

Maeda Corporation

**Castle Peak Road
Improvement Between
Sham Tseng and Ka
Loon Tsuen,
Tsuen Wan
West Contract No.
HY/99/18**

Monthly Environmental
Monitoring and Audit
Report
May 2004

First Issue

Maeda Corporation

**West Contract No. HY/99/18
Castle Peak Road Improvement Between
Sham Tseng and Ka Loon Tsuen, Tsuen Wan**

Environmental Monitoring and Audit

Monthly Environmental Monitoring and Audit Report – May 2004

June 2004

Ove Arup & Partners Hong Kong Ltd

Level 5, Festival Walk, 80 Tat Chee Avenue, Kowloon Tong, Kowloon, Hong Kong

Tel +852 2528 3031 Fax +852 2268 3950

www.arup.com

Job number 23437



安誠工程顧問有限公司

香港灣仔
皇后大道東183號
合和中心47樓

電話: (852) 2911 2233

圖文傳真: (852) 2805 5028

電子郵件: hyder@hyder.com.hk

網址: www.hyderconsulting.com

Hyder Consulting Limited

47/F Hopewell Centre,
183 Queen's Road East,
Wan Chai, Hong Kong

Tel : (852) 2911 2233

Fax : (852) 2805 5028

Email: hyder@hyder.com.hk

Website: www.hyderconsulting.com

Hyder Consulting Limited is incorporated in Hong Kong with limited liability.
COI Number 126012

11 June 2004

BY POST & FAX (2268-3950)Ove Arup & Partners Hong Kong Ltd.
Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
KowloonYour
Ref:Our 910-06/E04-45291
Ref:

For attention of: Mr. Sam Tsoi

Dear Mr. Tsoi

Contract HY/99/18 West Contract
Castle Peak Road Improvement between Sham Tseng and Ka Loon Tsuen, Tsuen Wan
Monthly EM&A Report (May 2004)

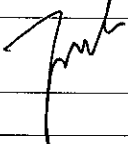

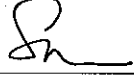
We refer to the electronic version of the captioned report submitted by your Ms. Sherry Tsang via e-mail on 7 June 2004 and subsequent submission. We have no further comment and endorse the report.

Please do not hesitate to contact the undersigned on 2911-2719 if you wish to discuss any further issues.

Yours sincerely

Coleman Ng
Project Manager
HYDER CONSULTING LIMITEDcc MHJV Attention: Mr. Jeff Yu (Fax: 2417-0134)
Maeda Attention: Mr. Derek Elliott (Fax: 2491-9678)CN/TKF
0

Job title	West Contract No. HY/99/18 Castle Peak Road Improvement Between Sham Tseng and Ka Loon Tsuen, Tsuen Wan			Job number	23437
Document title	Environmental Monitoring and Audit			File reference	
Document ref	23437-41				

Revision	Date	Filename	G:\env\project\23437\reports\Monthly\2004-05\41-May-04-RevA.doc		
First Issue	07/05/04	Description	Issue to IEC for comments		
			Prepared by	Checked by	Approved by
		Name	Fredrick Leong	Sam Tsoi	Sam Tsoi
		Signature			
Second Issue	14/05/04	Filename	G:\env\project\23437\reports\Monthly\2004-05\41-May-04-RevA.doc		
		Description	Issue to EPD with IEC's verification		
			Prepared by	Checked by	Approved by
		Name	Fredrick Leong	Sam Tsoi	Sam Tsoi
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document

©Ove Arup Partnership Ltd F8.5
QA Rev 1/00 1 December 2000

CONTENTS

	Page
EXECUTIVE SUMMARY	1
1. INTRODUCTION	4
1.1 Project Background	4
1.2 Designated Project	5
1.3 Impact EM&A Requirements	5
1.4 Purpose of the Report	5
2. ENVIRONMENTAL STATUS	7
2.1 Construction Programme	7
2.2 Construction Activities of the Month	7
3. SUMMARY OF EM&A REQUIREMENTS	8
3.1 Air Quality Monitoring	8
3.2 Construction Noise Monitoring	9
3.3 Water Quality (Designated Project)	11
3.4 Landscape and Visual Monitoring and Audit	16
3.5 Performance Limits and Event-Action Plans	16
3.6 Site Inspection and Environmental Complaint Handling	26
4. AIR QUALITY	29
4.1 Monitoring Parameters and Equipment	29
4.2 Methodology	29
4.3 Results and Observations	32
5. NOISE	35
5.1 Monitoring Equipment	35
5.2 Methodology	35
5.3 Results and Observations	36
6. WATER QUALITY (DESIGNATED PROJECT)	38
6.1 Water Quality Equipment	38
6.2 Methodology	38
6.3 Suspension of Marine Monitoring	40
7. LANDSCAPE AND VISUAL MONITORING AND AUDIT	41
7.1 Summary of Inspection – 13 May 2004	41
7.2 Summary of Inspection – 27 May 2004	42
7.3 Tree Transplanting Survival Rate	43
7.4 Audit Schedule	43
8. SITE INSPECTION, WASTE DISPOSAL, ENVIRONMENTAL COMPLAINTS, ENVIRONMENTAL LICENSES AND NON-COMPLIANCE RECORDS	44
8.1 Site Audit Results	44
8.2 Waste Disposal	44
8.3 Complaint Record	45
8.4 Non-compliances	45
8.5 Notification of Summons and Successful Prosecution	45
8.6 Environmental Licenses	46
9. REFERENCES	47

TABLES

Table 3-1	TSP monitoring parameters and frequency
Table 3-2	Air quality monitoring locations
Table 3-3	Construction noise monitoring parameters and frequency
Table 3-4	Construction noise monitoring locations
Table 3-5a	Water quality monitoring locations (Original)
Table 3-5b	Water quality monitoring locations (New)
Table 3-6	Action and Limit Level for air quality
Table 3-7	Event/Action plan for air quality
Table 3-8	Action and Limit Levels for construction noise
Table 3-9	Event/Action plan for construction noise
Table 3-10	Action and Limit Levels of water quality
Table 3-11	Event/Action plan for water quality
Table 3-12	Event/Action plan for landscape and visual impact
Table 4-1	Equipment list for air quality monitoring
Table 4-2	Calibration dates of 1-hour TSP monitoring equipment
Table 5-1	Equipment list for construction noise monitoring
Table 6-1	Water quality monitoring equipment
Table 8-1	Summary of environmental concerns identified in the site audits in May 2004
Table 8-2	Waste disposal quantity in May 2004
Table 8-3	Cumulative statistics on environmental complaints
Table 8-4	Summary of valid environmental licenses in May 2004

FIGURES

Figure 1-1	Site location plan
Figure 3-1a	Monitoring locations
Figure 3-1b	Monitoring locations
Figure 3-1c	Monitoring locations
Figure 3-1d	Monitoring locations
Figure 3-1d	Monitoring locations
Figure 3-1e	Monitoring locations
Figure 3-2	Flow chart of the complaint response procedure
Figure 4-1	Graphical presentation of 1-hour TSP levels for May 2004
Figure 4-2	Graphical presentation of 24-hour TSP levels for May 2004
Figure 5-1	Graphical presentation of daytime noise levels for May 2004

APPENDICES

APPENDIX A

Detailed site layout plans

APPENDIX B

Construction programme

APPENDIX C

Monitoring schedule for May 2004 and June 2004

APPENDIX D

Calibration certificates of 24-hour TSP monitoring equipment

APPENDIX E

Calibration certificates of 1-hour TSP monitoring equipment

APPENDIX F

Detailed air quality (1-hour TSP) monitoring results

APPENDIX G

Investigation report on breakdown of HVS at WA6

APPENDIX H

Detailed air quality (24-hour TSP) monitoring results

APPENDIX I

Detailed wind monitoring data for the air quality monitoring period

APPENDIX J

Calibration certificates of noise monitoring equipment

APPENDIX K

Detailed noise monitoring results

APPENDIX L

Details of Suspension of Marine Water Monitoring

APPENDIX M

Landscape and visual monitoring and audit report

APPENDIX N

Log record on environmental complaints

ABBREVIATIONS AND ACTONYMS

A/L	Action or Limit Levels
AQO	Air Quality Objectives
Arup	Ove Arup & Partners Hong Kong Limited
ASR	Area Sensitive Rating
BOD	Biochemical Oxygen Demand
B&K	Brüel & Kjær
CFM	Cubic Feet per Minute
CNP	Construction Noise Permit
CT	Contractor
C&D	Construction & Demolition
DO	Dissolved Oxygen
DGPS	Differential Global Positioning System
EA	Environmental Auditor
EIA	Environmental Impact Assessment
EM&A	Environmental Monitoring and Audit
EP	Environmental Permit
EPD	Environmental Protection Department
ER	Engineer / Engineer's Representative
ET	Environmental Team
HKPSG	Hong Kong Planning Standards and Guidelines
HKSAR	Hong Kong Special Administrative Region
HOKLAS	The Hong Kong Laboratory accreditation Scheme
HVS	High Volume Sampler
IC(E)	Independent Checker (Environment)
IEC	International Electrotechnical Commission Publications
K	Degrees Kelvin
MC	Maeda Corporation
MHJV	Mouchel Halcrow Joint Venture
NAMAS	National Measurement accreditation Service
NTU	Nephelometric Turbidity Unit
NSR	Noise Sensitive Receiver
SCFM	Standard Cubic Feet per Minute
SS	Suspended Solids
TSP	Total Suspended Particulates
Tby	Turbidity

EXECUTIVE SUMMARY

This is the twenty-eighth monthly environmental monitoring and audit (EM&A) report presenting the progress of environmental monitoring and audit works for the period between 1 May 2004 and 31 May 2004. Monitoring works included air quality monitoring and noise monitoring. Air quality was recorded in terms of 1-hour Total Suspended Particulates (TSP) and 24-hour TSP. Noise was measured in terms of $L_{eq(30min)}$ with L_{10} and L_{90} measurements as references. Audit works included the weekly environmental audit and the bi-weekly landscape and visual monitoring and audit.

Air Quality

A total of 5 sets of 3 consecutive 1-hour TSP measurements had been taken during the reporting month. The highest 1-hour TSP level was $329.0\mu g/m^3$ recorded at Hong Kong Garden between Block 1 and 2 (WA4) on 4 May 2004 while the lowest 1-hour TSP level was $30.9\mu g/m^3$ recorded at Podium of Sea Crest Villa Phase 4 Block 12 (WA7) on 12 May 2004. There was no exceedance of the Action and Limit (A/L) Levels during the monitoring period.

A total of 6 sets of 24-hours TSP measurement had been taken during the reporting month. The highest 24-hour TSP level was $157.2\mu g/m^3$ recorded at Tsing Lung Tau Tin Hau Temple (WA6) on 7 May 2004 while the lowest 24-hour TSP level was $34.5\mu g/m^3$ recorded at Carpark of Sea Crest Villa Phase 2 Block 6 (WA9) on 13 May 2004. There was no exceedance of the Action and Limit (A/L) Levels during the monitoring period.

The HVS at WA6 was broken down since 13 May 2004. After a thorough maintenance check by the supplier, it was found that an integral part of the HVS need to be replaced, such part would be available in early June 2004. As such, the 24-hour TSP monitoring was suspended until replacement. Moreover, it was confirmed by ET's site inspection and the monitoring team that there was no abnormal construction activity near WA6 and the construction activities were similar to the past several months (i.e. mainly reinforced concreting works for superstructure construction). Based on the available historical data of WA6 from February to April, only one exceedance was recorded at WA6 which was caused by intensive burning of incense and candle at WA6 rather than the construction activities. Since there was no exceedance of the A/L Levels during the monitoring period at all other monitoring stations, it was predicted that the 24-hour TSP level would also be complied with the A/L Levels.

Noise

A total of 4 sets of daytime (0700 – 1900 hours) noise monitoring had been taken during the reporting month. The highest noise level was 72dB(A) recorded at Car Park at Sea Crest Villa Phase 2 Block 6 (WN14) on 25 May 2004 while the lowest noise level was 59dB(A) recorded at Podium of Sea Crest Villa Phase 3 Block 8 (WN13) on 25 May 2004. There was no exceedance of the A/L Levels during the monitoring period.

