China State Joint Venture

MAUNSELL | AECOM

Contract No. HY/2003/11

Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau and Huangang and Associated Works

Final EM&A Review Report

August 2005

Florence Yuen	Florence Yuen	
Reviewed by (PM):	Checked by:	Approved by: Environmental Team Leader

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Action-United Environmental Services & Consulting
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Our Ref:- TCS00178/03/300/L00739

Major Works Project Management Office
3, 5 & 6/F Ho Man Tin Government Offices
88 Chung Hau Street
Kowloon.

Attn: Mr Roger Lee

28 July 2005
By Fax and Mail
(Fax 2482-9679)

Dear Mr Lee,

Re: HyD Agreement No. HMW 2/2003 (EP) Independent Environmental Checker (IEC) for New Boundary Bridge between Lok Ma Chau and Huanggang
Verification of the Final Project EM&A Report

We hereby verify that the Final Project EM&A Report received on 27 July 2005 is acceptable for submission to EPD in accordance with the requirements as stipulated in the project EP and the EM&A Manual.

Should you have any questions or need further information from us, please feel free to contact the undersigned at Tel: 2959-6959 or Fax: 2959-6079.

Yours sincerely,
For and on Behalf of
Ford Business International Ltd

Cliff S W Lam, IEC

cc Mr Benedick Cheung (SOR: Fax 2482 9679)
Mr Michael Yip (Contractor (China State JV): Fax 2482 7127)
Mr YTTang (ETL (MEMC): Fax 2891 0305)

TABLE OF CONTENTS

List of Figures

Appendices

EXECUTIVE SUMMARY

This report summarizes the EM&A works performed in the period between December 2003 and 18 June 2005. In the reporting period, site clearance, erection of site office, fencing and hoarding, access road and traffic diversion, pre-drilling of bored holes, bored piling, excavation and compaction for nullah diversion, excavation and sheet piling for pipe jacking, pre-bored H-piles and road and drainage works, construction of nullah bridge No. 1 and 2, backfilling of existing Ha Wan Nullah, construction of pile caps, ground beams, columns and piers, construction of bridge deck, erection of falsework and formwork for bridge deck, asphalt paving, modification, erection of sign gantries, road marking, road formatting, construction of surface and underground drain, reinstatement of Ha Wan Nullah & outfall, erection of traffic and direction signs, watermain laying, E&M works, watermain laying, steelwork, landscaping work, outfall reinstatement, security fence erection and road resurfacing took place for the Project.

No breach of Action or Limit (AL) Levels for 1-hour TSP was recorded in the reporting period.

Twelve exceedances of Action Level and one of Limit Level for 24-hour TSP were recorded in the reporting period. The exceedances were concluded not due to the Project works.

For noise monitoring, no noise complaint was received in the reporting period and all measured daytime noise levels were below the AL Levels. No evening and nighttime noise monitoring was conducted as scheduled in the reporting period. No exceedance of noise level was recorded in the reporting period.

For water quality monitoring, a total of 249 exceedances (69 Action Levels and 180 Limit Levels) were recorded in the reporting period. All exceedances were concluded not due to the works of the Project.

As the existing nullah had been backfilled by end of May 2004, water no longer passes through the proposed monitoring station WM6 (Coordinates Easting 825 453 Northing 841 702) due to nullah diversion. Monitoring station WM6 was relocated to a location in the newly constructed temporary nullah (Coordinates Easting 825 362 Northing 841 726) since 1 June 2004.

Recommendation to revise the Action and Limit Levels for turbidity and SS for monitoring station WM1, WM2 and WM5 was submitted to EPD for approval in April 2004. The Permit Holder withdrew the recommendation in May 2004. No further action is required.

Three complaints were made against this Project since commencement of the Project. They are respectively about absence of wheel wash facility, discharge of muddy water without proper treatment and illegal dumping of excavated materials.

For the first complaint, final investigation concluded that wheel wash was not provided to vehicles of the Project leaving the construction site. Wheel wash bay was provided and in use since 18 March 2004. The performance of the wheel wash bay was satisfactory.

For the second complaint, final investigation concluded that muddy water was not discharged from the construction site nearby Ha Wan Tsuen without receiving any treatment. Nevertheless, the Contractor had implemented the recommended mitigation measures since early March 2004 and performance of the mitigation measures was satisfactory.

For the third complaint, final investigation concluded that excavated materials from the construction site had not been illegally dumped. Nevertheless, the Contractor had continued to implement the recommended mitigation measures and performance of the mitigation measures was satisfactory. The IEC agreed with ET's final investigation results and ET closed all three complaint cases in the reporting period.

No summon or prosecution related to environmental issues was made against the Project in the reporting period.

1. INTRODUCTION

1.1 Maunsell Environmental Management Consultants Limited (MEMCL) (hereinafter called the "ET") was appointed by China State Joint Venture (CSJV) (hereinafter called the "Contractor") to undertake Environmental Monitoring and Audit for "Construction of the Approach Viaduct to the New Boundary Bridge Between Lok Ma Chau and Huanggang and Associated Works" (hereinafter called the "Project"). Under the requirements of Section 3 of Environmental Permit EP-168/2003, EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A Manual, environmental monitoring of air quality, noise and water quality are required for the Project.

1.2 This is the Final EM&A Review Report prepared by the ET summarizing the EM&A works performed from December 2003 to 18 June 2005.

2. PROJECT CHARACTERISTICS

Project Organization and Contacts of Key Management

2.1 An organization structure and the line of communication were set up for the Project between the Environmental Protection Department (EPD), Project Proponent, Supervising Officer's Representative (SOR), Independent Environmental Checker (IEC), the Contractor and the Environmental Team (ET). The project organization and contact details of key management are shown in Figure 2.1 and Appendix A respectively.

Construction Activities During The Reporting Period

2.2 The site activities undertaken during the reporting period include site clearance, erection of site office, fencing and hoarding, access road and traffic diversion, pre-drilling of bored holes, bored piling, excavation and compaction for nullah diversion, excavation and sheet piling for pipe jacking, pre-bored H-piles and road and drainage works, construction of nullah bridge No. 1 and 2, backfilling of existing Ha Wan Nullah, construction of pile caps, ground beams, columns and piers, construction of bridge deck, erection of falsework and formwork for bridge deck, asphalt paving, modification, erection of sign gantries, road marking, road formatting, construction of surface and underground drain, reinstatement of Ha Wan Nullah & outfall, erection of traffic and direction signs, watermain laying, E&M works, watermain laying, steelwork, landscaping work, outfall reinstatement, security fence erection and road resurfacing.

2.3 A layout plan of the Project is provided in Figure 2.2.

3. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

Monitoring Parameters and Locations

3.1 The EM&A Manual designates locations for the ET to monitor environmental impacts in terms of air quality, noise and water quality. The air quality, noise and water quality monitoring stations for this Project are shown in Figure 3.1. Appendix B gives the details of the monitoring requirements.

Environmental Quality Performance Limits (Action and Limit Levels)

3.2 The environmental quality performance limits, i.e. Action and Limit Levels (AL Levels) were derived from the baseline monitoring results and/or other approaches as detailed in the EM&A Manual. Should the measured environmental quality parameters exceed the AL Levels, the respective action plans would be implemented. The AL Levels for each environmental parameter are given in Appendix C.

Environmental Mitigation Measures

3.3 Relevant mitigation measures as recommended in the Project Profile had been stipulated in the EM&A Manual for the Contractor to adopt. A list of mitigation measures is given in Appendix G.

4. MONITORING RESULTS

Air Quality

4.1 1-hour TSP monitoring was carried out for ASR1 and ASR3 while 24-hour TSP monitoring was carried out for ASR3 in the reporting period. Graphical presentations of both 1-hour TSP and 24-hour TSP monitoring results are provided in Appendix D.

Noise

4.2 Noise monitoring was carried out for daytime period at NSR1 in the reporting period. Graphical presentations of the noise monitoring results are provided in Appendix E.

Water Quality

4.3 In accordance with the EM&A Manual, water quality monitoring was conducted at six monitoring stations (WM1 to WM6). Parameters monitored included salinity, dissolved oxygen (DO), turbidity, pH and suspended solids (SS). Graphical presentations of the water quality monitoring results are provided in Appendix F.

4.4 As the existing nullah had been backfilled by end of May 2004, water no longer passes through the proposed monitoring station WM6 (Coordinates Easting 825 453 Northing 841 702) due to nullah diversion. Monitoring station WM6 was relocated to a location in the newly constructed temporary nullah (Coordinates Easting 825 362 Northing 841 726) since 1 June 2004.

5. AUDIT RESULTS

Implementation Status of Environmental Mitigation Measures

5.1 The Contractor had implemented mitigation measures to minimize the environmental impacts due to construction activities in the reporting period. Regarding a few minor observations as noted during ET's site inspections, the Contractor rectified most of the problems and no major environmental impact was induced.

5.2 The updated implementation status of environmental mitigation measures (EMIS) is given in Appendix G.

Status of Environmental Licensing and Permit

5.3 Environmental licenses and permits including Environmental Permit for the Project, construction noise permit and effluent discharge license were in place and valid during the reporting period. A summary status of licences and permits is given in Appendix H.

6. NON-COMPLIANCE (EXCEEDANCES) OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS (ACTION AND LIMIT LEVELS)

Summary of Exceedances

6.1 No breach of Action / Limit Level for 1-hour TSP was recorded in the reporting period.

6.2 Twelve exceedances of Action Level and one of Limit Level for 24-hour TSP were recorded in the reporting period. The exceedances were concluded not due to the Project works.

6.3 No noise complaint was received during the quarter and all measured daytime noise levels were below the AL levels. No exceedance of noise level was recorded in the reporting period.

6.4 For water quality monitoring, a total of 249 exceedances (69 Action Levels and 180 Limit Levels) were recorded in the reporting period. All exceedances were concluded not due to the works of the Project.

Review of the Reasons for and the Implications of Non-compliance

6.5 No exceedance of AL Levels for 1-hour TSP monitoring was recorded in the reporting period.

6.6 Twelve exceedances of Action Level and one of Limit Level for 24-hour TSP were recorded in the reporting period. Mitigation measures for the construction dust were generally implemented. The exceedances were concluded not due to the Project works.

6.7 No exceedance of AL Levels for noise measurement was recorded in the reporting period.

6.8 For water quality monitoring, a total of 249 exceedances (69 Action Levels and 180 Limit Levels) were recorded in the reporting period. Field observations indicated that pipe jacking was conducted at the river bank from February to April 2004. Sheet piles were installed to avoid spillage or escape of wastewater and materials into the river. Besides, Ha Wan Nullah reinstatement, outfall construction and reinstatement were conducted from January 2005 to May 2005. The Contractor had implemented the necessary water quality mitigation measures. No discharge of wastewater and materials into the Shenzhen River and Ha Wan Nullah by the Project was observed. All exceedances were concluded not due to the works of the Project.

Environmental Acceptability of the Project

1-hour TSP and 24-hour TSP Monitoring

6.9 For the TSP monitoring, the monitoring results were well below the Action and Limit Levels excepting a few isolated events. The trends of 1-hour TSP and 24-hour TSP was comparable to the baseline range and showed no noticeable deterioration of air quality (1-hour TSP and 24-hour TSP) during the impact monitoring period. The results of TSP monitoring showed no adverse air quality impact at the monitoring location except for a few isolated and short-term incidents.

Noise Monitoring

6.10 All the daytime noise monitoring results were below the Limit Levels. The trend of daytime L_{eq} showed no noticeable noise impact from the Project during the impact monitoring period.

Water Quality Monitoring

Dissolved Oxygen

6.11 The trend of dissolved oxygen levels at each monitoring stations in Appendix F did not show any

noticeable deterioration of dissolved oxygen levels nor any correlation with the construction works during the impact monitoring period.

Turbidity

6.12 For WM1, 2 and 5, the trend of turbidity levels in Appendix F did not show any noticeable deterioration of turbidity levels nor any correlation with the construction works during the impact monitoring period. The trend of turbidity levels of WM6 in Appendix F showed deterioration of water quality from May 2004 to October 2004 and May 2005 to June 2005. However, these coincided with seasonal variation with more exceedances recorded during the wet season than in the dry season in regional water quality. Moreover, the trend did not show any correlation with the construction works during the impact monitoring period.

Suspended Solids

6.13 Suspended solids levels provide a direct indication of water quality impacts from the construction works. If construction works resulted in the deterioration of water quality, the suspended solids levels would correlate with the construction works. For WM1, 2 and 5, the trend of suspended solids levels in Appendix F did not show any noticeable deterioration of suspended solids levels nor any correlation with the construction works during the impact monitoring period. The trend of suspended solids levels of WM6 in Appendix F showed deterioration of water quality from May 2004 to October 2004 and May 2005 to June 2005. However, these coincided with seasonal variation with more exceedances recorded during the wet season than in the dry season in regional water quality. Moreover, the trend did not show any correlation with the construction works during the impact monitoring period.

Practicality and Effectiveness of the EM&A programme

TSP Monitoring

6.14 The air quality monitoring methodology was effective in monitoring the air quality impacts of the Project. Baseline monitoring of 1-hour TSP and 24-hour TSP helped to determine the ambient TSP levels at the sensitive receiver prior to commencement of construction works. During periods when there were possible dust generating construction activities, impact monitoring of 1-hour TSP and 24-hour TSP helped to determine whether the Project caused unacceptable air quality impacts on the sensitive receiver. As the scope of the Project mainly includes bridge and access road construction, dust generation from the construction activities is the key concern during the construction phase. The monitoring of TSP was therefore considered to be cost effective for the Project.

Noise Monitoring

6.15 The noise monitoring methodology was effective in monitoring the noise impacts of the Project. Baseline noise monitoring determined the ambient noise levels at the sensitive receivers prior to commencement of construction works. During periods when possible noise generating construction activities were on-going, impact noise monitoring would determine whether the Project caused adverse noise impacts on the sensitive receivers. The monitoring methodology focused on $L_{eq,30\ minute}$ during day time are therefore considered to be cost effective for the Project.

Water Quality Monitoring

6.16 The monitoring methodology which focused on dissolved oxygen, pH, turbidity and suspended solids, is considered to be cost effective for the Project. Baseline water quality monitoring determined the ambient water quality in the region prior to commencement of construction works. During periods when nullah reinstatement, sheet-piling works and outfall construction were on going near the riverbank, impact water quality monitoring helped to determine whether the Project would cause unacceptable water quality impacts on the sensitive receivers.

Summary of Actions Taken

6.17 The Event and Action Plans for air quality, noise and water quality are presented in Appendix J.

6.18 The Contractor generally implemented all the required mitigation measures to suppress the environmental impacts. As all AL level exceedances recorded in the reporting period were not associated with the works of the Project, no further action was required.

Comparison of EM&A results with Project Profile predictions

Noise Monitoring Results

6.19 The Project Profile predicted that no significant air quality impact would be brought by the project activities. The 1- hour and 24-hour TSP monitoring results were comparable to the Project Profile prediction.

TSP Monitoring Results

6.20 The Project Profile predicted that no significant noise impact would be brought by the project activities. The noise monitoring results were comparable to the Project Profile prediction.

Water Quality Monitoring Results

6.21 The Project Profile predicted that the water quality of Shenzhen River and nearby fishpond might be affected by the Project. The Contractor implemented good site practices and adequate treatment before discharging surface runoff and wastewater from the construction site. The water quality monitoring results of all designated parameters including Dissolved Oxygen, pH, Turbidity and Suspended Solids were comparable to the Project Profile prediction.

7. ENVIRONMENTAL COMPLAINTS

7.1 All complaints will be handled in accordance with the EM&A Manual. The complaint handling procedure is provided in Appendix I.

7.2 Three complaints were made against this Project since commencement of the Project. They are respectively about absence of wheel wash facility, discharge of muddy water without proper treatment and illegal dumping of excavated materials.

7.3 Summary record of the complaints, investigation and follow-up actions undertaken are provided in Appendix I.

8. NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

8.1 No notification of summons and successful prosecution was recorded during the reporting period.

9. COMMENTS, CONCLUSIONS AND RECOMMENDATIONS

9.1 The ET carried out air quality, construction noise and water quality monitoring and weekly site inspection in accordance with the EM&A Manual.

9.2 No exceedance of AL Levels for 1-hour TSP monitoring was recorded in the reporting period.

9.3 Twelve exceedances of Action Level and one of Limit Level for 24-hour TSP were recorded in the reporting period. Mitigation measures for the construction dust were generally implemented. The

exceedances were concluded not due to the Project works.

