study

General

2.3.1 No DP element under the Environmental Impact Assessment Ordinance (EIAO) was identified for the proposed improvement works of Leung Shuen Wan Pier under the Study. The impact assessment and associated mitigation measures are summarised as follows.

Air Quality Impact

Construction Phase

2.3.2 With the implementation of the recommended mitigation measures such as proper cover of stockpile materials by tarpaulin and spraying of any dusty activities with water, no adverse air quality impacts are anticipated.

Operation Phase

2.3.3 As no significant change in marine traffic is anticipated after the pier improvement works, no significant air quality impact is expected.

Noise Impact

Construction Phase

2.3.4 Typical noise mitigation measures were recommended to minimize the construction noise impacts. Adverse construction noise impacts are not anticipated.

Operation Phase

2.3.5 The existing pier is mainly used for leisure purposes by small and low-speed vessels without any scheduled ferry operation. The potential marine traffic noise impact due to leisure vessels should be transient and insignificant.

Water Quality Impact

Construction Phase

2.3.6 With the implementation of mitigation measures including installation of silt curtains, implementation of good site practices, as well as close water quality monitoring and site audits, no adverse water quality impacts on the surrounding water sensitive receivers are anticipated.

Operation Phase

2.3.7 No water quality impact and significant hydrodynamic changes are expected due to the pier improvement.

Waste Management Implications

Construction Phase

2.3.8 With the implementation of good site practices (e.g. provision of sufficient waste disposal points, cover stockpiles of C&D materials by impervious sheets, etc.) and mitigation measures (e.g. segregation of different types of waste, carefully planning of the use of construction materials, etc.), no adverse environmental impact is expected.

Operation Phase

2.3.9 Major wastes generated will be general refuse. As the number of residents and visitors will be similar to the existing pier, no significant increase in the amount of general refuse is expected.

Ecological Impact

Construction Phase

2.3.10 Permanent loss of about 7m² of marine bottom habitats will be caused due to pile installation. Hard corals of low abundance and diversity will be potentially affected. As a precautionary measure, it is recommended to carry out detailed coral survey for verification of the potential impact on coral communities and necessity of coral translocation before commencement of any marine works during the construction stage, thus to avoid the potential impact as far as practicable. A very low density of juvenile amphioxus was recorded, and one individual was found with gonad developed but not yet sexually mature. Marine works during peak spawning season of the amphioxus shall be avoided. Overall, the impact on marine ecology is considered to be insignificant.

Operation Phase

2.3.11 The berthing area of the proposed new pier is located further away from the coastline and in deeper water when compared to the existing pier. The turbulence generated from berthing vessels will be in lesser extent. Potential ecological impact is therefore considered to be minor.

Fisheries Impact

Construction Phase

2.3.12 Small areas of around 0.03 ha and 0.01 ha of fishing grounds and spawning and nursery grounds of commercial fisheries resources will be lost permanently and temporarily, respectively. No dredging, reclamation or underwater blasting works will be involved and water quality control measures are recommended to minimize the potential indirect impacts due to water quality deterioration. The potential impact on fishing operation, fish culture activity and fisheries resources is considered minor.

Operation Phase

2.3.13 Only a very small portion of Hong Kong waters would be affected, and the potential impact is considered minor. No adverse impact on fisheries due to loss of around 0.03 ha of fishing ground and spawning and nursery grounds of commercial fisheries resources is anticipated.

Landscape and Visual Impacts

Construction Phase

2.3.14 With proper implementation of the proposed landscape mitigation measures (e.g. minimization of construction area and contractor's temporary works areas, water quality control, etc.), the anticipated landscape impacts are generally insubstantial with slightly adverse impact on the open sea due to the occupation of a small open sea area by the construction activities.

Operation Phase

2.3.15 With the recommended mitigation measures (e.g. sensitive design and disposition of the pier structures), the landscape and visual impacts are generally insubstantial with only slightly adverse impact.

Cultural Heritage Impact

Construction Phase

- 2.3.16 The Grade 3 Tin Hau Temple (Leung Shuen Wan) is located 35m away from the proposed work site. To safeguard the Temple from any adverse impact that may be caused by the proposed work, condition survey on the Grade 3 Tin Hau Temple (Leung Shuen Wan) will be conducted and submitted to AMO for agreement prior to the commencement of construction works. Fencing off the works areas from the Tin Hau Temple in their vicinity will be considered during construction, and if works coincide with yearly Tin Hau festival or the marine parade held bi-yearly on the event of Tin Hau festival, construction works shall cease for the duration of the celebrations.
- 2.3.17 It is recommended to conduct Marine Archaeological Investigation (MAI) to confirm if there is any impact to marine archaeology. In the case that there is marine archaeological potential identified, licence from the Antiquities Authority under the provision of the Antiquities and Monuments Ordinance (Cap.53) shall be obtained for a diver survey. The design of the pier improvement shall incorporate the results of MAI to avoid any adverse impact on the marine archaeology, with prior consultation with AMO. Mitigation measures, if needed, shall also be implemented.

Operation Phase

2.3.18 All proposed hard structures of the pier will be sensitively designed to be compatible with the existing landscape context. Cultural heritage impact that may arise from the pier operation is not expected.

2.4 Mitigation Measures and EM&A Requirements

2.4.1 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact induced by the proposed pier improvement works for both the construction and operation phases.

2.5 Preliminary Engineering Assessments

Hydraulic and Meteorological Assessment

2.5.1 From the hydraulic study, it is concluded that the concerned pier site is located in area of very low dynamics. The typical flow and wave conditions are generally low.

Preliminary Geotechnical Appraisal

2.5.2 Natural Terrain Hazard Review was carried out and a further Natural Terrain Hazard Study (NTHS) is not required. No registered geotechnical features exist in the vicinity of the site. There will be no adverse impacts by / on the existing registered features from the proposed pier improvement works.

Utilities

2.5.3 The proposed pier improvement works will affect one lighting column.

Land Requirement Appraisal

2.5.4 The proposed improvement works will not involve any private land or occupied public land. No land clearance and acquisition will be required.

Temporary Berthing Arrangement During Construction

2.5.5 To avoid disruption of the pier services, it is recommended providing a temporary barge for berthing during the construction period.