Marine Water Quality

As reported by the Contractor, major sea works at level below +2.5mPD had been completed in July 2003. The proposal on suspension of marine monitoring was submitted to IC(E), HyD, EPD

and AFCD for comments on 25 September 2003. It was confirmed with IC(E) and AFCD that suspension of marine monitoring was acceptable if there is no “active” marine work being carried out. In future, if there is any marine work on or below +2.5mPD, the Contractor shall notify the relevant parties one month in advance and resume the marine monitoring. Subsequently, as instructed by the Contractor/ HyD, the marine monitoring was suspended since 10 October 2003. Since then, there was neither instruction from RE/Contractor on further marine monitoring nor additional information on marine reclamation works.

Environmental Auditing

A total of 4 environmental site audits had been carried out on a weekly basis in May 2004. The major environmental concerns included the following issues:

- **Water quality:** provision of wheel washing facilities and cleaning of mud trails.
- **Air quality:** watering of unpaved/public roads and dusty activities and covering of exposed slopes.
- **Construction Noise:** no significant noise impact.
- **Handling of waste and chemicals:** clearing and proper disposal of wastes.

Landscape and Visual

A total of 2 landscape and visual monitoring and audits had been carried out on a biweekly basis in May 2004. The Registered Landscape Architect had recommended as follows:

- To clear away all scattered litter and garbage as found on site, and keep the site in a tidy condition at all times.
- To re-hydroseed all the patchy surface areas at Slope No.8. However, it was advised by the Contractor that the hydroseeding bald patches were conforming design issues and beyond the scope of the Contractor's control. Nonetheless, the Contractor had presented alternative method proposals to the Engineer previously for comments.
- To carry out watering of the site more frequent to prevent dust nuisance during the dry season.

Waste Disposal

A total of 100 loads of Construction & Demolition (C&D) waste materials and a total of 1,483 loads of C&D fill materials (Public Fill) had been disposed of at WENT Landfills and at Public Filling Area in Tuen Mun respectively in May 2004. No chemical waste was disposed of in May 2004.

Complaint Records

There was no complaint received in May 2004.

Non-compliances

There was no non-compliance for air quality and noise monitoring during the monitoring period in May 2004.

Notification of Summons and Successful Prosecution

There was neither notification of summons nor prosecution received during the reporting month.

Environmental Licenses

There was no new environmental license granted in the reporting month.

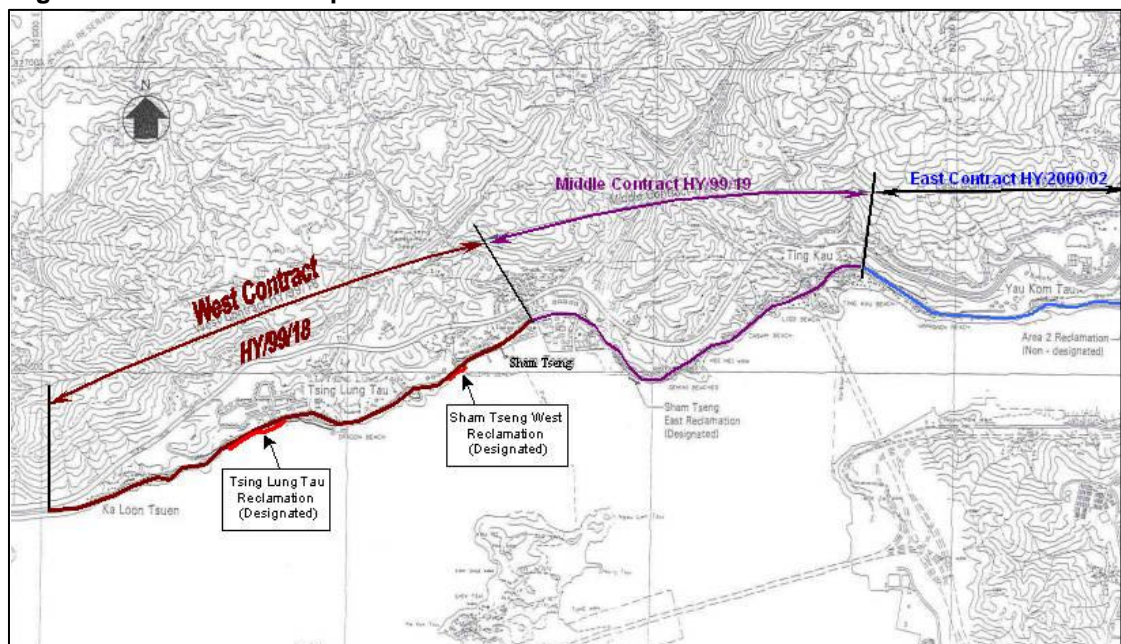
1. INTRODUCTION

Ove Arup & Partners Hong Kong Limited (Arup) was appointed by the Contractor - Maeda Corporation (MC) as the Environmental Team (ET) for *Contract No. HY/99/18 Castle Peak Road Improvements between Sham Tseng and Ka Loon Tsuen, Tsuen Wan* (hereafter called the “Project”). Environmental parameters including air quality, construction noise, water quality and landscape & visual issues were selected for impact monitoring for the Project. The major construction period of the Project are anticipated as 36 months from December 2001 to November 2004.

1.1 Project Background

The Castle Peak Road improvements works consists of upgrading the existing Castle Peak Road to provide a dual two-lane carriageway of “Rural Road A” classification between Area 2, Tsuen Wan and Ka Loon Tsuen, and all associated utility, junction and pedestrian facilities. The Castle Peak Improvement project is divided into three contracts. This Environmental Monitoring and Audit (EM&A) exercise only concerns the West Contract No. HY/99/18 between Sham Tseng and Ka Loon Tsuen, Tsuen Wan. Figure 1-1 shows the site location plan and the detailed site layout plans are provided in Appendix A.

Figure 1-1 Site location plan



The scope of the construction work includes:

- Improvement to Castle Peak Road between Area 2 and Ka Loon Tsuen, Tsuen Wan to a dual two-lane carriageway;
- Provision of pedestrian facilities in the form of footpaths, subways, footbridges and Crossings;
- Road junction and signal design and the re-provision of access roads and connections to existing road networks;
- Construction of associated drainage and landscaping works;
- Environmental mitigation measures;
- Design and construction of watermains;
- Construction of entrusted sewerage works; and
- Dredging and reclamation (designated project – see also Section 1.2)

1.2 Designated Project

The marine reclamation and the construction of the associated seawall at Tsing Lung Tau and Sham Tseng West within Contract No. HY/99/18 had been classified as designated projects under the Environmental Permits No. EP-093/2001 and EP-094/2001 respectively.

1.3 Impact EM&A Requirements

The impact environmental monitoring and audit included air quality monitoring (both 1-hour and 24-hour TSP), noise, water quality, landscape and visual monitoring, and environmental audit.

1.4 Purpose of the Report

The purpose of the monthly EM&A report is to provide the information on monitoring methodology, monitoring results, environmental permit status, site audit findings, recommendations and conclusions.

This is the twenty-eighth monthly EM&A report prepared by Arup for the submission to Maeda Corporation summarising the monitoring methodology, locations, periods, frequencies, results and any observation from the air quality, noise, marine water quality, and landscape and visual monitoring and audit from 1 May to 31 May 2004.

2. ENVIRONMENTAL STATUS

2.1 Construction Programme

The construction work was commenced in February 2002. An up-to-date construction programme is given in Appendix B.

2.2 Construction Activities of the Month

The major construction activities carried out by the Contractor (CT) in May 2004 included:

- Slope formation by rock breaking, rock drilling and chemical blasting at Slope No. 1;
- Installation of retaining walls and filling of sub-base at RW-B and RW-13;
- Shotcrete the exposed slope surface and construction of drainage system at BPRW60;
- Construction of bored pile wall for BPRW03;
- Reprovisioning of LCSD & FEHD facilities;
- Dragon Garden Accommodation Work;
- Construction of footbridges FB01 & FB02;
- Construction of noise barriers NM02, NM03 & NM04;
- Construction of outfalls; and
- Construction of retaining wall RW74 and RW01.

The major sea works at level below +2.5mPD had been completed in July 2003.

3. SUMMARY OF EM&A REQUIREMENTS

Air quality, construction noise, marine water quality and landscape issues are significant environmental impacts identified for the construction period of the project. In accordance with the Project specific EM&A Manual^[1], air quality, noise, water quality, landscape and visual monitoring and audit shall be performed by an ET at all specified monitoring locations during the construction and operational stages. As instructed by the Contractor, the marine monitoring was suspended since 10 October 2003 as the major sea works at level below +2.5mPD had been completed in July 2003. Since then, there was neither instruction from RE/Contractor on further marine monitoring nor additional information on marine reclamation works.

The monitoring schedule for May 2004 and the tentative schedule for June 2004 are attached in Appendix C.

3.1 Air Quality Monitoring

3.1.1 Monitoring Parameters

Air monitoring was measured in terms of the TSP levels for both 24-hour and 1-hour periods.

3.1.2 Monitoring Frequency

24-hour TSP and 1-hour TSP levels were monitored during the course of construction in accordance with the EM&A Manual. The monitoring parameters and frequency are specified in Table 3-1.

Table 3-1 TSP monitoring parameters and frequency

Parameters	Monitoring Frequency	Time Period	No. of measurement for each monitoring
24-hour TSP	Once every six days	0000 – 2400	1
1-hour TSP	Three times per every six days	0700 – 1900	1

3.1.3 Monitoring Locations

A total of eleven locations had been specified for the air quality monitoring and they are given in Table 3-2 and presented in Figures 3-1a to 3-1d.

Table 3-2 Air quality monitoring locations

Air Monitoring Station No.	Location	Location description
WA1	Bayside Villas	G/F, Bayside Villas (Temporary Suspended)
WA2	Grand Bay Villas	G/F, Grand Bay Villas (Temporary Suspended)
WA3	Hong Kong Garden	G/F, Hong Kong Garden (Regent Heights)
WA4	Hong Kong Garden	G/F, Hong Kong Garden (Between Blk 1 & 2)
WA5	Hong Kong Garden	G/F, Hong Kong Garden (Block 4)
WA6	Tsing Lung Tau Tin Hau Temple	G/F, Tsing Lung Tau Tin Hau Temple
WA7	Sea Crest Villa	Podium, Sea Crest Villa (Phase 4 Block 12)
WA8	Sea Crest Villa	Podium, Sea Crest Villa (Phase 3 Block 8)
WA9	Sea Crest Villa	Car Park (L3), Sea Crest Villa (Phase 2 Block 6)
WA10	Sea Crest Villa	Podium, Sea Crest Villa (Phase 1 Block 1)
WA11	Lido Garden	G/F, Carpark, Lido Garden Tower 1

Note: Bayside Villas (WA1) and Grand Bay Villas (WA2) are no longer the air sensitive receivers as all residents of Bayside Villas and Grand Bay Villas had been evacuated since September 2002. Therefore, the air quality monitoring at Bayside Villas and Grand Bay Villas were temporary suspended since October 2002 after approval from IC(E) and EPD.

3.1.4 Wind Monitoring

Wind monitoring data, which included the wind speed and wind directions are extracted from Hong Kong Observatory – Tsing Yi Wind Monitoring Station.

3.2 Construction Noise Monitoring

3.2.1 Monitoring Parameters

Construction noise monitoring was measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). L_{10} and L_{90} will also be recorded as supplementary reference information for data auditing.

3.2.2 Monitoring Frequency

Construction noise measurements were required to be taken on a weekly basis in accordance with the EM&A Manual. The monitoring time periods, monitoring parameters and frequency are specified in Table 3-3.

Table 3-3 Construction noise monitoring parameters and frequency

Time Period (when construction activity is found)	Parameters	Monitoring Frequency	No. of Measurements for Each Monitoring
Between 0700-1900 hours on normal weekdays	L _{eq} (30 min)	Once per week	1
Between 1900-2300 hours on normal weekdays	L _{eq} (5 min)*		3 (consecutive)
Between 2300-0700 hours of next day			
Between 0700-1900 hours on holidays			

Remarks: * The $L_{eq}(5 \text{ min})$ will only be measured if construction activities are conducted in holidays and between the period of 1900 and 0700 hours during normal weekdays.

3.2.3 Monitoring Locations

A total of sixteen noise monitoring locations had been specified. They are given in Table 3-4 and presented in Figures 3-1a to 3-1d. The measurements were taken at a position 1m from the exterior of building façade and at a position of 1.2m above ground.

