

PREPARED BY

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Limited**

FOR

Super Winner Development Ltd

**Dredging Works for Cruiser
Operation in North Point**

Project Profile

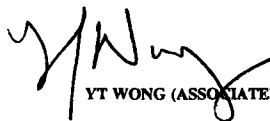
June 1999

CHECKED



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1. INTRODUCTION

1.1 Background

- 1.1.1 On the 26 February 1999 City Planning Consultants Ltd, on behalf of the applicant, Super Winner Development Ltd (the project proponent), successfully submitted a request for amendments to be made to the draft North Point Outline Zoning Plan (OZP) No. S/H8/7 to the Town Planning Board. The amendment to the draft OZP included the rezoning of a small part of the Victoria harbour as "OU (Pier)" to allow for the development of a cruise pier. In order to allow cruiser access to the cruise pier, a dredging campaign in Victoria Harbour is required.
- 1.1.2 Scott Wilson (Hong Kong) Ltd has been appointed by Super Winner Development Ltd to prepare a Project Profile for the required North Point dredging works in accordance with the Environmental Impact Assessment (EIA) Ordinance.

1.2 The Study Area

- 1.2.1 The proposed dredging area is shown in **Figure 1**. The dredging site is located in Victoria Harbour to the north of North Point. Further details of the site and the surrounding environment are given in Chapter 4 of this Project Profile.

2. BASIC INFORMATION

2.1 Project Title

- 2.1.1 Project title: **Dredging Works for Cruiser Operation in North Point**

2.2 Site Background and History

- 2.2.1 The site currently comprises a small part of Victoria Harbour off North Point. The dredging work is required to facilitate cruiser operation in the area.

2.3 Purpose and Nature of the Project

- 2.3.1 The dredging work is required in order to allow cruisers with a maximum length of approximately 280m access to the proposed cruise pier. The dredging work will involve the removal of more than 500,000m³ of material.

2.4 Name of Project Proponent

- 2.4.1 Super Winner Development Ltd.

2.5 Location and Scale of Project

- 2.5.1 The proposed dredging site is located in Victoria Harbour to the north of North Point. The Causeway Bay Typhoon Shelter is situated to the south-west of the dredging site (refer to **Figure 1**).

2.5.2 To the south of the dredging area there is mixed-use built environment as illustrated in **Figure 2**. The following features have been identified:

1. Government Supplies Department (vacated)
2. Provident Centre (residential/commercial)
3. City Garden Hotel
4. Newton Hotel
5. Asia Cold Storage Ltd. (industrial)
6. Manulife Tower (commercial)
7. New Office Development (commercial under construction)
8. City Garden (residential area)
9. King Wah House (residential)
10. Loy Mansion (residential)
11. Wong Fai Mansions (residential)
12. Harbour Heights (residential)
13. Sea View Estate (industrial)

2.6 Number and Types of Designated Projects

2.6.1 The proposed dredging work will constitute a Designated Project as detailed under Schedule 2 Part 1 (Category C12) of the EIA Ordinance given the requirement for dredging works less than 100m from a seawater intake point, as well as dredging a sediment volume in excess of 500,000m³ of sediment.

2.6.2 It is noted that dredging is not required to facilitate cruise pier construction. The cruise pier development does not constitute a Designated Project as dredging is not required, whilst the areal coverage of the pier is < 1ha (pier area approx. 0.6ha).

2.7 Name and Telephone Number of Contact Persons

2.7.1 Name and telephone number of contact person(s):

Project Proponent:	Super Winner Development Ltd
Planning Consultants:	City Planning Consultants Ltd
Environmental Consultants:	Scott Wilson (Hong Kong) Ltd

3. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

3.1 Planning Background and Implementation Process

3.1.1 Dredging is required to allow cruiser access to a proposed cruise pier in North Point. The project will be privately funded. Consultants will be employed to undertake the planning, engineering, marine and environmental elements of the project.

3.2 Proposed Implementation Time Table

3.2.1 The programme for this project is currently tentative. The major elements of the project are as follows:

Environmental Programme

EIA Ordinance process June 1999 - July 2000

Engineering Programme

Preliminary design July - December 1999
Detailed design January - July 2000
Draft contracts/tender period August - November 2000
Selection of Contractor December 2000

Construction

Award of Contract January 2001
Dredging Dredging likely to be completed within 4 to 5 months

3.3 Interaction with Other Existing or Planned Projects

3.3.1 The dredging work is likely to be completed prior to cruise pier construction and development of the Oil Street hotel/terminal development - it is noted that these developments do not constitute Designated Projects.

4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

4.1 Noise Sensitive Receivers

4.1.1 The noise climate near the Study Area is primarily dominated by road traffic noise from the Island Eastern Corridor and general community noise. Other contributing noise sources include offshore marine activities. The overall noise climate of the Study Area is not anticipated to change.

4.1.2 Noise sensitive receivers (NSRs) are defined as any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of worship, library, court of law or performing arts centre that are within 300m of the works site boundary. Definition of a site as a NSR does not necessarily mean that the area will be adversely impacted by the works. The closest NSRs to the Study Area are the residential blocks between King Wah Road and Wang On Road (NSR4) to the south, City Garden (NSR1) to the east and Harbour Heights (NSR2) to the south-west of the site. A description of the identified representative potential NSRs in the vicinity of the dredging works area and landuses are summarised in **Table 4.1**. The location of potential NSRs are shown in **Figure 3**.

Table 4.1 Representative Noise Sensitive Receivers in Vicinity of Dredging Area.

NSR	Description	Land uses [#]
1	City Garden	R
2	Harbour Heights	R
4	Residential area between King Wah Rd and Wang On Rd	R
5	Henrietta School	S
6	Provident Centre	R
7	Residential area between Wharf St and Electric Rd	R
8	Residential area between Chun Yeung St and King's Rd	R
9	Residential area between Tin Chong St and Electric Rd	R
10	Residential area between Tin Chong St and Power St	R
11	Residential area between Fuk Yuen St and Power St	R
12	Residential area between Fuk Yuen St and Boat St	R
13	Residential area between Merlin St and Oil St	R
14	Residential area between Merlin St and Shell St	R
15	Victoria Center	R
16	Residential area between Watson St and Glass St	R
17	Fortress Garden	R
18	Fortress Metro Tower	R
19	Kwong Chiu Terrace	R
20	North Point Centre	R
21	Residential area between Cheung Hong St and Fortress Hill Rd	R
22	North Point Methodist Primary School	S
23	Clementi Secondary School	S
24	Cannon Garden	R

R – Residential; S – School

4.2 Air Sensitive Receivers

- 4.2.1 In accordance with the HKPSG and the EIA-TM, domestic premises, hotels, educational institutions, offices, factories, shops, shopping centres, places of public worship, libraries, courts of law, sports stadiums and performing arts centres within 500m of a works site are considered to be Air Sensitive Receivers (ASRs). Definition of a site as an ASR does not mean that the location will be adversely impacted during the works. Sensitive receiver locations have been identified through a review of both existing and committed land uses, site visits and a review of Planning Department information.
- 4.2.2 Thirty-two potential ASRs have been identified and their locations are shown in **Figure 4**. A description of the ASRs and the corresponding land uses are summarised in **Table 4.2**.

