

PROJECT PROFILE

1.0 BASIC INFORMATION

1.1 Project Title

Remaining Works Contract
Castle Peak Road Improvement West of Tsing Lung Tau
Construction of Reclamation West of Tsing Lung Tau.

1.2 Purpose and nature of the project

Castle Peak Road (CPR) comprises a two-lane single carriageway, with narrow footways at discrete locations, and is generally characterised 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 CPR Improvement works consist of upgrading the existing CPR 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.

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 the above, three elements of the project, comprising reclamations at Tsing Lung Tau, Sham Tseng West and Sham Tseng East, are designated works, for which the Director of Environmental Protection issued EP Nos. EP-093/2001, EP-094/2001 and EP-095/2001 in April 2001.

The project is currently under construction, and has been divided into three works contracts as detailed in Table 1 below.

Table 1: Details of Current Works Contracts

Contract No.	HY/99/18 (West)	HY/99/19 (Middle)	HY/2000/02 (East)
Location	Sham Tseng – Ka Loon Tsuen	Ting Kau – Sham Tseng	Area 2 – Ting Kau
Chainage	0+900 – 4+470	4+470 – 7+070	7+070 – 9+250
Length	3,130 ⁽¹⁾	2,220 ⁽²⁾	2,180
Start Date	November 2001	May 2002	August 2001
Approximate End Date ⁽³⁾	2005 Q4	2006 Q2	2005 Q1

Notes: (1) Excluding excised section of CPR for Route 10 (see below).

(2) Excluding existing dual carriageway in Sham Tseng.

(3) Including all anticipated EOT, but excluding landscape establishment works.

Prior to commencing Contract No. HY/99/18, a 440m long section of the proposed road improvement works, between Ch.1+800 and Ch.2+240, west of Tsing Lung Tau, was excised from this contract and entrusted to the Route 10 North Lantau to Yuen Long Highway project. This section of improvement works was located under the proposed Route 10 suspension bridge, and was to form part of the works area for the Route 10 project. However, the Route 10 project has since been placed under review, and thus this section of improvement works will now be implemented under the original CPR Improvement project, under a fourth Works contract.

The alignment of this remaining section of road improvement works is fixed by the alignment of the improved road currently under construction under Contract No. HY/99/18. At the west interface (Ch. 1+800), the alignment passes under a new cut slope, as shown in Photo No. 1, and at the east interface (Ch. 2+240), the alignment is supported by a new area of reclamation at Tsing Lung Tau (see below), as shown in Photo No. 2. The slope works and reclamation works at Tsing Lung Tau will be largely complete by the third quarter of 2005.

The reclamation West of Tsing Lung Tau is required to support part of the remaining section of road improvement works. The reclamation comprises two parts, including an area of reclamation east of Grand Bay Villa and an area of reclamation west of Grand Bay Villa. The reclamation is the minimum required for the roadworks (Figure 1). These two reclamations are considered to constitute a Material Change to the 1.7ha Tsing Lung Tau Reclamation, also shown on Figure 1, covered by Environmental Permit No. EP-093/2001, issued in 2001, with reference to Section 6 of the Technical Memorandum on Environmental Impact Assessment Ordinance (TM EIAO). The Environmental Permit EP-093/2001 was issued following the approval of the application to apply directly for an EP based upon the Project Profile.

1.3 Name of Project Proponent

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

1.4 Location and scale of project

The existing reclamation at Tsing Lung Tau is about 1.7 ha in area and a direct application for an Environmental Permit was approved in April 2001 (Environmental Permit No. EP-093/2001). The length of the reclamation, measured parallel to the road, is about 754 m, and the maximum width, measured from the existing High Water Mark (HWM) to the proposed toe of the scour apron is about 74 m, of which about 26 m is sloping revetment. This reclamation was completed in 2004.

It is proposed to increase the extent of the reclamation at Tsing Lung Tau by a total of 0.58ha, an increase which constitutes a material change to the originally approved project. The additional reclamation will be constructed in two distinct sections West of Tsing Lung Tau, in areas to the east and west of Grand Bay Villa. The location and layout of the proposed additional reclamation West of Tsing Lung Tau is shown in Figure 1. The two areas of the additional reclamation are described below.

The area of reclamation to the east of Grand Bay Villa is about 0.12 ha. The length of this part of the reclamation, measured parallel to the road, is about 107 m, and the maximum width, measured from the existing High Water Mark (HWM) to the proposed toe of the scour apron is about 16 m, of which about 13 m is sloping revetment.

The area of reclamation west of Grand Bay Villa is about 0.46 ha. The length of this part of the reclamation, measured parallel to the road, is about 172 m, and the maximum width, measured from the existing High Water Mark (HWM) to the proposed toe of the scour apron is about 38 m, of which about 15 m is sloping revetment.

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

According to the TM on Environmental Impact Assessment Ordinance, Section 6, the additional reclamation works of the remaining project constitutes a material change to the reclamation works at Tsing Lung Tau, a designated project for which an Environmental Permit (EP-093/2001) was granted in April 2001. While the total reclamation area will increase from 1.7 ha which is specified in EP-093/2001, to 2.28 ha in total, the additional reclamation area to be constructed is only 0.58ha.

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.

1.6 Name and telephone number of contact person(s)

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Kowloon, Hong Kong

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2.0 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 How will the project be planned and implemented

The Consultants (Mouchel Halcrow Joint Venture) for the CPR Improvement project will design and supervise the construction of the Reclamation west of Tsing Lung Tau for the Government of the HKSAR.

The reclamation at Tsing Lung Tau has been completed and as such, no further works are required in this area. The additional reclamation works will be constructed using marine and land-based plant. Excavated material will be deposited on the seashore and removed by truck for either reuse on site or public fill.

