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

Monthly Environmental Monitoring & Audit (EM&A) Report for November 2007

(Report No. 382210/023)

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	For and on Behalf of Black & Veatch Hong Kong Limited

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December 2007

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DOCUMENT CONTROL			Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung	No. 382210/023
AMENDMENT RECORD				Prepared by: Esther Tong
Monthly EM&A Monitoring Report – November 2007			Client: **Hong Kong Jockey Club**	Initials: ET
				Date: December 2007
Pages:	**Date:**	**Issue No.**	**Description:**	**Initials:**
All	Dec 07	1	Monthly EM&A Report for submission to EPD	ET

Your ref:
Our ref: 40040032/CERT/29_07.doc

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung
(Independent Environmental Checker)

CHECK CERTIFICATE

1. We certify that professional skill and care have been used in the checking of the Environmental Team's (ET) No.23 Monthly EM&A Report for November 2007 for the construction of Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung.

2. We certify that the ET's EM&A programme for the reporting period has been satisfactorily executed and the No. 23 Monthly EM&A report for November 2007 has been verified.

3. We comment that our evaluation of the ET's EM&A is based on a random audit process which cannot be guaranteed to have all non-conformities identified.

Signed 

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Executive Summary

This is the twenty-second Monthly Environmental Monitoring and Audit (EM&A) Report prepared by Black & Veatch, the designated Environmental Team (ET), for the Project "Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung". The construction works of golf course was commenced on 16th January 2006. This report presents the results of the EM&A works conducted in the month of November 2007 (25th October to 24th November 2007).

Summary of construction works undertaken during this report period

No dredging of the permanent intake and outfall pipelines for the desalination plant had been carried out during the reporting month. Hong Kong Jockey Club (HKJC) continuously undertook the application of discharge licence. It is very critical to get the discharge licence of the desalination plant, in particular in dry season.

Some hydroseeding areas were not fully covered with hydroseed and re-hydroseeding was required. The Contractor (CHEC) proposed that re-hydroseed at those low density areas in spring time 2008. According to site record, turf planting (tees, fairways and green) was completed at Holes 1, 3 to 8, 10 to 16 and 18 except Holes 2, 9 and 17. Applications of fertilizers and pesticides at Holes 1 to 18 and Holes 3 to 8 & 11 to 16 respectively were recorded. All measured pesticides concentrations at all fresh water and marine monitoring stations was undetectable (October 2007). The construction of the closed low flow drainage for the East Course completed. No rainstorm event was recorded during the reporting month.

As most of the closed low flow drainage system was completed to collect surface runoff and covered with turf during reporting month. No significant runoff was observed. It is already dry season that heavy rains occurrence is expected to be minimal. For the Temporary Drainage Management Plan (TMDP), no revised plan was submitted to RE for approval during the two years construction phase. ET and the Engineer repeatedly reminded the Contractor to prevent silty/nutrient/pesticides runoff to the streams and marine water since the start of this year wet season.

Artificial rocks were observed depositing at downstream of Stream A after heavy rains on 3rd July 2007 which had already been occurred once last year (June 2006). The Contractor reported the rocks were cleared by hand without any use of machine in 11th August 2007. In the present terrestrial monitoring survey, it was found that most of the hydroseed applied to the area was lost. Hydroseeding might need to apply to the area again. The Contractor was reminded to enhance the buffer zone areas back to the baseline condition and prevent the occurrence of the similar case before the completion of reinstatement.

For the temporary Sewage Treatment Plant (STP), sewage effluent was stored temporarily in a temporary storage tank since early May 2007 and discharge off-site by licenced Contractor. The sewage disposal was carried out by the CHEC on monthly basis. The Contractor was reminded to take immediate and effective remedial actions to properly operate and maintain the wastewater treatment facilities in compliance with the discharge licence together with the provision of supportive water quality monitoring results of the sewage effluent. The Contractor was also reminded to pay particular attention and strictly follow all specific and standard conditions required by discharge licence of their sewage treatment plant. No information was submitted by CHEC regarding the STP performance during the reporting month.

Improper temporary stockpiles of construction wastes were observed during the reporting month and located at the edge of the temporary barging point. As falling of the construction waste to the sea could cause potential pollution problem or coral damage, the Contractor was reminded to dispose the construction wastes off-site immediately and properly enclosed or fence off the stockpiles area to prevent any incident occur.

Terrestrial ecological monitoring was carried out in November 2007. The flow in the Stream B was low due to the dry season. Atyid shrimps were recorded in Stream B in the present survey. No silty runoff was observed at Stream C. Two species of Atyid shrimps, i.e. *Caridina fasciata* and *Cardina cantonensis*, which have been absent for several months in the monitoring for this stream, were recorded in Stream C again in this monitoring but still in extreme low density. For Stream D (control which is outside the construction area), Atyid shrimp *Caridina trifasciata* was still recorded.

Finishing works for permanent bridges at the Streams A, B, C and the Fresh Water Inland Marsh were in progress.

The Construction Noise Permit (CNP) was expired on 25th November 2007. Regarding the telephone conservation with the CHEC's environmental representative on 21st November 2007, it was confirmed that the CNP would not renew. The tentative programme for the Contractor's site office removal will be carried out in 7th December 2007. The Contractor is reminded to ensure that no construction works should be carried out during the night time if they have the intention not to renew the CNP.

The Project is now entering the final stages of construction. The major construction activities are expected to be completed by end of December 2007 and all the golf holes will be planted with turfs. The remaining works will be mainly defect rectification and minor maintenance works. The potential environmental impacts arising from the remaining construction activities are expected to be limited. It is recommended the monitoring in December 2007 as the final construction phase EM&A.

The tentative programme for the removal of the rock filled pier at the temporary barging point will be about March 2008. It is necessary to keep the temporary barging point to provide access for the Contractor during the defect rectification / maintenance period to minimize disruption to the existing public ferry pier. It is proposed to continue the same coral monitoring frequency as the construction phase (on quarterly basis) at the temporary barging point until the removal of temporary barging point. Therefore, the operation phase coral monitoring will only commence after the removal of the temporary barging point.

Due to the coral damage incident occurred back in April 2006 when the Contractor erected the temporary barging point. As suggested by AFCD, it is require the Contractor to conduct dive inspections by coral specialist as additional measures to protect the corals during the removal period of the rock filled pier. The results will be reported to EPD and AFCD accordingly.

Environmental Monitoring and Audit Progress

A summary of monitoring activities in this reporting period is shown as follows:

24-hour Total Suspended Particulates (TSP) monitoring at GCA B1	5 times
Water quality monitoring (marine + freshwater)	4 times
Terrestrial Ecology	1 time
Marine Ecology	0 times*
Landscaping & Visual	2 times

* For marine ecology, the next quarterly coral monitoring is scheduled in December 2007.

Air Quality

5 sets of 24-hour TSP monitoring were carried out on 29th October, 3rd, 9th, 15th and 21st November 2007 at Bungalow A (GCA B1) at Kau Sai Chau during this reporting month.

Water Quality

4 sets of water quality monitoring were carried out on 29th October, 5th, 12th, and 19th November 2007 at 9 marine and 7 freshwater monitoring locations. No heavy rainstorm was hoisted during this reporting month.

Terrestrial Ecology

Terrestrial ecology was conducted on 13th and 30th November 2007. The majority of the construction works have been finished, and the stream buffer zones for the Streams A, B and C had been demarcated and were maintained. The permanent access bridges for the Streams A and C had been constructed with the piers outside Stream buffer zone demarcation. The downstream section of the Stream A channel was accidentally filled up by boulders before and some remedial works through manually clearing the rubbles have been implemented by the Contractor to clear the rubbles manually and a restore plan will be prepared by the Contractor. The area previously occupied by the temporary bridge piers were being restored by hydroseeding. The buffer zones for the Streams A, B, and C were basically intact. Some vegetation within the Stream B buffer zone had been previously damaged during the construction, and remedial replanting were implemented. But remedial works are still required for a small area within Stream C Buffer Zone which had also been accidentally damaged. Sedimentation had been previously observed in Stream B and C, but was not found in the present monitoring. Aquatic life including Atyid shrimps were found in Stream B and Stream C. But the abundance of aquatic fauna in particular caridian shrimps, however, was still very low in Stream C. Stream D was in natural conditions similar to the condition during the Baseline Survey, and the aquatic fauna abundance was found resuming.

Landscaping & Visual

Landscape and visual monitoring and site audits were carried on 8th and 21st November 2007. Site formation, shaping, hydroseeding and planting works are being carried out at present. The Contractor shall take measures to improve the condition of damaged trees described in this report, provide adequate watering to newly hydroseeded area, planted shrubs, trees and transplanted trees as well as improve the quality of newly planted light standard, standard and heavy standard trees.

All transplanted trees were in fair condition except for T848. Mal-pruning of transplanted trees has not been rectified. Construction material was stockpiled within tree protection zones. A statement on the cause of death of tree T925 recorded in the last report is still outstanding.

The following works have been outstanding since July 2006: (i) Carry out surgery to damaged trees, (ii) Report the cause of death of tree T925, (iii) Re-fix the label of retained tree for easy identification, (iv) More frequent watering for transplanted trees, planted vegetation and hydroseeded grass, (v) Rectify the mal-pruning practice of the transplanted trees and (vi) Replace all trees and shrubs with poor quality.

