Stanger Asia

ENVIRONMENTAL MONITORING AND AUDIT REPORT

FOR

CONTRACT No. DC/2001/09

SAN TIN EASTERN MAIN DRAINAGE CHANNEL

OCTOBER - DECEMBER 2003

Report No.: ET 11971

Certified by: _____ Date: 15/01/2004

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EXECUTIVE SUMMARY

This is the 4th quarterly Environmental Monitoring and Audit (EM&A) report for Contract No. DC/2001/09 – San Tin Eastern Main Drainage Channel and it covers the monitoring works conducted from 1st October to 31st December 2003.

Construction activities for the reported period

- Embankment construction
- Surcharge for storage pond
- Formation of reedbed
- Excavation for Pump House and Inflatable dam
- Laying rockfill material for Inflatable dam
- Temporary Border Road Construction
- Sheet piling and Construction for pile cap
- Formation setting for Inflatable dam
- Granular filter filling
- Band drain installation
- Filling of Embankment
- Construction of Box Culvert
- Cement Solidification for contaminated sediment
- Marine disposal of contaminated sediment

Air Quality Monitoring

The site office (AM1) has been identified as the location for the monitoring of 24 and 1-hour Total Suspended Particulates (TSP). Monitoring of 24-hour TSP was carried out on fifteen occasions, there were no exceedances to the set Action and Limit levels for this parameter during the reported period. Monitoring of 1-hour TSP was carried out on forty-seven occasions, there were no exceedances to set Action and Limit levels for either parameter during the reported period.

Noise Monitoring

Monitoring of construction noise was carried out on thirteen occasions at Yan Shau Wai NM1(A) for normal working hours (0700-1900 hours), thirteen occasions for the evening period (1900-2300 hours) and thirteen occasions for holidays period. There were no exceedances to the Limit level for noise during the reported period.

Water Quality Monitoring

Water quality in terms of pH, dissolved oxygen, suspended solids, temperature, turbidity and ammoniacal nitrogen, was carried out on twenty-seven occasions at WM1, WM4 (upstream stations) and WM2, WM3 (downstream stations). There were no exceedances to set Action and Limit Levels recorded.

Waste Management

A total of 35,666.67 m^3 C&D waste was generated from the works in this reporting period. All of the waste was transported to the WENT Landfill Site for disposal. In addition, 16,995 m^3 fill material was imported for the construction of Embankment from Tai Po, Sheung Shui and Yuen Long. 4344 m^3 Type I and Type II contaminated soil was delivered to East Sha Chau for disposal. 400 L chemical waste (spent lubricant) was collected by a licensed Contractor.

Complaints and Notifications of Summonses and Successful Prosecutions

No complaint and notifications of summons were received in this reported period. Two successful prosecutions were made in November 2003 regarding carrying out regulatory works not in accordance with the Construction Dust Regulation on the 28th March 2003.

Site Inspections

Thirteen weekly Site Inspections were conducted jointly by the Independent Environmental Checker (IEC), the Engineers' Representative (ER) and the ET.

The major observations / non-conformance, actions by the Contractor and the environmental outcomes are summarised in the Section 7.1 of this report.

1. INTRODUCTION

1.1 Background

Stanger Asia Ltd. has been commissioned by the Hsin Chong Construction Co., Ltd. to provide an Environmental Team (ET) to monitor air, noise, water quality and waste management for Contract No. DC/2001/09. The team is to take a pro-active role in all issues, which may be of environmental concern during the construction of the San Tin Eastern Main Channel.

In this report, the air, noise, water quality and waste management monitoring works conducted from 1st October to 31st December 2003 will be detailed and reviewed. All monitoring works were carried out in accordance to "*Main Drainage Channels and Poldered Village Protection Scheme for San Tin, NWNT: Environmental Impact Assessment Study, Environmental Monitoring and Audit Manual"*.

1.2 Report Structure

The purpose of this report is to detail and review the air, noise and water quality monitoring works undertaken from 1st October to 31st December 2003.

The report follows the format given below:

Section 1	Introduction and background information to the content of this report.
Section 2	This section gives the information of the project.
Section 3	This section summarises all the environmental permits and licenses.
Section 4	Summary of the EM&A requirements is presented.
Section 5	This section details the implemented mitigation measures.
Section 6	This section details monitoring results.
Section 7	The site environmental audits are summarized in this section.
Section 8	The status for solid and liquid waste management for the site is overviewed.
Section 9	Complaints, notifications of summons and successful prosecutions are summarized in this section.
Section 10	This section gives a conclusion in relation to all monitoring activities.

2. PROJECT INFORMATION

2.1 Site Description

The works mainly comprise the removal and disposal of contaminated materials, the construction of a reinforced concrete channel, construction of footpaths, drainage works, roadworks, construction of a pumping station, water and landscape works from the Castle Peak Road at San Tin to the Shenzhen River some 2.5km downstream.

The site layout plan is shown in Figure 2.1, Figure 2.2 and Figure 2.2 a.

2.2 Project Organization

Ir. C.L. Leung / Ir. Gary K.C. Yip are the Engineers' Representatives for the Drainage Services Department, Government of the HKSAR. (Tel: 25747400, Fax: 28278700).

The Independent Environmental Checker (IEC) for this project is headed by Dr. Guiyi Li of Hyder Consulting Limited. (Tel: 2911 2233, Fax: 2805 5028).

Mr. Raymond Suen is the Site Agent for Hsin Chong Construction Co., Ltd. (Tel: 2482 9587, Fax: 2482 9113).

The Environmental Team (ET) for the project is Stanger Asia Ltd. The team is headed by Mr Chris Shenfield – Associate. (Tel: 26821203, Fax: 26820046).

The Organization Chart with the key personnel contacts names and telephone numbers is given in Appendix I.

2.3 Construction Programme

The overall construction programme is given in Appendix VI. Details of the construction activities carried out in this quarter are listed below.

- Embankment construction
- Surcharge for storage pond
- Formation of reedbed
- Excavation for Pump House and Inflatable dam
- Laying rockfill material for Inflatable dam
- Temporary Border Road Construction
- Sheet piling and Construction for pile cap
- Formation setting for Inflatable dam
- Granular filter filling
- Band drain installation
- Filling of Embankment
- Construction of Box Culvert
- Cement Solidification for contaminated sediment
- Marine disposal of contaminated sediment

3. ENVIRONMENTAL PERMITS AND LICENSES

The summary of the status of all environmental permits, licenses and notification for this project as at December 2003 is summarized in the following table.

Table 3.1 Summary of the Environmental Permits and Licenses

Description	Licence/Permit No.	Date of Issue	Date of Expiry	Status
Environmental Permit	EP-124/2002	28-Mar-02	--	Issued
Notification of Works Under APCO	--	--	--	Notified
Registration of Chemical Waste Producer	WPN5113-542-H2913-22	24-Jan-03	--	Issued
Construction Noise Permit	GW-TW0245-03	01-Aug-03	31-Jan-04	Issued
Effluent Discharge Licence for Septic Tank System	1S41N/1	20-Mar-03	--	Issued
Effluent Discharge Licence	1S49/1	04-Aug-03	31-Aug-08	Issued
Dumping Permit	EP/MD/04-104	17-Dec-03	16-Jan-04	Issued

4. SUMMARY OF EM&A REQUIREMENTS

4.1 Air Quality

Monitoring Location

The project has one designated location for the monitoring of air quality, which is the Site Offices. This monitoring location has been coded AM1 and it's co-ordinates are given in the following table. The air monitoring location is shown in Figure 4.1.

Table 4.1 Coordinates of AM1

Station	HK Metric Grid – Easting	HK Metric Grid - Northing
AM1	826006	840543

Air Sensitive Receivers

Representative Air Sensitive Receivers (ASRs) have been identified and their horizontal separation between the eastern channels associated with the MDC are give in the following table and the locations are shown in Figure 4.4.

Table 4.2 Identified ASRs and Proximity to the Works.

ASRs	Name	Distance to Eastern MDC (m)
1	Lok Ma Chau Control Point	80
2	Ha Wan Tsuen	280
3	Ki Lun Tsuen	500
4	Yan Shau Wai	500
5	Tung Chan Wai	270
6	Wing Ping Tsuen	370

Methodology

Measurement of 24-hour and 1-hour TSP levels were carried out in accordance to the high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50). The high volume sampler is calibrated at bi-monthly intervals. The calibration kit (Andersen Model G2535) comprising pressure plates and a transfer standard is traceable to the internationally recognized standard.

Laboratory Measurement

Laboratory measurements were carried out in Stanger Asia Ltd. own HOKLAS accredited laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments.

Monitoring Parameters Frequency

Table 4.3 Air Quality Monitoring Frequency

Monitoring Location	Parameter	Frequency
AM1	24-hr TSP	Once in every six days
	1-hr TSP	Three times in every six days

Action and Limit Levels

The Action levels for air quality monitoring were established from the baseline monitoring data obtained prior to the commencement of the construction of the project. The Limit levels for air quality monitoring have been set in line with statutory guidelines for air quality in Hong Kong. Action and Limit levels for both 24-hour and 1-hour TSP are given in the following table.

Table 4.4 Action and Limit Levels for the Project

Parameter Monitored	Action Level $\mu g/m^3$	Limit Level $\mu g/m^3$
1-hour TSP	390	500
24-hour TSP	225	260

4.2 Noise

Monitoring Location

The project has two designated Noise Monitoring Stations, Tung Chan Wai (NM1) and the pumping station (NM2). Noise monitoring for the pumping station (NM2) shall only be carried out on two occasions, day 1 and day 60 of the commissioning stage. For NM1, however, due to distance from the works area to the village, and the expanse of container activities in between, a small residential dwelling at Yan Shau Wai slightly to the north of the Tung Chan Wai has been identified as being a more representative monitoring location. This monitoring location was coded as NM1(A) and construction phase noise impact monitoring was conducted at this station, it's co-ordinates are listed in the following table. The noise monitoring location is shown in Figure 4.2.

Table 4.5 Coordinates of NM1(A)

Station	HK Metric Grid – Easting	HK Metric Grid - Northing
NM1(A)	825982	840137

Noise Sensitive Receivers

Noise Sensitive Receivers (NSRs) have been identified. They are low-rise residential (2 to 3 storeys high) and their approximate distances from the nearest channel associated with the MDCs are given in the following table. The locations are shown in Figure 4.5.

Table 4.6 Identified NSRs and their Area Sensitivity Rating

NSRs	Name	Distance to Eastern MDC (m)	Area Sensitivity Rating
1	Ha Wan Tsuen	280	A
2	Pun Uk Tsuen	570	A
3	Chau Tau Tsuen	540	A
4	Ki Lun Tsuen	500	A
5	Yan Shau Wai	320	A
6	Tung Chan Wai	270	A
7	On Lung Tsuen	530	A
8	Fan Tin Tsuen	580	A
9	Wing Ping Tsuen	370	B
10	San Lung Tsuen	680	A
11	Tsing Lung Tsuen	830	B

Methodology

Monitoring was carried out in accordance to procedures recommended in the EM&A Manual for the monitoring of construction noise. Wind speed was measured by a portable anemometer, TSI model 8330 VelociCheck, with the wind direction being determined with a compass.

Monitoring Parameters and Frequency

Table 4.7 Noise Monitoring Frequency

Monitoring location	Monitoring period	Parameter	Frequency
NM1 (A)	Between 0700-1900 hours on normal weekdays.	$L_{Aeq(30\ min)}$, L_{90} & L_{10}	Once a week.
	Between 1900-2300 hours.	$L_{Aeq(5\ min)}$, L_{90} & L_{10}	
	Between 2300-0700 hours of the next day.		
	Between 0700-1900 hours on holidays.		

Action and Limit Levels

Action and Limit levels for the monitoring of construction noise are those recommended in the EM&A Manual for the project.

Table 4.8 Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
Daytime (0700-1900 hrs) on normal weekdays, e.g. Monday through to Saturday excluding Public Holidays.	When one complaint is received within 2 weeks on the same location.	$L_{Aeq(30min)}$75dB(A)
Daytime on holidays: and 1900 to 2300 hours an all other days.		$L_{Aeq(5min)}$ 70dB(A)
All night time periods (2300 to 0700 hours)		$L_{Aeq(5min)}$ 55dB(A)

4.3 Water Quality

Monitoring Locations

The EM&A Manual for this project has proposed one upstream station (WM1), one down stream station (WM2) within the San Tin Drainage Channel and, one upstream station (WM3) and one downstream station (WM4) at the discharge point for the San Tin Drainage Channel within the Shenzhen River to be monitored for water quality. The designated monitoring stations are shown in Figure 4.3.

Water Quality Sensitive Receivers

WSRs during construction include the surrounding water bodies along the Eastern MDC, either in direct contact (existing stream channel and Shenzhen River) or indirect contact (adjacent fishponds). The locations are shown in Figure 4.6.

Methodology

Surface water quality shall be monitored for the following parameters: Dissolved Oxygen (mg/L and % saturation), Temperature (^{o}C), pH value, Turbidity (NTU), Water Depth (m), Suspended Solids (mg/L) and Ammoniacal Nitrogen (mg/L). As the depth of the designated monitoring locations is less

than 1.5m, only one sample was taken from mid-depth of the water column. For *in situ* parameters, three measurements at each station shall be taken. Suspended solids and ammoniacal nitrogen shall be determined in the laboratory. All the measurements were taken during the mid-ebb tide.

Laboratory Analysis

Samples were returned to Stanger Asia Ltd. own HOKLAS accredited laboratory, for the determination of suspended solids and ammoniacal nitrogen. Methods are referenced from the "*Standard Methods for the Examination of Water and Wastewater*" (APHA, AWWA, WEF). Suspended solids content was determined employing Method 2540D (APHA 20th Edition) and Ammoniacal Nitrogen in accordance with APHA Method No. 4500-NH_3 B & D, (APHA 18th Edition). The laboratory operates a QA/QC scheme for these analysis inclusive of blank, duplicate and spike recovery analysis.

Monitoring Parameters and Frequency

Table 4.9 Water Quality Monitoring Frequency

Monitoring Locations	Parameter	Frequency
WM1 and WM2	Dissloved Oxygen (mg/L and % saturation), Total Suspended Solids, pH, Turbidity, Ammoniacal Nitrogen, Water Temperature and water depth	Twice per week

Action and Limit Levels

Since baseline dissolved oxygen, suspended solids and the ammoniacal nitrogen have exceeded the criteria stated in Table 4.7a of the EM&A Manual, an alternative set of Action and Limit level have been derived for this project in accordance with the "*EM&A Guidelines for Development Projects in Hong Kong*" published in February 1998 issued by EPD.

Table 4.10 Action and Limit Level for Water Quality

Parameter	Action Level	Limit Level
Dissolved Oxygen in (mg/L)	0.59 (5%-ile of baseline data) for WM2 (downstream station)	0.55 (1%-ile of baseline data) for WM2 (downstream)
	0.46 (5%-ile of baseline data) for WM3 (downstream station)	0.39 (1%-ile of baseline data) for WM3 (downstream station)
Suspended Solids (mg/L), Turbidity (NTU), Ammoniacal Nitrogen (mg/L)	120% of upstream control station at the same tide of same day	130% of upstream control station at the same tide of same day
pH	-	6-9

4.4 Event and Action Plans

The Event and Action Plans for air, noise and water are attached in Appendix II of this report. Since the Discharge Standards for Water Quality were not applicable, as detailed in Section 4.3 above, another Event and Action Plan for Water Quality was derived according to the "*EM&A Guidelines for Development Projects in Hong Kong*" published in February 1998 issued by EPD as a substitute to Table 4.7b of the EM&A Manual.

5. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

The contractor implemented various environmental mitigation measures as recommended in the EIA report, EM&A Manual and Environmental Permit. The implementation status during this quarter is attached in Appendix III.

6. MONITORING RESULTS

6.1 Air Quality Monitoring

Monitoring of 24-hour and 1-hour TSP monitoring is summarised in the following tables. The results are presented graphically in Figures 6.1 and 6.2.

Table 6.1 Results of 24-hour TSP Monitoring Data

Location	Number of Monitoring	Number of Exceedance	
		Action Level	Limit Level
AM1	15	0	0
Action Level	225 $\mu g/m^3$		
Limit Level	260 $\mu g/m^3$		

Table 6.2 Results of 1-hour TSP Monitoring Data

Location	No. of Monitoring	No. of Exceedance	
		Action Level	Limit Level
AM1	47	0	0
Action Level	390 $\mu g/m^3$		
Limit Level	500 $\mu g/m^3$		

6.2 Noise Monitoring

Monitoring of daytime construction noise, 0700-1900 hrs on normal weekdays, evening noise, 1900-2300 hrs on normal weekdays, 0700-2100 hrs on general holidays including Sunday were carried out at the designated location NM1(A) this reported period. The results for noise monitoring are summarised in the table below. The results are presented graphically in Figure 6.3.

Table 6.3 Results of Noise Levels for NM1(A)

Locations	Parameters	Number of Monitoring	Number of Exceedance
NM1(A)	Daytime	13	0
NM1(A)	Evening	13	0
NM1(A)	Holidays	13	0
Limit Level for 1900-2300 normal weekdays and 0700-2100 holidays			70 dB(A)
Limit Level for 0700-1900 normal weekdays75 dB(A)			75 dB(A)

6.3 Water Quality Monitoring

Water quality in terms of pH, dissolved oxygen, turbidity, ammoniacal nitrogen, suspended solids and temperature, was conducted twenty-seven occasions at WM1, WM2, WM3 and WM4 in this reported period. Results for water quality monitoring are summarised in the following tables. Graphical presentations of the results are shown in Figures 6.4 – 6.17.

Table 6.4 Summary of Water Quality Monitoring Data

Parameters	Number of Monitoring (WM1 to WM4)	Number of Exceedance	
		Action Level	Limit Level
Temperature, °C	27	-	-
pH	27	0	0
Dissolved Oxygen, %	27	-	-
Dissolved Oxygen, mg/L	27	0	0
Turbidity, NTU	27	0	0
Suspended Solids, mg/L	27	0	0
Ammoniacal Nitrogen, mg/L	27	0	0

Quarterly Assessment of Impacts from Construction Activities

A quarterly assessment of impacts on water quality from construction activities at the project site, including comparison of the difference between the quarterly mean and 1.3 times of the ambient mean, which is defined as 30% increase of the baseline data of the related parameters is summarized in the following table.

Table 6.5 Quarterly Assessment of Impacts from Construction Activities

Parameters	Quarterly Mean		30 % increase of Baseline data		Exceedance (Y/N)	
	WM2	WM3	WM2	WM3	WM2	WM3
pH	7.45	7.35	5.16 - 9.58	5.04 - 9.36	N	N
Dissolved Oxygen, mg/L	0.82	0.73	0.64	0.56	N	N
Turbidity, NTU	55.6	54.5	51.1	75.7	Y	N
Suspended Solids, mg/L	66	64	92	83	N	N
Ammoniacal Nitrogen, mg/L	48.5	44.9	52.0	36.1	N	Y

Notes: 1. For pH, both 30% increase and 30% decrease of baseline data are calculated for comparison.

2. For dissolved oxygen, 30% decrease of baseline data is calculated for comparison.

Based on the above table, the quarterly means of Turbidity (WM2) and Ammoniacal Nitrogen (WM3) are higher than the 130 % ambient mean of these parameters. However, as there was no exceedance to either the Action or Limit levels for these parameters during this quarter, the higher than ambient levels noted for Turbidity and Ammoniacal Nitrogen are not considered to be site-related. Thus, no additional mitigation measures have been proposed.

7. ENVIRONMENTAL AUDIT

7.1 Site Inspections

Thirteen weekly Site Inspections were conducted jointly by the IEC, the ER and the ET. The major observations / non-conformance, actions by the Contractor and outcomes are summarised in the following tables.

