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## **2 PROJECT DESCRIPTION**

### **Location and Scale of the Project**

- 2.1 The proposed site is located on the eastern coast of Lung Kwu Chau as shown in Figure 2.1. The location of the existing jetty is also shown on Figure 2.1.

### **Construction and Operational Activities**

- 2.2 The major activities involved during the construction stage of the Project are dredging for foundation of the jetty and catwalk, laying of rock bedding, construction of concrete catwalk, extension of an existing footpath, dredging for approach channel and demolition of the existing jetty. A maximum production rate for the dredging works is 500 m<sup>3</sup> per day, with one dredger working on-site at any time.
- 2.3 During the operation stage, the only activities at the proposed jetty will be the berthing and mooring of vessels for the purpose of servicing and maintaining the DVOR/DME station and for emergency repair work, and infrequent maintenance dredging of the approach channel.

### **Project Programme**

- 2.4 The planning, design and supervision of construction of the proposed jetty will be conducted by CED. The construction works is scheduled to commence in March 2003 for completion by December 2003.
- 2.5 It is expected that this Project has no major interaction with other projects.

### **Preferred Jetty Location and Design Option**

- 2.6 Under the preliminary design given in the EIA Study Brief, the Project comprises construction of a precast concrete blockwork jetty and a concrete catwalk and dredging of an approach channel. Alternative jetty location and design options have been investigated and the preliminary design has been refined from an environmental perspective. Alternative transportation modes for servicing and maintaining the DVOR/DME station have also been assessed with regard to their environmental benefits and disbenefits. Construction of the proposed jetty is considered necessary as there are no other modes of transportation available other than by sea to transport the required equipment and personnel to the island and to provide access to facilitate emergency repair work of the DVOR/DME Station.
- 2.7 In the vicinity of the existing small jetty, two alternative locations (Options 2 and 3) have been identified in addition to the initially proposed jetty location (Option

1 as shown in Figure 2.1). An evaluation of the environmental aspects of these alternative locations was undertaken with respect to the issues of water quality/dredged sediment, ecology, archaeology and visual/landscape.

- 2.8 Option 3 was preferred after the evaluation of the environmental benefits and disbenefits of the three options. Comparing with Option 1, the length of the catwalk in Option 3 was substantially reduced and the dredging area was smaller. This would minimise the area of seabed affected by the construction activities and the associated water quality, ecology, archaeology and visual/landscape impacts. Option 2 is a less preferred location for the jetty compared to Option 3. This location has a natural shoreline, with the highest density of intertidal organisms. Extension of a path to this location would cause major disturbance to the coastal terrestrial habitats owing to the need for major construction works. In addition, Option 2 is sited near the shipwreck area to the north of the bay where soft corals are attached to the wreck. Option 3 was preferred to Option 2 as the majority of the shore and backshore areas of Option 3 are already exposed to significant human disturbance.
- 2.9 The preferred option selected for the location of the jetty (refer to Figure 2.2) incorporates the recommendations raised at the Marine Parks Committee meeting held on 9 November 2001. The main environmental benefits of the proposed jetty location are that it would require a smaller dredging area and cause less intrusion into the bay of the adjacent beach, and therefore would have less impact on the dolphins. Support from the Lung Kwu Tan villagers for the preferred option has been obtained.
- 2.10 Based on the preferred jetty location, the scope of the Project comprises the following:
- construction of a precast concrete blockwork jetty (10 m by 20 m) with a single berth;
  - construction of a concrete catwalk (approximately 22 m long);
  - dredging of an approach channel to a level of  $-2.5$  mCD in front of the berth;
  - installation of miscellaneous facilities on the jetty, including lighting, navigation light, fendering, handrails, bollards, tide gauge, etc;
  - demolition of the existing jetty upon completion of the proposed jetty; and
  - extension of an existing footpath.
- 2.11 The environmental benefits and disbenefits of alternative design options for the jetty have been considered. The following design option is preferred:
- Adopt a blockwork structure to eliminate the need for any piling works which would be the most significant potential source of impact on the dolphins.
  - Use pre-cast structures to minimise the time of construction and reduce water quality impacts.
  - Provide openings along the bottom of the catwalk to allow seawater circulation. It is recommended that the number/size of openings beneath the catwalk be maximized as far as practicable to allow seawater circulation.

- Minimise overall jetty structure to minimise dredging works and associated impacts.

### **3 ENVIRONMENTAL IMPACTS**

- 3.1 The nature and extent of the environmental impacts associated with the construction and operation phases of the proposed jetty are summarized below. Specific mitigation measure requirements for the Project, as well as environmental monitoring and auditing procedures, have been developed during the assessment of the preferred jetty location and design option. The Implementation Schedules of the recommendations are presented in the EIA Report.

