

CONTRACT NO: CV/2004/02

**RECONSTRUCTION OF WONG SHEK AND
KO LAU WAN PUBLIC PIERS**

**ENVIRONMENTAL MONITORING & AUDIT
QUARTERLY REPORT
(KO LAU WAN)**

- JUN-AUG 2005 -

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Priority : normal / urgent

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C.c. To	Mr. Simon Fok (Kin Shing Con. Co. Ltd.)	Fax No.	2729 7858
Subject	Contract No. CV/2004/02 Reconstruction of Wong Shek and Ko Lau Wan Public Piers Quarterly EM&A Summary Report		

We refer to the June to August Quarterly EM&A reports for Wong Shek Pier and Ko Lau Wan Pier that we received through email on 19 November 2005 and are pleased to confirm we have no further comment on the reports.

Should you require further information, please feel free to contact us.

Best regards,



Joseph Poon
 Independent Environmental Checker

JP/cy

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EXECUTIVE SUMMARY

This is the Quarterly Environmental Monitoring and Audit (EM&A) report for Jun-August 2005 under Contract No. CV/2004/02 – Reconstruction of Wong Shek and Ko Lau Wan Public Piers. This report presents the environmental monitoring and auditing (EM&A) findings based on data and information recorded from the period 1st Jun to 31st Aug 2005 for the construction of Ko Lau Wan Public Pier.

Construction Activities for the Reported Period

During this reporting period, the principal work activities at Ko Lau Wan Pier include:

- Construction of temporary berth
- Construction of preliminary pile

Water Quality Monitoring

76 water quality monitoring events in terms of turbidity, dissolved oxygen, suspended solids, temperature, and salinity was carried out at MK1, MK2, MK3, MK4, CK1 and CK2 at Ko Lau Wan except at mid-flood tide on 22 Jul and on 13 Aug which could not be done due to typhoon signal hoisting.

Fluctuations for dissolved oxygen, turbidity and suspended solids resembled those fluctuations at the control stations which indicated that all the exceedances in water quality monitoring were due to natural phenomena and agreed with the changes in the control stations. Causation due to construction activities is unlikely and there were no valid exceedance for this reporting period.

Waste Management

5.6m³ C&D materials was produced and disposed of at public fill at SENT landfill while no general refuse or chemical waste was transported off site in this reported period.

Complaints, Notifications of Summons and Successful Prosecutions

There was no complaints, notification of prosecutions or summons in this reporting period.



1 INTRODUCTION

1.1 SCOPE OF THE REPORT

Lam Environmental Services (LAM) has been appointed to work as the Environmental Team (ET) for Kin Shing Construction Company Limited to implement the Environmental Monitoring and Audit (EM&A) programme for the Contract No. CV/2004/02 – Reconstruction of Wong Shek and Ko Lau Wan Public Piers.

This report presents the environmental monitoring and auditing work carried out at Ko Lau Wan Public Pier in accordance to Section 26 of the Particular Specification, Project Profile (PP-191/2003) and Environmental Permit (EP-186/2004) for this Project.

The following information relating to this project is documented in the EM&A Manual and, to avoid duplication, it is not presented in detail within the monthly report.

- Event-Action Plans;
- Full set of environmental mitigation measures and;
- Contracted environmental requirements.

1.2 STRUCTURE OF THE REPORT

Section 1 *Introduction* – details the scope and structure of the report.

Section 2 *Project Background* – summarizes background and scope of the project, site description, project organization and contact details of key personnel, construction programme and works undertaken during the reporting period.

Section 3 *Implementation Status* – summarizes the status of Environmental Permits / Licenses, implementation of environmental protection and pollution control / mitigation measures in an updated schedule for the reporting period.

Section 4 *Monitoring Requirements* – summarizes all monitoring parameters, monitoring methodology and equipment, monitoring locations, monitoring frequency and programmes.



Section 5 ***Quarterly Review of Monitoring Results*** – summarizes the status and review of monitoring, compliance, graphical plots of trends and waste management status in the reporting period.

Section 6 ***Complaints, Notification of Summons and Prosecution*** – summarizes the complaints, notification of summons and successful prosecution for breaches of environmental legislation and the actions taken within the reporting period.

Section 7 ***Conclusion and Recommendations***

2 PROJECT BACKGROUND

2.1 SCOPE OF THE PROJECT AND SITE DESCRIPTION

The works mainly comprise demolition of the existing piers and construction of reinforced concrete piers with roof covers at Ko Lau Wan. The construction of the Project is scheduled to commence in November 2004 for completion in August 2006. The construction period is 630 days for the entire construction.

The site layout plan is shown in [Figure 2.1](#).

2.2 PROJECT ORGANIZATION AND CONTACT PERSONNEL

Civil Engineering Office of Civil Engineering and Development Department is the project proponent. The organization chart for the EM&A programme is attached in [Appendix A](#).

Under the organization chart, Resident Engineer, Contractor, Independent Environmental Checker, Environmental Team are appointed to manage and control environmental issues for the construction phase of CV/2004/02. Overall responsibilities and duties of the team are found in the corresponding EM&A Manual. Key personnel and contact particulars are summarized in **Table 2.2**:

Table 2.2 Contact Details of Key Personnel

Post	Name	Contact No.	Contact Fax	Mobile No.
Resident Engineer	W H Lee	2760 5737	2714 2054	9630 1235
Site Agent	Simon Fok	2729 6779	2729 7858	6010 8730
Independent Environmental Checker (IEC)	Joseph T L Poon	2452 7140	2450 6138	9450 1968
Environmental Team Leader (ETL)	Raymond Dai	2975 3300	2897 5509	9738 0738

2.3 CONSTRUCTION PROGRAMME AND WORKS

Major construction works at Ko Lau Wan Pier carried out during this reporting period are:

- Construction of temporary berth
- Construction of preliminary pile

3 IMPLEMENTATION STATUS

3.1 STATUS OF REGULATORY COMPLIANCE

A summary of the current status on licences and/or permits on environmental protection pertinent to the Project is shown in **Table 3.1**.

Table 3.1 Cumulative Summary of Valid Licences and Permits

Permits and/or Licences	Reference No.	Issued Date	Expiry Date	Status
Environmental Permit	EP-186/2004/A	28-04-2005	-	Issued on receipt of VEP-171/2005 dated 14-04-2005
Waste Producer Registration	WPN5213-742-K1081-05	12-05-2005	-	Notified
Construction Noise Permit	-	-	-	No valid CNP granted to the Contractor

3.2 IMPLEMENTATION OF POLLUTION CONTROL / MITIGATION MEASURES

The contractor implemented various environmental mitigation measures as recommended in the Particular Specification and the Environmental Permit. The implementation schedule is presented in [Appendix B](#).

4 MONITORING REQUIREMENTS

Locations of environmental monitoring stations are referred in [Figure 4.1](#).

4.1 WATER QUALITY MONITORING

The brief for EM&A works details 6 designated stations to be monitored during the construction period comprising 4 monitoring stations and 2 control stations. These stations have been coded as MK1, MK2, MK3, MK4, CK1 and CK2 respectively.

Table 4.1a Water Quality Monitoring Stations

Station	HK Metric Grid (Easting / Northing)	Description
MK1	855 212.850E / 835 496.101N	Impact Monitoring
MK2	855 158.643E / 835 539.315N	Impact Monitoring
MK3	855 170.762E / 835 401.962N	Impact Monitoring
MK4	855 108.767E / 835 402.196N	Impact Monitoring
CK1	854 822.145E / 835 428.000N	Control during mid-ebb
CK2	854 996.976E / 835 675.135N	Control during mid-flood

Monitoring methodology and calibration details shall be referred to individual monthly reports.

4.2 MONITORING PARAMETERS AND FREQUENCY

Water quality monitoring programme has been scheduled according to the requirements stipulated in the EM&A Manual produced for the Project summarized in [Tables 4.2](#).

Table 4.2 Water Quality Monitoring Parameters and Frequencies

Station(s)	Parameter	Frequency
MK1, MK2 MK3, MK4 CK1, CK2	DO, Temperature, Salinity, Turbidity, Suspended Solids, Water Depth	<u>For piling or demolition works</u> 3 days per week at mid-flood and mid-ebb <u>For marine works other than piling or demolition works</u> 1 day per week at mid-flood and mid-ebb

4.3 WATER QUALITY CRITERIA

Water quality criteria were determined prior to the commencement of the construction of the project for the purpose of impact monitoring. Various levels established based on the results of baseline monitoring and the Event Action Plan stipulated in the EM&A Manual are summarized in **Tables 4.3**.

Table 4.3 Action and Limit Levels for Water Quality Monitoring

Parameter	Action Level	Target Level
Dissolved Oxygen (Surface, Middle & Bottom)	<u>Surface & Middle</u> For Ko Lau Wan – 6.90	<u>Surface & Middle</u> For Ko Lau Wan – 6.79
	<u>Bottom</u> For Ko Lau Wan – 6.75	<u>Bottom</u> For Ko Lau Wan – 5.63
Turbidity (depth-averaged)	For Ko Lau Wan – 1.25 or 120% of upstream control station's Tby at the same tide of same day, whichever is lower	For Ko Lau Wan – 1.60 or 130% of upstream control station's Tby at the same tide of same day, whichever is lower
Suspended Solids (depth-averaged)	For Ko Lau Wan – 6.30 or 120% of upstream control station's SS at the same tide of same day, whichever is lower	For Ko Lau Wan – 6.87 or 130% of upstream control station's SS at the same tide of same day, whichever is lower

Note:

1. "Depth-averaged" is calculated by taking the arithmetic means of reading all three depths.
2. For Dissolved Oxygen, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
3. For Turbidity and Suspended Solid, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
4. All the figures given in the table are used for reference only and the Engineer may amend the figures whenever it is considered as necessary.

5 QUARTERLY REVIEW OF MONITORING AND COMPLIANCE

5.1 WATER QUALITY

Water quality monitoring was carried out on 76 occasions at stations MK1, MK2, MK3, MK4, CK1 and CK2. Averaged water quality monitoring results in this reporting period are reviewed and summarized in **Tables 5.1a and 5.1b**. Graphical trend is presented in [Figure 5.1a – 5.1h](#).

Table 5.1a Water Quality Monitoring Results (mid-flood tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle (mg/L)	Averaged DO Bottom (mg/L)	Averaged Turbidity (NTU)	Averaged Suspended Solids (mg/L)
MK1	4.98	4.31	1.53	10.15
MK2	4.79	3.29	1.59	10.26
MK3	5.21	4.42	1.53	10.59
MK4	4.98	3.34	1.56	9.98
CK1	4.68	3.24	1.55	8.86
CK2	4.94	2.84	1.60	9.98

Table 5.1b Water Quality Monitoring Results (mid-ebb tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle (mg/L)	Averaged DO Bottom (mg/L)	Averaged Turbidity (NTU)	Averaged Suspended Solids (mg/L)
MK1	4.81	3.98	1.51	12.00
MK2	4.93	3.32	1.54	10.09
MK3	5.33	4.57	1.59	11.21
MK4	5.02	3.61	1.63	12.28
CK1	4.65	3.03	1.54	10.08
CK2	4.99	2.97	1.57	10.95

5.2 WASTE MONITORING RESULTS

5.6m³ C&D materials was produced and disposed of at public fill at SENT landfill while no general refuse or chemical waste was transported off site in this reported period.

5.3 COMPLIANCE REVIEW

Water quality exceedances are summarized **Tables 5.3a and 5.3b**. Exceedances caused by natural phenomena namely fluctuation of overall water quality by comparing the graphical trends of monitoring and control stations are eliminated in order to identify the valid exceedance due to construction activities.

Table 5.3a Summary of Water Quality Exceedance (mid-flood tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle	Averaged DO Bottom	Averaged Turbidity	Averaged Suspended Solids
MW1	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)
MW2	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)

Table 5.3b Summary of Water Quality Exceedance (mid-ebb tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle	Averaged DO Bottom	Averaged Turbidity	Averaged Suspended Solids
MW1	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)
MW2	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)

As shown in the graphical trend, the observed exceedances in dissolved oxygen could possibly due to increasing temperature of marine water during the summer period, reducing the overall solubility of dissolved oxygen in marine water when compared to the action and limit levels derived from baseline water quality monitoring done during the period from January to February 2005 (water temperature: 16 - 17 °C). Moreover, drastic fluctuation recorded at the control station suggests variation due to monsoon effect, causing large degree of variation in water current or tidal effect.

The observed exceedance for turbidity and suspended solids are respectively within 2 NTU and 15 mg/L, indicating the fluctuation could possibility due to the natural variation around the small values of turbidity and suspended solids, possibly due to water current or tidal interference.

To conclude, the fluctuations for dissolved oxygen, turbidity and suspended solids resembled those fluctuations at the control stations which indicated that all the exceedances in water quality monitoring were due to natural phenomena and agreed with the changes in the control stations. Therefore, causation due to construction activities is unlikely and there were no valid exceedance for this reporting period.

