

東業德勤測試顧問有限公司
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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

(NOVEMBER 2007)

Prepared by:

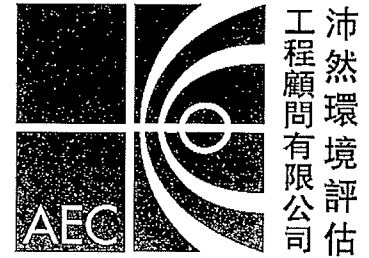
LAW, Sau Yee
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Allied Environmental Consultants Limited
Acousticians & Environmental Engineers

1001, Shanghai Industrial Investment Building, 48 Hennessy Rd., Wanchai, H.K.
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Our Ref: 840/08-0001

2nd January 2008

By POST and FAX (2827 8526)

Drainage Services Department
42nd 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 (November 2007)**

I refer to the Environmental Permit (EP-157/2003) and the email from the environmental monitoring team, ETS-Testconsult Limited, dated 15 December 2007 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 – Mr. T N Chan (By Email)
ETS-Testconsult – Ms Linda Law (By Email and Fax: 2695 3944)



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*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 Pipe*

*ENA71494
Monthly EM&A Report No.1*



EXECUTIVE SUMMARY

This monthly EM&A report (No.1) 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 30 November 2007.

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 9 designated boreholes.*

Groundwater Monitoring

Groundwater monitoring was carried out on 23 and 30 November 2007. During this monitoring, ground water was found in WM3, WM3a, WM10, WM11 and WM12, and the other sampling points were dry.

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 30 November 2007.

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/T/202, 23400/T/074, 23400/T/075 and 23400/T/076.

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 nine designated sampling points shown in Table 3.1.

Table 3.1 Locations of Groundwater Quality Monitoring

Sampling Point	Location
WM3	Keung Shan Road (L/P FA0445)
WM3a	Keung Shan Road (L/P FA0445)
WM6	Ngong Ping STP
WM7	Ngong Ping STP
WM7a	Ngong Ping STP
WM9	Ngong Ping STP
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 (BOD₅), mg/L;
- Ammonia Nitrogen (NH₄⁺-N), mg/L;
- Nitrate + Nitrite Nitrogen (NO₂⁻+NO₃⁻), 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

<i>Parameter</i>	<i>Frequency</i>	<i>No. of Boreholes</i>
<i>Biochemical Oxygen Demand</i>	<i>Once per month</i>	<i>9</i>
<i>Ammonia Nitrogen</i>		
<i>Nitrate + Nitrite</i>		
<i>pH value</i>		
<i>Turbidity</i>		
<i>Oil & Grease</i>		
<i>Total Phosphates</i>		
<i>Synthetic detergents</i>		
<i>E-coli</i>		

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

<i>Laboratory Analysis</i>	<i>Testing Procedure</i>	<i>Detection Limit</i>
<i>Biochemical Oxygen Demand</i>	<i>In house method TPE/001/W or BS 6068 : Section 2.14 : 1990</i>	<i>2.0 mg/L</i>
<i>Ammoniacal Nitrogen</i>	<i>In house method TPE/016/W, refer to APHA 19ed 4500-NH₃ F & G</i>	<i>0.13 mg/L</i>
<i>Nitrate + Nitrite</i>	<i>In house method TPE/023/W, refer to APHA 19ed 4500-NO₃ B</i>	<i>0.004 mg/L</i>
<i>pH (at 25°C)</i>	<i>In house method TPE/003/W, refer to APHA 19ed APHA 4500-H⁺ B</i>	<i>Detection range: 4.0-10.0</i>
<i>Turbidity</i>	<i>In house method TPE/005/W, refer to APHA 19ed 2130B</i>	<i>0.5 NTU</i>
<i>Oil & Grease</i>	<i>APHA 19ed 5520 B</i>	<i>5.0 mL</i>
<i>Total Phosphate</i>	<i>In house method base on ASTM D 515-88</i>	<i>0.05 mg/L</i>
<i>Synthetic detergents</i>	<i>In house method based on APHA 19ed 5540 C & D</i>	<i>0.1 mg/L</i>
<i>E-coli</i>	<i>DoE Section 7.8 & 7.9 plus in-site urease test</i>	<i><1 cfu/100ml</i>



3.5 Groundwater Monitoring Results

In this reporting month, groundwater monitoring was carried out on 23 and 30 November 2007. During this monitoring, groundwater was found in Borehole No WM3 and the other boreholes were dry. 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	---	---

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 23 and 30 November 2007. During this monitoring, ground water was found in WM3, WM3a, WM10, WM11 and WM12, and the other sampling points were dry.

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.

7.0 FUTURE KEY ISSUES

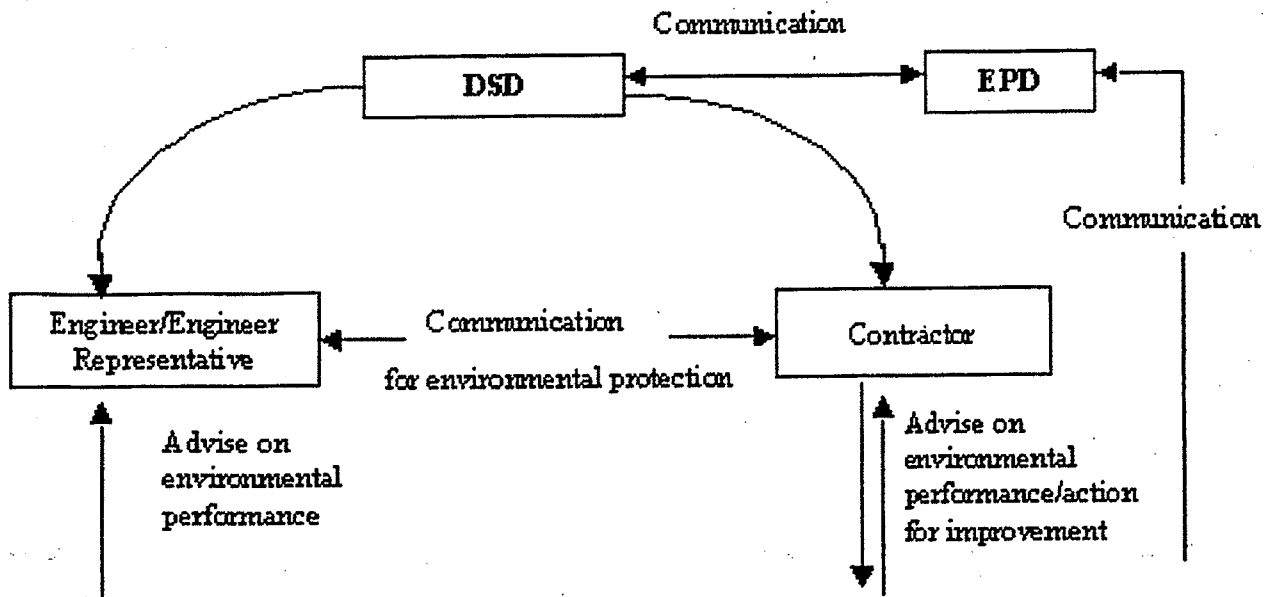
DSD will continue to carry out operation and maintenance works of NPSTW in the coming month. Future Key issues to be considered for the prevention of contamination of the water gathering ground are as follows:

- 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



Independent Environmental Checker (IEC)

- Validate accuracy of monitoring equipment, monitoring location, monitoring results, locations of sensitive receivers and monitoring procedure;
- Random sample check and audit on monitoring data;
- Site inspection;
- Audit construction and operation methodology;
- Review the effectiveness of environmental mitigation measures;
- Endorse EM&A report prepared by ET and provide feedback;
- Check on complaint cases & effectiveness of corrective measures;
- Review monitoring requirements.

- Implementation status proforma on mitigation action
 - Proactive environmental protection proforma for construction / operation method alternatives
 - Regulatory compliance proforma
 - Site inspection proforma
 - Complaint report
 - EM&A report for endorsement
 - Effectiveness of mitigation measures
-
- Advise on environmental performance
 - Return/sign off audit proformas
 - Environmental concerns and recommendations on construction/ operation methods

Environmental Team (ET)

- Sampling, analysis and statistical evaluation of monitoring parameters;
- Site surveillance;
- Review construction and operation programme and methodology, and equipment used;
- Audit of compliance with environmental protection clauses;
- Advice to the contractor on environmental improvement on site;
- Monitoring mitigation measures implementation;
- Complaint investigation & corrective measures;
- Timely submission of EM&A reports, summary reports.
- Equipment compliance/ purchase/maintenance
- Legislative issues – summons, prosecution, fines/etc.



