



PROJECT No.: TCS/00512/09

**DSD CONTRACT NO. DC/2009/13
CONSTRUCTION OF SEWAGE TREATMENT WORKS AT
YUNG SHUE WAN AND SOK KWU WAN**

**SOK KWU WAN PORTION AREA
QUARTERLY ENVIRONMENTAL MONITORING AND
AUDIT (EM&A) REPORT FOR POST
COMMISSIONING – DECEMBER 2015 TO FEBRUARY
2016**

PREPARED FOR
LEADER CIVIL ENGINEERING CORPORATION LIMITED

Quality Index

Date	Reference No.	Prepared By	Approved By
29 March 2016	TCS00512/09/600/R0944v1	 Nicola Hon Environmental Consultant	 T.W. Tam Environmental Team Leader

Version	Date	Description
1	29 March 2016	First Submission

AECOM CDM Joint Venture

Chief Engineer/Harbour Area Treatment Scheme
Drainage Services Department
5/F, Western Magistracy
2A, Pok Fu Lam Road
Hong Kong

Attention: Mr P.F. Ma

Your reference:

Our reference: 05117/6/16/450298

Date: 6 April 2016

BY FAX

Dear Sir,

Contract No. DC/2009/13
Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan
Sok Kwu Wan Portion Area
Quarterly EM&A Report for Post Commissioning – December 2015 to February 2016

We refer to the Environmental Permit (EP-281/2007/A) and the email from the Environmental Team, Action-United Environmental Services and Consulting (AUES), with the report for the captioned project, dated 29 March 2016. We have no comment and have verified the captioned report.

Yours faithfully
AECOM CDM JOINT VENTURE



Y.W. Fung
Independent Environmental Checker

YWF/LLMC/wwsc

Encl

cc	Leader Civil Engineering	(Attn: Mr Calvin Li)
	AUES	(Attn: Mr T.W. Tam)
	ER/LAMMA	(Attn: Mr K. K. Kam)
	CDM	(Attn: Mr John G Dryburgh)

EXECUTIVE SUMMARY

- ES.01. The Leader Civil Engineering Corporation Limited (Leader) has been awarded the *Contract DC/2009/13 - Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan* (the Project) by the Drainage Services Department (DSD) on 4 May 2010. The Project is part of an overall plan approved under a statutory EIA for Outlying Islands Sewerage Stage 1 Phase 2 Package J – Sok Kwu Wan Sewage Collection and Treatment (Register No. AEIAR-075/2003) and Disposal Facilities and Outlying Islands Sewerage Stage 1 Phase 1 Package C – Yung Shue Wan Sewage Treatment Works and Outfall (Register No. EIA-124/BC). The Environmental Permit (EP) No. EP-281/2007 and EP-282/2007 for the Project have been obtained by the DSD on 29 June 2007 for the relevant works. In July 2009, EP-281/2007/A was granted for Sok Kwu Wan relevant works.
- ES.02. For ease of reporting, the EM&A report under the Project is separated two stand-alone parts:
- (a) Sok Kwu Wan (under EP No. 281/2007/A);
 - (b) Yung Shue Wan (under EP No. 282/2007).
- ES.03. According to the construction information provided by the Contractor, the Sok Kwu Wan Sewage Treatment Works (SKW STW) has been handed over to maintenance authority Drainage Services Department (DSD/ST2) for operation on 18 May 2015. As agreed by the Contractor, IEC and RE, the construction phase EM&A programme was terminated on 31 May 2015 and the EM&A Programme has been proceeded to operation phase on 1 June 2015. In this regards, an associated letter ref. TCS0052/10/300/L0894 date 29 May 2015 has been issued to EPD for approval.
- ES.04. According to the EM&A Manual Section 4.9 of Sok Kwu Wan, Operation Phase Monitoring shall be conducted during Sewage Treatment Work (STW) commissioning for a year period. Upon completion of the construction phase of the project, commissioning of the STW of Sok Kwu Wan was commenced on 1 June 2015.
- ES.05. The main objective of the post-commissioning monitoring work is to ensure that the water quality in Sok Kwu Wan due to outfall discharge is more or less in line with the EIA prediction (i.e. no deterioration in local water quality).
- ES.06. According to the EM&A Manual Section 12.5.1, a total of four quarterly summary reports for the post-commissioning monitoring should be prepared with appropriate statistical analyses to show the water quality changes before and after the commissioning the outfall.
- ES.07. This is the 3rd Quarterly Post- Commissioning Monitoring Report prepared for Operation Phase of Sok Kwu Wan Sewage Treatment Plant for the period of 1 December 2015 to 29 February 2016 (Reporting Period).
- ES.08. In the Reporting Period, marine water quality monitoring was conducted on 8 and 22 December 2015, 13 and 26 January 2016 and 4 and 25 February 2016 at the designated monitoring locations. Statistical analysis for the monitoring result was made to compare to the baseline monitoring data. Overall, all the monitoring result obtained during operation phase are similar to the baseline data.
- ES.09. In the Reporting Period, a total of four (4) Action/ Limit Level exceedances of ammonia-N were recorded in the Reporting Period. In view of the measurement result, high values of ammonia-N were also at control station on the same day. It is considered that exceedance was due to natural variation. Other than that, no deterioration in local water quality related to the project was found which in line with the prediction to the EIA prediction.
- ES.10. In order to minimize the odour nuisance, all proposed MBR feed pump station and sludge dewatering room would be enclosed and the outlet air from these facilities would be properly treated by deodorization facility. The performance test for the deodorization facility was conducted upon installation and the test report shown that the deodorization facility at SKWSTP could achieve 99.5% odour removal which in line with the EIA prediction.

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1 INTRODUCTION

PROJECT BACKGROUND

- 1.01 The Leader Civil Engineering Corporation Limited (Leader) has been awarded the *Contract DC/2009/13 - Construction of Sewage Treatment Works at Yung Shue Wan and Sok Kwu Wan* (the Project) by the Drainage Services Department (DSD) on 4 May 2010. The Project is part of an overall plan approved under a statutory EIA for Outlying Islands Sewerage Stage 1 Phase 2 Package J – Sok Kwu Wan Sewage Collection and Treatment (Register No. AEIAR-075/2003) and Disposal Facilities and Outlying Islands Sewerage Stage 1 Phase 1 Package C – Yung Shue Wan Sewage Treatment Works and Outfall (Register No. EIA-124/BC). The Environmental Permit (EP) No. EP-281/2007 and EP-282/2007 for the Project have been obtained by the DSD on 29 June 2007 for the relevant works. After July 2009, EP-281/2007/A instead EP-281/2007 is EP for Sok Kwu Wan relevant works.
- 1.02 Action-United Environmental Services and Consulting (AUES) has been commissioned by Leader as the ET to implement the relevant EM&A programme including Construction (Impact and Post- Construction Monitoring) and Operation (Post- Commissioning Monitoring) Phases.
- 1.03 For ease of reporting, the EM&A report under the Project is separated into two stand-alone parts:
(a) Sok Kwu Wan (under EP No. 281/2007/A);
(b) Yung Shue Wan (under EP No. 282/2007).
- 1.04 The construction of Sok Kwu Wan and Yung Shue Wan were respectively commenced on **27 July 2010** and **14 September 2010**. Moreover, all the construction works at Yung Shue Wan and Sok Kwu Wan were completed on **31 December 2014** and **31 May 2015** respectively.
- 1.05 According to the EM&A Manual Section 4.9 of Sok Kwu Wan, Operation Phase Monitoring shall be conducted during Sewage Treatment Work (STW) commissioning for a year period. Upon completion of the construction phase of the project, commissioning of the STW of Sok Kwu Wan was commenced on 1 June 2015.
- 1.06 The main objective of the post-commissioning monitoring work is to ensure that the water quality in Sok Kwu Wan due to outfall discharge is more or less in line with the EIA prediction (i.e. no deterioration in local water quality)
- 1.07 This is the 3rd Quarterly Post- Commissioning Monitoring Report prepared for Operation Phase of Sok Kwu Wan Sewage Treatment Plant for the period of 1 December 2015 to 29 February 2016 (Reporting Period).

REPORT STRUCTURE

- 1.08 The Post- Commissioning Environmental Monitoring and Audit (EM&A) Report –Sok Kwu Wan structures into the following sections:-

SECTION 1	INTRODUCTION
SECTION 2	POST- COMMISSIONING MONITORING REQUIREMENTS
SECTION 3	WATER QUALITY MONITORING RESULTS
SECTION 4	ODOUR MONITORING RESULTS
SECTION 5	CONCLUSIONS

2 POST-COMMISSIONING MONITORING REQUIREMENTS

ENVIRONMENTAL ASPECT

2.01 The post-commissioning EM&A programme only included the marine water quality monitoring. The detailed monitoring requirement is presented in the following sub-sections.

2.02 A summary of the Marine Water monitoring parameters is listed in *Table 2-1*:

Table 2-1 Summary of the Marine Water monitoring parameters of EM&A Requirements

Measurement	Parameters
In-situ	<ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Salinity (ppt); • Water depth (m); and • Temperature (°C).
Laboratory Analysis	<ul style="list-style-type: none"> • Suspended Solids (mg/L) • Ammonia-Nitrogen (mg/L) • Total Inorganic Nitrogen as N (mg/L) • E Coli (cfu/100mL)

MONITORING LOCATIONS

2.03 Three control stations (C1-C3) and three impact stations (W1-W3) were recommended in the *EM&A Manual Section 4.5*. Impact stations W1-W3 identified at the sensitive receivers (FCZ and secondary contact recreation subzone) to monitor the impacts from the construction of the submarine outfall as well as the effluent discharge from the proposed STW on water quality. Three control stations: C1, C2 & C3 were specified at locations representative of the project site in its undisturbed condition and located at upstream and downstream of the works area. Details of the marine water monitoring stations are described in *Table 2-2*. The graphical of marine water quality monitoring stations is shown in *Appendix B*.

Table 2-2 Location of the Marine Water Quality Monitoring Station

Station	Description	Co-ordnance	
		Easting	Northing
W1	Secondary recreation contact subzone at Mo Tat Wan	832 968	807 732
W2	Fish culture zone at Picnic Bay	832 670	807 985
W3	Fish culture zone at Picnic Bay	832 045	807 893
C1 (flood)	Control Station	833 703	808 172
C2	Control Station	831 467	807 747
C3 (ebb)	Control Station	832 220	808 862

MONITORING FREQUENCY AND PERIOD

2.04 The post-commissioning monitoring was basically carried out in accordance with the requirements in the EM&A Manual Sections 4.9. The marine water quality monitoring requirements are listed as follows:

Parameters: Duplicate in-situ measurements: water depth, temperature, Dissolved Oxygen, pH, turbidity and salinity;

HOKLAS-accredited laboratory analysis: Suspended Solids, Ammonia as N (NH₃-N), Total Inorganic Nitrogen (TIN) and *E-coli*.

Frequency: 2 occasions per month (mid-ebb and mid-flood tides)

Sampling Depth Two depths: 1m below water surface and 1m above sea bottom

Duration: One year monitoring upon the STW commissioning

MONITORING EQUIPMENT

2.05 The monitoring equipments adopted for the EM&A program was proposed by ET. The equipments used for monitoring is listed in *Table 2-3* as below.

Table 2-3 Monitoring Equipments Used in EM&A Program

<i>Marine Water quality</i>	
A Digital Global Positioning System	GPS12 Garmin
Water Depth Detector	Eagle Sonar
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends
Thermometer & DO meter	YSI Professional Plus Multifunctional Meter or YSI 550A DO Meter
pH meter	YSI Professional Plus Multifunctional Meter or Hanna HI 98128
Turbidimeter	Hach 2100q
Salinometer	YSI Professional Plus Multifunctional Meter or ATAGO Hand Refractometer.
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-litter plastic cool box with Ice pad
Suspended Solids; Ammonia as N (NH ₃ -N), Total Inorganic Nitrogen (TIN) and <i>E-coli</i>	HOKLAS-accredited laboratory (ALS Technichem (HK) Pty Ltd)

- i. **Dissolved Oxygen and Temperature Measuring Equipment** – The instrument should be a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable, sensor and a DC power source. The equipment should be capable of measuring as a DO level in the range of 0 – 20mg L⁻¹ and 0 – 200% saturation; and a temperature of 0 – 45 degree Celsius.
- ii. **pH Meter** – The instrument should consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It should be readable to 0.1 pH in arrange of 0 to 14.
- iii. **Turbidity (NTU) Measuring Equipment** – The instrument should be a portable and weatherproof turbidity measuring instrument using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.
- iv. **Water Sampling Equipment** – A water sampler should comprise a transparent PVC cylinder with a capacity not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.
- v. **Water Depth Detector** – A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat.
- vi. **Salinity Measuring Equipment** – A portable salinometer capable of measuring salinity in the range of 0 - 40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.
- vii. **Sample Containers and Storage** – Water samples for Suspended Solids should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen).
- viii. **Monitoring Position Equipment** - A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for maritime (RTCM) Type 16 error message 'screen pop-up' facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office), or other equipment instrument of similar accuracy, should be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.
- ix. **Suspended Solids, Ammonia-Nitrogen, Total Inorganic Nitrogen and *E.Coli* Analysis** –

Analysis of those parameters shall be carried out in a HOKLAS or other international accredited laboratory following the analytical methods listed in *Table 2-4*.

Table 2-4 Analytical Methods to be applied to Marine Water Quality Samples.

