Civil Engineering and Development Department

Agreement No. CE34/2017(CE) Study for Pier Improvement at Yung Shue Wan, Shek Tsai Wan, Yi O and Ma Wan Chung - Investigation

Executive Summary

Job number 258878

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Nomenclature and Abbreviation

Table 1.1 lists out the abbreviated titles of government bureaux, departments, offices, statutory bodies and public organisations mentioned in this report.

Table 1.1 - Abbreviations of bureaux, government departments and organisations

Abbreviation	Full title
AFCD	Agriculture, Fisheries and Conservation Department
AMO	Antiquities and Monuments Office
CEDD	Civil Engineering and Development Department
DEVB	Development Bureau
DSD	Drainage Services Department
EMSD	Electrical and Mechanical Services Department
ETWB	Environment, Transport and Works Bureau
EPD	Environmental Protection Department
FEHD	Food and Environmental Hygiene Department
GEO	Geotechnical Engineering Office of the Civil Engineering and Development Department
HAD	Home Affairs Department
HKO	Hong Kong Observatory
HyD	Highways Department
IsDC	Islands District Council
MD	Marine Department
OGCIO	Office of the Government Chief Information Officer
RC	Rural Committee
TD	Transport Department
TWDC	Tsuen Wan District Council
WSD	Water Supplies Department

Table 1.2 lists out the meaning of abbreviation for expressions adopted in this report.

Table 1.2 - Abbreviations for expressions adopted in this report

Abbreviation	Full meaning
BIM	Building Information Modelling
DO	District Officer
EIAO	Environmental Impact Assessment Ordinance
EM&A	Environmental Monitoring and Audit Manual
FCZ	Fish Culture Zone
FS(R)O	Foreshore and Sea-bed (Reclamations) Ordinance

Abbreviation	Full meaning
GI	Ground investigation
HKPSG	Hong Kong Planning Standards and Guidelines
HKSAR	Hong Kong Special Administrative Region
OZP	Outline Zoning Plan
PIP	Pier Improvement Programme
PWDM	Port Works Design Manual
PES	Preliminary Environmental Study
PHO	Protection of the Harbour Ordinance
RR	Rural Representative
TC	Technical Circular
TPDM	Transport Planning & Design Manual

1 Introduction

1.1 Project Background

1.1.1 On 17 November 2017, Civil Engineering and Development Department (CEDD) of the Government of the Hong Kong Special Administrative Region (HKSAR) appointed Ove Arup & Partners Hong Kong Limited under Agreement No. CE34/2017(CE) to provide consultancy services for Agreement No. CE34/2017 (CE) "Study for Pier Improvement at Yung Shue Wan, Shek Tsai Wan, Yi O and Ma Wan Chung – Investigation" (the Study).

1.2 The Study

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. Country parks, marine parks, temples, eco-tourism sites and beaches in coastal areas are some examples for connection. Many attractions are located at remote rural areas without land access and rely on marine transport. In recent years, the number of tourists visited these attractions has been increasing constantly.

1.2.2 Public piers play an important role in accessing these remote destinations. There are more than 100 public piers in Hong Kong. The majority of these piers were built and are maintained and managed by the HKSAR Government.

1.2.3 Although regular inspections and maintenance of the remote public piers are carried out by the HKSAR Government to ensure their 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 condition especially for kids and elderly; (b) inadequate depth of water for berthing during low tide; (c) limited berthing space or narrow accesses which cannot cater for fluctuating utilization during festive times or weekends; and (d) aged pier structures with a need for structural improvement works. Pier improvement works is essential for improving the pier facilities and ensuring adequate structural integrity for safe pier usage by local villagers, mariculturists, visitors and tourists.

1.2.4 Four (4) piers in the southwest region of Hong Kong were selected by CEDD for carrying out investigation studies under this Assignment. These piers are located at Yung Shue Wan, Shek Tsai Wan, Yi O and Ma Wan Chung (**Figure 1.1**).

Figure 1.1 - Pier locations under the Study

1.3 Main Objectives of the Study

1.3.1 The overall objective of the Study is to conduct preliminary environmental and preliminary engineering studies, among other necessary investigation, before proceeding with the detailed design and construction of pier improvement works.

1.3.2 The main objectives of the Study are:-

(a) to produce preliminary engineering studies for individual pier taking into account public aspiration and other constraints and prepare preliminary engineering layouts;

(b) to identify any Designated Project under Schedule 2 of Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and carry out preliminary environmental study to ensure the pier improvement works will meet the requirement under the EIAO;

(c) to specify environmental monitoring and audit requirements to ensure the effective implementation of the recommended environmental protection and pollution control measures;

(d) to 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) to produce a pilot innovative design using floating platform for one of the piers to be recommended by the Consultants;

(f) to collect and review opinions from stakeholders and the public on the Study; and

(g) to assist to gain support from stakeholders and the public through stakeholder consultation.

1.4 Scope of "Executive Summary"

1.4.1 The Executive Summary provides a brief summary on the findings of the Study based on various assessments and highlights the key issues and mitigation measures considered in the assessment. Based on the findings of the Study, preliminary pier design and design requirements for each pier are developed for further development in detailed design and project implementation.

1.5 Structure of the Report

1.5.1 The Report is structured as follows:-

(a) Section 1 introduces the Study;

(b) Section 2 presents the findings of preliminary engineering and environmental assessments, and preliminary pier layout for Yung Shue Wan Public Pier;

(c) Section 3 presents the findings of preliminary engineering and environmental assessments, and preliminary pier layout for Shek Tsai Wan Pier;

(d) Section 4 presents the findings of preliminary engineering and environmental assessments, and preliminary pier layout for Yi O Pier;

(e) Section 5 presents the findings of preliminary engineering and environmental assessments, and preliminary pier layout for Ma Wan Chung Pier; and

(f) Section 6 summarises the conclusions and way forwards

2 Yung Shue Wan Public Pier

2.1 Existing Pier Condition

2.1.1 Yung Shue Wan Public Pier is situated in the Islands District. It connects to Yung Shue Wan Ferry Pier at the seaward side and connects to the catwalk linking to Yung Shue Wan Main Street at the landward side. The pier was built in 1960s and modification to the public pier and catwalk was carried out in 1980s. The location of Yung Shue Wan Public Pier is shown in **Figure 2.1**.

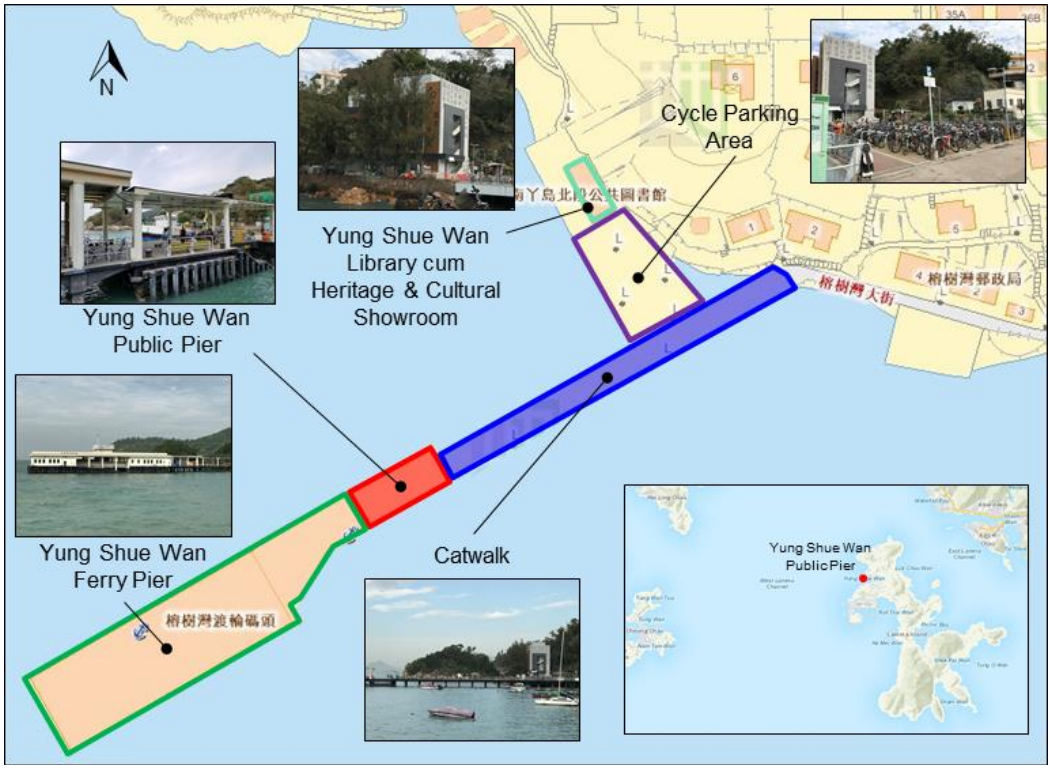

Figure 2.1 - Location plan of Yung Shue Wan Public Pier

2.1.2 The existing public pier is about 24m long and 9m wide with a landing step on each side of the public pier. The catwalk for the public pier (~83m long) was widened to ~6.5m during ferry pier construction in early 1980s. Rock outcrops are found near the landfall of the catwalk. Owing to structural aging problem, temporary steelworks were erected at the soffit of the public pier and catwalk to provide additional structural rigidity.

