

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

6<sup>th</sup> QUARTERLY ENVIRONMENTAL MONITORING &  
AUDIT SUMMARY REPORT –  
(May 2011 to July 2011)

PREPARED FOR

CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG)  
COMPANY LIMITED

## Quality Index

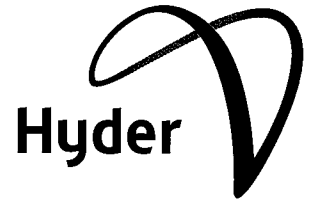
Date	Reference No.	Prepared By	Certified By
28 September 2011	TCS00491/09/600/R0266v3	Nicola Hon (Environmental Consultant)	T.W. Tam (Environmental Team Leader)
			

Version	Date	Description
1	20 September 2011	First submission
2	27 September 2011	Amended against IEC's comments on 23 September 2011
3	28 September 2011	Amended against IEC's comments on 28 September 2011

This report has been prepared by Action-United Environmental Services & Consulting with all reasonable skill, care and diligence within the terms of the Agreement with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

安誠工程顧問有限公司  
香港灣仔  
皇后大道東183號  
合和中心47樓  
電話: (852) 2911 2233  
傳真: (852) 2805 5028

Hyder Consulting Limited  
Company Number 126012  
47th Floor, Hopewell Centre  
183 Queen's Road East  
Wan Chai, Hong Kong  
Tel: (852) 2911 2233  
Fax: (852) 2805 5028  
hyder.hk@hyderconsulting.com  
www.hyderconsulting.com



30 September 2011

**By Post**

Action-United Environmental Services &  
Consulting  
Unit A, 20/F, Gold King Industrial Building,  
35-41 Tai Lin Pai Road,  
Kwai Chung,  
New Territories,  
Hong Kong.

**Your Ref:**

**Our Ref:** EB000586-F/THW11-1915

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 Report for Designated Project, May to July 2011 – IEC Verification**

With reference to ET's captioned report (ET's ref.: TCS00491/09/600/R0266v3 dated 28 September 2011) received on 28 September 2011, 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 our William Law on 2911 2511.

Yours sincerely

F.C. TSANG  
Independent Environmental Checker  
HYDER CONSULTING LIMITED

FCT/WL/my

## EXECUTIVE SUMMARY

ES.01. This is the 6<sup>th</sup> quarterly EM&A summary report under Environmental Permit No. EP327/2009 (hereinafter “the EP”) for the *Expansion of Ha Tsuen Sewage Pumping Station*, covering the period from **1 May to 31 July 2011** (hereinafter “Reporting Period”).

### ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

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

Aspects	Environmental Monitoring Parameters / Inspection	Occasions
Air Quality	1-hour TSP	<b>96</b>
	24-hour TSP	<b>32</b>
Construction Noise	Leq (30min) Daytime	<b>32</b>
Water Quality	Dissolved Oxygen	<b>38</b>
	Turbidity	<b>38</b>
	Suspended Solids (SS)	<b>38</b>
Inspection / Audit	ET Weekly Environmental Site Inspection	<b>13</b>

### BREACHES OF ACTION/LIMIT LEVELS

ES.03. In the Reporting Period, monitoring results demonstrated that no exceedance of environmental quality criteria recorded in both construction noise and air quality monitoring. However, 1 Limit Level exceedance was recorded in water quality monitoring. The summaries of exceedance in water quality monitoring is shown below:

Month	Exceedance	DO	Turbidity	SS	Sub-total
May 2011	Action Level	0	0	0	0
	Limit Level	0	0	<b>1</b>	<b>1</b>
June 2011	Action Level	0	0	0	0
	Limit Level	0	0	0	0
July 2011	Action Level	0	0	0	0
	Limit Level	0	0	0	0
<b>Total</b>	<b>Action Level</b>	0	0	0	0
	<b>Limit Level</b>	0	0	<b>1</b>	<b>1</b>

ES.04. Investigation for the water quality exceedances was completed and it was concluded that the exceedances was not related to the works under the Project. No corrective action was therefore recommended. Nevertheless, the Contractor was reminded to ensure the water mitigation measures were implementation as stipulated in the EM&A Manual Section 3.8.

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 period.

### FUTURE KEY ISSUES

ES.08. During wet season, 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 to avoid dust emission from the construction site should be properly paid attention as recommended in the EIA and summarized in Mitigation Measure Implementation

Schedule; and also with construction noise and other environmental issues stipulated in the Environmental Monitoring and Audit Manual.

- 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**

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	BACKGROUND	1
	REPORT STRUCTURE	1
<b>2</b>	<b>PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS</b>	<b>2</b>
	PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE	2
	WORKS UNDERTAKEN DURING THE REPORTING PERIOD	2
	SUMMARY OF ENVIRONMENTAL SUBMISSIONS	2
<b>3</b>	<b>SUMMARY OF IMPACT MONITORING REQUIREMENTS</b>	<b>3</b>
	MONITORING PARAMETERS	3
	MONITORING LOCATIONS	3
	MONITORING FREQUENCY	4
	ENVIRONMENTAL QUALITY CRITERIA	5
	ENVIRONMENTAL MITIGATION MEASURES	5
<b>4</b>	<b>MONITORING RESULTS AND BREACHES OF ENVIRONMENTAL QUALITY CRITERIA</b>	<b>6</b>
	AIR QUALITY MONITORING	6
	CONSTRUCTION NOISE MONITORING	6
	WATER QUALITY MONITORING – LOCAL STREAM COURSE	7
	OTHER MONITORING AND AUDIT	8
<b>5</b>	<b>WASTE MANAGEMENT</b>	<b>9</b>
	RECORDS OF WASTE QUANTITIES	9
<b>6</b>	<b>SITE INSPECTIONS</b>	<b>10</b>
<b>7</b>	<b>NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS</b>	<b>11</b>
	NON-COMPLIANCE	11
	ENVIRONMENTAL COMPLAINT	11
	NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS	11
<b>8</b>	<b>IMPLEMENTATION STATUS OF MITIGATION MEASURES</b>	<b>12</b>
<b>9</b>	<b>CONCLUSIONS AND RECOMMENTATIONS</b>	<b>14</b>
	CONCLUSIONS	14
	RECOMMENDATIONS	14

## **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 STATIONS
TABLE 3-3	CONSTRUCTION NOISE MONITORING STATIONS
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 (LEQ30, 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 OF THE EXISTING HA TSUEN SEWAGE PUMPING STATION
APPENDIX B	ENVIRONMENTAL MANAGEMENT ORGANIZATION AND CONTACTS OF KEY PERSONNEL
APPENDIX C	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 construction of expansion Ha Tsuen Sewage 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 6<sup>th</sup> Quarterly EM&A Summary Report which undertaken as 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 May to 31 July 2011**.

### REPORT STRUCTURE

- 1.06 This Report is structured as follows:

<b>Section 1</b>	Introduction
<b>Section 2</b>	Project Organization and Construction Progress
<b>Section 3</b>	Summary of Impact Environmental Monitoring and Audit Requirements
<b>Section 4</b>	Monitoring Results and Breaches of Environmental Quality Criteria
<b>Section 5</b>	Waste Management
<b>Section 6</b>	Site Inspection
<b>Section 7</b>	Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
<b>Section 8</b>	Implementation Status of Mitigation Measures
<b>Section 9</b>	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 master tentative construction program is enclosed in [Appendix C](#). Also, the major construction activities undertaken in this reporting period are listed below:

- |           |   |
|-----------|---|
| May 2011  | • Installation of temporary shoring system                |
|           | • Excavation  |
| June 2011 | • Installation of temporary shoring system                |
|           | • Excavation  |
| July 2011 | • Infrastructure construction below existing ground level |

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

#### MONITORING LOCATIONS

##### Air Quality

- 3.02 The designated monitoring location Yeung Chun Pui Care & Attention Home located at Sha Chau Lei Road has been identified, but the premise was granted by CEDD existing project CV/2008/03 for air quality monitoring. Also, the HVS installation at the other one designated air monitoring station Tin Shing Court, the premises is refused by the incorporated owners. The alternative location Ho Tak Sum Primary School as one sensitive receiver mentioned in the EIA Report (Register No. AEIAR-072/2003) is proposed to be the replacement to undertake air quality monitoring during the expansion works of Ha Tsuen Sewage Pumping Station in accordance with the EM&A Manual Clauses 2.2.1.20. Simultaneously, air monitoring at the designated location Yeung Chun Pui Care & Attention Home is proposed to perform. The proposal and recommendation is agreed by IEC and as endorsed by EPD. The monitoring stations are detailed to list in *Table 3-2* and illustrated in *Appendix D*.

