



土木工程署  
Civil Engineering Department

偉信

Scott  
Wilson

The Government of the Hong Kong Special Administrative Region  
香港特別行政區政府

Agreement No CE 18/98

# Penny's Bay Reclamation Design and Construction

EM&A Manual  
for Penny's Bay Reclamation  
(with IEC Check Certificate)  
(Rev. 4 - Final)

December 2000

VEP-018/2000/A/  
EP-054

**Civil Engineering Department**

**Agreement No. CE18/98**

**Penny's Bay Reclamation  
Design and Construction**

**EM&A Manual  
for Penny's Bay Reclamation  
(with IEC Check Certificate)**

**(Rev. 4 - Final)**

**December 2000**

**Scott Wilson (Hong Kong) Ltd**

本署檔號  
OUR REF:  
來函檔號  
YOUR REF:  
電話  
TEL. NO.:  
圖文傳真  
FAX NO.:  
電子郵件  
E-MAIL:  
網址  
HOMEPAGE: <http://www.info.gov.hk/epd/>

**Environmental Protection Department  
Headquarters**

28th Floor, Southorn Centre,  
130 Hennessy Road,  
Wan Chai, Hong Kong.

環境保護署總部  
香港灣仔  
軒尼詩道  
一百三十號  
修頓中心廿八樓

27 December, 2000

**Urgent By Fax and Post (27140103)**

Civil Engineering Department,  
3/F, Civil Engineering Building,  
101 Princess Margaret Road,  
Homantin, Kowloon  
(Attn: Mr. P. D. Morgan)

Dear Sir,

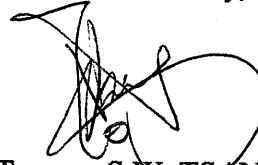
**Environmental Impact Assessment Ordinance (EIAO), Cap.499  
Environmental Permit (No. VEP-018/2000/A/EP-054)  
Penny's Bay Reclamation  
Environmental Monitoring and Audit Manual (Rev. 4 – Final)**

I refer to the letter from your Consultant, Scott Wilson (ref: 97323/M45/210/58988) dated 8 December 2000 submitting the captioned Environmental Monitoring and Audit (EM&A) Manual, on behalf of your department, for our consideration and approval under Condition 2.3 of the Environmental Permit (VEP-018/2000/A/EP-054).

As the submitted EM&A Manual are in compliance with the requirements stipulated under the Permit, approval is hereby given to the EM&A Manual (Rev. 4 – Final) under Condition 2.3 of the Permit.

If you have any question on the above, please contact the undersigned at TEL: 28351151.

Yours faithfully,



(Terence S.W. TSANG)

Acting Principal Environmental Protection Officer  
for Director of Environmental Protection

**C.C.**

Scott Wilson  
DAFC

(Attn: Mr. Phil Holmes)  
(Attn: Mr. Cary Ho)

29836181  
23774427

Internal: S(WP)4

Scott Wilson (Hong Kong) Ltd  
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Website [www.scottwilson.com](http://www.scottwilson.com)



(13)

Environmental Protection Department  
28th Floor Southorn Centre  
130 Hennessy Road  
Wanchai  
Hong Kong

Your Reference : (40)inAnnex(3)toEP2/N9/65XIII

Our Reference : 97323/M45/210/58988

Date : 8 December 2000

Attn.: Mr Terence Tsang

**BY HAND**

Dear Sirs

Agreement No. CE18/98  
Penny's Bay Reclamation – Design and Construction  
Environmental Permit No. VEP-018/2000/A/EP-054  
EM&A Manual (Rev. 4 - Final)

On behalf of the Permit Holder, we enclose four hard copies and one soft copy of the Final of EM&A Manual with IEC Check Certificate attached. The revised Manual has incorporated all the comments in your letter to CED of 14 November 2000, certified by the ET Leader and verified by the IEC.

Yours faithfully  
SCOTT WILSON (HONG KONG) LTD

Michael HENDY

DWKY/bpst

Encl.

cc CE/SD(W) (Attn: Mr Ken Wu) (fax 2714 0103) - w/ encl.  
Mouchel (Attn: Mr Steve Jones) (fax 2807 1577) - w/ encl.  
CRE/PB1 (Attn: Mr Phil Holmes) - w/ encl.  
HAM-HKC (Attn: Mr Hans Dieteren) - w/ encl.

By Hand  
By Hand  
By Hand  
By Hand

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**Associates** Harold T M Insley, Geoff A S Phillips, Jonathan Meigh, Tony A W Johnston, Arul A R Kumarasan, Peter K F Leung, Tong Wai-lok, Anthony H K Yung, Tommy W T Chani, David Hadley, Michael S Hendy **Company Secretary** Victor J Siddle

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ISO 9001 : 1994  
Certification No. CC213

Agreement No. CE 21/2000  
Environmental Monitoring and Audit  
for Penny's Bay Reclamation Stage 1

Mouchel Asia Limited

**INDEPENDENT ENVIRONMENTAL CHECKER  
CHECK CERTIFICATE**

**Contract No. CE 21/2000  
Penny's Bay Reclamation Stage 1  
EM&A Manual (Rev.4) for Penny's Bay Reclamation November 2000**

We confirm having used reasonable skill and care in the review of this report and we certify that the report complies with the Environmental Permit and the EIA report.

Signed:



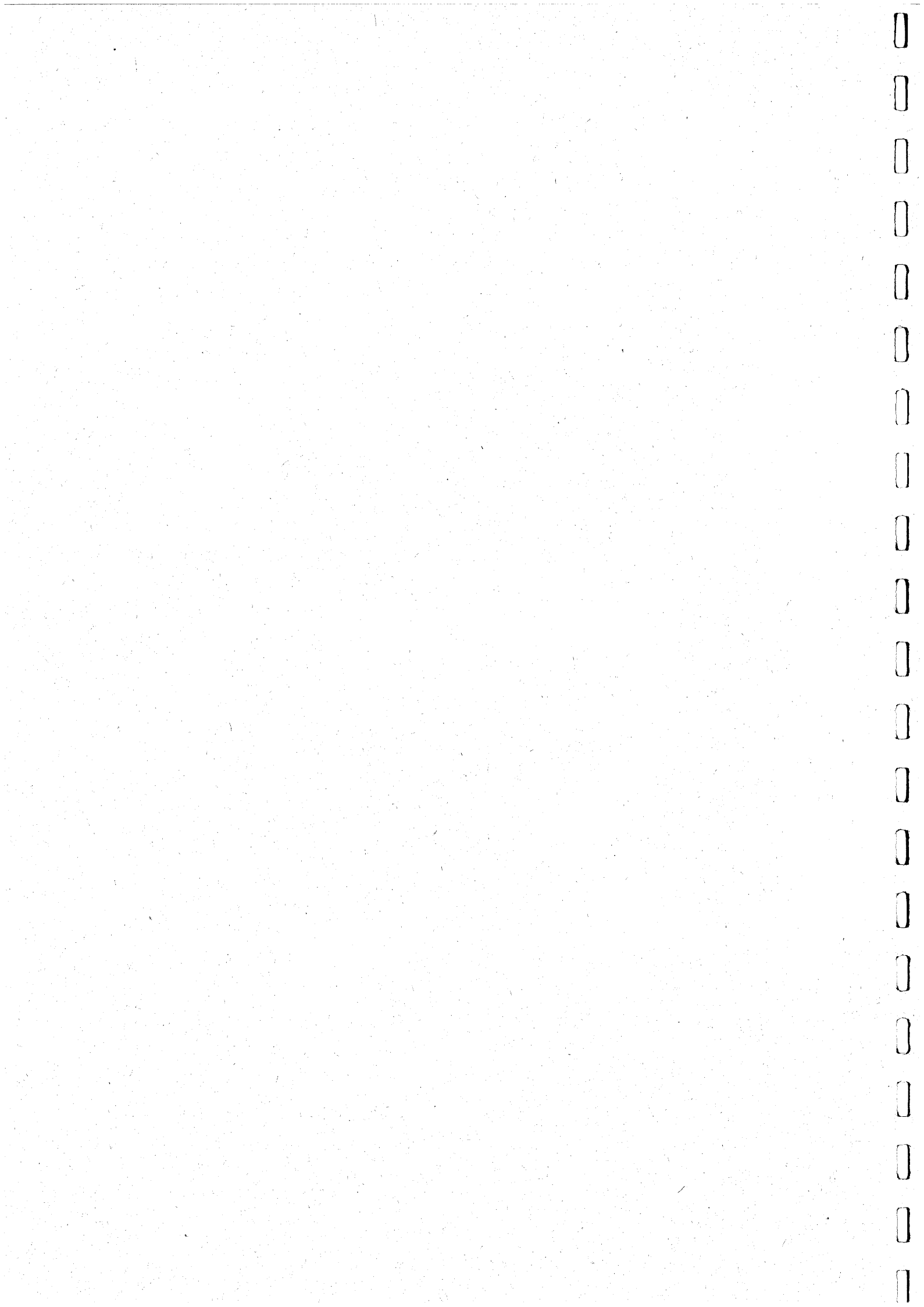
Independent Environmental Checker

Name:

S. V. Jones  
Director  
Mouchel Asia Limited

Date:

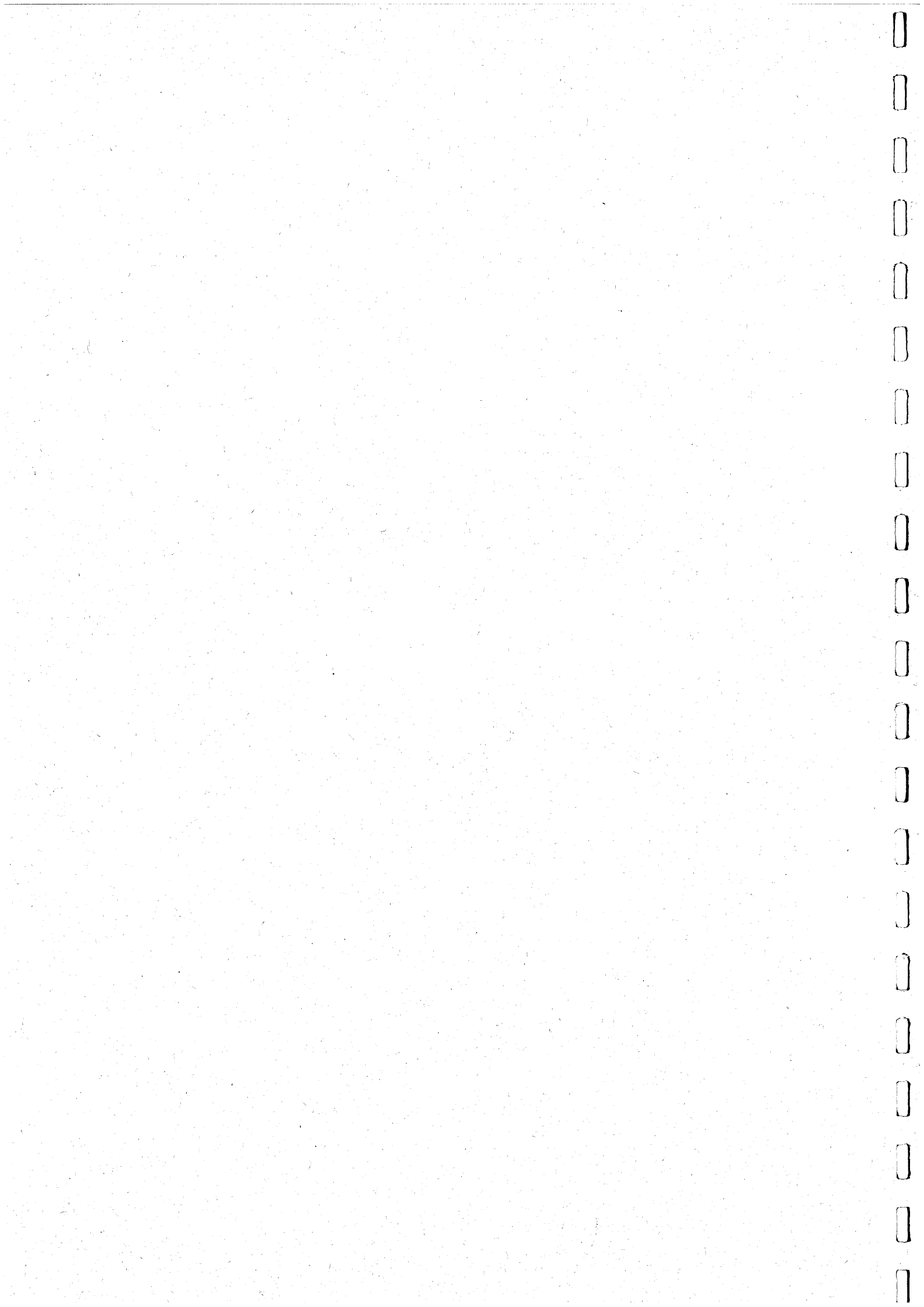
6/12/00



## **CONTENTS**

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- 1. Introduction**
- 2. Contract CV/99/12 Penny's Bay Reclamation Stage 1 EM&A Manual**
- 3. Penny's Bay Reclamation Supplementary EM&A Manual**



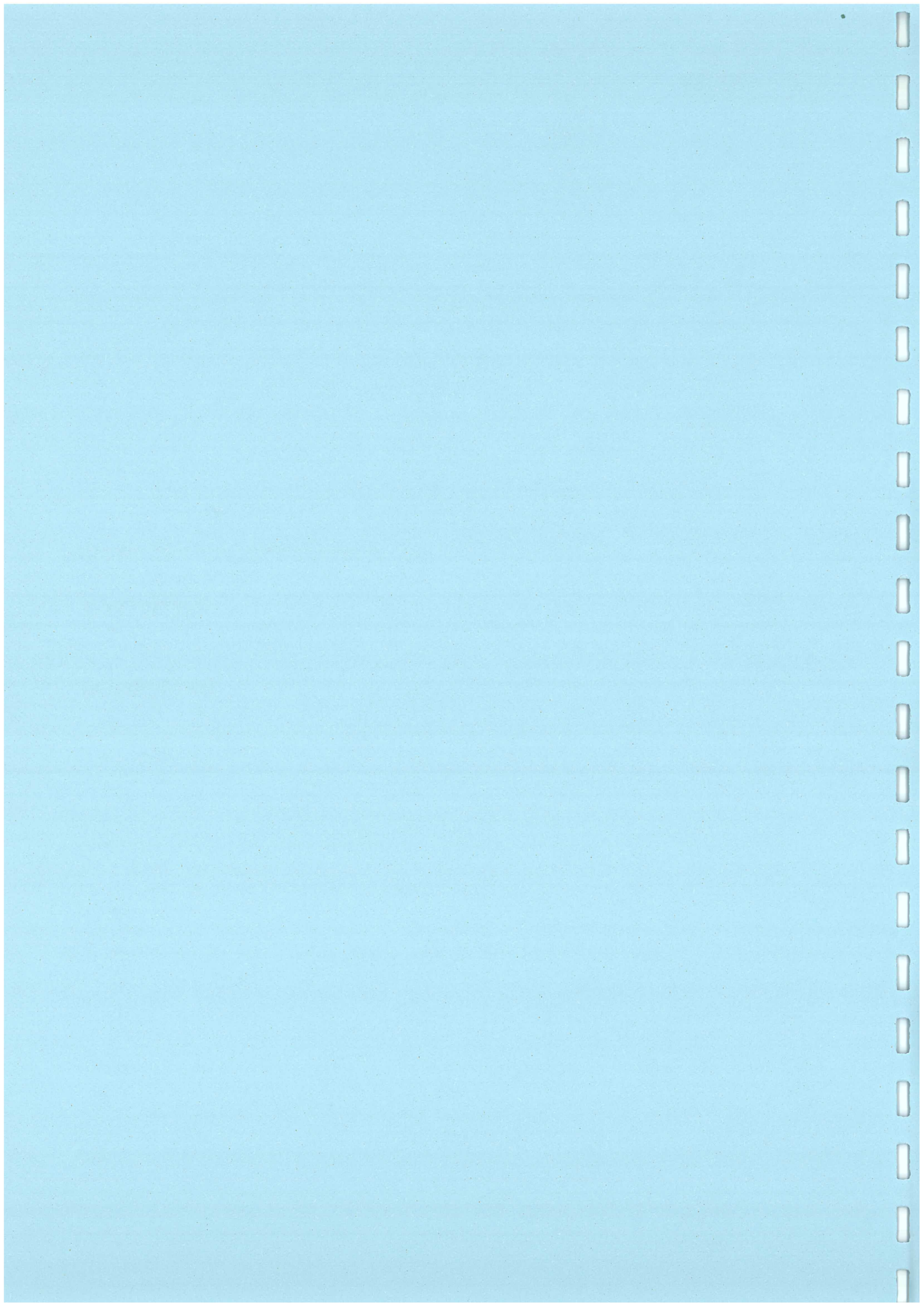


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**SECTION 1**

**Introduction**

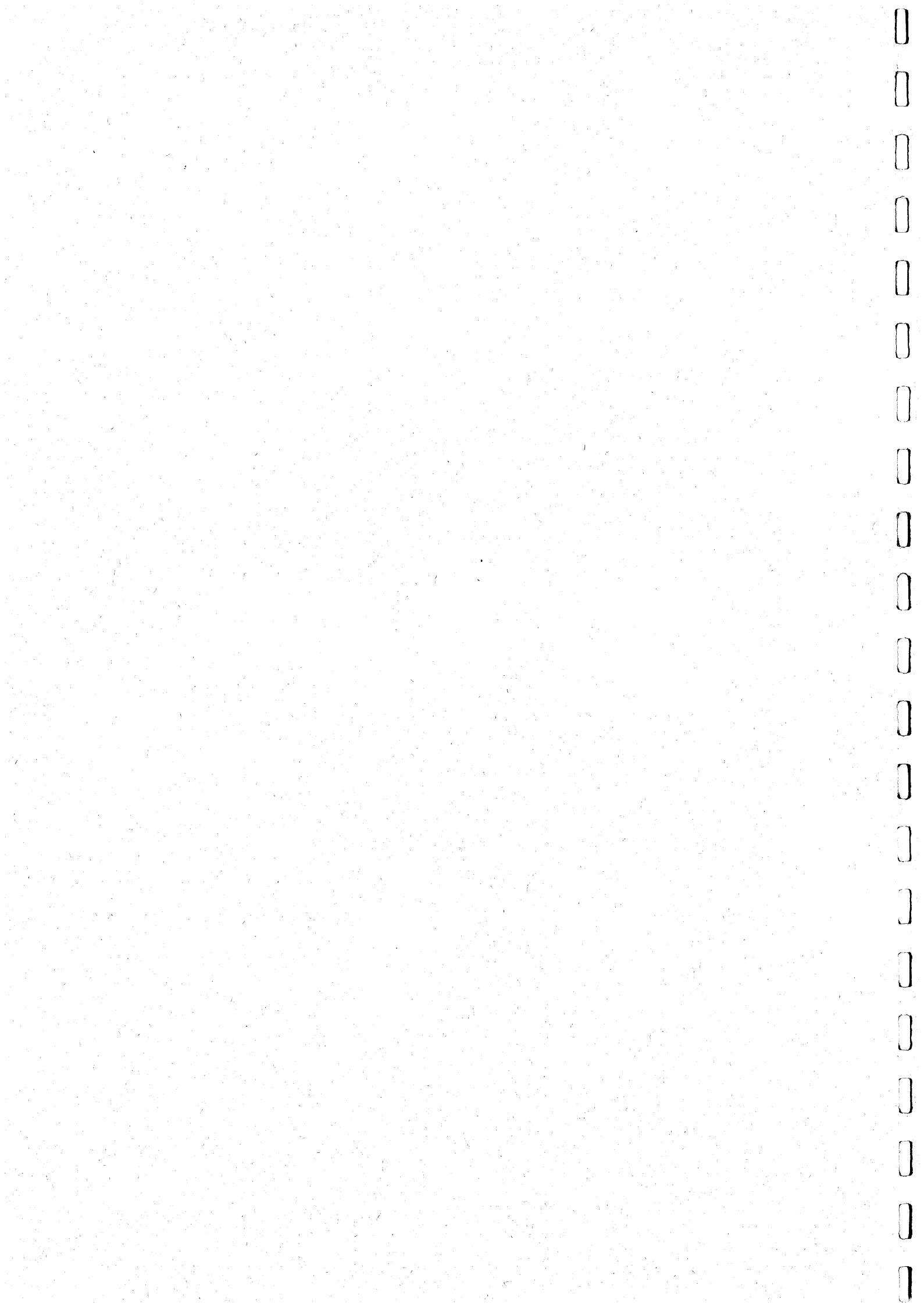
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## 1. INTRODUCTION

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- 1.1.1 In accordance with the Environmental Impact Assessment (EIA) Ordinance, Cap. 499, Environmental Protection Department (EPD) issued the Environmental Permit (EP) No. EP-054/2000 on 28 April 2000. The Permit was issued to Civil Engineering Department termed as the Permit Holder for the Designated Project entitled 'Penny's Bay Reclamation'. This covers reclamation of about 280 ha. of land at Penny's Bay, the construction of about 3.3km of seawall, two ferry piers and construction of about 1.5 km long open drainage channel. See Figure 1 of the EP which details the location of the Project and reclamation limit. An amended version of the EP No. VEP-018/2000/A/EP-054 was issued on 8 July 2000. The amended Permit incorporated a minor addition of a condition with regard to the earth berms. A copy of the amended EP is attached.
- 1.1.2 The relevant EIA is titled 'Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructures' dated 29 February 2000. It was endorsed by the Advisory Council on the Environment (ACE) with conditions on 17 April 2000 and approved under EIA Ordinance with conditions on 28 April 2000.
- 1.1.3 HAM-HKC JV were awarded the construction Contract: CV/99/12 Penny's Bay Reclamation Stage 1 by CED (Civil Engineering Department) on 8 May 2000 Contract. CV/99/12 covers the dredging and reclamation to form approximately 200 ha. of land, the construction of approximately 1,800m of permanent seawall and 1200m of temporary seawall to be extended later under a further contract and an access road and water supply from the existing Yam O Interchange to CLP's Power Station at Penny's Bay. A copy of the Key Plan extracted from the Stage 1 Construction Drawings is shown in Figure 1 outlining the extent of the Stage 1 works.
- 1.1.4 There are currently a number of design contracts being undertaken for the development of the Disneyland Theme Park at Penny's Bay.
- 1.1.5 Agreement No. CE 18/98 Penny's Bay Reclamation – Design and Construction encompasses both the Stage 1 and Stage 2 reclamations. The Stage 2 Reclamation consists of the reclamation of approximately 80 ha. of land, and the construction of 1500m of sloping seawall. The reclamation will be principally formed using public fill material. Any marine mud will be removed from under the seawalls only with the remainder of the area being constructed as a drained reclamation using vertical drains and surcharge. This project is currently at the preliminary design stage with detailed design likely to commence later this year. It is likely that the award of contract will be in 2002/2003, with a five year construction programme, although the programme is currently under review with CED.
- 1.1.6 Agreement No. CE 68/99 Infrastructure for Penny's Bay Development – Engineering Design and Construction (PBI) comprises the construction of the associated infrastructure in connection with the development of the Theme Park, the construction of the Penny's Bay Section of the Chok Ko Wan Link Road and carrying out the associated Public Transport Provision Study and Signage Study. The major works to be constructed include several roads, two public transport interchanges, a ferry pier, landscaping berms, recreation area including a lake, stormwater drainage system and other associated utilities.

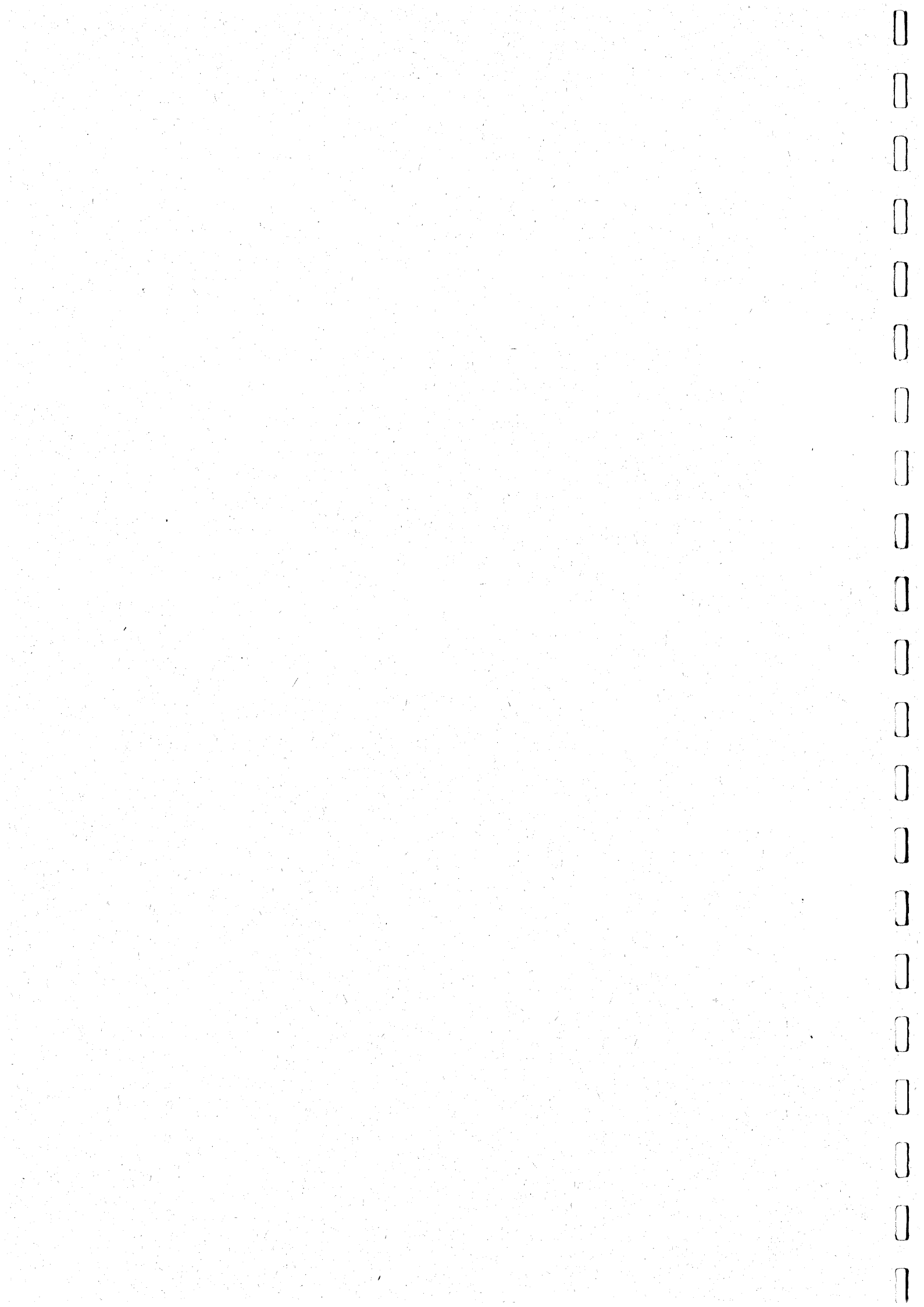


This agreement commenced in April 2000 and is currently at the beginning of the detailed design stage. It is envisaged that the construction contract for these works will commence in November 2001.

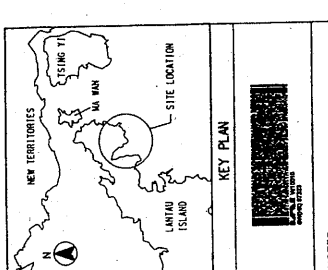
- 1.1.7 Agreement No. CAO J01 Landscaping Works for Penny's Bay Development – Design and Construction comprises the construction of landscaping works and associated infrastructures in connection with the development of the Theme Park. This involves both soft and hard landscaping works, architectural works and all aesthetic aspects of all infrastructure including road works, pedestrian walkways, public transport interchanges, landscaped berms, street furnishings, Water Recreation Centre and slope treatment works. This agreement commenced in July 2000 and will run concurrent with the PBI design agreement.
- 1.1.8 Agreement No. CE 48/2000 Pa Tau Kwu Section of Chok Ko Wan Link Road (PTK-CKWLR) in North Lantau – Engineering Design and Construction comprises the review and design of the PTK-CKWLR including highway structures and an embankment reclamation along the coast at Pau Tau Kwu. It is proposed that the design would be completed by January 2003 and the construction to meet the Route 10 North Lantau to Yuen Long interface deadline in 2007. This Agreement has not been awarded at the current time.
- 1.1.9 From these design consultancies it is anticipated that there will be a number of Construction Contracts, however at this current time it is unclear as to the exact number.
- 1.1.10 In order to comply with the EP (Condition 2.3) the Permit Holder shall submit to and obtain approval from the Director of Environmental Protection (DEP) an Environmental Monitoring and Audit (EM&A) Manual for the construction of the Project. The purpose of the Environmental Monitoring and Auditing is to assess, control and minimise/eliminate the environmental impacts of construction projects. It proposes corrective actions for compliance with statutory requirements and forms the provision of an environmental database recording abnormalities and documentation of corrective actions. The granting and validity of EP is subject to implementation of the EM&A programme. The EM&A Manual is a major aspect of the environmental monitoring and auditing processes and generally details the following:
- Project synopsis
  - Responsibility, organisation and management structure
  - Methodology
  - Equipment and calibrations
  - Locations, parameters, frequency and duration for baseline, impact and compliance monitoring
  - Specifications for Action and Limit levels
  - Detailed Event-Action Plan with mitigation measures
  - Review of procedures for monitoring results
  - Implementation programme for proposed mitigation measures
  - Impact prediction review procedures
  - Auditing procedures
  - Compliance and consultation procedures
  - Reporting format and procedures



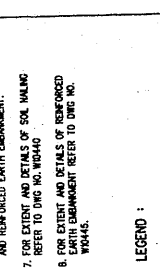
- 1.1.11 The EP covers the development site and therefore includes elements of work not covered by the Stage 1 Contract. Hence there is a need to produce an EM&A Manual that reflects this and will ensure that the requirements of Condition 2.3 of the EP are achieved. This Manual has been prepared to ensure compliance of the EP and is separated into sections as detailed below:
- 1.1.12 Section 2 contains the Contractor's submission for the Stage 1 Contract CV/99/12 and is included verbatim. The Contractor produced an EM&A Manual detailing the monitoring and auditing programme for all works under the Stage 1 Contract. This was submitted to EPD on 19 June 2000, six weeks after the commencement of the construction of the Project. EPD issued comments on this submission on 19 July 2000 (letter reference (20) in AX(3) to EP2/N9/O/65 V) and a revised version (Revision 2) was submitted to EPD on 3 August 2000. EPD issued further comments to this revision on 21 August 2000 (memo reference (16) in An(3) to EP2/N9/O/65 VII), and the current version of this report incorporating changes as requested by EPD is contained in Section 2.
- 1.1.13 The EM&A Manual produced by the Contractor for Contract CV/99/12 only covers the works for the Stage 1 reclamation. A revised EM&A Manual which meet the requirements as stipulated in the Environmental Permit for Penny's Bay Reclamation was prepared covering all other aspects not defined in this Contract. This was to ensure the full implementation of the EM&A programme for the Penny's Bay Reclamation. The Supplementary EM&A Manual was prepared by ERM and submitted to EPD on 2 August 2000. Comments on the Supplementary EM&A Manual were received from EPD on 21 August 2000 (memo reference (16) in An(3) to EP2/N9/O/65 VII) and is incorporated.







- NOTES:
1. COORDINATES ARE RELATED TO HONG KONG METRIC GRID (1980).
  2. ALL LEVELS ARE IN METRES ABOVE HONG KONG PRINCIPAL DATUM (H.K.P.D.).
  3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
  4. THE SOUTHERN SITE BOUNDARY CONFORMS WITH THE SOUTHERN BOUNDARY OF THE SOUTHERN AND EXTENSION SEAWALLS.
  5. THE RATE OF RECLAMATION AND SURCHARGED BUILD UP IN THE SPECIAL EMERGENCY ZONE ARE BASED ON THE ENGINEER'S ASSESSMENT OF THE GROUND PERFORMANCE IN THE SPECIAL MONITORING ZONE.
  6. SECTION OF ACCESS ROAD INCLUDES SOIL WALKING AND REINFORCED EARTH EMBANKMENT.
  7. FOR EXTENT AND DETAILS OF SOIL WALKING REFER TO DWG NO. W0440.
  8. FOR EXTENT AND DETAILS OF REINFORCED EARTH EMBANKMENT REFER TO DWG NO. W0445.



REDUCED TO 50% OF THE ORIGINAL FOR A3 SIZE DRAWING

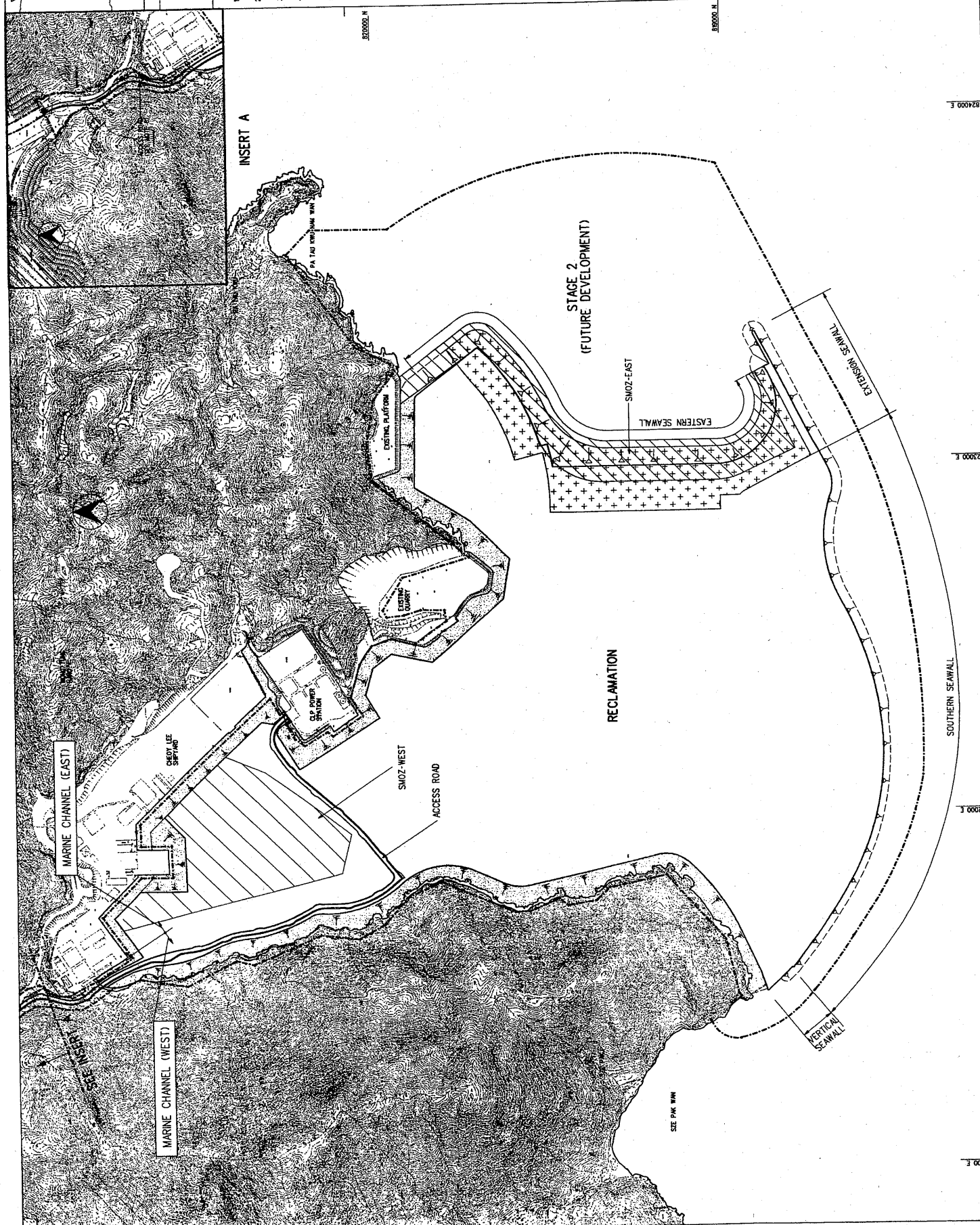
CIVIL ENGINEERING DEPARTMENT  
土木工務署

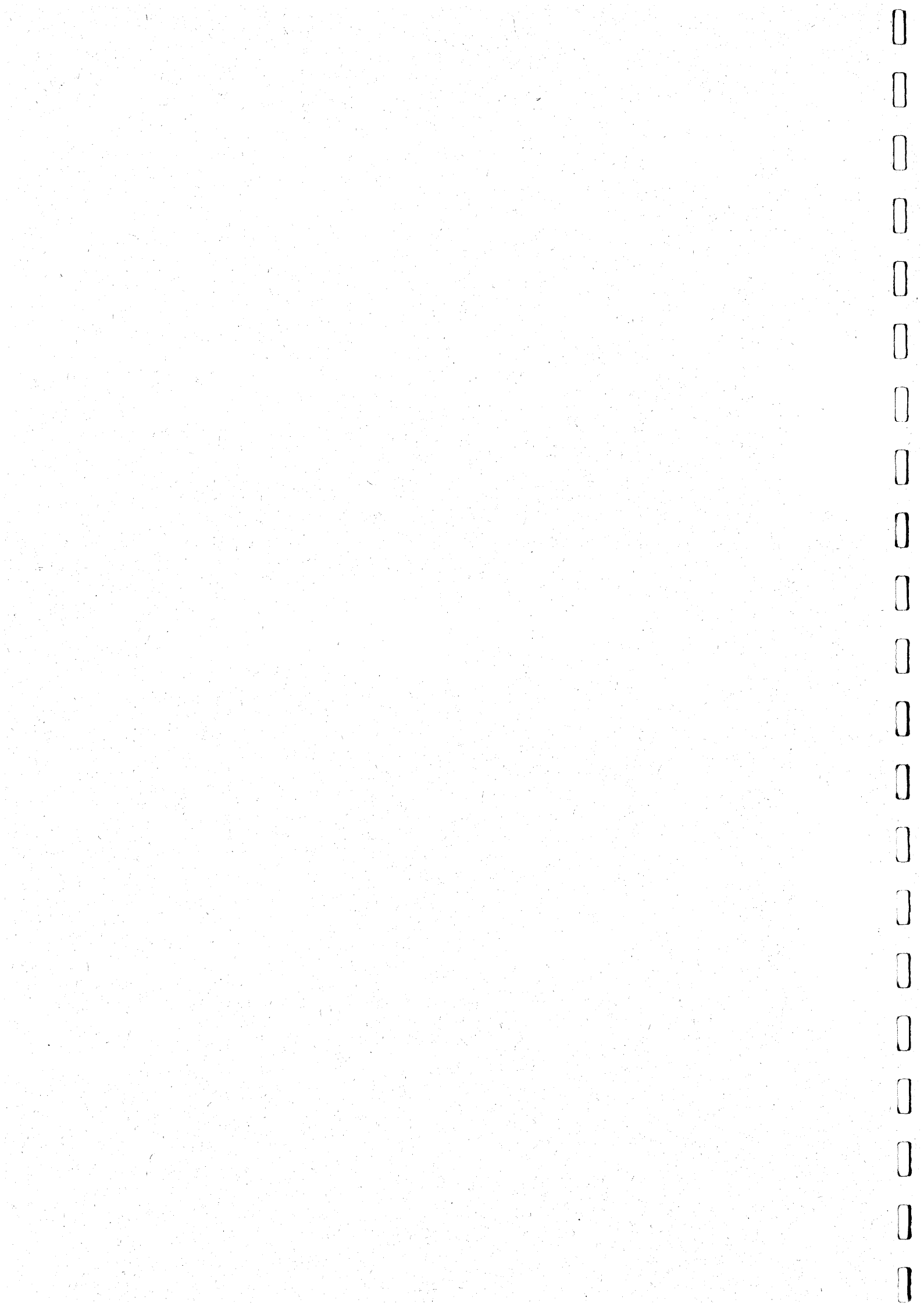
CONTRACT C/1/89/72  
PENNY'S BAY RECLAMATION  
STAGE 1

KEY PLAN

Drawing No.	W10010		
Scale	1:1000	1:2000	1:5000
Drawn	W/S	W/S	W/S
Checked	W/S	W/S	W/S
Approved	W/S	W/S	W/S
Date	19/12/90	19/12/90	19/12/90
Project	PENNY'S BAY RECLAMATION STAGE 1		

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Sloan Wilson (Hong Kong) Ltd  
Sloan Wilson (香港)有限公司





檔號 REF: Annex (3) to EP2/N9/O/65

YOUR REF: 2835 1105  
電話 TEL. NO.: 2835 1105  
圖文傳真 FAX NO.: 2591 0558

Hong Kong Government  
Environmental Protection Department  
Headquarters  
28th Floor, Southorn Centre,  
130 Hennessy Road,  
Wan Chai, Hong Kong.

Env.	24
Answered	香港灣仔
Answered	軒尼詩道
Answered	一百三十一號
	修頓中心B大樓

8 July, 2000

Civil Engineering Department  
3/F, Civil Engineering Building,  
101 Princess Margaret Road,  
Homantin,  
Kowloon  
(Attn: Mr. P. D. Morgan)

RECEIVED ON A.M.
10 JUL 2000
SPECIAL DUTIES (W) DIV

Dear Mr. Morgan,

**Environmental Impact Assessment (EIA) Ordinance, Cap.499**  
**Application for Variation of an Environmental Permit**  
**Title of Project : Penny's Bay Reclamation**

I refer to your above application for variation of the Environmental Permit (No.EP-054/2000) on 6 July 2000 under Section 13(1) of the EIA Ordinance.

I am please to inform you that we have agreed to the proposed variations. Please find attached the English version of the amended Environmental Permit (No. VEP-018/2000/A/EP-054) for the captioned project signed by our Assistant Director. We shall send you the Chinese translation of Part C of the amended Environmental Permit once it is ready.

I would also like to remind you that in accordance with Sections 9 and 26 of the EIA Ordinance, it is an offence to construct or operate a designated project listed in Part I of Schedule 2 of the Ordinance without an Environmental Permit or contrary to the conditions Your attention is drawn to the provision that any person who constructs or operates this designated project contrary to the conditions in this Permit, if convicted of an offence under the Ordinance, is liable:-.

- (i) on a first conviction on indictment to a fine of \$2 million and to imprisonment for 6 months;
- (ii) on a second or subsequent conviction on indictment to a fine of \$5 million and to imprisonment for 2 years;
- (iii) on a first summary conviction to a fine at level 6 and to imprisonment for 6 months;
- (iv) on a second or subsequent summary conviction to a fine of \$1 million and to imprisonment for 1 year; and
- (v) in any case where the offence is of a continuing nature, the court or magistrate may impose a fine of \$10,000 for each day on which he is satisfied the offence continued.

f.i.

005146

SDW/CS 07-00196/03

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HKITP a C for T.

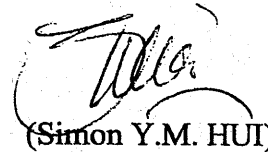
CR/ED/W	ER/W	ER/W	ER/W	SGE	SLA	E/W	E/W	E/W	E/W	PTO	PS	GR
10/7	✓	✓	✓	✓	✓							
B.U.	CC SG/W/											

E/W4  
K/H

Under section 15(h) of the EIA Ordinance, the Permit will be placed in the EIA Ordinance Register for public information and it will be uploaded to the EIA Ordinance website (<http://www.info.gov.hk/epd/eia>).

If you have any queries, please contact our Mr. Terence S.W. TSANG at Tel: 28351151.

Yours sincerely,



(Simon Y.M. HUI)

Principal Environmental Protection Officer  
for Director of Environmental Protection

c.c. ACE(Attn: Secretary to EIA Sub-Committee)

(fax:2136 3321)

**ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE**  
**(CHAPTER 499)**  
**Section 13**

**環境影響評估條例**  
**(第 499 章)**  
**第 13 條**

**ENVIRONMENTAL PERMIT TO CONSTRUCT AND OPERATE A DESIGNATED PROJECT**  
**建造及營辦指定工程項目的環境許可證**

**PART A (MAIN PERMIT)**  
**A 部 (許可證主要部分)**

Pursuant to Section 13 of the Environmental Impact Assessment Ordinance (the EIAO), the Director of Environmental Protection (the Director) amends the environmental permit EP-054/2000 granted to the Civil Engineering Department (hereinafter referred to as the "Permit Holder") on 28 April 2000. This amended Permit is for the construction and operation of the designated project described in Part B subject to the conditions specified in Part C. The Environmental Permit No. EP-054/2000 is hereby replaced by this amended Environmental Permit.

The issue of this amended environmental permit is based on the documents, approvals or permissions described below:

根據環境影響評估條例第 13 條的規定，環境保護署署長 (署長) 現修訂於 2000 年 4 月 28 日批予土木工程署 (下稱 "許可證持有人") 的環境許可證編號 EP-054/2000。許可證持有人可根據本經修訂的環境許可證建造和營辦 B 部所說明的指定工程項目，但須遵守 C 部所說明的條件。環境許可證編號 EP-054/2000 已被本經修訂的環境許可證所取代。

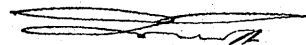
本經修訂的環境許可證乃依據下列文件、批准或許可條件而簽發—

<b>Application No.</b> 申請書編號	VEP-018/2000
<b>Conditions or matters for which approval of variation is sought</b>	Adding one condition which is Condition 3.10 of the current Environmental Permit No. EP-059/2000 to be transferred to this amended Permit.

<p><b>Document in the Register :</b> 登記冊上的文件 :</p>	<p>Environmental Impact Assessment – Construction of an International Theme Park in Penny’s Bay of North Lantau and its Essential Associated Infrastructure</p> <ul style="list-style-type: none"><li>- Final EIA Report</li><li>- Annex (Volume 1)</li><li>- Annex (Volume 2)</li><li>- Annex (Volume 3)</li><li>- Executive Summary</li></ul> <p>(Register No.: AEIAR-032/2000) [Hereinafter referred to as the EIA Report]</p> <p>The Director’s letter of approval of the EIA Report dated 28 April 2000, ref: (53) in Annex (3) to EP2/N9/O/65 III.</p> <p>Application for Variation of an Environmental Permit No. VEP-018/2000. [Hereafter referred to as “the Application VEP-018/2000”]</p> <p>Environmental Permit Issued – Permit No.: EP-054/2000 issued on 28 April 2000</p> <p>Environmental Permit Issued – Permit No.: EP-059/2000 issued on 6 May 2000</p> <p>北大嶼山竹篙灣國際主題公園及有關主要基礎設施建造工程 - 環境影響評估</p> <ul style="list-style-type: none"><li>環境影響評估報告</li><li>附件 (第一冊)</li><li>附件 (第二冊)</li><li>附件 (第三冊)</li><li>摘要</li></ul> <p>(登記冊編號: AEIAR-032/2000) [下稱“環評報告”]</p> <p>環境保護署署長於二〇〇〇年四月廿八日發出批准環評報告的信件 (檔案編號: (53) in Annex (3) to EP2/N9/O/65 III)</p> <p>申請更改環境許可證編號 VEP-018/2000。 [下稱“申請書編號 VEP-018/2000”]</p> <p>已簽發的環境許可證 - 許可證編號: EP-054/2000; 於2000年4月28日簽發</p> <p>已簽發的環境許可證 - 許可證編號: EP-059/2000; 於2000年5月6日簽發</p>
--	--

8/7/2000

Date  
日期



(Elvis W. K. AU)  
Assistant Director  
(Environmental Assessment and Noise)  
for the Director of Environmental Protection  
環境保護署署長  
(助理署長(環境評估及噪音) 區偉光 代行)

**PART B (DESCRIPTIONS OF DESIGNATED PROJECT)**

**B 部 (指定工程項目的說明)**

Hereunder is the description of the designated project mentioned in Part A of this environmental permit (hereinafter referred to as the "Permit"):

下列為本環境許可證(下稱“許可證”)A 部所提述的指定工程項目的說明:

<b>Title of Designated Project</b> 指定工程項目的名稱	Penny's Bay Reclamation [This designated project is hereinafter referred to as "the Project"] 竹篙灣填海工程 [本指定工程項目下稱“工程項目”]
<b>Nature of Designated Project</b> 指定工程項目的性質	Reclamation works (including associated dredging works) of approximately 280 ha. in size. 建造及營辦面積約為 280 公頃的填海工程(包括相聯挖泥工程)。
<b>Location of Designated Project</b> 指定工程項目的地點	Penny's Bay, Lantau. The location of the project is shown on Figure 1 attached to this Permit 大嶼山竹篙灣。工程項目的地點載於本環境許可證的圖 1
<b>Scale and Scope of Designated Project(s)</b> 指定工程項目的規模和範圍	Reclamation of about 280 ha. of land at Penny's Bay as shown on Figure 1 attached to this Permit, construction of about 3.3 km of seawall, two ferry piers and construction of about 1.5 km long open drainage channel. 在竹篙灣進行面積約 280 公頃的填海、築建約 3.3 千米長的海堤、兩個渡輪碼頭及約 1.5 千米長的排水渠。

## PART C (PERMIT CONDITIONS)

### 1. General Conditions

- 1.1 The Permit Holder shall ensure full compliance with all conditions of this environmental permit. Any non-compliance may constitute a contravention of the EIAO and may become subject of appropriate action being taken under the Ordinance.
- 1.2 The Permit Holder shall ensure full compliance with all legislation from time to time in force including without limitation the Noise Control Ordinance (Cap. 400), Air Pollution Control Ordinance (Cap. 311), Water Pollution Control Ordinance (Cap. 358), Dumping at Sea Ordinance (Cap. 466), Waste Disposal Ordinance (Cap. 354). This Permit does not of itself constitute any ground of defense against any proceedings instituted under any legislation.
- 1.3 The Permit Holder shall make copies of this Permit together with all documents referred to in this Permit or the documents referred to in Part A of the Permit readily available at all times for inspection by the Director at all sites/offices covered by this Permit. Any reference to the Permit shall include all documents referred to in the Permit and also the relevant documents in the Register.
- 1.4 The Permit Holder shall give a copy of this Permit to the person(s) in charge of the site(s) and ensure that such person(s) fully understands all conditions and all requirements incorporated by the Permit.
- 1.5 The Permit Holder shall display a copy of this Permit on the construction site at all vehicular site entrances/exits or at a convenient location for public's information at all times. The Permit Holder shall ensure that the most updated information about the Permit, including any amended permit, is displayed at such locations. If the Permit Holder surrenders a part or the whole of the Permit, the notice he sends to the Director shall also be displayed at the same locations as the original Permit. The suspended, varied or cancelled Permit shall be removed from the display at the construction site.
- 1.6 The Permit Holder shall construct and operate the Project as described in Part B of this Permit.
- 1.7 The Permit Holder shall ensure that the Project is designed, constructed and operated in accordance with the information and recommendations described in the EIA Report (Register No. AEIAR-032/2000); other relevant documents in the Register; and the information or mitigation measures described in this Permit, or mitigation measures to be recommended in submissions that shall be deposited with or approved by the Director as a result of permit conditions contained in this Permit, or mitigation measures to be recommended under on-going surveillance and monitoring activities during all stages of the Project. Where recommendations referred to in the documents of the Register are not expressly referred to in this Permit, such recommendations are nevertheless to be implemented unless expressly excluded or impliedly amended in this Permit.



- 1.8 All deposited submissions as required under this Permit, shall be rectified in accordance with the comments, if any, made by the Director, within one month of the receipt of the Director's comments or otherwise specified by the Director.
- 1.9 All submissions approved by the Director, all submissions deposited without comments by the Director, or all submissions rectified in accordance with comments by the Director under this Permit shall be construed as part of the permit conditions described in Part C of this Permit. Any variation of the submissions shall be approved by the Director in writing or as prescribed in the relevant permit conditions. Any non-compliance with the submissions may constitute a contravention of the EIAO. All submissions or any variations of the submissions shall be verified and certified by the Independent Environmental Checker (IEC) or the Environmental Team (ET) Leader referred to in Condition 2.1 and 2.2 below, before submitting to the Director under this Permit.
- 1.10 The Permit Holder shall release all finalized submissions, as required under this Permit, to the public by depositing copies in the Environmental Impact Assessment Ordinance Register Office, or in any other places, or any internet websites as specified by the Director, or by any other means as specified by the Director for public inspection. For this purpose, the Permit Holder shall provide sufficient copies of the submissions.
- 1.11 The Permit Holder shall notify the Director in writing the commencement date of construction of the Project at least one week prior to the commencement of any major dredging or filling activities of the Project. The Permit Holder shall notify the Director in writing immediately if there is any change of the commencement date of the construction.
- 1.12 All submissions to the Director required under this Permit shall be delivered either in person or by registered mail to the Environmental Impact Assessment Ordinance Register Office at 27/F, Southorn Centre, 130 Hennessy Road, Wanchai, Hong Kong.

2. **Special Conditions**

- 2.1 An Independent Environmental Checker (IEC) shall be employed within two weeks after the commencement of construction of the Project. The IEC shall have at least 7 years' experience in environmental monitoring and audit (EM&A) or environmental management. The IEC shall audit the overall EM&A programme including the implementation of all environmental mitigation measures, submissions relating to EM&A, and any other submissions required under this Permit. In addition, the IEC shall be responsible for verifying and certifying the environmental acceptability of permanent and temporary works, relevant design plans and submissions under this Permit.
- 2.2 An Environmental Team (ET) shall be established within two weeks after the commencement of construction of the Project. The ET shall be headed by the ET Leader who shall have at least 7 years' experience in EM&A or environmental

management. The ET Leader shall be responsible for the implementation of the EM&A programme in accordance with the EM&A requirements as contained in the approved EM&A Manual submitted and approved under Condition 2.3 of this Permit.

- 2.3 No later than 6 weeks after commencement of the construction of the Project, the Permit Holder shall submit to and obtain approval from the Director an Environmental Monitoring and Audit (EM&A) Manual for the construction of the Project. The EM&A Manual approved under this condition shall hereafter be referred to as the EM&A Manual.
- 2.4 Before the submission of the EM&A Manual required under Condition 2.3 to the Director, the EM&A Manual shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report including without limitation the details of the monitoring of the transplanted species as described in Condition 2.22 and monitoring of the rehabilitation in the sloping seawall as described in Condition 2.29. All measures recommended in the EM&A Manual shall be fully implemented in accordance with the requirements and time schedule(s) set out in the EM&A Manual.
- 2.5 Prior to the approval of the EM&A Manual submitted under Condition 2.3, water quality monitoring shall be carried out in accordance with the requirements as contained in Section 7 of Annex N of the EIA Report, unless otherwise specified by the Director.
- 2.6 To oversee the cumulative environmental impacts arising from the developments in Penny's Bay and the adjoining areas, the Permit Holder shall set up an independent Environmental Project Office (ENPO) in accordance with Section 3 of Annex N in the EIA Report. The ENPO shall be formed on or before 1 December 2001 or within 2 months as directed by the Director in the event there is a need to control multiple contracts within the Penny's Bay and the adjoining areas.
- 2.7 The Permit Holder shall, within 4 weeks after the commencement of construction of the Project, inform the Director in writing the management organization of the main construction companies and/or any form of joint ventures associated with the construction of the Project. The submitted information shall include at least an organization chart, names of responsible persons and their contact details.
- 2.8 Three sets of Waste Management Plan for the construction stage of the Project shall be submitted to the Director for approval within 6 weeks after the commencement of construction of the Project. The Plan shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report. The Plan shall describe the arrangements for avoidance, reuse, recovery and recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities and shall include the recommended mitigation measures on waste management in Section 6.7 and Section 16 of the EIA Report. Such a management plan shall include the designation of areas for segregation and temporary storage of reusable and recyclable materials and

disposal location of different categories of waste. All measures in the approved Waste Management Plan shall be fully implemented throughout the construction period.

- 2.9 As recommended in Section 6.5.18 and Section 6.5.19 of the EIA Report, no less than 13 million m<sup>3</sup> of public fill shall be used in the project. Three sets of fill import programme shall be deposited with the Director within 6 weeks after the commencement of construction of the Project. The programme shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report and shall demonstrate that the total amount of public fill imported for the Project shall not be less than 13 million m<sup>3</sup>, unless otherwise agreed with the Director. The actual amount of fill imported for the Project shall be recorded and reported in the monthly EM&A report.

***Measures to Mitigate Water Quality Impacts***

- 2.10 As recommended in the EIA Report, those reclamation works described in Table 2.3a and Figure 2.3a of the EIA Report shall be designed and constructed by drained method as far as practicable. As indicated in Section 6.5.5 and Section 6.5.6 of the EIA Report, the volume of marine sediment to be dredged for the reclamation shall not be greater than 45 million m<sup>3</sup>, unless otherwise agreed with the Director. The actual amount of marine sediment dredged for the Project shall be recorded and reported in the monthly EM&A report.
- 2.11 The reclamation sequence shall be scheduled to avoid formation of embayed water bodies and prevent water pollution problems. Three sets of reclamation schedule shall be deposited with the Director within 6 weeks after the commencement of construction of the Project. The reclamation schedule shall be certified by the ET Leader and verified by the IEC as conforming to the recommendations contained in the EIA reports. The reclamation works shall be carried out according to the sequence as indicated in the reclamation schedule deposited with the Director, unless otherwise agreed with the Director.
- 2.12 To ensure that any fine sediment lost to suspension during the filling activities and operation of the re-handling basins shall not be dispersed outside the works area, any filling activities and operation of re-handling basins shall be carried out behind seawalls which shall be constructed to above high water level and at least 200 m in advance of the filling point or location of re-handling basins. In the event that the 200 meters lead of seawall construction is not practicable, other suitable barriers shall be implemented to provide an effective lead of 200 meters upon prior written approval by the Director.
- 2.13 To minimize water quality impacts during dredging and filling, the total maximum rates of dredging and filling shall be as described below:
- (a) Total maximum dredging rate by all trailing suction hopper dredgers shall not exceed 404,000 m<sup>3</sup> per week and the total maximum dredging rate by all 8.5m<sup>3</sup> grab dredgers shall not exceed 230,000 m<sup>3</sup> per week and total maximum filling rate by all trailing suction hopper dredger shall not exceed 331,600 m<sup>3</sup> per week;  
or

- (b) Total maximum dredging rate by all trailing suction hopper dredgers shall not exceed 291,000 m<sup>3</sup> per week and the total maximum dredging rate by all 8.5m<sup>3</sup> grab dredgers shall not exceed 230,000 m<sup>3</sup> per week and the total maximum filling rate by all trailing suction hopper dredgers shall not exceed 994,800 m<sup>3</sup> per week.
- 2.14 Any proposal to adopt a different combination of plant type and maximum dredging/filling rates shall be certified by the ET Leader and verified by the IEC and shall be submitted to the Director for approval. In any case, the total loss rate of fine sediment to suspension due to dredging and filling shall not be greater than 25.3 kgs<sup>-1</sup>. Before the Director's approval is obtained, the maximum dredging and filling rates as stated in Condition 2.13 shall be complied with.
- 2.15 Monitoring of Tributyl Tin (TBT), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) levels in waters shall be carried out before and during the initial phases of dredging operations in Penny's Bay. The details of the monitoring shall be included in the EM&A Manual submitted under Condition 2.3 of this Permit.
- 2.16 An additional water quality monitoring station shall be established at the Ma Wan Fish Culture Zone. The details of the monitoring shall be included in the EM&A Manual submitted under Condition 2.3 of this Permit.
- 2.17 The following general working methods shall be implemented during dredging and filling works to minimise the loss of fine sediment to suspension:
- (a) for dredging uncontaminated sediment tightly closing grabs shall be used to restrict the loss of fine sediment to suspension;
  - (b) when dredging mud at the reclamation site trailer dredgers shall be prohibited from overflowing or using Automatic Lean Mixture Overboard (ALMOB) systems;
  - (c) all barges used for the transport of dredged materials shall be fitted with tight bottom seals in order to prevent leakage of material during loading and transport; and
  - (d) 'Rainbowing' sand fill from trailer dredgers shall not be permitted except when the material is discharged onto areas above water level or in areas which are sheltered behind seawalls, or other suitable barriers, which have been constructed at least 200 m in advance of the discharge point
- 2.18 The Permit Holder shall deposit with the Director three sets of dredging plan for the area designated as "Lake" as shown in Figure 1 attached to this Permit before the dredging for the relevant part of works.
- 2.19 The Western Drainage Channel as shown in Figure 2 attached to this Permit shall be designed and constructed to retain the existing natural coastline of Penny's Bay.
- 2.20 All surface run-off from carparks, utility yards and public roads shall be collected,

treated by silt traps and oil and grit interceptors and shall not be discharged into the Western Drainage Channel prior to the commencement of construction of the drainage system. The design of the stormwater drainage system shall be certified by the ET Leader and verified by the IEC as conforming to the EIA Report.

- 2.21 To mitigate environmental impacts due to site runoff and other potential water pollution caused by construction activities, all mitigation measures described in Appendix A shall be implemented throughout the construction period.

***Measures to Mitigate Terrestrial Ecological Impacts***

- 2.22 No less than 6 ha. of compensatory tree planting shall be carried out at Ngong Sheung Au. Three sets of compensatory tree planting plan shall be deposited with the Director within 12 months after the commencement of construction of the Project. The compensatory tree planting plan shall be certified by the ET Leader and verified by the IEC as conforming to the recommendations in the EIA Report. The compensatory tree planting plan shall include information on the size and location of the planting site, species to be planted, schedule of the plantation works, the monitoring and maintenance arrangements of the planted trees. The Permit Holder shall carry out a monitoring programme for at least 3 years and a maintenance programme for at least 10 years after plantation by qualified botanists.
- 2.23 To avoid impacts on the rare/restricted/protected species including without limitation to Rice Fish (*Oryzias latipes*) in Mong Tung Hang Stream, Pitcher Plant (*Nepenthes mirabilis*), *Fimbristylis acuminata* and *Fimbristylis complanata* behind Cheoy Lee Shipyard, no works shall be carried out within the areas where rare/restricted/protected species are found as shown in Figure 7.6a of the EIA Report before the completion of a detailed vegetation survey. Three sets of detailed vegetation survey reports shall be deposited with the Director within 8 weeks after the commencement of construction of the Project. The survey report shall be certified by the ET Leader and verified by the IEC before submission. The survey report shall indicate the detailed setting out of the Project site boundary and demonstrate that the impacts are avoided or minimized to the most practicable extent. The survey report shall include a transplantation schedule and a 3-year monitoring programme after transplantation of the rare/restricted/protected species which will be affected by the construction activities. No construction works of the relevant part(s) of the Project shall be carried out prior to the transplantation of plant species.
- 2.24 Public land access from the Project works areas to Pa Tau Kwu shall be fenced off to prevent access of workers to the nesting site of the White-bellied Sea Eagles.
- 2.25 No construction activities, including transportation of equipment, shall be allowed at Pa Tau Kwu headland as shown in Figure 2 attached to this Permit.
- 2.26 To avoid disturbance to the White-bellied Sea Eagles at Pa Tau Kwu, quiet plant as described in Section 4.6.6 of the EIA report shall be adopted for any construction activities within areas as shown in Figure 2 attached to this Permit.
- 2.27 Monitoring of the White-bellied Sea Eagles at Pa Tau Kwu shall be carried out during the entire construction period. The details of the monitoring shall be included in the

EM&A Manual submitted under Condition 2.3 of this Permit.

- 2.28 The site working area shall not extend onto the natural slope and coastline of Tai Shan which is located adjacent to the Western Drainage Channel. The eastern slope of the channel shall be vegetated.

*Measures to Mitigate Marine Ecological & Fisheries Impacts*

- 2.29 The seawall shall be designed and constructed to allow for rehabilitation of sub-tidal and inter-tidal habitats. Three sets of seawall design drawings shall be deposited with the Director within 3 months after the commencement of the construction of the Project. The design drawings shall be certified by the ET Leader and verified by the IEC as conforming to the recommendations contained in the EIA Report and shall show the key design features to demonstrate that the seawall design can allow for rehabilitation of sub-tidal and inter-tidal habitats. The seawall shall be constructed in accordance with the deposited seawall design drawings deposited with the Director. Three sets of the as-built drawings of the seawall construction shall be deposited with the Director within 3 months after the completion of the seawall construction works to show that design features for rehabilitation of sub-tidal and inter-tidal habitats are actually built.
- 2.30 The Permit Holder shall undertake a three-year monitoring programme of the effectiveness of the sloping seawall as an ecological mitigation measure. If re-colonization of the corals occurs at a slow rate, the Permit Holder shall continue the monitoring for another three years. If re-colonization does not occur, the Permit Holder shall submit proposal on further mitigation measures to the Director for approval. The Permit Holder shall fully and properly implement the approved mitigation measures.
- 2.31 To enhance the sub-tidal habitat, the Permit Holder shall deploy at least 4,350 m<sup>3</sup> Artificial Reefs (ARs) as directed by the Director and the management arrangement worked out to the satisfaction of the Director. The Permit Holder shall submit the detailed design and implementation schedule of the ARs to the Director for approval at least 12 months before the completion of the reclamation. The Permit Holder shall deploy the AR in accordance with the approved schedule and details prior to the opening of the theme park in Penny's Bay.
- 2.32 To monitor the changes in subtidal conditions during construction, underwater video/photo taking shall be carried out in the regular environmental monitoring and audit programme. The details shall be included in the EM&A Manual submitted under Condition 2.3 of this Permit.
- 2.33 The speed of construction ferries and vessels shall not exceed 10 knots when passing through an area within 500 meters from the reclamation limit as shown in Figure 5 attached to this Permit.
- 2.34 No underwater blasting shall be carried out.
- 2.35 No underwater percussive piling shall be carried out between September to February

inclusive.

- 2.36 For underwater percussive piling carried out between March to August inclusive, the following mitigation measures shall be taken:
- (a) An exclusion zone of 500 m radius shall be scanned around the work area for at least 30 minutes prior to the start of the piling. If cetaceans are observed in the exclusion zone, piling shall be delayed until they have left the area;
  - (b) A bubble curtain shall be used to surround the piling barge and work area, and the bubble curtain shall be in operation during any time in which piling occurs; and
  - (c) The mitigation measures taken in (a) and (b) of this Condition shall be certified by the ET Leader and verified by the IEC as conforming to the recommendations contained in the EIA Report before any underwater piling works can be carried out.

***Measures to Mitigate Cultural Heritage Impacts***

- 2.37 The rescue excavation at Chok Ko Wan archaeological site shall be completed to the Director's satisfaction prior to any construction works commencing within the archeological site area as shown in Figure 3 attached to this Permit.
- 2.38 At the Wan Tuk archaeological site, the following mitigation measures in accordance with Section 11.7 of the EIA Report shall be implemented:
- (a) plastic sheets shall be used to cover the Wan Tuk archeological site area (as shown in Figure 4 attached to this Permit) before filling works and construction of the temporary access road;
  - (b) to prevent waterlogged conditions, no site runoff shall be allowed to discharge into the Wan Tuk archeological site area; and
  - (c) all the fill materials and plastic sheets within the Wan Tuk archeological site area shall be removed after completion of the Penny's Bay reclamation.

***Other Mitigation Measures***

- 2.39 To reduce the quantity of construction and demolition wastes, wood hoarding shall not be used.
- 2.40 No works except for investigation works necessary for the completion of the decommissioning EIA study for the shipyard, shall be carried out within the Cheoy Lee Shipyard at Penny's Bay.
- 2.41 Hydroseeding to reclamation shall be undertaken if the lapse time between the completion of the reclamation and subsequent development is one year or more.
- 2.42 The road surface of the maintenance road as shown in Figure 2 attached to this Permit

shall be formed with grasscrete or other form of reinforced vegetated surface.

- 2.43 The detailed design of the Western Drainage Channel and the maintenance road shall be certified by the ET Leader and verified by the IEC as conforming to the recommendations contained in the EIA Report prior to the construction of the channel.
- 2.44 All mitigation measures as described in the EM&A Manual and the submissions required under this Permit, shall be properly constructed and implemented.