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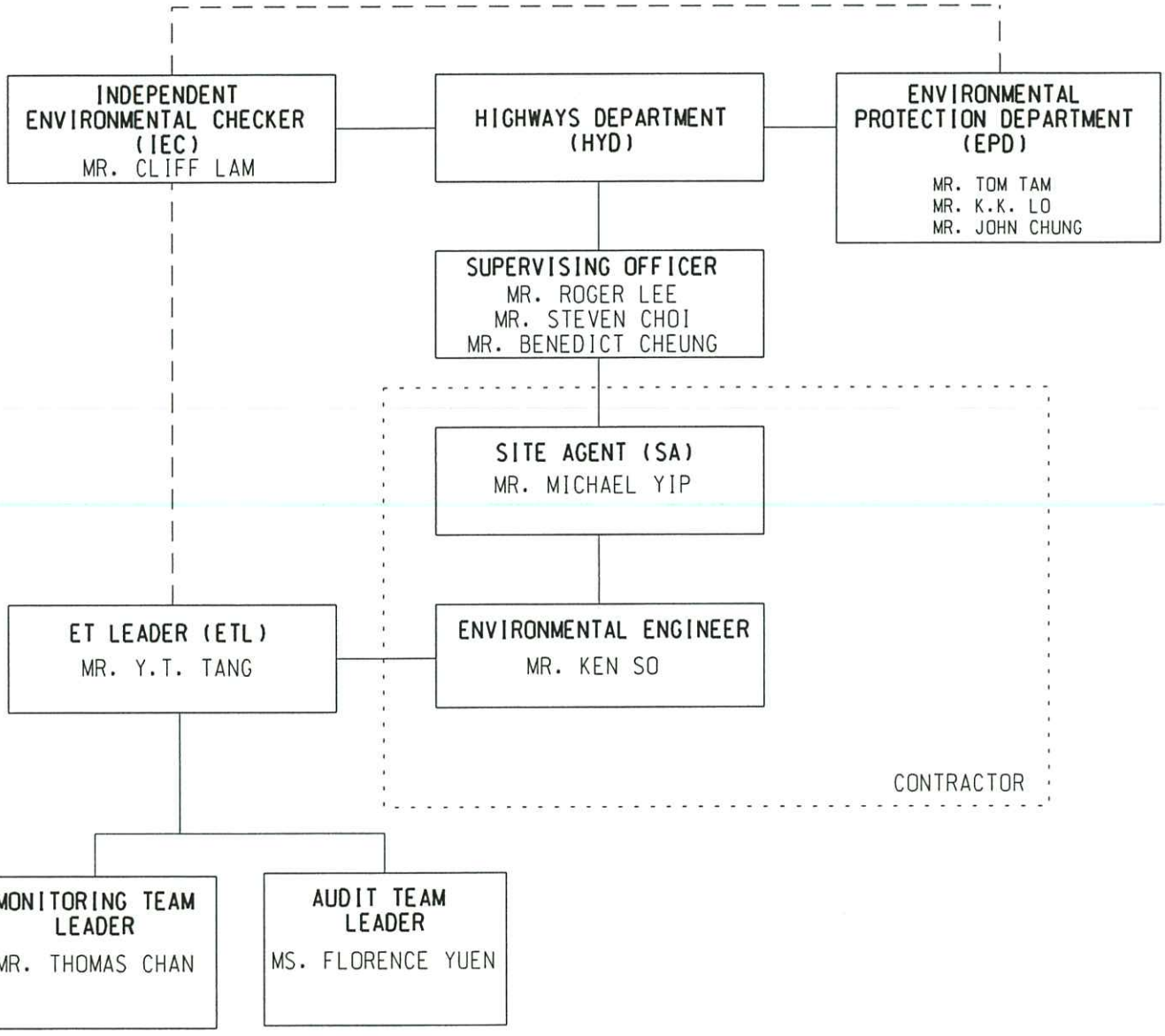
9.10 No summon or prosecution related to environmental issues was made against the Project in the reporting period.

9.11 The implemented EM&A programme ensured that any air quality, noise and water quality impacts to the receivers would be readily detected and timely actions could be taken to rectify any non-compliance. Assessment and analysis of air quality, noise and water quality monitoring results collected demonstrated that the environmental performance of the Project was acceptable. Weekly site inspections ensured that the EIA recommended mitigation measures were effectively implemented.

FIGURES

PROJECT ORGANIZATION FOR ENVIRONMENTAL MANAGEMENT



LEGEND:

——— DIRECT COMMUNICATION

— — — LIAISON

MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	CONTRACT NO: HY/ 2003/ 11 CONSTRUCTION OF THE APPROACH VIADUCT TO THE NEW BOUNDARY BRIDGE BETWEEN LOK MA CHAU AND HUAGGANG AND ASSOCIATED WORKS PROJECT ORGANIZATION FOR ENVIRONMENTAL MANAGEMENT	SCALE: N.T.S. / DATE: 2005 CHECK: FSYY / DRAWN: LLMC JOB NO.: S09203	DRAWING NO.: 2.1 / REV: –

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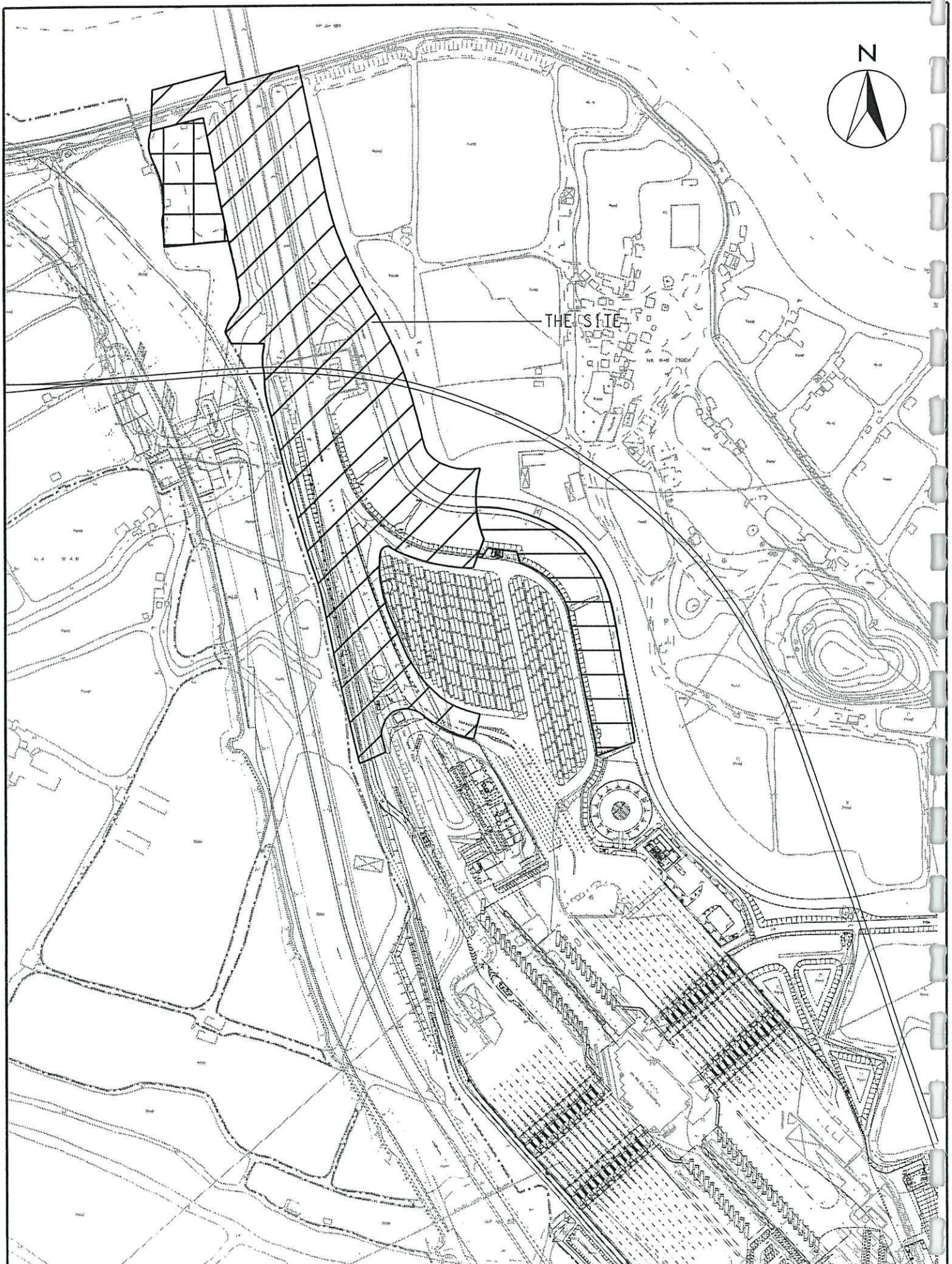

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Maunsell Environmental Management Consultants Ltd

CONTRACT NO: HY/ 2003/ 11 CONSTRUCTION OF THE APPROACH VIADUCT TO THE NEW BOUNDARY BRIDGE BETWEEN LOK MA CHAU AND HUAGGANG AND ASSOCIATED WORKS

LAYOUT OF WORK SITE

SCALE	A4 1:4000	DATE	2005
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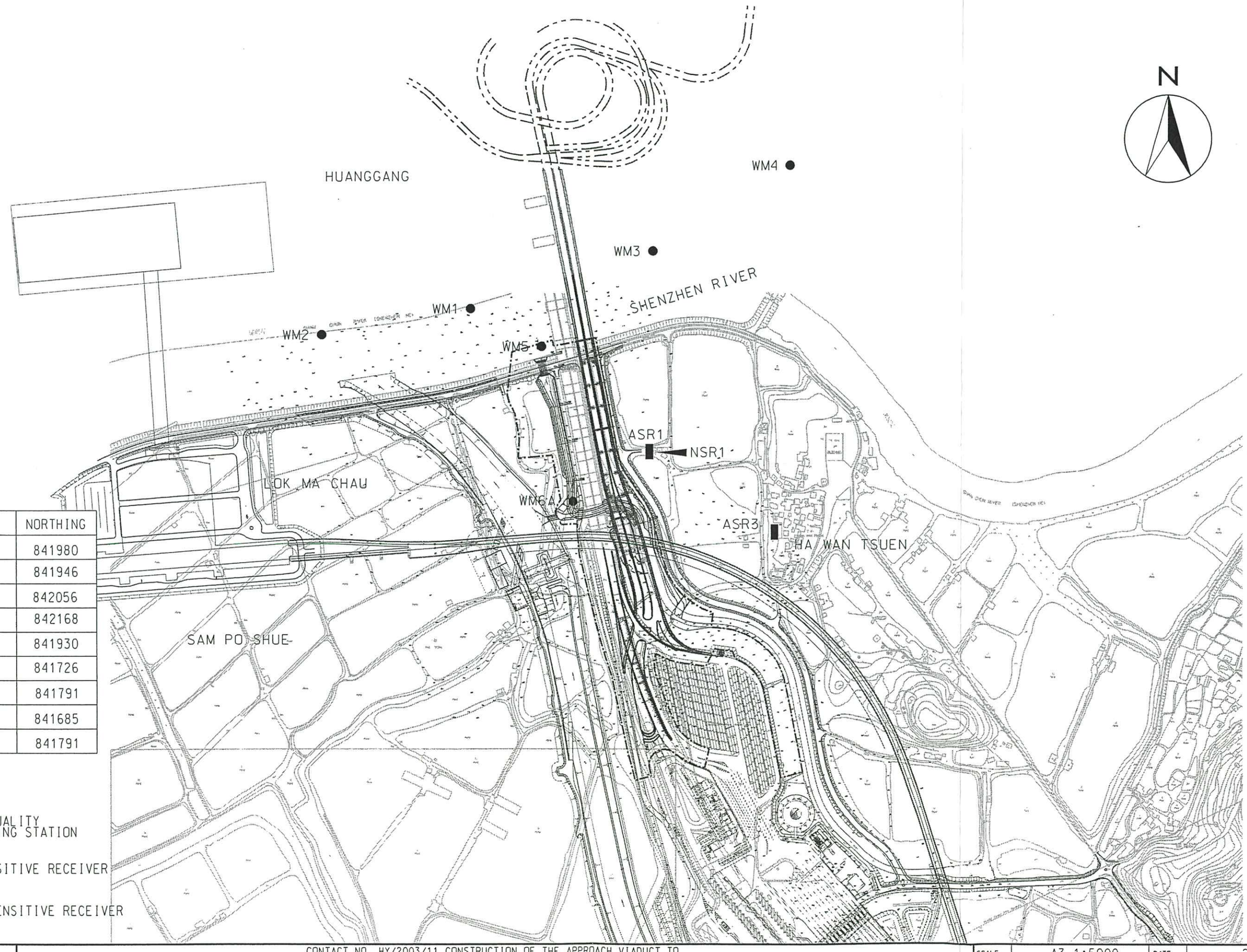

	EASTING	NORTHING
WM1	825226	841980
WM2	825030	841946
WM3	825469	842056
WM4	825651	842168
WM5	825320	841930
WM6A	825362	841726
ASR1	825470	841791
ASR3	825631	841685
NSR1	825470	841791

LEGEND:

WM6 ● WATER QUALITY MONITORING STATION

ASR1 ▮ AIR SENSITIVE RECEIVER

NSR1 ▲ NOISE SENSITIVE RECEIVER

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CONTACT NO. HY/2003/11 CONSTRUCTION OF THE APPROACH VIADUCT TO THE NEW BOUNDARY BRIDGE BETWEEN LOK MA CHAU AND HUAGGANG AND ASSOCIATE WORKS

LOCATIONS OF AIR QUALITY, NOISE AND WATER QUALITY MONITORING STATIONS

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APPENDIX A
CONTACTS DETAILS OF KEY MANAGEMENT

Appendix A — Contacts of Key Environmental Personnel

	Name	Telephone	Fax
Environmental Protection Department			
Senior Environmental Protection Officer	Tom Tam	2835 1843	2591 0558
Environmental Protection Officer	K.K. Lo	2835 1300	2591 0558
Environmental Protection Officer	John K.O. Chung	2411 9608	2413 3358
Supervising Officer/ Engineer Representative			
Highways Department			
Senior Engineer	Roger P.K. Lee	2482 0139	2482 9679
Engineer	Steven Choi	2482 0139	2482 9679
Assistant Engineer	Benedict Cheung	2482 0139	2482 9679
Independent Environmental Checker			
Ford Business International Limited			
Independent Environmental Checker	Cliff Lam	2959 6059	2959 6079
Contractor			
China State Joint Venture			
Site Agent	Michael Yip	2482 4369	2482 7127
Environmental Team			
Maunsell Environmental Management Consultants Limited			
Environmental Team Leader	Y.T. Tang	2893 1551	2891 0305
Audit Team Leader	Florence Yuen	2893 1551	2891 0305
Monitoring Team Leader	Thomas Chan	2893 1551	2891 0305

APPENDIX B
ENVIRONMENTAL MONITORING PROGRAMME

Appendix B Environmental Monitoring Programme

Table B1 Air Quality Monitoring Parameters and Frequency

Location	Parameter	Duration	Frequency
ASR1	1-hour TSP	1 hour	3 times every six days
ASR3	1-hour TSP	1 hour	3 times every six days
	24-hour TSP	24 hours	Once every six days

Table B2 Noise Monitoring Parameters, Period and Frequency

Location	Time Period	Parameters	Frequency
NSR1	Daytime (0700 to 1900 on normal weekdays)	$L_{eq\ (30\text{-}min)}$	Once per week

Table B3 Water Quality Monitoring Parameters, Period and Frequency

Monitoring Stations	Parameter, unit	Frequency	No. of Depth
WM1 – WM6	*Salinity, ppt *DO, mg/L * Turbidity, NTU *pH, unit SS, mg/L	Three times per week	3 (Surface, Mid-Depth & Bottom) where appropriate**

*Parameters measured in-situ, otherwise by laboratory analysis

**Measurements were taken at 3 water depths, namely 1m below water surface, mid-depth, and 1m from seabed, except where the water depth was less than 6m, the mid-depth measurement was omitted. If the water depth was less than 3m, only the mid-depth position was monitored.

APPENDIX C
ACTION AND LIMIT LEVELS

Appendix C – Action and Limit Levels

Action and Limit Levels for 1-hour TSP and 24 hour TSP

Parameter	Location	Action Level, μg/m^3	Limit Level, μg/m^3
1-hour TSP	ASR1	417.3	500
	ASR3	409.0	
24-hour TSP	ASR3	194.5	260

Action and Limit Levels (L_{eq}) for Construction Noise

Location	Time Period	Action Level	Limit Level, dB(A)
NSR1	0700 – 1900 hours on normal weekdays	When one documented complaint is received from any one of the sensitive receivers	75

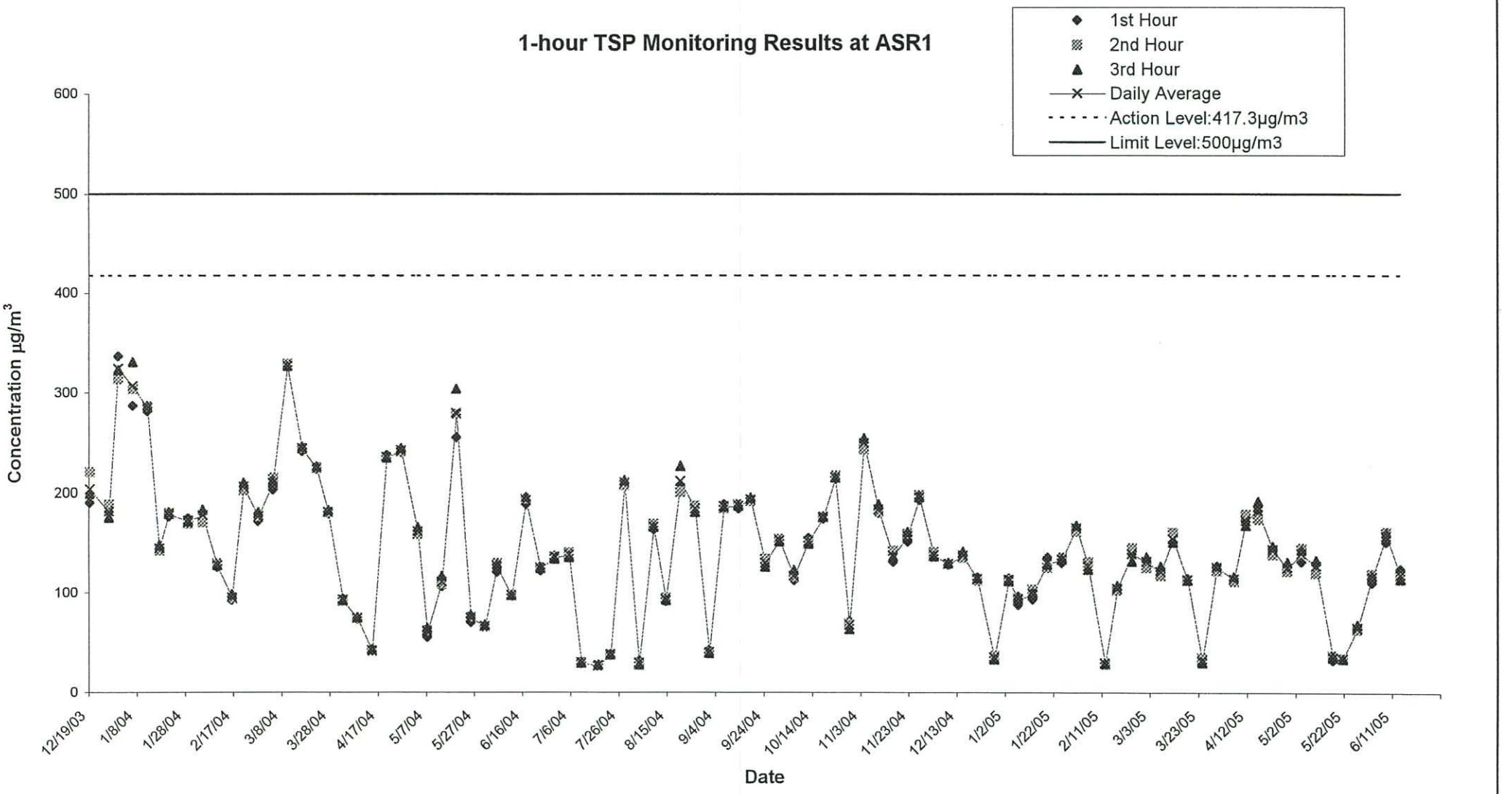
Action and Limit Levels for Water Quality

Location	Parameter	Action	Limit
WM1 WM2 WM5	DO, mg/L (Surface & Mid-depth)	Not Applicable	Not Applicable
	Turbidity, NTU	**131** or 120% of upstream control station's* turbidity at the same tide of the same day	**286** or 130% of upstream control station's* turbidity at the same tide of the same day
	SS, mg/L	**204** or 120% of upstream control station's* SS at the same tide of the same day	**277** or 130% of upstream control station's* SS at the same tide of the same day
	pH, unit	Not Applicable	**<6.5 or >8.5**
WM6	DO, mg/L (Surface & Mid-depth)	**0.31**	**0.10**
	Turbidity, NTU	**70**	**73**
	SS, mg/L	**83**	**88**
	pH, unit	Not Applicable	**<6.5 or >8.5**

*Monitoring would be conducted during ebb tide. Monitoring stations WM3 and WM4 would act as Upstream Control stations.