Appendix B

Groundwater Monitoring Results

and

Photos of Groundwater Monitoring at Boleholes



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TEST REPORT

Environmental Testing of Water & Wastewater

Report No. : ENA71493
Date of issue : 08 December 2007
Page No. : 1 of 5

Information provided by client

Client name : Welcome Construction Co Ltd
Client 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 Png STW and Effluent Export Pipe
Sample Type : Groundwater
Date of sampling : 23 and 30 November 2007
Sample Description : The sample was collected in 200ml glass bottle (for Total Phosphates only), 500ml glass bottle (for Oil & Grease only), 200ml 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. H₂SO₄ 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 : 23 and 30 November 2007

Result

Client Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM3	W22549 (01)	pH Value	In house method TPE/003/W	6.0 (at 25°C)	23 November 2007
		Turbidity	In house method TPE/005/W	25 NTU	23 November 2007
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	2.0 mg/L	23 November 2007 (17:00) to 28 November 2007 (17:00)
	W22549 (02)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	<0.04 mg/L	24 November 2007
		Ammonia	In house method TPE/016/W	<0.025 mg/L	26 November 2007
	W22549 (03)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	25 November 2007
	W22549 (04)	Total Phosphates	In house method TPE/019/W	0.04 mg/L	24 November 2007
	W22549 (05)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	24 November 2007
W22549 (06)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	<1 cfu/100ml	23 to 25 November 2007	

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 only carried out at WM3, WM3a, WM10, WM11 and WM12 only since other sampling points were observed to be dry during the monitoring.

Checked by : 
LAW, Sau Yee
Senior Chemist

Approved by : 
LAU, Chi Leung
Chief Chemist



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Laboratory information

Date Received : 23 and 30 November 2007

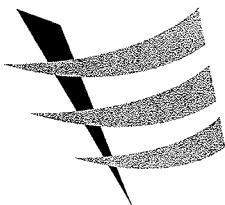
Result

Client Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM3a	W22589 (01)	pH Value	In house method TPE/003/W	6.7 (at 25°C)	30 November 2007
		Turbidity	In house method TPE/005/W	0.8 NTU	30 November 2007
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	<2.0 mg/L	30 November 2007 (18:00) to 05 December 2007 (18:00)
	W22589 (05)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	0.06 mg/L	01 December 2007
		Ammonia	In house method TPE/016/W	<0.025 mg/L	01 December 2007
	W22589 (09)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	01 December 2007
	W22589 (13)	Total Phosphates	In house method TPE/019/W	1.0 mg/L	01 December 2007
	W22589 (17)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	01 December 2007
	W22589 (21)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	1 cfu/100ml	30 November to 02 December 2007

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 only carried out at WM3, WM3a, WM10, WM11 and WM12 only since other sampling points were observed to be dry during the monitoring.

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Laboratory information

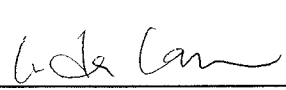
Date Received : 23 and 30 November 2007

Result

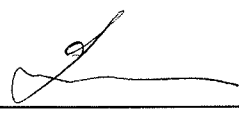
Client Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM10	W22589 (02)	pH Value	In house method TPE/003/W	11.5 (at 25°C)	30 November 2007
		Turbidity	In house method TPE/005/W	64 NTU	30 November 2007
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	5.0 mg/L	30 November 2007 (18:00) to 05 December 2007 (18:00)
	W22589 (06)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	0.16 mg/L	01 December 2007
		Ammonia	In house method TPE/016/W	0.30 mg/L	01 December 2007
	W22589 (10)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	01 December 2007
	W22589 (14)	Total Phosphates	In house method TPE/019/W	<0.1 mg/L	01 December 2007
	W22589 (18)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	01 December 2007
	W22589 (22)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	<1 cfu/100ml	30 November to 02 December 2007

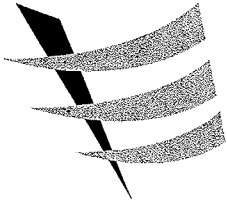
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Information provided by client

Client name : Welcome Construction Co Ltd
Client 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 Png STW and Effluent Export Pipe
Sample Type : Groundwater
Date of sampling : 23 and 30 November 2007
Sample Description : The sample was collected in 200ml glass bottle (for Total Phosphates only), 500ml glass bottle (for Oil & Grease only), 200ml 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. H₂SO₄ 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 : 23 and 30 November 2007

Result

Client Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM11	W22589 (03)	pH Value	In house method TPE/003/W	5.5 (at 25°C)	30 November 2007
		Turbidity	In house method TPE/005/W	24 NTU	30 November 2007
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	3.1 mg/L	30 November 2007 (18:00) to 05 December 2007 (18:00)
	W22589 (07)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	0.33 mg/L	01 December 2007
		Ammonia	In house method TPE/016/W	<0.025 mg/L	01 December 2007
	W22589 (11)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	01 December 2007
	W22589 (15)	Total Phosphates	In house method TPE/019/W	<0.1 mg/L	01 December 2007
	W22589 (19)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	01 December 2007
W22589 (23)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	<1 cfu/100ml	30 November to 02 December 2007	

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 only carried out at WM3, WM3a, WM10, WM11 and WM12 only since other sampling points were observed to be dry during the monitoring.

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

Environmental Testing of Water & Wastewater

Report No. : ENA71493
Date of issue : 08 December 2007
Page No. : 5 of 5

Information provided by client

Client name : Welcome Construction Co Ltd
Client 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 Png STW and Effluent Export Pipe
Sample Type : Groundwater
Date of sampling : 23 and 30 November 2007
Sample Description : The sample was collected in 200ml glass bottle (for Total Phosphates only), 500ml glass bottle (for Oil & Grease only), 200ml 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. H₂SO₄ 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 : 23 and 30 November 2007

Result

Client Sample ID	Lab Ref No	Test	Method Used	Result	Date Tested
WM12	W22589 (04)	pH Value	In house method TPE/003/W	5.8 (at 25°C)	30 November 2007
		Turbidity	In house method TPE/005/W	15 NTU	30 November 2007
		Biochemical Oxygen Demand (5-day)	In house method TPE/001/W	<2.0 mg/L	30 November 2007 (18:00) to 05 December 2007 (18:00)
	W22589 (08)	Nitrate & Nitrite Nitrogen	In house method TPE/023/W	1.0 mg/L	01 December 2007
		Ammonia	In house method TPE/016/W	<0.025 mg/L	01 December 2007
	W22589 (12)	Synthetic Detergents	In house method refer to APHA 19th ed 5540 C & D	<0.1 mg/L	01 December 2007
	W22589 (16)	Total Phosphates	In house method TPE/019/W	<0.1 mg/L	01 December 2007
	W22589 (20)	Oil & Grease	APHA 19ed 5520B	<5.0 mg/L	01 December 2007
	W22589 (24)	E-coli *	DoE (1983), section 7.8 & 7.9 plus in-situ urease test	<1 cfu/100ml	30 November to 02 December 2007

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 only carried out at WM3, WM3a, WM10, WM11 and WM12 only since other sampling points were observed to be dry during the monitoring.

