

MTR Corporation

PROJECT PROFILE

for

IMT Dredging Works

Mouchel Asia Limited

August 1999

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1 BASIC INFORMATION

1.1 Project Title

IMT Dredging Works

1.2 Purpose and Nature of the Project

Dredging works are required to (i) reduce the surcharge load imposed on the MTRC immersed tube tunnel generated by the accumulation of marine silt on tunnel elements close to both the northern and southern intake structures at Tsim Sha Tsui and Wanchai respectively; and (ii) to prevent blockage of the pumping facilities for the salt water cooling systems. The areas proposed to be dredged are illustrated in Drawing 1 and shown in more detail in Drawings 2 and 3. Similar maintenance dredging was last carried out at the southern intake in 1989/90.

The project is a designated project under the EIAO because, although the dredging volumes are small, seawater intakes for the Wan Chai (West) Sewage Screening Plant and Palace Mall at Tsim Sha Tsui are within 100m of the dredging sites.

1.3 Name of Project Proponent

Mass Transit Railway Corporation (MTRC)
2/F MTR Tower
Telford Plaza
33 Wai Yai Street
Kowloon Bay

1.4 Location and Scale of Project

The proposed dredging areas are located in Victoria Harbour at Wan Chai and Tsim Sha Tsui. The location and details of the dredging works are shown in Drawings 1 to 3.

The required dredged depth is -8mPD and the dredged volumes have been estimated to total $25,500\text{m}^3$ with the bulk of the dredging ($18,000\text{m}^3$) being required at the northern intake with only $7,500\text{m}^3$ of sediment to be dredged at the southern intake. The areas to be dredged cover approximately 100m by 70m (0.7ha) at the northern landfall and 100m by 50m (0.5ha) at the southern landfall. Based on typical dredging rates for a grab dredger, assuming careful working in close proximity to the seawalls and tunnel elements of around $1,000\text{m}^3$ per day, the dredging works amount to say 8 days at Wanchai and 18 days at Tsim Sha Tsui.

It was anticipated that the sediments might be contaminated with heavy metals and, in April 1999, sediment samples were collected using a grab sampler at four stations in each proposed dredging area (Drawings 4 and 5). The samples were analysed for Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc (using test methods APHA 19th edition 3030 F and 3120 except for Mercury where method 3030 F and 3112 were used). The results of the analysis for the seven heavy metals used in the classification of contaminated dredged sediments for marine disposal are presented in Table 1 below:

Table 1 Sediment Heavy Metal Concentrations (mg/kg) and Classification with respect to EPD sClassification of Marine Sediments (TC No. 1-1-92)

Location	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Southern Intake 1	0.68	55	<u>220</u>	60	0.55	26	<u>250</u>
Southern Intake 2	0.78	58	<u>230</u>	71	<u>1.2</u>	21	<u>340</u>
Southern Intake 3	0.78	57	<u>250</u>	73	0.56	25	<u>360</u>
Southern Intake 4	0.77	56	<u>280</u>	71	0.53	23	<u>310</u>
Northern Intake 1	0.86	76	<u>350</u>	<u>110</u>	0.53	23	<u>300</u>
Northern Intake 2	0.74	71	<u>300</u>	60	0.61	24	<u>320</u>
Northern Intake 3	<u>1.5</u>	<u>120</u>	<u>680</u>	<u>100</u>	<u>1.1</u>	30	<u>340</u>
Northern Intake 4	0.4	50	<u>190</u>	40	0.22	24	100

Notes: **Bold** indicates Class B material; **Bold** indicates Class C material

It can be seen that all sediment samples were Class C, contaminated, with respect to the EPD classification of marine sediments and this material would have to be removed and disposed of in the contaminated mud disposal pits at East of Sha Chau. The sediment samples described above were collected using a grab sampler and, before any dredging takes place, a site investigation in accordance with Works Branch Technical Circular No. 22/92 will be agreed with EPD and a sediment quality report will be produced. The proposed sediment sampling stations at which cores will be collected and tested are shown in Drawings 2 and 3 and the sediment quality report will detail the volumes of contaminated and uncontaminated mud to be dredged and will form the basis for an application for a marine dumping permit.

1.5 Number and Types of Designated Projects to Be Covered by the Project Profile

In accordance with Schedule 2 Part 1 (Category C12) of the Environmental Impact Assessment Ordinance, this project shall be regarded as a Designated Project because Seawater Intakes for the Wan Chai (West) Sewage Screening Plant and Palace Mall at Tsim Sha Tsui are within 100 metres of the dredging Site. Dredging at the two sites will be considered a single project which is the project covered by this Project Profile and a construction Permit in accordance with Section 5(11) of the EIAO will be required to undertake the works.