Environmental Site Auditing

Four weekly joint environmental site audits were carried out on 30th October, 6th, 13th and 20th November 2007 with the Engineer and the Contractor's representatives. A monthly joint environmental site audit was carried out on 20th November 2007 by the Engineer, the Contractor's Representative and the Independent Environmental Checker (IEC).

Environmental Non-conformance

Air Quality

No exceedance of 24-hour TSP was recorded at GCA B1 during the reporting month.

Marine Water Quality

One exceedance of turbidity was recorded at KLW. Two exceedances of suspended solids were recorded at KLW and KS. Seven exceedances of ammonia nitrogen were recorded at M_Marsh, TTC, M_BP, M_Coral and KS. Two exceedances of total inorganic nitrogen were recorded at TTC and KS. Moreover, four exceedances of chlorophyll a were recorded at TTC and KS. Exceedances were considered due to the natural variation of the marine water and non-project related.

Freshwater Quality

Four exceedances of suspended solids were recorded at Streams A amd B. Eight exceedances of ammonia nitrogen were recorded at Streams B, C and the downstream of Fresh Water Inland Marsh. Fourteen exceedances of nitrate nitrogen were recorded at Streams A, B, C and the downstream of Fresh Water Inland Marsh. Sixteen exceedances of total inorganic nitrogen were recorded at Streams A, B, C and the downstream of Fresh Water Inland Marsh. Two exceedances of total phosphorus were recorded at Streams B and C. Moreover, five exceedances of chlorophyll a were recorded at Streams A and C. Most of the exceedances were considered non-project related except the exceedances of nitrate nitrogen and total inorganic nitrogen were recorded at Stream B on 29th October 2007 and 5th November 2007. It is considered potentially project-related since the measured values were found not much higher than with the control monitoring station (the upstream of Stream A).

As the upstream monitoring locations at Streams B & C (F_UB and F_UC) are located within the construction work area since September 2006, they have represented and have become impact monitoring stations instead of control stations in the environmental monitoring.

All notifications of exceedances and the subsequent exceedance incident reports were/would be forwarded to the relevant parties.

No environmental complaint / summon was received in this reporting month.

Implementation Status of Environmental Mitigation Measures

The Contractor was reminded the following issues and to take actions if necessary:

Air Quality

- Increase frequency of watering at main haul roads and rock breaking areas; and
- Cover all soil/sand/aggregates stockpiles with tarpaulin or other measures to reduce the dust emission;

Waste Management

- Properly dispose of the vegetation stockpiles, general refuse and construction waste off-site;
- Properly stockpile and regularly dispose the construction waste;
- Properly maintain the temporary sewage treatment plant; and
- Properly locate the chemical waste storage facility on-site and provide regular dispose to prevent accumulate of chemical waste.

Ecology

- Enhancement of the newly hyroseding areas located within the buffer zone area at downstream of the Stream A;
- Maintain the reinstated conditions (planting shrub) at Stream B2 buffer zone since March 2007 and Stream C buffer zone since May 2007;
- Rectify and remediate the silt deposit at Streams A, B and C after rainstorm events; and
- Carry out coral monitoring during the removal of the temporary barging point.

Water Quality

- Provide sufficient preventing and/or mitigation measures at all open cut areas to avoid silty runoff;
- Provide sufficient treatment facilities before water discharges from construction site; and
- Maintain the integrity of silt curtains and remove settled silt within the silt curtain which have been installed outside the fresh water inland marsh, near Hole 2, near Hole 4, inactive culture zone and Stream A;
- Desilting of silt curtain / silt fence before removal; and
- Provide effective mitigation measures at the temporary barging point during removal of the temporary barging point.

Landscape & Visual

- Protect the retain trees with sufficient watering mainly located at the administration building;
- Provide sufficient water to the retain trees, transplanted trees, hydroseeding areas; and
- Provide incident report for the death of the retain trees.

Future Key Issues

General issues to be considered in the coming month include:

- Turf establishment at East Course;
- Removal and desilting of silt curtain / silt fence;
- Apply the discharge licence for the desalination plant near to the existing KSC pier before operation;
- Dispose of construction wastes, chemical wastes and general refuse off-site;
- Re-hydroseed / re-planting of the permanent slopes according to the golf course design; and
- Removal of site office and temporary barging point.

Key issues at particular areas:

- Carry out water quality monitoring for nutrients/pesticides due to turf establishment;
- Carry out coral monitoring during the removal of the temporary barging point;
- Carry out coral monitoring when desalination plant operates in dry season.

1. Introduction

1.1 Background of the Project

1.1.1 Black & Veatch (hereinafter called the "ET") was appointed by Hong Kong Jockey Club (hereinafter called the "Project Proponent") to undertake 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, 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 of air quality, water quality, terrestrial and marine ecology, landscape and visual, archaeology (watching brief) and land contamination are required for the Project. Application for Variation of an Environmental Permit by the Project Proponent on 2 August 2006 (Application No. VEP-222/2006) and the EP was superseded by EP-224/2005/A.

1.1.2 This report summarises the environmental monitoring and audit works for the Project in November 2007 (from 25th October to 24th November 2007).

1.2 Purpose of the Report

1.2.1 This is the twenty-second EM&A report which summarizes the impact monitoring results and audit findings for the EM&A programme during the reporting period from **25th October** to **24th September 2007.**

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

Section		Description
1	Introduction	Details the scope and structure of the report
2	Project Information	Summarizes background and scope of the project, site description, project organization and contact details, construction programme, the construction works undertaken and the status of environmental permits/licenses during the reporting period.
3	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.
4	Implementation Status on Environmental Mitigation Measures	Summarizes the implementation of environmental protection measures during the reporting period.
5	Monitoring Results	Summarizes the monitoring results obtained in the reporting period.
6	Environmental Site Auditing	Summarizes the audit findings of the weekly site inspections undertaken within the reporting period.
7	Environmental Non-conformance	Summarizes any monitoring exceedance, environmental complaints and environmental summons within the reporting period.
8	Future Key Issues	Summarizes the impact forecast and monitoring schedule for the next two month (25 Nov 2007 – 24 Jan 2007).
9	Recommendations and Conclusions	Lists out any recommendations and 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 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 Project Organization

2.3.1 Project organization and lines of communication are shown in **Figure 1.2**.

2.4 Construction Programme

2.4.1 The tentative construction programme for the Project is presented in **Annex A**. The construction works were commenced on 16 January 2006 and were scheduled to be completed by end of July 2007. According to the present schedule, the Project is to be extended.

2.5 Status of Environmental Submission

2.5.1 A summary of the reporting requirement for compliance with EP conditions of the Project is listed in Table 2.1.

Table 2.1 Summary of Compliance with EP Conditions

EP-224/2005	Environmental Permit Submission	Status	Remarks
2.3	Management organization of the main construction companies and/or any form of joint ventures associated with the construction of the Project.	Submitted	At least one week before the commencement of construction of the Project.
2.4	Contamination Assessment Plan (CAP) submission. If land contamination is confirmed by the site investigation, submission of a Remediation Assessment Plan (RAP) including a Contamination Assessment Report (CAR) is required.	Submitted	The Final Site Remediation Report (FSRR) was approved by EPD in this reporting month.
3.6	Detailed methodology for Coral Transplantation submission to the Director for approval.	Approved	Approved on 16th November 2006. Coral transplantation at Site D2 was completed in early December 2006. No dredging work for the desalination plant's intake and outfall pipelines was carried out. AFCD has no comment for the coral donor site survey, coral mapping survey and coral transplantation reports.
4.1	EM&A Manual (revised)	Submitted	At least two weeks before commencement of construction of the Project.
4.3	Baseline Monitoring Report	Submitted	At least two weeks before commencement of construction of the Project
4.5	Monthly EM&A Report	Submitted	within 10 working days after the end of the reporting month
5.1	Set up a dedicated web site and notify the Director in writing the Internet address.	Completed	Within 6 weeks after the commencement of construction of the Project (http://www.kscgolf.com/ema/index.asp)
3.4	Variation of Environmental Permit for the construction of the temporary crossings at Stream B during wet season.	Completed	Variation of Environmental Permit was approved on 18th August 2006. The revised registered EP was EP-224/2005/A.

2.6 Summary of EM&A Requirements

2.6.1 The EM&A programme requires environmental monitoring for air quality, water quality, terrestrial and marine ecology, landscape and visual, archaeology (watching brief) and land contamination. 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.

