

東業德勤測試顧問有限公司  
ETS-TESTCONSULT LIMITED

8/F, Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong  
Tel : 2695 8318 E-mail : etl@ets-testconsult.com  
Fax : 2695 3944 Web site : www.ets-testconsult.com

**TEST REPORT**

**DRAINAGE SERVICES DEPARTMENT**

**CONTRACT NO. DC/2006/15 BUILDING AND  
CIVIL MAINTENANCE AND MINOR WORKS OF  
DSD PLANTS AND FACILITIES (2007-2009)**

**GROUNDWATER MONITORING AT  
NGONG PING STW AND EFFLUENT EXPORT  
PIPE**

**MONTHLY EM&A REPORT**

**(AUGUST 2009)**

Prepared by:

LAW, Sau Yee  
Senior Environmental Officer

Checked and  
Approved by:

LAU, Chi Leung  
Environmental Team Leader

**Allied Environmental Consultants Limited**  
Acousticians & Environmental Engineers

19/F., Kwan Chart Tower, 6 Tannochoy Road, Wan Chai, Hong Kong  
Tel.: (852) 2815 7028 Fax: (852) 2815 5399 Email: info@aechk.com

Our Ref: 840/09-0015

1 September 2009



*By POST and FAX (2827 8526)*

Drainage Services Department  
42<sup>nd</sup> Floor  
Revenue Tower  
5 Gloucester Road  
Wan Chai  
Hong Kong

**Attn: Mr. Ringo Mok**

Dear Sir,

**Re: Ngong Ping Sewerage Project  
Groundwater Monitoring at Ngong Ping STW and Effluent Export Pipe  
EM&A Report (August 2009)**

---

I refer to the Environmental Permit (EP-157/2003) and the email from the environmental monitoring team, ETS-Testconsult Limited with the revised report on 1 September 2009 for the captioned. I do not have comment and have verified the captioned report.

Yours sincerely,

Claudine Lee  
Independent Environmental Checker

*CL/ys*

Cc. OAP – Ms Ada Pang (By Email)  
ETS-Testconsult – Ms Linda Law (By Email and Fax: 2695 3944)



<b>TABLE OF CONTENTS</b>		Page
<b>EXECUTIVE SUMMARY</b>		
<b>1.0</b>	<b>INTRODUCTION</b>	1
<b>2.0</b>	<b>PROJECT INFORMATION</b>	
	2.1 Background	1
	2.2 Site Description	1
	2.3 Project Organization and Management Structure	1
	2.4 Contact Details of Key Personnel	2
<b>3.0</b>	<b>GROUNDWATER QUALITY MONITORING</b>	
	3.1 Monitoring Locations	2
	3.2 Monitoring Parameters	2
	3.3 Monitoring Frequency	3
	3.4 Monitoring Methodology and Equipment Used	3
	3.5 Groundwater Monitoring Results	4
<b>4.0</b>	<b>ENVIRONMENTAL NON-CONFORMANCE</b>	
	4.1 Summary of air quality, noise and water quality monitoring	4
	4.2 Summary of Environmental Complaints	4
	4.3 Summary of Notification of Summons and Prosecution	4
<b>5.0</b>	<b>IMPLEMENTATION STATUS</b>	
	5.1 Implementation Status of Environmental Mitigation Measures	4
	5.2 Implementation Status of Environmental Complaint Handling	4
	5.3 Implementation Status of Notification of Summons and Prosecution	4
<b>6.0</b>	<b>CONCLUSION</b>	5
<b>7.0</b>	<b>FUTURE KEY ISSUES</b>	5
 <b>APPENDIX</b>		
A	Lines of Communication of Project Organization	
B	Groundwater Monitoring Results and Photos of Groundwater Monitoring at Boleholes	
C	Graphical Plots of Groundwater Monitoring Data	
D	General Layout Plan	
E	QA/QC Results	

## FIGURES

Drawing No. 23400/RVS/406      Location & Typical Details of Ground Water Monitoring Borehole

## TABLES

2.1	Contact Details of Key Personnel
3.1	Location of Groundwater Quality Monitoring
3.3	The Frequency of the Groundwater Monitoring
3.4	Summary of testing procedures
5.1	Statistical Summary of Environmental Complaints



## **EXECUTIVE SUMMARY**

This monthly EM&A report (No.22) has been prepared by the Environmental Team (ET) of ETS-Testconsult Ltd for groundwater monitoring under "Contract No. DC/2006/15 Building and Civil Maintenance and Minor Works to DSD Plants and Facilities (2007-2009) – Groundwater Monitoring at Ngong Ping STW and Effluent Export Pipeline" (the Project) during the operation period from 01 to 31 August 2009.

Under the requirements of Section 5 of "the Environmental Permit (No. EP-157/2003/A)" (the EP), EM&A programme as set out in the EM&A Manual and the EIA Report (Register No.: AEIAR-065/2002) is required to be implemented. In accordance with the EM&A manual and the EIA Report, groundwater monitoring is required for the Project during operation phase

### **Environmental Monitoring Progress**

The summary of the monitoring activities in this monitoring month is listed below:

- *Groundwater Monitoring: 1 Occasion at 3 designated boreholes.*

### **Groundwater Monitoring**

Groundwater monitoring was carried out on 11 August 2009 at WM10, WM11 and WM12.

Test results of the groundwater during this monitoring show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground.

### **Environmental Complaints**

No complaints were received in this reporting month.

### **Notification of summons and successful prosecutions**

There were no notification of summons and prosecutions with respect to environmental issues in this month.

### **Future Key Issues**

Future Key issues to be considered for the prevention of contamination of the water gathering ground are as follows:

- *The provision of leakage containment system for the section of pipeline in the close proximity of the reservoir;*
- *Removing waste in a timely manner and disposing of outside the water gathering ground;*
- *Locating the chemical storage area at a safe environment with adequate space; and*
- *Reminding the workers not to discharge any sewage or wastewater into the nearby environment.*



## 1.0 INTRODUCTION

The construction works of Ngong Ping Sewage Treatment Works (NPSTW) was certificated completed on 09 March 2006 and the NPSTW was handed over to "Drainage Sewage Department" (DSD) for operation and maintenance from 10 March 2006. "ETS-Testconsult Limited" (ETL) has been commissioned as Environmental Team (ET) to carry out groundwater monitoring at Ngong Ping according to the EM&A Manual.

This monthly EM&A report presents the results of groundwater monitoring during the reporting period from 01 to 31 August 2009.

## 2.0 PROJECT INFORMATION

### 2.1 Background

Master Plan (OI SMP) Study in December 1994 and drew up a SMP for Lantau Island, Cheung Chau, Lamma Island, Peng Chau and other smaller and less populated islands. The SMP comprises provisions for upgrading and expanding the sewerage systems to cover unsewered areas.

This sewerage project is the Stage 1 works under the OI SMP and can be divided into 3 packages as follows:

*Package 1 – Ngong Ping STW with tertiary treatment*

*Package 2 – Ngong Ping main trunk sewer and effluent export pipeline*

*Package 3 – Ngong Ping village sewerage system*

This Project only covers the operation phase of Package 1 and Package 2. The general layout plan of the project is shown in Appendix D (Drawing No. 23400/EN/098).