The anticipated construction method for the area of reclamation east of Grand Bay Villa is shown in Figure 2a. The construction stages are as follows:

- Stage 1 Construct temporary bund (+2mPD) using backhoe and/or grab dredger.
- Stage 2 Excavate existing ground down to underside of reclamation using backhoe.
- Stage 3 Place rockfill into excavation up to underside of retaining wall using end tipping and backhoe.
- Stage 4 Remove temporary bund and excavate existing ground down to underside of scour apron using backhoe and/or grab dredger.
- Stage 5 Place armour stone into excavation using backhoe and/or grab dredger.
- Stage 6 Construct reinforced concrete retaining wall.
- Stage 7 Place backfill behind retaining wall using end tipping and backhoe.
- Stage 8 Complete armour stone revetment using backhoe and/or grab dredger.

The anticipated construction method for the area of reclamation west of Grand Bay Villa is shown in Figure 2b. The construction stages are as follows:

- Stage 1 Excavate existing ground down to underside of reclamation / scour apron using backhoe and grab dredger.
- Stage 2 Construct temporary bund (+2mPD) using backhoe and/or grab dredger.
- Stage 3 Place rockfill into excavation upto underside of lower retaining wall using end tipping and backhoe and grab dredger.
- Stage 4 Place armour stone into excavation using backhoe.
- Stage 5 Construct lower reinforced concrete retaining wall.
- Stage 6 Place rockfill behind lower retaining wall upto underside of upper retaining wall using end tipping and backhoe.
- Stage 7 Complete armour stone revetment using backhoe and grab dredger.
- Stage 8 Construct upper reinforced concrete retaining wall.
- Stage 9 Place backfill behind retaining wall using end tipping and backhoe.
- Stage 10 Place topsoil and carry out landscape works on upper slope.

It is anticipated that up to three backhoes and one grab dredger may be working on the

area of reclamation east of Grand Bay Villa concurrently with up to five backhoes and one grab dredger on the area of reclamation west of Grand Bay Villa. The works for both additional reclamation areas will be undertaken concurrently.

2.2 What is the project timetable

It is anticipated that the construction of the remaining section of road improvement works will commence in the third quarter of 2005, following completion of all necessary statutory procedures under the Roads (Works, Use and Compensation) Ordinance and the Environmental Impact Assessment Ordinance and is scheduled to be completed in early 2007. It should be noted that, by the third quarter of 2005, the works associated with the west contract (HY/19/88), adjoining the remaining works area to the east and west will be largely complete (see Photograph 1).

The construction of the Reclamation west of Tsing Lung Tau will be carried within the above construction period for the remaining section of road improvement works. The anticipated construction duration for the area of reclamation east of Grand Bay Villa is as follows:

Stage 1	3 weeks
Stage 2	5 weeks
Stage 3	4 weeks
Stage 4	4 weeks
Stage 5	5 weeks
Stage 6	6 weeks
Stage 7	5 weeks
Stage 8	3 weeks
Total	35 weeks

The anticipated construction duration for the area of reclamation west of Grand Bay Villa is as follows:

Stage 1	7 weeks
Stage 2	6 weeks
Stage 3	4 weeks
Stage 4	6 weeks
Stage 5	7 weeks
Stage 6	8 weeks
Stage 7	3 weeks
Stage 8	7 weeks
Stage 9	4 weeks
Stage 10	3 weeks
Total	55 weeks

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

The construction of the additional reclamation areas form one element of the remaining section of roadworks. The programming of the reclamation works in relation to the overall project is described in Section 2.2 above. As the road works under Contract HY/99/18, immediately to the east and west of the section for the remaining works, will be largely complete before the Remaining Works commence, cumulative impacts associated with this designated element and the remainder of the road improvement works under HY/99/18 will not occur.

The reclamations required at Sham Tseng West and Sham Tseng East, as part of the Castle Peak Road Improvement works have been completed. Also, as mentioned previously, the main element of this designated project, the reclamation at Tsing Lung Tau, has also been completed. In addition, no other reclamation projects in the general vicinity of this designated project are on-going at the same time. Therefore, the only major construction works on-going during the same period as the additional reclamation works will be the road improvement of the remaining works itself which may lead to cumulative noise impacts.

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 a combination of high-rise and low-rise in nature. The sensitive facades of these properties mostly face seawards and towards the proposed construction works. Four representative noise sensitive receivers have been identified within 300m of the proposed additional reclamation works at West of Tsing Lung Tau. The locations of the representative noise sensitive receivers (NSRs) are shown on Figure 3 and details of the NSRs are provided in Table 2 below.

Table 2: Identified Representative Noise Sensitive Receivers

NSR ID	NSR Identification	Land Use	Minimum Slant Distance from construction site (m)	
			West of GBV	East of GBV
SR1	Bayside Villas	Residential	205	501*
SR2	Grand Bay Villa [#]	Residential	26	89
SR3	Hong Kong Garden – Woodland Heights	Residential	343*	163
SR4	Hong Kong Garden – Savoy Heights	Residential	381*	143

* The distance between NSRs and construction activities are over 300m, no significant noise impact is expected from this element of the works and will not be included in the noise assessment for the particular sensitive receiver.

Grand Bay Villa is currently unoccupied but the noise impacts have been assessed.

As the works at Tsing Lung Tau reclamation have been completed, no impacts will occur from this section of the project. As such, only the sensitive receivers within 300m of the Reclamation West of Tsing Lung Tau have been identified. With the exception of Hong Kong Garden, the sensitive receivers relevant to the original Tsing Lung Tau reclamation (Lung Tang Court, Tsing Lung Tau Village, Dragon villa, Villa Alfa Vista and Victoria Valerie's Court) will not be subject to any potential additional impacts as a result of the material change to the project due to the increased distance to the additional reclamation works. In respect of Hong Kong Garden, while cumulative impacts from the original and additional reclamations will not occur, this property has the potential to be further affected by noise. In addition, Bayside Villas and Grand Bay Villa, not previously affected by the original reclamation, may be affected by the additional works and as such the potential impacts at these properties have been assessed in Section 4.

