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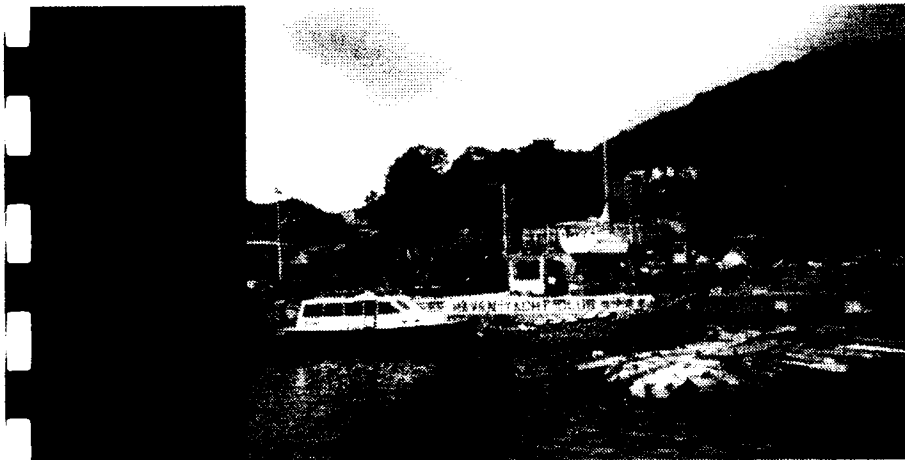
合樂 工程顧問集團

# Hebe Haven Yacht Club Development - Phase 2 Environmental Impact Assessment Study

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Executive Summary

October 1999



**Hyder**  
Consulting



EIA-028.3/1999 \*  
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## **HEBE HAVEN YACHT CLUB DEVELOPMENT - PHASE 2**

### **ENVIRONMENTAL IMPACT ASSESSMENT**

#### **EXECUTIVE SUMMARY**

**OCTOBER 1999**

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## **1. INTRODUCTION**

### **1.1 BACKGROUND**

- 1.1.1 This report summarises the findings of the Environmental Impact Assessment (EIA), prepared by Hyder Consulting Ltd, and required under the EIA Ordinance, Cap. 499 for designated projects.
- 1.1.2 The proposed development aims to improve the Hebe Haven Yacht Club's marine facilities and will involve small scale dredging works, seawall construction, land reclamation, and the provision of pontoon moorings.
- 1.1.3 The study area for Hebe Haven Yacht Club Phase 2 Development covers the area of the existing Club site, the proposed reclamation area and the harbour of Hebe Haven as shown in Figure 1. Phase 1 was the land rearrangement for the club and not part of the current development plan.
- 1.1.4 Hebe Haven Yacht Club, hereafter referred to as "The Club", has occupied its present site at Pak Sha Wan (Hebe Haven) near Sai Kung, of the New Territories since 1963. The Club is located on the western shore of Pak Sha Wan (Figure 1) and occupies a site area of approximately 8,830 m<sup>2</sup>. It is bounded by a boatyard to the north, a public car park and boatyards to the south, by Hiram's Highway to the west and to the east by the natural harbour of Hebe Haven.
- 1.1.5 The project is classified as a "Designated Project" under the EIA Ordinance, in accordance with Schedule 2, section C12 "A dredging operation which is less than 500m from the nearest boundary of an existing or planned conservation area", and section O2 "A marina designed to provide moorings or dry storage for not less than 30 vessels used primarily for pleasure or recreation".

### **1.2 THE NEED FOR DEVELOPMENT**

- 1.2.1 The Club caters for its members and also provides facilities for the students of Clearwater Bay School, Sea Scouts, Outward Bound, King George V and Police Sail Training Club. These facilities include fixed mooring buoys, pontoons, workshops, and hard standings.
- 1.2.2 The number of members and the intensity of boating activity remains static at the club due to a lack of available space. Demand for both membership and boat storage is, however, increasing.
- 1.2.3 Besides the existing cramped conditions, another issue that the Club is facing is the proposed widening of Hiram's Highway which cuts into the western boundary of the Club. This scenario would undoubtedly worsen the present conditions at the Club as there would be added constraints which may compromise vehicular access, and members convenience and would ultimately require the Clubhouse to be relocated. The proposed Phase 2 development aims to compensate for this loss and enable the Club to meet its projected demand. In order to meet the projected demand for boat

storage, additional land area is needed, which is only possible by means of land reclamation and provision of additional pontoon moorings.