Table 4.2 Air Sensitive Receivers (ASRs) in the Vicinity of the Dredging Area.

ASR	Description	Land uses [#]	Height
1	Government Supplies Department	C	23 m
2	City Garden	R	79 m
3	Harbour Heights	R	116 m
5	Residential area between King Wah Rd and Wang On Rd	R	68 m
6	Commercial area between Wang On Rd and Electric Rd	C	159 m
7	The Electric Centre	C	43 m
8	Henrietta School	S	21 m
9	Provident Centre	R	74 m
10	Residential area between Wharf St and Electric Rd	R	66 m
11	City Garden Hotel	H	75 m
12	Residential area between Chun Yeung St and King's Rd	R	34 m
13	Residential area between Tin Chong St and Electric Rd	R	34 m
14	Residential area between Tin Chong St and Power St	R	34 m
15	Olympia Plaza	C	146 m
16	Residential area between Fuk Yuen St and Power St	R	60 m
17	Residential area between Fuk Yuen St and Boat St	R	58 m
18	Newton Hotel	H	63 m
19	Residential area between Merlin St and Oil St	R	68 m
20	Residential area between Merlin St and Shell St	R	81 m
21	Victoria Centre	R	107 m
22	Residential area between Watson St and Glass St	R	92 m
23	Commercial area between Shell St and Jupiter St	C	96 m
24	Fortress Garden	R	118 m
25	Fortress Metro Tower	R	104 m
26	Fortress Tower	C	71 m
27	Kwong Chiu Terrace	R	70 m
28	North Point Centre	R	70 m
29	Residential area between Cheung Hong St and Fortress Hill Rd	R	69 m
30	North Point Methodist Primary School	S	15 m
31	Clementi Secondary School	S	21 m
32	Cannon Garden	R	87 m

[#] R – Residential; C – Commercial/Office; H – Hotel; S – School

4.3 Water Sensitive Receivers

4.3.1 Water sensitive receivers located in the vicinity of the proposed dredging area are as follows (refer to **Figure 1**):

- Victoria Harbour Water Control Zone (Phase 3);
- the Causeway Bay Typhoon Shelter;
- cooling water abstraction point at City Garden;
- cooling water abstraction point at the Provident Centre;
- Water Supplies Department (WSD) pumping station at North Point.

4.3.2 Of the identified sensitive receivers, the cooling water abstraction inlets for City Garden and the Provident Centre, and the WSD pumping station are considered to be the most

sensitive and in need of protection during the dredging works. It is noted that there are numerous cooling water system inlets and WSD pumping stations in Victoria Harbour.

4.4 Ecology Sensitive Receivers

4.4.1 Due to the disturbed nature of the site and the water quality of this area, it is anticipated that there will be no marine ecology of significant interest. It is thus considered that there are no sensitive ecological receivers in the vicinity of the proposed dredging works.

5. POSSIBLE IMPACTS ON THE ENVIRONMENT

5.1 Introduction

5.1.1 During the dredging work there is the potential for impacts upon the environment to occur. The following sections present a preliminary assessment for the dredging work to potentially impact upon the following key environmental criteria:

- noise
- air quality
- water quality
- ecology

5.1.2 Following the assessment of possible environmental impacts, recommendations for mitigation measures are provided in Chapter 6.

5.2 Noise Impacts

Introduction

5.2.1 Dredging works may result in noise impacts which need to be controlled and minimised. This section addresses potential sources of impact and assesses their potential significance. Recommendations for suitable mitigation measures are presented in Chapter 6.

Noise Legislation

Dredging Phase Legislation

5.2.2 In Hong Kong the control of construction noise is carried out under the Noise Control Ordinance (NCO) and two subsidiary Technical Memoranda (TM), namely *Noise from Percussive Piling* (PP-TM) and *Noise from Construction Work Other Than Percussive Piling* (GW-TM). These TMs establish the permitted noise levels for construction work depending upon working hours and the existing noise climate.

5.2.3 An additional TM on *Noise from Construction Work in Designated Areas* (DA-TM) deals with the control of noise generated by Specified Powered Mechanical Equipment (SPME) and Prescribed Construction Works (PCWs) in identified designated areas. SPME

includes hand-held breakers, bulldozers, concrete lorry mixers, dump trucks and hand-held poker vibrators; while PCWs include erection/dismantling of formwork/scaffolding, loading/ unloading of rubble, wooden boards, steel bars, wood or scaffolding material and hammering. The criteria detailed in the DA-TM are considered applicable to this Study.

5.2.4 The NCO criteria for the control of noise from Power Mechanical Equipment (PME) is dependent upon the Area Sensitivity Rating (ASR), which is a "letter" system describing the background noise conditions in which the Noise Sensitive Receivers (NSRs) are located, rather than the measured background noise levels. The NCO requires that construction related noise levels affecting NSRs should be less than the specified Acceptable Noise Level (ANL) which relates to the ASR. **Table 5.1** below shows the ASR selection criteria as stated in the GW-TM.

Table 5.1 Area Sensitivity Rating (ASR) Criteria during Construction.

Type of area containing the NSR	Degree to which NSR is affected by IF		
	Not Affected ⁽¹⁾	Indirectly Affected ⁽²⁾	Directly Affected ⁽³⁾
(i) Rural area, including country parks or village type developments	A	B	B
(ii) Low density residential area consisting of low- rise or isolated high-rise developments	A	B	C
(iii) Urban area	B	C	C
(iv) Area other than those above	B	B	C

- (1) Not Affected means that the NSR is at such a location that the noise generated by the influencing factors⁽⁴⁾ (IFs) is not noticeable at the NSR
- (2) Indirectly Affected means that the NSR is at such a location that the noise generated by the IF, whilst noticeable at the NSR, is not a dominant feature of the noise climate of the NSR
- (3) Directly Affected means that the NSR is in such a location that the noise generated by the IF is readily noticeable at the NSR and is a dominant feature of the noise climate of the NSR
- (4) IFs are defined as industrial areas, major roads or the area within the boundary of Hong Kong International Airport

5.2.5 It is intended that the dredging activities are planned and controlled in accordance with the NCO, GW-TM and DA-TM. Works requiring the use of PME during restricted hours and particularly at night will need to be carried out under the provision of a Construction Noise Permit (CNP) and planned to achieve the required Basic Noise Level (BNL) - these are shown in **Table 5.2** below.

Table 5.2 Basic Noise Levels (in $L_{eq, 30 \text{ min}}$ dB(A)).

Time Period	Area Sensitivity Rating		
	A	B	C
All days during the evening (1900-2300) and general holidays (including Sundays) during the day and evening (0700-2300)	60(45)	65(50)	70(55)
All days during the night-time (2300-0700)	45(30)	50(35)	55(40)

N.B. BNL in brackets apply to SPME and PCW specified in DA-TM.

