

JOB No.: TCS00491/09

DSD CONTRACT No.: DC/2009/08



CONSTRUCTION OF YUEN LONG SOUTH BRANCH
SEWERS AND EXPANSION OF HA TSUEN SEWAGE
PUMPING STATION

9th QUARTERLY ENVIRONMENTAL MONITORING &
AUDIT SUMMARY REPORT –
(February to April 2012)

PREPARED FOR

CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG)
COMPANY LIMITED

Quality Index

Date	Reference No.	Prepared By	Certified By
7 June 2012	TCS00491/09/600/R0369v3	 Nicola Hon (Environmental Consultant)	 T.W. Tam (Environmental Team Leader)

Version	Date	Description
1	24 May 2012	First submission
2	4 June 2012	Amended against IEC's comments on 1 June 2012
3	7 June 2012	Amended against IEC's comments on 5 June 2012

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7 June 2012

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For attention of: Mr. T. W. Tam

Dear Mr. Tam,

Contract No.: DC/2009/08

Construction of Yuen Long South Branch Sewers and Expansion of Ha Tsuen Sewage Pumping Station

Quarterly EM&A Summary Report for Designated Project (February to April 2012) – IEC Verification

With reference to ET's captioned report (ET's ref.: TCS00491/09/600/R0369v3, dated 7 June 2012) received on 7 June 2012, we have no comment and hereby verify the captioned report excluding the Landscape and Visual Impact section of the report.

We request the ET to submit the separate submission of Landscape and Visual Impact section of the report as soon as possible, for the completion of the captioned report.

Should there be any queries, please feel free to contact the undersigned on 2911 2744.

Yours sincerely,

F.C. TSANG
Independent Environmental Checker
HYDER CONSULTING LIMITED

FCT/my

EXECUTIVE SUMMARY

ES.01. This is the 9th Quarterly EM&A Summary Report for the *Expansion of Ha Tsuen Sewage Pumping Station* under Environmental Permit No.EP327/2009 (hereinafter “the EP”), covering the period from **1 February to 30 April 2012** (hereinafter “Reporting Period”).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02. Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Aspects	Environmental Monitoring Parameters / Inspection	Occasions
Air Quality	1-hour TSP	90
	24-hour TSP	32
Construction Noise	$L_{eq(30min)}$ Daytime	30
Water Quality	Dissolved Oxygen	38
	Turbidity	38
	Suspended Solids (SS)	38
Inspection / Audit	ET Weekly Environmental Site Inspection	12

BREACHES OF ACTION/LIMIT LEVELS

ES.03. In the Reporting Period, monitoring results demonstrated that no exceedance of environmental quality criteria recorded in both air quality and construction noise. However, (1) one Limit Level exceedance of SS was recorded during water quality monitoring on 12 March 2012. Breaches of the exceedance are summarized in the following table.

Environmental Aspects	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	0	--	--
	24-hour TSP	0	0	0	--	--
Construction Noise	$L_{eq(30min)}$ Daytime	0	0	0	--	--
Water Quality	Dissolved Oxygen	0	0	0	--	--
	Turbidity	0	0	0	--	--
	Suspended Solids	0	1	1	Not Project related	--

ES.04. For the water quality exceedance, notification of exceedance (NOE) was issued to relevant parties upon confirmation of the results and investigation for the exceedance has been carried out subsequently and concluded that the SS exceedance was not related to the works under the DP Project. No corrective action was therefore required.

ES.05. The results and findings for landscape and visual monitoring, as part of the EM&A programme, will be submitted in a stand-alone submission.

ENVIRONMENTAL COMPLAINT, NOTIFICATIONS OF SUMMONS AND PROSECUTIONS

ES.06. No documented complaint, notifications of summons and successful prosecutions were received during the Reporting Period. No associated mitigation action is needed.

REPORTING CHANGES

ES.07. There are no reporting changes in this reporting month.

FUTURE KEY ISSUES

ES.08. As wet season is approaching, muddy water or other water pollutants from site surface runoff into the local stream will be key environment issue. Therefore, mitigation measures to prevent surface runoff into nearby water bodies should be implemented and maintained.

Moreover, mitigation measures should be properly maintained to avoid fugitive dust emissions from loose soil surface or haul road.

- ES.09. According to Clause 3.4 of the Environmental Permit No. EP-327/2009/A, the Contractor should cease all construction activities in Ha Tsuen Pumping Station during the Public Examination period of the school nearby.

TABLE OF CONTENTS

1	INTRODUCTION	1
	BACKGROUND	1
	REPORT STRUCTURE	1
2	PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS	2
	PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE	2
	WORKS UNDERTAKEN DURING THE REPORTING PERIOD	2
	SUMMARY OF ENVIRONMENTAL SUBMISSIONS	2
3	SUMMARY OF IMPACT MONITORING REQUIREMENTS	3
	MONITORING PARAMETERS	3
	MONITORING LOCATIONS	3
	MONITORING FREQUENCY	4
	ENVIRONMENTAL QUALITY CRITERIA	5
	ENVIRONMENTAL MITIGATION MEASURES	5
4	MONITORING RESULTS AND BREACHES OF ENVIRONMENTAL QUALITY CRITERIA	6
	AIR QUALITY MONITORING	6
	CONSTRUCTION NOISE MONITORING	6
	WATER QUALITY MONITORING – LOCAL STREAM COURSE	7
	RESULTS OF LANDSCAPE AND VISUAL IMPACT	8
	RESULTS OF EFFLUENT MONITORING	8
5	WASTE MANAGEMENT	9
	RECORDS OF WASTE QUANTITIES	9
6	SITE INSPECTIONS	10
7	NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS	12
	NON-COMPLIANCE	12
	ENVIRONMENTAL COMPLAINT	12
	NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS	12
8	IMPLEMENTATION STATUS OF MITIGATION MEASURES	13
9	CONCLUSIONS AND RECOMMENDATIONS	15
	CONCLUSIONS	15
	RECOMMENDATIONS	15

LIST OF TABLES

TABLE 2-1	STATUS OF ENVIRONMENTAL LICENSES AND PERMITS
TABLE 3-1	SUMMARY OF MONITORING PARAMETERS
TABLE 3-2	AIR QUALITY MONITORING STATION UNDER THE PROJECT PROPOSED IN THE EM&A MANUAL
TABLE 3-3	CONSTRUCTION NOISE MONITORING STATION UNDER THE PROJECT PROPOSED IN THE EM&A MANUAL
TABLE 3-4	LOCAL STREAM WATER QUALITY MONITORING STATION
TABLE 3-5	ACTION AND LIMIT LEVELS FOR AIR QUALITY MONITORING
TABLE 3-6	ACTION AND LIMIT LEVELS FOR CONSTRUCTION NOISE
TABLE 3-7	ACTION AND LIMIT LEVELS FOR A LOCAL STREAM WATER QUALITY MONITORING (R1b)
TABLE 4-1	SUMMARY OF AIR QUALITY MONITORING RESULTS, ($\mu\text{g}/\text{m}^3$)
TABLE 4-2	SUMMARIES OF BREACHES OF AIR QUALITY A/L LEVELS
TABLE 4-3	SUMMARY OF CONSTRUCTION NOISE MONITORING RESULTS ($L_{\text{eq}(30\text{min})}$, dB(A))
TABLE 4-4	SUMMARIES OF BREACHES OF CONSTRUCTION NOISE A/L LEVELS
TABLE 4-5	STATISTICS OF THE MONITORING RESULTS
TABLE 4-6	SUMMARIES OF BREACHES OF THE EXISTING WATER QUALITY A/L LEVELS
TABLE 5-1	SUMMARY OF QUANTITIES OF INERT C&D MATERIALS
TABLE 5-2	SUMMARY OF QUANTITIES OF C&D WASTES
TABLE 6-1	SITE REMINDERS/OBSERVATIONS FOUND IN THE REPORTING PERIOD
TABLE 7-1	STATISTICAL SUMMARY OF ENVIRONMENTAL COMPLAINTS
TABLE 7-2	STATISTICAL SUMMARY OF ENVIRONMENTAL SUMMONS
TABLE 7-3	STATISTICAL SUMMARY OF ENVIRONMENTAL PROSECUTION
TABLE 8-1	ENVIRONMENTAL MITIGATION MEASURES IMPLEMENTATION IN THE REPORTING PERIOD

LIST OF ANNEXES

APPENDIX A	SITE LAYOUT PLAN
APPENDIX B	ENVIRONMENTAL MANAGEMENT ORGANIZATION CHART
APPENDIX C	MASTER CONSTRUCTION PROGRAM
APPENDIX D	MONITORING LOCATION OF EM&A PROGRAMME
APPENDIX E	GRAPHIC PLOT OF AIR QUALITY, CONSTRUCTION NOISE AND WATER QUALITY
APPENDIX F	METEOROLOGICAL INFORMATION

1 INTRODUCTION

BACKGROUND

- 1.01 The China State Construction Engineering (Hong Kong) Limited (hereinafter “CSCE”) has been awarded by the Drainage Services Department (DSD) the Contract DC/2009/08 *Construction of Yuen Long South Branch Sewers and Expansion of Ha Tsuen Sewage Pumping Station* (the Project) in October 2009.
- 1.02 The Project involves construction of about 9km of sewers and rising mains with diameter ranging from 200-1500mm in Yuen Long South and Ha Tsuen areas, a sewage pumping station near Shui Tsui San Tsuen Road in Yuen Long South, expansion of existing Ha Tsuen Sewage Pumping Station. The site layout plan is shown in **Appendix A**.
- 1.03 The expansion of Ha Tsuen Pumping Station is under a statutory EIA (Register No. AEIAR-072/2003) study for “*Upgrading and expansion of San Wai Sewage Treatment Works and expansion of Ha Tsuen Pumping Station*” commissioned by the DSD. The Variation Environmental Permit No. EP-327/2009A for upgrading and expansion of Sewage Treatment Works at San Wai (excluded for the Project) and Ha Tsuen Sewage Pumping Station was again obtained by DSD in June 2010 for the relevant works.
- 1.04 According to the Section 25 of the Particular Specification (PS) and the Variation Environmental Permit No. EP-327/2009A, the scope of monitoring includes air quality, construction noise, water quality and environmental site audit. It should be undertaken in accordance with the Environmental Monitoring and Audit Manual as part of EIA report [AEIAR-072/2003] (hereafter “the EM&A Manual”) by an independent Environmental Team (ET).
- 1.05 This is the 9th Quarterly EM&A Summary Report which is part of the EM&A programme under Environmental Permit No. EP-327/2009A for the Expansion Ha Tsuen Sewage Pumping Station, covering the period from **1 February to 30 April 2012**.

REPORT STRUCTURE

- 1.06 This Report is structured as follows:
- | | |
|------------------|--|
| Section 1 | Introduction |
| Section 2 | Project Organization and Construction Progress |
| Section 3 | Summary of Impact Monitoring Requirements |
| Section 4 | Monitoring Results and Breaches of Environmental Quality Criteria |
| Section 5 | Waste Management |
| Section 6 | Site Inspections |
| Section 7 | Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions |
| Section 8 | Implementation Status of Mitigation Measures |
| Section 9 | Conclusions and Recommendations |

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

- 2.01 Organization structure and contact details of the Contractor and relevant parties with respect to the on-site environmental management are shown in [Appendix B](#).

WORKS UNDERTAKEN DURING THE REPORTING PERIOD

- 2.02 The tentative master construction program is enclosed in [Appendix C](#). Also, the major construction activities undertaken in this reporting period are listed below:

- | | | |
|---------------|---|---------------------------------|
| February 2012 | • | Construction of pumping station |
| March 2012 | • | Construction of pumping station |
| April 2012 | • | Construction of pumping station |

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

- 2.03 Summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in the Reporting Period is presented in [Table 2-1](#).

Table 2-1 Status of Environmental Licenses and Permits

Item	Description	License/Permit Status
1	Environmental Permit (EP-329/2009/A)	Update on 1 June 2010
2	Chemical waste Producer Registration Registration No. 5213-511-C3570-01	Issued on 13 Nov 2009
3	Water Pollution Control Ordinance (Discharge License) License No. WT00005671-2009	Issued on 12 Jan 2010 Expiry date: 31 Jan 2015
4	Billing Account for Disposal of Construction Waste (Account Number: 700947)	Issued on 7 October 2009

- 2.04 The baseline monitoring report - *Expansion of Ha Tsuen Sewage Pumping Station* (Ref: TCS00491/09/600/R0023v6) had been verified by IEC and endorsed by EPD.

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

MONITORING PARAMETERS

- 3.01 According to the *EM&A Manual*, the environmental aspect implemented by ET, including air quality, construction noise and water quality, also the landscape and visual impact to be monitored by a competent landscape architect. The monitoring parameters are summarized in *Table 3-1*.

Table 3-1 Summary of Monitoring Parameters

Environmental Aspect	Parameters
Air Quality	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (hereinafter '1-hr TSP'); and 24-hour Total Suspended Particulates (hereinafter '24-hr TSP').
Construction Noise	<ul style="list-style-type: none"> A-weighted equivalent continuous sound pressure level (30min) (hereinafter '$L_{eq(30min)}$') during the normal working hours; and A-weighted equivalent continuous sound pressure level (5min) (hereinafter '$L_{eq(5min)}$') for construction work during the restricted hours.
Water Quality – Local Stream Course	<ul style="list-style-type: none"> In Situ Measurement - Dissolved Oxygen (DO) and Turbidity Laboratory Analysis - Suspended Solids (SS)
Water Quality – Effluent Discharge	<ul style="list-style-type: none"> In Situ Measurement - pH value Laboratory Analysis - SS and Chemical oxygen demand (COD)
Landscape and Visual Resources	<ul style="list-style-type: none"> Vegetation survey undertaken on an "area" basis to identify representative types and species composition; Assessment of landscape character; and Tree survey report. The inspection findings will be submitted separately.

