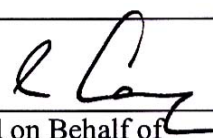


**Proposed Extension of Public Golf Course
at Kau Sai Chau Island, Sai Kung**

**Monthly Environmental Monitoring & Audit (EM&A) Report
for May 2006**

(Report No. 382210/005)

Report Authorized For
Issue By:



For and on Behalf of
Black & Veatch Hong Kong Limited

Black & Veatch Hong Kong Limited
Room 1201-11, Millennium City 5,
418 Kwun Tong Road,
Kowloon, Hong Kong

The Hong Kong Jockey Club
One Sports Road
Happy Valley
Hong Kong

June 2006

Table of Content

Executive Summary

1. Introduction

- 1.1 Background of the Project*
- 1.2 Purpose of the Report*
- 1.3 Structure of the Report*

2. Project Information

- 2.1 Background*
- 2.2 Site Description*
- 2.3 Project Organization*
- 2.4 Construction Programme*
- 2.5 Status of Environmental Submission*
- 2.6 Summary of EM&A Requirements*

3. Environmental Monitoring Requirements

- 3.1 Air Quality*
- 3.2 Water Quality*
- 3.3 Ecology*
- 3.4 Landscape and Visual*
- 3.5 Archaeology (Watching Brief)*
- 3.6 Land Contamination*

4. Implementation Status on Environmental Protection Requirements

5. Monitoring Results

- 5.1 Air Quality*
- 5.2 Water Quality*
- 5.3 Ecology*
- 5.4 Landscape and Visual*
- 5.5 Archaeology (Watching Brief)*
- 5.6 Land Contamination*

6. Environmental Site Auditing

7. Environmental Non-Conformance

- 7.1 Summary of Environmental Non-Compliance*
- 7.2 Summary of Environmental Complaint*
- 7.3 Summary of Environmental Summons*

8. Future Key Issues

- 8.1 Key Issues for coming month*
- 8.2 Monitoring Schedule for the coming month*
- 8.3 Construction programme for the next three month*

9. Recommendations and Conclusions

List of Figure

- 1.1 Master Layout Plan of the Proposed Third Golf Course
- 1.2 Project Organisation and Lines of Communication
- 3.1 Proposed Air Quality Monitoring Locations
- 3.2 Proposed Water Quality Monitoring Locations (Construction phase)
- 3.3 Proposed Ecology Monitoring Locations
- 3.4a Locations of Coral and Seagrass Monitoring (Sites D2, D3 and C)
- 3.4b Indicative locations of the tagged corals at Site B2 under the revised monitoring regime
- 3.5 Coral Transplantation Location
- 3.6 Watching Brief Monitoring Area
- 3.7 Sampling Locations for Land Contamination

List of Table

- Table 1.1 Structure of the Report
- Table 2.1 Summary of Compliance with EP Conditions
- Table 2.2 Summary of Impact EM&A Requirements
- Table 3.1 Action and Limit Levels for 1-hour TSP
- Table 3.2 Action and Limit Levels for 24-hour TSP
- Table 3.3 TSP Monitoring Parameter and Frequency
- Table 3.4 Air Quality Monitoring Equipment
- Table 3.5 Derived Summaries of Action and Limit Levels for Marine Water Quality
- Table 3.6 Derived Summaries of Action and Limit Levels for Freshwater Water Quality
- Table 3.7 Water Quality Monitoring Parameter, Frequency and Locations
- Table 3.8 Water Quality Monitoring Locations during Construction Phase
- Table 3.9 Analytical Methods to be applied to Water Quality Samples
- Table 5.2-1 Marine Water Exceedance Summary April – May 2006
- Table 5.2-2 Freshwater Exceedance Summary April – May 2006
- Table 5.3-1 Conditions of tagged corals at Site B2
- Table 5.3-2 Conditions of tagged corals at Site C
- Table 5.3-3 Conditions of tagged corals at Control Site
- Table 6.1 Summary of Environmental Licensing and Permit Status

List of Annex

- Annex A Tentative Construction Programme
- Annex B Monitoring Programme for the reporting month
- Annex C Event Action Plan
- Annex D Implementation status on Environmental Protection Requirements
- Annex E Monitoring results
- Annex F Calibration Certificates
- Annex G Monitoring Programme for the next three months
- Annex H Construction Programme for the next three months

	Name	Signature	Date
Prepared	Esther Tong		June 2006
Checked	Manuel Chua		June 2006
Reviewed	Johan Wong		June 2006

[illegible]

Your ref : 40040032/CERT/06_06.doc
Our ref :

**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.5 Monthly EM&A Report for May 2006 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.5 Monthly EM&A report for May 2006 has been verified.
3. We would 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



Independent Environmental Checker

Name Gary Tam

of Hong Kong Productivity Council
3/F., HKPC Building,
78 Tat Chee Avenue,
Kowloon

Date 5 June 2006

Executive Summary

This is the fifth 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 May 2006 (25th April 2006 to 24th May 2006).

Summary of construction works undertaken during this report period

Vegetation clearance at Holes 1, 2, 3, 5, 8, 9 & 18 were completed. For Hole 17 and Hole 4, approximate 40% and 20% of vegetation were cleared respectively. Haul roads located at centre and northern part of the project was completed to link up Holes between 1-10, 17&18. Major cut & fill work was carried at Holes 1, 2, 3, 5, 8, 9, 17 & 18 during the reporting month.

The temporary barging point was completed at early April 2006. The floating pontoon was located at the EP location. Construction of concrete batching plant was on-going. Minimum amount of concrete production was observed during the monitoring month. Construction of site office was completed at mid May 2006 and located near the existing maintenance building. Sewage treatment plant was installed and operated near the end of May 2006.

For the desalination plant, no dredging work for the desalination plant intake and outfall pipelines was carried out. Only land formation work for the desalination plant was carried out near the existing Kau Sai Chau pier.

Stream buffer zone was demarcated at Stream A and partially at Stream B (tributary mainly). Construction of temporary bridge no. 5, across the existing freshwater marsh near to existing Hole N15, was completed at the mid-May 2006.

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)	5 times
Terrestrial Ecology	1 time
Marine Ecology	1 time
Landscaping & Visual	2 times

Air Quality

5 sets of 24-hour TSP monitoring were carried out on 28th April, 4th, 10th, 16th and 22nd May 2006 at Bungalow A (GCA B1) at Kau Sai Chau during this reporting month. No exceedance of 24-TSP was recorded at GCA B1.

Water Quality

5 sets of water quality monitoring were carried out on 28th April, 3rd, 8th, 19th and 24th May 2006 at 9 marine and 7 freshwater monitoring locations. Monitoring was performed on schedule.