**3. Submissions or Measures for the Operation of the Project**

- 3.1 *The following earth berms shall be constructed prior to the operation of the Theme Park:*
- (a) *Earth berms of 5 to 9 metres high shall be constructed to encircle the Theme Park as shown in Figure 6 attached to this Permit;*
  - (b) *Earth berms of at least 9 metres high shall be constructed to encircle the sewage pumping station as shown in Figure 6 attached to this Permit; and*
  - (c) *Earth berms of at least 9 metres high shall be constructed to encircle the Penny's Bay Gas Turbine Plant (GTP) as shown in Figure 6 attached to this Permit.*

**4. Environmental Monitoring and Audit (EM&A) during the Construction Period**

- 4.1 The EM&A programme shall be implemented in accordance with the procedures and requirements in the EM&A Manual. Any changes to the programme shall be justified by the IEC as conforming to the requirements set out in the EM&A Manual and shall be approved by the Director.
- 4.2 Samples and measurements shall be taken in accordance with the requirements in the EM&A Manual by:
- (a) conducting baseline monitoring on water quality, noise, air quality, terrestrial ecology as set out in the EM&A Manual.
  - (b) conducting impact monitoring on water quality, noise, air quality, terrestrial and marine ecology as set out in the EM&A Manual.
  - (c) carrying out remedial actions in accordance with the Event/Action Plans, as set out in the EM&A Manual, in cases where specified criteria in the EM&A Manual are exceeded, and;
  - (d) logging and keeping records of the details of (a) to (c) above, within 3 working days of the collection of data or completion of remedial action, for the purposes of preparing and submitting the monthly EM&A reports and to make available the information for inspection on site.



- 4.3 All environmental monitoring and audit data submitted under this Permit shall be true, valid and correct.
- 4.4 One hard copy and one soft copy of the Baseline Monitoring Report shall be submitted to the Director 1 week before the commencement of any major construction works that would affect the monitoring results. The submissions shall be certified by the ET Leader and verified by the IEC. Additional copies of the submission shall be provided to the Director upon request from the Director.
- 4.5 One hard copy and one soft copy of monthly EM&A Report shall be submitted to the Director within 2 weeks from the end of the reporting month. The submissions shall be certified by the ET Leader and verified by the IEC. Additional copies of the submission shall be provided to the Director upon request from the Director.
- 4.6 The actions described in the Event and Action Plans of the EM&A Manual shall be fully and properly carried out, in accordance with the time frame set out in the Event and Action Plans, or as agreed by the Director.
5. **Electronic Reporting of EM&A Information**
- 5.1 To enable the public inspection of the Baseline Monitoring Report, monthly EM&A Reports via the EIAO Internet Website and at the EIAO Register Office, electronic copies of monthly EM&A Reports shall be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by the Director and shall be submitted at the same time as the hard copies as described in Conditions 4.4 and 4.5. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EM&A Reports shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EM&A Reports shall be provided in the main text from where the respective references are made. All graphics in the report shall be in interlaced GIF format unless otherwise agreed by the Director. The content of the electronic copies of the monthly EM&A Reports must be the same as the hard copies.
- 5.2 All environmental monitoring data as described in Condition 5.1 above shall be made available to the public via internet access in the form of a website, in the shortest possible time and in no event later than 2 weeks after the relevant environmental monitoring data are collected or become available, unless otherwise agreed with the Director. The Permit Holder shall notify the Director in writing within 6 weeks after the commencement of works the internet address where the environmental monitoring data are to be placed. The internet address and the environmental monitoring data shall be made available to the public via the EIAO Internet Website and the EIAO Register Office.
- 5.3 The internet website as described in Condition 5.2 above shall enable user friendly public access to the monitoring data and with features capable of:

- (a) providing access to all environmental monitoring data collected since the commencement of works;
- (b) searching by data;
- (c) searching by types of monitoring data (air quality, water quality and noise); and
- (d) hyperlinks to relevant monitoring data after searching;

or otherwise as agreed by the Director.

**Notes :**

1. This Permit consists of three parts, namely, PART A (Main Permit), PART B (Description of Designated Project) and PART C (Permit Conditions). Any person relying on this Permit should obtain independent legal advice on the legal implications under the Ordinance, and that the following notes are for general information only.
2. The Permit Holder may apply under Section 13 of the Ordinance to the Director for a variation of the conditions of this Permit. The Permit Holder shall replace the original permit displayed on the construction site by the amended permit.
3. A person who assumes the responsibility for the whole or a part of the designated project may, before he assumes responsibility of the designated project, apply under Section 12 of the Ordinance to the Director for a further environmental permit.
4. Under Section 14 of the Ordinance, the Director may with the consent of the Secretary for the Environment and Food, suspend, vary or cancel this Permit. The suspended, varied or cancelled Permit shall be removed from display at the construction site.
5. If this Permit is cancelled or surrendered during construction or operation of the Project, another environmental permit must be obtained under the Ordinance before the Project could be continued. It is an offence under Section 26(1) of the Ordinance to construct or operate a designated project listed in Part I of Schedule 2 of the Ordinance without a valid environmental permit.
6. Any person who constructs or operates the Project contrary to the conditions in the Permit, and is convicted of an offence under the Ordinance, is liable:-
  - (i) on a first conviction on indictment to a fine of \$ 2 million and to imprisonment for 6 months;
  - (ii) on a second or subsequent conviction on indictment to a fine of \$ 5 million and to imprisonment for 2 years;

- (iii) on a first summary conviction to a fine at level 6 and to imprisonment for 6 months;
  - (iv) on a second or subsequent summary conviction to a fine of \$1 million and to imprisonment for 1 year; and
  - (v) in any case where the offence is of a continuing nature, the court or magistrate may impose a fine of \$ 10,000 for each day on which he is satisfied the offence continued.
7. The Permit Holder may appeal against any condition of this Permit under Section 17 of the Ordinance within 30 days of receipt of this Permit.

**Appendix A (as referred to in Condition 2.21)**

**Measures to Mitigate Environmental Impacts due to Site Run-off and Other Potential Water Pollution During Construction**

**(a) Surface Runoff**

- (i) Surface run-off from the construction site shall be directed into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers shall be provided on site to properly direct stormwater to such silt removal facilities.
- (ii) Catchpits and perimeter channels shall be constructed in advance of site formation works and earthworks.
- (iii) Silt removal facilities, channels and manholes shall be suitably maintained with the deposited silt and grit being removed at least once a week, and at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.
- (iv) Earthworks final surfaces shall be well compacted and the subsequent permanent work or surface protection shall be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate intercepting channels shall be provided along the site boundary or at the locations agreed with the IEC or EATL. Rainwater pumped out from trenches or foundation excavations shall be discharged into storm drains via silt removal facilities.
- (v) Open stockpiles of construction materials (e.g. aggregates and sand) on site shall be covered with tarpaulin or similar fabric during rainstorms. Measures such as providing sand bag barriers shall be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.
- (vi) Manholes (including any newly constructed ones) shall always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. Discharges of surface run-off into foul sewers shall always be prevented in order not to unduly overload the foul sewerage system.

**(b) Groundwater**

Groundwater pumped out of wells, etc. for the lowering of ground water level in foundation construction shall be discharged into storm drains after being passed through appropriate silt removal facilities.

**(c) General Construction Activities**

At all parts of all works areas and construction sites, and throughout the full duration of the construction contract(s), debris and rubbish on site shall be handled and disposed of to avoid entering the water column and causing water quality impacts. Temporary on-site storage of excavated materials from station and depot construction works shall be covered with tarpaulin or similar fabric during rainstorms. Any washout of construction or excavated materials should be diverted to the drainage system via sediment traps. Stockpiling of the excavated material can be minimised by scheduling the construction programme in a way that one section of the alignment can be constructed and completed before the excavation works of the next section commence.

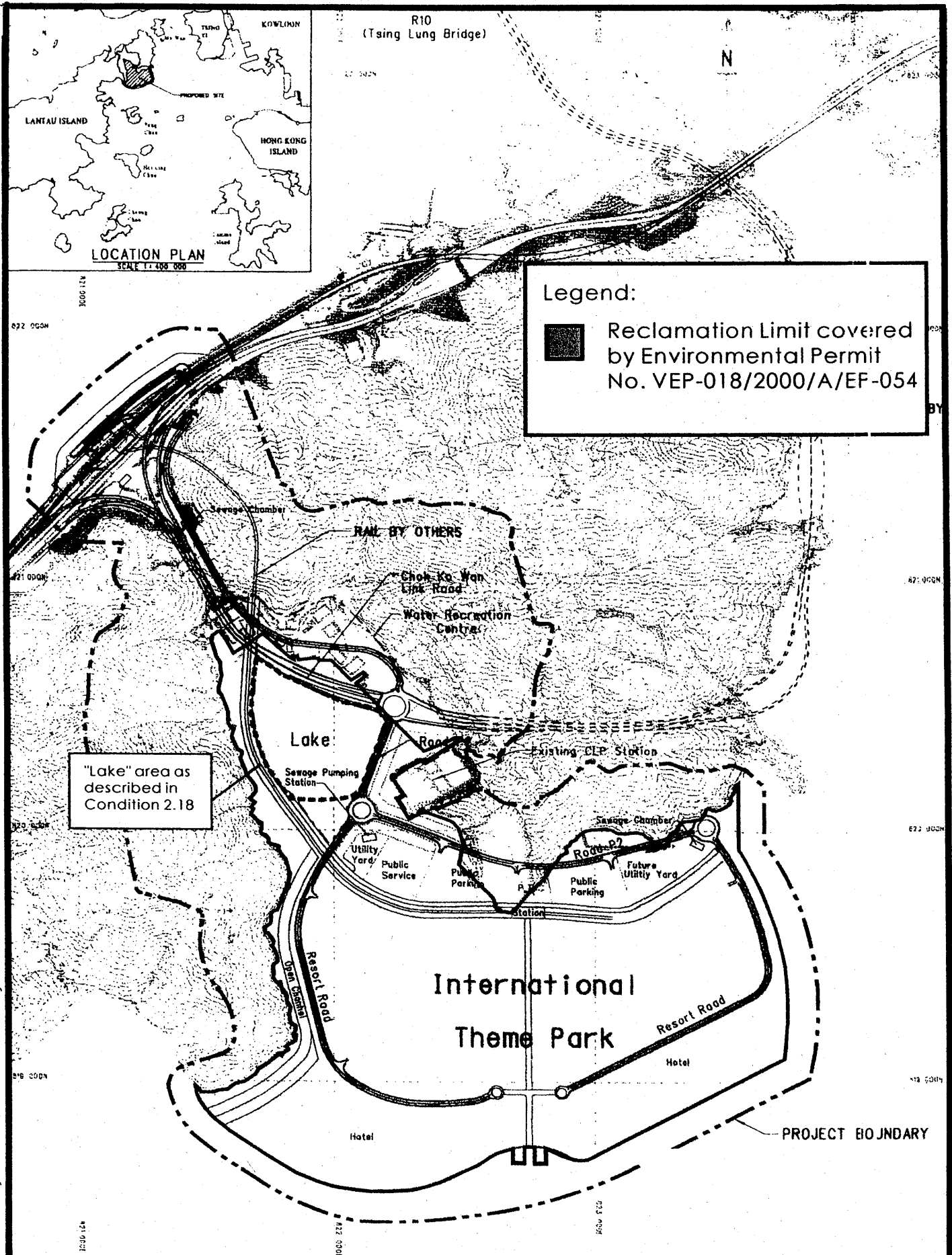


Figure 1

Location of Project and Reclamation Limit

Environmental Permit No.: VEP-018/2000/A/EP-054

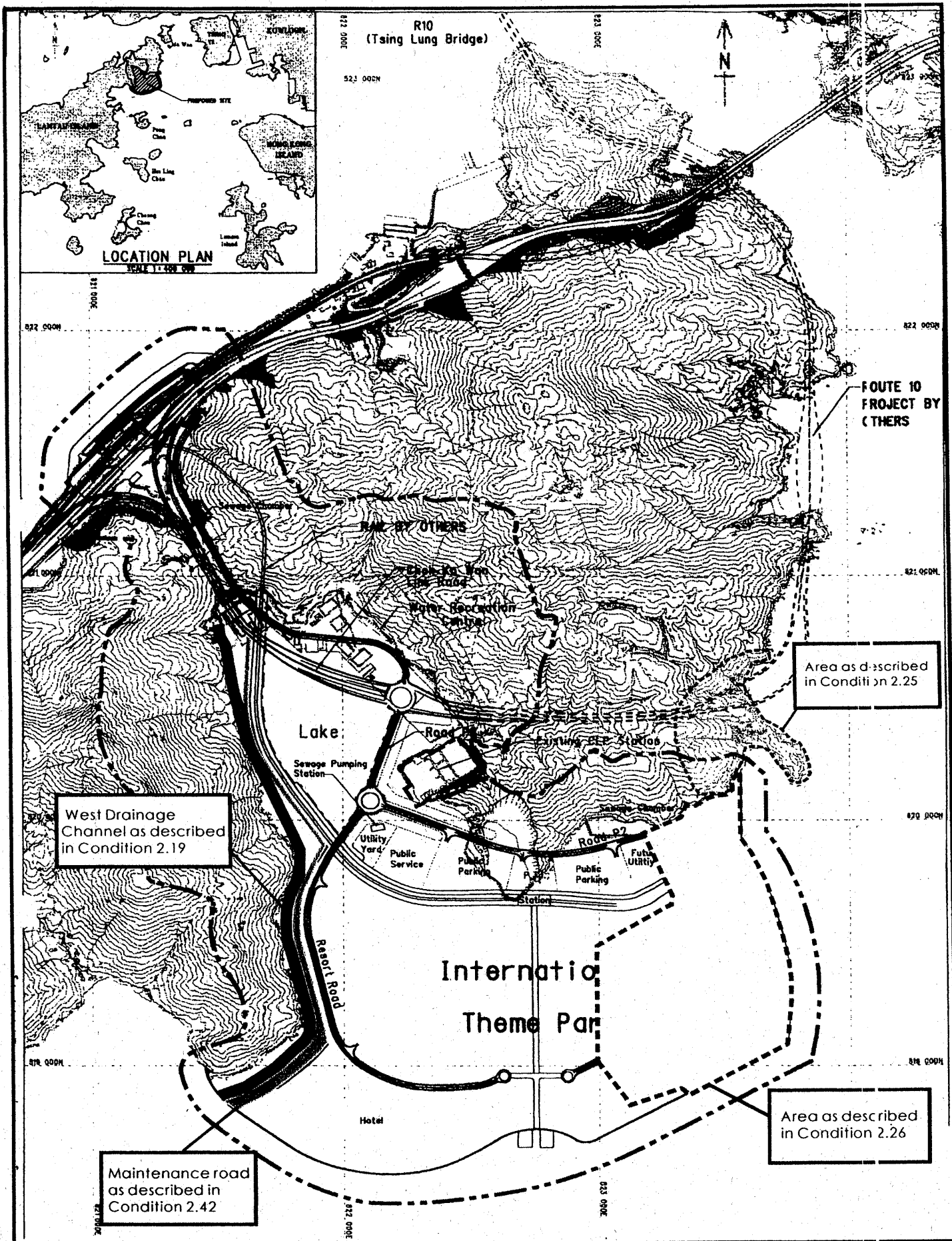
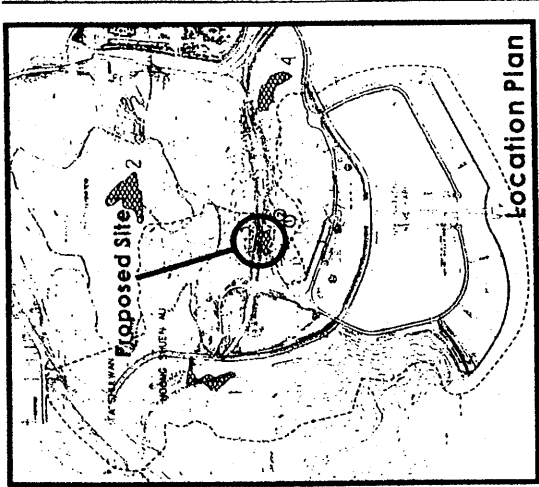
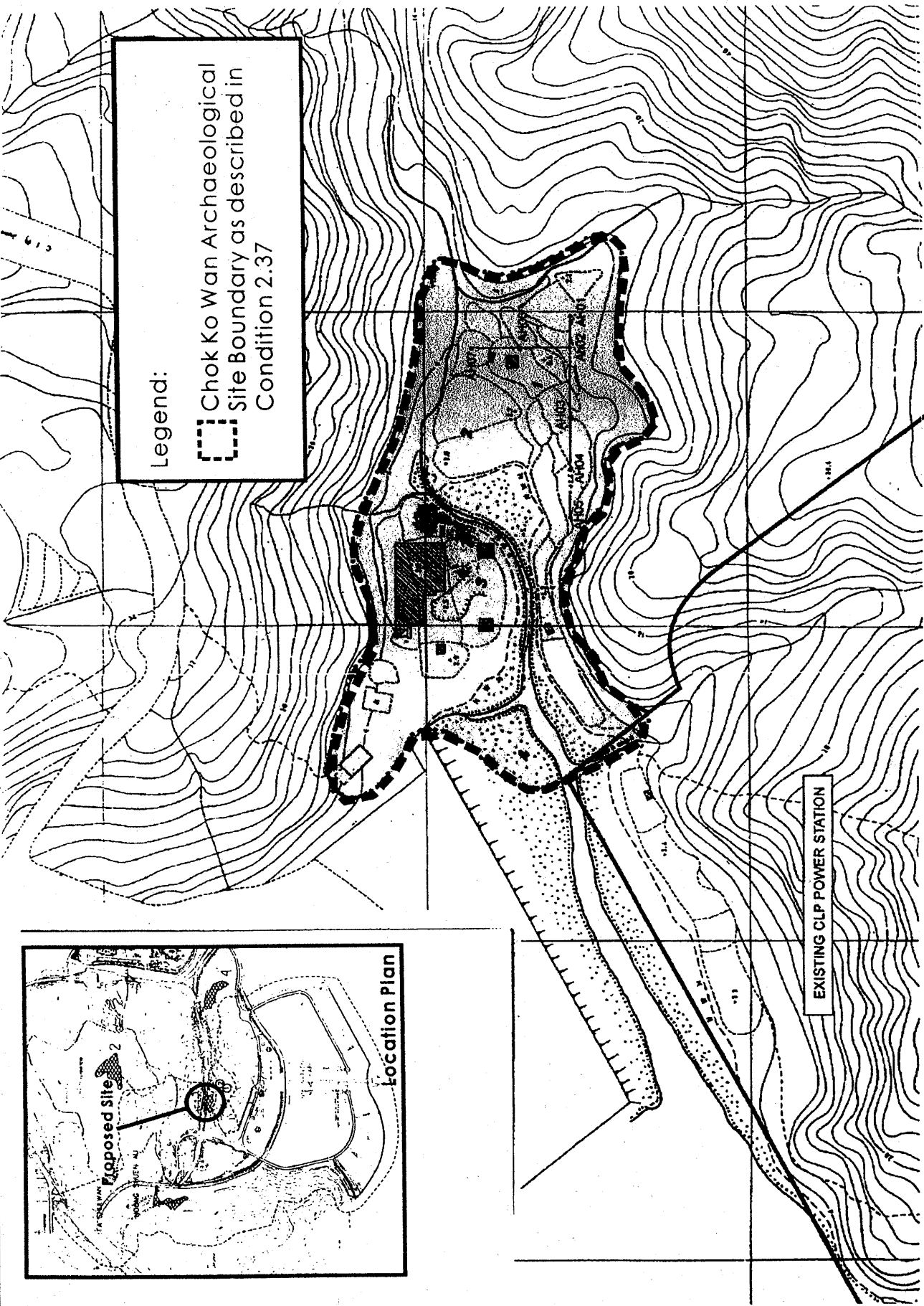


Figure 2 Mitigation Measures for Terrestrial Ecology

Environmental Permit No.:  
VEP-018/2000/A/EP-054



Legend:  
 Chok Ko Wan Archaeological Site Boundary as described in Condition 2.37



Environmental Permit No.:  
 VEP-018/2000/A/EP-054

Figure 3 Chok Ko Wan Archeological Site  
 (Extracted from Figure 11.3d of the EIA Report)

Figure 3

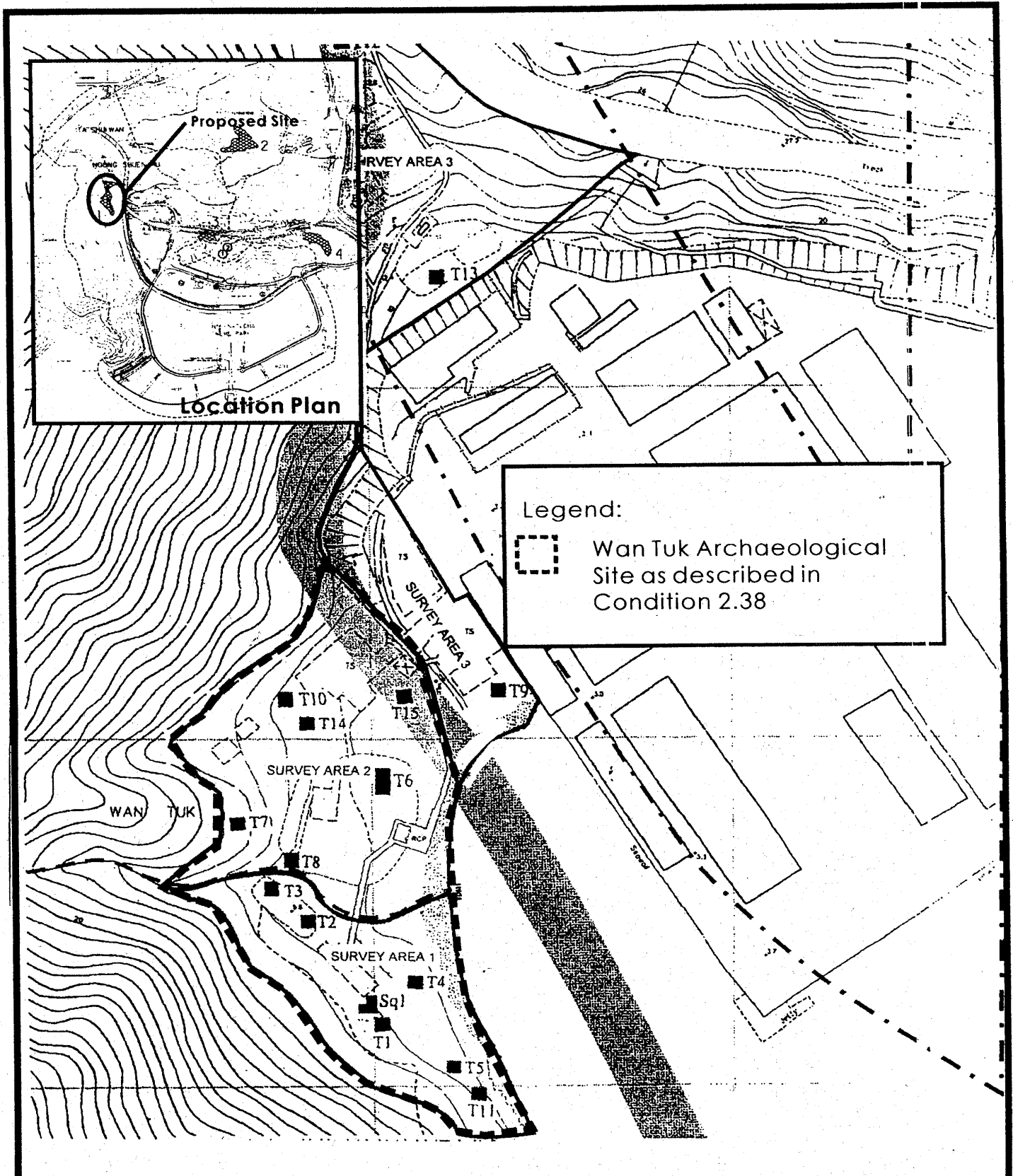
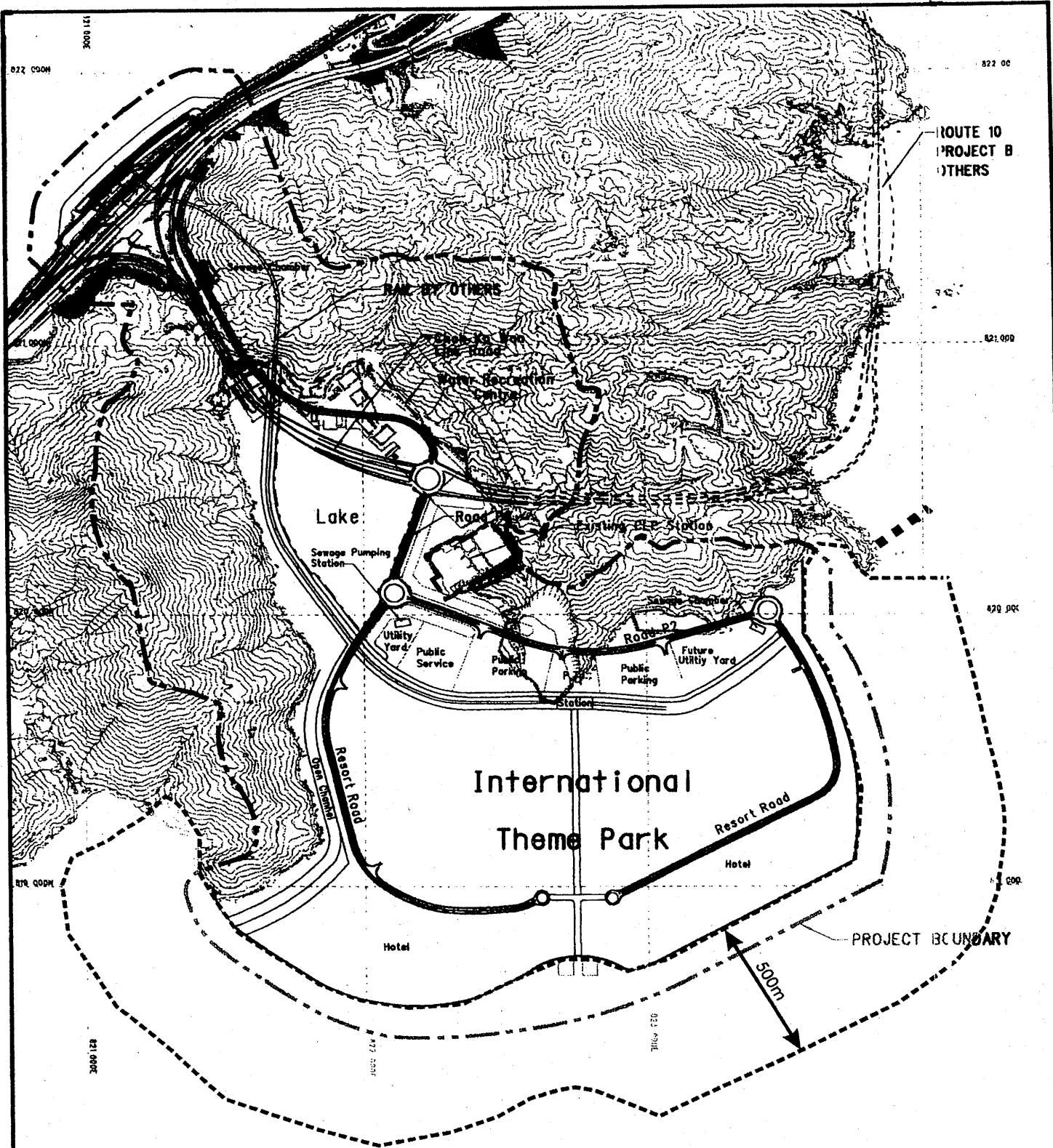


Figure 4 Location of Wan Tuk Archeological Site  
 (Extracted from Figure 11.3b of EIA Report)

Environmental Permit No.: VEP-018/2000/A/EP-054





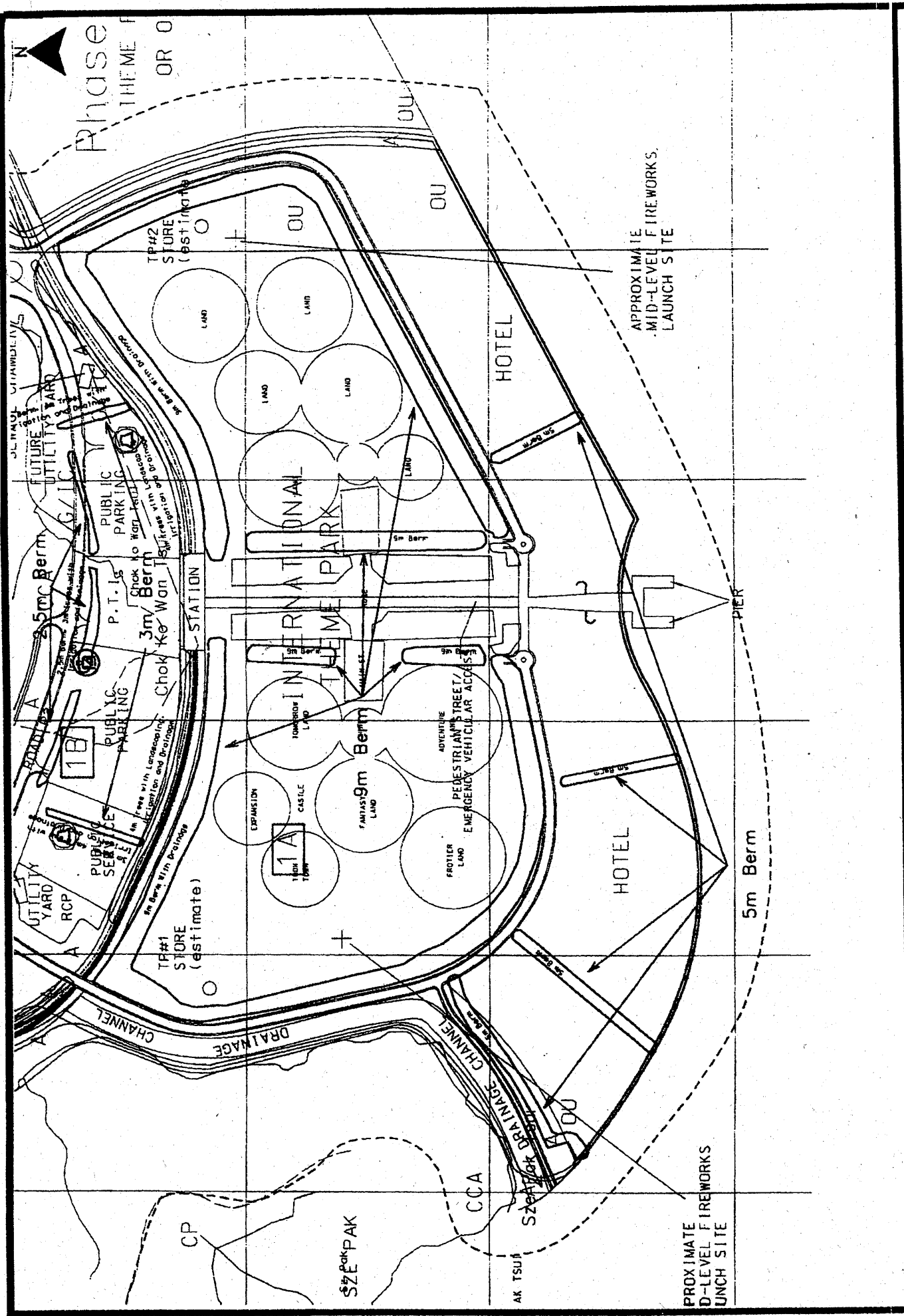
 10 knot Speed Control Zone as described in Condition 2.33

Figure 5

Boundary of Speed Control Zone

Environmental Permit No.:

VEP-018/2000/A/EP-054



**Figure 6** Location of Earth Berms in the Project  
 (Extract from Figure 2.7b in the EIA Report)

Environmental Permit No.:  
 VEP-018/2000/A/EP-054

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**SECTION 2**

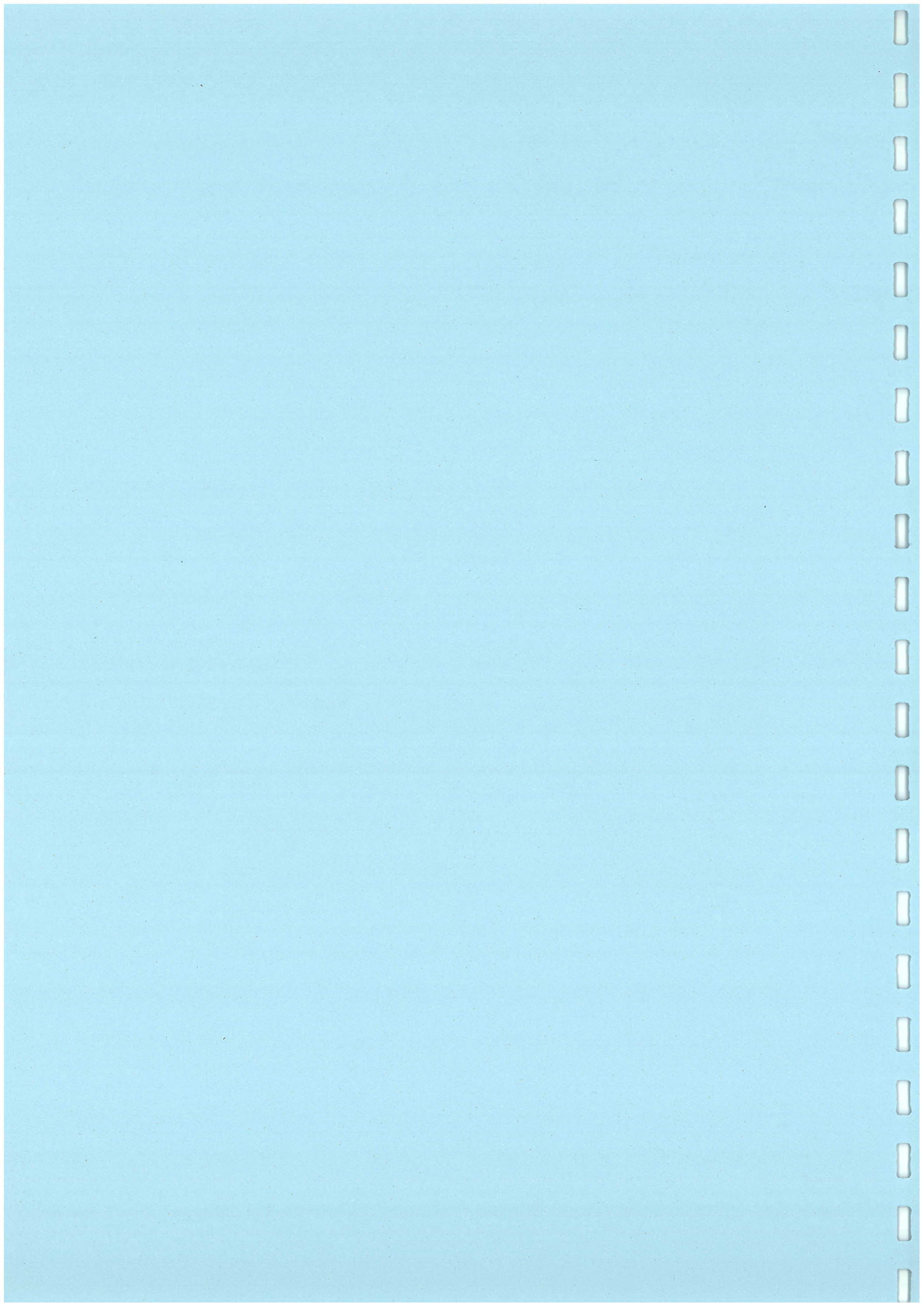
**Contract CV/99/12**

**Penny's Bay Reclamation**

**Stage 1**


**EM&A Manual**

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HAM-HKC JV

**EM&A Manual  
for Penny's Bay Reclamation Stage 1  
Contract No. CV/99/12  
Revision 4  
November 2000**

Report No.	2323
Certified By	
	(Dr. HF Chan, Environmental Team Leader)

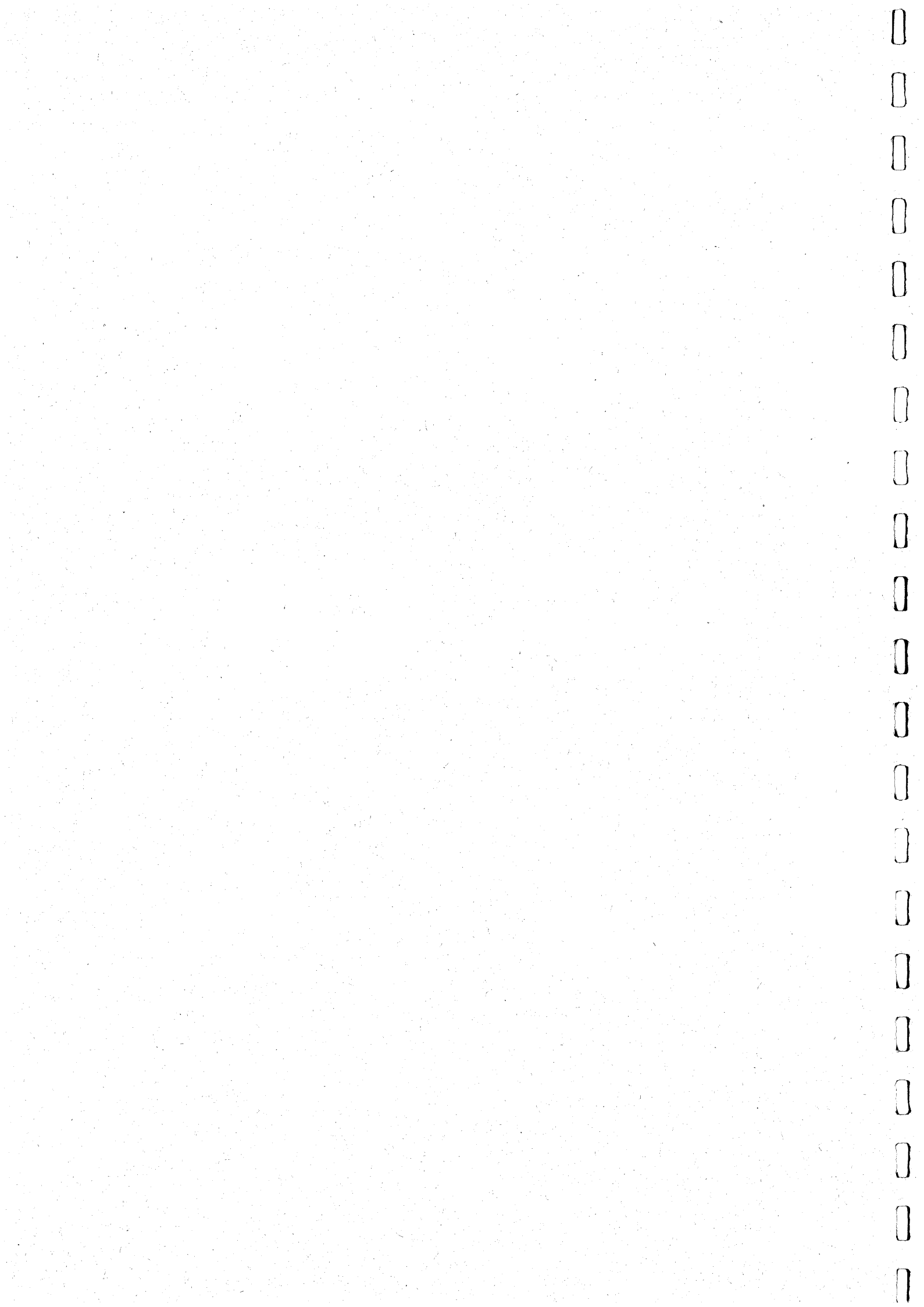
REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

MEMCL accepts no responsibility for changes made to this report by third parties.

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## 1 INTRODUCTION

### Background

- 1.1 HAM-HKC JV (the Contractor) was commissioned by the Civil Engineering Department (CED) to carry out the Penny's Bay Reclamation Stage 1 works (the Project) under Contract No. CV/99/12. Maunsell Environmental Management Consultants Limited (MEMCL) was employed by the Contractor as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) works for the Project.
- 1.2 An amended Environmental Permit VEP-018/2000/A/EP-054 (the Permit) was issued by the Environmental Protection Department (EPD) to CED, the Permit Holder, regarding the Penny's Bay Reclamation. Condition 2.3 of the Permit requires the Permit Holder to submit and obtain approval from EPD an EM&A Manual for the construction of the Project. The Contractor was requested, through the Engineer, to prepare this EM&A Manual on behalf of the Permit Holder to satisfy this Condition.

### Purpose of the Manual

- 1.3 An Environmental Impact Assessment (EIA) was conducted for the Project and the *Final EIA Report for Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructures* (the EIA report) was issued on 29 February 2000. Annex N of the EIA report includes an EM&A Manual which covers both construction and operation phases of the *Hong Kong International Theme Park*. This EM&A Manual is specific to the Stage 1 reclamation phase of the International Theme Park and includes the requirements relevant to the reclamation works as specified in Annex N of the EIA report and the Permit. The EM&A requirements for all subsequent phases of the development are set out in the Supplementary EM&A Manual.
- 1.4 As required under condition 2.3 of the Permit, this EM&A Manual details the monitoring and audit programme for the construction of the Project. The purpose of this EM&A Manual is to provide information, guidance and instruction to personnel charged with environmental duties and those responsible for undertaking environmental monitoring and auditing work during the reclamation phase of *Hong Kong International Theme Park*. It provides systematic procedures for the monitoring and auditing of potential environmental impacts that may arise from the works.

### Previous Reports

- 1.5 The EIA reports that are relevant to this Project and have been endorsed by Environmental Pollution Advisory Committee (EPCOM) and the Advisory Council on the Environment (ACE) are as follows:
- Construction of an International Theme Park in Penny's Bay of North Lantau together with its Essential Associated Infrastructures – Final Environmental Impact Assessment Report, CED, (EIA-041/2000) endorsed by ACE with conditions on 28 April 2000;

- Lantau Port and Western Harbour Development (LAPH) Studies (1993) Final Report, Volume III, EIA Report, CED, (EIA-021/BC) endorsed by the EPCOM on 7 June 1993;
- Lantau Port Development Stage 1 - Container Terminals 10 and 11 Ancillary Works (Design) EIA Final Report, CED, 1994 (EIA-049BC) endorsed by the ACE with conditions on 20 February 1995;
- Lantau Port Development Stage 1 - Container Terminals 10 and 11 Preliminary Design, Final Report, Volume 2, Container Terminal EIA, CED 1995 (EIA-057BC) endorsed by ACE with conditions on 20 February 1995; and
- Lantau Port Development Stage 1 - Design of Reclamation and Edge Structures for Container Terminals 10 and 11 and Back-up Areas, EIA Final Report, CED, 1995 (EIA-073/BC) endorsed by ACE with conditions on 18 December 1995.

### **Proposed Works**

1.6 The Penny's Bay Reclamation Stage 1 site is located at Penny's Bay in North Lantau. The Project involves:

- an access road and water supply from the existing Yam O Interchange to CLP's power station in Penny's bay;
- dredging and reclamation to form approximately 200 hectares of land;
- construction of approximately 1,800m of permanent seawall; and
- construction of approximately 1,200m of seawall which will be extended under a future contract.

1.7 The layout of the work sites is shown in Figure 1.1. Air quality, noise, and water quality sensitive receivers that may be affected by the Penny's Bay reclamation works have been identified in the EIA report. They are shown in Figures 1.2 to 1.4.

### **Objectives of the Environmental Monitoring and Audit**

1.8 The construction impacts resulting from the implementation of the Project are specified in the EIA Report. The Report also specifies the mitigation measures that need to be implemented to ensure compliance with the required environmental criteria; these mitigation measures and their implementation requirements, are presented in the Implementation Schedule contained in Annex C of this EM&A Manual. In order to ensure that these mitigation measures are fully and effectively implemented, the EIA Report recommends that EM&A should be undertaken for noise, air, water, waste, risk assessment, land contamination, terrestrial and marine ecology, fisheries, cultural heritage, archaeology and landscape and visual issues.

1.9 This Manual provides specific details of the EM&A requirements that have been recommended to ensure compliance with the mitigation measures specified in the EIA Report.

1.10 The main objectives of the EM&A programme are:

- to provide a database against which any short or long term environmental impacts of the project can be determined;
- to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;
- to monitor the performance of the project and the effectiveness of mitigation measures;
- to verify the environmental impacts predicted in the EIA Study;
- to determine project compliance with regulatory requirements, standards and government policies;
- to take remedial action if unexpected problems or unacceptable impacts arise; and
- to provide data against which environmental audits may be undertaken.

### **The Scope of the Environmental Monitoring and Audit Programme**

1.11 The scope of this EM&A programme is to:

- establish baseline air, noise and water quality levels at specified locations and review these baseline levels every six months;
- implement impact monitoring and inspection programmes for air, noise, water quality, and marine and terrestrial ecology monitoring;
- implement inspection and audit requirements for waste management, landscape and visual, hazard assessment, heritage and fisheries issues;
- liaise with, and provide environmental advice (as requested or when otherwise necessary) to construction site staff on the comprehension and consequences of the environmental monitoring data;
- identify and resolve environmental issues and other functions as they may arise from the works;
- check and quantify the Contractor's overall environmental performance, the implementation of Event and Action Plans (EAPs), and remedial actions taken to mitigate adverse environmental effects as they may arise from the works;
- conduct monthly reviews of monitored impact data as the basis for assessing compliance with the defined criteria and to ensure that necessary mitigation measures are identified and implemented, and to undertake additional ad hoc monitoring and auditing as required by special circumstances;
- evaluate and interpret all environmental monitoring data to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards, and to verify the environmental impacts predicted in the EIA Report;
- manage and liaise with other individuals or parties concerning other environmental issues deemed to be relevant to the construction process;
- conduct regular site inspections of a formal or informal nature to assess:
  - the level of the Contractor's general environmental awareness,
  - the Contractor's implementation of the recommendations in the EIA Report;
  - the Contractor's performance as measured by the EM&A;
  - the need for specific mitigation measures to be implemented or the continued usage of those previously agreed; and
  - to advise the site staff of any identified potential environmental issues; and
- submit monthly EM&A reports which summarise project monitoring and auditing data, with full interpretation illustrating the acceptability or otherwise of any environmental

impacts and identification or assessment of the implementation status of agreed mitigation measures.

### Structure of the EM&A Manual

1.12 Following this introductory Section, the remainder of the Manual is set out as follows:

- Section 2 outlines the wider aspects of Environmental Management which should be employed during the construction phase to minimise environmental impacts;
- Section 3 outlines the various parties involved in the EM&A process, and presents the proposed organisational structure of the organisations responsible implementing the EM&A programme and their key responsibilities;
- Section 4 sets out the EM&A general requirements;
- Section 5 details the requirements for baseline and impact monitoring for air quality, and lists relevant monitoring equipment, locations, compliance and EAPs;
- Section 6 details the requirements for baseline and impact monitoring for noise, and lists relevant monitoring equipment, locations, compliance and Event and Action Plans (EAPs);
- Section 7 details the requirements for baseline and impact monitoring for water quality, and lists relevant monitoring equipment, locations, compliance and EAPs;
- Section 8 details the audit procedures with regard to waste management issues;
- Section 9 details sampling and audit procedures and key locations with regard to ecological issues;
- Section 10 details the audit procedures and key locations with regard to marine ecology;
- Section 11 details the audit procedures and key locations with regard to fisheries issues;
- Section 12 details audit procedures and key locations with regard to cultural heritage issues;
- Section 13 details the audit procedures and key locations with regard to landscape and visual issues;
- Section 14 describes the scope and frequency of site auditing;
- Section 15 details the EM&A reporting requirements;
- Annex A contains a summary of the key findings of the EIA Report
- Annex B contains Event Action Plan

- Annex C contains Implementation Schedule
- Annex D contains sample data record sheet for air quality monitoring
- Annex E contains sample data record sheet for noise monitoring
- Annex F contains sample data record sheet for water quality monitoring
- Annex G contains the Action and Limit Levels for Water Quality Monitoring of Penny's Bay Reclamation





## 2 ENVIRONMENTAL MANAGEMENT SYSTEMS FOR THE CONSTRUCTION PHASE

### Introduction

- 2.1 This section sets out the proposed environmental management system approaches that will be implemented to ensure that the recommendations of the EIA are fully and effectively implemented during the Project's construction phase 1.

### General

- 2.2 The EIA Report provides an assessment of the predicted scope and extent of likely impacts resulting from the construction and operation of the Theme Park and associated development. Mitigation recommendations have been specified to ensure that the environmental quality objectives are met. The recommended mitigation measures from the EIA Report are summarised in the form of an Implementation Schedule (IS) (In Annex C of this EM&A Manual). The IS provides the primary means by which the EIA Report recommendations are transferred from the planning phase to the construction phase of the Project.
- 2.3 An integral part of these recommendations is the requirement to undertake an EM&A process to verify the level of environmental performance achieved and the effectiveness of the recommended mitigation measures.

### The EM&A Manual

- 2.4 The EM&A programme provides the means by which feed-back on the project's compliance with the recommended mitigation measures and the environmental monitoring programme are provided to the Contractor, CED, and the Environmental Protection Department (EPD).
- 2.5 The EM&A Manual was submitted at the time of the EIA [refer to Annex N of the EIA] and provides an outline of the monitoring and auditing protocols and requirements which will be necessary to achieve the objectives of the EM&A programme. For the construction and operation phases, the Manual provides a description of the organisational arrangements required for the EM&A programme, stipulation of the scope of monitoring (e.g. noise, air, water etc), the parameters to be measured (e.g.  $L_{Aeq,30min}$ , Total Suspended Particulates, Suspended Solids, etc.), the frequency of monitoring and the actions to be taken in the event of exceedances of the environmental criteria being recorded. The EM&A programme also outlines guidelines for construction phase site inspections as a means of identifying and resolving problems, and the associated reporting requirements.
- 2.6 In addition to the construction and operational phase EM&A requirements, the EM&A Manual also makes recommendations on mechanisms for ensuring that the mitigation measures which have been recommended for the design stage are fully and effectively implemented.
- 2.7 This EM&A Manual is an updated revision of the EM&A Manual as provided in Annex N of the EIA, as well as the Permit and is specific to the stage 1 reclamation works. A

supplementary EM&A Manual, related to stage 2 of the Penny's Bay reclamation, is presently been prepared.

- 2.8 The EM&A Manual is a dynamic document that will be reviewed and updated (as necessary) during later stages of the Project.

### **Contractual Documentation**

- 2.9 In order to ensure that Contractor implement the recommended mitigation measures during the Project's construction phase, their contractual documentation includes clauses related to compliance with the appropriately recommended mitigation measures/environmental monitoring requirements. In addition, the contractual documentation defines appropriate contractual mechanisms to ensure compliance with these environmental requirements.

- 2.10 The contractual documentation requires the Contractor to prepare, implement and maintain an Environmental Management Plan (EMP).

### **Construction Phase**

- 2.11 The management of the construction phase of the Theme Park and associated developments will be undertaken in line with an EM&A procedure which has been agreed with Government. The EM&A process will seek to ensure that the works are carried out in a manner which meets all legal, contractual and environmental commitments.

### **Construction Phase EM&A Manual**

- 2.12 This EM&A Manual is specific for the reclamation stage 1 of the construction works. It is based on the EM&A Manual and requirements stipulated in the Permit. This Manual is prepared to ensure that this EM&A programme remains current.

- 2.13 When the ENPO system is adopted, it is recommended that the update of the construction phase EM&A Manual is undertaken by the ENPO. Alternatively, the Environmental Auditing Team Leader shall update the Manual.

### **Environmental Management Plans**

- 2.14 In order to ensure the effective contract specific implementation and reporting on compliance with the stated mitigation measures, as well as the monitoring and auditing requirements and remedial actions defined in the EIA Report, an appropriate contractual and supervisory framework was established. During the construction phase, the basis of the framework within which implementation should be managed overall is through the preparation of Environmental Management Plan (EMP) by the Contractor.

- 2.15 An EMP is similar in nature to a quality plan and provides details of the means by which the Contractor (and all subcontractor working to the Contractor) will implement the recommended mitigation measures and achieve the environmental performance standards defined in Hong Kong environmental legislation, the Contract and in the EIA documentation.

The primary reason for adopting the EMP approach is to make the Contractor aware of his environmental responsibilities and to be pro-active about the commitment to achieve the standards specified, rather than relying on the EM&A programme.

- 2.16 The EMP also provides opportunities for the Contractor to draw upon the strength of other institutional processes such as ISO 9000/14000 to ensure that the achievement of the required standards and fulfilment of commitments are documented.
- 2.17 The provision of an EMP is a contractual requirement, and the EMP needs to be approved by the Engineer following verification form the IEC.
- 2.18 The contractual requirement for an EMP generally comprises appropriate extracts from (and references to) the Project EIA Report and EM&A Manual, and include such typical elements as the relevant statutory environmental standards, general environmental control clauses and specific environmental management clauses, as well as an outline of the scope and content of the EMP. In drafting the documentation, due consideration should be given to the predictive nature of the EIA process and the consequent need to manage and accommodate the actual impacts arising from the construction process. In particular, the Contractor must be placed under a clear obligation to identify and control any implications arising from changes to the working methods assumed in the EIA Report, or to the progress rates and other estimates made during the preliminary design phase.

#### **Environmental Performance Reviews**

- 2.19 The environmental performance review programme comprises the regular assessment of the effectiveness of the EMP, site practices and procedures to ensure that the required mitigation measures are routinely implemented and that they are being effective in achieving the required environmental standards.
- 2.20 The criteria against which the review should be undertaken should be derived from the following:
- the approaches, procedures and commitments given by the Contractor in their EMP;
  - the clauses contained within the Contractor' Contractual Documentation; and
  - those parts of the Contractor' method statements which relate to the minimisation of environmental impacts or other specified environmental protection measures.
- 2.21 The reviews should focus on the effectiveness of the implemented measures to achieve the purpose, not simply the fact that a measure has been implemented.
- 2.22 Review protocols should be developed prior to the commencement of works and it is suggested that the protocols should include inspection and auditing of the following:
- the allocation of responsibility for fulfilling environmental requirements, and agreed mitigation measures, and the effectiveness of lines of communication with regard to environmental issues;

- compliance with procedures established to enable an effective response to environmental incidents, exceedances or non-compliance;
- the extent and accuracy of record-keeping related to environmental performance indicators;
- the effectiveness of staff training in ensuring high levels of awareness with regard to environmental requirements; and
- the effectiveness of environmental management activities.

2.23 The protocols should comprise checklists of environmental requirements and should be amended, throughout the construction phase as necessary, to focus on areas of frequent non-compliance and to reflect the potential impacts associated with specific activities within the construction programme.

### **Construction Method Statement**

2.24 It is common practice for the Contractor to submit details of forthcoming works to the Engineer to seek approval for the commencement of the works as well as the methodology and equipment proposed to be used.

2.25 The Environmental Team Leader shall comment on deviations of the specific works from that assumed in the Project EIA and advise on the implications of the changes in construction methods for achieving the environmental performance criteria set out in the EIA documentation and the EMP.

2.26 This ongoing requirement for the Contractor to review proposed working methods, in terms of their potential to impact upon the environment, will reduce the time taken to implement the necessary environmental control measures and reduce the number of iterations a measure may have to go through before becoming effective.

2.27 Any changes in construction methods will need to be reflected in a revised EMP or the Contractor will be required to demonstrate the manner in which the existing EMP shall accommodate the proposed changes.

### 3 ORGANISATION AND STRUCTURE OF THE EM&A

#### Introduction

3.1 In this Section, the various parties involved in the EM&A process are outlined and the proposed organisational structure of the organisations responsible implementing the EM&A programme and their key responsibilities are presented. Furthermore an alternative organisational structure is presented with reference to the fact that a number of the construction contracts may be undertaken concurrently in the future.

#### Project Organisation

3.2 The roles and responsibilities of the various parties involved in the construction phase EM&A process outlined above are further expanded upon in the following sections. The organisation and lines of communication with respect to environmental works are shown in Figure 3.1.

3.3 The duties and responsibilities of respective parties are as follows:

#### 3.4 Engineer

The Engineer will:

- Monitor the Contractor's compliance with contract specifications, including the effective implementation and operation of environmental mitigation measures and other aspects of the EM&A programme;
- Instruct the Contractor to follow the agreed protocols or those in the Contract Specifications in the event of exceedances or complaints; and
- Comply with the agreed Event Action Plan in the event of any exceedance.

#### 3.5 Independent Environmental Checker

The Independent Environmental Checker (IEC) will independently audit the overall environmental performance of the works and will:

- Monitor the implementation of the EM&A programme and the overall level of environmental performance being achieved;
- Arrange and conduct regular "independent" site inspections of the works;
- Provide specialist advice to the Engineer and Employer on environmental matters;
- Ensure that impact monitoring is conducted at the correct locations at the frequency identified in the EM&A Manual;
- Check that the mitigation measures are effectively implemented; and
- Report the findings of the site inspections and other environmental performance reviews to the Engineer and EPD.

### 3.6 Contractor – HAM-HKC JV (HKJV)

Reporting to the Engineer, the Contractor shall:

- Work within the scope of the construction contract and other tender documents;
- Participate in the site inspections undertaken by the Environmental Team and the Independent Environmental Checker as required and undertake any corrective actions instructed by the Engineer; and
- Take responsibility and strictly adhere to the guidelines of the EM&A programme and complementary protocols developed by their staff.

Several key personnel within the Contractor's organisation are responsible for environmental matters. Roles and responsibilities of these key personnel are as follows:

#### Project Manager

The Project Manager is the Management Representative of the HAM-HKC JV. His responsibilities include:

- Oversee the implementation of the EMS;
- Assign adequate resources for the implementation of the EMS; and
- Take part in the Environmental Performance Reviews.

#### Environment Co-ordinator (E Co-ordinator)

The E Co-ordinator is the Site Representative of the HAM-HKC JV on environmental matters. He is resident on site and is the point of contact for the day-to-day environmental issues. His responsibilities include:

- Ensure all site workers (including sub-contractors) comply with the mitigation measures stipulated in the EMP and WMP by checking on site at regular intervals;
- In the event of unacceptable work practice or infringements of the EMS requirements, inform the site workers (including sub-contractors) the correct procedures and ensure that they understand and agree to follow, and afterwards check whether they have followed the correct procedures;
- In the event of recurring exceedance, non-compliance or unwillingness of site workers (including sub-contractors) to follow correct procedures, inform and discuss with the respective Deputy Project Manager and carry out necessary actions;
- Follow the procedures stipulated in the agreed Event Contingency Plans in the event of exceedance, non-compliance or complaint;
- Accompany the IEC or ET at the site environmental audits;
- Take part in the environmental performance reviews;
- Maintain all relevant environmental records stipulated in the EMS; and
- Discuss environmental concerns with the Engineer, other staff of the Contractor, and the ET.

### Deputy Project Managers (Marine Works and Land Works)

The Deputy Project Managers (for Marine Works and Land Works) are resident on site and their responsibilities include:

- Ensure all mitigation measures stipulated in the EMP and WMP are implemented properly;
- Ensure all environmental mitigation equipment and installations are maintained properly and regularly;
- In the event of unwillingness of the site workers (including sub-contractors) to follow correct procedures, carry out necessary actions to rectify the situation;
- follow up recurring non-compliance, exceedance, or complaint in association with the E Co-ordinator and the ET; and
- support the E Co-ordinator in carrying out his environmental related duties.

### Works Managers

The Planning & Engineering Manager's main function in environmental management is to support and assist the review of construction method statements by the ET. His duties include:

- Provide all construction method statements to the ET for review;
- Assist the CEC in the review of construction method statements by providing relevant information or clarifications requested by the ET; and
- Consider any recommendations provided by the ET on the construction method statements and revise the construction method statements where necessary and practicable.

### Environmental Team

The Environmental Team (ET) is Maunsell Environmental Management Consultants Limited, an independent environmental consultant employed by HAM-HKC JV. Their responsibilities include:

- Designate an ET Leader to fulfil the Special Condition 2.2 of the Environmental Permit. The ET Leader will certify or verify any environmental submissions as required by the Environmental Permit;
- Provide specialist advice on all environmental issues to HAM-HKC JV;
- Monitor the various environmental parameters as required by the EM&A Manual;
- Conduct site inspections and investigate and inspect the Contractor's equipment and work methodologies with respect to pollution control and environmental mitigation stipulated in the EMP and WMP, and to anticipate environmental issues that may require mitigation before the problem arises;

- Review the programme of works, in order to anticipate any potential environmental impacts before they arise;
- Review the construction method statements provided by the Planning & Engineering Manager and provide comments on the method statements to HAM-HKC JV;
- Audit the environmental monitoring data and report the status of the general site environmental conditions and of the implementation of mitigation measures resulting from site inspections;
- Report the EM&A results and the wider environmental issues and conditions to the Contractor and Engineer;
- Prepare monthly EM&A reports as required in the EM&A Manual;
- Follow the procedures stipulated in the agreed Event Contingency Plans in the event of exceedance, non-compliance or complaint;
- Take part in environmental performance reviews; and
- Revise any part of the EMS as necessary.
- All other requirements as stipulated under the contract for the Environmental Consultant.

#### **Interfacing with other projects**

- 3.7 The construction of the whole Theme Park Project will comprise several large-scale construction Contracts. Whilst the exact details and sequencing of the construction works are still being developed, preliminary information indicates that a number of the construction contracts may be undertaken concurrently.
- 3.8 The ENPO system provides an effective and proven mechanism for addressing and controlling potential cumulative impacts. For Stage 1 of this Project however, few sensitive receivers have been identified, and of those that have, most are situated at some distance from the works. Consequently, with the implementation of the recommended mitigation measures, the potential for impacts is generally considered to be small. It is for this reason that the organisation structure as defined above has been adopted for this stage.
- 3.9 In later stages of the Project multiple contracts will be implemented which will need to be monitored to assess, among other things, the cumulative environmental impacts. At this time, and in accordance with Condition 2.6 of the Environmental Permit, an ENPO will be established. Further details of the ENPO system are provided in the Supplementary EM&A Manual.



## 4 EM&A GENERAL REQUIREMENT

### Introduction

- 4.1 In this Section, the general requirements of the EM&A programme for the Reclamation Stage 1 are presented with reference to the relevant findings from the EIA Report that have formed the basis of the scope and content of the programme. A summary of the key findings of the EIA Report can be found in Annex A.

### Construction Phase EM&A

#### *General*

- 4.2 The environmental issues, which were identified during the EIA process and are associated with the construction phase of the Theme Park and associated developments, will be addressed through the monitoring and controls specified in this EM&A Manual and in the construction contracts.
- 4.3 During the construction phase noise, dust, water, waste, terrestrial and marine ecology, archaeology will be subject to EM&A, with environmental monitoring being undertaken for noise, dust, water and terrestrial and marine ecology as specified under Condition 4.2 of the Environmental Permit.
- 4.4 The monitoring of the effectiveness of the mitigation measures will be achieved through the environmental monitoring programme as well as through site inspections. The inspections will include within their scope, mechanisms to review and assess the Contractor's environmental performance, ensuring that the recommended mitigation measures have been properly implemented, and that the timely resolution of received complaints are managed and controlled in a manner consistent with the recommendations of the EIA Report.

#### *Environmental Monitoring*

- 4.5 The monitoring of environmental impacts during the construction phase shall be carried out by the ET. Monitoring works will comprise of quantitative assessment of physical parameters such as noise, air and water quality impacts; terrestrial and marine ecology impacts also forms an important part of the whole monitoring programme. Monitoring programme will conduct at chosen at representative sensitive receivers in the vicinity of the construction site.

#### *Action and Limit Levels*

- 4.6 Action and Limit (A/L) Levels are defined levels of impact recorded by the environmental monitoring activities which represent levels at which a prescribed response is required. These Levels are quantitatively defined later in the relevant sections of this manual and described in principle below:

- Action Limits: beyond which there is a clear indication of a deteriorating ambient environment for which appropriate remedial actions are likely to be necessary to prevent

environmental quality from falling outside the Limit Levels, which would be unacceptable; and

- Limit Levels: statutory and/or agreed contract limits stipulated in the relevant pollution control ordinances, HKPSG or Environmental Quality Objectives established by the EPD. If these are exceeded, works should not proceed without appropriate remedial action, including a critical review of plant and working methods.

#### *Event and Action Plans*

- 4.7 The purpose of the Event and Action Plans (EAPs) is to provide, in association with the monitoring and audit activities, procedures for ensuring that if any significant environmental incident (either accidental or through inadequate implementation of mitigation measures on the part of the Contractor) does occur, the cause will be quickly identified and remediated, and the risk of a similar event recurring is reduced. This also applies to the exceedances of A/L criteria identified in the EM&A programme.

#### *Site Inspections*

- 4.8 In addition, to monitoring noise, air and water quality levels as a means of assessing the ongoing performance of the Contractor, the ET shall undertake regular site inspections and audits of on-site practices and procedures. The primary objective of the inspection and audit programme will be to assess the effectiveness of the environmental controls established by the Contractor and the implementation of the environmental mitigation measures recommended in the EIA Report.
- 4.9 Whilst the audit and inspection programme will undoubtedly complement the monitoring activity with regard to the effectiveness of dust suppression, noise attenuation measures and water quality control, the criteria against which the audits shall be undertaken shall be derived from the clauses within the Contract Documents which seek to enforce the recommendations of the EIA Report and the established management systems.
- 4.10 The findings of site inspections and audits shall be made known to the Contractor at the time of the inspection to enable the rapid resolution of identified non-compliances. Non-compliances, and the corrective actions undertaken, shall also be reported in the monthly EM&A Reports.
- 4.11 Section 14 of this Manual presents details of the scope and frequency of on-site inspections and defines the range of issues that the audit protocols should be designed to address.

#### *Enquiries, Complaints and Requests for Information*

- 4.12 Enquiries, complaints and requests for information can be expected from a wide range of individuals and organisations including members of the public, Government departments, the press and television media and community groups.
- 4.13 All enquiries concerning the environmental effects of the construction works, irrespective of how they are received, shall be reported to the Engineer and via the Contractor directed to the

ET which shall set up procedures for the handling, investigation and storage of such information.

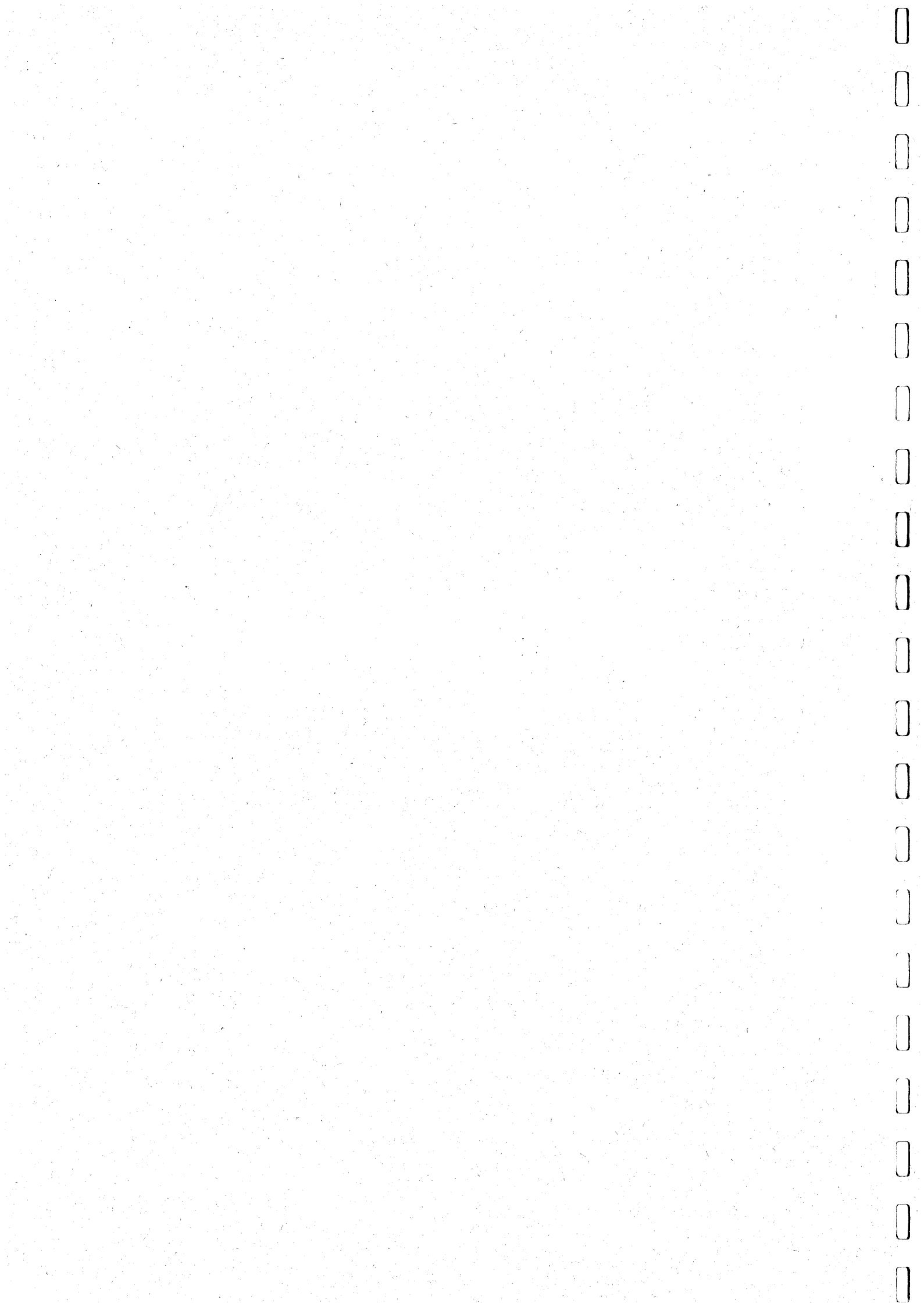
- 4.14 For complaints the event and action plan can be found in Annex B indicating the roles and responsibilities of all parties involved.
- 4.15 In all cases the complainant shall be notified of the findings, and audit procedures shall be put in place to minimise the change of reoccurrence of the problem.