2.6 Implementation

- 2.6.1 The proposed improvement works will not involve any resumption of private land.
- 2.6.2 Gazettal of the limits of the works area will be required under Cap. 127 Foreshore and Sea-bed (Reclamations) Ordinance.
- 2.6.3 Off-site prefabrication should be adopted as far as practicable to reduce the on-site construction works, thus the impact to the local community, to a minimum. It is assessed that the construction period of the proposed pier improvement will take about 2 years.

2.7 Stakeholder Consultation

2.7.1 Stakeholder consultations on the pier improvement works have been conducted with the relevant stakeholders including relevant District Council, Village Representatives, green groups, ferry operators and other concern groups. The proposed pier improvement works are generally supported by the relevant stakeholders.

2.8 Summary

- 2.8.1 From the results of the preliminary environmental study and the engineering assessments, the proposed improvement works of the Leung Shuen Wan Pier are confirmed to be technically feasible.
- 2.8.2 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact due to the project for both the construction and operation phases.

3 NE2 - Kau Sai Village Pier

3.1 Opportunities, Constraints and Key Issues

- 3.1.1 Kau Sai Village Pier is located in Sai Kung District and falls within the Hong Kong UNESCO Global Geopark. The pier is located in the inner estuary shielded by Kau Sai Chau and Tiu Chung Chau. On the island of Kau Sai Chau, there is a historic Hung Shing Temple, which restoration works had won the Outstanding Project Award of the 2000 UNESCO Asia-Pacific Heritage Awards for Culture Heritage Conservation and was declared a monument in 2002.
- 3.1.2 The Hung Shing Temple is a unique and significant landscape feature, which attracts thousands of tourists and worshippers every year.
- 3.1.3 The existing pier consists of a concrete jetty connected to the landing on shore through a short concrete catwalk. The pier has only one berthing space and has shallow water depth of about 1m during low tide which cannot be berthed by larger vessels. Hence, the current pier cannot cope with the current usage. The structural condition of the pier is deteriorating due to aging.
- 3.1.4 Air and noise sensitive receivers exist within 500m of the pier, including the Hung Shing Temple and village houses at Kau Sai Village. The pier is adjacent to the Kau Sai Fish Culture Zone, where water quality and other environmental concerns are key considerations when designing the pier improvement works. The pier is also within the spawning and nursery grounds of commercial fisheries resources.



Figure 3.1: General View of Existing Kau Sai Village Pier

3.1.5 There are opportunities to provide barrier-free facilities and smart city initiatives at the pier and better berthing conditions for berthing by extending the pier outward to deeper water. The improvement works will also enhance the capacity of the pier to scope with high demands during festive occasions, to provide sufficient waiting area and space for passenger loading and unloading.

3.2 Proposed Pier Improvement

3.2.1 Layout and photomontages illustrating the preliminary design of the proposed pier improvement works are shown in **Figure 3.2**.



Figure 3.2: Layout and Photomontages of Proposed Kau Sai Village Pier

- 3.2.2 The improved pier will comprise a reinforced concrete pier head about 27m long and 9m wide. The level of the pier head is designed to be 4.05mPD at its highest point.
- 3.2.3 Part of the pier head will be covered with a shelter/canopy structure. A reinforced concrete catwalk about 6m wide and 22m long will be provided to connect the pier head to the shore.
- 3.2.4 The improved pier will provide two berthing faces, including two sets of landing steps on one side; and one set of landing steps with two landings connected with a fixed ramp on the other side to facilitate the loading and unloading of passengers from ferries/vessels.
- 3.2.5 The following innovative / user friendly design features are recommended for the proposed pier improvement, details of which are subject to the detailed design:
 - (a) A fixed ramp connecting two landing platforms to facilitate the general public loading and unloading at the pier, particularly for people in need
 - (b) Photovoltaic panels and/or small wind turbines to be mounted on the shelter for renewable energy
 - (c) Shelter on the pier with lightning protection system
 - (d) Bollards, fenders and navigational lights
 - (e) Handrails, seats and lightings
 - (f) Tactile paving and braille for visually impaired persons
 - (g) Interactive information kiosks with public address system, mobile charge hubs and WiFi connection
 - (h) Drinking water fountain / dispenser
 - (i) CCTV to facilitate the future maintenance of the pier

3.3 Preliminary Environmental Study

General

3.3.1 No DP element under the Environmental Impact Assessment Ordinance (EIAO) was identified for the proposed improvement works of Kau Sai Village Pier under the Study. The impact assessment and associated mitigation measures are summarised as follows.

Air Quality Impact

Construction Phase

3.3.2 With the implementation of the recommended mitigation measures such as proper cover of stockpile materials by tarpaulin and spraying of any dusty activities with water, no adverse air quality impact is anticipated.

Operation Phase

3.3.3 As no significant change in marine traffic is anticipated after the pier improvement works, no significant air quality impact is expected.

Noise Impact

Construction Phase

3.3.4 Typical noise mitigation measures were recommended to minimize the construction noise impacts. Adverse construction noise impact is not anticipated.

Operation Phase

3.3.5 The existing pier is mainly used for leisure purposes by small and low-speed vessels without any scheduled ferry operation. The potential marine traffic noise impact due to leisure vessels is expected to be transient and insignificant.

Water Quality Impact

Construction Phase

3.3.6 With the implementation of mitigation measures including installation of silt curtains, implementation of good site practices, as well as close water quality monitoring and site audits, no adverse water quality impacts on the surrounding water sensitive receivers are anticipated.

Operation Phase

3.3.7 No water quality impact and significant hydrodynamic changes are expected due to the pier improvement.

Waste Management Implications

Construction Phase

3.3.8 With the implementation of good site practices (e.g. provision of sufficient waste disposal points, cover stockpiles of C&D materials by impervious sheets, etc.) and mitigation measures (e.g. segregation of different types of waste, carefully planning of the use of construction materials, etc.), no adverse environmental impact is expected.

Operation Phase

3.3.9 Major wastes generated will be general refuse. As the number of residents and visitors will be similar to the existing pier, no significant increase in the amount of general refuse is expected.