1.6 Contact Persons

Project Proponent: : MTRC

Environmental Consultants: : Mouchel Asia Environmental

The dredging works will be planned and implemented by MTRC (the proponent). Mouchel Asia Environmental (the Consultants) will advise on dredging methods, assist with the MTRC obtaining an Environmental Permit and a Marine Dumping Permit and will prepare the Sediment Quality Report for the project.

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Timetable

Allowing for the anticipated period required to apply for an Environmental Permit and to obtain the Marine Dumping permit, the commencement of dredging is expected by the end of 1999. The sediment appears to be contaminated and a site investigation and a sediment quality report will be prepared.

2.2 Interactions with Broader Programme Requirements Or Other Projects

The project does not interact with any other projects being undertaken by the MTRC. The project is not expected to interact with any other dredging works in Victoria Harbour or the Western Harbour which might lead to unacceptable cumulative impacts.

3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

The surrounding environment at both proposed dredging sites is characterised by significant road traffic noise on land and heavy marine traffic offshore especially in the form of smaller vessels and ferries. The local marine environment in Wanchai has been subject to significant disturbance over recent years especially during the construction of the island reclamation for the Hong Kong Convention and Exhibition Centre (HKCEC).

Water quality in the area likely to be affected by the dredging works is monitored under the EPD Routine Monitoring Programme and the most relevant monitoring station is Station VM5 (Marine Water Quality in Hong Kong 1997, EPD). It is clear that the water body is heavily affected by sewage discharges with high *E. coli* concentrations, ammonia and inorganic nitrogen. Of the Water Quality Objectives (WQO) set for the Victoria Harbour Water Control Zone, only the WQO pertaining to elevations in suspended sediment concentrations is considered to be at risk during the dredging operations.

3.1 Sensitive Receivers and the Natural Environment Which Might Be Affected by the Proposed Project

3.1.1 Noise Sensitive Receivers

Noise from road traffic, general community and offshore marine activities dominates the study areas on the northern and southern sides of Victoria Harbour. The closest noise sensitive receivers (NSRs) to the study areas are hotels, domestic, industrial premises, the performing arts centre and the HKCEC in Wanchai and the Space Museum, Cultural Centre, Arts Library and Museum of Art in Tsim Sha Tsui. The identification of a site as a NSR does not necessarily mean that the area will be adversely affected by the works. These noise sensitive receivers have not been mapped

in detail because, as described below, considering the distances between the dredging sites and the potential sensitive receivers, no unacceptable adverse impacts with respect to noise levels are expected.

3.1.2 *Air Sensitive Receivers*

Air sensitive receivers (ASRs) include those identified above as noise sensitive receivers. However, definition of a site as an ASR does not necessarily mean that the area will be adversely impacted by the works and, for the dredging of marine mud, no adverse air quality impacts are anticipated from the dredging works. Although the marine sediments are expected to be contaminated by heavy metals, odour problems are not expected to be significant and have not been reported as arising in previous dredging works for Central Reclamation Phase III and for the HKCEC Island reclamation.

3.1.3 *Water Quality Sensitive Receivers*

Water Quality Sensitive Receivers located in the vicinity of the proposed southern dredging area include seawater Intakes for the Wan Chai (West) Sewage Screening Plant, the HKCEC, the Queensway Government Offices and Pacific Place. In the vicinity of the Tsim Sha Tsui dredging area, there are intakes for the Palace Mall at Tsim Sha Tsui and the MTRC. In addition to these specific sensitive receivers, Victoria Harbour Water Control Zone itself is a sensitive receiver.

3.1.4 *Ecology Sensitive Receivers*

It is anticipated that there will be no marine or terrestrial ecology of significant interest due to the disturbed nature of the study area at Wanchai and Tsim Sha Tsui. No sensitive ecological receivers in the vicinity of the dredging site are considered.

3.1.5 *Visual Impacts*

The two dredging sites will be highly visible to members of the public and are located offshore of popular tourist areas and, for example, close to the Star Ferry routes. The dredgers themselves, however, are small vessels and, when set against the background of the generally very busy port with many tug and barge movements each day, visual impacts arising from the dredging works are not considered to be significant.

3 POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 Introduction

The works will be carried out using a grab dredger which will be manoeuvred into position using a tug. Once on site, the barge will probably not be moved from the site again until it is towed to the disposal site or moved from the first dredging site to the second dredging site. Any environmental impacts from the tug, therefore, will be infrequent, of very short duration and will not occur simultaneously with any impacts from the dredger operation.

Of relevance to the present studies are the Environmental Impact Assessments and environmental monitoring carried out for the Central Reclamation Phase III and the HKCEC Island Reclamation (HKCEC). The HKCEC works were much larger and of longer duration than the proposed IMT dredging works but had the potential to impact on the same sensitive receivers in Wanchai as the IMT works.