#### *Reporting*

- 4.16 Monthly, annual and bi-annual reports shall be prepared and certified by the ET and verified by the IEC as specified under Condition 4.5 of the Environmental Permit. These reports shall be submitted to the Engineer and EPD. The monthly reports shall be prepared and submitted within 2 weeks of the end of each calendar month. Additional details on reporting protocols are presented in Section 17.

#### *Cessation of EM&A*

- 4.17 The ET shall continue to carry out environmental monitoring and site inspections until the completion of the Construction works.



## 5 AIR QUALITY MONITORING

### Introduction

5.1 In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impacts during the construction and of the Theme Park and associated development are presented.

5.2 The objectives of the air quality monitoring for Total Suspended Particulates (TSP) shall be:

- to identify the extent of construction dust impacts on sensitive receivers;
- to determine the effectiveness of mitigation measures to control dust from construction activities;
- auditing the compliance of the Contractor with regard to dust control, contract conditions and the relevant dust impact criteria;
- to recommend further mitigation measures if found to be necessary; and
- to comply with Action and Limit (AL) Levels for air quality as defined in this Manual.

### Methodology and Criteria

5.3 Monitoring and audit of the TSP levels shall be carried out by the ET to ensure that any deterioration in air quality can be readily detected and timely actions taken to rectify the situation.

5.4 The criteria against which air quality (measured as TSP) monitoring shall be assessed are:

- The Hong Kong Air Quality Objectives (AQOs) for TSP, 24-hour TSP levels of 260 mg m<sup>-3</sup>; and
- The statutory 1-hour TSP limit of 500 mg m<sup>-3</sup>.

5.5 These levels are not to be exceeded at Air Sensitive Receivers (ASRs).

5.6 The 1-hour and 24-hour TSP levels shall be measured to indicate the impacts of construction dust. The TSP levels shall be measured by following the standard high volume sampling method as set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA.

5.7 24-hour average TSP concentrations should be measured by drawing air through a high volume sampler (HVS) fitted with a conditioned, pre-weighed filter paper, at a controlled rate. After sampling for 24-hours, the filter paper with retained particles is collected and returned to the laboratory for drying in a desiccator followed by accurate weighing. 24-hour average TSP levels are calculated from the ratio of the mass of particulates retained on the filter paper to the total volume of air sampled. The analysis process normally takes about two days to complete.

5.8 1-hour average TSP concentrations shall be measured using the same monitoring method as 24-hour average TSP (i.e. the HVS).

- 5.9 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc shall be recorded down in detail. A sample data sheet is shown in Annex E.

### Monitoring Equipment

- 5.10 A high volume sampler (HVS) in compliance with the following specifications shall be used for carrying out the 1-hr and 24-hr TSP monitoring:
- 0.6 - 1.7 m<sup>3</sup> min<sup>-1</sup> (20-60 SCFM) adjustable flow range;
  - equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
  - installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
  - capable of providing a minimum exposed area of 406 cm<sup>2</sup> (63 in<sup>2</sup>);
  - flow control accuracy: +/- 2.5% deviation over 24-hour sampling period;
  - incorporated with an electronic mass flow rate controller or other equivalent devices;
  - equipped with a flow recorder for continuous monitoring;
  - provided with a peaked roof inlet;
  - incorporated with a manometer;
  - able to hold and seal the filter paper to the sampler housing at horizontal position;
  - easy to change the filter; and
  - capable of operating continuously for 24-hr period.
- 5.11 The ET shall be responsible for the provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with an appropriate calibration kit are available for carrying out the baseline, regular impacts monitoring and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals, in accordance with requirements stated in the manufacturers operating manual and as described below. All the equipment, calibration kit, filter papers, etc shall be clearly labelled.
- 5.12 The flow rate of each HVS with mass flow controller shall be calibrated using an orifice calibrator. Initial calibration of the dust monitoring equipment shall be conducted upon installation and prior to commissioning. One point flow rate calibration shall be carried out every two months. Five point calibration shall be carried out every six months.
- 5.13 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded down on the data sheet as mentioned in Annex C.
- 5.14 Wind monitoring equipment shall also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. For installation and operation of the wind data monitoring equipment, the following points shall be observed:
- the wind sensors should be installed on masts at an elevated level 10 m above the ground, so that they are clear of obstructions or turbulence caused by building(s);

- the wind data should be captured by a data logger and to be downloaded for processing at least once a month;
- the wind data monitoring equipment should be re-calibrated at least once every six months; and
- wind direction should be divided into 16 sectors of 22.5 degrees.

5.15 In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the IEC and Engineer, and agreed with EPD.

5.16 Table 5.1 presents the recommended types and quantities of TSP monitoring equipment required.

**Table 5.1 TSP Recommended Monitoring Equipment**

Description	Quantity
High Volume sampler	1 unit

**Laboratory Measurement/Analysis**

5.17 A clean laboratory with constant temperature and humidity control, and equipped with the necessary measuring and conditioning instruments to handle the dust samples, shall be available for sample analysis and equipment calibration and maintenance. The laboratory shall be either HOKLAS accredited or another internationally accredited laboratory.

5.18 If a site laboratory or a non-HOKLAS accredited laboratory is used, the laboratory equipment and measurements shall meet with the satisfaction of the Engineer in consultation with the IEC. The ET shall conduct regular audits to determine the accuracy of the measurement results.

**Monitoring Locations**

5.19 One air quality monitoring station has been identified in the locality of the Theme Park and associated development. The location of the monitoring station is presented in Table 5.2 and depicted in Figure 5.1.

**Table 5.2 EM&A Representative Air Quality Monitoring Station During Construction Phase**

ASR No.	Identity/Description
AM1	Penny's Bay Power Station

5.20 Prior to the commencement of the EM&A programme, the proposed air quality monitoring stations shall be discussed and agreed with the Engineer, the ET, IEC and EPD. When positioning the samplers, the following points shall be noted:

- a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
- no two sampler shall be placed less than 2 m apart;

- the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- a minimum of 2 m separation from walls, parapets and penthouses is required for rooftops samplers;
- a minimum of 2 m separation from any supporting structure, measures horizontally is required;
- no furnace or incinerator flue is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20 m from the dripline;
- any wire fence and gate to protect the sampler, shall not cause any obstruction during monitoring;
- permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the samplers.

### **Baseline Monitoring**

- 5.21 Baseline monitoring shall be carried out to determine the ambient 24-hour TSP and 1-hour levels at the monitoring locations prior to the commencement of the construction works. During the baseline monitoring, there shall not be any construction or dust generating activities in the vicinity of the monitoring stations.
- 5.22 Baseline monitoring shall be carried out for a continuous period of at least two weeks under typical weather conditions with the 24-hour and three 1-hour ambient measurements taken daily at each monitoring location. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources shall also be recorded throughout the baseline monitoring period.
- 5.23 The baseline monitoring will provide data for the determination of the appropriate Action levels with the Limit levels set against statutory or otherwise agreed limits.
- 5.24 Baseline checking of ambient dust levels shall be carried out every six months at each monitoring location, when no dusty works activities are in operation. If the ET considers that significant changes in the ambient conditions have arisen, a repeat of the baseline monitoring may be carried out to update the baseline levels and air quality criteria, after consultation and agreement with the Engineer, the IEC and the EPD.

### **Impact Monitoring**

- 5.25 The monthly schedule of the compliance and impact monitoring programme shall be drawn up by the ET one month prior to the commencement of the scheduled construction period. For regular impact monitoring, a sampling frequency of at least once in every six-days shall be strictly observed at all of the monitoring stations for 24-hour TSP monitoring. In case of complaints, 1-hour TSP monitoring shall be conducted at least three times in every six-days when the highest dust impacts are likely to occur. Before commencing the baseline monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct an on-site audit to ensure the accuracy of the impact monitoring results.



- 5.26 The specific time to start and stop the 24-hour TSP monitoring shall be clearly defined for each location and shall be strictly followed by the operator.

### Compliance Assessment

- 5.27 Action and Limit (A/L) levels provide an appropriate framework for the interpretation of monitoring results. The air quality monitoring data shall be checked against the agreed A/L levels as listed in Tables 5.3 and 5.4.

**Table 5.3 Derivation of Action and Limit Levels for 24-Hour TSP Monitoring**

Level	Total Suspended Particulates ( $\mu\text{g m}^{-3}$ )
Baseline	Numerical average of physical measurements prior to construction commencement. For Baseline concentration above $200 \mu\text{g/m}^3$ only the limit level applies
Action	For baseline $<108 \mu\text{g m}^{-3}$ , average of 130% of baseline and the Limit level For $108 \mu\text{g m}^{-3} < \text{baseline} > 154 \mu\text{g m}^{-3}$ , $200 \mu\text{g m}^{-3}$ For baseline $>154 \mu\text{g m}^{-3}$ , 130% of baseline level
Limit	AQO for 24-hour TSP: $260 \mu\text{g m}^{-3}$

**Table 5.4 Derivation of Action and Limit Levels for 1-Hour TSP Monitoring**

Level	Total Suspended Particulates ( $\mu\text{g m}^{-3}$ )
Baseline	Numerical average of physical measurements prior to construction commencement. For Baseline concentration above $350 \mu\text{g/m}^3$ only the limit level applies
Action	For baseline $<154 \mu\text{g m}^{-3}$ , average of 130% of baseline and the Limit level For $154 \mu\text{g m}^{-3} < \text{baseline} > 269 \mu\text{g m}^{-3}$ , $350 \mu\text{g m}^{-3}$ For baseline $> 269 \mu\text{g m}^{-3}$ , 130% of baseline level
Limit	EIAO Statutory Limit: $500 \mu\text{g m}^{-3}$

### Event and Action Plan (EAP)

- 5.28 The principle upon which the EAP is based is the prescription of procedures and actions associated with the measurement of certain defined levels of air pollution recorded by the environmental monitoring process and defined in the tables above. The ET shall compare the impact monitoring results with the air quality criteria (Tables 5.3 and 5.4) established for 24-hour TSP and 1-hour TSP. In cases where exceedance of these criteria occurs, the ET, the IEC, the Engineer and the Contractor shall strictly observe the relevant actions of the EAP shown in Annex B.

**Mitigation Measures**

- 5.29 The EIA Report has recommended air quality control and mitigation measures during the construction phases of the Project. These are outlined in the Implementation Schedule (in Annex C of this EM&A Manual). In the event of exceedances or complaints, the Contractor shall be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

## 6 NOISE MONITORING

### Introduction

6.1 In this section, the requirements, methodology, equipment, monitoring locations and mitigation measures for the monitoring and audit of noise impacts associated with the construction and operational phases of Project are described.

### Methodology and Criteria

6.2 Noise level measurements shall be carried out using the methodology set out in Sub-section 3 of the Annex - General Calibration and Measurement Procedures, as stated in the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM).

6.3 The appropriate parameter for measuring construction noise impacts shall be the A-weighted equivalent continuous sound pressure level ( $L_{Aeq}$ ) measured in decibels (dB). The two statistical sound levels  $L_{10}$  and  $L_{90}$ ; the levels exceeded for 10 and 90 percent of the time respectively, shall also be recorded during the monitoring for reference. A sample data record sheet is shown in Annex C for reference.

6.4 Whilst the Noise Control Ordinance (NCO) does not provide for the statutory control of construction activities occurring on weekdays during normal working hours (that is, Monday to Saturday inclusive 0700-1900), a daytime limit of  $L_{Aeq(30\text{ minute})}$  75dB, recommended in the Practice Note for Professional Persons - Noise from Construction Activities - Non-statutory Controls, EPD, May 1993 (ProPECC PN2/93) was proposed in the EIA Report and agreed with EPD as the appropriate criterion for all residential dwellings; while a daytime limit of  $L_{Aeq(30\text{ minute})}$  70dB was proposed in the EIA Report as the appropriate criterion for all educational institutions during normal school days and  $L_{Aeq(30\text{ minute})}$  65dB during examination periods.

6.5 The NCO provides statutory controls on general construction works during restricted hours (ie 1900-0700 hours Monday to Saturday and at any time on Sundays and public holidays). The ANLs for evenings and holidays and for night-time are dependent on the Area Sensitivity Rating at the NSR. The relevant ANLs are provided in Table 6.1.

**Table 6.1 Acceptable Noise Levels (ANLs)**

Time Period	Area Sensitivity Rating		
	A	B	C
All days during the evening (1900-2300 hours) and general holidays (including Sundays) during the day and evening (0700-2300 hours)	60	65	70
All days during the night-time (2300-0700)	45	50	55

## Monitoring Equipment

- 6.6 The ET shall be responsible for providing and maintaining a sufficient number of sound level meters to conduct the necessary baseline monitoring, regular impact monitoring and ad hoc monitoring at the agreed monitoring locations.
- 6.7 Sound level meters and calibrators shall comply with the International Electrotechnical Commission (IEC) Publication 651 : 1979 (Type 1) and 804 : 1985 (Type 1) specification as referred to in the GW-TM. The sound level meters shall be supplied and used with the manufacturers recommended wind shield and with a tripod.
- 6.8 The calibration of the sound level meters shall be carried out in accordance with the manufacturer's requirements. The sound level meters, including the calibrators, shall be verified by the manufacturers once every two years to ensure that they perform to the same level of accuracy as stated in the manufacturers specifications. Calibrated hand-held anemometers capable of measuring the wind speed in  $\text{ms}^{-1}$  shall also be supplied for the measurement of wind speeds during noise monitoring periods. The anemometers shall be used and calibrated in accordance with the manufacturers recommendations.
- 6.9 Sound level meters shall be calibrated using a portable calibrator before and after each measurement. The calibration levels shall be noted with the measurement results and where the difference between the calibration levels is greater than 1 dB(A) the measurement shall be repeated.
- 6.10 The ET shall ensure the equipment shall be kept in a good state of repair in accordance with the manufacturer's recommendations and maintained in proper working order with sufficient spare equipment available in the event of breakdown to maintain the planned monitoring programme.
- 6.11 Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding  $5 \text{ ms}^{-1}$  or wind with gusts exceeding  $10 \text{ ms}^{-1}$ . The wind speed shall be checked with the hand-held anemometers. Table 6.2 lists the suggested quantities of noise monitoring equipment required for the Works.

**Table 6.2 Noise Monitoring Equipment**

Description	Quantity
Noise meter	1 unit
Calibrator	1 unit
Hand-held anemometer	1 unit

## Monitoring Locations

- 6.12 Based on the noise sensitive receivers identified and stated within the EIA Report, representative noise monitoring locations have been determined in the vicinity of the works associated with the construction of the Project. Their locations are listed below in Table 6.3

and depicted in Figure 6.1. Prior to the commencement of the EM&A Programme, the proposed noise monitoring locations will be discussed and agreed with the Engineer, IEC and the EPD.

**Table 6.3 EM&A Representative Noise Monitoring Locations**

NSR No	Identity/Description
NM1	Sea Crest Villa (Peng Chau)
NM2	Crestmont Villa (Discovery Bay)
NM3	Luk Keng Tsuen

6.13 If, due for example, there are difficulties obtaining access to the proposed noise monitoring locations, alternative monitoring locations may be proposed. The selection of these alternative monitoring locations shall be based on the following criteria:

- at locations close to the major site activities which are likely to have noise impacts;
- close to the NSRs (any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, performing arts centre shall be considered as a NSR); and
- for monitoring locations located in the vicinity of the NSRs, care shall be taken to cause minimal disturbance to the occupants during monitoring.

6.14 The monitoring locations shall normally be at a point 1 m from the exterior of the sensitive receiver building façade and at a height approximately 1.2 m above the ground or at the height that has the least obstructed view of the construction activity in relation to the receiver. If there is a problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3dB(A) shall be made to the free field measurements. The ET shall agree with the IEC and EPD on the monitoring positions and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and impact monitoring shall be carried out at the same positions.

#### **Baseline Monitoring**

6.15 The ET shall carry out the baseline noise monitoring prior to the commencement of the construction works. To obtain fully satisfactory baseline results, a waterproof sound level meter and noise logger shall be used. Baseline noise levels shall be measured over one consecutive 7-day calendar week at a minimum logging interval of 15 minutes. The  $L_{Aeq}$ ,  $L_{10}$  and  $L_{90}$  shall be recorded at the specified interval. The survey period shall be selected prior to the commencement of construction activities and so as to avoid other atypical noise sources. The proper functioning of the logger shall be ensured during this period and shall be visited for a period of not less than one hour every two days to ensure its continued operation and to detail specifics of audible noise sources at the monitoring locations. The calibration of the logger kit shall be as recommended by the manufacturer. Measurements shall be recorded to the nearest 0.1 dB.

- 6.16 Checking for changes in the baseline noise levels throughout the construction of Project shall be carried out by taking "sample" noise measurements every six months, when no noisy construction activities are in progress. If significant changes that can be validated are observed to have arisen, the baseline may be adjusted accordingly after consultation and agreement with the IEC, Engineer, and the EPD.

### Impact Monitoring

- 6.17 During normal construction working hours (0700-1900 Monday to Saturday), monitoring of  $L_{Aeq, 30min}$  noise levels (as six consecutive  $L_{Aeq, 5min}$  readings) shall be carried out at the agreed monitoring locations once every six days in accordance with the methodology in the GW-TM. The six consecutive  $L_{Aeq, 5min}$  readings shall be used to calculate the  $L_{Aeq, 30min}$  noise level and this shall be compared to the  $L_{Aeq, 30min}$  noise criteria and reported against.
- 6.18 If restricted hours works are undertaken, monitoring of  $L_{Aeq, 5min}$  noise levels shall be carried out at the agreed monitoring stations at the same frequency as specified for normal working hours. Three consecutive  $L_{Aeq, 5min}$  readings shall be taken to ensure the validity of the results. Each of the  $L_{Aeq, 5min}$  noise readings shall be compared to the  $L_{Aeq, 5min}$  noise criteria and reported against.
- 6.19 In relation to the monitored noise levels, other noise sources such as road traffic or aircraft may make a significant contribution to the overall noise environment. Therefore, the results of the noise monitoring activities will take into account any such influencing factors which were not present during the baseline monitoring period. All measurements shall be recorded to the nearest 0.1 dB.

### Compliance Assessment

- 6.20 Action and Limit (A/L) Levels provide an appropriate framework for the interpretation of monitoring results. As an Area Sensitivity Rating has been assigned to individual affected NSRs, it is proposed that the interpretation of monitoring results is undertaken through checking them against the Action and Limit (A/L) Levels defined in Table 6.4.

**Table 6.4 Action and Limit Levels for Construction Noise**

<b>Time Period</b>	<b>Action</b>	<b>Limit</b>
0700-1900 on any day not being a Sunday or public holiday.	When one documented complaint is received	75 dB(A) <sup>(1)</sup>
1900-2300 on all days and 0700-2300 on general holidays (including Sundays).	When one documented complaint is received	60/65/70 dB(A) <sup>(2)(3)</sup>
2300-0700 on all days.	When one documented complaint is received	45/50/55 dB(A) <sup>(2)(3)</sup>

(1) For educational establishments the limit level shall be 70 dB(A), reduced to 65 dB(A) during examination periods.

(2) Acceptable Noise Levels for Area Sensitivity Rating of A/B/C.

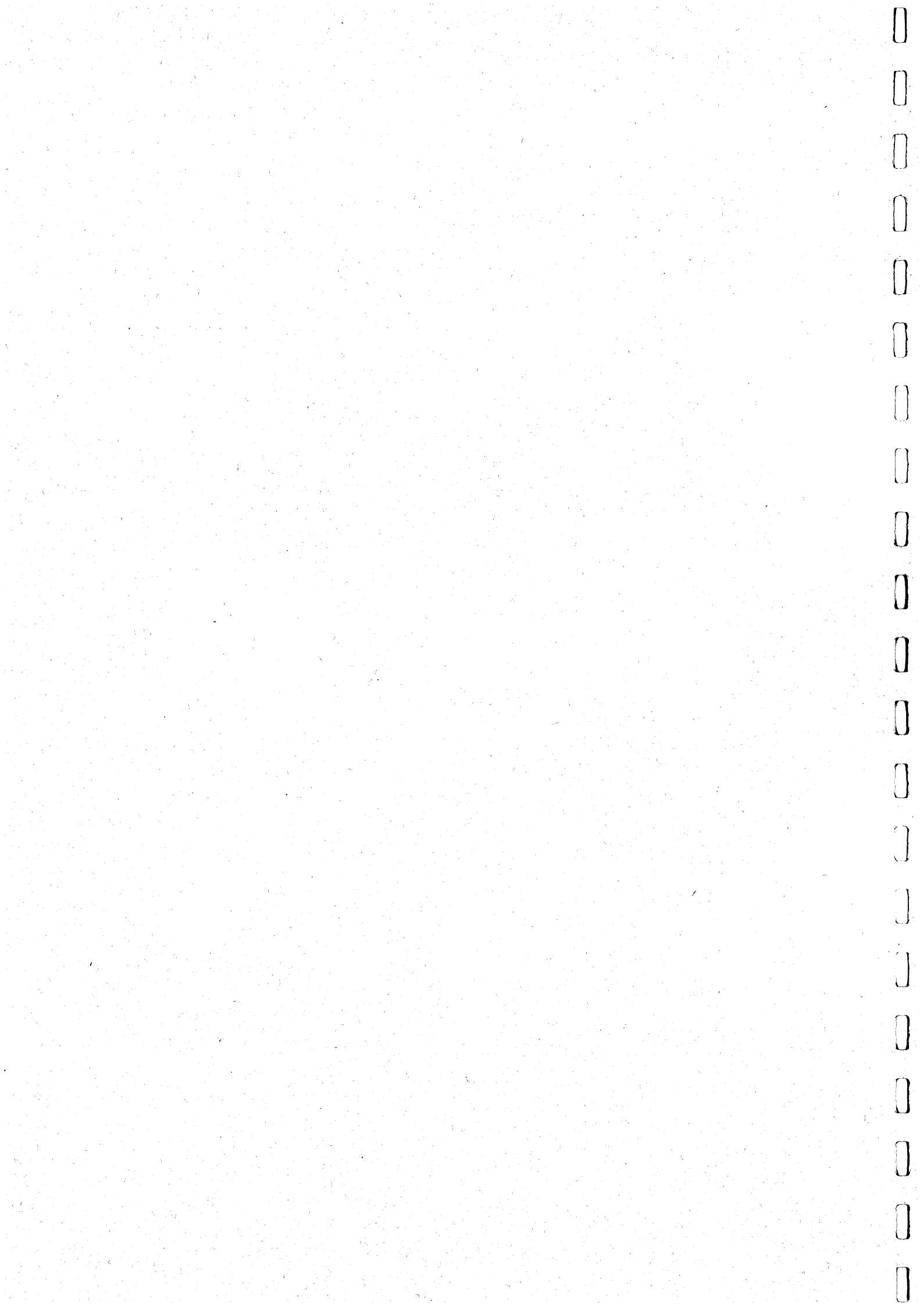
(3) NSR1 and 2 have been assigned an ASR of 'A' and NSR3 has been assigned an ASR of B

6.21 To account for cases where ambient noise levels, as identified by baseline monitoring, approach or exceed the stipulated Limit Level prior to commencement of construction, a Maximum Acceptable Impact Level, which incorporates the baseline noise level and the identified construction noise Limit Level, may be defined upon agreement with the EPD. This amended level will, therefore, be greater than 75 dB(A) and will represent the maximum acceptable noise level at a specific monitoring station. Correction factors for the effects of acoustic screening and / or architectural features of NSRs may also be applied for, from the EPD, as specified in the GW-TM.

6.22 For the purposes of compliance checking, after taking into account any adjustments agreed with EPD, comparison with either the Limit or the Maximum Acceptable Impact Level shall represent the governing criteria for noise impact assessment during the Project EM&A.

#### **Event Action Plan (EAP)**

6.23 The principle on which the EAP is based is the prescription of procedures and actions associated with the measurement of defined levels of noise impact recorded by the environmental monitoring process and defined in the table above. In cases where exceedance of these criteria occurs, the ET, the IEC, the Engineer and the Contractor shall strictly observe the relevant actions of the EAP shown in Annex B.





## 7 WATER QUALITY MONITORING

### Introduction

7.1 In this section, the requirements, methodology, equipment, monitoring locations and mitigation measures for the monitoring and audit of water quality impacts from the construction of the Project are presented.

### Marine Water Quality Monitoring

#### Methodology and Criteria

7.2 Marine water quality monitoring shall be carried out by the ET to ensure that any deteriorating water quality is readily detected and that timely action is taken to rectify the situation. The appropriate water quality mitigation measures are outlined in the Implementation Schedule (in Annex C of this EM&A Manual).

#### Water Quality Monitoring

7.3 The objectives of the water quality monitoring programme are as follows:

- to determine the effectiveness of the operational controls and mitigation measures employed, and the need for supplementary mitigation measures; and
- to check compliance with relevant WQOs;

7.4 Parameters to be measured in situ are:

- Dissolved oxygen (DO) (% saturation);
- Dissolved oxygen (DO) (in  $\text{mg L}^{-1}$ );
- Temperature ( $^{\circ}\text{C}$ );
- Turbidity (NTU);
- Salinity ( $\text{mg L}^{-1}$ ); and
- Water depth (m).

7.5 Parameters to be measured in the laboratory are:

- suspended solids ( $\text{mg L}^{-1}$ );
- Total Inorganic Nitrogen (TIN) ( $\text{mg L}^{-1}$ );
- Un-ionised Ammonia ( $\text{NH}_3 - \text{N}$ ) ( $\text{mg L}^{-1}$ );
- Tributyl Tin (TBT) ( $\text{mg L}^{-1}$ );
- Polycyclic Aromatic Hydrocarbons (PAHs) ( $\text{mg L}^{-1}$ ); and
- Polychlorinated Biphenyls (PCBs) ( $\text{mg L}^{-1}$ ).

7.6 In addition to the water quality parameters, other relevant data shall also be measured and recorded, including monitoring location, position, time, weather conditions, sea conditions

(where appropriate), tidal stage (where appropriate), special phenomena and work activities at the construction site.

- 7.7 A full listing of the water quality monitoring parameters to be monitored at each location is given in Table 7.5, and a sample monitoring record sheet shown in Annex F, the in-situ parameters are stored digitally in a logger.

### **Monitoring Equipment**

- 7.8 For water quality monitoring, the following equipment shall be supplied by the ET and approved by the IEC and the Engineer.

#### *Dissolved Oxygen and Temperature Measuring Equipment*

- 7.9 The instrument shall be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and shall be operable from a DC power source. It shall be capable of measuring:

- dissolved oxygen levels in the range of 0 - 20 mg L<sup>-1</sup> and 0 - 200% saturation; and
- a temperature of 0 - 45 degrees Celsius.

- 7.10 It shall have a membrane electrode with automatic temperature compensation complete with a cable of not less than 25 m in length. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary. (For example, YSI model 59 metre, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

#### *Turbidity Measurement Equipment*

- 7.11 Turbidity within the water shall be measured in-situ by the nephelometric method. The instrument shall be a portable, weatherproof turbidity-measuring unit complete with cable, sensor and comprehensive operation manuals. The equipment shall be operated from a DC power source, it shall have a photoelectric sensor capable of measuring turbidity between 0 - 1000.NTU and shall be complete with a cable with at least 25 m in length (Hach 2100P or an approved similar instrument).

- 7.12 To investigate the existence of any correlation between turbidity and Suspended Solids, the turbidity meter shall be calibrated with in a fluid with a known NTU.

#### *Water Depth Gauge*

- 7.13 A portable, battery-operated echo sounder (Seafarer 700 or a similar approved instrument) shall be used for the determination of water depth at each designated monitoring station. This unit shall either be hand-held or affixed to the bottom of the work boat if the same vessel is to be used throughout the monitoring programme.

*Salinity Measurement Instrument*

- 7.14 A portable salinometer, capable of measuring salinity in the range of 0 - 40 mg L<sup>-1</sup>, shall be provided for measuring salinity of the water at each monitoring location.

*Water Sampling Equipment*

- 7.15 A water sampler, consisting of a transparent PVC or glass cylinder of not less than two litres which can be effectively sealed with cups at both ends, shall be used (Kahlsico Water Sampler 13SWB203 or an approved similar instrument). The water sampler shall have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.
- 7.16 Water samples for SS measurements shall be collected in high density polythene bottles, packed in ice (cooled to 4 °C without being frozen), and delivered to a HOKLAS laboratory as soon as possible after collection.

*Positioning Device*

- 7.17 A digital Global Positioning System (GPS) shall be used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

**Testing Protocols**

- 7.18 All in situ monitoring instruments shall be checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use, and subsequently re-calibrated at 3-monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes shall be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location. The turbidity meter shall be calibrated to establish the relationship between turbidity readings (in NTU) and levels of suspended solids (in mg l<sup>-1</sup>) where possible.
- 7.19 For the on-site calibration of field equipment, the BS 1427 : 1993, Guide to Field and On-Site Test Methods for the Analysis of Waters shall be observed. Sufficient stocks of spare parts shall be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when equipment is under maintenance, calibration etc.

**Laboratory Analysis**

- 7.20 All laboratory work shall be carried out in a HOKLAS accredited laboratory. Water samples of about 1,000 ml shall be collected at the monitoring and control stations for carrying out the laboratory determinations. The determination work shall start within 24 hours after collection of the water samples. The analyses shall follow the standard methods according to Table 7.1 and as described in APHA Standard Methods for the Examination of Water and Wastewater, 19th Edition, unless otherwise specified.

**Table 7.1 Analytical Methods to be Applied to Marine Water Quality Samples**

<b>Determinant</b>	<b>Standard Method</b>
Suspended solids	APHA 2540D

- 7.21 For each of the testing methods details shall be submitted to the DEP for approval prior to the commencement of the monitoring programme. The submitted information should include pre-treatment procedures, instrument use, Quality Assurance/Quality Control (QA/QC) details (such as blank, spike recovery, number of duplicate samples per-batch etc), detection limits and accuracy. The QA/QC details shall be in accordance with requirements of HOKLAS or another internationally accredited scheme. The QA/QC results shall be reported. EPD may request the laboratory to carry out analysis of known standards provided by EPD for quality assurance. Additional duplicate samples may be required by EPD for inter-laboratory calibration. Remaining samples after analysis shall be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification should, if required, be submitted to the EPD. In any circumstances, the sample testing shall have comprehensive quality assurance and quality control programmes. The laboratory shall be prepared to demonstrate the quality control programmes to the EPD or their representative if and when required.

#### **Marine water Quality Monitoring Locations**

- 7.22 The water quality monitoring stations are shown in Figure 7.1. Seven Sensitive Receiver (SR) Stations have been chosen on the basis of their proximity to the dredging and filling operations and thus the greatest potential for water quality impacts, as detailed in Table 7.2. The seven SR monitoring locations are:

- SR1: Kau Yi Chau;
- SR2: Discovery Bay;
- SR3: Sze Pak Wan;
- SR4: Ma Wan Fish Culture Zone South;
- SR5: Ma Wan Fish Culture Zone North;
- SR6: Tung Wan Beach; and
- SR7: Ma Wan Fish Culture Zone

**Table 7.2** Locations of Marine Water Quality Monitoring Stations

<b>Station</b>	<b>Easting</b>	<b>Northing</b>
SR1	825 607	816 216
SR2	820 268	817 870
SR3	821 033	819 153
SR4	823 827	823 208
SR5	823 827	823 705
SR6	824 511	823 518
SR7	823 810	823 590

- 7.23 Note that SR7, a monitoring location at Ma Wan Fish Culture Zone, is added further to Condition 2.16 of the Permit.
- 7.24 As detailed in Table 7.3, six Control Stations have been chosen to facilitate comparison of the water quality of the SR stations with ambient water quality conditions.
- 7.25 Three of the control stations (C2, C3, and C6) are designed to monitor the ambient water quality in relation to other activities with potential water quality impacts in the Study Area (i.e. mud disposal at East Sha Chau & South Tsing Yi, sand winning at CT9 Marine Borrow Area (MBA), the Realignment of Northern Fairway into Victoria Harbour and the Tung Chung Reclamation). The other three control stations (C1, C4 and C5), are located in areas not expected to be affected by other projects and which lie within the path of water body movements affecting the SR's but are outside the predicted influence of the Theme Park reclamation works. Monitoring data from these control stations can be used as upstream and downstream controls for the SR stations. Locations of control stations shall be subject to change depending on the location and timing of dredging and other marine works projects in the Study Area. Any proposal for change to the locations of control/impact stations shall be subject to the EPD's approval.

**Table 7.3** Locations of Marine Water Quality Control Stations

<b>Station</b>	<b>Easting</b>	<b>Northing</b>
C1	818 678	823 526
C2	817 764	820 890
C3	826 137	822 377
C4	825 255	814 229
C5	821 055	814 210
C6	825 871	824 880

- 7.26 In addition to the SR and control stations detailed above, six gradient stations have been proposed to assist in the identification of the source of any impact. It was subsequently agreed between EPD and CED that four additional gradient stations were added to the initially proposed two. The locations of the gradient stations are as detailed in Table 7.4 and depicted in Figure 7.1.

**Table 7.4** Locations of Marine Water Gradient Stations

Station	Easting	Northing
G1	824 506	821 250
G2	824 506	819 229
G3	826 256	818 219
G4	822 756	818 219
G5	821 272	822 301
G6	822 500	823 400

7.27 Water quality monitoring shall be undertaken by suitably qualified members of the ET. Water quality monitoring results from both the control and SR stations shall be compared to EPD's Water Quality Objectives (WQO), for the Southern (SWCZ), North West (NWWCZ), and Western Water Control Zones (W WCZ), as follows:

- Suspended Solids (SS): SS should not be raised above ambient levels by an excess of 30% nor cause the accumulation of SS which may adversely affect aquatic communities.
- Dissolved Oxygen (DO): DO within 2m of the bottom should not be less than 2 mg l<sup>-1</sup> for 90% of the samples; depth-averaged DO should not be less than 4 mg l<sup>-1</sup> for 90% of the samples during the whole year.

7.28 Figure 7.3 shows the location of EPD's Water Control Zones (ECZ), as referred to in the above text.

7.29 Prior to the commencement of the EM&A programme, the ET shall seek approval of the proposed water monitoring stations from the IEC, the Engineer and the EPD.

7.30 When alternative monitoring locations are proposed, they should be chosen taking into regard the following criteria:

- at locations close to and preferably at the boundary of the mixing zone of the major site activities as indicated in the EIA Report, which are likely to have water quality impacts;
- close to sensitive receptors which are directly or likely to be affected;
- for monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance during monitoring;
- at two or more control stations which shall be at locations representative of the project site in its undisturbed condition. Control stations should be outside the area of influence of the works and, as far as practicable, not affected by any other works.

### Baseline Monitoring

7.31 The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of the works and to demonstrate the suitability of the proposed impact and control monitoring stations. The measurements shall be taken at all designated Control and

SR stations, 3-days per week, at mid-flood and mid-ebb tides, for at least 4 consecutive weeks prior to the commencement of the reclamation works. The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency will be increased. Duplicate water samples shall be taken and analysed.

- 7.32 Table 7.5 summarises the baseline monitoring programme for each water quality parameter.

**Table 7.5 Summary of Baseline Monitoring Programme for Water Quality**

Parameter	Monitoring Stations	Frequency	Total Number of Sampling Days
Dissolved Oxygen	All	Three days per week at each monitoring station	12
Temperature	All	Three days per week at each monitoring station	12
Turbidity	All	Three days per week at each monitoring station	12
Suspended Solids	All	Three days per week at each monitoring station	12
Salinity	All	Three days per week at each monitoring station	12

- 7.33 All measurements shall be carried out at three water depths, namely, 1 m below water surface, mid-water depth, and 1 m above sea bed as appropriate to the derivation of Action and Limit levels. If the water depth is less than 6 m, the mid-depth measurement is omitted. If the depth is less than 3 m, only the mid-depth measurement needs to be taken. The baseline monitoring campaign shall be executed prior to the start of the marine construction activities. All parameters should be measured at the control stations on each monitoring day.

### Impact Monitoring

- 7.34 During the course of the marine works, impact monitoring shall be undertaken on three working days per week. Monitoring at each station shall be undertaken at both mid-ebb and mid-flood tides on the same day. The interval between two sets of monitoring shall not be less than 36 hours. Two consecutive measurements of DO concentration ( $\text{mg l}^{-1}$ ), DO saturation (%) and turbidity (NTU) will be taken in situ according to the stated sampling method. The monitoring probes shall be retrieved out of water after the first measurement and then redeployed for the second measurement. Where the difference in value between the first and second measurement of DO or turbidity parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings shall be taken. Water samples for SS ( $\text{mg l}^{-1}$ ) measurements shall be collected at the same depths. As for the in situ measurements, duplicates will be taken at both Control and SR Stations.
- 7.35 In addition to the above in-situ measurements temperature and salinity will be determined at all Control and SR stations at the same depths, as specified above.

- 7.36 For the purpose of evaluating water quality, the values obtained will be assessed against specified WQOs criteria. Note that in addition to the monitoring location/position, time, water depth, water temperature, salinity, weather conditions, sea conditions, tidal stage, and any special phenomena and work underway at the dredging site shall be recorded.
- 7.37 Upon completion of all marine activities, a post project monitoring exercise water quality shall be carried out for four weeks, in the same manner as the monitoring during construction.

**Compliance Assessment**

- 7.38 Water quality monitoring results will be evaluated against Action and Limit levels as shown in Table 7.6. For all other parameters, Action and Limit Levels shall be proposed by the ET for agreement with the IEC and the EPD following the completion of the baseline monitoring. Exceedances of the Action and Limit level may, as necessary, result in changes to the monitoring and dredging operations, potentially involving increased monitoring and implementation of appropriate mitigation measures.

**Table 7.6 Action and Limit levels for Water Quality**

<u>Parameters</u>	<u>Action</u>	<u>Limit</u>
DO in mg L <sup>-1</sup> (Surface, Middle and Bottom).	<u>Surface and Middle</u> 5%-ile of pooled baseline data for surface and middle layer  <u>Bottom</u> 5%-ile of pooled baseline data for bottom layer	<u>Surface and Middle</u> For non-FCZ stations, the limit level shall be 4 mg L <sup>-1</sup> or 1%-ile of the pooled baseline data for surface and middle layer, whereas for FCZ stations the limit level shall be 5 mg L <sup>-1</sup> or 1%-ile of pooled baseline data for surface and middle layer  <u>Bottom</u> 2 mg L <sup>-1</sup> and 1%-ile of pooled baseline data for bottom layer
SS in mg L <sup>-1</sup> (depth-averaged)	95%-ile of pooled baseline data and 120% upstream control station's SS at the same tide of the same day	99%-ile of pooled baseline data, and 130% of upstream control station's SS at the same tide of the same day and specific sensitive receiver water quality requirements (e.g. required suspended solids level for concerned sea water intakes, inland water)



Parameters	Action	Limit
Turbidity (Tby) in (depth-averaged)	NTU 95%-ile of pooled baseline data and 120% of upstream control station's turbidity at the same tide on the same day	99%-ile of pooled baseline data and 130% of upstream control station's turbidity at the same tide on the same day

## Notes:

- "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths;
- For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- For SS and Tby, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered necessary.
- Whichever of the two criteria is greater shall be used as the Action and Limit levels. subject to approval from EPD..

- 7.39 Please note that the Action and Limit Levels were amended by EPD [EPD's letter to CED ref no. (31) in Annex (3) to EP2/N9/O/65 V11]: Turbidity [Limit level only] and Suspended Solids [Action Level and Limit Level]. Please refer to annex G for the current Action Levels and Limit Levels.

#### Event Action Plan

- 7.40 Should the monitoring results of the water quality parameters at any designated monitoring stations indicate that the water quality criteria have been exceeded, the actions in accordance with the Event and Action Plan in Annex B.

#### Monitoring of Total Inorganic Nitrogen and Un-ionised Ammonia

- 7.41 The EIA report states that the works of Penny's Bay Reclamation are not significant pollution sources of total inorganic nitrogen (TIN) and un-ionised ammonia (NH<sub>3</sub>-N). However, this should be demonstrated through field measurements.
- 7.42 Therefore TIN and NH<sub>3</sub>-N in marine water shall be monitored from the commencement of the dredging until the period of the maximum dredging rate is completed and at least monitored for 4 months. The monitoring programme and locations shall be the same as for the regular marine water quality monitoring programme for other parameters. Water samples shall be taken at all 19 monitoring locations listed in Tables 7.2 to 7.4. Monitoring shall be undertaken on three working days per week. Monitoring at each station shall be undertaken at both mid-ebb and mid-flood tides on the same day. The interval between two sets of monitoring shall not be less than 36 hours.
- 7.43 All laboratory work shall be carried out in a HOKLAS accredited laboratory. The determination work shall start within 24 hours after collection of the water samples. The analyses shall follow the standard methods according to Table 7.8 and as described in APHA Standard Methods for the Examination of Water and Wastewater, 19th Edition, unless otherwise specified.

**Table 7.8 Analytical Methods for TIN and NH<sub>3</sub>-N**

Determinant	Standard Method
Total inorganic nitrogen	APHA 4500-N <sub>org</sub> /NO <sub>3</sub> ; or equivalent methods subject to approval of DEP.
Ammonia	APHA 4500-NH <sub>3</sub> G

- 7.44 The monitored results shall be compared with the EPD's routine monitoring data in the vicinity during the last 5 years in order to demonstrate that the two parameters are in deed of no concern in the area and particularly Ma Wan Fish Culture Zone. In case, the monitoring results show that the Reclamation project is a significant source of TIN and NH<sub>3</sub>-N, and greater than the EIA findings, the impacts should be assessed, suitable remedial actions should be proposed and the monitoring should be continued.

#### Monitoring of TBT/PAHs/PCBs

- 7.45 As specified in Condition 2.15 of the Permit, Tributyl Tin (TBT), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) levels are to be monitored before and during the initial phases of dredging operation at Penny's Bay. As PAHs and PCBs are groups of compounds, the monitoring parameters to be reported shall be Low Molecular Weight PAHs (light PAHs), High Molecular Weight PAHs (heavy PAHs), and total PCBs.

#### Monitoring Locations

- 7.46 Water samples shall initially be taken at 6 locations in the vicinity of Penny's Bay Reclamation Site for the analysis of TBT, light PAHs, heavy PAHs, and total PCBs. The monitoring locations are presented in Table 7.9 and shown on Figure 7.2.
- 7.47 The number of monitoring locations shall be increased in the event of exceedance of any parameter monitored, or if the monitoring data indicates deterioration of water quality that may be due to the dredging activities. The additional locations and monitoring programme will be agreed with the Engineer, the IEC, and approved by the EPD.

**Table 7.9 Locations of Water Quality Monitoring for TBT/PAHs/PCBs**

Station	Easting	Northing
TPP1	823 798	823 630
TPP2	823 842	823 165
TPP3 (Control)	826 327	818 446
TPP4	824 084	819 562
TPP5	823 238	818 568
TPP6	821 693	818 427

*Pre-dredging Monitoring*

- 7.51 Before the dredging operations at Penny's Bay, water samples shall be taken on 2 days within 1 week at 6 designated monitoring locations, at mid-flood and mid-ebb tides on each sampling day. All samplings shall be carried out at three water depths, namely, 1 m below water surface, mid-water depth, and 1 m above seabed. If the water depth is less than 6 m, the mid-depth measurement may be omitted. If the depth is less than 3 m, only the mid-depth measurement needs to be taken. Water samples for the 3 depths at each monitoring location shall be combined in equal proportions in the laboratory to produce a composite sample for chemical analysis.

*Impact Monitoring*

- 7.52 During the initial phase of dredging, water samples shall be taken on 3 times per week. Monitoring at each location shall be undertaken at both mid-ebb and mid-flood tides on the same day. The interval between two sets of monitoring shall not be less than 36 hours. Water samples shall be taken at three water depths, namely, 1 m below water surface, mid-water depth, and 1 m above seabed. If the water depth is less than 6 m, the mid-depth measurement is omitted. If the depth is less than 3 m, only the mid-depth measurement needs to be taken. Water samples for the 3 depths at each monitoring location shall be combined in equal proportions in the laboratory to produce a composite sample for chemical analysis.

*Review of Monitoring Programme*

- 7.53 After the initial month of the dredging operation and monitoring, the monitoring data shall be reviewed. The monitoring programme shall be reviewed after the initial 2 months of dredging operation and monitoring based on the available data. Any revision of the monitoring programme will be agreed with the Engineer, the IEC, and approved by the EPD.

*Monitoring Equipment*

- 7.54 Water samples should be collected using a Niskin water sampler or similar instrument, be at least 2.5 L in capacity with messenger and using a 50m line. Samples should be submitted to a HOKLAS accredited laboratory as soon as possible for chemical analysis.
- 7.55 A Global Positioning System (GPS) should be used to ensure that the correction location has been selected prior to sample collection.
- 7.56 A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.
- 7.57 Water samples should be stored in glass bottles with no preservative added, packed in ice (cooled to 4°C without being frozen), delivered to the laboratory and analysed as soon as possible. A total of 3L of water sample shall be collected for each monitoring location at each depth for the analysis of the specified parameters.

*Laboratory Analytical Methods*

- 7.58 Analyses of TBT, light PAHs, heavy PAHs and total PCBs shall be carried out in a HOKLAS or other international accredited laboratory. Table 7.10 shows the standard test method of the proposed determinant for laboratory analysis.

**Table 7.10 Method for Laboratory Analysis of Water Samples**

Parameter	Preparation Method	Testing Method	Detection Limit
TBT	Ministry of Agriculture Fisheries and Food, Directorate of Fisheries Research, Analytical Chemistry, Applied Organometallic Chemistry		0.001 µg/L
PAHs (light)	USEPA 1311	USEPA 8270	0.1 µg/L
PAHs (heavy)	USEPA 1311	USEPA 8270	0.5 µg/L
total PCBs	USEPA 1311	USEPA 8082	0.001 µg/L

- 7.59 Water samples for the 3 depths at each monitoring location shall be combined in same proportions in the laboratory to produce a composite sample for chemical analysis. Therefore one composite water sample will be analysed for each monitoring location, on each day and for each tide. The total number of samples for the monitoring programme is summarised in Table 7.11.

**Table 7.11 Summary of Water Quality Monitoring Program**

	Pre-dredging	Impact
Number of Locations	6	6
Frequency	2 days in 1 week	3 days per week
Number of tides per day	2	2
Number of depths per location	3	3
Number of composite samples* for chemical analysis per day	12	12

\* Composite samples are formed from mixing samples from the three depths at the same location in equal proportions.

- 7.60 The testing laboratory should be HOKLAS accredited and comprehensive quality assurance and control procedures in place in order to ensure quality and consistency in results.

*Limit Levels for Water Quality*

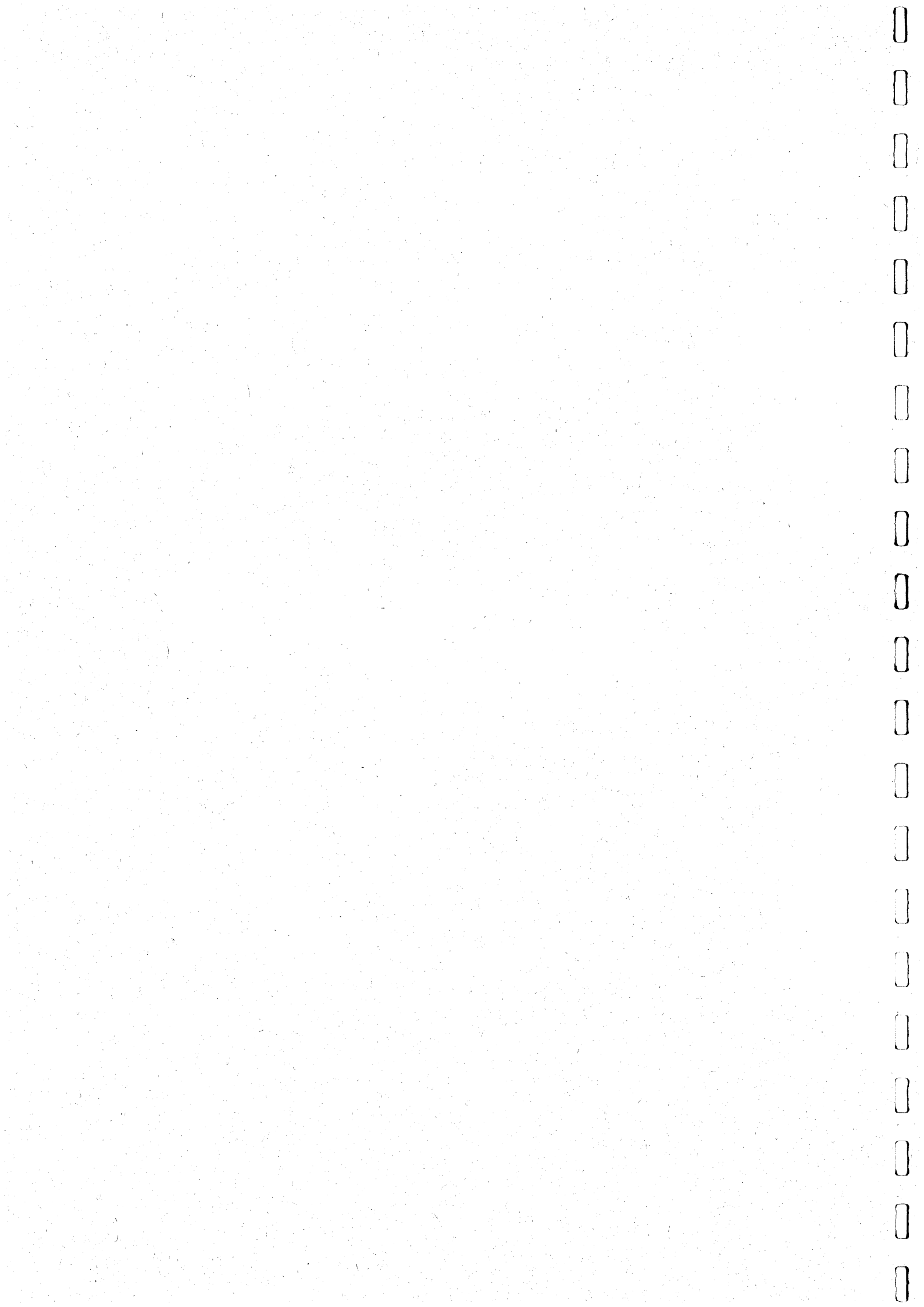
The Limit levels will be established in accordance with the Australia Water Quality Guidelines for Fresh and Marine Waters (1992). The Limit levels are provided in Table 7.12.

**Table 7.12 Limit Levels for Water Quality**

Parameter	Limit Level
TBT	0.002 µg/L
PAHs (light and heavy)	3.0 µg/L
total PCBs	0.004 µg/L

**Notes:**

1. For TBT, light PAHs, heavy PAHs, and total PCBs, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
2. All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.



## 8 WASTE MANAGEMENT

### Introduction

- 8.1 This section sets out the handling, recycling, storage, transportation and disposal measures which are recommended to avoid or minimise potential adverse impacts associated with waste arising from the construction of the Penny's Bay Reclamation.

### Waste Management Practices

- 8.2 The construction Contractor shall submit a Waste Management Plan for the construction works as required under Condition 2.8 of the Environmental Permit. Such a management plan should incorporate site specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.
- 8.3 Possible waste arising during the construction phase will include dredged/excavated sediment, construction and demolition waste, chemical waste and general refuse. Excavated material will also be generated of which some can be re-used on-site and off-site disposal is required.
- 8.4 The Implementation Schedule (Section 14 of the EIA report) provides details on the appropriate mitigation measures for avoiding and preventing adverse environmental impacts associated with dredged/excavated sediment, construction and demolition waste, chemical waste and general refuse. The Waste Management Plan should be refined and updated as more detailed information is generated on the volume of dredged/excavated sediment. Similarly, it should be regularly reviewed, and updated as appropriate, throughout the course of the construction works to ensure that it remains current with the latest detailed information and works practices.
- 8.5 The Waste Management Plan should also outline the requirements for a waste audit program to ensure the measures outlined in the plan are effectively implemented and adhered to.

### EM&A Recommendations

- 8.6 In order to ensure that the construction Contractor have implemented the recommendations of the EIA Report, the ET shall conduct regular site audits of each of the waste streams, to determine if wastes are being managed in accordance with the approved procedures and the site Waste Management Plan. The audits should look at all aspects of waste management including waste generation, storage, recycling, transport and disposal. An appropriate audit programme should be undertaken with the first audit conducted at the commencement of the construction works and then monthly audit, thereafter. Routine weekly site inspections should also include waste management issue. The scope of the waste management audits is presented below.

## Objectives of the Waste Audit

- 8.7 The aims of the waste management audit will include, but are not limited to, the following:
- ensuring that the wastes arising from works are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner and comply with the relevant requirements under the Waste Disposal Ordinance (WDO) and its regulations;
  - ensuring that the Contractor properly implement the appropriate environmental protection and waste pollution control mitigation measures, as outlined in Section 8.3 and the Implementation Schedule (in Annex C of this EM&A Manual) to minimise and control the potential for waste impacts;
  - ensuring the effective implementation of the Contractor' Environmental Management System (EMS) and waste management plan; and
  - to encourage the reuse and recycling of materials.

## Methodology and Criteria

- 8.8 The construction Contractor should ensure that the necessary waste disposal permits or licences are obtained from appropriate authorities in accordance with the various Ordinances. In addition to the ET audits, each construction Contractor should designate a member of staff as being responsible for inspecting and auditing the on-site waste management practices on a monthly basis, with reference to the relevant legislation and guidelines as well as the recommendations given in the Implementation Schedule contained in Annex C of this EM&A Manual, and defined below:
- 8.9 General Legislation for Waste Management
- Waste Disposal Ordinance (Cap 354);
  - Waste Disposal (Chemical Waste) (General) Regulation (Cap 354);
  - Land (Miscellaneous Provisions) Ordinance (Cap 28);
  - Public Health and Municipal Services Ordinance (Cap 132) - Public Cleansing and Prevention of Nuisances (Urban Council) and (Regional Council) By-laws;
  - Dumping at Sea Ordinance (1995).
  - the storage, handling and disposal of chemical waste should be audited with reference to the requirements of the Code of Practice on the Package, Labelling and Storage of Chemical Wastes published by the EPD.
- 8.10 Other Relevant Guidelines
- Waste Disposal Plan for Hong Kong (December 1989), Planning, Environment and Lands Branch Government Secretariat;
  - Environmental Guidelines for Planning In Hong Kong (1990), Hong Kong Planning and Standards Guidelines, Hong Kong Government;
  - New Disposal Arrangements for Construction Waste (1992), Environmental Protection Department & Civil Engineering Department;
  - Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), Environmental Protection Department.



- Works Branch Technical Circular No. 6/92, Fill Management; Works Branch, Hong Kong Government;
- Works Branch Technical Circular 22/92, Marine Disposal of Dredged Mud;
- Works Branch Technical Circular, 32/92, The Use of Tropical Hard Wood on Construction Site; Works Branch, Hong Kong Government;
- Technical Circular No 1-1-92 Classification of Dredged Sediments for Marine Disposal, Environmental Protection Department;
- Works Branch Technical Circular No. 2/93, Public Dumps, Works Branch, Hong Kong Government;
- Works Branch Technical Circular No. 16/96, Wet Soil in Public Dumps; Works Branch, Hong Kong Government;
- Works Bureau Technical Circular No. 4/98, Use of Public Fill in Reclamation and Earth Filling Projects; Works Bureau, Hong Kong SAR Government;
- Works Bureau Technical Circular No 5/98, On-site Sorting of Construction Waste on Demolition Site; Works Bureau, Hong Kong SAR Government;
- Waste Reduction Framework Plan, 1998 to 2007, Planning, Environment and Lands Bureau, Government Secretariat, 5 November 1998;
- Works Bureau Technical Circular No 5/99, Trip-ticket System for Disposal of Construction and Demolition Material; Works Bureau, Hong Kong SAR Government; and
- Work Bureau Technical Circular No. 25/99, Incorporation of Information on Construction and Demolition Material Management in Public Works Sub-committee Papers; Works Bureau, Hong Kong SAR Government.

### **Mitigation Measures**

- 8.11 Details of the recommended mitigation measures are included within the Implementation Schedule (in Annex C of this EM&A Manual).



## 9 TERRESTRIAL ECOLOGY

- 9.1 This Section defines the EM&A requirements that have been recommended to ensure that the proposed terrestrial ecological mitigation measures are effective.

### Potential Impacts

- 9.2 Potential impacts to terrestrial ecological resources are not expected to be high since most of the habitats impacted are generally of low ecological importance.
- 9.3 Whilst some rare plant *Schoenus falcatus* at Chok Ko Wan Tsui will be lost, the most significant potential ecological impact relates to the indirect impact to the locally rare White-bellied Sea Eagles *Haliaeetus leucogaster*. Indirect impacts to this species are expected to be moderate to high primarily due to noise disturbance.

### Residual Environmental Impacts

- 9.4 There remains the possibility that the White-bellied Sea Eagles may abandon their existing nesting site at the Pa Tau Kwu woodland.

### Environmental Monitoring and Audit Requirements

- 9.5 To monitor the effectiveness of the proposed mitigation measures, it is recommended that a specific EM&A programme is implemented for the White-bellied Sea Eagles on Pa Tau Kwu. The monitoring field work should be undertaken by an avian specialist with at least three years of local experience in ecological monitoring.

### Baseline Monitoring

- 9.6 Monitoring should be undertaken for 3 months (February-April 2000) prior to the commencement of the works. The baseline monitoring should have as its primary focus, the provision of baseline data on the White-bellied Sea Eagles on Pa Tau Kwu.
- 9.7 Field surveys of one days duration should be undertaken twice per month in order not to disrupt the birds' breeding activity. Information should be collected on behaviour, breeding activity, and responses to any disturbances.

### Monitoring During the Construction Phase

- 9.8 Monitoring of the White-bellied Sea Eagles during construction is required under Condition 2.27 of the Environmental Permit.
- 9.9 During construction, field surveys should be undertaken twice per month during periods of breeding activity (October to April), and once per month at other times of the year. Information should be collected on behaviour, breeding activity, and any responses to disturbances.

- 9.10 An Event and Action Plan is attached in Annex B. The Event and Action plan assumes that the are seldom absent from their territory on Pa Tau Kwu, if this is found not to be the case, then the Event and Action plan will need to be revised accordingly.
- 9.11 The White-bellied Sea Eagles monitoring should be undertaken by an avian specialist during the construction phase. The monitoring surveys should be undertaken by observations at Pa Tau Kwu, at certain distances from the nest of the White-bellied Sea Eagles to avoid disturbance to the normal behaviour of the White-bellied Sea Eagles. Equipment used for the monitoring included Fieldscope 20-60x and Binoculars 10x.
- 9.12 All the activities of the White-bellied Sea Eagles, including breeding, incubation, feeding, perching/roosting, preening, soaring, flying and territorial guarding should be recorded, including the time spent for each activity. Any disturbance to the White-bellied Sea Eagles, and their response and reaction should be recorded and examined in conjunction with the construction noise monitoring and other events related to the works

#### **Rare/Restricted/Protected Plant**

- 9.13 As required by Condition 2.23 of the EP, transplantation of rare/restricted/protected plants will be undertaken. Details of the monitoring and methods are provided in the Supplementary EM&A Manual as none of the species of interest will be affected by the Stage 1 Works according the Final Report Detailed Vegetation Survey [September 2000].

#### **Monitoring of Compensatory Tree Planting**

- 9.14 As required by Condition 2.22 of the EP, compensatory tree planting has to be undertaken. Details of the monitoring and methods are provided in the Supplementary EM&A Manual.

## 10 MARINE ECOLOGY

### Ecological Monitoring and Audit Requirements

#### General

- 10.1 The constraints on dredging and filling operations defined within the water quality section of the EIA Report will act as appropriate mitigation measures to control the environmental impacts to marine ecological resources to within acceptable levels. Actual impacts of construction activities will be monitored through impacts to water quality (see Section 7 of this EM&A Manual). EM&A activities designed to detect and mitigate any unacceptable impacts to water quality will serve to proactively protect against unacceptable impacts to marine ecological resources. Should any impacts be detected, the procedures outlined in the water quality Event and Action Plan for implementing appropriate mitigation will serve to protect against unacceptable impacts to marine ecological resources, thereby ensuring the environmental acceptability of the project.

#### Marine Mammals

- 10.2 Once sited at the Penny's Bay reclamation site, construction-phase dolphin/porpoise monitoring should be conducted by a qualified research team, to evaluate whether there have been any effects on the animals. The resulting data should be compatible with, and should be made available for, long-term studies of small cetacean ecology in Hong Kong.
- 10.3 The proposed monitoring/field survey will consist of vessel-based dolphin/porpoise surveys conducted twice per month during construction, around the Penny's Bay Reclamation Site.

#### Field Work Methodology

- 10.4 Line transect surveying techniques have now been standardised in Hong Kong Special Administrative Region Waters, in order that data from all surveys are directly comparable. The study area with transect lines is shown in Figure 10.1.
- 10.5 The survey vessel will depart from Queen's Pier at Central around 8:00 am, with transit time to the study area approximately 45 minutes. Observation for incidental sightings will begin immediately on departure from the assigned pier and will continue until the vessel reaches the East Lantau survey area.
- 10.6 Survey boat will have open upper deck, allowing for observer eye heights of 4-5m above water level and relatively unobstructed forward visibility between 270° and 90°. When on-effort, the boat will travel along the survey lines at a speed of approximately 7-8 knots (13-15 km/hr). The direction of the survey will be alternated on different days to avoid possible biases related to the timing of the survey coverage.
- 10.7 On arrival at East Lantau survey area, the survey vessel, containing three to four vessel-based survey personnel will proceed at a speed of approximately 7-8 knots along transects in the vicinity of the Project area. The final transect will be conducted around 1:00 pm. On the

return journey, observations for incidental dolphin sightings will again be undertaken. Observations will cease once the boat reaches the assigned arrival/departure pier.

#### Vessel-based Observation

- 10.8 Vessel-based transect observations by a 3-4 person team will be conducted by searching the 180° degree swath in front of the survey vessel (270° – 90°). The area behind the vessel will not be searched, although dolphins observed here can be recorded as off-effort sightings. There will be three survey personnel on board the vessel. A primary observer will scan the entire search path (270° – 90°) continuously with 7x50 marine binoculars with the second member of the team designated the data recorder, scanning the same area with naked eye and occasional binocular checks. The third observer rotates into the observation team after half an hour, thus relieving one of the initial team. Observers should rotate every half-hour. While on-effort, observers will be instructed to ignore potential sighting cues that could bias the sighting distance calibration (e.g. pair-trawl fishing vessels).
- 10.9 A critical consideration in the survey will be to ensure a strict timed quantification of "sighting effort" in order to maximise the comparative value of the field survey results. The time and position for the start and end of a period of intensive, uninterrupted effort and the sighting conditions associated with it must be recorded. The collection of effort data will allow comparisons to be made with a single study as well as between studies. Strict recording of time, speed, position and distance travelling along the assigned transect ("on-effort") will always therefore be recorded. Time spent during any deviation from the transect will be recorded as "off-effort". This effort data will allow dolphin abundance to be calculated using line transect methodology.
- 10.10 Survey personnel should be alert at all times during the surveying period. However, during periods of poor weather, when visibility is hindered or when Beaufort force 5 is reached, the survey should temporarily be postponed.
- 10.11 When an individual or a pod of dolphins or porpoises is observed, the observers will go off-effort and the survey vessel will reduce speed in order to allow for better observation. The observation process will continue only as long as is necessary to determine the size of the pod and the direction in which the pod is headed following strict adherence to the "on/off effort protocol".
- 10.12 It will be important to maximise survey time and therefore minimise off-transect observations and photo ID-work. Sightings distant to 500m perpendicular distance and sightings of single dolphins that are hard to track should not be pursued (although those distant to 500m ahead of the vessel can be pursued). The initial sighting distance between the dolphin and the survey vessel and sighting angle must be recorded in order to make estimates using line transect analysis. These and other details of the sighting, including the exact location of the sighting, will on every occasion be discussed among the observation team and recorded immediately. Distances and angles should be made as accurate as possible. For example, the primary

observer may be queried about the sighting distance by the recorder in order to maximise accuracy and precision of all data collected.

- 10.13 A digital Global Positioning System will be available onboard and used during every field survey. At times it may be necessary to follow the individual or pod, but the survey vessel will aim not to deviate more than ten minutes travelling time from the standard agreed transect and will return to the transect as soon as possible after the sighting.
- 10.14 A sighting record will be filled out at the initial sighting with time, position, distance, and angle data filled in immediately and verified between primary observer and data recorder. All information on sea state, weather conditions (Beaufort Scale), as well as notes on dolphin group size, age classes, behaviour, association with fishing boat, direction of movement, response to boat and any other information can be completed at the end of the sighting. Standard forms are to be issued in all dolphin monitoring.

#### Data Management

- 10.15 Completed sightings forms will be compiled and subjected to a quality control review before being entered into a database/spreadsheet programme. All data will be available to for long-term studies of dolphin population biology.

**Table 10.1 Summary of Equipment and Personnel Requirements for Marine Mammals**

Equipment Function	Type	Number
Vessel Based Monitoring	Observers	3
	A monitoring boat which should have a flying bridge or open upper deck with a relatively unobstructed forward visibility (270°-90°) allowing for observer eye heights of 4-5m above water	1
Observation	Fujinon 7x50 marine binoculars (or similar) with compass/reticle	2
	Autofocus camera (Canon) equipped with databacks and day of the month and time capability and telephoto or zoom lens of at least 300mm focal length with image stabiliser	1
Calibration	Leica Geovid laser range finder binnacles or equivalent	2
Records	(Aluminium Covered) clipboard	1
Navigation and positioning	Global Positioning Device (Magellan NAV 5000D or similar approved) (+ spare batteries)	1
Observation	Additional set of binoculars	1
Records	Aluminium covered clipboard	1
Measurement	Stopwatch	1

N.B. Equipment will be available to ensure adequate backup in case of equipment failure.

### Monitoring of Rehabilitation of Sloping Seawall

- 10.16 As required by Condition 2.30 of the EP, Monitoring of rehabilitation of sloping seawall will be undertaken. Details of the monitoring and methods are provided in the Supplementary EM&A Manual.

### Underwater Video/Photo Taking

- 10.17 As required under Condition 2.32 of the Environmental Permit, the purpose of the construction phase subtidal monitoring is to assess whether there has been any environmental impacts on the subtidal habitat and the associated marine organism.
- 10.18 The proposed monitoring/field survey will consist of underwater field surveys (video / photo taking) conducted once every six months at Kau Yi Chau and Sze Pak Wan.

### *Field Work Methodology*

- 10.19 One 30 m (depends on the depth of coral growth) vertical transect will be laid at the two monitoring sites. The presence of subtidal species, depth distributions and mortality will be recorded, to generate a general site description.
- 10.20 Two monitoring sites will be assessed quantitatively (Sze Pak Wan and Kau Yi Chau) by quantitative underwater video sampling. This technique has been adopted for territory-wide baseline survey of coral communities. (Wachenfeld<sup>1</sup> 1996; Carlton & Done<sup>2</sup>, 1995; and Clark<sup>3</sup>, 1998)
- 10.21 Three (or two, depends on the abundance of coral community at each monitoring sites), 50 metre permanent transects will be laid at the two monitoring sites. Transects will be parallel to the shore where possible, with depth ranged from -1 to -6 m C. D. (depends on the depth of coral growth). For the benefit of future survey, markings should be made at each transect, adding to the existing ones.
- 10.22 Standard operating procedures of videoing will be adopted from Wachenfeld (1996). Films will be taken at about 40 cm above the substratum with a rate of approximately 90 seconds (7.2 – 9.0 metre per minute) at each transect. Each video transect will record a 40 cm swathe of coral. The video camera will be held perpendicular to the substratum to minimise parallax error and to keep it in focus.

(1) <sup>1</sup> D. Wachenfeld; Standard operational Procedure Video-monitoring of sessile Bentic communities; Research Publications No.42; Great Barrier Reef Marine Park Authority 1996)

(2) <sup>2</sup> Carlton, J. H. and Done, T. 1995. Quantitative video sampling of coral benthos large-scale application. Coral Reefs 14: 35-46

(3) <sup>3</sup> Clark, T. H. 1998a. The ecology of indigenous and transplanted corals in the Cape d'Aguiar Marine Reserve, Hong Kong. PhD Thesis. The University of Hong Kong.