2.6.2 A summary of impact EM&A requirements is presented in Table 2.2.

Table 2.2 Summary of Impact EM&A Requirements

Impacts	Parameters/descriptions	Locations	Frequencies	Duration
Air Quality	24-Hour TSP	1 Location	Once every 6 days	During Construction
	1-Hour TSP	1 Location	Three times in every 6 days	During Construction (As required when complaint received)
Water Quality	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity and SS	9 marine and 7 freshwater locations	**First 3 months** 3 times a week, mid-ebb and mid-flood tides. If there is no exceedance occurs for the first 3 months, reduce to once per week.	During Construction
	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity, SS, NO3-N, NO2-N, NH3-N, TP and selected pesticides.	9 marine and 7 freshwater locations	Once per week. If there is no exceedance occurs, monitoring frequency is subjected to change and shall be agreed with EPD.	During Construction: turf establishment period (permanent low flow drainage is not completed)
	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	A 2-year of monitoring period for the operation phase is proposed. Monitoring should be carried out on bi-weekly basis for the first 12 months, after when the frequency will be reviewed by EPD.	During Operation
	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.	During Construction and Operation
Terrestrial Ecology	Monitoring aquatic fauna	Streams B, C & D	Once a month	During Construction
	Environmental Site Inspection mainly on intact of buffer zones	Streams A, B and C	Once a week	During Construction

Impacts	Parameters/descriptions	Locations	Frequencies	Duration
Marine Ecology	Transplanted corals	Site D2	Quarterly for one year after transplantation	During construction
	Natural corals	Site C, Site B2, Site D2, and the Control Site.	**For Site D2 and the Control Site:** Weekly at the first two weeks of dredging works for the desalination plant pipelines. If no exceedance was recorded, the monitoring schedule would be changed to biweekly till the pipeline construction works are finished. **For Site C, B2 and the Control Site:** Monthly for the first three months of the construction phase. If no exceedance was recorded, the monitoring schedule would be changed to quarterly during the rest of the construction phase.	During Construction
		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.	During Operation
	Seagrass bed	Site D3, and at Site D2 if seagrasses were found during the baseline monitoring.	Weekly during the first two weeks of dredging works, and then biweekly till the pipeline construction works are finished.	During Construction
		Site D3, and at Site D2 if seagrasses were found during the baseline monitoring.	During the first two years of the operation phase. The monitoring schedule during the first three months would be monthly. After that, the monitoring schedule would be changed to semi-annually, i.e. once in dry season and once in wet season.	During Operation
Landscape and Visual	Audits to ensure effective implementation of mitigation measures	Project area and at visual sensitive receivers	Auditing inspections and reporting shall be undertaken once every two weeks of the construction phase and once every two months of the operation phase.	During Construction and Operation
Archaeology (Watching Brief)	Monitor archaeological potential sites at major cut areas	Hole 2, Hole 11, Hole 12, Hole 14, Hole 15 and Hole 16.	The archaeologist should keep the AMO informed of the progress of watching brief. The archaeologist should submit progress reports every 3 months during the programme of the watching brief.	During Construction
Land Contamination	Total Sulphur and Total Lead	Locations 2, 3, 6, 7 & 8	One month before commencement of work at the identified 5 hotspots	During Construction
General Site Conditions	Environmental Site Inspection	Works areas and areas affected by works	Periodically (weekly basis)	During Construction

3. Environmental Monitoring Requirements

3.1 Air Quality

Monitoring Requirement

3.1.1 24-hour TSP monitoring was carried out at GCA B1 to monitor the construction dust impact level in this reporting period.

3.1.2 The established Action/Limit Levels (AL levels) for the 1-hour and 24-hour TSP monitoring works are summarized in Table 3.1 and Table 3.2.

Table 3.1 Action and Limit Levels for 1-hour TSP

Location	Description	Action Level	Limit Level
GCA B1	**Bungalow A** adjacent to Kau Sai Chau Public Golf Course Administration Building	277.2 μg m^{-3}	500 μg m^{-3}

Note: The action levels for GCA B1 are developed based on baseline monitoring result.

Table 3.2 Action and Limit Levels for 24-hour TSP

Location		Action Level	Limit Level
GCA B1	**Bungalow A** adjacent to Kau Sai Chau Public Golf Course Administration Building	187.4 μg m^{-3}	260 μg m^{-3}

Note: The action levels for GCA B1 are developed based on baseline monitoring result.

Monitoring Parameters, Frequency and Programme

3.1.3 The monitoring parameters and frequency are summarized in Table 3.3. The monitoring programme for the reporting period is shown in **Annex B**.

Table 3.3 TSP Monitoring Parameter and Frequency

Parameter	Frequency
24-hour TSP	Once every 6 days
1-hour TSP	3 times every 6 days (as required in case of complaints)

Monitoring Locations

3.1.4 In accordance with the EM&A Manual, one monitoring station (GCA B1) was selected and shown in **Figure 3.1**.

Monitoring Equipment

3.1.5 24-hour and 1-hour TSP (in case of complaints received) were performed using High Volume Samplers (HVS) and measured in-situ respectively. 24-hour TSP level of samples were collected using filters and High Volume Sampler and the collected samples were determined by a local HOKLAS accredited laboratory upon receipt of the samples and 1-hour TSP level will be performed in-situ.

3.1.6 High volume samplers (HVS - Model GS-2310 Accu-vol) complete with the appropriate sampling inlets were installed for 24-hour TSP sampling. The HVS is composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50 Appendix B). A portable dust meter was used for the 1-hour TSP monitoring. Table 3.4 summarises the equipment used.

Table 3.4 Air Quality Monitoring Equipment

Equipment	Model
HVS Sampler	GS 2310 Accu-vol system
Calibrator	GMW 25
1-hour TSP Dust Meter	Laser Dust Monitor – Model LD-1 (L)

Monitoring Methodology and Calibration Details

24-hour TSP Monitoring

(i) Field Monitoring, Operation & Analytical Procedures

3.1.7 Operating/analytical procedures for the operation of HVS are as follows. The sampler was placed on a horizontal platform with appropriate supporting structure such that:

- the filter was at least 1.3 meters above ground;
- no two samplers were placed less than 2 metres apart;
- the distance between the sampler and an obstacle, such as buildings, were at least twice the height that the obstacle protrudes above the sampler;
- a minimum of 2 metres separation from walls, parapets and penthouses were required for the rooftop samplers;
- a minimum of 2 metres separation from any supporting structure, measured horizontally was provided;
- airflow around the sampler was unrestricted;
- no furnaces or incineration flues were operating near the sampler;
- the sampler was more than 20 metres from the dripline; and
- any wire fence and gate to protect the sampler, did not cause any obstruction during monitoring.

3.1.8 Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 1.1 m3/min. and 1.4 m3/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.

3.1.9 For TSP sampling, fibreglass filters (G810) were used [Note: these filters have a collection efficiency of > 99% for particles of 0.3 mm diameter].

3.1.10 The power supply was checked to ensure the sampler worked properly.

3.1.11 On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air monitoring station.

3.1.12 The filter holding frame was then removed by loosening the four nuts and carefully a weighted and conditioned filter was centered with the stamped number upwards, on a supporting screen.

3.1.13 The filter was aligned on the screen so that the gasket formed an air-tight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.

3.1.14 The shelter lid was closed and secured with the aluminum strip.

3.1.15 The timer was then programmed. Information was recorded on the record sheeting, which included the starting time, the weather condition, and the filter number (the initial weight of the filter paper can be found out by using the filter number).

3.1.16 After sampling, the filter was transferred from the filter holder of the HVS to a sealable plastic bag and sent to the laboratory for weighing. The elapsed time was also recorded.

3.1.17 Before weighing, all filters were conditioned for 24 hours before weighing under temperature of 25°C ±3°C and the relative humidity (RH) < 50% ±5%, preferably 40%. The HOKLAS laboratory (ALS Technichem (HK) Pty Ltd) has comprehensive quality assurance and quality control programmes.

(ii) Maintenance

3.1.18 Proper maintenance would be provided for the HVS as described below:

3.1.19 The HVS motors and their accessories have been properly maintained. Appropriate maintenance such as routine motor brushes replacement (time interval for replacement is about 500 hours) and electrical wiring checking have been conducted to ensure that the equipment and necessary power supply were in good working condition.

3.1.20 Initial calibration of HVS was conducted upon installation of equipment. The subsequent calibration would be provided at 2-month intervals using GMW-25 Calibration Kit.

1-hour TSP Monitoring

(i) Measuring Procedures

3.1.21 The measuring procedures of the 1-hour dust meter have been in accordance with the Manufacturer's Instruction Manual as follows:

- Set POWER to "ON", push BATTERY button, make sure that the meter's indicator is in the range with a red line and allow the instrument to stand for about 3 minutes (Then, the air sampling inlet has been capped).
- Push the knob at MEASURE position.
- Push "O-ADJ" button. (Then meter's indication is 0).
- Push the knob at SENSI ADJ position and set the meter's indication to S value described on the Test Report using the trimmer for SENSI ADJ.
- Pull out the knob and return it to MEASURE position.
- Push "START" button.
- All measurement procedures in section 2.3 of the approved EM&A Manual are followed during the reporting period.

(ii) Maintenance

3.1.22 The 1-hour TSP meter would be checked at 3 month intervals and calibrated at 1-year intervals throughout all stages of the air quality baseline monitoring.

Event and Action Plans

3.1.23 The Event and Action Plan (EAP) for air quality monitoring is presented in **Annex C**.

3.2 Water Quality

Monitoring Requirement

3.2.1 Water quality monitoring was conducted in accordance with the EM&A Manual. Tables 3.5 & 3.6 show the established Action/Limit Levels for the water environmental monitoring parameters.

