AECOM

China Harbour Engineering Company Limited

Contract No. HY/2010/02

Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works

Quarterly EM&A Report for June 2013- August 2013

[04/2014]

	Name	Signature
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Ref.: HYDHZMBEEM00_0_1875L.14 2 May 2014

Engineer's Representative
Ove Arup & Partners
Chief Resident Engineer's Office
5 Ying Hei Road, Tung Chung, Lantau
Hong Kong

By Fax (3698 5999) and By Post

Attention: Mr. Roger Marechal

Dear Mr. Lo,

Re: Agreement No. CE 48/2011 (EP)
Environmental Project Office for the
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing Facilities, and Tuen Mun-Chek Lap Kok Link – Investigation

Contract No. HY/2010/02
Hong Kong – Zhuhai – Macao Bridge
Hong Kong Boundary Crossing Facilities – Reclamation Work
Quarterly Environmental Monitoring & Audit Report for June 2013 to August 2013

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for June 2013 to August 2013 (letter ref. 60249820/C/RMKY14043001 dated 30 April 2014) copied to us by E-mail on 25 April 2014.

Please be informed that we have no adverse comment on the captioned report. The ET Leader and the relevant specialist(s) of the ET are reminded that our verification to your report does not release any of their obligation in the EM&A Manual under the applicable Environmental Permit(s) for this project, in particular on dolphin monitoring and checking on any change in density and distribution pattern of Chinese White Dolphin and recommending appropriate actions and mitigation measures.

The ET is further reminded to advise the status of the development of multi-parameter analytical approach which should be incorporated in the report for next reporting quarter, i.e. Sep – Nov 2013.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned should you have any queries.

Yours sincerely,

Raymond Dai
Independent Environmental Checker

ENVIRON Hong Kong Limited 英環香港有限公司
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c.c.	HyD	Mr. Matthew Fung	(By Fax: 3188 6614)
	HyD	Mr. Wai-ping Lee	(By Fax: 3188 6614)
	AECOM	Ms. Echo Leong	(By Fax: 2317 7609)
	CHEC	Mr. C M Wong	(By Fax: 2578 0413)

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EXECUTIVE SUMMARY

Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as "the Project") mainly comprises reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL). It is a designated project and is governed by the current permits for the Project, i.e. the amended Environmental Permits (EPs) issued on 06 August 2013 (EP-353/2009/G) and 28 January 2014 (EP-354/2009/B) (for TMCLKL Southern Landfall Reclamation only).

Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project's reclamation works (i.e. the Engineer for the Project).

China Harbour Engineering Company Limited (CHEC) was awarded by HyD as the Contractor to undertake the construction work of the Project.

ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

AECOM Asia Co. Ltd. (AECOM) was appointed by CHEC to undertake the role of Environmental Team for the Project for carrying out the environmental monitoring and audit (EM&A) works.

The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016. The EM&A programme, including air quality, noise, water quality and dolphin monitoring and environmental site inspections, was commenced on 12 March 2012.

This report documents the findings of EM&A works conducted in the period between 1 June 2013 and 31 August 2013. As informed by the Contractor, major activities in the reporting quarter were:-

Marine-based Works

- Cellular structure installation
- Connecting arc cell installation
- Laying geo-textile
- Sand blanket laying
- Sand filling
- Maintenance of silt curtain & silt screen at sea water intake of HKIA
- Stone column installation
- Laying stone blanket
- Band drain installation
- Backfill cellular structure
- Instrumentation works
- Rubble mound seawall construction
- Construction of temporary seawall
- Ground investigation

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- Geo-textile fabrication at Works Area WA2
- Silt curtain fabrication at Works Area WA4
- Maintenance of Temporary Marine Access at Works Area WA2

A summary of monitoring and audit activities conducted in the reporting quarter is listed below:

24-hour Total Suspended Particulates (TSP) monitoring	15 sessions
1-hour TSP monitoring	15 sessions
Noise monitoring	12 sessions
Impact water quality monitoring	39 sessions

Impact dolphin monitoring	6 surveys
Joint Environmental site inspection	13 sessions

Breaches of Action and Limit Levels for Air Quality
All 1-Hour TSP and 24-hour TSP results were below the Action and Limit Level in the reporting quarter.

Breaches of Action and Limit Levels for Noise

For construction noise, no exceedance was recorded at all monitoring stations in the reporting period.

Breaches of Action and Limit Levels for Water Quality

Fourteen (14) Action Level exceedances and two (2) limit level exceedance were recorded in the reporting quarter. Six (6) Action Level Exceedances of DO (Bottom), one (1) Limit Level Exceedance of DO (Surface & Middle) and one (1) Limit Level Exceedances of SS were recorded in June 13. Three (3) Action Level Exceedances of SS were recorded in the July 13. Five (5) Action Level Exceedances of SS were recorded in August 13. Investigation results show that the exceedances were not due to the Project works.

Breaches of Action and Limit Levels for Impact Dolphin Monitoring

Two (2) Action level exceedances of Chinese White Dolphin monitoring were recorded in the reporting. After investigation, it was noted although no unacceptable changes in environmental parameters of this project have been measured, at this time it is not possible to make a conclusive assessment of the Project impact on dolphins. Investigation details are annexed in Appendix L.

Implementation Status and Review of Environmental Mitigation Measures

Most of the recommended mitigation measures, as included in the EM&A programme, were implemented properly in the reporting quarter.

The recommended environmental mitigation measures effectively minimize the potential environmental impacts from the Project. The EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

Moreover, regular review and checking on the construction methodologies, working processes and plants were carried out to ensure the environmental impacts were kept minimal and recommended environmental mitigation measures were implemented effectively.

Complaint, Notification of Summons and Successful Prosecution

No complaint, notification of summons and successful prosecution was received were received in the reporting quarter.

1 INTRODUCTION

1.1 Background

1.1.1 Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kog Boundary Crossing Facilities – Reclamation Work (here below, known as "the Project") mainly comprises seawall construction and reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL).

1.1.2 The environmental impact assessment (EIA) reports (Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities – EIA Report (Register No. AEIAR-145/2009) (HKBCFEIA) and Tuen Mun – Chek Lap Kok Link – EIA Report (Register No. AEIAR-146/2009) (TMCLKLEIA), and their environmental monitoring and audit (EM&A) Manuals (original EM&A Manuals), for the Project were approved by Environmental Protection Department (EPD) in October 2009.

1.1.3 EPD subsequently issued the Environmental Permit (EP) for HKBCF in November 2009 (EP-353/2009) and the Variation of Environmental Permit (VEP) in June 2010 (EP-353/2009/A), November 2010 (EP-353/2009/B), November 2011 (EP-353/2009/C), March 2012 (EP-353/2009/D), October 2012 (EP-353/2009/E), April 2013 (EP-353/2009/F) and August 2013 (EP-353/2009/G). Similarly, EPD issued the Environmental Permit (EP) for TMCLKL in November 2009 (EP-354/2009) and the Variation of Environmental Permit (VEP) in December 2010 (EP-354/2009/A) and January 2014 (EP-354/2009/B).

1.1.4 The Project is a designated project and is governed by the current permits for the Project, i.e. the amended EPs issued on 6 August 2013 (EP-353/2009/G) and 28 January 2014 (EP-354/2009/B) (for TMCLKL Southern Landfall Reclamation only).

1.1.5 A Project Specific EM&A Manual, which included all project-relation contents from the original EM&A Manuals for the Project, was issued in May 2012.

1.1.6 Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project's reclamation works (i.e. the Engineer for the Project).

1.1.7 China Harbour Engineering Company Limited (CHEC) was awarded by HyD as the Contractor to undertake the construction work of the Project.

1.1.8 ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

1.1.9 AECOM Asia Co. Ltd. (AECOM) was appointed by CHEC to undertake the role of Environmental Team for the Project for carrying out the EM&A works.

1.1.10 The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016.

1.1.11 According to the Project Specific EM&A Manual, there is a need of an EM&A programme including air quality, noise, water quality and dolphin monitoring and environmental site inspections. The EM&A programme of the Project commenced on 12 March 2012.

1.2 Scope of Report

1.2.1 This is the sixth quarterly EM&A Report under the Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. This report presents a summary of the environmental monitoring and audit works, list of activities and mitigation measures proposed by the ET for the Project from 1 June 2013 and 31 August 2013.

1.3 Project Organization

1.3.1 The project organization structure is shown in Appendix A. The key personnel contact names and numbers are summarized in Table 1.1.

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone	Fax
Engineer's Representative (ER) (Ove Arup & Partners Hong Kong Limited)	Chief Resident Engineer	Roger Marechal	2528 3031	2668 3970
IEC / ENPO (ENVIRON Hong Kong Limited)	Independent Environmental Checker	Raymond Dai	3465 2888	3548 6988
	Environmental Project Office Leader	Y.H. Hui	3465 2868	3465 2899
Contractor (China Harbour Engineering Company Limited)	General Manager (S&E)	Daniel Leung	3157 1086	2578 0413
	Environmental Officer	Richard Ng	36932253	2578 0413
	24-hour Hotline	Alan C.C. Yeung	9448 0325	--
ET (AECOM Asia Company Limited)	ET Leader	Echo Leong	3922 9280	2317 7609

1.4 Summary of Construction Works

1.4.1 The construction phase of the Project under the EP commenced on 12 March 2012.

1.4.2 As informed by the Contractor, details of the major works carried out in the reporting quarter are listed below:-

Marine-based Works

- Cellular structure installation
- Connecting arc cell installation
- Laying geo-textile
- Sand blanket laying
- Sand filling
- Maintenance of silt curtain & silt screen at sea water intake of HKIA
- Stone column installation
- Laying stone blanket
- Band drain installation
- Backfill cellular structure
- Instrumentation works
- Rubble mound seawall construction
- Construction of temporary seawall

- Ground investigation

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- Geo-textile fabrication at Works Area WA2
- Silt curtain fabrication at Works Area WA4
- Maintenance of Temporary Marine Access at Works Area WA2

1.4.3 The 3-month rolling construction programme of the Project is shown in Appendix B.

1.4.4 The general layout plan of the Project site showing the detailed works areas is shown in Figure 1.

1.4.5 The environmental mitigation measures implementation schedule are presented in Appendix C.

2 SUMMARY OF EM&A PROGRAMME REQUIREMENTS

2.1 Monitoring Parameters

2.1.1 The Project Specific EM&A Manual designated 4 air quality monitoring stations, 2 noise monitoring stations, 21 water monitoring stations (9 Impact Stations, 7 Sensitive Receiver Stations and 5 Control/Far Field Stations) to monitor environmental impacts on air quality, noise and water quality respectively. Pre-set and fixed transect line vessel based dolphin survey was required in two AFCD designated areas (Northeast and Northwest Lantau survey areas). The impact dolphin monitoring at each survey area should be conducted twice per month.

2.1.2 For impact air quality monitoring, monitoring locations AMS2 (Tung Chung Development Pier) and AMS7 (Hong Kong SkyCity Marriott Hotel) were set up at the proposed locations in accordance with Project Specific EM&A Manual. The conditional omission of Monitoring Station AMS6 was effective since 19 November 2012. For monitoring location AMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact air quality monitoring was conducted at site boundary of the site office area in Works Area WA2 (AMS3A) respectively. Same baseline and Action Level for air quality, as derived from the baseline monitoring data recorded at Ho Yu College, was adopted for this alternative air quality location.

2.1.3 For impact noise monitoring, monitoring locations NMS2 (Seaview Crescent Tower 1) was set up at the proposed locations in accordance with Project Specific EM&A Manual. However, for monitoring location NMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact noise monitoring was conducted at site boundary of the site office area in Works Area WA2 (NMS3A) respectively. Same baseline noise level, as derived from the baseline monitoring data recorded at Ho Yu College was adopted for this alternative noise monitoring location.

2.1.4 In accordance with the Project Specific EM&A Manual, twenty-one stations were designated for impact water quality monitoring. The nine Impact Stations (IS) were chosen on the basis of their proximity to the reclamation and thus the greatest potential for water quality impacts, the seven Sensitive Receiver Stations (SR) were chosen as they are close to the key sensitive receives and the five Control/ Far Field Stations (CS) were chosen to facilitate comparison of the water quality of the IS stations with less influence by the Project/ ambient water quality conditions.

2.1.5 Due to safety concern and topographical condition of the original locations of SR4 and SR10B, alternative impact water quality monitoring stations, naming as SR4(N) and SR10B(N), were adopted, which are situated in vicinity of the original impact water quality monitoring stations (SR4 and SR10B) and could be reachable. Same baseline and Action Level for water quality, as derived from the baseline monitoring data recorded, were adopted for these alternative impact water quality monitoring stations.

2.1.6 The monitoring locations used during the reporting quarter are depicted in Figures 2, 3 and 4 respectively.

2.1.7 The Project Specific EM&A Manual also required environmental site inspections for air quality, noise, water quality, chemical, waste management, marine ecology and landscape and visual impact.

2.2 Environmental Quality Performance (Action/Limit Levels)

2.2.1 The environmental quality performance limits (i.e. Action and/or Limit Levels) of air and water quality monitoring were derived from the baseline air and water quality monitoring results at the respective

monitoring stations, while the environmental quality performance limits of noise monitoring were defined in the EM&A Manual.

2.2.2 The environmental quality performance limits of air quality, noise and water monitoring are given in Appendix D.

2.3 Environmental Mitigation Measures

2.3.1 Relevant environmental mitigation measures were stipulated in the Particular Specification and EPs (EP-353/2009/G and EP-354/2009/B) (for TMCLKL Southern Landfall Reclamation only) for the Contractor to adopt. A list of environmental mitigation measures and their implementation statuses are given in Appendix C.

3 MONITORING RESULTS

3.1 Air Quality Monitoring

3.1.1 In accordance with the Project Specific EM&A Manual, impact 1-hour Total Suspended Particulates (TSP) monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was carried out for at least once every 6 days at the 4 monitoring stations (AMS2, AMS3A, AMS6 and AMS7).

3.1.2 The monitoring locations for impact air quality monitoring are depicted in Figure 2. However, for AMS6 (Dragonair/CNAC (Group) Building), permission on setting up and carrying out impact monitoring works was sought, however, access to the premise has not been granted yet on this report issuing date.

3.1.3 The weather was mostly sunny, with occasional cloudy and occasional rainy in the reporting quarter. The major dust source in the reporting quarter included construction activities from the Project, as well as nearby traffic emissions.

3.1.4 The number of monitoring events and exceedances recorded in each month of the reporting quarter are presented in Table 3.1 and Table 3.2 respectively.

Table 3.1 Summary of Number of Monitoring Events for 1-hr & 24-hr TSP Concentration

Monitoring Parameter	Location	No. of monitoring events		
		June 13	July 13	August13
1-hr TSP	AMS2	15	15	15
	AMS3A	15	15	15
	AMS7	15	15	15
24-hr TSP	AMS2	5	5	5
	AMS3A	5	5	5
	AMS7	5	5	5

Table 3.2 Summary of Number of Exceedances for 1-hr & 24-hr TSP Monitoring

Monitoring Parameter	Location	Level of Exceedance	Level of Exceedance		
			June 13	July 13	August 13
1-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3A	Action	0	0	0
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
		Total	***0***	***0***	***0***
24-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3A	Action	0	0	0
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
		Total	***0***	***0***	***0***

3.1.5 All impact 1-hour TSP and 24-hour TSP monitoring results at all monitoring locations were below the Action and Limit Levels in the reporting quarter.

3.1.6 The graphical plots of the trends of the monitoring results are provided in Appendix E. No specific trend of the monitoring results or existence of persistent pollution source was noted.

3.1.7 The event action plan is annexed in Appendix L.

3.2 Noise Monitoring

3.2.1 Impact noise monitoring was conducted at the 2 monitoring stations (NMS2 and NMS3A) for at least once per week during 07:00 – 19:00 in the reporting quarter.

3.2.2 The monitoring locations used during the reporting quarter are depicted in Figure 2.

3.2.3 Due to one documented complaint is received; one (1) Action Level Exceedance of construction noise was recorded in the reporting quarter. The investigation results showed that the action level exceedance was non-project related. No Limit Level Exceedance of construction noise was recorded in the reporting quarter.

3.2.4 Major noise sources during the noise monitoring included construction activities of the Project and nearby traffic noise.

3.2.5 The number of impact noise monitoring events and exceedances are summarized in Table 3.3 and Table 3.4 respectively

Table 3.3 Summary of Number of Monitoring Events for Impact Noise

Monitoring Parameter	Location	No. of monitoring events		
		June 13	July 13	August 13
	NMS2	4	4	4
	NMS3A	4	4	4

Table 3.4 Summary of Number of Monitoring Exceedances for Impact Noise

Monitoring Parameter	Location	Level of Exceedance	Level of Exceedance		
			June 13	July 13	August 13
	NMS2	Action	0	0	0
		Limit	0	0	0
	NMS3A	Action	0	0	0
		Limit	0	0	0
		Total	***0***	***0***	***0***

3.2.6 The graphical plots of the trends of the monitoring results are provided in Appendix F. No specific trend of the monitoring results or existence of persistent pollution source was noted.

3.2.7 The event action plan is annexed in Appendix L.

3.3 Water Quality Monitoring

3.3.1 The monitoring locations used during the reporting quarter are depicted in Figure 3.

3.3.2 Fourteen (14) Action Level exceedances and two (2) limit level exceedance were recorded in the reporting quarter. Six (6) Action Level Exceedances of DO (Bottom), one (1) Limit Level Exceedance of DO (Surface & Middle) and one (1) Limit Level Exceedances of SS were recorded in June 13. Three (3) Action Level Exceedances of SS were recorded in the July 13. Five (5) Action Level Exceedances of SS were recorded in August 13. Investigation results show that the exceedances were not due to the Project works.

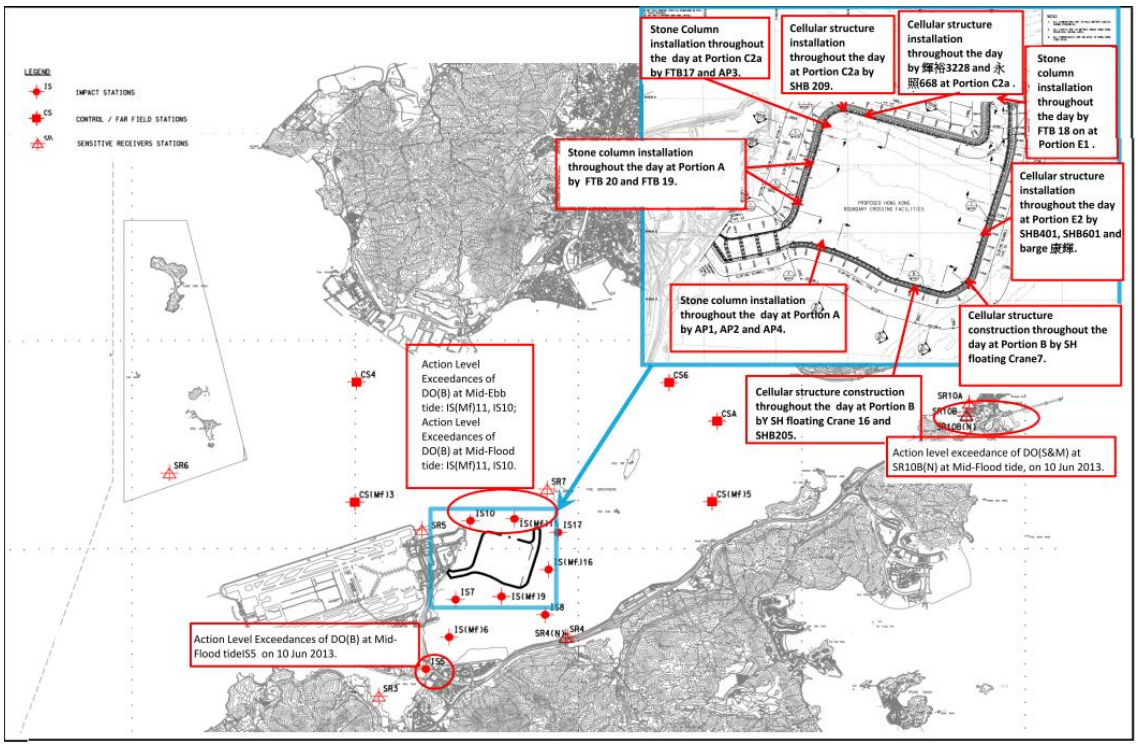
3.3.3 **Table 3.5 Summary of Water Quality Exceedances in Jun 13-Aug 13**

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
IS5	Action	0	0	0	**1 (10 June 13)**	0	0	0	**1 (7 Aug 2013)**	0	**2**
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)6	Action	0	0	0	0	0	0	0	**1 (7 Aug 2013)**	0	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
IS7	Action	0	0	0	0	0	0	0	**1 (7 Aug 2013)**	0	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
IS8	Action	0	0	0	0	0	0	0	**0**	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)9	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS10	Action	0	0	**1 (10 June 13)**	**1 (10 June 13)**	0	0	0	**1 (26 July 13)**	**1**	**2**
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)11	Action	0	0	**1 (10 June 13)**	**1 (10 June 13)**	0	0	0	0	**1**	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)16	Action	0	0	0	0	0	0	**1 (23 Aug 2013)**	0	**1**	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS17	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR3	Action	0	0	0	0	0	0	0	**1 (7 Aug 2013)**	0	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
SR4(N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	**1 (24 June 13)**	0	**1**	0
SR5	Action	0	0	0	0	0	0	0	**2 (26 and 31 July 13)**	0	**2**

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
	Limit	0	0	0	0	0	0	0	0	0	0
SR6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10A	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10B (N)	Action	0	0	0	**1 (10 June 13)**	0	0	0	0	0	**1**
	Limit	0	**1 (10 June 13)**	0	0	0	0	0	0	0	**1**
Total	**Action**	0	0	**2**	**4**	0	0	**1**	**7**	**14**	
	Limit	0	**1**	0	0	0	0	**1**	0	**2**	

Note: S: Surface;
M: Mid-depth;

3.3.4 For the one (1) Limit Level Exceedance record at SR10(B)N during flood tide, two (2) Action Level Exceedances of DO recorded IS10 and IS(Mf)11 during ebb tide, (4) Action Level Exceedance of DO recorded at IS5, IS10, SR10B(N) and IS(Mf)11 during mid flood tide on 10 Jun 13.



3.3.3.1 For type, location and duration of works carried out on 10 June 2013 please refer to the above layout map.

3.3.3.2 Exceedances were not due to marine based construction works of the Project because:

3.3.3.3 During ebb tide, monitoring station IS(Mf)11 and IS10 are considered upstream to active works which the water quality are unlikely to be affected by active works. In addition, no exceedance was recorded at IS(Mf)16 and IS17 which are considered downstream to active works suggesting active works were unlikely to be the source of impact.

3.3.3.4 During ebb tide, low DO (Bottom) - 4.8mg/L was noted at control station CS(Mf)3 which is considered upstream to monitoring station IS(Mf)11 and IS10, indicating DO (Bottom) at location upstream to active construction works was adversed affected by local effects in the vicinity. As such, the exceedances recorded were likely due to local effects in the vicinity at IS(Mf)11 and IS10 .

3.3.3.5 Low DO (Bottom) - 4.4mg/L, 4.2mg/L, 4.0mg/L and 4.0mg/L were noted at monitoring station SR10B(N), CS6, CSA and CS(Mf)5 respectively which are considered upstream to monitoring stations IS(Mf)11 and IS10 during mid flood tide indicating DO (Bottom) at locations upstream to active construction works were adversed affected by local effects in the vicinity. As such, the exceedances recorded were likely due to local effects in the vicinity at IS(Mf)11, IS10 and IS5 during mid flood tide.

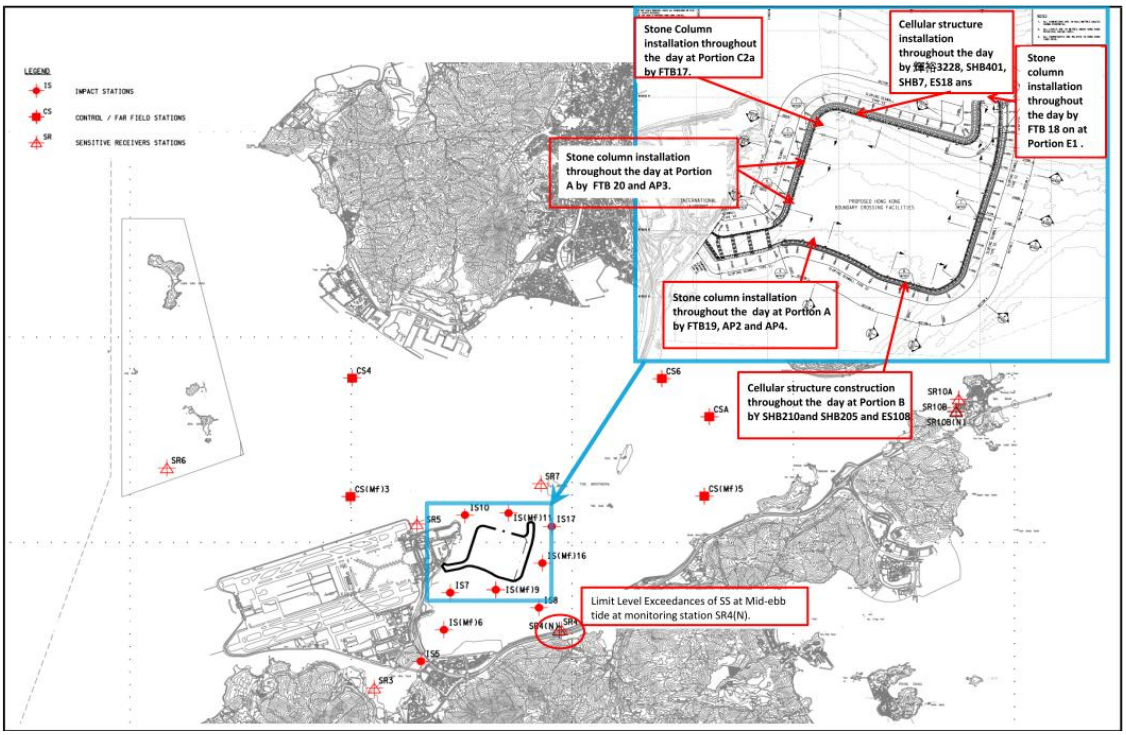
3.3.3.6 No DO (Bottom) exceedance was recorded during flood tide at monitoring locations IS7, IS(Mf)6 and IS(Mf)9 which are closer to active works than monitoring location IS5, indicating exceedance of DO (Bottom) recorded at monitoring location IS5 during flood tide was unlikely to be contributed by active works.

3.3.3.7 The exceedances were considered as Non-Project Related.

3.3.3.8 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains.

3.3.3.9 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.5 For the one (1) Limit Level Exceedance of SS was recorded at SR4(N) during mid ebb tide on 24 June 2013.



3.3.4.1 For type, location and duration of works carried out on 10 June 2013 please refer to the above layout map.

3.3.4.2 Exceedance was not due to marine based construction works of the Project because:

3.3.4.3 Red rain storm signal was hoisted between 10:20am - 11:35am by Hong Kong Observatory during flood tide and adverse weather condition e.g. heavy rainfall in the monitoring area was noted before the limit level exceedance recorded at SR4(N) at 12:53pm on 24 June 2013. As such, the water quality at SR4(N) was likely to be affected.

3.3.4.4 The monitoring sites SR4 far away from where active works were carried out during ebb tide. Suspended solids values recorded at Impact Stations closer to the works are (e.g. IS(Mf)9, IS7 and IS8) all below the Action and Limit Level during the same tide on the same day.

3.3.4.5 For limit level exceedance of depth averaged SS (in mg/L) recorded at SR4(N) during mid ebb tide, same works were carried out at almost the same locations on 21, 24 and 26 June 13, but all depth averaged SS (in mg/L) results recorded at all monitoring location on 21 and 26 June 13 were all below the Action and Limit Level. Which indicates project works is unlikely to contribute to the limit level exceedance recorded at SR4(N).

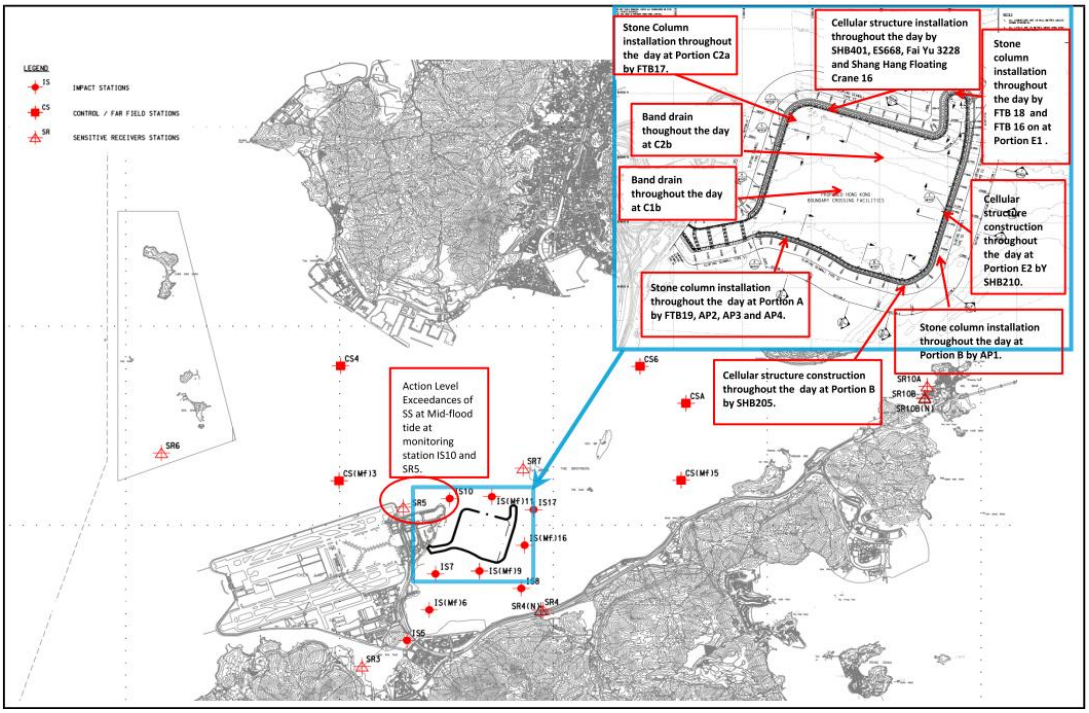
3.3.4.6 The exceedance was likely due to local effects in the vicinity SR4(N).

3.3.4.7 The exceedance was considered as Non-Project Related.

3.3.4.8 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.4.9 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.6 Two (2) Action Level exceedances at measured Suspended Solids (mg/L) were recorded on 26 Jul 2013 during mid-flood tide at monitoring station IS10 and SR5. For Action Level exceedances at measured Suspended Solids (mg/L), 23.9 mg/L and 23.8 mg/L were recorded at Monitoring Station IS10 and SR5 respectively.



3.3.5.1 For works activities carried out on 26 July 2013, please refer to above layout map which shows the locations active works.

3.3.5.2 Exceedances were not due to marine based construction works of the Project because:

3.3.5.3 Same type of works were carried out at the same location on 24 and 29 July 13 but Suspended Solids values recorded at IS10 and SR5 on 24 and 29 July 13 are all below the Action and Limit Level during the same tide on the same day which indicates project works are unlikely to contribute to the action level exceedance recorded at IS10 and SR5.

3.3.5.4 Suspended solids values recorded at Monitoring Stations CS(Mf)3 located downstream of monitoring station IS10 and SR5 during mid-flood tide were below the action and limit level.

3.3.5.5 No silt plume was observed flowing from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring works were conducted IS10 on 26 July 13 during mid flood tide.

3.3.5.6 Turbidity measurements results at IS10 and SR5 were 14.8(NTU) and 13.7(NTU) respectively during flood tide and are all below the Action and Limit Level. It is considered that the turbidity recorded at IS10 and IS(Mf)11 were not adversely affected by active works.

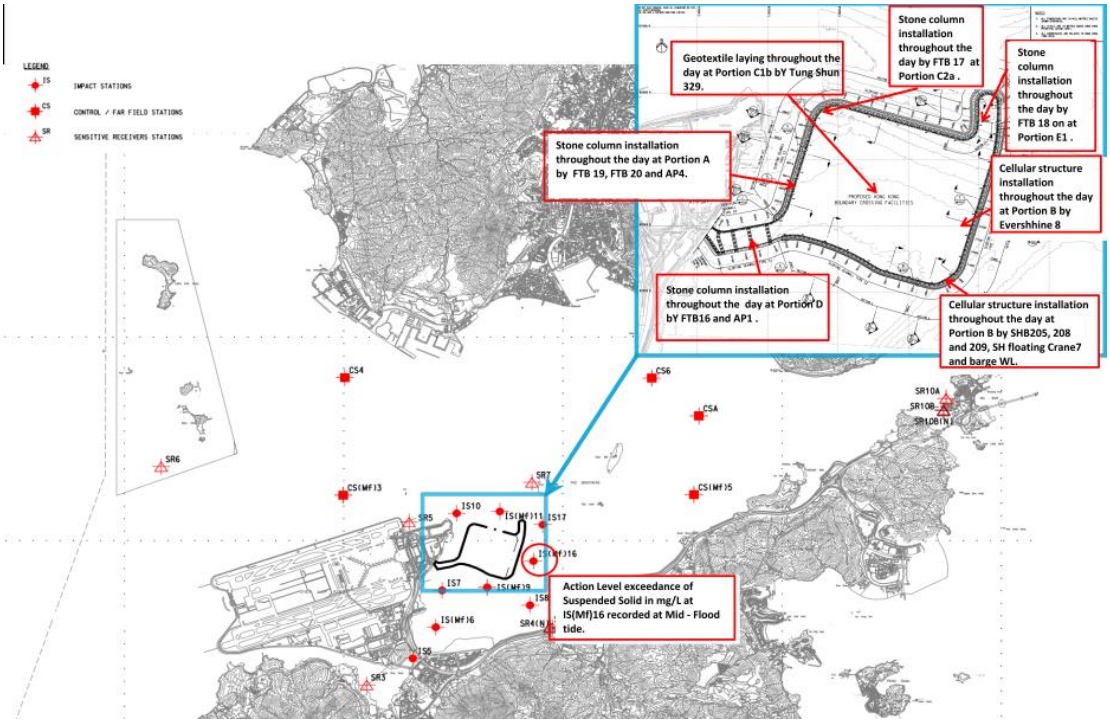
3.3.5.7 The exceedances were likely due to local effects in the vicinity of IS10 and SR5.

3.3.5.8 The exceedances were considered as non-Project related.

3.3.5.9 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.5.10 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.7 One (1) Action Level Exceedance at measured Suspended Solids (mg/L) was recorded on 31 July 2013 during mid-flood tide at monitoring station SR5. For Action Level exceedance at measured Suspended Solids (mg/L), 23.6 mg/L was recorded.



3.3.6.1 Exceedance was not due to marine based construction works of the Project because:

3.3.6.2 For works activities carried out on 31 July 2013, please refer to above layout map which shows the locations active works.

3.3.6.3 Same type of works were carried out at the same location on 29 July 13 but Suspended Solids values recorded at SR5 on 29 July 13 is below the Action and Limit Level during the same tide which indicates project works is unlikely to contribute to the limit level exceedance recorded at SR5.

3.3.6.4 Monitoring Stations IS10 and IS(Mf)11 which are considered downstream and closer to the active works than monitoring Station SR5. Since the Suspended Solids values recorded at IS10 and IS(Mf)11 are all below the Action and Limit Level during same tide on the same day which shows that the water quality noted at IS10 and IS(Mf)11 which are downstream of and closer to active works during flood tide than SR5 were not adversely affected by active works. Hence it is considered that the exceedance recorded at SR5 is not related to the Project.

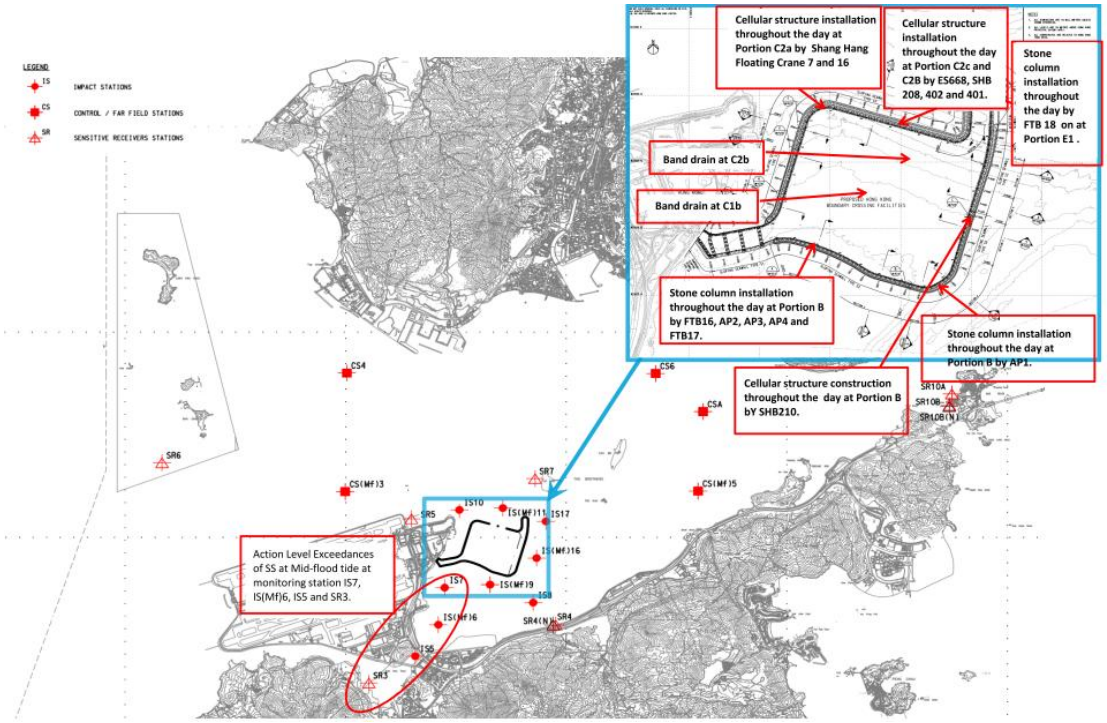
3.3.6.5 The exceedance was likely due to local effects in the vicinity of SR5.

3.3.6.6 The exceedance was considered as non-Project related.

3.3.6.7 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.6.8 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.8 Four (4) Action Level exceedances at measured Suspended Solids (mg/L) were recorded on 07 August 2013 during mid-flood tide at monitoring station IS(Mf)6, IS5, IS7 and SR3. For Action Level exceedances at measured Suspended Solids (mg/L), 24.7 mg/L, 29.8mg/L, 24.9 and 28.1 were recorded at Monitoring Station IS(Mf)6, IS5, IS7 and SR3 respectively.



3.3.7.1 For locations and type of active works carried out on 7 Aug 13, please refer to the above layout map.

3.3.7.2 Exceedances were not due to marine based construction works of the Project because:

3.3.7.3 Same type of works were carried out at the same locations on 5 and 9 Aug 13 but Suspended Solids values recorded at IS(Mf)6, IS5, IS7 and SR3 on 5 and 9 Aug 13 are below the Action and Limit Level during the same tide which indicates project works is unlikely to contribute to the action level exceedances recorded at IS(Mf)6, IS5, IS7 and SR3.

3.3.7.4 Monitoring Stations IS10 and IS(Mf)11 which are considered downstream to the active works of during mid flood tide. The Suspended Solids values recorded at IS10 and IS(Mf)11 are all below the Action and Limit Level during same tide on the same day which shows that the water quality noted downstream of active works during flood tide were not adversely affected by active works. Hence it is considered that the action level exceedances recorded at IS(Mf)6, IS5, IS7 and SR3 are unlikely contributed by project works.

3.3.7.5 Amongst the 4 exceedance stations, relatively higher SS value were recorded at IS5 and SR3 which are further away from HKBCF's active works than it is for IS(Mf)6 and IS7, indicating that the localized non-project source is likely to be located at upstream to the BCF site during flood tide.

3.3.7.6 Turbidity measurements results at IS(Mf)6, IS5, IS7 and SR3 during flood tide are all below the Action and Limit Level. It is considered that the turbidity recorded at IS(Mf)6, IS5, IS7 and SR3 were not adversely affected by active works.

3.3.7.7 The exceedances were likely due to local effects in the vicinity of IS(Mf)6, IS5, IS7 and SR3.

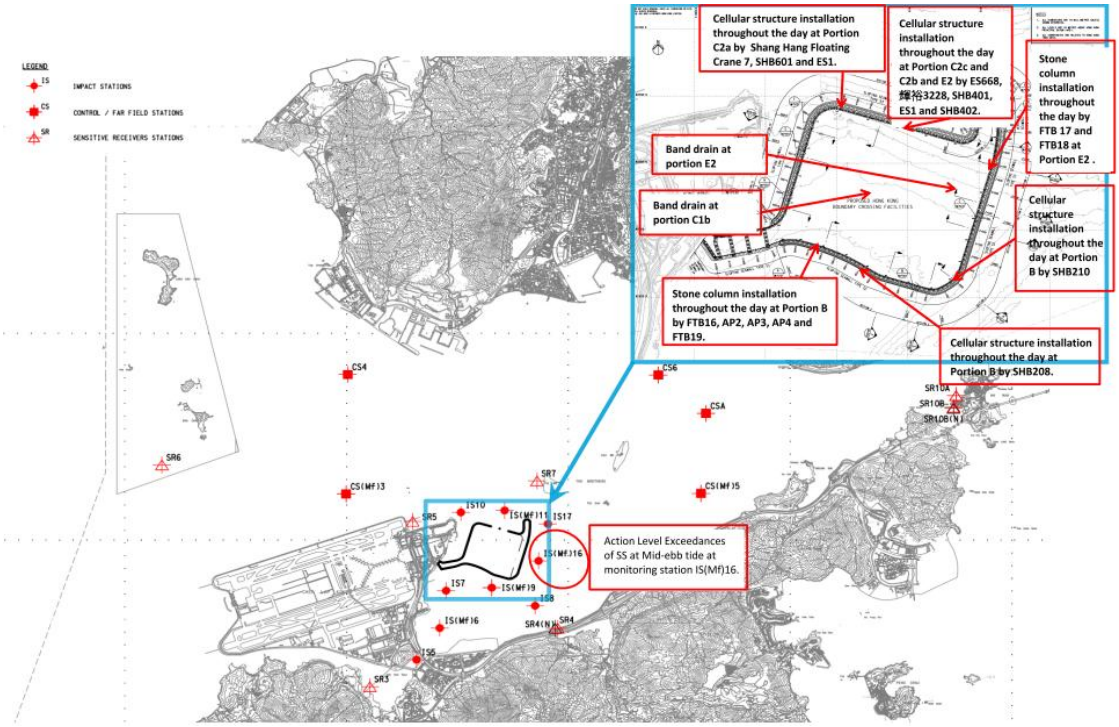
3.3.7.8 The exceedances were considered as non-Project related.

3.3.7.9 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt

curtains and to carry out maintenance work once defects were found.

3.3.7.10 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.9 One (1) Action Level exceedance at measured Suspended Solids (mg/L) were recorded on 23 August 2013 during mid-Ebb tide at monitoring station IS(Mf)16. For Action Level exceedance at measured Suspended Solids (mg/L), 24.1 mg/L was recorded.



3.3.8.1 For locations and type of active works carried out on 23 Aug 13, please refer to the above layout map.

3.3.8.2 Exceedance was not due to marine based construction works of the Project because:

3.3.8.3 Same type of works were carried out at the same locations on 21 and 26 Aug 13 but Suspended Solids values recorded at IS(Mf)16 on 21 and 26 Aug 13 are below the Action and Limit Level during the same tide which indicates project works is unlikely to contribute to the action level exceedances recorded at IS(Mf)16.

3.3.8.4 Turbidity measurements results at IS(Mf)16 during Ebb tide is 13.5 NTU which is well below the Action and Limit Level. It is considered that the turbidity recorded at IS(Mf)16 were not adversely affected by active works.

3.3.8.5 No silt plume was observed flowing from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when water quality monitoring was conducted at IS(Mf)16.

3.3.8.6 In view of there is no damage can be observed from the perimeter silt curtain which deployed in the works area at Portion D and E2.

3.3.8.7 The exceedance was likely due to local effects in the vicinity of IS(Mf)16 and considered non-project related.

3.3.8.8 Nevertheless, the Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.8.9 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.8.10 The graphical plots of the trends of the monitoring results are provided in Appendix G. No specific trend

of the monitoring results or existence of persistent pollution source was noted.

3.4 Dolphin Monitoring

3.4.1 In accordance with the Project Specific EM&A Manual, pre-set and fixed transect line vessel based dolphin survey was required in two AFCD designated areas (Northeast Lantau (NEL) and Northwest Lantau (NWL) survey areas). The impact dolphin monitoring at each survey area should be conducted twice per month.

3.4.2 The impact dolphin monitoring conducted is vessel-based and combines line-transect and photo-ID methodology, which have adopted similar survey methodologies as that adopted during baseline monitoring to facilitate comparisons between datasets.

3.4.3 The layout map of impact dolphin monitoring have been provided by AFCD and is shown in Figure 4.

3.4.4 The effort summary and sighting details during the reporting quarter are shown in the Appendix H. A summary of key findings of the dolphin surveys completed during the reporting quarter is shown below:

Table 3.6 Summary of Key Dolphin Survey Findings in Jun 2013- Aug 2013

Number of Impact Surveys Completed^	6
Survey Distance Travelled under Favourable On- Effort Condition	663.8km
Number of Sightings	45 sightings (29 sightings are ”on effort” (which are all under favourable condition), 16 “sightings are opportunistic”)
Number of dolphin individual sighted	125 individuals (the best estimated group size)
Dolphin Encounter Rate#	NEL: 1.8 NWL:5.7
Dolphin Group Size	Average of 2.8 Varied from 1-12 individuals
Most Often frequent dolphin sighting area	Sha Chau and Lung Kwu Chau Marine Park, Tai O, and areas to the east of the Brothers Islands.

Remarks:
^ Completion of line transect survey of NEL and NWL survey area once was counted as one complete survey.
# Dolphin Encounter Rate = (Sum of 1st 2nd, 3rd month’s total sighting/ Sum of 1st 2nd, 3rd month’s total effort)*100km (encounter rates are calculated using on effort sightings made under favourable conditions only.)

3.4.5 Two (2) Action level exceedances of Chinese White Dolphin monitoring were recorded in the reporting. After investigation, it was noted although no unacceptable changes in environmental parameters of this project have been measured, at this time it is not possible to make a conclusive assessment of the Project impact on dolphins. Actions were taken according to the Event and Action Plan for impact dolphin monitoring. Please refer to Appendix L for details of action taken. Table 3.7 shows the summary of STG and ANI encounter rates in Jun 2013 – Aug 2013.

Table 3.7 Summary of STG and ANI encounter rates in Jun 2013- Aug 2013

	NEL	NWL	Level Exceeded
STG*	1.8	1.8	Action
ANI**	5.7	16.6	Action

*Quarterly Average Encounter Rate of Number of Dolphin Sightings (STG) presents averaged encounter rates of the three monitored months in terms of groups per 100km per survey event.
STG Encounter rate = (Average of (total number sighting/total effort) of 1st and 2nd completed survey# of 1st month+ Average of (total number sighting/total effort) of 1st and 2nd completed survey# of 2nd month + Average of (total number sighting/total effort) of 1st and 2nd completed survey# of 3rd month)/3*100km
**Quarterly Average Encounter Rate of Total Number of Dolphins (ANI) presents averaged encounter rates of the three monitored months in terms of individuals per 100km per survey event.

ANI Encounter rate = (Average of (total number of Individual/total effort) of 1st and 2nd completed survey# of 1st month+ Average of (total number of Individual/total effort) of 1st and 2nd completed survey# of 2nd month + Average of (total number of Individual/total effort) of 1st and 2nd completed survey# of 3rd month +)/3*100km

3.4.6 Details of the comparison and analysis methodology and their findings and discussions are annexed in Appendix H.

3.5 Environmental Site Inspection and Audit

3.5.1 Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. In the reporting quarter, 13 site inspections were carried out. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.

3.5.2 Particular observations during the site inspections are described below:

Air Quality

3.5.3 No adverse observation was identified in the in the reporting Quarter.

Noise

3.5.4 No adverse observation was identified in the reporting quarter.

Water Quality

3.5.5 Litter and silty plumes were observed when filling material was being used for filling cellular structure number C057. The Contractor stopped the activity to prevent litter and silty plumes from dispersing. The Contractor was advised to provide mitigation measures such as silt curtain to enclose active filling activities at cellular structures to prevent litter and silty plumes from dispersing. (Reminder)

3.5.6 While inspection was conducted on FTB 23, silty plume was observed to flow from the inside to the outside of a cellular structure. The Contractor stopped prevented the silty plumes from dispersing. The Contractor was advised to provide mitigation measures such as silt curtain to enclose active filling activities at cellular structures to prevent litter and silty plumes from dispersing. (Reminder)

3.5.7 Hole was observed within the frame of the drip tray on barge Evershine No.1, barge 401 and FTB17. The Contractor was advised to rectify the situation by sealing the open hole properly to prevent potential waste oil leakage. The Contractor provided mitigation measures and sealed the hole of the drip tray to prevent potential oil leakage. (Closed)

3.5.8 It was observed that the frame of bunding on barge SHB 401 was deformed. The Contractor was reminded to fix the deformed part of frame so that the bunding may have appropriate height to confine potential oil leakage. (Reminder)

3.5.9 Generator was observed without drip tray or bunding on barge Evershine No.1, barge 401 and FTB17. The Contractor was advised to provide mitigation measures such as bunding/drip tray to confine potential oil leakage or to relocate the generator to an area with bunding.The Contractor provided bunding to generator to contain any potential oil leakage. (Closed)

3.5.10 Defect was observed within the side of the enclosing silt curtain on barge AP4. The contractor was rectified the defected silt curtain in order to prevent silt plumes from dispersing out from the vicinity of active stone column works. The contractor rectified the defected silt curtain in order to prevent silt plumes from dispersing out from the vicinity of active stone column works.

3.5.11 Defects were observed at portion B (southwest part of the perimeter silt curtain), E2 (northeast part of the perimeter silt curtain) and around portion C2a (northwest part of the perimeter silt curtain). The Contractor rectified the defects of the silt curtain at portion B (southwest part of the perimeter silt curtain), E2 (northeast part of the perimeter silt curtain) and around portion C2a (northwest part of the perimeter silt curtain) so the silt can be effectively prevented from dispersing from the inside to the outside of the site boundary. (Closed)

3.5.12 Oil stain was observed on barge Fai Yu 3228 and Evershine No.1. The Contractor was reminded to provide mitigation measures such adsorbents to clean the oil stain. The Contractor immediately provided mitigation measures such as adsorbents to clean the oil stain and treated the used absorbents as chemical waste. (Closed)

3.5.13 Oil stain was discovered over the sea on 25 July 2013 at 11:20 near the cell K038 at Portion B. The Contractor was advised to follow the actions stated on the Spill Response Plan and clear the oil waste on sea. The Contractor rectified the situation and clear the oil waste on sea using absorption boom according to the Spill Response Plan. The used absorption boom was disposed of as chemical waste. (Closed)

Chinese White Dolphin

3.5.14 No adverse observation was identified in the reporting quarter.

Chemical and Waste Management

Waste

3.5.15 Oil drum was observed improperly stored on barge Chi Full, Kiu Chi (AP1), FTB20 and FTB17. The Contractor was reminded to provide mitigation measures such as bunding/ drip tray to all oil drums. The Contractor relocated the oil drum to area enclosed by bunding. (Closed)

3.5.16 Oil drums were found without chemical label on barge SHB 209 and Evershine No.1. The Contractor was reminded to provide chemical label to all oil drum. The Contractor immediately provided chemical labels to oil drums. (Closed)

3.5.17 Oil drums were improperly covered on barge FTB 17. The Contractor was reminded to provide mitigation measures such as lid to oil drums to prevent potential spillage The Contractor immediately provided mitigation measures such a relocate the waste oil to another oil drum with lid to prevent potential spillage. (Closed)

3.5.18 Waste oil was observed accumulated inside bunding. The Contractor was reminded to clear the waste oil with water and disposed of as chemical waste. The Contractor cleared the waste oil with water and disposed of as chemical waste. (Closed)

3.5.19 General waste was observed improperly covered. The Contractor immediately provided mitigation measures such as to remove the general waste via a waste collector. The Contractor was reminded to provide mitigation measures such bin bag(s) or container to properly cover all general waste. (Reminder)

Landscape and Visual Impact

3.5.20 No relevant works was carried out in the reporting month.

Others

3.5.21 No other adverse observation was identified in the reporting month.

3.5.22 The Contractor had rectified most of the observations as identified during environmental site inspection in the reporting month. Rectifications of remaining identified items are undergoing by the Contractor. Follow-up inspections on the status on provision of mitigation measures will be conducted to ensure all identified items are mitigated properly.

4 ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS

4.1 Summary of Solid and Liquid Waste Management

4.1.1 The Contractor registered as a chemical waste producer for this project. Sufficient numbers of receptacles were available for general refuse collection and sorting.

4.1.2 As advised by the Contractor, 1,261,392.3 m^3 of imported fill were imported for the Project use in the reporting quarter. 4 tonnes of Paper/ cardboard packaging was generated, 5,600 L of chemical waste were generated and disposed of in the reporting quarter. 71.5 tonnes of general refuse were generated and disposed of in the reporting quarter. Summary of waste flow table is detailed in Appendix I.

4.1.3 The Contractor is advised to properly maintain on site C&D materials and wastes collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse / recycle of C&D materials and wastes. The Contractor is reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.

4.1.4 The Contractor is reminded that chemical waste containers should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

5 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

5.1 Implementation Status of Environmental Mitigation Measures

5.1.1 In response to the site audit findings, the Contractors carried out corrective actions.

5.1.2 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in Appendix C. Most of the recommended mitigation measures are being upheld. Moreover, regular review and checking on the construction methodologies, working processes and plants were carried out to ensure the environmental impacts were kept minimal and recommended environmental mitigation measures were implemented effectively.

5.1.3 Training of marine travel route for marine vessels operator was given to relevant staff and relevant records were kept properly.