Ecological Impact

Construction Phase

3.3.10 Permanent loss of about 7m² of marine bottom habitats will be caused due to pile installation. Hard corals of low abundance and diversity will be potentially affected. As a precautionary measure, it is recommended to carry out detailed coral survey for verification of the potential impact on coral communities and necessity of coral

translocation before commencement of any marine works during the construction stage, thus to avoid the potential impact as far as practicable. A very low density of juvenile amphioxus was recorded, and the impact is considered minor without mitigation measures. Overall, the impact on marine ecology is considered to be insignificant.

Operation Phase

3.3.11 The berthing area of the proposed new pier will be located further away from the coastline in deeper water when compared to the existing pier. The turbulence generated from berthing vessels will be in lesser extent. Potential ecological impact is therefore considered to be minor.

Fisheries Impact

Construction Phase

3.3.12 Small areas of around 0.03 ha and 0.01 ha of fishing grounds and spawning and nursery grounds of commercial fisheries resources will be lost permanently and temporarily, respectively. No dredging, reclamation or underwater blasting works will be involved and water quality control measures are recommended to minimize the potential indirect impacts due to water quality deterioration. The potential impact on fishing operation, fish culture activity and fisheries resources is considered minor.

Operation Phase

3.3.13 Only a very small portion of Hong Kong waters would be affected, and the potential impact is considered minor. No adverse impact on fisheries due to loss of around 0.03 ha of fishing ground and spawning and nursery grounds of commercial fisheries resources is anticipated.

Landscape and Visual Impacts

Construction Phase

3.3.14 With proper implementation of the proposed landscape mitigation measures (e.g. minimization of construction area and contractor's temporary works areas, water quality control, etc.), the anticipated landscape impacts are generally insubstantial with slightly adverse impact on the open sea due to the occupation of a small open sea area by the construction activities.

Operation Phase

3.3.15 With the recommended mitigation measures (e.g. sensitive design and disposition of the pier structures), the landscape and visual impacts are generally insubstantial with only slightly adverse impact.

Cultural Heritage Impact

Construction Phase

- 3.3.16 Fencing off the works areas from the Hung Shing Temple will be considered during the construction, and if the proposed works coincide with Hung Shing festival, construction works shall cease for the duration of the celebrations.
- 3.3.17 It is recommended to conduct Marine Archaeological Investigation (MAI) to confirm if there is any impact to marine archaeology. In the case that there is marine archaeological potential identified, licence from the Antiquities Authority under the provision of the Antiquities and Monuments Ordinance (Cap.53) shall be obtained for a diver survey. The design of the pier improvement shall incorporate the results of MAI to avoid any adverse impact on the marine archaeology, with prior consultation with AMO. Mitigation measures, if needed, shall also be implemented.

Operation Phase

3.3.18 All proposed hard structures of the pier will be sensitively designed to be compatible with the existing landscape context. Cultural heritage impact that may arise from the pier operation is not expected.

3.4 Mitigation Measures and EM&A Requirements

3.4.1 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact induced by the proposed pier improvement works for both the construction and operation phases.

3.5 Preliminary Engineering Assessments

Hydraulic and Meteorological Assessment

3.5.1 From the hydraulic study, it is concluded that the concerned pier site is located in area of very low dynamics. The typical flow and wave conditions are generally low.

Preliminary Geotechnical Appraisal

3.5.2 Natural Terrain Hazard Review was carried out and a further Natural Terrain Hazard Study (NTHS) is not required. No registered geotechnical features exist in the vicinity of the site. There will be no adverse impacts by / on the existing registered features from the proposed pier improvement works.

Utilities

3.5.3 The proposed pier improvement works will not affect existing utilities.

Land Requirement Appraisal

3.5.4 The proposed improvement works will not involve any private land or occupied public land. No land clearance and acquisition will be required.

Temporary Berthing Arrangement During Construction

3.5.5 To avoid disruption of the pier services, it is recommended providing a temporary barge for berthing during the construction period.

3.6 Implementation

- 3.6.1 The proposed improvement works will not involve any resumption of private land.
- 3.6.2 Gazettal of the limits of the works area will be required under Cap. 127 Foreshore and Sea-bed (Reclamations) Ordinance.
- 3.6.3 Off-site prefabrication should be adopted as far as practicable to reduce the on-site construction works, thus the impact to the local community, to a minimum. It is assessed that the construction period of the proposed pier improvement will take about 2 years.

3.7 Stakeholder Consultation

3.7.1 Stakeholder consultations on the pier improvement works have been conducted with the relevant stakeholders including relevant District Council, Village Representatives, green groups, ferry operators and other concern groups. The proposed pier improvement works are generally supported by the relevant stakeholders.

3.8 Summary

- 3.8.1 From the results of the preliminary environmental study and the engineering assessments, the proposed improvement works of the Kau Sai Village Pier are confirmed to be technically feasible.
- 3.8.2 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact due to the project for both the construction and operation phases.

4 NE3 - Lai Chi Chong Pier

4.1 Opportunities, Constraints and Key Issues

- 4.1.1 Lai Chi Chong Pier is located in Tai Po District and falls within the Hong Kong UNESCO Global Geopark. The pier is heavily frequented by tourists during holidays and weekends, as it provides access to the Lai Chi Chong Geo-tour Route of the Geopark. There is currently scheduled kaito ferry services during weekdays and weekends. The largest size of vessel commonly using the pier is vessel of kaito ferry services with an approximate passenger capacity of 150-320.
- 4.1.2 Vegetation immediately adjacent to the existing pier is dominated by a variety of native salt spray tolerant flora species. Together with the existing pier and extension of the coastline area at the eastern shore, the natural exposed coastline forms the Lai Chi Chong SSSI which encompasses a unique landscape feature.
- 4.1.3 The pier was built in 1962. Reinforced concrete topping on precast prestressed concrete channel and reinforced concrete beams form the main structure of pier head and catwalk with precast concrete staircase. Vertical and raking precast prestressed concrete piles are used for supporting the pier head and catwalk. The structural condition of the pier is deteriorating due to aging and the pier requires significant concrete repair regularly. A structural steel frame was built in 2006 to strengthen the pier deck.
- 4.1.4 The pier adjoins the Sai Kung West Country Park. A belt of coastal area adjacent to the Lai Chi Chong Pier is designated as a Site of Specific Scientific Interest (SSSI) due to the presence of excellent exposures of sedimentary rocks along the coast. The Lai Chi Chong Stream located south to the Pier is designated as Ecologically Important Stream (EIS) connected to the estuary with mudflat and mangrove habitats. This pier is also within the nursery grounds of commercial fisheries resources.