Table 3.5 Derived Summaries of Action and Limit Levels for Marine Water Quality

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

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_2-N) at non-FCZ stations, the trigger level has made reference to the existing golf course guideline values. The guideline value of NO_2-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_2-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

Table 3.6 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_3-N, NO_2-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

Monitoring Parameters, Frequency and Programme

3.2.2 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.

3.2.3 For the stream course, measurements shall be taken at mid-water depth.

3.2.4 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 and salinity

3.2.5 Additional marine and freshwater water quality monitoring parameters for the impact monitoring during construction include nitrate nitrogen (NO_3-N), nitrite nitrogen (NO_2-N), ammonia nitrogen (NH_3-N), total phosphate (TP) and selected pesticides.

3.2.6 The ET Leader shall propose the additional monitoring parameters for approval by IC(E), Engineer, EPD and AFCD, and shall submit such information for approval at least 2 weeks before the turf establishment period.

3.2.7 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 3.2.5-3.2.6.

Monitoring Frequency

3.2.8 The monitoring parameters and frequency are summarized in Table 3.7. The monitoring programme for the reporting period is shown in **Annex B**.

Table 3.7 Water Quality Monitoring Parameter, Frequency and Locations

Parameters	Frequency	Location
Dissolved Oxygen (mg/L)	**3 days per week** Marine water : 2 times per day – 1 for mid-flood and 1 for mid-ebb Freshwater : once per day	**Marine Water** Fish culture zone stations: TTC, KLW, KS Control stations: M_A, M_B Impact stations: M_BP, M_RO1, M_Marsh, M_Coral **Freshwater Water** Stream A (F_UA, F_DA) Stream B (F_UB, F_DB) Stream C (F_UC, F_DC) Inland Marsh (F_lnland_M)
Temperature (ºC)		
Turbidity (NTU)		
pH		
Salinity (ppt)		
Suspended Solids (mg/L)		

Monitoring Locations

3.2.9 The water quality monitoring locations for marine and freshwater (**Figure 3.2**) are summarized in Table 3.8.

Table 3.8 Water Quality Monitoring Locations during Construction Phase

Identification Number	Location	Co-ordinates		Approx. Water Depth	No. of Depth
Marine Water (9 stations)		**latitude**	**longitude**		
TTC	Tai Tau Chau Fish Culture Zone	22° 22' 03.7"	114° 19' 19.6"	9.5 m	3
KLW	Kai Lung Wan Fish Culture Zone	22° 22' 10.6"	114° 18' 01.4"	13 m	3
KS	Kau Sai Fish Culture Zone	22° 20' 26.5"	114° 18' 59.9"	11 m	3
M_BP	Temporary barging point	22° 21' 50.6"	114° 19' 16.7"	9.6 m	3
M_RO1	Desalination plant south of the existing pier	22° 21' 51.8"	114° 18' 17.7"	5 m	2
M _ Marsh	Discharge point at the existing marsh	22° 22' 19.8"	114° 19' 05.4"	7.7 m	3
M _ Coral	Marine water of Port Shelter	22° 21' 21.3"	114° 19' 42.7"	10.2m	3
M _ A	Water Control Station of Port Shelter	22° 22' 51.3"	114° 18' 34.5"	7.5 m	3
M _ B	Water Control Station of Port Shelter	22° 20' 26.4"	114° 20' 11.8"	16.5 m	3
Fresh Water (7 stations)					
F_UA	Upstream and downstream of stream A	22° 21' 32.3"	114° 19' 06.5"	-	1
F_DA		22° 21' 33.5"	114° 19' 06.8"		1
F_UB	Upstream and downstream of stream B	22° 21' 23.9"	114° 19' 16.1"	-	1
F_DB		22° 21' 27.2"	114° 19' 16.0"		1
F_UC	Upstream and downstream of stream C	22° 21' 14.8"	114° 19' 26.4"	-	1
F_DC		22° 21' 03.5"	114° 19' 32.0"		1
F _ Inland M	Downstream of the existing marsh (Inland)	22° 22' 17.9"	114° 18' 59.1"	-	1

Monitoring Equipment

3.2.10 The equipment listed below shall be supplied by the ET and approved by the IC(E) and the Engineer for water quality monitoring.

Dissolved Oxygen and Temperature Measuring Equipment

3.2.11 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^{-1} and 0 - 200% saturation; and
- a temperature of 0 - 45 degrees Celsius.

3.2.12 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).

3.2.13 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

3.2.14 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

3.2.15 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

3.2.16 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

3.2.17 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

3.2.18 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

3.2.19 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

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

Sample Containers and Storage

3.2.21 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

3.2.22 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

3.2.23 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.

3.2.24 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.

3.2.25 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

3.2.26 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

3.2.27 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

Determinant	Standard Method	Reporting Limit
Suspended Solids	APHA 2540 D	2 mg/L
Nitrate Nitrogen	APHA 4500-NO_3^-	0.01 mg/L
Nitrite Nitrogen	APHA 4500-NO_2^-	0.01 mg/L
Ammonia Nitrogen	APHA 4500-NH_3(D)	0.01 mg/L
Total phosphorus	ASTM D515-88B	0.02 mg/L*
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

3.2.28 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

3.2.29 The Event and Action Plan (EAP) for water quality monitoring is presented in **Annex C**.

3.3 Ecology

Introduction

3.3.1 The marine and terrestrial ecological monitoring surveys for the ecological EM&A were conducted in accordance with the EM&A manual.

3.3.2 As stipulated in the EM&A Manual, the ecological monitoring surveys for terrestrial ecology would be conducted monthly during the construction phase. Monitoring survey would consist of aquatic fauna survey. While the majority of the Project Area would be subject to site formation, natural streams would be partially or fully preserved and protected by buffer zones, and therefore would constitute the primary target of the terrestrial ecological monitoring. Special attention should thus be paid to ecologically sensitive streams to ensure minimum damage to existing vegetation and streams. The purpose of the monitoring survey was to check the conditions of the stream habitat and the associated aquatic fauna communities.

3.3.3 While the ecological monitoring surveys for marine ecology included coral monitoring at both the eastern and western coasts of Kau Sai Chau Island. The coral monitoring at the western coast would be conducted concurrently with the dredging works which have yet to conduct, and therefore had not been commenced. The coral monitoring at the eastern Kau Sau Chau would be monthly for the first three months of the construction phase, and if no exceedance was recorded, the monitoring schedule would be changed to quarterly during the rest of the construction phase. As a coral damage incident was recorded in March 2006, the monthly monitoring was extended for another three months from April 2006 to June 2006. No exceedance was recorded during these three months, the monitoring schedule were changed to quarterly after that till the end of the construction phase. Monitoring survey would consist of checking tagged corals at both impact sites and control site. The purpose of the monitoring survey was to check the conditions of the tagged corals and the impact sites. Although the dredging works for the desalination plant have yet to conduct, 89 natural corals near the plant were transplanted in November 2006. The transplanted corals would be monitored quarterly for a year.

Ecological Mitigation Measures and Implementations

3.3.4 Ecological mitigation measures to be implemented during the construction phase include the following:

- Establishment of buffer zones for the natural stream courses during both construction phase.
- Provision of temporary bypass channels or pipes during construction phase for stream courses subject to pipe culverting.
- Protection of water quality of the natural stream courses and temporary bypass channels or pipes.

- Transplantation of coral colonies within the dredging area for the desalination plant prior to the dredging works.
- Avoidance of corals when the anchoring points are deployed, and to shift the floating temporary barging point to the location with least corals within the mapping area.
- Regular site audit of ecological mitigation measures and good site practice.

Monitoring Frequency and Schedule

Terrestrial Ecology

3.3.5 As reported in the EIA Report, there were four perennial natural streams (Streams A-D) within the Assessment Area for the EIA Study. Streams A, B & C were located within the Project Area, while Stream D was outside the Project Areas and acted as the main stream draining the western part of the Assessment Area. Buffer Zone would be established for the three streams within the Project Area along their partial length (Stream A) or full length (Streams B & C) (**Figure 3.3**). Moreover, Streams B, C & D would be monitored for aquatic fauna monthly during the construction phase. Monitoring on the implementation of the mitigation measures for stream protection, the effectiveness of stream buffer zones, and the aquatic fauna in streams would be conducted during the entire construction phase.

3.3.6 The objectives of the monitoring survey are to check the status of *Caridina trifasciata* and *Nanhaipotamon hongkongensis*. The surveys covered natural stream courses within the assessment area (Streams A to D), and aquatic fauna were studied by various sampling methods depending upon site conditions. Methods included direct observation, active searching, and sample collection using hand-nets. Hand nets were used to collect swimming organisms such as shrimps and fish. Where necessary boulders on the stream beds were overturned to locate aquatic organisms such as crabs. Aquatic species encountered was recorded, with special attention to rare or protected species.

