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Liquefied Natural Gas (LNG) Receiving Terminal and Associated Facilities

EIA Study (EIA Study Brief ESB-126/2005)

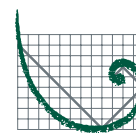
*EIA Report
Part 2 - South Soko
Sections 1 - 7*

22nd December 2006

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ERM

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22nd December 2006

For and on behalf of
ERM-Hong Kong, Limited

Approved by:



Dr Robin Kennish

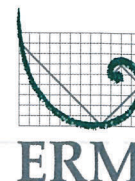
Position: Director

Date: 22nd December 2006

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1 INTRODUCTION

1.1 INTRODUCTION

This report is prepared by ERM-Hong Kong, Ltd (ERM) in accordance with the *EIA Study Brief* (No. ESB-126/2005) and the *Technical Memorandum of the Environmental Impact Assessment Process (EIAO-TM)*.

1.2 PURPOSE OF THIS EIA

The detailed requirements of this EIA study are set out in the *EIA Study Brief* and summarised in Part 1 of this EIA Report. This Part of the EIA Report addresses the key environmental issues associated with the construction and operation of the South Soko option.

1.3 SITE LOCATION AND HISTORY

1.3.1 Proposed Project Site at South Soko

Should the South Soko option be selected to locate the LNG receiving terminal, natural gas will be sent via a submarine gas pipeline to a Gas Receiving Station (GRS) at Black Point Power Station (BPPS). The South Soko option will require a power supply during construction and operation of the facility and this will be supplied via a submarine electricity circuit. The South Soko option may also require the installation of a submarine water main connection to the Shek Pik Reservoir on Lantau Island.

The South Soko Island has been heavily impacted by the construction and demolition of the former Detention Centre. The slopes in the centre of the Island in particular have been extensively cut and reclamations have been constructed in Sai Wan and Tung Wan bays. As a consequence of these disturbances CAPCO made an upfront design premise that the terminal works would be concentrated as far as practicable in the centre of the island to reduce impacts on natural habitats and take advantage of the previous site formation works for the Detention Centre. The South Soko LNG terminal is proposed to be located largely in the centre of the island, as presented in *Figure 1.1*. In order to unload LNG, a jetty will be required for the LNG carrier. To allow safe access for the LNG carrier, an approach channel and turning circle will also be required.

1.3.2 Description and Historical Background of the South Soko Island

South Soko, also known as Tai A Chau, is an outlying island located in the southwest waters of the Hong Kong Special Administrative Region (SAR), with a total land area of approximately 120 ha. South Soko consists of hills such as Fei Kei Teng, Nam Shan and Tai Chau Mei Teng with heights ranging