Table 3-4 Construction noise monitoring locations

Noise Monitoring Station No.	Location	Monitoring Point
WN1	Ka Loon Tsuen	House No.3, Ka Loon Tsuen
WN2	Ka Loon Tsuen	House No.15, Ka Loon Tsuen
WN3	Bayside Villas	Upper G/F, Bayside Villas (Temporary Suspended)
WN4	Bayside Villas	Lower G/F, Bayside Villas (Temporary Suspended)
WN5	Grand Bay Villas	G/F, Grand Bay Villas (Temporary Suspended)
WN6	Hong Kong Garden	G/F, Hong Kong Garden (Regent Heights)
WN7	Hong Kong Garden	G/F, Hong Kong Garden (Between Blk 1 & 2)
WN8	Hong Kong Garden	G/F, Hong Kong Garden (Block 4)
WN9	Tsing Lung Tau Village	House 1, Tsing Lung Tau Village
WN10	Tsing Lung Tau Village	House 60-64, Tsing Lung Tau Village
WN11	Villa Alfavista	G/F, Villa Alfavista

Noise Monitoring Station No.	Location	Monitoring Point
WN12	Sea Crest Villa	Podium, Sea Crest Villa (Phase 4 Block 12)
WN13	Sea Crest Villa	Podium, Sea Crest Villa (Phase 3 Block 8)
WN14	Sea Crest Villa	Car Park (L3), Sea Crest Villa (Phase 2 Block 6)
WN15	Sea Crest Villa	Podium, Sea Crest Villa (Phase 1 Block 1)
WN16	Lido Garden	G/F, Carpark, Lido Garden Tower 1

Note: Bayside Villas (WN3 and WN4) and Grand Bay Villas (WN5) are no longer the noise sensitive receivers as all residents of Bayside Villas and Grand Bay Villas had been evacuated since September 2002. Therefore, the noise monitoring at Bayside Villas and Grand Bay Villas were temporary suspended since October 2002 after approval from IC(E) and EPD.

3.3 Water Quality (Designated Project)

3.3.1 Monitoring Parameters

Water quality monitoring includes Turbidity (Tby) in the unit of NTU, Dissolved Oxygen (DO) in the unit of mg/L and Suspended Solids (SS) in the unit of mg/L. In addition to the water quality parameters, other relevant data, such as monitoring location/position, time, water depth, water temperature, salinity, DO saturation, weather conditions, sea conditions, tidal stage will be recorded including any special phenomena, work underway at the construction site, etc.

3.3.2 Monitoring Frequency

Water quality monitoring during the impact stage was conducted three times per week, during mid-flood and mid-ebb tides and at sixteen designated sampling. The interval between two sets of monitoring will not be less than 36 hours except where exceedances above the Action Level or Limit Level were detected (see also Section 3.5). In these cases, the monitoring frequency will be increased.

3.3.3 Monitoring Locations

A total of sixteen locations, 9 for impact and 7 for control were originally selected for marine water quality monitoring and the locations are given in Table 3-5a and presented in Figure 3-1b to 3-1e.

The new marine water quality monitoring programme, was commenced on 12 February 2003 and suspended on 10 October 2003, as agreed by the IC(E) and EPD. A total of twelve locations, 8 for impact and 4 for control were selected for the new marine water quality monitoring programme and the locations are given in Table 3-5b and presented in Figure 3-1b to Figure 3-1e.

Table 3-5a Water quality monitoring locations (Original)

Water Monitoring Station No.		Location	
		Eastings	Northings
Tsing Lung Tau	WW1 (Impact Station)	822260	824491
	WR1 (Control Station)	822278	824459
Tsing Lung Tau	WW2 (Impact Station)	822352	824538
	WR2 (Control Station)	822363	824505
Tsing Lung Tau	WW3 (Impact Station)	822506	824609
	WR3 (Control Station)	822518	824578
Tsing Lung Tau	WW4 (Impact Station)	822820	824640
	WR4 (Control Station)	822800	824603
Angler's Beach: Sham Tseung	WW5 (Impact Station)	823697	824937
	WR5 (Control Station)	823700	824905
Angler's Beach: Sham Tseung	WW6 (Impact Station)	823775	824991
	WW7 (Impact Station)	823797	825042
	WR6/WR7 (Control Station)	823797	824964
Angler's Beach	WW8 (Impact station)	823994	825141
	WR8 (Control Station)	824006	825107
Ma Wan Fish Culture Zone	FCZ1 (Impact Station)	823500	823870

Table 3-5b Water quality monitoring locations (New)

Water Monitoring Station No.		Location	
		Eastings	Northings
Tsing Lung Tau	WW1 (Impact Station)	822306	824405
	WW2 (Impact Station)	822377	824462
	WW3 (Impact Station)	822529	824500
	WW4 (Impact Station)	822775	824560
	WR-E-1234 (Control Station for Mid-Ebb Tide)	822204	824312
	WR-F-1234 (Control Station for Mid-Flood Tide)	822850	824519
Angler's Beach: Sham Tseung West	WW5 (Impact Station)	823700	824905
	WW6/7 (Impact Station)	823797	824964
	WW8 (Impact Station)	823900	825023
	WR-E-5678 (Control Station for Mid-Ebb Tide)	823590	824830
	WR-F-5678 (Control Station for Mid-Flood Tide)	823994	825034
Ma Wan Fish Culture Zone	FCZ1 (Impact Station)	823500	823870

