

**Public Golf Course at Kau Sai Chau Island, Sai Kung**  
**Operation Phase**  
**Environmental Monitoring & Audit (EM&A) Report**  
**for January 2009**

**(Report No. 382812/0201/011)**

Report Authorized For  
Issue By:



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## **Executive Summary**

This is the eleventh Operation Phase Monthly Environmental Monitoring and Audit (EM&A) Report prepared by Black & Veatch for the Project ‘Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung’. This report presents the results of the EM&A works conducted in the month of January 2009 (25<sup>th</sup> December 2008 to 24<sup>th</sup> January 2009).

### ***Water Quality***

2 sets of water quality monitoring were carried out on 5 and 21 January 2009 at 9 marine and 6 freshwater monitoring locations. For F\_Filter (fresh water station), no filter effluent was discharging during sampling and, thus no water sample was taken. No rainstorm event was recorded during this reporting month.

Exceedances found at marine stations (M\_Marsh, TTC and KS) and freshwater stations (F\_DA, F\_DB, F\_DC, Lake 1D and F\_Inland M) are considered non-project related during the reporting month.

According to the approved revised pesticides monitoring plan at East Course, the monitoring will reduce to bi-monthly during dry season. The dry season monitoring will be carried out in February 2009, December 2009 and February 2010 throughout the 2-year EM&A operation phase monitoring. Monthly monitoring for pesticides is required during wet season.

### ***Marine Ecology***

The coral monitoring for the operation of the East Course commenced in July 2008. As the original baseline monitoring for the corals in Site D2 were conducted over 3.5 years before December 2005 and no construction phase monitoring was required for Site D2 due to the avoidance of dredging at the pier, the previously tagged corals at Site D2 have mostly lost the tags. 20 new corals were selected in Site D2 for operation phase monitoring purposes. The July 2008 coral monitoring covering Site D2, Site C and the Control Site served as the baseline for the operation phase. In accordance with the EM&A manual, the operation phase coral monitoring would cover two years. The frequency would be monthly for the first three months, and if no exceedance is recorded, the frequency will change to semi-annually. The present monitoring (October 2008) was the third monthly monitoring. No exceedance was recorded at impact station during the first three months (August, September and October 2008). The coral monitoring would change to semi-annually. The tentative coral monitoring schedule will be carried out in February 2009, August 2009 and February 2010.

### ***Landscaping & Visual***

The replanting of death compensatory plants was carried out in December 2008 by the Contractor, it was observed that majority of compensatory planting tree were still dead trees. Among 841 trees were planted in accordance with planting plan provided by the Contractor, 642 individuals were found dead. However, there were still 582 dead trees observed during the present audit although 114 individual trees were recently planted. The Contractor was reminded to replant altogether over 400 new trees as replacement for all dead trees, and any other trees found to be in poor conditions prior to the next site inspection.

### ***Soil Nutrient***

The soil nutrient sampling and testing was completed in January 2008. The tentative soil nutrient sampling and testing will be carried out in June 2009.

## 1. Introduction

### 1.1 Background of the Project

1.1.1 Black & Veatch (hereinafter called the “ET”) was appointed by The Jockey Club Kau Sai Chau Public Golf Course Limited (hereinafter called the "Project Proponent") to undertake Operation Phase of Environmental Monitoring and Audit (EM&A) for “Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung” (hereinafter called the “Project”). Under the requirements of Section 4 of Environmental Permit EP-224/2005/A, EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A Manual, environmental monitoring on water quality, marine ecology, landscape and visual and land contamination during operation phase are required for the Project.

1.1.2 This report summarises the environmental monitoring and audit works for the Project in **January 2009**.

### 1.2 Purpose of the Report

1.2.1 This is the **eleventh** EM&A report which summarizes the impact monitoring results and audit findings for the EM&A programme during the reporting period from **25<sup>th</sup> December 2008 to 24<sup>th</sup> January 2009**.

### 1.3 Structure of the Report

1.3.1 The structure of the report is shown in Table 1.1.

**Table 1.1 Structure of the Report**

<b>Section</b>		<b>Description</b>
<b>1</b>	Introduction	Details the scope and structure of the report
<b>2</b>	Project Information	Summarizes background and scope of the project and site description
<b>3</b>	Environmental Monitoring Requirement	Summarizes the monitoring parameters, programmes, methodology, frequency, location, action and limit levels, event action plans, environmental mitigation measures as recommended in the EIA report and relevant environmental requirements.
<b>4</b>	Monitoring Results	Summarizes the monitoring results obtained in the reporting period.
<b>5</b>	Environmental Non-conformance	Summarizes any monitoring exceedance, environmental complaints and environmental summons within the reporting period.
<b>6</b>	Conclusions	Provides an overall conclusion of the results and findings of the EM&A programme for the reporting period.

## **2. Project Information**

### **2.1 Background**

2.1.1 The Project comprises the following major components:

- Construction of the third 18-hole public golf course on the east side of the island, south of the existing golfing area;
- A new irrigation lake to collect surface runoff from the new 18-hole golf course. Water stored at the new irrigation lake can also be diverted to existing reservoir for tertiary treatment and recycling;
- A new desalination plant adjacent to the existing pier to serve as an additional irrigation water supply for the new golf course during dry season; and
- Expansion of existing administration and maintenance buildings.

2.1.2 The potential environmental impacts of the Project have been studied in the Environmental Impact Assessment (EIA) report (EIAO Register No. AEIAR- 091/2005). The EIA was approved on 14 November 2005 under the EIAO. An Environmental Permit (EP-224/2005) was granted on 28 November 2005. Application for Variation of an Environmental Permit by the Project Proponent was submitted on 2 August 2006 (Application No. VEP-222/2006) and the EP was superseded by EP-224/2005/A.

### **2.2 Site Description**

2.2.1 A layout plan of the Project is provided in **Figure 1.1**.

### **2.3 Summary of EM&A Requirements**

2.3.1 The EM&A programme requires environmental monitoring for water quality, marine ecology, landscape and visual and land contamination during operation phase. The EM&A requirements for each parameter are described in subsequent sections, including:

- All monitoring parameters;
- Action and Limit Levels for all environmental parameters;
- Event and Action Plans; and
- Environmental mitigation measures, as recommended in the project EIA final report.

2.3.2 A summary of impact EM&A requirements is presented in Table 2.1.

**Table 2.1 Summary of Impact EM&A Requirements during Operation Phase**

<b>Impacts</b>	<b>Parameters/descriptions</b>	<b>Locations</b>	<b>Frequencies</b>
<b>Water Quality</b>	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity, SS, NO3-N, NO2-N, NH3-N, TP, Chl-a and selected pesticides.	9 marine and 6 freshwater locations	2-year of monitoring period for the operation phase. Monitoring should be carried out on bi-weekly basis for the first 12 months, after when the frequency will be reviewed by EPD. Additional monitoring parameters at Lake 1D are required (TKN, Ortho-P and Conductivity)
	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity, SS, NO3-N, NO2-N, NH3-N, TP, Chl-a and selected pesticides.	8 marine locations	Additional water quality monitoring shall be carried out after heavy rain storm or when there is an overflow event from the reservoir, irrigation buffer lake or detention ponds/tanks.
<b>Marine Ecology</b>	Natural corals	Site C, Site D2 and the Control Site.	First three months would be monthly conducted during the first two years of the operation phase. If no exceedance was recorded, the monitoring schedule would be changed to semi-annually, i.e. once in dry season and once in wet season.
<b>Landscape and Visual</b>	Audits to ensure effective implementation of mitigation measures	Golf course area and at visual sensitive receivers	Auditing inspections and reporting shall be undertaken once every two months for the first year of the operation phase.
<b>Soil Nutrient</b>	Nutrient Status of the Soil	Golf course	Twice annually

### 3. Environmental Monitoring Requirements

#### 3.1 Water Quality

##### Monitoring Requirement

3.1.1 Water quality monitoring was conducted in accordance with the EM&A Manual. Tables 3.1 to 3.3 show the established Action/Limit Levels for the water environmental monitoring parameters.

**Table 3.1 Derived Summaries of Action and Limit Levels for Freshwater Water Quality**

Parameters	Location	Action	Location	Limit
DO (mid-depth)		6.3 mg/L	All	4 mg/L ξ
pH (mid-depth)		N/A	All	6.0 - 9.0
SS (mid-depth)	All	3.8 mg/L or 120% of upstream control station's SS at the same tide of the same day	All	8 mg/L or 130% of upstream control station's SS at the same tide of the same day
Turbidity (Tby) (mid-depth)	All	3.1 NTU or 120% of upstream control station's Tby at the same tide of the same day	All	4 NTU or 130% of upstream control station's Tby at the same tide of the same day
Ammonia Nitrogen (mid-depth)		N/A	All	0.01 mg/L
Nitrate Nitrogen (mid-depth)	All	0.10 mg/L	All	0.11 mg/L
Nitrite Nitrogen (mid-depth)		N/A	All	0.01 mg/L
TIN (mid-depth)	All	0.12 mg/L	All	0.13 mg/L
Total Phosphorus (mid-depth)		N/A	All	0.02 mg/L

Remarks:

: Action and limit levels are subjected to review especially for wet season.

Freshwater monitoring locations: F-UA, F-DA, F-UB, F-DB, F-UC, F-DC and F-Inland Marsh

As most of the freshwater samples were reported of NH<sub>3</sub>-N, NO<sub>2</sub>-N levels below the detection limit of 0.01 mg/L, limit level is set at 0.01 mg/L. Similarly for TP, a limit level of 0.02 mg/L (the detection limit of TP) is imposed.

ξ : Water Quality Objectives of the Port Shelter

**Table 3.2 Action and Limit Levels for Water Quality Monitoring  
 (applicable to irrigation lake 1D and existing reservoir)**

Parameter (mg/L unless stated)	Action and Limit Levels
pH	6.0 - 9.0 <sup>(1)</sup>
Turbidity (NTU)	-
Dissolved Oxygen	>4 <sup>(1)</sup>
Chlorophyll a (mg/m <sup>3</sup> )	<5 <sup>(1)</sup>
Nitrate N	0.20 <sup>(1)</sup>
Nitrite N	0.20 <sup>(1)</sup>
Ammoniacal N	0.50 <sup>(1)</sup>
Total Kjeldahl N	1.2 <sup>(2)</sup>
Total Phosphate	0.1 <sup>(1)</sup>
Ortho Phosphate	0.05 <sup>(1)</sup>
Conductivity (µS/cm)	<1000 <sup>(1)</sup>

Note: (1) These values are based on professional judgment and knowledge

(2) Based on 90<sup>th</sup> percentile of operational phase monitoring data (1996 to June 1998)

**Table 3.3 Derived Summaries of Action and Limit Levels for Marine Water Quality**

Parameters	Location	Action	Location	Limit
<b>DO (Surface &amp; Middle)</b>	FCZ	6.0 mg/L	FCZ	5.3 mg/L
	All except FCZ	4.9 mg/L	All except FCZ	4.6 mg/L
<b>DO (Bottom)</b>	All	3.7 mg/L	All	3.4 mg/L
<b>pH (depth-averaged)</b>		N/A	All	6.5 - 8.5
<b>SS (Depth-averaged)</b>	FCZ	4.5 mg/L	FCZ	5.6 mg/L
	All except FCZ	6.1 mg/L	All except FCZ	10.6 mg/L
<b>SS (Depth-averaged) Dredging for submarine pipelines</b>	M_RO1	6.1 mg/L	M_RO1	10.6 mg/L
<b>Turbidity (Tby) (depth-averaged)</b>	FCZ	2.9 NTU $\alpha$	FCZ	3.9 NTU $\alpha$
	All except FCZ	3.3 NTU $\alpha$	All except FCZ	6.2 NTU $\alpha$
<b>Ammonia Nitrogen (depth-averaged)</b>	FCZ	0.02 mg/L	FCZ	0.03 mg/L
	All except FCZ	0.05 mg/L $\Delta$	All except FCZ	0.05 mg/L $\Delta$
<b>Nitrate Nitrogen (depth-averaged)</b>	FCZ	0.08 mg/L	FCZ	0.09 mg/L
	All except FCZ	0.09mg/L $\Delta$	All except FCZ	0.09 mg/L $\Delta$
<b>Nitrite Nitrogen (depth-averaged)</b>	FCZ	0.02 mg/L $\theta$	FCZ	0.02 mg/L $\theta$
	All except FCZ	0.02 mg/L	All except FCZ	0.04 mg/L
<b>TIN (depth-averaged)</b>	FCZ	0.12 mg/L	FCZ	0.14 mg/L
	All except FCZ	0.16 mg/L	All except FCZ	0.18 mg/L
<b>Total Phosphorus (depth-averaged)</b>	All	0.09 mg/L $\Delta$	All	0.09 mg/L $\Delta$



Remarks:

: Action and limit levels are subjected to review especially for wet season throughout the construction phase of the project.

: Action and limit levels are subjected to review before the dredging works.

⊗ : All are based on EM&A baseline monitoring data due to marked difference between EPD turbidity data and those from the baseline survey.

Δ : For nutrient monitoring (except NO<sub>2</sub>-N) at non-FCZ stations, the trigger level has made reference to the existing golf course guideline values. The guideline value of NO<sub>2</sub>-N is below the current detection limit of 0.01mg/L and thus not used.

θ : The same action and limit level of 0.02 mg/L is determined from the EM&A baseline data as 78% of the NO<sub>2</sub>-N data are ≤ 0.01 mg/L and all remaining 22% equal to 0.02 mg/L.

**FCZ** including fish culture zones of Kai Lung Wan, Tai Tau Chau and Kau Sai

**All except FCZ** including remaining impact monitoring station of M\_RO1, M\_Marsh, M\_BP and M\_Coral.

Control monitoring locations: M\_A & M\_B

### Monitoring Parameters, Frequency and Programme

- 3.1.2 For marine water quality, measurements shall be taken at both mid-flood and mid-ebb tides and at three water depths (1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted). Should the water depth be less than 3 m, only the mid-depth station will be monitored.
- 3.1.3 For the stream course, measurements shall be taken at mid-water depth.
- 3.1.4 The water quality parameters which need to be monitored are as follows:
- Marine water quality - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS), pH and salinity
  - Freshwater water quality - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS), pH, salinity and conductivity (Lake 1D only).
- 3.1.5 Additional marine and freshwater water quality monitoring parameters for the impact monitoring during construction include nitrate nitrogen (NO<sub>3</sub>-N), nitrite nitrogen (NO<sub>2</sub>-N), ammonia nitrogen (NH<sub>3</sub>-N), total phosphate (TP) and selected pesticides. For Lake 1D, Total Kjeldahl Nitrogen (TKN) and Orthophosphate (Ortho P) are required.
- 3.1.6 Additional water quality monitoring at Tai Tau Chau FCZ (TTC), Kai Lung Wan FCZ (KLW), Kau Sai FCZ (KS), downstream of the existing marsh (M\_Marsh), marine water of Port Shelter (M\_Coral), existing reservoir (F\_Inland M) and Control stations (M\_A and M\_B) shall be carried out after heavy rain storm or when there is an overflow event from the reservoir, irrigation buffer lake or detention ponds/tanks. The heavy rain storm shall be defined when there is an amber/red/black rainstorm warning signal issued by the Hong Kong Observatory. The water sample shall be taken within 24 hours after the black/red/amber rainstorm warning signal is cancelled. Please refer to revised EM&A manual for the sampling condition requirement after a heavy rain storm event occurs. The monitoring parameters shall include dissolved oxygen, temperature, turbidity, suspended solids, pH and salinity. Additional parameters shall be the same as stated in paragraphs 3.1.5.

*Monitoring Frequency*

3.1.7 After reviewing the water quality monitoring results during construction phase and early operation phase, EPD<sup>1</sup> agreed to revise monitoring parameters and frequency are summarized in Table 3.4. The monitoring programme for the reporting period is shown in **Annex A**.

**Table 3.4 Water Quality Monitoring Parameter, Frequency and Locations**

Parameters	Location	Frequency	Sampling Depth
Dissolved Oxygen (mg/L)	<p><b>Marine Water</b> Fish culture zone stations: TTC, KLW, KS</p> <p>Control stations: M_A, M_B</p> <p>Impact stations: M_RO1, M_RO2, M_Marsh, M_Coral</p> <p><b>Freshwater Water</b> Stream A (F_DA) Stream B (F_DB) Stream C (F_DC) Inland Marsh (F_Inland_M) Filter System (F_Filter) Irrigation Lake 1D (F_lake 1D)</p>	<p><b>Bi-weekly</b></p> <p><u>Marine water</u> : 2 times per day – 1 for mid-flood and 1 for mid-ebb</p> <p><u>Freshwater</u> : Mid-depth per trip</p>	3 individual water depth samples (surface, middle & bottom)
Temperature (°C)			
Turbidity (NTU)			
pH			
Salinity (ppt)			
Suspended Solids (mg/L)			
Nutrients <sup>2</sup>			
Chemicals <sup>3</sup>	<p><b>Monthly (wet season) and Bi-Monthly (dry season)</b></p> <p><u>Marine water</u> : 2 times per day – 1 for mid-flood and 1 for mid-ebb</p> <p><u>Freshwater</u> : Mid-depth per trip</p>	1 composite sample (combine surface, middle and bottom) with replicate	

Wet season: Apr to October; Dry season: November to March

<sup>1</sup> EPD letter dated 14 July 2008 (Ref. no.: (6) in EP2/N8/O/47 Ax(7) Pt X) regarding the approval on the revised water quality monitoring proposal.

<sup>2</sup> Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Inorganic Nitrogen, Total Phosphorus and Chlorophyll a. For Lake 1D, addition nutrient parameters are Total Kjeldahl Nitrogen, Ortho Phosphate and Conductivity (µS/cm).

<sup>3</sup> Pesticides (approved lists are Imazaquin, Glyphosate, Oxadiazon, 2,4-D/Mecoprop, Chlorothalonil, Mancozeb, Iprodione, Fosetyl Aluminum, Chlorpyrifos, Fipronil and Imidachloprid).

Monitoring Locations

3.1.8 The water quality monitoring locations for marine and freshwater (**Figure 3.1**) are summarized in Table 3.5.

**Table 3.5 Water Quality Monitoring Locations during Operation Phase**

Identification Number	Location	Approx. Water Depth	No. of Depth
<i>Marine Water (9 stations)</i>			
TTC	Tai Tau Chau Fish Culture Zone	9.5 m	3
KLW	Kai Lung Wan Fish Culture Zone	13 m	3
KS	Kau Sai Fish Culture Zone	11 m	3
M_BP	Temporary barging point	9.6 m	3
M_RO1	Desalination plant south of the existing pier	5 m	2
M_RO2	Desalination plant south of the existing pier	13 m	3
M_Marsh	Discharge point at the existing marsh	7.7 m	3
M_Coral	Marine water of Port Shelter	10.2m	3
M_A	Water Control Station of Port Shelter	7.5 m	3
M_B	Water Control Station of Port Shelter	16.5 m	3
<i>Fresh Water (7 stations)</i>			
F_DA	downstream of stream A	Mid-depth	1
F_DB	downstream of stream B	Mid-depth	1
F_DC	downstream of stream C	Mid-depth	1
F_Inland M	Downstream of the existing marsh (Inland)	Mid-depth	1
F_lake 1D	Irrigation Lake 1D	Mid-depth	1
F_Filter	Filter effluent point at Holes 5 / 6	Mid-depth	1

Monitoring Equipment

*Dissolved Oxygen and Temperature Measuring Equipment*

3.1.9 The instrument shall be a portable and weatherproof DO measuring instrument complete with cable and sensor, and use a DC power source. The equipment shall be capable of measuring:

- dissolved oxygen levels in the range of 0 - 20 mg L<sup>-1</sup> and 0 - 200% saturation; and
- a temperature of 0 - 45 degrees Celsius.

3.1.10 It shall have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary. (For example, YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

- 3.1.11 Should salinity compensation not be built-in in the DO equipment, in-situ salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

*Turbidity Measurement Instrument*

- 3.1.12 Turbidity shall be measured in situ by the nephelometric method. The instrument shall be portable and weatherproof turbidity measuring instrument using a DC power source complete with cable, sensor and comprehensive operation manuals. It shall have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU (for example, Hach model 2100P or an approved similar instrument). The cable shall not be less than 25m in length. The meter shall be calibrated in order to establish the relationship between NTU units and the levels of suspended solids.

*Suspended Solids*

- 3.1.13 A water sample at least 2.5L in capacity with messenger and using a 10m line should be collected. Samples should be submitted to HOKLAS accredited laboratory as soon as possible for gravimetric analysis for suspended.

*Sampler*

- 3.1.14 A water sampler is required. It shall comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler shall 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 (for example, Kahlsico Water Sampler or an approved similar instrument).

*Water Depth Detector*

- 3.1.15 A portable, battery-operated echo sounder shall 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, if the same vessel is to be used throughout the monitoring programme.

*Salinity*

- 3.1.16 A portable salinometer capable of measuring salinity in the range of 0 - 40 parts per thousand (ppt) shall be provided for measuring salinity of the water at each monitoring location.

*pH*

- 3.1.17 The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 shall be used for calibration of the instrument before and after use. Details of the method shall comply with APHA, 19th ed. 4500-HTB.

*Flow Rate Meter*

- 3.1.18 A portable, battery-operated flow meter should be used for the determination of water depth at each designated monitoring location and record in m<sup>3</sup>/s. A hand held or meter fixed to the underside of the survey boat may be used.

*Sample Containers and Storage*

- 3.1.19 Water samples for laboratory analysis shall be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory and analysed as soon as possible after collection. Sufficient volume of samples shall be collected to achieve the required detection limit.

*Monitoring Position Equipment*

- 3.1.20 A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication or other equipment instrument of similar accuracy, shall be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

Monitoring Methodology and Calibration Details

- 3.1.21 Dissolved oxygen (DO), temperature, turbidity, pH and salinity were measured in situ at the designated water quality monitoring stations. General observation, weather conditions, with the sampling time, date and location were marked on the field record sheet.
- 3.1.22 Water samples were taken from each monitoring station for laboratory analysis. The sample identification number, sampling location, date, time, project name and analyses were required.
- 3.1.23 The samples were placed in a cooler with ice (to 4°C without being frozen) and kept away from sunlight. Samples were submitted to a Hong Kong Laboratory Accreditation Scheme (HOKLAS) or other international accredited laboratory for analysis within 24 hours of sampling.

*Calibration of In-Situ Instruments*

- 3.1.24 All in situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring programme. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibration for a DO meter were carried out before measurement at each monitoring location.

*Laboratory Analysis*

- 3.1.25 All laboratory work were carried out by ALS Technichem Pty Ltd (HOKLAS accredited laboratory). Water samples were collected at the monitoring and control stations for carrying out the laboratory determinations. The determination work will start within 24 hours after collection of the water samples. The analysis shall follow the standard methods according to APHA Standard Methods for the Examination of Water and Wastewater, 19th Edition, or an equivalent method approved by EPD.

**Table 3.9 Analytical Methods to be applied to Water Quality Samples**

<b>Determinant</b>	<b>Standard Method</b>	<b>Reporting Limit</b>
Suspended Solids	APHA 2540 D	2 mg/L
Nitrate Nitrogen	APHA 4500-NO <sub>3</sub> <sup>-</sup>	0.01 mg/L
Nitrite Nitrogen	APHA 4500-NO <sub>2</sub> <sup>-</sup>	0.01 mg/L
Ammonia Nitrogen	APHA 4500-NH <sub>3</sub> (D)	0.01 mg/L
Total phosphorus	ASTM D515-88B	0.02 mg/L*

Determinant	Standard Method	Reporting Limit
Chlorophyll a	APHA 10200 H2 &3	0.5 µg/L

Remarks: \*After review baseline data, the detection limit report will be revised to 0.02 mg/L.

### *QA/QC Procedure*

- 3.1.26 ALS Technichem Pty Ltd. has comprehensive quality assurance and quality control programmes. For QA/QC procedures of parameters, one duplicate sample was analysed for every batch of 20 samples as required by HOKLAS.

### Event and Action Plans

- 3.1.27 The Event and Action Plan (EAP) for water quality monitoring is presented in **Annex B**.

## **3.2 Marine Ecology**

### Introduction

- 3.2.1 The marine ecological monitoring surveys are conducted in accordance with the EM&A manual.
- 3.2.2 As stipulated in the EM&A Manual, the ecological monitoring surveys for marine ecology included coral monitoring at both the eastern (Site C) and western (Site D2) coasts of Kau Sai Chau Island and Control Site. The purpose of the monitoring survey was to check the conditions of the tagged corals and the sites.

### Monitoring Frequency and Schedule

- 3.2.3 At each of the Site C and a Control Site near the AFCD's Coral Buoy at Sharp Island (**Figure 3.2**), 20 natural coral colonies are already selected and tagged during construction phase. If the tagged coral is found die or not suitable for sequent operation phase monitoring during the first month survey, new coral will be selected, tagged and replaced for the damage one. The species of corals had been tagged included the following 15 species: *Cyphastrea xerailia*, *Favia speciosa*, *Favites abdita*, *Favites pentagona*, *Goniastrea aspera*, *Goniopora columna*, *Hydnophora exesa*, *Leptastrea pruinosa*, *Lithophyllon undulatum*, *Pavona decussata*, *Platygyra acuta*, *Platygyra carnosus*, *Plesiastrea versipora*, *Psammocora superficialis*, and *Turbinaria peltata*. As the construction of the desalination plant intake and outfall at the existing pier was terminated, no dredging work had been carried out during the construction phase. According to the EM&A manual, no coral monitoring was required at Site D2 during the construction phase. As the original baseline coral monitoring at Site D2 was conducted 3.5 years ago (December 2005), most of the tags at the previous tagged corals were lost. Twenty (20) new corals were selected in Site D2 for operation phase monitoring purposes. The species of corals selected in Site D2 included the following 10 species: *Acropora tumida*, *Cyphastrea serailia*, *Favia speciosa*, *Favites chinensis*, *Goniastrea aspera*, *Goniopora columna*, *Gonipora stutchburyi*, *Pavona decussata*, *Porties lobata*, and *Turbinaria peltata*. The operation phase coral monitoring covering Site D2, Site C and the Control Site. The October 2008 monitoring is the third monthly monitoring.
- 3.2.4 The coral monitoring will be conducted monthly for the first three months of the operation phase, and if no exceedance was recorded, the monitoring schedule will be changed to semi-annually (i.e. one dry season and one in wet season) during the rest of the operation phase. Monitoring survey will consist of checking tagged corals at both impact sites and control site. Percentages of survival, sedimentation and bleaching for each tagged corals will be recorded. The monitoring programme for the reporting period is shown in **Annex A**.

#### Event and Action Plans

- 3.2.5 The Event and Action Plan (EAP) for ecology monitoring is presented in **Annex B**.

### **3.3 Landscape and Visual**

- 3.3.1 The EIA concluded that the landscape and visual impacts associated with the construction of the third golf course are anticipated to be acceptable with mitigation. In order to ensure that the effective management and implementation of landscape mitigation measures developed and defined in the EIA, regular site inspections on trees health will be conducted.
- 3.3.2 Landscape and Visual Audit conducted during the Operational Phase of the project to follow up the compensatory planting under the requirements of the EIA for Proposed Extension of Public Golf Course at Kau Sai Chau , Sai Kung.
- 3.3.3 Under the Environmental Impact Assessment for the above, the proposed mitigation measures included both the compensatory planting works and treatment to structures. As stated in paragraphs 8.3 of the EM&A Manual, the contractor shall maintain all soft landscape works for a period of 12 months after implementation. This period shall be the establishment period and will be year one of the operation phase. Auditing inspections and reporting shall be undertaken once every two months of the operation phase.

#### Scope of Audit

- 3.3.4 The broad scope of the audit on mitigation measures during operation phase of East Course is to monitor the maintenance operations of tree planting to ensure all compensatory plants are well developed and grow during the Establishment Period. The monitoring programme for the reporting period is shown in **Annex A**.

### **3.4 Soil Nutrient**

- 3.4.1 Routine soil testing for nutrients at East Course will be conducted semi-annually to ensure that nutrient applications to the golf course are having the desired effect. Adjustments, if necessary, are made to the applications program approved by Golf Course Superintendent to amend any soil imbalances or deficiencies in nutrients. The details of the fertilizers and pesticides application will also be recorded.

#### 4. Monitoring Results

4.1.1 Monitoring data are provided in **Annex C**.

##### 4.1 Water Quality

4.1.2 Marine and freshwater water quality monitoring were conducted at the 9 and 6 designated monitoring stations respectively. The desalination plant commenced operation in December 2008.

4.1.3 Monitoring of marine and freshwater locations was conducted on 2 occasions in January (5<sup>th</sup> and 21<sup>st</sup> January 2009). The QA/QC results for laboratory testing in the reporting month are acceptable and summarised in **Annex D**. No rainstorm signal was hoisted during this reporting month.

4.1.4 As there is no water discharge from the Holes 5 / 6 through the drainage system during sampling, no water sample for F\_Filter was collected during the reporting month. Summary of fertilizer and pesticides applications are summarized in **Annex E**.

4.1.5 Chemical applications were applied during the reporting month. They are approved pesticides listed in the turfgrass management plan in the final EIA report. Water samples were required to send to overseas laboratory for analysis and testing.

##### Marine water

4.1.6 The marine water exceedance is summarised in **Table 4.1-1**.

4.1.7 Non-compliances of ammonia nitrogen (average value was 0.05 mg/L), nitrate nitrogen (average value is 0.09 mg/L), chlorophyll a (average value was 2.1 µg/L) and TIN (average value was 0.15 mg/L) were recorded at M\_Marsh, TTC and KS stations. The non-compliance results were similar to the control stations M\_A and M\_B (average values for ammonia nitrogen, nitrate nitrogen, chlorophyll a and TIN were 0.05 mg/L, 0.09 mg/L, 2.1 µg/L and 0.14 mg/L).

4.1.8 It is believed that exceedances were caused by natural fluctuation/disturbance on water quality. Therefore, all exceedances are considered non-project related.

**Table 4.1-1 Marine Water Exceedance Summary (December 2008 to January 2009)**

Monitoring Location	Exceedance Level	Date	Parameters	Project-related
M_Marsh	Action Level	5 Jan 2009	TIN	No
	Limit Level	5 Jan 2009	NH <sub>3</sub> -N	No
TTC	Action Level	5 Jan 2009	NO <sub>3</sub> -N, TIN	No
	Limit Level	5 Jan 2009	NH <sub>3</sub> -N	No
KS	Action Level	21 Jan 2009	Chl a	No
	Action Level	5 Jan 2009	NO <sub>3</sub> -N, TIN	No
	Limit Level	5 Jan 2009	NH <sub>3</sub> -N	No
	Action Level	21 Jan 2009	Chl a	No



Fresh water

4.1.9 The fresh water exceedances are summarised in **Table 4.1-2**.

**Table 4.1-2 Fresh water Exceedance Summary (December 2008 to January 2009)**

Monitoring Location	Exceedance Level	Date	Parameters	Project-related
F_DA	Action Level	5 Jan 2009	Chl a	No
	Limit Level	21 Jan 2009	NO <sub>3</sub> -N, TIN	No
F_DB	Limit Level	5 Jan 2009	NH <sub>3</sub> -N, NO <sub>3</sub> -N, TIN	No
	Limit Level	21 Jan 2009	NO <sub>3</sub> -N, TIN	No
F_DC	Limit Level	5 Jan 2009	NH <sub>3</sub> -N, Chl a	No
	Limit Level	21 Jan 2009	NO <sub>3</sub> -N, TIN	No
F_Inland M	Limit Level	5 Jan 2009	NO <sub>3</sub> -N, TIN	No
	Limit Level	21 Jan 2009	NO <sub>3</sub> -N, TIN	No
Lake 1D	Limit Level	5 Jan 2009	NO <sub>2</sub> -N, Ortho P	No

4.1.10 Action / Limit level exceedances of NO<sub>3</sub>-N (0.12 mg/L to 0.23 mg/L) and TIN (0.19 mg/L to 0.25 mg/L) were recorded downstream A, B and C and Fresh water inland marsh. Water quality of the streams before any commencement works were measured in April 2006 in order to indicate natural variation between dry and wet seasons. By taking into account the seasonal variation (wet season) together with the baseline monitoring data (dry season), 95%-ile and 99%-ile for NH<sub>3</sub>-N are 0.08 mg/L and 0.21 mg/L, 95%-ile and 99%-ile for NO<sub>3</sub>-N are 0.55 and 0.85 mg/L and 95%-ile and 99%-ile for TIN are 0.71 mg/L and 1.08 mg/L. NO<sub>3</sub>-N and TIN concentrations are well within the wet season natural variation range. Therefore, it is considered that all exceedances are non-project related. Low values of Chlorophyll a were detected at downstream A and C (average value 0.6 µg/L).