- 5.2.6 The BNL is corrected using the TM methodology to produce the ANL which is in the CNP approval process.
- 5.2.7 A limit of $L_{eq(30 \text{ min})}$ 75 dB(A) for daytime construction activities, as detailed in Table 1B of the *Technical Memorandum on Environmental Impact Assessment Process (EIA-TM)* is considered to be applicable to this Study. This standard applies to all domestic premises including temporary housing accommodation, hotels and hostels which rely on opened windows for ventilation. For schools, a daytime noise level of L_{eq} 70 dB(A), lowered to 65 dB(A) during examination periods, is required.
- 5.2.8 Subsidiary regulations of the NCO include the *Noise Control (Hand Held Percussive Breakers)* and *Noise Control (Air Compressors) Regulations*, which require compliance with relevant noise emission standards and the fixing of noise emission labels to specified plant and equipment. While these requirements are not directly relevant to the dredging noise impact assessment, Contractors must meet them during the dredging phase of the project.
- 5.2.9 A CNP is required by the regulations of the NCO for the use of all PME during restricted hours. The procedures set out in GW-TM, DA-TM and PP-TM are used by EPD to determine whether or not a CNP should be issued. CNPs will not automatically be granted and are assessed on a case-by-case basis.

Dredging Noise Impacts

- 5.2.10 In order to assess the potential for noise impacts during the proposed dredging work, the methods specified in the GW-TM need to be followed. In general, the methodology for a dredging noise assessment needs to undertake the following:
- locate appropriate NSRs with respect to the worksite (refer to Chapter 4);
 - identify noise generating activities due to dredging activities;
 - determine distance attenuation and screening effects to NSRs from dredging worksite notional noise source point;
 - predict noise levels at NSRs in the absence of any mitigation measures; and
 - calculate the maximum total site Sound Power Level (SWL) for mitigated dredging activities such that noise levels at NSRs comply with appropriate noise criteria.

- 5.2.11 The practicality of achieving the above-mentioned maximum total site SWL then needs to be considered in the light of viable options since this “performance specification” might offer a preferred form of mitigation. Other mitigation measures then need to be considered and recommended - refer to Chapter 6.

Dredging Noise Impact Source Identification

- 5.2.12 The major potential source of noise during the dredging activities will be the on-site use of PME. Typical PME used during dredging works include grab dredgers, cutter suction dredgers, tug boats and derrick barges.
- 5.2.13 The number and type of PME will vary with the proposed dredging methodology and programme.
- 5.2.14 The EIA will need to investigate the potential significance of noise impacts on the identified sensitive receivers during the proposed dredging work taking into account the number and location of specified PME.

Operational Noise Assessment Methodology

- 5.2.15 Following completion of the dredging campaign there may be the necessity to undertake periodic dredging works. The potential for noise impacts during these works will need to be assessed during the EIA.

5.3 Air Quality Impacts

Introduction

- 5.3.1 Dredging works could potentially impact upon air quality through the generation of dust or emissions from dredgers. As dredged material contains a high moisture content, potential dust impacts are unlikely to occur. Impacts associated with dredger emissions are also considered unlikely to adversely impact upon identified ASRs given the distance between the proposed dredging operations and the identified ASRs, and the occurrence of Island Eastern Corridor. Overall, it is not anticipated that the dredging work will adversely impact upon air quality.

5.4 Water Quality Impacts

Introduction

- 5.4.1 This Section considers the potential water quality impacts associated with the proposed dredging work. In order to undertake this assessment, the following paragraphs provide details of the applicable environmental legislation, details of the existing water and sediment quality conditions, sources of water quality impacts and potential impacts. Water sensitive receivers were identified in Chapter 4, whilst potential mitigation measures are presented in Chapter 6.

Water Quality Legislation

5.4.2 The following Hong Kong legislation is of relevance with respect to potential water quality impacts during the proposed dredging campaign:

- the Water Pollution Control Ordinance (Cap. 358);
- the Water Pollution Control (General) Regulations;
- the Water Pollution Control (Sewerage) Regulations;
- the Statement of Water Quality Objectives (WQO) (Victoria Harbour (Phase 2) Water Control Zone);
- Annex 6 and Annex 14 of the Technical Memorandum (TM) on the Environmental Impact Assessment (EIA) Process.

5.4.3 Hong Kong's water quality legislative framework is built around the Water Pollution Control Ordinance (WPCO 1981(Cap. 358)), from which over 20 other Regulations and Orders stem. Under the WPCO, Hong Kong waters are divided into 10 Water Control Zones (WCZs). Each WCZ has a designated set of statutory Water Quality Objectives (WQOs). The Victoria Harbour WCZ was declared in three separate phases, Phase 1 was declared in November 1994 (covering Kwai Chung, East Kowloon and their adjacent waters); Phase 2 was declared in September 1995 (covering North, South and West Kowloon and their adjacent waters); Phase 3 was declared on 1 April 1996 and covers the north shore of Hong Kong Island from Kennedy Town to Sai Wan Ho and its adjacent waters. This dredging work will take place within the Victoria Harbour WCZ Phase 3 area.

Existing Water Quality Conditions

5.4.4 EPD routinely monitors water quality in Victoria Harbour in the vicinity of the Study Area (VM2, VM4 and VT2 - refer to **Figure 1**). **Table 5.3** provides a summary of the water quality data collated by EPD during 1997 for the routine monitoring stations nearest the Study Area.

Table 5.3 Summary of 1997 Routine EPD Water Quality Monitoring Data in the Vicinity of the Proposed Dredging Work (EPD, 1998 pers. Comm.).

Determinant	Victoria Harbour		Causeway Bay TS
	VM2	VM4	VT2
Number of Samples	12	12	6
Temperature (°C)	22.99 (16.56 - 27.45)	23.09 (16.60 - 27.62)	25.28 (17.85 - 32.37)
Salinity (ppt)	30.98 (28.58 - 32.74)	30.64 (27.06 - 32.81)	28.90 (23.50 - 31.45)
Dissolved Oxygen (% Saturation)	63.60 (51.45 - 84.73)	65.82 (53.99 - 84.61)	59.83 (29.40 - 92.11)
Dissolved Oxygen (mg/L)	4.58 (3.42 - 6.41)	4.73 (3.59 - 6.40)	4.11 (2.03 - 6.33)
pH	7.98 (7.58 - 8.16)	7.96 (7.54 - 8.17)	7.83 (7.66 - 7.93)
Turbidity (NTU)	3.87 (1.70 - 6.80)	4.02 (1.88 - 8.81)	9.84 (2.05 - 29.19)
Suspended Solids (mg/L)	5.48 (2.23 - 10.43)	5.72 (2.03 - 19.67)	16.99 (2.55 - 56.50)
5-day Biochemical Oxygen Demand (mg/L)	0.95 (0.54 - 2.41)	0.80 (0.45 - 1.71)	1.45 (1.07 - 2.28)
Nitrite Nitrogen (mg/L)	0.02 (0.00 - 0.04)	0.02 (0.00 - 0.04)	0.02 (0.01 - 0.03)
Nitrate Nitrogen (mg/L)	0.09 (0.03 - 0.28)	0.11 (0.03 - 0.45)	0.17 (0.08 - 0.36)
Ammoniacal Nitrogen (mg/L)	0.28 (0.08 - 0.41)	0.27 (0.09 - 0.38)	0.33 (0.15 - 0.53)
Total Inorganic Nitrogen (mg/L)	0.39 (0.24 - 0.54)	0.40 (0.24 - 0.57)	0.52 (0.27 - 0.66)
Total Nitrogen (mg/L)	1.26 (0.45 - 1.64)	1.23 (0.36 - 1.64)	1.44 (1.02 - 1.9)
Ortho-phosphate (mg/L)	0.05 (0.02 - 0.08)	0.05 (0.03 - 0.08)	0.06 (0.03 - 0.10)
Total Phosphorus (mg/L)	0.11 (0.06 - 0.18)	0.10 (0.06 - 0.18)	0.14 (0.07 - 0.31)
<i>E.coli</i> (cfu/100mL)	22761.08 (3000 - 110667)	9563.83 (3567 - 19000)	37288.83 (3233 - 105000)

Note: 1. Data presented are depth-averaged data, except as specified.
2. Data presented are annual arithmetic means except for *E.coli* and faecal coliform data which are geometric means.
3. Data enclosed in brackets indicate the ranges.