Table 7.1 Summary of Findings, Actions and Outcomes of Site Inspection by the IEC, ER and ET

Observations	Actions by Contractor	Outcome
The haul road was dusty at container yard. (3rd Oct 03)	The water sprinkler was used to dampen the haul road.	No fugitive dust was observed. (7th Oct 03)
Surface runoff was discharged by soak away near the Shenzhen River. (10th Oct 03)	The water was diverted to sump pit for sedimentation before discharge.	The situation was rectified. (13th Oct 03)
The bund / curtain located at IFRC was damaged. (10th Oct 03)	A new bund / curtain was installed at the IFRC.	The environmental outcome was satisfactory. (15th Oct 03)
No trip trays were provided for chemical containers. (17th Oct 03)	The chemical containers were removed off-site.	The situation was rectified. (18th Oct 03)
Pool of stagnant water was observed at Closed Area. (17th Oct 03)	The contractor has pumped out the water accordingly.	No accumulation of stagnant water was observed. (20th Oct 03)
Idle stockpile observed. (17th Oct 03)	The contractor has either compact or covered with tarpaulin.	The situation was rectified. (20th Oct 03)
The road surface was uneven that muddy water was accumulated. (24th Oct 03)	The contractor has laid some rubbles / aggregates on the road.	Measures have been improved and are to be reviewed.
Dusty environment was observed at Border Road / Closed Border Area and haul road opposite to the wheel wash area. (31st Oct 03)	The contractor has arranged worker / water truck to spray the area with water to make the entire road surface wet.	No significant fugitive dust observed. (4th Oct 03).
Access road exited from wheel washing bay was muddy. (31st Oct 03)	The contractor has arranged worker to wash the public road and divert the water back to the wheel washing bay.	The public road was kept clean. (4th Nov 03)

Table 7.1 (cont'd) Summary of Findings, Actions and Outcomes of Site Inspection by the IEC, ER and ET

Observations	Actions by Contractor	Outcome
Stockpile of C&D material observed near Shenzhen River. (6th Nov 03)	The stockpile was removed.	The situation was rectified. (20th Nov 03)
No trip trays were provided for generator and diesel drums. (6th,12th and 27th Nov 03)	The trip tray was provided to the generators and the diesel drum was removed.	The situation was rectified. (29th Nov 03)
Oil stain was observed near the diesel drum (6th Nov 03)	The soil was removed and disposed of as chemical waste.	The situation was rectified. (11th Nov 03)
The doors of the generator were not closed. (6th Nov 03)	The contractor has closed the door accordingly.	The noise was reduced significantly. (8th Nov 03)
Pool of stagnant water was observed at Pump House and Closed Area (6th,20th and 27th Nov 03)	The contractor has pumped out the stagnant water or backfilled the area.	No accumulation of stagnant water was observed. (22nd Nov 03)
Dusty environment was observed at Pump house (12th Nov 03)	The contractor has arranged worker / water truck to spray the area with water to make the entire road surface wet.	To be reviewed regularly
A vehicle exit without wheel washing facilities was observed. (12th Nov 03)	The contractor has asked the driver not to use that exit to leave the site.	To be reviewed regularly.
Small amount of wastewater generated by wheel washing was flowing into the IFRC. (27th Nov 03)	The water was collected and reused as far as practicable.	No muddy surface run-off observed. (29th November 03)
Muddy surface runoff observed at Container yard. (27th Nov 03)	The contractor has improved the sedimentation system and diverted the runoff to the system.	The situation improved and to be reviewed regularly.
A tank or a sump pit should be installed at the end of the channel for checking the water quality. (4th Dec 03)	Sump pit was established and piece of geo-textile was installed at the outlet.	The quality of the discharge was improved. (11th Dec 03)
Oil drums were not put in the drip trays. (4th and 24th Dec 03)	Drip trays were provided.	The situation was rectified. (11th and 30th Dec 03)
The border road around the site entrance was not kept free from soil. (12th Dec 03)	More frequent cleaning was conducted by the Contractor.	The Border road was kept clean. (13th Dec 03)
Additional layer of geo-textile was recommended to install at the channel outlet. (12th and 18th Dec 03)	The additional geo-textile has been installed.	The quality of the discharge was acceptable. (20th Dec 03)

Table 7.1 (cont'd) Summary of Findings, Actions and Outcomes of Site Inspection by the IEC, ER and ET

Observations	Actions by Contractor	Outcome
Pool of stagnant water observed near the wheel wash bay. (18th and 24th Dec 03)	The stagnant water was pumped out.	The situation was rectified. (30th Dec 03)
Fugitive dust generated by site traffic observed. (18th Dec 03)	Water bowser was employed.	No dust generation by site traffic observed. (20th Dec 03)

Table 7.2 Summary of Non-Conformance, Actions and Outcomes of Site Inspection by the IEC, ER and ET

Non-Conformance	Actions by Contractor	Outcome
The sedimentation tank used for the collection of wastewater created from wheel wash facilities at container yard was damaged. Muddy water was discharged (3rd Oct 03)	The contractor has repaired the tank.	No muddy water was discharged. (6th Oct 03)
Muddy water was flowing into the IFRC. (17th Oct 03)	The water was diverted to the sump pit only for sedimentation.	No muddy water was discharged to the IFRC. (22nd Oct 03)
Muddy water was discharged into the existing stream from a sedimentation tank. (11th Oct 03)	The contractor has stopped the discharge immediately.	No muddy water was discharged to the stream at once.
Muddy water was flowing into the San Tin River. (12th Nov 03)	The contractor has stopped the water pump at once.	No muddy water was discharged at once.
Muddy water was flowing into the channel. (4th Dec 03)	The muddy effluent was diverted to a sump pit.	No muddy water was discharged. (6th Dec 03)

8. SOLID AND LIQUID WASTE MANAGMENT STATUS

A total of 35,666.67 m^3 C&D waste was generated from the works in this reporting period. All of the waste was transported to the WENT Landfill Site for disposal. In addition, 16,995 m^3 fill material was imported for the construction of Embankment from Tai Po, Sheung Shui and Yuen Long. 4344 m^3 Type I and Type II contaminated soil was delivered to East Sha Chau for disposal. 400 L chemical waste (spent lubricant) was collected by a licensed Contractor.

9. COMPLAINTS, NOTIFICATIONS OF SUMMONSES AND SUCCESSFUL PROSECUTIONS

No complaint and notifications of summons were received in this reported period. Two successful prosecutions were made in November 2003 regarding carrying out regulatory works not in accordance with the Construction Dust Regulation on the 28th March 2003.

Complaint Log is attached in Appendix IX. Cumulative statistics on complaint, is attached in Appendix X.

10. CONCLUSIONS

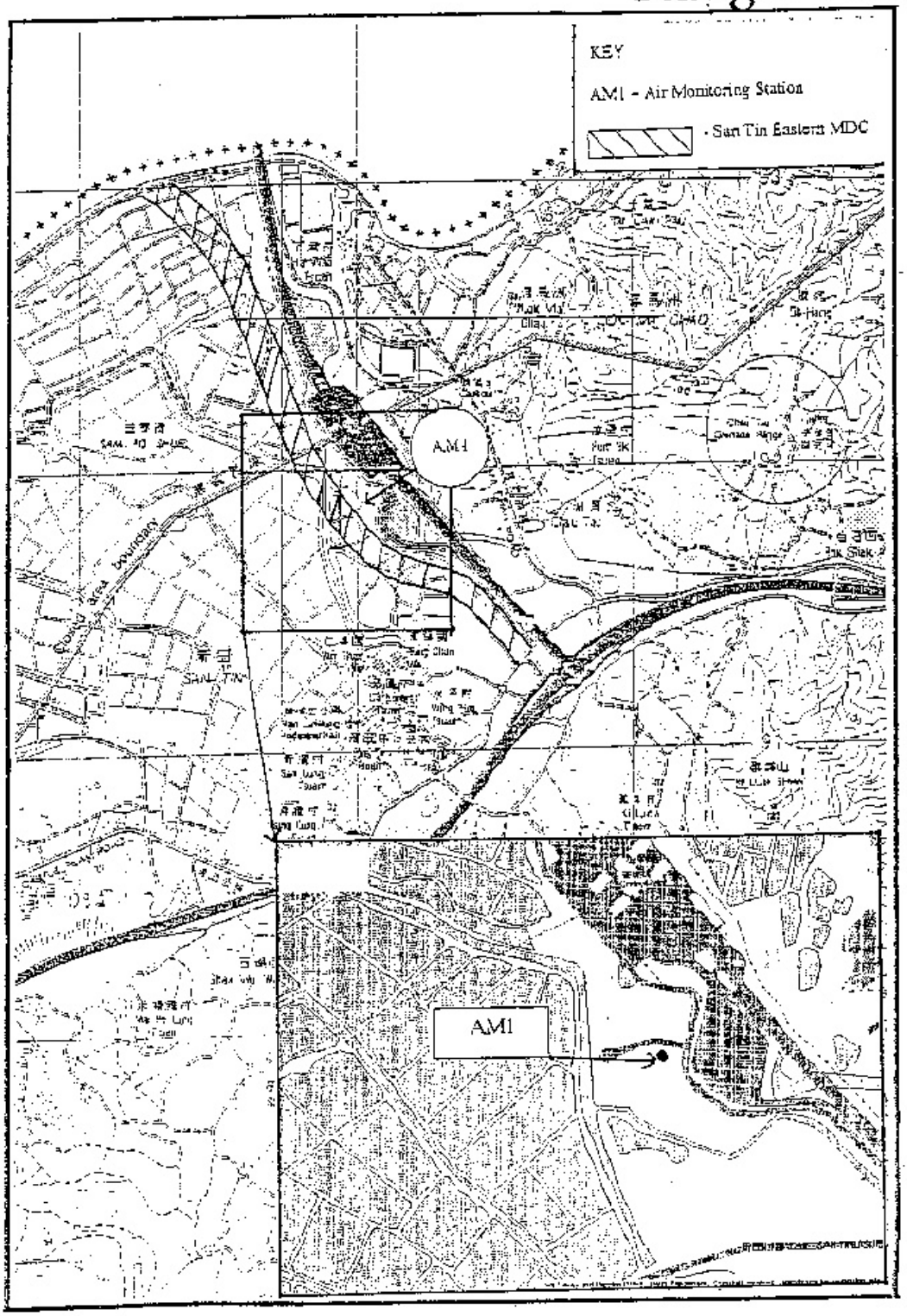
This Quarterly Environmental Monitoring and Audit Report details the monitoring works carried out during the period from 1st October to 31st December 2003.

All results for the air quality monitoring conducted this quarter were acceptable with no exceedance to set Action or Limit levels for either 24 or 1-Hour TSP levels being recorded. No untoward results or trends in results were noted. All impact noise monitoring gave results that complied with the proposed Limit exceedance levels NM1(A). In addition, results for water quality were found to be acceptable this reported period with no exceedances to any set Action or Limit levels.

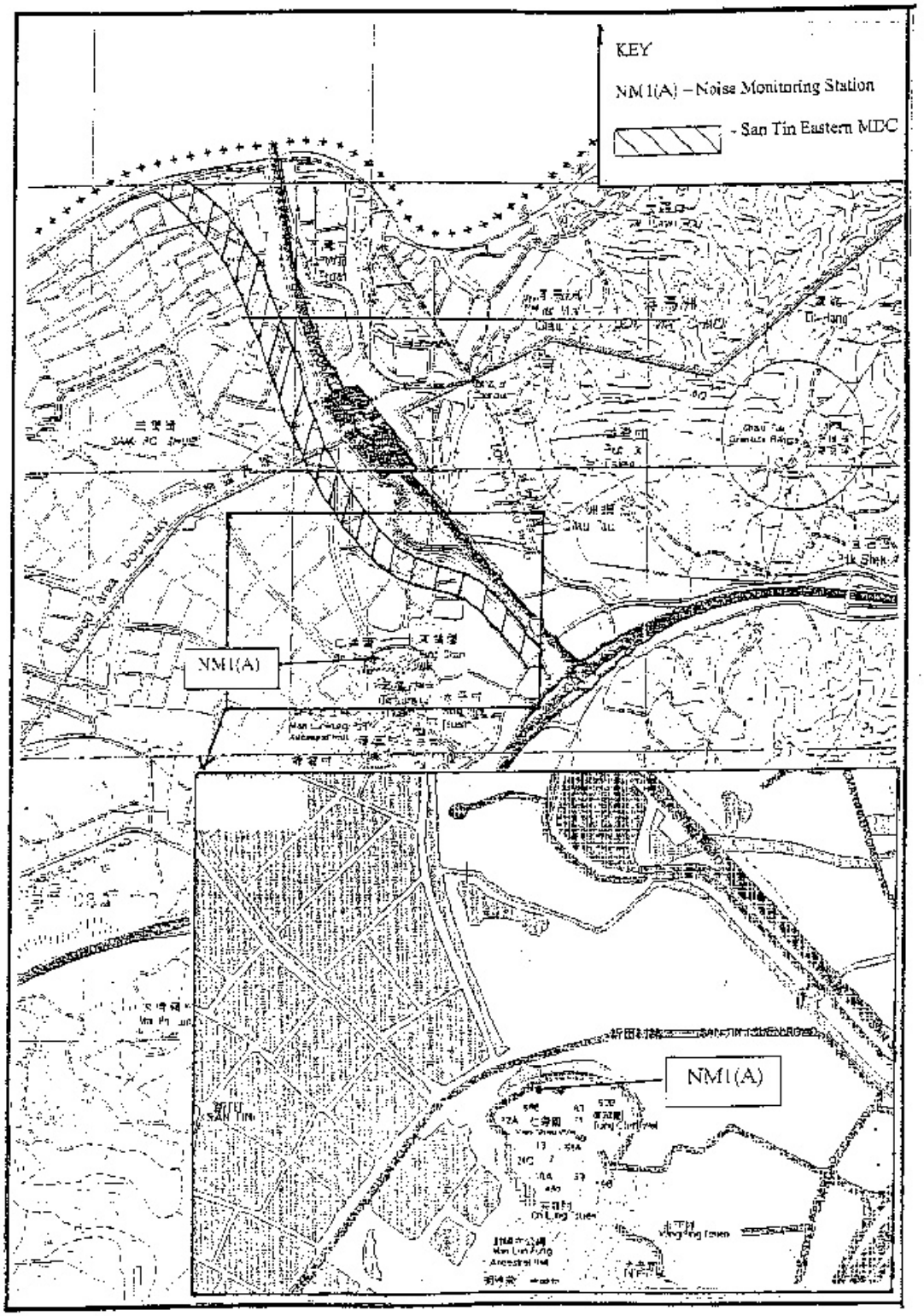
In addition, no complaint received this month. Two successful prosecutions were made in November 2003 regarding carrying out regulatory works not in accordance with the Construction Dust Regulation on the 28th March 2003.

Figures

Stanger Asia



Stanger Asia



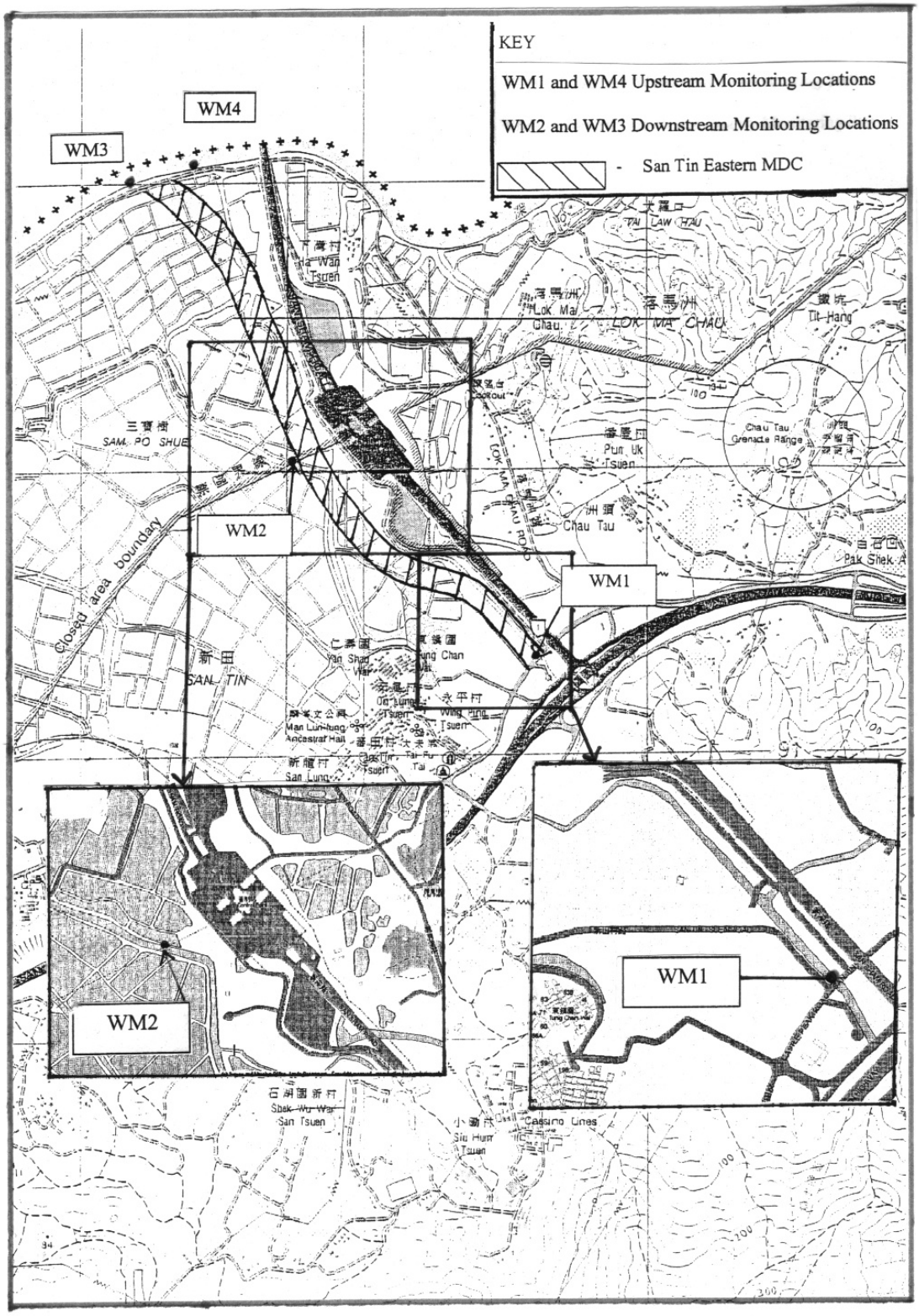
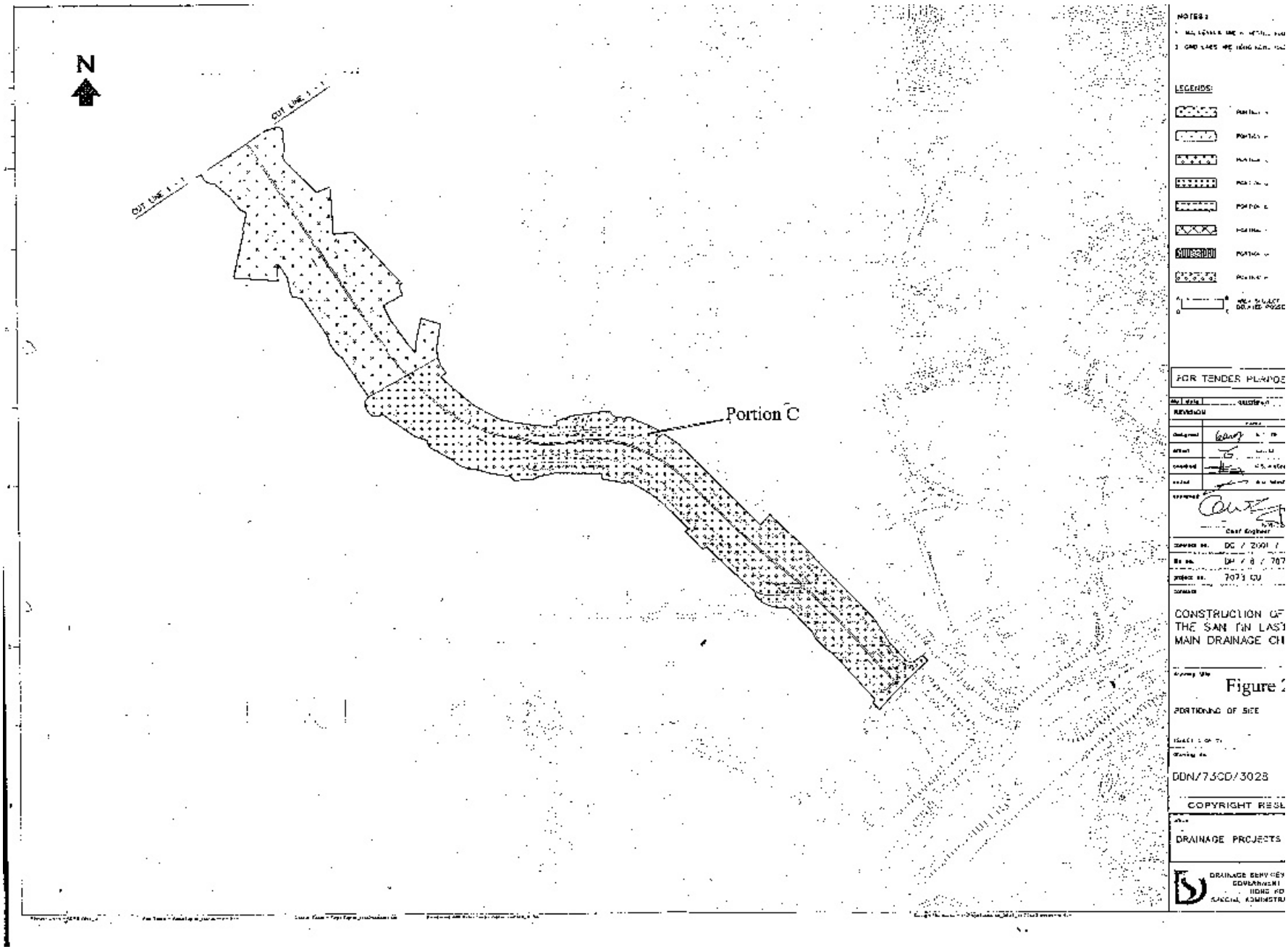