7 COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTION

No complaint, inspection notice, notification of summons or prosecution was received in this reporting period. Complaint log, summaries of cumulative complaints and successful prosecutions are presented in **Table 7a**, **Table 7b**, **Table 7c** and **Table 7d** respectively.

Table 7a Environmental Complaints Log

Complaint Log No.	Date of Receipt	Received From and By	Nature of Complaint	Date investigated	Outcome	Date of Reply and to Whom
-	-	-	-	-	-	-

Table 7b Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative No. Project-to-Date
Air	-	-	-
Noise	-	-	-
Water	-	-	-
Waste	-	-	-
Total	-	-	-

Table 7c Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Prosecutions this month (Offence Date)	Cumulative Number to Date
Air	-	-	-
Noise	-	-	-
Water	-	-	-
Waste	-	-	-
Total	-	-	-

Table 7d Cumulative Statistics on Notification of Summons

Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Summons	Cumulative Number to Date
Air	-	-	-
Noise	-	-	-
Water	-	-	-
Waste	-	-	-
Total	-	-	-



8

CONCLUSION AND RECOMMENDATIONS

The EM&A programme was carried out in accordance with the EM&A Manual requirements, minor alterations to the programme proposed in the previous EM&A Report were made in response to changing circumstances.

No exceedance due to construction activities was reported in routine environmental monitoring. Such results indicate that the construction operation generally performed reasonably acceptable against environmental auditing criteria.

In summary, environmental mitigation measures are being satisfactorily implemented within the CV/2004/02 project along with the on-going construction activities.



Figure 2.1

Location Plan



Figure 4.1

Layout of Environmental Monitoring Stations

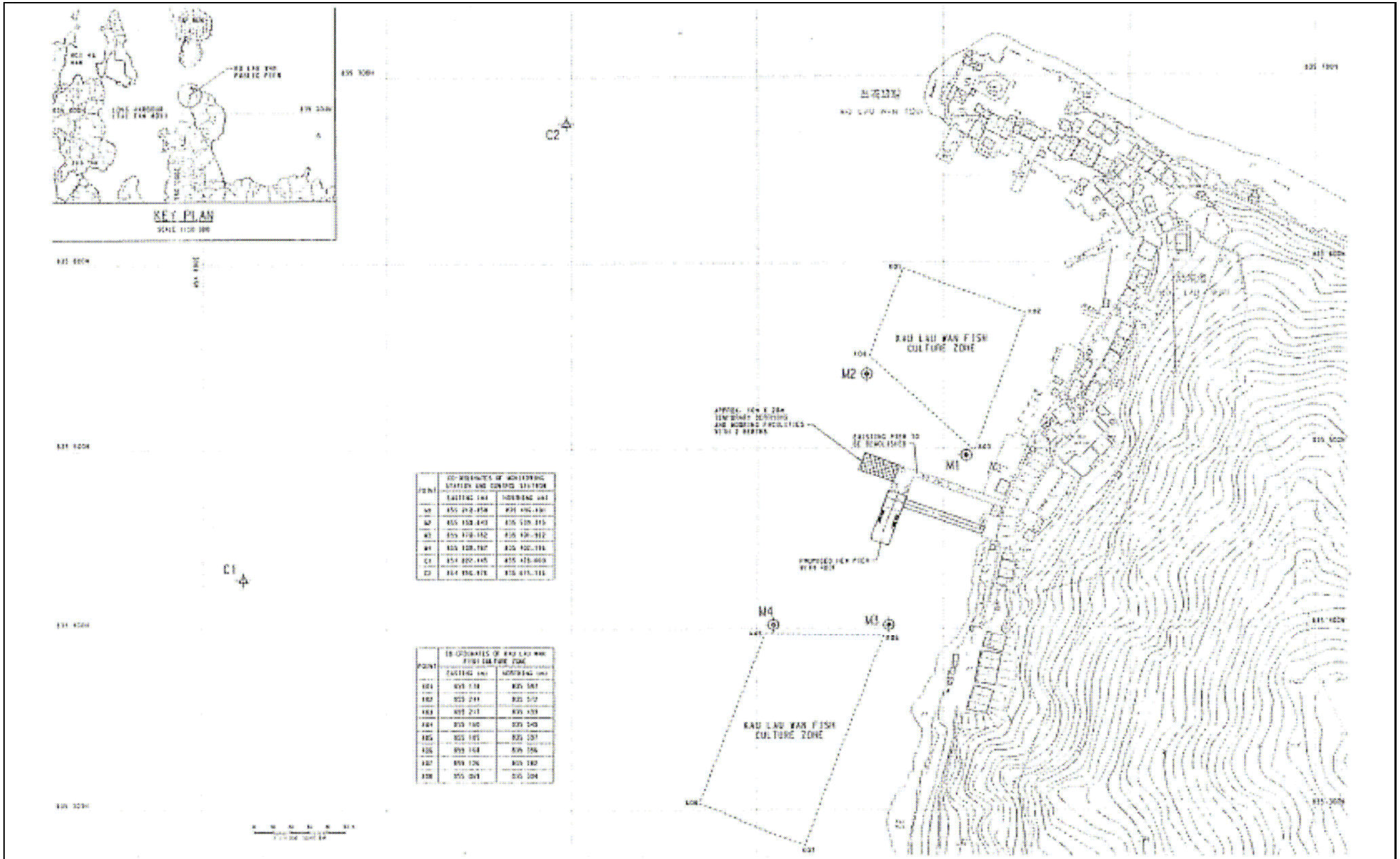
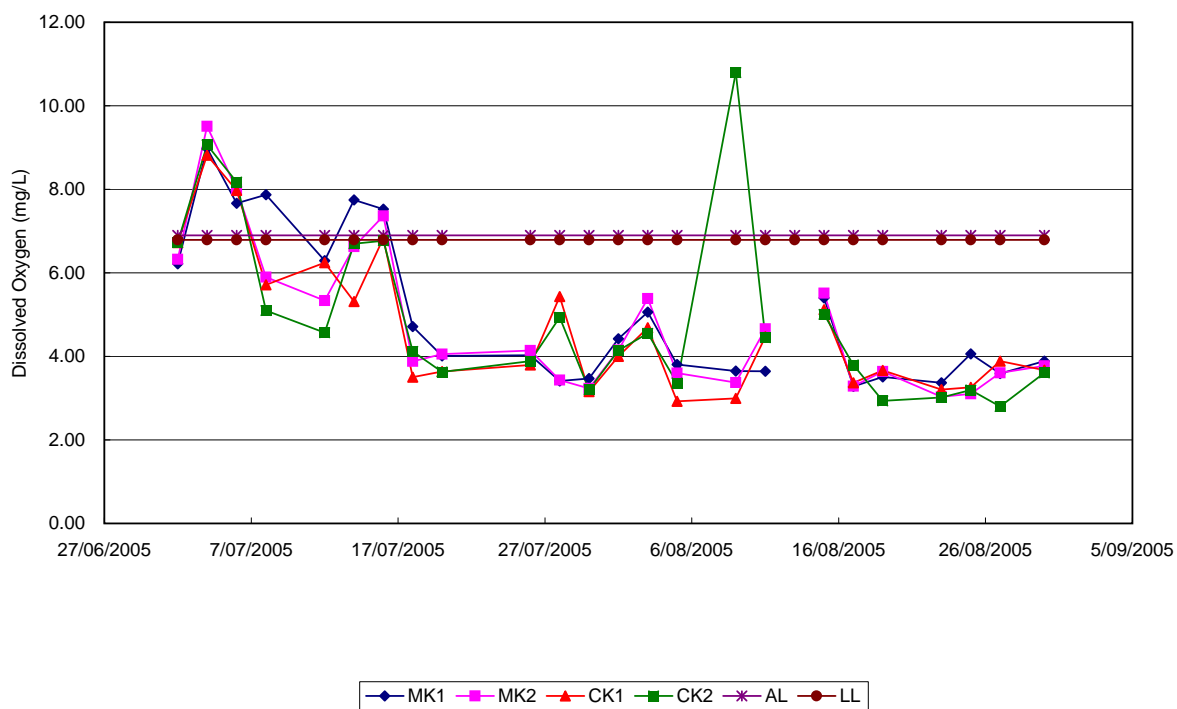




Figure 5.1a-h

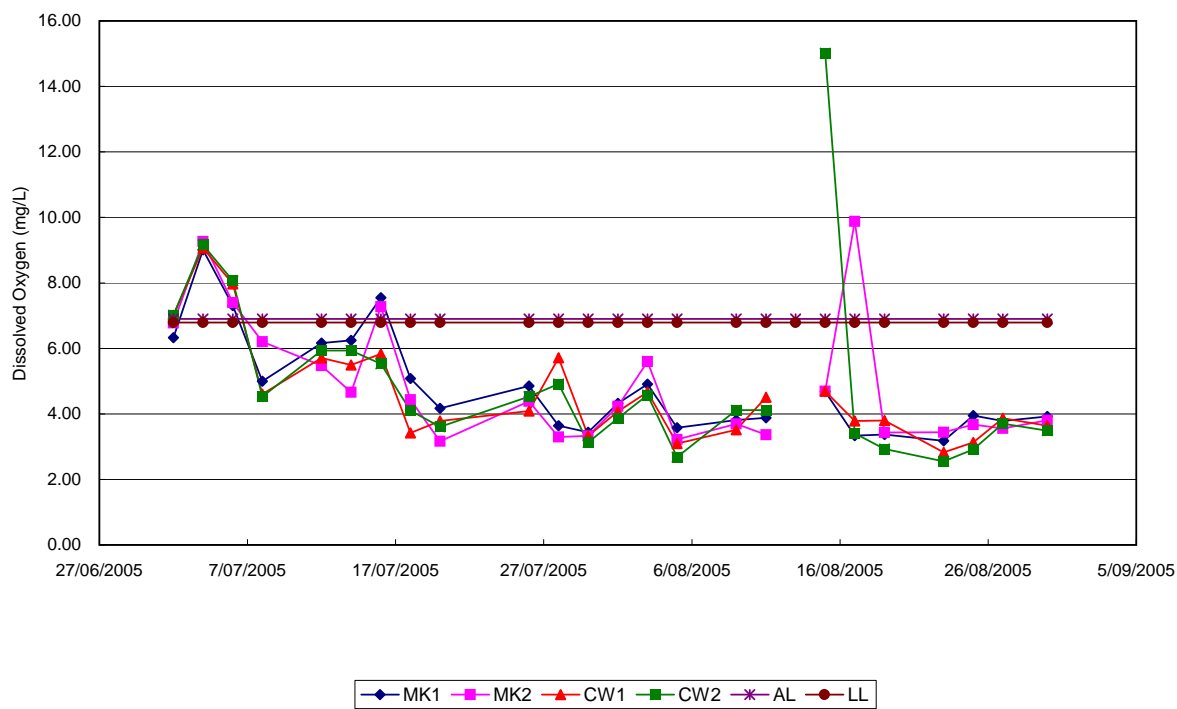
Graphical Plots of Water Quality Monitoring Results

Figure 5.1a - Dissolved Oxygen (Surface & Middle Averaged) - Mid-Flood
(Ko Lau Wan)



Legend: MK1 (blue diamond), MK2 (magenta square), CK1 (red triangle), CK2 (green square), AL (purple asterisk), LL (brown circle)

Figure 5.1b - Dissolved Oxygen (Surface & Middle Averaged) - Mid-Ebb
(Ko Lau Wan)



Legend: MK1 (blue diamond), MK2 (magenta square), CW1 (red triangle), CW2 (green square), AL (purple asterisk), LL (brown circle)

Figure 5.1c - Dissolved Oxygen (Bottom Averaged) - Mid-Flood
(Ko Lau Wan)

