

PROJECT PROFILE

for

132kV Supply Circuit from

Pui-O via Chi-Ma-Wan Peninsula

via Sea Crossing towards Cheung Chau

Reference : **T595**
Client : **CLP Power Hong Kong Limited**
Date : **July 2000**

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1. BASIC INFORMATION

1.1 Project Title

This Project Profile has been prepared for:

132kV Supply Circuit from Pui-O
via Chi-Ma-Wan Peninsula via
Sea Crossing towards Cheung Chau

1.2 Purpose and Nature of the Project

Owing to the unsatisfactory performance of the supply reliability, transmission efficiency, and the system performance for Cheung Chau area and the implementation of the South Lantau/Pui-O phasing out programme, it has become necessary to establish 3 x 132kV circuits from the existing Pui O Substation on Lantau Island South to Cheung Chau in order to maintain a secure supply to the existing and serve future load growth on Cheung Chau Island.

The Route Options Assessment for 3 x 132kV electricity supply circuits connecting Pui O Substation to Cheung Chau was undertaken in April 2000. Taken account of the comments from the relevant Government Department, a set of evaluation criteria covering environmental issues, statutory requirements, traffic impacts, programme, costs etc. were established. The evaluation process has ultimately identified a preferred alignment, which provides a technically feasible route as well as minimal impacts on the environment in particular the South Lantau Country Park for the installation of the 3 x 132kV circuit from Pui-O via Chi-Ma-Wan Peninsula via Sea Crossing towards Cheung Chau. However, as this project is a Designated Project the statutory Environmental Impact Assessment (EIA) process must be followed.

This project profile covers the proposed route of 3 x 132kV the supply circuit via underground cable, cable tunnel and submarine cable to deliver electricity from the existing Pui-O Substation on South Lantau to the existing Cheung Chau North and South Substations.

1.3 Name of Project Proponent

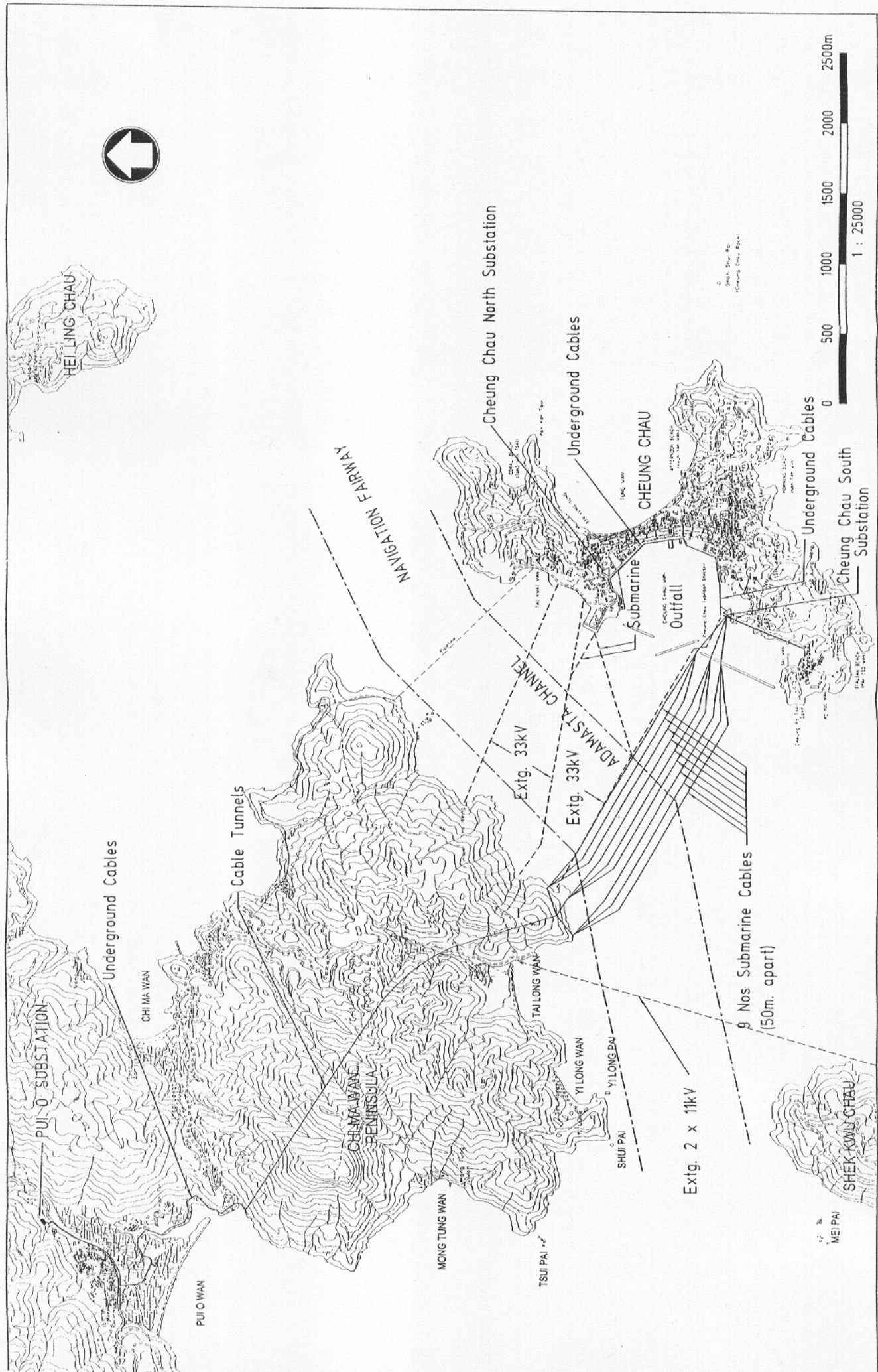
The project proponent for the Assignment is:

CLP Power Hong Kong Limited
7/F Shamshuipo Centre,
215 Fuk Wa Street,
Kowloon, Hong Kong.

1.4 Location and Scale of Project

The brief of the proposed alignment on the Chi-Ma-Wan Peninsula for 3 x 132kV supply circuit to Cheung Chau Island is shown in Figure 1. The alignment details for the proposed route are summarised in Table 1.1 below.

Table 1.1 A Summary of the Proposed Alignment Details



中華電力 CLP Power	 Mott Connell Mott Connell Limited 40/F Hopewell Centre 183 Queen's Road East, Hong Kong Tel No. 2886 8888 Fax No. 2887 1888	Project ENVIRONMENTAL IMPACT ASSESSMENT - 132 kV SUPPLY TO CHEUNG CHAU	Rev.
		Title Underground Cables Plus Cable Tunnel and Submarine Cable to Cheung Chau Island Via Tai Long Wan East	Date : JUNE 2000 Scale 1 : 25000 CAD File : F:\PRO\56\SKETCH\Fig2-1

FIGURE 1

Sections	Transmission Method	Type of Land Traversed (Refer to the Outline Zoning Plan No. S/SLC/8)	Approx. Length (m)	Approx. overall Length (m)
Common Sections				
Section 1 : From Pui O Substation to Pui O Beach	Underground cables	• <i>South Lantau Road</i> – Between Pui O Substation and Pui O Lo Wai Tsuen.	800	2350
		• <i>Coastal Protection Area</i> - Chi Ma Wan Road between Pui O Lo Wai Tsuen and Ham Tin Tsuen.	700	
		• <i>Villagel Type Development</i> – Ham Tin Tsuen.	100	
		• <i>Coastal Protection Area</i> – Pui O Beach	400	
		• <i>Green Belt</i> – South of Pui O Beach	300	
		• <i>Country Park</i> – South of Pui O Beach	50	
		Section 2 – From Pui O Beach to Tai Long Wan East	Cable Tunnel	
Section 3 – From Tai Long Wan East to Cheung Chau Sai Tai Road, Cheung Chau south	Submarine Cable	• <i>Tai Long Wan East</i>	150	2300
		• <i>Navigation fairway</i> – Adamasta Channel	900	
		• <i>Sea off Cheung Chau south</i>	950	
		• <i>Cheung Chau Typhoon Shelter</i>	300	
Section 4 – From Cheung Chau Sai Tai Road to Cheung Chau South Substation	Underground Cable	• <i>Public Road</i> – Cheung Chau Sai Tai Road	100	100
Total (for 2 x 132kV circuits) :				7750
Sections for 1x132kV Circuit				
Section 5 – From Cheung Chau Sai Tai Road to Cheung Chau North Substation	Underground Cable	• <i>Public Road</i> – Cheung Chau Sai Tai Road, Tai Hing Tai Road, Praya Street, Pak She Praya Street	1250	1250
Total (for 1 x 132kV circuits) :				8900

This alignment starts from Pui O Substation with underground cables along South Lantau Road and Chi Ma Wan Road to the proposed tunnel portal at Pui O Wan. In order to provide a works area for the Pui O site, a small scale reclamation in shallow water is required. The alignment will continue in a cable tunnel leading to the other end at Tai Long Wan East. The cables will be spread out by means of a number of small sections of underground cables in the Tai Long Wan portal area.