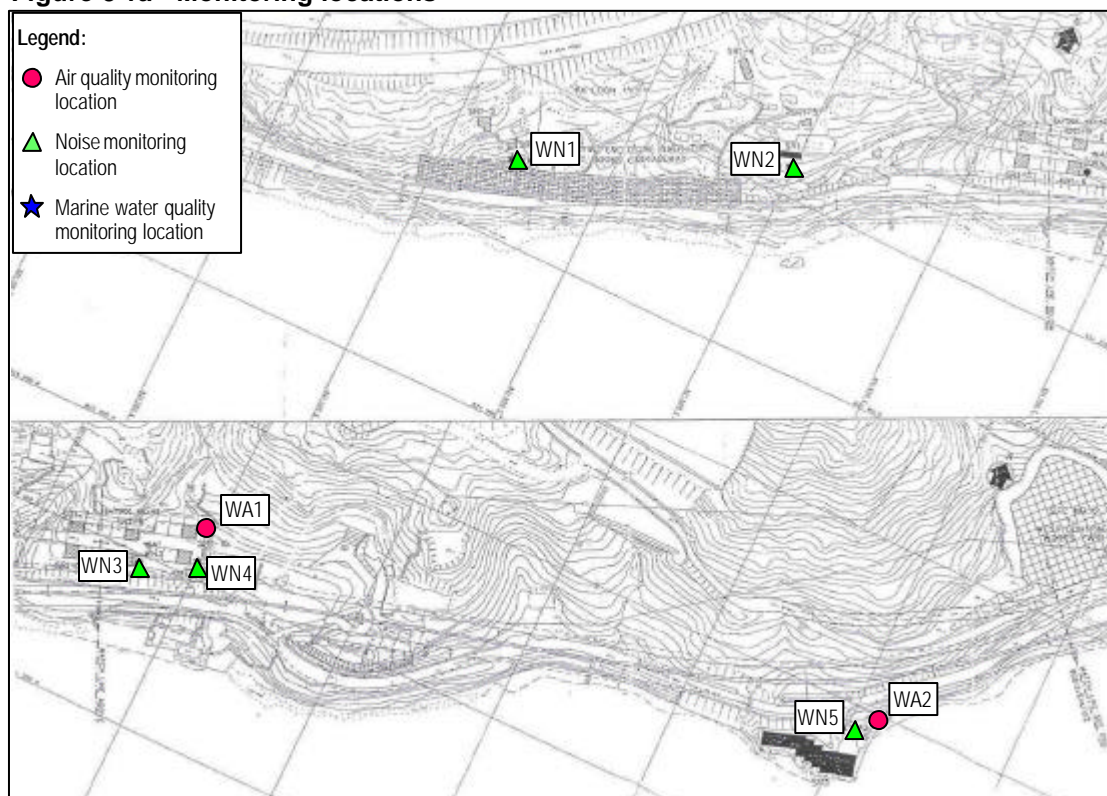
Figure 3-1a Monitoring locations

Figure 3-1b Monitoring locations

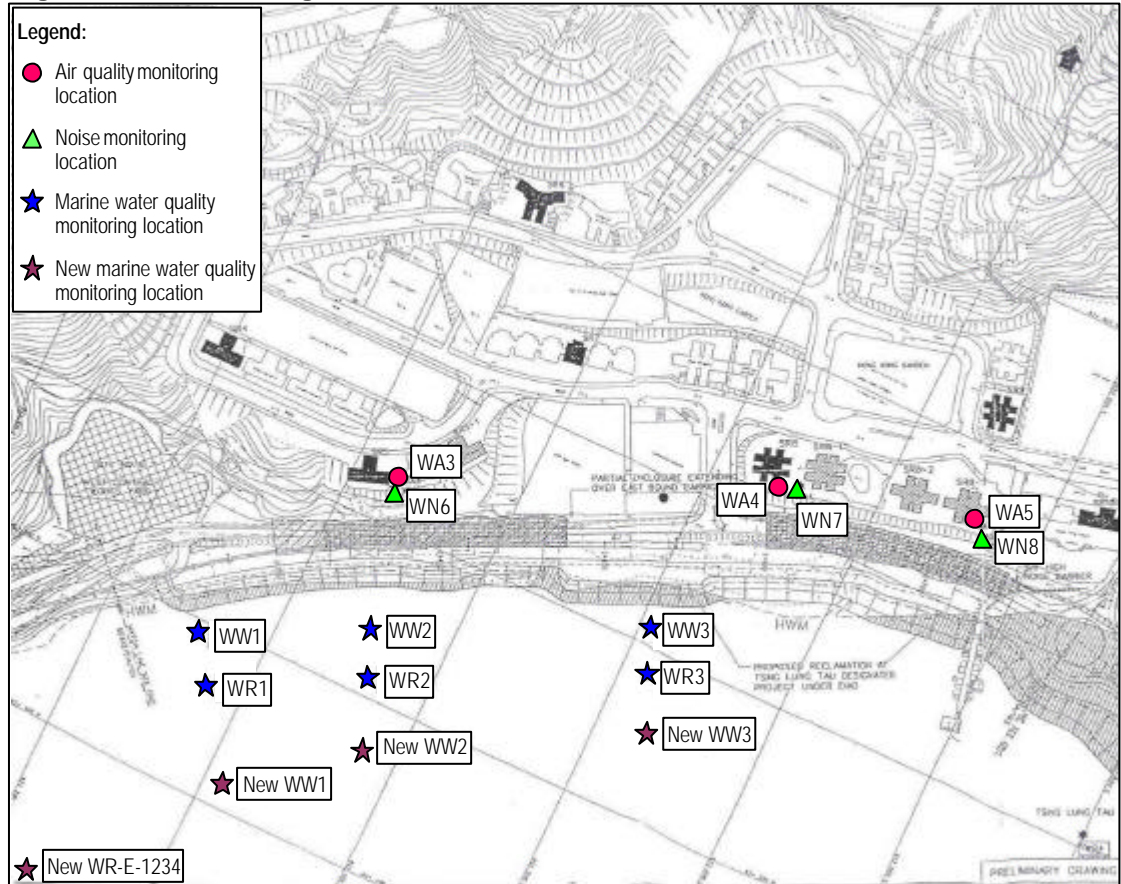


Figure 3-1c Monitoring locations

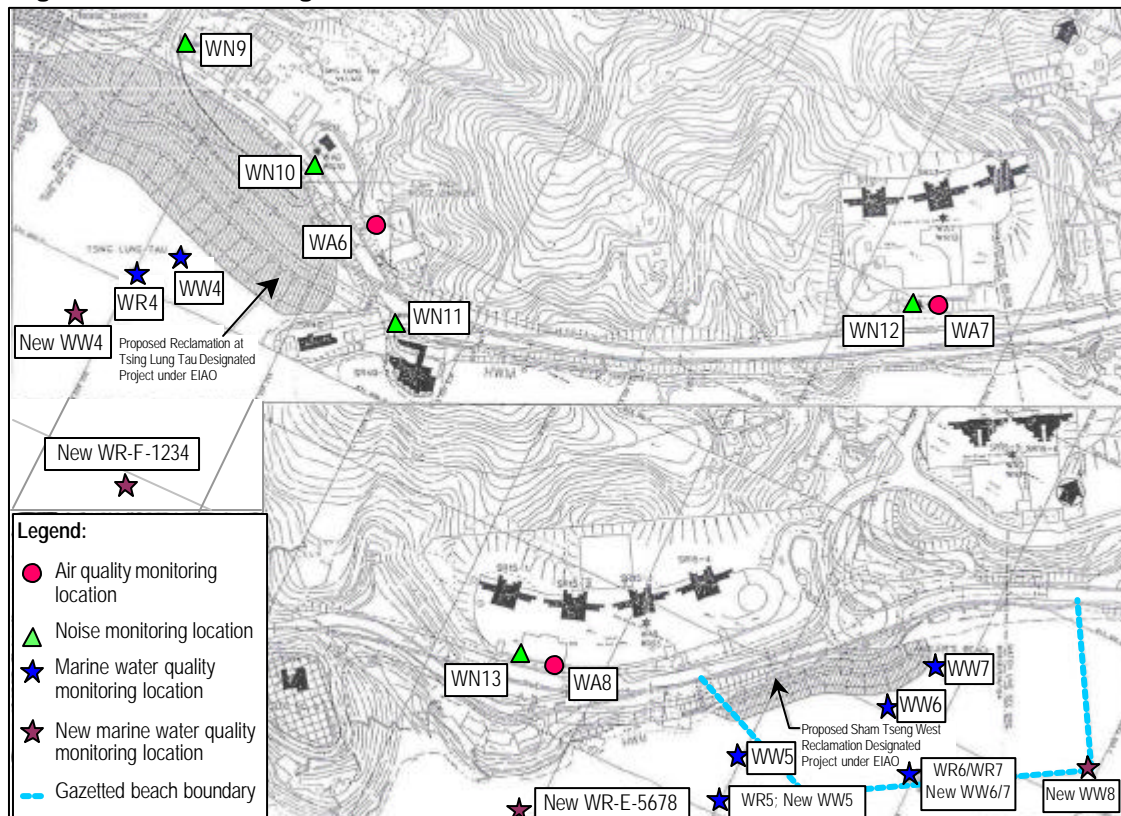
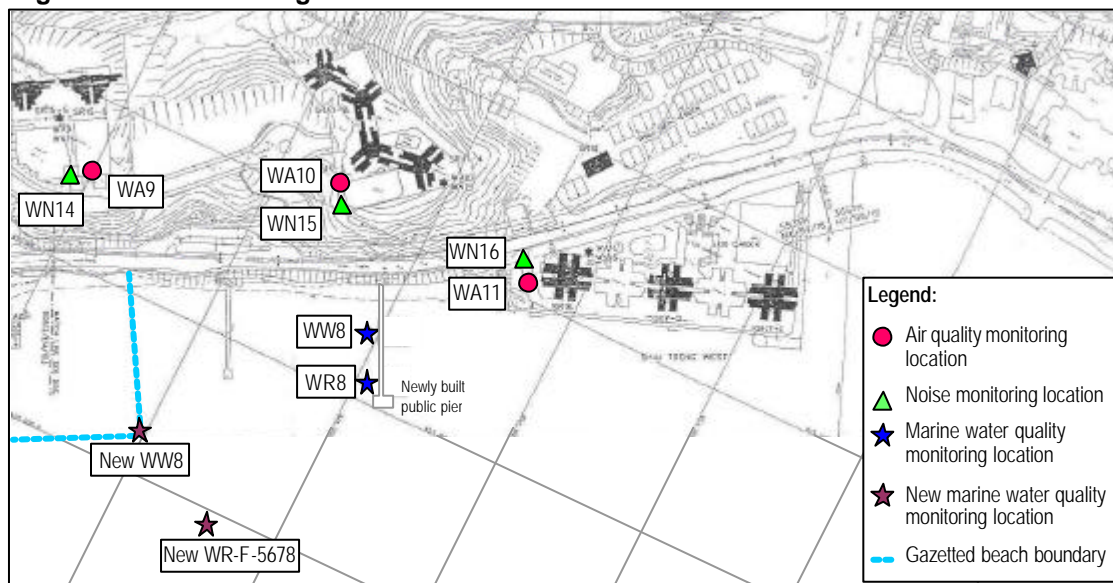
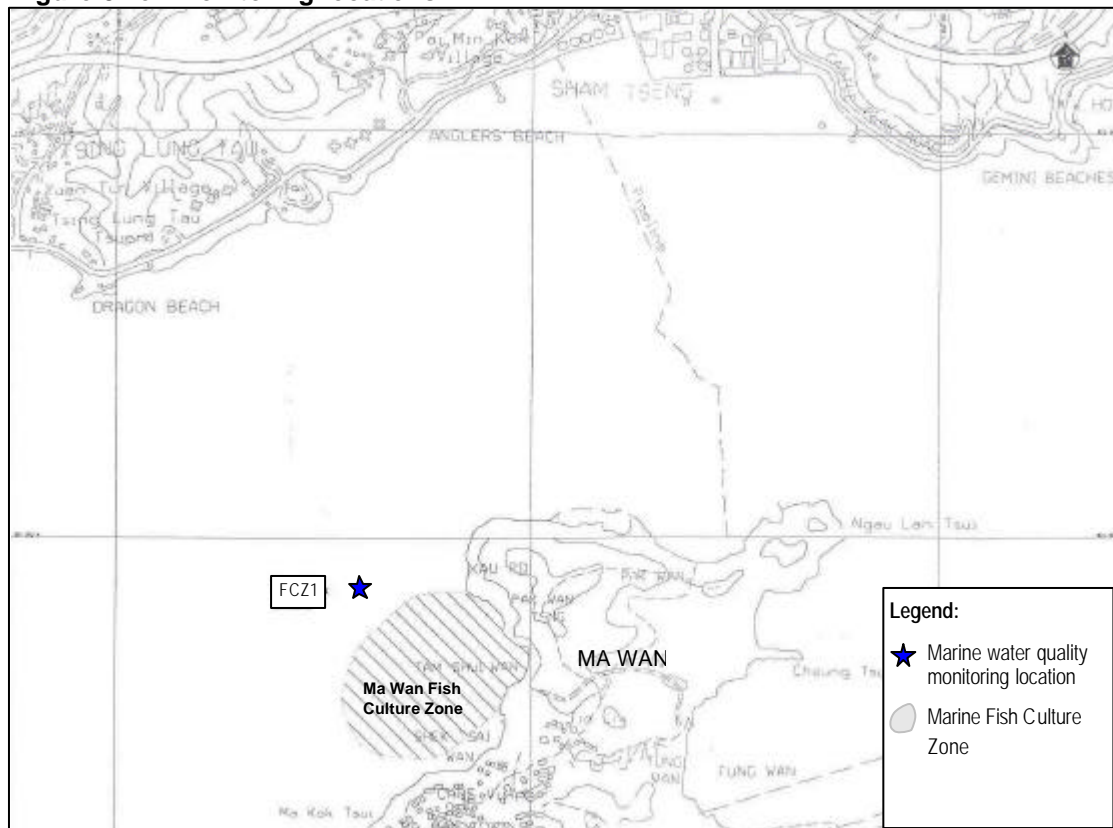


Figure 3-1d Monitoring locations**Figure 3-1e Monitoring locations**

3.4 Landscape and Visual Monitoring and Audit

3.4.1 Audit Parameters

All landscape and visual mitigation measures undertaken by both the CT and the Landscape Contractor during the construction phase and during the first year of the operational phase shall be audited by a Registered Landscape Architect, to ensure compliance with the intended aims of the mitigation measures.

3.4.2 Audit Frequency

The landscape and visual monitoring and audit shall be undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase.

3.4.3 Audit Location

The landscape and visual monitoring and audit shall be conducted throughout the entire site area.

3.5 Performance Limits and Event-Action Plans

The monitoring results shall be checked against appropriate standards and requirements. A two-tier system performance limits have been established in the Project specific EM&A Manual. The “Action Level” and the “Limit Level” (A/L) are established according to the EPD requirements. ET, ER, IC(E), and CT will take corresponding actions in accordance with the Event-Action Plans if the monitoring results exceed the performance limits.

3.5.1 Air Quality

The action and limit levels for air quality have been established during the baseline monitoring and are provided in Table 3-6.

Table 3-6 Action and Limit Level for air quality

Air Monitoring Station No.	1-hour TSP Level in $\mu\text{g}/\text{m}^3$		24-hour TSP Level in $\mu\text{g}/\text{m}^3$	
	Action Level	Limit Level	Action Level	Limit Level
WA1	350	500	187	260
WA2	362		192	
WA3	353		190	
WA4	362		187	
WA5	346		185	
WA6	362		204	
WA7	351		187	
WA8	347		188	
WA9	345		182	
WA10	352		183	
WA11	357		195	

Table 3-7 details the actions required to be carried out by different parties in case of an exceedance of performance limits being detected.

Table 3-7 Event/Action plan for air quality

Event	Action			
	ET Leader	IC(E)	ER	Contractor
Action Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the IC(E) and the ER. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by the ET Leader. 2. Check Contractor's working method.	1. Notify the Contractor.	1. Rectify any unacceptable practice. 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify the source. 2. Inform the IC(E) and the ER. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Discuss with the IC(E) and the Contractor on remedial actions required. 6. If exceedance continues, arrange meeting with the IC(E) and the ER. 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET Leader. 2. Check the Contractor's working method. 3. Discuss with the ET Leader and the Contractor on possible remedial measures. 4. Advise the ER on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial actions to IC(E) within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposal if appropriate.
Limit Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the ER and the EPD. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of Contractor's remedial actions and keep the IC(E), the EPD and the ER informed of the results.	1. Check monitoring data submitted by the ET Leader. 2. Check the Contractor's working method. 3. Discuss with the ET Leader and the Contractor on possible remedial measures. 4. Advise the ER on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify the IC(E), the ER, the EPD and the Contractor. 2. Identify the source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 6. Arrange meeting the IC(E) and the ER to discuss the remedial actions to be taken. 7. Assess effectiveness of the Contractor's remedial actions and keep the IC(E), the EPD and the ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst the ER, the ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. In consultation with the IC(E), agree with the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the ER until the exceedance is abated.

3.5.2 Construction Noise Impact

The action and limit levels for the construction noise extracted from the Baseline Monitoring Report^[2] are tabulated in Table 3-8.

Table 3-8 Action and Limit Levels for construction noise

Time Period	Action	Limit
0700 – 1900 hours on any day not being a Sunday or public holiday	When one documented complaint is received	75dB(A) ⁽¹⁾
19:00 – 23:00 hours on all days and 07:00 – 23:00 on general holidays (including Sundays)		55 ⁽²⁾ / 70 ⁽³⁾
23:00 – 07:00 hours on all days		40 ⁽²⁾ / 55 ⁽³⁾

Remarks:

- (1) For educational establishments the limit level shall be 70dB(A) and reduced to 65dB(A) during examination periods.
- (2) Refers to the types of Plant regulated under the Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM).
- (3) Refers to the types of Plant regulated under the Technical Memorandum on Noise Other than Percussive Piling (GW-TM).
- (4) Owing to the high background noise level recorded at WN5, WN9, and WN10, the noise impact monitoring results at these 3 locations will be corrected by its background using the following background correction equation: $L_{eq(30min)} = 10 \log (10^{m/10} - 10^{b/10})$ as $m = \text{Measured } L_{eq(30min)}$, $b = \text{Average Baseline } L_{eq(30min)}$. Only up to the maximum of 3dB(A) is allowed to be deducted after the background correction.

Table 3-9 details the actions required to be carried out by different parties in the case of an exceedance of performance limits being detected.

Table 3-9 Event/Action plan for construction noise

Event	Action			
	ET Leader	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify the IC(E) and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IC(E) and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation measures. 	<ol style="list-style-type: none"> 1. Review with analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implement of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IC(E). 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Notify the IC(E), the ER, the EPD and the Contractor. 2. Identify the source. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform the IC(E), the ER, and the EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of the contractor's remedial actions and keep the IC(E), the EPD and the ER informed of the results. 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst the ER, the ET Leader and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the ER until the exceedance is abated.