Figure 4.1: General View of Existing Lai Chi Chong Pier

4.1.5 There are opportunities to provide barrier-free facilities and smart city initiatives at the pier and better conditions for berthing by aligning the pier head perpendicular to the shoreline. The improvement works will also enhance the capacity of the pier to scope with the demand during holidays and weekends.

4.2 Proposed Pier Improvement

4.2.1 Layout and photomontages illustrating the preliminary design of the proposed pier improvement works are shown in **Figure 4.2**.

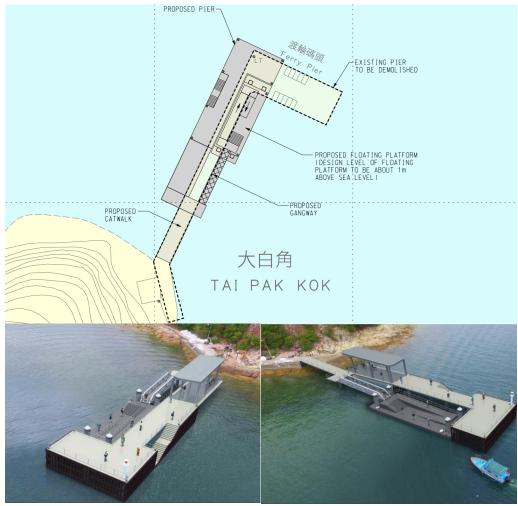


Figure 4.2: Layout and Photomontages of Proposed Lai Chi Chong Pier

- 4.2.2 The improved pier will comprise a reinforced concrete pier head about 300m² and a floating platform sized about 24m long and 7m wide. The level of the pier head is designed to be 4.05mPD at its highest point.
- 4.2.3 Part of the pier head will be covered with a shelter/canopy structure. A reinforced concrete catwalk about 4m wide and 13.5m long will be provided to connect the pier head to the shore and the intermediate platform about 3.5m wide and 11.5m long.
- 4.2.4 The improved pier will provide two berths, including one set of landing steps on one side; and a floating platform/pontoon connected with a gangway on the other side to facilitate the loading and unloading of passengers from ferries/vessels.
- 4.2.5 The following innovative / user friendly design features are recommended for the proposed pier improvement works, the details of which are subject to the detailed design:
 - (a) A floating platform / pontoon cum a long-span gangway to facilitate the loading and unloading of passengers at the pier, particular for people in need
 - (b) Photovoltaic panels and/or small wind turbines to be mounted on the shelter for renewable energy
 - (c) Shelter on the pier with lightning protection system
 - (d) Bollards, fenders and navigational lights
 - (e) Handrails, seats and lightings
 - (f) Tactile paving and braille for visually impaired persons

- (g) Interactive information kiosks with public address system, mobile charge hubs and WiFi connection
- (h) Drinking water fountain / dispenser
- (i) CCTV to facilitate the future maintenance of the pier

4.3 Preliminary Environmental Study

General

4.3.1 No DP element under the Environmental Impact Assessment Ordinance (EIAO) was identified for the proposed improvement works of Lai Chi Chong Pier under the Study. The impact assessment and associated mitigation measures are summarised as follows.

Air Quality Impact

Construction Phase

4.3.2 No Air Sensitive Receivers have been identified and no adverse air quality impact is anticipated. However, implementation of the recommended mitigation measures such as proper cover of stockpile materials by tarpaulin and spraying of any dusty activities with water are recommended.

Operation Phase

4.3.3 As no Air Sensitive Receivers have been identified and no significant change in marine traffic is anticipated after the pier improvement works, no significant air quality impact is expected.

Noise Impact

Construction Phase

4.3.4 No Noise Sensitive Receivers have been identified and adverse construction noise impact is not anticipated. However, typical noise mitigation measures were recommended to minimize the construction noise impacts.

Operation Phase

4.3.5 No Noise Sensitive Receivers have been identified and the marine traffic including small and low-speed vessels for leisure purposes and scheduled kaito ferry services remains remain similar to the existing pier operation. The potential marine traffic noise impact should be transient and insignificant.

Water Quality Impact

Construction Phase

4.3.6 With the implementation of mitigation measures including installation of silt curtains and implementation of good site practices, no adverse water quality impacts on the surrounding water sensitive receivers are anticipated.

Operation Phase

4.3.7 No water quality impact and significant hydrodynamic changes are expected due to the pier improvement.

Waste Management Implications

Construction Phase

4.3.8 With the implementation of good site practices (e.g. provision of sufficient waste disposal points, cover stockpiles of C&D materials by impervious sheets, etc.) and mitigation measures (e.g. segregation of different types of waste, carefully planning of the use of construction materials, etc.), no adverse environmental impact is expected.

Operation Phase

4.3.9 Major wastes generated will be general refuse. As the number of visitors will be similar to the existing pier, no significant increase in the amount of general refuse is expected.

Ecological Impact

Construction Phase

4.3.10 Permanent loss of about 7m² of marine bottom habitats will be caused due to pile installation. Hard corals of low abundance and diversity will be potentially affected. As a precautionary measure, it is recommended to carry out detailed coral survey for verification of the potential impact on coral communities and necessity of coral translocation before commencement of any marine works during the construction stage, thus to avoid the potential impact as far as practicable. A very low density of juvenile amphioxus was recorded, and the impact is considered minor without mitigation measures. Overall, the impact on marine ecology is considered to be insignificant.

Operation Phase

4.3.11 The berthing area of the proposed new pier is located further away from the coastline and in deeper water when compared to the existing pier. The turbulence generated from berthing vessels will be in lesser extent. Potential ecological impact is therefore considered to be minor.

Fisheries Impact

Construction Phase

4.3.12 Small areas of around 0.03 ha and 0.02 ha of fishing grounds and nursery grounds of commercial fisheries resources will be lost permanently and temporarily, respectively. No dredging, reclamation or underwater blasting works will be involved and water quality control measures are recommended to minimize the potential indirect impacts due to water quality deterioration. The potential impact on fishing operation and fisheries resources is considered minor.