2.2 Preliminary Engineering Assessment

2.2.1 The findings on preliminary engineering assessment for Yung Shue Wan are summarized as follows:-

Table 2.1 - Summary of the findings on preliminary engineering assessment (Yung Shue Wan Public Pier)

<table>
<tr><th>Technical Consideration</th><th>Preliminary Findings</th></tr>
<tr><td>1. Geological/ geotechnical conditions</td><td>• The site is predominantly underlain by 2m to 9m thick marine sand.
• 1-2m thick alluvial clay is locally encountered beneath marine deposit.
• Some angular cobbles are lying above the granite bedrock.</td></tr>
<tr><td>2. Ground settlement</td><td>• There will be ground settlement in marine/beach deposits and piled foundation is considered appropriate
• Shallow foundation will be used at the nearshore if seabed materials are granular and non-cohesive or shallow rock.</td></tr>
<tr><td>3. Natural terrain hazard impact assessment</td><td>• No natural hillside catchments will potentially pose an impact to the pier.</td></tr>
<tr><td>4. Man-made feature impact assessment</td><td>• No registered man-made features are present within the pier footprint.
• One slope feature (Slope Registered No. 14NE-B/R94) will have low potential to significantly affect or be affected by the proposed pier improvement works.
• Design submissions shall take into account the impact of pier improvement works to two unregistered/non-registrable features and propose necessary stabilisation and upgrading works, if needed.
• Further investigations and studies of the registered slope feature and the two unregistered/non-registrable features, and necessary stabilisation and upgrading works would be included in a geotechnical assessment in the detailed design stage when the design is confirmed.</td></tr>
<tr><td>5. Hydraulic conditions</td><td>• Extreme values of significant wave height (Hs) and peak wave period (Tp) for Yung Shue Wan Public Pier are summarized below:
<table>
<tr><th>Return Period (years)</th><th>Hs (m)</th><th>Tp (s)</th></tr>
<tr><td>2</td><td>0.7</td><td>2.7</td></tr>
<tr><td>10</td><td>1.3</td><td>8 - 10</td></tr>
<tr><td>50</td><td>1.8</td><td>8 - 10</td></tr>
<tr><td>100</td><td>2.0</td><td>8 - 10</td></tr>
</table>
• To improve the wave condition of the pier, downstand wall is proposed to be constructed to enhance the berthing condition for the floating platform and could reduce wave height.</td></tr>
<tr><td>6. Water quality and sedimentation rate</td><td>• The proposed pier improvement works will not result in significant impact to current speed and pattern and water circulation/flushing near the pier and the change to sedimentation rate will not be significant.</td></tr>
</table>

2.3 Preliminary Environmental Study

2.3.1 Based on the project nature and the proposed construction activities, the proposed pier improvement works at Yung Shue Wan Public Pier under the Study do not constitute as a Designated Project under Schedule 2 of the EIAO.

2.3.2 The findings on preliminary environmental study are summarised as follows:-

Table 2.2 - Summary of the findings on preliminary environmental study (Yung Shue Wan Public Pier)

Description of environmental impact	**Construction Phase**		**Operational Phase**	
	Preliminary Findings	**Mitigation Measures**	**Preliminary Findings**	**Mitigation Measures**
1. Air quality	• No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices	• No significant change in marine traffic • No additional road traffic • No existing chimney or other industrial activities within 500m assessment area	-
2. Noise	• No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices • No concurrent construction works within 300m from the pier	• No significant change in marine traffic • No additional road traffic	-
3. Water quality	• No adverse impact	• No dredging operation • Installation of silt curtain • Good site practices	• No significant hydrodynamic impact • No anticipated additional pollution loading	-
4. Waste management	• No adverse impact	• Use of prefabrication construction • Low generation of construction and demolition waste, chemical waste and general refuse • Good site practices	• No significant change in marine traffic • No increase in the amount of general refuse	-
5. Land contamination	• No adverse impact	• Marine-based construction	-	-

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	**Mitigation Measures**	**Preliminary Findings**	**Mitigation Measures**
6. Ecology	• Common intertidal organism, low coverage (less than 50 colonies) of common hard coral and gorgonian • "Minor" water quality impact on marine organisms • No adverse impact	• Avoidance of direct encroachment upon Coastal Protection Area	• Insignificant permanent marine habitat loss (<0.007ha) • No significant change in hydrodynamics and no water quality impact	-
7. Fisheries	• Insignificant fishing ground loss (0.024ha) • Minor impact to fishing operation • Minor water quality impact on fisheries resources • No significant impact to Lo Tik Wan and Yung Shue Wan FCZ and spawning ground of commercial fisheries resources • No adverse impact	-	• Insignificant permanent fishing ground loss (0.004ha) • No significant impact to Lo Tik Wan and Yung Shue Wan FCZ and spawning ground of commercial fisheries resources	-
8. Landscape and visual impact	• Overall landscape impact – generally insignificant with slight impact • Overall visual impact – generally insignificant with slight impact • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures	• Overall landscape impact – generally insignificant with slight impact • Overall visual impact – generally moderately beneficial from improving exterior appearance of pier structure • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
9. Cultural heritage	• No declared monuments within the 300m assessment area • One grade 3 historic building and the Yung Shue Wan site of archaeological interest are located at 300m and 150m respectively • No historical ship wreck • Significant seabed disturbance, thereby reducing marine archaeological potential • Insignificant impact on archaeological interest	-	-	-

2.3.3 Environmental Monitoring and Audit will be carried out during construction to ensure all mitigation measures recommended in the PES and EM&A reports are properly and effectively implemented and to ensure compliance with the intended aims of the measures. Site inspections will be undertaken by the works contractor and Environmental Team once a week during construction.

2.4 Stakeholder Consultation

2.4.1 A comprehensive stakeholder consultation strategy is formulated for the Study to solicit support and opinions from key stakeholders. Stakeholder consultation was planned and conducted in two stages, namely (i) Initial Stakeholder Consultation and (ii) Stakeholder Consultation, to enable better and early consultation of the stakeholders and to facilitate consensus building throughout the Study process.

2.4.2 The stakeholders generally supported the conceptual pier design and the proposed new pier facilities including floating platform, cover for waiting area and catwalk and powering of pier facilities by renewable energy.

2.4.3 The key stakeholders' views/opinions are summarised as follows:-

- Improvement to structural integrity, durability and safety
- Canopy design (durable and corrosion resistant)
- Measures to prevent illegal bicycle parking along catwalk and pier
- Provision of information display system and sightseeing signage for better experience and social life in Yung Shue Wan
- Adequate catwalk width for co-use by village vehicles and people in construction and operation stages
- Temporary access during construction
- Construction cost and timetable for implementation
- Arrangement of the existing pillar box

2.5 Preliminary Pier Design

2.5.1 Design of new public pier and catwalk includes the following key considerations:

(i) **Meeting public aspiration** to provide/enhance structurally adequate, robust and durable marine structures for the use as public pier and catwalk;

(ii) **Environmental friendly approach** to minimise the impact to the environment during the construction, operation and maintenance;

(iii) **Smart city development** to improve people's quality of living as well as Hong Kong's sustainability, efficiency and safety; and

(iv) **Prefabrication design** to optimise the use of prefabrication structural elements, facilitating on-site construction in a more efficient and cost-effective manner.