Marine Ecology

3.3.7 As required in the EM&A Manual, prior to the commencement of all construction works, a baseline survey of natural corals were conducted in December 2005. At each of the Site C, Site B2, Site D2 and a Control Site near the AFCD's Coral Buoy at Sharp Island (**Figure 3.4**), 20 natural coral colonies in good conditions (i.e. generally intact and no sign of bleaching) and significant sizes (preferably over 20 cm in diameter) were selected and tagged. Each of the tagged coral colonies was identified to species level and their conditions, in terms of percentages of survival, sedimentation and bleaching, were recorded. Each coral was attached with a plastic label with assigned number and then photographed. The species and the size of each tagged corals were also recorded. The species of corals to have been tagged included the following 15 species: *Cyphastrea serailia, 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.* All tagged corals were in good conditions during the baseline survey, without significant sign of bleaching or being covered by sediments, and therefore were all recommended as the monitored coral colonies (all 80 tagged corals, 20 from each site). The seagrass beds in Site D3 were also surveyed for their extent, coverage percentage and health conditions during the baseline survey. The results of the baseline survey were presented in the Baseline Report. The original 20 tagged corals at Site B2 were re-organised in April 2006, with B-11 to B-20 retained, but 40 new tagged corals (B-21 to B-60) were established. The number of tagged corals at Site B2 was therefore increased from 20 nos. to 50 nos. The baseline conditions of these newly tagged corals (40 nos.) were presented in the monitoring Report for April 2006.

3.3.8 As the dredging works for the desalination plant had not been commenced, the impact sites to be monitored in this monitoring survey were Site B2 and Site C (impact sites on the eastern Kau Sai Chau Island for the new golf course) only, while Site D2 and Site D3 (impact sites on the western Kau Sai Chau Island for desalination plant) were not required in this survey. The coral transplantation, which should be conducted prior to the commencement of dredging works, however were conducted in November 2006. The monitoring on transplanted corals on the bedrock at Site D2 (see **Figure 3.5**) was performed. 89 natural corals were transplanted and each was assigned with a number. These corals would be monitored quarterly for a year after transplantation, and the first monitoring was performed in December 2006. The baseline conditions of the transplanted corals had been recorded during the transplantation and were checked during the monitoring. With the first monitoring in December 2006, the second monitoring in March 2007, and the third monitoring in July 2007, the fourth monitoring (also the final one) was completed in September 2007.

3.3.9 The schedule for the impact sites on the eastern Kau Sai Chau Island during construction would be monthly in the first three months of the construction programme, and if no exceedance was recorded then quarterly till the end of the construction. As coral damage incident was reported in Month Three of the construction programme, AFCD requested the monthly monitoring should be extended to cover another three months (April, May and June 2006). No exceedence was recorded during the extended three-month period and the schedule were change to quarterly. The present survey was the eleventh monitoring survey (the fifth quarterly survey on the eastern Kau Sai Chau Island). The survival and health conditions of the coral colonies were recorded.

3.3.10 During the weekly site inspection, ET also monitored and audited the implementation of the recommended mitigation measures for terrestrial and marine ecology. Monitoring locations for ecology are shown in **Figures 3.3 – 3.5**. The monitoring programme for the reporting period is shown in **Annex B**.

Event and Action Plans

3.3.11 The Event and Action Plan (EAP) for ecology monitoring is presented in **Annex C**.

3.4 Landscape and Visual

3.4.1 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, the ET conducted regular site inspections of the construction work sites.

3.4.2 Auditing inspections and reporting are undertaken once every two weeks of the construction phase. The effectiveness of the mitigation works has been audited in order to ensure impact reduction levels are achieved as described in the EIA report for this monitoring month. The monitoring programme for the reporting period is shown in **Annex B.**

3.5 Archaeology (Watching Brief)

Introduction

3.5.1 The archeological impact assessment conducted in the EIA concluded that some potential for archaeological material remains at the Wan Chai Archaeological Site and a watching brief is recommended during the construction phase.

3.5.2 A watching brief is a process whereby a qualified and licensed archaeologist monitors the excavation works during the construction phase in areas identified (and agreed with the Antiquities and Monuments Office (AMO)) to be of archaeological potential.

3.5.3 The archaeologist conducting the watching brief should obtain a licence prior to commencement of works as stipulated in Section 12 of the Antiquities and Monuments Ordinance (Cap. 53). The licence was granted on 22nd December 2005.

Monitoring Location

3.5.4 The monitoring locations include Hole 2, Hole 11, Hole 12, Hole 14, Hole 15 & Hole 16. The monitoring locations are present in **Figure 3.6**.

Monitoring Frequency

3.5.5 A total of 18 days of monitoring is considered as minimum, and additional arrangement for watching brief should be made in consultation with AMO in case significant archaeological findings are unearthed in the course of excavation work.

Progress Report

3.5.6 Archaeologist should submit progress reports every 3 months during the programme of the watching brief.

3.5.7 A summary table for categories of archaeological find and recommended action is presented in **Annex C**.

3.6 Land Contamination

Potential Areas Recommended for Further Investigation

3.6.1 Contamination Assessment Plan (CAP) shall be submitted to EPD for approval before site investigation. If land contamination is confirmed by the site investigation, submission of a Remediation Assessment Plan (RAP) including a Contamination Assessment Report (CAR) is required. Potential 5 land contamination hotspots are presented in **Figure 3.7**.

4. Implementation Status on Environmental Protection Requirements

4.1.1 Major construction work of the third golf course were (i) sand capping at Holes 2 and 9, (ii) turfing at Holes 2, 9 & 17 (iii) permanent drainage / irrigation system / sub-soil drainage installation at central part (Holes 2 and 17) of East Course, (iv) permanent closed low flow drainage system installation, (v) hydroseeding at the permanent slope/bare grounds and (vi) furnishing work at permanent bridges.

4.1.2 The Contractor was reminded to provide sufficient dust suppression measures for loading/unloading activities and haul road (truck traffic).

4.1.3 No revised submission was received from the Contractor regarding the temporary drainage during the 2 years construction phase, in particular wet seasons. Improvement on the implementation of temporary drains on site was not observed. As it is in the dry season, the silt runoff from the construction site is expected to be minimal.

4.1.4 The Contractor was reminded to dispose the construction waste regularly and properly off-site.

4.1.5 Hydroseeding at scar areas within the East Course was completed before March 2007. However, some areas were required re-hydroseeding (due to soil erosion after rain and died out) and will be planted with native shrub. The Contractor proposed to carry out re-planting work in early spring 2008 before the next wet season come.

4.1.6 Construction wastes were improperly stockpiles at the edge of the temporary barging point. The Contractor was reminded to provide proper container to prevent the waste accidentally dropping into the marine water. The Contractor was reminded to dispose more off-site regularly and to submit the chit tickets for our record. However, the exemption waste account was expired in late October 2007, the Contractor was reminded to submit the renewal information for our record.

4.1.7 Disposal of temporary stored wastewater from the CHEC's temporary sewage treatment plant was carried out on 17th November 2007 by licenced Contractor. However, no water quality report was submitted by CHEC regarding the performance of the sewage treatment plant. Therefore, no discharge of sewage effluent from the sewage treatment plant to fresh water inland marsh is allowed. The Contractor was continuously reminded to submit the disposal record by the licenced Contractor for record.

4.1.8 The tentative removal programme for the Contractor's site office will be carry out in early December 2007, the Contractor was reminded not to carry out any construction work at night time unless the Construction Noise Permit (CNP) is renew.

4.1.9 Insufficient mobile toilets were available on site at remote areas, only few units were located at the central portion of construction site and temporary barging point and were in dirty condition. The Contractor was reminded to keep the mobile toilets in clean condition.

4.1.10 No dredging work has been carried out near to the existing pier for the desalination plant pipelines. Summary of implementation status is provided in **Annex D**.

5. Monitoring Results

5.1 Air Quality

5.1.1 Dust monitoring was conducted as scheduled in the reporting month. Monitoring of air quality was conducted on 5 occasions in 25th October to 24th November 2007. All monitoring data are provided in **Annex E**. Monitoring of 24-hour TSP was conducted at GCA B1 on 29th October, 3rd, 9th, 15th, 21st November 2007. The QA/QC results for laboratory testing in the reporting month were acceptable. The QA/QC results are summarised in **Annex F**.

5.1.2 No exceedance of 24-hour TSP was recorded at GCA B1 during this reporting month.

5.2 Water Quality

5.2.1 Marine and freshwater water quality monitoring were conducted at the 9 and 7 designated monitoring stations respectively. All monitoring data are provided in **Annex E**.

5.2.2 Monitoring of marine and freshwater locations was conducted on 4 occasions in October to September 2007 (29th October, 5th, 12th and 19th November 2007). The QA/QC results for laboratory testing in the reporting month were acceptable. The QA/QC results are summarised in **Annex F**. No rainstorm signal was hoisted during this reporting month.

5.2.3 Turf establishment progress is shown as follows:

- Hole 8 – February 2007 (Tee, fairway and green);
- Hole 5 – March 2007 (Tee, fairway and green);
- Hole 4 – April 2007 Tee, fairway and green);
- Hole 6 – May 2007 (Tee, fairway and green);
- Hole 7 – June 2007 (Tee, fairway and green);
- Hole 3 – June 2007 (Tee, fairway and green);
- Hole 11 – June 2007 (Tee, fairway, except green);
- Hole 18 – July 2007 (Tee, fairway, except green);
- Hole 15 – July 2007 (Tee, fairway and green)
- Hole 11 – July 2007 (Green)
- Hole 13 – August 2007 (Tee, fairway, except green)
- Hole 14 – August 2007 (Tee, fairway, except green)
- Hole 16 – August 2007 (Tee, fairway, except green)
- Hole 12 – September 2007 (Tee, fairway and green)
- Hole 10 – September 2007 (Tee, fairway and green)
- Hole 1 – October 2007 (Green)
- Hole 9 – October 2007 (Green)
- Hole 18 – October 2007 (Green)
- Hole 2 – November 2007 (Green, except fairway and tee)
- Hole 9 – November 2007 (fairway and tee)
- Hole 17 – November 2007 (green and tee except fairway)

(Planting at Holes 2, 9 and 17 is in progress)

5.2.4 Water quality parameters include NH_3-N, NO_3-N, NO_2-N, TIN, TP and Chlorophyll a completely had covered all fresh water since from this reporting month.

