

## **PROJECT PROFILE**

### **1.0 BASIC INFORMATION**

#### **1.1 Project Title**

Contract No. HY/99/18

Castle Peak Road Improvement between Sham Tseng and Ka Loon Tsuen, Tsuen Wan  
Construction of Reclamation and Associated Seawall at Sham Tseng West.

#### **1.2 Purpose and nature of the project**

Castle Peak Road is at present a two-lane single carriageway, with narrow footways at discrete locations and is generally characteristics by sub-standard geometry and frequent entry/egress points offering insufficient visibility. The exception to this is through the centre of Sham Tseng, where the road is already built to a dual two-lane carriageway standard.

In order to enhance the level of service for the increasing number of users, the road needs to be improved to cope with traffic growth predicted by the year 2011. Thus, the Castle Peak Road improvements works consists of upgrading the existing Castle Peak Road to provide a dual two-lane carriageway of 'Rural Road A' classification between Area 2, Tsuen Wan and Ka Loon Tsuen, and all associated utility, junction and pedestrian facilities.

The Castle Peak Road Improvement project has been divided into three contracts as follows:

- ◆ the west contract HY/99/18 between Sham Tseng and Ka Loon Tsuen, Tsuen Wan;
- ◆ the middle contract HY/99/19 between Ting Kau and Sham Tseng, Tsuen Wan; and
- ◆ the east contract HY/2000/02 between Area 2 and Ting Kau, Tsuen Wan.

An Environmental Impact Assessment (EIA) on the Feasibility Study for the Castle Peak Road Improvements between Ka Loon Tsuen and Yau Kom Tau, hereafter referred to as the Feasibility Study EIA, was completed in December 1996. The Feasibility Study EIA has been approved by all relevant parties, including EPD, and was endorsed by the Advisory Council on the Environment (ACE) in April 1997. Further details on the main findings of the Feasibility Study EIA are presented in Section 5.4 of this Project Profile. However, based upon the 'Rural Road A' classification of the road, the project as a whole is not classified as a designated project under the Environmental Impact Assessment Ordinance and as such does not require an Environmental Permit (EP) for its implementation.

Notwithstanding, three elements of the project, reclamations at Tsing Lung Tau and Sham Tseng West (west contract) and Sham Tseng East (middle contract) are designated works and each will require an EP under the EIAO. This Project Profile is for the Sham

Tseng West reclamation, an element of the west contract HY/99/18.

The proposed reclamation is required to support a small section of improved road, including a roundabout and footbridge, where it protrudes from the existing shoreline between the end of Angler's Beach to the east and the natural shoreline to the west. The reclamation is the minimum required for the roadworks.

The reclamation cannot be replaced by a viaduct structure, since the bridge deck of such a structure would be too close to sea level, and therefore not practical. Furthermore, the alignment is constrained on the inland side by a large property development (Sea Crest Villa Phase 3), and therefore cannot be shifted inland. The reclamation option is thus considered the most appropriate solution.

### **1.3 Name of Project Proponent**

Highways Department  
Major Works Project Management Office  
3<sup>rd</sup> Floor, Ho Man Tin Government Offices.  
88 Chung Hau Street,  
Ho Man Tin,  
Kowloon, Hong Kong

### **1.4 Location and scale of project**

The location and layout of the proposed reclamation are shown in Figure 1. The reclamation is about 0.2 ha in area. The length of the reclamation, measured parallel to the road, is about 140 m, and the maximum width, measured from the existing High Water Mark (HWM) to the proposed toe of the scour apron is about 29 m, of which about 14 m is sloping revetment.

### **1.5 Number and types of designated projects to be covered by the project profile**

In accordance with category C.12 (a) (iii) of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance, this project shall be regarded as a Designated Project as the proposed reclamation works comprises dredging work within the boundary of Angler's Beach, which is a gazetted beach. Therefore, an Environmental Permit under the EIA Ordinance must be obtained prior to the commencement of construction. Only one designated project is covered by this project profile.

## **2.0 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

### **2.1 How will the project be planned and implemented**

The Consultants (Mouchel Halcrow Joint Venture) will design the project. The construction works will be planned and implemented by the Contractor as one of the elements of the Contract No. HY/99/18, the western most contract of three contracts making up the Castle Peak Road Improvement works.

The reclamation will be constructed using land-based plant and small derrick lighters. Excavated material will be removed either by truck or lighter, the latter being offloaded at the Contractor's temporary barging point at Tai Lam Kok (see Figure 1), for reuse as backfill elsewhere on site.

The anticipated construction method of the proposed reclamation is shown in Figure 2. The construction stages are as follows:

- Stage 1 Excavate existing ground down to working platform (+2 mPD high tide level) using backhoe.
- Stage 2 Excavate beach and seabed down to underside of scour apron level using grab from derrick lighter.
- Stage 3 Excavate about 10m width of working platform (measured along reclamation) using backhoe.
- Stage 4 Place rockfill into excavation by end tipping / backhoe.
- Stage 5 Place armour into excavation for scour apron using grab from derrick lighter.
- Stage 6 Place filter and backfill behind rockfill by end tipping / backhoe.
- Stage 7 Construct about 10m length of retaining wall.
- Stage 8 Complete armouring in front of retaining wall using crane from shore.
- Stage 9 Complete backfilling behind retaining wall by end tipping / backhoe.
- Stage 10 Move 10m along reclamation and repeat from Stage 2.

### **2.2 What is the project time table**

The construction period for Contract No. HY/99/18 will be 42 months, with the latest tentative construction programme being August 2001 to February 2005. However, it is anticipated that the construction of the proposed reclamation will only take 17 months, and will take place early on in the overall construction programme.

An outline programme for the construction of the reclamation is presented in Figure 3. As indicated above and shown in Figure 3, there are 9 main stages to the construction process, with stages 2 to 8 being undertaken on a cyclic process, with 9 phases predicted in total. The approximate periods for each phase of stages 2 to 8 and for stages 1 and 9 are as follows:

- Stage 1 5 weeks
- Stage 2 1 week per phase

|         |                     |
|---------|---------------------|
| Stage 3 | 1 week per phase    |
| Stage 4 | 1 week per phase    |
| Stage 5 | 1 week per phase    |
| Stage 6 | 0.5 weeks per phase |
| Stage 7 | 2 weeks per phase   |
| Stage 8 | 0.5 weeks pre phase |
| Stage 9 | 7 weeks             |

**2.3 Are there any interactions with broader programme requirements or other projects that shall be considered.**

The construction of the reclamation forms one element of Contract HY 99/18. The programming of this reclamation in relation to the overall project is described in Section 2.2 above. There is potential, therefore, for cumulative impacts associated with this designated element and the remainder of the road improvement works being implemented concurrently. In addition, the other reclamations required as part of the Castle Peak Road Improvement works as a whole may be constructed during the same period which could lead to cumulative impacts, largely associated with water quality and marine ecology. Other reclamation projects in the general vicinity of this designated project and potentially on-going at the same time include Penny's Bay and CT9 reclamations and thus there is a potential for cumulative water quality and marine ecology impacts in this area of Hong Kong waters. These factors are addressed in this project profile.

### 3.0 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

#### 3.1 Outline existing and planned sensitive receivers and sensitive parts of the natural environment which might be affected by the proposed project

##### Noise

The existing Castle Peak Road provides access to the North-west New Territories and there are numerous residential properties along the road which are largely highrise in nature. The sensitive facades of these properties mostly face seawards and towards the proposed construction works. 16 residential buildings have been identified within 200m of the proposed reclamation works. The locations of the key noise sensitive receivers (NSRs) are shown on Figure 1 and details of the NSRs are provided in Appendix 1.

The major noise sources in this area is the road traffic from the existing Castle Peak Road and Tuen Mun Road, with marine traffic unlikely to make a significant contribution. A baseline profile of the existing conditions was obtained by monitoring prevailing noise levels in March 1995 for the Feasibility Study EIA<sup>1</sup>. Weekday morning peak hour noise levels were monitored to obtain  $L_{10}$  (1-hour),  $L_{eq}$  (1-hour) and  $L_{90}$  (1-hour) noise levels at Sea Crest Villas Phase 4 (facade noise level at podium facing Castle Peak Road). The recorded noise levels at this location were determined to be  $L_{eq}63.8$  dB(A) and  $L_{eq}62.9$  dB(A) between 8:00 to 9:00 am and 9:00 to 10:00 am respectively.

##### Air quality

Air quality sensitive receivers are the same as for noise above. The closest baseline levels available, for Total Suspended Particulates (TSP) and Respirable Suspended Particulates (RSP), were obtained at the podium of Sea Crest Villas Phase IV in May 1995 as part of the Feasibility Study EIA. No exceedances of the Air Quality Objectives (AQO) were recorded and the mean of the 24-hour average TSP and RSP levels were below  $60 \text{ :g m}^{-3}$ , which are well within 24-hour average AQOs for TSP ( $260 \text{ :g m}^{-3}$ ) and RSP ( $180 \text{ :g m}^{-3}$ ). These indicate a relatively low background dust level at Sea Crest Villas and it is expected that these levels should also prevail in the study area.

##### Marine Water Quality

The study area is within the Western Buffer Water Control Zone. Background marine water quality of the specific project area is not available, however, data is available for a comparable location on the eastern side of Ma Wan<sup>2</sup> (Monitoring Station WM4). Depth-averaged Dissolved Oxygen (DO) for 1998 failed the Water Quality Objectives (WQOs) of the Control Zone with approximately 10% of samples found to be below the 4mg/L target DO concentration. Bottom DO on the other hand was within the WQOs. Depth-averaged DO ranged between 2.9mg/L to 8.1mg/L with an average of 5.4mg/L.

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1 Feasibility Study for Castle Peak Road Improvements between Ka Loon Tsuen and Yau Kom Tau EIA Report, December 1996  
2 EPD (1998) *Marine Water Quality in Hong Kong*

Bottom DO ranged between 2.2 to 8.1 mg/L with an average of 5.2mg/L. DO levels below 4mg/L generally place respiratory stress on local marine fauna, which are adapted to normal background concentrations of between 4 to 8mg/L.

Suspended solids ranged between 1.2 to 17.4mg/L with an average concentration of 7.6mg/L. The suspended solid loading recorded at WM4 is typical of water from the western side of Hong Kong, which is affected by the silt laden fresh waters of the Pearl River.

Angler's Beach, a designated bathing beach, is within the project. It was ranked third poorest in Hong Kong by the EPD<sup>3</sup> in 1997 and has been closed to the public since 1996 due to poor water quality.

### **Ecology and Fisheries**

#### **Ecology**

A beach environment, revetment and occasional outcrops of natural rock are present within the project area. Subtidal sediments are sandy in nature, as shown by the borehole logs provided in Figures 4a to 4c. The beach is exposed to wave action and can be considered mobile with wave action is constantly reworking and transporting sand particles.

In Hong Kong mobile beaches tend to be colonised by relatively few species due to the turbulent and uncertain nature of the environment. Typically the burrows of the Family Ocypodidae (Ghost Crabs) can often be found along the upper shore. They feed by sifting sand for food particles as well as catching small insects and crustaceans. The bivalve *Donax cuneatus* is encountered usually in large number within the permanently fluid sands below the mid tide mark. They feed by filtering seawater for food particles.

The rocky outcrops found within the site are likely to be colonised by a typical set of rocky shore fauna that are mainly composed of gastropod snails and barnacles. In the North Western waters of Hong Kong faunal density on rocky shores tends to be low.