The existing treatment facilities at Ngong Ping include grease traps and septic tanks, with discharge locally to soakaways. Following the opening of the Statue of Buddha in December 1993, the number of visitors to Ngong Ping increased significantly. Besides, the Cable Car system linking Tung Chung and Ngong Ping was being planned for commissioning in June 2006. It will certainly further increase the number of visitors in Ngong Ping. The existing treatment and disposal facilities were found to be inadequate, with significant quantities of sewage being directly discharged into the local stream. It was under this setting that the recommendation to provide a local sewerage system and a centralised treatment system for Ngong Ping was put forward in the OI SMP in 1994.

The Project was planned, designed, operated and maintained by the DSD. During the operation phase of NPSTW, DSD will follow the environmental monitoring recommendation stated at the M&A Manual that was prepared with reference to the EIA Report (Register No.: AEIAR-065/2002) to avoid the contamination of the water gathering ground.

### 2.2 Site Description

The general layout plan of the project is shown in Appendix D. The groundwater monitoring locations are also shown in the Drawing No. 23400/R/VS/406.

### 2.3 Project Organization and Management Structure

The line of communication of project organization with respect to the on-site environmental management and monitoring program are shown in Appendix A.



## 2.4 Contact Details of Key Personnel

The key personnel contact names and telephone numbers, and construction programme are shown in table 2.1.

Table 2.1 Contact Details of Key Personnel

Organization	Project Role	Name of Key Staff	Tel. No.	Fax No.
DSD	Contractor	Mr. P C Wu	2594 7199	2827 6657
Allied Environmental Consultants Limited	Independent Environmental Checker	Ms. Claudine Lee	2815 7028	2815 5399
ETL	Contractor's Environmental Team	Mr. C L Lau (ET Leader)	2946 7791	2695 3944

## 3.0 GROUNDWATER QUALITY MONITORING

### 3.1 Monitoring Locations

Groundwater quality monitoring was undertaken at three designated sampling points shown in Table 3.1.

Table 3.1 Locations of Groundwater Quality Monitoring

Sampling Point	Location
WM10	Ngong Ping Village
WM11	Ngong Ping Village
WM12	Ngong Ping Village

### 3.2 Monitoring Parameters

Monitoring of the groundwater monitoring parameters are listed below:

- Biochemical Oxygen Demand (BOD<sub>5</sub>), mg/L;
- Ammonia Nitrogen (NH<sub>4</sub><sup>+</sup>-N), mg/L;
- Nitrate + Nitrite Nitrogen (NO<sub>2</sub><sup>-</sup>+NO<sub>3</sub><sup>-</sup>), mg/L;
- pH value;
- Turbidity, NTU;
- Oil & Grease (O&G), mg/L;
- Total Phosphates (TP), mg/L;
- Synthetic detergents, mg/L;
- E-coli, cfu/100ml.



### 3.3 Monitoring Frequency

The monitoring frequency of the groundwater monitoring is summarized in Table 3.3.

Table 3.3 The frequency of the Groundwater Monitoring

Parameter	Frequency	No. of Boreholes
Biochemical Oxygen Demand	Once per month	3
Ammonia Nitrogen		
Nitrate + Nitrite		
pH value		
Turbidity		
Oil & Grease		
Total Phosphates		
Synthetic detergents		
E-coli		

### 3.4 Monitoring Methodology and Equipment Used

A water sampler comprising a transparent PVC cylinder, with a capacity of not less than 2 liters, was lowered into the water body at the predetermined depth. The opening ends of the sampler were then closed accordingly and water samples were collected.

The sample container, made by high-density polythene / glass, was rinsed with a portion of the water sample. The groundwater sample was then transferred to the container, labeled with a unique sample ID and sealed with a screw cap. The water samples were stored in a cool box maintained at 4°C. The groundwater samples were then delivered to a local HOKLAS-accredited laboratory (Environmental Laboratory, ETS-Testconsult Ltd, HOKLAS Registration No. 022) on the same day for analysis.

In accordance with the requirement of HOKLAS, the laboratory testing of the monitoring parameters were carried out with QA/QC results shown in Appendix E. The summary of testing methods of testing parameters as recommended by EIA or required by EPD were shown in Table 3.4.

Table 3.4 Summary of testing procedures

Laboratory Analysis	Testing Procedure	Detection Limit
Biochemical Oxygen Demand	In house method TPE/001/W or BS 6068 : Section 2.14 : 1990	2.0 mg/L
Ammoniacal Nitrogen	In house method TPE/016/W, refer to APHA 19ed 4500-NH <sub>3</sub> F & G	0.13 mg/L
Nitrate + Nitrite	In house method TPE/023/W, refer to APHA 19ed 4500-NO <sub>3</sub> B	0.004 mg/L
pH (at 25°C)	In house method TPE/003/W, refer to APHA 19ed APHA 4500-H <sup>+</sup> B	Detection range: 4.0-10.0
Turbidity	In house method TPE/005/W, refer to APHA 19ed 2130B	0.5 NTU
Oil & Grease	APHA 19ed 5520 B	5.0 m/L
Total Phosphate	In house method base on ASTM D 515-88	0.05 mg/L
Synthetic detergents	In house method based on APHA 19ed 5540 C & D	0.1 mg/L
E-coli	DoE Section 7.8 & 7.9 plus in-site urease test	<1 cfu/100ml



### **3.5 Groundwater Monitoring Results**

In this reporting month, groundwater monitoring was carried out on 11 August 2009 at WM10, WM11 and WM12. The groundwater quality measurement results are detailed in Appendix B. Graphical presentation of the monitoring parameters for this reporting month is shown in Appendix C.

Test results of the groundwater during this monitoring show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground.

## **4.0 ENVIRONMENTAL NON-CONFORMANCE**

### **4.1 Summary of Groundwater Quality Monitoring**

According to the results of all testing parameters, they show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground.

### **4.2 Summary of Environmental Complaints**

No complaints were received in this reporting month.

### **4.3 Summary of Notification of Summons and Prosecution**

There was no notification of summons respect to environmental issues registered in this month.

## **5.0 IMPLEMENTATION STATUS**

### **5.1 Implementation Status of Environmental Mitigation Measures**

DSD has been implementing the required environmental mitigation measures indicating in Clause 4.5.20 of the EM&A manual.

### **5.2 Implementation Status of Environmental Complaint Handling**

No complaints were received in this reporting month. The details of the complaint-log are presented in Table 5.1.





Table 5.1 Statistical Summary of Environmental Complaints

Reporting Month	Complaint Statistics			
	Frequency	Cumulative	Aspect	Investigation Results and Follow up Actions
November 07	0	0	---	---
December 07	0	0	---	---
January 08	0	0	---	---
February 08	0	0	---	---
March 08	0	0	---	---
April 08	0	0	---	---
May 08	0	0	---	---
June 08	0	0	---	---
July 08	0	0	---	---
August 08	0	0	---	---
September 08	0	0	---	---
October 08	0	0	---	---
November 08	0	0	---	---
December 08	0	0	---	---
January 09	0	0	---	---
February 09	0	0	---	---
March 09	0	0	---	---
April 09	0	0	---	---
May 09	0	0	---	---
June 09	0	0	---	---
July 09	0	0	---	---
August 09	0	0	---	---

### 5.3 Implementation Status of Notification of Summons and Prosecution

There were no notifications of summons respect to environmental issues registered in this reporting month.