Operation Phase

4.3.13 Only a very small portion of Hong Kong waters would be affected, and the potential impact is considered minor. No adverse impact on fisheries due to loss of around 0.03 ha of fishing ground and nursery grounds of commercial fisheries resources is anticipated.

Landscape and Visual Impacts

Construction Phase

4.3.14 With proper implementation of the proposed landscape mitigation measures (e.g. minimization of construction area and contractor's temporary works areas, water quality control, etc.), the anticipated landscape impacts are generally insubstantial with slightly adverse impact on the open sea due to the occupation of a small open sea area by the construction activities.

Operation Phase

4.3.15 With the recommended mitigation measures (e.g. sensitive design and disposition of the pier structures), the landscape and visual impacts are generally insubstantial with only slightly adverse impact.

Cultural Heritage Impact

Construction Phase & Operation Phase

4.3.16 No adverse impact on cultural heritage and marine archaeology arising from the construction and operation of the proposed pier improvement is expected. It is recommended that the Antiquities and Monuments Office should be informed in case of any discovery / suspect of antiquities during the marine works.

4.4 Mitigation Measures and EM&A Requirements

4.4.1 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact induced by the proposed improvement works for both the construction and operation phases.

4.5 Preliminary Engineering Assessments

Hydraulic and Meteorological Assessment

4.5.1 From the hydraulic study, it is concluded that the concerned pier site is located in area of very low dynamics. The typical flow and wave conditions are generally low.

Preliminary Geotechnical Appraisal

4.5.2 Natural Terrain Hazard Review was carried out and a further Natural Terrain Hazard Study (NTHS) is not required. No registered geotechnical features exist in the vicinity of the site. There will be no adverse impacts by / on the existing registered features from the proposed pier improvement works.

Utilities

4.5.3 The proposed pier improvement works will not affect existing utilities.

Land Requirement Appraisal

4.5.4 The proposed improvement works will not involve any private land or occupied public land. No land clearance and acquisition will be required.

Temporary Berthing Arrangement During Construction

4.5.5 To avoid disruption of the pier services, it is recommended providing a temporary barge for berthing during the construction period.

4.6 Implementation

- 4.6.1 The proposed improvement works will not involve any resumption of private land.
- 4.6.2 Gazettal of the limits of the works area will be required under Cap. 127 Foreshore and Sea-bed (Reclamations) Ordinance.
- 4.6.3 Off-site prefabrication should be adopted as far as practicable to reduce the on-site construction works, thus the impact to the local community, to a minimum. It is assessed that the construction period of the proposed pier improvement will take about 2 years.

4.7 Stakeholder Consultation

4.7.1 Stakeholder consultations on the pier improvement works have been conducted with the relevant stakeholders including relevant District Council, Village Representatives, green groups, ferry operators and other concern groups. The proposed pier improvement works are generally supported by the relevant stakeholders.

4.8 Summary

- 4.8.1 From the results of the preliminary environmental study and the engineering assessments, the proposed improvement works of the Lai Chi Chong Pier are confirmed to be technically feasible.
- 4.8.2 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact due to the project for both the construction and operation phases.

5 NE4 - Sham Chung Pier

5.1 Opportunities, Constraints and Key Issues

- 5.1.1 Sham Chung Pier is located in Tai Po District and falls within the Hong Kong UNESCO Global Geopark.
- 5.1.2 The existing pier is located near Sai Kung West Country Park, Coastal Protection Area, Conservation Area and Site of Special Scientific Interest. One end of the catwalk of the existing pier marginally encroaches on Sai Kung West Country Park. The pier is also within the nursery grounds of commercial fisheries resources.
- 5.1.3 The pier is frequented by tourists, hikers, pet keepers and holiday makers during holidays and weekends. There is currently scheduled kaito ferry services during weekdays and weekends. The largest size of vessel commonly using the pier is vessel of kaito ferry services with an approximate passenger capacity of 150-320. The structural condition of the pier is deteriorating due to aging and the pier requires significant concrete repair regularly. A structural steel frame was built in 2006 to strengthen the pier deck.
- 5.1.4 The pier was built in 1962. Reinforced concrete topping on precast prestressed concrete channel and reinforced concrete beams form the main structure of pier head and catwalk with precast concrete staircase. Vertical and raking precast prestressed concrete piles are used as foundation of the pier head and catwalk.



Figure 5.1: General View of Existing Sham Chung Pier

5.1.5 There are opportunities to provide barrier-free facilities and smart city initiatives at the pier and better conditions for berthing by aligning the pier head perpendicular to the shoreline. The improvement works will also enhance the capacity of the pier to scope with the demand during holidays and weekends.

5.2 Proposed Pier Improvement

5.2.1 Layout and photomontages illustrating the preliminary design of the proposed pier improvement works are shown in **Figure 5.2**.



Figure 5.2: Layout and Photomontages of Proposed Sham Chung Pier

- 5.2.2 The improved pier will comprise a reinforced concrete pier head about 300m² and a floating platform sized about 24m long and 7m wide. The level of the pier head is designed to be 4.05mPD at its highest point.
- 5.2.3 Part of the pier head will be covered with a shelter/canopy structure. A reinforced concrete catwalk about 4m wide and 13.5m long will be provided to connect the pier head to the shore and the intermediate platform about 3.5m wide and 11.5m long.
- 5.2.4 The improved pier will provide two berths, including one set of landing steps on one side; and a floating platform/pontoon connected with a gangway on the other side to facilitate the loading and unloading of passengers from ferries/vessels.
- 5.2.5 The following innovative / user friendly design features are recommended for the proposed pier improvement works, the details of which are subject to the detailed design:
 - (a) A floating platform / pontoon cum a long-span gangway to facilitate the loading and unloading of passengers at the pier, particularly for people in need
 - (b) Photovoltaic panels and/or small wind turbines to be mounted on the shelter for renewable energy
 - (c) Shelter on the pier with lightning protection system
 - (d) Bollards, fenders and navigational lights
 - (e) Handrails, seats and lightings
 - (f) Tactile paving and braille for visually impaired persons

- (g) Interactive information kiosks with public address system, mobile charge hubs and WiFi connection
- (h) Drinking water fountain / dispenser
- (i) CCTV to facilitate the future maintenance of the pier

5.3 Preliminary Environmental Study

General

5.3.1 No DP element under the Environmental Impact Assessment Ordinance (EIAO) was identified for the proposed improvement works of Sham Chung Pier under the Study. The impact assessment and associated mitigation measures are summarised as follows.