It is highly unlikely that hard coral will be found within the project area as the North Western waters are generally unsuitable environments for this group due to low salinity and high background water turbidity.

The backshore habitat is very limited consisting of a narrow strip of land bounded by the existing Castle Peak Road to the north and is dominated by trees, coastal grasses and occasional coastal scrub bushes.

#### **Fisheries**

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3 EPD (1997) *Bacteriological Water Quality of Bathing Beaches in Hong Kong*

There are no commercial fish survey records for the project area. However, fish records are available from the Environmental Monitoring and Audit of Pit IV at East of Sha Chau<sup>4</sup>. Demersal trawl survey results from this study indicate that approximately 97 species are found in the area East of Sha Chau. The most common species being *Charybdis* sp., *Metapenaeus affinis*, *Leiognathus brevirostris*, *Platycephalus indicus*, *Oxyurichthys tentacularis*, *Turritella terebra*, *Murex trapa*, *Polycaulus uranoscopa* and *Oratosquilla oratoria*. It is likely that the same species will be found within the coastal waters of the project area.

### **Landscape and Visual**

The topography of the area comprises vegetated slopes interspersed with many highrise residential developments. There is little vegetation in this area except where the existing road revetment gives rise to the verge at the rear of Angler's Beach where mature trees are present. Residents in this area have uninterrupted views of the sea and views from the sea will be able to see the residential blocks and the vegetated hillside, with a low lying revetment for the existing road running along the coastline and some beach.

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4 ERM (1999) *Environmental Monitoring and Audit for Contaminated Mud Pit IV at East of Sha Chau 8<sup>th</sup> Quarterly report*

## **4.0 POSSIBLE IMPACTS ON THE ENVIRONMENT**

### **4.1 Outline any processes involved, including process flow diagrams, site plans, storage requirements and information on emissions and discharges**

As described in Section 2.1, the reclamation will be constructed in several different stages with mechanical equipment being used at all stages resulting in a potential for noise during the whole process. However, only stages 2 to 4 have the potential to disturb the seabed which could influence water quality and marine ecology. The existing beach and seabed under the reclamation will require excavating to a maximum depth of about -3 mPD, with about 15,200 m<sup>3</sup> of material being removed. It is anticipated that the excavation rate will be less than 200 m<sup>3</sup> of material per day.

The excavated material will be removed either by truck or derrick lighter and subsequent offloading at the Contractor's temporary barging point at Tai Lam Kok (see Figure 1). The material is of high quality and suitable for reuse as backfill elsewhere on site and thus no disposal of any of the excavated material from the proposed works is anticipated.

Handling of material will take place during the initial stages during excavation and during backfilling, processes which have the potential for dust generation.

### **4.2 Describe the environmental impacts or issues that arise during the construction, operation or decommissioning of the project, where applicable**

#### 4.2.1 Construction Phase

##### **Noise**

Noise during the construction phase will be generated from powered mechanical equipment (PME) being used during various construction activities. Operations that may generate adverse noise impacts can be broadly divided into the following 9 stages:

- X Stage 1 – Excavation and removal of existing soil;
- X Stage 2 – Excavation of Beach;
- X Stage 3 – Excavation of Platform;
- X Stage 4 – Placing of Rockfill on the Platform;
- X Stage 5 – Placing of Armour;
- X Stage 6 – Placing of Filter and Backfill;
- X Stage 7 – Construction of Concrete Retaining Wall;
- X Stage 8 – Complete Armouring by Placement from Shore;
- X Stage 9 – Final Filling.

The equipment which will be required for the construction operations during each of these stages is listed in Table 1 below:



**Table 1: Predicted Sound Power Levels for Each Construction Activities**

| Construction Stage | Equipment           | CNP Equipment Code | Number of Equipment | Sound Power Level (SWL) in dB(A)* | Total SWL During Operation |
|--------------------|---------------------|--------------------|---------------------|-----------------------------------|----------------------------|
| Stage 1            | Excavator (Backhoe) | CNP 081            | 1                   | 112                               | 115.0                      |
|                    | Lorry               | CNP 141            | 1                   | 112                               |                            |
| Stage 2            | Barge Mounted Crane | CNP 048            | 1                   | 112                               | 112.0                      |
| Stage 3            | Excavator           | CNP 081            | 1                   | 112                               | 115.0                      |
|                    | Lorry               | CNP 141            | 1                   | 112                               |                            |
| Stage 4            | Excavator           | CNP 081            | 1                   | 112                               | 115.4                      |
|                    | Lorry               | CNP 141            | 1                   | 112                               |                            |
|                    | Vibrator/ Compactor | CNP 050            | 1                   | 105                               |                            |
| Stage 5            | Barge Mounted Crane | CNP 048            | 1                   | 112                               | 112.0                      |
| Stage 6            | Excavator           | CNP 081            | 1                   | 112                               | 115.4                      |
|                    | Lorry               | CNP 141            | 1                   | 112                               |                            |
|                    | Vibrator/ Compactor | CNP 050            | 1                   | 105                               |                            |
| Stage 7            | Concrete Lorry      | CNP 044            | 1                   | 109                               | 112.0                      |
|                    | Concrete Pump       | CNP 047            | 1                   | 109                               |                            |
| Stage 8            | Mobile Crane        | CNP 048            | 1                   | 112                               | 115.0                      |
|                    | Lorry               | CNP 141            | 1                   | 112                               |                            |
| Stage 9            | Excavator           | CNP 081            | 1                   | 112                               | 115.4                      |
|                    | Lorry               | CNP 141            | 1                   | 112                               |                            |
|                    | Vibrator/ Compactor | CNP 050            | 1                   | 105                               |                            |

\* SWL are obtained from the Technical Memorandum on Noise from Construction Work Other than Percussive Piling

The construction noise at the designated NSRs has been assessed in accordance with the methodology specified in the *Technical Memorandum on Noise from Construction Work Other than Percussive Piling*. The details of the predicted noise levels at the representative NSRs during the seawalls and retaining wall construction is shown in Appendix 2A. Noise calculations have been based on the assumption that all the identified NSRs are 1 storey in height.

The results indicate that maximum noise levels will not exceed the daytime noise criteria of 75dB(A). Based upon these results, no noise mitigation measures will be necessary at this location to reduce the noise to acceptable levels.

No cumulative impacts associated with works on-going for the other reclamations highlighted in Section 1.2 are predicted due to the distance between the works, with approximately 1km between each of the three designated reclamations. However, due to the progress of the remaining works of the Castle Peak Road Improvement contract HY/99/18, it is possible that there could be some cumulative construction activities

occurring. As the existing road will be in use until after the reclamation is complete, the key activity that could occur will be bored piling for the foundations for the foot bridge across the roundabout between Sea Crest Villas Phases 2 and 3. The Feasibility Study EIA assumes that 1 large diameter bored piling rig, either oscillating or grab-and-chisel, would be used during this process. The equipment would have a sound power level (SWL) of 115 dB(A), based upon the CNP 164 or 165 of the Technical Memorandum on Noise from Construction Work Other than Percussive Piling.

The Feasibility Study EIA has predicted that a portable noise barrier with an attenuation of 10 dB(A) would be required to reduce the noise levels at the adjacent sensitive receivers to below the 75 dB(A) standard during this operation. In order to determine the cumulative effects of the reclamation equipment and the bored piling rig operating simultaneously, calculations have been undertaken. The predicted noise levels for the bored piling with noise barrier and reclamation equipment without mitigation are shown in Appendix 2B. The results indicate that cumulative impacts in excess of the 75 dB(A) standard will not occur if used and thus, no mitigation is required.

### **Air Quality**

Material will be excavated at the start of the proposed works and loaded into either a derrick lighter or truck for removal. The excavated material will be wet sand and based upon both its moisture content and particle size is not predicted to generate significant amounts of dust. During backfilling the material used will also be granular and thus not be subject to significant dust blow except in very high winds. The moisture content of the material will be influenced by how long it has been stockpiled and in some situations it may be necessary to dampen the material to reduce any dust during its use. In this regard, the Contractor will be required to comply with the Air Pollution Control (Construction Dust) Regulation in order to ensure that no adverse dust impact on the air sensitive receivers will result.

The Feasibility Study EIA predicted maximum construction dust levels of 115: g m<sup>-3</sup> and 109 :g m<sup>-3</sup> at Sea Crest Villa Phase 3 (SR1-1 on Figure 1) and Sea Crest Villa Phase 2 (SR2-1) respectively, based upon the mitigation measures highlighted in Section 5.4, which are well within the 24-hour average AQO for TSP of 260 :g m<sup>-3</sup>. The Feasibility Study EIA predictions included the proposed reclamation in the scope of its assessment and thus, the levels show that cumulative impacts from the reclamation and the remainder of the road works being conducted concurrently would not give rise to adverse cumulative effects. In addition, no cumulative impacts from works on the other reclamations being constructed concurrently are predicted due to the distance between the works.

### **Marine Water Quality**

The greatest potential impact to marine water quality is likely to occur during Stages 2 and 3 of the reclamation construction process, with Stage 4 having less potential to cause impacts. During Stages 2 and 3, tidal and subtidal sediment deposits will be excavated to form the base for the reclamation's foundations. Excavation activities will result in

the suspension of sediment particles in the water column.

A geotechnical borehole survey has shown that the sediment in the area is granular in nature. A total of 7 boreholes were drilled in the vicinity of the proposed reclamation and all indicated the same sand material. Examples of 3 of these boreholes (B54, B56, B57(M)) are shown in Figures 4a, 4b and 4c with the borehole locations provided on Figure 1. Sediments put into suspension during excavation will, therefore, settle out rapidly and are unlikely to travel far from the works area. Water quality impacts in terms of suspended solid concentrations are expected to be minimal. In addition, the sediment particles are too granular to constitute mud and thus impacts associated with contaminated excavation material on water quality are, therefore, not expected.

The impact on the bathing water of Angler's Beach is not considered an issue as the beach is currently closed to swimmers. Water quality impacts during the remaining stages of construction are not expected to have any great affect on water quality, as there will be no sediment removal.

In addition, due to the progress of the remaining works of the Castle Peak Road Improvement contract HY/99/18, it is possible that there could be some cumulative construction activities occurring. The key issue in respect of marine water quality is any increase in suspended solids in the water column which could occur from earthworks and slope works. However, during the reclamation works, no major excavation works will be undertaken concurrently with the excavation for the reclamation and there are no slope works required in the vicinity of the reclamation. As such, cumulative impacts should not occur. Notwithstanding, the proposed reclamation was included in the scope of works assessed by the Feasibility Study EIA which stated that impacts associated with suspended solids from all activities would be low based upon the runoff from all active working areas being passed through a sediment removal facility. The EIA report also stated that the reclamation works are minor and not expected to result in substantial impacts based upon the works preferably being conducted behind a sealed seawall and the method of fill placement managed. The proposed method of construction concurs with this recommendation and based upon this and the assessment provided above, cumulative impacts from the reclamation and other works associated with the road improvement, including the other reclamations highlighted in Section 1.2, being conducted concurrently are not predicted to be significant.

Other reclamation projects in this area of Hong Kong waters, namely Penny's Bay and CT9, could be on-going at the same time as this designated project, providing the potential for cumulative impacts. However, as the impacts of this designated project are considered to be localised and based upon the large distance between these projects, the strong tidal flows separating the areas and the mitigation being applied during all these works, cumulative impacts associated with these works being conducted concurrently are considered to be negligible.