5.2.5 Chemical applications were applied at the Holes 3 to 8 & 11 to 16 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

- KLW: (i) one action level exceedance of turbidity and (ii) one action level exceedance of suspended solids;
- M_Marsh: (i) one limit level exceedance of ammonia nitrogen;
- TTC: (i) one action and one limit level exceedances of ammonia nitrogen, (ii) one limit level exceedance of total inorganic nitrogen and (iii) one action and one limit level exceedances of chlorophyll a;
- M_BP: (i) one limit level exceedance of ammonia nitrogen;
- M_Coral: (i) one limit level exceedance of ammonia nitrogen; and
- KS: (i) one action level exceedance of suspended solids, (ii) two limit level exceedances of ammonia nitrogen, (iii) one action level exceedance of total inorganic nitrogen and (iv) two limit level exceedances of chlorophyll a.

5.2.6 The marine water exceedances were summarised in **Table 5.2-1.**

Table 5.2-1 Marine water Exceedance Summary October to November 2007

Monitoring Station	Exceedance Level	Date	Parameters	Project-related
KLW	Action Level	29th Oct 07	SS	No
	Action Level	19th Nov 07	Turbidity	No
M_Marsh	Limit Level	12th Nov 07	NH_3-N	No
TTC	Action Level	29th Oct 07	NH_3-N, Chl a	No
	Limit Level	5th Nov 07	Chl a	No
	Limit Level	12th Nov 07	NH_3-N, TIN	No
M_BP	Limit Level	12th Nov 07	NH_3-N	No
M_Coral	Limit Level	12th Nov 07	NH_3-N	No
KS	Action Level	29th Oct 07	SS	No
	Limit Level	29th Oct 07	Chl a	No
	Limit Level	5th Nov 07	NH_3-N, Chl a	No
	Action Level	12th Nov 07	TIN	No
	Limit Level	12th Nov 07	NH_3-N	No

Remarks: Exceedances were mainly due to natural variation / rainstorm events of the marine water.

5.2.7 During non-rainy days, the range of the suspended solids, turbidity, ammonia nitrogen, chlorophyll a and total inorganic nitrogen measured at the Control Station (M_A) was in the same order of magnitude at various marine monitoring stations including M_Marsh, TTC, M_BP and KS. There is no significant difference of the measured concentrations between control station and impact stations and the exceedances were considered not project-related.

Freshwater

- Stream A: (i) two action level exceedances of suspended solids, (ii) two limit level exceedances of nitrate nitrogen, (iii) two limit level exceedances of total inorganic nitrogen and (iv) two limit level exceedances of chlorophyll a;
- Stream B: (i) two action level exceedances of suspended solids, (ii) two limit level exceedances of ammonia nitrogen, (iii) seven limit level exceedances of nitrate nitrogen, (iv) seven limit level exceedances of total inorganic nitrogen and (v) one limit level exceedance of total phosphorus;
- Stream C: (i) three limit level exceedances of ammonia nitrogen, (ii) one action and one limit level exceedances of nitrate nitrogen, (iii) one action and three limit level exceedances of total inorganic nitrogen, (iv) one limit level exceedance of total phosphorus and (v) one action and two limit level exceedances of chlorophyll a; and

- Fresh Water Inland Marsh: (i) three limit level exceedances of ammonia nitrogen, (ii) three limit level exceedances of nitrate nitrogen and (iii) three limit level exceedances of total inorganic nitrogen.

5.2.8 The freshwater water exceedances were summarised in **Table 5.2-2.**

Table 5.2-2 Freshwater Exceedance Summary October to November 2007

Monitoring Station	Exceedance Level	Date	Parameters	Project-related
F_DA	Action Level	29th Oct 07	SS	No
	Limit Level	29th Oct 07	NO_3-N, TIN, Chl a	No
	Action Level	5th Nov 07	SS	No
	Limit Level	5th Nov 07	NO_3-N, TIN	No
	Limit Level	12th Nov 07	Chl a	No
F_UB	Action Level	29th Oct 07	SS	No
	Limit Level	29th Oct 07	NO_3-N, TIN	Yes
	Limit Level	5th Nov 07	NO_3-N, TIN	Yes
	Limit Level	12th Nov 07	NH_3-N, NO_3-N, TIN	No
	Limit Level	19th Nov 07	NO_3-N, TIN	No
F_DB	Action Level	29th Oct 07	SS	No
	Limit Level	29th Oct 07	NO_3-N, TIN	Yes
	Limit Level	5th Nov 07	NO_3-N, TIN	Yes
	Limit Level	12th Nov 07	NH_3-N, TP	No
	Limit Level	19th Nov 07	NO_3-N, TIN	No
F_UC	Limit Level	29th Oct 07	Chl a	No
	Limit Level	5th Nov 07	Chl a	No
	Limit Level	12th Nov 07	NH_3-N, TIN, TP	No
F_DC	Action Level	29th Oct 07	NO_3-N, TIN	No
	Limit Level	5th Nov 07	NH_3-N, NO_3-N, TIN	No
	Limit Level	12th Nov 07	NH_3-N, TIN	No
	Action Level	19th Nov 07	Chl a	No
F_Inland M	Limit Level	29th Oct 07	NH_3-N, NO_3-N, TIN	No
	Limit Level	5th Nov 07	NH_3-N, NO_3-N, TIN	No
	Limit Level	12th Nov 07	NH_3-N, NO_3-N, TIN	No

Remarks:
Exceedances of turbidity and suspended soild recorded at the Streams A, B, C and the Fresh Water Inland Marsh were mainly due to insufficient temporary drainage provided on site, in particular during and after rain.

5.2.9 The monitoring of pesticides were summarised in **Table 5.2-3.**

Table 5.2-3 Pesticides Monitoring Results October 2007

Date	Monitoring Station	Parameters	Monitoring Result
6th Oct 07	F_Inland_Marsh, F_DB, F_DC, M_Marsh, M_BP, M_Coral, TTC, KS	Chlorpyrifos	Undetectable
10th Oct 07	M_BP, TTC	Chlorpyrifos	Undetectable
13th Oct 07	M_BP, TTC, F_DB	Chlorpyrifos	Undetectable
16th Oct 07	M_BP, TTC, F_DB	Chlorpyrifos	Undetectable
18th Oct 07	M_BP, TTC, F_DB	Chlorpyrifos	Undetectable
27th Oct 07	M_BP, TTC, F_DA	Chlorpyrifos	Undetectable
5th Oct 07	F_Inland_Marsh, M_Marsh, TTC	Chlorothalonil	Undetectable
6th Oct 07	F_Inland_Marsh, F_DB, F_DC, M_Marsh, M_BP, M_Coral, TTC, KS	Chlorothalonil	Undetectable
10th Oct 07	M_BP, TTC	Chlorothalonil	Undetectable

Date	Monitoring Station	Parameters	Monitoring Result
18th Oct 07	M_BP, TTC, F_DA	Glyphosate	Undetectable
27th Oct 07	M_Marsh , M_BP, TTC, F_Inland_Marsh	Fipronil	Undetectable

5.2.10 The exceedances at Stream B were potentially caused by the nutrients runoff from Hole 10. Further investigation will be carried out in the next reporting month.

5.2.11 For the upstream monitoring location (F_UB), it is located downstream to the construction area near Hole 10 and the monitoring location cannot be relocated further upstream (temporary bridges located at Streams B1 and B2) as no water was observed and available for sampling. For the upstream monitoring location (F_UC), it is located downstream to the construction area near Hole 16 and the monitoring location cannot be relocated further upstream as no water was observed and available for sampling. Therefore, the F_UC is considered the most upstream location of Stream C. Same as Stream B, it is considered that F_UC is also the impact monitoring location and F_UA was used as the representative control monitoring station.

5.3 Ecology

5.3.1 Terrestrial and marine ecology monitoring photos are provided in **Annex E**.

Terrestrial Ecology

5.3.2 The Monitoring Survey for the reporting month was conducted on 13th and 30th November 2007. The project site was fully under construction works.

5.3.3 Although the surveyed streams have not been previously affected by developments or pollution sources, they are relatively small. During the EIA study, water depth was found less than 0.3m in most of the stream reaches even during wet season. Within dry season, these streams would have very small surface flow or even no surface flow for most of the length.

5.3.4 Stream A is located within the Project Area. Its main stream section (downstream to the confluence of two tributaries) would be protected by stream buffer zone (**Figure 3.3**). Stream A had been heavily silted with sediments from eroded hillsides all year round, particularly at the main stream section. The stream had low flow.