The existing major noise sources in this area are the construction noise due to the road improvement as mentioned in Section 1 and 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 the Environmental Monitoring and Audit programme for the road improvement project in

October 2004¹. The results indicate that the average daytime noise level $L_{eq(1-hour)}$ at Regent Heights of Hong Kong Garden is 67.0 dB(A).

Air Quality

Air quality sensitive receivers are the same as for noise above and again the additional reclamation works will not result in any of the original sensitive receivers being subject to additional impacts, with the potential exception of Hong Kong Garden. However, 2 sensitive receivers, not previously affected will be sensitive to potential impacts. The closest baseline levels available, for Total Suspended Particulates (TSP) was obtained at Regent Heights of Hong Kong Garden as part of the EM&A programme for the road improvement project as above. No exceedances of the Air Quality Objectives (AQO) were recorded and the mean of the 24-hour average TSP level was $129.6 \mu\text{g m}^{-3}$, which are well within 24-hour average AQO for TSP ($260 \mu\text{g m}^{-3}$). This indicates a relatively low background dust level at the project area 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 Wan² (Monitoring Station WM4). Depth-averaged Dissolved Oxygen (DO) for 1998 and 2001 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 3.9 mg/L to 7.5 mg/L with an average of 5.8 mg/L. Bottom DO ranged between 2.2 to 7.4 mg/L with an average of 5.4 mg/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 5.9 to 40.2 mg/L with an average concentration of 15.1 mg/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.

The bacteriological quality deteriorated after the commissioning of the Harbour Area Treatment Scheme (HATS) Stage I in 2002. The *E.coli* at Ma Wan monitoring station has sharply increased since 2002 and reached a record high level in 2002 ($1100 \text{ cfu}/100\text{ml}$)².

The additional reclamation works have the potential to result in loss of sediment to the water column. However, as the reclamation at Tsing Lung Tau has already been completed, there will be no cumulative impacts from the original and new elements of reclamation being constructed simultaneously.

1 Maeda Corporation (October 2004), *Castle Peak Road Improvement Between Sham Tseng and Ka Loon Tsuen, Tsuen Wan West Contract No. HY/99/18, Monthly Environmental Monitoring and Audit Report, Second Issue.*

2 EPD (2002) *Marine Water Quality in Hong Kong*

Ecology

Intertidal Ecology

A coarse sandy beach environment and boulder are present within the project area. The boulder coastline is a typical sheltered rocky shore with little exposure to strong-waves. Subtidal sediments are sandy in nature, as shown by the borehole logs provided in Figures 4a to 4d.

Field survey was undertaken to supplement and update the data collected through the literature review. Areas of ecological interest that would be directly or indirectly affected by the proposed project were surveyed by a marine ecology team.

Quantitative field survey was conducted on 3 November 2004 covering the natural coastline to identify the species composition. The survey design involved sampling throughout the intertidal zones so that the vertical range (0.6 mCD – 1.5 mCD) of all species was represented. A 10 m horizontal transect was laid at the selected height and 10 quadrats (0.5 × 0.5 m²) were placed randomly along the transect to assess the abundance and distribution of intertidal fauna. All fauna found in each quadrat were counted and identified to species level (or to genus level as appropriate).

The field survey indicated that the assemblages were of sheltered shore communities with high quantities of Periwinkle *Nodilittorina radiata* dominating the upper shore. The dominant fauna on the lower shore was Common Topshell *Monodonta labia* while the mid shore was dominant by Limpets *Cellana sp.* Other intertidal species recorded including Goose-neck Barnacle *Pollicipes nitella*, Shore crabs *Hemigrapsus sanguineus* and *Sphaerozium nitidus*, Hermit crab, Common Whelk *Thais sp.*, Rock Oyster *Saccostrea cucullata*, Smooth Limpet *Notoacmaea sp.*, False Limpet *Siphonaria sp.* and Sea Anemone *Haliplanella lineata*. The findings of the intertidal survey concur with the findings of the Feasibility Study EIA.

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 coastal grasses, occasional coastal scrub bushes and some mature trees.

No rare species were recorded in the present field survey or other previous surveys of similar habitats near the project area (Agreement No. CE 82/97; Agreement No. CE 88/98). The Route 10 EIA also concluded that the communities in Tsing Lung Tau are common in Hong Kong and the high levels of human disturbance signify that it is unlikely that the habitat could develop conservation interest.³

Based on the Annexes 8 and 16 of the EIAO-TM, the potential ecological value of the coastline habitats within the project area is considered as low. The intertidal fauna survey report is included in Appendix A.

Sub-tidal Marine Ecology

Other nearby areas along the coast of Mainland China also have similar assemblages of marine organisms. This suggests that these areas along the Lantau coast are not

3 Mott Connell Ltd (September 1999), Route 10 – North Lantau to Yuen Lung Highway, Investigation and Preliminary Design Assignment, EIA Final Assessment Report.

unique to Hong Kong. One such area already located and surveyed is the southern end of Hai Ling Island in Bei Luo Wan (Oceanway 2004a). This area is approximately 200km south of Hong Kong, and has a similar mix of estuarine (low salinity) and marine (higher salinity) water. It is the Feng Tau Luo River outflow near Hai Ling Island that provides the fresh water component for this area. All species located in the Hai Ling survey were also recorded in the Castle Peak Survey. The one major difference between the two areas is the visibility. Castle Peak has a very high turbidity and a low visibility, Hai Ling averages 5~10m visibility all year round. This suggests that these communities are also not unique to the turbid waters of the Lantau coast.

A seabed survey was also undertaken at the area of proposed reclamation (Full Dive Survey Report is enclosed in Appendix B). The habitats recorded in these survey areas are typical of the Urmston Road (channel) area. Three main habitats are present; rocky shores, sand and mud. The survey data shows that between 20%~25% consist of hard substratum, the remainder (75%~80%) being soft substrate. Of the soft substratum, about 50% consists of mud.