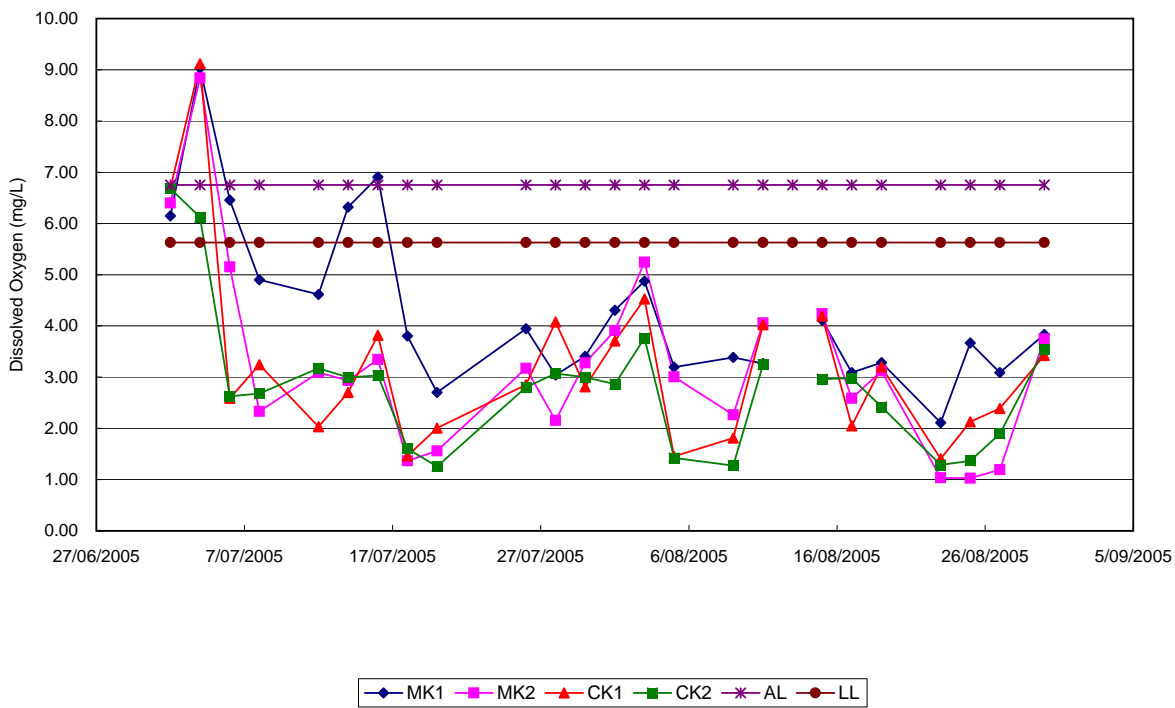


Figure 5.1d - Dissolved Oxygen (Bottom Averaged) - Mid-Ebb
(Ko Lau Wan)

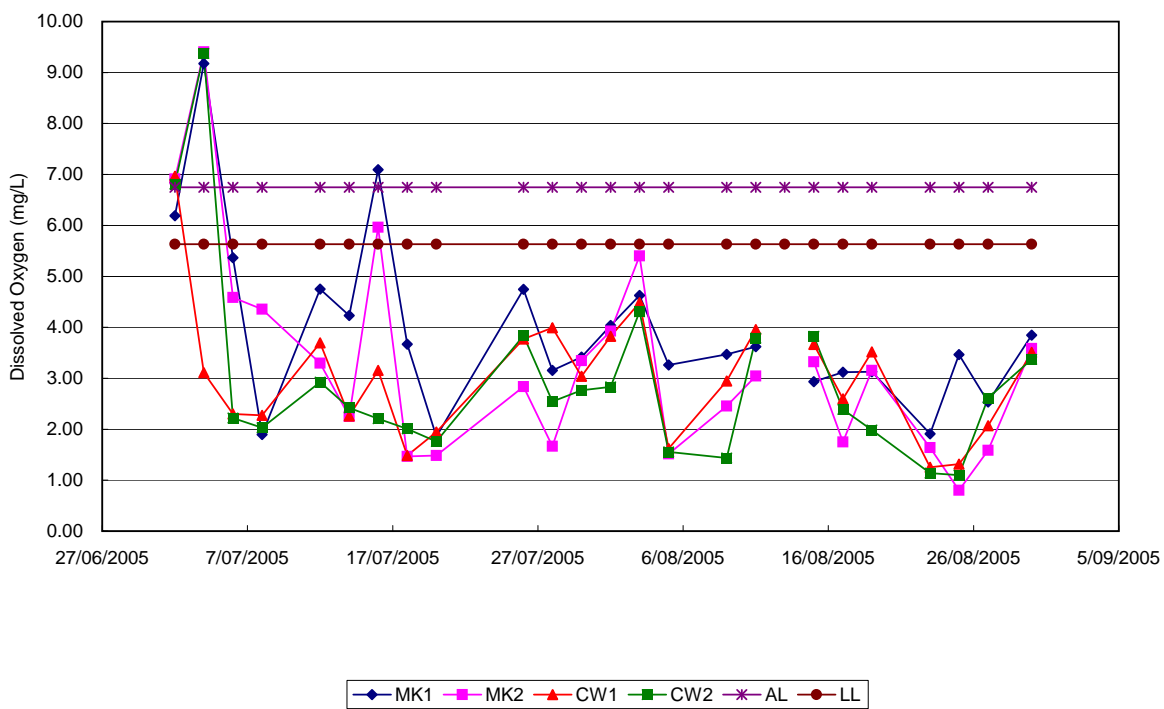


Figure 5.1e - Turbidity (Depth Averaged) - Mid-Flood
(Ko Lau Wan)

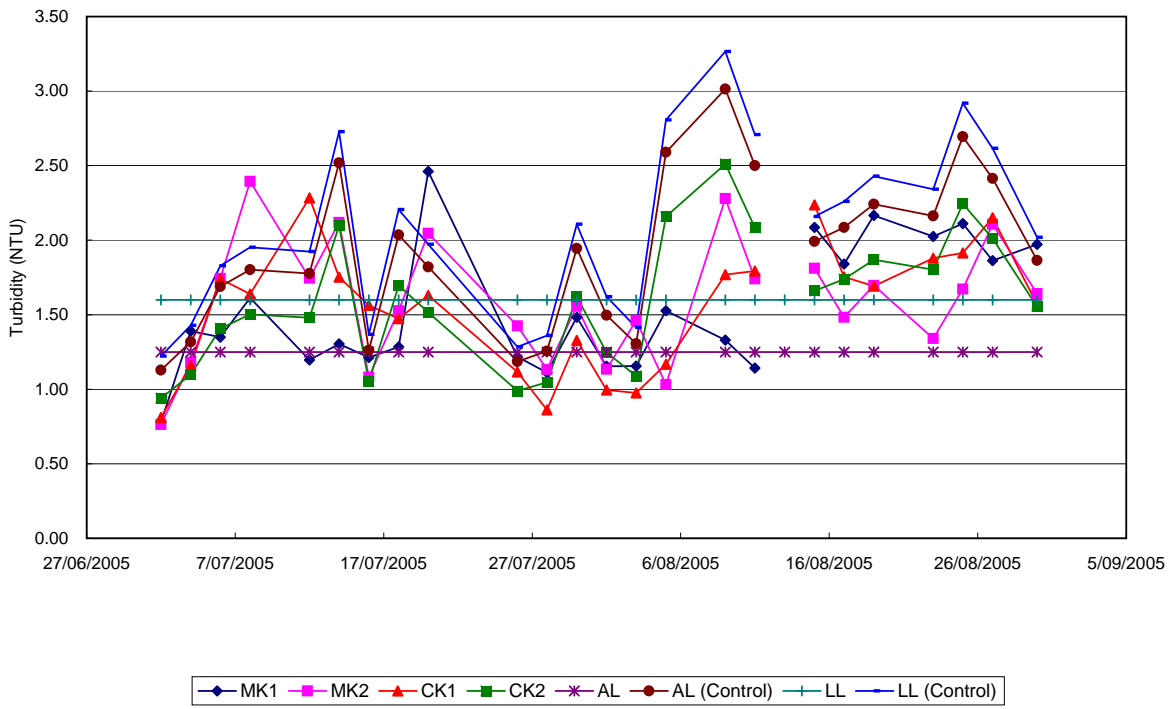


Figure 5.1f - Turbidity (Depth Averaged) - Mid-Ebb
(Ko Lau Wan)

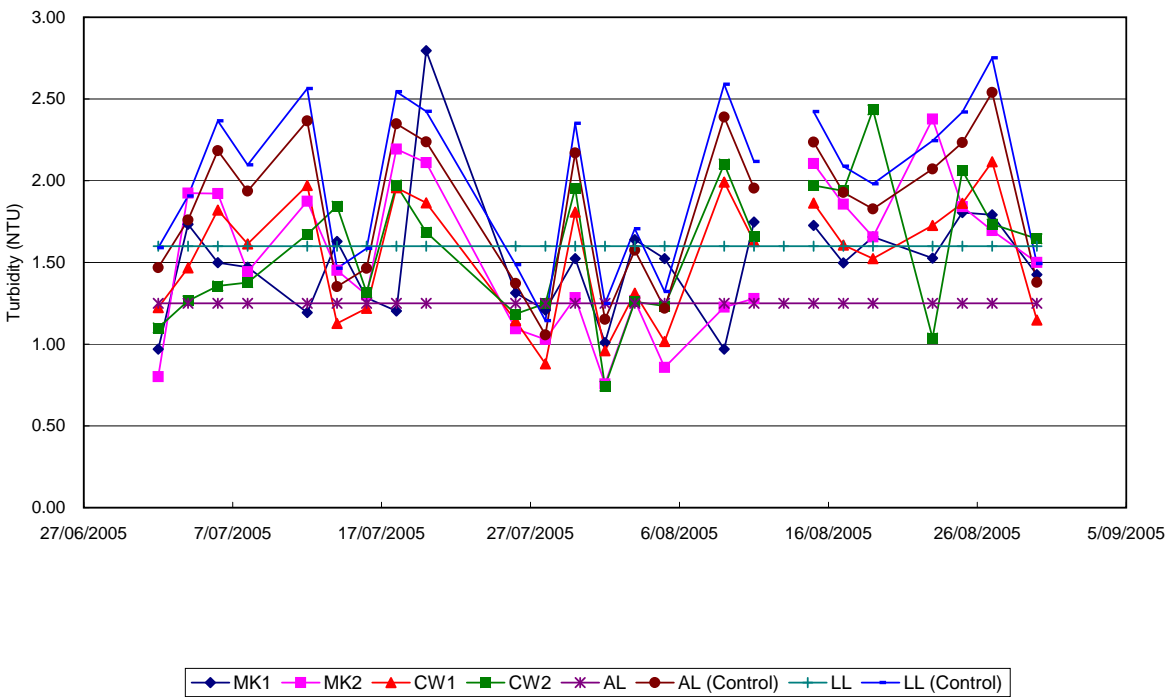


Figure 5.1g - Suspended Solids (Depth Averaged) - Mid-Flood
(Ko Lau Wan)

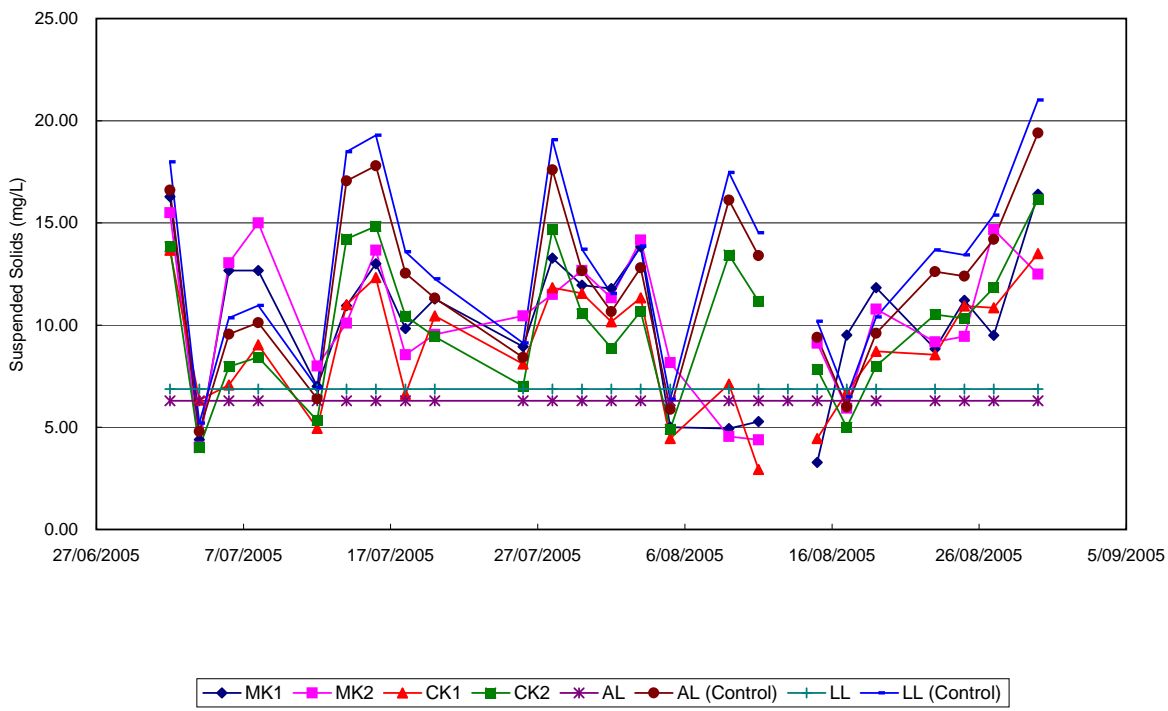
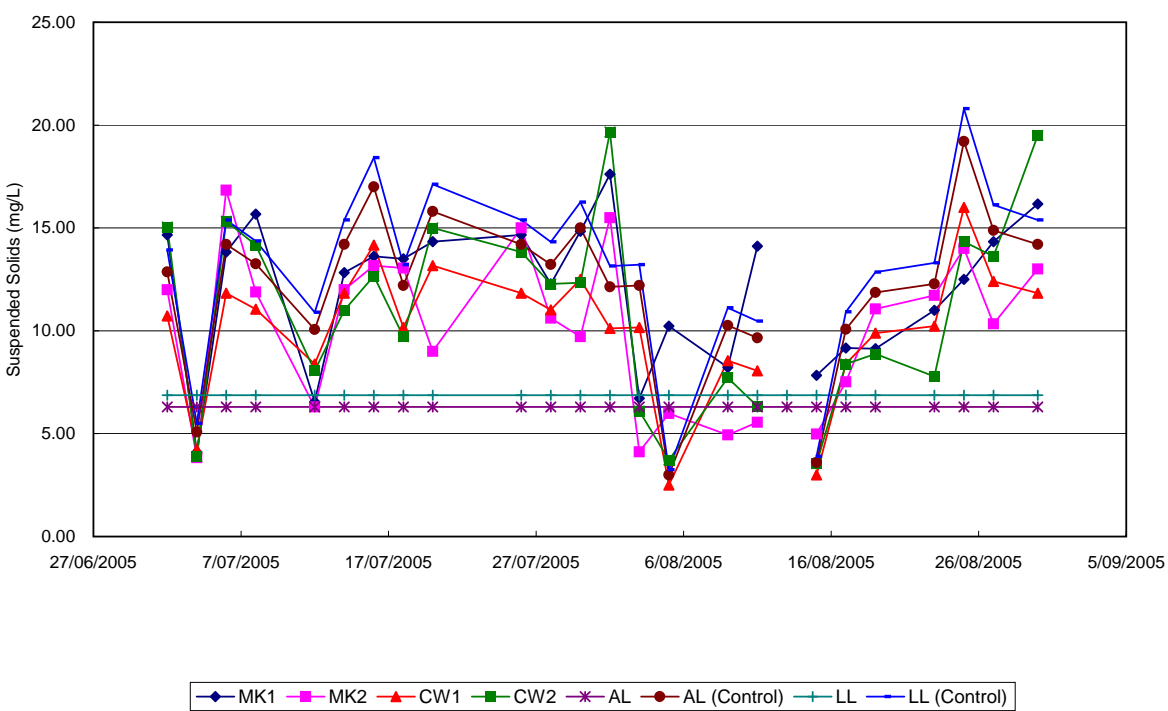