Exceedances were recorded at stream courses and marine water and summarize as follows:

Marine water

- Seven action and five limit level exceedances of turbidity were recorded at KLW, M_Marsh, TTC, M_BP, M_Coral and KS; and
- Six action and seven limit level exceedances of SS were recorded at M_RO1, KLW, M_Marsh, TTC, M_BP, M_Coral and KS.

Freshwater

- Twelve limit level exceedances of turbidity were recorded at Stream A, B & freshwater inland marsh; and
- Two action and seven limit level exceedances of SS were recorded at Stream A, B & freshwater inland marsh.

Ecology

Terrestrial ecology was conducted on 11th and 25th May 2006. The demarcation of the stream buffer zone had been established for Streams A and tributary of Stream B, the construction works fronts had reached Stream A, and a haul road was approaching Stream B at the time of the monitoring survey. Stream C buffer zone demarcation establishment will be finished by the Contractor before the works fronts reach Stream C. In general, the streams and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey.

Marine ecology was conducted on 27th & 28th May 2006 at Site B2, Site C and Control Site. Due to the coral incident on 23rd March 2006 at the temporary baring point, coral remedial work was carried out by the Contractor on 13th and 14th May 2006. The Contractor is preparing the report for onward submission to EPD and AFCD for record and comments.

The number of tagged corals at Site B2 was increased from 20 to 50 in April 2006 after the coral damage incident, which included the original B-11 to B-20 and newly established B-21 to B-60. The distribution of these tagged corals was 20 nos. to the north of the barge, 20 nos. to the south of the barge, and 10 nos. within the area of the barge. In the present survey, 15 tagged corals at Site B2 indicated minor extend of sedimentation impact (1 to 10%). This may probably caused by the runoff of sediment after a few days of heavy rain with insufficient temporary drainage implemented on site.

Site C and the Control Site still remained similar conditions as during the Baseline Survey. No mortality, sedimentation or bleaching was found on the tagged corals in these two sites. In addition, the coral monitoring at Site B2, Site C and Control Site would extend from April to June 2006.

Landscaping & Visual

Landscape and visual monitoring and site audits were carried on 9th and 23rd May 2006. Vegetation clearance work and site formation is being carried out at present. Some of the trees have been already transplanted to final location and some temporary hydroseeding works have been carried out on slopes.

Environmental Site Auditing

Four weekly joint environmental site audits were carried out on 28th April, 2nd, 8th, 16th and 23rd May 2006, with the Engineer and Contractor's representatives. A monthly joint environmental site audit was carried out on 23rd May 2006 by the Contractor's Representative ET's representative and Independent Environmental Checker (IC(E)).

Environmental Non-conformance

Air Quality

No exceedance of 24-TSP was recorded at GCA B1.

Marine Water

For marine water, eight and seven exceedances of SS and turbidity respectively at M_Marsh, TTC, M_BP and M_Coral were considered project-related. For the monitoring data on 19th May 2006, the exceedances were mainly due to the natural variation of marine water after the typhoon (magnitude of the increase of SS and turbidity were similar to the control monitoring stations at M_A and M_B), therefore, were considered not project-related. According to the sampling record, the weather of the sampling date was fine and no major silty runoff was observed at the sampling location.

For the exceedances at M_RO1, KLW and KS, they were considered not attributed to the works. No further action was required. The exceedances were mainly due to natural variation of marine water after heavy rainstorm event.

Freshwater

All (seventeen) SS and turbidity exceedances at Stream A and freshwater inland marsh were considered project-related. The exceedances recorded at Stream A were mainly attributed to from runoff from filling area of Hole 17. The exceedances recorded at freshwater inland marsh were mainly attributed to the runoff from Holes 1 & 18 to the existing freshwater inland marsh and considered project-related. As no construction work adjacent to the Stream B, those SS and turbidity exceedances were considered natural variation of the streams and considered not project-related. No exceedances were recorded at Stream C during this reporting month.

All notifications of exceedances and the subsequent exceedance incident report had been forwarded to the relevant parties.

For those considered project-related freshwater and marine water exceedances, the Contractor was required to critically review the temporary drainage management plan and implement necessary improvement to prevent runoff from the construction site to the marine and stream courses. The Contractor was also requested to rectify the situation as soon as possible. The water quality monitoring results revealed that the temporary drainage installed on site was insufficient and should be improved especially at concern areas.

No environmental complaint was received in this reporting period. No environmental summon was received in this reporting period.

Implementation Status of Environmental Mitigation Measures

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

- Watering/modify the haul road, during rock breaking, loading/unloading of dusty materials in order to minimize the dust generation;
- Minimize the water quality impact when undertaking cut-and-fill works. It is important to provide sufficient temporary drainage at critical areas to confine, collect and provide proper treatment before discharge to marine water and stream courses to ensure the water quality is comply with WPCO requirement;
- Minimize the exposed areas by controlling the vegetation clearance area. Vegetation should be kept in-situ as much as possible until works require at the construction areas;

- Minimize the cut-and-fill areas especially during wet seasons;
- Properly dispose of the vegetation stockpiles and construction waste off-site;
- Strengthen the preventive/interim measures for the silty runoff along the boundary of the exposed areas especially at low lying areas. More frequent maintenance on the silt fence is necessary;
- Providing wheel washing facilities;
- Provide chemical storage areas on site;
- Install temporary drainage system at the concrete batching plant area to ensure all wastewater will be recycled and reused on site and no wastewater discharge from the concrete batching plant outside the works boundary;
- Provide temporary drainage at the temporary bridges;
- Cover the bare slopes or other means to minimize the dust and runoff impacts to nearby sensitive receivers;
- Provide treatment facilities especially at water sensitive areas before water discharges from construction site; and
- Maintenance of the silt curtain (integrity of the silt curtain and removal of settled silt deposited within the silt curtain) installed outside the fresh water inland marsh.

The Contractor has provided the following major mitigation measures during the reporting month to minimize the silty runoff to water sensitive receivers:

- Rock bunds and sedimentation basins were mainly constructed and located at Holes 1, 17 & 18;
- Some major haul roads were paved with concrete/gravels in order to minimize the silty runoff to fresh water inland marsh, inactive fish pond, temporary barging point and Stream A;
- Cover the exposed area (low lying areas) with tarpaulin at Holes 3, 5 & 10 to prevent silty runoff;
- Decking of the temporary bridges (no. 5 & 9) were paved with concrete;
- Hydroseed at some bare/exposed slope areas of Holes 1, 3 & 18; and
- Installation of silt curtain at the outlet of fresh water inland marsh;

Future Key Issues

Key issues to be considered in the coming month include:

- Implementation of sufficient and improve the temporary drainage system on site to prevent silty runoff to marine and stream courses;
- Implementation of sufficient temporary drainage system before carry out any newly exposed area;
- Potential dust generation from activities on-site : cut-and-fill at mainly Holes 1-10 & 17-18, concrete batching plant operation, exposed/bare slope areas/stockpiles and temporary haul roads;
- Wastewater discharge from construction site : operation of sewage treatment work for the site office (near maintenance building) and concrete batching plant (located at Hole 2);
- Temporary drainage system installation at temporary bridges no. 5 (freshwater inland marsh) and 9 (Stream A);
- Land formation works for the desalination plant near to the existing pier;
- Storage of chemicals/fuel and chemical waste/waste oil on site; and
- Construction wastes, vegetation, general refuse generated from workers.