5.4.5 **Table 5.3** illustrates that Victoria Harbour water quality in the vicinity of the proposed dredging works is fairly turbid with a high inorganic nutrient load and sewage bacteria levels. Levels of phosphorus and *E.coli* have increased over recent years, probably due to increasing development in the Victoria Harbour area. Comparison of the data presented in **Table 5.3** with relevant WQOs indicates that non-compliances may occur with the VHW CZ WQOs for *E.coli*, dissolved oxygen (DO), ammonia and total inorganic nitrogen (TIN).

5.4.6 Water quality in the Causeway Bay Typhoon Shelter is significantly poorer than in the open parts of Victoria Harbour (refer to **Table 5.3**). This is the case due to the poor tidal flushing of pollutants received from surface water and sewage effluents from the surrounding urbanised areas and discharges from boats using the shelter. EPD has classified the Causeway Bay Typhoon Shelter as being of Category 3, which means that DO levels are generally below 4 mg/L, total nitrogen levels greater than 0.8 mg/L and *E.coli* levels in excess of 5000 cfu/100 mL.

Potential Impacts during Dredging

5.4.7 The dredging works will involve the removal of sediments to an approximate depth of -11.0 mCD, thereby removing approximately the surface 6.5 - 7.5 m of sediment. The dredging campaign will generate more than 0.5Mm³ of sediments requiring disposal (Babtie BMT Harris & Sutherland, pers. comm.). **Figure 1** illustrates the potential areal extent of the dredging programme - this dredging area is currently under review.

5.4.8 During dredging the following impacts upon water quality can potentially occur:

- release of sediment bound pollutants to the receiving water column;
- release of suspended solids into the water column and the formation and off-site migration of sediment plumes; and
- potential depletion of dissolved oxygen in the vicinity of the dredgers as a result of the sediment perturbation.

5.4.9 Victoria Harbour is not considered to support an important marine ecological community. Therefore, whilst impacts related to release of sediment bound pollutants and depletion of DO levels are possible, they are not expected to be a major environmental concern.

5.4.10 Of most concern during sediment dredging operations is the interference of the cooling water systems operated by City Garden and the Provident Centre, as well as the WSD pumping station. It is understood that the City Garden cooling water system abstracts seawater at a rate of 1,900m³ per hour and involves electrochlorination of abstracted seawater. Abstraction rates and methods of treatment operated for the Provident Centre cooling water system are currently unknown. Dredging in the vicinity of these seawater intakes has the potential to generate sediment plumes which may result in the influx of suspended solids into the cooling water systems which can seriously disrupt system operation and performance.

Potential Impacts during Operation

5.4.11 Maintenance dredging will probably be required to maintain water depths. Such operations have the potential to impact upon the environment in the same manner as the initial dredging work.

Dredged Sediment Disposal

5.4.12 As highlighted above, dredged sediment arisings will be generated (>0.5Mm³), whilst maintenance dredging may also be required. This material must be disposed of in an environmentally acceptable manner.

5.4.13 In Hong Kong dredged marine sediments are generally disposed of to the marine environment which is controlled by the Dumping at Sea Ordinance. Cap. 466 of the Dumping at Sea Ordinance describes the requirements with regard to the disposal of dredged sediments to designated marine dumping grounds. EPD Technical Circular TC-1-1-92 Classification of Dredged Sediments for Marine Disposal sets out the criteria used to establish whether or not dredged sediment is considered to be contaminated for the purposes of backfilling or placement within designated Marine Disposal Areas (MDA). EPD Technical Circular TC-1-1-92 defines three classes of dredged sediments based on the analysis of seven heavy metals as follows (sediment contamination criteria are included in **Table 5.4**):

- Class A:** Uncontaminated material for which no special dredging, transport or disposal methods are required beyond those which would normally be applied for the purpose of ensuring compliance with EPD's Water Quality Objectives, or for protection of sensitive receptors near the dredging or disposal areas.
- Class B:** Moderately contaminated material, which requires special care during dredging and transport and which must be disposed of in a manner which minimises the loss of pollutants either into solution or by resuspension.
- Class C:** Seriously contaminated material which must be dredged and transported with great care and which cannot be dumped in the gazetted disposal grounds and which must be effectively isolated from the environment upon final disposal.

Table 5.4 Sediment Contamination Criteria for Marine Disposal (mg/kg dry weight).

	Cd	Cr	Cu	Hg	Ni	Pb	Zn
Class A	< 1	< 50	< 55	< 0.8	< 35	< 65	< 150
Class B	1.0 - 1.4	50 - 79	55 - 64	0.8 - 0.9	35 - 39	65 - 74	150 - 190
Class C	> 1.5	> 80	> 65	> 1.0	> 40	> 75	> 200

5.4.14 As indicated above, in order to define an appropriate method of sediment disposal it is necessary to define sediment contamination characteristics. Whilst sediment contamination in the Study Area has not been defined, EPD routinely monitors sediment quality in Victoria Harbour. **Figure 1** illustrates the routine EPD sediment monitoring locations closest to the Study Area (i.e. VS3, VS5 and VS12). Sediment contamination data for these monitoring stations is presented in **Table 5.5**. EPD also analyses sediments for particle size distribution - refer to **Table 5.6** and **Figure 5**.

Table 5.5 Sediment Quality Data for Victoria Harbour and Comparison with EPD Contamination Criteria (mg/kg unless indicated).