9 nos. submarine cables for 3 x 132 kV circuits will be laid to Cheung Chau South. 2 x 132kV circuits will be connected to Cheung Chau South Substation via underground cables laid along Sai Wan Promenade. The remaining 1 x132 kV circuit will be laid underground along Cheung Chau Sai Tai Road, Tai Hing Tai Road, Praya Street, Pak She Praya Street and connected to Cheung Chau North Substation.

1.5 Number and Types of Designated Projects to be Covered by This Project Profile

Only one Designated Project (DP) is covered by this Project Profile. In accordance with the definitions given in the EIAO Technical Memorandum, this project is a DP under Part 1 Schedule 2, Q1. Specifically the proposed route for the installation of 3 x 132kV supply circuit involves the detailed design and subsequent construction of underground cables, cable tunnel and submarine cables from Pui-O via Chi-Ma-Wan Peninsula via sea crossing towards Cheung Chau.

1.6 Name and Telephone Number of Contact Person(s)

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

An Environmental Impact Assessment (EIA) will be undertaken by Consultants acting on behalf of the project proponent to assess the impacts of the proposed route of 3 x 132kV supply circuit on the receiving environment with particular emphasis given to the water quality and marine ecological impacts due to construction.

The design period for the proposed route of 3 x 132kV supply circuit are tentatively scheduled to be finalized in November 2001. Gazetting of the works is critical to the project programme and should be carried out as soon as possible to minimise potential delays. The commencement of the construction is tentatively scheduled to be in November 2001 for completion in February 2004.

3. POSSIBLE IMPACT ON THE ENVIRONMENT

Since the operation of the 132kV supply circuit is expected to cause no insurmountable environmental impacts, the possible impacts will mainly be focused during construction phase. In addition to the preliminary environmental review undertaken, it has been identified the potential impacts on the receiving environment due to construction include:

- Water Quality and Wastewater Impacts
- Marine Ecology and the Fishing Industry
- Terrestrial Ecology
- Construction Solid Waste Management
- Dust
- Noise

3.1 Submarine Section

3.1.1 *Potential Sources of Impacts*

During the various stages of the submarine cables installation through dredging and laying of cables and thereafter backfilling the trench would be the major source of impact due to the disturbance to marine mud and the water column. A small scale reclamation at Pui O Wan for the tunnel portal may also create water quality problems during construction phase.

3.1.2 *Water Quality*

Potential Impacts on Water Sensitive Areas

The proposed submarine cable will be laid in a dredged trench. The trench will be backfilled. Dredging and cable laying are envisaged to take around 13 weeks. For a small scale reclamation works at Pui O for the tunnel portal, the immediate effects of resuspension of sediment will need to be considered together with long term impacts of changed flow regimes. The potential impacts on water sensitive areas have been addressed below and the location of them are given in Figure 2.

(i) Gazetted Bathing Beach – Pui O Beach

One of the proposed tunnel portals by the side of Pui O Wan is located about 300m from the gazetted bathing beach at Pui O. In order to provide the works area for the portal, a small-scale reclamation of area in approximately 180m², in shallow water, will be required. Since dredging work is not likely to be required, the potential impact on the Pui O Beach will be primarily due to aesthetics.

(ii) Typhoon Shelter – Cheung Chau Typhoon Shelter

A small section of the proposed submarine cable will be laid across the Cheung Chau Typhoon Shelter. Release of sediment may possibly be experienced with the typhoon shelter during dredging and cable installation.

(iii) Fish Culture Zone & Fish Fry Nursery Area– Chi Ma Wan Fish Farms & Nearby Fish Fry Nursery Area

A number of fish farms exist off the coast of Chi Ma Wan. The fish fry nursery areas are situated some considerable distance from the dredging activities in the Adamasta Channel. As a result, the dilution afforded by the receiving waters may create effective protection for the fish culture zone and the nearby fish fry nursery areas.

3.1.3 Marine Ecology and the Fishing Industry

Potential Impacts on Marine Ecology and the Fishing Industry

The potential impacts of dredging activities upon marine ecology and the local fisheries in general, is the smothering of local benthic organisms, and clogging of the gills of susceptible biota through deposition and resuspension of suspended solids.

