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for information

# Quarterly Report on Environmental Monitoring and Audit for Construction of ACP Projects

( October - December 1994 )

Environmental Assessment Division
Environmental Protection Department
May 1995

# Executive Summary

This paper is to report to the Airport Consultative Committee on the status of environmental monitoring and audit works for the major ACP projects now under construction. The information contained covers the period from October to December 1994. The following provides a summary of the major issues concerning the environmental performance of the projects included in this report and the total number of complaints since the commencement of the works.

## (I) Major issues concerning the environmental performance of the projects

A. Environmental Project Office - West Kowloon Project Area (ENPO WKPA).

- Air quality continued to be an important issue conditions improved in December due to progressing landscape works at Mei Foo and unseasonal rainfall plus regular watering of haul roads.
- Occasional violations of Construction Noise Permit conditions have occurred but only one site-related exceedance was recorded.

B. Environmental Project Office - Kwai Chung/Tsing Yi (ENPO-KC/TY)

- A number of complaints have been received although the number of exceedances recorded was minimal. Most of the complaints have been dealt with satisfactorily.
- Five new LAR contracts will commence shortly.

C. Chek Lap Kok Airport - Site Preparation Contract

- No exceedance of the Air Quality Objectives or the ExCo Exemption Order allowable noise levels was recorded.
- About 0.5 % of the total monitoring events undertaken in the North Lantau waters in the quarter have exceeded the EPD Target Levels for turbidity. As for the southern waters, about 2 % of the total monitoring events undertaken in the area have exceeded the EPD Target Levels for turbidity.
- The Action Response Plan was implemented and EPD was notified of the exceedances. The PAA also undertook to review and ensure that their operations would comply with the necessary procedures and requirements.
- The water quality monitoring programme has been reviewed resulting in a new set of monitoring stations and auditing criteria established.
- The dredging programme has passed its peak intensity with dredgers already demobilised from a fleet of 9 from the last quarter to 5 in this quarter.
- As recommended in the New Airport Master Plan EIA, air conditioners have been installed and are operational at 62 numbers of village premises at Sha Lo Wan Shore and San Tau.
- A 1.5 km section of the noise bund has been completed. In addition, a marine sand stockpile located opposite to the Sha Lo Wan is serving as a temporary noise bund while the construction of the seawall is being carried out.

D. North Lantau Development - Tung Chung Development Phase I

- In this quarter the consultant was revising the EM&A Manuals and continued to carry out regular monitoring.
- The consultant was advised to increase water spraying to suppress dust problem.

E. North Lantau Expressway

- There were minimal water quality exceedances due to little marine works.
- Dust exceedances were occasional in Tai Ho and more frequent in Yam O and Tung Chung arising from haul roads, blasting and material handling.
- The noise exceedances in Yam O were primarily due to log deliveries and dockyard operations nearby.
- In the Yam O Section, there are two water bowsers to spray haul roads. Automatic sprinkler systems are installed in Wang Tong and Yam O Tuk to suppress dust emission. The NLE Engineer was advised to spray haul roads in Tung Chung.

F. Lantau Fixed Crossing - Tsing Ma Bridge, Kap Shui Mun Bridge and Ma Wan Viaducts

- Exceedances of dust limits arose for the Toll Plaza Contract. Mitigation measures including increased water spraying and interim hydroseeding for dust suppression have been carried out.
- Exceedances in noise were caused by local village activities.

G. Water Supply to North Lantau - Stage 1

- At present, four sites namely Tung Chung Reservoir, Pui O, Siu Ho Wan and Tai Lam Chung Submarine Mains are reported on monthly by the Consultant.
- A site environmental laboratory was set up for North Lantau Water supply contracts.
- The working method statement of contaminated mud dredging at Tai Lam Chung Nullah was reviewed.

H. Route 3 Advanced Earthworks

- Noise exceedances during night-time were due to the nearby marine traffic.
- The contractor has been instructed to carry out dust suppression measures including provision of sprays from water bowsers.

I. Central Reclamation, Phase 1 - Engineering Works

- The frequent exceedances of Action and Target Levels for air in October and November were due to the proximity of the monitoring station to the nearby traffic (as a result of the current temporary traffic diversion). The situation was however improved with regular watering of the site access.
- The frequent exceedances for noise during this quarter were caused primarily by the proximity of the temporary diversion and to a lesser extent by construction traffic. Subsequent rescheduling of construction activities has been successful at minimising the latter contribution.
- No exceedances of Action and Target Levels for water was noted.

J. Western Harbour Crossing

- <u>Sai Ying Pun & Victoria Harbour site</u>

  There was no exceedance of Action and Target Levels for air in October and December while there were some exceedances in November. Mitigation measures including regular watering and covering of dusty materials were undertaken to control the dust levels within the criteria limits.

  No exceedance for noise and water was noted.

- <u>Shek O Quarry Casting Basin</u>

  There was no exceedance of Action and Target Levels for noise and DO.

  The exceedances for air were due to activities on the exposed site areas within the casting basin and wind blown dust from other activities outside the casting basin. Mitigation measures including regular watering and covering of dusty materials were undertaken to mitigate the impact.

  The frequent exceedances of the SS target level were due to the discharge of the effluent from the sedimentation tanks. It was, therefore, proposed to utilise the wide drains leading to the sump pumps of the tanks as initial settlement ponds to reduce the initial sediments being pumped into the tanks.

(II) No. of Complaints of ACP projects since Commencement of works

| Projects | | Air | Noise | Water | Waste | Total |
|---|---|---|---|---|---|---|
| A. ENPO-WKPA | | 40 | 31 | 6 | 0 | 77 |
| B. ENPO-KC/TY | | 6 | 6 | 1 | 7 | 20 |
| C. CLK | | 0 | 3 | 0 | 0 | 3 |
| D. NLD | - Site Formation | 1 | 1 | 0 | 0 | 2 |
| | - Infrastructure | 1 | 0 | 0 | 0 | 1 |
| E. NLE | - Tai Ho | 2 | 2 | 2 | 0 | 6 |
| | - Yam O | 2 | 2 | 4 | 1 | 9 |
| | - Tung Chung | 0 | 0 | 0 | 0 | 0 |
| F. LFC | | 3 | 1 | 3 | 0 | 7 |
| G. Water supply to N.L. | - North Lantau | 2 | 0 | 3 | 1 | 6 |
| | - Sub-marine | 0 | 0 | 0 | 0 | 0 |
| H. Route 3- Adv. Earth. | | 0 | 0 | 0 | 0 | 0 |
| I. Central Reclamation | | 0 | 0 | 1 | 0 | 1 |
| J. WHC | | 5 | 10 | 0 | 0 | 15 |
| **Total** | | 62 | 56 | 20 | 9 | **147** |

Contents

# A. Project Title: Environmental Project Office (ENPO) - West Kowloon Project Area

## 1. Project Data and Project Organisation:

The 334 hectare West Kowloon Project Area (WKPA) has been divided into a number of operational ACP contracts for the construction of the West Kowloon Reclamation, West Kowloon Expressway and the Western Harbour Crossing Tunnel approach. In addition, certain sections of the Airport Railway have already been entrusted to the two West Kowloon Expressway contracts. The construction is being carried out by consortia of large construction companies with dredging, heavy marine, foundation and infrastructure expertise.

The Environmental Project Office for the WKPA was set up by EPD to carry out environmental monitoring and audit based on a routine assessment of the cumulative construction impacts for all the ACP contracts within the WKPA. The ENPO service is provided by Binnie Consultants Limited (BCL) on behalf of the Environmental Protection Department. The project office has an interactive liaison role between EPD, the works departments, engineers, contractors and the community. Site visits are made frequently to maintain a proactive approach to identifying construction-related environmental problems before compliance limits set on the project are breached.

ENPO reports on a monthly basis to a steering group formed by EPD, NAPCO, PM/KDevO, HyD and CED. Issues which cannot be resolved at this level will be referred to the Secretary for Works and the Secretary for Planning, Environment and Lands for resolution. The second stage of ENPO commenced on 1 December 1994 for a period of two years following ENPO Stage I (September 1992 - November 1994).

## 2. Monitoring Requirement:

Air, noise and water quality are monitored together with related meteorological information. ENPO monitoring locations and main residential sensitive receivers are shown in Figure A1.

Ten permanent air monitoring stations are programmed to collect 24 hour dust samples. These are sampled every four days with ad hoc hourly sampling being implemented when it is necessary to focus on specific works operations. Two wind speed and direction monitoring stations have been commissioned to determine the areas most likely to be impacted by fugitive dust from the site.

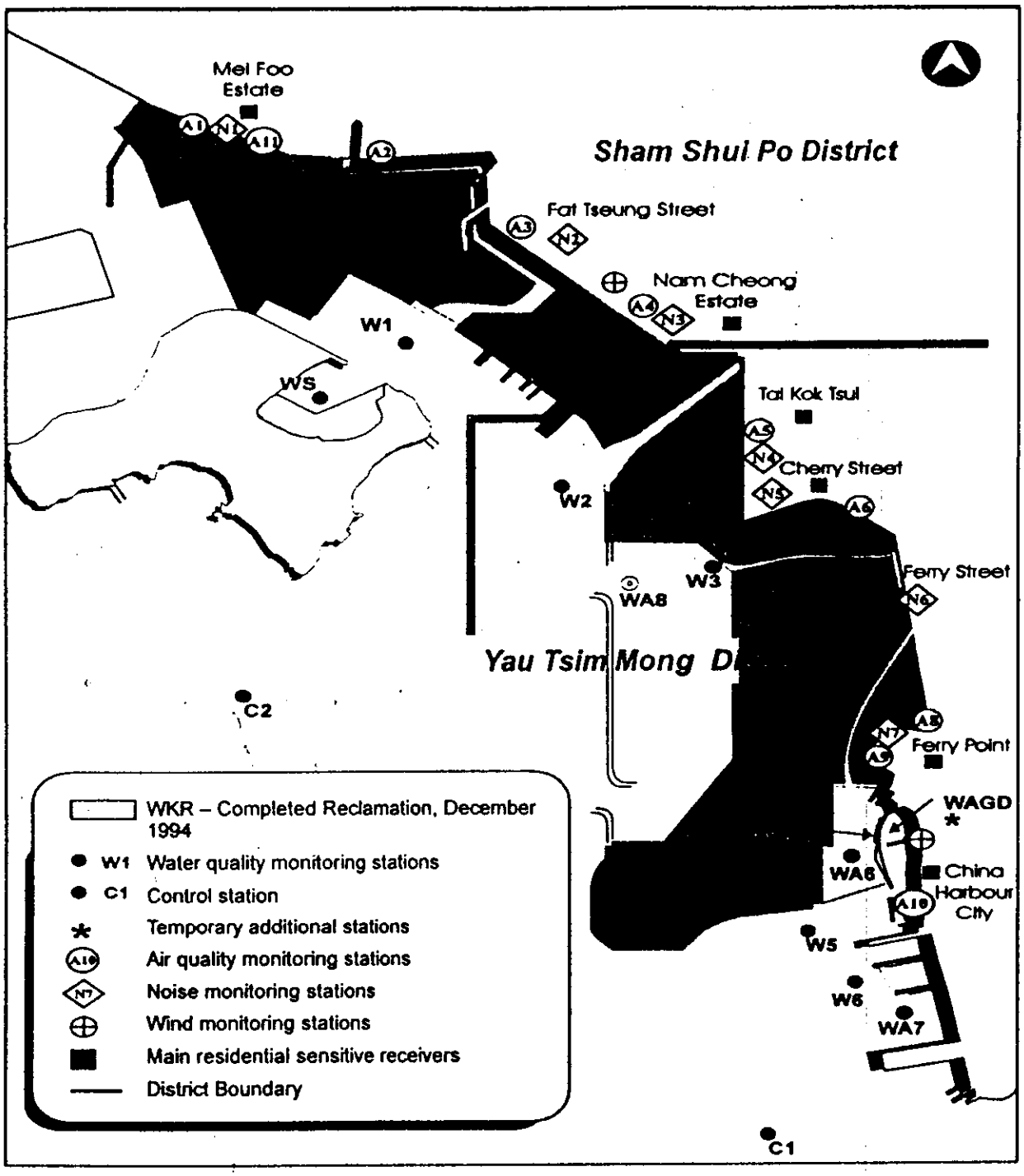


Figure A1
ENPO Monitoring Locations for WKPA

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At least one set of daytime, evening and night-time noise monitoring is carried out every week. Each daytime set consists of 30 minute consecutive readings whereas each evening and night-time set contains three consecutive 5 minute readings at each of the seven noise monitoring stations. Additional monitoring is called up to focus on specific exceedances or complaints.

Five permanent water stations and two control stations, to determine background water quality in the harbour, were initially established. Further supplementary stations have been added to provide data for specific operations. Monitoring is carried out three times a week. Parameters include dissolved oxygen (DO and DOS), suspended solids (SS), turbidity and temperature.

**Table A1. ENPO Trigger, Action and Target Levels and guidelines for initiation of Action Plans**

| | TAT Exceedance Levels | Action Plan Implementations |
|---|---|---|
| Air | Trigger: ≥180 $\mu g/m^3$/day<br>Action: ≥220 $\mu g/m^3$/day<br>Target: ≥260 $\mu g/m^3$/day | Receipt of complaint(s) or when Target Level (AQO) is breached |
| Noise | Daytime<br>Target: >75 dB(A)<br><br>Evening<br>Target: >70 dB(A)<br><br>Night-time<br>Target: >55 dB(A) | Complaint received plus site-related Target exceedance<br>Complaint received or exceedance<br><br>Complaint received or exceedance |
| Water | Dissolved Oxygen<br>Trigger: <2.50 mg/l<br>Action: <2.25 mg/l<br>Target: <2.00 mg/l<br><br>Suspended Solids<br>Trigger: >50 mg/l<br>Action: >70 mg/l<br>Target: >100 mg/l<br><br>Turbidity<br>Trigger: >60 NTU | Readings less than specified level on 2 consecutive monitoring days<br><br>Action Plan deactivated if daily depth-averaged readings below specified levels |

An additional program of *E.coli* monitoring in the embayment south of Ferry Point commenced on April 21st in order to monitor and safeguard the quality of seawater abstracted by WSD for flushing purposes. A sump has been constructed around the intake to abstract water directly from the Government Dockyard to compensate for the declining quality of the water body south of Ferry Point, which is currently subject to pollution loading from storm drains discharging to the southern end of the old typhoon shelter. Pumping of water from southern end of the reclamation to the sump inside the Government Dockyard implemented on August 28th was interrupted on 4 November when the submerged pumping main was ruptured. Pumping resumed on 12 December. *E. coli* levels in the sump exceeded WSD's tolerance limit on three occasions in the absence of pumping, but were otherwise acceptable.

Environmental mitigation measures recommended in the project EIA reports for the West Kowloon Reclamation and the West Kowloon Expressway to control dust include the deployment of water bowsers on haul roads, the restriction of vehicles to designated haul roads, the introduction of wheel washing bays at exits from the site and the paving of major haul roads. Noise control measures suggested locating dredging and sandfilling activities at least 500m or more away from sensitive receivers or, the use of silenced equipment or quiet working methods when operating closer to the shoreline at night. Under the Noise Control Ordinance, all site operations carried out between the hours of 7 p.m. and 7 a.m. or at any time on a general holiday (including Sundays) which require the use of powered mechanical equipment must have a Construction Noise Permit.

The current agreed Trigger, Action and Target levels for the three parameters are shown in Table A1. These compliance limits are used as an audit tool by ENPO and form the basis for the generation of formal Action Plans. The guidelines which are generally followed for the implementation of Action Plans, taking into account the ambient or baseline conditions, are also included in the table. Any complaints received through the EPD Hotline or by direct referral are also investigated and reported individually.

## 3. Monitoring Results: Compliance with Action/Target levels

Monitoring results in the form of exceedances for the period October to December 1994 are included in Table A2 and Table A3.

*Air*

During this quarter there was one Target Level exceedance (in October) at the Tai Kok Tsui station, A5. There were also five Trigger Level exceedances in November at the Mei Foo monitoring location, A1. Figure A2 shows the TSP trend over the reporting period for the air monitors.

*Noise*

There were 31 overnight Target exceedances in this quarter. Only one of these exceedances, recorded at the Fat Tseung Street temporary housing area monitoring location, N2, was found to be related to construction works within the WKPA (Figure A3).

*Water*

There were 3 Action level DO exceedances at W2 and 1 Action level exceedance at W1 at the end of September. The remaining exceedances were at the typhoon shelter monitoring location, W3. DO levels at all the permanent monitoring stations except W3 gradually rose to around 4.0mg/l in this quarter from their low levels recorded in late September. DO levels also improved within the new typhoon shelter. A single Action level SS exceedance was recorded at W3 (Figure A4).

There has been no indication of problems associated with the on-site generation of either sewage or waste oil.

*Table A2. Exceedances of the ENPO Action and Target Levels - Sham Shui Po District*

| Parameter | October '94 | | | November' 94 | | | December '94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total * | A | T | Total * | A | T | Total * | A | T |
| Air | 40 | 0 | 0 | 48 | 0 | 0 | 20 | 0 | 0 |
| Noise | 12 | - | 6(0) | 21 | - | 2(0) | 36 | - | 8(1) |
| Water DO (Depth averaged) | 15 | 1 | 0 | 16 | 0 | 0 | 24 | 0 | 0 |
| Water SS | 15 | 0 | 0 | 16 | 0 | 0 | 24 | 0 | 0 |
| Water Turbidity | 15 | 0 | 0 | 16 | 0 | 0 | 24 | 0 | 0 |

* Total number of monitoring events undertaken
A No. of monitoring events with results exceeding the Action level
T No. of monitoring events with results exceeding the Target level
( ) No. of noise exceedances which are thought to have been related to construction activities on the WKPA

*Table A3. Exceedances of the ENPO Action and Target Levels - Yau Tsim Mong District*

| Parameter | October '94 | | | November' 94 | | | December '94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total * | A | T | Total * | A | T | Total * | A | T |
| Air | 40 | 0 | 1 | 50 | 0 | 0 | 18 | 0 | 0 |
| Noise | 16 | - | 6(0) | 28 | - | 4(0) | 48 | - | 5(0) |
| Water DO (Depth averaged) | 90 | 3 | 14(1†) | 96 | 0 | 15 | 96 | 4 | 3 |
| Water SS | 90 | 0 | 0 | 96 | 1 | 0 | 96 | 0 | 0 |
| Water Turbidity | 90 | 0 | 0 | 96 | 0 | 0 | 96 | 0 | 0 |

* Total number of monitoring events undertaken
A No. of monitoring events with results exceeding the Action level
T No. of monitoring events with results exceeding the Target level
( ) No. of noise exceedances which are thought to have been related to construction activities on the WKPA
† Measurement taken on 28/09/94 flood tide only.

## *Table A4. Action Plan Implementation List (October - December 1994)*

| *Action Plan Number* | *Date Opened* | *Plan Resulted From/Action Taken* | *Comments* |
|---|---|---|---|
| *AP017*<br><br>*(Sham Shiu Po District)* | *30/6/94* | *Dust plumes on Mei Foo buffer zone noted by ENPO during routine visit.*<br>*Action:-*<br>*RSS for UA 9/91 and WKE(N) informed. Meeting held on site with RSS and Contractor for UA 9/91 on July 1st. Contractor agreed to deploy bowser more frequently on haul roads and water stockpile. Bowser not deployed July 11-18. Increase in truck movement with infrequent bowser deployment noted between August 23-31. ENPO letters sent re bowser deployment on August 23 and September 16. Further faxes to site (3 nr) and meetings held with RSS/Contractors in November.* | *Still Open*<br>*Reason:*<br>*To focus attention on Mei Foo buffer zone landscaping works. Improvements in watering have been made but no header tank or large diameter connection has been installed (although requested by ENPO) to facilitate faster filling of bowsers.* |
| *AP020*<br><br>*(Sham Shiu Po District)* | *28/9/94* | *Stonecutters embayment and adjacent water body : DO levels fell below Action level*<br>*Action:-*<br>*Aeration carried out on 29 September 1994* | *Date Closed: 27/10/94*<br>*Reason for Closure:*<br>*DO levels returned to normal after aeration as on 1 October 1994* |

## *Table A5. Summary of Complaints*

| *Environmental Parameters* | *Cumulative No. Brought Forward* | *No. of Complaints* | | | | | | *Cumulative No.* |
|---|---|---|---|---|---|---|---|---|
| | | *October'94* | | *November'94* | | *December'94* | | |
| | | *SSPD* | *YTMD* | *SSPD* | *YTMD* | *SSPD* | *YTMD* | |
| *Air* | 40 | 1** | 0 | 1** | 1*** | 0 | 0 | 43 |
| *Noise* | 31 | 0 | 0 | 1‡ | 1‡‡ | 0 | 3* | 36 |
| Water | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Waste | 0 | 0 | 0 | 0 | 1† | 0 | 0 | 1 |
| Total | 77 | 1 | | 5 | | 3 | | 86 |

‡ Night-time noise direct referral complaint - Mei Foo
‡‡ Daytime noise hotline complaint - Ferry Street.
† One waste complaint from newspaper article.
* Ferry Point overnight site activities, CV/91/02
** Mei Foo dust complaints.
*** Tai Kok Tsui bus terminal - dust

SSPD = Sham Shui Po District
YTMD = Yau Tsim Mong District

## 4. Audit Results: Implications of Non-compliance; Advice on the Implementation Status of EIA Mitigation Measures; Action Plans Implemented by ENPO

*Air*

Dust continued to be an important issue resulting from a combination of dry weather, strong winds and insufficient watering. Action Plan AP017 was maintained to focus attention on the Mei Foo Buffer Zone (Table A4).

ENPO continued to request the Contractor of UA9/91 to provide a pumped water supply or header tanks to maximize the efficiency of bowser filling and deployment. The dust problems diminished with the wet days in December and landscaping works at Mei Foo Buffer Zone. Dust raised by vehicles travelling on unwatered haul roads opposite Nam Cheong Estate was of continuing concern. Further south, considerable improvement was achieved after the implementation of the Dust Policy on WKE(S) site in end of September.

*Noise*

As shown in Figure A3, the overnight exceedances were generally related to high background levels associated with traffic on the West Kowloon Corridor and Ferry Street (N3, N6), container terminal noise or works outside the WKPA (ie the Route 3 works opposite Mei Foo, resolved by ENPO (Kwai Chung/Tsing Yi), N1). Only one WKR site related noise exceedance was recorded during this quarter. This related to works in the vicinity of the Fat Tseung Street temporary housing area monitoring station, N2. The relevant operations were covered by a Construction Noise Permit. In December, ENPO investigated a number of complaints related to illegal over-night excavation and filling works at Ferry Point (N7). The Resident Site Staff were informed of the incidents as the CNP for the operation restricted work to between 0700 and 2300 hrs. The local control office of EPD has issued a warning letter to the Contractor and out of hours working has now ceased.

*Water*

As shown in Figure A5, the majority of the DO exceedances given in Table A2 and A3 occurred at monitoring station W3. This is located at the northeastern corner of the typhoon shelter which was strongly influenced by sewage polluted flows from the hinterland drainage outside the WKPA.

There are currently no construction activities in North Kowloon which would have an influence on DO Levels in this area. The ambient water quality problems experienced to date in ENPO have been entirely in line with the effluent flow and landform configuration impacts highlighted in the West Kowloon Reclamation EIA.

A summary of the Action Plan Implementation Programme during the quarter is given in Table A4.

## 5. Proposals for Remedial Measures: Solutions to Problems

ENPO has made a number of proposals; these include:-

- recommending more effective deployment and operation of existing bowsers on site through the use of a pumped water supply or header tank to reduce the time taken to fill the bowsers.

- watering and sweeping of public road crossing points at each site.
- supplying RSS regularly with a list of updated CNPs and advise when infringement of permits is observed by the monitoring team. ENPO have recommended that contractors are notified promptly by the RSS of these breaches and urged to restrict operations to permitted hours.
- increasing site security to prevent opportunist parking on the southern tip of the reclamation.

## 6. Follow-up Actions: By Contractors and Engineers etc.

The majority of the above suggested remedial or proactive solutions have been taken up by the Engineers through written correspondence with their contractors. However, follow-up action by the contractors is such that mitigation measures may not be implemented for a number of weeks after the problem is first highlighted by ENPO, despite frequent encouragement through site meetings and further correspondence. The UA 9/91 Contractor has failed to provide a pumped water supply or header tank for the bowsers on this contract despite numerous requests from ENPO. This unsatisfactory condition has prevailed for nine months.

## 7. Complaints: From the Public

Seven EPD 'Hotline' complaints (4 noise and 3 air), one noise direct referral and one waste complaint from newspaper article were received by ENPO relating to construction activities on the WKPA during the last quarter (Table A5). All complaints have been investigated and complainants contacted by telephone. The Engineers were contacted in all instances in order to discuss remedial measures. These have subsequently been implemented. A report on each complaint has subsequently been submitted to EPD.

## 8. Liaison: Meetings and Representations to the Public

ENPO made presentations to the Yau Tsim Mong District Board and LegCo Members this quarter.

A paper was prepared and presented by Mr. S.N. Gray of ENPO in a HKIE seminar.

## 9. Summary and Conclusions

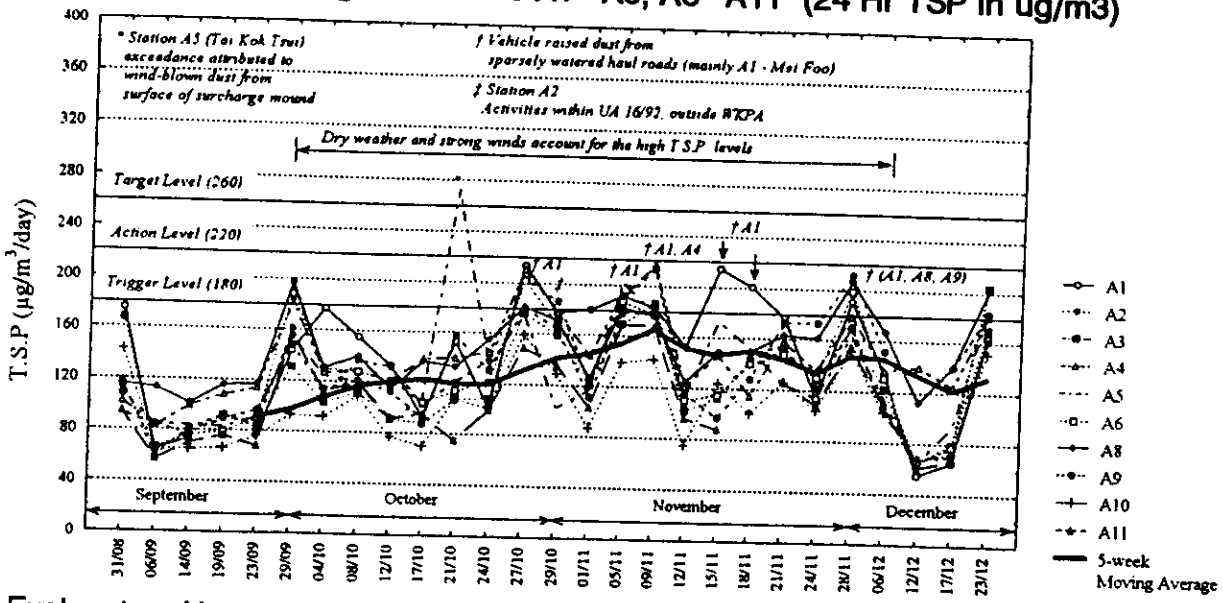
Although the resources to suppress dust are generally available on the site, problems have been encountered when these resources have not been utilised effectively. An improvement in bowser deployment is still required on the UA 9/91 Contract where only 3 of the five available bowsers are generally operational. Violations of CNPs have occurred during the quarter on both the reclamation contracts.

**Complaints on environmental issues arising from site activities can be made direct to EPD on the Hotline number 2838-3111 or by fax on 2960-1756. All complaints relevant to the WKR works made to EPD are subsequently passed through to ENPO.**

## West Kowloon Project Area

Figure A 1

## Air Quality monitoring at Stations A1–A6, A8–A11 (24 Hr TSP in ug/m3)

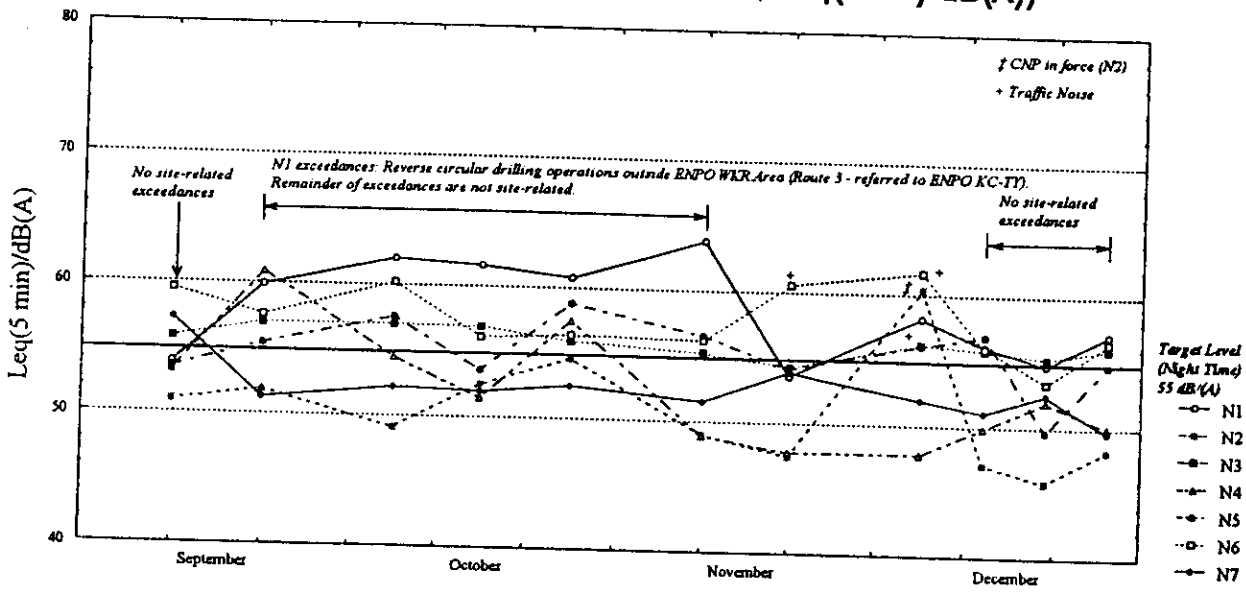



### Explanatory Notes

- Representative Air Monitoring Station at Stations A1–A6, A8–A11
- Target Limit = 260ug/m3 Action Limit = 220ug/m3

Figure A 3

## Noise Monitoring at Stations N1–N7 (Night time, Leq(5min) dB(A))



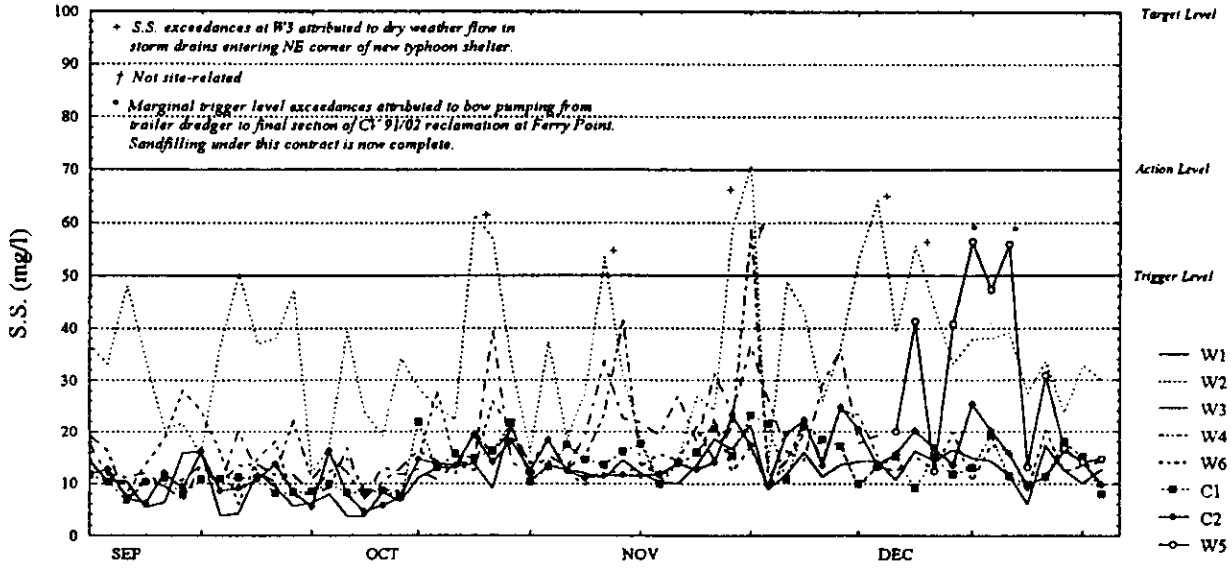

### Explanatory Notes

- Representative Noise Monitoring Station at Stations N1–N7
- Target Level for Night time = 55 dB(A)

Figure A 4

## West Kowloon Project Area

## Water Quality monitoring at Station No. W1–6, C1–2 (Suspended Solids)



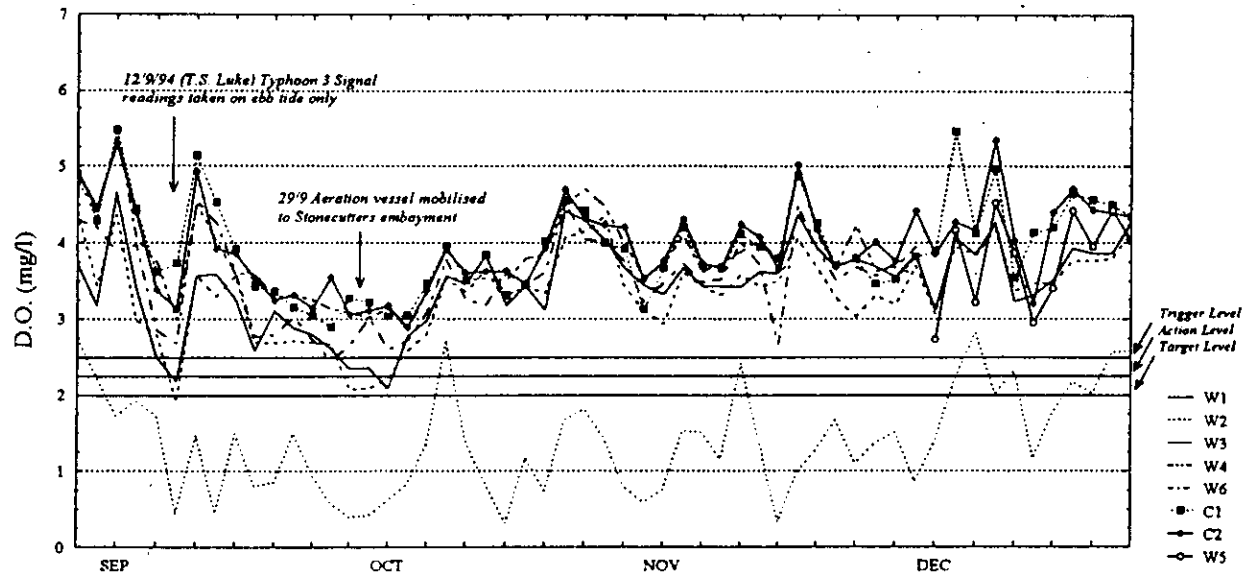

### Explanatory Notes

o Representative Water Monitoring Station No. W1–6, C1–2

o Target Limit = 100 mg/l & Action Limit = 70 mg/l

Figure A 5

## Water Quality monitoring at Station No. W1–6, C1–2 (Dissolved Oxygen Content)




### Explanatory Notes

o Representative Water Monitoring Station No. W1–6, C1–2

o Target Limit = 2 mg/l & Action Limit = 2.25 mg/l

## B. Project Title : Environmental Project Office - Kwai Chung Tsing Yi (ENPO-KC/TY)

### 1. Project Data and Project Organisation :

ENPO-KC/TY was established on 21 July 1993 with the appointment of consultants, Mott MacDonald Hong Kong Ltd. under the management of the Environmental Protection Department (EPD). The key purpose of ENPO-KC/TY is to assess the cumulative environmental impacts caused by the construction of major projects in the Kwai Tsing area including Kwai Chung Viaduct (KCV), Rambler Channel Bridge (RCB) and Cheung Ching Tunnel (CCT) of Route 3, Container Terminal No. 9, Duplicate South Tsing Yi Bridge and the Airport Railway. Under the present arrangement, the consultancy will run for two years. The ENPO-KC/TY is required to report to a Study Management Group chaired by EPD with members from HyD, PM/Tsuen Wan, NAPCO and MTRC.

### 2. Monitoring and Modelling Requirement :

Unlike the Environmental Project Office - West Kowloon Project Area (ENPO-WK), the routine environmental monitoring works are the responsibility of the Resident Site Staff (RSS) of individual projects and not ENPO-KC/TY.

ENPO-KC/TY is required to have a regular site presence to enable it to liaise closely with the RSS in order to assess the environmental impacts arising from the ongoing construction works and to identify potential cumulative environmental problems. ENPO-KC/TY is also required to review the relevant documents relating to construction environmental issues in Kwai Chung and Tsing Yi area and provide expert advice to the RSS. If the data and information collected indicate that there is a potential for cumulative environmental impacts, ENPO-KC/TY has to propose practical and cost effective mitigation measures and liaise with the RSS for their implementation. Issues that cannot be resolved at working level will be referred to the Secretary for Works and Secretary for Planning, Environment and Lands for resolution.

If ENPO-KC/TY considers that more monitoring works are required, there is provision for supplementary monitoring to be carried out subject to the approval of EPD.

### 3. Current Environmental Monitoring Status :

Work on the three Route 3 contracts and the LAR Lai King Abutments (LKA) Contract continued. In addition, it has been confirmed that five new LAR contracts, Lai King Station (LKS), Kwai Chung Park Viaducts (KCPV), Rambler Channel Railway Bridge (RCRB), Tsing Yi Station (TYS) and the Tsing Yi Tunnels & Viaducts (TYTV) will commence in the near future. Preparatory works have already started at both station sites.

Noise impact monitoring was ongoing for the LAR LKA Contract and the Route 3 CCT and KCV Contracts. Dust impact monitoring was ongoing for the LAR LKA Contract and the Route 3 CCT, KCV and RCB Contracts. Baseline monitoring for the five new LAR contracts has been completed, but no information is available to date.

Supplementary monitoring by ENPO involving five 'hot spot' NSRs being monitored over a period of a week in Lai King was approved in December. The monitoring has commenced and is ongoing in December.

## 4. Monitoring and Audit Results :

Monitoring results in the form of exceedances of action and target levels for the period October to December 1994 are included in Table B1.

Air (1 Hr TSP): 1 breach of target level was recorded in the reporting period.
Air (24 Hr TSP): No breach of target level was recorded in the reporting period.
Noise: 1 breach of target level was recorded in the reporting period.