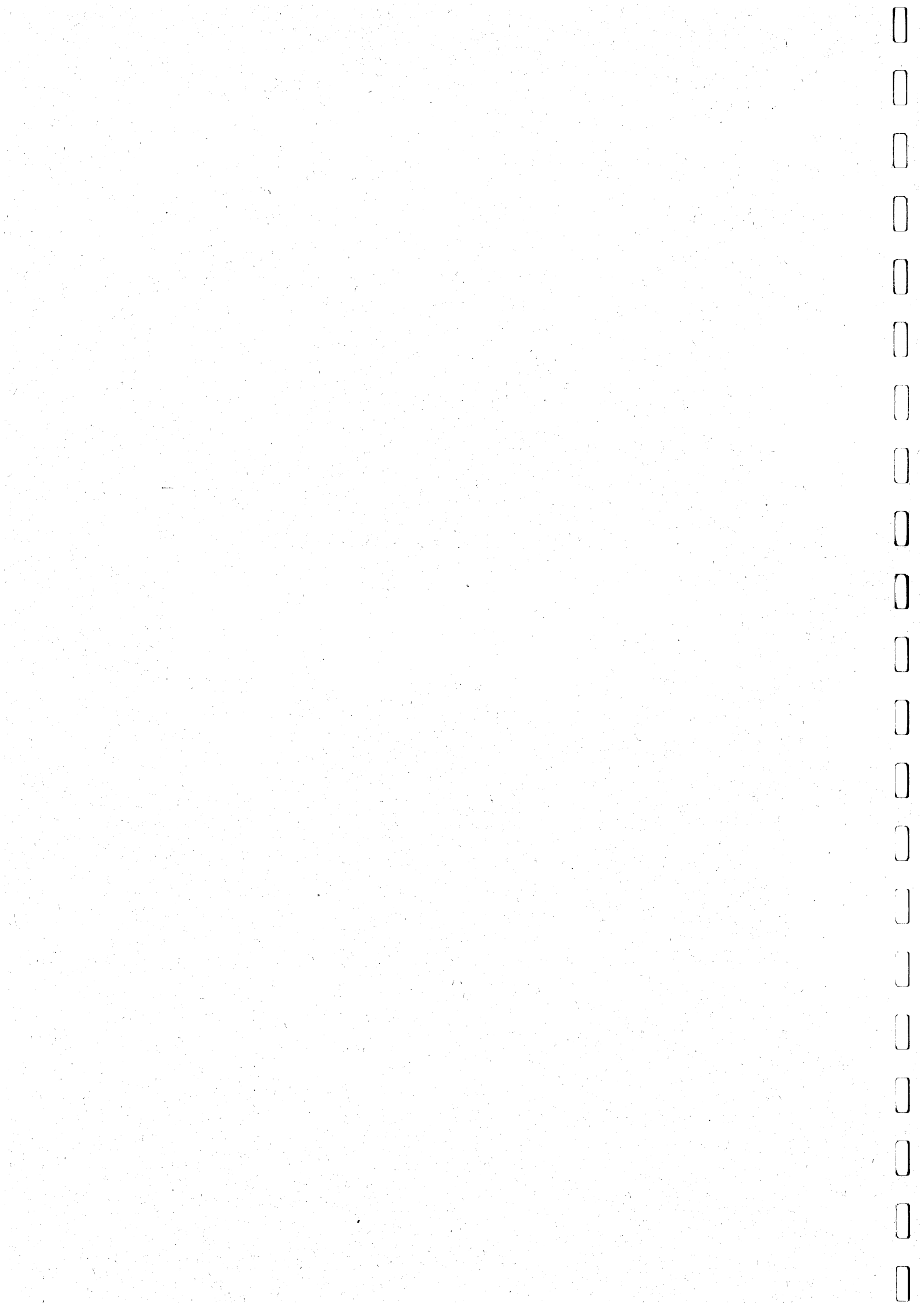
- 10.23 Footage from each monitoring site will be copied from Hi8 to VHS after editing and the video will be played back on a TV monitor using a VHS video recorder. The video transects will be studied. The species composition, percentage coverage, mortality and evidence of siltation will be estimated.

*Subtidal Monitoring Equipment*

- 10.24 Equipment listed in Table 10.2 will be required for subtidal monitoring work.

**Table 10.2 Summary of Equipment and Personnel Requirements for Subtidal Monitoring**

Equipment Function	Type	Number
Field Observation	<i>SCUBA Diver</i>	2 - 3
	50 measuring tape	2
	Underwater slate	1
	Boat	1
Data Recording	A Sony video camera recorded Hi8 with a standard video lens (f = 5.4~64.8 mm) and Sony Marine Pack Handycam underwater housing.	1
	A Nikonos V camera with a 15 mm wide angle lens and two Nikonos SB103 strobes.	1



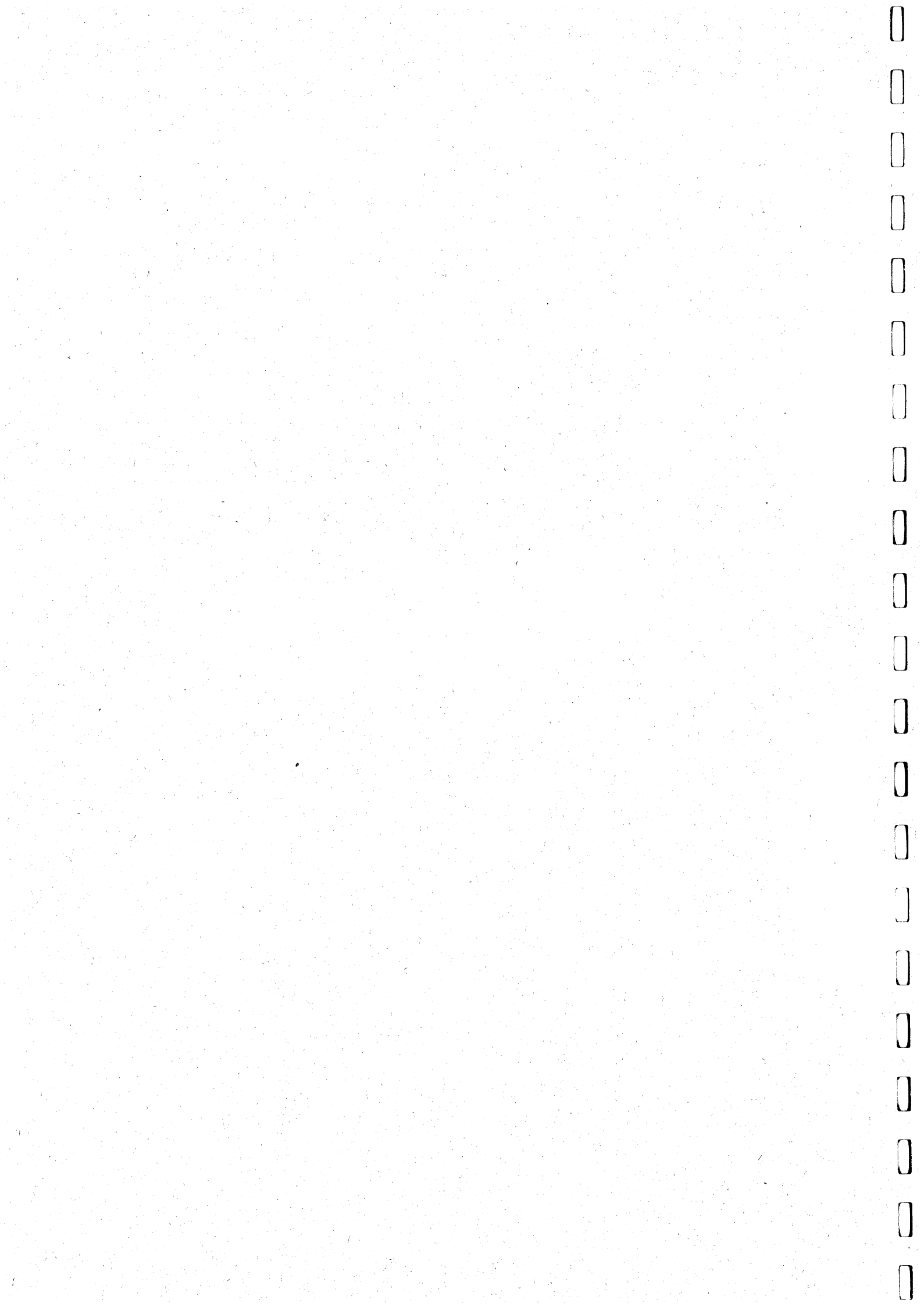
## 11 FISHERIES

### The EM&A Recommendations

- 11.1 The impacts of the reclamation activities on fisheries resources will be monitored indirectly through the water quality EM&A programme. The mitigation measures recommended protecting fisheries resources are identified in the Implementation Schedule (in Annex C of this EM&A Manual).

### Environmental Monitoring and Audit

- 11.2 The constraints on dredging and filling operations defined within the water quality section of the EIA Report will act as appropriate mitigation measures to control the environmental impacts to fisheries resources to within acceptable levels. Actual impacts of construction activities will be monitored through impacts to water quality (see Section 7 of this EM&A Manual). EM&A activities designed to detect and mitigate any unacceptable impacts to water quality will serve to proactively protect against unacceptable impacts to fisheries resources. Should any impacts be detected, the procedures outlined in the water quality Event and Action Plan for implementing appropriate mitigation will serve to protect against unacceptable impacts to fisheries resources, thereby ensuring the environmental acceptability of the project. Consequently, the development and implementation of a monitoring and audit programme specifically designed to assess the effects of construction activities on fisheries resources is not deemed necessary.



## 12 CULTURAL HERITAGE IMPACT

### Introduction

- 12.1 The EIA Report assessed the potential impacts to cultural and heritage resources from the Project's implementation. Whilst no specific environmental monitoring and auditing activities have been recommended, the EIA Report did specify a number of mitigation measures that should be implemented to minimise the potential impacts to cultural and heritage resources.
- 12.2 In order to ensure that these mitigation measures are fully and effectively implemented during the construction phase, it is recommended that the Contractor' compliance with these requirements is assessed as part of the regular auditing programme defined in Section 14 of this Manual.

### Auditing Requirements

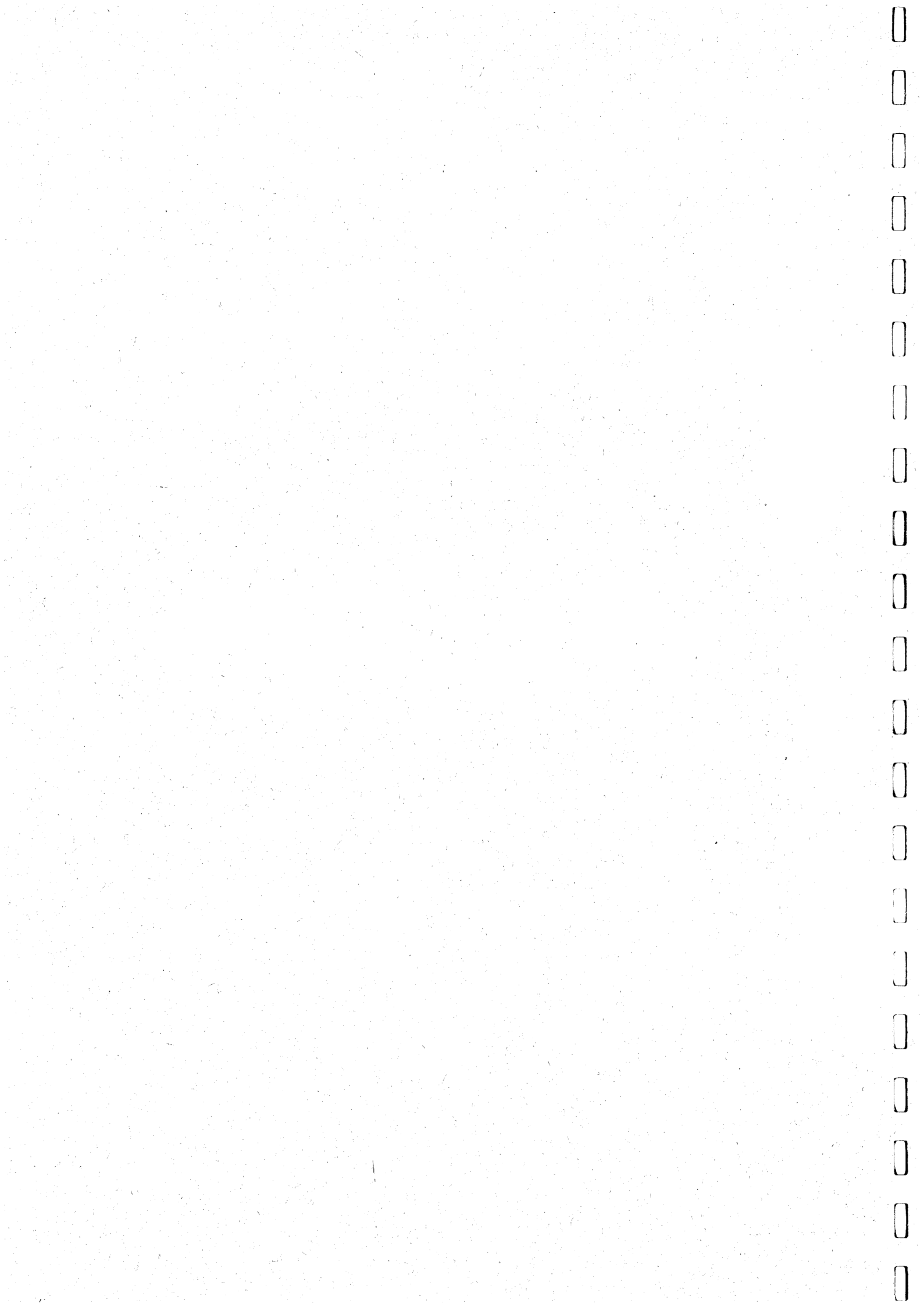
- 12.3 In order to ensure that heritage resources are adequately protected it will be necessary to undertake audits to ensure the effective implementation of the recommended mitigation measures. Section 14 of this EM&A Manual sets out the requirements of the auditing programme.

### Mitigation Measures

- 12.4 Details of the recommended mitigation measures, as stated in Condition 2.38 of the Environmental Permit, are included within the Implementation Schedule (in Annex C of this EM&A Manual). Details of mitigation measures required under Conditions 2.37 and 2.38c of the Environmental Permit are provided in the Supplementary EM&A Manual.

### Auditing Requirements

- 12.5 The implementation of the mitigation measures recommended in the Implementation Schedule should be assessed as part of the EM&A programme. The assessment should evaluate the effectiveness and suitability of the mitigation measures rather than simply verifying their implementation.



## 13 LANDSCAPE AND VISUAL

### Introduction

- 13.1 This Section defines the EM&A requirements that have been recommended to ensure that the proposed landscape and visual mitigation measures are effectively implemented.

### General

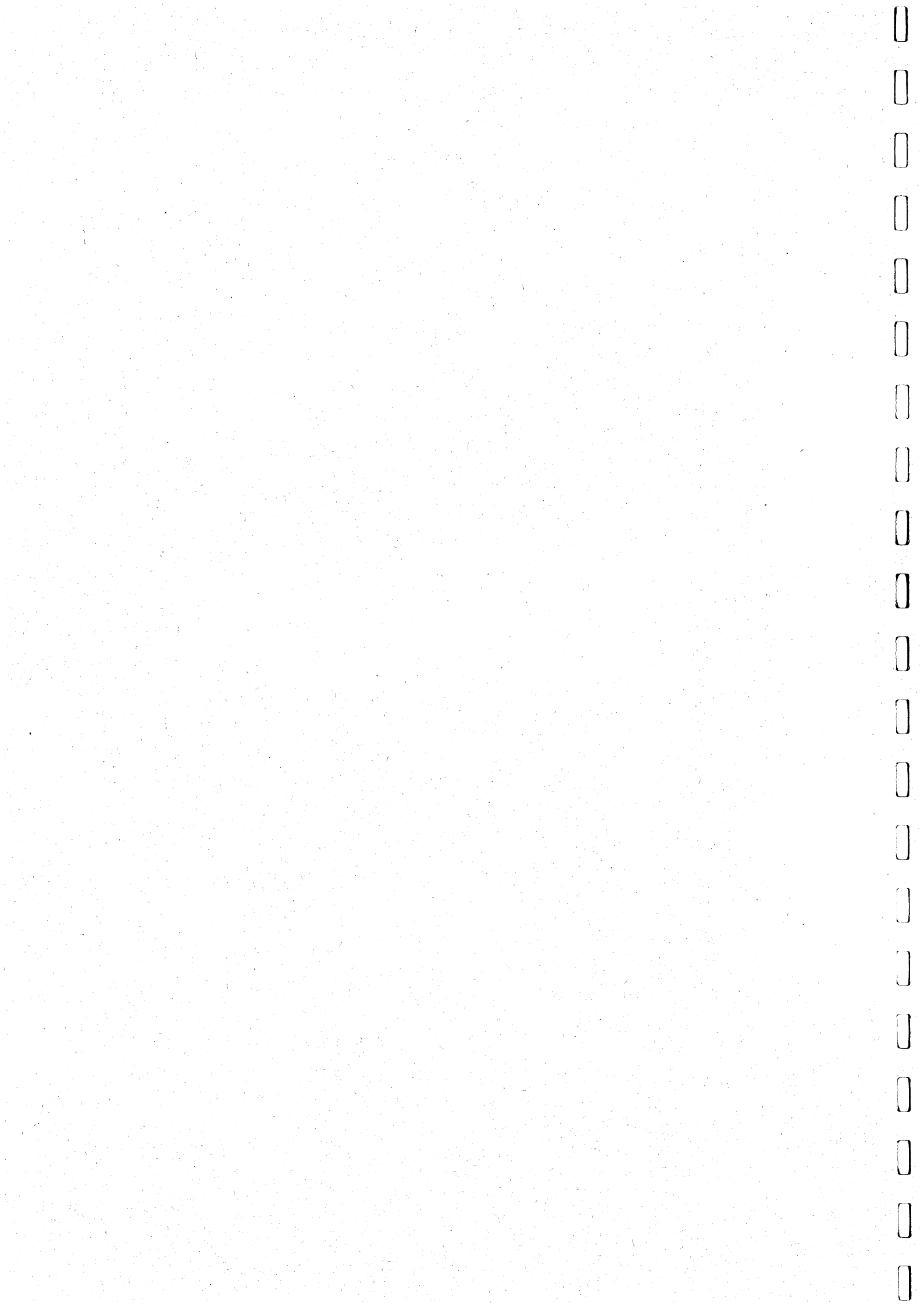
- 13.2 The implementation of the project will result in high level of change to the local visual system. In particular, high levels of adverse impact will result from a loss of a large area of bay and coastal waters. A range of mitigation measures have been proposed including the following: reclamation mitigation measures include temporary hydroseeding along the edge to improve its visual characteristics.

### Mitigation Measures

- 13.3 Details of all the recommended mitigation measures are included within the Implementation Schedule (in Annex C of this EM&A Manual). Details of mitigation measures of subsequent stages of the Project required under the Environmental Permit are provided in the Supplementary EM&A Manual.

### Auditing Requirements

- 13.4 Undertake audits to ensure the effective implementation of the recommended mitigation measures. Section 14 of this EM&A Manual sets out the requirements of the auditing programme.





## 14 ENVIRONMENTAL AUDITING

### Site Inspections

- 14.1 Site inspections provide a direct means to track and ensure the enforcement of specified environmental protection and pollution control measures. The inspections should be undertaken routinely by the ET to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Additionally, the ET shall be responsible for defining the scope of the inspections, detailing any deficiencies that are identified, and reporting any necessary action or mitigation measures that were implemented as a result of the inspection.
- 14.2 Site inspections shall be carried out at least once per week. The areas of inspection should include the general environmental conditions in the vicinity of the site and the pollution control and mitigation measures within the site; it should also review the environmental conditions outside the site area which are likely to be affected, directly or indirectly, by site activities. The ET shall make reference to the following information in conducting the inspections:
- the EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
  - ongoing results of the EM&A programme;
  - works progress and programme;
  - individual works method statements which shall include proposals on associated pollution control measures;
  - the contract specifications on environmental protection;
  - the relevant environmental protection and pollution control laws; and
  - previous site inspection results undertaken.
- A monthly waste management audit will be carried out as part of the site audit programme.
- 14.3 The inspection results and their associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the Contractor, as appropriate, within 24 hours, for reference and for taking immediate action. They shall also be presented, along with the remedial actions taken, in the monthly EM&A report. The Contractor shall follow the procedures and time-frames stipulated in the environmental site inspection for the implementation of mitigation proposals and the resolution of deficiencies in the Contractor' EMS. An action reporting system shall be formulated and implemented to report on any remedial measures implemented subsequent to the site inspections.
- 14.4 Ad hoc site inspections shall also be carried out by the ET if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the associated investigation work.

### **Compliance with Legal and Contractual Requirements**

- 14.5 There shall be contractual environmental protection and pollution control requirements, which the Contractor shall comply with, in addition to Hong Kong's environmental protection and pollution control laws.
- 14.6 The ET shall review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.
- 14.7 The Contractor shall also make available for inspection relevant documents to the ET so that the checking and auditing process can be carried out. The relevant documents are expected to include the updated Work Progress Reports, the updated Works Programme, the application letters for different licences/permits under the environmental protection laws, and all the valid licences/permit. The site diary shall also be available, upon request, to the ET during his site inspection.
- 14.8 After reviewing the documentation, the ET shall advise the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works is incompatible with the works programme or may result in a potential violation of environmental protection and pollution control requirements by the works in due course, he shall also advise the Contractor accordingly.
- 14.9 Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The Engineer shall follow up to ensure that appropriate action has been taken by the Contractor in order that the environmental protection and pollution control requirements are fulfilled.

### **Environmental Complaint**

- 14.10 Complaints shall be referred to the Permit Holder who shall implement the complaint investigation procedures; which shall comprise the complaint event and action plan as stated in Annex B.
- 14.11 During the complaint investigation work, the Contractor and Engineer shall co-operate with the ET and IEC in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation works. The Engineer shall ensure that the measures have been carried out by the Contractor.
- 14.12 An Event action Plan for complaint response procedures is shown in Annex B.
- 14.13 The Event Action Plan in case of a fish kill or a suspected exceedance of suspended solids [SS] level inside a fish culture zone is listed in Annex B.

## 15 REPORTING

### General

- 15.1 The primary reporting function, undertaken within the EM&A programme, will be the issuance of formal exceedance notifications, corrective actions and ongoing feedback between the ET, the Contractor and the Engineer. Reporting will be driven by the results of the monitoring and audit programme and will be recorded through written correspondence, site inspections and minutes and notes of meetings.
- 15.2 In addition, periodic reviews of the EM&A process and subsequent revisions to the EM&A Manual, as appropriate, will be prepared and circulated to relevant personnel within the Contractor' Project Team as a means of gauging site staff and contractor performance. The periodic reviews will comprise Monthly, Biannual and Annual EM&A Reports; these reports will be copied to the EPD for comment. The exact details of the frequency, distribution and time frame for submission shall be agreed with the EPD prior to the commencement of the works.
- 15.3 As required under condition 5.1 of the Environmental Permit, the public should be able to inspect the Baseline Monitoring Report , Monthly EM&A Reports via the EIAO Internet website and at the EIAO Register Office, electronic copies of the Monthly EM&A Reports shall be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by the Director and shall be submitted at the same time as the hard copies. For the HTML version a content page capable of providing hyperlinks to each section and sub-section of the EM&A Reports shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EM&A Report shall be provided in the main text from where the respective references are made. All graphics in the Report shall be interfaced GIF format unless otherwise agreed by the Director. The content of the electronic copies of the EM&A Reports must be the same as the hard copies.
- 15.4 As required under condition 5.2 of the Environmental Permit, all environmental monitoring data shall be made available to the public via internet access in the form of a website, in the shortest possible time and in no event later than 2 weeks after the relevant environmental monitoring data are collected or become available information unless otherwise agreed by the Director.
- 15.5 The internet website shall enable user friendly public access to the monitoring data and with features capable of:
- Providing access to all environmental monitoring data collected since the commencement of the works;
  - Search by data;
  - Searching by type of monitoring data (air quality, water quality and noise);
  - Hyperlinks to relevant monitoring data after searching.

### Baseline Monitoring Report

- 15.6 The ET shall prepare and certify a draft Baseline Environmental Monitoring Report within 10 working days of the completion of the baseline monitoring for submittal to the IEC for verification. The certified and verified copies of the Baseline Report shall be submitted to the Engineer and the EPD for their agreement as required under Condition 4.4 of the Environmental Permit. Copies shall also be provided to the Contractor for their information. The exact number of copies required by each party will be established through liaison. The draft report will be supported by the baseline monitoring data in electronic format, along with information covering the monitoring locations and conditions, equipment and protocols. The agreed baseline report will then be reissued as a stand alone report.
- 15.7 The form and content of the report and the representation of baseline monitoring data shall be in a format to the satisfaction of EPD and include, but not limited to the following:
- (a) up to half a page executive summary;
  - (b) brief project background information;
  - (c) drawings showing locations of the baseline monitoring stations;
  - (d) an updated construction programme with milestones of environmental protection/mitigation activities annotated;
  - (e) monitoring results (in both hard and diskette copies) together with the following information:
    - monitoring methodology;
    - name of laboratory and types of equipment used and calibration details;
    - parameters monitored;
    - monitoring locations (and depth);
    - monitoring date, time, frequency and duration;
    - QA/QC results and detection limits.
  - (f) details on influencing factors, including:
    - major activities, if any, being carried out on the Site during the period;
    - weather conditions during the period;
    - other factors which might affect the results;
  - (g) determination of the Action and Limit Levels (AL levels) for each monitoring parameter and statistical analysis of the baseline data; the analysis shall conclude if there is any significant difference between control and impact stations for the parameters monitored;
  - (h) revisions for inclusion in the EM&A Manual; and
  - (i) comments and conclusions.

### EM&A Reports

- 15.8 The results and findings of all EM&A work required in the Manual shall be recorded in the

monthly EM&A reports prepared and certified by the ET and verified by the IEC as required under Condition 4.5 of the Environmental Permit. The reports shall be submitted to the EPD within 10 working days of the end of each calendar month, with the first report due in the month after construction works commence. Copies shall also be submitted to the Contractor and Engineer for information. The ET shall liaise with the relevant parties to confirm the exact number and format of monthly reports in both hard copy and electronic format. However, it is envisaged that each party will receive no more than a maximum 4 copies of each monthly EM&A report. The ET and the IEC shall review the number and location of monitoring stations and parameters to monitor every 6 months or on an as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

15.9 The report shall include, but not be limited to, the following elements:

*First Monthly EM&A Report*

15.10 The first monthly EM&A report shall include at least but not be limited to the following :

- (a) Executive Summary (1-2 pages);
  - Breaches of AL levels;
  - Complaint Log;
  - Notifications of any summons and successful prosecutions;
  - Reporting Changes;
  - Future key issues.
- (b) Basic Project Information
  - Project organisation including key personnel contact names and telephone numbers;
  - Construction Programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
  - Management structure; and
  - Works undertaken during the month;
- (c) Environmental Status
  - Works undertaken during the month with illustrations (such as location of works, daily dredging/filling rates, percentage fines in the fill material used); and
  - Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (d) Summary of EM&A requirements including:
  - All monitoring parameters;
  - Environmental quality performance limits (Action and Limit levels);
  - Event-Action Plans;
  - Environmental mitigation measures, as recommended in the project EIA study final report;
  - Environmental requirements in contract documents;

(e) Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures for ecological and visual impacts, as recommended in the project EIA study report, summarised in the updated implementation schedule.

(f) Monitoring Results

To provide monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations (and depth);
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Graphical plots of trends of monitored parameters in the month annotated against;
- The major activities being carried out on site during the period;
- Weather conditions that may affect the results; and
- Any other factors which might affect the monitoring results;
- QA/QC results and detection limits.

(g) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

- Record of all noncompliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation's, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

(h) Others

- An account of the future key issues as reviewed from the works programme and work method statements;
- Advice on the solid and liquid waste management status; and

- Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarising the EM&A of the period.

#### *Subsequent Monthly EM&A Reports*

15.11 The subsequent monthly EM&A reports shall include the following:

(a) Executive Summary (1-2 pages)

- Breaches of AL levels
- Complaint Log
- Notifications of any summons and successful prosecutions;
- Reporting Changes
- Future key issues

(b) Environmental Status

- Construction Programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
- Works undertaken during the month with illustrations including key personnel contact names and telephone numbers; and
- Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.

(c) Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures for ecological and visual impacts, as recommended in the project EIA study report, summarised in the updated implementation schedule.

(d) Monitoring Results

Apart from monitoring and auditing result (in both hard and diskette copies), the following information should be submitted:

- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations (and depth);
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Graphical plots of trends of monitored parameters in the month annotated against;
- The major activities being carried out on site during the period;
- Weather conditions that may affect the results; and
- Any other factors which might affect the monitoring results;
- QA QC results and detection limits.

- (e) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
- Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
  - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
  - Record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation's, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
  - Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
  - Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- (f) Others
- An account of the future key issues as reviewed from the works programme and work method statements; and
  - Advice on the solid and liquid waste management status.
- (g) Appendix
- AL levels
  - Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
    - i) major activities being carried out on site during the period;
    - ii) weather conditions during the period; and
    - iii) any other factors which might affect the monitoring results
  - Monitoring schedule for the present and next reporting period
  - Cumulative statistics on complaints, notifications of summons and successful prosecutions
  - Outstanding issues and deficiencies

### Quarterly EM&A Summary Reports

- 15.12 The quarterly EM&A summary report, which shall be produced and certified by the ET and verified by the IEC, should generally be around 5 pages (including about 3 of text and tables and 2 of figures) should contain at least the following information. Apart from these, the first quarterly summary report should also confirm that the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.



- 
- (a) up to half a page executive summary;
  - (b) basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
  - (c) a brief summary of EM&A requirements including:
    - monitoring parameters;
    - environmental quality performance limits (Action and Limit levels); and
    - environmental mitigation measures, as recommended in the project EIA study final report;
  - (d) advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;
  - (e) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
  - (f) graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against;
    - the major activities being carried out on site during the period;
    - weather conditions during the period; and
    - any other factors which might affect the monitoring results;
  - (g) advice on the solid and liquid waste management status;
  - (h) a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
  - (i) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
  - (k) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
  - (l) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
  - (m) a summary record of notification of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation's, locations and nature of the breaches, investigation, follow-up actions taken and results;
  - (n) comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
  - (o) proponents' contacts and any hotline telephone number for the public to make enquiries.
-

### Final EM&A Summary Report

15.13 The EM&A programme shall be terminated upon completion of those construction activities that have the potential to result in a significant environmental impact.

15.14 The proposed termination should only be implemented after the proposal has been endorsed by the ET, IEC, the Engineer and the project proponent, and following final approval from the Director of Environmental Protection.

15.15 The final EM&A summary report shall include, inter alia, the following:

- (a) an executive summary;
- (b) basic project information including a synopsis of the project organisation, programme, contracts of key management, and a synopsis of work undertaken during the entire construction period;
- (c) a brief summary of EM&A requirements including:
  - monitoring parameters;
  - environmental quality performance limits (Action and Limit levels); and
  - environmental mitigation measures, as recommended in the project EIA study final report;
- (d) advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;
- (e) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (f) graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
  - the major activities being carried out on site during the period;
  - weather conditions during the period; and
  - any other factors which might affect the monitoring results; and
  - the return of ambient environmental conditions in comparison with baseline data;
- (g) compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies;
- (h) provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis;
- (i) advice on the solid and liquid waste management status;
- (j) a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

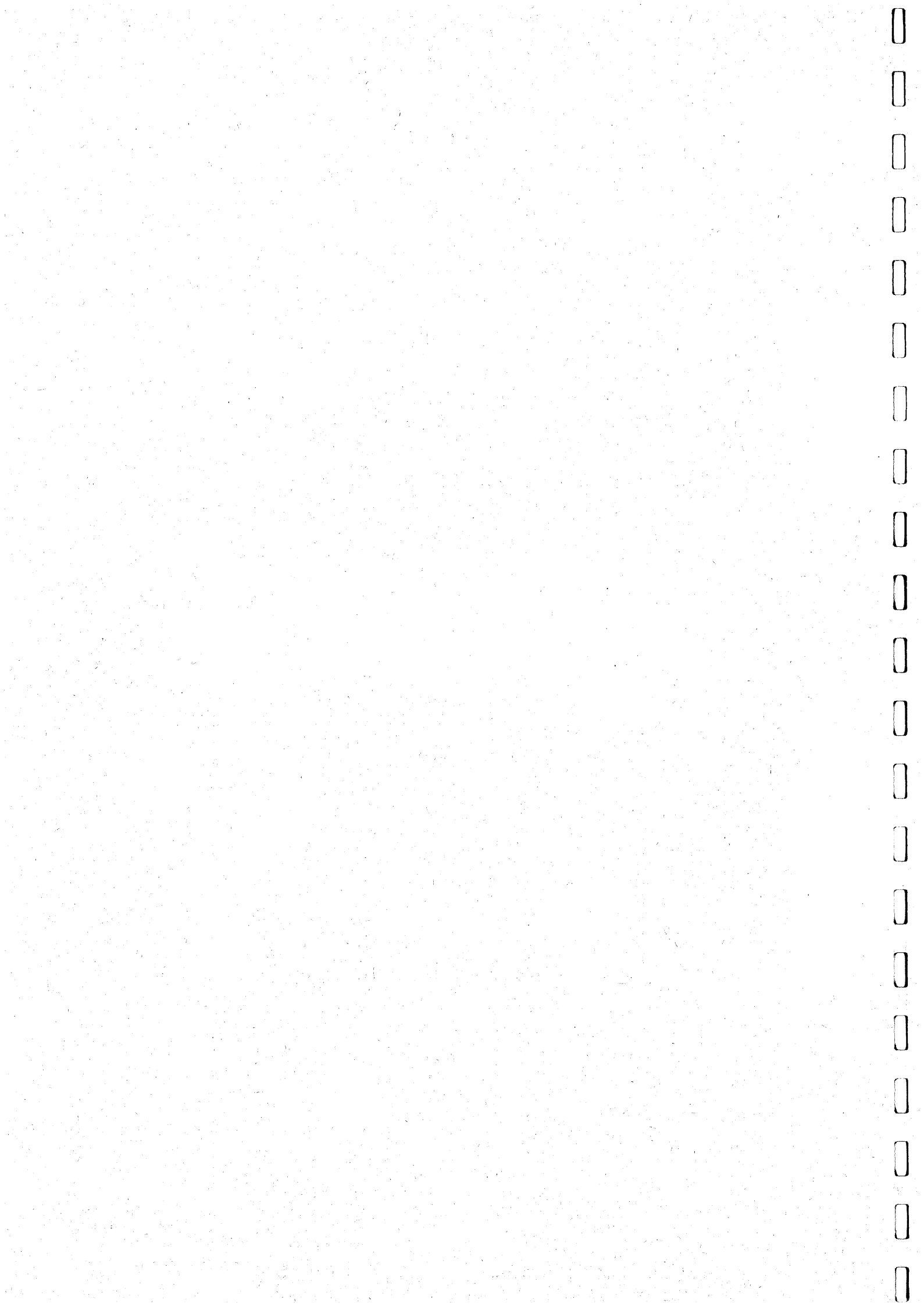
- (k) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- (l) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- (m) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (n) review the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);
- (o) a summary record of notification of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislation's, locations and nature of the breaches, investigation, follow-up actions taken and results;
- (p) review the practicality and effectiveness of the EIA process and EM&A programme (e.g. effectiveness and efficiency of the mitigation measures) recommend any improvement in the EM&A programme; and
- (q) a conclusion to state the return of ambient and/or the predicted scenario as per EIA findings.

#### **Datakeeping**

- 15.16 Documentation such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, such documents shall be well kept by the ET, as appropriate, and shall be available for inspection upon request. All relevant information shall be clearly and systematically recorded in the documents. The monitoring data shall also be recorded in magnetic media form, and the software copy can be available upon request. The water quality data software format shall be agreed with EPD. All the documents and data shall be kept for at least one year after completion of the construction contract.

#### **Interim Notification of Environmental Quality Limit Exceedances**

- 15.17 Interim notifications of exceedances of Limit levels will be issued to the Engineer and the IEC within 24 hours of the identification of an exceedance. The Monthly Reports will contain all available details concerning measures, exceedances and complaints, their causes and those steps taken to control and prevent their recurrence.



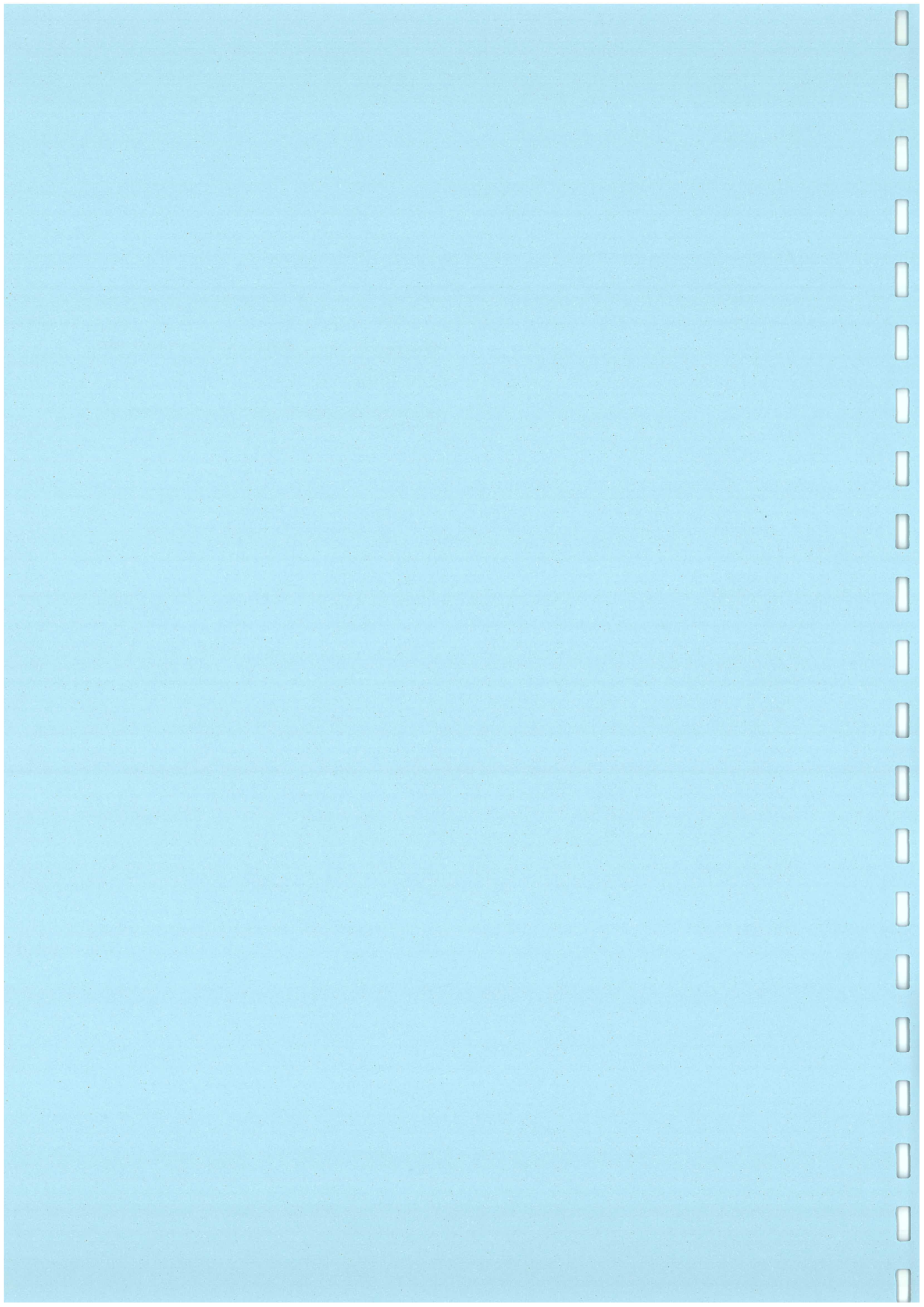
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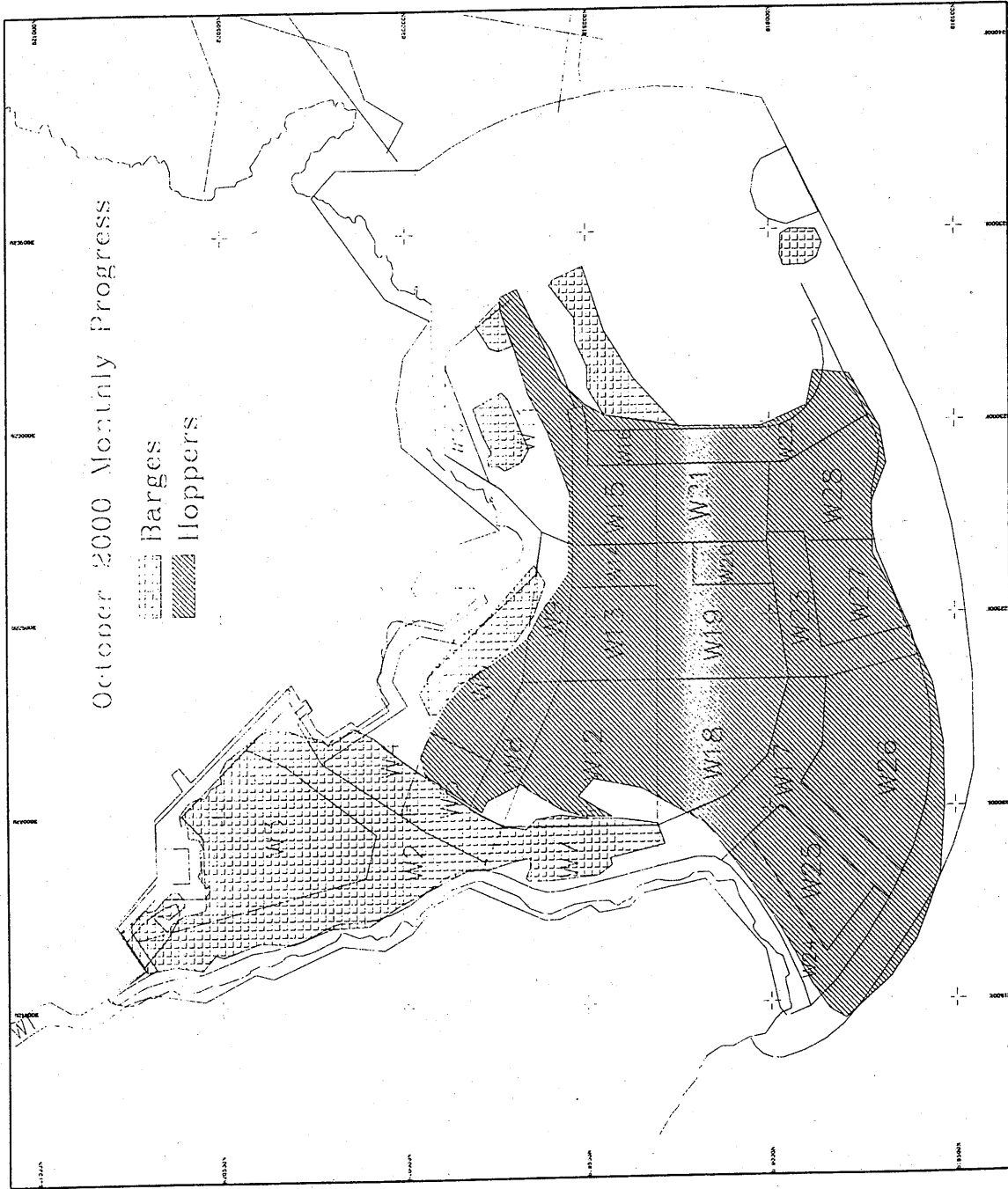
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**FIGURES**

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Penny's Bay Reclamation Stage 1

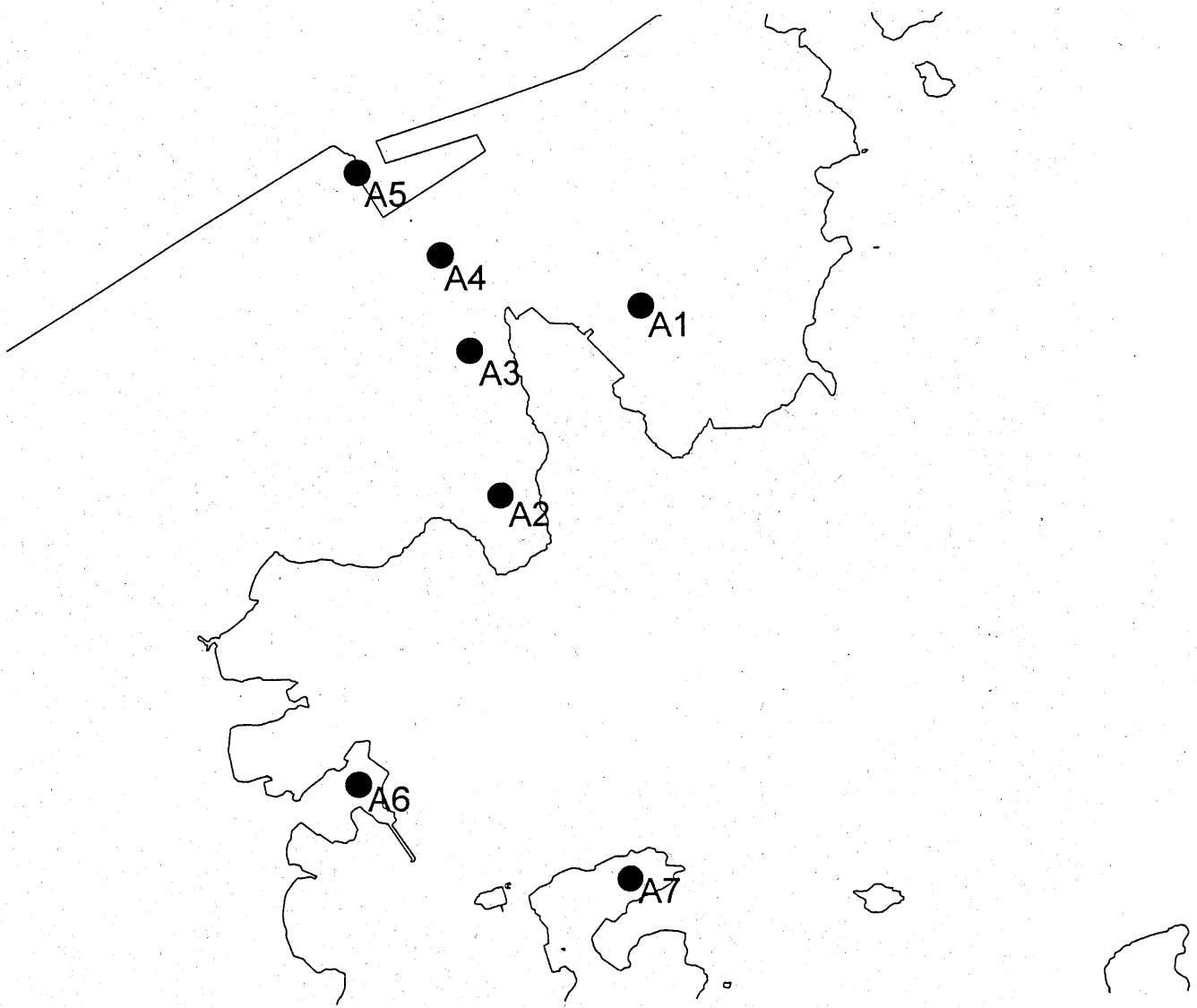
Layout of Work Site

Project No. S06200

Figure No. 1.1

Scale N.T.S.

Date 2000

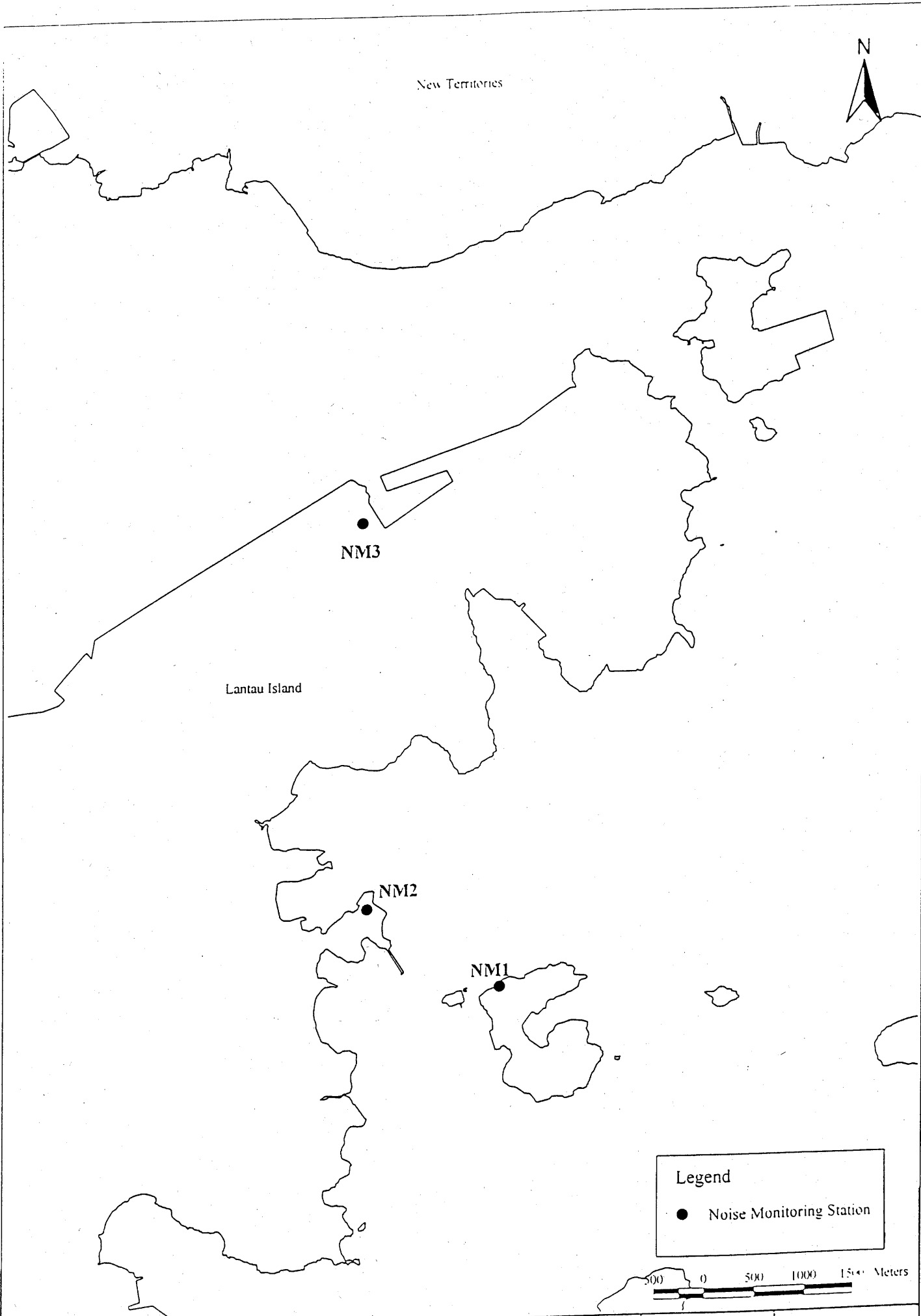


**Legend**

- A1 Penny's Bay Gas Turbine Plant
- A2 Possible Country Park Extension Area
- A3 Possible Country Park Extension Area
- A4 Possible Country Park Extension Area
- A5 Luk Keng Tsuen
- A6 Discovery Bay
- A7 Peng Chau
- Waterfront

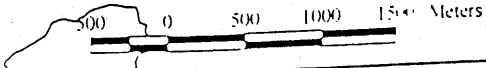
Title	LOCATION OF AIR SENSITIVE RECEIVERS	Scale	1 : 15000	Project	No. S06200	<b>Maunsell</b> MAUNSELL ENGINEERING MANAGEMENT CONSULTANTS
		Date	Nov 2000	Figure	No. 1.2	



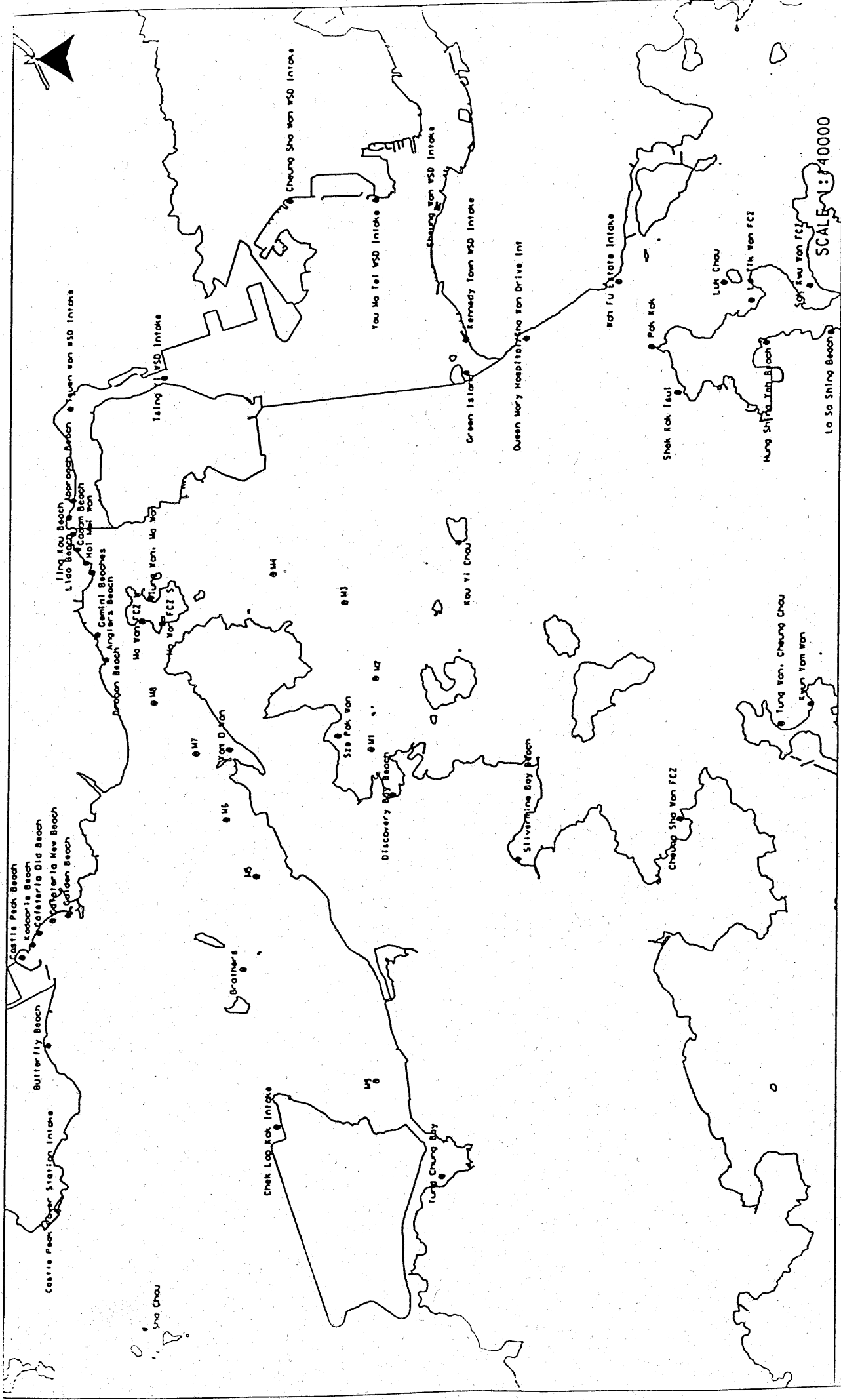


**Legend**

- Noise Monitoring Station

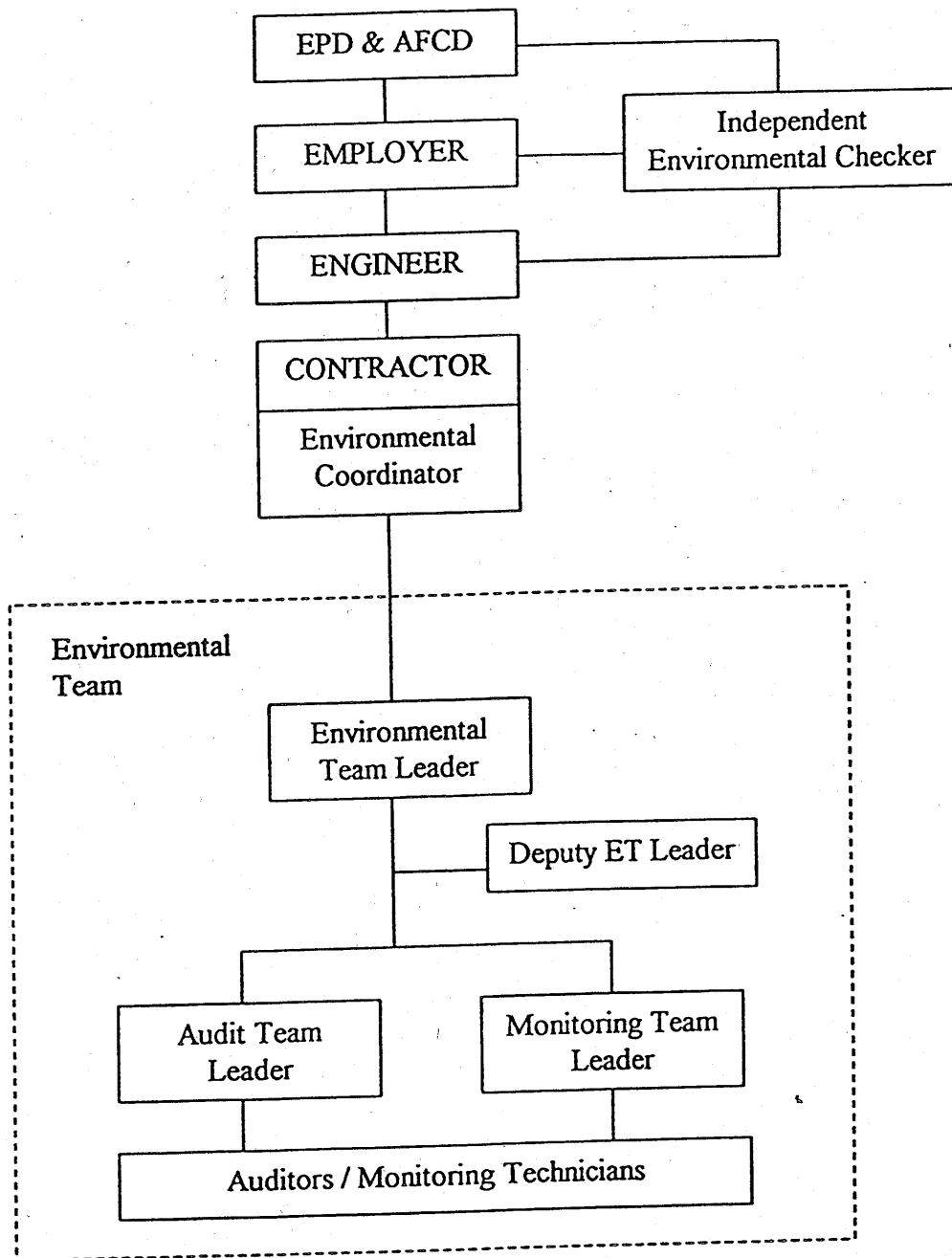


Title Penny's Bay Reclamation Stage 1 Locations of Noise Sensitive Receivers	Scale 1 : 50 000	Project No. S06200	<b>Maunsell</b>
	Date 20	Revision No. 1.3	

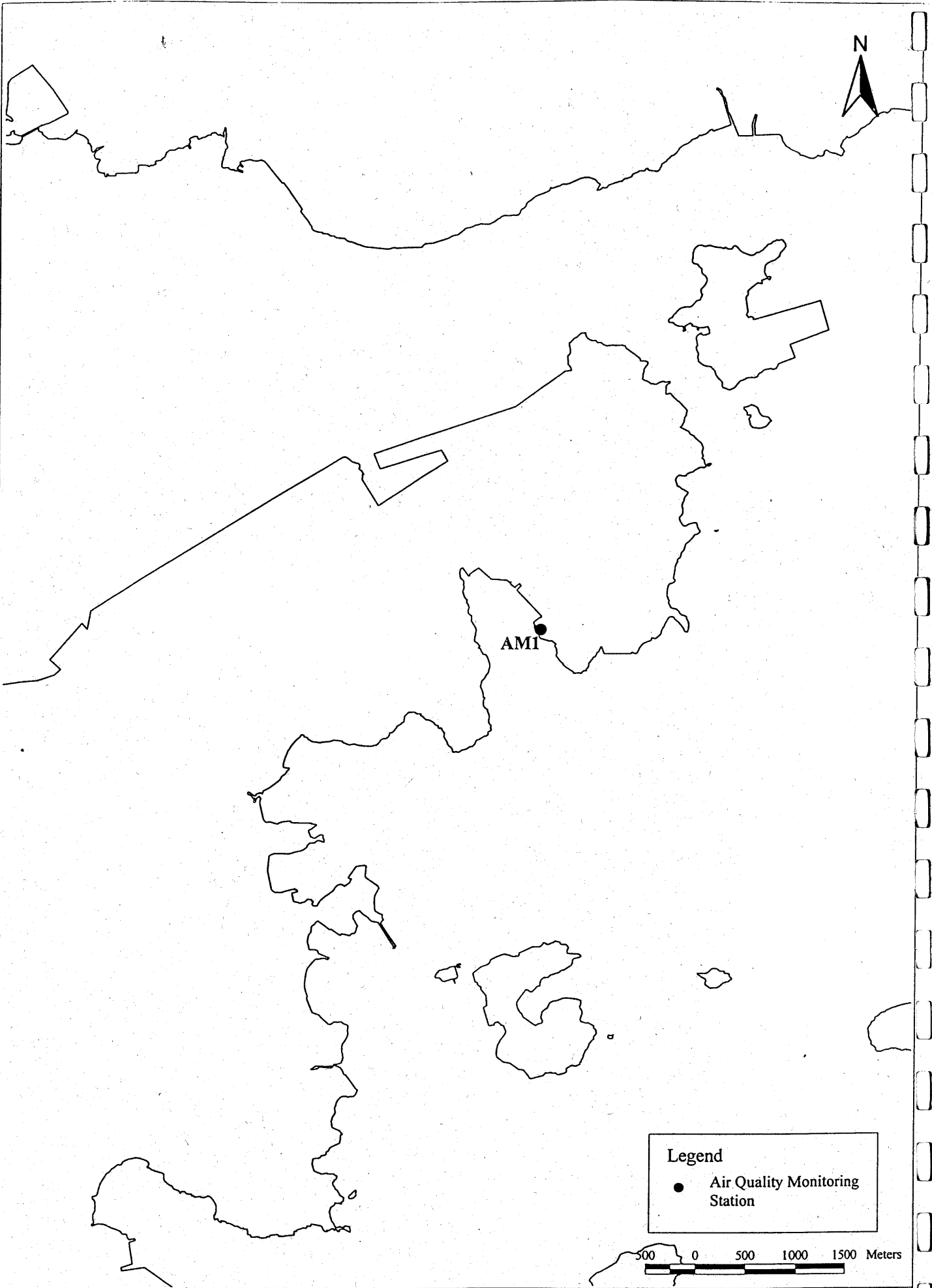


Title:		Penny's Bay Reclamation Stage I	
Scale		N.T.S.	
Project No.		S06200	
Date		Nov 00	
Figure No.		1.4	
SCALE		1:40000	

## Environmental Project Organisation



Title <p style="text-align: center;">Penny's Bay Reclamation Stage 1</p> <p style="text-align: center;">Organisational Structure and Lines of Communication</p>	Scale <p style="text-align: center;">N.T.S.</p>	Project No. <p style="text-align: center;">S06200</p>	Figure No. <p style="text-align: center;">3.1</p>	<b>Maunsell</b> <small>MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD</small>
Date 2000				

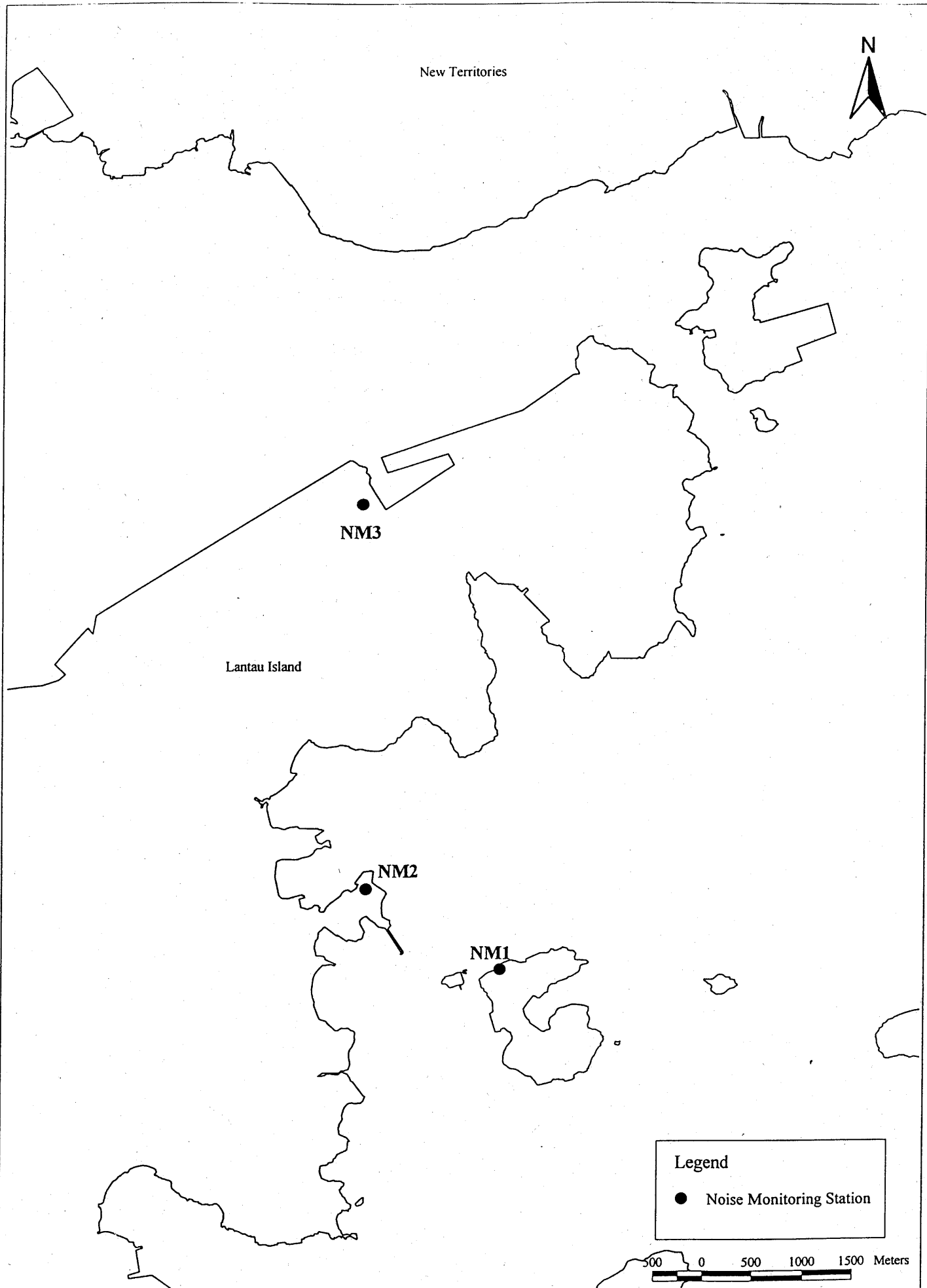


Title Penny's Bay Reclamation Stage 1  
 Location of Air Quality Monitoring Station