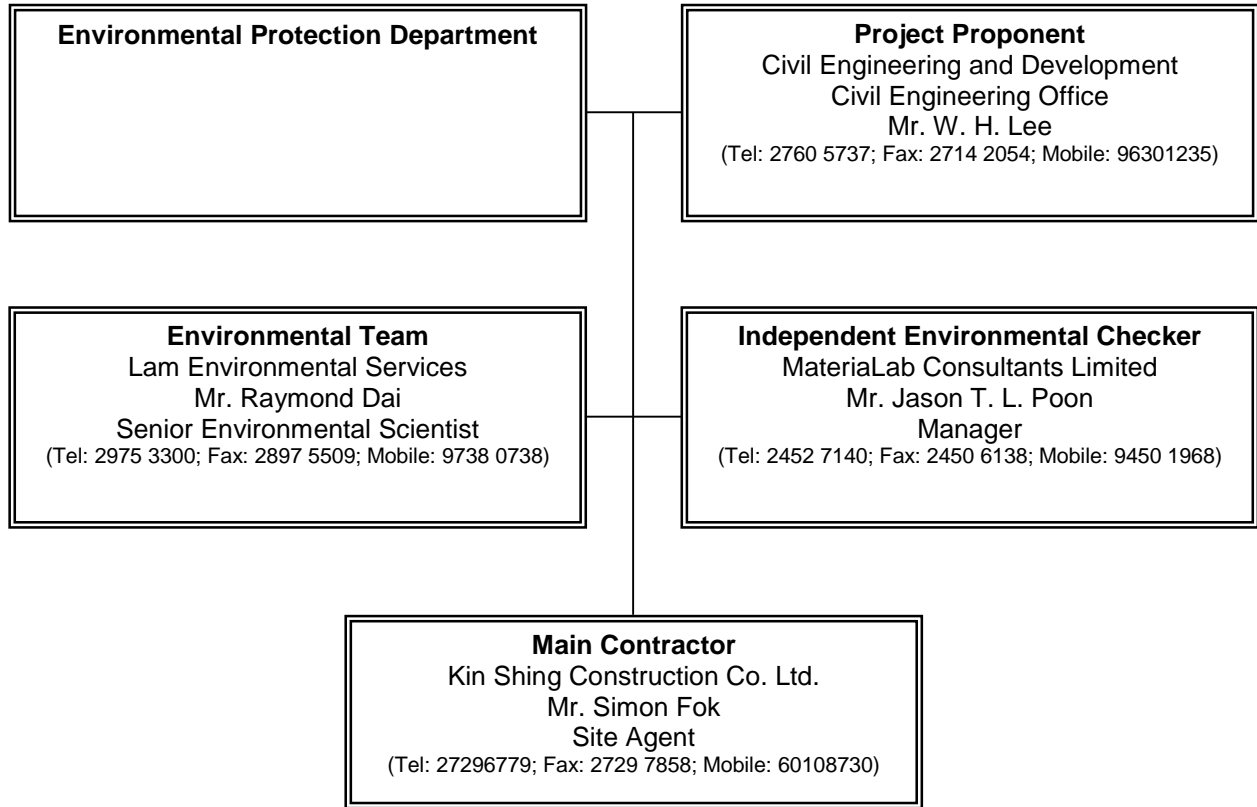
Figure 5.1h - Suspended Solids (Depth Averaged) - Mid-Ebb
(Ko Lau Wan)





Appendix A

Organization Chart





Appendix B

Implementation Schedule of Mitigation Measures



Implementation Schedule of Mitigation Measures – Ko Lau Wan

Environmental Aspect	No.	Mitigation Measures	Implementation Status	Follow Up Action(s)
Air Quality	AQ01	Provide a wash-pit or a wheel washing and/or vehicle cleaning facility at the exits.	Not applicable at this stage	-
	AQ02	Provide a hard surfaced road between the wheel washing facilities and any finished road.	Not applicable at this stage	-
	AQ03	No burning of construction wastes or vegetation shall be allowed on the Site.	Implemented	-
	AQ04	In the process of material handling, any material which has the potential to create dust shall be treated with water or sprayed with wetting agent.	Not applicable at this stage	-
	AQ05	Any vehicle with an open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards.	Not applicable at this stage	-
	AQ06	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.	Not applicable at this stage	-
	AQ07	Stockpiles of sand, aggregate and construction and demolition material greater than 20m ³ shall be enclosed on three sides, with walls extending above the pile and 2 meters beyond the front of the pile.	Not applicable at this stage	-
	AQ08	Water sprays shall be provided and used both to dampen stored materials and when receiving raw materials.	Not applicable at this stage	-
	AQ09	Clean and water the Site to minimize the fugitive dust emissions.	Implemented	-
	AQ10	Furnace, boiler or other plant or equipment or use any fuel that might in any circumstances produce smoke or any other air pollution should not be installed.	Implemented	-
Noise	N01	All plant and equipment to be used on Site are properly maintained in good operating condition and noisy construction activities shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means to avoid disturbance to any nearby noise sensitive receivers.	Implemented	-
	N02	No excavator mounted breaker shall be used within 125m from any nearby noise sensitive receivers. Use hydraulic concrete crusher whenever applicable.	Implemented	-
	N03	All construction works should stop on Sundays and General Holidays.	Implemented	-
Water Quality	WQ01	Water in wheel washing facilities shall be changed at frequent intervals and sediments shall be removed regularly.	Not applicable at this stage	-
	WQ02	The polluted water from the wheel washing facilities would not be discharged into all existing stream courses/drains and nearby waterbodies.	Not applicable at this stage	-
	WQ03	All existing stream courses and drains within, and adjacent to the Site should be kept free from any debris and any excavated materials arising from the Works	Implemented	-
	WQ04	Chemicals and concrete agitator washings should not be deposited in watercourses.	Scrum observed at sea surface	Remove immediately
	WQ05	The effluent shall comply with the standards stated in the "Technical Memorandum on Standards and Effluent discharges into Drainage and Sewerage Systems, Inland and Coastal Waters" for the appropriate Water Control Zone.	Implemented	-
	WQ06	No spoil or debris of any kind is allowed to be pushed, washed down, fall or be deposited on land or on the seabed adjacent to the Site.	Plastic sheet for piling damaged	Repair prior to next piling operation
	WQ07	Maintain any existing site drainage system at all times including removal of solids in sand traps, manholes and stream beds.	Damaged / missing sand bags at the edge of the barge	Remove and replace with new ones
	WQ08	Material from any earthworks should not be washed into the drainage system.	Implemented	-
	WQ09	Silt curtain shall be provided during all demolition works and piling works with the Site.	Implemented	-



Implementation Schedule of Mitigation Measures – Ko Lau Wan

Environmental Aspect	No.	Mitigation Measures	Implementation Status	Follow Up Action(s)
	WQ10	Silt curtain shall be formed from tough, abrasion-resistant permeable membranes suitable for the purpose, supported on floating booms in such a way as to ensure that the passage of turbid water to the surrounding water shall be restricted.	Gap observed at silt curtain	Close immediately
	WQ11	No dredging and spoil dumping shall be conducted.	Not applicable at this stage	-
Ecology	E01	Marker buoys shall be set up to indicate the location of the "Coral Exclusion Zone". All working vessels shall be restricted to encroach the "Coral Exclusion Zone"	Implemented	-
	E02	No overloading of the working barges during operation and no movement of the working barges, particularly close to the pier and shallow areas, during low tide should be allowed.	Not applicable at this stage	-
	E03	No coral shall be enclosed by the silt curtain.	Not applicable at this stage	-
Waste	W01	All excavated materials should be sorted to recover the inert portions for reuse on site or disposal to designated outlets.	Not applicable at this stage	-
	W02	All metals should be recovered on site for collection by recycling contractors.	Implemented	-
	W03	All cardboard and paper packaging should be recovered on site, properly stockpiled in dry condition and covered to prevent cross contamination by other C&D materials.	Implemented	-
	W04	All demolition debris from demolition works should be sorted to recover on site broken concrete, reinforcement bars, mechanical and electrical fittings as well as other building services fittings/materials that have established recycling outlets.	Implemented	-



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Materialab**FAX MESSAGE**

Priority : normal / urgent

To	Lam Environmental Services	Ref. No.	MCLF1335
Country		Fax No.	2897 5509
Attn.	Mr. Raymond Dai	Date	29 November 2005
From	Joseph Poon	No. of Pages	1 (Incl. this page)
C.c. To	Mr. Simon Fok (Kin Shing Con. Co. Ltd.)	Fax No.	2729 7858
Subject	Contract No. CV/2004/02 Reconstruction of Wong Shek and Ko Lau Wan Public Piers Quarterly EM&A Summary Report		

We refer to the June to August Quarterly EM&A reports for Wong Shek Pier and Ko Lau Wan Pier that we received through email on 19 November 2005 and are pleased to confirm we have no further comment on the reports.

Should you require further information, please feel free to contact us.

Best regards,


 Joseph Poon
 Independent Environmental Checker

JP/cy

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EXECUTIVE SUMMARY

This is the Quarterly Environmental Monitoring and Audit (EM&A) report for Jun-August 2005 under Contract No. CV/2004/02 – Reconstruction of Wong Shek and Ko Lau Wan Public Piers. This report presents the environmental monitoring and auditing (EM&A) findings based on data and information recorded from the period 1st Jun to 31st Aug 2005 for the construction of Wong Shek Public Pier.

Construction Activities for the Reported Period

During this reporting period, the principal work activities at Wong Shek Pier include:

- Construction of main piles
- Construction of temporary berth
- Construction of preliminary pile
- Pile loading test

Water Quality Monitoring

75 water quality monitoring events in terms of turbidity, dissolved oxygen, suspended solids, temperature, and salinity was carried out at MW1, MW2, CW1 and CW2 at Wong Shek except at mid-flood tide on 22 Jul and on 13 Aug which could not be done due to typhoon signal hoisting.

Fluctuations for dissolved oxygen, turbidity and suspended solids resembled those fluctuations at the control stations which indicated that all the exceedances in water quality monitoring were due to natural phenomena and agreed with the changes in the control stations. Causation due to construction activities is unlikely and there were no valid exceedance for this reporting period.