Air Quality Impact

Construction Phase

5.3.2 No Air Sensitive Receivers have been identified and no adverse air quality impact is anticipated. However, implementation of the recommended mitigation measures such as proper cover of stockpile materials by tarpaulin and spraying of any dusty activities with water are recommended.

Operation Phase

5.3.3 As no Air Sensitive Receivers have been identified and no significant change in marine traffic is anticipated after the pier improvement works, no significant air quality impact is expected.

Noise Impact

Construction Phase

5.3.4 No Noise Sensitive Receivers have been identified and adverse construction noise impact is not anticipated. However, typical noise mitigation measures were recommended to minimize the construction noise impacts.

Operation Phase

5.3.5 No Noise Sensitive Receivers have been identified and the marine traffic including small and low-speed vessels for leisure purposes and scheduled kaito ferry services remains remain similar to the existing pier operation. The potential marine traffic noise impact due to leisure vessels is expected to be transient and insignificant.

Water Quality Impact

Construction Phase

5.3.6 With the implementation of mitigation measures including installation of silt curtains and implementation of good site practices, no adverse water quality impacts on the surrounding water sensitive receivers are anticipated.

Operation Phase

5.3.7 No water quality impact and significant hydrodynamic changes are expected due to the pier improvement.

Waste Management Implications

Construction Phase

5.3.8 With the implementation of good site practices (e.g. provision of sufficient waste disposal points, cover stockpiles of C&D materials by impervious sheets, etc.) and mitigation measures (e.g. segregation of different types of waste, carefully planning of the use of construction materials, etc.), no adverse environmental impact is expected.

Operation Phase

5.3.9 Major wastes generated will be general refuse. As the number of visitors will be similar to the existing pier, no significant increase in the amount of general refuse is expected.

Ecological Impact

Construction Phase

5.3.10 Permanent loss of about 7m² of marine bottom habitats will be caused due to pile installation. Hard corals of low abundance and diversity will be potentially affected. As a precautionary measure, it is recommended to carry out detailed coral survey for verification of the potential impact on coral communities and necessity of coral translocation before commencement of any marine works during the construction stage, thus to avoid the potential impact as far as practicable. Overall, the impact on marine ecology is considered to be insignificant.

Operation Phase

5.3.11 The berthing area of the proposed new pier is located further away from the coastline and in deeper water when compared to the existing pier. The turbulence generated from berthing vessels will be in lesser extent. Potential ecological impact is therefore considered to be minor.

Fisheries Impact

Construction Phase

5.3.12 Small areas of around 0.05 ha and 0.01 ha of fishing grounds and nursery grounds of commercial fisheries resources will be lost permanently and temporarily, respectively. No dredging, reclamation or underwater blasting works will be involved and water quality control measures are recommended to minimize the potential indirect impacts due to water quality deterioration. The potential impact on fishing operation and fisheries resources is considered minor.

Operation Phase

5.3.13 Only a very small portion of Hong Kong waters would be affected, and the potential impact is considered minor. No adverse impact on fisheries due to loss of around 0.05 ha of fishing ground and nursery grounds of commercial fisheries resources is anticipated.

Landscape and Visual Impacts

Construction Phase

5.3.14 With proper implementation of the proposed landscape mitigation measures (e.g. minimization of construction area and contractor's temporary works areas, water quality control, etc.), the anticipated landscape impacts are generally insubstantial with slightly adverse impact on the open sea due to the occupation of a small open sea area by the construction activities.

Operation Phase

5.3.15 With the recommended mitigation measures (e.g. sensitive design and disposition of the pier structures), the landscape and visual impacts are generally insubstantial with only slightly adverse impact.

Cultural Heritage Impact

Construction Phase & Operation Phase

5.3.16 No adverse impact on cultural heritage and marine archaeology arising from the construction and operation of the proposed pier improvement is expected. It is recommended that the Antiquities and Monuments Office should be informed in case of any discovery / suspect of antiquities during the marine works.

5.4 Mitigation Measures and EM&A Requirements

5.4.1 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact induced by the proposed pier improvement works for both the construction and operation phases.

5.5 Preliminary Engineering Assessments

Hydraulic and Meteorological Assessment

5.5.1 From the hydraulic study, it is concluded that the concerned pier site is located in area of very low dynamics. The typical flow and wave conditions are generally low.

Preliminary Geotechnical Appraisal

5.5.2 Natural Terrain Hazard Review was carried out and a further Natural Terrain Hazard Study (NTHS) is not required. No registered geotechnical features exist in the vicinity of the site. There will be no adverse impacts by / on the existing registered features from the proposed pier improvement works.

Jtilities

5.5.3 The proposed pier improvement works will not affect existing utilities.

Land Requirement Appraisal

5.5.4 The proposed improvement works will not involve any private land or occupied public land. No land clearance and acquisition will be required.

Temporary Berthing Arrangement During Construction

5.5.5 To avoid disruption of the pier services, it is recommended providing a temporary barge for berthing during the construction period.

5.6 Implementation

- 5.6.1 The proposed improvement works will not involve any resumption of private land.
- 5.6.2 Gazettal of the limits of the works area will be required under Cap. 127 Foreshore and Sea-bed (Reclamations) Ordinance.
- 5.6.3 Off-site prefabrication should be adopted as far as practicable to reduce the on-site construction works, thus the impact to the local community, to a minimum. It is assessed that the construction period of the proposed pier improvement will take about 2 years.

5.7 Stakeholder Consultation

5.7.1 Stakeholder consultations on the pier improvement works have been conducted with the relevant stakeholders including relevant District Council, Village Representatives, green groups, ferry operators and other concern groups. The proposed pier improvement works are generally supported by the relevant stakeholders.

5.8 Summary

- 5.8.1 From the results of the preliminary environmental study and the engineering assessments, the proposed improvement works of the Sham Chung Pier are confirmed to be technically feasible.
- 5.8.2 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact due to the project for both the construction and operation phases.