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 : 23 and 30 November 2007

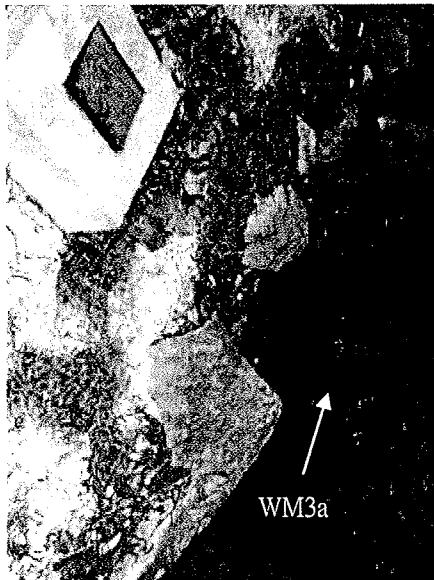
Report No. : ENA71493

Date of issue : 08 December 2007

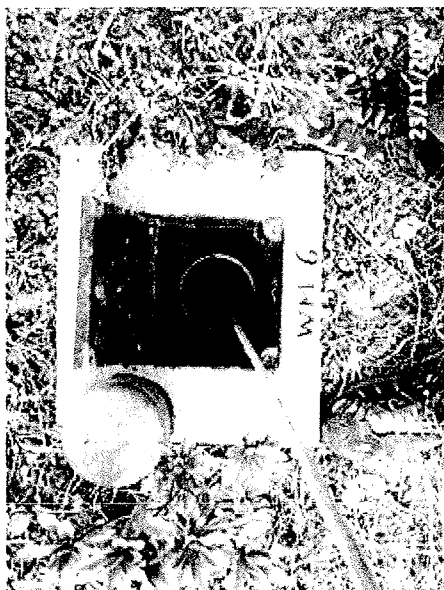
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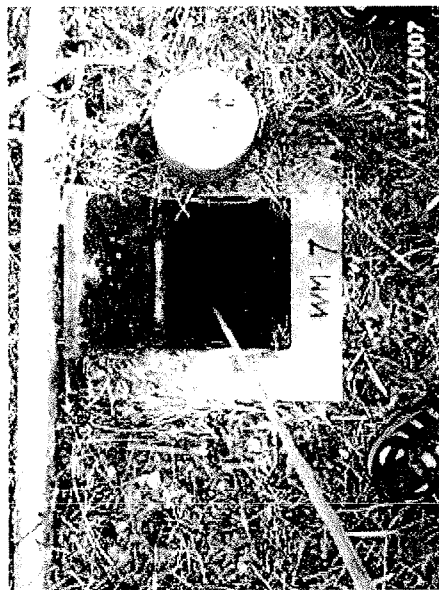
WM3a



WM6



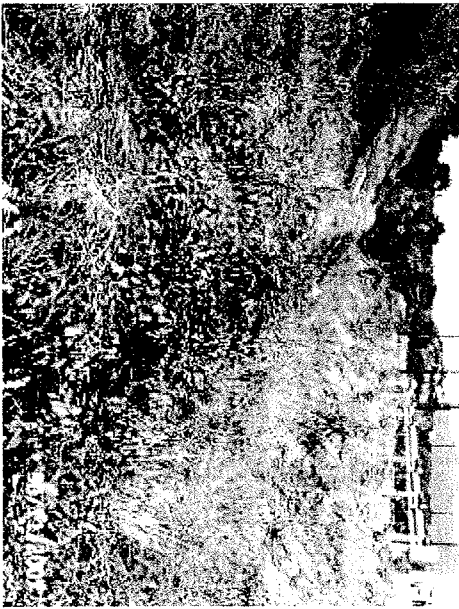
WM7



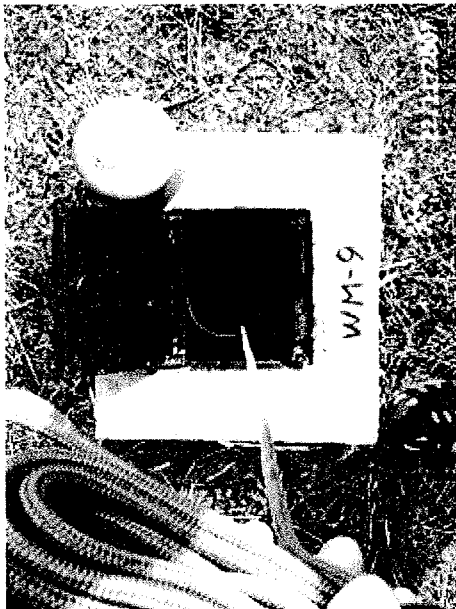


Project : DC/2006/15 - Building and Civil Maintenance and
Minor Works to DSD Plants and Facilities (2007-2009)
Date of sampling and photo taking : 23 and 30 November 2007
Report No. : ENA71493
Date of issue : 08 December 2007

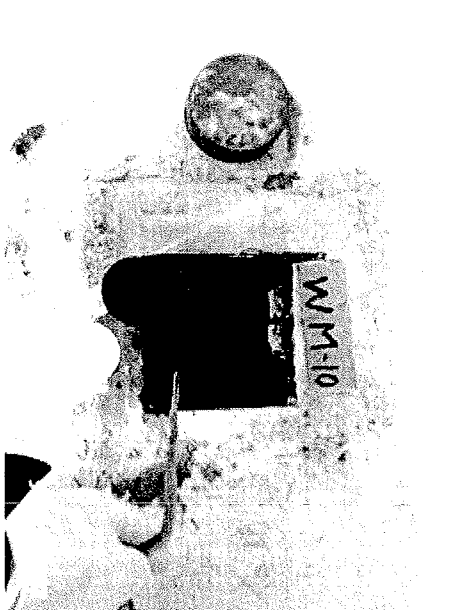
WM7a



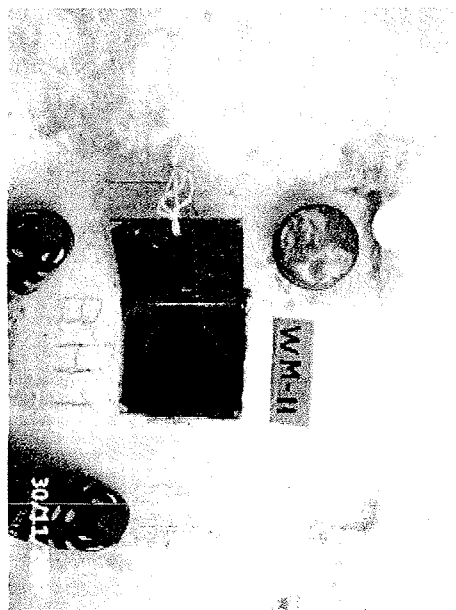
WM9



WM10



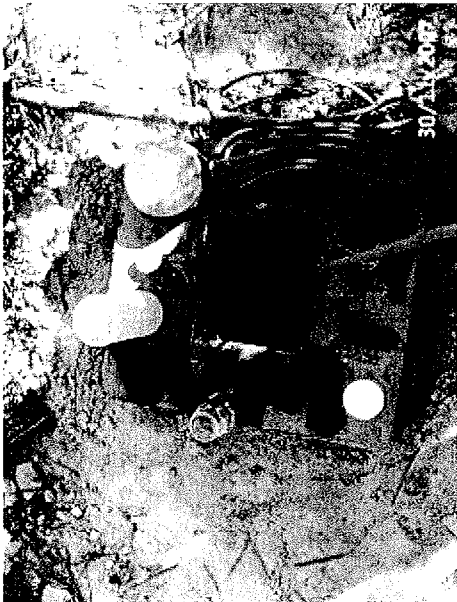
WM11

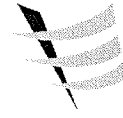




Project : DC/2006/15 - Building and Civil Maintenance and
Minor Works to DSD Plants and Facilities (2007-2009)
Date of sampling and photo taking : 23 and 30 November 2007
Report No. : ENA71493
Date of issue : 08 December 2007