MONITORING LOCATIONS

Air Quality

- 3.02 The designated monitoring location Yeung Chun Pui Care & Attention Home has been identified. As HVS installation at another designated air monitoring station Tin Shing Court was refused by the incorporated owners, the alternative location Ho Tak Sum Primary School as sensitive receiver mentioned in the EIA Report (Register No. AEIAR-072/2003) is proposed to be the replacement to undertake air quality monitoring in accordance with the EM&A Manual Clauses 2.2.1.20. The proposal and recommendation is agreed by IEC and as endorsed by EPD. Details of monitoring stations are presented in *Table 3-2* and illustrated in *Appendix D*.
- 3.03 As informed by the Contractor on 19 October 2011, an incident report was received from the Yeung Chun Pui Care & Attention Home (AM2) that the High Volume Sample (HVS) have been used by some of the old folks as a stairway to escape from the premise, causing a serious safety problem to the escapees as well as the Home of the Elderly. The person in charge of Yeung Chun Pui Care & Attention Home therefore request prompt removal of the High Volume Sampler from the premise.
- 3.04 Therefore, the HVS is shifted to nearby location where less than 10 meters from the original location towards the construction site on 27 October 2011. Since the shifted distance of the monitoring location is less than 10 meters, it is considered that the background condition would not have significant change, the Action Level of 1-hour and 24-hour TSP will remain unchanged as the original location and the Location ID is also remained as AM2 - Yeung Chun Pui Care & Attention Home. The relocated monitoring location was accepted by EPD, RE and IEC.

Table 3-2 Air Quality Monitoring Station under the Project Proposed in the EM&A Manual

Monitoring Location ID	Identified Address	Remarks
AM1	Ho Tak Sum Primary School	Replace the Designated Monitoring Station Tin Shing Court
AM2*	Yeung Chun Pui Care &	Designated in the EM&A Manual

Monitoring Location ID	Identified Address	Remarks
	Attention Home	

* HVS shifted to nearby location where less than 10 meters from the original location towards the construction site on 27 October 2011.

Construction Noise

- 3.05 Similar to the air quality monitoring, the construction noise monitoring stations undertaken for EM&A programme was agreed by IEC and endorsed by EPD. Details of the monitoring stations are presented in **Table 3-3** and shown in **Appendix D**.

Table 3-3 Construction Noise Monitoring Station under the Project Proposed in the EM&A Manual

Monitoring Location ID	Identified Address	Remarks
NM1	Ho Tak Sum Primary School	Replace the Designated Monitoring Station Tin Shing Court
NM2	Yeung Chun Pui Care & Attention Home	Designated in the EM&A Manual

Water Quality

- 3.06 One designated location of a local stream course, Tin Shui Wai Nullah, is recommended to carry out water quality monitoring in accordance with the EM&A Manual. The designated sampling location R1 is located at the midpoint between two pedestrian flyovers athwart Tin Shui Wai Nullah, which are 320 meters apart. There are technical difficulty and safety issue to sample at R1. So, a new sampling point located at approximately 160m upstream of the R1 (hereinafter as R1b) was therefore proposed for the local stream water quality impact monitoring and was verified by IEC, without comment from EPD.
- 3.07 Details of the monitoring station are presented in **Table 3-4** and shown in **Appendix D**.

Table 3-4 Local Stream Water Quality Monitoring Station

Monitoring Location ID	Identified Address	Remarks
R1b	The athwart Tin Shui Wai Nullah pedestrian flyover	About 160 meters upstream from the designated location as stipulated in the EM&A Manual. Also, it is closer to the existing Ha Tsuen Pumping Station

Landscape and Visual

- 3.08 The selected route and area, frequency and requirements of landscape & visual monitoring is proposed by a competent landscape architect.

MONITORING FREQUENCY

- 3.09 The impact monitoring frequency and duration for air quality, construction noise, water quality of local stream course, and landscape & visual are summarized below.

Air Quality Monitoring

Parameters: 1-hour TSP and 24-hour TSP.

Frequency: Once every six days for 24-hour TSP and three times every six days for 1-hour TSP.

Duration: Throughout the construction period.

Noise Monitoring

Parameters: One set of $L_{eq(30min)}$ as 6 consecutive $L_{eq(5min)}$ between 0700-1900 hours on normal weekdays.

$L_{eq(5min)}$, L_{10} and L_{90} during the construction undertaken during Restricted Hours (from 19:00 to 07:00 hours of the following day and full day of public holiday and Sunday)

Frequency: Once every six days during 0700-1900 hours on normal weekdays. Restricted Hour monitoring should depend on conditions stipulated in Construction Noise Permit.

Duration: Throughout the construction period.

Water Quality Monitoring of Local Stream Course

Parameters: DO, Turbidity and SS.

Frequency: 3 days per week.

Depth: mid-depth

Duration: Throughout the construction period and the interval between 2 sets of monitoring is not less than 36 hours

Landscape and Visual Monitoring

Parameters: Site inspection with broad scope of audit as listed in the EM&A Manuals

Frequency: Once every 2 weeks

Duration: Throughout the construction period

Site inspection and Audit

Frequency: Once per week.

Duration: Throughout the construction period.

ENVIRONMENTAL QUALITY CRITERIA

- 3.10 The environmental quality criteria i.e. Action and Limit levels (herein after 'A/L levels') are listed in Table 3-5, 3-6 and 3-7 below.

Table 3-5 Action and Limit Levels for Air Quality Monitoring

Monitoring Location	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour	24-hour	1-hour	24-hour
AM1	305	162	500	260
AM2	310	190	500	260

Table 3-6 Action and Limit Levels for Construction Noise

Monitoring Location	Action Level	Limit Level in dB(A)
	0700-1900 hrs on normal weekdays	
NM1	When one or more documented complaints are received	70 dB(A) of $L_{eq(30min)}$ during normal hours from 0700 to 1900 hours on normal weekdays, reduced to 65 dB(A) during school examination periods
NM2		70 dB(A) of $L_{eq(30min)}$ during normal hours from 0700 to 1900 hours on normal weekdays

Table 3-7 Action and Limit Levels for a Local Stream Water Quality Monitoring (R1b)

Parameter	Action Level	Limit Level
DO (mg/L)	4.6	4 mg/L or 40% saturation at 15°C
Turbidity (NTU)	15.6	16.2
SS (mg/L)	31.5	31.9

ENVIRONMENTAL MITIGATION MEASURES

- 3.11 Environmental Mitigation Implementation Schedule (EMIS) such as the construction dust, noise, wastewater and waste management shall be performed in accordance with the project EM&A Manual Appendix A requirements.

4 MONITORING RESULTS AND BREACHES OF ENVIRONMENTAL QUALITY CRITERIA

AIR QUALITY MONITORING

- 4.01 Monitoring results and breaches of air quality A/L levels during the Reporting Period are tabulated in **Tables 4-1** and **4-2** and the relevant graphical plots are presented in **Appendix E**.

Table 4-1 Summary of Air Quality Monitoring Results, ($\mu\text{g}/\text{m}^3$)

Date	24-hour TSP		Date	1-hour TSP					
	AM1	AM2		AM1			AM2		
				1 st hour	2 nd hour	3 rd hour	1 st hour	2 nd hour	3 rd hour
1-Feb-12	64	93	4-Feb-12	113	120	118	142	151	154
7-Feb-12	75	67	10-Feb-12	206	243	217	222	195	261
13-Feb-12	80	72	16-Feb-12	216	243	198	222	216	209
18-Feb-12	103	91	22-Feb-12	108	95	94	123	108	97
23-Feb-12	34	45	28-Feb-12	147	186	124	178	162	154
29-Feb-12	35	50	5-Mar-12	206	189	223	217	234	208
6-Mar-12	48	45	10-Mar-12	82	76	91	88	101	106
12-Mar-12	42	78	16-Mar-12	82	95	91	113	101	96
17-Mar-12	40	76	22-Mar-12	134	162	167	141	106	123
23-Mar-12	63	63	28-Mar-12	62	76	74	63	66	70
29-Mar-12	54	93	3-Apr-12	202	198	191	196	182	197
3-Apr-12	68	80	10-Apr-12	92	84	86	76	91	101
10-Apr-12	46	28	16-Apr-12	96	108	82	117	98	92
16-Apr-12	38	37	21-Apr-12	138	152	134	111	123	108
21-Apr-12	120	43	27-Apr-12	124	123	116	162	170	145
27-Apr-12	20	18							
Average (Range)	58 (20 – 120)	61 (18 – 93)	Average (Range)	137 (62-243)			142 (63-261)		

Remarks: *Bold and italic indicated Action Level exceedance*

Table 4-2 Summaries of Breaches of Air Quality A/L Levels

Location	Exceedance	1-hour TSP	24- hour TSP	Total
AM1	Action Level	0	0	0
	Limit Level	0	0	0
AM2	Action Level	0	0	0
	Limit Level	0	0	0

- 4.02 As shown in **Table 4-1**, all 1-hour TSP and 24-hour TSP monitoring results were fluctuated below the Action Level in this Reporting Period.

CONSTRUCTION NOISE MONITORING

- 4.03 Monitoring results and breaches of construction noise A/L levels during the Reporting Period are tabulated in **Tables 4-3** and **4-4** and the relevant graphical plots are presented in **Appendix E**.

Table 4-3 Summary of Construction Noise Monitoring Results ($L_{eq(30min)}$, dB(A))

Date	(*) NM1	(*) NM2
4-Feb-12	61.3	61.3
10-Feb-12	64.2	63.2
16-Jan-12	64.6	67.1
22-Feb-12	67.3	68.0
28-Feb-12	67.3	61.9
5-Mar-12	69.2	67.0
10-Mar-12	66.5	62.2
16-Mar-12	67.4	65.2
22-Mar-12	69.4	64.2

Date	(*) NM1	(*) NM2
28-Mar-12	65.2	63.2
3-Apr-12	66.2	61.8
10-Apr-12	68.7	65.8
16-Apr-12	65.6	62.0
21-Apr-12	61.5	62.5
27-Apr-12	64.7	62.9

Remarks: (*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

(#) The noise limit level was reduced to 65dB(A) during the school exam period.

Table 4-4 Summaries of Breaches of Construction Noise A/L Levels

Station	Limit Level	Action Level	Received Date
NM1	0	Noise complaint	NA
NM2	0		

- 4.04 As shown in **Table 4-3**, all the measured noise values are fluctuated below the Limit level. Neither documented construction complaint nor exceedance of Limit level was recorded during the Reporting Period. Neither NOE nor corrective action was therefore recommended.

WATER QUALITY MONITORING – LOCAL STREAM COURSE

- 4.05 In this Reporting Period, a total of **38** events of local stream course monitoring were undertaken. Statistical analyses for the monitoring results are summarized in **Table 4-5** and the relevant graphical plots are presented in **Appendix E**.

Table 4-5 Statistics of the Monitoring Results

Statistics	DO (mg/L)	Turbidity (NTU)	SS (mg/L)
Min	4.7	10.0	5.0
Average	5.8	13.0	17.5
Max	7.5	15.1	32.0

- 4.06 Breaches of water quality A/L levels and statistical analysis of compliance for the water quality monitoring results are summarized in **Table 4-6**.

Table 4-6 Summaries of Breaches of the Existing Water Quality A/L Levels

Construction Month	No. of sample analysis in each Parameter	Exceedance	DO	Turbidity	SS
February 2012	12	Action Level	0	0	0
		Limit Level	0	0	0
		Sub-Total	0	0	0
March 2012	14	Action Level	0	0	0
		Limit Level	0	0	1
		Sub-Total	0	0	1
April 2012	12	Action Level	0	0	0
		Limit Level	0	0	0
		Sub-Total	0	0	0
Total	38	Action Level	0	0	0
		Limit Level	0	0	1
Percentage of compliance			100%	100%	97.4%
Total % of compliance for water quality			99.1%		

- 4.07 As shown in **Table 4-6**, one (1) Limit Level exceedance of SS was recorded during water quality monitoring on 12 March 2012. Notification of exceedance (NOE) was issued to relevant parties upon confirmation of the results and investigation for the exceedance has been carried out subsequently.

- 4.08 According to the site information provided by the Contractor, construction activities within the DP site at Ha Tsuen Pumping Station during 12 March 2012 comprised re-bar fixing work and formwork, which is not considered highly likely to generate adverse water quality impacts. Water quality mitigation measures implemented within the DP site includes water treatment facility installed at the DP site for treatment of all the collected construction wastewater including surface runoff/groundwater/wheel washing etc. prior to discharge.
- 4.09 Our recent records of weekly site inspection on the DP site and water discharge status on 12 March 2012 reported by the Contractor confirm zero discharge from Ha Tsuen Pumping Station during the date of exceedance, which has been sustained since months ago when pumping of groundwater generated within the DP site was ceased in order to maintain the existing groundwater level and all wastewater generated from the DP site was used for V-Tec operation.
- 4.10 It is therefore concluded that the exceedance of SS Limit Level on 12 March 2012 was not due to the works under the DP Project. No corrective action is therefore required.