### **Waste Management**

Due to the close proximity of residences to the construction site, improper waste

management on site could cause visual and dust impacts on nearby sensitive receivers. However, as all excavated material will be loaded directly onto either the derrick lighter or a truck for removal and reuse at an alternative location on site. No dumping of the material is required as it is of high quality and suitable for reuse. This approach is consistent with that to be applied for the other elements of Contract HY/99/18 for the remainder of the road improvement works based upon the recommendations of the Feasibility Study EIA, which stated that excavated material should be reused on site as far as possible to minimise off-site disposal. In addition, as detailed in the boreholes in Figures 4a, 4b and 4c, the material does not constitute mud and therefore cannot be contaminated and thus, no special handling is required. Therefore, significant issues associated with waste management are not anticipated.

## **Ecology and Fisheries**

### **Ecology**

Construction of the reclamation will initially result in the loss of some 125m of beach habitat which is used by Ghost Crabs and Bivalves. Rocky outcrops and existing revetment habitats of the gastropods and barnacles will also be lost.

However, the sea front of the reclamation will be constructed of stonework revetment, which will effectively increase the area of rocky shore within the project area. Once complete it is expected that the revetment will be colonised by a range of rocky shore fauna similar to that presently occurring within the project area. Recolonisation is expected to take 2-3 years to complete.

There will be a net loss in beach area to the reclamation with the upper to mid beach being permanently removed. The planned reclamation is mostly limited to the upper shore. A small area of Ghost Crab habitat will, therefore, be permanently lost. The reclamation will be constructed in a sectional format with only a small part of the beach being worked on at any one time. Construction of the initial section will require the remove of sand from the beach but subsequent sections will have the excavated sand moved to replace the beach extracted during construction of the previous section. Thus overall losses of sand shall be minimal. Wave action will reform the mid to lower beach area to a natural state once construction is complete and the bivalve community will most likely recolonise this area of beach disturbed within 2-3 years after construction. The removal of some vegetation will occur, but this is confined to some coastal grasses and bushes which are not of high ecological value. No trees will be felled as a result of the reclamation.

Overall short-term ecological impacts of construction will not be significant, as the habitats are common in Hong Kong, the area lost is relatively small when compared to the length of natural coastline still present in Hong Kong. Species affected are likely to be common and it is unlikely that any rare or endangered species will be lost. Long term ecological impacts on balance will be insignificant, as the loss of beach will be replaced by revetment rocky shore.

Cumulatively, the Feasibility Study EIA predicts impacts on the rocky shore, beach areas and intertidal areas. The proposed reclamation was included in the scope of works assessed by the Feasibility Study EIA and all impacts on marine habitats and aquatic fauna were predicted to be small and insignificant. Based upon this and the assessment provided above, cumulative impacts from the reclamation and other works associated with the road improvement, including the other reclamations highlighted in Section 1.2, are not predicted to be significant.

Cumulative loss of marine habitats and impacts on marine ecology associated with other major reclamation projects on-going concurrently are considered to be minor as this designated project would result in only a negligible loss of habitat and not result in significant water quality impacts as noted above.

### **Fisheries**

Construction of the reclamation will result in the generation of suspended solids but due to the coarse nature of the sediments and low current velocities expected in the project area, dispersal of suspended solids will be minimal. Impacts will be highly localised and the impact on the North Western waters fishery resource will be insignificant.

Permanent loss of subtidal habitat is not expected as the subtidal beach area is predicted to return on completion of the construction works. Long-term impacts on fisheries are, therefore, insignificant.

In addition, the Feasibility Study EIA has recommended mitigation in the form of runoff from all active working areas being passed through a sediment removal facility and based upon this does not predict any significant impacts on water quality or marine fauna. The proposed reclamation was included in the scope of works assessed by the Feasibility Study EIA and based upon this and the assessment provided above, cumulative impacts on the fisheries resource of the North Western Waters from the reclamation and other works associated with the road improvement, including the other reclamations highlighted in Section 1.2, being conducted concurrently are not predicted to be significant. Also, as noted for water quality above, due to the only localised impacts at worst, cumulative impacts with other reclamation projects such as Penny's Bay and CT9 are considered to be negligible.

### **Landscape and Visual Impact**

The proposed reclamation is of a relatively small scale and effectively just extends the existing road platform out to sea, being at the same elevation. Thus, from the landward side, the existing sea views will not be obstructed in any way and due the presence of the podium on these residential blocks, few residents will have views of the shoreline and the proposed works. From the sea, the low lying reclamation will not be prominent in the views and little change will be detected as the existing man-made shoreline is extended slightly seawards. Views may even improve slightly as the existing concrete structure is replaced by a more attractive granite amour block revetment. The vegetated hill slopes and residential blocks will still dominate the views.

No tree felling will be required for the reclamation. However, landscaping is proposed in this area to provide a greener outlook and this will also compensate for any coastal vegetation losses. The proposed landscaping for the study area is shown in Drawings 90612/T/LD/1000 and 90612/T/LD/1011.

In respect of cumulative impacts, the Feasibility Study EIA has included the proposed reclamation in the scope of its assessment and concludes that as a whole the road improvement works will have impacts on the landscape character of the area with the loss of mature vegetation associated with the alignment and retaining wall being the most significant. These impacts are mitigated by the implementation of the landscape proposals as detailed above. Severe visual impacts from the whole project are predicted by the Feasibility Study EIA but with the reclamation itself not presenting a dominant element. Thus, as the majority of the impacts will be generated by the other elements of the road improvement works, cumulative impacts are considered to be limited.

#### **4.2.2 Operational Phase**

No adverse impacts are expected during the operational phase. The Feasibility Study EIA predicted that this designated reclamation and the reclamation at Tsing Lung Tau would unlikely have any measureable impacts on marine flows and water quality during the operational phase due to the shallow water and narrow nature of the reclamations which do not extend far from the existing coastline.

## **5.0 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED**

### **5.1 Describe measures to minimise environmental impacts**

#### **Noise**

The results in Appendix 2A have shown that no noise mitigation measures are required if the reclamation works are not undertaken while other contract works are on-going. In addition, as shown in Appendix 2B, the cumulative noise levels are also below the 75 dB(A) standard and no mitigation is required in this case.

#### **Air Quality**

It may be necessary to dampen the backfilling material prior to its use. However, with the adoption of this measure if required and the relevant pollution control clauses in the Construction Contract as detailed in Attachment 1, environmental nuisance can be kept to a minimum.

#### **Water Quality**

Impacts on water quality are predicted to be insignificant given the limited amount of excavation required, the granular and uncontaminated nature of the material and the short length of the works. Thus, based upon the specification of the Pollution Control Clauses in the Construction Contract as detailed in Attachment 1, no further mitigation measures are recommended.

#### **Ecology and Fisheries**

The revetment wall will be constructed of stonework blocks of granite, the type of rock currently found within the project area. These blocks will form cracks and crannies in which rocky shore fauna such as gastropods can shelter during low tide. The surface of the blocks will provide a suitable habitat for lichen and algae to grow as well as gastropods to graze.

Based upon this, the fact that the beach will return after a period of time, the landscaping to compensate for tree loss and the overall insignificant impacts, no further mitigation measures are considered necessary.

#### **Waste Management**

Based upon the process of the removal of all excavated waste from the site as it is excavated and the reuse of the material during the overall construction works, no mitigation is required. Notwithstanding, relevant pollution control clauses will be included in the Construction Contract, as detailed in Attachment 1, so as to minimize the environmental nuisance to the nearby sensitive receivers.

## **Landscape and Visual**

The proposed reclamation is predicted to give rise to low visual impacts and not significantly change the landscape character of the area. Thus, taking into account the landscape proposals to be implemented, no further mitigation measures are considered to be required.

### **5.2 Comment on the possible severity, distribution and duration of environmental effects**

No adverse noise, air and water quality impacts are predicted and with the application of the pollution control clauses, any impacts will be reduced to a minimum. In respect of ecology and fisheries, while significant impacts are not predicted, the construction of a granite block revetment and the potential for the beach to return are considered sufficient to compensate any impacts.

The duration of the works is short term, will affect a localised area only and no significant impacts have been predicted. In addition, any cumulative impacts associated the construction of the reclamation and elements of the remainder of the road improvement works are not predicted to be significant based upon the implementation of mitigation measures recommended by this Project Profile and in the Feasibility Study EIA.

### **5.3 Comment on any further implications**

None

### **5.4 Use of previous approved EIA**

Reference has been made to the Feasibility Study for Castle Peak Road Improvements between Ka Loon Tsuen and Yau Kom Tau EIA Report, dated December 1996. The Feasibility Study EIA addressed six major environmental parameters during the construction and operational phase of the road improvement works as follows:

- ◆ noise;
- ◆ air quality;
- ◆ water quality;
- ◆ ecology;
- ◆ solid waste; and
- ◆ landscape and visual.

The construction phase of the road works is relevant to this Project Profile as such the key findings and recommendations of the Feasibility Study EIA construction phase assessment are summarised below. The proposed reclamation was included in the scope of works assessed by the Feasibility Study EIA, which thus effectively represents a cumulative assessment of the impacts associated with the road works and the reclamation.



However, the specific relevance of these to the designated project is described below and in the main text of this Project Profile.

**Noise** – because of the close proximity of sensitive receivers, exceedances of the 75 dB(A) criteria was predicted during the construction phase along the length of the road and extensive mitigation measures were recommended. The measures included incorporating clauses into the construction contract, quietened equipment and temporary noise barriers. The construction impacts of the reclamation were not specifically covered by the Feasibility Study EIA

**Air Quality** – modelling was undertaken based upon the implementation of standard dust suppression measures including pre-watering of dropping surfaces and twice daily watering of excavated surfaces and dusty roads. With the adoption of these measures, the assessment predicted that there would be no exceedances of the criteria at any of the selected air quality sensitive receivers. Mitigation measures specific to fill/reclamation areas included twice daily watering of bulldozed material and unpaved site roads and formed areas.

**Water Quality** - the key water quality issue concerned suspended solids contained in site runoff, especially cut slopes, entering the water bodies, with the reclamation at Sham Tseng West and Tsing Lung Tau being predicted not to result in significant impacts. The EIA does recommend that the works are preferably conducted behind a sealed seawall and the method of fill placement managed. The report states that the adoption of these and standard mitigation measures, including the treatment of site runoff through sediment traps, should result in low residual impacts. In addition, the Feasibility Study EIA predicted that this designated reclamation and the reclamation at Tsing Lung Tau would unlikely have any measureable impacts on marine flows and water quality during the operational phase due to the shallow water and narrow nature of the reclamations.

**Ecology** – the report stated that the entire study area was extensively disturbed by human activities with no protected flora or fauna present. The road widening will result in the loss of different types of habitats including woodland, shrubland, rocky and sandy shore and intertidal area. Only the loss of woodland is of significance but this is mitigated by extensive compensatory planting. Some seabed will be permanently lost but this is not considered significant due to the degraded nature of the water quality and marine benthic communities in the area. The Feasibility Study EIA predicts that ecological impacts from the reclamation will be minor.

**Solid Waste** – the report concluded that there would be a balance of surplus spoil which would require disposal off site. However, in order to minimise the off-site fill requirements and disposal of surplus spoil, it was recommended that the Contractor should make use of excavated material as much as possible. In addition, different categories of waste should be segregated, stored, transported and disposed of separately in accordance with the required procedures.