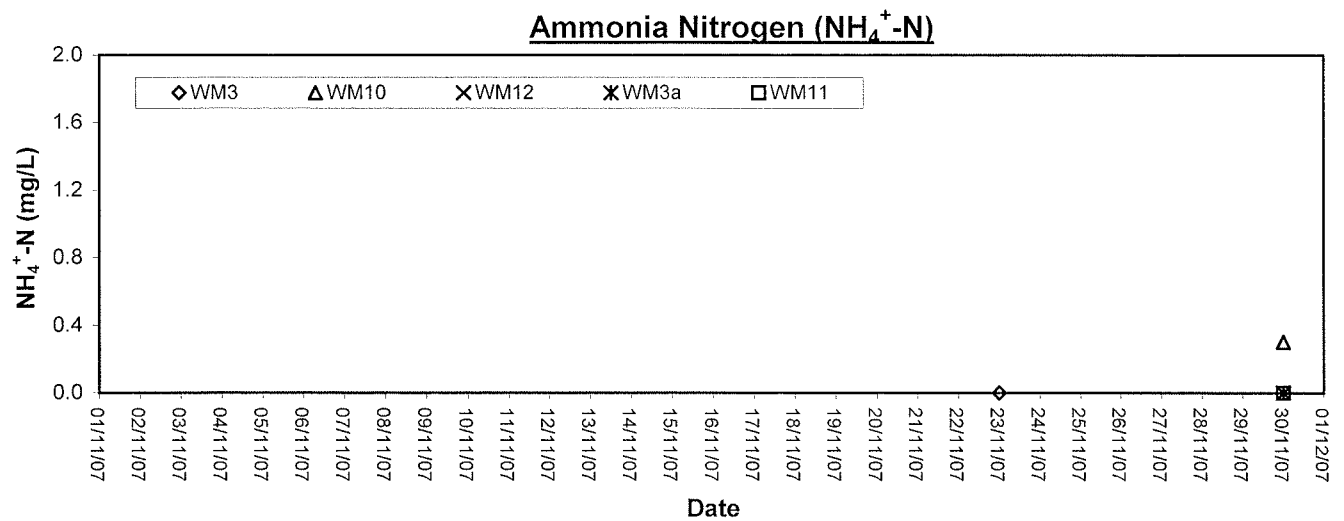
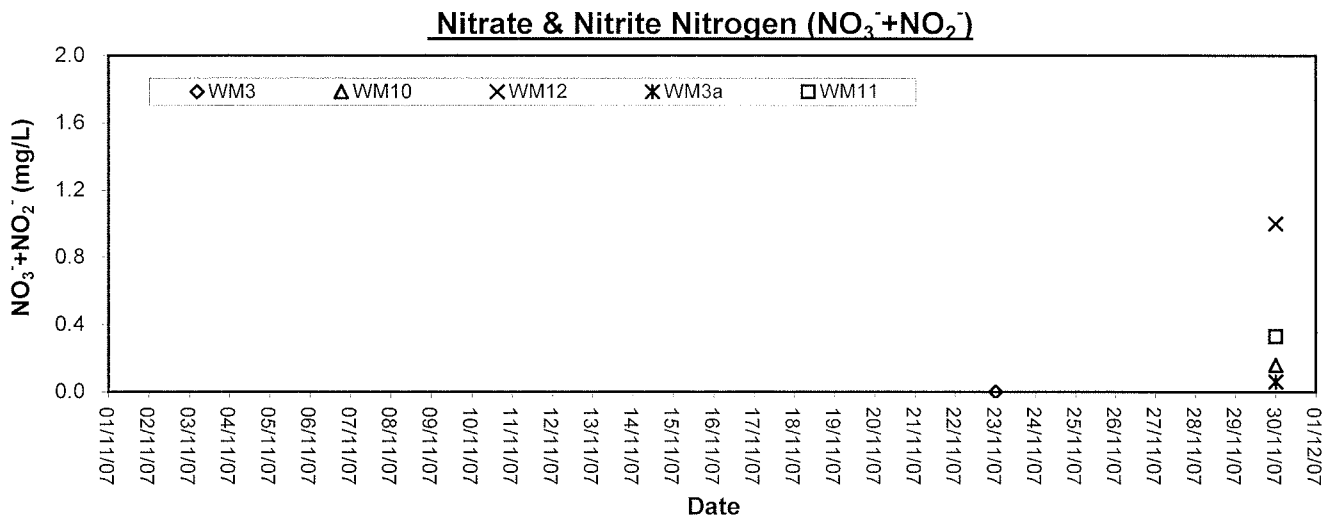
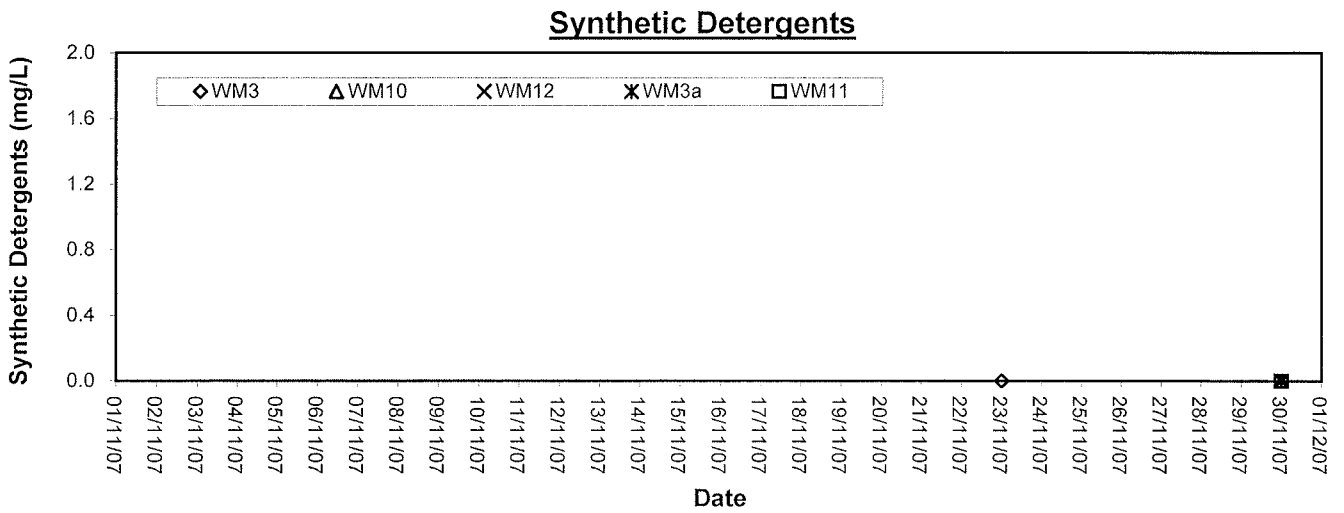
WM12





