

7. VISUAL

7.1 Introduction

In accordance with *Clause 3.4.7* and *Appendix F* Requirements for Visual Impact Assessment (VIA) of the EIA Study Brief, a VIA has been conducted based on mapping with a Geographic Information System (GIS) and field surveys to help identify the existing conditions so as to be able to assess the potential visual impacts during construction and operation and glare associated with the light sources of the Project. The VIA presented here covers the elements of the Project that are located above sea level.

7.2 Legislative Requirements and Evaluation Criteria

This VIA has been prepared according to *Clause 2.1 (vi)*, *Clause 3.2.1 (vi)*, *Clause 3.4.7* and *Appendix F* of the EIA Study Brief.

Environmental Impact Assessment Ordinance (EIAO) legislation (Cap.499, S.16) and the *Technical Memorandum on EIA Process (EIAO-TM)*, particularly *Annexes 10 (Criteria for Evaluating Visual and Landscape Impact, and Impact on Sites of Cultural Heritage)* and *18 (Guidelines for Landscape and Visual Impact Assessment)* have been referred to in carrying out this assessment.

In addition, the following standards and guidelines have been referred to for assessing the visual impacts associated with the Project:

- Environmental Impact Assessment Ordinance Guidance Note 8/2010 (Preparation of Landscape and Visual Impact Assessment under the Environmental Impact Assessment Ordinance);
- Hong Kong Planning Standards and Guidelines (HKPSG) issued by the Planning Department (November 2015), in particular Chapter 11 Urban Design Guidelines;
- Study on Landscape Value Mapping of Hong Kong.

7.3 Review of Existing Planning and Development Control Framework

The Project site is located at the waters to the west of Tap Mun (**Figure 7.1**). The Project site at Outer Tap Mun is approximately 55 hectares (~1,630 m long and ~330 m wide) in size. It is not covered by any existing outline zoning plan (OZP) (**Figure 7.2**). To the south of the Project Site is Kau Lau Wan, which consists of green belt, coastal protection area, and village type development.

7.4 Methodology

7.4.1 Baseline

The Assessment Area for visual impact assessment shall be defined by the Visual Envelope of the Project. A Visual Envelope is an area within which views of the Project will be possible. Identification of the visual envelope has been achieved by site visit and desk-top study of topographic maps and photographs, and GIS analysis, to determine potential visibility of the Project from various locations. GIS analysis uses known data regarding the proposed built structures to model the area that can potentially see the developments. It should be noted that GIS analysis uses topographic data as a baseline, disregarding existing built forms and vegetation which reduce the actual visual envelope. **Figure 7.1** illustrates the GIS Visual Envelope for this Project.

The visual envelope of the Project site is determined based on its potential dimensions of 1,630 m x 330 m across the horizontal plane, with FCZ facilities no higher than 3 m in height above water (except during maintenance). Considering that the visual impact of this Project would be mainly associated with the horizontal field of view of fish farms, it is proposed to use the horizontal field of view of individual fish farms within the whole FCZ area when assessing the visual extent of impact for this Project.

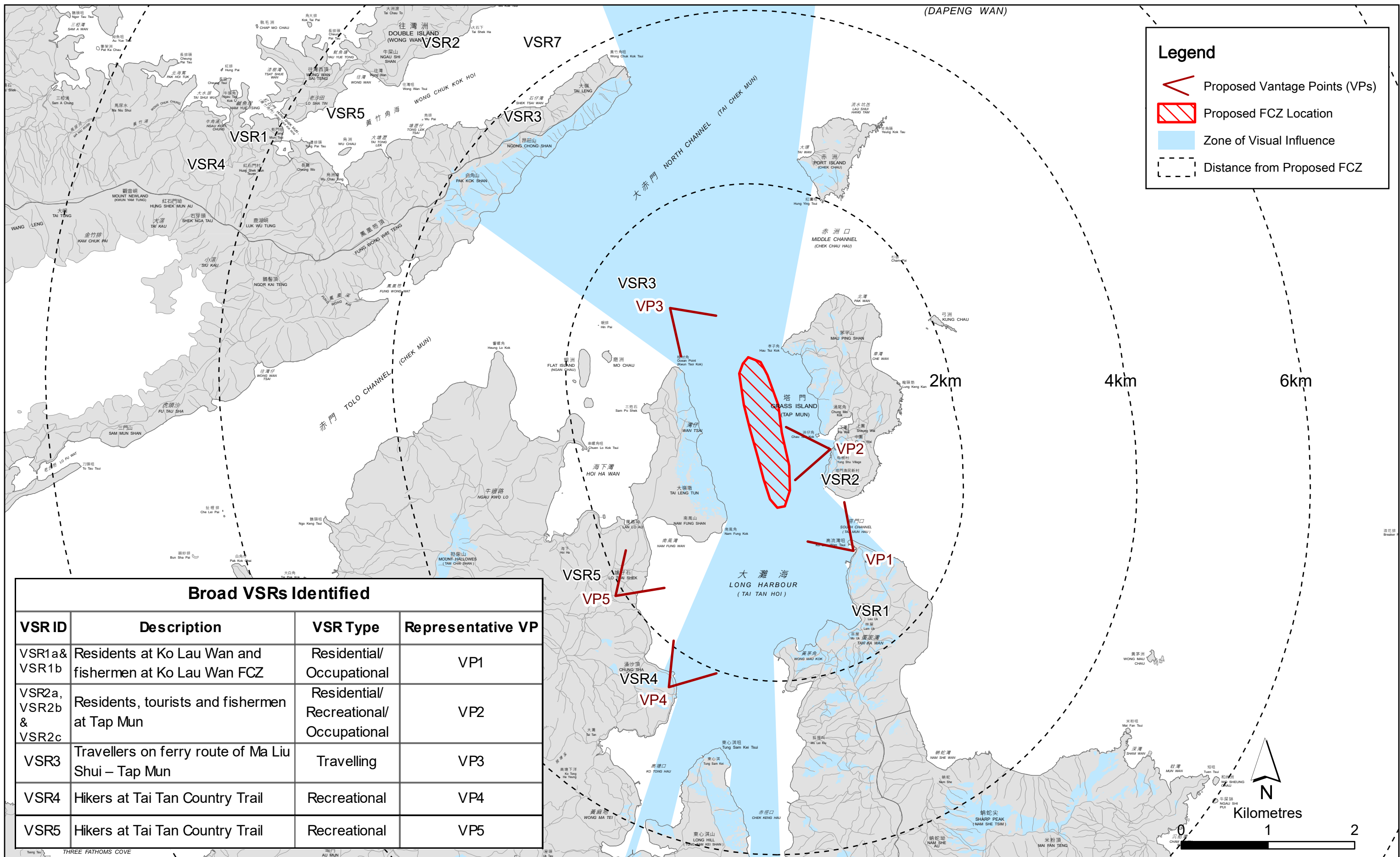


Figure 7.1

VIA Assessment Area and Locations of Proposed Vantage Points (VPs) for Outer Tap Mun FCZ