Station	Date	Eh (mV)	Specific Gravity	As	B	Cd	Cr	Cu
VS12	13/01/97	-359	2.41	18.0	37	1.10		
VS12	15/09/97	-494	2.31	8.6	31	1.20		
VS3	15/01/97	-358	2.53	3.7	14	0.10	23	
VS3	18/09/97	-327	2.40	5.1	18	0.60	70	
VS5	15/01/97	-376	2.54	2.9	10	0.10	15	59
VS5	18/09/97	-368	2.53	5.2	18	0.30	25	

Station	Date	Fe	Hg	Mn	Ni	Pb	Zn	CN
VS12	13/01/97	33000	1.00	410	39			0.10
VS12	15/09/97	32000	0.83	400	31			0.10
VS3	15/01/97	10000	0.35	170	10		76	0.10
VS3	18/09/97	16000	0.38	220	25		150	0.10
VS5	15/01/97	7300	0.08	110	6	19	45	0.10
VS5	18/09/97	13000	0.17	210	11	25	86	0.10

Station	Date	Total N	NH4	Total P	COD	TOC	Sulphide	PCB*	PAH*
VS12	13/01/97	470	28	300	38000	1.4	290	5	187
VS12	15/09/97	610	95	220	24000	1.2	320	5	204
VS3	15/01/97	240	93	160	12000	0.7	150	15	187
VS3	18/09/97	430	32	390	17000	0.8	34	5	148
VS5	15/01/97	130	22	120	11000	0.5	120	5	2787
VS5	18/09/97	490	140	160	12000	0.9	5.30	5	108

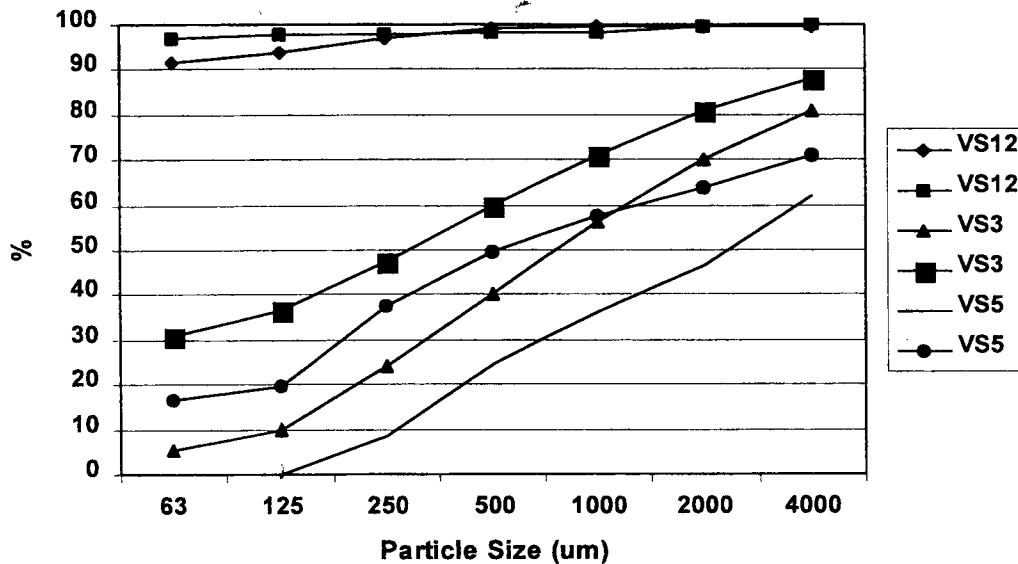
Shaded area means in excess of EPD Class C sediment contamination criteria

* $\mu\text{g}/\text{kg}$

Table 5.6 Sediment Particle Size Distribution Data (EPD, 1998 pers. Comm.)

Station	63 μm	125 μm	250 μm	500 μm	1000 μm	2000 μm	4000 μm
VS12	91.60	93.68	96.76	99.07	99.51	99.77	99.72
VS12	96.92	97.77	97.95	98.15	98.15	99.72	100.00
VS3	5.52	10.04	24.06	40.20	56.40	70.25	80.84
VS3	30.80	36.68	47.45	59.69	71.02	80.76	88.10
VS5	0.00	0.00	8.35	24.51	35.97	46.61	62.15
VS5	16.36	19.63	37.67	49.65	57.47	63.70	70.95

Figure 5 Sediment Particle Size Distribution Data (EPD, 1998 pers. Comm.).



5.4.15 The EPD routine monitoring data illustrates that the Victoria Harbour sediments are relatively enriched with copper, chromium and zinc. Sediments within the Causeway Bay Typhoon Shelter are comprised of predominantly fine material (<63µm in diameter), organic and highly anaerobic. **Table 5.5** illustrates that sediments within the Causeway Bay typhoon shelter are significantly more contaminated than sediments excavated from the open Victoria Harbour.

5.4.16 According to the criteria defined in **Table 5.4**, all the sediments sampled by EPD (refer to **Table 5.5**) in the vicinity of the Study Area would be defined as Class C. Therefore, such sediment would not be suitable for unconfined marine disposal, but would need to be disposed of at the confined pits at East of Sha Chau.

5.5 Ecology Impacts

Introduction

5.5.1 Given the restricted ecological characteristics of the Study Area, significant adverse ecological impacts are not anticipated during the proposed dredging works.

6. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED INTO THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

6.1 Noise Mitigation Measures

Dredging Phase

6.1.1 It is anticipated that daytime dredging activities will be able to proceed without the need

for mitigation measures at all the identified NSRs. However, dredging during restricted hour periods, which will require a CNP, may require the use of specific mitigation measures in order to comply with the applicable criteria.

6.1.2 Specific provisions for noise mitigation measures which may be incorporated into the dredging programme are detailed below:

- good plant maintenance and ensuring that appropriate plant are chosen for each task;
- plant not in use will be switched off;
- intrusive noisy activities will be scheduled for periods when the number of affected persons are likely to be minimal;
- silencing of noisy equipment, particularly diesel-engined plant; and
- efficient management of the dredging programme and crews to ensure that periods of noisy activities are minimised, or not grouped together in the same site area.

6.1.3 It is anticipated that daytime dredging activities will probably be able to proceed without the need for specific mitigation measures at the identified NSRs.

6.2 Air Quality Mitigation Measures

6.2.1 No particular air quality mitigation measures are considered necessary given the unlikely occurrence of air quality impacts during the dredging works.

6.3 Water Quality Mitigation Measures

6.3.1 The dredging works have the potential to cause significant impacts upon the operation of the cooling water systems at the City Garden and the Provident Centre. Therefore, appropriate dredging methods must be selected in order to control potential impacts associated with the generation of sediment plumes. In addition, mitigation measures may also be required to ensure that dredging does not cause system interference. Methods available to minimise the generation of sediment plumes during dredging are detailed below:

- minimisation of unnecessary disturbance to the sediments by exerting care when lowering and lifting the grab will reduce depletions in DO;
- the use of silt curtains where applicable (i.e. in areas of low water disturbance and current swell);
- the Contractor should ensure accurate barge loading, ensure grabs close tightly and that hoist speeds are suitably low;
- the Contractor should manually remove large objects and debris prior to mechanical dredging to minimise losses from partially closed grabs;
- dredging should be undertaken taking into account tidal conditions;
- the Contractor should use watertight barges;
- appropriate monitoring of water quality during dredging should be undertaken to allow the implementation of appropriate action plans to prevent any unacceptable water quality impacts.

6.3.2 Through adoption of these mitigation measures, water quality impacts during dredging can be controlled and limited.

6.3.3 It is considered that there are methods available which can ensure that the cooling water system operated in the vicinity of the site are not adversely affected during the dredging phase.

6.4 Ecological Mitigation Measures

6.4.1 Significant ecological impacts during the dredging works are not anticipated given the degraded nature of ecology in Victoria Harbour. Whilst no particular ecological mitigation measures are likely to be required, the measures defined above to control water quality impacts will also minimise any ecological effects.