RESULTS OF LANDSCAPE AND VISUAL IMPACT

- 4.11 The monitoring and audit works for landscaping and visual is undertaken by others and the monitoring findings will be submitted as a stand-alone document separately. During the regular weekly site inspection, it was observed that all the retained and transplanted trees were well protected by site hoarding and fence erection, and were in good condition. Details of the inspections and observations will be reported in a stand-alone Tree Report of the Reporting Period that will be submitted separately.

RESULTS OF EFFLUENT MONITORING

- 4.12 A discharge license under Water Pollution Control Ordinance has been obtained by the Contractor upon commencement of the Project. The licensee shall perform self-monitoring as and when required by the Authority.
- 4.13 There was no site effluent discharged in this Reporting Period, therefore, no result of effluent monitoring was submitted by the Contractor.

5 WASTE MANAGEMENT

- 5.01 Waste management was performed by an on-site Environmental Officer or an Environmental Supervisor from time to time. A Billing Account (The account number 700947) under the **Waste Disposal (Charges for Disposal of Construction Waste) Regulation** has already been assigned on 7 October 2009, a discharge license No. WT00005671-2009 under Section 20 of the **Water Pollution Control Ordinance** has been issued. CSCE has also registered as a Chemical Waste Producer with EPD under the Waste Disposal (Chemical Waste) (General) Regulation and the Waste Producer Number assigned is WPN: 5213-511-C3570-01 dated 13 November 2009.

RECORDS OF WASTE QUANTITIES

- 5.02 All types of waste arising from the construction work are classified into the following:
- Construction & Demolition (C&D) Material;
 - Chemical Waste;
 - General Refuse; and
 - Excavated Soil.
- 5.03 Whenever possible, materials were reused on-site as far as practicable. The quantities of waste for disposal in the Reporting Period are summarized in **Tables 5-1** and **5-2**. The Monthly Summary Waste Flow Table provided by the Contractor can be found at the relevant EM&A monthly report.

Table 5-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity			Disposal Location
	Feb 12	Mar 12	Apr 12	
C&D Materials (Inert) (m ³)	0	0	0	-
Reused in this Contract (Inert) (m ³)	0	0	0	-
Reused in other Projects (Inert) (m ³)	0	0	0	-
Disposal as Public Fill (Inert) (m ³)	1,516	2,256	2,134	Tuen Mun Area 38

Table 5-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity			Disposal Location
	Feb 12	Mar 12	Apr 12	
Recycled Metal (kg)	0	0	0	-
Recycled Paper/Cardboard Packing (kg)	0	0	0	-
Recycled Plastic (kg)	0	0	0	-
Chemical Wastes (kg)	0	0	0	-
General Refuses (m ³)	1	1	2	NENT Landfill

- 5.04 There was no site effluent or surface runoff discharged in the Reporting Period. The Monthly Summary Waste Flow Table provided by the Contractor can be found from the relevant EM&A monthly report.

6 SITE INSPECTIONS

- 6.01 According to the Environmental Monitoring and Audit Manual, regular environmental site inspections had been carried out by ET joined with the Contractor and ER to confirm the environmental performance. During the Reporting Period, **12** events of the joint site inspection was undertaken to evaluate the site environmental performance. No non-compliance was noted but **13** observations and **1** reminder were recorded during the site inspections within the Reporting Period.
- 6.02 The summaries of the findings are presented in **Table 6-1** and the site inspection checklists can be found in relevant EM&A monthly report.

Table 6-1 Site Reminders/Observations Found in the Reporting Period

Date	Findings / Deficiencies	Follow-Up Status
7 February 2012	<ul style="list-style-type: none"> Refilled wheel washing bay at Ha Tsuen Pumping Station site exit was observed. Manual wheel washing is reminded to prevent carrying excavated soil to the surrounding public roads. Generator without drip tray was observed idling within the site. Drip tray is required to avoid oil contamination. 	The deficiencies have been followed during site inspection on 16 February 2012.
16 February 2012	<ul style="list-style-type: none"> Two oil drums were observed at Ha Tsuen Pumping Station full of water. Regular drying off the water in the drums is reminded. One rubbish bins at Ha Tsuen Pumping Station were found mismanaged. Improvement is reminded. 	The deficiencies have been followed during site inspection on 21 February 2012.
21 February 2012	<ul style="list-style-type: none"> Dusty construction site was observed at Ha Tsuen Pumping Station. Construction dust suppression measures is reminded under dry and windy conditions and wheel washing of any dusty vehicle prior to exit is reminded. 	Not required for reminders.
28 February 2012	No adverse environmental issue was observed in Ha Tsuen Pumping Station.	N.A.
6 March 2012	<ul style="list-style-type: none"> Tree trunks and branches were used for supporting of shelters of construction plant within Ha Tsuen Pumping Station. Some trees within the site were also used for supporting ropes for drying washed clothes. Removal of the materials attached to the trees is required to protect the trees. 	The materials attached to the trees or support of construction shelter found to be removed during site inspection on 16 March 2012.
16 March 2012	<ul style="list-style-type: none"> Excessive accumulation of construction waste was observed within the site at Ha Tsuen Pumping Station. Regular clearance is reminded. Soil trails were observed on the road near the entrance/exit. Wheel washing of the vehicles is required prior to exit the site. 	<ul style="list-style-type: none"> Excessive accumulation of construction waste was found to be cleared during site inspection on 27 March 2012. Clearance of the dusty road surface was observed during site inspection on 20 March 2012. Besides, wheel washing bay was observed constructed at the exit of the site and put into operation on 27

		March 2012
20 March 2012	<ul style="list-style-type: none"> Excessive construction waste were observed at Ha Tsuen Pumping Station. Regular clearance is reminded. 	Excessive accumulation of construction waste was found to be cleared during site inspection on 27 March 2012.
27 March 2012	<ul style="list-style-type: none"> Dusty surface was observed within the site at Ha Tsuen Pumping Stations. Construction dust suppression measures is reminded during dusty construction activities under dry and windy conditions. 	Rectified on 17 April 2012
5 April 2012	<ul style="list-style-type: none"> No adverse environmental issue was observed in Ha Tsuen P/S during site inspection. 	N.A.
13 April 2012	<ul style="list-style-type: none"> Soil trails were observed on the road within the site at Ha Tsuen P/S. Regular clearance of the road and wheel washing prior to exit the site is reminded. Dusty construction activities were observed at the site at Ha Tsuen P/S. Construction dust suppression measures is reminded during dusty construction activities under dry and windy conditions 	<p>Soil trails were not observed on the road within the site at Ha Tsuen P/S during site inspection on 17 April 2012.</p> <p>Not required for reminder.</p>
17 April 2012	<ul style="list-style-type: none"> Oil drum without drip tray was observed within Ha Tsuen Pumping Station. Drip trays or removal of the generators from the site are required. 	The oil drum was found to be removed during site inspection on 24 April 2012.
24 April 2012	<ul style="list-style-type: none"> Construction material /waste was observed scattered within the site at Ha Tsuen Pumping Station. Regular clearance is reminded avoid excessive accumulation. 	Rectified on 2 May 2012

- 6.03 In general, it is reminded that air quality mitigation measures such as wheel washing facility at site exit/ entrance should be properly maintained. Besides, chemical waste management shall be enhanced as drum without drip tray was occasionally observed at Ha Tsuen Pumping Station. Overall, the environmental performance of the Project was considered satisfactory.

7 NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

NON-COMPLIANCE

- 7.01 One (1) Limit Level exceedance in water quality monitoring was recorded on 12 March 2012. However, the exceedance was identified not related to the project in accordance with the investigation of finding.
- 7.02 No non-compliance or deficiency was identified during regular site inspection and environmental audit. No associated remedial actions were recommended.

ENVIRONMENTAL COMPLAINT

- 7.03 No documented noise, air quality or water quality complaint was received by the Contractor or ER or EPD. The statistical summary table of environmental complaint is presented in [Table 7-1](#).

Table 7-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
February 2010 - January 2012	3	3	Air (2)/ Noise (1)
February 2012	0	3	NA
March 2012	0	3	NA
April 2012	0	3	NA

NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- 7.04 No notifications of summons and successful prosecutions were recorded during the Reporting Period. No associated remedial actions were recommended. The statistical summary table of environmental summons and successful prosecution are presented in [Tables 7-2 and 7-3](#).

Table 7-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
February 2010 - January 2012	0	0	NA
February 2012	0	0	NA
March 2012	0	0	NA
April 2012	0	0	NA

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
February 2010 - January 2012	0	0	NA
February 2012	0	0	NA
March 2012	0	0	NA
April 2012	0	0	NA

8 IMPLEMENTATION STATUS OF MITIGATION MEASURES

- 8.01 The environmental mitigation measures that recommended in the Environmental Monitoring and Audit Manual covered the issues of dust, noise and waste.
- 8.02 The Contractor had been implementing the required environmental mitigation measures according to the Environmental Monitoring and Audit Manual subject to the site condition. Environmental mitigation measures generally implemented during the Reporting Period are summarized in [Table 8-1](#).

Table 8-1 Environmental Mitigation Measures Implementation in the Reporting Period

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> Wastewater were appropriately treated by treatment facilities; Drainage channels were provided to convey run-off into the treatment facilities; Drainage systems were regularly and adequately maintained; De-silting facility was provided to treat the discharged water; also the treated water is reused for spraying the road surface; Exposed stockpiles and exposed soil surfaces were covered with tarpaulin or impervious sheets to minimise dust emission; The stockpiles of materials were placed in the locations away from the drainage channel so as to avoid releasing materials into the channel; Wheel washing facilities were provided at site exits to ensure that earth, mud and debris would not be carried out of the works areas by vehicles; Provision of site drainage systems and treatment facilities would be required to minimize the water pollution; A discharge licence was applied from EPD for discharging effluent from the construction site; A licensed waste collector have been applied from EPD; Illegal disposal of chemicals should be strictly prohibited; and Registration as a chemical waste producer have been applied from EPD.
Air Quality	<ul style="list-style-type: none"> Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather; Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet; Public roads around the site entrance/exit had been kept clean and free from dust; Tarpaulin covering of any dusty materials on a vehicle leaving the site; Sprinkler of water spray system is provided at haul road to reduce dust emissions during the vehicles passing through the haul road; The vehicle speed within the site is limited to 5km/hr; and Wheel washing facilities have been provided at the site exit.
Noise	<ul style="list-style-type: none"> Good site practices to limit noise emissions at the sources; Use of quiet plant and working methods according to EP-329/2009; Use of site hoarding with noise barriers to screen noise at ground level of NSRs; Use of shrouds/temporary noise barriers to screen noise from relatively static PMEs according to EP-329/2009; Use of temporary noise barrier with surface density 7kg/m² to be assumed that the noise reduction is 10 dB(A) for stable plants and 5dB(A) for movable plant in accordance with approved EIA Report Appendix 4A Table 4A3.2; Idle equipment are turned off or throttled down; No construction works were undertaken during school examination period in the Ha Tsuen Pumping Station according to EP-329/2009; and Alternative use of plant items within one worksite, where practicable.

Issues	Environmental Mitigation Measures
Waste and Chemical Management	<ul style="list-style-type: none"> Excavated material should be reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible; Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner; The Contractor should adopt a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill; Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes; Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; To encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the workforce; Any unused chemicals or those with remaining functional capacity were recycled; Prior to disposal of C&D waste, wood, steel, and other metals were separated for re-use and/or recycling and inert waste utilised as fill material to minimise the quantity of waste to be disposed of to landfill; Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.
Landscape and Visual	<ul style="list-style-type: none"> The landscape and visual impacts monitoring results and findings will be presented and submitted in the stand-alone document.
General	<ul style="list-style-type: none"> The site was generally kept tidy and clean.