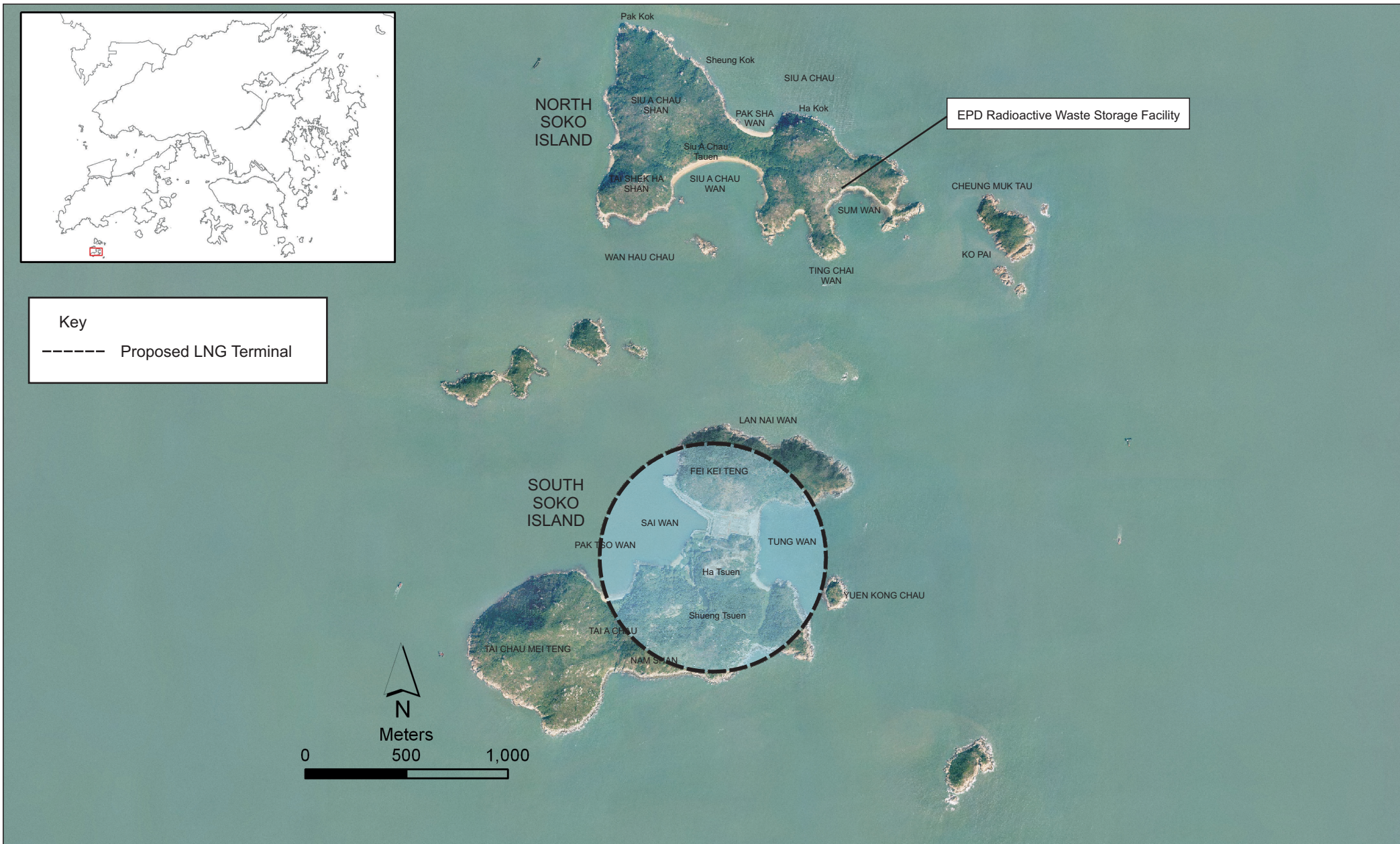


Figure 1.1 Location of Proposed LNG Terminal on South Soko Island

from 85 m to 140 m ⁽¹⁾. Two bays, namely Tung Wan and Sai Wan, are located on the east and west sides of the island, respectively. The surrounding hills provide protection from the wind and this likely led to the formation of settlements of Ha Tsuen and Sheung Tsuen during the early 20th century at the west and south side of the island correspondingly. The underlying geology of the island is Fan Lau Porphyritic Granite, and the island has an indented coastline with steep slopes rising from the sea.

1963

By reviewing the aerial photographs of the early 1960's (D3F400 dated 1963, *Figure 1.2*), settlements were concentrated in Ha Tsuen and Sheung Tsuen with approximately 50 households. During this period terrace cultivation was evident and extensive on South Soko so that most of the lowland areas and some of the hill sides had been modified by human development and occupied by agricultural lands. A small patch of native woodland was found at the back of Sheung Tsuen. The less disturbed areas were mainly the hillside shrubland areas. Bare land due to soil erosion was observed on the steep slopes, particularly at Fei Kei Teng. Aside from a small pier and typhoon shelter, the shoreline of South Soko remained natural and mainly consisted of rocks, boulders and sandy beaches.

1986

Before the construction of a Detention Centre in the late 1980's, the number of households in Ha Tsuen and Sheung Tsuen reduced to approximately 20 (Aerial Photograph 1986, *Figure 1.3*). The agricultural lands located near Sheung Tsuen were modified into a small reservoir lined with a concrete bund. Most of the agricultural lands were either abandoned and covered by grasses and shrubs or modified into livestock farms. Plantation woodland was found surrounding Sheung Tsuen. The shoreline remained natural and mainly consisted of rocks, boulders and sandy beaches. Fish culture activities with a number of fish cages were observed in Sai Wan.