4.2 Construction Phase

4.2.1 Noise

Noise during the construction phase will be generated by the tug during manoeuvring operations and by the grab dredger during dredging operations. For the planned dredging operations, it is expected that dredging will take place at approximately 1,000m³ per day. Dredging at the Wanchai tunnel landfall, therefore, should last approximately 8 days while that at Tsim Sha Tsui may last for 18 days.

The intermittent operation of one tug and dredging for a few days in this busy part of the harbour is unlikely to generate any adverse noise impacts at the sensitive receivers. Work will only take place during normal daytime working hours. From baseline noise studies carried out for Justice Drive Extension EIA (Agreement No. CE 61/95, Mouchel 1997), background noise levels at, for example, the roof of the Academy for Performing Arts was measured over a seven day period with L_{eq} levels being in excess of 71dB(A) during normal working hours reaching over 74dB(A) at times. By comparison, based on the sound power levels for items of powered mechanical equipment (EPD Technical Memorandum on Noise from Construction Work other Than Percussive Piling), it is estimated that the dredging works could generate noise levels of 61dB(A)-58dB(A) 200m-300m away at the Academy for Performing Arts which would be an insignificant contribution to the existing background noise levels. Similarly, at Tsim Sha Tsui, no noise sensitive receivers lie within the area where the dredging operation would contribute significantly to noise levels in excess of 75dB(A), the noise standard for normal working daytime noise standard for construction activities (Table 1B of the Technical Memorandum on Environmental Impact Assessment).

It should also be noted that much more significant dredging works were required for the construction of the HKCEC Island Reclamation (HKCEC) and the Central Reclamation Phase III. The HKCEC, which lies immediately to the east (200m) of the proposed Wanchai IMT dredging works, had the potential to affect the same sensitive receivers of relevance to the IMT dredging works but, as far as it is known, no adverse impacts from tug or dredger generated noise were encountered during construction of the HKCEC.

4.2.2 Air Quality

The only air quality issue which might arise would be due to the intermittent and infrequent operation of the tug required to move the barge and operation of the grab dredger itself. Dust generation is not considered to be a problem associated with the removal of wet marine sediments. It is unlikely that, considering the short duration of the proposed dredging works and the location of the sites at the northern and southern shores of Victoria Harbour, that the impact from the operation of the dredger would be detectable. The HKCEC, which lies immediately to the east (200m) of the proposed IMT dredging works, was a much larger project and of longer duration than the IMT dredging works and had the potential to affect the same sensitive receivers of

relevance to the IMT dredging works at the Wanchai dredging site but, as far as it is known, no air quality problems were encountered due to dredging works.

4.2.3 Marine Water Quality

The principal impact of concern is associated with the loss of fine sediment to suspension during the dredging of marine mud some of which is expected to be contaminated. In addition, nutrients in the sediment lost to suspension and the introduction of an additional sediment oxygen demand into the water column could impact on water quality. However, previous studies of dredging and mud disposal operations (References 1&2) have shown that, for the rate of sediment loss likely to be associated with grab dredging operations, sediment oxygen demand and nutrient loss, even for contaminated sediments in poorly flushed areas, has a very minor impact on local water quality and would not result in any additional exceedance of the Water Quality Objectives set for the Victoria Harbour Water Control Zone.

Previous dredging studies carried out for the HKCEC EIA indicated that sediment losses to suspension would, on the whole, resettle to the seabed locally but some sediment could be carried off at low concentrations in the tidal currents. With the construction of the HKCEC reclamation, tidal flows in the area of the Wanchai IMT dredging works have reduced and the potential for significant losses of sediment to areas remote from the dredging area are considerably reduced. Previous work for the EIA for the HKCEC has shown that the dredging is unlikely to result in an exceedance of the Water Quality Objectives set for Victoria Harbour with respect to suspended sediment concentrations. At the Northern landfall, it is again anticipated that tidal flows are weak (which has resulted in the present siltation in the first instance) and losses of sediment to suspension are unlikely to be a concern outside the immediate dredging works area.

The disposal of the dredged material will be in the contaminated mud pits at East of Sha Chau for contaminated material and at open coastal disposal areas for uncontaminated material. Previous environmental studies have been carried out at these disposal areas and the acceptability of the disposal operations has already been established.

4.2.4 Ecology No ecological impacts are anticipated to be generated by the dredging works which will be of short duration. The areas to be dredged have been subject to significant disturbance over the past few years and are not known to host any marine ecology of specific importance. The only potential impact to the local marine ecology would be through the loss of fine sediment to suspension but any resulting increases in suspended sediment concentrations would remain within the natural range of concentrations encountered in the harbour.

4.3 Operational Phase

No adverse impacts are expected in this phase. Impacts from the dredging works would be of very short duration and there would be no persistent residual impacts from the dredging works. The impact of reducing seabed levels over the limited area proposed for dredging will not have a noticeable impact on tidal flows and so the existing transport and dispersion of local discharges of, for example, effluent and cooling water will be unchanged.