9 CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

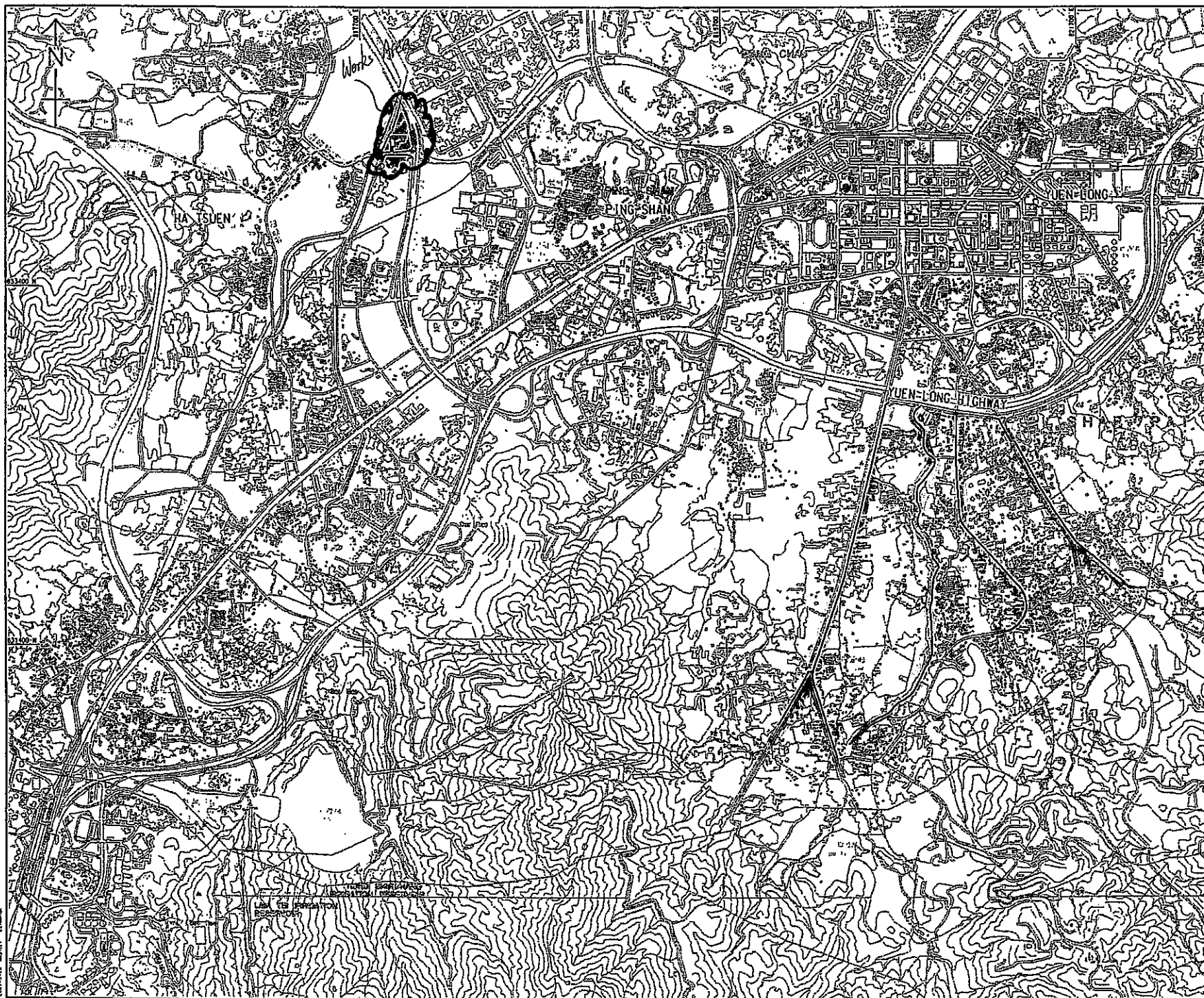
- 9.01 This is the 9th quarterly EM&A summary report under Environmental Permit No. EP327/2009 for the *Expansion of Ha Tsuen Sewage Pumping Station*, covering the period from **1 February to 30 April 2012**.
- 9.02 No 1-hour TSP and 24-hour monitoring results that triggered the Action or Limit Level was recorded in this Reporting Period.
- 9.03 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results exceeded the Limit Level were recorded in this Reporting Period.
- 9.04 For water quality monitoring, (1) Limit Level exceedance of SS was recorded on 12 March 2012. Notification of exceedance (NOE) was issued to relevant parties upon confirmation of the results and investigation for the exceedance has been carried out subsequently and concluded that the SS exceedance is not related to the works under the DP Project. No corrective action is therefore required.
- 9.05 The monitoring and audit works for landscaping and visual is undertaken by others and the monitoring findings were submitted as a stand-alone document separately. During the regular weekly site inspection, it was observed that all the retained and transplanted trees were well protected by site hoarding and fence erection, and were in good condition. Details of the inspections and observations will be reported in a stand-alone Tree Report of the Reporting Period that will be submitted separately.
- 9.06 A total of **12** occasions of joint site inspection was undertaken to evaluate the site environmental performance. No non-compliance was noted but **13** observations and **1** reminder were recorded during the site inspections within the Reporting Period.
- 9.07 No documented complaint, notifications of summons and successful prosecutions were received during the Reporting Period. No adverse environmental impacts were observed during the weekly site inspection and environmental audit of the Reporting Period, indicating the implemented mitigation measures for air quality, construction noise and water quality were effective. Minor deficiencies found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.
- 9.08 No site inspection was undertaken by EPD, the Agriculture, Fisheries and Conservation Department (AFCD) and Leisure and Cultural Services Department (LCSD) in this Reporting Period.

RECOMMENDATIONS

- 9.09 As wet season is approaching, muddy water or other water pollutants from site surface runoff into the local stream will be key environment issue. Therefore, water mitigation measures to prevent surface runoff into nearby water bodies should be paid on special attention. Moreover, mitigation measures should be properly maintained to avoid fugitive dust emissions from loose soil surface or haul road.
- 9.10 To control the site performance on waste management, the Contractor shall ensure that all solid and liquid waste management works are fully in compliance with the relevant license/permit requirements, such as the effluent discharge license and the chemical waste producer registration. The Contractor is also reminded to implement the recommended environmental mitigation measures according to the Environmental Monitoring and Audit Manual.
- 9.11 According to Clause 3.4 of the Environmental Permit No. EP-327/2009/A, the Contractor should cease all construction activities in Ha Tsuen Pumping Station during the Public Examination period of the school nearby.

Appendix A

Site Layout Plan



LEGEND:

- SEWERAGE PIPE
- RISSING MAIN
- SEWER PUMPING STATION

1	TENDER DRAWING	05/01/2017	05-09
2	REVISION		

D DRAINAGE SERVICES DEPARTMENT,
THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION

YUEN LONG AND KAM TIN SEWERAGE
AND SEWAGE DISPOSAL -
CONSTRUCTION OF YUEN LONG SOUTH
BRANCH SEWERS AND EXPANSION OF
HA TSUEN SEWER PUMPING STATION

LOCATION PLAN

AECOM

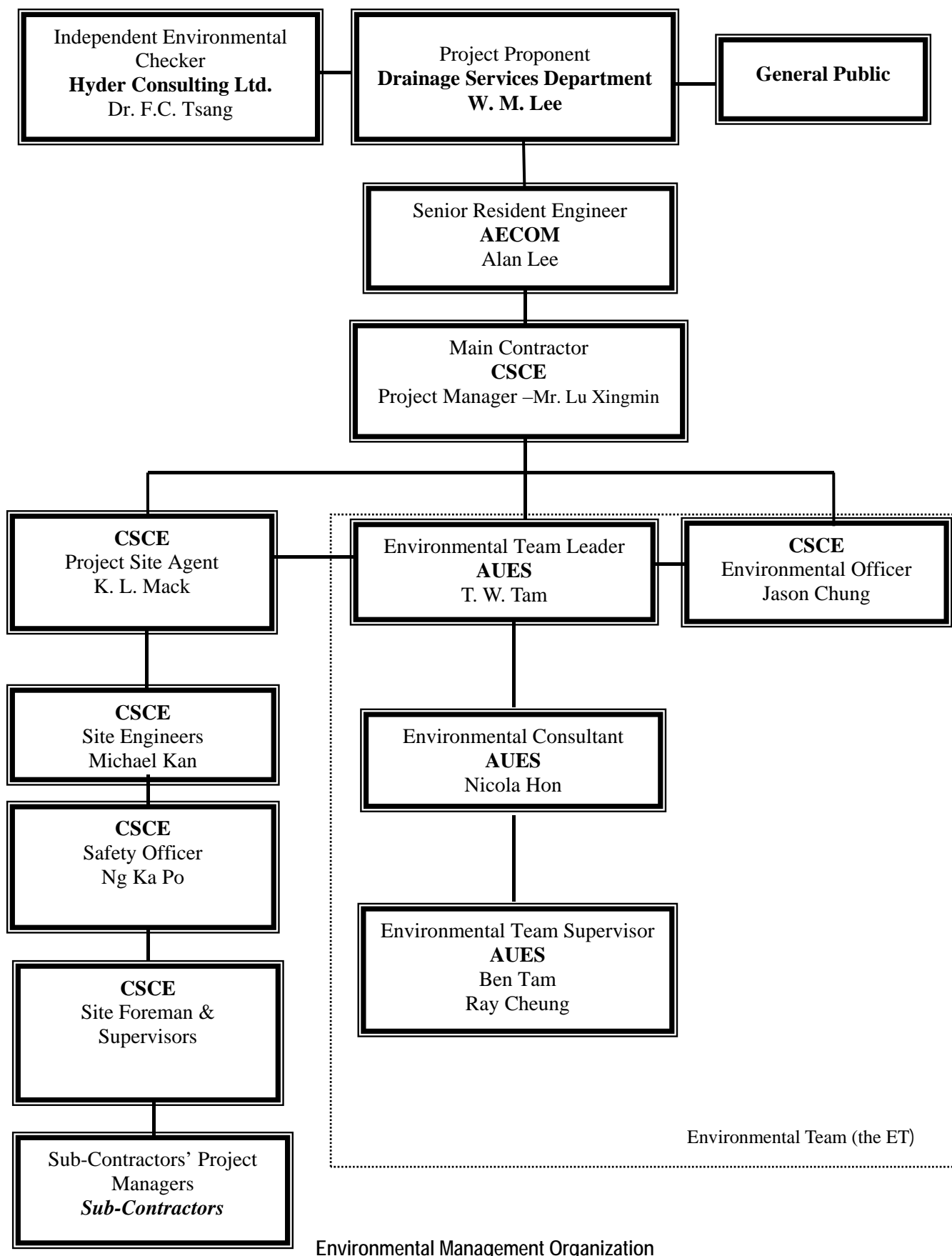
DWG NO. 60022017/C1/1001

DATE	05/01/2017	SCALE	1:10000
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BY	05/01/2017	DATE	05/01/2017
BY	05/01/2017	DATE	05/01/2017

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Appendix B

Environmental Management Organization Chart



Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
DSD	Employer	Mr. W. M. Lee	--	2827-8700
AECOM	Senior Resident Engineer	Mr. Alan Lee	9706 9568	2472 0132
Hyder	Independent Environmental Checker	Dr. F C Tsang	2911 2744	2805 5028
CSCE	Project Manager	Mr. Lu Xingmin	2472 0113	2472-0229
CSCE	Site Agent	Mr. K L Mack	2472 0113	2472-0229
CSCE	Site Engineer	Mr. Michael Kan	2472 0113	2472-0229
CSCE	Environmental Officer	Mr. Jason Chung	2472 0113	2472-0229
CSCE	Environmental Supervisor	Mr. Chan Yau Pang	2472 0113	2472-0229
CSCE	Safety Officer	Mr. Ng Ka Po	2472 0113	2472-0229
AUES	Environmental Team Leader	Mr. T. W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Assistance Environmental Consultant	Mr. Ray Cheung	2959-6059	2959-6079
AUES	Team Supervisor	Mr. Ben Tam	2959-6059	2959-6079

Legend:

DSD (Employer) – Drainage Services Department

AECOM (Engineer) – AECOM

CSCE (Main Contractor) – China State Construction Engineering (Hong Kong) Ltd







Hyder (IEC) – Hyder Consulting Limited

AUES (ET) – Action-United Environmental Services & Consulting

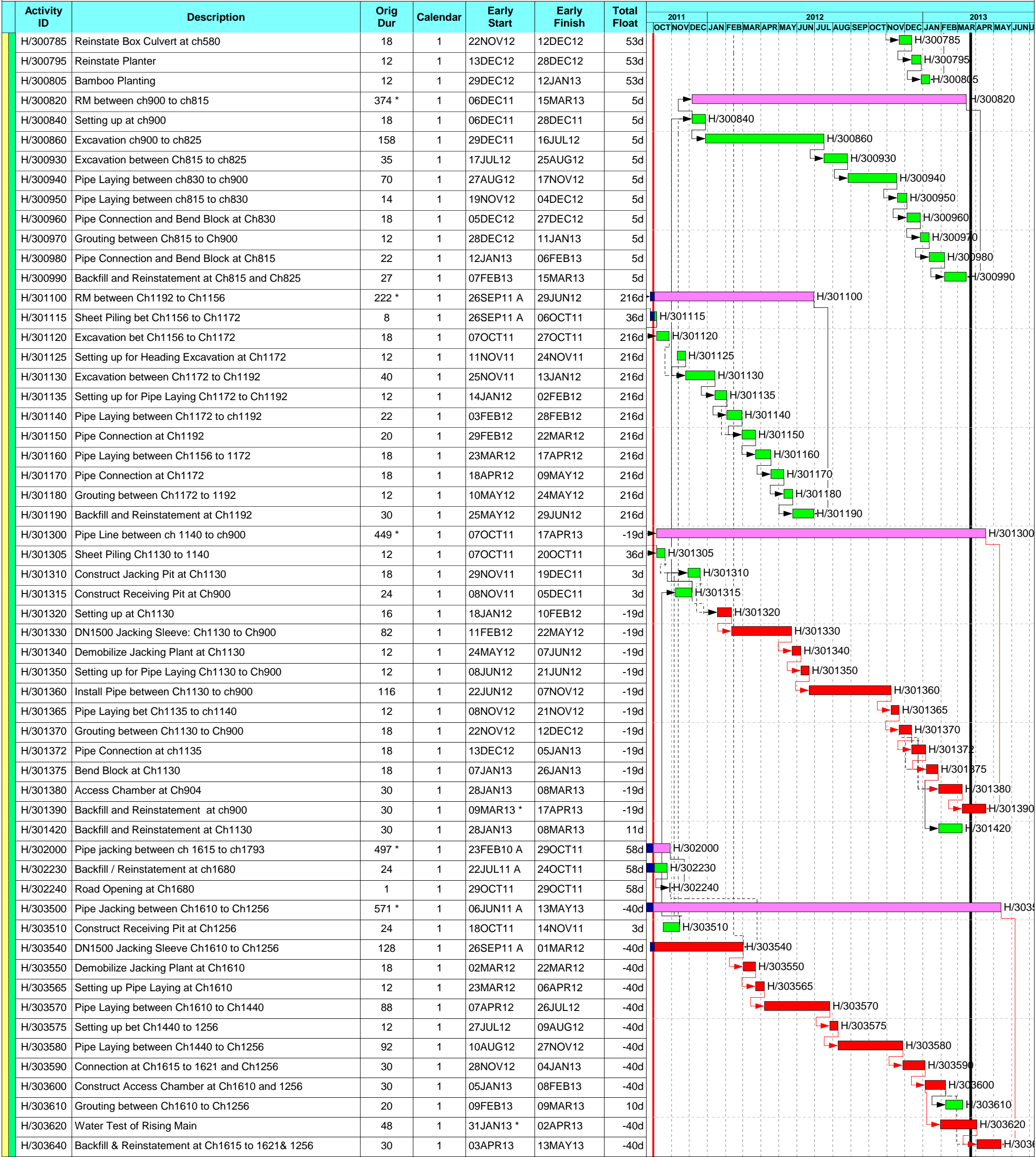
Appendix C

Master Construction Program

Activity ID	Description	Orig Dur	Calendar	Early Start	Early Finish	Total Float	2011												2012												2013																							
							OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC									
Ha Tsuen Area																																																						
Rising Main																																																						
H/300005	Rising Main bet HTPS to ChC20	136 *	1	18JUN12	26NOV12	1d																																																
H/300014	Sheet Piling bet HTPS to ChC20	12	1	18JUN12	30JUN12	1d																																																
H/300016	Excavation and Shoring bet HTPS to ChC20	24	1	03JUL12	30JUL12	1d																																																
H/300018	Pipe Laying bet HTPS to ChC20	24	1	31JUL12	27AUG12	1d																																																
H/300020	Pipe Connection at ChC20	10	1	28AUG12	07SEP12	1d																																																
H/300024	Cast Bend Block	12	1	08SEP12	21SEP12	1d																																																
H/300025	Water Testing HTPS to C20	24	1	22SEP12	22OCT12	1d																																																
H/300026	Backfill and Remove Sheet Pile HTPS to ChC20	18	1	23OCT12	12NOV12	1d																																																
H/300028	Reinstatement HTPS to ChC20	12	1	13NOV12	26NOV12	1d																																																
H/300030	XP Application for Flow Meter Chamber	75	1	16JUL11 A	18OCT11	0																																																
H/300035	Obtain RA for TTA	10	1	19OCT11	29OCT11	0																																																
H/300041	Rising Main bet ChC20 to ChC57	410 *	1	31OCT11	21MAR13	0																																																
H/300042	Erect Temp Fence	12	1	31OCT11	12NOV11	0																																																
H/300044	Remove Extg Fence	6	1	14NOV11	19NOV11	0																																																
H/300046	Fell and Transplant Tree	12	1	21NOV11	03DEC11	0																																																
H/300048	Remove Wheel Washing Bay	4	1	05DEC11	08DEC11	0																																																
H/300052	Remove Existing Planter	15	1	09DEC11	28DEC11	0																																																
H/300054	TTA for RM bet ChC20 to ChC57	12	1	29DEC11	12JAN12	0																																																
H/300056	Remove U-channel and Catchpit	6	1	13JAN12	19JAN12	0																																																
H/300057	Diversion of Existing Drainage	72	1	20JAN12	23APR12	0																																																
H/300058	Trial Pits bet ChC20 to ChC57	6	1	24APR12	30APR12	0																																																
H/300060	Relocation of Existing Gate Control Panel	6	1	02MAY12	08MAY12	0																																																
H/300062	Sheet Piling bet ChC20 to ChC57	15	1	09MAY12	26MAY12	0																																																
H/300064	Excavation and Shoring bet ChC20 to chC57	24	1	29MAY12	25JUN12	0																																																
H/300068	Laying Pipe bet ChC20 to ChC57	40	1	26JUN12	11AUG12	0																																																
H/300069	Construct Flow Meter Chamber	30	1	13AUG12	15SEP12	0																																																
H/300070	Water Testing Ch20 to Ch57	24	1	17SEP12	16OCT12	0																																																
H/300071	Backfill and Remove Sheet Pile	30	1	17OCT12	20NOV12	0																																																
H/300072	New Catchpit and DN200 DI Pipe	16	1	21NOV12	08DEC12	0																																																
H/300074	Power Supply Cable Duct and Draw Pit	15	1	10DEC12	28DEC12	0																																																
H/300076	Extend U-channel	11	1	29DEC12	11JAN13	0																																																
H/300080	Formation Work	6	1	12JAN13	18JAN13	0																																																
H/300082	Reinstatement of Gate Control Panel	6	1	19JAN13	25JAN13	0																																																
H/300090	Kerb and Footpath	12	1	26JAN13	08FEB13	0																																																
H/300100	Reinstate ChC20 to ChC57	30	1	09FEB13	21MAR13	0																																																
H/300125	Testing of RM bet station and extg valve chamber	24	1	22SEP12	22OCT12	91d																																																
H/300190	ChA0 - ChA13: Reinstate Inside HTPS	12	1	16JUL11 A	14OCT11	129d																																																
H/300207	Connection at Ch89	60	1	07FEB12	20APR12	129d																																																
H/300400	Rising Main bet ch267 to ch280 & Washout Chamber	164 *	1	31AUG12	21MAR13	0																																																
H/300410	Construct Washout Chamber	30	1	26OCT12	29NOV12	0																																																
H/300430	Rising Main between ch280 to ch267	46	1	31AUG12	25OCT12	0																																																
H/300440	Connection at ch267	18	1	31DEC12	21JAN13	0																																																
H/300445	Reinstatement of Area	46	1	22JAN13	21MAR13	0																																																
H/300450	Pipe Jacking between ch280 to ch387	312 *	1	12DEC11	02JAN13	16d																																																
H/300460	Construct Jacking pit at ch280	48	1	12DEC11 *	14FEB12	0																																																
H/300470	Setting up Pipe Jacking at ch280	20	1	15FEB12	08MAR12	0																																																
H/300475	Preparation Works at Receiving Pit at Ch387	70	1	13DEC11	12MAR12	10d																																																
H/300480																																																						

Start date	17SEP09		Early bar
Finish date	15NOV17		Progress bar
Run date	25OCT11		Critical bar
Project name	WP07		Summary bar
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Contract No. DC/2009/08
Construction of Yuen Long South Branch Sewers and Expansion of HTS Pumping Station

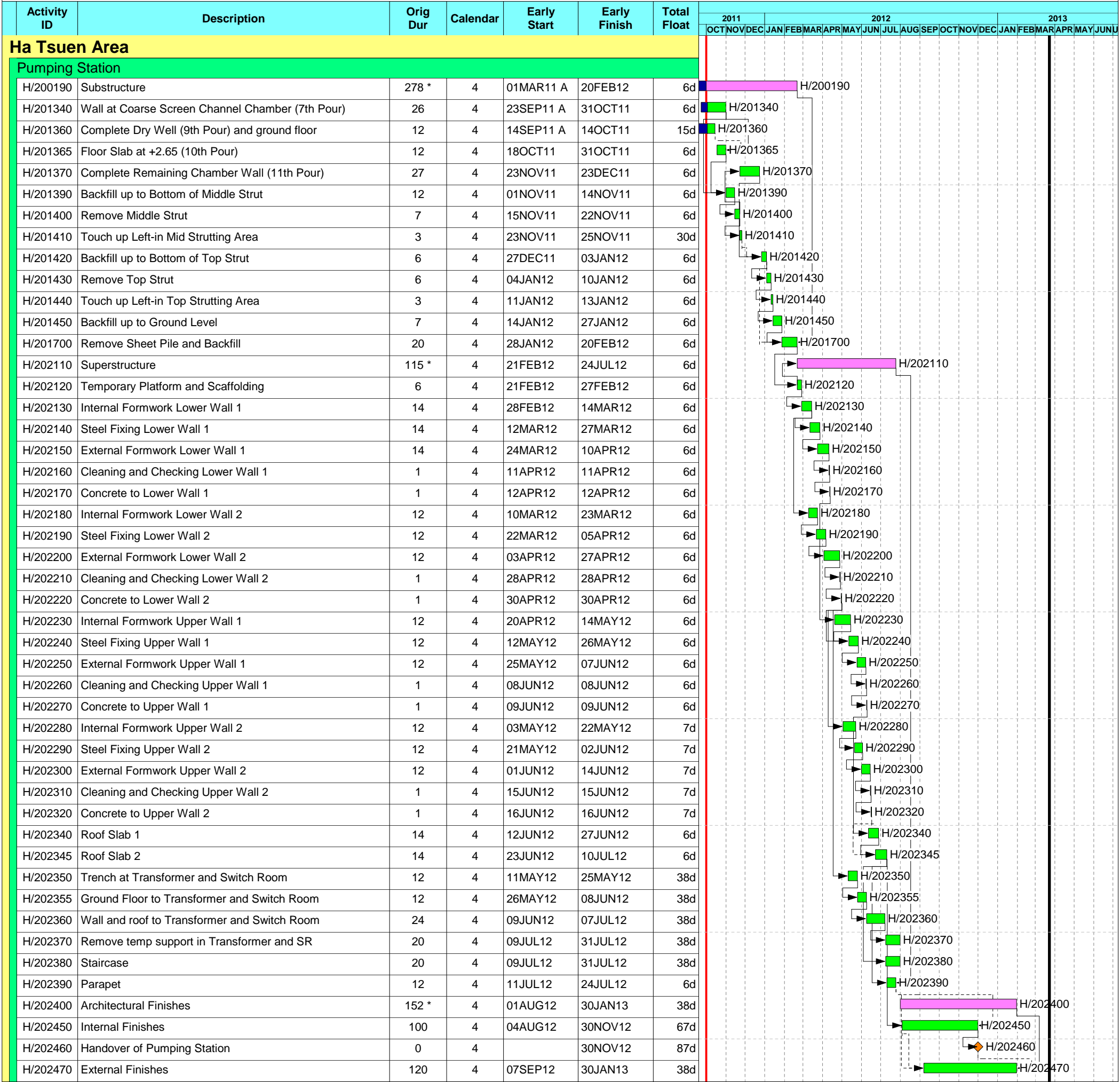


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Run date	25OCT11
Project name	WP07
Page number	2A
c Primavera Systems, Inc.	

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Contract No. DC/2009/08
Construction of Yuen Long South Branch Sewers and Expansion of HTS Pumping Station



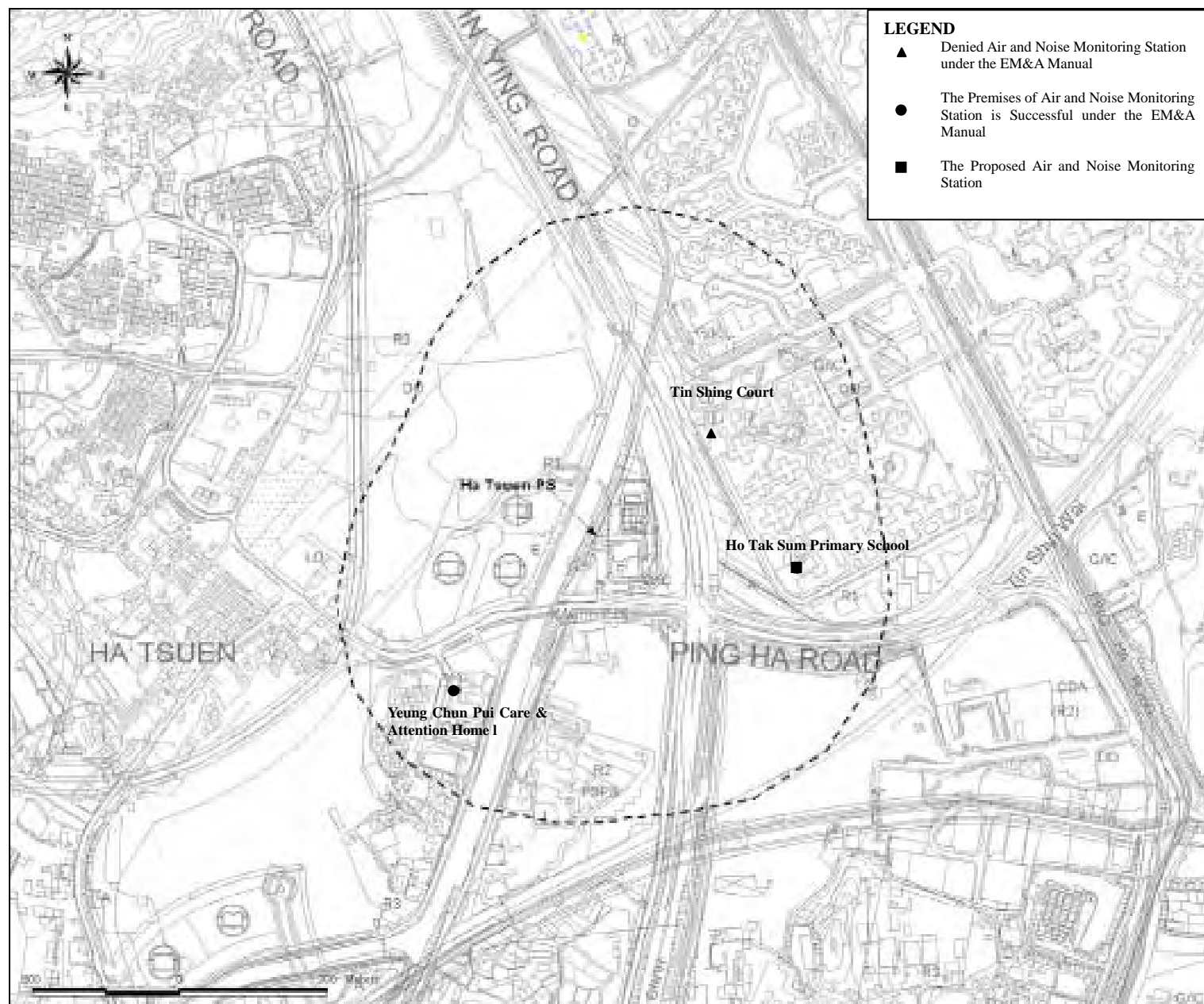
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Appendix D