Determinant	Standard	Detection Limit
SS (mg/L)	APHA 2540D	0.5mg/L
NH3-N (mg/L)	ASTM D3590-89 B(FIA)	0.005mg/L
E-Coli	In-house method, membrane filtration with CHRIMagar Liquid E.coli-coliform culture	1cfu/100mL

MONITORING PROCEDURES

- 2.06 The marine water quality monitoring was conducted at the six designated locations at Sok Kwu Wan. The sampling procedure including the in-situ monitoring are presented as below:
- 2.07 A Digital Global Positioning System (GPS) was used to identify the designated monitoring stations prior water sampling. A portable, battery-operated echo sounder was used for the determination of water depth at each station. At each station, marine water samples were collected at two depths: 1m below water surface and 1m above sea bottom.
- 2.08 The marine water sampler was lowered into the water body at the predetermined depth. The trigger system of the sampler was activated with a messenger. The opening ends of the sampler then were closed accordingly and water samples were collected.
- 2.09 The sample container was rinsed with a portion of the water sample. The water sample then was transferred to the high-density polythene bottles as provided by the laboratory, labeled with a unique sample number and sealed with a screw cap.
- 2.10 Before commencement of the sampling, general information such as the date and time of sampling, weather condition and tidal condition as well as the personnel responsible for the monitoring were be recorded on the monitoring field data sheet.
- 2.11 A 'Willow' 33-liter plastic cool box packed with ice was used to preserve the collected water samples prior to arrival at the laboratory for chemical determination. The water temperature of the cool box was maintained at a temperature as close to 40C as possible without being frozen. Samples collected were delivered to the laboratory upon collection.

In-situ Measurement

Positioning of Monitoring Locations

- 2.12 A digital Global Positioning System (GPS) was used during marine water monitoring to ensure the monitoring vessel is at the correct location when taking measurement and samples.

Depth, Dissolved Oxygen (DO), Temperature, Salinity and pH value

- 2.13 YSI Professional Plus Multifunctional Meter was used for marine water in-situ measurement, which automates the measurements and data logging of depth, temperature, dissolved oxygen, dissolved oxygen saturation, pH and salinity simultaneously. Before each round of monitoring, the dissolved oxygen probe was calibrated by the wet bulb method and the turbidity and salinity probes checked with distilled water.
- 2.14 The laboratory has be comprehensive quality assurance and quality control programme. For QA/QC procedures, one duplicate samples of every batch of 20 samples is analyzed as followed the HOKLAS accredited requirement.

EQUIPMENT CALIBRATION

- 2.15 The Multi-parameter Water Quality Monitoring System will be calibrated by HOKLAS

accredited laboratory of three month intervals. The available calibration certificate will be issued to ensure the performance of Multi-parameter Water Quality Monitoring System to use for in-situ measurement.

- 2.16 Valid calibration certificates of the monitoring equipment used for EM&A program in the Reporting Period would be attached in *Appendix C*.

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 2.17 The monitoring data are handled by the ET's systematic data recording and management, which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the monitoring programme.
- 2.18 The monitoring data recorded in Multi-parameter Water Quality Monitoring System, are downloaded directly from the equipments at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

- 2.19 The baseline marine water quality monitoring was carried out from August 2010 to January 2011 for consecutive six months. Based on the baseline monitoring data, the proposed Action and Limit Levels for water quality was determined and they are shown in *Table 2-5*.

Table 2-5 Action and Limit Levels of Water Quality Monitoring during Operation Stage of the STP

Parameter	Performance Criteria	Impact Station		
		W1	W2	W3
DO Concentration (Surface and Middle) (mg/L)	Action Level	5.39	4.64	4.71
	Limit Level	5.29	4.56	4.54
DO Concentration (Bottom) (mg/L)	Action Level	N/A	3.60	3.37
	Limit Level	N/A	3.06	3.18
Turbidity (Depth-Average) (NTU)	Action Level	4.39	4.84	6.48
	Limit Level	6.06	5.99	6.71
Suspended Solids (Depth-Average) (mg/L)	Action Level	12.41	9.24	10.79
	Limit Level	12.68	11.28	12.25
Ammonia as N (Depth – Average) (mg/L)	Action Level	0.051	0.042	0.047
	Limit Level	0.054	0.045	0.053
Total Inorganic Nitrogen as N (Depth-Average) (mg/L)	Action Level	0.401	0.385	0.396
	Limit Level	0.464	0.453	0.442
<i>E. coli</i> Depth-Average (1cfu/100ml)	Action Level	24	26	20
	Limit Level	610	610	610

Notes:

- The proposed Action/Limit Levels of DO are adopted to be used 5%-ile/1%-ile of baseline data;
- The proposed Action/Limit Levels of Turbidity, SS, Ammonia and TIN are adopted to be used 95%-ile/99%-ile of baseline data;
- *E-coli* performance criteria of Action and Limit Levels are respectively proposed to use 95%-ile baseline data and 610 cfu/100mL geometric mean; and
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered necessary.

3 POST-COMMISSIONING WATER QUALITY MONITORING RESULTS

3.01 The Operation Phase EM&A Programme was commenced on 1 June 2015. In this reporting period, 6 monitoring events have been carried out at the designated locations. The monitoring results including in-situ measurements and laboratory testing results are provided in *Appendix D* and the graphical plots of monitoring results are shown in *Appendix E*.

Monitoring Result

3.02 In the Reporting Period, water monitoring was carried out on 8 and 22 December 2015, 13 and 26 January 2016 and 4 and 25 February 2016. Monitoring results of key parameters: dissolved oxygen (DO), turbidity, suspended solids, Ammonia-N, TIN and E.coli are summarized in *Tables 3-1 to 3-8*.

Table 3-1 Summary of Water Quality Results – Mid-ebb Tides (Dissolved Oxygen)

Sampling date	DO conc. of Depth Ave. of Surf. and Mid Layer (mg/L)						DO conc. of Depth Ave. of Bottom Layer (mg/L)					
	W1	W2	W3	C1	C2	C3	W1	W2	W3	C1	C2	C3
8-Dec-15	6.77	6.52	7.05	7.00	6.97	7.02	N/A	6.44	7.01	6.90	6.54	6.80
22-Dec-15	7.38	7.34	7.33	7.51	7.43	7.51	N/A	7.17	7.20	7.46	7.37	7.46
13-Jan-16	7.78	7.76	7.77	7.65	7.63	7.61	N/A	7.44	7.34	7.49	7.43	7.54
26-Jan-16	7.54	7.55	7.46	7.55	7.59	7.46	N/A	7.50	7.42	7.47	7.22	7.46
4-Feb-16	7.51	7.33	7.45	7.61	7.52	7.64	N/A	7.67	7.59	7.55	7.39	7.54
25-Feb-16	8.03	8.18	8.34	8.26	8.52	8.19	N/A	8.09	7.99	8.20	8.02	7.99

Table 3-2 Summary of Water Quality Results – Mid-ebb Tides (Turbidity & Suspended Solids)

Sampling date	Turbidity Depth Ave. (NTU)						SS Depth Ave. (mg/L)					
	W1	W2	W3	C1	C2	C3	W1	W2	W3	C1	C2	C3
8-Dec-15	2.66	1.98	1.99	2.65	2.20	2.14	3.50	4.50	5.00	9.50	5.50	4.50
22-Dec-15	1.05	1.91	2.05	1.54	1.18	1.51	4.50	2.50	3.00	2.50	2.50	2.50
13-Jan-16	0.30	0.30	0.85	0.50	0.30	0.35	2.00	3.00	<2	2.00	2.00	3.00
26-Jan-16	1.29	1.37	1.83	1.38	1.02	1.31	2.00	<2	3.00	3.00	2.00	<2
4-Feb-16	0.04	0.73	1.08	0.12	1.17	0.15	<2	<2	<2	<2	3.00	<2
25-Feb-16	2.48	2.67	2.31	2.60	2.17	2.99	5.50	3.00	3.00	4.00	4.00	3.50

Table 3-3 Summary of Water Quality Results – Mid-ebb Tides (Ammonia –N and TIN)

Sampling date	Ammonia-N(mg/L)						TIN (mg/L)					
	W1	W2	W3	C1	C2	C3	W1	W2	W3	C1	C2	C3
8-Dec-15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	0.08	0.09	0.08	0.11	0.09
22-Dec-15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.14	0.15	0.15	0.15	0.13	0.15
13-Jan-16	0.06	0.04	0.05	0.02	0.05	0.02	0.24	0.22	0.23	0.18	0.23	0.17
26-Jan-16	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.16	0.16	0.16	0.16	0.16	0.16
4-Feb-16	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.16	0.16	0.16	0.16	0.16	0.16
25-Feb-16	0.02	0.03	<0.01	0.02	<0.01	0.02	0.18	0.18	0.16	0.19	0.17	0.16

Note: *Bolded and italic indicated Action Level exceedance*
Bolded and underlined indicated Limit Level exceedance

Table 3-4 Summary of Water Quality Results – Mid-ebb Tides (E.coli)

Sampling date	E.coli (CFU/100ml)					
	W1	W2	W3	C1	C2	C3
8-Dec-15	not detected	not detected	1.00	1.50	5.50	4.00
22-Dec-15	1.50	2.00	6.50	1.00	2.00	not detected
13-Jan-16	13.50	9.00	13.00	10.00	4.50	5.50
26-Jan-16	9.00	9.00	1.00	not detected	not detected	not detected
4-Feb-16	2.00	9.00	1.00	not detected	not detected	not detected
25-Feb-16	1.00	not detected	11.00	1.00	1.00	3.00

Table 3-5 Summary of Water Quality Results – Mid-flood Tides (Dissolved Oxygen)

Sampling date	DO conc. of Depth Ave. of Surf. and Mid Layer (mg/L)						DO conc. of Depth Ave. of Bottom Layer (mg/L)					
	W1	W2	W3	C1	C2	C3	W1	W2	W3	C1	C2	C3
8-Dec-15	6.78	6.78	6.77	6.94	6.67	6.91	N/A	6.70	6.75	6.67	6.59	6.70
22-Dec-15	7.41	7.39	7.35	7.54	7.39	7.53	N/A	7.29	7.21	7.48	7.29	7.47
13-Jan-16	7.64	7.59	7.63	7.53	7.71	7.53	N/A	7.23	7.25	7.37	7.62	7.39
26-Jan-16	7.73	7.55	7.53	7.54	7.49	7.66	N/A	7.51	7.45	7.48	7.32	7.49
4-Feb-16	7.59	7.48	7.54	7.62	7.48	7.61	N/A	7.68	7.62	7.55	7.56	7.55
25-Feb-16	8.16	8.39	8.46	8.06	8.12	8.11	N/A	7.92	7.92	7.82	7.96	7.83

Table 3-6 Summary of Water Quality Results – Mid- flood Tides (Turbidity & Suspended Solids)

Sampling date	Turbidity Depth Ave. (NTU)						SS Depth Ave. (mg/L)					
	W1	W2	W3	C1	C2	C3	W1	W2	W3	C1	C2	C3
8-Dec-15	2.33	1.81	2.08	2.09	2.01	2.17	4.50	4.00	4.00	3.00	6.50	5.00
22-Dec-15	1.16	1.20	4.04	1.29	1.47	1.22	2.50	4.00	4.50	<2	3.00	2.50
13-Jan-16	0.52	0.45	0.56	0.57	0.71	0.51	2.00	<2	2.00	2.00	2.00	<2
26-Jan-16	1.78	2.21	1.48	2.17	0.95	2.03	<2	<2	<2	<2	3.00	<2
4-Feb-16	0.85	0.89	1.13	0.89	1.42	0.90	2.00	<2	3.00	3.00	2.00	<2
25-Feb-16	2.18	2.40	2.59	3.09	2.15	3.32	6.00	4.00	2.00	3.00	4.00	4.00

Table 3-7 Summary of Water Quality Results – Mid- flood Tides (Ammonia –N and TIN)

Sampling date	Ammonia-N(mg/L)						TIN (mg/L)					
	W1	W2	W3	C1	C2	C3	W1	W2	W3	C1	C2	C3
8-Dec-15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	0.08	0.10	0.07	0.11	0.08
22-Dec-15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	0.16	0.14	0.16	0.15	0.15
13-Jan-16	0.04	0.05	0.06	0.03	0.04	0.06	0.21	0.23	0.25	0.20	0.21	0.20
26-Jan-16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	0.16	0.16	0.16	0.16	0.15
4-Feb-16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	0.16	0.16	0.16	0.16	0.15
25-Feb-16	0.01	0.04	<0.01	<0.01	0.01	0.02	0.18	0.18	0.17	0.16	0.19	0.17

Note:

1. *Bolded and underlined indicated Limit Level exceedance.*

Table 3-8 Summary of Water Quality Results – Mid- flood Tides (E.coli)

Sampling date	E.coli (CFU/100ml)					
	W1	W2	W3	C1	C2	C3
8-Dec-15	1.00	not detected	not detected	not detected	6.00	not detected
22-Dec-15	7.00	5.00	8.00	1.00	not detected	not detected
13-Jan-16	21.50	18.00	15.00	10.00	2.00	4.00
26-Jan-16	not detected	not detected	not detected	not detected	not detected	not detected
4-Feb-16	not detected	not detected	not detected	not detected	not detected	not detected
25-Feb-16	not detected	1.50	not detected	1.00	2.00	2.00

3.03 Statistical analysis for the monitoring result was made to compare to the baseline monitoring data. Overall, all the monitoring result obtained during operation phase is fall within and similar to the baseline data. The comparison of operation phase and baseline monitoring result is presented in **Tables 3-9**. Moreover, a summary of exceedances for the key parameters are shown in **Table 3-10**.

