



EM&A Report

# SkyCity Nine Eagles Golf Course


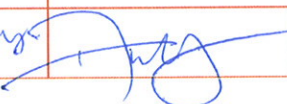
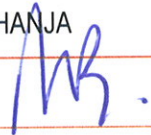
## Quarterly EM&A Compliance Report

August to October 2010



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Project Name:	SkyCity Nine Eagles Golf Course
Report Name:	Quarterly EM&A Compliance Report – August to October 2010
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Report for:	Sky City Nine Eagles Golf Course

#### PREPARATION, REVIEW AND AUTHORISATION

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
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## 1 EXECUTIVE SUMMARY

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The purpose of this Project is to construct and operate a 9-hole Golf Course at the east side of the North Commercial District (NCD) on the Airport Island as an interim arrangement prior to the area's future development as a business park. The interim golf facility, known as "SkyCity Nine Eagles Golf Course" is intended to serve airport passengers, overseas visitors and airport workers until August 2013.

According to the approved EM&A Manual, monthly compliance monitoring of lake water quality at four locations (W1 and W2 in Lake A and W3 and W4 in Lake B) is required during the second phase of the Operation Period, with reporting on a quarterly basis. Parameters monitored comprise Suspended Solids (SS), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD<sub>5</sub>), nitrogen, phosphorous, temperature and salinity.

This is the fourteenth Quarterly Compliance report covering August to October 2010 and complies with the reporting requirements stated in the approved EM&A Manual.

During the reporting quarter, there were exceedances of Limit Levels for SS. As soon as monthly results were available, EPD and the Golf Course Supervisor were notified of the exceedances as required by the Event/Action Plan. Furthermore, the Golf Course Supervisor was also advised that lake water was not of an acceptable quality for discharge and that the control valve must not be opened until there are no longer any exceedances.

The exceedances, which occurred in August, September and October, are considered to have been caused by algae. The results show that both nitrogen and phosphorous concentrations were well below their respective Action Levels, which indicates that the algae has not been caused by accumulation of excessive nutrients from fertilizer use on the Golf Course. Rather, we consider that algal growth has resulted from the recent hot and sunny weather and will continue while the hot and sunny weather lasts – this is a natural phenomenon. As such, and given that the control valve must remain closed, it was considered unnecessary for follow-on monitoring to be carried out, or for the monitoring frequency to be increased.

Aqua Bio-Trol liquid, a natural algae remover, was added to lake water in August, September and October in an attempt to control the problem but, being a biological agent, no immediate improvement in water quality has been observed – it will likely take some time for an effect to be observed.

During the reporting quarter, no complaints were received; and there were no notifications of summons. There were also no openings of the control valve, emergency or otherwise. As such, there was no off-site release of lake water and therefore no impact to the marine environment.

# 1 PROJECT DESCRIPTION

## 1.1 Overview

The purpose of this Project is to construct and operate a 9-hole Golf Course at the east side of the North Commercial District (NCD) on the Airport Island as an interim arrangement prior to the area's future development as a business park (see *Figure 1-1*). The interim golf facility, known as "SkyCity Nine Eagles Golf Course" is intended to serve airport passengers, overseas visitors and airport workers until August 2013.

The Project is managed by SkyCity Nine Eagles Golf Course, who has engaged Asia Turf Solutions Ltd. to establish and maintain the turfgrass of the Golf Course. SMEC Asia Ltd have been employed as the Environmental Team (ET) for the Operation Period since May 2010 and have engaged ALS Technichem Pty Ltd as the HOKLAS accredited testing laboratory to carry out lake water analysis. Construction was completed on 31 December 2006, the first phase of the Operation Period was completed on 30 April 2007, and the second phase commenced on 1 May 2007.

## 1.2 Operation

The Golf Course has been designed to contain water within two artificial lakes, which are linked together by two underwater pipes. The lakes provide a source of freshwater for irrigation. All rainwater and surplus irrigation water collected within the Golf Course will drain back into the lakes for reuse, through a sub-soil drainage system.

The lakes are maintained at a capacity of 15,000m<sup>3</sup>. This is not "full" but is the level that provides the required visual appearance. During the winter (dry) months, however, the lake water may fall below this level. The maximum capacity of the lakes is 20,000m<sup>3</sup>.

If the capacity of the lakes exceeds 20,000m<sup>3</sup>, then the Golf Course may flood. To avoid this, the Golf Course Supervisor can authorise the opening of a control valve to allow the water to overflow from the lakes into storm drains that discharge off-site via Outfall No. 8. However, the valve can only be opened if the lake water monitoring results indicate that water is of an acceptable quality. Under normal circumstances, the control valve remains closed and discharge off-site is not possible. All opening/closing of the control valve is logged on site.

If the latest lake water monitoring results indicate that water is not of an acceptable quality, then the valve cannot be opened, the lake water cannot overflow and the Golf Course may begin to flood. This is part of the mitigation design to prevent off-site discharge of water that does not meet the required standard.

The bund that surrounds the site is at least 1.5m high and up to 90,000m<sup>3</sup> of floodwater can be retained within the Golf Course in addition to the 20,000m<sup>3</sup> lake capacity. In this situation, water samples from the flooded Golf Course will be taken more frequently. Only when water has returned to an acceptable quality will the control valve be opened to allow water to overflow from the lake and into off-site storm drains that discharge via Outfall No. 8, thereby allowing the flood to recede.

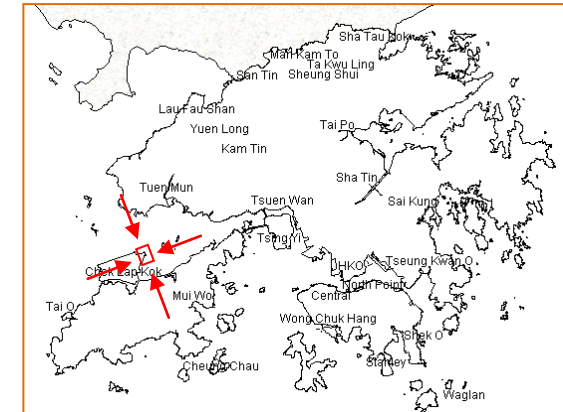
The system by which this water control is achieved is shown in *Figure 1-2*.