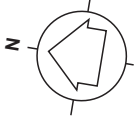
1989

Construction of the Detention Centre commenced in 1989 and was completed in 1991 (Aerial photograph 1989, *Figure 1.4*). The photograph presents the extent of the works areas during land formation for the Detention Centre facilities in the middle of the Island.

1994

During the early 1990s the Detention Centre was operational and an aerial photograph from 1994 (*Figure 1.5*) presents the areas on the island that were used during this period. It is noticeable from the photographs that the

(1) ERM (1997) Stage 1 EIA for a New Power Station: Stage 1 EIA Report, Draft Report, prepared for the Hong Kong Electric Co Ltd.



Key
Agricultural Land
Village Development

Typhoon shelter



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Figure 1.2 Aerial Photograph of South Soko in 1963 -- A number of inhabitants were living at South Soko and most of the lowland areas were modified as agricultural land (source : Lands Department)

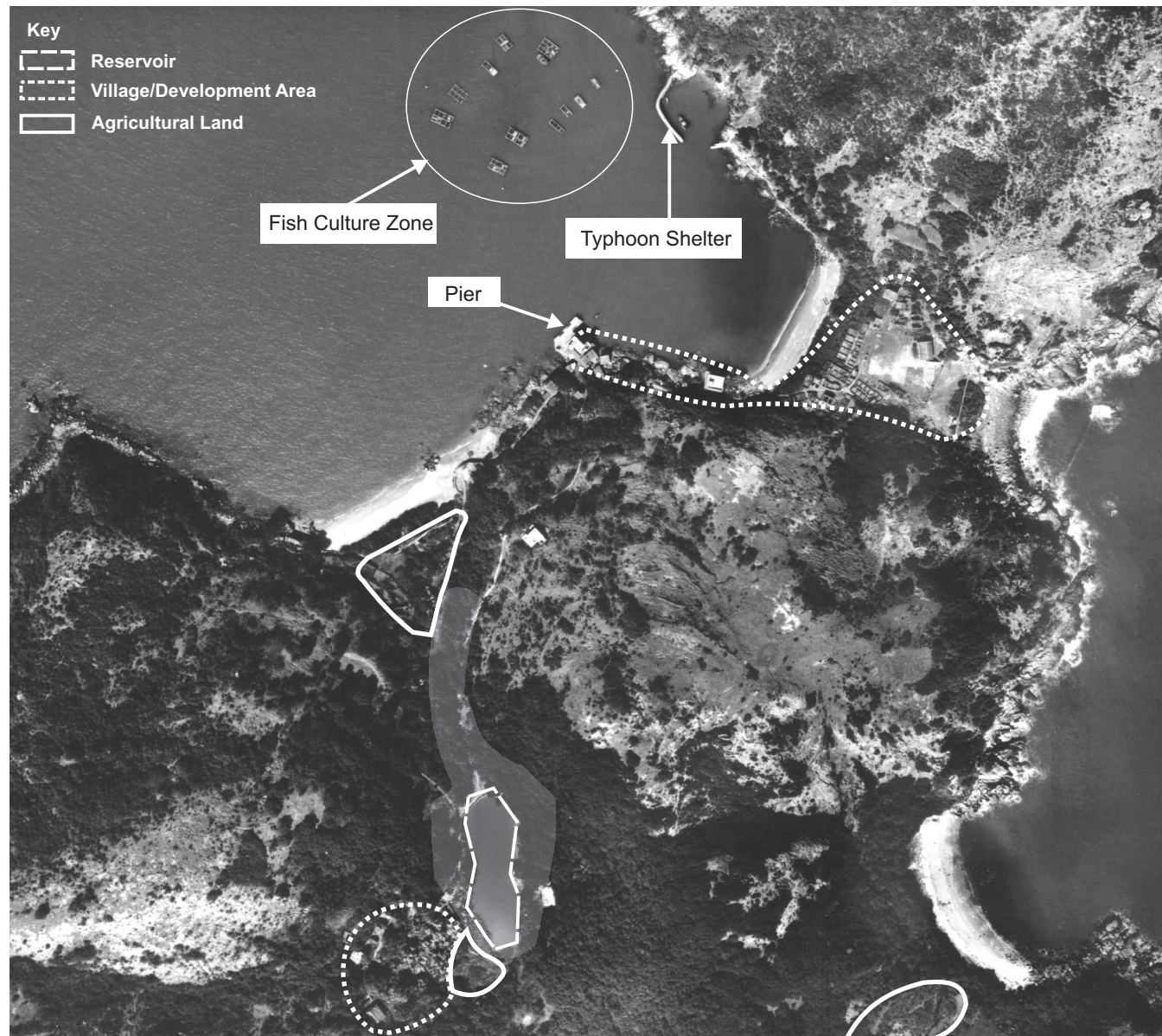


Figure 1.3

Aerial Photograph of South Soko at 1986 - South Soko supported a number of inhabitants during early 1980's.
Fish culture rafts were found in Sai Wan

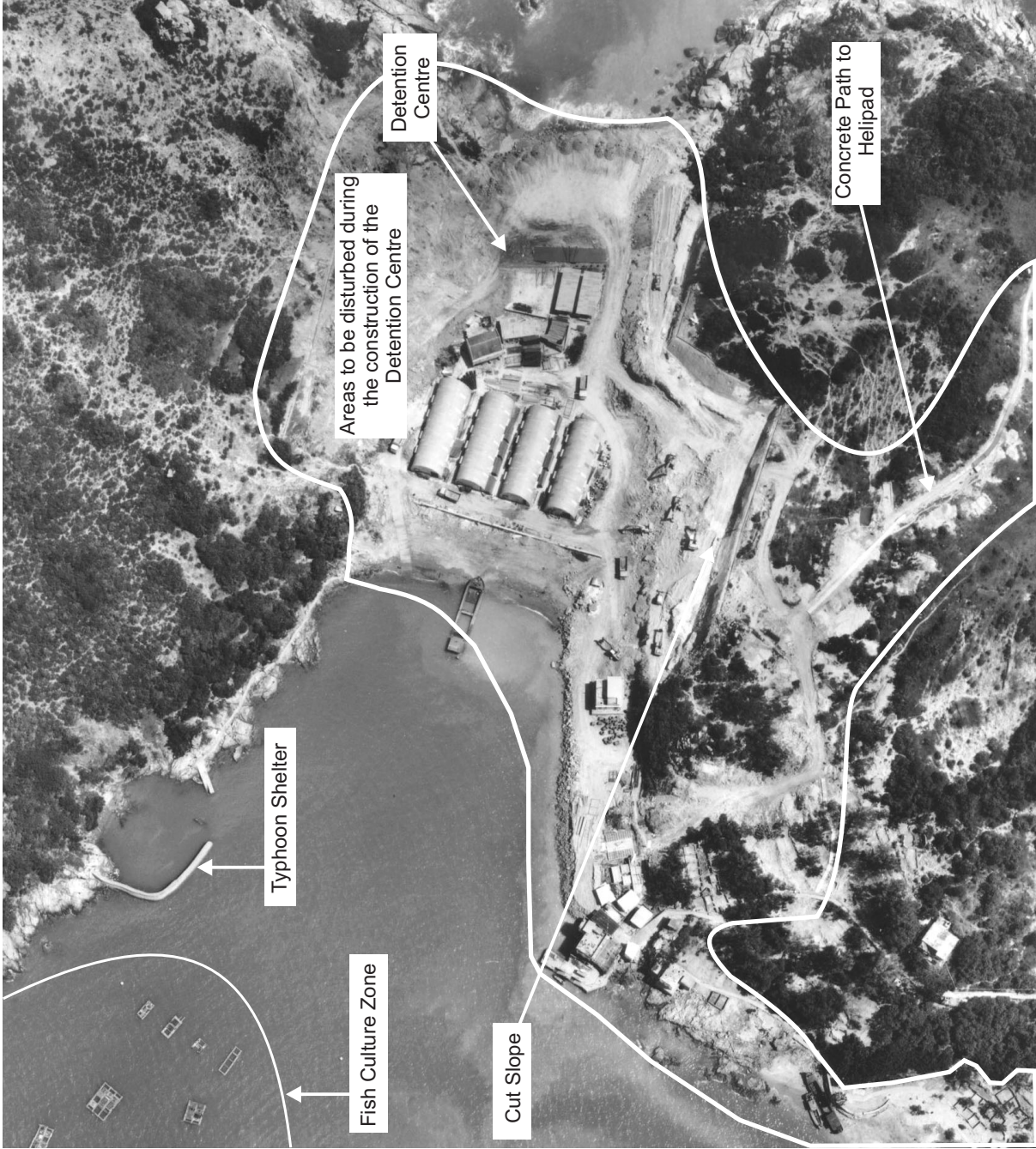
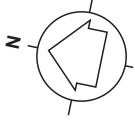