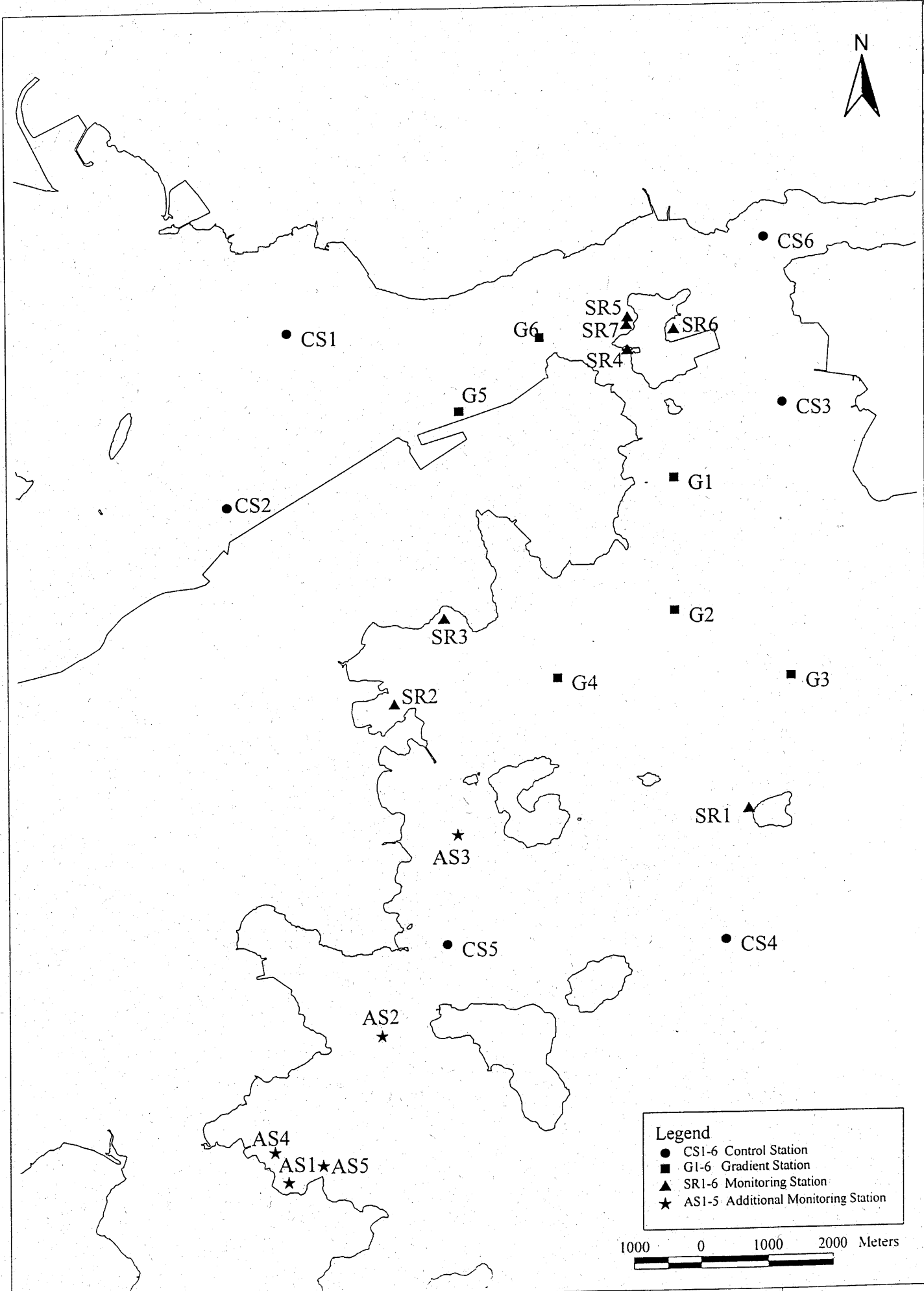
Scale 1 : 50 000  
 Date 2000

Project No. S06200  
 Figure No. 5.1

**Maunsell**  
 MAUNSELL ENVIRONMENTAL  
 MANAGEMENT CONSULTANTS LTD

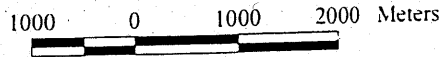


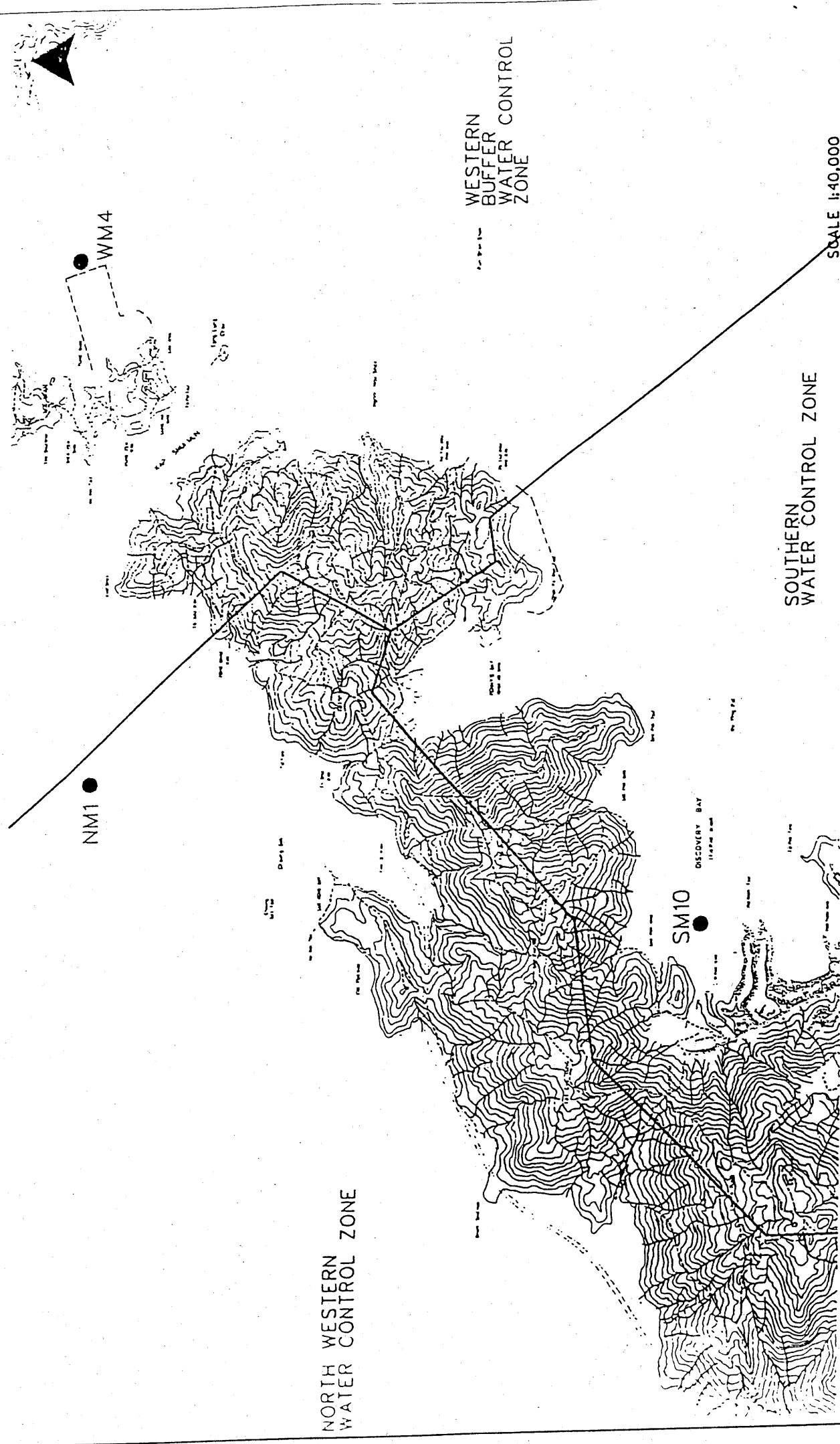
Title Penny's Bay Reclamation Stage 1 Locations of Noise Monitoring Stations	Scale 1 : 50 000	Project No. S06200	
	Date 2000	Figure No. 6.1	



**Legend**

- CS1-6 Control Station
- G1-6 Gradient Station
- ▲ SR1-6 Monitoring Station
- ★ AS1-5 Additional Monitoring Station





Title

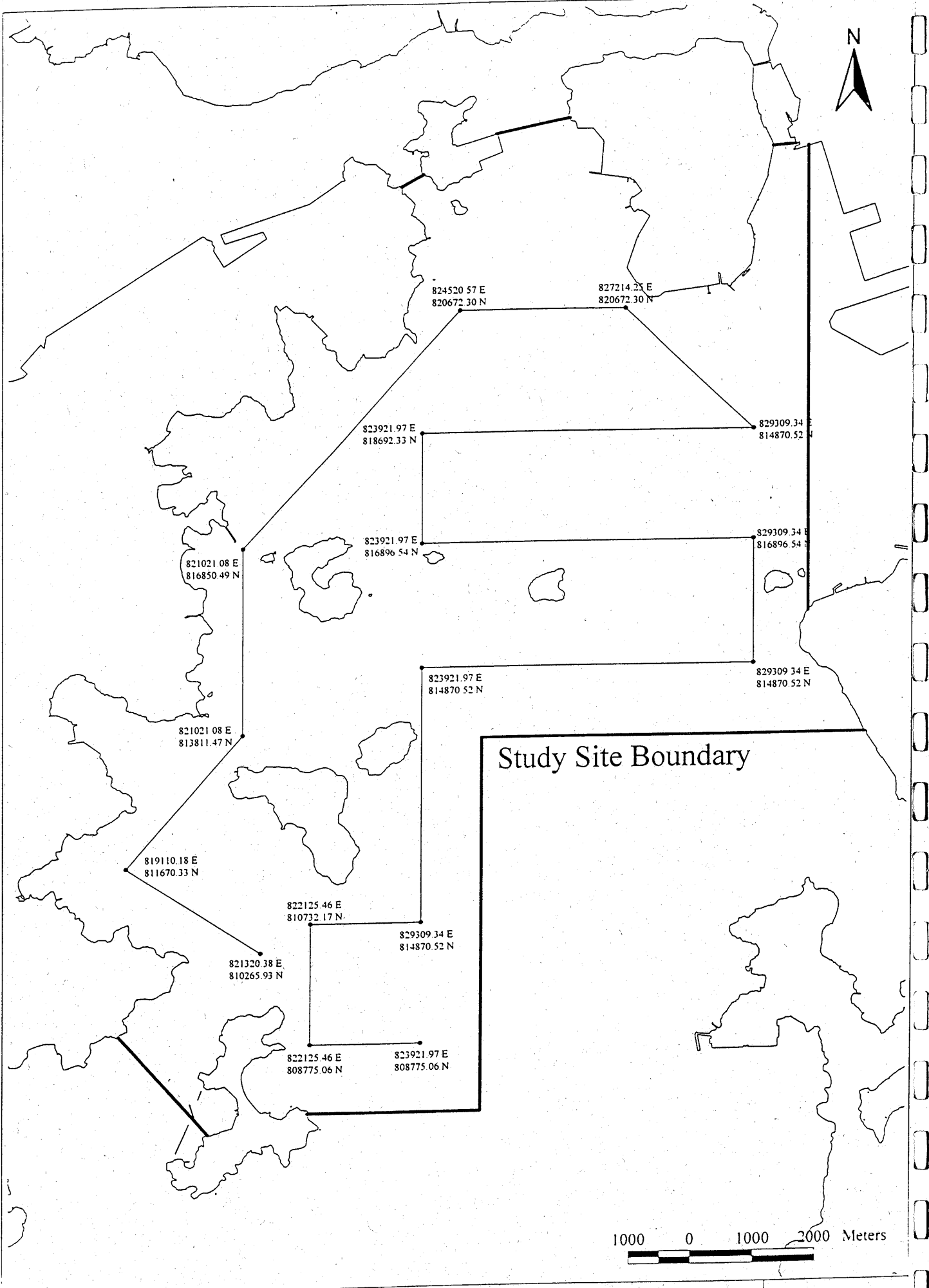
Penny's Bay Reclamation Stage 1 - Contract No. CV/99/12

Locations of Water Control Zones And EPD Routine Water Quality Monitoring Stations

Scale	N.T.S.
Date	July 2000

Project No.	S06200
Figure No.	7.3

SCALE 1:40,000





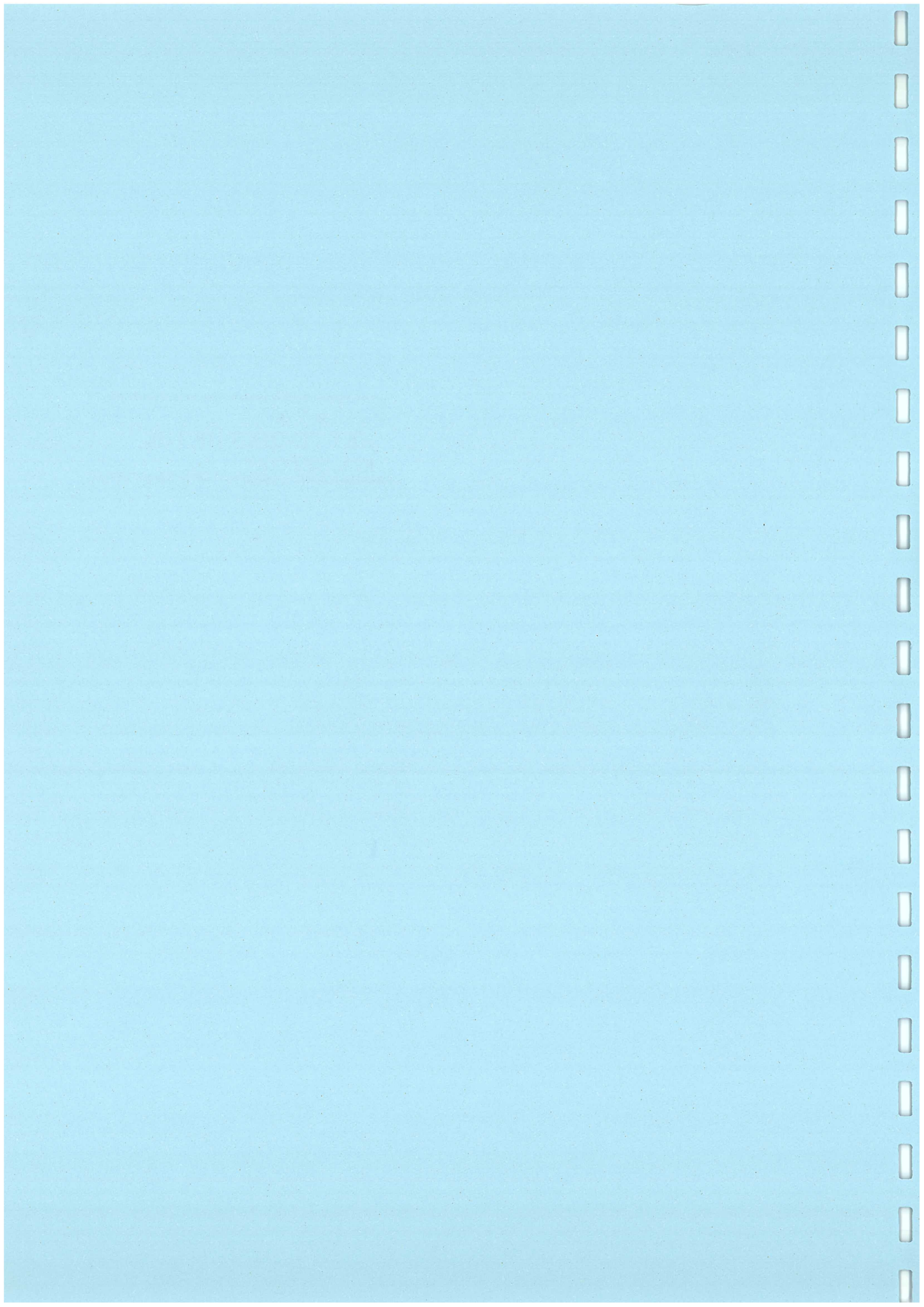
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ANNEX A  
KEY FINDING OF THE  
EIA REPORT

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## **Summary of the Schedule 2 Designated Project Environmental Impact Assessment**

- 1.1 A summary of the key findings of the EIA Report that have a bearing on the objectives, scope and content of the EM&A programme are presented below.

### **Air Quality**

#### *Construction Phase*

- 1.2 Impacts primarily relate to dust nuisance and gaseous emissions from the construction plant and vehicles, with dust generation being the major concern. The construction activities include, site formation, construction of the Theme Park and associated facilities including hotels and WRC; road and railway including track and station construction. With the incorporation of the recommended mitigation measures, it has been predicted that there will be no exceedances of the statutory Air Quality Objectives (AQOs) cumulative hourly and daily total suspended particulate (TSP) levels at any of the identified sensitive receivers (ASRs) taking in account the construction of concurrent projects. However, to ensure no exceedance of the TSP level at the receivers, EM&A is recommended as prescribed in the Project EM&A Manual.

#### *Operational Phase*

- 1.3 Vehicular emissions from the adjacent road networks including CKWLR, Route 10 and road P2, and the emissions from the GTP are the major air quality concerns to the Theme Park. In addition, the vehicle emissions from the vehicle parking areas and emissions from fireworks displays, fuel combustion equipment and sewage pumping station are another air quality concerns to the adjacent ASRs. Potential air quality impacts during the operation of PBRL will be limited since the electric passenger trains will be used, no local air emissions will be produced.
- 1.4 All statutory AQOs will be satisfied at all ASRs at both low level (ground level and 10 m above ground) and high level (20-40 m above ground) due to the vehicular emission from road networks to and boiler emissions at the Theme Park. Height restrictions have been incorporated into the Theme Park plans to avoid any potential air quality impact from the GTP and it has been assessed that the dispersion of the chimney emissions will not be affected by the Theme Park and associated developments.
- 1.5 Impact from fireworks displays has been assessed through literature review and dispersion modelling. Based on the available literature, fireworks displays will not be the source of atmospheric emissions of PCDD/Fs and VOC. The modelling results indicated emissions from fireworks would increase the

predicted daily and annual RSP concentrations by 5.6 and 0.38  $\mu\text{gm}^{-3}$  respectively at the worst affected ASR. Based on the RSP modelling results and the low percentage of heavy metal compositions, impact from heavy metals is not expected. Potential odour impact from H<sub>2</sub>S has also been modelled and the results are within the acceptable criteria at ASRs. Firework emissions assessment predicts that fireworks would only contribute to marginal increase in the air pollutant levels in the atmosphere; operational monitoring is proposed for verification purposes.

## Noise

### *Construction Noise*

- 1.6 Powered Mechanical Equipment (PME) will be the primary source of construction noise. Noise exceedances at Noise Sensitive receivers (NSRs) have been predicted only for the evening time period. Mitigation measures including the use of quiet plant and the erection of movable noise barriers have been recommended for evening construction works. With the implementation of the recommended mitigation measures, noise impacts at the identified NSRs from construction works could be mitigated to comply with the statutory Noise Control Ordinance evening criterion. Regular monitoring of construction noise at adjacent NSRs is recommended, in order to ensure that the NSRs are not subject to adverse construction noise.
- 1.7 The proposed Lantau North Country Park has been considered as noise sensitive receiver. However, there are no established construction noise criteria associated with Country Parks. Nevertheless, the noise from the construction of the Theme Park and associated developments should not be perceptible at the Lantau North Country Park.

### *Operational Noise*

- 1.8 No adverse impact on NSRs such as Peng Chau, Discovery Bay and Luk Keng Tsuen was identified during the operation of the Theme Park. Noise created by the evening fireworks displays at the Theme Park on the relevant NSRs is predicted to comply with the  $L_{\text{eq}, 15\text{min}}$  55 dB(A) limit. For other fixed plant noise sources, including the GTP, the proposed sewage pumping station at Penny's Bay, the public transport interchanges and the future Container Terminal development, it is anticipated that their impacts on NSRs are likely to be minimal and within the relevant criteria.
- 1.9 For railway noise from the PBRL, predicted  $L_{\text{Aeq}, 30\text{min}}$  level at Luk Keng Tsuen was 45 dB, with  $L_{\text{max}}$  level at 55 dB(A) and the  $L_{\text{eq}, 24\text{hour}}$  noise level would be at least 1 dB(A) lower. Cumulative impact from Airport Express Line and Tung Chung Line was estimated to be 55 dB(A). The results indicated that the

proposed PBRL will not impact upon the existing NSRs and will comply with the statutory requirements of the NCO and EIAO-TM.

- 1.10 There are no established operational noise criteria associated with Country Park. The operational noise of Theme Park and associated developments should not be perceptible at the Lantau North Country Park. However, at the Proposed Country Park Extension Area, a noise level of up to 67 dB(A) has been predicted from the operation of the Theme Park. The Lantau North Country Park is located at more than 7 km from the Theme Park. Adverse noise impacts from the operation of the Theme Park is not anticipated.
- 1.11 It is concluded that adverse noise impact due to the operation of the Theme Park and associated developments are not anticipated.
- 1.12 Noise monitoring is recommended during the operational phase to ensure compliance with the operational noise criteria. For the noise monitoring on the Theme Park operation, mainly from fixed plant, it is suggested that this should be carried out at the Theme Park perimeter to ensure compliance with the  $L_{eq, 30min}$  75 dB(A) criterion. In addition, it is recommended that monitoring should be undertaken during the fireworks displays to ensure that the duration does not exceed the maximum limit of 5 minutes for mid-level shows and that they also do not exceed the maximum bursting height limit of 100 m.

## **Water Quality**

### *Construction Phase*

- 1.13 Impacts were assessed by considering the potential impacts due to the formation of reclamations at Penny's Bay and Yam O and land based construction activities, including those for the Theme Park and road and rail links. The assessment determined that there would be no adverse impacts to water quality due to the reclamation formation provided that specified mitigation measures were implemented. The mitigation measures were specified in terms of operational constraints and 'best practice' construction methods. The potential impacts to water quality from land based construction activities could be readily controlled through a series of 'best practice' methods to control wastewater discharges from the construction sites. EM&A was recommended to ensure that no adverse impacts would occur during reclamation formation, while audit of the mitigation measures for the land based construction activities would be carried out.

### *Operation Phase*

- 1.14 The assessment determined that the operation of the Theme Park would have no adverse impacts on tidal current patterns and marine water quality. A number of operational measures were devised to ensure that water quality in the artificial lake would be maintained and thus its beneficial uses protected. It

was determined that at the opening of the Theme Park in 2005 the Siu Ho Wan Sewage Treatment Works (STW) would have adequate capacity to cater for the increased flows due to the Theme Park. However, as flows increased up to 2011 and beyond it was determined that additional capacity would be required at the Siu Ho Wan STW.

## **Waste Management**

### *Construction Phase*

- 1.15 The following quantities of waste are predicted to arise during the construction of the Theme Park and associated developments; dredged materials (approximately 46.3 M m<sup>3</sup> or a maximum rate of 634,000 m<sup>3</sup> w<sup>-1</sup>), construction and demolition material waste (a peak generation rate of approximately 45 m<sup>3</sup> d<sup>-1</sup>); chemical waste (a few cubic metres per month); and general refuse (2.8 tpd during peak construction period). No surplus of excavated materials is envisaged.
- 1.16 The Theme Park and associated development reclamations offers a very good opportunity to utilise the public fill generated in the HK SAR. The use of public fill will not only alleviate the demand for virgin fill material but also reduce the pressure of disposing inert C&DM at the strategic landfills. The Penny Bay's Reclamation Stage I will utilise about 2 million m<sup>3</sup> of public fill (the maximum capacity of the reclamation can accept) which is the maximum rate of public fill that could be supplied. Stage II of the Penny's Bay Reclamation will adopt maximum use of public fill given the available geometry of the reclamation (53 %) of the reclamation volume. For the Yam O reclamation about 58 % of the fill requirement will use public fill for the reclamation; in all cases the balance will be sand fill.
- 1.17 Based on the assessment, adverse waste management issues are not anticipated during the construction phase.

### *Operation Phase*

- 1.18 Based on the operation experience of other international theme parks, the amount of Municipal Solid Waste (MSW) to be generated from the operation of the Theme Park at Penny's Bay will increase from about 38 tpd in 2005 to 73.5 tpd in 2014, then to 174 tpd in 2024.
- 1.19 The quantity of recyclable materials potentially recovered by local recyclers under market driven conditions is estimated to be about 23 to 26% of the total waste generated. These estimates are based on the market conditions in Hong Kong. The analysis on the markets show that the market for the major recyclables exists, especially when source separation programmes are in place to enhance the market value of the materials. It is recommended that the Theme Park should institute a source separation programme to recover

recyclables from the remaining waste stream with a additional recycling target of 10% for remaining recyclable materials and 10% for compostable materials if composting facility is available, be adopted in the Waste Management Plan of the Theme Park. A waste avoidance and recycling programme, which forms a major part of the HKITP's Waste Management Plan for the operation of the Theme Park, should be implemented and annually monitored to determine the practical recycling rate that can be achieved based the recycling market. The assessment concludes that the North Lantau Transfer Station will be able to handle the waste arising from the Theme Park and associated developments until at least 2016. With regard to transfer an disposal, HKITP should closely liaise with the EPD regarding waste transfer and disposal arrangements when the handling capacity of the NLTS and strategic landfills are close to their maxima.

- 1.20 Based on the assessment, adverse waste management issues are not anticipated during the operation phase.

### **Terrestrial Ecology**

#### *Construction Phase*

- 1.21 The proposed developments associated with the Project will generally lead to a loss of low ecological value terrestrial habitats with low ecological impact. Mitigation measures are recommended to avoid or reduce the potential impacts on habitats of moderate to high ecological value such as woodland compensation planting.
- 1.22 Noise and general disturbance effects associated with the construction of the Penny's Bay reclamation works the White-bellied Sea Eagle, would have low to moderate impact as quiet construction plant will be used for the Stage II reclamation, and the construction activities of Theme Park Phase I and II will be over 1 km and 500 m from their nest site, respectively. However, the assessment does indicate the potential worst case scenario of abandonment of the nest, although possible suitable habitats and nesting sites are available in the area. Additionally, the assessment identifies that the principal threat to these birds of prey comprises the threats from egg and young birds from human access to the nest area. Consequently, the mitigation measures to protect the White-bellied Sea Eagle from the principal threat comprise prohibiting human access to their nesting site during the construction phase via secure fencing and monitoring. Adopting the precautionary principle, EM&A before and during construction is recommended to monitor these birds. With the implementation of the recommended mitigation measures, no significant residual impact are expected to the White-bellied Sea Eagle, although abandonment of the nest can not be ruled out, as possible suitable habitat and nesting sites are available in the vicinity of the Assessment Area.

### *Operation Phase*

- 1.23 During operation of the Theme Park and associated developments, an identified impact comprises the possibility of the White-bellied Sea Eagles abandoning the existing nesting site due to noise from the remote (more than 2 km and 800 m from Phase I and II, respectively), nightly laser show and short duration fireworks displays. Human interference impact identified may be mitigated by the further prohibition of human access during Project operation by secure fencing of the nesting site. It is, thus, considered necessary to extend the EM&A programme during Theme Park operation to monitor the reaction of White-bellied Sea Eagle to the fireworks. In the worst case of abandonment of the pair from their nest during operation, possible suitable habitat and nesting sites are available in the vicinity of the Assessment Area and thus no residual impact is predicted.

### **Marine Ecology**

#### *Construction Phase*

- 1.24 Potential impacts to marine ecological resources from the proposed construction works may arise either indirectly, eg through perturbations of the surrounding water quality, or directly as a result of habitat loss. The natural intertidal and subtidal assemblages with the Penny's Bay and Yam O reclamations will be lost permanently due to the proposed reclamation works. However, it is anticipated that given adequate seawall design, assemblages typical of those lost will recolonise after reclamation. Indirect impacts during the reclamation process, such as an increase in suspended solids levels and decrease in dissolved oxygen in the water column may impact intertidal and subtidal filter feeders and other marine organisms. However, the effects are not expected to be severe and no unacceptable impacts are predicted to occur.

#### *Operation Phase*

- 1.25 Operational impacts to marine ecological resources may occur through disturbances to water quality due to changes in the hydrodynamic regime of the area or due to polluted discharges into the marine environment. It is expected that all discharges will comply with the WPCO discharge standards and consequently marine ecological resources will be protected from impacts. Minor changes in the local hydrodynamic regime are predicted although these are not expected to alter water quality to an extent that marine ecological resources are affected. An increase in the number of vessels travelling to and from Victoria Harbour and the Theme Park is predicted to occur. However, as these vessels will not be high speed and this area is not regarded as critical habitat to the Indo-Pacific Humpback Dolphin unacceptable impacts are not predicted to occur with appropriate mitigation measures.



- 1.26 The impacts occurring as a result of construction and operation of the Theme Park and associated developments are the direct loss of 290 ha of the low ecological value soft benthic assemblages, 3.08 km of medium and low ecological value natural intertidal shores, 1.27 km sloping artificial seawalls, and 0.298 ha of high ecological value coral habitat. The loss of the habitat within the areas to be reclaimed can be mitigated through the provision of 3.9 km of rubble mound seawalls, of which 4.3 ha would be suitable for corals to colonise and grow. This mitigation measure reduces the magnitude of the residual impact to acceptable levels.
- 1.27 An ecological monitoring and audit programme involving the use of dive surveys will be conducted to report on the progress of colonisation of the rubble mound seawalls once construction works have ceased. As an additional habitat enhancement measure the Project proponent has undertaken to deploy Artificial Reefs in Hong Kong waters at a site (or sites) to be decided upon consultation with the Director of Agriculture, Fisheries and Conservation Department. Construction and operation phase dolphin/porpoise monitoring should be conducted by a qualified research team, to evaluate whether there have been any effects on the animals. The resulting data should be compatible with, and should be made available for, studies of small cetacean ecology in Hong Kong.

#### *Mitigation Measures*

- 1.28 Mitigation measures specific to marine ecology include the provision of rubble mound seawalls on the southern edges of the Penny's Bay reclamation, and at Yam O, to facilitate colonisation by intertidal organisms and corals which will be lost as a result of the construction of the reclamation. Mitigation measures designed to minimise impacts to the seasonal population of marine mammals that use the area include restrictions on vessel speed and the use of bubble curtains during underwater percussive piling work for construction of the two Theme Park ferry piers. Other mitigation measures designed to mitigate impacts to water quality to acceptable levels (compliance with WQO), including constraints on dredging and filling operations, are also expected to mitigate impacts to marine ecological resources. These mitigation measures reduce the magnitude of the residual impact to acceptable levels.

#### *Ecological Monitoring and Audit Programme*

- 1.29 An ecological monitoring and audit programme involving the use of dive surveys will be conducted to report on the progress of colonisation of the rubble mound seawalls once construction works have ceased. As an additional habitat enhancement measure the Project proponent has undertaken to deploy Artificial Reefs in Hong Kong waters at a site (or sites) to be decided upon consultation with the Director of Agriculture, Fisheries and Conservation Department. Construction and operation phase dolphin/porpoise monitoring

should be conducted to evaluate whether there have been any effects on the animals.

### **Fisheries**

- 1.30 A review of existing information on capture fisheries indicates that the adult fisheries resources in the marine areas close to the Assessment Area are in general low. Adult capture fisheries resources are unlikely to be adversely impacted by the Project as they will likely avoid the works areas. Although impacts to fish fry may occur through the permanent loss of habitat and/or elevated suspended sediment levels as a result of the proposed reclamation works, these impacts have been deemed acceptable as these waters are not an important nursery area for commercial fisheries species. Any impacts which are predicted can be mitigated through Project design. Any measures which are required to reduce impacts to water quality will also serve to protect against unacceptable impacts to capture fisheries resources. In terms of residual impacts to capture fisheries, the small loss of fishing grounds of the Hong Kong fishery is expected to be compensated for by the potential environmental benefits of the proposed rubble mound seawalls. Artificial Reefs have been recommended for deployment as an additional marine ecology and fisheries habitat enhancement measure. As a result, the residual impacts to capture fisheries through the construction and operation of the Theme Park and associated developments has been deemed acceptable.
- 1.31 In terms of impacts to the culture fisheries, the Ma Wan Fish Culture Zone (FCZ) is not predicted to be impacted by either suspended solids elevations, dissolved oxygen depletions or nutrient elevations as a result of the either the construction or operation. Discharges comply with WPCO standards and any potential impacts to water quality and, therefore, culture fisheries resources at the FCZ will be avoided. Project changes to the hydrodynamic regime are not expected to impact the water quality of the FCZ as current speeds are expected to be only minimally affected.

### **Hazard Assessment of Dangerous Goods (Fireworks and Sodium Hypochlorite) Incidents Resulting in Loss of Life**

- 1.32 As part of the EIA, a hazard assessment of dangerous goods (fireworks and sodium hypochlorite) incidents resulting in loss of life was undertaken to evaluate the risks associated with storage, transport and use of dangerous goods at the Theme Park. With the incorporation of design and operating safety measures considered in the analysis, the risks due to fireworks and sodium hypochlorite storage, transport and use were found to be in the 'acceptable' region of the Hong Kong Risk Guidelines. Further risk mitigation measures have been suggested for the Theme Park operator to consider for implementation on a good practice basis.

## **Cultural Heritage**

- 1.33 Potential impact to archaeological resources may arise from temporary or permanent landtake, ground compaction, topsoil or subsoil disturbance during construction, change in watertable and a limitation on accessibility for future investigation, which may result in damage to, or loss of the archaeological remains. Mitigation measures to heritage resources including the usage of plastic sheets to cover the impacted area at Wan Tuk archaeological site (SA2) before the temporary access road construction; the avoidance and minimisation of potential impact to SA1 and SA2 required for ground level adjustment; if the impact is unavoidable, plastic sheets should be used to cover impacted area before the fill up work and avoidance of waterlogged site conditions through detail design of runoff diversion. The associated residual impact could be mitigated by the removal of the filled material and the plastic sheet covers when necessary for future investigation and design to allow the diversion of surface runoff to avoid the waterlogged site conditions.
- 1.34 Preservation by record prior to the reclamation of Chok Ko Wan archaeological site has been recommended to mitigate the impact to this site and therefore, a full rescue programme should be implemented.
- 1.35 As the CKWLR, Road P2 and PBRL comprise the preferred alignments, the impact to any archaeological deposit at the original coastal area can be mitigated by detailed design of structural support location of CKWLR and detailed design of Road P2 and PBRL to minimise the impact to the potential coastal archaeological deposit to an absolute minimum. The development of the area will provide an opportunity for an archaeological field evaluation to be undertaken at the original coastal area of existing CLS site, which will be considered under a separate Schedule 2 EIA of CLS site commissioning. If significant archaeological deposit is found under the Shipyard site and if preservation in situ is not possible, the impacted archaeological deposits could be mitigated by rescue excavation before the construction of these transport infrastructural elements associated with the Theme Park development.
- 1.36 In order to ensure the preservation of the heritage sites near the Study Area boundary not to be impacted by construction, the Pa Tau Kwu archaeological site and the two grave sites, which are outside the Study Area boundary, could be indicated on any construction plans as "temporary protection area"; the physical site boundaries, with the inclusion of 5 m buffer zone, could be marked on sites and drawn construction workers' attention to ensure no direct impact to the grave sites and no soil disturbance to the archaeological sites are allowed. Access to the grave sites could be possible during construction, if grave owners are informed so that special arrangements for the them to visit the sites is possible, when necessary. Operational access should also be retained to the grave sites for future visitors after the Project completion.

- 1.37 With mitigation recommended it is considered that the impacts to cultural heritage are acceptable.

### **Landscape and Visual**

- 1.38 Grassland, shrub groups and woodland are affected primarily by the proposed transport infrastructure and in particular woodland shall be adversely affected by CKWLR and Road P2 proposals at Ngong Shuen Au. The Theme Park reclamation shall remove sections of natural coastline and is therefore a significant impact, although the proposal of an open channel along the western edge of the Penny's Bay reclamation has allowed the retention of an extensive length of natural coastline. There shall be a high level of change to the landscape character of the Study Area from a predominately rural type to a more semi-rural/urban type, whereas, the upland character zones are largely unaffected by development proposals. An expected high level of change to the local visual system of the Study Area is also predicted. The higher levels of adverse impact will result from a loss of a large area of bay and coastal waters, the temporary low visual quality associated with the undeveloped reclamation, and slope cutting associated with the CKWLR and Road P2. A range of mitigation measures have been proposed including the following: reclamation mitigation measures include temporary hydroseeding along the edge to improve its visual characteristics. The construction of the Theme Park shall be mitigated by the proposed advancement of construction and landscaping of the permanent soil berms. The operation phase is considered to be of a high visual value and not requiring mitigation. The mitigation for the slope cutting associated with the CKWLR and Road P2 includes slope landscaping and minimisation of the areas affected by slope cutting. The primary residual impacts that have been identified are the loss of bay and coastal waters and the adverse impact of the CKWLR on local topography, landscape character and the local visual system. In accordance with Annex 10 of the EIAO TM, the landscape and visual impact is considered acceptable with mitigation.

### **Land Contamination**

- 1.39 To allow the Theme Park and associated developments EIA to 'stand alone' the relevant land contamination section of the Schedule 3 NLDFS EIA was included within this EIA, although it is not strictly a requirement of the Theme Park EIA Study Brief. As appropriate remediation will be performed for the CLS site by CED, in accordance with EPD guidelines for the decommissioning of the shipyard site, before construction of Theme Park road and rail elements, future potential negative land contamination impacts are judged to be minimal. The NLDFS assessment will be verified by CED in a separate, subsequent EIAO Schedule 2 EIA for the CLS site. Thus, it is considered there will be no potential residual negative impacts and no insurmountable conditions for the use of the site as for Theme Park and associated developments.

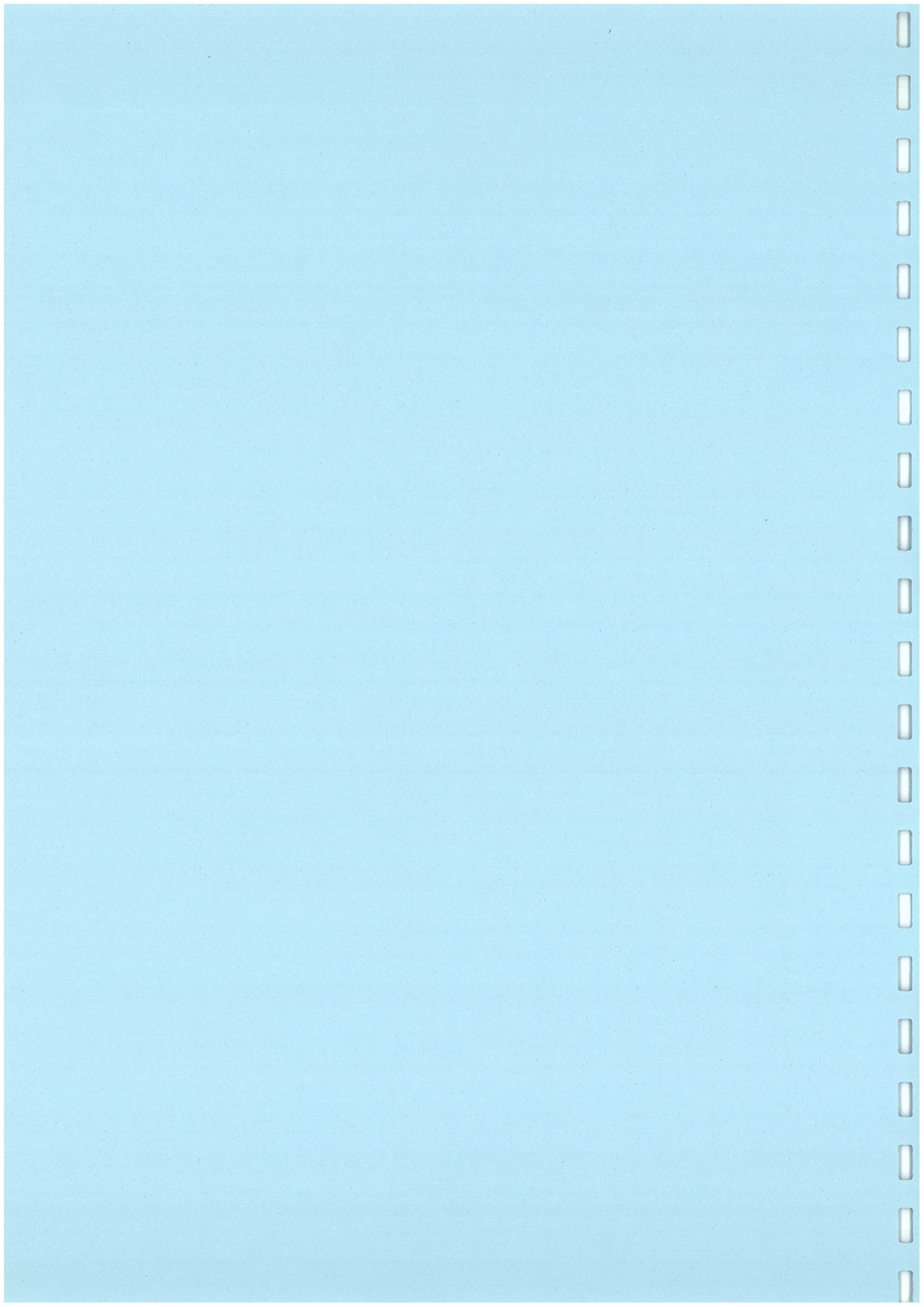
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ANNEX B  
EVENT ACTION PLAN

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## EVENT ACTION PLAN FOR AIR QUALITY

### ACTION

	ET Leader	Contractor	ER	IEC
	<b>ACTION LEVEL</b>			
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source</li> <li>2. Repeat measurement to confirm findings</li> <li>3. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>4. Carry out investigation</li> <li>5. Report the results of investigation to the Contractor within 3 working days of identification of exceedance</li> <li>6. Increase monitoring frequency to daily if ETL assessment indicates that exceedance is due to contractor's construction works.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER in writing within 24 hours of identification of the exceedance</li> <li>2. Rectify any unacceptable practice</li> <li>3. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance</li> <li>4. Submit air mitigation proposals to IEC and ER if exceedance is related to the construction works within 4 working days of the exceedance</li> <li>5. Amend work method if appropriate and within reasonable time scale if exceedance is due to the works</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform EPD and other relevant Governmental Agencies within 24 hours of identification of the exceedance</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Check contractor's working method</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source</li> <li>2. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>3. Repeat measurement to confirm findings</li> <li>4. Carry out investigation, report the results of investigation to the Contractor within 3 working days of identification of exceedance</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER in writing within 24 hours of identification of the exceedance</li> <li>2. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance</li> <li>3. Submit proposals for remedial actions to ER and IEC within 4 working days of notification</li> <li>4. Implement agreed proposals within reasonable time scale</li> <li>5. Amend proposal if appropriate</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance</li> <li>2. Ensure remedial measures properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitor data submitted by ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Check contractor's working method</li> <li>4. Discuss with ETL and Contractor remedial actions</li> <li>5. Advise the ER on the effectiveness of the proposed remedial measures</li> <li>6. Supervise implementation of remedial measures</li> </ol>

## EVENT ACTION PLAN FOR AIR QUALITY

EVENT	ACTION			
	ET Leader	Contractor	ER	IEC
	<ol style="list-style-type: none"> <li>5. Increase monitoring frequency to daily if ETL assessment indicates that exceedance is due to contractor's construction works.</li> <li>6. Discuss with IEC and contractor on remedial actions required within 3 working days of the identification of the exceedance</li> <li>7. If exceedance continues, arrange meeting with IEC, ER and contractor</li> <li>8. If exceedance stops, cease additional monitoring</li> </ol>			
	<b>LIMIT LEVEL</b>			
<ol style="list-style-type: none"> <li>1. Exceedance for one sample</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify source</li> <li>2. Repeat measurement to confirm findings</li> <li>3. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>9. Carry out investigation, report the results of investigation to the Contractor within 3 working days of identification of exceedance</li> <li>4. Increase monitoring frequency to daily if ETL assessment indicates that exceedance is due to contractor's construction works.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify within 24 hours of identification of the exceedance IEC and ER in writing</li> <li>2. Rectify any unacceptable practice immediately</li> <li>3. Amend work method if appropriate if exceedance is due to the works</li> <li>4. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance</li> <li>5. Submit proposal for remedial action to IEC and ER within 4 working days of notification</li> <li>6. Implement the agreed proposals within reasonable time scale</li> <li>7. Amend proposal if required</li> <li>8. Inform IEC and ER on the effectiveness of the remedial actions</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance</li> <li>2. Ensure remedial measures properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Check contractor's working method</li> <li>4. Discuss with contractor and ETL remedial actions if exceedance is due to the construction works within 3 working days</li> <li>5. Review the remedial actions whenever necessary to assure their effectiveness and advise ER accordingly</li> <li>6. Supervise the implementation of the remedial actions</li> </ol>



## EVENT ACTION PLAN FOR AIR QUALITY

EVENT	ACTION			
	ET Leader	Contractor	ER	IEC
<p>5. Discuss with contractor and IEC remedial actions if exceedance is due to the construction works within 3 working days</p> <p>6. Assess the effectiveness of the remedial actions</p>				
<p>2. Exceedance for two or more consecutive samples</p>	<p>1. Identify source</p> <p>2. Repeat measurement to confirm findings</p> <p>3. Notify contractor in writing within 24 hours of identification of the exceedance and advise contractor if exceedance is due to contractor's construction works</p> <p>4. Increase monitoring frequency to daily if ETL assessment indicates that exceedance is due to contractor's construction works.</p> <p>5. Carry out analysis of contractor's working procedures to determine possible remedial actions</p> <p>6. Discuss with contractor, ER and IEC remedial actions if exceedance is due to the construction works within 3 working days</p> <p>7. Assess the effectiveness of the remedial actions</p> <p>8. If exceedance stops, cease additional monitoring</p>	<p>1. Notify IEC and ER in writing within 24 hours of identification of the exceedance</p> <p>2. Rectify any unacceptable practice immediately</p> <p>3. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance</p> <p>4. Submit proposal for remedial action to IEC and ER within 4 working days of notification</p> <p>5. Implement the agreed proposals within reasonable time scale</p> <p>6. Amend proposal if required</p> <p>7. Inform IEC and ER on the effectiveness of the remedial actions</p> <p>8. Resubmit proposals if problem still not under control</p> <p>9. Stop the relevant portions of the works until the exceedance is abated</p>	<p>1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance</p> <p>2. Ensure remedial measures properly implemented</p> <p>3. If exceedance continues arrange meeting with ETL, Contractor and IEC to determine which portion of the works is responsible for the exceedance</p> <p>4. Instruct the contractor to stop that portion of the work until the exceedance is abated</p>	<p>1. Check monitoring data submitted by ETL</p> <p>2. Confirm ETL assessment if exceedance is due / not due to the works</p> <p>3. Check contractor's working method</p> <p>4. Discuss with contractor and ETL remedial actions if exceedance is due to the construction works within 3 working days</p> <p>5. Review the remedial actions whenever necessary to assure their effectiveness and advise ER accordingly</p> <p>6. Supervise the implementation of the remedial actions</p>

## EVENT/ACTION PLAN FOR CONSTRUCTION NOISE

EVENT	ACTION			
	ET Leader	Contractor	ER	IEC
Action Level	<ol style="list-style-type: none"> <li>1. Identify source</li> <li>2. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>3. Carry out investigation</li> <li>4. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>5. Discuss with the Contractor and formulate remedial measures if exceedance is related to the works within 4 working days of the identification of the exceedance</li> <li>6. Increase monitoring frequency to check mitigation effectiveness</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER in writing within 24 hours of identification of the exceedance</li> <li>2. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance</li> <li>3. Submit noise mitigation proposals to IEC and ER if exceedance is related to the construction works within 4 working days of the exceedance</li> <li>4. Implement noise mitigation proposals within reasonable time scale</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of the exceedance</li> <li>2. Require Contractor to propose remedial measures for the analysed noise problem if related to the construction works</li> <li>3. Ensure remedial measures are properly implemented</li> <li>4. Assess the effectiveness of the mitigation measure</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ETL, ER and Contractor on the mitigation measures</li> <li>4. Review the proposed remedial measures by the Contractor and advise the ER accordingly</li> <li>5. Supervise the implementation of remedial measures</li> </ol>

## EVENT/ACTION PLAN FOR CONSTRUCTION NOISE

EVENT	ACTION			
	ET Leader	Contractor	ER	IEC
Limit Level	<ol style="list-style-type: none"> <li>1. Identify source</li> <li>2. Repeat measurement to confirm findings</li> <li>3. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>4. Carry out investigation</li> <li>5. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>6. Increase monitoring frequency if exceedance is due to the construction works</li> <li>7. Discuss with the Contractor and formulate remedial measures if exceedance is related to the works within 4 working days of the identification of the exceedance</li> <li>8. Assess effectiveness of Contractor's remedial actions and keep contractor informed of the results</li> <li>9. If exceedance due to the construction works stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify ER and IEC in writing within 24 hours of identification of exceedance</li> <li>2. Take immediate action to avoid further exceedance if exceedance is due to the construction works</li> <li>3. Submit within 3 working days the investigation report concerning the exceedance to IEC and ER</li> <li>4. Submit proposals for remedial actions to IEC and ER within 4 working days of notification if exceedance is due to contractor's construction works</li> <li>5. Implement the agreed proposals within reasonable time scale</li> <li>6. Keep ER and IEC informed on the effectiveness of the results</li> <li>7. Resubmit proposals if problem still not under control</li> <li>8. Stop the relevant portion of works as determined by the ER until the exceedance is abated</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant Governmental Agencies in writing within 24 hours of identification of exceedance</li> <li>2. Require Contractor to propose mitigation measures for the analysed noise problem</li> <li>3. Ensure mitigation measures are properly implemented</li> <li>4. If exceedance continues, arrange meeting with ETL, Contractor, IEC and ER to determine what portion of the work is responsible for the exceedance</li> <li>5. Instruct the Contractor to stop that portion of work if no other mitigation measures can be implemented until the exceedance is abated</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Discuss amongst ER, ETL and Contractor on the mitigation measures</li> <li>4. Review Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the ER accordingly</li> <li>5. Supervise the implementation of mitigation measures</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY

Event	ACTION			IEC
	ET Leader	Contractor	ER	
<p>Action level being exceeded by one sampling day</p>	<ol style="list-style-type: none"> <li>1. Identify source(s) of impact;</li> <li>2. Repeat in-situ measurement to confirm findings;</li> <li>3. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation</li> <li>6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with Contractor if exceedance is due to the construction works within 4 working days</li> <li>8. Repeat measurement on next day of exceedance if exceedance is due to the construction works</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify the ER and IEC in writing within 24 hours of identification of exceedance</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance</li> <li>5. Consider changes of working method if exceedance is due to the construction works</li> <li>6. Discuss with ETL, IEC and ER and propose mitigation measures to IEC and ER if exceedance is due to the construction works within 4 working days of identification of an exceedance</li> <li>7. Implement the agreed mitigation measures within reasonable time scale</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance</li> <li>2. Discuss with IEC, ETL and Contractor on the proposed mitigation measures;</li> <li>3. Require contractor to propose remedial measures for the analysed problem if related to the construction works</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. Assess the effectiveness of the mitigation measure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ETL, ER and Contractor on the mitigation measures</li> <li>4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly</li> <li>5. Supervise the implementation of mitigation measures</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY

Event	ACTION			
	ET Leader	Contractor	ER	IEC
<p>Action level being exceeded by more than one consecutive sampling days</p>	<ol style="list-style-type: none"> <li>1. Identify source(s) of impact;</li> <li>2. Repeat in-situ measurement to confirm findings</li> <li>3. Notify Contractor in writing within 24 hours of identification</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation</li> <li>6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with IEC and Contractor within 4 working days of identification of an exceedance</li> <li>8. Ensure mitigation measures are implemented;</li> <li>9. Prepare to increase the monitoring frequency to daily;</li> <li>10. Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER in writing within 24 hours of identification of exceedance</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance</li> <li>6. Discuss with ETL, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of identification of an exceedance</li> <li>7. Implement the agreed mitigation measures within reasonable time scale</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance</li> <li>2. Discuss with IEC, ETL and Contractor on the proposed mitigation measures;</li> <li>3. Require contractor to propose remedial measures for the analysed problem if related to the construction works</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. Assess the effectiveness of the mitigation measure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ETL, ER and Contractor on the mitigation measures.</li> <li>4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly</li> <li>5. Assess the effectiveness of the implemented mitigation measures.</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY

Event	ACTION			IEC
	ET Leader	Contractor	ER	
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation</li> <li>6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with IEC, ER and Contractor within 4 working days of identification of an exceedance</li> <li>8. Ensure mitigation measures are implemented;</li> <li>9. Increase the monitoring frequency to daily until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER in writing; within 24 hours of the identification of the exceedance</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance</li> <li>6. Discuss with ETL, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of the identification of an exceedance</li> <li>7. Implement the agreed mitigation measures within reasonable time scale</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance</li> <li>2. Discuss with IEC, ETL and Contractor on the proposed mitigation measures;</li> <li>3. Request Contractor to critically review the working methods;</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ETL, ER and Contractor on the mitigation measures.</li> <li>4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly.</li> <li>5. Assess the effectiveness of the implemented mitigation measures</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY

Event	ACTION			IEC
	ET Leader	Contractor	ER	
<p>Limit Level being exceeded by more than one consecutive sampling days</p>	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with IEC, ER and Contractor;</li> <li>8. Ensure mitigation measures are implemented;</li> <li>9. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify ER and IEC in writing within 24 hours of the identification of the exceedance and</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>8. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance</li> <li>5. Discuss with ETL, IEC and ER and propose mitigation measures to IEC and ER within 4 working days;</li> <li>6. Implement the agreed mitigation measures within reasonable time scale</li> <li>7. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance</li> <li>2. Discuss with IEC, ETL and Contractor on the proposed mitigation measures;</li> <li>3. Request Contractor to critically review the working methods;</li> <li>6. Ensure remedial measures are properly implemented</li> <li>4. Assess the effectiveness of the implemented mitigation measures;</li> <li>5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ETL</li> <li>2. Confirm ETL assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ER, ETL and Contractor on the mitigation measures.</li> <li>4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly.</li> <li>5. Assess the effectiveness of the implemented mitigation measures.</li> </ol>

If white-bellied Sea Eagle is absent for a whole day during the monitoring period

Step	Day	Action	ET	HHJV	ER	IEC
1	1	Conduct ad hoc monitoring for one more day. Check monitoring data trend and Contractor's work method. Notify Contractor	■			
2	1	Notify ER and IEC. Er to notify EPD		■	■ □	□
3	3	Propose and discuss remedial measures within 3 working days of receipt of NOE to ER and IEC	■	■		
4	4	Review and agree with the proposed remedial measures and make recommendations where necessary.			■	□
5	4	Implement the proposed remedial measures once they have been agreed within reasonable time-scale.		■		
6	-	Assess effectiveness of remedial measures.	■			□

Note that the natural behaviour of the White-bellied Sea Eagles must be taken into consideration prior to the implementation of any of the actions stated in this EAP. Furthermore there remains the possibility that the White-bellied Sea Eagles may abandon their existing nesting site at the Pa Tau Kwu woodland.

■ action party

□ comments on the non-compliance record where applicable.

ET - Contractor's Environmental Team

HHJV - Contractor

IEC - Independent Environmental Checker

ER - Engineer / Engineer Representative



EVENT	ACTION				
<p><b>Fish kill</b></p>	<p>Complaint hotline numbers: 2983 6391 [office hours : 9 am to 5 pm] 9278 7816 [after office hours 5 pm to 9 am]</p> <p>Whichever party receives the complaint the ER will be informed immediately. ER will notify Contractor immediately Contractor will inform ET Leader</p>	<p><b>ET Leader</b></p> <ol style="list-style-type: none"> <li>1. Record complaint in complaint log</li> <li>2. Complaint received before 5 pm: <ul style="list-style-type: none"> <li>• If no water quality monitoring is scheduled on the day, ET will collect water samples at impact and control stations provided all locations can be reached in day light. Otherwise water samples will be taken at impact and control stations on the morning following the complaint</li> </ul> </li> <li>3. Compliant received after 5 pm: <ul style="list-style-type: none"> <li>• ET will collect water samples at impact and control stations on the morning following the complaint</li> </ul> </li> <li>4. Analyse all monitoring data</li> <li>5. Investigate validity of complaint.</li> <li>6. Review contractor's work method</li> <li>7. Discuss with contractor used work methods</li> <li>8. Issue a preliminary investigation report within 72 hours to contractor</li> <li>9. Propose mitigation measures within one day after investigation has concluded that fish kill is related to the works</li> <li>10. Issue final investigation report once all outstanding information has been obtained</li> <li>11. Monitor effectiveness of mitigation measures put in place</li> </ol>	<p><b>Contractor</b></p> <ol style="list-style-type: none"> <li>1. Within one working day of complaint provide ER with all relevant work site information [types, locations of construction works etc.]</li> <li>2. Submit preliminary investigation report to IEC and ER within 72 hours to of receipt of complaint</li> <li>3. Discuss with ER, ET and IEC on mitigation measures if investigation report shows that fish kill is related to the construction works</li> <li>4. Implement agreed mitigation measures within reasonable time scale</li> <li>5. Issue final investigation report once all outstanding information has been obtained</li> </ol>	<p><b>ER</b></p> <ol style="list-style-type: none"> <li>1. Review and agree with mitigation measure</li> <li>2. Ensure mitigation measures are put in place</li> </ol>	<p><b>IEC</b></p> <ol style="list-style-type: none"> <li>1. Review all monitoring data</li> <li>2. Comment on ET's assessment on whether fish kill is due to the construction works or not.</li> <li>3. Review mitigation measures, advise ER, contractor and ET</li> <li>4. Monitor implementation of mitigation measures</li> <li>5. Report to ER on effectiveness of mitigation measures</li> </ol>

**Event Action Plan for Complaint [Excluding fish kill]  
(Environmental complaint handling procedures)**

Step	Day	Action	Contractor	ER	IEC
1.	1	Party receiving complaint shall create a new complaint record. If the contractor receives a complaint, the contractor shall inform the ER. A notification of the complaint will be sent to contractor and IEC	■	■	
2.	2	Within 1 working days after the receipt of the notification of complaint, provide ER relevant works site information e.g. types and locations of construction works	■	□	
3.	2	Investigate the complaint to determine its validity and to assess whether the source of the problem is due to the works activities. Report validity of the complaint to ER	■	□	□
4.	2	If complaint is valid and due to the works, Contractor shall notify ER If complaint is invalid or not due to the works, go to step 11		■	□
5.	2	Propose mitigation measures to ER within 1 working day of the receipt of notification	■	□	
6.	2	Review and agree with the proposed mitigation measures and make recommendations where necessary		■ □	■ □
7.	2	Implement the mitigation measures once they have been agreed	■		
8.	4	Audit the implementation of the proposed mitigation measures on site within 2 working days after the measures have been implemented		■ □	■ □
9.	-	Undertake additional monitoring to verify the situation where necessary	■		
10.	4	Report to ER the implementation of the proposed mitigation measures results and subsequent actions taken within 2 working days after implementation of mitigation measures	■	□	
11.	5	Respond to complainant within 1 working day after receiving the investigation report, or otherwise make an interim reply within one working day		■	
12.	25	If no further comments or complaints are received from the complainant within 20m working days after responding to complainant, close the complaint record If the complainant has further comments or complaints on the same issue, notify other parties on the same day and go to step 2		■ □	

- Comment or propose on the complaint record where applicable
- Action party
- ET Contractor's Environmental Team
- IEC Independent Environmental Checker
- ER Engineer / Engineer's Representative

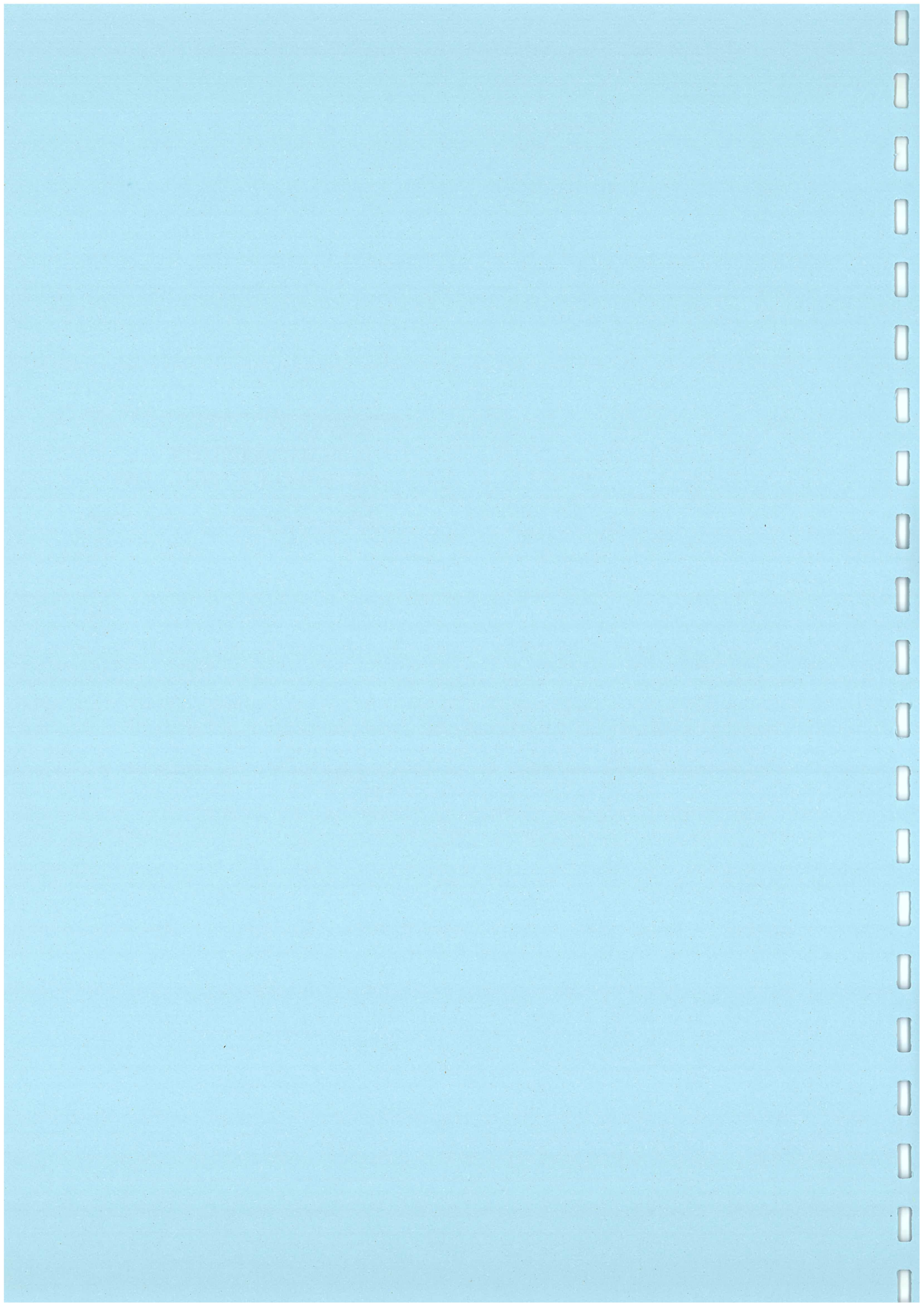
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ANNEX C  
IMPLEMENTATION  
SCHEDULES FOR THE  
PROJECT

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### Implementation Schedule for the Penny's Bay Reclamation Stage 1 - Construction Phase

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
		<b>AIR QUALITY - Construction Phase</b>						
		In accordance with the <i>Air Pollution Control (Construction Dust) Regulation</i> the following mitigation measures shall be implemented to limit the dust emissions from the site:						
3.4.3	A1	<ul style="list-style-type: none"> <li>if a stockpile of dusty materials is more than 1.2 m high and lies within 50 m from any site boundary that adjoins a road, street, or other area accessible to the public, it shall be properly treated and sealed with latex, vinyl, bitumen or other suitable surface stabilizer;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A2	<ul style="list-style-type: none"> <li>vehicle washing facilities shall be provided at every vehicle exit point</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A3	<ul style="list-style-type: none"> <li>where a site boundary adjoins a road, streets or other area accessible to the public, hoarding of not less than 2.4 m high from ground level shall be provided along the entire length except for a site entrance or exit;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A4	<ul style="list-style-type: none"> <li>every main haul road shall be sealed and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A5	<ul style="list-style-type: none"> <li>stockpiles of dusty materials shall be either covered entirely by impervious sheeting, placed in an area sheltered on the top and 3 sides; or sprayed with water so as to maintain the entire surface wet;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
3.4.3	A6	<ul style="list-style-type: none"> <li>all dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Air Pollution Control (Construction Dust) Regulation
3.4.3	A7	<ul style="list-style-type: none"> <li>vehicle speed within the worksite shall be limited to 10 kph, except for properly formed and maintained access roads;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Air Pollution Control (Construction Dust) Regulation
3.4.3	A8	<ul style="list-style-type: none"> <li>every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the construction sites;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Air Pollution Control (Construction Dust) Regulation
3.4.3	A9	<ul style="list-style-type: none"> <li>the working area of excavation shall be sprayed with water immediately before, during and immediately after the operation so as to maintain the entire surface wet;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Air Pollution Control (Construction Dust) Regulation
		<p><b>NOISE - Construction Phase</b></p> <p>In addition to the use of good site practice (as defined in the EIA Report) the following mitigation measures shall be implemented to minimise noise emissions:</p>						
4.6	B1	<p><i>Selecting Quieter Plant for Evening Time Works</i></p> <p>Where available, the Contractor shall use models of plant that are quieter than those specified in the EPD's Technical Memorandum (GW-TM) for undertaking construction works in the evening.</p> <p><b>WATER QUALITY- Construction Phase</b></p> <p>Reclamation Formation - Penny's Bay</p>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			GW-TM
5.7.1	C1	If the loss rate of fine sediment to suspension from the different types of plant working on the site is greater than 25.3 kg s-1 then either the quantities of plant operating or the rates of working should be reduced.		To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**				Relevant Legislation & Guidelines
					Des	C	O	Dec	
5.7.1	C2	The loss rate for dredging and filling by a trailing suction hopper dredger ('trailer') is assumed to be independent of the size of the dredger. It is assumed that the trailer will deliver their load of sand fill into the reclamation by bottom dumping. The loss rate is calculated based on a maximum fines content of the material delivered to site of 8%, which will be achievable event for high <i>in situ</i> fines content at the borrow area. The loss rate for grab dredging is based on the use of an 8.5 m <sup>3</sup> grab. Should larger grabs be used than the same loss rate may be applied, although the actual loss rate is likely to be lower. However, if the Contractor can demonstrate through the use of field trials that the actual loss rates from the proposed plant and operating methods are lower than those shown in <i>Table 5.7a</i> in the EIA Report, then the loss rate figures in the second column may be revised and the total loss rate re-calculated. The total calculated loss rate should still be less than 25.3 kg s <sup>-1</sup> .		To be implemented by the Contractors and enforced by the Engineer/IEC	✓	✓			Water Pollution Control Ordinance
5.7.1	C3	Monitoring of dredging rate on a daily basis, and determination of fines content in at least one hopper load every two days.		To be implemented by the Contractors and enforced by the Engineer/IEC	✓				
5.7.1	C4	The seawalls along the face of the reclamation shall be constructed as early as practicable in the construction programme in order to shelter the works area from tidal currents and hence minimise the transport of fine sediment in suspension away from the works area. Priority should be given to the seawall along the western frontage of the reclamation. The filling activities shall be undertaken (ie discharge of sand fill from trailing suction hopper dredgers) behind seawalls or other suitable structure to act as a barrier. The seawalls, or other suitable barrier, shall be constructed at least 200 m in advance of the filling point.	As early as practicable in the construction programme, with the seawalls or other similar structures used to act as a barrier in Areas Q4 and Q7 being above water level prior to Month 10 of the programme.	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		The following general working methods shall be implemented during dredging and filling works to minimise the loss of fine sediment to suspension.							
5.7.1	C5	<ul style="list-style-type: none"> <li>for dredging contaminated (Class C) sediments, fully-enclosed (water tight) grabs shall be used to minimise the loss of sediment during the raising of the loaded grabs through the water column;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C6	<ul style="list-style-type: none"> <li>for dredging uncontaminated sediment tightly closing grabs should be used to restrict the loss of fine sediment to suspension;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C7	<ul style="list-style-type: none"> <li>the descent speed of grabs should be controlled to minimise the seabed impact speed;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C8	<ul style="list-style-type: none"> <li>barges should be loaded carefully to avoid splashing of material;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C9	<ul style="list-style-type: none"> <li>all barges used for the transport of dredged materials should be fitted with tight bottom seals in order to prevent leakage of material during loading and transport;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C10	<ul style="list-style-type: none"> <li>all barges should be filled to a level which ensures that material does not spill over during loading and transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C11	<ul style="list-style-type: none"> <li>the speed of trailer dredger should be controlled within the works area to prevent propeller wash from stirring up the sea bed sediments;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance



EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**				Relevant Legislation & Guidelines
					Des	C	O	Dec	
5.7.1	C12	<ul style="list-style-type: none"> <li>when dredging mud at the reclamation site trailer dredgers shall be prohibited from overflowing or using Automatic Lean Mixture Overboard (ALMOB) systems;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C13	<ul style="list-style-type: none"> <li>the use of Lean Mixture Overboard (LMOB) will be permitted during the raising and lower of the suction head, but shall cease once the suction head is in contact with the sea bed;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C14	<ul style="list-style-type: none"> <li>"rainbowing" sand fill from trailer dredgers will not be permitted except when the material is discharged onto areas above water level and are sheltered behind seawalls, or other suitable barriers, which have been constructed at least 200 m in advance of the discharge point; and</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C15	<ul style="list-style-type: none"> <li>the works shall cause no visible foam, oil, grease or litter or other objectionable matter to be present in the water within and adjacent to the reclamation site and along the route to and from the marine borrow area and disposal site.</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C16	<ul style="list-style-type: none"> <li>A suitable device shall be fitted to the cutter suction dredger, which discharges the re-handled fill in thin layers. The design of the device should be such that the fill material does not disturb the sea bed and that a density flow is formed close to the sea bed.</li> </ul>	Prior to the use of the cutter suction dredger, and throughout the whole duration, of its use	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance
5.7.1	C17	<ul style="list-style-type: none"> <li>The re-handling basin shall be located such that it is always positioned behind completed seawalls or other suitable barriers, which have been constructed at least 200 m in advance of the location of the re-handling basin. This measure will ensure that any fine sediment lost to suspension during the operation of the re-handling basin is retained within the filling area, ie behind the seawalls.</li> </ul>	Prior to the use of the re-handling basin, and throughout the whole duration, of its use	To be implemented by the Contractors and enforced by the Engineer/IEC	✓				Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.1	C18	In the initial phases of construction, the re-handling basin should be positioned in Penny's Bay where tidal currents are low.	Prior to and throughout the initial phases of the re-handling basin	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
5.7.1	C19	Prior to the initial operation of the re-handling basin, seawalls of approximately 400 m in length from the Size Pak headland, or other suitable retaining structures, shall be completed to above the water level to act as a barrier in Area Q4 (see Figure 5.6b of the EIA Report).	Prior to the initial operation of the re-handling basin	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
5.7.1	C20	As the construction of the reclamation progresses the location of the re-handling basin will move with the leading face of the reclamation. Seawalls, or other suitable retaining structures, should be constructed above the water level at least 200 m in advance of the location of the re-handling basin.	Prior to the initial operation of the re-handling basin	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
		<b>Land Based Construction Activities</b>						
		<b>Surface Run-off</b>						
5.7.2	C22	Surface run-off from the construction site shall be directed into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers shall be provided on site to properly direct stormwater to such silt removal facilities.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
5.7.2	C23	Catchpits and perimeter channels shall be constructed in advance of site formation works and earthworks.	At all construction work site prior to the commencement of site formation works and earthworks	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
5.7.2	C24	Silt removal facilities, channels and manholes shall be suitably maintained with the deposited silt and grit being removed regularly, and at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.2	C25	Earthworks final surfaces shall be well compacted and the subsequent permanent work or surface protection shall be carried out as soon as practical after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate intercepting channels shall be provided where necessary. Rainwater pumped out from trenches or foundation excavations shall be discharged into storm drains via silt removal facilities.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
5.7.2	C26	Open stockpiles of construction materials (e.g. aggregates and sand) on site shall be covered with tarpaulin or similar fabric during rainstorms. Measures shall be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
5.7.2	C27	Manholes (including any newly constructed ones) shall always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance
		<i>Groundwater</i>						
5.7.2	C28	Groundwater pumped out of wells, etc. for the lowering of ground water level in foundation construction shall be discharged into storm drains after being passed through appropriate silt removal facilities.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.2	C29	<p><i>Wheel Washing Water</i></p> <p>All vehicles and plant shall be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay shall be provided at every site exit, if practicable, and wash-water shall have sand and silt settled out or removed before being discharged into the storm drains. The section of construction road between the wheel washing bay and the public road shall be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.</p>	At every site exit to all construction work sites, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Water Pollution Control Ordinance</i>
5.7.2	C30	<p><i>Wastewater from Site Facilities</i></p> <p>Sewage from toilets, kitchens and similar facilities shall be discharged into a foul sewer or chemical toilets shall be provided. Should the use of chemical toilets be necessary then these shall be provided by a licensed contractor, who will be responsible for appropriate disposal and maintenance of these facilities. Wastewater collected from canteen kitchens, including that from basins, sinks and floor drains, shall be discharged into foul sewers via grease traps.</p>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Water Pollution Control Ordinance</i>
5.7.2	C31	<p>Vehicle and plant servicing areas, vehicle wash bays and lubrication bays shall, as far as possible, be located within roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor. Oil leakage or spillage shall be contained and cleaned up immediately. Waste oil shall be collected and stored for recycling or disposal, in accordance with the <i>Waste Disposal Ordinance</i>.</p>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Water Pollution Control Ordinance</i> <i>Waste Disposal Ordinance</i>

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.2	C32	<p><i>Storage and Handling of Oil, Other Petroleum Products and Chemicals</i></p> <p>All fuel tanks and chemical storage areas shall be provided with locks and be sited on sealed areas. The storage areas shall be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil, fuel and chemicals from reaching the receiving waters. The Contractors shall prepare guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals.</p> <p><b>WASTE - Construction Phase</b></p> <p>The following procedures and measures shall be implemented when handling waste material.</p> <p><i>Dredged/Excavated Sediment</i></p> <ul style="list-style-type: none"> <li>• Potential impacts associated with the exposure to and disposal of contaminated sediments could be mitigated by adopting the following measures: <ul style="list-style-type: none"> <li>• minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities, and preventing eating during dredging/excavation;</li> <li>• any contaminated sediment dredged should not be allowed to stockpile on the site and should be immediately removed from site once dredged;</li> <li>• all vessels for marine transportation of dredged sediment should be fitted with tight fitting seals to their bottom openings to prevent leakage of materials; and</li> </ul> </li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Water Pollution Control Ordinance</i>
6.7.2	D1	<ul style="list-style-type: none"> <li>• Potential impacts associated with the exposure to and disposal of contaminated sediments could be mitigated by adopting the following measures: <ul style="list-style-type: none"> <li>• minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities, and preventing eating during dredging/excavation;</li> <li>• any contaminated sediment dredged should not be allowed to stockpile on the site and should be immediately removed from site once dredged;</li> <li>• all vessels for marine transportation of dredged sediment should be fitted with tight fitting seals to their bottom openings to prevent leakage of materials; and</li> </ul> </li> </ul>	To be implemented at all work sites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance, EPDTC 1-1-92</i>

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
		<ul style="list-style-type: none"> <li>loading of barges and hoppers should be controlled to prevent splashing of dredged material to the surrounding water, and barges or hoppers should under no circumstances to be filled to a level which will cause other overflowing of materials or polluted water during loading or transportation.</li> </ul>						
6.7.2	D2	<p><i>Use of Public Fill for Reclamation</i></p> <p>The Contractor should enforce strict application of the public fill license and monitor the material placed in the reclamation and barges to control disposal of unauthorised material. The Contractor shall also provide floating booms and collect any floating materials on a daily basis at the public filling area.</p> <p><i>Measures Taken in the Planning and Design Stages to Reduce the Generation of C&amp;DM</i></p> <p>The following waste management hierarchy shall be followed:</p> <ol style="list-style-type: none"> <li>avoidance and minimisation, that is, not generating waste through changing or improving practices and design;</li> <li>reuse of materials, thus avoiding disposal (generally with only limited reprocessing);</li> <li>recovery and recycling, thus avoiding disposal (although reprocessing may be required); and</li> <li>treatment and disposal, according to relevant law, guidelines and good practice.</li> </ol>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance</i>
6.7.2	D3	<p>The following waste management hierarchy shall be followed:</p> <ol style="list-style-type: none"> <li>avoidance and minimisation, that is, not generating waste through changing or improving practices and design;</li> <li>reuse of materials, thus avoiding disposal (generally with only limited reprocessing);</li> <li>recovery and recycling, thus avoiding disposal (although reprocessing may be required); and</li> <li>treatment and disposal, according to relevant law, guidelines and good practice.</li> </ol>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance</i>
6.7.2	D4	Records of quantities of wastes generated, recycled and disposed (locations) shall be properly kept.	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance</i>

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
6.7.2	D5	Any clean excavated soil shall be reused on site as far as possible for landscape works in order to minimise the amount of public fill to be disposed off-site. Should there be any surplus public fill generated from the project, the Contractors shall liaise with the Fill Management Committee to identify as far as possible suitable reclamation or site formation projects near the project site to reuse the material.	To be implemented at all work sites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance
6.7.2	D6	The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage of construction materials, such as ready mixed concrete.	To be implemented at all work sites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance
		<i>Measures To be Taken in the Construction Stage To Reduce the Generation of C&amp;DM</i>						
6.7.2	D7	The Contractor shall recycle as much as possible of the C&D material on-site. Public fill and C&D waste shall be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Concrete and masonry, for example can be crushed and used as fill and steel reinforcing bar can be used by scrap steel mills. Different areas of the work sites should be designated for such segregation and storage.	To be implemented at all work sites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance
6.7.2	D8	In order to minimise the impacts of the demolition works these wastes must be cleared as quickly as possible after demolition. The demolition and clearance works shall therefore be undertaken simultaneously.	To be implemented at all work sites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance
6.7.2	D9	The use of wooden hoardings shall not be allowed. An alternative material, for example, metal (aluminium, alloy etc) shall be used.	To be implemented at all work sites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance

EIA * Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**				Relevant Legislation & Guidelines
					Des	C	O	Dec	
6.7.2	D10	<p><b>Chemical Waste</b></p> <p>For those processes which generate chemical waste, it may be possible to find alternatives which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste. Containers used for storage of chemical wastes should:</p> <ul style="list-style-type: none"> <li>• be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;</li> <li>• have a capacity of less than 450 L unless the specifications have been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations.</li> </ul> <p>The storage area for chemical wastes should:</p> <ul style="list-style-type: none"> <li>• be clearly labelled and used solely for the storage of chemical waste;</li> <li>• be enclosed on at least 3 sides;</li> <li>• have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;</li> <li>• have adequate ventilation;</li> <li>• be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and</li> <li>• be arranged so that incompatible materials are adequately separated.</li> </ul>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC		✓			<p>Waste Disposal Ordinance, Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</p>



EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
		<p>Disposal of chemical waste should:</p> <ul style="list-style-type: none"> <li>• be via a licensed waste collector; and</li> <li>• be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers; or</li> <li>• be to a re-user of the waste, under approval from the EPD.</li> </ul> <p>The Centre for Environmental Technology operates a Waste Exchange Scheme which can assist in finding receivers or buyers.</p>						
		<i>Management of General Refuse</i>						
6.7.2	D11	<p>General refuse generated on-site shall be stored in enclosed bins or compaction units separate from construction and chemical wastes. A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimise odour pest and litter impacts. The burning of refuse shall not be permitted.</p>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance</i>
6.7.2	D12	<p>Reusable rather than disposable dishware shall be used if feasible. Separate, labelled bins shall be provided, if feasible, for the collection of aluminium cans.</p>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance</i>
6.7.2	D13	<p>The Contractor shall participate in a local waste collection scheme, if one is available, to reduce office wastes.</p>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance</i>
		<i>Management of Waste Disposal</i>						

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
6.7.2	D14	A trip-ticket system should be established and used to monitor the disposal of C&DM and solid wastes at public filling facilities and landfills, and to control fly-tipping.	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance Works Bureau Technical Circular No 5/99
6.7.2	D15	A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) shall be established during the construction stage.	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance
6.7.2	D16	<i>Staff Training</i> Training shall be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling at the beginning of the contract.	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance
6.7.2	D17	<i>Dredged Material</i> Potential impacts associated with the exposure to and disposal of contaminated sediments shall be mitigated by adopting the following measures: <ul style="list-style-type: none"> <li>minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities, and preventing eating during dredging;</li> <li>any contaminated sediment dredged should not be allowed to stockpile on the site and should be immediately removed from site once dredged;</li> <li>all vessels for marine transportation of dredged sediment should be fitted with tight fitting seals to their bottom openings to prevent leakage of materials; and</li> </ul>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			Waste Disposal Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
		<ul style="list-style-type: none"> <li>loading of barges and hoppers should be controlled to prevent splashing of dredged material to the surrounding water, and barges or hoppers should under no circumstances to be filled to a level which will cause other overflowing of materials or polluted water during loading or transportation.</li> </ul>						
		<i>Waste Management Plan</i>						
6.7.2	D18	The construction Contractors shall incorporate the above recommendations into a Waste Management Plan for the construction works. Such a management plan shall incorporate site specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.	To be produced by all construction contractors and submitted to the Engineer for approval at the commencement of the construction period. The Plans shall be implemented throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			<i>Waste Disposal Ordinance</i>
		<b>TERRESTRIAL ECOLOGY - Construction Phase</b>						
		<i>White-bellied Sea Eagle</i>						
		<i>Construction Practice</i>						
7.7.3	E10	Erect fences where practical along the boundary of construction sites before the commencement of works to prevent tipping, vehicle movements, and encroachment of personnel into adjacent areas, particularly where the rare/restricted/protected species, such as rare Rice Fish <i>Oryzias latipes</i> in Mong Tung Hang stream, White-bellied Sea Eagles <i>Haliaeetus leucogaster</i> at Pa Tau Kwu woodland, Pitcher Plant <i>Nepenthes mirabilis</i> , <i>Fimbristylis acuminata</i> and <i>Fimbristylis complanata</i> behind Cheoy Lee shipyard, are located;	At all construction work sites particularly the areas close to freshwater wetland behind Cheoy Lee shipyard, Pa Tau Kwu secondary woodland and Mong Tung Hang stream /Throughout the whole construction period /At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			
7.7.3	E12	Select haul routes, storage and works areas etc. to avoid or minimize disturbance to ecologically significant areas;	At all construction work sites /Throughout the whole construction period /At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des.	C	O	
7.7.3	E13	Check the work site boundaries regularly to ensure that they are not exceeded and that no damage has been caused to surrounding natural habitats;	At all construction work sites /Throughout the whole construction period /At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			
7.7.3	E14	Prohibit and prevent open fires within the work site boundary during construction and provide temporary fire fighting equipment in all work areas.	At all construction work sites /Throughout the whole construction period /At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			
		<b>MARINE ECOLOGY AND FISHERIES - Construction Phase</b>						
		<i>Marine Ecological Resources: General</i>						
8.7.1	F1	In order to assist in rehabilitating the area after reclamation, a sloping armour rock/concrete design should be adopted for the construction of the seawalls.	To be developed during the detailed design an implemented during the construction phase	To be developed by the Detailed Design Engineers, implemented by the Contractors and enforced by the Engineer/IEC	✓			
		<i>Marine Ecological Resources: Marine Mammals</i>						
8.7.2	F2	1) The following mitigation measures shall be implemented to minimize potential construction impacts to dolphins and porpoises:  1. All vessel operators working on the Project construction shall be given a briefing, alerting them to the possible presence of dolphins and porpoises in the area, and the rules for safe vessel operation around cetaceans. If high speed vessels are used, they should be required to slow to 10 knots when passing through a high density dolphin area.  2. A policy of no dumping of rubbish, food, oil, or chemicals should be strictly enforced. This should also be covered in the contractor briefing;	To be implemented throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		3. Every attempt shall be made to minimize the effects of construction of the Project on the water quality of the area;							
		4. Any construction work that could potentially harm dolphins shall be planned to take place in spring (Mar - May) or summer (Jun-Aug), when dolphin abundance is apparently lowest. In particular, the winter season (Dec - Feb) should be avoided;							
		5. If piling must be done in autumn or winter, then the following steps shall be taken:							
		<ul style="list-style-type: none"> <li>An exclusion zone of 500 m radius should be scanned around the work area for at least 30 minutes prior to the start of piling. If cetaceans are observed in the exclusion zone, piling should be delayed until they have left the area; and</li> <li>A bubble curtain shall be used to surround the piling barge and work area, and the bubble curtain shall be in operation during any time in which piling occurs.</li> </ul>							
		<b>ARCHAEOLOGY AND CULTURAL HERITAGE - Construction Phase</b>							
11.6	G1	In order to minimise the potential for impact to the Wan Tuk archaeological site, the following mitigation measures shall be implemented:							
		<ul style="list-style-type: none"> <li>Plastic sheets shall be used to cover the impact area before construction of the temporary access road.</li> </ul>	Prior to and throughout the construction of the temporary access road	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			✓	
		<ul style="list-style-type: none"> <li>Any area required to be filled shall be covered by plastic sheets before the filling work.</li> </ul>	Prior to and throughout the filling works	To be implemented by the Contractors and enforced by the Engineer/IEC	✓			✓	

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
		<ul style="list-style-type: none"> <li>Detailed design of filling work or ground level adjustment work shall consider diversion of site runoff to prevent waterlogged conditions.</li> </ul>	During the detailed design stage and before the commencement of filling or ground level adjustment work	To be undertaken by the detailed design engineers, implemented by the Contractors and enforced by the Engineer/IEC	✓			
		<b>HAZARD - Construction Phase</b>						
		Not applicable						
		CONTAMINATED LAND - <i>Construction Phase</i>						
		<i>Not applicable</i>						
		<b>LANDSCAPE AND VISUAL - Construction Phase</b>						
		<i>Not applicable</i>						
		<b>EM&amp;A REQUIREMENTS - Construction Phase</b>						
		<i>Air Quality</i>						
3.7	I1	Subject to the Environmental Protection Department's (EPD's) agreement, construction phase dust monitoring shall be undertaken at the following location in accordance with the recommendations detailed in Section 5 of the EM&A Manual. <ul style="list-style-type: none"> <li>ASR1- Penny's Bay Gas Turbine Plant</li> </ul> <i>Construction Noise</i>	At specified dust monitoring locations throughout the duration of the construction works	To be undertaken by the Contractor, enforced by Engineer and reviewed/audited by the IEC	✓			Air Pollution Control (Construction Dust) Regulations
4.9	I2	Subject to the Environmental Protection Department's (EPD's) agreement, construction phase noise monitoring shall be undertaken at the following locations in accordance with the recommendations detailed in Section 6 of the EM&A Manual. <ul style="list-style-type: none"> <li>NSR1-Sea Crest Villa (Peng Chau)</li> <li>NSR2-Crestmont Villa (Discovery Bay)</li> <li>NSR3-Luk Keng Tsuen</li> </ul>	At specified noise monitoring locations throughout the duration of the construction works	To be undertaken by the Contractor, enforced by Engineer and reviewed/audited by the IEC	✓			Noise Control Ordinance (NCO)

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.13.1	I3	<p><i>Water Quality</i></p> <p>Subject to the Environmental Protection Department's (EPD's) agreement, construction phase water quality monitoring shall be undertaken at the following locations in accordance with the recommendations detailed in Section 6 of the EM&amp;A Manual.</p> <p>Sensitive Receiver Stations</p> <ul style="list-style-type: none"> <li>• SR1: Kau Yi Chau;</li> <li>• SR2: Discovery Bay;</li> <li>• SR3: Sze Pak Wan;</li> <li>• SR4: Ma Wan Fish Culture Zone South;</li> <li>• SR5: Ma Wan Fish Culture Zone North;</li> <li>• SR6: Tung Wan Beach; and</li> <li>• SR7: Ma Wan Fish Culture Zone North;</li> </ul>	At specified water quality monitoring locations throughout the duration of the construction works	To be undertaken by the Contractor, enforced by Engineer and reviewed/audited by the IEC				Water Pollution Control Ordinance (WPCO)
		<p>Control Monitoring Stations</p> <p>C1 to C6 as detailed in Section 7 of the EM&amp;A Manual</p>						
		<p>Gradient Stations</p> <p>G1-6</p>						
		<b>TERRESTRIAL ECOLOGY</b>						
		White-bellied Sea Eagle						
7.9	J4	Subject to the EPD's agreement, construction phase monitoring of the White-bellied Sea Eagle shall be undertaken in accordance with the recommendations of Section 9 of the EM&A Manual	Throughout the duration of the construction works.	To be undertaken by an avian specialist with at least 3 years experience	✓			

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
8.12	K5	Marine Ecological Monitoring Subject to the Environmental Protection Department's (EPD's) agreement, construction phase monitoring of the dolphin/porpoise population shall be conducted by a qualified research team in accordance with the recommendations of Section 10 of the EM&A Manual.	Throughout the construction phase	Qualified research team employed by HKITP		✓		
* Des = Design, C = Construction, O = Operation, Dec = Decommissioning								



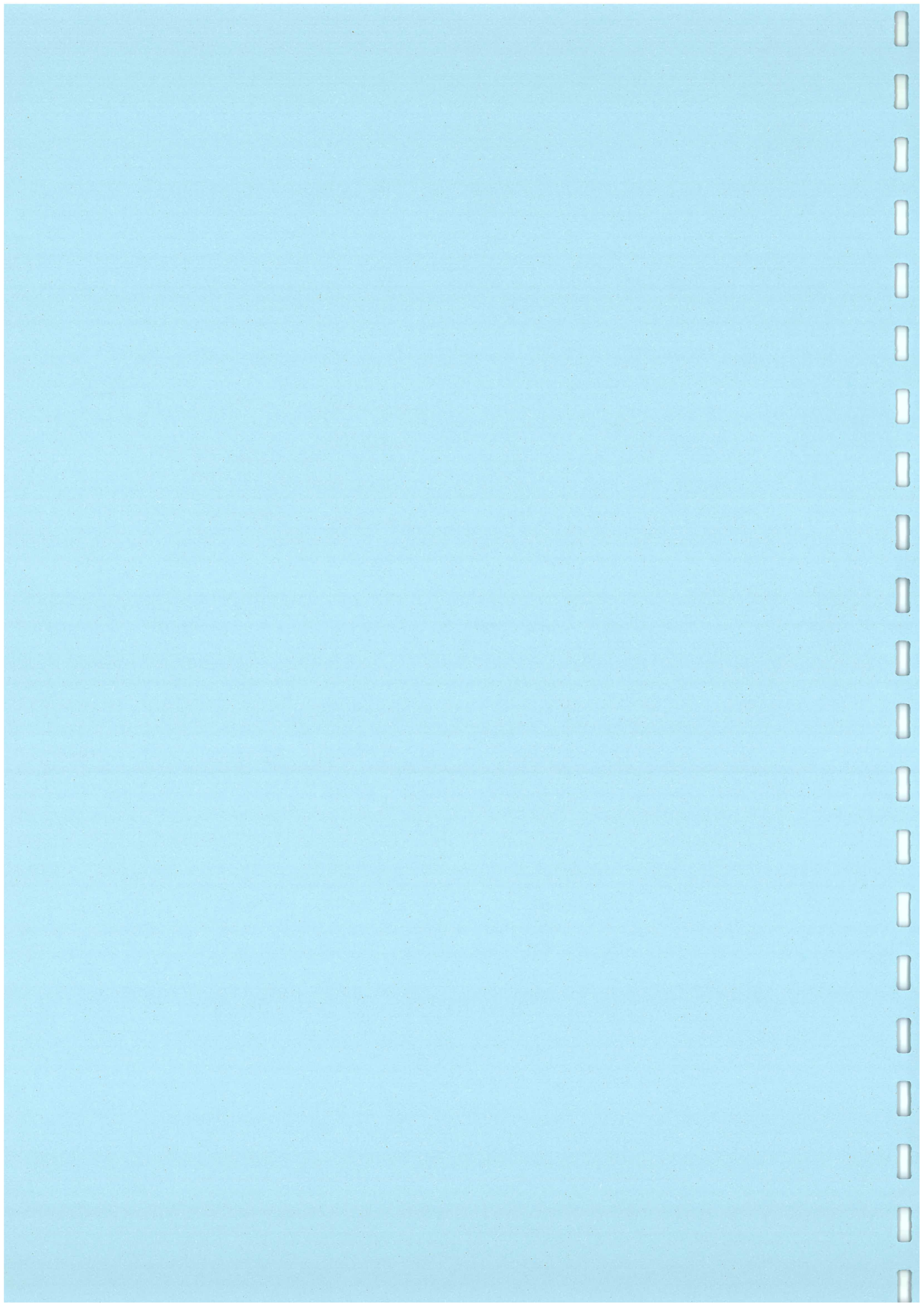
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ANNEX D  
SAMPLE DATA RECORD SHEET  
FOR AIR QUALITY MONITORING

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# Penny's Bay Reclamation Stage 1

## 1 hour TSP Monitoring

### Data Record Sheet

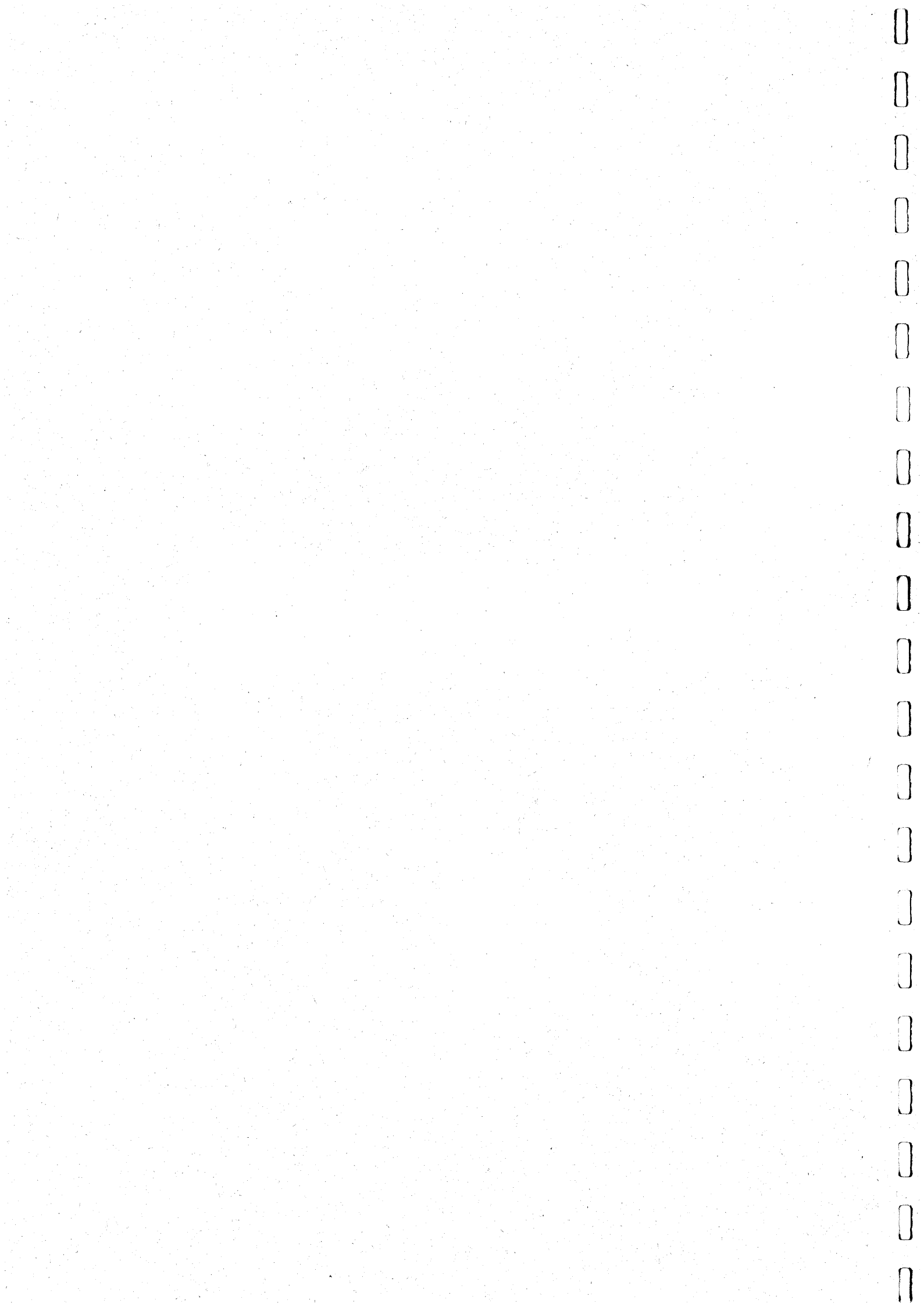
Equipment	Model	Equipment No.	Last Calibration/Due Date
			/

Monitoring Location		AM1		
Details of Location		Penny's Power Plant		
Sampling Date and Time				
Weather Condition		Sunny / Cloudy / Rainy		
Measuring Parameters		TSP		
		1st hour	2nd hour	3rd hour
Count Value				
Count Value ÷ 60 mins x 0.01 (K Factor) = Mass Concentration (mg/m <sup>3</sup> )				
Observed Construction Activities	Main Construction Site			
	Other Construction Site			
Remarks				

	Name	Signature	Date
Recorded By			
Checked By			

Project No. S06200

MEMCL



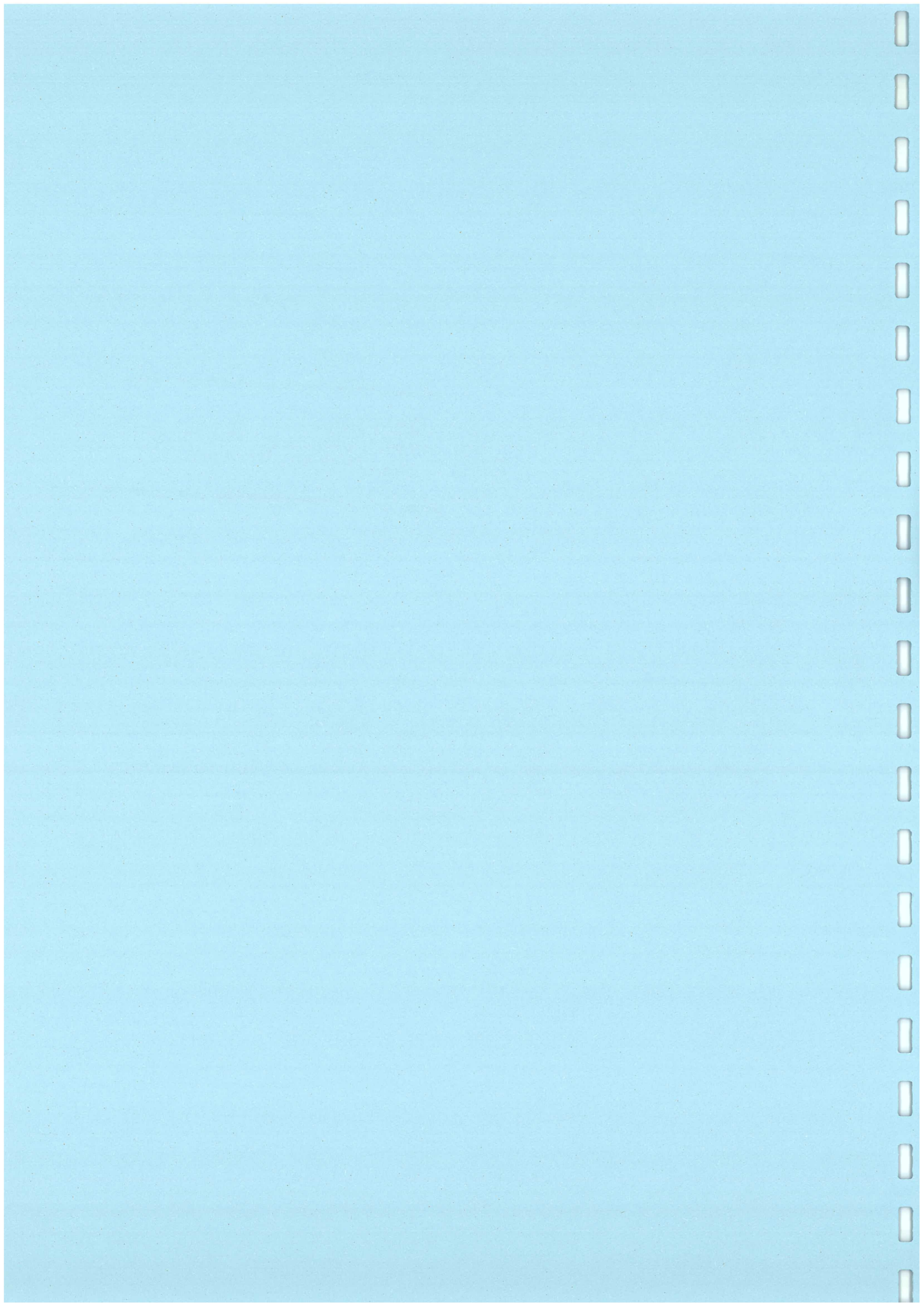
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ANNEX E  
SAMPLE DATA RECORD SHEET  
FOR NOISE MONITORING

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# Penny's Bay Reclamation Stage I

## Noise Monitoring

### Field Record Sheet

Equipment	Model	Equipment No.	Last Calibration/Due Date
Sound Level Meter			/
Sound Pressure Calibrator			/

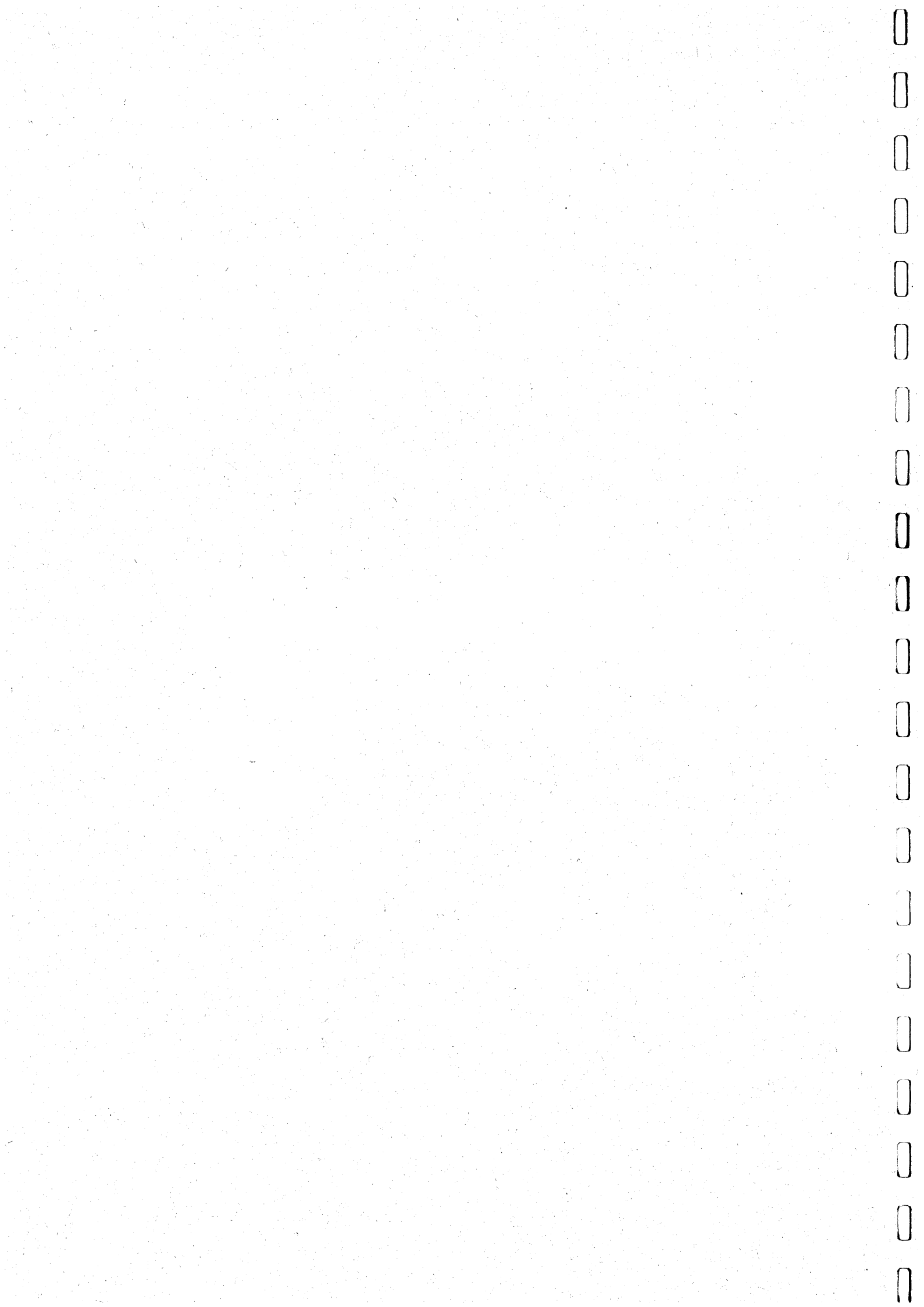
Noise Monitoring Period	Before Measurement			After Measurement		
	Noise Level (dB)	Freq. of Signal (KHz)	Display (dB)	Noise Level (dB)	Freq. of Signal (KHz)	Display (dB)
07:00 – 19:00						
19:00 – 23:00						
23:00 – 07:00						

Monitoring Location	NM1 / NM2 / NM3					
Description of Location	Sea Creat Villa (Peng Chau) / Crestmont Villa (Discovery Bay) / Luk Keng Tsuen					
Date of Monitoring						
Weather Condition	Sunny / Cloudy / Rainy					
Measurement Start Time (hh:mm)						
Measurement Time Length (min/hr)						
Measurement Results	L90 (dB(A))					
	L10 (dB(A))					
	Leq (dB(A))					
Major Construction Noise Source(s) During Measurement	Excavator / backhoe			Bulldozer		
	Dump truck / lorry			Roller		
	Others, pls specify					
Other Noise Source(s) During Measurement	Road traffic noise			Air traffic noise		
	Construction noise from other sites (e.g. piling) pls specify:					
	Village activities or animal noise (e.g. dog barking) pls specify:					
Remarks						

	Name	Signature	Date
Recorded By			
Checked By			

Project No. S06200

MEMCL





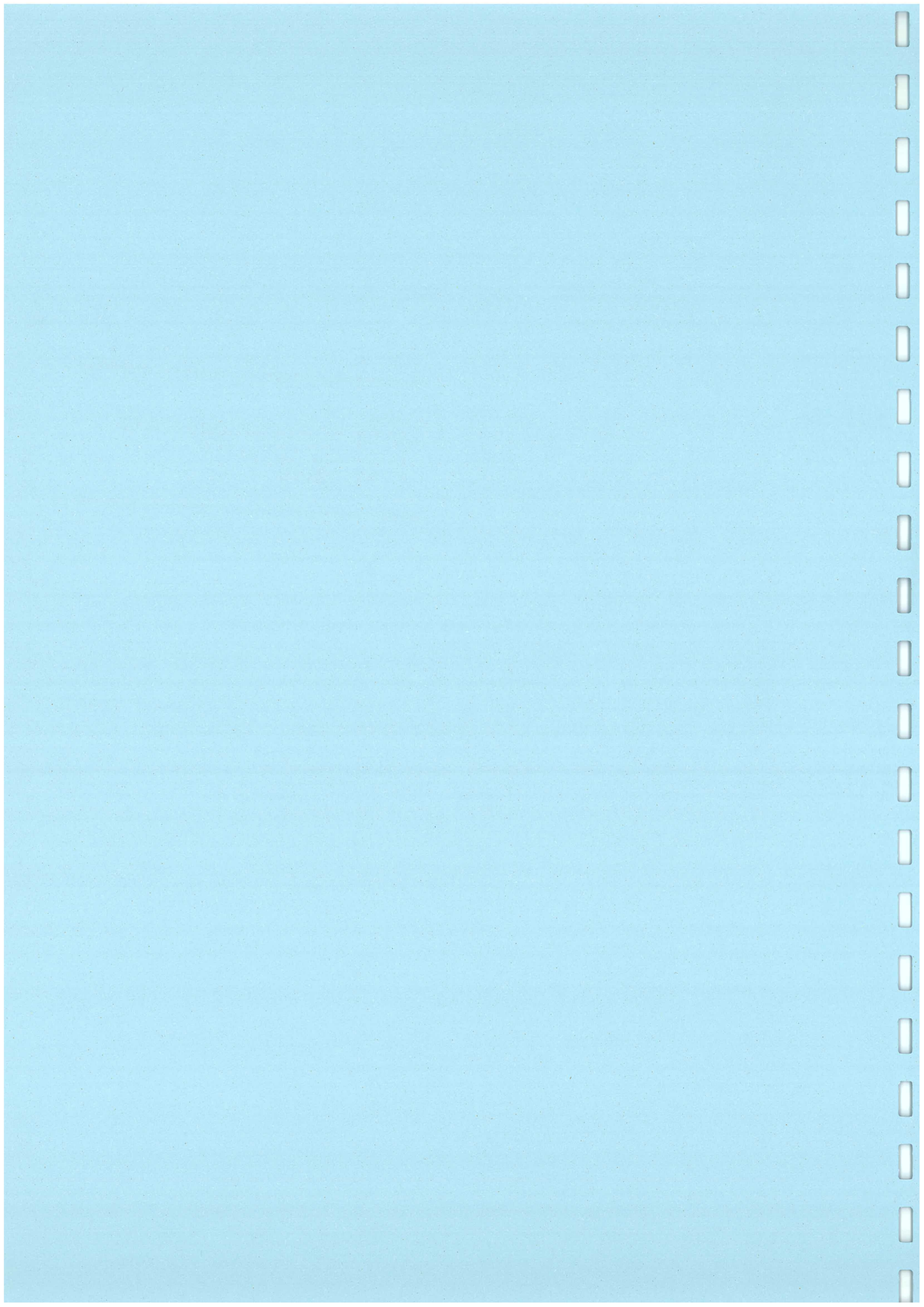
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ANNEX F  
SAMPLE DATA RECORD SHEET  
FOR WATER QUALITY  
MONITORING

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Penny's Bay Reclamation Stage I

Water Quality Monitoring  
Data Record Sheet

Date of Monitoring: \_\_\_\_\_ Tide Condition: Mid-Flood  
Weather: Sunny / Fine / Cloudy / Rainy Vessel No: \_\_\_\_\_ Sea Condition: Calm / Moderate / Rough

Equipment	Model	Equipment No.	Remarks
YSI 6820 Multi-Parameter	6820	<input type="checkbox"/> W026.01 <input type="checkbox"/> W026.05 <input type="checkbox"/> W026.02 <input type="checkbox"/> W026.06 <input type="checkbox"/> W026.03 <input type="checkbox"/> W026.07 <input type="checkbox"/> W026.04	
YSI 610-DM Handheld Display	610-DM	<input type="checkbox"/> W027.01 <input type="checkbox"/> W027.05 <input type="checkbox"/> W027.02 <input type="checkbox"/> W027.06 <input type="checkbox"/> W027.03 <input type="checkbox"/> W027.07 <input type="checkbox"/> W027.04	

Location	Login I.D.	Sampling Start Time	Water Depth (m)	Sampling Depth		Appearance of Water	Observations			Coordinate	Remark
				S	M		<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed			
CS3	W1SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°20.426 114°04.712 or		
	W1MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
	W1BF	B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
CS6	W2SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°21.782 114°04.556 or		
	W2MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
	W2BF	B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
SR6	W3SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°21.044 114°03.764 or		
	W3MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
	W3BF	B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
SR5	W4SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°21.145 114°03.366 or		
	W4MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
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	W5BF	B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
SR4	W6SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°20.876 114°03.366 or		
	W6MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
	W6BF	B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
G6	W7SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°20.979 114°02.593 or		
	W7MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
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G5	W8SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°20.383 114°01.878 or		
	W8MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
	W8BF	B		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
CS2	W9SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°21.045 114°00.367 or		
	W9MF	M		Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid							
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CS1	W9SF			S	1.0	Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid	<input type="checkbox"/> Dredging <input type="checkbox"/> Dumping <input type="checkbox"/> Reclamation <input type="checkbox"/> Dead fishes	<input type="checkbox"/> Plume <input type="checkbox"/> Scum <input type="checkbox"/> Rubbish <input type="checkbox"/> not observed	<input type="checkbox"/> 22°19.616 113°59.836 or		
	W9MF					Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					
	W9BF					Clear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Turbid					

Note: If water depth is 3m-6m, omit the mid-depth measurement. If water depth is less than 3m, only 1m below water surface is required.

Volume of sample collected for SS, TIN, Ammonia testing: 1.25L

Any dumping barge nearby? Y/N      If yes, mark location on map on reverse side and indicate whether working or not.

Name of barge: \_\_\_\_\_ (Please numbers and shows the number on the map).

Any visible discoloration of the water? Y/N      If yes, please mark on map with remarks on appearance.

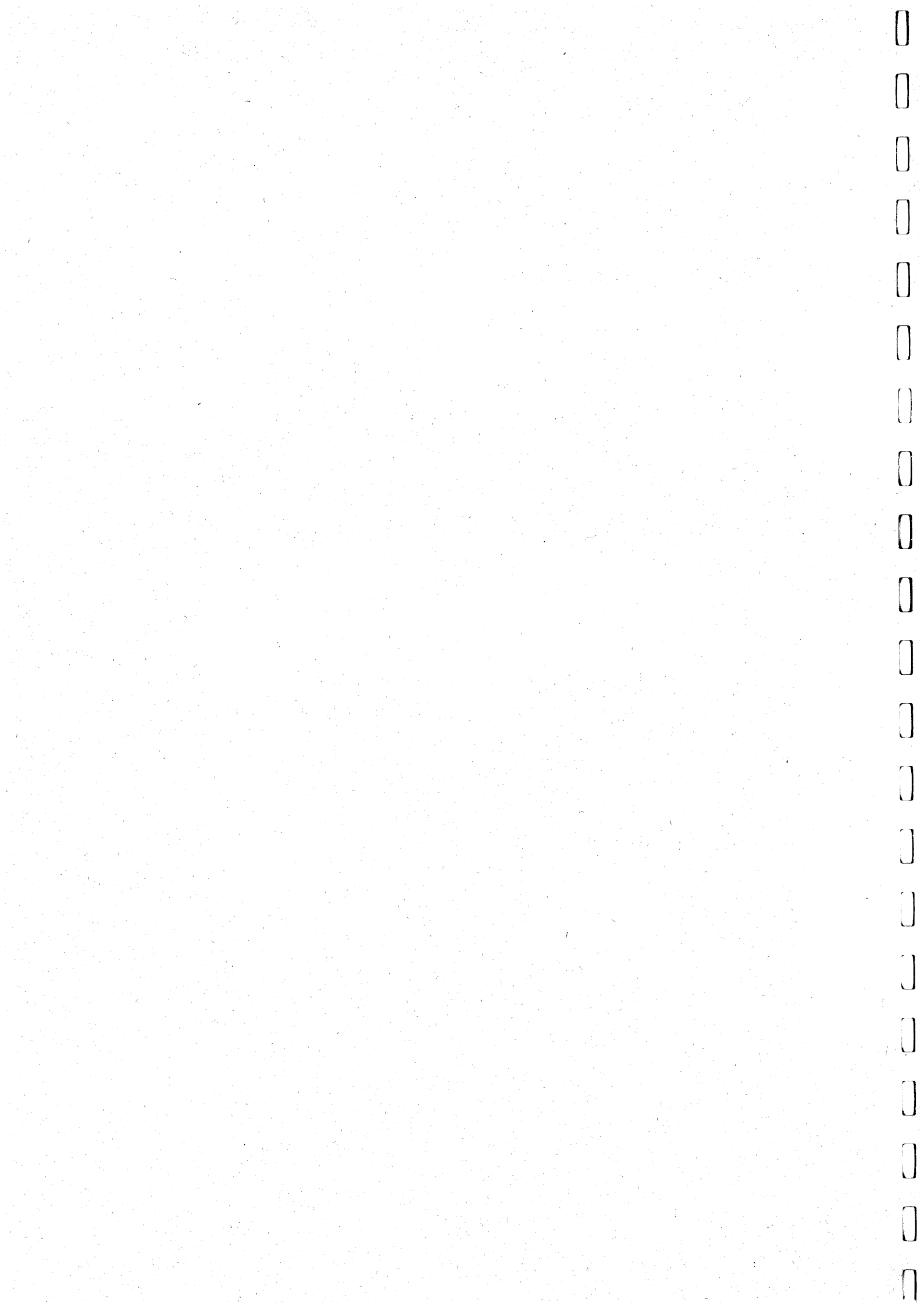
Any red tide? Y/N      If yes, please mark on map with remarks on appearance.

Remark: \_\_\_\_\_

Conducted by: \_\_\_\_\_      Checked by: \_\_\_\_\_

Date: \_\_\_\_\_      Date: \_\_\_\_\_

Project No. S06200



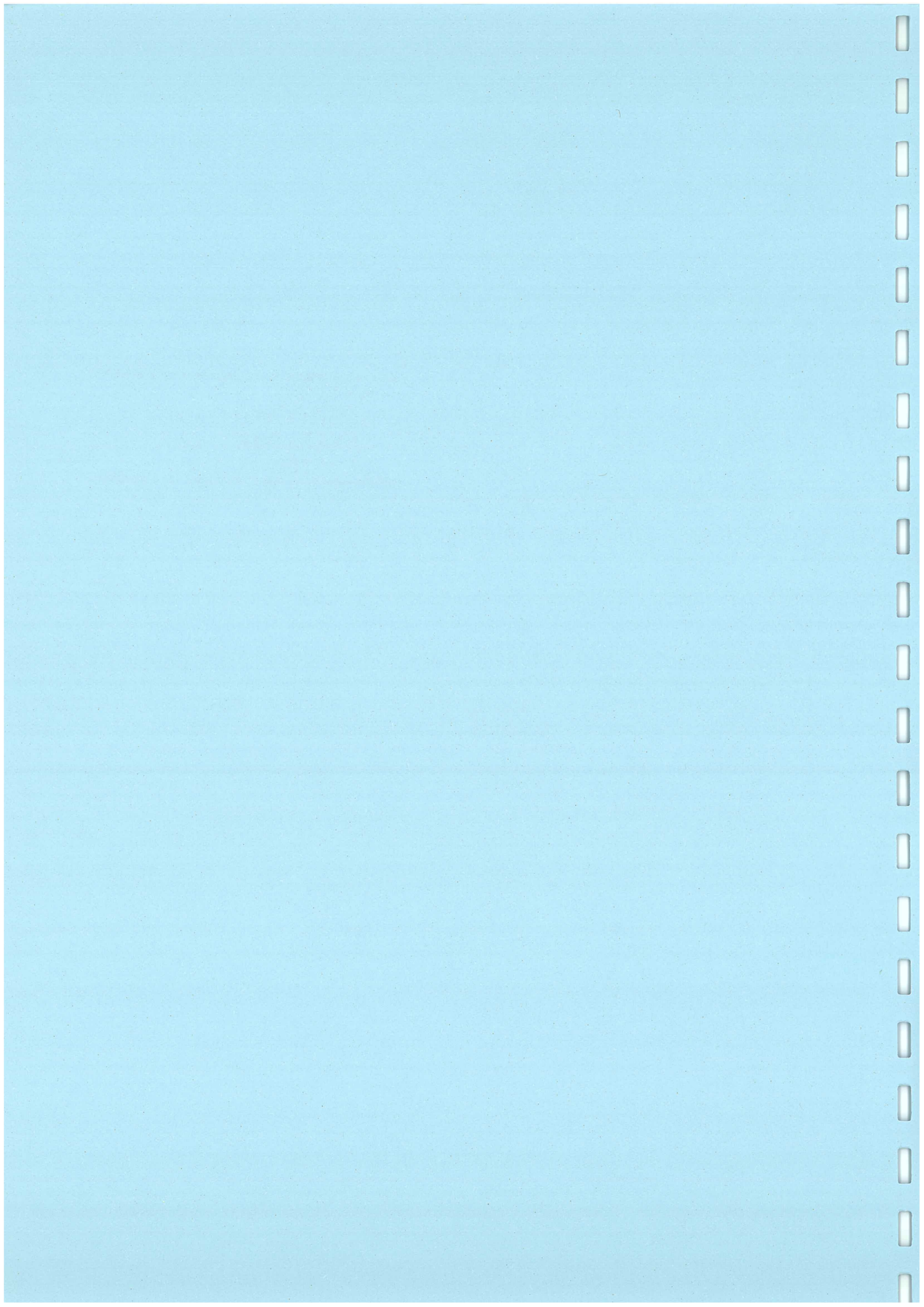
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ANNEX G  
ACTION AND LIMIT  
LEVELS FOR WATER  
QUALITY

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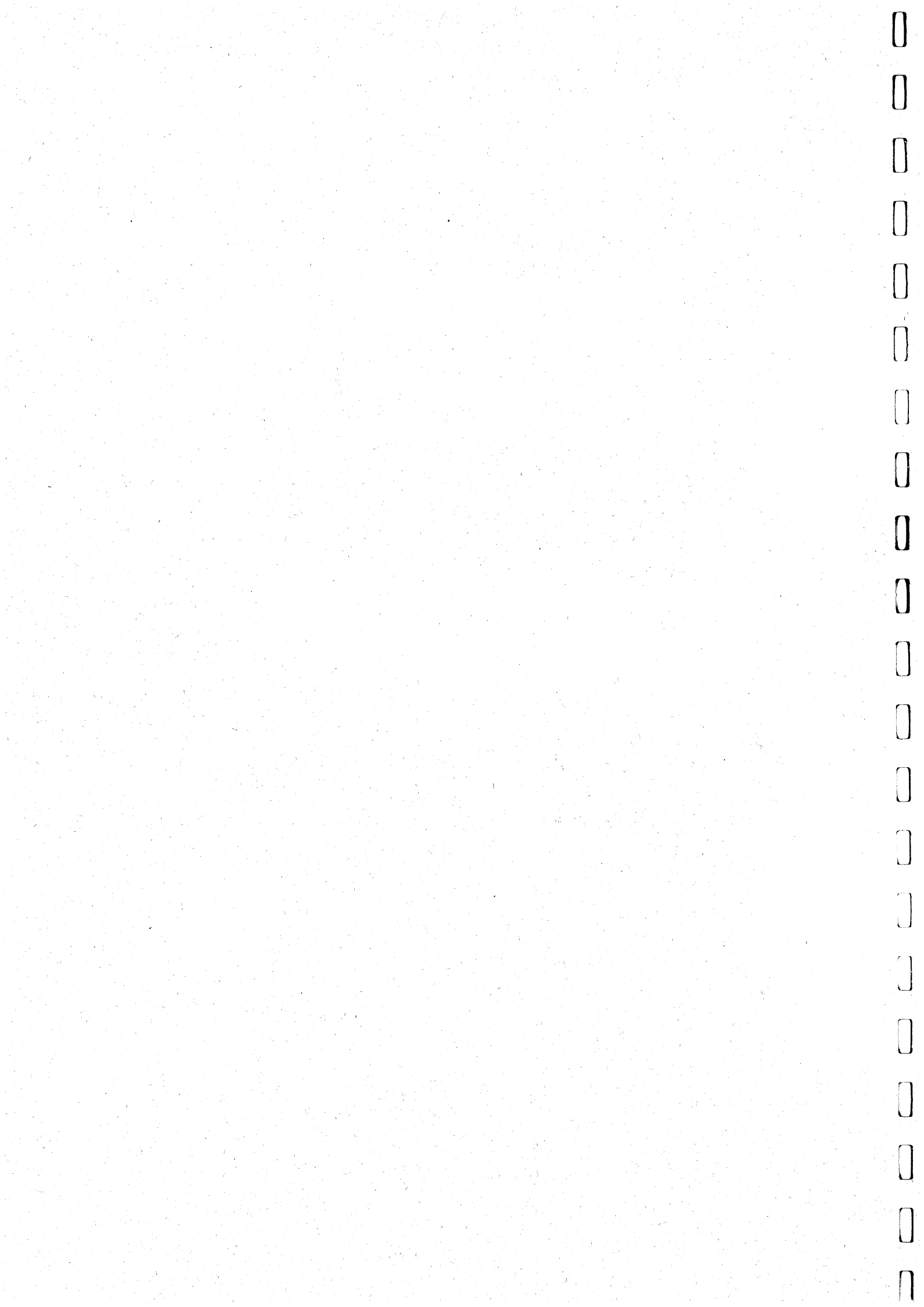


Action and Limit Levels for Water Quality Monitoring of Penny's Bay Reclamation

Parameter	Action level	Limit Level
DO, mg/l (surface and Middle)	3.6 mg/l	3.2 mg/l
DO, mg/l (bottom)	3.5 mg/l	2.0 mg/l
SS, mg/l (depth averaged)	19.0 mg/l and 120 % of upstream control station's SS at the same tide of the same day	39.0 mg/l and 130 % of upstream control station's SS at the same tide of the same day
Turbidity, NTU (depth averaged)	9.7 NTU and 120 % of upstream control station's turbidity at the same tide of the same day	13.3 NTU and 130 % of upstream control station's turbidity at the same tide of the same day

Notes:

- (i) "Depth averaged" is calculated by taking the arithmetic means of reading of all three depths
- (ii) For DO, non compliance of the water quality limits occurs when monitoring result is lower than the limits
- (iii) For SS, non compliance of the water quality limits occurs when monitoring result is higher than the limits
- (iv) All the figures given in the table are used for reference only and EPD may amend the figures whenever it is considered necessary
- (v) The following Action and Limit levels were amended by EPD [EPD's letter to CED ref no. (31) in Annex (3) to EP2/N9/O/65 V11]: Turbidity [Limit level only] and Suspended Solids [Action Level and Limit Level]



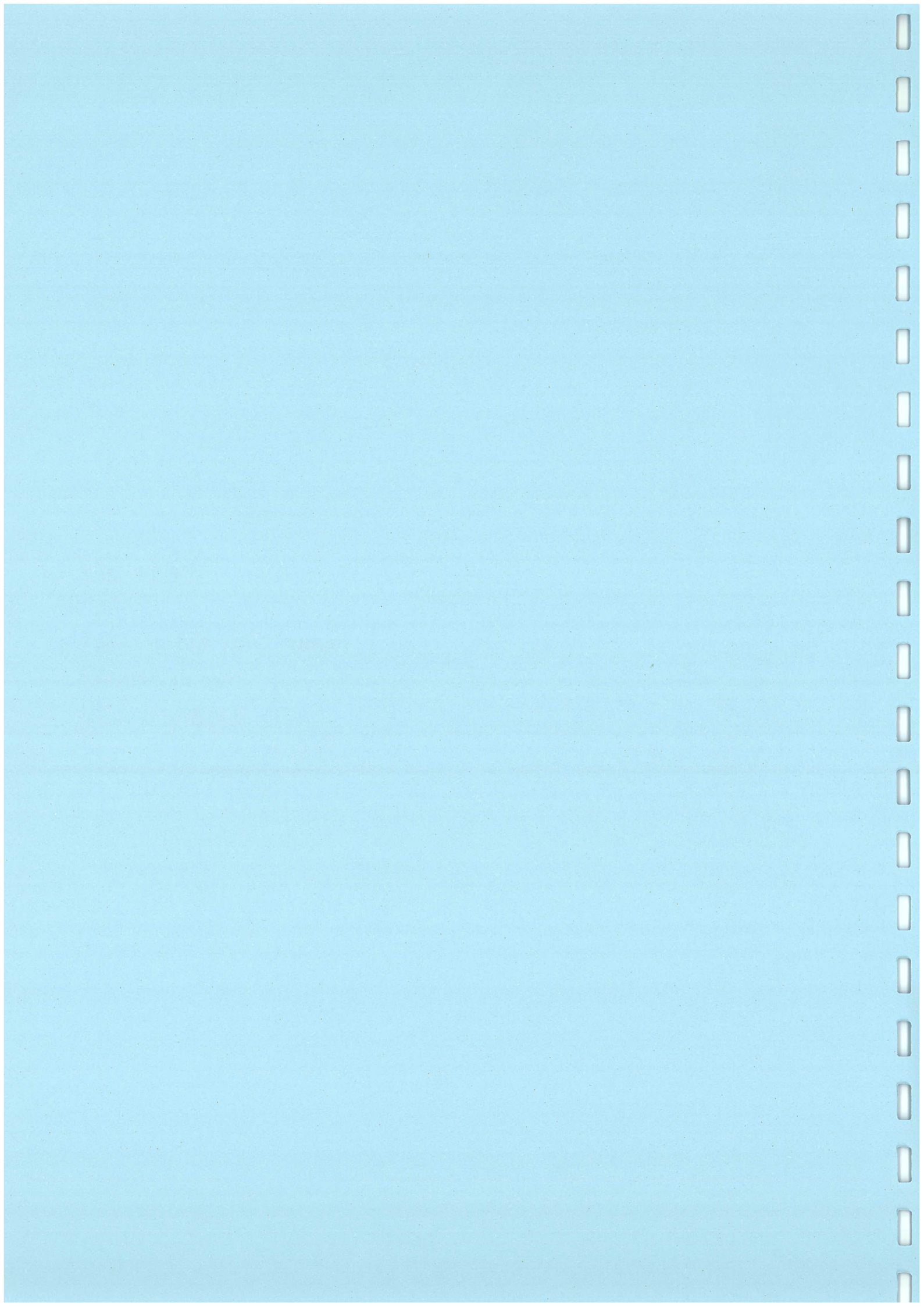


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**SECTION 3**

**Penny's Bay Reclamation  
Supplementary  
EM&A Manual**

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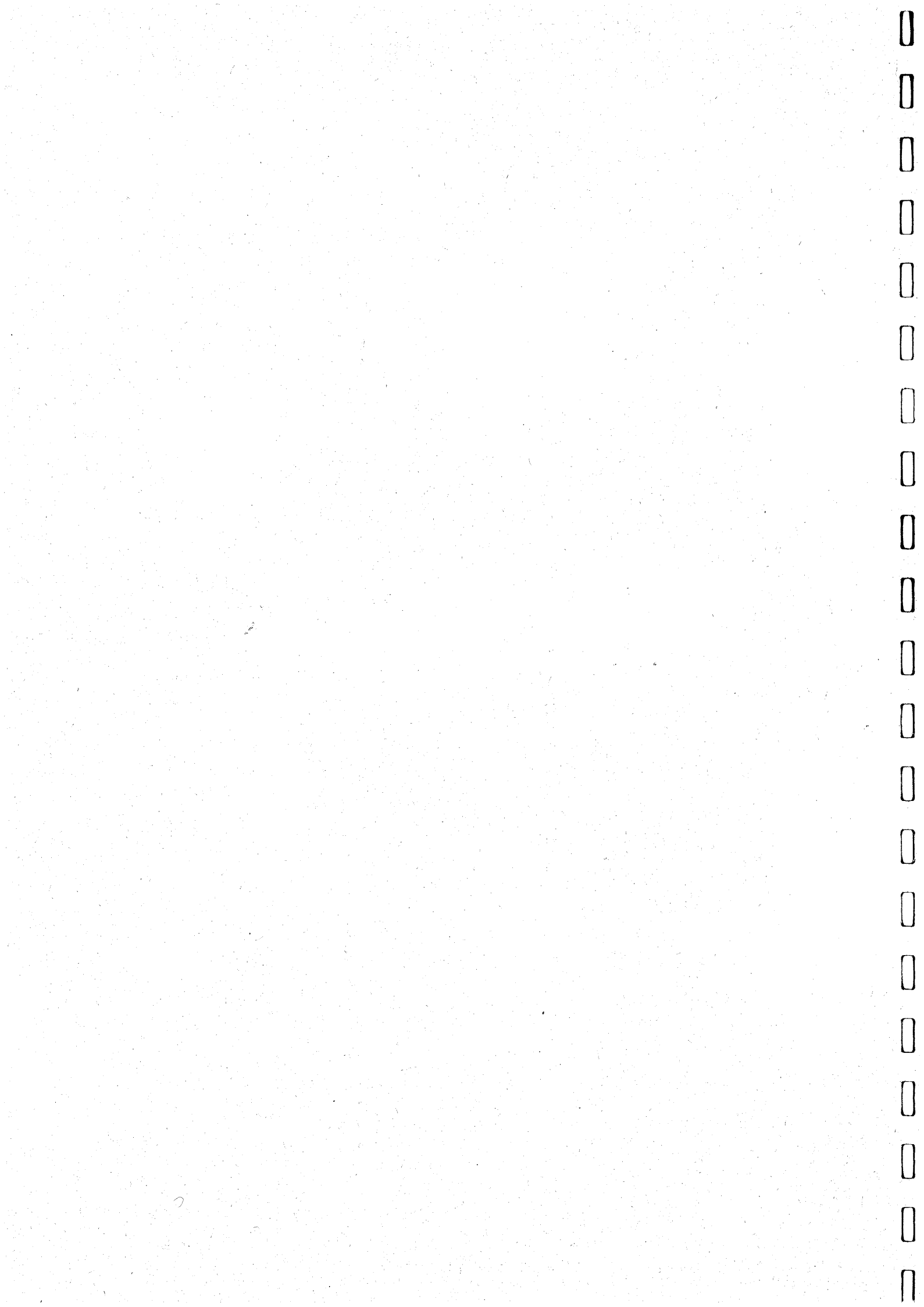
Penny's Bay Reclamation Stage 2:  
*Supplementary EM&A Manual*

September 2000

**Environmental Resources Management**

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9 Chatham Road, Tsimshatsui  
Kowloon, Hong Kong  
Telephone: 2271 3000  
Facsimile: 2723 5660



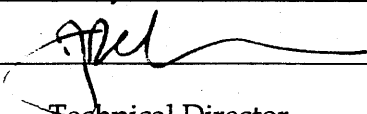


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Penny's Bay Reclamation Stage 2:  
*Supplementary EM&A Manual*

September 2000

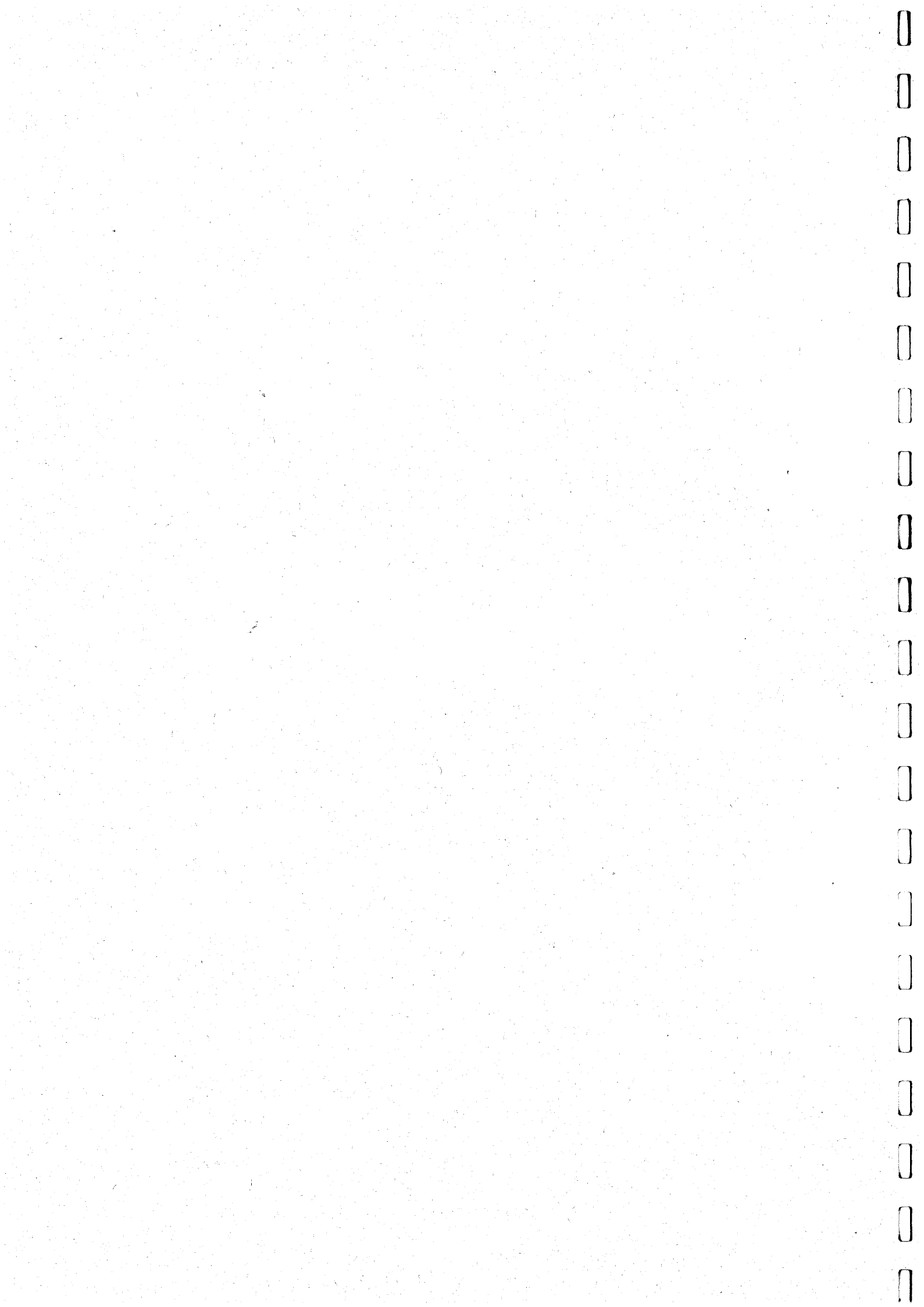
Reference C1819/132975

For and on behalf of Environmental Resources Management
Approved by: <u>Timothy J Peirson-Smith</u>
Signed: <u></u>
Position: <u>Technical Director</u>
Date: <u>15 September 2000</u>

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Scott Wilson (Hong Kong) Ltd

Penny's Bay Reclamation Stage 2:  
*Supplementary EM&A Manual*

September 2000

Reference C1819/132975

This document conforms to the information and recommendations contained within the EIA Report for the Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructure.