**Table B1 - Exceedances of the ENPO-KC/TY Action and Target Levels**

| Environmental Parameters | October 1994 | | | November 1994 | | | December 1994 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| Air (1 Hr TSP) | 57 | -(1) | 1(2) | 75 | -(1) | 0 | 71 | -(1) | 0 |
| Air (24 Hr TSP) | 24 | 0 | 0 | 30 | 0 | 0 | 23 | 0 | 0 |
| Noise | 133 | 0 | 0 | 160 | 1(3) | 0 | 148 | 0 | 1(4) |

* Total no. of monitoring events undertaken for both Route 3 and the LAR projects
A No. of monitoring events with results exceeding the Action Level
T No. of monitoring events with results exceeding the Target Level
(1) Action level is not applicable to 1-hour TSP monitoring
(2) The MTRC reported the breach was due to equipment error
(3) Breach in action level was a result of receiving more than one complaint within two weeks on the CCT Contract (refer to Section 5 for details of complaints)
(4) The breach was due to two hydraulic breakers working adjacent to Morninghope School. MTRC advised the Contractor of the exceedance but have not confirmed what follow up actions were taken or provided data to confirm that no further breaches have occurred.

## 5. Complaints: From the Public

Table B2 indicates the number of environmental complaints for the Route 3 and LAR projects.

**Table B2 - Complaints**

| Environmental Parameters | Cumulative No. Brought Forward | No. of Complaints | | | Cumulative No. |
|---|---|---|---|---|---|
| | | October | November | December | |
| Air | 6 | 0 | 0 | 1 | 7 |
| Noise | 6 | 0 | 6 | 1 | 13 |
| Water | 1 | 0 | 0 | 1 | 2 |
| Other | 7 | 3 | 0 | 1 | 11 |
| Total | 20 | 3 | 6 | 4 | 33 |

In October, 3 complaints were received all relating to the KCV Contract. Two related to water discharged onto Kwai King Road and the Contractor rectified the problem. The third related to dumping on a Government land site in Mei Foo. The Contractor cleared the dumped material.

In November, 6 complaints were received. Three were made about midnight tunnel blasting on the CCT Contract. Additional noise and vibration monitoring was undertaken and the CCT Contractor was instructed to inform the RSS/CCT prior to any further blasting so the amount of explosive could be assessed to ensure the Contract would be complied with. The fourth complaint concerned noise generated at night from a generator near the LKA site. The Contractor stopped the generator. The fifth and the sixth complaints were regarding noisy night-time work by the KCV Contractor adjacent to Mei Foo Sun Chuen Estate. Warning letters were issued to the KCV Contractor by the RSS and EPD. EPD has advised that prosecution action may be taken.

In December, 4 complaints were received. The first concerned noise from night work on the KCV Contract opposite to the Yat King and Ming King House. Observations made subsequent to the complaint confirmed the subject work was no longer undertaken at night. The second was regarding smoke and smell from the east portal of the CCT Contract. The Contractor was asked for his proposals to rectify the problem. The third related to midnight tunnel blasting from the CCT Contract. The RSS explained the blasting details to the complainant. The fourth concerned the blockage of a sewer manhole and the pumping of sewage into the stormwater system near the Mariner's Club by the KCV Contractor. DSD cleared the blocked drain and the Contractor was instructed to pump the sewage into a foul drain.

## 6. Liaison: Meetings and Representations to the Public

ENPO attended the Kwai Tsing District Board 1st Works Committee Meeting (94-95) on 16 December 1994.

## C. Project Title: Chek Lap Kok (CLK) Airport: Provisional Airport Authority (PAA)'s Site Preparation Contract No.201

### 1. Project Data and Project Organisation:

The land for the new international two-runway airport for Hong Kong at CLK is formed under this Contract by levelling the islands of CLK and Lam Chau and by using the land-excavated/marine-borrowed materials to reclaim the required additional land areas. Environmental Monitoring and Audit (EM&A) for the project is carried out by the PAA's own environmental team. An environmental manager co-ordinates the work of the professional and technical staff of the team. To facilitate efficient liaison and consultation, the PAA holds regular co-ordination meetings with EPD.

### 2. Monitoring Requirement:

An EM&A Manual has been formulated by the PAA stipulating the requirements and procedures for undertaking the monitoring and audit of the construction phase of the project. The Manual was updated and submitted to EPD on 21 March 1994. It is expected that this Manual will continue to be reviewed periodically and updated based on further experience gained in undertaking the EM&A work. Monthly EM&A progress reports are submitted to EPD.

Dust or Total Suspended Particulates (TSP) monitoring for 1-hr and continuous 24-hr periods should be carried out once in every six days at three locations in villages with identified sensitive receivers, namely Tung Chung, San Tau and Sha Lo Wan, and at other locations from where dust complaints are received.

Five-minute noise monitoring is to be carried out at 4 sites daily for works being carried out within the monitoring zones as defined in the ExCo Exemption Order outside the hours of 0700-1900 hours or on general holidays. (An exemption from the permit requirements of the Noise Control Ordinance was granted by the Executive Council because construction must proceed for 24 hours per day).

The water quality monitoring programme has been reviewed and revised, and a new set of monitoring stations have been established. It involves the collection of water samples from 22 numbers of monitoring and control stations around the CLK/ESC/Brothers area and 28 numbers of monitoring and control stations around borrow and dumping sites, namely, the West Po Toi (WPT), South Tsing Yi (STY), South Cheung Chau (SCC) areas and also the sensitive areas (such as Ma Wan Fish Culture Zone, Castle Peak Power Station, etc). Monitoring on three days per week within each given works area measured parameters such as dissolved oxygen (DO) (concentration in mg/l and saturation in %), temperature, and turbidity. Samples were taken for suspended solids (SS) analysis on each occasion that turbidity target criteria were exceeded. An SS/Turbidity correlation is available for an understanding of the SS values and is regularly verified.

### 3. Activities undertaken during the quarter

Marine mud-dredging operations continued in the CLK area waters during the quarter with the mud deposited at the East Sha Chau dump site. These operations were part of the preparation work for the construction of a seawall along the south shore of the airport platform. Trailer dredging

operations also continued during the quarter in the Brother middle pit and East Sha Chau west borrow pit with the dredged mud deposited at the East Sha Chau dump site.

Marine reclamation work was carried out in seawall trench areas, with materials from the construction sites of Route 3, the Brothers, Sha Lo Wan headland, Lantau Fixed Crossing toll plaza, and Tung Chung. Reclamation work by end-tipping from land with excavated/blast materials was also undertaken along the edges of the platform. Drilling, blasting and excavation continued at CLK particularly for the terminal building and at the Sha Lo Wan headland. The diversion of the navigation channel through the headland commenced on 27 September 1994 and a causeway connecting the headland to the platform has been formed.

## 4. Monitoring Results: Compliance with Action/Target Levels

Monitoring Results in the form of exceedances obtained during the quarter are shown in Table C1.

Air/Noise : No exceedance of Target Levels were recorded. (See Figures C1 & C2.)

Water : Table C1 shows exceedances of criteria. (Also see Figures C3 to C10.)

No exceedance of criteria in DO was recorded.

As before, EPD has divided the monitoring data into two categories: one for the CLK/ESC/Brothers area in North Lantau waters, and the other for the SCC/STY/WPT area in southern waters.

About 0.5 % of the total monitoring events undertaken in the North Lantau waters in the quarter have exceeded the Target Levels for turbidity. As for the southern waters, about 2 % of the total monitoring events undertaken in the area have exceeded the Target Levels for turbidity.

**Table C1 -Exceedances of the Action and Target Levels for the CLK/ESC/Brothers area**

| Environmental Parameters | October 94 | | | November 94 | | | December 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total | A | T |
| Air | 15 | 0 | 0 | 17 | 0 | 0 | 15 | 0 | 0 |
| Noise | 251 | 0 | 0 | 268 | 0 | 0 | 256 | 0 | 0 |
| Water DO Surface | 477 (154) | 0 (0) | 0 (0) | 495 (156) | 0 (0) | 0 (0) | 475 (134) | 0 (0) | 0 (0) |
| Water DO Bottom | 239 (78) | 0 (0) | 0 (0) | 248 (78) | 0 (0) | 0 (0) | 239 (67) | 0 (0) | 0 (0) |
| Water Turbidity | 716 (234) | 70 (59) | 11 (10) | 743 (234) | 63 (35) | 0 (0) | 718 (234) | 46 (42) | 0 (5) |

Total no. of monitoring events undertaken.
A No. of monitoring events with results exceeding the Action Level only.
T No. of monitoring events with results exceeding the Target Level.
( ) Exceedances for southern waters, namely, West Po Toi MBA.

## 5. Audit Results: Implications of Non-compliance

Air/Noise: No exceedance of criteria was recorded during the quarter and, therefore, the impacts have been well controlled.

Water: The 2 % exceedances for the southern waters, as indicated above, may have been influenced by the dumping activity that resumed at West Po Toi since 28 August 1994.

The Action Response Plan was followed notifying EPD as a result of turbidity levels exceeding the target levels. Compared with the previous quarters, there have been obvious signs of improvement in the quarter in controlling the water quality impacts around both North Lantau and southern waters.

## 6. Proposals for Remedial Measures: Solutions to Problems

No proposals for remedial measures were made to EPD for implementation on site by the PAA in response to their identified water quality exceedances. However, the PAA undertook to ensure that all dredging and dumping operations adhere to stringent procedures designed to minimize pollution outlined in the BLD Licence and the EPD's dumping licences. These include maintaining adequate freeboard on hopper dredgers to prevent overflow or deck washing by wave action; ensuring that dredgers are fitted with tight seals to bottom openings to prevent leakage; etc.

To meet the above objectives, the PAA has also been required to conduct regular inspections to their dredging and dumping operations for compliance audit. The EPD has conducted independent patrols and visits (including those by helicopter) during the quarter.

The dredging programme has now past its point of peak intensity with several dredgers already demobilised further from a fleet of 9 in the last quarter (comprising 4 trailer hopper, 3 cutter suction & 2 grab dredgers respectively) to 5 (comprising 3 trailer hopper and 2 cutter suction).

## 7. Follow-up Actions: By Contractors, Engineers, etc

As recommended in the New Airport Master Plan EIA, air conditioners have been installed and are operational at 62 village premises at Sha Lo Wan Shore and San Tau to protect the villagers from any adverse noise impact arising from the construction works.

The construction of the southern seawall continue, after removal of the Sha Lo Wan Headland, to enable the construction of the noise bund. A 1.5 km section of the noise bund has been completed. The noise bund is to break the line of sight between the noise sensitive receptors and the noise generating plant. Additional sections of the bund will be constructed as more sections of the seawall are completed. The southern seawall also serves to curb the drift of suspended sediments to the North Lantau project area. Opposite to the Sha Lo Wan, a marine sand stockpile is serving as a temporary noise bund whilst the sea wall works continued.

## 8. Liquid/Solid Waste Issues:

Licences have been issued under the Water Pollution Control Ordinance for the effluent discharges from temporary site offices, canteen and workers accommodation etc on site. Site visits were regularly conducted by the EPD staff during the quarter to ensure compliance with the licence conditions and the PAA has been required to take necessary action for statutory compliance.

At present, under the Site Preparation Contract, limited amounts of construction waste are generated at Chek Lap Kok. Construction wastes, when not reused on-site, are containerised with the domestic waste arisings and taken by roll-on/roll-off lorry to Lok On Pai for ultimate disposal to Pillar Point Valley Landfill.

It is envisaged by PAA that once significant construction activities commence, all domestic and construction waste containing less than 20% by volume of inert material, will be disposed of to WENT Landfill, the remainder of the construction waste arising being used within the reclamation.

The storage, transportation and final disposal of chemical waste is regulated. The Regulation requires waste producers to arrange proper packaging, labelling and storage of chemical waste before they are transported off site to a proper facility for disposal. These arrangements have already been established at Chek Lap Kok in accordance with the Regulation. Site inspections are also conducted by EPD staff and findings & recommendations are made known to PAA and their contractors for rectification/implementation.

Marine Pollution Equipment such as oil sorbent materials and containment booms are currently provided at the Chek Lap Kok work area for emergency use. The PAA is coordinating amongst its Site Preparation Contractor and other contractors, soon to be using the site in formulating a spill response plan.

The PAA will provide an updated inventory of chemical waste materials quarterly.

## 9. Implementation status of EIA recommendations

A summary of implementation status of EIA recommendations has been provided in Appendix C1.

## 10. Complaints: <u>From the Public</u>

There were no complaints reported during the quarter.

## Table C2 : Monthly Distribution of Complaints Received for CLK

| Environmental Parameters | Cumulative No. Brought Forward | No. of Complaints this month | | | Cumulative No. |
|---|---|---|---|---|---|
| | | October 94 | November 94 | December 94 | |
| Air | 0 | 0 | 0 | 0 | 0 |
| Noise | 3 | 0 | 0 | 0 | 3 |
| Water | 0 | 0 | 0 | 0 | 0 |
| Waste | 0 | 0 | 0 | 0 | 0 |
| Total | 3 | 0 | 0 | 0 | 3 |

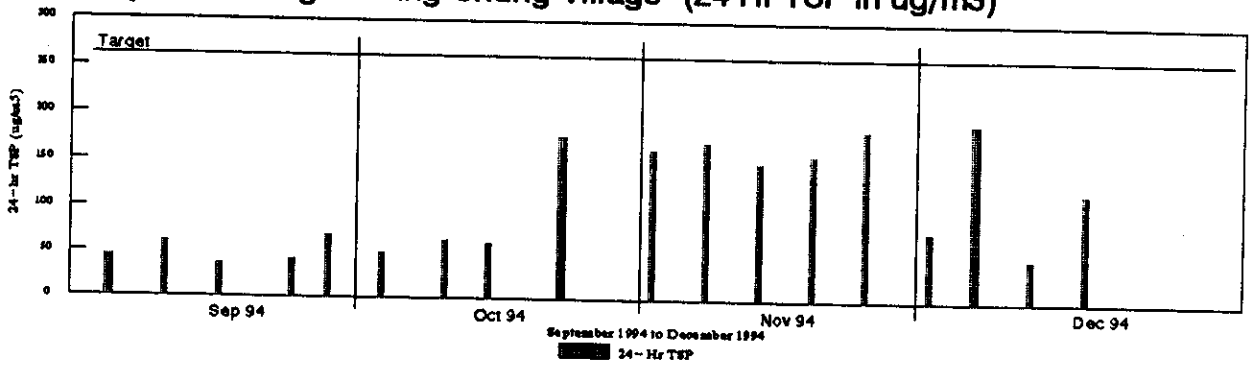
## 11. Liaison: Meetings and Representations to the Public

The PAA's environmental staff will continue to attend regularly scheduled citizen liaison committee meetings.

Chek Lap Kok Airport

Figure C 1

## Air Quality monitoring at Tung Chung Village (24 Hr TSP in ug/m3)

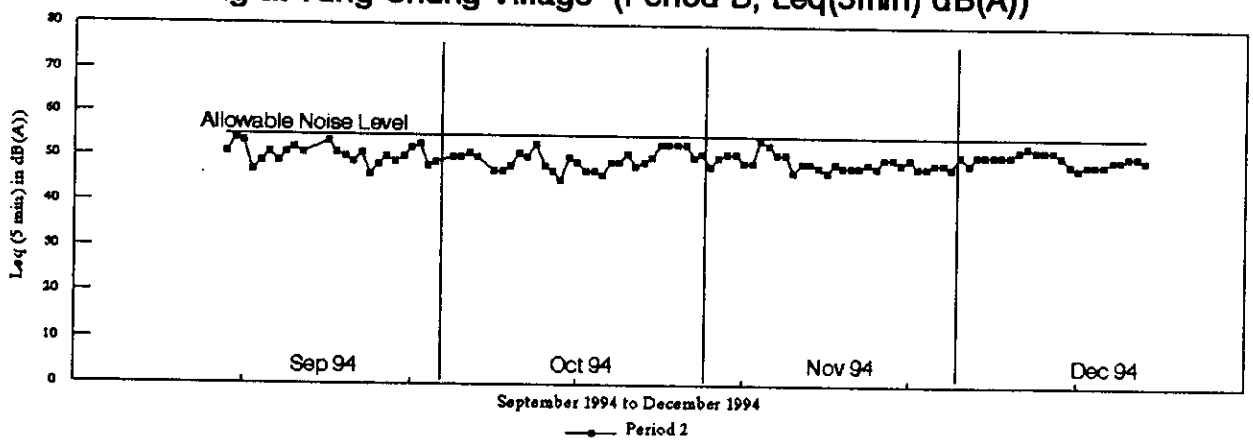



### Explanatory Notes

- o Representative Air Monitoring Station at Tung Chung Village.
- o Target Limit = 260ug/m3

Figure C 2

## Noise Monitoring at Tung Chung Village (Period B, Leq(5min) dB(A))



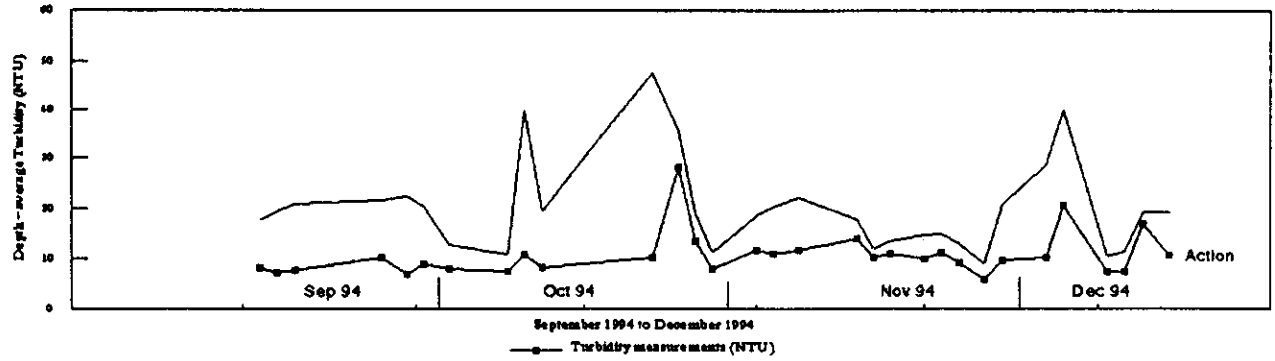

### Explanatory Notes

- o Representative Noise Monitoring Station at Tung Chung Village.
- o Period B: All days 2300 – 0700 hrs
- o Allowable Noise Level at Tung Chung Village for Period B = 55 dB(A)

Figure C 3

## Chek Lap Kok Airport

### Water Quality monitoring at Station No. 25 (Turbidity – at Flood Tide)

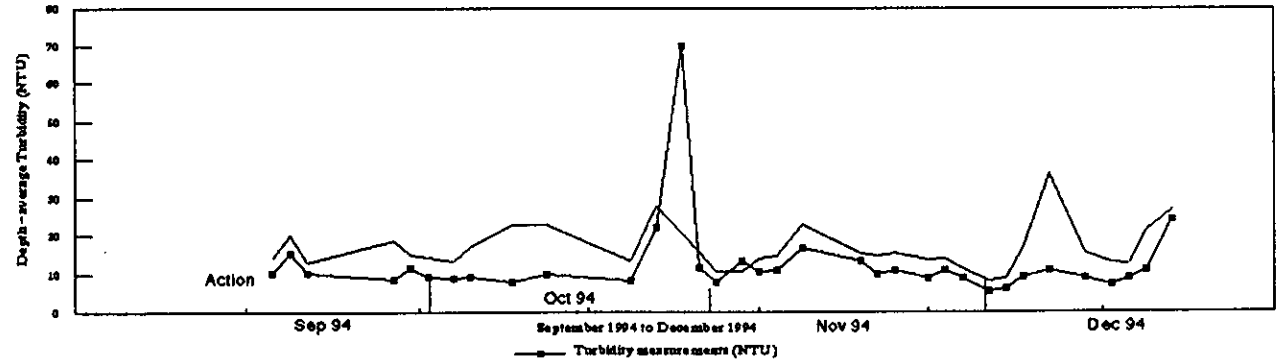



### Explanatory Notes

- o Representative Water Monitoring Station (No.25) located at the Brothers Area. (Location plan attached)
- o Action Limit = 30% above the average of readings obtained from Control Stations
- o Target Limit = 2 consecutive exceedances of the action level at the same tide.

Figure C 4

### Water Quality monitoring at Station No. 53 (Turbidity – at Flood Tide)



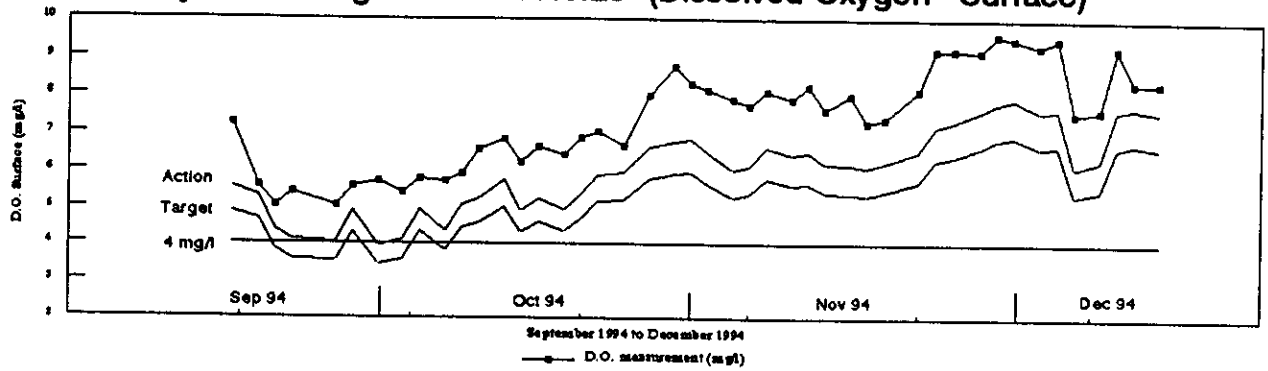

### Explanatory Notes

- o Representative Water Monitoring Station (No.53) located at the west of the Chek Lap Kok Area. (Location plan attached
- o Action Limit = 30% above the average of readings obtained from Control Stations
- o Target Limit = 2 consecutive exceedances of the action level at the same tide.

Chek Lap Kok Airport

Figure C 5

## Water Quality monitoring at Station No.25 (Dissolved Oxygen–Surface)



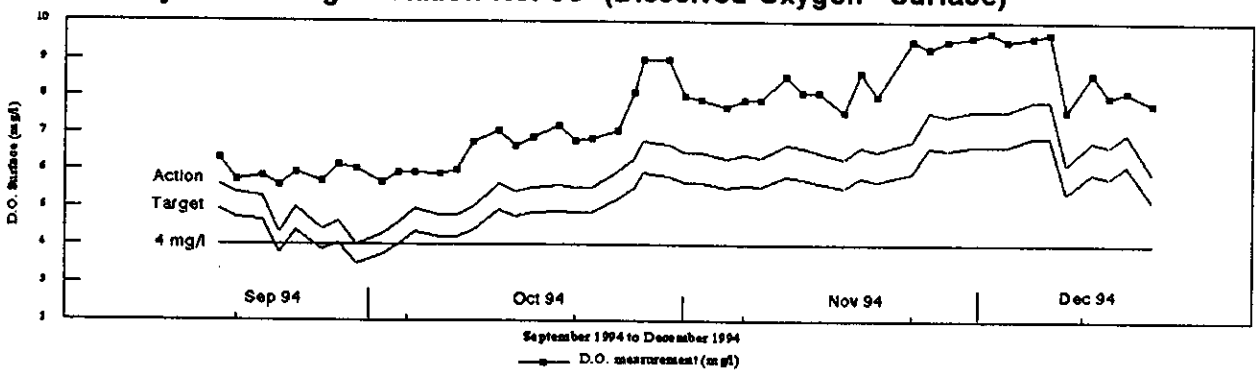

### Explanatory Notes

- o Representative Water Monitoring Station (No.25) located at the Brothers Area. (Location plan attached)
- o Action Limit = 20% below the average of readings obtained from Control Stations
- o Target Limit = 30% below the average of readings obtained from Control Stations AND below 4 mg/l.

- o No exceedances of Action or Target Limits were measured in the quarter.

Figure C 6

## Water Quality monitoring at Station No. 53 (Dissolved Oxygen–Surface)




### Explanatory Notes

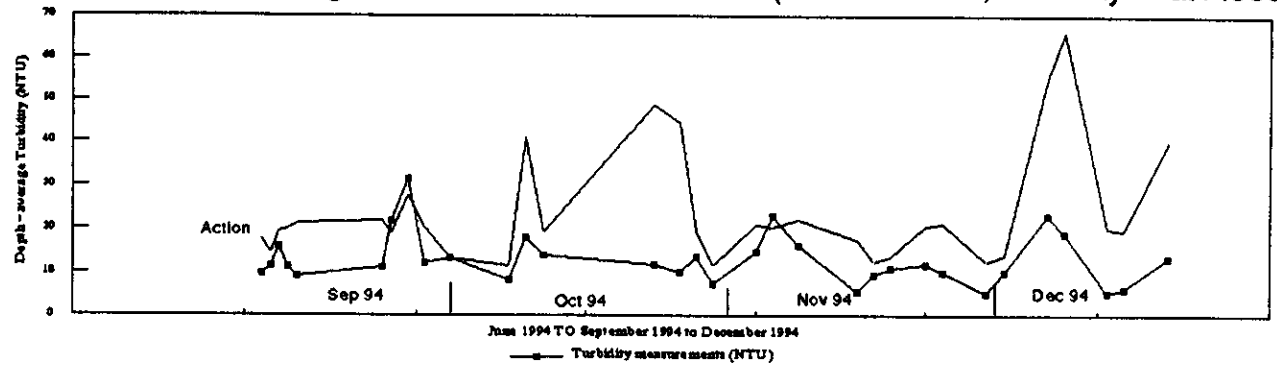
- o Representative Water Monitoring Station (No.53) located at the west of the Chek Lap Kok Area. (Location plan attache
- o Action Limit = 20% below the average of readings obtained from Control Stations
- o Target Limit = 30% below the average of readings obtained from Control Stations AND below 4 mg/l.

- o No exceedances of Action or Target Limits were measured in the quarter.

Figure C 7

Chek Lap Kok Airport

Water Quality monitoring at Ma Wan Fish Culture Zone (Station No. 63, Turbidity – at Flood Tide)

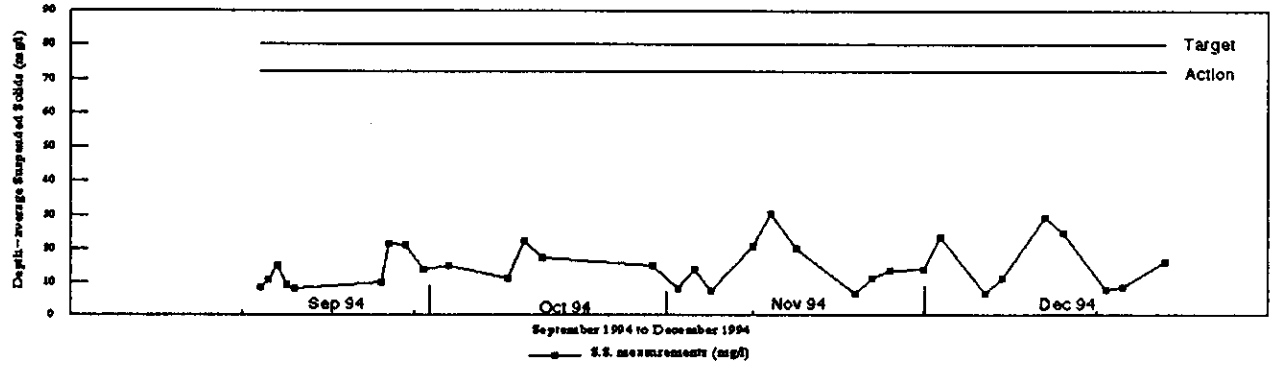



## Explanatory Notes

- o Representative Water Monitoring Station (No.63) located to the west of the Ma Wan. (Location plan attached)
- o Action Limit = 30% above the average of readings obtained from Control Stations
- o Target Limit = 2 consecutive exceedances of the action level at the same tide.

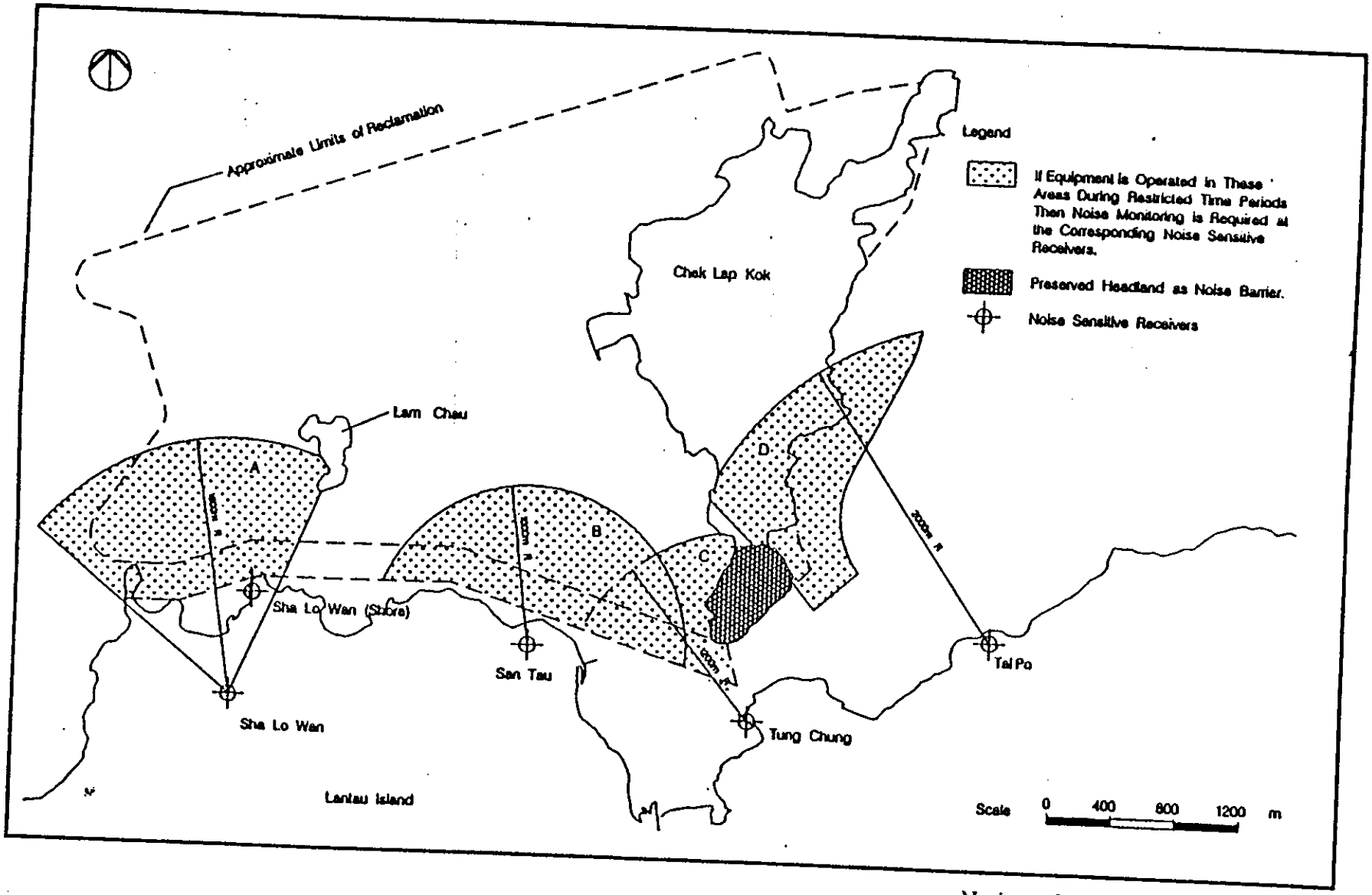
Figure C 8

Water Quality monitoring at Ma Wan Fish Culture Zone (Station No. 63, Suspended Solids – at Flood Tide)




## Explanatory Notes

- o Representative Water Monitoring Station (No.63) located to the west of the Ma Wan. (Location plan attached)
- o Action Limit = 72 mg/l
- o Target Limit = 80 mg/l




Noise Sensitive Receivers

Figure C 9

Figure C 10

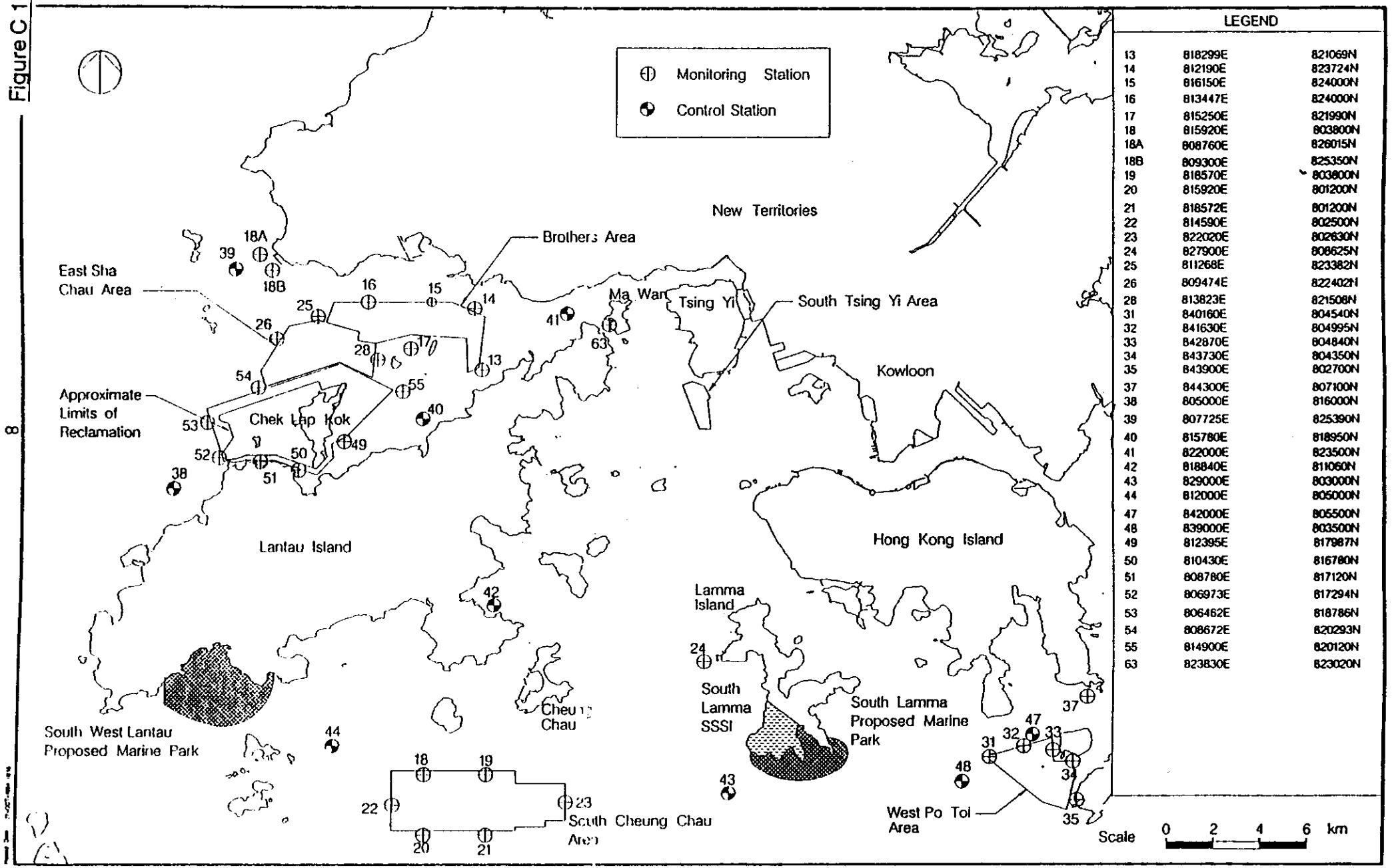
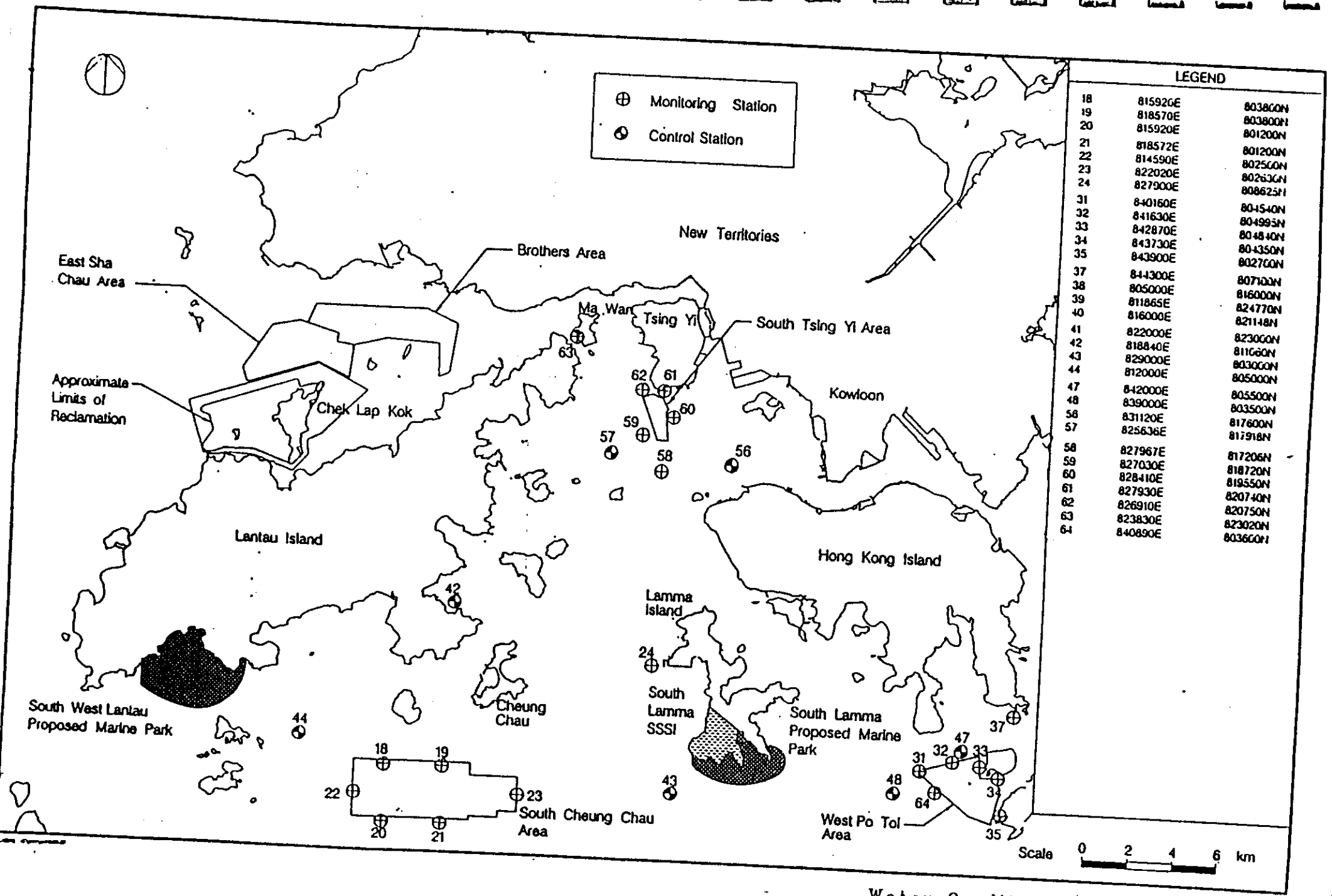