2.5.2 The proposed pier improvement works will include alteration and modification of existing pier and catwalk. The new pier and catwalk will be in the structural form of a suspended deck structure. Having considered (i) the presence of soft sediment below the seabed, and (ii) no dredging method, pile foundation is recommended to be adopted in terms of structural integrity, settlement performance and environmental consideration. Shallow foundation will be adopted in the nearshore area where the founding soils are firm in nature and less susceptible to long-term settlement.

2.5.3 The two-berth layout and arrangement will be retained. The northern berth will have conventional landing step. Floating platform will be provided at the southern berth for vessel berthing and users' boarding. The floating platform will rise or lower with different tidal levels from time to time such that a constant freeboard (i.e. the depth between water level and platform surface level) will be always maintained. The floating platform will be fixed in position by guide piles, which will constrain the movement of floating platform in any direction on plan and only vertical movement due to different tidal levels will be allowed. The floating

platform will be connected to the catwalk by gangway and fixed ramps. Landings will also be provided at appropriate distance to meet the requirement on the gradient for the ramp and gangway.

2.5.4 The extent of pier/catwalk improvement works and the provision of pier facilities will be further reviewed in detailed design stage. Pier improvement works will be designed with the view to avoiding the need for dredging and disposal of soft marine sediment within Hong Kong waters.

2.5.5 The preliminary layout for the re-provisioned public pier and catwalk is shown in **Figure 2.2**.

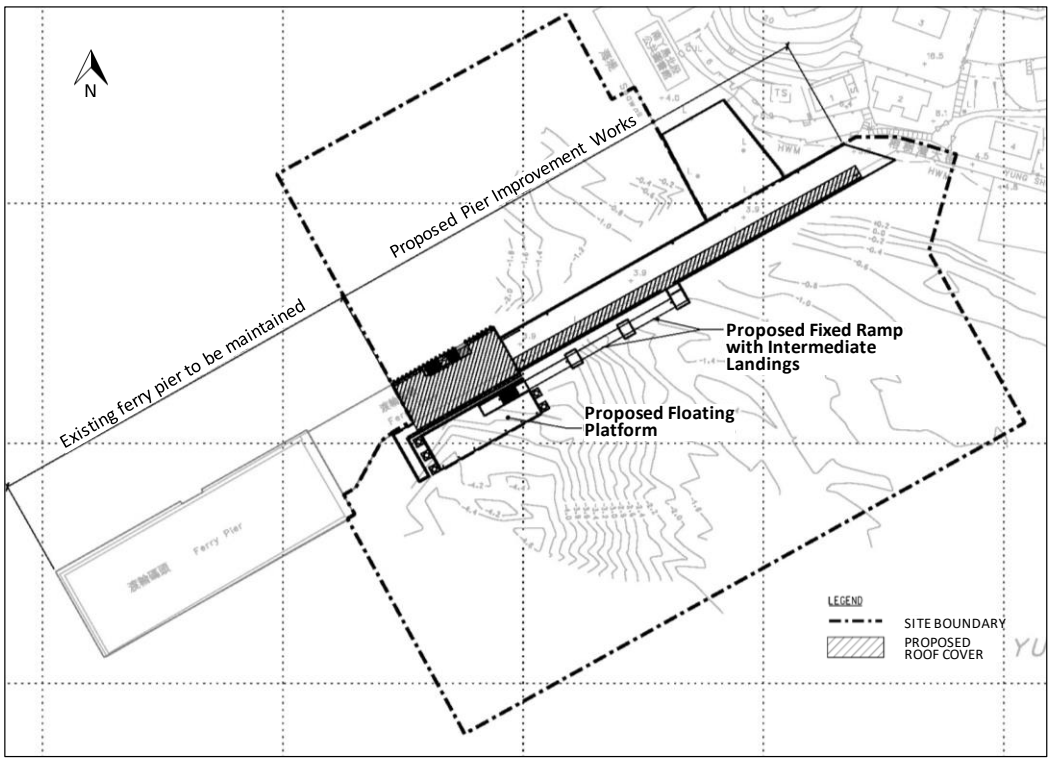

Figure 2.2 - Preliminary layout for Yung Shue Wan Public Pier and catwalk

2.5.6 The following innovative ideas are recommended to be considered and further developed in detailed design:

Table 2.3 - Summary of innovation ideas for Yung Shue Wan Public Pier

Innovative Pier Element	
1. Floating platform including anchor system and mooring/ berthing facilities	
2. Gangway	3. Solar power system
4. Gov-Wi-Fi	5. Flexible conduits
6. Benches / seats	7. Canopy
8. LED lighting	9. Smart information display system
10. Multi-functional lamp post	11. Surveillance system
12. Corrosion monitoring device	13. Drinking facilities

2.5.7 It is preliminarily considered that the new deck structure for Yung Shue Wan Public Pier and catwalk will be technically feasible to adopt prefabrication construction method. The prefabricated units will include precast pile caps, precast beams, precast fender blocks and precast slab panels.

2.5.8 As the pier improvement works involve the provision of a new floating platform and catwalk widening which will be over and upon the foreshore and sea-bed, the proposed pier improvement works at Yung Shue Wan will require gazettal under the FS(R)O.

2.5.9 It is estimated that the construction will take about 30 months to complete pier improvement works.

2.6 Summary

2.6.1 Based on the preliminary engineering assessment and preliminary environment study, the proposed pier improvement works at Yung Shue Wan Public Pier are technically feasible and environmentally acceptable.

2.6.2 Environmental Monitoring and Audit will be carried out during construction to ensure all recommended mitigation measures are properly and effectively implemented and to ensure compliance with the intended aims of the measures.

3 Shek Tsai Wan Pier

3.1 Existing Pier Condition

3.1.1 Shek Tsai Wan Pier is located at the western side of Ma Wan, next to the Ma Wan Fish Culture Zone. The existing pier was probably built by locals and is primarily used by fishermen and local villagers. The pier head, including the heading part at the northwest corner, was damaged and collapsed. For safety reason, the damaged pier part was fenced off to prevent pier usage by the public and the removal of damaged part was completed in January 2018. The location of Shek Tsai Wan Pier is shown in **Figure 3.1.**

3.1.2 The existing pier is in the structural form of gravity structure. Temporary wooden ladders are currently used by the people for boarding or materials loading/ unloading. Because of the lack of appropriate pier facilities, the pier is considered unsafe for vessel berthing and accessibility. Rock outcrops are observed near the landward part of the pier structure. Due to shallow water depth, the existing pier can only be used by small vessels with vessel freeboard less than 1m during low tide.

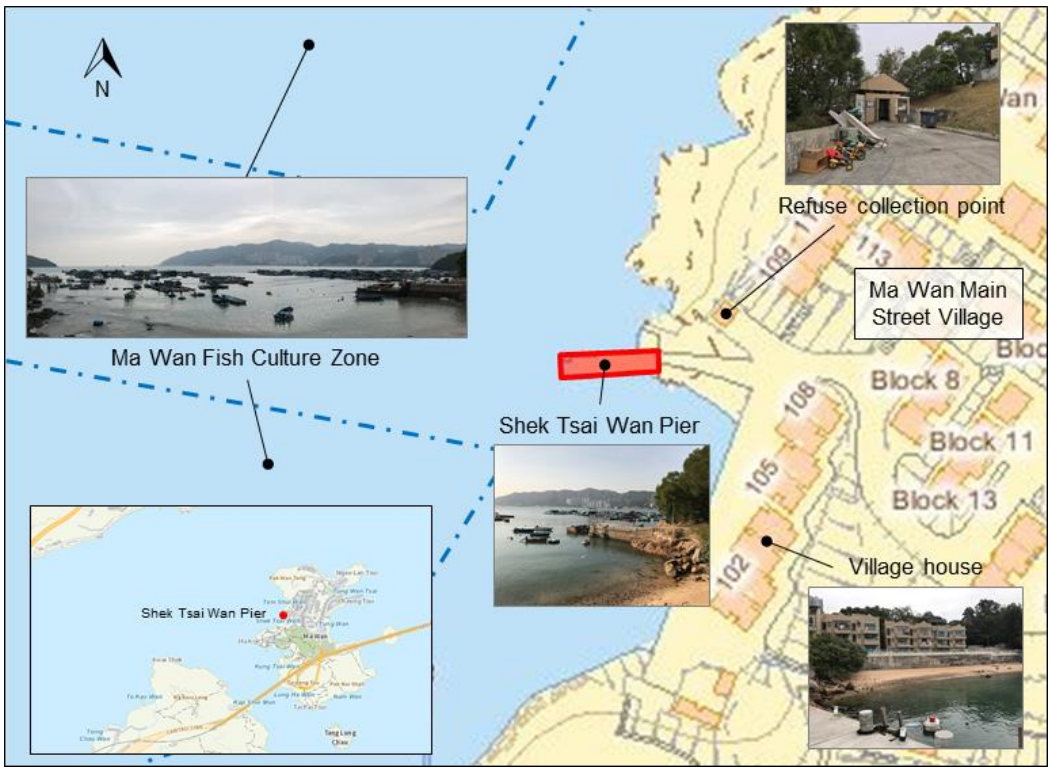

Figure 3.1 - Location plan of Shek Tsai Wan Pier

3.1.3 From the site visits, the structural condition of the existing pier is poor and will need improvement works to provide berthing / mooring function for the pier.