Figure 4.1 – Location of Water Quality Monitoring


N
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NOTES:
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FOR TENDER PURPOSES
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Chief Engineer
CONSTRUCTION OF
THE SAN TIN LAST
MAIN DRAINAGE CH
Figure 2
PORTIONING OF SITE
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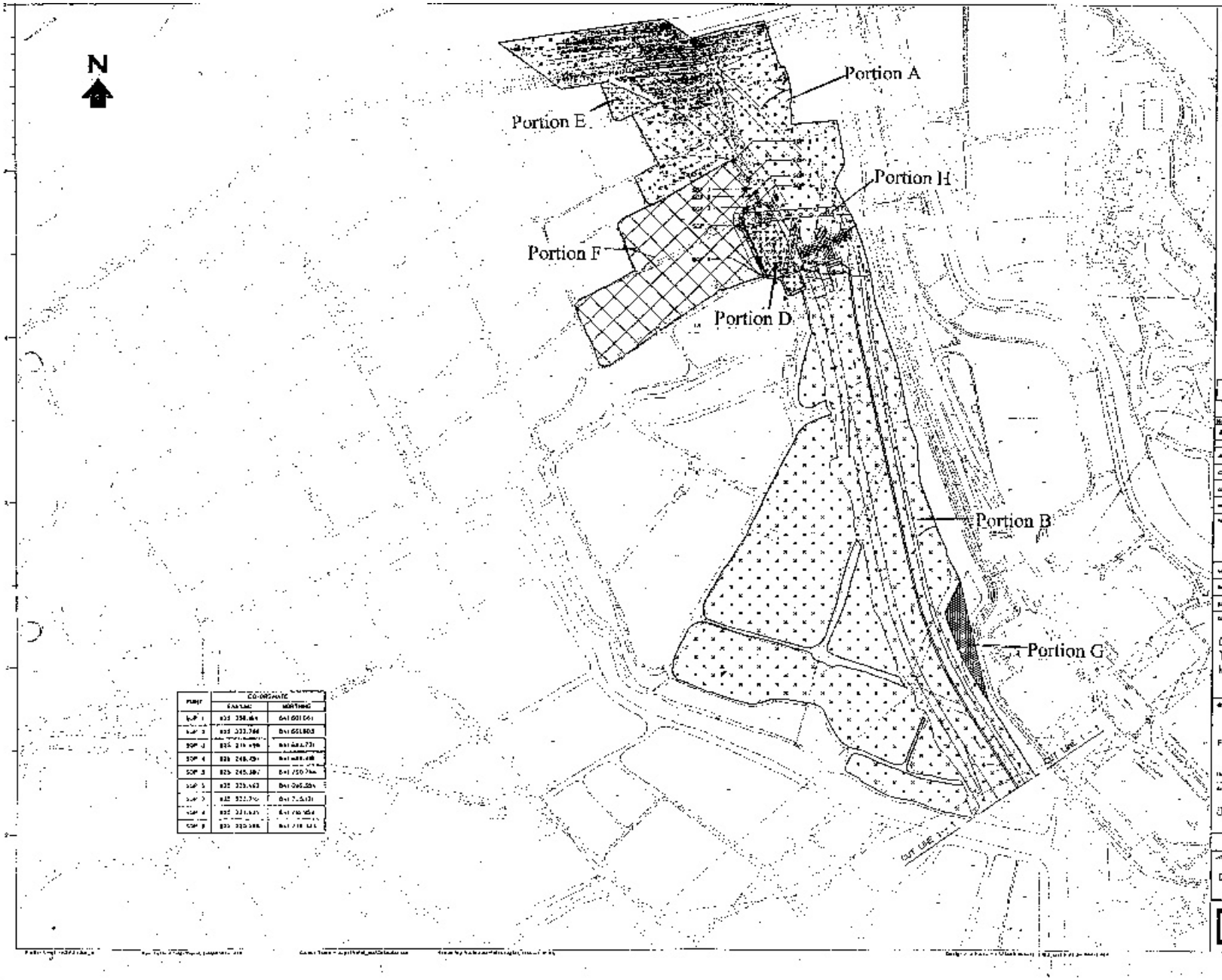
DRAINAGE PROJECTS
DRAINAGE SERVICES
GOVERNMENT



POINT	COORDINATE	
	EASTING	NORTHING
SOP 1	835 358.864	841 601.061
SOP 2	835 333.766	841 661.803
SOP 3	835 216.496	841 644.731
SOP 4	835 248.451	841 488.498
SOP 5	835 245.387	841 450.784
SOP 6	835 329.163	841 396.284
SOP 7	835 322.376	841 [illegible]
SOP 8	835 331.631	841 [illegible]
SOP 9	835 335.588	841 [illegible]

NOTES :

1. FOR GENERAL NOTES [illegible]
DRG. No. 30W/73[illegible]

FOR TENDER PURPO

No.	DATE	REVISION
A	[illegible]	[illegible]
B	[illegible]	[illegible]
C	[illegible]	[illegible]
D	[illegible]	[illegible]

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CONSTRUCTION OF
THE SAN TIN EAS
MAIN DRAINAGE CH

Figure

FORTIONING OF SITE

SHEET 2 OF 3

DRG. No.