Potential environmental impacts arising from the construction activities in the coming month are expected to be mainly associated with dust, site runoff and waste management.

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.

1.1.2 This report summarises the environmental monitoring and audit works for the Project in May 2006 (from 25th April to 24th May 2006).

1.2 Purpose of the Report

1.2.1 This is the fifth EM&A report which summarizes the impact monitoring results and audit findings for the EM&A programme during the reporting period from **25th April to 24th May 2006**.

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 three month (25 May – 24 Aug 2006).
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 a 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 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.

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 are scheduled to be completed by end of July 2007.

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	Submitted	The site investigation was carried out on 14 th and 15 th February 2006. The CAR was submitted on 23 rd March 2006. According to the preliminary results, Location 3 was the only one location

EP-224/2005	Environmental Permit Submission	Status	Remarks
	Plan (RAP) including a Contamination Assessment Report (CAR) is required.		had to further investigate and quantify the Pb concentration around that area. The CAR and RAP (if necessary) are now prepared by the Contractor and will be submitted soon.
3.6	Detailed methodology for Coral Transplantation submission to the Director for approval.	In progress	At least one month before commencement of the Coral Transplantation.
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)

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	<u>First 3 months</u> 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

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung
Monthly EM&A Report

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.	<p>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.</p> <p>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.</p>	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.	<p>During the first two years of the operation phase.</p> <p>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.</p>	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 $\mu\text{g m}^{-3}$	500 $\mu\text{g m}^{-3}$

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	Description	Action Level	Limit Level
GCA B1	Bungalow A adjacent to Kau Sai Chau Public Golf Course Administration Building	187.4 $\mu\text{g m}^{-3}$	260 $\mu\text{g m}^{-3}$

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 will be collected using filters and High Volume Sampler and the collected samples will be 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 should be placed less than 2 metres apart;
 - the distance between the sampler and an obstacle, such as buildings, would be at least twice the height that the obstacle protrudes above the sampler;
 - a minimum of 2 metres separation from walls, parapets and penthouses would be required for the rooftop samplers;
 - a minimum of 2 metres separation from any supporting structure, measured horizontally would be required;
 - airflow around the sampler would be unrestricted;
 - no furnaces or incineration flues would be operating near the sampler;
 - the sampler would be more than 20 metres from the dripline; and
 - any wire fence and gate, to protect the sampler, should 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 $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and the relative humidity (RH) $< 50\% \pm 5\%$, 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 NO₂-N) at non-FCZ stations, the trigger level has made reference to the existing golf course guideline values. The guideline value of NO₂-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 NO₂-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 NH₃-N, NO₂-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 (NO₃-N), nitrite nitrogen (NO₂-N), ammonia nitrogen (NH₃-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	<u>Marine Water</u> Fish culture zone stations: TTC, KLW, KS
Temperature (°C)		Control stations: M_A, M_B
Turbidity (NTU)		Impact stations: M_BP, M_RO1, M_Marsh, M_Coral
pH		
Salinity (ppt)		<u>Freshwater Water</u> Stream A (F_UA, F_DA) Stream B (F_UB, F_DB) Stream C (F_UC, F_DC) Inland Marsh (F_Inland_M)
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
<i>Marine Water (9 stations)</i>		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
<i>Fresh Water (7 stations)</i>					
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 m³/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 has 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. If no exceedance was recorded during these three months, the monitoring schedule would be 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.

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 decussate*, *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 has presented in the Baseline Monitoring 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 monthly monitoring report of April 2006.
- 3.3.8 The reporting month (May 2006) was the Month Five of the construction programme. 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, had not been performed. The monitoring on transplanted corals on the bedrock at Site D2 (see **Figure 3.5**) therefore was not needed in this survey.

- 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). The present survey was the fifth monitoring survey (the fifth monthly survey). 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 The major works at construction site were (i) excavation at Holes 1, 2, 3, 5, 8, 9, 17 & 18, (ii) erection and operation of concrete batching plant at Hole 2 and (iii) land formation for desalination plant near existing KSC pier.
- 4.1.2 The Contractor has provided interim/minimum preventive mitigation measures (silt fence mainly, rock bund covered with geotextile fabric at some low lying areas) to control silty runoff. Sedimentation basins with rock bunds were provided at Holes 1, 17 & 18 low lying areas and modification at the discharge outlet (distribution channel was paved with small rocks and geotextile fabric underneath) near the existing maintenance building to freshwater inland marsh was observed. No cut-off drainage was observed implemented on site during the site audit.
- 4.1.3 For dust suppression, the Contractor was providing mainly at Hole 9 (with water sprayer) during rock breaking activities. Other areas (Holes 3, 8 & 18) were not provided sufficient dust suppression measures during the rock breaking activities and unloading/loading activities. Watering of haul road was observed during the site audit.
- 4.1.4 No temporary drainage system was available at the concrete batching plant in order to collect, recycle and reuse within the site. As confirmed with the Contractor, the temporary drainage will be implemented early next month to ensure no water discharge from the plant to nearby marine water and a schematic layout plan indicates the details of the temporary drainage will be submitted early next month.
- 4.1.5 No dredging work has been carried out near to the existing pier for the desalination plant pipelines.
- 4.1.6 The sewage treatment plant was started to operate at the end of this reporting month. No approved/valid water discharge licence(s) for this project was submitted by the Contractor for record.
- 4.1.7 Hydroseeding was observed at part of Holes, 1, 3 & 18 of bare/exposed slopes.
- 4.1.8 Vegetation and construction waste stockpiles were observed on site without proper disposal. No chemical storage area was available on site.
- 4.1.9 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 April and May 2006. All monitoring data are provided in **Annex E**. Monitoring of 24-hour TSP was conducted at GCA B1 on 28th April, 4th, 10th, 16th and 22nd May 2006. 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-TSP was recorded at GCA B1 on 4th April 2006 in the reporting month. No 1-hour TSP measurement was required due to no complaint was received during this monitoring 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 5 occasions in April and May 2006 (28th April, 3rd, 8th, 19th and 24th May 2006). The QA/QC results for laboratory testing in the reporting month were acceptable. The QA/QC results are summarised in **Annex F**.