4.1.11 The lake 1D is designed for temporary storage to collect the runoff from East Course through the closed low flow drainage system. The water will be recycled and reused as one of the irrigation water sources for the East Course. Exceedances of Ortho-P (0.25 mg/L) and NO<sub>2</sub>-N (0.30 mg/L) were recorded. As there is no overflow / discharge from the Lake 1D to marine or fresh water bodies, no further action has to be taken.

4.1.12 The monitoring of pesticides are summarised in **Table 4.1-3**. All applied pesticides were below detection limit.

**Table 4.1-3 Pesticides Monitoring Results (December 2008 to January 2009)**

Date	Monitoring Station	Parameters	Monitoring Result
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## 4.2 Marine Ecology

- 4.2.1 No coral monitoring was carried out during the reporting month. The upcoming monitoring is scheduled in February 2009.

## 4.3 Landscape & Visual

- 4.3.1 The finalized landscape works plan was submitted by the Contractor in October 2008. According to the preliminary report, there are about 90% of trees where planted on site as stipulated in the EIA. However, more than 70% of trees are death. The Engineer has urged the Contractor to remove and replant all death trees on site. Death tree replacement planting was carried out by the Contractor in December 2008, the bi-monthly Landscape and Visual site audit was carried out during the reporting month.

### Planting Works and Maintenance Operations (Summary of Inspection on January 2009)

#### *General Observations:*

- It is noted that the Contractor was requested to perform replanting for dead trees prior to the present monitoring. It was however observed that the majority of the compensatory planting trees were still dead trees. No/little landscape maintenance operations were carried out by the Contractor recently, or the maintenance works were not satisfactory.
- In order to compensate for the loss of trees, a total number of 967 trees are required to be planted in accordance with the approved EIA reported. Among the 841 trees were planted in accordance with the planting plan provided by the Contractor, 642 individuals were previously found dead and the Contractor was request to perform replanting. During the present audit, however, there were still 582 dead trees observed.
- Although another 114 individual trees have been recently planted in some additional planting sites (the areas not previously planted with trees), the total number of planted trees was still much below that in the planting plan.
- Some stakes for trees were found in poor conditions or leaning.
- A detailed summary of the inspection was shown on the drawings enclosed under **Annex C**.

#### Recommendations

- The Contractor was strongly recommended to perform all landscape maintenance operations, including replacing all dead trees; replanting any missing trees; providing stakes for leaning trees; re-staking all trees with broken/leaning tree stakes; pruning of die back tree branches; fertilizing of plants; and cutting of overgrown grass and removal of weeds on slopes, to ensure a healthy establishment of the compensatory planting.
- The Contractor was reminded to replant altogether over 400 new trees as replacement for all dead trees, and any other trees found to be in poor conditions prior to the next site inspection.
- The Contractor was reminded to carry out regular inspection of all tree stakes, especially trees on locations where it could be easily blown over in strong wind conditions, and rectify all defects as soon as possible.

- The Contractor was reminded to update the drawings to show the locations of replacement/replanting trees after the replanting is implemented.

Audit Schedule during Establishment Period

4.3.2 The next audit (once in every two months) is schedule in March 2009.

**4.4 Soil Nutrient**

4.4.1 The soil testing sampling was completed in January 2009. The upcoming monitoring will be carried out in June 2009.

## **5. Conclusions**

- 5.1.1 The Environmental Monitoring and Audit (EM&A) Report presents the operational EM&A works undertaken during the period from 25<sup>th</sup> December 2008 to 24<sup>th</sup> January 2009 in accordance with EM&A Manual and the requirement under EP-224-2005/A.
- 5.1.2 Exceedances on marine stations and fresh water stations are recorded and considered non-project related. The exceedances are mainly due to the natural variation.
- 5.1.3 No coral monitoring was conducted during the reporting month. The tentative upcoming monitoring schedule will be carried out in February 2008. For the soil nutrient, it will be carried out in June 2009.
- 5.1.4 The finalized landscape works plan was submitted by the Contractor in October 2008. There are about 70% of planted trees were death. The tree replanting work was carried out by the Contractor in December 2008, bi-monthly Landscape and visual site audit was conducted in January 2009. Among the 841 trees to be planted in accordance with the planting plan provided by the Contractor, 642 individuals were previously found dead. During the present audit, however, there were still 582 dead trees observed.
- 5.1.5 No environmental complaint / summon was received during the reporting month.

# **Annex A**

## **Monitoring Programme for the reporting month**

Public Golf Course at Kau Sai Chau Island, Sai Kung  
 Operation Phase - Monthly EM&A Report

<b>December 2008</b>						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
21	22	23	24	25	26	27
28	29	30	31			

<b>January 2009</b>						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5 WQ	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20 LV	21 WQ	22	23	24
25	26	27	28	29	30	31

WQ: Water Quality Monitoring (WQ); Rainstorm Water Sampling (RWQ)  
 ME: Marine Ecology  
 LV: Landscape and Visual

# **Annex B**

## **Event Action Plan**

### **Event and Action Plan for Water Quality**

Should monitoring results of the water quality parameters at any designated monitoring station exceed the water quality criteria related to turf management, action the proposed actions to be taken shall be as follows:

- inform Golf Course Manager immediately and stop chemical application;
- notify EPD and AFCD;
- review the application and re-evaluate suitability and availability of alternatives to chemical controls, etc.;
- agree remedial measures with Golf Course Manager and inform EPD and AFCD;
- implement the agreed remedial measures immediately; and
- increase monitoring frequency and/or locations to demonstrate effectiveness of the remedial measures.



**Action and Limit level and Event Action Plan for natural corals monitoring**

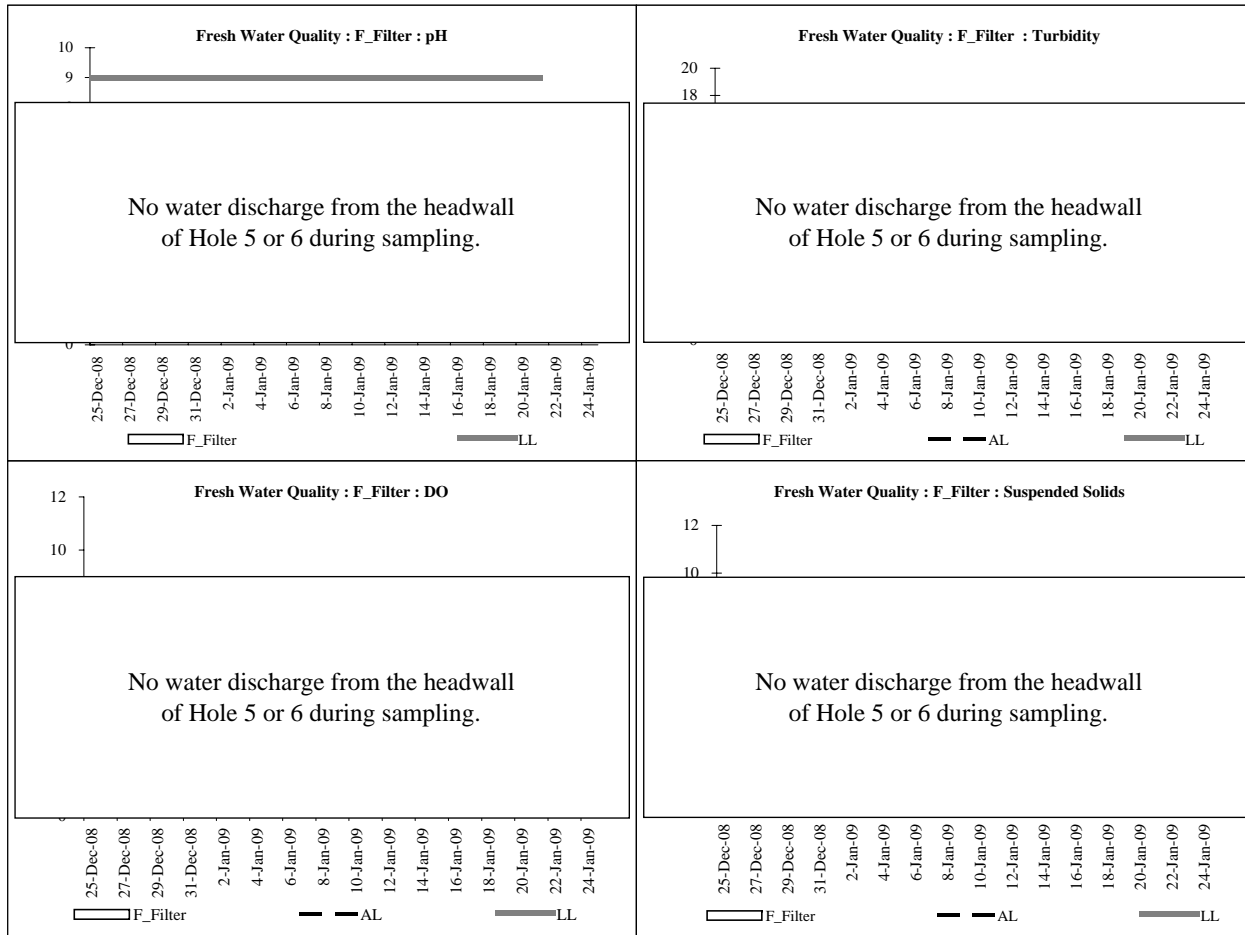
<b>Parameters</b>	<b>Action Level</b>	<b>Limit Level</b>
Sedimentation	a 15% increase in the percentage of sedimentation on the hard corals occurs at more than 20% of the tagged coral colonies at one or more monitoring sites	a 25% increase in the percentage of sedimentation on the hard corals occurs at more than 20% of the tagged coral colonies at one or more monitoring sites
Bleaching	a 15% increase in the percentage of bleaching of hard corals occurs at more than 20% of the tagged coral colonies at one or more monitoring sites	a 25% increase in the percentage of bleaching of hard corals occurs at more than 20% of the tagged coral colonies at one or more monitoring sites
Mortality	a 15% increase in the percentage of partial mortality of corals occurs at more than 20% of the tagged coral colonies at one or more monitoring sites	a 25% increase in the percentage of partial mortality of corals occurs at more than 20% of the tagged coral colonies at one or more monitoring sites

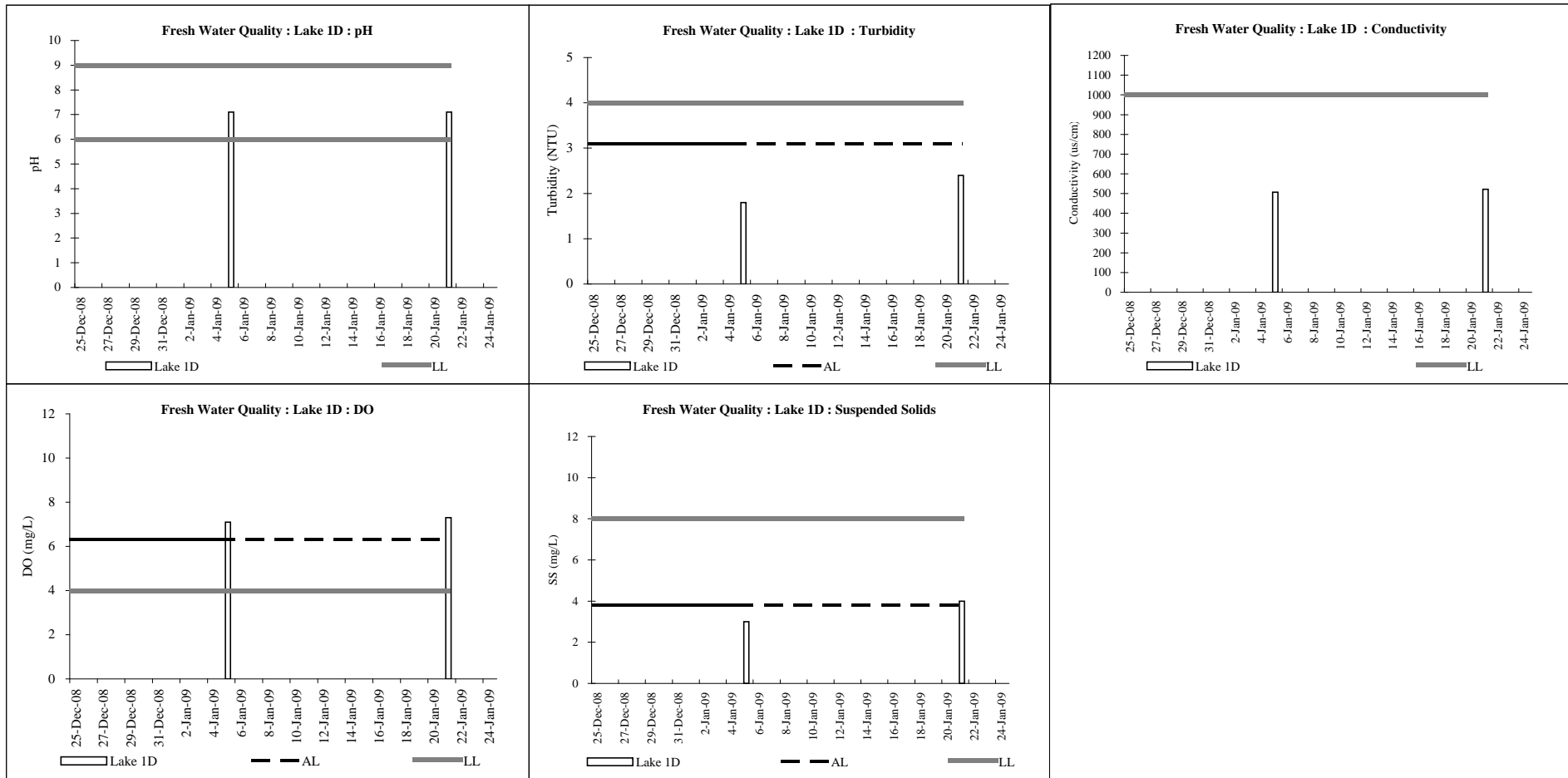
<b>Action</b>	<b>Action Level</b>	<b>Limit Level</b>
Operation phase	If the Action Level is exceeded the ET Leader should inform Golf Course Operator, EPD, and AFCD. The data from the water quality monitoring should also be reviewed. If the water quality monitoring shows no attributable effects of the installation works, then the Action Level is not triggered. If the water quality data indicate exceedances (salinity and/or pesticides) the ET Leader should discuss with the Golf Course Operator the most appropriate method of reducing salinity (e.g. reduce the daily operation time of the desalination plant), and/or control chemicals from runoff (e.g. reduce the frequency and quantity of chemical applied, check the intactness and effectiveness of the closed drainage system and stream buffer zone). This mitigated method should then be enacted on the next working day.	If the Limit Level is exceeded the ET Leader should inform all parties Golf Course Operator, EPD, and AFCD immediately. Should the Limit Level be exceeded, the Golf Course Operator should stop the operation of the desalination plant and/or the application of chemicals immediately and work out the solution according to the requirements of EPD and AFCD. The operation of the desalination plant and/or the application of chemicals would be suspended until an effective solution is identified.