*Landscape and Visual* – it was predicted that the road improvement works would generate severe impacts on the existing landscape character based upon the cutting of slopes and rock faces and encroachment of construction works onto beach areas causing the loss of vegetation. Loss of areas of woodland was also considered a key issue. The Feasibility Study EIA concludes that the reclamation would remove existing vegetation and alter the profile of the coastline. Visually, due to the high number of sensitive receivers, there will a high disruption to the existing views during the construction phase associated with extensive engineering works, cut slopes, the removal of existing vegetation and encroachment into the coastline areas. Mitigation in the form of extensive planting for all vegetation loss, sensitive hardworks and the restoration of the disturbed hillside was recommended.

## **ATTACHMENT 1**

### **RECOMMENDED POLLUTION CONTROL CLAUSES FOR CONSTRUCTION CONTRACTS**

#### **AVOIDANCE OF NUISANCE**

- (i) All works are to be carried out in such a manner as to cause as little inconvenience as possible to nearby residents, property and to the public in general, and the Contractor shall be held responsible for any claims which may arise from such inconvenience.
- (ii) The Contractor shall be responsible for the adequate maintenance and clearance of channels, gullies etc. and shall also provide and maintain such pedestrian and vehicular access as shall be directed within the works site.
- (iii) Water shall be used to prevent dust rising and the Contractor shall take every precaution to prevent the excavated materials from entering into the public drainage system.
- (iv) The Contractor shall carry out the Works in such a manner as to minimize adverse impacts on the environment during execution of the Works.

#### **NOISE POLLUTION CONTROL**

##### **General Requirements**

- (i) The Contractor shall comply with and observe the Noise Control Ordinance and its subsidiary regulations in force in Hong Kong.
- (ii) The Contractor shall provide an approved integrating sound level meter to IEC 651: 1979 (Type 1) and 804 : 1985 (Type 1) and the manufacturer's recommended sound level calibrator for the exclusive use of the Engineer at all times. The Contractor shall maintain the equipment in proper working order and provide a substitute when the equipment are out of order or otherwise not available.
- (iii) The sound level meter including the sound level calibrator shall be verified by the manufacturers every two years to ensure they perform the same levels of accuracies as stated in the manufacturer's specifications. That is to say at the time of measurements, the equipment shall have been verified within the last two years.
- (iv) In addition to the requirements imposed by the Noise Control Ordinance, to control noise generated from equipment and activities for the purpose of carrying out any construction work other than percussive piling during the time period from 0700 to 1900 hours on any day not being a general holiday (including Sundays), the following requirements shall also be complied with : -

- (a) The noise level measured at 1m from the most affected external facade of any nearby noise sensitive receivers from the construction work alone during any 30 minute period shall not exceed an equivalent sound level (Leq) of 75 dB(A).
- (b) The noise level measured at 1m from the most affected external facade of any nearby schools from the construction work along during any 30 minute period shall not exceed an equivalent sound level (Leq) of 70dB(A) [65dB(A) during school examination periods].

The contractor shall liaise with the schools and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the Contract.

- (c) Should the limits stated in the above sub-clauses (a) and (b) be exceeded, the construction shall stop and shall not recommence until appropriate measures acceptable to the Engineer that are necessary for compliance have been implemented.

Any stoppage or reduction in output resulting from compliance with this clause shall not entitle the Contractor to any extension of time for completion or to any additional costs whatsoever.

- (v) Before the commencement of any work, the Engineer may require the methods of working, equipment and sound-reducing measures intended to be used on the Site to be made available for inspection and approval to ensure that they are suitable for the project.
- (vi) The Contractor shall devise, arrange methods of working and carry out the Works in such a manner so as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.
- (vii) The Contractor shall ensure that all plant and equipment to be used on Site are properly maintained in good operating condition and noisy construction activities shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means to avoid disturbance to any nearby noise sensitive receivers.
- (viii) Notwithstanding the requirements and limitations set out in clause (iv) above and subject to compliance with clauses (vi) and (vii) above, the Engineer may upon application in writing by the Contractor, allow the use of any equipment and the carrying out of any construction activities for any duration provided that he is satisfied with the application which, in his opinion, to be of absolute necessity and adequate noise insulation has been provided to the educational institutions to be affected, or of emergency nature, and not in contravention with the Noise Control Ordinance in any respect.
- (ix) No excavator-mounted breaker shall be used within 125m from any nearby noise sensitive

receivers. The Contractor shall use hydraulic concrete crusher whenever applicable.

- (x) The only equipment that shall be allowed on the site for rock drilling works will be quiet drilling rigs with a sound power level not exceeding 110dB(A). Conventional pneumatically driven drilling rigs are specifically prohibited.
- (xi) For the purposes of the above clauses, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, or performing arts centre or office building shall be considered a noise sensitive receiver.
- (xii) The Contractor shall, when necessary, apply as soon as possible for a construction noise permit in accordance with the Noise Control (General) Regulations, display the permit as required and copy to the Engineer.

#### **DUST SUPPRESSION MEASURES**

- (i) The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. The air pollution control system installed shall be operated whenever the plant is in operation.
- (ii) The Contractor shall at his own cost, and to the satisfaction of the Engineer, install effective dust suppression equipment and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver the concentration of air-borne dust shall not exceed 0.5 milligrams per cubic meter, at standard temperature (25<sup>B</sup>C) and pressure (1.0 bar) averaged over one hour, and 0.26 milligrams per cubic metre, at standard temperature (25<sup>B</sup>C) and pressure (1.0 bar) averaged over 24 hours.
- (iii) In the process of material handling, any material which has the potential to create dust shall be treated with water or sprayed with wetting agent.
- (iv) Where dusty materials are being discharged to vehicle from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust should be provided for this enclosure and vented to a fabric filter system.
- (v) Any vehicle with an open load carrying area used for moving materials which have the potential to create dust shall have properly fitting side and tail boards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.
- (vi) Any stockpile of dusty material shall be either:
  - (a) covered entirely by impervious sheeting;
  - (b) placed in an area sheltered on the top and three sides; or

- (c) sprayed with water or dust suppression chemical so as to maintain the entire surface wet.
- (vii) Implementation of mitigation measures under the Air Pollution Control (Construction Dust) Regulation where appropriate.
- (viii) The Contractor shall frequently clean and water the site to minimize the fugitive dust emissions.
- (ix) The Contractor shall restrict all motorized vehicles to a maximum speed of 8km per hour and confine haulage and delivery vehicles to designated roadways inside the site. Areas of roadway longer than 100m where movement of motorized vehicles exceeds 100 vehicular movements/day or as directed by the Engineer shall be furnished with a flexible pavement surfacing.
- (x) Wheel washing facilities shall be installed and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer prior to construction of the facility. Such wheel washing facility shall be usable prior to any earthworks excavation activity on the Site. The Contractor shall also provide a hard-surfaced road between washing facility and the public road.
- (xi) Conveyor belts shall be fitted with windboards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize emission of dust. All conveyors carrying materials which have the potential to create dust shall be totally enclosed and fitted with belt cleaners.

## **WATER POLLUTION CONTROL**

### **Discharge into Sewers and Drains**

- (i) The Contractor shall not discharge directly or indirectly (by runoff) or cause or permit or suffer to be discharged into any public sewer, storm-water drain, channel, stream-course or sea, any effluent or foul or contaminated water or cooling or hot water without the prior consent of the relevant Authority who may require the Contractor to provide, operate and maintain at the Contractor=s own expense, within the premises or otherwise, suitable works for the treatment and disposal of such effluent or foul or contaminated or cooling or hot water.
- (ii) If any office, site canteen or toilet facilities is erected, foul water effluent shall, subject to paragraph (I) above, be directed to a foul sewer or to a sewage treatment facility.
- (iii) The Contractor=s attention is drawn to the Building Ordinance, the Water Pollution Control Ordinance and the Technical Memorandum >Standard for Effluent Discharged

into Drainage and Sewerage Systems, Inland and Coastal Waters. = and ProPECC PN 1/94 A Construction Site Drainage.

## **WASTE MANAGEMENT**

### **General**

- (i) The Contractor is responsible for waste control within the Site, removal of waste materials produced from the Works and to implement any mitigation measures to minimise waste or to redress problems from waste arising from the Works. The waste may include any sewage, waste water or effluent containing sand, cement, silt or any other suspended solid or dissolved material to flow from the Works onto any adjoining land, storm water or foul water sewer, or any waste matter or surplus material or refuse to be deposited outside the Site or to be deposited permanently anywhere within the Works. The illegal 'fly-tipping' of any wastes or surpluses which may arise from the Works is strictly prohibited.
- (ii) The overall waste management strategy to be adopted involves minimisation of the waste generation, coupled with the maximum reuse and recycling of waste, where practicable, in accordance with the general principles of the waste management hierarchy.
- (iii) Unless otherwise stated in the Contract, all Construction and Demolition (C&D) Material arising from or in connection with the Works shall become the property of the Contractor. The Contractor shall promptly remove all sorted and processed materials not suitable for inclusion in the Works.
- (iv) The Contractor shall comply with the Waste Disposal Ordinance, the Dumping at Sea Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance and any other relevant legislation that may be brought into force when undertaking waste management.
- (v) The Contractor shall be responsible for obtaining the relevant license / permit, such as the effluent discharge licence, the chemical waste producer registration etc.

### **Removal of Waste Material**

- (i) The Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Site onto any adjoining land or allow any waste matter or refuse to be deposited anywhere within the Site or onto any adjoining land and shall have all such matter removed from the Site.
- (ii) The Contractor shall be liable for any damages caused to adjoining land through his failure to comply with sub-clause (i).
- (iii) The Contractor shall be responsible for temporary training; diverting or conducting of open streams or drains intercepted by any works and for reinstating these to their original courses

on completion of the Works.

- (iv) The Contractor shall be responsible for adequately maintaining any existing site drainage system at all times including removal of solids in sand traps, manholes and stream beds.
- (v) Any proposed stream course and nullah temporary diversions shall be submitted to the Engineer for agreement one month prior to such diversion works being commenced. Diversions shall be constructed to allow the water flow to discharge without overflow, erosion or washout. The area through which the temporary diversion runs is to be reinstated to its original condition or as agreed by the Engineer after the permanent drainage system has been completed.
- (vi) The Contractor shall furnish, for the Engineer's information, particulars of the Contractor's arrangements for ensuring that material from any earthworks does not wash into the drainage system. If at any time such arrangements prove to be ineffective, the Contractor shall take such additional measures as the Engineer shall deem necessary and shall remove all silt which may have accumulated in the drainage system whether within the Site or not.
- (vii) The Contractor shall segregate all inert construction waste material suitable for reclamation or land formation and shall dispose of such material at such dumping areas as may be specified from time to time by the Director of Civil Engineering.
- (viii) All non-inert construction waste material deemed unsuitable for reclamation or land formation and all other waste material shall be disposed of at a public landfill.
- (ix) The Contractor's attention is drawn to the Waste Disposal Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance. It shall be the Contractor's responsibility, at his own cost, to obtain all licences, permits and the like which may be necessary for compliance with the above or other ordinance.