**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 & Attention Home	Designated in the EM&A Manual

##### Construction Noise

- 3.03 Similarly to the air monitoring, the construction noise monitoring stations undertaken for EM&A programme was agreed by IEC and as endorsed by EPD. The detailed monitoring stations are listed 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

- 3.04 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 is technical difficulty and safety is concerned. So, a new sampling point located at approximately 160m upstream of the R1 (hereinafter as R1b) was therefore proposed for the local stream impact monitoring and has been verified by IEC and no further comments by EPD.
- 3.05 The detailed monitoring station is listed 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

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

**MONITORING FREQUENCY**

- 3.07 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 Leq(30min) as 6 consecutive Leq(5min) between 0700-1900 hours on normal weekdays.

Leq (5min), L10 and L90 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**

- 3.08 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 Leq(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 Leq(30min) during normal hours from 0700 to 1900 hours on normal weekdays

Note: \*Reduces to 65 dB(A) during the school examination periods.

**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**

- 3.09 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 A/L levels of air quality 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, (µg/m<sup>3</sup>)**

Date	24-hour TSP		Date	1-hour TSP					
	AM1	AM2		AM1			AM2		
				1 <sup>st</sup> hour	2 <sup>nd</sup> hour	3 <sup>rd</sup> hour	1 <sup>st</sup> hour	2 <sup>nd</sup> hour	3 <sup>rd</sup> hour
3-May-11	38	45	4-May-11	118	121	114	118	116	119
7-May-11	45	33	9-May-11	81	66	74	73	72	64
13-May-11	25	43	14-May-11	68	75	61	59	68	60
19-May-11	22	27	20-May-11	75	66	74	74	87	68
25-May-11	92	30	26-May-11	86	93	82	101	91	85
31-May-11	59	57	1-Jun-11	86	102	91	94	89	85
4-Jun-11	30	46	7-Jun-11	78	96	98	98	106	109
10-Jun-11	24	28	13-Jun-11	94	86	81	89	101	79
16-Jun-11	12	27	18-Jun-11	76	93	89	89	96	94
22-Jun-11	16	43	24-Jun-11	86	97	81	98	103	89
28-Jun-11	19	43	30-Jun-11	65	76	69	74	69	78
4-Jul-11	30	32	6-Jul-11	86	93	105	103	126	95
9-Jul-11	84	73	12-Jul-11	66	78	84	91	80	83
15-Jul-11	24	35	18-Jul-11	64	72	81	79	85	89
21-Jul-11	35	40	23-Jul-11	71	97	100	101	98	85
27-Jul-11	30	51	29-Jul-11	76	102	82	86	92	103
Average (Range)	37 (12 – 92)	41 (27 – 73)	Average (Range)	84 (61-121)			89 (59-126)		

**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 During the Reporting Period, no Action/Limit Level exceedance in air quality monitoring was recorded at both Locations AM1 and AM2. All the 1-hr TSP and 24-hr TSP results were well below the corresponding A/L level and no corrective action was therefore required.

### CONSTRUCTION NOISE MONITORING

- 4.03 Monitoring results and breaches A/L levels of construction noise 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 (Leq30, dB(A))**

Date	(*) NM1	(*) NM2
4-May-11	64.8	66.9
9-May-11	62.2	65.3
14-May-11	61.5	64.4
20-May-11	65.6	68.1
26-May-11	64.2	67.4
1-Jun-11	64.6	66.5
7-Jun-11	63.1	64.9
13-Jun-11	63.3	65.6
18-Jun-11	63.4	65.1
24-Jun-11	68.9	69.0

Date	(*) NM1	(*) NM2
30-Jun-11	63.5	64.5
6-Jul-11	62.9	65.1
12-Jul-11	63.1	67.3
18-Jul-11	63.9	65.2
23-Jul-11	65.4	67.2
29-Jul-11	63.7	65.6

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

**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)
Average	7.4	10.4	14.3
Minimum	4.8	2.0	3.0
Maximum	15.5	15.6	51.0

- 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	Total Exceedances in the Month
May 2011	12	Action Level	0	0	0	0
		Limit Level	0	0	1	1
		Sub-Total	0	0	1	1
June 2011	13	Action Level	0	0	0	0
		Limit Level	0	0	0	0
		Sub-Total	0	0	0	0
July 2011	13	Action Level	0	0	0	0
		Limit Level	0	0	0	0
		Sub-Total	0	0	0	0
Total	38	Action Level	0	0	0	0
		Limit Level	0	0	1	1
Percentage of Exceedance in the Quarterly Month			0%	0%	2.6%	0.88%

- 4.07 As shown in **Table 4-6**, 1 Limit Level exceedances in Suspended Solids were recorded in water quality monitoring during the Reporting Period. The NOEs and the associated investigation reports were issued upon confirmation of the results and construction information

- 4.08 According to the site information provided by the Contractor, formworking, site clearance and

backfilling were in progress at the exceedance day. It is noted that no significant wastewater would be generated on the above works. Therefore, conclusion that the exceedance is not works related under the project. It was concluded that water quality exceedances were not due to the Project and no corrective action was therefore recommended.

#### **OTHER MONITORING AND AUDIT**

##### *Landscape and Visual*

- 4.09 The monitoring and audit works for landscaping and visual was 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 fencing erection and relevant Tree Report has been described that all the retained and transplanted trees were in good condition.

## 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
	May 11	Jun 11	Jul 11	Total	
C&D Materials (Inert) (m <sup>3</sup> )	0	0	0	0	-
Reused in this Contract (Inert) (m <sup>3</sup> )	0	0	0	0	-
Reused in other Projects (Inert) (m <sup>3</sup> )	0	0	0	0	-
Disposal as Public Fill (Inert) (m <sup>3</sup> )	1,110	751	752	2,613	Tuen Mun Area 38

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

Type of Waste	Quantity				Disposal Location
	May 11	Jun 11	Jul 11	Total	
Recycled Metal (kg)	0	0	0	0	-
Recycled Paper/Cardboard Packing (kg)	0	0	0	0	-
Recycled Plastic (kg)	0	0	0	0	-
Chemical Wastes (kg)	0	0	0	0	-
General Refuses (m <sup>3</sup> )	0	16	2	18	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 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, **13** events of the joint site inspection was undertaken to evaluate the site environmental performance. No non-compliance was noted but **7** observations were recorded during the site inspections within the Reporting Period. The summarized 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
3 May 2011	Nil	N/A
11 May 2011	<ul style="list-style-type: none"> <li>Stagnant water ponding was observed at Ha Tsuen Pumping Station. The Contractor was reminded to provide proper mitigation measures for preventing mosquitoes breeding</li> </ul>	The issue was rectified before next inspection.
19 May 2011	Nil	N/A
26 May 2011	Nil	N/A
31 May 2011	Nil	N/A
7 June 2011	Nil	N/A
15 June 2011	Nil	N/A
20 June 2011	<ul style="list-style-type: none"> <li>In view of the school examination period is approaching, the contractor was reminded to consider the potential noise impact generated from the construction works. (Ha Tsuen Pumping Station)</li> </ul>	Not required for reminder.
28 June 2011	Nil	N/A
5 July 2011	Nil	N/A
12 July 2011	Nil	N/A
19 July 2011	<ul style="list-style-type: none"> <li>General refuse was observed scattered along the site. Regular clearing is reminded.</li> <li>EP was not displayed at entrance of Ha Tsuen Pumping Station. Display of EP is required.</li> </ul>	To be followed for next inspection.
26 July 2011	<ul style="list-style-type: none"> <li>General refuse was observed scattered along the site. Regular clearing is reminded;</li> <li>Oil stain was observed beside chemical store at Ha Tsuen Pumping Station. Clearing is reminded.</li> <li>EP was not displayed at entrance of Ha Tsuen Pumping Station. Display of EP is required.</li> </ul>	The issues were rectified before next inspection.

- 6.02 In general, it is reminded that good housekeeping practice should be maintained. Besides, chemical waste management shall be enhanced as oil stain was observed beside chemical store at Ha Tsuen Pumping Station and proper clearing is reminded immediately to avoid land contamination. During wet season, implement water mitigation measures to eliminate any accumulation of stagnant water on site is also recommended. Overall, the environmental performance of the Project was considered satisfactory.