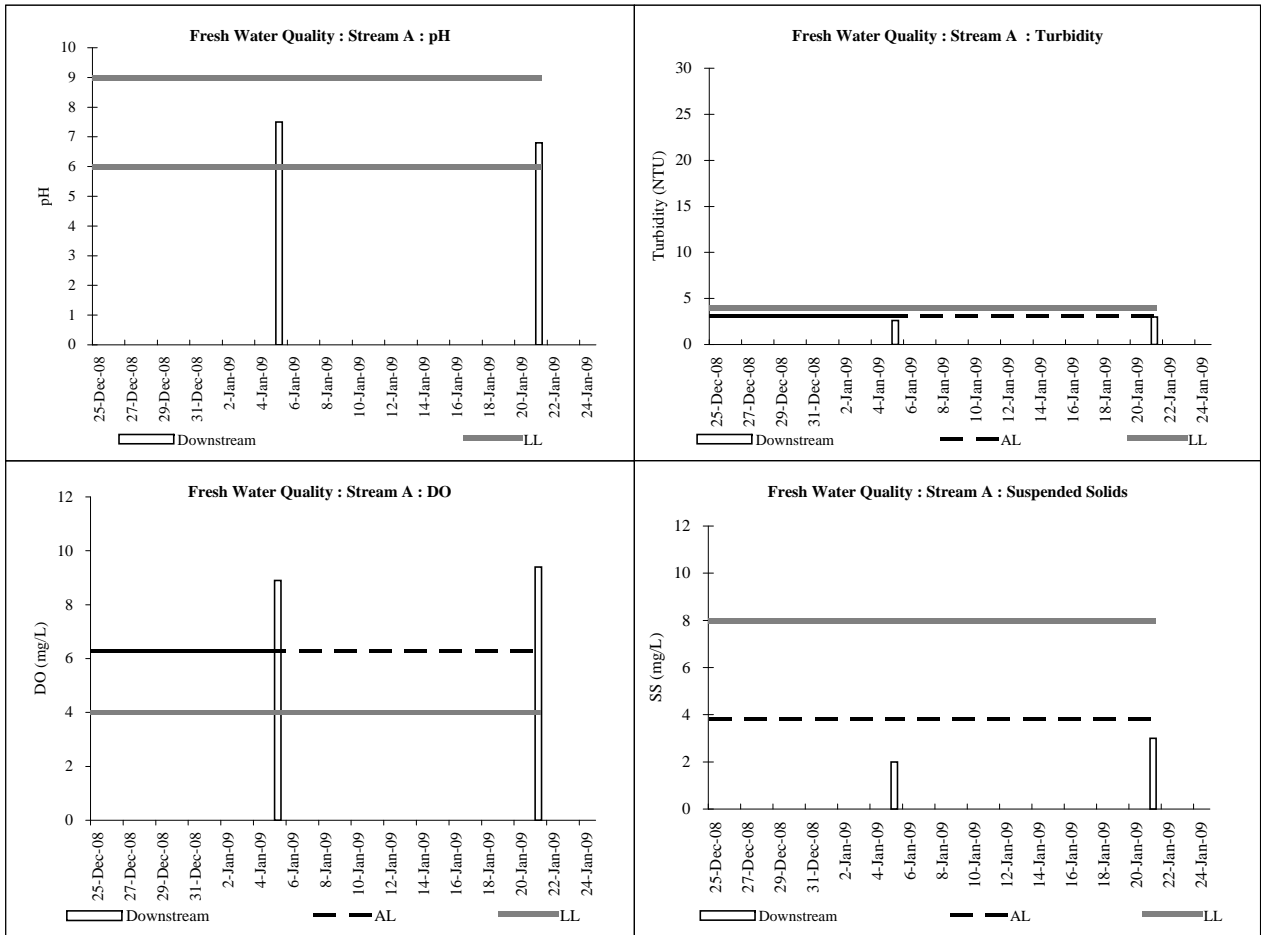
# **Annex C**

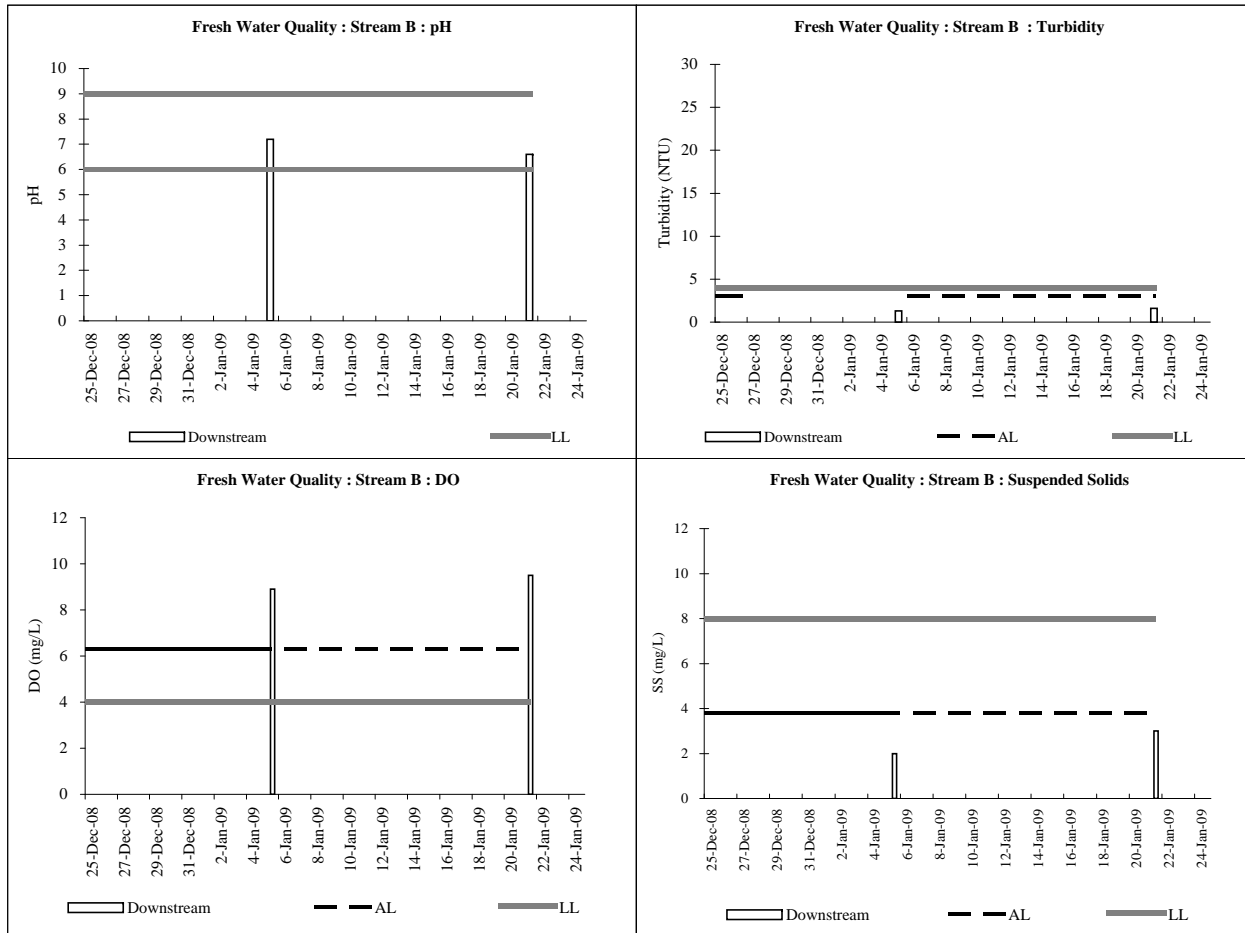
## **Monitoring results**

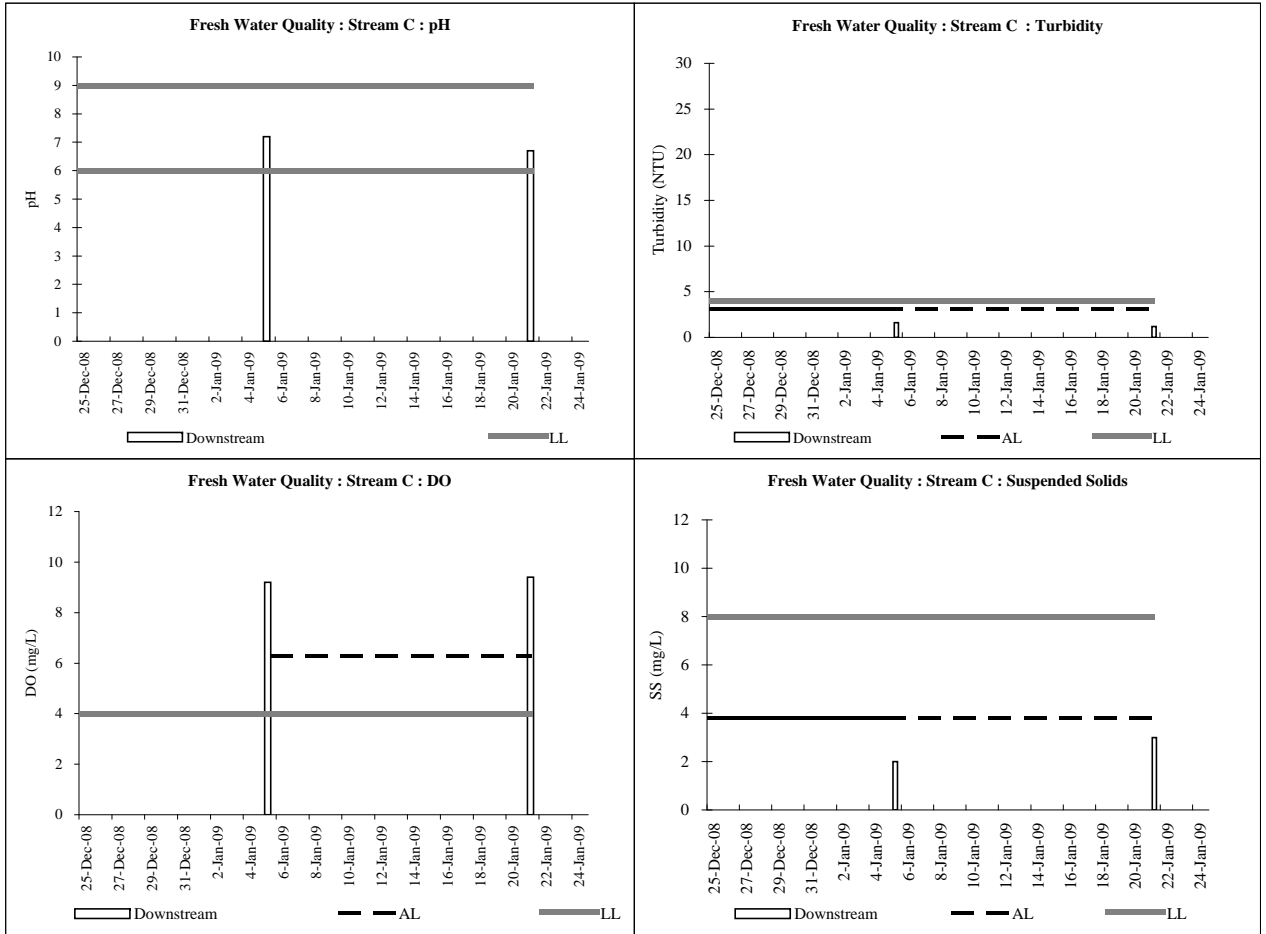
# Water Quality



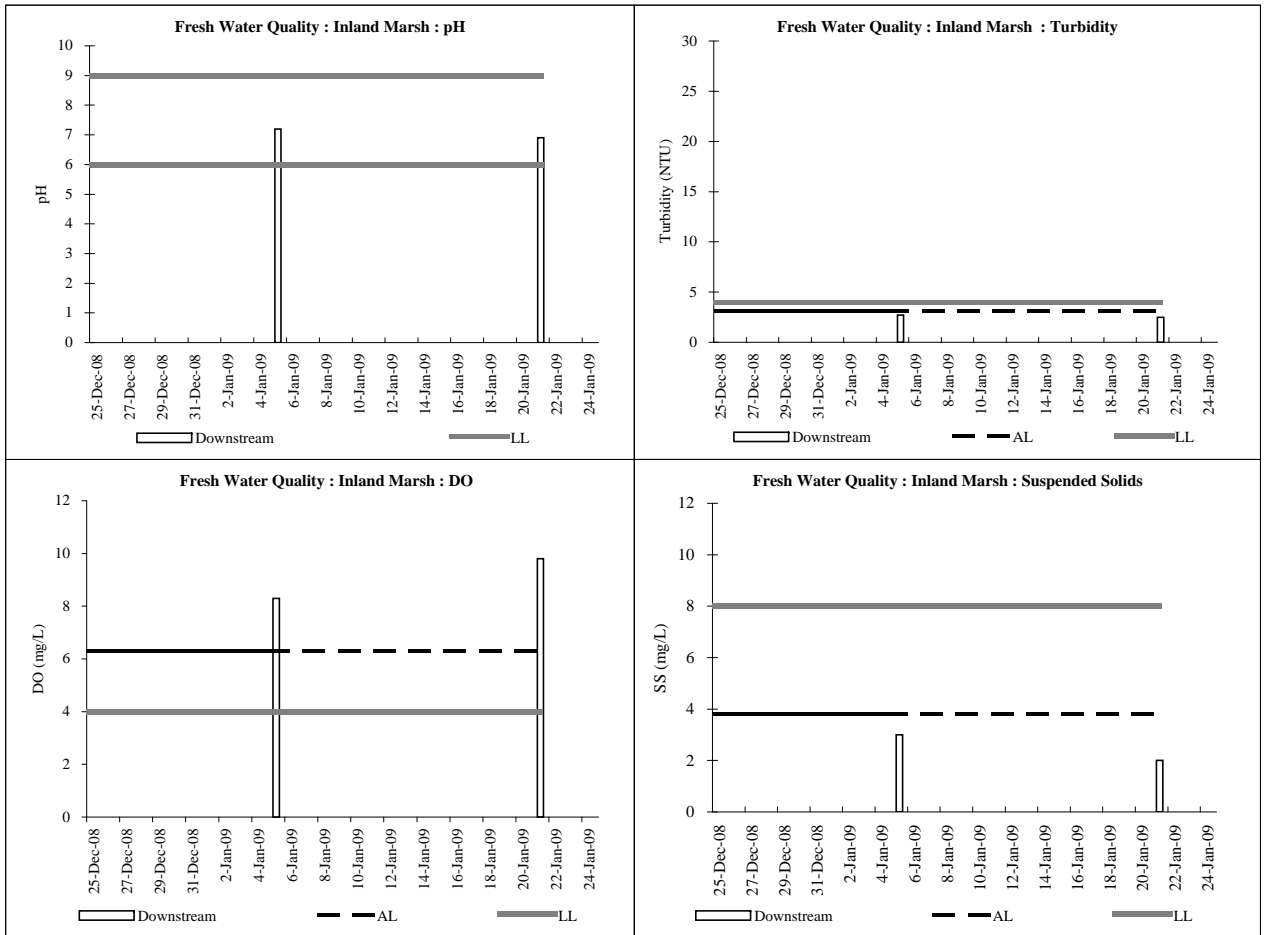


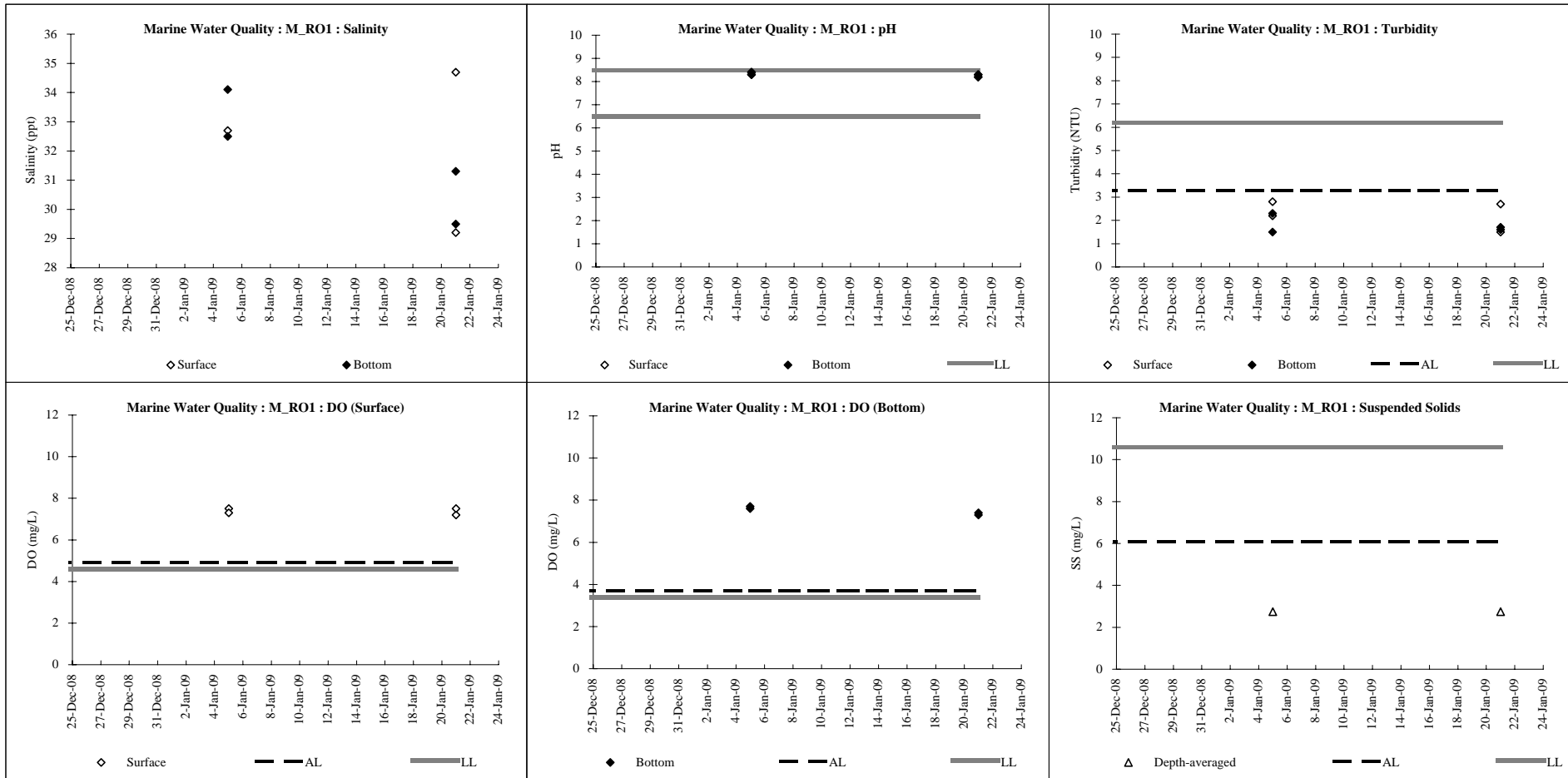


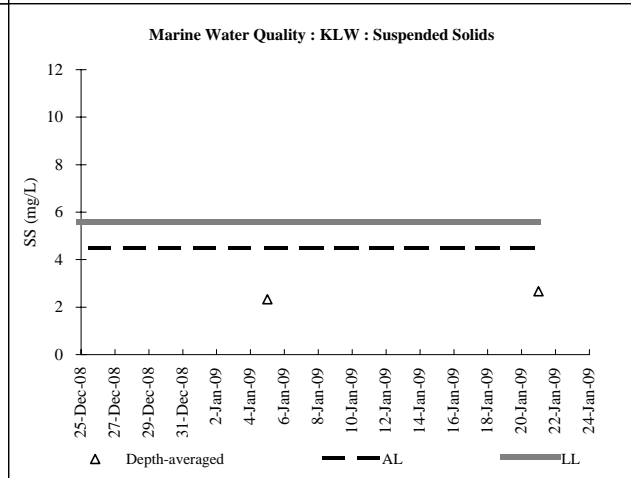
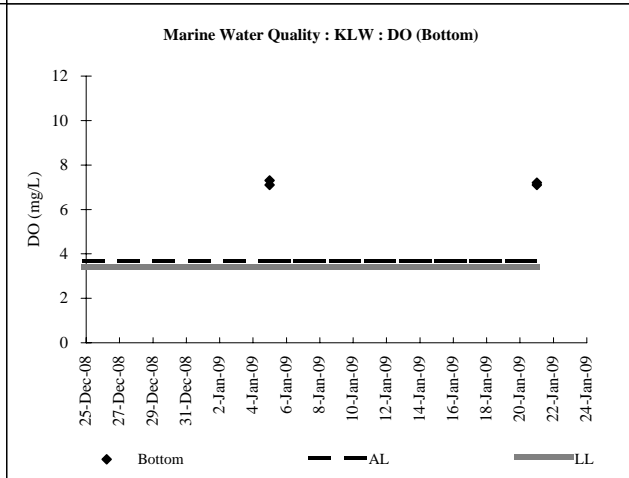
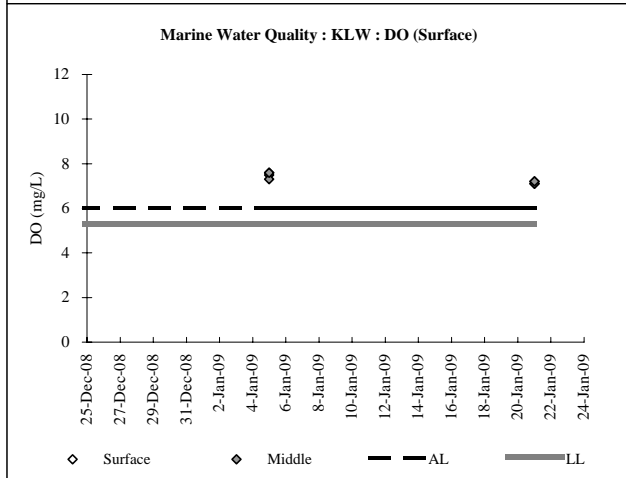
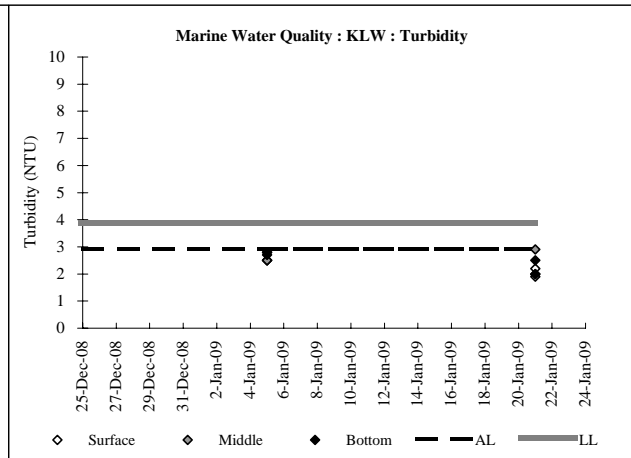
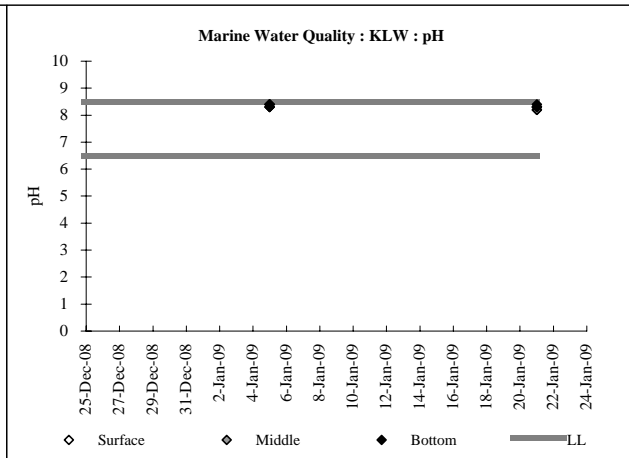
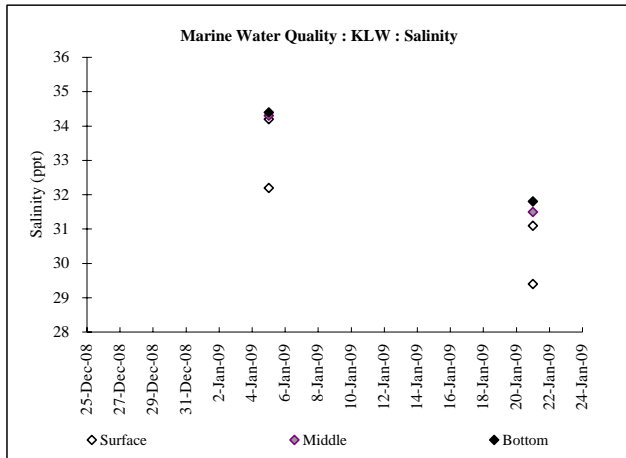


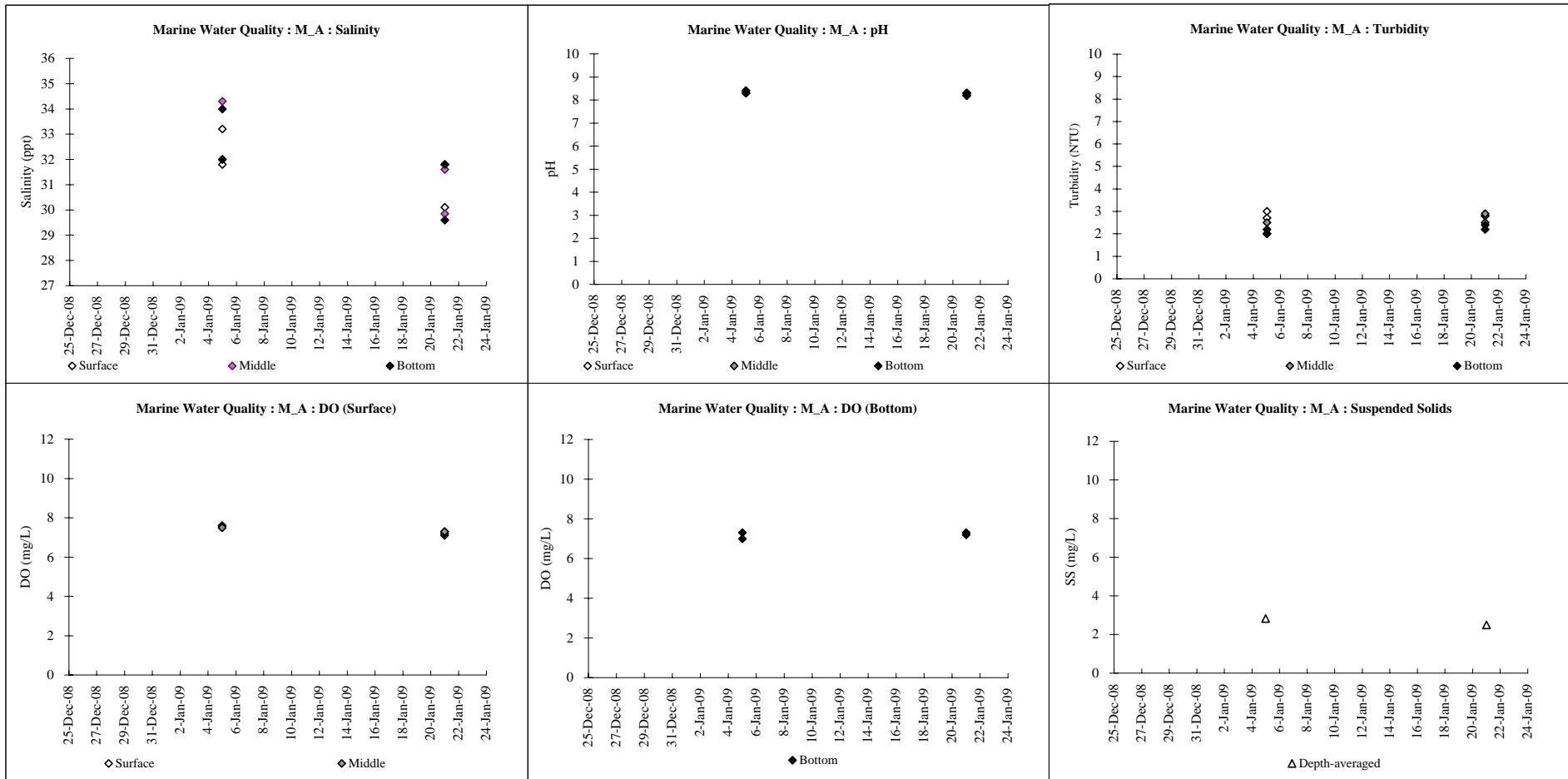


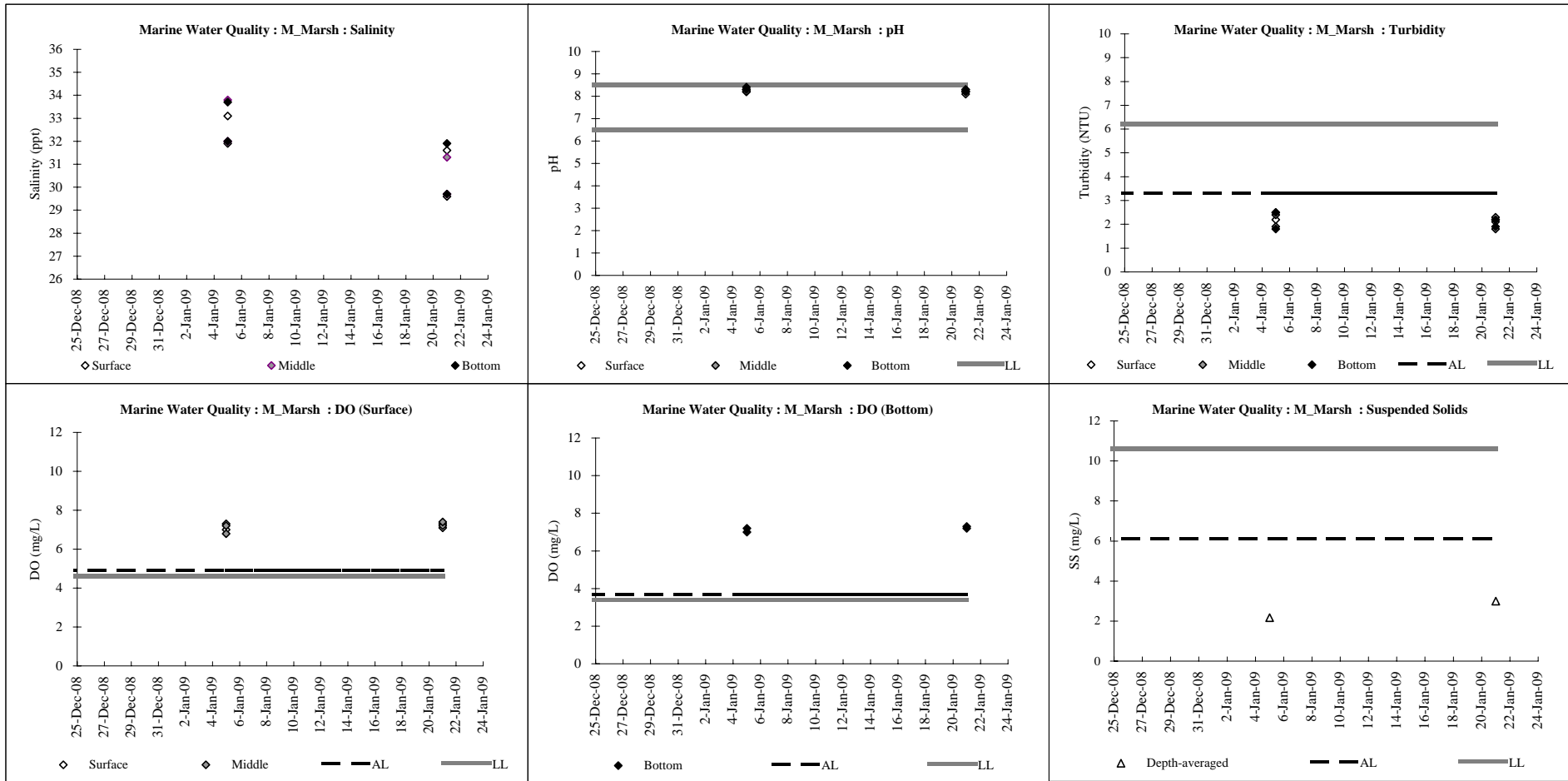


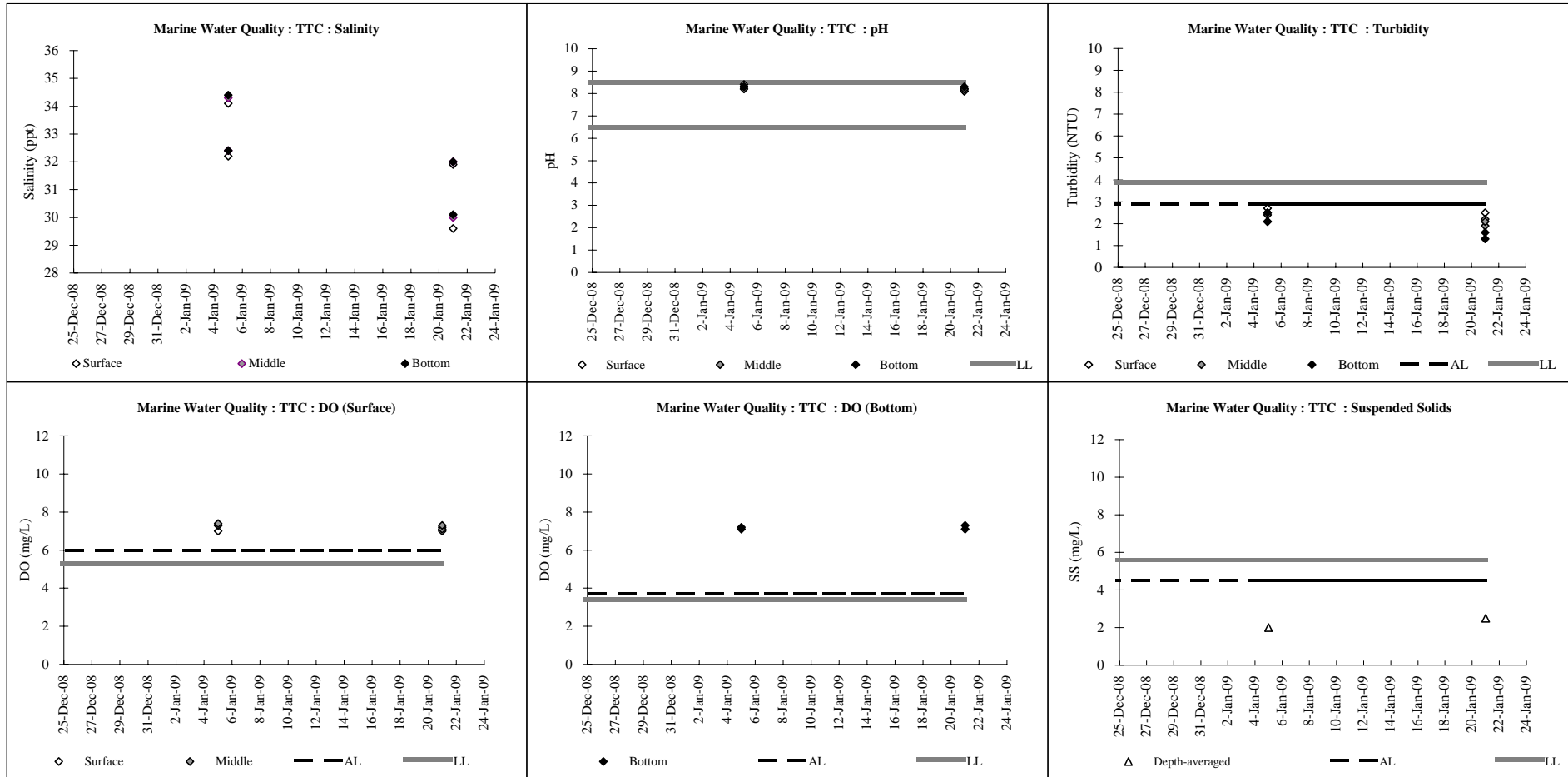


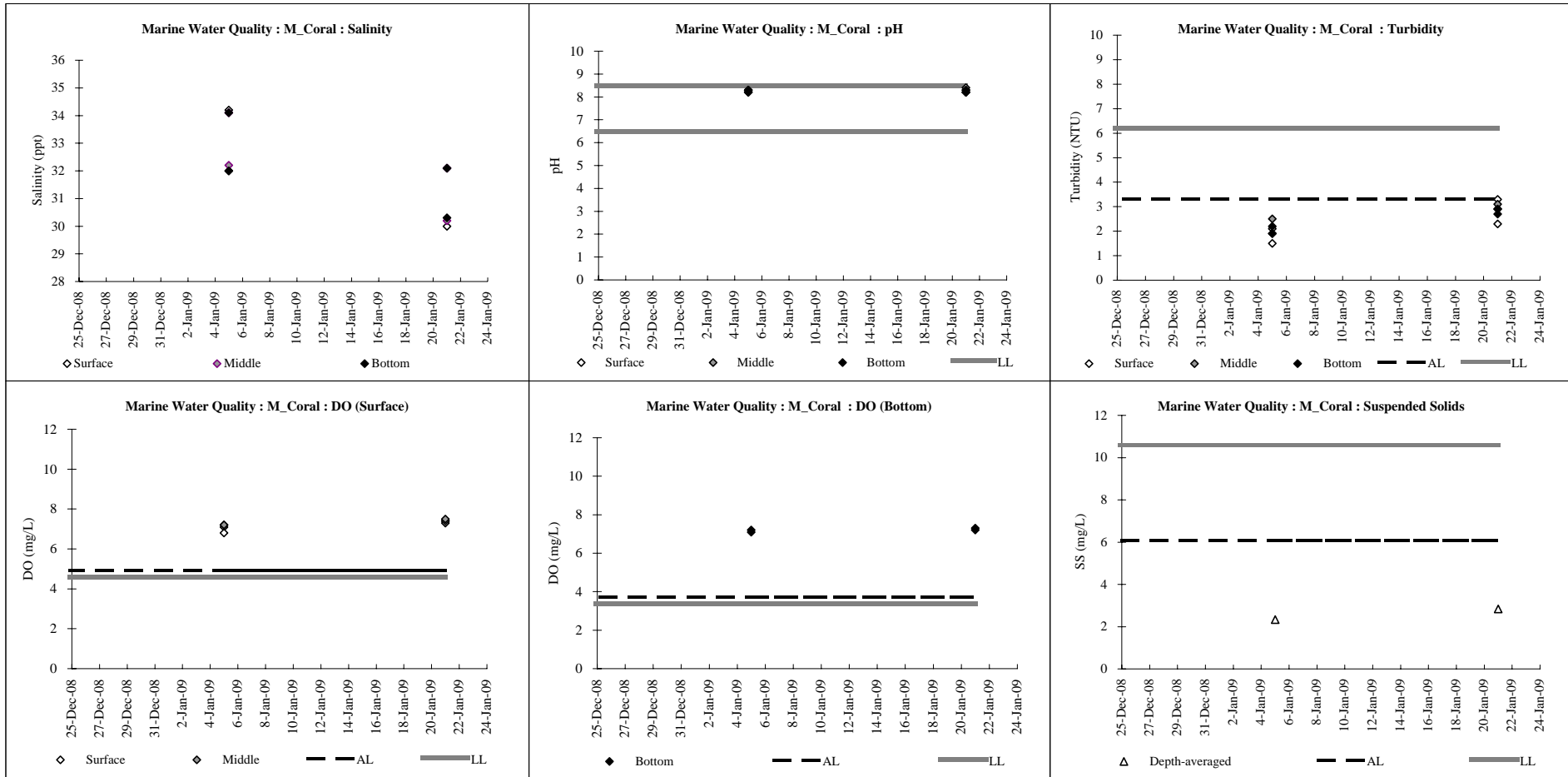


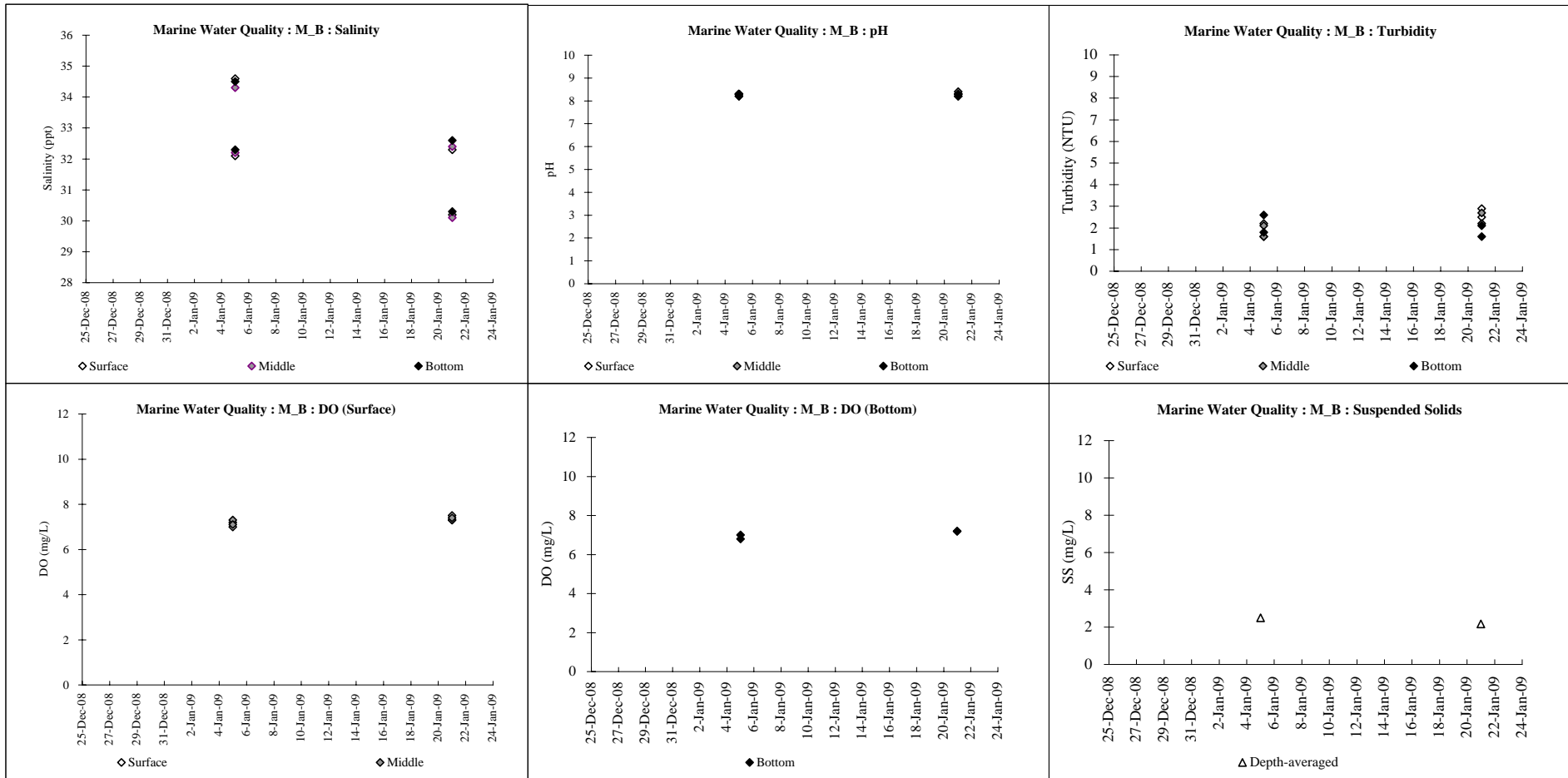




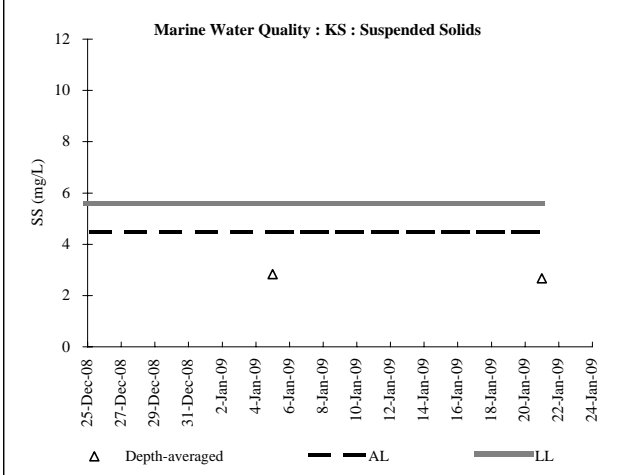
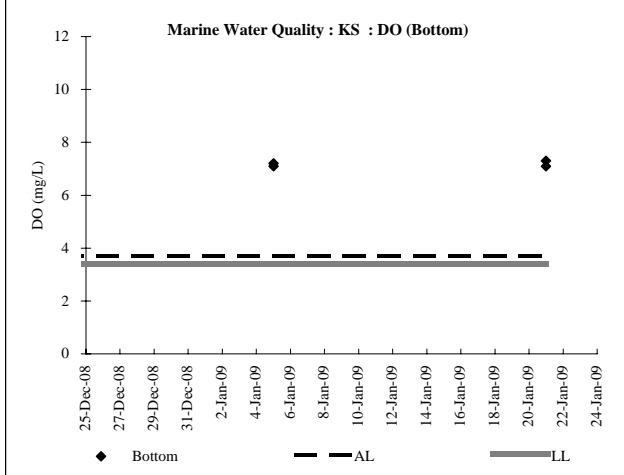
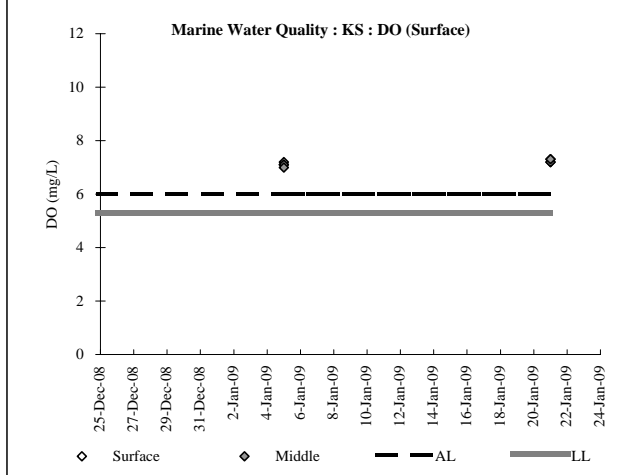
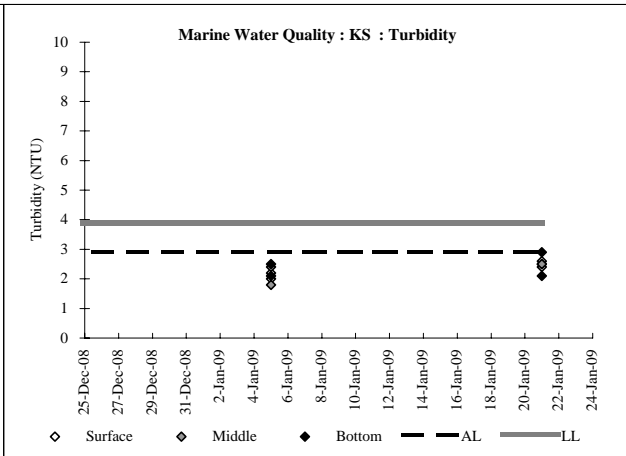
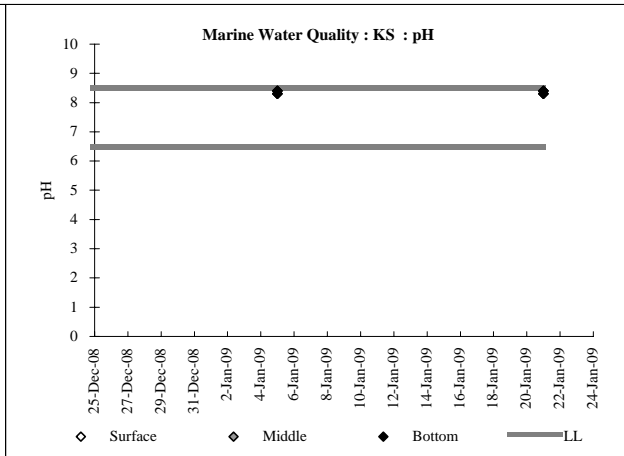
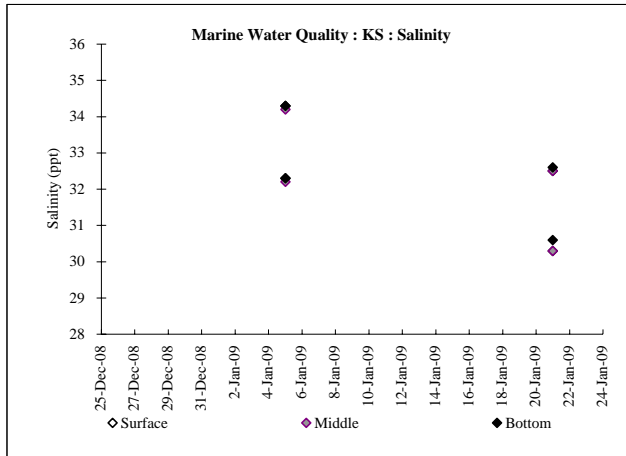