Exhibit 3 Water Quality Monitoring Stations




Water Quality Monitoring Stations

Figure C 11

Appendix C1

# Implementation Status of EIA Recommendations for CLK

## Project : New Airport at Chek Lap Kok
## Construction Phase Site Preparation Contract commenced on 30.11.92.

| Key Measures Implemented | Key Measures Required | Action Taken |
|---|---|---|
| **Noise**<br><br>The southern tip (headland) of CLK has been preserved to act as a natural noise barrier. A southern berm to +10mPD is being constructed to break the line of sight between sensitive receptors and noise generating plant. A 1.5km section of the berm has been completed. Air conditioners for about 73 NSRs have been installed and are operational.<br><br>**Air Quality**<br><br>PAA reported that the SPC contract is being undertaken, within safety limits, to properly manage the blasting and excavation operations during periods of "worst case" meteorological conditions. To minimize the construction related dust, the contractor has implemented measures e.g.placing dust collectors on drill rigs; water spraying; covering dusty materials during transport, etc. The measures are also included in follow-on contracts.<br><br>**Water Quality**<br><br>Sewage treatment facilities for construction workers have been addressed in PAA's design contract #120 and agreed by WSG/EPD. Basically, sewage effluent will be collected by centralized sewage system, with support by tankering of some area canteen waste from temporary storage tanks, for final disposal at a submarine outfall (with screening plant) to the north-east of the CLK island. PAA has applied for a licence for the discharge to the surrounding water body.<br><br>Silt traps have been provided for all existing concrete batching and asphalt plant and will be provided for all future facilities.<br><br>Water quality monitoring is being undertaken as for air and noise. Additional monitoring is also undertaken when dredging or dumping vessels are active within a 5km radius of Castle Peak Power station.<br><br>**Marine Ecology**<br><br>The PAA has provided funds to AFD to transplant the existing Zostera from Tung Chung beds to the North Lantau coastline. AFD is aware of the recommended quarterly inspection of the mangrove and eel grass community south of Tin Sam jetty during the airport construction. Dolphin sighting forms have been provided to all PAA and contractor boat crews for dolphins protection. A dolphin exclusion zone is also patrolled prior to each below sea-level blast.<br><br>**Terrestrial Ecology**<br><br>AFD has commissioned studies for implementation of the following : a detailed field investigation of Romer's Tree frog on Lantau and Lamma Islands; creation of new mangrove habitats outside the seawalls of the NLD or other PADS developments; protection of representative freshwater wetland habitats elsewhere within the Territory by inclusion within the Country Parks system; development of a management strategy for woodland habitat on North Lantau to improve wildlife conditions; etc.<br>After levelling the Brothers Islands, the centre of West Brother Island will be reinstated with low stature vegetation under a landscape consultancy.<br><br>**Solid Waste and hazardous materials**<br><br>A plan for the containment and cleanup of hazardous materials, chemical wastes or oil is in place for the duration of the SPC. A supplementary/replacement plan is now being developed. Both LCO and PAA conduct regular site visits and audits to ensure that hazardous material, chemical wastes and fuel are handled properly and that the statutory requirements are met. | **Noise**<br><br>Nil<br><br>**Air Quality**<br><br>Nil<br><br>**Water Quality**<br><br>Implementation of Action Response Plan in cases of exceedances should be improved. It generally includes reporting to EPD without identifying source of pollution and remedial actions taken.<br><br>**Marine Ecology**<br><br>Small non-lethal "seal bombs" recommended to scare marine fauna from the construction area prior to a blasting were not used in favour of an alternative approach.<br><br>Lung Kwu Chau should be removed from the SSSI list, since sea-eagles no longer nest there.<br><br>Spoil removed from the top of Sha Chau should be disposed of to the west of the island over the existing eroded shoreline. | **Noise**<br><br>Nil<br><br>**Air Quality**<br><br>Nil<br><br>**Water Quality**<br><br>The PAA have been encouraged to identify on the cause & actions taken when an exceedance of action or target level occurs. However, the PAA have difficulty in doing this due to the nature of the dredging works releasing sediments. The water quality has improved in recent months due to a reduced scope of marine works. In addition, the PAA cooperated in a mixing zone trial and have now amended the W.Q. monitoring network which should more accurately reflect the sediments arising from the works. The PAA has also invited EPD to visit dredgers, to observe operations and to work with the Authority on developing means for further reducing impacts.<br><br>**Marine Ecology**<br><br>AFD agreed that the seal bombs should not be used. Instead, the PAA patrol the waters around the blast area.<br><br>AFD does not agree to the recommended removal of Lung Kwu Chau from the SSSI list as it is not meant to mitigate any identified impact.<br><br>AFD advised that it had better not be implemented in view of the presence of dolphins in the waters around Sha Chau. |

## D. Project Title: North Lantau Development (NLD) Tung Chung Development Phase I - Infrastructure

### 1. Project Data and Project Organisation:

The North Lantau Development (NLD) covers the construction of Tung Chung New Town. The New Town is planned to be a fully comprehensive development incorporating residential, industrial and commercial activities and with all necessary infrastructure to serve the New Town and the New Airport. Currently, the NLD construction comprises the following Contracts :

- Infrastructure (Contract NL2/93)

  The infrastructure works includes the construction of footbridges, subways, trunk sewers, access to China Light and Power sites, the promenade, roads and related traffic systems, coach and car parking facilities, Second Sea Channel Bridge, MTR sea water pipework, pumping main and distribution main.

- North Lantau Sewage Treatment Facilities (Contract NL3/93)

  - Siu Ho Wan Sewage Treatment Works; and
  - Tung Chung Sewage Pumping Station : this is designed to pump sewage from North Lantau Development area to Siu Ho Wan Sewage Treatment Works via a rising main along the utilities reserve of the North Lantau Expressway (NLE).

- North Lantau Sewage Facilities - Submarine Outfall (Contract NL4/93)

  This is the contract for the construction of 1.5 km long 1843 mm diameter submarine outfall from the Sewage Treatment Works into the sea to the south of East Brother Island. This also includes the construction of a related sewage chamber and culvert in the contract area.

  The works are supervised by the Engineer, Mott MacDonald HK Ltd., and the Environmental Monitoring and Audit (EM&A) programme is being carried out by an environmental team of MMHK.

### 2. Monitoring Requirement:

The EM&A Manuals are under revision during the reporting period. EM&A monthly report containing the monitoring data and the audit results is submitted to EPD for comment.

24-hour dust sampling and analysis should be taken five days per week at each of seven monitoring stations. One-hour dust sampling should also be undertaken every day at the worst affected sampling stations or at the site boundary in between the air sensitive receivers and the sources of the dust impact.

Noise monitoring should be carried out at four monitoring stations adjacent to identified noise sensitive receivers (NSRs) whenever construction activities are in progress. For all monitoring stations, in case construction is carried out during the restricted period, at least one measurement ($L_{eq(5min)}$)will be made daily between 1900 hours and 2300 hours, and between 2300 hours and 0700 hours. On general holidays and Sundays at least one measurement will be made between 0700 hours and 1900 hours; at least one measurement ($L_{eq(30min)}$) will be made during the daytime between 0700

hours and 1900 hours on normal weekdays one to three times each week; and measurement at the affected NSR will also be made following a complaint from members of the public.

Water quality impact monitoring is to be undertaken at 4 monitoring stations around the Works. All measurements, with the exception of suspended solids, should be taken in-situ and in-duplicate. Water samples will be taken for the determination of suspended solids according to method 2540D of Standard Methods for the Examination of Water and Wastewater. Impact monitoring should be carried out throughout the duration of the marine works, and should continue until six weeks after all marine works have ceased. The monitoring programme includes sampling during three working days each week whenever marine works are in progress. The impact monitoring is scheduled on Monday, Wednesday and Friday each week. In case the monitoring could not be undertaken according to the schedule, additional monitoring will be conducted, if possible.

## 3. Activities Undertaken during the Quarter

During this Quarter, the following activities were recorded :-

- structural work for the existing ferry pier roof;
- construction of Subways 1, 3 and 4;
- bored piling at the Tung Chung bay for the Second Sea Channel Bridge;
- piling for the footbridge;
- foundation and structural works for the mini transport interchange and walkway;
- foundation works for the noise barrier;
- sheet piling for the cofferdam at Tung Chung Pumping Station;
- foundation works for the Screen House and Discharge Culvert at Siu Ho Wan site; and
- site preparation works for submarine Outfall site.

## 4. Monitoring Results : Compliance with Action/Target Levels

Monitoring results for these three sites in the form of exceedances during the reporting period are included in Table D1.

Air : 28% and 43% of the monitoring events undertaken for NL2 and NL3 sites, respectively, recorded exceedances of the TSP Action and Target levels. There was no report on the monitoring of NL4 as no site work was on-going during the reporting period.

Noise: 0% and 0% of the monitoring events undertaken for NL2 and NL3 sites, respectively, recorded exceedances of Action and Target levels. There was no report on the monitoring of NL4 as no site work was on-going during the reporting period.

Water: 0% of the suspended Solids monitoring events for NL2 recorded exceedances of the Action and Target levels. There was 0% exceedance in DO Action and Target levels for NL2. There were no report on the monitoring of NL3 and NL4 as no site work was on-going during the reporting period.

Typical monitoring stations are selected to present the trend in a graphical format. Please refer to Figures D1 to D3.

**Table D1 - Exceedances of the Action and Target Levels for Contracts NL2 & NL3 (NLD)**

| Environmental Parameters | Oct 94 | | | Nov 94 | | | Dec 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| **Contract NL2** | | | | | | | | | |
| Air | 93 | 14 | 12 | 82 | 14 | 5 | 22 | 4 | 0 |
| Noise | 36 | 0 | 0 | 75 | 0 | 18 | 87 | 0 | 10 |
| Water DO Surface | 78 | 0 | 0 | 78 | 0 | 0 | 63 | 0 | 0 |
| Water DO Bottom | 52 | 0 | 0 | 52 | 0 | 0 | 42 | 0 | 0 |
| Water SS | 52 | 0 | 0 | 52 | 0 | 0 | 42 | 0 | 0 |
| Water Turbidity | 52 | 0 | 3 | 52 | 0 | 0 | 42 | 2 | 0 |
| **Contract NL3** | | | | | | | | | |
| Air | 14 | 3 | 3 | 14 | 1 | 2 | 5 | 0 | 0 |
| Noise | 12 | 0 | 0 | 25 | 0 | 9 | 29 | 0 | 6 |

* Total no. of monitoring events undertaken only
A No. of monitoring events with results exceeding the Action Level
T No. of monitoring events with results exceeding the Target Level

## 5. Audit Results : Implications of Non-compliance

### Tung Chung Development Phase I - Infrastructure (NL2)

#### Water Quality

The water quality results in the past 4 months showed that the concentration of dissolved oxygen level was maintained at a high level, and no breach of TAT levels was recorded. The minimum and maximum levels of DO concentration were 4.41 mg/L in September and 8.55 mg/L in December, respectively. Since the marine bored piling works were undertaken by NL2 and NLE between impact Station 1 and Station 2, the suspended solids concentration and turbidity level during the reporting period were occasionally higher than the TAT Levels. However, the variation of suspended solids and turbidity levels might also be contributed by natural turbulence, caused by tidal flushing.

#### Air Quality

The high 1-hr TSP and 24-hr TSP measurements found at each of the monitoring stations were mainly due to traffic on haul routes, strong wind and dry weather. Since one of the water

bowsers had broken down, as from the month of October, high TSP levels were found at all stations in October and November. However, the air quality was gradually improved by increasing the frequency of water sprinkling on haul routes. The dust level was reduced in December in comparison with that in October and November.

Noise

The monitoring results showed that all impact data for noise at each station, during the unrestricted period (07:00 - 19:00 hours on normal weekdays), were below the Target Level of 75dB(A). There were no noise measurements carried out in period 2 (23:00 - 07:00 hours all days) because no night-time works were undertaken on site in the past four months. The noise levels at Station NSR1 (Ma Wan Chung Village) and Station NSR2 (Buddhist Youth Camp) exceeded the Target Level of 60 dB(A) during the period 1 (19:00 - 23:00 hours on normal weekdays and 07:00 - 19:00 hours on general holidays and Sundays). The major noise source at Station NSR1 included community noise, traffic on haul routes, and marine vessels from the new airport site. The noise monitoring station at NSR1 was relocated in December in order to be more representative of noise generated from the NLD site. The breach of the Target Level at NSR2 was due to the caisson works undertaken by NLE.

North Lantau Sewage Pumping Station & Treatment Works (NL3)

Air Quality

The 1-hr TSP and 24-hr TSP measurements at the Buddhist Youth Camp Station were high in October and November. This was mainly due to traffic on haul routes, strong wind and dry weather. However, the air quality has gradually improved by increasing the frequency of water sprinkling on haul road by the Contractor of NL2. The dust level was reduced in December in comparison with that in October and November.

Noise

The monitoring results at the Buddhist Youth Camp Station showed that no breach of TAT Levels occured during the unrestricted period (07:00 - 19:00 hours on normal weekdays). Since no night-time works were undertaken on site, there was no noise measurement carried out in period 2 (23:00 - 07:00 hours all days). The noise levels at the Buddhist Youth Camp Station exceeded the Target Level of 60 dB(A) during the period 1 in November and December (19:00 - 23:00 hours on normal weekdays and 07:00 - 19:00 hours on general holidays and Sundays). The breach of the Target Level at the monitoring station was due to the caisson works undertaken by NLE. However, the noise level was expected to reduce because the caisson works would be completed at the end of December 1994.

## 6. Proposals for Remedial Measures : Solution to problems

The number of water bowsers on the Tung Chung site was increased to two. The Contractor was advised to increase the frequency of water sprinkling and extend the sprinkling area to the apron slab for minimizing the dust level.

The wheel washing facility was installed at the entrance of Tung Chung Site where construction vehicles frequently access the public roads. The frequently used haul road was paved with a hard surface and a speed reducing hump was also built on the haul road to help limit the speed of vehicles to 15 km/hr to help suppress the dust emission on site.

Enclosures and filters were installed in the concrete batching plant to minimize the dust emission from this site.

## 7. Implementation status of EIA recommendations

A summary of implementation status of EIA recommendations has been provided in Appendix D1.

## 8. Complaints: From the Public

There were no complaints reported during the quarter.

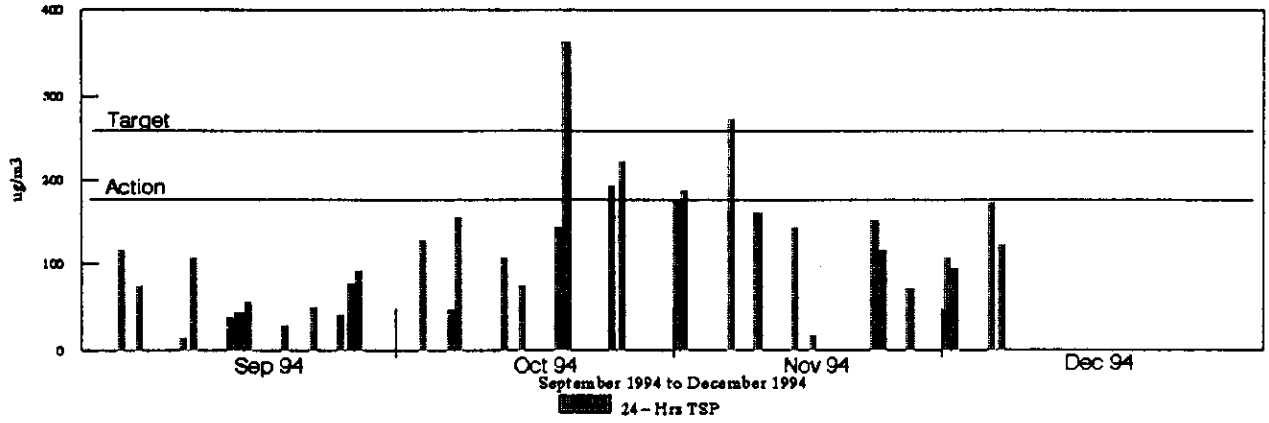
**Table D3: Monthly Distribution of Complaints Received for NLD Phase I - Infrastructure**

| Environmental Parameters | Cumulative No. Brought Forward | No. of Complaints this month | | | Cumulative No. |
|---|---|---|---|---|---|
| | | October 94 | November 94 | December 94 | |
| Air | 0 | 0 | 0 | 0 | 0 |
| Noise | 0 | 0 | 0 | 0 | 0 |
| Water | 0 | 0 | 0 | 0 | 0 |
| Waste | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 |

Figure D 1

## North Lantau Development

### Air Quality monitoring at Station No. AS5 [Contract NL3/93] (24 Hr TSP in ug/m3)

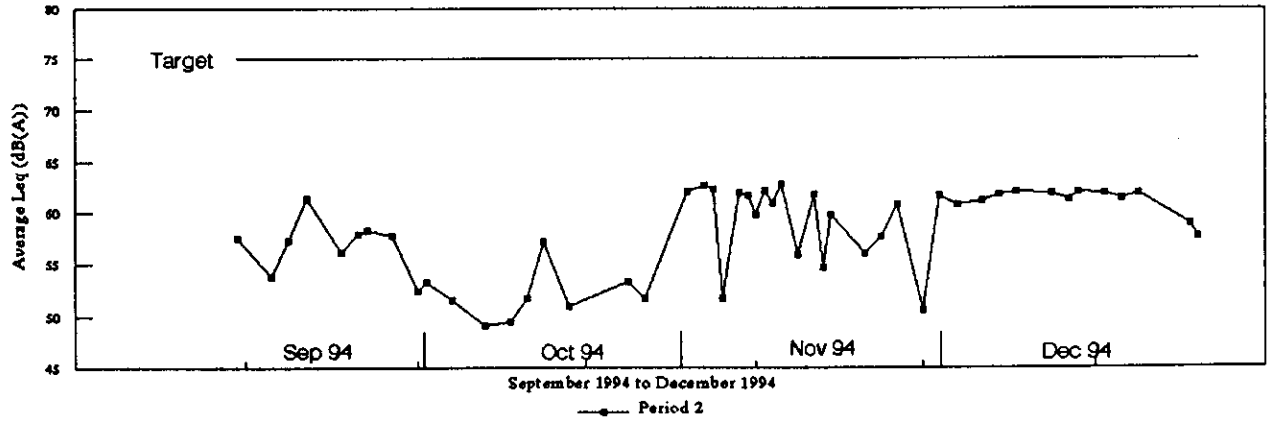



### Explanatory Notes

- o North Lantau Development Phase I Representative Air Monitoring Station No. AS5 (Buddhist Youth Camp) [Contract NL3/93].
- o Target Limit = 260ug/m3 & Action Limit = 180ug/m3
- o The high level 24-hr TSP in Oct & Nov 94 was due to hauling, strong wind and dry weather.
- o The dust level was reduced by increasing the frequency of water sprinking on haul road in Dec 94.

Figure D 2

### Noise monitoring at Station No. NSR2 [Contract NL3/93] (Period 2, Leq dB(A))



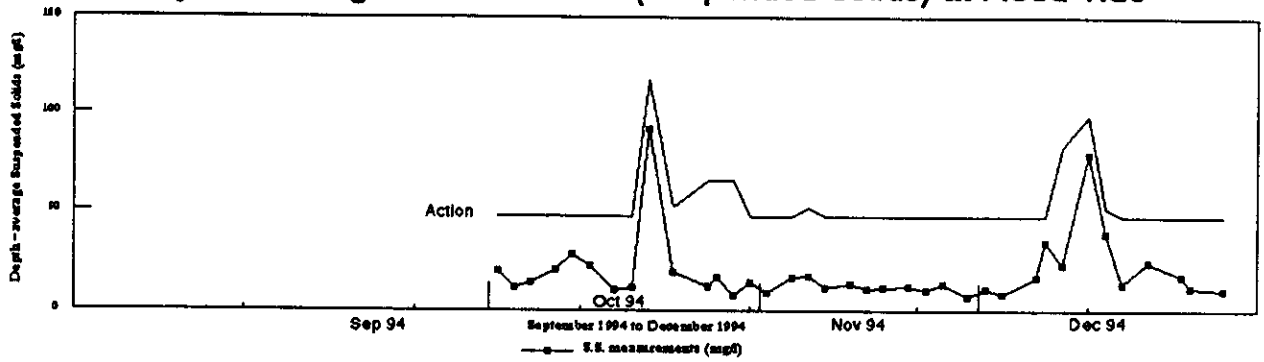

### Explanatory Notes

- o North Lantau Development Phase I Representative Noise Monitoring Station No. NSR2 (Buddhist Youth Camp) [Contract NL3/93].
- o Period 2: All days evening (1900 to 2300 hr), Sundays and general holidays during daytime and evening (0700 to 2300 hr).
  Target Limit = 75 dB(A)
  Action Limit = when more than one complaint is received within two weeks at the same location.

Figure D 3

## North Lantau Development

## Water Quality monitoring at Station No. 1 (Suspended Solids) at Flood Tide




### Explanatory Notes

- o Tung Chung Development Phase I Representative Water Monitoring Station No. 1 Tung Chung Wan.
- o Target Limit = the higher value of (i) > 48 mg/l and (ii) the corresponding control station reading with 30% added. for consecutively 2 times
- o Action Limit = the higher value of (i) > 48 mg/l and (ii) the corresponding control station reading with 30% adde

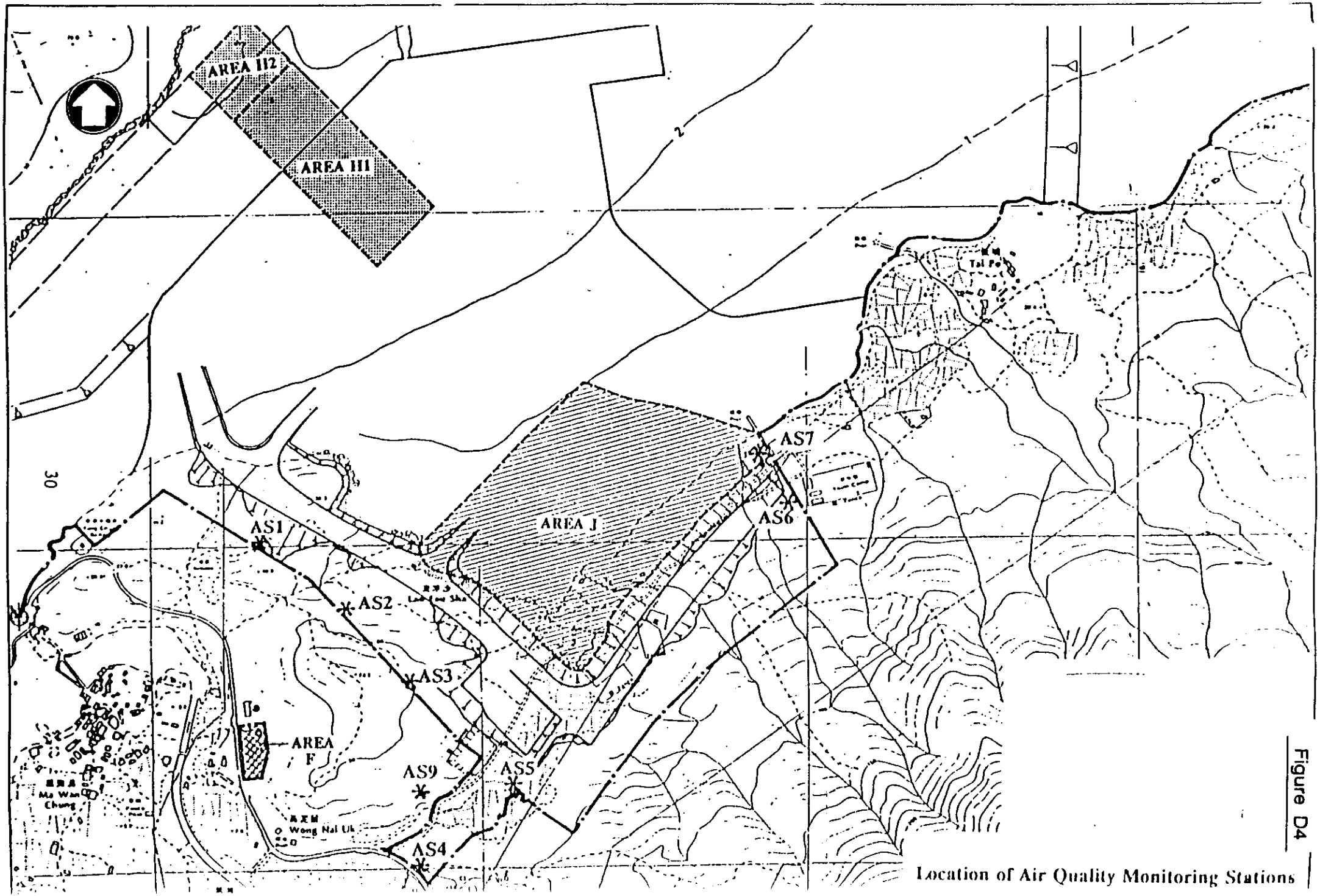



Figure D4

Location of Air Quality Monitoring Stations

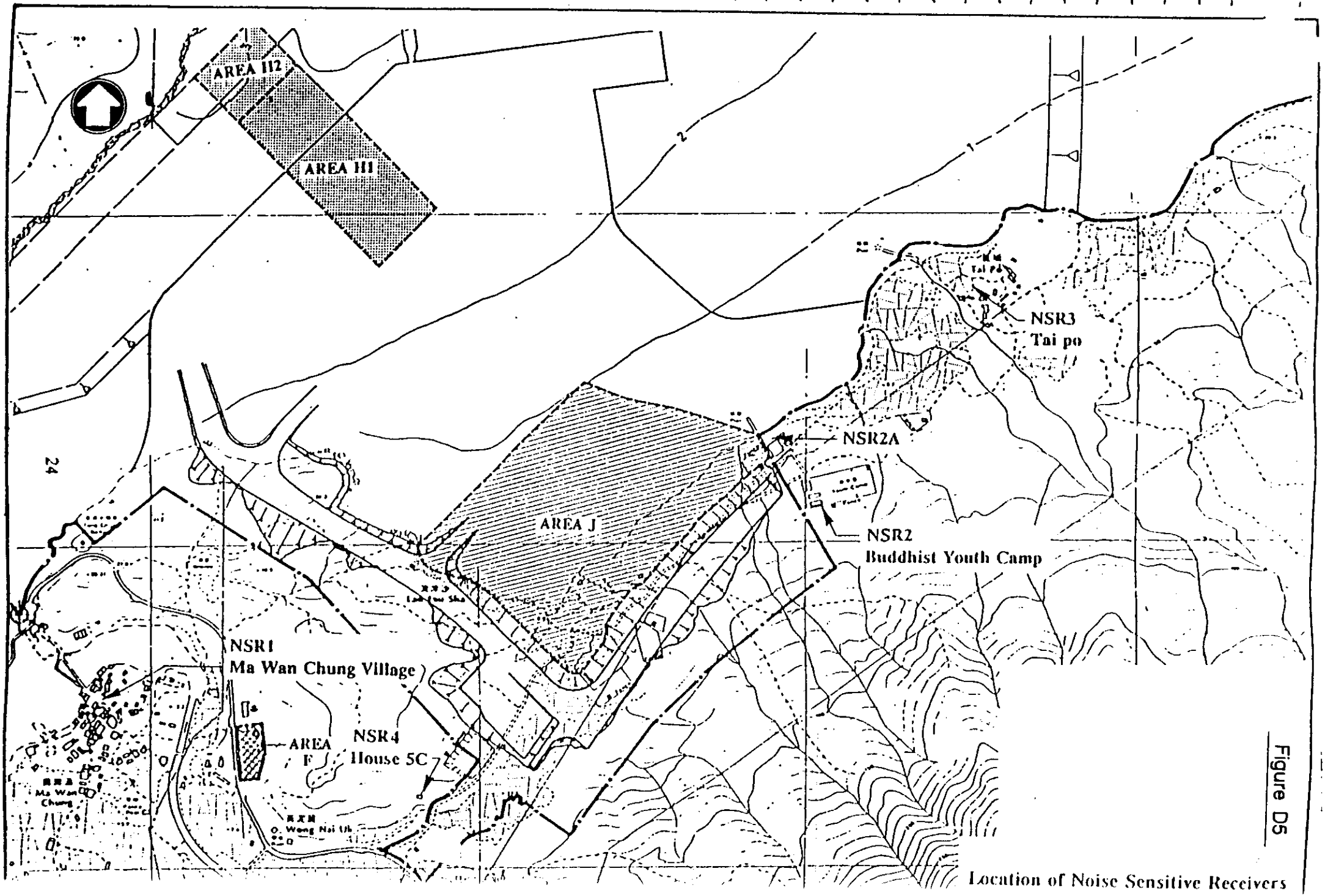



Figure D5

Location of Noise Sensitive Receivers

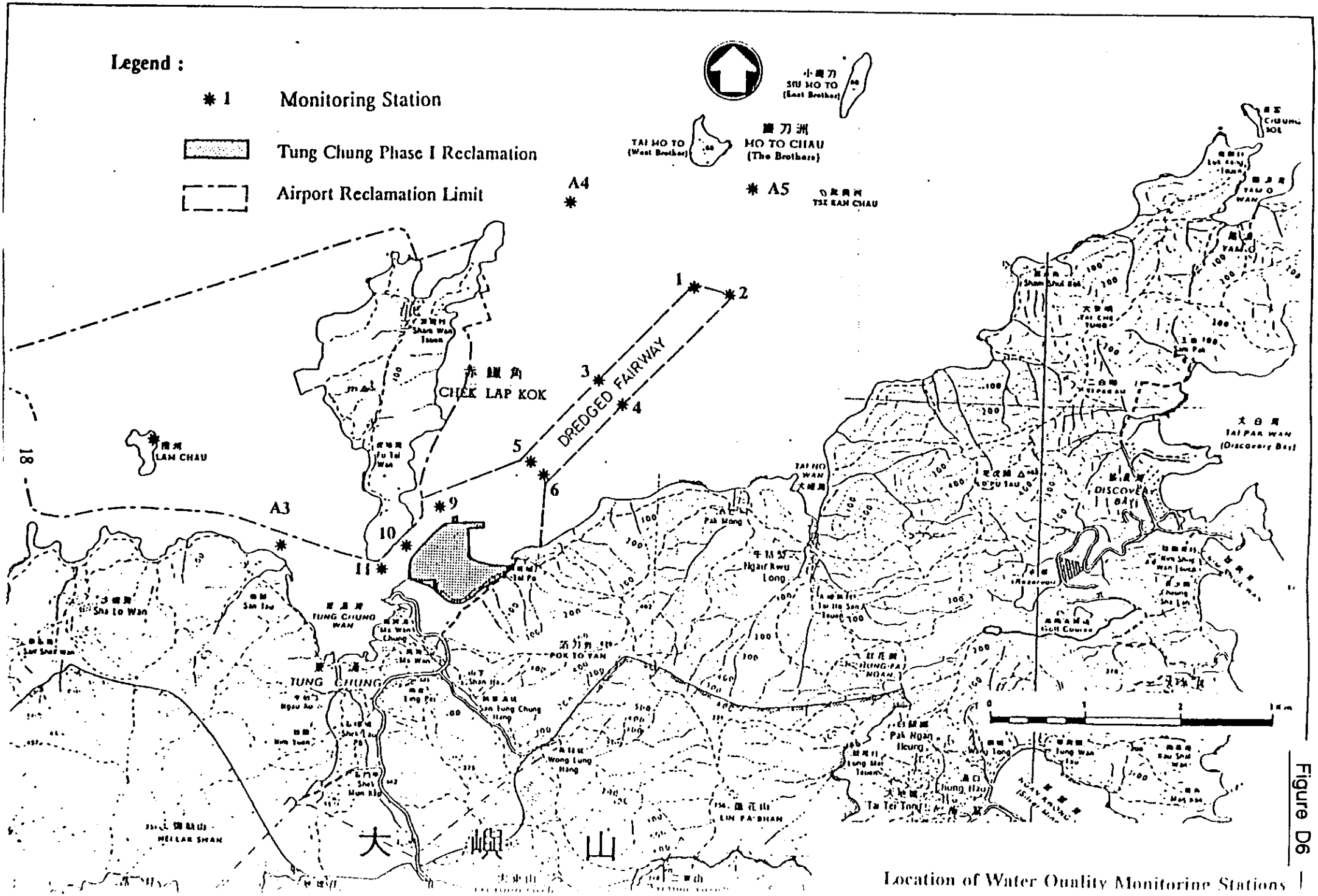



Figure D6

Location of Water Quality Monitoring Stations

Appendix D1

# Implementation status of EIA recommendations for NLD

| Key Measures Implemented | Key Measures Required | Action Taken |
|---|---|---|
| **Noise**<br>. Noise Control at Sensitive Receivers<br><br>The recommended sound insulation such as air conditioners for Tai Po and the Youth Camps have been already implemented.<br>. Noise Barrier<br><br>A Noise Barrier Acoustic Study has been carried by the consultant to identify the best appropriate mitigation measures.<br><br>**Air Quality**<br>. The recommended mitigation of dust by suppression during construction has been included in all construction contracts.<br>- by use of marine fill, rather than land based fill;<br>- by programming so that use smaller numbers of plants items at any one time to reduce dust levels;<br>- by avoiding the need for stockpiles and surcharges;<br>- by phasing projects so that any haul road movements are over short distance.<br><br>**Water Quality**<br>. Work Sites<br><br>Inclusion of clauses covering the following mitigation in all contracts :<br>(a) ensure liquid and solid wastes arising on-site are properly disposed of;<br>(b) ensure liquid domestic wastes are treated to comply with the Technical Memorandum on Effluent Standards;<br>(c) dispose of any chemical wastes at the Chemical Waste Treatment Facility at Tsing Yi;<br>(d) segregate and re-use of inert construction wastes should be specified in the contract and disposal facilities should be provided in the form of a central construction wastes collection point for wastes unsuited to disposal in parts of the reclamation; | **Noise**<br>. Noise Control at Source<br>The Contractor should be encouraged to silence all equipment items on site by enclosures, baffles, mufflers or silencers, particularly if night works are required.<br><br>. Noise Barriers<br>The Area Layout Plan is to be implemented by MTRC and the noise barriers for the Tung chung Development are to be implemented by TDD.<br><br>. Road Traffic Noise Consideration<br>- NLE road surface should be covered with a noise reducing friction course adjacent to noise sensitive land uses;<br>- opportunities to utilise noise "shadow" zones should be further explored at the detailed planning stage; and<br>- Railway Noise: Trackside barriers 1.5m high are recommended for the ARL & LAL.<br>- buildings should be oriented with an angle of view of 120 deg. or less from the nearest adjacent road.<br>- the inclusion of effective purpose-build landscaped noise reduction bunds within the development site.<br><br>**Air Quality**<br><br>. Dust Suppression Requirements<br><br>(a) concrete batching - enclosures and filters;<br>(b) rock crushing - filters and wet spray systems;<br>(c) haul road - speed reduction and the alternative of watering and surface chemical treatment mitigation;<br>(d) loading and unloading - the alternative of watering and chemical wetting agents.<br><br>. Planning Considerations<br><br>- desulphurisation and denitrification of all proposed power stations;<br>- reduction of road traffic by encouraging use of the railway.<br>- the early development of an efficient road based public transport system is also recommended as it will contribute to reductions in private traffic on the NLE;<br>- the use of two way catalytic converters (TWCC) is already assumed;<br>- process emissions as well as fuel (combustion) emissions from local industry should be limited and the use of low sulphur fuels (Town gas, LPG) should be stipulated.<br><br>**Water Quality**<br><br>. Planning Considerations<br><br>The hydraulics of the sea channel should be examined to optimise the flow through the channel and minimise maintenance dredging requirements while maintaining the natural coastline as far as possible, and strict control on all discharges to the channel, particularly in terms of discharges from the New Airport, New Town and associated areas. | **Noise**<br>. Noise Control at Source<br>Recent site inspection revealed that no sound silencer was installed and RSS was advised to rectify the situation.<br>. Noise Barriers<br>Liaison will continue with the TDD/MTRC design consultant until the design is fully implemented.<br>**Ecology**<br>. Compensatory Planting in North Lantau<br><br>As part of the development of the new airport at Chek Lap Kok, there is a commitment to provide a compensatory planting of 60 ha. of new woodland in North Lantau to compensate for the areas of native woodland lost during the removal of Chek Lap Kok island. This compensatory planting has been entrusted to TDD/AFD and to be implemented over a 3-year period. There are three phases :<br>. phase I (Sept 93 to Sept 94), planted 8,000 native trees;<br>. phase II (Sept 94 to 95), aiming to plant 10,000 to 15,000 native trees; and<br>. phase III (95 to 96), aiming to plant the remaining to make up the total planting of 27,000 trees.<br>. Extension of North Lantau Country Park<br><br>It has been recommended in both the SWNT Development Strategy and the earlier Topic Reports (TR7 and TR10) of the approved North Lantau Development (NLD) Study that the Country Parks boundaries should be extended as shown in Figure TR10-7.2 to coincide with the hinterland fringe of the New Town development.<br>It was stated in EPCOM Paper 7/92-93 that during construction stage adverse ecological impacts are unavoidable and indicated that our EIAs has recommended mitigation measures to minimise the impact outside works areas and to ameliorate the impact through landscaping and habitat rehabilitation. It was also said in the paper that the ecological rehabilitation programme is being looked at by NAPCO, TDD and AFD. In our liaison with Senior Officer/AFD Mr F Y Wong on 14.10.94, he revealed that the proposal of the extension of Country Park was endorsed by the Country Park Board. However, AFD has failed to obtain funding through normal channels and it will take a long time to compete for funding with other government projects. AFD was advised to turn to NAPCO for ACP funding and was rejected by D, NAPCO since the park extension is outside the project boundary and therefore, cannot use the resources earmarked for ACP projects. A letter from S for Works to GLA, dated 1.12.94, indicated the Secretary will discuss with D, NAPCO and DAF to look for alternative funding. At present SPEL is applying funding for this project. |

# Implementation status of EIA recommendations for NLD

| | | |
|---|---|---|
| (e) provide adequate and appropriate pollution control equipment to deal with accidental spillage both on and off-site; | It is recommended that discharge limits for the surface water run-off from the New Airport are adopted in addition to those given in the Technical Memorandum on Effluent Standards.<br><br>Surface water collectors are recommended at the railway depot especially in the maintenance area where oils and lubricating fluids could be spilt. Pollutants should be separated before discharge to the sea.<br><br>Leachates, washdown waters, and any other aqueous substance arising from operations at the Refuse Transfer Station should be collected and directed to the sewage treatment works for disposal. Oils and grease from the proposed maintenance areas should be separated and recycled. | . Liaison with AFD<br>We are constantly liaison with officers in AFD. In some cases we have arranged joint site inspection with AFD and invited the officers to sit in our monthly EM&A meeting. |
| (f) monitor water quality, during marine based activities to ensure operations are not creating adverse impacts on water quality in the Sea Channel, Tung Chung Wan or East Tung Chung Bay; | Ecology<br><br>. Mangrove Habitat Creation and Preservation<br><br>- Ways must be investigated to recreate similar communities. Further work would be required to establish whether artificial mangrove recolonization on the seaward or landward side of NLE would be successful.<br><br>- The establishment of new mangrove areas and preservation of any present habitats along the North Lantau coast would be of undoubted ecological and conservation value.<br><br>- The whole shoreline in the San Tan area will be preserved and thus this small area of mangrove may at least be conserved.<br><br>- Compensatory permanent protection of mangrove habitats outside the North Lantau area would also be a practical miligation measure to halt the progressive loss of those smaller areas of mangrove in Hong Kong.<br><br>- Access to these protected areas be restricted, either by not upgrading existing footpaths and/or by the 'honey-pot' technique of providing attractive recreation areas far from the most valuable and sensitive sites. Cooperation with Government to ensure that these 'alternative habitats' are designated Sites of Special Scientific Interest is also essential.<br><br>- Any approach towards mangrove rehabilitation should be jointly dealt with by NLD, NLE and AMPS Consultants and coordinated by AFD.<br><br>. Romer's Tree Frog - Philautus Romeri<br><br>- It is understood that the AMPS Consultants have proposed that a two year study be undertaken to obtain information on the ecology of Romer's Tree Frog and the preparation of a detailed species management plan for their continual survival. It is understood that WWFN have supported this and have already initiated a temporary rescue operation to collect the Romer's Tree Frog on Chek Lap Kok.<br><br>. Bisection and Channelization of Streams<br><br>- Impacts can be reduced by bridging water courses, so that the original bank structure and characteristics are maintained, rather than transforming them into a simple tunnel or culvert running to the sea.<br><br>. Native Tree Species Planting<br><br>- In order to increase the carrying capacity of woodlands for wildlife it is recommended that additional fringe tree planting be undertaken around the edges of existing woods to increase their area.<br>- It will be necessary to ensure adequate fire prevention measures (e.g. firebreaks).<br>- It is strongly recommended that any planting undertaken for habitat mitigation, landscaping purposes | EM&A Management of the Project<br><br>Due to the inadequacy in the management structure, the client TDD and their consultant were advised to strengthen monitoring and audit programme in order to ensure all recommended findings would be implemented. Both TDD and their consultant has agreed the urgent need for an additional environmental professional for the existing team, however, we are still sceptical about this. At present, there is no full time environmental protection officer on site. |
| (g) undertake impact monitoring in Tung Chung Wan, the Sea Channel and East Tung Chung Bay as appropriate; | | |
| (h) arrange that oily or bituminous wastes are cleaned and re-used or sent to either a landfill site or the Chemical Waste Treatment Facility on Tsing Yi Island for disposal; | | |

# E. Project Title: North Lantau Expressway

## 1. Project Data and Project Organisation

The North Lantau Expressway (NLE) comprises a dual three-lane expressway of approximate 13.5km highway with a design speed of 100 km/h linking the new airport at Chek Lap Kok to the urban areas. The route of the NLE runs along the steeply sloping northern shoreline of Lantau both at the reclamation at the toe of hillsides and partially within large cuttings into the slope.