Waste Management

5.6m³ C&D materials was produced and disposed of at public fill at SENT landfill while no general refuse or chemical waste was transported off site in this reported period.

Complaints, Notifications of Summons and Successful Prosecutions

There was no complaints, notification of prosecutions or summons in this reporting period.



1 INTRODUCTION

1.1 SCOPE OF THE REPORT

Lam Environmental Services (LAM) has been appointed to work as the Environmental Team (ET) for Kin Shing Construction Company Limited to implement the Environmental Monitoring and Audit (EM&A) programme for the Contract No. CV/2004/02 – Reconstruction of Wong Shek and Ko Lau Wan Public Piers.

This report presents the environmental monitoring and auditing work carried out at Wong Shek Public Pier in accordance to Section 26 of the Particular Specification, Project Profile (PP-191/2003) and Environmental Permit (EP-186/2004) for this Project.

The following information relating to this project is documented in the EM&A Manual and, to avoid duplication, it is not presented in detail within the monthly report.

- Event-Action Plans;
- Full set of environmental mitigation measures and;
- Contracted environmental requirements.

1.2 STRUCTURE OF THE REPORT

Section 1 *Introduction* – details the scope and structure of the report.

Section 2 *Project Background* – summarizes background and scope of the project, site description, project organization and contact details of key personnel, construction programme and works undertaken during the reporting period.

Section 3 *Implementation Status* – summarizes the status of Environmental Permits / Licenses, implementation of environmental protection and pollution control / mitigation measures in an updated schedule for the reporting period.

Section 4 *Monitoring Requirements* – summarizes all monitoring parameters, monitoring methodology and equipment, monitoring locations, monitoring frequency and programmes.



Section 5 ***Quarterly Review of Monitoring Results*** – summarizes the status and review of monitoring, compliance, graphical plots of trends and waste management status in the reporting period.

Section 6 ***Complaints, Notification of Summons and Prosecution*** – summarizes the complaints, notification of summons and successful prosecution for breaches of environmental legislation and the actions taken within the reporting period.

Section 7 ***Conclusion and Recommendations***



2 PROJECT BACKGROUND

2.1 SCOPE OF THE PROJECT AND SITE DESCRIPTION

The works mainly comprise demolition of the existing piers and construction of reinforced concrete piers with roof covers at Wong Shek. The construction of the Project is scheduled to commence in November 2004 for completion in August 2006. The construction period is 630 days for the entire construction.

The site layout plan is shown in [Figure 2.1](#).

2.2 PROJECT ORGANIZATION AND CONTACT PERSONNEL

Civil Engineering Office of Civil Engineering and Development Department is the project proponent. The organization chart for the EM&A programme is attached in [Appendix A](#).

Under the organization chart, Resident Engineer, Contractor, Independent Environmental Checker, Environmental Team are appointed to manage and control environmental issues for the construction phase of CV/2004/02. Overall responsibilities and duties of the team are found in the corresponding EM&A Manual. Key personnel and contact particulars are summarized in **Table 2.2**:

Table 2.2 Contact Details of Key Personnel

Post	Name	Contact No.	Contact Fax	Mobile No.
Resident Engineer	W H Lee	2760 5737	2714 2054	9630 1235
Site Agent	Simon Fok	2729 6779	2729 7858	6010 8730
Independent Environmental Checker (IEC)	Joseph T L Poon	2452 7140	2450 6138	9450 1968
Environmental Team Leader (ETL)	Raymond Dai	2975 3300	2897 5509	9738 0738

2.3

CONSTRUCTION PROGRAMME AND WORKS

Major construction works at Wong Shek Pier carried out during this reporting period are:

- Construction of main piles
- Construction of temporary berth
- Construction of preliminary pile
- Pile loading test

The master construction programme is given in [Figure 2.3](#).

3 **IMPLEMENTATION STATUS**

3.1 **STATUS OF REGULATORY COMPLIANCE**

A summary of the current status on licences and/or permits on environmental protection pertinent to the Project is shown in **Table 3.1**.

Table 3.1 Cumulative Summary of Valid Licences and Permits

Permits and/or Licences	Reference No.	Issued Date	Expiry Date	Status
Environmental Permit	EP-186/2004/A	28-04-2005	-	Issued on receipt of VEP-171/2005 dated 14-04-2005
Waste Producer Registration	WPN5213-742-K1081-05	12-05-2005	-	Notified
Construction Noise Permit	-	-	-	No valid CNP granted to the Contractor

3.2 **IMPLEMENTATION OF POLLUTION CONTROL / MITIGATION MEASURES**

The contractor implemented various environmental mitigation measures as recommended in the Particular Specification and the Environmental Permit. The implementation schedule is presented in [Appendix B](#).

4 MONITORING REQUIREMENTS

Locations of environmental monitoring stations are referred in [Figure 4.1](#).

4.1 WATER QUALITY MONITORING

The brief for EM&A works details 4 designated stations to be monitored during the construction period comprising 2 monitoring stations and 2 control stations. These stations have been coded as MW1, MW2, CW1 and CW2 respectively.

Table 4.1a Water Quality Monitoring Stations

Station	HK Metric Grid (Easting / Northing)	Description
MW1	852 789.231E / 832 978.476N	Impact Monitoring
MW2	852 844.187E / 832 878.676N	Impact Monitoring
CW1	852 922.540E / 833 067.718N	Control during mid-flood
CW2	852 992.314E / 832 853.794N	Control during mid-ebb

Monitoring methodology and calibration details shall be referred to individual monthly reports.

4.2 MONITORING PARAMETERS AND FREQUENCY

Water quality monitoring programme has been scheduled according to the requirements stipulated in the EM&A Manual produced for the Project summarized in **Tables 4.2**.

Table 4.2 Water Quality Monitoring Parameters and Frequencies

Station(s)	Parameter	Frequency
MW1, MW2 CW1, CW2	DO, Temperature, Salinity, Turbidity, Suspended Solids, Water Depth	<u>For piling or demolition works</u> 3 days per week at mid-flood and mid-ebb <u>For marine works other than piling or demolition works</u> 1 day per week at mid-flood and mid-ebb

4.3 WATER QUALITY CRITERIA

Water quality criteria were determined prior to the commencement of the construction of the project for the purpose of impact monitoring. Various levels established based on the results of baseline monitoring and the Event Action Plan stipulated in the EM&A Manual are summarized in **Tables 4.3**.

Table 4.3 Action and Limit Levels for Water Quality Monitoring

Parameter	Action Level	Target Level
Dissolved Oxygen (Surface, Middle & Bottom)	<u>Surface & Middle</u> For Wong Shek – 6.96	<u>Surface & Middle</u> For Wong Shek – 6.69
	<u>Bottom</u> For Wong Shek – 6.93	<u>Bottom</u> For Wong Shek – 6.71
Turbidity (depth-averaged)	For Wong Shek – 1.47 or 120% of upstream control station's Tby at the same tide of same day, whichever is lower	For Wong Shek – 4.05 or 130% of upstream control station's Tby at the same tide of same day, whichever is lower
Suspended Solids (depth-averaged)	For Wong Shek – 6.85 or 120% of upstream control station's SS at the same tide of same day, whichever is lower	For Wong Shek – 8.85 or 130% of upstream control station's SS at the same tide of same day, whichever is lower

Note:

1. "Depth-averaged" is calculated by taking the arithmetic means of reading all three depths.
2. For Dissolved Oxygen, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
3. For Turbidity and Suspended Solid, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
4. All the figures given in the table are used for reference only and the Engineer may amend the figures whenever it is considered as necessary.

5 QUARTERLY REVIEW OF MONITORING AND COMPLIANCE

5.1 WATER QUALITY

Water quality monitoring was carried out on 75 occasions at stations MW1, MW2, CW1 and CW2. Averaged water quality monitoring results in this reporting period are reviewed and summarized in **Tables 5.1a and 5.1b**. Graphical trend is presented in [Figure 5.1a – 5.1h](#).

Table 5.1a Water Quality Monitoring Results (mid-flood tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle (mg/L)	Averaged DO Bottom (mg/L)	Averaged Turbidity (NTU)	Averaged Suspended Solids (mg/L)
MW1	5.52	4.78	1.60	11.98
MW2	5.62	4.00	1.60	11.34
CW1	5.20	4.75	1.65	11.44
CW2	5.19	4.08	1.68	10.69

Table 5.1b Water Quality Monitoring Results (mid-ebb tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle (mg/L)	Averaged DO Bottom (mg/L)	Averaged Turbidity (NTU)	Averaged Suspended Solids (mg/L)
MW1	5.56	4.83	1.64	11.84
MW2	5.72	4.27	1.66	11.31
CW1	5.19	4.73	1.66	11.20
CW2	5.33	4.14	1.60	10.04

5.2 WASTE MONITORING RESULTS

5.6m³ C&D materials was produced and disposed of at public fill at SENT landfill while no general refuse or chemical waste was transported off site in this reported period.

5.3 COMPLIANCE REVIEW

Water quality exceedances are summarized **Tables 5.3a and 5.3b**. Exceedances caused by natural phenomena namely fluctuation of overall water quality by comparing the graphical trends of monitoring and control stations are eliminated in order to identify the valid exceedance due to construction activities.

Table 5.3a Summary of Water Quality Exceedance (mid-flood tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle	Averaged DO Bottom	Averaged Turbidity	Averaged Suspended Solids
MW1	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)
MW2	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)

Table 5.3b Summary of Water Quality Exceedance (mid-ebb tide) – Jun-Aug 05

Station	Averaged DO Surface & Middle	Averaged DO Bottom	Averaged Turbidity	Averaged Suspended Solids
MW1	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)
MW2	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)	0 (AL); 0 (LL)

As shown in the graphical trend, the observed exceedances in dissolved oxygen could possibly due to increasing temperature of marine water during the summer period, reducing the overall solubility of dissolved oxygen in marine water when compared to the action and limit levels derived from baseline water quality monitoring done during the period from January to February 2005 (water temperature: 16 - 17 °C). Moreover, drastic fluctuation recorded at the control station suggests variation due to monsoon effect, causing large degree of variation in water current or tidal effect.

The observed exceedance for turbidity and suspended solids are respectively within 2 NTU and 30 mg/L, indicating the fluctuation could possibility due to the natural variation around the small values of turbidity and suspended solids, possibly due to water current or tidal interference.

To conclude, the fluctuations for dissolved oxygen, turbidity and suspended solids resembled those fluctuations at the control stations which indicated that all the exceedances in water quality monitoring were due to natural phenomena and agreed with the changes in the control stations. Therefore, causation due to construction activities is unlikely and there were no valid exceedance for this reporting period.

7 COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTION

No complaint, inspection notice, notification of summons or prosecution was received in this reporting period. Complaint log, summaries of cumulative complaints and successful prosecutions are presented in **Table 7a**, **Table 7b**, **Table 7c** and **Table 7d** respectively.

Table 7a Environmental Complaints Log

Complaint Log No.	Date of Receipt	Received From and By	Nature of Complaint	Date investigated	Outcome	Date of Reply and to Whom
-	-	-	-	-	-	-

Table 7b Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative No. Project-to-Date
Air	-	-	-
Noise	-	-	-
Water	-	-	-
Waste	-	-	-
Total	-	-	-

Table 7c Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Prosecutions this month (Offence Date)	Cumulative Number to Date
Air	-	-	-
Noise	-	-	-
Water	-	-	-
Waste	-	-	-
Total	-	-	-

Table 7d Cumulative Statistics on Notification of Summons

Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Summons	Cumulative Number to Date
Air	-	-	-
Noise	-	-	-
Water	-	-	-
Waste	-	-	-
Total	-	-	-



8

CONCLUSION AND RECOMMENDATIONS

The EM&A programme was carried out in accordance with the EM&A Manual requirements, minor alterations to the programme proposed in the previous EM&A Report were made in response to changing circumstances.