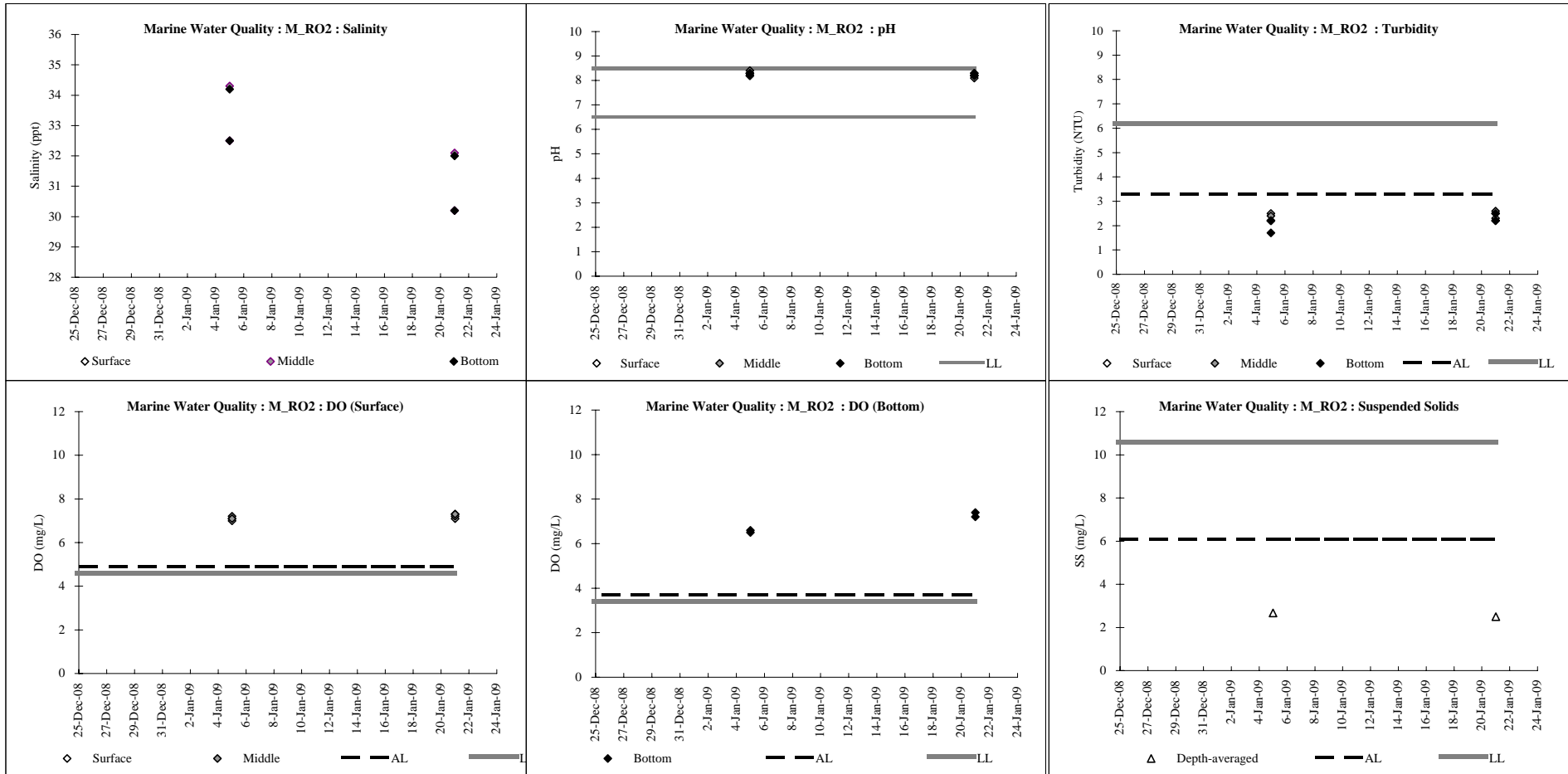


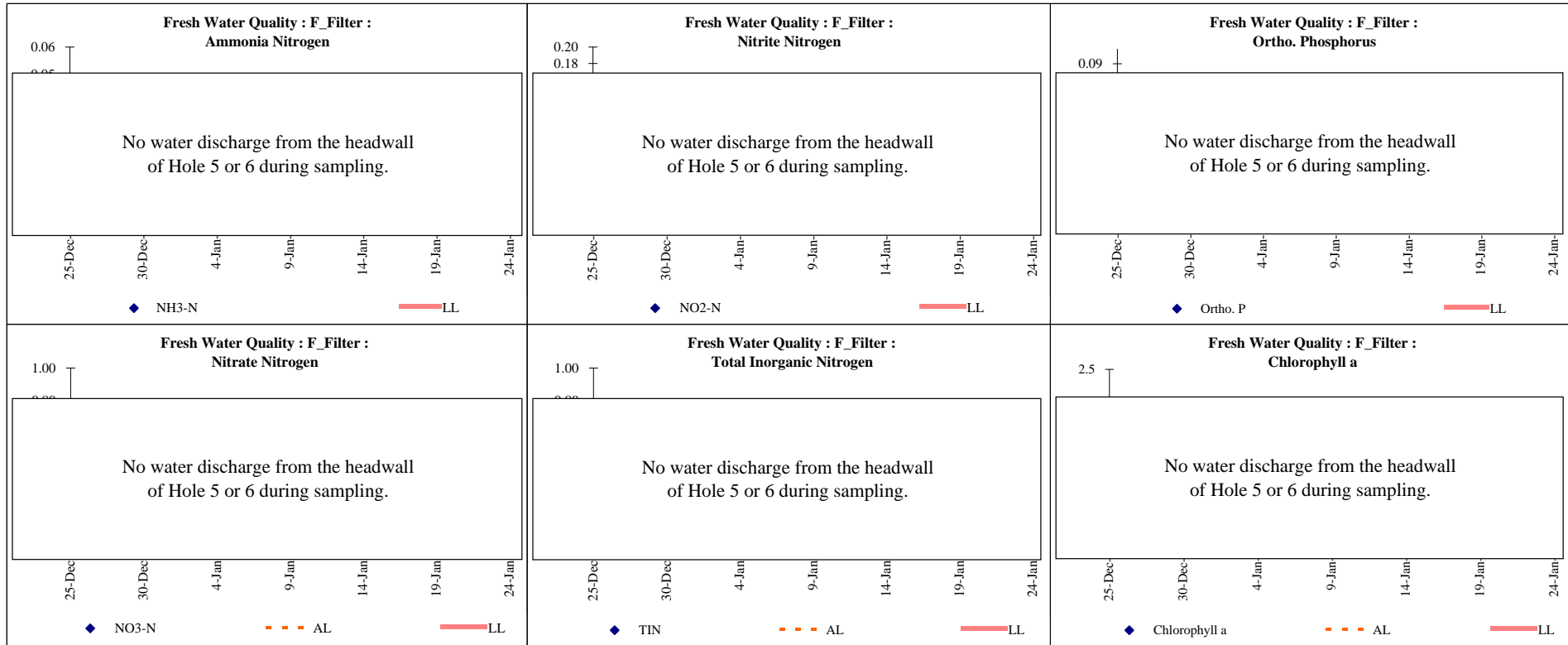


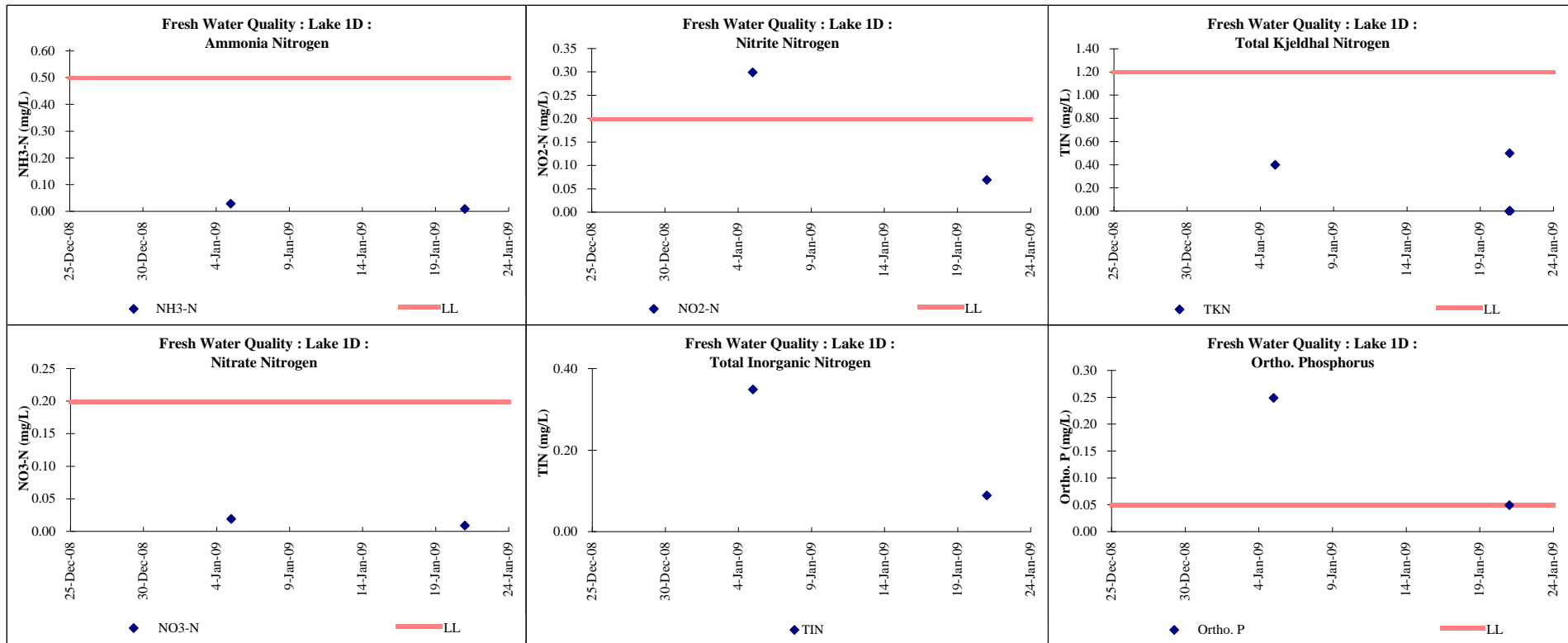


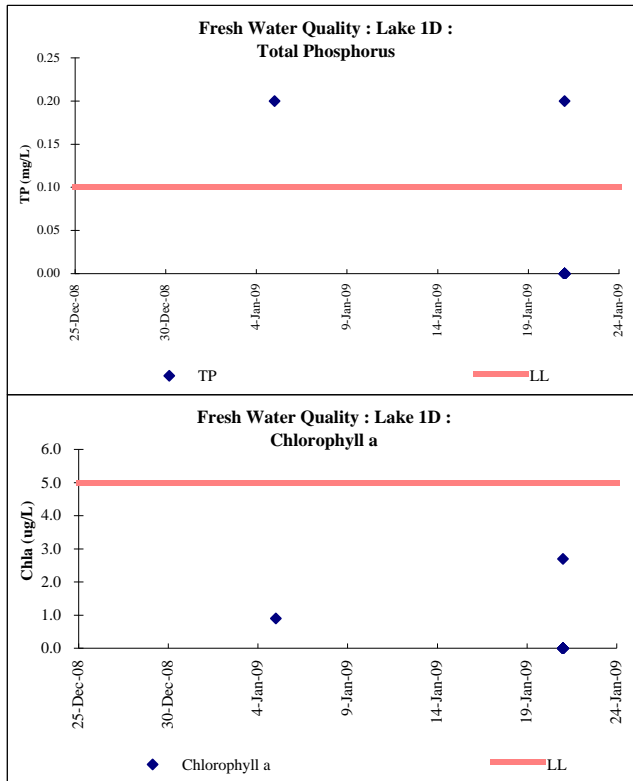


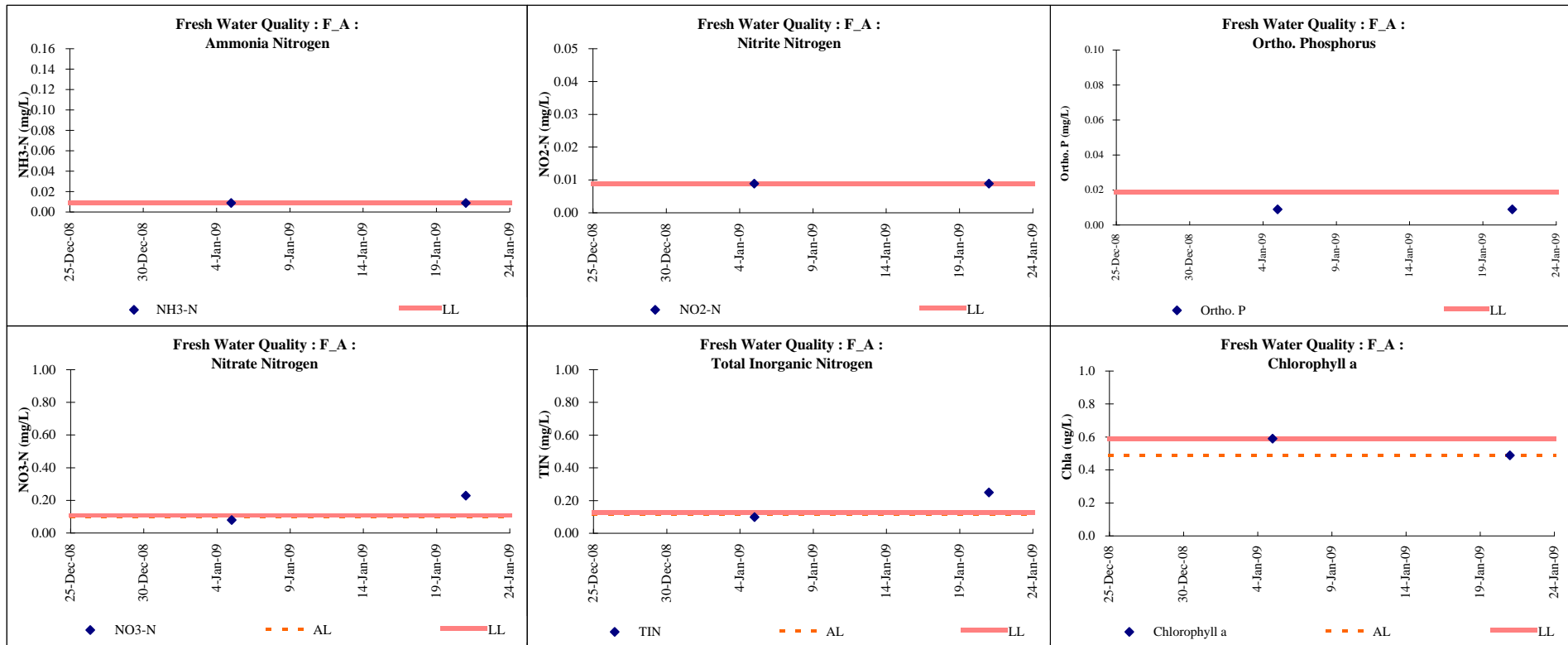


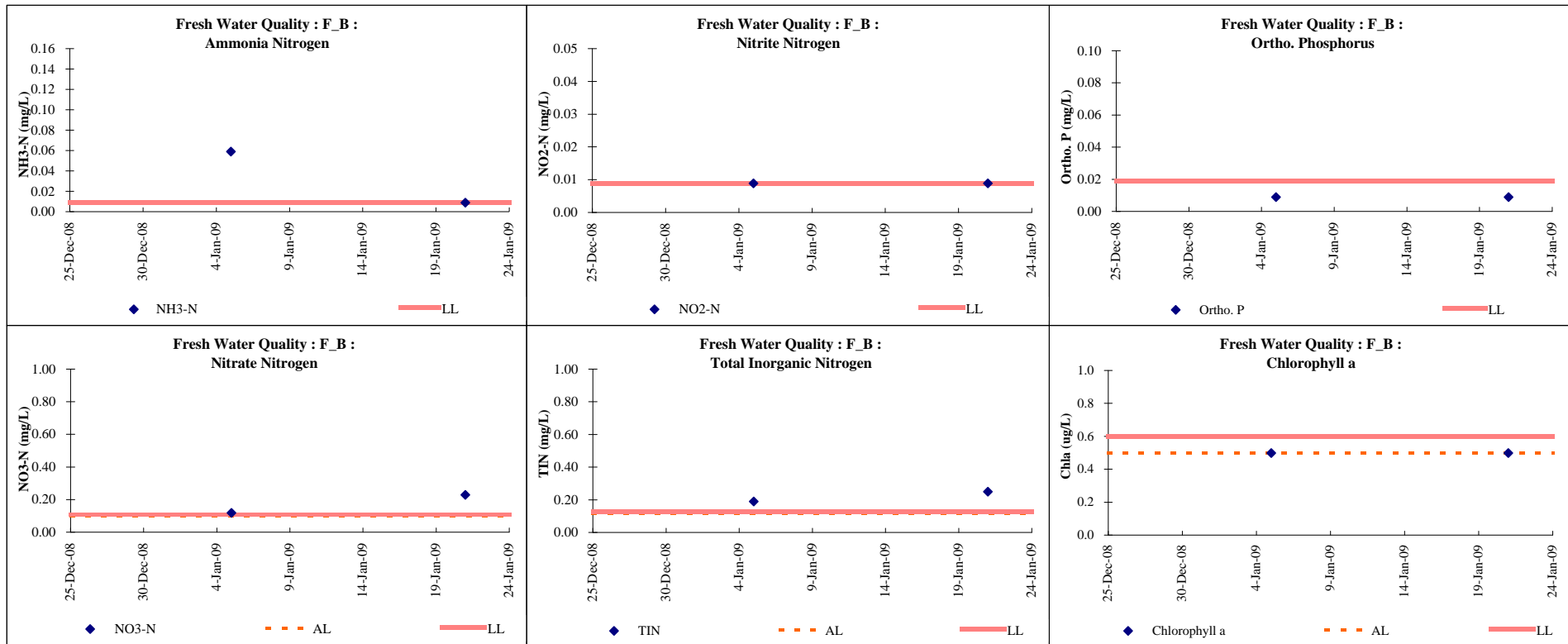


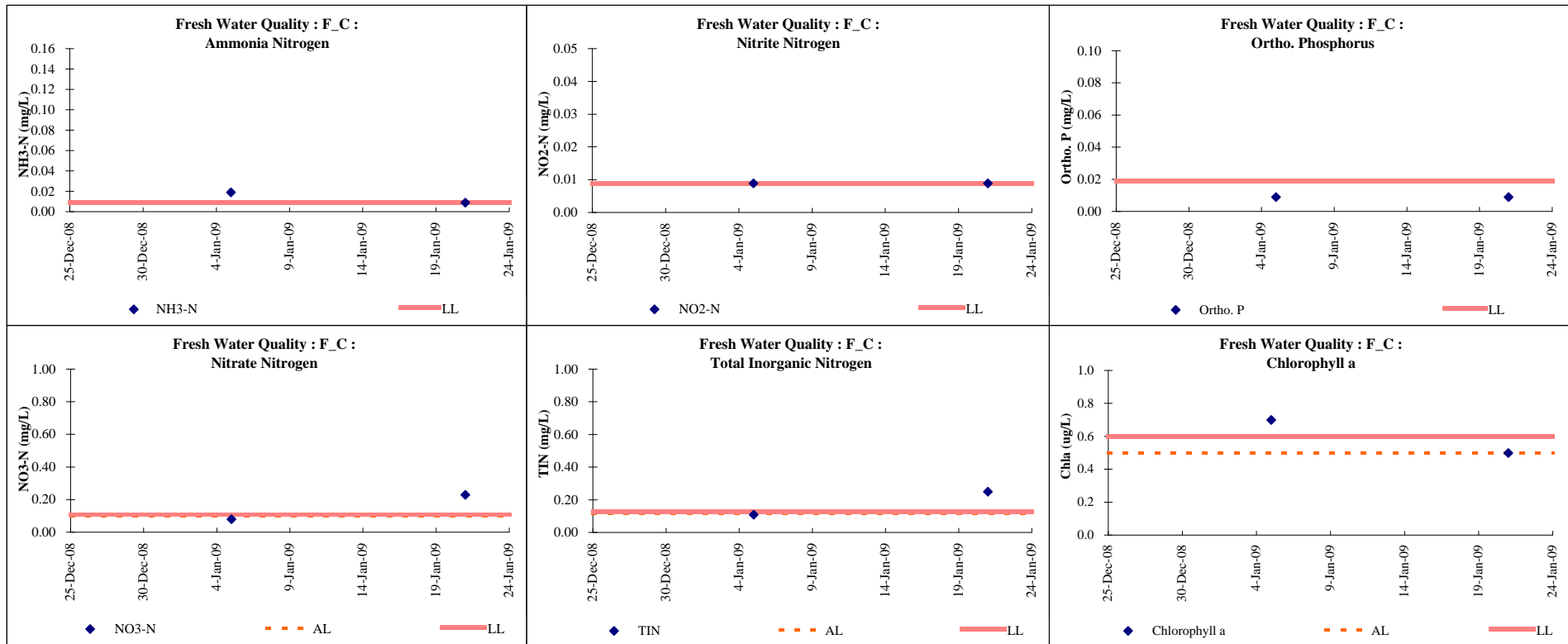




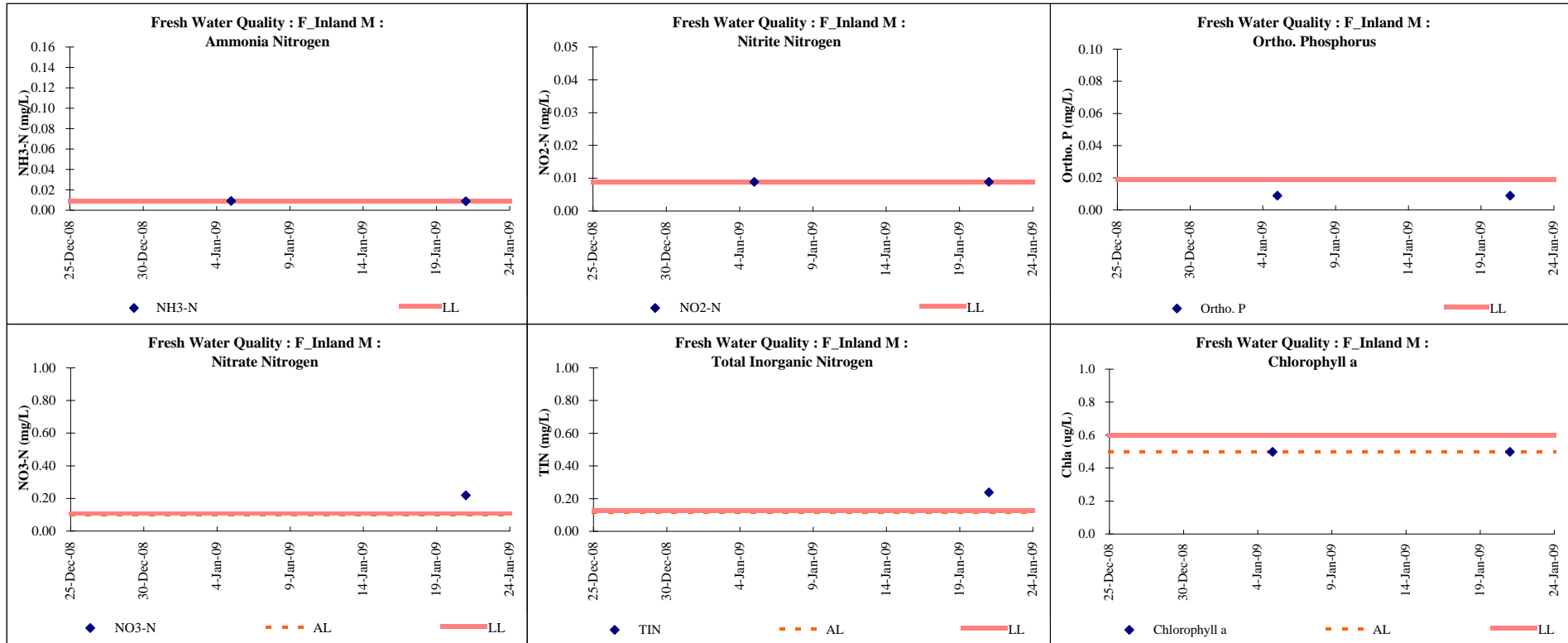


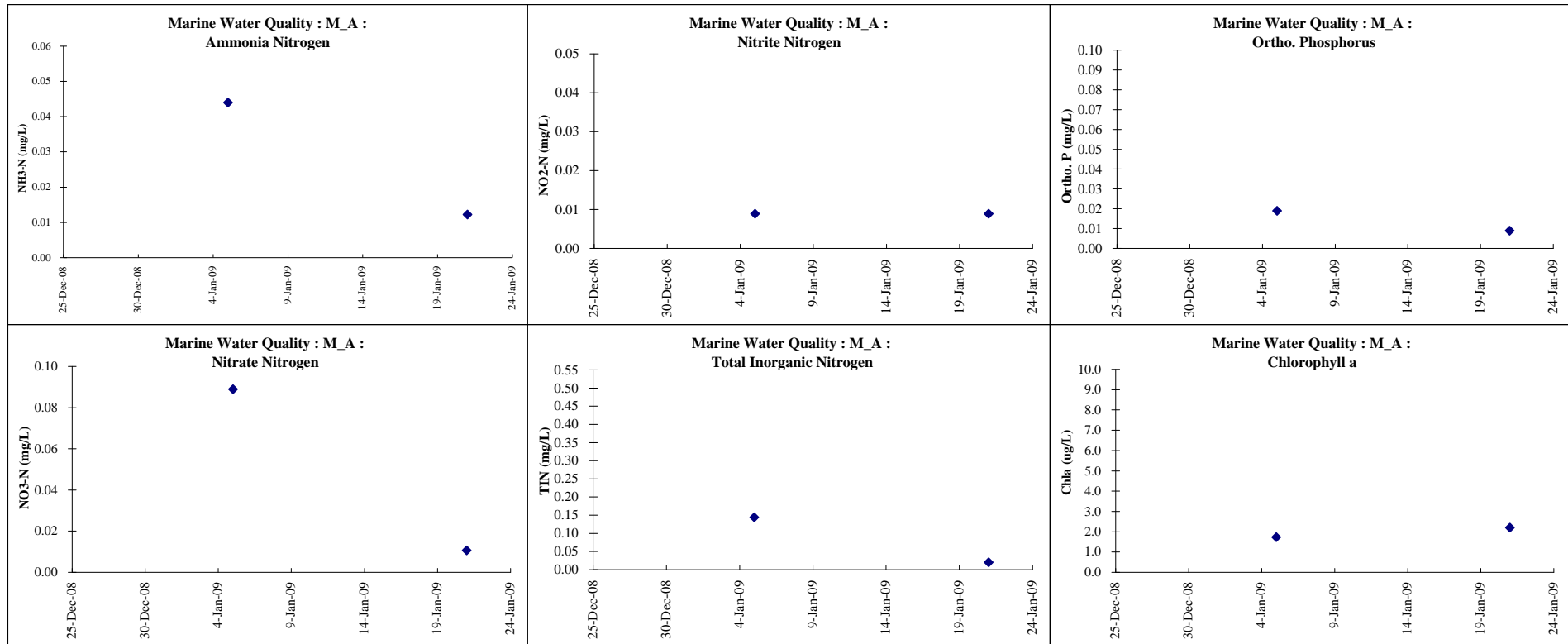


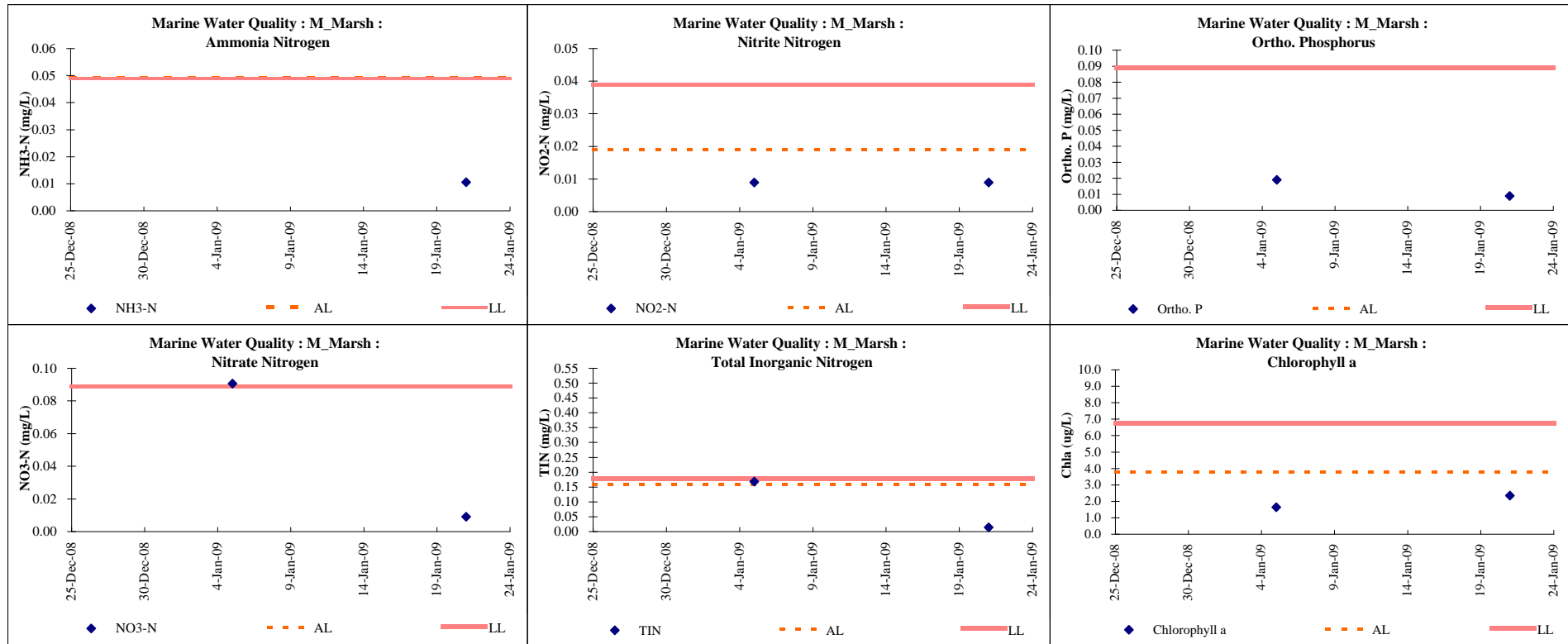


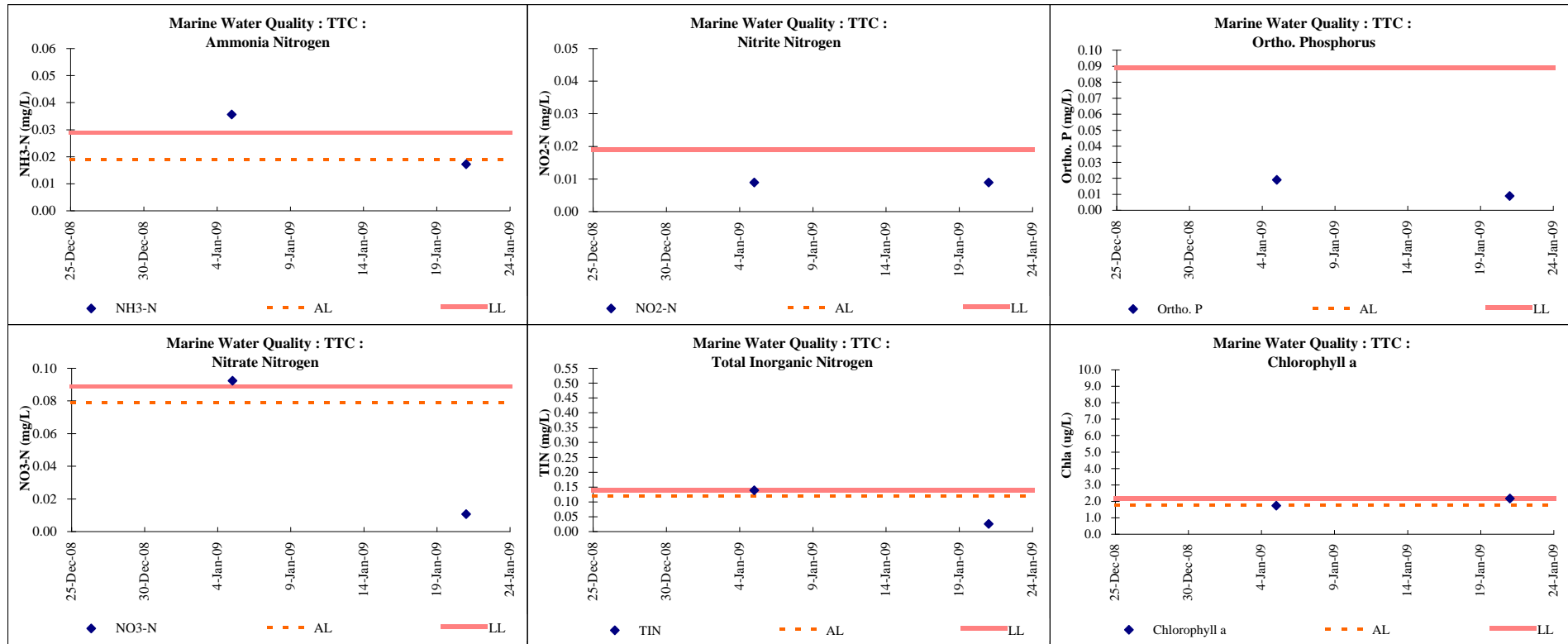


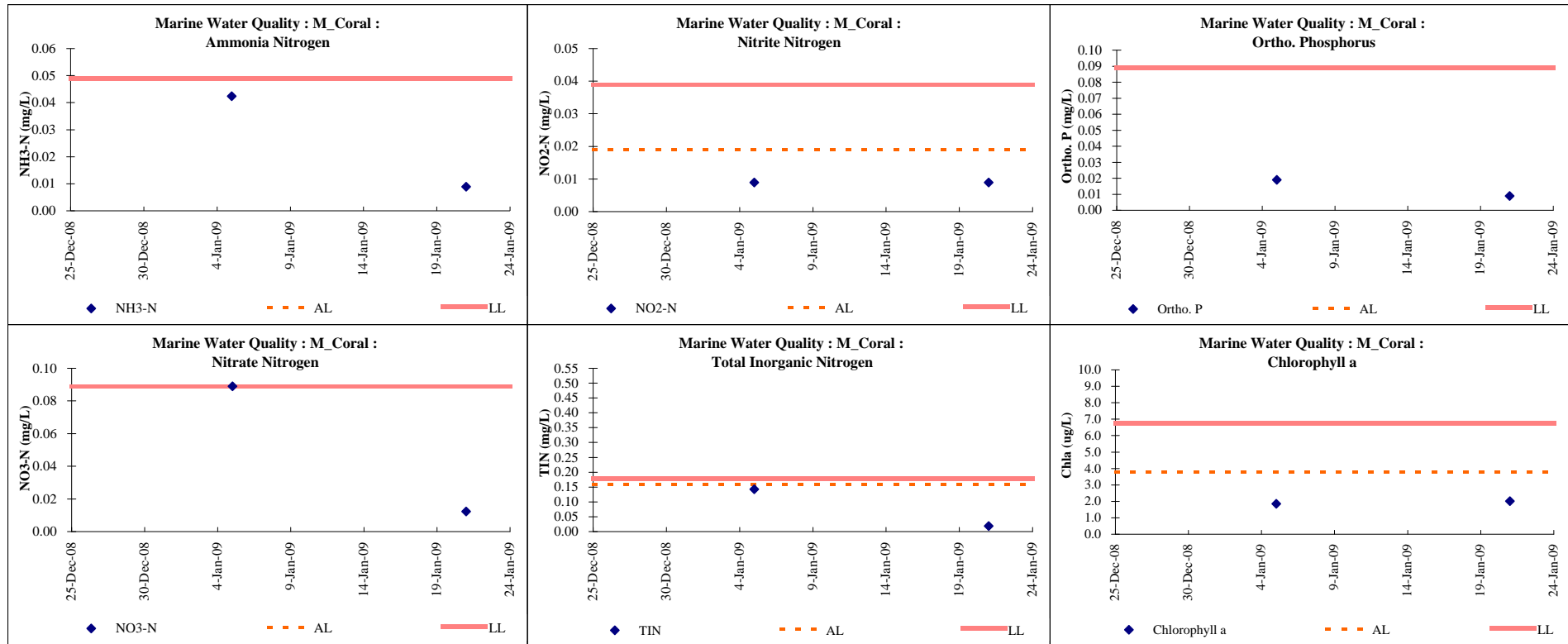


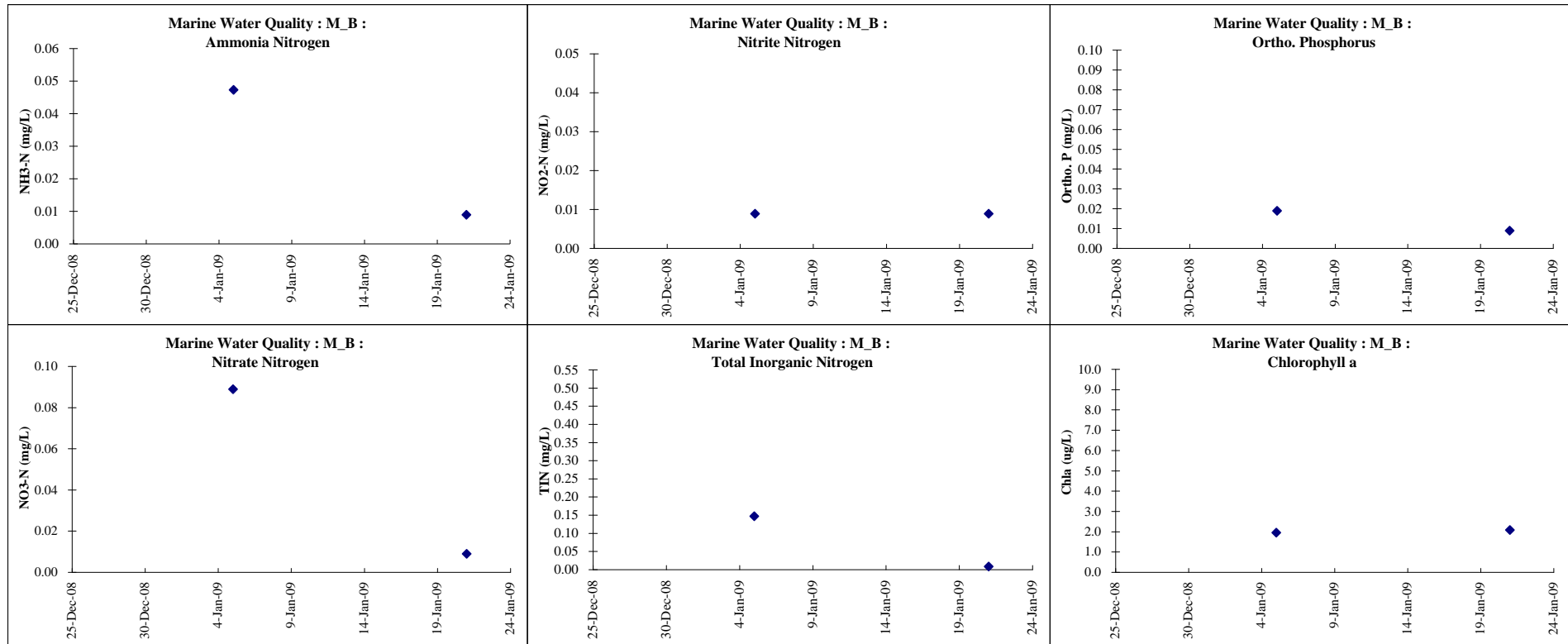


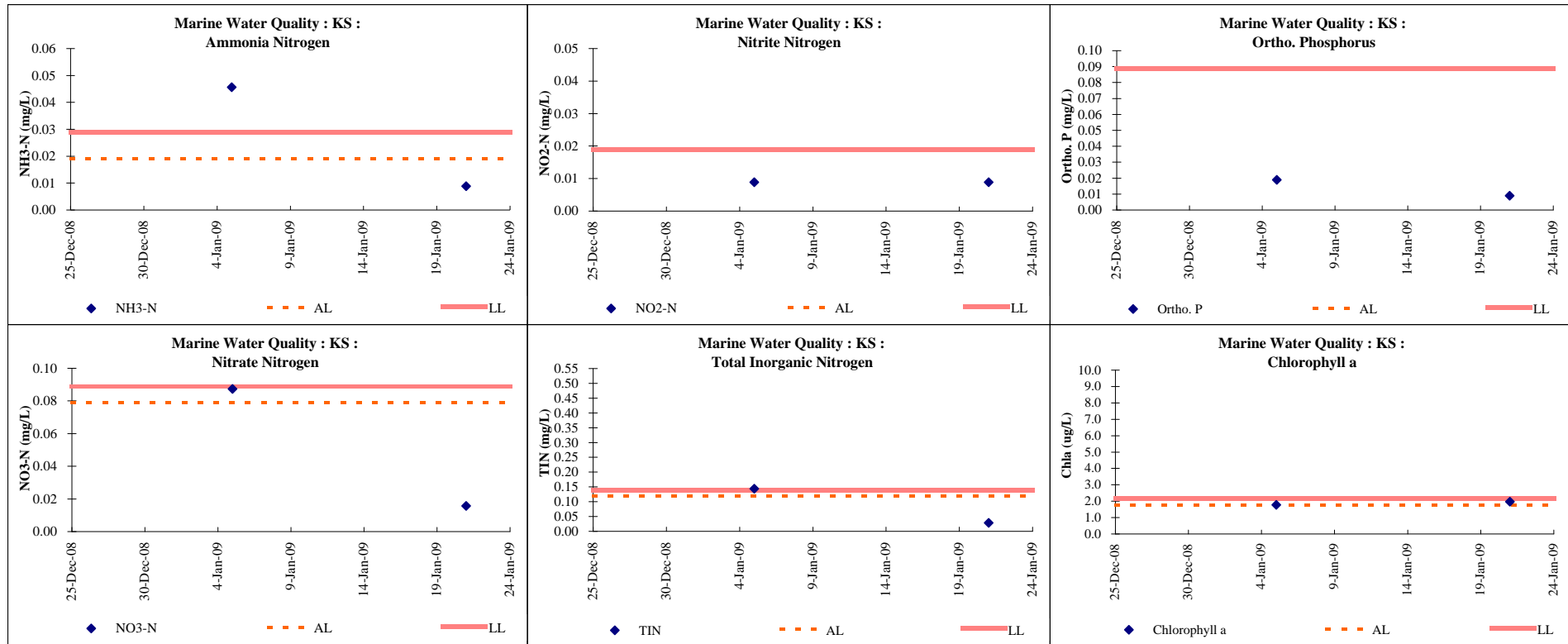






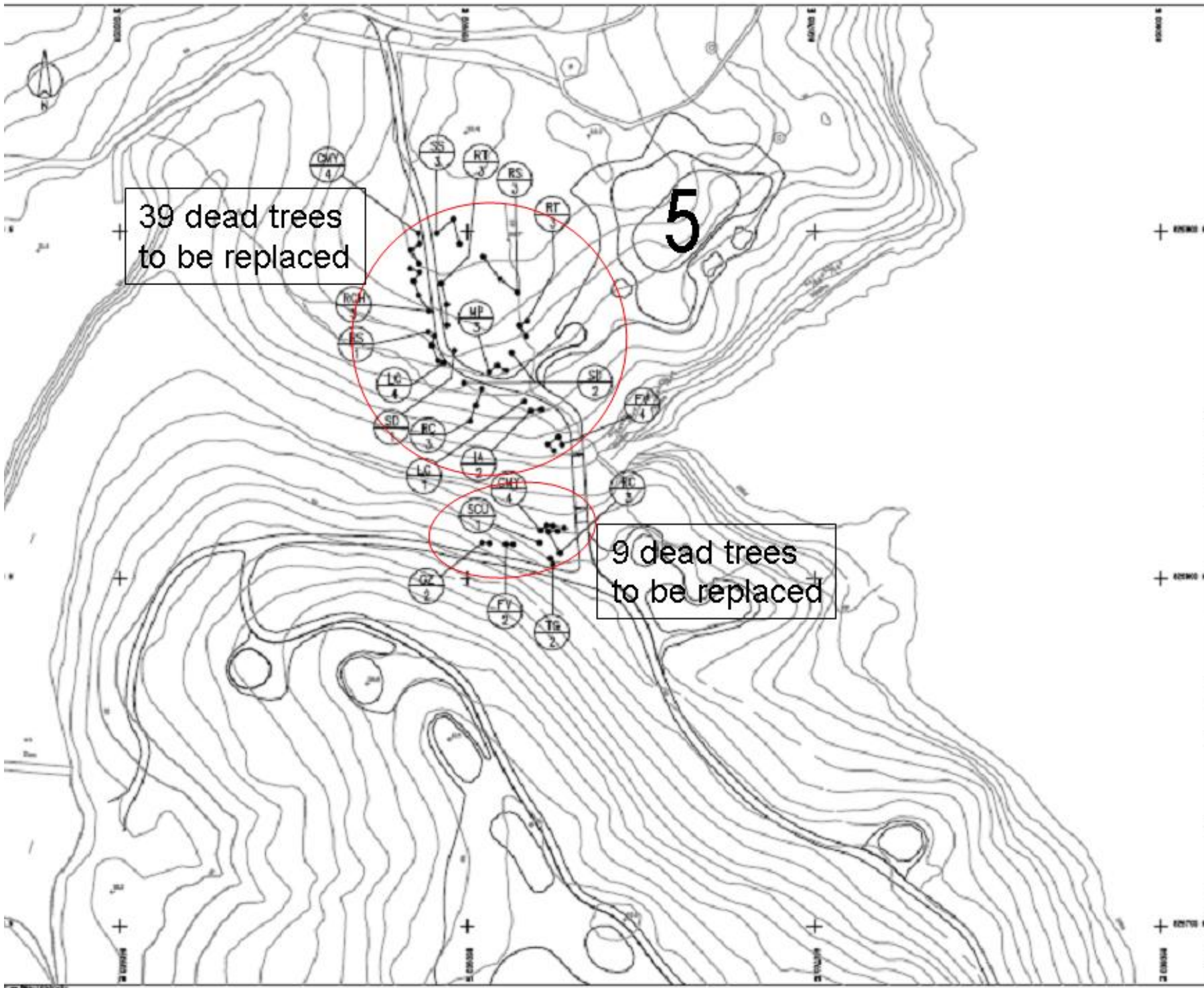






# Landscape and Visual





39 dead trees  
to be replaced

9 dead trees  
to be replaced

5

NO.	DATE	REVISION



**ARUP** CONSULTANTS  
 100 HONG KONG STREET  
 HONG KONG  
 CHINA



THE JOCKEY CLUB  
 KOWLOON  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KOWLOON

PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	BY	CHECKED	SCALE

AS-COMPLETED

2013/AS/011

2013/L/AS/011

6

10 dead trees to be replanted

4 dead trees to be replanted

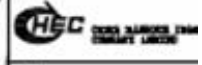
28 dead trees to be replanted

4

NO.	REV.	DATE	BY



**ARUP** CONSULTANTS  
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THE JOCKEY CLUB  
