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**Section 3**



### 3 ENVIRONMENTAL CONTEXT OF THE STUDY AREA

#### 3.1 INTRODUCTION

The LAPH studies relate to proposed developments which by their location, scale, duration and complexity give rise to potentially significant and long term environmental impacts. It is therefore essential that the Study Areas are described as fully as possible to establish a baseline against which to assess potential impacts. Consequently, in February 1992 an Environmental Baseline Working paper (No. 12A) was produced and this was endorsed at a subsequent Project Steering Group. Results from the environmental surveys undertaken as part of the Environmental Impact Assessment are presented in the Environmental Survey Data Report (ESDR, October 1992).

The environmental baseline comprises the existing environment plus any contribution in terms of pollutant loads (and other implications) from committed projects. By providing an overview of the baseline study this Section sets the environmental context of the Study Area, and includes:

- a review of existing sensitive receivers (SRs) which are particularly significant or susceptible to impacts resulting from the LAPH development;
- a review of existing and committed impact sources which affect the Study Area; and
- a general description of the Study Area; outlining existing visual features and environmental conditions.

#### 3.2 OVERVIEW OF THE ENVIRONMENTAL BASELINE STUDY

##### 3.2.1 Background

In order to determine the existing environmental conditions in the Study Area, a number of environmental aspects were reviewed, including:

- air quality;
- noise;
- marine water and sediment quality;
- terrestrial and marine ecology;

- landscape characteristics (visual aspects);
- archaeology and sites of historic interest; and
- waste management.

In addition, committed projects which may affect the Study Area were identified. Through discussion with the appropriate Government departments, it is understood that the following projects are likely to proceed and were therefore incorporated into the assessment of the environmental baseline:

- Chek Lap Kok Airport and Reclamation;
- North Lantau Development;
- Lantau Fixed Crossing (LFC) (and Ma Wan Reclamation);
- Airport Railway;
- North Lantau Expressway (NLE);
- West Kowloon Reclamation (North and South);
- Green Island Reclamation;
- Green Island Link (GIL);
- Sham Tseng Link (STL);
- Container Terminal 8;
- Container Terminal 9;
- Central and Wan Chai Reclamation;
- Kowloon Point Reclamation; and the
- Strategic Sewage Disposal Scheme (SSDS).

In addition, marine fill source areas include an area south of Tsing Yi and also near the Brothers.

Qualitative and semi-quantitative analysis of the environmental parameters established that the Study Area is quite distinct from the heavily populated and often congested areas, typical of Hong Kong Island, Kowloon and the New Territories coastline around Tsing Yi.

### 3.2.2 Existing and Committed Impact Sources

Existing and committed impact sources were identified in relation to their effect on both existing environmental quality and on the LAPH development itself. Potential impact sources which have been identified (Figure 3.1) are outlined below and summarized in Table 3.1. Sources situated outside the Study Area have additionally been included if it is considered that they may have an effect within the Study Area.

**TABLE 3.1**  
**KEY EXISTING IMPACT SOURCES**

Element	Description	Impact Category				
		Noise	Air	Water	Waste	
<b>Industrial</b>	Cheoy Lee Shipyard	x	-	-	x	
	Lamma Power Station	x	x	x	x	
	Penny's Bay Power Station	x	x	-	x	
	Shipping	x	-	-	x	
	Yam O Log Pound	x	-	-	x	
	Quarry TCT	x	x	-	x	
	LFC Works Area	x	x	x	x	
<b>Committed Project</b>	Chek Lap Kok Airport	x	-	x	-	
	North Lantau Expressway	x	x	x	-	
	Lantau Fixed Crossing	x	x	-	-	
	General	-	x	x	-	
	Kowloon/Hong Kong Strategic Sewage Disposal Scheme	-	-	x	x	
	Marine Borrow Areas (South Tsing Yi and near the Brothers)	-	-	x	-	
	<b>Residential</b>	Discovery Bay	-	-	x	x
		Yi Pak	-	-	x	x
Mui Wo		-	-	x	x	
Chi Ma Wan		-	-	x	x	
Peng Chau		-	-	x	x	
Hei Ling Chau		-	-	x	x	
Cheung Chau		-	-	x	x	
Lamma Island	-	-	x	x		
<b>Fish Culture</b>	Ma Wan	-	-	x	-	
	Luk Chan Wan	-	-	x	-	
	Sok Kwu Wan	-	-	x	-	
	Chi Ma Wan	-	-	x	-	