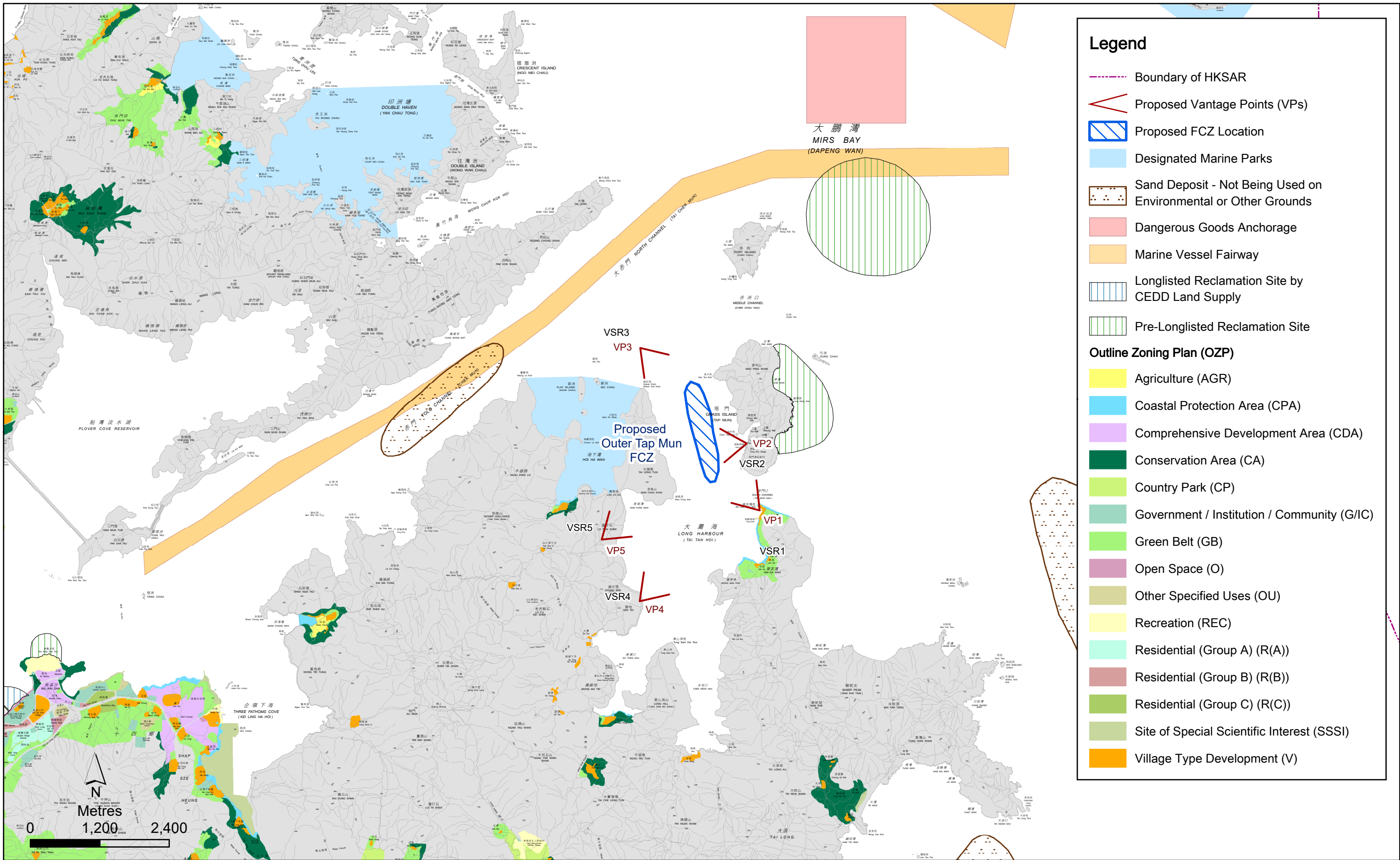


Figure 7.2

Planning & Development Context near Proposed Outer Tap Mun FCZ

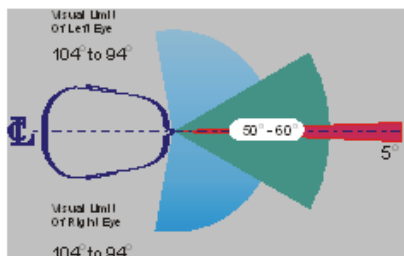


Figure 7.1 also gives an indication of how far viewers are from the Project site. As a viewer moves further away from the Project site, the visual impact decreases until it is no longer visible. However, before the point of invisibility is reached, the FCZ would have reduced in scale such that it no longer has a significant visual effect on the view.

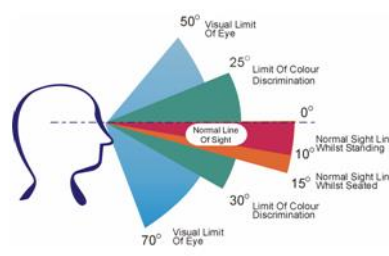
Boxes 1 and 2 below show that for an individual fish farm, the horizontal field of view will be visually dominant for distance <170 m and insignificant further than 2.3 km away, whereas the vertical field of view will be visually evident for distance <70m and insignificant for distance >340 m. Therefore, the maximum distance which the fish farm is considered insignificant will be at >2.3 km.

Box 1 - EXTENT OF HUMAN VISION

The visual impact of a development can be quantified by reference to the degree of influence on a person's field of vision. The following diagrams illustrate the typical parameters of human vision and are based on anthropometric data (*Human Dimension & Interior Space – A Source Book of Design Reference Standards*, Julius Panero and Martin Zelnik, The Architectural Press Ltd. London, 1979). This data provides a basis for assessing and interpreting the impact of a development by comparing the extent to which the development would intrude into the central field of vision (both horizontally and vertically).



Horizontal Field of View



Vertical Field of View

Horizontal Cone of View - The central field of vision for most people covers an angle of between 50° and 60°, within which both eyes observe an object simultaneously within this 'binocular field' images are sharp, depth perception occurs and colour discrimination is possible. These physical parameters are illustrated in the images above.

The visual impact of a development will vary according to the proportion to which the development consumes the central field of vision. Developments, which take up less than 5% of the central binocular field, are usually insignificant in most landscapes (5% of 50° = 2.5°).

Vertical Field of View - A similar analysis can be undertaken based upon the vertical line of sight for human vision. A person's natural or normal line of sight is normally a 10° cone of view below the horizontal and, if sitting, approximately 15°. Objects which take up 5% of this cone of view (5% of 10° = 0.5°) would only take up a small proportion of the vertical field of view, and are only visible when one focuses on them directly. Objects that take up such a small proportion of the vertical view cone are not dominant, nor create a significant change to the existing environment when placed within a disturbed or man-modified landscape. They may, however, be more noticeable in a pristine environment.

Box 2 – DISTANCE FROM WHICH PROJECT WILL BE VISIBLE

In assessing the visual impact of the Project site it is assumed that the largest horizontal component is the longest dimension of the FCZ layout, which is approximately 1.63 km wide and a maximum height of 3 m. However, as the fish culture zone is comprised of multiple fish farms of the same dimensions with a separation distance of ~100m in between, therefore, it would not be accurate to examine the entire width of the FCZ when reviewing the horizontal field of view. This effect can also be demonstrated by the example of a farm fence that may be many kilometres in width, yet as one moves further away it becomes less apparent, until at some distance it is not possible to separate this element from the horizontal plane of the landscape. In essence, as soon as one fish farm becomes visually insignificant, so do all of the fish farms in the entire FCZ. In assessing the visual impact of the fish farms it is therefore assumed that the largest horizontal component is the diameter of a fish farm. Considering that on fish farm will be ~1 ha, its maximum width would be of 100 m wide.

The tables below show the calculations for horizontal and vertical fields of view respectively.

Horizontal Field of View	Impact	Distance from an observer to a fish farm of 1 ha 100 m wide
<2.5° of view	<i>Insignificant</i> The development will take up less than 5% of the central field of view. The development, unless particularly conspicuous against the background, will not intrude significantly into the view. The extent of the vertical angle will also affect the visual impact.	>2.3 km
2.5° – 30° of view	<i>Potentially noticeable</i> The development may be noticeable and its degree of visual intrusion will depend greatly on its ability to blend in with its surroundings and how far someone is from the terminal.	170 m–2.3 km
>30° of view	<i>Potentially visually dominant</i> Developments that fill more than 50 percent of the central field of vision will always be noticed and only sympathetic treatments will mitigate visual effects.	<170 m

Vertical Line of Sight	Impact	Distance from an observer to a facility that is 3m high
< 0.5° of vertical angle	<i>Insignificant</i> A thin line in the landscape.	>340m
0.5° – 2.5° of vertical angle	<i>Potentially noticeable</i> The degree of visual intrusion will depend on the development's ability to blend in with the surroundings.	70m – 340m
> 2.5° of vertical angle	<i>Visually evident</i> Usually visible, however the degree of visual intrusion will depend on the width of the object and its placement within the landscape.	<70m

7.4.2 Identification of Visual Sensitive Receivers (VSRs) and Vantage Points (VPs)

Having determined the Assessment Area for the VIA, VSRs have been broadly identified within the visual envelope. VSRs may include the people who would reside, work, play within, or travel through the Assessment Area and be potentially under the impact of the proposed Project.