### **1.3 PROJECT DESCRIPTION**

- 1.3.1 Permission is sought for the reclamation of foreshore covering an area of 2,619m<sup>2</sup>, together with pontoon moorings providing a total area of 4,392m<sup>2</sup> beyond the existing eastern limit of the Club as illustrated in Figure 2.1. The proposed development will involve 2,619m<sup>2</sup> of land which is to be used for hard standing, boat storage and repair; provisions for a boat removal or transport facility such as a boat hoist; and 46 berths in the pontoon marina facility. The development allows for the maintenance and repair of an increased number of boats and provides a more efficient overall layout.
- 1.3.2 The existing clubhouse, garden and slipways will remain intact. The reorganisation of the existing site is consistent with existing Town Planning Board approval already obtained by the Club.
- 1.3.3 The key features of the project in terms of their potential for environmental impact are the dredging and reclamation works. The dredging works will extend over an area of 100m x 90m (Area A of Figure 2.2) and will require the removal of up to 2m of seabed to provide a depth of -2.25m. This will generate an estimated 15,000m<sup>3</sup> of material. An additional 8,000m<sup>3</sup> of material will be removed from an area close to the Sea Scout Association (Area B). All dredging works will be completed within a 3 month time frame and are likely to involve 3-5 weeks of dredging based on the use of a small-medium sized grab and dredging from 9.00 a.m to 7.00 p.m. Since the sediment is found to be uncontaminated (based on criteria set out in EPD Technical Circular (TC) No. 1-1-92) it will not require any special removal, transportation or disposal methods.
- 1.3.4 Seawall construction will take place prior to reclamation on the three seaward faces of the proposed reclamation so as to minimise loss of material to the marine environment. The volume of fill required for reclamation is estimated at 16,000m<sup>3</sup> of material, which is based on an average depth of 6m of fill over the reclaimed area.
- 1.3.5 Each pontoon mooring will be placed on piled foundations capable of taking lateral loads only. Only one piling rig will be utilised during the construction works.

## **2. KEY ISSUES AND SENSITIVE RECEIVERS**

### **2.1 KEY ISSUES**

- 2.1.1 The key environmental considerations relate to both short and long term impacts on marine water quality within the enclosed waters of Hebe Haven, and any associated ecological impacts on aquatic fauna and flora. In terms of ecology and fisheries, at the outset of the study, the key issues were identified as being the potential impacts on mangrove habitat around the Haven; and impacts on Fish Culture Zone operations as a consequence of water quality impacts.

2.1.2 Other potential areas of environmental impact are less significant but include noise and dust impacts during construction, visual and landscape impacts, waste management impacts, including the disposal of dredged sediment.

## **2.2 SENSITIVE RECEIVERS**

2.2.1 The Sensitive Receivers in this study include the Ma Nam Wat Fish Culture Zone, the Hebe Haven Gazetted Beach and three mangrove areas at Sai Kung Hoi, Pak Sha Wan and Ho Chung. Also within Hebe Haven there is an existing Site of Special Scientific Interest (SSSI), a coastal protection area and a conservation area, which is indicated in the Hebe Haven Outline Zoning Plan. Part of the Pak Sha Wan peninsula is a designated SSSI, and almost all of the peninsula is within the Ma On Shan Country Park Extension. There is also a Conservation Area at the north of the peninsula.