Less obvious but potentially significant impacts may arise during dredging activities through disruption to the marine ecosystem and its intricate food webs. For example, increased levels of suspended solids may reduce the light availability inducing an unfavourable environment for simple photosynthetic plant life, and the primary food source at the base of the food chain. The dredging activities may therefore have an indirect impact on species of importance to the local fishing industry.

It should be noted that the Chinese White Dolphin which is locally protected under the Wild Animals Protection Ordinance is occasionally sighted during summer in the study areas. During dredging, potential impacts to the dolphins would be of concern. There is localised fishing for shrimp around Cheung Chau.

3.1.4 Terrestrial Ecology

Only a small section of over land across the Country Park will be involved of underground cable installation, for the majority will be of cable tunnel, the terrestrial ecological impact is considered to be insignificant. At the portal areas there may be some habitat disturbance during construction. This will be minor and locally confined.

3.1.5 Construction Solid Waste Management

Waste Management Implications

Construction waste associated with the proposed route for the submarine section will include the dredged marine mud. Dredging works for the cable installation will generate approximately 200,000m³ of marine mud which will subsequently be backfilled. It is therefore envisaged that the construction waste arising from the dredging works would be minimal.

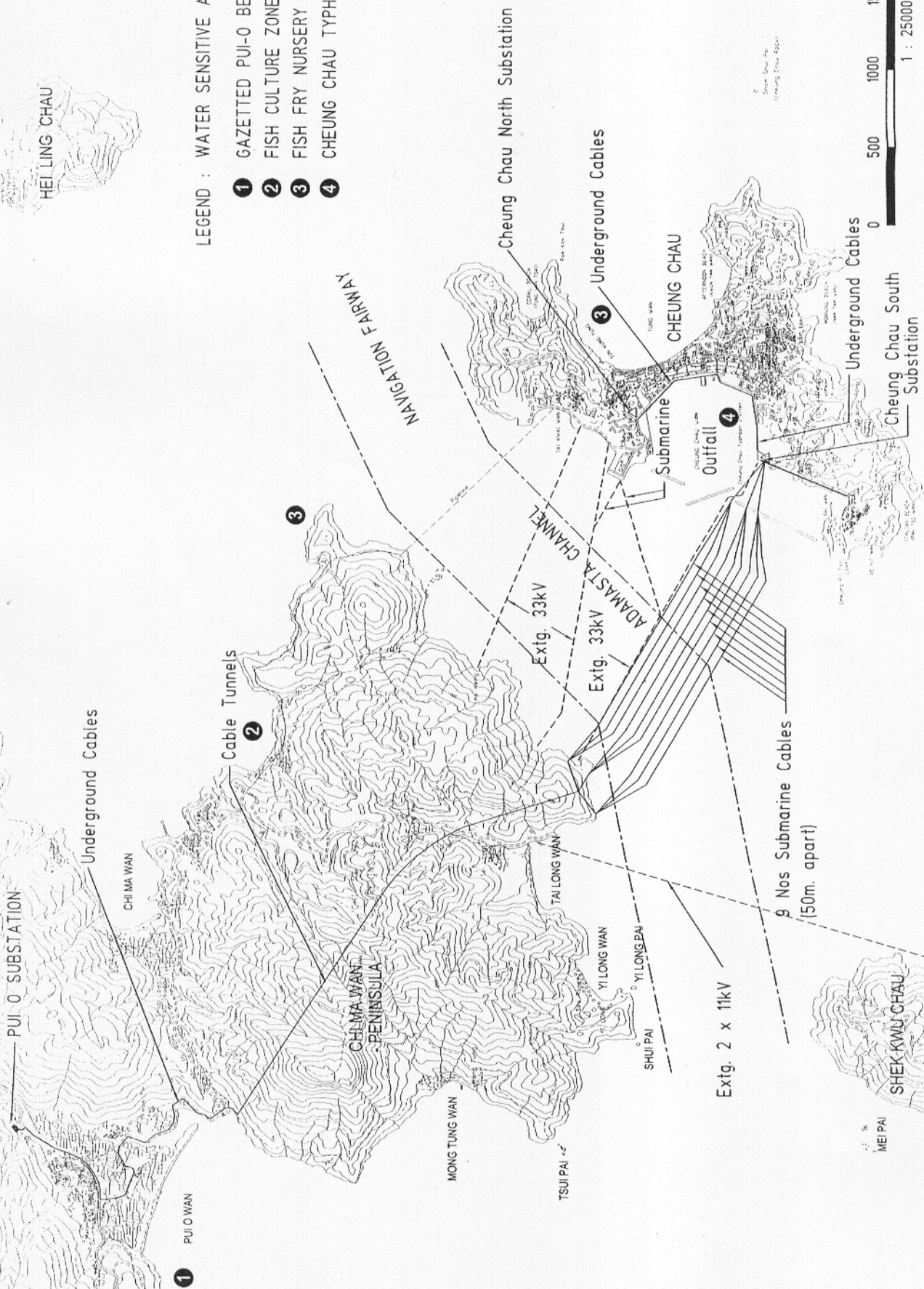
3.1.6 Dust/Noise



HEI LING CHAU

LEGEND : WATER SENSITIVE AREAS

- 1 GAZETTED PUI-O BEACH
- 2 FISH CULTURE ZONE
- 3 FISH FRY NURSERY AREA
- 4 CHEUNG CHAU TYPHOON SHELTER



Project ENVIRONMENTAL IMPACT ASSESSMENT - 132 kV SUPPLY TO CHEUNG CHAU

Title Location of the Water Sensitive Areas

Rev.

FIGURE 2

Date : JUNE 2000
 Scale 1 : 25000
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Potential Impact on Air Quality and Noise

Construction dust and noise for the route of submarine cables from Tai Long Wan East of Chi-Ma-Wan Peninsula to Cheung Chau Island will not be an issue except at the landfalls.

3.2 Over Land Section

3.2.1 *Potential Sources of Impacts*

Trenching and filling activities for the underground cables and drilling for the cable tunnel would be the major source of impact arising from the landbased construction activities.

3.2.2 *Water Quality and Wastewater Impacts*

Potential Impact