Figure 1-1 Location of SkyCity Golf Course on the Airport Island



Source: Image courtesy of Airport Authority

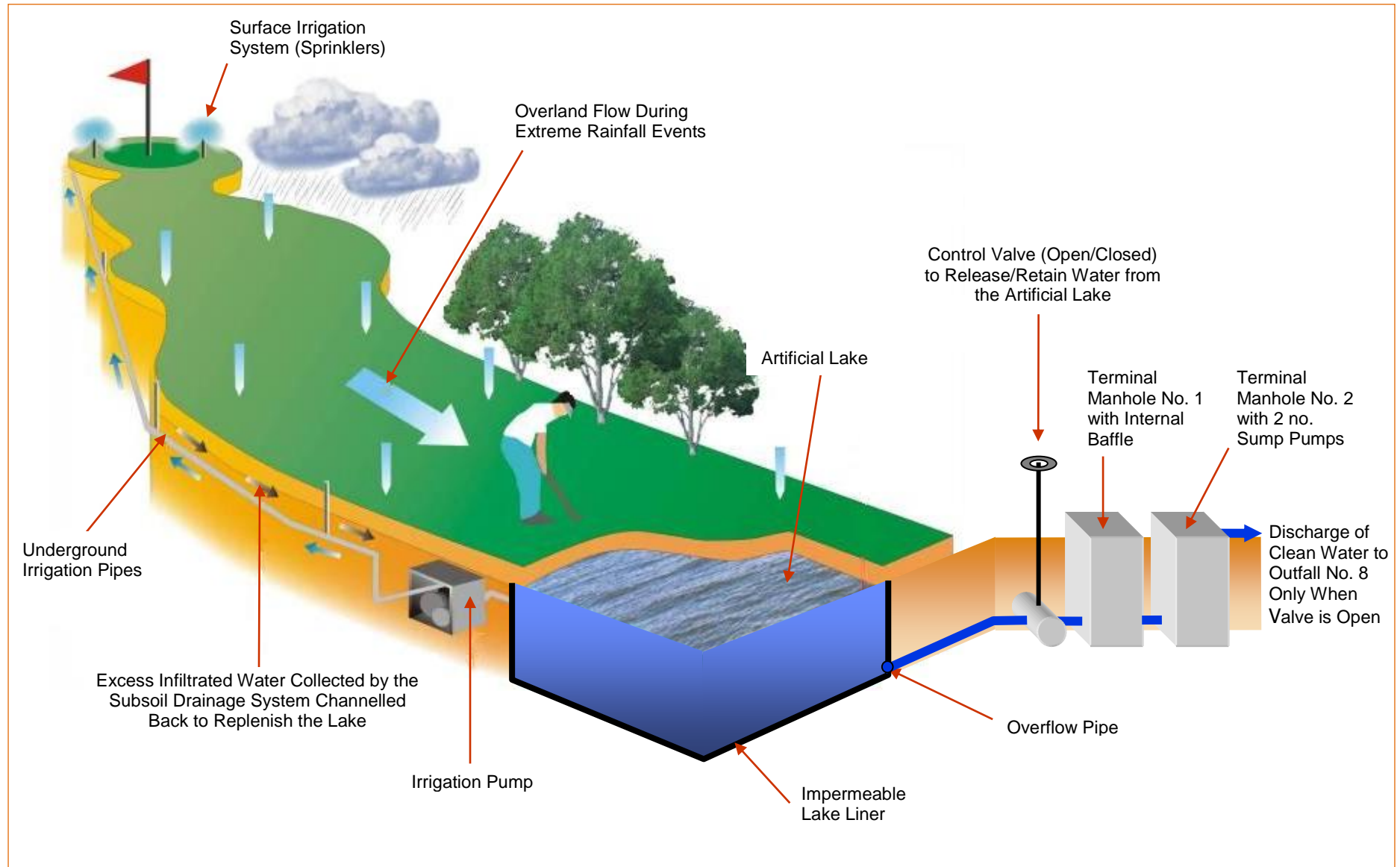
### Location Map



### Key

- 1 Terminal 2 & SkyPlaza  
(Retail, F&B & Entertainment)  
二號客運大樓及翔天廊 (零售、食肆及娛樂區)
- 2 HKIA Tower  
機場行政大樓
- 3 AsiaWorld - Expo  
亞洲國際博覽館
- 4 2nd on-airport hotel  
第二間機場酒店
- 5 SkyPier  
海天客運碼頭
- 6 SkyCity Nine Eagles Golf Course  
航天城高爾夫球場
- 7 Airport World Trade Centre  
暫名: 機場世界貿易中心

Figure 1-2 Schematic of Lake Water Control System





## 2 LAKE WATER QUALITY EM&A

### 2.1 EM&A Programme

Monitoring of Dissolved Oxygen (DO) in mg/l, Suspended Solids (SS) in mg/l, Biochemical Oxygen Demand (BOD<sub>5</sub>) in mg/l, Total Nitrogen in mg/l, Total Phosphorous in mg/l, Salinity in g/l, and temperature in °C was carried out by the ET to ensure that any deterioration in lake water quality could be readily detected and timely action could be taken to rectify the situation if this was due to site operations.

DO, temperature and salinity were measured in-situ whilst other parameters were determined in a HOKLAS-accredited laboratory.

#### 2.1.1 Monitoring This Quarter

The actual lake water monitoring schedule for this quarter (August to October 2010) is given in **Table 2-1**, below.

**Table 2-1 Monitoring Schedule for This Quarter**

Sampling Date	Sampling Locations
13 August 2010	W1 to W4
10 September 2010	W1 to W4
15 October 2010	W1 to W4

#### 2.1.2 Monitoring Next Quarter

The planned lake water monitoring schedule for the next quarter (November 2010 to January 2011) is given in **Table 2-2**, below.

**Table 2-2 Monitoring Schedule for the Next Quarter**

Sampling Date	Sampling Locations
12 November 2010	W1 to W4
10 December 2010	W1 to W4
14 January 2011	W1 to W4

## 2.2 Equipment and Methodology

Because of the relatively shallow water, in-situ measurements and water sampling were conducted at 0.5m from the surface (the mid-point of the 1m deep lake). Water samples for all monitoring parameters were collected, stored, preserved and analysed according to *APHA Standard Methods for the Examination of Water and Wastewater, 19th Ed, #17*.

In-situ monitoring was carried out using a DO concentration and DO saturation were carried out using a YSI Model 85 CE-C-M-Y multi-parameter meter and the range, resolution and accuracy of the equipment is provided in **Table 2-3**.

**Table 2-3 In-situ Monitoring Equipment Details**

In-situ Parameters	Measuring Devices	Measurement Precision
Dissolved Oxygen	YSI Professional Plus	0.1mg/l and 0.1%
Salinity		0.1ppt (or g/l)
Temperature		0.1°C

A Kahlisco water sampler was used to obtain water samples for subsequent SS analysis in the laboratory. A sufficient volume of the sample is collected in clean, high density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to the ALS laboratory immediately after monitoring. The analysis of the collected samples starts by the next working day following APHA *Standard Methods* #2540D.

## 2.3 Maintenance and Calibration

All in-situ monitoring instruments are calibrated and certified by ALS at monthly intervals throughout all stages of the lake water quality monitoring programme.

The YSI Multi-purpose Meter is calibrated once per monitoring day by the wet bulb method. Calibration at the ALS laboratory is carried out once every month in a water sample of known dissolved oxygen concentration. The sensor is immersed in the water and after thermal equilibration, the known mg/l value is keyed in and the calibration is carried out automatically. Calibration details are provided in [Appendix 1](#).

## 2.4 Parameters Monitored

The following parameters are monitored and compared to Action/Limit (A/L) Levels:

- Dissolved Oxygen
- Suspended Solids
- BOD<sub>5</sub>
- Total Nitrogen
- Total Phosphorous

There are no A/L Levels for temperature or salinity – these parameters are recorded for information only.

## 2.5 Monitoring Locations

Monitoring locations together with grid references are shown in [Figure 2-1](#). Monitoring Stations are designated as W1, W2, W3 and W4.

## 2.6 Monitoring Date, Time, Frequency and Duration

In accordance with the EM&A Manual, the monitoring frequency of lake water quality is shown as [Table 2-4](#).

**Table 2-4 Monitoring Frequency**

	Operation Phase	
	Below A/L Level	A/L Level Exceedance
Monitoring Frequency	Monthly	Weekly

## 2.7 Action / Limit Levels

According to the approved EM&A manual, the A/L Levels for the compliance monitoring (for monitoring locations W1 to W4) are shown in **Table 2-5**, below.

**Table 2-5 Action and Limit Levels for Lake Water Quality**

Parameter	Acceptable Standard (mg/l)	
	Action Level	Limit Level
Suspended Solids	20	30
BOD <sub>5</sub>	13.5	20
Dissolved Oxygen	4	3
Total Nitrogen	20	30
Total Phosphorous	3.5	5

In case of exceedance of A/L Levels caused by the operation of the Golf Course, the ET shall immediately implement the Event/ Action Plan (E/AP), shown in **Table 2-6**, below, in order to resolve lake water quality problems:

**Table 2-6 E/AP for Lake Water Quality Monitoring**

Event	Action
Exceedance of Action Level	<ul style="list-style-type: none"> <li>Notify the Golf Course Supervisor of the exceedance, providing full details (time, location, parameter, level, etc.).</li> <li>Increase the frequency of monitoring of the particular parameter(s) to “Action/Limit Level Exceedance” as shown in <b>Table 2-4</b>.</li> <li>If water quality continues to worsen, it may be prudent to review the Turfgrass Management Plan (TMP) in terms of application of nutrients and agree any revisions with the Golf Facility Supervisor.</li> <li>Notify the Golf Facility Supervisor when water quality falls below “Action Level” and reduce monitoring frequency to “Below Action/Limit Level” as shown in <b>Table 2-4</b>.</li> </ul>
Exceedance of Limit Level	<ul style="list-style-type: none"> <li>Notify EPD and Golf Course Supervisor of the exceedance, providing full details (time, location, parameter, level, etc.).</li> <li>Suspend any ongoing application of organic nutrients.</li> <li>Determine the likely cause of the exceedance(s). Review the TMP in terms of application of nutrients and agree any revisions with the Golf Facility Supervisor. Continue to irrigate the Golf Course using lake water.</li> <li>Increase the frequency of monitoring of the particular parameter(s) to “Action/Limit Level Exceedance” as shown in <b>Table 2-4</b>. (if not already at this frequency) to demonstrate the effectiveness of remedial measures and to confirm that water quality has returned to acceptable levels.</li> <li>Notify EPD and Golf Course Supervisor when water quality falls below “Action Level” (not “Limit Level”) and reduce monitoring frequency to “Below Action/Limit Level” as shown in <b>Table 2-4</b>.</li> </ul>

**Figure 2-1** Locations for Lake Water Quality Monitoring



## 3 MONITORING RESULTS

### 3.1 Summary of Results

A summary of scheduled lake water monitoring results for the reporting quarter is provided in **Table 3-1**, below. Detailed results are provided in **Appendix 2** and graphical plots since commencement of the second phase of Operation are given in **Appendix 3**.