2.2.2 There are intertidal mudflats of over 0.5 hectares and established mangal communities in the area.

2.2.3 Hebe Haven is a popular focus for boating and other recreational activities. In the vicinity are Marina Cove, the Pak Sha Wan Scout Sea Activities Centre, Hong Kong Marina and the Royal Hong Kong Yacht Club. The local ferry service runs from the pier at Pak Sha Wan to Trio Beach and Kiu Tsui Chau. In addition, there are numerous other private moorings, slipways and boatyards in the area.

## **3. EIA FINDINGS**

### **3.1 INTRODUCTION**

3.1.1 According to the study brief the EIA has focussed on quantifying the key impacts and their effects on identified sensitive receivers.

3.1.2 The findings of the marine assessment were based on numerical water quality modelling of the effects of dredging and fill activities in Hebe Haven. Key issues were assessed based on the procedures set out in the study brief issued by the EPD and the Technical Memorandum on the EIA Process also issued by the EPD.

### **3.2 WATER QUALITY IMPACTS**

3.2.1 The area to be dredged is small and lies in shallow water. The materials to be dredged are believed to comprise fine marine sediment. The assessment considered a worst case scenario which looked at the effect of dredging material comprised of 100% fines.

3.2.2 The water quality model was used to investigate and quantify impacts to the general area of Hebe Haven and to the identified sensitive locations in the vicinity of the proposed works i.e:

1. Mangal communities at the mouth of the stream located to the north of the dredging area.
2. Mangroves at the rocky tip of the outcrop south of Ta Ho Tun Ha Wai.

3. Rocky shore habitat with interspersed mangrove, just east of Sha Tsui.
  4. Rocky shore habitat with interspersed mangrove, just south of Tsiu Hang Hau.
  5. Gazetted bathing beach and Fish Culture Zone south east of Sha Tsui.
- 3.2.3 Generally the low tidal currents and associated small tidal excursion in Hebe Haven would mean that water quality impacts would only be likely to occur in the immediate area surrounding the dredging, as indicated below under each of the parameters assessed.

#### *Suspended Solids*

- 3.2.4 The model indicated that increases in suspended sediment concentrations would be restricted to the area within and immediately adjacent to the dredge sites and any exceedance of the suspended sediment assessment criteria, which were derived from the gazetted water quality objectives for the area, was predicted to be restricted to an area within approximately 100m of the dredging point.

#### *Tributyl Tin*

- 3.2.5 The sediment around the Club was known to contain elevated levels of Tributyl tin (TBT), a marine antifoulant used in paints to protect the hulls of ships. The potential for increases in TBT concentration in the water column due to losses from the sediment were investigated. TBT can be in particulate or soluble form i.e it may be adsorbed onto particles or due to disturbance, desorbed into the water column.
- 3.2.6 Predicted levels of both particulate and soluble TBT at the worst affected sensitive receiver were found to be well below the safe level for ambient TBT concentrations adopted in the UK (i.e 2 ng/l), and significantly lower than levels reported to have toxic effects of marine life. It was concluded that no significant effects would arise from the TBT in the sediment.

#### *Dissolved Oxygen Concentrations*

- 3.2.7 Since the dredging period itself is short, approximately three months, and the daily dredging duration would be restricted to normal working hours, water quality impacts will be minimised. Under such a dredging scenario the cumulative depletion of dissolved oxygen was predicted to be negligible and this was supported by the model results which show a depletion of oxygen to only occur within an area 100m from the works.

#### *Nutrients*

- 3.2.8 Nutrient releases were assessed in terms of nitrates (Section 5 in the EIA report) and these were found to cause exceedances of the water quality assessment criteria, based on the WQOs, however, the exceedance will be emitted to an areas within a few tens of metres of the dredging works.