5.1.4 Regarding the implementation of dolphin monitoring and protection measures (i.e. implementation of Dolphin Watching Plan, Dolphin Exclusion Zone and Silt Curtain integrity Check), regular checks were conducted by experienced MMOs within the works area to ensure that no dolphins were trapped by the silt curtain area. There were no dolphins spotted within the silt curtain during this quarter. The relevant procedures were followed and all measures were well implemented. The silt curtains were also inspected in accordance to the submitted plan.

5.1.5 Inadequacy of acoustic decoupling measures on noisy plants on construction vessels were identified by EPD during the site visit on 22 August 2013. The Contractor was reminded to provide acoustic decoupling measures to noisy plants on construction vessels and acoustic decoupling measures should be properly implemented for all existing and incoming construction vessels with continuous and regularly checking to ensure effective implementation of acoustic decoupling measures.

6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

6.1 Summary of Exceedances of the Environmental Quality Performance Limit

6.1.1 For air quality monitoring, no Action/Limit Level exceedance of 1-hour TSP or 24-hour TSP results were below the Action and Limit Level in the reporting quarter.

6.1.2 For construction noise, no exceedance was recorded at all monitoring stations in the reporting period.

6.1.3 Fourteen (14) Action Level exceedances and two (2) limit level exceedance were recorded in the reporting quarter. Six (6) Action Level Exceedances of DO (Bottom), one (1) Limit Level Exceedance of DO (Surface & Middle) and one (1) Limit Level Exceedances of SS were recorded in June 13. Three (3) Action Level Exceedances of SS were recorded in the July 13. Five (5) Action Level Exceedances of SS were recorded in August 13. Investigation results show that the exceedances were not due to the Project works.

6.1.4 Two (2) Action level exceedances of Chinese White Dolphin monitoring were recorded in the reporting. After investigation, it was noted although no unacceptable changes in environmental parameters of this project have been measured, at this time it is not possible to make a conclusive assessment of the Project impact on dolphins.

6.1.5 Cumulative statistics on exceedances is provided in Appendix J.

7 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

7.1 Summary of Environmental Compliants, Notification of Summons and Successful Prosecutions

7.1.1 The Environmental Complaint Handling Procedure is annexed in Figure 5.

7.1.2 No environmental complaint, notification of Summons and Successful Prosecutions was received in the reporting quarter.

7.1.3 As informed by the Contractor on 9 May 13, one summons was received on 29 April 13 regarding the suspected violation case of Noise Control Ordinance (Cap.400) at Works Area WA4 on 31 Oct 2012. As informed by the Contractor in August 13, the Contractor was subsequently prosecuted on 21 May 2013 for breaching Cap.400 Noise Control Ordinance.

7.1.4 Statistics on complaints, notifications of summons and successful prosecutions are summarized in Appendix J.

8 COMMENTS, RECOMMENDATIONS AND CONCLUSIONS

8.1 Comments on mitigation measures

8.1.1 According to the environmental site inspections performed in the reporting quarter, the following recommendations were provided:

Air Quality Impact

- All working plants and vessels on site should be regularly inspected and properly maintained to avoid dark smoke emission.
- All vehicles should be washed to remove any dusty materials before leaving the site.
- Haul roads should be sufficiently dampened to minimize fugitive dust generation.
- Wheel washing facilities should be properly maintained and reviewed to ensure properly functioning.
- Temporary exposed slopes and open stockpiles should be properly covered.
- Enclosure should be erected for cement debagging, batching and mixing operations.
- Water spraying should be provided to suppress fugitive dust for any dusty construction activity.

Construction Noise Impact

- Quieter powered mechanical equipment should be used as far as possible.
- Noisy operations should be oriented to a direction away from sensitive receivers as far as possible.
- Proper and effective noise control measures for operating equipment and machinery on-site should be provided, such as erection of movable noise barriers or enclosure for noisy plants. Closely check and replace the sound insulation materials regularly
- Vessels and equipment operating should be checked regularly and properly maintained.
- Noise Emission Label (NEL) shall be affixed to the air compressor and hand-held breaker operating within works area.
- Better scheduling of construction works to minimize noise nuisance.
- Acoustic decoupling measures should be properly implemented for all existing and incoming construction vessels with continuous and regularly checking to ensure effective implementation of acoustic decoupling measures.

Water Quality Impact

- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities in order to make sure they are functioning effectively.
- Construction of seawall should be completed as early as possible.
- Regular inspect and review the loading process from barges to avoid splashing of material.
- Silt, debris and leaves accumulated at public drains, wheel washing bays and perimeter u-channels and desilting facilities should be cleaned up regularly.
- Silty effluent should be treated/ desilted before discharged. Untreated effluent should be prevented from entering public drain channel.
- Proper drainage channels/bunds should be provided at the site boundaries to collect/intercept the surface run-off from works areas.

- Exposed slopes and stockpiles should be covered up properly during rainstorm.

Chemical and Waste Management

- All types of wastes, both on land and floating in the sea, should be collected and sorted properly and disposed of timely and properly. They should be properly stored in designated areas within works areas temporarily.
- All chemical containers and oil drums should be properly stored and labelled.
- All plants and vehicles on site should be properly maintained to prevent oil leakage.
- All kinds of maintenance works should be carried out within roofed, paved and confined areas.
- All drain holes of the drip trays utilized within works areas should be properly plugged to avoid any oil and chemical waste leakage.
- Oil stains on soil surface and empty chemical containers should be cleared and disposed of as chemical waste.
- Regular review should be conducted for working barges and patrol boats to ensure sufficient measures and spill control kits were provided on working barges and patrol boats to avoid any spreading of leaked oil/chemicals.

Landscape and Visual Impact

- All existing, retained/transplanted trees at the works areas should be properly fenced off and regularly inspected.

8.2 Recommendations on EM&A Programme

8.2.1 The impact monitoring programme for air quality, noise, water quality and dolphin ensured that any deterioration in environmental condition was readily detected and timely actions taken to rectify any non-compliance. Assessment and analysis of monitoring results collected demonstrated the environmental impacts of the Project. With implementation of recommended effective environmental mitigation measures, the Project's environmental impacts were considered as environmentally acceptable. The weekly environmental site inspections ensured that all the environmental mitigation measures recommended were effectively implemented.

8.2.2 The recommended environmental mitigation measures, as included in the EM&A programme, effectively minimize the potential environmental impacts from the Project. Also, the EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

8.3 Conclusions

8.3.1 The construction phase and EM&A programme of the Project commenced on 12 March 2012.

8.3.2 All 1-Hour TSP and 24-hour TSP results were below the Action and Limit Level in the reporting quarter.

8.3.3 For construction noise, no exceedance was recorded at all monitoring stations in the reporting period.

8.3.4 Fourteen (14) Action Level exceedances and two (2) limit level exceedance were recorded in the reporting quarter. Six (6) Action Level Exceedances of DO (Bottom), one (1) Limit Level Exceedance of DO (Surface & Middle) and one (1) Limit Level Exceedances of SS were recorded in June 13. Three (3) Action Level Exceedances of SS were recorded in the July 13. Five (5) Action Level Exceedances of SS were recorded in August 13. Investigation results show that the exceedances were not due to the Project works.

8.3.5 Two (2) Action level exceedances of Chinese White Dolphin monitoring were recorded in the reporting. After investigation, it was noted although no unacceptable changes in environmental parameters of this project have been measured, at this time it is not possible to make a conclusive assessment of the Project impact on dolphins.

8.3.6 Environmental site inspection was carried out thirteen times in the reporting quarter. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.

8.3.7 No environmental complaints, notification of summons or prosecution were received in the reporting quarter.

8.3.8 As informed by the Contractor on 9 May 13, one summons was received on 29 April 13 regarding the suspected violation case of Noise Control Ordinance (Cap.400) at Works Area WA4 on 31 Oct 2012. As informed by the Contractor in August 13, the Contractor was subsequently prosecuted on 21 May 2013 for breaching Cap.400 Noise Control Ordinance.

8.3.9 Apart from the above mentioned monitoring, most of the recommended mitigation measures, as included in the EM&A programme, were implemented properly in the reporting quarter.

8.3.10 The recommended environmental mitigation measures effectively minimize the potential environmental impacts from the Project. The EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

8.3.11 Moreover, regular review and checking on the construction methodologies, working processes and plants were carried out to ensure the environmental impacts were kept minimal and recommended environmental mitigation measures were implemented effectively.

FIGURES

FIGURE 1
GENERAL PROJECT LAYOUT PLAN

812000 E 813000 E 814000 E 815000 E 816000 E 817000 E 818000 E 819000 E 820000 E 821000 E 822000 E 823000 E

825000 N 824000 N 823000 N 822000 N 821000 N 820000 N 819000 N 818000 N 817000 N 816000 N 815000 N

N

THE SITE

PROPOSED HONG KONG BOUNDARY CROSSING FACILITIES

HONG KONG INTERNATIONAL AIRPORT

SIU HO WAN WIND PROFILER

SIU HO WAN ANEMOMETER STATION

WORKS AREA WA4

WORKS AREA WA3

WORKS AREA WA2

TUNG CHUNG

THE BROTHERS

TO KAU WAN

SIU HO WAN

PENG CHAU

HONG KONG INTERNATIONAL AIRPORT

HKBCF

HONG KONG DISNEYLAND

TUNG CHUNG

KEY PLAN

NOTES

1. ALL COORDINATES ARE RELATED TO HONG KONG 1980 GRID.
2. ALL LEVELS ARE IN METRES ABOVE HONG KONG PRINCIPAL DATUM (mPD).
3. REFER TO DRG NO. 211036/SL/1002 FOR THE DEFINITION OF SETTING OUT LINE (SOL) FOR THE HONG KONG BOUNDARY CROSSING FACILITIES (HKBCF) RECLAMATION SITE.
4. REFER TO DRG NO. 211036/SL/1004 FOR DETAILS OF SITE BOUNDARY.
5. FOR EXTENT OF SORTING FACILITIES AT FILL BANK AT TSEUNG KWAN O AREA 137 REFER TO DRG NO. 211036/SL/1015.

LEGEND

SITE BOUNDARY

SETTING OUT LINE (SOL)

WORKS AREA BOUNDARY

Rev	Description	By	Date
-	FOR CONSTRUCTION	HYJL	11/11

Consultant

ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

Supported By :
- Ecosystems Ltd.
- EDA Marine Ltd.
- Geotechnical Consulting Group (Asia) Ltd.
- Hong Kong Cetacean Research Project
- InteliBuild Technyx Asia Limited
- Tony Gee and Partners LLP

Contract No. and Title:

Contract No. HY/2010/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities
- Reclamation Works

Drawing title

KEY PLAN

Drawing no. 211036/SL/1001 Rev. -

Drawn	Date	Checked	Approved
RL	11/09	KKY	DML

Scale 1:20000 @A1 1:40000 @A3 Status WORKING

路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

Printed by : 12/17/2011
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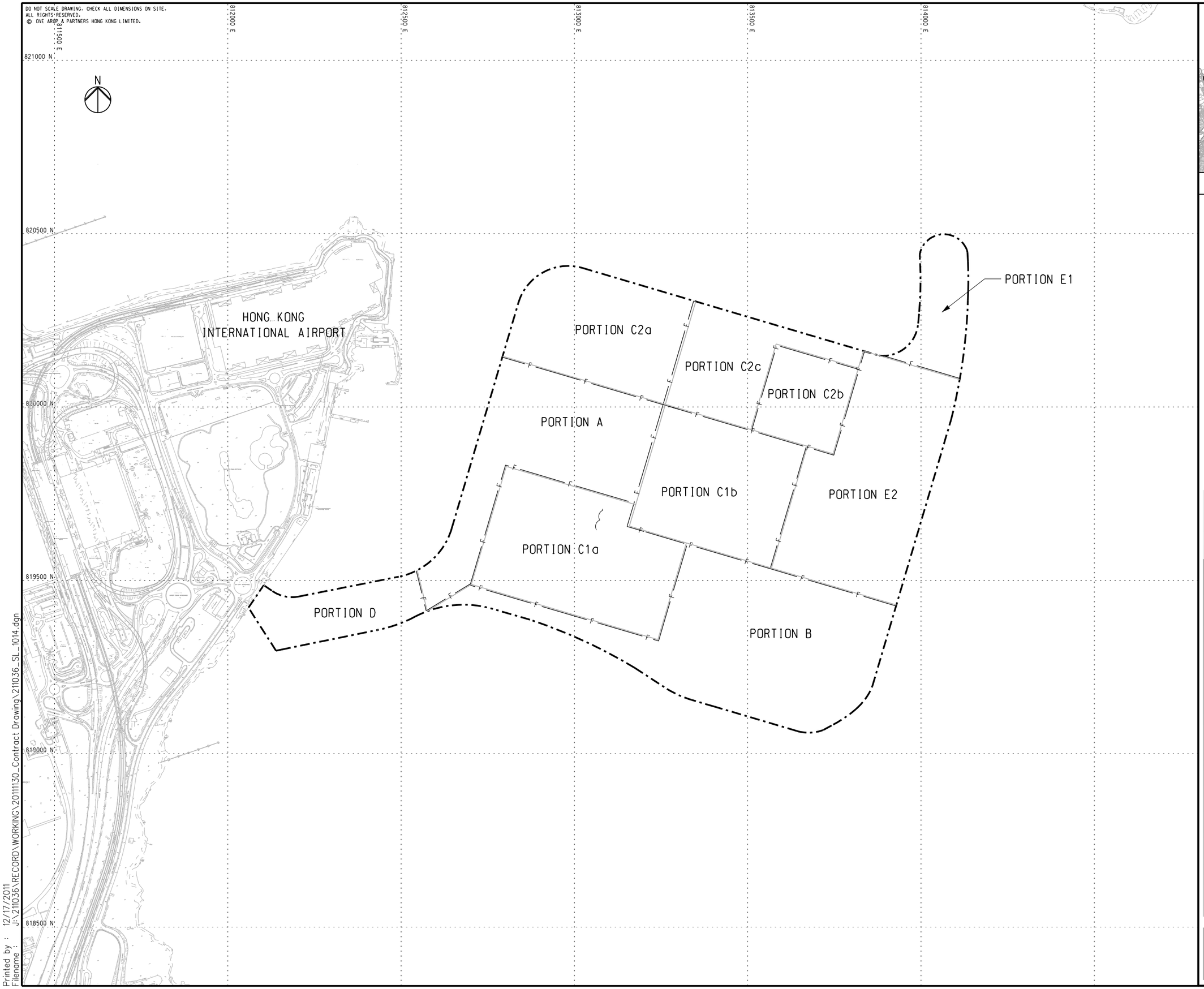

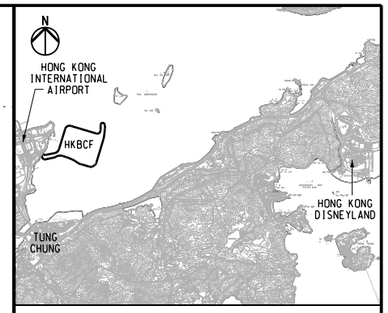

KEY PLAN

NOTES

1. FOR LEGENDS AND NOTES FOR CHAIN LINK FENCE AND GATE REFER TO DRG NO. 211036/SL/1013.
2. THE ERECTION OF CHAIN LINK FENCE AND GATES SHALL BE COMPLETED BY THE HANDOVER DATE OF EACH PORTION OF SITE, OR AS INSTRUCTED BY THE ENGINEER.
3. FOR SETTING OUT COORDINATES OF DIFFERENT PORTIONS OF SITE REFER TO DRG NO. 211036/SL/1003.
4. ACCESS POINTS BETWEEN PORTIONS SHALL BE PROVIDED BY THE CONTRACTOR. AND THE LOCATIONS SHALL BE AGREED WITH THE ENGINEER ON SITE.
5. FOR HOARDING AND FENCE AT FILL BANK AT TSEUNG KWAN O AREA 137 REFER TO DRG NO. 211036/SL/1015.

LEGEND

- SETTING OUT LINE (SOL)
- WORKS AREA BOUNDARY
- PORTIONS BOUNDARY LINE

Rev	Description	By	Date
-	FOR CONSTRUCTION	HYJL	11/11

Consultant

ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

Supported By :
- Ecosystems Ltd.
- EDA Marine Ltd.
- Geotechnical Consulting Group (Asia) Ltd.
- Hong Kong Cetacean Research Project
- InteliBuild Technyx Asia Limited
- Tony Gee and Partners LLP

Contract No. and Title:
Contract No. HY/2010/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities
- Reclamation Works

Drawing title
WORKS AREA LAYOUT
AND HORADING PLAN
(SHEET 2 OF 3)

Drawing no.	Rev.
211036/SL/1014	-

Drawn	Date	Checked	Approved
RL	06/10	KKY	DML

Scale 1:5000 @A1 1:10000 @A3
Status WORKING

路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

Printed by : 12/17/2011
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ISO A3 297mm x 420mm

Checked:

Project Management Initials:

809000 E
810000 E
811000 E
812000 E
813000 E
814000 E
815000 E

820000 N
819000 N
818000 N
817000 N
816000 N

PROPOSED HONG KONG BOUNDARY CROSSING FACILITIES

AMS7

AMS6

AMS3A
NMS3A

AMS2
NMS2

CHEK LAP KOK

HONG KONG INTERNATIONAL AIRPORT

SCENIC HILL

Pak Sha Tsui

TUNG CHUNG

LEGEND

AMS1 AIR MONITORING STATIONS

NMS1 NOISE MONITORING STATIONS

WIND STATION

AECOM

Figure 2

IMPACT AIR QUALITY AND NOISE
MONITORING STATIONS AND WIND STATION

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

Project No.: 60249820 Date: MAY 2012

Plot File by: Lammd 03/05/2012
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Plot File by: LAMMCL
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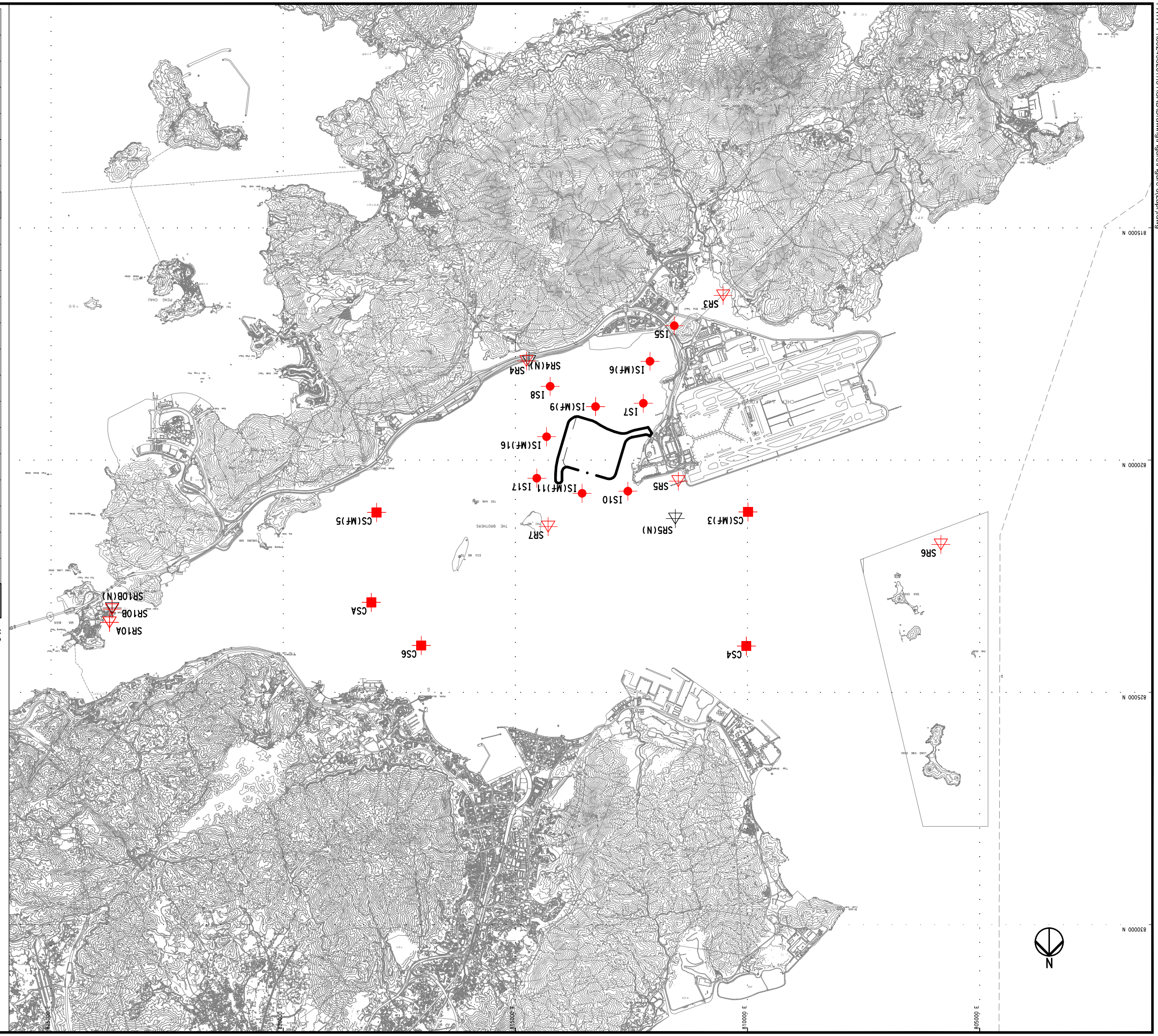
13/04/2012

Project Management Initials:

Checked:

ISO A3 297mm x 420mm



MONITORING STATIONS	CO-ORDINATES	
	EASTING	NORTHING
IS5	811579	817106
IS(MF)6	812101	817873
IS7	812244	818777
IS8	814251	818412
IS(MF)9	813273	818850
IS10	812577	820670
IS(MF)11	813562	820716
IS(MF)16	814328	819497
IS17	814539	820391
SR3	810525	816456
SR4(N)	814705	817859
SR5	811489	820455
SR5(N)	811555	821258
SR6	805837	821818
SR7	814293	821431
SR10A	823741	823495
SR10B(N)	823683	823187
CS(MF)3	809989	821117
CS(MF)5	817990	821129
CS4	810025	824004
CS6	817028	823992
CSA	818103	823064

SETTING OUT SCHEDULE

LEGEND

IS — IMPACT STATIONS

CS — CONTROL / FAR FIELD STATIONS

SR — SENSITIVE RECEIVERS STATIONS

SR — SENSITIVE RECEIVERS STATIONS (RELOCATED)

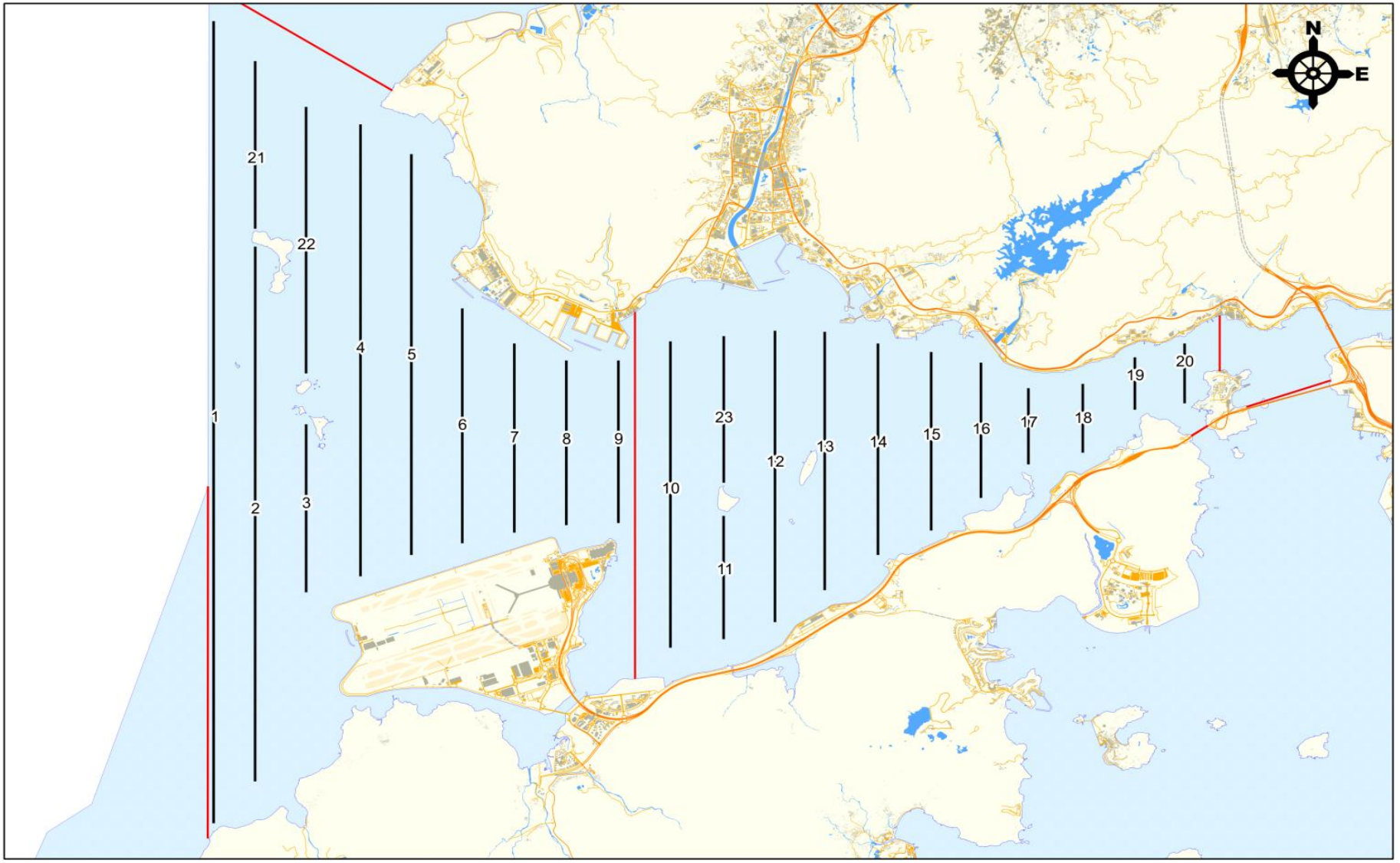
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

Project No.: 60249820 Date: APR 2012

IMPACT WATER QUALITY MONITORING STATIONS

AECOM

Figure 3



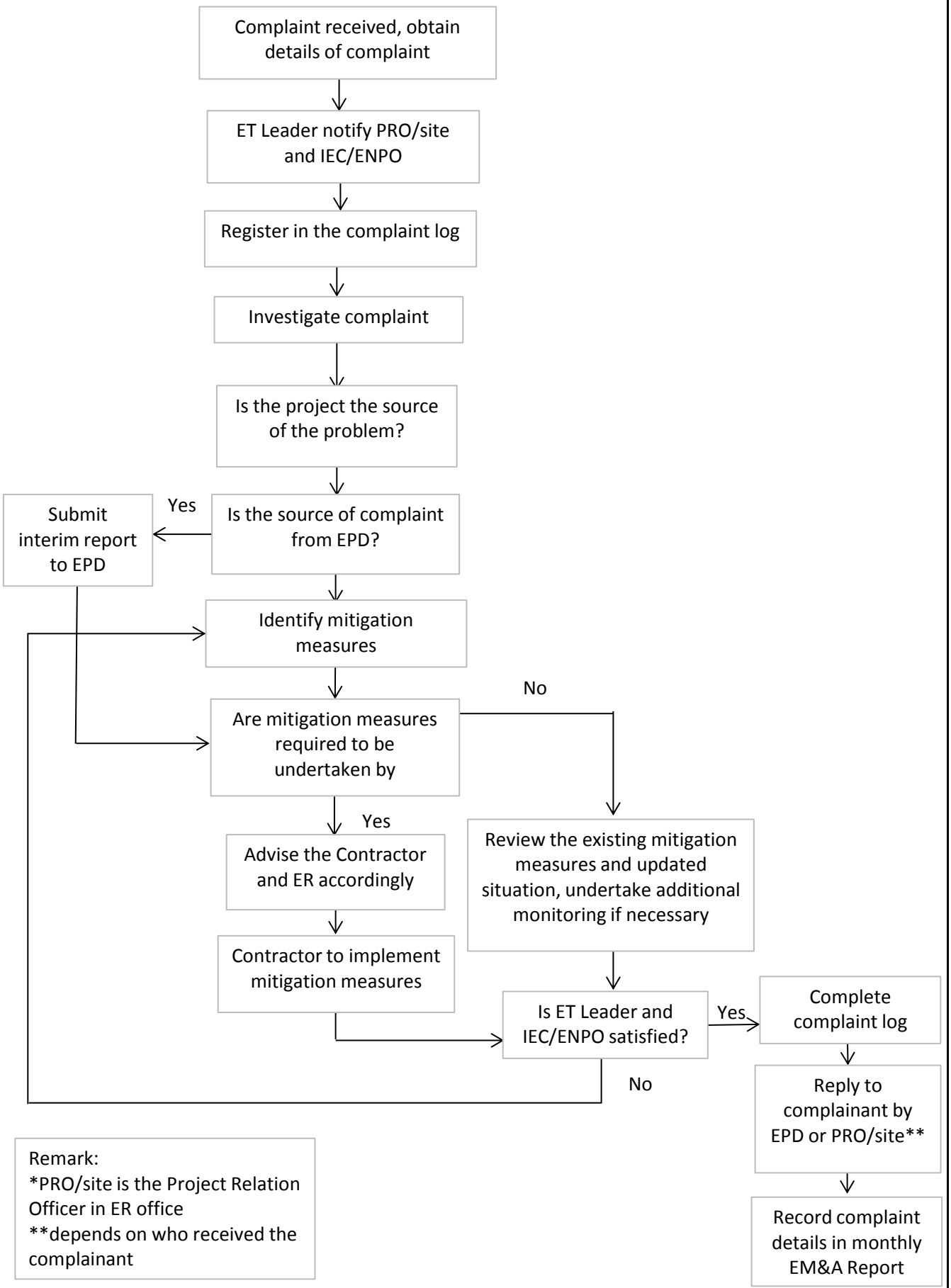
***Remark: Transect 10 is now 3.6km in length due to the HKBCF construction site. The total transect length for both NEL and NWL combined is 111km.**

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS
Project No.: 60249820 Date: January 13

Impact Dolphin Monitoring
Line Transect Layout Map

AECOM

Figure 4



HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

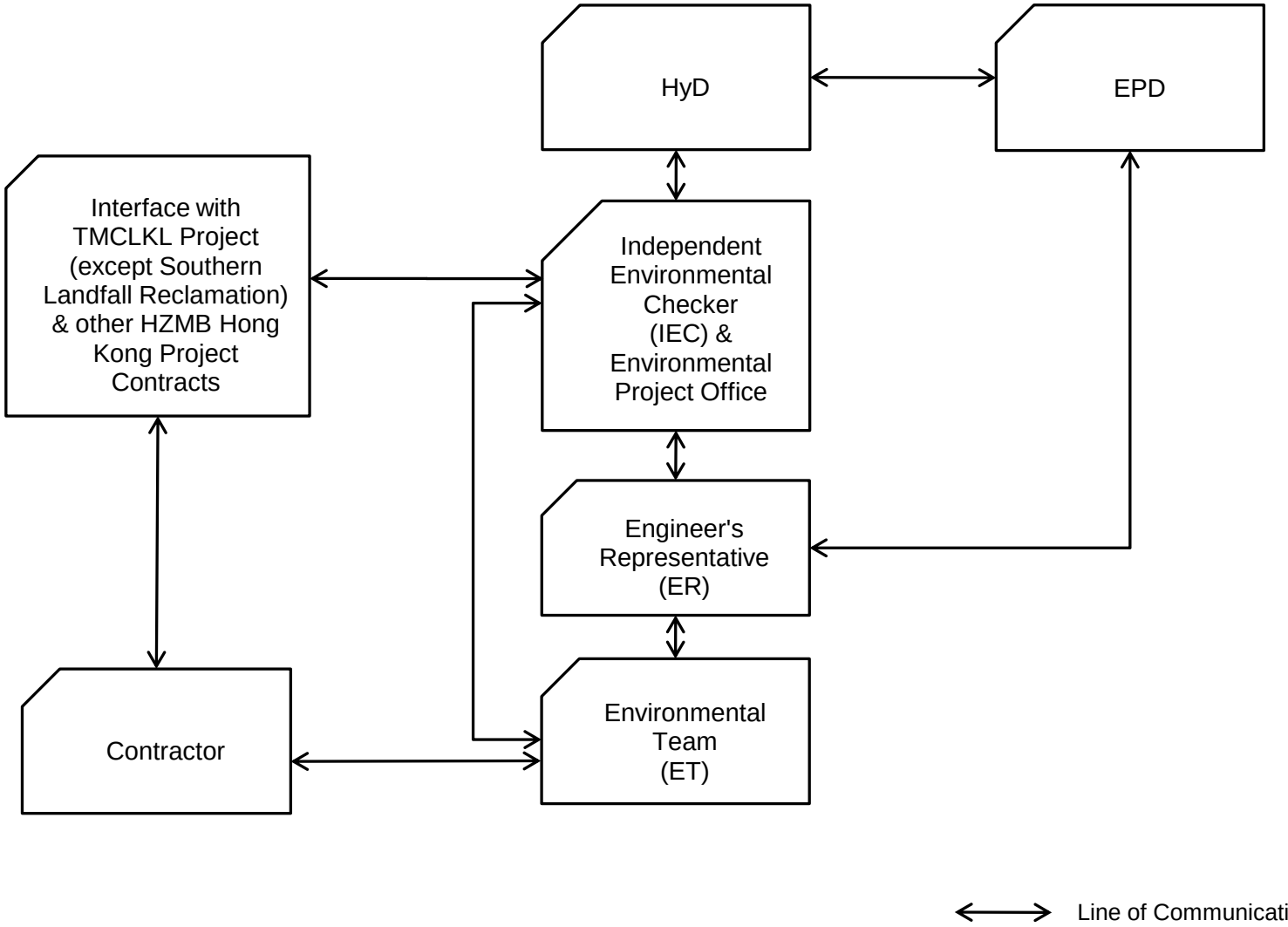
AECOM

Environmental Complaint Handling Procedure

Project No.: 60249820 **Date: July 2012**

Figure 5

APPENDIX A
PROJECT ORGANIZATION FOR ENVIRONMENTAL WORKS



HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
--RECLAMATION WORKS
Project No.: 60249820 Date: April 2013

Project Organisation for Environmental Works

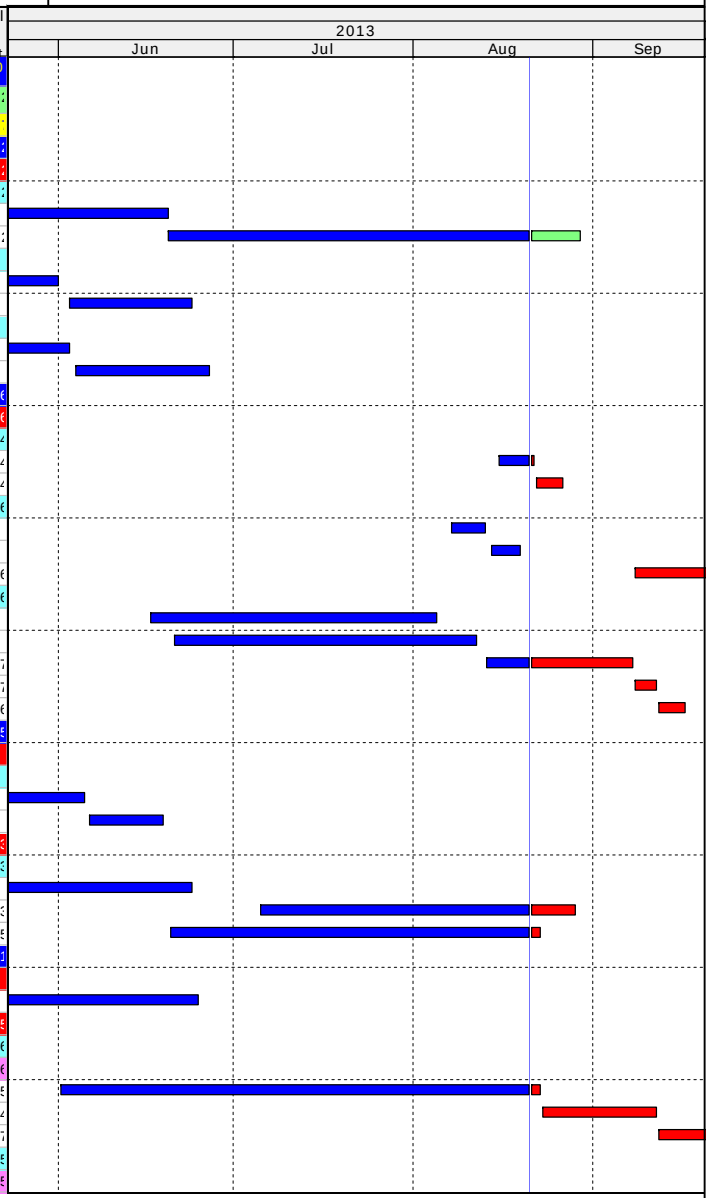
AECOM

Appendix A

APPENDIX B
THREE MONTH ROLLING CONSTRUCTION PROGRAMMES

Environmental 3 month programme

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish
21th Monthly Progress Report status as in 21 Aug 2013		687	314	13-Aug-12 A	30-Jun-14
Work Zone, as defined in PS Clause 1.03(6)		687	314	13-Aug-12 A	30-Jun-14
Portion A		256	59	05-Feb-13 A	18-Oct-13
Ground Treatment		166	8	05-Feb-13 A	29-Aug-13
Stone Columns C118 - C134 6,399Nos.		166	8	05-Feb-13 A	29-Aug-13
Portion A C118 - C121 4Cells 1,460Nos.		108	8	12-Apr-13 A	29-Aug-13
SC0A-1020	Stone Columns PA C118 - C121 4cells 1,210nrs/1460nrs FTB17 after removal of C120	64	0	12-Apr-13 A	20-Jun-13 A
SC0A-1020a	Stone Columns PA C118 - C121 4cells [Additional SC - 856 nr] FTB17 after removal of C120	39	8	20-Jun-13 A	29-Aug-13
Portion A C122 - C124 3Cells 1,075Nos.		128	0	05-Feb-13 A	24-Jun-13 A
SC0A-2010	Stone Columns PA C122 - C124 3cells 837nrs/1075nrs (15nrs/day) FTB-AP3	106	0	05-Feb-13 A	01-Jun-13 A
SC0A-2010a	Stone Columns PA C122 - C124 [additional 642 nrs] (15nrs/day)	5	0	03-Jun-13 A	24-Jun-13 A
Portion A C132 - C134 3Cells 1,167Nos		161	0	05-Feb-13 A	27-Jun-13 A
SC0A-5010	Stone Columns PA C132 - C134 3cells 879nrs/1167nrs (15nrs/day) FTB-AP4	107	0	05-Feb-13 A	03-Jun-13 A
SC0A-5010a	Stone Columns PA C132 - C134 3cells[Additional SC - 642 nr] (15nrs/day) FTB-AP4	25	0	04-Jun-13 A	27-Jun-13 A
Sloping Seawalls		82	28	17-Jun-13 A	20-Sep-13
Rockfill		82	28	17-Jun-13 A	20-Sep-13
Seawall Portion A at C118 - C121		10	5	15-Aug-13 A	26-Aug-13
RFA0-2010	PA at C121 - C118 Geotextile	4	1	15-Aug-13 A	21-Aug-13
RFA0-2020	PA at C121 - C118 Rock Cat0 Bottom Fill	4	4	22-Aug-13	26-Aug-13
Seawall Portion A at C122 - C126		41	12	07-Aug-13 A	20-Sep-13
RFA0-1010	PA at C126 - C122 Geotextile	5	0	07-Aug-13 A	13-Aug-13 A
RFA0-1020	PA at C126 - C122 Rock Cat0 Bottom Fill	5	0	14-Aug-13 A	19-Aug-13 A
RFA0-1030	PA at C126 - C122 Rock Cat1 Rock Core	12	12	08-Sep-13	20-Sep-13
Seawall Portion A at C127 - C134		78	24	17-Jun-13 A	16-Sep-13
RFA0-3010	PA at C127 - C134 Geotextile	8	0	17-Jun-13 A	05-Aug-13 A
RFA0-3020	PA at C127 - C134 Rock Cat0 Bottom Fill	8	0	21-Jun-13 A	12-Aug-13 A
RFA0-3030	PA at C127 - C134 Rock Cat1 Rock Core	21	16	13-Aug-13 A	07-Sep-13
RFA0-3040	PA at C127 - C134 Rock Cat0 Behind Rock Core	4	4	08-Sep-13	11-Sep-13
RFA0-3050	PA at C127 - C134 Under Layer	4	4	12-Sep-13	16-Sep-13
Reclamation		168	8	18-Feb-13 A	28-Aug-13
Portion A Geotextile		31	0	20-May-13 A	19-Jun-13 A
Land Portion A		31	0	20-May-13 A	19-Jun-13 A
GERA0-020	Geotextile 142,500m2 for sand blanket PA Edge Area C118 to C126 10,000m2/day	15	0	20-May-13 A	05-Jun-13 A
GERA0-030	Geotextile 142,500m2 for sand blanket PA Edge Area C127 to C134 10,000m2/day	15	0	06-Jun-13 A	19-Jun-13 A
Portion A Sand Blanket		156	7	18-Feb-13 A	28-Aug-13
Land Portion A		156	7	18-Feb-13 A	28-Aug-13
SABRA0-010	Sand Blankets 357,500m3 PA Main Area C120 to C126 10,000m3/day	97	0	18-Feb-13 A	24-Jun-13 A
SABRA0-020	Sand Blankets 278,750m3 PA Edge Area C118 to C126 10,000m3/day	28	7	05-Jul-13 A	28-Aug-13
SABRA0-030	Sand Blankets 278,750m3 PA Edge Area C127 to C134 10,000m3/day	28	2	20-Jun-13 A	22-Aug-13
Portion A		156	59	16-May-13 A	18-Oct-13
Temporary Bund		34	0	16-May-13 A	25-Jun-13 A
PA6-TB0090	Construction of Temporary Seawall	34	0	16-May-13 A	25-Jun-13 A
Reclamation		118	43	01-Jun-13 A	06-Oct-13
Portion A Marine Fill upto +2.5mPD		115	40	01-Jun-13 A	03-Oct-13
Land Portion A		115	40	01-Jun-13 A	03-Oct-13
PA6-MFA0-010	Marine Fill Type A Sand 100% at PA Main Area at C118 - C121 530,010m3 20,000m3/day	27	2	01-Jun-13 A	22-Aug-13
PA6-MFA0-020	Marine Fill Type A Sand 100% at PA Main Area at C122 - C126 530,010m3 30,000m3/day	18	18	23-Aug-13	11-Sep-13
PA6-MFA0-040	Marine Fill Type A Sand 100% at PA Edge Area at C127 - C134 530,010m3 30,000m3/day	20	20	12-Sep-13	03-Oct-13
Portion A Land Band Drain		41	41	23-Aug-13	06-Oct-13
Land Portion A		41	41	23-Aug-13	06-Oct-13

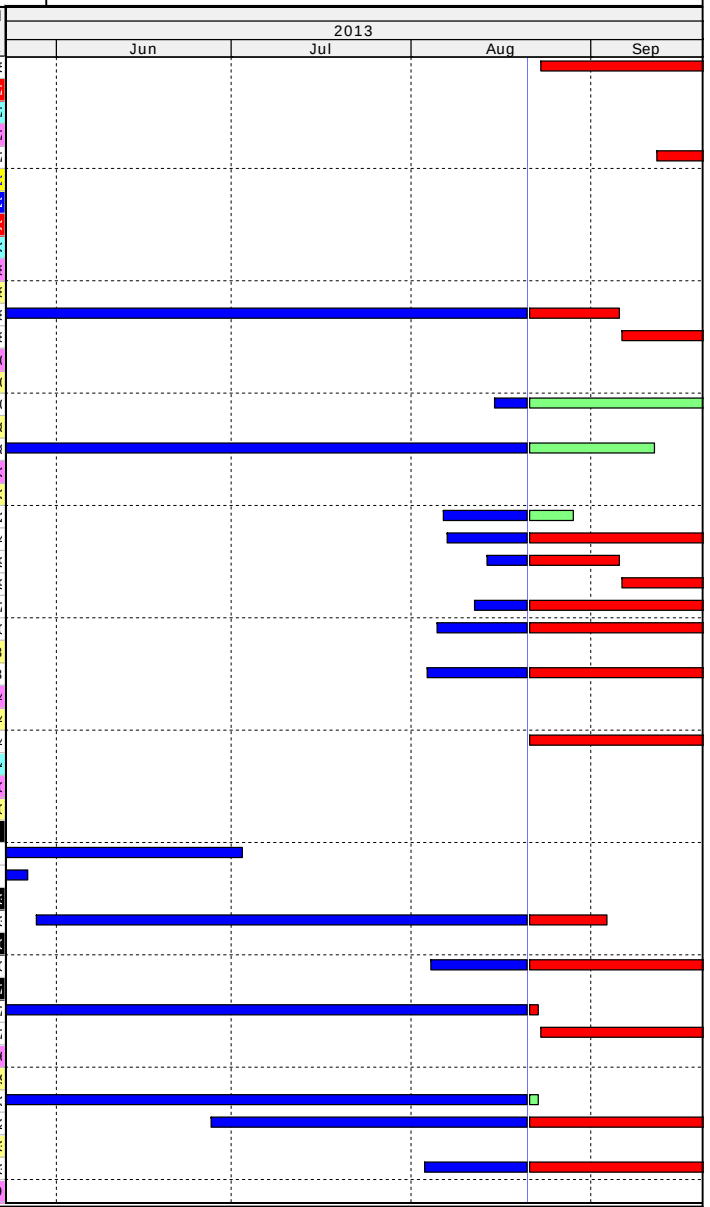


Actual Work
Remaining Work
Critical Remaining Work
Milestone

TASK filters: Last 3 month prog, Works Programme.

Environmental 3 month programme

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish
PA6-VBDA0-010	Vertical Band Drains12,3832 / 137,334nrs by land plant at PA C118 - C126 Main 3,000nrs/day	41	41	23-Aug-13	06-Oct-13
Portion A Instrumentation		30	30	12-Sep-13	18-Oct-13
Portion A Instrumentation - SD		30	30	12-Sep-13	18-Oct-13
SD-24 C123		30	30	12-Sep-13	18-Oct-13
PA6-CTSD-240	Installation of SD-24 (C123) PA	30	30	12-Sep-13	18-Oct-13
Portion B, C & E		687	314	13-Aug-12 A	30-Jun-14
Portion B, C & E		687	314	13-Aug-12 A	30-Jun-14
Seawall		460	100	13-Aug-12 A	06-Dec-13
Ground Treatment		235	100	15-Apr-13 A	06-Dec-13
Stone Columns for Sloping Seawall by Marine Plant		191	72	15-Apr-13 A	06-Nov-13
Portion C2a C113 - C117 5Cells 2,164Nos FTB17		191	72	15-Apr-13 A	06-Nov-13
SC0A-5020	Stone Columns PC2a C113 - C117 5cells 952nrs/2164nrs (15nrs/day) FTB17	75	14	15-Apr-13 A	05-Sep-13
SC0A-5020a	Stone Columns PC2a C113 - C117 5cells [Additional SC - 1,159 nr] (15nrs/day) FTB17	58	58	06-Sep-13	06-Nov-13
Stone Columns Inside cellular structures by Marine Plant		140	30	25-Apr-13 A	22-Sep-13
Seawall Portion E2 at C060 - C067 8cells @80nrs/cell 640nrs		36	30	15-Aug-13 A	22-Sep-13
SCIE2-010	Stone Columns inside cells & 2rows 8cells 537/ 640nrs (15nrs/day) FTB18	36	30	15-Aug-13 A	22-Sep-13
Seawall Portion E1 at C068 - C091 24cells @80nrs/cell 1,920nrs		78	20	25-Apr-13 A	11-Sep-13
SCIE1-010	Stone Columns inside cells & 2rows 16cells 1,280nrs (15nrs/day) C091 - C076 FTB18	78	20	25-Apr-13 A	11-Sep-13
Stone Columns Outside cellular Structures by Marine Plant		132	100	03-Aug-13 A	06-Dec-13
Seawall Portion B at K024 - K051 28cells 5,729nrs		131	100	05-Aug-13 A	06-Dec-13
SCOB-A005	Modifcation of stone columns barge FTB16	17	7	06-Aug-13 A	28-Aug-13
SCOB-A020	Stone Columns outermost K033 - K045 13cells 1,330nrs (15nrs/day) FTB19	89	75	07-Aug-13 A	09-Nov-13
SCOB-A030	Setup Gravel pump system FTB20 stone column barge	21	14	14-Aug-13 A	05-Sep-13
SCOB-A040	Stone Columns outermost K046 - K051 6cells 614nrs (15nrs/day) FTB20	41	41	06-Sep-13	19-Oct-13
SCOB-B010	Stone Columns beside K024 - K040 17cells 1,739nrs (15nrs/day) FTB-AP3	116	100	12-Aug-13 A	06-Dec-13
SCOB-B030	Stone Columns beside K041 - K051 11cells 1,125nrs (15nrs/day) FTB-AP1	75	60	05-Aug-13 A	24-Oct-13
Seawall Portion E1 at C068 - C090 23cells 6,841nrs		91	70	03-Aug-13 A	04-Nov-13
SCOE1-A020	Stone Columns outermost C070 - C074 5cells 1,368nrs (15nrs/day) FTB18	91	70	03-Aug-13 A	04-Nov-13
Stone Columns Inside cells by Land Plant		78	78	21-Aug-13	13-Nov-13
Seawall Portion B at K024 - C051 28cells 3,080nrs		78	78	21-Aug-13	13-Nov-13
V3-SCIB0-010	Stone Columns inside cells & 2rows PB K024 - K040 17cells 1,870nrs (12nrs/day/plant x 2pl	78	78	21-Aug-13	13-Nov-13
Cellular Structures		429	85	13-Aug-12 A	20-Nov-13
Cellular Main Cells 89cells		409	65	13-Aug-12 A	30-Oct-13
Full Guide Frames Method 89cells		409	65	13-Aug-12 A	30-Oct-13
Portion B K024 to K051 28cells		199	0	23-Oct-12 A	03-Jul-13 A
CSB00-010	Portion B Modification of guide frame for Cellular structures	118	0	18-Jan-13 A	03-Jul-13 A
CSB00-990	Portion B Cellular Structure K43,K44,K47,K48,K50 & K51 6cells type_C 27,045m3	199	0	23-Oct-12 A	27-May-13 A
Portion C2a C112 to C103 10cells		69	12	28-May-13 A	03-Sep-13
CSC2a-000	Portion C2a Cellular Structure C112 to C103 10cells Type_C 63,322m3	69	12	28-May-13 A	03-Sep-13
Portion C2c C102 to C91 12cells		81	65	04-Aug-13 A	30-Oct-13
CSC2c-000	Portion C2c Cellular Structure C102 to C091 12cells Type_C 81,338m3	81	65	04-Aug-13 A	30-Oct-13
Portion E2 K052 to C067 16cells		379	35	13-Aug-12 A	27-Sep-13
CS00E2-010	Portion E2 Cellular Structure K052 to C063 10cells (except K055 & K056) Type_C 69,540m3	285	2	13-Aug-12 A	22-Aug-13
CS00E2-020	Portion E2 Cellular Structure C064 to C067 4cells 19,731m3	33	33	23-Aug-13	27-Sep-13
Connecting Arcs		194	65	24-Mar-13 A	30-Oct-13
Portion B between K024 to K051 27arcs		149	40	24-Mar-13 A	03-Oct-13
CA00B-000	Portion B Connecting Arc structure 1st install K038 & other 2arcs	89	2	24-Mar-13 A	22-Aug-13
CA00B-010	Portion B Connecting Arc structure K024 -K040 15arcs Type_C 30,969m3 8day/arc 2plants	60	40	27-Jun-13 A	03-Oct-13
Portion C2a between C112 to C103 9arcs		72	65	03-Aug-13 A	30-Oct-13
CAC2a-000	Portion C2a Connecting Arc structure C103-C112 9arcs Type_C 31,312m3 8days/arc	72	65	03-Aug-13 A	30-Oct-13
Capping Beams		85	85	21-Aug-13	20-Nov-13

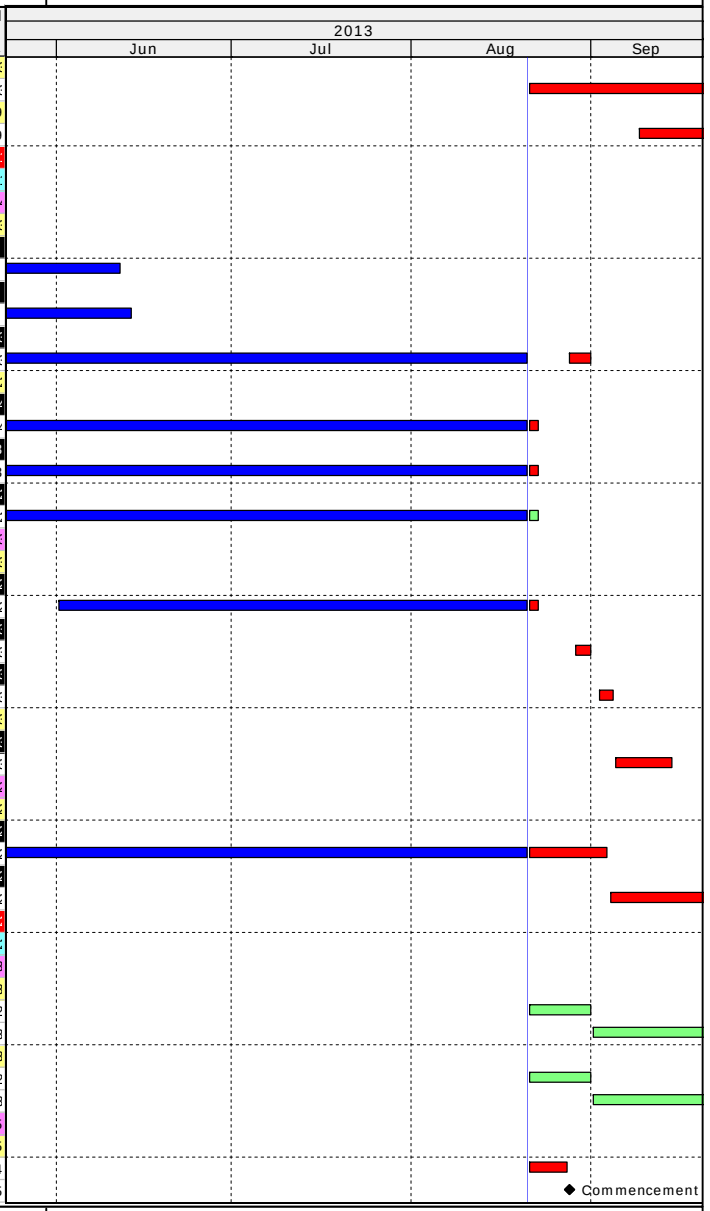


Actual Work
Remaining Work
Critical Remaining Work
Milestone

TASK filters: Last 3 month prog, Works Programme.