3 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED

5.1 Measures to Minimise Environmental Impacts

The main potential for unacceptable adverse environmental impacts are the dredging losses to suspension and the principal sensitive receivers which might suffer adverse impacts are seawater intakes close to the works. However, by employing good working practices and active mitigation measures, the potential for adverse impacts can be minimised as follows:

- (1) Only sealed grabs should be used of large size (8m³)
- (2) The grab should not be allowed to swing when placing spoil in the hopper and should be empty before being positioned over the sea to begin each grab
- (3) The speed of operation of the grab should be minimised to prevent disturbance of bed sediments on impact with the seabed and when retrieving the grab
- (4) Silt curtains should be used and could be placed around the dredger to minimise losses. More direct protection to the sensitive receivers, however, could be achieved by deploying silt curtains around the intakes themselves.

Silt curtains can be very effective in reducing losses from a dredging area or, for example, in preventing suspended sediment from entering intakes. The silt curtain is a permeable fabric which allows water to pass through but prevents the transport of fine sediment through the fabric. The silt curtain is usually supported by floats, extends to the seabed and can be used to surround the dredger itself or just the area being dredged. At intakes, the silt curtain can be placed across the entrance to the intake structure.

5.2 Possible Severity, Distribution and Duration of Environmental Effects

The dredging works will be carried out at a low rate (less than 1000m³) per day which will reduce the rate of loss of sediment to suspension. The dredging works will be carried out in quiescent waters and sediment lost to suspension should remain within the immediate vicinity of the works and re-settle to the seabed locally. Following completion of the dredging, there will be no residual impacts.

5.3 Further Implications

A similar dredging operation was undertaken at the southern intake structure in 1989/1990 and no adverse impacts have been reported. There has been no public consultation to date but the dredging works are unlikely to be of interest to the public and are not considered to be politically sensitivity.

5.4 Use of Previously Approved EIA Reports

No previously approved EIA report for projects of a similar nature are referenced.

5.5 Environmental Monitoring and Audit

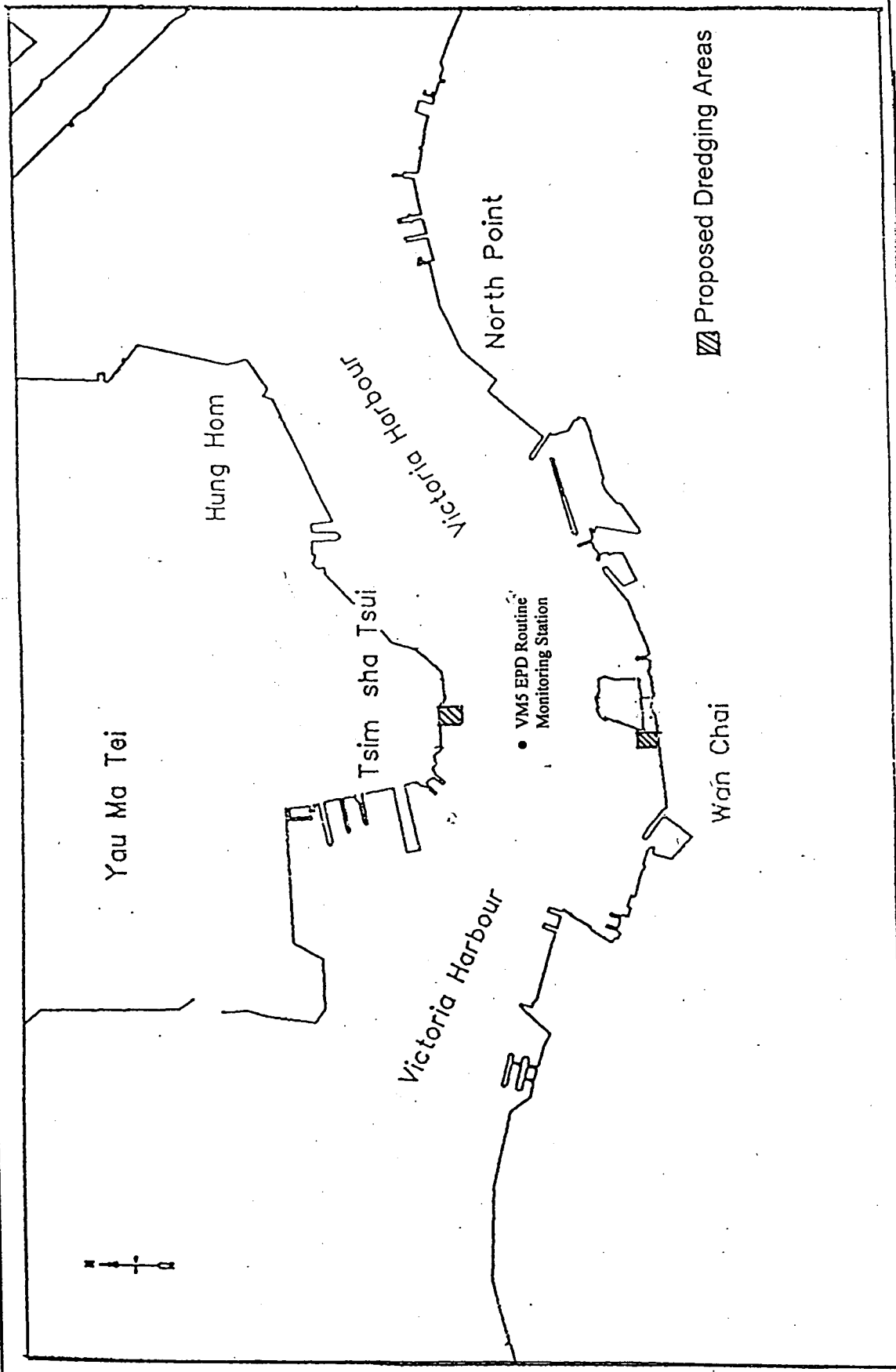
During the dredging operation, it is proposed to carry out water quality sampling at mid flood and mid ebb tides three times per week at locations approximately 100m from the dredger, in the vicinity of the nearest sensitive receivers on the flood and ebb