### 3.3 ECOLOGICAL IMPACTS

- 3.3.1 Within the study area there exist a variety of coastal habitats with varying wind and wave influences. At the mouth of Hebe Haven there are stretches of rocky shore and further into the inlet are boulder and sandy shores, whilst the back shore habitats and small coves are comprised of silt and mud substrates. An area of 2,619m<sup>2</sup> of inter-tidal and sub-tidal soft seabed will be reclaimed and an adjacent area of 14,400m<sup>2</sup> of subtidal soft seabed will be made deeper by dredging to a depth of approximately 2.0 metres.
- 3.3.2 The areas of shoreline around the Haven are limited, but represent a diverse range of habitats including three mangals located at Sai Kung Hoi; Ho Chung, and Pak Sha Wan. These three areas are considered as SRs for this project.
- 3.3.3 All mangals were surveyed and the Pak Sha Wan mangal, which is the closest mangal to the Club (around 300 metres) and the least sheltered, was found to be in poor condition.
- 3.3.4 Potential impacts were identified to occur as a result of the dredging and reclamation. However, the modelling indicated that none of the identified ecological sensitive receivers would be affected by the dredging plume since they are all outside the zone of influence of the dredging operations delineated by the water quality model.
- 3.3.5 The area lost to reclamation would be only a very small proportion of shallow soft habitat in the Haven. This area of 2,619m<sup>2</sup> is highly disturbed and of low ecological value and its loss is therefore considered to be acceptable.
- 3.3.6 A similar evaluation is made for the 14,400m<sup>2</sup> of shallow waters which would be made deeper by dredging. In this case the ecological significance is reduced further by the fact that following dredging, a benthic community would eventually be able to recolonise the area of seabed devoted to pontoons and boat moorings.
- 3.3.7 Results from the plume dispersion model reveal that the predicted release of TBT and the extent of the sediment plume would not have a significant impact on any identified ecological sensitive receivers. This is due to the predicted local nature of the sediment plume generated by the dredging works. Ecological impacts are therefore considered to be acceptable.

### 3.4 FISHERIES IMPACT

- 3.4.1 Port Shelter as a whole, is a busy fishing area and supports several fish culture zones. At the southern end of the Pak Sha Wan peninsula is the Ma Nam Wat Fish Culture Zone and this was a key sensitive receiver in the assessment, given that fish are kept in cages and are unable to move away if disturbed or affected by sediment plumes.
- 3.4.2 The extent of the mixing zone for the works was used to determine the extent to which the waters used for capture fisheries were affected by the works, and to determine whether the sediment plume would adversely affect the mariculture zones in Port Shelter.

- 3.4.3 A key feature of the findings was that overnight, when works stop, all sediment settles within the vicinity of the works, thus reducing the possibility of any cumulative effects on water quality throughout the dredging period.
- 3.4.4 The dredging works will cause only short term impacts whilst the dredger is operating - between the hours of 9.00 a.m and 7.00 p.m. These impacts are extremely localised and short lived. Short term disturbance will cause many of the mobile species to move from the affected area and Fish Culture Zones in the area will be unaffected by the sediment plume. As such the impact to local fishermen is considered to be negligible but water quality monitoring has been recommended to verify the model findings and ensure that the works do not affect water quality at the Fish Culture Zones.
- 3.4.5 Nutrient releases were predicted to be undetectable and highly unlikely to affect the nutrient balance in the waters or to affect fisheries. Predicted TBT releases during the works were negligible, as described above, and unlikely to exceed the safe level for marine organisms.
- 3.4.6 Sedimentation will occur in the immediate vicinity of the works area due to the very slow current speeds in the area. Fishing activities in the immediate vicinity of the works area are currently, and will in the future be minimal. These are not anticipated to be any impacts to the fishing industry as a result of sedimentation or direct habitat loss.
- 3.4.7 The area of the proposed reclamation, which will cause irreversible loss of seabed and fishing area, is very small and represents an insignificant proportion of the total fisheries area in Hong Kong. No natural coastal areas will be affected by the reclamation and the seawalls will, to an extent, replace the habitats lost such as sea bed to the reclamation.
- 3.4.8 Since Pak Sha Wan is used by relatively small fishing vessels, it is considered unlikely that the works will disrupt fishing vessel movement thus minimising impacts to commercial fishing vessels.