Environmental 3 month programme

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish
Portion B between K024 to K040 Capping Beams		85	85	21-Aug-13	20-Nov-13
CB025-00010	Capping Beams structure K024 - K040 17cells	85	85	21-Aug-13	20-Nov-13
Portion C2a between C112 to C103 Capping Beams		60	60	09-Sep-13	12-Nov-13
CBC2a-000	Capping Beams structure C112 to C103 10cells	60	60	09-Sep-13	12-Nov-13
Reclamation		277	60	16-Jan-13 A	19-Oct-13
Ground Treatment		277	60	16-Jan-13 A	19-Oct-13
Geotextile		193	10	16-Jan-13 A	31-Aug-13
Existing Seabed Below -5mPD		193	4	16-Jan-13 A	31-Aug-13
Land Portion C2a		117	0	16-Jan-13 A	12-Jun-13 A
GERC2a-010	Geotextile for sand blanket at Portion C2a	117	0	16-Jan-13 A	12-Jun-13 A
Land Portion C2c		41	0	09-Apr-13 A	14-Jun-13 A
GERC2c-010	Geotextile for sand blanket at Portion C2c	41	0	09-Apr-13 A	14-Jun-13 A
Land Portion C2b		118	4	10-Apr-13 A	31-Aug-13
GERC2b-010	Geotextile for sand blanket at Portion C2b	118	4	10-Apr-13 A	31-Aug-13
Existing Seabed above -5mPD		118	2	25-Jan-13 A	22-Aug-13
Land Portion B		118	2	25-Jan-13 A	22-Aug-13
GERB0-020	Geotextile for sand blanket at Portion B K041 - K051	118	2	25-Jan-13 A	22-Aug-13
Land Portion C1b		58	2	26-Mar-13 A	22-Aug-13
GERC1b-010	Geotextile for sand blanket at Portion C1b 145,000m3	58	2	26-Mar-13 A	22-Aug-13
Land Portion E2 Southern Part		31	2	24-Apr-13 A	22-Aug-13
GERE2-012	Geotextile for sand blanket at Portion E2 Southern (seabed above -5mPD)	31	2	24-Apr-13 A	22-Aug-13
Sand Blankets		98	23	01-Jun-13 A	14-Sep-13
Existing Seabed below -5mPD		88	13	01-Jun-13 A	04-Sep-13
Land Portion C2a		37	2	01-Jun-13 A	22-Aug-13
SABRC2a-010	Sand Blankets at Portion C2a 73,000m3 2,000m3/day	37	2	01-Jun-13 A	22-Aug-13
Land Portion C2c		3	3	29-Aug-13	31-Aug-13
SABRC2c-010	Sand Blankets at Portion C2c 10,000m3/day	3	3	29-Aug-13	31-Aug-13
Land Portion C2b		3	3	02-Sep-13	04-Sep-13
SABRC2b-010	Sand Blankets at Portion C2b 18,000m3 10,000m3/day	3	3	02-Sep-13	04-Sep-13
Existing Seabed Above -5mPD		10	10	05-Sep-13	14-Sep-13
Land Portion C1a		10	10	05-Sep-13	14-Sep-13
SABRC1a-010	Sand Blankets at Portion C1a 100,000m3 10,000m3/day	10	10	05-Sep-13	14-Sep-13
Vertical Band Drains		156	55	04-May-13 A	19-Oct-13
Vertical Band Drains by Marine Plant		156	55	04-May-13 A	19-Oct-13
Land Portion C2a		81	12	04-May-13 A	03-Sep-13
VBDC2a-010	Vertical Band Drains 97,288nrs by marine plant at Portion C2a	81	12	04-May-13 A	03-Sep-13
Land Portion C2c		43	43	04-Sep-13	19-Oct-13
VBDC2c-010	Vertical Band Drains 61,920 / 62,400nrs by marine plant at Portion C2c	43	43	04-Sep-13	19-Oct-13
Geotechnical Instrumentation Works		431	314	26-Apr-13 A	30-Jun-14
Geotechnical Instrumentation Works for Seawalls		399	314	28-May-13 A	30-Jun-14
Cluster Type SA 2nrs Piezometer, Extensometer and Settlement Marker Cluster inside Cells		314	314	21-Aug-13	30-Jun-14
SA-1 K048 Portion B		314	314	21-Aug-13	30-Jun-14
CTSA1-010	Installation of SA-1 C048 (within 10days after filling C048) Portion B	10	10	21-Aug-13	31-Aug-13
CTSA1-020	Montioring of SA-1 C048 Portion B by weekly for subsequent 10mths	303	303	01-Sep-13	30-Jun-14
SA-2 C113 Portion C2a		314	314	21-Aug-13	30-Jun-14
CTSA2-010	Installation of SA-2 C113 (within 10days after filling C113) Portion C2a	10	10	21-Aug-13	31-Aug-13
CTSA2-020	Monitoring of SA-2 C113 Portion C2a by weekly for subsequent 10mths	303	303	01-Sep-13	30-Jun-14
Cluster Type SB 2nrs Inclinometer Cluster inside cells		7	7	21-Aug-13	28-Aug-13
SB-2 C112 Portion C2a		7	7	21-Aug-13	28-Aug-13
CTSB2-010	Installation of SB-2 C112 Portion C2a	6	6	21-Aug-13	27-Aug-13
CTSB2-020	Commencement of Monitoring of SB-2 C112 Portion C2a	0	0	28-Aug-13	

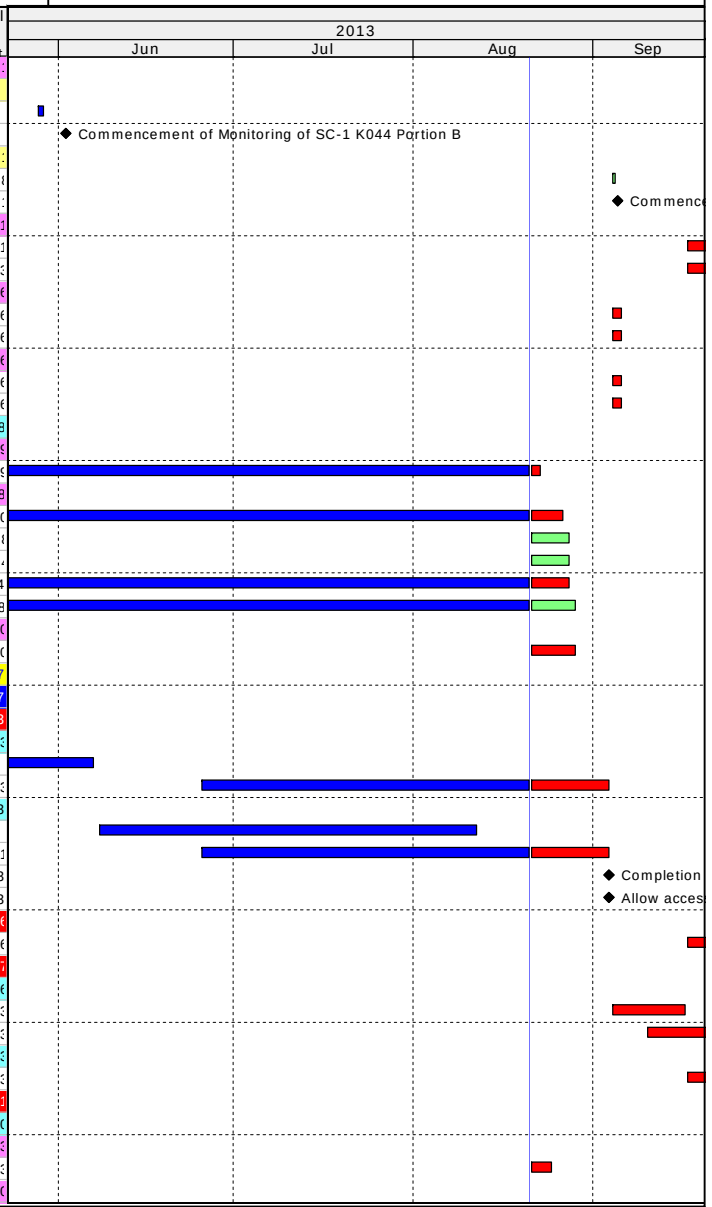


Actual Work
Remaining Work
Critical Remaining Work
Milestone

TASK filters: Last 3 month prog, Works Programme.

Environmental 3 month programme

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish
Cluster Type SC 3nrs Strain Guage and Inclinometer Cluster inside cells		100	1	28-May-13 A	05-Sep-13
SC-1 K044 Portion B		5	0	28-May-13 A	02-Jun-13 A
CTSC1-010	Installation of SC-1 K044 Portion B	1	0	28-May-13 A	29-May-13 A
CTSC1-020	Commencement of Monitoring of SC-1 K044 Portion B	0	0	02-Jun-13 A	
SC-3 C108 Portion C2a		1	1	04-Sep-13	05-Sep-13
CTSC3-010	Installation of SC-3 C108 Portion C2a	1	1	04-Sep-13	04-Sep-13
CTSC3-020	Commencement of Monitoring of SC-3 C108 Portion C2a	0	0	05-Sep-13	
Cluster Type SE 26nrs Surface movement marker cluster at top of cell and sloping seawall		7	7	17-Sep-13	24-Sep-13
CTSE-250	Installation of SE-25 (C126) Portion A	7	7	17-Sep-13	24-Sep-13
CTSE-260	Installation of SE-26 (C131) Portion A	7	7	17-Sep-13	24-Sep-13
Cluster Type DV 4nrs Surface movement marker and inclinometer cluster at V2 seawall		2	2	04-Sep-13	05-Sep-13
CTDV-010	Installation of combined inclinometer and extensometer at seawall V2 Portion D	2	2	04-Sep-13	05-Sep-13
CTDV-020	Installation of surface movement markers at seawall V2 Portion D	2	2	04-Sep-13	05-Sep-13
Cluster Type DS 4nrs Surface movement marker and inclinometer cluster at S1 seawall		2	2	04-Sep-13	05-Sep-13
CTDS-010	Installation of DS-1 to DS2 Portion D	2	2	04-Sep-13	05-Sep-13
CTDS-020	Installation of DS-3 to DS4 Portion D	2	2	04-Sep-13	05-Sep-13
Geotechnical Instrumentation Works for Reclamation RA & RB		346	7	26-Apr-13 A	28-Aug-13
RA		15	2	04-May-13 A	22-Aug-13
CTRA-010	Installation of RA 5sets at Portion A	15	2	04-May-13 A	22-Aug-13
RB		346	7	26-Apr-13 A	28-Aug-13
SMT1-010	Installation of at Portion A	21	5	30-Apr-13 A	26-Aug-13
SMT1-050	Installation of at Portion C1a	7	6	08-May-14 A	27-Aug-13
SMT1-060	Installation of at Portion C1b	7	6	13-May-14 A	27-Aug-13
SMT1-070	Installation of at Portion C2a	25	6	26-Apr-13 A	27-Aug-13
SMT1-090	Installation of at Portion C2c	14	7	11-May-13 A	28-Aug-13
Settlement Marker Type 2		7	7	21-Aug-13	28-Aug-13
SMT2-010	M2 - Installation of at Portion A	7	7	21-Aug-13	28-Aug-13
Portion D		150	57	20-May-13 A	16-Oct-13
Construction		150	57	20-May-13 A	16-Oct-13
Seawall Construction		107	14	20-May-13 A	03-Sep-13
North Portion (North CH 5700 - 6136)		65	12	20-May-13 A	03-Sep-13
SI1-SW-A1590	Stone Blankets & Geotextile Type 1 for Seawall at West Portion D	18	0	20-May-13 A	07-Jun-13 A
SI1-SW-A1592	Temporary Seawall Construction at North Portion D	30	12	25-Jun-13 A	03-Sep-13
South Portion (South CH 0 - 450)		85	14	08-Jun-13 A	03-Sep-13
SI1-SW-A1612	Stone Blankets & Geotextile Type 1 for Seawall at East Portion D	20	0	08-Jun-13 A	12-Aug-13 A
SI1-SW-A1614	Temporary Seawall Construction at South Portion D	30	12	25-Jun-13 A	03-Sep-13
SI1-SW-A1674	Completion of Temporary Seawall S4 Portion D	0	0		03-Sep-13*
SI1-SW-A1684	Allow access to HY/2011/03	0	0		03-Sep-13*
Temporary Drainage Diversion		30	30	17-Sep-13	16-Oct-13
SI1-TD-0010	Temporary Drainage Construction	30	30	17-Sep-13	16-Oct-13
Reclamation below +2.5mPD		25	25	04-Sep-13	28-Sep-13
West Portion (South CH 0 - 225 & North CH 5900 - 6136)		17	17	04-Sep-13	20-Sep-13
SI1-A1610	D - Lay Geotextile West Portion	12	12	04-Sep-13	16-Sep-13
SI1-A1615	D - Lay Sand Blanket West Portion 57,200m3 5,000m3/day	10	10	10-Sep-13	20-Sep-13
East Portion (South CH 225 - 450 & North CH 5700 - 5900)		12	12	17-Sep-13	28-Sep-13
SI1-A1624	D - Lay Geotextile East Portion	12	12	17-Sep-13	28-Sep-13
Instrumentation & Monitoring Requirements		18	18	21-Aug-13	07-Sep-13
West Portion		4	4	21-Aug-13	24-Aug-13
Vertical Seawalls - Cluster Type DV-1 & DV-2		4	4	21-Aug-13	24-Aug-13
SI1-DV-1010	D - Surface Movements Marker (Type 3B) 4nrs west	4	4	21-Aug-13	24-Aug-13
Sloping Seawalls - Cluster Type DS-1 & DS-2		4	4	21-Aug-13	24-Aug-13

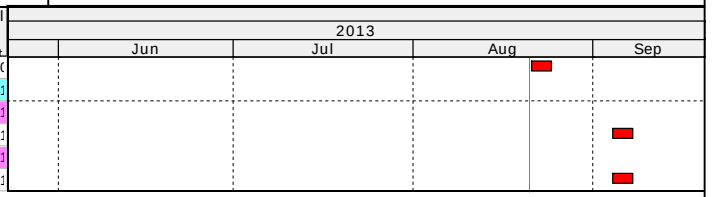


Actual Work
Remaining Work
Critical Remaining Work
Milestone

TASK filters: Last 3 month prog, Works Programme.

Environmental 3 month programme

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	tl
SI1-DS-1010	D - Surface Movement Marker (Type 3B) 4nrs east	4	4	21-Aug-13	24-Aug-13	(
East Portion		4	4	04-Sep-13	07-Sep-13	1
Vertical Seawalls - Cluster Type DV-3 & DV-4		4	4	04-Sep-13	07-Sep-13	1
SI1-DV-1050	D - Surface Movements Marker (Type 3B) 4nrs east	4	4	04-Sep-13	07-Sep-13	1
Sloping Seawalls - Cluster Type DS-3 & DS-4		4	4	04-Sep-13	07-Sep-13	1
SI1-DS-1050	D - Surface Movement Marker (Type 3B) 4nrs east	4	4	04-Sep-13	07-Sep-13	1



Actual Work
Remaining Work
Critical Remaining Work
Milestone

TASK filters: Last 3 month prog, Works Programme.

APPENDIX C
IMPLEMENTATION SCHEDULE OF ENVIRONMENTAL MITIGATION MEASURES (EMIS)

Appendix C - Implementation Schedule of Environmental Mitigation Measures

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
Air Quality				
S5.5.6.1 of HKBCFEIA	A1	The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	All construction sites	V
S5.5.6.2 of HKBCFEIA and S4.8.1 of TKCLKLEIA	A2	Proper watering of exposed spoil should be undertaken throughout the construction phase: • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • When there are open excavation and reinstatement works, hoarding of not less	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		on the top and the 3 sides; • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • All unpaved roads/exposed area shall be watered which results in dust suppression by forming moist cohesive films among the discrete grains of road surface material. • No burning of debris or other materials on the works areas is allowed; • Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created; • Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading; • During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport. 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. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.		
S5.5.6.3 of HKBCFEIA and S4.8.1 of TKCLKLEIA	A3	The Contractor should undertake proper watering on all exposed spoil and associated work areas (with at least 8 times per day) throughout the construction phase.	All construction sites	V
S5.5.6.4 of HKBCFEIA and S4.11 of TKCLKLEIA	A4	Implement regular dust monitoring under EM&A programme during the construction stage.	Selected representative dust monitoring station	V
S5.5.7.1 of HKBCFEIA	A5	The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant: • Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; • All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP;	All construction sites	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• Vents for all silos and cement/ pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; • The materials which may generate airborne dusty emissions should be wetted by water spray system; • All receiving hoppers should be enclosed on three sides up to 3m above unloading point; • All conveyor transfer points should be totally enclosed; • All access and route roads within the premises should be paved and wetted; and • Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body.		
S5.5.2.7 of HKBCFEIA	A6	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: • All road surface within the barging facilities will be paved; • Dust enclosures will be provided for the loading ramp; • Vehicles will be required to pass through designated wheels wash facilities; and • Continuous water spray at the loading points.	All construction sites	N/A (Construction in process)
Construction Noise (Air borne)				
S6.4.10 of HKBCFEIA	N1	Use of good site practices to limit noise emissions by considering the following: • only well-maintained plant should be operated on-site and plant should be	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		serviced regularly during the construction programme; • machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; • silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • mobile plant should be sited as far away from NSRs as possible and practicable; • material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.		
S6.4.11 of HKBCFEIA	N2	Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	All construction sites	V
S6.4.12 of HKBCFEIA	N3	Install movable noise barriers (typically density @14kg/m^2), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	For plant items listed in Appendix 6D of the EIA report at all construction sites	N/A
S6.4.13 of HKBCFEIA	N4	Select “Quiet plants” which comply with the BS 5228 Part 1 or TM standards.	For plant items listed in Appendix 6D of the	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
			EIA report at all construction sites	
S6.4.14 of HKBCFEIA	N5	Sequencing operation of construction plants where practicable.	All construction sites where practicable	V
S5.1 of TMCLKLEIA	N6	Implement a noise monitoring under EM&A programme.	Selected representative noise monitoring station	V
Waste Management (Construction Waste)				
S12.6 of TMCLKLEIA	WM1	The Contractor shall identify a coordinator for the management of waste.	All construction sites	V
S12.6 of TMCLKLEIA	WM2	The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	All construction sites	V
S12.6 of TMCLKLEIA	WM3	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All construction sites	V
S8.3.8 of HKBCFEIA and S12.6 of TMCLKLEIA	WM4	*Construction and Demolition Material* The following mitigation measures should be implemented in handling the waste: • Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; • Carry out on-site sorting;	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; • Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; • Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; • Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction; • In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation; and • The surplus surcharge should be transferred to a fill bank.		
S8.3.9-S8.3.11 of HKBCFEIA and S12.6 of	WM5	*C&D Waste* • Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
TMCLKLEIA		hoardings should not be used, as in other projects. Metal hoarding and falsework should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. • The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.		
S8.2.12-S8.3.15 of HKBCFEIA and S12.6 of TMCLKLEIA	WM6	*Chemical Waste* • Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. • The storage area for chemical wastes should be clearly labelled and used solely for	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated. • Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD.		
S8.3.16 of HKBCFEIA and S12.6 of TMCLKLEIA	WM7	*Sewage* • Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly.	All construction sites	V
S8.3.17 of HKBCFEIA and S12.6 of TMCLKLEIA	WM8	*General Refuse* • The site and surroundings shall be kept tidy and litter free. General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. • A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. • Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. • Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided. • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes. • Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. • All waste containers shall be in a secure area on hardstanding.		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
Water Quality (Construction Phase)				
	W1	Mitigation during the marine works to reduce impacts to within acceptable levels have been recommended and will comprise a series of measures that restrict the method and sequencing of backfilling, as well as protection measures. Details of the measures are provided below: • Reclamation filling for the Project shall not proceed until at least 200m of leading seawall at the reclamation area formed above +2.2mPD, unless otherwise agreement was obtained from EPD, except for the 300m gaps for marine access. All underwater filling works shall be carried out behind seawalls to avoid dispersion of suspended solids outside the Project limit; • Except for the filling of the cellular structures, not more than 15% public fill shall be used for reclamation filling below +2.5mPD during construction of the seawall; • After the seawall is completed except for the 300m marine access as indicated in the EPs, not more than 30% public fill shall be used for reclamation filling below +2.5mPD, unless otherwise agreement from EPD was obtained; • Upon completion of 200m leading seawall, no more than a total of 60 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 60,000	During filling	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		m3 for HKBCF and TMCLKL southern landfall reclamation during the filling operation; and • Upon completion of the whole section of seawall except for the 300m marine access as indicated in the EPs, no more than a total of 190 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 190,000 m3 for the remaining filling operations for HKBCF and TMCLKL southern landfall reclamation. • Floating type perimeter silt curtains shall be around the HKBCF site before the commencement of marine works. Staggered layers of silt curtain shall be provided to prevent sediment loss at navigation accesses. The length of each staggered layers shall be at least 200m; • Single layer silt curtain to be applied around the North-east airport water intake; • The silt-curtains should be maintained in good condition to ensure the sediment plume generated from filling be confined effectively within the site boundary; • The filling works shall be scheduled to spread the works evenly over a working day; • Cellular structure shall be used for seawall construction; • A layer of geotextile shall be placed on top of the seabed before any filling activities take place inside the cellular structures to form the seawall; • The conveyor belts shall be fitted with windboards and conveyor release points shall be covered with curtain to prevent any spillage of filling materials onto the		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		surrounding waters; and • An additional layer of silt curtain shall be installed near the active stone column installation points. A layer of geotextile with stone blanket on top shall be placed on the seabed prior to stone column installation works.		
S9.11.1.3 of HKBCFEIA and S6.10 of TMCLKLEIA	W2	<u>Land Works</u> General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include: • wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; • sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; • storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; • silt removal facilities, channels and manholes shall be maintained and any	All land-based construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm; • temporary access roads should be surfaced with crushed stone or gravel; • rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; • measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; • open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; • manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; • discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; • all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit; • wheel wash overflow shall be directed to silt removal facilities before being		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		discharged to the storm drain; • the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; • wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; • vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for offsite disposal; • the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; • waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; • all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and • surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the storm water system..		
S9.14 of HKBCFEIA	W3	Implement a water quality monitoring programme	At identified monitoring location	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
and S6.10 of TMCLKLEIA				
S6.10 of TMCLKLEIA	W4	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All construction site areas	V
Ecology (Construction Phase)				
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E1	• Install silt curtain during the construction • Limit works fronts • Construct seawall prior to reclamation filling where practicable • Good site practices • Strict enforcement of no marine dumping • Site runoff control • Spill response plan	Seawall, reclamation area	V
S10.7 of HKBCFEIA	E2	• Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater.	Land-based works areas	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E3	• Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time.	Land-based works areas	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E4	• Dolphin Exclusion Zone • Dolphin watching plan	Marine works	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E5	• Decouple compressors and other equipment on working vessels • Proposal on design and implementation of acoustic decoupling measures applied during reclamation works • Avoidance of percussive piling	Marine works	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E6	• Control vessel speed • Skipper training • Predefined and regular routes for working vessels; avoid Brothers Islands	Marine traffic	V
S10.10 of HKBCFEIA and S8.14 of TMCLKLEIA	E7	• Vessel based dolphin monitoring	Northeast and Northwest Lantau	V
Fisheries				
S11.7 of HKBCFEIA	F1	• Reduce re-suspension of sediments • Limit works fronts • Good site practices	Seawall, reclamation area	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• Strict enforcement of no marine dumping • Spill response plan		
S11.7 of HKBCFEIA	F2	• Install silt-grease trap in the drainage system collecting surface runoff	Reclamation area	V
Landscape & Visual (Construction Phase)				
S14.3.3. 3 of HKBCFEIA and S10.9 of TMCLKLEIA	LV1	*Mitigate Landscape Impacts* G1/CM4 Grass-hydroseed or sheeting bare soil surface and stock pile areas. G9 Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt "natural-look" by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of new coastline.	All construction site areas	N/A
S10.9 of TMCLKLEIA	LV2	*Mitigate Landscape Impacts* CM7 Ensure no run-off into water body adjacent to the Project Area.	All construction site areas	V
S14.3.3. 3 of HKBCFEIA	LV4	*Mitigate Visual Impacts* V1 Minimize time for construction activities during construction period.	All construction site areas	V
S10.9 of TMCLKLEIA	LV5	*Mitigate Visual Impacts* CM6 Control night-time lighting and glare by hooding all lights.	All construction site areas	V
EM&A				

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
S15.2.2 of HKBCFEIA	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	All construction site areas	V
S15.5 - S15.6 of HKBCFEIA	EM2	• An Environmental Team needs to be employed as per the EM&A Manual. • Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. • An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	All construction site areas	V

Legend: V = implemented; x = not implemented; N/A = not applicable

APPENDIX D
SUMMARY OF ACTION AND LIMIT LEVELS

Appendix D - Summary of Action and Limit Levels

Table 1 – Action and Limit Levels for 1-hour TSP

Location	Action Level	Limit Level
AMS2	374 $\mu g/m^3$	500 $\mu g/m^3$
AMS3A*	368 $\mu g/m^3$	500 $\mu g/m^3$
AMS6	360 $\mu g/m^3$	500 $\mu g/m^3$
AMS7	370 $\mu g/m^3$	500 $\mu g/m^3$

Remarks: * Action Level set out at AMS3 Ho Yu College is adopted.

Table 2 – Action and Limit Levels for 24-hour TSP

Location	Action Level	Limit Level
AMS2	176 $\mu g/m^3$	260 $\mu g/m^3$
AMS3A*	167 $\mu g/m^3$	260 $\mu g/m^3$
AMS6	173 $\mu g/m^3$	260 $\mu g/m^3$
AMS7	183 $\mu g/m^3$	260 $\mu g/m^3$

Remarks: * Action Level set out at AMS3 Ho Yu College is adopted.

Table 3 – Action and Limit Levels for Construction Noise (0700-1900 hrs of normal weekdays)

Location	Action Level	Limit Level
NMS2	When one documented complaint, related to 0700 – 1900 hours on normal weekdays, is received from any one of the sensitive receivers	75 dB(A)
NMS3A		*65 / 70 dB(A)

*Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65dB(A) applies during school examination period.

Table 4 – Action and Limit Levels for Water Quality

Parameters	**Action**	**Limit**
DO in mg L^{-1} (Surface, Middle & Bottom)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4 .2 (except 5 mg/L for FCZ) Bottom 3.6
SS in mg L^{-1} (depth-averaged)	23.5 and 120% of upstream control station's SS at the same tide of the same day	34.4 and 130% of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes
Turbidity in NTU (depth-averaged)	27.5 and 120% of upstream control station's turbidity at the same tide of the same day	47.0 and130% of upstream control station's turbidity at the same tide of the same day

Notes:

1. "depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
2. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
3. For turbidity, SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table 5(a) Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL):

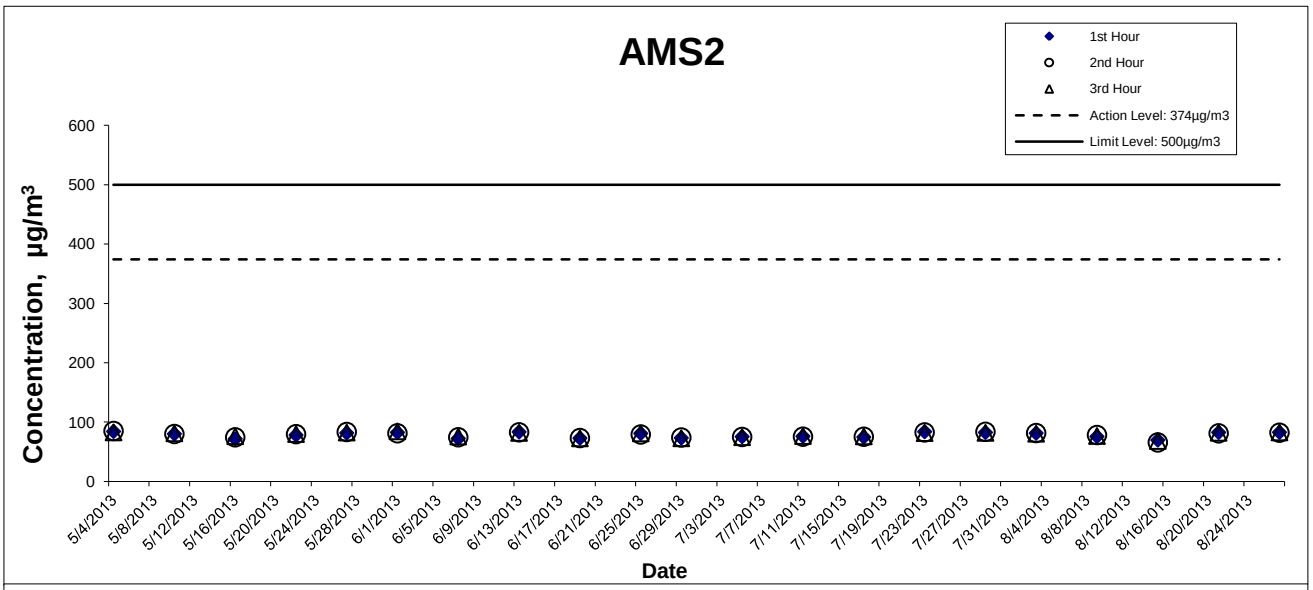
	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG < 70% of baseline) & (ANI < 70% of baseline)	(STG < 70% of baseline) & (ANI < 70% of baseline)
Limit Level	[(STG < 40% of baseline) & (ANI < 40% of baseline)] AND [(STG < 40% of baseline) & (ANI < 40% of baseline)]	

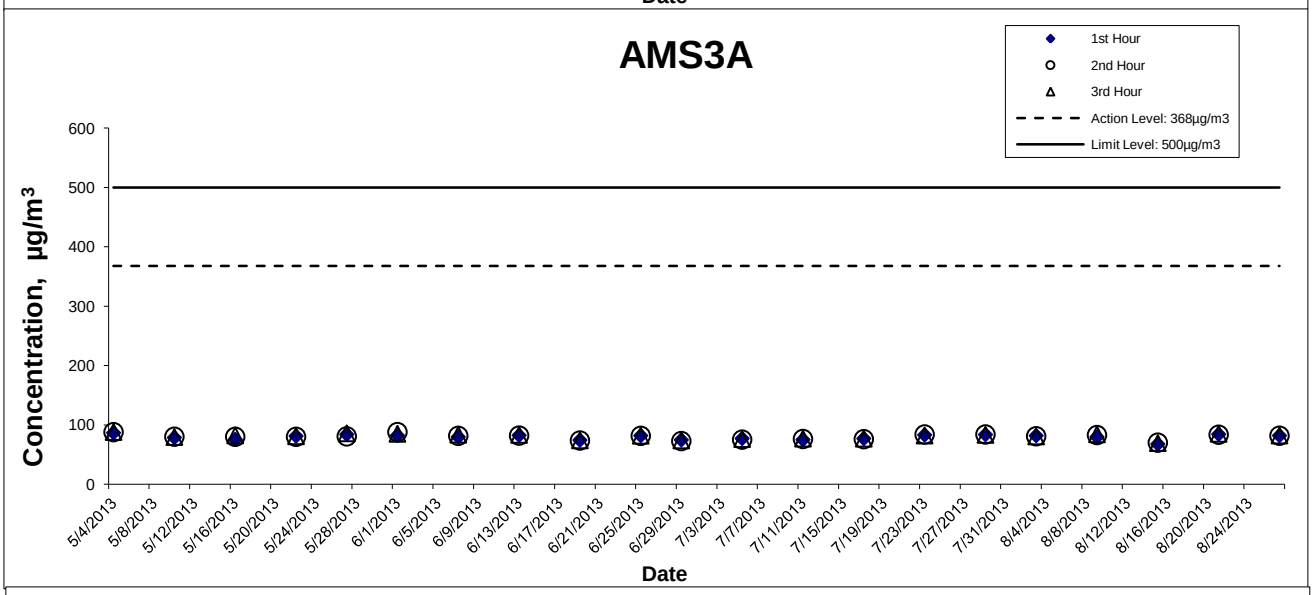
For North Lantau Social Cluster, action level will be trigger if either NEL **or** NWL fall below the criteria; limit level will be triggered if both NEL **and** NWL fall below the criteria.

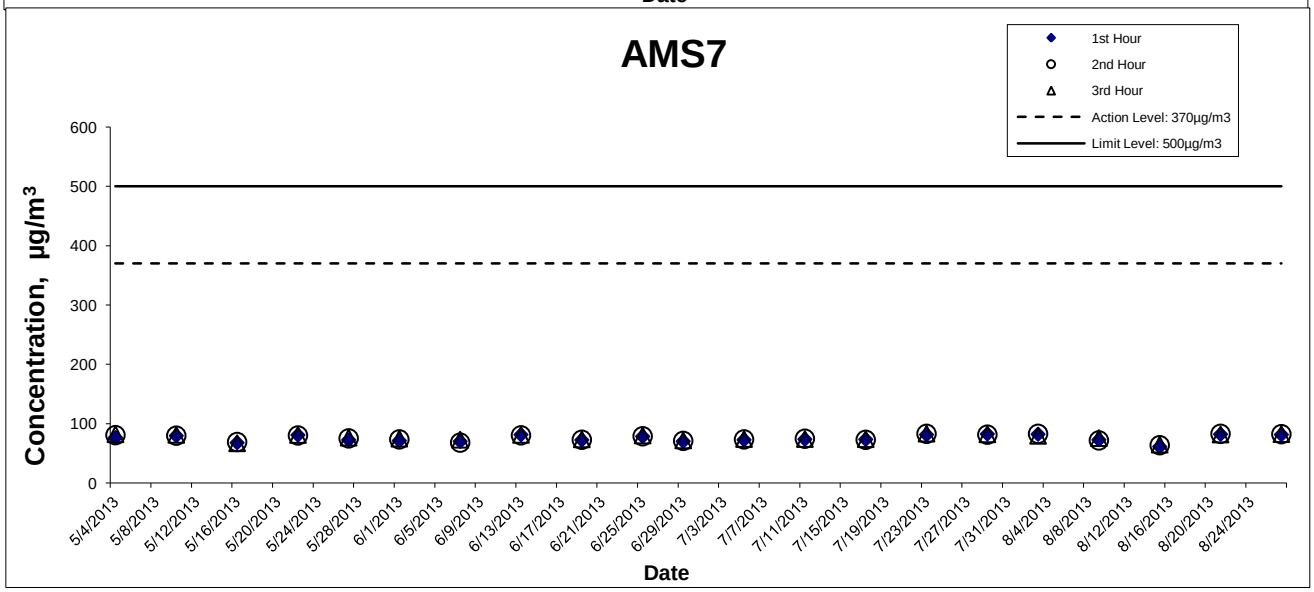
Table 5(b) Derived Value of Action Level (AL) and Limit Level (LL) for Chinese White Dolphin Monitoring

	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG < 4.2) & (ANI < 15.5)	(STG < 6.9) & (ANI < 31.3)
Limit Level	[(STG < 2.4) & (ANI <8.9)] AND [(STG < 3.9)& (ANI < 17.9)]	

APPENDIX E
GRAPHICAL PRESENTATION OF IMPACT AIR QUALITY MONITORING RESULTS







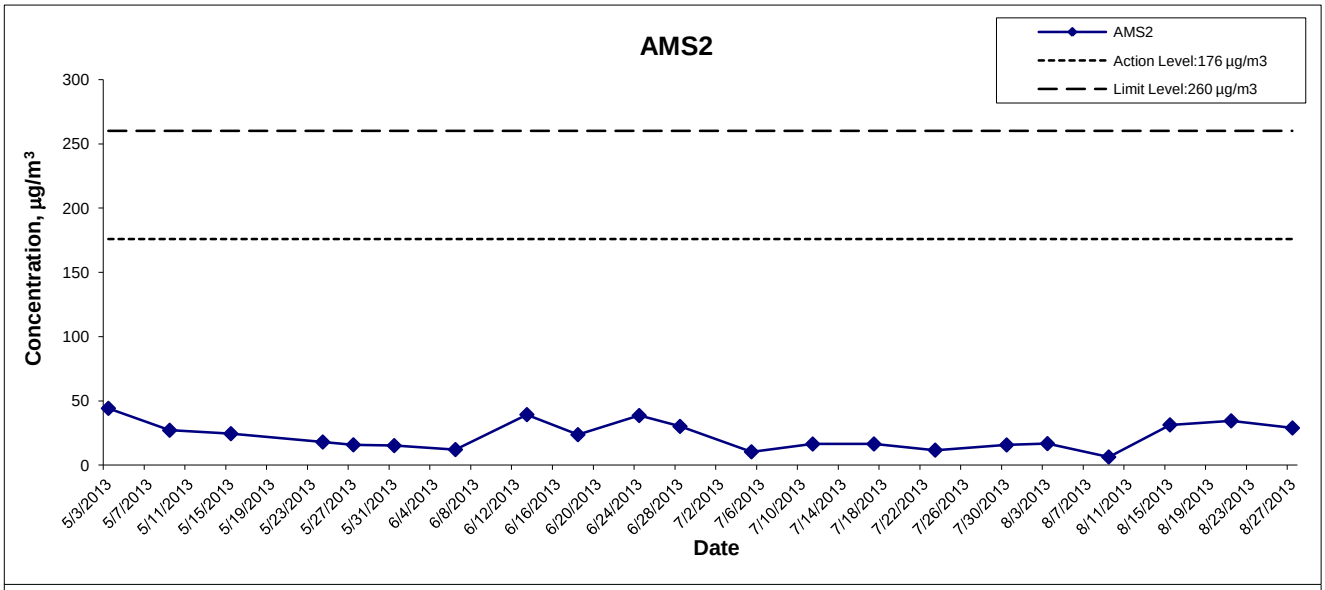
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

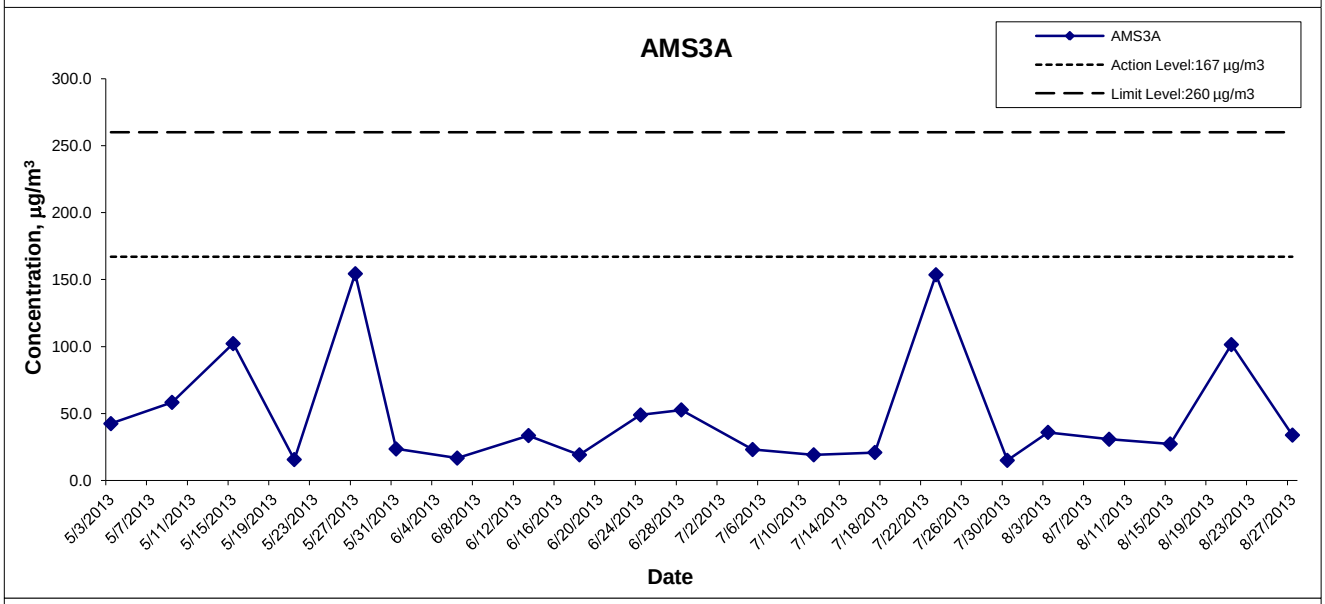
AECOM

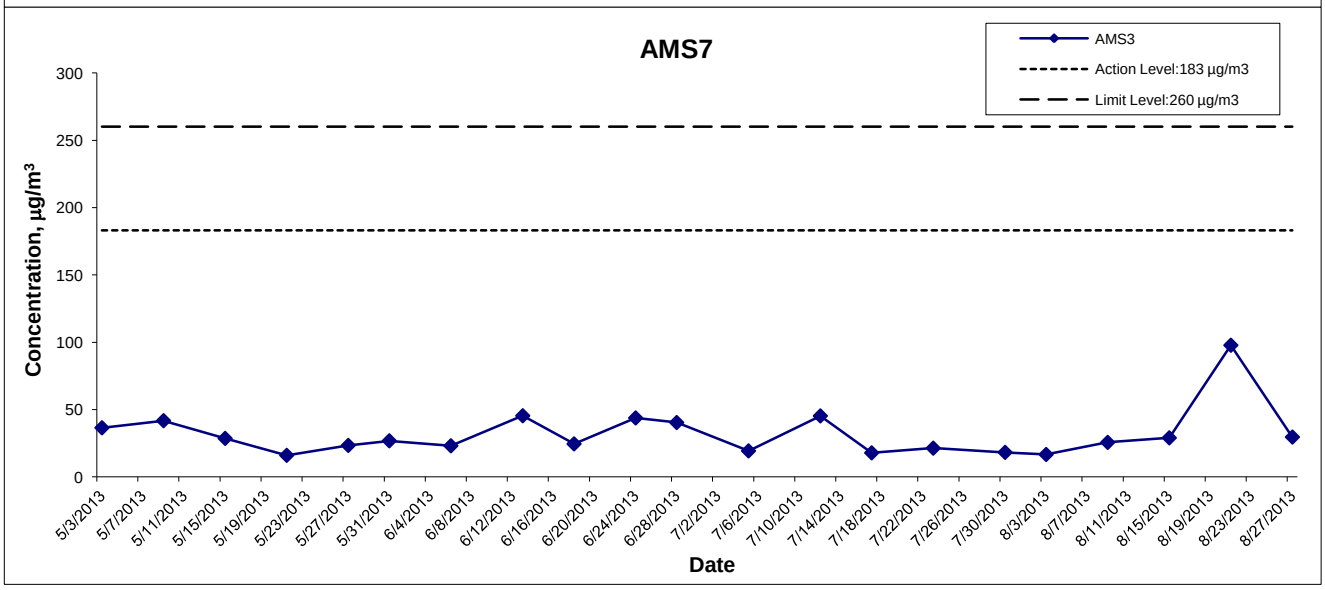
Graphical Presentation of Impact 1-hour TSP Monitoring Results

Project No.: 60249820 **Date: September 2013**

Appendix E







HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

AECOM

Graphical Presentation of Impact 24-hour TSP Monitoring Results

Project No.: 60249820 **Date: September 2013**

Appendix E

APPENDIX F
GRAPHICAL PRESENTATION OF IMPACT DAYTIME CONSTRUCTION NOISE MONITORING RESULTS

Appendix F Impact Daytime Construction Noise Monitoring Results

Daytime Noise Monitoring Results at Station NMS2 - Seaview Crescent Tower 1

Date	Weather Condition	Noise Level for 30-min, dB(A)[#]				Averaged Wind Speed (m/s)	Baseline Noise Level, dB(A)	Limit Level, dB(A)	Exceedance (Y/N)
		Time	L90	L10	Leq				
09-Aug-13	Sunny	10:40	64	69	67	<5m/s	62.9	75	N
17-Aug-13	Cloudy	15:31	64	67	66	<5m/s	62.9	75	N
21-Aug-13	Cloudy	14:28	63	67	66	<5m/s	62.9	75	N
27-Aug-13	Sunny	14:25	60	67	65	<5m/s	62.9	75	N
		Min	60	67	65				
		Max	64	69	67				
		Average	--	--	66				

Access to the monitoring location NMS2 on 15 Aug 13 was not permitted by the property management of Seaview Crsecent due to hoisting of typhoon signal 1. The noise monitoring event at NMS2 is rescheduled to 17 Aug 13.

Daytime Noise Monitoring Results at Station NMS3A - Site Boundary of Site Office (WA2)

Date	Weather Condition	Noise Level for 30-min, dB(A)[#]				Averaged Wind Speed (m/s)	Baseline Noise Level, dB(A) ^	Limit Level, dB(A)**	Exceedance (Y/N)
		Time	L90	L10	Leq				
09-Aug-13	Sunny	14:35	60	67	66	<5m/s	66.3	70	N
15-Aug-13	Cloudy	15:00	64	68	66	<5m/s	66.3	70	N
21-Aug-13	Cloudy	15:30	64	70	69	<5m/s	66.3	70	N
27-Aug-13	Sunny	14:27	64	68	66	<5m/s	66.3	70	N
		Min	60	67	66				
		Max	64	70	69				
		Average	--	--	67				

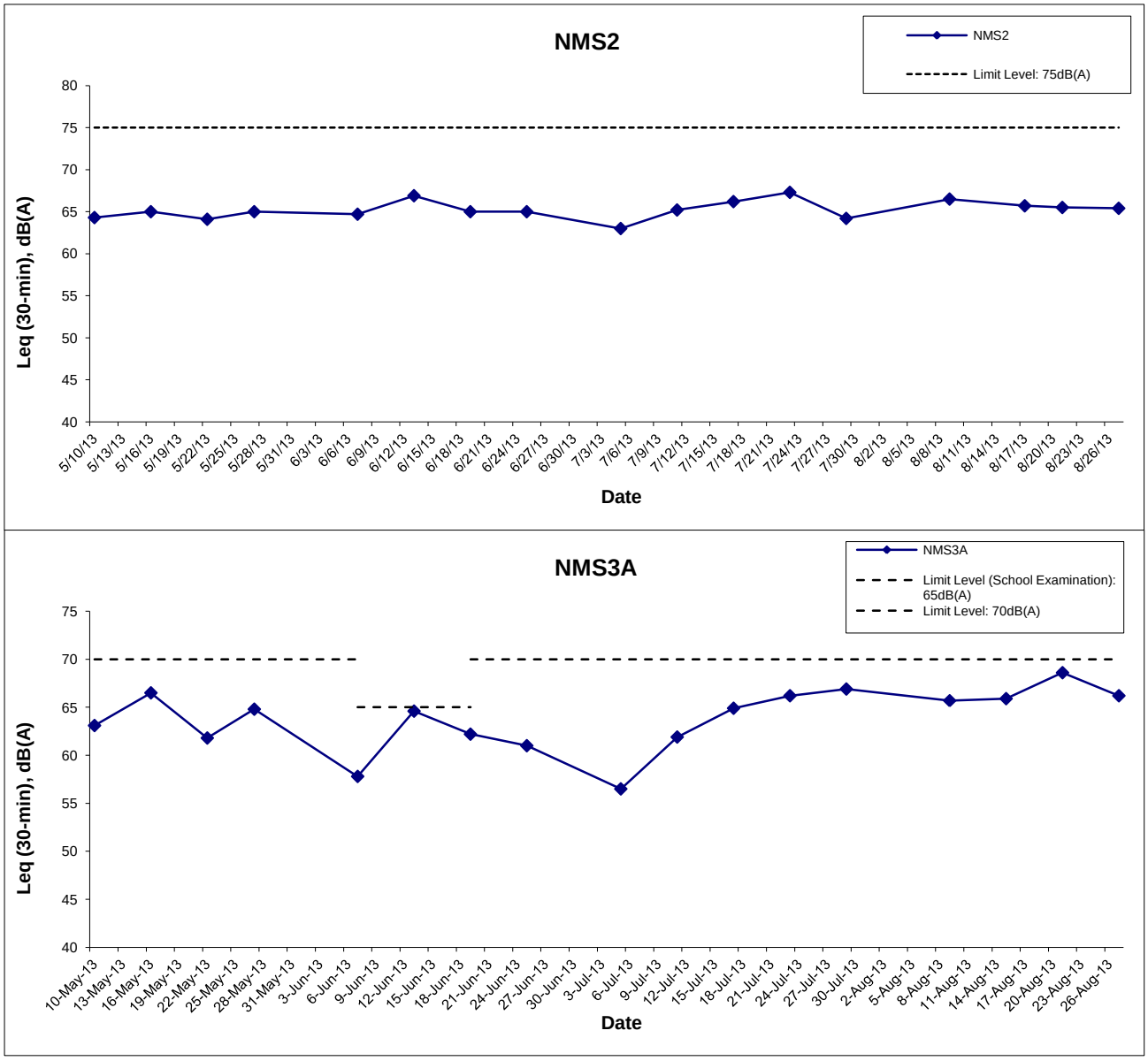
Remark:

[#] A correction of +3dB(A) was made to the free field measurement.

* Façade measurement.

^ Averaged baseline noise level recorded at NMS3 Ho Yu College is adopted.

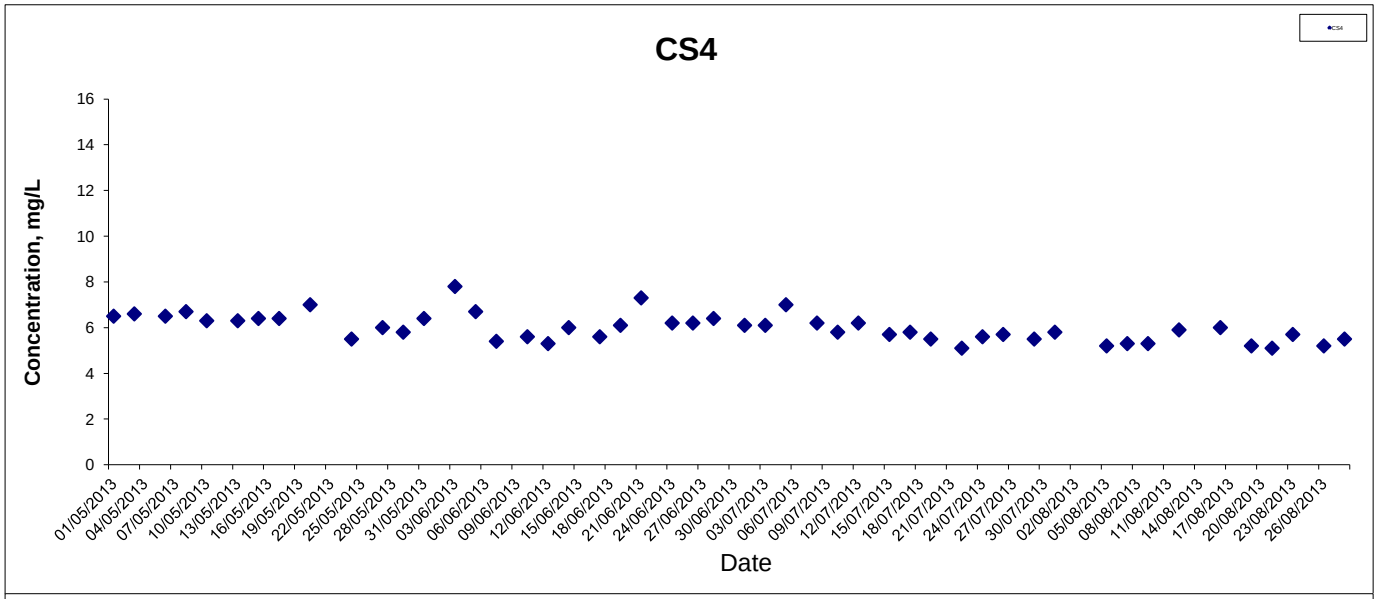
** Limit Level of 70dB(A) applies to education institutes while 65dB(A) applies during school examination period.