Monitoring Location of EM&A Programme

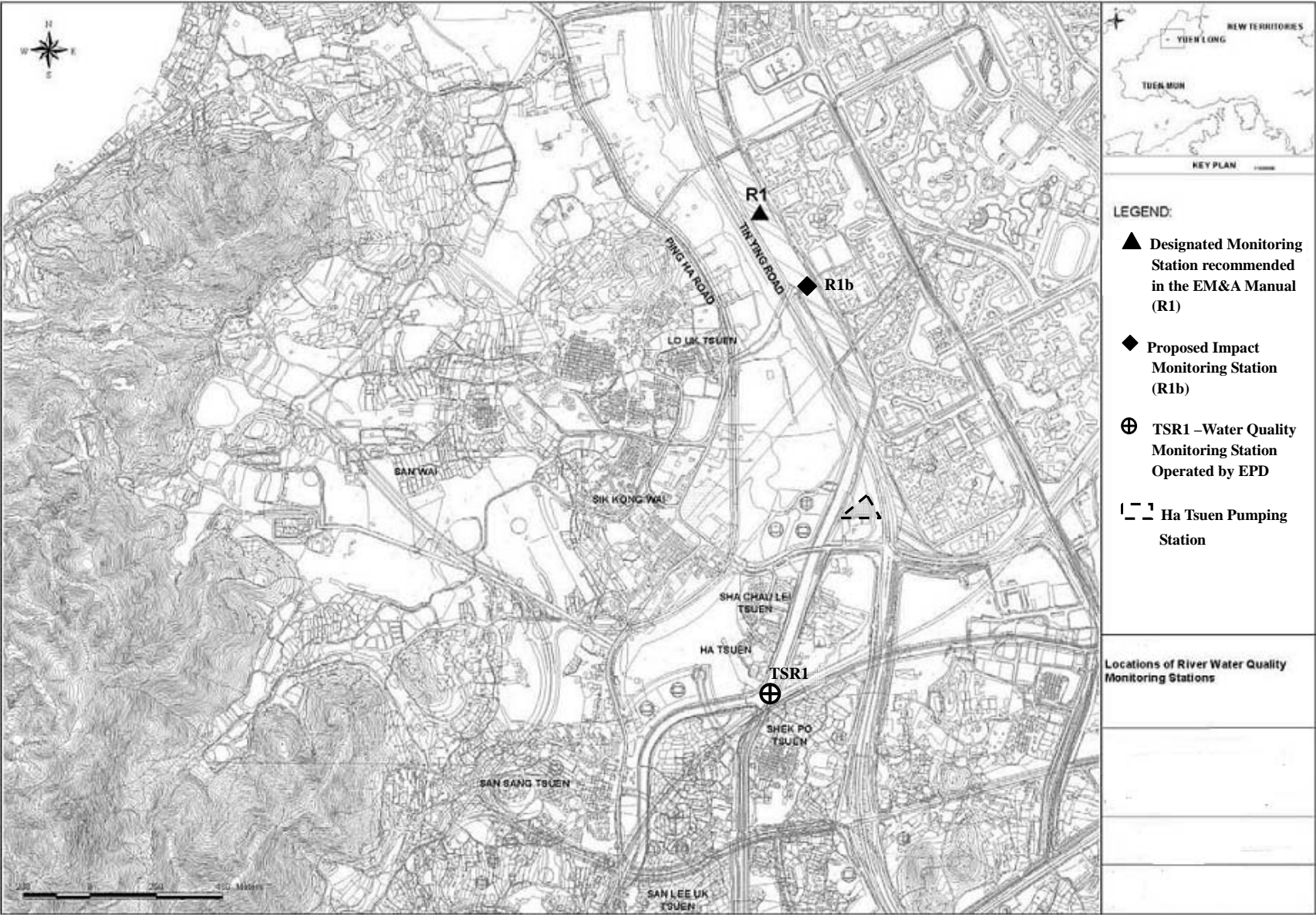
Proposed Air and Noise Monitoring Station



**DSD Contract No. DC/2009/08 – Construction of Yuen Long South Branch Sewers
And Extension of Ha Tsuen Sewage Pumping Station**

Proposed Water Quality Monitoring Location

AUES

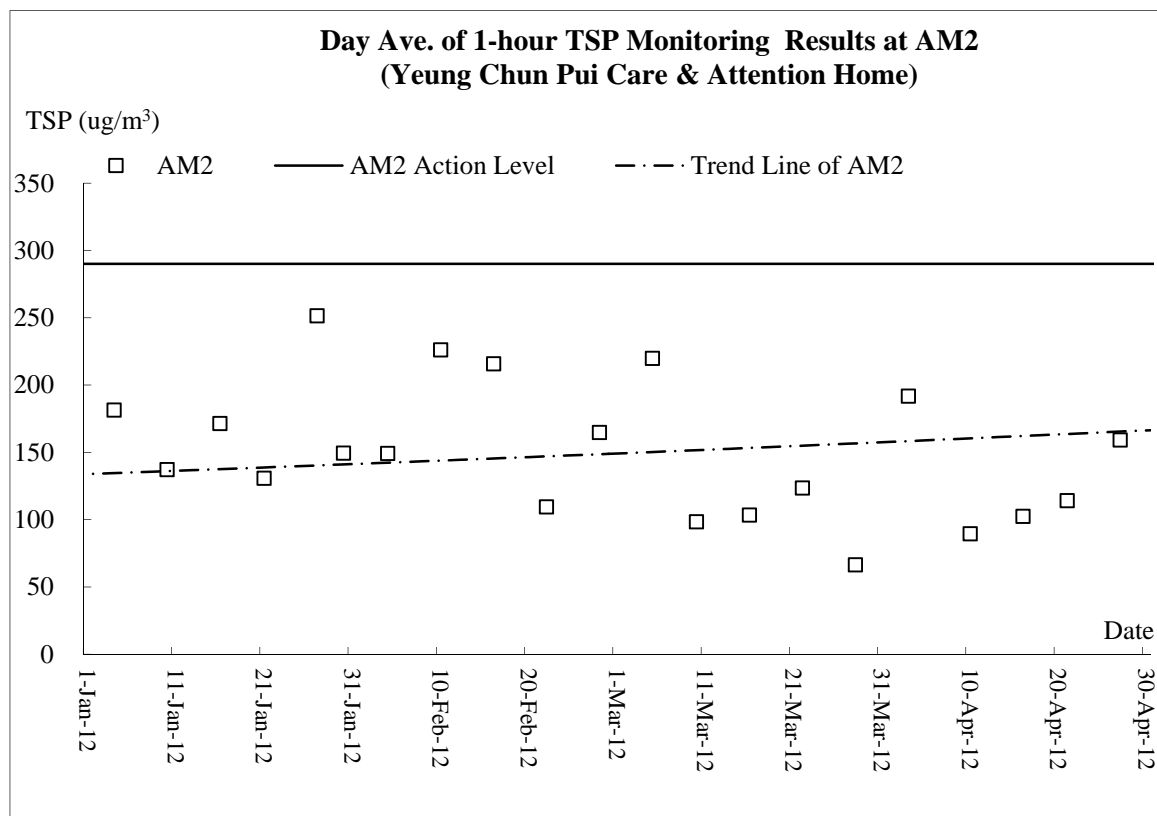
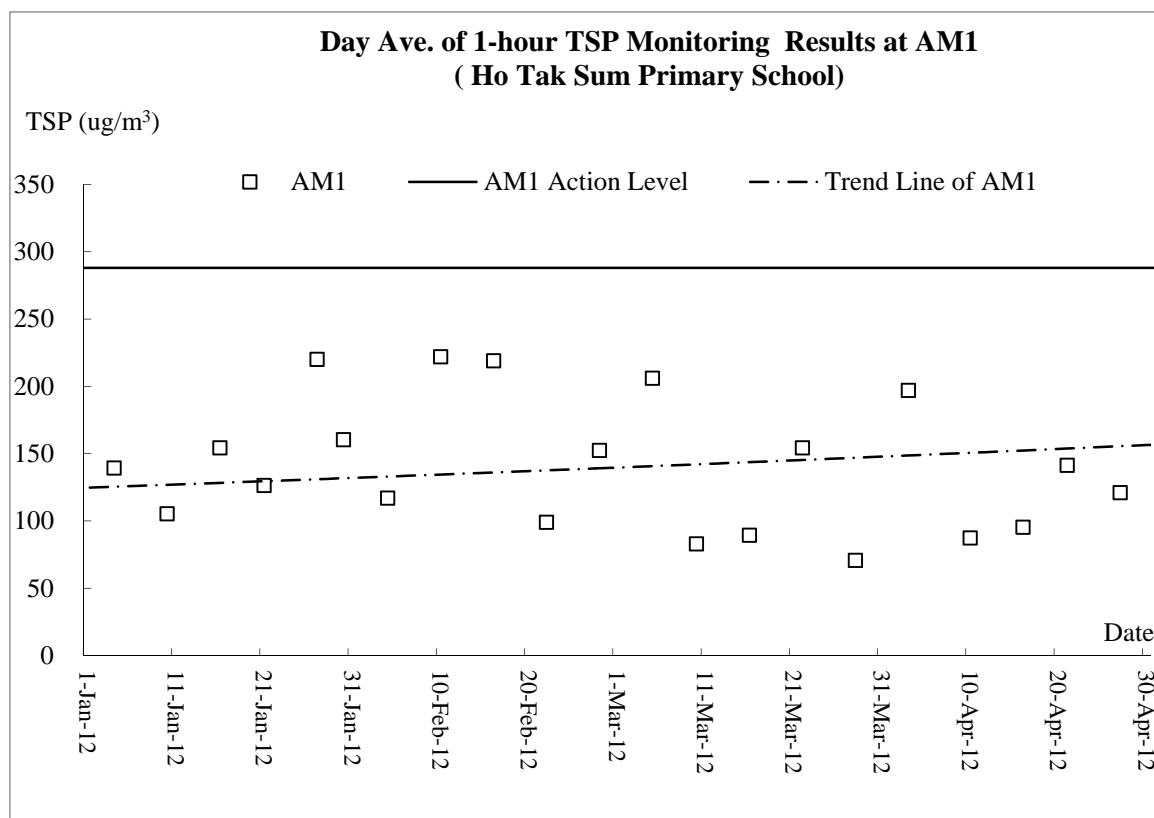