6 NE5 - Sam Mun Tsai Pier

6.1 Opportunities, Constraints and Key Issues

- 6.1.1 Sam Mun Tsai Pier is located in Tai Po District and falls within the Hong Kong UNESCO Global Geopark. The pier is in a stable, well protected marine environment within the Shuen Wan Typhoon Shelter. The existing Sam Mun Tsai Pier falls within an area zoned "Other Specified Uses" annotated "Pier" ("OU(Pier)") on approved Yim Tin Tsai and Ma Shi Chau Outline Zoning Plan (OZP) No. S/NE-YTT/2, whilst the extension part of the proposed new pier is not covered by any statutory plan. According to the Notes of the OZP, 'Pier' use is always permitted within the said zone. Development within the "OU(Pier)" is subject to a maximum building height of one storey.
- 6.1.2 The pier is heavily used by fishermen and local villagers as well as tourists for access to Ma Shi Chau Nature Trail of the Geopark. Significant volume of marine traffic arrives at the pier each day.
- 6.1.3 The existing pier head is in mass concrete block and the narrow catwalk was built with insitu concrete slab on concrete seawall blocks found on pell mell rubble. The structural condition of the pier is deteriorating due to aging.
- 6.1.4 Air and noise sensitive receivers exist within 500m of the pier, including the Sam Mun Tsai Pentecostal Holiness Church, the Springdale Garden, the Sam Mun Tsai New Village, and two extra air sensitive receivers at Tung Wah Group of Hospitals Pao Siu Loong Care & Attention Home and House 112, the Beverly Hills Phase 3. The pier is nearby Yim Tin Tsai Fish Culture Zone, which is a fisheries sensitive receiver.



Figure 6.1: General View of Existing Sam Mun Tsai Pier

6.1.5 There are opportunities to provide barrier-free facilities and smart city initiatives at the pier and better berthing conditions for berthing by extending the pier outward to deeper water. The improvement works will also enhance the capacity of the pier to scope with high demands during holidays and weekends and to provide sufficient waiting area and space for passenger loading and unloading.

6.2 Proposed Pier Improvement

6.2.1 Layout and photomontages illustrating the preliminary design of the proposed pier improvement works are shown in **Figure 6.2**.

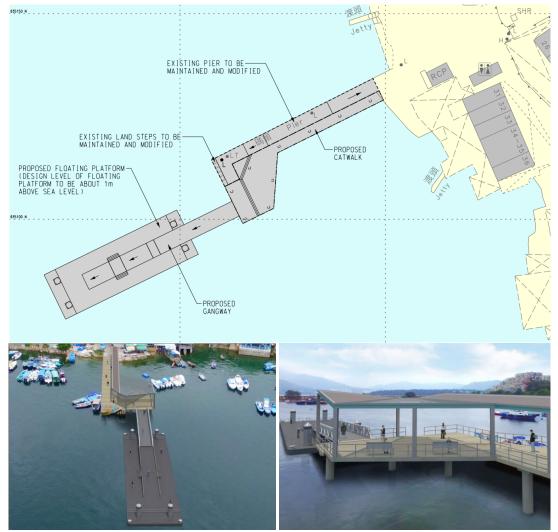


Figure 6.2: Layout and Photomontages of Proposed Sam Mun Tsai Pier

- 6.2.2 The improved pier will comprise a floating platform sized about 36m long and 12m wide. The existing conventional landing steps will be maintained.
- 6.2.3 The level of the pier head is designed to be 4.05mPD at its highest point. Part of the pier head will be covered with a shelter/canopy structure. The existing catwalk of about 44m long will be widened by about 2.5m connecting with the shore.
- 6.2.4 The improved pier will provide a floating platform/pontoon connected by a gangway to facilitate the loading and unloading of passengers from ferries/vessels. The floating platform/pontoon allows 2 sides of berths.
- 6.2.5 The following innovative / user friendly design features are recommended for the proposed pier improvement works, the details of which are subject to the detailed design:
 - (a) A floating platform / pontoon cum a long-span gangway to facilitate the loading and unloading of passengers on both sides of the floating platform / pontoon, particularly for people in need

- (b) Photovoltaic panels and/or small wind turbines to be mounted on the shelter for renewable energy
- (c) Shelter on the catwalk with lightning protection system
- (d) Bollards, fenders and navigational lights
- (e) Handrails, seats and lightings
- (f) Tactile paving and braille for visually impaired persons
- (g) Interactive information kiosks with public address system, mobile charge hubs and WiFi connection
- (h) Drinking water fountain / dispenser
- (i) CCTV to facilitate the future maintenance of the pier

6.3 Preliminary Environmental Study

General

6.3.1 No DP element under the Environmental Impact Assessment Ordinance (EIAO) was identified for the proposed improvement works of Sam Mun Tsai Pier under the Study. The impact assessment and associated mitigation measures are summarised as follows.

Air Quality Impact

Construction Phase

6.3.2 With the implementation of the recommended mitigation measures such as proper cover of stockpile materials by tarpaulin and spraying of any dusty activities with water, no adverse air quality impacts are anticipated.

Operation Phase

6.3.3 As no significant change in marine traffic is anticipated after the pier improvement works, no significant air quality impact is expected.

Noise Impact

Construction Phase

6.3.4 Typical noise mitigation measures were recommended to minimize the construction noise impacts. Adverse construction noise impact is not anticipated.

Operation Phase

6.3.5 The existing pier is mainly used for leisure purposes by small and low-speed vessels without any scheduled ferry operation. The potential marine traffic noise impact due to leisure vessels is expected to be transient and insignificant.

Water Quality Impact

Construction Phase

6.3.6 With the implementation of mitigation measures including installation of silt curtains, implementation of good site practices and close water quality monitoring and site audits, no adverse water quality impacts on the surrounding water sensitive receivers are anticipated.

Operation Phase

6.3.7 No water quality impact and significant hydrodynamic changes are expected due to the pier improvement.

Waste Management Implications

Construction Phase

6.3.8 With the implementation of good site practices (e.g. provision of sufficient waste disposal points, cover stockpiles of C&D materials by impervious sheets, etc.) and mitigation measures (e.g. segregation of different types of waste, carefully planning of the use of construction materials, etc.), no adverse environmental impact is expected.