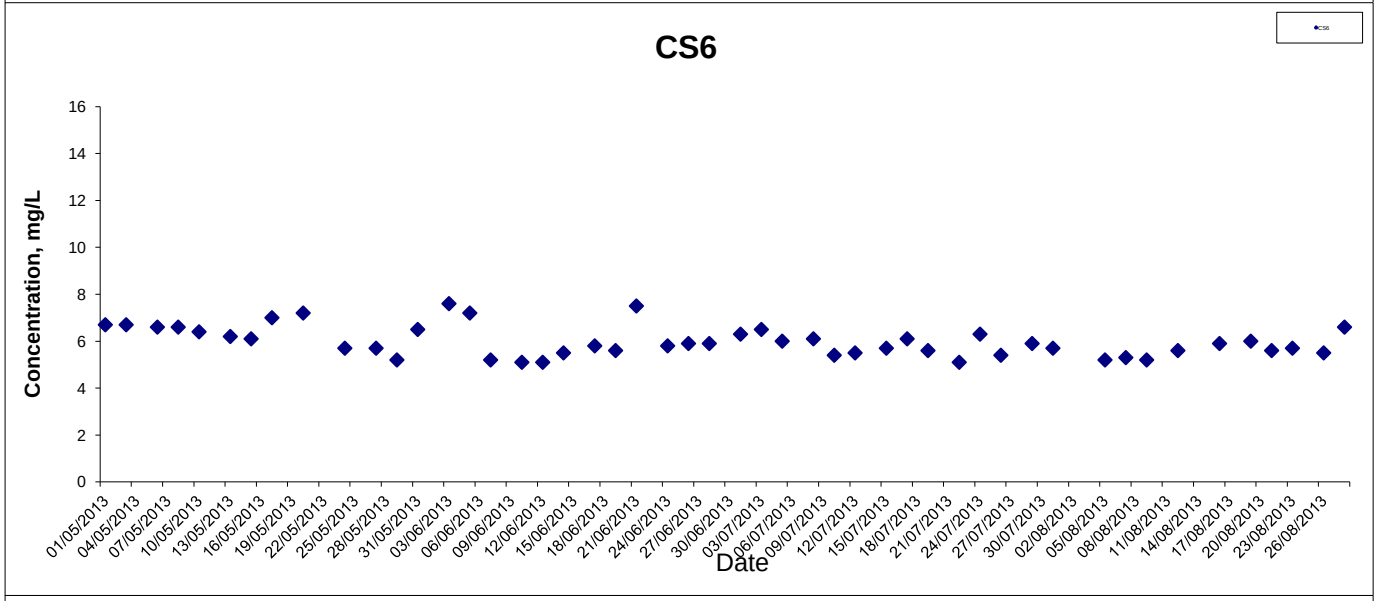


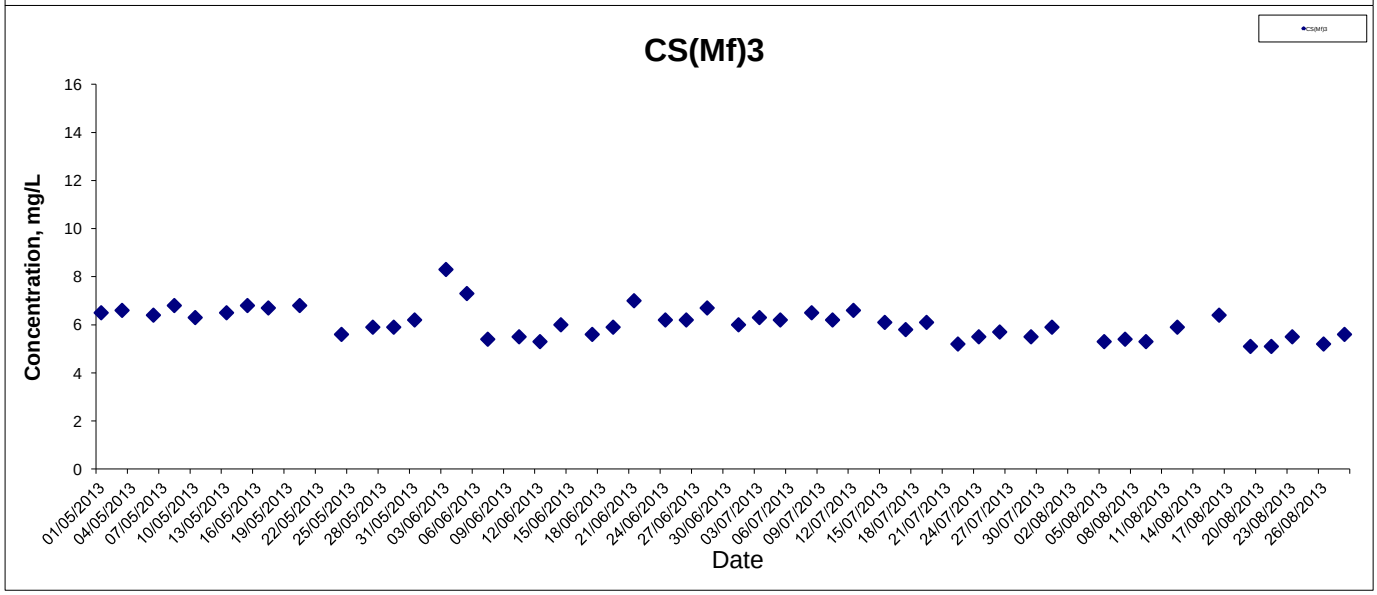
Remarks: Effective from July 2012, the Limit Level at NMS3A was revised to 70dB(A). Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65dB(A) applies during school examination period.

APPENDIX G
GRAPHICAL PRESENTATION OF IMPACT WATER QUALITY MONITORING RESULTS

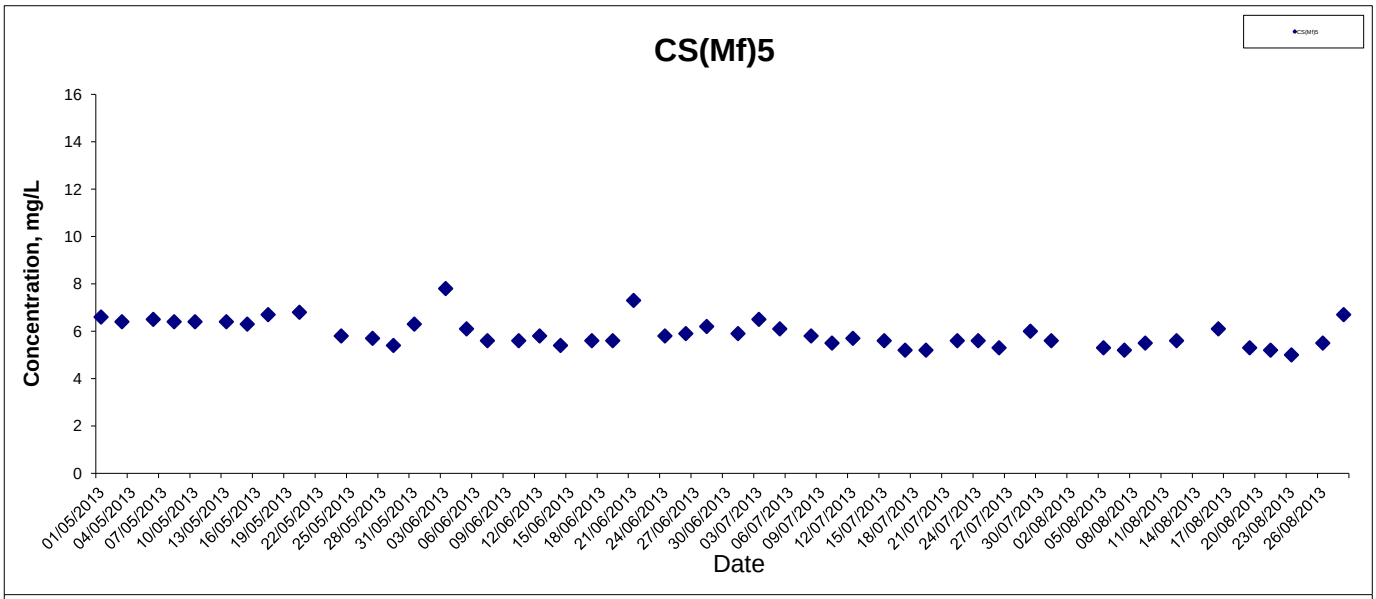
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

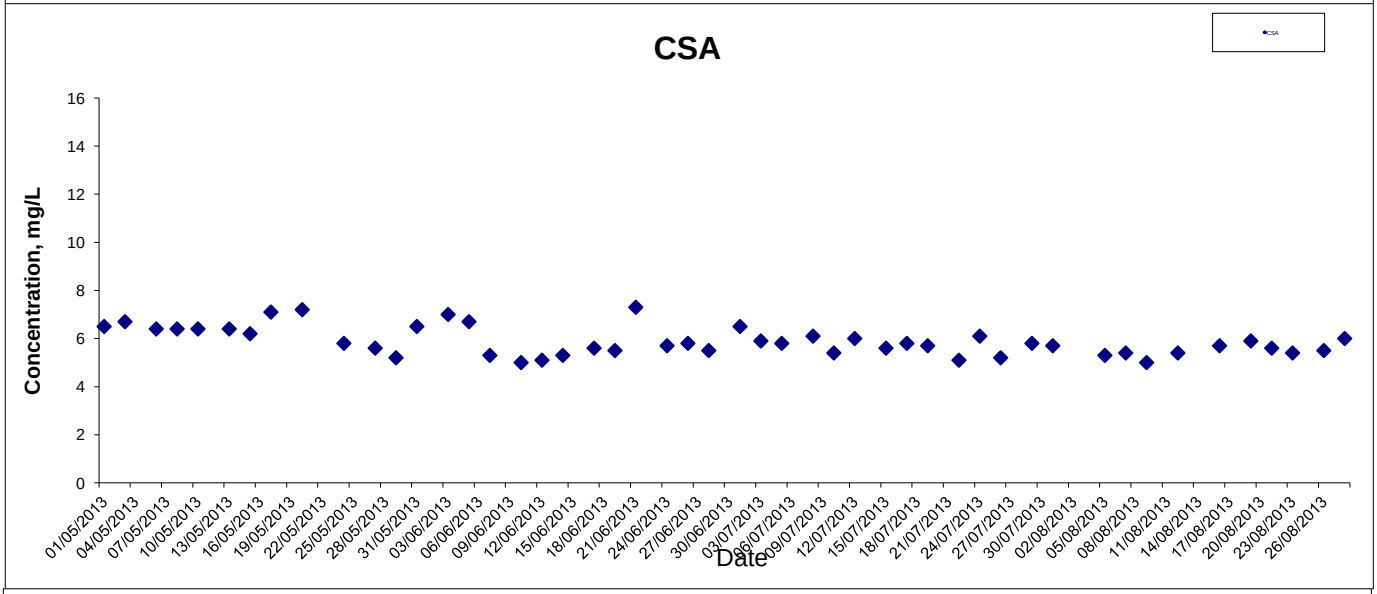


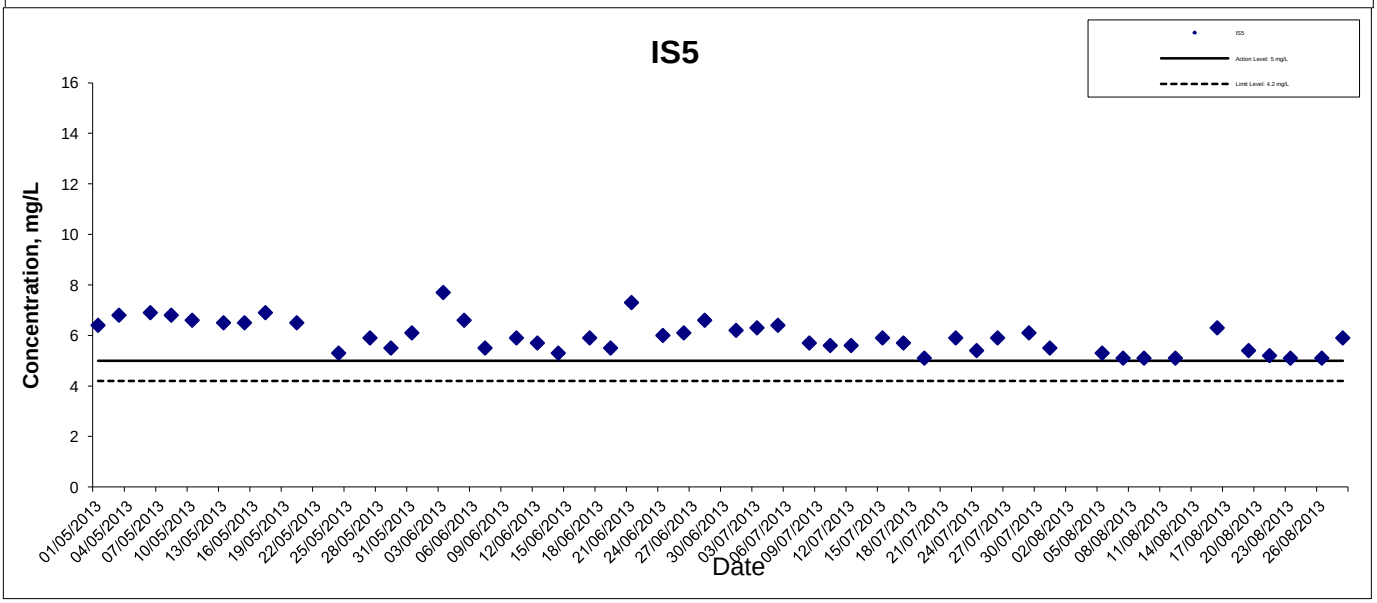




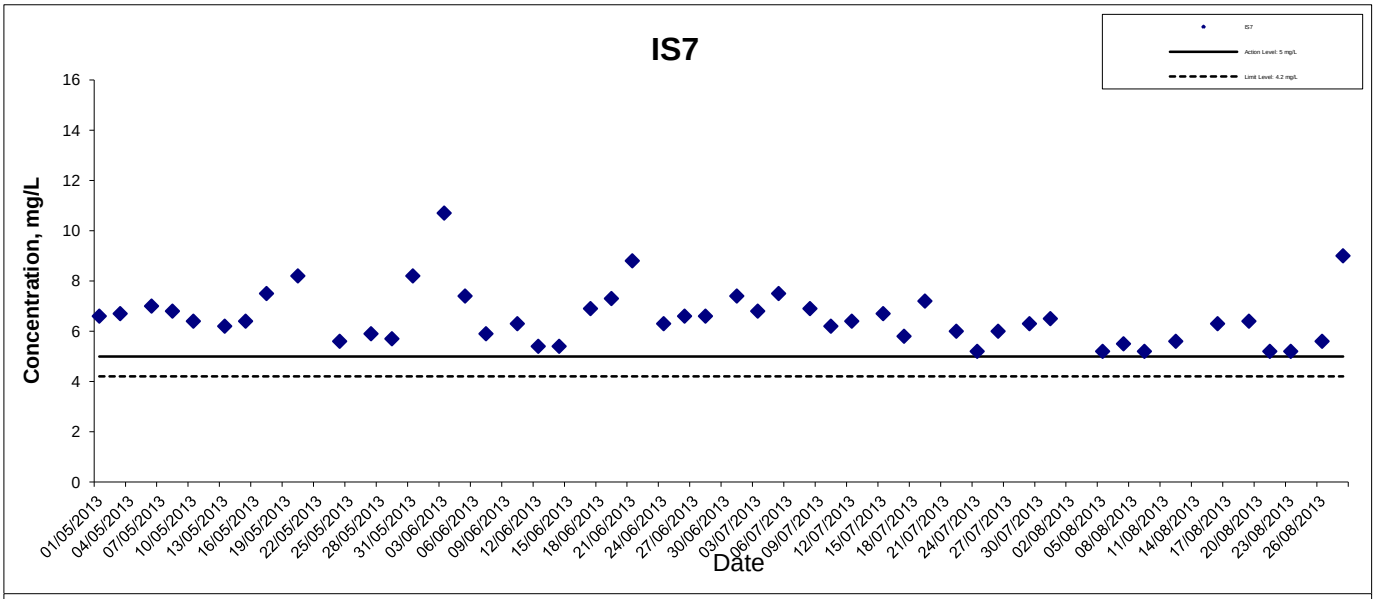
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

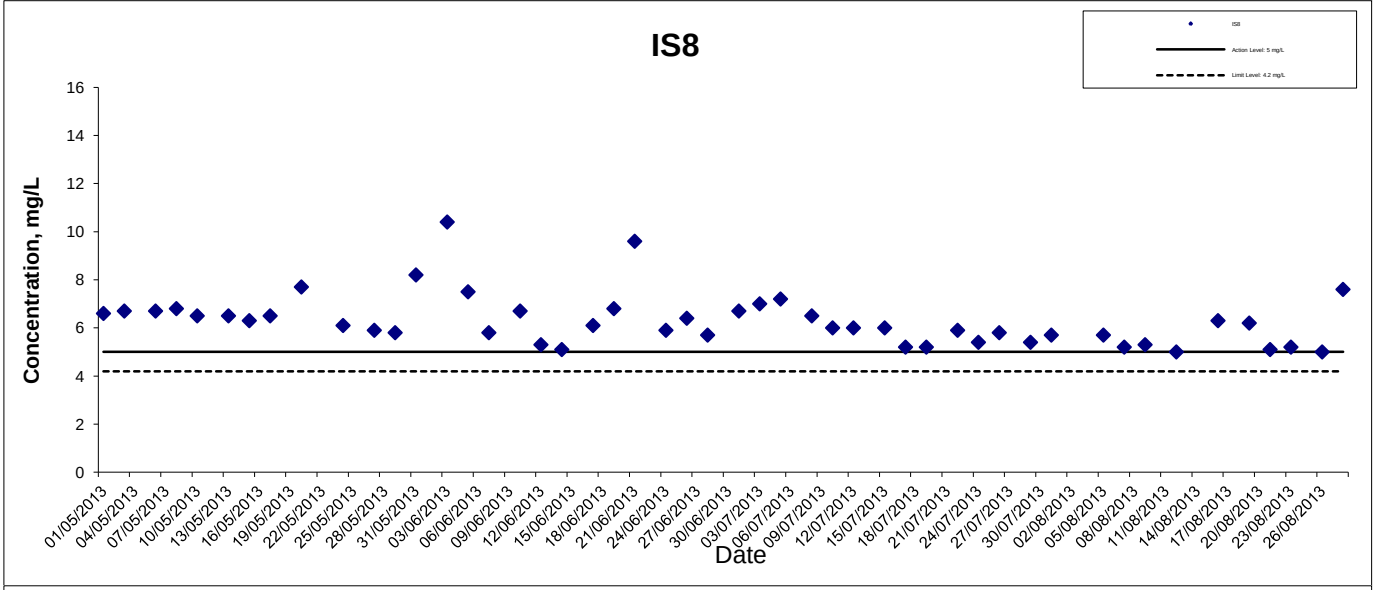


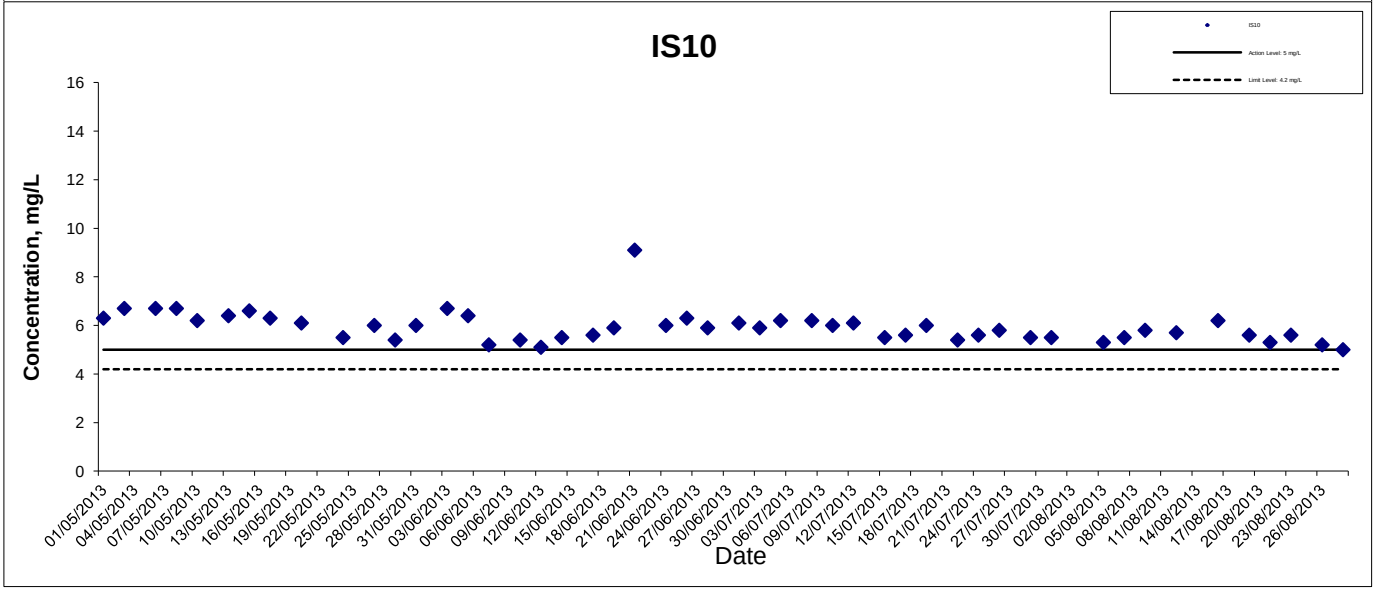




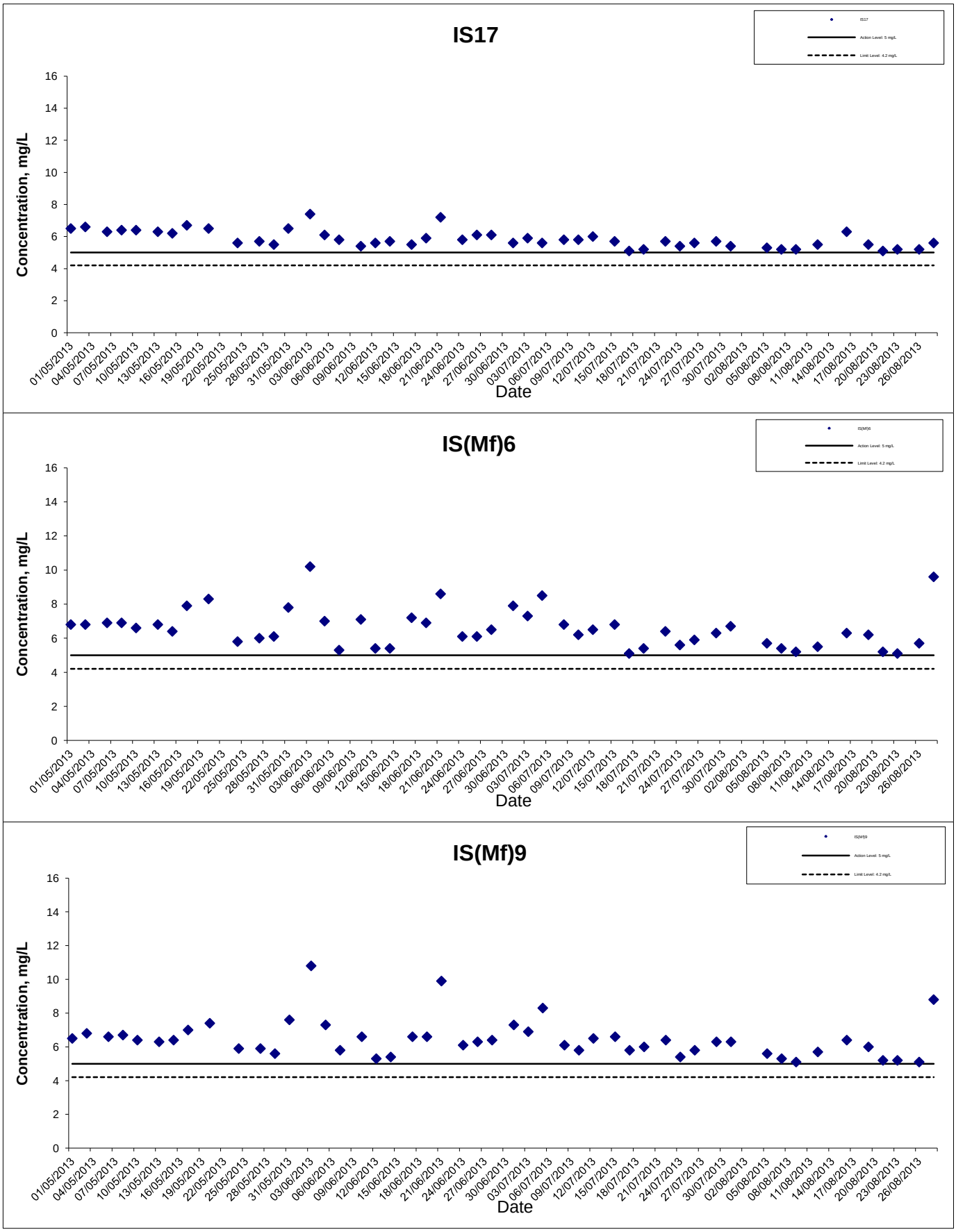
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



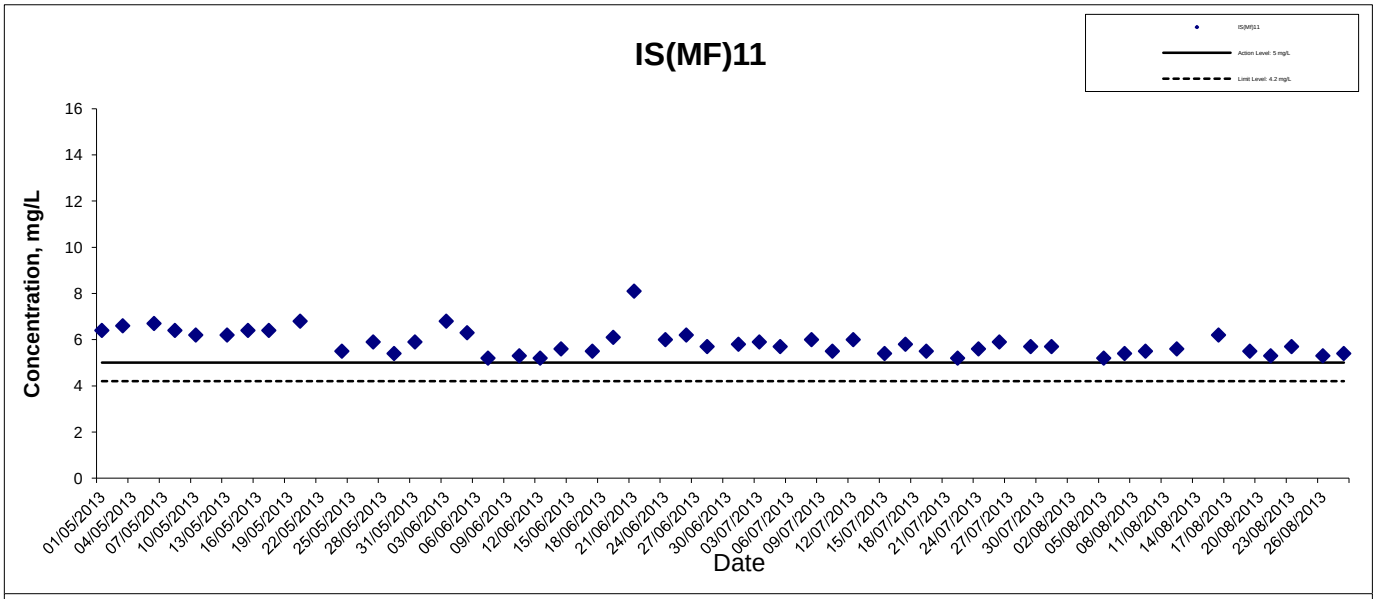


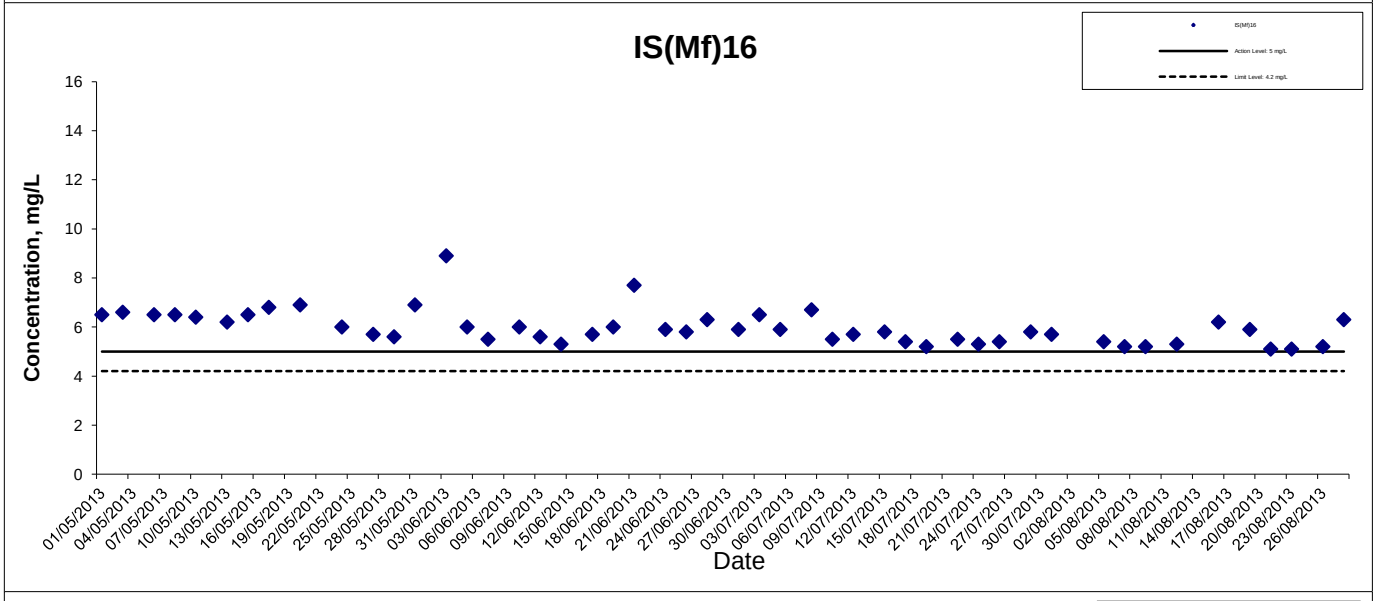


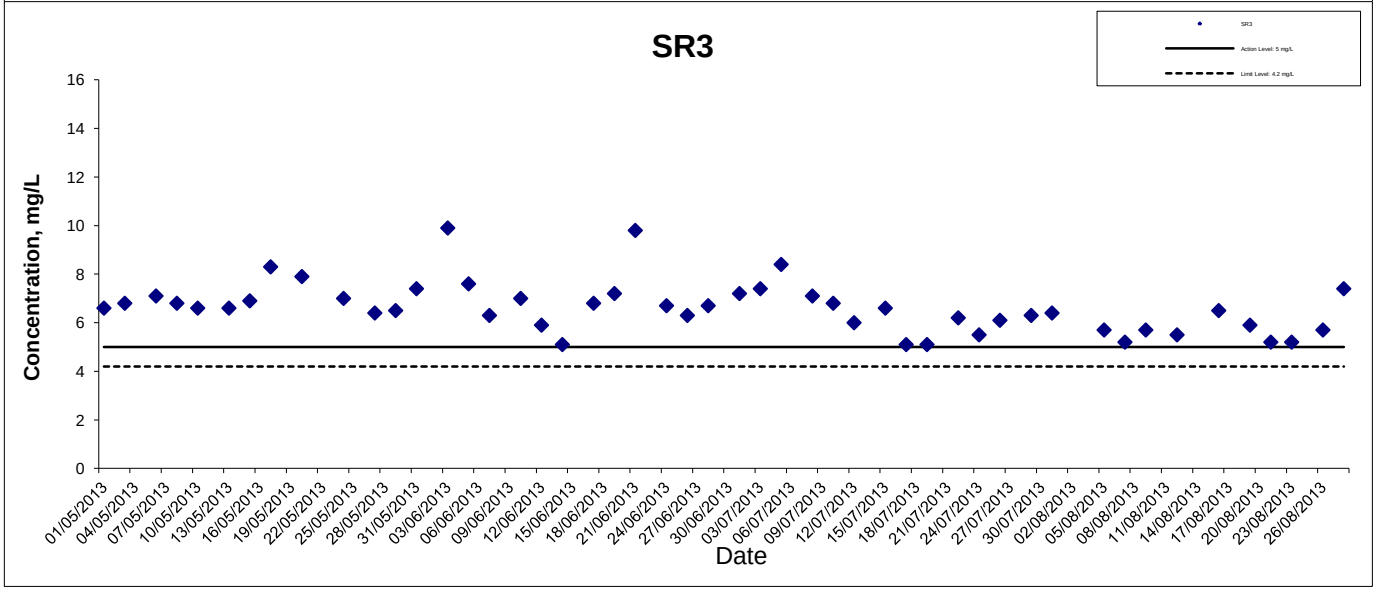
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



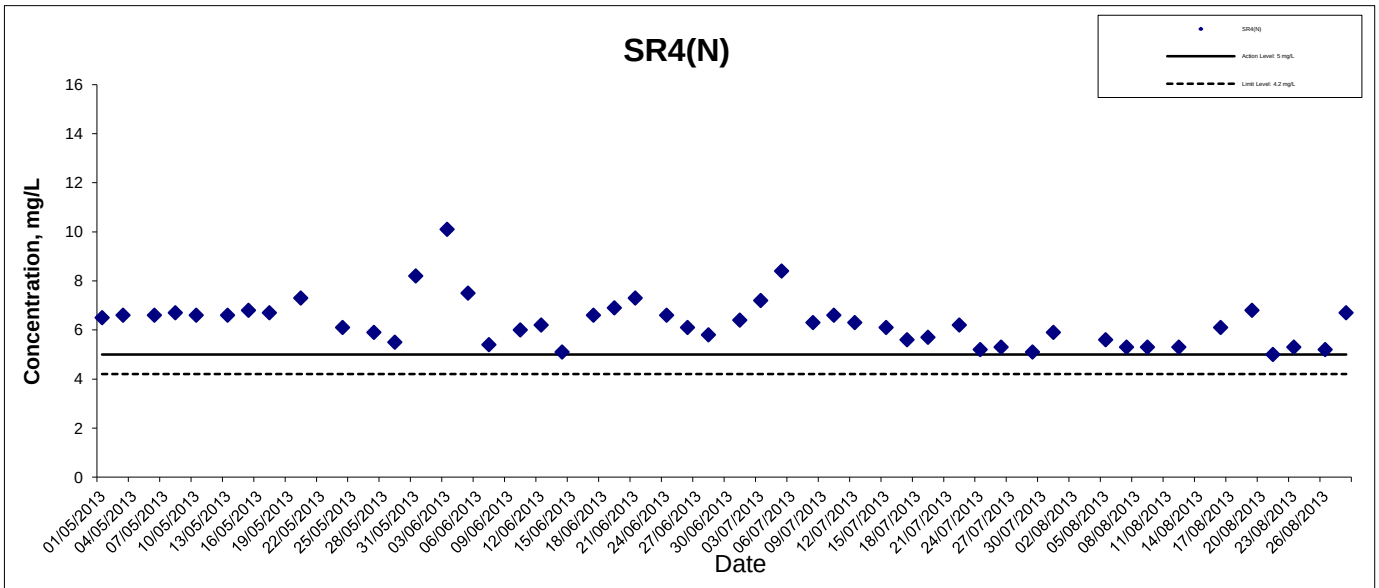
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

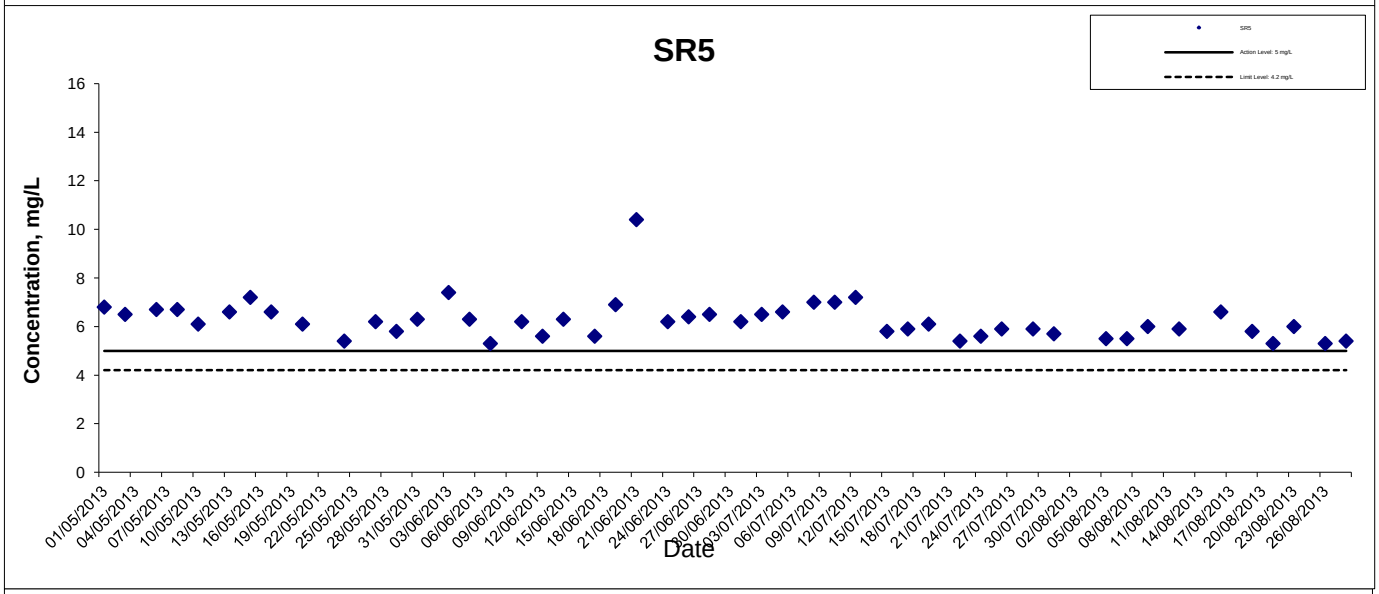


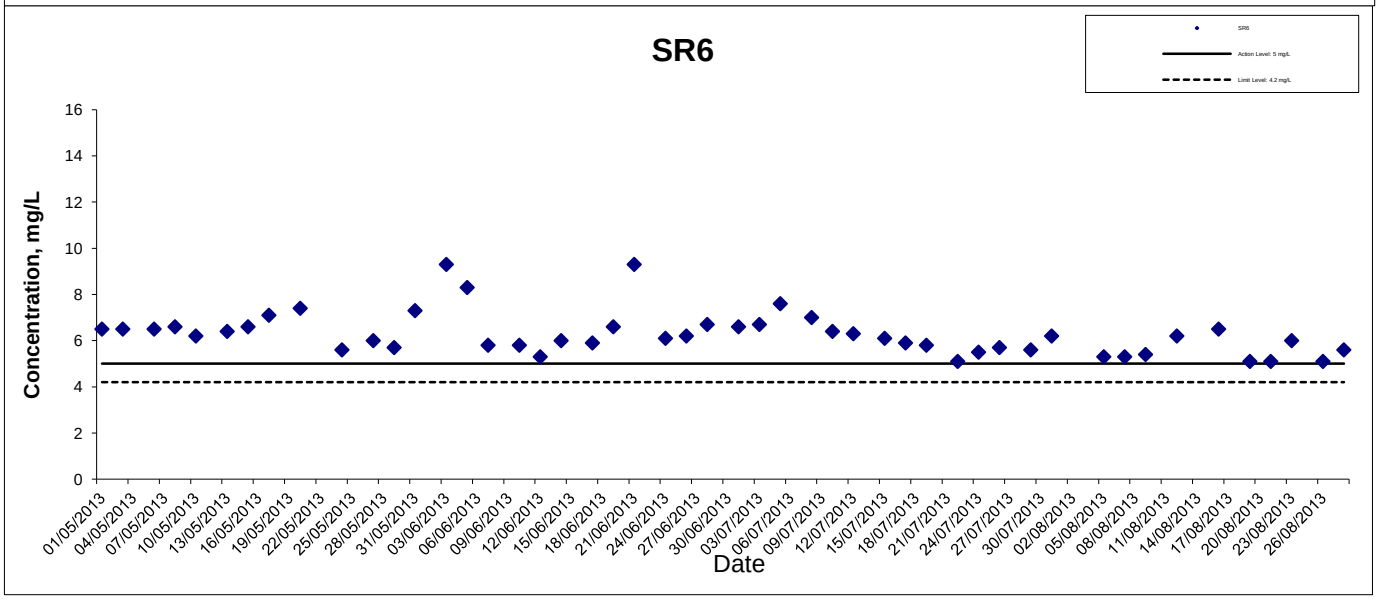




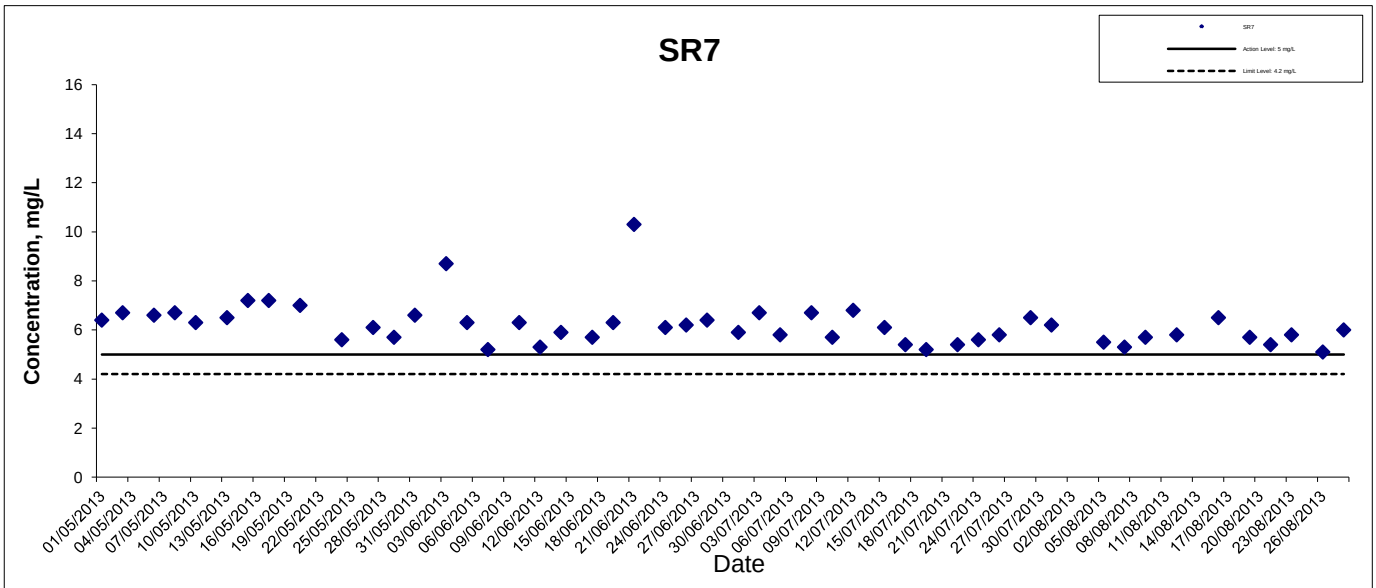
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

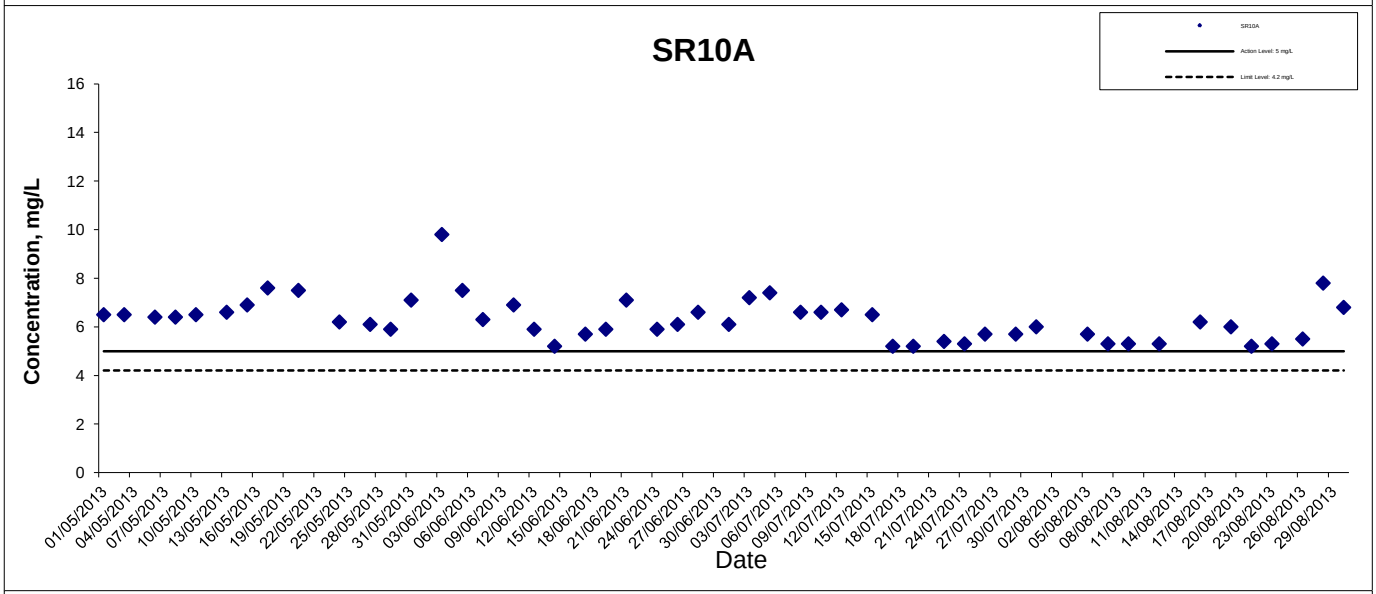


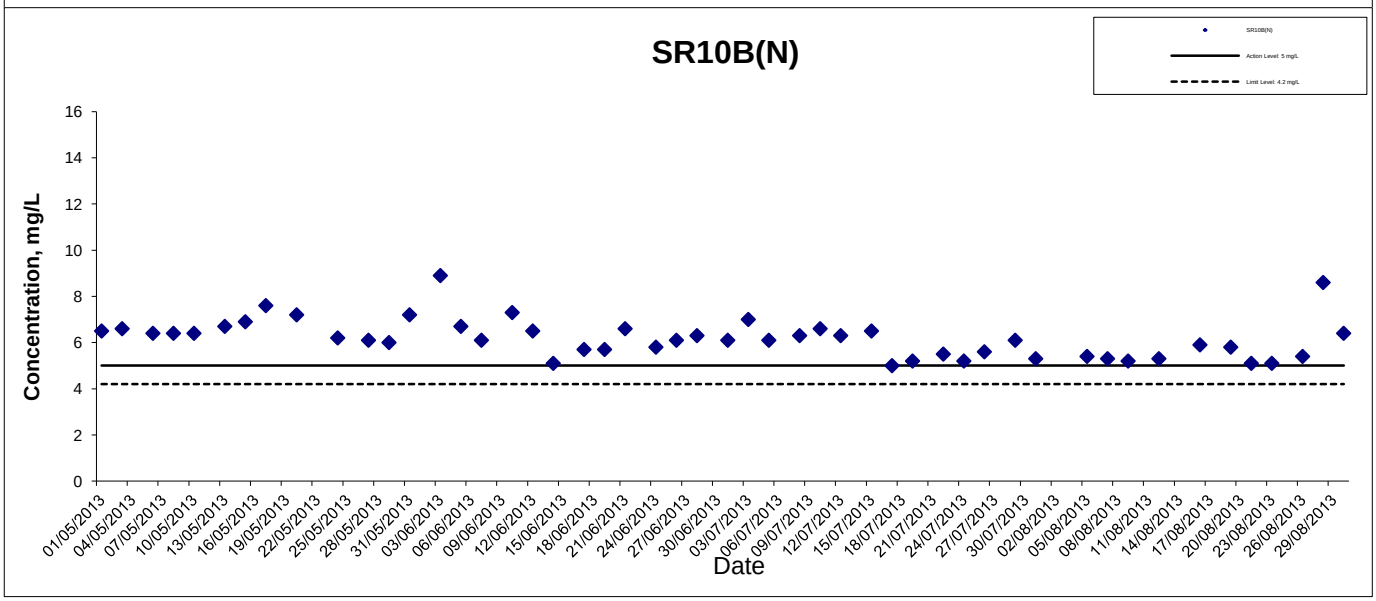




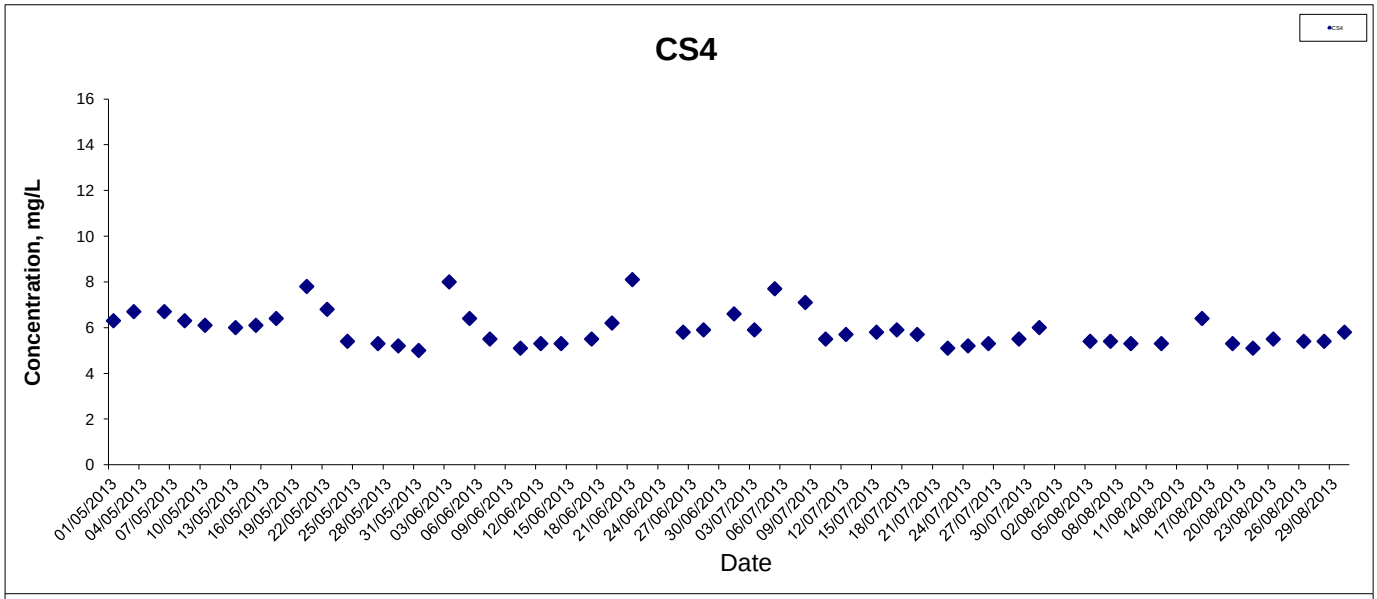
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

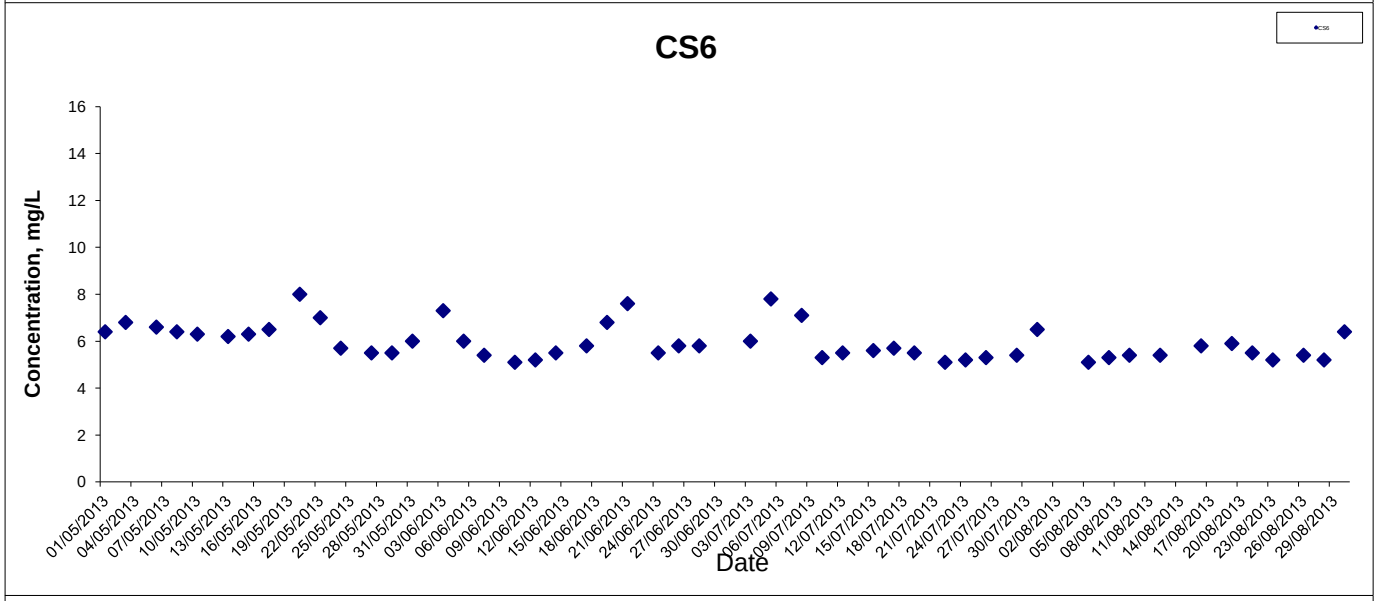


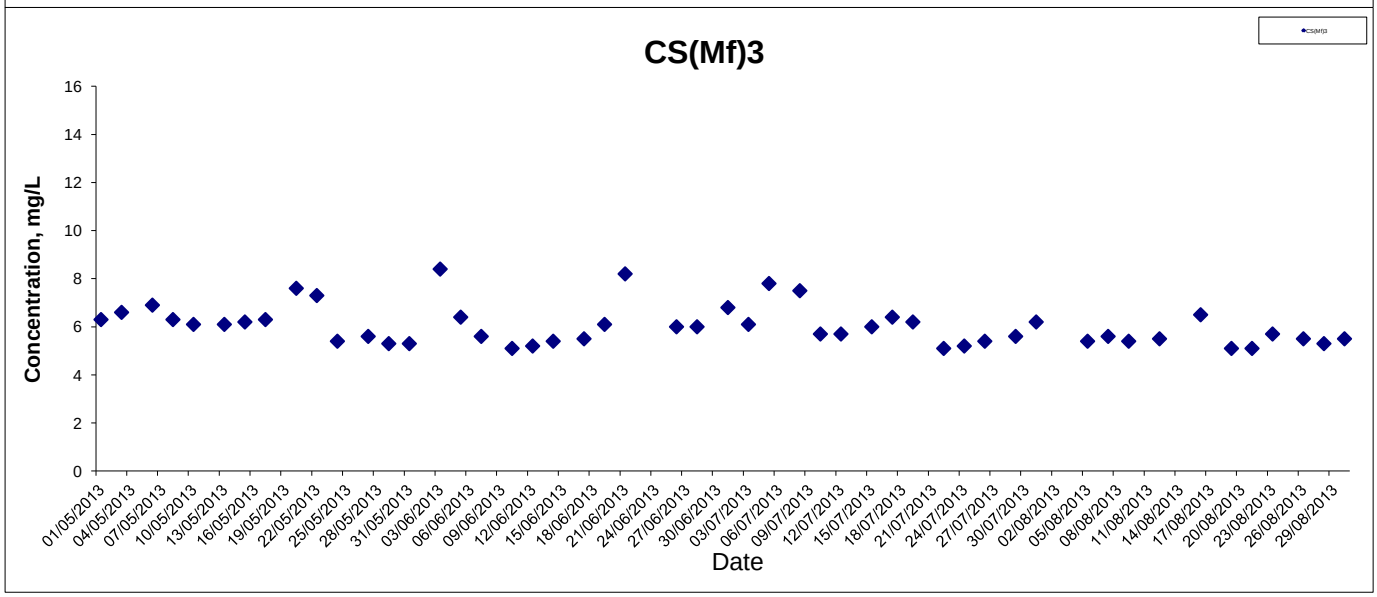




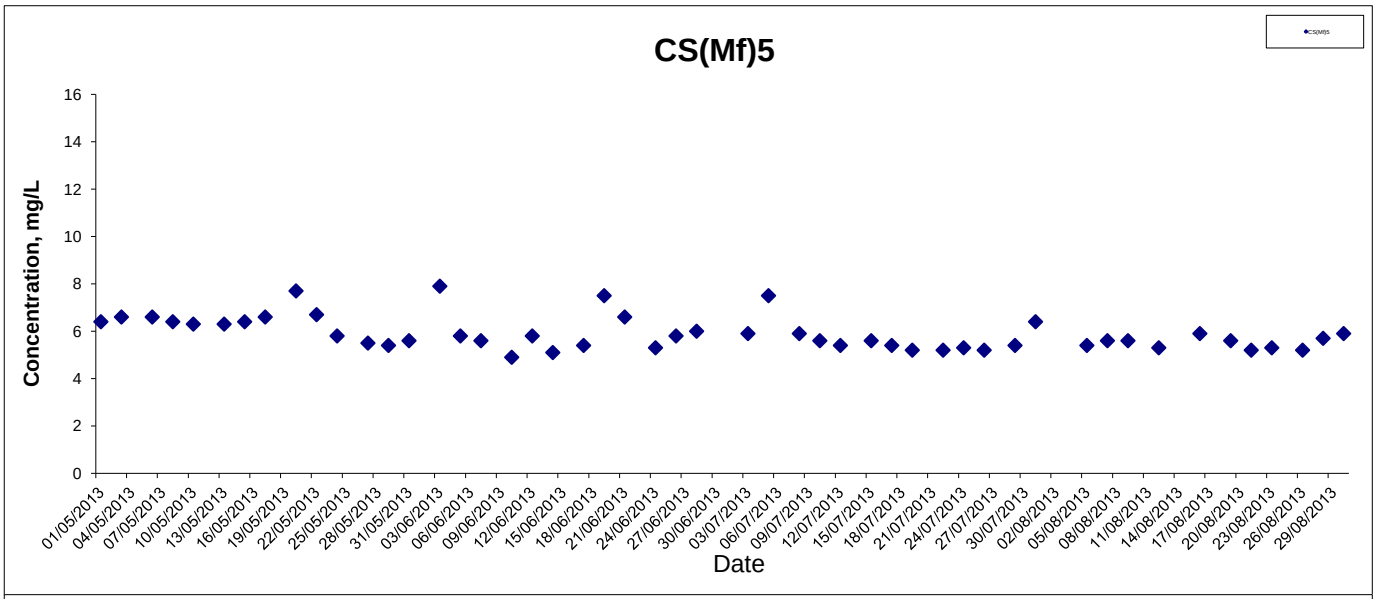
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