APPENDIX D
GRAPHICAL PRESENTATION OF AIR QUALITY MONITORING RESULTS

1-hour TSP Monitoring Results at ASR1



MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No.: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of 1-hour TSP Monitoring Result - ASR1 (December 2003-June 2005)**	SCALE	N.T.S.	DATE	2005
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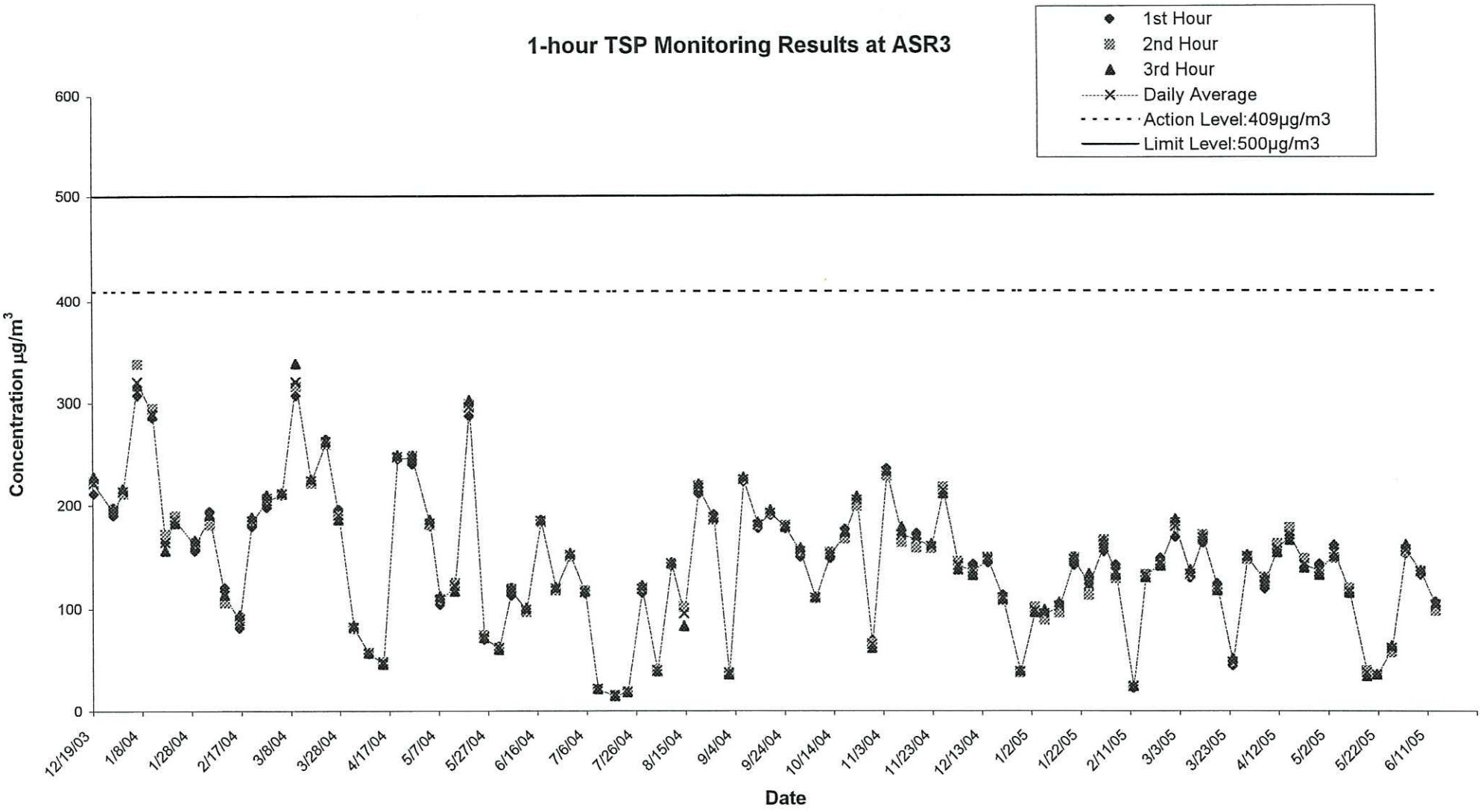
1-hour TSP Monitoring Results at ASR3



MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No.: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of 1-hour TSP Monitoring Result - ASR3 (December 2003-June 2005)**	SCALE	N.T.S.	DATE	2005
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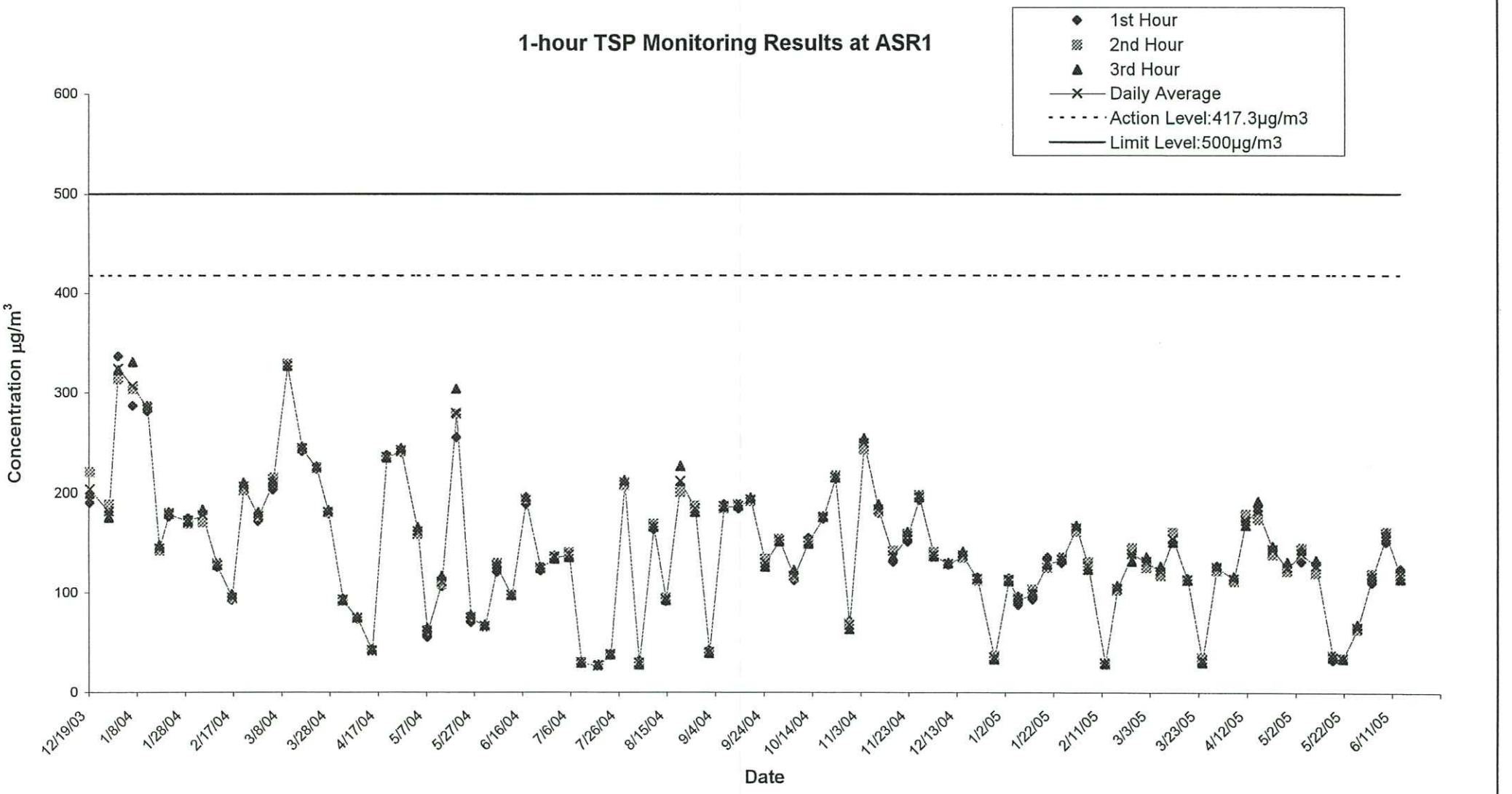
		JOB NO.	S09203	**APPENDIX No.** D	**Rev.** -

1-hour TSP Monitoring Results at ASR1



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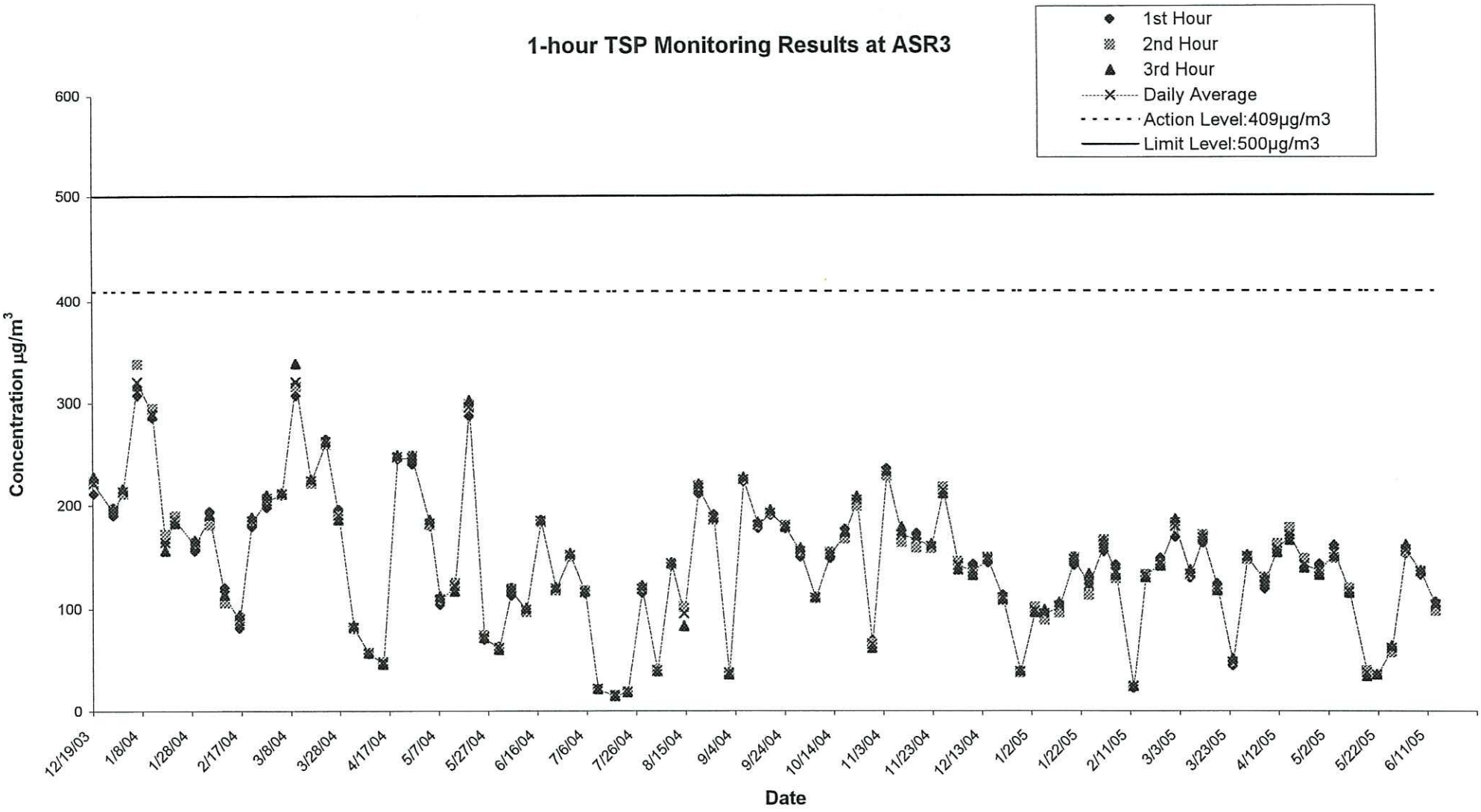
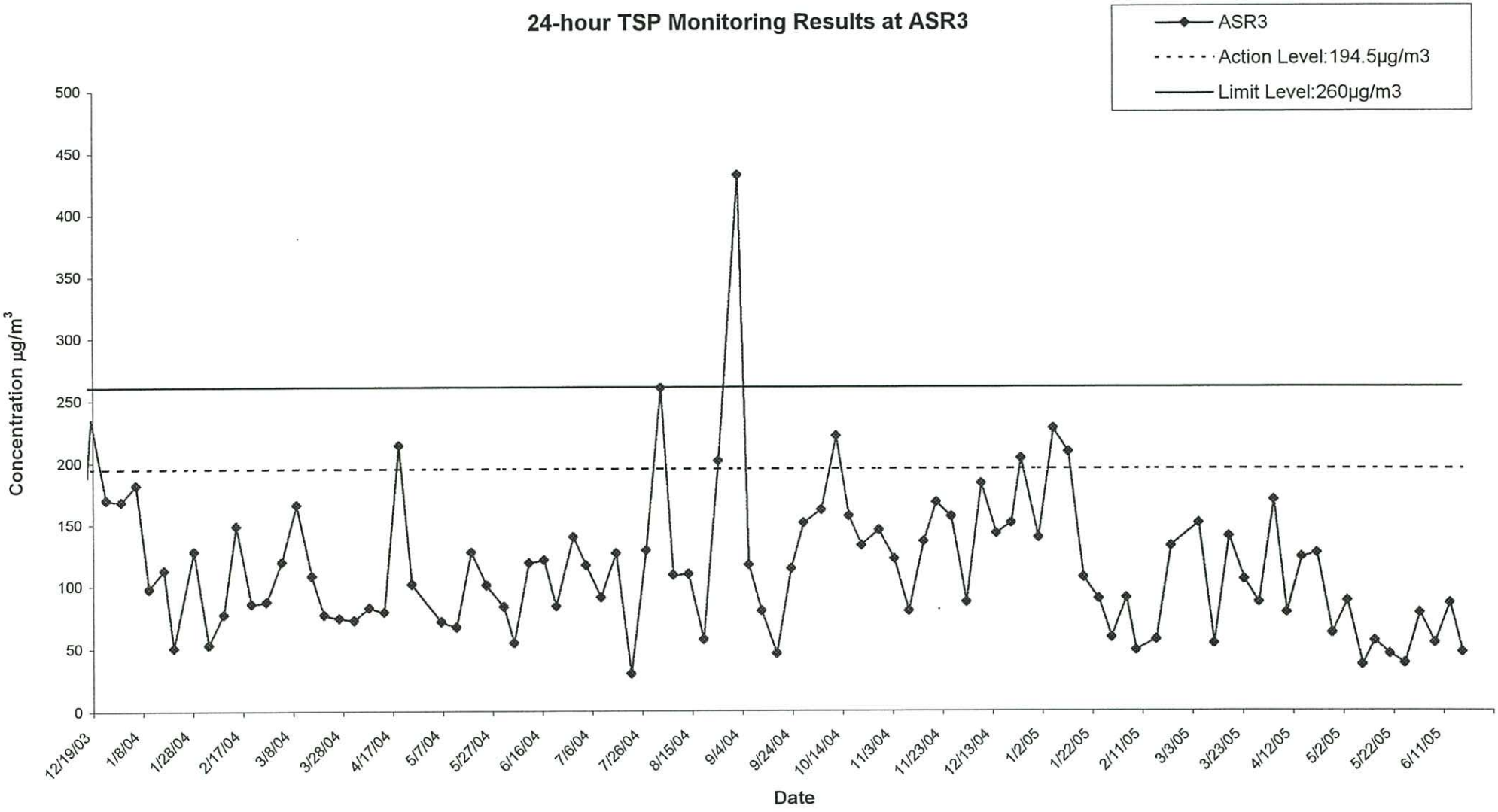
		JOB NO.	S09203	APPENDIX No. D	Rev. -

1-hour TSP Monitoring Results at ASR3



MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No.: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of 1-hour TSP Monitoring Result - ASR3 (December 2003-June 2005)**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	**APPENDIX No.** D	**Rev.** -