### **3.5 OTHER ENVIRONMENTAL IMPACTS**

#### *Noise*

- 3.5.1 Construction Phase and Operational Phase noise levels were assessed and the study found that the development would not result in any unacceptable noise impact at identified noise sensitive receivers. However, the EIA recommends that good site practice be observed during the construction works to ensure unnecessary noise is not generated from the site.

#### *Air*

- 3.5.2 During the construction period, there is likely to be fugitive dust emissions due to various earth moving and material handling operations. However, the quantity of construction equipment to be used is expected to be small, hence the extent of the dust emissions was predicted to be limited.



*Waste*

- 3.5.3 The main waste stream is for uncontaminated marine muds, approximately 23,000 m<sup>3</sup>, the disposal of which is governed by legislation and the Project Proponent will be require agreement with the Fill Management Committee of CED for the mud disposal, prior to the commencement of construction.

*Landscape and Visual*

- 3.5.4 During the construction phase there will be minor landscape and visual impacts predominantly affecting the actual users of Hebe Haven who will benefit from the works in the long term. The actual impact is minimised by the small number of construction plant operating at any one time. The EIA has recommended that stockpiles and site fencing be used where practicable to screen potential visual impacts.
- 3.5.5 The development would not result in any significant change in site usage and therefore does not alter the landscape character of the study area.

**4. MITIGATION AND MONITORING****4.1 MITIGATION MEASURES**

- 4.1.1 Significant impacts are not anticipated as a result of the works. However, general mitigation measures have been recommended to ensure that impacts are avoided.
- 4.1.2 Dredging should be restricted to normal working hours to prevent cumulative effects of the released sediment on the water quality by allowing material to settle out of the water column over night.
- 4.1.3 Use of a small to medium grab dredger during the dredging operations would maintain the sediment release rate at or below 0.5 kg/s provided that "sweeping" techniques are not used. Numerical water quality modelling has indicated that such a dredging operation would limit water quality impacts to the immediate vicinity of the dredging operation and would not impact sensitive receivers within or close to Hebe Haven. Other possible dredging mitigation measures such as the use of sealed grabs and silt curtains are not advisable in this case as they are more likely to increase than reduce fine sediment releases, due to the very shallow water in the proposed dredging area.
- 4.1.4 The contractor should follow good site practices recommended in the EIA to minimise dust emissions and construction run off to the marine environment and to reduce construction noise.
- 4.1.5 Waste generation should be minimised and waste recycled to minimise waste disposed to landfill. To achieve this waste inventories should be maintained on the site and detailed records kept by the contractor.

4.1.6 Since there are no significant ecological impacts, no specific ecological mitigation measures or monitoring and audit requirements have been specified.