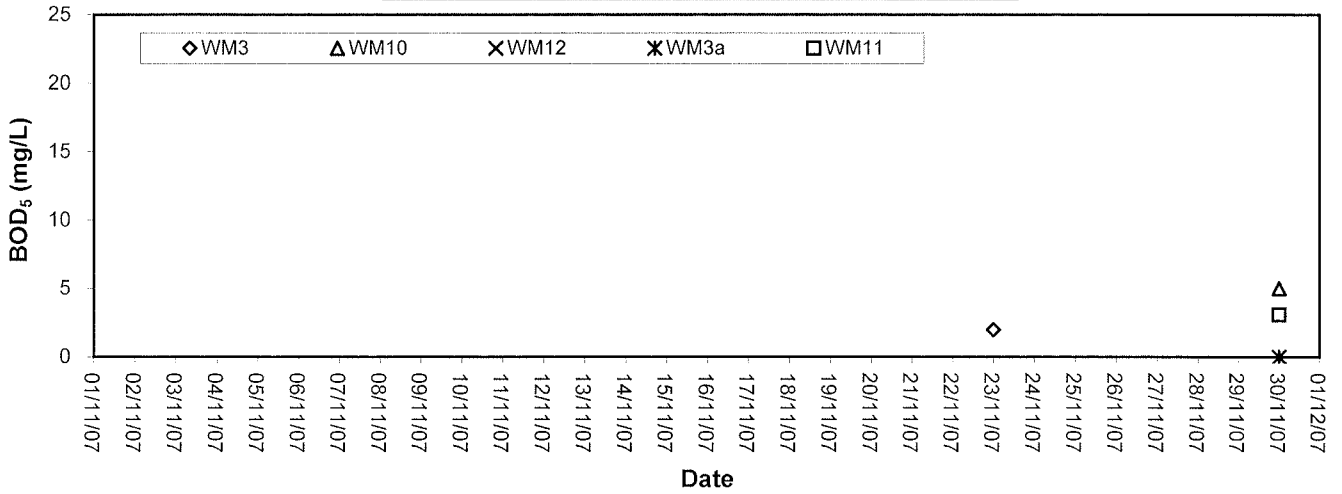
Appendix C

Graphical Plots of Groundwater Monitoring Data

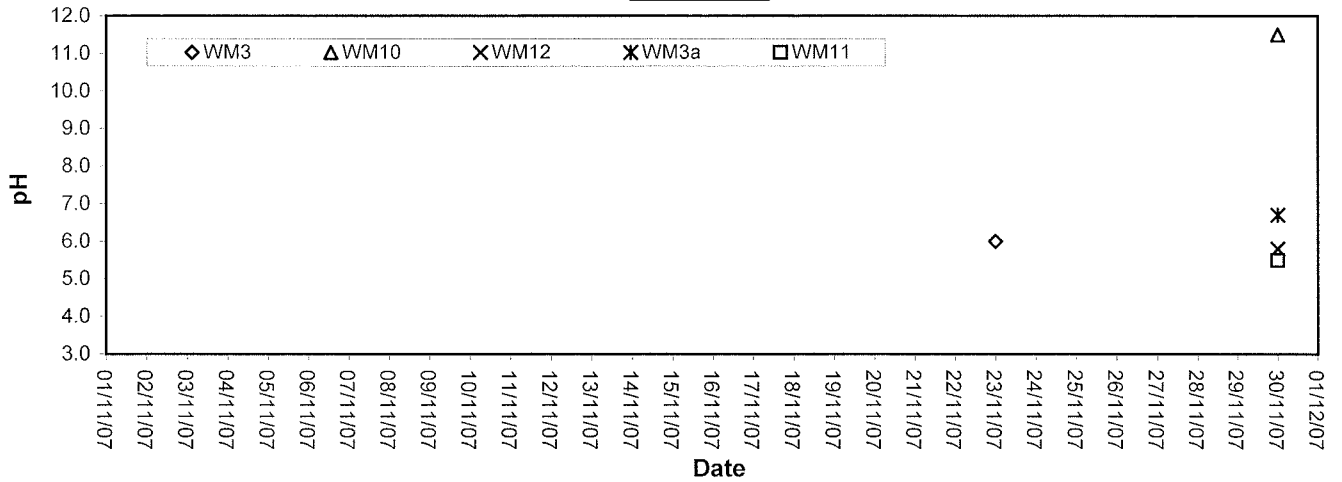




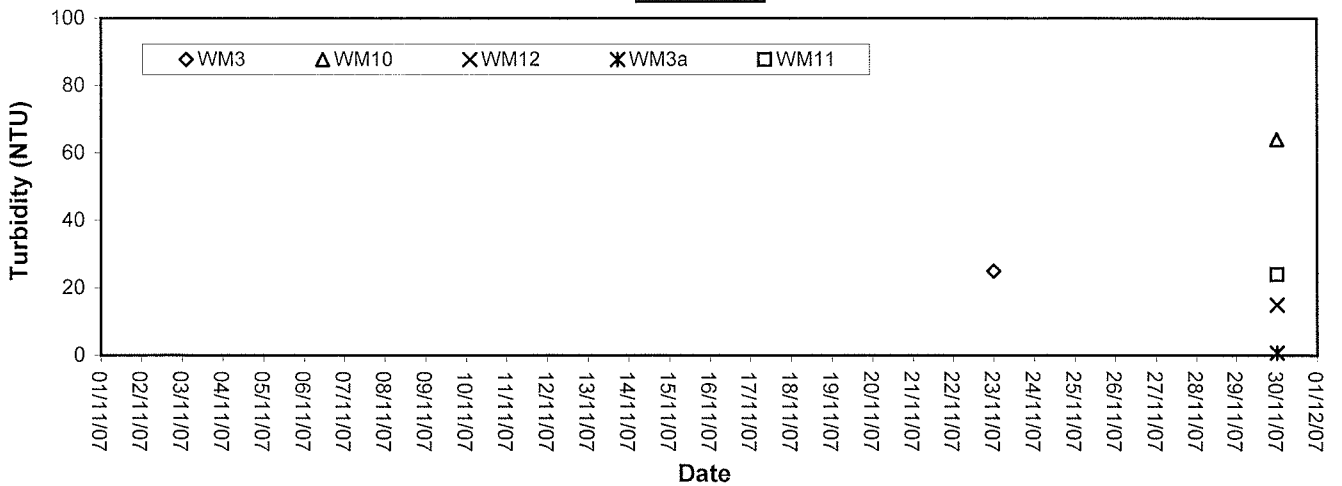
5-day Biochemical Oxygen Demand (BOD₅)