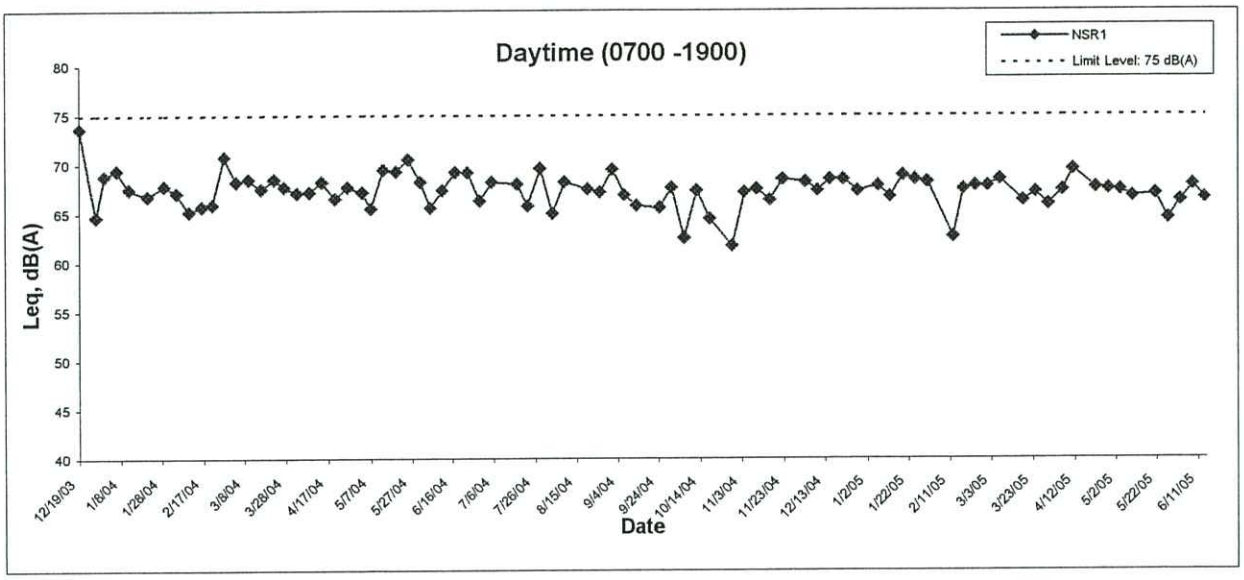
24-hour TSP Monitoring Results at ASR3



MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No.: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of 24-hour TSP Monitoring Result - ASR3 (December 2003-June 2005)**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No. D	Rev. -

APPENDIX E
GRAPHICAL PRESENTATION OF NOISE MONITORING RESULTS

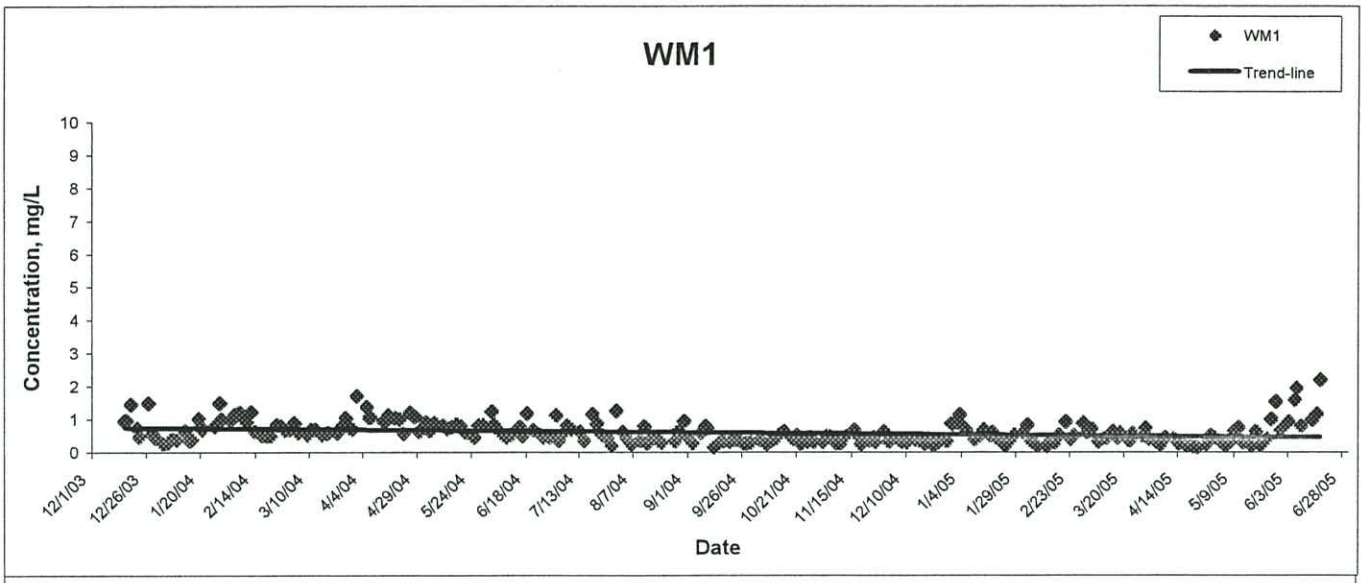
Noise Monitoring Results at NSR1

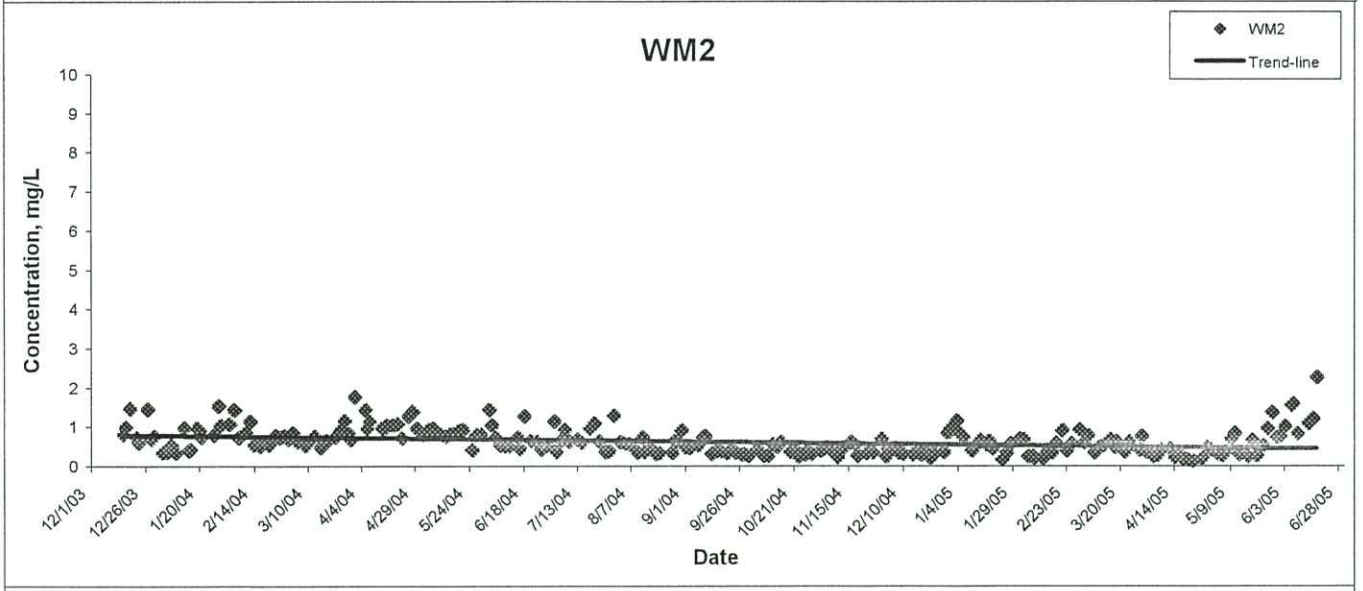


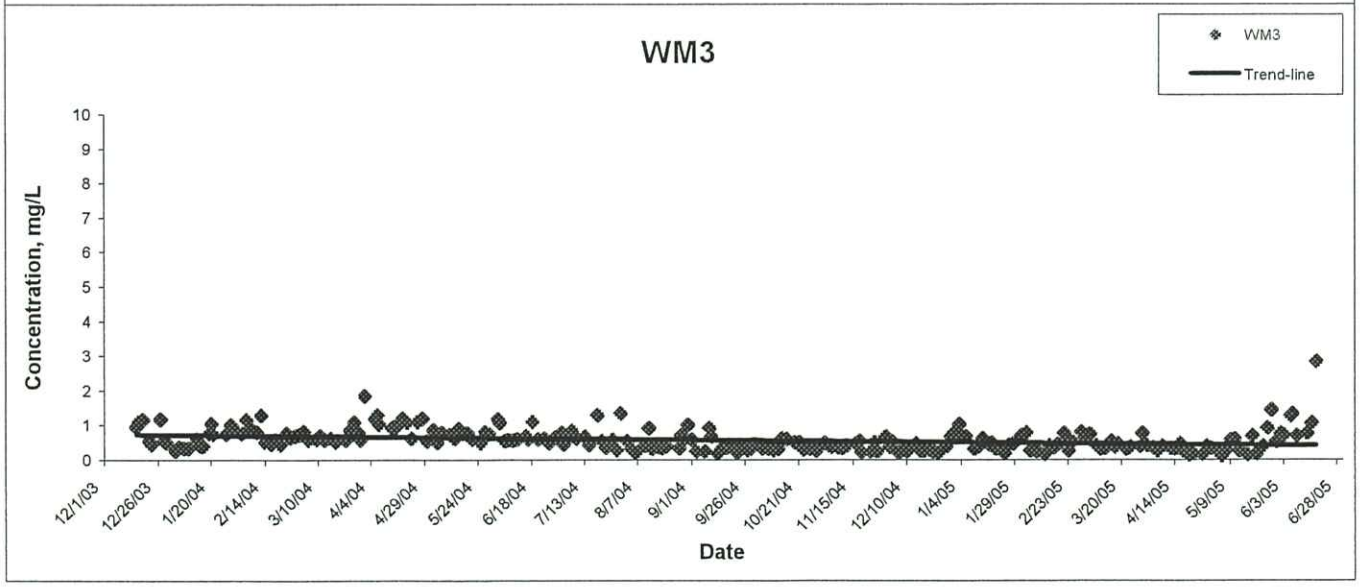
MAUNSELL AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of Noise Monitoring Results (December 2003-June 2005)**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	**APPENDIX No.** E	**Rev.** -

APPENDIX F
GRAPHICAL PRESENTATION OF WATER QUALITY MONITORING RESULTS

Dissolved Oxygen (Surface & Middle)

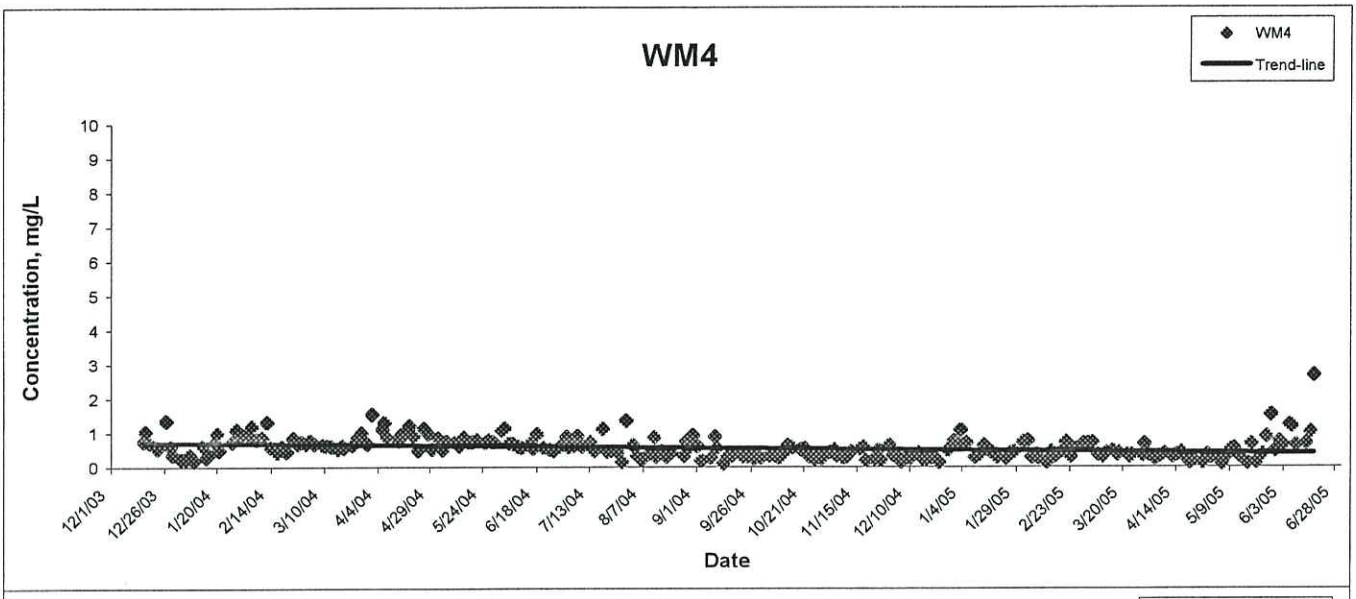


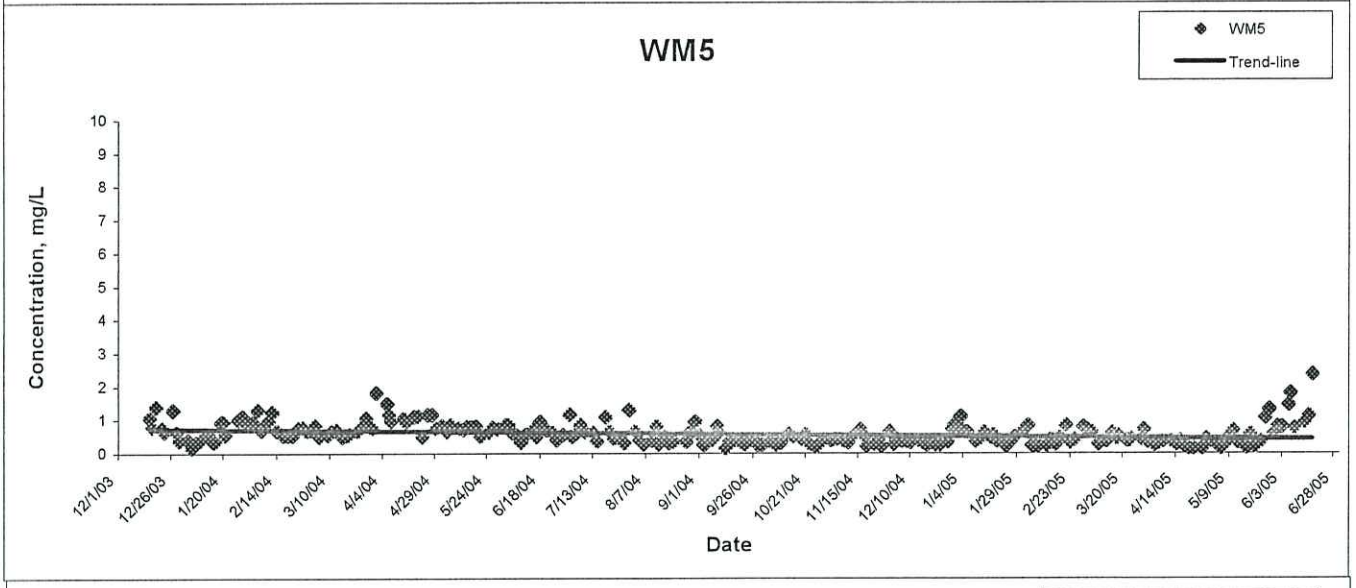


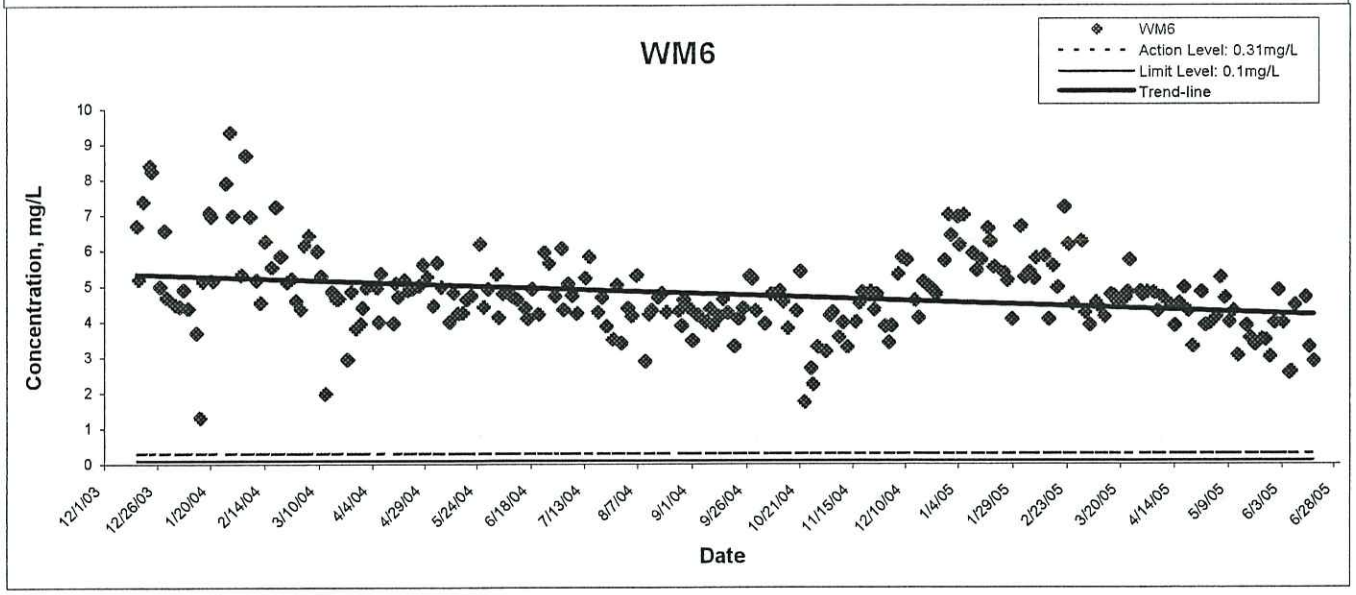


MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of Water Quality Monitoring Results**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No. F	Rev. -