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

### NON-COMPLIANCE

- 7.01 Apart from the exceedance of water quality summarized in *Table 4-6*, no non-compliance or deficiency was identified during regular site inspection and environmental audit. No associated remedial actions were recommended.

### ENVIRONMENTAL COMPLAINT

- 7.02 No documented noise, air quality or water quality 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
1 – 31 May 2011	0	0	NA
1 – 30 June 2011	0	0	NA
1 – 31 July 2011	0	0	NA

### NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- 7.03 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
1 – 31 May 2011	0	0	NA
1 – 30 June 2011	0	0	NA
1 – 31 July 2011	0	0	NA

**Table 7-3 Statistical Summary of Environmental Prosecution**

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 – 31 May 2011	0	0	NA
1 – 30 June 2011	0	0	NA
1 – 31 July 2011	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"> <li>Wastewater were appropriately treated by treatment facilities;</li> <li>Drainage channels were provided to convey run-off into the treatment facilities;</li> <li>Drainage systems were regularly and adequately maintained.</li> <li>De-silting facility was provided to treat the discharged water; also the treated water is reused for spraying the road surface;</li> <li>Exposed stockpiles and exposed soil surfaces were covered with tarpaulin or impervious sheets to minimise dust emission;</li> <li>The stockpiles of materials were placed in the locations away from the drainage channel so as to avoid releasing materials into the channel;</li> <li>Wheel washing facilities should has been provided at site exits to ensure that earth, mud and debris would not be carried out of the works areas by vehicles;</li> <li>Provision of site drainage systems and treatment facilities would be required to minimize the water pollution;</li> <li>A discharge licence was applied from EPD for discharging effluent from the construction site;</li> <li>A licensed waste collector have been applied from EPD;</li> <li>Illegal disposal of chemicals should be strictly prohibited; and</li> <li>Registration as a chemical waste producer have been applied from EPD</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather;</li> <li>Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;</li> <li>Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet;</li> <li>Public roads around the site entrance/exit had been kept clean and free from dust;</li> <li>Tarpaulin covering of any dusty materials on a vehicle leaving the site;</li> <li>Spanker of water spray system is provided at haul road to reduce dust emissions during the vehicles passing through the haul road'</li> <li>The vehicle speed within the site is limited to 5km/hr;</li> <li>Wheel washing facilities have been provided at the site exit</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Good site practices to limit noise emissions at the sources;</li> <li>Use of quite plant and working methods according to EP-329/2009;</li> <li>Use of site hoarding with noise barriers to screen noise at ground level of NSRs;</li> <li>Use of shrouds/temporary noise barriers to screen noise from relatively static PMEs according to EP-329/2009</li> <li>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;</li> <li>Idle equipment are turned off or throttled down;</li> <li>No construction works shall be undertaken during school examination period in the Ha Tsuen Pumping Station according to EP-329/2009; and</li> <li>Alternative use of plant items within one worksite, where practicable.</li> </ul>

Issues	Environmental Mitigation Measures
Waste and Chemical Management	<ul style="list-style-type: none"> <li>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;</li> <li>Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner;</li> <li>The Contractor should adopt a trip ticket system for the disposal of C&amp;D materials to any designed public filling facility and/or landfill; and</li> <li>Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.</li> <li>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;</li> <li>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;</li> <li>Any unused chemicals or those with remaining functional capacity should be recycled;</li> <li>Prior to disposal of C&amp;D waste, it is recommended that wood, steel and other metals be 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;</li> <li>Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and</li> <li>Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.</li> </ul>
Landscape and Visual	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"> <li>The site was generally kept tidy and clean.</li> </ul>

## 9 CONCLUSIONS AND RECOMMENTATIONS

### CONCLUSIONS

- 9.01 This is the 6<sup>th</sup> 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 May** to **31 July 2011**.
- 9.02 Monitoring results demonstrated that no exceedance of environmental quality criteria was recorded in both construction noise and air quality monitoring. However, 1 Limit Level exceedances recorded in water quality monitoring. Investigation report concluded that the exceedance was not related to the works under the Project. No corrective actions were therefore recommended.
- 9.03 The monitoring and audit works for landscaping and visual was 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 fencing erection and relevant Tree Report has been described that all the retained and transplanted trees were in good condition.
- 9.04 A total of **13** occasions of joint site inspection was undertaken to evaluate the site environmental performance. No non-compliance was noted but 8 observations were recorded during the site inspections within the Reporting Period.
- 9.05 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.
- 9.06 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

- 9.07 During wet season, 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 to avoid dust emission from the construction site should be properly paid attention as recommended in the EIA and summarized in Mitigation Measure Implementation Schedule; and also with construction noise and other environmental issues stipulated in the Environmental Monitoring and Audit Manual.
- 9.08 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.
- 9.09 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.

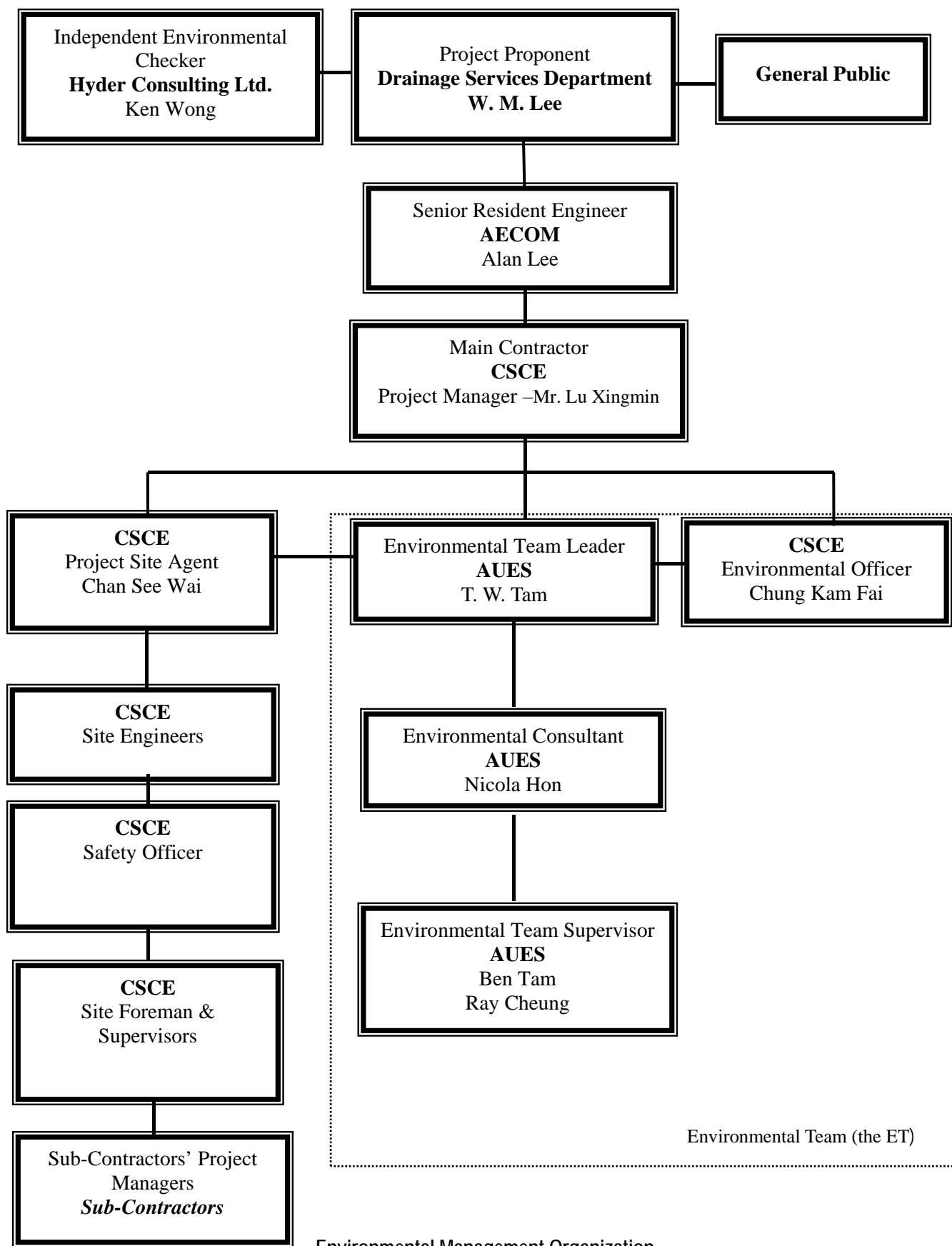
## **Appendix A**

### **Site Layout Plan**



## **Appendix B**

### **On-site environmental management**





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 2730	2805 5028
CSCE	Project Manager	Mr. Lu Xingmin	2472 0113	2472-0229
CSCE	Site Agent	Mr. Chan See Wai	2472 0113	2472-0229
CSCE	Site Engineer	Mr. Poon Kwong Keung	2472 0113	2472-0229
CSCE	Environmental Officer	Mr. Chung Kam Fai	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**

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

[illegible]

Start date	17SEP09		Early bar
Finish date	02JUL15		Critical bar
Run date	05FEB10		Summary bar
Project name	WP11		Start milestone point
Page number	1A		Finish milestone point
c Primavera Systems, Inc.			