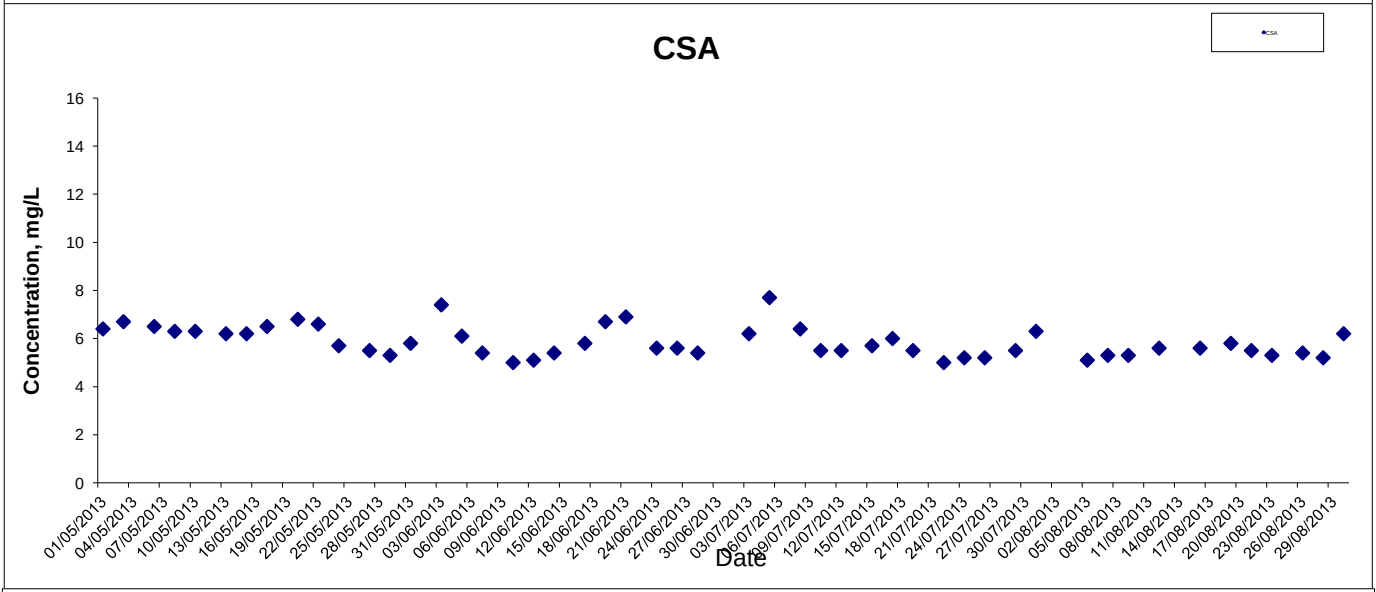


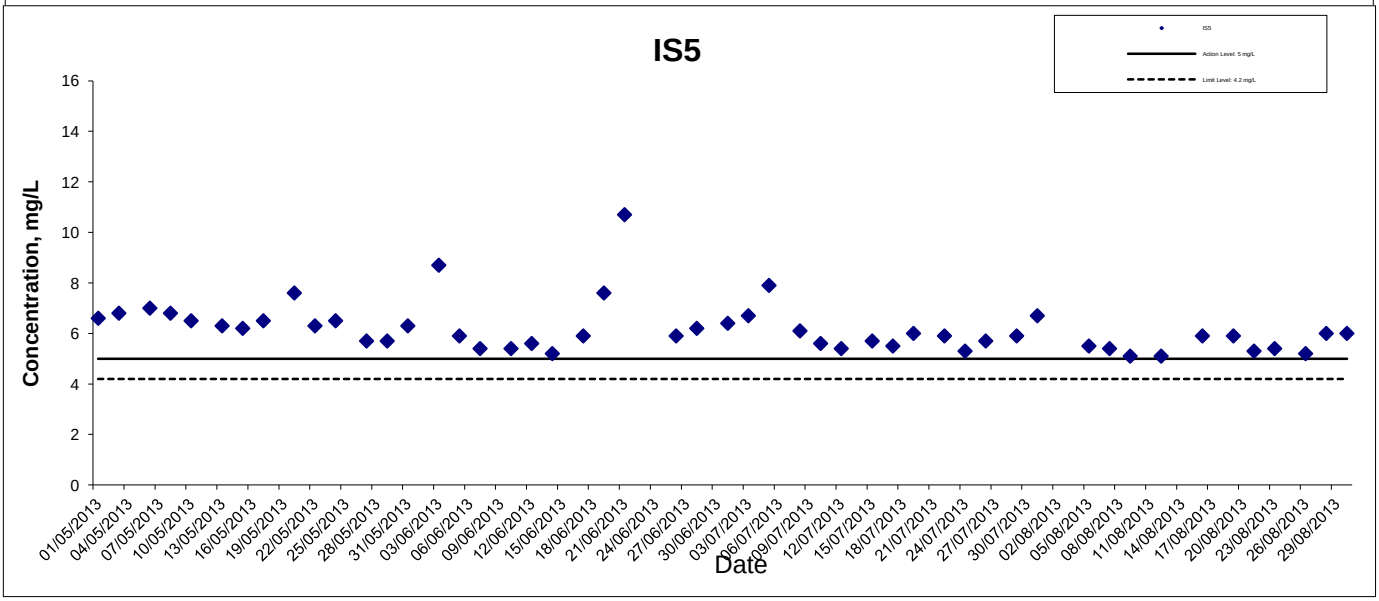




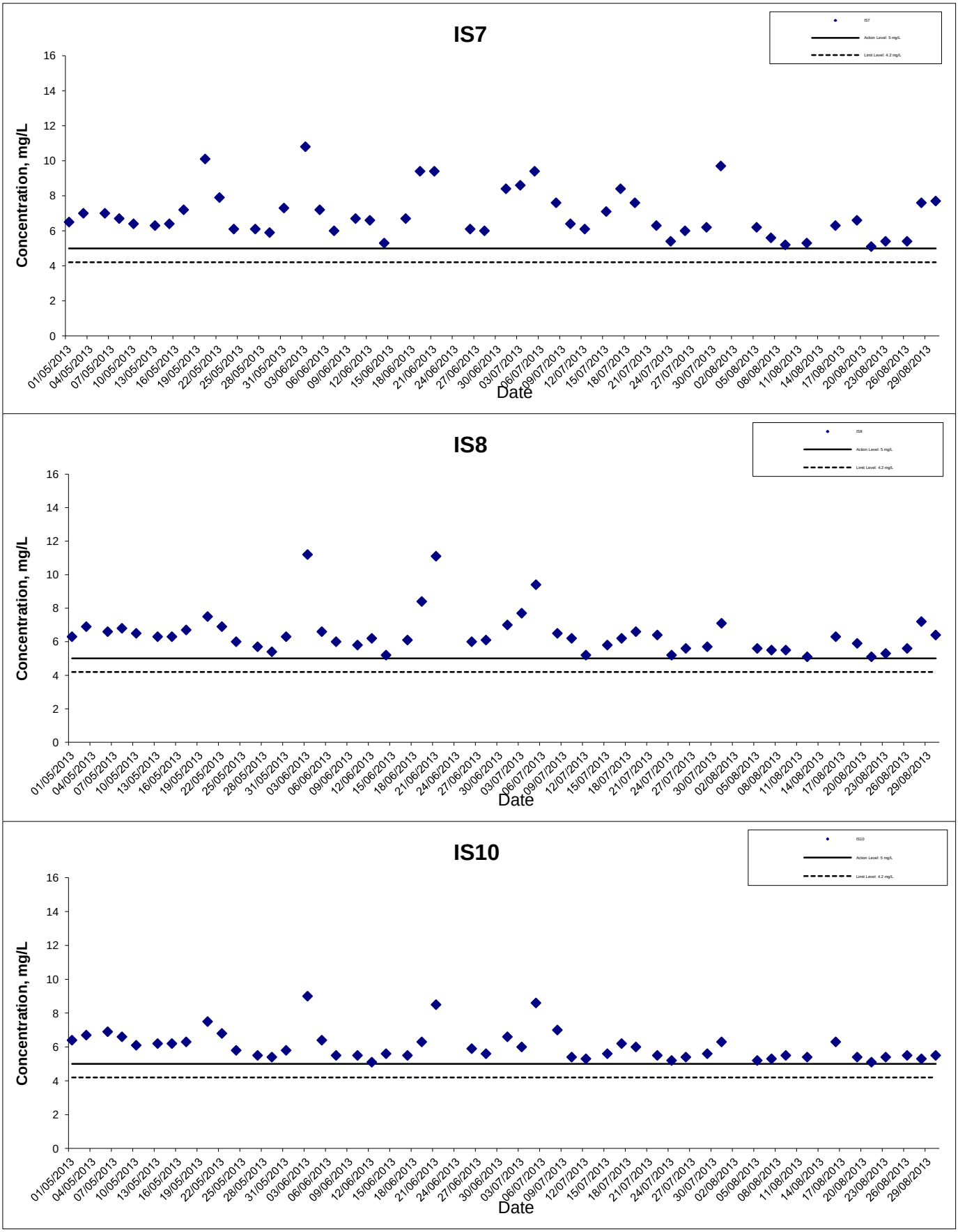
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



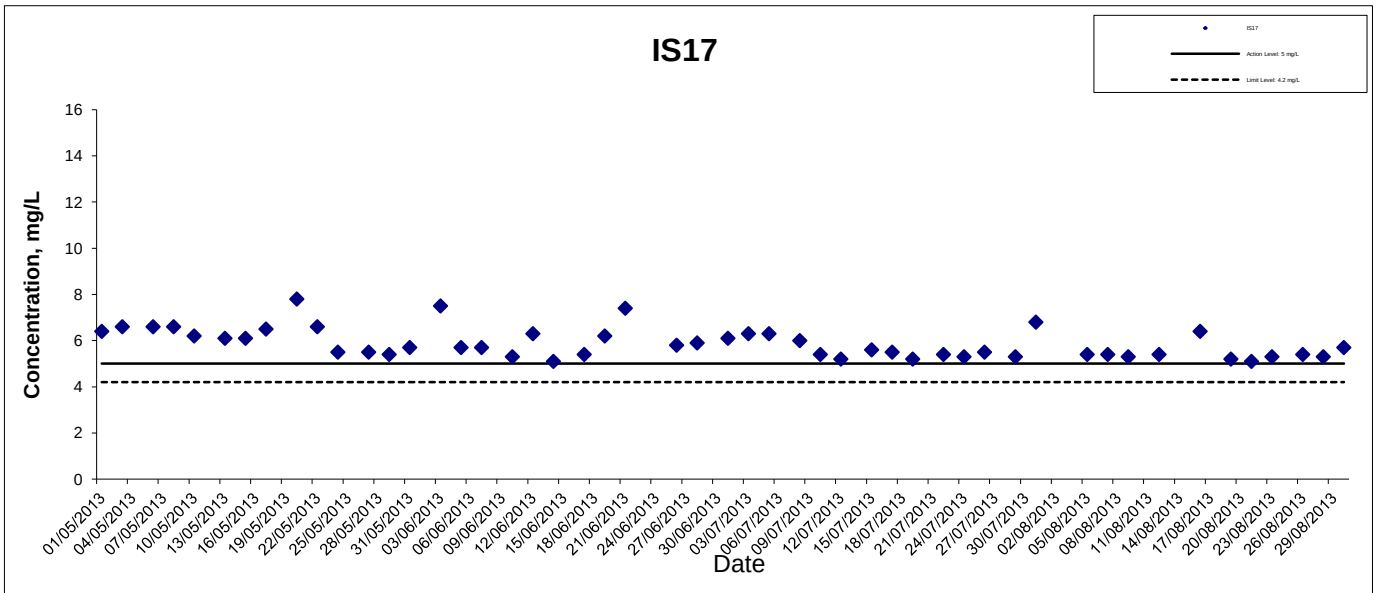


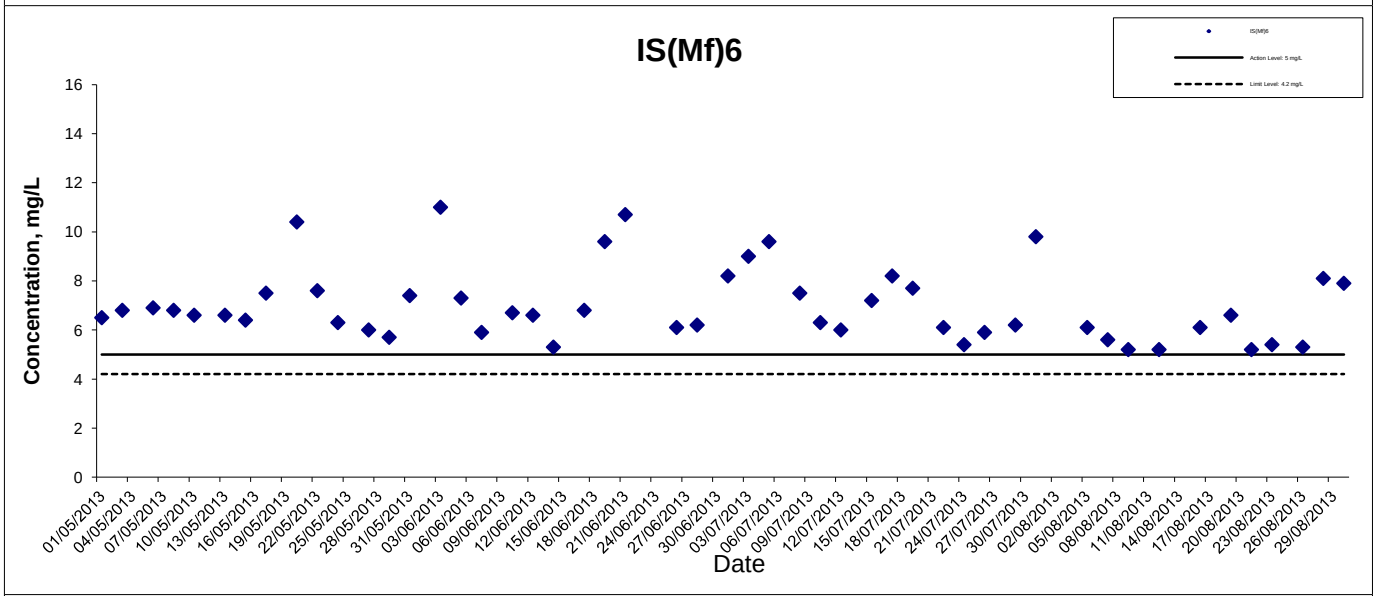


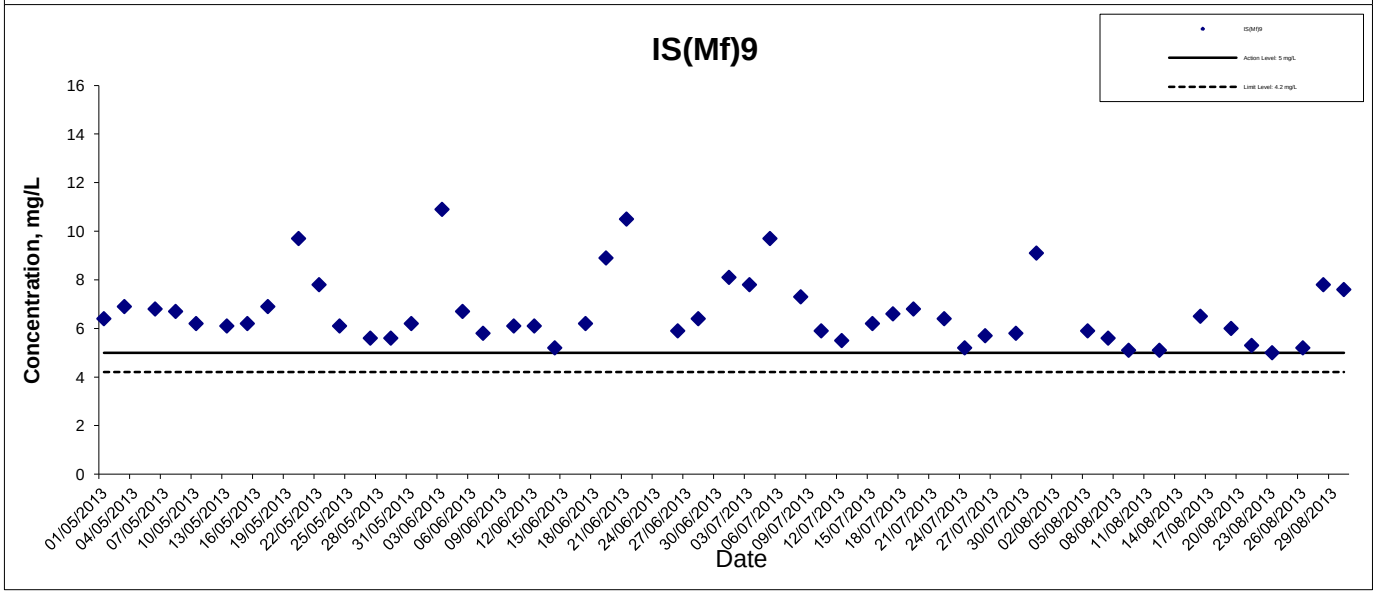
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



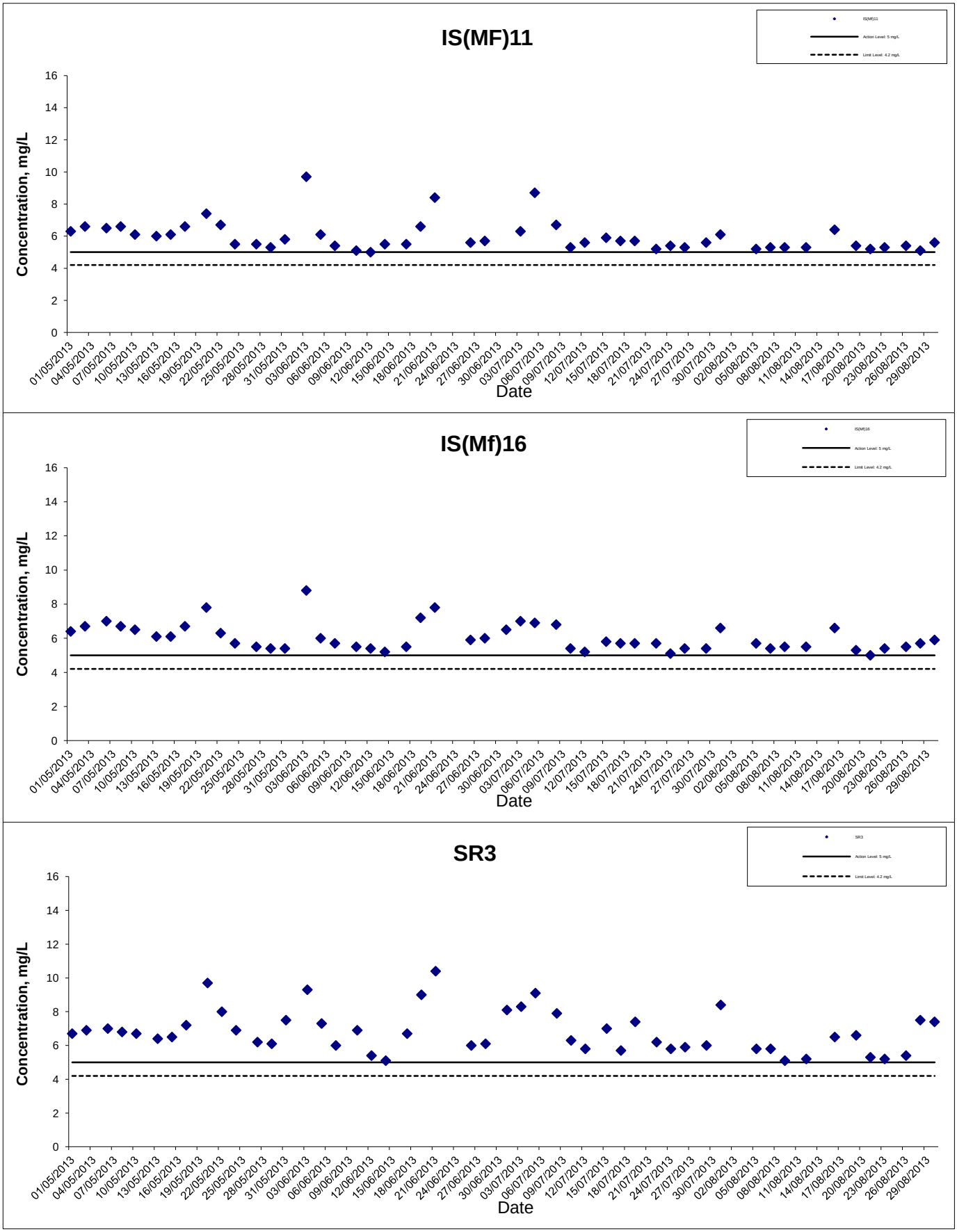
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



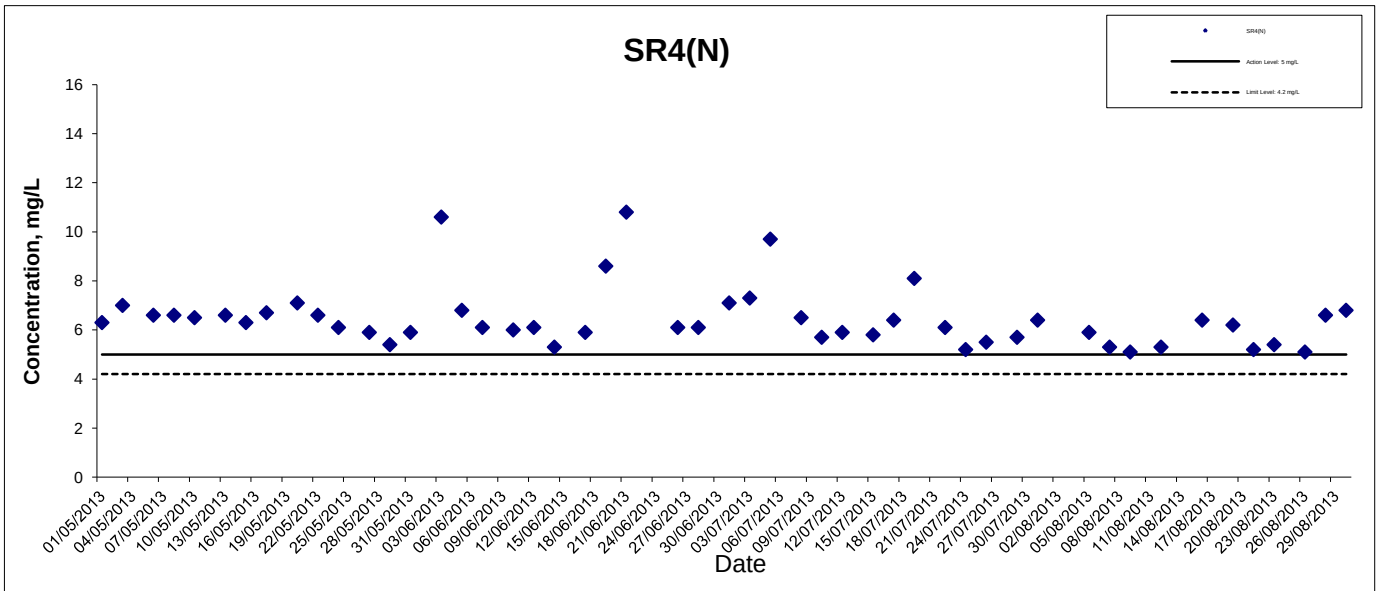


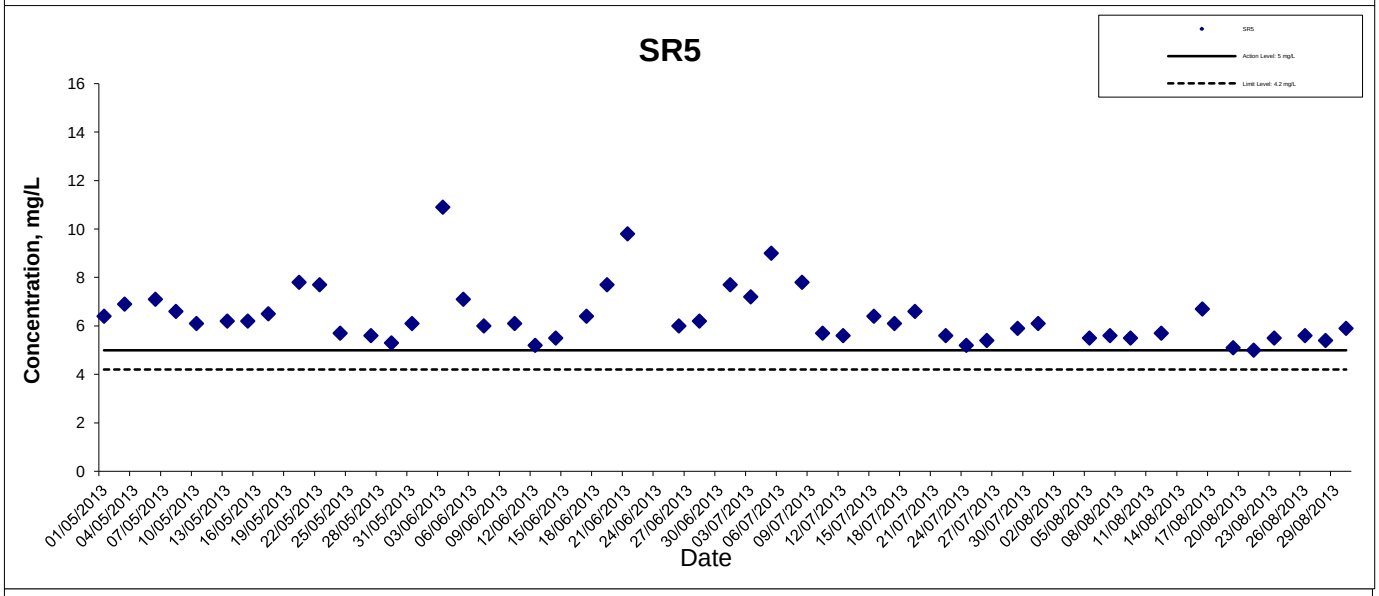


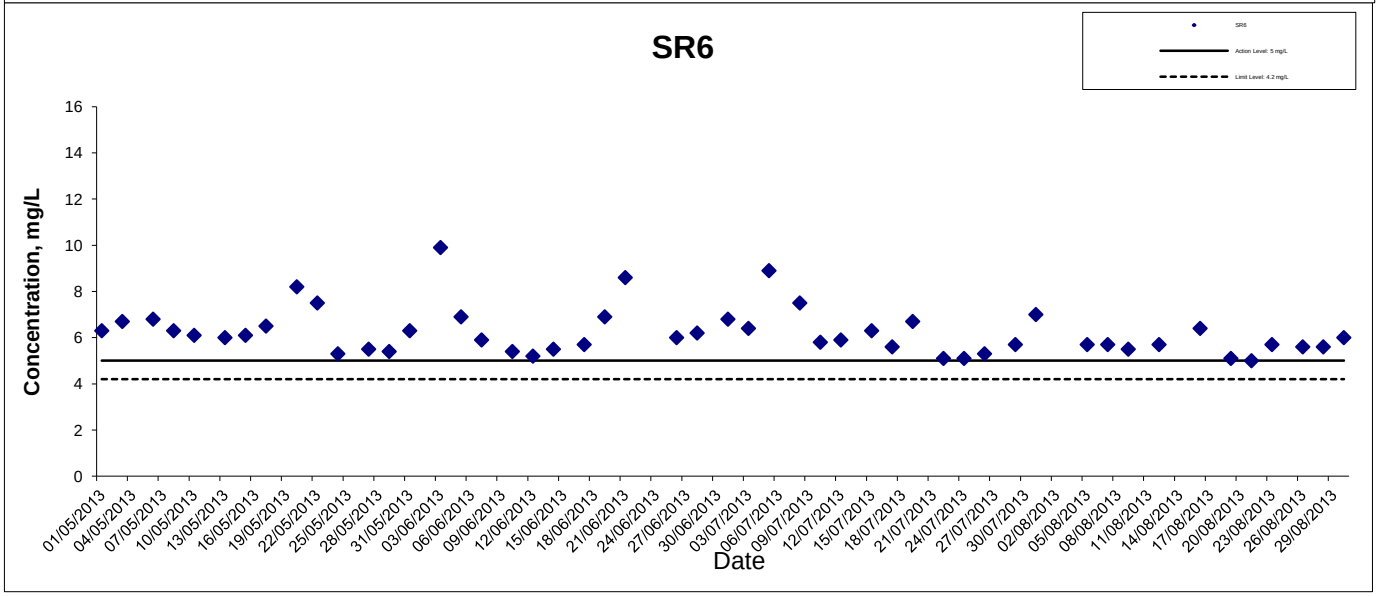
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



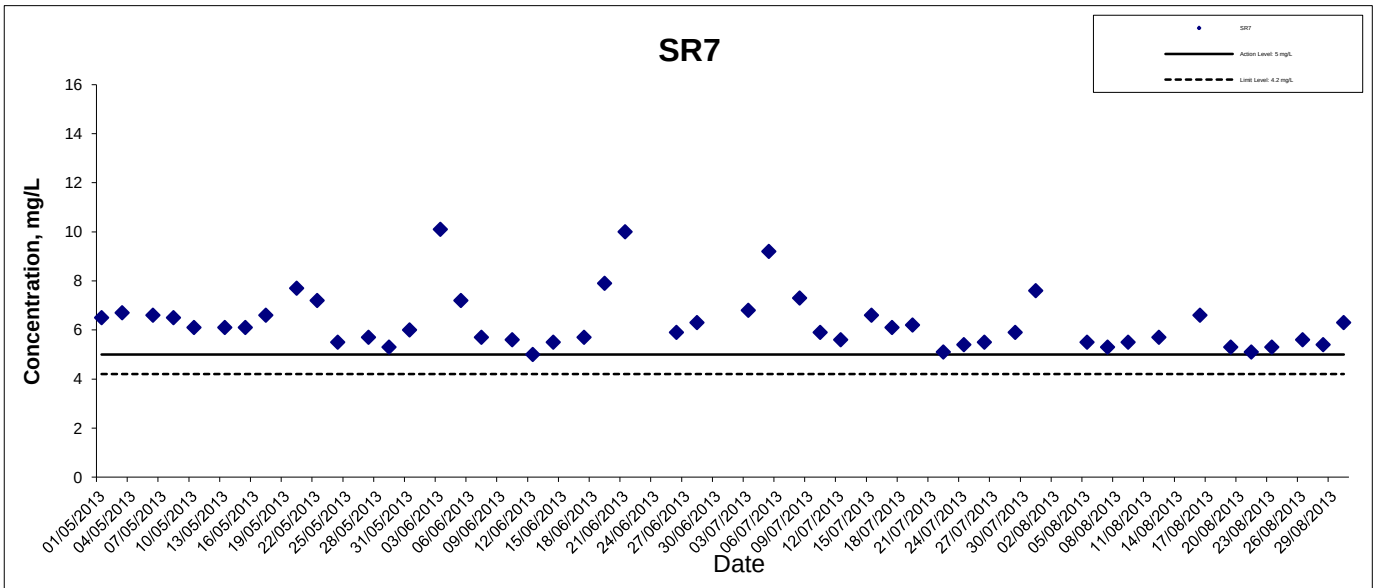
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

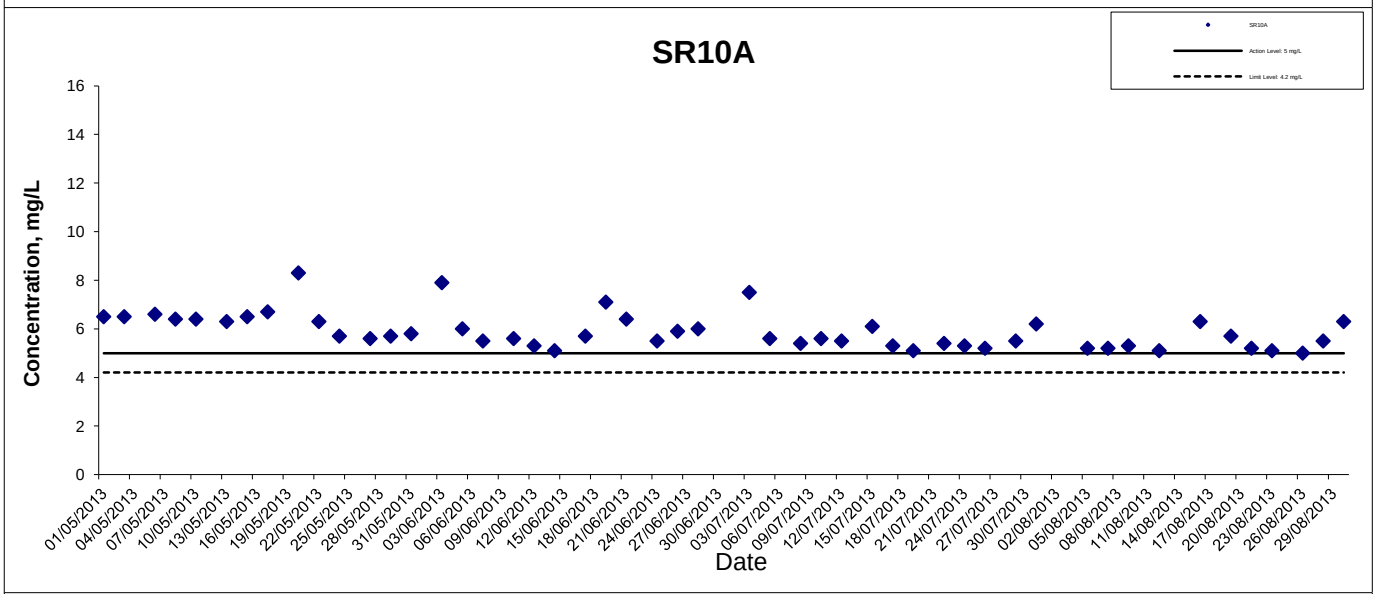


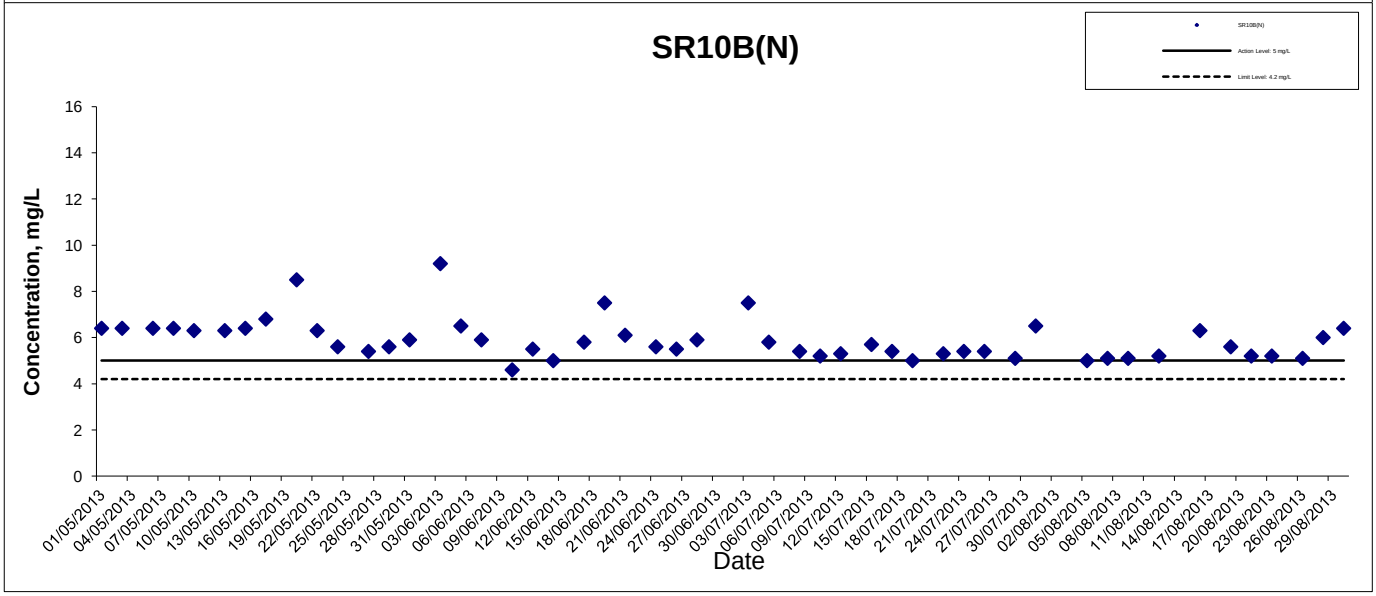




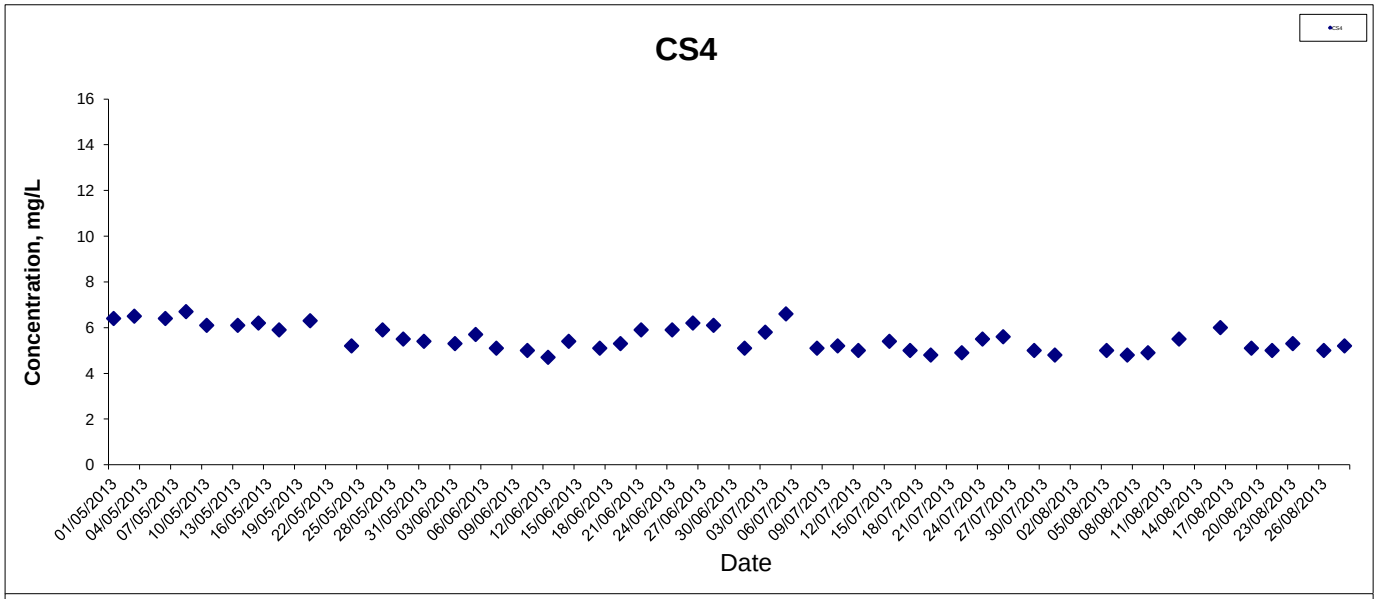
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

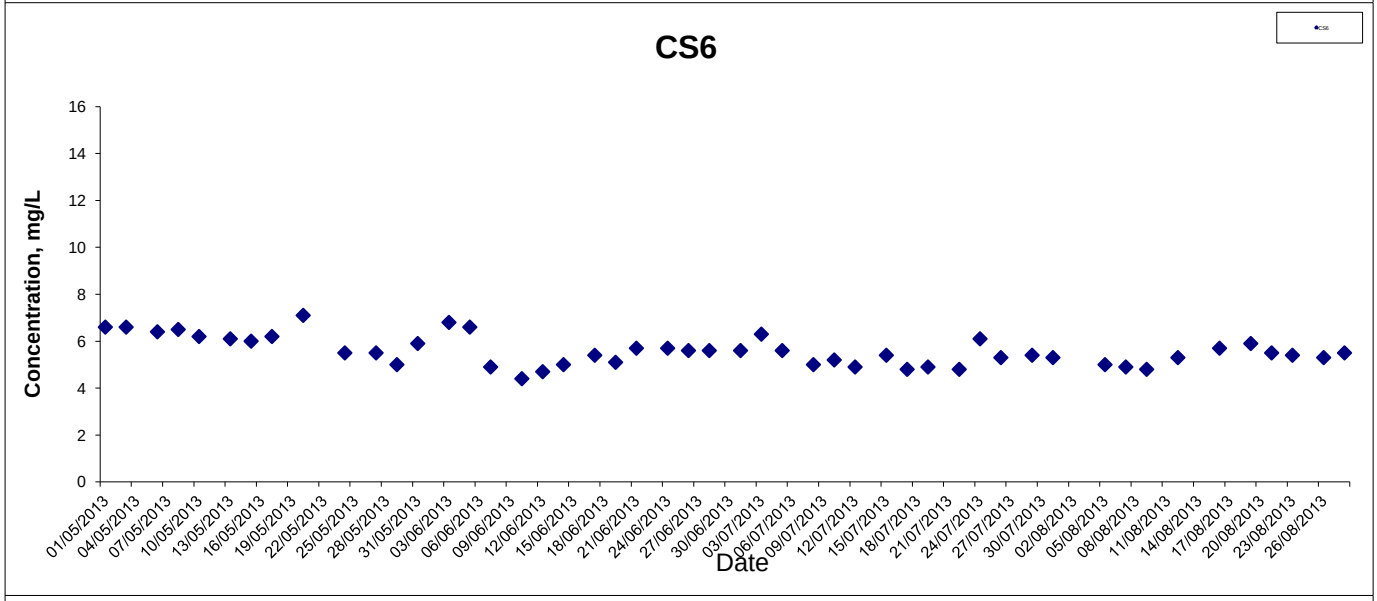


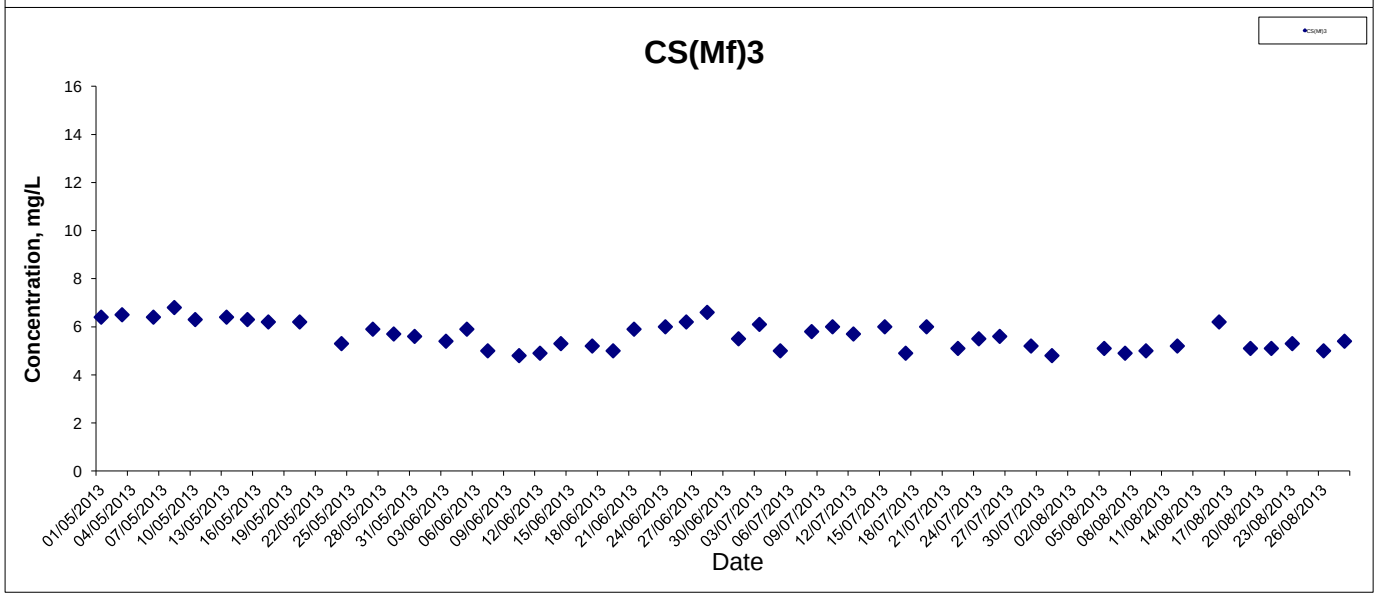




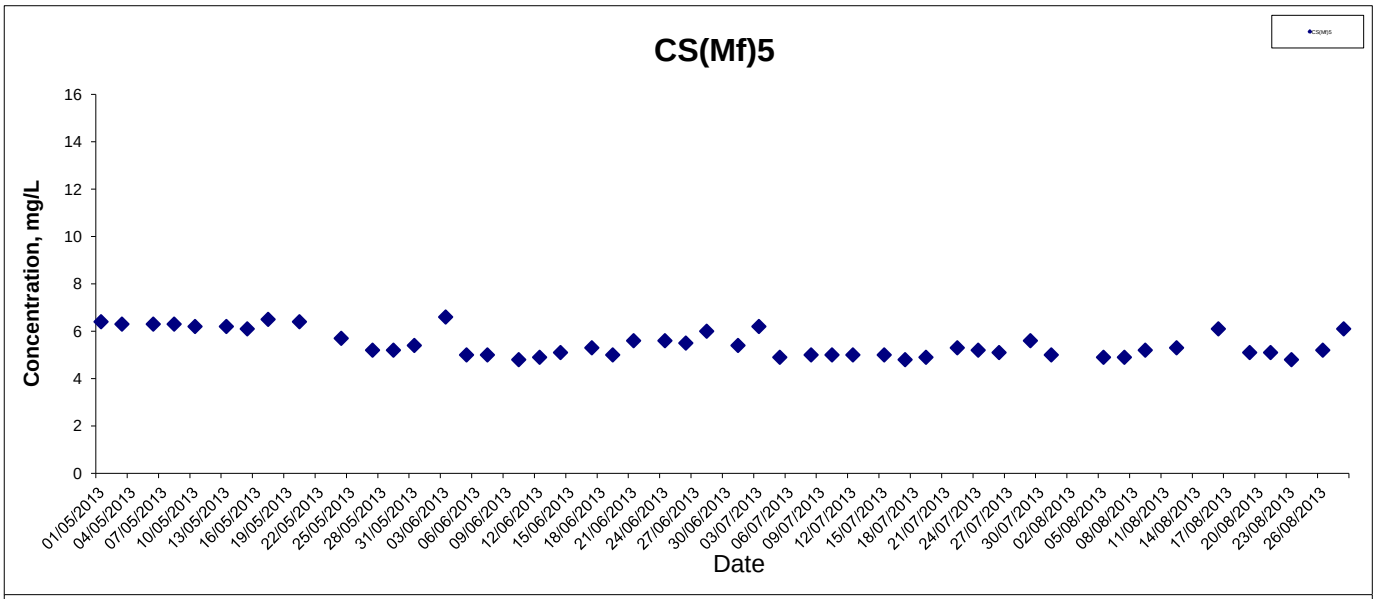
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

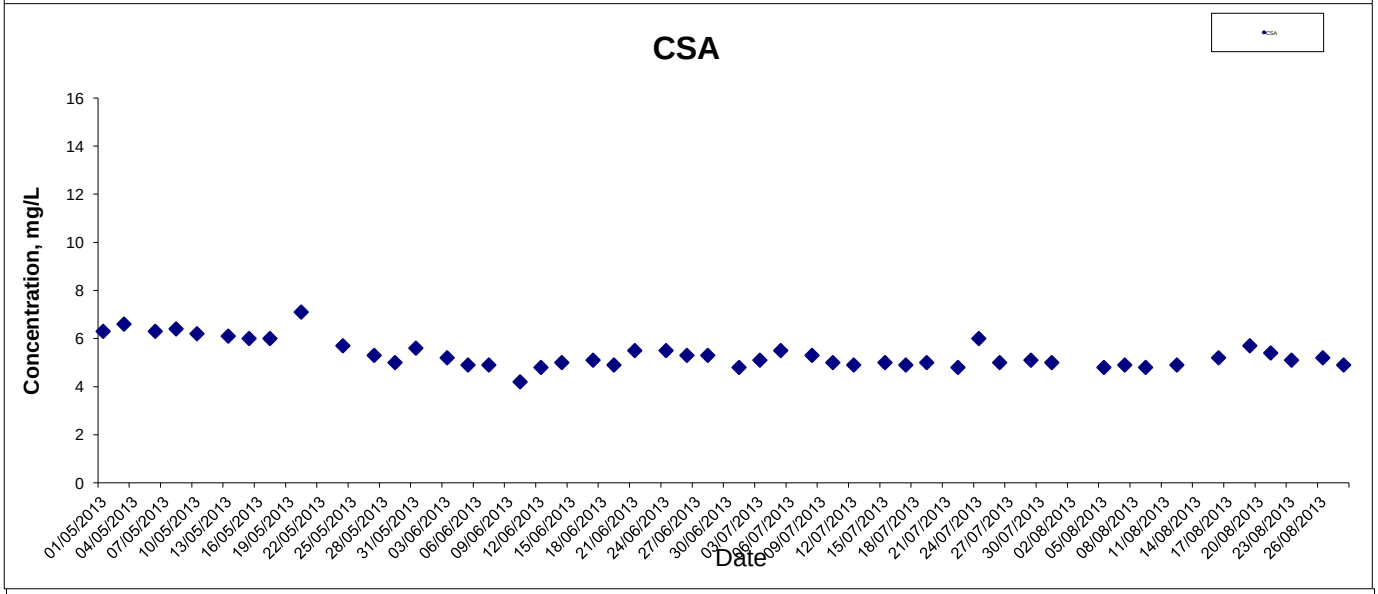


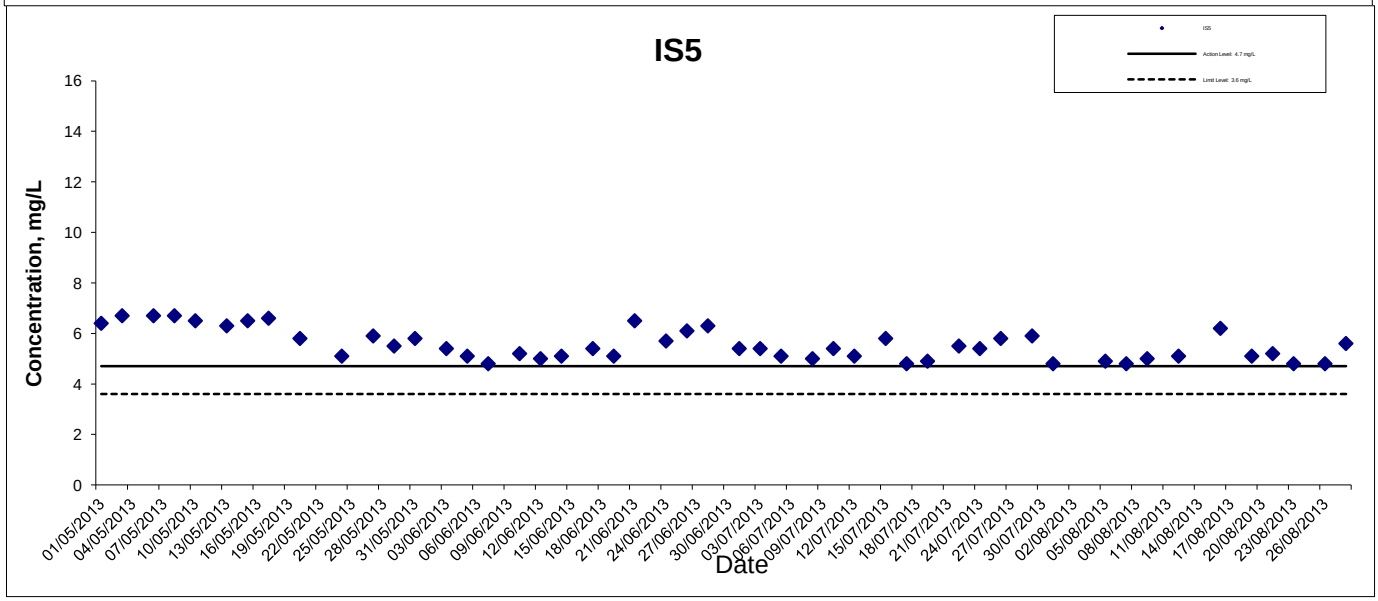




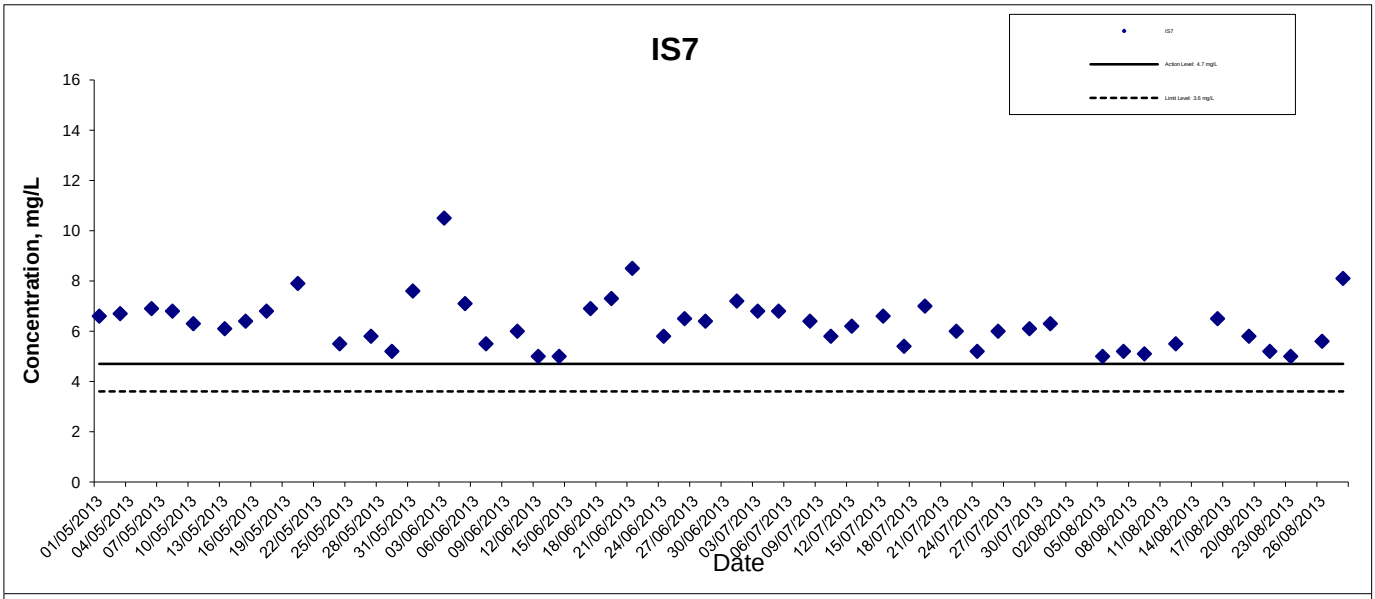
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