Note: x = impact anticipated

- = no impact anticipated

#### Noise

Existing noise sources within the Study Area are generally a result of limited industry including Penny's Bay Shipyard, Lamma and Penny's Bay Power Stations and quarry extractions at TCT. On the fringes of the Study Area ship repairing (near Yam O Wan), industrial developments on the coast of Tsing Yi Island and road noise from the NLE and LFC and the LFC Works Area in Penny's Bay will add to the existing noise environment.

#### Air Quality

Existing sources which may impact on air quality in the Study Area comprise Lamma and Penny's Bay Power Stations, and on-going quarry extraction at the TCT peninsula. In addition, due to the north east prevailing winds, industrial areas located on Tsing Yi Island and vehicular traffic on Hong Kong Island and Kowloon may affect the Study Area.

#### Water Quality

The main source of impact on existing water quality in the Study Area is the Pearl River which delivers large quantities of sediments, nutrients and industrial effluent to the waters of the Study Area. Industrial and domestic sewage from Hong Kong Island, Kowloon and Tsing Yi and to a limited extent Ma Wan will also make a significant contribution to background levels. A sewage treatment works for Kowloon industrial and domestic flows is planned with an outfall to the southwest of Stonecutters Island as part of the SSDS. This is expected to give rise to an overall improvement of water quality in the Study Area.

Other sources in the immediate area are divided primarily, into industrial and domestic sewage discharges. Industrial discharges are largely a result of hot water discharges from the Lamma Power Station. Domestic sewage discharges arise from urban areas at Discovery Bay, Mui Wo, Chi Ma Wan Prison, Cheung Chau, Hei Ling Chau and Yung Shue Wan.

#### Waste Management

Within the Primary Study Area, arisings are primarily domestic waste from; the urban developments of Discovery Bay, Mui Wo and Chi Ma Wan on Lantau Island; and Ma Wan, Peng Chau, Hei Ling Chau, Cheung Chau and Lamma. Pulverised Fuel Ash (PFA), furnace bottom ash and flue gas desulphurisation by-products, which are all generated from the power station operations at

Lamma, are the only major identified industrial wastes generated.

### 3.2.3 Key Existing and Committed Sensitive Receivers

Key existing or committed SRs within the Study Area have been split into two categories and comprise water quality SRs (Figure 3.2) and land based SRs (Figure 3.3). Water quality SRs have been identified in relation to livelihood, recreation, ecology and industry, and include:

- commercial, local and subsistence fishing industries/communities;
- fish culture areas;
- gazetted and ungazetted beaches;
- species of ecological importance (e.g. Green-Sea turtles and Chinese White dolphins); and
- Lamma Power Station.

Land based SRs comprise those areas susceptible to noise, visual and air quality impacts. In relation to the LAPH development, SRs have been identified as residential areas on Lantau, the Outlying Islands and Hong Kong Island, and include:

- Discovery Bay (Lantau);
- Silver Mine Bay (Lantau);
- Fa Peng (Lantau);
- Cheung Chau;
- Peng Chau;
- Hong Kong Island West to Mt. Davis;
- Hei Ling Chau; and
- Ma Wan.

Of these, Fa Peng is by far the smallest and consists of only a few buildings. The next smallest is located on the northern Peng Chau headland and is made up of a small number of buildings.

Further details of SRs within the Study Area are presented in the appropriate Sections of this Report.

### 3.2.4 Potential Sensitive Receivers

In accordance with current development proposals, the following have been identified as potential residential areas (and therefore future SRs):

- Yi Pak;
- Sz Pak;
- Sam Pak, and
- an undetermined area south of Discovery Bay.