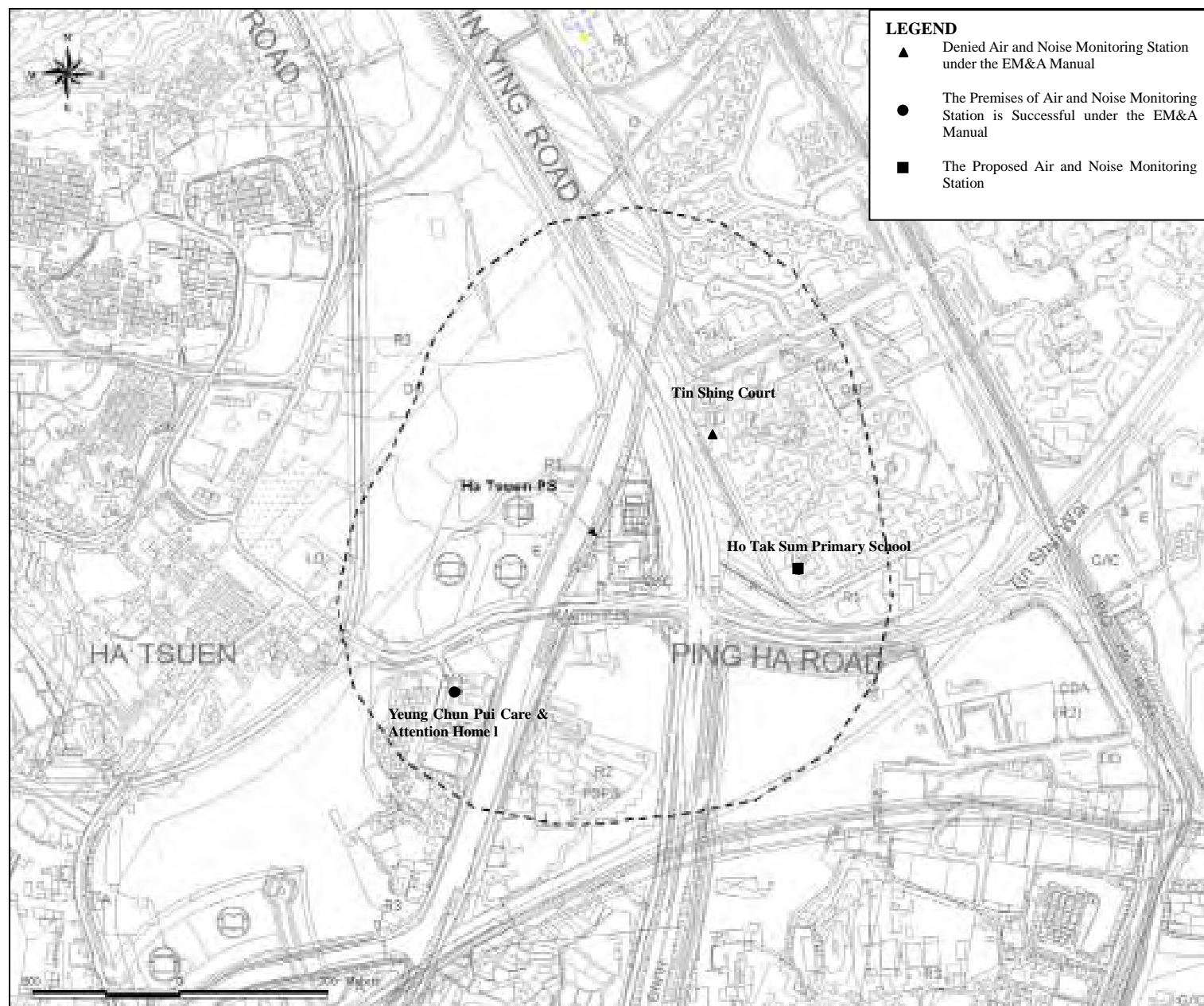
## Initial Works Programme - Rev 02 (Ha Tsuen Area)



## **Appendix D**

### **Monitoring Location of EM&A Programme**

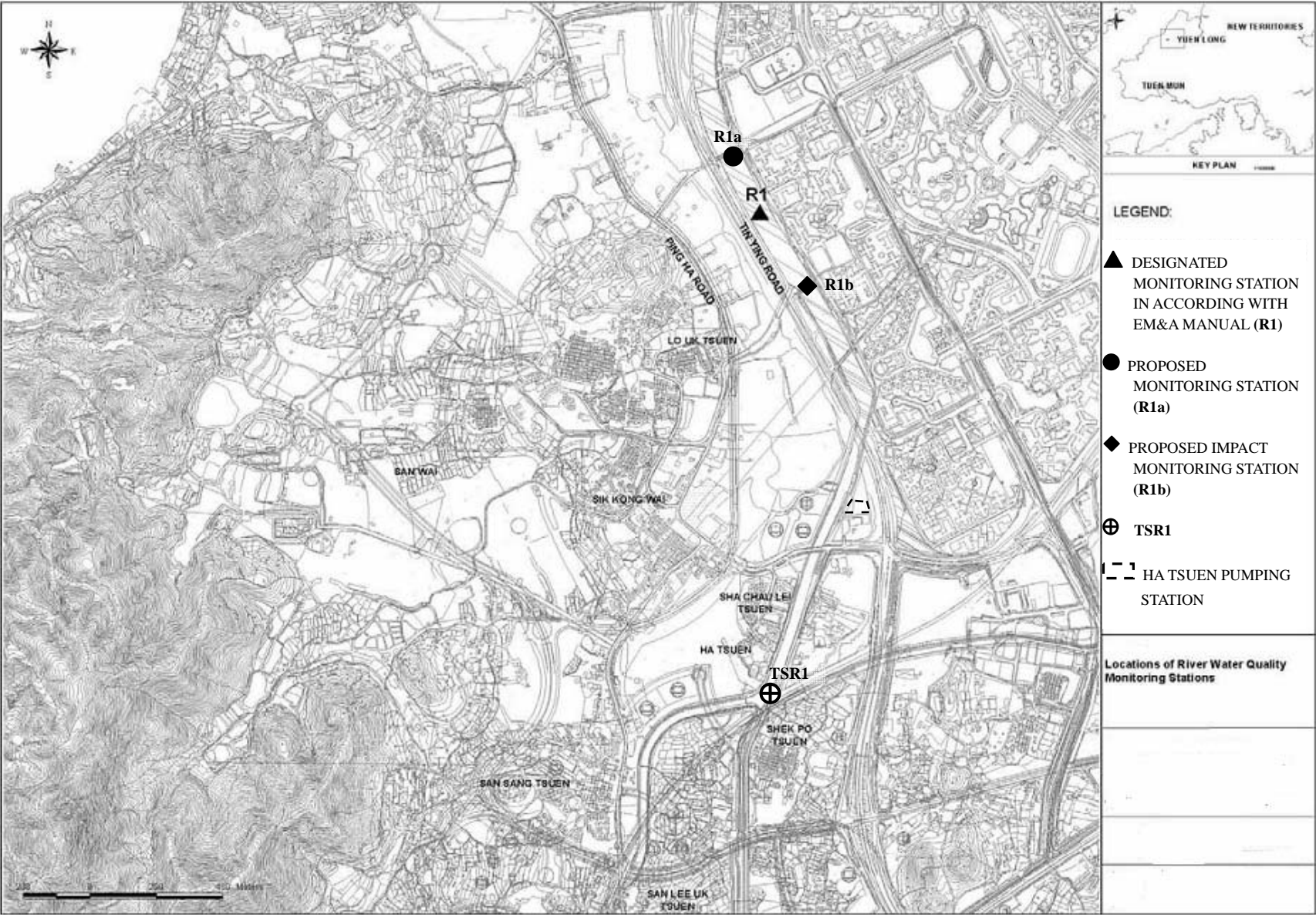
Proposed Air and Noise Monitoring Station