3.2 Preliminary Engineering Assessment

3.2.1 The findings on preliminary engineering assessment for Shek Tasi Wan are summarized as follows:-

Table 3.1 - Summary of the findings on preliminary engineering assessment (Shek Tsai Wan Pier)

<table>
<tr><th>Technical Consideration</th><th>Preliminary Findings</th></tr>
<tr><td>1. Geological/ geotechnical conditions</td><td>• The site is predominantly underlain by 2-6m thick marine clay and sand and 1-3m thick colluvium at the coast.
• Marine deposits are thicker offshore and are absence near the coastline.
• In-situ soil generally comprises sandy silt and clayey silty medium to coarse sand which lies above the Tuff bedrock.</td></tr>
<tr><td>2. Ground settlement</td><td>• Immediate/elastic settlement upon imposing additional loads is anticipated because of the presence of sandy soils below the seabed.
• Shallow foundation will be considered and a more detailed ground investigation shall be conducted in detailed design stage to confirm that sound founding materials can be found for the entire new pier head.</td></tr>
<tr><td>3. Natural terrain hazard impact assessment</td><td>• No natural hillside catchments will potentially pose an impact to the pier.</td></tr>
<tr><td>4. Man-made feature impact assessment</td><td>• No registered man-made features are present within the pier footprint.</td></tr>
<tr><td>5. Hydraulic conditions</td><td>• Extreme values of significant wave height (Hs) and peak wave period (Tp) for Shek Tsai Wan Pier are summarized below:
<table>
<tr><th>Return Period (years)</th><th>Hs (m)</th><th>Tp (s)</th></tr>
<tr><td>2</td><td>0.5</td><td>3 - 5</td></tr>
<tr><td>10</td><td>0.7</td><td>3 - 5</td></tr>
<tr><td>50</td><td>0.9</td><td>3 - 5</td></tr>
<tr><td>100</td><td>1.0</td><td>3 - 5</td></tr>
</table></td></tr>
<tr><td>6. Water quality and sedimentation rate</td><td>• The proposed pier improvement works will not result in significant impact to current speed and pattern and water circulation/flushing near the pier and the change to sedimentation rate will not be significant.</td></tr>
</table>

3.3 Preliminary Environmental Study

3.3.1 Based on the project nature and the proposed construction activities, the proposed pier improvement works at Shek Tsai Wan Pier under the Study do not constitute as a Designated Project under Schedule 2 of the EIAO.

3.3.2 The findings on preliminary environmental study are summarised as follows:-

Table 3.2 - Summary of the findings on preliminary environmental study (Shek Tsai Wan Pier)

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
1. Air quality	• No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices	• No significant change in marine traffic • No additional road traffic • No existing chimney or other industrial activities within 500m assessment area	-
2. Noise	• No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices • No concurrent construction works within 300m from the pier	• No significant change in marine traffic • No additional road traffic	-
3. Water quality	• No adverse impact	• No dredging operation • Installation of silt curtain • Good site practices	• No significant hydrodynamic impact • No anticipated additional pollution loading	-
4. Waste management	• No adverse impact	• Use of prefabrication construction • Low generation of construction and demolition waste, chemical waste and general refuse • Good site practices	• No significant change in marine traffic • No increase in the amount of general refuse	-
5. Land contamination	• No adverse impact	• Marine-based construction	-	-

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	**Mitigation Measures**	**Preliminary Findings**	**Mitigation Measures**
6. Ecology	• Common intertidal organism, low coverage (<5%) of common hard coral and gorgonian • Minor water quality impact on marine organisms • Insignificant water quality impact to the mangrove stand (800m away from the pier) • Not directly affecting Ma Wan Egrety (~300m from the pier) • No adverse impact	-	• Insignificant permanent marine habitat loss (<0.013ha) • No significant change in hydrodynamics and no water quality impact	-
7. Fisheries	• Insignificant fishing ground loss (0.013ha) • Minor impact to fishing operation • Minor water quality impact on fisheries resources including Ma Wan FCZ • No adverse impact	-	• Insignificant permanent fishing ground loss (0.013ha) • The impact on Ma Wan FCZ is not anticipated	-
8. Landscape and visual impact	• Overall landscape impact – generally insignificant to slightly adverse impact • Overall visual impact – generally slightly adverse impact • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures	• Overall landscape impact – generally insignificant to slightly adverse impact • Overall visual impact – generally moderately beneficial from improving exterior appearance of pier structure • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
9. Cultural heritage	• No declared monuments and sites of archaeological interest within the 300m assessment area • Two grade 3 historical buildings located at 100m and 280m away from the pier • The impact to marine archaeological potential for the proposed pier improvement works is considered unlikely	-	-	-

3.3.3 Environmental Monitoring and Audit will be carried out during construction to ensure all mitigation measures recommended in the PES and EM&A reports are properly and effectively implemented and to ensure compliance with the intended aims of the measures. Site inspections will be undertaken by the works contractor and Environmental Team once a week during construction.

3.4 Stakeholder Consultation

3.4.1 A comprehensive stakeholder consultation strategy is formulated for the Study to solicit support and opinions from key stakeholders. Stakeholder consultation was planned and conducted in two stages, namely (i) Initial Stakeholder Consultation and (ii) Stakeholder Consultation, to enable better and early consultation of the stakeholders and to facilitate consensus building throughout the Study process.

3.4.2 The stakeholders generally supported the conceptual pier design and the proposed new pier facilities including floating platform, cover for waiting area and catwalk and powering of pier facilities by renewable energy.

3.4.3 The key stakeholders' views/opinions are summarised as follows:-

- Use of renewable energy for power supply to pier facilities
- Durable design for pier structure and canopy
- Environmental impact to nearby fish culture zone and mitigation measures
- Construction method and costs, and timetable for implementation

3.5 Preliminary Pier Design

3.5.1 Design of new pier includes the following key considerations:

(i) **Meeting public aspiration** to provide/enhance structurally adequate, robust and durable marine structures for the use as public pier;

(ii) **Environmental friendly approach** to minimise the impact to the environment during the construction, operation and maintenance;

(iii) **Smart city development** to improve people's quality of living as well as Hong Kong's sustainability, efficiency and safety; and

(iv) **Prefabrication design** to optimise the use of prefabrication structural elements, facilitating on-site construction in a more efficient and cost-effective manner.

3.5.2 The proposed pier improvement works at Shek Tsai Wan Pier will include the alteration and modification of existing pier. The new pier head will be tentatively in the structural form of gravity structure, subject to further ground investigation to confirm if firm founding material is found at the existing seabed for the entire length of the pier head.

3.5.3 The pier will be made of concrete blockworks. The new pier will have two berths; one at the end of the pier head and the other is at the floating platform. The berth at the pier head end will have conventional landing step. Floating platform will be provided at the southern berth for vessel berthing and users' boarding. The floating platform will rise or lower consistently with different tidal levels from time to time such that a constant freeboard (i.e. the depth between water level and platform surface level) will be always maintained. The floating platform will be fixed in position by guide piles, which constrain the movement of floating platform in any direction on plan and only allow vertical movement due to different tidal levels. The floating platform will be connected to the pier surface by means of ramp.

3.5.4 The extent of pier improvement works and the provision of pier facilities will be further reviewed in detailed design stage. Pier improvement works will be designed with the view to avoiding the need for dredging and disposal of soft marine sediment within Hong Kong waters.