Subsequently Vantage Points, or Viewpoints (VPs), were selected. VPs are positions selected to represent some potential VSRs from where the proposed Project can be viewed, and are selected to help illustrate the visual change that would be brought about by the proposed Project. The VPs have been selected to ensure that in combination they give a good overall representation of how the

Project will appear to different types of VSRs, both near and far and at sea level as well as lower and higher ground elevations.

7.4.3 VSR Sensitivity

Assessment of the sensitivity of VSRs is influenced by a number of factors including the following:

- Type of VSR. VSRs are categorized according to whether the viewer is at home, at work or school, at play or leisure, or travelling (ranked by the major VSR types, as described below):
 - *Residential VSRs* – These VSRs are people living in the area and who view the proposed Project from their homes. They are considered the most sensitive VSRs due to the character of the view from their homes having a substantial effect on their perception of quality and acceptability of their home environment and general quality of life.
 - *Occupational VSRs* – These VSRs are people working or in education in the area, who view the proposed Project from their workplace or education centre. Visual amenity is in general not considered a top priority within the average workplace and these VSRs are considered to be relatively less sensitive than residential VSRs as their view will have a less important, although still material, effect on their perception of quality of life. The degree to which this applies to workers depends on whether their location is industrial, retail or commercial. The VSRs in industrial areas, such as factories, are generally considered to be the least sensitive, due to the relatively low quality of their existing view in an industrial area.
 - *Recreational VSRs* – These VSRs are people engaging in recreational activities such as hikers on established trails and footpaths, recreational fishers near the coast and outlying islands. Sensitivity of these VSRs depends on duration of stay, nature of the activity and how enclosed the location is. There might be some hikers respectively visiting Mau Ping Shan at Tap Mun and eastern coastline of the Sai Kung West Country Park (Wan Tsai Extension). However, based on our site visits in July 2021, Mau Ping Shan is not a sightseeing spot and the route to it is considered a dangerous path. Meanwhile, the view to Project Site from Sai Kung West Country Park (Wan Tsai Extension) is blocked by dense vegetation along the trail. As such, these two VSRs will not be considered in this EIA Report.
 - *Travelling VSRs* – These VSRs are people travelling on marine vessels. They have varying sensitivity depending on the speed, nature and frequency of travel, but are generally considered to be transitory to the area with less regard for the surrounding views and with low sensitivity.
- Number of individuals (ranked as very many, many, few or very few);
- Quality of existing view (ranked as good, fair or poor);
- Availability of alternative views (ranked as yes or no);
- Degree of visibility (ranked as full, partial or glimpse);
- Duration of view (ranked as long, medium or short); and
- Frequency of view (ranked as frequent, occasional or rare).

The sensitivity of each VSR is based on the values of all the above factors in totality and classified as follows:

- **High:** The VSR is highly sensitive to any change in their viewing experience.
- **Medium:** The VSR is moderately sensitive to any change in their viewing experience.
- **Low:** The VSR is only slightly sensitive to any change in their viewing experience.

7.4.4 Identification and Assessment of Impacts

The magnitude of change caused by a visual impact is quantified according to a number of factors including the following:

- Distance between the closest source of impact and the VSR (given in meters);
- Scale of the development. This is assessed using a number of factors, including: absolute dimensions of new built structures visible to the VSR; relative dimensions of the new built structures compared to other structures visible to the VSRs in their existing view (ranked as small, medium or large);
- Potential blockage of view (ranked as full, partial or nil);
- Duration of the impacts (ranked as temporary or permanent);
- Compatibility of the Project and associated works with the existing and planned landscape in the vicinity (ranked as good, fair or poor); and
- Reversibility of change (ranked as reversible or irreversible).

The magnitude of change caused by visual impacts on each VSR is based on the values of all the above factors in totality and classified as follows:

- **Large:** VSRs would suffer a major change in their viewing experience.
- **Intermediate:** VSRs would suffer a moderate change in their viewing experience.
- **Small:** VSRs would suffer a small change in their viewing experience.
- **Negligible:** VSRs would suffer no discernible change in their viewing experience.

7.4.5 Ranking Significance of Impact

By understanding the magnitude of change caused by the various impacts and the sensitivity of the various sensitive receivers, it is possible to categorize impacts in a logical, well-reasoned and consistent fashion. **Table 7.1** shows the rationale for dividing the degree of significance into four thresholds, namely insignificant, slight, moderate, and substantial, depending on the combination of a magnitude of change and sensitivity of sensitive receiver.

Table 7.1 Relationship between receptor sensitivity and magnitude of change in defining impact significance

		Magnitude of Change			
		Negligible	Small	Intermediate	Large
Receptor Sensitivity (VSR)	Low	Insignificant	Slight	Slight/ Moderate*	Moderate
	Medium	Insignificant	Slight/ Moderate*	Moderate	Moderate/ Substantial*
	High	Insignificant	Moderate	Moderate/ Substantial*	Substantial

**In those instances where the lower level of impact is predicted, this will be justified in the description of the impact*

The four thresholds for the degree of significance are explained below. Noting impacts can be either adverse or beneficial, it should be noted that any impacts described in the text of the Report are assumed to be adverse unless specifically identified otherwise.

- **Substantial:** Adverse / beneficial impact where the proposed Project will cause significant deterioration or improvement in existing landscape quality.
- **Moderate:** Adverse / beneficial impact where the proposed Project will cause a noticeable deterioration or improvement in existing landscape quality.

- **Slight:** Adverse / beneficial impact where the proposed Project will cause barely perceptible deterioration or improvement in existing landscape quality.
- **Insignificant:** No discernible change in the existing landscape quality

7.4.6 Mitigation Measures

Having identified and ranked the significance of potential impacts, measures, if required, will be proposed to mitigate the impacts. Firstly, means by which impacts can be avoided will be considered, then possible means that might reduce the impact magnitude, and also measures that potentially enhance existing visual quality. To ensure their effectiveness throughout the construction and operation phases of the Project and associated works, the relevant responsible parties for the implementation and management / maintenance of the proposed mitigation measures will be identified as appropriate.

As outlined in **Section 7.1**, the photomontages will illustrate options of design schemes as well as mitigation measures by showing baseline conditions, Day 1 with no mitigation measures, Day 1 with mitigation measures and Year 10 with mitigation measures.

7.4.7 Acceptability of Visual Impacts

An overall assessment of the acceptability, or otherwise, of visual impacts in accordance with the five criteria set out in *Annex 10* of the *EIAO-TM* will be provided, considering the guidelines in paragraph 3.11 of Environmental Impact Assessment Ordinance *GN No. 8/2010*.

7.5 Visual Baseline Conditions

As detailed in **Figure 7.1**, **Figure 7.3** and **Figure 7.4**, the indicative location of the Project site is in open waters about 0.5 km west of Tap Mun, 2.3 km east of Sai Kung West Country Park (Wan Tsai Extension), and 1.0 km north to Kau Lau Wan. The Project is located in a relatively open sea area with high degree of visibility to a large area from a visual perspective.

The Project site will be visible to west facing coastline on Tap Mun, north facing coastline on Kau Lau Wan and elevated areas of Sai Kung West Country Park. Residents at Kau Lau Wan and Tap Mun, hikers at Tai Tan Country Trail and marine sea farers such as ferry massagers, fishermen or recreational vessels, will have view to the Project site (**Figure 7.1**). Overall, the VSRs have been identified within the predicted Visual Envelope, including four types as identified in the methodology: recreational, residential, occupational and travelling. The VSRs include receivers at ground level, sea level and on elevated ground. The quality of most existing views for these VSRs affected by the FCZ, are generally good, respectively, with a high degree of visibility to natural views containing limited or no anthropogenic structures. The details of VSRs are summarised in **Table 7.2** which includes their sensitivity.