Table3-9 Fluctuation Ranges for the Monitored Operation Phase Water Quality Parameters

Parameter		W1	W2	W3	C1	C2	C3
DO (mg/L)	Surface + Middle	6.77 – 8.16 (5.26 – 9.27)	6.52 – 8.39 (4.54 – 11.48)	6.77 – 8.46 (4.49 – 8.68)	6.94 – 8.26 (4.29 – 10.52)	6.67 – 8.52 (3.98 – 11.82)	6.91 – 8.19 (4.18 – 7.42)
	Bottom	NA	6.44 – 8.09 (2.92 – 10.76)	6.75 – 7.99 (3.17 – 8.26)	6.67 – 8.20 (3.01 – 9.97)	6.54 – 8.02 (3.73 – 10.39)	6.70 – 7.99 (3.68 – 10.02)
Turbidity (NTU)		0.04 – 2.66 (1.40 – 6.55)	0.30 – 2.67 (1.38 – 6.33)	0.56 – 4.04 (1.48 – 6.75)	0.12 – 3.09 (1.58 – 8.17)	0.30 – 2.20 (1.30 – 6.53)	0.15 – 3.32 (1.08 – 7.35)
SS (mg/L)		2.0 – 6.0 (0.50 – 12.70)	2.5 – 4.5 (1.10 – 11.87)	2.0 – 5.0 (0.50 – 12.67)	2.0 – 9.5 (0.90 – 11.10)	2.0 – 6.5 (0.70 – 12.73)	2.5 – 5.0 (1.27 – 11.17)
Ammonia-N (mg/L)		0.01 – 0.06 (0.005 – 0.055)	0.03 – 0.05 (0.005 – 0.046)	0.05 – 0.06 (0.005 – 0.054)	0.02 – 0.03 (0.005 – 0.054)	0.01 – 0.05 (0.005 – 0.105)	0.02 – 0.06 (0.005 – 0.047)
TIN (mg/L)		0.08 – 0.24 (0.04 – 0.480)	0.08 – 0.23 (0.063 – 0.473)	0.09 – 0.25 (0.067 – 0.453)	0.07 – 0.20 (0.063 – 0.420)	0.11 – 0.23 (0.027 – 0.477)	0.08 – 0.20 (0.060 – 0.407)
E.coli (CFU/100ml)		1.00 – 21.50 (1 – 100)	1.50 – 18.00 (1 – 57)	1.00 – 15.00 (1 – 42)	1.00 – 10.00 (1 – 82)	1.00 – 6.00 (1 – 22)	2.00 – 5.50 (1 – 100)

Note:

- The numbers in brackets denote the range of baseline monitoring result.

Table 3-10 Summary of Exceedances of Marine Water Quality

Station	DO (Ave of surf. & mid-depth)		DO (Ave. of Bottom Layer)		Turbidity (Depth Ave)		SS (Depth Ave)		Ammonia – N (Depth Ave)		TIN (Depth Ave)		E.coli (Depth Ave)	
	A	L	A	L	A	L	A	L	A	L	A	L	A	L
Mid-Ebb														
W1	0	0	0	0	0	0	0	0	0	1	0	0	0	1
W2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W3	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Mid-Flood														
W1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W2	0	0	0	0	0	0	0	0	0	1	0	0	0	1
W3	0	0	0	0	0	0	0	0	0	1	0	0	0	1
No. of exceed.	0	0	0	0	0	0	0	0	1	3	0	0	1	3

- 3.04 According to the monitoring result, a total of four (4) Action/ Limit Level exceedances of ammonia-N were recorded in the Reporting Period. In view of the measurement result, high values of ammonia-N were also at control station on the same day. It is considered that exceedance was due to natural variation. Other than that, no deterioration in local water quality related to the project was found which in line with the prediction to the EIA prediction.

4 ODOUR MONITORING RESULTS

- 4.01 As presented in the EIA Report and subsequent Review Report on EIA Study, it was predicted that air quality at the ASRs would satisfy the odour criteria with the proposed mitigation measures. Nevertheless, monitoring would be carried out during the operation phase to monitor the performance of the deodorization facilities.
- 4.02 In order to minimize the odour nuisance, all proposed MBR feed pump station and sludge dewatering room would be enclosed and the outlet air from these facilities would be properly treated by deodorization facility. The performance test for the deodorization facility was conducted upon installation and it aims to achieve 99.5% odour removal.

Methodology

- 4.03 The odour samples of air were collected at the inlet and outlet in accordance with ISC 3rd edition, Method 701 “Determination of Hydrogen Sulphide Content of the Atmosphere”.
- 4.04 Hydrogen sulfide (H₂S), as an odourous indicator gas in this odour removal efficiency test for the deodorizer, was generated by mixing sodium sulfide hydrates and concentrated sulfuric acid at the inlet of the deodorizer. The generation rate of gaseous of H₂S was kept constant by controlling the delivery rate of concentrated sulfuric acid from the dropping funnel. Gaseous sample containing H₂S was withdrawn from each sampling port (inlet and outlet) at a flow rate of 2 L/min., using a sampling pump. H₂S present in the gas stream was collected in the impinger which contained 10 – 15 mL absorbing solution. Sampling time was about 10 minutes to avoid overloading of the absorbing solution while ensuring a large enough sample was collected.
- 4.05 Colorimetric analytical method (ISC 3rd edition, Method 701 “Determination of Hydrogen Sulphide Content of the Atmosphere”) was used to determine the concentration of H₂S in the deodorizer odour removal test.
- 4.06 H₂S will be injected in the inlet as per following table, one sample of inlet H₂S concentration and one sample of outlet H₂S concentration will be measured and the removal efficiency of the deodorizer will be calculated as :-
- 4.07 Efficiency = (1-outlet concentration/inlet concentration) x 100%.

Injection H2S concentration	Location
At least 7 ppm	SKWSTW

Result

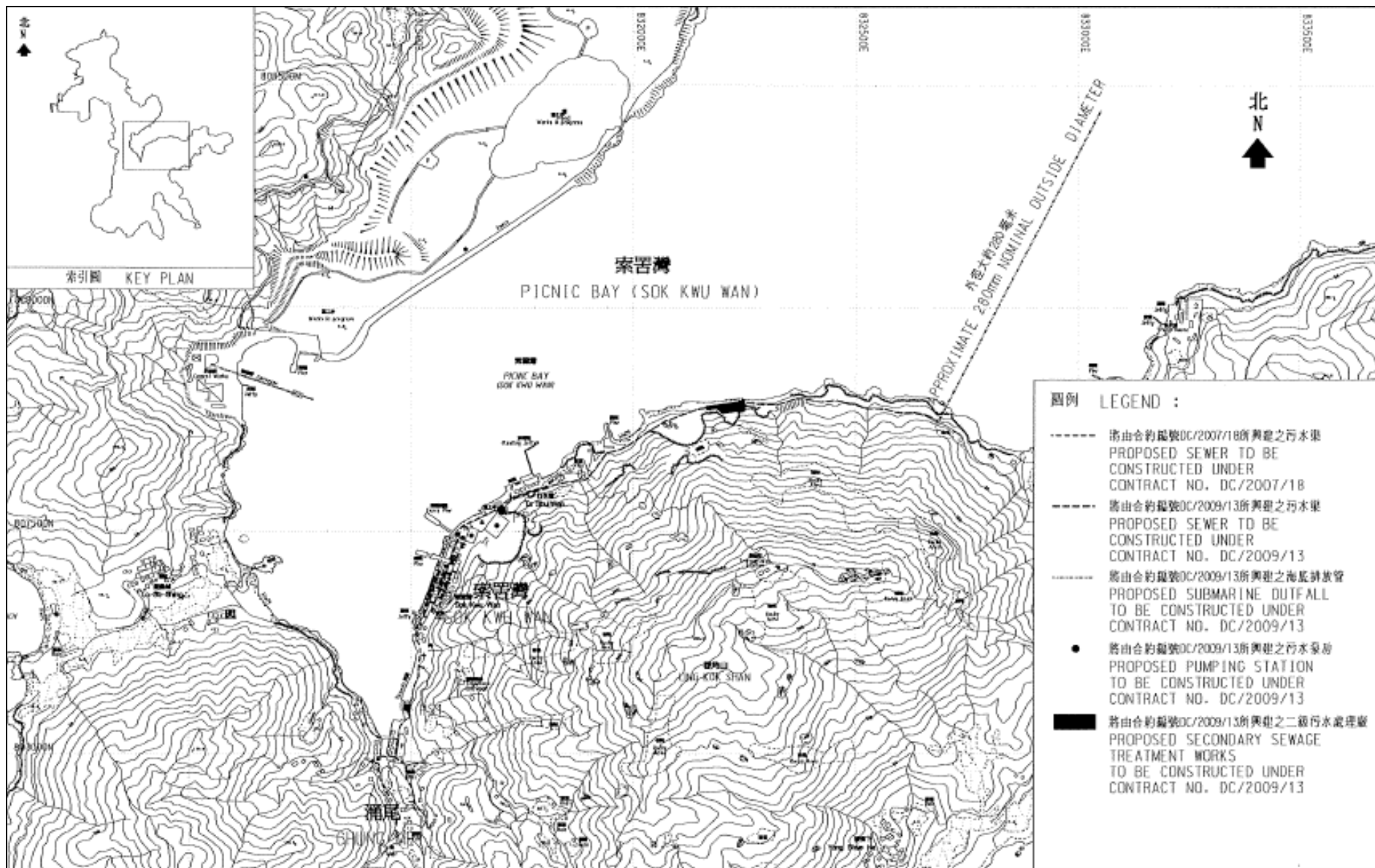
- 4.08 According to the test report provided by the laboratory, it shows that the deodorization facility at two DO tanks could achieve over 99.5% odour removal which in line with the EIA prediction. The test reports for performance of deodorization facility at SKWSTW are presented in **Appendix F**.

5 CONCLUSIONS

- 5.01 This is the 3rd Quarterly Post- Commissioning Monitoring Report prepared for Operation Phase of Sok Kwu Wan Sewage Treatment Plant for the period of 1 December 2015 to 29 February 2016 (Reporting Period).
- 5.02 In the Reporting Period, marine water quality monitoring was conducted on 8 and 22 December 2015, 13 and 26 January 2016 and 4 and 25 February 2016 at the designated monitoring locations. Statistical analysis for the monitoring result was made to compare to the baseline monitoring data. Overall, all the monitoring result obtained during operation phase is similar to the baseline data.
- 5.03 In the Reporting Period, a total of four (4) Action/ Limit Level exceedances of ammonia-N were recorded in the Reporting Period. In view of the measurement result, high values of ammonia-N were also at control station on the same day. It is considered that exceedance was due to natural variation. Other than that, no deterioration in local water quality related to the project was found which in line with the prediction to the EIA prediction.
- 5.04 In order to minimize the odour nuisance, all proposed MBR feed pump station and sludge dewatering room would be enclosed and the outlet air from these facilities would be properly treated by deodorization facility. The performance test for the deodorization facility was conducted upon installation and the test report shown that the deodorization facility at SKWSTP could achieve 99.5% odour removal which in line with the EIA prediction.

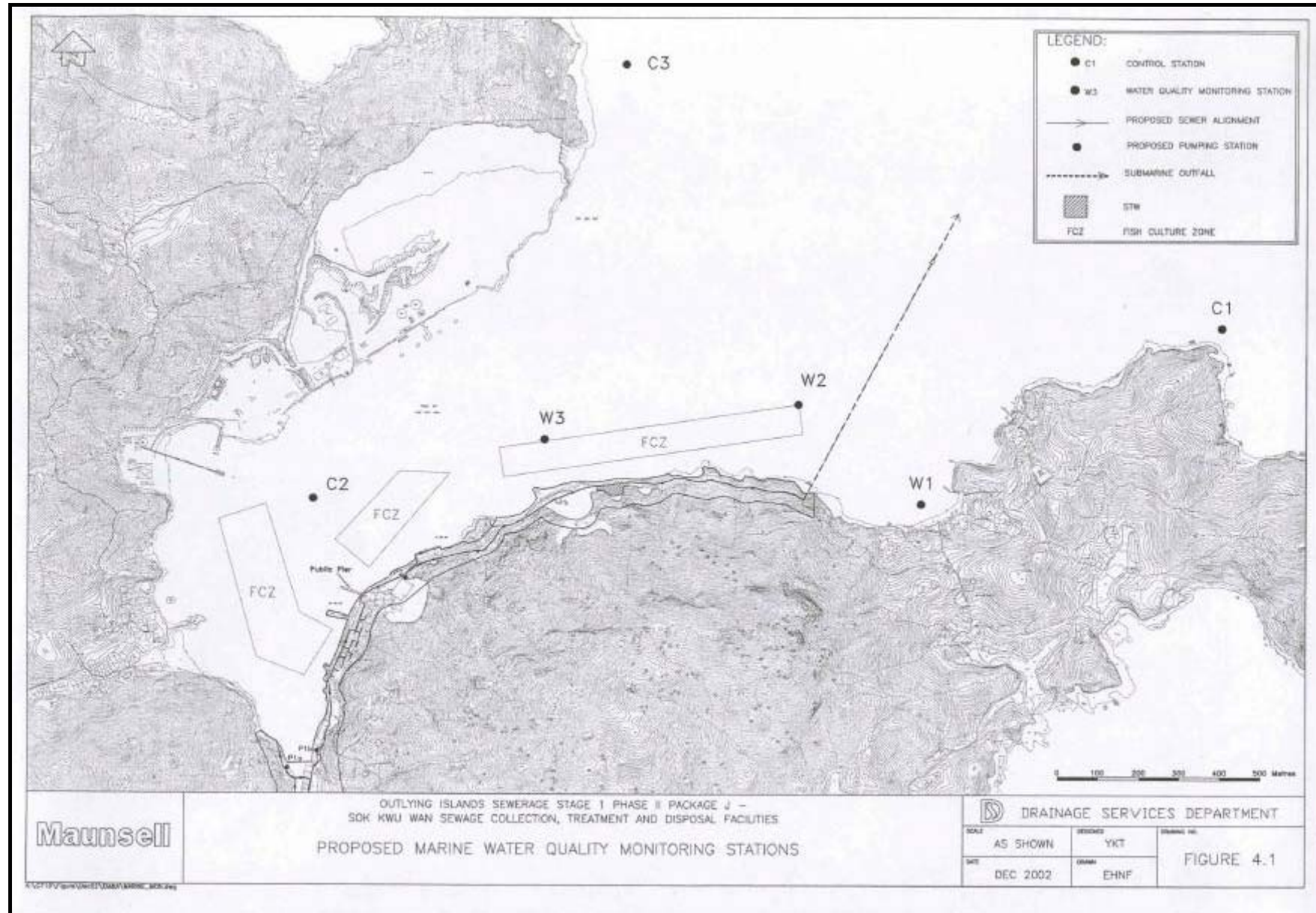
Appendix A

Site Layout Plan – Sok Kwu Wan Portion Area



Appendix B

**Location of Monitoring Stations
(Water Quality)**



Appendix C

Monitoring Equipments Calibration Certificate



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG.