This project comprises three contracts : Tai Ho Section, Yam O Section, and Tung Chung Section.

The Environmental Monitoring and Audit (EM&A) for the Contracts are carried out by an environmental team of the Engineer's (Mott MacDonald Hong Kong Ltd's) Resident Site Staff (RSS).

## 2. Monitoring Requirement:

An EM&A manual was produced stipulating the requirements and procedures for undertaking the monitoring & audit of the construction phase of the project. EM&A progress reports have been submitted to EPD monthly.

Dust monitoring is to be conducted during construction on up to three days per week to obtain 1-hour and 24-hour Total Suspended Particulate (TSP) measurements.

Noise monitoring during construction is to be conducted with the following number of measurements per week for each selected monitoring station : up to 3 measurements between 0700 and 1900 hours and up to 2 measurements between 1900 and 2300 hours on all days except Sundays and general holidays; up to 2 measurements between 2300 and 0700 hours on all days; and up to 1 measurement between 0700 and 2300 hours on each Sunday and general holiday.

Water monitoring should be conducted at a frequency of up to 2 days per week. A maximum total number of 20 monitoring stations were designated over the length of the Works Site, and 4 stations at the marine dumping areas (MDA's). Due to the shallow marine water conditions along Tung Chung Section, environmental inspections were agreed to be carried out instead of sampling.

## 3. Activities Undertaken during the Quarter

The construction of the expressway, undertaken during the quarter, involved massive earth movement, such as,

- underwater fill, deep compaction, and vertical drains construction;
- seawall and rock armour construction;
- reclamation surcharge;
- caisson piles and pile cap construction for Tsing Chau Wan viaduct and Ta Shui Wan viaduct;
- filter material placement at Sham Shui Kok; and
- earthwork, excavation and blasting at various locations.

## 4. Monitoring Results: Compliance with Action/Target Levels

Monitoring results for Tai Ho, Yam O and Tung Chung Sections in the form of exceedances during the reporting period are included in Table E1.

Air : 4%, 0% and 42% of the monitoring events undertaken for Tai Ho, Yam O and Tung Chung sites, respectively, recorded exceedances of the TSP Action & Target levels.

Noise: 8%, and 23% of the monitoring events undertaken for Tai Ho and Yam O sites, respectively, recorded exceedances of the Action & Target levels.

Water: 12% and 3% of the Suspended Solids monitoring events for Tai Ho and Yam O, respectively, recorded exceedances of the Action & Target levels. There was 3% & 0% exceedance in DO Action & Target levels for Tai Ho and Yam O sites.

Typical monitoring stations are selected to present the trend in a graphical format. Please refer to Figures E1 to E14.

**Table E1 - Exceedances of the Action and Target Levels for Contracts 1 & 2 (NLE)**

| Environmental Parameters | Oct 94 | | | Nov 94 | | | Dec 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total | A | T |
| Tai Ho Section | | | | | | | | | |
| Air | 23 | 1 | 0 | 20 | 1 | 0 | 20 | 1 | 0 |
| Noise | 51 | 4 | 0 | 69 | 19 | 0 | 56 | 0 | 0 |
| Water DO Surface | 76 | 3 | 0 | 90 | 2 | 2 | 30 | 0 | 0 |
| Water DO Bottom | 38 | 0 | 0 | 45 | 0 | 0 | 15 | 0 | 0 |
| Water SS | 120 | 4 | 1<br>0 | 135 | 0 | 5 | 135 | 8 | 11 |
| Water Turbidity | 120 | 3 | 8 | 135 | 0 | 4 | 135 | 9 | 12 |
| Yam O Section | | | | | | | | | |
| Air | 16 | 0 | 0 | 15 | 1 | 1 | 10 | 0 | 0 |
| Noise | 74 | 9 | 8 | 90 | 0 | 0 | 76 | 0 | 0 |
| Water DO Surface | 80 | 0 | 0 | 90 | 0 | 0 | 90 | 0 | 0 |
| Water DO Bottom | 40 | 0 | 0 | 45 | 0 | 0 | 45 | 0 | 0 |
| Water SS | 120 | 2 | 2 | 135 | 0 | 1 | 135 | 2 | 5 |
| Water Turbidity | 120 | 1 | 0 | 135 | 0 | 2 | 135 | 0 | 4 |
| Tung Chung Section | | | | | | | | | |
| Air | 12 | 2 | 3 | 17 | 1 | 2 | 16 | 0 | 0 |
| Noise | 35 | 1<br>4 | 1<br>8 | 35 | 0 | 4 | 32 | 0 | 10 |

* Total no. of monitoring events undertaken only
A No. of monitoring events with results exceeding the Action Level
T No. of monitoring events with results exceeding the Target Level

**5. Audit Results:** Implications of Non-compliance

Air : The exceedances in the Yam O Section were considered to be caused by dust emissions from the haul roads, blasting and material handling.

Water: While localised short-lived exceedances occurred occasionally on site for Yam O and Tai Ho contracts, the overall water quality was satisfactory and, according to the RSS, the exceedances were not caused by the NLE activities.

Noise: The exceedances in Yam O was partly due to construction noise and partly due to log delivering and dockyard operations nearby. The increase in noise in Tung Chung was mainly due to the bored piling work at the area opposite to Chek Lap Kok. The increase in construction work on the NLD and housing sites also caused the increase in noise levels in Tung Chung.

**6. Proposals for Remedial Measures:** Solutions to Problems

The RSS held monthly Environmental Meetings with the Contractors and their sub-contractors to discuss and resolve any environmental problems. The following mitigation actions have been taken by the RSS :

(a) Haul roads have been frequently sprayed with water. In the Yam O Section, there are two water bowsers to carry out this job and also automatic sprinkler systems are installed in Wang Tong and Yam O Tuk to suppress dust emissions. The NLD Engineer was advised to spray haul roads in Tung Chung.

(b) The automatic sprinkler system at the rock processing site was in operation during the crushing process.

(c) The Contractors were advised to comply with the statutory environmental regulations and obtain licences for any specified processes and plant on site. The contractor was reminded to apply for asphalt concaste plant.

(d) In order to reduce the construction noise level at Yam O, speed control of dump trucks is exercised. In addition, handling of hard materials should be carried out during the day time only. Noise insulation facilities have been installed at the Luk Keng Village Cottages. The RSS was reminded to advise the contractors to use silenced construction plant and equipment.

**7. Implementation status of EIA recommendations**

A summary of implementation status of EIA recommendations has been provided in Appendix E1.

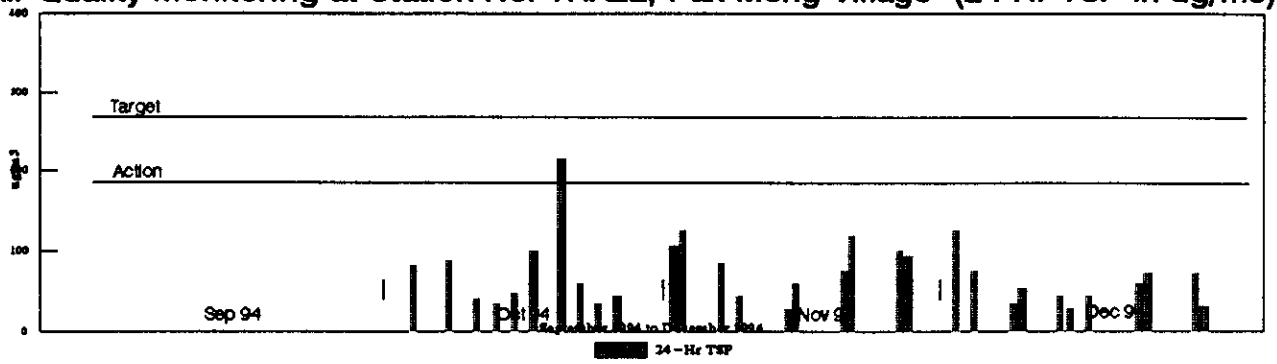
**8. Complaints:** From the Public

No complaint was made in this quarter.

Figure E 1

## North Lantau Expressway (Tai Ho Section)

## Air Quality monitoring at Station No. THA22, Pak Mong Village (24 Hr TSP in ug/m3)




### Explanatory Notes

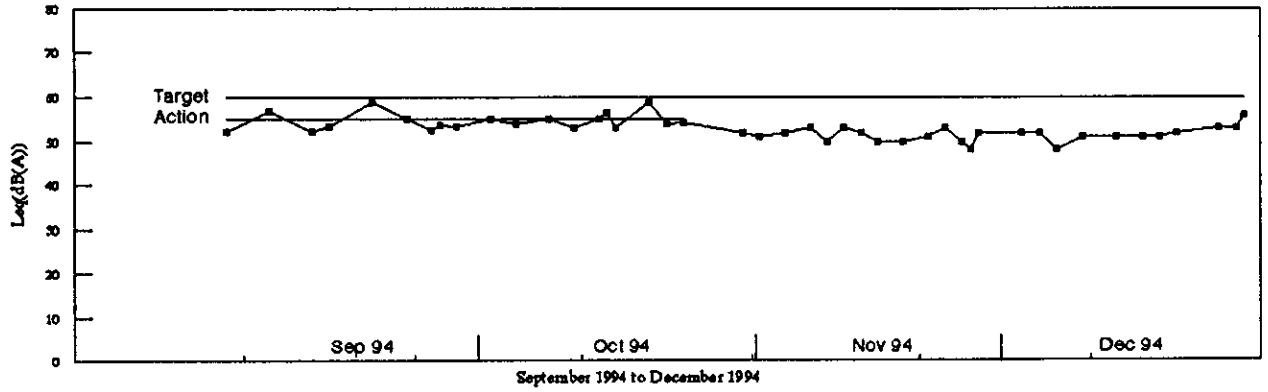
- o Tai Ho Section Representative Air Monitoring Station (THA22) at Pak Mong Village.
- o Target Limit = 260ug/m3 & Action Limit = 170ug/m3

- o The exceedance of the action level on 22.10.94 was due to the extremely strong north wind blowing.

- o No air monitoring was obtained in Sep. 94 due to break down for all equipments.

Figure E 2

## Noise Monitoring at Station No. THN11 (Period 2, Average Leq (dB(A))




### Explanatory Notes

- o Tai Ho Section Representative Noise Monitoring Station (THN11) at Pak Mong Village.
- o Period 2: All days evening (1900 to 2300 hr), Sundays and general holidays during daytime and evening (0700 to 2300 hr)

| | | |
|---|---|---|
| [Sep 94 & Oct 94] | Target Limit = 60 dB(A) | Action Limit = 55 dB(A) |
| [Nov 94 & Dec 94] | Target Limit = 60 dB(A) | Action Limit = 2 public complaints within 14 days |

- o The breaches of the action level in the evenings of 6.9.94 & 18.9.94 were due to the construction noise.
- o The breach of the action level in the evening of 15.10.94 was due to the reclamation works along the coast.
- o The breaches of the action level in the evenings of 12.10.94 & 21.10.94 were due to the construction activities along the haul road.

## Table E2 : Monthly Distribution of Complaints Received for NLE

| Environ-mental Parameters | Cumulative No. Brought Forward | No. of Complaints this month | | | Cumulative No. |
|---|---|---|---|---|---|
| | | October 94 | November 94 | December 94 | |
| **Tai Ho Section** | | | | | |
| Air | 2 | 0 | 0 | 0 | 2 |
| Noise | 2 | 0 | 0 | 0 | 2 |
| Water | 2 | 0 | 0 | 0 | 2 |
| Waste | 1 | 0 | 0 | 0 | 1 |
| Total | 6 | 0 | 0 | 0 | 7 |
| **Yam O Section** | | | | | |
| Air | 2 | 0 | 0 | 0 | 2 |
| Noise | 2 | 0 | 0 | 0 | 2 |
| Water | 4 | 0 | 0 | 0 | 4 |
| Waste | 1 | 0 | 0 | 0 | 1 |
| Total | 9 | 0 | 0 | 0 | 9 |
| **Tung Chung Section** | | | | | |
| Air | 0 | 0 | 0 | 0 | 0 |
| Noise | 0 | 0 | 0 | 0 | 0 |
| Water | 0 | 0 | 0 | 0 | 0 |
| Waste | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 |

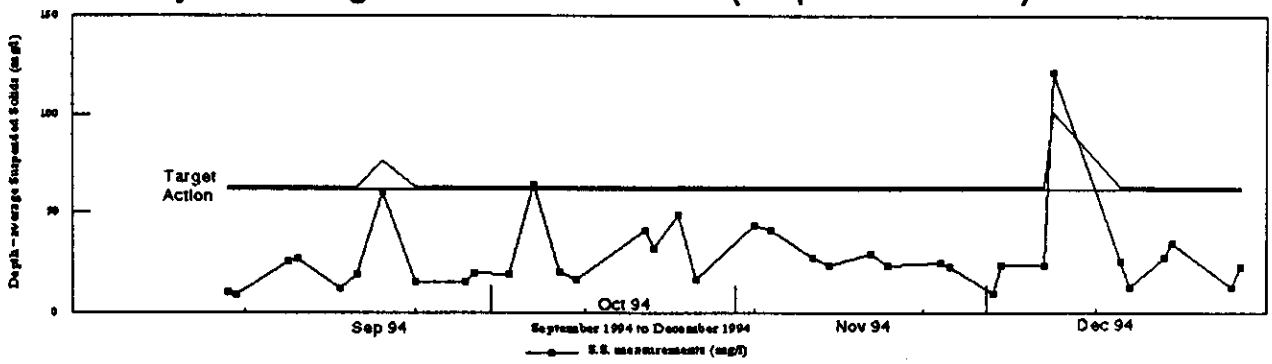
## 9. Liaison: Meetings and Representations to the Public

No meeting or representation to the public was made during the quarter.

Figure E 3

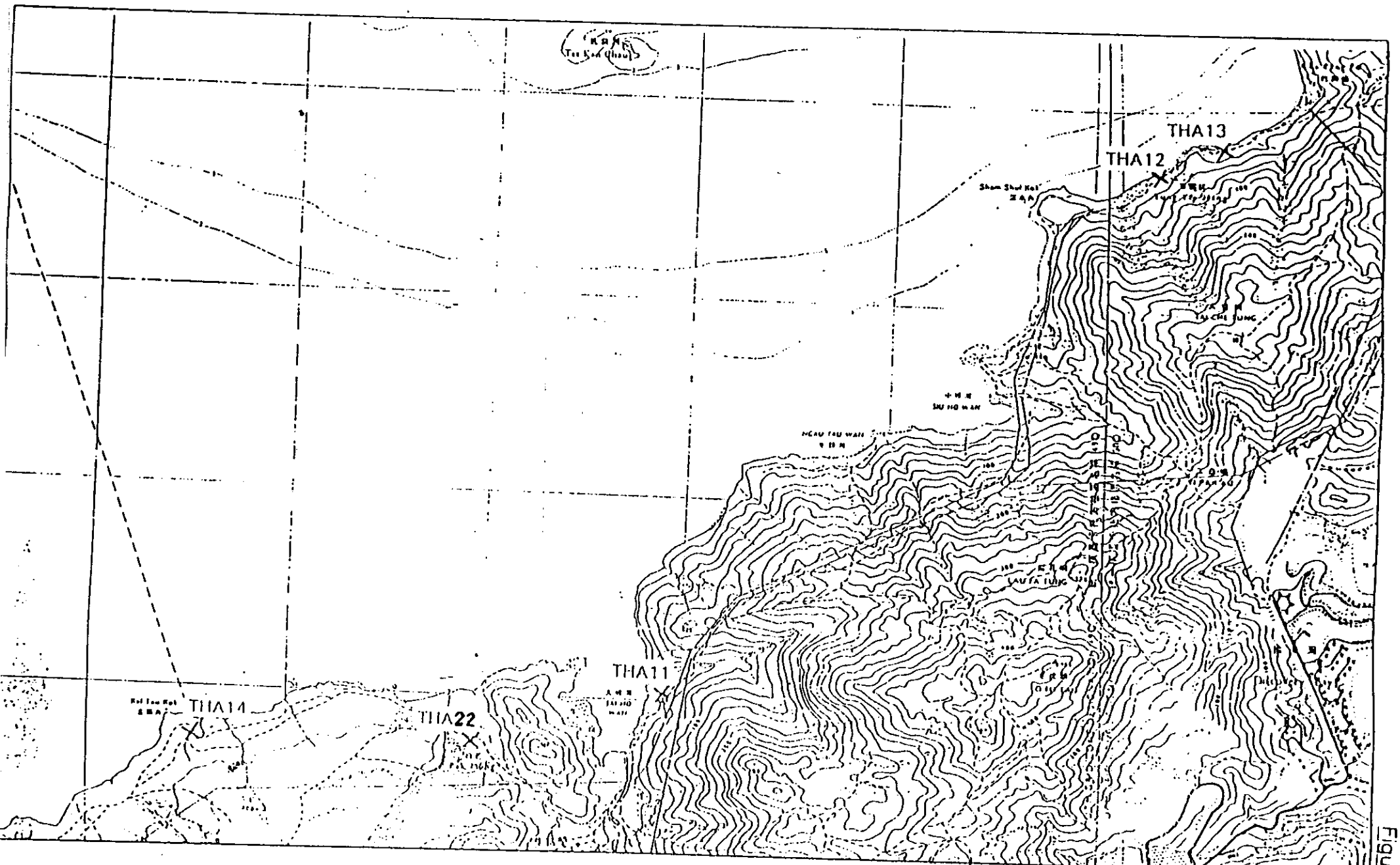
## North Lantau Expressway (Tai Ho Section)

### Water Quality monitoring at Station No. THW41 (Suspended Solids)




## Explanatory Notes

- o Tai Ho Section Representative Water Monitoring Station (THW41) near Tung Chung Section.
- o Target Limit = the higher value of (i) the action level and (ii) the corresponding control station reading with 30% added.
- o Action Level = 62 mg/l



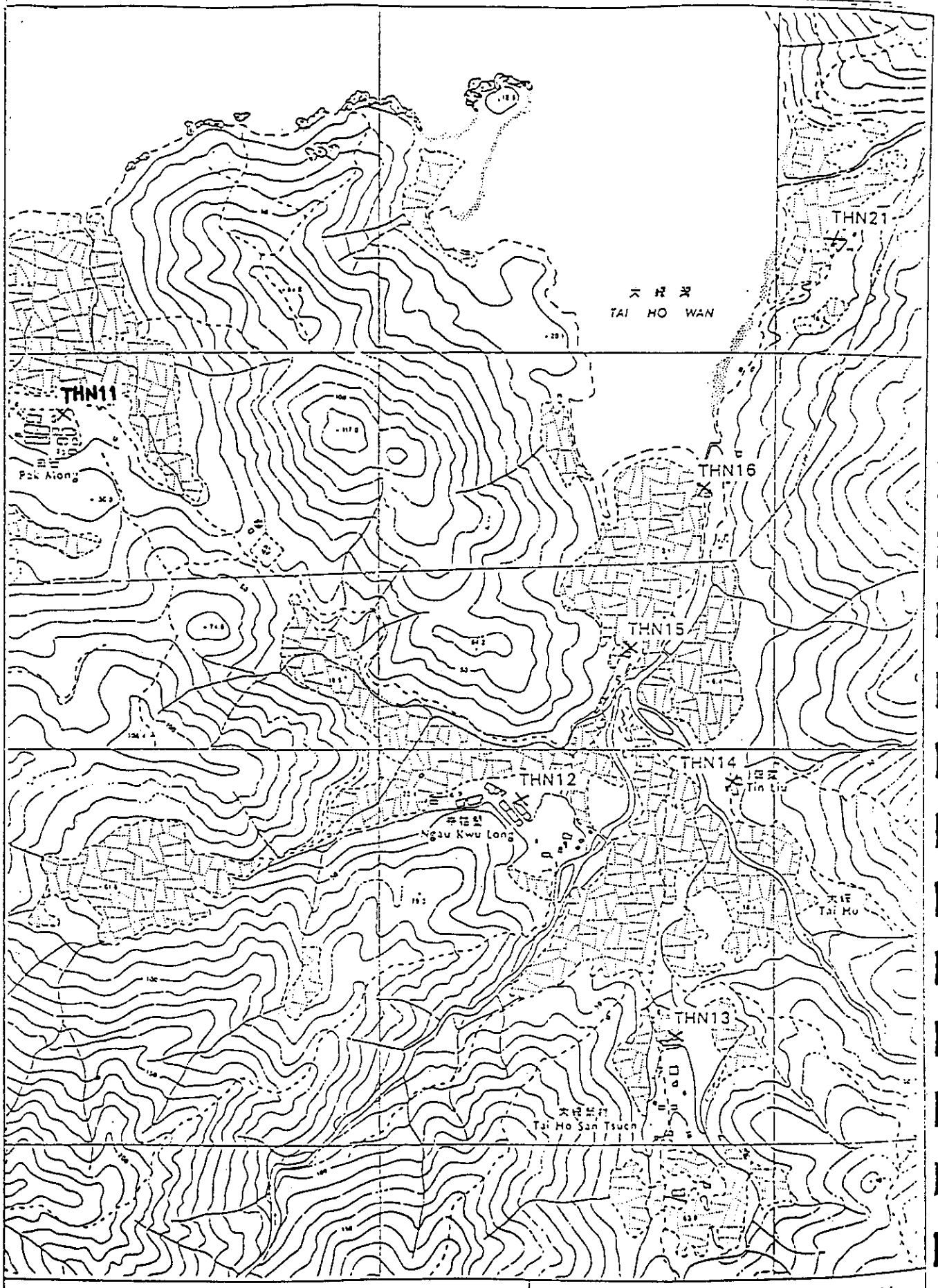

LOCATION OF AIR QUALITY BASELINE MONITORING STATIONS, TAI HO SECTION

NORTH LANTAU EXPRESSWAY
ENVIRONMENTAL MONITORING AND AUDIT MANUAL

REVISION DATE : APRIL 1993

Figure E4

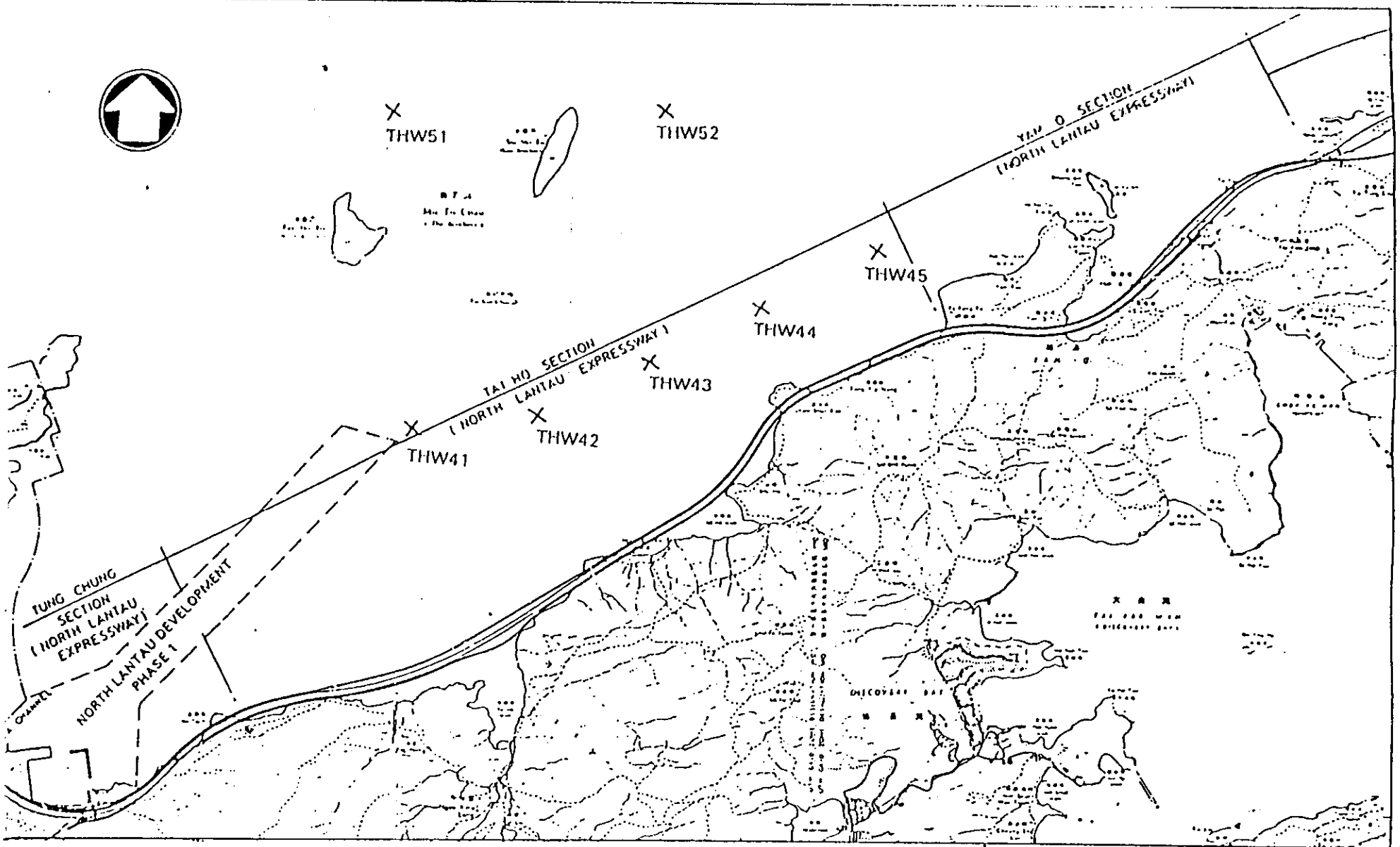
Figure E5




LOCATION OF NOISE MONITORING STATIONS, TAI HO SECTION

NORTH LANTAU EXPRESSWAY
TAI HO SECTION

REVISION DATE : JUNE 1993




LOCATION OF WATER QUALITY IMPACT MONITO G STATIONS,
TAI HO SECTION SITE AREA

NORTH LANTAU EXPRESSWAY
ENVIRONMENTAL MONITORING AND AUDIT MANUAL

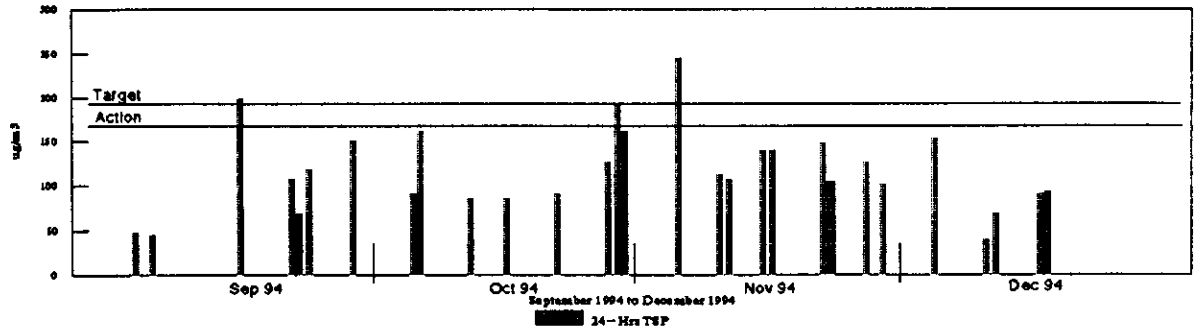
REVISION DATE : APRIL 1993

Figure E6

Figure E 7

## North Lantau Expressway (Yam O Section)

## Air Quality monitoring at Station No. YOA21 (24 Hr TSP in ug/m3)




### Explanatory Notes

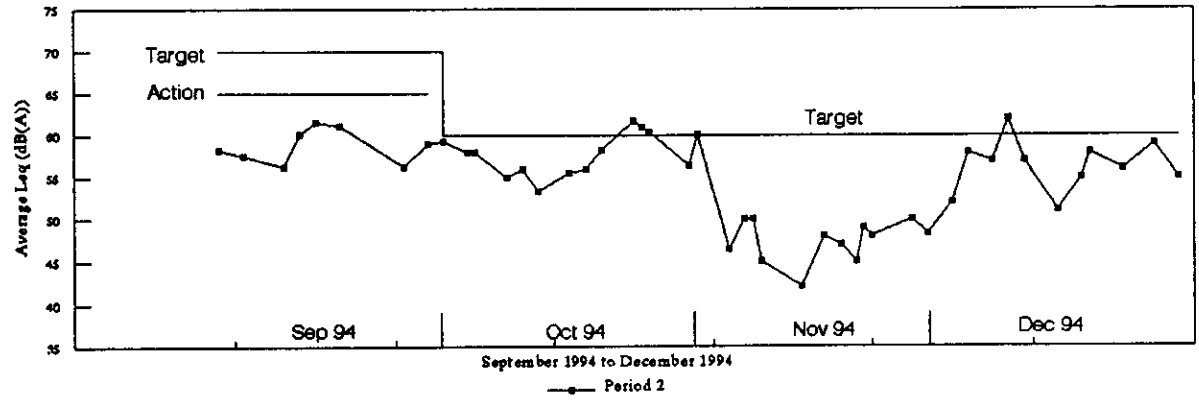
o Yam O Section Representative Air Monitoring Station (YOA21) at Luk Keng Village.

o Target Limit = 260ug/m3 & Action Limit = 220ug/m3

o The exceedance on 6.11.94 was due to the heavy traffic along the haul road and reclamation activities at Yam O Wan.

Figure E 8

## Noise Monitoring at Station No. YON11 (Period 2, Average Leq (dB(A))




### Explanatory Notes

o Yam O Section Representative Noise Monitoring Station (YON11) at Luk Keng Village.

o Period 2: All days evening (1900 to 2300 hr), Sundays and general holidays during daytime and evening (0700 to 2300 hr).

Target Limit = 70 dB(A) & Action Limit = 65 dB(A) [Sep 94]

Target Limit = 60 dB(A) & Action Limit = 2 public complaints within 14 days [Revised the criteria with EPD]

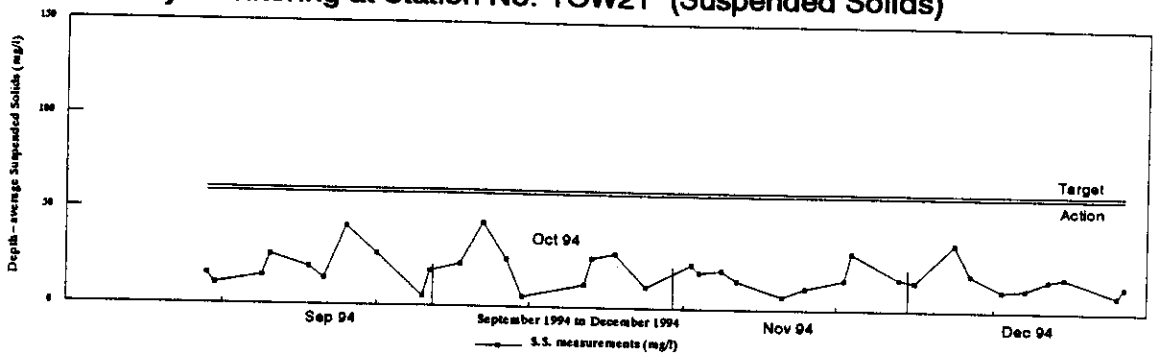
o High noise levels were to be due to the transportation of timber logs, the operation of the floating dockyards and the sea waves.

o Dump trucks were the major construction noise source during the evening period.