**Appendix 1: Identified Sensitive Receivers**

| Receiver Reference | Sensitive Receiver Identification | Slant Distance from the Construction Work (m) | Description          |
|--------------------|-----------------------------------|-----------------------------------------------|----------------------|
| SR1-1              | Sea Crest Villa (Phase 3)         | 90                                            | Residential Building |
| SR1-2              |                                   | 66                                            |                      |
| SR1-3              |                                   | 60                                            |                      |
| SR2-1              | Sea Crest Villa (Phase 2)         | 146                                           |                      |
| SR2-2              |                                   | 166                                           |                      |

**Appendix 2A Maximum Noise Levels [dB(A)] at the Noise Sensitive Receivers without Mitigation Measures**

| Receivers Reference | Slant Distance | Noise Level without Mitigation, dB(A) |        |        |        |        |        |        |        |        |
|---------------------|----------------|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                     |                | Stage1                                | Stage2 | Stage3 | Stage4 | Stage5 | Stage6 | Stage7 | Stage8 | Stage9 |
| SR1-1               | 90             | 71                                    | 68     | 71     | 71     | 68     | 71     | 68     | 71     | 71     |
| SR1-2               | 62             | 74                                    | 71     | 74     | 75     | 71     | 75     | 71     | 74     | 75     |
| SR1-3               | 60             | 74                                    | 71     | 74     | 75     | 71     | 75     | 71     | 74     | 75     |
| SR2-1               | 146            | 67                                    | 64     | 67     | 67     | 64     | 67     | 64     | 67     | 67     |
| SR2-2               | 166            | 66                                    | 63     | 66     | 66     | 63     | 66     | 63     | 66     | 66     |

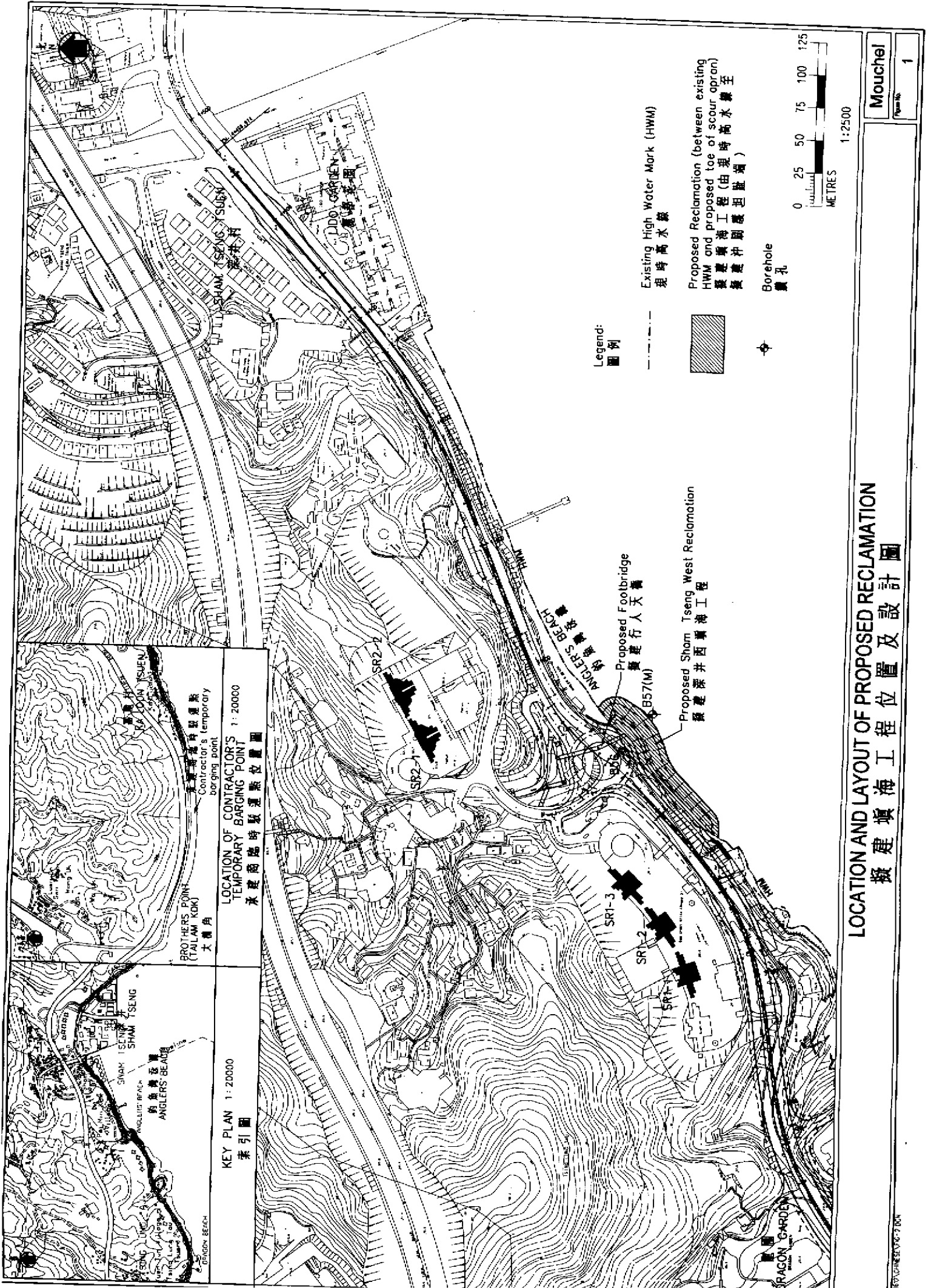
76 NSR exceeding 75dB(A) will require the application of mitigation measures

**Appendix 2B - Maximum Noise Level at Sensitive Receivers - Mitigation Measures Applied on Bored Piling\***

| Receivers Reference | Distance From Receivers |              | Noise Level, dB(A) |        |        |        |        |        |        |        |        |
|---------------------|-------------------------|--------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                     | Reclamation Site 1      | Bored Piling | Stage1             | Stage2 | Stage3 | Stage4 | Stage5 | Stage6 | Stage7 | Stage8 | Stage9 |
| SR1-1               | 90                      | 170          | 71                 | 68     | 71     | 71     | 68     | 71     | 68     | 71     | 71     |
| SR1-2               | 62                      | 126          | 74                 | 71     | 74     | 75     | 71     | 75     | 71     | 74     | 75     |
| SR1-3               | 60                      | 89           | 75                 | 72     | 75     | 75     | 72     | 75     | 72     | 75     | 75     |
| SR2-1               | 146                     | 98           | 68                 | 65     | 68     | 68     | 65     | 68     | 65     | 68     | 68     |
| SR2-2               | 166                     | 136          | 66                 | 64     | 66     | 67     | 64     | 67     | 64     | 66     | 67     |

**75** NSR exceeding noise standard criteria 75dB(A)

\* Assume Noise Barrier is Applied on Piling Activities [10 dB(A) Reduced]

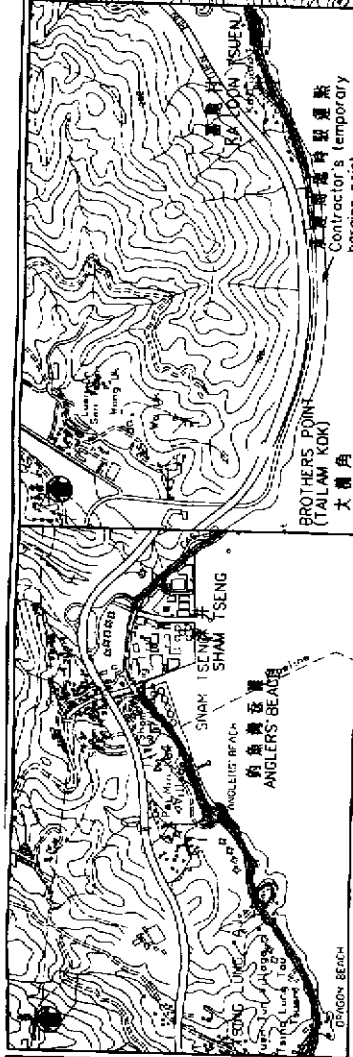
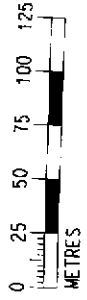


Legend:  
圖例

Existing High Water Mark (HWM)  
現時高水線

Proposed Reclamation (between existing HWM and proposed toe of scour apron)  
擬建填海工程 (由現時高水線至擬建沖刷護坦趾端)

Borehole  
鑽孔



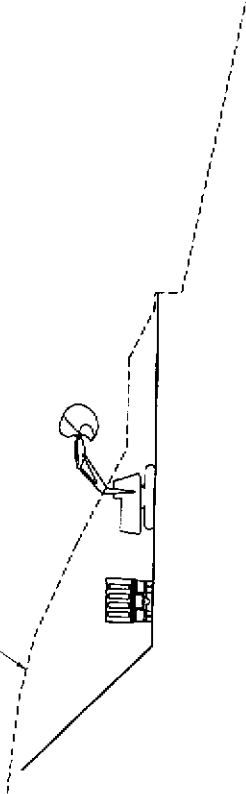
KEY PLAN 1:20000  
索引圖

LOCATION OF CONTRACTOR'S TEMPORARY BARGING POINT  
承建商臨時駁運點位置圖

Contractor's temporary barging point

LOCATION AND LAYOUT OF PROPOSED RECLAMATION  
擬建填海工程位置及設計圖

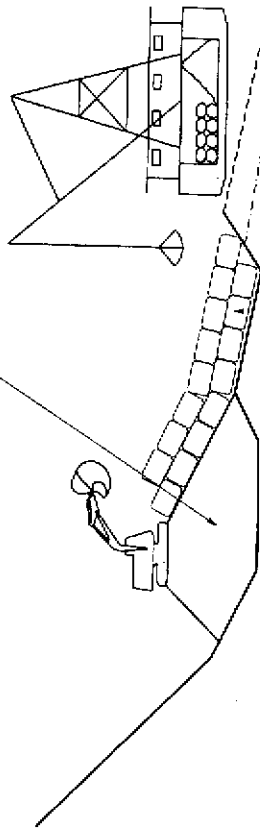
現時的土壤橫剖面  
EXISTING SOIL PROFILE



STAGE 1 - EXCAVATE EXISTING GROUND DOWN TO WORKING PLATFORM (+2m TPD HIGH TIDE LEVEL)  
第一階段 - 利用反鏟挖土機，將現有土地挖成工作平台 (主水平基準以上2米的潮高水平)

STAGE 1  
第一階段

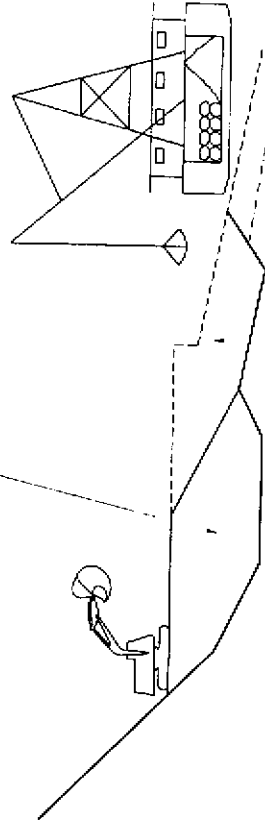
STAGE 4 - PLACE ROCKFILL INTO EXCAVATION BY END TIPPING/BACKHOE  
第四階段 - 利用末端裝卸式泥頭車/反鏟挖土機，將石塊卸入挖土範圍