WORK ORDER: HK1539523
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 14/10/2015
DATE OF ISSUE: 23/10/2015

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Conductivity, Dissolved Oxygen, pH, Salinity, Temperature and Turbidity
Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Sonde 6820 / 650 MDS
Serial No.: 02J0912 / 02K0788 AA
Equipment No.: --
Date of Calibration: 22 October, 2015

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1539523
Sub-Batch: 0
Date of Issue: 23/10/2015
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Sonde 6820 / 650 MDS
Serial No.: 02J0912 / 02K0788 AA
Equipment No.: --
Date of Calibration: 22 October, 2015 **Date of next Calibration:** 22 January, 2016

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	140.9	-4.1
6667	6281	-5.8
12890	12580	-2.4
58670	58650	0.0
Tolerance Limit (%)		±10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.53	2.66	+0.13
5.26	5.42	+0.16
7.97	8.07	+0.10
Tolerance Limit (mg/L)		±0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.03	+0.03
7.0	7.02	+0.02
10.0	10.01	+0.01
Tolerance Limit (pH unit)		±0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.02	+0.2
20	20.62	+3.1
30	30.07	+0.2
Tolerance Limit (%)		±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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 General Manager -
 Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1539523
Sub-Batch: 0
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Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Sonde 6820 / 650 MDS
Serial No.: 02J0912 / 02K0788 AA
Equipment No.: --
Date of Calibration: 22 October, 2015 Date of next Calibration: 22 January, 2016

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical
Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10	10.11	+0.1
20	21.01	+1.0
40	40.34	+0.3
Tolerance Limit (°C)		±2.0

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.1	+2.5
40	42.0	+5.0
80	86.1	+7.6
400	414.1	+3.5
800	838.1	+4.8
Tolerance Limit (%)		±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

A handwritten signature in blue ink, appearing to read 'Richard Fung Lim Chee'.

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KWAI CHUNG,
N.T., HONG KONG.

WORK ORDER: HK1600630
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 06/01/2016
DATE OF ISSUE: 12/01/2016

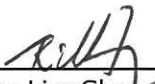
COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Conductivity, Dissolved Oxygen, pH, Salinity and Temperature
Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 12 January, 2016

NOTES

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Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


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General Manager
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Page 1 of 3

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1600630
Sub-Batch: 0
Date of Issue: 12/01/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --

Date of Calibration: 12 January, 2016 **Date of next Calibration:** 12 April, 2016

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	136.1	-7.4
6667	6018	-9.7
Tolerance Limit (%)		±10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.60	3.66	+0.06
6.55	6.59	+0.04
8.65	8.68	+0.03
Tolerance Limit (mg/L)		±0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.19	+0.19
7.0	6.82	-0.18
10.0	9.83	-0.17
Tolerance Limit (pH unit)		±0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.05	-9.5
20	18.34	-8.3
30	27.09	-9.7
Tolerance Limit (%)		±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.


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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1600630
Sub-Batch: 0
Date of Issue: 12/01/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --

Date of Calibration: 12 January, 2016 Date of next Calibration: 12 April, 2016

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
13	12.4	-0.6
23	22.4	-0.6
38	36.9	-1.1
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.


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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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WORK ORDER: HK1600630
SUB-BATCH: 1
LABORATORY: HONG KONG
DATE RECEIVED: 06/01/2016
DATE OF ISSUE: 12/01/2016

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Conductivity
Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 12 January, 2016

NOTES

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General Manager -
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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1600630
Sub-Batch: 1
Date of Issue: 12/01/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 12 January, 2016

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
12890	11401	-11.6
58670	50437	-14.0
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

A handwritten signature in blue ink, appearing to read 'Richard Fung Lim Chee'.

Mr. Fung Lim Chee, Richard
General Manager -
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WORK ORDER: HK1600633
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 06/01/2016
DATE OF ISSUE: 08/01/2016

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Turbidity
Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 07 January, 2016

NOTES

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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1600633
Sub-batch: 0
Date of Issue: 08/01/2016
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 07 January, 2016

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.00	--
40	43.7	+9.3
400	404	+1.0
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.


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Appendix D

Monitoring Data Sheet

Contract No. DC/2009/13

Construction of Sewage Treatment Works
at Yung Shue Wan and Sok Kwu Wan



Sok Kwu Wan

Post-commissioning Marine Water Monitoring Programme
8-Dec-15

Date / Time	Location	Tide	Co-ordinates		Water Depth m	Sampling Depth m	Temp °C	DO Conc mg/L	DO Saturation %	Turbidity NTU	Salinity ppt	pH unit	SS mg/l	Ammonia N mg/l	TIN mg/l	E.coli 1CFU/100ml
			East	North												
2015/12/8 10:28:00	W1	ME	832972	807718	2.7	1.00	23.5	7.03	100.2	2.3	35.75	8.52	3	<0.01	0.07	NOT Detected
						1.00	23.4	7.02	100.2	2.34	35.75	8.52				
						1.70	22.9	6.52	93.9	2.99	35.75	8.53				
2015/12/8 10:30:00	W2	ME	832604	807991	12.3	1.00	23.6	6.52	93.9	1.66	35.28	8.5	5	<0.01	0.08	NOT Detected
						1.00	23.4	6.51	93.8	1.63	35.28	8.5				
						11.30	23.1	6.44	93.1	2.33	36.05	8.52				
2015/12/8 10:41:00	W3	ME	832038	807892	11.4	1.00	24.2	7.05	100.4	1.59	34.97	8.49	5	<0.01	0.09	1
						1.00	24.3	7.05	100.3	1.68	34.97	8.49				
						10.40	24	7.01	99.8	2.36	35.82	8.49				
2015/12/8 10:42:00	W3	ME	832038	807892	11.4	10.40	23.9	7.01	99.8	2.33	35.9	8.49	5	<0.01	0.08	1
						1.00	24.3	7	99.8	2.41	35.05	8.51				
						1.00	24.3	7	99.8	2.45	35.06	8.51				
2015/12/8 10:22:00	C1	ME	833703	808181	15.8	14.80	23.9	6.94	99.1	2.89	36.01	8.52	10	<0.01	0.08	1
						14.80	23.8	6.85	98	2.84	36.02	8.52				
						1.00	23.5	6.96	99.4	1.18	35	8.53				
2015/12/8 10:54:00	C2	ME	831468	807757	9.8	1.00	23.5	6.97	99.5	1.13	35	8.53	5	<0.01	0.11	3
						8.80	23.1	6.55	94.2	3.26	35.57	8.51				
						8.80	23.1	6.52	93.9	3.24	35.44	8.51				
2015/12/8 10:09:00	C3	ME	832218	808871	16.2	1.00	23.5	7.02	99.8	1.64	35.05	8.45	5	<0.01	0.08	NOT Detected
						1.00	23.4	7.02	99.9	1.65	35.05	8.45				
						15.20	23.1	6.82	97.3	2.65	35.95	8.5				
2015/12/8 10:09:00	C3	ME	832218	808871	16.2	15.20	23	6.78	96.7	2.61	36.02	8.51	4	<0.01	0.09	4
						1.00	23.6	6.83	97.4	2.21	35.63	8.52				
						1.00	23.6	6.84	97.4	2.23	35.64	8.52				
2015/12/8 15:51:00	W1	MF	832966	807723	2.8	1.80	23.1	6.75	96.5	2.46	35.66	8.53	4	<0.01	0.08	NOT Detected
						1.80	23.2	6.71	96	2.43	35.66	8.53				
						1.00	23.8	6.82	97.3	1.06	35.43	8.51				
2015/12/8 15:40:00	W2	MF	832602	807981	12.9	1.00	23.9	6.74	96.3	1.01	35.43	8.51	4	<0.01	0.08	NOT Detected
						11.90	23.3	6.72	96.2	2.59	35.7	8.54				
						11.90	23.3	6.68	95.8	2.56	35.7	8.54				
2015/12/8 15:27:00	W3	MF	832046	807894	11.7	1.00	23.6	6.77	96.4	1.24	35.01	8.53	4	<0.01	0.09	NOT Detected
						1.00	23.6	6.76	96.2	1.23	35.01	8.53				
						10.70	23.1	6.76	96.2	2.93	35.69	8.55				
2015/12/8 15:27:00	W3	MF	832046	807894	11.7	10.70	23.3	6.74	96	2.92	35.75	8.55	4	<0.01	0.1	NOT Detected
						1.00	23.9	6.94	98.9	1.62	35.46	8.51				
						1.00	23.8	6.94	98.8	1.68	35.45	8.51				
2015/12/8 15:58:00	C1	MF	833692	808190	15.7	14.70	22.9	6.67	95.8	2.54	35.91	8.54	3	<0.01	0.06	NOT Detected
						14.70	22.8	6.67	95.7	2.53	35.93	8.54				
						1.00	23.5	6.68	95.5	1.64	35.03	8.58				
2015/12/8 15:19:00	C2	MF	831470	807753	10.1	1.00	23.5	6.66	95.3	1.68	35.03	8.58	6	<0.01	0.11	3
						9.10	23.1	6.59	94.4	2.39	35.85	8.55				
						9.10	23.1	6.58	94.3	2.34	35.88	8.55				
2015/12/8 16:19:00	C3	MF	832209	808877	15.9	1.00	23.7	6.91	99	1.19	35.43	8.53	4	<0.01	0.08	NOT Detected
						1.00	23.7	6.9	98.9	1.18	35.43	8.53				
						14.90	23.2	6.7	96.5	3.12	35.93	8.54				
2015/12/8 16:19:00	C3	MF	832209	808877	15.9	14.90	23.3	6.69	96.4	3.19	35.94	8.54	6	<0.01	0.08	NOT Detected
						14.90	23.3	6.69	96.4	3.19	35.94	8.54				

Remarks: MF - Middle Flood tide
ME - Middle Ebb tide

Contract No. DC/2009/13

Construction of Sewage Treatment Works
at Yung Shue Wan and Sok Kwu Wan



Sok Kwu Wan

Post-commissioning Marine Water Monitoring Programme
22-Dec-15

Date / Time	Location	Tide	Co-ordinates		Water Depth m	Sampling Depth m	Temp °C	DO Conc mg/L	DO Saturation %	Turbidity NTU	Salinity ppt	pH unit	SS mg/l	Ammonia N mg/l	TIN mg/l	E.coli 1CFU/100ml
			East	North												
2015/12/22 08:53:00	W1	ME	832962	807720	2.9	1.00	20	7.4	100.5	1.01	35.88	8.68	4	<0.01	0.14	2
						1.00	20	7.39	100.4	1.02	35.88	8.68				
						1.90	20	7.37	100.1	1.07	35.89	8.68				
						1.90	20	7.35	99.9	1.1	35.89	8.67				
2015/12/22 09:01:00	W2	ME	832609	807979	12.2	1.00	20	7.34	99.8	1.43	35.88	8.68	2	<0.01	0.15	2
						1.00	20	7.34	99.8	1.46	35.88	8.68				
						11.20	20	7.17	97.4	2.37	35.89	8.67				
						11.20	20	7.17	97.4	2.38	35.89	8.67				
2015/12/22 09:10:00	W3	ME	832054	807891	11.5	1.00	20	7.35	99.9	1.37	35.89	8.67	3	<0.01	0.15	7
						1.00	20	7.31	99.4	1.35	35.89	8.67				
						10.50	20	7.21	97.9	2.84	35.89	8.67				
						10.50	20	7.18	97.5	2.64	35.89	8.67				
2015/12/22 08:46:00	C1	ME	833708	808191	15.2	1.00	20	7.51	102	1.44	35.87	8.68	3	<0.01	0.14	NOT Detected
						1.00	20	7.51	102	1.4	35.87	8.68				
						14.20	20	7.46	101.4	1.66	35.87	8.68				
						14.20	20	7.46	101.4	1.66	35.87	8.68				
2015/12/22 09:18:00	C2	ME	831477	807750	9.7	1.00	20	7.43	100.9	0.94	35.89	8.68	3	<0.01	0.12	2
						1.00	20	7.42	100.9	1.01	35.89	8.68				
						8.70	20	7.37	100.2	1.37	35.89	8.68				
						8.70	20	7.36	100.1	1.38	35.89	8.68				
2015/12/22 08:27:00	C3	ME	832229	808879	14.9	1.00	20	7.51	102.1	1.45	35.86	8.62	3	<0.01	0.15	NOT Detected
						1.00	20	7.51	102.1	1.51	35.86	8.62				
						13.90	20	7.46	101.3	1.57	35.88	8.67				
						13.90	20	7.46	101.4	1.52	35.88	8.68				
2015/12/22 13:56:00	W1	MF	832959	807724	2.9	1.00	20	7.45	101.3	1.15	35.89	8.68	3	<0.01	0.16	7
						1.00	20	7.42	100.9	1.16	35.89	8.68				
						1.90	20	7.4	100.6	1.19	35.89	8.68				
						1.90	20	7.38	100.4	1.15	35.89	8.68				
2015/12/22 13:49:00	W2	MF	832603	807989	12	1.00	20	7.39	100.5	1.14	35.88	8.68	3	<0.01	0.16	5
						1.00	20	7.39	100.4	1.17	35.88	8.68				
						11.00	20	7.29	99	1.22	35.88	8.68				
						11.00	20	7.28	98.9	1.25	35.88	8.68				
2015/12/22 13:40:00	W3	MF	832041	807896	11.5	1.00	20	7.36	100	1.91	35.88	8.68	5	<0.01	0.14	10
						1.00	20	7.33	99.7	1.89	35.88	8.68				
						10.50	20	7.21	98.1	1.67	35.89	8.67				
						10.50	20	7.2	97.9	1.07	35.89	8.67				
2015/12/22 14:07:00	C1	MF	833708	808177	15.3	1.00	20	7.54	102.4	1.23	35.87	8.7	<2	<0.01	0.16	NOT Detected
						1.00	20	7.53	102.4	1.27	35.87	8.69				
						14.30	20	7.48	101.6	1.32	35.87	8.69				
						14.30	20	7.48	101.6	1.34	35.87	8.69				
2015/12/22 13:31:00	C2	MF	831454	807749	9.6	1.00	20	7.39	100.6	0.9	35.88	8.68	<2	<0.01	0.15	NOT Detected
						1.00	20	7.39	100.5	0.82	35.88	8.68				
						8.60	20	7.3	99.2	1.64	35.88	8.68				
						8.60	20	7.27	98.8	2.5	35.88	8.68				
2015/12/22 14:19:00	C3	MF	832228	808859	15.9	1.00	20	7.53	102.3	1.16	35.87	8.69	2	<0.01	0.16	NOT Detected
						1.00	20	7.53	102.3	1.19	35.87	8.69				
						14.90	20	7.47	101.4	1.28	35.87	8.69				
						14.90	20	7.47	101.5	1.25	35.87	8.69				