pH Value

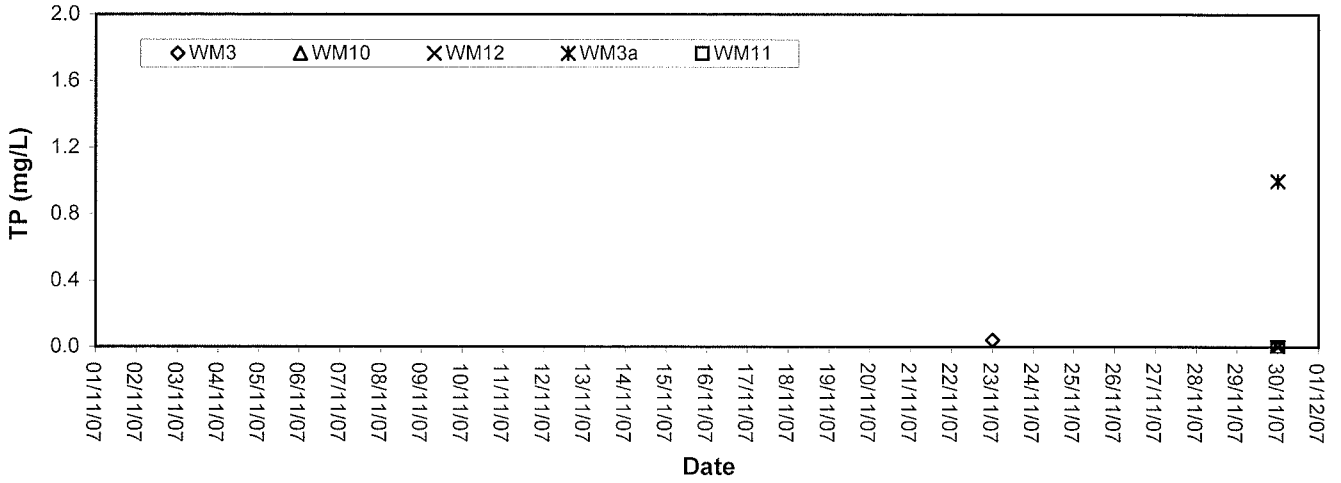


Turbidity

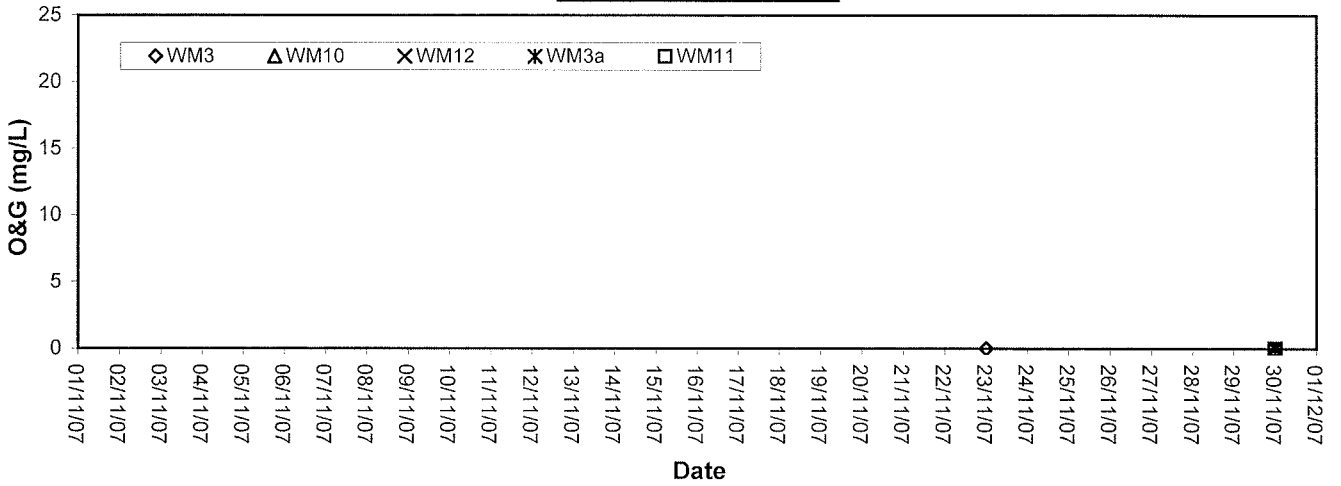




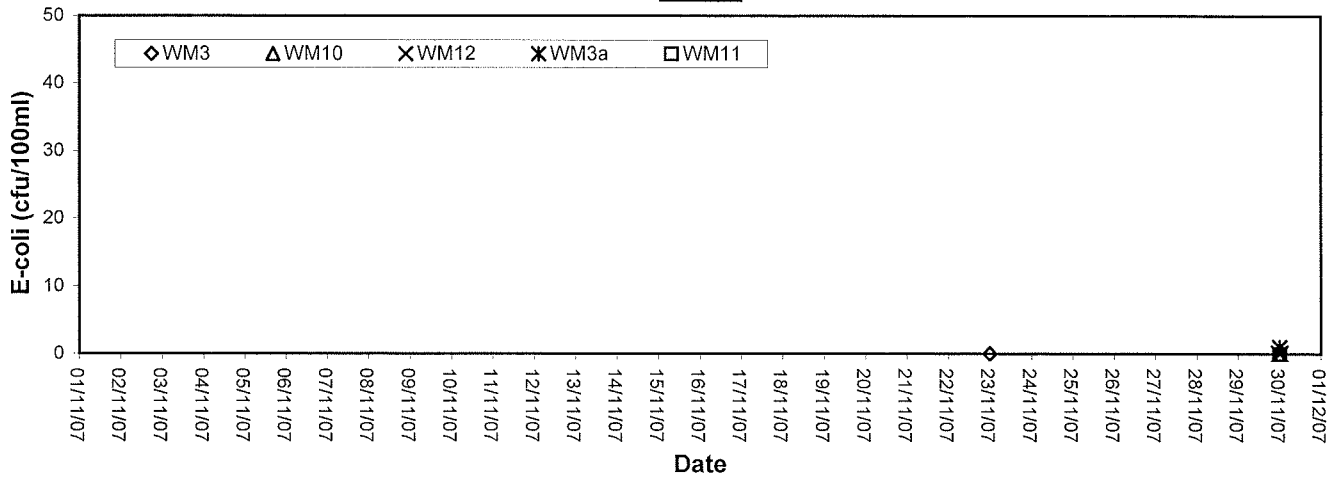
Total Phosphates (TP)



Oil & Grease (O&G)



E-coli





Appendix D

General Layout Plan

Legend:

- Proposed Effluent Export Pipeline
- Proposed Trunk Sewer of Ngong Ping Sewerage
- Ngong Ping Sewerage Catchment Area

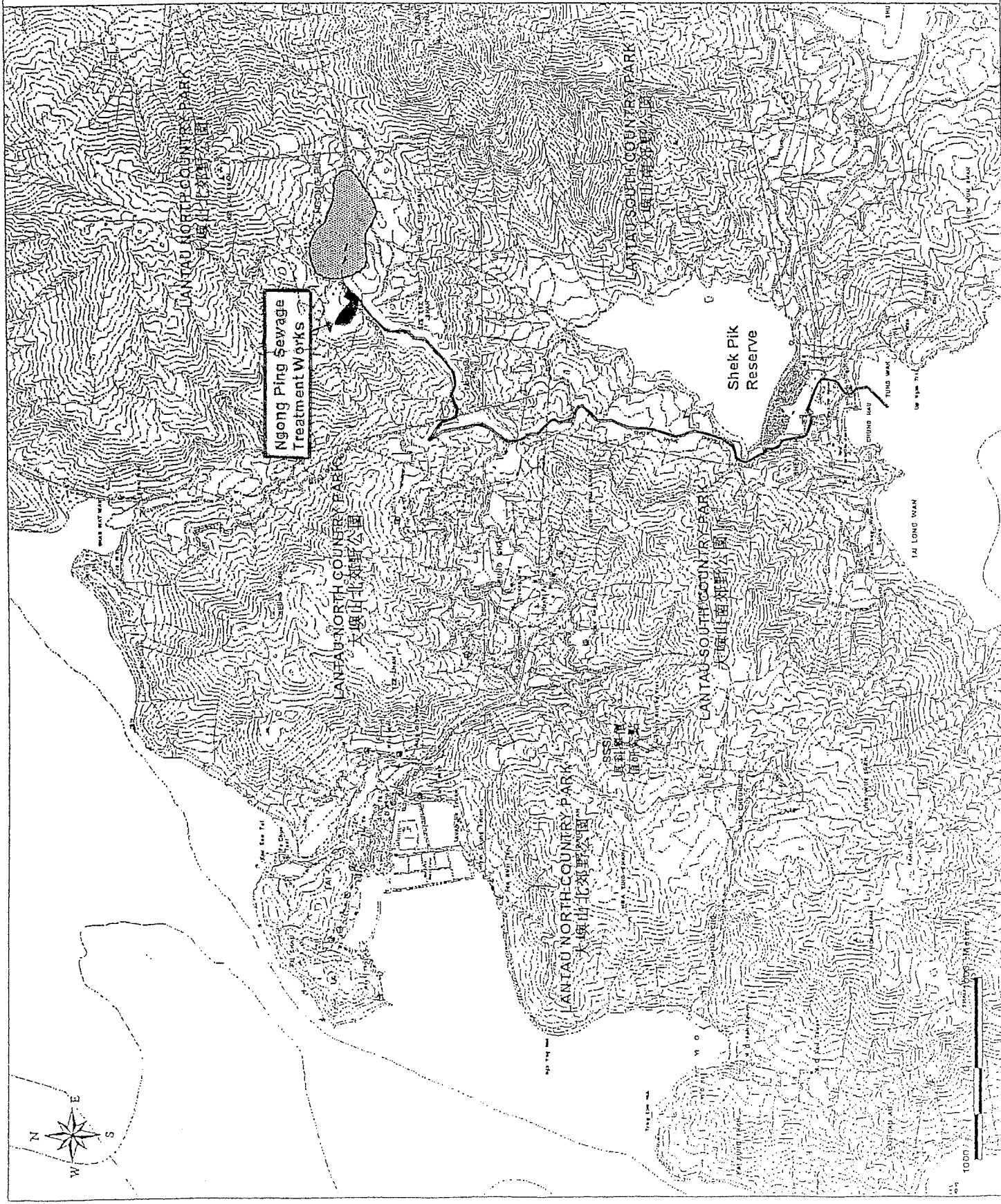
ARUP 23400/EN/098

AGREEMENT NO. CE 2001
OUTLINE ISLANDS STAGE 1 PHASE 1
NGONG PING SEWERAGE TREATMENT WORKS AND SEWERAGE

Ngong Ping Sewerage Project
Scheme - General Layout

23400/EN/098
KC Feb 03 AC AC
1:20000/A3 Preliminary

香港特別行政區政府
環境保護署
DEPARTMENT OF THE
ENVIRONMENT
HONG KONG
SPECIAL ADMINISTRATIVE REGION





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	102.4	WM3a	3.4	---	---
Nitrate + Nitrite	101.7	WM3a	4.9	WM3a	113.0
Oil & Grease	104.9	---	---	---	---
Ammoniacal Nitrogen	108.0	---	---	---	---
Synthetic detergents	---	---	---	---	---
Biochemical Oxygen Demand (5-day)	98.5	---	---	---	---
Total Phosphates	103.2	WM3a	N/A	---	---
Testing Parameter	QC Sample Analysis	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	Difference between Duplicates +	Sample ID	% Recovery @
pH Value(at 25°C)	---	WM3a	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.