Appendix E

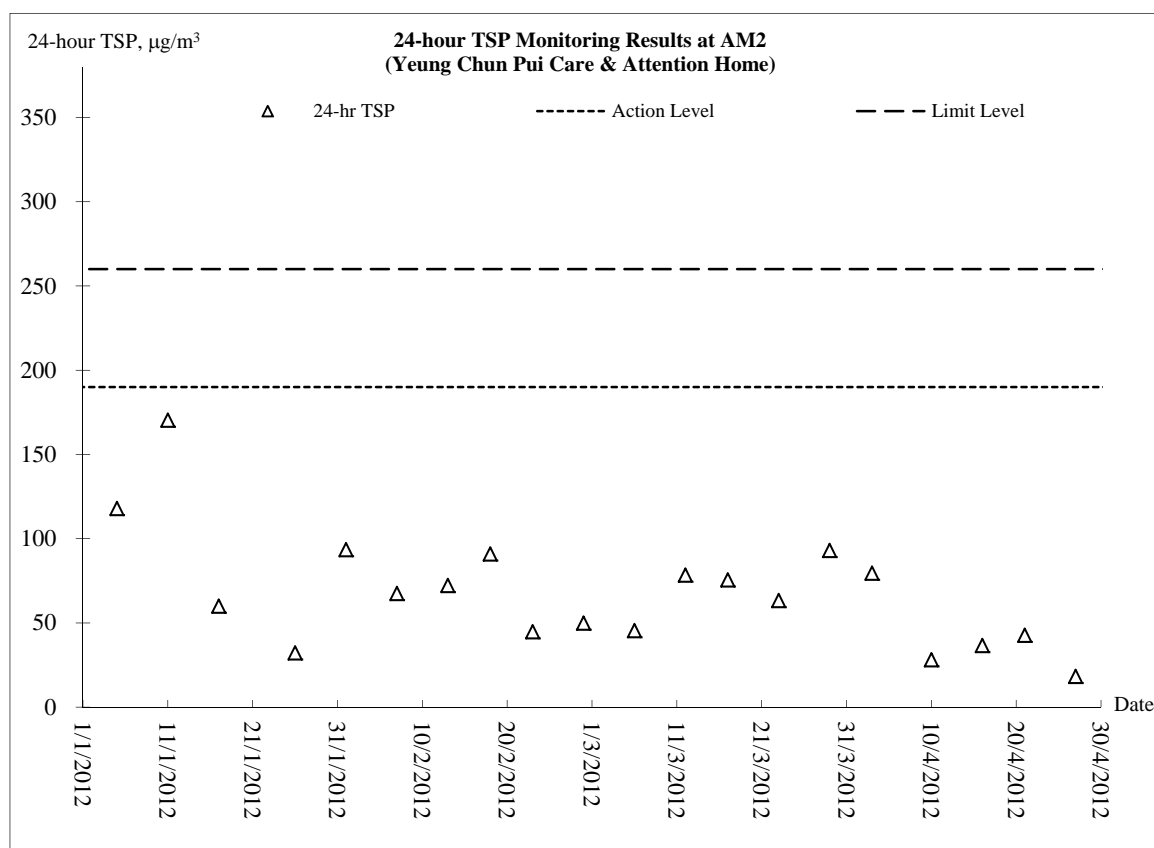
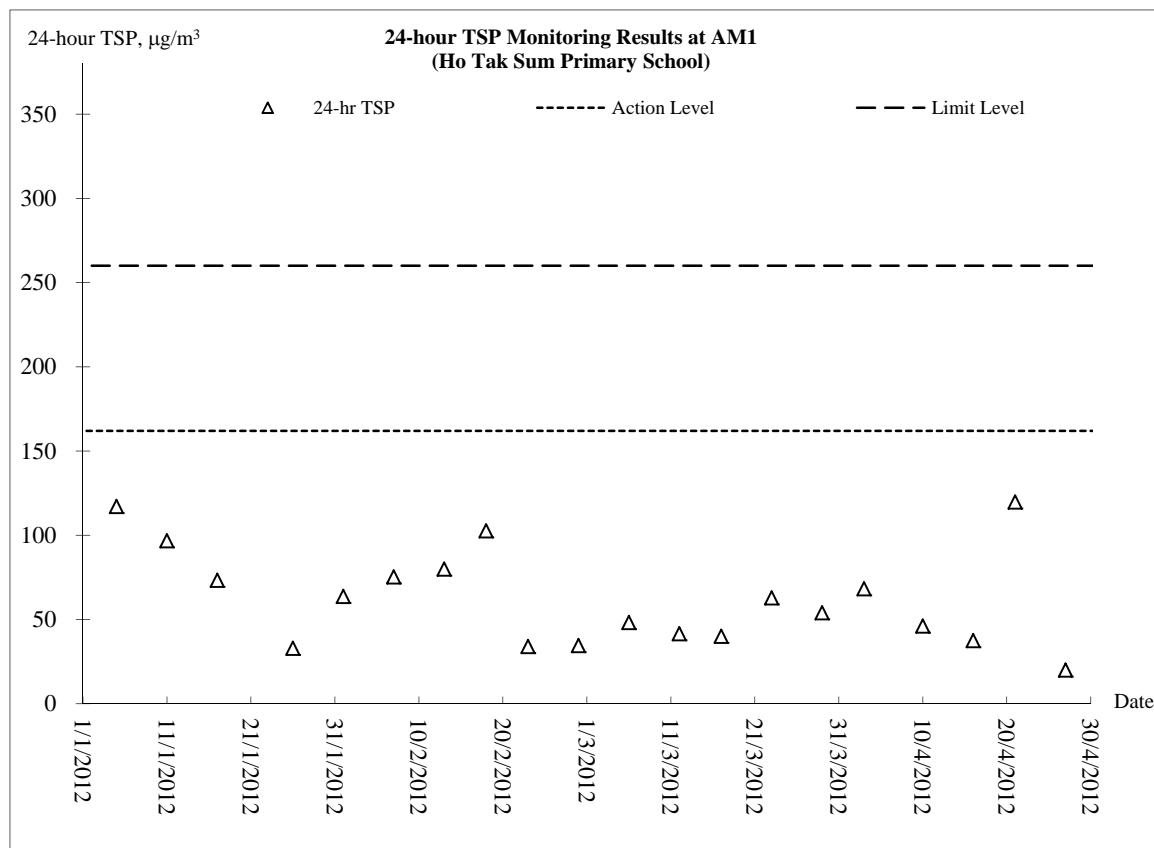
Graphic Plot of

- **Air Quality**
- **Construction Noise**
- **Water Quality**

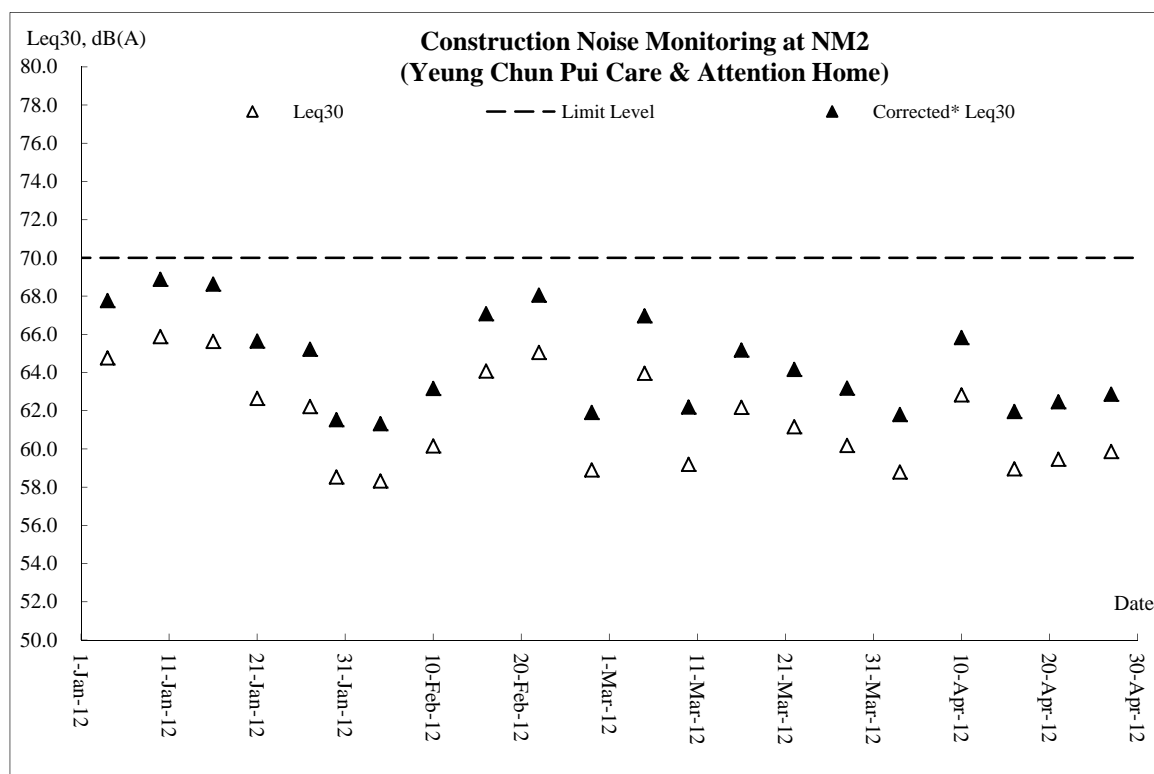
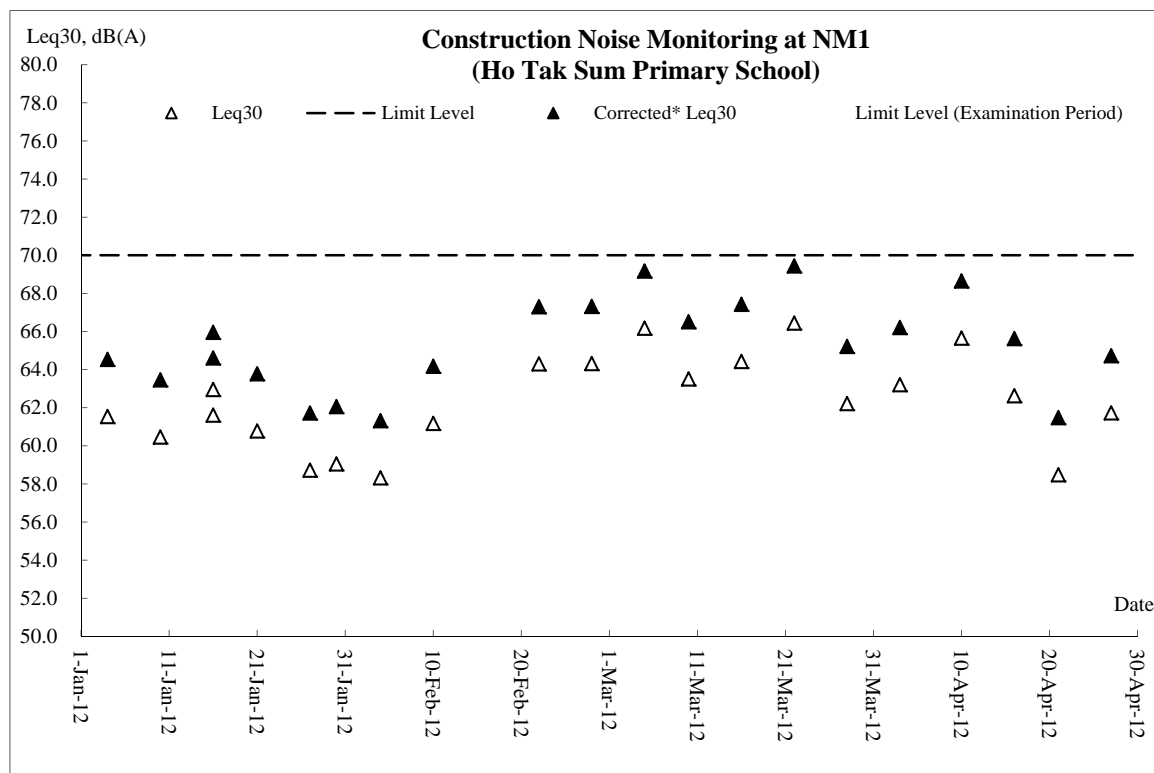
Air Quality – 1-hour TSP