**Table 3-1 Summary of Compliance Monitoring Data during Reporting Quarter**

Monitoring Location		Salinity (g/ℓ)	Temperature (°C)	SS (mg/ℓ)	BOD <sub>5</sub> (mg/ℓ)	DO Saturation (%age)	DO Concentration (mg/ℓ)	Total Nitrogen (mg/ℓ)	Total Phosphorous (mg/ℓ)
W1	Mean	0.1	27.4	<b>88.0</b>	3.3	96.1	8.4	2.4	0.3
	Minimum	0.1	24.2	<b>54.0</b>	3.0	89.6	7.7	1.2	0.1
	Maximum	0.1	31.6	<b>113.0</b>	4.0	105.0	9.0	4.6	0.7
W2	Mean	0.1	27.8	<b>69.7</b>	2.7	98.1	8.6	1.3	0.1
	Minimum	0.1	24.6	20.0	2.0	89.5	8.0	0.9	0.1
	Maximum	0.1	32.6	<b>106.0</b>	3.0	111.0	8.9	1.6	0.1
W3	Mean	0.1	27.9	<b>52.0</b>	4.7	107.2	9.4	1.6	0.2
	Minimum	0.1	24.5	<b>45.0</b>	3.0	90.3	9.1	1.2	0.1
	Maximum	0.1	32.2	<b>61.0</b>	6.0	136.0	9.9	1.9	0.2
W4	Mean	0.1	27.8	<b>36.3</b>	5.0	111.7	9.6	3.5	0.1
	Minimum	0.1	24.3	19.0	3.0	91.4	9.0	1.4	0.1
	Maximum	0.1	32.3	<b>52.0</b>	7.0	148.0	10.7	7.3	0.2

**Note:** **Bold** indicates Action Level exceedance; **Bold** indicates **Limit Level** exceedance

As can be seen from the above summary, during the reporting quarter, there were almost continuous exceedances of Limit Level for SS.

As soon as monthly results were available, EPD and the Golf Course Supervisor were notified of the exceedances as required by the Event/Action Plan. Furthermore, the Golf Course Supervisor was also advised that lake water was not of an acceptable quality for discharge and that the control valve must not be opened until there are no longer any exceedances.

It was not considered necessary to carry out follow-up monitoring, nor to increase the sampling frequency – this is discussed below, based on the data in **Appendix 2**.

## 3.2 Discussion

### 3.2.1 August 2010

In August, there were exceedances of Limit Level for SS at all four monitoring locations. Based on observations, we consider that the high SS concentrations are due to algal growth in the lakes – the water in the lakes was visibly green and clouded with algae during sampling.

The results show that both nitrogen and phosphorous concentrations are well below their respective Action Levels, which indicates that the algae has not been caused by accumulation of excessive nutrients from fertilizer use on the golf course. Rather, we consider that algal growth has resulted from the hot and sunny weather – this is a natural phenomenon, not the result of operation of the Golf Course. As such, and given that the control valve must remain closed, it was considered unnecessary for follow-on monitoring to be carried out, or for the frequency of monitoring to be increased.

In an attempt to control the water quality problem caused by excessive algal growth, “Aqua Bio-Trol Liquid” was added to lake water during August. This is a liquid microbial pond clarifier, comprising a proprietary blend of 58 strains of aerobic and facultative beneficial bacteria, and is a safe, natural way to establish and maintain cleaner pond and lake water without the addition of chemicals. Further details of “Aqua Bio-Trol Liquid” are provided in [Appendix 4](#). However, being a biological agent, no immediate improvement in water quality is expected – it will take time for an effect to be observed.

### 3.2.2 September 2010

In September, the exceedances of Limit Level for SS occurred only at W1 (Lake A) and W3 (Lake B). Both nitrogen and phosphorous concentrations are well below their respective Action Levels.

For the same reasons as stated above, we consider the continued algal growth to be a natural phenomenon, not the result of operation of the Golf Course. As such, and given that the control valve must continue to remain closed, it was considered unnecessary for follow-on monitoring to be carried out, or for the frequency of monitoring to be increased.

“Aqua Bio-Trol Liquid” continued to be added to lake water during September.

### 3.2.3 October 2010

In October, the exceedances of Limit Level for SS resumed at all four monitoring locations. Both nitrogen and phosphorous concentrations are well below their respective Action Levels.

For the same reasons as stated above, we consider the continued algal growth to be a natural phenomenon, not the result of operation of the Golf Course. As such, and given that the control valve must continue to remain closed, it was considered unnecessary for follow-on monitoring to be carried out, or for the frequency of monitoring to be increased.

“Aqua Bio-Trol Liquid” continued to be added to lake water during October and the application rate was doubled in Lake B.

### 3.3 Operational Practice

**Table 3-2**, below, shows the operational practice during the reporting quarter, i.e., the activities relating to the management of water in the lakes. Because lake water is not considered to be of an acceptable quality, the control valve has remained closed and there has been no discharge off-site into the surrounding marine waters. The control valve remained closed as of end-October 2010.

**Table 3-2 Operational Results**

Month	Month-end Lake Water Depth (m)	Can Control Valve Be Opened?	Has Control Valve Been Opened?	Quantity of Water Discharged (m <sup>3</sup> )
August 2010	1.4	No	No	-
September 2010	1.3	No	No	-
October 2010	0.9	No	No	-

### 3.4 Complaints and Notifications of Summons

During the reporting quarter, no complaints were received; and there were no notifications of summons. There were also no openings of the control valve, emergency or otherwise.

Water quality remains an issue as algal growth has caused high levels of SS, which means that the lake water is not of an acceptable quality for discharge. The ET will continue to closely review the application of “Aqua Bio-Trol Liquid” and anticipates an improvement in lake water quality in the next quarter because of this application.

## 4 COMMENTS, RECOMMENDATIONS AND CONCLUSIONS

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Reporting during the second phase of the Operation Period is required on a quarterly basis. This is the fourteenth Quarterly Compliance report covering August to October 2010 and complies with the reporting requirements stated in the approved EM&A Manual.

Compliance monitoring of lake water quality is required on a monthly basis, with an increase in frequency to weekly if there are Action or Limit Levels exceedances caused by the operation of the Golf Course. Parameters tested include SS, DO, BOD<sub>5</sub>, nitrogen, phosphorous, temperature and salinity. Monthly compliance monitoring was carried out on 13 August 2010, 10 September 2010 and 15 October 2010 at four locations within the two lakes.

During the reporting quarter, there were exceedances of Limit Levels for SS. Because lake water is not considered to be of an acceptable quality, the control valve has remained closed and there has been no discharge off-site into the surrounding marine waters.

The exceedances, which occurred in August, September and October, are considered to have been caused by algae. The results show that both nitrogen and phosphorous concentrations were well below their respective Action Levels, which indicates that the algae has not been caused by accumulation of excessive nutrients from fertilizer use on the Golf Course. Rather, we consider that algal growth has resulted from the recent hot and sunny weather and will continue while the hot and sunny weather lasts – this is a natural phenomenon. As such, and given that the control valve must remain closed, it was considered unnecessary for follow-on monitoring to be carried out, or for the monitoring frequency to be increased.

Aqua Bio-Trol liquid, a natural algae remover, was added to lake water in August, September and October in an attempt to control the problem but, being a biological agent, no immediate improvement in water quality is expected.

Water quality remains an issue as algal growth has caused high levels of SS, which means that the lake water is not of an acceptable quality for discharge. The ET will continue to closely review the application of “Aqua Bio-Trol Liquid” and anticipates an improvement in lake water quality in the next quarter because of this application.

During the reporting quarter, no complaints were received; and there were no notifications of summons. There were also no openings of the control valve, emergency or otherwise.