3.5.5 The preliminary layout for the re-provisioned pier is shown in **Figure 3.2**.

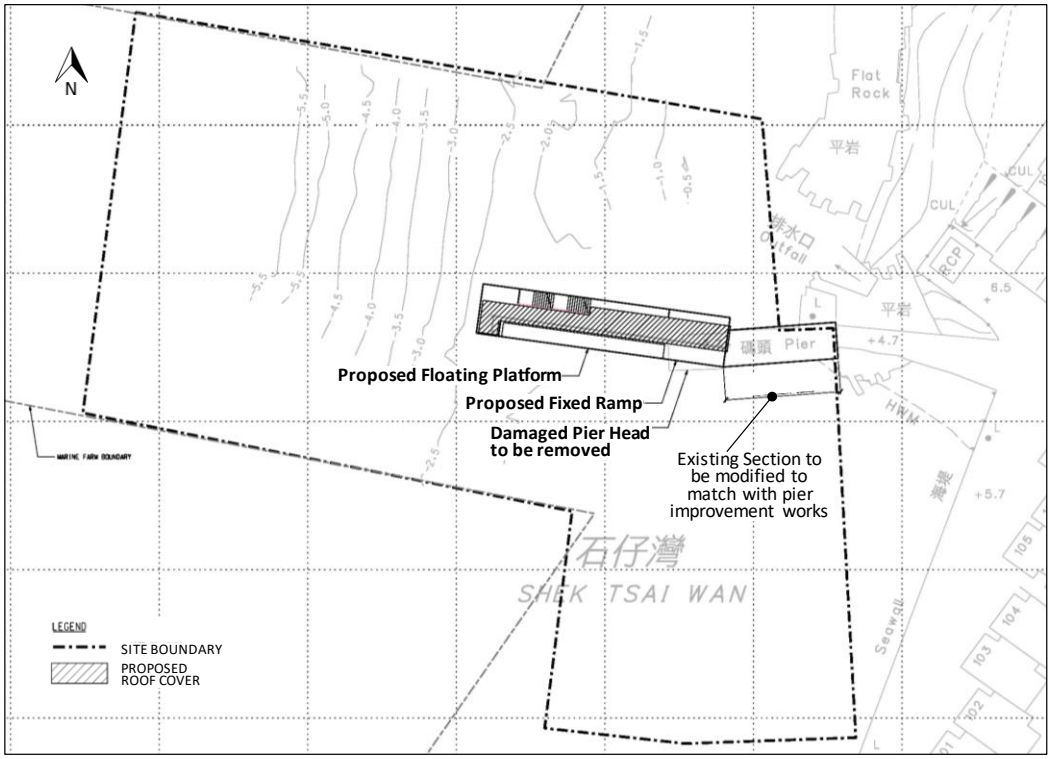

Figure 3.2 - Preliminary layout for Shek Tsai Wan Pier

3.5.6 The following innovative ideas are recommended to be considered and further developed in detailed design:

Table 3.3 - Summary of innovation ideas for Shek Tsai Wan Pier

Innovative Pier Element	
1. Floating platform including anchor system and mooring/ berthing facilities	
2. Solar power system	3. Gov-Wi-Fi
4. Flexible conduits	5. Benches / seats
6. Canopy	7. LED lighting

3.5.7 It is preliminarily considered that the new pier head will be technically feasible to adopt prefabrication construction method. The prefabricated units will include precast concrete blocks and precast landing steps.

3.5.8 As the pier improvement works involve the provision of a new floating platform which will be over and upon the foreshore and sea-bed, the proposed pier improvement works for Shek Tsai Wan Pier will require gazettal under the FS(R)O.

3.5.9 It is estimated that the construction will take about 18 months to complete pier improvement works.

3.6 Summary

3.6.1 From the preliminary engineering assessment and preliminary environment study, the proposed pier improvement works at Shek Tsai Wan Pier are technically feasible and environmentally acceptable.

3.6.2 Environmental Monitoring and Audit will be carried out during construction to ensure all recommended mitigation measures are properly and effectively implemented and to ensure compliance with the intended aims of the measures.

4 Yi O Pier

4.1 Existing Pier Condition

4.1.1 There is an agricultural village with a history of about 300 years at Yi O. The pier is usually used by local villagers, visitors and hikers during weekends and holidays. The existing pier, which was probably built by locals, is in a poor condition. There are concerns on inadequate water depth at the pier together with poor pier condition for passengers' safe embarkation/disembarkation. The location of Yi O Pier is shown in **Figure 4.1**.

Figure 4.1 - Location plan of Yi O Pier

4.1.2 The existing pier, which is primitive and in poor condition, was probably built by locals before 1963 and might be used by local residents in Yi O Village between Yi O and Tai O or other nearby areas. From the site observation, the pier structure is made of concrete decking supported on concrete columns founded on rock outcrops. The pier does not equip with any mooring and berthing facilities. Due to shallow water depth, the existing pier can only be used by small vessels with small draft normally and cannot be used during low tide.

4.1.3 In view of poor condition of the existing pier, a new pier head is proposed at a deeper water depth. No new access road will be proposed to connect the proposed Yi O Pier.

4.2 Preliminary Engineering Assessment

4.2.1 The findings on preliminary engineering assessment for Yi O Pier are summarized as follows:-

Table 4.1 - Summary of the findings on preliminary engineering assessment (Yi O Pier)

<table>
<tr><th>Technical Consideration</th><th>Preliminary Findings</th></tr>
<tr><td>1. Geological/ geotechnical conditions</td><td>• The seabed has primarily fine-grained sediments of clay/silt bounded by rocky areas with intermittent sediments along the eastern coast.
• The rocky area extends along the coast and is composed of rock outcrops, boulders and intermittent sediments.</td></tr>
<tr><td>2. Ground settlement</td><td>• There will be ground settlement in marine/beach deposits and piled foundation is considered appropriate
• Shallow foundation will be used at the nearshore if seabed materials are granular and non-cohesive or shallow rock.</td></tr>
<tr><td>3. Natural terrain hazard impact assessment</td><td>• There will be no natural terrain hazard on the covered pier head with boarding/alighting facilities.</td></tr>
<tr><td>4. Man-made feature impact assessment</td><td>• No registered man-made features are present within the pier footprint.</td></tr>
<tr><td>5. Hydraulic conditions</td><td>• Extreme values of significant wave height (Hs) and peak wave period (Tp) for Yi O Pier are summarized below:
<table>
<tr><th>Return Period (years)</th><th>Hs (m)</th><th>Tp (s)</th></tr>
<tr><td>2</td><td>1.1</td><td>5 - 5.5</td></tr>
<tr><td>10</td><td>1.5</td><td>5 - 5.5</td></tr>
<tr><td>50</td><td>1.8</td><td>5 - 5.5</td></tr>
<tr><td>100</td><td>1.9</td><td>5 - 5.5</td></tr>
</table>
• To improve the wave condition of the pier, downstand wall is proposed to be constructed to enhance the berthing condition for the floating platform and could reduce wave height.</td></tr>
<tr><td>6. Water quality and sedimentation rate</td><td>• The proposed pier improvement works will not result in significant impact to current speed and pattern and water circulation/flushing near the pier and the change to sedimentation rate will not be significant.</td></tr>
</table>

4.3 Preliminary Environmental Study

4.3.1 Based on the project nature and the proposed construction activities, the proposed pier improvement works at Yi O Pier under the Study do not constitute as a Designated Project under Schedule 2 of the EIAO.