5.2.3 On 28th April, 2nd May and 3rd May, amber and red rainstorm signals were hoisted (ranging from 66 mm/day to 108 mm/day). Rainfalls were also recorded on 17th May, 21st -23rd May 2006 (ranging from 15 mm/day to 69.7 mm/day). Typhoon signal was hoisted on 15th to 18th May 2006 with trace amount of rainfall was recorded.

5.2.4 Exceedances were recorded at stream courses and marine water and summarize as follows:

Marine water

- Seven action and five limit level exceedances of turbidity were recorded at K LW, M_Marsh, TTC, M_BP, M_Coral and KS; and
- Six action and seven limit level exceedances of SS were recorded at M_RO1, K LW, M_Marsh, TTC, M_BP, M_Coral and KS.

Freshwater

- Twelve limit level exceedances of turbidity were recorded at Stream A, B & freshwater inland marsh; and
- Two action and seven limit level exceedances of SS were recorded at Stream A, B & freshwater inland marsh.

5.2.5 The marine water exceedances were summarised in **Table 5.2-1**. For the exceedances at M_RO1, K LW and KS, they were not considered project-related. The exceedances were mainly due to the natural variation of marine water after the typhoon. The magnitude of the increase of SS and turbidity were similar to the control monitoring stations at M_A and M_B. According to the sampling record, the weather of the sampling date was fine and no major silty runoff was observed at the sampling locations.

Table 5.2-1 Marine Water Exceedance Summary April – May 2006

Monitoring Station	Exceedance Level	Date	Parameters	Project-related
M_RO1	Action Level	19 th May 2006	SS	No
KLW	Limit Level	19 th May 2006	SS, Turbidity	No
M_Marsh	Limit Level	28 th Apr 2006	SS, Turbidity	Yes
	Limit Level	3 rd May 2006	SS, Turbidity	Yes
	Action Level	24 th May 2006	SS	Yes
TTC	Action Level	28 th Apr 2006	Turbidity	Yes
	Action Level	3 rd May 2006	Turbidity	Yes
	Limit Level	19 th May 2006	Turbidity	Yes
	Action Level	24 th May 2006	Turbidity	Yes
	Limit Level	28 th Apr 2006	SS	Yes
	Limit Level	3 rd May 2006	SS	Yes
	Limit Level	19 th May 2006	SS	Yes
M_BP	Limit Level	28 th Apr 2006	SS, Turbidity	Yes
M_Coral	Action Level	3 rd May 2006	Turbidity	Yes
	Action Level	19 th May 2006	SS, Turbidity	Yes
	Action Level	24 th May 2006	SS, Turbidity	Yes
KS	Action Level	3 rd May 2006	SS	No
	Action Level	19 th May 2006	SS, Turbidity	No

Remarks: Exceedances were mainly due to the cause of heavy rainstorm event.

- 5.2.6 Silty runoff was observed after the heavy rainstorm event (28th Apr, 3rd May, and 23rd May 2006) from Stream A2, temporary barging point, Hole 2 low lying areas and existing freshwater inland marsh to marine water.

Freshwater

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

Table 5.2-2 Freshwater Exceedance Summary April – May 2006

Monitoring Station	Exceedance Level	Date	Parameters	Project-related
F_DA	Limit Level	28 th Apr 2006	SS, Turbidity	Yes
	Limit Level	3 rd May 2006	SS, Turbidity	Yes
	Limit Level	8 th May 2006	Turbidity	Yes
	Limit Level	19 th May 2006	Turbidity	Yes
	Limit Level	24 th May 2006	SS, Turbidity	Yes
	Action Level	19 th May 2006	SS	Yes
F_DB	Action Level	28 th Apr 2006	SS, Turbidity	No
	Action Level	3 rd May 2006	Turbidity	No
	Limit Level	3 rd May 2006	SS	No
F_Inland M	Limit Level	28 th Apr 2006	SS, Turbidity	Yes
	Limit Level	3 rd May 2006	SS, Turbidity	Yes
	Limit Level	8 th May 2006	Turbidity	Yes
	Limit Level	19 th May 2006	Turbidity	Yes
	Limit Level	24 th May 2006	SS, Turbidity	Yes

Remarks: Exceedances were mainly due to the cause of heavy rainstorm event.

- 5.2.8 The exceedances recorded at Stream A were mainly attributed to (i) insufficient mitigation measure provided at the bridge abutment during the construction of temporary bridge no. 9 and (ii) silty runoff was observed from the filling area of Hole 17 to Stream A2. The sheet pile temporary bridge decking was paved with concrete to prevent the direct runoff to the Stream A after the rainstorm incident on 3rd May 2006. No temporary drainage was provided to collect and divert the runoff from the temporary bridge located within the Stream A buffer zone during this reporting month.
- 5.2.9 As no construction work adjacent to the Stream B, those exceedances were considered natural variation of the streams and considered not project-related.
- 5.2.10 The exceedances recorded at freshwater inland marsh were mainly attributed to the silty runoff from Holes 1 & 18 to the existing freshwater inland marsh and considered project-related.

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 11th and 25th May 2006. Site clearance works were advancing eastward and southward, and some earth works had been being conducted at the northern part of the new golf course site (areas closer to and within the existing golf course).
- 5.3.3 Although the surveyed streams have not been previously affected by developments or pollution sources, they are relatively small. Water depth was less than 0.3m in most of the stream reaches even during wet season.
- 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 was heavily silted with sediments from eroded hillsides all year round, particularly at the main stream section. The stream had low flow.
- 5.3.5 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**). Stream B also contains a long estuarine section of muddy sandy substrate.
- 5.3.6 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) would all be protected by buffer zone (**Figure 3.3**).
- 5.3.7 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.
- 5.3.8 In general, the streams and the riparian vegetation were still in natural conditions. The only exception was the sections of stream banks right beneath the temporary access bridge at Stream

A. Water levels in the 4 streams were much higher than in previous monitoring surveys during dry season. For the two tributaries in Stream B, the flow in B2 tributary was similar and flow in B1 tributary was also observed at its lower reach. The majority of Stream C had been found dry in previous monitoring surveys, but in the present survey surface flow was present in even upstream section. Stream D had surface flow even at the most upper reach. Photos of Streams A to D were shown in **Photo Plate 5.3-1 (Annex E)**.