Operation Phase

6.3.9 Major wastes generated will be general refuse. As the number of residents and visitors will be similar to the existing pier, no significant increase in the amount of general refuse is expected.

Ecological Impact

Construction Phase

6.3.10 Permanent loss of about 7m² of marine bottom habitats will be caused due to pile installation. Very low marine ecological value is established. Overall, the impact on marine ecology is considered to be insignificant.

Operation Phase

6.3.11 The berthing area of the proposed new pier is located further away from the coastline and in deeper water when compared to the existing pier. The turbulence generated from berthing vessels will be in lesser extent. Potential ecological impact is therefore considered to be minor.

Fisheries Impact

Construction Phase

6.3.12 Small areas of around 0.06 ha and 0.01 ha of fishing grounds and fisheries resources will be lost permanently and temporarily, respectively. No dredging, reclamation or underwater blasting works will be involved and water quality control measures are recommended to minimize the potential indirect impacts due to water quality deterioration. The potential impact on fishing operation, fish culture activity and fisheries resources is considered minor.

Operation Phase

6.3.13 Only a very small portion of Hong Kong waters would be affected, and the potential impact is considered minor. No adverse impact on fisheries due to loss of around 0.06 ha of fishing ground and fisheries resources is anticipated.

Landscape and Visual Impacts

Construction Phase

6.3.14 With proper implementation of the proposed landscape mitigation measures (e.g. minimization of construction area and contractor's temporary works areas, water quality control, etc.), the anticipated landscape impacts are generally insubstantial with slightly adverse impact on the open sea due to the occupation of a small open sea area by the construction activities.

Operation Phase

6.3.15 With the recommended mitigation measures (e.g. sensitive design and disposition of the pier structures), the landscape and visual impacts are generally insubstantial with only slightly adverse impact.

Cultural Heritage Impact

Construction Phase & Operation Phase

6.3.16 No adverse impact on cultural heritage and marine archaeology arising from the construction and operation of the proposed pier improvement is expected.

6.4 Mitigation Measures and EM&A Requirements

6.4.1 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact induced by the proposed pier improvement works for both the construction and operation phases.

6.5 Preliminary Engineering Assessments

Hydraulic and Meteorological Assessment

6.5.1 From the hydraulic study, it is concluded that the concerned pier site is located in area of very low dynamics. The typical flow and wave conditions are generally low.

Preliminary Geotechnical Appraisal

6.5.2 Natural Terrain Hazard Review was carried out and a further Natural Terrain Hazard Study (NTHS) is not required. No registered geotechnical features exist in the vicinity of the site. There will be no adverse impacts by / on the existing registered features from the proposed pier improvement works.

Utilities

6.5.3 The proposed pier improvement works will affect two lighting columns and one fresh water main.

Land Requirement Appraisal

The proposed improvement works will not involve any private land or occupied public land. No land clearance and acquisition will be required.

Temporary Berthing Arrangement During Construction

6.5.5 To avoid disruption of the pier services, it is recommended providing a temporary barge for berthing during the construction period.

6.6 Implementation

- 6.6.1 The proposed improvement works will not involve any resumption of private land.
- 6.6.2 Gazettal of the limits of the works area will be required under Cap. 127 Foreshore and Sea-bed (Reclamations) Ordinance.
- 6.6.3 Off-site prefabrication should be adopted as far as practicable to reduce the on-site construction works, thus the impact to the local community, to a minimum. It is assessed that the construction period of the proposed pier improvement will take about 2 years.

6.7 Stakeholder Consultation

6.7.1 Stakeholder consultations on the pier improvement works have been conducted with the relevant stakeholders including members of relevant District Council, Village Representatives, green groups, ferry operators and other concern groups. The proposed pier improvement works are generally supported by the relevant stakeholders.

6.8 Summary

- 6.8.1 From the results of the preliminary environmental study and the engineering assessments, the proposed improvement works of the Sam Mun Tsai Pier are confirmed to be technically feasible.
- 6.8.2 With the implementation of the recommended mitigation measures and the proposed EM&A, there will be no adverse environmental impact due to the project for both the construction and operation phases.

7 Conclusion and Way Forward

7.1 Conclusion

- 7.1.1 This Executive Summary summarizes the proposed pier improvement works to five existing public piers, namely Leung Shuen Wan Pier (NE1), Kau Sai Village Pier (NE2), Lai Chi Chong Pier (NE3), Sham Chung Pier (NE4) and Sam Mun Tsai Pier (NE5).
- 7.1.2 Results of the preliminary environmental study and the preliminary engineering assessments confirm that the proposed pier improvement works are all technically feasible.
- 7.1.3 With the implementation of the recommended mitigation measures and the environmental monitoring, the proposed pier improvement works would not cause adverse environmental impacts for both the construction and operation phases.
- 7.1.4 To support Government's smart city initiatives, innovative / user friendly design features including solar panels, wind turbines, interactive information kiosks, mobile charge hubs, WiFi connection, drinking water fountains / dispensers and CCTV are recommended to be incorporated into the proposed works where practicable.
- 7.1.5 Stakeholder consultations on the pier improvement works have been conducted. The proposed pier improvement works are generally supported by the relevant stakeholders.
- 7.1.6 It is recommended adopting off-site prefabrication for the works as far as practicable to reduce the on-site construction works, thus reducing the impact to the local community to a minimum. The construction period for each pier is estimated to be about 2 years.
- 7.1.7 The development of preliminary engineering layouts and proposed construction methods for the pier improvement works have been reviewed. No DP element under the Environmental Impact Assessment Ordinance (EIAO) was identified for the proposed pier improvement works under the Study, and EPD has agreed with the Non-DP status. During the next detailed design and construction stage, the engineering design and construction method will follow the conclusion and recommendation under this Study, so that the status of non-DP under EIAO could be maintained for the proposed improvement works.
- 7.1.8 The proposed pier improvement works will not involve any resumption of private land.

7.2 Way Forward

- 7.2.1 Gazettal of the limits of the works area for each pier site will be required under Cap. 127 Foreshore and Sea-bed (Reclamations) Ordinance.
- 7.2.2 The findings and recommendations should be referenced in the next detailed design and construction stage when taking forward the proposed pier improvement works for implementation.