tide directions and at a control station remote from each dredging site. The control station would be located approximately 500m offshore of each dredging site. Water samples would be collected at mid depth at times of mid flood and mid ebb flows for analysis for suspended sediment concentrations. Comparison would be made between the samples collected at the impact stations and the control station and with the longer term water quality data for Victoria Harbour available from EPD's Routine Monitoring Programme at Station VM5 (Drawing 1) . The data would also be assessed with respect to the Water Quality Objectives for Victoria Harbour. Should any exceedances of the Water Quality Objectives be detected, additional mitigation measures would be developed and implemented before the dredging works was allowed to continue.

6 REFERENCES

- 1 Environmental Impact Assessment for Contaminated Mud Pit IV at East of Sha Chau.
- 2 Feasibility Study for Additional Cross-Border Links Stage 2: Investigations on Environment, Ecology, Land Use Planning, Land acquisition, Economic/Financial Viability and Preliminary Project Feasibility/Preliminary Design. Agreement No. C E 48/97.

FIGURES

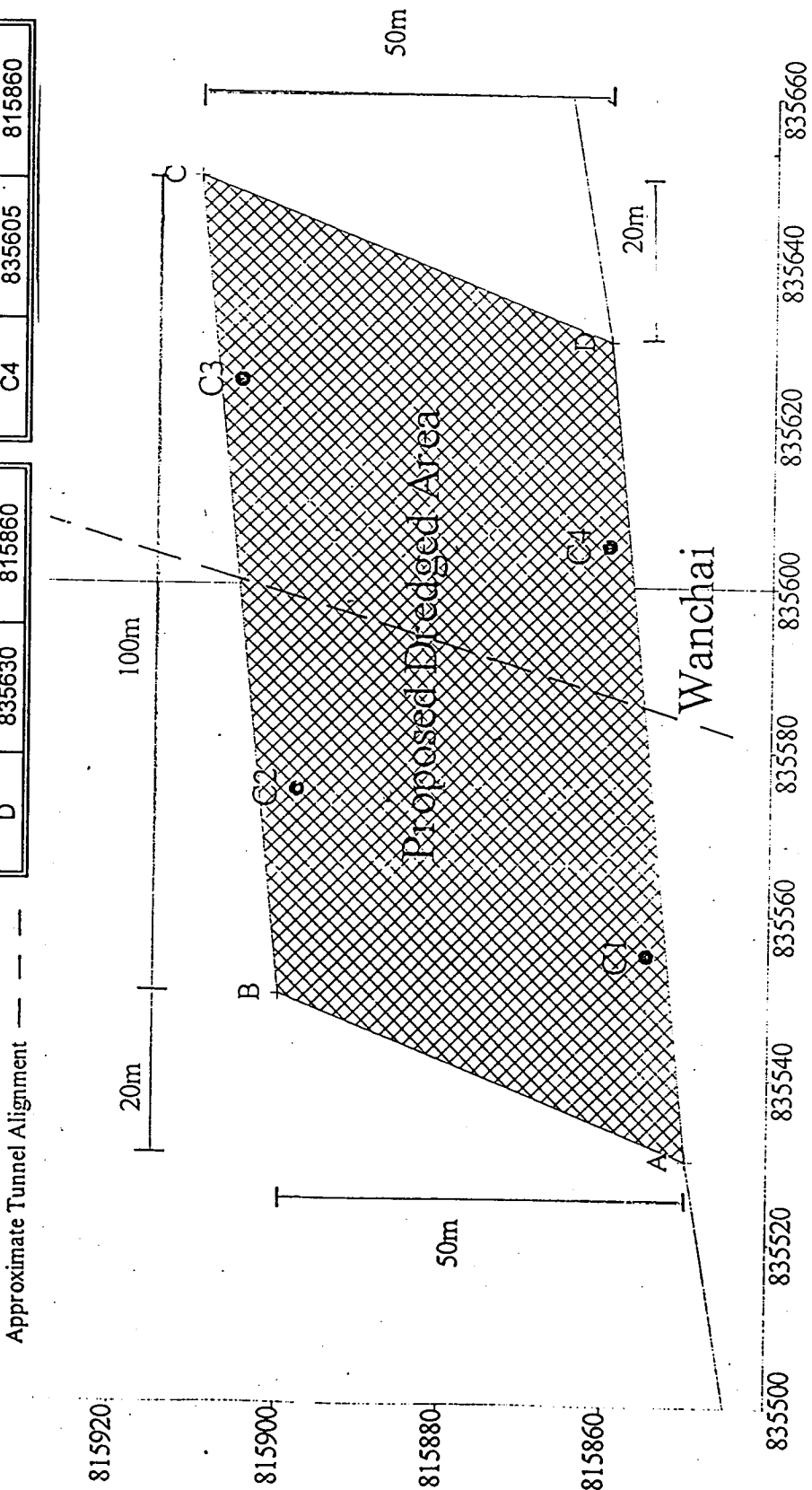


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Drawing 1

Location of Dredging Works

Boundary of Dredged Area		Proposed Sediment Core Locations	
Location	Hong Kong Metric Grid	Location	Hong Kong Metric Grid
	Easting		Eastings
	Northing		Northing
A	835530	C1	835555
B	835550	C2	835575
C	835650	C3	835625
D	835630	C4	835605
	815850		815855
	815900		815898
	815910		815905
	815860		815860

Boundary of Dredged Area		Proposed Sediment Core Locations	
Location	Hong Kong Metric Grid	Location	Hong Kong Metric Grid
	Easting		Eastings
	Northing		Northing
A	835530	C1	835555
B	835550	C2	835575
C	835650	C3	835625
D	835630	C4	835605
	815850		815855
	815900		815898
	815910		815905
	815860		815860