Figure E 9

## North Lantau Expressway (Yam O Section)

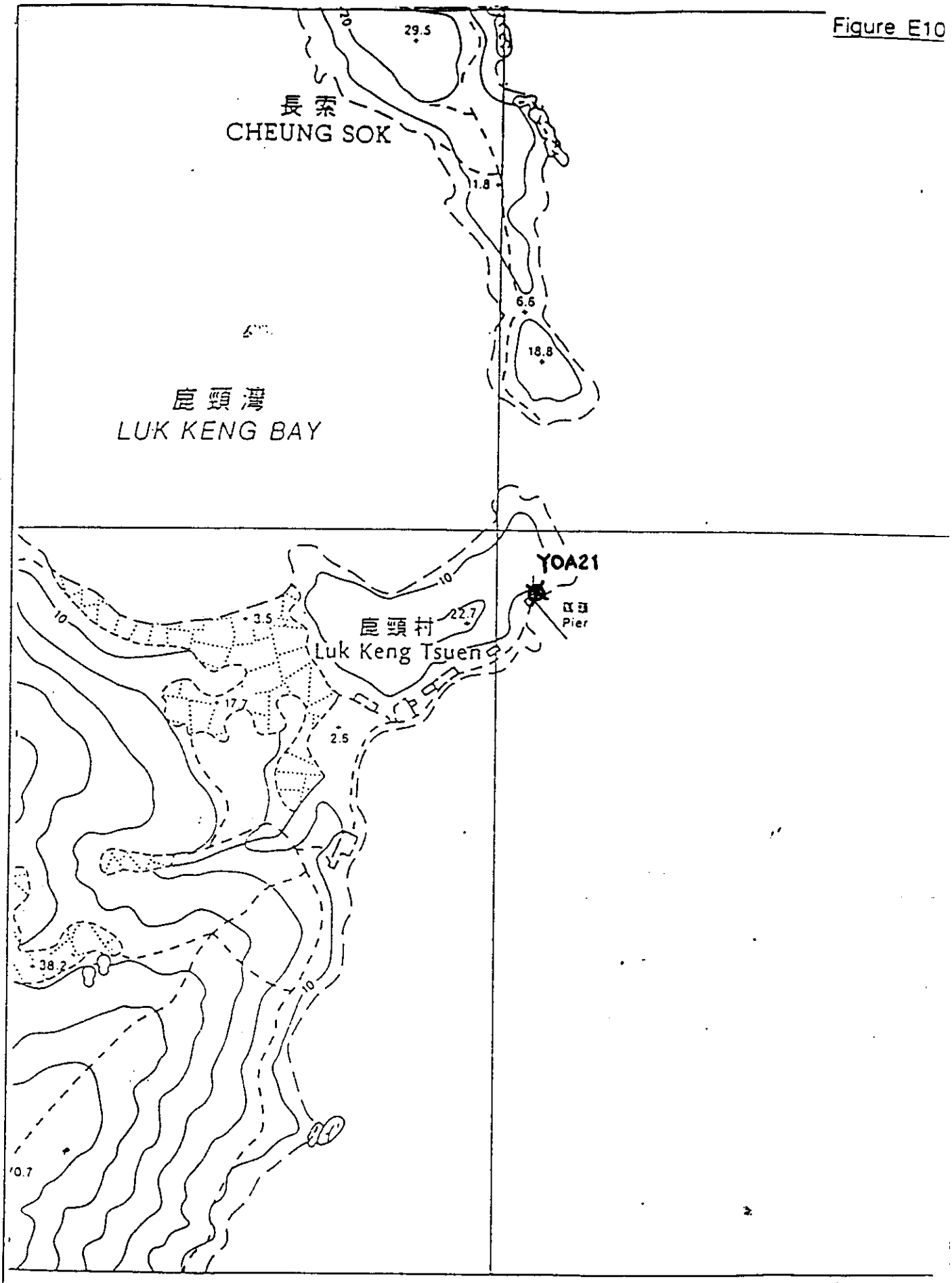
## Water Quality monitoring at Station No. YOW21 (Suspended Solids)




## Explanatory Notes

- o Yam O Section Representative Water Monitoring Station (YOW21) near Luk Keng Village.
- o Target Limit = the higher value of (i) the action level and (ii) the corresponding control station reading with 30% added.
- o Action Level = 59.3 mg/l

Figure E10

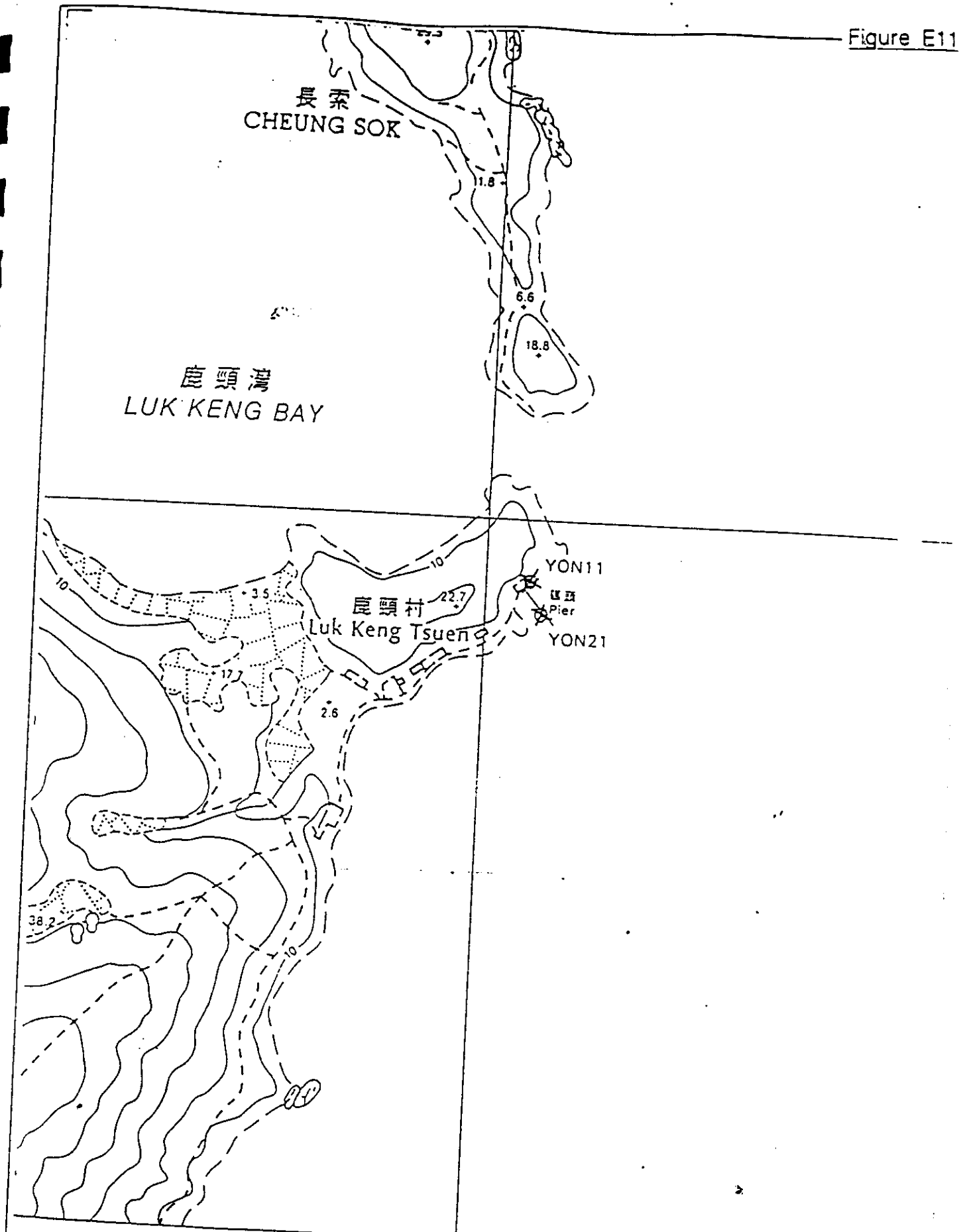



LOCATION OF AIR QUALITY IMPACT MONITORING STATION, YOA21

NORTH LANTAU EXPRESSWAY
YAM O SECTION

REVISION DATE : FEBRUARY 1993

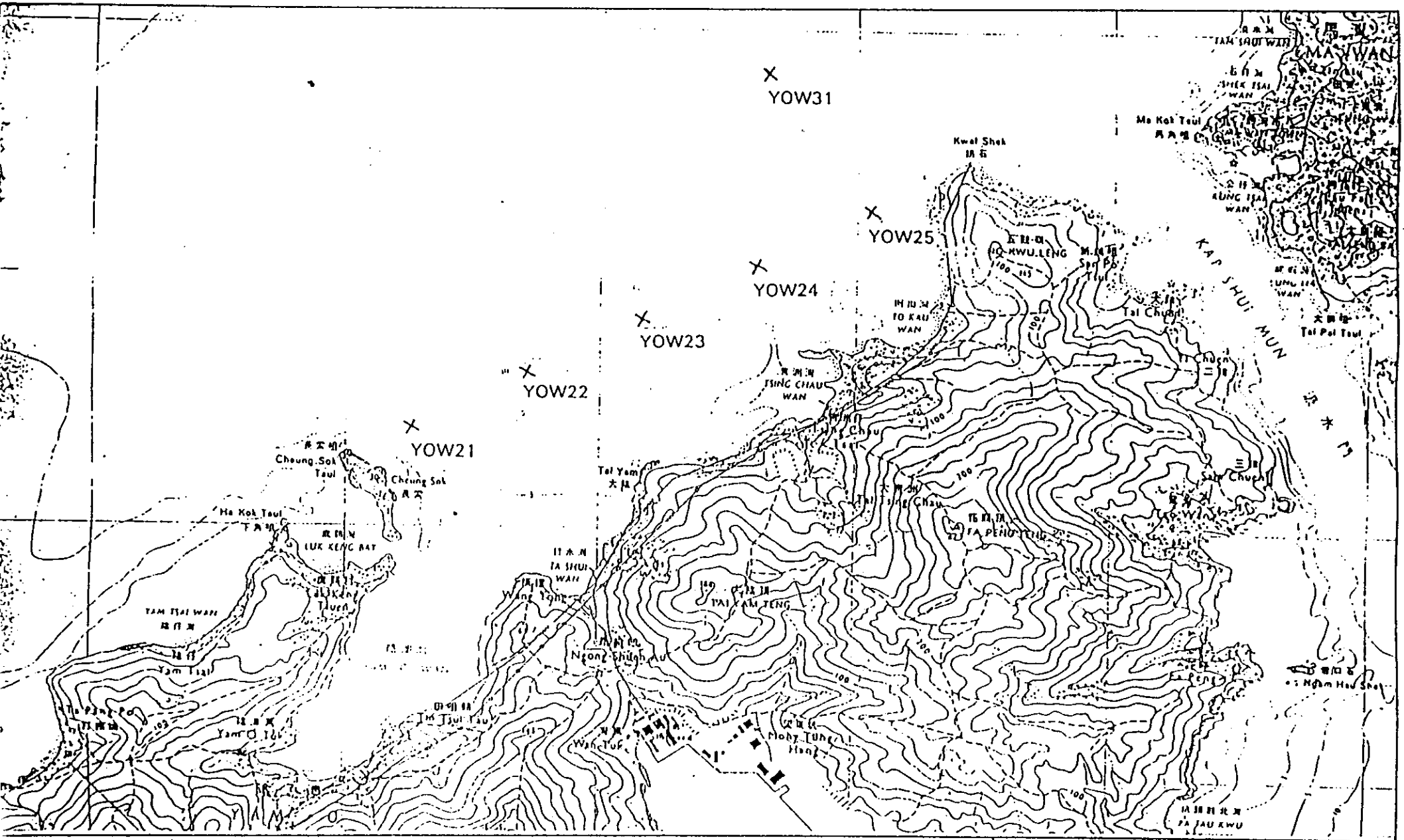
Figure E11




LOCATION OF NOISE IMPACT MONITORING STATIONS

NORTH LANTAU EXPRESSWAY
YAM O SECTION

REVISION DATE : MAY 1993




LOCATION OF WATER QUALITY IMPACT MONITORING STATIONS, YAM O SECTION SITE AREA

NORTH LANTAU EXPRESSWAY
ENVIRONMENTAL MONITORING AND AUDIT MANUAL

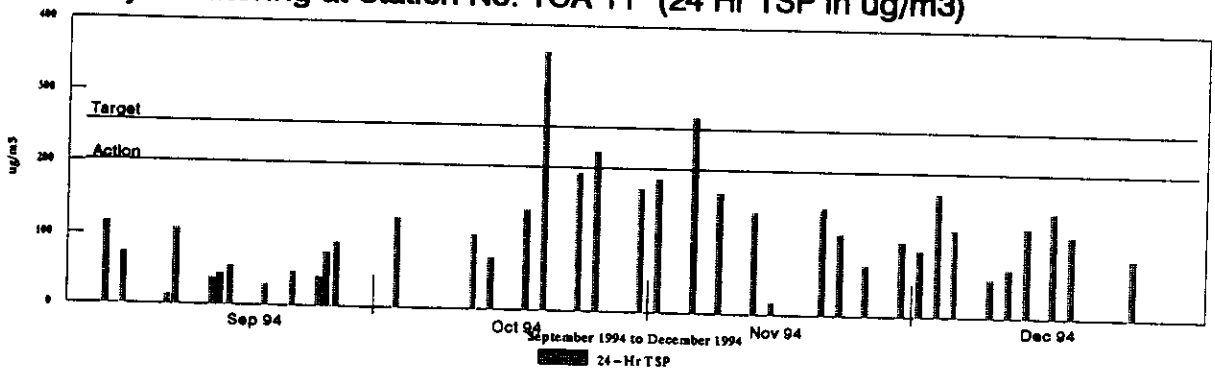
REVISION DATE : APRIL 1993

Figure E12

Figure E 13

## North Lantau Expressway (Tung Chung Section)

## Air Quality monitoring at Station No. TCA 11 (24 Hr TSP in ug/m3)



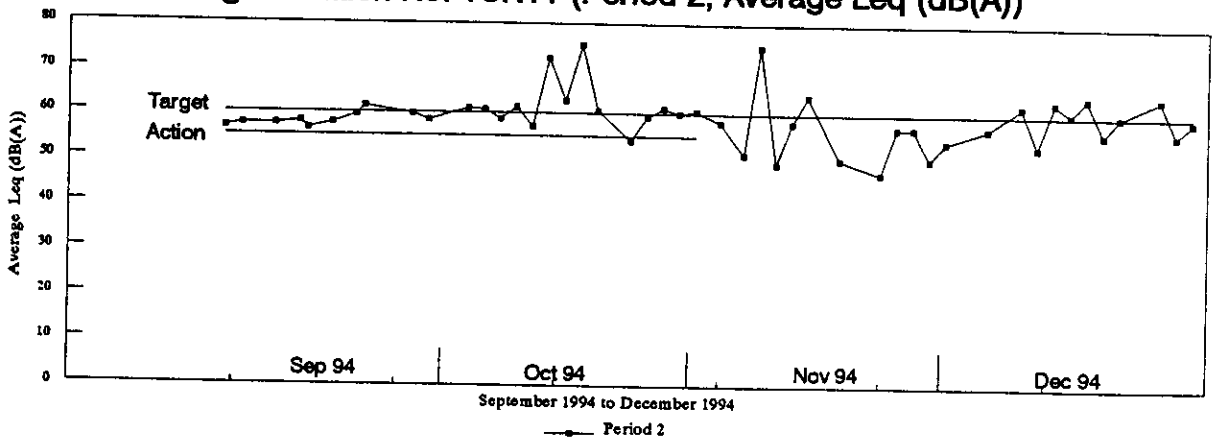

### Explanatory Notes

- o Tung Chung Section Representative Air Monitoring Station (TCA11) at Buddhist Youth Camp.
- o Target Limit = 260ug/m3 & Action Limit = 200ug/m3

- o In Oct & Nov 94, the dust was generated from the dumper trucks operating along the haul road and excavation. Also, one water bowser has broken down in the period. Furthermore, it should be notedthat considerable amount of dust were generated by adjacent site's (NLD) traffic.

Figure E 14

## Noise Monitoring at Station No. TCN11 (Period 2, Average Leq (dB(A))



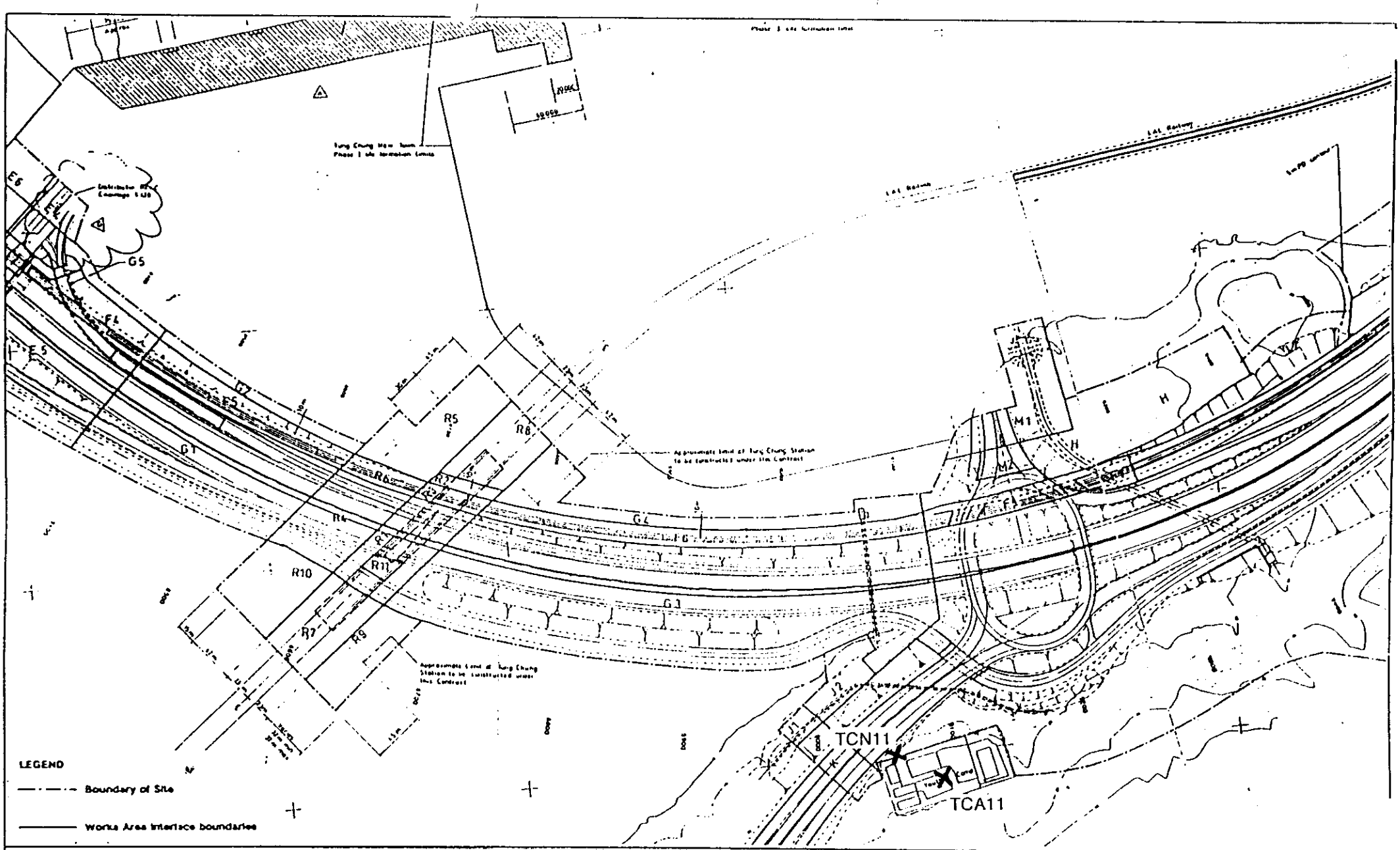

### Explanatory Notes

- o Tung Chung Section Representative Noise Monitoring Station (TCN11) at Buddhist Youth Camp.
- o Period 2: All days evening (1900 to 2300 hr), Sundays and general holidays during daytime and evening (0700 to 2300 hr).

| | | |
|---|---|---|
| [Sep 94 & Oct 94] | Target Limit = 60 dB(A) | Action Limit = 55 dB(A) |
| [Nov 94 & Dec 94] | Target Limit = 60 dB(A) | Action Limit = 2 public complaints within 14 days |

- o The noise was mainly due to the bored piling work, traffic along haul road and dumping works in the evening periods.

- o The contractor has been informed of the monitoring results and has been requested to propose mitigation measure to minimize the noise from bored piling work.




LOCATION OF NOISE & AIR QUALITY MONITORING STATION, TUNG CHUNG SECTION
(TCN11 & TCA11)

NORTH LANTAU EXPRESSWAY
ENVIRONMENTAL MONITORING AND AUDIT MANUAL

REVISION DATE : MAY 1994

Figure E 15

Appendix E1

# Implementation status of EIA recommendations for NLE

| Key Measures Implemented | Key Measures Required | Action Taken |
|---|---|---|
| **Water Quality**<br><br>- **Marine Bored Piling**<br><br>Silt curtain and water retention tanks were applied to control the dispersion of silt during marine boring<br>- **Foul Water Control**<br><br>Septic tanks with licence are in use for on-site domestic effluent from canteens, washroom and toilets.<br>- **Dredging**<br><br>- Mechanical garbs were designed and maintained to avoid spillage and should seal lightly while being lifted.<br>- All pipe leakages were repaired immediately<br>- Barges and hopper dredgers were fitted with tight fitting seals to their bottom openings to prevent leakage of material<br>- Excess material was removed from the decks to avoid overflow.<br><br>**Noise**<br><br>- **Noise Control at source**<br><br>It was recommended in the EIAs that all equipment used for construction should be effectively sound reduced by silencers, mufflers, acoustic beings, shields, acoustic sheds or screens.<br>- **Noise Control at Sensitive Receiver**<br><br>Noise insulation such as air conditioners were installed at receivers at Luk Keng Village.<br><br>**Air Quality**<br><br>- **Dust Control at Sources**<br><br>Water sprinkler systems are used at<br>- loading jetty<br>- rock segregation plants<br>- crushing and screening plants<br>- water bowsers are used to spray haul roads<br>- **Concrete batching**<br><br>Cement is stored in closed silos fitted with a fabric filter. Sand and aggregate is used during delivery and handling of raw materials and to dampen stored materials during dry and windy weather.<br><br>**Ecology**<br><br>- **Transplanting of Pitcher Plant**<br><br>The pitcher plants along a slope at the Tung Chung Section expressway were transplanted by AFD with the help from us last year. (less than a hundred plants) | **Water Quality**<br><br>- **Concrete Batching Plant Discharge**<br><br>Process effluent from concrete batching plant should be treated and de-silted before discharging. At least two concrete batching plants claimed that they would re-cycle and reuse the process water.<br><br>**Air Quality**<br><br>- **Concrete batching**<br><br>Shaking on pulse air cleaning mechanism for these filters should be provided. For dry batching, the truck batching aperture should be shrouded and fitted with water suppression sprays, or alternatively enclosed and ducted with fabric filter and extractor fan. | **Water Quality**<br><br>- **Sand Re-handling Pit Control**<br><br>The proposal to use sand pits to hold the dredged mud along the coast of Tai Ho was rejected by EPD. We advised RSS to review work methods<br>- **Concrete Batching Plant Discharge**<br><br>We have a joint visit with LCO(TS) and the project consultant to the Plant in December, 1994 and advised the contractor the mal-practice of the facilities. LCO(TS) threatened prosecution if there are no rectification by 23.1.95.<br><br>**Noise**<br><br>- **Noise Control at Source**<br><br>The consultant was advised to implement the recommended measures as far as possible.<br><br>**Ecology**<br><br>- **Mangrove and Freshwater Wetland**<br><br>Due to the construction of Tai Ho section of the highway, an embankment was filled across the Tai Ho Wan, causing the embayment of Pak Mong and Tai Ho. Along this engulfed coast, there is still a large piece of mudflat supporting some surviving mangrove. This wetland environment is deteriorating. We have advised the project client, HyD and RSS to take appropriate action to mitigate and save the mangrove. AFD officer and senior officer were advised the situation in April and November 1994. |

# F. Project Title : Lantau Fixed Crossing (LFC)

## 1. Project Data and Project Organisation

The LFC Project consists of the Tsing Ma Bridge Contract, the Kap Shui Mun Bridge and Ma Wan Viaducts Contract, and Lantau Toll Plaza Contract. The Environmental Monitoring and Audit (EM&A) works for the above projects are undertaken by the same environmental team, as part of the Engineer's (Mott MacDonald) Resident Site Staff.

EM&A requirements during the construction period were stipulated in the contracts with the Contractors. The Contractors are also responsible for the supply of monitoring equipment and accessories and the investigation any of environmental problems. In the event of Action Levels being exceeded the Contractors are to review working procedures and to implement appropriate mitigation measures in accordance with the agreed Action Plan.

## 2. Monitoring Requirement :

An EM&A manual has been produced specifying the monitoring & audit requirements during the construction phase of the project. Eight air monitoring stations are required initially, although a maximum of 20 stations may be needed eventually. At present four monitoring stations have been constructed at sensitive receivers throughout Ma Wan and an additional two stations are located at site boundaries. Impact monitoring is carried out throughout the construction period and undertaken at any four of the specified monitoring stations up to three days per week, depending on site activities.

No definite number of noise monitoring stations were specified in the EM&A Manual and so the RSS had to decide the most suitable locations based on site activities and the Noise Sensitive Receiver locations. The RSS have also determined the frequency of monitoring: $Leq_{(5min)}$ measurements be taken continuously at up to seven monitoring stations.

10 impact monitoring stations and 6 control stations are used for water quality monitoring with dissolved oxygen (DO), suspended solids (SS) and turbidity as the monitoring parameters. Samples are normally collected on three working days per week for each Contract.

## 3. Activities Undertaken during the Quarter

The construction of bridges and viaduct involved various structural works for:

- cable spinning;
- construction of concrete segments;
- construction of caisson foundations;
- construction of pilecaps; and
- excavation and rock blasting.

## 4. Monitoring Results: Compliance with Action/Target Levels

Air : 24% of the monitoring results exceeded the Action or Target level in the quarter.

Water: Water quality monitoring was undertaken in compliance with the EM&A Manual and no breaches in DO Action or Target Levels were observed during this period. With regard to suspended solids, there were 3% of the monitoring results which exceeded the Action or Target level in the quarter.

Noise: There were 0.05% of the monitoring results which exceeded the Target level in the quarter.

Typical monitoring stations are selected to present the trends in a graphical format. Please refer to Figures F1 to F3.

**Table F1 - Exceedances of the Action and Target Levels for LFC**

| Environmental Parameters | Oct 94 | | | Nov 94 | | | Dec 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| Air | 139 | 8 | 23 | 156 | 19 | 30 | 74 | 4 | 3 |
| Noise | 50400 | 0 | 25 | 52416 | 0 | 30 | 31100 | 0 | 14 |
| Water DO | 124 | 0 | 0 | 160 | 0 | 0 | 128 | 0 | 0 |
| Water SS | 144 | 0 | 0 | 160 | 5 | 4 | 128 | 5 | 0 |

* Total no. of monitoring events undertaken only
A No. of monitoring events with results exceeding the Action Level
T No. of monitoring events with results exceeding the Target Level

## 5. Audit Results: Implications of Non-compliance

Air : The RSS has been advised to carry out more effective dust suppression measures (e.g. increasing water spraying frequency) and hydroseeding of exposed slopes.

Water: There were some exceedances recorded, most of which were short-lived. However, the Action Plan as stipulated in the EM&A Manual continued to be followed in response to any exceedance of the criteria.

Noise: Audit of noise breaches confirmed that all exceedances were caused by locally generated noise and not from site activities. No complaints were received.

## 6. Proposal for Remedial Measures: Solutions to Problems

In accordance with the Action Plan stated in the EM&A Manual, the RSS informed the Contractor of all exceedances in all monitored parameters. This has been done through the use of Environmental Quality Notices (EQNs) instigated by the RSS. EQNs are issued within 24-hours of the RSS receiving the monitoring results to inform the contractor of the nature of the breach and of the actions he is required to take to comply with the requirements. During this quarter, the RSS requested the Toll Plaza Contractor to increase the frequency of water spray along the haul road to suppress dust. The RSS was advised to hydroseed exposed slopes as soon as work has been completed.

**7. Follow-up Actions:** By Contractors, Engineers, etc.

In the event of breaches, the RSS followed the Action Plan tightly. It was reported that the Contractors have generally responded well to the EQNs issued by the RSS and in most cases have proposed mitigatory measures, or accepted RSS proposals for mitigatory measures. Such measures have included construction of rock bunds and restriction on working hours (for suspended solids mitigation), and increased water spraying (for dust suppression).

**8. Implementation status of EIA recommendations**

A summary of implementation status of EIA recommendations has been provided in Appendix F1.

**9. Complaints:** From the Public

No complaints arose during this quarter.

**Table F2 : Monthly Distribution of Complaints Received for LFC**

| Environ-mental Parameters | Cumulative No. Brought Forward | No. of Complaints this month | | | Cumulative No. |
|---|---|---|---|---|---|
| | | October 94 | November 94 | December 94 | |
| Air | 3 | 0 | 0 | 0 | 3 |
| Noise | 1 | 0 | 0 | 0 | 1 |
| Water | 3 | 0 | 0 | 0 | 3 |
| Waste | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | 0 | 0 | 0 | 7 |

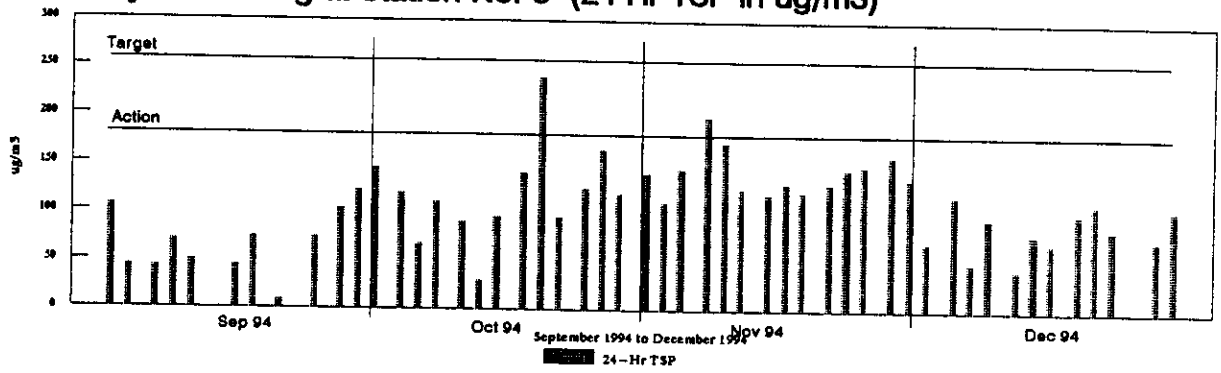
**10. Liaison : Meetings and Representations to the Public**

No meeting or representation to the public was made during the quarter.

Figure F1

## Lantau Fixed Crossing

### Air Quality monitoring at Station No. 3 (24 Hr TSP in ug/m3)

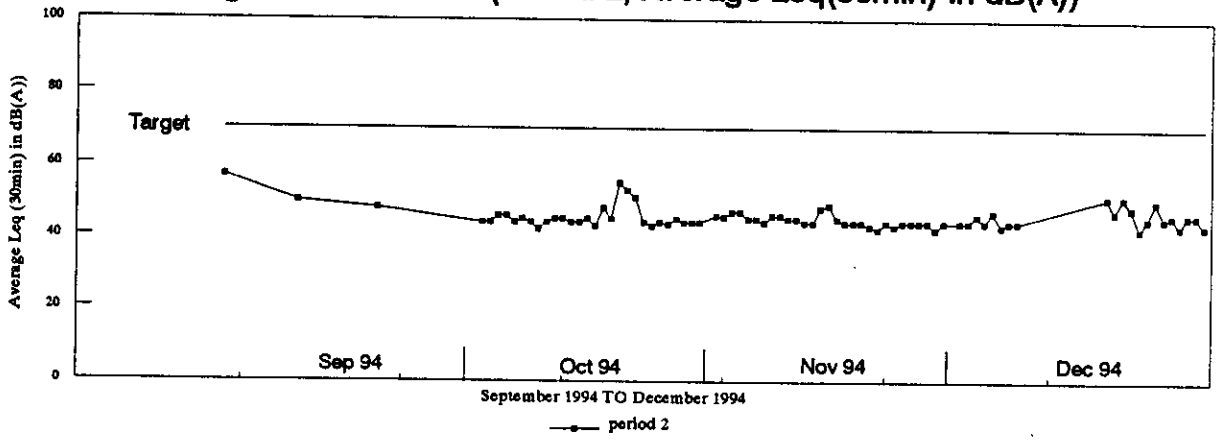



## Explanatory Notes

- o Representative Air Monitoring Station (Stn No.3) at Lau Fa Chuen Village.
- o Target Limit = 260ug/m3 & Action Limit = 180ug/m3

Figure F2

### Noise Monitoring at Station No. 9 (Period 2, Average Leq(30min) in dB(A))




## Explanatory Notes

- o Representative Noise Monitoring Station (No.9) at Lau Fa Chuen Village.
- o Period 2: All days 2300 to 0700 hr

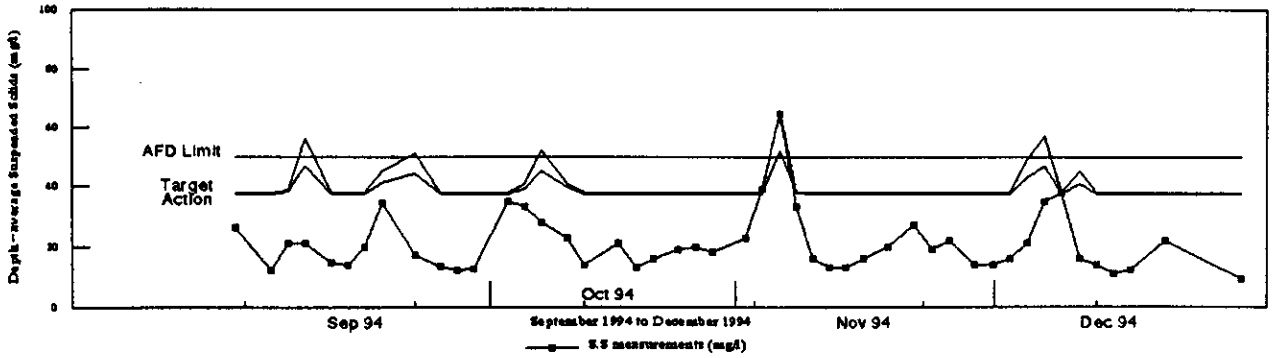
  Target Limit = 70 dB(A) Action Limit = more than 1 complaint received within two weeks

- o No complaint was received in the quarter and therefore Action Level was not breached.

Figure F3

## Lantau Fixed Crossing

## Water Quality monitoring at Station No. 12 during Mid Flood Tide (Suspended Solids)




### Explanatory Notes

- o Representative Water Monitoring Station (No.12) located at Fish Culture Zones of Ma Wan.
- o Target Limit = 30% above the maximum level recorded upstream of the works on that sampling day.
- o Action Level = Average of the trigger and target levels. (Trigger Level = 37.5mg/l)
- o AFD Limit = 50 mg/l

Location of Air Quality Monitoring Stations on Ma Wan

Figure F4

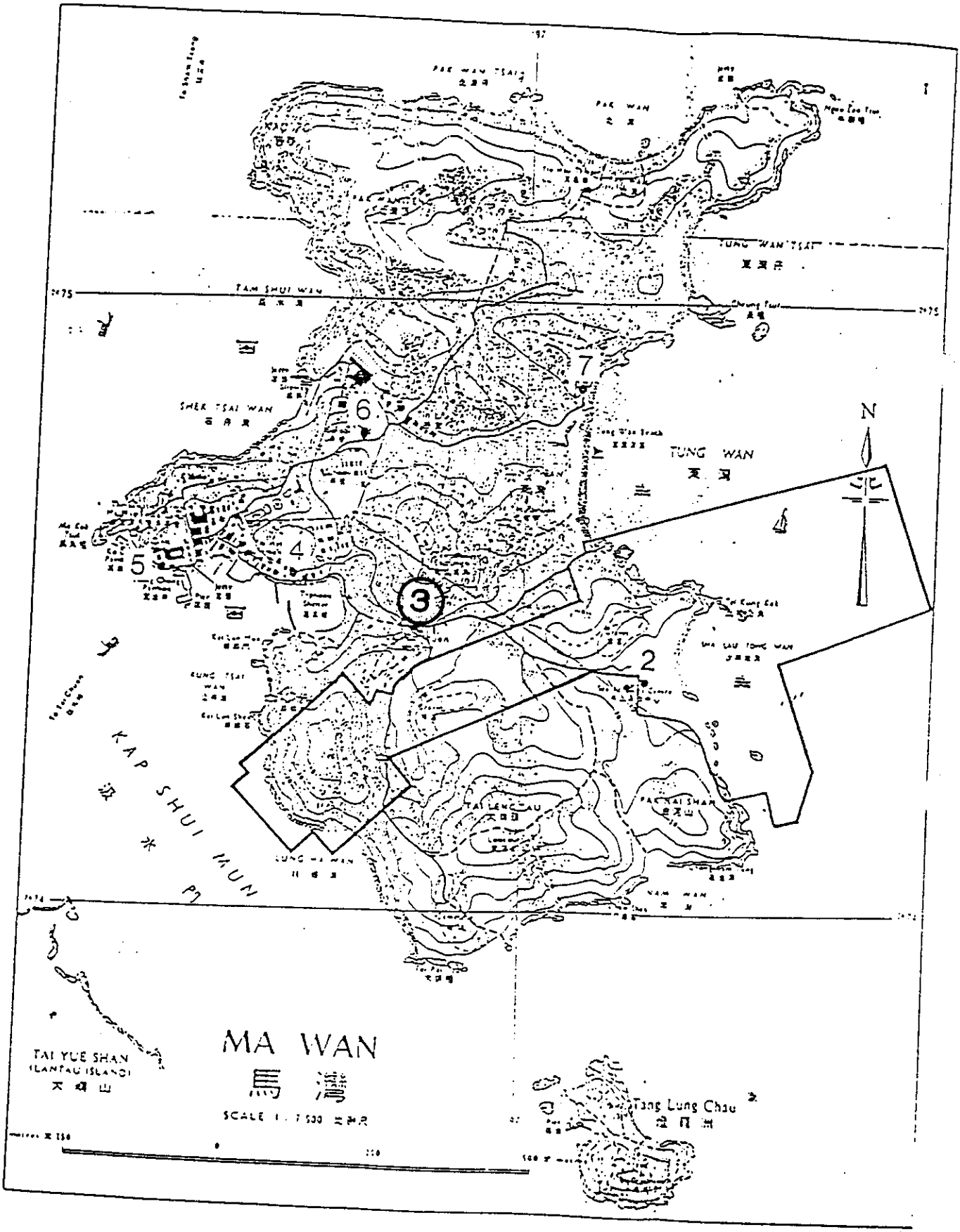


Figure F5

Location Of Noise Monitoring Stations on Ma Wan

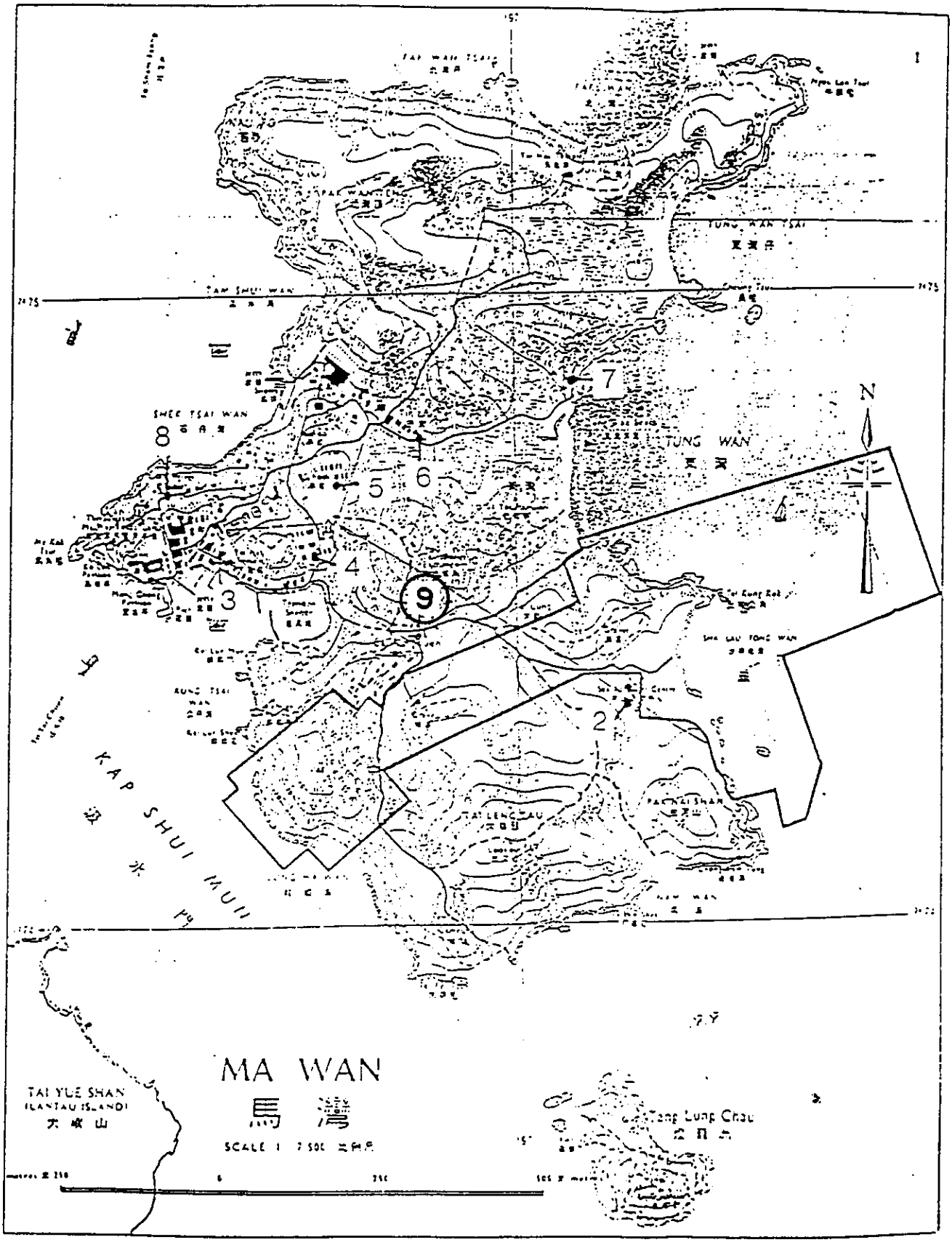
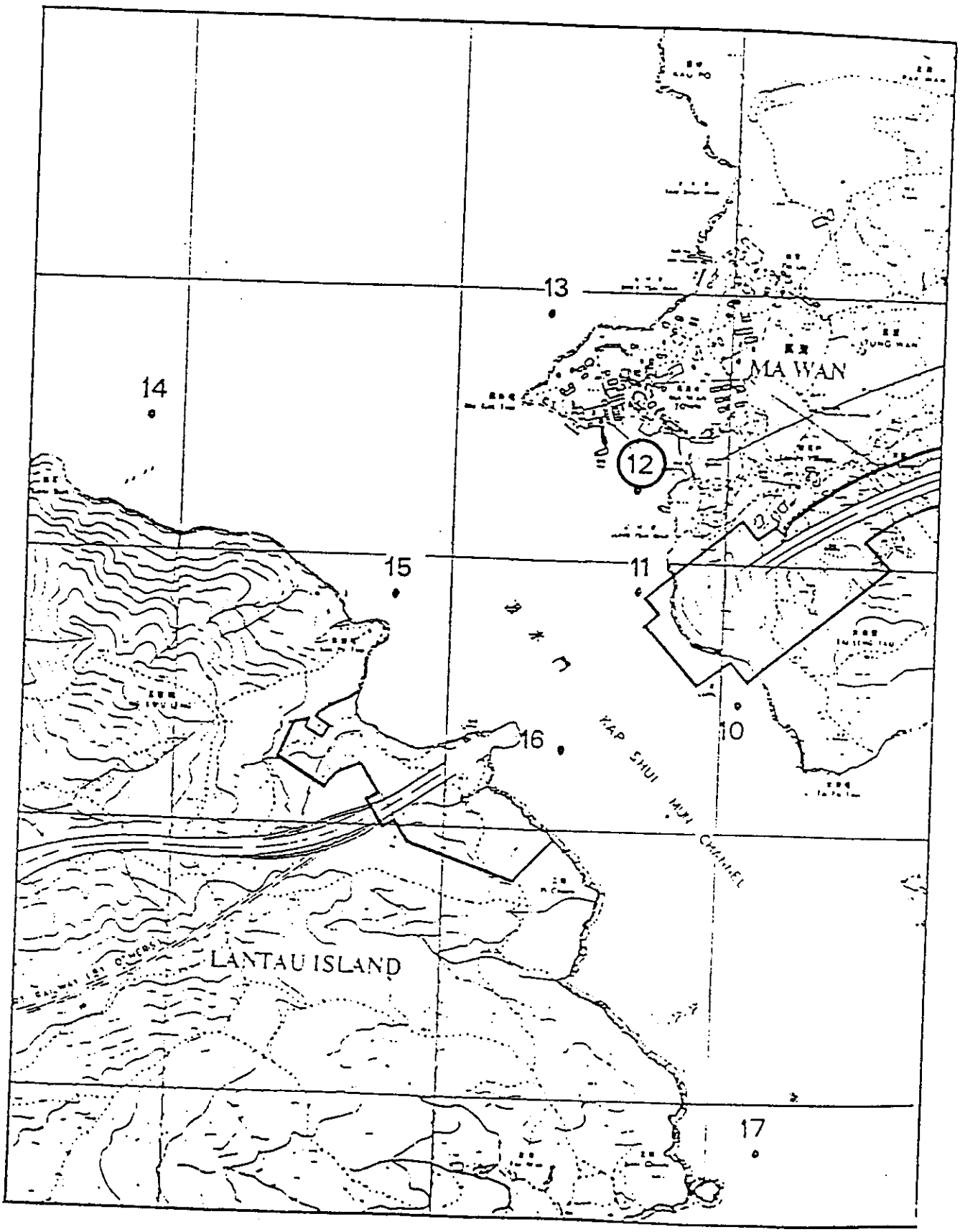