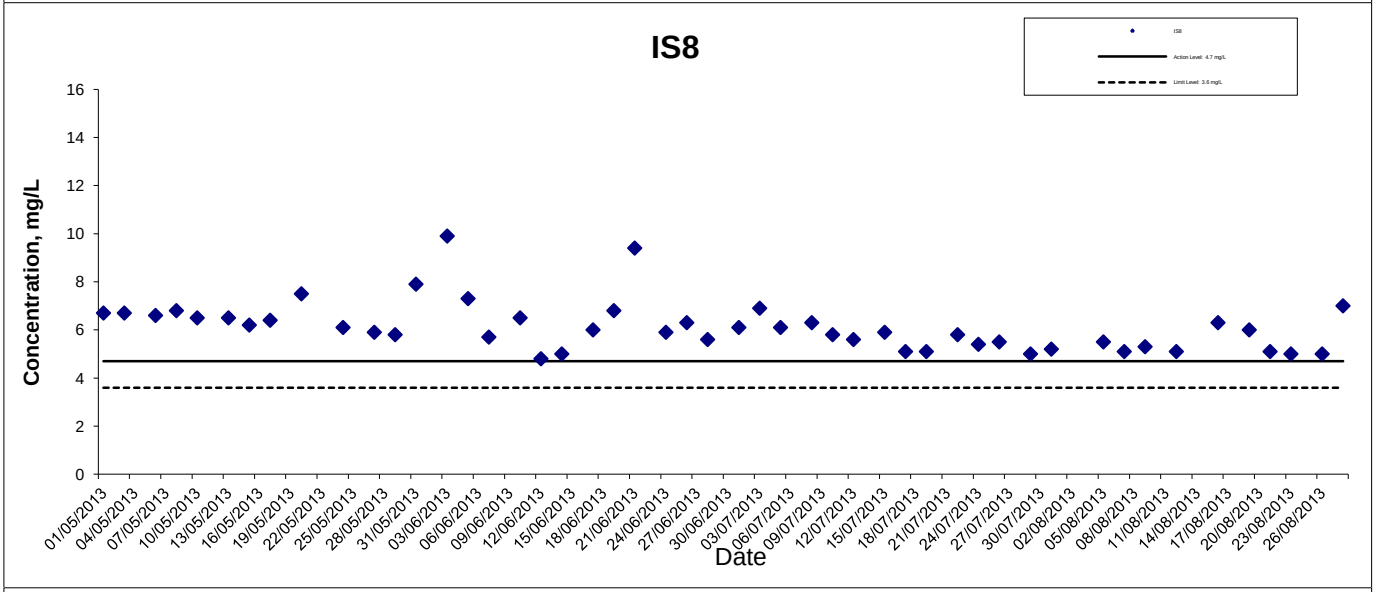


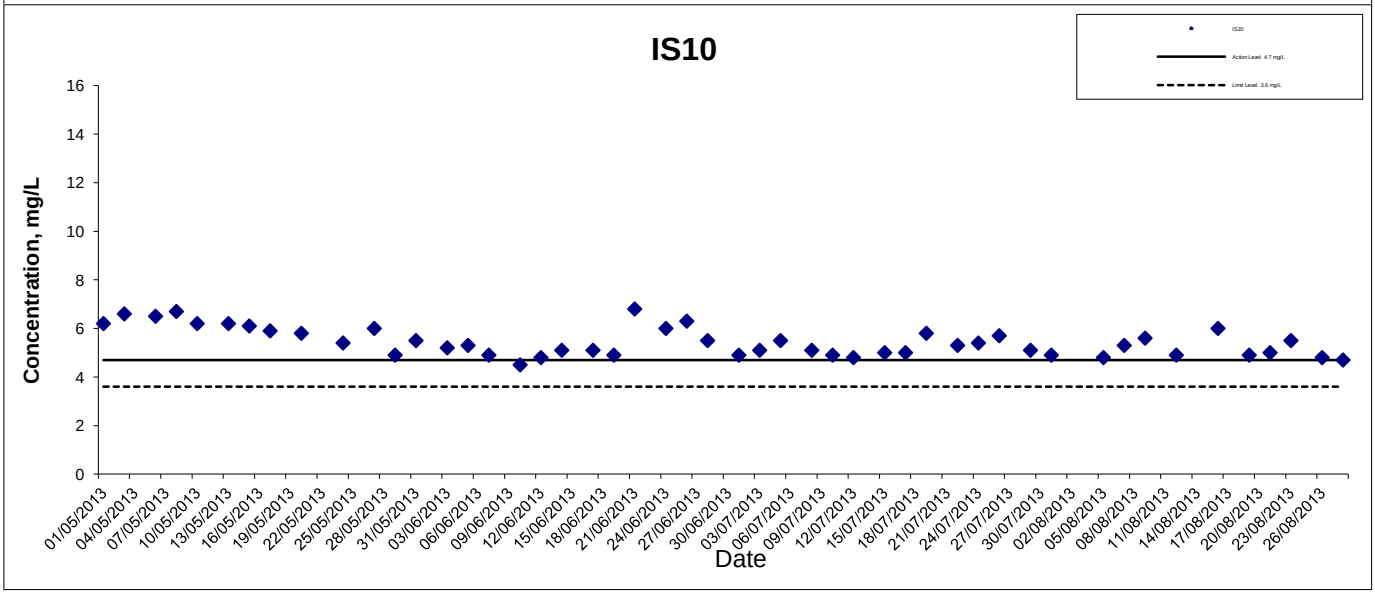




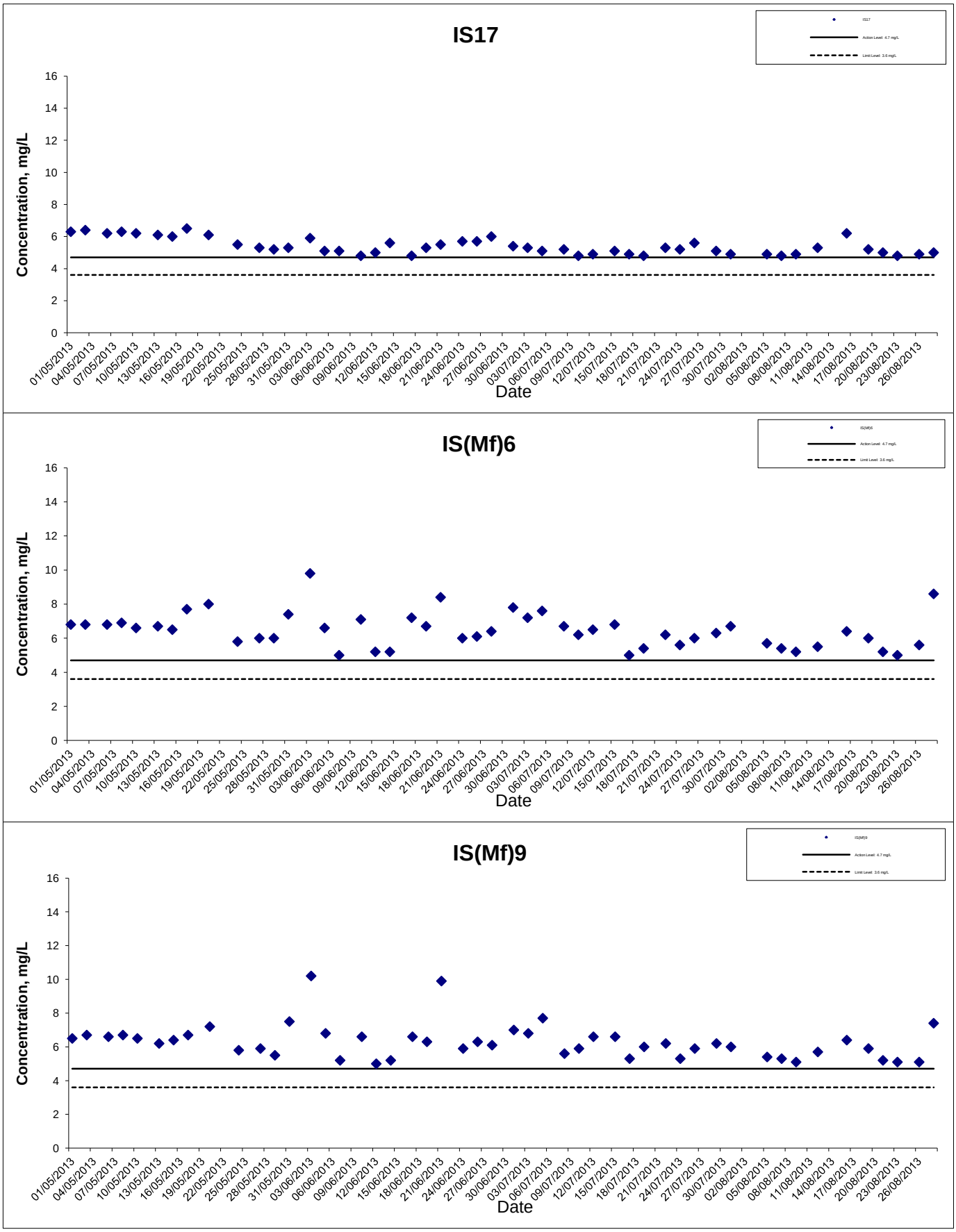
Dissolved Oxygen (Bottom) at Mid-Ebb Tide







Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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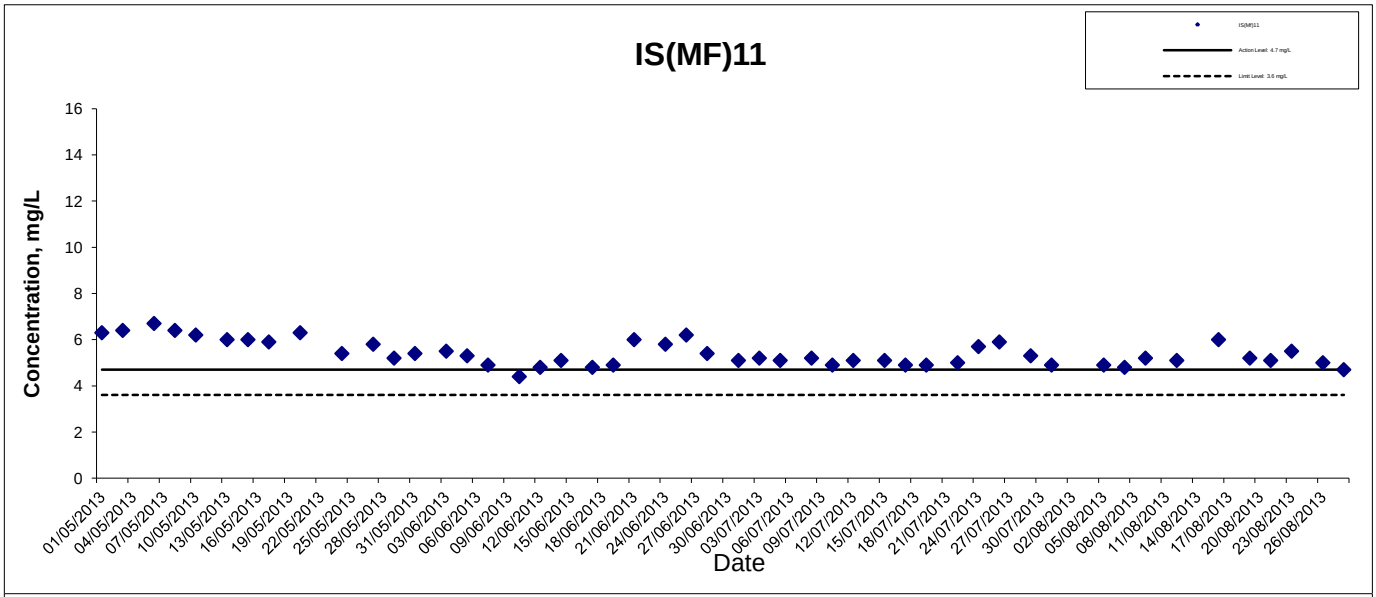
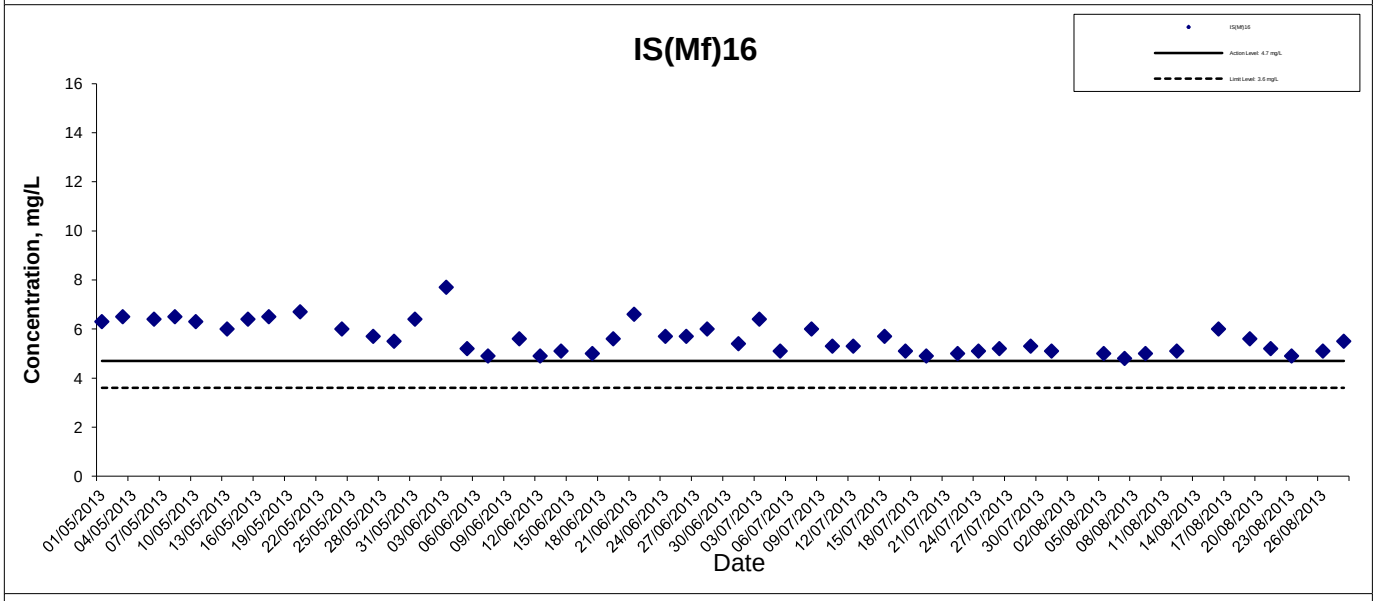
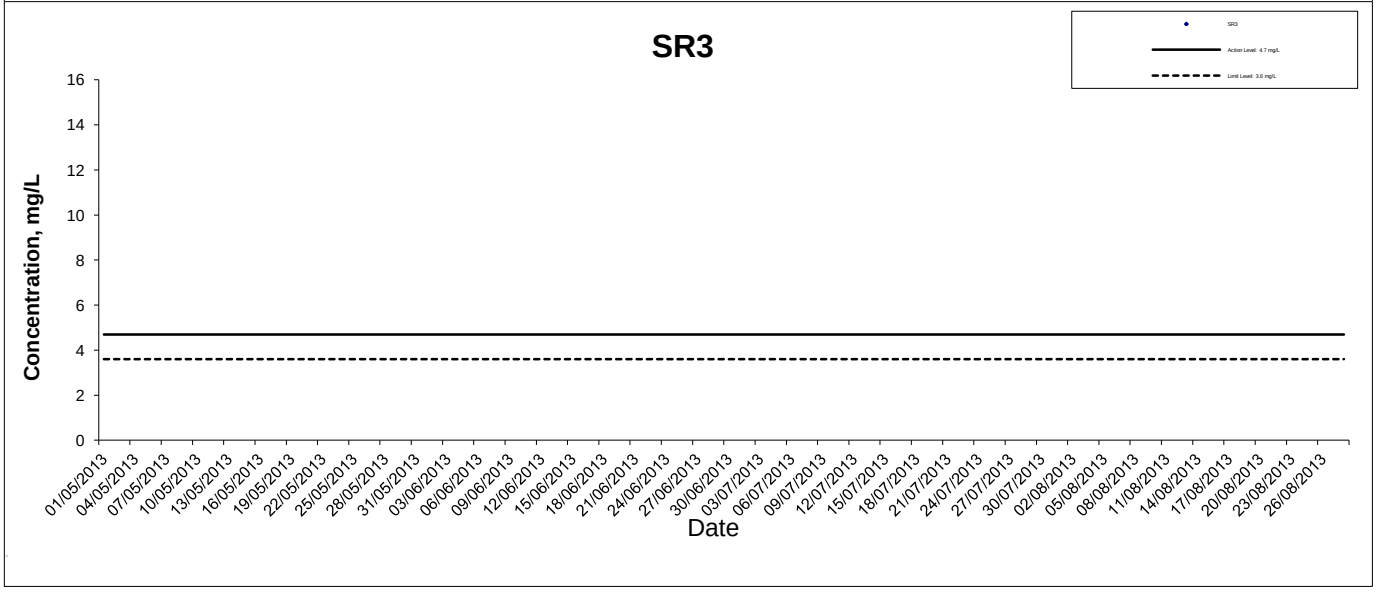
Graphical Presentation of Impact Water Quality Monitoring Results

Project No.: 60249820 **Date: Sep 2013** **Appendix G**

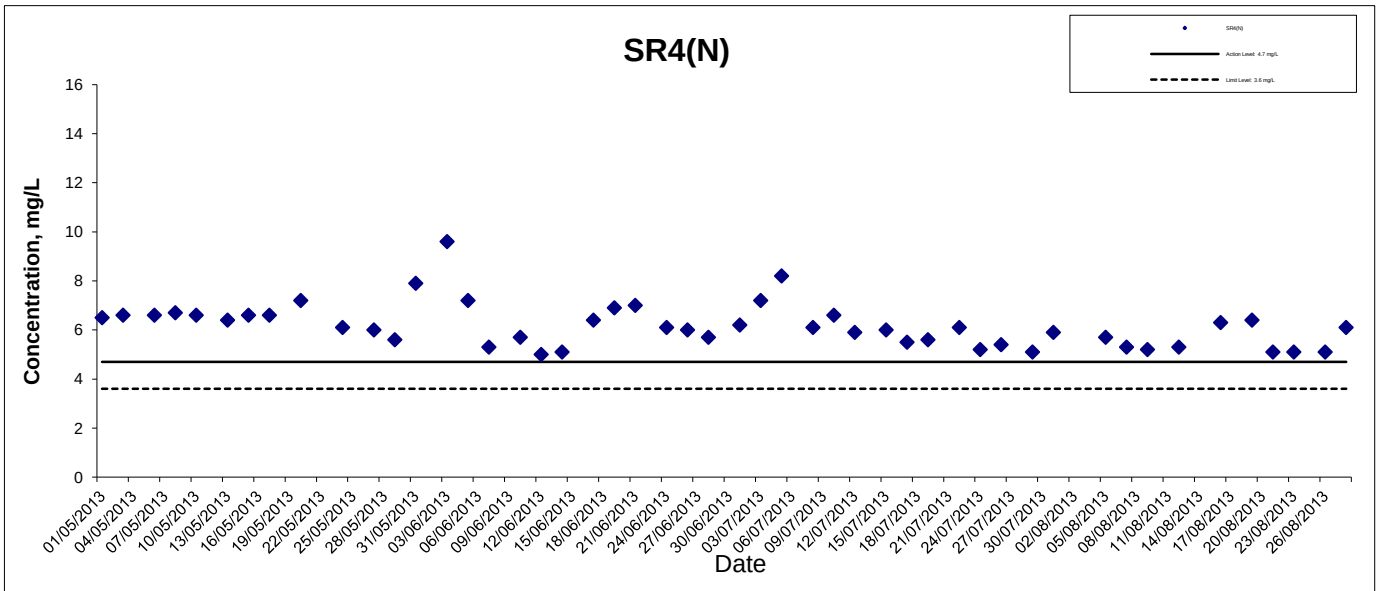
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

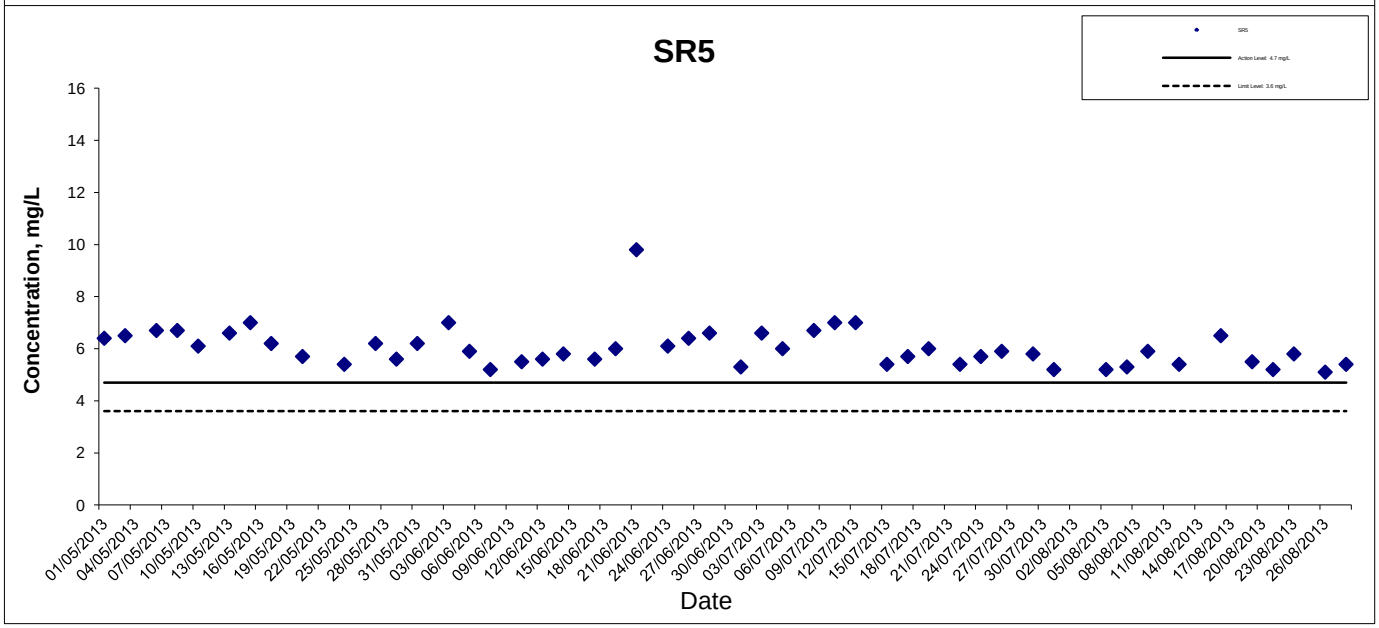


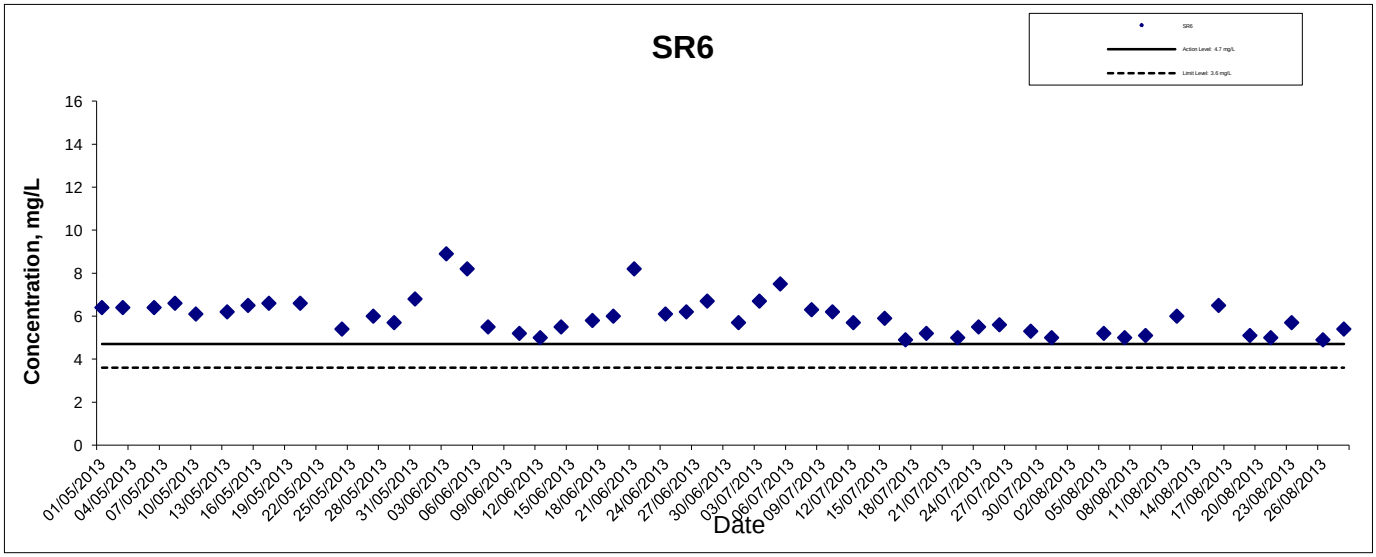




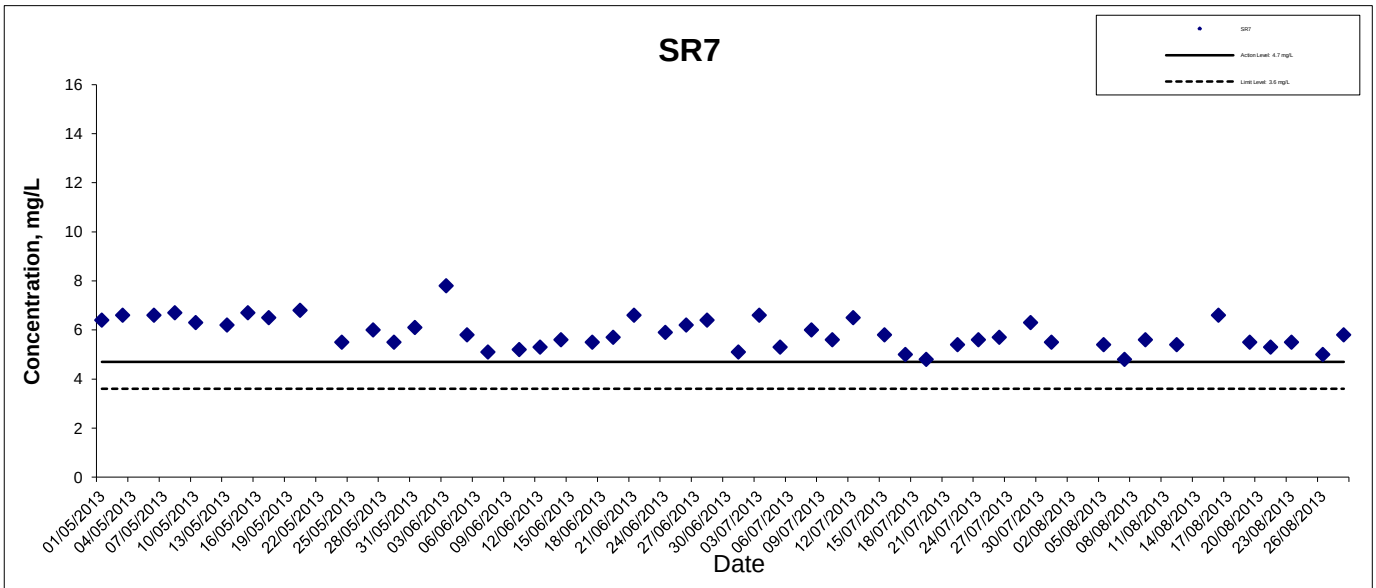
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

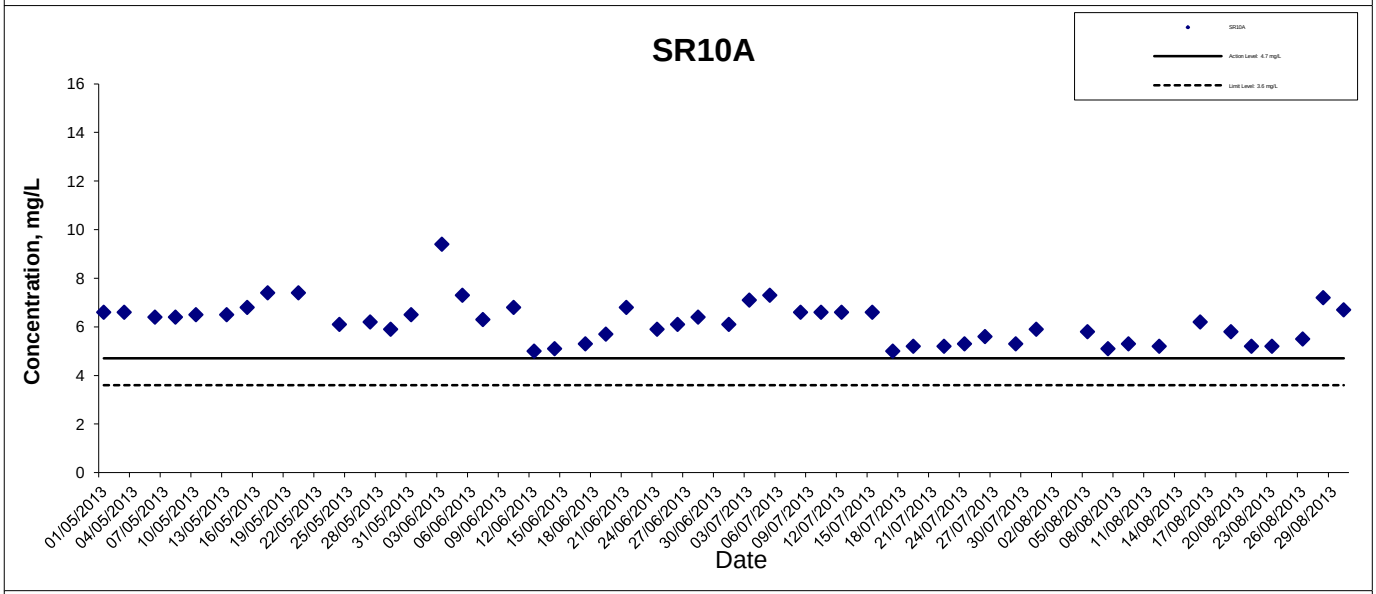


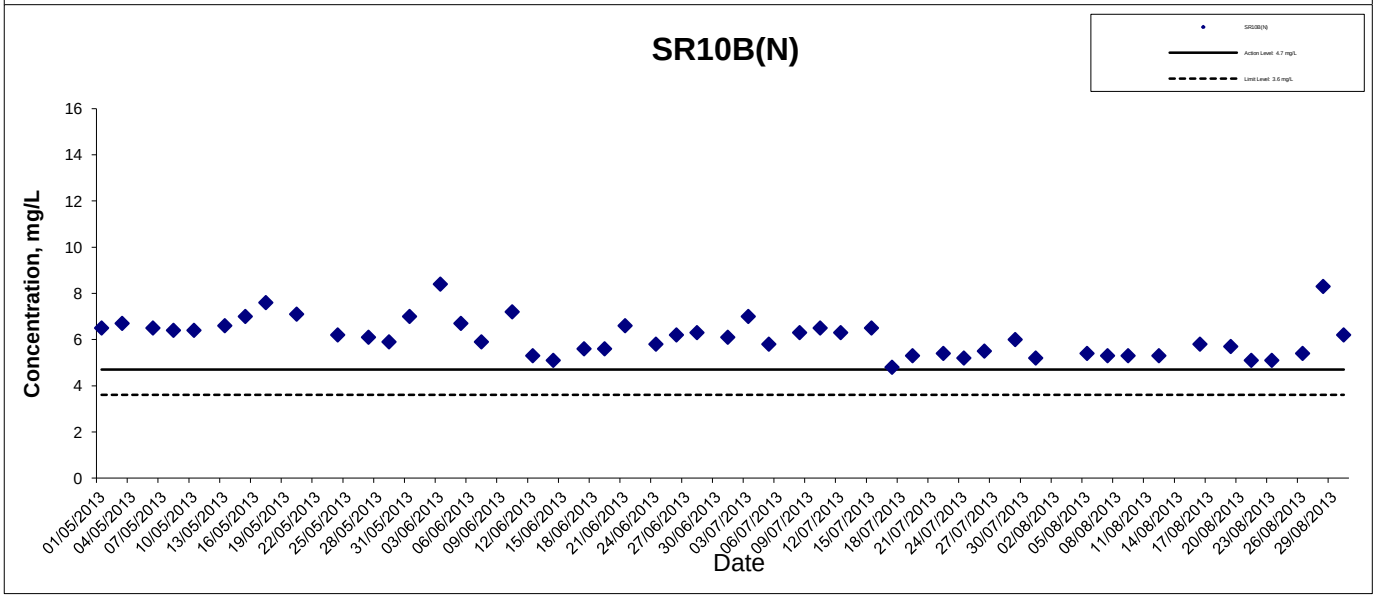




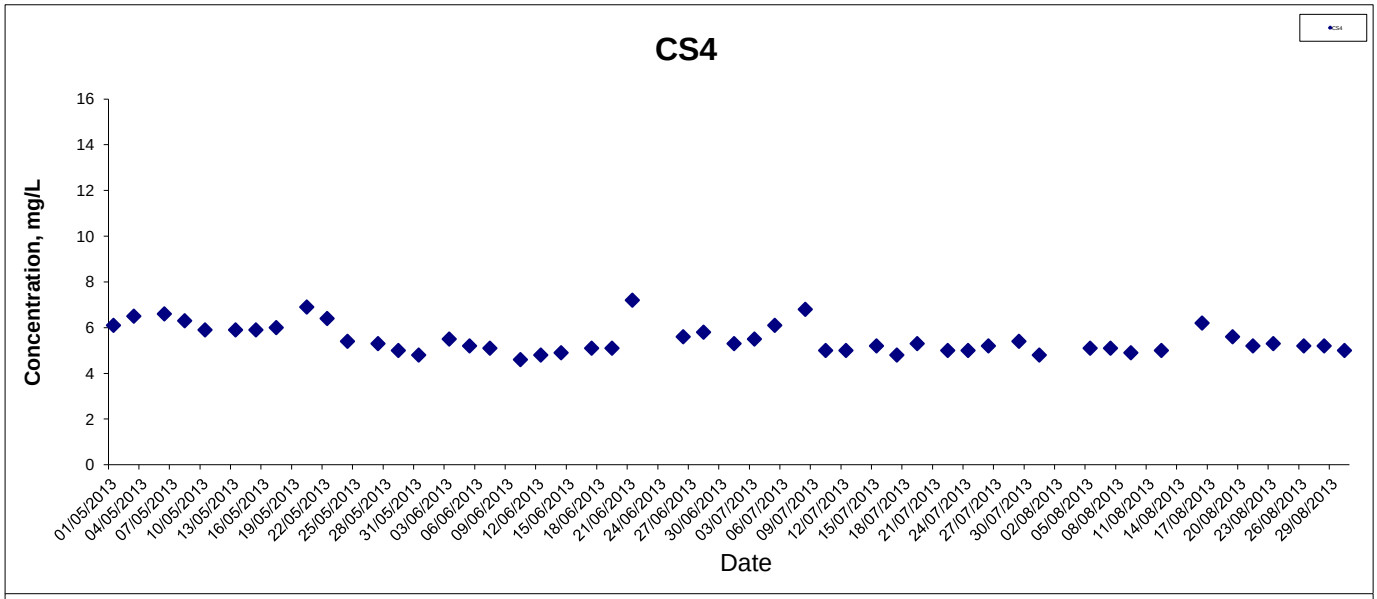
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

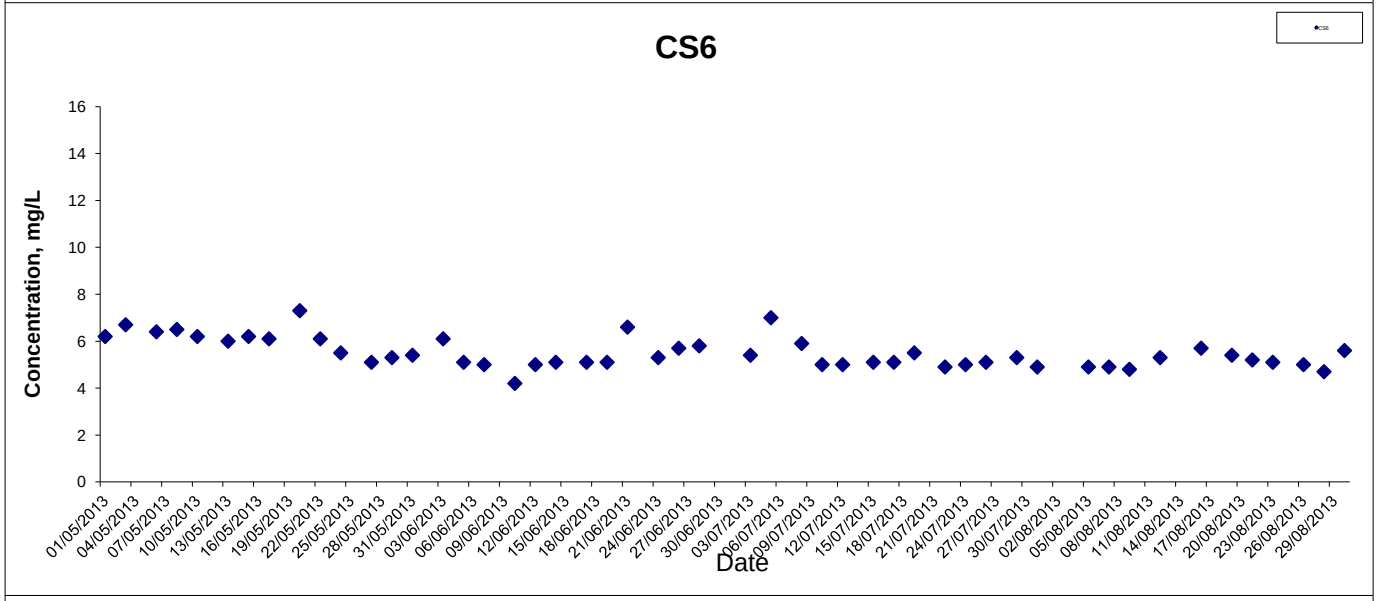


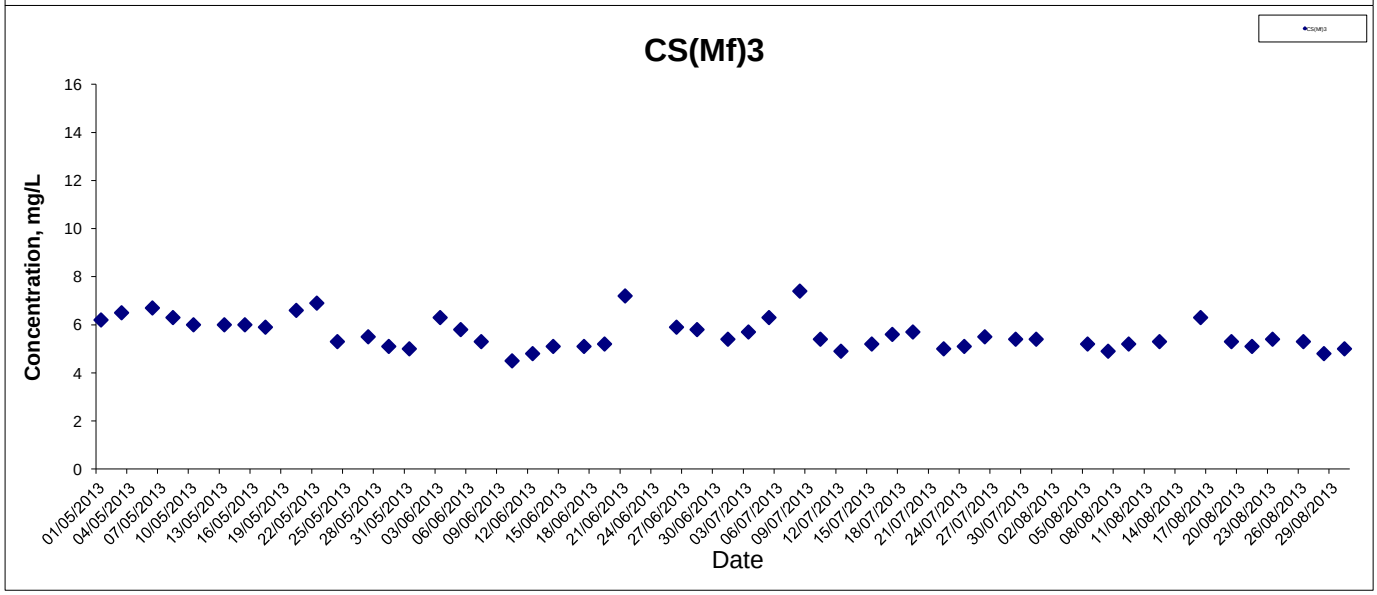




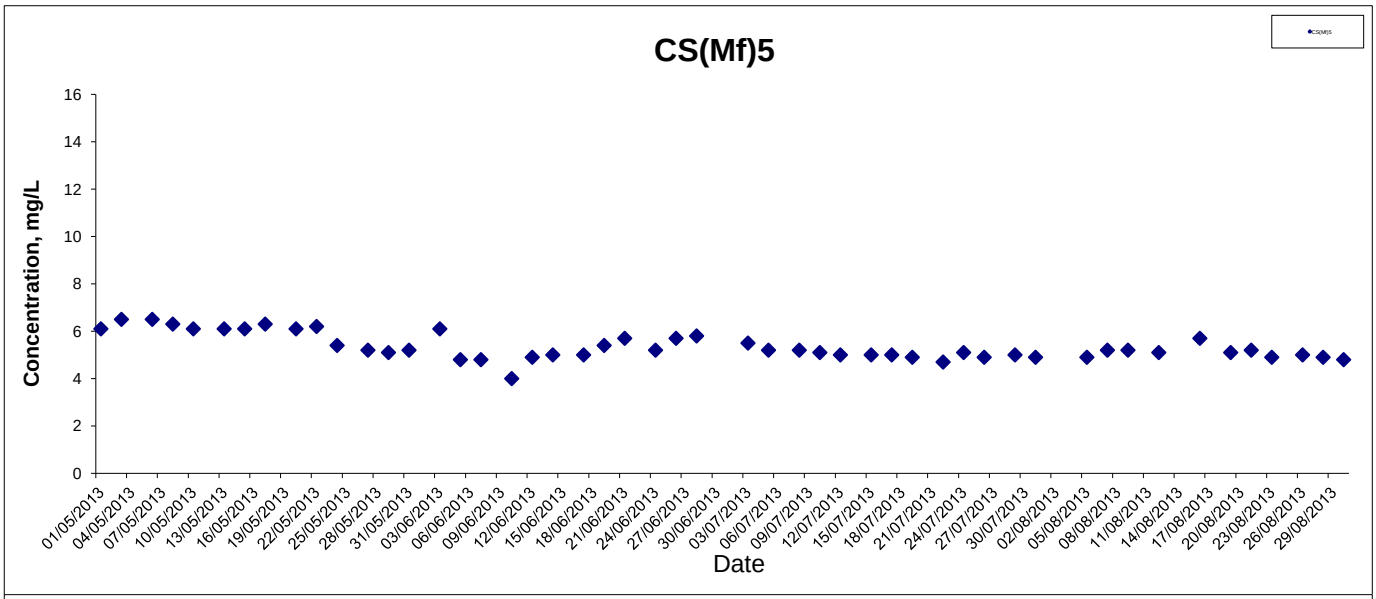
Dissolved Oxygen (Bottom) at Mid-Flood Tide

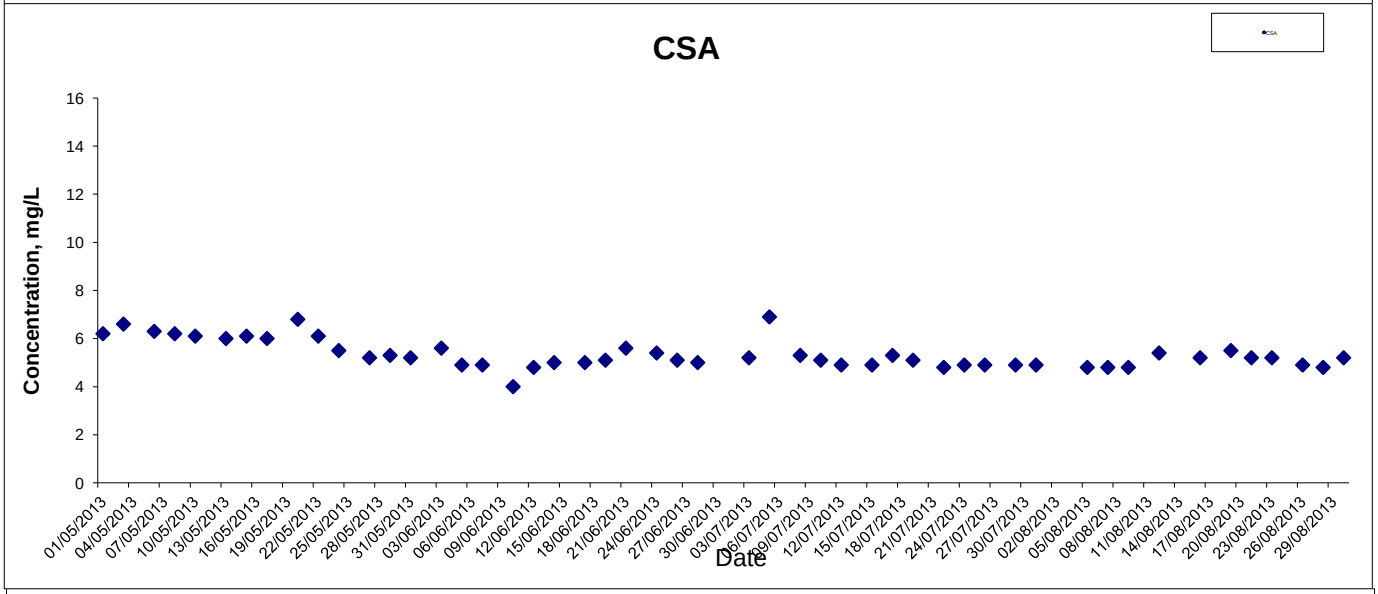


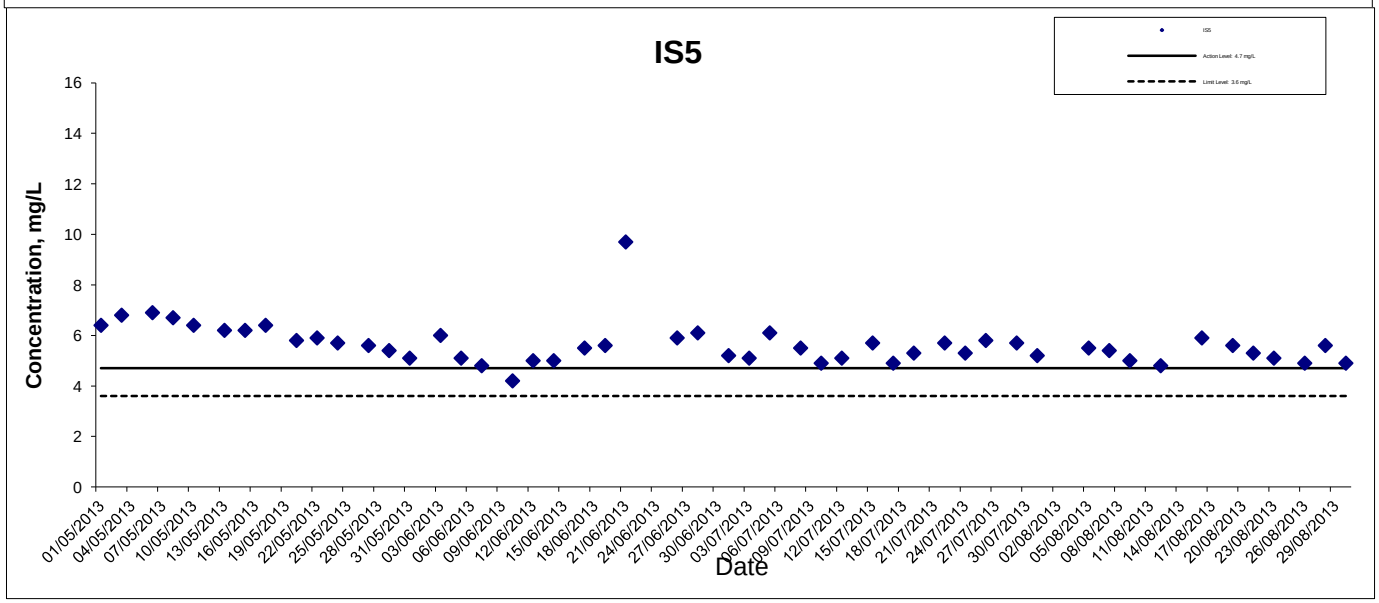




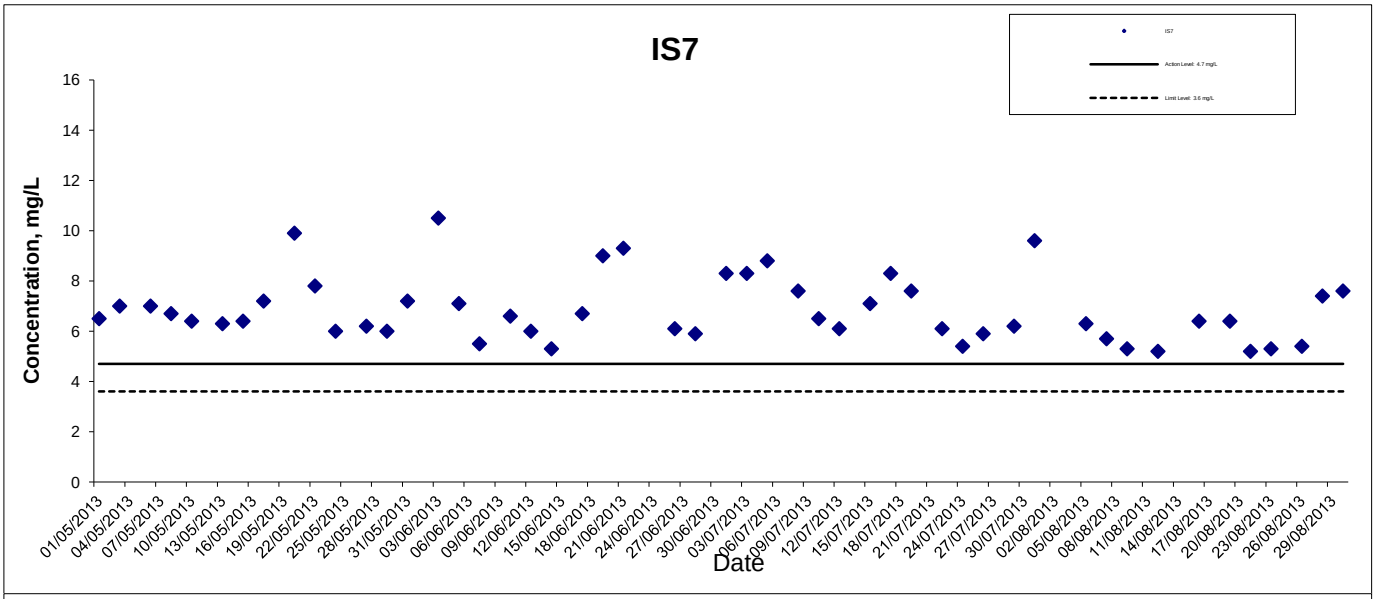
Dissolved Oxygen (Bottom) at Mid-Flood Tide