3DN/7390/3029

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DRAINAGE PROJECTS

DRAINAGE SERVICES
GOVERNMENT
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SPECIAL ADMINISTR

Stanger Asia

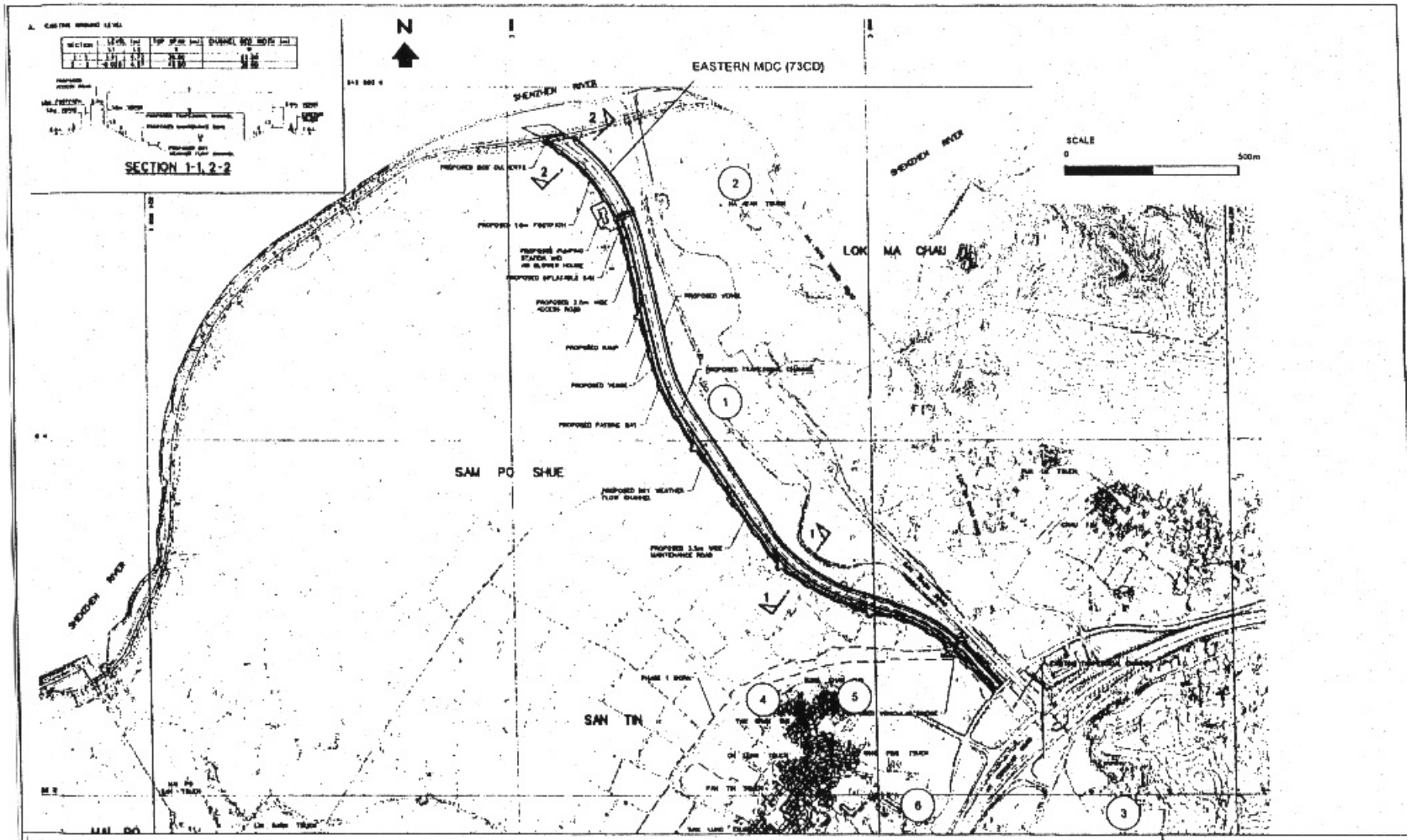


Figure 4.4 LOCATION OF REPRESENTATIVE ASRs

FILE: C1814s82
DATE: 02/03/99

Stanger Asia

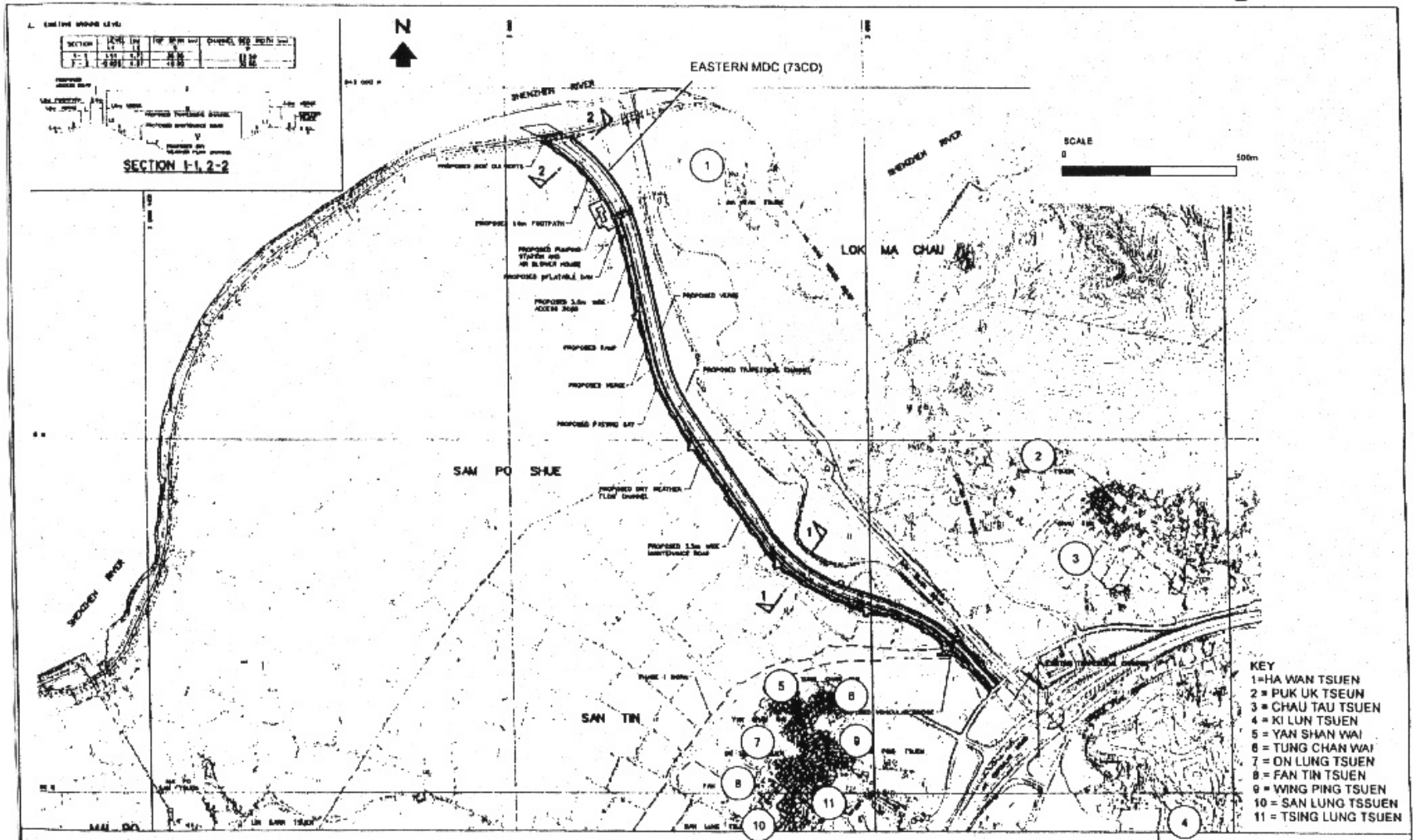


Figure 4.5 LOCATION OF REPRESENTATIVE NSRs

FILE:
DATE: 02/03/98

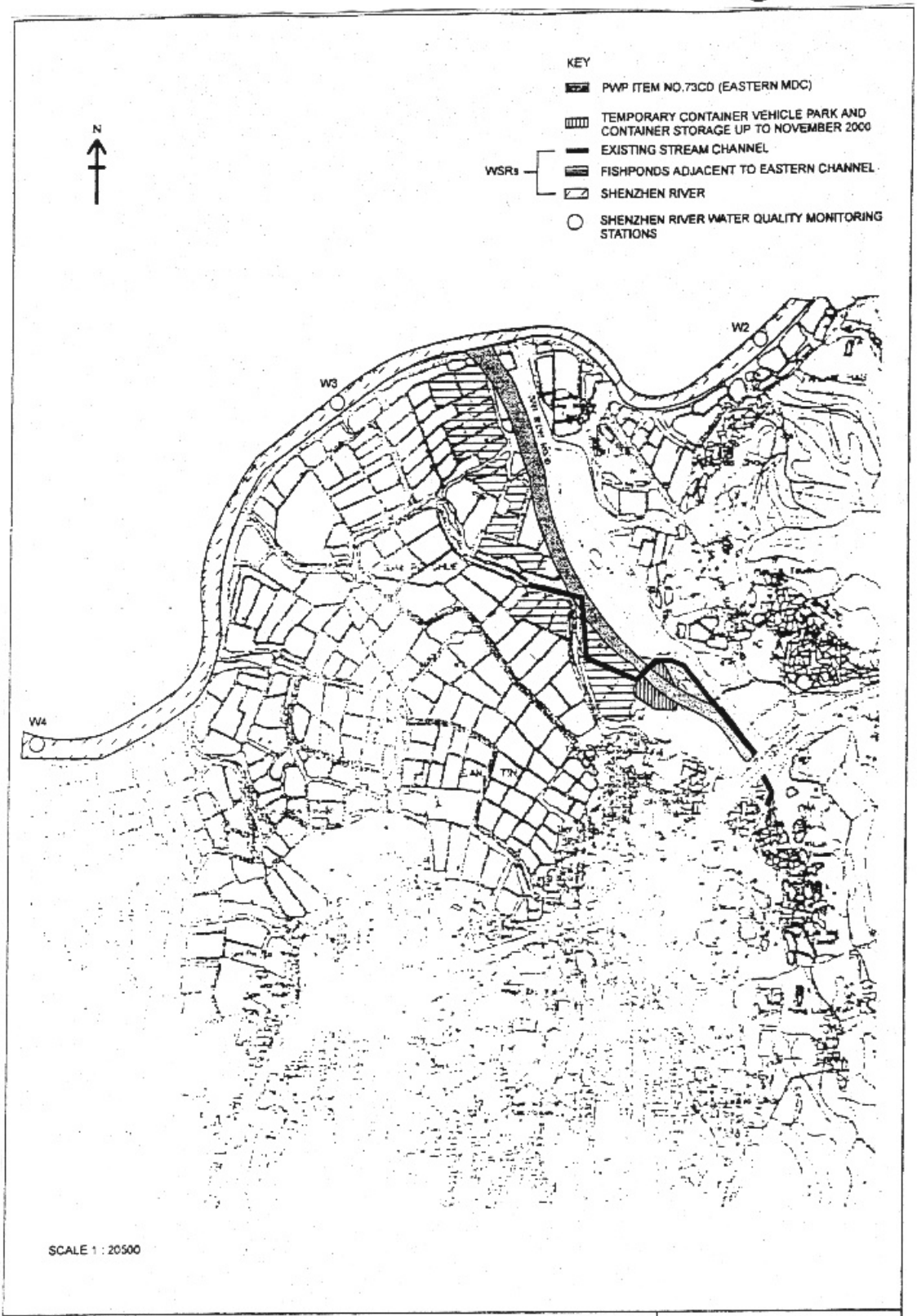


Figure 4.6 WATER QUALITY SENSITIVE RECEIVERS AND LOCATIONS OF SHAM CHUN RIVER WATER QUALITY MONITORING STATIONS

Figure 6.1 - Graphical Plot of 24-hr TSP Levels

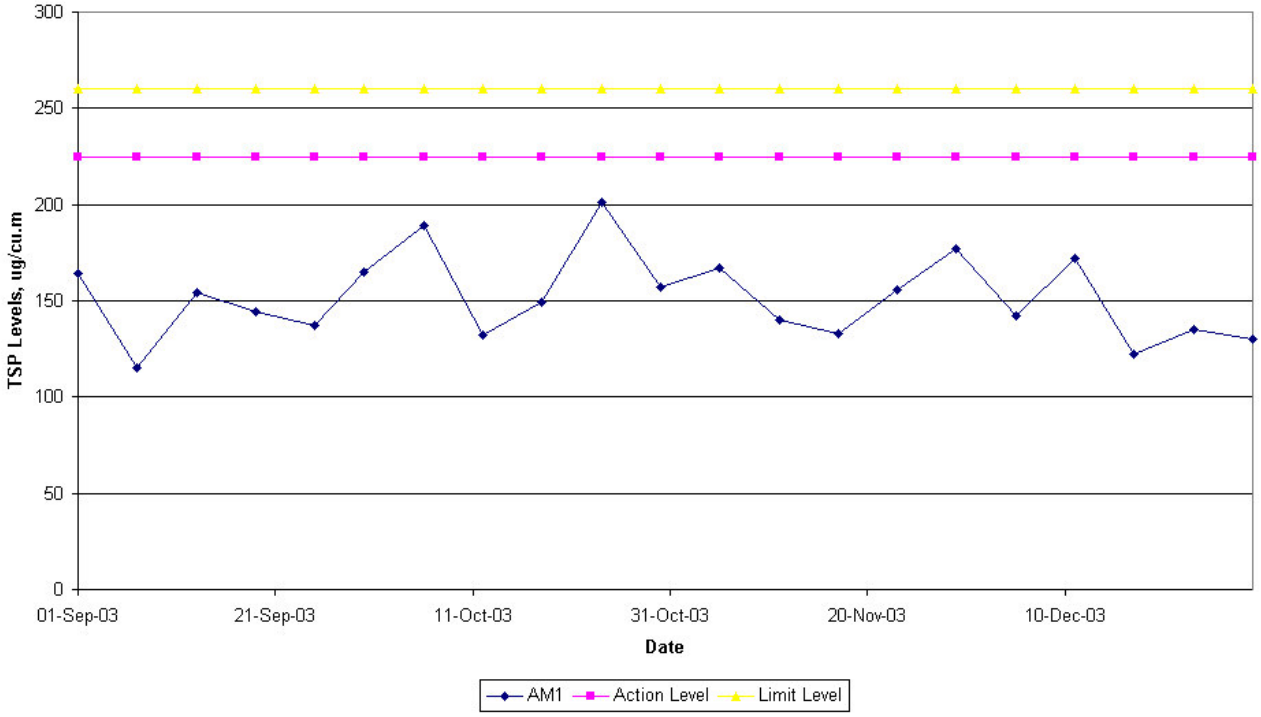


Figure 6.2 - Graphical Plot of 1-hr TSP Levels

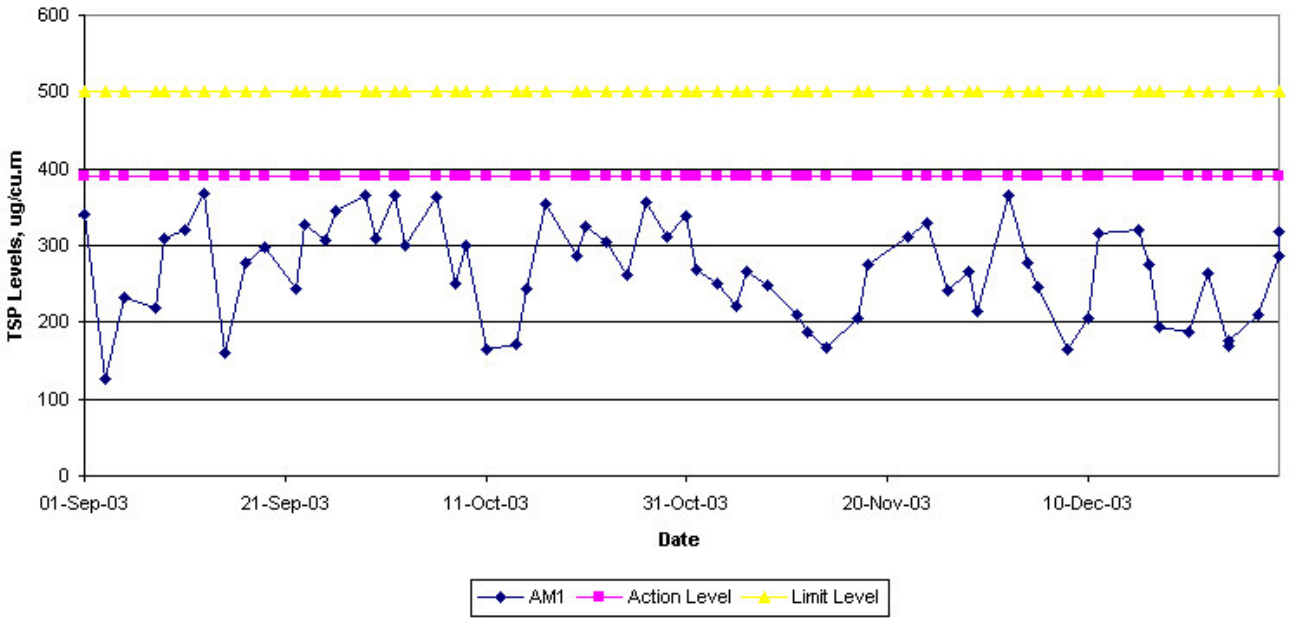


Figure 6.3 - Graphical Plot of Noise Level

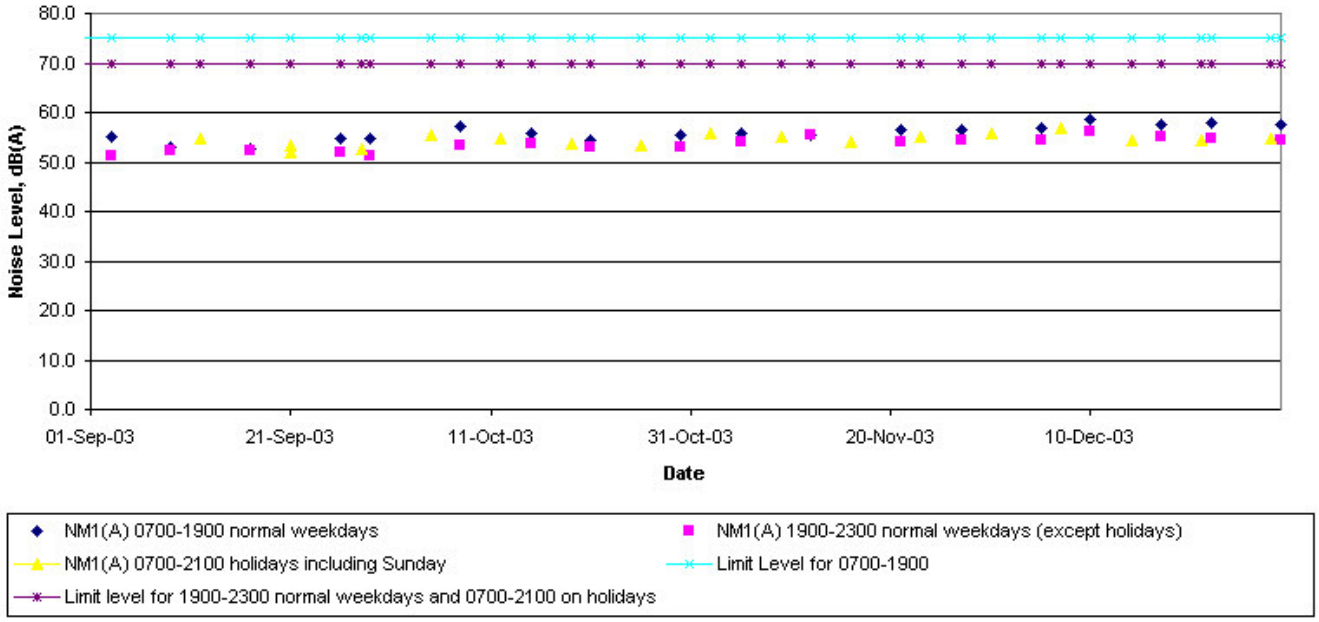


Figure 6.4 - Graphical Plot for Temperature (WM1 & WM2)

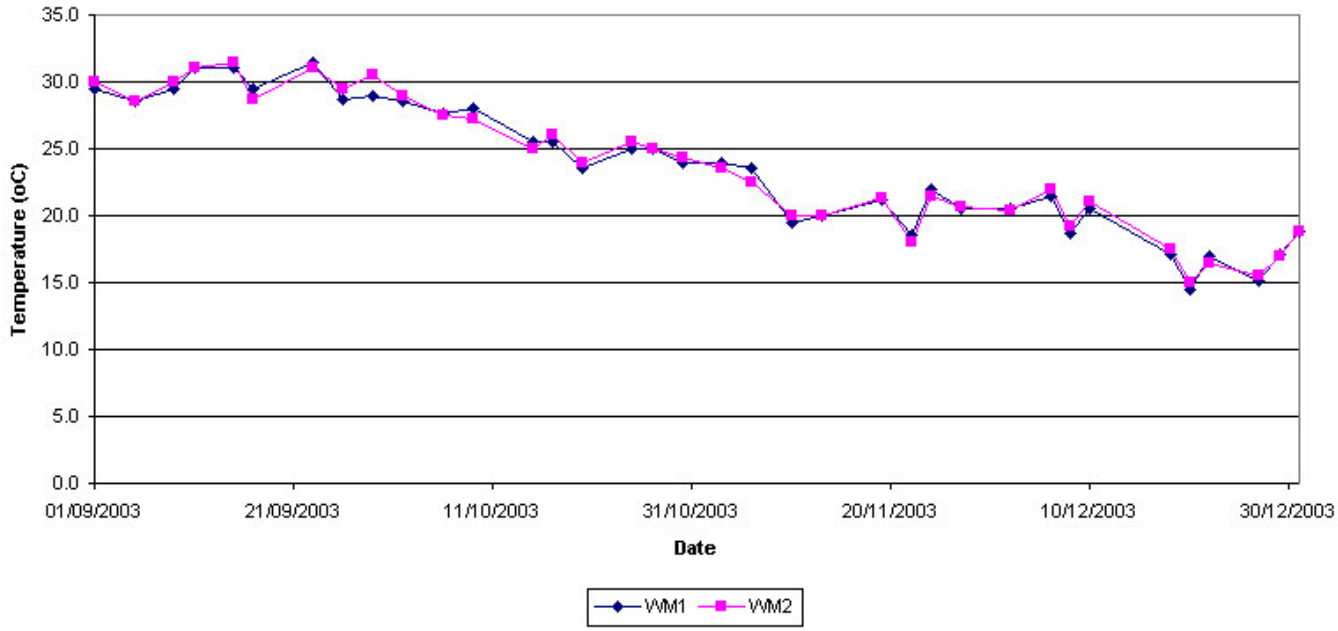


Figure 6.5 - Graphical Plot for Temperature (WM3 and WM4)

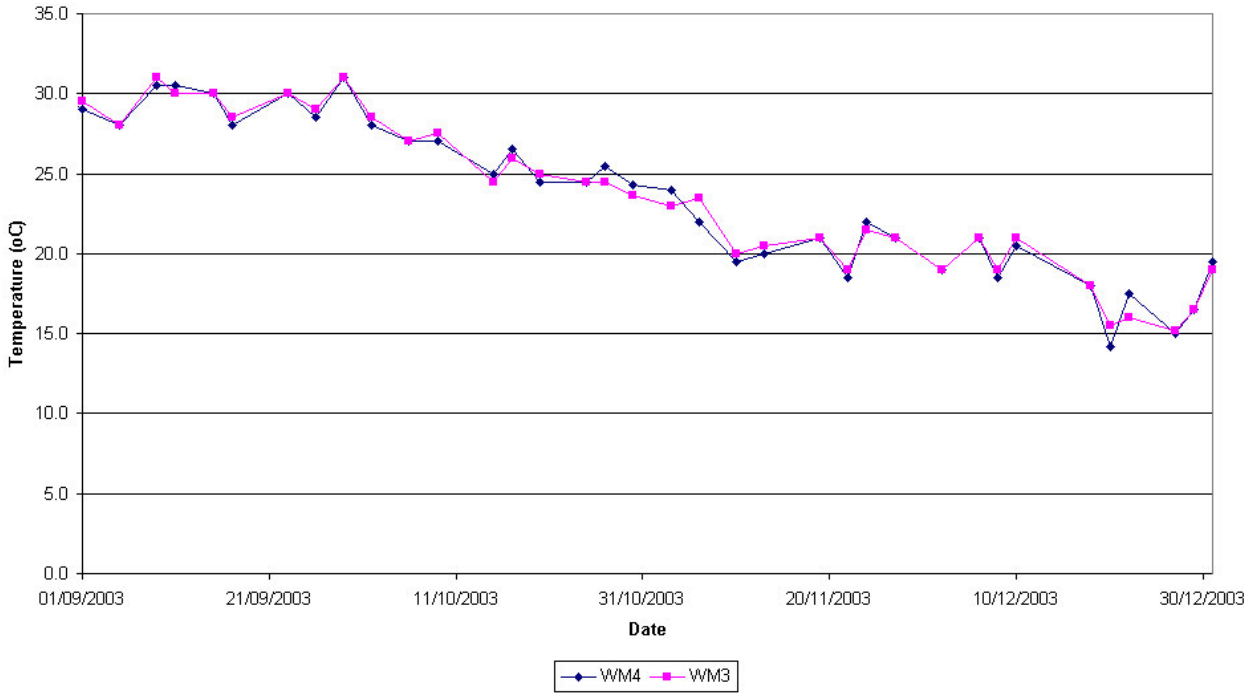


Figure 6.6 - Graphical Plot for pH (WM1 & WM2)

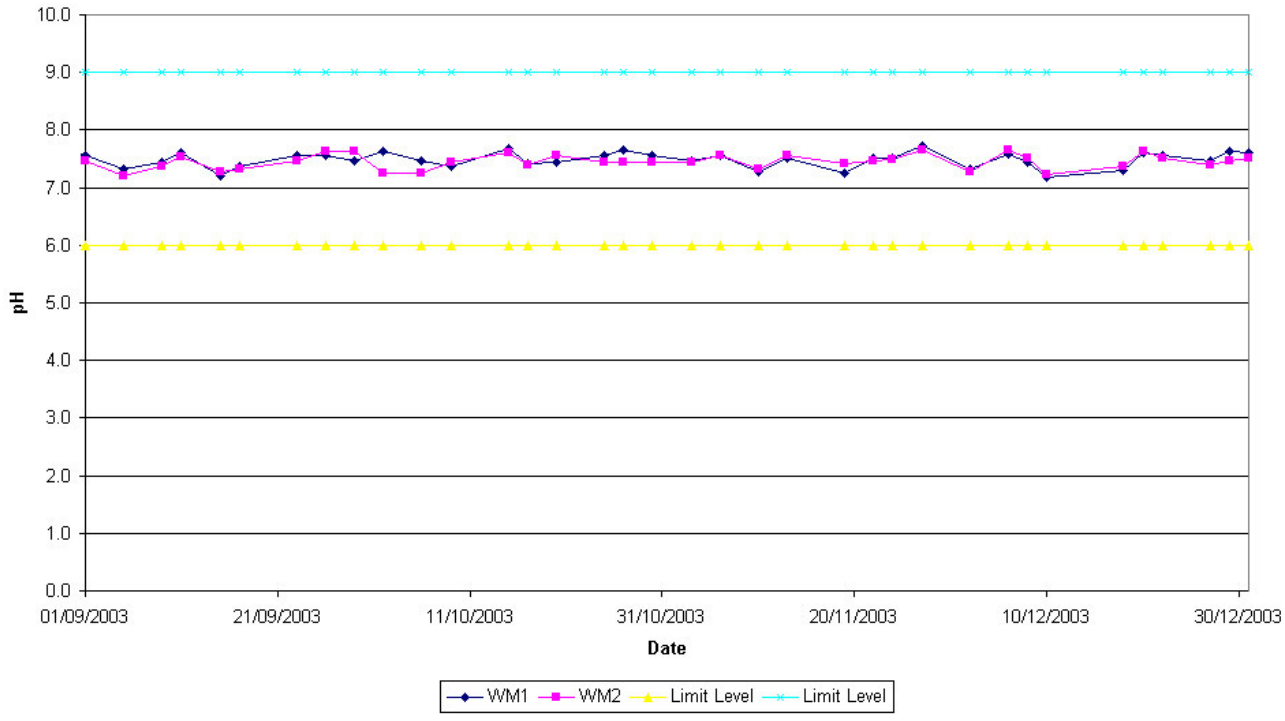


Figure 6.7 - Graphical Plot for pH (WM3 & WM4)

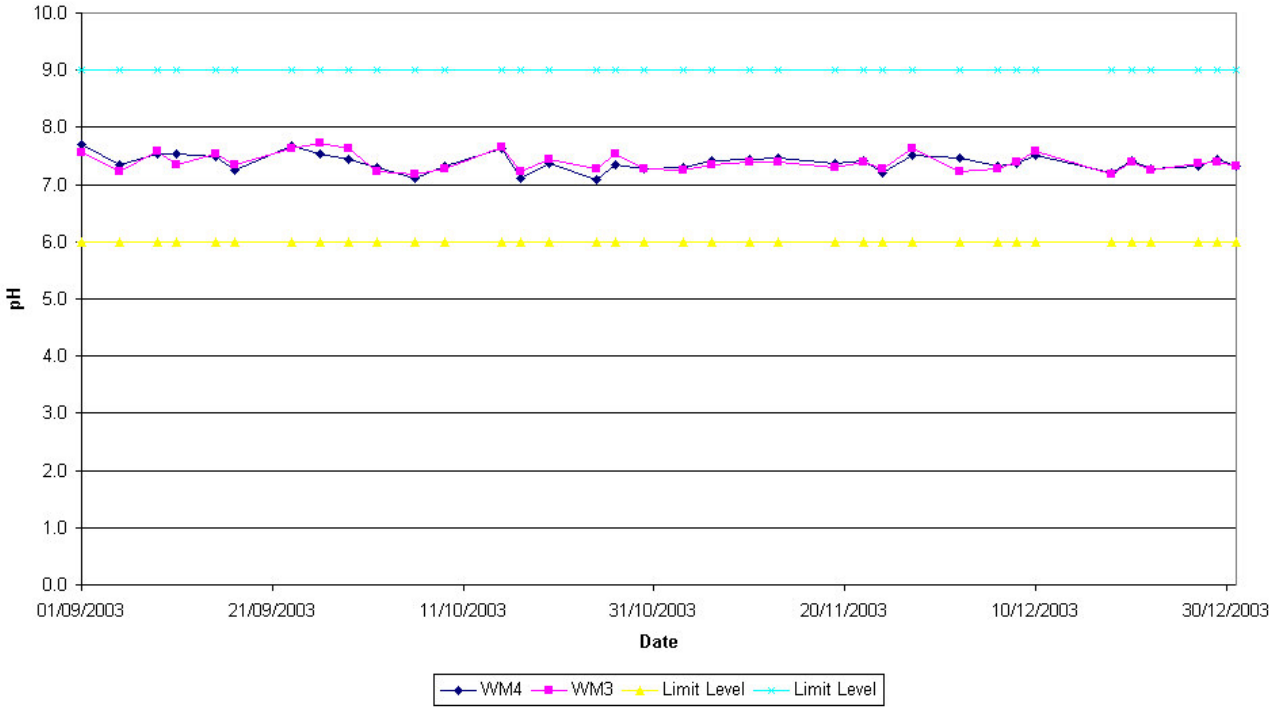


Figure 6.8 - Graphical Plot for Dissolved Oxygen (%) (WM1 & WM2)