In environmental terms the optimum location for new residential development in the Study Area is heavily influenced by the potential environmental impacts which will arise from the construction and operation of the LAPH development. A broad assessment of the advantages and disadvantages associated with each location has been carried out and is outlined below:

#### *Yi Pak*

Yi Pak is located north of the Hai Kam Tsui peninsula in such close proximity to Discovery Bay that it may almost be viewed as an extension to the existing residential development in this area. Consequently development at this location could have the advantages of existing communication links requiring limited further development in this respect.

However, Yi Pak will be exposed to noise and visual impacts from the LAPH development of a similar magnitude to Discovery Bay. Furthermore the shore area is colonised by mangroves and it is considered important that the mangroves are both preserved and maintained.

#### *Sam Pak*

Sam Pak is located approximately ½km north of Yi Pak. Development in this area will be shielded to some extent from the LAPH development by the Sz Pak headland. However, this will largely apply to low level developments, the elevated areas which would be developed are likely to be subject to significant noise and visual impacts from the operation of the Port.

#### *Sz Pak*

Sz Pak is located on the southern side of the Sz Pak Tsui peninsula. The area will be afforded

some shielding from the LAPH development by the peninsula itself and will have a limited line of sight. However this area is in such close proximity to the LAPH development that development of a residential area in this location is considered to be in conflict with the principles of environmental planning and as a consequence is not recommended appropriate.

#### *Area South of Discovery Bay*

The brief requires that an area to the south of Discovery Bay be included as a possible location for residential development. As yet undetermined, it is likely that such an area would be located in the vicinity of Nim Shue Wan and Cheung Sha Lan.

This area has the advantage of restricted line of sight to the LAPH development being significantly shielded by the peninsula north of Hai Tei Wan and Peng Chau. Consequently the level of noise and severity of visual impacts which would be experienced will be somewhat reduced compared to other possible locations.

However, developing this area would necessitate the development of communication links to Discovery Bay and the Port and would effectively extend the urban development area and open up south Lantau to future development. This is in direct conflict with current planning proposals to preserve south Lantau as a rural area and is therefore undesirable from an environmental perspective.

### **3.3 GENERAL DESCRIPTION OF THE STUDY AREA**

#### **3.3.1 Landscape Characteristics**

The Study Area is characterised by mountainous rugged terrain in a largely undeveloped environment. Lantau Island itself contains mountain peaks generally in excess of 200m above sea level, the remaining islands however are smaller in scale reaching to no more than 100m above sea level. The area includes many scenic and important amenity locations and is widely used for recreational pursuits including hill walking, picnics/barbecues, boating, watersports and beach activities. The marine areas are important for marine and shipping activities/facilities such as anchorages, shipping lanes, passenger ferry routes and commercial fishing.

The land areas are mainly rural with a restricted transport network and limited industry in the form of shipbuilding, ship repair and power generation. There are a few dense residential areas, notably Discovery Bay, Ma Wan, Silvermine Bay, and communities on Peng Chau, Cheung Chau, Hei Ling Chau and Lamma Island.

#### **3.3.2 Environmental Quality**

##### *Air Quality*

In December 1991 and June 1992, baseline air quality monitoring was undertaken at Cheung Chau and Discovery Bay to quantify existing atmospheric conditions in the Study Area. The results of the monitoring and analysis (EDSR, October 1992) indicate that concentrations of SO<sub>2</sub> and NO<sub>2</sub> and both Total and Respirable Suspended Particulates (TSP, RSP) are within the standards set in Hong Kong's Air Quality Objectives. Air Quality within the Study Area is generally considered to be good.

##### *Noise*

From October to December 1991 a baseline noise survey was carried out to determine existing background noise levels in the Study Area (EDSR, October 1992). The survey, which covered thirteen monitoring locations, established that background noise is generally low (in the region of 45-55dB(A), L90, 24hr) thus both reflecting and confirming the quiet nature of the Study Area.