Figure F6

Location of Water Quality Monitoring Stations in Kap Shui Mun Channel



Appendix F1

# Implementation status of EIA recommendations for LFC

| Key Measures Implemented | Key Measures Required | Action Taken |
|---|---|---|
| **Water Quality**<br><br>. Sewage Effluent<br><br>Domestic sewage and site drainage are intercepted by the provision of adequate drainage and sewage treatment facilities. Drainage facilities incorporate oil and sediment traps to prevent the discharge of pollution to the receiving water body. RBC biological treatment plants and septic tanks are used in all sites. All permanent surface drains incorporate sediment traps.<br>. Discharge from Concrete Batching Plant<br><br>All concrete batching plants are installed with water retention tanks to treat water before discharge.<br>**Noise**<br><br>. Noise Control at Source<br><br>Mobile plants are silenced by fitting more efficient intake and exhaust silences, acoustically dampened panels and covers to engine units.<br>. Noise Control at Sensitive Receiver<br><br>Noise insulation, such as air conditioners were installed at receivers (Ma Wan Village).<br>**Air Quality**<br><br>. Windboards are used at stockpile area to shield as far as possible from wind.<br>. Cement is stored in closed silos and sand and aggregates are stored in bunkers with walls which extend beyond the piles.<br>. Batched concrete is supplied to the point of use via a pipeline. | **Noise**<br><br>. Noise Control at Source<br><br>. Floating track design for airport railway to reduce noise impact should be designed by the consultant. | **Noise**<br><br>. Noise Control at Source<br><br>We liaise with the consultant for floating track design until actual implementation. We still have to overcome the technical constraints due to the light weight bridge together with the O&M requirements during operation. At present, NPG is actively involving in the design requirements of noise and vibration due to the railway tracks. HyD and MTRC have hired a number of consultants to resolve this complex problem. |

## G. Project Title: Water Supply to North Lantau - Stage 1

### 1. Project Data and Project Organisation

This project is to provide a water supply system to the North Lantau area. This covers the Environmental Monitoring and Audit (EM&A) programme at site areas:

- Tung Chung Service Reservoir;
- Siu Ho Wan Treatment Work;
- Pui O Pumping Station; and
- Submarine mains from Tai Lam Chung to Ta Pang Po

The EM&A programmes for the Contracts are carried out by an environmental team of the Engineer's (Mott MacDonald Hong Kong Ltd in charge of the submarine mains works and the rest are carried out by Pypun/SWK Water Consultants).

### 2. Monitoring Requirement:

EM&A manuals were produced stipulating the requirements and procedures for undertaking the monitoring & audit of the construction phase of the project. EM&A progress reports have been submitted to EPD monthly.

Dust monitoring is to be conducted during construction on up to three days per week to obtain 1-hour and 24-hour Total Suspended Particulate (TSP) measurements. In the Tai Lam Chung site, dust monitoring is programmed to be conducted during construction on up to 2 days per week to obtain both 1-hour and 24-hour total suspended particulate (TSP) at sensitive locations.

For North Lantau sites, noise monitoring during construction is to be conducted by one measurement between 0700 to 1900 hour on weekdays. Additional measurements are required if noise generating activities are underway (ie. one measurement between 1900 to 0700 hour; one measurement between 2300 to 0700 hour of the next day and/or one measurement between 0700 to 1900 hour on holidays. For the Tai Lam Chung site, noise monitoring during construction is programmed to be conducted at sensitive sites everyday in a week between 0700 and 1900 hour.

Marine water monitoring should be conducted at a frequency of up to 3 days per week. A maximum total number of 10 monitoring stations were designated over the length of the Works Site of the submarine mains. It is estimated that there are 13000 $m^3$ of seriously contaminated (Class C) material which must be dredged from the Tai Lam Chung nullah. The disposal site for the material is the East Sha Chau Contaminated Mud Disposal Area.

### 3. Activities Undertaken during the Quarter

- Tung Chung Service Reservoir
  - caisson wall & assess road construction; and
  - site preparation work.

- Siu Ho Wan Water Treatment Work
  - construction of tanks.

- Pui O Pumping Station
  - basement construction.

- Tai Lam Chung to Ta Pang Po Submarine Mains
  - Land Section: Construction of pipeline, and
  - Submarine Section: Trimming trench and launchway platform are being erected.

## 4. Monitoring Results: Compliance with Action/Target Levels

Monitoring results in the form of exceedances of Action & Target levels during the reporting period are included in Table G1. There is no data for the Siu Ho Wan site owing to the delay of electric power supply to that area for the operation of the monitoring equipment.

Air : There was no exceedance for all sites.

Water: There were minimal exceedances for the submarine site.

Noise: 0% and 1% of monitoring results exceeded in the North Lantau sites & the submarine site respectively.

Some monitoring stations are selected to present the trend in a graphical format. Please refer to Figures G1 to G8.

**Table G1 - Exceedances of the Action and Target Levels**

| Environmental Parameters | Oct 94 | | | Nov 94 | | | Dec 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| North Lantau Sites | | | | | | | | | |
| Air | 14 | 0 | 0 | 16 | 1 | 0 | 27 | 1 | 1 |
| Noise | 28 | 0 | 0 | 32 | 0 | 0 | 33 | 0 | 0 |
| Water DO | 8 | 0 | 0 | 8 | 0 | 0 | 8 | 0 | 0 |
| Water SS | 8 | 0 | 0 | 8 | 0 | 0 | 8 | 1 | 0 |
| Submarine Mains | | | | | | | | | |
| Air | 30 | 0 | 0 | 41 | 3 | 1 | 60 | 2 | 0 |
| Noise | 96 | 0 | 1 | 96 | 0 | 5 | 83 | 0 | 3 |
| Water DO | 300 | 0 | 0 | 420 | 1 | 0 | 420 | 0 | 0 |
| Water SS | 720 | 0 | 0 | 420 | 1 | 0 | 420 | 0 | 0 |
| Water Turbidity | 720 | 0 | 0 | 420 | 3 | 0 | 420 | 0 | 0 |

* Total no. of monitoring events undertaken only
A No. of monitoring events with results exceeding the Action Level
T No. of monitoring events with results exceeding the Target Level

**5. Audit Results:** Implications of Non-compliance

Air : There were no dust problem.

Water: The suspended solids recorded in the submarine sections revealed that no adverse impact from the dredging could be detected.

Noise: There was no significant problem.

**6. Proposals for Remedial Measures:** Solutions to Problems

- frequent sweeping and water spraying of the affected roads;
- cover loaded trucks with canvas;
- wash the truck wheels before the trucks leave the site;
- adopt the application of silenced plant;
- stop untreated high SS water from direct discharge into stream course; and
- review of the construction method statement for dumping of contaminated mud.

**7. Implementation status of EIA recommendations**

A summary of implementation status of EIA recommendations has been provided in Apeendices G1 and G2.

**8. Complaints:** From the Public

A total of five complaints were received during the reporting period. Three complaints were on construction noise, one complaint on dust emission and one on discharge of untreated effluent. The following actions were taken to remedy the problems:

Noise

The contractor was requested to reschedule the noisy activities on site to minimise the cumulative noise impact.

Dust emission

The contractor was requested to spray water along the access road to reduce the dust impact.

Effluent discharge

The contractor was requested to stop the discharge of the untreated effluent and clean up the affected channel.

## Table G2 : Monthly Distribution of Complaints Received for WSNL

| Environmental Parameters | Cumulated No. Brought Forward | No. of Complaints this month | | | Cumulated No. |
|---|---|---|---|---|---|
| | | Oct 94 | Nov 94 | Dec 94 | |
| North Lantau Sites | | | | | |
| Air | 2 | 0 | 1 | 0 | 3 |
| Noise | 0 | 1 | 0 | 1 | 2 |
| Water | 3 | 1 | 0 | 0 | 4 |
| Waste | 1 | 0 | 0 | 0 | 1 |
| Total | 6 | 2 | 1 | 1 | 10 |
| Submarine Mains | | | | | |
| Air | 0 | 0 | 0 | 0 | 0 |
| Noise | 0 | 1 | 0 | 0 | 1 |
| Water | 0 | 0 | 0 | 0 | 0 |
| Waste | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 1 | 0 | 0 | 1 |

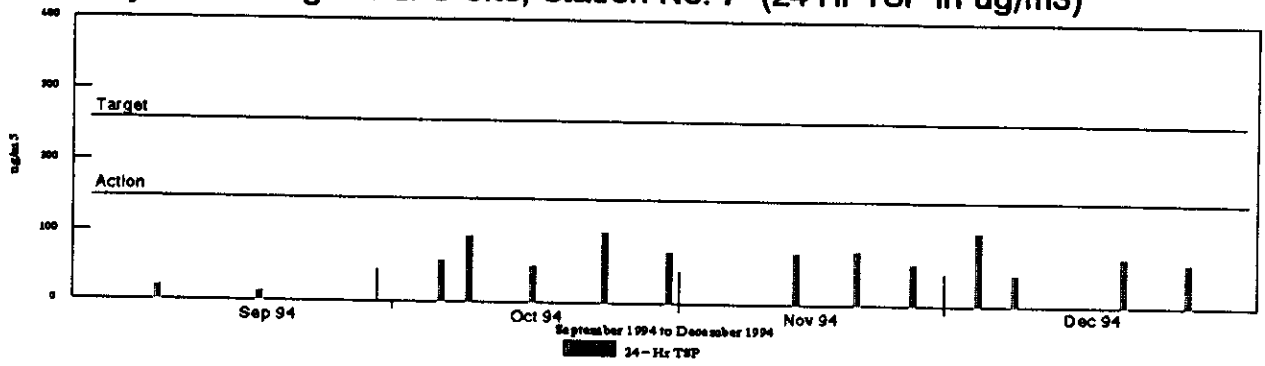
## 9. Liaison: Meetings and Representations to the Public

No meeting or representation to the public was made during the quarter.

Figure G1

## Water Supply to North Lantau – Stage 1

## Air Quality monitoring at Pui O Site, Station No. 7 (24 Hr TSP in ug/m3)

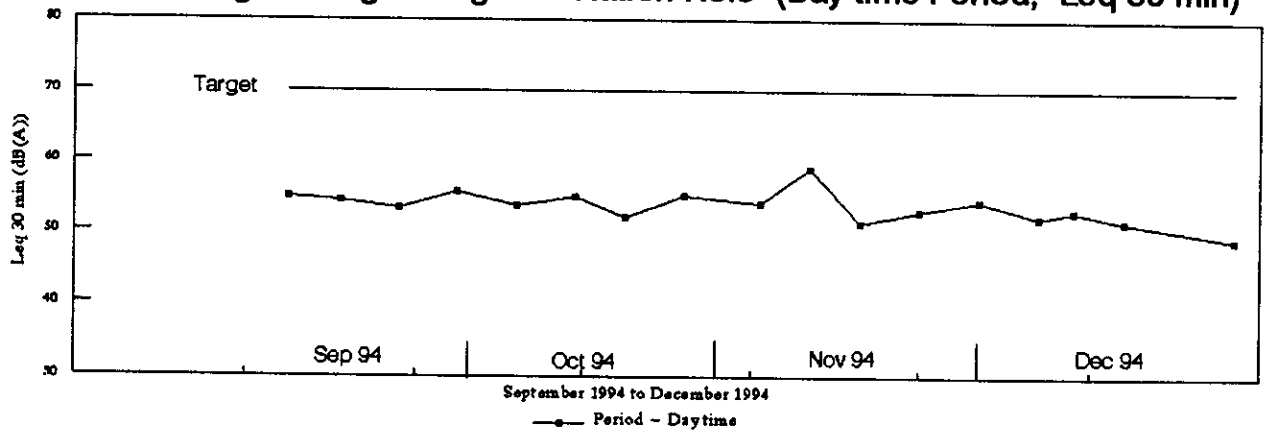



### Explanatory Notes

- o Pui O Site Representative Air Monitoring Station No.7 at Pui O Village.
- o Target Limit = 260ug/m3 & Action Limit = 155ug/m3

Figure G2

## Noise Monitoring at Tung Chung Site Station No.3 (Day time Period, Leq 30 min)



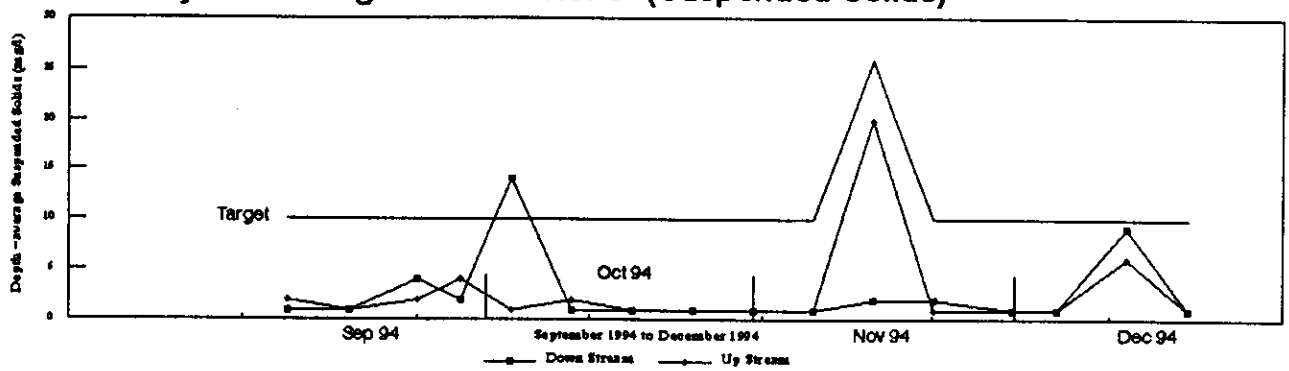

### Explanatory Notes

- o Tung Chung Site Representative Noise Monitoring Station No.3 at Tung Chung Public School.
- o Period : Day time (0700–1900 hour on normal weekdays)
  - Target Limit = 70 dB(A) for School
  - Action Limit = When more than one complaints are received on the same events or location within a period of 2 weeks.
- o No complaint was received in the quarter and therefore the Action Level was not breached.

Figure G 3

## North Lantau Water Supply – Stage I

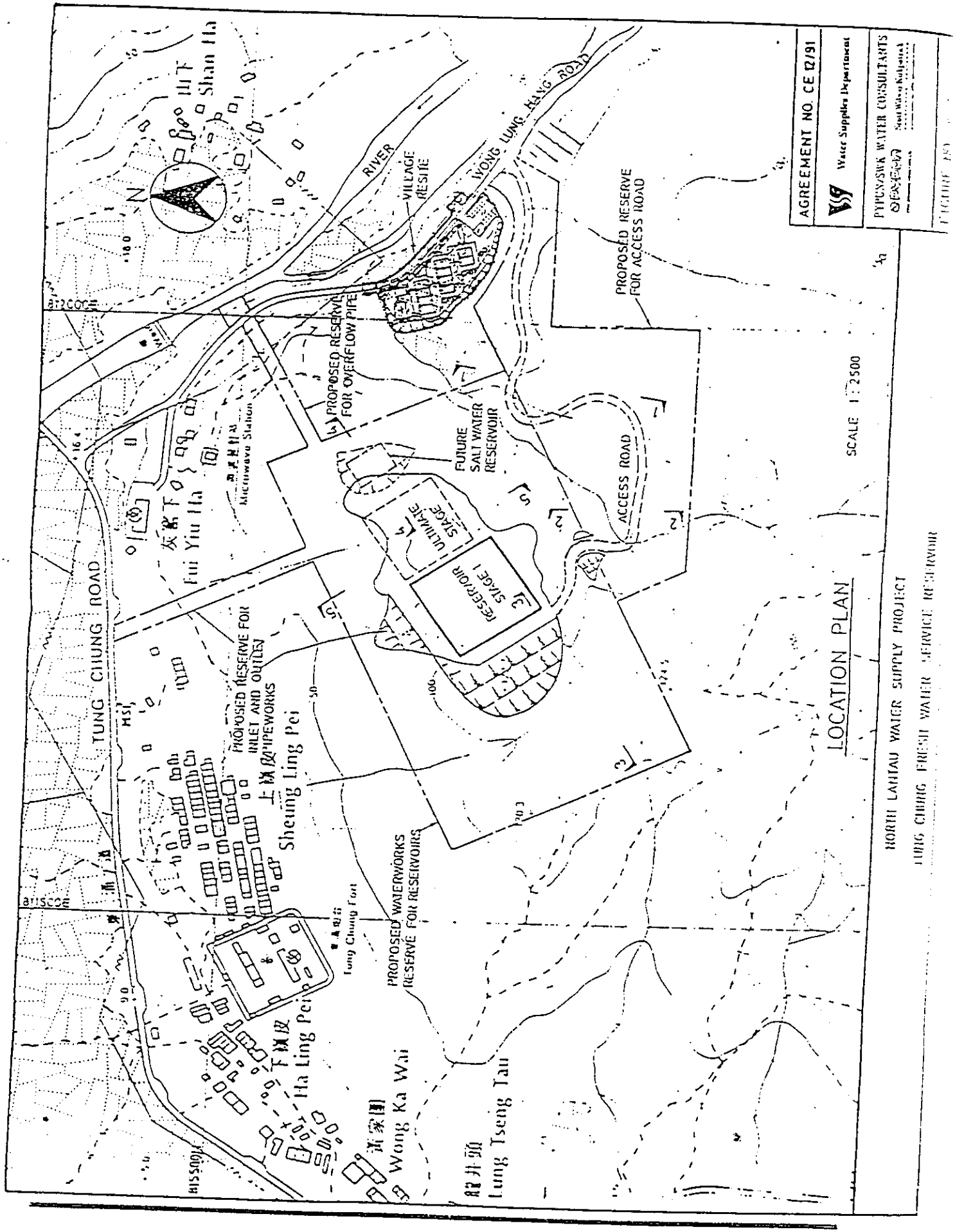
## Water Quality monitoring at Station No. 8 (Suspended Solids)

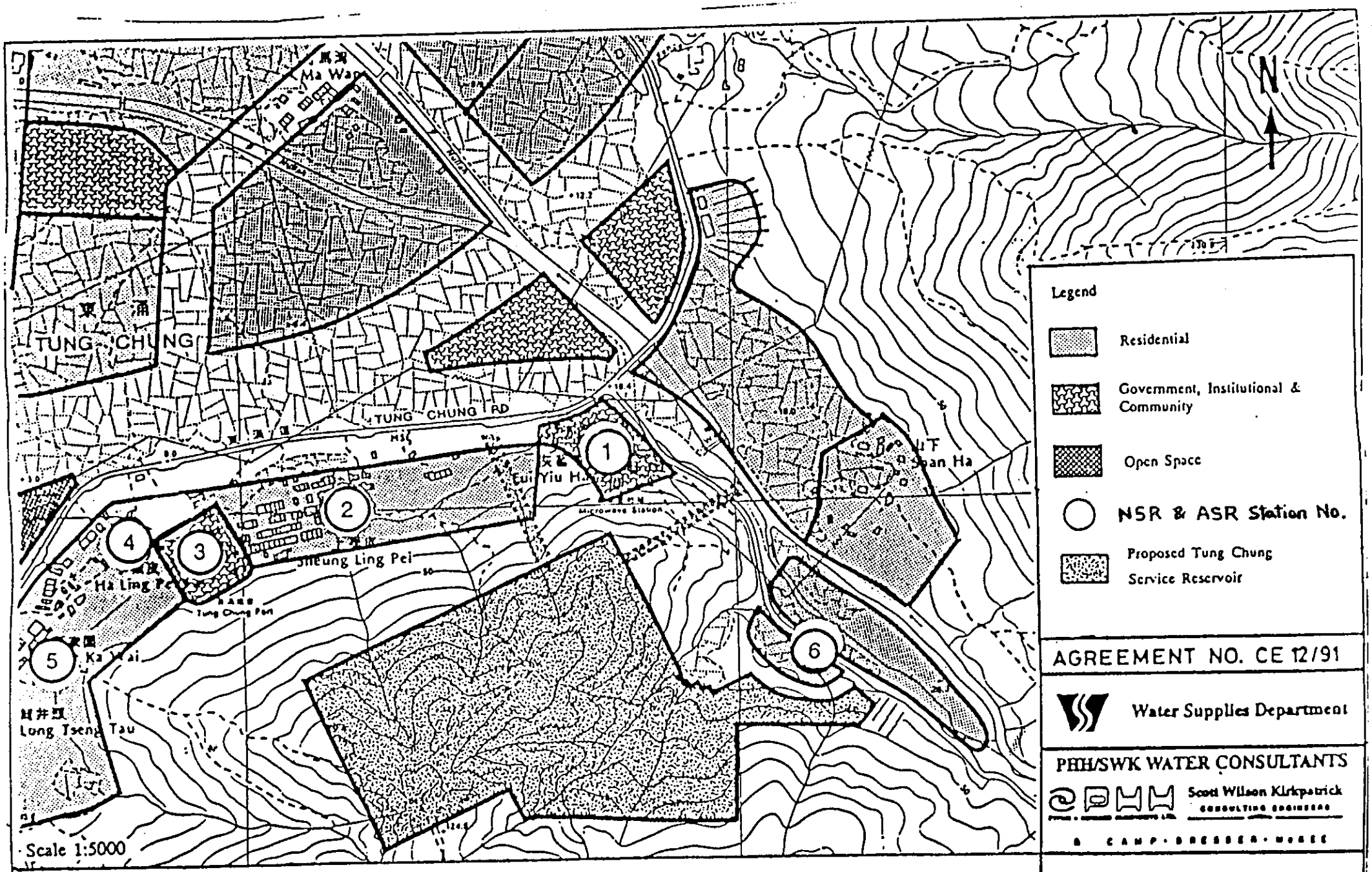



## Explanatory Notes

o Pui O Area Representative Water Monitoring Station No.8 at Pui O stream.

o Target level = 10 mg/l AND 30% above the reading obtained from upstream station.


AGREEMENT NO. CE 12/91
Water Supplies Department
PYPO/SWK WATER CONSULTANTS
LOCATION PLAN
NORTH LANTAU WATER SUPPLY PROJECT
TUNG CHUNG FRESH WATER SERVICE RESERVOIR
SCALE 1 : 2500
Shan Ha
Fui Yiu Ha
Sheung Ling Pei
Ha Ling Pei
Wong Ka Wai
Lung Tseng Tau
Long Chung Fort
TUNG CHUNG ROAD
WONG LUNG HANG ROAD
RIVER
VILLAGE RESITE
PROPOSED RESERVE FOR OVERFLOW PIPE
PROPOSED RESERVE FOR ACCESS ROAD
FUTURE SALT WATER RESERVOIR
ULTIMATE STAGE
RESERVOIR STAGE 1
ACCESS ROAD
PROPOSED RESERVE FOR INLET AND OUTLET PIPEWORKS
PROPOSED WATERWORKS RESERVE FOR RESERVOIRS



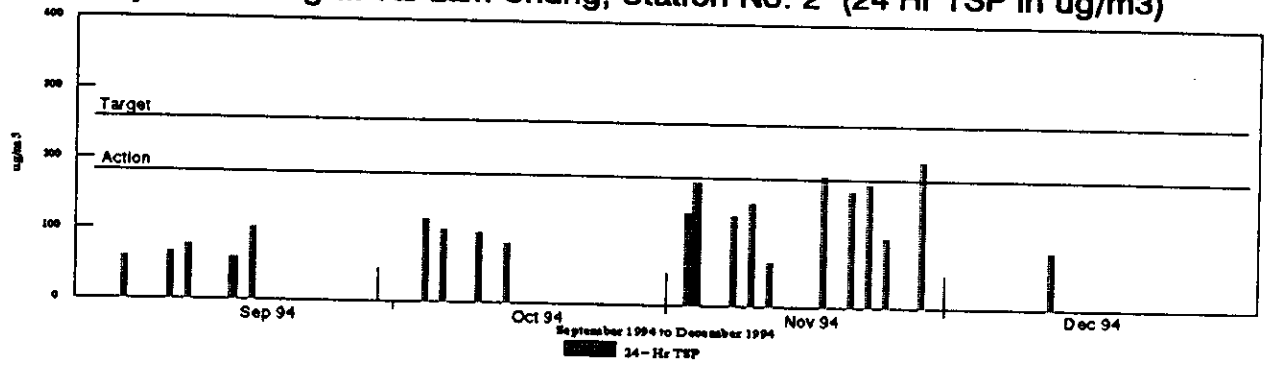

NORTH LANTAU WATER SUPPLY PROJECT – TUNG CHUNG

Figure G4A

Figure G5

## Water Supply to North Lantau – Stage 1

## Air Quality monitoring at Tai Lam Chung, Station No. 2 (24 Hr TSP in ug/m3)



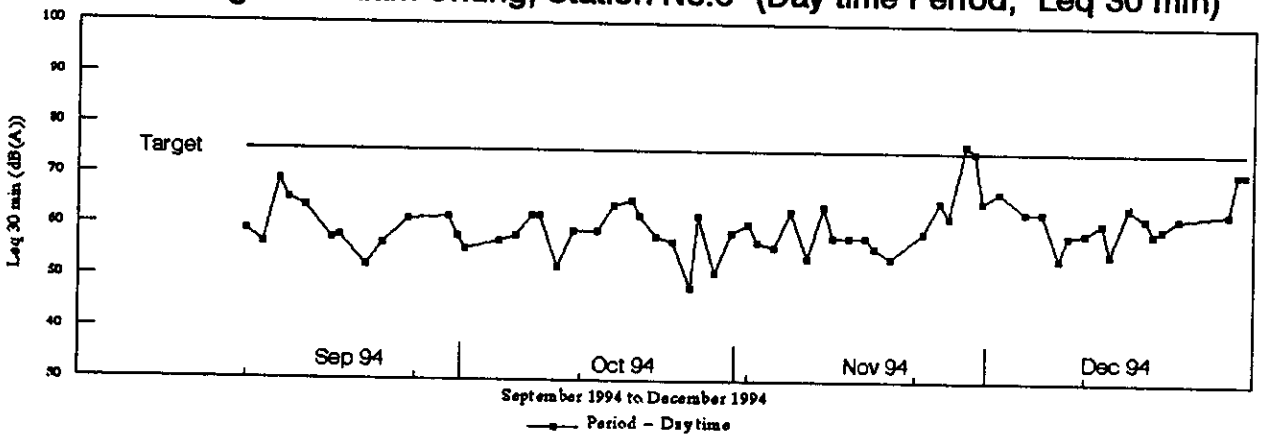

### Explanatory Notes

- o Tai Lam Chung Site Representative Air Monitoring Station No.2 at scattered village houses areas.
- o Target Limit = 260ug/m3 & Action Limit = 190ug/m3

- o High dust level in Nov 94 was due to excavation works and rock breaking.
- o Contractor were required to spray water regularly on haul road and dust generating working areas to reduce the dust emissions.

Figure G6

## Noise Monitoring at Tai Lam Chung, Station No.5 (Day time Period, Leq 30 min)




### Explanatory Notes

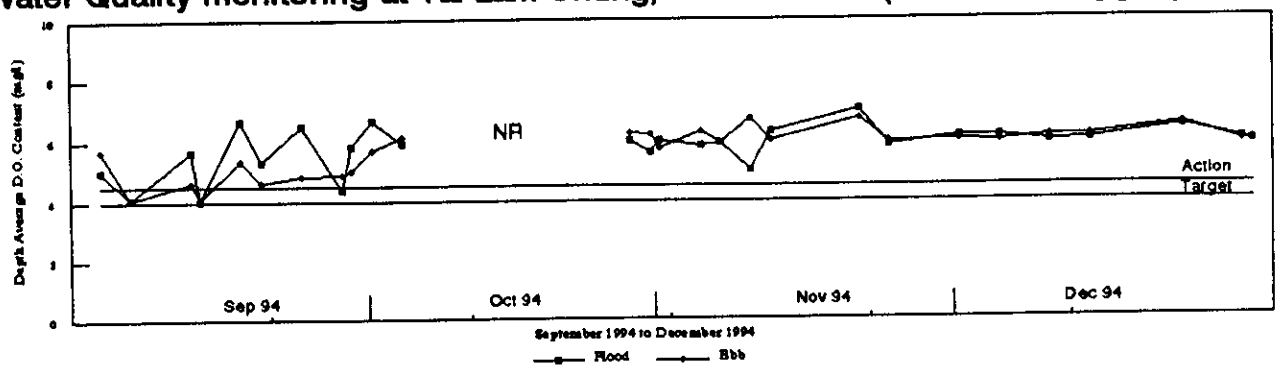
- o Tai Lam Chung Site Representative Noise Monitoring Station No.5 at scattered village houses areas.
- o Period : Day time (0700–1900 hour on normal weekdays)
  - Target Limit = 75 dB(A)
  - Action Limit = When more than one complaints are received on the same events or location within a period of 2 weeks.
- o No complaint was received in the quarter.

- o Target level was breached two time in Nov 94, it is due to operation of hydraulic breakers at Chainage 880, sheet piling and excavation at Chainage 20 to 30.

Figure G 7

## North Lantau Water Supply – Stage I

### Water Quality monitoring at Tai Lam Chung, Station No.3 (Dissolved Oxygen)



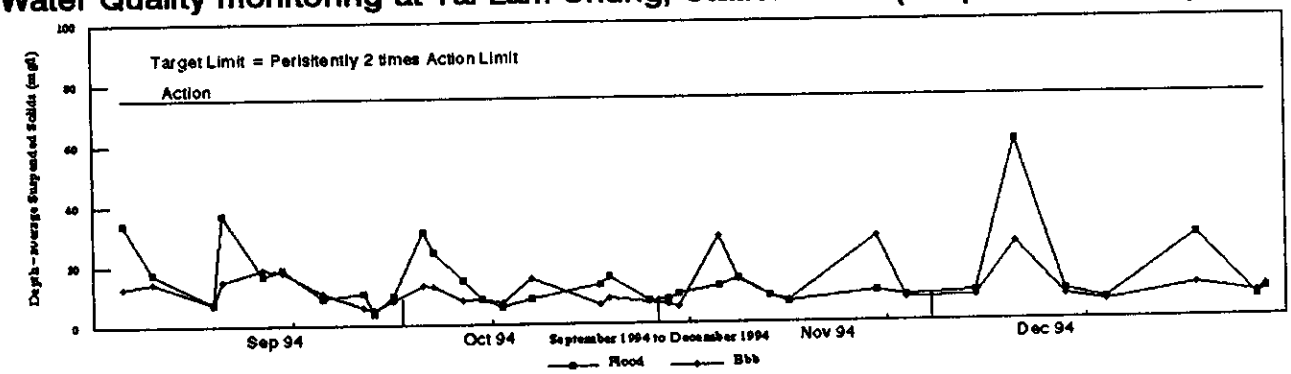

Explanatory Notes

- o Representative Water Monitoring Station at Tai Lam Chung Station No.3
- o Action Limit = 4.5 mg/l
- o Target Limit = 4 mg/l

- o No Record (NR) of D.O. readings in Oct 94 due to loss of D.O. probe and cable.
- o Breach the action level at 9.9.94 & 16.9.94 due to the seasonal variation.

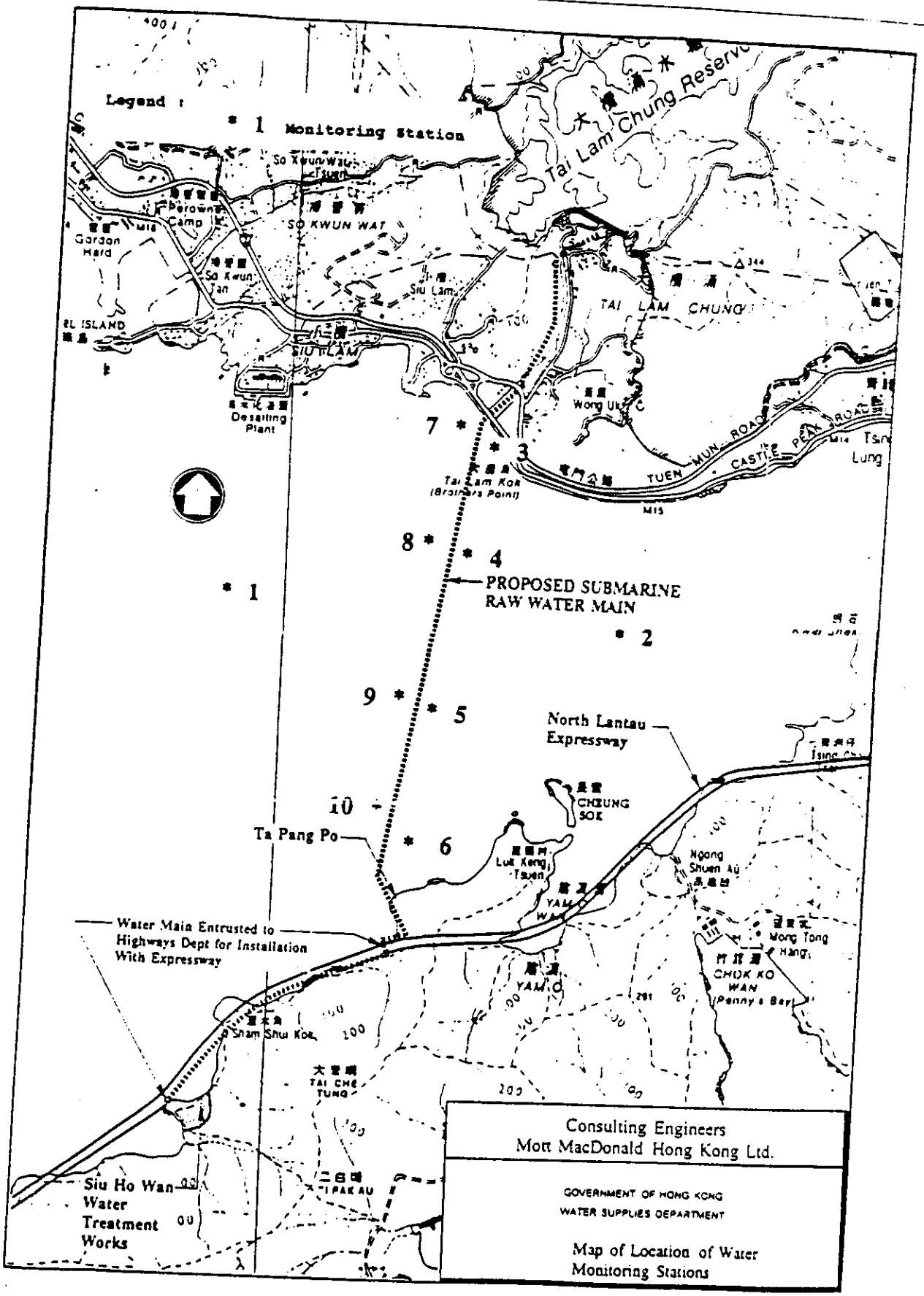
Figure G 8

### Water Quality monitoring at Tai Lam Chung, Station No.3 (Suspended Solids)




Explanatory Notes

- o Representative Water Monitoring Station at Tai Lam Chung Station No.3
- o Action Limit = 75mg/l
- o Target Limit = Perisitently 2 times Action Limit.