**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**

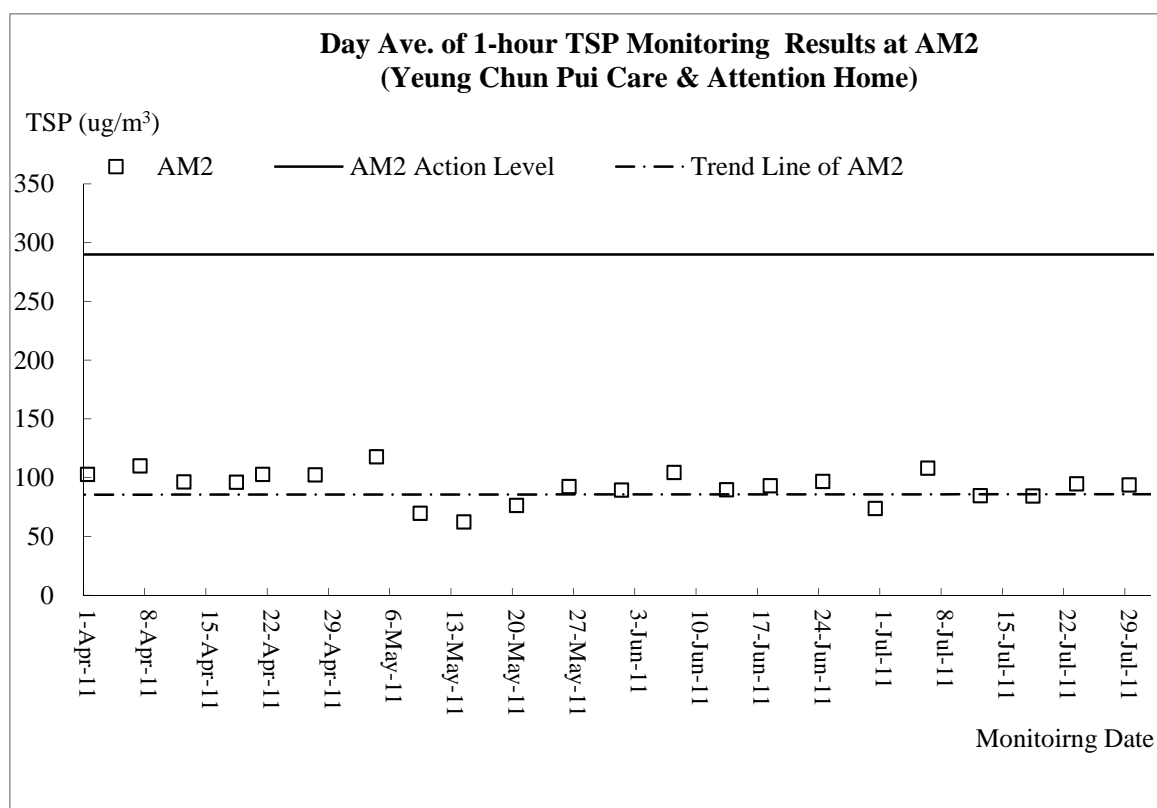
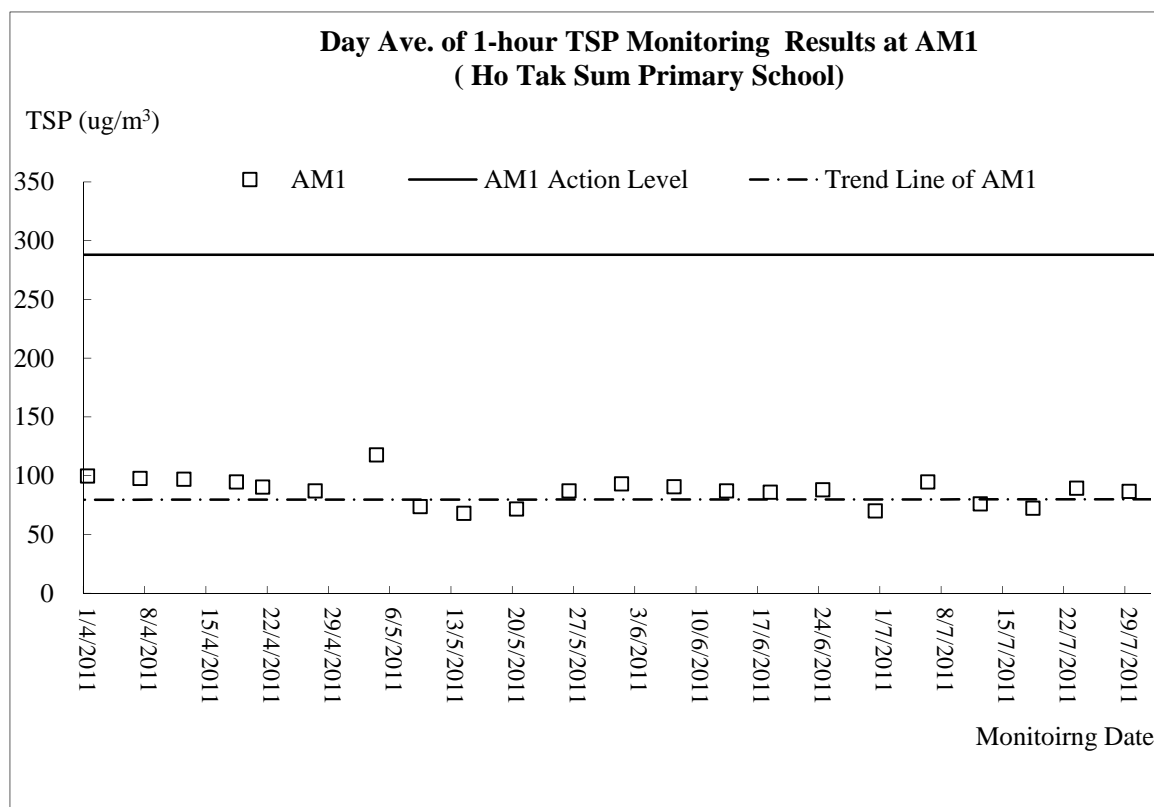