Unlike areas in the eastern waters, the mud areas of Urmston Road are devoid of soft corals. The reasons for this are not confirmed but may be due to the total lack of any scattered rocks in the mud areas. These areas are, therefore, considered to be of low ecological value.

Fisheries

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 Chau⁴. The fisheries resources were significantly affected by seasonal factors and the most common species being *Charybdis* sp., *Johnius macrorhynchus*, *Metapenaeus affinis*, *Leiognathus brevirostris*, *Platycephalus indicus*, *Oxyurichthys tentacularis*, *Turritella terebra*, *Murex trapa*, and *Oratosquilla* sp.. 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 at east of Grand Bay Villa comprises gently sloping vegetated slopes on both the landward and seaward side of the existing road and small stretches of beach. Shrubland and grassland are located at the seaward verge of the existing road. A small sand beach is located along the proposed additional reclamation.

A large shortcreted slope is located adjacent to the West of Grand Bay Villa. Similar to the east side, the area west of the shortcreted slope is shrubland and grassland at the seaward verge of the existing road. In addition, a small sand beach is located at the proposed reclamation area with a rocky shore at both ends.

Residents in this area have uninterrupted views of the sea and views from the sea will

4 Meinhardt Mouchel Limited (2004) *Environmental Monitoring and Audit for Contaminated Mud Pit IV at East of Sha Chau, Second Annual Report*.

be able to see the residential blocks and the vegetated hillside, with a low lying revetment for the existing road running along the coastline.

Marine Archaeology

Two separate Marine Archaeological Investigations have been undertaken in the study area in recent years. These comprise:

1. Marine Archaeological Investigation, Castle Peak Road Improvement between Area 2 and Ka Loon Tsuen, Tsuen Wan, Construction of Reclamation and associated Seawall at Tsing Lung Tau and Sham Tseng, by SDA Marine for AMO, June 2001 (Castle Peak Road MAI); and
2. Route 10 – North Lantau to Yuen Long Highway, North Lantau to Tsing Lung Tau Section, Design and Construction Assignment, Marine Archaeological Investigation, Final Report, by SDA Marine for Maunsell Consultants Asia Ltd, December 2001 (Route 10 MAI).

Both investigations included a baseline review; marine Geophysical Survey; establishing the archaeological potential of the area; visual diver survey and preparation of a MAI report. The areas covered by the above Marine Archaeological Investigations are shown in Figure 5, in relation to the scope of this designated project. Figure 5 shows that the Castle Peak Road MAI covered the whole of the large Tsing Lung Tau reclamation which has already been constructed under EP-093/2001. The Route 10 MAI also covered a large part of the study area, including the proposed reclamation west of Grand Bay Villa. However, the proposed reclamation located east of Grand Bay Villa has not been completely covered by the previous studies.

Both MAI's undertook a baseline review of the archaeological potential in the study area and in both cases concluded that based upon the large maritime activity in the study area associated with historical trade and piracy, the archaeological potential of the study area was high. However, as the formation of archaeological sites underwater is mainly due to shipwrecks and these are random events it is difficult to predict their exact location. As such a combination of geophysical survey and visual diver survey were undertaken.

The Route 10 MAI geophysical survey identified some 14 seabed anomalies in the areas and the subsequent diver inspection showed all of these anomalies to be either of modern anthropogenic origin or natural in the form of rocks. The CPR MAI revealed three seabed anomalies at Tsing Lung Tau and again, diver inspection showed these to be either of modern anthropogenic origin or natural in the form of rocks.

Both MAI's concluded that there was nothing on the seabed with archaeological potential and that there were no archaeological resources within the study area. As such, no mitigation was deemed to be required.

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

The reclamation at Tsing Lung Tau (EP-093/2001) was completed in 2004. The environmental issues relating to that reclamation have been addressed in Project Profile *Castle Peak Road Improvement between Sham Tseng and Ka Loon Tsuen, Tsuen Wan, Construction of Reclamation and Associated Seawall at Tsing Lung Tau* (DIR 049/2001). Therefore, this project profile will mainly focus on the material change to this EP and the potential environmental impact arising from the proposed additional reclamation construction only.

As described in Section 2.1, the reclamation west of Tsing Lung Tau will be constructed in two parts and in several different stages with mechanical equipment being used at all stages. This will result in a potential for noise during the whole process.

However, only stages 1 to 4 during construction at east of Grand Bay Villa and stages 1 and 2 at west of Grand Bay Villa have the potential to disturb the seabed which could influence water quality, marine ecology and marine archaeology. The existing beach and seabed under the reclamation will require excavating to a maximum depth of approximately –5 mPD, with about 11,000 m³ and 23,000 m³ of material, at the proposed additional reclamation area east and west of Grand Bay Villa respectively, being removed. It is anticipated that the excavation rate will be less than 1,000 m³ and 2000 m³ of material per day respectively.

The excavated material will likely be removed by truck for subsequent transport to Area 38, Tsuen Mun (see Figure 1 for the location). The material is of high quality and suitable for reuse as backfill elsewhere 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 8 and 10 stages during the reclamation construction at the two areas respectively, as described in Section 2.1.

The equipment which will be required for the construction operations during each of these stages is listed in Tables 3 and 4 below for the reclamation East of Grand Bay Villa and Reclamation West of Grand Bay Villa respectively.