4.3.2 The findings on preliminary environmental study are summarised as follows:-

Table 4.2 - Summary of the findings on preliminary environmental study (Yi O Pier)

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
1. Air quality	• No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices	• No significant change in marine traffic • No additional road traffic • No existing chimney or other industrial activities within 500m assessment area	-
2. Noise	• No Noise Sensitive Receiver is identified within the 300m assessment area • No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices	• No significant change in marine traffic • No additional road traffic	-
3. Water quality	• No adverse impact	• No dredging operation • Installation of silt curtain • Good site practices	• No significant hydrodynamic impact • No anticipated additional pollution loading	-
4. Waste management	• No adverse impact	• Use of prefabrication construction • Low generation of construction and demolition waste, chemical waste and general refuse • Good site practices	• No significant change in marine traffic • No increase in the amount of general refuse	-
5. Land contamination	• No adverse impact	• Marine-based construction	-	-
6. Ecology	• Common intertidal organism, low coverage of common gorgonian	-	• Insignificant permanent habitat loss • No significant change in hydrodynamics	-

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
	• Minor water quality impact on marine organisms • No terrestrial habitat loss except the encroachment upon a small area of woodland (0.0001ha) by the new catwalk • No direct encroachment upon country parks • No adverse impact		and no water quality impact • No adverse impact to terrestrial fauna of conservation importance	
7. Fisheries	• Insignificant fishing ground loss (0.009ha) • Minor impact to fishing operation • Minor water quality impact on fisheries resources • No significant impact to Cheung Sha Wan FCZ, Yi O embayment with mangrove and Tai O • No adverse impact	-	• Insignificant permanent fishing ground loss (0.006ha) • No significant impact to Cheung Sha Wan FCZ, Yi O embayment with mangrove and Tai O	-
8. Landscape and visual impact	• Overall landscape impact – insignificant to slightly adverse impact; no tree being affected • Overall visual impact – insignificant visual impacts • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures	• Overall landscape impact – insignificant to slightly adverse impact; no tree being affected • Overall visual impact – insignificant visual impacts on visually sensitive receiver • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
9. Cultural heritage	• No declared monuments within the 300m assessment area • No object or feature with archaeological potential or value	-	-	-

4.3.3 Environmental Monitoring and Audit will be carried out during construction to ensure all mitigation measures recommended in the PES and EM&A reports are properly and effectively implemented and to ensure compliance with the intended aims of the measures. Site inspections will be undertaken by the works contractor and Environmental Team once a week during construction.

4.4 Stakeholder Consultation

4.4.1 A comprehensive stakeholder consultation strategy is formulated for the Study to solicit support and opinions from key stakeholders. Stakeholder consultation was planned and conducted in two stages, namely (i) Initial Stakeholder Consultation and (ii) Stakeholder Consultation, to enable better and early consultation of the stakeholders and to facilitate consensus building throughout the Study process.

4.4.2 The stakeholders generally supported the conceptual pier design and the proposed new pier facilities including floating platform, cover for waiting area and catwalk and powering of pier facilities by renewable energy.

4.4.3 The key stakeholders' views/opinions are summarised as follows:-

- Adequate water depth at the pier to minimise berthing constraint due to high or low tide levels
- Environmental and visual impact
- Construction method and costs, and timetable for implementation
- Need for improvement works for Yi O Pier
- Influence on fishing activities by Tai O fishermen in Yi O Bay

4.5 Preliminary Pier Design

4.5.1 Design of the pier includes the following key considerations:

(i) **Meeting public aspiration** to provide/enhance structurally adequate, robust and durable marine structures for the use as public pier and catwalk;

(ii) **Environmental friendly approach** to minimise the impact to the environment during the construction, operation and maintenance;

(iii) **Smart city development** to improve people's quality of living as well as Hong Kong's sustainability, efficiency and safety; and

(iv) **Prefabrication design** to optimise the use of prefabrication structural elements, facilitating on-site construction in a more efficient and cost-effective manner.

4.5.2 The proposed pier improvement works at Yi O Pier will include the construction of a new pier head and catwalk at deeper water depth (~170m in the northwest direction from the existing shore). The new pier head and 170m long catwalk will be in the structural form of a suspended deck structure. Pile foundation is recommended to be adopted in terms of the considerations on structural integrity and settlement performance. Shallow foundation will be adopted in the nearshore area where the founding soils are more firm and less susceptible to long-term settlement.

4.5.3 The pier deck will be made of reinforced concrete beams and slabs. The pier head will provide two berths. The northern berth will have conventional landing step. Floating platform will be provided at the southern berth for vessel berthing and users' boarding. The floating platform will rise or lower consistently with different tidal levels from time to time such that a constant freeboard (i.e. the depth between water level and platform surface level) will be always maintained. The floating platform will be fixed in position by guide piles, which constrain the movement of floating platform in any direction on plan and only allow vertical movement due to different tidal levels. The floating platform will be connected to the catwalk by gangway and fixed ramps. Landings will be also provided at appropriate distance to meet the requirement on the gradient for the ramp and gangway.

4.5.4 To reduce the disruption or nuisance to the users during construction, the existing landing steps and pier structure will be maintained for servicing during construction.

4.5.5 The extent of pier/catwalk improvement works and the provision of pier facilities will be further reviewed in detailed design stage. Pier improvement works will be designed with the view to avoiding the need for dredging and disposal of soft marine sediment within Hong Kong waters.

4.5.6 The preliminary layout for the re-provisioned pier and catwalk is shown in **Figure 4.2**.

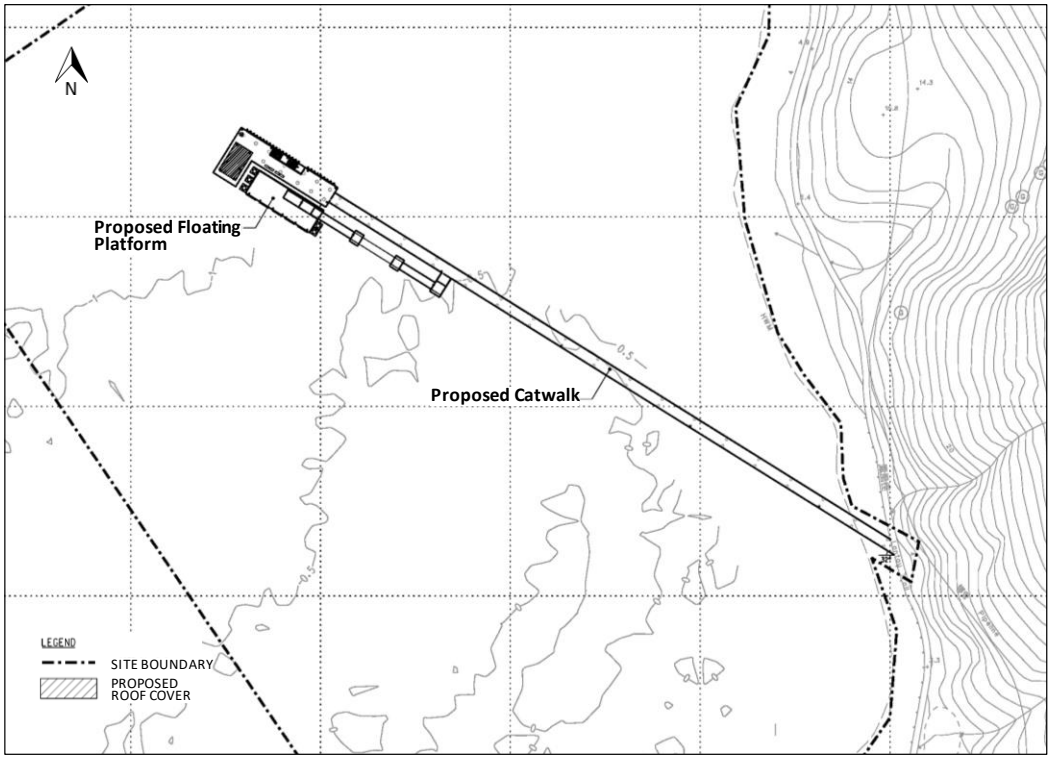

Figure 4.2 - Preliminary layout for Yi O Pier and catwalk

4.5.7 The following innovative ideas are recommended to be considered and further developed in detailed design:

Table 4.3 - Summary of innovation ideas for Yi O Pier

Innovative Pier Element	
1. Floating platform including anchor system and mooring/ berthing facilities	
2. Gangway	3. Solar power system
4. Gov-Wi-Fi	5. Flexible conduits
6. Benches / seats	7. Canopy
8. LED lighting	

4.5.8 It is preliminarily considered that the new deck structure for Yi O Pier and catwalk will be technically feasible to adopt prefabrication construction method. The prefabricated units will include precast pile caps, precast beams, precast fender blocks and precast slab panels.

4.5.9 As the pier improvement works involve the provision of a new floating platform which will be over and upon the foreshore and sea-bed, the proposed pier improvement works at Yi O will require gazettal under the FS(R)O.

4.5.10 It is estimated that the construction will take about 24 months to complete pier improvement works.

4.6 Summary

4.6.1 From the preliminary engineering assessment and preliminary environment study, the proposed pier improvement works at Yi O Pier are technically feasible and environmentally acceptable.