##### *Water Quality, Marine Ecology*

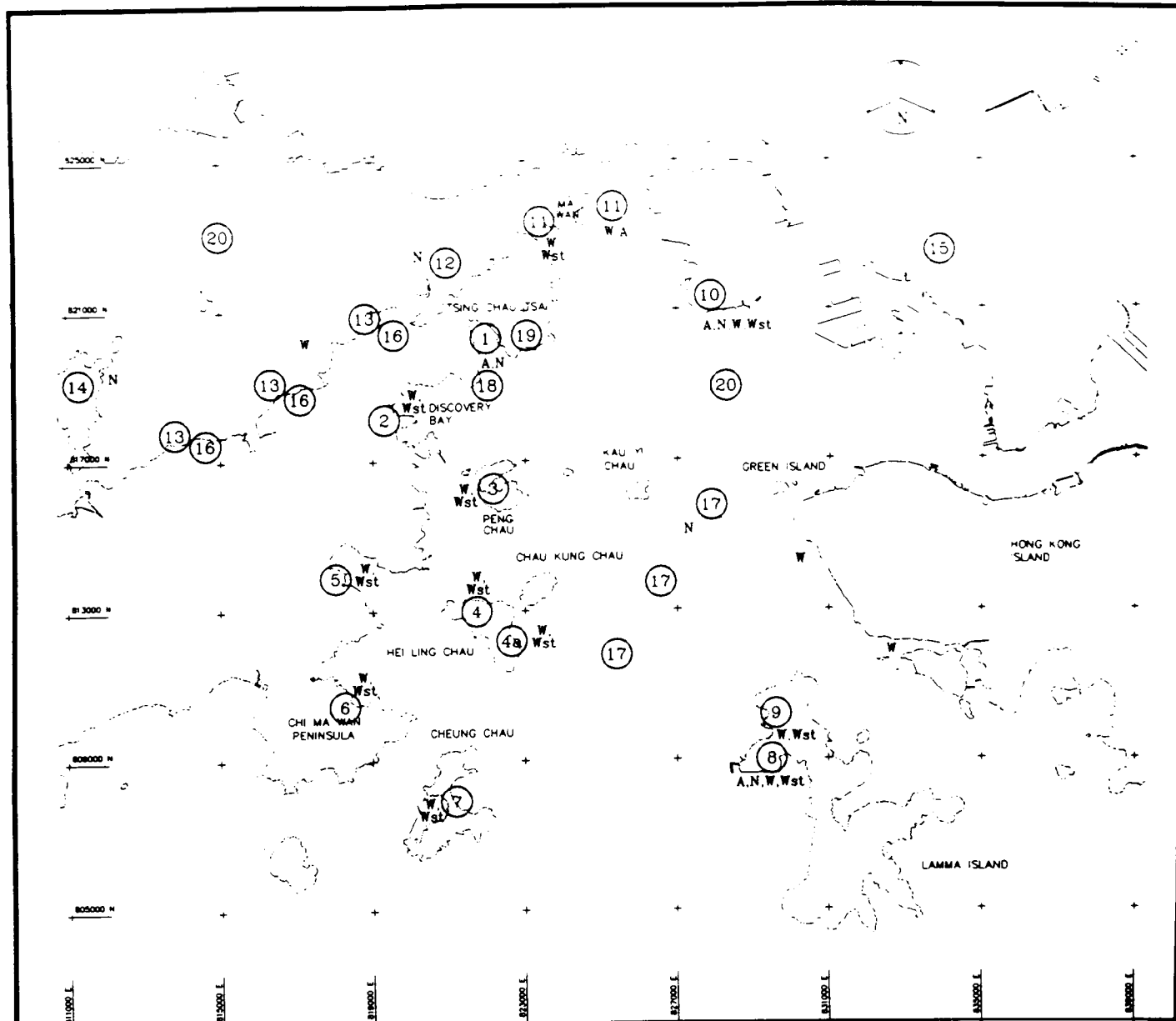
Water quality in the Study Area reflects the semi-estuarine nature of the Territory and is influenced by seasonal flows from the Pearl River. Water quality in both the Study Area generally and the Discovery Bay area specifically, which is of particular relevance to proposals for the LAPH development, currently meet the Water Quality Objectives gazetted for the Southern Water Control Zone. EPD has carried out extensive water quality monitoring for over 10 years and has built up a significant source of, both historic and current water quality information. Consequently, it was not considered necessary to undertake any additional water quality surveys to form a water quality baseline.