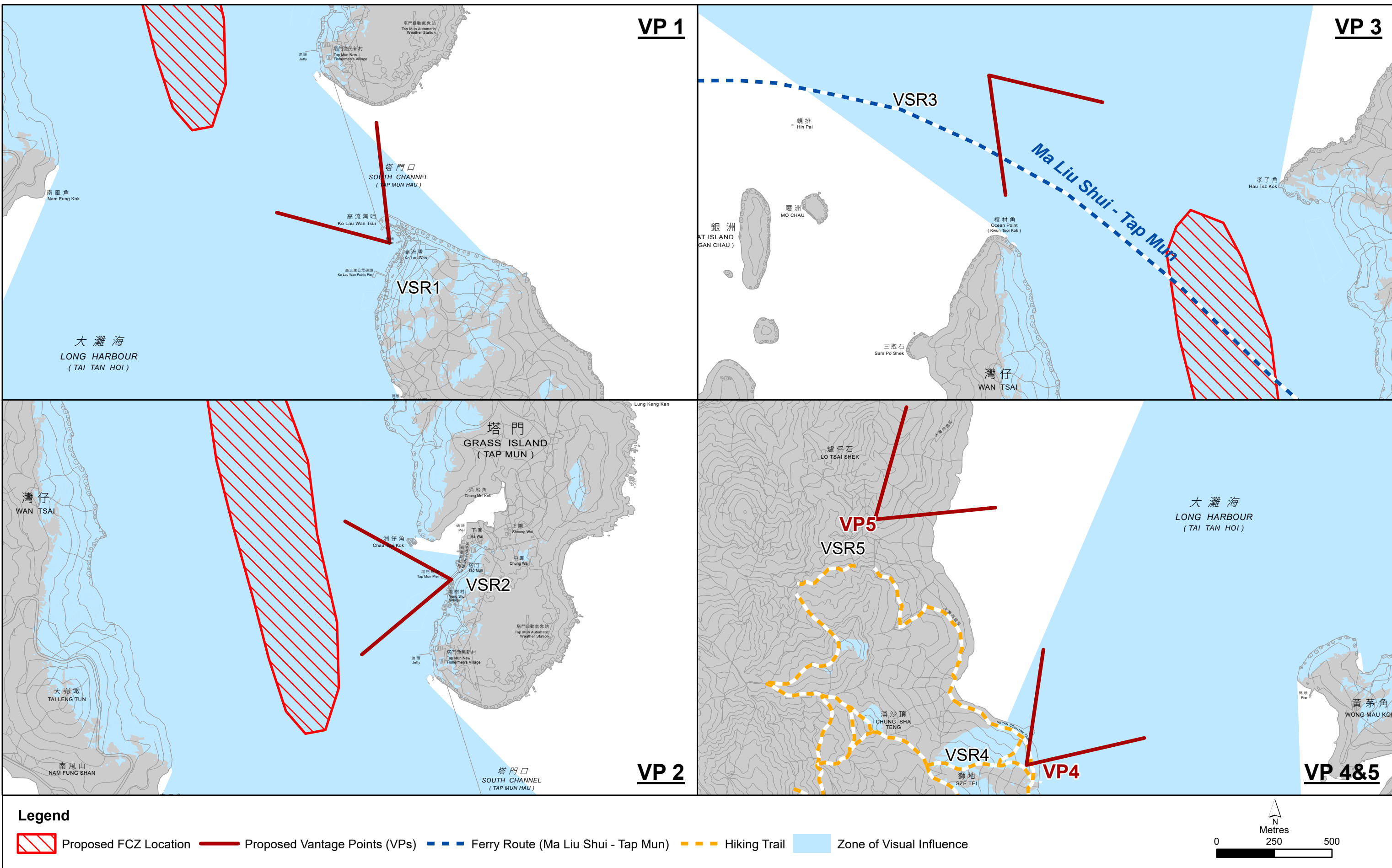


Figure 7.3

Detailed Locations of Proposed Vantage Points (VP1 to VP5) and Zone of Visual Influence for Outer Tap Mun FCZ



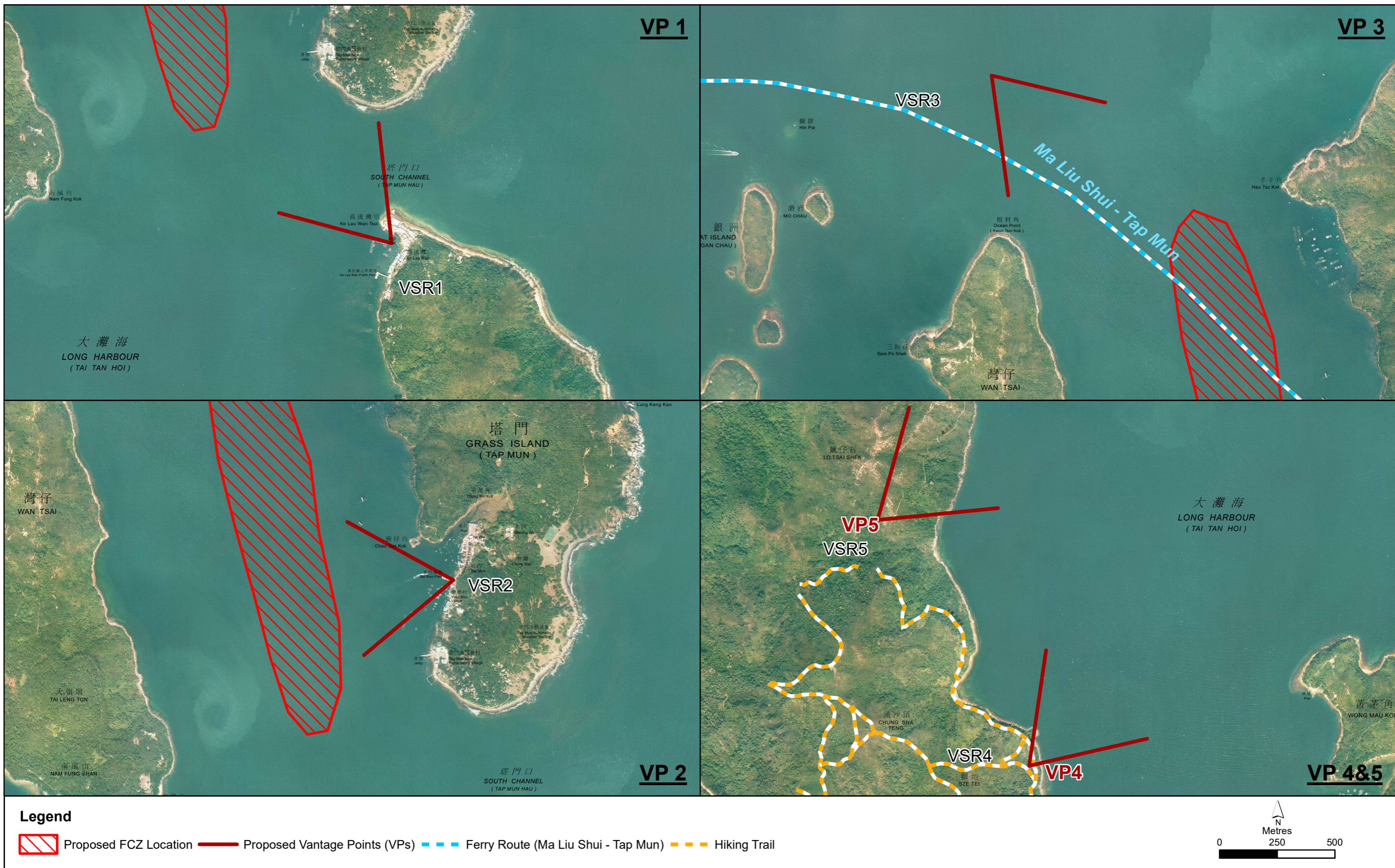


Figure 7.4

Aerial View of Detailed Locations of Proposed Vantage Points (VP1 to VP5) and Zone of Visual Influence for Outer Tap Mun FCZ