STAGE 5 - PLACE ARMOUR INTO EXCAVATION FOR SCOUR APRON USING GRAB FROM DERRICK LIGHTER  
第五階段 - 利用吊臂管鏟船上的抓斗，將防禦物卸入裝卸坪的挖土範圍

STAGE 4 & 5  
第四及第五階段

STAGE 3 - EXCAVATE ABOUT 10m WIDTH OF WORKING PLATFORM (MEASURED ALONG RECLAMATION) USING BACKHOE  
第三階段 - 利用反鏟挖土機，將工作平台寬度至約10米闊 (沿填海區量度)



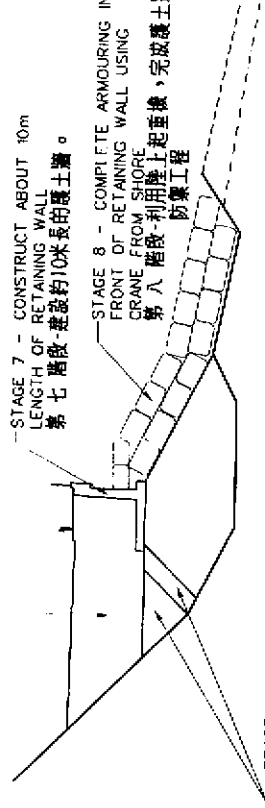
STAGE 2 - EXCAVATE BEACH AND SEABED DOWN TO UNDERSIDE OF SCOUR APRON LEVEL USING GRAB FROM DERRICK LIGHTER  
第二階段 - 利用吊臂管鏟船上的抓斗，將海床及海床挖至裝卸坪的底標水平

STAGE 2 & 3  
第二及第三階段

STAGE 9 - COMPLETE BACKFILLING BEHIND RETAINING WALL BY END TIPPING/BACKHOE  
第九階段 - 利用末端裝卸式泥頭車/反鏟挖土機，完成護土牆回填土工程

STAGE 7 - CONSTRUCT ABOUT 10m LENGTH OF RETAINING WALL  
第七階段 - 建設約10米長的護土牆。

STAGE 8 - COMPLETE ARMOURING IN FRONT OF RETAINING WALL USING CRANE FROM SHORE  
第八階段 - 利用岸上起重機，完成護土牆上的防禦工程



STAGE 6 - PLACE FILTER AND BACKFILL BEHIND ROCKFILL BY END TIPPING/BACKHOE  
第六階段 - 利用末端裝卸式泥頭車/反鏟挖土機，將濾水層及填土置於石塊上

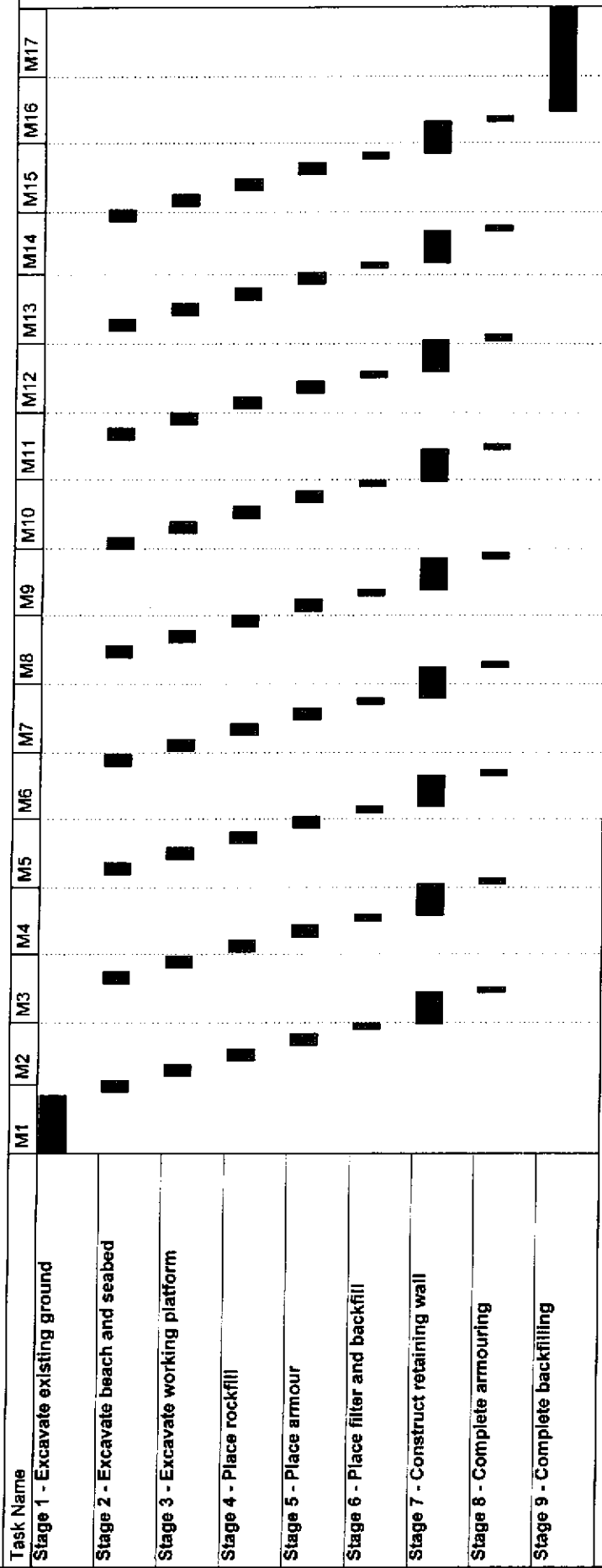
STAGE 6 TO 9  
第六至第九階段

ANTICIPATED CONSTRUCTION METHOD OF PROPOSED RECLAMATION  
建議填海區的預計建設方法

**Contract No. HY/99/18**

**Castle Peak Road Improvement between Sham Tseng and Ka Loon Tsuen, Tsuen Wan**

**Programme for Construction of Reclamation and Associated Seawall at Sham Tseng West**



REC-2.MPP

Figure 3



**DRILLHOLE RECORD**

HOLE NO. **B54**

CONTRACT NO. HY/97/11

SHEET 1 of 1

PROJECT **CASTLE PEAK ROAD IMPROVEMENT BETWEEN AREA 2 AND KA LOON TSUEN TSUEN WAN - SITE INVESTIGATION**

METHOD **IP + RO + RC**

CO-ORDINATES

W.O. NO. **W611**

MACHINE & No. **D2K70**

**E 823661.60  
N 824951.60**

DATE **11/07/98** to **13/07/98**

FLUSHING MEDIUM **WATER**

ORIENTATION **Vertical**

GROUND LEVEL **3.30** mPD

| Drilling Progress | Casing size | Water level (ml Shift start/end) | TCR% | SCR% | RCO% | FI  | Tests  | Samples        | Reduced Level | Depth (m) | Legend | Grade   | Description                                                                                                                                                                                                                                                       |
|-------------------|-------------|----------------------------------|------|------|------|-----|--------|----------------|---------------|-----------|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11/07/98          | PX          | DRY 07:30                        |      |      |      |     |        | INSPECTION PIT |               | 0.00      |        |         | Firm, grey (5Y 5/1) and brown (10YR 5/3), sandy, very clayey SILT with occasional angular, fine gravel of quartz. (COLLUVIUM)                                                                                                                                     |
| 11/07/98          | PX          |                                  |      |      |      |     |        |                |               | 0.40      |        |         |                                                                                                                                                                                                                                                                   |
| 11/07/98          | PX          |                                  |      |      |      |     |        |                |               | 0.90      |        |         |                                                                                                                                                                                                                                                                   |
| 11/07/98          | HX          |                                  | 0    |      |      |     |        |                | 1.30          | 1.40      |        |         |                                                                                                                                                                                                                                                                   |
| 11/07/98          | HX          |                                  |      |      |      | >20 |        |                | 1.50          | 1.65      |        | V/IV    | Extremely weak to weak, yellow (10YR 8/6), completely to highly decomposed, medium grained GRANITE. (Angular, fine to coarse GRAVEL of granite with some coarse sand)                                                                                             |
| 11/07/98          | HX          | 0.60m 19:30                      | 97   | 58   | 42   |     | T2-101 |                | 1.80          | 1.80      |        | III     | Moderately strong, brown, moderately decomposed, medium grained GRANITE with very closely spaced, rough planar, limonite stained joints, dipping 10° and 60° to 65°.                                                                                              |
| 13/07/98          |             | 1.20m 07:30                      |      |      |      | 4.9 |        |                | 0.84          | 2.46      |        | III/III | Moderately strong to strong, grey, spotted black, moderately to slightly decomposed, medium grained GRANITE with closely to medium spaced, rough planar, limonite stained joints, dipping 10° to 20°, 45° and subvertical from 4.47m to 4.79m and 7.70m to 7.95m. |
| 13/07/98          |             |                                  | 98   | 98   | 89   |     | T2-101 |                |               |           |        |         |                                                                                                                                                                                                                                                                   |
| 13/07/98          |             |                                  |      |      |      |     |        |                |               | 3.78      |        |         |                                                                                                                                                                                                                                                                   |
| 13/07/98          |             |                                  | 100  | 100  | 80   | 6.9 | T2-101 |                |               | 4.79      |        |         |                                                                                                                                                                                                                                                                   |
| 13/07/98          |             |                                  | 100  | 100  | 100  |     | T2-101 |                |               | 5.69      |        |         |                                                                                                                                                                                                                                                                   |
| 13/07/98          |             |                                  | 100  | 100  | 87   | 8.4 | T2-101 |                |               | 6.62      |        |         |                                                                                                                                                                                                                                                                   |
| 13/07/98          |             |                                  | 100  | 98   | 87   |     | T2-101 |                |               | 7.95      |        |         |                                                                                                                                                                                                                                                                   |
| 13/07/98          |             | 2.30m 19:30                      |      |      |      |     |        |                | -4.55         | 7.95      |        |         | End of drillhole at 7.95m                                                                                                                                                                                                                                         |

- SMALL DISTURBED SAMPLE
- PISTON SAMPLE
- U78 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZER SAMPLE
- SPT LINER SAMPLE
- WATER SAMPLE
- STANDARD PENETRATION TEST
- IN SITU VANE SHEAR TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- PACKER TEST
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED R.T.WU  
 DATE 15/07/1998  
 CHECKED M.DAVIDSON  
 DATE 15/07/1998

**REMARKS**  
 An inspection pit was excavated from 0.00m to 1.50m.  
 A water sample was taken at 2.30m  
 A falling head permeability test was carried out from 2.46m to 7.95m.  
 A standpipe piezometer was installed at 2.00m