- 5.3.9 The habitats and vegetation generally remained intact within a large portion of the project site (beyond the works fronts), within the stream buffer zone and outside the project area. No earthwork, human disturbance or fire disturbance was observed beyond the works fronts other than the historical erosion of hillsides and the access paths to the project site.
- 5.3.10 Aquatic fauna communities were checked during the monitoring survey. Atyid shrimp *Caridina trifasciata* were found in Stream B, Stream C & Stream D during the present monitoring survey (**Annex E - Photo Plate 5.3-2**). The recent heavy rainfall had significantly increased the flow in the streams. Abundance of this species was still low in all streams. It is anticipated that their abundance will increase more significantly later.
- 5.3.11 Another species of Atyid shrimp, *Caridina cantonensis*, which is common and widespread in Hong Kong was found in Stream B, C and D. Other aquatic fauna and flora encountered during the monitoring included Freshwater snail *Brotia hainanensis*, which is usually found in streams with good water quality, found at B2 tributary of Stream B, and Long-armed Palemonid shrimp *Macrobrachia hainanensis* in Stream B (**Annex E - Photo Plate 5.3-2**).
- 5.3.12 The demarcation of the stream buffer zone had been fully established at Stream A main stream and Tributary B2 of Stream B at the time of the monitoring survey. Except at the temporary access bridge at Stream A, riparian vegetation within the buffer zone was not disturbed by construction works. As the construction works fronts had not exceeded Stream A, it is anticipated that the establishment of stream buffer zone demarcation will be finished before the works fronts reach Tributary B1 and Stream C.

Marine Ecology

- 5.3.13 The present Marine Ecological Monitoring Survey was conducted during high tide on 27th & 28th May 2006. The weather conditions were cloudy but calm, the underwater visibility was fine (approximately 5m). At Site C and Control Site, the 20 colonies of natural corals selected during the Baseline Survey were recovered and checked for conditions, while at Site B2, 50 tagged corals (with 10 established in the Baseline Survey and 40 established in April 2006) were also recovered and checked.
- 5.3.14 Site B2 was the location for the temporary barging point. Some rectangular concrete blocks were deployed along the seaward side of the intertidal zone to form a seawall, and the area landward to this wall was filled with boulders. This was used as the landing point of the temporary barging point. Road surface was formed near the abandoned pier and connected to the landing point. The conditions of the tagged corals during the present survey were compared with the conditions during the Baseline Survey (for B-11 to B-20) or in April 2006 (for B-21 to B-60) (**Annex E - Photo Plates 5.3-2 to 5.3-6**). Tagged Coral #19 was being turned over and have 10% bleaching and 70% mortality. The coral was probably turned over by the natural wave action during the period of typhoon "Pearl". No mortality, or bleaching was found on the rest of the tagged corals (see **Table 5.3-1**). However, 15 tagged corals were found to have 1-10% sediment covered (see **Table 5.3-1**). This may probably caused by the run off of sediment after a few days of heavy rain. The corals remained similar conditions with their baseline conditions during the Baseline Survey or in April 2006. No differences were identified on the conditions

of the three groups (i.e. B-11 to B-20 within the barge area; B-21 to B-40 to the north of the barge, and B-50 to B-60 to the south of the barge) of tagged corals.

- 5.3.15 Site C was on the south-eastern coast of Kau Sai Chau Island and had a high coral coverage among the sites investigated during the EIA Study. The sizes of coral colonies at Site C were also larger than those at other sites. Site C was away from the boundary of the new golf course and would not be subject to direct impacts during construction. The site and its vicinity still remained similar conditions as during the Baseline Survey. All 20 tagged corals were recovered. No mortality, sedimentation or bleaching was found on any of the tagged corals (see **Table 5.3-2**). The corals remained similar conditions as during the Baseline Survey (**Annex E - Photo Plates 5.3-7 to 5.3-8**).
- 5.3.16 The Control Site is the buoy of coral marker established by AFCD in Sharp Island. Similar with Site C, both the coral coverage percentage and the sizes of coral colonies were high at this site and would not be impacted by the Project. The site and its vicinity still remained similar conditions as during the Baseline Survey. All 20 tagged corals were recovered. No mortality, sedimentation or bleaching was found on any of the tagged corals (see **Table 5.3-3**). The corals remained similar conditions as during the Baseline Survey (**Annex E - Photo Plates 5.3-9 to 5.3-10**). However some of the tags were missing during the survey period. This is probably caused by the disturbance of recreation divers at the control site.
- 5.3.17 **Photo Plates 5.3-2 to 5.3-10** showed the photos of each tagged corals. The assigned numbers, species, mortality percentage, sedimentation coverage percentage and bleaching percentage of the baseline conditions of tagged corals and their present conditions were presented in **Tables 5.3-1 to 5.3-3** below.

Table 5.3-1 Conditions of tagged corals at Site B2

Code of tagged corals	Species*	Baseline Survey (December 2005)			Month Five (May 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
Within the Temporary Barging Point Area							
B-11	<i>Turbinaria peltata</i>	0	0	0	0	0	0
B-12	<i>Plesiastrea versipora</i>	0	0	0	0	0	0
B-13	<i>Plesiastrea versipora</i>	0	0	0	0	0	0
B-14	<i>Goniastrea aspera</i>	0	0	0	0	0	0
B-15	<i>Lithophyllon undulatum</i>	0	0	0	0	10	0
B-16	<i>Favia speciosa</i>	0	0	0	0	0	0
B-17	<i>Favia speciosa</i>	0	0	0	0	5	0
B-18	<i>Turbinaria peltata</i>	0	0	0	0	5	0
B-19	<i>Favia speciosa</i>	0	0	0	70	0	10
B-20	<i>Favia speciosa</i>	0	0	0	0	0	0
To the North of the Temporary Barging Point Area							
B-21	<i>Favia speciosa</i>	0	0	0	0	0	0
B-22	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-23	<i>Favia speciosa</i>	0	0	0	0	0	0
B-24	<i>Favia speciosa</i>	0	0	0	0	0	0
B-25	<i>Favites abdita</i>	0	0	0	0	2	0