Figure 1.4

Aerial Photograph of South Soko at 1989 - Detention Centre was under construction



Figure 1.5

Aerial Photograph 1994

Detention Centre operations covered large portions of the Island with a network of access roads and paths to areas to the south. All of the villagers left the island before the construction works commenced and none have since returned.

The Detention Centre occupied the flat land in between Tung Wan and Sai Wan and reclaimed some shoreline of both bays. The hillsides at the south of the Detention Centre were modified into cut slopes and all the vegetation above was removed. A cemented path was constructed to link the Detention Centre to the top of the hill, which was developed as a helipad. All of the constructed areas around the helipad were hydroseeded to form grassland. The reservoir was used for water storage and with plantation of trees around the fringes of the reservoir. The natural shoreline of Sai Wan was modified into an artificial shore with piers constructed at the north and south edges of Sai Wan. The natural shoreline of Tung Wan was also modified into artificial shore with rocks and boulders. All of the agricultural lands have been abandoned since this period.

Present Condition

Before 1997, the Detention Centre was cleared and all the building structures were demolished and abandoned as wasteland. The island is presently abandoned with no inhabitants (aerial photograph 2004, *Figure 1.6*). The concrete paths and the remaining structures of the development have, over time, become covered by climbers and grasses.

The marine waters around the South Soko Island (and North Soko Island) have been identified as a proposed marine park by AFCD. To date though, no statutory plans have been gazetted for designating the waters as a Marine Park and, the recent publication of the Lantau Concept Plan has acknowledged that there are competing uses for the South Soko Island including the LNG terminal and a spa resort.

1.4 SCOPING OF ENVIRONMENTAL ISSUES

The potential environmental impacts which may arise from the construction and operation of the terminal and associated facilities were identified and discussed in the Project Profile for this EIA. The specific scope for the EIA of the South Soko option is presented in **Clause 3.2** of the EIA Study Brief.