### 6.0 CONCLUSION

In this reporting month, groundwater monitoring was carried out on 11 August 2009 at WM10, WM11 and WM12.

Test results of the groundwater during this monitoring show no contamination of ground water by any treated effluent. In other words, it is evident that there was no leakage of treated effluent from the Ngong Ping Sewage Treatment Works or its effluent export pipeline into the water gathering ground.

### 7.0 FUTURE KEY ISSUES

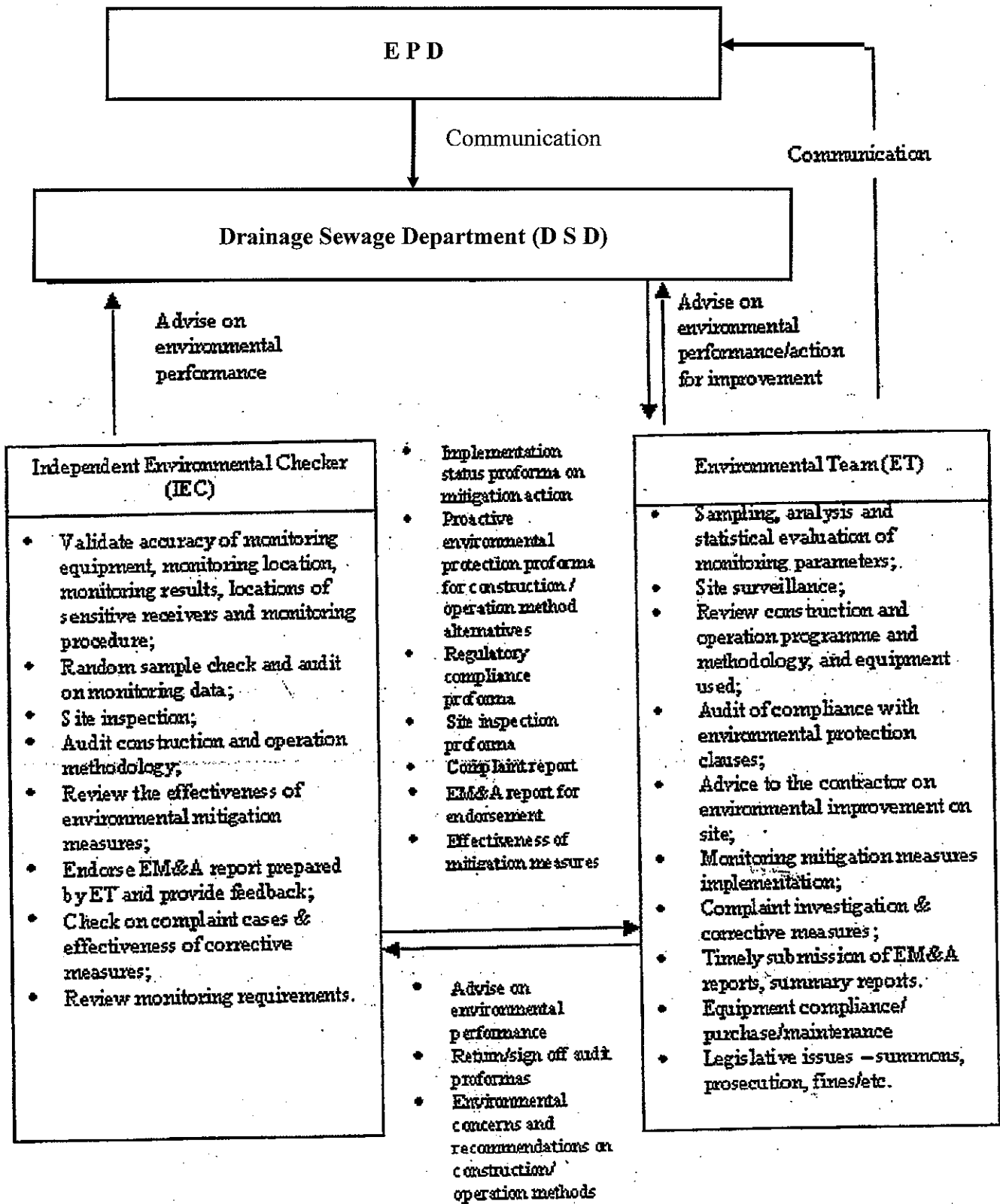
DSD will continue to carry out operation and maintenance works of NPSTW in the coming month. Future Key issues to be considered for the prevention of contamination of the water gathering ground are as follows:

- The provision of leakage containment system for the section of pipeline in the close proximity of the reservoir;
- Removing waste in a timely manner and disposing of outside the water gathering ground;
- Locating the chemical storage area at a safe environment with adequate space; and
- Reminding the workers not to discharge any sewage or wastewater into the nearby environment.



## **Appendix A**

### **Lines of Communication**





## **Appendix B**

# **Groundwater Monitoring Results and Photos of Groundwater Monitoring at Boleholes**

東業德勤測試顧問有限公司  
ETS-TESTCONSULT LIMITED

8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong  
Tel : 2695 8318 E-mail : etl@ets-testconsult.com  
Fax : 2695 3944 Web site : www.ets-testconsult.com

**TEST REPORT**

Form : E/ENR/01/Issue 4 (1/1) [08/02]

**Environmental Testing of Water & Wastewater**

Report No. : ENA90630  
Date of issue : 27 August 2009  
Page No. : 1 of 3

**Information provided by Customer**

Customer Name : Welcome Construction Co Ltd  
Customer Address : Flat 01, 19/F, Westley Square, 48 Hoi Yuen Road, Kwun Tong, Kowloon  
Sample Source : DC/2006/15 - Building and Civil Maintenance and Minor Works to DSD Plants and Facilities (2007-2009) - Groundwater Monitoring at Ngong Ping STW and Effluent Export Pipe  
Sample Type : Groundwater  
Date of Sampling : 11 August 2009  
Sample Description : The sample was collected in 100ml glass bottle (for Total Phosphates only), 500ml glass bottle (for Oil & Grease only), 100ml sterilized glass bottle (for E-coli only), 500ml and 1L plastic bottles (for other testing parameters). Sample for Ammonia and Nitrate + Nitrite Nitrogen was preserved by adding conc. H<sub>2</sub>SO<sub>4</sub> to pH<2. Sample for Oil & Grease was preserved by adding conc. HCl to pH<2. All samples were chilled immediately after collection.