Potential water quality impacts may arise during the construction of the proposed landfall and laying of underground cables. If uncontrolled, construction runoff and drainage may cause an increase in Suspended Solids (SS) concentration in receiving waters of Southern Water Control Zone. In the vicinity of the subject site, the main water sensitive areas are the Pui O Beach and the Cheung Chau Typhoon Shelter. The method of constructing the tunnel will have a bearing on the nature of the impacts. For example if the tunnels are driven using a Tunnel Boring Machine (TBM) then a large volume of slurry will need to be treated before discharging the waste waters to the receiving environment (possibly using settling basins). If on the other hand the tunnels are driven by drill and blast the wastewater generated is much less and the issues of spoil disposal relate to larger fraction of rock. Standard mitigation measures (including the use of settling basins for wastewater generated from driving tunnels) would be adequate to reduce impacts to acceptable levels.

3.2.3 *Construction Solid Waste Management*

Potential Impact

The main source of solid waste during construction is likely to be hard and soft spoil generated as result of trenching and filling activities for the underground cables. As stated above if the tunnels are driven using TBM then the spoil is more likely to be smaller fraction with a high volume of slurry requiring pretreatment prior to disposal to receiving waters. If the tunnels are driven using the drill and blast techniques then the fraction of rock may be larger and the potential for re-use of spoil is greater.

3.2.4 *Dust*

Potential Impact

The major dust generating activities associated with the construction works are materials handling, excavation, road openings and backfilling as well as tunnel drilling. The identified potentially affected Air Sensitive Receivers (ASRs) within 300m of the study area due to construction would conclude a few scattered village houses at Yim Tin Kong Tsuen, and Tai Long on Chi-Ma-Wan Peninsula and the residential buildings of Cheung Kwai Estate, and Greenery Crest, and the institution of Buddhist Wai Yan Memorial College along the west coast of Cheung Chau Island. The representative sensitive receivers have been identified and are detailed in Table 3.1 below. Standard mitigation measures would be adequate to reduce impacts to acceptable levels.

Table 3.1 A Summary of the Representative Sensitive Receivers

SRs	Location	Usage	Distance (m) away
SR1	Yim Tin Kong Tsuen	Village House	100
SR2	Tai Long	Village House	200
SR3	Cheung Kwai Estate	Residential	100

SR4	Greenery Crest	Residential	250
SR5	Buddhist Wai Yan Memorial College	Institution	200

3.2.5 Noise

Potential Impact

The major noise nuisance is mainly from the use of Powered Mechanical Equipment (PME) on site. The identified potentially affected Noise Sensitive Receivers (NSRs) within 300m of the study area are a few scattered village houses at Yim Tin Kong Tsuen, and Tai Long on Chi-Ma-Wan Peninsula and the residential buildings of Cheung Kwai Estate, and Greenery Crest, and the institution of Buddhist Wai Yan Memorial College along the west coast of Cheung Chau Island. The representative sensitive receivers have been identified and are detailed in Table 3.1 above. Standard mitigation measures would be adequate to reduce impacts to acceptable levels.