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## APPENDIX 1

### Equipment Calibration Details

# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## ALS TECHNICHEM (HK) Pty Ltd

Environmental Division



### CERTIFICATE OF ANALYSIS

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**ADDRESS:** 14/F., HUA FU COMMERCIAL BUILDING,  
111 QUEEN`S ROAD WEST,  
SHEUNG WAN, HONG KONG.  
**ORDER No.:** SKY CITY GOLF COURSE

**Batch:** HK1018668  
**Sub-batch:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 13/08/2010  
**DATE OF ISSUE:** 21/08/2010  
**SAMPLE TYPE:** EQUIPMENT  
**No. of SAMPLES:** 1

### COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

### NOTES

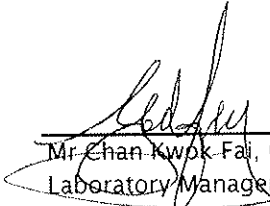
This is the Final Report and supersedes any preliminary report with this batch number.  
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

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**Abbreviations:** % SPK REC denotes percentage spike recovery  
CHK denotes duplicate check sample  
LOR denotes limit of reporting  
LCS % REC denotes Laboratory Control Sample percentage recovery

ALS Technichem (HK) Pty Ltd

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A Campbell Brothers Limited Company

# CERTIFICATE OF ANALYSIS



Batch: HK1018668  
Date of Issue: 21/08/2010  
Client: SMEC ASIA LIMITED  
Client Reference:

Calibration of Multimeter

Item : YSI Multimeter                      Serial No.: 09K100735  
Model No.: YSI Professional Plus        Equipment No.: N/A  
ALS Lab ID: HK1018668 -001            Date of Calibration: 21 August, 2010

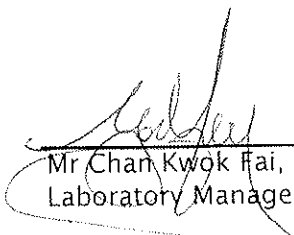
Testing Results :

Dissolved Oxygen	Expected Reading	Recording Reading
	3.4 mg/L	3.2 mg/L
5.0 mg/L	4.8 mg/L	
6.1 mg/L	6.1 mg/L	
7.9 mg/L	7.7 mg/L	
Allowing Deviation	± 0.2 mg/L	

Testing Method:  
APHA (20th edition), 4500-OC & C

Temperature	Expected Reading	Recording Reading
	20.1 °C	20.4 °C
Allowing Deviation	±2.0 °C	

Testing Method:  
In House Method

  
Mr Chan Kwok Fai, Godfrey  
Laboratory Manager - Hong Kong

# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

## ALS TECHNICHEM (HK) Pty Ltd

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111 QUEEN`S ROAD WEST,  
SHEUNG WAN, HONG KONG.  
**ORDER No.:** SKY CITY GOLF COURSE

**Batch:** HK1021177  
**Sub-batch:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 10/09/2010  
**DATE OF ISSUE:** 22/09/2010  
**SAMPLE TYPE:** EQUIPMENT  
**No. of SAMPLES:** 1

### COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

### NOTES

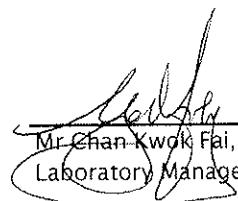
This is the Final Report and supersedes any preliminary report with this batch number.  
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

### ISSUING LABORATORY: HONG KONG

#### Address

ALS Technichem (HK) Pty Ltd  
11/F  
Chung Shun Knitting Centre  
1-3 Wing Yip Street  
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**Phone:** 852-2610 1044  
**Fax:** 852-2610 2021  
**Email:** hongkong@alsenviro.com

  
Mr. Chan Kwok Fai, Godfrey  
Laboratory Manager - Hong Kong

#### Other ALS Environmental Laboratories

AUSTRALIA		AMERICAS
Brisbane	Hong Kong	Vancouver
Melbourne	Singapore	Santiago
Sydney	Kuala Lumpur	Amtofagasta
Newcastle	Bogor	Lima

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Abbreviations: % SPK REC denotes percentage spike recovery  
CHK denotes duplicate check sample  
LOR denotes limit of reporting  
LCS % REC denotes Laboratory Control Sample percentage recovery

ALS Technichem (HK) Pty Ltd  
Part of the ALS Laboratory Group

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., H.K.  
Phone: 852-2610 1044 Fax: 852-2610 2021 www.alsenviro.com  
A Campbell Brothers Limited Company

# CERTIFICATE OF ANALYSIS



Batch: HK1021177  
Date of Issue: 22/09/2010  
Client: SMEC ASIA LIMITED  
Client Reference:

## Calibration of Multimeter

Item : YSI Multimeter                      Serial No.: 09K100735  
Model No.: YSI Professional Plus        Equipment No.: N/A  
ALS Lab ID: HK1021177 -001              Date of Calibration: 22 September, 2010

## Testing Results :

Dissolved Oxygen

Expected Reading	Recording Reading
3.4 mg/L	3.2 mg/L
5.0 mg/L	4.8 mg/L
6.1 mg/L	6.1 mg/L
7.9 mg/L	7.7 mg/L
Allowing Deviation	± 0.2 mg/L

Testing Method:

APHA (20th edition), 4500-OC & C

Temperature

Expected Reading	Recording Reading
20.1 °C	20.4 °C
Allowing Deviation	±2.0 °C

Testing Method:

In House Method

# ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

ALS Technichem (HK) Pty Ltd  
Environmental Division



## CERTIFICATE OF ANALYSIS

CONTACT: MR ALEXI BHANJA  
CLIENT: SMEC ASIA LIMITED  
ADDRESS: 14/F., HUA FU COMMERCIAL BUILDING,  
111 QUEEN`S ROAD WEST,  
SHEUNG WAN, HONG KONG.  
ORDER No.: SKY CITY GOLF COURSE

WORK ORDER: HK1024448  
Sub-batch: 1  
LABORATORY: HONG KONG  
DATE RECEIVED: 15/10/2010  
DATE OF ISSUE: 26/10/2010  
SAMPLE TYPE: EQUIPMENT  
No. of SAMPLES: 1

### COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

### NOTES

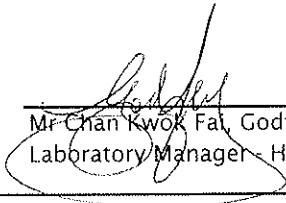
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Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

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HONG KONG

Phone: 852-2610 1044  
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Mr Chan Kwok Fat, Godfrey  
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Abbreviations: % SPK REC denotes percentage spike recovery  
CHK denotes duplicate check sample  
LOR denotes limit of reporting  
LCS % REC denotes Laboratory Control Sample percentage recovery

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Phone: 852-2610 1044 Fax: 852-2610 2021 www.alsenviro.com  
A Campbell Brothers Limited Company

# CERTIFICATE OF ANALYSIS



Work Order: HK1024448  
Sub-batch: 1  
Date of Issue: 26/10/2010  
Client: SMEC ASIA LIMITED  
Client Reference:

## Calibration of Multimeter

Item : YSI Multimeter Serial No.: 09K100735  
Model No.: YSI Professional Plus Equipment No.: N/A  
ALS Lab ID: HK1024448 -001 Date of Calibration: 26 October, 2010

## Testing Results :

Dissolved Oxygen

Expected Reading	Recording Reading
3.4 mg/L	3.2 mg/L
5.0 mg/L	4.8 mg/L
6.1 mg/L	6.1 mg/L
7.9 mg/L	7.7 mg/L
Allowing Deviation	± 0.2 mg/L

Testing Method:

APHA (20th edition), 4500-OC & G

Temperature

Expected Reading	Recording Reading
20.1 °C	20.4 °C
Allowing Deviation	±2.0 °C

Testing Method:

In House Method

---

## APPENDIX 2

### Lake Water Quality Monitoring Data



Date	Time	Station	Salinity (g/ℓ)	Temperature (°C)	SS (mg/ℓ)	BOD <sub>5</sub> (mg/ℓ)	DO Saturation (%age)	DO Conc. (mg/ℓ)	Total Nitrogen (mg/ℓ)	T. Phosphorous (mg/ℓ)
13 August 2010	12:05	W1	0.1	31.6	<b>113.0</b>	4.0	105.0	7.7	1.2	0.2
	12:10	W2	0.1	32.6	<b>83.0</b>	3.0	111.0	8.0	0.9	0.1
	12:15	W3	0.1	32.2	<b>45.0</b>	6.0	136.0	9.9	1.9	0.2
	12:20	W4	0.1	32.3	<b>38.0</b>	7.0	148.0	10.7	7.3	0.2
10 September 2010	06:50	W1	0.1	24.2	<b>54.0</b>	3.0	89.6	8.6	4.6	0.7
	06:55	W2	0.1	24.6	20.0	3.0	89.5	8.8	1.5	0.1
	07:00	W3	0.1	24.5	<b>50.0</b>	3.0	90.3	9.2	1.2	0.1
	07:05	W4	0.1	24.3	19.0	3.0	91.4	9.0	1.4	0.1
15 October 2010	07:15	W1	0.1	26.3	<b>97.0</b>	3.0	93.6	9.0	1.5	0.1
	07:20	W2	0.1	26.3	<b>106.0</b>	2.0	93.9	8.9	1.6	0.1
	07:25	W3	0.1	26.9	<b>61.0</b>	5.0	95.4	9.1	1.8	0.2
	07:30	W4	0.1	26.8	<b>52.0</b>	5.0	95.7	9.1	1.7	0.1