Certified by: Timothy J Peirson-Smith

Signed: 

Position: Environmental Team Leader

Date: 15 September 2000





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## 1 INTRODUCTION

### 1.1 INTRODUCTION

On 28 April 2000 Environmental Permit (EP) No. EP-054/2000 was issued to the Civil Engineering Department (CED) for the Designated Project (DP) related to the construction of approximately 280 ha of reclamation within Penny's Bay. The EP also covers the provision of infrastructure and associated works (including the construction of approximately 3.3 km of seawall, two ferry piers and approximately 1.5 km of open drainage channel). A variation to the EP was issued on the 8 July 2000, (VEP-018/2000/A/EP-054).

For reasons of programming and Project procurement, the proposed reclamation within Penny's Bay has been divided into two design and construction contracts. The first contract (relating to Penny's Bay Reclamation Stage 1 CV/99/12) commenced on 8 May 2000 and covers an area of about 200 ha. The second reclamation contract (Penny's Bay Reclamation Stage 2) will cover the residual area of about 80 ha.

Construction of the first contract will commence in late 2001, whereas the second reclamation contract is scheduled to commence construction in 2002.

The EP does not differentiate between the Stage 1 and Stage 2 reclamation works, therefore, each of the conditions in the EP is applicable to the works undertaken as part of the DP rather than different stages of the work. However, in practical terms, by virtue of timing, nature of work etc, some of the EP conditions are more applicable to either the Stage 1 or 2 reclamation works.

#### 1.1.1 *Requirement for an EM&A Programme and Manual*

An EM&A Manual covering nine Designated Projects, hereafter referred to as the Original EM&A Manual, was submitted as part of the Environmental Impact Assessment for the Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructure, hereafter referred to as the EIA Report. The Original EM&A Manual provided an outline of the proposed monitoring and auditing protocols and requirements which were recommended to achieve the objectives of the EM&A programme.

Clause 2.3 of the EP (VEP-018/2000/A/EP-054) requires that the Permit Holder submits to, and obtains approval from, the EPD for an EM&A Manual for the construction of the DP no later than 6 weeks after the commencement of the construction of the project.

In accordance with the above requirements, the Permit Holder required the Contractor for the Penny's Bay Reclamation Stage 1 works (HAM-HKC JV) to prepare an EM&A Manual. This document was prepared by the Contractor's Environmental Team.

However, the EM&A Manual that has been produced by the Penny's Bay Stage 1 reclamation Contractor only addresses the scope of works included within the Stage 1 reclamation works. Consequently, there are a number of items stipulated within the EP (VEP-018/2000/A/EP-054) for the whole Penny's Bay Reclamation which have not been adequately addressed since they relate to either the Stage 2 reclamation works or items of infrastructure and associated works which are not included within the Stage 1 reclamation contract.

### 1.1.2

#### *Purpose of this Manual*

The purpose of this Project Specific EM&A Manual, hereafter referred to as the Supplementary EM&A Manual, is to ensure that mechanisms and procedures are in place to ensure the full implementation of the EM&A programme and the conditions stated in the Penny's Bay Reclamation EP (VEP-018/2000/A/EP-054) that are relevant to the Stage 2 reclamation works and/or items of infrastructure or associated works which are covered by the EP but not included within the Stage 1 reclamation contract.

It is intended that this Supplementary EM&A Manual shall form an integral part of the EM&A Manual already submitted by the Penny's Bay Stage 1 reclamation Contractor. Consequently, the provision of the EM&A Manual produced on behalf of the Penny's Bay Stage 1 reclamation Contractor and this Supplementary EM&A Manual together will fulfil the requirement in the EP for the preparation of an EM&A Manual for the whole Penny's Bay Reclamation.

*Figure 1.1a* graphically presents the interrelationships between the Penny's Bay Reclamation EP, the Construction Contracts, the EM&A Manual produced on behalf of the Penny's Bay Stage 1 reclamation Contractor and the Supplementary EM&A Manual.

## 1.2

### **OBJECTIVES OF THE STAGE 2 RELATED EM&A PROGRAMME**

The main objectives of the EM&A programme are:

- to provide a database against which any short or long term environmental impacts of the Project can be determined;
- to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;
- to monitor the performance of the Project and the effectiveness of mitigation measures;

- to verify the environmental impacts predicted in the EIA Study;
- to determine Project compliance with regulatory requirements, standards and government policies;
- to take remedial action if unexpected problems or unacceptable impacts arise; and
- to provide data against which environmental audits may be undertaken.

### 1.3

#### *THE SCOPE OF THE ENVIRONMENTAL MONITORING AND AUDIT PROGRAMME*

The scope of the EM&A programme is to:

- establish baseline air, noise and water quality levels at specified locations and review these baseline levels every six months;
- implement impact monitoring and inspection programmes for air, noise, water quality, and marine and terrestrial ecology;
- implement inspection and audit requirements for waste management, landscape and visual, heritage and fisheries issues;
- liaise with, and provide environmental advice (as requested or when otherwise necessary) to construction site staff on the comprehension and consequences of the environmental monitoring data;
- identify and resolve environmental issues and other functions as they may arise from the works;
- check and quantify the Contractor's overall environmental performance, the implementation of Event and Action Plans (EAPs), and remedial actions taken to mitigate adverse environmental effects as they may arise from the works;
- conduct monthly reviews of monitored impact data as the basis for assessing compliance with the defined criteria and to ensure that necessary mitigation measures are identified and implemented, and to undertake additional *ad hoc* monitoring and auditing as required by special circumstances;
- evaluate and interpret all environmental monitoring data to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards, and to verify the environmental impacts predicted in the EIA Report;
- manage and liaise with other individuals or parties concerning other environmental issues deemed to be relevant to the construction process;
- conduct regular site inspections of a formal or informal nature to assess:
  - the level of the Contractors' general environmental awareness,
  - the Contractors' implementation of the conditions in the EP and the recommendations in the EIA Report;
  - the Contractors' performance as measured by the EM&A programme;
  - the need for specific mitigation measures to be implemented or the continued usage of those previously agreed; and
  - to advise the site staff of any identified potential environmental issues; and

- submit monthly EM&A reports which summarise project monitoring and auditing data, with full interpretation illustrating the acceptability or otherwise of any environmental impacts and identification or assessment of the implementation status of agreed mitigation measures.

#### 1.4

#### STRUCTURE OF THE EM&A MANUAL

Following this introductory Section, the remainder of the Supplementary EM&A Manual is set out as follows:

- *Section 2* outlines the various parties involved in the EM&A process, and presents the proposed structure of the organisations responsible for implementing the EM&A programme and their key responsibilities;
- *Section 3* sets out the EM&A general requirements;
- *Section 4* details the EM&A requirements for air quality;
- *Section 5* details the EM&A requirements for noise;
- *Section 6* details the EM&A requirements for water quality;
- *Section 7* outlines the audit procedures with regard to waste management issues;
- *Section 8* details the EM&A requirements for terrestrial ecology;
- *Section 9* details the EM&A requirements for marine ecology;
- *Section 10* details the EM&A requirements for fisheries issues;
- *Section 11* details the EM&A requirements culture and heritage issues;
- *Section 12* outlines the audit procedures for landscape and visual issues;
- *Section 13* discusses the EM&A requirements with regard to land contamination issues;
- *Section 14* outlines the site auditing requirements; and
- *Section 15* outlines the EM&A reporting requirements.

## 2 *PROJECT STRUCTURE AND ORGANISATION*

### 2.1 *INTRODUCTION*

This Section discusses the proposed structure and organisational arrangements that should be established to ensure the full and efficient implementation of the EM&A programme for Stage 2 of the Penny's Bay reclamation works.

The roles and objectives of the various parties involved in the programme are also defined.

### 2.2 *CUMULATIVE IMPACTS AND THE NEED FOR A CO-ORDINATED APPROACH TO EM&A*

The Stage 1 and 2 Penny's Bay reclamation works will have a period of 'overlap' when construction works associated with both of the contracts are undertaken concurrently. In addition, works associated with the other DPs considered within the EIA Report will also, at times, be undertaken concurrently with other construction works.

In situations where two or more construction contracts are being undertaken concurrently, within close proximity, there is the potential for cumulative impacts to occur. In the event of an exceedance of the agreed Action or Limit Levels there is also the potential for each Contractor to blame the other, and at times it could potentially be difficult to determine which party was responsible for an individual breach. There may also, potentially, be occasions on which each of the separate Contractors are working within their own acceptable environmental criteria, however the combined effect is causing an exceedance at a sensitive receivers position. In such situations, it is important to have an independent and impartial body which can adjudicate between the parties involved and assist in the swift determination of appropriate mitigation measures to rectify the situation. To work effectively this body needs to be suitably empowered and to receive support and recognition from the Project proponents, the Engineer and the Contractors.

The 'standard' approach to EM&A normally involves environmental monitoring being undertaken on an individual contract basis; normally by an Environmental Team employed by the Contractor. This approach is therefore focussed upon the impacts from individual Contractors, and there is no intentional consideration of the cumulative impacts which may result from other adjacent worksites. In addition, there is no incentive or requirement to implement a proactive approach to the consideration of possible future impacts that may result from the combined execution of construction works on each of the adjacent work sites, and consequently, there are no

mechanisms for implementing appropriate additional mitigation measures, or for re-scheduling of works activities, in order to prevent or mitigate cumulative impacts.

In order to overcome the above problems, and thereby implement a more proactive approach to EM&A, the Original EM&A Manual recommended implementing alternative mechanisms similar to those previously established for the West Kowloon Reclamation Project, and for the Kwai Chung/Tsing Yi Project. For these multi-contract Projects, the EPD established Environmental Project Offices (ENPO) to act as umbrella organisations providing a unified approach to the EM&A process and the determination of cumulative impacts. Where necessary, the ENPO was responsible for identifying the source of any impacts, and for recommending timely and appropriate mitigation measures.

### 2.3

#### *THE ENPO SYSTEM*

The Original EM&A Manual acknowledged that the execution of multiple contracts associated with the Project could give rise to cumulative impacts, and it also confirmed that the ENPO system provided an effective and proven mechanism for addressing and controlling such potential cumulative impacts.

However, it was also stated that, with the implementation of the recommended mitigation measures, the potential for impacts (and consequently cumulative impacts) was generally considered to be small. This was because relatively few sensitive receivers who may be affected by the works were identified during the preparation of the EIA, and, of those that were identified, most were situated at some distance from the works, reducing the potential for impacts.

Whilst the potential for cumulative impacts may be low, it was still considered that the ENPO system offered an effective approach to the implementation of the EM&A programme. Advantages that were highlighted included the avoidance of duplication of monitoring results that may occur as a result of each of the different Contractors undertaking monitoring at each of the monitoring locations. Additionally, the ENPO was also considered to be able to assess the monitoring data from a more 'global' perspective, and thereby provide more co-ordinated responses to any exceedances or complaints.

In accordance with the recommendations in the Original EM&A Manual, the EP (VEP-018/2000/A/EP-054) requires that an independent ENPO is formed 'on or before 1 December 2001 or within 2 months as directed by the Director in the event there is a need to control multiple contracts within Penny's Bay and the adjoining areas.' It should be noted that if there is no multiple contract working during the Stage 2 Penny's Bay reclamation works (or the works associated with the construction of other items of infrastructure which are covered by the EP) then the ENPO system will not be required, and an Environmental Team and an Independent Environmental Checker shall be



appointed to undertake the necessary duties (as outlined in the Stage 1 EM&A Manual) as required for the full and proper implementation of the EM&A programme as required by this Supplementary EM&A Manual and the EP.

## 2.4

### *ROLE AND OBJECTIVES OF THE ENPO*

The ENPO will only be operational during the construction phase. The ENPO shall be established, managed and funded by CED. The ENPO shall undertake all the environmental monitoring and audit requirements defined in this Supplementary EM&A Manual and shall interpret the environmental monitoring data and determine whether there are any breaches of the agreed environmental criteria. In such cases, the ENPO shall investigate these exceedances and, if appropriate, assist in the specification of remediation action. The ENPO shall have particular regard to the potential for cumulative impacts.

To be effective, the ENPO must be suitably empowered, and must have influence over each of the Contractors working on site. It is envisaged that this will require the establishment of contractual obligations for each of the Contractors to implement the recommendations of the ENPO.

The objectives of the ENPO are as follows:

- to control pollution and reduce adverse environmental impacts and nuisances arising from the works;
- to identify sources of pollution, impacts or nuisance particularly of a cumulative nature (from multiple sources), which arise as a result of the works;
- to propose timely, cost effective, and practical solutions to problems through liaison with the site engineers, contractors and government works agencies;
- to ensure the implementation of appropriate mitigation measures;
- to collect and maintain an up-to-date database of monitoring information from the project area;
- to audit the results by determining baseline pollution levels for the area and to set Action and Limit levels;
- to provide regular notification of existing or predicted problems via regular public consultation and liaison, and
- to assist the Government in investigating complaints arising as a result of construction activities on the Penny's Bay.

## 2.5

### *PROJECT ORGANISATION*

The roles and responsibilities of the various parties involved in the construction phase EM&A process are discussed within the following sections. The organisation and lines of communication with respect to environmental works are shown in *Figure 2.5a*.

## 2.5.1

*ENPO**Environmental Team*

Within the ENPO, an Environmental Team (ET) shall be appointed to undertake all the environmental monitoring requirements for each of the proposed construction contracts. An Environmental Team Leader (ETL) (who shall have at least 7 years experience in EM&A or environmental management) shall be appointed to plan and organise the implementation of the environmental monitoring programme, and to ensure that the EM&A programme is implemented in accordance with the approved EM&A Manual. In accordance with the requirements of the EP, the ETL shall also be responsible for certifying that deliverables required by the EP conform to the information and recommendations contained in the EIA Report.

The main objectives of the ET will be to:

- to monitor the various environmental parameters as required by this or subsequent revisions to the EM&A Manual; and
- to adhere to the agreed protocols or those in the Contract Specifications in the event of exceedances or complaints.

*Independent Environmental Checker*

Within the ENPO, an Independent Environmental Checker (IEC) shall be appointed to independently audit and interpret the monitoring data obtained by the ET. The IEC shall also be responsible for undertaking site audits/inspections to verify the overall environmental performance of the works, and for assessing the effectiveness of the ET in their duties. The main objectives of the IEC will be to:

- assess the EM&A data and review the success of the EM&A programme determining the adequacy of the mitigation measures implemented and the validity of the EIA predictions as well as identify any adverse environmental impacts before they arise;
- review and audit the environmental monitoring data obtained by the ET;
- verify and certify the environmental acceptability of permanent and temporary works, relevant design plans and submissions that are required by the EP;
- arrange and conduct regular site inspections and to investigate and inspect the Contractors' equipment and work methodologies with respect to pollution control and environmental mitigation, and to anticipate environmental issues that may require mitigation before the problem arises;
- report to the Engineer, the EPD and the Client regarding the environmental monitoring and audit results and, in particular, on compliance with the agreed environmental criteria, and on the general site

EPD

ENPO

ENGINEER  
FOR PENNY'S  
BAY STAGE 1  
RECLAMATION  
WORKS

CONTRACTOR  
FOR PENNY'S  
BAY STAGE 1  
RECLAMATION  
WORKS

ENGINEER  
FOR PENNY'S  
BAY STAGE 2  
RECLAMATION  
WORKS

CONTRACTOR  
FOR PENNY'S  
BAY STAGE 2  
RECLAMATION  
WORKS



CIVIL ENGINEERING  
DEPARTMENT  
土木工程

Scott Wilson (Hong Kong) Ltd  
in association with City Planning Consultants,  
ERM Hong Kong, Shukasa Co.,  
Wilbur Smith Associates



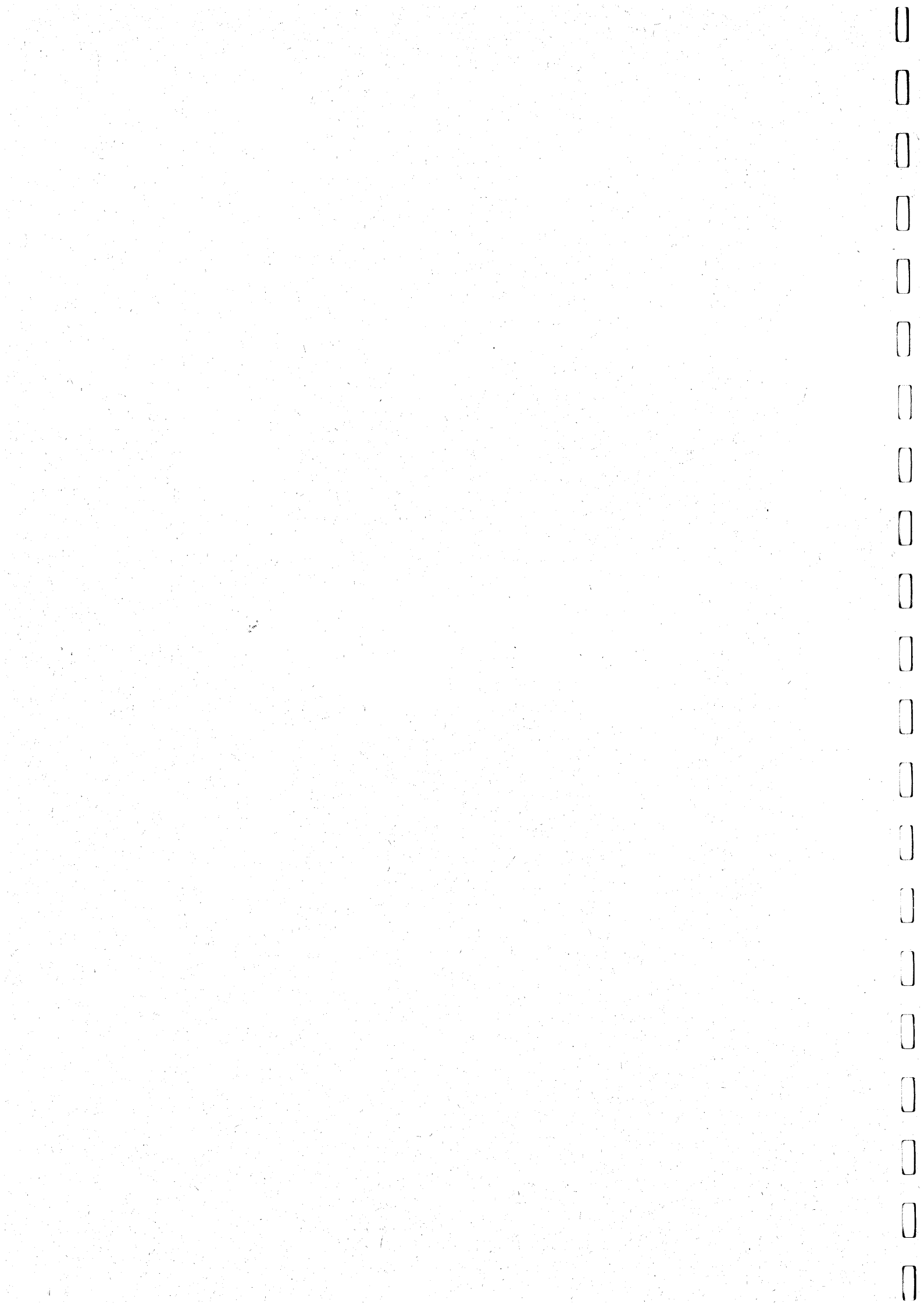
AGREEMENT NO. CE 60/96  
FOR THE  
RECLAMATION AND DEVELOPMENT  
FEASIBILITY STUDY

ORGANISATIONAL STRUCTURE & LINES OF COMMUNICATION



Figure 2.5a

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environmental conditions and the implementation of mitigation measures resulting from site inspections; and

- provide specialist advice to the Engineer and/or the Client on environmental matters.

Whilst the members of the ENPO Team must be suitably empowered in order to be effective in their role, it is not envisaged that they will have the power to give instructions directly to the Contractors. Any instructions to effect change or to stop the construction Works must be made through the Engineer.

### 2.5.2 *Contractors*

The duties and responsibilities of the Contractor shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

### 2.5.3 *Engineer or Engineer's Representative*

The duties and responsibilities of the Contractor shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

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### 3 *EM&A GENERAL REQUIREMENTS*

#### 3.1 *INTRODUCTION*

This Section provides an overview of the general requirements that will be applicable to the implementation of the EM&A programme for Stage 2 of the Penny's Bay reclamation works.

In accordance with the EP (VEP-018/2000/A/EP-054), any changes to the programme shall be justified by the as conforming to the requirements set out in the EM&A Manual and approved by the Director.

#### 3.2 *EM&A PROGRAMME*

The environmental issues, which were identified during the EIA process and are associated with the construction phase of the Project, will be addressed through the implementation of the EM&A programme, and more specifically, the monitoring and controls specified in this Supplementary EM&A Manual and in the construction contracts.

During the construction phase noise, dust, water, waste, terrestrial and marine ecology, archaeology and landscape and visual issues will be subject to EM&A, with environmental monitoring being undertaken for noise, dust, water and terrestrial and marine ecology.

The monitoring of the effectiveness of the mitigation measures will be achieved through the environmental monitoring programme as well as through site inspections. The inspections will include within their scope, mechanisms to review and assess the Contractors' environmental performance, ensuring that the recommended mitigation measures have been properly implemented, and that the timely resolution of received complaints are managed and controlled in a manner consistent with the recommendations of the EIA Report.

##### 3.2.1 *Environmental Monitoring*

The monitoring of environmental impacts during the construction phase shall be carried out by the ENPO; the monitoring work will comprise the quantitative assessment of noise, air and water quality impacts at representative sensitive receivers in the vicinity of the works, together with the assessment of terrestrial and marine ecology impacts.

##### 3.2.2 *Action and Limit Levels*

Action and Limit (A/L) Levels are defined levels of impact recorded by the environmental monitoring activities which represent levels at which a

prescribed response is required. These levels are quantitatively defined later in the relevant sections of this manual and described in principle below:

- *Action Limits*: beyond which there is a clear indication of a deteriorating ambient environment for which appropriate remedial actions are likely to be necessary to prevent environmental quality from falling outside the *Limit Levels*, which would be unacceptable; and
- *Limit Levels*: statutory and/or agreed contract limits stipulated in the relevant pollution control ordinances, HKPSG or *Environmental Quality Objectives* established by the EPD. If these are exceeded, works should not proceed without appropriate remedial action, including a critical review of plant and working methods.

### 3.2.3 *Event and Action Plans*

The purpose of the Event and Action Plans (EAPs) is to provide, in association with the monitoring and audit activities, procedures for ensuring that if any significant environmental incident (either accidental or through inadequate implementation of mitigation measures on the part of the Contractor) does occur, the cause will be quickly identified and remediated, and the risk of a similar event recurring is reduced. This also applies to the exceedances of A/L criteria identified in the EM&A programme.

### 3.2.4 *Site Inspections*

As a means of assessing the ongoing performance of the Contractors, the IEC shall undertake regular site inspections and audits of on-site practices and procedures. The primary objective of the inspection and audit programme will be to assess the effectiveness of the environmental controls established by the Contractors and the implementation of the environmental mitigation measures recommended in the EIA Report.

Whilst the audit and inspection programme will undoubtedly complement the monitoring activity with regard to the effectiveness of dust suppression, noise attenuation measures and water quality control, the criteria against which the audits shall be undertaken shall be derived from the clauses within the Contract Documents which seek to enforce the recommendations of the EIA Report and the established management systems.

The findings of site inspections and audits shall be made known to the Contractors at the time of the inspection to enable the rapid resolution of identified non-compliances. Non-compliances, and the corrective actions undertaken, shall also be reported in the monthly EM&A Reports.

Section 14 of this Supplementary EM&A Manual presents details of the scope and frequency of on-site inspections and defines the range of issues that the audit protocols should be designed to address.



### 3.2.5 *Enquiries, Complaints and Requests for Information*

Enquiries, complaints and requests for information can be expected from a wide range of individuals and organisations including members of the public, Government departments, the press and television media and community groups.

All enquiries concerning the environmental effects of the construction works, irrespective of how they are received, shall be reported to the Engineer and directed to the ENPO which shall set up procedures for the handling, investigation and storage of such information. The following steps shall then be followed:

- 1) The IEC shall ensure that the Engineer is notified of the nature of the enquiry.
- 2) An investigation shall be initiated to determine the validity of the complaint and to identify the source of the problem.
- 3) The following steps, as necessary:
  - the IEC shall investigate and identify the source of the problem;
  - if considered necessary by the IEC following consultation with the Engineer, the ETL shall undertake additional monitoring to verify the existence and severity of the alleged complaint;
  - the IEC shall liaise with the Contractor to identify remedial measures;
  - the Contractor implement the agreed mitigation measures;
  - the ETL shall repeat the monitoring to verify the effectiveness of the mitigation measures; and
  - if the repeat monitoring results continue to substantiate the complaint, the IEC, the Engineer and the Contractor shall repeat their review of the procedures to identify further possible areas of improvement.
- 4) The outcome of the investigation and the action taken shall be documented by the IEC on a complaint proforma. A formal response to each complaint received shall be prepared, by the IEC, within a maximum of five working days and submitted to the Engineer in order to notify the concerned person(s) that action has been taken.
- 5) All enquiries which trigger this process shall be reported in the monthly reports which shall include results of inspections undertaken by the IEC, and details of the measures taken, and additional monitoring results (if deemed necessary). It should be noted that the receipt of complaints or enquiries will not, in itself, be sufficient reason to introduce additional mitigation measures.

In all cases the complainant shall be notified of the findings, and audit procedures shall be put in place to ensure that the problem does not recur.

**3.2.6**      ***Reporting***

Monthly, quarterly, and a final report shall be prepared by the ETL and approved by the IEC. Otherwise, the reporting requirements shall be as detailed in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

**3.2.7**      ***Cessation of EM&A***

The ETL and the IEC shall continue to carry out environmental monitoring and site inspections until throughout the full duration of the construction works. The EM&A programme, or any part of it, shall only cease after approval is gained from the Director of the Environmental Protection Department.

## 4 AIR QUALITY MONITORING

### 4.1 INTRODUCTION

This Section presents the air quality related EM&A requirements for the Stage 2 Penny's Bay reclamation works.

### 4.2 CONSTRUCTION DUST MONITORING

#### 4.2.1 Methodology and Criteria

The sampling methodology, assessment criteria, monitoring equipment and locations, and the requirements for laboratory measurement/analysis shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 4.2.2 Baseline Monitoring

Baseline monitoring shall have already been undertaken by others (at the designated monitoring locations) prior to the commencement of the Stage 1 and 2 construction works in order to determine the ambient 24-hour TSP and 1-hour levels.

The baseline monitoring data shall be used for the determination of the appropriate Action Levels with the Limit Levels set against statutory or otherwise agreed limits.

#### 4.2.3 Impact Monitoring

The ETL shall undertake the impact monitoring. The impact monitoring requirements shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 4.2.4 Compliance Assessment

Compliance assessment shall be determined in accordance with the criteria defined in the section of this EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 4.2.5 Event and Action Plan (EAP)

The ETL shall compare the impact monitoring results with the air quality criteria established for 24-hour TSP and 1-hour TSP. In cases where exceedance of these criteria occurs, the ETL, the IEC, the Engineer and the

Contractor shall strictly observe the relevant actions of the EAP shown in *Table 4.2a* below.

#### 4.3

#### *MITIGATION MEASURES*

The EIA Report recommended mitigation measures that should be implemented during the construction of the Project. Details of all the recommended mitigation measures that are applicable to the Stage 2 reclamation works, or items of infrastructure and associated works which are covered by the EP but not included within the Stage 1 reclamation contract, are included within the Implementation Schedule (in *Annex A* of this Supplementary EM&A Manual).

Table 4.2a Air Quality Event and Action Plan for Penny's Bay Stage 2 Reclamation Works

EVENT Action Level	ENPO		Contractor
	ETL	IEC	
1. Exceedance for one sample	2. Repeat measurement to confirm findings.	1. Identify the source(s) of impact.	1. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification.
	4. Increase monitoring frequency to daily to assess efficacy of remedial measures.	3. Confirm receipt of notification of exceedance and notify the Engineer and Contractor in writing.	2. Amend proposals if required by the Engineer or the IEC.
		5. Check monitoring data trends and Contractors' working methods.	3. Implement the remedial actions immediately upon instruction from the Engineer.
2. Exceedance for two or more consecutive samples	2. Repeat measurement to confirm findings.	1. Identify the source(s) of impact.	1. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification.
	4. Increase monitoring frequency to daily to assess efficacy of remedial measures.	3. Confirm receipt of notification of exceedance and notify the Engineer and Contractor in writing.	2. Amend proposals if required by the Engineer or the IEC.
	10. If exceedance stops after the implementation of the mitigation measures, cease additional monitoring.	5. Check monitoring data trends and Contractors' working methods.	3. Implement the remedial actions immediately upon instruction from the Engineer.
		6. Discuss remedial actions required with the Engineer and the Contractor.	4. Liaise with the Engineer to optimise the effectiveness of the agreed mitigation.
		7. Ensure agreed mitigation measures are fully implemented.	
		8. Assess the efficacy of remedial actions and keep the Contractor informed.	
		9. If exceedance continues, arrange meeting with Engineer to review implementation and identify further appropriate mitigation measures	

Table 4.2a Air Quality Event and Action Plan for Penny's Bay Stage 2 Reclamation Works (Continued)

Limit Level	3. Repeat measurement to confirm findings.	1. Identify the source(s) of impact.	1. Remind the Contractor of his contractual obligations and discuss remedial actions to be implemented.	1. Take immediate action to avoid further exceedance.
4. Increase monitoring frequency to assess efficacy of remedial measures.	2. Confirm receipt of notification of exceedance and notify the Engineer, Contractor and EPD in writing.	2. Discuss remedial actions required with the IEC and the Contractor.	2. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification.	
3. Repeat measurement to confirm findings.	5. Check monitoring data trends and Contractors' working methods.	3. Ensure agreed mitigation measures are fully implemented.	3. Amend proposals if required by the Engineer or the IEC.	
4. Increase monitoring frequency to assess efficacy of remedial measures.	6. Discuss remedial actions required with EPD, the Engineer and the Contractor.	4. Implement remedial actions immediately upon instruction from the Engineer.	4. Implement remedial actions immediately upon instruction from the Engineer.	
10. If exceedance stops after the implementation of the mitigation measures, cease additional monitoring.	7. Ensure agreed mitigation measures are fully implemented.	5. Ensure agreed mitigation measures are fully implemented.	5. Liaise with the Engineer to optimise the effectiveness of the agreed mitigation.	
3. Repeat measurement to confirm findings.	8. Assess the efficacy of remedial actions and keep EPD, Engineer and Contractor informed.	8. Assess the efficacy of remedial actions and keep EPD, Engineer and Contractor informed.		
2. Exceedance for two or more consecutive samples	3. Repeat measurement to confirm findings.	1. Identify the source(s) of impact.	1. Remind the Contractor of his contractual obligations and discuss remedial actions to be implemented.	1. Take immediate action to avoid further exceedance.
4. Increase monitoring frequency to assess efficacy of remedial measures.	2. Confirm receipt of notification of exceedance and notify the Engineer, Contractor and EPD in writing.	2. Discuss remedial actions required with the IEC and the Contractor.	2. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification.	
10. If exceedance stops after the implementation of the mitigation measures, cease additional monitoring.	5. Check monitoring data trends and Contractors' working methods.	3. Ensure agreed mitigation measures are fully implemented.	3. Amend proposals if required by the Engineer or the IEC.	
6. Discuss remedial actions required with EPD, the Engineer and the Contractor.	6. Discuss remedial actions required with EPD, the Engineer and the Contractor.	6. Discuss remedial actions required with the IEC and the Contractor.	4. Implement remedial actions immediately upon instruction from the Engineer.	
7. Ensure agreed mitigation measures are fully implemented.	7. Ensure agreed mitigation measures are fully implemented.	7. Ensure agreed mitigation measures are fully implemented.	5. Resubmit proposal to IEC and Engineer if the problem is still not under control.	
8. Assess the efficacy of remedial actions and keep EPD, Engineer and Contractor informed	8. Assess the efficacy of remedial actions and keep EPD, Engineer and Contractor informed	8. Assess the efficacy of remedial actions and keep EPD, Engineer and Contractor informed	6. Stop the relevant portion of works as determined by the IEC and Engineer, until the exceedance is abated.	
9. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	9. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.			

## 5 NOISE MONITORING

### 5.1 INTRODUCTION

In this Section, the noise related EM&A requirements for the Stage 2 Penny's Bay reclamation works are presented.

### 5.2 CONSTRUCTION PHASE EM&A

The sampling methodology, assessment criteria, monitoring equipment and monitoring locations shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 5.2.1 *Baseline Monitoring*

Baseline monitoring shall have already been undertaken by others (at the designated monitoring locations) prior to the commencement of the Stage 1 and 2 construction works, and submitted to the Engineer and the EPD for their agreement.

Checking for changes in the baseline noise levels throughout the construction of Project shall be carried out by taking "sample" noise measurements every six months, when no noisy construction activities are in progress. If significant changes that can be validated are observed to have arisen, the baseline may be adjusted accordingly after consultation and agreement with the Engineer, the IEC and the EPD.

#### 5.2.2 *Impact Monitoring*

The ETL shall undertake the impact monitoring. The impact monitoring requirements shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 5.2.3 *Compliance Assessment*

Compliance assessment shall be determined in accordance with the criteria defined in the section of this EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 5.2.4 *Event and Action Plan (EAP)*

The ETL shall compare the impact monitoring results with the agreed compliance criteria. In cases where exceedance of these criteria occurs, the ETL, the IEC, the Engineer and the Contractor shall strictly observe the relevant actions of the EAP shown in *Table 5.2a*.

Table 5.2a Noise Event and Action Plan for Penny's Bay Stage 2 Reclamation Works

EVENT Action Level	ETL	ENPO		Engineer	Contractor
		IEC			
1. Exceedance for one sample	2. Repeat measurement to confirm findings.	1. Identify the source(s) of impact.	3. Confirm receipt of notification of exceedance and notify the Engineer and Contractor in writing.	1. Remind the Contractor of his contractual obligations and discuss remedial actions to be implemented.	1. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification. 2. Amend proposals if required by the Engineer or the IEC. 3. Implement the remedial actions immediately upon instruction from the Engineer.
4. Increase monitoring frequency to daily to assess efficacy of remedial measures.	3. Confirm receipt of notification of exceedance and notify the Engineer and Contractor in writing.	5. Check monitoring data trends and Contractors' working methods.			
2. Exceedance for two or more consecutive samples	2. Repeat measurement to confirm findings. 4. Increase monitoring frequency to daily to assess efficacy of remedial measures. 10. If exceedance stops after the implementation of the mitigation measures, cease additional monitoring.	1. Identify the source(s) of impact.	3. Confirm receipt of notification of exceedance and notify the Engineer and Contractor in writing.	1. Remind the Contractor of his contractual obligations and discuss remedial actions to be implemented. 2. Discuss remedial actions required with the IEC and the Contractor. 3. Ensure agreed mitigation measures are fully implemented.	1. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification. 2. Amend proposals if required by the Engineer or the IEC. 3. Implement the remedial actions immediately upon instruction from the Engineer.
		6. Discuss remedial actions required with the Engineer and the Contractor. 7. Ensure agreed mitigation measures are fully implemented. 8. Assess the efficacy of remedial actions and keep the Contractor informed. 9. If exceedance continues, arrange meeting with Engineer to review implementation and identify further appropriate mitigation measures			4. Liaise with the Engineer to optimise the effectiveness of the agreed mitigation.



**Table 5.2a Noise Event and Action Plan for Penny's Bay Stage 2 Reclamation Works (Continued)**

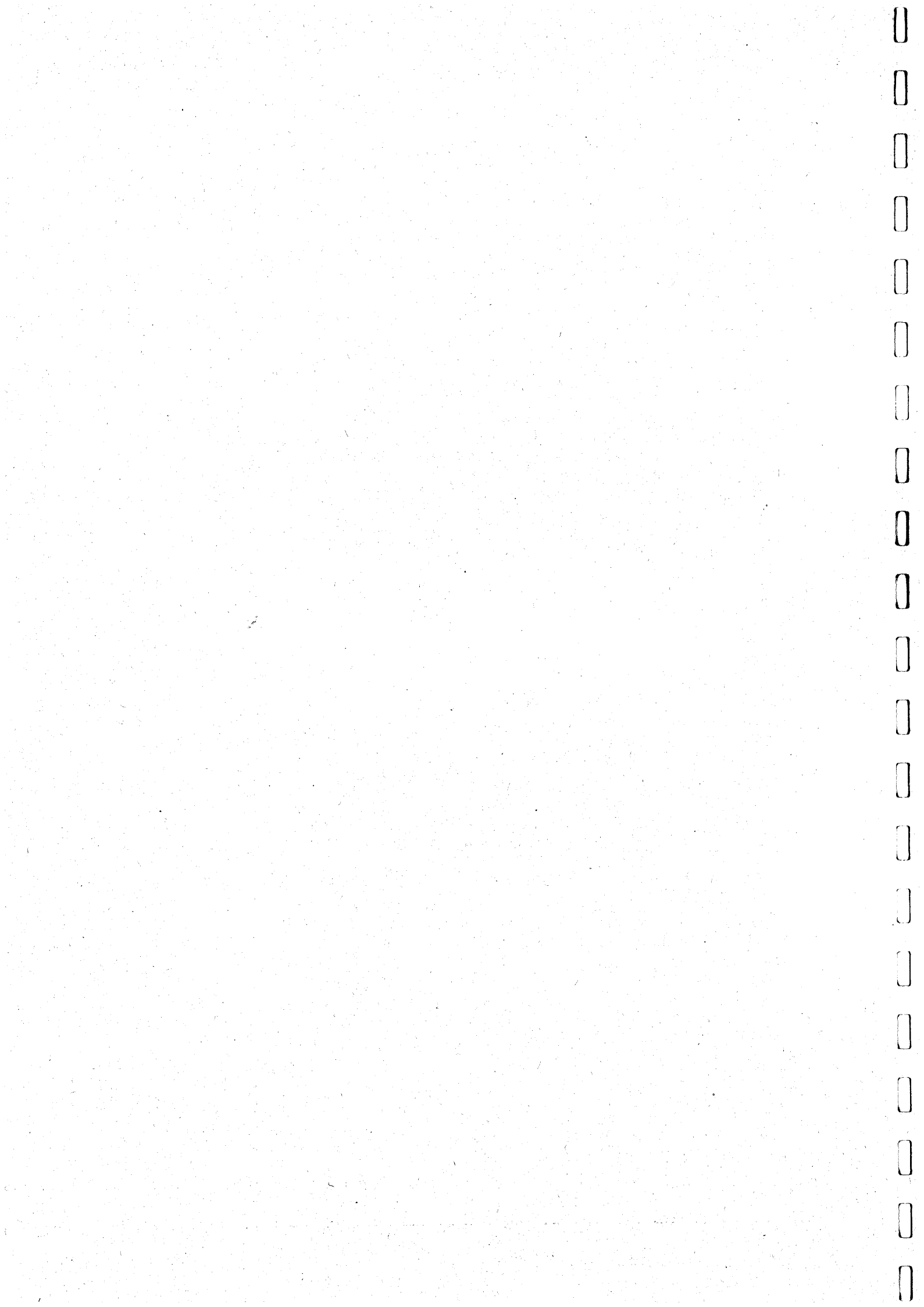
EVENT Limit Level	ENPO		Contractor
	ETL	IEC	
3. Repeat measurement to confirm findings.	4. Increase monitoring frequency to assess efficacy of remedial measures.	1. Identify the source(s) of impact.	1. Take immediate action to avoid further exceedance.
		2. Confirm receipt of notification of exceedance and notify the Engineer, Contractor and EPD in writing.	2. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification.
2. Exceedance for two or more consecutive samples	3. Repeat measurement to confirm findings.	3. Check monitoring data trends and Contractors' working methods.	3. Amend proposals if required by the Engineer or the IEC.
		4. Discuss remedial actions required with EPD, the Engineer and the Contractor.	4. Implement remedial actions immediately upon instruction from the Engineer.
4. Increase monitoring frequency to assess efficacy of remedial measures.	10. If exceedance stops after the implementation of the mitigation measures, cease additional monitoring.	5. Ensure agreed mitigation measures are fully implemented.	5. Liaise with the Engineer to optimise the effectiveness of the agreed mitigation.
		6. Assess the efficacy of remedial actions and keep EPD, Engineer and Contractor informed.	
3. Repeat measurement to confirm findings.	4. Increase monitoring frequency to assess efficacy of remedial measures.	1. Identify the source(s) of impact.	1. Take immediate action to avoid further exceedance.
		2. Confirm receipt of notification of exceedance and notify the Engineer, Contractor and EPD in writing.	2. In consultation with the IEC and the Engineer, submit proposals for remedial actions to Engineer within three working days of notification.
10. If exceedance stops after the implementation of the mitigation measures, cease additional monitoring.	3. Repeat measurement to confirm findings.	3. Check monitoring data trends and Contractors' working methods.	3. Amend proposals if required by the Engineer or the IEC.
		4. Discuss remedial actions required with EPD, the Engineer and the Contractor.	4. Implement remedial actions immediately upon instruction from the Engineer.
3. Repeat measurement to confirm findings.	4. Increase monitoring frequency to assess efficacy of remedial measures.	5. Ensure agreed mitigation measures are fully implemented.	5. Resubmit proposal to IEC and Engineer if the problem is still not under control.
		6. Assess the efficacy of remedial actions and keep EPD, Engineer and Contractor informed.	6. Stop the relevant portion of works as determined by the IEC and Engineer, until the exceedance is abated.

EVENT	ETL	ENPO	IEC	Engineer	Contractor
Limit Level					
9. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.					

## 5.3

*MITIGATION MEASURES*

The EIA Report recommended mitigation measures that should be implemented during the construction of the Project. Details of all the recommended mitigation measures that are applicable to the Stage 2 reclamation works, or items of infrastructure and associated works which are covered by the EP but not included within the Stage 1 reclamation contract, are included within the Implementation Schedule (in *Annex A* of this Supplementary EM&A Manual).



## 6 WATER QUALITY MONITORING

### 6.1 INTRODUCTION

In this Section, the water quality related EM&A requirements for the Stage 2 Penny's Bay reclamation works are presented.

### 6.2 MARINE WATER QUALITY MONITORING

The sampling methodology, assessment criteria, monitoring equipment and locations, and the testing protocols and requirements for laboratory analysis shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 6.2.1 *Baseline Monitoring*

Baseline monitoring shall have already been undertaken by others (at the designated monitoring locations) prior to the commencement of the Stage 1 and 2 construction works, and submitted to the Engineer and the EPD for their agreement.

#### 6.2.2 *Impact Monitoring*

The ETL shall undertake the impact monitoring. The impact monitoring requirements shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

Upon completion of all marine activities, a post Project monitoring water quality exercise shall be carried out for four weeks, in the same manner as the monitoring during construction.

#### 6.2.3 *Compliance Assessment*

Compliance assessment shall be determined in accordance with the criteria defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

### 6.3 EVENT AND ACTION PLAN

Should the monitoring results of the water quality parameters at any designated monitoring stations indicate that the water quality criteria have been exceeded, the actions in accordance with the Event and Action Plan in *Table 6.3a* shall be carried out.

Table 6.3a Water Quality Event and Action Plan for Penny's Bay Stage 2 Reclamation Works

EVENT Action Level	ETL	ENPO	IEC	Engineer	Contractor
1. Exceedance for one sample	2. Repeat in-situ measurement to confirm findings; 6. Repeat measurement on next day of exceedance.	1. Identify the source(s) of impact. 3. Inform Engineer and EPD and confirm notification of the non-compliance in writing; 4. Check monitoring data, all plant, equipment and Contractors' working methods; 5. Discuss mitigation measures with Engineer and Contractor; 7. Assess the effectiveness of the implemented mitigation measures.		1. Discuss proposed mitigation measures with IEC and Contractor; 2. Make agreement on the mitigation measures to be implemented; 3. Ensure mitigation measures are implemented.	1. Rectify unacceptable practice; Check all plant and equipment. 2. Consider changes of working methods; 3. Propose and discuss mitigation measures with Engineer and IEC; 4. Implement the agreed mitigation measures.
Action level exceeded on more than two consecutive sampling days	1. Repeat in-situ measurements to confirm findings; 7. Following the implementation of the mitigation measures increase the monitoring frequency to daily; 9. Repeat measurement on next day of exceedance.	1. Repeat source(s) of impact; 3. Inform Engineer and EPD and confirm notification of the non-compliance in writing; 4. Check monitoring data, all plant, equipment and Contractors' working methods; 5. Discuss mitigation measure with Engineer and Contractor; 6. Ensure mitigation measures are implemented; 8. Assess the effectiveness of the implemented mitigation measures.		1. Discuss proposed mitigation measures with IEC and Contractor; 2. Make agreement on the mitigation measures to be implemented; 3. Ensure mitigation measures are implemented.	1. Rectify unacceptable practice; Check all plant and equipment; 2. Consider changes of working methods; 3. In consultation with the IEC and the Engineer, propose and agree mitigation measures within 3 working days; 4. Implement the agreed mitigation measures.

Table 6.3a Water Quality Event and Action Plan for Penny's Bay Stage 2 Reclamation Works (Continued)

EVENT	ETL	ENPO			Contractor
		IEC	Engineer	Contractor	
Limit Level					
Limit level exceeded on one sampling day	1. Repeat in-situ measurement to confirm findings; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	2. Identify source(s) of impact; 3. Inform Engineer and EPD and confirm notification of the non-compliance in writing; 4. Check monitoring data, all plant, equipment and Contractors' working methods; 5. Discuss mitigation measure with Engineer and Contractor; 6. Ensure mitigation measures are implemented; 8. Assess the effectiveness of the implemented mitigation measures.	1. Discuss proposed mitigation measures with IEC and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are implemented.	1. Rectify unacceptable practice; 2. In consultation with the IEC and the Engineer, propose and agree mitigation measures within 3 working days; 3. Implement the agreed mitigation measures.	
	1. Repeat in-situ measurement to confirm findings; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	2. Identify source(s) of impact; 3. Inform Engineer and EPD and confirm notification of the non-compliance in writing; 4. Check monitoring data, all plant, equipment and Contractors' working methods; 5. Discuss mitigation measure with Engineer and Contractor; 6. Ensure mitigation measures are implemented; 8. Assess the effectiveness of the implemented mitigation measures.	1. Discuss proposed mitigation measures with IEC and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are implemented.	1. Rectify unacceptable practice; 2. In consultation with the IEC and the Engineer, propose and agree mitigation measures within 3 working days; 3. Implement the agreed mitigation measures. 4. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities.	

#### 6.4 *AUDITING REQUIREMENTS*

In order to ensure that water resources are adequately protected it will be necessary to undertake audits to ensure the effective implementation of the required mitigation measures. In particular, it will be necessary to ensure that dredging rates are regularly audited in order to ensure compliance with the EIA Report's assumptions and recommendations.

The auditing requirements shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 6.5 *ENVIRONMENTAL PERMIT CONDITIONS*

The EP (VEP-018/2000/A/EP-054) contains a number of conditions that relate to the mitigation of water quality impacts. These specific conditions therefore need to be highlighted within this Supplementary EM&A Manual and included within the EM&A programme.

The following subsections highlight the specific clauses of the EP (VEP-018/2000/A/EP-054) and outline the required actions to ensure compliance.

##### 6.5.1 *Volume of Dredged Marine Sediment*

Clause 2.10 of the EP (VEP-018/2000/A/EP-054) confirms that the volume of marine sediment to be dredged for the reclamation shall not be greater than 45 million m<sup>3</sup>, unless otherwise agreed with the Director. To monitor compliance with this condition, the actual amounts of marine sediment dredged for the Project shall be recorded and reported in the Monthly EM&A Reports.

##### 6.5.2 *Reclamation Schedule*

Clause 2.11 of the EP (VEP-018/2000/A/EP-054) requires that the reclamation sequence be scheduled to avoid formation of embayed water bodies and prevent water pollution problems. To achieve this, a reclamation schedule is required to be submitted to the Director and the reclamation works shall be carried out in accordance with the schedule, unless otherwise agreed with the Director. The Contractor shall monitor compliance with this condition as part of the EM&A programme's auditing requirements.

##### 6.5.3 *Additional Monitoring Requirements*

Clause 2.11 of the EP (VEP-018/2000/A/EP-054) requires that Tributyl Tin (TBT), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) levels in the water are monitored before and during the initial phases of dredging in Penny's Bay. It is assumed, due to the location of the Cheoy Lee Shipyard within the Stage 1 works area, that this requirement will only be applicable to the Stage 1 Penny's Bay reclamation works. If,



however, it is also required for the Stage 2 works, the monitoring shall be carried out in accordance with the requirements stated in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 6.5.4 *Retention of the Existing Natural Coastline*

Clause 2.19 of the EP (VEP-018/2000/A/EP-054) requires that the Western Drainage Channel is designed and constructed to retain the existing natural coastline of Penny's Bay. The Contractor shall ensure, as part of his EMS system, that this condition is complied with, and he shall monitor and report compliance with this condition during the construction phase as part of the EM&A programme's auditing requirements.

#### 6.5.5 *Surface Run-off*

Clause 2.20 of the EP (VEP-018/2000/A/EP-054) requires that all surface run-off from carparks, utility yards and public roads are collected treated by silt traps and oil interceptors and grit interceptors and discharged to the Western Drainage Channel prior to the commencement of the construction of the drainage system. The Contractor shall ensure, as part of his EMS system, that this condition is complied with, and shall monitor and report compliance with this condition during the construction phase as part of the EM&A programme's auditing requirements.

In addition, Appendix A of the EP (VEP-018/2000/A/EP-054) specifies a range of measures to mitigate environmental impacts due to site run-off and other potential water pollution caused by construction activities. In accordance with Clause 2.21 of the EP, the Contractor shall ensure, as part of his EMS system, that this condition is complied with throughout the construction period. The Contractor shall monitor and report compliance with this condition as part of the EM&A programme's auditing requirements.

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## 7 *WASTE MANAGEMENT*

### 7.1 *INTRODUCTION*

In this Section, the waste management related EM&A requirements for the Stage 2 Penny's Bay reclamation works are presented.

### 7.2 *WASTE MANAGEMENT PRACTICES*

In accordance with the requirements of the EP (VEP-018/2000/A/EP-054), the construction Contractor shall prepare and submit a Waste Management Plan to the Director for approval within 6 weeks after the commencement of construction of the Project.

The Plan, which shall be certified by the ET Leader and verified by the IEC, shall describe the arrangements for avoidance, reuse, recovery and recycling, storage, collection and disposal of different categories of waste which will be generated from the construction activities. The Plan shall incorporate site specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials, and disposal locations of different categories of waste.

The Waste Management Plan should be refined and updated as more detailed information is generated on the volume of dredged/excavated sediment. Similarly, it should be regularly reviewed, and updated as appropriate, throughout the course of the construction works to ensure that it remains current with the latest detailed information and works practices.

All the measures in the approved Waste Management plan shall be fully implemented throughout the construction period.

### 7.3 *EM&A RECOMMENDATIONS*

In order to ensure that the construction Contractors have implemented the recommendations of the EIA Report, the IEC shall conduct regular site audits of each of the waste streams. The audit requirements shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

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## 8 TERRESTRIAL ECOLOGY

This Section defines the EM&A requirements that have been recommended to ensure that the proposed terrestrial ecological mitigation measures are effective.

### 8.1 POTENTIAL IMPACTS

Potential impacts to terrestrial ecological resources are not expected to be high since most of the habitats impacted are generally of low ecological importance.

Whilst some rare plants *Schoenus falcatus* at Chok Ko Wan Tsui will be lost, the most significant potential ecological impact relates to the indirect impact to the locally rare White-bellied Sea Eagles *Haliaeetus leucogaster*. Indirect impacts to this species are expected to be moderate to high primarily due to noise disturbance.

To minimise the impact to the White Bellied Sea Eagle, a range of mitigation measures were recommended in the EIA and are now requirements, these include:

- Prohibiting human access to the nesting site of White-bellied Sea Eagles by fencing off the Pa Tau Kwu secondary woodland area where the pair of White-bellied Sea Eagles are present (refer *Clause 2.24* of the EP). The fencing off of the restricted area will be undertaken by CED. However, the Contractor for the Stage 2 reclamation works (or items of infrastructure and associated works which are not included within the Stage 1 reclamation contract) will inspect the fencing once every month to ensure it is adequately maintained. Any damage that is identified shall immediately be repaired. The Contractor shall also ensure (through means of briefings etc) that all staff and sub-contractors are fully aware of the requirement to prohibit human access to this area. The Contractor shall report on compliance with this as part of his regular EM&A reporting requirements.
- Use quietened construction plant and equipment during Penny's Bay Stage 2 reclamation (refer *Clause 2.25* of the EP).

### 8.2 RESIDUAL ENVIRONMENTAL IMPACTS

Even with the implementation of the recommended mitigation measures, there remains the possibility that the White-bellied Sea Eagles may abandon their existing nesting site at the Pa Tau Kwu woodland.

### 8.3 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

To monitor the effectiveness of the proposed mitigation measures, a specific EM&A programme shall be implemented for the White-bellied Sea Eagles on Pa Tau Kwu. The monitoring field work should be undertaken by an avian specialist with at least three years of local experience in ecological monitoring.

#### 8.3.1 *Monitoring During the Construction Phase*

During construction, field surveys should be undertaken twice per month during periods of breeding activity (October to April), and once per month at other times of the year. Information should be collected on behaviour, breeding activity, and any responses to disturbances. Any disturbance of the breeding pair should be examined in conjunction with the construction noise monitoring and other events related to the works.

An Event and Action Plan is recommended in *Table 8.3a*. Whilst the presence of the White-bellied Sea Eagles will be verified during the baseline monitoring, the Event and Action plan assumes that they are seldom absent from their territory on Pa Tau Kwu, if this is found not to be the case, then the Event and Action plan will need to be revised accordingly.

Table 8.3a *Event and Action Plan for Penny's Bay Stage 2 Reclamation Works*

Event	Action		
	ENPO Environmental Monitoring Team	ENPO Environmental Auditing Team	Contractor
White-bellied Sea Eagle absence for a whole day during the monitoring period	1. Increase monitoring to daily frequency	1. Notify Site Engineer 2. If absence persists, review construction activities, within 1 km from nest site, and noise monitoring results from the previous week 3. Submit recommendations for remedial action, such as adjustment of construction method. 4. Discuss remedial actions with Site Engineer and Contractors 5. Liaise with Environmental Monitoring Team regarding the effectiveness of the remedial actions	1. Implement agreed remedial action

## 8.3.2

*Rare/Restricted/Protected Plant*

The detailed vegetation survey report (that was required under Clause 2.23 of the EP) has demonstrated that no rare/restricted/ protected plant species were found within the Stage 1 works area. Before the Stage 2 reclamation works commence, (or any other works that may affect the rare/restricted/ protected plant species) the affected rare plant species, *Schoenus falcatus*, will be transplanted to a suitably selected site (as required by Clause 2.23 of the EP - see Section 8.5.2 below). The transplantation shall be undertaken in accordance with the recommendations of the detailed vegetation survey report. After transplantation of the restricted plants is complete, monitoring shall be undertaken to check the health, condition, growth rate and reproductive performance of the transplanted plants and to ensure that they are experiencing no adverse effects. The monitoring shall be undertaken by qualified botanists at monthly intervals for a period of three years. The field monitoring should be evenly spread over the duration of the monitoring programme.

A remedial action should be produced and implemented in the case of any unsuccessful transplantation. If the transplantation fails, the seed stocks of the species *Schoenus falcatus* should be used for a second trial in the same site or other suitable site depending on the reasons of first trial failure.

The transplantation procedures, post-transplantation monitoring, auditing requirements (as outlined in this Supplementary EM&A Manual and the Stage 1 EM&A Manual) and any recommendations and mitigation measures

defined in the finalised detailed vegetation survey report shall be strictly followed.

#### 8.4 *AUDITING REQUIREMENTS*

The implementation of the required mitigation measures shall be assessed as part of the EM&A programme. The assessment should evaluate the effectiveness and suitability of the mitigation measures rather than simply verifying their implementation.

#### 8.5 *ENVIRONMENTAL PERMIT CONDITIONS*

The EP (VEP-018/2000/A/EP-054) contains a number of conditions that relate to the mitigation of terrestrial ecological impacts. These specific conditions therefore need to be highlighted within this Supplementary EM&A Manual and included within the EM&A programme.

The following subsections highlight the specific clauses of the EP (VEP-018/2000/A/EP-054) and outline the required actions to ensure compliance.

##### 8.5.1 *Compensatory Tree Planting*

Clause 2.22 of the EP (VEP-018/2000/A/EP-054) requires that no less than 6 ha of compensatory tree planting is carried out at Ngong Sheung Au. A compensatory tree planting plan shall be produced and deposited with the Director within 2 months after the commencement of construction. The compensatory tree planting plan shall conform to the recommendations of the EIA Report and shall include information on the size and location of the planting site, species to be planted, schedule of the plantation works, the monitoring and maintenance arrangements of the planted trees. A monitoring programme shall be carried out by qualified botanists for at least 3 years, and a maintenance programme for 10 years after plantation. The Contractor shall ensure, as part of his EMS system, that the required deliverable is produced on schedule. He shall also employ suitably qualified personnel to undertake the initial 3 year monitoring programme. The 10 year maintenance programme shall be arranged by the Permit Holder.

Monitoring programmes shall be carried out both during and after planting to ensure that the works are correctly implemented and that they are successful. If any problems are identified during the monitoring, they shall be addressed and rectified as soon as possible.

In selecting the species for planting, reference shall be made to the species identified in the Tree Survey. The species used for planting should be native to Hong Kong or the South China Region. Monitoring shall be undertaken by qualified botanists on two occasions during the tree planting programme. The monitoring shall assess the nursery stock being used, the tree planting



technique, and ensure that the planting is being undertaken in the appropriate season.

After planting, monitoring shall be undertaken by qualified botanists once every two months during dry season (October to March), and once every three months during the wet season (April to September). The monitoring programme shall continue for 3 years and shall determine and record the health, condition and growth rate of the planted trees, the effectiveness or need for weed control measures, and the soil conditions.

#### 8.5.2 *Rare/Restricted/Protected Plant Species*

Clause 2.23 of the EP (VEP-018/2000/A/EP-054) requires that no works are carried out within the areas where the rare/restricted/protected plant species are found before the completion of a detailed vegetation survey. Three copies of the detailed vegetation report are required to be deposited with the Director within 8 weeks after the commencement of the construction of the Project. The survey report shall indicate the detailed setting out of the Project site boundary and demonstrate that the impacts are avoided or minimised to the most practicable extent.

The detailed vegetation survey shall be undertaken by qualified botanists. Individuals of the concerned species shall be identified and marked as the basis for the detailed design / refinement of the transplantation requirements.

No construction works are permitted on the relevant parts of the Project prior to the transplantation of the plant species. The Contractor shall ensure, as part of his EMS system, that this condition is complied with.

Clause 2.23 of the EP (VEP-018/2000/A/EP-054) also requires that the survey report (produced for following the completion of the detailed vegetation survey) includes details of the transplantation schedule and a 3 year monitoring programme after transplantation of the rare/restricted/protected plant species which will be affected by the construction works.

The details of the 3 year monitoring programme which is to be implemented after transplantation are presented in *Section 8.3.3*.

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## 9 *MARINE ECOLOGY*

### 9.1 *ECOLOGICAL MONITORING AND AUDIT REQUIREMENTS*

#### 9.1.1 *General*

The constraints on dredging and filling operations defined within the water quality section of the EIA Report will act as appropriate mitigation measures to control the environmental impacts to marine ecological resources to within acceptable levels. Actual impacts of construction activities will be monitored through impacts to water quality (see *Section 6 of this EM&A Manual*).

EM&A activities designed to detect and mitigate any unacceptable impacts to water quality will serve to proactively protect against unacceptable impacts to marine ecological resources. Should any impacts be detected, the procedures outlined in the water quality Event and Action Plan for implementing appropriate mitigation will serve to protect against unacceptable impacts to marine ecological resources, thereby ensuring the environmental acceptability of the project.

### 9.2 *RECOLONISATION OF SLOPING SEAWALLS*

According to the *EIAO TM Section 8.3 (c)* an EM&A programme is required in a situation where "the project involves mitigation measures of which the effectiveness may require a long period to establish".

*Section 8.3 (c)* of the *EIAO TM* is applicable to these Project works as the effectiveness of providing rubble mound seawalls for the recolonisation of corals will take time to evaluate. In response to this, and Clause 2.30 of the EP (VEP-018/2000/A/EP-054), an ecological monitoring and audit programme is required to monitor the process of recolonisation of the rubble mound seawalls along the perimeter of the Stage 2 reclamation once the construction works have been completed. Before monitoring can be begin, details of the monitoring programme should be agreed with AFCD and EPD. However, a provisional monitoring programme is discussed below.

#### 9.2.1 *Objective*

The objectives of the ecological monitoring programme is to determine the rate and effectiveness of colonisation of the rubble mound seawall by coral. In order to satisfy this objective, ecological monitoring will consist of an initial survey of the rubble mound seawalls, conducted as soon as possible upon the completion of construction works, followed by subsequent follow-up surveys to assess the rate of recolonisation.

### 9.2.2 *Survey Methodology*

The initial survey will consist of quantitative dive surveys undertaken at a certain number of locations along the seawalls. The number of locations to be surveyed should be agreed with AFCD and EPD before commencement of the surveys. At each location a 300m transect (containing ten 10m sub-transects) at two depth ranges of -2 to -4m PD and -5m to -7m PD for the survey of hard and soft coral communities, respectively. Ten, 50m transects should be laid randomly within the boundaries of the fixed site. All transects should be oriented parallel to the seawall. The corners of each site, the start and end points of each transect, and the start of the depth ranges should be permanently marked by hammering a 1m long steel rebar into the substrate and securing it in place using underwater cement when needed. This will facilitate location of the transects for further surveys.

Each transect line will be filmed using underwater digital video at approximately 40 cm above the substrate and at a constant speed in compliance with standard protocols for coral surveys (ie at a rate of approximately 90 seconds per metre). Each video transect will record a 40 cm swath of seabed. The video camera will be held perpendicular to the substrate to minimise parallax error and to keep the substrate in focus. In addition, photographs of any colonising coral species located in the surveyed areas will be taken using a Nikonos V underwater camera (or equivalent) equipped with a 15 mm wide angle lens and a SB 103 strobe light (or equivalent).

### 9.2.3 *Data Manipulation and Analysis*

Data on colony abundance of hard corals (scleractinian) and octocorals (soft corals and gorgonians) will be extracted from the video transects. Counts will be made for each site and the locations of the corals along the transects noted. Wherever possible, hard corals will be identified to species level by coral specialists using regional texts. Octocorals recorded within the transects will be identified to the lowest taxonomic level possible and accompanied by a brief description of their morphology. The results will be presented in two forms, as detailed below.

- *Percentage Cover Estimates:* these values will be calculated using the fixed point sampling method to estimate the coverage of coral species on the seabed surface.
- *Total number of colonies:* this method will record the number of colonies of each coral species along the entire transects length. This measure is unlike the first as it will record all species observed instead of the cover of those occurring on a set number of fixed frames. As a result more coral species may potentially be identified under the second method than the first.

Following the initial survey, each location should be re-visited every six months for a period of three years. As a result, a total of six surveys should be

conducted, including the initial survey. Any observable differences between the sites and surveys should be tested using Analysis of Variance (ANOVA). This monitoring will be used to assess the extent of recolonisation of corals and gorgonians on the rubble mound seawalls. The results of these surveys will be reported to EPD and AFCD and will form the basis for deciding whether any further mitigation measures are necessary.

#### 9.2.4 *Criteria for Establishing Colonisation Effectiveness*

Information from the dive surveys conducted during the EIA indicated that the percentage cover of hard corals recorded inside Penny's Bay ranged from 0.4 to 17.1 % cover or between 2 and 80 coral colonies within a 50m transect. The mean values were 9 % cover and 33 colonies. For the rubble mound seawalls to be considered as effective in mitigating for the loss of the assemblages within Penny's Bay they should be demonstrated as supporting, by the end of the 3 year monitoring period, coral assemblages of comparable abundance and cover. It is recommended, therefore, that the mean values are used as criteria for which to assess this. If, after 3 years, the survey results reveal that colonisation is below these criteria (ie 33 colonies and 9 % cover) and occurs at only a slow rate, then a further 3-year monitoring should be conducted. If, recolonisation does not occur after the second 3-year monitoring, further mitigation measures should be considered.

### 9.3 *MARINE MAMMALS*

Construction-phase dolphin/porpoise monitoring should be conducted, in accordance with the methodology defined in the Stage 1 EM&A Manual, by a qualified research team, to evaluate whether there have been any effects on the animals. The resulting data should be compatible with, and should be made available for, long-term studies of small cetacean ecology in Hong Kong.

### 9.4 *ENVIRONMENTAL PERMIT CONDITIONS*

The EP (VEP-018/2000/A/EP-054) contains a number of conditions that relate to the mitigation of marine ecological impacts. These specific conditions therefore need to be highlighted within this EM&A Manual and included within the EM&A programme.

The following subsections highlight the specific clauses of the EP (VEP-018/2000/A/EP-054) and outline the required actions to ensure compliance.

#### 9.4.1 *Recolonisation of the Rubble Mound Seawalls*

Clause 2.30 of the EP (VEP-018/2000/A/EP-054) requires that if the recolonisation of the rubble mound seawalls by corals is slow, the Permit Holder shall extend the duration of the monitoring programme for another 3

years. (It is assumed that this work would be undertaken by the Permit Holder rather than the Contractor). If recolonisation does not occur, the Permit Holder shall submit proposals for further mitigation measures. (It is assumed that this work shall be undertaken by the Client rather than the Contractor).

#### 9.4.2 *Underwater Video/Photography*

Clause 2.30 of the EP (VEP-018/2000/A/EP-054) requires that underwater video/photography is undertaken to determine the changes to the subtidal conditions during construction. The underwater video/photography shall be undertaken in accordance with the methodology defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

#### 9.4.3 *Deployment of Artificial Reefs*

Clause 2.31 of the EP (VEP-018/2000/A/EP-054) requires that, to enhance the sub-tidal habitat, at least 4,350 m<sup>3</sup> of Artificial Reefs (AR) are deployed and that the management arrangements are worked out to the satisfaction of the Director. To fulfil the requirements, CED shall submit the detailed design and implementation schedule of the AR to DEP for approval at least 12 months before the completion of the reclamation. CED shall deploy AR in accordance with the approved schedule and details prior to the opening of the theme park at Penny's Bay

## 10 FISHERIES

### 10.1 THE EM&A RECOMMENDATIONS

The impacts of the reclamation activities on fisheries resources will be monitored indirectly through the water quality EM&A programme.

### 10.2 ENVIRONMENTAL MONITORING AND AUDIT

The constraints on dredging and filling operations defined within the water quality section of the EIA Report will act as appropriate mitigation measures to control the environmental impacts to fisheries resources to within acceptable levels. Actual impacts of construction activities will be monitored through impacts to water quality (see *Section 6 of this EM&A Manual*).

EM&A activities designed to detect and mitigate any unacceptable impacts to water quality will serve to proactively protect against unacceptable impacts to fisheries resources. Should any impacts be detected, the procedures outlined in the water quality Event and Action Plan for implementing appropriate mitigation will serve to protect against unacceptable impacts to fisheries resources, thereby ensuring the environmental acceptability of the project. Consequently, the development and implementation of a monitoring and audit programme specifically designed to assess the effects of construction activities on fisheries resources is not deemed necessary.

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## 11 *CULTURAL HERITAGE IMPACT*

### 11.1 *INTRODUCTION*

Whilst the EIA Report did not recommend any specific EM&A requirements for cultural and heritage resources, it did specify a number of mitigation measures that should be implemented to minimise the potential impacts.

### 11.2 *AUDITING REQUIREMENTS*

In order to ensure that heritage resources are adequately protected it will be necessary to undertake audits to ensure the effective implementation of the recommended mitigation measures and EP requirements. The audit requirements shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works. The audit programme should evaluate the effectiveness and suitability of the mitigation measures rather than simply verifying their implementation.