Remarks: MF - Middle Flood tide
ME - Middle Ebb tide

Contract No. DC/2009/13

Construction of Sewage Treatment Works
at Yung Shue Wan and Sok Kwu Wan



Sok Kwu Wan

Post-commissioning Marine Water Monitoring Programme

13-Jan-16

Date / Time	Location	Tide	Co-ordinates		Water Depth m	Sampling Depth m	Temp °C	DO Conc mg/L	DO Saturation %	Turbidity NTU	Salinity ppt	pH unit	SS mg/l	Ammonia N mg/l	TIN mg/l	E.coli 1CFU/100ml
			East	North												
13/1/2016 14:44:00	W1	ME	832973	807724	2.8	1.00	19.5	7.83	104.6	0.31	34.31	8.12	2	0.06	0.24	16
						1.00	19.5	7.77	103.7	0.27	34.3	8.13				
						1.80	19.6	7.76	103.6	0.29	34.3	8.13				
13/1/2016 14:33:00	W2	ME	832608	807979	12.1	1.00	19.6	7.76	103.7	0.33	34.3	8.13	<2	0.06	0.23	11
						1.00	19.6	7.76	103.7	0.29	34.28	8.13				
						11.10	19.5	7.44	99.3	0.31	34.42	8.12				
13/1/2016 14:24:00	W3	ME	832068	807900	10.7	1.00	19.5	7.43	99.2	0.34	34.44	8.12	<2	0.05	0.23	1
						1.00	19.7	7.77	104	0.4	34.27	8.13				
						1.00	19.7	7.77	104	0.35	34.27	8.13				
13/1/2016 14:57:00	C1	ME	833692	808193	16.3	9.70	19.3	7.33	97.6	1.37	34.31	8.12	<2	0.05	0.23	25
						9.70	19.3	7.35	97.7	1.27	34.31	8.11				
						1.00	19.5	7.65	102.1	0.44	34.39	8.13				
13/1/2016 14:13:00	C2	ME	832455	807756	9.9	1.00	19.5	7.65	102.2	0.48	34.39	8.13	<2	0.02	0.18	10
						15.30	19.4	7.49	99.9	0.55	34.45	8.12				
						15.30	19.4	7.49	99.9	0.51	34.45	8.12				
13/1/2016 14:13:00	C2	ME	832455	807756	9.9	1.00	19.6	7.62	101.8	0.28	34.29	8.13	<2	0.05	0.23	2
						1.00	19.6	7.64	102.2	0.22	34.28	8.13				
						8.90	19.6	7.43	99.5	0.37	34.48	8.12				
13/1/2016 15:16:00	C3	ME	832231	808870	16.7	1.00	19.5	7.61	101.6	0.44	34.4	8.12	<2	0.02	0.18	6
						1.00	19.5	7.61	101.6	0.34	34.4	8.12				
						15.70	19.4	7.53	100.5	0.31	34.45	8.12				
13/1/2016 08:45:00	W1	MF	832970	807738	2.9	1.00	19.4	7.54	100.6	0.31	34.45	8.12	<2	0.03	0.2	29
						1.00	19.5	7.61	101.5	0.59	34.32	8.1				
						1.00	19.6	7.64	102.1	0.47	34.31	8.11				
13/1/2016 08:53:00	W2	MF	832607	807992	12.2	1.90	19.6	7.66	102.3	0.46	34.3	8.11	2	0.04	0.22	14
						1.90	19.5	7.64	102	0.56	34.31	8.11				
						1.00	19.5	7.58	101.2	0.47	34.28	8.11				
13/1/2016 09:02:00	W3	MF	832046	807903	11.8	1.00	19.6	7.59	101.4	0.47	34.28	8.11	<2	0.05	0.23	7
						1.00	19.6	7.59	101.4	0.47	34.28	8.11				
						11.20	19.3	7.22	96.1	0.44	34.35	8.09				
13/1/2016 09:02:00	W3	MF	832046	807903	11.8	1.00	19.4	7.23	96.2	0.41	34.35	8.09	<2	0.04	0.22	29
						1.00	19.5	7.63	101.8	0.41	34.27	8.11				
						1.00	19.5	7.62	101.8	0.45	34.27	8.11				
13/1/2016 08:24:00	C1	MF	833706	808182	17.1	10.80	19.2	7.25	96.3	0.72	34.28	8.09	<2	0.05	0.24	18
						10.80	19.2	7.25	96.3	0.65	34.28	8.09				
						1.00	19.5	7.53	100.5	0.62	34.34	8.09				
13/1/2016 09:12:00	C2	MF	831468	807748	9.9	1.00	19.5	7.52	100.5	0.6	34.35	8.09	2	0.03	0.21	9
						1.00	19.5	7.52	100.5	0.6	34.35	8.09				
						16.10	19.4	7.37	98.2	0.55	34.49	8.09				
13/1/2016 08:07:00	C3	MF	832228	808870	16.5	1.00	19.4	7.37	98.2	0.49	34.49	8.09	<2	0.02	0.18	11
						1.00	19.5	7.71	102.8	0.36	34.27	8.12				
						1.00	19.5	7.71	102.8	0.35	34.27	8.12				
13/1/2016 08:07:00	C3	MF	832228	808870	16.5	8.90	19.5	7.61	101.7	0.98	34.54	8.13	2	0.05	0.23	1
						8.90	19.5	7.62	101.8	1.16	34.54	8.13				
						1.00	19.5	7.53	100.6	0.6	34.37	8.07				
13/1/2016 08:07:00	C3	MF	832228	808870	16.5	1.00	19.5	7.53	100.5	0.62	34.35	8.07	<2	0.06	0.24	7
						1.00	19.5	7.53	100.5	0.62	34.35	8.07				
						15.50	19.4	7.39	98.5	0.4	34.49	8.09				
15.50	19.4	7.38	98.4	0.41	34.49	8.09	<2	<0.01	0.16	1						

Remarks: MF - Middle Flood tide
ME - Middle Ebb tide

Contract No. DC/2009/13

Construction of Sewage Treatment Works
at Yung Shue Wan and Sok Kwu Wan



Sok Kwu Wan

Post-commissioning Marine Water Monitoring Programme
26-Jan-16

Date / Time	Location	Tide	Co-ordinates		Water Depth m	Sampling Depth m	Temp °C	DO Conc mg/L	DO Saturation %	Turbidity NTU	Salinity ppt	pH unit	SS mg/l	Ammonia N mg/l	TIN mg/l	E.coli 1CFU/100ml
			East	North												
26/1/2016 14:03:00	W1	ME	832970	807716	2.5	1.00	16.6	7.55	95.4	1.29	34.53	8.14	2	<0.01	0.16	9
						1.00	16.6	7.54	95.3	1.37	34.53	8.15				
						1.50	16.6	7.53	95.3	1.27	34.55	8.15	2	<0.01	0.16	NOT Detected
						1.50	16.6	7.53	95.3	1.23	34.55	8.14				
26/1/2016 13:48:00	W2	ME	832608	807991	13.4	1.00	16.6	7.55	95.6	1.3	34.56	8.15	<2	<0.01	0.16	NOT Detected
						1.00	16.6	7.54	95.4	1.29	34.57	8.15				
						12.40	16.7	7.5	95	1.49	34.59	8.14	<2	<0.01	0.16	9
						12.40	16.7	7.5	95	1.39	34.59	8.14				
26/1/2016 13:38:00	W3	ME	832038	807896	12	1.00	16.6	7.46	94.3	1.93	34.52	8.14	<2	<0.01	0.16	1
						1.00	16.6	7.45	94.1	2.08	34.52	8.14				
						11.00	16.6	7.42	93.9	1.59	34.57	8.13	3	<0.01	0.16	NOT Detected
						11.00	16.6	7.42	93.9	1.71	34.57	8.13				
26/1/2016 14:18:00	C1	ME	833706	808180	16.7	1.00	16.6	7.56	95.6	1.37	34.54	8.12	<2	<0.01	0.16	NOT Detected
						1.00	16.6	7.53	95.2	1.34	34.54	8.13				
						15.70	16.7	7.47	94.7	1.37	34.6	8.14	3	<0.01	0.16	NOT Detected
						15.70	16.7	7.47	94.8	1.44	34.61	8.14				
26/1/2016 13:27:00	C2	ME	831466	807748	10.5	1.00	16.3	7.6	95.6	0.66	34.44	8.12	<2	0.01	0.16	NOT Detected
						1.00	16.3	7.57	95.2	0.67	34.44	8.13				
						9.50	16.3	7.25	91.1	1.33	34.44	8.12	2	<0.01	0.15	NOT Detected
						9.50	16.3	7.18	90.3	1.4	34.45	8.11				
26/1/2016 14:38:00	C3	ME	832232	808879	16.6	1.00	16.6	7.46	94.4	1.34	34.54	8.12	<2	<0.01	0.16	NOT Detected
						1.00	16.6	7.46	94.4	1.33	34.54	8.12				
						15.60	16.7	7.46	94.5	1.34	34.6	8.13	<2	<0.01	0.16	NOT Detected
						15.60	16.7	7.46	94.5	1.21	34.6	8.13				
26/1/2016 09:40:00	W1	MF	832977	807719	2.4	1.00	16.5	7.91	99.9	1.53	34.52	8.09	<2	<0.01	0.16	NOT Detected
						1.00	16.5	7.85	99.2	1.55	34.52	8.1				
						1.40	16.7	7.57	96	2.06	34.61	8.13	<2	<0.01	0.16	NOT Detected
						1.40	16.7	7.57	95.9	1.97	34.61	8.13				
26/1/2016 09:47:00	W2	MF	832601	807991	13	1.00	16.7	7.55	95.7	2.19	34.61	8.13	<2	<0.01	0.16	NOT Detected
						1.00	16.7	7.55	95.7	2.24	34.61	8.13				
						12.00	16.7	7.51	95.1	2.18	34.61	8.13	<2	<0.01	0.15	NOT Detected
						12.00	16.7	7.5	95.1	2.21	34.61	8.13				
26/1/2016 10:02:00	W3	MF	832049	807894	11.5	1.00	16.6	7.53	95.2	1.52	34.52	8.13	<2	<0.01	0.15	NOT Detected
						1.00	16.6	7.52	95.1	1.47	34.52	8.13				
						10.50	16.6	7.45	94.2	1.47	34.52	8.12	<2	<0.01	0.16	NOT Detected
						10.50	16.6	7.44	94	1.45	34.52	8.12				
26/1/2016 09:11:00	C1	MF	833708	808790	16.2	1.00	16.7	7.54	95.5	1.89	34.61	8.09	<2	<0.01	0.16	NOT Detected
						1.00	16.7	7.53	95.5	1.94	34.61	8.09				
						15.20	16.7	7.48	94.8	2.27	34.61	8.09	<2	<0.01	0.15	NOT Detected
						15.20	16.7	7.48	94.8	2.59	34.61	8.09				
26/1/2016 10:12:00	C2	MF	831469	807758	9.8	1.00	16.4	7.49	94.3	0.74	34.45	8.11	2	<0.01	0.16	NOT Detected
						1.00	16.4	7.49	94.2	0.68	34.44	8.12				
						8.80	16.4	7.33	92.2	1.2	34.45	8.11	4	<0.01	0.16	NOT Detected
						8.80	16.4	7.3	91.8	1.19	34.45	8.11				
26/1/2016 08:46:00	C3	MF	832341	808870	16.4	1.00	16.7	7.7	97.5	1.9	34.6	8	<2	<0.01	0.15	NOT Detected
						1.00	16.7	7.62	96.6	1.75	34.61	8.05				
						15.40	16.7	7.49	95	2.24	34.6	8.08	<2	<0.01	0.15	NOT Detected
						15.40	16.7	7.49	94.9	2.24	34.6	8.08				