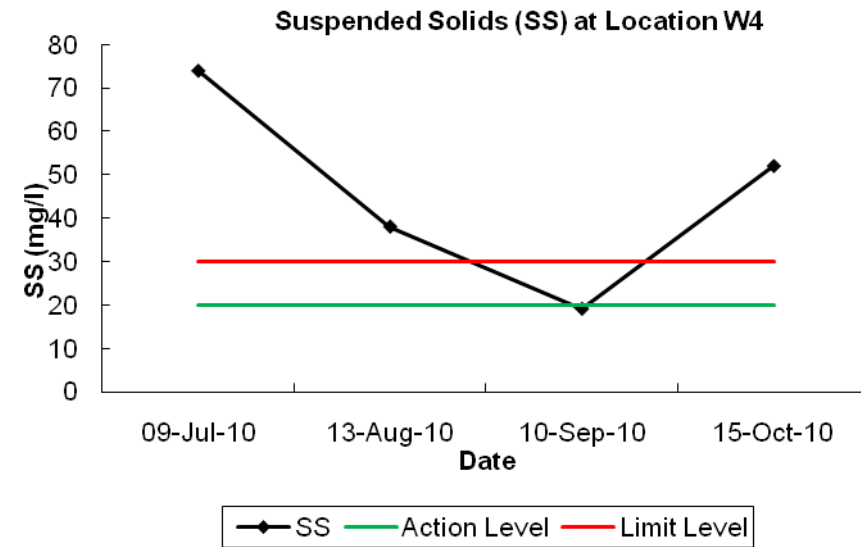
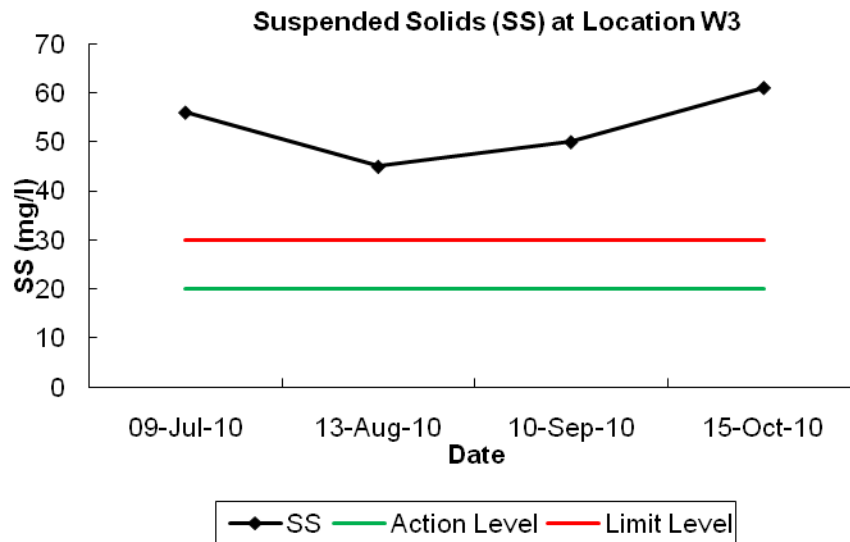
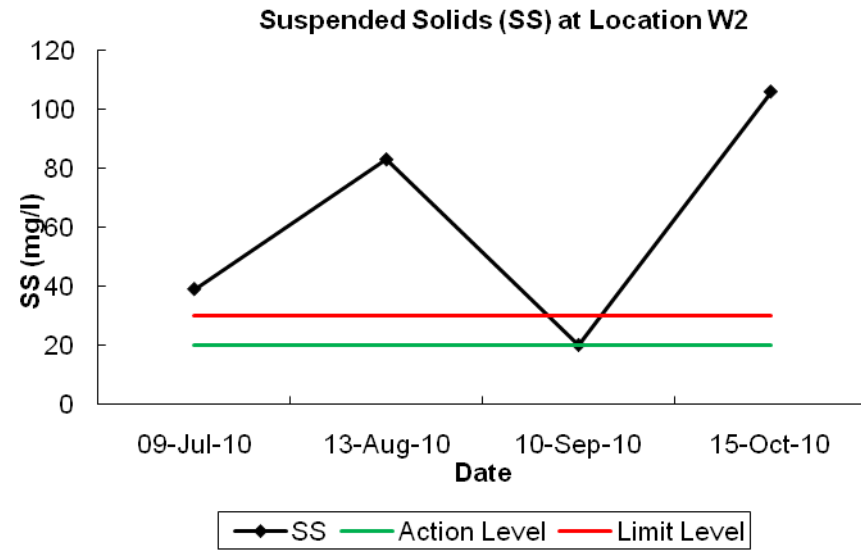
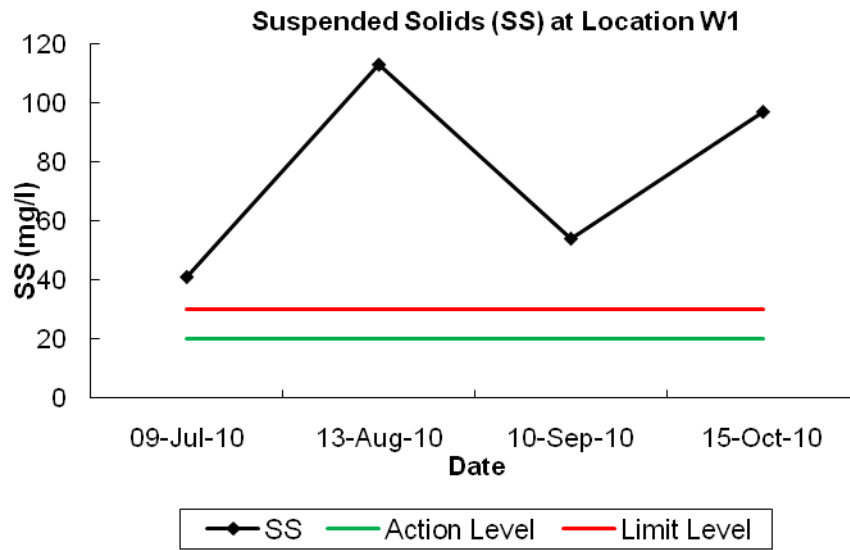
<b>Mean</b>	0.1	27.7	61.5	3.9	103.3	9.0	2.2	0.2
<b>Minimum</b>	0.1	24.2	19.0	2.0	89.5	7.7	0.9	0.1
<b>Maximum</b>	0.1	32.6	113.0	7.0	148.0	10.7	7.3	0.7