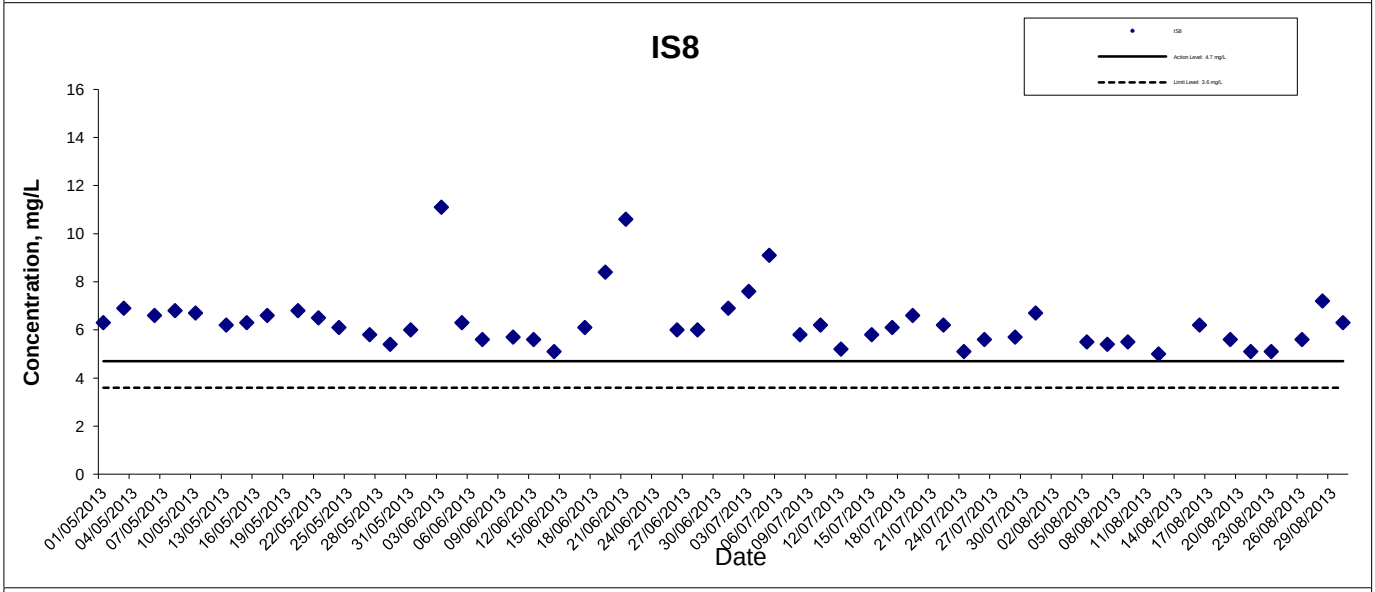


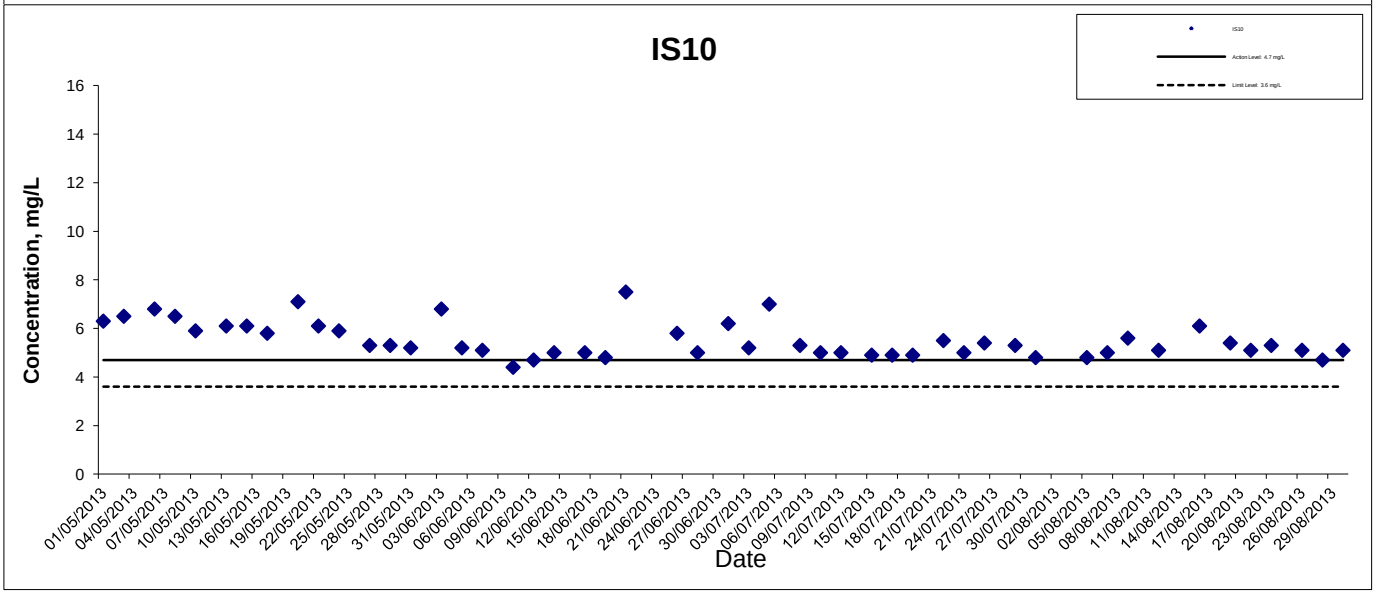




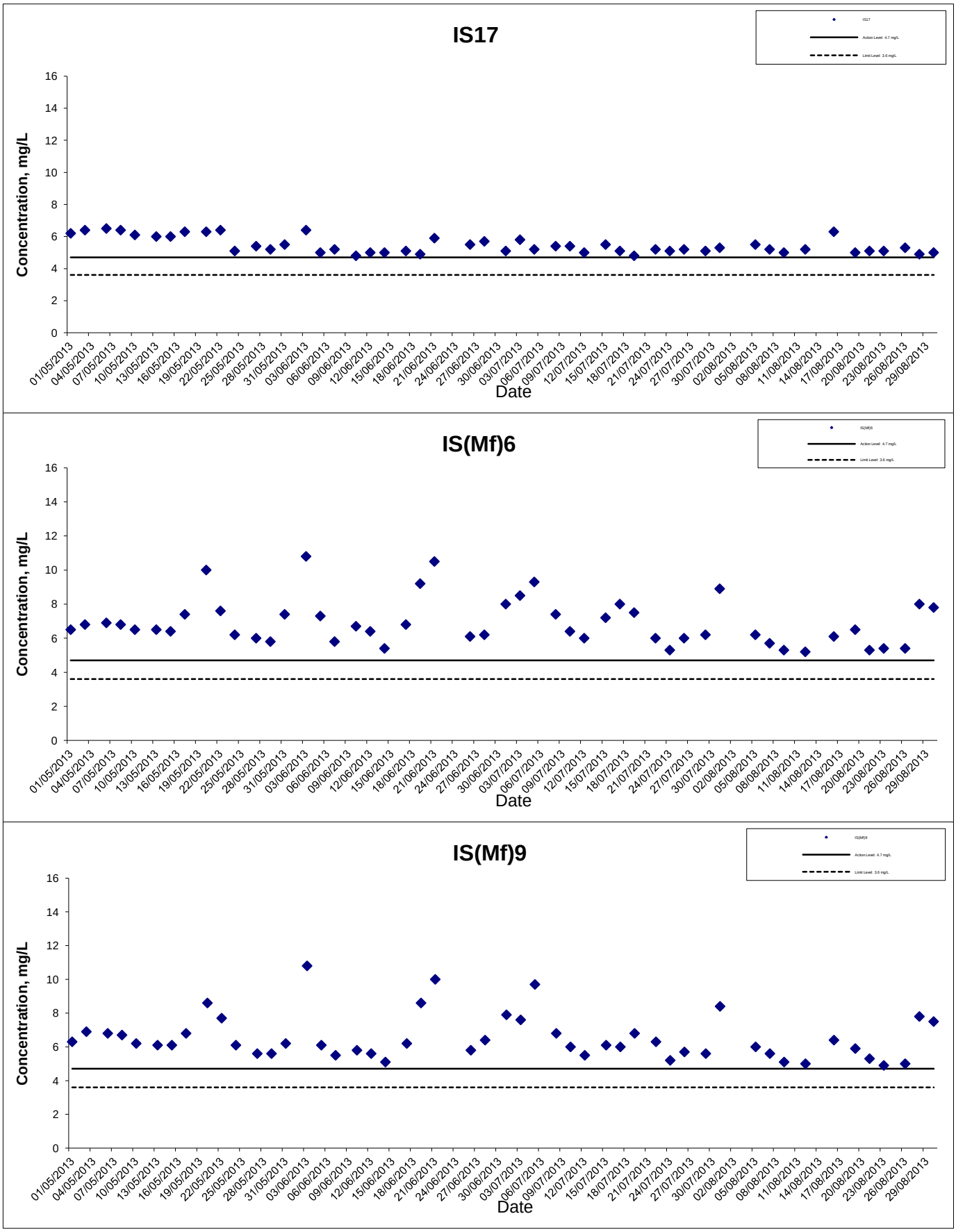
Dissolved Oxygen (Bottom) at Mid-Flood Tide







Dissolved Oxygen (Bottom) at Mid-Flood Tide



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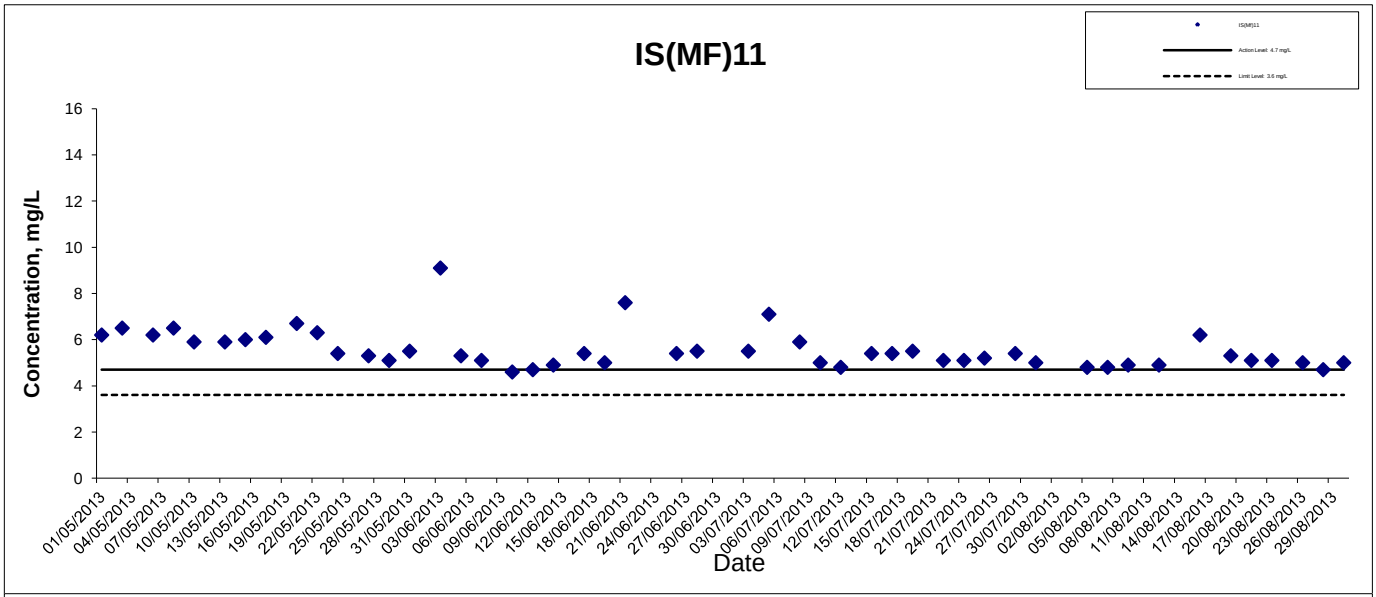
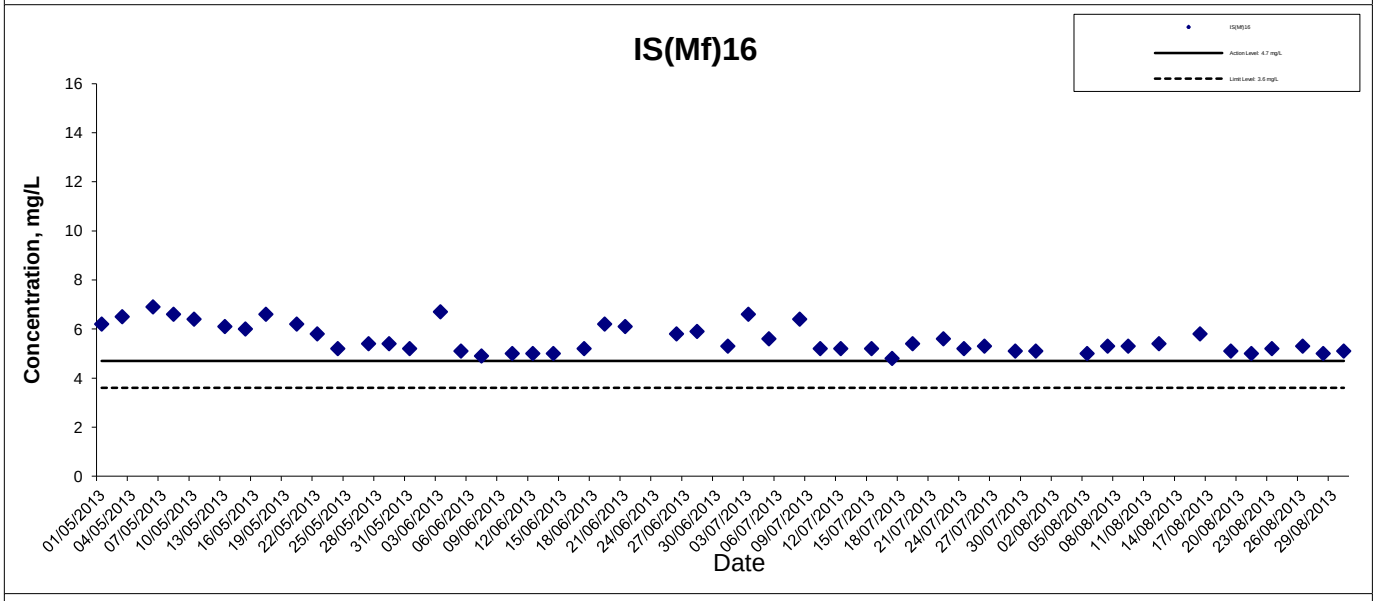
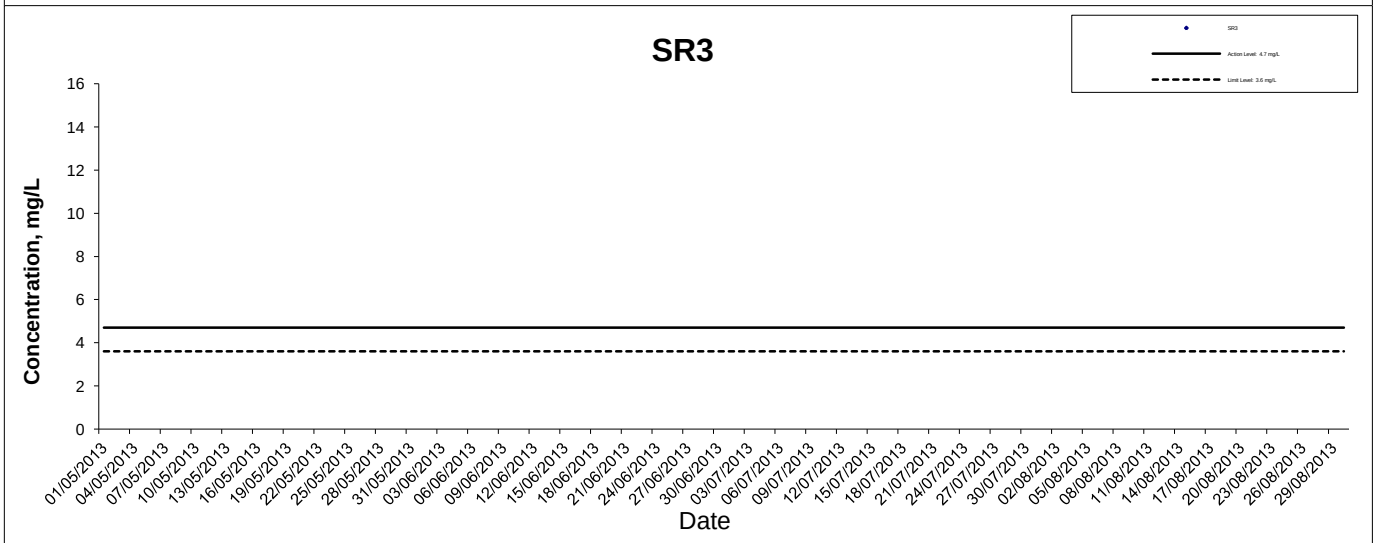
Project No.: 60249820 **Date: Sep 2013** **Appendix G**

Dissolved Oxygen (Bottom) at Mid-Flood Tide

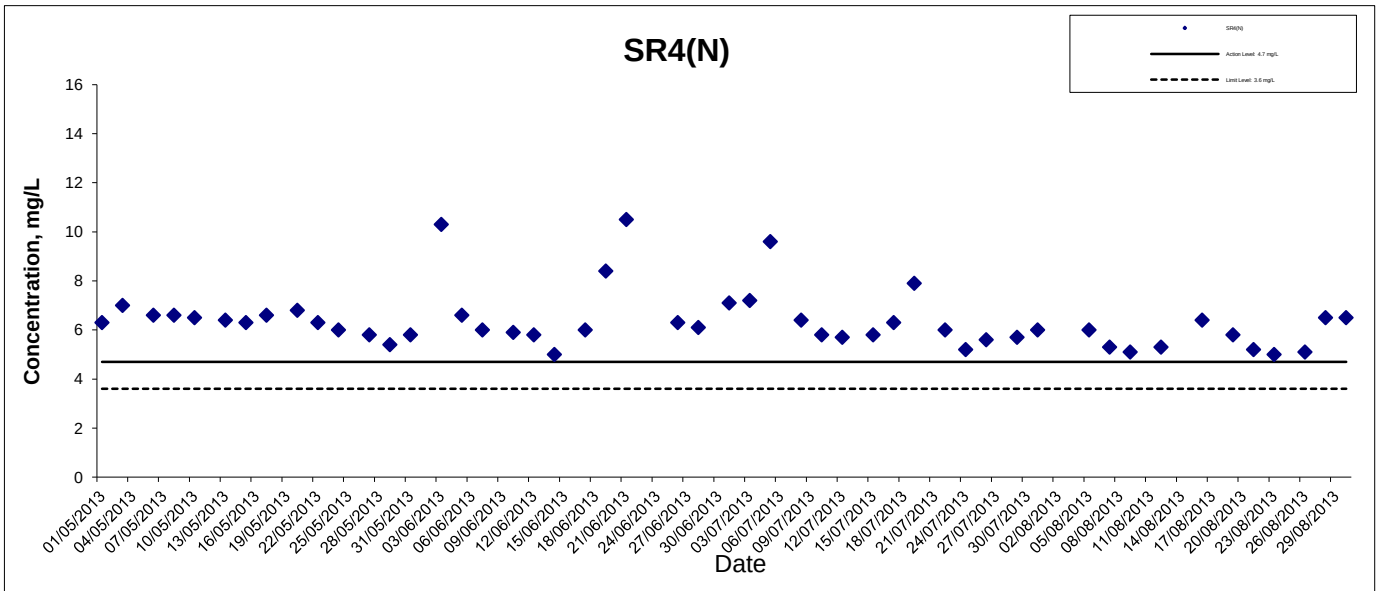


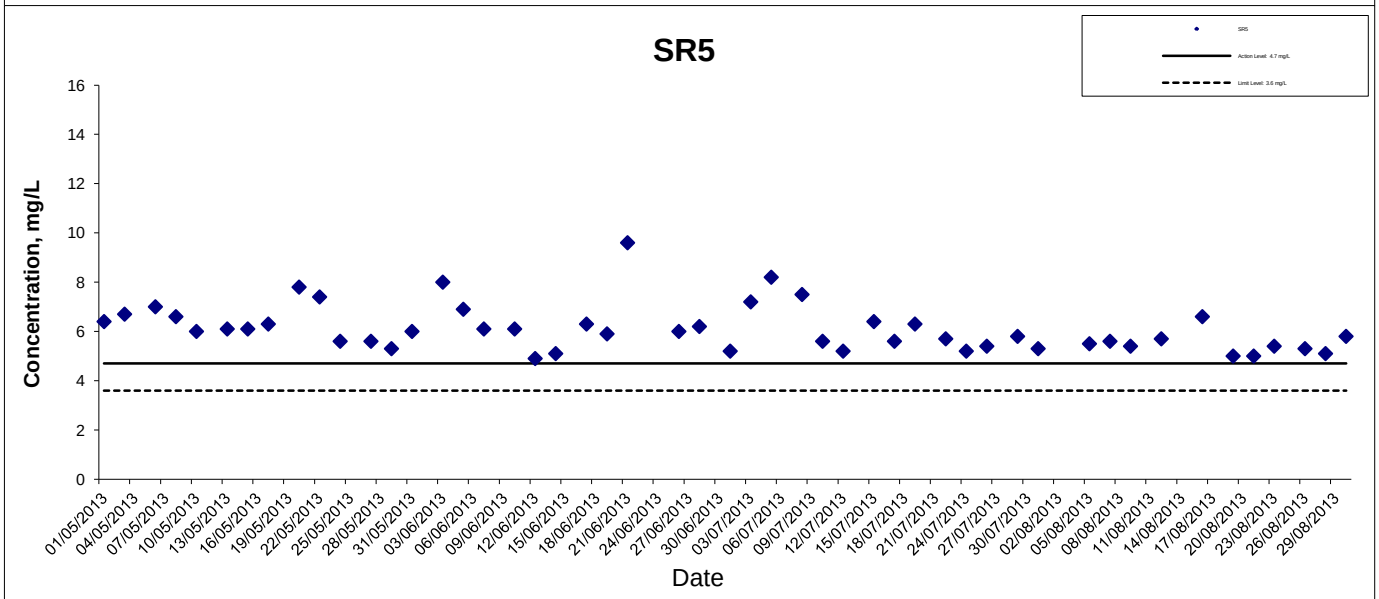


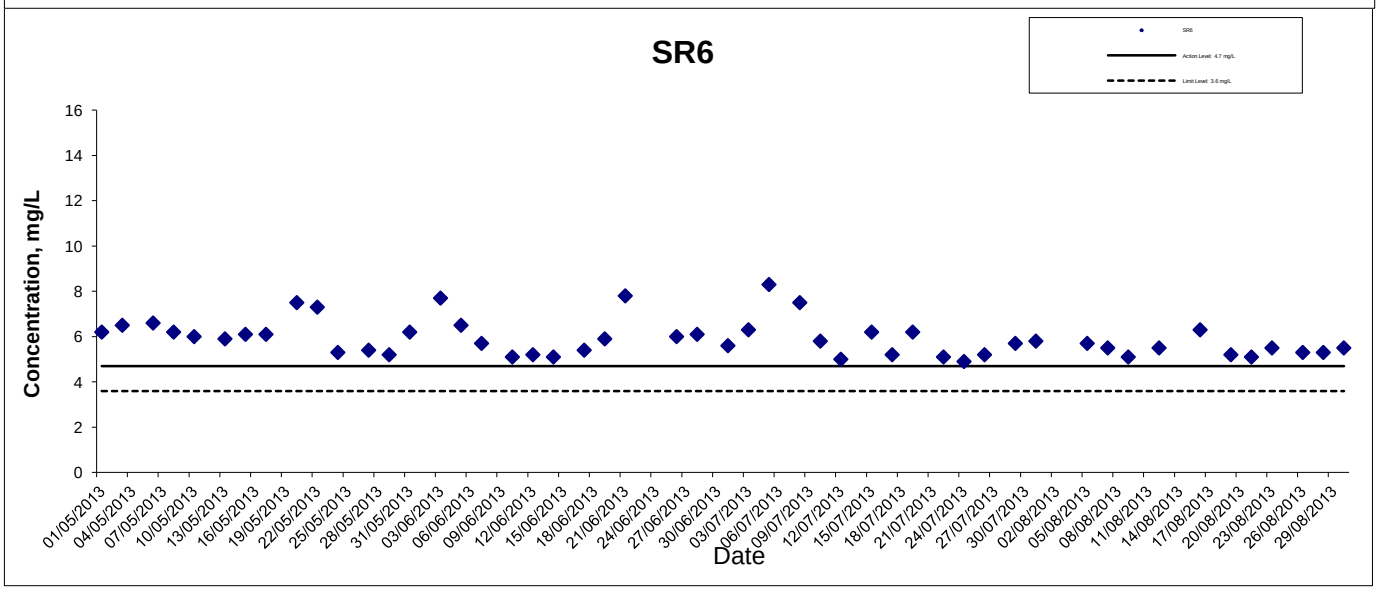


As the measured water depths were less than 3 m during all monitoring days, water samples are collected at mid-depth only .

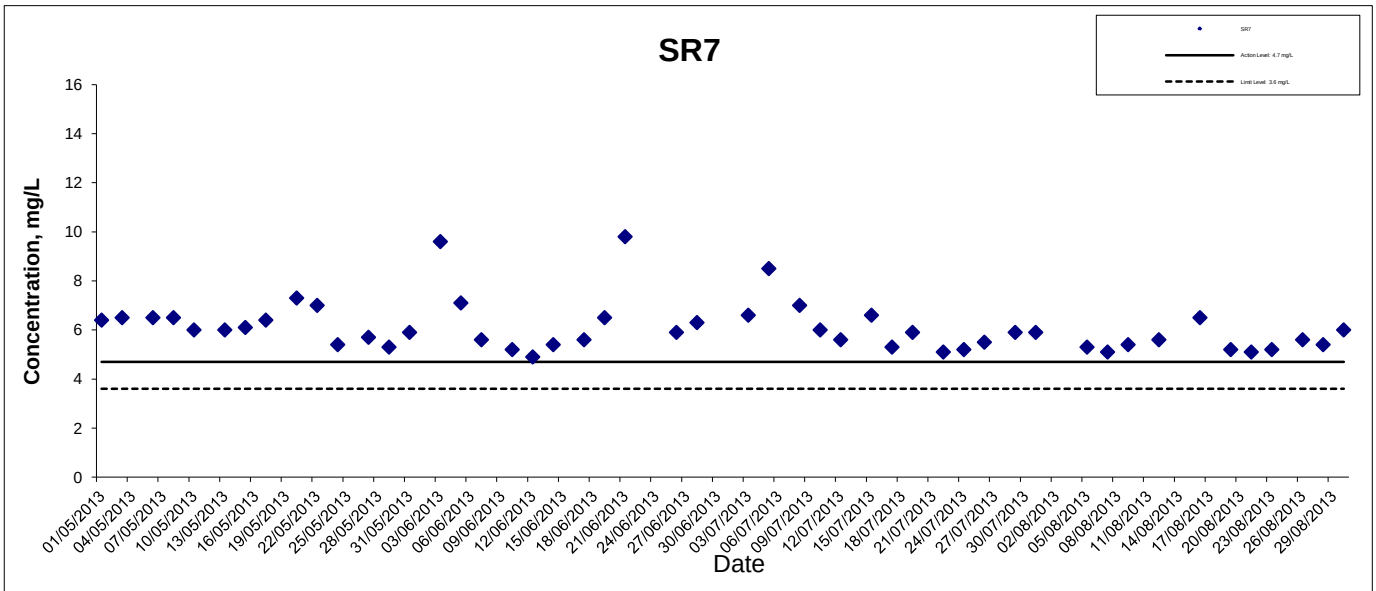
Dissolved Oxygen (Bottom) at Mid-Flood Tide

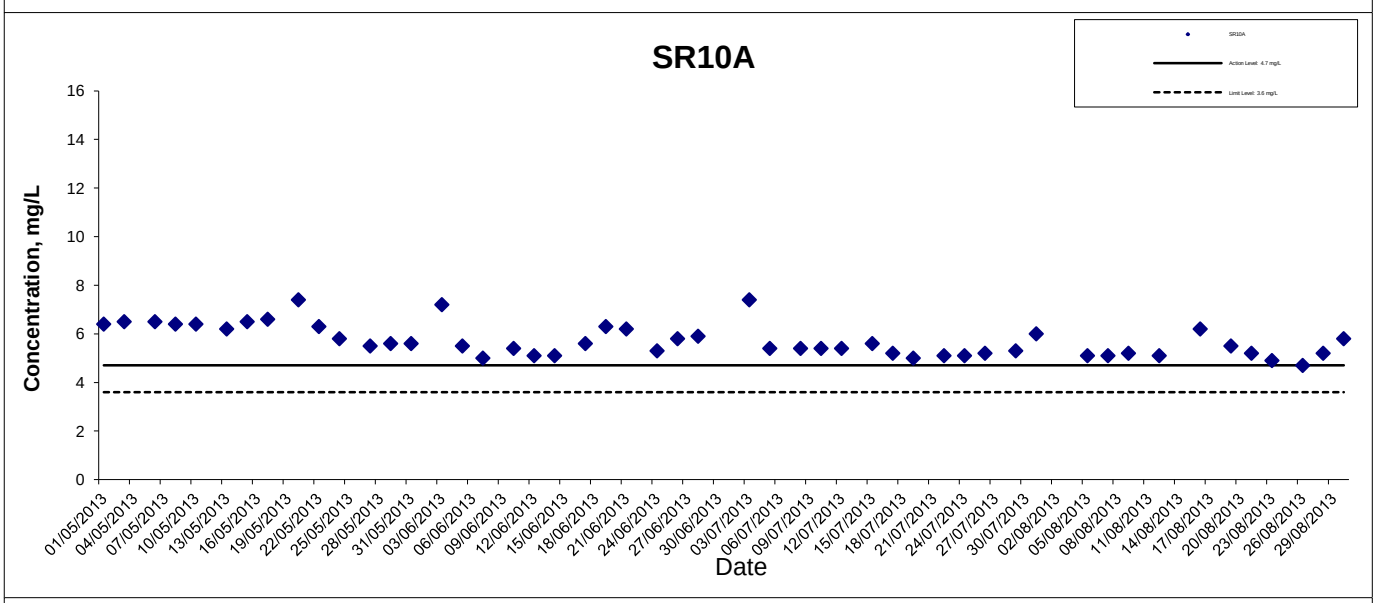


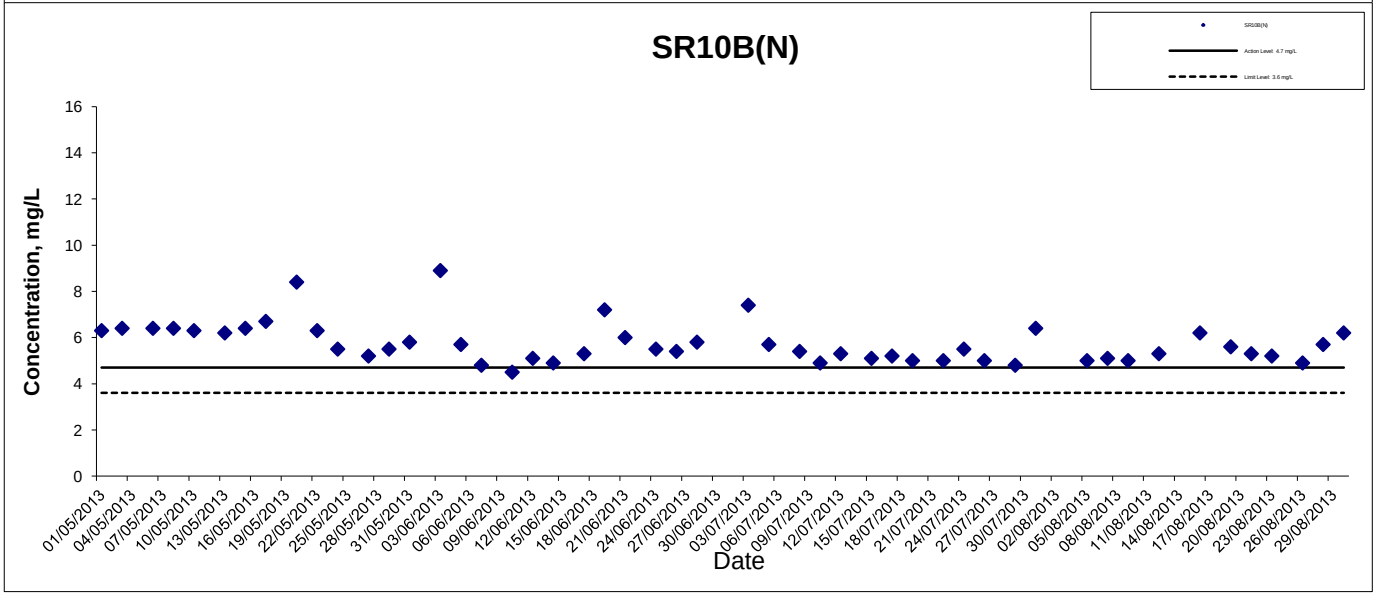




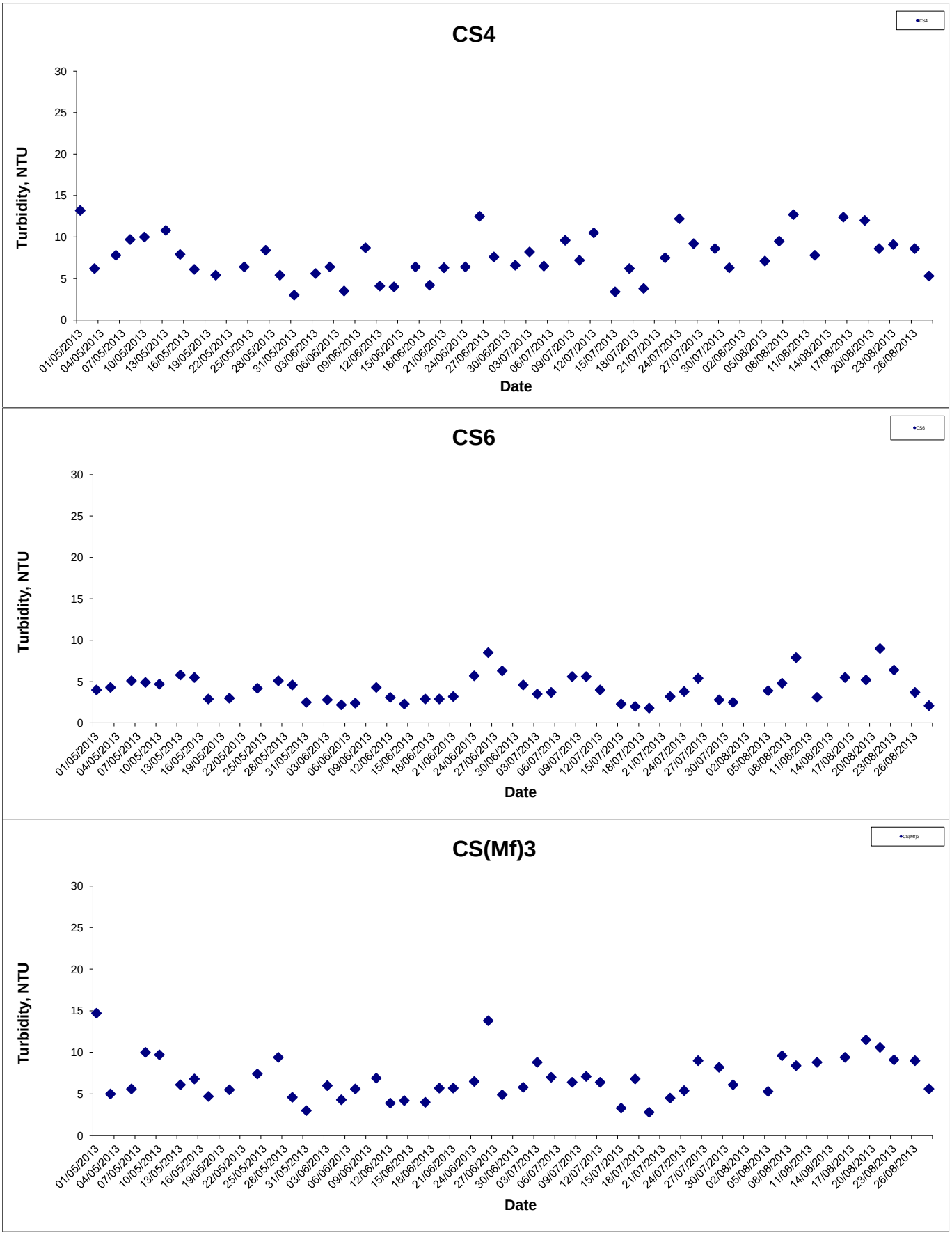
Dissolved Oxygen (Bottom) at Mid-Flood Tide