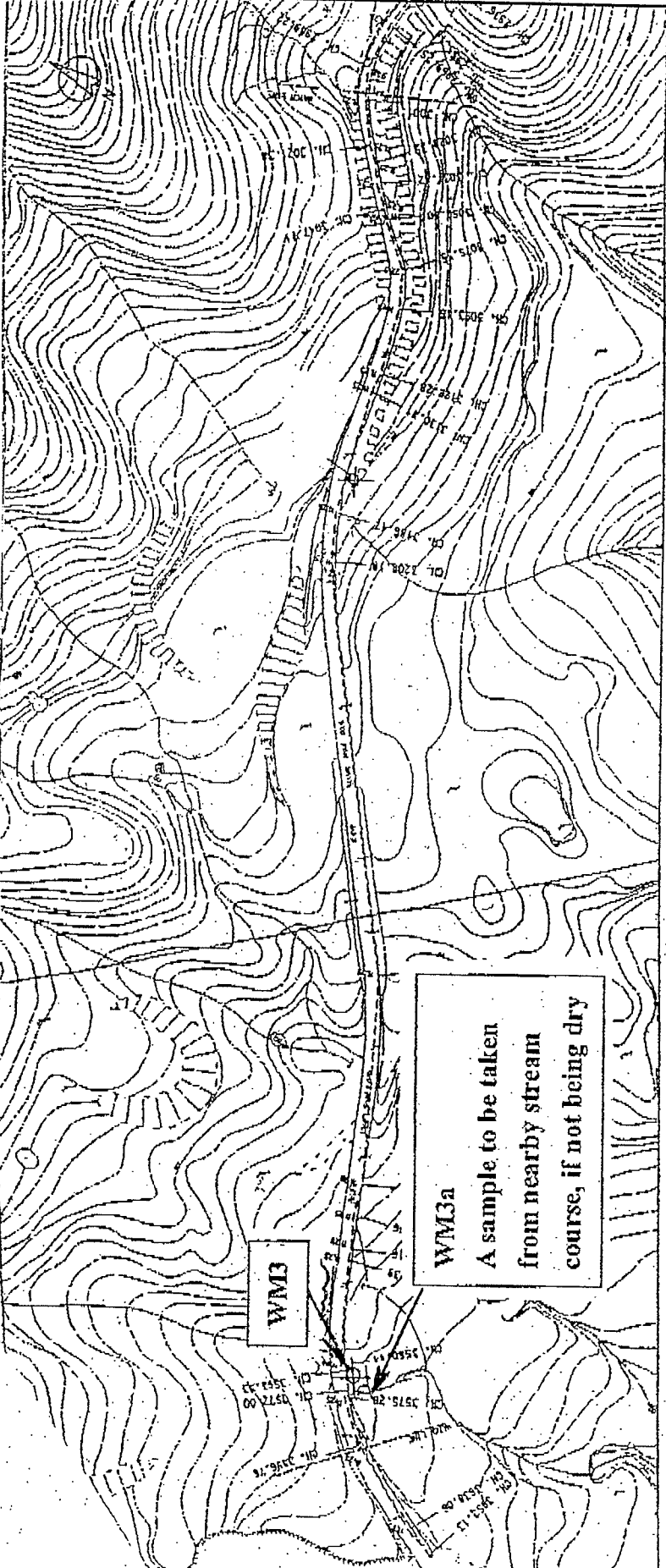
Figures

LOCATIONS

- EXISTING GRADE
- EFFLUENT PIPELINE
- EFFLUENT PIPES
- HATCHBOX CHAMBER
- GATE VALVE CHAMBER
- VENTILATOR PIPE CHAMBER
- 1.5" BENCH

NOTES

1. WORK IS TO BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND CONDITIONS OF CONTRACT NO. D00000301.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL HEALTH DEPARTMENT AND OTHER AGENCIES.
3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL EXISTING UTILITIES AND STRUCTURES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND REPAIR OF ALL EXISTING UTILITIES AND STRUCTURES.
5. THE CONTRACTOR SHALL MAINTAIN ADEQUATE DRAINAGE AND EROSION CONTROL MEASURES THROUGHOUT THE PROJECT.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND REPAIR OF ALL EXISTING UTILITIES AND STRUCTURES.
7. THE CONTRACTOR SHALL MAINTAIN ADEQUATE DRAINAGE AND EROSION CONTROL MEASURES THROUGHOUT THE PROJECT.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND REPAIR OF ALL EXISTING UTILITIES AND STRUCTURES.
9. THE CONTRACTOR SHALL MAINTAIN ADEQUATE DRAINAGE AND EROSION CONTROL MEASURES THROUGHOUT THE PROJECT.



WM3a
A sample to be taken
from nearby stream
course, if not being dry

WM3

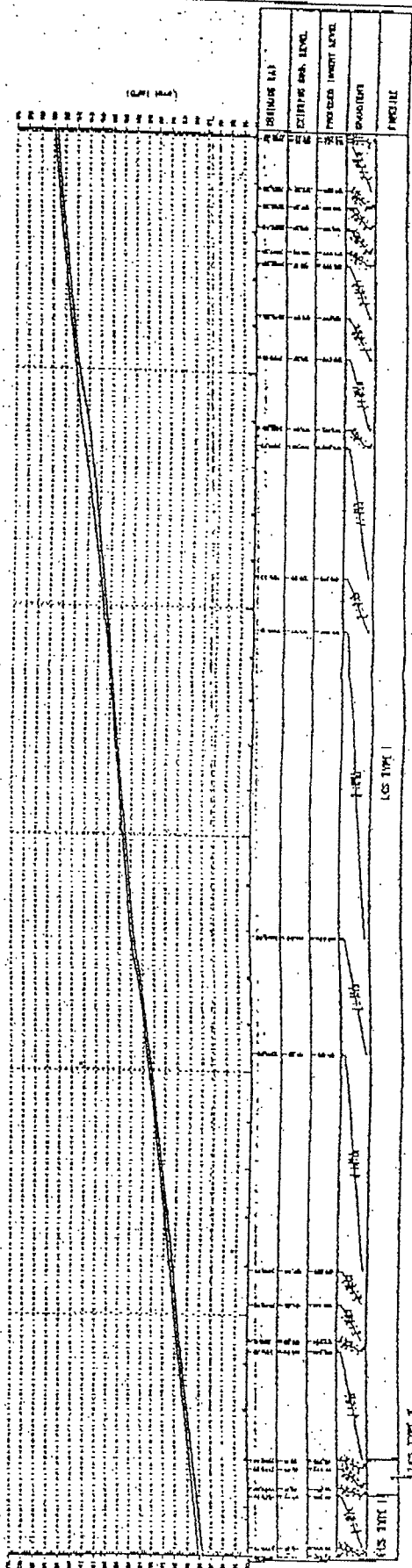
DATE FOR CONSTRUCTION	DATE	BY

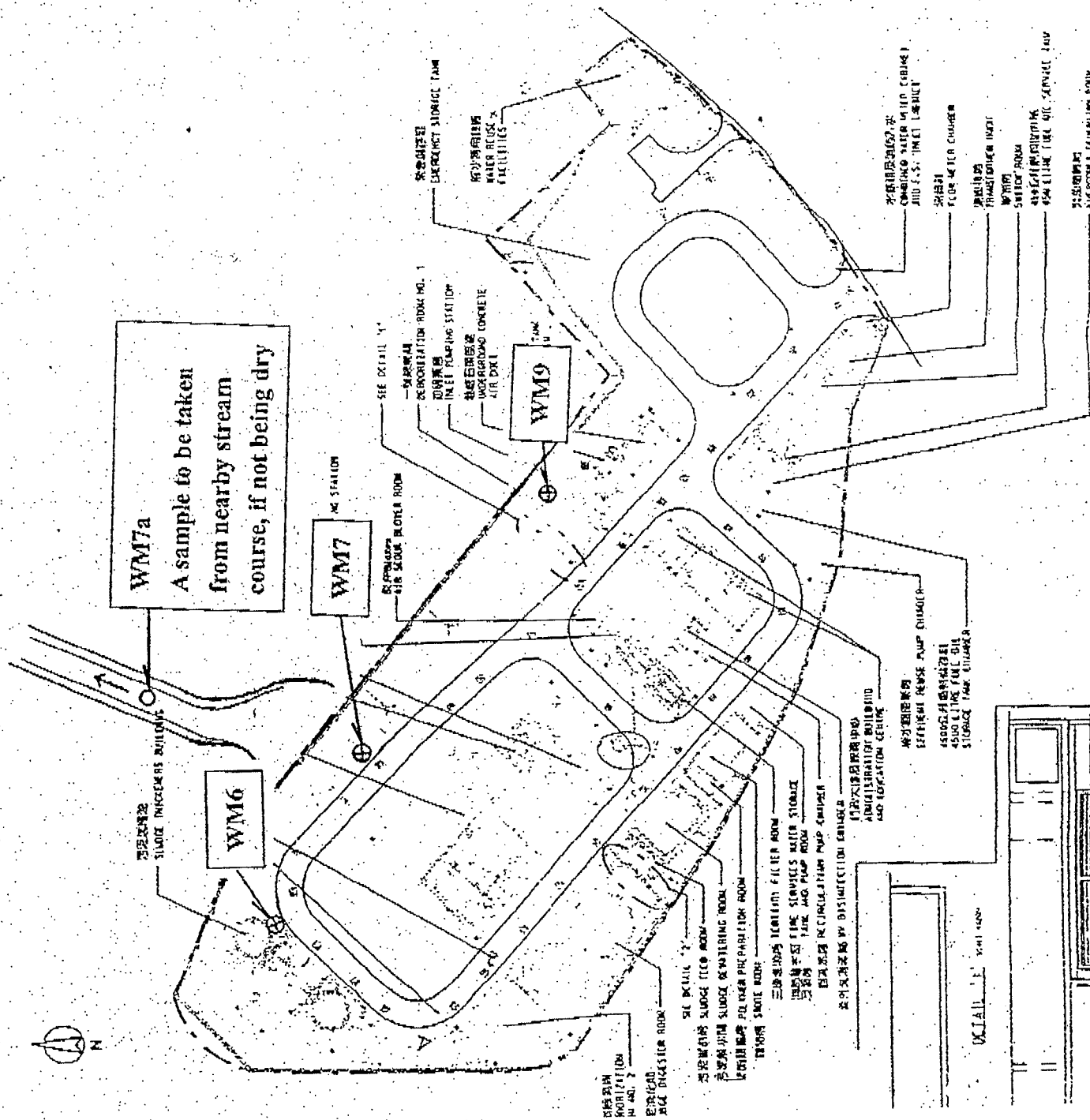
ARUP
One Day / Project / Project / Project