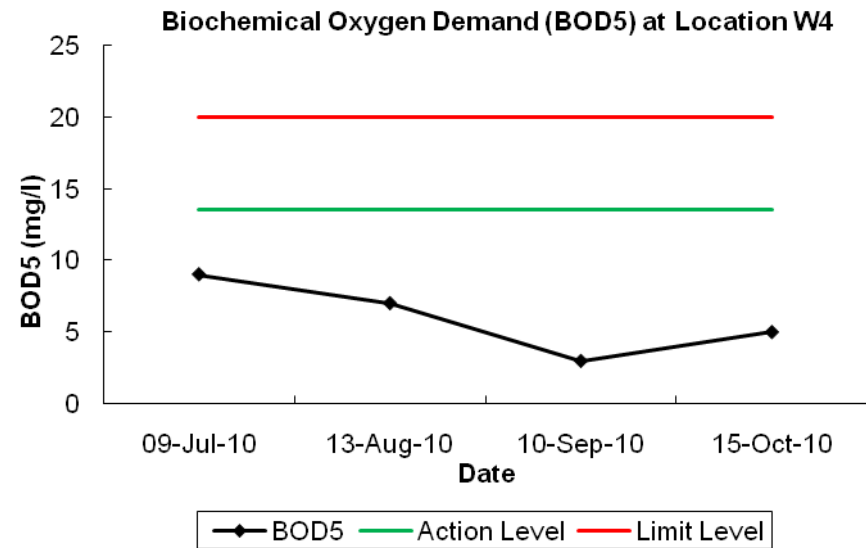
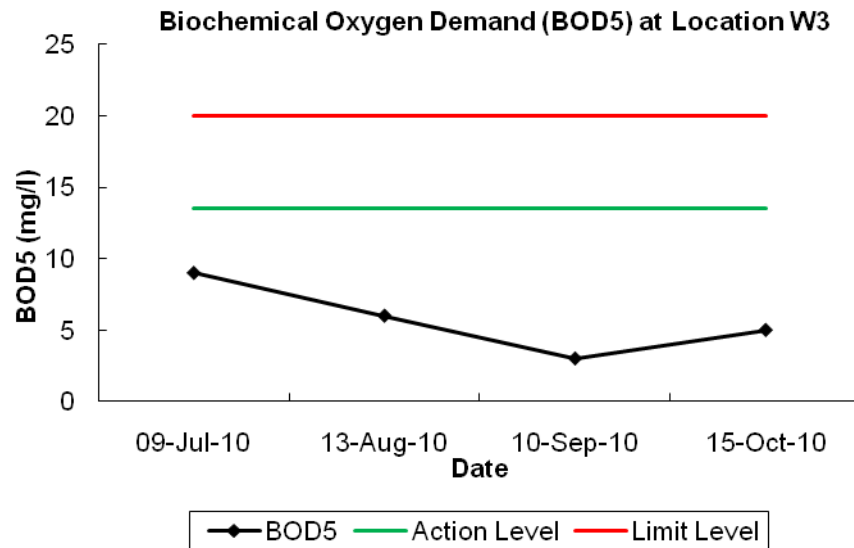
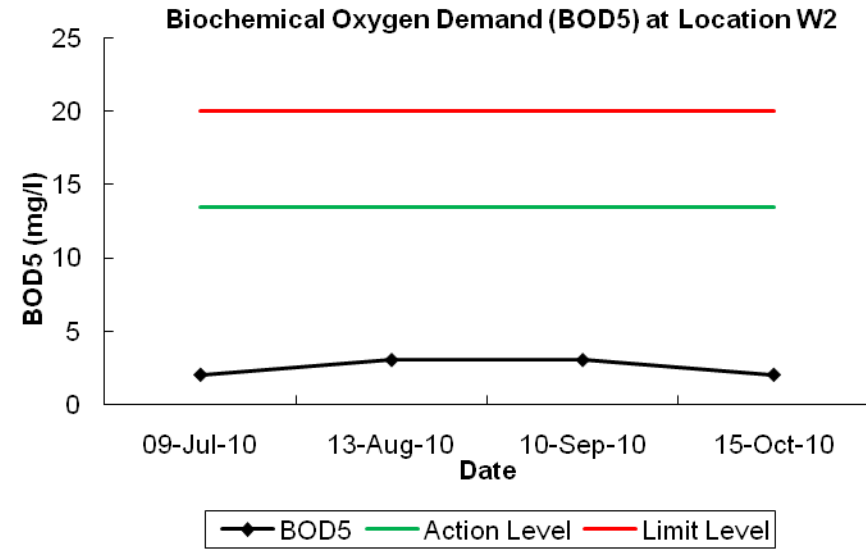
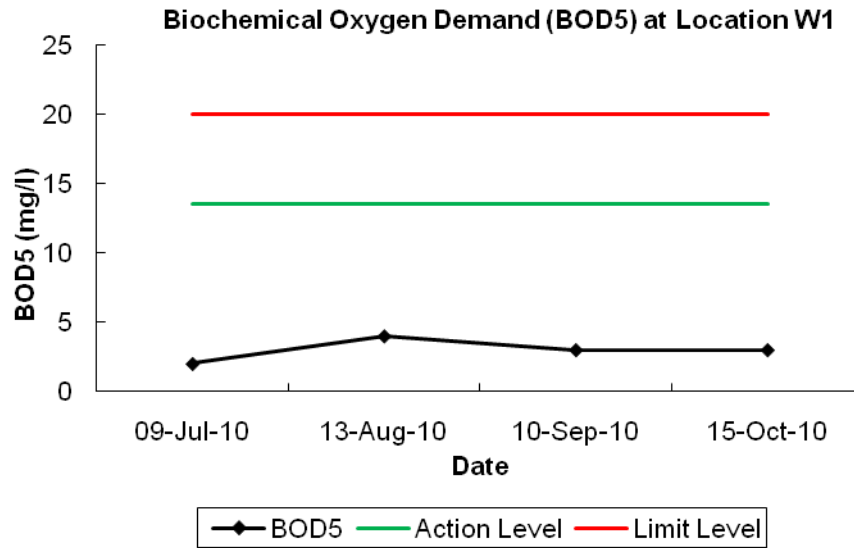
**Notes:** Bold indicates Action Level exceedance; **Bold** indicates Limit Level exceedance