Table 3 Predicted Sound Power Levels (SWL) for Each Construction Activities at Reclamation East of Grand Bay Villa

Construction Stage	Equipment	CNP Equipment Code	Number of Equipment	SWL in dB(A)*	Total SWL in dB(A)*
Stage 1	Grab Dredger	CNP 063	1	112	120.5
	Excavator (Backhoe)	CNP 081	3	112	
	Lorry	CNP 141	3	112	
Stage 2	Excavator (Backhoe)	CNP 081	3	112	119.8
	Lorry	CNP 141	3	112	
Stage 3	Excavator (Backhoe)	CNP 081	3	112	119.8
	Lorry	CNP 141	3	112	
Stage 4	Grab Dredger	CNP 063	1	112	120.5
	Excavator (Backhoe)	CNP 081	3	112	
	Lorry	CNP 141	3	112	
Stage 5	Grab Dredger	CNP 063	1	112	120.5
	Excavator (Backhoe)	CNP 081	3	112	
	Lorry	CNP 141	3	112	
Stage 6	Concrete Lorry	CNP 044	1	109	115.8
	Concrete Pump	CNP 047	1	109	
	Concrete Poker	CNP 170	1	113	
	Air Compressor	CNP 003	1	104	
Stage 7	Excavator (Backhoe)	CNP 081	3	112	120.6
	Lorry	CNP 141	3	112	
	Roller	CNP186	3	108	
Stage 8	Grab Dredger	CNP 063	1	112	120.5
	Excavator (Backhoe)	CNP 081	3	112	
	Lorry	CNP 141	3	112	

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

Table 4 Predicted Sound Power Levels (SWL) for Each Construction Activities at Reclamation West of Grand Bay Villa

Construction Stage	Equipment	CNP Equipment Code	Number of Equipment	SWL in dB(A)*	Total SWL in dB(A)*
Stage 1	Grab Dredger	CNP 063	1	112	122.4
	Excavator (Backhoe)	CNP 081	5	112	
	Lorry	CNP 141	5	112	
Stage 2	Grab Dredger	CNP 063	1	112	122.4
	Excavator (Backhoe)	CNP 081	5	112	
	Lorry	CNP 141	5	112	
Stage 3	Excavator (Backhoe)	CNP 081	5	112	122.0
	Lorry	CNP 141	5	112	

Construction Stage	Equipment	CNP Equipment Code	Number of Equipment	SWL in dB(A)*	Total SWL in dB(A)*
Stage 4	Grab Dredger	CNP 063	1	112	122.4
	Excavator (Backhoe)	CNP 081	5	112	
	Lorry	CNP 141	5	112	
Stage 5	Concrete Lorry	CNP 044	1	109	115.8
	Concrete Pump	CNP 047	1	109	
	Concrete Poker	CNP 170	1	113	
	Air Compressor	CNP 003	1	104	
Stage 6	Excavator (Backhoe)	CNP 081	5	112	122.0
	Lorry	CNP 141	5	112	
Stage 7	Grab Dredger	CNP 063	1	112	122.4
	Excavator (Backhoe)	CNP 081	5	112	
	Lorry	CNP 141	5	112	
Stage 8	Concrete Lorry	CNP 044	1	109	115.8
	Concrete Pump	CNP 047	1	109	
	Concrete Poker	CNP 170	1	113	
	Air Compressor	CNP 003	1	104	
Stage 9	Excavator (Backhoe)	CNP 081	5	112	122.8
	Lorry	CNP 141	5	112	
	Roller	CNP186	5	108	
Stage 10	Dumper	CNP 066	1	106	119.2
	Lorry	CNP 141	5	112	

* 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*. Since more than one item will be used for some of the equipment (e.g. three excavators in construction stage 1 at East of Grand Bay Villa), the equipment is assumed to be evenly distributed over the construction area and the slant distance between each piece of equipment and the sensitive receivers are specified in Appendix C.

The details of the predicted unmitigated noise levels at the representative NSRs during the construction at each reclamation area are shown in Appendix D. Noise calculations have been based on the assumption that all the identified NSRs are 1 storey in height and without screening effect, which is expected to represent the worst case for the representative noise sensitive receivers. The calculations also assume that only the specified construction activity is being undertaken at one reclamation area at any one time and no other road works are being carried out concurrently. In addition, construction is assumed to be carried out during daytime only and not including Sunday and public holidays.

The results indicate that predicted noise levels at all receivers, except SR2 (Grand Bay Villa), are well below the noise criteria. However, SR2 (Grand Bay Villa), which is located between two reclamation areas, will exceed the daytime noise criteria of 75dB(A) during all stages of construction at reclamation west of Grand Bay Villa, with a maximum predicted noise level of up to 84.5 dB(A). Based on the assumption

that no other construction works will occur concurrently, no exceedence is predicted at all sensitive receivers during the reclamation works at east of Grand Bay Villa. Based upon these results, noise mitigation measures will be necessary at SR2 (should this be subsequently occupied) during construction of the reclamation at west of Tsing Lung Tau in order to reduce the noise to acceptable levels.

Cumulative Noise Impact

As noted in Section 2.1 above, it is likely that the construction of the two reclamation areas would be carried out at the same time for all stages of the works and as such, cumulative noise impacts will occur. In addition, a bored pile retaining wall is required on the north side of the Castle Peak Road to retain the hillside above the widened road. Construction for this will also be in the same period, which will also contribute to the cumulative noise impact. The location of the bored pile retaining wall is shown in Figure 1.

The road construction works at either side at the study area of remaining project under Contract HY/99/18, will be generally completed by the third quarter of 2005, before the remaining works commence. As such, the noise contribution from the minor works in the adjacent areas will not be significant. Therefore, the noise from the construction sites of other Castle Peak Road Improvement works is considered not significant and will not contribute to any cumulative noise impact.