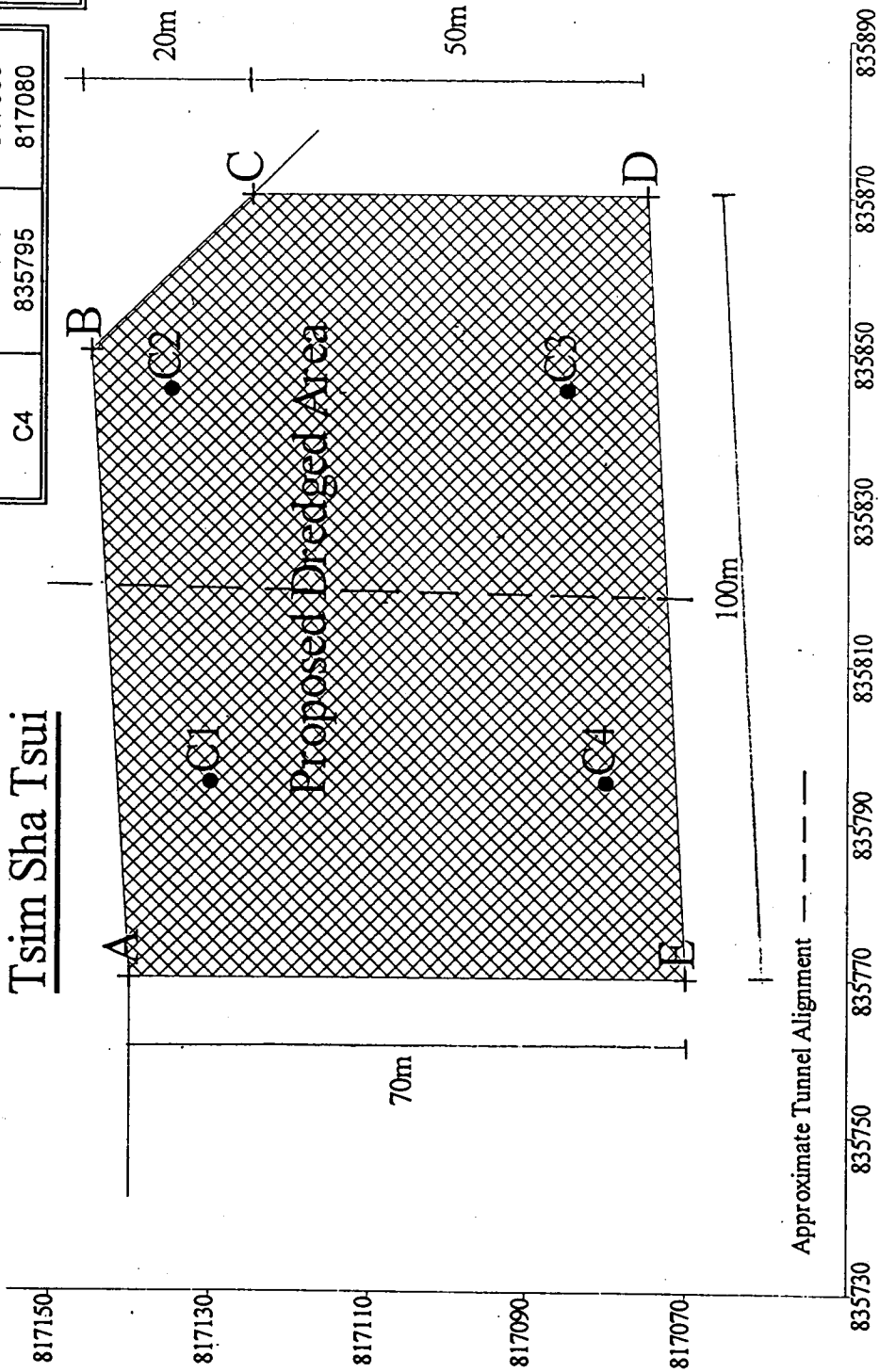


Wanchai Dredging Area Showing Proposed Seabed Core Locations

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Drawing 2

Tsim Sha Tsui



Proposed Sediment Core Locations		
Hong Kong Metric Grid		
Location	Easting	Northing