Remarks: MF - Middle Flood tide
ME - Middle Ebb tide

Contract No. DC/2009/13

Construction of Sewage Treatment Works
at Yung Shue Wan and Sok Kwu Wan



Sok Kwu Wan

Post-commissioning Marine Water Monitoring Programme
4-Feb-16

Date / Time	Location	Tide	Co-ordinates		Water Depth m	Sampling Depth m	Temp °C	DO Conc mg/L	DO Saturation %	Turbidity NTU	Salinity ppt	pH unit	SS mg/l	Ammonia N mg/l	TIN mg/l	E.coli 1CFU/100ml
			East	North												
2016/2/4 10:00:00	W1	ME	832970	807716	2.7	1.00	16.3	7.53	94.6	0	34.36	8.08	<2	<0.01	0.16	2
						1.00	16.3	7.52	94.5	0.02	34.36	8.09				
						1.70	16.2	7.5	94.2	0.07	34.36	8.1				
2016/2/4 10:07:00	W2	ME	832609	807992	12.3	1.00	16.2	7.33	91.9	0.08	34.37	8.12	<2	<0.01	0.16	NOT Detected
						1.00	16.2	7.33	91.9	0.07	34.37	8.12				
						11.30	16.1	7.67	95.9	1.38	34.42	8.15				
2016/2/4 10:17:00	W3	ME	832038	807901	11.9	1.00	16.2	7.45	93.4	1.03	34.35	8.13	<2	<0.01	0.16	1
						1.00	16.2	7.45	93.4	1.03	34.34	8.13				
						10.90	16	7.58	94.8	1.09	34.42	8.14				
2016/2/4 09:44:00	C1	ME	833706	808190	16.4	1.00	16.3	7.61	95.7	0.05	34.41	8.12	<2	<0.01	0.16	NOT Detected
						1.00	16.4	7.61	95.8	0.04	34.41	8.12				
						15.40	16	7.55	94.3	0.2	34.41	8.12				
2016/2/4 10:26:00	C2	ME	831458	807748	9.5	1.00	16.3	7.52	94.5	0.95	34.34	8.13	2	0.01	0.16	NOT Detected
						1.00	16.3	7.52	94.4	0.98	34.34	8.13				
						8.50	16	7.38	92.2	1.27	34.39	8.13				
2016/2/4 09:25:00	C3	ME	832218	808870	16.9	1.00	16.2	7.64	95.8	0.09	34.41	8.1	<2	<0.01	0.16	NOT Detected
						1.00	16.2	7.64	95.8	0.07	34.41	8.1				
						15.90	16	7.54	94.2	0.25	34.41	8.11				
2016/2/4 14:05:00	W1	MF	832967	807724	2.9	1.00	16.2	7.6	95.2	0.88	34.4	8.16	2	<0.01	0.16	NOT Detected
						1.00	16.2	7.6	95.2	0.87	34.39	8.16				
						1.90	16.1	7.57	94.8	0.83	34.4	8.16				
2016/2/4 13:53:00	W2	MF	832609	807992	12.7	1.00	16.4	7.47	94	0.92	34.39	8.14	<2	<0.01	0.16	NOT Detected
						1.00	16.4	7.48	94.2	0.92	34.39	8.14				
						11.70	16.1	7.67	96	0.85	34.42	8.16				
2016/2/4 13:42:00	W3	MF	832048	807896	11.3	1.00	16.4	7.54	94.9	0.94	34.34	8.14	<2	<0.01	0.15	NOT Detected
						1.00	16.4	7.53	94.8	0.9	34.34	8.14				
						10.30	16.1	7.61	95.2	1.31	34.42	8.15				
2016/2/4 14:12:00	C1	MF	833709	808177	16.5	1.00	16.5	7.62	96.1	0.81	34.42	8.16	<2	<0.01	0.16	NOT Detected
						1.00	16.5	7.62	96.1	0.83	34.42	8.16				
						15.50	16	7.55	94.4	0.95	34.41	8.16				
2016/2/4 13:31:00	C2	MF	831468	807744	9.6	1.00	16.3	7.48	94	1.02	34.35	8.11	<2	<0.01	0.16	NOT Detected
						1.00	16.3	7.47	93.9	1.02	34.36	8.12				
						8.60	16	7.55	94.4	1.75	34.4	8.14				
2016/2/4 14:27:00	C3	MF	832222	808876	17.2	1.00	16.5	7.61	96.1	0.8	34.41	8.14	<2	<0.01	0.15	NOT Detected
						1.00	16.6	7.61	96.1	0.86	34.42	8.14				
						16.20	16	7.55	94.3	0.99	34.41	8.15				
						16.20	16	7.54	94.3	0.94	34.41	8.15	<2	<0.01	0.15	NOT Detected

Remarks: MF - Middle Flood tide
ME - Middle Ebb tide

Contract No. DC/2009/13

**Construction of Sewage Treatment Works
at Yung Shue Wan and Sok Kwu Wan**



Sok Kwu Wan

**Post-commissioning Marine Water Monitoring Programme
25-Feb-16**

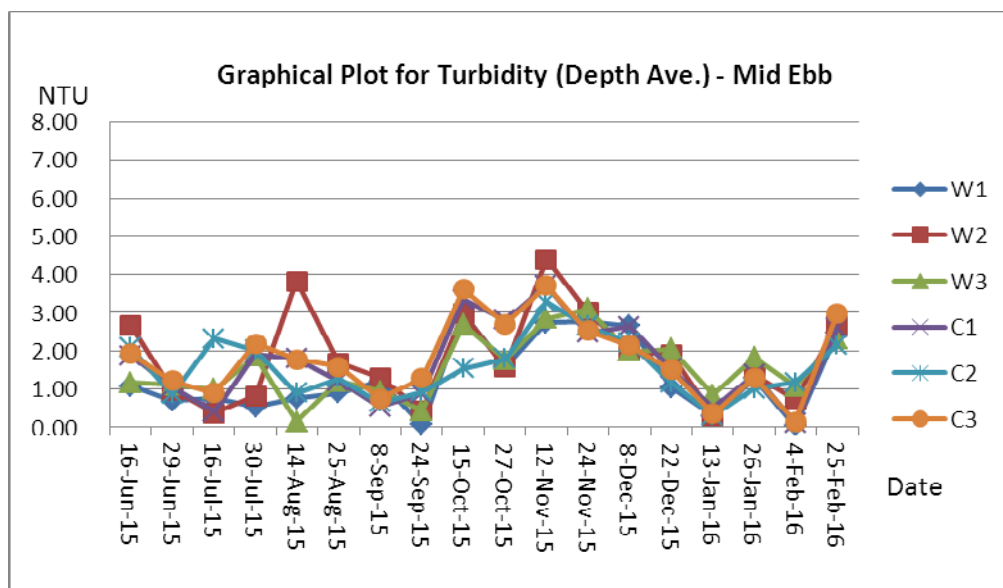
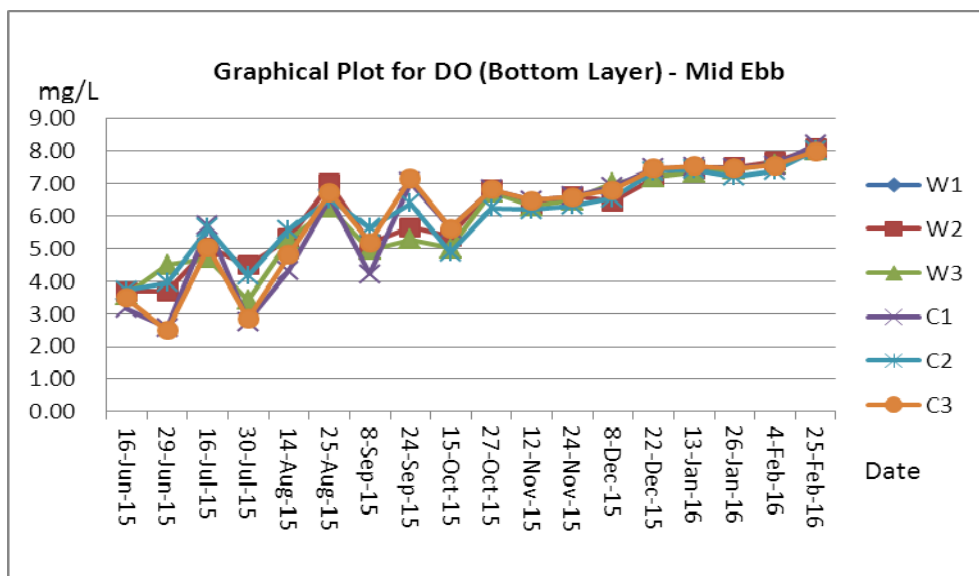
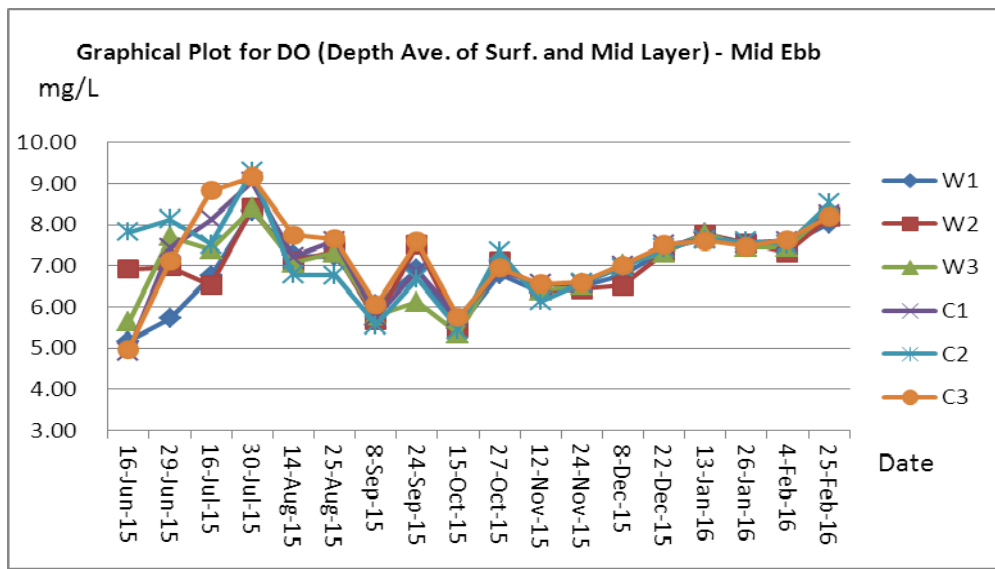
Date / Time	Location	Tide	Co-ordinates		Water Depth m	Sampling Depth m	Temp °C	DO Conc mg/L	DO Saturation %	Turbidity NTU	Salinity ppt	pH unit	SS mg/l	Ammonia N mg/l	TIN mg/l	E.coli 1CFU/100ml
			East	North												
2016/2/25 14:05:00	W1	ME	832966	807727	2.9	1.00	15.6	7.97	98.3	2.41	33.61	8.24	5	0.02	0.19	1
						1.00	15.6	7.97	98.3	2.49	33.62	8.24				
						1.90	15.6	8.08	99.8	2.52	33.68	8.24	6	<0.01	0.16	1
						1.90	15.7	8.08	99.8	2.5	33.68	8.24				
2016/2/25 13:55:00	W2	ME	832609	807992	12.9	1.00	15.7	8.16	100.8	2.51	33.68	8.25	3	0.03	0.19	NOT Detected
						1.00	15.7	8.19	101.2	2.52	33.67	8.25				
						11.90	15.7	8.09	100.1	2.81	33.74	8.24	<2	<0.01	0.16	NOT Detected
						11.90	15.7	8.09	100	2.83	33.74	8.24				
2016/2/25 13:44:00	W3	ME	832046	807896	11.6	1.00	15.6	8.34	102.9	2.17	33.55	8.24	3	<0.01	0.16	11
						1.00	15.6	8.34	102.9	2.16	33.55	8.24				
						10.60	15.6	8.05	99.2	2.44	33.61	8.24	<2	<0.01	0.15	NOT Detected
						10.60	15.6	7.93	97.7	2.45	33.61	8.23				
2016/2/25 14:23:00	C1	ME	833703	808190	15.1	1.00	15.7	8.25	101.9	2.43	33.66	8.25	4	0.02	0.2	NOT Detected
						1.00	15.7	8.26	102	2.47	33.67	8.25				
						14.10	15.7	8.2	101.5	2.62	33.77	8.26	<2	<0.01	0.18	1
						14.10	15.7	8.19	101.3	2.89	33.77	8.26				
2016/2/25 13:34:00	C2	ME	831468	807748	10.1	1.00	15.7	8.46	104.5	1.91	33.54	8.25	4	<0.01	0.18	1
						1.00	15.7	8.57	105.7	1.92	33.54	8.25				
						9.10	15.6	8.04	99.3	2.42	33.63	8.24	4	<0.01	0.16	1
						9.10	15.6	8	98.8	2.41	33.63	8.24				
2016/2/25 14:42:00	C3	ME	832224	808870	15.9	1.00	15.7	8.18	101.1	2.56	33.67	8.26	4	0.02	0.18	5
						1.00	15.7	8.2	101.3	2.7	33.67	8.25				
						14.90	15.8	8	99	3.32	33.84	8.24	3	<0.01	0.14	1
						14.90	15.8	7.97	98.8	3.37	33.84	8.24				
2016/2/25 08:41:00	W1	MF	832977	807720	2.9	1.00	15.6	8.13	100.2	2.12	33.55	8.21	6	0.01	0.18	NOT Detected
						1.00	15.6	8.14	100.3	2.14	33.56	8.22				
						1.90	15.6	8.18	100.8	2.21	33.56	8.22	<2	<0.01	0.17	NOT Detected
						1.90	15.6	8.18	100.8	2.23	33.56	8.22				
2016/2/25 08:50:00	W2	MF	832609	807993	13.3	1.00	15.6	8.38	103.2	2.08	33.57	8.24	<2	0.04	0.2	1
						1.00	15.6	8.39	103.4	2.11	33.57	8.24				
						12.30	15.6	7.92	97.7	2.66	33.61	8.23	4	<0.01	0.16	2
						12.30	15.6	7.91	97.5	2.74	33.61	8.23				
2016/2/25 09:00:00	W3	MF	832058	807903	12.9	1.00	15.6	8.43	104	2	33.55	8.25	<2	<0.01	0.17	NOT Detected
						1.00	15.6	8.48	104.5	1.97	33.55	8.25				
						11.90	15.6	7.92	97.6	3.17	33.61	8.23	2	<0.01	0.16	NOT Detected
						11.90	15.6	7.92	97.6	3.2	33.61	8.23				
2016/2/25 08:23:00	C1	MF	833962	808177	16.7	1.00	15.6	8.06	99.4	2.45	33.61	8.21	2	<0.01	0.16	1
						1.00	15.6	8.05	99.2	2.47	33.61	8.21				
						15.70	15.8	7.82	97	3.67	33.87	8.23	4	<0.01	0.16	NOT Detected
						15.70	15.8	7.82	97	3.75	33.87	8.23				
2016/2/25 09:10:00	C2	MF	831458	807759	10.9	1.00	15.6	8.11	99.9	1.95	33.52	8.22	4	0.01	0.2	2
						1.00	15.6	8.12	100.1	1.91	33.52	8.22				
						9.90	15.6	7.96	98.3	2.33	33.62	8.23	<2	0.01	0.17	2
						9.90	15.6	7.95	98.1	2.42	33.62	8.23				
2016/2/25 08:05:00	C3	MF	832218	808873	16.6	1.00	15.6	8.11	100	2.27	33.61	8.14	4	0.01	0.18	NOT Detected
						1.00	15.6	8.11	99.9	2.25	33.61	8.15				
						15.60	15.8	7.83	97.2	4.37	33.93	8.19	4	0.02	0.16	2
						15.60	15.8	7.83	97.2	4.37	33.93	8.2				