Code of tagged corals	Species*	Baseline Survey (December 2005)			Month Five (May 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
B-26	<i>Cyphastrea serailia</i>	0	0	0	0	5	0
B-27	<i>Favia speciosa</i>	0	0	0	0	0	0
B-28	<i>Goniopora columna</i>	0	0	0	0	0	0
B-29	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-30	<i>Favia speciosa</i>	0	0	0	0	0	0
B-31	<i>Platygyra acuta</i>	5	0	0	5	0	0
B-32	<i>Favia speciosa</i>	3	0	0	3	1	0
B-33	<i>Turbinaria peltata</i>	0	0	0	0	0	0
B-34	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-35	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-36	<i>Platygyra acuta</i>	0	0	0	0	0	0
B-37	<i>Favia speciosa</i>	0	0	0	0	2	0
B-38	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-39	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-40	<i>Favia speciosa</i>	0	0	0	0	0	0
To the south of the Temporary Barging Point Area							
B-41	<i>Leptastrea pruinosa</i>	0	0	0	0	5	0
B-42	<i>Goniastrea aspera</i>	0	0	0	0	0	0
B-43	<i>Favia speciosa</i>	0	0	0	0	10	0
B-44	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-45	<i>Platygyra acuta</i>	0	0	0	0	0	0
B-46	<i>Favia speciosa</i>	0	0	0	0	5	0
B-47	<i>Favites abdita</i>	0	0	0	0	0	0
B-48	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-49	<i>Goniopora columna</i>	0	0	0	0	0	0
B-50	<i>Favia speciosa</i>	0	0	0	0	2	0
B-51	<i>Psammocora superficialis</i>	0	0	0	0	5	0
B-52	<i>Favia speciosa</i>	0	0	0	0	0	0
B-53	<i>Favia speciosa</i>	0	0	0	0	2	0
B-54	<i>Favia speciosa</i>	0	0	0	0	1	0
B-55	<i>Goniastrea aspera</i>	0	0	0	0	0	0
B-56	<i>Platygyra carnosus</i>	0	0	0	0	0	0
B-57	<i>Goniastrea aspera</i>	0	0	0	0	0	0
B-58	<i>Favia speciosa</i>	5	0	0	5	2	0
B-59	<i>Favia speciosa</i>	0	0	0	0	0	0
B-60	<i>Favia speciosa</i>	5	0	0	5	1	0

* Damaged corals were bold.

Table 5.3-2 Conditions of tagged corals at Site C

Code of tagged corals	Species	Baseline Survey (December 2005)			Month Five (May 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
C-01	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-02	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-03	<i>Favia speciosa</i>	0	0	0	0	0	0
C-04	<i>Favites abdita</i>	0	0	0	0	0	0
C-05	<i>Turbinaria peltata</i>	0	0	0	0	0	0
C-06	<i>Favia speciosa</i>	0	0	0	0	0	0
C-07	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-08	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-09	<i>Favia speciosa</i>	0	0	0	0	0	0
C-10	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-11	<i>Favia speciosa</i>	0	0	0	0	0	0
C-12	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-13	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-14	<i>Favia speciosa</i>	0	0	0	0	0	0
C-15	<i>Goniopora columna</i>	0	0	0	0	0	0
C-16	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-17	<i>Goniopora columna</i>	0	0	0	0	0	0
C-18	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-19	<i>Favites pentagona</i>	0	0	0	0	0	0
C-20	<i>Favia speciosa</i>	0	0	0	0	0	0

Table 5.3-3 Conditions of tagged corals at Control Site

Code of tagged corals	Species	Baseline Survey (December 2005)			Month Five (May 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
X-01	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-02	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-03	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-04	<i>Pavona decussata</i>	0	0	0	0	0	0
X-05	<i>Hydnophora exesa</i>	0	0	0	0	0	0
X-06	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-07	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-08	<i>Favites abdita</i>	0	0	0	0	0	0

Code of tagged corals	Species	Baseline Survey (December 2005)			Month Five (May 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
X-09	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
X-10	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
X-11	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-12	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-13	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-14	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-15	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-16	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-17	<i>Favia speciosa</i>	0	0	0	0	0	0
X-18	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-19	<i>Goniastrea aspera</i>	0	0	0	0	0	0
X-20	<i>Cyphastrea serailia</i>	0	0	0	0	0	0

5.4 Landscape and Visual

- 5.4.1 Landscape resource changes during the site clearance work comprises of the loss of scrubland. As the construction progress, more vegetation and shrubs will be cleared, which will be followed by planting works. Expected visual impacts due to site formation works have become apparent. Hydroseeding works has commenced to mitigate this impact.
- 5.4.2 The landscape and visual monitoring and site audits were carried out on 9th and 23rd May 2006. During the site audit, site formation and vegetation clearance works were being carried out. Trees within the construction area were protected properly.
- 5.4.3 No new tree was transplanted during the month. The eighteen transplanted trees are in fair condition except for T982, which is in poor condition. The Contractor shall closely monitor T982 and maintain the said tree in good health. Mal-pruning of transplanted trees had not been rectified.
- 5.4.4 A two-storey high site office had been constructed and is in operation. The surface of the office is painted in green and the height of the office complies with the EIA requirements.
- 5.4.5 Hydroseeding near the site office for erosion control and visual impact mitigation is recorded.
- 5.4.6 Stockpiles of vegetation have been cleared.

5.5 Archaeology (Watching Brief)

- 5.5.1 Excavation was carried out at Hole 2 during this monitoring month and watching brief monitoring was carried out. According to the latest construction programme, part of the Hole 2 will not be completed in May 2006. Approximate 40% of the Hole 2 area was being excavated and the watching brief at Hole 2 will have to further extend. The first progress report (January to March 2006) had been sent to AMO for comments on 31st March 2006. The progress report will be submitted to AMO on quarterly basis. For the excavation at watching brief concern areas (Holes 11, 12, 14, 15 & 16), the excavation programme could be further delay to next dry

season. Under the EP requirement, construction works within the buffer zone area is restricted within the November to March. As no temporary bridge was being constructed at Streams B and C buffer zone area, no construction work at southern part of Kau Sai Chau is expected unless the successfully apply for the Variation of EP.

5.6 Land Contamination

- 5.6.1 The Contamination Assessment Plan (CAP) was approved by EPD 17th February 2006. Site investigation was carried out on 14th and 15th February 2006. Site audit was carried out with IEC on 14th February 2006 with the Contractor's representatives. The CAP was approved on 17th February 2006. Contamination Assessment Report (CAR) was submitted to EPD for approval on 23rd March 2006. Based on the preliminary results and comments from EPD, further site investigation is required to quantify the lead contamination extent at the hotspot location 3. The additional soil samples were taken around mid May 2006 at Location 3. CAR will be prepared by the Contractor and submitted to EPD for approval next month. Remediation Assessment Plan (RAP) will be prepared if necessary.