3.5.3 Water Quality (Designated Project)

The action and limit levels for the water quality have been established in accordance with the EM&A Manual and approved by EPD on 15 October 2002. EPD and IC(E) had agreed on 10 April 2003 to apply the “Direct Comparison” method for evaluation of the marine water quality exceedance. The A/L levels had been revised in April 2003 and are presented in Table 3-10.

Table 3-10 Action and Limit Levels of water quality

Parameters		Monitoring Location			
		WW1 to WW8		FCZ1	
		Action Level	Limit Level	Action Level	Limit Level
Mid-Ebb					
DO (mg/L)	Surface & Middle	4.9	4.8	4.7	4.6
	Bottom	4.8	4.8	4.0	4.0
SS (mg/L) (Depth-averaged)		17.0	23.4	For EPD: 12.9 For AFCD: 12.9 and 120% of upstream control station's SS at the same tide of the same day	For EPD: 14.0 For AFCD: 14.0 and 130% of upstream control station's SS at the same tide of the same day
Tby (NTU) (Depth-averaged)		12.0	13.6	For EPD: 9.1 For AFCD: 9.1 and 120% of upstream control station's Tby at the same tide of the same day	For EPD: 10.3 For AFCD: 10.3 and 130% of upstream control station's Tby at the same tide of the same day.
Mid-Flood					
DO (mg/L)	Surface & Middle	4.3	4.2	4.5	4.4
	Bottom	4.3	4.1	4.1	4.1
SS (mg/L) (Depth-averaged)		25.3	28.7	For EPD: 23.3 For AFCD: 23.3 and 120% of upstream control station's SS at the same tide of the same day	For EPD: 25.9 For AFCD: 25.9 and 130% of upstream control station's SS at the same tide of the same day
Tby (NTU) (Depth-averaged)		25.2	31.5	For EPD: 18.7 For AFCD: 18.7 and 120% of upstream control station's Tby at the same tide of the same day	For EPD: 22.3 For AFCD: 22.3 and 130% of upstream control station's Tby at the same tide of the same day.

Notes: “Depth-averaged” is calculated by taking the arithmetic means of reading of all three depths.
For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.

In order to better differentiate between exceedance caused by the contract works and elevated readings arising from causes unrelated to contract works, all parties had agreed to introduce a term “Reaching of Trigger Value” to represent the scenario

where the A/L levels were exceeded by the “Direct Comparison” evaluation method. Upon the detection of “Reaching of Trigger Value”, an initial analysis would be carried out to determine whether it was caused by contract works. Exceedance and non-compliance should only be recorded in case where the “Reaching of Trigger Value” was caused by the contract works.

Table 3-11 details the actions required to be carried out by different parties in the case of water quality exceedance of performance limits being detected. The revised Event/Action Plan for water quality has been endorsed by IC(E) in May 2003, and will be finalised subject to agreement with EPD.

Table 3-11 Event/Action plan for water quality

Event	Action			
	ET Leader	IC(E)	ER	Contractor
Trigger Value				
1. Trigger Value being surpassed for one sampling day	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings. Conduct investigation to identify the source(s) of impact. Check monitoring data, all plant, equipment, mitigation measures and the Contractor's working methods. Inform the IC(E), ER, EPD, HyD, Contractor and AFCD (if required) the investigation results. If exceedance is confirmed as caused by the construction works, take relevant actions as detailed in "Action Level" and "Limit Level" 	<ol style="list-style-type: none"> If exceedance is confirmed as caused by the construction works, take relevant actions as detailed in "Action Level" and "Limit Level" 	<ol style="list-style-type: none"> If exceedance is confirmed as caused by the construction works, take relevant actions as detailed in "Action Level" and "Limit Level" 	<ol style="list-style-type: none"> If exceedance is confirmed as caused by the construction works, take relevant actions as detailed in "Action Level" and "Limit Level"
Action Level				
1. Action level being exceeded by one sampling day and is caused by the construction works	<ol style="list-style-type: none"> Discuss the current mitigation measures with the IC(E) and the Contractor. Pay attention on the monitoring results collected on the subsequent scheduled monitoring date to see if an exceedance, caused by the same or related construction works, is recurring. 	<ol style="list-style-type: none"> Discuss with the ET Leader and the Contractor on the current mitigation measures. Assess the effectiveness of the current mitigation measures and advised the ER accordingly. 	<ol style="list-style-type: none"> Discuss with the IC(E) on the current mitigation measures. 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the exceedance in writing. Rectify unacceptable practice. Check all plants and equipment. Consider changes of working methods. Discuss with the ET Leader and the IC(E) on the current mitigation measures.
2. Action level being exceeded by more than one consecutive days and is cause by the construction works	<ol style="list-style-type: none"> Discuss mitigation measures with the IC(E) and the Contractor. Ensure the proposed mitigation measures are implemented. Further evaluation of the monitoring results on the next scheduled monitoring day and report to all concerned parties, if the affected monitoring stations are still being affected (or are no longer affected) by the construction works. Prepare to increase the monitoring frequency to daily, if the Limit Level is exceeded as below. 	<ol style="list-style-type: none"> Discuss with the ET Leader and the Contractor on the proposed mitigation measures. Review proposals on mitigation measures submitted by the Contractor and advised the ER accordingly. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss with IC(E), the ET Leader and the Contractor on the proposed mitigation measures. Make agreement on the proposed mitigation measures to be implemented. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the consecutive exceedance in writing. Rectify unacceptable practice. Check all plants and equipment. Consider changes of working methods. Discuss with the ET Leader and the IC(E) and propose mitigation measures to the IC(E) and the ER within 3 working day. Implement the agreed mitigation measures.
Limit Level				
1. Limit level being exceeded by one sampling day and is cause by the construction works	<ol style="list-style-type: none"> Discuss mitigation measures with the IC(E), the ER and the Contractor. Ensure the proposed mitigation measures are implemented. Prepare to increase the monitoring frequency to daily if further exceedances of the Limit Level are detected on the next sampling day 	<ol style="list-style-type: none"> Discuss with the ET Leader and the Contractor on the proposed mitigation measures. Review proposals on mitigation measures submitted by the Contractor and advised the ER accordingly. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss with IC(E), the ET Leader and the Contractor on the proposed mitigation measures. Request the Contractor to Critically review the working methods. Make agreement on the proposed mitigation measures to be implemented. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the exceedance in writing. Rectify unacceptable practice. Check all plants and equipment. Consider changes of working methods. Discuss with the ET Leader, the IC(E) and the ER, and propose mitigation measures to the IC(E) and the ER within 3 working days. Implement the agreed mitigation measures.

Event	Action			
	ET Leader	IC(E)	ER	Contractor
2. Limit level being exceeded by more than one consecutive days and is cause by the construction works	<ol style="list-style-type: none"> 1. Discuss further mitigation measures with the IC(E), the ER and the Contractor. 2. Ensure the proposed further mitigation measures are implemented. 3. Increase the monitoring frequency to daily until no exceedance of the Limit Level. 	<ol style="list-style-type: none"> 1. Discuss with the ET Leader and the Contractor on the proposed further mitigation measures. 2. Review proposals on further mitigation measures submitted by the Contractor and advised the ER accordingly. 3. Assess the effectiveness of the implemented further mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IC(E), the ET Leader and the Contractor on the proposed further mitigation measures. 2. Request the Contractor to Critically review the working methods. 3. Make agreement on the further mitigation measures to be implemented. 4. Assess the effectiveness of the implemented further mitigation measures. 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the consecutive exceedance in writing. 2. Rectify unacceptable practice. 3. Check all plants and equipment. 4. Consider changes of working methods. 5. Discuss with the ET Leader, the IC(E) and the ER, and propose further mitigation measures to the IC(E) and the ER within 3 working days. 6. Implement the agreed further mitigation measures. 7. As directed by the ER, slow down or stop all or part of the construction activities.

3.5.4 Landscape and Visual

The Final Tree Survey Report^[3] approved in April 2001 was adopted as the framework of the baseline landscape condition of this road section. In addition, a supplementary tree survey has been carried out in December 2001. The Supplementary Tree Survey Report (Revision A)^[4] completed in March 2002 is also adopted to provide supplementary information of the baseline landscape condition of this road section.

If any non-conformity on landscape and visual issue is observed, the actions in accordance with Event/Action Plan shown in Table 3-12 shall be carried out.

Table 3-12 Event/Action plan for landscape and visual impact

Event	Action			
	ET Leader	IC(E)	ER	Contractor
Non-conformity on one occasion	<ol style="list-style-type: none"> 1. Identify Source(s). 2. Inform the IC(E) and the ER. 3. Discuss mitigation actions with the IC(E), the ER and the Contractor. 4. Monitor remedial actions until rectification has been completed. 	<ol style="list-style-type: none"> 1. Check report. 2. Check the Contractor's working method. 3. Discuss with the ET Leader and the Contractor on possible remedial measures. 4. Advise the ER on effectiveness of proposed remedial measures. 5. Check implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Notify the Contractor. 2. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Amend working method. 2. Rectify damage and undertaken any necessary replacement.
Repeated Non-conformity	<ol style="list-style-type: none"> 1. Identify Source(s). 2. Inform the IC(E) and the ER. 3. Increase monitoring frequency 4. Discuss mitigation actions with the IC(E), the ER and the Contractor. 5. Monitor remedial actions until rectification has been completed. 6. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Check monitoring report 2. Check the Contractor's working method 3. Discuss with the ET Leader and the Contractor on possible remedial measures. 4. Advise the ER on effectiveness of proposed remedial measures. 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Notify the Contractor. 2. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Amend working method. 2. Rectify damage and undertaken any necessary replacement.

3.6 Site Inspection and Environmental Complaint Handling

3.6.1 Site Inspection Frequency and Areas Covered

Regular site inspections shall be carried out on a weekly basis. The areas of inspection cover the different environmental impacts, such as air, noise, water and waste, and their pollution controls and mitigation measures for both within and outside the site area. Site inspection for landscape and visual impact shall be carried out on a bi-weekly basis.

Ad hoc site inspection will be carried out if significant environmental non-compliance is identified. Inspections may also be carried out subsequent to receipt of any environmental complaints, or as part of the investigation work, as specified in the Event-Action Plans.

3.6.2 Site Inspection Procedures

- a) The CT and/or ER will advise the Environmental Auditor (EA) for all information on any environmental related aspects.
- b) The EA will conduct discussion with the CT and/or ER to sort out and forecast any potential environmental impact.
- c) The EA will conduct a site walk with the CT and/or ER, particularly the areas with extensive construction works.
- d) The EA will conduct inspection for the main environmental facilities and measures such as the wheel washing facilities located at the site exits, water spraying truck, temporary noise barrier, and the internal noise-reducing measures of the heavy equipment etc, to ensure that these environmental facilities operate normally and effectively.
- e) The EA will fill up a site inspection checklist during the site inspection for recording of any special observations.
- f) The EA will conduct post-discussion with the CT and/or ER for the establishment of additional/special measures if any non-conformance is found. The completion date for such additional measures will be confirmed during the post-discussion.
- g) The EA will propose a reasonable timeframe together with the CT and/or ER, for the preparation of the proposal for the remediation of environmental non-compliance.

- h) The completed site inspection checklist will be signed by the EA, the CT and/or ER, for reference and for taking actions in accordance with the agreed procedures, reporting systems and time frame.