Remarks: MF - Middle Flood tide
ME - Middle Ebb tide

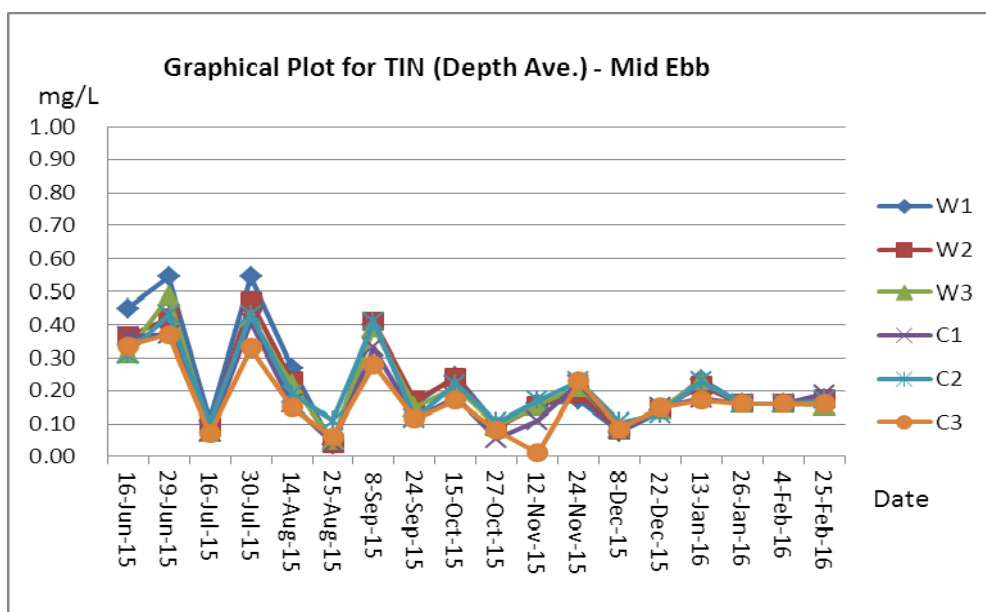
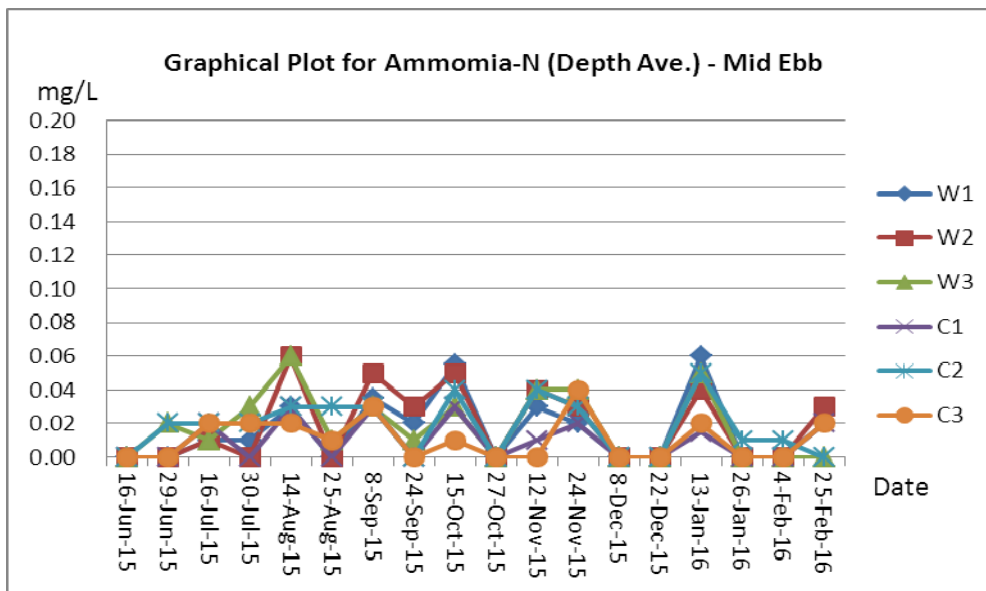
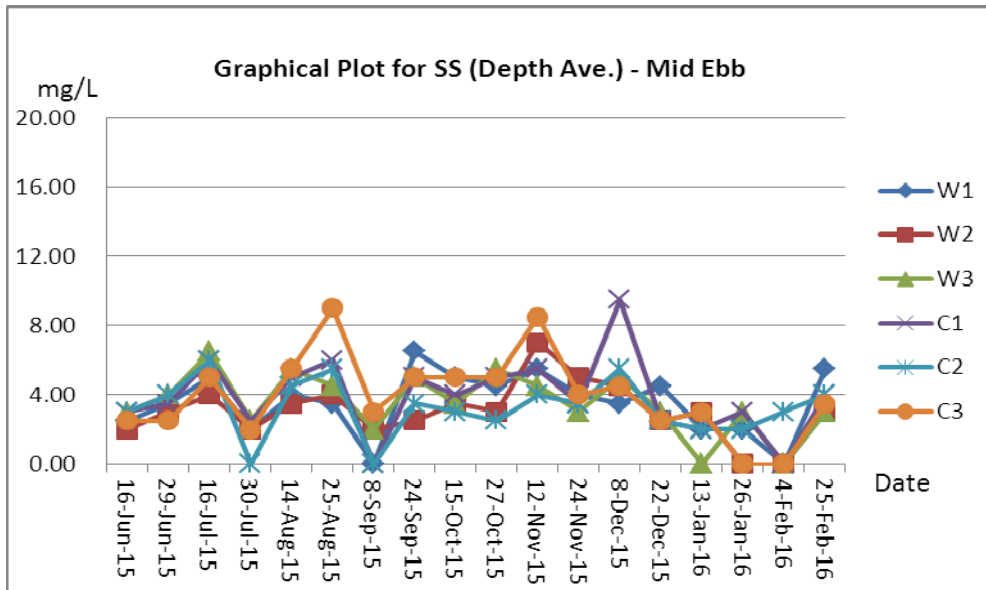
Appendix E

Graphical Plots of Monitoring Results

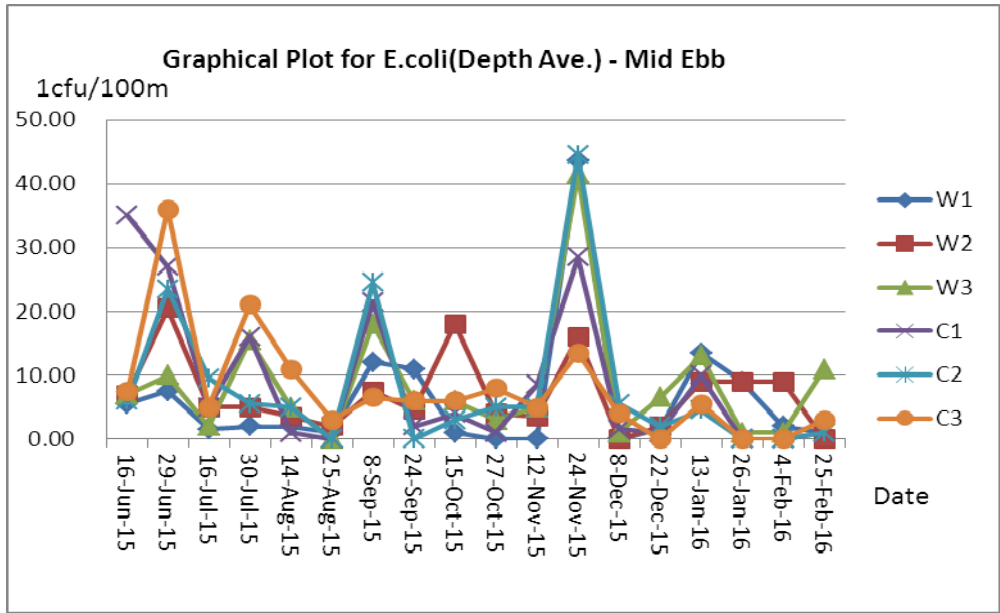
Water Quality Monitoring Result – Mid Ebb



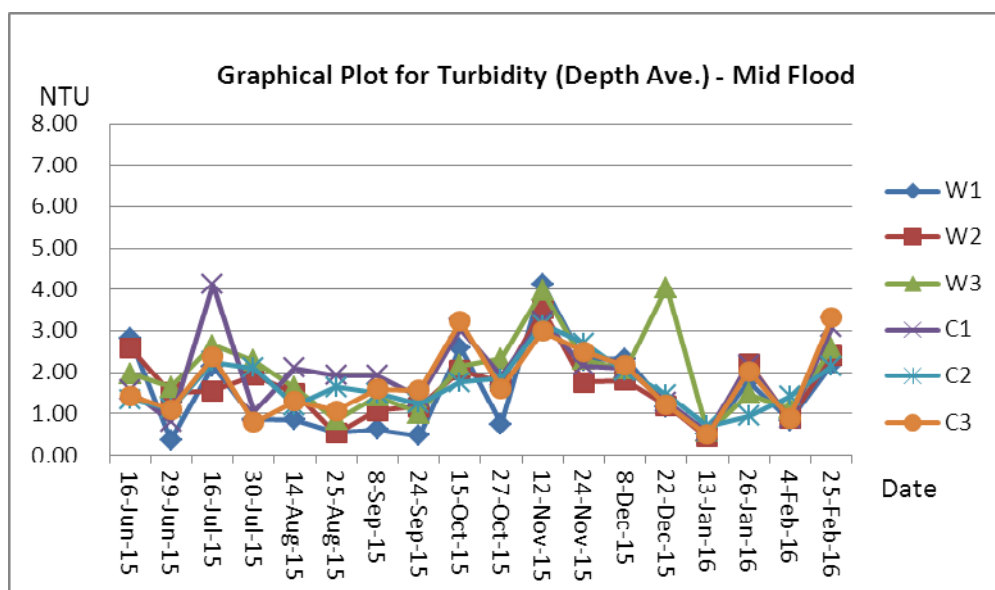
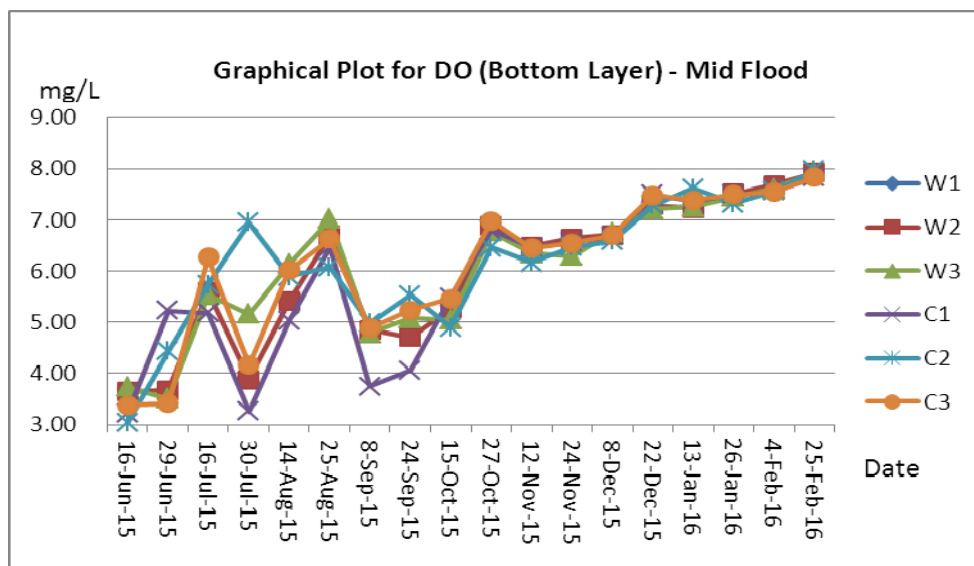
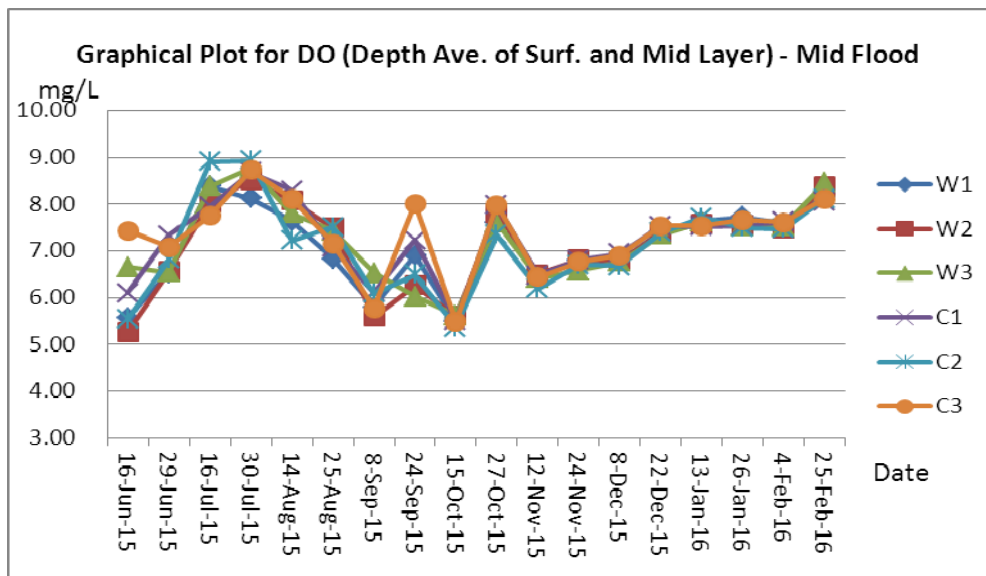
Contract No. DC/2009/13 – Construction of Sewage Treatment Works at
 Yung Shue Wan and Sok Kwu Wan
 Sok Kwu Wan Portion Area
 Quarterly EM&A Report for Post Commissioning (December 2015 to February 2016)