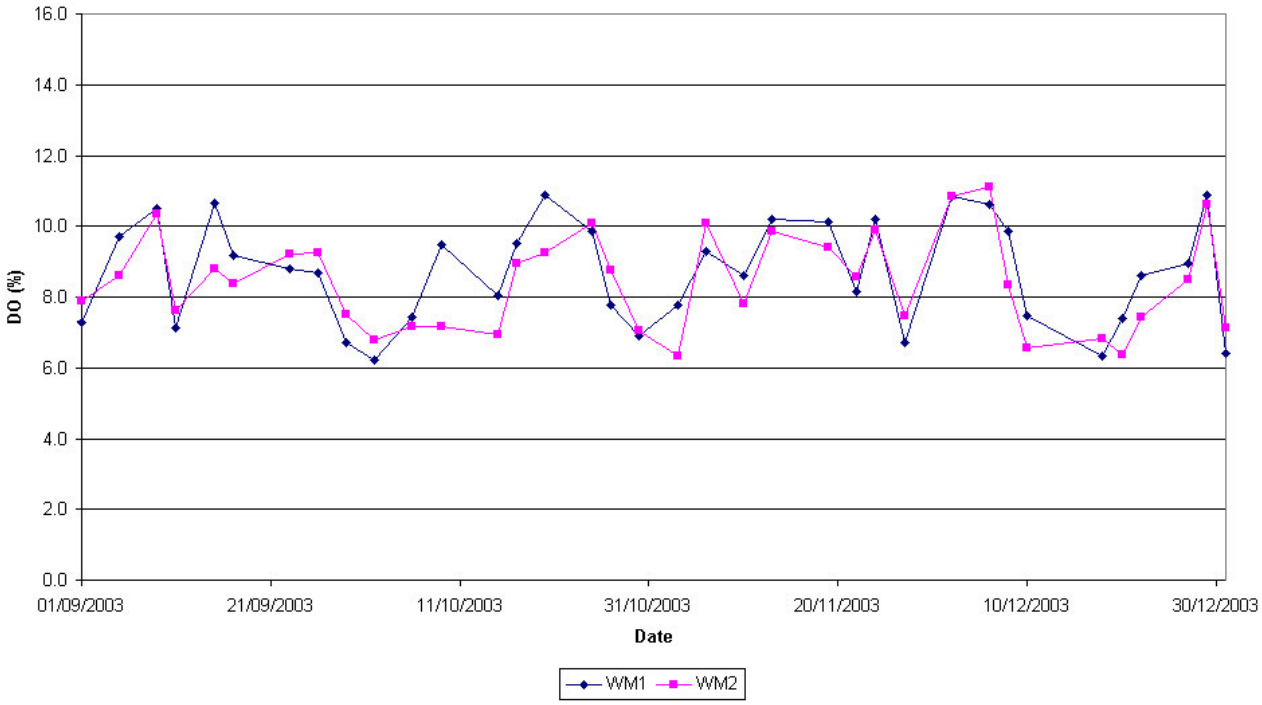


Figure 6.9- Graphical Plot for Dissolved Oxygen (%) (WM3 & WM4)

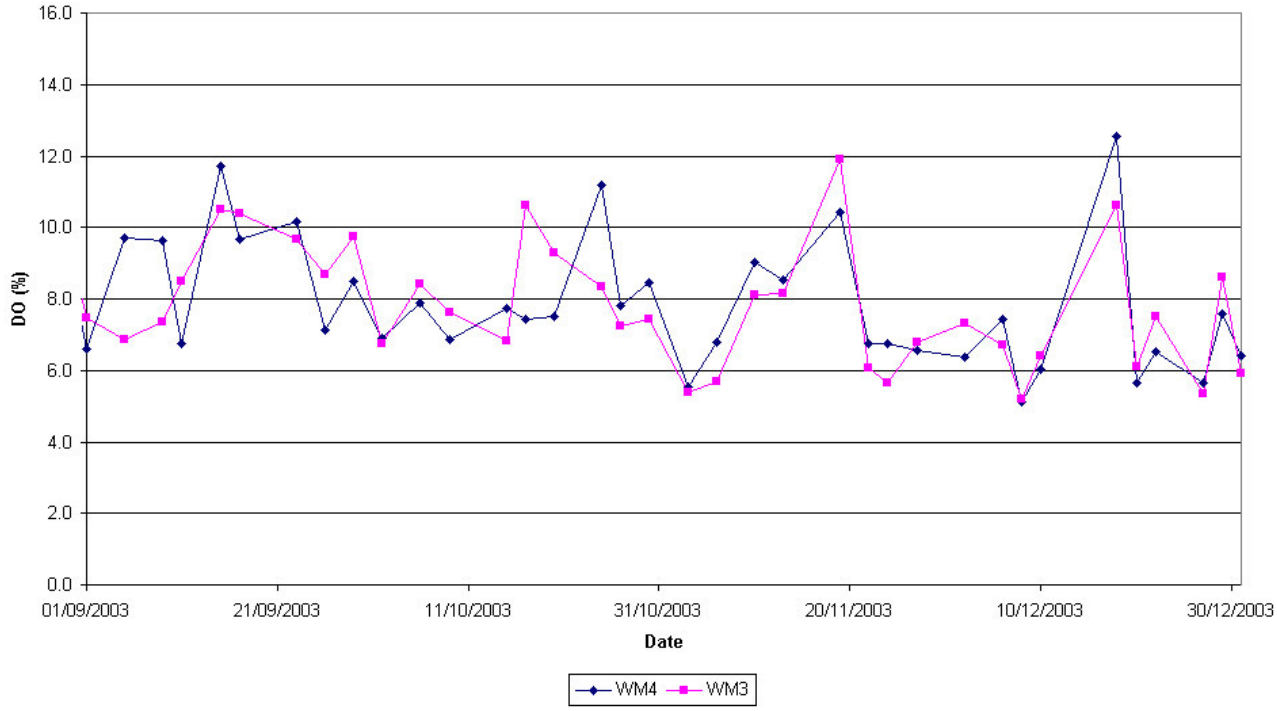


Figure 6.10 - Graphical Plot for Dissoloved Oxygen (mg/L) (WM1 & WM2)

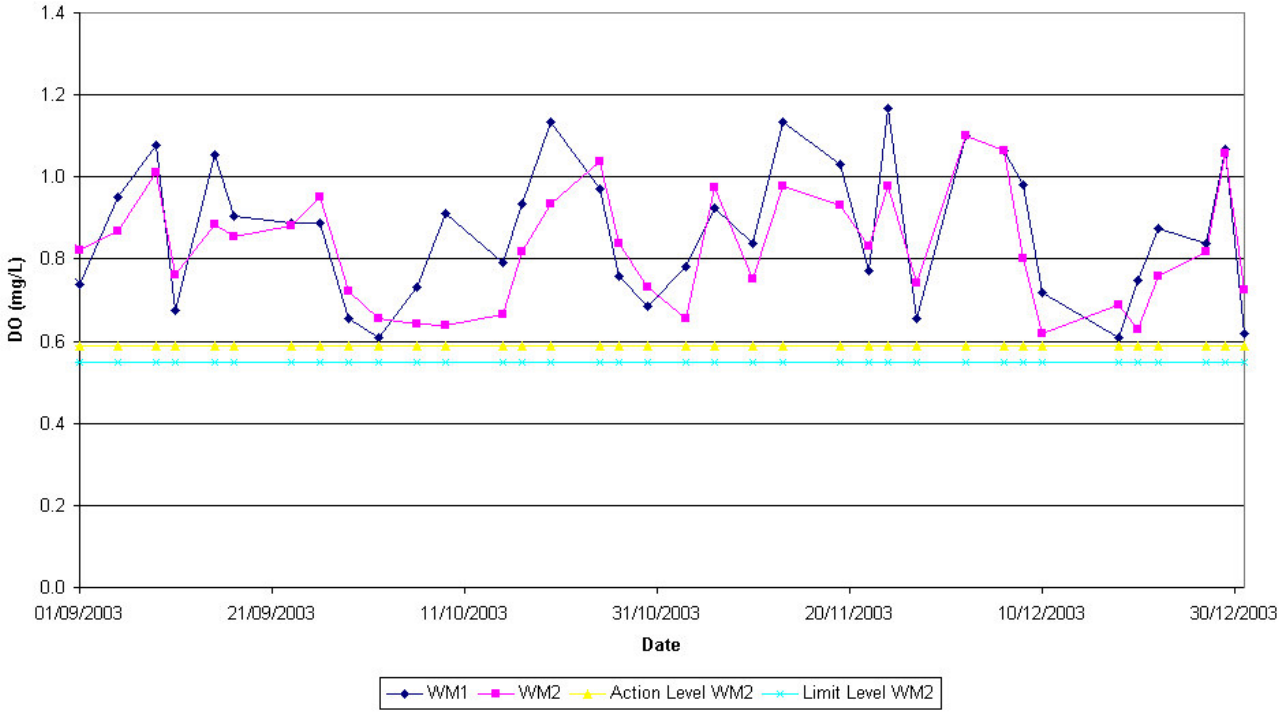


Figure 6.11 - Graphical Plot for Dissoloved Oxygen (mg/L) (WM3 & WM4)

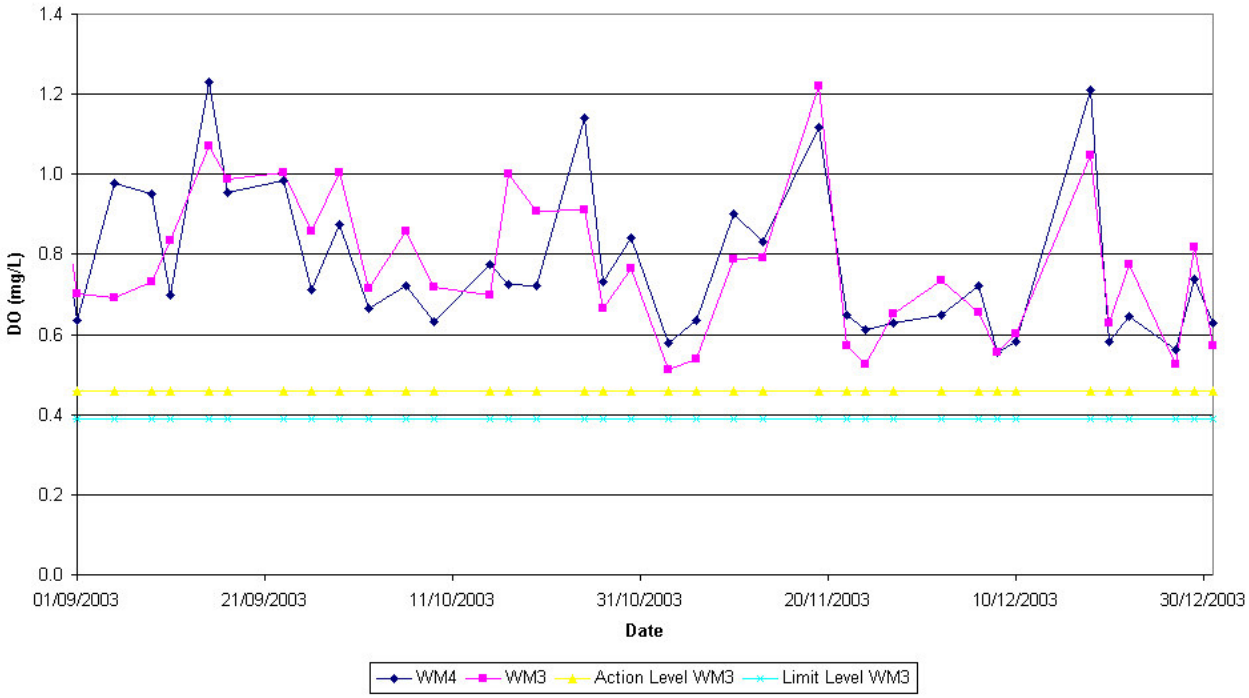


Figure 6.12 - Graphical Plot of Turbidity (WM1 & WM2)

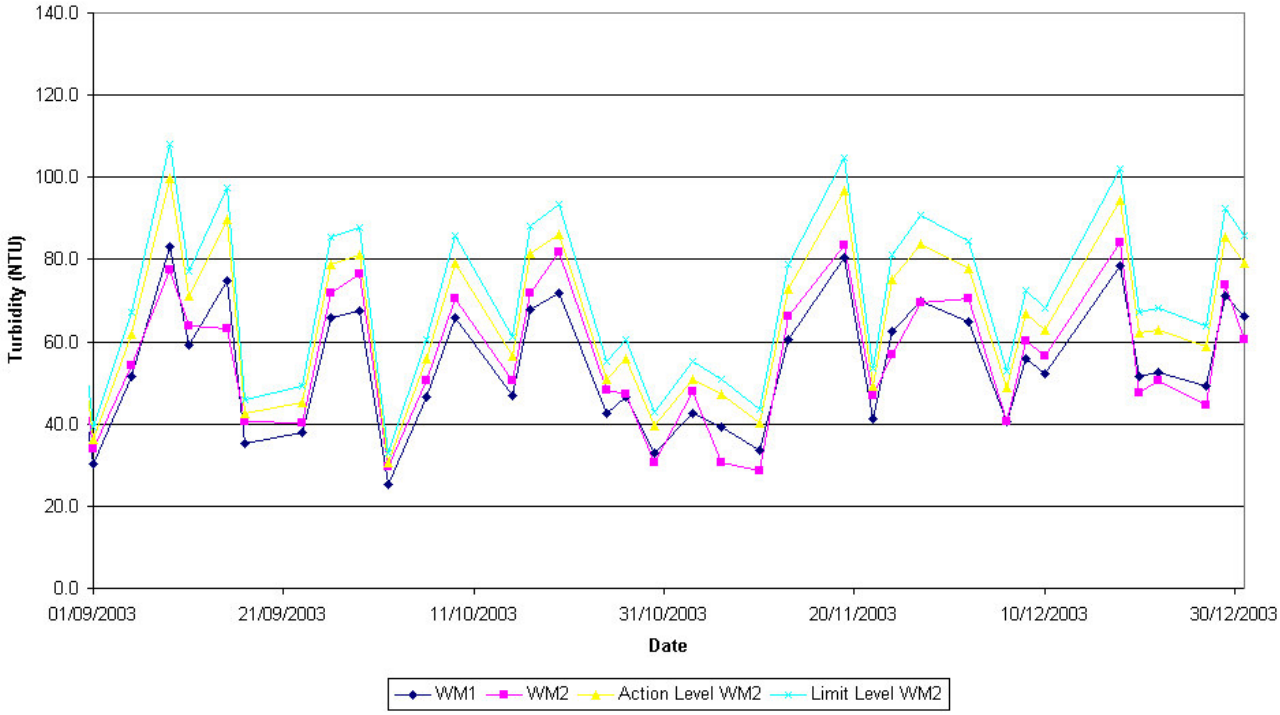


Figure 6.13 - Graphical Plot of Turbidity (WM3 & WM4)

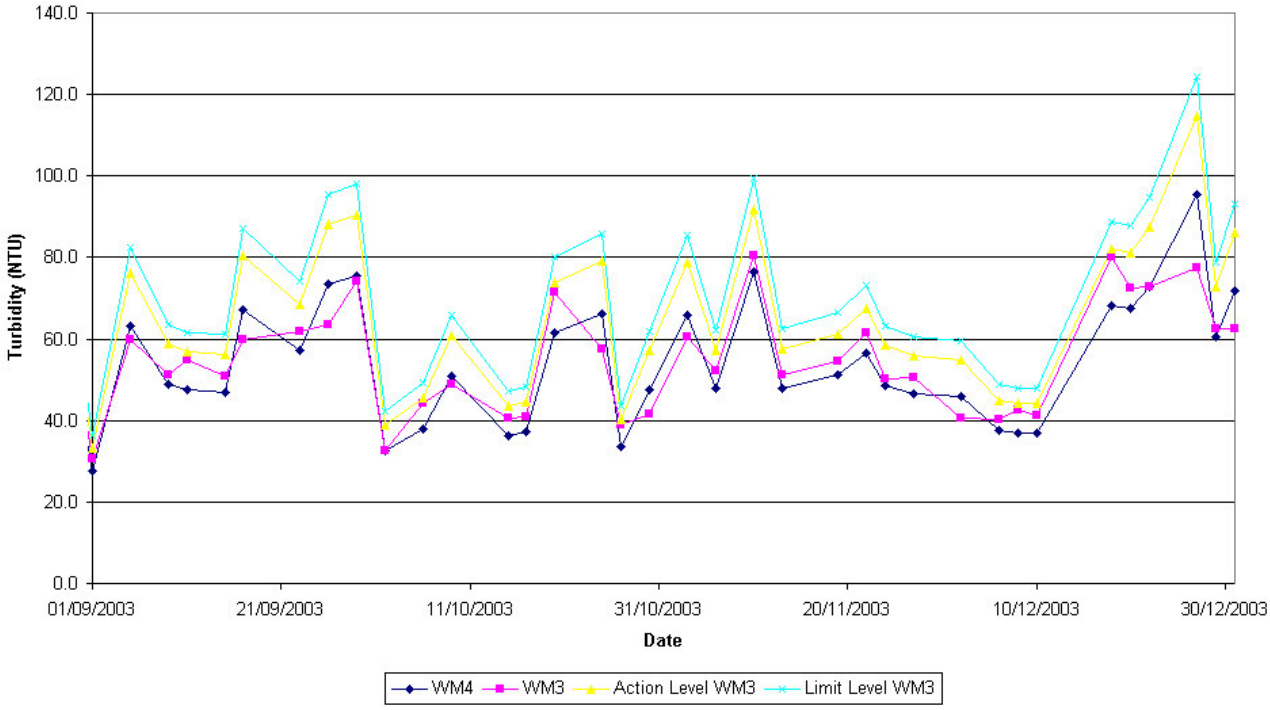


Figure 6.14 - Graphical Plot for Suspended Solids (WM1 & WM2)

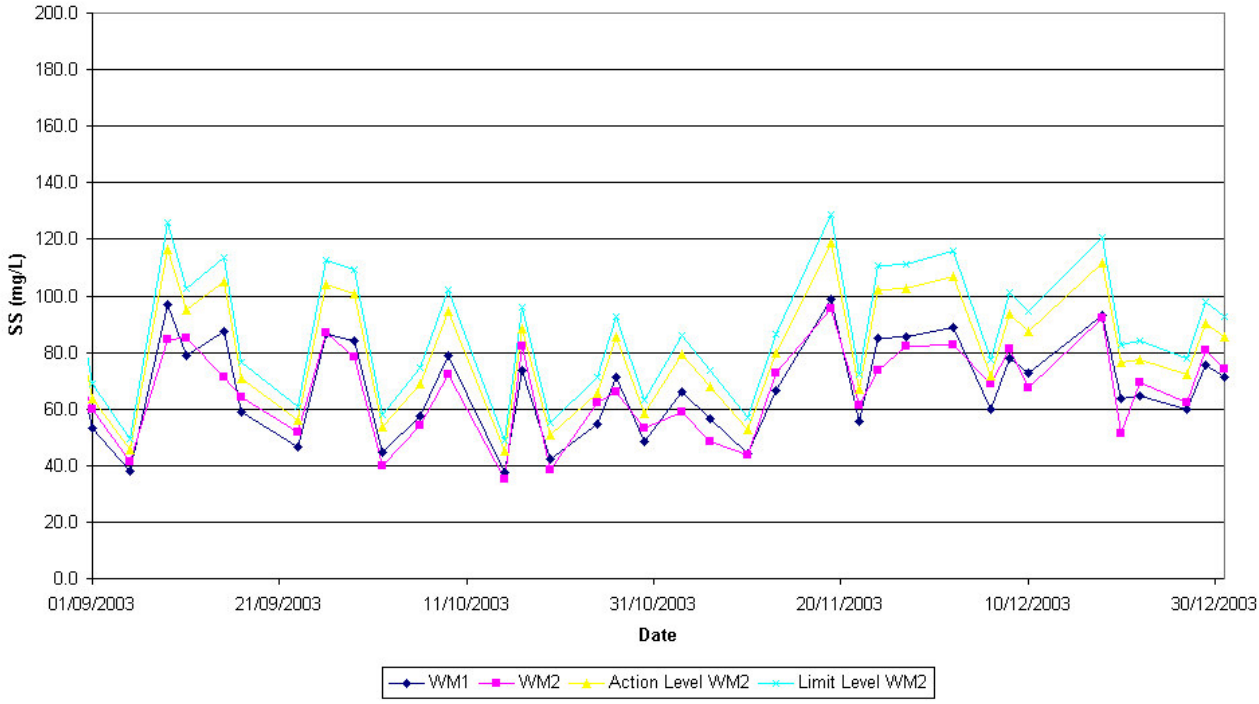


Figure 6.15 - Graphical Plot for Suspended Solids (WM3 & WM4)