**Figure 4a**



# DRILLHOLE RECORD

CONTRACT NO. HY/97/11

HOLE NO. **B56**

SHEET **1** of **2**

PROJECT **CASTLE PEAK ROAD IMPROVEMENT BETWEEN AREA 2 AND KA LOON TSUEN TSUEN WAN - SITE INVESTIGATION**

|                 |         |                            |          |                      |          |
|-----------------|---------|----------------------------|----------|----------------------|----------|
| METHOD          | RO + RC | CO-ORDINATES               | W.O. NO. | W611                 |          |
| MACHINE & No.   | D2K73   | E 823736.11<br>N 825029.78 | DATE     | 16/05/98 to 18/05/98 |          |
| FLUSHING MEDIUM | WATER   | ORIENTATION                | Vertical | GROUND LEVEL         | 3.21 mPD |

| Drilling Progress | Casing size | Water level (m) Shift start/end | TCR% | SCR% | RQD% | F1   | Tests                      | Samples | Reduced Level | Depth (m) | Legend | Grade  | Description                                                                                                                                                                                                                                                                                                                                     |                           |
|-------------------|-------------|---------------------------------|------|------|------|------|----------------------------|---------|---------------|-----------|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| 16/05/98<br>1     | PX          | DRY<br>07:30                    | 100  |      |      |      |                            | PX      |               | 0.98      | 0.98   | △      |                                                                                                                                                                                                                                                                                                                                                 | Grey (5YR 6/1), CONCRETE. |
|                   |             |                                 | 100  |      |      |      |                            | PX      |               | 0.50      | 0.50   | △      |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 | 100  |      |      |      |                            | PX      |               | 0.70      | 0.70   | △      |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 | 80   |      |      |      |                            | PX      |               | 1.00      | 1.00   | △      |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 | 93   |      |      |      |                            | PX      |               | 1.30      | 1.30   | △      |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 | 95   |      |      |      |                            | PX      |               | 1.50      | 1.50   | △      |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 2                 |             |                                 | 27   |      |      |      |                            | T2-101  |               |           | △      |        | Brown (7.5YR 5/2), angular, fine to coarse GRAVEL and COBBLES of granite, brick and concrete fragments. (FILL)                                                                                                                                                                                                                                  |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 3                 |             |                                 | 25   |      |      |      |                            | T2-101  |               | 3.00      |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 4                 | PX<br>HX    |                                 | 100  |      |      |      |                            |         | -0.19         | 3.40      |        | V      | Extremely weak, pale yellow (2.5Y 8/3), completely decomposed, medium grained GRANITE. (Slightly silty, fine to coarse SAND with some angular, fine gravel sized quartz)                                                                                                                                                                        |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 5                 | HX          |                                 |      |      |      |      | (5, 7, 9, 17, 25, 32) N=83 |         | -1.74         | 4.90      |        | III    | Moderately strong, brown, spotted white and black, moderately decomposed, medium grained GRANITE with closely to medium spaced, rough planar, limonite stained and chlorite coated joints, dipping 40° and 60°. (CORESTONE?)                                                                                                                    |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 6                 |             | 1.50m<br>19:30                  | 84   | 84   | 79   | N.A. |                            |         | -2.62         | 5.83      |        | V?     | 5.83 - 6.00m: No recovery assumed to be completely decomposed granite.<br>Moderately strong to strong, grey, spotted black, moderately to slightly decomposed, medium grained GRANITE with closely to medium spaced, rough planar and undulating, limonite stained joints, dipping 20° to 30°, 40° and 50° and subvertical from 9.60m to 9.86m. |                           |
|                   |             | 1.50m<br>07:30                  |      |      |      | N.R. |                            |         | -2.79         | 6.00      |        | III/II |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 7                 |             |                                 | 97   | 90   | 80   |      |                            |         |               | 7.44      |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 8                 |             |                                 | 100  | 100  | 100  |      |                            |         |               | 8.00      |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 9                 |             |                                 | 100  | 100  | 87   |      |                            |         |               | 8.80      |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
| 10                |             |                                 | 100  | 100  | 83   |      |                            |         |               | 9.16      |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 |      |      |      |      |                            |         |               |           |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |
|                   |             |                                 | 100  | 100  | 97   |      | 2.8                        |         |               | 9.90      |        |        |                                                                                                                                                                                                                                                                                                                                                 |                           |

- SMALL DISTURBED SAMPLE
- PISTON SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZER SAMPLE
- SPT LINER SAMPLE
- WATER SAMPLE
- STANDARD PENETRATION TEST
- IN SITU VANE SHEAR TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- PACKER TEST
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED R.T.WU  
 DATE 21/05/1998  
 CHECKED M.DAVIDSON  
 DATE 23/05/1998

REMARKS  
 A water sample was taken at 2.30m  
 A packer test was carried out from 5.50m to 8.50m.  
 An impression packer test was carried out from 5.00m to 6.60m, 6.00m to 7.50m and 7.00m to 8.50m.

Figure 4b





**DRILLHOLE RECORD**

CONTRACT NO. HY/97/11

HOLE NO. **B56**

SHEET **2** of **2**

PROJECT **CASTLE PEAK ROAD IMPROVEMENT BETWEEN AREA 2 AND KA LOON TSUEN TSUEN WAN - SITE INVESTIGATION**

|                 |         |              |                            |              |          |
|-----------------|---------|--------------|----------------------------|--------------|----------|
| METHOD          | RO + RC | CO-ORDINATES | E 823736.11<br>N 825029.78 | W.O. NO.     | W611     |
| MACHINE & No.   | D2K73   | DATE         | 16/05/98 to 18/05/98       | GROUND LEVEL | 3.21 mPD |
| FLUSHING MEDIUM | WATER   | ORIENTATION  | Vertical                   |              |          |

| Drilling Progress          | Casing size | Water level (m) Shift start/end | TCR% | SCR% | RCD% | FI  | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade  | Description                                                                                                                                                                                                                                   |
|----------------------------|-------------|---------------------------------|------|------|------|-----|-------|---------|---------------|-----------|--------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11                         |             |                                 | 100  | 100  | 100  |     |       | T2-101  | 7.11          | 10.32     | +      | III/II | Moderately strong to strong, brown and grey, spotted black, moderately to slightly decomposed, medium grained GRANITE with closely to medium spaced, rough planar and undulating, limonite stained joints, dipping 10° to 20° and 40° to 50°. |
|                            |             |                                 | 99   | 96   | 96   | 3.6 |       | T2-101  |               | 11.11     | +      |        |                                                                                                                                                                                                                                               |
| 12                         |             |                                 | 100  | 100  | 100  |     |       | T2-101  |               | 12.34     | +      |        |                                                                                                                                                                                                                                               |
| 13                         |             | 2.30m<br>19:30                  | 100  | 100  | 100  |     |       | T2-101  | 9.88          | 13.09     | +      |        |                                                                                                                                                                                                                                               |
| End of drillhole at 13.09m |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |
| 14                         |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |
| 15                         |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |
| 16                         |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |
| 17                         |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |
| 18                         |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |
| 19                         |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |
| 20                         |             |                                 |      |      |      |     |       |         |               |           |        |        |                                                                                                                                                                                                                                               |

- SMALL DISTURBED SAMPLE
- ▨ PISTON SAMPLE
- ▩ U76 UNDISTURBED SAMPLE
- ▧ U100 UNDISTURBED SAMPLE
- ▤ MAZIER SAMPLE
- ▥ SPT LINER SAMPLE
- △ WATER SAMPLE
- ↓ STANDARD PENETRATION TEST
- ∨ IN SITU VANE SHEAR TEST
- ⊥ PERMEABILITY TEST
- IMPRESSION PACKER TEST
- ◻ PACKER TEST
- ▲ PEZOMETER TIP
- ⊕ STANDPIPE TIP

LOGGED R.T.WU

DATE 21/05/1998

CHECKED M.DAVIDSON

DATE 23/05/1998

REMARKS

**Figure 4b**



# DRILLHOLE RECORD

CONTRACT NO. HY/97/11

HOLE NO. **B57(M)**

SHEET **1** of **2**

PROJECT **CASTLE PEAK ROAD IMPROVEMENT BETWEEN AREA 2 AND KA LOON TSUEN TSUEN WAN - SITE INVESTIGATION**

|               |         |                            |          |                      |
|---------------|---------|----------------------------|----------|----------------------|
| METHOD        | RO + RC | CO-ORDINATES               | W.O. NO. | W611                 |
| MACHINE & No. | CLAIRE  | E 823765.73<br>N 825008.33 | DATE     | 20/05/98 to 21/05/98 |

|                 |       |             |          |              |           |
|-----------------|-------|-------------|----------|--------------|-----------|
| FLUSHING MEDIUM | WATER | ORIENTATION | Vertical | GROUND LEVEL | -0.87 mPD |
|-----------------|-------|-------------|----------|--------------|-----------|

| Drilling Progress | Casing size | Water level (m) Shift start/end | TCR% | SCR% | RDD% | FI  | Tests                                   | Samples                    | Reduced Level | Depth (m)                                    | Legend | Grade | Description                                                                                                                                                                                             |
|-------------------|-------------|---------------------------------|------|------|------|-----|-----------------------------------------|----------------------------|---------------|----------------------------------------------|--------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                 | SX          | 1.00m<br>19:30                  | 100  |      |      |     | B=68<br>{1, 1, 1,<br>1, 1, 1}<br>N=4    | 1<br>2                     |               | 0.00<br>0.35<br>0.50                         |        |       | Very loose to loose, light grey (N 7/), medium to coarse SAND with some subangular to subrounded, fine to coarse gravel of quartz and granite fragments and occasional shell fragments. (BEACH DEPOSIT) |
| 2                 |             |                                 | 100  |      |      |     | B=35<br>{1, 2, 1,<br>2, 2, 2}<br>N=7    | 3<br>4<br>5<br>6<br>7      |               | 0.90<br>1.40<br>1.90<br>2.00<br>2.35<br>2.50 |        |       |                                                                                                                                                                                                         |
| 3                 |             |                                 |      |      |      |     |                                         |                            |               | 2.90<br>3.40                                 |        |       |                                                                                                                                                                                                         |
| 4                 |             | 1.90m<br>19:30                  |      |      |      |     |                                         |                            |               | 3.80<br>4.00                                 |        |       |                                                                                                                                                                                                         |
| 5                 |             | 2.00m<br>07:30                  | 100  |      |      |     | B=25<br>{1, 0, 1,<br>0, 1, 1}<br>N=3    | 8<br>9<br>10<br>11<br>12   |               | 4.35<br>4.45<br>4.50<br>4.90                 |        |       | Very loose, grey (N 6/), fine to coarse SAND with occasional angular, fine gravel of quartz and shell fragments. (MARINE DEPOSIT)                                                                       |
| 6                 |             |                                 |      |      |      |     |                                         |                            |               | 5.30<br>5.90<br>6.00                         |        |       |                                                                                                                                                                                                         |
| 7                 | SX<br>HX    |                                 |      |      |      |     | B=70<br>{2, 3, 3,<br>2, 2, 2}<br>N=9    | 13<br>14<br>15<br>16<br>17 |               | 6.35<br>6.45<br>6.50<br>6.90                 |        |       | Loose, yellow (2.5Y 8/8) and grey (2.5Y 6/1), medium to coarse SAND with some angular to subangular, fine to coarse gravel of granite fragments. (ALLUVIUM)                                             |
| 8                 |             |                                 | 90   |      |      |     |                                         |                            |               | 6.95<br>7.95                                 |        |       |                                                                                                                                                                                                         |
| 9                 |             |                                 | 80   |      |      |     | {16, 23,<br>26, 28,<br>32, 39}<br>N=125 | 18<br>19<br>20<br>21       |               | 8.05<br>8.45<br>8.95                         |        | V/IV  | Extremely weak to weak, reddish yellow (5YR 7/8), completely to highly decomposed, medium grained GRANITE. (Fine to coarse SAND with much angular, fine to coarse gravel sized granite fragments)       |
| 10                | HX          |                                 |      |      |      | 8.9 |                                         | 22<br>23                   |               | 9.70<br>9.86                                 |        | III   | Moderately strong, brownish yellow,                                                                                                                                                                     |

|                         |                           |
|-------------------------|---------------------------|
| SMALL DISTURBED SAMPLE  | STANDARD PENETRATION TEST |
| PISTON SAMPLE           | IN SITU VANE SHEAR TEST   |
| U76 UNDISTURBED SAMPLE  | PERMEABILITY TEST         |
| U100 UNDISTURBED SAMPLE | IMPRESSION PACKER TEST    |
| MAZER SAMPLE            | PACKER TEST               |
| SPT LINER SAMPLE        | PIEZOMETER TIP            |
| WATER SAMPLE            | STANDPIPE TIP             |