7. SUMMARY AND CONCLUSIONS

7.1 Summary

Noise Impacts

7.1.1 Daytime dredging should be able to proceed without the need for mitigation measures at the identified NSRs.

Air Quality

7.1.2 Adverse air quality impacts are not anticipated during the dredging works and thus no particular mitigation measures are proposed.

Water Quality

7.1.3 The dredging work has the potential to cause significant impacts upon the operation of the cooling water systems at City Garden and the Provident Centre. Therefore, appropriate dredging methods must be selected in order to control potential impacts associated with the generation of sediment plumes. In addition, mitigation measures may also be required to ensure that dredging does not cause system interference. It is considered that there are methods available which can ensure that the cooling water systems operated in the vicinity of the site are not adversely affected during the dredging works.

Sediment Disposal

7.1.4 It is expected that sediments dredged are likely to be defined as Class C by EPD. Such sediment would need to be disposed of at the confined disposal pits at East of Sha Chau.

Ecology

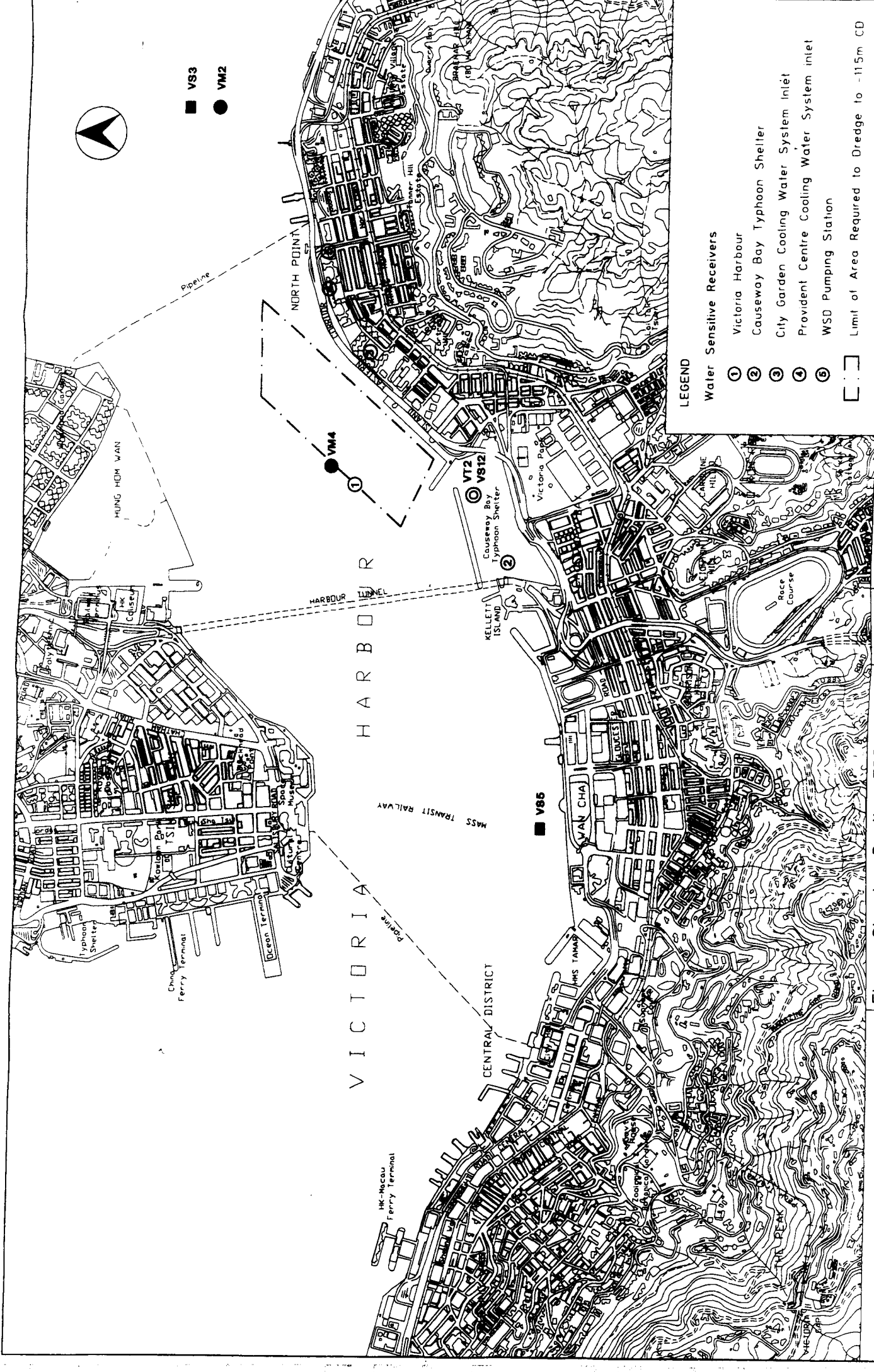
7.1.5 Significant ecological impacts are not anticipated during the dredging work. No ecological mitigation measures are likely to be required, although water quality impacts should be minimised.

7.2 Conclusions

- 7.2.1 The potential environmental impacts associated with the proposed dredging work in Victoria Harbour near North Point have been identified. No insurmountable environmental impacts are envisaged provided that the mitigation measures defined herein are implemented.

FIGURES

*



- V83
- VM2

LEGEND

Water Sensitive Receivers

- ① Victoria Harbour
- ② Causeway Bay Typhoon Shelter
- ③ City Garden Cooling Water System Inlet
- ④ Provident Centre Cooling Water System inlet
- ⑤ WSD Pumping Station

□ Limit of Area Required to Dredge to -11.5m CD

Figure 1
Showing Routine EPD Water/Sediment Monitoring Locations, Extent of Proposed Dredging and Water Sensitive Receivers

Figure 圖則編號	1
Drawn 繪圖	VAS
Checked 校核	RPM
Approved 批准	
Scale 比例	1:300000
Date 日期	8/98
Status 圖況	