4.6.2 Environmental Monitoring and Audit will be carried out during construction to ensure all recommended mitigation measures are properly and effectively implemented and to ensure compliance with the intended aims of the measures.

5 Ma Wan Chung Pier

5.1 Existing Pier Condition

5.1.1 Ma Wan Chung Village is a serene fishing village in Tung Chung. The pier mainly serves as the landing point for local villagers and fishermen in Ma Wan Chung. The existing pier, which was probably built by locals, is primitive and the condition is found poor due to lack of maintenance. The water depth around the pier is shallow and some mooring facilities are found damaged and inadequate. The location of Ma Wan Chung Pier is shown in **Figure 5.1**.

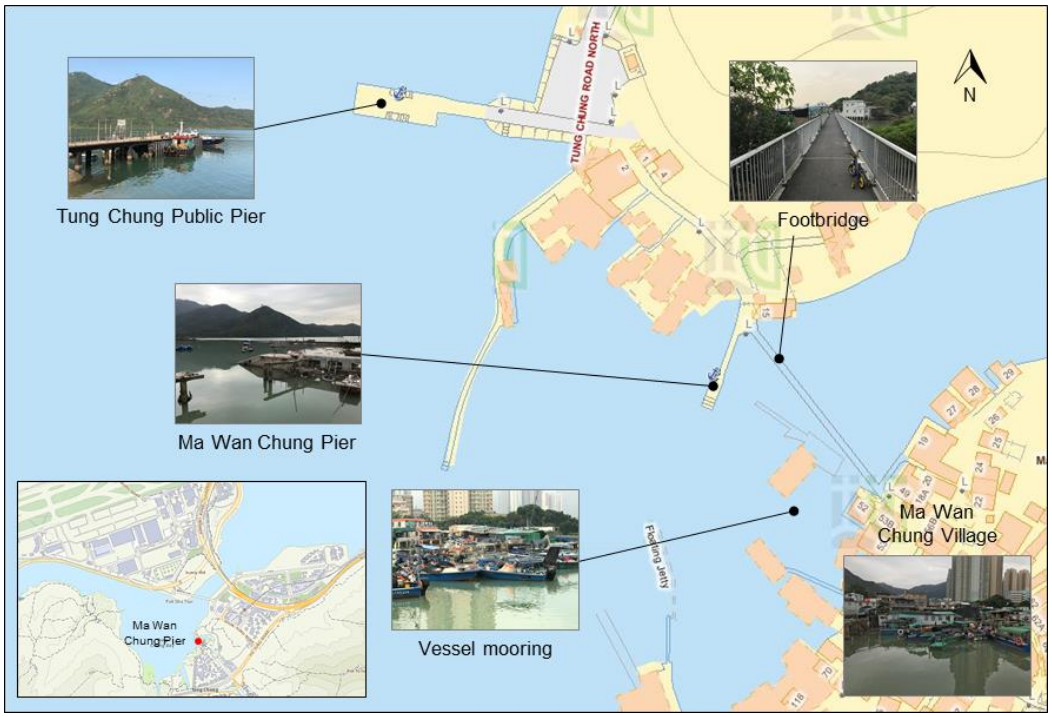

Figure 5.1 - Location plan of Ma Wan Chung Pier

5.1.2 The pier is in the structural form of gravity structure with landing steps at pier end. From the site observation, the pier is a mass concrete structure. Concrete short columns were observed on the pier and it is of question if they are structurally suitable for vessel mooring. In additional to the concrete columns, some ropes attached to the landing steps are used for mooring of small vessels. Due to shallow water depth, the existing pier can only be used by small vessels during low tide.

5.1.3 The pier structure may be re-used as the connection to the new pier head, subject to further assessment in terms of structural integrity, load carrying capacity and ground bearing capacity. The existing structure will be altered and modified in case either structural capacity or ground bearing capacity will be exceeded.

5.2 Preliminary Engineering Assessment

5.2.1 The findings on preliminary engineering assessment for Ma Wan Chung Pier are summarized as follows:-

Table 5.1 - Summary of the findings on preliminary engineering assessment (Ma Wan Chung Pier)

<table>
<tr><th>Technical Consideration</th><th>Preliminary Findings</th></tr>
<tr><td>1. Geological/ geotechnical conditions</td><td>• The site is predominantly underlain by marine sand followed by alluvium.</td></tr>
<tr><td>2. Ground settlement</td><td>• Immediate/elastic settlement upon imposing additional loads is anticipated because of the presence of sandy soils below the seabed.
• Shallow foundation will be considered and a more detailed ground investigation shall be conducted in detailed design stage to confirm that sound founding materials can be found for the entire new pier head.</td></tr>
<tr><td>3. Natural terrain hazard impact assessment</td><td>• No natural hillside catchments will potentially pose an impact to the pier.</td></tr>
<tr><td>4. Man-made feature impact assessment</td><td>• No registered man-made features are present within the pier footprint.</td></tr>
<tr><td>5. Hydraulic conditions</td><td>• Extreme values of significant wave height (Hs) and peak wave period (Tp) for Ma Wan Chung Pier are summarized below:
<table>
<tr><th>Return Period (years)</th><th>Hs (m)</th><th>Tp (s)</th></tr>
<tr><td>2</td><td>0.05</td><td>1.5 - 2</td></tr>
<tr><td>10</td><td>0.05</td><td>1.5 - 2</td></tr>
<tr><td>50</td><td>0.06</td><td>1.5 - 2</td></tr>
<tr><td>100</td><td>0.06</td><td>1.5 - 2</td></tr>
</table></td></tr>
<tr><td>6. Water quality and sedimentation rate</td><td>• The proposed pier improvement works will not result in significant impact to current speed and pattern and water circulation/flushing near the pier and the change to sedimentation rate will not be significant.</td></tr>
</table>

5.3 Preliminary Environmental Study

5.3.1 Based on the project nature and the proposed construction activities, the proposed pier improvement works for Ma Wan Chung Pier under the Study do not constitute as a Designated Project under Schedule 2 of the EIAO.

5.3.2 The findings on preliminary environmental study are summarised as follows:-

Table 5.2 - Summary of the findings on preliminary environmental study (Ma Wan Chung Pier)

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
1. Air quality	• No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices	• No significant change in marine traffic • No additional road traffic • No existing chimney or other industrial activities within 500m assessment area	-
2. Noise	• Concurrent construction for Tung Chung New Town Extension West far from the pier • No adverse impact	• Prefabrication construction plus off-site element breaking and treatment • Good site practices	• No significant change in marine traffic • No additional road traffic	-
3. Water quality	• No adverse impact	• No dredging operation • Installation of silt curtain • Good site practices	• No significant hydrodynamic impact • No anticipated additional pollution loading	-
4. Waste management	• No adverse impact	• Use of prefabrication construction • Low generation of construction and demolition waste, chemical waste and general refuse • Good site practices	• No significant change in marine traffic • No increase in the amount of general refuse	-
5. Land contamination	• No adverse impact	• Marine-based construction	-	-
6. Ecology	• Low ecological conservation importance	-	• Insignificant permanent marine habitat loss (<0.0125ha) • No significant change in	-

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
	• Insignificant habitat loss (<0.0125ha) • Minor water quality impact on marine organisms • San Tau Beach Site of Special Scientific Interest at a distance of more than 500m • No effect on other species of conversation importance • No adverse impact		hydrodynamics and no water quality impact	
7. Fisheries	• Insignificant fishing ground loss (0.0125ha) • Minor impact to fishing operation and fisheries resources • No significant impact to the artificial reefs near Chek Lap Kok and Ma Wan FCZ • No adverse impact	-	• Insignificant permanent fishing ground loss (0.0125ha) • The impacts on Ma Wan FCZ and artificial reefs near Chek Lap Kok are not anticipated	-
8. Landscape and visual impact	• Overall landscape impact – generally insignificant with slightly adverse impact • Overall visual impact – slight visual impact • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures	• Overall landscape impact – generally insignificant with slightly adverse impact • Overall visual impact – generally moderately beneficial from improving exterior appearance of pier structure • Overall acceptability – acceptable landscape and visual impact with mitigation measures	• Appropriate and acceptable landscape and visual mitigation measures

Description of environmental impact	Construction Phase		Operational Phase	
	Preliminary Findings	Mitigation Measures	Preliminary Findings	Mitigation Measures
9. Cultural heritage	• No built heritage located within the 300m assessment area • No impact to the Declared Monument, namely Tung Chung Battery located at 160m away from the pier • No impact to Ma Wan Chung Site of Archaeological Interest and Fu Tei Wan Kiln located at 50m and 170m away from the pier respectively • No marine archaeological resources	-	-	-

5.3.3 Environmental Monitoring and Audit will be carried out during construction to ensure all mitigation measures recommended in the PES and EM&A reports are properly and effectively implemented and to ensure compliance with the intended aims of the measures. Site inspections will be undertaken by the works contractor and Environmental Team once a week during construction.