## **Appendix E**

### **Graphic Plot of**

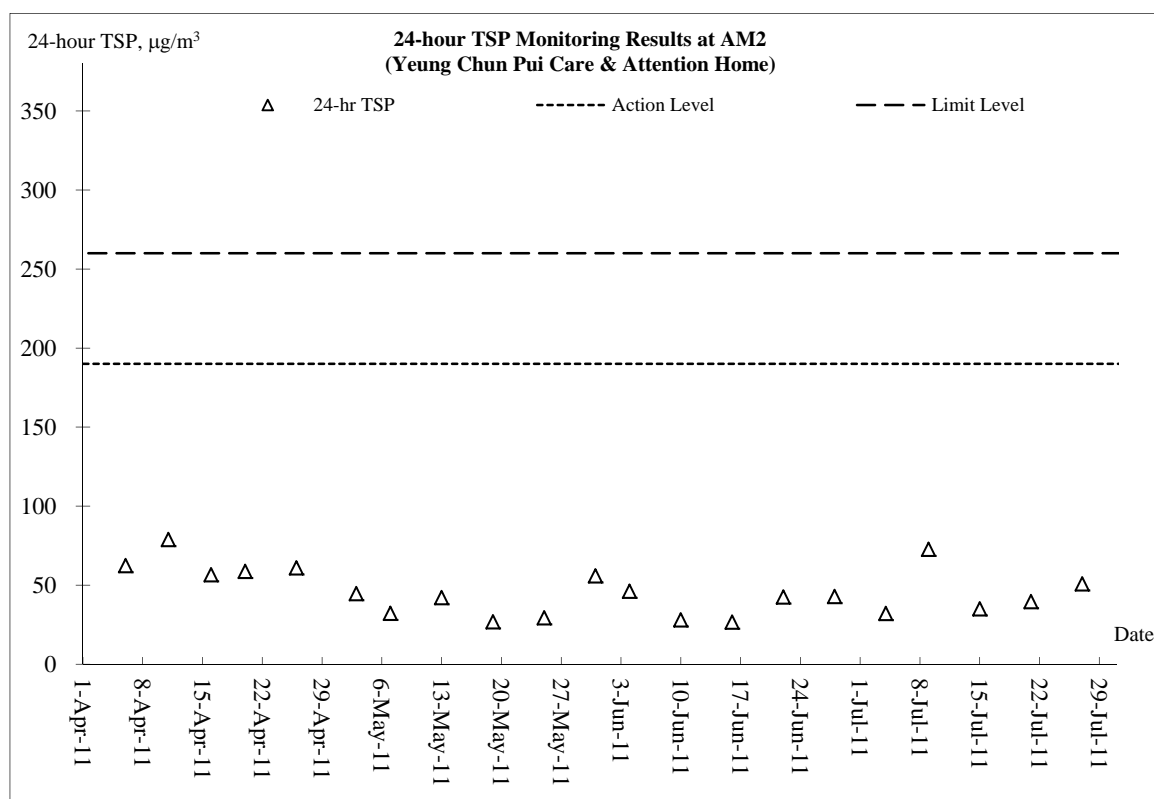
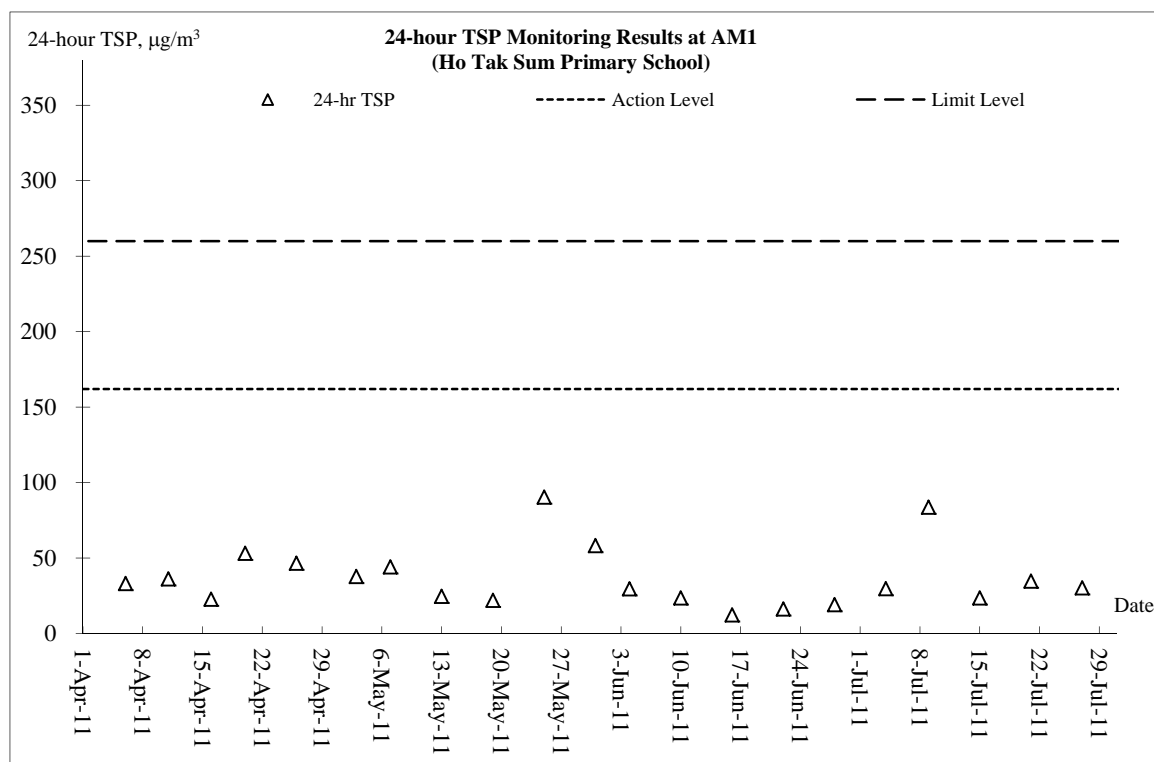
- **Air Quality**
- **Construction Noise**
- **Water Quality**

## Air Quality – 1-hour TSP

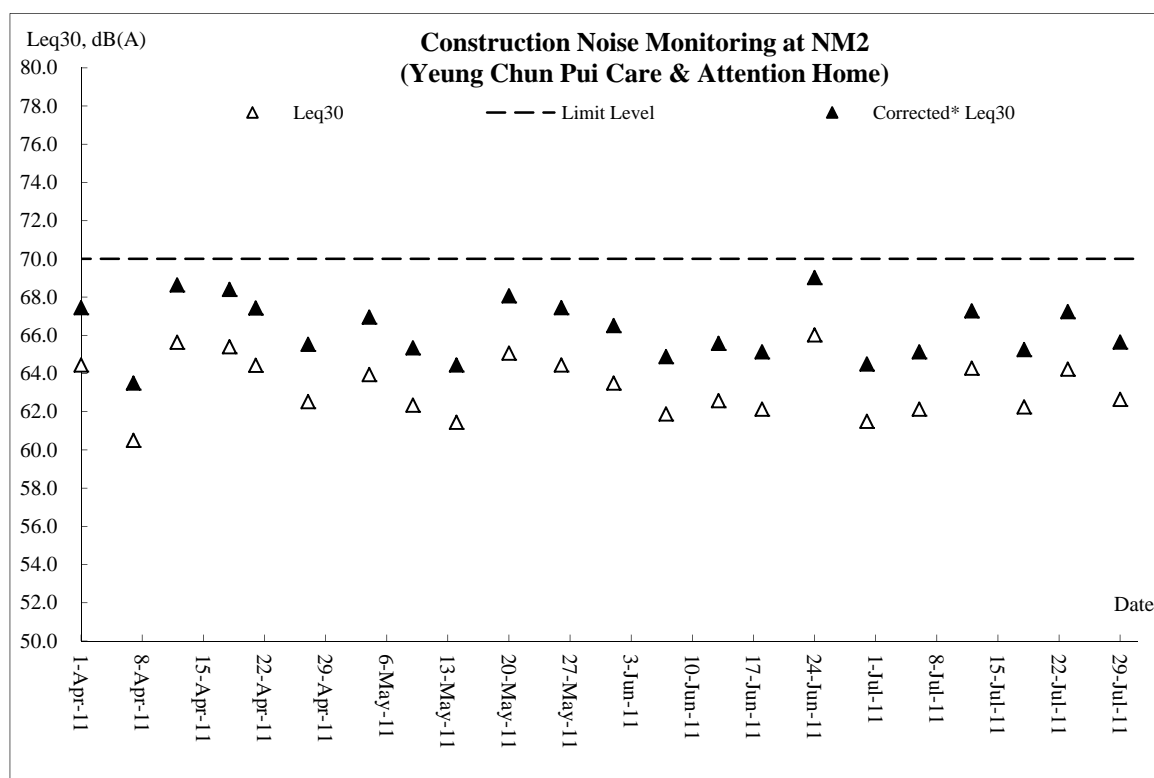
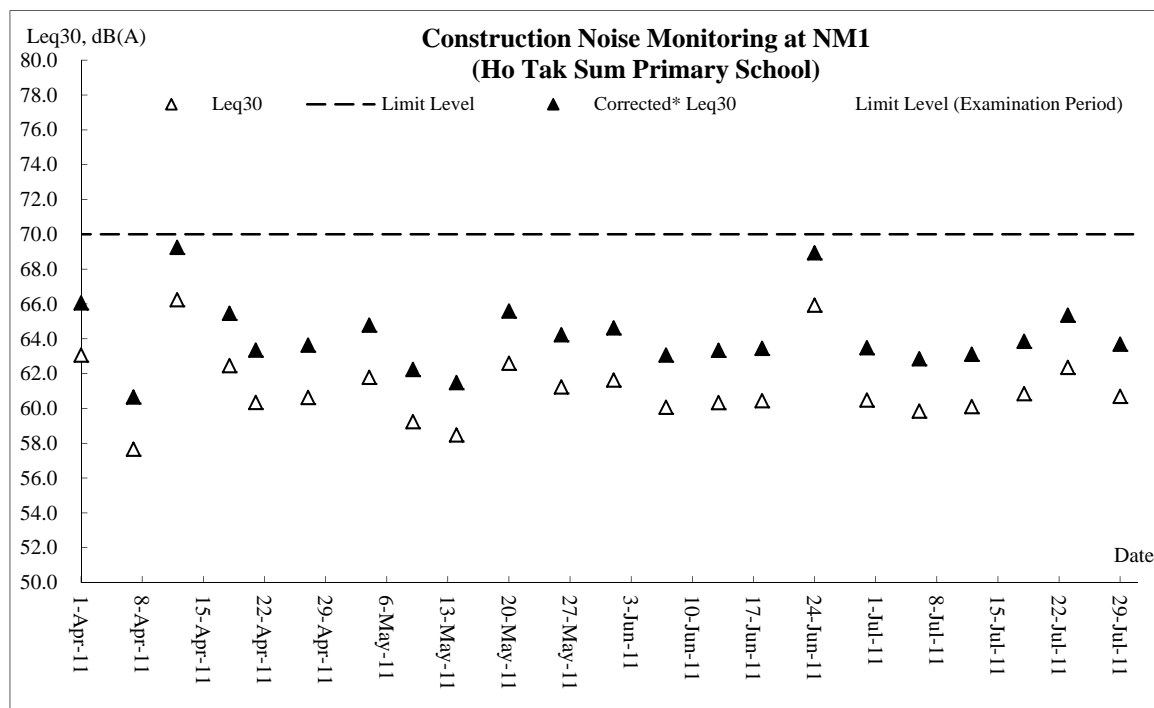