 KAU SAI CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAI CHAU

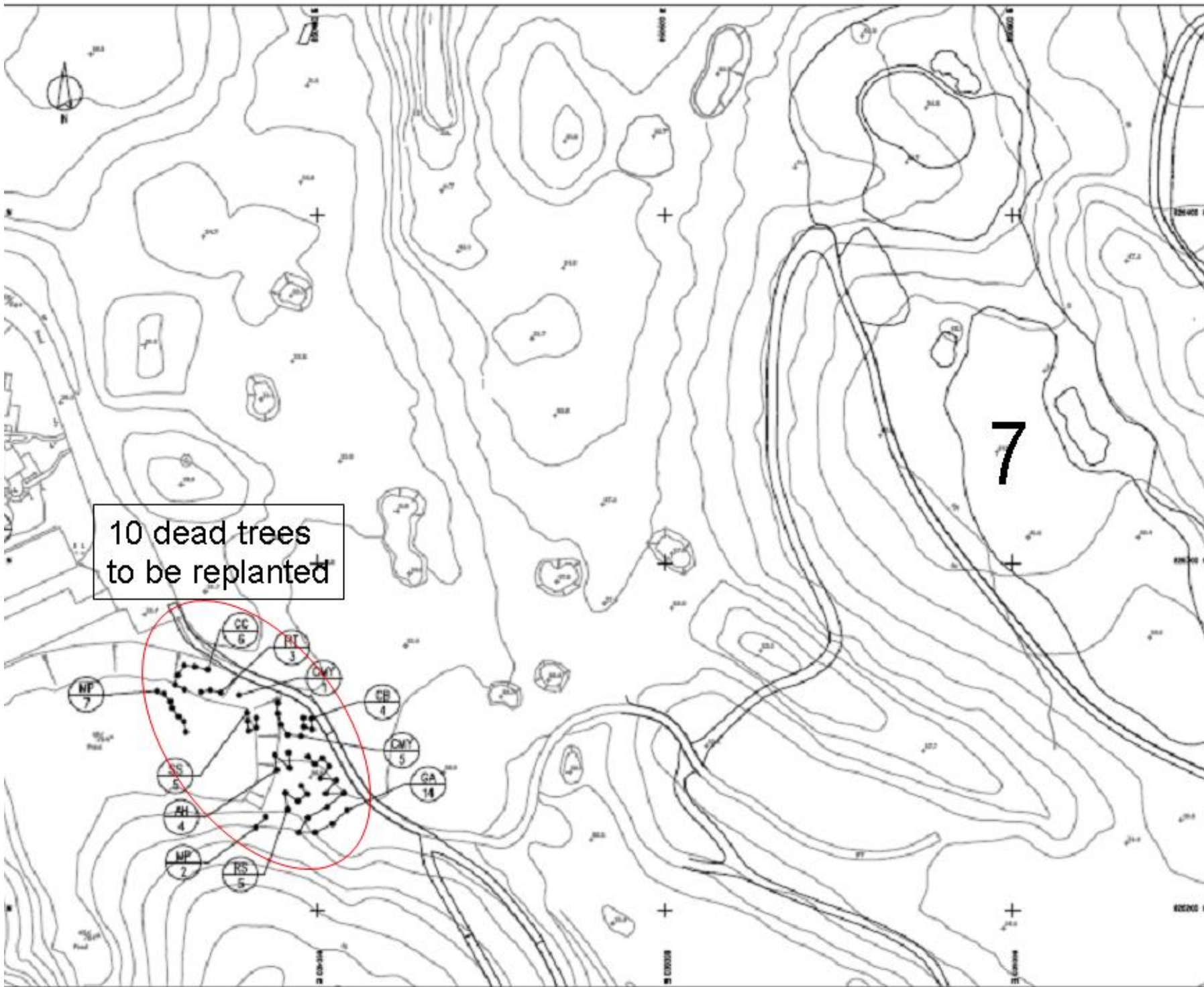
PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	2013/05/01	SCALE	1:1000
DRAWN		CHECKED	
DATE		DATE	

AS-CONSTRUCTED

2013/L/AS/011





10 dead trees  
to be replanted

NO.	REV.	DESCRIPTION



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 11th Floor, 111 South Bay Street, Singapore 048917  
 111 South Bay Street, Singapore 048917  
 111 South Bay Street, Singapore 048917  
 111 South Bay Street, Singapore 048917



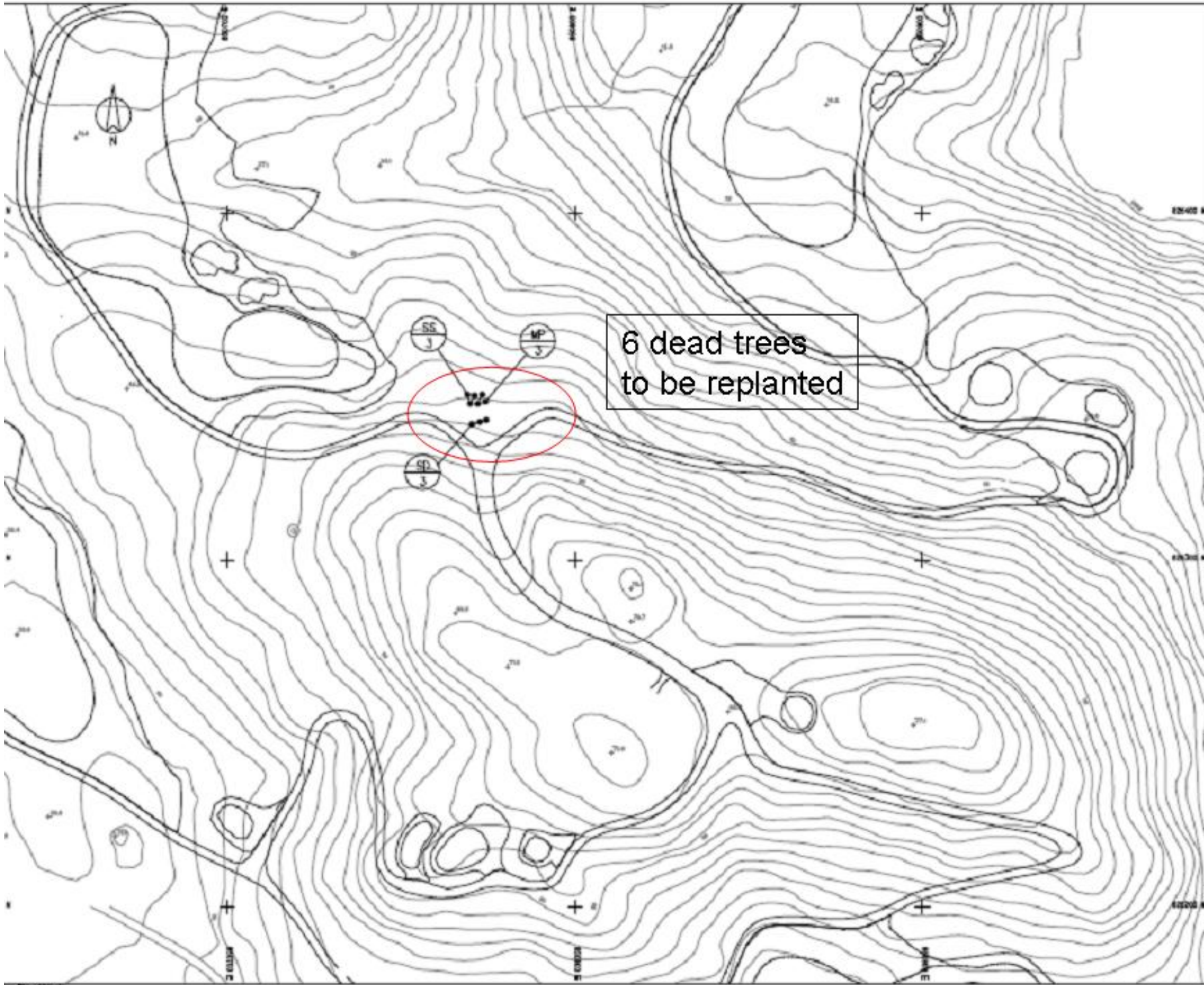
THE JOCKEY CLUB  
 KAU SAO CHAI  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAO CHAI

PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	NO.	REV.	BY

AS-COMPLETED

24/11/16/013



6 dead trees  
to be replanted

DATE	AS-DRAWN
BY	XXXXXXXX
NO.	1010



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 5th Floor, 111, Market Street, Singapore  
 111 Market Street, Singapore  
 Tel: 65 434 8888  
 Fax: 65 434 8889  
 Email: arup@arup.com



**THE JOCKEY CLUB  
 KAU SAI CHAI  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAI CHAI**

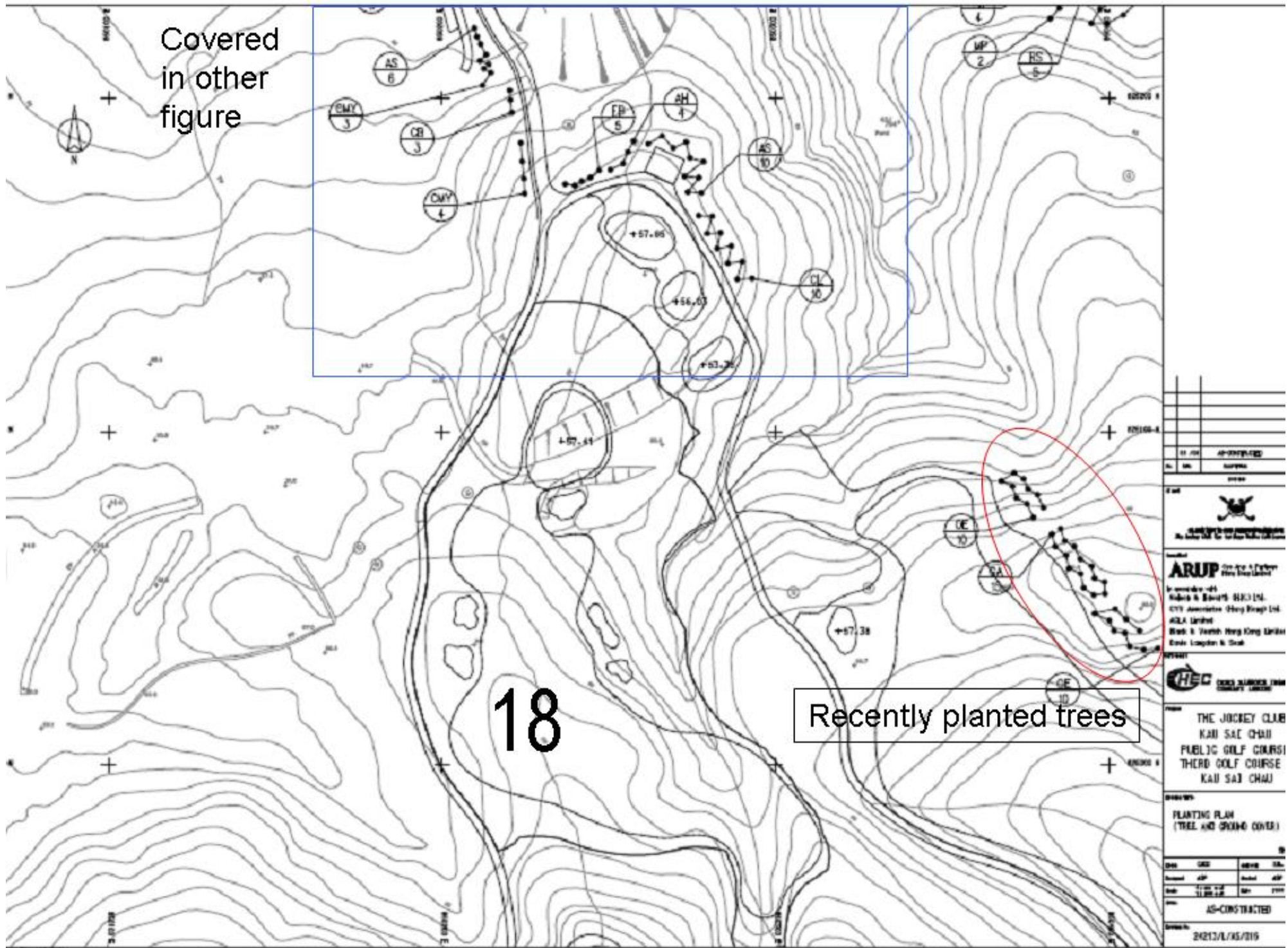
**PLANTING PLAN  
 (TREE AND SPACING CONTS)**