C1	835795	817130
C2	835845	817135
C3	835845	817085
C4	835795	817080

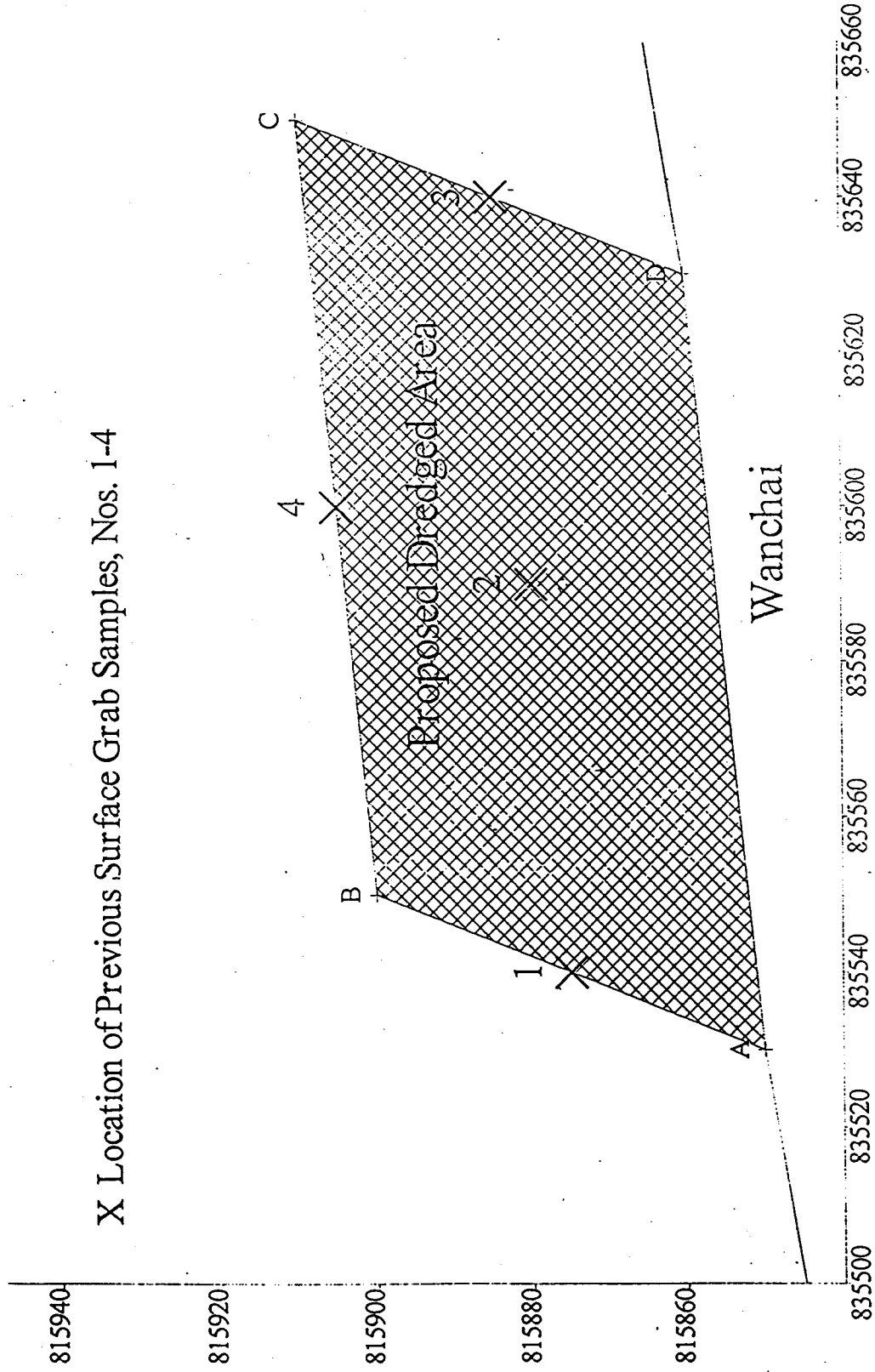
Boundary of Dredged Area		
Hong Kong Metric Grid		
Location	Easting	Northing
A	835770	817140
B	835850	817145
C	835870	817125
D	835870	817075
E	835770	817070