Table 7.2 VSRs within the Predicted Visual Envelope

VSR ID / Representative VP	Representative VP	VSR Type	Distance with the FCZ (m)	Quality of Existing View	Alternative Views	Receiver Population	Duration of View	Frequency of View	Degree of Visibility	Sensitivity
VSR 1a – Residents at Kau Lau Wan	VP1	Residential	951	Good	Yes	Few	Long	Frequent	Full	High
VSR 1b – Fishermen at Kau Lau Wan FCZ		Occupational								Medium
VSR 2a – Residents at Tap Mun	VP2	Residential	523	Good	Yes	Few	Long	Frequent	Full	High
VSR 2b – Tourists at Tap Mun		Recreational					Short	Occasional		Medium
VSR 2c – Fishermen at Tap Mun		Occupational					Long	Frequent		Medium
VSR 3 – Travellers on ferry route of Ma Liu Shui – Tap Mun	VP3	Travelling	901	Good	Yes	Few	Short	Occasional	Full	Low
VSR 4 – Hikers at Tai Tan Country Trail	VP4	Recreational	2,348	Good	Yes	Few	Short	Occasional	Full	Medium
VSR 5 – Hikers at Tai Tan Country Trail	VP5	Recreational	2,100	Good	Yes	Few	Short	Occasional	Full	Medium

7.6 Selected VPs to Represent VSRs

As shown in **Figure 7.1**, computer modelling suggests sections of coastal areas located on the western coastline of Tap Mun, eastern coastline of Sai Kung West Country Park (Wan Tsai Extension), and northern coastline of Kau Lau Wan, which fall within the visible area for the Project site. Broad VSR areas and specific locations of VPs are illustrated in **Figure 7.1** and **7.3**.

Generally VPs have been selected to represent the most affected VSRs and a total of five nos. of VPs have been selected from which to develop photomontages. **Figure 7.1** and **7.3** show the suggested VP locations and their corresponding details are provided below. **Figure 7.4** shows the aerial photos of the suggested VP locations. **Figure 7.5a&b – 7.9&b** show the existing conditions of VP1 – VP5.

VPs selected to represent VSRs of the proposed Outer Tap Mun FCZ

Views from Scenic Lookouts

VP1 - Kau Lau Wan. VP1 is selected to represent the residents in Kau Lau Wan (VSR 1a) and fishermen (VSR 1b) working at the Kau Lau Wan fish culture zone. It is located approximately 951 m southeast of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. Both VSR 1a and VSR 1b have alternative views to the sea. The number of VSR 1a and VSR 1b is few due to the limited number of residents and fishermen at Kau Lau Wan. Both VSR 1a and VSR 1b have a full degree of visibility. For residents at Kau Lau Wan (VSR 1a), their sensitivity is high, since they live in the area, and their duration of view is long and frequent. For fishermen at Kau Lau Wan (VSR 1b), although they also have long and frequent view of the Project, they are occupational VSR, who would mainly focus much on work, hence having medium sensitivity.

VP2 - Tap Mun. VP2 is selected to represent residents (VSR 2a), tourists (VSR 2b) and fishermen (VSR 2c) of Tap Mun. The selected VP is located at the Tap Mun pier which will provide an overall view of the proposed Outer Tap Mun FCZ. It is located approximately 523 m east of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. The VSRs have alternative views to the sea. The number of VSR 2a, VSR 2b and VSR 2c is few due to the limited number of residents, tourists and fishermen at Tap Mun. VSR 2a, VSR 2b and VSR 2c have a full degree of visibility. For residents at Tap Mun (VSR 2a), their sensitivity is high, since they live in the area, and their duration of view is long and frequent. For tourists at Tap Mun (VSR 2b), although they have short and occasional view of the Project, they are recreational VSR, who aim to enjoy the view, hence having medium sensitivity. For fishermen at Tap Mun (VSR 2c), although they have long and frequent view of the Project, they are occupational VSR, who would mainly focus much on work, hence having medium sensitivity.

Views from Ferry and Other Marine Vessels

VP3 - Marine traffic in Long Harbour. VP3 is selected to represent viewers on the sea, including ferry passengers travelling between Ma Liu Shui and Tap Mun and other viewers travelling to Wong Shek, Kau Lau Wan, Sai Kung West Country Park (Wan Tsai Extension) and Sai Kung East Country Park. The selected VP is located near the ferry routes in Long Harbour and represents the view from marine vessel users. Other viewers would include passengers on recreational marine vessels, fishing boats etc. It is located approximately 901 m northwest of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. This VSR has alternative views to the sea. The number of VSRs is few due to the limited number of travellers commuting between Ma Liu Shui and Tap Mun. The duration and frequency of view is short and occasional as this VSR only spends a limited amount of time on the ferry. This VSR has a full degree of visibility. However, given the view on the ferry is transient, VSR 3 is considered to have low sensitivity.

Views from Country Parks

VP4 – Tai Tan Country Trail. VP4 is selected to represent hikers visiting the southern section of Tai Tan Country Trail near the coastline of Sai Kung West Country Park. The selected VP is located at a hiking trail and will provide occasional view of the Outer Tap Mun FCZ at unobstructed sites along the