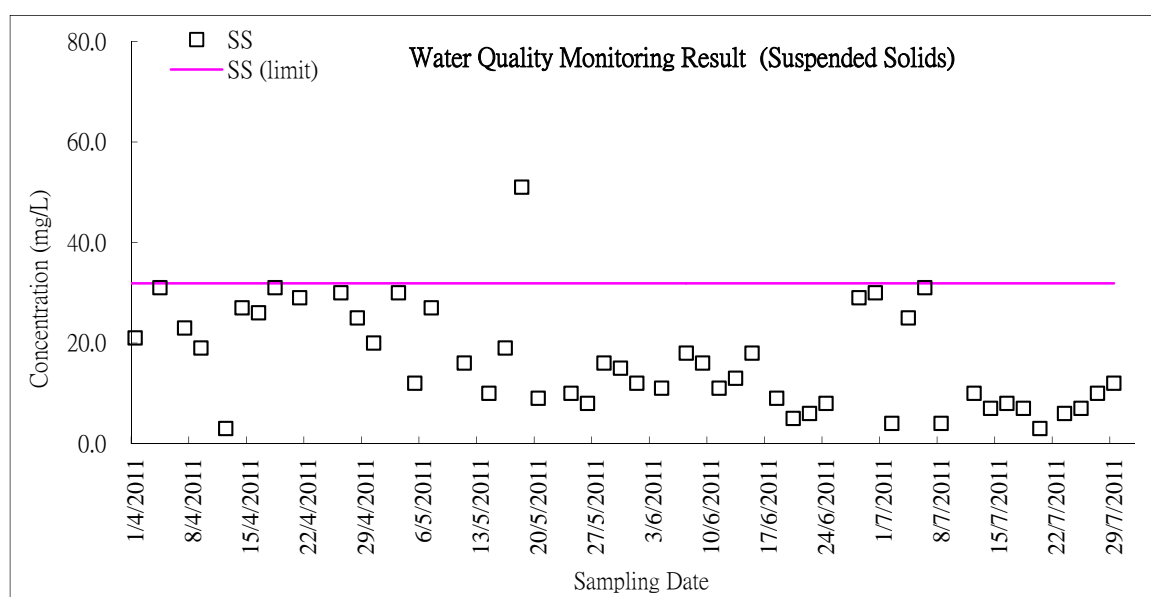
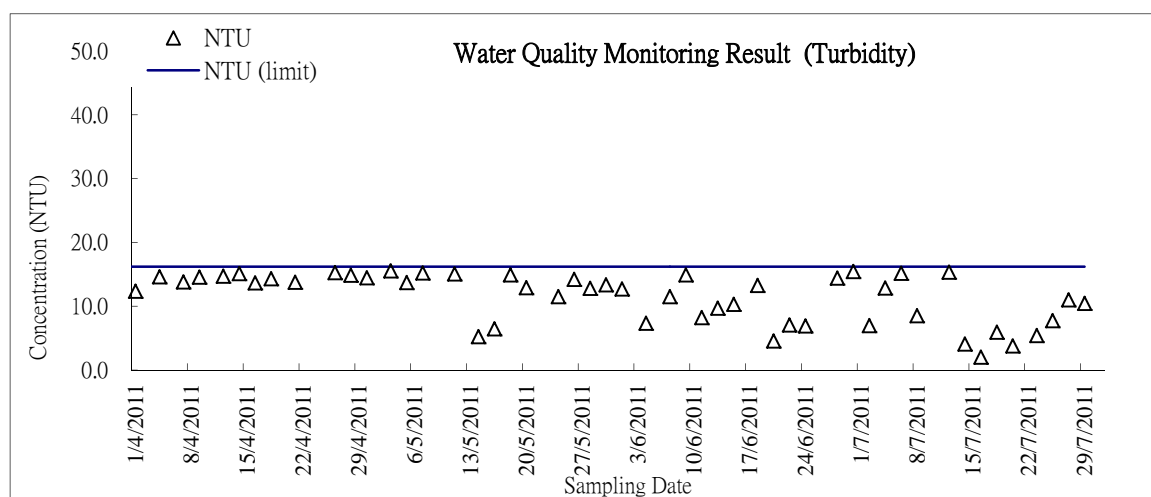
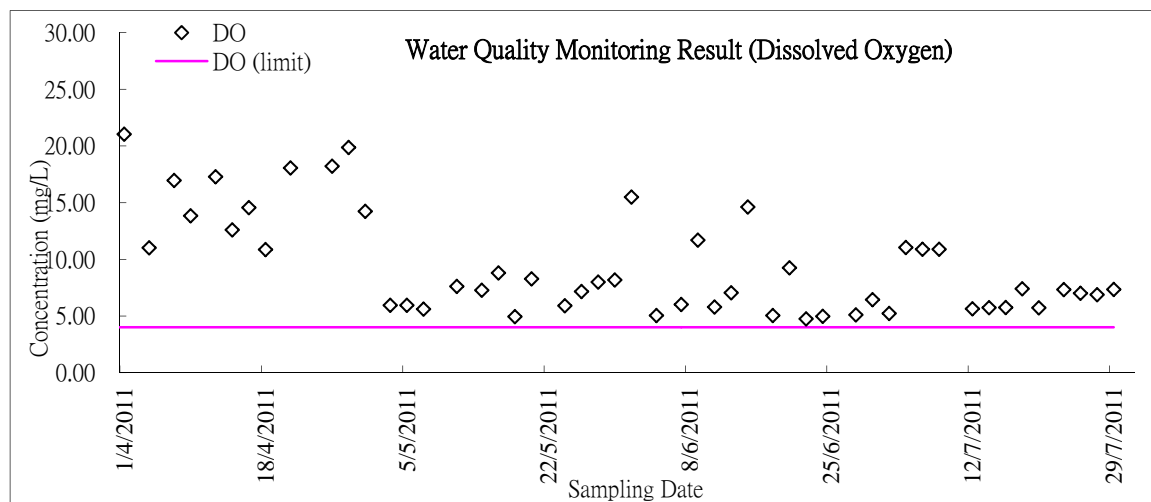
## Air Quality – 24-hour TSP