Tsim Sha Tsui Dredging Area Showing Proposed Seabed Core Locations

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Drawing 3

X Location of Previous Surface Grab Samples, Nos. 1-4



Mouchel

Drawing 4

Wanchai Dredging Area Showing Previous Grab Sampling Locations

Tsim Sha Tsui

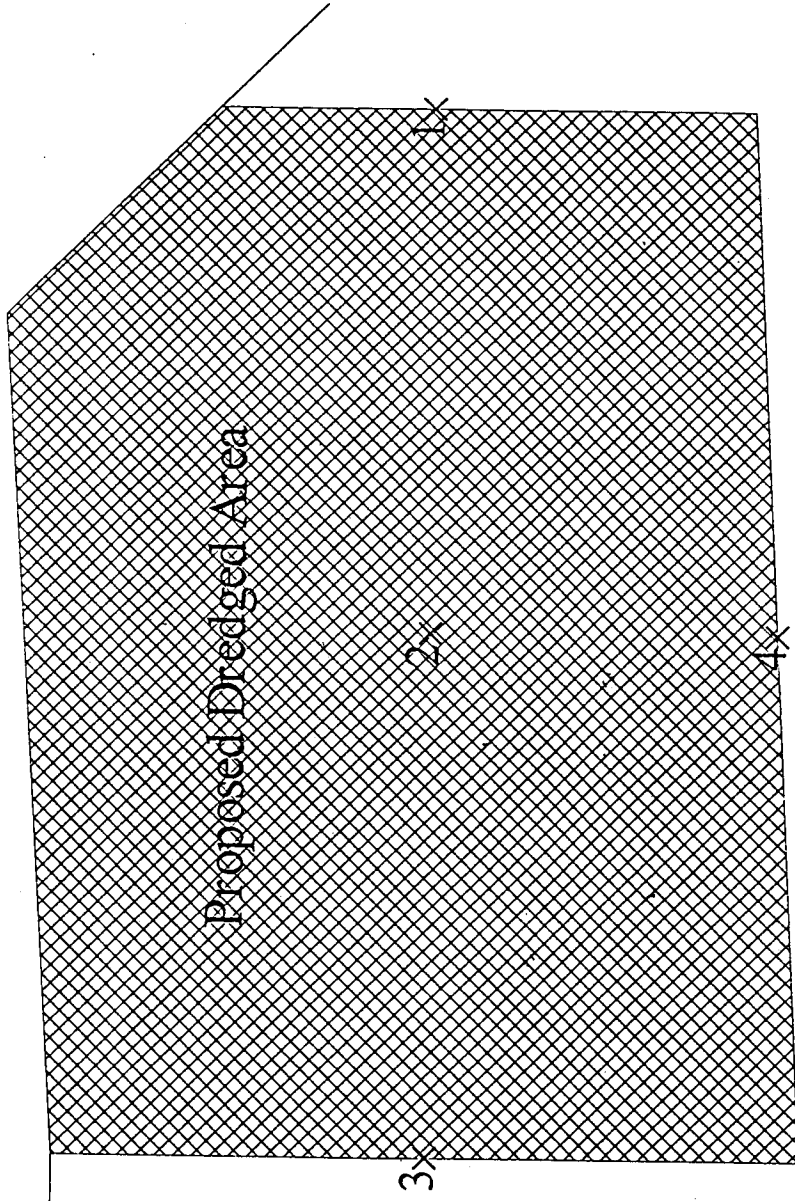
817150

817130

817110

817090

817070



X Location of Previous Surface Grab Samples, Nos. 1-4

835730

835750

835770

835790

835810

835830

835850

835870

Tsim Sha Tsui Dredging Area Showing Previous Grab Sampling Locations

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Drawing 5