5.4 Stakeholder Consultation

5.4.1 A comprehensive stakeholder consultation strategy is formulated for the Study to solicit support and opinions from key stakeholders. Stakeholder consultation was planned and conducted in two stages, namely (i) Initial Stakeholder Consultation and (ii) Stakeholder Consultation, to enable better and early consultation of the stakeholders and to facilitate consensus building throughout the Study process.

5.4.2 The stakeholders generally supported the conceptual pier design and the proposed new pier facilities including floating platform, cover for waiting area and catwalk and powering of pier facilities by renewable energy.

5.4.3 The key stakeholders' views/opinions are summarised as follows:-

- Canopy design
- Construction material for floating platform
- Environmental impact and natural flushing condition
- Timetable for implementation

5.5 Preliminary Pier Design

5.5.1 Design of the pier includes the following key considerations:

(i) **Meeting public aspiration** to provide/enhance structurally adequate, robust and durable marine structures for the use as public pier;

(ii) **Environmental friendly approach** to minimise the impact to the environment during the construction, operation and maintenance;

(iii) **Smart city development** to improve people's quality of living as well as Hong Kong's sustainability, efficiency and safety; and

(iv) **Prefabrication design** to optimise the use of prefabrication structural elements, facilitating on-site construction in a more efficient and cost-effective manner.

5.5.2 The proposed pier improvement work at Ma Wan Chung Pier will include modification and re-construction of existing pier. Shallow foundation will be adopted. The new pier will be tentatively in the structural form of gravity structure, subject to further ground investigation to confirm if firm founding material is found at the existing seabed for the entire length of pier structure.

5.5.3 The pier will be made of concrete blockworks. The new pier will provide one berth with the floating platform. Floating platform will be provided for vessel berthing and users' boarding. The floating platform will rise or lower consistently with different tidal levels from time to time such that a constant freeboard (i.e. the depth between water level and platform surface level) will be always maintained. The floating platform will be fixed in position by guide piles, which constrain the movement of floating platform in any direction on plan and only allow vertical movement due to different tidal levels. The floating platform will be connected to the pier surface by means of ramp.

5.5.4 The extent of pier improvement works and the provision of pier facilities will be further reviewed in detailed design stage. Pier improvement works will be designed with the view to avoiding the need for dredging and disposal of soft marine sediment within Hong Kong waters.

5.5.5 The preliminary layout for the re-provisioned pier is shown in **Figure 5.2**.

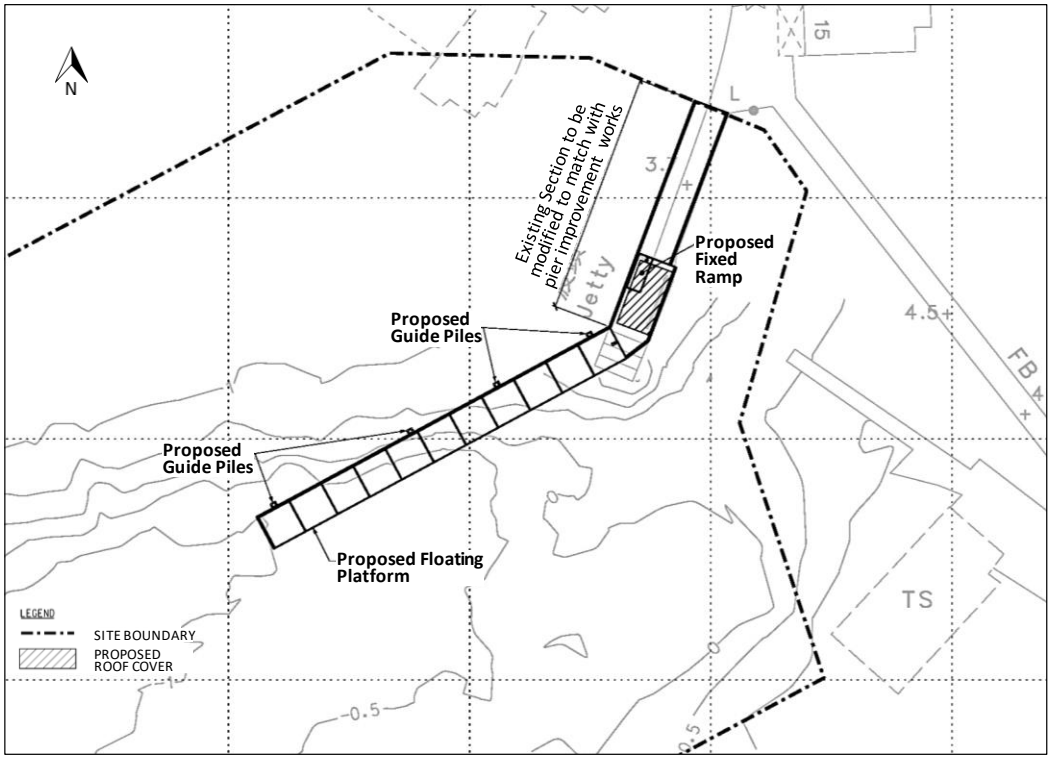

Figure 5.2 - Preliminary layout for Ma Wan Chung Pier

5.5.6 The following innovative ideas are recommended to be considered and further developed in detailed design:

Table 5.3 - Summary of innovation ideas for Ma Wan Chung Pier

Innovative Pier Element	
1. Floating platform including anchor system and mooring/ berthing facilities	
2. Solar power system	3. Gov-Wi-Fi
4. Flexible conduits	5. Benches / seats
6. Canopy	7. LED lighting

5.5.7 It is preliminarily considered that the new pier head will be technically feasible to adopt prefabrication construction method. The prefabricated units will include precast concrete blocks and precast landing steps.

5.5.8 As the pier improvement works inovlve provision of a new floating platform which will be over and upon the foreshore and sea-bed, the proposed pier improvement works at Ma Wan Chung will require gazettal under the FS(R)O.

5.5.9 It is estimated that the construction will take about 18 months to complete pier modification and construction.

5.6 Summary

5.6.1 From the preliminary engineering assessment and preliminary environment study, the proposed pier improvement works at Ma Wan Chung Pier are technically feasible and environmentally acceptable.

5.6.2 Environmental Monitoring and Audit will be carried out during construction to ensure all recommended mitigation measures are properly and effectively implemented and to ensure compliance with the intended aims of the measures.

6 Conclusions and Way Forwards

6.1.1 Based on the preliminary engineering assessment and preliminary environmental study, the proposed pier improvement works at Yung Shue Wan Public Pier, Shek Tsai Wan Pier, Yi O Pier and Ma Wan Chung Pier are considered technically feasible and environmentally acceptable.

6.1.2 Having examined the criteria under the EIAO, because of adopting non-dredged method and no encroachment upon environmental sensitive areas, the proposed pier improvement works at Yung Shue Wan, Shek Tsai Wan, Yi O and Ma Wan Chung under this Study do not constitute as Designated Projects under Schedule 2 of the EIAO.

6.1.3 Environmental Monitoring and Audit will be carried out during construction to ensure all mitigation measures recommended are properly and effectively implemented and to ensure compliance with the intended aims of the measures.

6.1.4 The stakeholders generally supported the proposed pier layout and arrangement of new pier facilities including floating platform, cover for waiting area/catwalk and powering of pier facilities by renewable energy.

6.1.5 As the construction of new pier structures and provision of new floating platform will be carried out over and upon the foreshore and sea-bed, the proposed pier improvement works will require gazettal under the Foreshore and Sea-bed (Reclamations) Ordinance.

6.1.6 The findings and recommendations of this Final Report should be referenced during the detailed design stage when taking forward the proposed pier improvement works.