LOGGED **R.T.WU**

DATE **25/05/1998**

CHECKED **M.DAVIDSON**

DATE **01/06/1998**

REMARKS

**Figure 4c**



**DRILLHOLE RECORD**

CONTRACT NO. HY/97/11

HOLE NO. **B57(M)**

SHEET **2** of **2**

PROJECT **CASTLE PEAK ROAD IMPROVEMENT BETWEEN AREA 2 AND KA LOON TSUEN TSUEN WAN - SITE INVESTIGATION**

|                 |         |                            |              |                      |
|-----------------|---------|----------------------------|--------------|----------------------|
| METHOD          | RO + RC | CO-ORDINATES               | W.O. NO.     | W611                 |
| MACHINE & No.   | CLAIRE  | E 823765.73<br>N 825008.33 | DATE         | 20/05/98 to 21/05/98 |
| FLUSHING MEDIUM | WATER   | ORIENTATION Vertical       | GROUND LEVEL | -0.87 mPD            |

| Drilling Progress | Casing size | Water level (ml Shift start/end) | TCR% | SCR% | RQD% | FI     | Tests | Samples | Reduced Level | Depth (m) | Legend | Grade  | Description                                                                                                                                                                                                                                                                   |
|-------------------|-------------|----------------------------------|------|------|------|--------|-------|---------|---------------|-----------|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11                |             |                                  | 99   | 99   | 99   |        |       | T2-101  |               | 10.70     | ++++   |        | moderately decomposed, medium grained GRANITE with closely spaced, rough planar, limonite and manganese stained, locally kaolin coated joints, dipping 10° to 20°, 40° to 50° and subvertical from 10.10m to 10.70m.                                                          |
|                   |             |                                  | 95   | 76   | 47   |        |       | T2-101  |               | 11.44     |        |        |                                                                                                                                                                                                                                                                               |
| 12                |             |                                  | 100  | 100  | 100  | 8.1    |       | T2-101  | -12.57        | 11.70     | ++++   | III/II | Moderately strong to strong, pink and grey, locally brown, moderately to slightly decomposed, medium grained GRANITE with closely spaced, rough planar, limonite and manganese stained joints, dipping 20° to 30° and subvertical from 11.85m to 12.30m and 13.00m to 13.60m. |
|                   |             |                                  | 100  | 100  | 100  | T2-101 |       | 12.15   | 12.45         |           |        |        |                                                                                                                                                                                                                                                                               |
| 13                |             |                                  | 100  | 100  | 95   |        |       | T2-101  |               | 13.32     | ++++   |        |                                                                                                                                                                                                                                                                               |
|                   |             |                                  |      |      |      |        |       | T2-101  |               | 13.32     |        |        |                                                                                                                                                                                                                                                                               |
| 14                |             |                                  | 100  | 100  | 94   | 4.8    |       |         |               | 14.60     | ++++   |        |                                                                                                                                                                                                                                                                               |
|                   |             |                                  |      |      |      | T2-101 |       |         |               | 14.60     |        |        |                                                                                                                                                                                                                                                                               |
| 15<br>21/05/98    |             | 2.20m<br>19:30                   | 100  | 100  | 95   |        |       | T2-101  | -16.04        | 15.17     | ++++   |        | End of drillhole at 15.17m                                                                                                                                                                                                                                                    |
| 16                |             |                                  |      |      |      |        |       |         |               |           |        |        |                                                                                                                                                                                                                                                                               |
| 17                |             |                                  |      |      |      |        |       |         |               |           |        |        |                                                                                                                                                                                                                                                                               |
| 18                |             |                                  |      |      |      |        |       |         |               |           |        |        |                                                                                                                                                                                                                                                                               |
| 19                |             |                                  |      |      |      |        |       |         |               |           |        |        |                                                                                                                                                                                                                                                                               |
| 20                |             |                                  |      |      |      |        |       |         |               |           |        |        |                                                                                                                                                                                                                                                                               |

- SMALL DISTURBED SAMPLE
- PISTON SAMPLE
- 1/28 UNDISTURBED SAMPLE
- 1/100 UNDISTURBED SAMPLE
- MAZZER SAMPLE
- SPT LINER SAMPLE
- WATER SAMPLE
- STANDARD PENETRATION TEST
- IN SITU VANE SHEAR TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- PACKER TEST
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED R.T. WU

DATE 25/05/1998

CHECKED M. DAVIDSON

DATE 01/06/1998

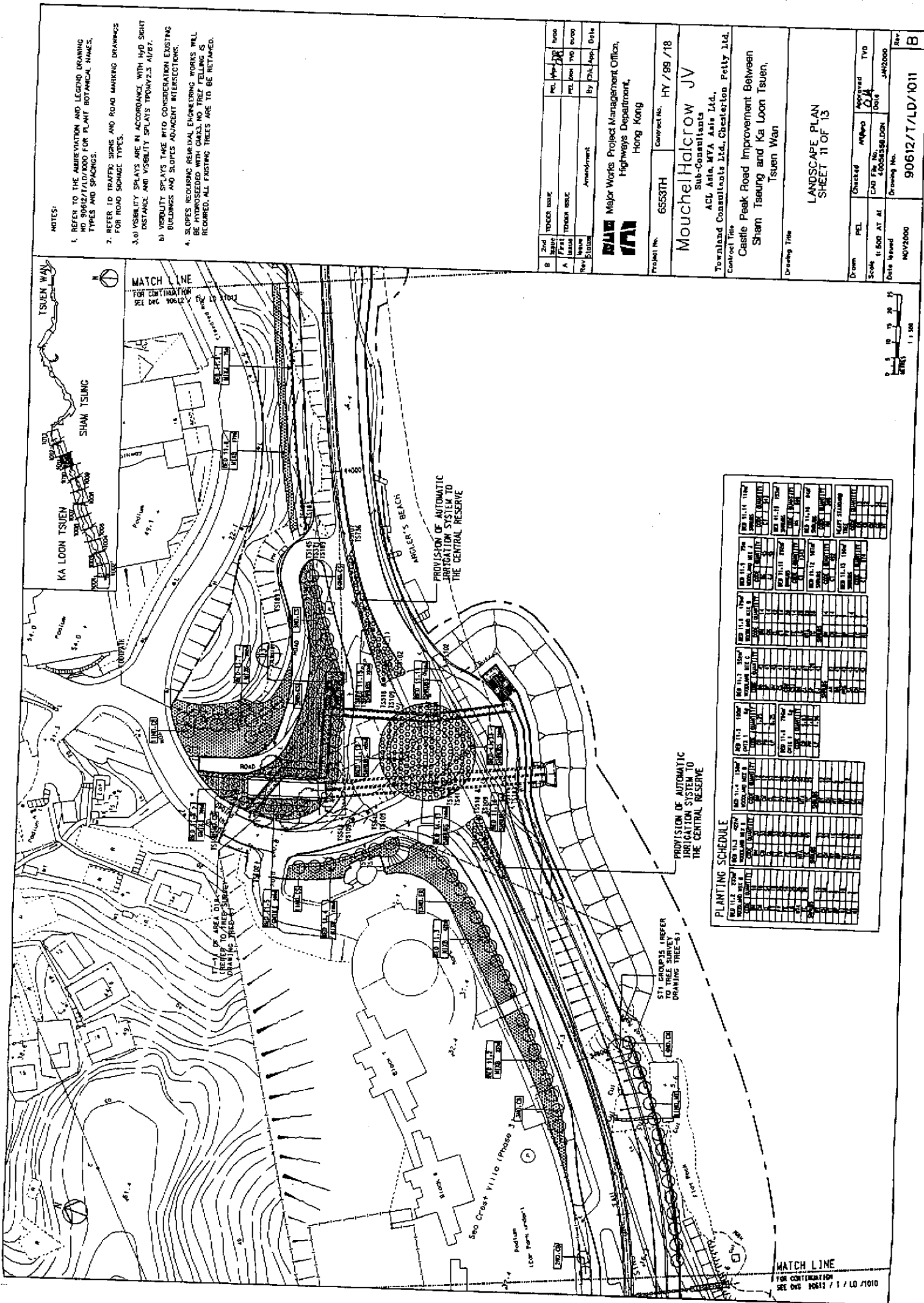
REMARKS

**Figure 4c**



**NOTES:**

1. REFER TO THE AMBIGUATION AND LEGEND DRAWING NO 90612/T/LD/00 FOR PLANT BOTANICAL NAMES, TYPES AND SPACINGS.
2. REFER TO TRAFFIC SIGNS AND ROAD MARKING DRAWINGS FOR ROAD SIGNAGE TYPES.
3. VISIBILITY SPLAYS ARE IN ACCORDANCE WITH HYD SIGHT DISTANCE AND VISIBILITY SPLAYS TPOHW2.3 A/B7.
4. VISIBILITY SPLAYS TAKE INTO CONSIDERATION EXISTING BUILDINGS AND SLOPES ADJACENT INTERSECTIONS.
5. SLOPES REQUIRING REMOVAL, ENGINEERING WORKS WILL BE HYDROSEEDED WITH GRASS. NO TREE FELLING IS REQUIRED. ALL EXISTING TREES ARE TO BE RETAINED.



**PLANTING SCHEDULE**

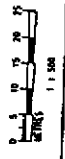
| Code   | Quantity | Plant Name | Remarks                               |
|--------|----------|------------|---------------------------------------|
| S11.1  | 10       | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.2  | 20       | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.3  | 15       | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.4  | 12       | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.5  | 8        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.6  | 5        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.7  | 3        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.8  | 2        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.9  | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.10 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.11 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.12 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.13 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.14 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.15 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.16 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.17 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.18 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.19 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |
| S11.20 | 1        | STY GROUPE | REFER TO TREE SURVIVAL DRAWING TREE-6 |

|             |             |              |                 |         |
|-------------|-------------|--------------|-----------------|---------|
| Drawn       | PEL         | Checked      | Approved        | TVD     |
| Scale       | 1:500 AT A1 | CAD File No. | 4/06/2006       | JAN2006 |
| Date Issued |             | Drawing No.  | 90612/T/LD/1011 | Rev     |
|             |             |              |                 | B       |

**MAJOR** Major Works Project Management Office,  
 Highways Department,  
 Hong Kong

Project No. 6553TH Contract No. HY / 99 / 18  
**MouchelHalcrow JV**  
 Sub-Contractors  
 ACL Asia, MVA Asia Ltd.,  
 Townland Consultants Ltd., Chesterlon Petty Ltd.  
 Contract Title  
 Castle Peak Road Improvement Between  
 Sham Tsuen and Ka Loon Tsuen,  
 Tsuen Wan

Drawing Title  
 LANDSCAPE PLAN  
 SHEET 11 OF 13



MATCH LINE  
FOR CONTINUATION  
SEE DWG 90612 / T / LD / 1010