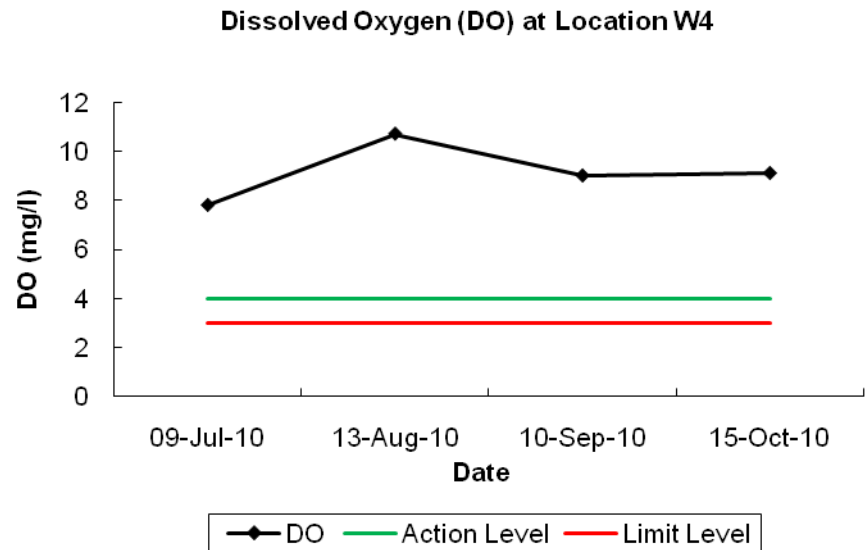
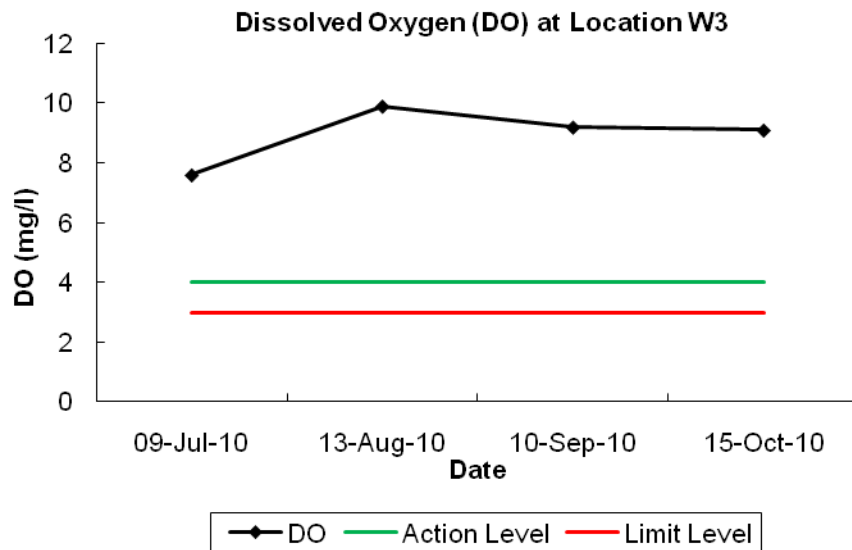
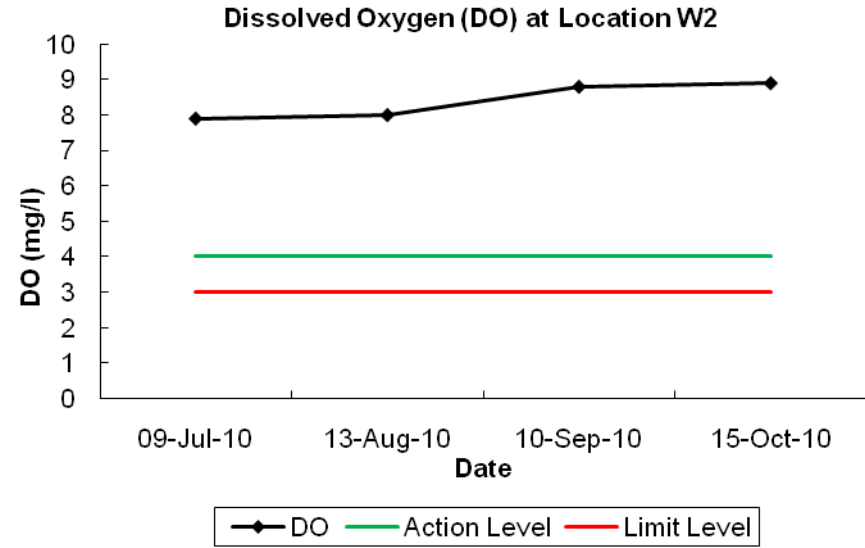
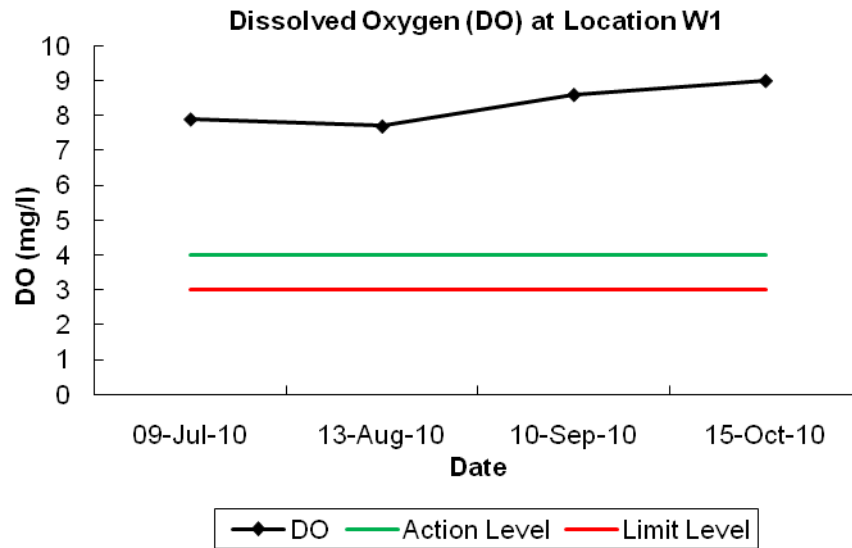
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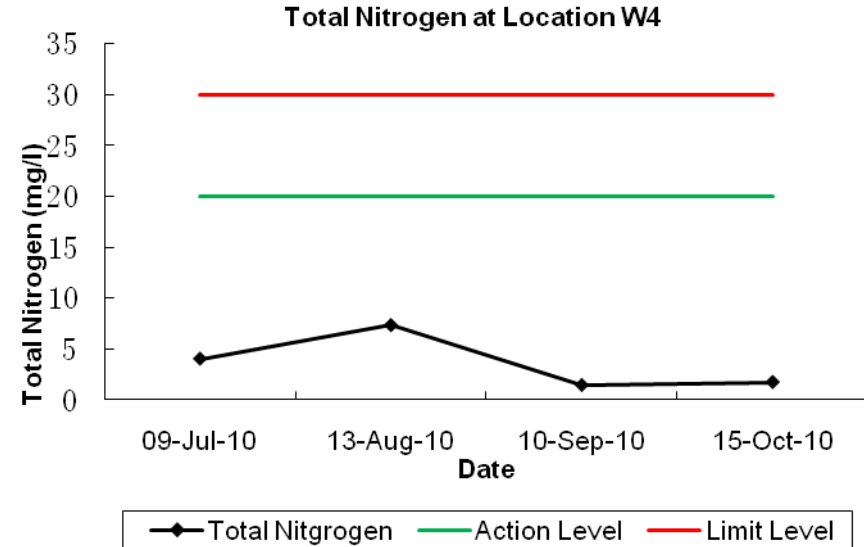
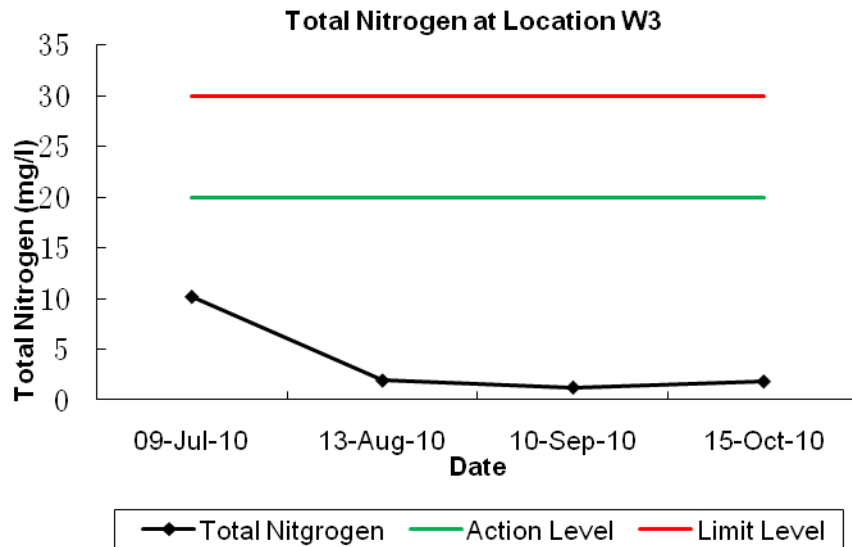
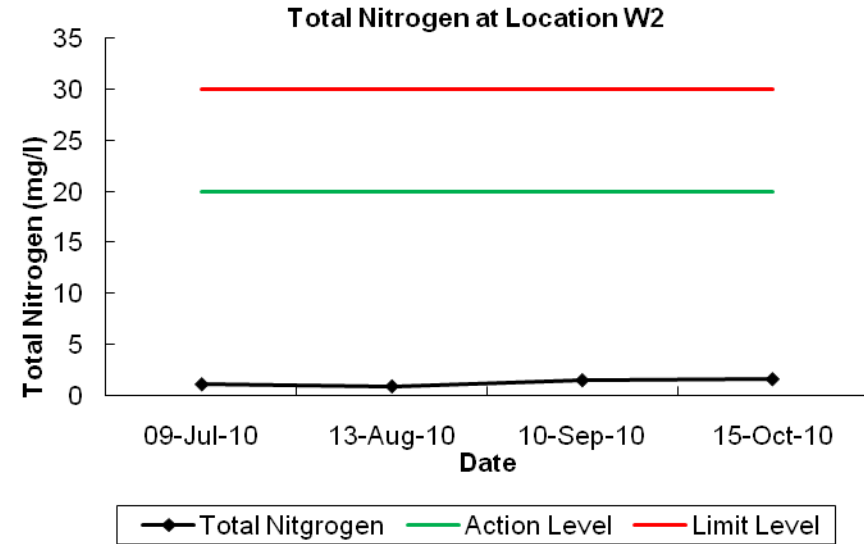
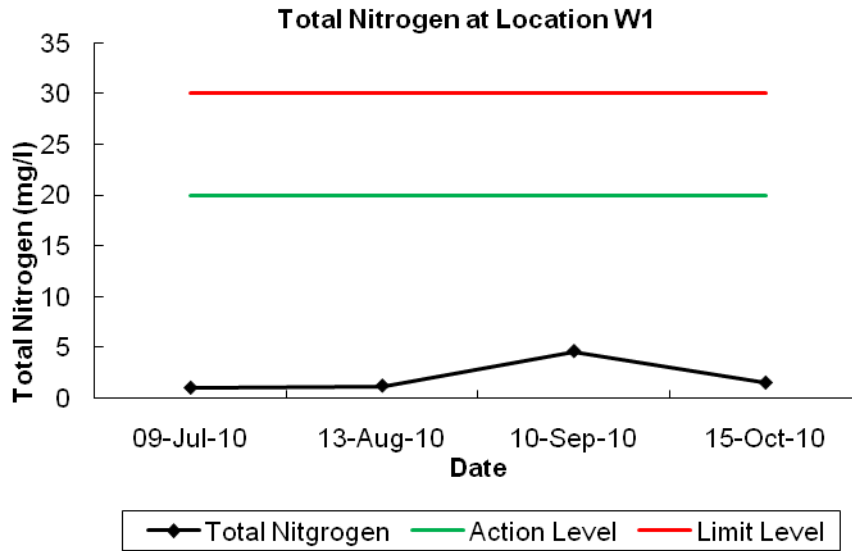
## APPENDIX 3