**Laboratory information**

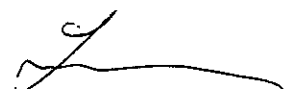
Date Received : 11 August 2009

**Result**

Customer Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM10	W24704 (01)	pH Value	In house method TPE/003/W	5.2 (at 25°C)	11 August 2009
		Turbidity	In house method TPE/005/W	29 NTU	11 August 2009
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	2.9 mg/L	12 August 2009 (11:00) to 17 August 2009 (11:00)
	W24704 (04)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	0.19 mg/L	13 August 2009
		Ammonia	In house method TPE/016/W	<0.25 mg/L	13 August 2009
	W24704 (07)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	12 August 2009
	W24704 (10)	Total Phosphates	In house method TPE/019/W	<0.10 mg/L	12 August 2009
	W24704 (13)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	13 August 2009
W24704 (16)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	2 cfu/100ml	11 to 12 August 2009	

Remark (if any) : The tests marked with "\*" indicated the tests were sub-contract to ALS Technichem (HK) Pty Ltd and HOKLAS accredited. Ground water monitoring was carried out at WM10, WM11 and WM12. The reporting limit of Total Phosphates and Ammonia were <0.10mg/L and <0.25mg/L instead of <0.010mg/L and <0.025mg/L correspondingly since the samples were diluted 10-fold before analysis due to matrix effect.

Checked by :   
LAW, Sau Yee  
Senior Chemist

Approved by :   
LAU, Chi Leung  
Chief Chemist

東業德勤測試顧問有限公司  
ETS-TESTCONSULT LIMITED

8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong  
Tel : 2695 8318 E-mail : etl@ets-testconsult.com  
Fax : 2695 3944 Web site : www.ets-testconsult.com

**TEST REPORT**

Form : E/ENR/01/Issue 4 (1/1) [08/02]

**Environmental Testing of Water & Wastewater**

Report No. : ENA90630  
Date of issue : 27 August 2009  
Page No. : 2 of 3

Information provided by Customer

Customer Name : Welcome Construction Co Ltd  
Customer Address : Flat 01, 19/F, Westley Square, 48 Hoi Yuen Road, Kwun Tong, Kowloon  
Sample Source : DC/2006/15 - Building and Civil Maintenance and Minor Works to DSD Plants and Facilities (2007-2009) - Groundwater Monitoring at Ngong Ping STW and Effluent Export Pipe  
Sample Type : Groundwater  
Date of Sampling : 11 August 2009  
Sample Description : The sample was collected in 100ml glass bottle (for Total Phosphates only), 500ml glass bottle (for Oil & Grease only), 100ml sterilized glass bottle (for E-coli only), 500ml and 1L plastic bottles (for other testing parameters). Sample for Ammonia and Nitrate + Nitrite Nitrogen was preserved by adding conc. H<sub>2</sub>SO<sub>4</sub> to pH<2. Sample for Oil & Grease was preserved by adding conc. HCl to pH<2. All samples were chilled immediately after collection.


Laboratory information


Date Received : 11 August 2009

Result

Customer Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM11	W24704 (02)	pH Value	In house method TPE/003/W	6.2 (at 25°C)	11 August 2009
		Turbidity	In house method TPE/005/W	9.3 NTU	11 August 2009
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	<2.0 mg/L	12 August 2009 (11:00) to 17 August 2009 (11:00)
	W24704 (05)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	0.10 mg/L	13 August 2009
		Ammonia	In house method TPE/016/W	<0.25 mg/L	13 August 2009
	W24704 (08)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	12 August 2009
	W24704 (11)	Total Phosphates	In house method TPE/019/W	<0.10 mg/L	12 August 2009
	W24704 (14)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	13 August 2009
W24704 (17)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	37 cfu/100ml	11 to 12 August 2009	

Remark (if any) : The tests marked with "\*" indicated the tests were sub-contract to ALS Technichem (HK) Pty Ltd and HOKLAS accredited. Ground water monitoring was carried out at WM10, WM11 and WM12. The reporting limit of Total Phosphates and Ammonia were <0.10mg/L and <0.25mg/L instead of <0.010mg/L and <0.025mg/L correspondingly since the samples were diluted 10-fold before analysis due to matrix effect.

Checked by :   
LAW, Sau Yee  
Senior Chemist

Approved by :   
LAU, Chi Leung  
Chief Chemist



東業德勤測試顧問有限公司  
ETS-TESTCONSULT LIMITED

8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong  
Tel : 2695 8318 E-mail : etl@ets-testconsult.com  
Fax : 2695 3944 Web site : www.ets-testconsult.com

**TEST REPORT**

Form : E/EN/R/01/Issue 4 (1/1) [08/02]

**Environmental Testing of Water & Wastewater**

Report No. : ENA90630  
Date of issue : 27 August 2009  
Page No. : 3 of 3

**Information provided by Customer**

Customer Name : Welcome Construction Co Ltd  
Customer Address : Flat 01, 19/F, Westley Square, 48 Hoi Yuen Road, Kwun Tong, Kowloon  
Sample Source : DC/2006/15 - Building and Civil Maintenance and Minor Works to DSD Plants and Facilities (2007-2009) - Groundwater Monitoring at Ngong Ping STW and Effluent Export Pipe  
Sample Type : Groundwater  
Date of Sampling : 11 August 2009  
Sample Description : The sample was collected in 100ml glass bottle (for Total Phosphates only), 500ml glass bottle (for Oil & Grease only), 100ml sterilized glass bottle (for E-coli only), 500ml and 1L plastic bottles (for other testing parameters). Sample for Ammonia and Nitrate + Nitrite Nitrogen was preserved by adding conc. H<sub>2</sub>SO<sub>4</sub> to pH<2. Sample for Oil & Grease was preserved by adding conc. HCl to pH<2. All samples were chilled immediately after collection.


**Laboratory information**

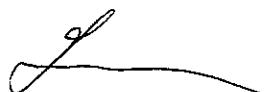
Date Received : 11 August 2009

**Result**

Customer Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM12	W24704 (03)	pH Value	In house method TPE/003/W	6.4 (at 25°C)	11 August 2009
		Turbidity	In house method TPE/005/W	3.1 NTU	11 August 2009
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	<2.0 mg/L	12 August 2009 (11:00) to 17 August 2009 (11:00)
	W24704 (06)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	0.06 mg/L	13 August 2009
		Ammonia	In house method TPE/016/W	<0.25 mg/L	13 August 2009
	W24704 (09)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	12 August 2009
	W24704 (12)	Total Phosphates	In house method TPE/019/W	<0.10 mg/L	12 August 2009
	W24704 (15)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	13 August 2009
W24704 (18)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	6 cfu/100ml	11 to 12 August 2009	

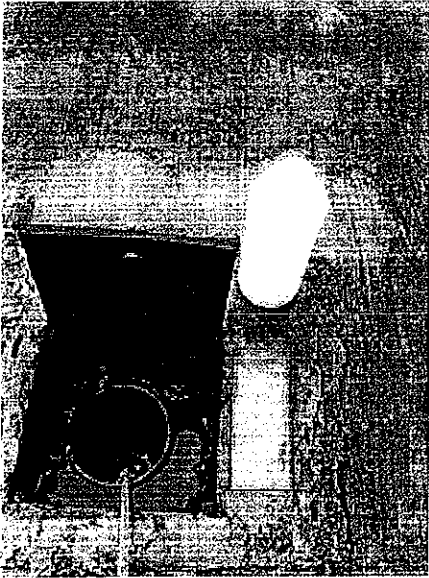
Remark (if any) : The tests marked with "\*" indicated the tests were sub-contract to ALS Technichem (HK) Pty Ltd and HOKLAS accredited. Ground water monitoring was carried out at WM10, WM11 and WM12. The reporting limit of Total Phosphates and Ammonia were <0.10mg/L and <0.25mg/L instead of <0.010mg/L and <0.025mg/L correspondingly since the samples were diluted 10-fold before analysis due to matrix effect.