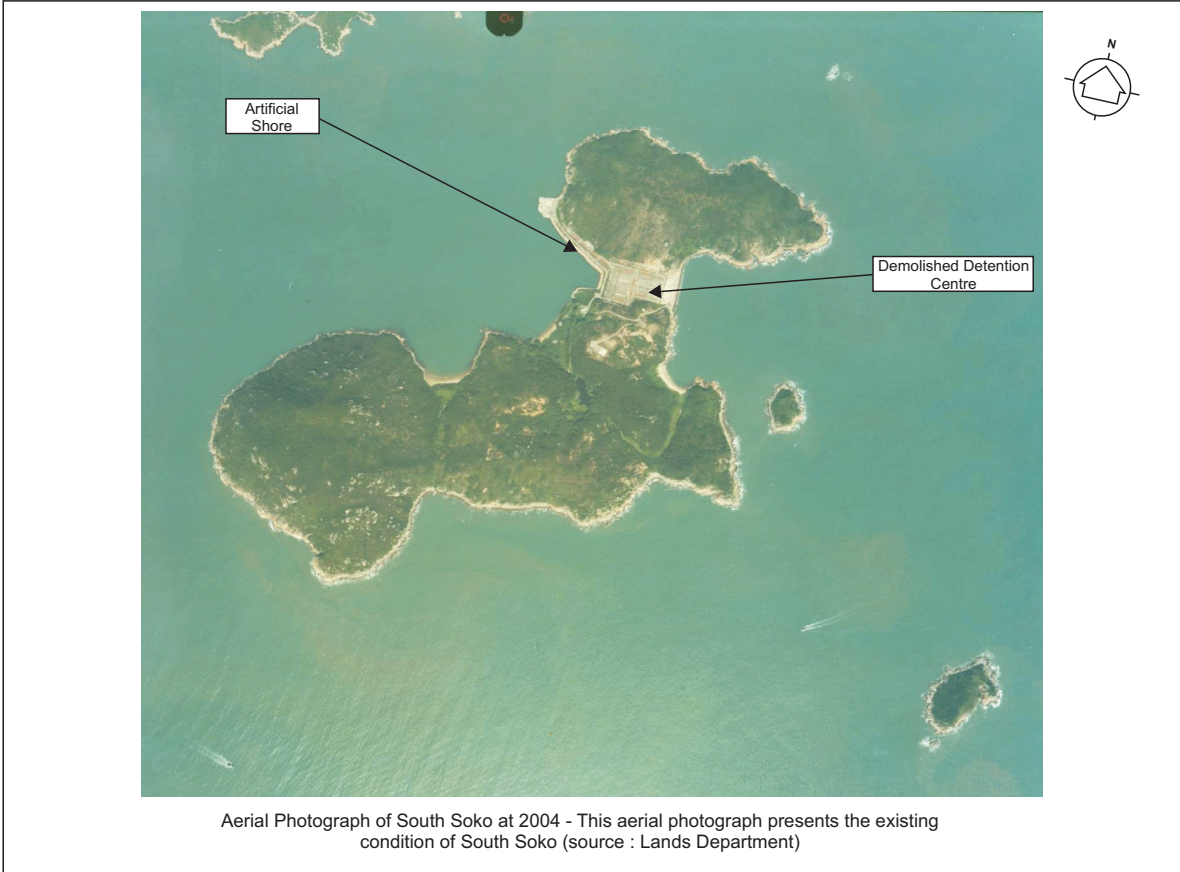


Figure 1.6 Existing Condition of South Soko (Photographs Taken in 2004)

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1.5

STRUCTURE OF THE REPORT

Following this introductory section, the remainder of this *Section* is arranged as follows:

- Section 2* This section of the EIA report presents the findings of assessments conducted by ERM on behalf of CAPCO in considering alternative layout and design options for the LNG terminal at South Soko. This review of options has also examined alternative routing options for the submarine gas pipeline, water main and cable circuit that form part of the LNG terminal. This section concludes with an introduction to the preferred scenario for a LNG terminal at the South Soko Island.
- Section 3* Provides a description of the Project highlighting the key infrastructure to be constructed, the timeline for implementing the Project and the operational activities. This section forms the basis of the technical assessments presented in *Sections 4 – 14* below.
- Section 4* Presents details of an assessment of impacts from the construction and operation of the LNG terminal to air quality sensitive receivers.
- Section 5* Presents details of an assessment of impacts from the construction and operation of the LNG terminal to noise sensitive receivers.
- Section 6* Details the assessment of impacts to water quality sensitive receivers arising from the construction and operation of the LNG terminal.
- Section 7* Presents the waste management implications from construction and operation of the LNG terminal.
- Section 8* Details the assessment of impacts to terrestrial ecological resources arising from the construction and operation of the LNG terminal.
- Section 9* Presents details of an assessment of impacts from the construction and operation of the LNG terminal to marine ecological resources.
- Section 10* Details the assessment of impacts to fisheries resources and fishing operations arising from the construction and operation of the LNG terminal.

- Section 11* Presents the details of an assessment of impacts from the construction and operation of the LNG terminal to landscape and visual sensitive receivers.
- Section 12* Details the assessment of impacts from the construction and operation of the LNG terminal to cultural heritage resources.
- Section 13* Presents the quantitative risk assessment from the operation of the LNG terminal.
- Section 14* Describes the measures that are to be adopted in the operational phase of the LNG terminal to prevent land contamination.
- Section 15* Presents a summary of the environmental outcomes of the EIA of the South Soko option.
- Section 16* Presents the environmental performance comparison of the South Soko option and the Black Point option.
- Section 17* Introduces a summary of the environmental monitoring and audit (EM&A) measures for the Project.
- Section 18* Presents the conclusions of the EIA on the South Soko option.