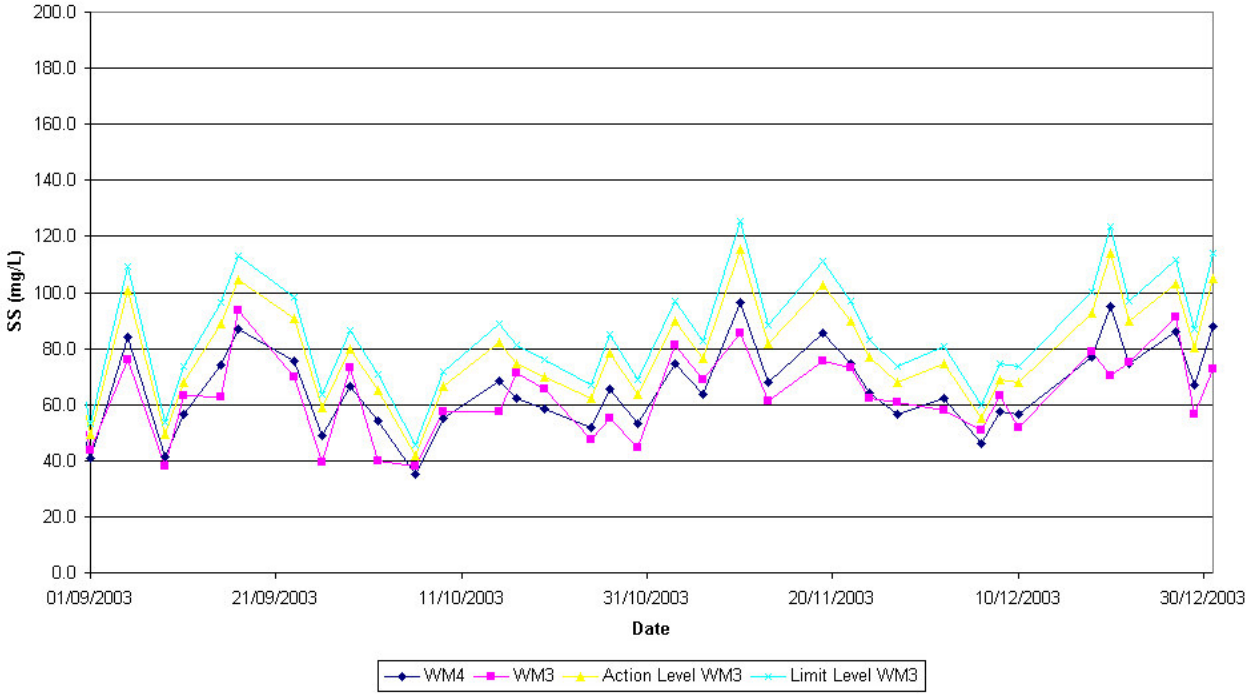


Figure 6.16 - Graphical Plot of Ammoniacal Nitrogen (WM1 & WM2)

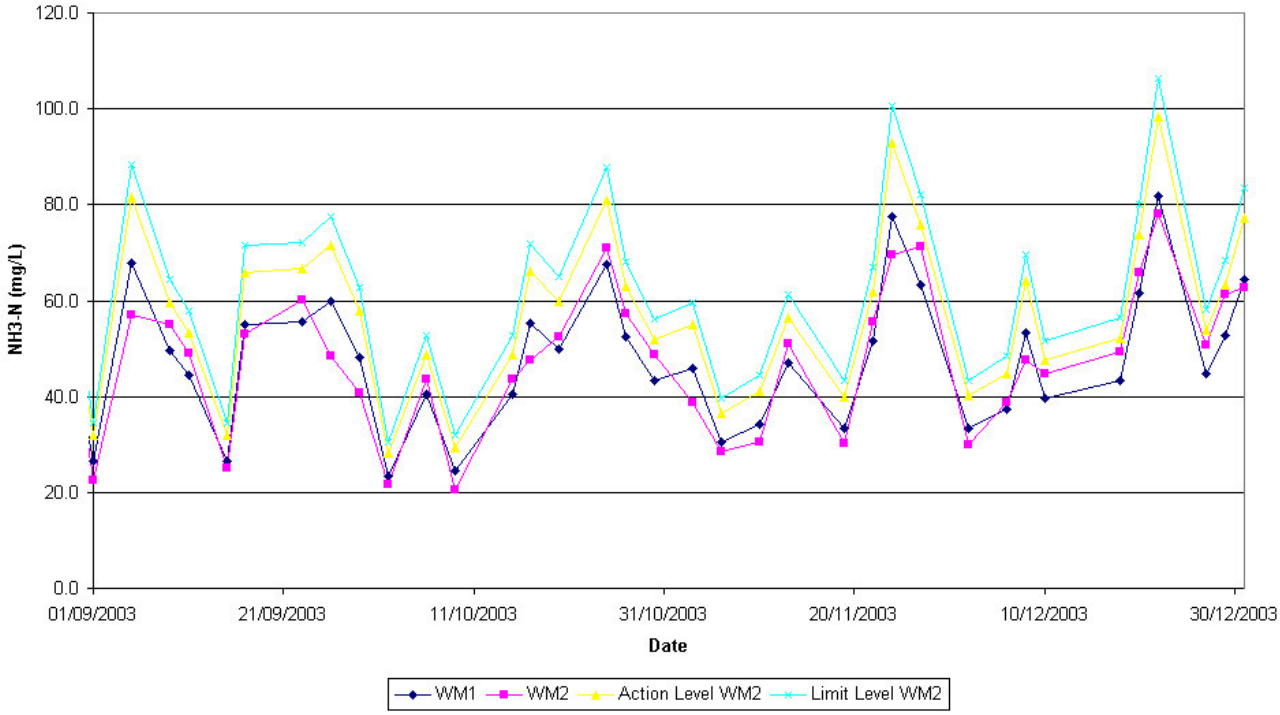
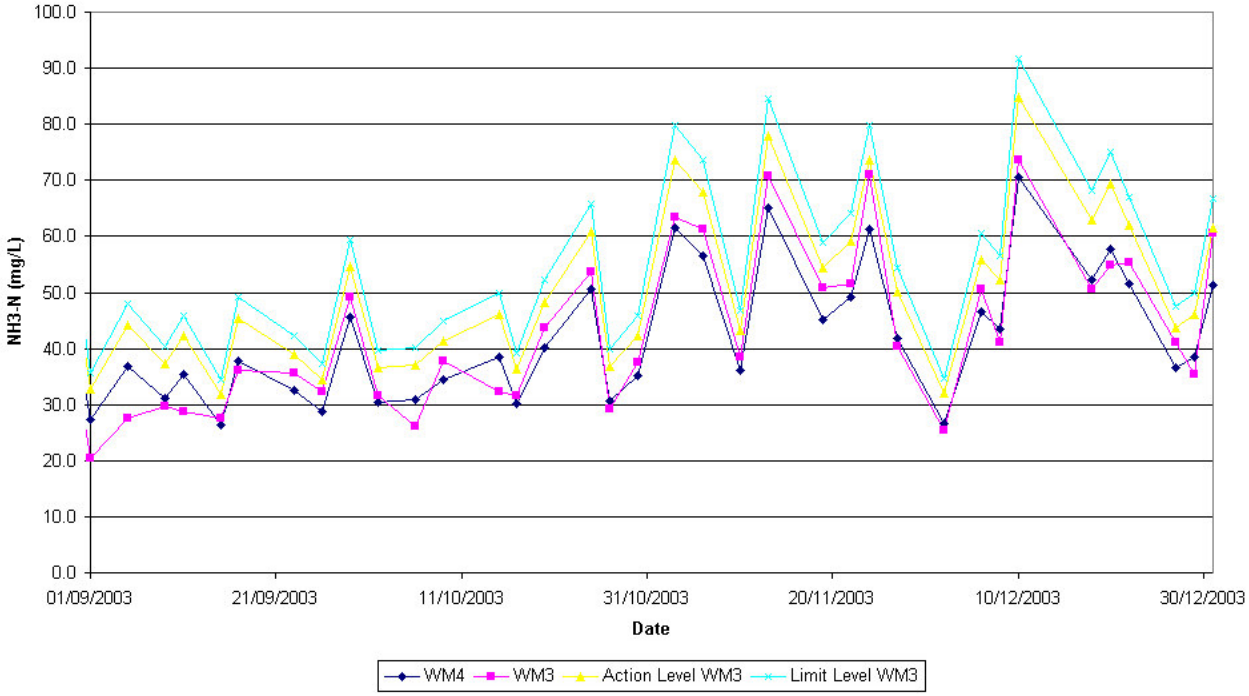


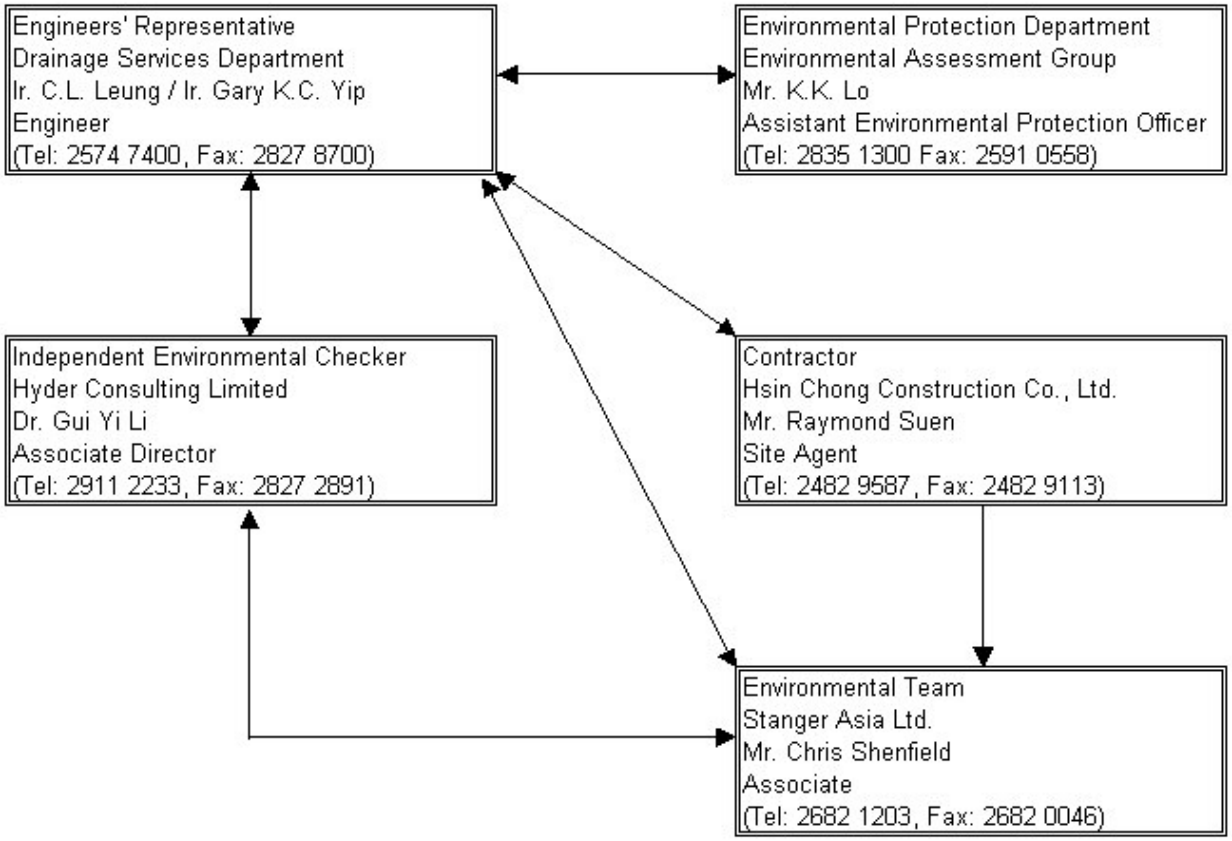
Figure 6.17 - Graphical Plot of Ammoniacal Nitrogen (WM3 & WM4)



Appendix I

Organization Chart

Project Organization (Environmental)
Construction of San Tin Eastern Main Channel
Contract No. DC/2001/09



Appendix II

Event and Actions Plans

Event and Action Plan for Water Quality.

EVENT	ACTION			
	ET Leader	**IC(E)**	**ER**	**CONTRACTOR**
Action Level				
Exceedance for one sample.	1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform ER, IC(E) and Contractor. 3. Repeat measurements to confirm finding. 4. Increase monitoring frequency to daily until no exceedance is found.	1. Check monitoring data submitted by ET. 2. Check Contractor's working methods.	1. Notify Contractor.	1. Rectify any unacceptable practice. 2. Amend working methods if appropriate.
Exceedance for two samples.	1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform ER, IC(E) and Contractor. 3. Repeat measurements to confirm finding. 4. Increase monitoring frequency to daily until no exceedance is found.	1. Check monitoring data submitted by ET. 2. Check Contractor's working methods. 3. Discuss with ET and Contractor on possible remedial measures. 4. Advise the ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. Ensure remedial measures are properly implemented.	1. Submit proposals for remedial actions to IC(E) within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposals if appropriate.

Event and Action Plan for Water Quality.

EVENT	ACTION			
	ET Leader	**IC(E)**	**ER**	**CONTRACTOR**
Limit Level				
Exceedane for one sample.	1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform ER, IC(E) and Contractor. 3. Repeat measurements to confirm finding. 4. Increase monitoring frequency to daily until no exceedance is found. 5. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results.	1. Check monitoring data submitted by ET. 2. Check Contractor's working method. 3. Discuss with ET and Contractor on possible remedial measures. 4. Advise the ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. Ensure remedial measures are properly implemented.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IC(E) within 3 working days. 3. Implement the agreed proposals. 4. Amend proposals if appropriate.
Exceedance for two or more consecutive samples.	1. Identify source, investigate the causes of exceedance and propose remedial measures. 2. Inform ER, IC(E), Contractor and EPD. 3. Repeat measurements to confirm finding. 4. Increase monitoring frequency to daily. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Arrange meeting with IC(E) and ER to discuss the remedial actions to betaken. 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET and Contractor on the potential remedial actions. 2. Review Contractor's remedial actions whenever necessary to assure effectiveness and advise ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. In consultation with the IC(E) agree with the Contractor on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	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 agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant portion of the works as determined by the ER until the exceedance is abated.

Event and Action Plan for Construction Noise

EVENT	ACTION			
	ET Leader	**IC(E)**	**ER**	**CONTRACTOR**
Action Level				
	1. Notify IC(E) and Contractor. 2. Carry out investigation. 3. Report the results of the investigation to the IC(E) and Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. Require Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IC(E). 2. Implement noise mitigation proposals.
Limit Level				
	1. Notify IC(E), ER, EPD and Contractor. 2. Identify source. 3. Repeat measurements to confirm finding. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform IC(E), ER and EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions. 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. Require Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	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 portion of works as determined by the ER until the exceedance is abated.

Event and Action Plan for Pumping Station Noise During Commissioning

EVENT	ACTION			
	ET Leader	**IC(E)**	**ER**	**CONTRACTOR**
Action Level				
	1. Notify IC(E) and DSD. 2. Carry out investigation. 3. Report the results of the investigation to the IC(E) and DSD. 4. Discuss with the DSD and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the DSD and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify DSD. 3. Require DSD to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IC(E). 2. Implement noise mitigation proposals.
Limit Level				
	1. Notify IC(E), ER, EPD and DSD. 2. Identify source. 3. Repeat measurements to confirm finding. 4. Increase monitoring frequency. 5. Carry out analysis of DSD's working procedures to determine possible mitigation to be implemented. 6. Inform IC(E), ER and EPD the causes & actions taken for the exceedances. 7. Assess effectiveness of DSD's remedial actions and keep IC(E), EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and DSD on the potential remedial actions. 2. Review DSD's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify DSD. 3. Require DSD to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are 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. Resubmit proposals if problem still not under control.

Event and Action Plan for Air Quality

EVENT	ACTION			
	ET Leader	**IC(E)**	**ER**	**CONTRACTOR**
Action Level				
Exceedance for one sample	1. Identify sources. 2. Inform IC(E) and ER. 3. Repeat measurements to confirm finding. 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET. 2. Check Contractor's working methods.	1. Notify Contractor.	1. Rectify unacceptable practice. 2. Amend working methods if appropriate.
Exceedance for two or more consecutive samples	1. Identify source. 2. Inform IC(E) and ER. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Discuss with IC(E) and Contractor for remedial actions if required. 6. If exceedance continues, arrange meeting with IC(E) and ER. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET. 2. Check Contractor's working methods. 3. Discuss with ET and Contractor on possible remedial measure. 4. Advise ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. Ensure remedial actions properly implemented.	1. Submit proposals for remedial actions to IC(E) within 3 days. 2. Implement the agreed proposals. 3. Amend proposals if appropriate.

Event and Action Plan for Air Quality

EVENT	ACTION			
	ET Leader	**IC(E)**	**ER**	**CONTRCATOR**
Limit Level				
Exceedance for one sample	1. Identify source. 2. Inform ER and EPD. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results.	1. Check monitoring data submitted by ET. 2. Check Contractor's working methods. 3. Discuss with ET and Contractor on possible remedial measures. 4. Advise ER on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. Ensure remedial actions properly implemented.	1. Take immediate action to avoid further exceedances. 2. Submit proposals for remedial actions to ER within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate.
Exceedance for two or more consecutive samples	1. Notify IC(E), ER, Contractor and EPD the causes & actions taken for the exceedances. 2. Identify source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Arrange meeting with EPD and ER to discuss the remedial actions to be taken. 7. Assess effectiveness of Contractor's remedial actions and keep EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss among ER, ET and Contractor on possible remedial measures. 2. Revise Contractor's remedial measures whenever necessary to ensure their effectiveness and advise the ER accordingly. 3. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify Contractor. 3. In consultation with IC(E), agree with the Contractor remedial measures to be implemented. 4. Ensure remedial measures properly implemented. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	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 portion of works as determined by the ER until the exceedance is abated.