6. Environmental Site Auditing

- 6.1.1 A site inspection was conducted by EPD and Contractor's representatives on 19th May 2006. During the site inspection, EPD has verbally raised their following concerns:
- (i) Stream A : EPD found that there was an intrusion of buffer zone (rock filling activities) near to the temporary bridge no.9 at Stream A. The Contractor should clarify the reason of intrusion within the buffer zone areas during the wet season.
 - (ii) EPD concerned about the runoff and would expect the Contractor to provide more cut-off drainage on site as soon as possible.
 - (iii) EPD concerned about at the low lying points (with one layer of silt fence only) and would expect the contractor to provide more mitigation measures on site to strengthen at those low lying areas in order to prevent silty runoff.
 - (iv) EPD concerned about the drainage implementation at the concrete batching plant. EPD expected all wastewater discharge from the site will be collected, reused and recycled within the plant. EPD reminded that no water should runoff outside the works boundary especially to the down slope areas next to the concrete batching plant. In addition, preventative measures/drainage should be provided to cut-off the runoff from the haul road adjacent to the concrete batching plant.
 - (v) EPD concerned about the dust generation on site. The Contractor was reminded to provide more dust suppression mitigation measures on site (mainly loading and unloading activities) and also educate the workers on site. During the site visit, one of the worker was carrying out rock breaking activity by a hand-held breaker without providing dust suppression measures. The Contractor instantly rectified this situation by providing water spraying during the rock breaking activity.
 - (vi) Silty water near the existing maintenance building at the inlet of the freshwater marsh was observed. EPD reminded the Contractor to enhance the water treatment and improve the water quality before discharge to the freshwater inland marsh.
- 6.1.2 The weekly site inspections were conducted by the ET with Contractor's representative and/or Jockey Club's representative on 28th April, 2nd, 8th, 16th and 23rd May 2006 and the monthly joined site inspection with IEC and the Contractor's representative undertaken on 23rd May 2006. The following observations and recommendations were made.

Dust Mitigation Measures

- 6.1.3 Excavation work was carried out at Holes 1, 2, 3, 5, 8, 9, 17, & 18 during the reporting month. Haul road was constructed linking up Holes 1-9, 17 & 18. Sprinklers were provided when the rock breaking activities were carried out for dust suppression at Hole 9 only. Dust generation from the haul road, during earth moving operation and excavation were observed at sunny and windy weather, insufficient mitigation measures was provided on site. The Contractor was reminded to minimize the dust generated by the site vehicles moving along the haul road. For other excavation or earth moving areas, the Contractor was reminded to provide sufficient dust suppression measure.
- 6.1.4 Concrete batching plant was completed erection and started to operate at the end of this reporting month. The Contractor was confirmed that the total silo capacity on site was less than 50 tonnes.

Water Quality

Temporary Drainage Master Plan

- 6.1.5 A revised temporary drainage master plan (TDMP), which concentrates at Holes 1, 17 & 18 only, had been formally submitted on 13th May 2006 by the Contractor for ER to review during this monitoring month. Similar concept of the earlier submission (29th March 2006) was applied to the temporary drainage plan and summarizes below:
- (i) In some of construction areas, part of the runoff from the natural catchment will mix up with the construction site contaminated runoff before directly discharge to marine or stream courses.
 - (ii) The TDMP indicates that there are many discharge points along the construction boundary to the marine water and streams. The basic temporary drainage principle submitted by CHEC is that the construction site contaminated runoff will pass through the silt fence / rock channel / sedimentation basin and then discharge/overflow to marine or stream courses. The construction site contaminated runoff will not be confined, collected and properly treat before water discharge.
- 6.1.6 ET recommends the runoff from the upper catchment (without construction work areas) should be cut off and divert away from the construction site as much as possible in order to minimize the mixing of contaminated water within the construction site area. The water discharge from the construction site should be confined and pre-treat before discharge and the discharge water quality should comply with the WQO.
- 6.1.7 The present submitted TDMP is only for the control of silty runoff. The Contractor is reminded to prepare the temporary drainage plan for approval and implement before turf grass establishment. This is a major concern because pesticide is a prohibited substance which is not allowed to be discharged to any water bodies under the WPCO.
- 6.1.8 No cut-off drainage was implemented on site and no temporary drainage was observed on site to collect and reuse the water from the concrete batching plant during the reporting month.

Water Quality

- 6.1.9 More rock bunds were provided mainly at Holes 1, 17 & 18. Sedimentation basins were provided at low lying areas at Holes 1 & 18. Due to the large volume of water runoff from the construction site, silty water was observed and discharged from the construction site to Stream A, temporary barging point and freshwater inland marsh. In some lying areas, installed silt fence areas along the site boundary were poorly maintained and leading to silty runoff. The Contractor was reminded to improve the temporary drainage system and maintain the integrity and function of the silt fences on regular basis to prevent the silty runoff from construction site.
- 6.1.10 The decking of temporary bridge no. 9 and part of the haul road near Hole 9 were paved with concrete to reduce the direct silty runoff from the temporary bridge. The Contractor was reminded to provide adequate mitigation facilities on site and sufficient temporary drainage to ensure no polluted runoff discharge from the construction works to Stream A. Any discharge of polluted runoff to the stream is prohibited.
- 6.1.11 The decking of temporary bridge no. 5 was paved with concrete to reduce the direct silty runoff from the temporary bridge to freshwater inland marsh. The Contractor was reminded to provide

adequate mitigation facilities on site and sufficient temporary drainage to ensure no polluted runoff discharge from the construction works to freshwater inland marsh.

- 6.1.12 Temporary drainage was constructed for the temporary barging point (concrete U-channel with a sump pit) and a wider U-channel was also constructed along the haul road between the temporary barging point and Hole 2. Part of the haul road (near to the temporary barging point) was paved with concrete.
- 6.1.13 Silty runoff was observed at Stream A (from Hole 17), inactive fish pond near temporary barging point (runoff from haul road and Hole 3), marine water beneath the Hole 2 (from Holes 2 and 8), Hole 4 (or lake near Hole 4) to marine water and freshwater inland marsh (from Holes 1 & 18) after rain, the Contractor was reminded to improve the temporary drainage system and mitigation measure on site to prevent silty runoff.
- 6.1.14 No cut-off drainage was implemented on site to prevent the natural runoff mixing with construction site runoff before discharge to marine water and stream courses during this reporting month. No temporary drainage system provided at temporary bridges no.5 & no.9 to prevent any silty runoff from the bridge to stream course and ultimately discharge to marine water.
- 6.1.15 Silt curtain was installed at the outlet freshwater inland marsh. Silty water was enclosed within the silt curtain and could contaminate the nearby marine water and inter-tidal habitats. The Contractor was reminded to maintain the silt curtain and desilt the settled solids within the silt curtain in a routine basis.
- 6.1.16 A wastewater treatment plant was located (not in operation) at Hole 1 (end of May 2006) near existing S6 to treat the silty water before direct discharge to freshwater inland marsh through existing drainage system and could treat 80m³/hr. It may start to operation during the next monitoring month.
- 6.1.17 Hydroseeding was observed at part of the bare slopes of Holes 1, 3 & 18 to prevent silty runoff.
- 6.1.18 No turf has been established during this reporting month. According to the construction programme, turf establishment will start at the August 2006 at Hole 3, 5 & 8. The Contractor was reminded to provide temporary drainage system to collect and divert the runoff to the existing reservoir when the permanent drainage system is not completed yet. The Contractor was recommended that turf establishment should not be concentrated in a short period of time to reduce the potential nutrients and pesticides runoff to freshwater and marine water sensitive receivers.