3.6.3 Environmental Complaints

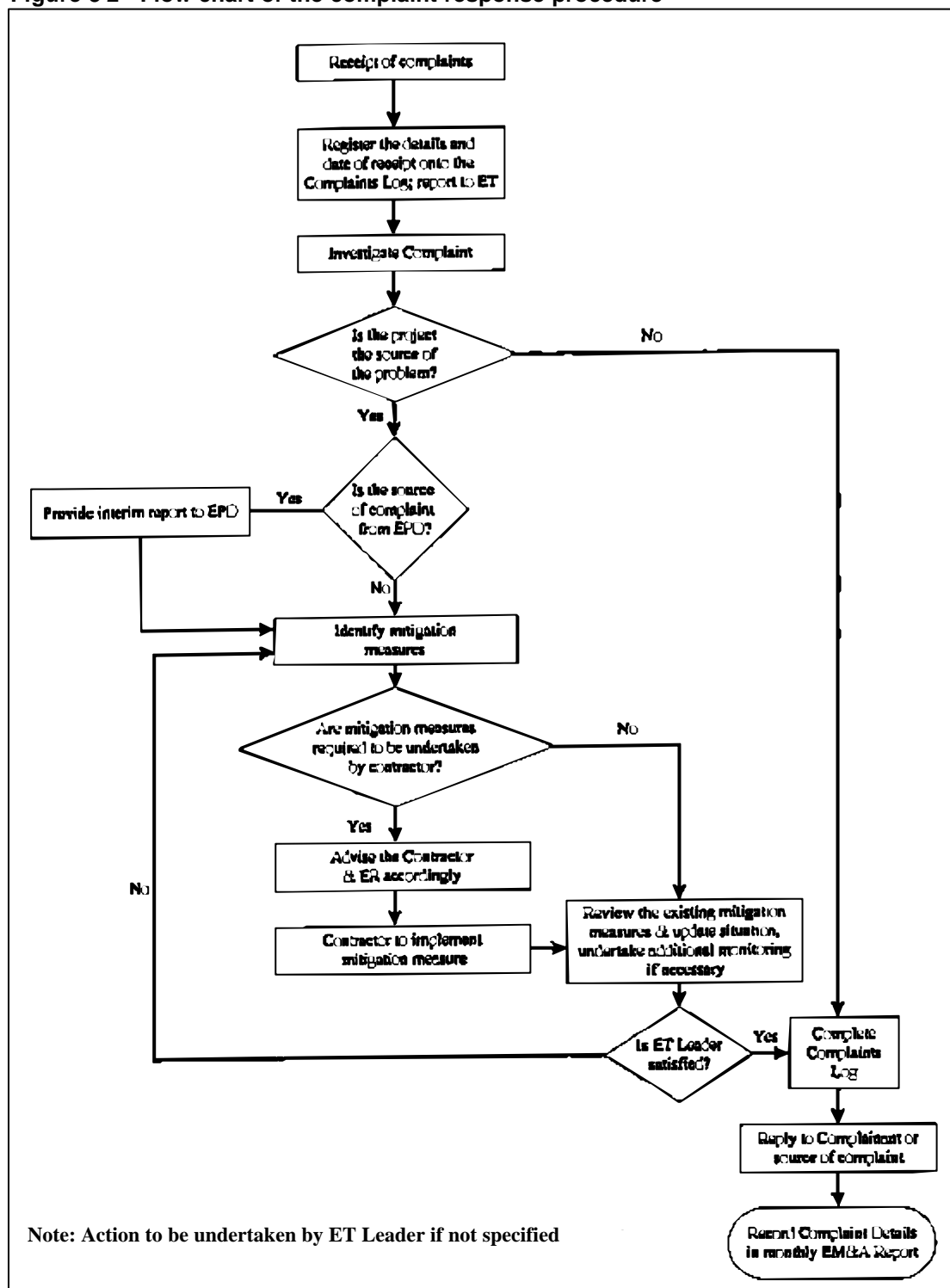
In accordance with the EM&A Manual, environmental complaints will be referred to the ET for initiation of the complaint investigation procedures. The ET will undertake the following procedures upon receipt of the complaints:

- a) The ET will record the details of the complaint and the date of receipt onto the complaint database, and inform ER immediately.
- b) The ET will perform compliant investigation to determine its validity, and to assess whether the source of the problem is due to work activities.
- c) The ER will instruct the CT to identify mitigation measures in consultation with the ET, if the complaint is valid and due to works.
- d) The ET will liaise with the CT on their mitigation measure proposals and implementation, if required.
- e) The ET will conduct review of the CT's response on the identified mitigation measures, and of the updated situation.
- f) The ET will submit interim report to EPD if the complaint is received via EPD. The interim report will clearly state the status of the complaint investigation and the follow-up action within the time frame assigned by EPD.
- g) The ET will undertake additional monitoring and audit to verify the situation if necessary, and ensure that any valid reason for complaint does not recur.
- h) The ET will report on the investigation results and the subsequent actions to the source of complaint for responding to the complainant (If the source of complaint is via EPD, the results will be reported within the time frame assigned by EPD).
- i) The ET will record the details of the complaint, investigation, subsequent actions and results in the monthly EM&A reports.

During the complaint investigation work undertaken by the ET, the CT and ER shall cooperate with the ET on providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified as necessary after the investigation, the CT shall promptly carry out the required mitigation to the satisfaction of ET. The ER shall ensure that the CT has carried out such identified measures.

A flow chart of the complaint response procedures is shown in Figure 3-2 for reference.

Figure 3-2 Flow chart of the complaint response procedure



4. AIR QUALITY

4.1 Monitoring Parameters and Equipment

Impact air quality monitoring was conducted in terms of both 1-hour and 24-hour TSP using a direct reading meter, MIE Data-RAM Portable Real Time Aerosol Monitor (MIE) and High Volume Sampler (HVS) respectively. Table 4-1 shows the equipment list for air quality monitoring.

Table 4-1 Equipment list for air quality monitoring

Equipment	Manufacturer & Model No.	Measurement Parameter	Qty.
High Volume Sampler	GS-2310105 & TE-5170	24-hour TSP	11
Fibreglass Filter	G810		--
HVS Calibration Kit	GMW-2535		1
Photometric Aerosol Monitor	MIE <i>personal</i> DataRAM	1-hour TSP	10
Hand Held Barometer	Cole-Parmer EB833	Pa, Temperature	2

4.2 Methodology

4.2.1 1-hour TSP Monitoring

The procedure for 1-hour TSP monitoring is described as follows:

The MIE monitor was switched on by pressing the ON/OFF button. The NEXT button was pressed to select Run or Ready mode.

The NEXT button was pressed subsequently to check the following settings:

- i. data logging function: on
- ii. log period: 5 minutes
- iii. tag number: storage
- iv. analogue output: 0-4.000mg/m³

- v. calibration factor: 1.0
- vi. averaging time: 10s
- vii. battery charge: $\geq 50\%$
- viii. remaining memory: $\geq 10\%$

The monitoring was started by pressing ENTER. The real-time concentration would display “CONC” and the time-averaged concentration would display “TWA”.

The monitoring was stopped by pressing EXIT and ENTER buttons.

The date and start time, weather, site condition and the downloaded monitoring results were recorded on specified field record sheet.

4.2.2 24-hour TSP Monitoring

24-hour TSP by using a High Volume Sampler (HVS). The HVS should be in compliance with the following specifications:

- 0.6 – 1.7 m³/min (20 – 60SCFM);
- equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- installed with elapsed time meter with +/- 2 minutes accuracy for 24 hours operation;
- capable of providing a minimum exposed area of 406 cm² (63in²);
- flow control accuracy: +/-2.5% deviation over 24-hr sampling period;
- equipped with a shelter to protect the filter and sampler;
- incorporated with an electronic mass flow rate controller or other equivalent devices;
- equipped with a flow recorder for continuous monitoring;
- provided with a peaked roof inlet;
- incorporated with a manometer;
- able to hold and seal the filter paper to the sampler housing at horizontal position;
- easy to change the filter; and
- capable of operating continuously for a 24-hour period.

4.2.3 Maintenance and Calibration

The HVS and their accessories were frequently checked and maintained in accordance with the manufacturer's operation & maintenance manual. Maintenance includes the checking of the supporting screen and the gasket, and routine replacement of motor carbon brushes for the blower motor. The power cords and power supply were checked each time before sampling to ensure proper operation.

The HVS are calibrated at 2-month intervals using GMW-2535 Calibration Kit. The calibration kit will be re-calibrated by the manufacturer after one year of use. The calibration certificates of the HVS and the calibration kit are provided in Appendix D. The next calibration will be conducted on or before 17 July 2004 for the HVS and 1 March 2005 for the GMW-2535.

The MIE monitor and its accessories were frequently checked and maintained in accordance with the manufacturer's operation & maintenance manual to ensure proper operation. Maintenance includes the checking of batteries, zero and sensitive adjustment and filter replacement.

The MIE monitor is returned to the manufacturer for calibration bi-annually. The calibration certificates are provided in Appendix E. The next calibration dates for the MIE monitors are given in Table 4-2.

Table 4-2 Calibration dates of 1-hour TSP monitoring equipment

1-hour TPS monitoring equipment	Serial number	Last calibration date	Next calibration date (on or before)
MIE Data-RAM Portable Real Time Aerosol Monitor	3809	31-Oct-02	31-Oct-04
	3893	12-Jul-02	12-Jul-04
	4239	17-Dec-02	17-Dec-04
	4243	31-Oct-02	31-Oct-04
	4492	12-Jun-03	12-Jun-05
	4736	21-Nov-03	21-Nov-05
	4715	21-Nov-03	21-Nov-05
	4496	25-Sep-03	25-Sep-05
	4615	15-Jan-04	15-Jan-05
	4705	15-Jan-04	15-Jan-05

4.3 Results and Observations

4.3.1 Weather conditions and other factors

The weather condition varied from sunny to rainy during the air quality monitoring period in May 2004. Thunderstorm warning signal was hoisted during the 1-hour TSP monitoring on 4 May 2004.

The construction site had been under normal operation during the air quality monitoring period and no unusual operation or dust from other source was observed.

4.3.2 Summary Results

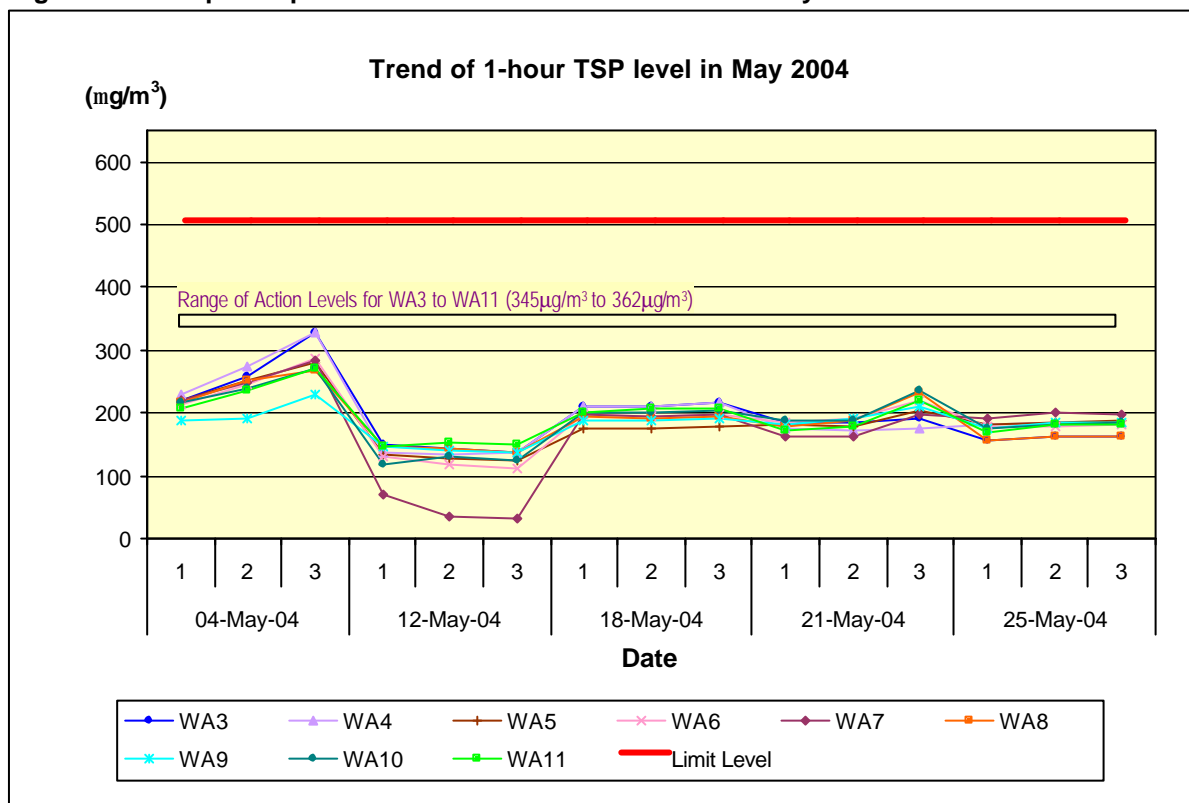
1-hour TSP

A total of 5 sets of 3 consecutive 1-hour TSP measurements had been taken on 4, 12, 18, 21 and 25 May 2004.