DATE	NO.	DATE	NO.
10/10/04	1010	10/10/04	1010

AS-DRAWN  
 10/10/04

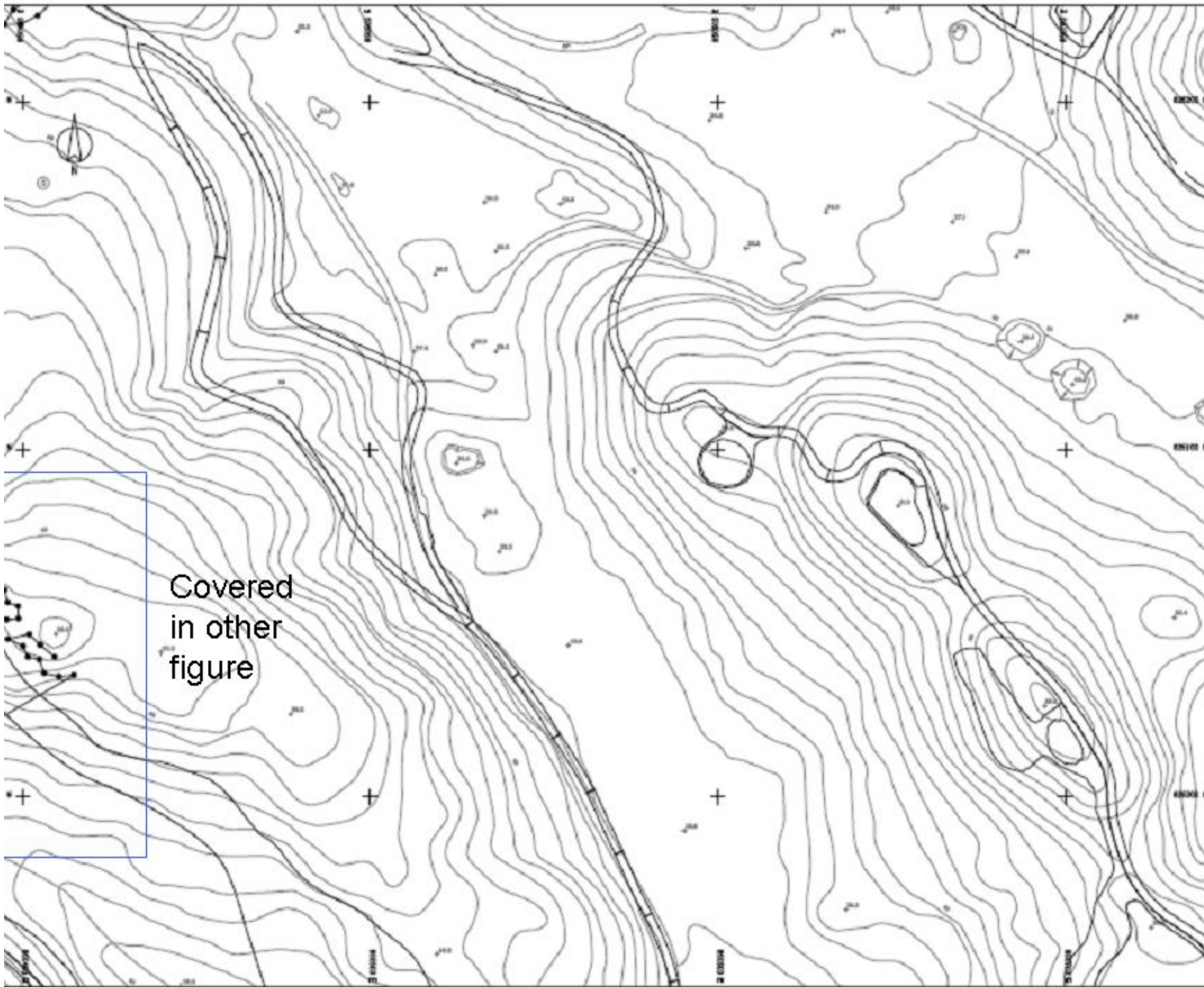


Covered  
in other  
figure



18

Recently planted trees

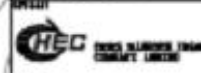


Covered  
in other  
figure

11.00	40.000.000
12.00	40.000.000
13.00	40.000.000
14.00	40.000.000
15.00	40.000.000
16.00	40.000.000
17.00	40.000.000
18.00	40.000.000
19.00	40.000.000
20.00	40.000.000



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 415 774 2900  
 415 774 2901  
 415 774 2902  
 415 774 2903  
 415 774 2904  
 415 774 2905  
 415 774 2906  
 415 774 2907  
 415 774 2908  
 415 774 2909  
 415 774 2910  
 415 774 2911  
 415 774 2912  
 415 774 2913  
 415 774 2914  
 415 774 2915  
 415 774 2916  
 415 774 2917  
 415 774 2918  
 415 774 2919  
 415 774 2920



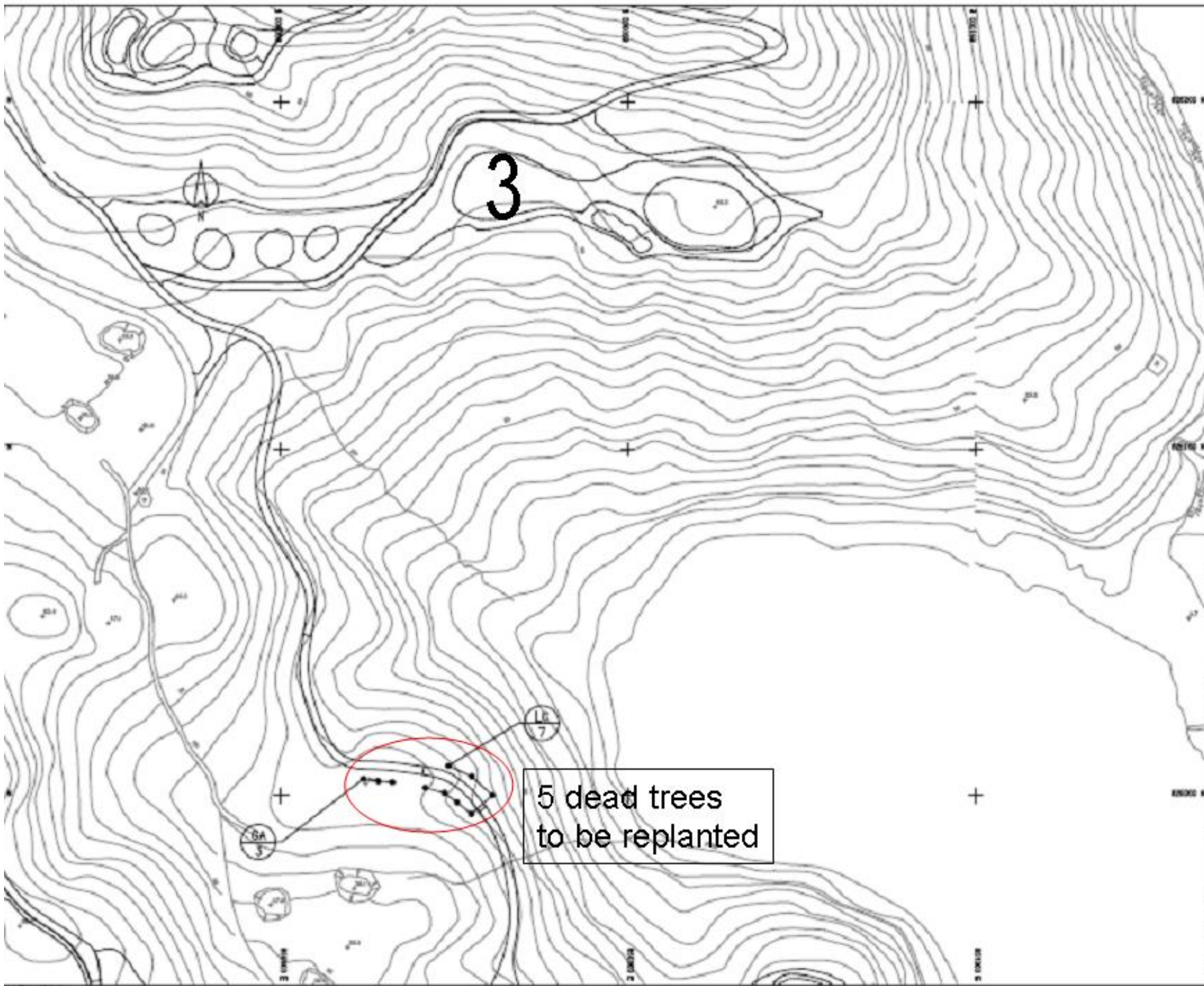
**THE JOCKEY CLUB  
 KAU SAU CHAI  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAU CHAI**

**PLANTING PLAN  
 (TREE AND GRASSING CONCEPT)**

DATE	DESCRIPTION	BY	CHKD
11/08/08	ISSUED FOR TENDERS	ARUP	ARUP
11/08/08	REVISED	ARUP	ARUP

AS-COMPLETED  
 24213/L/AS/016





3



5 dead trees  
to be replanted

NO.	DESCRIPTION
1	...
2	...
3	...



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 HONG KONG

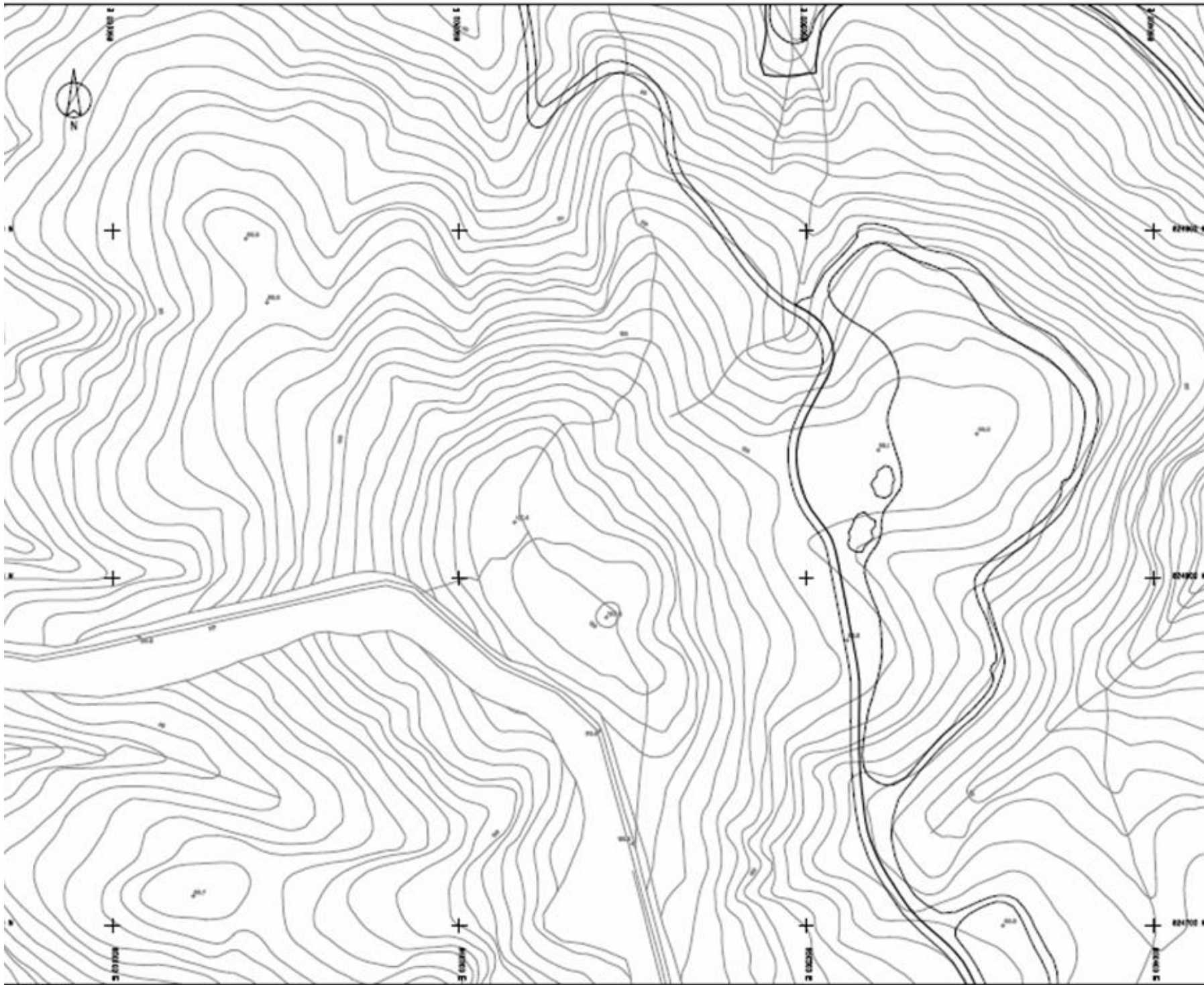


THE JOCKEY CLAI  
 KAU SAI CHAI  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAI CHAI

PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	NO.	REVISED	BY
11/08/07	01	...	...

AD-CONSTRUCTED  
 24/12/06/07



DATE	DESCRIPTION



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 Fax: +852 2911 2222  
 www.arup.com



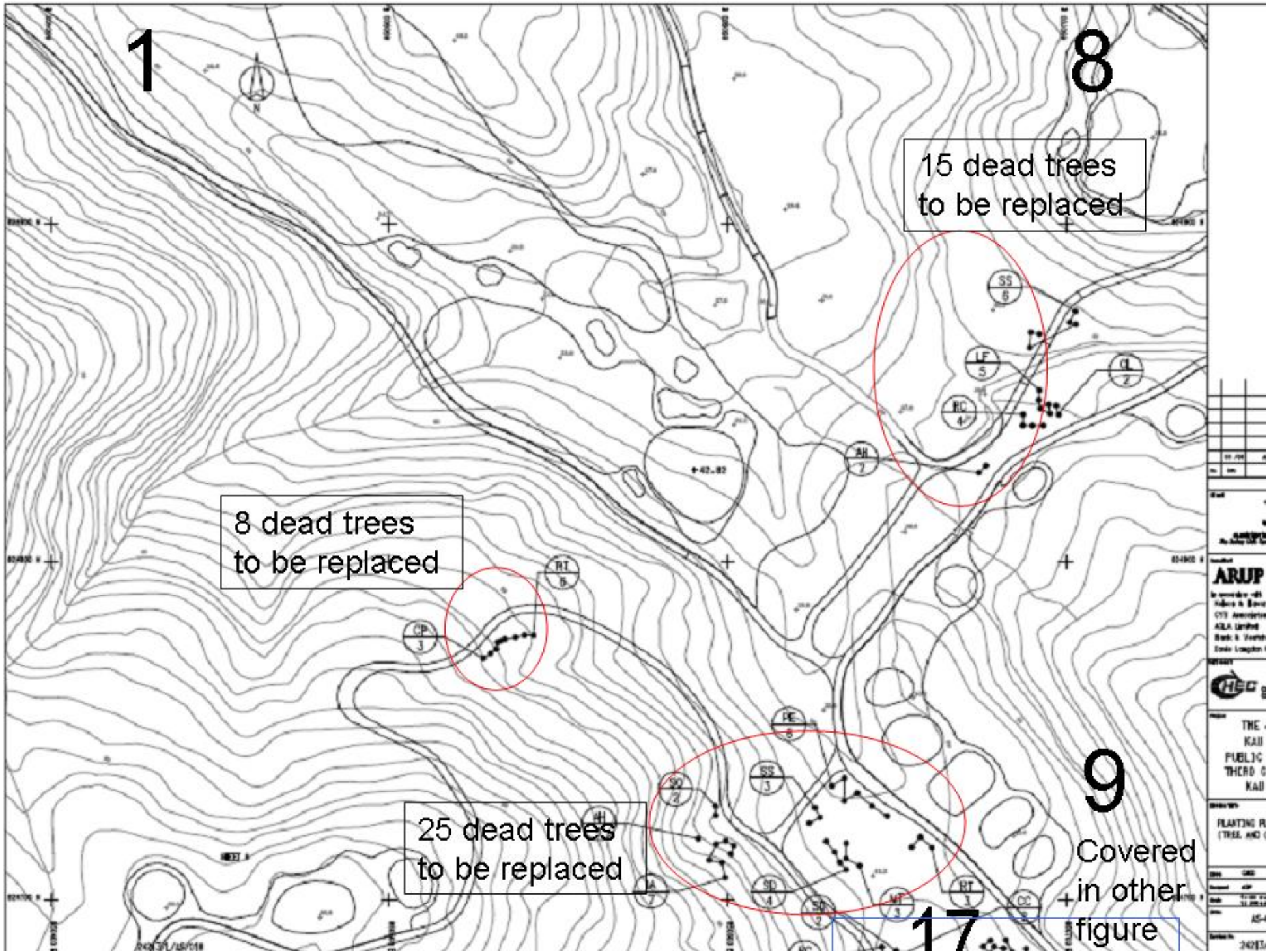
THE JOCKEY CLUB  
 KAU SAU CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAU CHAU

PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	SCALE	DATE	SCALE

AS-CONSTRUCTED  
 2013/AS/01





15 dead trees to be replaced

8 dead trees to be replaced

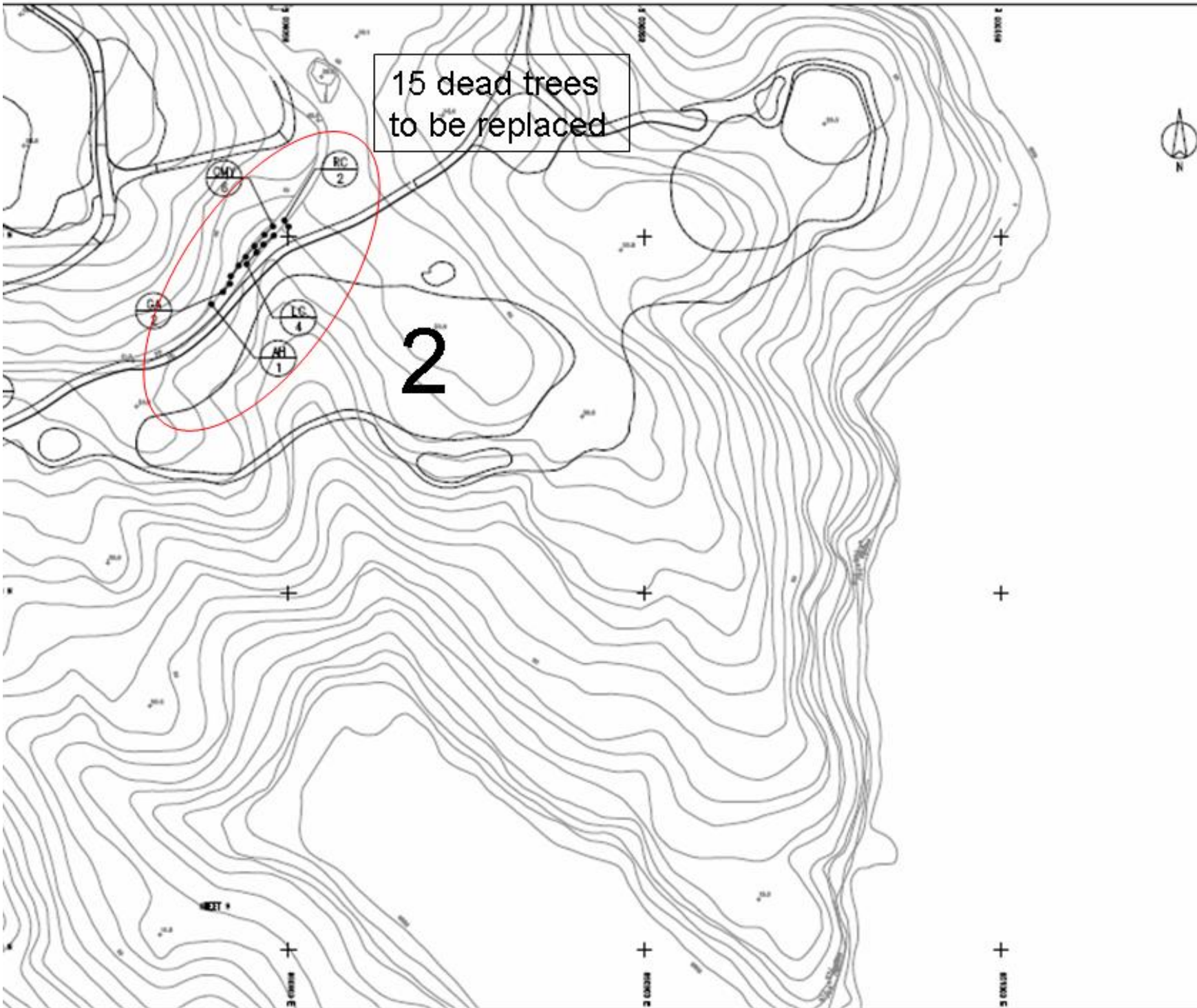
25 dead trees to be replaced

9  
Covered in other figure

17

ARUP  
HEC  
THE  
KAD  
PUBLIC  
THIRD  
KAD  
PLANTING P  
(TREE AND  
2025





82490 6

82490 6

82470 6

1:1	AS-CONSTRUCTED
Scale	1:1



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 a member of the  
 Arup Group Ltd  
 ONE American Street, Suite 2100  
 New York, NY 10019  
 Tel: +1 212 850 6000  
 Fax: +1 212 850 6001  
 Email: [arup@arup.com](mailto:arup@arup.com)



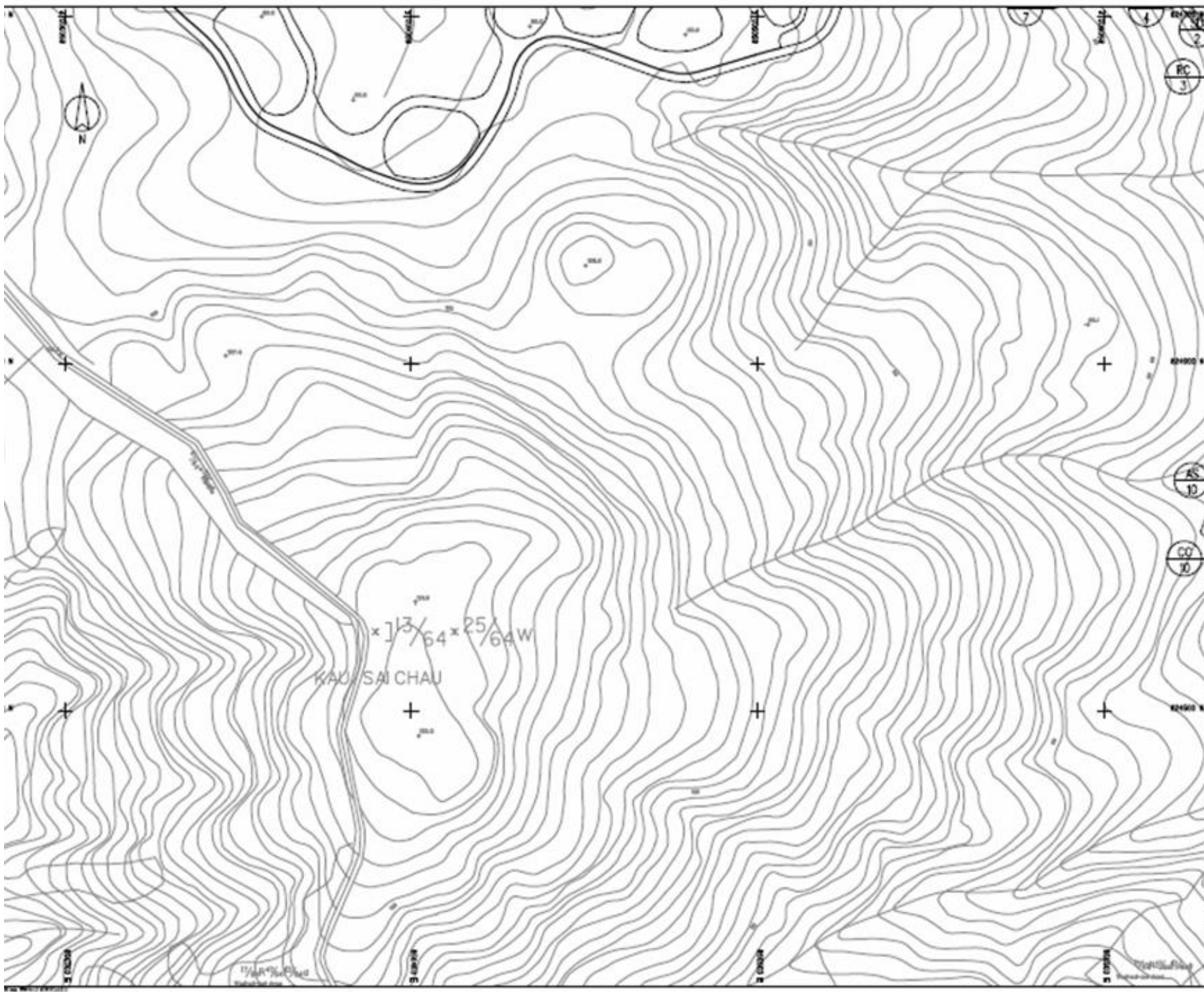
THE JOCKEY CLUB  
 KAU SAI CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAI CHAU

PLANTING PLAN  
 (TREE AND GRASSING COVER)

Area	100	Area	100
Volume	100	Volume	100
Scale	1:1	Scale	1:1

AS-CONSTRUCTED

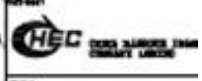
24/73A/AS/100



NO.	DESCRIPTION
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...



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 19th Floor, Bank of China Tower, 100 Queen's Road Central, Hong Kong  
 HKS Limited  
 Ho Yee & Vincent Ho Yee Limited  
 Estate Management & Services



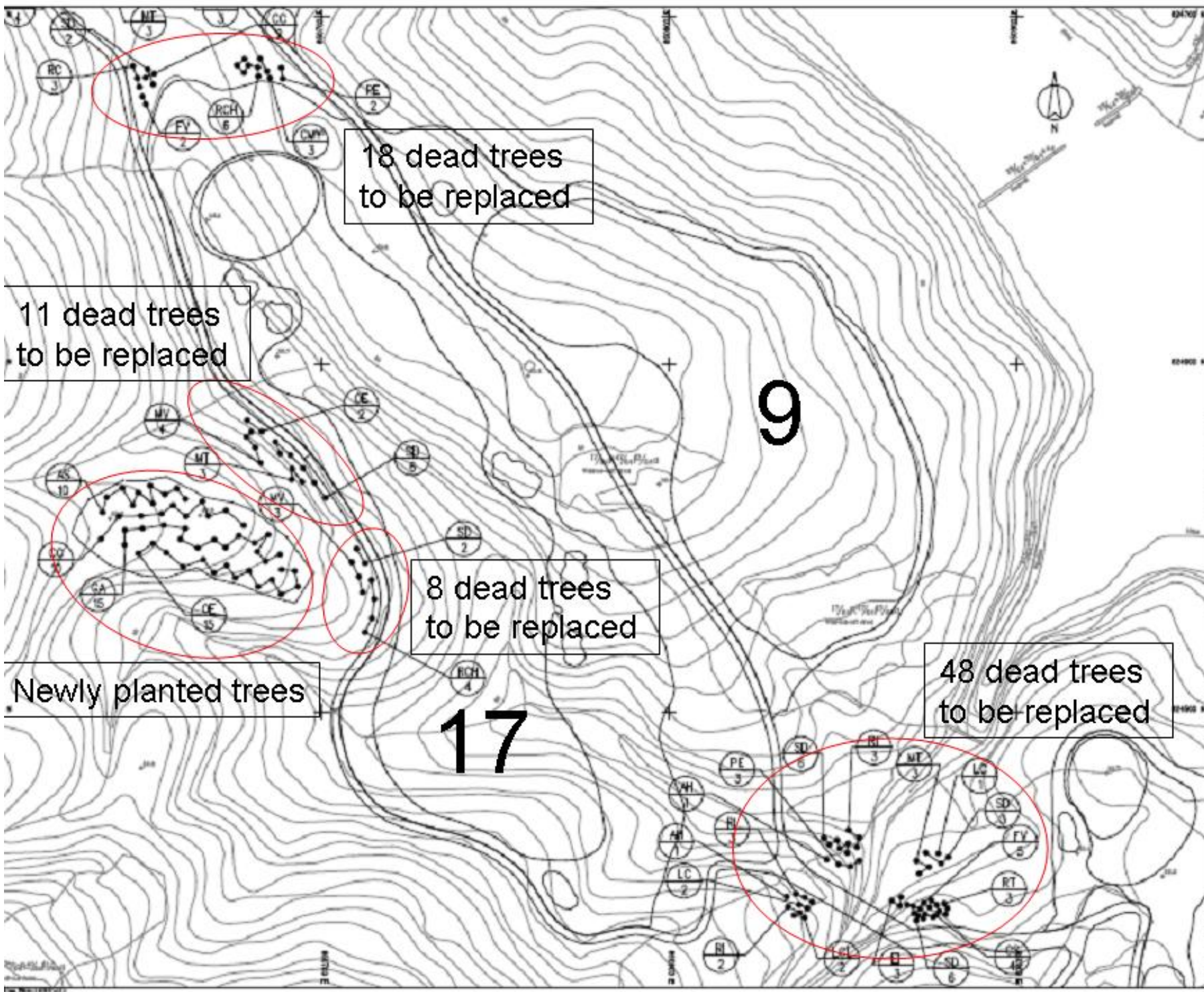
**THE JOCKEY CLUB**  
**KAU SAI CHAU**  
**PUBLIC GOLF COURSE**  
**THIRD GOLF COURSE**  
**KAU SAI CHAU**