Marine ecology surveys were undertaken in November 1991 and June 1992 as a part of the environmental baseline study, the results of these surveys are given in detail in the EDSR. The surveys established that the intertidal and subtidal

areas are relatively sparsely populated and the species present are not unique or rare, one exception to this is the protected Green Sea Turtle (*Chelonia mydas*) which occasionally lays its eggs on the beaches of southern Lamma.

#### *Sediment Quality*

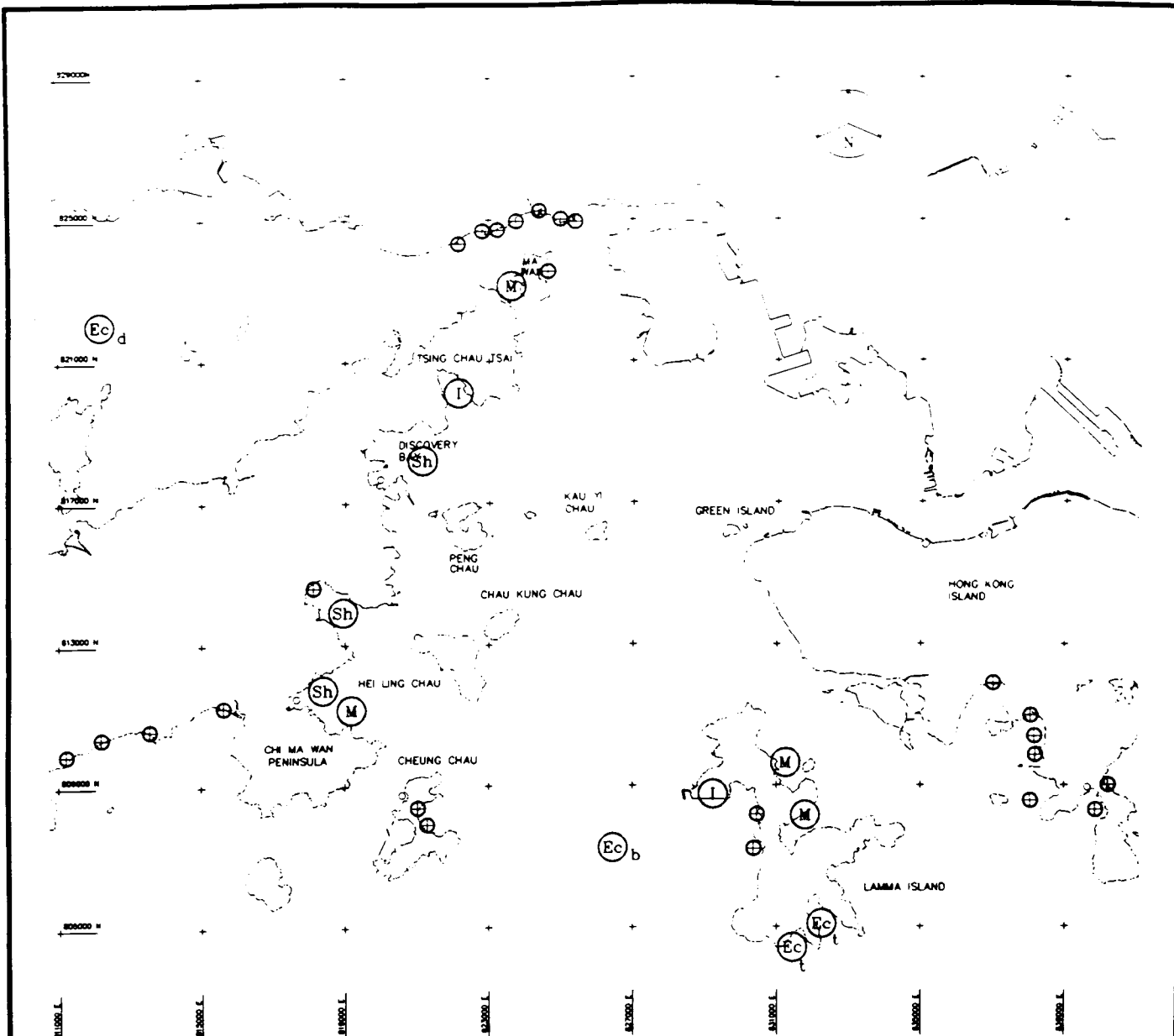
Sediment Quality within the Study Area has been established with reference to the EPD's routine sampling programme, the Contaminated Spoil Management Study and the results of the marine ecology survey. In general the sediments of the Study Area are relatively clean, however areas of contaminated sediments exist, with high levels of metals indicating pollution from industrial sources. On the basis of the limited information directly relevant to the Study Area it appears that the spoil ground north of Kau Yi Chau is likely to fall into the Class B (possibly Class C) classification of sediments and therefore special precautions will be necessary for any dredging and disposal of dredged muds from this area. The remainder of the sediments in the Study Area are relatively clean and fall into Class A, and therefore require no special precautions during dredging and disposal.