Appendix III

Implementation Status of Mitigation Measures

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
Air Quality							
1.	Dust	8.4.4.1	Vehicle washing facilities shall be provided at the exit point of the site;	Entrance/exit of site	All period during construction phase	Site Agent / Engineer	Implemented, required to improve the efficiency.
		8.4.4.1	Any debris or materials shall be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and 3 sides;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		8.4.4.1	Water spray or dust suppression chemical shall be provided during material handling and excavation;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		8.4.4.1	The load on the vehicle shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented, required to remind the driver to implement.
2.	Odour	8.4.4.2	Any odorous dredged material shall be placed remote from air sensitive receivers;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		8.4.4.2	Any odorous permitted stockpiled material shall be removed within 2 days of work to reduce the amount of time available for decomposition;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		8.4.4.2	Any odorous permitted stockpiled material shall be covered with plastic tarpaulin sheets in the stockpile area.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
3.	Monitoring	EM&A 2.7	The 24 hour TSP level monitored at the monitoring station shall be comply with the Limit level of 260μgm^3;	Whole site	All period during construction phase	ET Leader	Implemented
		EM&A 2.7	The hourly TSP level monitored at the monitoring station shall comply with the Limit level of 500μgm^3.	Whole site	All period during construction phase	ET Leader	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
Noise							
4.	Construction Activities	7.4.4.2	Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the re-profiling works;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		7.4.4.2	Plant and mobile plant (i.e. trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		7.4.4.2	Plant known to emit noise strongly in one direction, shall be orientated so that the noise is directed away from the NSRs;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		7.4.4.2	Silencers or mufflers on construction equipment shall be utilised and shall be properly maintained during the re-profiling works;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		7.4.4.2	Mobile plant shall be sited far away from the NSR's;	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		7.4.4.2	Material stockpiles and other structures shall be effectively utilised to screen noise from on-site construction activities; and	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		7.4.4.2	The Contractor shall select the models of PMEs that are quieter than the standard types given in GW-TM.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
5.	Operation Activities	7.5.4.1	Considering sensitivity of the Deep Bay buffer zone area, it is recommended that a maximum noise of $L_{eq(5min.)}$ 75 dB(A) be achieved at 1m from the louver of the pumping station through good engineering design.	Pumping Station	Design and Operation Phases	DSD's Engineer	Not applicable to construction phase
6.	Monitoring	EM&A 3	The baseline noise monitoring shall be carried out;	Monitoring location, NM1(A)	Prior to commencement of construction	ET Leader	Implemented
			Construction noise monitoring shall be carried out;	Monitoring location NM1(A)	All period during construction phase	ET Leader	Implemented
			Operational noise shall be carried out 1m from the louvre of the pumping station during commissioning stage.	Monitoring location, NM2	Commissioning/ operational phase	DSD's Engineer	Not applicable to construction phase

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
Water Quality							
7.	Construction Excavation of Sediment	4.4.4.3-4	If excavation on wet stream is not avoidable, the following shall be implemented: - Minimise disturbance to the stream bed while excavating; - Minimise leakage of excavating material during lifting; - Prevent loss of material during transport of excavated material; - Prevent discharge of excavated material except at approved locations; - To minimize the leakage and loss of sediments during excavation, tightly sealed closed grab excavators shall be employed in river sections where material to be handled is wet.	Stream Channel	All period during stream channel excavation	Site Agent / Engineer	 Implemented Implemented Implemented Implemented Implemented
8.	Construction Works Timing	4.4.4.5	Excavation shall be undertaken during periods of low flow (dry season).	Stream Channel	All period stream channel excavation	Site Agent / Engineer	Implemented
9.	Construction Runoff and Drainage	4.4.4.6-8	Exposed soil areas shall be minimized to reduce the potential for increased siltation, contamination of run-off and erosion. In addition, no site run-off shall enter fishponds. Construction run-off impacts associated with above ground construction activities shall be controlled through the use of appropriate mitigation measures which include:	All works area	All period during construction phase	Site Agent / Engineer	Implemented
		4.4.4.6-8	Temporary ditches shall be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond.	All works area	All period during construction phase	Site Agent / Engineer	Implemented
		4.4.4.6-8	The boundaries of earthworks shall marked and surrounded by dykes or embankments for flood protection.	All works area	All period during construction phase	Site Agent / Engineer	Implemented
		4.4.4.6-8	Open material storage stockpiles shall be covered with tarpaulin or similar fabric to prevent material washing away.	All works area	All period during construction phase	Site Agent / Engineer	Implemented, required to implement at all works area.

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
10. (cont' d)	Construction Excavation of Sediment	4.4.4.6-8	Exposed soil areas shall be minimized to reduce the potential for increased siltation and contamination of run-off.	All works area	All period during stream channel excavation	Site Agent / Engineer	Implemented
			Earthwork final surfaces shall be well compacted and subsequent permanent work shall be immediately preformed.	All works area	All period during stream channel excavation	Site Agent / Engineer	Implemented
			The use of sediment traps.	All works area	All period during stream channel excavation	Site Agent / Engineer	Implemented
			The adequate maintenance of drainage systems to prevent flooding and overflow.	All works area		Site Agent / Engineer	Implemented
			All temporary drainage pipes and culverts provided to facilitate run-off discharge shall be adequately designed to facilitate rapid discharge of storm flows. All sediment traps shall be regularly cleaned and maintained. The temporarily diverted drainage shall be reinstated to its original condition, when construction work is completed or the temporary diversion is no longer required.	All works area	All period during stream channel excavation	Site Agent / Engineer	Implemented
			Sand and silt in wash water from wheel washing facilities shall be settled out and removed before discharge into temporary drainage pipes or culverts. A section of the haul road between the wheel washing bay and the public road shall be paved with backfill to prevent wash water or other site run-off from entering the public road.	All works area	All period during stream channel excavation	Site Agent / Engineer	Implemented, the efficiency required to be increased.
			Oil interceptors shall be provided in the drainage system downstream of any significant oil and grease sources. They shall be regularly maintained to prevent the release of oils and grease into the storm water drainage system after accidental spillage. The interceptor shall have a bypass to prevent flushing during heavy rain.	All works area	All period during stream channel excavation	Site Agent / Engineer	Implemented
11.	General Construction	4.4.4.10	Debris and rubbish on site shall be collected, handled and disposed of properly.	All works area	All period during construction phase	Site Agent / Engineer	Implemented
	Construction Runoff and Drainage	4.4.4.11	All fuel tanks and storage areas shall be provided with locks and placed on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching the downstream.	All works area	All period during construction phase	Site Agent / Engineer	The oil drums were put in drip trays. The measures required to implement at all generators as well.

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
12.	Marine Disposal of Excavated Sediment	4.4.412	The decks of the marine dumping disposal barges and floating pontoons shall be kept tidy and free of oil or other substances or articles which might be accidentally or otherwise washed overboard.	Marine dumping route/area	Marine dumping	Site Agent / Engineer	Implemented
		4.4.412	All off-site vessels and barges shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement of propeller wash.	Marine dumping route/area	Marine dumping	Site Agent / Engineer	Implemented
		4.4.412	The works shall cause no visible foam, oil, grease, scum, litter or other objectionable matter to be present on the water at the loading berth or dumping grounds.	Marine dumping route/area	Marine dumping	Site Agent / Engineer	Implemented
		4.4.412	Water tight trucks shall be used for transportation of marine disposal of excavated material.	Marine dumping route/area	Marine dumping	Site Agent / Engineer	Implemented
		4.4.413	Additional provisions shall be required upon confirmation that marine sediments are contaminated. Location and depths of areas of contaminated marine sediments shall be indicated in the construction contract. The Contractor shall ensure that contaminated sediments are excavated, transported and placed in approved special dumping grounds in accordance with relevant Technical circulars.	Marine dumping grounds	Marine dumping	Site Agent / Engineer	Implemented
		4.4.414	Transport of contaminated marine mud to the marine disposal grounds shall be by split barge of not less than 750m^3 capacity, well maintained and capable of rapid opening and discharge.	Marine dumping grounds	Marine dumping	Site Agent / Engineer	Implemented
		4.4.414	The material shall be placed in the pit by bottom dumping, at a location within the pit specified by the FMC.	Marine dumping grounds	Marine dumping	Site Agent / Engineer	Implemented
		4.4.414	Discharge shall be undertaken rapidly and the hoppers shall then immediately be closed, material adhering to the sides of the hopper shall not be washed out of the hopper and the hopper shall remain closed until the barge next returns to the disposal site.	Marine dumping grounds	Marine dumping	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
12. (cont'd)	Marine Disposal of Excavated Sediment	4.4.414	The dumping vessel shall be stationary throughout the dumping operation.	Marine dumping grounds	Marine dumping	Site Agent / Engineer	Implemented
		4.4.414	The Contractor must be able to position the dumping vessel to an accuracy of ±10m. Barge loading shall be monitored to ensure that loss of material does not take place during transportation.	Marine dumping grounds	Maine dumping	Site Agent / Engineer	Implemented
		4.4.414	Transport barges or vessels shall be equipped with automatic self monitoring devices as specified by the EPD.	Marine dumping grounds	Marine dumping	Site Agent / Engineer	Implemented
		4.4.414	The Contractor shall follow procedures as outlined in the Guidance Note for Dumping and Additional Conditions on Disposal of Contaminated Marine Mud at East Sha Chau Contaminated Mud Disposal.	Marine Dumping grounds	Marine dumping	Site Agent / Engineer	Implemented
13.	Sewage Effluents	4.4.415	Construction work force sewage is expected to be handled by portable chemical toilets along the alignment if connection to a public sanitary sewer system is not feasible. Appropriate and adequate portable toilets shall be provided by licensed contractors who shall be responsible for appropriate disposal and maintenance of these facilities.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
14.	Monitoring	EM&A 4.5	The baseline water quality monitoring shall be carried out.	Monitoring locations, WM1, WM2	Prior to commencement of construction	ET Leader	Baseline Monitoring of WM3 and WM4 completed in May 2003.
		EM&A 4.6	Construction phase water quality monitoring shall be carried out.	Monitoring locations, WM1, WM2	All period during construction phase	ET Leader	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
Waste Management							
15.	General	5.4.5.2	Training and instruction shall be given to construction staff to increase awareness and draw attention to waste management issues and the need to minimize waste generation.	All works area	All period during construction phase	Site Agent / Engineer	Implemented
		5.4.5.2	The Contractor shall prepare an on-site management plan of the construction works which should take into account the recommended mitigation measures in the EIA report. Site specific factors such as the designation of areas of segregation and temporary storage of reusable and recyclable materials should be incorporated.	All works area	Before construction phase	Site Agent / Engineer	Implemented
16.	Storage, Collection and Transportation of Waste	5.4.5.3	Wastes shall be handled and stored in a manner to ensure that they are held securely without loss or leakage.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
			Licensed waste hauliers shall be used and they shall only collect wastes prescribed by their permits.	Waste/refuse Storage areas	All period during construction phase	Site Agent / Engineer	Implemented
			Wastes shall be removed	Waste/refuse Storage areas	Daily during construction	Site Agent / Engineer	Implemented
			Waste storage areas shall be maintained and cleaned on a daily basis.	Waste/refuse Storage areas	All period during construction phase	Site Agent / Engineer	Implemented
			Windblown litter and dust during transportation shall be minimized by either covering trucks or transporting wastes in enclosed containers.	Waste handling trucks	After waste collection & before trucks leave the construction site	Site Agent / Engineer	Implemented
16. (cont' d)		5.4.5.3	Obtain the necessary waste disposal permits from the appropriate authorities.	-	Before construction of the Eastern MDC	Site Agent / Engineer	Implemented
		5.4.5.3	Wastes shall be disposed of at licensed waste disposal facilities.	-	All period during construction phase	Site Agent / Engineer	Implemented
		5.4.5.3	Develop procedures such as ticketing system to facilitate tracking of loads, particularly for chemical waste, and to ensure that illegal disposal of wastes does not occur; and	-	All period during construction phase	Site Agent / Engineer & ET Leader	Implemented
		5.4.5.3	Maintain records of the quantities of wastes generated, recycled and disposed.	-	All period during construction phase	Site Agent / Engineer & ET Leader	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
17.	Construction and Demolition Waste	5.4.5.5	Careful design, planning and good site management shall be adopted to minimize over-ordering and generation of waste materials such as concrete, mortars and cement grouts.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
			The handling and disposal of bentonite slurries shall be undertaken in accordance with *Practice Note for Professional Persons – Construction Site Drainage (ProPECC PN 1/94)* on construction site drainage.	All works areas	All period during construction phase	Site Agent / Engineer	No bentonite used in this stage
			Cover open stockpiles of construction and demolition materials, and temporarily exposed slopes by tarpaulin or similar fabric, particularly during rainy season.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
		5.4.5.9 and 5.4.5.6	Construction and demolition material shall be segregated to inert and non-inert parts. The inert portion shall be re-used at areas of reclamation or land formation, or to public filling area shall such a allocation is deemed necessary. The non-inert portion shall be disposed of to landfill.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
18.	Chemical Waste	5.4.5.12	Chemical waste produced shall be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.*	Chemical waste arising points	All period during construction phase	Site Agent / Engineer	Implemented
		5.4.5.13	Containers used for the storage of chemical wastes shall be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450litres unless the specifications have been approved by EPD; and display a label in English and Chinese in accordance with instructions prescribed in *Schedule 2 of the Chemical Waste Regulation.*	Chemical waste arising points	All period during construction phase	Site Agent / Engineer	Implemented
		5.4.5.14	The chemical waste storage area shall be clearly labeled and used solely for storage of chemical waste, enclosed on at least 3 sides; have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% of the total volume of waste stored in that area; have adequate ventilation; be covered to prevent rainfall entering; and be arranged so that incompatible materials are adequately separated.	Chemical waste arising points	All period during construction phase	Site Agent / Engineer	Implemented
			Disposal of chemical waste shall be via a licensed waste collector; and to a facility licensed to receive chemical waste; or to a reuser of waste.	Chemical waste arising points	All period during construction phase	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
19.	General Refuse	5.4.5.17	General refuse on-site shall be stored in enclosed bins separate from construction and chemical wastes. A reputable waste collector shall be employed by the Contractor top remove general refuse from the site, separately from construction and chemical wastes, on a daily or every second day basis to minimize odour, pest and litter impacts. The burning of refuse on construction sites is prohibited by law.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
19. (cont' d)		5.4.5.18	General refuse shall be largely by food service activities on site, so reusable rather than disposable dishware shall be used if feasible. Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated or easily accessible; separate., labeled bins for their deposit shall be provided if feasible.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
		5.4.5.19	Office wastes can be reduced through recycling if volumes are large enough to warrant collection. Participation in a local collection scheme shall be considered if one is available.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
20.	Dust	5.4.5.20	Wetting the surface of the stockpiled soil with water in dry season unless during emergency; covering the stockpile soil with sheets; minimize disturbance of the stockpile soil; and enclosure of the stockpiling area.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
21.	Water Quality	5.5.5.20	There shall be a separate surface water drainage system for the stockpiling area; silt traps shall be installed for surface water drainage system and the stockpile material shall be covered with tarpaulin during heavy rainstorm.	All works areas	All period during construction phase	Site Agent / Engineer	Implemented
22.	Excavated Materials/ Contamin'd Sediment	5.4.5.21	Sampling and analysis of the sediment to confirm the level of contamination is required prior to construction of the MDC. A sediment Quality Report shall be submitted to FMC and EPD for allocation of final disposal site and issuance of disposal permit. This is to ensure that specific disposal requirements and precautionary handling procedures can be determined; DSD to advise FMC on the quality and quantity of the contaminated sediment arising during the detailed design stage.	Proposed Sediment sampling points of MDC	Before construction phase	Site Agent / Engineer	Not required for the contractor
		5.4.5.21	The use of bulk earth-moving equipment to minimize the contact of contaminated material with construction workers.	All excavation/ Dredging area	During excavation/ Dredging of MDC	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
22.		5.4.5.21	Minimising exposure to any contaminated material by the wearing of protective gear such as gloves, providing adequate hygiene and washing facilities and preventing eating during excavation.	All excavation/ Dredging area	During excavation/ Dredging of MDC	Site Agent / Engineer	Implemented
23. (cont' d)		5.4.5.21	Any contaminated mud or sediment excavated shall not be allowed to stockpile on site and shall be immediately removed from site once excavated.	All excavation/ Dredging area	During excavation / dredging of MDC	Site Agent / Engineer	Implemented
		5.4.5.21	Excavated sediment shall be transported by water-tight trucks to potential marine barging points, then to sea going barges for transfer to designated marine disposal grounds.	All excavation/ Dredging area	During excavation / dredging of MDC	Site Agent / Engineer	Implemented
		5.4.5.21	Permitted waste hauliers shall be used to collect and transport contaminated sediments for disposal.	All excavation/ Dredging area	During excavation / dredging of MDC	Site Agent / Engineer	Implemented
		5.4.5.21	All vessels for marine transportation of excavated sediment shall be fitted with tight fitting seals to their bottom openings to prevent leakage of materials.	All excavation/ Dredging area	During excavation / dredging of MDC	Site Agent / Engineer	Implemented
		5.4.5.21	Loading of barges and hoppers shall be controlled to prevent splashing of excavated material to the surrounding water, and barges or hoppers shall under no circumstances to be filled to a level which shall cause the overflowing of materials or polluted water during loading or transportation.	All excavation/ Dredging area	During excavation / dredging of MDC	Site Agent / Engineer	Implemented
		5.4.5.21	The decks of any off-site barges (for disposal to marine dumping grounds) and floating pontoons shall be kept tidy and free of oil or any other substances or articles which might be accidentally or otherwise washed overboard.	All excavation/ Dredging area	During excavation / dredging of MDC	Site Agent / Engineer	Implemented
Ecology							
24.	Habitat Mitigation	3.6.4.2	Isolate working area from remainder of TOAs and other temporarily affected ponds by constructing earth bund across ponds within the works boundary 50m from the west edge of the Eastern MDC. Do not drain pond area outside the 50M limit during bund construction, or refill them immediately following bund construction. Remove bunds, reinstate the 50m wide working area portion of the affected ponds upon completion of construction. Provide access for fish ponds affected by the project.	All other TOAs and all other fish ponds drained down for project construction at Eastern MDC works site	Design and construction stage	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
24. (cont' d)		3.6.4.5	Deletion from design of maintenance access road on eastern MDC embankment (already accomplished)	Eastern embankment of Eastern MDC	Already accomplished (design stage)	DSD's Engineer	Not required for contractor
		3.6.4.6	Design and construction of flood storage pond at San Tin Village: grasscrete sides at 1 in 2 slope, concrete bottom.	Flood storage pond, San Tin villages	Design and construction stage	DSD's Engineer	Not required for contractor
		3.6.4.6-3.6.4.8	Management of flood storage pond at San Tin Villages: maintain water depth of 0.3m to 0.85m through pond design and pump operation except during maintenance or exceptional circumstances. Allow up to 150m of sediment to accumulate on bottom; Avoid dredging clear to the bottom; Allow vegetation to colonise banks; Cut back vegetation only on maintenance-need basis; Allow fish to colonise pond naturally.	Flood storage pond, San Tin villages	Throughout operational lifetime of pond	DSD's Engineer	Not required for contractor
		3.6.4.9	Maintenance of Tsing Lung Tsuen drainage channel: Do not cut back vegetation along sides of channel except as required for channel maintenance.	Channel outside San Tin villages polder	Throughout operational lifetime of pond	DSD's Engineer	Not applicable in this stage
		3.6.4.10	Design and construction of tidal portion of Eastern MDC: Grasscrete sides at 1 in 2 slope; earthen bottom in channel.	Eastern MDC downstream of inflatable dam	Project design and construction phases	DSD's Engineer and TDD (design) Site Agent / Engineer	Not applicable in this stage
			Maintenance of tidal portion of Eastern MDC: Minimise cutting back of vegetation to lowest levels compatible with maintaining flood capacity. Minimise dredging of channel bottom in this zone to lowest levels compatible with maintaining flood capacity.	Eastern MDC downstream of inflatable dam	Throughout operational lifetime of channel	DSD's Engineer	Not applicable in this stage