The highest 1-hour TSP level was $329.0\mu\text{g}/\text{m}^3$ recorded at Hong Kong Garden between Block 1 and 2 (WA4) on 4 May 2004 while the lowest 1-hour TSP level was $30.9\mu\text{g}/\text{m}^3$ recorded at Podium of Sea Crest Villa Phase 4 Block 12 (WA7) on 12 May 2004.

There was no exceedance of the A/L Levels during the monitoring period.

The detailed monitoring results of 1-hour TSP are given in Appendix F and the 1-hour TSP level at each monitoring location are plotted and presented in Figure 4-1.

Figure 4-1 Graphical presentation of 1-hour TSP levels for May 2004

24-hour TSP

A total of 6 sets of 24-hour TSP measurement had been taken on 3, 7, 13, 19, 25 and 31 May 2004 except for WA6 which was suspended since 13 May 2004 due to the malfunction of the HVS.

The highest 24-hour TSP level was 157.2µg/m³ recorded at Tsing Lung Tau Tin Hau Temple (WA6) on 7 May 2004 while the lowest 24-hour TSP level was 34.5µg/m³ recorded at Carpark of Sea Crest Villa Phase 2 Block 6 (WA9) on 13 May 2004.

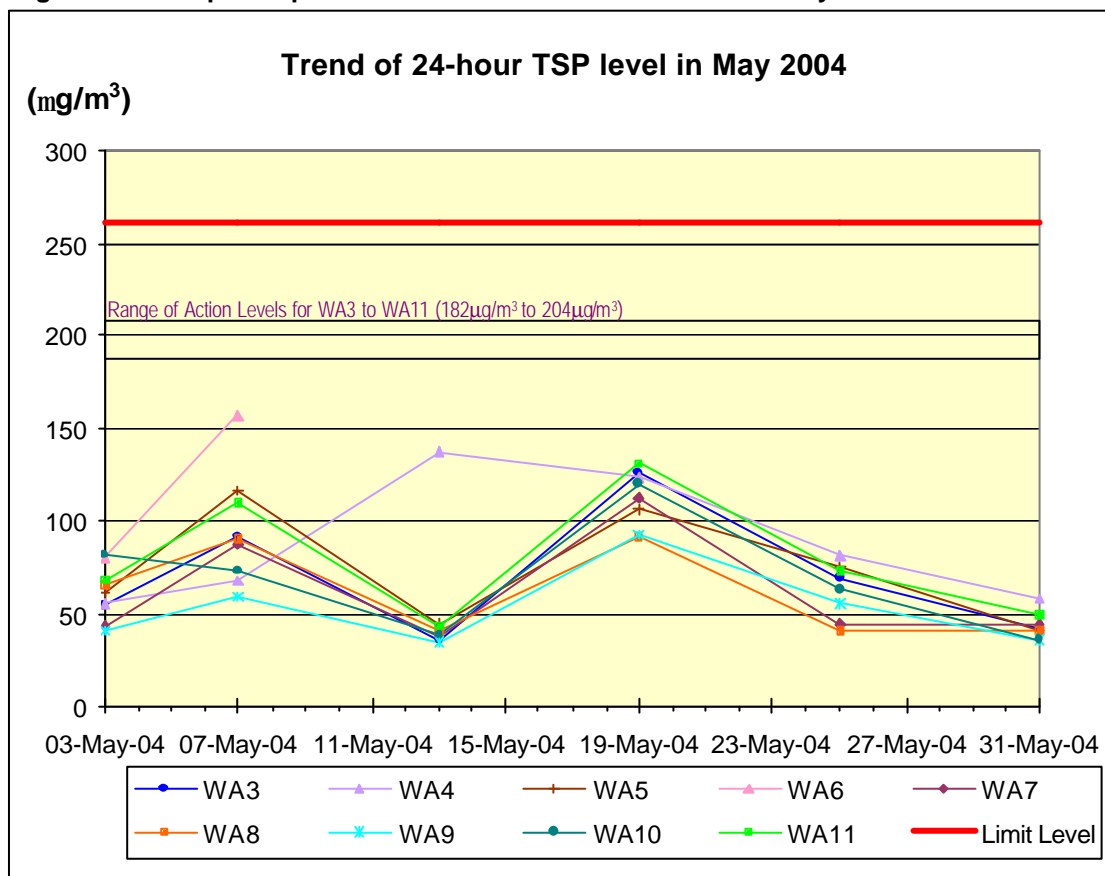
There was no exceedance of the A/L Levels during the monitoring period.

The HVS at WA6 was broken down since 13 May 2004. After a thorough maintenance check by the supplier, it was found that an integral part of the HVS need to be replaced, such part would be available in early June 2004. As such, the 24-hour TSP monitoring was suspended until replacement. Moreover, it was confirmed by ET's site inspection and the monitoring team that there was no abnormal construction activity near WA6 and the construction activities were similar to the past several months (i.e. mainly reinforced concreting works for superstructure construction). Based on the available historical data of WA6 from February to April, only one exceedance was recorded at WA6 which was caused by intensive burning of incense and candle at WA6 rather than the construction activities. Since there was no

exceedance of the A/L Levels during the monitoring period at all other monitoring stations, it was predicted that the 24-hour TSP level would also be complied with the A/L Levels. Details are given in Appendix G.

The detailed monitoring results of 24-hour TSP are given in Appendix H and the 24-hour TSP level at each monitoring location are plotted and presented in Figure 4-2.

Figure 4-2 Graphical presentation of 24-hour TSP levels for May 2004



4.3.3 Wind Monitoring Data

The detailed wind monitoring data for the air quality monitoring period in May 2004 extracted from Hong Kong Observatory – Tsing Yi Wind Monitoring Station is attached in Appendix I.

5. NOISE

5.1 Monitoring Equipment

An integrating sound level meter was used for the noise monitoring. The sound level meter equipment are listed in Table 5-1.

Table 5-1 Equipment list for construction noise monitoring

Equipment	Manufacturer & Model No.	Precision Grade	Qty.
Integrating sound level meter	Brüel & Kjær 2231	IEC 651 Type 1 IEC 804 Type 1	2
Integrating sound level meter	Brüel & Kjær 2238		3
Integrating sound level meter	Rion NA27		2
Windshield	Brüel & Kjær UA0237		6
Acoustical calibrator	Brüel & Kjær 4230	IEC 942 Type 1	2
Acoustical calibrator	Brüel & Kjær 4226		1
LCD wind speed indicator	Kestrel Vane Anemometer	--	2

5.2 Methodology

5.2.1 Field Measurement

- The sound level meter and the battery were checked to ensure that they were in proper condition.
- The sound level meter was set on a tripod at 1.2m above ground and at 1m from the exterior of the building façade.
- Before conducting the measurement, the sound level meter was calibrated by an acoustical calibrator.

- The measurement parameter was set to A-weighted sound pressure level. The time weighting was set in fast response and the time period of measurement at 30 minutes.
- The wind speed was checked during noise monitoring to ensure the steady wind speed did not exceed 5m/s, or wind with gusts did not exceed 10m/s.
- Any abnormal conditions that generated intrusive noise during the measurement were recorded on the field record sheet.
- After each measurement, the equivalent continuous sound pressure level (L_{eq}), L_{10} and L_{90} were recorded on the field record sheet.
- The sound level meter was re-calibrated by the acoustical calibrator to confirm that there was no significant drift of reading.

5.2.2 Equipment Maintenance and Calibration

The sound level meter complies with the standards of IEC 651 (Fast, Slow, Impulse rms detector tests) and IEC 804 (L_{eq} functions). The acoustical calibrator model no. 4230 is in compliance with IEC 942. Both equipment are calibrated annually in-house using Brüel & Kjær (B&K) calibrator model no. 4226.

The National Physical Laboratory in Teddington, London, which is accredited by National Measurement accreditation Service (NAMAS), annually calibrates the B&K calibrator model no. 4226. All in-house calibrations that are undertaken can be traced back to the National Physical Laboratory. The calibration certificates of the noise monitoring equipment are given Appendix J. The next calibration will be conducted on or before 18 August 2004 for the sound level meters and the acoustical calibrators.

5.3 Results and Observations

5.3.1 Weather Conditions and Other Factors

The weather condition varied from sunny to fine during the noise monitoring period in May 2004.

The construction site had been under normal operation during the noise monitoring period and no unusual operation was observed. Traffic noise had been noticed at some noise monitoring locations during the noise monitoring period.

5.3.2 Summary Results

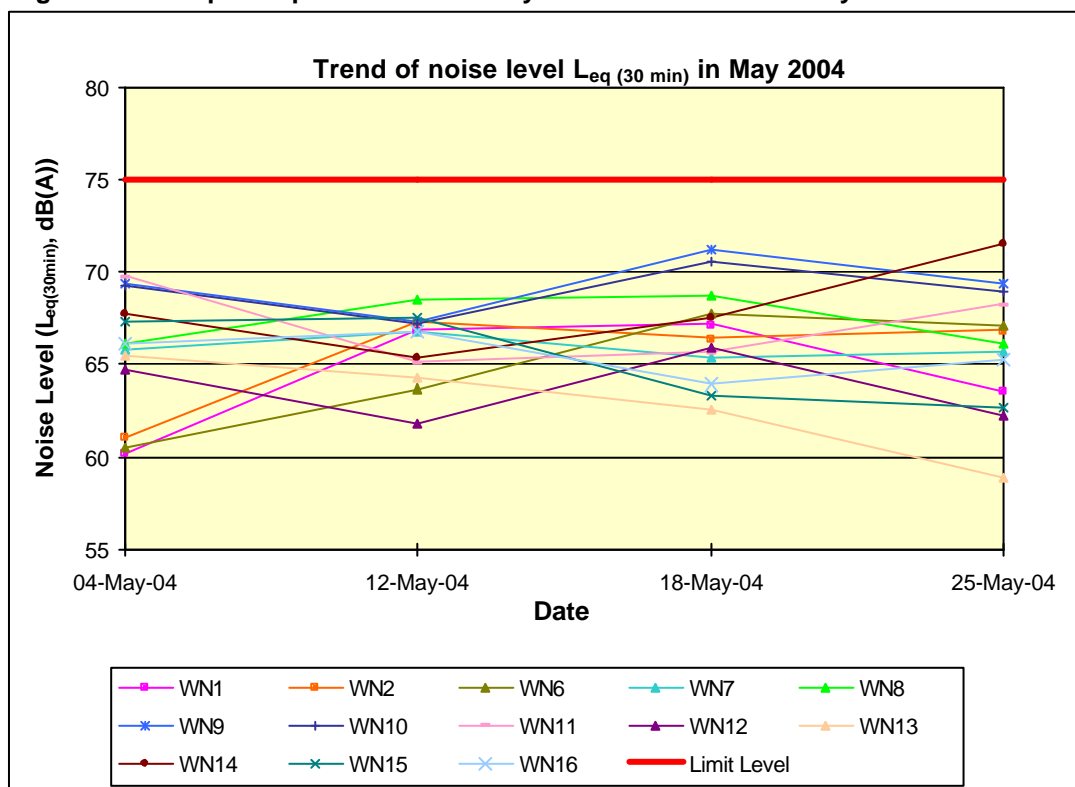
A total of 4 set of noise measurement had been conducted between 0700-1900 hours on 4, 12, 18 and 25 May 2004. The detailed construction noise monitoring results are given in Appendix K.

The highest noise level was 72dB(A) recorded at Car Park at Sea Crest Villa Phase 2 Block 6 (WN14) on 25 May 2004 while the lowest noise level was 59dB(A) recorded at Podium of Sea Crest Villa Phase 3 Block 8 (WN13) on 25 May 2004.

There was no exceedance of the A/L Levels during the monitoring period.

The noise levels at each monitoring location are plotted and presented in Figure 5-1.