4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

The only area with conservation value in the surrounding environment is the South Lantau Country Park.

5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FUTURE ENVIRONMENTAL IMPLICATIONS

5.1 Construction Phase Protection Measures

5.1.1 Air Quality Protection Measures

Practicable and cost-effective dust mitigation measures shall be formulated during the detailed design stage of the project for implementation through incorporation into contract documents. The requirements of the Air Pollution Control (Construction Dust) Regulation will apply to the construction phase.

5.1.2 Noise Mitigation Measures

Noise mitigation measures that have been considered for this Project include:

- Application of properly designed silencers, mufflers, acoustically dampened panels and acoustic sheds or shields, etc.;
- Erection of noise enclosures around noisy plant;
- Location of noise emitting plant at maximum distances from noise sensitive receivers;
- Inclusion of Conditions of Contract for environmental protection during construction;
- Use of appropriately powered equipment; and
- Regular maintenance of site plant/ equipment.

The effectiveness and continuous implementation of the noise mitigation measures would be checked through a noise monitoring and audit programme.

5.1.3 Construction Water Quality Mitigation Measures

Good site management practice should ensure that construction impacts on water quality are kept to a minimum. Prevention of surface water contamination during construction involves two basic elements:

- (a) minimising the quantity of water which might become contaminated by high levels of suspended solids (silt) off exposed and disturbed ground surfaces; and
- (b) collection and treatment of potentially contaminated water to appropriate standards.

The potential for water quality impacts should be mitigated by the following means:

- (a) stormwater runoff from the study area during construction should be routed through oil/grit separator and/or sediment basin/trap where applicable before discharging to the nearby receiving waters; and
- (b) storm catchbasins/inlets, if any, receiving storm runoff from construction areas should be covered with wire mesh filter on top of which should be placed with crushed stone on top in order to prevent sediment from entering the inlet structure and to reduce potential sediment loading to the receiving waters. In addition, advice should be sought from the EPD's ProPECC P/N 1/94 Construction Site Drainage.

5.1.4 Environmental Protection Measures for Marine Ecology

Appropriate dredging methods will be carefully selected to reduce the amount of resuspension of sediment. Careful scheduling of the dredging activities will be required to avoid the peak reproductive periods for Chinese White Dolphins which generally occur in Spring or Autumn. Losses following the peak reproductive season would therefore be minimised.

5.1.5 Environmental Protection Measures for Construction Waste

Chemical and oily wastes generated from the construction activities, vehicle and plant maintenance and oil interceptors should be disposed of as chemical waste in strict compliance with the Waste Disposal (Chemical Waste) (General) Regulations.

5.2 Operational Phase Protection Measures

No additional mitigation measures are proposed.

5.3 Environmental Monitoring and Audit

This Project Profile has outlined the potential environmental impacts which would arise from the construction of 3 x 132kV supply circuit from Pui-O via Chi-Ma-Wan Peninsula via Sea Crossing towards Cheung Chau and has introduced briefly some possible environmental mitigation measures that can be incorporated into the Project. The need to develop an environmental monitoring and audit programme, for the construction and/or operational phase of the project, will be reviewed after evaluation of the magnitude of various environmental impacts in the detailed EIA report.

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

The only previously approved EIA report which has been referred to during the preparation of this Project Profile:

- Lantau Port and Western Harbour Development Studies Final Report Volume III – Environmental Impact Assessment

The EIA was approved in March 1993. Environmental considerations which were addressed in the EIA include: -

- Air Quality
- Noise
- Marine Water Quality and Marine Ecology
- Terrestrial Ecology
- Visual Aspects
- Archaeology and Sites of Historic Interest
- Waste Management
- Risk Appraisal
- Environmental Monitoring and Audit

The assessments which were conducted are relevant to the current situation because the information of the marine water quality and marine ecology survey, and studies of the fisheries industry from the previously approved EIA which preliminary outline the potential impacts on the marine ecology and fisheries in the study area.

Although reference has been made to the aforementioned report the information was only used to provide guidelines for assessing the scale of the potential impacts. It is proposed that the current EIA is carried out without reference to the previous report to ensure the latest information are used which will reflect a more accurate situation.