### 11.3 *ENVIRONMENTAL PERMIT CONDITIONS*

The EP (VEP-018/2000/A/EP-054) contains a number of conditions that relate to the mitigation of cultural heritage impacts. These specific conditions therefore need to be highlighted within this Supplementary EM&A Manual and included within the EM&A programme.

The following subsections highlight the specific clauses of the EP (VEP-018/2000/A/EP-054) and outline the required actions to ensure compliance.

#### 11.3.1 *Rescue Excavation at Chok Ko Wan Archaeological Site*

Clause 2.37 of the EP (VEP-018/2000/A/EP-054) requires that the rescue excavation at Chok Ko Wan archaeological site shall be completed to the Director's satisfaction prior to any construction works commencing within the defined archaeological site area. Whilst the works associated with the Stage 2 reclamation works are not envisaged to encroach upon this site, the Contractor should be aware of this condition and should, if necessary, take appropriate action to comply with this requirement.

#### 11.3.2 *Wan Tuk Archaeological Area*

Clause 2.8(c) of the EP (VEP-018/2000/A/EP-054) is applicable to the Stage 2 Penny's Bay reclamation works. This clause requires that all fill materials and plastic sheets within the Wan Tuk archaeological area shall be removed after completion of the Penny's Bay Reclamation. The Stage 2 Contractor shall ensure, as part of his EMS system, that this condition is complied with, and

shall report compliance with this condition within the EM&A reporting mechanism.

## 12 LANDSCAPE AND VISUAL

### 12.1 INTRODUCTION

Whilst the EIA Report did not recommend any specific EM&A requirements for landscape and visual issues, it did specify a number of mitigation measures that should be implemented to minimise the potential impacts.

### 12.2 AUDITING REQUIREMENTS

In order to ensure that landscape and visual resources are adequately protected it will be necessary to undertake audits to ensure the effective implementation of the recommended mitigation measures and EP requirements. The audit requirements shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works. The audit programme should evaluate the effectiveness and suitability of the mitigation measures rather than simply verifying their implementation.

### 12.3 ENVIRONMENTAL PERMIT CONDITIONS

The EP (VEP-018/2000/A/EP-054) contains a number of conditions that relate to the mitigation of landscape and visual impacts. These specific conditions therefore need to be highlighted within this Supplementary EM&A Manual and included within the EM&A programme.

The following subsections highlight the specific clauses of the EP (VEP-018/2000/A/EP-054) and outline the required actions to ensure compliance.

#### 12.3.1 *Earth Berms*

Clause 3.1 of the EP (VEP-018/2000/A/EP-054) requires that a number of landscaped earth berms be constructed prior to the operation of the Theme Park. The landscaped earth berms that will be constructed as part of the Penny's Bay reclamation stage 2 works comprise the following:

- a) Earth berms of 5 to 9 m high shall be constructed to encircle the Theme Park;
- b) Earth berms of at least 9 m high shall be constructed to encircle the Sewage Pumping Station; and,
- c) Earth berms of at least 9 m high shall be constructed to encircle the Penny's Bay Gas Turbine Plant (GTP).

The Contractor shall ensure, as part of his EMS system, that the required landscaped earth berms are constructed prior to the operation of the Theme

Park. Progress related to compliance with this matter shall be reported in the monthly EM&A reports.

#### 12.4

#### **MITIGATION MEASURES**

The EIA Report recommended mitigation measures that should be implemented during the construction of the Project. Details of all the recommended mitigation measures that are applicable to the Stage 2 reclamation works, or items of infrastructure and associated works which are covered by the EP but not included within the Stage 1 reclamation contract, are included within the Implementation Schedule (in *Annex A* of this Supplementary EM&A Manual).

## 13 LAND CONTAMINATION

### 13.1 INTRODUCTION

Although not included within the scope of the original Study Brief issued by the EPD for the Theme Park and associated developments, a review was undertaken as part of the EIA Study to determine whether there were likely to be any potential land contamination impacts as a result of the Project's implementation. As no contamination concerns were identified for the Penny's Bay Reclamation Schedule 2 Designated Project, no specific environmental monitoring and auditing activities are required.

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## 14 ENVIRONMENTAL AUDITING

### 14.1 SITE INSPECTIONS

Site inspections provide a direct means to track and ensure the enforcement of specified environmental protection and pollution control measures. The inspections should be undertaken routinely by the IEC to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Additionally, the IEC shall be responsible for defining the scope of the inspections, detailing any deficiencies that are identified, and reporting any necessary action or mitigation measures that were implemented as a result of the inspection.

Site inspections shall be carried out at least once per week. The areas of inspection should include the general environmental conditions in the vicinity of the site and the pollution control and mitigation measures within the site; it should also review the environmental conditions outside the site area which are likely to be affected, directly or indirectly, by site activities. The IEC shall make reference to the following information in conducting the inspections:

- the EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
- ongoing results of the EM&A programme;
- works progress and programme;
- individual works method statements which shall include proposals on associated pollution control measures;
- the contract specifications on environmental protection;
- the relevant environmental protection and pollution control laws; and
- previous site inspection results undertaken by the IEC.

The inspection results and their associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the Engineer and the Contractor, as appropriate, within 24 hours, for reference and for taking immediate action. They shall also be presented, along with the remedial actions taken, in the monthly EM&A report. The Contractor shall follow the procedures and time-frames stipulated in the environmental site inspection for the implementation of mitigation proposals and the resolution of deficiencies. An action reporting system shall be formulated and implemented to report on any remedial measures implemented subsequent to the site inspections.

*Ad hoc* site inspections shall also be carried out by the IEC if significant environmental problems are identified. Inspections may also be required

subsequent to receipt of an environmental complaint, or as part of the associated investigation work.

#### 14.2 *EMERGENCY RESPONSE*

An emergency response plan will be implemented in the event of fish kill or a suspect exceedance of Suspended Solids (SS) level inside the Fish Culture Zone if detected or reported by the public or mariculturists. A telephone hotline should be set up between concerned parties, especially for mariculturists. The normal response time to a complaint should either be the same day (for complaints received before 5 pm) or before 10 am the next morning (for complaints received after business hours, ie 5 pm to 9am). In order to determine whether fish kills and/ or SS exceedance is due to the project, the SS levels in both the Impact and Control stations should be measured for all complaint cases. The SS results should be provided to AFCD within 48 hours

#### 14.3 *COMPLIANCE WITH LEGAL AND CONTRACTUAL REQUIREMENTS*

There shall be contractual environmental protection and pollution control requirements, which the Contractor shall comply with, in addition to Hong Kong's environmental protection and pollution control laws.

The IEC shall review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.

The Contractors shall also regularly copy relevant correspondence and information to the IEC so that the checking and auditing process can be carried out. The relevant documents are expected to include the updated Work Progress Reports, the updated Works Programme, application letters for different licences/permits under the environmental protection laws, and all the valid licences/permits. The site diary shall also be available, upon request, to the IEC during his site inspection.

After reviewing the documentation, the IEC shall advise the Engineer and the Contractors of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the IEC's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works is incompatible with the works programme or may result in a potential violation of environmental protection and pollution control requirements by the works in due course, he shall also advise the Contractors and the Engineer accordingly.



Upon receipt of the advice, the Contractors shall undertake immediate action to remedy the situation. The Engineer shall follow up to ensure that appropriate action has been taken by the Contractors in order that the environmental protection and pollution control requirements are fulfilled.

#### 14.4

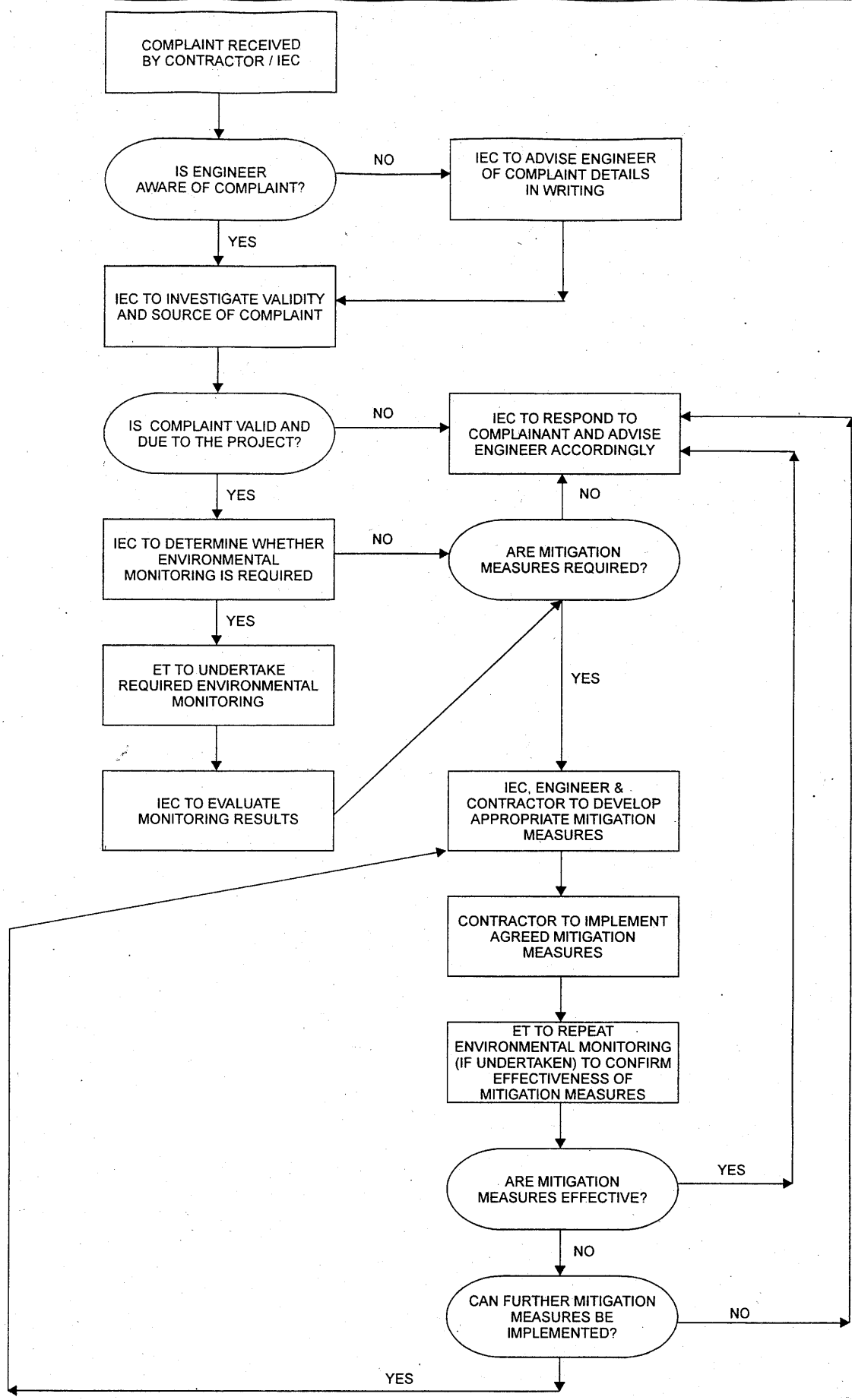
##### *ENVIRONMENTAL COMPLAINTS*

Complaints shall be referred to, and investigations co-ordinated by the ENPO. The IEC shall implement the complaint investigation procedures; which shall comprise the following upon receipt of a complaint:

- log complaint and date of receipt onto the complaint database;
- investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- if considered necessary following consultation the Engineer, liaise with the ETL so that the ET undertake monitoring to verify the existence and severity of the alleged complaint;
- if a complaint is valid and due to works, identify mitigation measures;
- if mitigation measures are required, advise the Engineer and Contractor accordingly;
- review the Contractor's response on the identified mitigation measures, and the updated situation;
- if the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;
- undertake additional audits and/or inspections, and if necessary co-ordinate with the ETL so that the ET undertake additional monitoring to verify the effectiveness of the mitigation measures;
- report the investigation results and the subsequent actions to the complainant for responding to the complainant (if the source of complaint is EPD, the results should be reported within the time frame assigned by EPD); and
- record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports and filing system.

During the complaint investigation work, the Contractor and Engineer shall cooperate with the IEC in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation works. The Engineer shall ensure that the measures have been carried out by the Contractor.

A flow chart of the complaint response procedures is shown in *Figure 14.1*. In the event that the ENPO is required to undertake the EM&A programme, then as detailed in the EIA Report, the Environmental Auditing Team Leader shall assume the IEC's role, and the Environmental Monitoring Team Leader shall assume the ET's role.



CIVIL ENGINEERING DEPARTMENT  
土木工程署

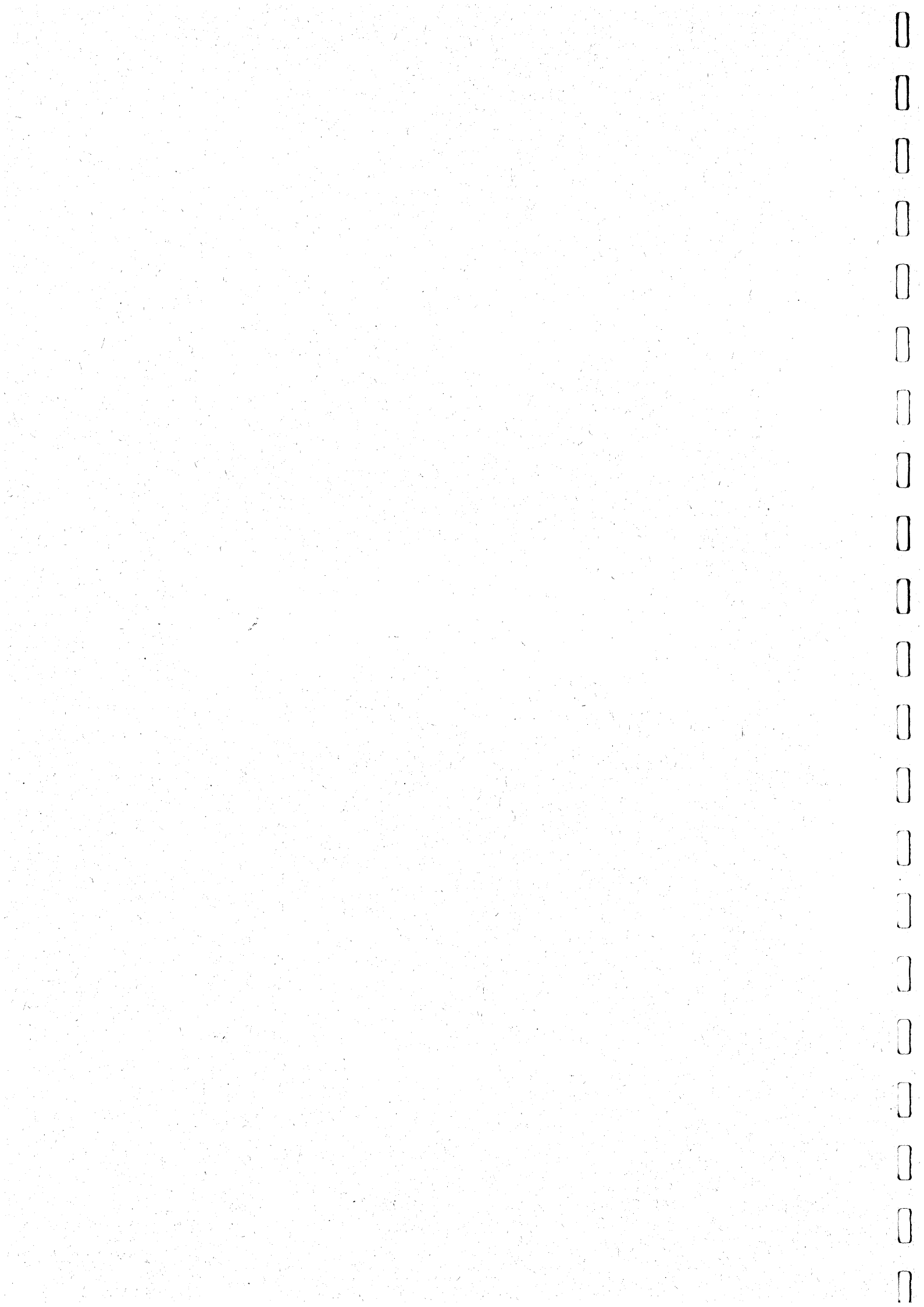
PENNY'S BAY RECLAMATION STAGE 2: SUPPLEMENTARY EM&A MANUAL  
COMPLAINTS RESPONSE PROCEDURES



Scott Wilson (Hong Kong) Ltd  
in association with City Planning Consultants,  
ERM, Shankland Cox, Wilbur Smith Associates

File: C1819u1b  
Date: 14/09/00

FIG. 14.1



## 15 *REPORTING*

### 15.1 *GENERAL*

#### 15.1.1 *Baseline Report*

Baseline environmental data will have been collected prior to the Stage 1 reclamation works. As such, it is unlikely that the Stage 2 Contractor will have to undertake a comprehensive baseline assessment. However, the Stage 2 Contractor should review the available data, and if he considers that the baseline conditions have changed since the collected of the data, he should undertake further investigations (in the absence of any construction works) to establish the current baseline conditions. If warranted by the scope and extent of any additional data that is collected, the information should be presented in a Baseline Monitoring Report in accordance with that outlined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

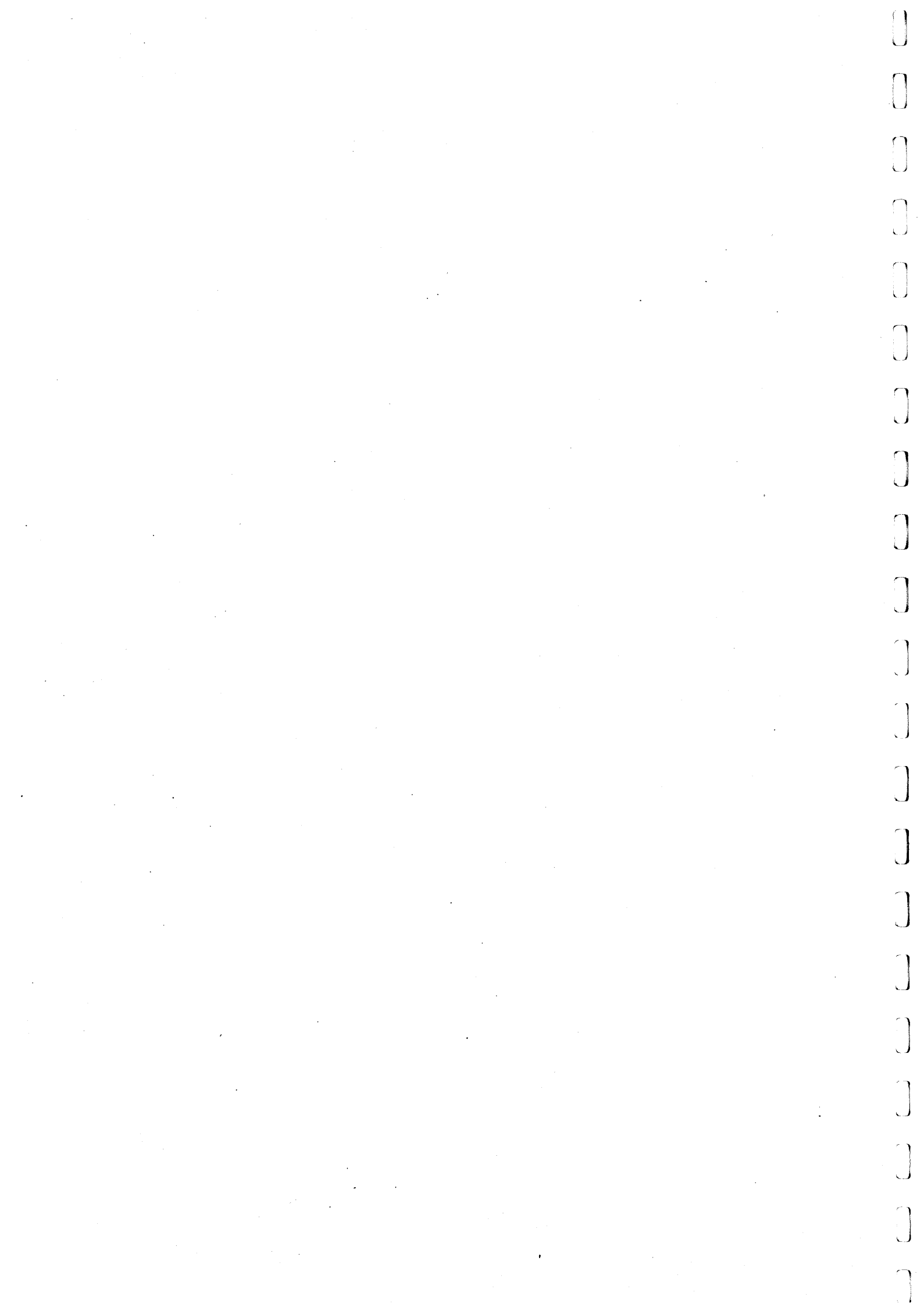
#### 15.1.2 *EM&A Reports*

The reporting of information collected as part of the EM&A programme (i.e. that presented in the EM&A Reports) shall be as defined in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.

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Annex A

## Implementation Schedule





## 1 IMPLEMENTATION SCHEDULES

### 1.1 INTRODUCTION

The EIA Report recommended mitigation measures that were to be implemented to ensure that potential impacts are controlled to acceptable levels. To assist with the full and proper implementation of all the recommendations, as part of the EIA, the mitigation measures were reproduced in Implementation Schedules together with details of the proposed timing and implementation agent.

Clause 3.8.14.3 of the EIA Study Brief (No. ESB-043/1999 - Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructure), requested that the Implementation Schedules should be 'grouped under individual works packages in separate DPs where applicable'. However, this was not possible at the EIA Stage because details were not available regarding the likely content of the possible construction works packages.

However, with regard to the Penny's Bay Reclamation works details of the works packages are now available and it has been possible to produce Implementation Schedules for both the Stage 1 and Stage 2 works packages.

This section presents the Implementation Schedule for the Stage 2 reclamation works and/or items of infrastructure or associated works which are covered by the EP but not included within the Stage 1 reclamation contract.

The Implementation Schedule has following column headings:

***EIA Ref:***

This denoted the section number or reference from the EIA Report Main text.

***EM&A Log Ref:***

This denotes the sequential number of each of the recommended mitigation measures specified in the Implementation Schedule.

***Environmental Protection Measures***

This denotes the recommended mitigation measures, courses of action or subsequent deliverables that are to be adopted, undertaken or delivered to avoid, minimise or ameliorate predicted environmental impacts.

***Location/Duration of Measures/Timing of Completion of Measures***

This indicates the spatial area in which the recommended mitigation measures are to be implemented together with details of the programming or timing of their implementation.

***Implementation Agent***

This denotes where the responsibility lies for the implementation of the recommended mitigation measures.

***Implementation Stage***

This denotes the stage at which the recommended mitigation measures are to be implemented; either during the Design, Construction, Operation or Decommissioning.

***Relevant Legislation & Guidelines***

This section defines the controlling legislation or guidelines that are either required to be complied with, or should be complied with as good practice.

Table A1 Implementation Schedule for the Penny's Bay Reclamation - Construction Phase

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
		<b>AIR QUALITY - Construction Phase</b>						
		In accordance with the <i>Air Pollution Control (Construction Dust) Regulation</i> the following mitigation measures shall be implemented to limit the dust emissions from the site:						
3.4.3	A1	<ul style="list-style-type: none"> <li>if a stockpile of dusty materials is more than 1.2 m high and lies within 50 m from any site boundary that adjoins a road, street, or other area accessible to the public, it shall be properly treated and sealed with latex, vinyl, bitumen or other suitable surface stabilizer;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A2	<ul style="list-style-type: none"> <li>vehicle washing facilities shall be provided at every vehicle exit point</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A3	<ul style="list-style-type: none"> <li>where a site boundary adjoins a road, street or other area accessible to the public, hoarding of not less than 2.4 m high from ground level shall be provided along the entire length except for a site entrance or exit;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A4	<ul style="list-style-type: none"> <li>every main haul road shall be sealed and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A5	<ul style="list-style-type: none"> <li>stockpiles of dusty materials shall be either covered entirely by impervious sheeting, placed in an area sheltered on the top and 3 sides; or sprayed with water so as to maintain the entire surface wet;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>
3.4.3	A6	<ul style="list-style-type: none"> <li>all dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;</li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Air Pollution Control (Construction Dust) Regulation</i>

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	Dec	
3.4.3	A7	<ul style="list-style-type: none"> <li>vehicle speed within the worksite shall be limited to 10 kph, except for properly formed and maintained access roads;</li> <li>every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the construction sites;</li> <li>the working area of excavation shall be sprayed with water immediately before, during and immediately after the operation so as to maintain the entire surface wet;</li> </ul>	<p>At all construction work site, throughout the whole duration of the construction period</p> <p>At all construction work site, throughout the whole duration of the construction period</p> <p>At all construction work site, throughout the whole duration of the construction period</p>	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Air Pollution Control (Construction Dust) Regulation
3.4.3	A8	<ul style="list-style-type: none"> <li>every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the construction sites;</li> </ul>	<p>At all construction work site, throughout the whole duration of the construction period</p>	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Air Pollution Control (Construction Dust) Regulation
3.4.3	A9	<ul style="list-style-type: none"> <li>the working area of excavation shall be sprayed with water immediately before, during and immediately after the operation so as to maintain the entire surface wet;</li> </ul>	<p>At all construction work site, throughout the whole duration of the construction period</p>	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Air Pollution Control (Construction Dust) Regulation
		<b>NOISE - Construction Phase</b>						
		In addition to the use of good site practice (as defined in the EIA Report) the following mitigation measures shall be implemented to minimise noise emissions:						
4.6	B1	<b>Selecting Quiet Plant for Evening Time Works</b> Where available, the Contractor shall use models of plant that are quieter than those specified in the EPD's Technical Memorandum (GW-TM) for undertaking construction works in the evening.	<p>At all construction work site, throughout the whole duration of the construction period</p>	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			GW-TM
		<b>WATER QUALITY- Construction Phase</b>						
		Reclamation Formation - Penny's Bay						
5.7.1	C1	If the loss rate of fine sediment to suspension from the different types of plant working on the site is greater than 25.3 kg s <sup>-1</sup> then either the quantities of plant operating or the rates of working should be reduced.		To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.1	C2	The loss rate for dredging and filling by a trailing suction hopper dredger ('trailer') is assumed to be independent of the size of the dredger. It is assumed that the trailer will deliver their load of sand fill into the reclamation by bottom dumping. The loss rate is calculated based on a maximum fines content of the material delivered to site of 8%, which will be achievable event for high <i>in situ</i> fines content at the borrow area. The loss rate for grab dredging is based on the use of an 8.5 m <sup>3</sup> grab. Should larger grabs be used than the same loss rate may be applied, although the actual loss rate is likely to be lower. However, if the Contractor can demonstrate through the use of field trials that the actual loss rates from the proposed plant and operating methods are lower than those shown in Table 5.7a in the EIA Report, then the loss rate figures in the second column may be revised and the total loss rate re-calculated. The total calculated loss rate should still be less than 25.3 kg s <sup>-1</sup> .		To be implemented by the Contractors and enforced by the Engineer/ENPO	✓	✓		Water Pollution Control Ordinance
5.7.1	C3	Monitoring of dredging rate on a daily basis, and determination of fines content in at least one hopper load every two days.		To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			
EP Clause 2.10	C4	In accordance with Clause 2.10 of the EP (VEP-018/2000/A/EP-054) the volume of marine sediment to be dredged for the reclamation shall not be greater than 45 million m <sup>3</sup> , unless otherwise agreed with the Director. To monitor compliance with this condition, the actual amounts of marine sediment dredged for the Project shall be recorded and reported in the Monthly EM&A Reports.		To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.10 of the EP (VEP-018/2000/A/EP-054)

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.1	C5	The seawalls along the face of the reclamation shall be constructed as early as practicable in the construction programme in order to shelter the works area from tidal currents and hence minimise the transport of fine sediment in suspension away from the works area. Priority should be given to the seawall along the western frontage of the reclamation. The filling activities shall be undertaken (ie discharge of sand fill from trailing suction hopper dredgers) behind seawalls or other similar structure to act as a barrier. The seawalls, or other suitable barrier, shall be constructed at least 200 m in advance of the filling point.	As early as practicable in the construction programme, with the seawalls or other similar structures used to act as a barrier in Areas Q4 and Q7 being above water level prior to Month 10 of the programme.	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓	✓		Water Pollution Control Ordinance
EP Clause 2.11	C6	Clause 2.11 of the EP (VEP-018/2000/A/EP-054) requires that the reclamation sequence be scheduled to avoid formation of embayed water bodies and prevent water pollution problems. To achieve this, a reclamation schedule shall be submitted to the Director and the reclamation works shall be carried out in accordance with the schedule, unless otherwise agreed with the Director. The Contractor shall monitor compliance with this condition as part of the EM&A programme's auditing requirements, and he shall report against this item in the Monthly EM&A Reports.	Prior to, and throughout the full duration of the reclamation works.	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.11 of the EP (VEP-018/2000/A/EP-054)

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	Dec	
EP Clause 2.11	C7	Clause 2.11 of the EP (VEP-018/2000/A/EP-054) requires that Tributyl Tin (TBT), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) levels in the water are monitored before and during the initial phases of dredging in Penny's Bay. It is assumed, due to the location of the Cheoy Lee Shipyard within the Stage 1 works area, that this requirement will only be applicable to the Stage 1 Penny's Bay reclamation works. If, however, it is also required for the Stage 2 works, the monitoring shall be carried out in accordance with the requirements stated in the EM&A Manual related to the Penny's Bay Stage 1 reclamation works.	If required, during the initial phases of (Stage 2) dredging in Penny's Bay	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.11 of the EP (VEP-018/2000/A/EP-054)
EP Clause 2.19	C8	Clause 2.19 of the EP (VEP-018/2000/A/EP-054) requires that the Western Drainage Channel is designed and constructed to retain the existing natural coastline of Penny's Bay. The Contractor shall ensure, as part of his EMS system, that this condition is complied with, and he shall monitor and report compliance with this condition during the construction phase as part of the EM&A programme's auditing requirements.	During the design and construction of the Western Drainage Channel	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.19 of the EP (VEP-018/2000/A/EP-054)
EP Clause 2.20	C9	In accordance with Clause 2.20 of the EP (VEP-018/2000/A/EP-054) all surface run-off from carparks, utility yards and public roads shall be collected and treated by silt traps and oil interceptors and grit interceptors and discharged to the Western Drainage Channel prior to the commencement of the construction of the drainage system. The Contractor shall ensure, as part of his EMS system, that this condition is complied with, and he shall monitor and report compliance with this condition during the construction phase as part of the EM&A programme's auditing requirements.	Prior to the commencement of the construction of the drainage system	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.20 of the EP (VEP-018/2000/A/EP-054)

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	Dec	
EP Clause 2.20	C10	In accordance with Clause 2.20 of the EP the Contractor shall implement the mitigation measures specified in Appendix A of the EP (VEP-018/2000/A/EP-054) to mitigate environmental impacts due to site run-off and other potential water pollution caused by construction activities. The Contractor shall ensure, as part of his EMS system, that this condition is complied with throughout the construction period. The Contractor shall monitor and report compliance with this condition as part of the EM&A programme's auditing requirements.	Throughout the full duration of the construction works.	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.20 of the EP (VEP-018/2000/A/EP-054)
5.7.1	C11	The following general working methods shall be implemented during dredging and filling works to minimise the loss of fine sediment to suspension. <ul style="list-style-type: none"> <li>for dredging contaminated (Class C) sediments, fully-enclosed (water tight) grabs shall be used to minimise the loss of sediment during the raising of the loaded grabs through the water column;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C12	<ul style="list-style-type: none"> <li>for dredging uncontaminated sediment tightly closing grabs should be used to restrict the loss of fine sediment to suspension;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C13	<ul style="list-style-type: none"> <li>the descent speed of grabs should be controlled to minimise the seabed impact speed;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C14	<ul style="list-style-type: none"> <li>barges should be loaded carefully to avoid splashing of material;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C15	<ul style="list-style-type: none"> <li>all barges used for the transport of dredged materials should be fitted with tight bottom seals in order to prevent leakage of material during loading and transport;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance



EIA* Ref	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.1	C16	<ul style="list-style-type: none"> <li>all barges should be filled to a level which ensures that material does not spill over during loading and transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action;</li> <li>the speed of trailer dredger should be controlled within the works area to prevent propeller wash from stirring up the sea bed sediments;</li> <li>when dredging mud at the reclamation site trailer dredgers shall be prohibited from overflowing or using Automatic Lean Mixture Overboard (ALMOB) systems;</li> <li>the use of Lean Mixture Overboard (LMOB) will be permitted during the raising and lower of the suction head, but shall cease once the suction head is in contact with the sea bed;</li> <li>"rainbowing" sand fill from trailer dredgers will not be permitted except when the material is discharged onto areas above water level and are sheltered behind seawalls, or other suitable barriers, which have been constructed at least 200 m in advance of the discharge point ; and</li> <li>the works shall cause no visible foam, oil, grease or litter or other objectionable matter to be present in the water within and adjacent to the reclamation site and along the route to and from the marine borrow area and disposal site.</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C17	<ul style="list-style-type: none"> <li>the speed of trailer dredger should be controlled within the works area to prevent propeller wash from stirring up the sea bed sediments;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C18	<ul style="list-style-type: none"> <li>when dredging mud at the reclamation site trailer dredgers shall be prohibited from overflowing or using Automatic Lean Mixture Overboard (ALMOB) systems;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C19	<ul style="list-style-type: none"> <li>the use of Lean Mixture Overboard (LMOB) will be permitted during the raising and lower of the suction head, but shall cease once the suction head is in contact with the sea bed;</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C20	<ul style="list-style-type: none"> <li>"rainbowing" sand fill from trailer dredgers will not be permitted except when the material is discharged onto areas above water level and are sheltered behind seawalls, or other suitable barriers, which have been constructed at least 200 m in advance of the discharge point ; and</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C21	<ul style="list-style-type: none"> <li>the works shall cause no visible foam, oil, grease or litter or other objectionable matter to be present in the water within and adjacent to the reclamation site and along the route to and from the marine borrow area and disposal site.</li> </ul>	At all times, and throughout the whole duration, of the dredging and filling works	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C22	<ul style="list-style-type: none"> <li>A suitable device shall be fitted to the cutter suction dredger, which discharges the re-handled fill in thin layers. The design of the device should be such that the fill material does not disturb the sea bed and that a density flow is formed close to the sea bed.</li> </ul>	Prior to the use of the cutter suction dredger, and throughout the whole duration, of its use	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.1	C23	The re-handling basin shall be located such that it is always positioned behind completed seawalls or other suitable barriers, which have been constructed at least 200 m in advance of the location of the re-handling basin. This measure will ensure that any fine sediment lost to suspension during the operation of the re-handling basin is retained within the filling area, ie behind the seawalls.	Prior to the use of the re-handling basin, and throughout the whole duration, of its use	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C24	In the initial phases of construction, the re-handling basin should be positioned in Penny's Bay where tidal currents are low.	Prior to and throughout the initial phases of the re-handling basin	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C25	Prior to the initial operation of the re-handling basin, seawalls of approximately 400 m in length from the Sze Pak headland, or other suitable retaining structures, shall be completed to above the water level to act as a barrier in Area Q4 (see Figure 5.6b of the EIA Report).	Prior to the initial operation of the re-handling basin	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C26	As the construction of the reclamation progresses the location of the re-handling basin will move with the leading face of the reclamation. Seawalls, or other suitable retaining structures, should be constructed above the water level at least 200 m in advance of the location of the re-handling basin.	Prior to the initial operation of the re-handling basin	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.1	C27	In order to prevent cumulative impacts with the concurrent construction of the Route 10 Toll Plaza the seawalls along the eastern side of the Phase II reclamation (see Figure 5.6b of the EIA Report) shall be constructed to above the water surface prior to the commencement of the works for the Route 10 Toll Plaza.	During the Phase II reclamation	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
		<b>Land Based Construction Activities</b>						
		<i>Surface Run-off</i>						
5.7.2	C28	Surface run-off from the construction site shall be directed into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers shall be provided on site to properly direct stormwater to such silt removal facilities.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
5.7.2	C29	Catchpits and perimeter channels shall be constructed in advance of site formation works and earthworks.	At all construction work site prior to the commencement of site formation works and earthworks	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.2	C30	Silt removal facilities, channels and manholes shall be suitably maintained with the deposited silt and grit being removed regularly, and at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.2	C31	Earthworks final surfaces shall be well compacted and the subsequent permanent work or surface protection shall be carried out as soon as practical after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate intercepting channels shall be provided where necessary. Rainwater pumped out from trenches or foundation excavations shall be discharged into storm drains via silt removal facilities.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.2	C32	Open stockpiles of construction materials (e.g. aggregates and sand) on site shall be covered with tarpaulin or similar fabric during rainstorms. Measures shall be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
5.7.2	C33	Manholes (including any newly constructed ones) shall always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
		<i>Groundwater</i>						
5.7.2	C34	Groundwater pumped out of wells, etc. for the lowering of ground water level in foundation construction shall be discharged into storm drains after being passed through appropriate silt removal facilities.	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	Dec	
5.7.2	C35	<p><i>Wheel Washing Water</i></p> <p>All vehicles and plant shall be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay shall be provided at every site exit, if practicable, and wash-water shall have sand and silt settled out or removed before being discharged into the storm drains. The section of construction road between the wheel washing bay and the public road shall be paved with backfall to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.</p> <p><i>Wastewater from Site Facilities</i></p> <p>Sewage from toilets, kitchens and similar facilities shall be discharged into a foul sewer or chemical toilets shall be provided. Should the use of chemical toilets be necessary then these shall be provided by a licensed contractor, who will be responsible for appropriate disposal and maintenance of these facilities. Wastewater collected from canteen kitchens, including that from basins, sinks and floor drains, shall be discharged into foul sewers via grease traps.</p>	At every site exit to all construction work sites, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Water Pollution Control Ordinance</i>
5.7.2	C36	<p>Vehicle and plant servicing areas, vehicle wash bays and lubrication bays shall, as far as possible, be located within roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor. Oil leakage or spillage shall be contained and cleaned up immediately. Waste oil shall be collected and stored for recycling or disposal, in accordance with the <i>Waste Disposal Ordinance</i>.</p>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Water Pollution Control Ordinance</i>
5.7.2	C37		At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			<i>Water Pollution Control Ordinance</i> <i>Waste Disposal Ordinance</i>

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					Des	C	O	
5.7.2	C38	<p><i>Storage and Handling of Oil, Other Petroleum Products and Chemicals</i></p> <p>All fuel tanks and chemical storage areas shall be provided with locks and be sited on sealed areas. The storage areas shall be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil, fuel and chemicals from reaching the receiving waters. The Contractors shall prepare guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals.</p> <p><b>WASTE - Construction Phase</b></p> <p>The following procedures and measures shall be implemented when handling waste material.</p> <p><i>Dredged/Excavated Sediment</i></p> <ul style="list-style-type: none"> <li>• Potential impacts associated with the exposure to and disposal of contaminated sediments could be mitigated by adopting the following measures:                             <ul style="list-style-type: none"> <li>• minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities, and preventing eating during dredging/ excavation;</li> <li>• any contaminated sediment dredged should not be allowed to stockpile on the site and should be immediately removed from site once dredged;</li> <li>• all vessels for marine transportation of dredged sediment should be fitted with tight fitting seals to their bottom openings to prevent leakage of materials; and</li> <li>• loading of barges and hoppers should be controlled to prevent splashing of dredged material to the surrounding water, and barges or hoppers should under no circumstances to be filled to a level which will cause other overflowing of materials or polluted water during loading or transportation.</li> </ul> </li> </ul>	At all construction work site, throughout the whole duration of the construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Water Pollution Control Ordinance
6.7.2	D1	<ul style="list-style-type: none"> <li>• Potential impacts associated with the exposure to and disposal of contaminated sediments could be mitigated by adopting the following measures:                             <ul style="list-style-type: none"> <li>• minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities, and preventing eating during dredging/ excavation;</li> <li>• any contaminated sediment dredged should not be allowed to stockpile on the site and should be immediately removed from site once dredged;</li> <li>• all vessels for marine transportation of dredged sediment should be fitted with tight fitting seals to their bottom openings to prevent leakage of materials; and</li> <li>• loading of barges and hoppers should be controlled to prevent splashing of dredged material to the surrounding water, and barges or hoppers should under no circumstances to be filled to a level which will cause other overflowing of materials or polluted water during loading or transportation.</li> </ul> </li> </ul>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance, EPDTC 1-1-92

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
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6.7.2	D2	<p><i>Use of Public Fill for Reclamation</i></p> <p>The Contractor should enforce strict application of the public fill license and monitor the material placed in the reclamation and barges to control disposal of unauthorised material. The Contractor shall also provide floating booms and collect any floating materials on a daily basis at the public filling area.</p> <p><i>Measures Taken in the Planning and Design Stages to Reduce the Generation of C&amp;DM</i></p>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D3	<p>The following waste management hierarchy shall be followed:</p> <ol style="list-style-type: none"> <li>1. avoidance and minimisation, that is, not generating waste through changing or improving practices and design;</li> <li>2. reuse of materials, thus avoiding disposal (generally with only limited reprocessing);</li> <li>3. recovery and recycling, thus avoiding disposal (although reprocessing may be required); and</li> <li>4. treatment and disposal, according to relevant law, guidelines and good practice.</li> </ol> <p>Records of quantities of wastes generated, recycled and disposed (locations) shall be properly kept.</p>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D4	Records of quantities of wastes generated, recycled and disposed (locations) shall be properly kept.	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D5	Any clean excavated soil shall be reused on site as far as possible for landscape works in order to minimise the amount public fill to be disposed off-site. Should there be any surplus public fill generated from the project, the Contractors shall liaise with the Fill Management Committee to identify as far as possible suitable reclamation or site formation projects near the project site to reuse the material.	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D6	The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage of construction materials, such as ready mixed concrete.	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance

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6.7.2	D7	<p><i>Measures To be Taken in the Construction Stage To Reduce the Generation of C&amp;DM</i></p> <p>The Contractor shall recycle as much as possible of the C&amp;D material on-site. Public fill and C&amp;D waste shall be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Concrete and masonry, for example can be crushed and used as fill and steel reinforcing bar can be used by scrap steel mills. Different areas of the work sites should be designated for such segregation and storage.</p> <p>In order to minimise the impacts of the demolition works these wastes must be cleared as quickly as possible after demolition. The demolition and clearance works shall therefore be undertaken simultaneously.</p> <p>The use of wooden hoardings shall not be allowed. An alternative material, for example, metal (aluminium, alloy etc) shall be used.</p>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D8	<p>In order to minimise the impacts of the demolition works these wastes must be cleared as quickly as possible after demolition. The demolition and clearance works shall therefore be undertaken simultaneously.</p> <p>The use of wooden hoardings shall not be allowed. An alternative material, for example, metal (aluminium, alloy etc) shall be used.</p>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D9	<p>The use of wooden hoardings shall not be allowed. An alternative material, for example, metal (aluminium, alloy etc) shall be used.</p>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D10	<p><i>Chemical Waste</i></p> <p>For those processes which generate chemical waste, it may be possible to find alternatives which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste. Containers used for storage of chemical wastes should:</p> <ul style="list-style-type: none"> <li>• be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;</li> <li>• have a capacity of less than 450 L unless the specifications have been approved by the EPD; and</li> <li>• display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations.</li> </ul>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance, Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Packaging, Handling and Storage of Chemical Wastes

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
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		<p>The storage area for chemical wastes should:</p> <ul style="list-style-type: none"> <li>• be clearly labelled and used solely for the storage of chemical waste;</li> <li>• be enclosed on at least 3 sides;</li> <li>• have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;</li> <li>• have adequate ventilation;</li> <li>• be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and</li> <li>• be arranged so that incompatible materials are adequately separated.</li> </ul>						
		<p>Disposal of chemical waste should:</p> <ul style="list-style-type: none"> <li>• be via a licensed waste collector; and</li> <li>• be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers; or</li> <li>• be to a re-user of the waste, under approval from the EPD.</li> </ul> <p>The Centre for Environmental Technology operates a Waste Exchange Scheme which can assist in finding receivers or buyers.</p>						
6.7.2	D11	<p><i>Management of General Refuse</i></p> <p>General refuse generated on-site shall be stored in enclosed bins or compaction units separate from construction and chemical wastes. A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimise odour pest and litter impacts. The burning of refuse shall not be permitted.</p>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance



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6.7.2	D12	Reusable rather than disposable dishware shall be used if feasible. Separate, labelled bins shall be provided, if feasible, for the collection of aluminium cans. The Contractor shall participate in a local waste collection scheme, if one is available, to reduce office wastes.	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D13		To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
		<i>Management of Waste Disposal</i>						
6.7.2	D14	A trip-ticket system should be established and used to monitor the disposal of C&DM and solid wastes at public filling facilities and landfills, and to control fly-tipping.	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance Works Bureau Technical Circular No 5/99
6.7.2	D15	A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) shall be established during the construction stage. <i>Staff Training</i>	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
6.7.2	D16	Training shall be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling at the beginning of the contract.	To be implemented at all workites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance

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					Des	C	O	
6.7.2	D17	<p><i>Dredged Material</i></p> <p>Potential impacts associated with the exposure to and disposal of contaminated sediments shall be mitigated by adopting the following measures:</p> <ul style="list-style-type: none"> <li>minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities, and preventing eating during dredging;</li> <li>any contaminated sediment dredged should not be allowed to stockpile on the site and should be immediately removed from site once dredged;</li> <li>all vessels for marine transportation of dredged sediment should be fitted with tight fitting seals to their bottom openings to prevent leakage of materials; and</li> <li>loading of barges and hoppers should be controlled to prevent splashing of dredged material to the surrounding water, and barges or hoppers should under no circumstances to be filled to a level which will cause other overflowing of materials or polluted water during loading or transportation.</li> </ul>	To be implemented at all worksites throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance
		<p><i>Waste Management Plan</i></p> <p>The construction Contractor shall incorporate the above recommendations into a Waste Management Plan for the construction works. Such a management plan shall incorporate site specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.</p>	To be produced by all construction contractors and submitted to the Engineer for approval at the commencement of the construction period. The Plans shall be implemented throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Waste Disposal Ordinance

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7.7.1	E1	<b>TERRESTRIAL ECOLOGY - Construction Phase</b> It is assumed that the Contractor for the Penny's Bay Stage 1 reclamation works will have adjusted the construction area to avoid/minimize direct impact on the rare/restricted plant <i>Schoenus falcatus</i> and <i>Eriocaulon merrilli</i> at Penny's Bay and Chok Ko Wan Tsui. If avoidance of these habitats and plant species was not found to be possible, the Contractor for the Penny's Bay Stage 1 reclamation works should have transplanted the affected individuals to an environment similar to the original habitat (rocky shore with freshwater seepage or near a small stream) before the works commenced. The Contractor for the Penny's Bay Stage 2 reclamation works shall review the his activities to ensure that he avoids/minimises any further direct impact to the rare/restricted plant <i>Schoenus falcatus</i> and <i>Eriocaulon merrilli</i> . If further impacts are unavoidable, the Contractor for the Penny's Bay Stage 2 reclamation works shall undertake further transplanting of the affected individuals before the works commence.	Chok Ko Wan Tsui/ During design and construction stage / At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			
7.7.2	E2	<i>White-bellied Sea Eagle</i> Prohibit construction workers access to the nesting site of White-bellied Sea Eagles at Pa Tau Kwu secondary woodland through warning and regular audit by Site Engineer, and fence off the public land access from the development areas.	At all construction work sites close to Pa Tau Kwu secondary woodland/ Throughout the whole construction period detailed design stage / At the end of detailed design stage	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			
7.7.2	E3	Use quiet construction plant and equipment for Penny's Bay Stage 2 reclamation.	At all construction work sites close to Pa Tau Kwu secondary woodland/ Throughout the whole construction period / At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			
		<i>Construction Practice</i>						

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
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7.7.3	E4	Erect fences where practical along the boundary of construction sites before the commencement of works to prevent tipping, vehicle movements, and encroachment of personnel into adjacent areas, particularly where the locally rare White-bellied Sea Eagles <i>Haliaeetus leucogaster</i> at Pa Tau Kwu woodland is located;	At all construction work sites close to Pa Tau Kwu secondary woodland /Throughout the whole construction period /At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			
7.7.3	E5	Select haul routes, storage and works areas etc. to avoid or minimize disturbance to ecologically significant areas;	At all construction work sites /Throughout the whole construction period / At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			
7.7.3	E6	Check the work site boundaries regularly to ensure that they are not exceeded and that no damage has been caused to surrounding natural habitats;	At all construction work sites /Throughout the whole construction period / At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			
7.7.3	E7	Prohibit and prevent open fires within the work site boundary during construction and provide temporary fire fighting equipment in all work areas.	At all construction work sites /Throughout the whole construction period / At the end of construction period	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			

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EP Clause 2.22	E8	<p>Clause 2.22 of the EP (VEP-018/2000/A/EP-054) requires that no less than 6 ha of compensatory tree planting is carried out at Ngong Sheung Au. A compensatory tree planting plan shall be produced and deposited with the Director within 2 months after the commencement of construction. The compensatory tree planting plan shall conform to the recommendations of the EIA Report and shall include information on the size and location of the planting site, species to be planted, schedule of the plantation works, the monitoring and maintenance arrangements of the planted trees. A monitoring programme shall be carried out by qualified botanists for at least 3 years, and a maintenance programme for 10 years after plantation. The Contractor shall ensure, as part of his EMS system, that the required deliverable is produced on schedule. He shall also employ suitably qualified personnel to undertake the initial 3 year monitoring programme. The 10 year maintenance programme shall be arranged by the Permit Holder.</p>	<p>Within 2 months after the commencement of construction</p>	<p>To be implemented by the Contractors and enforced by the Engineer/ENPO</p>	✓			<p>Clause 2.22 of the EP (VEP-018/2000/A/EP-054)</p>

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EP Clause 2.23	E9	In accordance with Clause 2.23 of the EP (VEP-018/2000/A/EP-054) the Contractor shall undertake a detailed vegetation survey before undertaking any works within the areas where the rare/restricted/protected plant species may be found. Three copies of the detailed vegetation report shall be deposited with the Director within 8 weeks after the commencement of the construction of the Project. The survey report shall indicate the detailed setting out of the Project site boundary and demonstrate that the impacts are avoided or minimised to the most practicable extent.	Before the commencement of works within the areas where the rare/restricted/protected plant species may be found, and within 8 weeks after the commencement of the construction of the Project.	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.23 of the EP (VEP-018/2000/A/EP-054)
EP Clause 2.23	E10	The detailed vegetation survey shall be undertaken by qualified botanists. Individuals of the concerned species shall be identified and marked as the basis for the detailed design / refinement of the transplantation requirements.  No construction works are permitted on the relevant parts of the Project prior to the transplantation of the plant species. The Contractor shall ensure, as part of his EMS system, that this condition is complied with.	Upon completion of the detailed vegetation survey	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.23 of the EP (VEP-018/2000/A/EP-054)
		<b>MARINE ECOLOGY AND FISHERIES - Construction Phase</b>						

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
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8.7.1	F1	<i>Marine Ecological Resources: General</i> In order to assist in rehabilitating the area after reclamation, a sloping armour rock/ concrete design should be adopted for the construction of the seawalls.	To be developed during the detailed design and implemented during the construction phase	To be developed by the Detailed Design Engineers, implemented by the Contractors and enforced by the Engineer/ENPO	✓			
8.7.2	F2	<i>Marine Ecological Resources: Marine Mammals</i> The following mitigation measures shall be implemented to minimize potential construction impacts to dolphins and porpoises: 1. All vessel operators working on the Project construction shall be given a briefing, alerting them to the possible presence of dolphins and porpoises in the area, and the rules for safe vessel operation around cetaceans. If high speed vessels are used, they should be required to slow to 10 knots when passing through a high density dolphin area; 2. A policy of no dumping of rubbish, food, oil, or chemicals should be strictly enforced. This should also be covered in the contractor briefing; 3. Every attempt shall be made to minimize the effects of construction of the Project on the water quality of the area; 4. Any construction work that could potentially harm dolphins shall be planned to take place in spring (Mar - May) or summer (Jun-Aug), when dolphin abundance is apparently lowest. In particular, the winter season (Dec - Feb) should be avoided; 5. If piling must be done in autumn or winter, then the following steps shall be taken:	To be implemented throughout the full duration of the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			

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8.11.4 & 8.11.5	F3	<ul style="list-style-type: none"> <li>An exclusion zone of 500 m radius should be scanned around the work area for at least 30 minutes prior to the start of piling. If cetaceans are observed in the exclusion zone, piling should be delayed until they have left the area; and</li> <li>A bubble curtain shall be used to surround the piling barge and work area, and the bubble curtain shall be in operation during any time in which piling occurs.</li> </ul>						
		<p>As an additional habitat enhancement measure the Project proponent has undertaken to deploy Artificial Reefs (ARs) in Hong Kong waters at a site (or sites) to be decided upon consultation with the Director of Agriculture, Fisheries and Conservation. To be effective in enhancing marine resources, it is recommended that the ARs should have a minimum volume of 400m<sup>3</sup>. The stocking density of the ARs should also be no less than 1,500m<sup>3</sup> km<sup>-2</sup>. The total area of seabed lost through reclamation works for the Theme Park is 290ha (280 ha at Penny's Bay and 10 ha for Yam O). In order to enhance an equivalent area of this size 4,350m<sup>3</sup> of ARs should be deployed (1,500 m<sup>3</sup> x 2.9 km<sup>-2</sup>). One potential location for the deployment of the ARs is the area north of the Luk Keng headland.</p>	The exact location and timing for the AR deployment will be submitted to EPD and others for approval.	CED		✓		
		<b>ARCHAEOLOGY AND CULTURAL HERITAGE - Construction Phase</b>						
11.6	G1	<p>In order to minimise the potential for impact to the Wan Tuk archaeological site, the following mitigation measures shall be implemented:</p> <ul style="list-style-type: none"> <li>Plastic sheets shall be used to cover the impact area before construction of the temporary access road.</li> <li>After the completion of the Penny's Bay reclamation, all the fill materials and plastic sheets shall be removed.</li> </ul>						
			Prior to and throughout the construction of the temporary access road	To be implemented by the Contractors and enforced by the Engineer/ENPO		✓		
			On completion of the Penny's Bay reclamation	To be implemented by the Contractors and enforced by the Engineer/ENPO		✓		



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					Des	C	Dec	
		<ul style="list-style-type: none"> <li>Any area required to be filled shall be covered by plastic sheets before the filling work.</li> <li>Detailed design of filling work or ground level adjustment work shall consider diversion of site runoff to prevent waterlogged conditions.</li> </ul>	<p>Prior to and throughout the filling works</p> <p>During the detailed design stage and before the commencement of filling or ground level adjustment work</p>	<p>To be implemented by the Contractors and enforced by the Engineer/ENPO</p> <p>To be undertaken by the detailed design engineers, implemented by the Contractors and enforced by the Engineer/ENPO</p>	✓	✓		
11.6	G2	<p>An opportunity shall be provided for an archaeological field evaluation at the coastal area of the existing CLS after its resumption, as part of the Schedule 2 EIA for the Shipyard decommissioning. If significant archaeological deposit are found at the Shipyard site, direct impact to the identified archaeological deposits will be unavoidable as the alignment design are the preferred alignments on other considerations. Therefore, if preservation <i>in situ</i> is not possible, rescue excavation programme should be implemented and a full rescue excavation could be consider, if necessary, since the Penny's Bay reclamation will result in limitation for future archaeological investigation.</p>	<p>At the CLS site, under the Schedule 2 EIA for CLS decommissioning.</p>	<p>CED and AMO/qualified archaeologist</p>	✓			

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
11.6 and EP Clause 2.37	G3	In accordance with Clause 2.37 of the EP (VEP-018/2000/A/EP-054) a rescue excavation at Chok Ko Wan archaeological site shall be completed prior to any construction works commencing within the defined archaeological site area. Whilst the works associated with the Stage 2 reclamation works are not envisaged to encroach upon this site, the Contractor should be aware of this condition and should, if necessary, take appropriate action to comply with this requirement.	Chok Ko Wan archaeological site	Contractor and AMO/qualified archaeologist	✓			
EP Clause 2.8(c)	G4	In accordance with Clause 2.8(c) of the EP (VEP-018/2000/A/EP-054) the Contractor shall ensure that all fill materials and plastic sheets within the Wan Tuk archaeological area are removed after completion of the Penny's Bay Reclamation works. The Stage 2 Contractor shall ensure, as part of his EMS system, that this condition is complied with, and shall report compliance with this condition within the EM&A reporting mechanism. <b>HAZARD - Construction Phase</b>	Wan Tuk archaeological area	To be implemented by the Contractors and enforced by the Engineer/ENPO				Clause 2.8(c) of the EP (VEP-018/2000/A/EP-054)
		Not applicable						
		CONTAMINATED LAND - Construction Phase						
		Not applicable						
		<b>LANDSCAPE AND VISUAL - Construction Phase</b>						
12.4.8	H1	Connection of existing streams to drainage systems to be undertaken with minimum alteration to stream course. Visually exposed structures associated with the connection to be stonefaced to reflect the rural character of the local area.	At all existing streams, throughout the duration of the construction of the connection of the streams to the new drainage system.	CED/DSD	✓			
12.4.18	H2	Temporary hydroseeding to reclamation if lapse time between completion of the reclamation and subsequent development is one year or more.	At all reclamation, on completion of reclamation until subsequent development.	CED	✓			

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	Dec	
EP Clause 3.1	H3	<p>In accordance with Clause 3.1 of the EP (VEP-018/2000/A/EP-054) the following earth berms shall be constructed prior to the operation of the Theme Park.</p> <p>a) Earth berms of 5 to 9 m high shall be constructed to encircle the Theme Park;</p> <p>b) Earth berms of at least 9 m high shall be constructed to encircle the Sewage Pumping Station; and,</p> <p>c) Earth berms of at least 9 m high shall be constructed to encircle the Penny's Bay Gas Turbine Plant (GTP).</p> <p>The Contractor shall ensure, as part of his EMS system, that the required earth berms are constructed prior to the operation of the Theme Park. Progress related to compliance with this matter shall be reported in the monthly EM&amp;A reports.</p>	Prior to the operation of the Theme Park.	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 3.1 of the EP (VEP-018/2000/A/EP-054)
		<b>EM&amp;A REQUIREMENTS - Construction Phase</b>						
		<i>Air Quality</i>						
3.7	I1	<p>Subject to the Environmental Protection Department's (EPD's) agreement, construction phase dust monitoring shall be undertaken at the following location in accordance with the recommendations of the EM&amp;A Manual.</p> <ul style="list-style-type: none"> <li>ASR1- Penny's Bay Gas Turbine Plant</li> </ul> <p><i>Construction Noise</i></p>	At specified dust monitoring locations throughout the duration of the construction works	To be undertaken by the EMT and reviewed/ audited by the EAT	✓			Air Pollution Control (Construction Dust) Regulations

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines	
					Des	C	O		Dec
4.9	12	<p>Subject to the Environmental Protection Department's (EPD's) agreement, construction phase noise monitoring shall be undertaken at the following locations in accordance with the recommendations of the EM&amp;A Manual.</p> <ul style="list-style-type: none"> <li>• NSR1 - Sea Crest Villa (Peng Chau)</li> <li>• NSR2 - Crestmont Villa (Discovery Bay)</li> <li>• NSR3 - Luk Keng Tsuen</li> </ul> <p><i>Water Quality</i></p> <p>Subject to the Environmental Protection Department's (EPD's) agreement, construction phase water quality monitoring shall be undertaken at the following locations in accordance with the recommendations of the EM&amp;A Manual.</p> <p>Sensitive Receiver Stations</p> <ul style="list-style-type: none"> <li>• SR1: Kau Yi Chau;</li> <li>• SR2: Discovery Bay;</li> <li>• SR3: Sze Pak Wan;</li> <li>• SR4: Ma Wan Fish Culture Zone South;</li> <li>• SR5: Ma Wan Fish Culture Zone North;</li> <li>• SR6: Tung Wan Beach; and,</li> <li>• SR7: Ma Wan Fish Culture Zone.</li> </ul>	At specified noise monitoring locations throughout the duration of the construction works.	To be undertaken by the EMT and reviewed/ audited by the EAT	✓			Noise Control Ordinance (NCO)	
5.13.1	13	<p><i>Water Quality</i></p> <p>Subject to the Environmental Protection Department's (EPD's) agreement, construction phase water quality monitoring shall be undertaken at the following locations in accordance with the recommendations of the EM&amp;A Manual.</p> <p>Sensitive Receiver Stations</p> <ul style="list-style-type: none"> <li>• SR1: Kau Yi Chau;</li> <li>• SR2: Discovery Bay;</li> <li>• SR3: Sze Pak Wan;</li> <li>• SR4: Ma Wan Fish Culture Zone South;</li> <li>• SR5: Ma Wan Fish Culture Zone North;</li> <li>• SR6: Tung Wan Beach; and,</li> <li>• SR7: Ma Wan Fish Culture Zone.</li> </ul>	At specified water quality monitoring locations throughout the duration of the construction works.	To be undertaken by the EMT and reviewed/ audited by the EAT				Water Pollution Control Ordinance (WPCO)	
		Control Monitoring Stations C1 to C6 as detailed in Section 7 of the EM&A Manual							
		Gradient Stations G1-G6							
7.9	14	<p><i>Terrestrial Ecology - White-bellied Sea Eagle</i></p> <p>Subject to the EPD's agreement, construction phase monitoring of the White-bellied Sea Eagle shall be undertaken in accordance with the recommendations of the EM&amp;A Manual</p>	Throughout the duration of the construction works.	To be undertaken by an avian specialist with at least 3 years experience	✓				

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**			Relevant Legislation & Guidelines
					Des	C	O	
EP Clause 2.30	15	<p>Marine Ecological Monitoring</p> <p>In accordance with Clause 2.30 of the EP (VEP-018/2000/A/EP-054) the Contractor shall undertake underwater video/ photography to determine the changes to the subtidal conditions during construction. The underwater video/ photography shall be undertaken in accordance with the methodology defined in the EM&amp;A Manual related to the Penny's Bay Stage 1 reclamation works.</p>	Throughout the construction phase	To be implemented by the Contractors and enforced by the Engineer/ENPO	✓			Clause 2.30 of the EP (VEP-018/2000/A/EP-054)
8.12	16	<p>Subject to the Environmental Protection Department's (EPD's) agreement, construction phase monitoring of the dolphin/ porpoise population shall be conducted by a qualified research team in accordance with the recommendations of the EM&amp;A Manual.</p>	Throughout the construction phase	To be undertaken by qualified research team employed Contractor	✓			

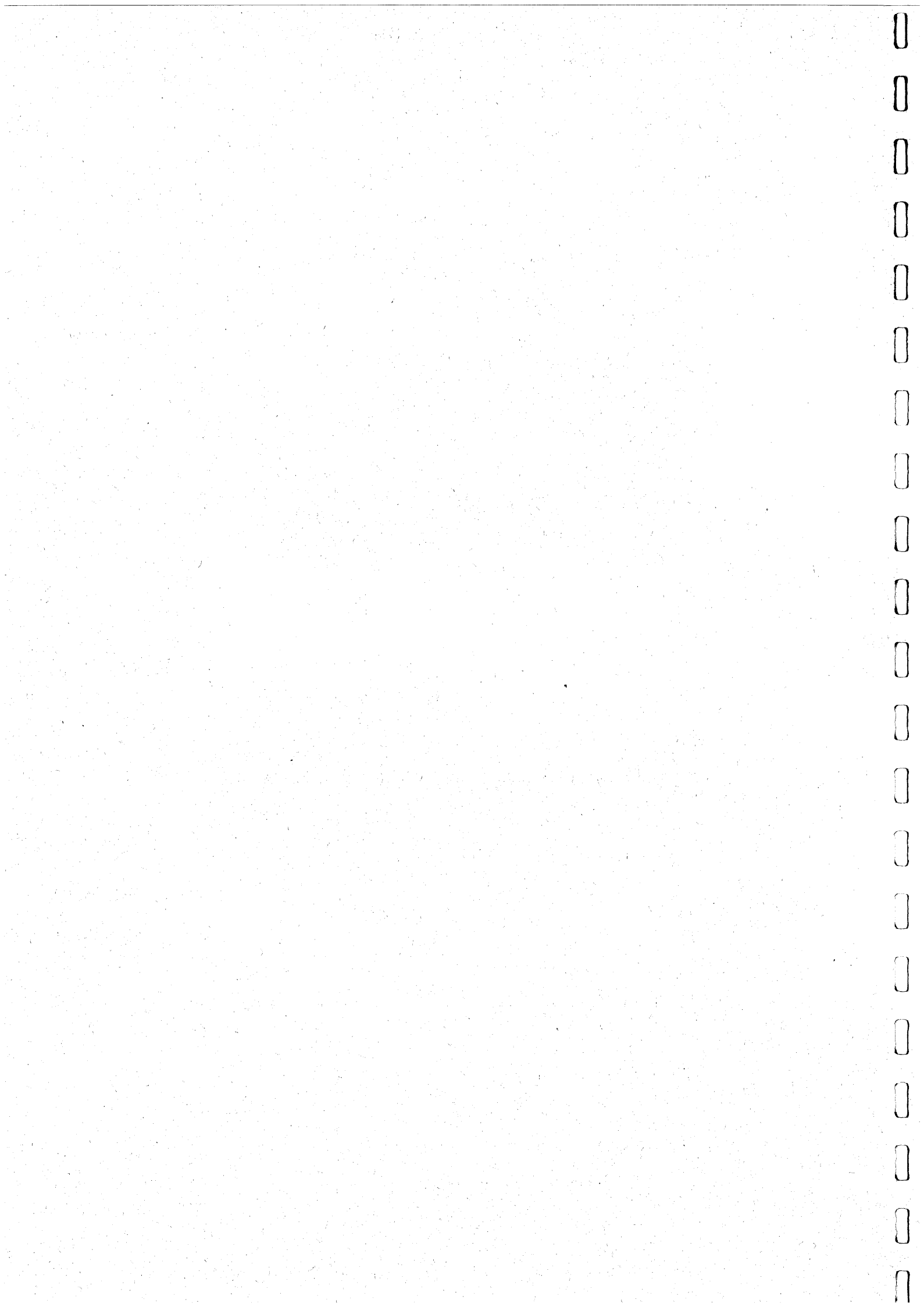
\* Des = Design, C = Construction, O = Operation, Dec = Decommissioning

Table A2 Implementation Schedule for the Penny's Bay Reclamation - Operational Phase

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		<b>AIR QUALITY - Operational Phase</b> Not applicable							
		<b>NOISE - Operational Phase</b> Not applicable							
		<b>WATER QUALITY- Operational Phase</b> Not applicable							
		<b>WASTE - Operational Phase</b> Not applicable							
		<b>TERRESTRIAL ECOLOGY - Operational Phase</b> Not applicable							
		<b>MARINE ECOLOGY AND FISHERIES - Operational Phase</b> Not applicable							
		<b>ARCHAEOLOGY AND CULTURAL HERITAGE - Operational Phase</b> There shall be adequate drainage provision to prevent waterlogging to the Wan Tuk archaeological site	In the vicinity of the Wan Tuk archaeological site	To be developed by the Design Engineers and implemented by the contractors.	✓			✓	
		<b>HAZARD - Operational Phase</b> Not applicable							
		<b>CONTAMINATED LAND - Construction Phase</b> Not applicable							
		<b>LANDSCAPE AND VISUAL - Operational Phase</b> Not applicable							

EIA* Ref.	EM&A Log Ref	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage**				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		<i>EM&amp;A REQUIREMENTS - Operational Phase</i> <i>Marine Ecology</i>							
7.9 and EP Clause 2.30	B1	Ecological monitoring, comprising subtidal dive surveys, shall be undertaken after the reclamation has ceased in order to determine the rate and effectiveness of colonisation of the sloping armour rock/ concrete seawalls by soft coral.	The ecological monitoring shall be carried out by suitably qualified specialists at six monthly intervals for a period of 3 years	CED		✓			Clause 2.30 of the EP (VEP-018/2000/A/EP-054)
EP Clause 2.30	B2	If the recolonisation of the rubble mound seawalls by corals is slow, the Permit Holder shall (in accordance with Clause 2.30 of the EP (VEP-018/2000/A/EP-054)) extend the duration of the monitoring programme by 3 years. If recolonisation does not occur, the Permit Holder shall submit proposals for further mitigation measures.		EP Permit Holder		✓			Clause 2.30 of the EP (VEP-018/2000/A/EP-054)

\* Des = Design, C = Construction, O = Operation, Dec = Decommissioning





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