Figure 5-1 Graphical presentation of daytime noise levels for May 2004



6. WATER QUALITY (DESGINATED PROJECT)

6.1 Water Quality Equipment

Monitoring of Turbidity (Tby) in NTU, Dissolved Oxygen (DO) in mg/L and Suspended Solids (SS) in mg/L were carried out by the ET to ensure that any deteriorating water quality could be readily detected and timely action be taken to rectify the situation. The Tby and DO were measured in-situ while the SS was determined in the laboratory. A summary of the water quality monitoring equipment is provided in Table 6-1.

Table 6-1 Water quality monitoring equipment

Equipment	Manufacturer & Model No.	Qty
Handheld Salinity, Conductivity & Temperature System	YSI Model 30	1
Dissolved Oxygen Meter	YSI Model 52	1
pH meter	Hanna	1
Turbidimeter	HACH 2100P	1
Nephelometer	Analite Model 156	1

6.2 Methodology

Dissolved Oxygen and Temperature Measuring Equipment

The equipment to measure DO and temperature complies with the following:

- i. The instrument shall be a portable, weatherproof dissolved oxygen measuring instrument complete with cable and use a DC power source. It shall be capable of measuring:
 - A dissolved oxygen level in the range of 0-20 mg/L and 0-200% saturation; and
 - A temperature of 0-45°C.
- ii. It shall have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

- iii. Should salinity compensation not be integrated in the DO equipment, in-situ salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

Turbidity Measurement Instrument

The instrument is a portable, weatherproof turbidity-measuring instrument complete with comprehensive operations manual. The equipment shall use a DC power source. It shall have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU and be completed with a cable (e.g. Hach model 2100P or an approved similar instrument).

Suspended Solids

The following equipment is required to monitor the SS:

- i. A water sampler comprising a transparent PVC cylinder, with a capacity of not less than 2 litres and which can be effectively sealed with latex cups at both ends. The sampler shall have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).
- ii. Water samples for SS measurement of both the marine and freshwater environment shall be collected in high density polythene bottles, packed in ice (cooled at 4°C without being frozen) and delivered to the laboratory as soon as possible after collection.

Water Depth Detector

A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring. This unit can either be handheld or affixed to the bottom of the monitoring boat, if the same vessel is to be used throughout the monitoring programme.

Salinity

A portable salinometer capable of measuring salinity in the range of 0-40 ppt shall be provided for measuring salinity of the water at each monitoring location and setting salinity compensation on the DO Meter.

Location of the Monitoring Site

A hand-held or boat-fixed type Differential Global Positioning System (DGPS) or other equivalent instrument of similar accuracy shall be provided and used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements. For the monitoring locations in the water courses a hand-held DGPS, together with a suitably scaled map shall be used.

6.2.1 Calibration and Accuracy of Instrumentation

All in-situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.

For the on site calibration of field equipment, the BS 1427:1993, “Guide to Field and on-site test methods for the analysis of waters” shall be followed.

6.3 Suspension of Marine Monitoring

As reported by the Contractor, major sea works at level below +2.5mPD had been completed in July 2003. The proposal on suspension of marine monitoring was submitted to IC(E), HyD, EPD and AFCD for comments on 25 September 2003. It was confirmed with IC(E) and AFCD that suspension of marine monitoring was acceptable if there is no “active” marine work being carried out. In future, if there is any marine work on or below +2.5mPD, the Contractor shall notify the relevant parties one month in advance and resume the marine monitoring. Subsequently, as instructed by the Contractor/ HyD, the marine monitoring was suspended since 10 October 2003. Since then, there was neither instruction from RE/Contractor on further marine monitoring nor additional information on marine reclamation works. Details are given in Appendix L.

7. LANDSCAPE AND VISUAL MONITORING AND AUDIT

The landscape and visual monitoring and audits were carried out on 13 and 27 May 2004 by a Registered Landscape Architect.

The audit findings and recommendations are summarised in the following paragraphs.

7.1 Summary of Inspection – 13 May 2004

7.1.1 Matters Arising from Previous Inspections

- The Contractor had cleared away the litter pile at Ma Wan Pier area.
- The Contractor had emptied the garbage drum at footbridge FB-03 area.
- Clearance of scrap woods pile at Junction A15 area was still outstanding. The Contractor was requested to clear it away as soon as possible.
- The Contractor had cleared away the scrap woods pile at seawall ‘B’, seawall ‘C’, and BPRW74 areas.
- The Contractor had cleared away the scattered construction waste piles at RW13 area.
- The Contractor had cleared away the scattered construction waste found at construction area in front of Lido Bach Garden. However, new scrap wood pile was found and the Contractor was requested to clear it away as soon as possible.
- Re-hydroseeding of the Slope No. 8 was still outstanding. The Contractor was requested to re-hydroseed the patches of barren slope surface area.
- Dry surface conditions were observed at Slopes 9 & 11, seawall ‘B’, and retaining walls RW13 and RW60 areas. The Contractor was requested to carry out more frequent watering.

7.1.2 Site Clearance and Formation Works

- The remaining portion of slope at BPRW74 area was still found to be expose. The Contractor was requested to hydroseed the slope as soon as possible.

7.1.3 Tree Felling and Transplanting Works

- No tree transplanting work was carried out during the inspection period.

7.1.4 Recommendations

- The Contractor was requested to clear away all scattered litter, construction waste, and garbage as found on site, and keep the site in a tidy condition at all times.
- The Contractor was recommended to re-hydroseed all patchy slope surface area at Slope No. 8. However, it was advised by the Contractor that the hydroseeding bald patches were conforming design issues and beyond the scope of the Contractor's control. Nonetheless, the Contractor had presented alternative method proposals to the Engineer previously for comments.
- The Contractor was recommended to carry out more frequent watering of the site to prevent dust nuisance.

7.2 Summary of Inspection – 27 May 2004

7.2.1 Matters Arising from Previous Inspections

- The Contractor had cleared away the scrap wood pile at construction area in front of Lido Bach Garden
- The Contractor had cleared away the scrap woods pile at Junction A15 area. However, new scrap woods and construction waste piles were found and the Contractor was requested to clear it away as soon as possible.
- Hydroseeding of the remaining portion of slope at BPRW74 area was still outstanding. The Contractor was requested to hydroseed the slope as soon as possible.
- Also, re-hydroseeding of the Slope No. 8 was still outstanding. The Contractor was requested to re-hydroseed the patches of barren slope surface area.
- Dry surface conditions were observed at many parts of the site. The Contractor was requested to carry out more frequent watering to prevent dust nuisance.

7.2.2 Site Clearance and Formation Works

- Construction waste pile was found at Ma Wan Pier area. The Contractor was requested to clear it away as soon as possible.
- Construction waste pile was found at footbridge FB-03 area. The Contractor was requested to clear it away as soon as possible.
- Garbage piles were found at Seawall 'C' and retaining wall RW13 areas. The Contractor was requested to clear it away as soon as possible.

7.2.3 Tree Felling and Transplanting Works

- No tree transplanting works was carried out during the inspection period.

7.2.4 Recommendations

- The Contractor was requested to clear away all scattered litter, garbage, etc. as found on site, and keep the site in a tidy condition at all times.
- The Contractor was recommended to re-hydroseed all the patchy surface areas at Slope No. 8 for planting works. However, it was advised by the Contractor that the hydroseeding bald patches were conforming design issues and beyond the scope of the Contractor's control. Nonetheless, the Contractor had presented alternative method proposals to the Engineer previously for comments.
- The Contractor was recommended to carry out more frequent watering of the site to prevent dust nuisance during the dry season.

7.3 Tree Transplanting Survival Rate

7.3.1 Tree Transplanting Survival Rate

- The tree transplanting survival rate as reported by the Contractor for the period up to the end of May is 100%.

7.4 Audit Schedule

7.4.1 Audit Schedule for June 2004

- The next audits are schedule to be conducted on 10 and 24 June 2004.

The Landscape and Visual Monitoring & Audit Report for May 2004 prepared by the Registered Landscape Architect is attached in Appendix M.

8. SITE INSPECTION, WASTE DISPOSAL, ENVIRONMENTAL COMPLAINTS, ENVIRONMENTAL LICENSES AND NON-COMPLIANCE RECORDS

8.1 Site Audit Results

Weekly environmental site audits were carried out on 6, 13, 20 and 27 May 2004. The environmental concerns identified in the site audits are summarised in Table 8-1.

Table 8-1 Summary of environmental concerns identified in the site audits in May 2004

Date of Issue Raised	Observation	Advice from EA	CT's Response / Environmental Outcomes	Closing Date
Water Quality				
13-May-04	A new site entrance W33A (RW01) was opened.	To provide wheel washing facilities or paved the area as soon as possible.	Site entrance W33A was paved and water hose was provided.	20-May-04
13-May-04	Mud trail was found outside site entrance W19.	To clean up the mud trail.	No mud trail was found.	20-May-04
27-May-04	Mud trail was found outside site entrance W32 at RW74.	To clean up the mud trail.	No mud trail was found.	03-Jun-04
Air Quality				
06-May-04	Unloading of dusty materials at Seawall C was not sprayed with water.	To spray dusty activities with water.	All loading and unloading operation were sprayed with water.	13-May-04
13-May-04	Slope at RW01 was exposed.	To cover the slope with tarpaulin.	The slope was covered.	20-May-04
Construction Noise				
No significant construction noise impact.				
Handling of wastes and chemicals				
06-May-04	Waste was found accumulated at RW13 and the coast of Seawall B.	To remove the waste.	The waste was removed.	13-May-04
20-May-04	C&D waste was found accumulated at Dragon Beach West (RW13) and Outfall H.	To remove the waste.	C&D waste was removed.	27-May-04

8.2 Waste Disposal

The Contractor had properly disposed of the waste material in the reporting month, and the disposal quantity in the reporting month is summarised in Table 8-2.

Table 8-2 Waste disposal quantity in May 2004

Type of waste or material		Disposal at	No. of loads or quantities	Remarks
C&D waste		WENT Landfill	100 loads	--
C&D material		Public Filling Area in Tuen Mun	1,483 loads	--
Grease trap waste		Interim Grease Trap Waste Treatment Facility at WENT Landfill	0	--
Chemical waste	Spent lube oil	Collected by licenced collector	0	--

8.3 Complaint Record

There was no environmental complaint received in May 2004.

A log record on the environmental complaints is given in Appendix N and a cumulative statistics on environmental complaints is given in Table 8-3.

Table 8-3 Cumulative statistics on environmental complaints

No. of complaints received in the reporting month	No. of outstanding complaints	Cumulative no. of complaints received since the commencement of project
0	0	26

8.4 Non-compliances

There was no non-compliance for air quality and noise monitoring during the monitoring period in May 2004.

8.5 Notification of Summons and Successful Prosecution

There was neither notification of summons nor prosecution received during the reporting month.

8.6 Environmental Licenses

No new environmental license was granted in the reporting month. A summary of the valid environmental licenses in May 2004 is given in Table 8-4.

Table 8-4 Summary of valid environmental licenses in May 2004

Type of Licence	Reference No.	Valid from	Valid to
Environmental Permits	EP-093/2001	Not applicable	Not applicable
	EP-094/2001	Not applicable	Not applicable
Water Discharge Licence	EP742/336/0029 I	09-May-2002	31-May-2007
Registration of Chemical Waste Producer	5213-336-M2446-04	09-Mar-2002	Not applicable
	5213-336-G2040-68	10-Sep-2002	Not applicable

9. REFERENCES

- [1] Mouchel Halcrow Joint Venture. 2001. Castle Peak Road Improvement between Area 2 and Ka Loon Tsuen, Tsuen Wan West Contract No. HY/99/18, Environmental Monitoring & Audit Manual.

- [2] Ove Arup & Partners Hong Kong Limited. July 2002. Contract No. HY/99/18 Castle Peak Road Improvement between Shem Tseng and Ka Lung Tsuen, Tsuen Wan, Environmental Baseline Monitoring Report (Second Issue).

- [3] Mouchel Halcrow Joint Venture. 2001. D&C Consultancy Agreement No. CE 1/96 Castle Peak Road Improvement between Area 2 and Ka Loon Tsuen, Tsuen Wan, Tree Survey Report & Tree Felling Application Revision D.

- [4] Mouchel Halcrow Joint Venture. Contract No. HY/99/18 March 2002. D&C Consultancy Agreement No. CE 1/96 Castle Peak Road Improvement between Area 2 and Ka Loon Tsuen, Tsuen Wan, Supplementary Tree Survey Report & Tree Felling Application Revision A.