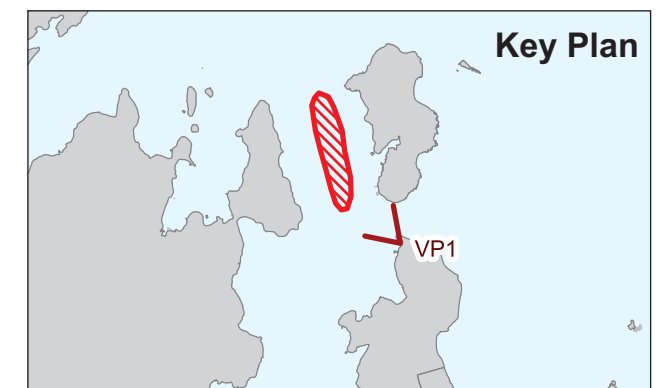
Existing View



View without Mitigation at Day 1 Operation

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: July 2021





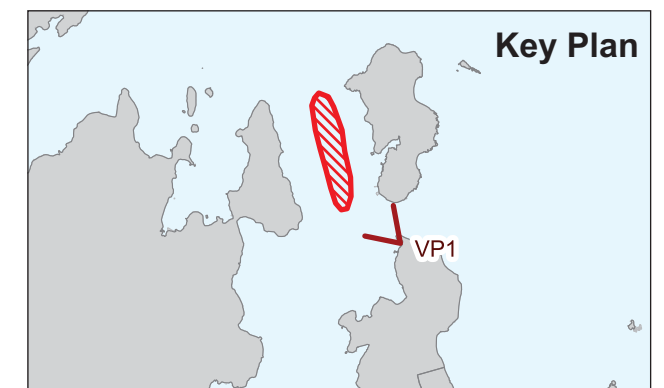
View with Mitigation at Day 1 Operation



View with Mitigation at Year 10 Operation

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

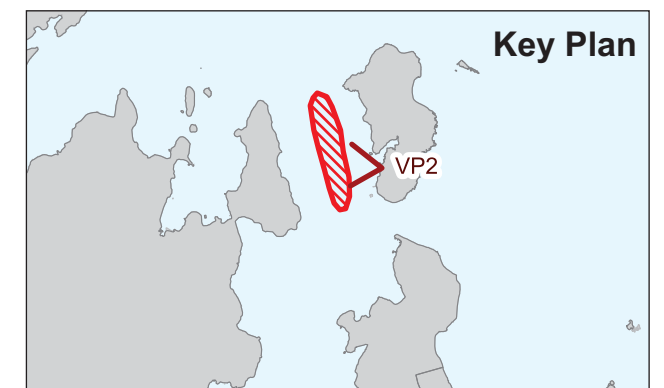
Date Photograph Taken: July 2021





Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

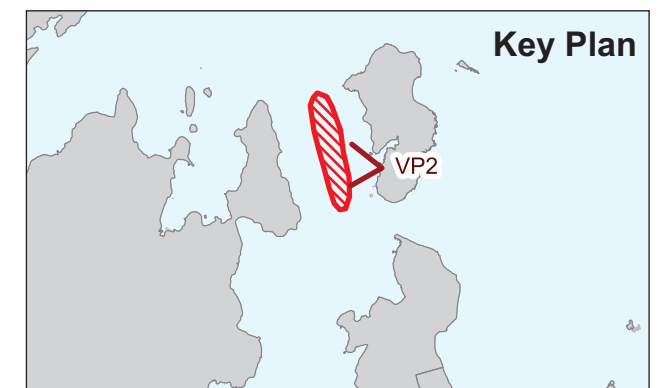
Date Photograph Taken: July 2021





Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: July 2021





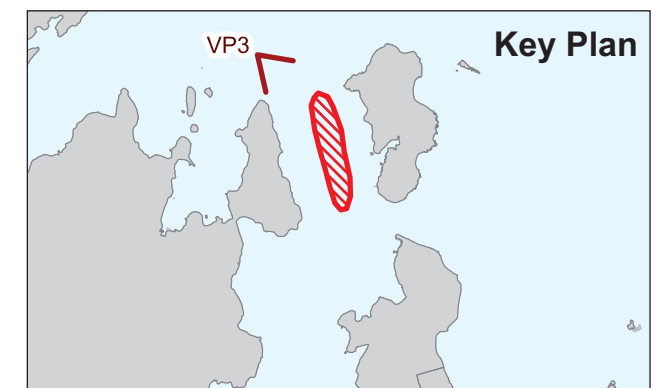
Existing View



View without Mitigation at Day 1 Operation

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

Date Photograph Taken: July 2021



Key Plan



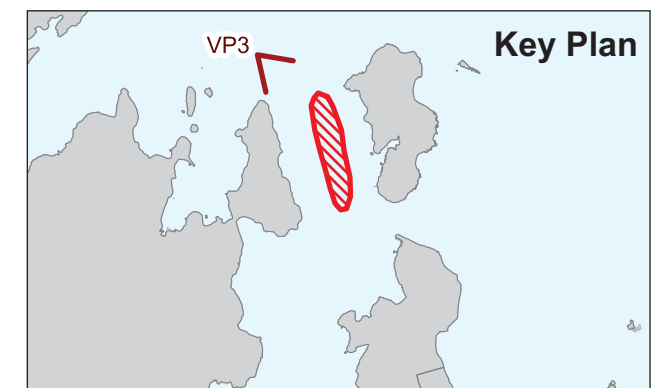
Figure 7.7a

Outer Tap Mun Viewpoint 3 - View to Project Site from Marine Traffic in Long Harbour



Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

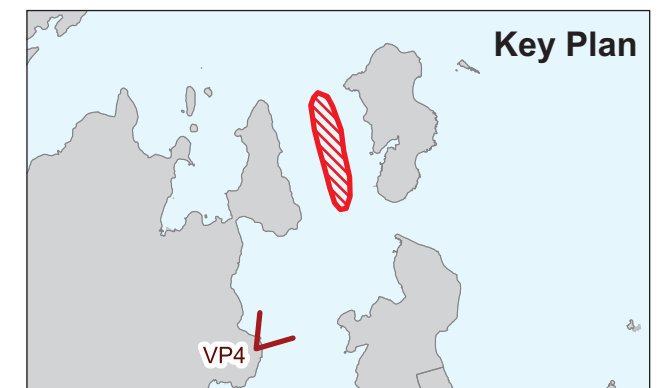
Date Photograph Taken: July 2021





Date Photograph Taken: July 2021

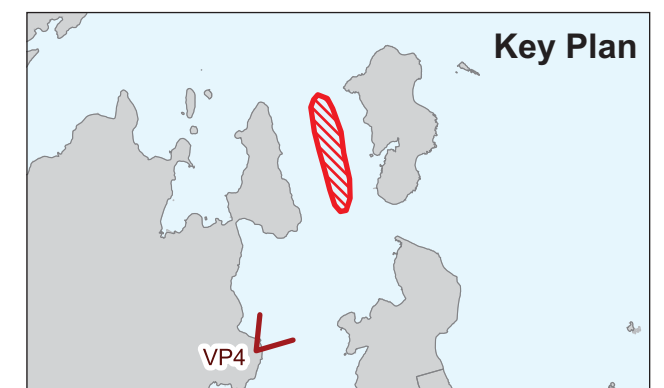
Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.





Date Photograph Taken: July 2021

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.





Date Photograph Taken: July 2021

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

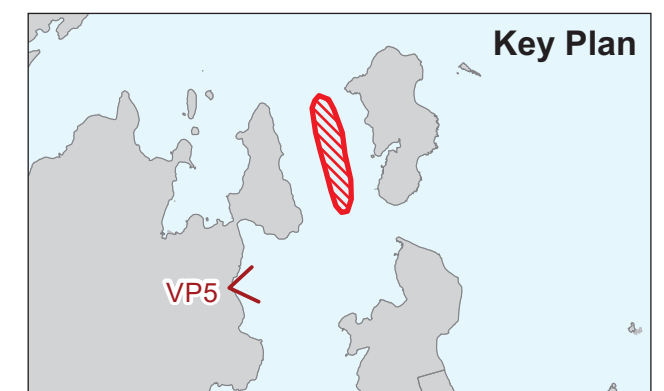


Figure 7.9a

Outer Tap Mun Viewpoint 5 - View to Project Site from Tai Tan Country Trail



Date Photograph Taken: July 2021

Remark: The structures on the sea within the Fish Culture Zone Area are fish cages (circular objects) / rafts (rectangular objects) / steel truss cages (yellow and white rectangular objects) for illustration purpose only.

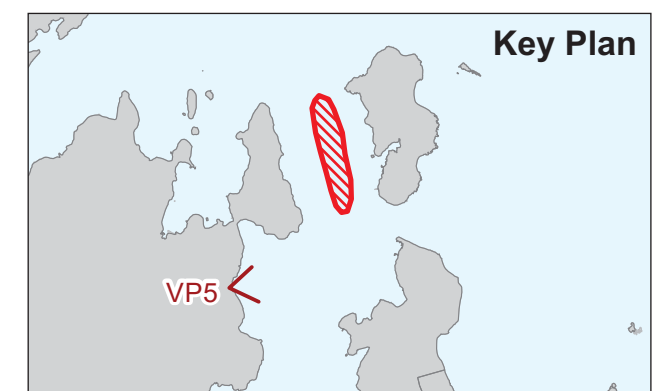


Figure 7.9b

Outer Tap Mun Viewpoint 5 - View to Project Site from Tai Tan Country Trail

way. It is located approximately 2,348 m southwest of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. This VSR has alternative views to the sea. The number of VSRs is few due to the limited number of hikers visiting Tai Tan Country Trail. The duration and frequency of view is short and occasional as this VSR only spends a limited amount of time along the trail during holidays. This VSR has a full degree of visibility. Therefore, VSR 4 is considered to have medium sensitivity.

VP5 - Tai Tan Country Trail. VP5 is selected to represent hikers visiting the northern section of Tai Tan Country Trail near the coastline of Sai Kung West Country Park. The selected VP is located at a hiking trail and will provide occasional view of the Outer Tap Mun and Mirs Bay FCZ from the viewing window between Tap Mun and Kau Lau Wan. It is located approximately 2,100 m west of the Project site. **Table 7.2** shows the value and quality of view of the sea from this VP is considered to be good. This VSR has alternative views to the sea. The number of VSRs is few due to the limited number of hikers visiting Tai Tan Country Trail. The duration and frequency of view is short and occasional as this VSR only spends a limited amount of time along the trail during holidays. This VSR has a full degree of visibility. Therefore, VSR 5 is considered to have medium sensitivity.