CONTRACT NO. D0000301
ROUND PING SEWAGE TREATMENT
PLANT, TRUNK SEWER AND
EFFLUENT EXPORT PIPELINE

PROJECT NO.
DRAWING NO.
EFFLUENT EXPORT PIPELINE:
ALIGNMENT AND PROFILE
(SHEET 8 OF 10)

DATE: 23/03/2015
TIME: 10:00 AM
SCALE: 1:100
PROJECT: ROUND PING SEWAGE TREATMENT PLANT, TRUNK SEWER AND EFFLUENT EXPORT PIPELINE
DRAWING NO. 15/01/15/001
PROJECT NO. D0000301
DATE: 23/03/2015
TIME: 10:00 AM
SCALE: 1:100
PROJECT: ROUND PING SEWAGE TREATMENT PLANT, TRUNK SEWER AND EFFLUENT EXPORT PIPELINE
DRAWING NO. 15/01/15/001
PROJECT NO. D0000301





WM7a

A sample to be taken from nearby stream course, if not being dry

WM7

WM9

WM6

LOCATION	COORDINATES	
	NORTHING	EASTING
1	33124.351	42268.262
2	33124.351	42268.262
3	33124.351	42268.262
4	33124.351	42268.262
5	33124.351	42268.262
6	33124.351	42268.262
7	33124.351	42268.262
8	33124.351	42268.262
9	33124.351	42268.262
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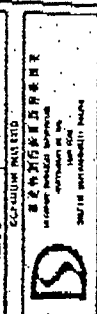
KEY PLAN

NOTES:
1. COORDINATES SHOWN ON THIS PLAN ARE LISTED AT THE BOTTOM OF THIS SHEET.
2. PLAN OF STRUCTURES AND EQUIPMENT ARE SHOWN AT SCALE OF 1:500.

LEGEND:
- - - - - 11% SLOPE
- - - - - 5% SLOPE
- - - - - FULL SCALE PLAN SECTION

PROJECT NO. C-2000-115
DATE: 11/15/00

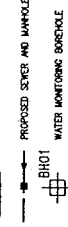
ARUP
Consulting Engineers
1000 West Broadway
New York, NY 10036



NOTE:

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

LEGEND:



A	TEKER ISSUE	TNC	07/05
Rev	Description	By	Date
Comments			

ARUP

One Asia & Parkway Hong Kong Limited

Project Site

**CONTRACT NO. DC20080105
INGONG PING VILLAGE SEWERAGE**

Drawing Site

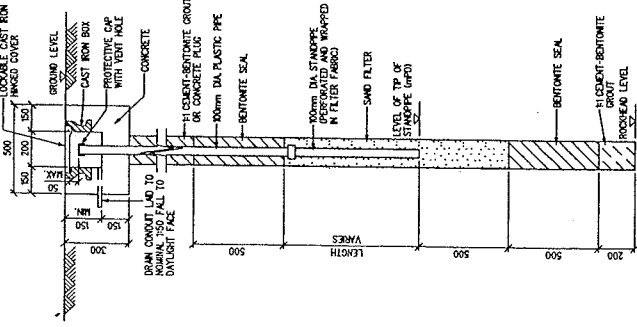
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GROUND WATER MONITORING BOREHOLE**

Drawing No. **23400RVS1406**

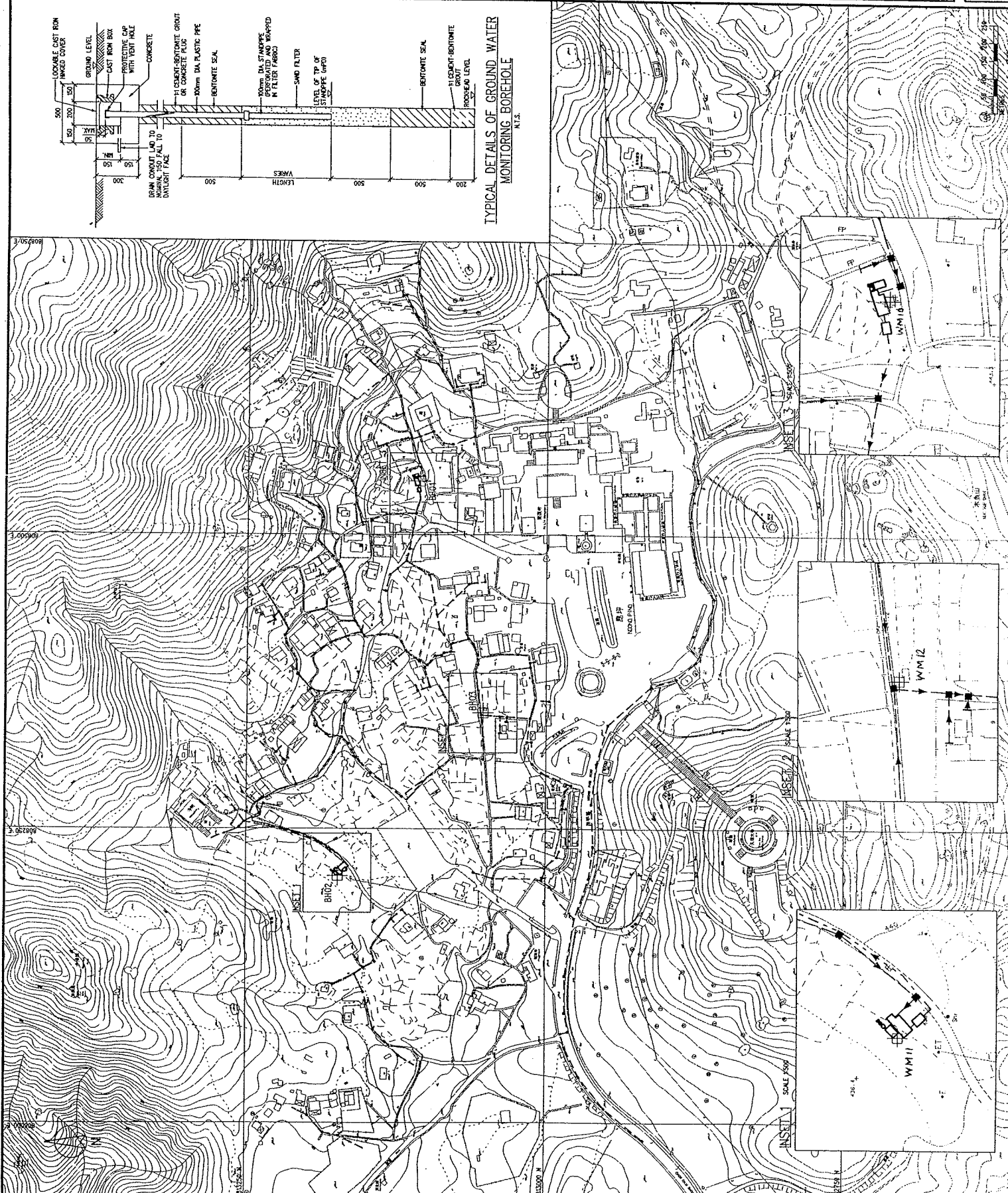
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渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG



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



3/05/2009

3/05/2009

3/05/2009