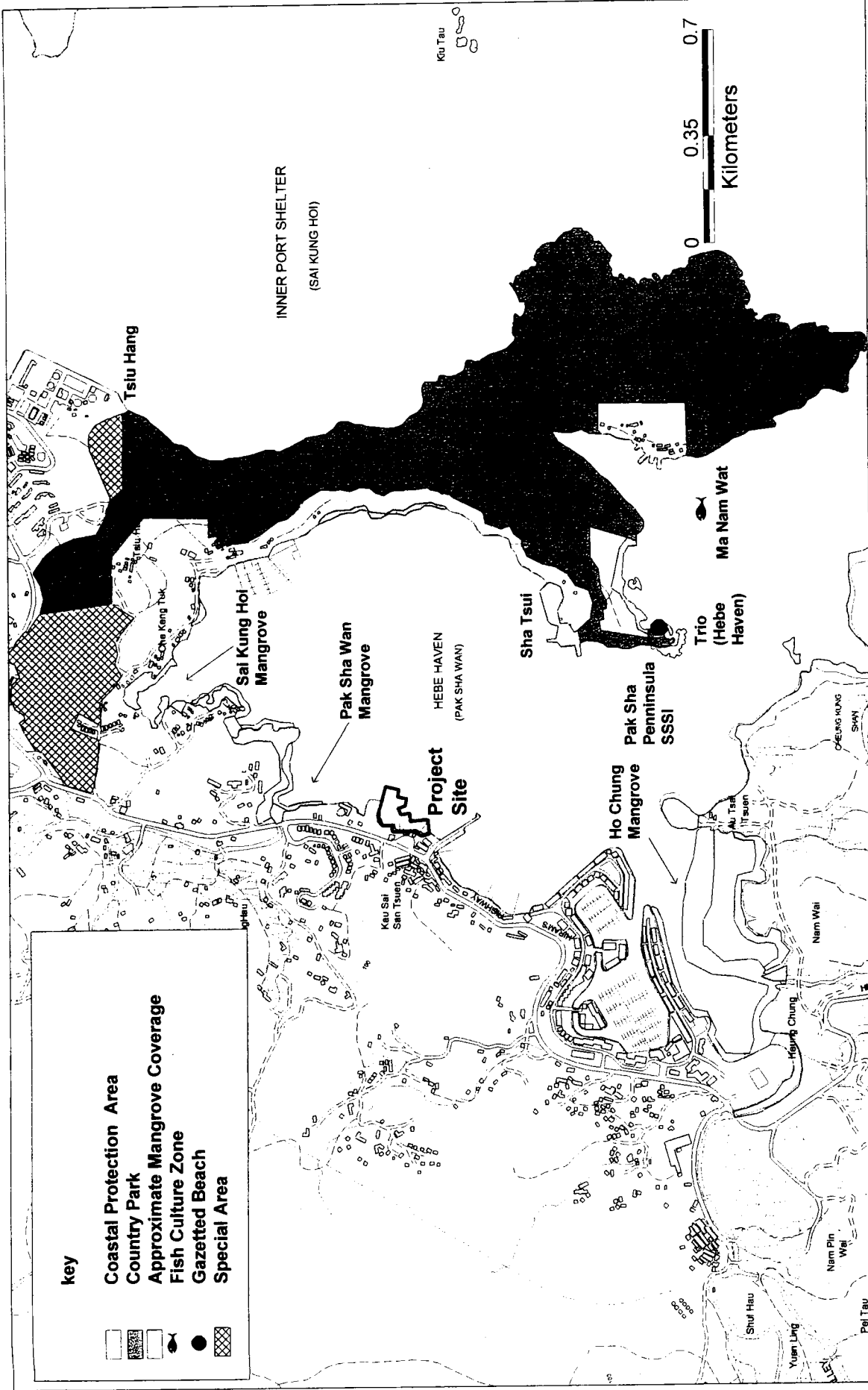
#### **4.2 MONITORING AND AUDIT**

4.2.1 An environmental monitoring and audit manual has been prepared in addition to the EIA which sets out in detail the monitoring requirements for the study. Since many of the key issues were dependent upon marine water quality impacts, water quality will form the focus of the monitoring.

4.2.2 Water quality will therefore be monitored at the works area and the fish culture zone during dredging to monitor and control the extent of the dredging plume and ensure the findings of the EIA, which were based on model output, are correct.

#### **5. CONCLUSIONS OF THE EIA**

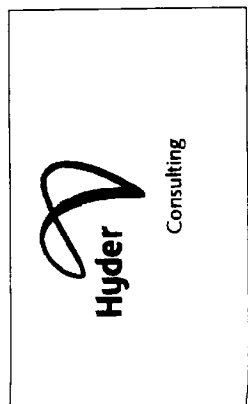
5.1.1 The EIA has not found any of the potential environmental impacts to be unacceptable, provided the mitigation measures recommended above are implemented and good site practice followed. The EIA therefore concludes that the project is acceptable from an environmental perspective.