5.3.5 The permanent bridge across Stream A was finished and the temporary access bridge had been removed. Remedial works had been conducted in the main stream course of Stream A (the section downstream to the confluence of tributaries A1 and A2). The remedial works were to remove the rubbles which were washed down from the upper Tributary A2 during pipe culvert construction in June 2006. Although the riparian vegetation were not affected by the rubbles, and Stream A was of the lowest ecological value among the four natural streams (it was heavily silted with sediments from eroded hillsides all year round and only very limited aquatic fauna were recorded before), this section of stream channel was temporarily lost. Remedial works had thus been requested by the ET for clearing the rubbles, restoring the channel and improving the water quality, as the conditions of this stream is expected to improve after the construction of the golf course extension (in which the eroded hill slopes would be replaced by turf). A large portion of the fallen rubbles had been removed. It was found in previous monitoring that hydroseeding had been applied to the areas previously occupied by the temporary access bridge piers as restoration works. In the present monitoring survey, it was found that most of the hydroseed applied to the area was lost (see **Photo Plate 5.3-1**). Hydroseeding might need to apply to the area again.

5.3.6 Stream B is located within the Project Area. It had clear flow (with little sediment in the stream beds) of moderate volume during the wet season. This stream also has two main tributaries, B1

and B2. The full length of Stream B (two tributaries and the main stream) would all be protected by buffer zone (**Figure 3.3** and **Figure 5.3-1**). Stream B also contains a long estuarine section of muddy sandy substrate.

5.3.7 An area of the buffer zone of Tributary B2 was previously accidentally cleared. As the function of the buffer zone for the stream protection might be affected, replanting with native shrub species was implemented as remedial action.

5.3.8 Sedimentation had been reported on the stream bed in previous monitoring, and had been attributed to the heavy rainfall and the recently constructed pipeline in the vicinity, as no additional encroachment was found in the buffer zone and the vegetation inside. The abundance of aquatic fauna, in particular Atyid shrimps, had also been found very low. But in recent monitoring survey, there was a certain degree of recovery in Stream B as the majority of the previously sighted sediments were absent, and the flow was clear and some species such as Freshwater shrimp *Macrobrachium* sp. and Atyid shrimps resumed. In the present survey, the flow in Stream B was still clear and no sign of sedimentation was found. But the flow was low, probably due to the dry season (see **Figure 5.3.1**). Moreover, Atyid shrimps were recorded in Stream B.

5.3.9 Stream C is located within the Project Area. This stream also has two main tributaries. It has had low but clear flow. In contrast to Stream B, Stream C drains to a sandy beach at Kau Chung Wan, and therefore lacks a clear estuarine zone. The full length of Stream C (two tributaries and the main stream) was protected by buffer zone (**Figure 3.3**). However the vegetation of a small area of the buffer zone was accidentally damaged. Remedial works such as replanting should be implemented for this area. The permanent bridge across Stream C had been in place, with the piers outside the buffer zone demarcation. The temporary bridge had been removed.

5.3.10 Sedimentation in Stream C had been found during previous monitoring on the majority of the main stream course of Stream C, and no aquatic fauna had been recorded. Some improvements were reported in previous monitoring surveys. In the present monitoring it was found that the conditions of Stream C had further improved as the majority of the previously sighted sediments were absent, and the flow was clear (see **Figure 5.3.1**). There was no sediment on the surfaces of aquatic plants. Two species of Atyid shrimps, i.e. Caridina fasciata and Cardina cantonensis, which have been absent for several months in the monitoring for this stream, were recorded in Stream C again in this monitoring.

5.3.11 Stream D is located outside the Project Area but within the Assessment Area and is the main stream draining the west side of the Assessment Area. It had clear water and moderate flow levels. Stream D is the only stream with deeper water depth among the four streams (water depth over 0.3 m in some of the stream reaches). As Stream D is outside the construction area, buffer zone would not be needed for this stream. In the present survey, the flow was found clear in Stream D, and Atyid shrimp *Caridina trifasciata* was still recorded.

5.3.12 Photos of Streams A to C were shown in **Photo Plate 5.3-1 (Annex E)**. The habitats and vegetation beyond the works fronts, within the majority of the stream buffer zone (except an area in Stream C which was accidentally cleared before) and outside the project area, generally remained intact. No earthwork, human disturbance or fire disturbance was observed beyond the project site boundary other than the historical erosion of hillsides. Aquatic fauna communities were checked during the monitoring survey. No sedimentation was found on the stream bed in Stream B and Stream C, and aquatic fauna including Atyid shrimp were recorded in Stream B and Stream C *Caridina trifasciata* was still found in Stream D as in previous monitoring. Measures should be taken to prevent any further sedimentation incidents in the future.

Marine Ecology

5.3.13 No monitoring survey for transplanted corals and the monitoring on tagged corals in Site B, Site C and Control Site was scheduled in the reporting month (i.e. November 2007). The next monitoring will be conducted in December 2007.

5.4 Archaeology (Watching Brief)

Final Archaeology Watching Brief Report

5.4.1 The Final Archaeology Watching Brief Report was submitted to AMO in June 2007. No archaeological material was identified.

6. Environmental Site Auditing

6.1.1 The weekly site inspections were conducted by the ET with Contractor's representative and/or Jockey Club's representative on 30th October, 6th, 13th and 20th November 2007, and the monthly joined site inspection with IEC and the Contractor's representative undertaken on 20th November 2007. The following observations and recommendations were made.

Dust Mitigation Measures

6.1.2 Dust generation from the haul road and loading/unloading activities were observed at sunny and windy weather, insufficient dust mitigation measures was provided on site. No water truck was observed watering the haul road during the site inspection.

6.1.3 An *ad hoc* site inspection was carried out on 16th November 2007, dust nuisance from the construction site Hole East 2 to the existing golf course Hole South 6 was observed. We are concerned that the incident would arise complaints from golfers as it was already happened in previous reporting month. The Contractor was reminded to provide sufficient mitigation measures to reduce the dust impact such as regular watering. As the Hole 2 was progressively covered with sand and turf, the dust nuisance to the adjacent golfers was greatly reduced.

6.1.4 Temporary sand stockpile was located next to Hole South 6. Sand / dust blowing from the sand stockpile was observed. The Contractor was reminded to provide mitigation measures to prevent dust generation due to wind erosion.

Water Quality

Temporary Drainage Management Plan

6.1.5 Temporary Drainage Management Plan TDMP is critical to effectively manage the runoff from the construction site to the nearby streams and marine water, no revised (TDMP) was submitted by the Contractor to RE for approval for the wet seasons in 2006 and 2007. Numerous of silty runoff was recorded and observed during the wet season. Although the Contractor had tried to rectify the collapsed silt fence after heavy rains at vulnerable low lying areas, water quality monitoring data revealed that the temporary drainage installed on site was considered insufficient and ineffective, in particular, to streams.

6.1.6 No additional or provision of effective measures was observed to prevent the silty runoff at those vulnerable areas. However, sand capping and turfing can significantly reduce the potential silty runoff during rain. As most of the construction area is planted with turf and it is already in dry season, silty runoff is expected to be minimal.

6.1.7 Similar to previous month, hydroseeding areas for final golf course layout and scar areas were established gradually in the past wet season. But many of the areas had to be re-planting due to the poor maintenance and low coverage of the grass. The Contractor proposed to re-planting in the coming spring 2008.

6.1.8 No dredging work for the permanent intake and outfall pipelines was carried out during the reporting month.

6.1.9 Construction of permanent bridges was completed before the wet season 2007. Remaining furnishing work was in progress during the reporting month.

Turfing

6.1.10 Fertilizer and chemical applications were applied in according to the approved Turf Management Plan during the reporting month.

Ecology

6.1.11 Buffer zone at Streams A, B1, B2 and C had been fully established. The whole buffer zone aims to protect the streams and avoid any works/equipment intrusion into the buffer zone.

6.1.12 The hydroseeding areas at the downstream of Stream A were found not in good condition. The Contractor was required to reinstate the buffer zone back to baseline condition.

6.1.13 No illegal berthing was observed during the site audit. Floating pontoon was berthed at EP location at the temporary barging point. The barges were mainly delivering sand, aggregates and turf during the reporting month.

6.1.14 Regarding to the vegetation clearance of Streams B & C buffer zone due to the permanent drainage construction work, the area was planting with shrubs. The Contractor was reminded to keep the reinstated area in good and healthy condition for the newly plants.

Waste / Chemical Management

6.1.15 An *ad hoc* site inspection was carried out on the 22nd November 2007, improper temporary stockpiles of construction wastes were observed and located at the edge of the temporary barging point. The falling of the construction waste to the sea could cause potential pollution problem or coral damage. The Contractor was reminded to dispose the construction wastes off-site immediately and properly enclosed or fence off the stockpiles area to prevent any incident occur.

6.1.16 The exemption account (A/C no.: 5005322) for the construction waste charging scheme had expired in late-October 2007. The Contractor was not yet submit details of any renewed account to ET and RE for checking. ET reminded the CHEC not to dispose construction waste off-site until the exemption account for the construction waste charging scheme is granted by the Authority.