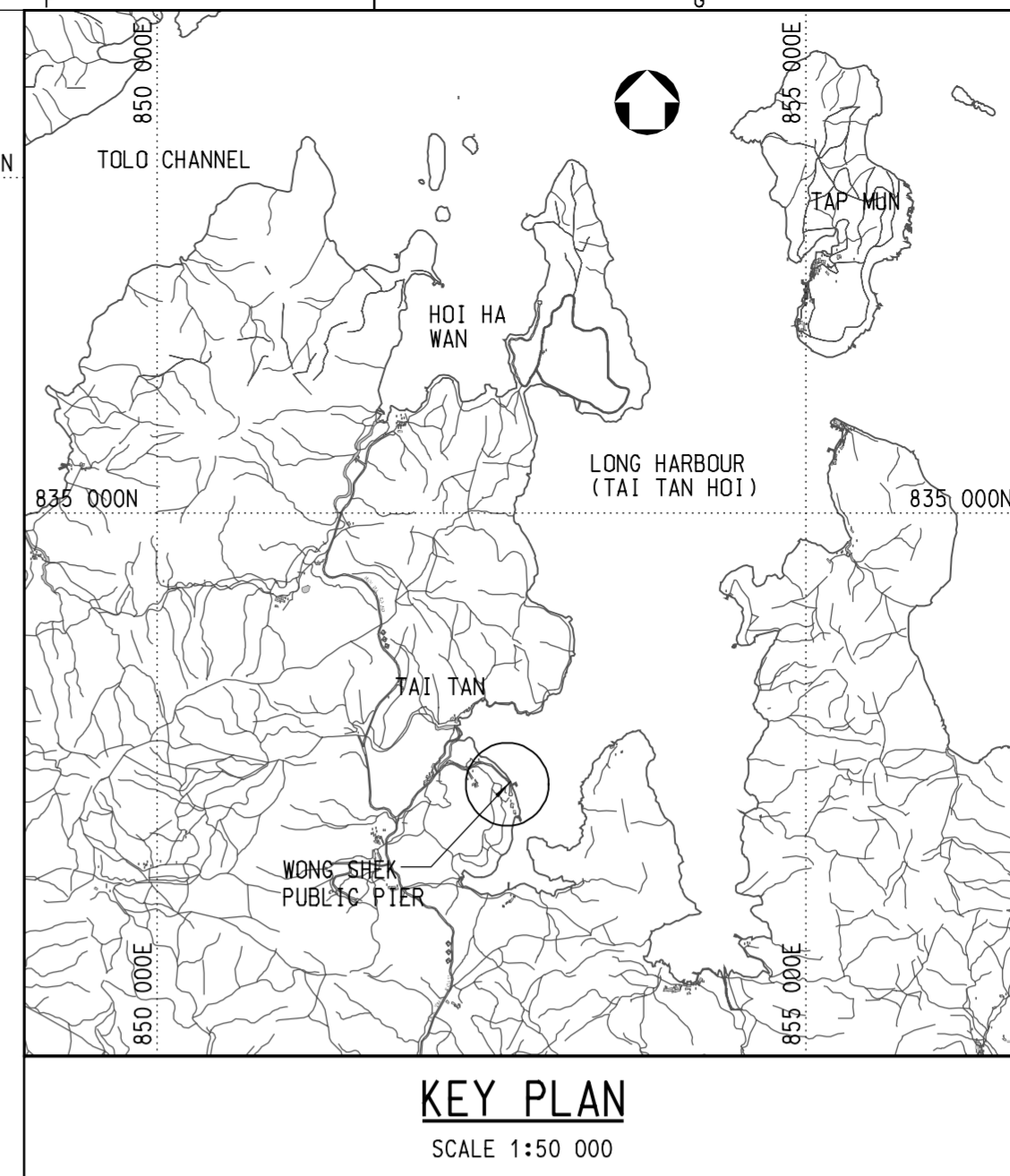
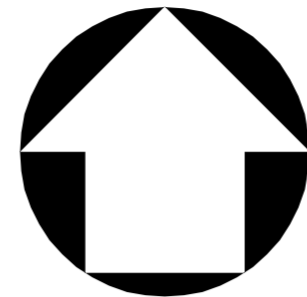
No exceedance due to construction activities was reported in routine environmental monitoring. Such results indicate that the construction operation generally performed reasonably acceptable against environmental auditing criteria.

In summary, environmental mitigation measures are being satisfactorily implemented within the CV/2004/02 project along with the on-going construction activities.



Figure 2.1

Location Plan



- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETRES.
 2. ALL CO-ORDINATES REFER TO HONG KONG GEODETIC DATUM 1980 AND ARE IN METRES.
 3. ALL LEVELS REFER TO CHART DATUM (C.D.) AND ARE IN METRES.

- LEGEND:**
- ⊙ BOLLARD
 - * NAVIGATION LIGHT

no.	date	description	checked	approved
REVISION				
		name	Initial	date
designed				
drawn				
traced				
checked				

contract no.
file no.
project no.

contract

drawing title

**WONG SHEK PUBLIC PIER
- GENERAL LAYOUT**

drawing no. scale

office



Figure 4.1

Layout of Environmental Monitoring Stations

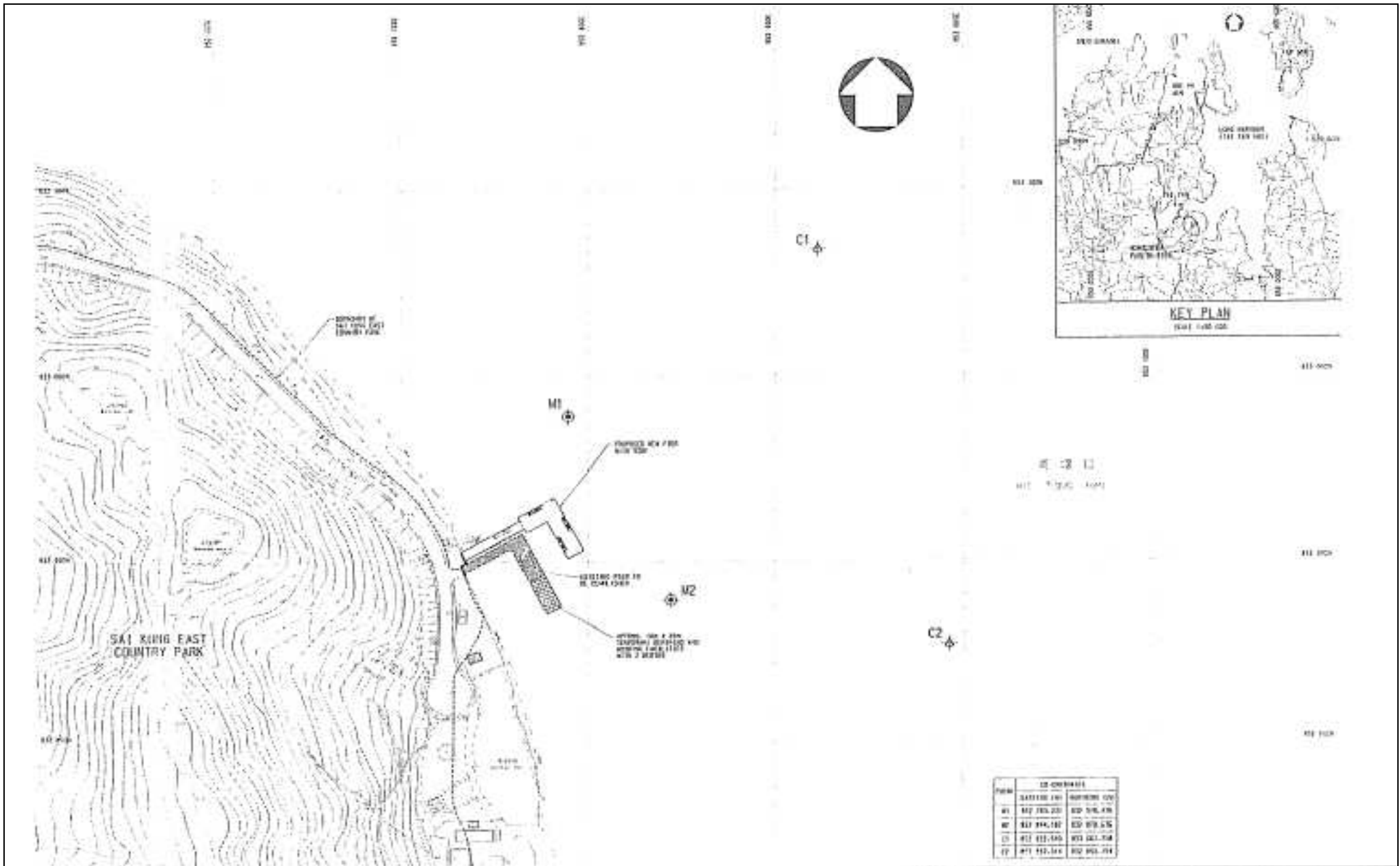


FIGURE 4.1 LAYOUT OF ENVIRONMENTAL MONITORING STATIONS (WONG SHEK)



Figure 5.1a-h

Graphical Plots of Water Quality Monitoring Results

Figure 5.1a - Dissolved Oxygen (Surface & Middle Averaged) - Mid-Flood
(Wong Shek)

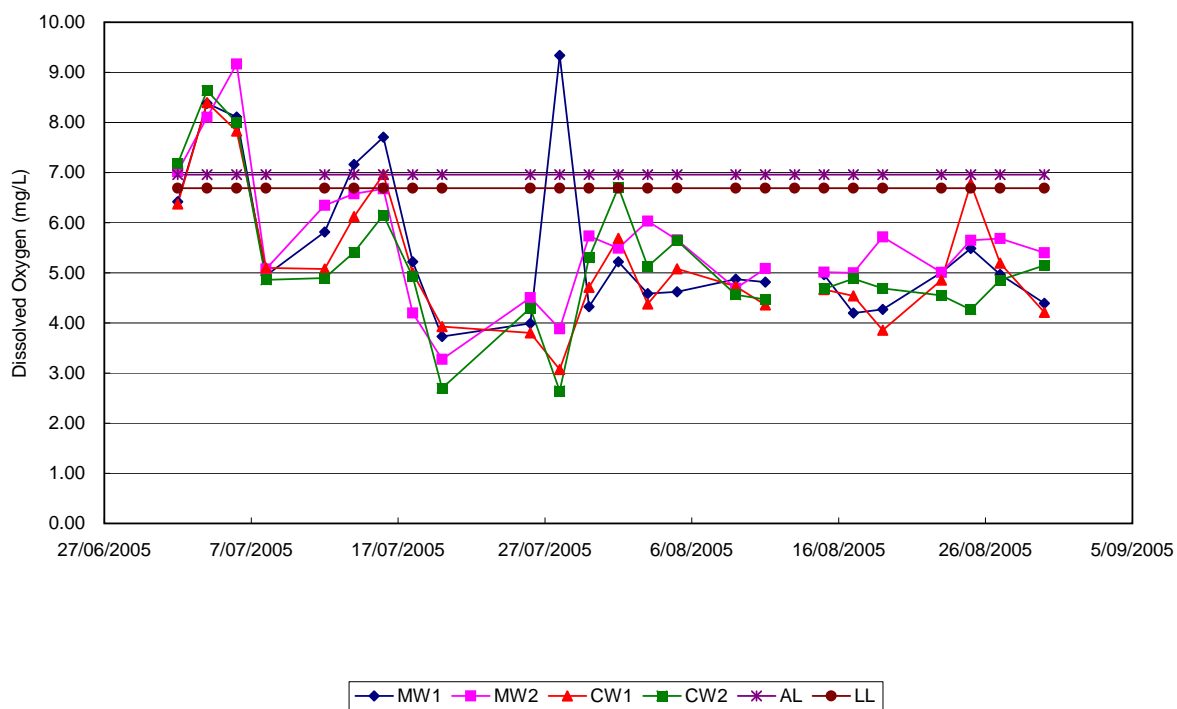


Figure 5.1b - Dissolved Oxygen (Surface & Middle Averaged) - Mid-Ebb
(Wong Shek)

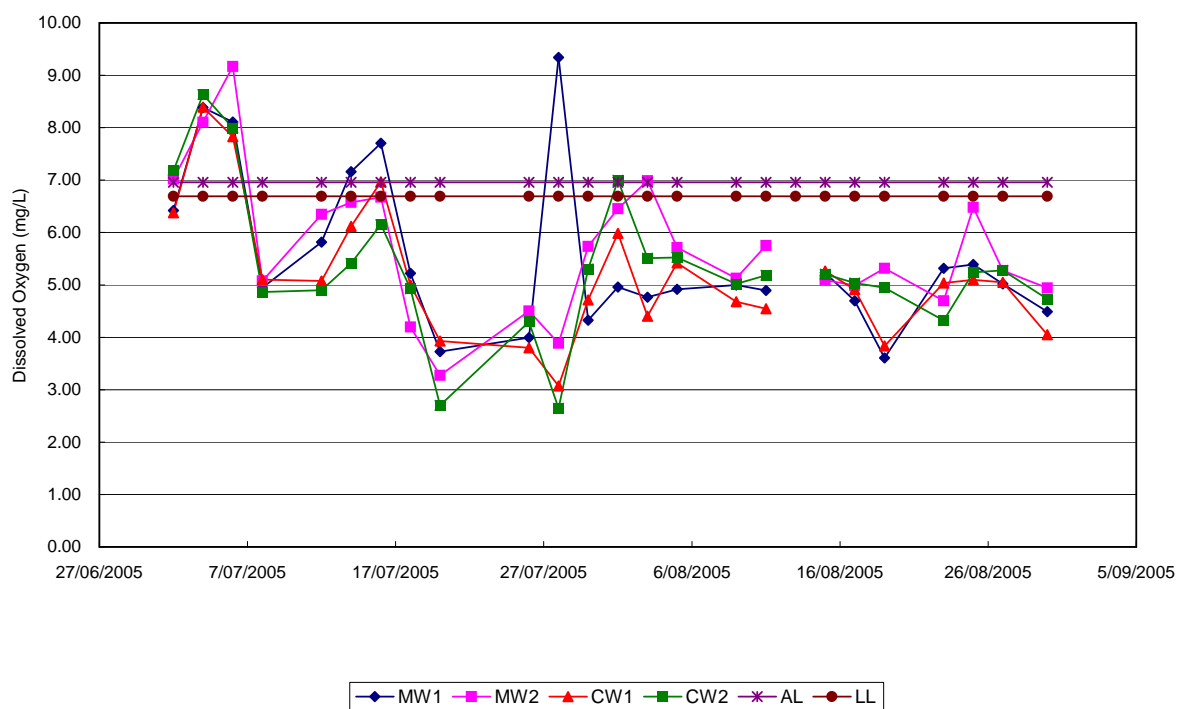


Figure 5.1c - Dissolved Oxygen (Bottom Averaged) - Mid-Flood
(Wong Shek)