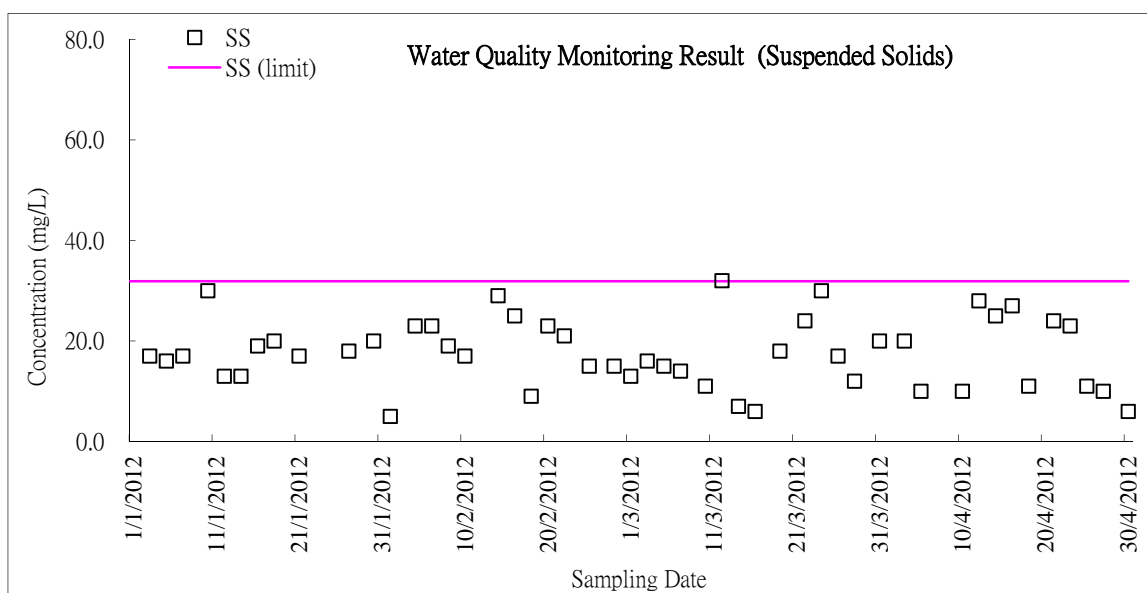
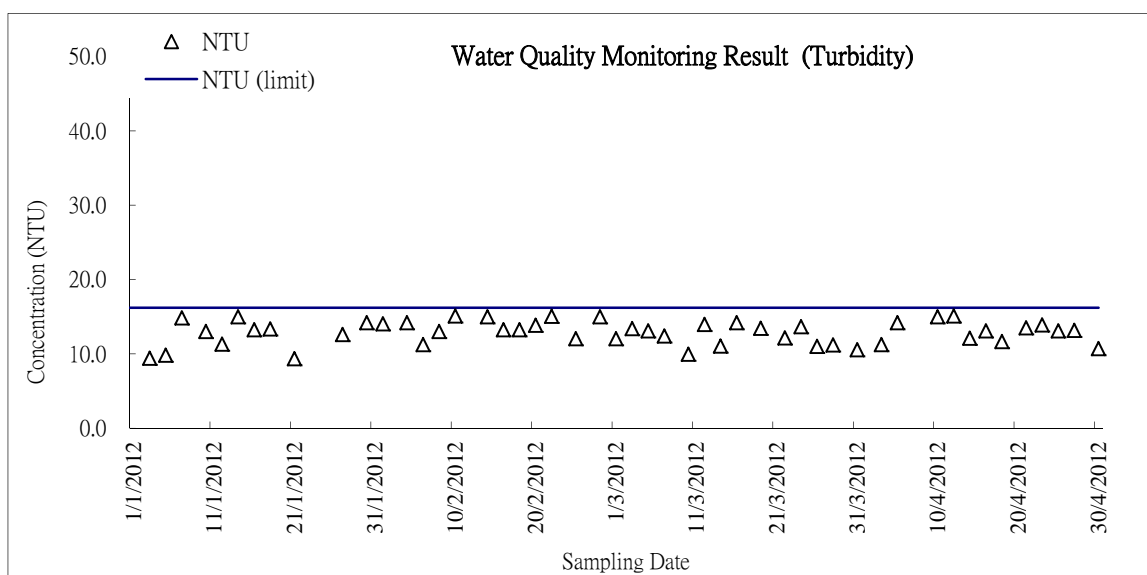
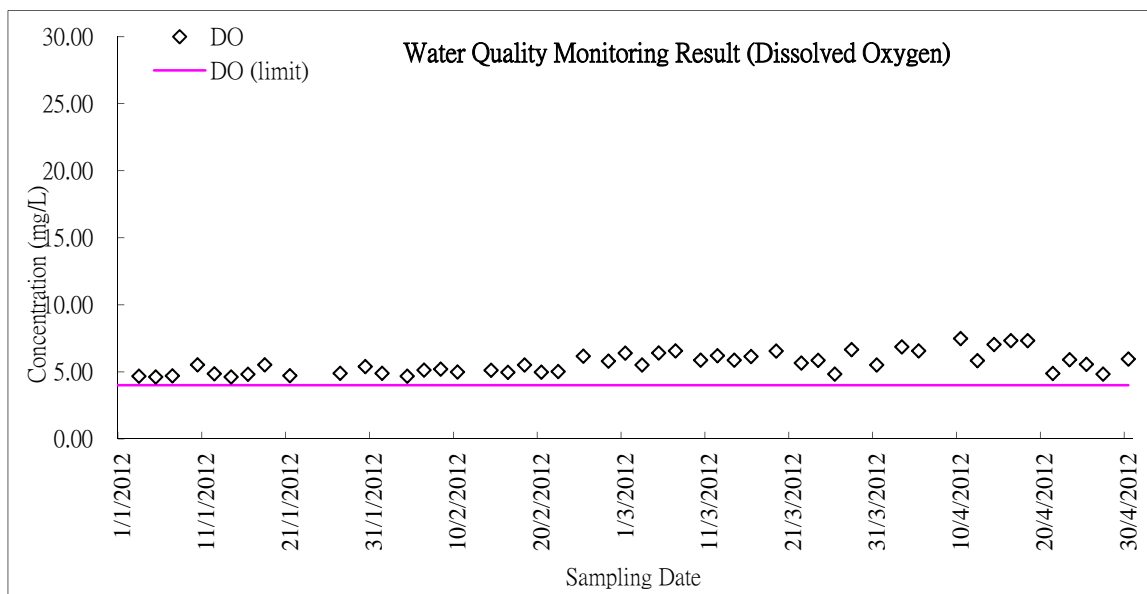
Air Quality – 24-hour TSP



Construction Noise



Water Quality (R1b)



Appendix F

Meteorological information

Meteorological Data Extracted from HKO – February 2012

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Feb-12	Wed	Sunny intervals.	0	15.7	10	71.7	E/SE
2-Feb-12	Thu	Cloudy with a few mist patches	0	16.8	7.8	73.2	E/NE
3-Feb-12	Fri	Moderate easterly winds	Trace	14.8	13.5	74	NE
4-Feb-12	Sat	Mainly cloudy.	Trace	17.1	19	87	S/SE
5-Feb-12	Sun	Moderate easterly winds	0.1	19.3	14.5	79.7	S/SE
6-Feb-12	Mon	Moderate easterly winds, fresh at times offshore	0.4	21.4	17	81	S/SE
7-Feb-12	Tue	Mainly cloudy.	3.1	15.6	17.5	76.5	N/NE
8-Feb-12	Wed	Moderate easterly winds	0.7	11.1	15.5	81	NE
9-Feb-12	Thu	Mainly cloudy.	Trace	12.7	14.1	80.5	E
10-Feb-12	Fri	Cloudy with a few mist patches	Trace	13.6	12.5	85.7	E/NE
11-Feb-12	Sat	Cloudy with one or two rain patches.	0	11.8	9.2	86	W/SW
12-Feb-12	Sun	Cloudy with a few mist patches	Trace	15.8	7	82	W/SW
13-Feb-12	Mon	Cloudy with one or two rain patches and coastal fog.	Trace	19.5	9	79.5	W/SW
14-Feb-12	Tue	Cloudy with one or two rain patches.	0.3	20.4	6.5	88	E/NE
15-Feb-12	Wed	Moderate easterly winds.	Trace	17.6	8	87.5	E
16-Feb-12	Thu	Moderate easterly winds	Trace	16	13.5	84.2	E/NE
17-Feb-12	Fri	Sunny intervals.	Trace	15	12.8	59.7	NE
18-Feb-12	Sat	Cloudy with a few mist patches	0	13.5	12.3	67	N/NE
19-Feb-12	Sun	Sunny intervals.	0	15.4	11.9	60	E/SE
20-Feb-12	Mon	Moderate easterly winds.	0	15.2	9.2	68.7	E/NE
21-Feb-12	Tue	Mainly cloudy with one or two rain patches.	1.7	19.2	12	78.5	E
22-Feb-12	Wed	Humid with fog.	1.3	20.8	7.6	84.5	E
23-Feb-12	Thu	Cloudy with a few rain patches	2.9	23	10.7	85.5	E/NE
24-Feb-12	Fri	Sunny intervals.	0.5	21.2	13.7	82.5	E/NE
25-Feb-12	Sat	Moderate to fresh northerly winds	Trace	16	14	78.7	NE
26-Feb-12	Sun	Fresh easterly winds	Trace	12.7	17.5	71.2	NE
27-Feb-12	Mon	Moderate to fresh northerly winds	Trace	9.6	14	82.5	NE
28-Feb-12	Tue	Mainly cloudy with one or two rain patches.	18	11.3	13.2	88.2	N/NE
29-Feb-12	Wed	Cloudy with a few rain patches at first	0.5	16	12.2	84.2	E

Meteorological Data Extracted from HKO – March 2012

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Mar-12	Thu	Cloudy.	Trace	17.1	8.5	85.5	1-Mar-12
2-Mar-12	Fri	Coastal fog and one or two light rain patches at first.	0	20.2	11	82	2-Mar-12
3-Mar-12	Sat	Moderate easterly winds.	0.2	20.7	14	81.5	3-Mar-12
4-Mar-12	Sun	Moderate east to southeasterly winds.	0.5	22.3	12	76.7	4-Mar-12
5-Mar-12	Mon	Mainly cloudy with coastal mist.	Trace	23.9	9.2	77.5	5-Mar-12
6-Mar-12	Tue	Moderate easterly winds.	0.3	25.6	16.2	78.7	6-Mar-12
7-Mar-12	Wed	Mainly cloudy with a few light rain patches.	Trace	22.9	22	78.5	7-Mar-12
8-Mar-12	Thu	Moderate to fresh easterly winds.	3.3	28.5	10.2	91.5	8-Mar-12
9-Mar-12	Fri	Mainly cloudy with coastal mist.	0.2	14.9	12.9	89.5	9-Mar-12
10-Mar-12	Sat	Mainly cloudy with a few light rain patches.	Trace	12.5	11	91	10-Mar-12
11-Mar-12	Sun	Moderate east to northeasterly winds, freshening gradually.	8.4	12	10	90	11-Mar-12
12-Mar-12	Mon	Moderate northeasterly winds	6.6	12.1	9.5	90.5	12-Mar-12
13-Mar-12	Tue	Cloudy with mist and a few light rain patches.	1.7	14.5	7.5	85.5	13-Mar-12
14-Mar-12	Wed	Cloudy with mist and a few light rain patches.	Trace	17.8	8.3	79.2	14-Mar-12
15-Mar-12	Thu	Fresh easterly winds	0.6	19.7	12.4	76.5	15-Mar-12
16-Mar-12	Fri	Cloudy with fog.	0.2	23.8	7	77.5	16-Mar-12
17-Mar-12	Sat	Light to moderate easterly winds.	Trace	23.2	8.2	76	17-Mar-12
18-Mar-12	Sun	Cloudy and misty.	0	24.5	9.8	74	18-Mar-12
19-Mar-12	Mon	Moderate easterly winds, occasionally fresh offshore.	Trace	23.7	10.7	75	19-Mar-12
20-Mar-12	Tue	Cloudy.	Trace	22.5	9	78	20-Mar-12
21-Mar-12	Wed	Mainly cloudy with a few mist patches.	Trace	21.3	16.1	75	21-Mar-12
22-Mar-12	Thu	Moderate to fresh easterly winds	Trace	24.4	15.7	68	22-Mar-12
23-Mar-12	Fri	Fresh easterly winds	0	20.4	20	79.2	23-Mar-12
24-Mar-12	Sat	Cloudy with fog.	0.1	17.2	17.4	51	24-Mar-12
25-Mar-12	Sun	Moderate to fresh easterly winds	0	19.2	16.5	47	25-Mar-12
26-Mar-12	Mon	Cloudy and misty.	0	20.7	14.2	38.5	26-Mar-12
27-Mar-12	Tue	Mainly cloudy with a few mist patches.	0	22.5	15	45.5	27-Mar-12
28-Mar-12	Wed	Mainly cloudy with relatively low visibility.	0	23.1	18.4	49.5	28-Mar-12
29-Mar-12	Thu	Sunny intervals	0	24.5	13	58.7	29-Mar-12
30-Mar-12	Fri	Moderate easterly winds	0	24	9.1	77	30-Mar-12
31-Mar-12	Sat	Mainly cloudy with relatively low visibility.	Trace	22.5	8.1	79	31-Mar-12

Meteorological Data Extracted from HKO – April 2012

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Apr-12	Sun	Mainly fine.	0	22.2	7.3	53	E/NE
2-Apr-12	Mon	Light to moderate southerly winds.	0	23.8	11.2	72	E/NE
3-Apr-12	Tue	Mainly fine.	0	25.9	8.2	70	E/NE
4-Apr-12	Wed	holiday					
5-Apr-12	Thu	Light to moderate southerly winds.	48.5	23.4	12.5	84.5	E/NE
6-Apr-12	Fri	holiday					
7-Apr-12	Sat	holiday					
8-Apr-12	Sun	holiday					
9-Apr-12	Mon	holiday					
10-Apr-12	Tue	Mainly fine with coastal fog	0	23.7	15	65.5	W/SW
11-Apr-12	Wed	Light to moderate southerly winds.	0	25.8	12	76.5	W/SW
12-Apr-12	Thu	Moderate southerly winds.	0	26.3	14.2	77.5	S/SE
13-Apr-12	Fri	Mainly cloudy with a few showers.	Trace	27.2	13	77.5	SE
14-Apr-12	Sat	Moderate southerly winds.	Trace	28.2	14	76	S/SE
15-Apr-12	Sun	Moderate easterly winds	Trace	28	15.2	70	S/SE
16-Apr-12	Mon	One or two squally thunderstorms	11.8	26.9	15.7	80	S/SE
17-Apr-12	Tue	Cloudy with occasional rain.	16.6	22	13.4	87.5	E/NE
18-Apr-12	Wed	Cloudy to overcast with rain and a few squally thunderstorms	Trace	23	17.2	80.5	E/NE
19-Apr-12	Thu	Moderate easterly winds	28.2	23	20	87	E/NE
20-Apr-12	Fri	Cloudy with rain and squally thunderstorms.	66.2	21.7	15.7	93	E/NE
21-Apr-12	Sat	Moderate to fresh southeasterly winds.	0	24.4	17.2	91	E/NE
22-Apr-12	Sun	Sunny periods.	0	25.1	15.3	65	E/NE
23-Apr-12	Mon	Mainly cloudy with a few showers.	0.3	26.3	17.2	78	SE
24-Apr-12	Tue	Moderate to fresh southwesterly winds	Trace	27.8	15.2	77.5	S
25-Apr-12	Wed	Moderate to fresh southwesterly winds	4.8	26.5	23.5	76.7	S/SW
26-Apr-12	Thu	Sunny periods.	Trace	25.8	10.5	75	N/NE
27-Apr-12	Fri	Cloudy with occasional rain.	34.5	25	21	81	E/NE
28-Apr-12	Sat	holiday					
29-Apr-12	Sun	Sunny periods.	21.2	26.8	12.6	83.2	S/SE
30-Apr-12	Mon	Moderate to fresh southeasterly winds.	0.5	28.5	15.7	82	S/SE