7.7 Identification of Impacts

Section 2 provides an overview of the Project. The key components which may cause visual impacts are listed below. Construction visual impacts are expected to be minimal and may be caused by:

- Setup of fish rafts / cages, which includes: on-site assembly and anchoring of the fish rafts / cages, small number of marine vessels will be used as supporting vessels; and
- Provision of auxiliary facilities, such as storage and shelters for fish farmers.

Operational visual impacts are expected to be minimal and arise from:

- The presence and operation of the FCZ, including night time lighting for the sake of safety purpose.

The construction of the Project site, including towing the fish rafts / cages to the Site, assembly and anchoring of the fish rafts / cages and provision of auxiliary facilities would normally take a few weeks for each fish raft.

During operation phase, as mentioned in **Section 2.6.2**, four types of advanced aquaculture technologies, i.e. floating gravity cage; submersible gravity cage; integrated multi-trophic aquaculture; and semi-submersible steel truss cage, are considered suitable for this Project. Since the materials adopted in the fish rafts / cages are durable compared to traditional cages, the operation of the fish rafts / cages in the Project site based on advanced aquaculture technologies would be more than 10 years without major repair.

7.8 Visual Impact Assessment Prior to Mitigation

As illustrated in **Figures 7.1, 7.3 and 7.4**, the predicted Visual Envelope for the Project is relatively large and four VSR groups have been identified. Five representative VPs have been selected to represent these VSRs.

Photomontages have been prepared from the VPs to illustrate the existing conditions, as well as conceptual visual impacts, for all of: impacts at Day 1 of operation without implementation of mitigation/ enhancement measures; impacts at Day 1 of operation with implementation of mitigation/ enhancement measures and residual impacts at Year 10 of operation with implementation of mitigation/ enhancement measures. The photomontages supplement the visual changes described in the text. Photomontages showing the presence of the FCZ help illustrate that the magnitude of visual change for all VSRs are negligible to intermediate. Those VSRs that are closer to the FCZ are expected to experience relatively higher magnitude of change. It should be noted that detailed information on the type of advanced aquaculture technologies as well as the number, size and separation distance of the fish rafts / cages is not available at the current stage. Such information will

only be available during the later detailed design stage, subject to the mariculturists' proposals on the type of advanced technologies to suit their business need for agreement with AFCD. The photomontages are thus prepared for illustration purpose only.

7.8.1 VSR 1a and VSR 1b – Residents at Kau Lau Wan and Fishermen at Kau Lau Wan FCZ (VP1)

The construction of the Project will take a few weeks for each fish raft. However, due to the short distance (951 m) to the Project, the construction activities will be noticeable, and the magnitude of change is considered small. For residents at Kau Lau Wan (VSR 1a), their sensitivity is high, since they live in the area, and their duration of view is long and frequent. For fishermen at Kau Lau Wan (VSR 1b), although they also have long and frequent view of the Project, they are occupational VSR, who would mainly focus much on work, hence having medium sensitivity. The resulting significance during construction is considered moderate for residents at Kau Lau Wan (VSR 1a), and slight for fishermen at Kau Lau Wan (VSR 1b).

The photomontage in **Figure 7.5a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view, and the scale of development is small. In addition, as the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. Despite the short distance to the Project (951 m), since the viewpoint is horizontal to the sea, and the FCZ facilities' above water heights are limited to 3 m (except during maintenance), the magnitude of change is considered small. As suggested in the previous section, Kau Lau Wan's residents and fishermen are respectively considered to have high and medium sensitivity. Therefore, the resulting significance during operation is considered moderate for residents at Ko Lau Wan (VSR 1a), and slight for fishermen at Ko Lau Wan (VSR 1b).

7.8.2 VSR 2a, VSR 2b and VSR 2c – Residents, Tourists and Fishermen at Tap Mun (VP2)

The construction of the Project will take a few weeks for each fish raft. However, due to the short distance (523 m) to the Project, the construction activities will be noticeable, and the magnitude of change is considered small. For residents at Tap Mun (VSR 2a), their sensitivity is high, since they live in the area, and their duration of view is long and frequent. For tourists at Tap Mun (VSR 2b), although they have short and occasional view of the Project, they are recreational VSR, who aim to enjoy the view, hence having medium sensitivity. For fishermen at Tap Mun (VSR 2c), although they have long and frequent view of the Project, they are occupational VSR, who would mainly focus much on work, hence having medium sensitivity. Therefore, the resulting significance during construction is considered moderate for residents at Tap Mun (VSR 2a), and slight for visitors (VSR 2b) and fishermen at Tap Mun (VSR 2c).

The photomontage in **Figure 7.6a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view, and the scale of development is small. In addition, as the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. Despite the short distance to the Project (523 m), the viewpoint is horizontal to the sea, and the FCZ facilities' above water heights are limited to 3 m (except during maintenance), the magnitude of change is considered small. As suggested in the previous section, Tap Mun's residents are considered to have high sensitivity, while tourists and fishermen are considered to have medium sensitivity. Therefore,

the resulting significance during operation is considered moderate for residents at Tap Mun (VSR 2a), and slight for visitors (VSR 2b) and fishermen at Tap Mun (VSR 2c).

7.8.3 VSR 3 – Travellers on Ferry Route of Ma Liu Shui – Tap Mun (VP3)

The construction of the Project will take a few weeks for each fish raft. However, due to the short distance (901 m) to the Project, the construction activities will be noticeable, and the magnitude of change is considered small. The resulting significance during construction is considered slight.

The photomontage in **Figure 7.7a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view, and the scale of development is small. In addition, as the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. The Project site will be noticeable, and the magnitude of change is considered small. The resulting significance during operation is considered slight.

7.8.4 VSR 4 – Hikers at Tai Tan Country Trail (VP4)

The construction of the Project will take a few weeks for each fish raft. Due to the considerable distance to the Project (2,348 m), the construction activities will not be noticeable, and the magnitude of change is considered negligible. The resulting significance during construction is considered insignificant.

The photomontage in **Figure 7.8a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, and the scale of development is small. In addition, as the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. Due to the considerable distance to the Project (2,348 m), the Project site is inconspicuous, and the magnitude of change is considered negligible. The resulting significance during operation is considered insignificant.

7.8.5 VSR 5 – Hikers at Tai Tan Country Trail (VP5)

The construction of the Project site will take a few weeks for each fish raft. Due to the considerable distance to the Project (2,100 m), the construction activities will not be noticeable, and the magnitude of change is considered negligible. The resulting significance during construction is considered insignificant.

The photomontage in **Figure 7.9a&b** shows the Project site from this viewpoint. Since the FCZ facilities will not be higher than 3 m in height above water (except during maintenance), only the upper part of the fish rafts / cages would be exposed above the water, they would only block part of the view and the scale of development is small. As the fish rafts / cages adopt simple design (buoyancy collar system and a weighted net enclosure suspended beneath), they have good compatibility with the surrounding seascape. The duration of impact is temporary during construction phase and permanent during operation phase; and the impact is reversible for both phases. As the VP has a considerable distance to the Project (2,100 m), the magnitude of change is considered negligible. The resulting significance during operation is considered insignificant.