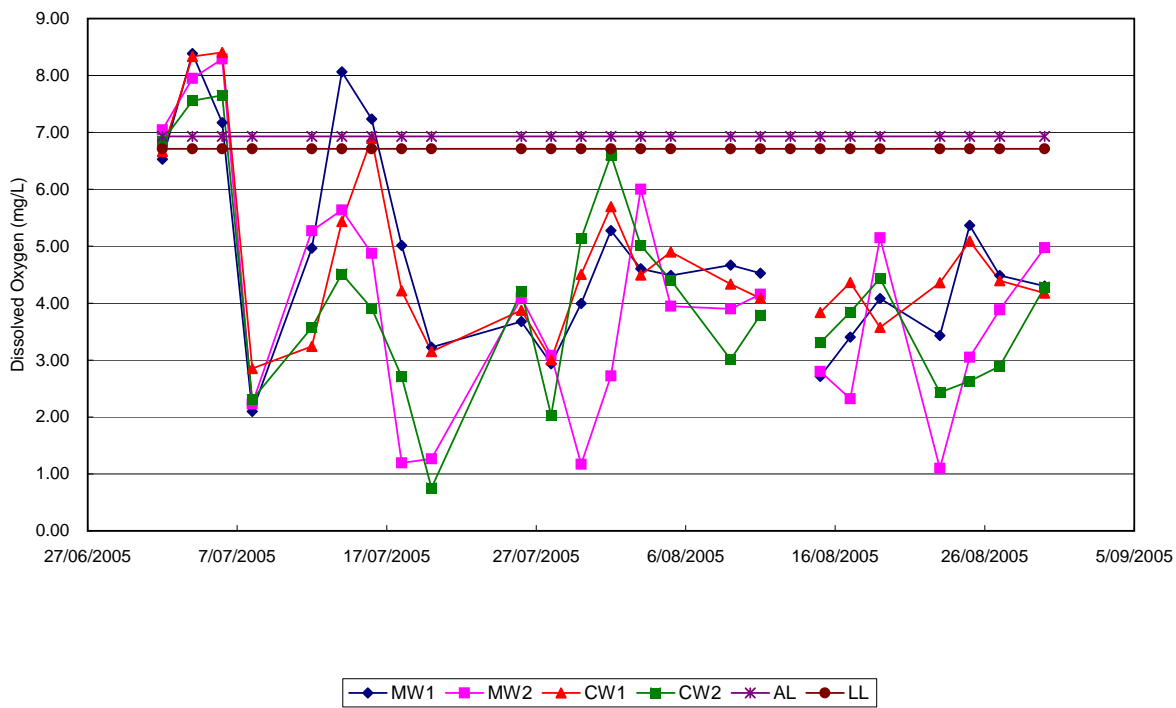


Figure 5.1d - Dissolved Oxygen (Bottom Averaged) - Mid-Ebb
(Wong Shek)

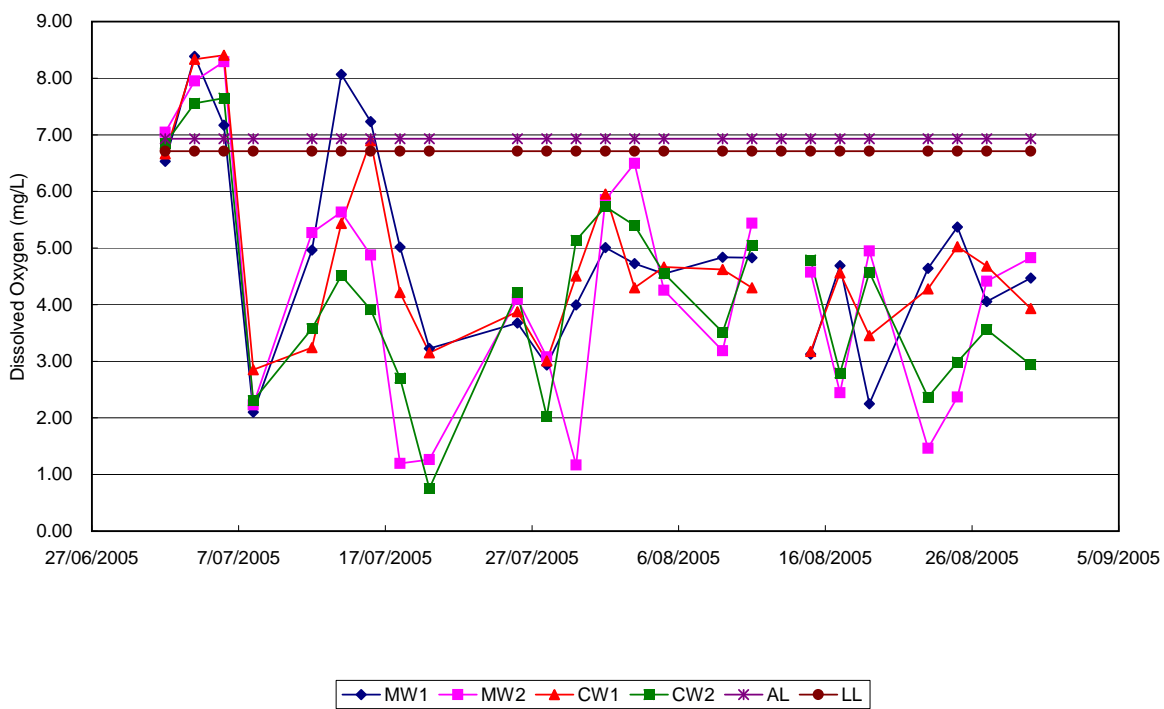


Figure 5.1e - Turbidity (Depth Averaged) - Mid-Flood
(Wong Shek)

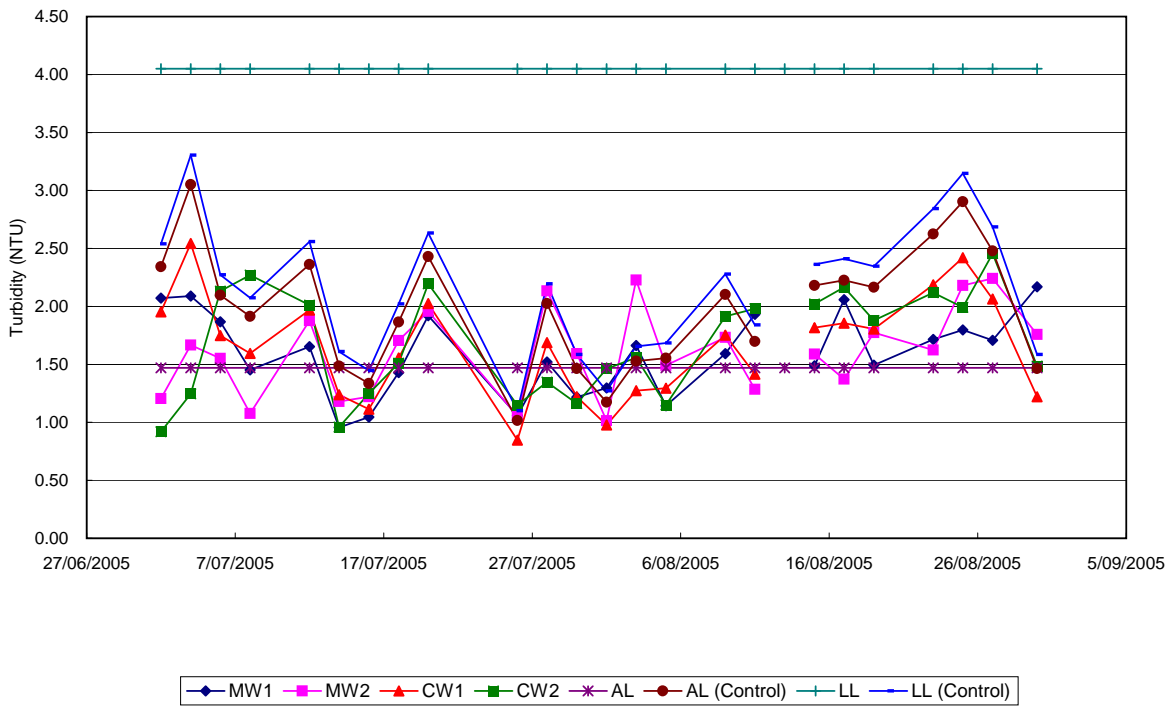


Figure 5.1f - Turbidity (Depth Averaged) - Mid-Ebb
(Wong Shek)

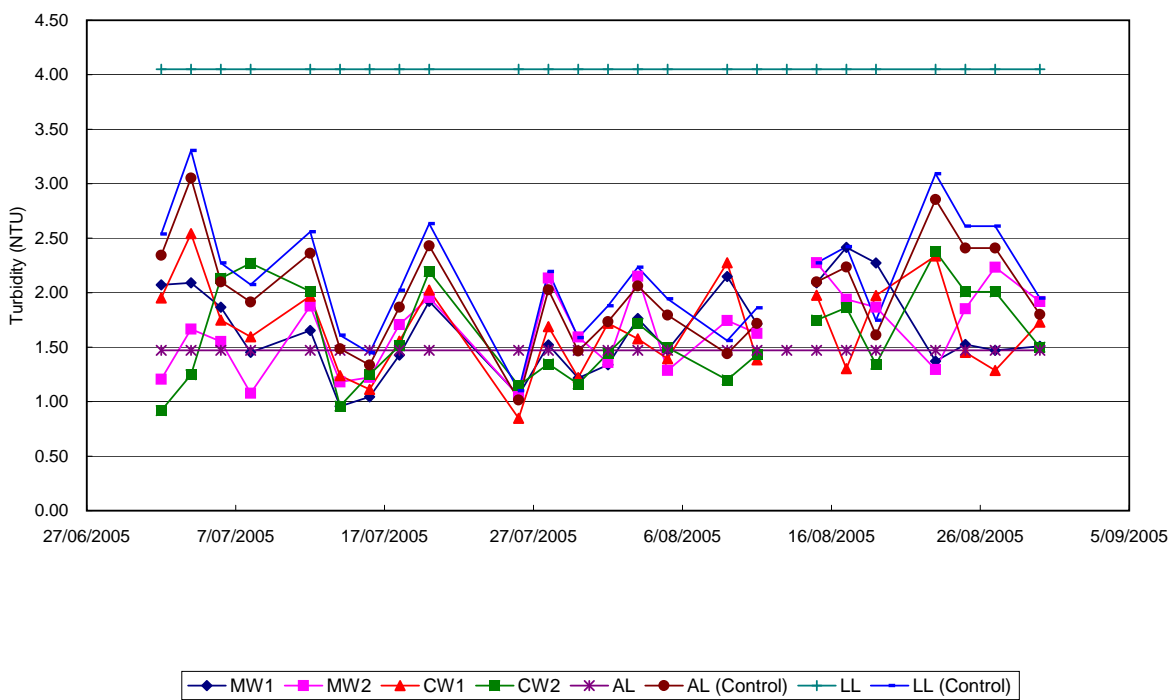


Figure 5.1g - Suspended Solids (Depth Averaged) - Mid-Flood
(Wong Shek)