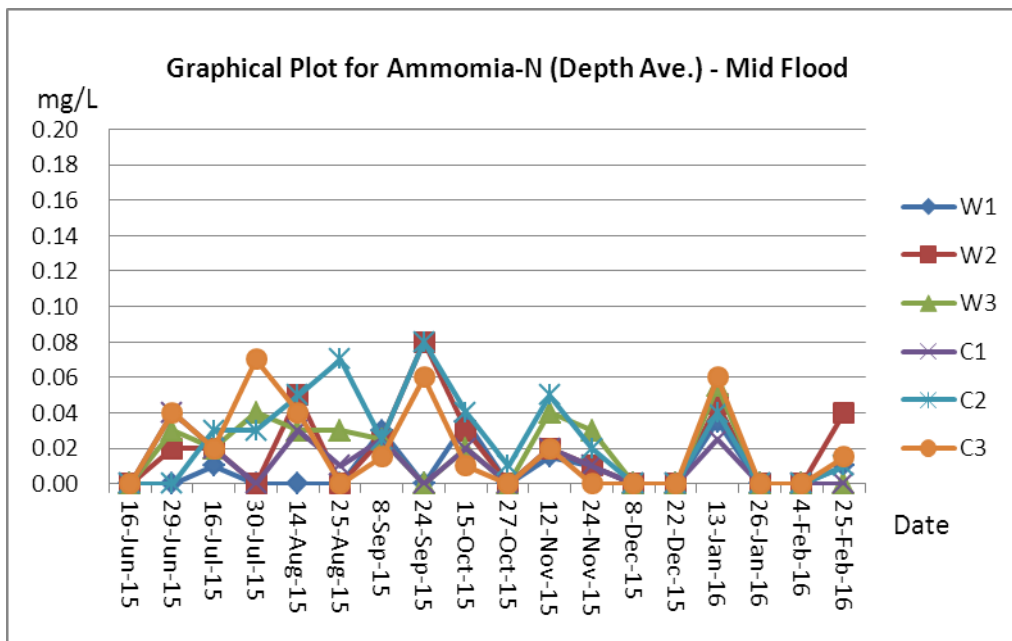
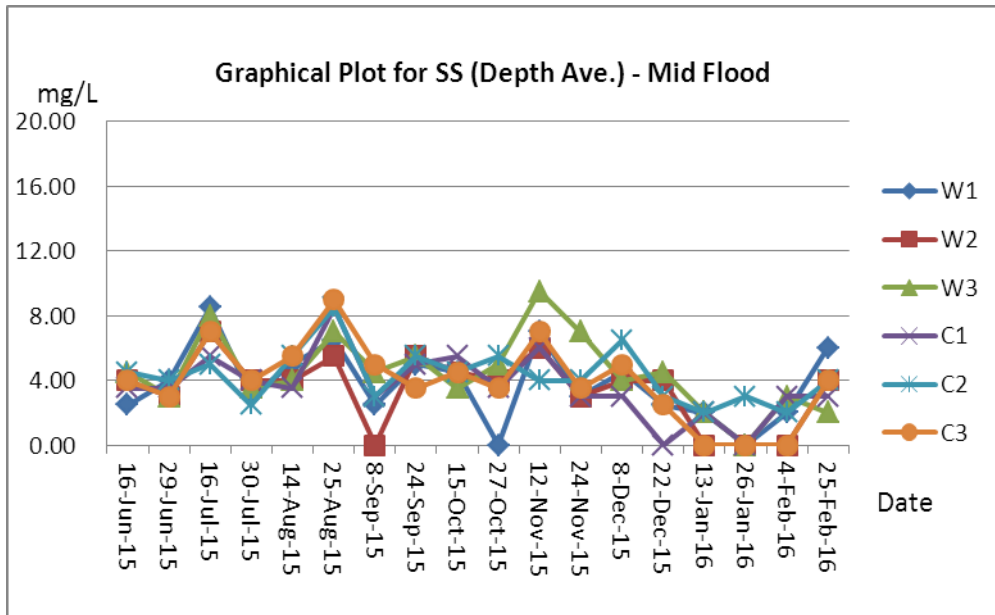
Contract No. DC/2009/13 – Construction of Sewage Treatment Works at
 Yung Shue Wan and Sok Kwu Wan
 Sok Kwu Wan Portion Area
 Quarterly EM&A Report for Post Commissioning (December 2015 to February 2016)



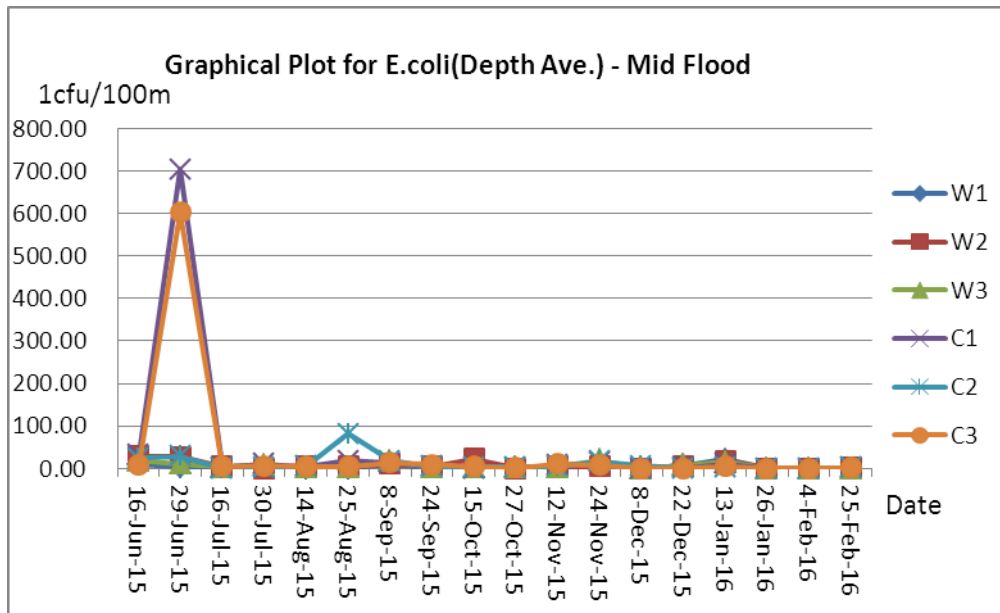
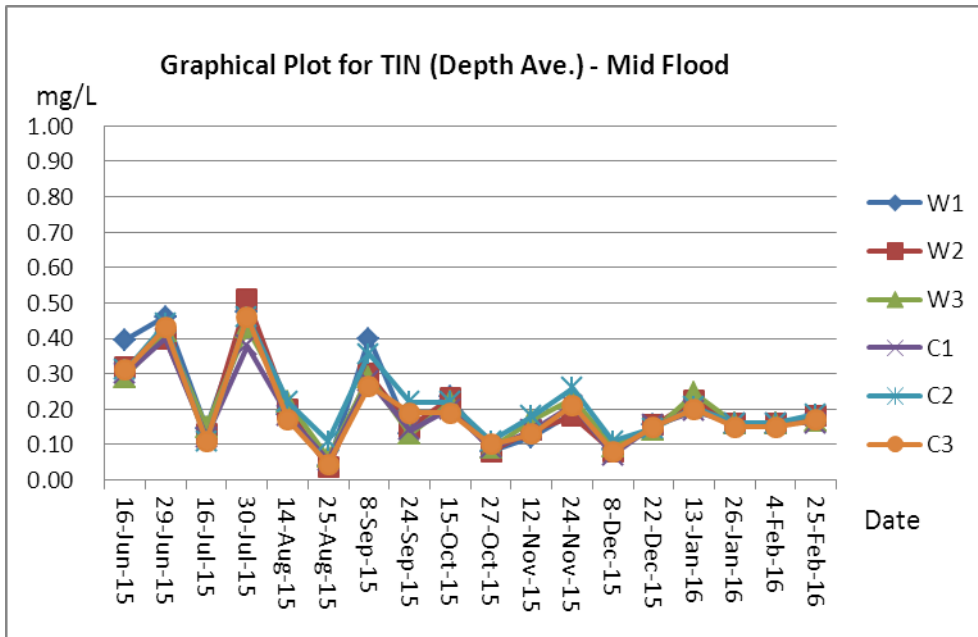
Water Quality Monitoring Result – Mid Flood



Contract No. DC/2009/13 – Construction of Sewage Treatment Works at
 Yung Shue Wan and Sok Kwu Wan
 Sok Kwu Wan Portion Area
 Quarterly EM&A Report for Post Commissioning (December 2015 to February 2016)



Contract No. DC/2009/13 – Construction of Sewage Treatment Works at
 Yung Shue Wan and Sok Kwu Wan
 Sok Kwu Wan Portion Area
 Quarterly EM&A Report for Post Commissioning (December 2015 to February 2016)



Appendix F

**Test Reports for Performance
of Deodorization Facility at SKWSTW**



PHARMTECH (HONG KONG) LIMITED

Unit 1C, 6/F., Cheung Fung Industrial Building,
23-39 Pak Tin Par Street, Tsuen Wan, Hong Kong.
Tel: (852) 2499 8886 Fax: (852) 2405 7005
Website: www.pharmtechhk.com E-mail: lab@pharmtech.com.hk

TEST REPORT

Name of Client :	Kai Mei Environmental Co. Ltd. No.18-20, 9/F Block A Hi-Tech Ind. Ctr. 5-21 Pak Tin Par St., Tsuen Wan Hong Kong	Report No. :	LR15/00664
Contact Person :	Mr. Johnson Wong	Date of Issue :	23-03-2015
		Date Received :	18-03-2015
		Date Commenced :	19-03-2015
		Date Completed :	19-03-2015
		Page No. :	1 of 1

Information of Sample(s):

Sample Description	2 liquid absorbent samples as received
Sampling Date	18-03-2015
Sampling Location	Sok Kwu Wan STW
Equipment Model	U-7000
Serial Number	101207

Test Parameter(s) & Method Reference(s):



Parameter(s)	Method Reference(s)	Limit of Reporting
Hydrogen Sulphide Content	Refer to ISC 3 rd edition, Method 701 "Determination of Hydrogen Sulphide Content of the Atmosphere"	0.02 ppm

Test Result(s):

	Inlet (sample 1)	Outlet (sample 2)
Sample Code	LR15/00664/001	LR15/00664/002
Hydrogen Sulphide Content, ppm (v/v)	7.5	<0.02

***** END *****

PREPARED AND APPROVED BY:

T.C. Lee, Jeffrey
Date: 23-03-2015



PHARMTECH (HONG KONG) LIMITED

Unit 1C, 6/F., Cheung Fung Industrial Building,
23-39 Pak Tin Par Street, Tsuen Wan, Hong Kong.
Tel: (852) 2499 8886 Fax: (852) 2405 7005
Website: www.pharmtechhk.com E-mail: lab@pharmtech.com.hk

TEST REPORT

Name of Client :	Kai Mei Environmental Co. Ltd. No.18-20, 9/F Block A Hi-Tech Ind. Ctr. 5-21 Pak Tin Par St., Tsuen Wan Hong Kong	Report No. :	LR15/00664A
Contact Person :	Mr. Johnson Wong	Date of Issue :	23-03-2015
		Date Received :	18-03-2015
		Date Commenced :	19-03-2015
		Date Completed :	19-03-2015
		Page No. :	1 of 1

Information of Sample(s):

Sample Description	2 liquid absorbent samples as received
Sampling Date	18-03-2015
Sampling Location	Sok Kwu Wan STW
Equipment Model	U-7000
Serial Number	101208

Test Parameter(s) & Method Reference(s):



Parameter(s)	Method Reference(s)	Limit of Reporting
Hydrogen Sulphide Content	Refer to ISC 3 rd edition, Method 701 "Determination of Hydrogen Sulphide Content of the Atmosphere"	0.02 ppm

Test Result(s):

	Inlet (sample 1)	Outlet (sample 2)
Sample Code	LR15/00664/003	LR15/00664/004
Hydrogen Sulphide Content, ppm (v/v)	7.8	<0.02

***** END *****

PREPARED AND APPROVED BY:

 T.C. Lee, Jeffrey
 Date: 23-03-2015