Dissolved Oxygen (Surface & Middle)







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Maunsell Environmental Management Consultants Ltd

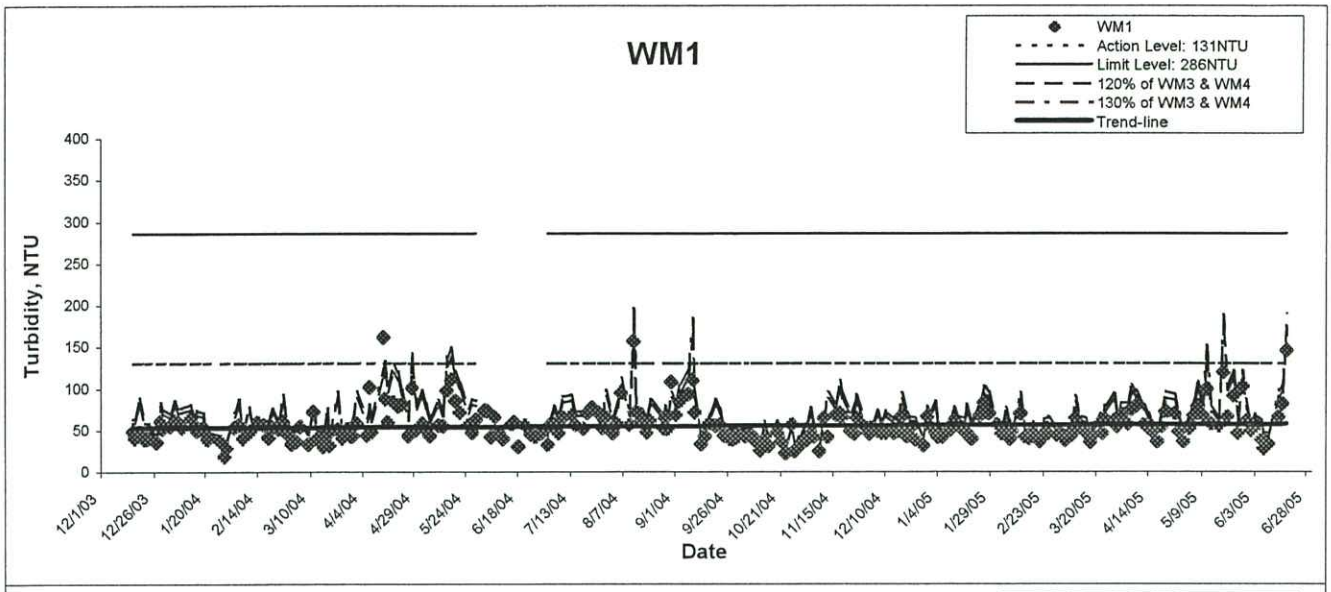
Contract No: HY/2003/11

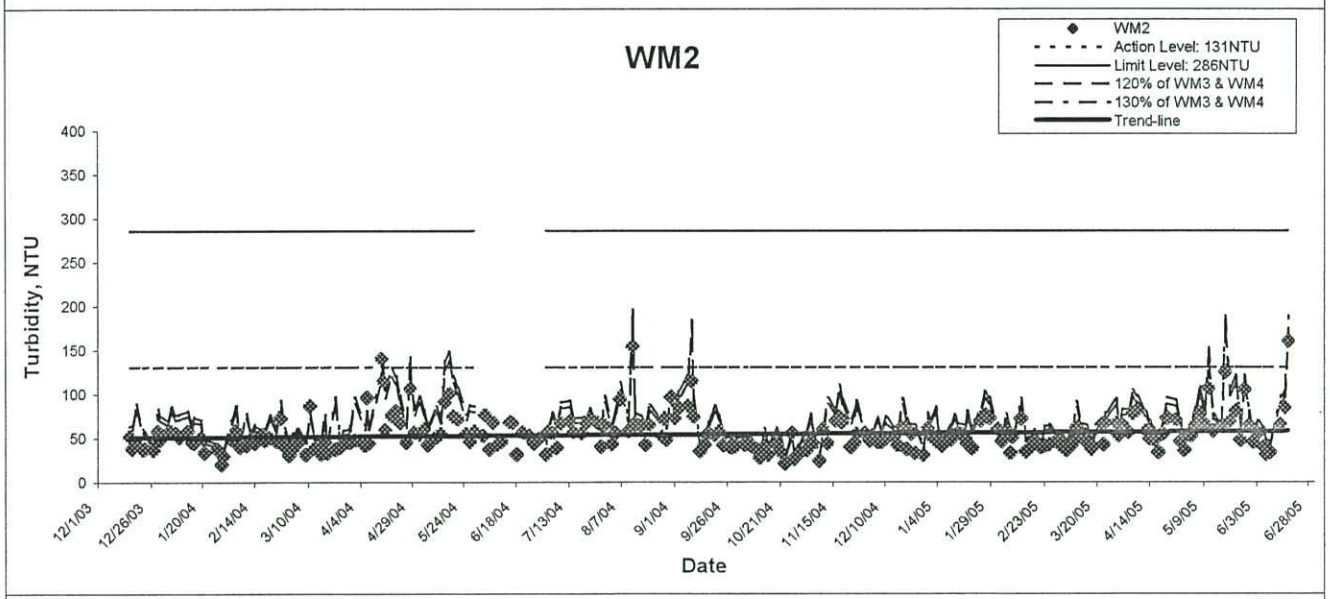
Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works

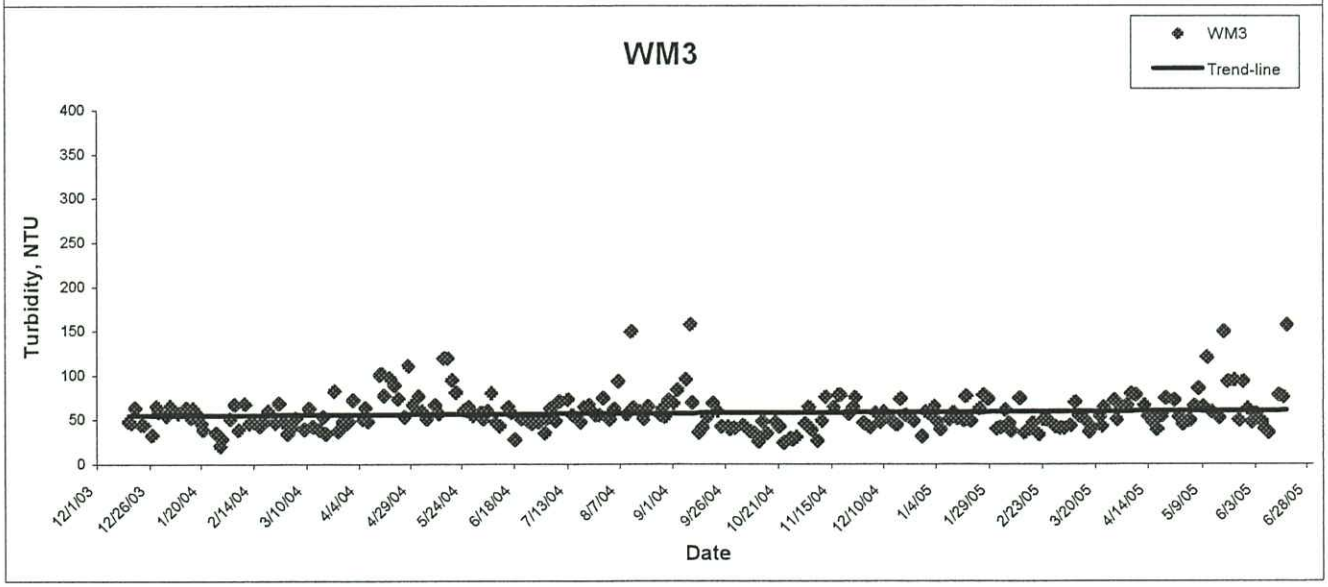
Graphical Presentation of Water Quality Monitoring Results

SCALE	N.T.S.	DATE	2005
CHECK	FSYY	DRAWN	KWLAI
JOB NO.	S09203	APPENDIX No.	F

Turbidity

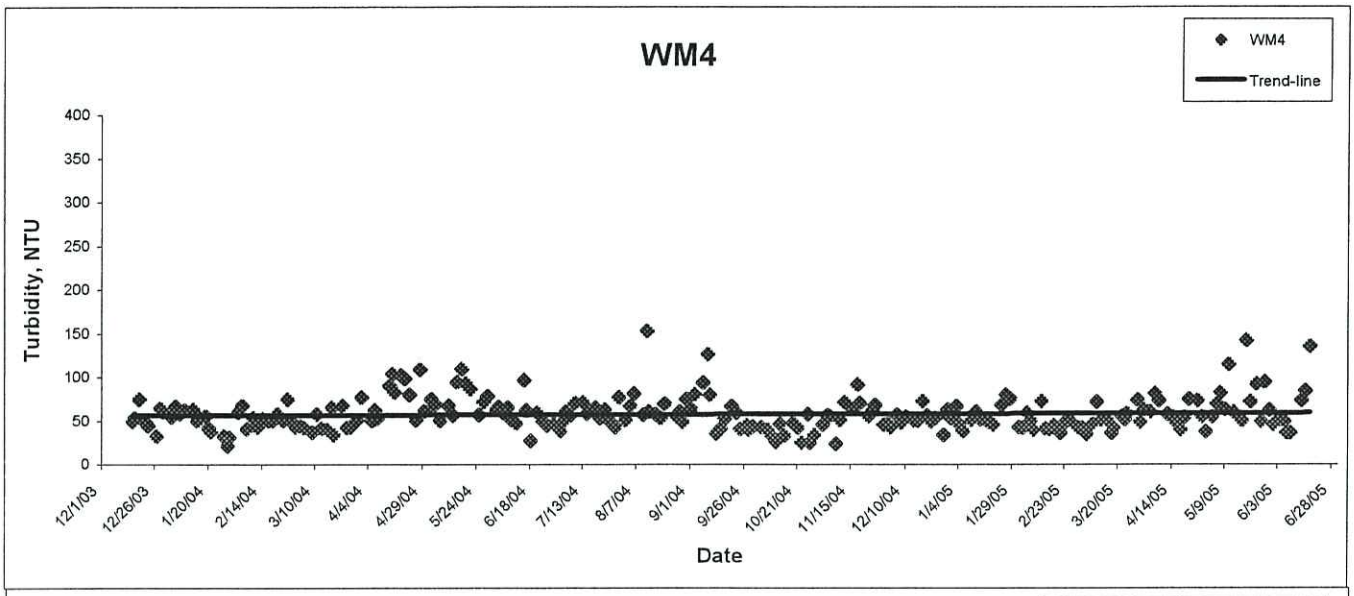


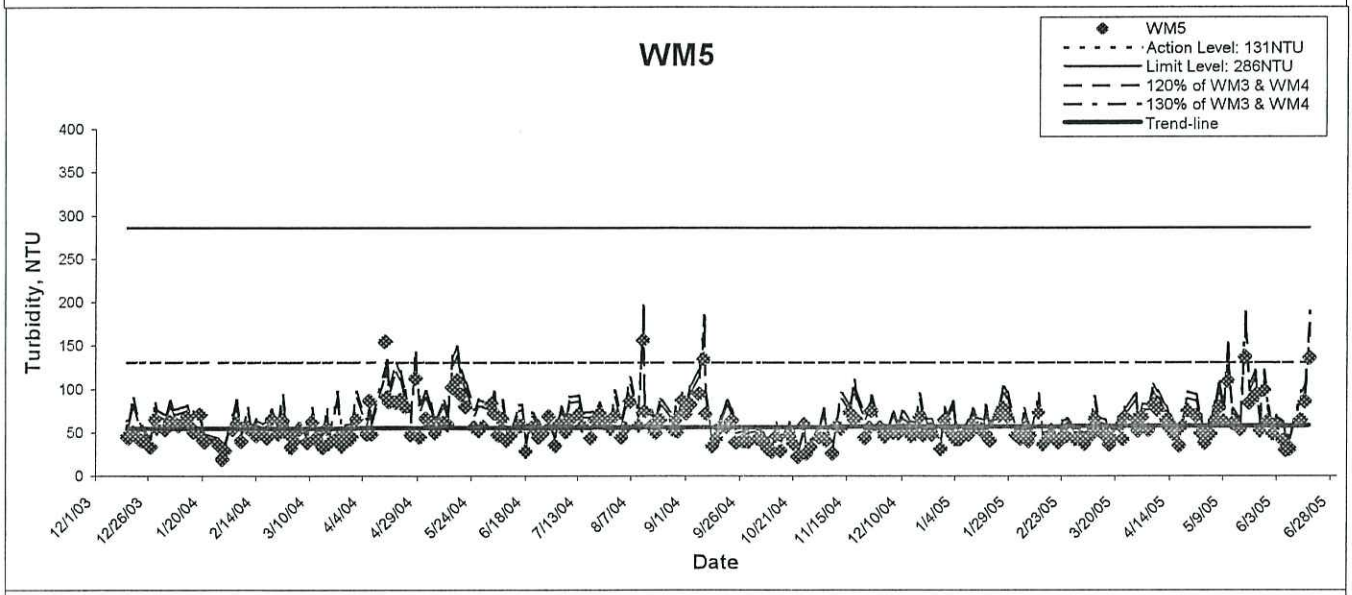


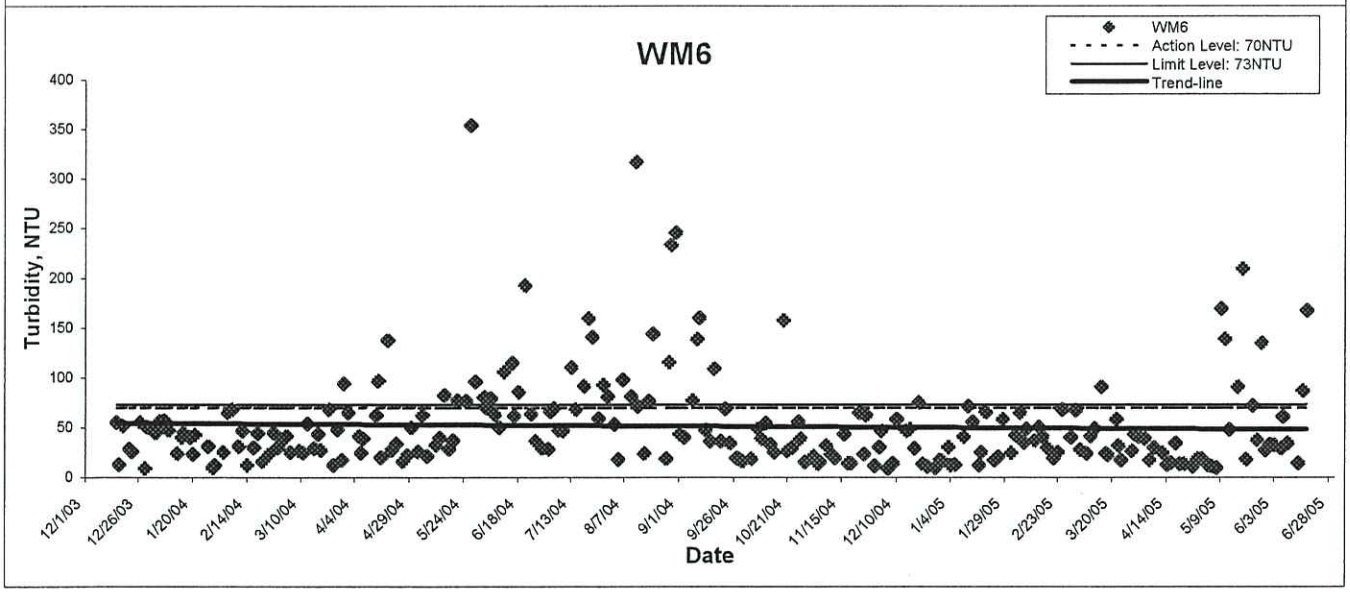


MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of Water Quality Monitoring Results**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No. F	Rev. -