Checked by :   
LAW, Sau Yee  
Senior Chemist

Approved by :   
LAU, Chi Leung  
Chief Chemist

Project : DC/2006/15 - Building and Civil Maintenance and  
Minor Works to DSD Plants and Facilities (2007-2009)  
Date of sampling and photo taking : 11 August 2009  
Report No. : ENA90630  
Date of issue : 27 August 2009

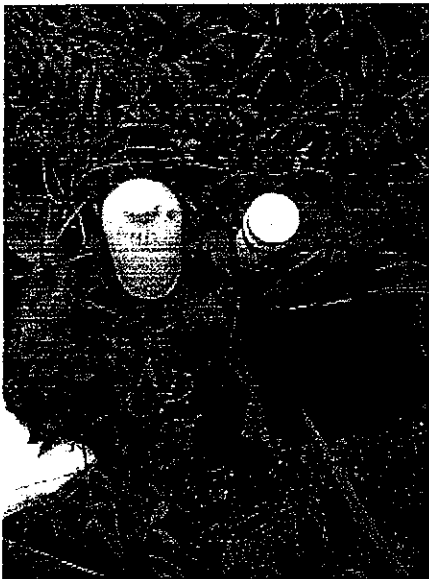
WM10



WM11



WM12





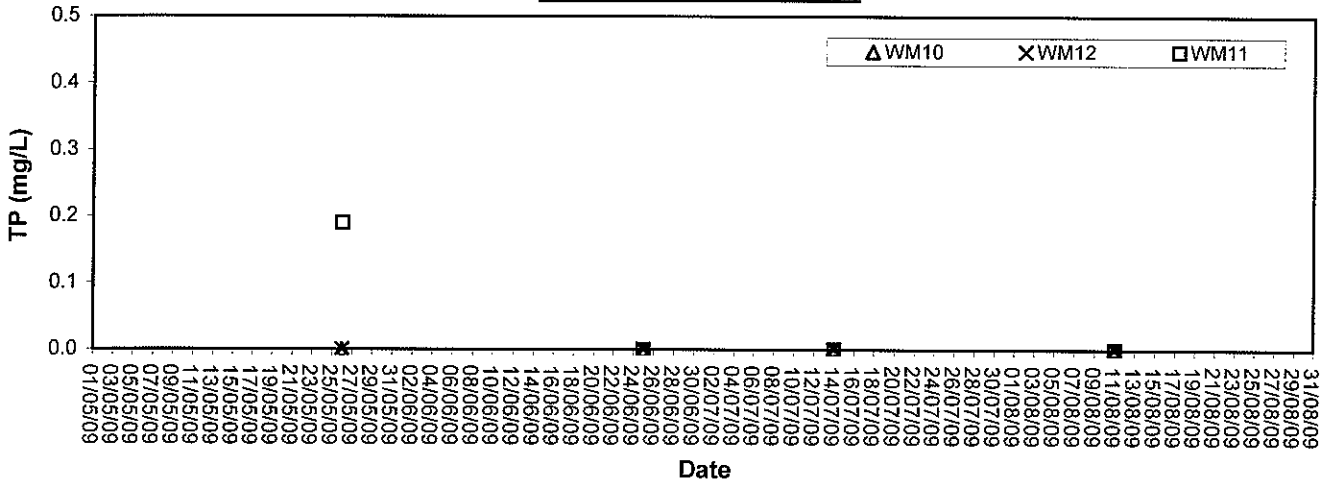


## **Appendix C**

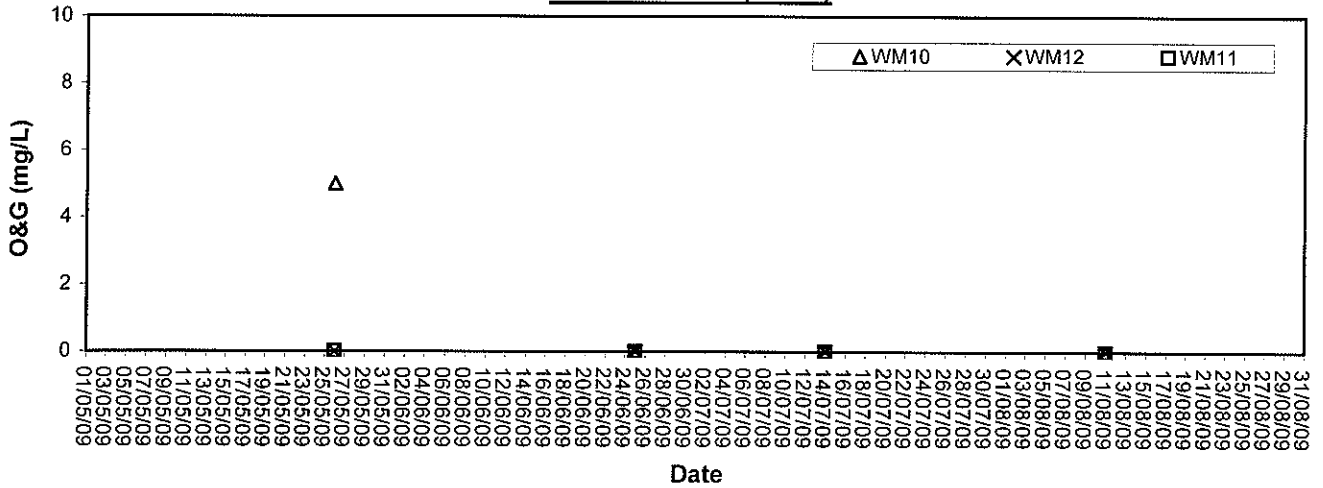
### **Graphical Plots of Groundwater Monitoring Data**



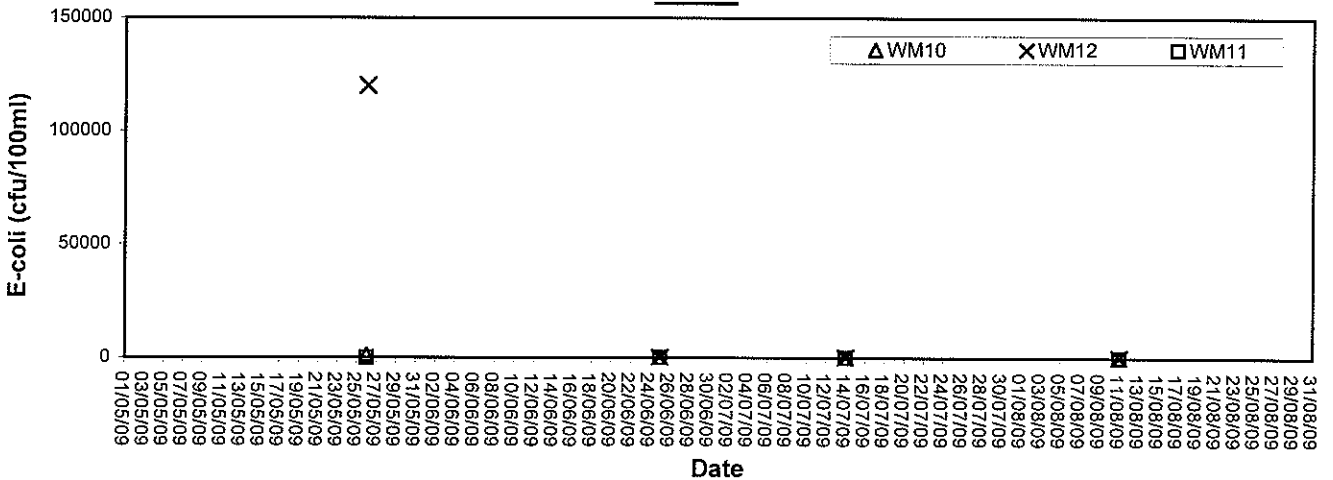
### Total Phosphates (TP)