Dredging Works for Cruiser Operation in North Point

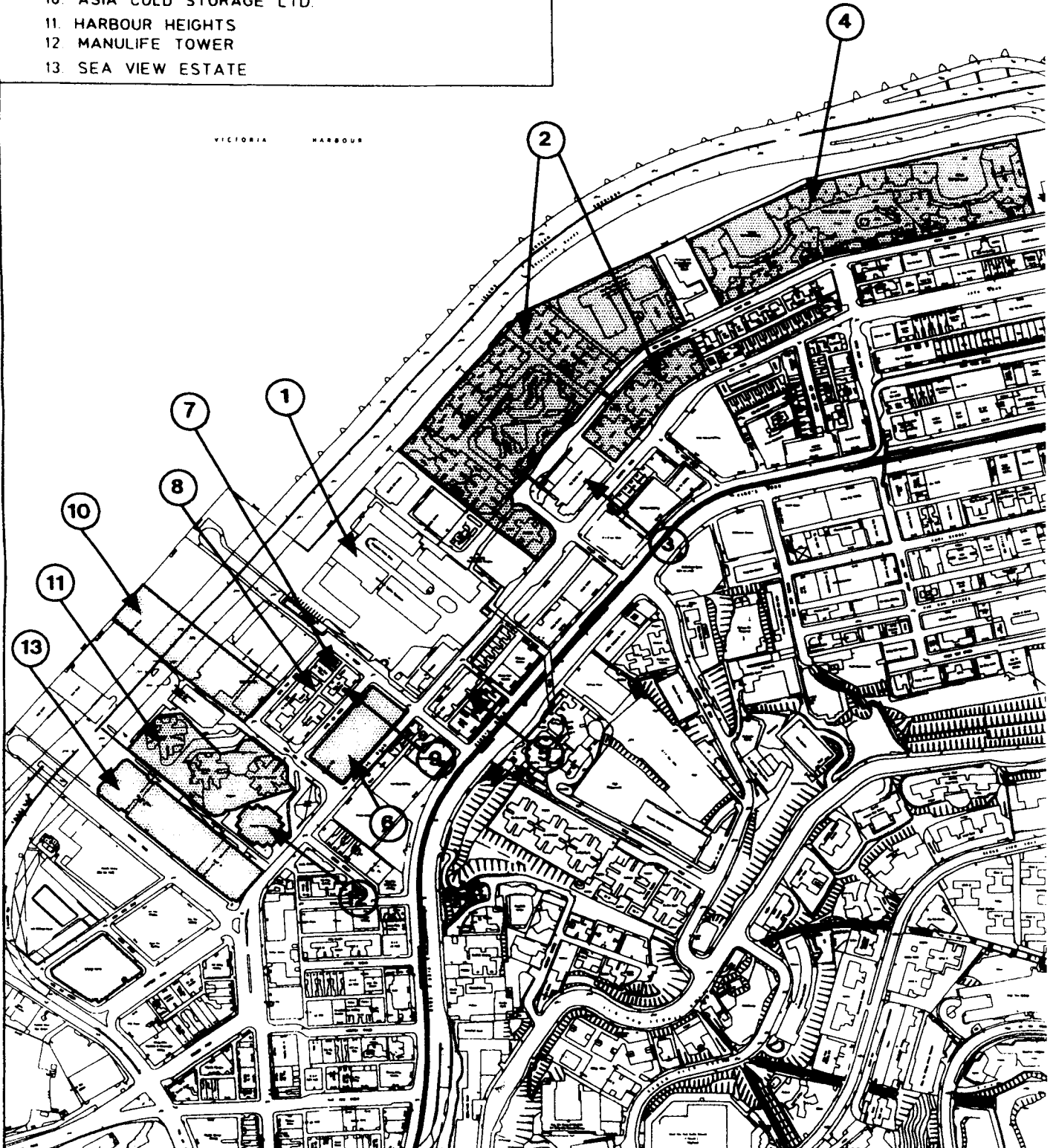
Scott Wilson (Hong Kong) Ltd
 偉信顧問(香港)有限公司

Legend

- 1 GOVERNMENT SUPPLIES DEPARTMENT
- 2 CITY GARDEN
- 3 CITY GARDEN HOTEL
- 4 PROVIDENT CENTRE
- 5 NEWTON HOTEL
- 6 NEW OFFICE DEVELOPMENT (UNDER CONSTRUCTION)
- 7 KING WAH HOUSE
- 8 LOY MANSION
- 9 WONG FAI MANSIONS
- 10 ASIA COLD STORAGE LTD.
- 11 HARBOUR HEIGHTS
- 12 MANULIFE TOWER
- 13 SEA VIEW ESTATE



HABO



**Dredging Works for Cruiser
Operation in North Point**

Surrounding Landuses

Figure No 圖則編號	2	
Drawn 繪圖	Checked 校核	Date 日期
VAS	RPM	8/98
Scale 比例	Status 現況	
15000		



LEGEND

Noise Sensitive Receivers

- ① City Garden
- ② Harbour Heights
- ④ Residential area between King Wah Rd and Wang On Rd
- ⑤ Henrietta School
- ⑥ Provident Center
- ⑦ Residential area between Wharf St. and Electric Rd.
- ⑧ Residential area between ChunYeung St. and King's Rd.
- ⑨ Residential area between Tin Chong St. and Electric Rd.
- ⑩ Residential area between Tin Chong st. and Power St.
- ⑪ Residential area between Fuk Yuen St. and Power St.
- ⑫ Residential area between Fuk Yuen St. and Boat St.
- ⑬ Residential area between Merlin St. and Oil St.
- ⑭ Residential area between Merlin St. and Shell St.
- ⑮ Victoria Center
- ⑯ Residential area between Watson St. and Glass St.
- ⑰ Fortress Garden
- ⑱ Fortress Metro Tower
- ⑲ Kwong Chiu Terrace
- ⑳ North Point Center
- ㉑ Residential area between Cheung Hong St. and Fortress Hill Rd
- ㉒ North Point Methodist Primary School
- ㉓ Clementi Secondary School
- ㉔ Cannon Garden