Table 7.3 Magnitude of Change

VSR ID / Representative VP	Representative VP	Distance with the FCZ (m)	Blockage of View (Full / Partial / Nil)	Scale of Development (Large / Medium / Small)	Compatibility with Surrounding Seascape (Good / Fair / Poor)	Duration of Impact (Temporary / Permanent)	Reversibility of Impact (Reversible / Irreversible)	Magnitude of Change (Large / Intermediate / Small / Negligible)	
								Construction	Operation
VSR 1a – Residents at Kau Lau Wan	VP1	951	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Small	Small
VSR 1b – Fishermen at Kau Lau Wan FCZ									
VSR 2a – Residents at Tap Mun	VP2	523	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Small	Small
VSR 2b – Tourists at Tap Mun									
VSR 2c – Fishermen at Tap Mun									
VSR 3 – Travellers on ferry route of Ma Liu Shui – Tap Mun	VP3	901	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Small	Small
VSR 4 – Hikers at Tai Tan Country Trail	VP4	2,348	Nil	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Negligible	Negligible
VSR 5 – Hikers at Tai Tan Country Trail	VP5	2,100	Partial	Small	Good	Construction phase: Temporary; Operation phase: Permanent	Reversible for both construction and operation phases	Negligible	Negligible

Table 7.4 Visual Impacts Prior to Mitigation

VSR ID / Representative VP	Representative VP	VSR Sensitivity	Magnitude of Change (Large / Intermediate / Small / Negligible)		Impact Significance threshold BEFORE Mitigation (Substantial/ Moderate/ Slight/ Insignificant)	
			Construction	Operation	Construction	Operation
VSR 1a – Residents at Kau Lau Wan	VP1	High	Small	Small	Moderate	Moderate
VSR 1b – Fishermen at Kau Lau Wan FCZ		Medium	Small	Small	Slight	Slight
VSR 2 – Residents at Tap Mun	VP2	High	Small	Small	Moderate	Moderate
VSR 2b – Tourists at Tap Mun		Medium	Small	Small	Slight	Slight
VSR 2c – Fishermen at Tap Mun		Medium	Small	Small	Slight	Slight
VSR 3 – Travellers on ferry route of Ma Liu Shui – Tap Mun	VP3	Low	Small	Small	Slight	Slight
VSR 4 – Hikers at Tai Tan Country Trail	VP4	Medium	Negligible	Negligible	Insignificant	Insignificant
VSR 5 – Hikers at Tai Tan Country Trail	VP5	Medium	Negligible	Negligible	Insignificant	Insignificant

7.8.6 Night Lighting and Glare

The above analysis examined the visual impacts of the Project during daylight hours. Night-lighting will be used for safety purpose in this Project. Detailed night lighting specifications are not available at this preliminary design stage, however, a preliminary assessment can be made based on similar developments. It is assumed that the light sources will generally be of low intensity, the orientation of light will point towards to the fish rafts / cages, and will not be pointing horizontally and to any VSRs. In addition, no mirrors or polished materials will be installed on the fish rafts / cages, reflectance of light will be low. Therefore, the night lighting and glare impact is considered acceptable.

7.9 Suggested Mitigation Measures

The assessment made in **Section 7.8** shows that visual impacts arising from the Project without any mitigation or enhancement measures in place are between insignificant to moderate. The following mitigation measures are proposed to minimise the visual impacts:

- **VM1 – Construction period.** Pre-construction and construction period for the Project site should be reduced as far as practical to lower visual impact;
- **VM2 – Sensitive design of the fish rafts / cages.** The new structures will be designed in accordance with relevant marine safety standards and regulations. Sensitive architectural design will be considered where practicable. This should take into account material texture, colour, finishes to structures to ensure the fish rafts / cages blend into the existing context, cause least disturbance to the existing seascape, and are the most visually appealing. Please refer to Figure 7.5b, Figure 7.6b, Figure 7.7b, Figure 7.8b, and Figure 7.9b for the implementation of VM2;
- **VM3 – Reinstatement.** After operation, the open water occupied by the Project site will be reinstated to their former state, i.e. the 'existing view' (top photo) shown in Figure 7.5a, Figure 7.6a, Figure 7.7a, Figure 7.8a and Figure 7.9a;
- **VM4 – Night-time lighting control.** Light intensity and beam directional angle should be controlled at the Project site at the design stage to reduce light pollution and glare (e.g. hooded lights, specific directional focus, etc.). In addition, lighting will be limited to auxiliary structures to reduce night-time impacts.

Table 7.5 Un-mitigated and Mitigated Impacts at the VSRs

VSR ID / Representative VP	Un-Mitigated Visual Impact		Recommended Mitigation Measure	Mitigated Impact (Substantial/ Moderate/ Slight/ Insignificant)		
	Construction	Operation		Construction	Operation Day 1	Operation Year 10
VSR 1a – Residents at Kau Lau Wan	Moderate	Moderate	VM1-4	Slight	Slight	Slight
VSR 1b – Fishermen at Kau Lau Wan FCZ	Slight	Slight	VM1-4	Insignificant	Insignificant	Insignificant
VSR 2a – Residents at Tap Mun	Moderate	Moderate	VM1-4	Slight	Slight	Slight
VSR 2b – Tourists at Tap Mun	Slight	Slight	VM1-4	Insignificant	Insignificant	Insignificant
VSR 2c – Fishermen at Tap Mun	Slight	Slight	VM1-4	Insignificant	Insignificant	Insignificant
VSR 3 – Travellers on ferry route of Ma Liu Shui – Tap Mun	Slight	Slight	VM1-4	Insignificant	Insignificant	Insignificant
VSR 4 – Hikers at Tai Tan Country Trail	Insignificant	Insignificant	VM1-4	Insignificant	Insignificant	Insignificant
VSR 5 – Hikers at Tai Tan Country Trail	Insignificant	Insignificant	VM1-4	Insignificant	Insignificant	Insignificant

7.10 Residual Impact Assessment

The assessment made in **Section 7.7** shows that visual impacts arising from the Project prior to any mitigation or enhancement measures in place, are between insignificant to moderate.

By operation, auxiliary facilities will have been removed. Therefore with sensitive design of the new structures (materials, textures, colours) and careful design of lighting, impacts would further reduce at operation day 1 for the Project site. The new structures are expected to blend in to the seascape and residual visual impacts will be insignificant to visitors to VSR 1b, VSR 2b, VSR 2c, VSR3, VSR 4 and VSR 5, but remain as slight for VSR 1a and VSR 2a.

No unacceptable residual visual impact is expected.

7.11 Cumulative Impact Assessment

As **Section 7.8.5** mentioned, hikers at Tai Tan Country Trail will be able to see both this Project and the Project site at Mirs Bay. However, with the mitigation or enhancement measures in place, the residual impact would be reduced to insignificant for this VP. The Project may have the potential to interact with the proposed establishment of FCZ at Wong Chuk Kok Hoi, subject to the timing of completion of legislative exercise to amend the *Schedule to the Fish Culture Zone (Designation) Order (Cap. 353B)*. Due to its considerable distance with Wong Chuk Kok Hoi (3,996 m), cumulative impacts are not expected from these projects.

7.12 Environmental Monitoring and Audit Requirements

A number of measures to be implemented during design and construction of the Project are recommended in **Section 7.9**, to further enhance the visual elements associated with the Project. Design measures such as for the design of the new fish rafts / cages are recommended to be integrated into the design and construction stage of the Project as early as possible.

As no tree felling, transplanting or compensatory planting is required for the Project and visual enhancement measures would be provided during the construction phase, therefore no specific EM&A programme is required.

7.13 Conclusion

A visual impact assessment has been undertaken for Project located at Outer Tap Mun. The VSRs were identified and assessed based on their sensitivity and magnitude of change. Four visual mitigation measures are proposed to minimise the visual impacts. Given the sensitive design of the new structures, small scale of development and good compatibility with the surrounding seascape of the structures, residual visual impacts of the Project will be subsequently considered as between insignificant and slight. No unacceptable residual visual impact is expected.

Regarding cumulative visual impacts, as **Section 7.8.5** has mentioned, hikers at the northern section of Tai Tan Country Trail will be able to see both this Project and the proposed FCZ at Mirs Bay. However, with the mitigation or enhancement measures in place, the residual impact would be reduced to insignificant for this VP. Other cumulative visual impacts with the proposed Wong Chuk Kok Hoi FCZ are not anticipated. According to Annex 10 of the *Technical Memorandum on the Environmental Impact Assessment Process (EIAO-TM)* the visual impacts are considered acceptable with mitigation measures.