Operations that may generate adverse noise impacts from Bored Pile Retaining Wall (BPRW) construction can be broadly divided into 3 stages. The equipment which will be required for the construction operations during each of these stages is listed in Table 5 below:

Table 5 Predicted Sound Power Levels (SWL) for Each Construction Activities During Bored Pile Retaining Wall Construction

Construction Stage	Equipment	CNP Equipment Code	Number of Equipment	SWL in dB(A)*	Total SWL in dB(A)*
Stage 1	Mobile Crane	CNP 048	2	112	118.0
	Lorry	CNP 141	2	112	
Stage 2	Reverse Circulation Drill	CNP166	4	100	121.2
	Excavator (Backhoe)	CNP 081	4	112	
	Lorry	CNP 141	4	112	
Stage 3	Oscillator	CNP165	1	115	118.2
	Air Compressor	CNP003	1	104	
	Mobile Crane	CNP048	1	112	
	Concrete Lorry	CNP044	1	109	
	Concrete Pump	CNP047	1	109	

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

The worst case scenario in this respect is that the noisiest equipment will be operating at the same time at all three working areas (both reclamations plus the BPRW). The slant distances between the NSRs and power mechanical equipment and the predicted noise level during bore pile retaining wall construction are presented in Appendix E.

The result shown in Appendix G indicates that the unmitigated cumulative noise levels at SR2 will exceed the 75dB(A) noise criteria during construction for all areas carried out simultaneously, with a predicted maximum noise level of 86.0 dB(A) in the worst case. As the overall noise levels generated from three working areas, noise mitigation measures may be required at all three working areas to reduce the noise impacts to an acceptable level.

Air Quality

Material will be excavated at the start of the proposed works and loaded into 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 $132 \mu\text{g m}^{-3}$ and $128 \mu\text{g m}^{-3}$ at Hong Kong Gardens and Lung Tang Court respectively, based upon the mitigation measures highlighted in Section 5.4. These levels are well within the 24-hour average AQO for TSP of $260 \mu\text{g m}^{-3}$. The TSP monitoring result of the EM&A programme at Tsing Lung Tau as described in Section 3.1 is generally consistent with the prediction in Feasibility Study EIA.

The Feasibility Study EIA predictions included the reclamation at Tsing Lung Tau 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. While the remaining project was not included in the Feasibility Study EIA, the larger reclamation works at Tsing Lung Tau were. As no cumulative impacts were predicted for the 1.7 ha Tsing Lung Tau reclamation, cumulative impacts from the additional reclamation at west of Tsing Lung Tau, totally 0.58 ha, are also not expected, noting that the works at Tsing Lung Tau have been completed.

Marine Water Quality

The construction and removal of the temporary bund and excavation of the ground down to the underside of the scour apron (Stages 1 and 4) are considered as the greatest potential impact to marine water quality during the construction at east of Grand Bay Villa. Meanwhile, the greatest potential impact to marine water quality

during the reclamation at west of Grand Bay Villa is likely to occur during excavation of the ground down to the underside of the scour apron and placing of rockfill up to the underside of the lower retaining wall (Stages 1 and 2).

During the construction, 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.

However, a geotechnical borehole survey has shown that the sediment in the area is granular in nature. A total of 59 boreholes were drilled in the vicinity of the proposed reclamation and all were found to be composed of sandy material, indicating that the areas to be dredged will be composed of similar deposits. Examples of four of these boreholes (RT34, RT35, RT57 and RT58) are shown in Figures 4a to 4d 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.

Potential 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, cumulative construction activities occurring are not predicted. The key issue in respect of marine water quality is any increase in suspended solids in the water column and it is likely that retaining wall works associated with the road improvements in the vicinity of the reclamation, which could lead to high suspended solids site runoff, will be undertaken concurrently with the excavation for the reclamation. However, Feasibility Study EIA 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 Feasibility EIA report also stated that the reclamation works (Tsing Lung Tau reclamation) 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 much smaller additional reclamations and other works associated with the road improvement, being conducted concurrently are not predicted to be significant.

No other major reclamation projects in this area of Hong Kong waters is identified, therefore, the potential for cumulative impacts is considered not significant.

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 truck for

transfer to Area 38, Tsuen Mun (see Figure 1 for the location) and ultimate reuse by an alternative project. 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 as far as possible. In addition, as detailed in the boreholes in Figures 4a – 4d, 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

Intertidal Ecology

Construction of the reclamation will initially result in the loss of some 279 m of upper to mid shore habitat which is colonised by Periwinkle and Limpet. Rocky outcrops and existing revetment habitats of the Common Topshell will also be lost. This is in addition to the 725m of beach habitat lost at Tsing Lung Tau.

However, as at Tsing Lung Tau, 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 sections of the revetment that are within the tidal range 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 to 3 years to complete.

For the completed reclamation in Tsing Lung Tau, there was a loss in beach area of 725m in length with the upper to mid beach being permanently removed. The reclamation is mostly limited to the upper shore along the western and middle sections of the reclamation but also occupies the mid shore at the eastern end of the reclamation. The upper shore habitat along the beach was predicted to be permanently lost while only a small portion of the bivalve habitat was expected to be lost. However, the beach habitat has been reinstated along the stonework revetment, replacing about 235 m of habitat. As such the net loss is reduced to 490 m.

Similarly, the proposed additional reclamations, at both east and west of Grand Bay Villa, will permanently remove some upper to mid beach habitat totally 279 m in length, but will mostly be limited to the upper shore for both reclamation areas. The common habitat, which is dominated by Limpets, Periwinkle and Barnacles, will be permanently lost.

Wave action will reform the mid to lower beach area to a natural state once construction is complete. It is not expected that any scour will occur as a result of the construction and the beach that remains should stay in place. Given this, the bivalve community will most likely recolonise the disturbed areas of beach within 2-3 years after construction.

The removal of some vegetation will occur to the landward side of the reclamations, but the coastal grasses and bushes are of low ecological value and the mature trees to be felled will be replaced as part of the landscape proposal, which is discussed in

more detail below.

Sub-tidal Marine Ecology

The baseline survey concluded that the ecological value of the study area is considered to be low. The associated sessile marine benthos is also typical for this area and comprised of species common to similar habitats throughout Hong Kong. All areas of hard substratum have scattered colonies of Gorgonacea, Scleractinia, Porifera, Cirripedia and some Octocorallia. The recorded organisms in sandy areas were noted on either rocks or rubbish in those areas.