LEGEND

- |   |                           |   |                          |     |                         |
|---|---------------------------|---|--------------------------|-----|-------------------------|
| ① | LAMMA POWER STATION       | ⑨ | TAI WAN TSUEN (LAMMA)    | ⑰   | SHIPPING                |
| ② | PENNY'S BAY POWER STATION | ⑩ | TSING YI                 | ⑱   | WORKS AREA              |
| ③ | DISCOVERY BAY             | ⑪ | LANTAU FIXED CROSSING    | ⑲   | BORROW AREA             |
| ④ | PENG CHAU                 | ⑫ | YAM O SHEPHERDS          | ⑳   | MARINE FILL SOURCE AREA |
| ⑤ | HEI LING CHAU             | ⑬ | NORTH LANTAU RECLAMATION | A   | AIR                     |
| ⑥ | VIET BOAT CAMP            | ⑭ | CHEK LAP KOK AIRPORT     | N   | NOISE                   |
| ⑦ | MUI WO                    | ⑮ | KOWLOON URBAN AREA       | W   | WATER                   |
| ⑧ | CHI MA WAN                | ⑯ | NORTH LANTAU EXPRESSWAY  | Wst | WASTE ARISING           |
| ⑨ | CHEUNG CHAU               |   |                          |     |                         |