Legend :
1 Monitoring Station
PROPOSED SUBMARINE RAW WATER MAIN
Water Main Entrusted to Highways Dept for Installation With Expressway
Ta Pang Po
North Lantau Expressway
Tai Lam Chung Reserv
TUEN MUN ROAD
CASTLE PEAK ROAD
Siu Ho Wan Water Treatment Works
Consulting Engineers
Mott MacDonald Hong Kong Ltd.
GOVERNMENT OF HONG KONG
WATER SUPPLIES DEPARTMENT
Map of Location of Water Monitoring Stations

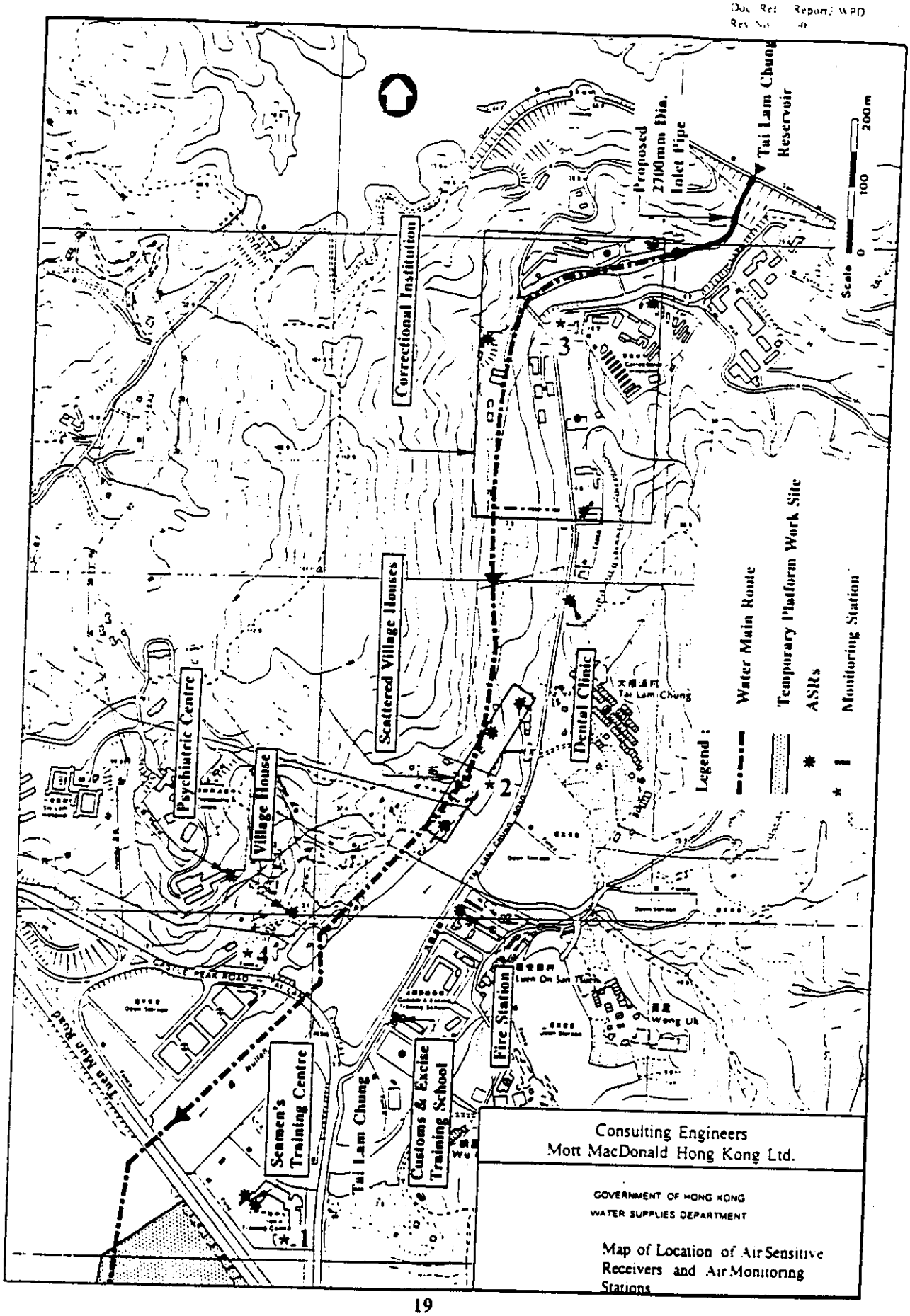
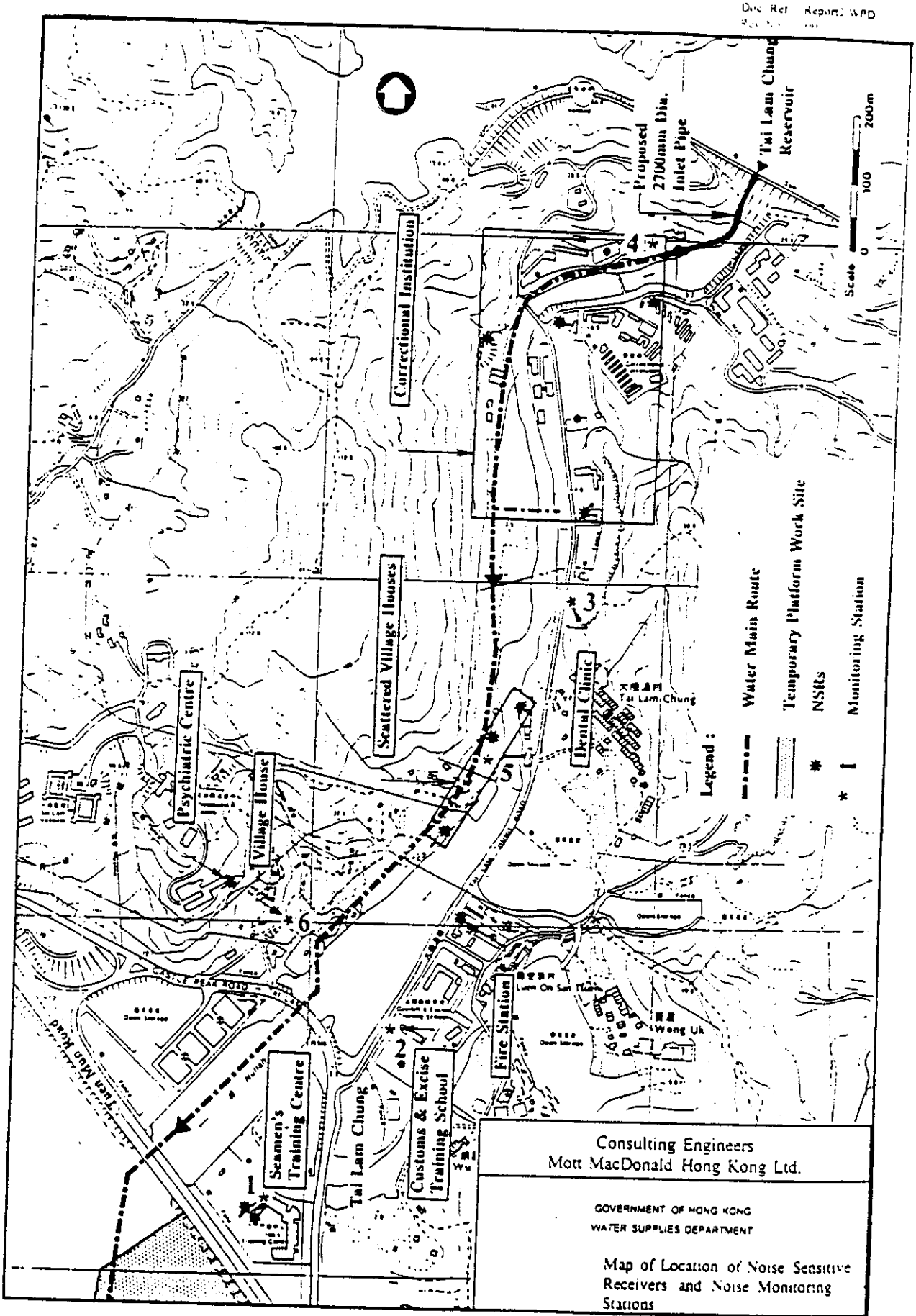

Proposed 2700mm Dia. Inlet Pipe
Tai Lam Chung Reservoir
Scale 0 100 200m
Correctional Institution
Scattered Village Houses
Psychiatric Centre
Village House
Dental Clinic
Tai Lam Chung
Fire Station
Customs & Excise Training School
Seamen's Training Centre
Tuen Mun Road
Castle Peak Road
Legend :
Water Main Route
Temporary Platform Work Site
ASRs
Monitoring Station
1
2
3
4
5
Consulting Engineers
Mott MacDonald Hong Kong Ltd.
GOVERNMENT OF HONG KONG
WATER SUPPLIES DEPARTMENT
Map of Location of Air Sensitive Receivers and Air Monitoring Stations

Figure G11


Proposed 2700mm Dia. Inlet Pipe
Tai Lam Chung Reservoir
Correctional Institution
Scattered Village Houses
Psychiatric Centre
Village House
Dental Clinic
Fire Station
Seamen's Training Centre
Customs & Excise Training School
Tai Lam Chung
Castle Peak Road
Tuen Mun Road
Wong Uk
Legend :
Water Main Route
Temporary Platform Work Site
NSRs
Monitoring Station
Scale 0 100 200m
Consulting Engineers
Mott MacDonald Hong Kong Ltd.
GOVERNMENT OF HONG KONG
WATER SUPPLIES DEPARTMENT
Map of Location of Noise Sensitive Receivers and Noise Monitoring Stations

Appendix G1

# Implementation status of EIA recommendations for WSNL (Tai Lam Chung to Ta Pang Po)

| Key Measures Implemented | Key Measures Required | Action Taken |
|---|---|---|
| **Water Quality**<br>. Contaminated Mud Dredging<br>In the Sediment Quality Report, samples of nullah bed material collected between bridge of Tuen Mun Road and the bridge of Castle Peak Road were found to be contaminated with zinc metal. About 13,000m³ of contaminated material is expected to be dredged at the nullah by suction dredger, then transported by barges to the allocated mud disposal pits of East Shau Chau. The Resident Site Staff (RSS) are responsible for supervising and keeping records of the dredging processes.<br>Before Dredging Commencement:<br>- The Contractor is required to submit weekly dredging plan two weeks before the expected dredging works are carried out.<br>- The Contractor will use barges with installation of automatic self-monitoring systems. The system provides accurate satellite records of the barges's positions at regular intervals, and electronically monitors loading and dumping operations.<br>During Dredging:<br>- The RSS will undertake spot checks on all dredging and disposal operations.<br>- The Contractor has been instructed to load all dredged material into the hopper barges and minimise loss rates. He must also ensure that barges or hoppers should not be filled to a level which could cause dredged material or polluted water to overflow during loading or transportation. The RSS should report to EPD any of the above malpractice.<br>- The RSS should ensure that the Contractor cleans any excess material from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.<br>- The RSS check that all barges and hopper dredgers are fitted with seals to their bottom openings to prevent leakage of material.<br>- The RSS should make sure that all dredged materials are not mixed with other uncontaminated materials.<br>- In addition, the materials should be directly transported to the dumping pit at Est Shau Chau.<br>Monitoring During Dredging:<br>At present, water quality monitoring is carried out by RSS at three depths, on the mid-flood and mid-ebb tides, at eight impact monitoring stations and two control stations, three times per week. During the period of dredging at the nullah, an additional parameter, the total zinc content in the water samples collected at the mid level of station W3 and W7 will also be analyzed. Trigger, Action and Target (TAT) levels for the parameter was established after carrying out water baseline measurements. Measurements of suspended solids, turbidity, dissolved oxygen and the total zinc content at the stations are the water quality monitoring during the dredging.<br><br>Record:<br>The Contractor is required to fill in daily dumping records of contaminated mud that shown in the following : - information of date of operation, time of barge departure from dredging site, name of dredger(s), name of barges(s), dumped quantity should be included in the records. The records should be passed to Engineer's representative for checking and filing. Copy of the records will be sent to Environmental Protection Department (EPD).<br><br>. Underwater Blasting<br>As underwater blasting was carried out for the trench for water pipeline, the Contractor was required an visual inspection of 500m radius of the blasting area in order to ensure no Chinese White Dolphin in the nearby water.<br><br>**Noise**<br>. Noise Control at Sensitive Receivers<br>It was recommended in the EIAs that sound insulation such as air conditioners should be installed at Tai Po and the Youth Camps. It was already implemented. | **Water Quality**<br>. Discharge from site<br>It is required that all water, the liquid waste products arising on site should be collected, removed from site by the contractor via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance.<br>**Noise**<br>. Noise Control at Source<br>Methods of mitigation at sources need to be used<br>(a) fit exhaust muffles and an acoustic lining to the engine compartments of mobile plant;<br>(b) construct an acoustic enclosure around the diesel engines of stationary plant;<br>(c) construct an acoustic enclosure around stationary plant;<br>(d) acoustic enclosure of hydraulic hammer bracket.<br>. Excavation by Blasting<br>It was recommended in EIAs that it would be better to use blasting rather than use of hydraulic rock breakers which are likely to lead to significant noise impacts and extend the duration of excavation activities. After a review of excavation method, the contractor compromised to re-alignment the water pipeline to reduce excavation. A small scale excavation by rock breaker was implemented with negligible impact. | **Water Quality**<br>. Discharge from site<br>Site investigation revealed that mud water was pumped directly from trench to open channel. RSS was advised to rectify the situation.<br>**Noise**<br>. Noise Control at Source<br>A recent site inspection revealed that no reduction components for site equipment are being used. RSS was advised to take action. |

Appendix G2

## Implementation status of EIA recommendations for WSNL (Siu Ho Wan, Tung Chung, Pui O and Water Tunnel)

| Key Measures Implemented | Key Measures Required | Action Taken |
|---|---|---|
| Water Quality<br><br>Discharge from Site<br><br>Water retention tank is applied to de-silt muddy water from excavation prior to discharge to open channel.<br><br>Air Quality<br><br>Dust Suppression at Tung Chung SR<br><br>- A penalty system has been introduced and was reinforced by the Contractor to penalize truck drivers with excessive speed, or not using canvas as dust control measures. Drivers who have got 2 offense records would be asked to leave the site.<br><br>- A "Stop and Go" sign has been operating manually along the access road to ensure the traffic flow of this 2-ways single lane rural road in an acceptable manner.<br><br>- A water bowser has been employed to spray the haul route at a frequency of approximately 2 round trips per hour, except during lunch time and water re-filling period. The Consultant would keep a tight control on its effectiveness.<br><br>- In addition to the wheel wash bay, a worker will stand by to wash the wheels by spraying water on to the trucks. | Water Quality<br><br>Discharge from Tunnelling<br><br>The construction method statement is under review. Any discharge of wastewater or wasted oil is not allowed. The contractor claimed the re-cycling and re-using of these process water and oil in the course of boring. | Water Quality<br><br>Discharge from Tunnelling<br><br>RSS was advised to audit the practicality of the tunnel boring method and its related discharge. Site inspection confirmed the preparation work of the TBM. |

# H. Project Title: Route 3 Advanced Earthworks

## 1. Project Data and Project Organization

The Advanced Earthwork project commenced in May 1992 and was substantially completed in September 1994. The North West Tsing Yi Interchange then took up the site and commenced construction. Scott Wilson Kirkpatrick & Partners is the Engineer for both contracts, and the RE (General) undertakes the EM&A works on a part time basis.

## 2. Monitoring Requirement :

An EM&A Manual has been prepared by the Engineer to be followed by the site staff. The Engineer and EPD have agreed on the Target Limits for noise levels for all NSRs. Based on the "Technical Memorandum on Noise from Construction Work Other Than Percussive Piling", EPD classified the NSRs as class A/B. EPD has advised the Engineer that the specified noise level is for noise solely from construction activities and the Engineer will endeavor to differentiate whether the noise level exceedance is from ambient noise or from construction activities.

There was one air quality monitoring station and one noise monitoring station in operation during the reporting period. No water quality monitoring was undertaken owing to the completion of the marine construction works.

## 3. Monitoring/Audit Results: Implications of Non-compliance

Monitoring results in the form of exceedances during the quarter are summarized in table H1.

Air: No exceedance in either action or target level has been recorded in the reporting period.

Noise: There were occasional exceedances which were due to external factors including marine traffic and construction works from other sites.

**Table H1 - Exceedances of the Action and Target Levels for Route 3 Advanced Earthworks**

| Environmental Parameters | October 94 | | | November 94 | | | December 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| Air | 12 | 0 | 0 | 15 | 0 | 0 | 14 | 0 | 0 |
| Noise | 9 | 0 | 1 | 9 | 0 | 1 | 8 | 0 | 1 |

* Total no. of monitoring events undertaken
A No. of monitoring events with results exceeding the Action Level only
T No. of monitoring event with results exceeding the Target Level

**4. Proposal for Remedial Measures:** Solutions to Problems

The contractor has provided a water bowser for dust suppression on the site.

**5. Complaints:** From the Public

No complaint has been received during the reporting period.

# I. Project Title: Central Reclamation, Phase 1 - Engineering Works

## 1. Project Data and Project Organisation

The Central and Wanchai Reclamation Development comprises six phases. The first phase being implemented is Central Reclamation Phase I which is one of the ACP projects. The contract started on 1st September 1993 and will take 48 months to complete. The works which include primarily dredging, reclamation, piling and drainage works have been entrusted to the MTRC for implementation.

On-site monitoring of water quality is being carried out by the Contractor and audited by the MTRC. The monitoring of noise and dust is being implemented by an independent consultant employed by the MTRC.

## 2. Monitoring Requirement :

The monitoring requirements are based on the recommendations of the Focused EIA Study and the Contract requirements.

Water quality monitoring is to be conducted at 12 monitoring stations around the works area on 3 working days a week at both mid-ebb and mid-flood tides. Additional monitoring has been carried out at 8 more stations since 24 May 1994 around the East Po Toi Marine Borrow Areas and the adjacent sensitive receivers.

Noise monitoring is to be carried out twice at sensitive receivers (8 groups of receivers altogether) at a frequency of 3 consecutive 5-minute Leq for each monitoring period every week.

24-hour dust samples are to be taken at 2 monitoring stations once every six days.

## 3. Activities undertaken during the quarter

The major works activities undertaken during the quarter included:

- seawall construction,
- piling,
- drainage and cooling water discharge works, and
- reclamation.

## 4. Monitoring Results:

The monitoring results in the form of exceedances are included in Table I1.

Air: There were frequent exceedances of Action and Target Levels in October and November; while there was only one exceedance in December.

Noise: There were quite frequent exceedances of the Target Level during the quarter.

Water: No exceedance of Action and Target Levels was noted.

## 5. Audit Results: Implications of Non-compliance

Air: The frequent exceedances of the Action and Target Levels in October and November were due to the proximity of the monitoring station to the nearby traffic (as a result of the current temporary traffic diversion). The situation was, however, improved with the regular watering of the access road.

Noise: The frequent exceedances were mainly due to the proximity of the temporary traffic diversion and to a lesser extent the construction traffic.

Water: No exceedance of Action and Target Levels was noted.

**Table I1 Exceedances of the Action and Target Levels for Central Reclamation Phase I**

| Environmental Parameters | Oct. 94 | | | Nov. 94 | | | Dec. 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| Air | 4 | 2 | 0 | 5 | 2 | 2 | 9 | 0 | 1 |
| Noise | 16 | 0 | 7 | 48 | 0 | 14 | 32 | 0 | 10 |
| Water DO | 318 | 0 | 0 | 456 | 0 | 0 | 432 | 0 | 0 |
| Water SS | 312 | 0 | 0 | 456 | 0 | 0 | 432 | 0 | 0 |

* : Total no. of monitoring events undertaken
A : No. of monitoring events with results exceeding the Action Level only [The Action Level for noise is exceeded if more than one complaint is received within two weeks.]
T : No. of monitoring events with results exceeding the Target Level

## 6. Proposals for remedial measures : Solutions to Problems

Air : Regular watering of the access road was carried out to control the dust level within the criteria limits.

Noise: In view of the exceedances, the contractor was requested to reschedule the noisy activities in such a manner that the noise levels were under control.

Water: No remedial measure was required as there was no exceedance of the Action and Target Levels.

## 7. Implementation status of EIA recommendations

A summary of EIA recommendations for Central Reclamation Phase I has been provided in Appendix I1.

## 8. Complaints :-

No complaint was received during the quarter.

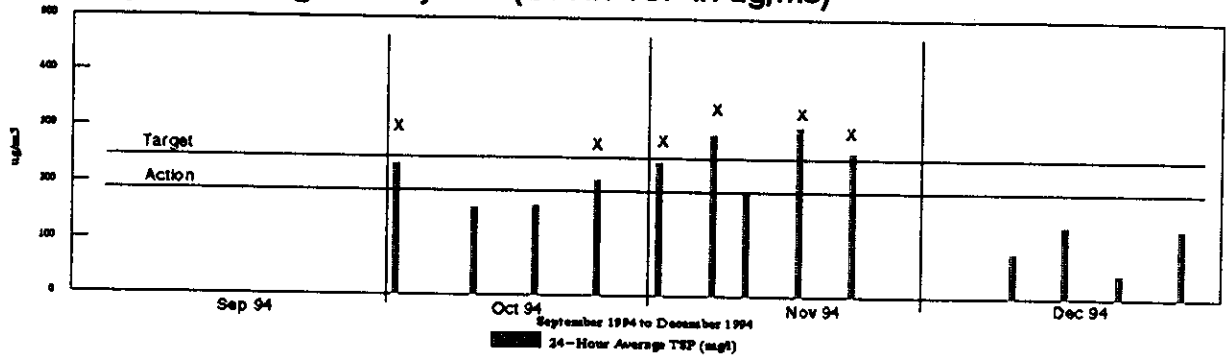
## 9. Liaison: Meetings and Representation to the public

No meeting or representation to the public was made during the quarter.

Figure 11

## Central Reclamation

### Air Quality monitoring at Ferry Pier (24 Hr. TSP in ug/m3)




### Explanatory Notes

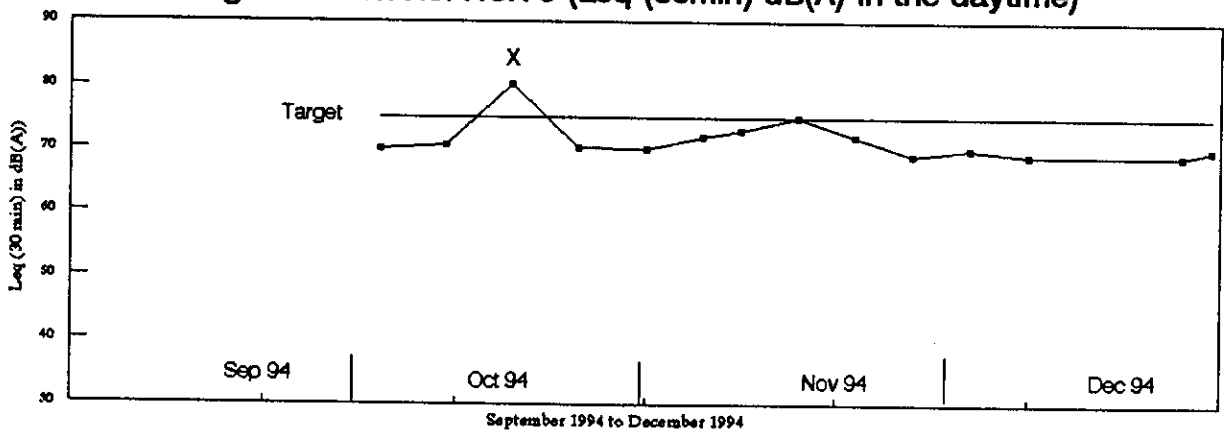
o Air Monitoring Station at Ferry Pier

o Target Limit = 260ug/m3 & Action Limit = 196 ug/m3

X: The exceedance of the Action/Target Level was due to the proximity of the monitoring station to the nearby traffic (as a result of the current temporary traffic diversion).

Figure 12

### Noise Monitoring at Station No. NSR 5 (Leq (30min) dB(A) in the daytime)




### Explanatory Notes

o Representative Noise Monitoring Station 'NSR 5' at City Hall

o Period: daytime (0700 to 1900 hr).

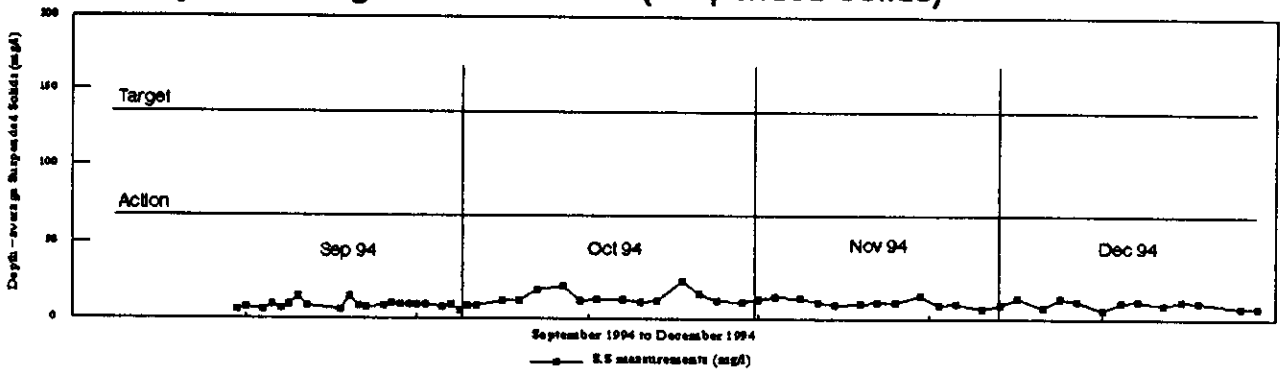
o Target Level for daytime noise level = 75 dB(A)

X: The exceedance was mainly due to the proximity of the temporary traffic diversion and to a lesser extent the construction traffic.

Figure I 3

## Central Reclamation

### Water Quality monitoring at Station No. 9 (Suspended Solids)

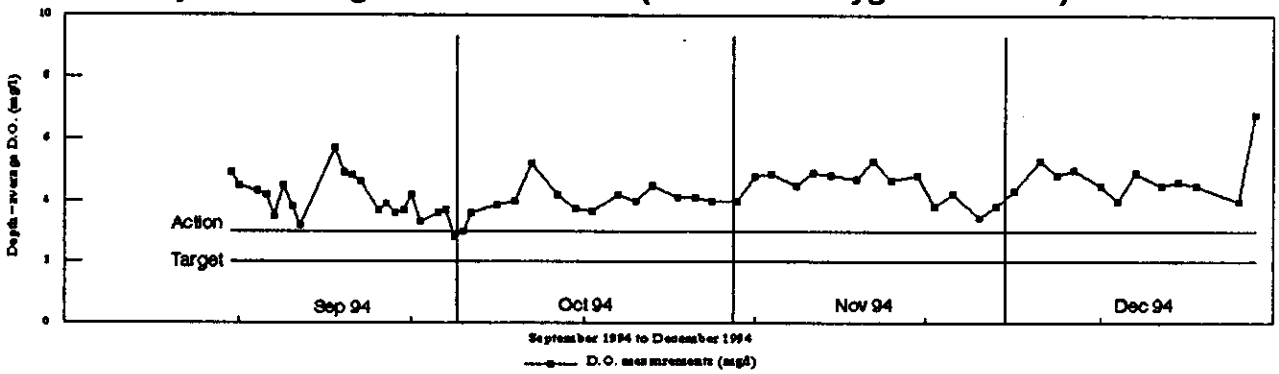



Explanatory Notes

- o Representative Water Monitoring Station No.9.
- o Target Limit = 140 mg/l & Action Limit = 70 mg/l

Figure I 4

### Water Quality monitoring at Station No. 9 (Dissolved Oxygen Content)




Explanatory Notes

- o Representative Water Monitoring Station No.9.
- o Target Limit = 2 mg/l & Action Limit = 3 mg/l

- o Breach the action level on 28.9.94 due to the seasonal variation.

Figure 15

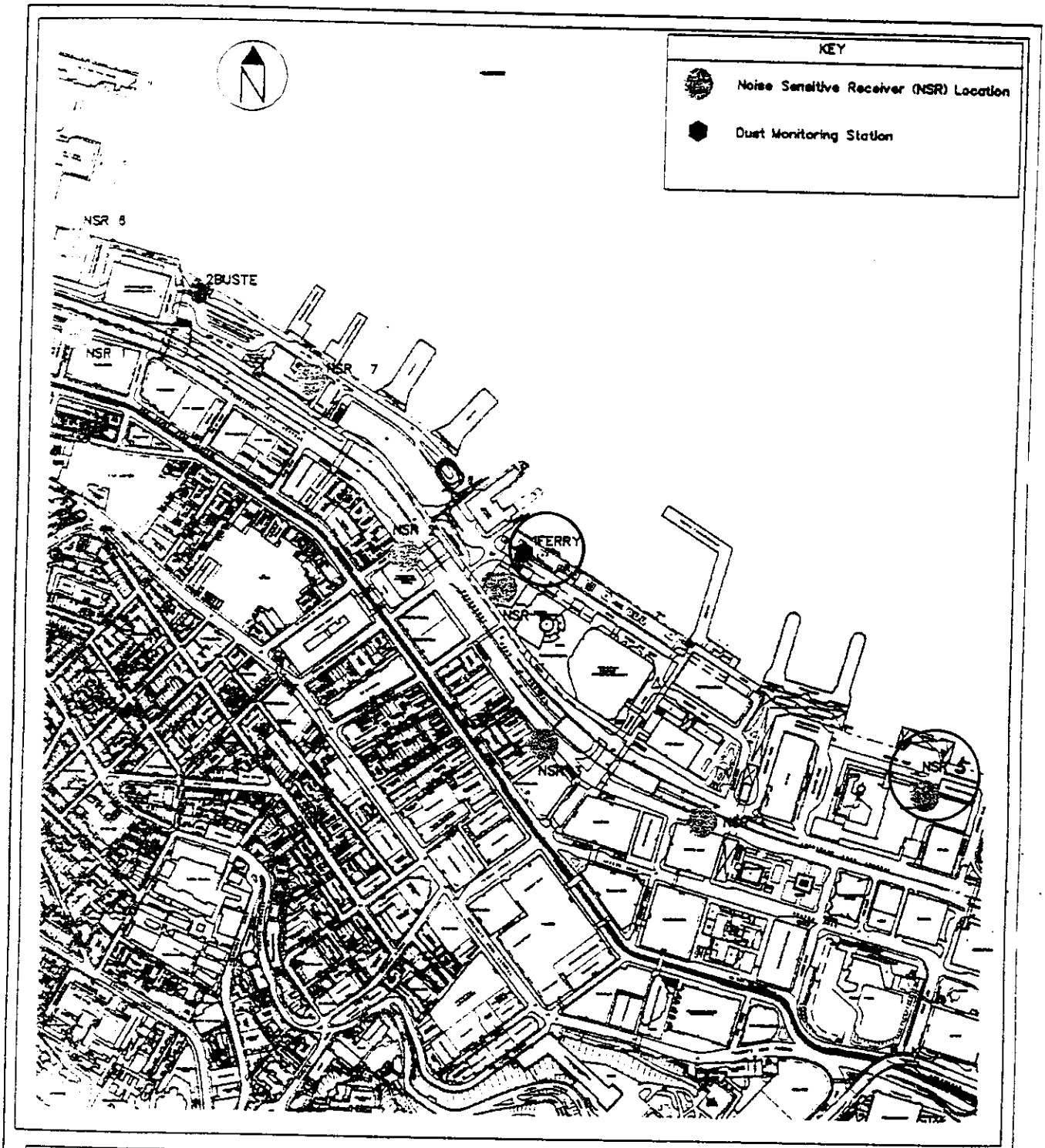
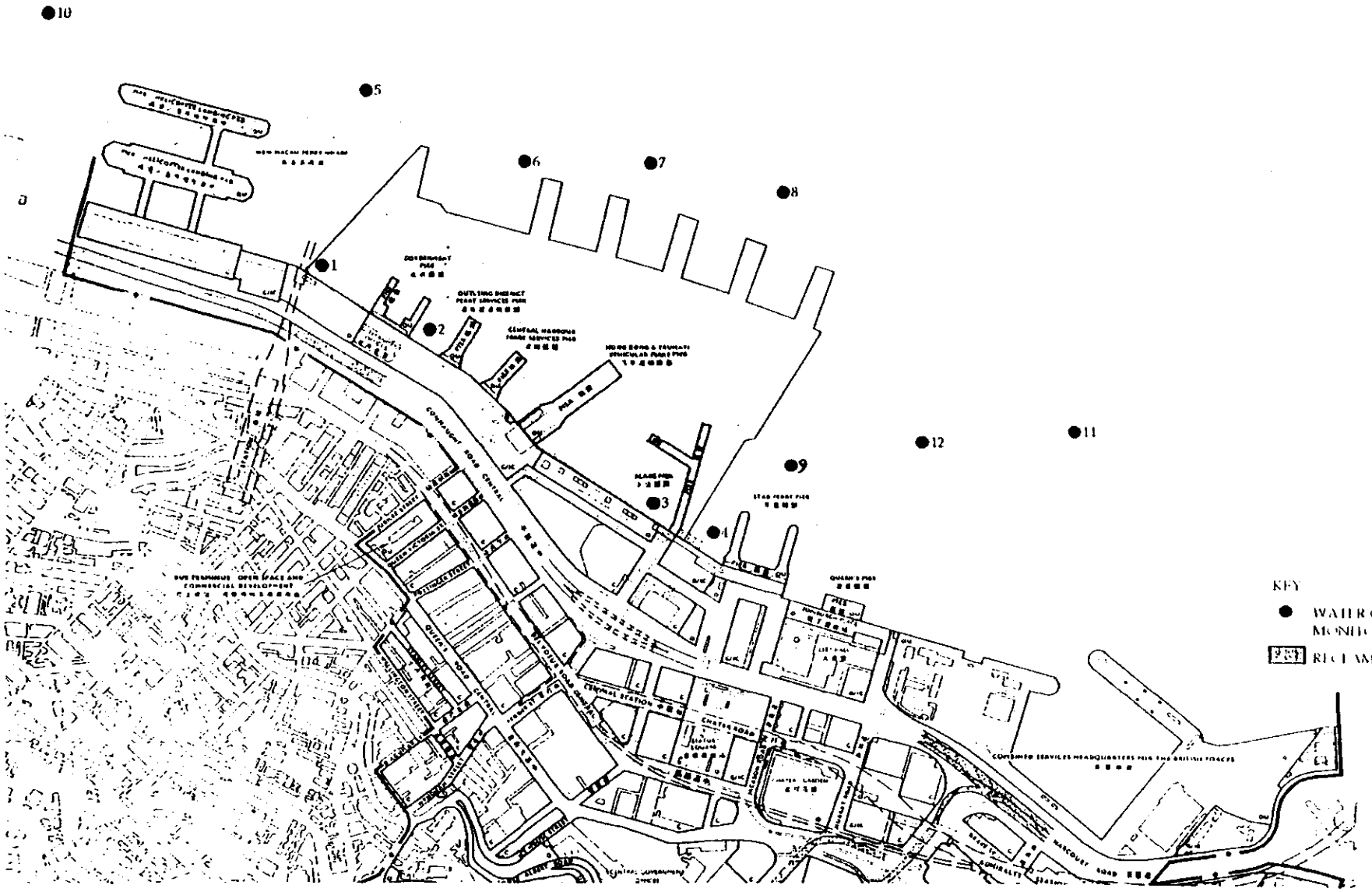



FIGURE 3.1 a Locations of NSRs and Dust Monitoring Stations - Central and Wanchai Reclamation

| | |
|---|---|
| Date 6 Dec 1994 | Project No.: C 1267 |
| Map drawn by GIS and Mapping,ERM | Base map from LANDS DEPT. 1:1k topo |

**ERM Hong Kong**
6th Floor
Hecny Tower
9 Chatham Road
Tsimshatsui, Kowloon
Hong Kong

ERM




WATER QUALITY MONITORING POINT LOCATIONS

**ERM Hong Kong**

10-11th Floor
Hecny Tower
9 Chatham Road
Tsimshatsui, Kowloon
Hong Kong

Figure 16

Appendix I1

## Implementation status of EIA recommendations for Central Reclamation Phase I

| Key measures implemented | Key measures required | Actions taken |
|---|---|---|
| Water<br><br>The key water mitigation measures, which include fitting all barges and hopper dredgers with tight fitting seals and transporting the dredged materials in suitable and well maintained vessels, have been/are being properly implemented. | While MTRC has compiled monthly EM&A reports in accordance with our requirements since December 1994 (after we have liaised with and pushed MTRC for a relatively long time), there are still a few outstanding items, such as the status report for mitigation measures and a table highlighting the scheduled and actual monitoring programmes, that need to be included in the monthly report. | MTRC has been requested on 29.12.94 and 5.1.95 respectively to incorporate those outstanding items (i.e. the status report for mitigation measures and a table highlighting and scheduled and actual monitoring programmes) into the monthly EM&A report as far as possible. No reply has yet been received from MTRC so far. Would k.i.v. on this. |
| Air<br><br>The key air mitigation measures, which include enclosing the stockpiles of sand and aggregate and providing effective water sprays, have been/are being properly implemented. | | |
| Noise<br><br>The key noise mitigation measures, which include providing sound silencers for all plant and equipment and examining the noise elves of the equipment before use, have been/are being properly implemented. | | |
| Drainage<br><br>Most of the key drainage improvement works recommended in the Focused EIA study have been/are being designed by DSD and the construction programme is still under discussion between EPD and TDD. It is anticipated that an agreed construction programme would come up in due course. | | |

# J. Project Title: Western Harbour Crossing

## 1. Project Data and Project Organisation

The construction of the Western Harbour Crossing (WHC), which is one of the four sections of the proposed Route 3, is being undertaken by Nishimatsu-Kumagai Joint Venture on behalf of the Western Harbour Tunnel Company. This contract comprises two sites, one at Sai Ying Pun (works commenced in August 1993) while the other one at Shek O Quarry Casting Basin (works commenced in March 1994) The major works in the project includes the construction of roads, bridges and tunnels.

Consultants in Environmental Sciences Asia Ltd is commissioned by Nishimatsu-Kumagai Joint Venture to carry out the EM&A works for the contract.

## 2. Monitoring Requirement

Based on the recommendations of the EIA study and the EM&A Manual submitted in November 1993, the monitoring requirements are as follows:

(a) dust sampling is to be conducted at a monitoring station once every 6 days to obtain 24-hour and ad hoc 1-hour Total Suspended Particulate (TSP) measurements;

(b) noise monitoring is to be undertaken at three monitoring stations once a week; and

(c) water quality monitoring is to be conducted at ten stations on two days per week. The parameters measured include dissolved oxygen, turbidity and suspended solids.

## 3. Activities undertaken during the quarter

The major works activities undertaken during the quarter included foundation works and diaphragm wall construction.