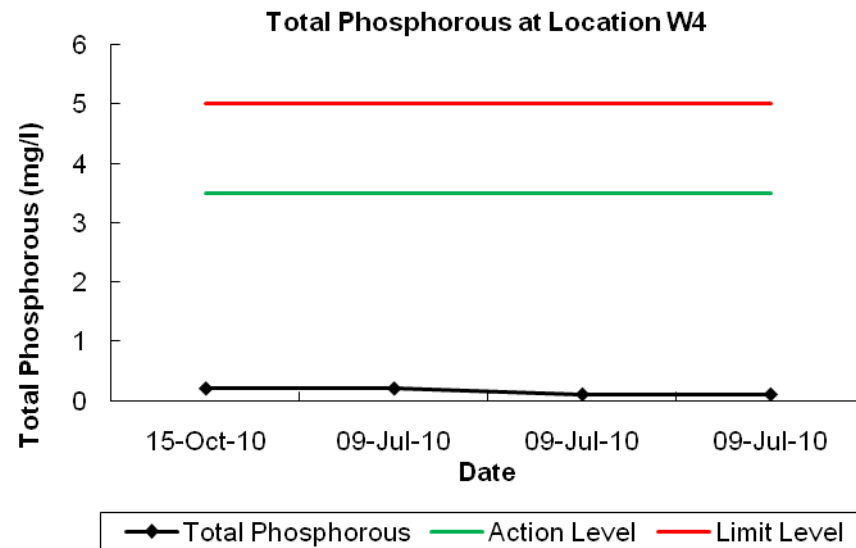
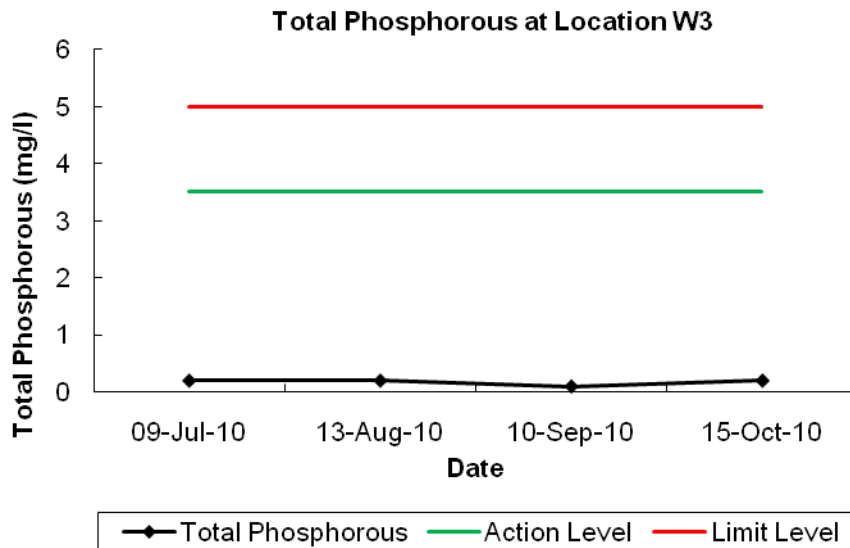
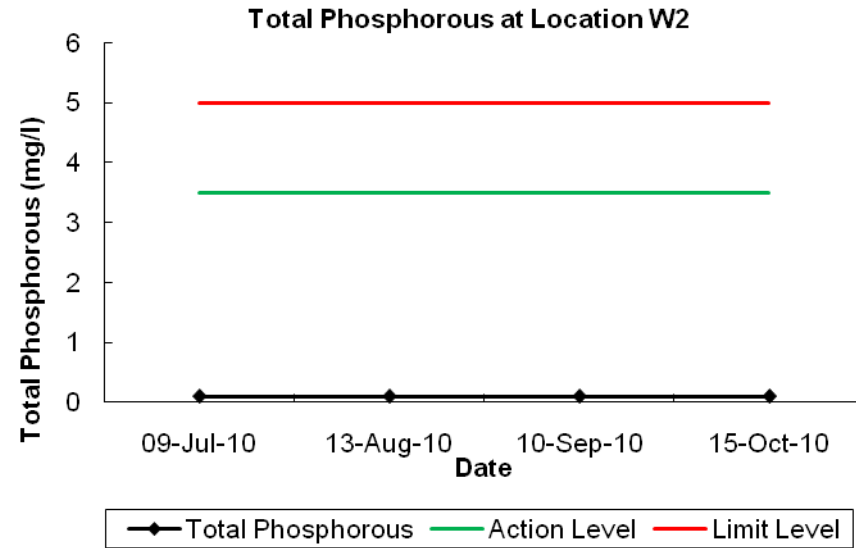
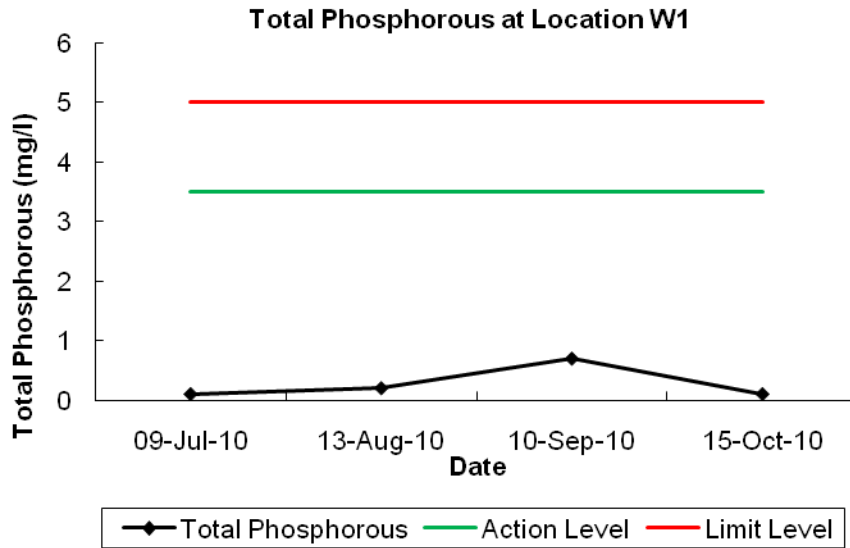
### Graphical Plots of Monitoring Data for the Past Four Months











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## APPENDIX 4

### Aqua Bio-Trol Liquid – Product Datasheet



# Aqua Bio-Trol Liquid

## Liquid Microbial Pond Clarifier

PRODUCT DATA BULLETIN

### Features

- Eliminates pond scum and green, soupy conditions
- Improves water clarity
- Reduces foul odors and organic sediment
- Contains facultative bacteria capable of withstanding low oxygen levels
- Reduces levels of harmful nitrates & ammonia
- Effective under a wide range of climactic conditions
- Enhances conditions for all aquatic life
- Reduces biological oxygen demand
- Non-toxic, safe for fish, plants & applicator
- Microencapsulated, microbial stimulants

**Aqua Bio-Trol Liquid** is the safe, natural way to establish and maintain cleaner pond and lake water without chemicals. *Aqua Bio-Trol Liquid* eliminates pond scum and green, soupy conditions, while eliminating foul odors. *Aqua Bio-Trol Liquid* improves water clarity and digests excess organic matter in ponds, lakes and fountains.

**Aqua Bio-Trol Liquid** helps to create and maintain a healthier pond, lake and fountain water ecosystem through non-chemical treatment. *Aqua Bio-Trol Liquid* is an all natural, microbial based product effective for improving poor water conditions, and especially for maintenance of healthy water conditions once they are established. *Aqua Bio-Trol Liquid* is a concentration of naturally occurring microbes, which act to bring pond and lake water into proper ecological balance.

**Aqua Bio-Trol Liquid** is completely biodegradable and non-toxic to humans, animals and water life. The result of treatment is reduced organic sediment and particulate, reduced sludge, clear water, and enhanced conditions for all aquatic life.

**Aqua Bio-Trol Liquid** microbes preemptively consume organic matter which feeds algae and which leads to anaerobic conditions, including bad odors. The active microbes in *Aqua Bio-Trol Liquid* feed on excess nutrients in the entire water column, from sludge at the bottom to suspended particulate, to green organic matter on the surface. Routine application helps keep water in it's best condition without the use of potentially harmful chemicals.



### DIRECTIONS FOR USE

**Aqua Bio-Trol Liquid** is most effective when water temperatures range from 50° to 100° F. For best results, provide adequate surface or subsurface aeration. Subsurface aeration is preferred. For maximum efficiency, assure a minimum of 5-6 % dissolved oxygen.

Apply by distributing liquid as much as possible around pond and lake edges. Avoid dumping liquid in one location.

Pond Volume	Initial Treatment	Monthly Maintenance
Acre Foot 325,900 gallons	4 gallons	2 gallons

### Formulas to help in your calculations

- Length x Width x Depth (feet) x 7.48 = Number of Gallons
- One acre-foot of water = 325,900 gallons
- One acre-foot of water = 1,233 CuMt

### Active Ingredients

A proprietary blend of 58 strains of aerobic and facultative beneficial bacteria at a minimum concentration of  $6.6 \times 10^7$  CFU per ml (including *Bacillus subtilis*)

**Warranty:** Seller warrants that the product conforms to its chemical description and is reasonably fit for the purpose stated on the label when used in accordance with directions under normal conditions of use; but neither this warranty nor any other warranty of merchantability or fitness of a particular product expressed or implied, extends to the use of this product contrary to label conditions, or under conditions not reasonably foreseeable to the seller; and buyer assumes the risk of any such use.



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