6.1.17 ET and IEC considered that the current off-site disposal arrangement may deviate from the discharge licence. ET and IEC suggested the Contractor to inform EPD of their current disposal arrangement. The Contractor was reminded to repair the sewage treatment plant to ensure the sewage effluent quality comply with the discharge licence at all times in the past six months. However, no water quality performance report regarding the temporary sewage treatment plant was submitted by the Contractor. The latest record of sewage disposal off-site was on 17th November 2007. The Contractor was reminded to submit disposal record to ET and RE for record.

Landscape and Visual

6.1.18 During the site audits, site formation, shaping, hydroseeding and planting works were being carried out at present. The quality of newly planted standard trees and heavy standard trees are poor which is same as previous few months. The Contractor is reminded to take measures to improve the condition of damaged trees, provide adequate watering to newly hydroseeded area, planted shrubs, trees and transplanted trees as well as improve the quality of newly planted light standard, standard and heavy standard trees by such as frequently irrigate the plants and hydroseeded area and replace all substandard trees or shrubs.

6.1.19 No surgery was carried out to the damaged trees next to the administration building after being damaged by the adjacent construction activities. The Contractor is also required to rectify the mal-pruning practice of the transplanted trees.

6.1.20 All transplanted trees were in fair condition except for T848. Mal-pruning of transplanted trees has not been rectified. A statement on the cause of death of tree T925 recorded is still outstanding.

Status of Environmental Licensing and Permitting

6.1.21 Permits / licences submission and approval status are summarised in Table 6.1.

6.1.22 The Construction Noise Permit (CNP) was expired on 25th November 2007 and the Contractor has no intension to renew the CNP. The Contractor was reminded to have a valid CNP under the Noise Control Ordinance for the use of the powered mechanical equipment during night time. No construction work should be carried out during the night time due to the expired CNP.

Table 6.1 Summary of Environmental Licensing and Permit Status

Permit/licence/notification form title	Submission date	Status	Registration No./ Remarks
Application for a construction noise permit for the use of powered mechanical equipment for the purpose of carrying out construction work other than percussive pilling and/or the carrying out of prescribed construction work.	21st Jan 2006	Approved on 16th February 2006	GW-RE0012-06 (valid until 3rd July 2006)
Application for a construction noise permit for the use of powered mechanical equipment for the purpose of carrying out construction work other than percussive pilling and/or the carrying out of prescribed construction work.	6th Apr 2006	Approved on 9th Jun 06 (supersede the GW-RE0012-06)	GW-RE0157-06 (valid until 28th Nov 2006)
Application for a construction noise permit for the use of powered mechanical equipment for the purpose of carrying out construction work other than percussive pilling and/or the carrying out of prescribed construction work.	Nov 2006	Approved on 22nd Nov 06 (supersede the GW-RE0157-06)	GW-RE0384-06 (valid until 26th May 2007).
Application for a construction noise permit for the use of powered mechanical equipment for the purpose of carrying out construction work other than percussive pilling and/or the carrying out of prescribed construction work.	4th May 2007	Approved on 18th May 07 (supersede the GW-RE0384-06)	GW-RE0141-07 (valid until 25th Nov 2007).
Notification of the air pollution control (construction dust) regulation	21st Jan 2006	Acknowledge receipt from EPD on 27th February 2006	Ref. no.: 001006902
Registration as a chemical waste producer	10th Jan 2006	Register on 7th February 2006	WPN-5213-813-C1186-04
Application for a permit to dump material at sea under the Dumping at Sea Ordinance	10th Jan 2006	Deferred by CHEC on 17th March 2006 (CHEC/KSC3.9.1/0459)	No dredging work will be carried out between May to December 2006.
Application of exemption account for the construction waste charging scheme***	***12th Jan 2006***	***Approved on 16th January 2006***	***A/C no. 5005322 (valid until 2nd August 2007)***

Permit/licence/notification form title	Submission date	Status	Registration No./ Remarks
Application for a licence for production pursuant to Section 14 of Air pollution Control Ordinance	2nd Mar 2006	The total silo capacity for the cement works was 45 tonnes which is lower than 50 tonnes. It is not a specified process, application is not required.	EPD letter refer. no.: EP640/EA/SK/015
Application for a licence under Water Pollution Ordinance – Construction Site	18th Mar 2006	Approved on 12th Sept 2006 (CHEC/KSC3/9.1/0414)	EPD letter refer. No: EP640/W4/J1003

*** The exemption account for the construction waste charging scheme was expired on 2nd August 2007. The Contractor reported the exemption account for the construction waste charging scheme was renewed in last reporting month, however, no information was submitted to the ET for checking. Moreover, the Contractor reported the renewed exemption account was also expired in late-October 2007. The Contractor was urged to submit the previous renewal information and was reminded not to dispose construction waste off-site before the renewed exemption account was granted.

7. Environmental Non-Conformance

7.1 Summary of Environmental Non-Compliance

Air Quality

7.1.1 No exceedance of 24-hour TSP was recorded at GCA B1 during the reporting month.

Marine Water Quality

7.1.2 One exceedance of turbidity and one exceedance of suspended solids were recorded at KLW. One exceedance of ammonia nitrogen was recorded at M_Marsh. Two exceedances of ammonia nitrogen, one exceedance of total inorganic nitrogen and two exceedances of chlorophyll a were recorded at TTC. One exceedance of ammonia nitrogen was recorded at M_BP. One exceedance of ammonia nitrogen at M_Coral was recorded at M_Coral. One exceedance of suspended solids, two exceedances of ammonia nitrogen, one exceedance of total inorganic nitrogen and two exceedances of chlorophyll a were recorded at KS. All of the exceedances were mainly due to the natural variation of the marine water and considered non-project related.

Freshwater Quality

7.1.3 Four exceedances of suspended solids were recorded at Streams A and B. Six exceedances of ammonia nitrogen were recorded at Stream C and Fresh Water Inland Marsh. Nine exceedances of nitrate nitrogen were recorded at Streams A, B, C & Fresh Water Inland Marsh. Twelve exceedances of total inorganic nitrogen were recorded at Streams A, B & Fresh Water Inland Marsh. Five exceedances of chlorophyll a were recorded at Streams A & C. Two exceedances of total phosphorus were recorded at Streams B & C. Exceedances were mainly due to the natural variation of the fresh water and considered non-project related except exceedances were occurred at 29th October and 5th November 2007 at Stream B. Further investigation is required during the coming reporting month.

Terrestrial Ecology

7.1.4 Although the buffer zones for Stream A, B, and C were basically intact, sedimentation was however observed in Stream B and C, and the abundance of aquatic fauna, in particular caridian shrimps, was found very low during the reporting month.

Marine Ecology

7.1.5 No coral monitoring was required during the reporting month.

7.2 Summary of Environmental Complaint

7.2.1 No environmental complaint was received in this reporting month.

7.3 Summary of Environmental Summons

7.3.1 No summon was received in this reporting month.

8. Future Key Issues

8.1 Key Issues for coming month

8.1.1 Major works to be taken for the coming monitoring period are summarized as follows.

- Operation of temporary barging point;
- Operation of sewage treatment plant;
- Turf management;
- Removal of the Contractor's site office;
- Removal of the temporary sewage treatment plant;
- Disposal of construction waste;
- Removal of silt curtain and silt fence; and
- Operation of desalination plant if required

8.2 Monitoring Schedule for the coming month

8.2.1 The tentative schedule of air, water, ecology and landscape & visual monitoring for the next two months is presented in **Annex F**. The environmental monitoring will be conducted at the same monitoring locations in this reporting month. The monitoring programme has been reviewed and was considered as adequate to cater the nature of works to be undertaken.

8.2.2 The construction phase will be ended in December 2007. Post-monitoring will be carried out in January 2008. The operation phase will be commenced in February 2008. ET and IEC service for the construction EM&A will be completed in January 2008.

8.3 Construction programme for the next three month

8.3.1 The construction programme for the next three months is presented in **Annex G.**

9. Recommendations and Conclusions

9.1.1 The Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken during the period from 25th October to 24th November 2007 in accordance with EM&A Manual and the requirement under EP-224-2005/A.

9.1.2 The Contractor was reminded to provide sufficient dust suppression mitigation measures especially during earth movement (loading and unloading), at haul road (vehicle movement) and large soils stockpiles.

9.1.3 The Contractor was reminded to dispose and stockpiles of the construction waste properly.

9.1.4 Although the buffer zones for Stream A, B, and C were basically intact, sedimentation was however observed in Stream B and C, and the abundance of aquatic fauna, in particular caridian shrimps, was still found very low.

9.1.5 Regarding the retained trees, the Contractor shall take the following measures:

- Carry out surgery to damaged trees;
- Report the cause of death of tree T925;
- Re-fix the label of retained tree for easy identification;
- Maintain the tree protection zone required and remove all construction material / debris from the tree protection zone;
- More frequent watering for transplanted trees, planted vegetation and hydroseeded grass; and
- Rectify the mal-pruning practice of the transplanted trees.

9.1.6 No environmental complaint / summon was received during the reporting month.

9.1.7 The ET will keep track of the EM&A programme with respect to compliance of environmental requirements and the proper implementation of all necessary mitigation measures.