FIGURE 3.1  
IMPACT SOURCES



**LEGEND :**

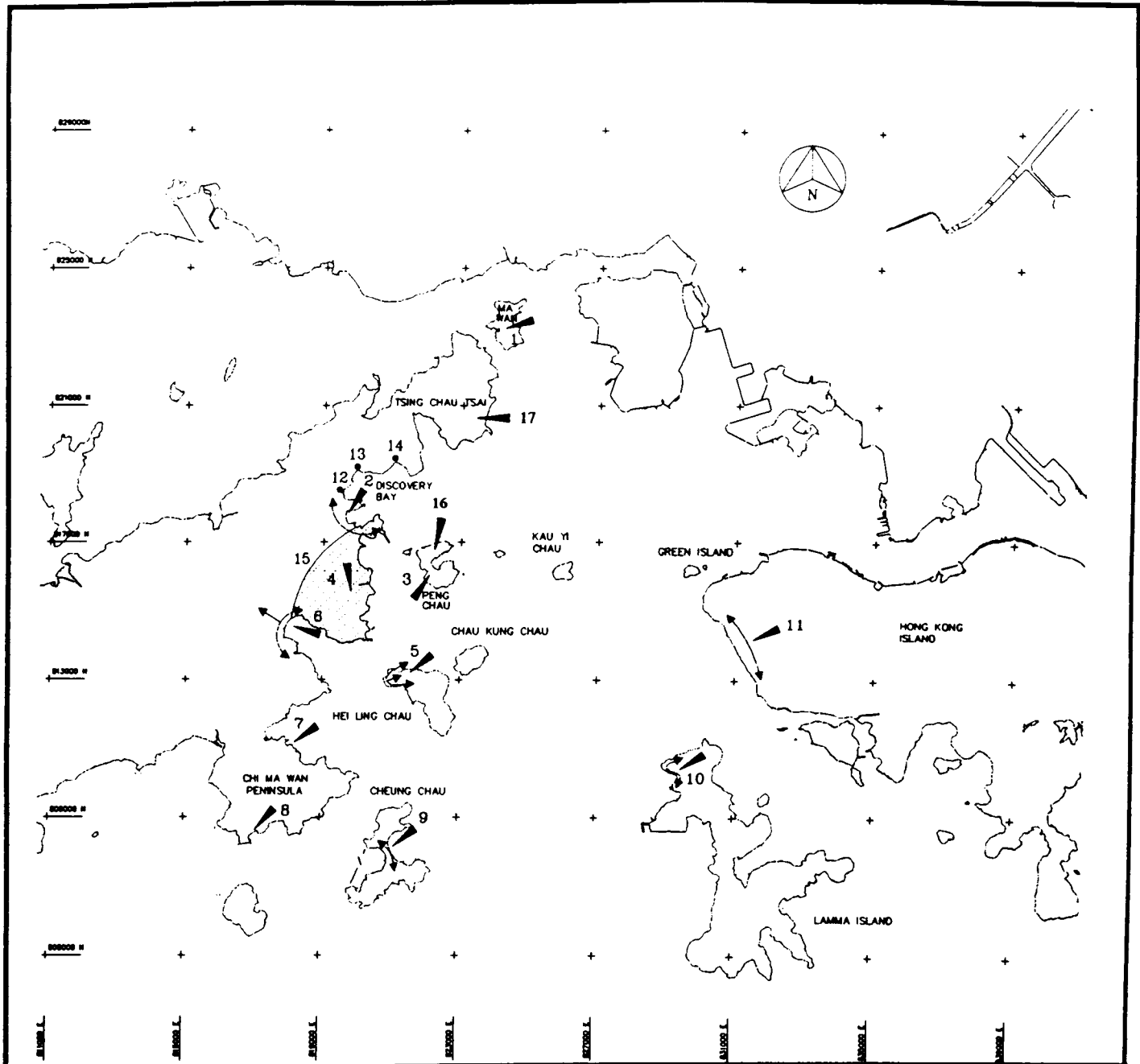
- ⊕ GAZETTED BEACHES
- UNGAZETTED BEACHES
- (M) MARICULTURE
- (I) SEA WATER INTAKES
- (Sh) SHALLOW EMBAYMENTS
- (Ec) ECOLOGICAL
  - t = TURTLES
  - d = DOLPHINS
  - b = SEA BIRD ROOSTING SITE



FIGURE 3.2

**WATER QUALITY SENSITIVE RECEIVERS**





**LEGEND :**

- ▲ 1 MA WAN
- ▲ 2 DISCOVERY BAY
- ▲ 3 PING CHAU
- ▲ 4 MONASTRY
- ▲ 5 HEI LING CHAU
- ▲ 6 MUI WO
- ▲ 7 CHI MA WAN
- ▲ 8 SEA RANCH
- ▲ 9 CHEUNG CHAU
- ▲ 10 TAI WAN TSUEN (LAMMA)
- ▲ 11 HONG KONG ISLAND WEST
- ▲ 16 PENG CHAU HEADLAND
- ▲ 17 PA PENG

**POTENTIAL RESIDENTIAL AREAS**

- 12 YI PAK
- 13 SAM PAK
- 14 SZ PAK
- ▨ 15 UNDETERMINED AREA SOUTH



**FIGURE 3.3**

**LOCATION OF LAND BASED SENSITIVE RECEIVERS**