Turbidity

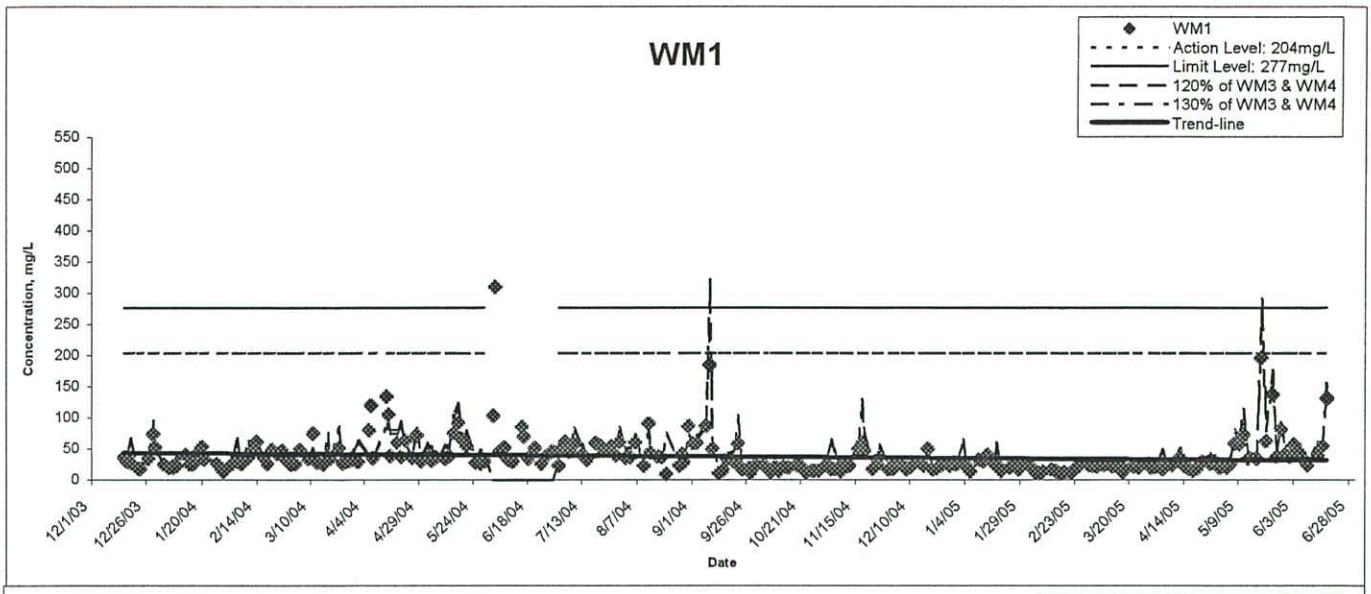


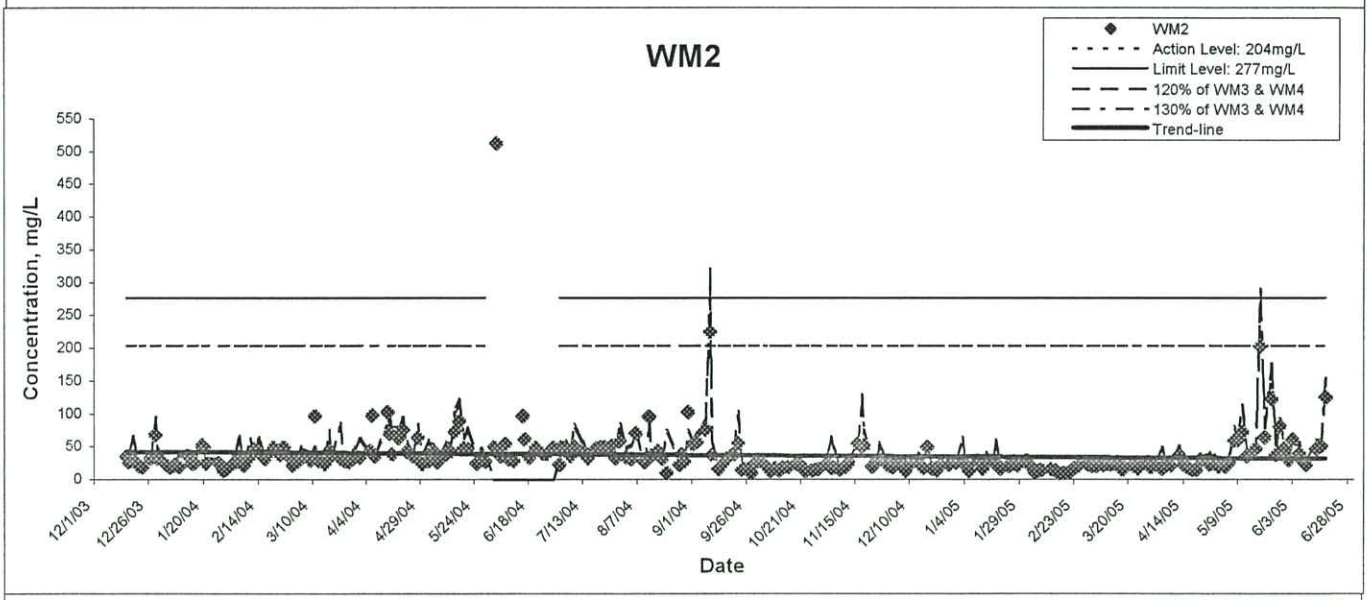


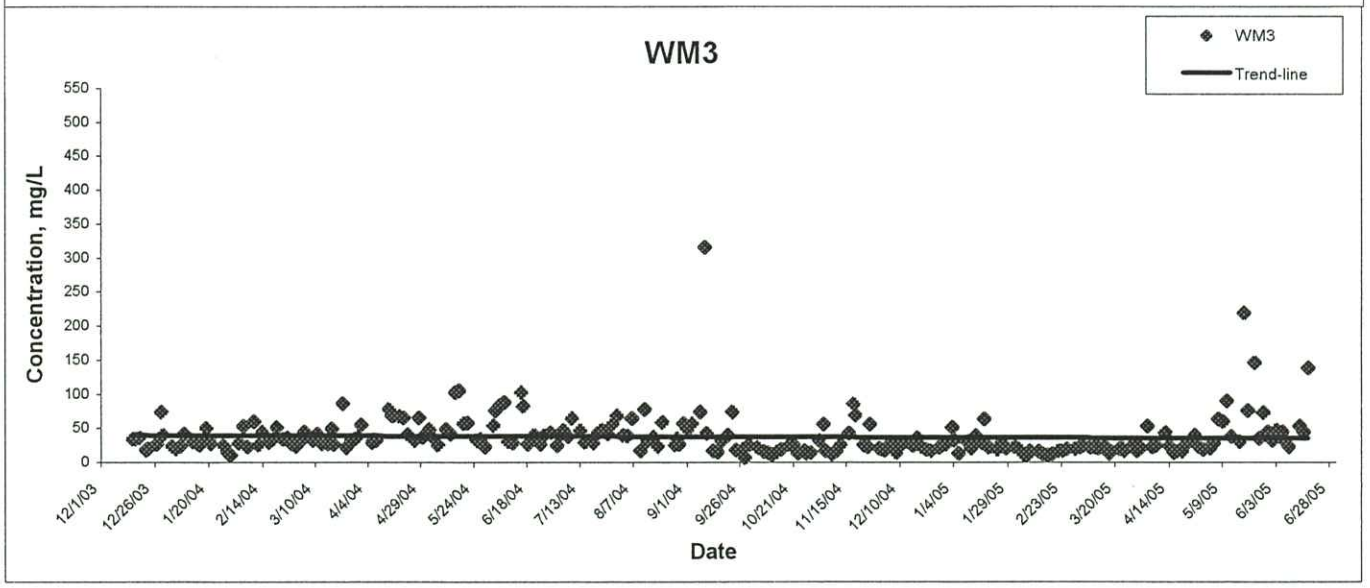


MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of Water Quality Monitoring Results**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No.	F

Suspended Solids



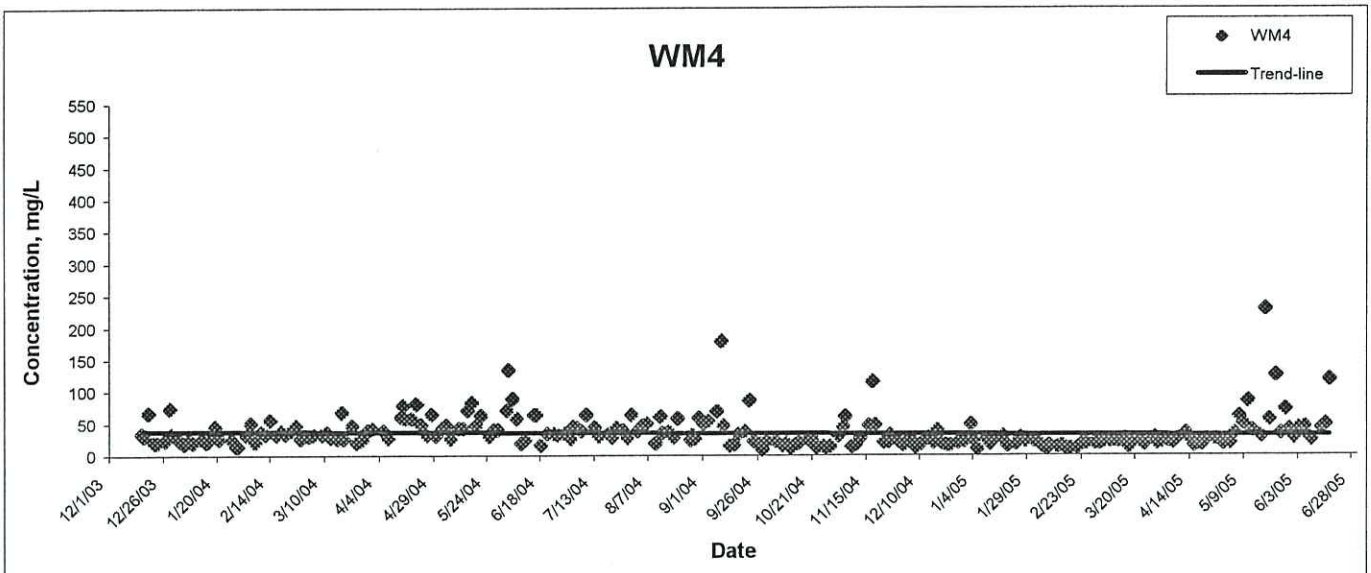




MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of Water Quality Monitoring Results**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No. F	Rev. -

Suspended Solids

WM4



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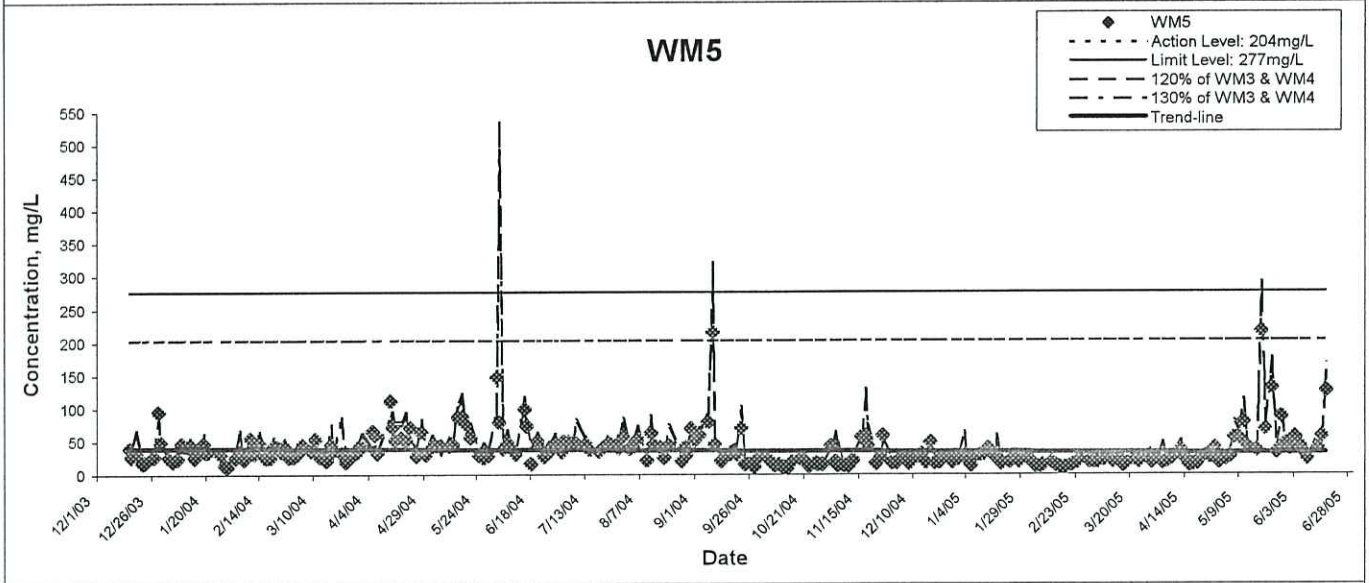

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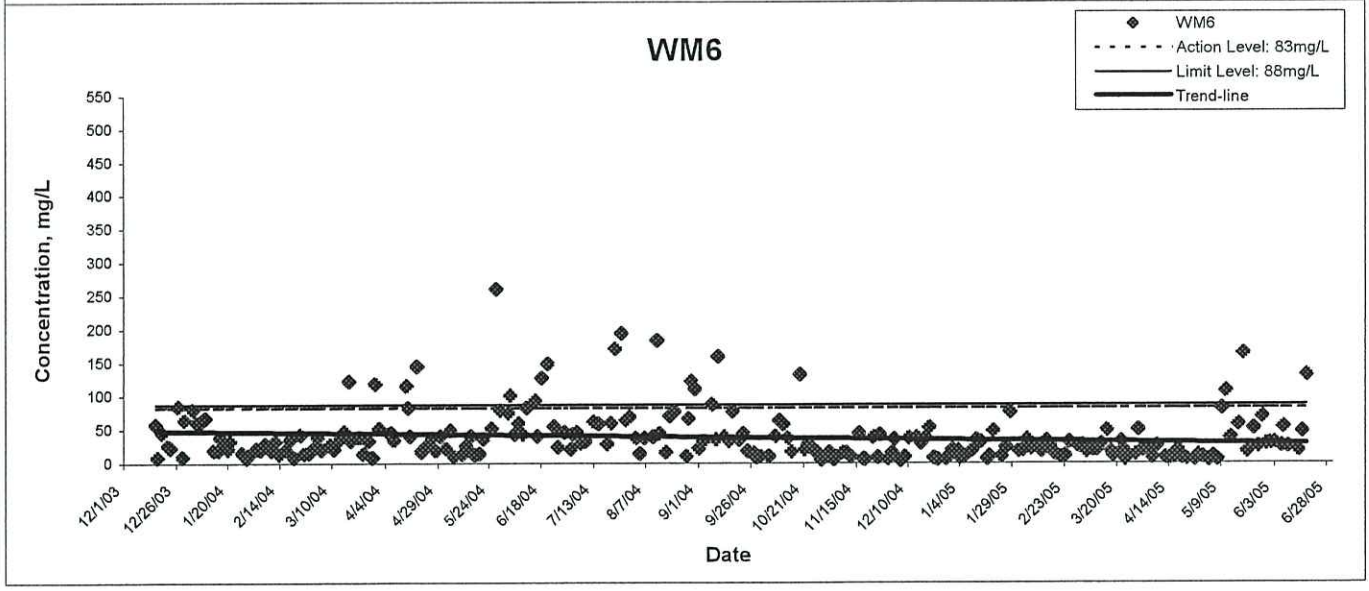

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Maunsell Environmental Management Consultants Ltd

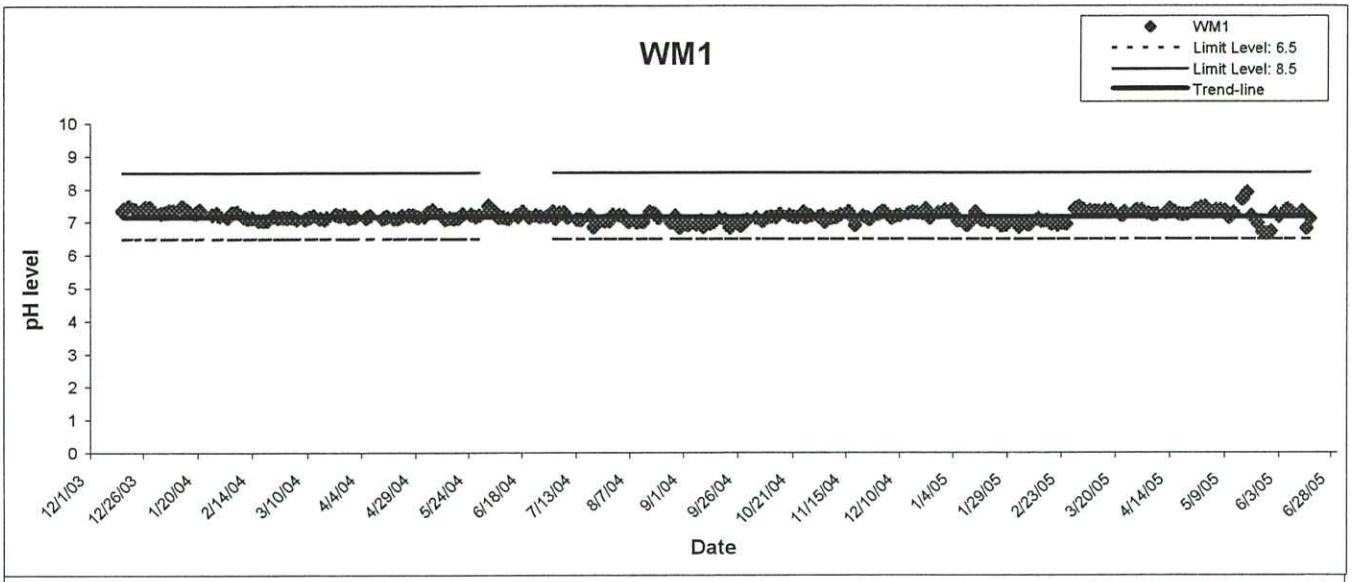
Contract No: HY/2003/11

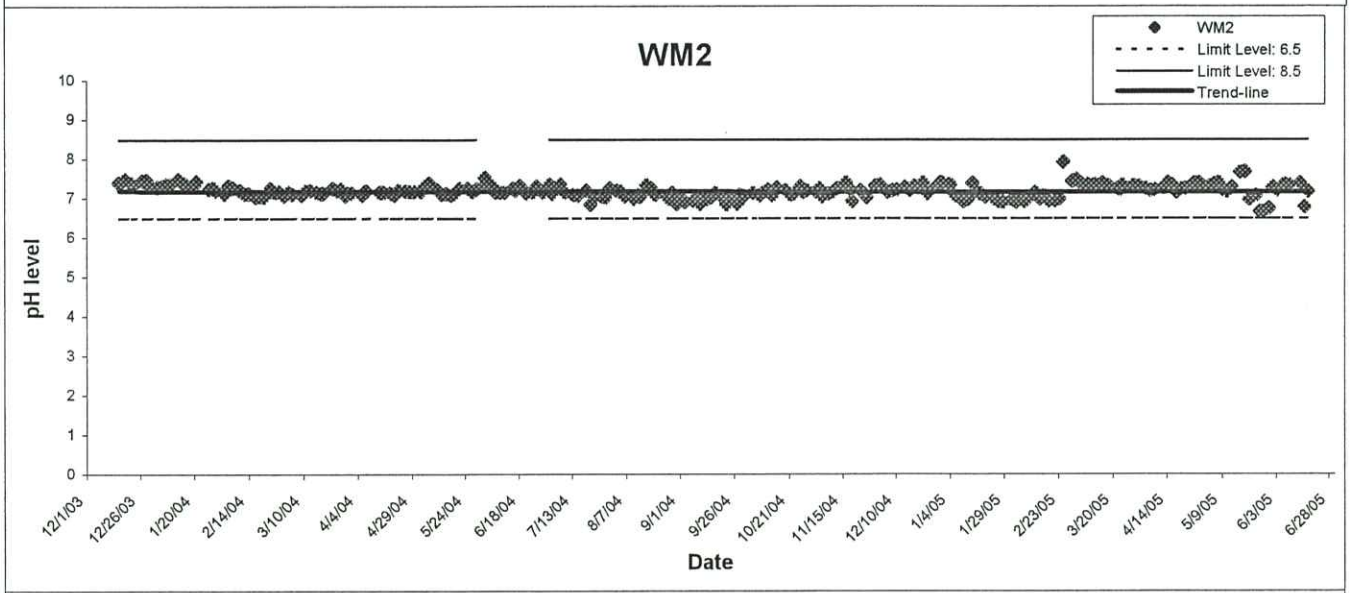
Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works