Stony corals are of conservation interest and habitats where they are present considered to be of high ecological value. The reclamation will result in loss of habitat and the direct loss of benthos including solitary corals, as detailed in Appendix B. However, based on the poor condition and negligible abundance of the corals present, the overall impact associated with individuals under the reclamation footprint is considered to be minor.

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 and in the case of the reclamation at Tsing Lung Tau, some of the beach will be reinstated.

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, additional cumulative impacts from the reclamation area west of Tsing Lung Tau and other works associated with the road improvement, 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, any significant impacts on water quality or marine fauna does not predicted. The reclamation at Tsing Lung Tau 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 being conducted concurrently are not predicted to be significant. As such, impacts from the much smaller additional reclamations at west of Tsing Lung Tau are also expected to be insignificant. Also, as noted for water quality above, due to the only localised impacts at worst, cumulative impacts with other projects are considered to be negligible.

Landscape and Visual Impact

The proposed additional reclamations are 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, although construction equipment will be visible to some residents in the higher floors of the adjacent blocks for the short term. However, this will not be significant in the context of the improvement works to be undertaken in this area. The beaches at the both additional reclamation areas are not prominent in current views due to their low lying and narrow nature and thus their loss will not be significant to the majority of residents. From the sea, the low lying reclamation will not be prominent in the views and the vegetated hill slopes and residential blocks will still dominate the views.

Some trees will be lost during the construction phase, but extensive planting along the new promenade, together with further planting along the new road verges will compensate and provide a greener outlook. DLO/TW&KT granted approval to fell trees for the "Castle Peak Road Improvement between Area 2 and Ka Loon Tsuen, Tsuen Wan" project on 19 April 2001. The approval also covered those affected trees within the remaining section of road improvement works. However, a supplementary tree felling application will be made to take account of the final layout of the remaining section of road improvement works, and the original proposed compensatory planting will be revised accordingly. Details of the proposed Compensatory Planting Plan are shown in the figures in Appendix H.

In respect of cumulative impacts, the Feasibility Study EIA has included the Tsing Lung Tau reclamation in the scope of its assessment and has concluded that the elements presenting the most significant visual impacts relate largely to the infrastructure to be constructed on and in the vicinity of the reclamation as opposed to the reclamation itself. As such, the visual impacts relating to the reclamations west of Tsing Lung Tau are also not expected to be significant. The loss of shrubs as a result of the reclamation does increase the landscape impacts of the road improvement works as a whole, however, but residual cumulative impacts are considered to be suitably mitigated by the implementation of the landscape proposals as detailed

above.

Marine Archaeology

While the proposed reclamation at east of Grand Bay Villa was not been completely covered by the Castle Peak Road and Route 10 archaeological assessment. It should be noted that the CPR MAI also concluded that the strong prevailing currents and geology of the site would create a bad preservation environment for archaeological material. Also, the reclamation at west of Grand Bay Villa is a small area of 0.2ha situated in the inter-tidal area and shallow waters; such shallow waters would make it difficult to undertake a geophysical survey of the area. Based upon the above and the proximity of MAIs undertaken, it is considered that the findings of the previous MAIs would be relevant to this area.

As such, it is concluded that there are no archaeological resources in the study area which would be affected by the implementation of this designated project. As such no mitigation measures are required.

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 Sham Tseng West would unlikely have any measurable 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 C have highlighted that only SR2 (Grand Bay Villa) may experience adverse noise impacts during the various stages of construction and thus these will require mitigation. While the property is currently unoccupied and unlikely to be occupied for the duration of the project, mitigation measures have been explored. The mitigation measures potentially required are detailed in Table 6 below.

Table 6: Recommended Mitigation Measures for the Noisy Equipment

Plant	Source of Noise	Mitigation Measure(s)*	Noise Reduction Assumed in dB(A)	CNP Code	Unmitigated / Mitigated Sound Power Level, dB(A)
Grab Dredger	Engine	<ul style="list-style-type: none"> Fit more efficient exhaust sound reduction equipment; Manufacturers' enclosure panels should be kept closed. 	10	CNP 063	112 / 102
Excavator				CNP 081	112 / 102
Lorry				CNP 141	112 / 102
Concrete Lorry				CNP 044	109 / 99
Concrete Pump				CNP 047	109 / 99
Poker				CNP 170	113 / 103
Roller				CNP 186	108 / 98
Dumper				CNP 066	106 / 96
Mobile Crane	Engine / material handling	<ul style="list-style-type: none"> Fit more efficient exhaust sound reduction equipment; Manufacturers' enclosure panels should be kept closed; Do not drop material from excessive heights. 	10	CNP 048	112 / 102
Air Compressor	Engine / compress or body shell	<ul style="list-style-type: none"> Fit more efficient sound reduction equipment; Acoustically dampen metal casing; Manufacturers' enclosure panels should be kept closed. 	10	CNP 104	104 / 94

* Table B.1, BS 5228: Part 1: 1997, Noise and Vibration Control on Construction and Open Sites, Part 1. Code of Practice for Basic Information and Procedures for Noise and Vibration Control.

For the mitigated noise assessment, a temporary 5m-height noise barrier at Grand Bay Villa (SR2) during the bored pile retaining wall construction and the mitigation measures for the construction equipment listed in Table 6 above are assumed to be implemented. A complete set of mitigated noise results, during the construction activities of each area and cumulative impact, are shown in Appendix F and G respectively.

The location of the proposed temporary noise barrier and a cross section is shown in Figure 6. In the prediction of the effectiveness of the temporary barrier, 5dB(A) noise reduction for movable plant and 10dB(A) reduction for stationary plants has been applied. The barrier should have a mass per unit surface area in excess of 7 kg/m² and

the minimum height of the barrier should be such that no part of the equipment is visible by the sensitive receivers.