Dredging Works for Cruiser
Operation in North Point

Noise Sensitive Receivers

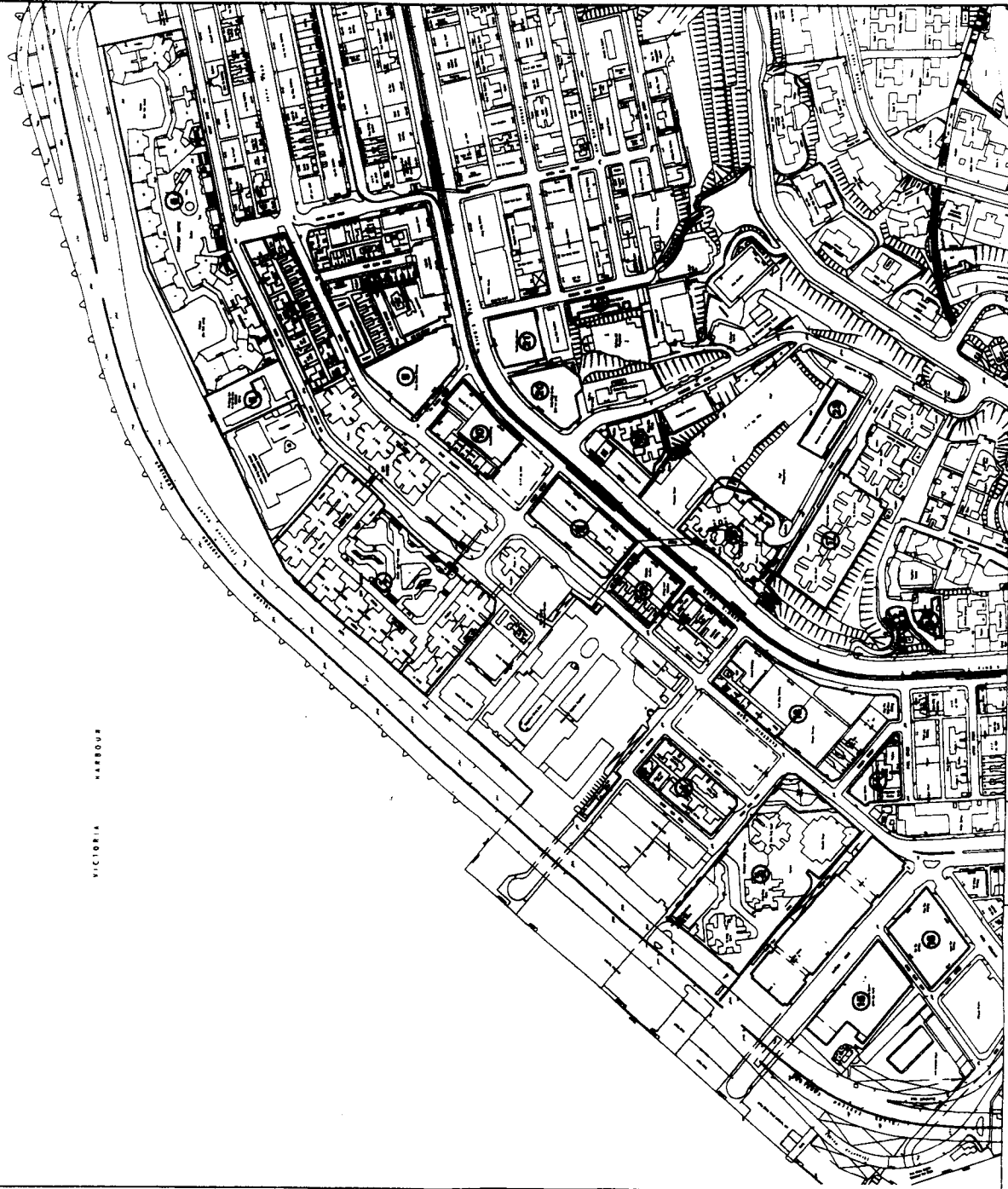
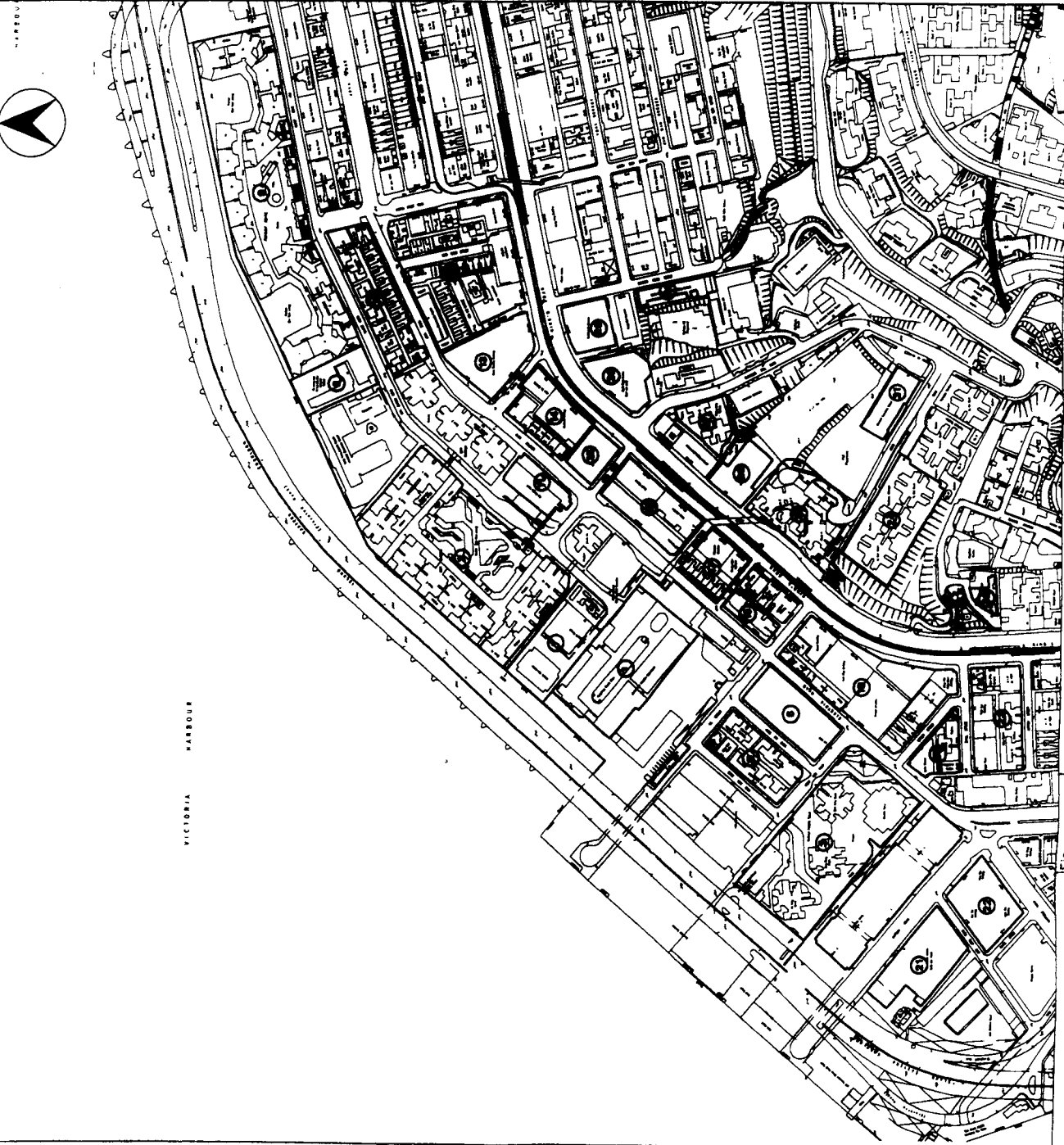


Figure 圖則編號	3
Drawn 繪圖	VAS
Scale 比例	
Checked 核核	RPM
Date 日期	8/98
Status 情況	Approved 批准



VICTORIA HARBOUR

LEGEND

Air Sensitive Receivers

- 1 Government Supplies Department
- 2 City Garden
- 3 Harbour Heights
- 4 Residential area between King Wah Rd and Wang On Rd
- 5 Commercial area between Wang On Rd and Electric Rd.
- 6 The Electric Center
- 7 Henrietta School
- 8 Provident Center
- 9 Residential area between Wharf St. and Electric Rd.
- 10 City Garden Hotel
- 11 Residential area between ChunYeung St. and King's Rd.
- 12 Residential area between Tin Chong St. and Electric Rd.
- 13 Residential area between Tin Chong St. and Power St.
- 14 Olympia Plaza
- 15 Residential area between Fuk Yuen St and Power St.
- 16 Residential area between Fuk Yuen St. and Boat St.
- 17 Newton Hotel
- 18 Residential area between Merlin St and Oil St.
- 19 Residential area between Merlin St. and Shell St
- 20 Victoria Center
- 21 Residential area between Watson St and Glass St.
- 22 Commercial area between Shell St. Jupiter St
- 23 Fortress Garden
- 24 Fortress Metro Tower
- 25 Fortress Tower
- 26 Kwong Chiu Terrace
- 27 North Point Center
- 28 Residential area between Cheung Hong St and Fortress Hill Rd.
- 29 North Point Methodist Primary School
- 30 Clementi Secondary School
- 31 Cannon Garden
- 32

Dredging Works for Cruiser Operation in North Point

Air Sensitive Receivers

Figure	4
圖則編號	4
Drawn	VAS
繪圖	VAS
Checked	RPM
校核	RPM
Date	8/98
日期	8/98
Approved	
批准	
Date	
日期	