## 4. Monitoring Results: Compliance with Action/Target Levels

The monitoring results in the form of exceedances are included in Tables J1 and J2.

Sai Ying Pun & Victoria Harbour site

Air: There was no exceedance in October and December, while there were some exceedances of Action and Target Levels in November.

Noise: No exceedance of Action and Target Levels owing to the construction activities was noted.

Water: No exceedance of Action and Target Levels for DO, SS and turbidity.

Shek O Quarry Casting Basin site

Air: There were frequent exceedances of the Target Level.

Noise: No exceedance of Action and Target Levels was noted.

Water: There was no exceedances for DO, while there were quite frequent exceedances for SS and occasional exceedances for turbidity.

**Table J1 - Exceedances of the Action and Target Levels for Sai Ying Pun Site & Victoria Harbour of WHC**

| Environmental Parameters | Oct 94 | | | Nov. 94 | | | Dec 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| Air | 6 | 0 | 0 | 10 | 2 | 1 | 5 | 0 | 0 |
| Noise | 28 | 0 | 2[c] | 30 | 0 | 0 | 24 | 2[c] | 1[c] |
| Water DO | 320 | 0 | 0 | 310 | 0 | 0 | 356 | 0 | 0 |
| Water SS | 158 | 0 | 0 | 175 | 0 | 0 | 178 | 0 | 0 |
| Water Turbidity | 160 | 0 | 0 | 169 | 0 | 0 | 178 | 0 | 0 |

**Table J2 - Exceedances of the Action and Target Levels for Shek O Casting Basin of WHC**

| Environmental Parameters | Oct 94 | | | Nov 94 | | | Dec 94 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total* | A | T | Total* | A | T | Total* | A | T |
| Air | 5 | 0 | 2 | 4 | 0 | 3 | 3 | 0 | 2 |
| Noise | 27 | 0 | 0 | 30 | 0 | 0 | 21 | 0 | 0 |
| Water DO | 288 | 0 | 0 | 335 | 0 | 0 | 300 | 0 | 0 |
| Water SS | 144 | 0 | 23 | 168 | 3 | 15 | 156 | 1 | 3 |
| Water Turbidity | 144 | 1 | 3 | 168 | 1 | 2 | 156 | 3 | 4 |

* Total no. of monitoring events undertaken
A : No. of monitoring events with results exceeding the Action Level only
[The Action Level for noise is exceeded if more than one complaint is received within two weeks.]
T : No. of monitoring events with results exceeding the Target Level
[c] : Exceedances not caused by construction activities.

## 5. Audit Results: Implications of Non-compliance

Sai Ying Pun & Victoria Harbour Site

Air

The exceedances were due to the dusty activities on site and the contractor was requested to carry out the mitigation measures highlighted in para. 6 below.

Noise

No exceedance was noted.

Water

No exceedance was noted.

Shek O Casting Basin site

Air

The exceedances were due to activities on the exposed site areas within the casting basin and wind blown dust from other activities outside the casting basin. The contractor was requested to carry out mitigation measures highlighted in para. 6 below.

Noise

No exceedance was noted.

Water

(a) There was no exceedance for DO.

(b) The exceedances for turbidity were short-lived and no action was required.

(c) It was noted that the exceedances for SS were due to the discharge of the effluent from the sedimentation tanks.

## 6. Proposals for Remedial Measures: Solutions to Problems

Sai Ying Pun & Victoria Harbour Site

Air: In view of the exceedances, mitigation measures including regular watering and covering of dusty materials were undertaken to control the dust levels within limits.

Noise: No remedial measure was required as there was no exceedance of the Action and Target Levels.

Water: No remedial measure was required as there was no exceedance of the Action and Target Levels.

Shek O Quarry Casting Basin Site

Air: In view of the exceedances, mitigation measures including regular watering and covering of dusty materials were undertaken to control the dust levels within limits.

Noise: No remedial measures was required as there was no exceedance of the Action and Target Levels.

Water: In view of the frequent exceedances of the SS target level, it was proposed to utilise the wide drains leading to the sump pumps of the tanks as initial settlement ponds to reduce the initial sediments being pumped into the tanks.

## 7. Implementation status of EIA recommendations

A summary of implementation status of EIA recommendation has been provided in Appendices J1 and J2.

## 8. Complaints: From the Public

No complaint was received for both Sai Ying Pun and Shek O sites during the quarter.

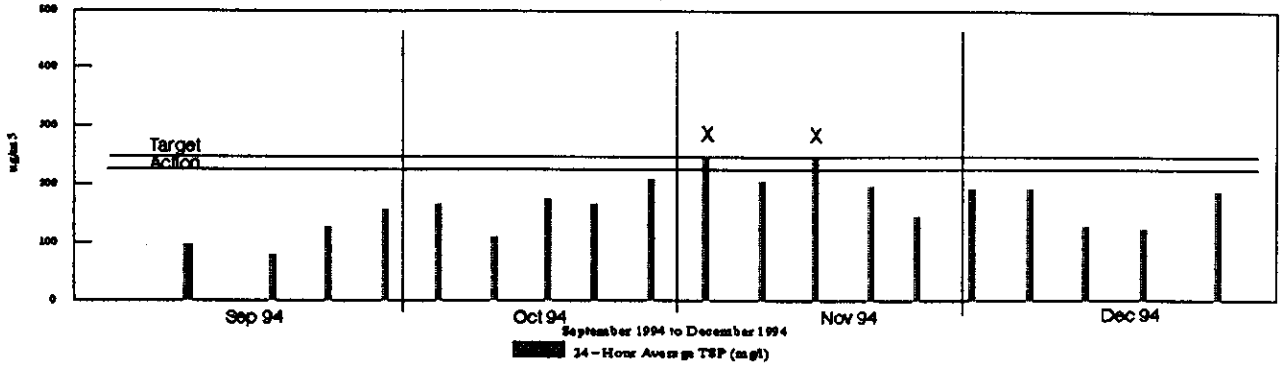
## 9. Liaison : Meetings and Representation to the Public

No meeting or representation to the public was made during the quarter.

Western Harbour Crossing

Figure J1

## Air Quality monitoring at Sai Ying Pun & Victoria Harbour – Construction Phase (24 Hr TSP in ug/m3)




### Explanatory Notes

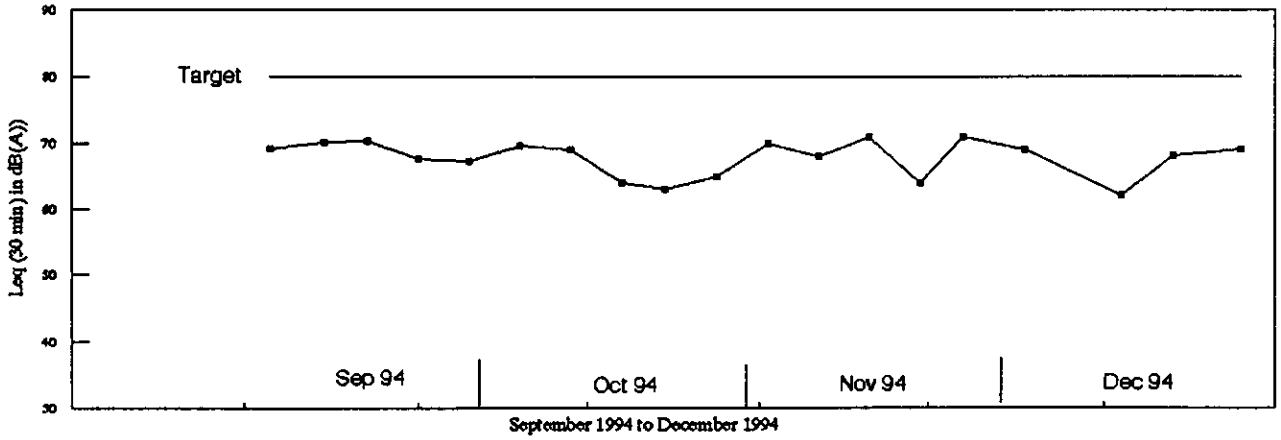
o Air Monitoring Station at WHC construction phase:

o Target Limit = 260ug/m3 & Action Limit

X: The exceedance of the Action Level was due to the dusty activity on site and the contractor was requested to water the access road regularly and to cover the dusty materials to mitigate the impact.

Figure J2

## Noise Monitoring at Sai Ying Pun & Victoria Harbour, Station D (Leq (30min) dB(A) in the daytime)




### Explanatory Notes

o Representative Noise Monitoring Station 'D' at Qualipak Tower.

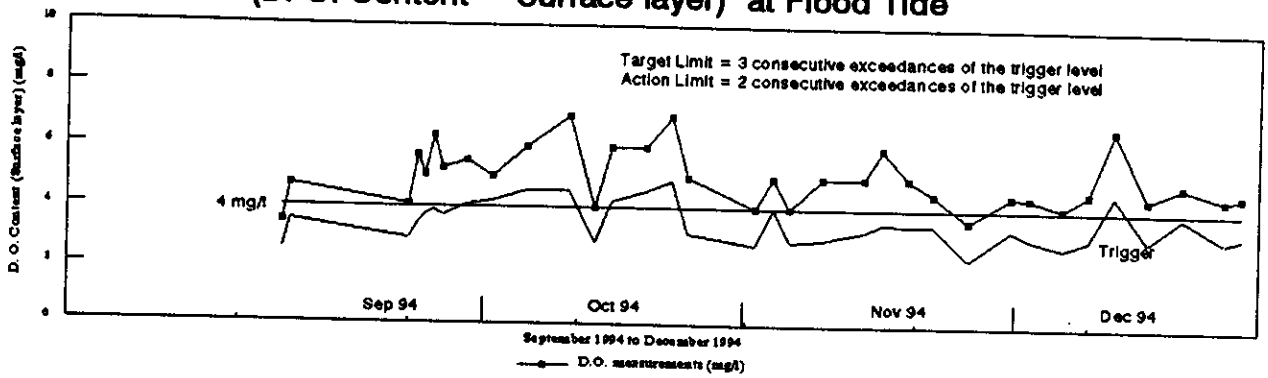
o Period: daytime (0700 to 1900 hr).

o Target Level for daytime noise level = 80 dB(A)
Action Limit: 3 independent noise complaints within 1 month.

Western Harbour Crossing

Figure J3

## Water Quality monitoring at Sai Ying Pun & Victoria Harbour at Station No. 3 (D. O. Content – Surface layer) at Flood Tide

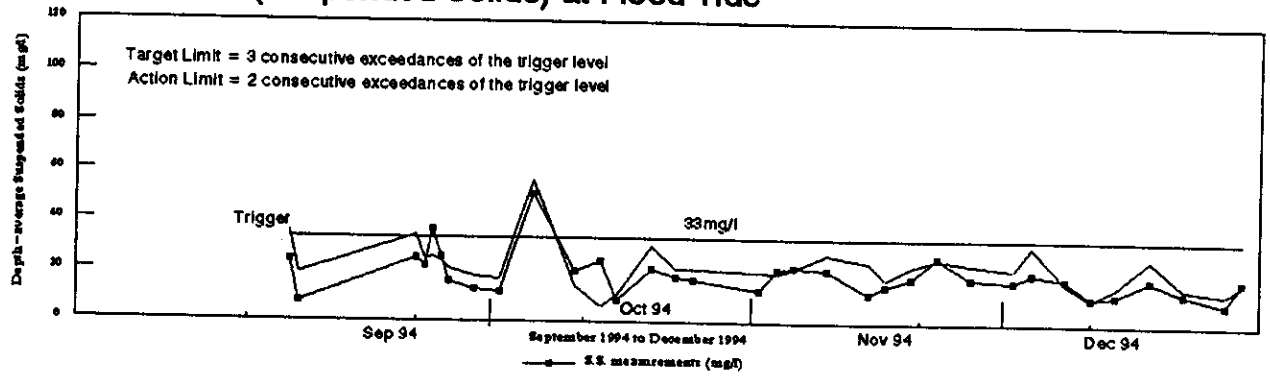



### Explanatory Notes

- o Representative Water Monitoring Station No.3
- o Trigger Limit = 30% below the average of readings obtained from Control Stations (W1 & W10) AND 4 mg/l.
- o Action Limit = Exceedance of Trigger Level in 2 consecutive days.
- o Target Limit = Exceedance of Trigger Level in 3 consecutive days.

Figure J4

## Water Quality monitoring at Sai Ying Pun & Victoria Harbour at Station No. 3 (Suspended Solids) at Flood Tide



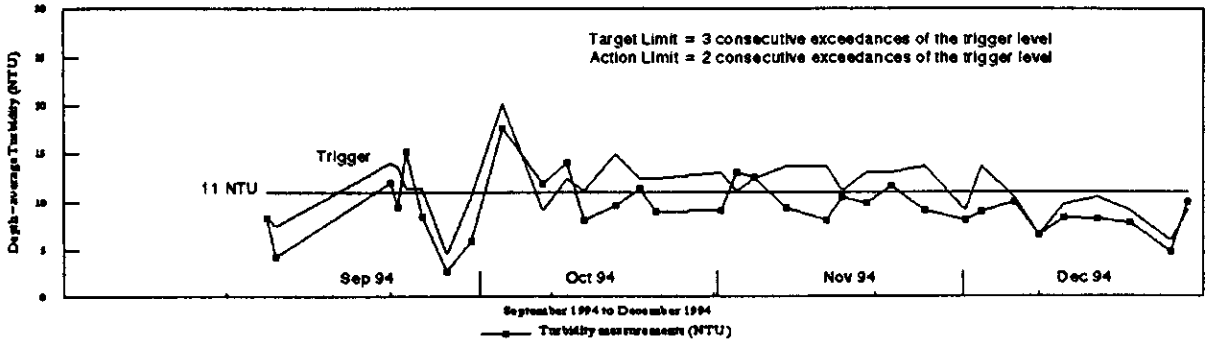

### Explanatory Notes

- o Representative Water Monitoring Station No.3
- o Trigger Limit = 30% above the average of readings obtained from Control Stations (W1 & W10) AND exceed 33 mg/l.
- o Action Limit = Exceedance of Trigger Level in 2 consecutive days.
- o Target Limit = Exceedance of Trigger Level in 3 consecutive days.

Figure J5

## Western Harbour Crossing

### Water Quality monitoring at Sai Ying Pun & Victoria Harbour at Station No. 3 (Turbidity) at Flood Tide



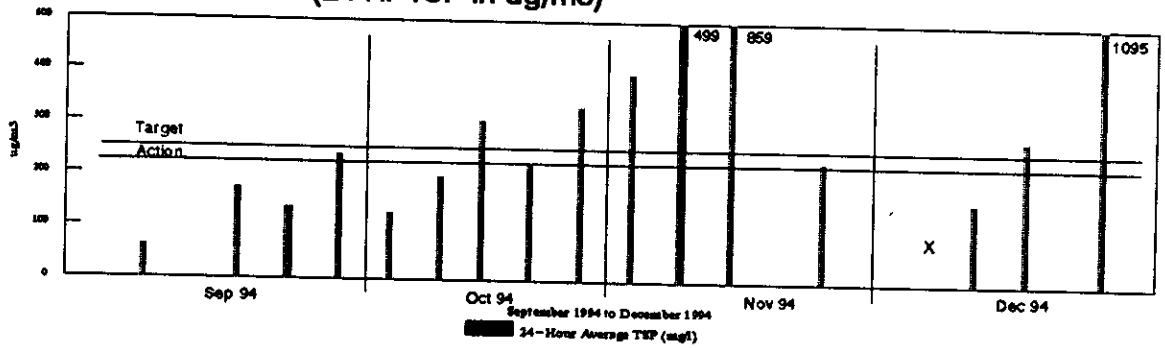

## Explanatory Notes

- o Representative Water Monitoring Station No.3
- o Trigger Limit = 30% above the average of readings obtained from Control Stations (W1 & W10) AND exceed 11 (NTU
- o Action Limit = Exceedance of Trigger Level in 2 consecutive days.
- o Target Limit = Exceedance of Trigger Level in 3 consecutive days.

Western Harbour Crossing

Figure J 6

## Air Quality monitoring at Shek O Casting Basin, Station AS1 – Construction Phase (24 Hr TSP in ug/m3)



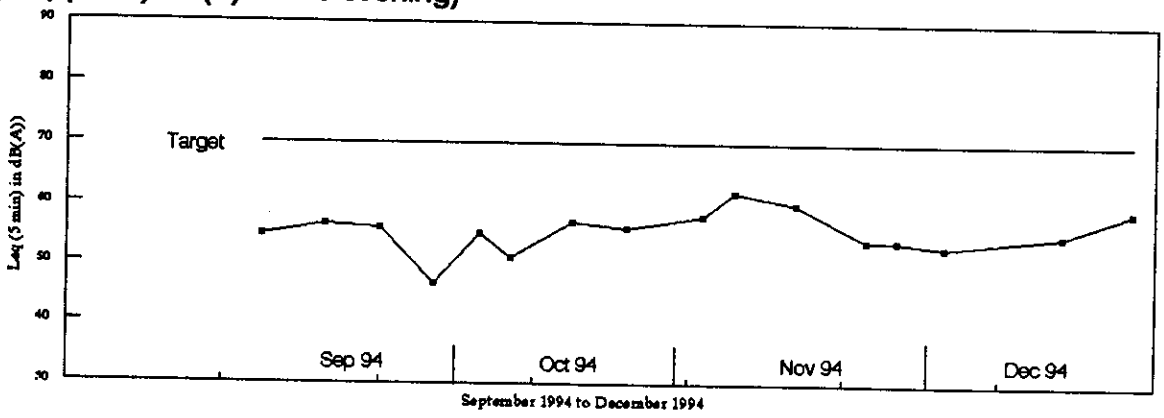

### Explanatory Notes

- o Air Monitoring Station at WHC construction phase
- o Target Limit = 260ug/m3 & Action Limit = 230 ug/m3

- o X = No data recorded due to technical problems with the sampler.
- o Contractor was requested to undertake all reasonable dust mitigation measures to reduce the dust level in the quarter.

Figure J 7

## Noise monitoring at Shek O Casting Basin, Station NS1 (Leq (5min) dB(A) in the evening)




### Explanatory Notes

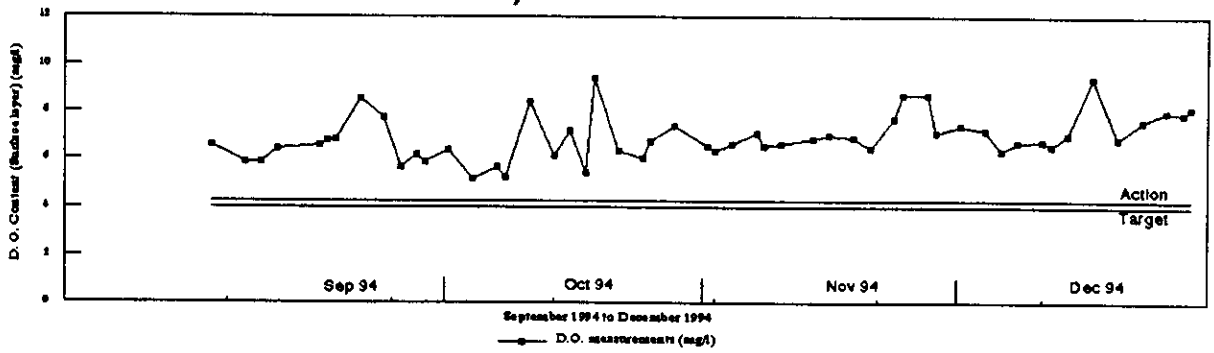
- o Representative Noise Monitoring Station 'NS1'

- o Period : daytime (1900 to 2300 hr).
- o Target Level for daytime noise level = 70 dB(A)
  Action Limit: 3 independent noise complaints within 1 month.

Figure J 8

## Western Harbour Crossing

### Water Quality monitoring at Shek O Casting Basin, Station No.3 (Surface D.O. Content – Flood Tide)

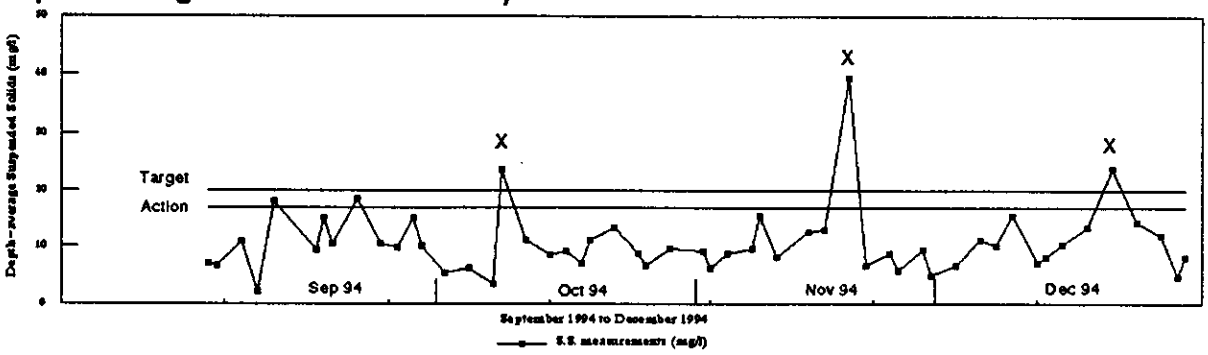



Explanatory Notes

- o Representative Water Monitoring Station at Shek O Station No.3
- o Target Limit = 4 mg/l & Action Limit = 4.25 mg/l

Figure J 9

### Water Quality monitoring at Shek O Casting Basin, Station No.3 (Depth Averaged S.S. – Flood Tide)




Explanatory Notes

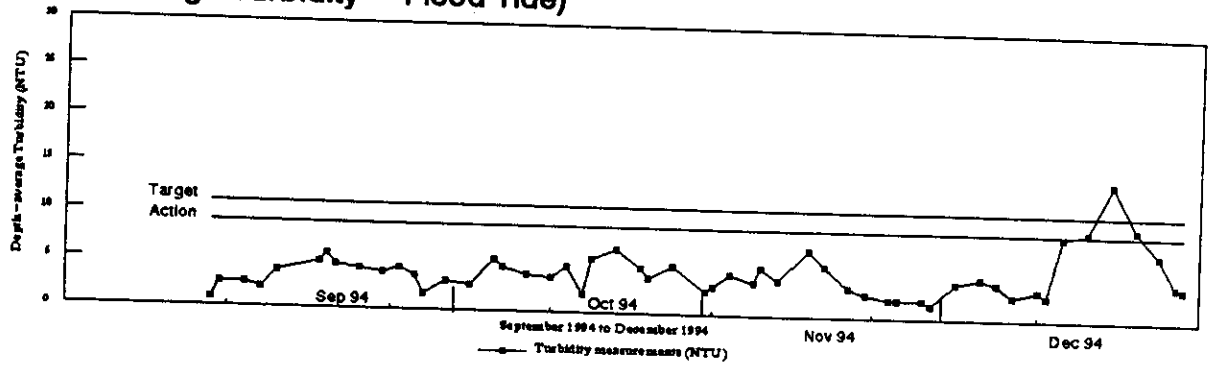
- o Representative Water Monitoring Station at Shek O Station No.3
- o Target Limit = 20 mg/l & Action Limit = 17 mg/l

X : The exceedance was due to the discharge of the effluent from the sedimentation tanks. It was therefore proposed to utilise the wide drains leading to the sump pumps of the tanks as initial settlement ponds to reduce the initial sediments being pumped into the tanks.

Western Harbour Crossing

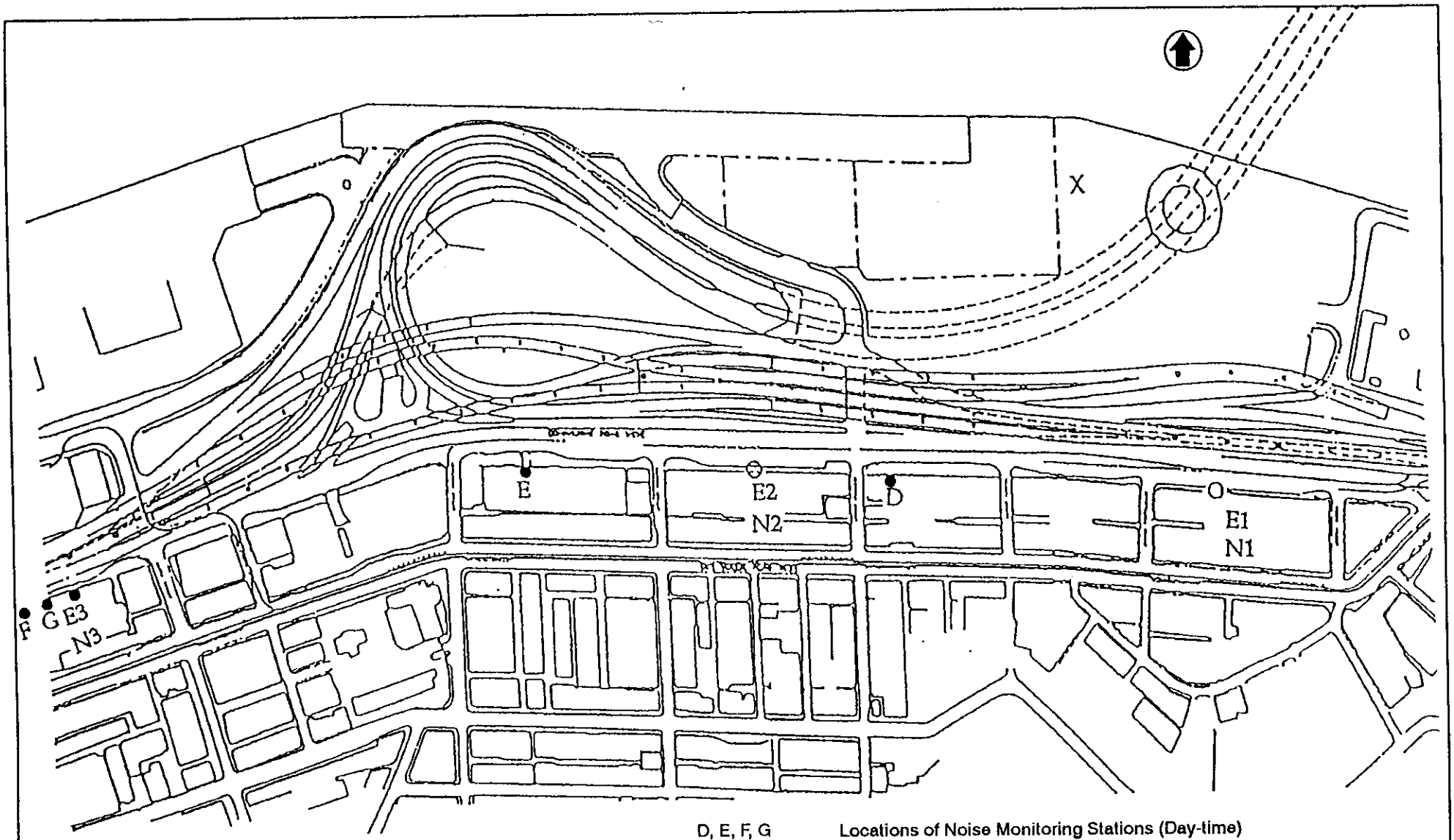
Figure J 10

## Water Quality monitoring at Shek O Casting Basin, Station No.3 (Depth Average Turbidity – Flood Tide)




### Explanatory Notes

- Representative Water Monitoring Station at Shek O Station No.3
- Target Limit = 11 NTU & Action Limit = 9 NTU




| | |
|---|---|
| D, E, F, G | Locations of Noise Monitoring Stations (Day-time) |
| E1, E2, N1, N2 | Locations of Noise Monitoring Stations (Evening & Night-time) |
| E3, N3 | Locations of Noise Monitoring Control Stations (Evening & Night-time) |
| X | Location of Air Monitoring Station |

Air and Noise Monitoring Stations
(Sai Ying Pun and Victoria Harbour)

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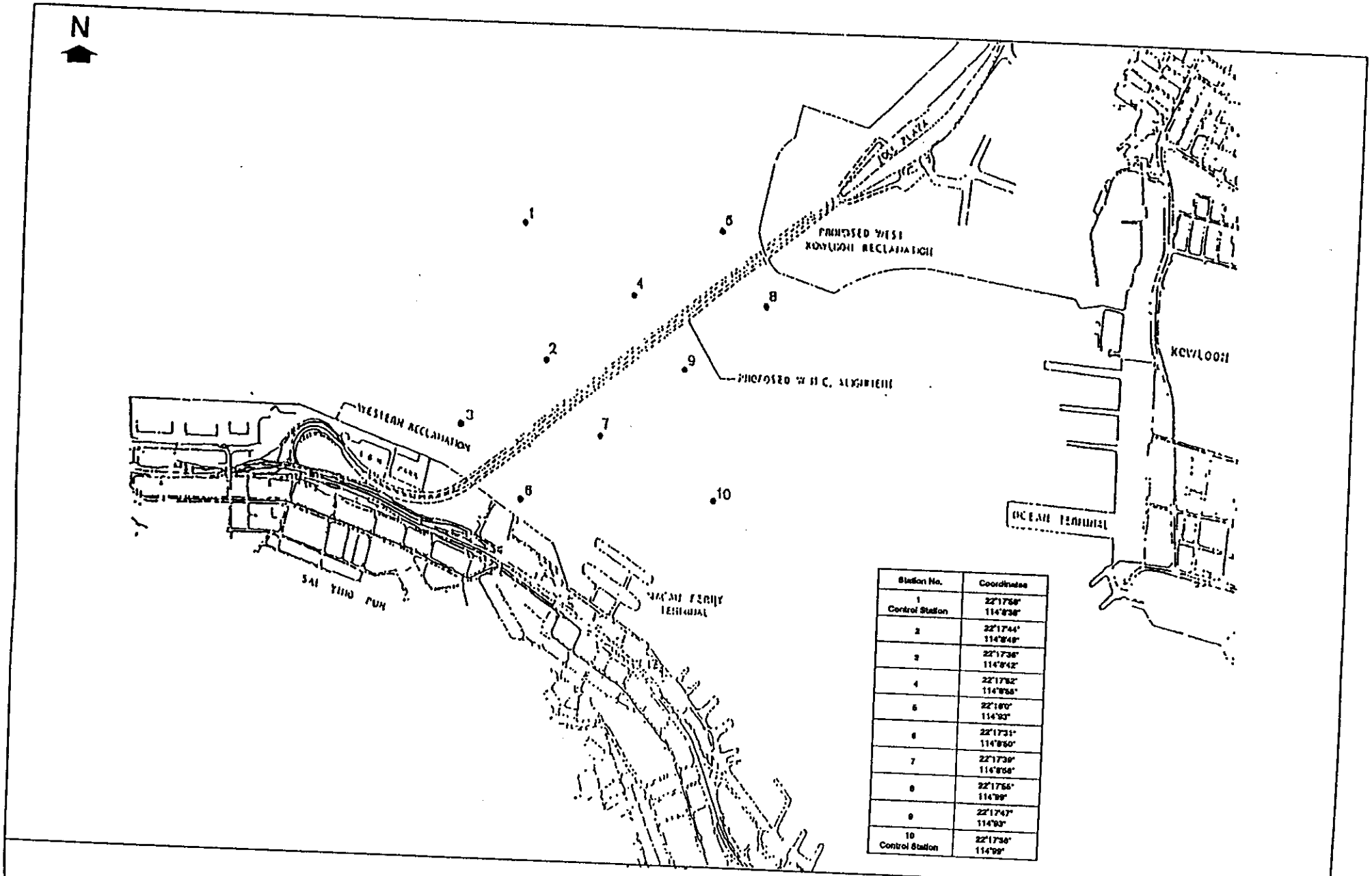
Figure J 11




| Station No. | Coordinates |
|---|---|
| 1 Control Station | 22°17'58" 114°8'38" |
| 2 | 22°17'44" 114°8'48" |
| 3 | 22°17'36" 114°8'42" |
| 4 | 22°17'52" 114°8'58" |
| 5 | 22°18'0" 114°9'3" |
| 6 | 22°17'31" 114°8'50" |
| 7 | 22°17'39" 114°8'56" |
| 8 | 22°17'55" 114°9'9" |
| 9 | 22°17'47" 114°9'3" |
| 10 Control Station | 22°17'36" 114°9'9" |

Water Quality Monitoring Stations
(Sai Ying Pun and Victoria Harbour)

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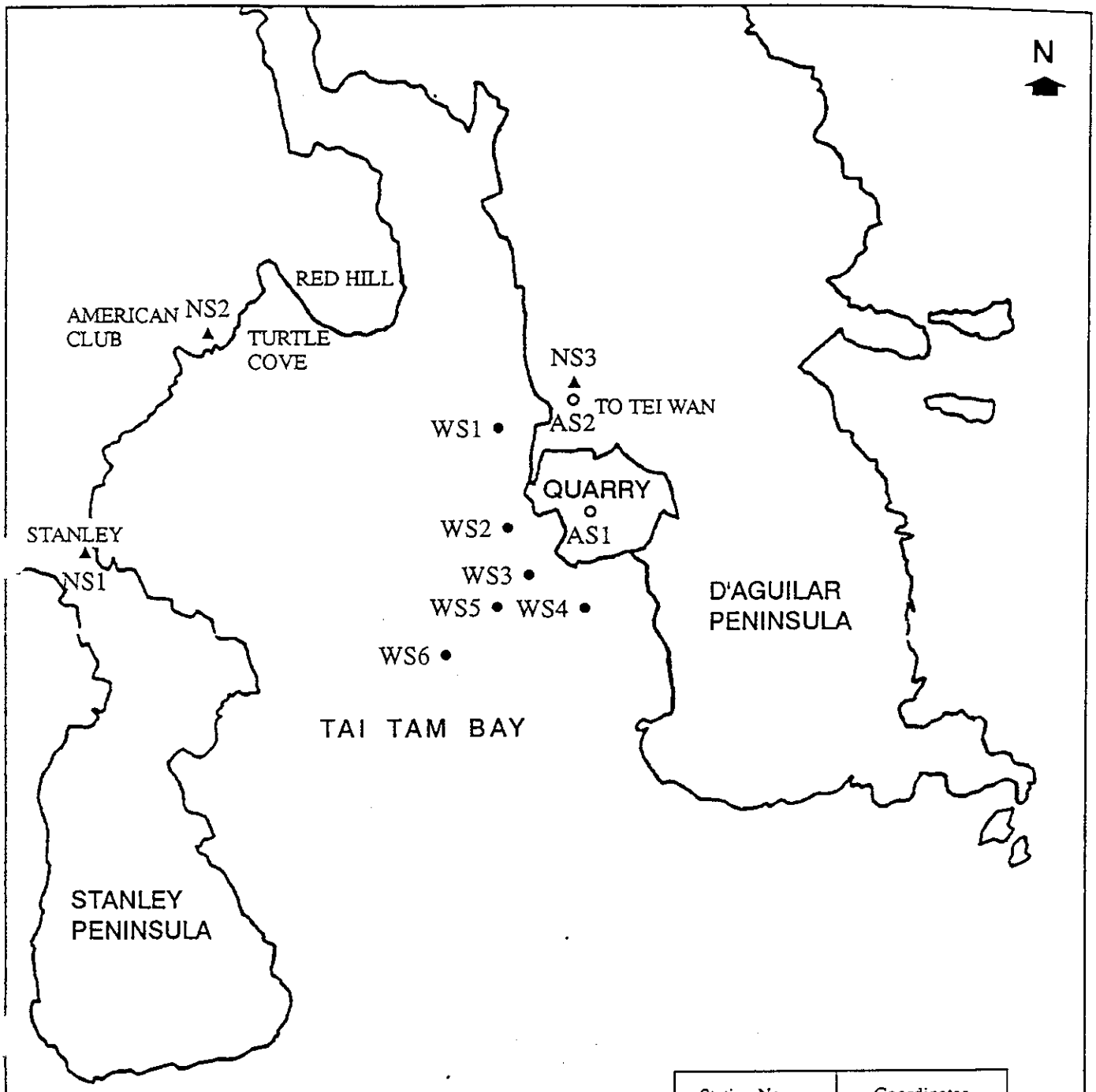
Figure J 12




| Station No. | Coordinates |
|---|---|
| WS1 | 22°13'34 N 114°13'59 E |
| WS2 | 22°13'27 N 114°13'57 E |
| WS3 | 22°13'15 N 114°13'55 E |
| WS4 | 22°13'11 N 114°14'04 E |
| WS5 | 22°13'09 N 114°13'53 E |
| WS6 (Control Station) | 22°12'58 N 114°13'46 E |

| | |
|---|---|
| AS1 | Air Monitoring Station at Shek O Quarry |
| AS2 | Air Monitoring Station at To Tei Wan |
| NS1 | Noise Monitoring Station at Stanley Beach (Day-time/Evening) |
| NS2 | Noise Monitoring Station at American Club (Day-time/Evening) |
| NS3 | Noise Monitoring Station at To Tei Wan (Day-time/Evening) |
| WS1 - WS5 | Water Monitoring Stations (Compliance) |
| WS6 | Water Monitoring Station (Control) |

Figure 2.3 Air, Noise and Water Monitoring Stations at Shek O Quarry Casting Basin

Appendix J1

Implementation status of EIA recommendations for WHC (Sai Ying Pun)

| Key measures required | Key measures required | Action taken |
|---|---|---|
| Water | Water | Water |
| It is noted from our recent site visit that most of the key mitigation measures, which include employing sealed grabs for mechanical dredging and storing fuel and paint in properly secured containers, have been/are being properly implemented. | The only outstanding measures is that there is no provision of sediment traps/facilities to treat the drainage water on site. | It is intended to request NKJV to provide the sediment traps/facilities as soon as possible. Would k.i.v. on this. |
| Air | Air | Air |
| Nil | It is noted from our recent site visit that most of the key air mitigation measures have not been properly implemented and these include :<br>· providing effective water sprays;<br>· paving of frequently used site roads;<br>· providing wheel washing facilities. | Considering that these outstanding measures are significant, it is intended to urge NKJV to provide these measures as soon as possible. |
| Noise | | |
| The key noise mitigation measures, which include employing silenced plant and equipment and observing requirements in Construction Noise Permits where necessary, have been/are being properly implemented. | | |

Appendix J2

Implementation status of EIA recommendations for WHC (Shek O Quary Casting Basin)

| Key measures required | Key measures required | Action taken |
|---|---|---|
| Water | Water | Water |
| The key water mitigation measures, which include employing sealed grabs for mechanical dredging and treating sewage off-site, have been/are being properly implemented. | However, in view of the frequent exceedances of the SS target Level (caused by the effluent discharge from the sedimentation tank), it is considered that additional measures are needed to rectify the problem. | NKJV was requested on 17.11.94, 5.1.94 and 29.12.94 respectively to provide additional mitigation measures to reduce the SS level to be acceptable. |
| Air | | |
| The key air mitigation measures, which include providing effective water sprays at vehicle loading points and watering site roads on a regular basis, have been/are being properly implemented. | | |
| Noise | | |
| No noise mitigation measures is considered necessary for the project. | | |

I.D. NO. TAB