#### **Water Quality Impact**

- 3.2 The water quality impact as a result of dredging has been quantitatively assessed using a Particle Dispersion Model to simulate spreading, sedimentation and re-suspension of particulate matter. During mitigated dredging, the sediment plume is shown to be very narrow and localized. The calculated maximum concentrations in the sediment plume are predicted to remain very close to the source and are well within the range of natural fluctuations of suspended solids concentrations measured in the assessment area. The implementation of the proposed mitigation measures will be required during the marine works to effectively minimize the sediment loss from dredging activities given the presence of ecological resources in the assessment area. It is concluded that with the adoption of the recommended mitigation measures, the construction works for the jetty are not anticipated to result in unacceptable impacts on water quality.
- 3.3 An assessment of the impact of the proposed jetty on the hydrodynamic regime has been made using a local model. It is predicted that the jetty and catwalk structure has a limited effect on the flow regime and on the flushing of water in the nearby bay to the north of the jetty. The morphological impact assessment concluded that construction of the jetty and dredging of the approach channel would not impact negatively on the morphology of the nearby beach.

#### **Ecological Impact**

- 3.4 Literature review of existing ecological conditions were supplemented by field surveys of marine ecological resources in the assessment area. This indicated that the ecological value of the intertidal sandy and rocky shore habitats and subtidal soft seabed at Lung Kwu Chau are of low ecological value. Construction of the jetty and associated dredging works will result in the loss of 0.2ha of subtidal seabed area and approximately 0.002ha of rocky shore habitat. The impact of the project works on these habitats is concluded to be low.
- 3.5 The key marine sensitive receiver is the Indo-Pacific Humpback dolphin with the assessment area being high value habitat to this dolphin species. This dolphin is commonly sighted off the north and east coasts of Lung Kwu Chau and their

abundance in North Lantau waters is generally greater from late spring to summer. Although the impact of the Project on the marine dolphin habitat is medium, by strictly observing the recommended mitigation measures, the impact on dolphins can be minimised to an acceptable level. These mitigation measures primarily address ways to minimise noise impacts and physical dangers posed by marine traffic and works. The evaluation of other potential impacts such as the direct and indirect affects of changed water quality due to dredging indicates that no significant impacts are predicted. As a precautionary measure, dredging of approach channel will be scheduled outside late spring to summer.

- 3.6 Common gorgonian corals from the genus *Euplexaura* sp. were also found in the assessment area. These soft corals were found in abundance attached to a shipwreck on the north-east side of Lung Kwu Chau, while a handful of these corals were found growing on dumped material in the bay of the existing jetty. There would be no direct impact on these corals. In addition, sediment plume modelling indicates that increases in sedimentation rates on these corals are minor and would not cause any significant impact.

### **Fisheries Impact**

- 3.7 The findings of the literature review indicate that the fisheries resources at Lung Kwu Chau would be considered as low to moderate. Direct impacts to fisheries resources and fishing operations from habitat loss due to the jetty construction and dredging works for the approach channel are regarded as low.
- 3.8 The sediment plume modelling results indicate that sedimentation rates or turbidity levels in the assessment area's waters are not elevated to levels that would impact fisheries. Provided that the mitigation measures recommended to protect water quality are fully implemented, specific mitigation measures to protect fisheries resources are not considered necessary.

### **Cultural Heritage Impact**

- 3.9 The results of the desktop review and archaeological test pits indicate that the distribution of archaeological deposits is confined on the sandy tombolo and along the western beach in the middle part of the Island. The on-shore works area of the proposed jetty construction has no archaeological remains and deposits and hence, no adverse impact to cultural heritage is expected.
- 3.10 The marine geophysical survey for the marine archaeological investigation (MAI) did not reveal any seabed features with archaeological potential within the assessment area. The MAI concluded that there is no need for any further archaeological investigation nor mitigation measures.

### **Waste Management Impact**

- 3.11 The sediment quality characterisation survey indicates that the sediments to be dredged are classified as Category L and therefore the sediments are suitable for open sea disposal. Other wastes are likely to include C&D material from demolition of the existing jetty and the footpath extension. Provided that these waste arisings are handled, transported and disposed of using approved methods and that the recommended good site practices are strictly followed, adverse environmental impacts are not anticipated.

### **Landscape and Visual Impact**

- 3.12 Given that the proposed jetty location is on a small area of shore already subjected to previous disturbance, and the scale of the works has been minimised, the landscape and visual impact assessment concluded that the impact is acceptable with implementation of mitigation measures, including sympathetic design with rounded jetty cope line and irregular armour rocks on catwalk, compatible construction materials and finishes e.g. granite stone facing, visually recessive colours, and avoidance of lighting glare to Lung Kwu Tan villagers. Project works would result in small losses of landscape character/resource areas confining to 0.008ha of backshore area, 0.002ha of rocky boulder shore area and 0.03ha of water area.

### **Environmental Monitoring and Audit**

- 3.13 Environmental monitoring and audit are recommended for marine water quality. Site inspection/audit is also recommended to check the strict implementation of the recommended water quality, ecological and waste management mitigation measures during the construction phase. Details of the recommended monitoring procedures and locations are presented in a stand-alone Environmental Monitoring and Audit Manual.