### Oil & Grease (O&G)

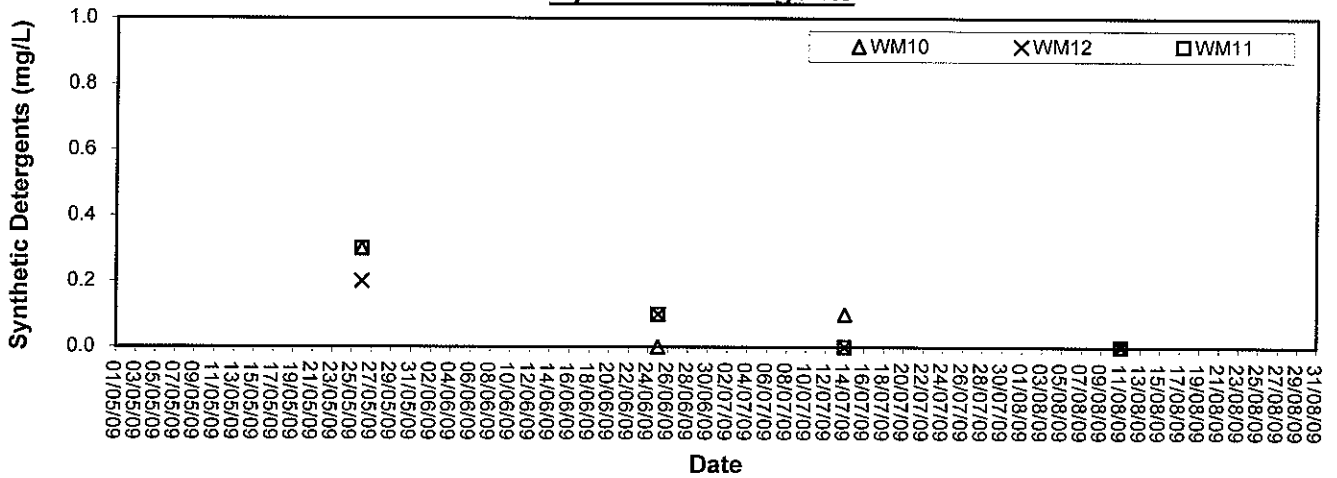


### E-coli

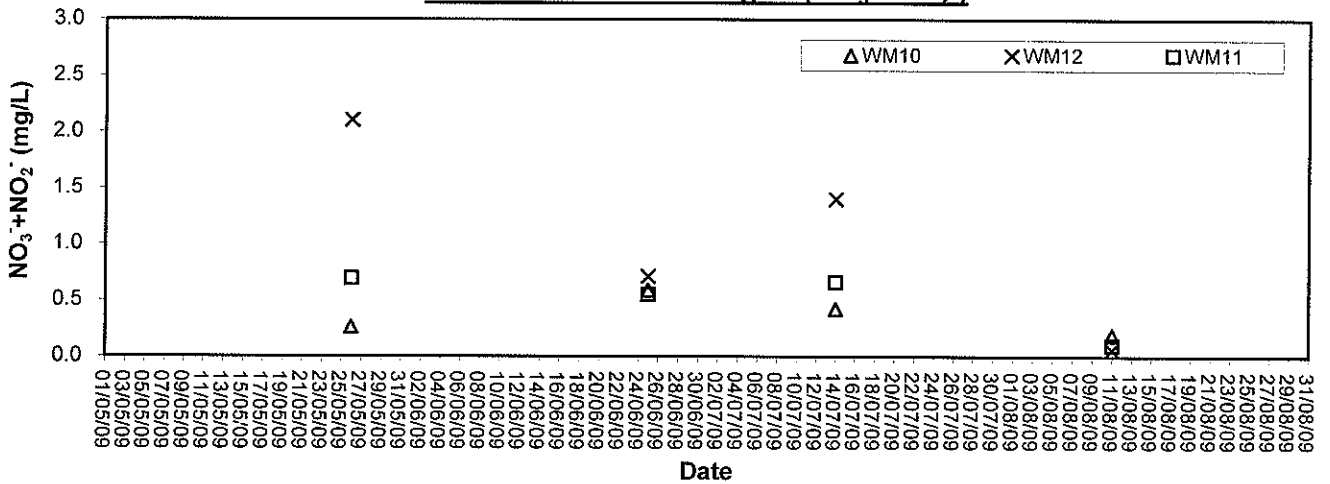




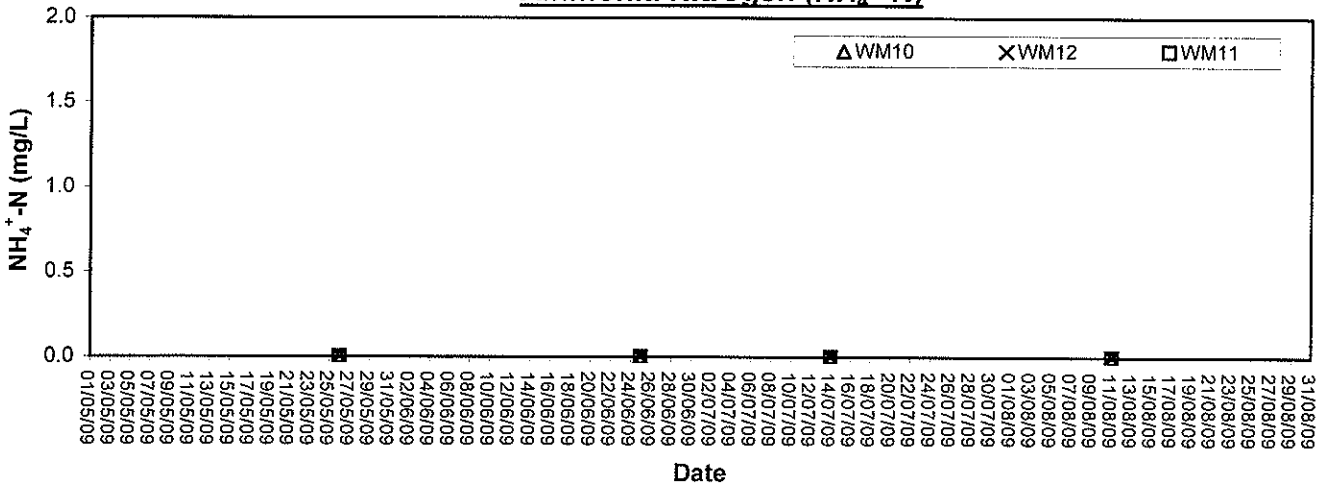
### Synthetic Detergents



### Nitrate & Nitrite Nitrogen (NO<sub>3</sub><sup>-</sup>+NO<sub>2</sub><sup>-</sup>)