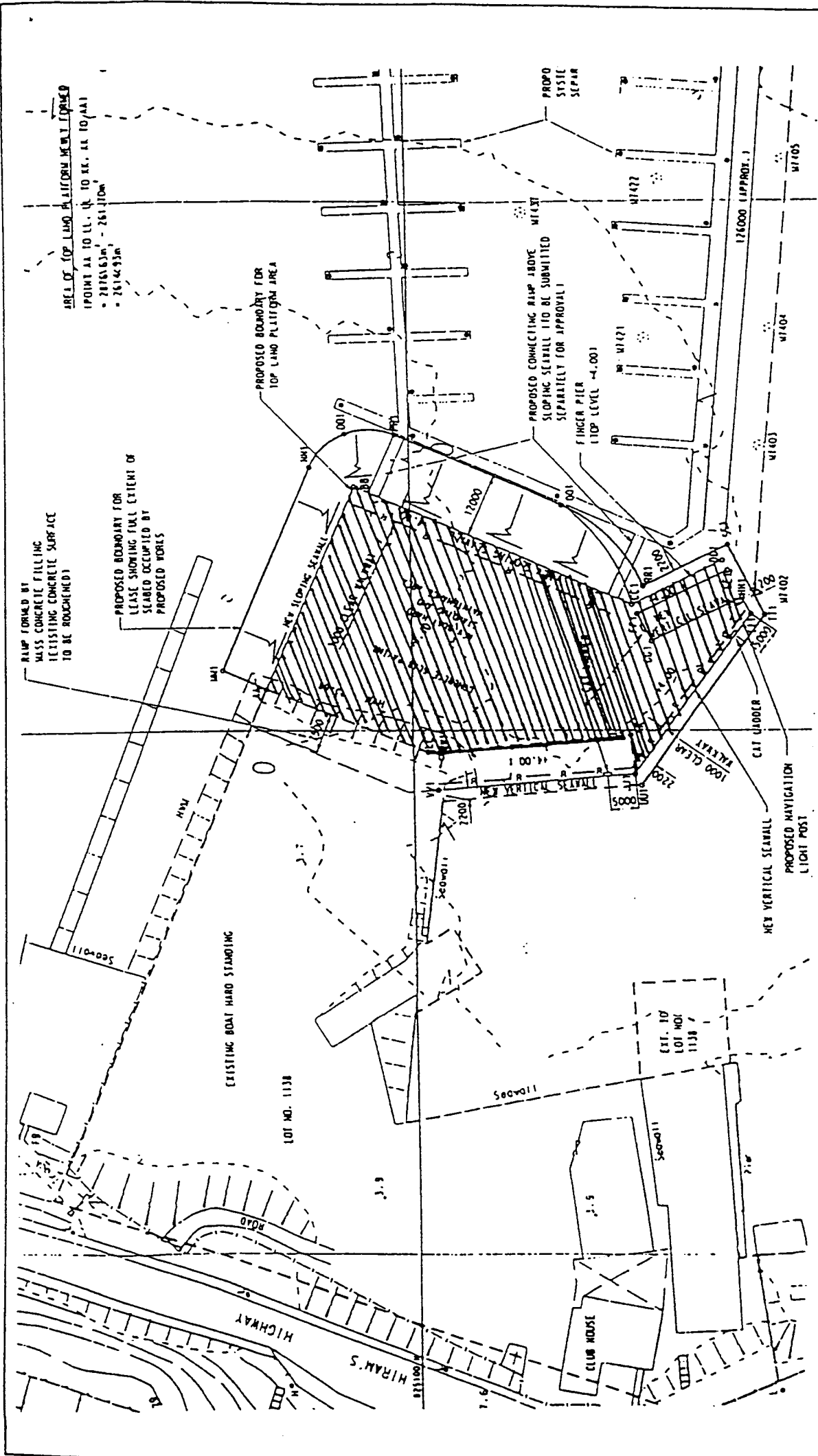


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Figure 1 Study Area

Job EA00501



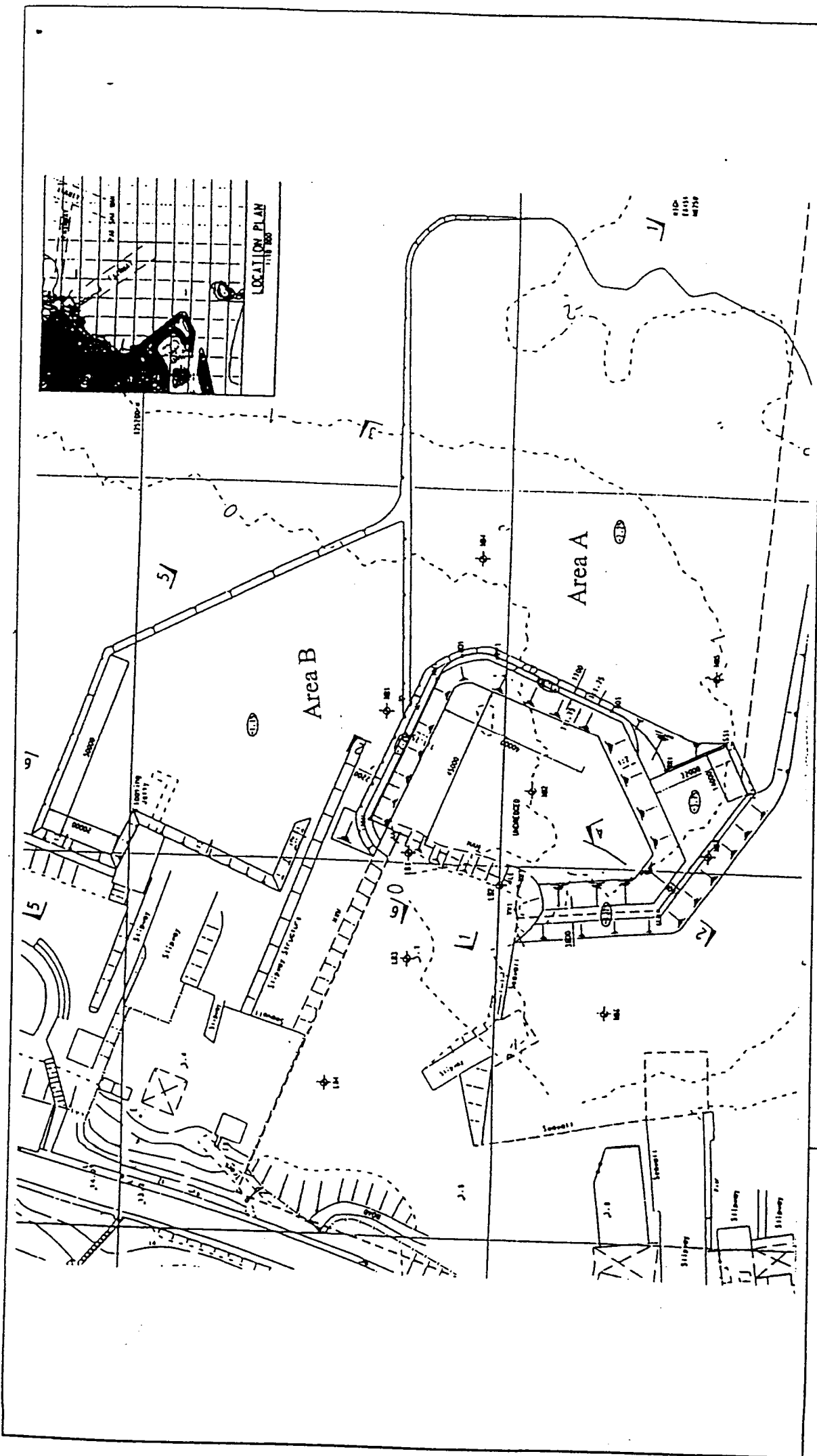


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Figure 2.1 Proposed Reclamation

Job No. EA00501





Hebe Haven Yacht Club Development - Phase 2 Executive Summary  
**Figure 2.2 Dredging Layout**  
 Job No. EA00501