After the adoption of the mitigation measures, the noise level at the majority of sensitive receivers during the construction will not exceed the statutory requirement. A few flats at SR2, flats at the west end of Grand Bay Villa (House 15) and flats opposite the main entrance (House 2, 3 and 5) could not be fully screened by the temporary barrier as the barrier is considered not practicable in these areas. As such these flats may be subject to residual noise impacts. The predicted residual noise level at these flats is 76.9 dB(A) (assuming the oscillator is partly screened during stage 3 of bored pile wall construction). However, the construction duration at the un-screened area for the bored pile wall is considered to be of very short duration (2 to 3 days based upon an estimated construction period for each pile of a half day). In addition, it is considered most of the equipment will be screened by the proposed barrier. Therefore, the residual impact is considered acceptable.

In order to minimize the noise impact, the Contractor is recommended to carefully schedule construction activities so that parallel operations of several sets of equipment close to the given receivers is avoided where possible.

The predicted unmitigated noise levels at SR1, SR3 and SR4 are well below the acceptable level (75dB(A)), no mitigation measures are required for these sensitive receivers. SR2 (Grand Bay Villa) is currently unoccupied. However, SR2 (Grand Bay Villa) is predicted to be subjected to noise impacts in excess of the noise criteria during the construction phase and as such, all proposed noise mitigation measures should be implemented to minimize the noise impact at Grand Bay Villa if it becomes occupied during the course of the works.

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

As per recommendation of Feasibility Study EIA, reclamation construction (backfilling) will be operated after construction of a temporary bund to minimize the off-site migration (as described in Section 2.1). In addition, in accordance with the procedure adopted under EP-093/2001, a silt curtain will also be provided as a precautionary mitigation measure during the reclamation construction.

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

Ecology and Fisheries

The beach at east of Grand Bay Villa will be reinstated. However, reinstatement of the beach at west of Grand Bay Villa is considered infeasible due to high water depth and strong tidal current. The revetment wall of the proposed additional reclamation 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 algae to grow and gastropods to graze. In more exposed areas, barnacles are expected to attach to the granite blocks.

The beach at Tsing Lung Tau is being reinstated after the completion of the reclamation work in 2004. In addition, the bivalve community has started recolonising at the habitat provided and it is expected the recolonisation would take 2 to 3 years to complete.

Based upon this, the fact that the intertidal habitat will be reformed after a period of time, the landscaping to compensate for tree loss and the overall insignificant impacts at the proposed additional reclamations, 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 suitability for reuse of the material, no mitigation is required. Notwithstanding, relevant pollution control clauses will be included in the Construction Contract, as detailed in Attachment 1, so as to minimise the environmental nuisance to the nearby sensitive receivers.

Landscape and Visual

The boundary or works area has been defined by the detailed design layout. Every effort has been taken to avoid the works impacting mature trees within the works area during the detailed design process. However, in order to quantify the tree loss, a tree survey report has been prepared and the associated Landscape Proposal provides the details of the compensatory planting proposed (see Appendix H). The proposals will be sufficient to mitigate the loss of vegetation and in light of the low and short-term visual impacts of the reclamation no further mitigation measures are required.

Marine Archaeology

As there are no archaeological resources in the study area which would be affected by the implementation of this designated project. As such no mitigation measures are required.

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

In exception of SR2, no adverse noise impacts will occur after the application of the full set of recommended mitigation measures. SR2, should this property become occupied during the course of the works, may be subject to minor residual noise impacts for a very short duration (2 to 3 days) which is considered acceptable. However, the mitigation measures will only be required if the affected sensitive receiver (SR2) becomes occupied during the construction works. With the application of the pollution control clauses, no significant air or water quality impacts are expected. In respect of ecology and fisheries, while significant impacts are not predicted, the construction of a granite block revetment, the potential for the beach to return and the planting of compensatory trees are considered sufficient to compensate for 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 remaining road works contract 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 and Route 10 North Lantau to Yuen Lung Highway EIA Final Assessment Report, dated September 1999. The reports 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 EIA reports construction phase assessment are summarised below. The proposed reclamation was included in the scope of works assessed by the EIA reports, 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 Castle Peak Road Feasibility Study EIA.

In addition, a completely different construction approach, e.g. bridge/tunnel construction, was assumed in the noise assessment of the Route 10 EIA, which is considered not applicable for the proposed additional reclamation.

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 Tsing Lung Tau and Sham Tseng West being predicted not to result in significant impacts. However, the reclamation at these were completed, the cumulative impact is considered not significant.

The Castle Peak Road Feasibility 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 other 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 measurable impacts on marine flows and water quality during the operational phase due to the shallow water and narrow nature of the reclamations.

As per the recommendation of the Feasibility Study EIA, reclamation construction (backfilling) will be undertaken after construction of a temporary bund constructed to minimize the off-site migration of suspended solids (as described in Section 2.1). In addition, a silt curtain will also be employed as a precautionary mitigation measure during the construction.

Ecology – both reports also 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. The plantation located in Tsing Lung Tau area is considered as low conservation interest of the species and simple structural diversity. Some seabed will be permanently lost but the habitat is common in Hong Kong. Thus, the potential impact is not considered to be significant due to the degraded

nature of the water quality and marine benthic communities in the area. The ecological impacts from the reclamation is predicted to be minor.

Solid Waste – the report concludes 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. The Castle Peak Road Feasibility Study EIA concludes that the reclamation would cause the loss of mature trees at the road boundary. Loss of areas of woodland was also considered a key issue. 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, including that associated with the reclamation, sensitive hardworks and the restoration of the disturbed hillside was recommended.

As the different scope of the assessment in Route 10 EIA, the impact assessment and the recommendation in the report is not applicable on the proposed additional reclamation.