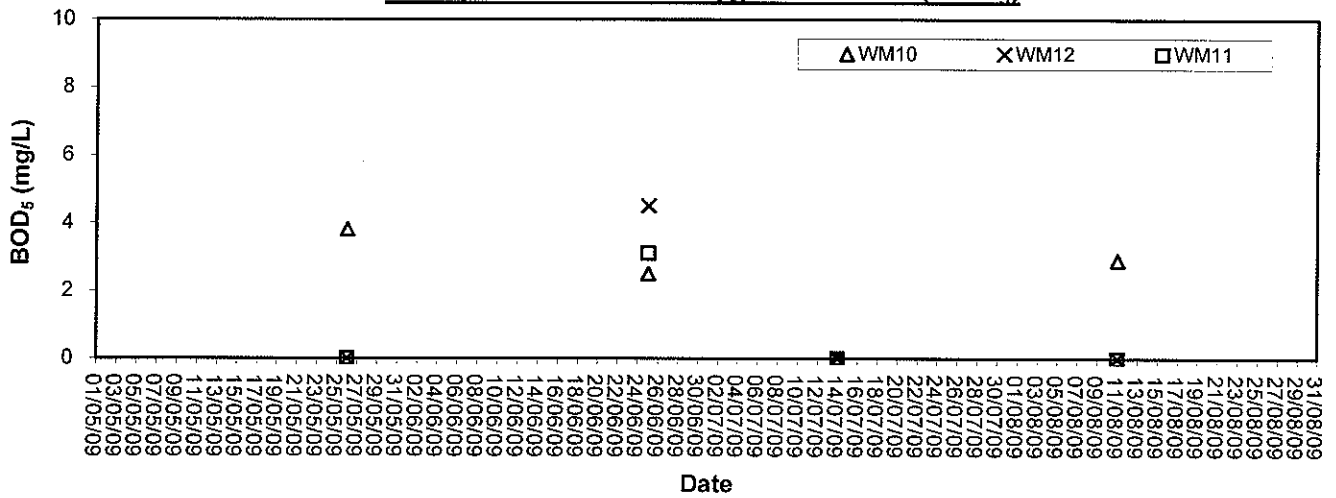


### Ammonia Nitrogen (NH<sub>4</sub><sup>+</sup>-N)

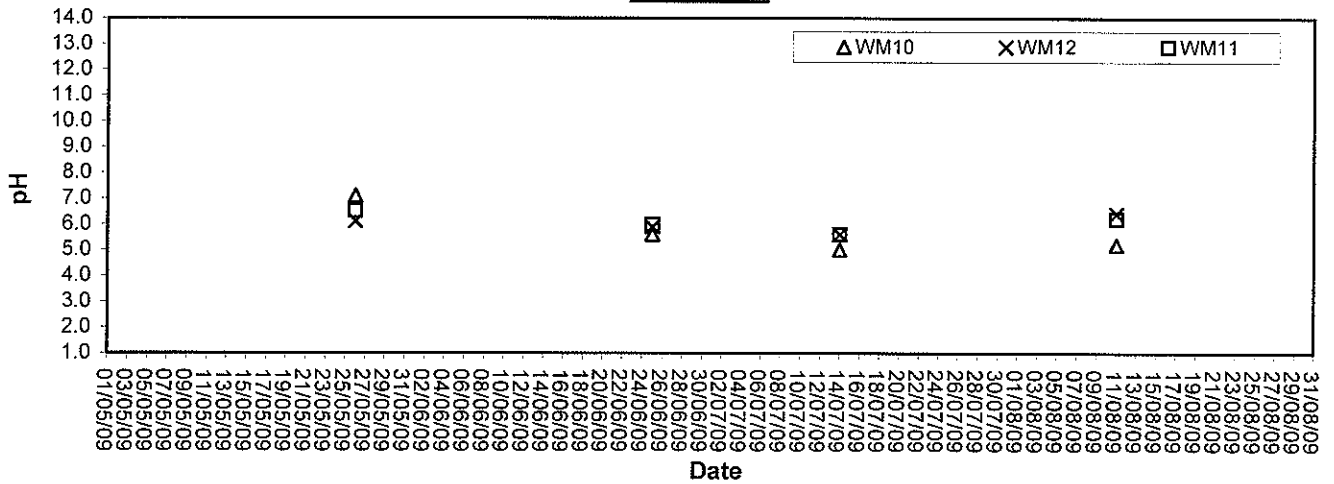




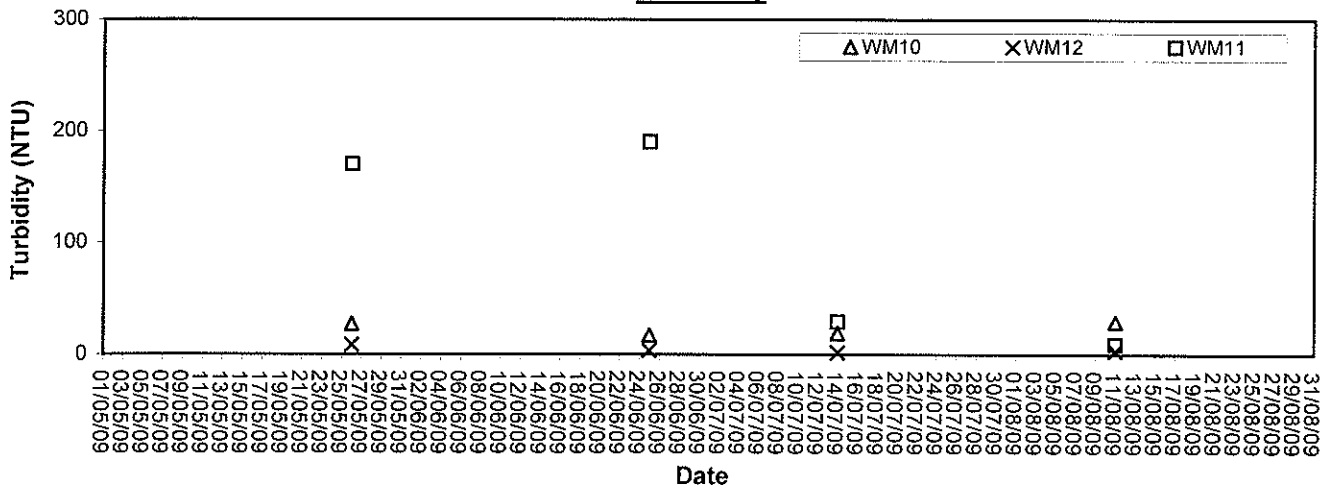
### 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>)