## Construction Noise



## Water Quality (R1b)



## **Appendix F**

### **Meteorological information**

### Meteorological Data Extracted from HKO – May 2011

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-May-11	Sun	Holiday					
2-May-11	Mon	Holiday					
3-May-11	Tue	Moderate southerly winds	Trace	28.5	16.7	70.7	S/SE
4-May-11	Wed	Mainly fine and dry.	0.7	23	14	85.5	W/NW
5-May-11	Thu	Light winds	Trace	24.6	8	83.5	E/SE
6-May-11	Fri	Fine and dry.	Trace	27.9	13.5	75	S/SE
7-May-11	Sat	Fine and hot. Light winds	Trace	29.1	12.2	67	S/SE
8-May-11	Sun	Moderate southerly winds	0	29.9	16.5	82	E/SE
9-May-11	Mon	Sunny periods	0	28.3	8.7	79	E/SE
10-May-11	Tue	Holiday					
11-May-11	Wed	Light winds	0	30.7	14.2	71.5	S/SE
12-May-11	Thu	Misty with occasional rain	0.2	29.1	16.2	79.5	S
13-May-11	Fri	Mainly cloudy with occasional rain.	33.5	27.2	17	86.5	E/NE
14-May-11	Sat	a few squally thunderstorms.	14.5	27.5	17	76.2	E/NE
15-May-11	Sun	Moderate easterly winds	2.9	25.9	11.7	85.5	E/NE
16-May-11	Mon	Cloudy with one or two rain patches at first.	7.5	26.4	13.5	86.5	E
17-May-11	Tue	Moderate northeasterly winds.	0.3	23.2	9.2	84.2	E/NE
18-May-11	Wed	Cloudy with a few rain patches	Trace	26	12.2	58	E
19-May-11	Thu	Moderate northerly winds	0	26.2	10.2	67	E
20-May-11	Fri	Cloudy with a few rain patches.	0	27	12.1	78	E
21-May-11	Sat	Light to moderate northerly winds.	42.8	28.7	17.5	75.2	SE
22-May-11	Sun	Mainly fine and dry.	69.8	24.4	25	90	SE
23-May-11	Mon	Isolated showers	9.3	23	11.2	85	NE
24-May-11	Tue	Moderate east to northeasterly winds.	4.9	22	12	80	E/NE
25-May-11	Wed	Mainly fine and hot.	0.3	22.1	10.5	80	E/NE
26-May-11	Thu	Fine but with some haze.	0	25.8	11.2	62	NE
27-May-11	Fri	Light to moderate westerly winds.	0	27.3	11.5	65.5	W/SW
28-May-11	Sat	Hot with sunny periods.	0	27.4	11	67.2	E/NE
29-May-11	Sun	Moderate south to southwesterly winds.	0	28.3	13.5	68.7	E/SE
30-May-11	Mon	Mainly fine and dry.	0	27.3	12.5	62	E/NE
31-May-11	Tue	Light to moderate northerly winds.	0	26.9	10.6	63	SE

### Meteorological Data Extracted from HKO – June 2011

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jun-11	Wed	Moderate south to southeasterly winds	0	28.2	12	67.7	W/SW
2-Jun-11	Thu	squally thunderstorms	0	29	12	76	SE
3-Jun-11	Fri	Moderate to fresh southeasterly winds.	0	29.1	12	72	W
4-Jun-11	Sat	Mainly cloudy with a few showers.	0	29.7	17.5	73	S/SE
5-Jun-11	Sun	Hot with a few showers.	Trace	29.9	12	80.7	S/SE
6-Jun-11	Mon	Moderate south to southwesterly winds.	Trace	30.4	15	74.2	S/SE
7-Jun-11	Tue	A few showers with isolated thunderstorms.	Trace	31	16.7	70.5	SW
8-Jun-11	Wed	Hot with sunny periods.	Trace	29.8	17.5	78.5	S/SW
9-Jun-11	Thu	Moderate southerly winds.	2.8	30	15	76	S/SE
10-Jun-11	Fri	Sunny periods tomorrow	0	29.9	14.7	68.7	SE
11-Jun-11	Sat	Cloudy with occasional showers and squally thunderstorms	11.6	29.8	25	79.7	W/SW
12-Jun-11	Sun	Mainly cloudy with a few showers.	28.4	27	10.4	87.2	S/SE
13-Jun-11	Mon	Moderate southerly winds.	5.9	28.7	11.9	81.2	S/SE
14-Jun-11	Tue	Mainly cloudy with a few showers.	2.4	29.8	16	77	S
15-Jun-11	Wed	Cloudy with a few showers.	2.4	28.8	17	83.5	S
16-Jun-11	Thu	Cloudy with rain	64.7	26.2	10.5	88.7	E
17-Jun-11	Fri	Hot with sunny periods	77.5	27.6	13.2	89	SE
18-Jun-11	Sat	Sunny periods.	1.2	29	15.6	78	SE
19-Jun-11	Sun	Moderate west to southwesterly winds.	Trace	30.1	11.6	70	S/SE
20-Jun-11	Mon	Fresh east to northeasterly winds	0	30	11.5	77	E/NE
21-Jun-11	Tue	Cloudy with squally showers and a few thunderstorms.	8.3	30.4	13.3	74.2	E/NE
22-Jun-11	Wed	Mainly cloudy with squally showers	41.4	27.1	23.2	87.5	E
23-Jun-11	Thu	Moderate to fresh east to southeasterly winds.	Trace	28.1	23.7	80.5	SE
24-Jun-11	Fri	Sunny periods.	0.6	29.5	13.6	75	S/SE
25-Jun-11	Sat	Mainly fine apart from one or two showers	0	29.5	9	81.5	W/SW
26-Jun-11	Sun	Sunny intervals with one or two showers.	Trace	27.7	10	83.5	W/SW
27-Jun-11	Mon	Moderate west to southwesterly winds.	Trace	30.2	16	75.7	W/SW
28-Jun-11	Tue	Cloudy with occasional rain and a few squally thunderstorms	106.6	26.1	24.5	91	S/SE
29-Jun-11	Wed	Very hot	76.5	25.9	28	92.2	S/SE
30-Jun-11	Thu	Moderate south to southwesterly winds	5.3	26	16	91.5	SE

### Meteorological Data Extracted from HKO – July 2011

Date		Weather	Lau Fau Shan Weather Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jul-11	Fri	Fine and very hot.	11.2	28.2	15.2	83.7	S/SE
2-Jul-11	Sat	Moderate southwesterly winds.	Trace	29.1	14	78.2	S/SE
3-Jul-11	Sun	Fine and very hot.	Trace	29.1	19.5	78.5	W/SW
4-Jul-11	Mon	Moderate southwesterly winds.	0	29.3	14	79.7	W
5-Jul-11	Tue	Mainly cloudy with showers.	0	30	15	72.5	W
6-Jul-11	Wed	Moderate easterly winds	0	30.1	15.7	74	W
7-Jul-11	Thu	Mainly cloudy with showers.	0	29.8	17.7	71.2	W
8-Jul-11	Fri	Light to moderate southwesterly winds.	0	30.2	13.5	75	W
9-Jul-11	Sat	Moderate southwesterly winds, occasionally fresh.	0	30	25.5	75	W
10-Jul-11	Sun	Mainly cloudy with showers.	Trace	30.2	11.5	75.7	W/SW
11-Jul-11	Mon	Mainly cloudy with showers	33.2	28.8	12.7	80.5	N/NW
12-Jul-11	Tue	Light to moderate southerly winds.	10.9	26.8	8.5	90.7	E/SE
13-Jul-11	Wed	Sunny intervals during the day.	21.8	29	16.2	81.7	E
14-Jul-11	Thu	Moderate easterly winds	12.4	27.7	13.5	86.3	E
15-Jul-11	Fri	Cloudy with occasional rain.	34.9	27.4	10.4	86.7	S/SE
16-Jul-11	Sat	Cloudy with occasional rain and squally thunderstorms.	60.5	26.2	24.7	92.2	SW
17-Jul-11	Sun	Moderate westerly winds	0.2	27.7	13	81.5	W/SW
18-Jul-11	Mon	Cloudy with showers and a few squally thunderstorms	4.3	28.5	12.7	83	W/SW
19-Jul-11	Tue	Mainly cloudy with occasional rain	5.6	27.4	28.5	88.7	S/SE
20-Jul-11	Wed	Mainly cloudy with showers.	15.2	27.3	9.7	89.5	S/SW
21-Jul-11	Thu	Sunny intervals during the day.	0	28.4	11.5	82	W
22-Jul-11	Fri	Mainly fine and very hot.	4.2	29.3	12.7	78.7	S/SE
23-Jul-11	Sat	Mainly cloudy with showers	0	29.7	15	77	W
24-Jul-11	Sun	Moderate westerly winds	0	29.3	12	72	W/SW
25-Jul-11	Mon	Light to moderate southerly winds.	0	30.5	11.5	76	W/SW
26-Jul-11	Tue	Mainly fine and very hot.	0	29.5	13.2	75	S/SE
27-Jul-11	Wed	Moderate westerly winds	Trace	29.5	10	72.2	E/SE
28-Jul-11	Thu	Cloudy with squally showers and thunderstorms.	Trace	30.5	23	71.5	E/NE
29-Jul-11	Fri	Cloudy with squally showers and a few thunderstorms	12.4	28	22.2	84	E
30-Jul-11	Sat	Fine and hot. Light winds.	Trace	28.4	13.7	80.5	E
31-Jul-11	Sun	Hot with sunny periods	0	28.2	7.6	80	W/NW