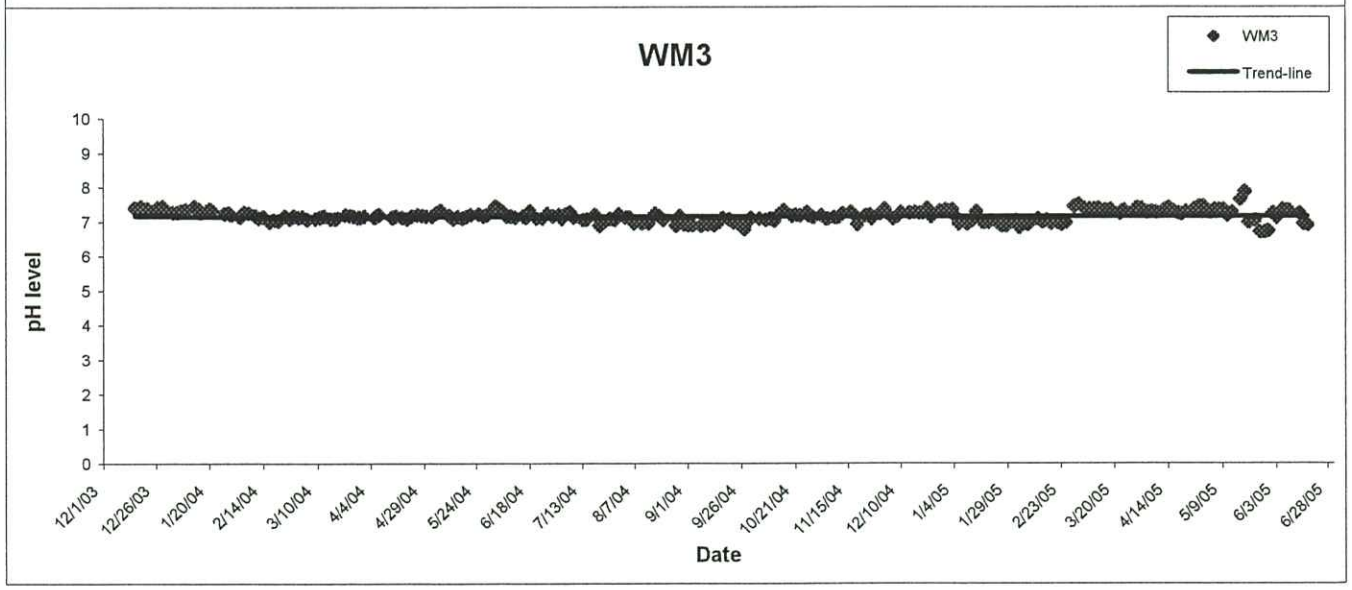
Graphical Presentation of Water Quality Monitoring Results

SCALE	N.T.S.	DATE	2005
CHECK	FSYY	DRAWN	KWLAI
JOB NO.	S09203	APPENDIX No.	F

pH

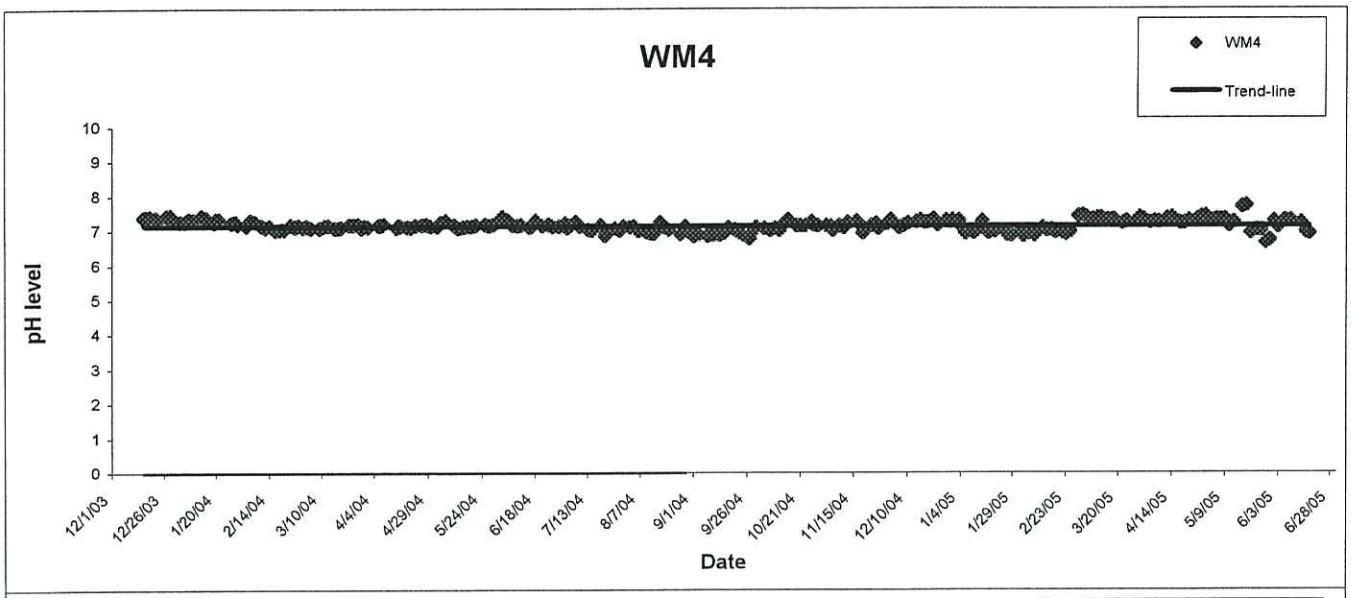


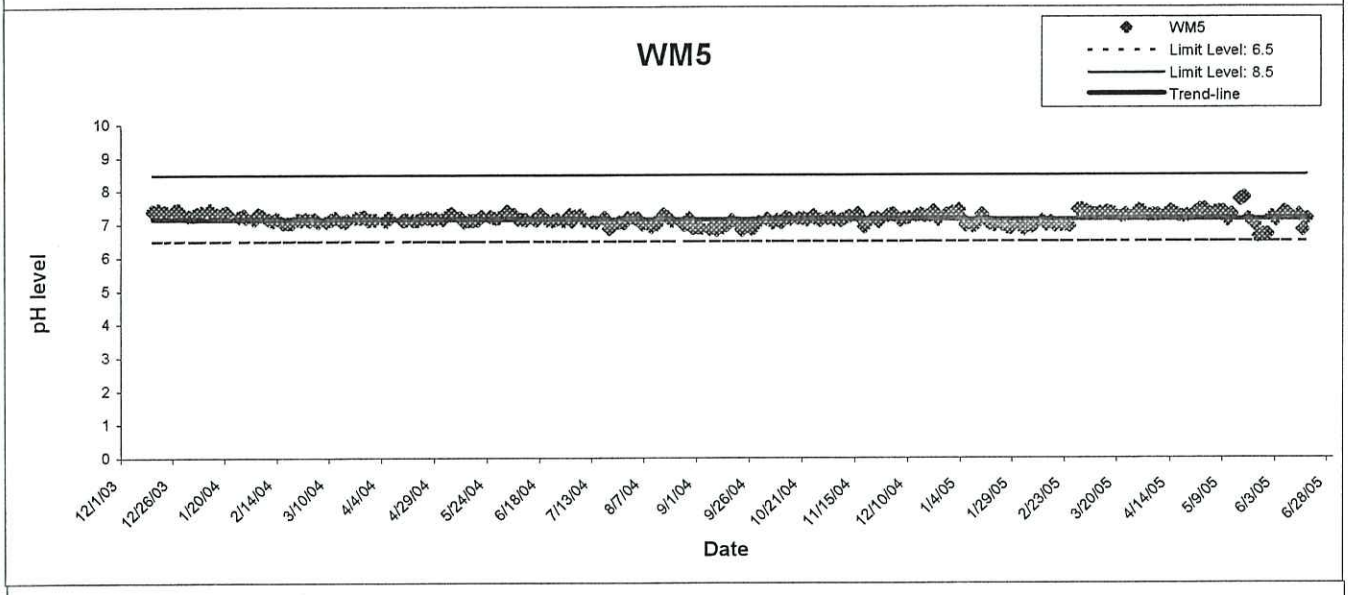


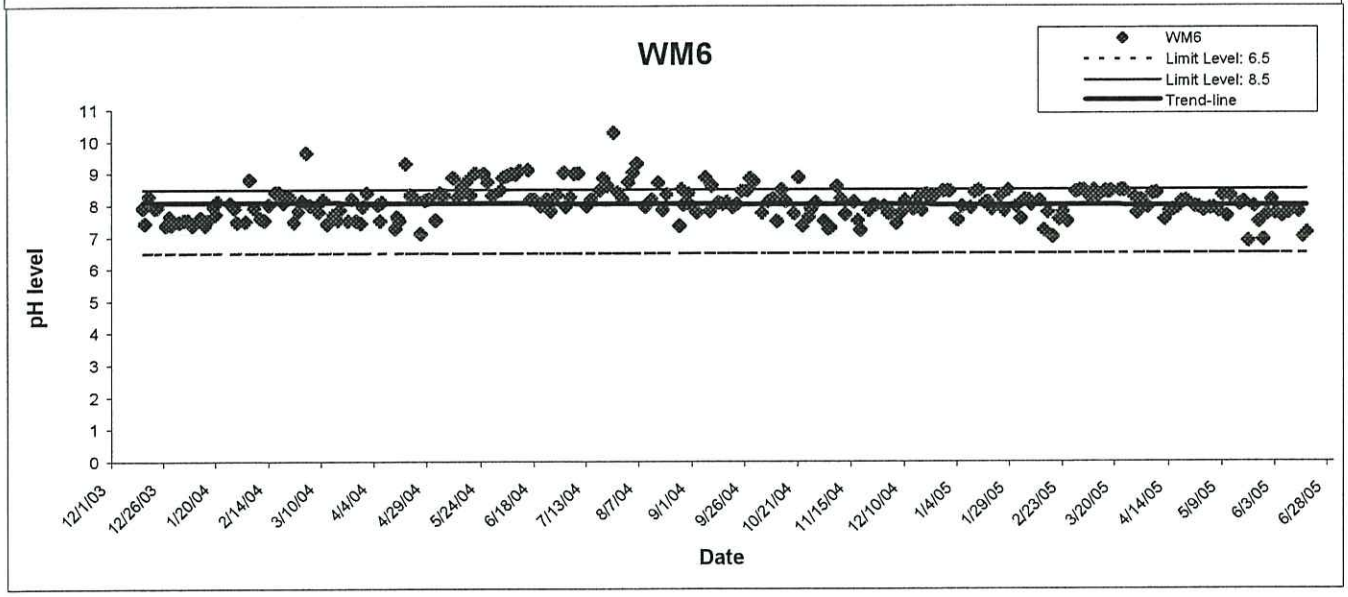


MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of Water Quality Monitoring Results**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No. F	Rev. -

pH







MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Design & Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Graphical Presentation of Water Quality Monitoring Results**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No.	F

APPENDIX G
IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

Appendix G — Summary of Environmental Mitigation Implementation Schedule

Types of Concern	Mitigation Measures	Where	What	When	Who	Status
Air Quality	• The Contractors shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels	All works area	All activities	Construction phase	Contractor	√
	• The Contractors shall not burn debris or other materials on the works area	All works area	All activities	Construction phase	Contractor	√
	• In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet	All works area	All activities	Construction phase	Contractor	√
	• Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created	All works area	All activities	Construction phase	Contractor	√
	• Open dropping heights for excavated materials shall be controlled to a maximum height of 2 m to minimise the fugitive dust arising from unloading	All works area	All activities	Construction phase	Contractor	N/A
	• During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards	All works area	All activities	Construction phase	Contractor	√
	• No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earth works excavation activity on site	All works area	All activities	Construction phase	Contractor	√
	• Areas of exposed soil be minimised to areas in which works have been completed shall be restored as soon as is practicable; and	All works area	All activities	Construction phase	Contractor	√
	• All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All works area	All activities	Construction phase	Contractor	√
Noise						

Types of Concern	Mitigation Measures	Where	What	When	Who	Status
	• Noisy equipment and activities should be positioned as far as practicable from the NSRs. Prolonged operation of noisy equipment close to dwellings should be avoided;	All works area	All activities	Construction phase	Contractor	N/A
	• Noisy plants or processes should be replaced by quieter alternatives where possible. Silenced diesel and gasoline generators and power units, as well as silenced and super-silenced air compressors should be adopted;	All works area	All activities	Construction phase	Contractor	√
	• Noisy activities should be scheduled to minimise exposure of nearby sensitive receivers to high levels of construction noise. For example, noisy activities can be scheduled for midday, or at times coinciding with periods of high background noise (such as during peak traffic hours);	All works area	All activities	Construction phase	Contractor	N/A
	• Idle equipment should be turned off or throttled down. Noisy equipment should be properly maintained and used no more often than is necessary;	All works area	All activities	Construction phase	Contractor	√
	• Material stockpiles and other structures (such as site offices) should be effectively utilised to shield construction noise. Noise can also be reduced by construction of temporary noise barriers that screen the lower floors from viewing the sites. Temporary noise barriers should be installed at active parts of construction areas where construction equipment is being operated in close proximity to NSRs.	All works area	All activities	Construction phase	Contractor	N/A
Water Quality						
Surface runoff from works site	• Implementation of suitable temporary drainage system, including the use of channels, sandbags or bunds to avoid escape of contaminated water.	All works area	All activities	Construction phase	Contractor	√
	• Provision of de-silting facilities to reduce SS levels in effluent.	All works area	All activities	Construction phase	Contractor	√
	• Provision of oil interceptor as appropriate.	All works area	All activities	Construction phase	Contractor	N/A
Marine bored-piling	• The installation of the sheetpiles for the cofferdams shall be controlled to minimize stirring up of sediments.	Marine works area	Bored piling activities	Construction phase	Contractor	N/A
	• Recycle of bentonite where appropriate.	Marine works area	Bored piling activities	Construction phase	Contractor	N/A

Types of Concern	Mitigation Measures	Where	What	When	Who	Status
	• Contain run-off from cofferdams.	Marine works area	Bored piling activities	Construction phase	Contractor	N/A
	• Waste discharged from the piling activities shall be treated and disposed of offsite.	Marine works area	Bored piling activities	Construction phase	Contractor	N/A
Elevation of pH in watercourses from concrete washings	• Closed monitoring of pH in watercourses.	All works area	All activities	Construction phase	Contractor	√
	• Construction of temporary working platform underneath the concreting work to collect split cement and concrete washings.	All works area	All activities	Construction phase	Contractor	N/A
General	• Avoid spillage of wastewater and materials into the River.	All works area	All activities	Construction phase	Contractor	√
	• Minimize concrete production on site – use pre-cast units where possible.	All works area	All activities	Construction phase	Contractor	N/A
	• Wastewater from construction should be collected and treated before being discharged.	All works area	All activities	Construction phase	Contractor	√
Environmental Permit Conditions						
EP Condition 2.3	• The new boundary bridge shall be vertically aligned with and at the immediate east of the existing bridge. The new piers of the bridge at Shenzhen River shall be in line with existing piers so as to minimize impacts to the sensitive receivers during construction and operation phases;	All works area	All activities	Construction phase	Contractor	N/A
	• During the construction of the project, the size of each of the cofferdams shall not be larger than 12x12m. The installation of the cofferdams and construction of bridge foundation shall be restricted to th dry season (between Nov – Mid March next year). After the completion of the foundation works, the cofferdams shall be removed immediately;	Marine works area	Bored piling activities	Construction phase	Contractor	N/A
	• To minimize the water quality impacts, silt and oil traps shall be installed to control site runoff. Debris and harmful materials shall be prevented from reaching drainage facilities of water bodies. Toilet facilities shall be provided and sewage shall be properly disposed of.	All works area	All activities	Construction phase	Contractor	√
Landscape and Visual Impacts						

Types of Concern	Mitigation Measures	Where	What	When	Who	Status
EP Appendix A	• Conservation (excavation and stockpiling on site) of topsoil shall be undertaken for re-use in landscape works. This includes the proper storage of topsoil to a maximum height of 2m.	All works area	All activities	Construction phase	Contractor	N/A
	• Night-time lighting shall be controlled to minimize glare to sensitive receivers.	All works area	All activities	Construction phase	Contractor	N/A
	• Replanting disturbed vegetation shall be undertaken.	All works area	All activities	Construction phase	Contractor	N/A
	• Screen hoarding, using decorative graphic and chromatic devices, shall be erected around the works wherever possible to screen the works from motorists and other receivers within the road corridor and adjacent areas.	All works area	All activities	Construction phase	Contractor	N/A
	• Planting within and at the perimeter of works sites shall be undertaken at the earliest possible stage before and during construction, and opportunities should be sought for undertaking any advance planting.	All works area	All activities	Construction phase	Contractor	√
	• Existing trees of high amenity value shall be transplanted.	All works area	All activities	Construction phase	Contractor	√

Note:

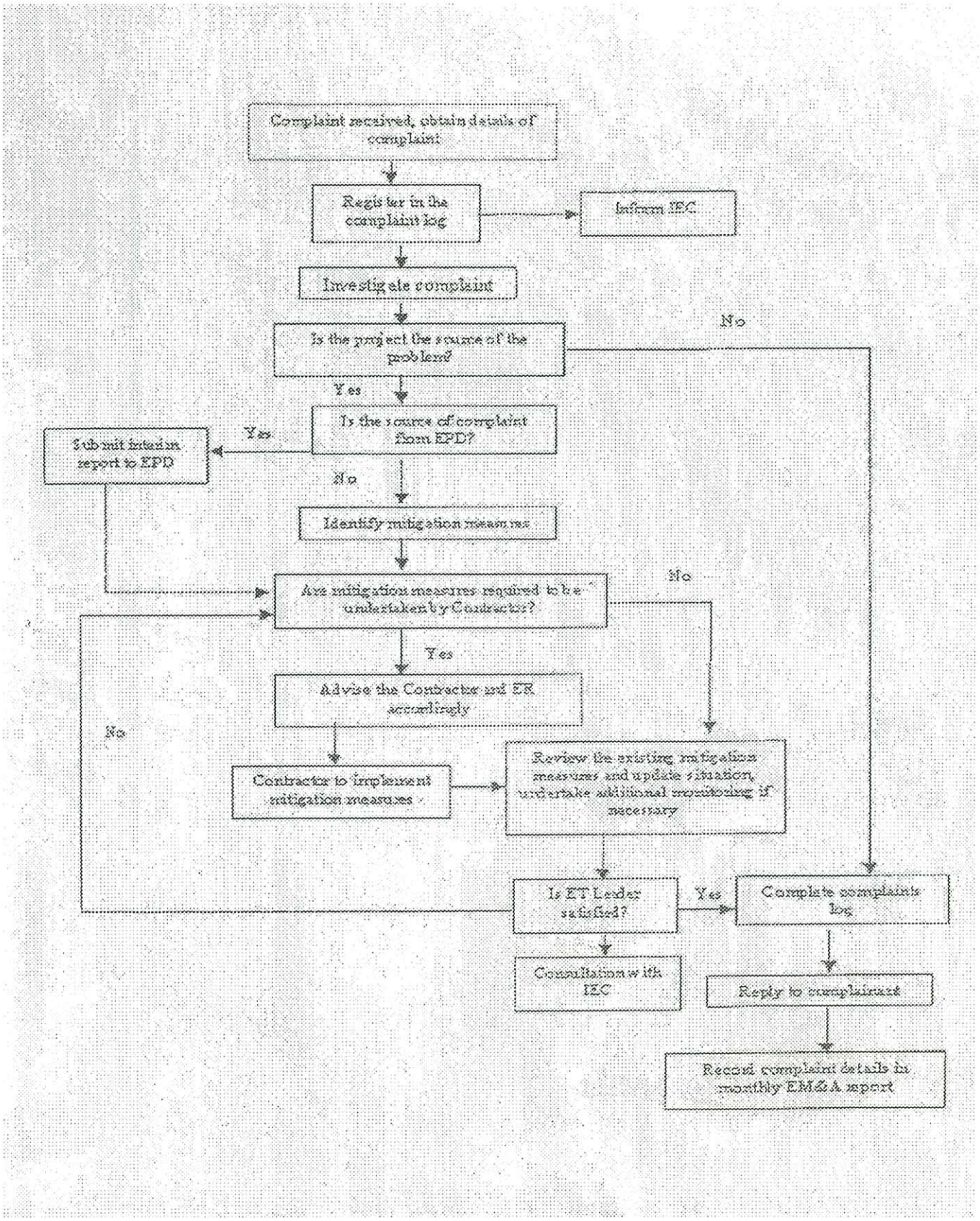
√	Compliance of mitigation measure
×	Non-compliance of mitigation measures
•	Non-compliance but rectified by the contractor
N/A	Not applicable

APPENDIX H
STATUS OF ENVIRONMENTAL LICENSES AND PERMITS

Appendix H Status of Environmental Licenses and Permits

Permit No.	Valid Period		Section	Status
	From	To		
Environmental Permit				
EP-168/2003	10 June 2003	N/A	Construction of a new dual 2-lane boundary road bridge and associated works between the Lok Ma Chau Control Point and the new boundary bridge proposed within the Mainland side.	Valid
Construction Noise Permit				
GW-TW0014-04	1 Feb 2004	31 Jul 2004	Air compressor with Noise Emission Label showing a sound power level of <= 102dB(A), generator, silenced, 75 dB(A) at 7m, piling, large diameter bored and revise circulation drill.	Expired
GW-TW0026-04	12 Feb 2004	11 Aug 2004	Dump truck, backhoe, generator or generator, piling or generator or concrete lorry mixer, concrete pump, generator	Expired
GW-TW0127-04	6 May 2004	5 Nov 2004	Approach Viaduct	Expired
GW-TW0138-04	17 May 2004	16 Nov 2004	Approach Deck	Expired
GW-TW0139-04	17 May 2004	16 Nov 2004	Over bridge	Expired
GW-TW0161-04	4 Jun 2004	3 Dec 2004	Approach Ramp	Expired
GW-RN0564-04	6 Nov 2004	5 Apr 2005	Approach Viaduct	Expired
GW-RN0603-04	17 Nov 2004	16 Apr 2005	Approach Deck	Expired
GW-RN0565-04	17 Nov 2004	16 May 2005	Over bridge	Expired
GW-RN0604-04	4 Dec 2004	3 May 2005	Approach Ramp	Expired
GW-RN0412-04	1 Sep 2004	3 Dec 2004	Over bridge	Expired
Wastewater Discharge License				
1859/1	20 Feb 2004	28 Feb 2009	Discharge of Industrial Trade Effluent to Deep Bay Water Control Zone.	Valid

APPENDIX I
COMPLAINT FLOW DIAGRAM AND COMPLAINT LOG



MAUNSELL | AECOM Maunsell Environmental Management Consultants Ltd	Contract No: HY/2003/11 Construction of the Approach Viaduct to the New Boundary Bridge between Lok Ma Chau & Huanggang & Associated Works **Environmental Complaint Flow Diagram**	SCALE	N.T.S.	DATE	2005
		CHECK	FSYY	DRAWN	KWLAI
		JOB NO.	S09203	APPENDIX No. J	Rev. -

Appendix I — Complaint Log

Log Ref.	Location	Received Date	Details of Complaint	Investigation/Mitigation Action	Status
LMC/2004/01	Project's Construction Site	11 February 2004	Mud deposition caused by vehicles leaving the construction site without receiving any wheel washing.	Preliminary investigation concluded that wheel wash was not provided to vehicles of the Project leaving the construction site. The Contractor was recommended to provide wheel wash bay as soon as possible and performance of the bay should be maintained. Wheel wash bay was provided and in use since 18 March. The performance of the wheel wash bay was satisfactory.	Closed
LMC/2004/02	Project's Construction Site	17 February 2004	Muddy water being discharged from the construction site nearby Ha Wan Tsuen without receiving any treatment.	Preliminary investigation concluded that the Contractor had implemented the water quality mitigation measures as specified in the EM&A Manual. The Contractor was recommended to erect earth bund or sandbags around the pre-bored H piling activity where water pumps should be used to transfer any wastewater to the wastewater or sedimentation tank for treatment before discharge. The Contractor had implemented the recommended mitigation measures since early March and performance of the mitigation measures was satisfactory.	Closed
LMC/2004/03	Project's Construction Site	17 March 2004	Illegal dumping of excavated material	Preliminary investigation concluded that excavated materials from the construction site had not been illegally dumped. The Contractor had stockpiled excavated materials at the designated excavated material storage area as identified in the Waste Management Plan. Surplus excavated materials were disposed off properly as records of disposal of excavated material to designated area (Tuen Mun Area 38) were available for inspection. Illegal dumping of excavated materials was not observed during ET's weekly site inspection. The Contractor was recommended and had continued to implement the management practice for excavated material as specified in the Waste Management Plan.	Closed

APPENDIX J
EVENT ACTION PLANS

Appendix J — Event and Action Plans

Table J.1 Event / Action Plan for Air Quality

EVENT	ACTION			
	ET[1]	IEC[1]	SO[1]	contractors
Action Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the IEC and the SO. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by the ET. 2. Check contractors' working method.	1. Notify contractors.	1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	1. Identify the source. 2. Inform the IEC and the SO. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Discuss with the IEC and the contractors on remedial actions required. 6. If exceedance continues, arrange meeting with the IEC and the SO. 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check the contractors' working method. 3. Discuss with the ET and the contractors on possible remedial measures. 4. Advise the SO 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 the contractors. 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial actions to IEC within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate

EVENT	*ACTION*			
	ET	**IEC**	**SO**	**contractors**
Limit Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the SO and the DEP. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of contractors' remedial actions and keep the IEC, the DEP and the SO informed of the results.	1. Check monitoring data submitted by the ET. 2. Check contractors' working method. 3. Discuss with the ET and the contractors on possible remedial measures. 4. Advise the SO 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 the contractors. 3. Ensure remedial measures are properly implemented.	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	1. Notify the IEC, the SO, the DEP and the contractors. 2. Identify the source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of the contractors' working procedures to determine possible mitigation to be implemented. 6. Arrange meeting with the IEC and the SO to discuss the remedial actions to be taken.	1. Discuss amongst the SO, ET and the contractors on the potential remedial actions. 2. Review the contractors' remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the contractors. 3. In consultation with the IEC, agree with the contractors on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the SO until the exceedance is

EVENT	*ACTION*			
	ET	**IEC**	**SO**	**contractors**
	7. Assess effectiveness of the contractors' remedial actions and keep the IEC, the DEP and the SO informed of the results. 8. If exceedance stops, cease additional monitoring.		instruct the contractors to stop that activity of work until the exceedance is abated.	abated.

Note: ET – Environmental Team, IEC – Independent (Environmental) Checker, SO – Supervising Officer

Table J.2 Event / Action Plan for Noise

EVENT	ACTION			
	ET	IEC	SO	Contractors
Action Level	1. Notify the IEC and the contractors. 2. Carry out investigation. 3. Report the results of investigation to the IEC and the contractors. 4. Discuss with the contractors 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 contractors and advise the SO accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the contractors. 3. Require the contractors to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals
Limit Level	1. Notify the IEC, the SO, the DEP and the contractors. 2. Identify the source. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of contractors' working procedures to determine possible mitigation to be implemented. 6. Inform the IEC, the SO and the DEP the causes & actions taken for the exceedances. 7. Assess effectiveness of the contractors' remedial actions	1. Discuss amongst the SO, the ET and the contractors on the potential remedial actions. 2. Review the contractors' remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the contractors. 3. Require the contractors to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the contractors to stop that activity of work until	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant activity of works as determined by the SO until the exceedance is abated.

	and keep the IEC, the DEP and the SO informed of the results. 8. If exceedance stops, cease additional monitoring.		the exceedance is abated.	

Note: ET – Environmental Team, IEC – Independent (Environmental) Checker, SO – Supervising Officer

Table J.3 Event / Action Plan for Water Quality

Event	Action			
Action Level Exceedance	**Environmental Team Leader (ETL)**	**Contractor**	**Engineer Representative (ER)**	**IEC**
Exceedance for one sample	1. Identify sources of impact 2. Repeat in-situ measurement to confirm findings 3. Notify Contractor in writing within 24 hours of the identification of the exceedance; 4. Check monitoring data, all plant, equipment and Contractor's working method 5. Carry out investigation 6. Report investigation results to Contractor within 3 working days of identification of the exceedance and advice the Contractor if exceedance is works related 7. Discuss mitigation measures within 4 days of identification of the exceedance with IEC and Contractor if the exceedance is works related 8. Repeat measurement on	1. Notify the ER and IEC in writing within 24 hours of the identification of the exceedance 2. Rectify unacceptable practice 3. Check all plant and equipment 4. Submit investigation report to IEC and the ER within 3 working days of the identification of the exceedance 5. Consider changes of working methods if the exceedance is works related 6. Discuss with ETL, IEC and the ER and propose mitigation measures to IEC and the ER and discuss with ETL and the ER; within 4 days of identification of the exceedance if the exceedance is works related 7. Implement the agreed	1. Notify EPD and other relevant government agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ETL and Contractor on the proposed mitigation measures 3. Require Contractor to propose remediation measures for the works related problem 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measures	1. Check monitoring data submitted by ET 2. Confirm ET's assessment results on whether or not the exceedance is works related 3. Discuss with ETL, ER and Contractor on the mitigation measures 4. Review Contractor's mitigation measures as necessary to ensure their effectiveness and advice ER accordingly 5. Supervise the implementation of mitigation measures.

	next day of the works related exceedance.	mitigation measures within reasonable time scale.		

Event	Action			
Action Level Exceedance	**Environmental Team Leader (ETL)**	**Contractor**	**Engineer Representative (ER)**	**IEC**
Exceedance for more than one sample	1. Identify sources of impact 2. Repeat in-situ measurement to confirm findings 3. Inform in writing Contractor and IEC within 24 hours of the identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working method 5. Carry out investigation 6. Report investigation results to the Contractor within 3 working days of identification of the exceedance and advice Contractor if exceedance is works related 7. Discuss mitigation measures within 4 days of identification of the exceedance with IEC and Contractor if the	1. Notify the ER and IEC in writing within 24 hours of the identification of the exceedance 2. Rectify unacceptable practice 3. Check all plant and equipment 4. Consider changes of working methods 5. Submit investigation results to IEC and the ER within 3 working days of the identification of the exceedance 6. Discuss with ETL, IEC and the ER and propose mitigation measures to IEC and the ER and discuss with ETL and the ER; within 4 days of identification of the exceedance 7. Implement the agreed mitigation measures within	1. Notify EPD and other relevant government agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ETL and the Contractor on the proposed mitigation measures 3. Require Contractor to propose remediation measures for the works related problem 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measures	1. Check monitoring data submitted by ET 2. Confirm ET's assessment results on whether or not the exceedance is works related 3. Discuss with ETL, ER and Contractor on the mitigation measures 4. Review Contractor's mitigation measures as necessary to ensure their effectiveness and advice ER accordingly 5. Assess the effectiveness of the implemented mitigation measures.

	exceedance is works related 8. Ensure mitigation measures are implemented 9. Prepare to increase monitoring frequency to daily 10. Repeat measurement on next day of the works related exceedance.	reasonable time scale.		

Event	Action			
Limit Level Exceedance	**Environmental Team Leader (ETL)**	**Contractor**	**Engineer Representative (ER)**	**IEC**
Exceedance for one sample	1. Repeat in-situ measurement to confirm findings 2. Identify sources of impact 3. Notify Contractor in writing within 24 hours of the identification of the exceedance; 4. Check monitoring data, all plant, equipment and Contractor's working method 5. Carry out investigation 6. Report investigation results to the Contractor within 3 working days of identification of the exceedance and advice the Contractor if exceedance is works related 7. Discuss mitigation measures within 4 days of identification of the exceedance with IEC, ER and Contractor if the	1. Notify the IEC and ER in writing within 24 hours of the identification of the exceedance 2. Rectify unacceptable practice 3. Check all plant and equipment 4. Consider changes of working methods if the exceedance is works related 5. Submit investigation report to IEC and the ER within 3 working days of the identification of the exceedance 6. Discuss with ETL, IEC and the ER and propose mitigation measures to IEC and ER within 4 days of identification of the exceedance 7. Implement the agreed mitigation measures within	1. Notify EPD and other relevant government agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ETL and the Contractor on the proposed mitigation measures 3. Require Contractor to propose remediation measures for the works related problem 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measures	1. Check monitoring data submitted by ET 2. Confirm ET's assessment results on whether or not the exceedance is works related 3. Discuss with ETL, ER and Contractor on the mitigation measures 4. Review Contractor's proposal on mitigation measures and advice ER accordingly 5. Assess the implementation of mitigation measures.

	exceedance is works related 8. Ensure mitigation measures are implemented 9. Increase monitoring frequency to daily until no exceedance of Limit level.	reasonable time scale.		

Event	Action			
Limit Level Exceedance	**Environmental Team Leader (ETL)**	**Contractor**	**Engineer Representative (ER)**	**IEC**
Exceedance for more than one sample	1. Repeat in-situ measurement to confirm findings 2. Identify sources of impact 3. Inform Contractor in writing within 24 hours of the identification of the exceedance 4. Check monitoring data, all plant, equipment and Contractor's working method 5. Carry out investigation 6. Report investigation results to the Contractor within 3 working days of identification of the exceedance and advice the Contractor if exceedance is works related 7. Discuss mitigation measures with IEC, ER and Contractor 8. Ensure mitigation	1. Notify the ER and IEC within 24 hours of the identification of the exceedance 2. Rectify unacceptable practice 3. Check all plant and equipment 4. Consider changes of working methods 5. Submit investigation results to IEC and the ER within 3 working days of the identification of the exceedance 6. Discuss with ETL, IEC and the ER and propose mitigation measures to IEC and the ER within 4 days of identification of the exceedance 7. Implement the agreed mitigation measures within reasonable time scale.	1. Notify EPD and other relevant government agencies in writing within 24 hours of the identification of the exceedance 2. Discuss with IEC, ETL and the Contractor on the proposed mitigation measures 3. Require Contractor to critically review the working methods 4. Ensure remedial measures are properly implemented 5. Assess the effectiveness of the mitigation measures 6. Consider and instruct as necessary Contractor to slow down or to stop all or part of work until no exceedance of Limit levels	1. Check monitoring data submitted by ET 2. Confirm ET's assessment results on whether or not the exceedance is works related 3. Discuss with ETL, ER and Contractor on the mitigation measures 4. Review Contractor's mitigation measures as necessary to ensure their effectiveness and advice ER accordingly 5. Assess the effectiveness of the implemented mitigation measures.

	measures are implemented 9. Increase monitoring frequency to daily until no exceedance of Limit levels for two consecutive days.	8. As directed by the ER, slow down or stop all or part of the works activities.		