Ecology

- 6.1.19 Buffer zone at Stream A and part of Stream B had been established. The whole buffer zone aims to protect the streams and avoid any works/equipment intrusion into the buffer zone. No work has been carried out near Streams B and C. The Contractor was reminded to demarcate Streams B and C buffer zones before any construction work close to the buffer zone areas.
- 6.1.20 Sediment plume was observed from temporary barging point which caused some tagged corals were affected by the sediment at Site B2. This may probably caused by the silty runoff after heavy rain with insufficient temporary drainage implemented on site. The Contractor was reminded to improve the temporary drainage system to prevent silty runoff.
- 6.1.21 Floating pontoon was berthed at EP location at the temporary barging point.

- 6.1.22 No dredging work was carried out at the desalination plant location. No monitoring and transplantation was carried at this area.

Waste / Chemical Management

- 6.1.23 Cleared vegetation was stockpile and located mainly in Holes 1 and 17 or along the site boundary (outside the silt fences) for wind/sun drying before proper disposal. Stockpile of construction waste was also observed located at Hole 2. The Contractor was reminded to dispose the vegetation stockpiles and construction waste off-site properly according to the waste management plan.
- 6.1.24 No chemical storage area was available on site during the reporting month. Some oil tanks were required as the standby fuel. Drip trays were provided underneath the oil tanks to prevent leakage on the bare ground. The Contractor confirmed that the chemical waste generated was in small amount and would be disposed by their sub-contractor or store on site. The Contractor was reminded to provide chemical storage areas for chemical storage on site.
- 6.1.25 Site office construction was completed and located near existing maintenance building. Mobile chemical toilets were provided on site. The number of workers on site was around 100 (excluding the management staff of the Contractor) could be increased up to 200 persons on site. The Contractor was reminded to provide sufficient sewage treatment facility and/or mobile chemical toilets on site to cater for the needs. The sewage treatment plant for the site office was started to operate near the end of this reporting month. The effluent was directly discharged to the freshwater inland marsh and ultimately to the marine water.

Landscape and Visual

- 6.1.26 The landscape and visual monitoring and site audits were carried out on 4th and 20th April 2006. During the site audit, site formation and vegetation clearance works were being carried out. Trees within the construction area were protected properly.
- 6.1.27 Eighteen trees (T903, T905, T906, T908, T909, T913, T966, T967, T970, T973, T981, T982, T1008, T1009, T1010, T1081, T1083, T1084) near the administrative building and two (T1230 and T1233) near the workshop have been transplanted to final location. However, this transplantation works were not carried out with a rootball preparation period of at least 1 month.
- 6.1.28 A two-storey high site office is being constructed near the administrative building during the second visit. The height of the office complies with the EIA requirements.
- 6.1.29 Stockpiles of cleared vegetation were still recorded on site.
- 6.1.30 Green hoardings were erected near the desalinization plant and next to administrative building to reduce visual impacts.

Status of Environmental Licensing and Permitting

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

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 piling and/or the carrying out of prescribed construction work.	21 st Jan 2006	Approved on 16 th February 2006	GW-RE0012-06 (valid until 3 rd 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 piling and/or the carrying out of prescribed construction work.	13 th Mar 2006	Approved on 6 th April 2006	GW-RE0067-06 (valid until 22 nd August 2006)
Notification of the air pollution control (construction dust) regulation	21 st Jan 2006	Acknowledge receipt from EPD on 27 th February 2006	Ref. no.: 001006902
Registration as a chemical waste producer	10 th Jan 2006	Register on 7 th February 2006	WPN-5213-813-C1186-04
Application for a permit to dump material at sea under the Dumping at Sea Ordinance	10 th Jan 2006	Deferred by CHEC on 17 th 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	12 th Jan 2006	Approved on 16 th January 2006	A/C no. 5005322 (valid until 2 nd August 2007)
Application for a licence for production pursuant to Section 14 of Air pollution Control Ordinance	2 nd 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 – Sewage treatment for toilets and pantry	14 th Mar 2006	Awaiting for approval (CHEC/KSC3/9.1/0414)	
Application for a licence under Water Pollution Ordinance – temporary drainage	16 th Mar 2006	Awaiting for approval (CHEC/KSC3/9.1/0460)	

7. Environmental Non-Conformance

7.1 Summary of Environmental Non-Compliance

Air Quality

- 7.1.1 No non-compliance of 24-TSP was recorded at GCA B1 in the reporting month.

Marine Water Quality

- 7.1.2 For marine water, eight and seven exceedances of SS and turbidity respectively at M_Marsh, TTC, M_BP and M_Coral were considered project-related. For exceedances at M_ROI, K LW and KS were not considered project-related.

Freshwater Quality

- 7.1.3 For freshwater, seven and ten exceedances of SS and turbidity respectively at F_DA and F_Inland Marsh. For Stream B, all exceedances were considered not project-related as no construction work approach to the stream during this reporting month.

Marine Ecology

- 7.1.4 Minor sedimentation was observed on some of the tagged corals at Site B2, but the percentages were smaller than the action level standard (i.e. 15%). The exceedance was considered project-related.

7.2 Summary of Environmental Complaint

- 7.2.1 No environmental complaint was received during the reporting month.

7.3 Summary of Environmental Summons

- 7.2.2 There was no notification of summons with respect to environmental issues registered in this month.

8. Future Key Issues

8.1 Key Issues for coming month

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

- Operation of temporary barging point
- Operation of sewage treatment plant
- Operation of concrete batching plant
- Land formation for desalination plant
- Cut and fill at Golf Holes 1-10 & 17-18
- Implementation of temporary drainage master plan

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 three 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.

8.3 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 April 2006 to 24th May 2006 in accordance with EM&A Manual and the requirement under EP-224/2005.
- 9.1.2 The Contractor was reminded to improve the temporary drainage system on site to prevent silty runoff to marine and stream courses.
- 9.1.3 For terrestrial ecology, the streams (except Stream A – temporary bridge no. 9 construction) and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey.
- 9.1.4 Minor sedimentation was observed on some of the tagged corals at Site B2, but the percentages were smaller than the action level standard (i.e. 15%). The Contractor was reminded to provide sufficient temporary drainage system at the temporary barging point.
- 9.1.5 The Contractor was reminded to rectify the mal-pruning practice of the transplanted trees and maintain all transplanted trees in good health condition. In addition, bulk hydroseeding works would be carried out as soon as practical.
- 9.1.6 No environmental complaint and environmental summons/prosecutions were received during the reporting period.
- 9.1.7 The ET will keep track of the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.