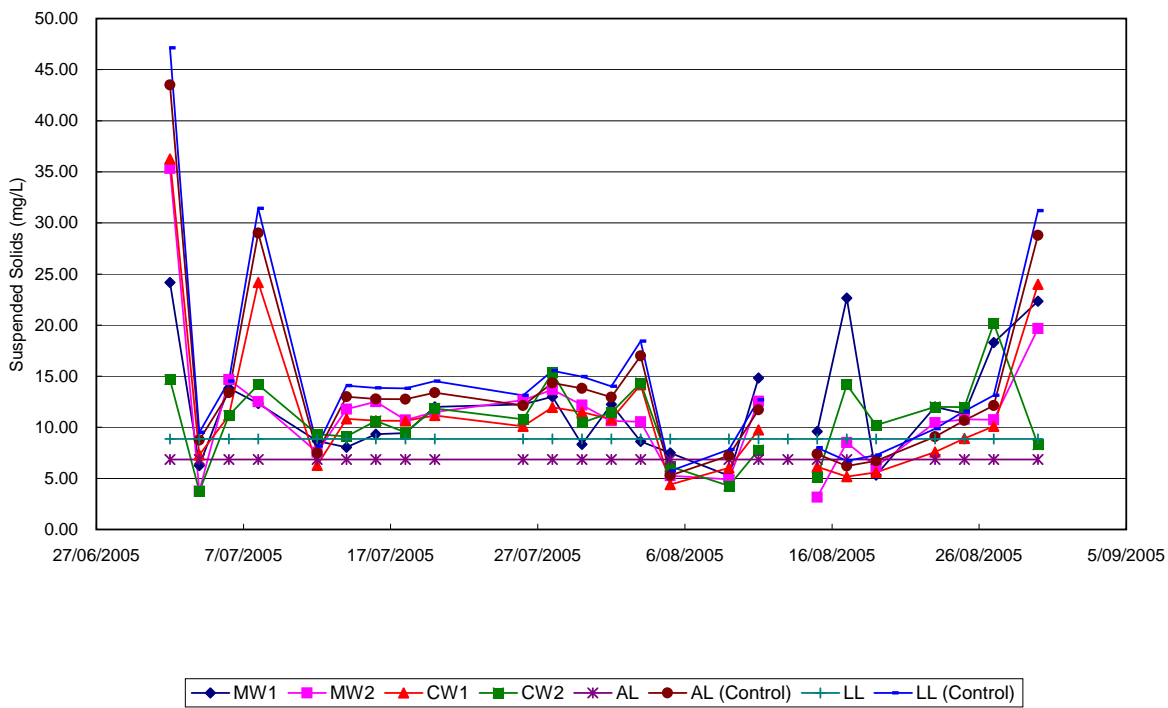
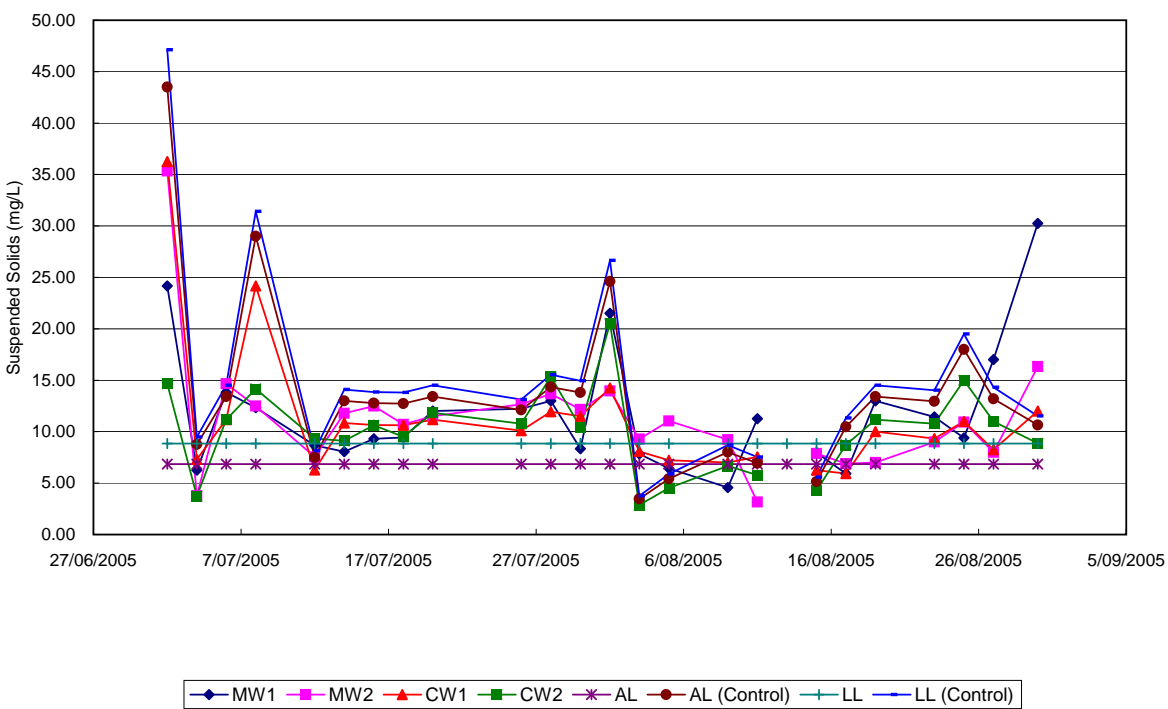


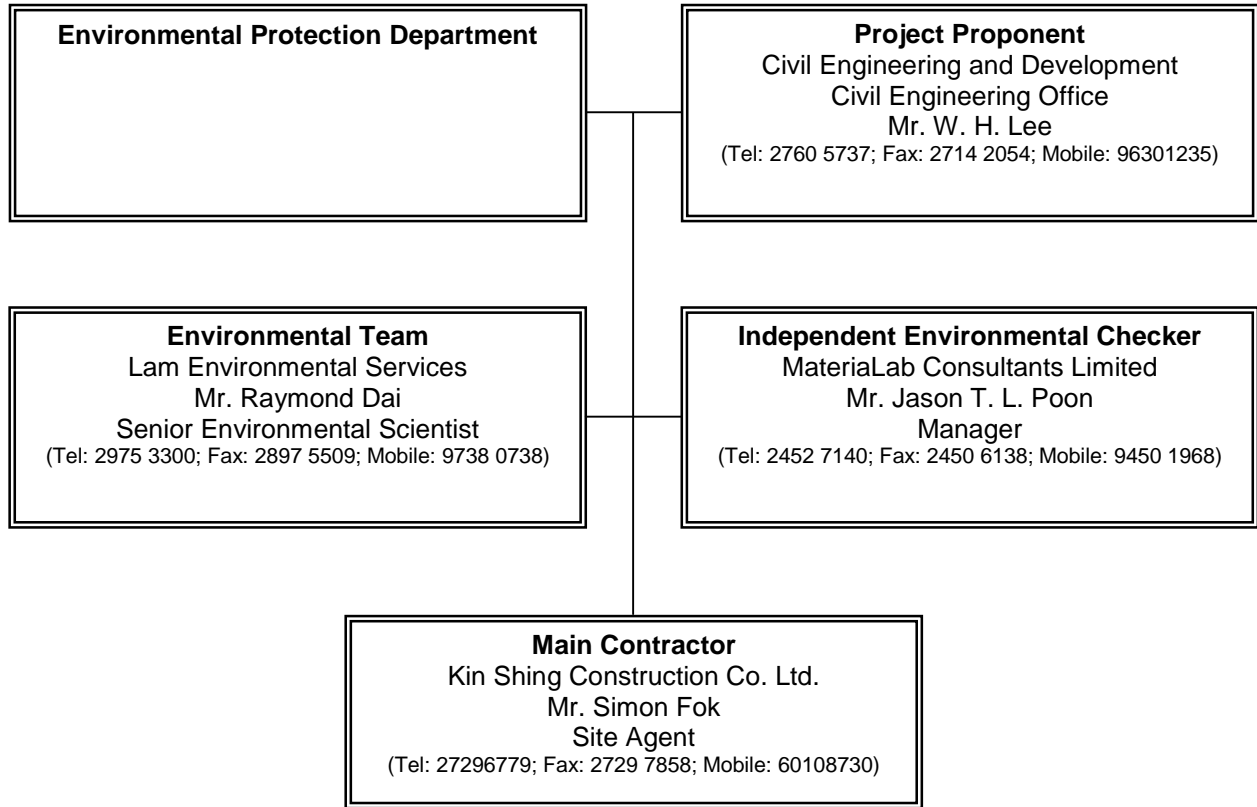
Figure 5.1h - Suspended Solids (Depth Averaged) - Mid-Ebb
(Wong Shek)





Appendix A

Organization Chart





Appendix B

Implementation Schedule of Mitigation Measures



Implementation Schedule of Mitigation Measures – Wong Shek

Environmental Aspect	No.	Mitigation Measures	Implementation Status	Follow Up action(s)
Air Quality	AQ01	Provide a wash-pit or a wheel washing and/or vehicle cleaning facility at the exits.	Not applicable at this stage	-
	AQ02	Provide a hard surfaced road between the wheel washing facilities and any finished road.	Not applicable at this stage	-
	AQ03	No burning of construction wastes or vegetation shall be allowed on the Site.	Implemented	-
	AQ04	In the process of material handling, any material which has the potential to create dust shall be treated with water or sprayed with wetting agent.	Not applicable at this stage	-
	AQ05	Any vehicle with an open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards.	Not applicable at this stage	-
	AQ06	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.	Not applicable at this stage	-
	AQ07	Stockpiles of sand, aggregate and construction and demolition material greater than 20m ³ shall be enclosed on three sides, with walls extending above the pile and 2 meters beyond the front of the pile.	Not applicable at this stage	-
	AQ08	Water sprays shall be provided and used both to dampen stored materials and when receiving raw materials.	Not applicable at this stage	-
	AQ09	Clean and water the Site to minimize the fugitive dust emissions.	Implemented	-
	AQ10	Furnace, boiler or other plant or equipment or use any fuel that might in any circumstances produce smoke or any other air pollution should not be installed.	Implemented	-
Noise	N01	All plant and equipment to be used on Site are properly maintained in good operating condition and noisy construction activities shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means to avoid disturbance to any nearby noise sensitive receivers.	Implemented	-
	N02	No excavator mounted breaker shall be used within 125m from any nearby noise sensitive receivers. Use hydraulic concrete crusher whenever applicable.	Implemented	-
	N03	All construction works should stop on Sundays and General Holidays.	Implemented	-
Water Quality	WQ01	Water in wheel washing facilities shall be changed at frequent intervals and sediments shall be removed regularly.	Not applicable at this stage	-
	WQ02	The polluted water from the wheel washing facilities would not be discharged into all existing stream courses/drains and nearby waterbodies.	Not applicable at this stage	-
	WQ03	All existing stream courses and drains within, and adjacent to the Site should be kept free from any debris and any excavated materials arising from the Works	Implemented	-
	WQ04	Chemicals and concrete agitator washings should not be deposited in watercourses.	Implemented	-
	WQ05	The effluent shall comply with the standards stated in the "Technical Memorandum on Standards and Effluent discharges into Drainage and Sewerage Systems, Inland and Coastal Waters" for the appropriate Water Control Zone.	Implemented	-
	WQ06	No spoil or debris of any kind is allowed to be pushed, washed down, fall or be deposited on land or on the seabed adjacent to the Site.	Idle silt curtain stirring up seabed on shallow waters	Remove idle silt curtain away from shallow waters
	WQ07	Maintain any existing site drainage system at all times including removal of solids in sand traps, manholes and stream beds.	Implemented	-
	WQ08	Material from any earthworks should not be washed into the drainage system.	Implemented	-
	WQ09	Silt curtain shall be provided during all demolition works and piling works with the Site.	Gap at the silt curtain during pile-washing	Close the gap



Implementation Schedule of Mitigation Measures – Wong Shek

Environmental Aspect	No.	Mitigation Measures	Implementation Status	Follow Up action(s)
	WQ10	Silt curtain shall be formed from tough, abrasion-resistant permeable membranes suitable for the purpose, supported on floating booms in such a way as to ensure that the passage of turbid water to the surrounding water shall be restricted.	Inadequate spacing between pile and silt curtain to contain the silt	Maintain adequate spacing between pile and silt
	WQ11	No dredging and spoil dumping shall be conducted.	Not applicable at this stage	-
Ecology	E01	Marker buoys shall be set up to indicate the location of the "Coral Exclusion Zone". All working vessels shall be restricted to encroach the "Coral Exclusion Zone"	Implemented	-
	E02	No overloading of the working barges during operation and no movement of the working barges, particularly close to the pier and shallow areas, during low tide should be allowed.	Not applicable at this stage	-
	E03	No coral shall be enclosed by the silt curtain.	Not applicable at this stage	-
Waste	W01	All excavated materials should be sorted to recover the inert portions for reuse on site or disposal to designated outlets.	Not applicable at this stage	-
	W02	All metals should be recovered on site for collection by recycling contractors.	Implemented	-
	W03	All cardboard and paper packaging should be recovered on site, properly stockpiled in dry condition and covered to prevent cross contamination by other C&D materials.	Implemented	-
	W04	All demolition debris from demolition works should be sorted to recover on site broken concrete, reinforcement bars, mechanical and electrical fittings as well as other building services fittings/materials that have established recycling outlets.	Implemented	-