**PLANTING PLAN**  
**(TREE AND GRASSING COVER)**

Area	100%	100%	100%
Number	100	100	100
Area	100%	100%	100%
Number	100	100	100

AS-CONSTRUCTED  
 24/12/14/AS/021





18 dead trees  
to be replaced

11 dead trees  
to be replaced

8 dead trees  
to be replaced

48 dead trees  
to be replaced

Newly planted trees

9

17

NO.	DATE	REVISIONS

**ARUP** CONSULTANTS  
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 www.arup.com

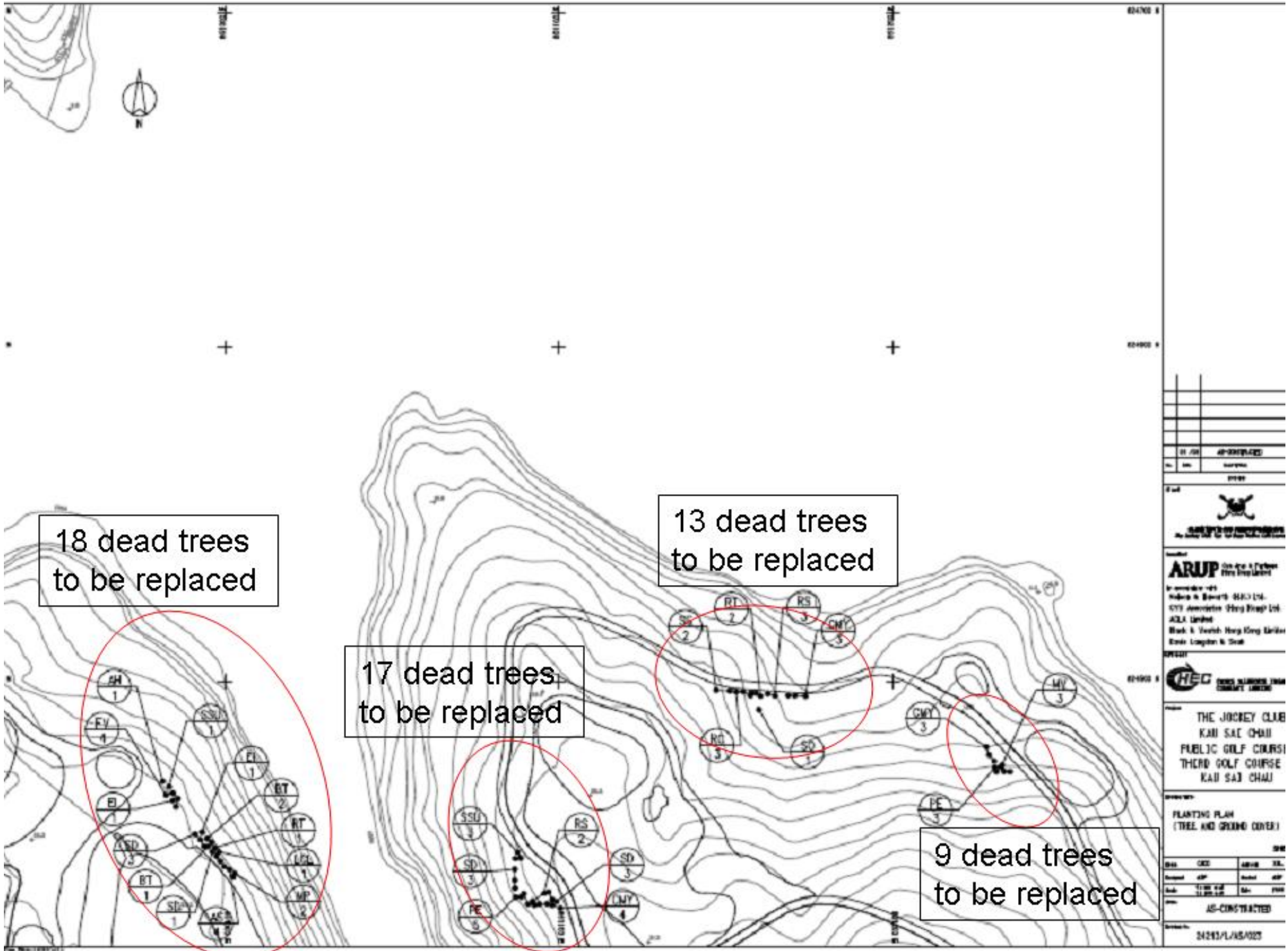
**HEC** HONG KONG ENGINEERING CONSULTANTS

THE JOCKEY CLUB  
 KAU SAE CHAI  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAE CHAI

PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	DESIGN	APPROVED	SCALE

AS-COMPLETED  
 2023/1/15/2023



18 dead trees  
to be replaced

17 dead trees  
to be replaced

13 dead trees  
to be replaced

9 dead trees  
to be replaced

NO.	REV.	DATE	DESCRIPTION

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 TEL: (852) 2500 8200  
 FAX: (852) 2500 8201  
 WWW.ARUP.COM

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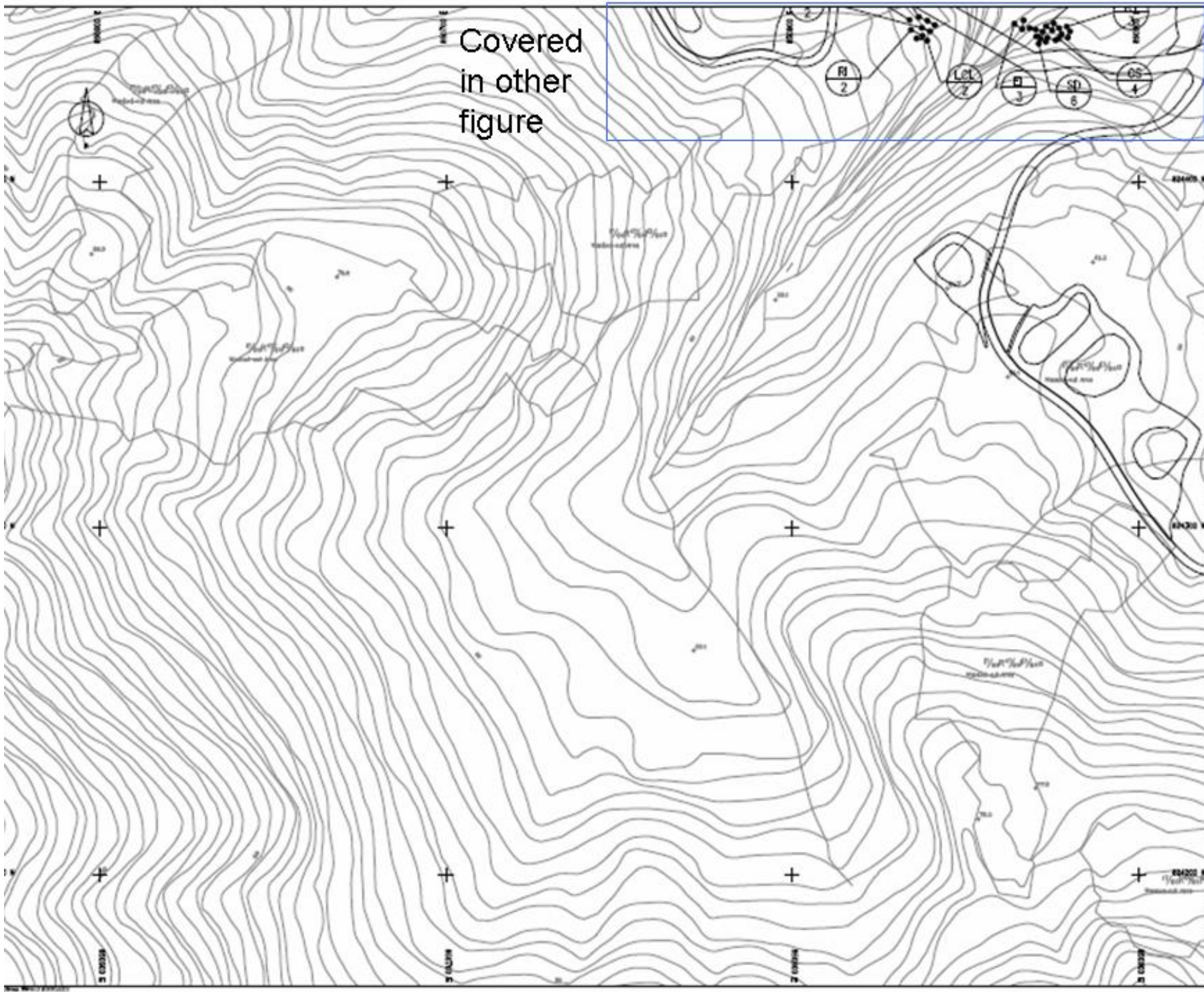
THE JOCKEY CLUB  
 KAU SAE CHAI  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAE CHAI

PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	BY	CHKD	DATE	BY

AS-COMPLETED  
 24283/PLAS/023





Covered  
in other  
figure

DATE	DESCRIPTION



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 CTS Associates (Hong Kong) Ltd.  
 AIA Limited  
 Bank & Yeung Hong King United  
 Trade Langdon & Seah



THE JOCKEY CLUB  
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 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAI CHAU

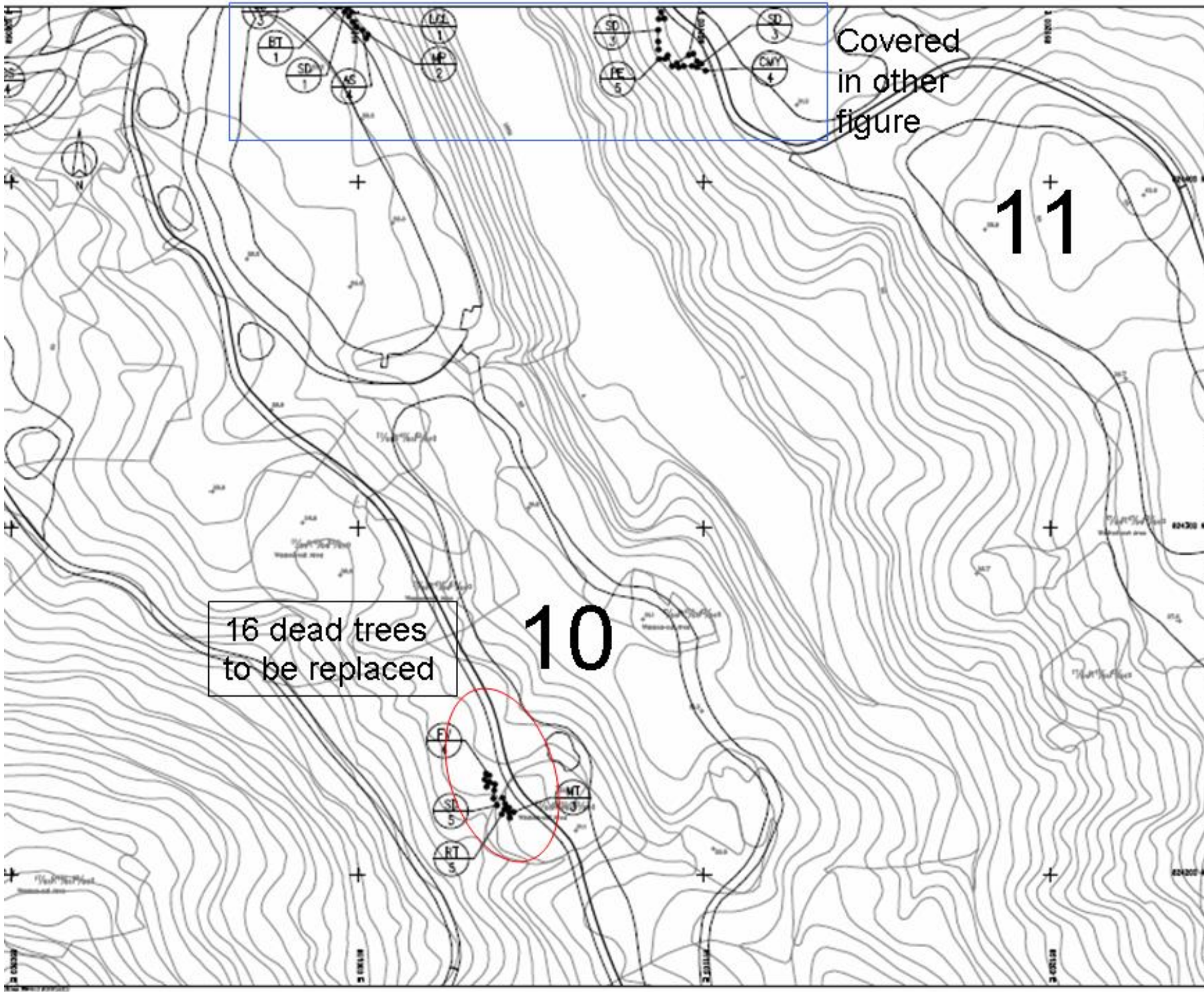
PLANNING PLAN  
 (TREE AND GRASS COVER)

DATE	ISSUE	REVISION	BY

AS-CONSTRUCTED

2013/L/AS/004





Covered  
in other  
figure

11

16 dead trees  
to be replaced

10

DATE	APPROVED
BY	REVISION
NO.	DATE

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 KAU SAI CHAU

FLIGHTING PLAN  
 (TREE AND GRASS COVER)

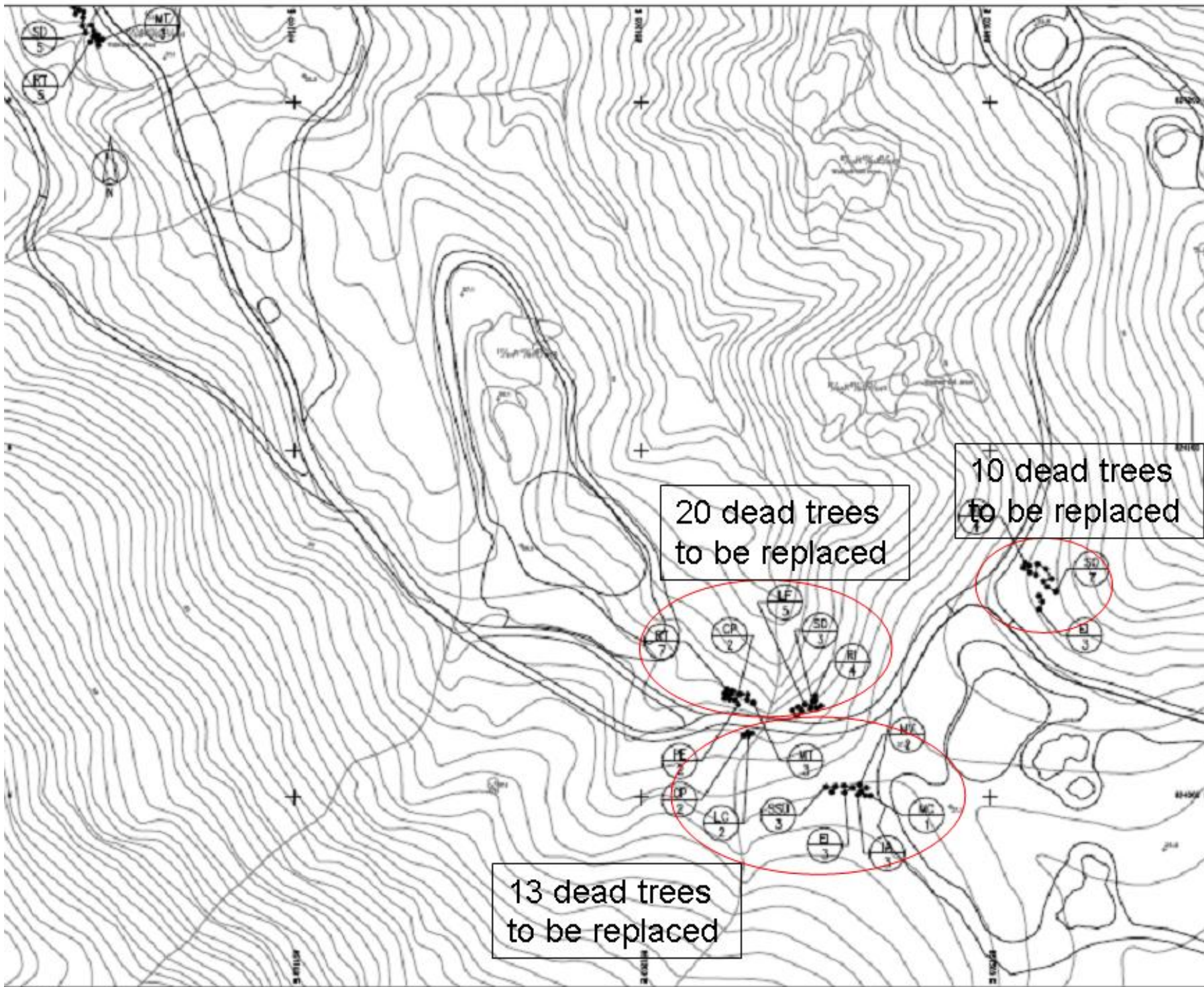
DATE	NO.	REVISION	BY
11/05/08	01	AS-COMPLETED	AS

AS-COMPLETED  
 24/11/08/AS/025









NO.	DATE	DESCRIPTION
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2	11/01/2014	ISSUED FOR TENDER
3	11/01/2014	ISSUED FOR TENDER
4	11/01/2014	ISSUED FOR TENDER
5	11/01/2014	ISSUED FOR TENDER
6	11/01/2014	ISSUED FOR TENDER
7	11/01/2014	ISSUED FOR TENDER
8	11/01/2014	ISSUED FOR TENDER
9	11/01/2014	ISSUED FOR TENDER
10	11/01/2014	ISSUED FOR TENDER
11	11/01/2014	ISSUED FOR TENDER
12	11/01/2014	ISSUED FOR TENDER
13	11/01/2014	ISSUED FOR TENDER
14	11/01/2014	ISSUED FOR TENDER
15	11/01/2014	ISSUED FOR TENDER
16	11/01/2014	ISSUED FOR TENDER
17	11/01/2014	ISSUED FOR TENDER
18	11/01/2014	ISSUED FOR TENDER
19	11/01/2014	ISSUED FOR TENDER
20	11/01/2014	ISSUED FOR TENDER

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**THE JOCKEY CLUB  
 KAU SAE CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAE CHAU**

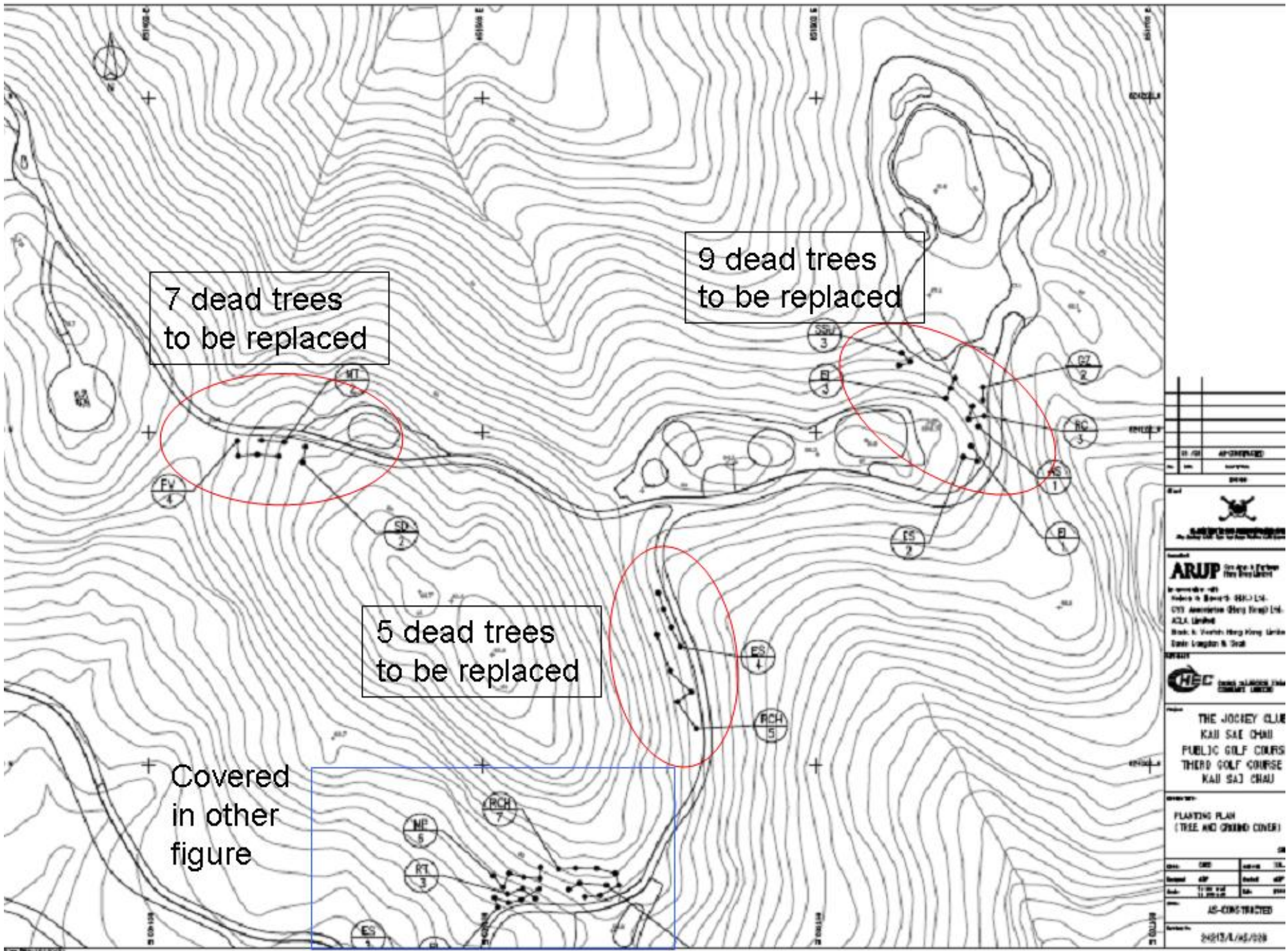
**PLANTING PLAN  
 (TREE AND GRASS COVER)**

NO.	DATE	DESCRIPTION
1	11/01/2014	ISSUED FOR TENDER
2	11/01/2014	ISSUED FOR TENDER
3	11/01/2014	ISSUED FOR TENDER
4	11/01/2014	ISSUED FOR TENDER
5	11/01/2014	ISSUED FOR TENDER
6	11/01/2014	ISSUED FOR TENDER
7	11/01/2014	ISSUED FOR TENDER
8	11/01/2014	ISSUED FOR TENDER
9	11/01/2014	ISSUED FOR TENDER
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11	11/01/2014	ISSUED FOR TENDER
12	11/01/2014	ISSUED FOR TENDER
13	11/01/2014	ISSUED FOR TENDER
14	11/01/2014	ISSUED FOR TENDER
15	11/01/2014	ISSUED FOR TENDER
16	11/01/2014	ISSUED FOR TENDER
17	11/01/2014	ISSUED FOR TENDER
18	11/01/2014	ISSUED FOR TENDER
19	11/01/2014	ISSUED FOR TENDER
20	11/01/2014	ISSUED FOR TENDER

AS-CONSTRUCTED

24/15/L/AS/007





7 dead trees  
to be replaced

9 dead trees  
to be replaced

5 dead trees  
to be replaced

Covered  
in other  
figure

Scale	1:100
Scale	1:200
Scale	1:500
Scale	1:1000
Scale	1:2000
Scale	1:5000
Scale	1:10000



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ARUP Group



THE JOCKEY CLUB  
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PUBLIC GOLF COURSE  
THIRD GOLF COURSE  
KAU SAE CHAU

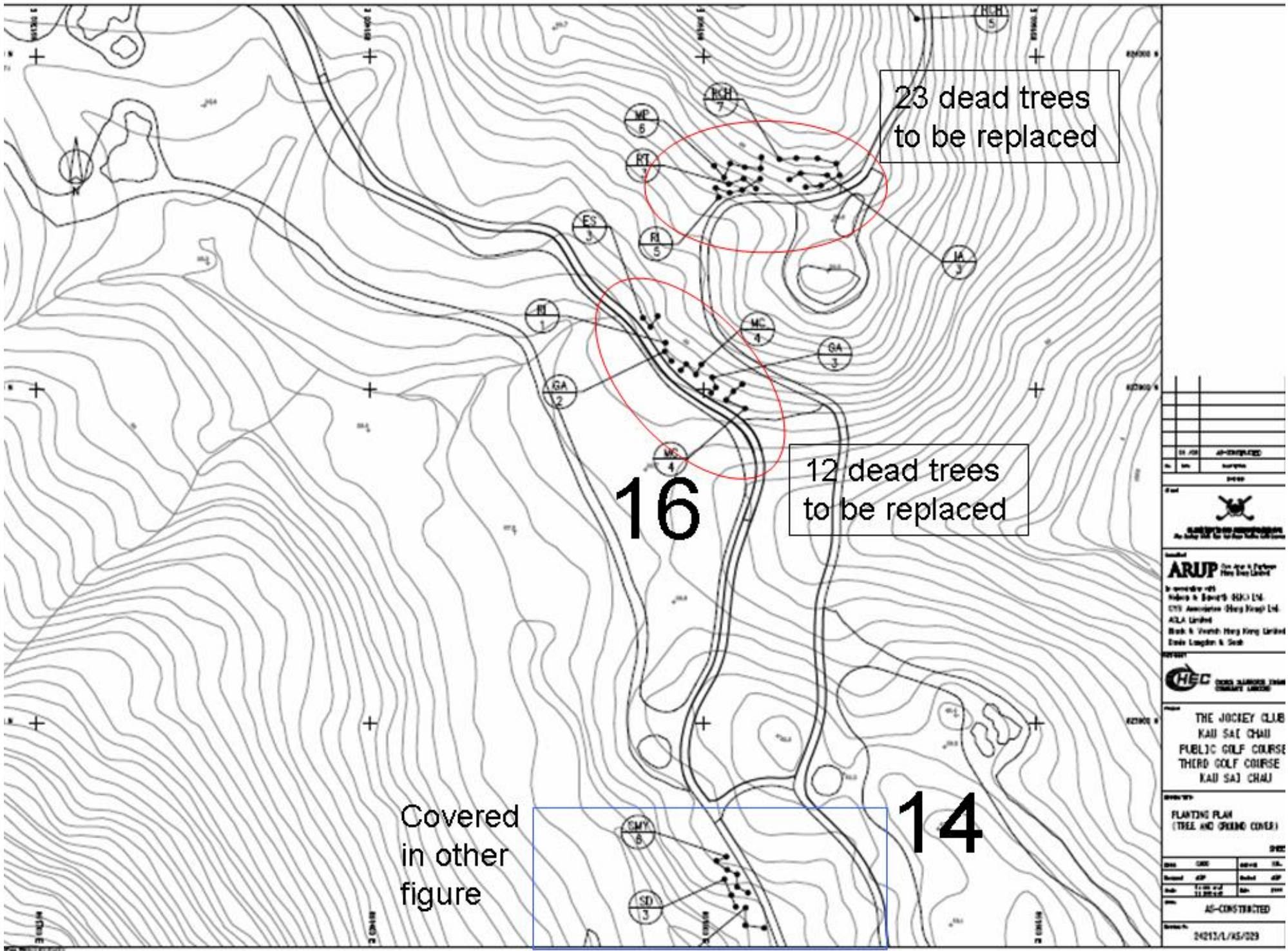
PLANTING PLAN  
(TREE AND GRASS COVER)

Scale	1:100	1:200	1:500	1:1000
Scale	1:2000	1:5000	1:10000	1:20000

AS-CONSTRUCTED

24/12/14/RS/008





NO.	DATE	BY	REVISION



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THE JOCKEY CLUB  
 KAU SAU CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAU CHAU

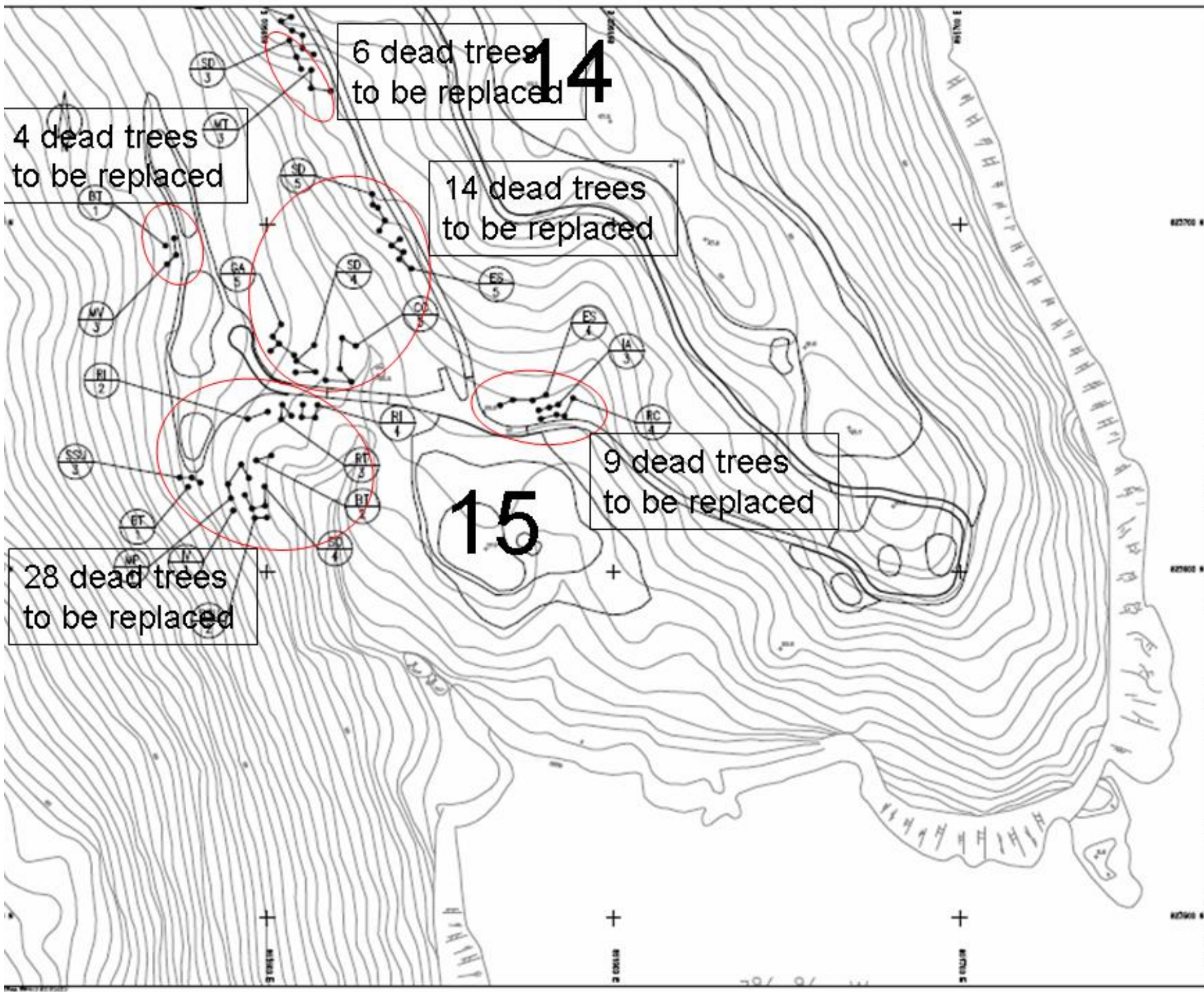
PLANTING PLAN  
 (TREE AND GREENING COVER)

DATE	NO.	BY	CHK.