### pH Value



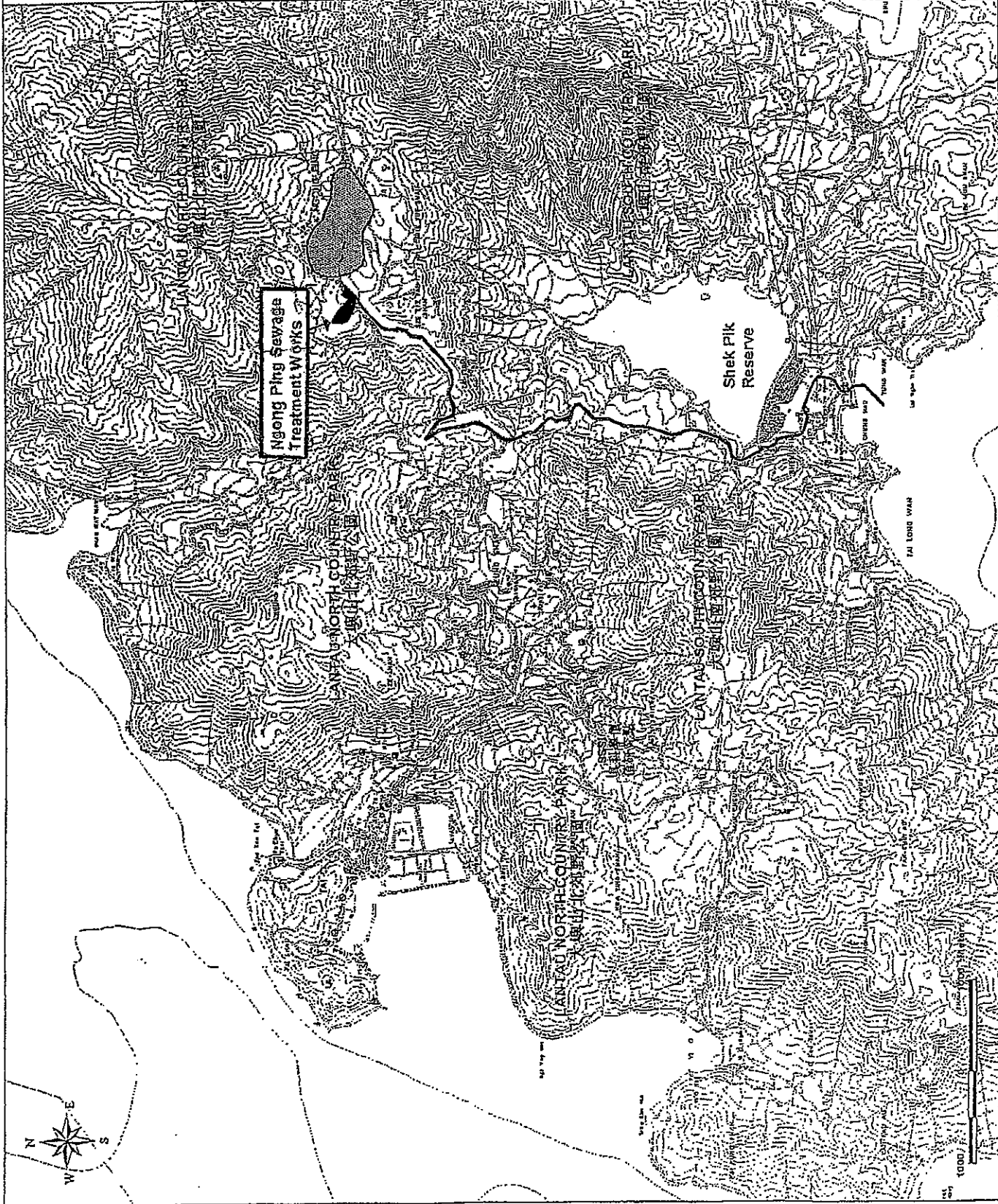
### Turbidity





## **Appendix D**

### **General Layout Plan**



**Legend:**

Proposed Effluent Export Pipeline

Proposed Trunk Sewer of Ngong Ping Sewerage

Ngong Ping Sewerage Catchment Area

NO.	DATE	BY	CHKD

**ARUP**

AGREEMENT NO. CE 2801  
OUTLING ISLANDS STAGE 1 PHASE 1  
NGONG PING SEWAGE TREATMENT  
WORKS AND SEWERAGE

Ngong Ping Sewerage Project  
Scheme - General Layout

23400EN/098

HC Feb 03 AC AC  
1:2000@A3 Preliminary



香港特別行政區環境保護署  
ENVIRONMENTAL PROTECTION  
DEPARTMENT  
GOVERNMENT OF THE  
SPECIAL ADMINISTRATIVE REGION  
OF HONG KONG



## Appendix E

### QA/QC Results



## QA/QC Results of Laboratory Analysis of Testing Parameters

Testing Parameter	QC Sample Analysis	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
Turbidity	100.8	WM10	1.0	---	---
Nitrate + Nitrite	98.3	WM10	2.6	WM10	98.3
Oil & Grease	106.0	---	---	---	---
Ammoniacal Nitrogen	104.8	---	---	WM10	116.5
Synthetic detergents	---	---	--	---	---
Biochemical Oxygen Demand (5-day)	92.4	WM10	1.4	---	---
Total Phosphates	104.6	---	---	WM10	109.2
Testing Parameter	QC Sample Analysis	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	Difference between Duplicates +	Sample ID	% Recovery @
pH Value(at 25°C)	---	WM10	0.01 unit	---	---

Note: (\* ) % Recovery of QC sample should be between 80% to 120%.  
 (# ) % Error of Sample Duplicate should be between -10% to 10%.  
 (@ ) % Recovery of Sample Spike should be between 80% to 120%.  
 (+ ) Difference between Duplicates should be less than 0.1 unit for pH value.





## Figures

**NOTE:**

1. EXACT LOCATIONS OF GROUND WATER MONITORING BOREHOLES ARE SUBJECT TO CONFIRMATION ON SITE

**LEGEND:**

- PROPOSED SEWER AND MANHOLE
- ⊕ WATER MONITORING BOREHOLE

No.	Description	Rev.	Date
A	TRACER ISSUE	INC	07/05

**ARUP**

One Arup & Partners Hong Kong Limited

Project No.

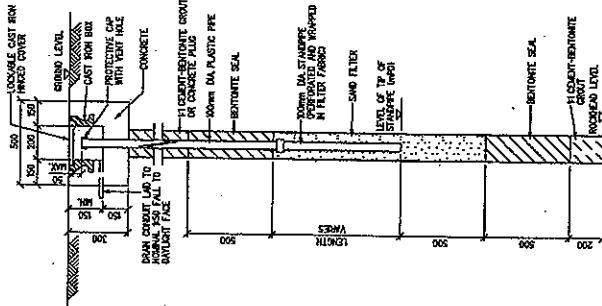
CONTRACT NO. DC230905  
NGONG PING VILLAGE SEWERAGE

Drawing No.

**LOCATION & TYPICAL DETAILS OF GROUND WATER MONITORING BOREHOLE**

Contract No.	23400RVS/006	REV.	A
Drawn by	JMS	Checked by	JMS
Scale	AS SHOWN	Scale	AS SHOWN
Author	TEHNER	Author	TEHNER

Copyright Reserved  
 香港特別行政區政府  
 渠務署  
 DRAINAGE SERVICES DEPARTMENT  
 GOVERNMENT OF THE  
 SPECIAL ADMINISTRATIVE REGION



**TYPICAL DETAILS OF GROUND WATER MONITORING BOREHOLE**  
M.T.S.