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
24. (cont' d)		3.6.4.11-3.6.4.12 Annex 3-J	Design, construction and management of constructed wetland area east of Eastern MDC: to provide wetland habitats useful to wildlife, with varied water depth, and planting of wetland vegetation and trees/bamboos; details as specified in Annex 3-J	Location shown in EIA Report Figure 3.6c, east of Eastern MDC and west of San-Sham Road	Construction of wetlands simultaneous with or immediately on completion of Eastern MDC construction. Management to begin upon completion of wetland construction and to continue throughout lifetime of channel.	DSD and TDD (design) Site Agent / Engineer (earthworks vegetation) DSD (maintenance of outlet pipes and flag valves) Lands Dept. (lands administration) AFD (vegetation management)	Not applicable in this stage
		3.6.4.13	Design of Eastern MDC upstream of inflatable dam: Grasscrete lining of channel except DWF channel; channel banks at 1 in 2 slope.	Eastern MDC Upstream of inflatable dam	Project design and construction phases	DSD and TDD (design) and Site Agent / Engineer (construction)	Not applicable in this stage
			Hydroseeding of outer embankments of Eastern MDC. Plant stands of bamboos and trees at sites along Eastern MDC embankments as shown in Figure 3.6e; species and density as described in Annex 3-J. Replace any dead plantings during one-year establishment Period with species approved by TDD and AFD.	At sites along Eastern MDC as marked in Final EIA Report Figure 3.6e	Simultaneous with or immediately following completion of channel construction	DSD and TDD (design); Site Agent / Engineer (implementation Including establishment phase)	Not applicable in this stage
25.	Water quality	3.6.4.20 – 3.6.4.21	Water quality control measures: Implement and enforce water quality control measures outlined in implementation schedule for water section. Dredging of existing stream channel shall only be undertaken in dry season unless during emergency conditions.	all works area	During construction phase	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
26.	Wildlife Disturbance	3.6.4.22	Noise and disturbance control measures: Restrict movements of construction equipment and site workers to areas within the site boundary (including Temporary Works Areas) and approved entry/exit points under terms of contract; supervision by contractor. ET to brief site workers on the need to remain within the site and avoid disturbance to surrounding habitats. Tape off excavation areas. Implement and enforce measures recommended in Implementation Schedule item 5.	On works site	During construction phase	The Contractor and ET Leader	Implemented
27.	Habitat Mitigation	3.6.5.2	Maintenance of Eastern MDC: Minimise dredging frequency and clearance of in-channel vegetation without compromising flood capacity of channel to unacceptable levels. Conduct dredging of existing stream channel only in dry season except under emergency conditions; follow relevant guidelines in the Water section of the Implementation Schedule during dredging. Operation of inflatable dam in Eastern MDC: Periodic review of dam operation in relation to ecological value of the Eastern MDC, as specified in EM&A Manual Section 6.2.1.	Eastern MDC Eastern MDC	Throughout operational lifetime of channel Throughout operational lifetime of channel	DSD's Engineer DSD and TDD/Appointed ecologist (first three years); to be determined thereafter	Not applicable in this stage Not applicable in this stage
28.	Habitat Mitigation – Monitoring	EM&A 6.2.2 Task 1	Monitoring of bird use of San Tin Villages flood storage pond methodology as per EM&A Manual.	San Tin Villages Flood storage pond (see Final EIA Report, Figure 3.6c for location)	4 times per year for first 3 years of pond operation	Appointed ecologist /TDD	Not applicable in this stage

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
Land Contamination							
29.	General	6.4.3.1	Determine the potential extent of any land contamination by developing a current Contamination Assessment Plan (CAP) for sites to be investigated. This CAP will be prepared and approved by EPD prior to site investigation. Depending on the investigation requirements, a contamination assessment report (CAR) will be prepared after contamination investigation activities have concluded.	Selected portions of site(s) which require specific contamination investigation	Prior to construction phase (as required)	DSD's Engineer	Not applicable to the contractor
		6.6.1. 1-7	Prepare the CAP for approval prior to the construction phase. Upon completion of subsequent CAR, discuss the results and data with EPD to determine the most appropriate course of action (which may or may not include mitigation works).	Selected portions of site(s) which require specific contamination investigation	Prior to construction phase (as required); and prior to development as required.	DSD's Engineer	Not applicable to the contractor
		Annex 6-A	Perform the typical site investigation activities as per the CAP presented in Annex 6-A 9to be approved by EPD), and in accordance with applicable guidelines such as the ProPECC PN3/94 Guidance note.	Selected portions of site(s) which require specific contamination investigation	Prior to construction phase (as required)	DSD's Engineer	Not applicable to the contractor
		6.6.1.8	No soils shall be stockpiled. If this cannot be avoided, they shall be covered with tarpaulin to ` inimize the potential for run-off and prevent any pollution, especially during heavy rainstorms.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Vehicles containing any contaminated materials shall be covered to limit potential dust emissions, or contaminated wastewater run-off during transportation or under wet conditions.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	All appropriate licenses and permits shall be obtained for working with contaminated material in accordance with appropriate regulations.	Whole site	Design phase	DSD's Engineer	Not applicable to contractor.

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
29. (cont' d)		6.6.1.8	All excavation activities in contaminated areas and the handling of contaminated groundwater shall be performed by the contractor and observed by and directed, as required, by the environmental specialist.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Only licensed contractors shall be utilized for hauling the contaminated soil to the specified disposal location, and specific operational procedures shall be implemented for the activities.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Liaison shall be maintained with EPD to ensure that all excavation activities have been performed to requirements.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	If the size of the excavation increases, engineering and other concerns may limit the depth or extent of excavation along the property boundaries, as required. Decisions on this matter shall be addressed by appropriate works contractor's engineerin g personnel and the environmental specialist as required, based on filed conditions.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Procedures shall be developed to ensure that illegal disposal of wastes does not occur, and records of quantities of wastes Generated and disposed of shall be maintained.	Whole site	All period during construction phase	DSD's Engineer./ Site Agent / Engineer	Implemented
30.	Health & Safety/ Contaminatio n Exposure During Construction Works	6.4.3.2	No unauthorized persons shall be allowed into the work area, and necessary precautions shall be taken to prohibit unauthorized entry into the Site or works areas.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.4.3.2	Eating, drinking, smoking or any practice that increases the probability of hand to mouth transfer and ingestion of material is prohibited in any area designated as being contaminated.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.4.3.2	Food, beverages. Tobacco products, etc. are prohibited in any area designated as being contaminated. Adequate warning signs shall be posted to this effect.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.4.3.2	Hands must be thoroughly washed upon leaving the work area, and before eating, drinking or any other activities.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
30. (cont' d)		6.4.3.2	Contact with contaminated surfaces or with surfaces suspected of being contaminated shall be avoided. Whenever possible, one shall not walk through puddles, mud or other discoloured surfaces; kneel on the ground; lean, sit or place equipment on drums, containers, vehicles or the ground.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.4.3.2	No trench or other excavation greater than 1m deep shall be entered unless the atmosphere has been tested and found to be safe, or the sides of the excavation have been shored up or prepared in such a way, as required, to remain stable. Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.4.3.2	During site operations with contaminated soil, all field personnel must be on the alert for potentially hazardous materials including odorous solids or liquids, and accumulations or seepage of liquids which are tarry, oily, fuming, bubbling, or discoloured.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.4.3.2	Adequate first aid kits shall be present on site.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		8.4.5.1	The use of dust control measures, such as water sprays, shall be employed to minimise dust emissions and the possible spread of contamination during dry, dusty or windy conditions.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.4.3.2	Prior to starting work workers shall determine the location of The nearest telephone and washing facilities. If accidental contact is made with hazardous or unknown chemicals the contact point shall immediately be washed, and if necessary, medical aid sought.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
31.	Contamin'd Soil Disposal	6.6.1.8	All soil disposal activities shall be subject to the conditions and approval of the Facilities Management Group, under the authority of the EPD.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	A record of all correspondence with the Facilities Management Group regarding the disposal of soils from this site shall be maintained.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	All contaminated soil shall be disposed of at the designated landfill subject to approval of the EPD and Facilities Management Group.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	For contaminated soil disposal, trip tickets shall be issued to ensure proof of disposal at the landfill facility.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	All trucks/lorries leaving the site containing contaminated materials shall be sheeted/covered to limit potential dust emissions in dry conditions, and contaminated waste water run-off under wet conditions.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Wheel washing of vehicles leaving the site shall be undertaken to ensure that nay contaminated materials or dusts are not carried over onto the public highway.	Whole site	All period during construction phase	Site Agent / Engineer	The access road was paved with concrete.
		6.6.1.8	Upon completion of the soil excavation activities, additional confirmatory soil samples shall be collected, as required, for analysis.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Upon completion of the soil excavation programme, clean fill material may be imported and placed in the excavations as required, to bring the site level to grade.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
32.	Contamin'd Ground Water Disposal (if required)	6.6.1.8	A discharge license shall be obtained from EPD for the disposal of any groundwater from the site in accordance with the appropriate protocols to meet applicable regulations.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	The Contractor shall ensure that surface waters and run-off are diverted around any areas currently being worked, to minimise potential run-off into the excavation, thereby increasing the volume of groundwater requiring potential disposal. This includes blocking or protecting surface drains to prohibit any uncontrolled discharges.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Surface run-off may contain increased sediment loads, suspended solids, or contaminants. The Contractor shall control site run-off to prevent high levels of suspended solids from entering surrounding waters through the use of appropriate mitigation measures such as sediment traps.	Whole site	All period during construction phase	Site Agent / Engineer	Some of the exposed slope was compact.
		6.6.1.8	Groundwater shall be pumped at such a rate as to ensure that it does not create ground stability and subsidence problems for the surrounding work areas or any buildings. The actual rate of pumping, if required, shall be dependant upon field observations and following discussion with the environmental specialist and the Contractor's engineers.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Where the level of the contamination of groundwater encountered is found to be below the specified levels in the WPCO requiring treatment, the groundwater shall be discharged, as required directly through a flexible hose or pipeline. Prior agreement with the EPD Local Control Office is required.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Upon completion of the soil excavation activities, additional confirmatory soil samples shall be collected, as required, for analysis.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented
		6.6.1.8	Upon completion of the soil excavation programme, clean fill material may be imported and placed in the excavations as required, to bring the site level to grade.	Whole site	All period during construction phase	Site Agent / Engineer	Implemented

No.	Parameter	EIA Ref.	Mitigation Measures/Key EM&A Requirements	Location	Timing	Responsibility	Implementation Status
33.	Future Issues	6.6.1.8	Follow appropriate protocols.	Whole site	All period during construction phase or operational phase, as necessary	Site Agent / Engineer	Implemented
Landscape and Visual							
35.	Planting to eastern embankment and constructed wetland (and associated planting)	9.9.1.1, 3, 9.9.2.1	Planting to assist screening function of border crossing area and also to assist to provide and ecological and landscape resource within the constructed wetland, with consideration given to early planting. The PELBTC No. 3/94 Tree Preservation should be followed in the design process.	Eastern embankment to perimeter of Lok Ma Chau border crossing	During design and construction phase	Site Agent / Engineer	Not applicable in this stage
36.	Planting to western embankment	9.9.1.2, 3 9.9.21	Planting to reflect existing fish pond group/individual tree/shrub groupings and ecological mitigation in design and species selection, with consideration given to early planting.	Western Embankment	During construction phase	Site Agent / Engineer	Implemented
37.	Pumping station design and detailing	9.9.1.4	Design pumping station building to reflect the scale of other buildings/structures in the local area.	Pumping station	Design stage of pumping station	DSD's Engineer	Not applicable in this stage
38.	Soil Conservat'n	9.9.2.1	Consideration should be given to undertake landscaping works early in the construction phase, as well as to as conserve soil as a planting medium, such as from pond0bund materials.	Whole site	All period during construction	Site Agent / Engineer	Implemented
39.	Planting Work Monitoring	EM&A 6.2.1. Task 6	Monitoring of planting work for the ecological and landscape mitigation shall be undertaken.	Planting to eastern embankment, constructed wetland and western embankment	Once per year for first 3 years of operation	TDD/ Appointed consultant	Not applicable in this stage

Notes:
EM&A = Agreement No. CE 43/96 Main Drainage Channels and Poldered Village Protection Scheme of San Tin, NWNT: Environmental Impact Assessment Study – Environmental Monitoring and Audit Manual
EIA = Agreement No. CE 43/96 Main Drainage Channels and Poldered Village Protection Scheme for San Tin: Environmental Impact Assessment Study – Final Assessment Report
ET Leader = Environmental Team Leader *DSD = Drainage Services Department*
GW-TM = General Works Technical Memorandum *PELBTC = Planning Environmental Lands Bureau Technical Circular*
TDD = Territory Development Department *PME = Powered Mechanical Equipment*

Appendix IV

Complaint Log

CONTRACT No. DC/2001/09 – CONSTRUCTION OF SAN TIN EASTERN MAIN DRAINAGE CHANNEL - ENVIRONMENTAL COMPLAINTS LOG.						
Complaint Log No.	Date of Receipt	Received From and Received By	Nature of Complaint	Date Investigated	Outcome	Date of Reply and to Whom
STEMDC 001	28th July 2003	EPD	Dead fish in the pond caused bad odour and potential mosquito breeding	29th July 2003	No visible cause can be identified attributed to construction activities	29th July 2003
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
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-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

APPENDIX V

Cumulative Statistics on Complaints and Successful Prosecutions

CONTRACT No. DC/2001/09 – CONSTRUCTION OF SAN TIN EASTERN MAIN DRAINAGE CHANNEL - Cumulative Statistics on Complaints						
Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Quarter				Cumulative Number to Date
		Air	Noise	Water	Waste	
Air	---	---	---	---	---	---
Noise	---	---	---	---	---	---
Water	1	---	---	---	---	1
Waste	---	---	---	---	---	---
Total	1	---	---	---	---	1

CONTRACT No. DC/2001/09 – CONSTRUCTION OF SAN TIN EASTERN MAIN DRAINAGE CHANNEL - Cumulative Statistics on Successful Prosecutions						
Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Prosecutions this month (Offence Date)				Cumulative Number to Date
		Air	Noise	Water	Waste	
Air	---	2 (28 Mar 03)	---	---	---	2
Noise	---	---	---	---	---	---
Water	---	---	---	---	---	---
Waste	---	---	---	---	---	---
Total	---	---	---	---	---	2

APPENDIX VI

Master Construction Programme

HSIN CHONG CONSTRUCTION CO LTD

Contract No DC/2001/09

Construction of the San Tin Eastern Main Drainage Channel

THREE-MONTH ROLLING — (BASED ON MASTER PROGRAMME MPV2)

Date: Feb, 2003

ID	Task Name	Duration	Start	Finish
1	Durations of work	1540 days	Wed 10/16/02	Fri 6/16/06
2	Section 1 completion	150 days	Wed 10/16/02	Fri 3/14/03
3	Section 2 completion	270 days	Wed 10/16/02	Sat 7/12/03
4	Section 3 completion	365 days	Wed 10/16/02	Wed 10/15/03
5	Section 4 completion	670 days	Wed 10/16/02	Sun 8/15/04
6	Section 5 completion	730 days	Wed 10/16/02	Thu 10/14/04
7	Section 6 completion	910 days	Wed 10/16/02	Tue 4/12/05
8	Section 7 completion	570 days	Sat 2/22/03	Wed 12/22/04
9	Section 8 completion	850 days	Wed 11/27/02	Fri 3/25/05
10	Section 9 completion	970 days	Wed 10/16/02	Sat 6/11/05
11	Section 10 completion	1340 days	Wed 10/16/02	Fri 6/16/06
12	Schedule of Site Occupation by KCRC in Portion H	630 days	Tue 1/14/03	Fri 4/22/05
13	Stage 1 (Piles & Pile Caps for Piers W3-W5)	159 days	Tue 1/14/03	Sun 6/22/03
14	Mobilization	136 days	Wed 10/16/02	Thu 2/27/03
15	Initial Setting Out	45 days	Sun 12/15/02	Tue 1/28/03
16	Import Fill Material from Shenzhen River	136 days	Wed 10/16/02	Thu 2/27/03
17	Formation of Setting at Shenzhen River	30 days	Mon 12/30/02	Tue 1/28/03
18	Relocation of XPM Mesh Fence	30 days	Wed 1/29/03	Thu 2/27/03
19	Section 2 - Interim Flood Relief Channel (Portion A, B, C)	270 days	Wed 10/16/02	Sat 7/12/03
20	Site Clearance	38 days	Fri 12/6/02	Sun 1/12/03
21	Removal of Contaminated Material	110 days	Mon 1/13/03	Fri 5/2/03
22	Section 3 - Portion G (Reedbed near LMC Kiosk)	365 days	Wed 10/16/02	Wed 10/15/03
23	Approval Materials & Submission	80 days	Wed 10/16/02	Fri 1/3/03
24	Site Clearance	65 days	Sat 1/4/03	Sun 3/9/03
25	Site formation	65 days	Mon 3/10/03	Tue 5/13/03
26	Section 4 - Portion E (Pond filling work)	670 days	Wed 10/16/02	Sun 8/15/04
27	Submission & Approval of Materials	80 days	Wed 10/16/02	Fri 1/3/03
28	Site Clearance	65 days	Sat 1/4/03	Sun 3/9/03
29	Site formation	30 days	Mon 3/10/03	Sat 5/7/03
30	Section 5 - Portion D (PS/DG/PPC/LOC & boundary fence)	730 days	Wed 10/16/02	Thu 10/14/04
31	Stone Column Work	370 days	Wed 10/16/02	Mon 10/20/03
32	Submission & Approval	134 days	Wed 10/16/02	Wed 2/26/03
33	Installation	300 days	Fri 2/28/03	Mon 9/15/03
34	Pumping Station + Box Culvert	40 days	Fri 2/28/03	Sun 5/18/03
35	Section 6 - Portion A (Initiation Dam)	910 days	Wed 10/16/02	Tue 4/12/05
36	Inflatable Dam	910 days	Wed 10/16/02	Tue 4/12/05
37	Stone Column Work	456 days	Wed 10/16/02	Tue 1/13/04
38	Submission & Approval	134 days	Wed 10/16/02	Wed 2/26/03
39	Formation preparation	216 days	Wed 10/16/02	Mon 5/19/03
40	Jam System Approval & Delivery	364 days	Wed 10/16/02	Tue 10/14/03
41	Submission & Approval	184 days	Wed 10/16/02	Tue 4/15/03
42	Police Gantry—Steel Bridge	910 days	Wed 10/16/02	Tue 4/12/05
43	Security Fence & Finder	910 days	Wed 10/16/02	Tue 4/12/05
44	Section 7 - Portion A (Border Road Bridge)	570 days	Sat 2/22/03	Wed 12/22/04
45	Material Submission and Approval	49 days	Sat 2/22/03	Tue 4/8/03
46	Section 8 - Portion B (excluding Wetland)	850 days	Wed 11/27/02	Fri 3/25/05
47	Material Submission and Approval	90 days	Wed 11/27/02	Mon 2/24/03
48	Site formation for Vertical Drains	30 days	Tue 3/25/03	Wed 3/26/03
49	Site Clearance	30 days	Tue 2/25/03	Wed 3/26/03
50	Ground Improvement & Vertical Drains	480 days	Thu 3/27/03	Wed 7/28/04
51	Section 9 - Portion A & C (excluding Wetland)	970 days	Wed 10/16/02	Sat 6/11/05
52	Material Submission and Approval	30 days	Wed 10/16/02	Fri 11/15/02
53	Site formation for Vertical Drains	30 days	Sat 1/4/03	Sun 2/2/03
54	Site Clearance	30 days	Sun 1/4/03	Sun 2/2/03
55	Ground Improvement & Vertical Drains	710 days	Sat 1/4/03	Mon 12/13/04
56	Vehicular Bridge near Castle Peak Road	970 days	Wed 10/16/02	Sat 6/11/05
57	Submission and Approval of Temporary Border Road	80 days	Wed 10/16/02	Fri 1/3/03
58	Site formation for Vertical Drains	302 days	Sat 1/4/03	Sun 10/12/03
59	Submission & Approval of Materials	60 days	Sun 1/4/03	Sun 3/2/03
60	Diversion of Cross Border Road	175 days	Wed 10/16/02	Tue 4/8/03
61	Temporary Border Road & Diversion	115 days	Thu 12/5/02	Mon 3/24/03
62	Utilities Diversion & Commissioning of Border Road	7 days	Tue 2/25/03	Mon 3/3/03
63	Section 10 - Remainder of Works	1340 days	Wed 10/16/02	Fri 6/16/06
64	Construction of Wetland	1316 days	Sat 1/4/03	Fri 6/16/06
65	Site Excavation	30 days	Sat 1/4/03	Thu 2/6/03
66	Filling + Formation	761 days	Fri 2/28/03	Thu 2/16/06
67	Drainage Pipe and Watermain Work	984 days	Wed 10/16/02	Sun 6/4/06
68	Procurement of Drainage Pipe Materials	365 days	Wed 10/16/02	Fri 10/15/03
69	Procurement of Watermain Materials	365 days	Wed 10/16/02	Fri 10/15/03

Task | Split | Summary | External Tasks

Task Progress | Rolled Up Task | Rolled Up Critical Task | Project Summary

Critical Task | Rolled Up Milestone | External Milestone

Prepared by: Kennet Kwong

on: 4th Feb 2003

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