AS-COMPLETED

24/11/L/AS/029





6 dead trees  
to be replaced

4 dead trees  
to be replaced

14 dead trees  
to be replaced

9 dead trees  
to be replaced

28 dead trees  
to be replaced

15

DATE	DESCRIPTION



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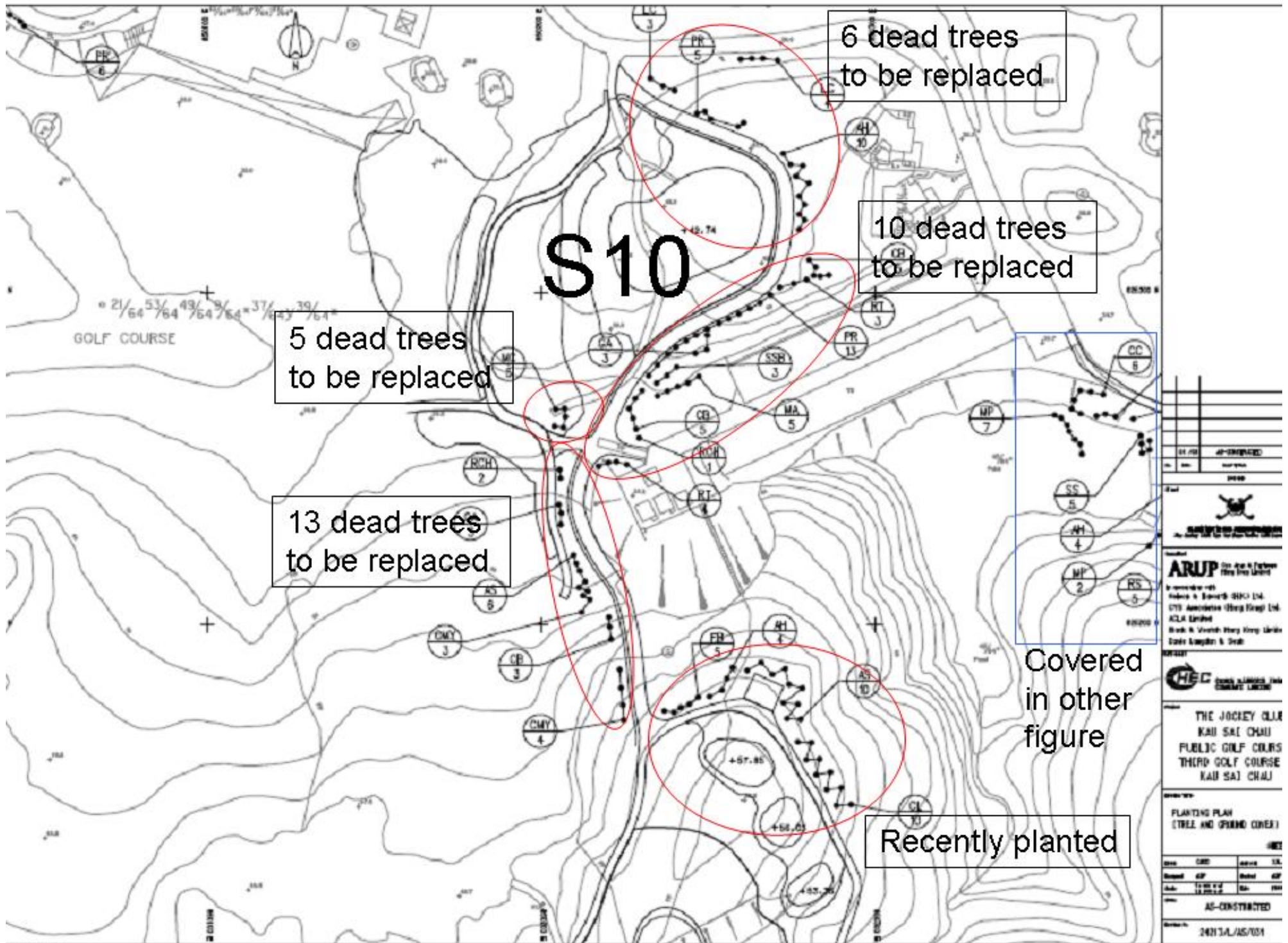
THE JOCKEY CLUB  
 KAU SAI CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAI CHAU

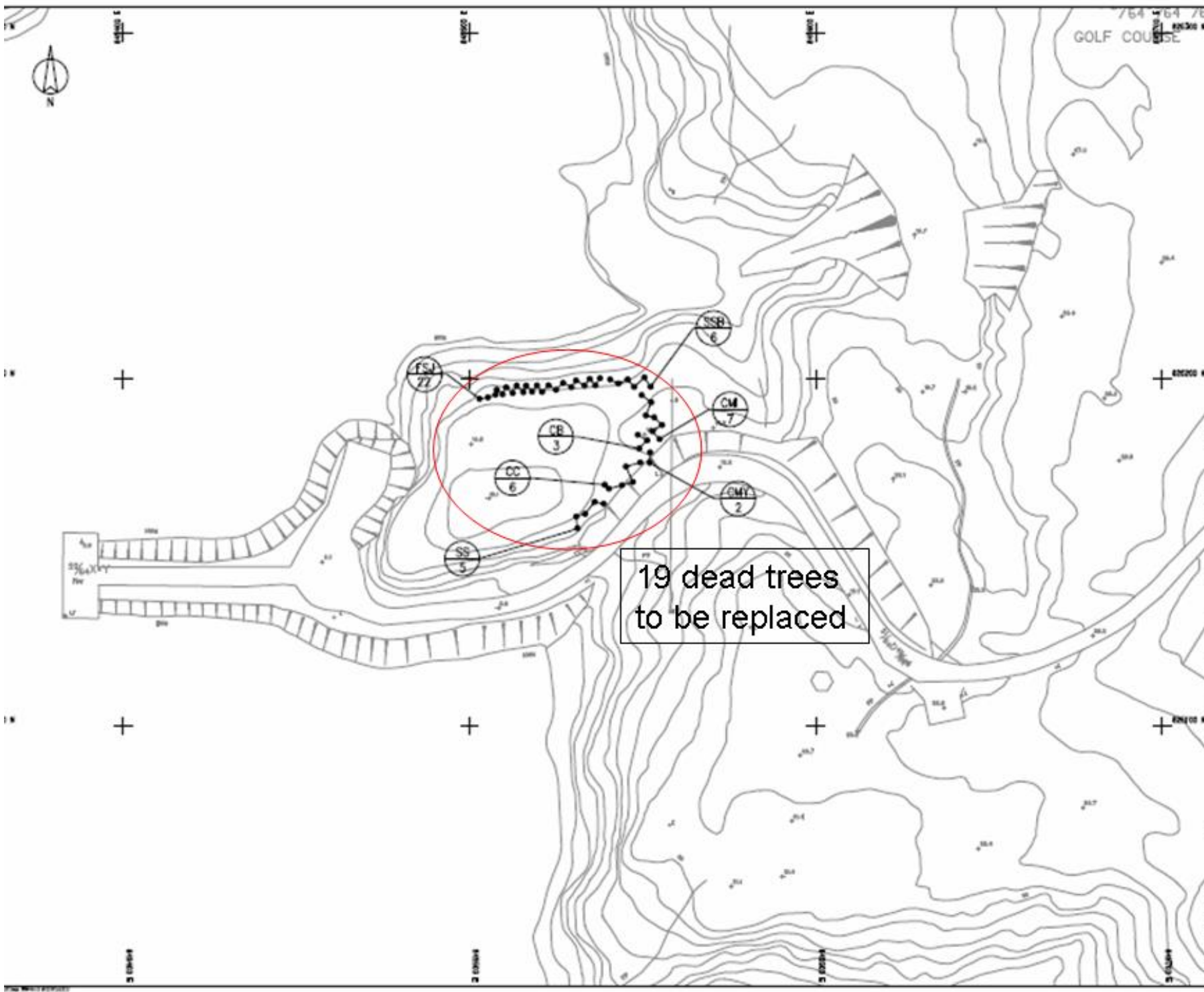
PLANTING PLAN  
 (TREE AND GRASS COVER)

DATE	DATE	DATE	DATE

AS-CONSTRUCTED  
 24213/L/AS/100







19 dead trees  
to be replaced

764 764 76  
GOLF COURSE

DATE	AS-COMPLETED
NO.	NO.
DATE	NO.

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 25/F, ARUP CENTRE, 115 HONG KONG STREET, HONG KONG

**HEC** HONG KONG ENGINEERING CONSULTANTS LIMITED  
 11/F, HONG KONG ENGINEERING CONSULTANTS LIMITED, 115 HONG KONG STREET, HONG KONG

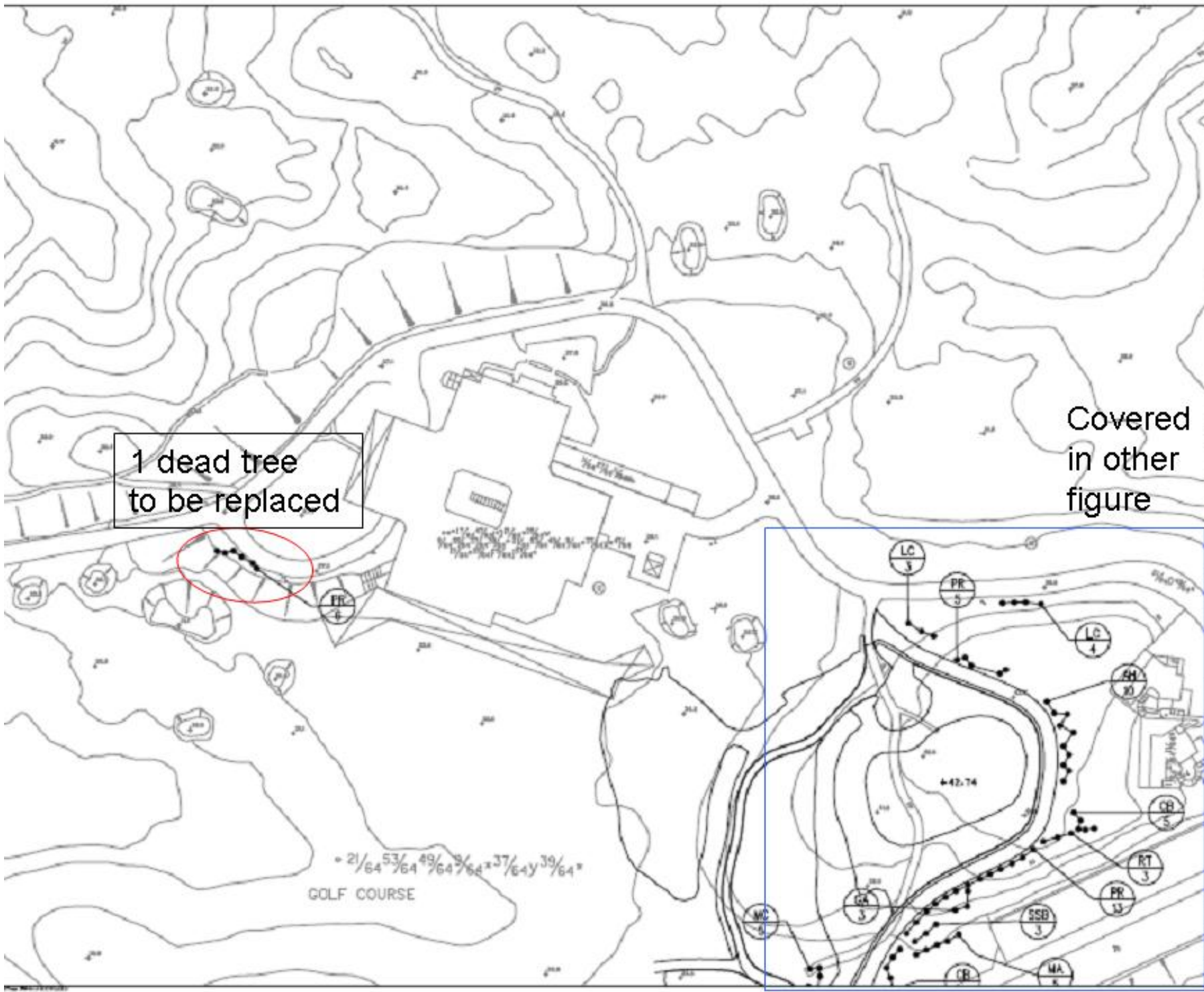
THE JOCKEY CLUB  
 KAU SAI CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAI CHAU

PLANNING PLAN  
 (TREE AND GRASS COVER)

DATE	NO.	DATE	NO.
DATE	NO.	DATE	NO.
DATE	NO.	DATE	NO.

AS-COMPLETED  
 24213/L/AS/032





1 dead tree  
to be replaced

Covered  
in other  
figure

Scale	AS-CONSTRUCTED
North	AS-CONSTRUCTED

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THE JOCKEY CLUB  
 KAU SAE CHAU  
 PUBLIC GOLF COURSE  
 THIRD GOLF COURSE  
 KAU SAE CHAU

PLAYING PLAN  
 (TREE AND SHRUB COVER)

Scale	AS-CONSTRUCTED
North	AS-CONSTRUCTED

24/11/15/03

# **Annex D**

## **Calibration Certificates**





Environmental Division

## CERTIFICATE OF ANALYSIS

<b>CONTACT:</b>	MR WONG SIU HO	<b>Batch:</b>	HK130077
<b>CLIENT:</b>	ENOVATIVE ENV TECHNOLOGY CO	<b>Sub Batch:</b>	0
<b>ADDRESS:</b>	RM 3704 SIK MAN HOUSE HOMANTIN ESTATE KOWLOON	<b>LABORATORY:</b>	HONG KONG
<b>ORDER No.:</b>		<b>DATE RECEIVED:</b>	25/01/2009
<b>PROJECT:</b>		<b>DATE OF ISSUE:</b>	30/01/2009
		<b>SAMPLE TYPE:</b>	EQUIPMENT
		<b>No. of SAMPLES:</b>	1

### COMMENTS

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

### NOTES

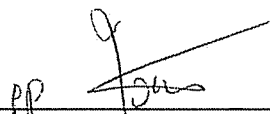
This is the Final Report and supersedes any preliminary report with this batch number.  
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

### ISSUING LABORATORY: HONG KONG

#### Address

ALS Technichem (HK) Pty Ltd  
11/F  
Chung Shun Knitting Centre  
1-3 Wing Yip Street  
Kwai Chung  
HONG KONG

**Phone:** 852-2610 1044  
**Fax:** 852-2610 2021  
**Email:** hongkong@alsenviro.com

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong

#### Other ALS Environmental Laboratories

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Newcastle	Bogor	Lima

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: HK130077  
Sub Batch : 0  
Date of Issue: 30/01/2009  
Client: ENOVATIVE ENV TECHNOLOGY CO  
Client Reference:

## Calibration of Tubidimeter

Item : YSI SONDE Environmental Monitoring System  
Model No. : 6920  
Serial No. : 000109DF  
Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 2130B  
Date of Calibration : 25 January, 2009

### Testing Results :

Expected Reading	Recording Reading
0.00 NTU	0.1 NTU
4.00 NTU	4.05 NTU
16.0 NTU	16.1 NTU
80.0 NTU	80.3 NTU
160 NTU	160 NTU
Allowing Deviation	±10%

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS




Batch: HK130077  
Sub Batch : 0  
Date of Issue: 30/01/2009  
Client: ENOVATIVE ENV TECHNOLOGY CO  
Client Reference:

## Calibration of Conductivity System

Item : YSI SONDE Environmental Monitoring System  
Model No. : 6920  
Serial No. : 000109DF  
Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 2510B  
Date of Calibration : 25 January, 2009

### Testing Results :

Expected Reading	Recording Reading
1412 uS/cm	1421 uS/cm
6667 uS/cm	6677 uS/cm
58670 uS/cm	58660 uS/cm
Allowing Deviation	±10%

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS



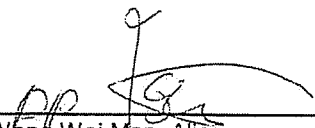
Batch: HK130077  
Sub Batch : 0  
Date of Issue: 30/01/2009  
Client: ENOVATIVE ENV TECHNOLOGY CO  
Client Reference:

## Calibration of Salinity System

Item : YSI SONDE Environmental Monitoring System  
Model No. : 6920  
Serial No. : 000109DF  
Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 2520 A and B  
Date of Calibration : 25 January, 2009

### Testing Results :

Expected Reading	Recording Reading
10.0 g/L	10.0 g/L
20.0 g/L	20.0 g/L
30.0 g/L	30.0 g/L
Allowing Deviation	±10%

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS




Batch: HK130077  
Sub Batch : 0  
Date of Issue: 30/01/2009  
Client: ENOVATIVE ENV TECHNOLOGY CO  
Client Reference:

## Calibration of Thermometer

Item : YSI SONDE Environmental Monitoring System  
Model No. : 6920  
Serial No. : 000109DF  
Calibration Method : In-house Method  
Date of Calibration : 25 January, 2009

### Testing Results :

Reference Temperature (°C)	Recorded Temperature (°C)
3.5 °C	3.5 °C
19.3 °C	19.3 °C
Allowing Deviation	±2.0°C

  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS

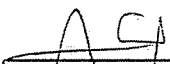


Batch: HK130077  
Sub Batch : 0  
Date of Issue: 30/01/2009  
Client: ENOVATIVE ENV TECHNOLOGY CO  
Client Reference:

## Calibration of DO System

Item : YSI SONDE Environmental Monitoring System  
Model No. : 6920  
Serial No. : 000109DF  
Calibration Method : This meter was calibrated in accordance with standard method APHA (18th Ed.) 4500-OC & G  
Date of Calibration : 25 January, 2009  
Testing Results :

Expected Reading	Recording Reading
0.00 mg/L	0.10 mg/L
2.50 mg/L	2.47 mg/L
3.92 mg/L	3.89 mg/L
8.05 mg/L	8.10 mg/L
Allowing Deviation	±0.2 mg/L

  
\_\_\_\_\_  
Alice W M Wong  
Laboratory Manager - Hong Kong

# CERTIFICATE OF ANALYSIS




Batch: HK130077  
Sub Batch : 0  
Date of Issue: 30/01/2009  
Client: ENOVATIVE ENV TECHNOLOGY CO  
Client Reference:

## Calibration of pH System

Item : YSI SONDE Environmental Monitoring System  
Model No. : 6920  
Serial No. : 000109DF  
Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 4500 H:B  
Date of Calibration : 25 January, 2009

### Testing Results :

Expected Reading	Recording Reading
4.00	4.00
7.00	7.00
10.0	10.0
Allowing Deviation	±0.2 unit












  
Ms Wong Wai Man, Alice  
Laboratory Manager - Hong Kong




































# **Annex E**

## **Fertilizer and Pesticides Application**

December 2008						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
21 	22 	23  WQ	24  F (1-18, PG2)	25 	26  C (1, 2, PG2)	27 
28 	29  F (1-4, 9, 10, 16, 18)	30 	31  F (1-18, PG2)			

January 2009						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 	2  F (1-18)	3 
4 	5  F (1-18, PG2) WQ	6  F (1-18)	7  F (1-18)	8 	9 	10  F (1-18)
11 	12  F (4, 6, 8, 9, 11, 13,18)	13 	14 	15 	16 	17 
18 	19 	20 	21  WQ	22 	23 	24 
25 	26 	27 	28 	29 	30 	31 

Remarks:

1. Dosage Application by JCKSC

F (follow with numbers) – fertilizers were applied at those holes of East Golf Course.

C (follow with numbers) – non-biological chemicals (eg. pesticides, fungicides, etc.) were applied at those holes of East Golf Course.

2. Weather Information (from Hong Kong Observatory)



daily duration of sunshine > 4 hours and without raining



daily duration of sunshine < 4 hours and without raining



daily rainfall > 0.5 mm at Kau Sai Chau Island



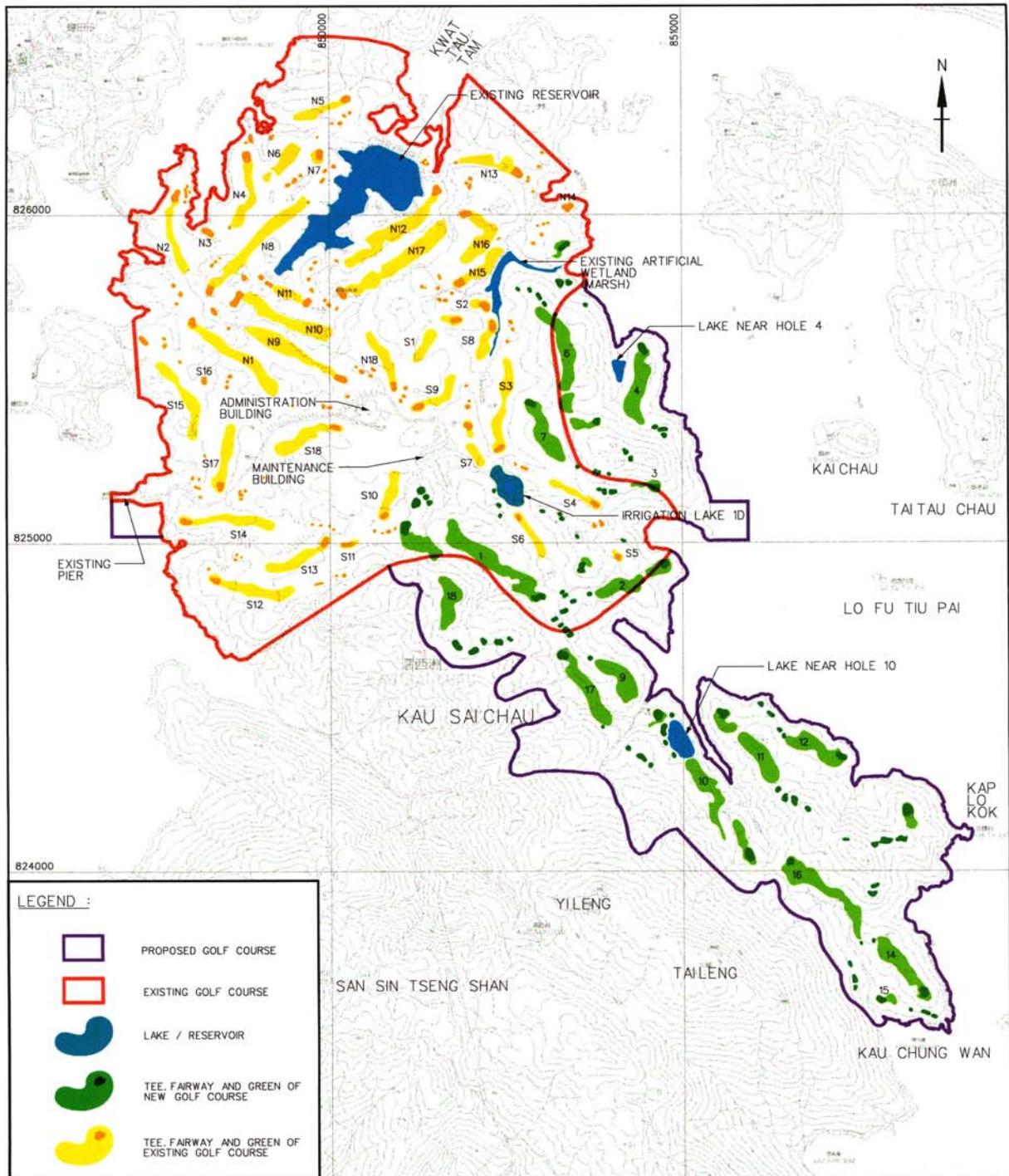
daily rainfall > 30 mm at Kau Sai Chau Island

{R} Rainstorm signal was hoisted; “A” stands for Amber, “R” stands for Red and “B” stands for Black rainstorm signals were hoisted.

3. Environmental Monitoring

WQ – fresh and marine water quality monitoring were implemented.

# FIGURES



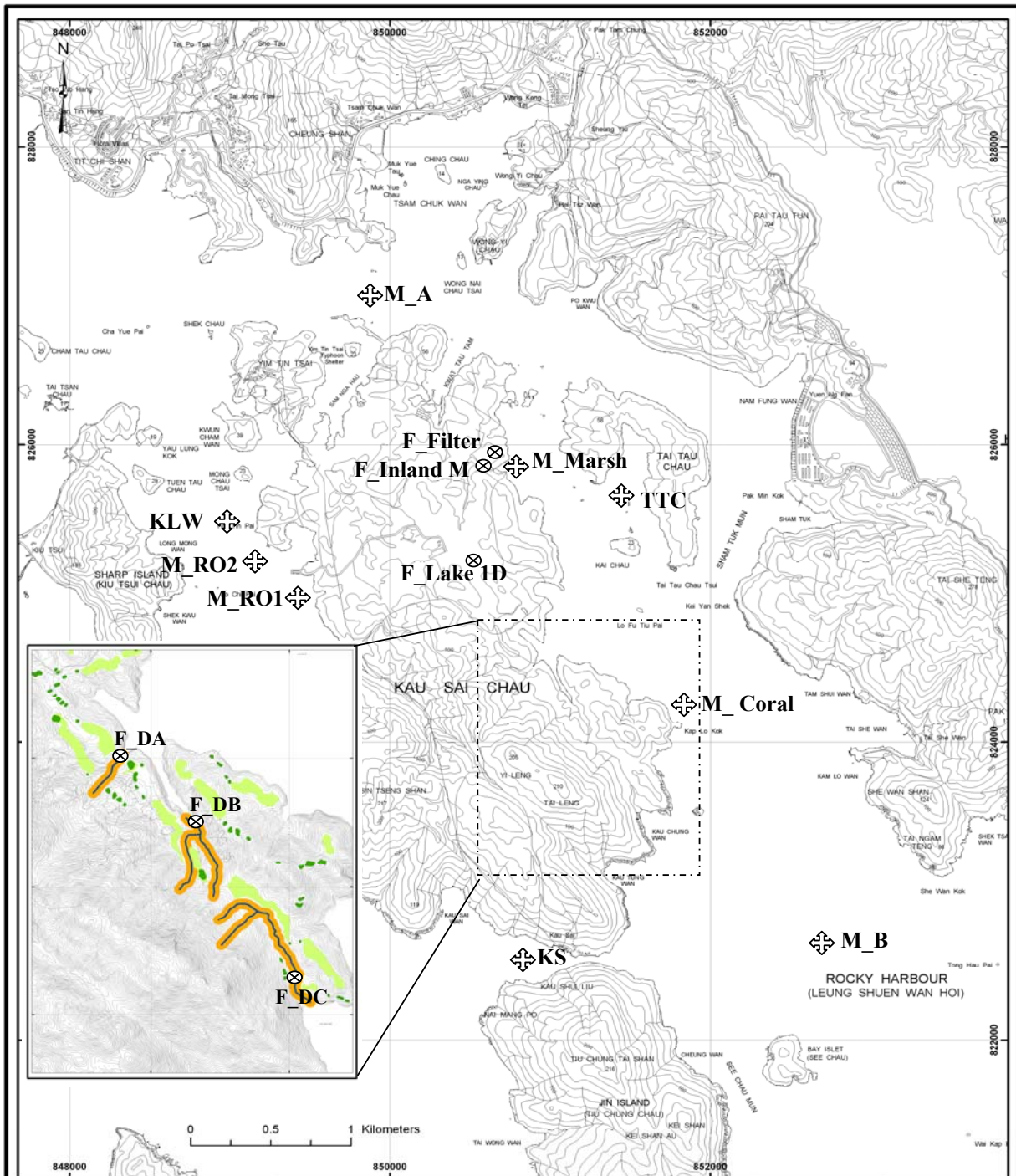
The Hong Kong Jockey Club

**BLACK & VEATCH HONG KONG LIMITED**  
 博威工程顧問有限公司

PROPOSED EXTENSION OF PUBLIC GOLF  
 Public Golf Course at Kau Sai Chau Island,  
 Sai Kung

Master Layer Plan

<b>Fig 1.1</b>	Revision
Reference	File Name
Prepared	Checked
Date	Scale
ET	PKL
Apr 08	1:15000 (A4)




 香港賽馬會  
 The Hong Kong Jockey Club

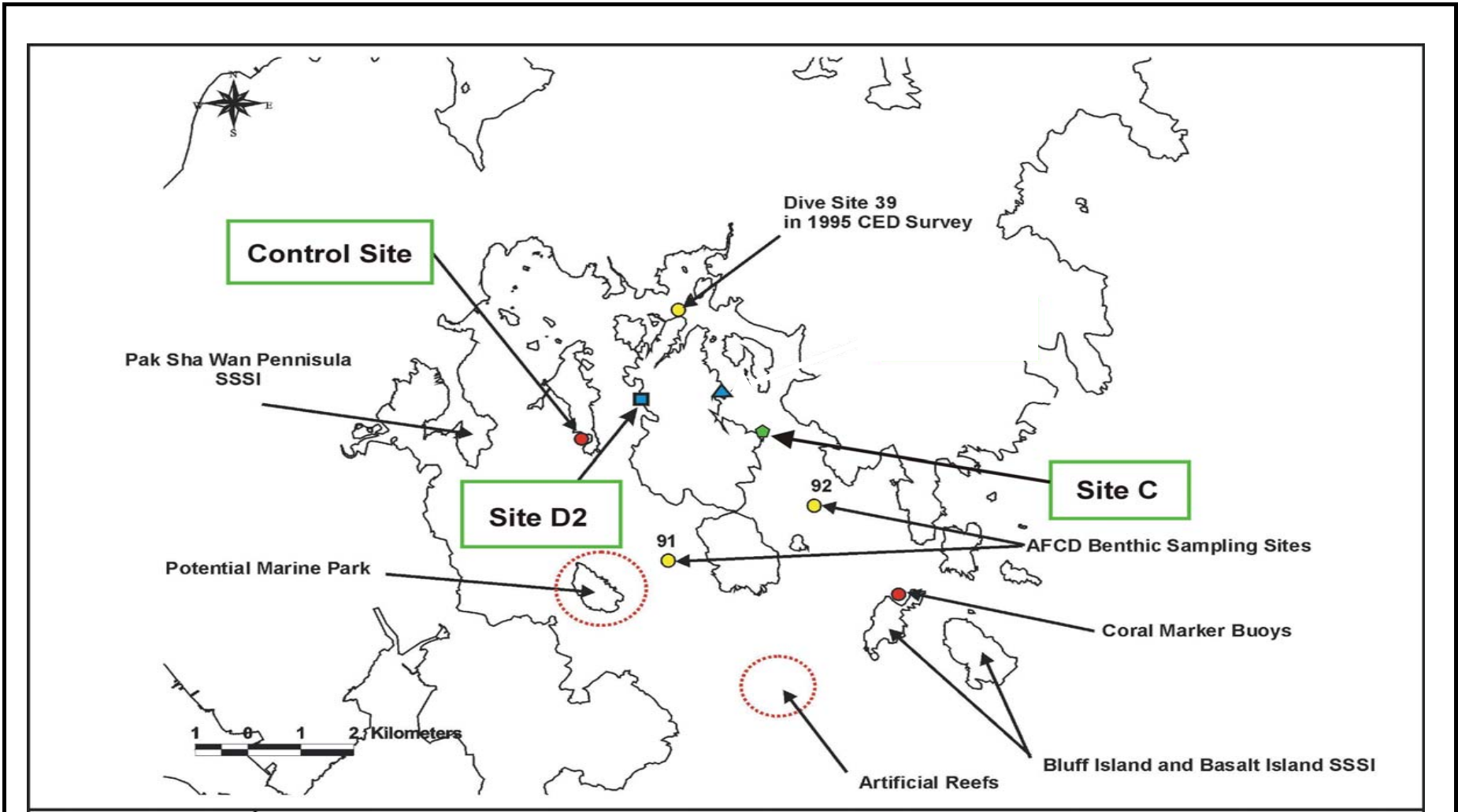

 BLACK & VEATCH HONG KONG LIMITED  
 博威工程顧問有限公司

Public Golf Course at Kau Sai Chau Island, Sai Kung  
 Water Quality Monitoring Locations -  
 Operation Phase

Fig 3.1	
ET	PKL
Apr 08	

MXD: \\s:\p566\0\Project\032219\_022\location.mxd  
 Plot No: C:\P566\0\Project\032219\_022\location.pdf





香港賽馬會  
The Hong Kong Jockey Club



BLACK & VEATCH HONG KONG LIMITED  
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Coral Survey Monitoring Location

Fig 3.2

Prepared	Checked
ET	PKL
Date	Apr-08