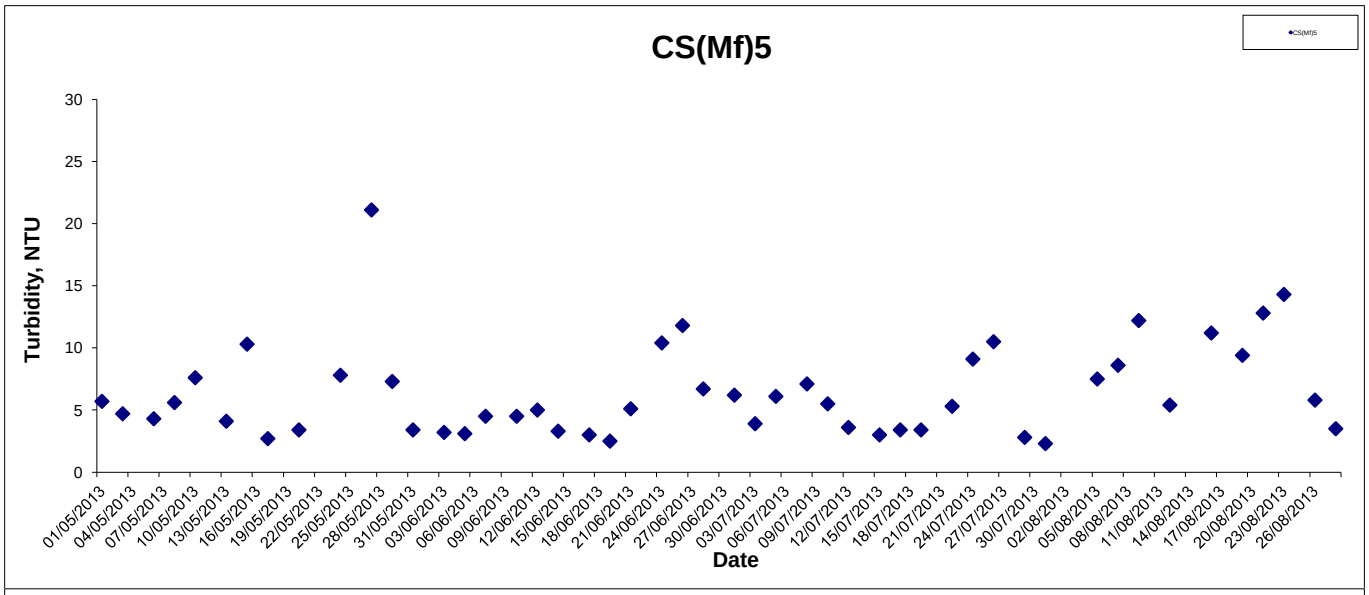


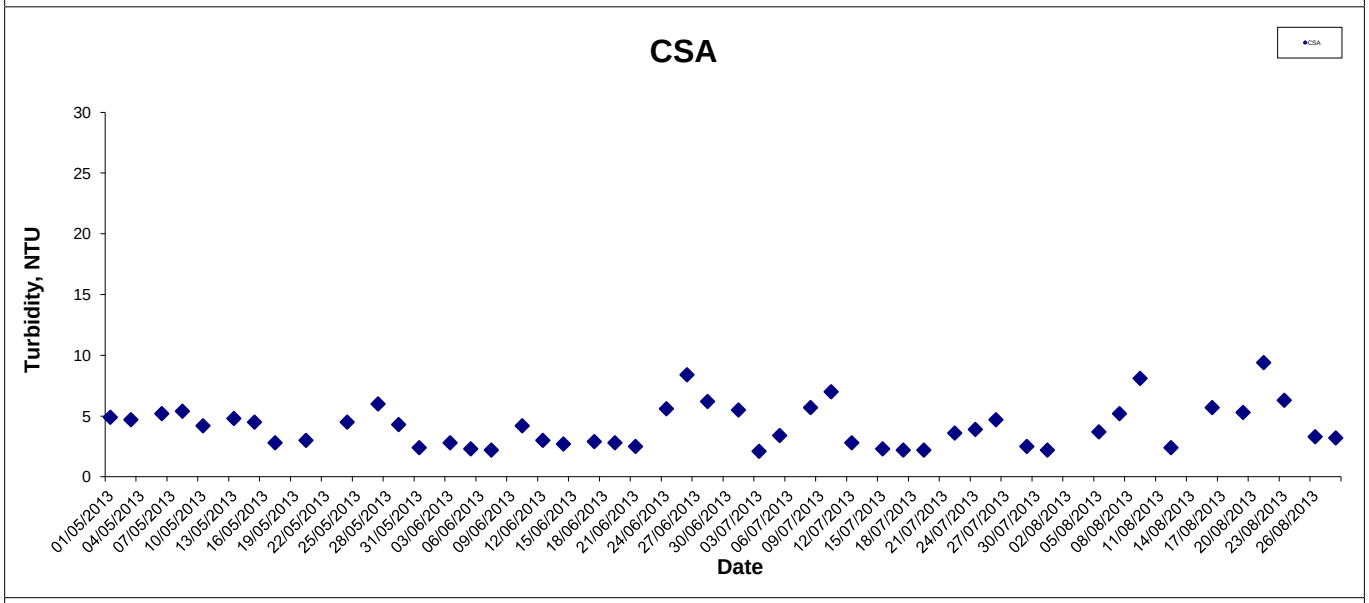


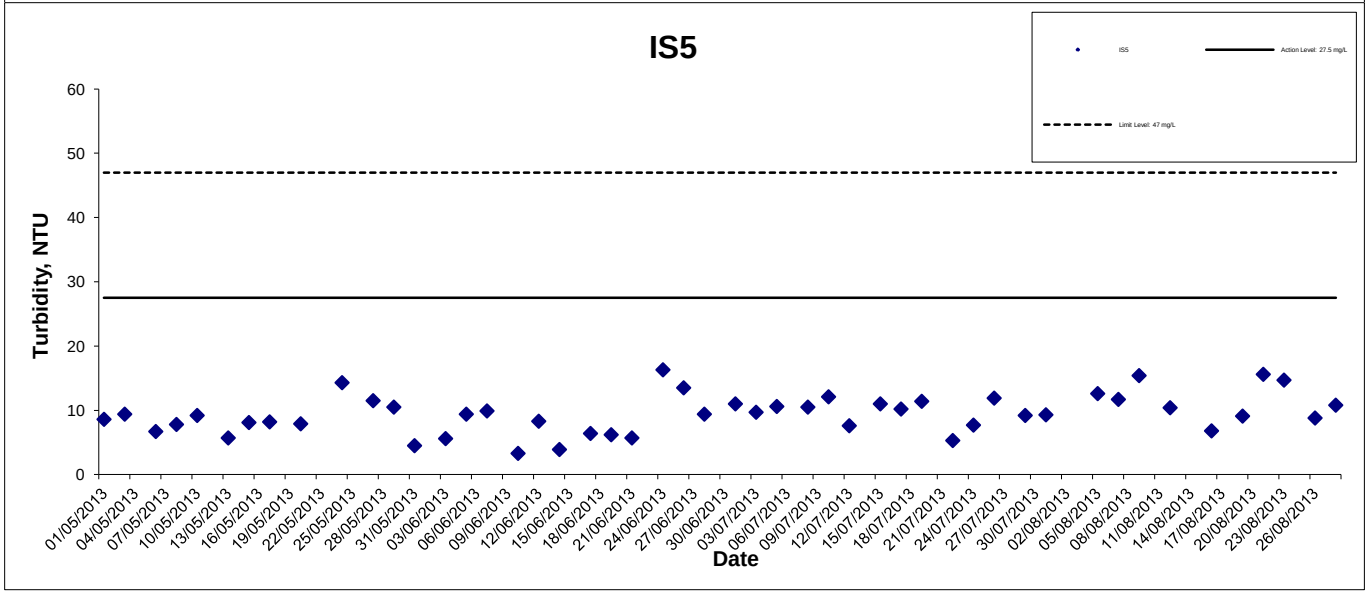
Turbidity at Mid-Ebb Tide



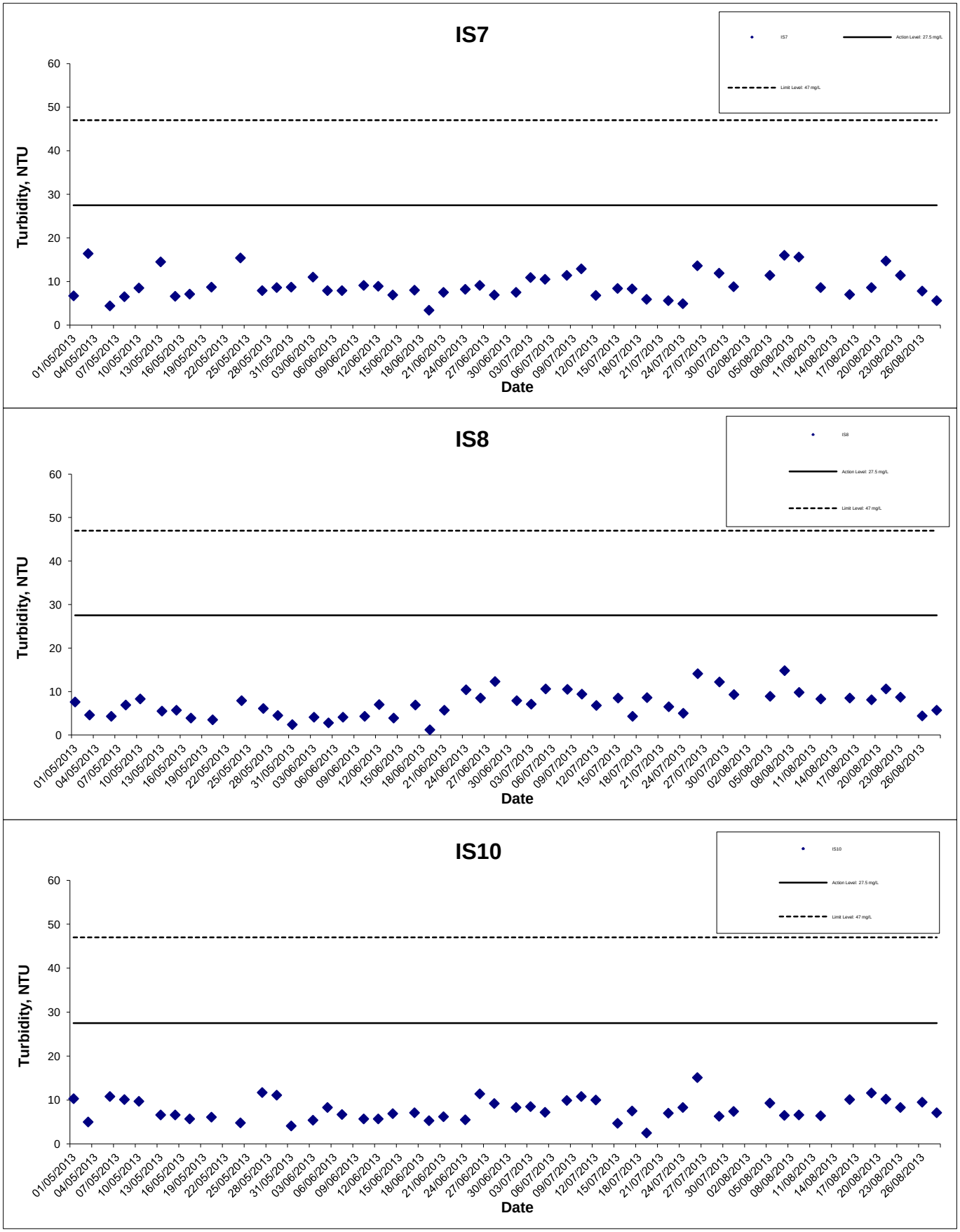
Turbidity at Mid-Ebb Tide



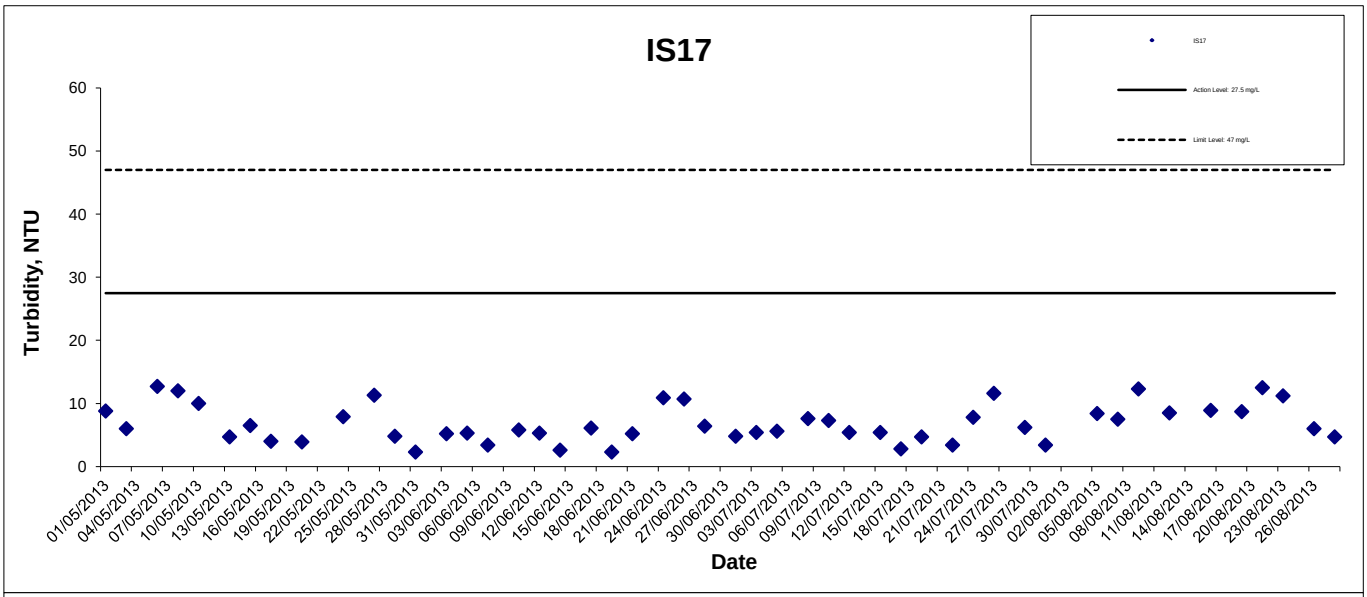


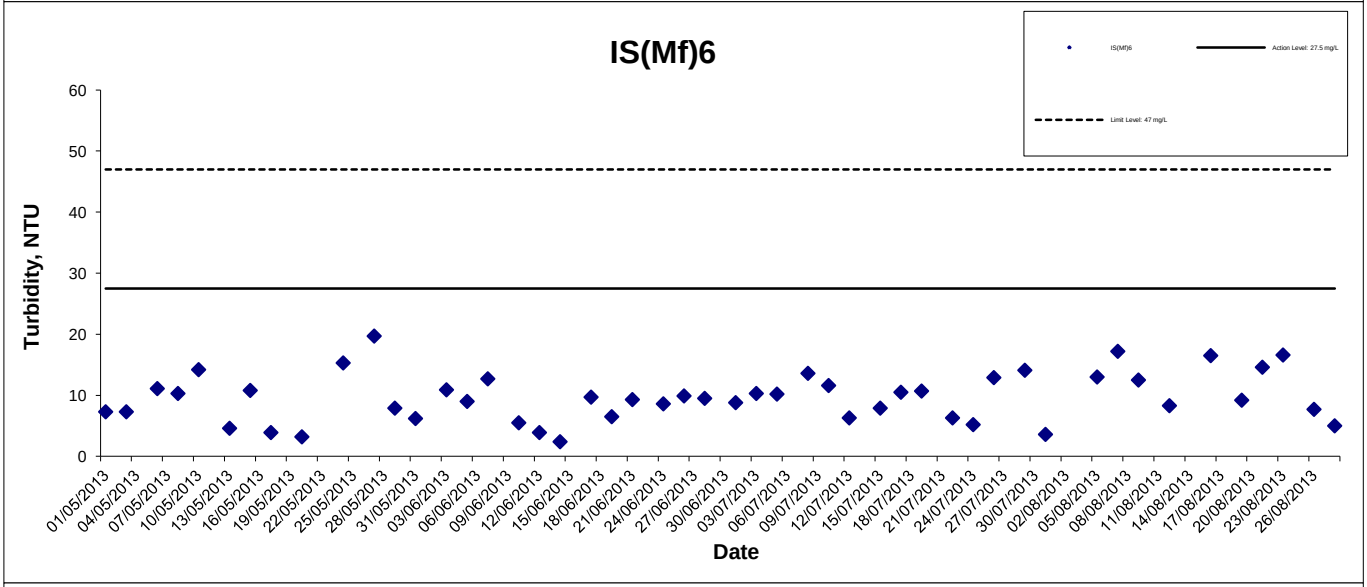


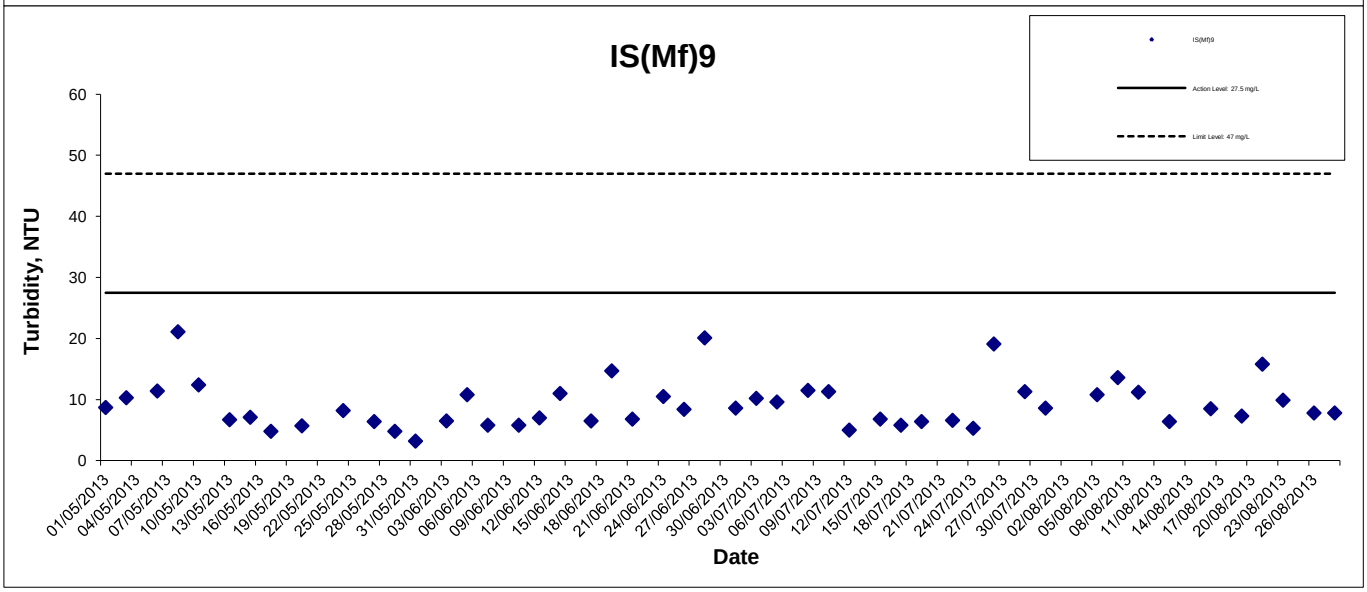
Turbidity at Mid-Ebb Tide



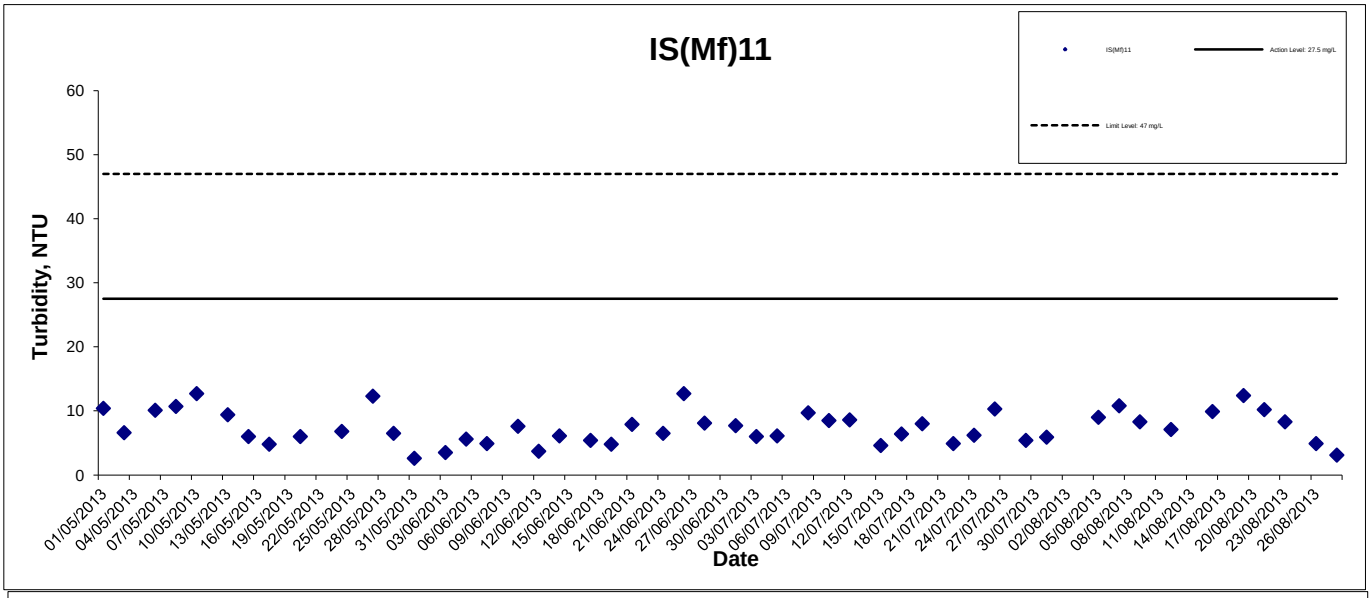
Turbidity at Mid-Ebb Tide

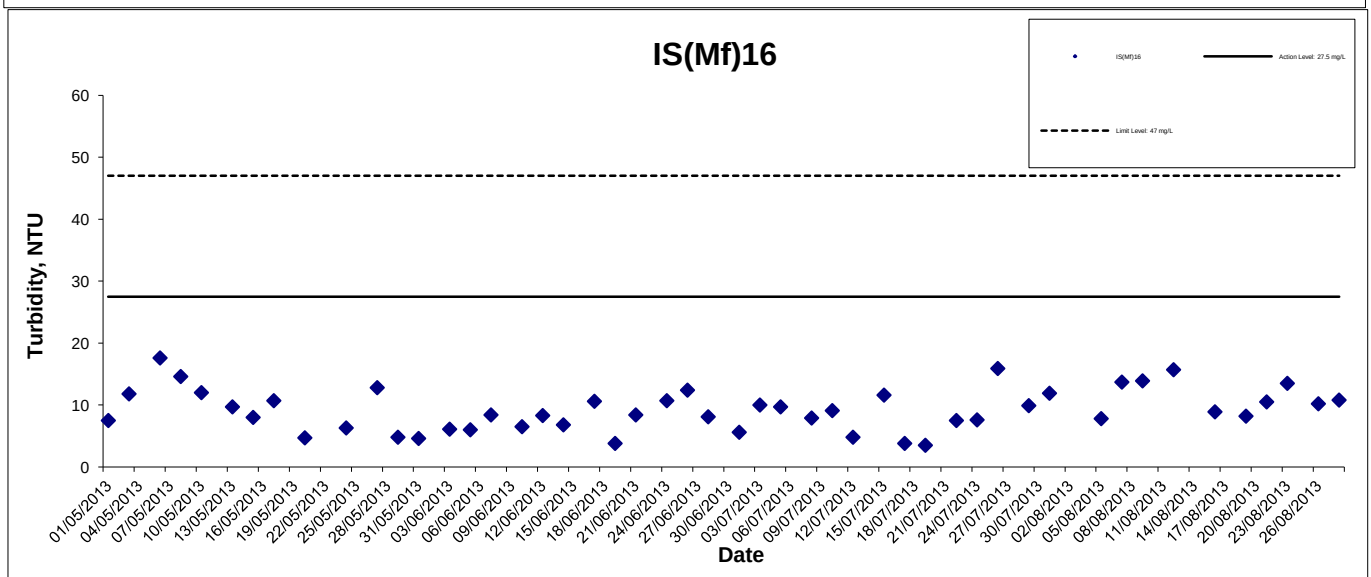


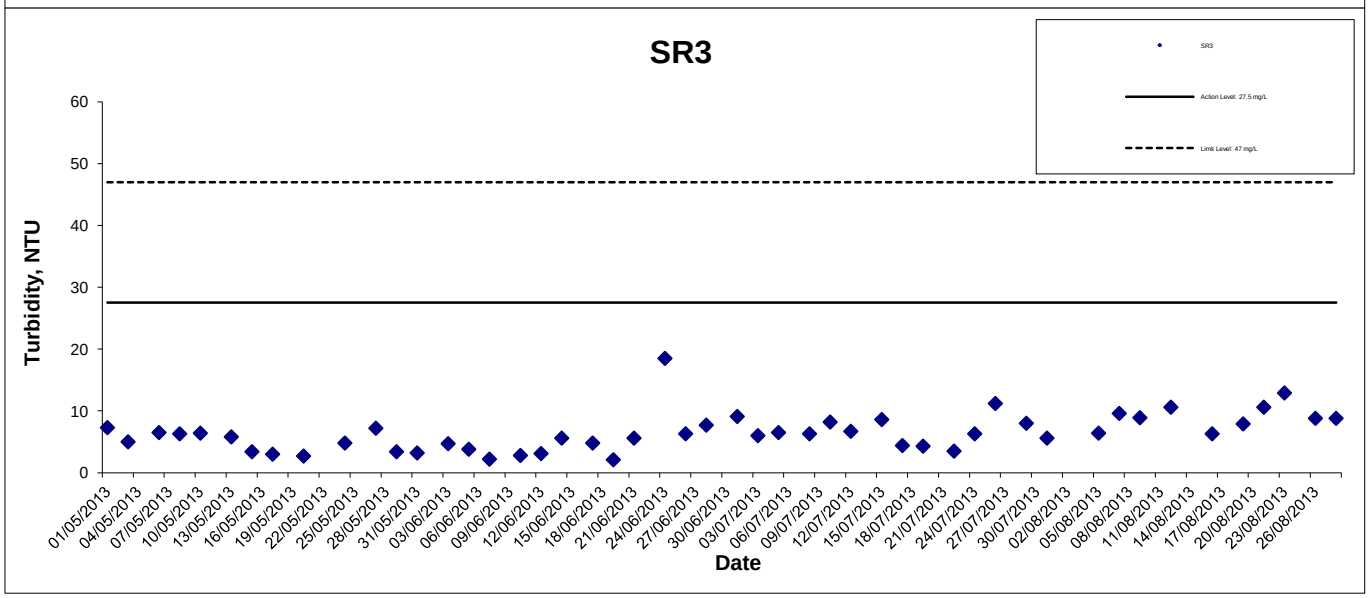




Turbidity at Mid-Ebb Tide







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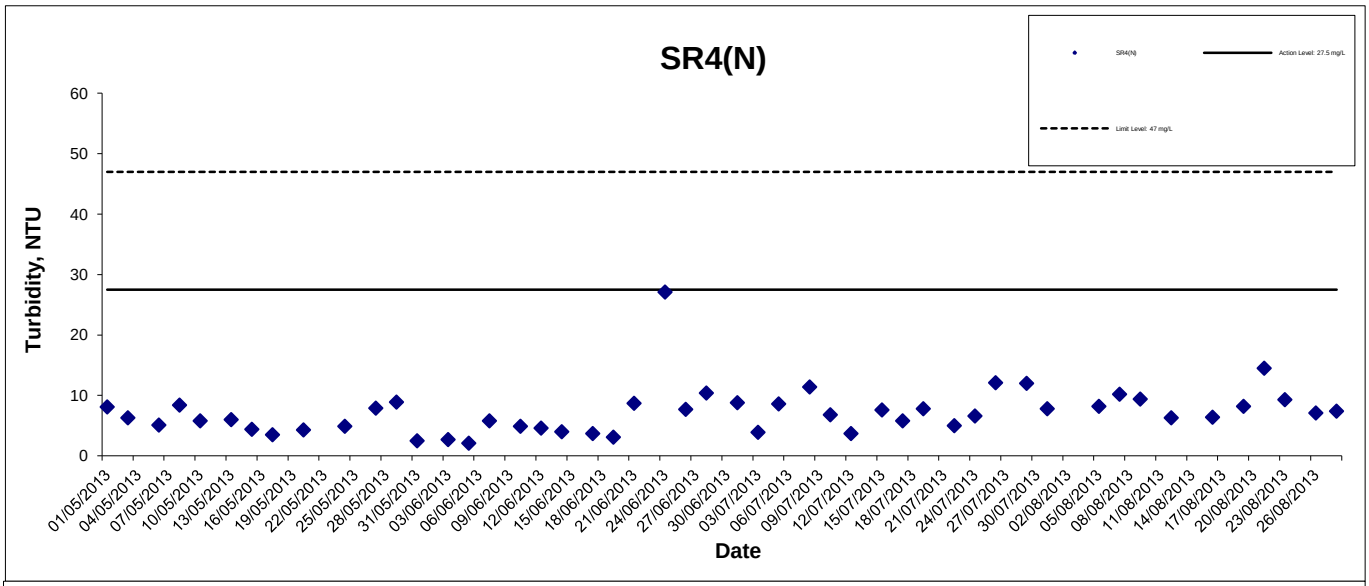
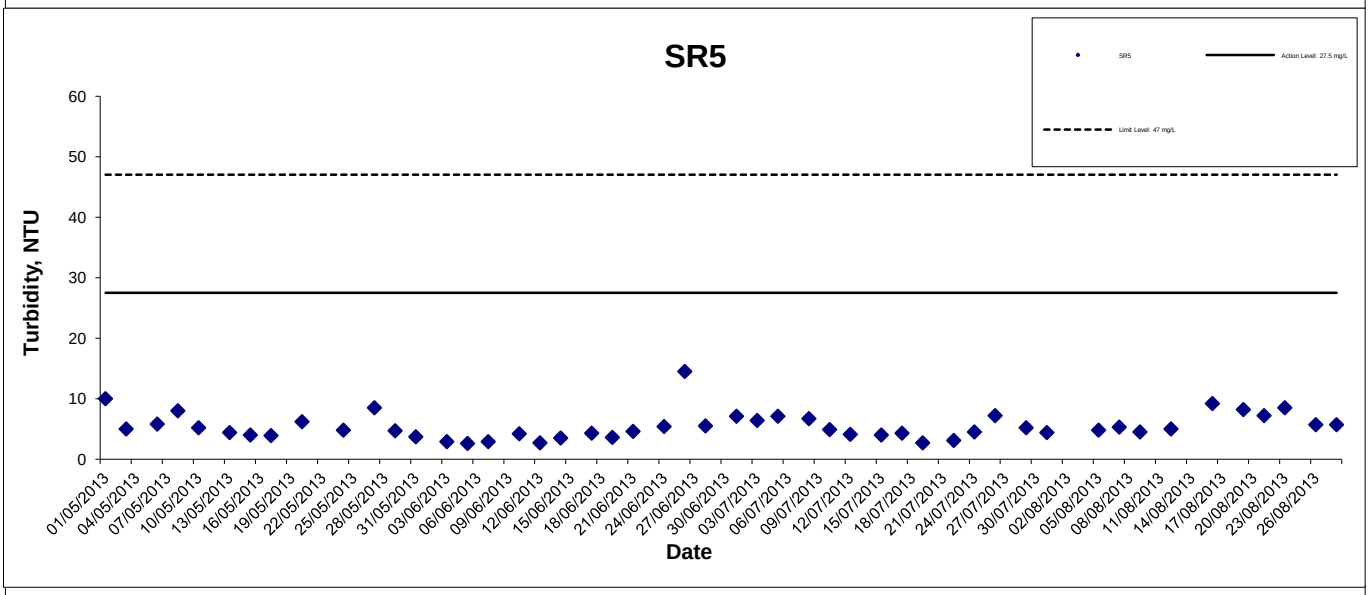
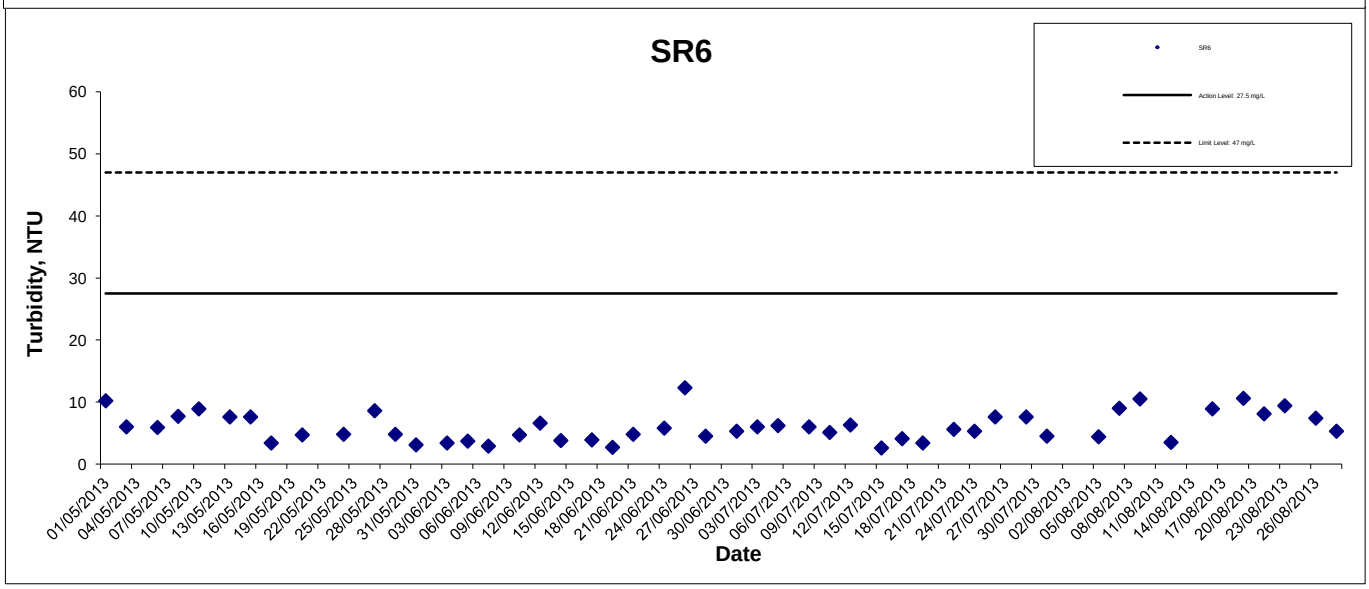
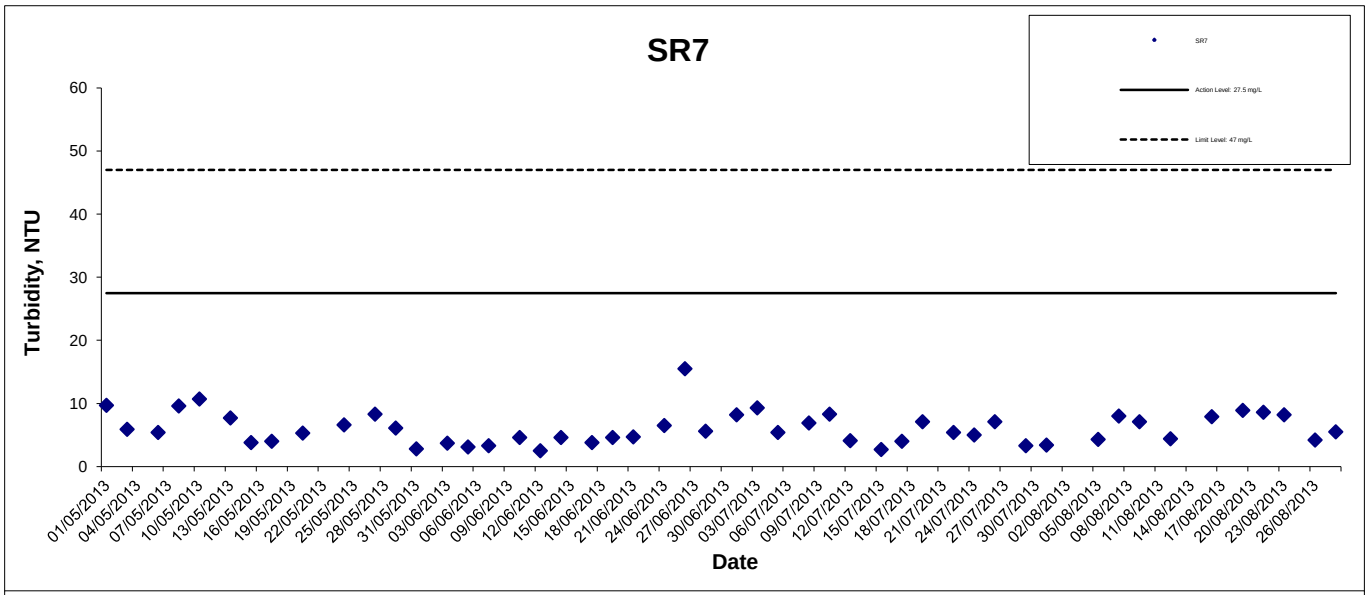
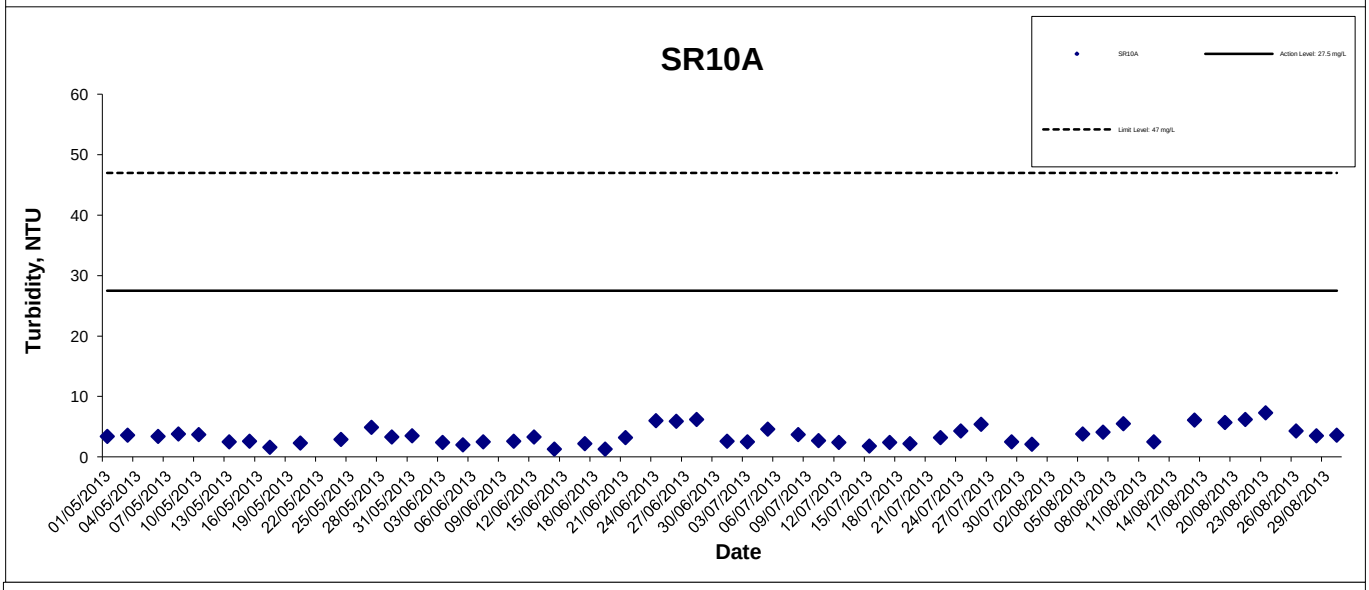


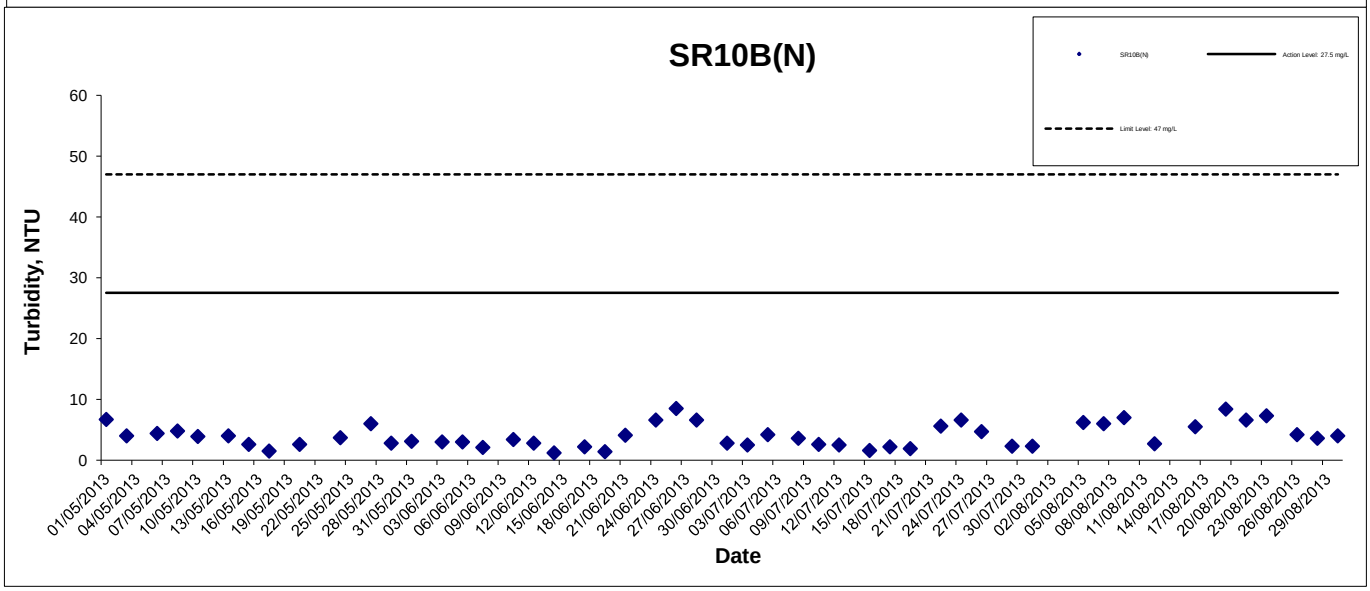




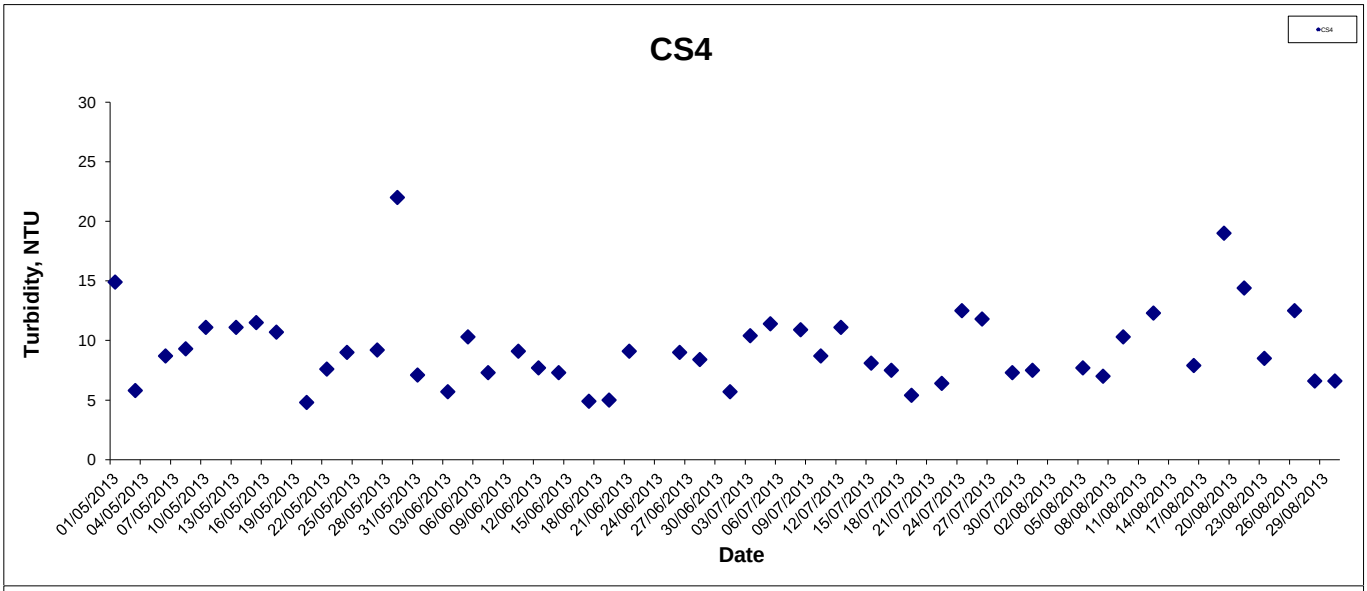
Turbidity at Mid-Ebb Tide

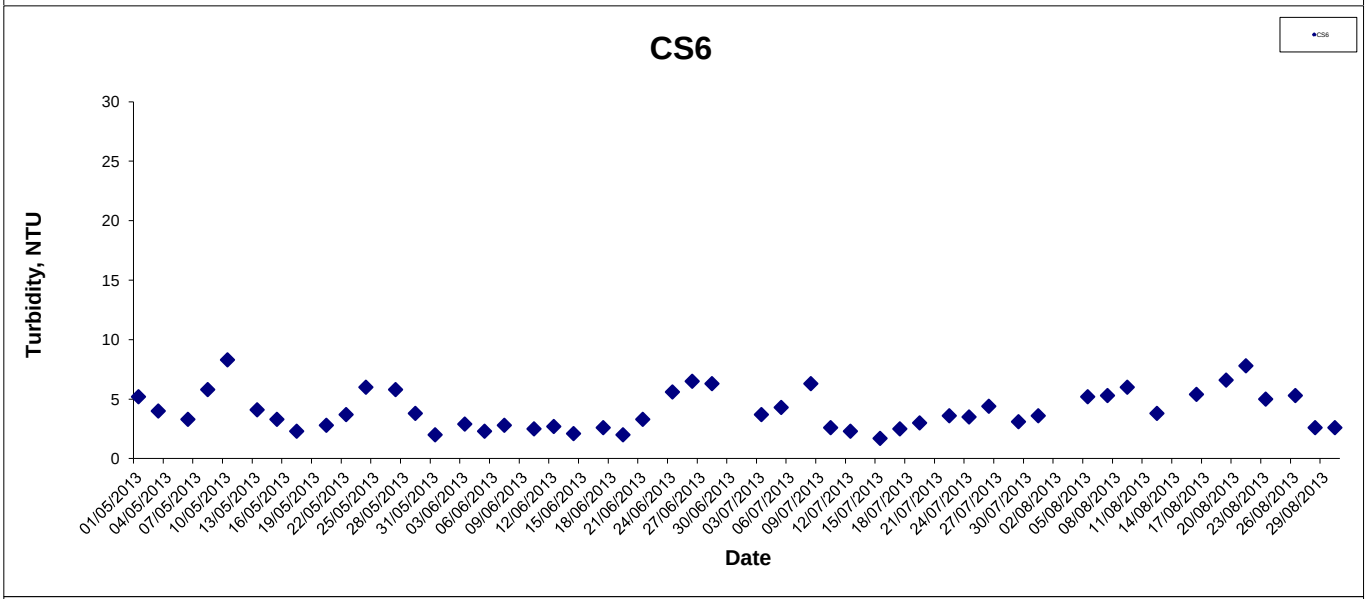


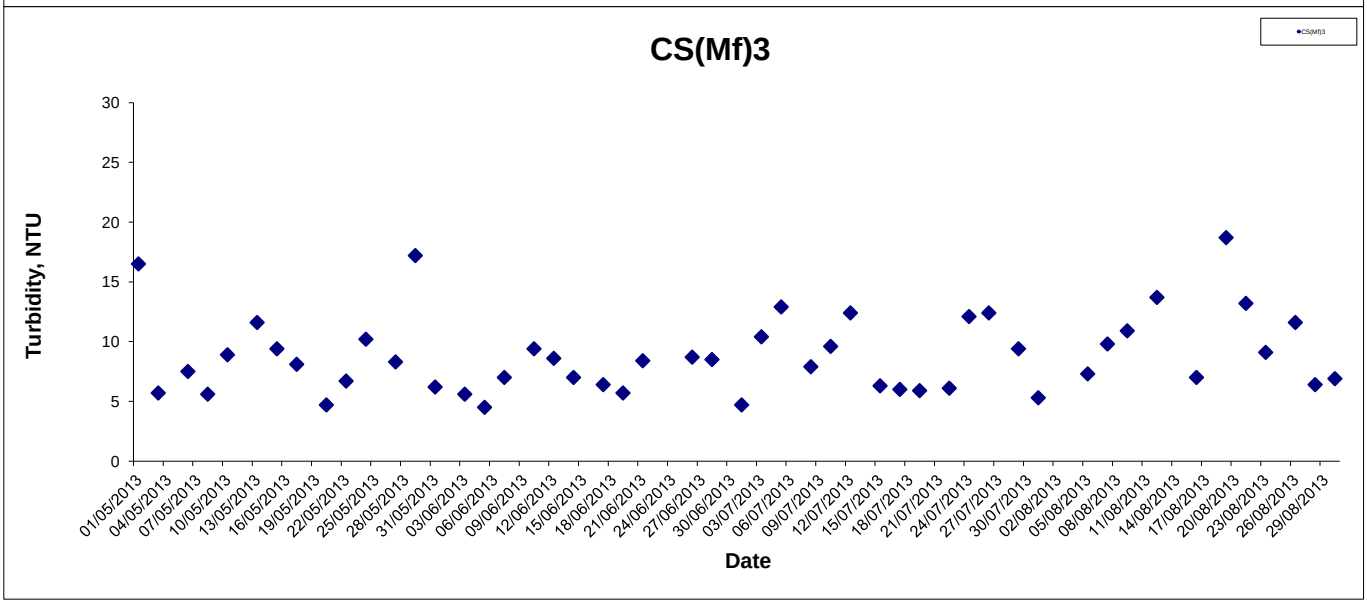




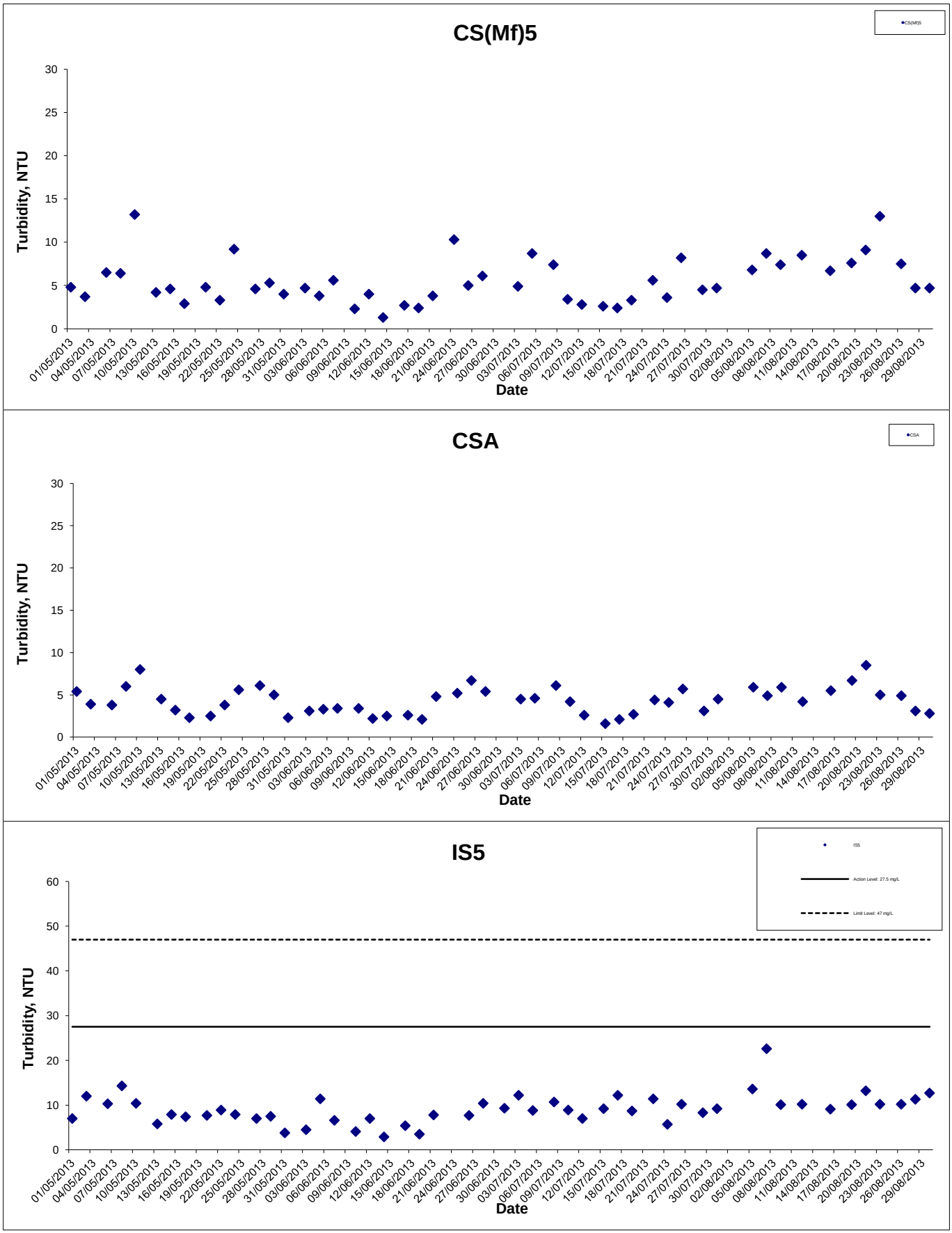
Turbidity at Mid-Flood Tide







Turbidity at Mid-Flood Tide



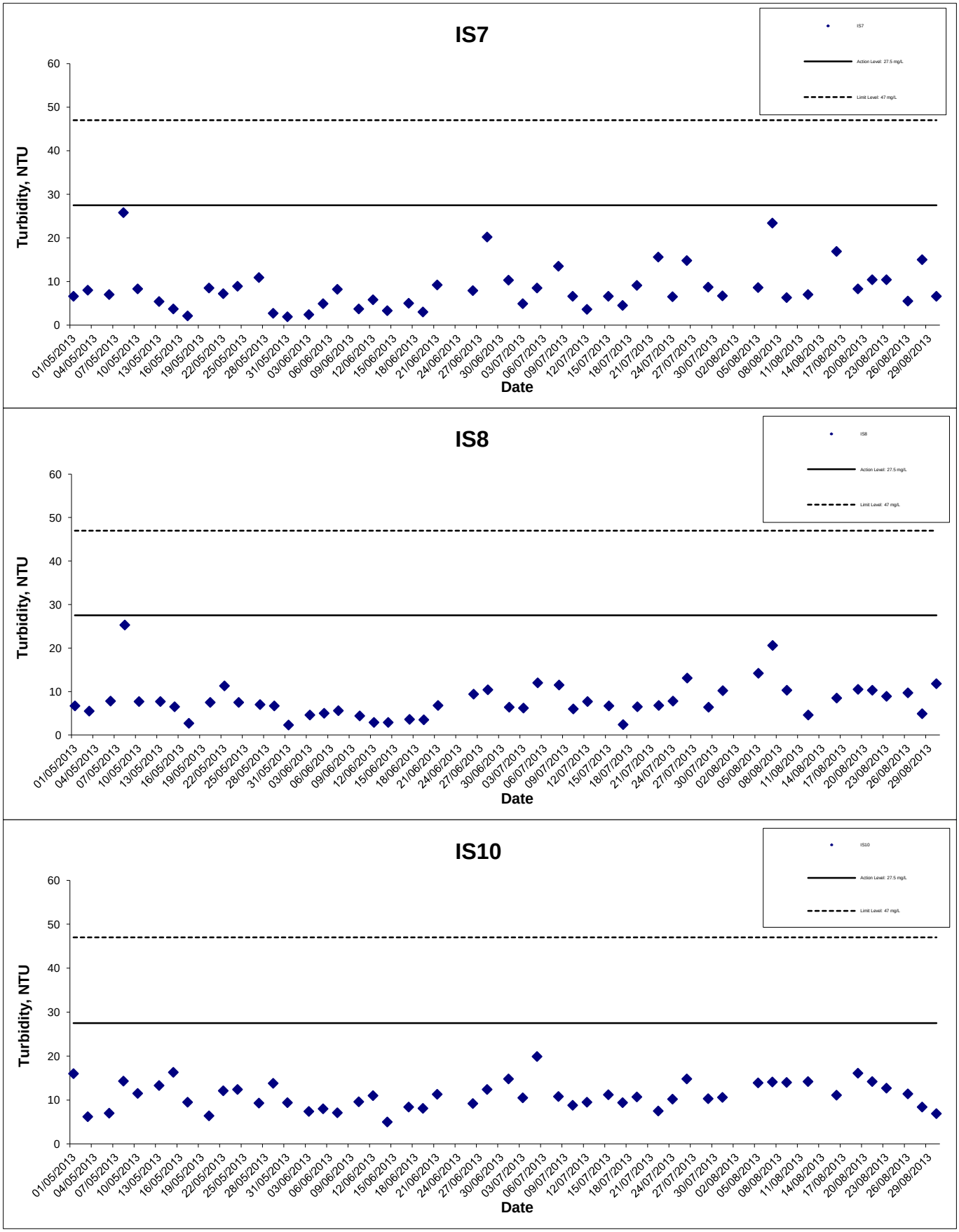
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

Graphical Presentation of Impact Water Quality Monitoring Results

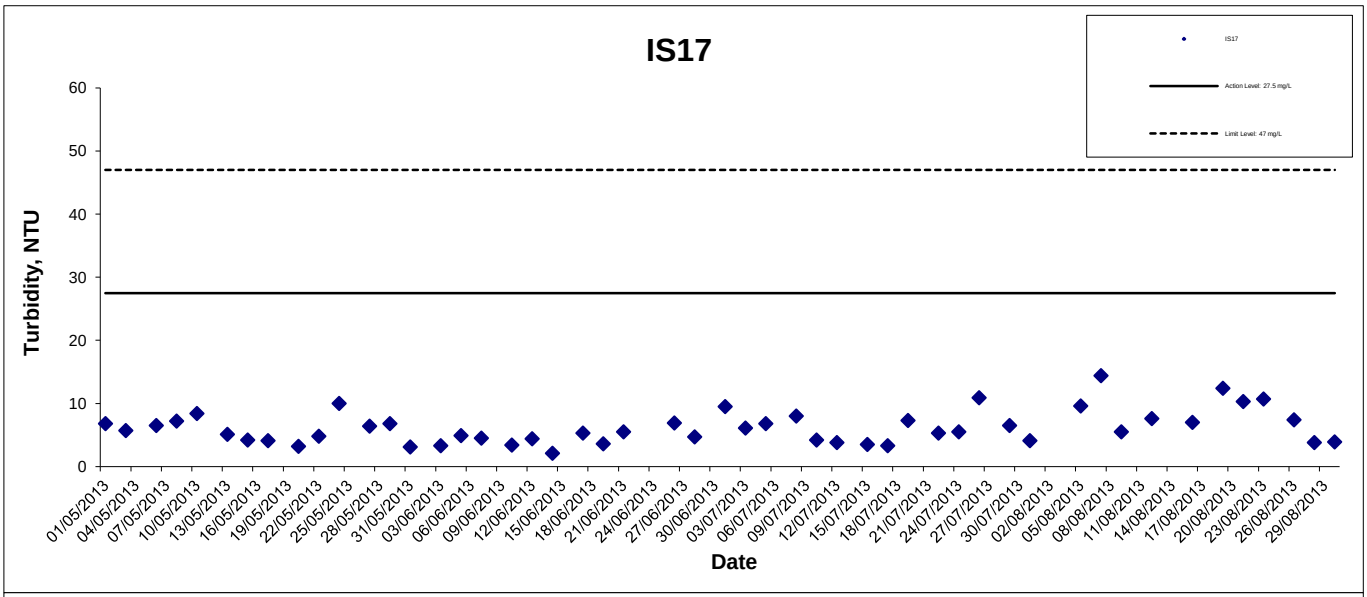
Project No.: 60249820 **Date: Sep 2013**

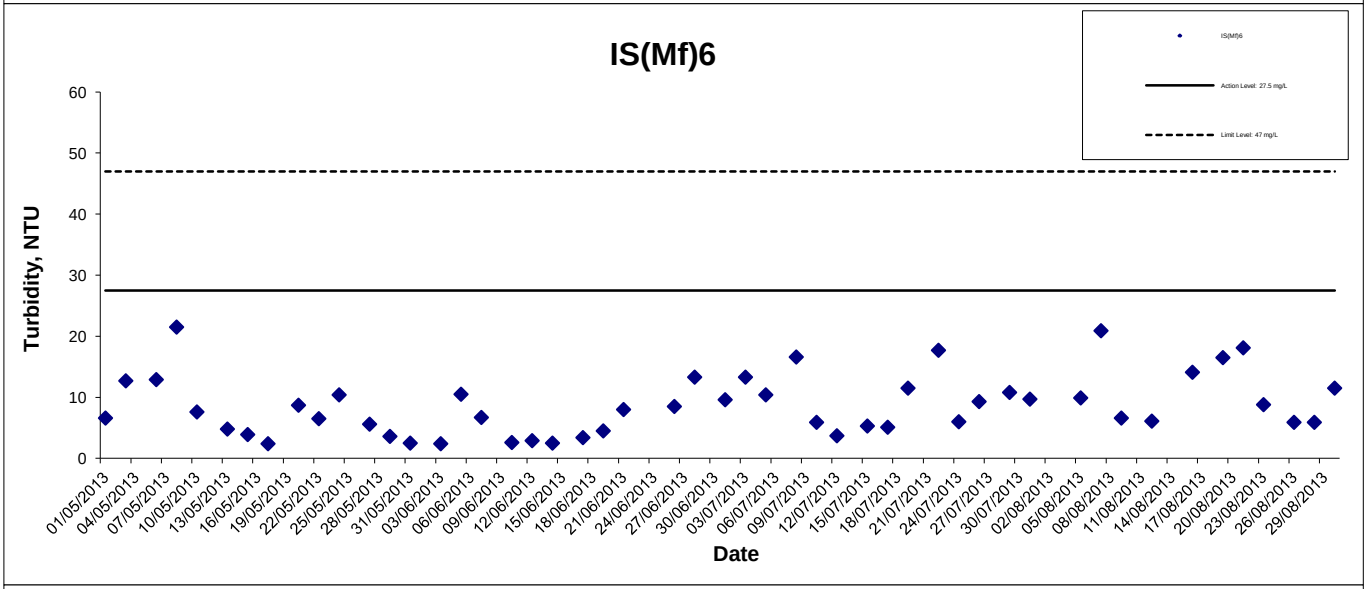
Appendix G

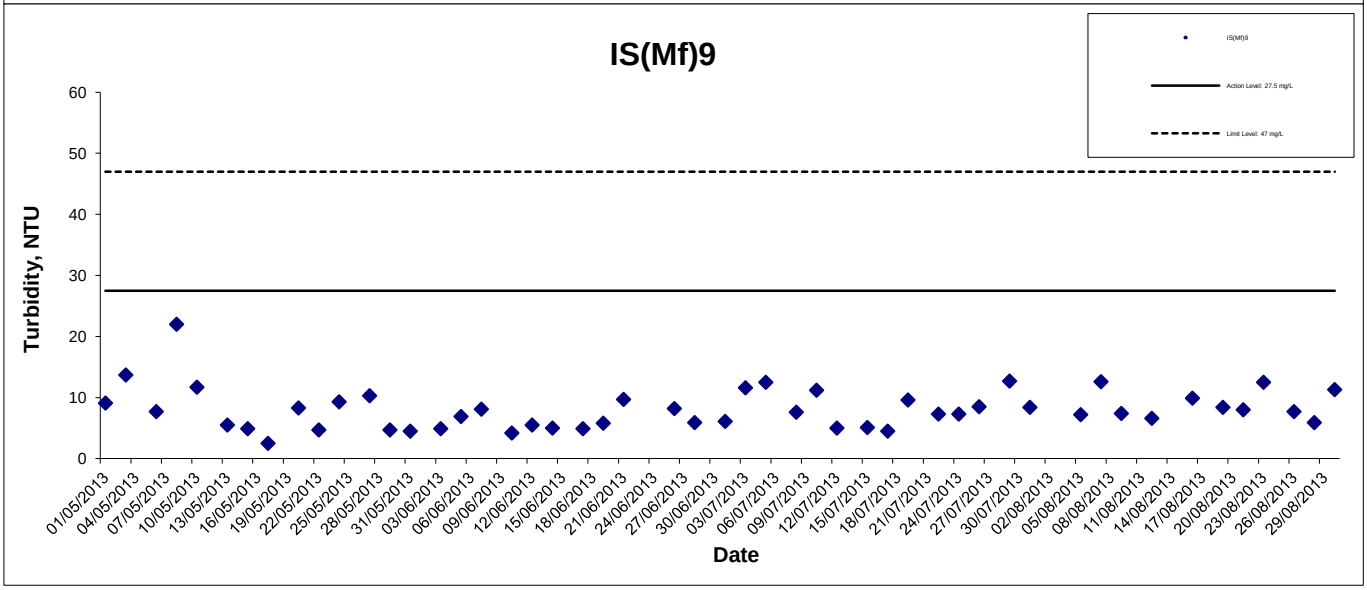
Turbidity at Mid-Flood Tide



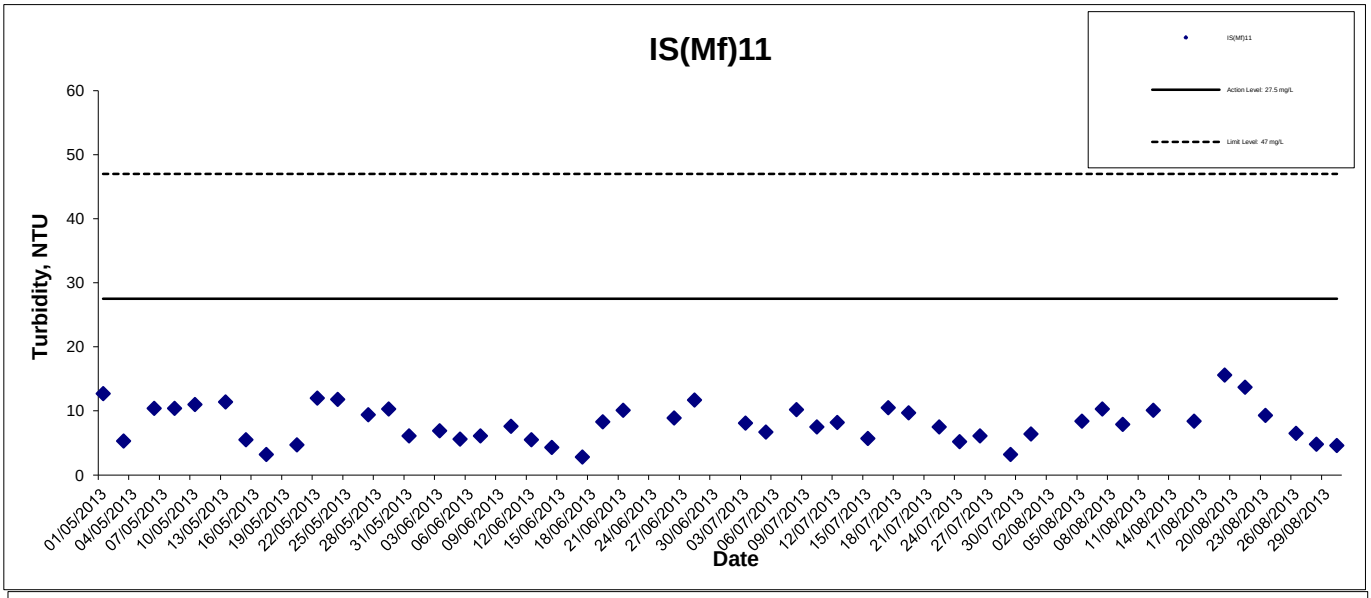
Turbidity at Mid-Flood Tide

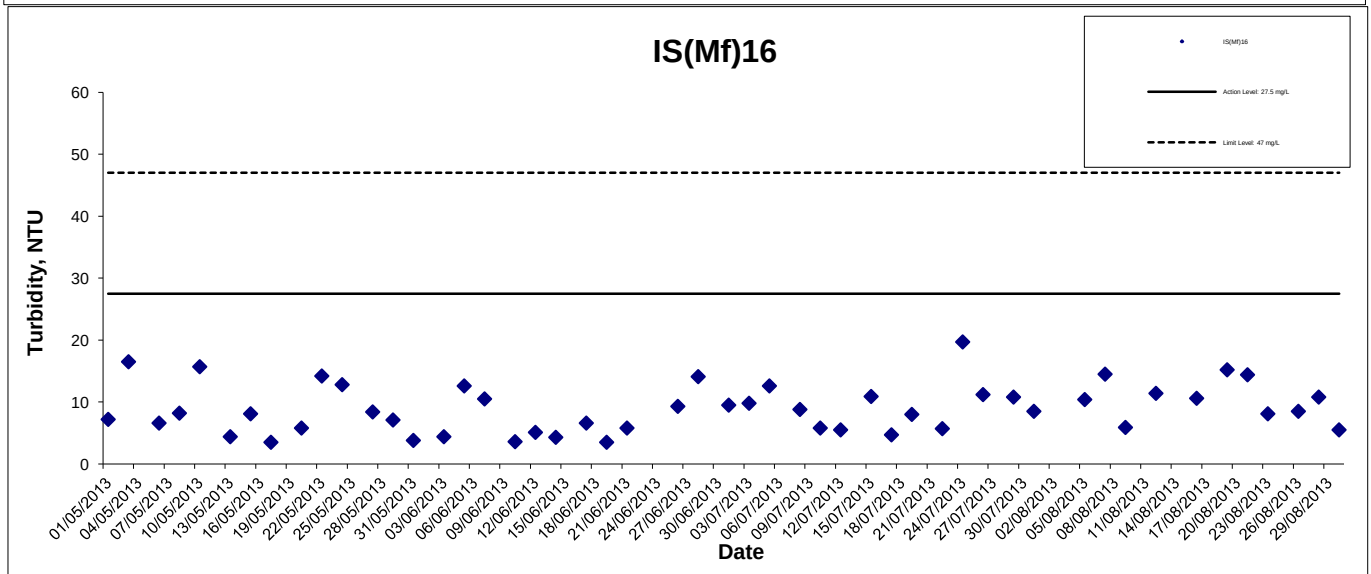


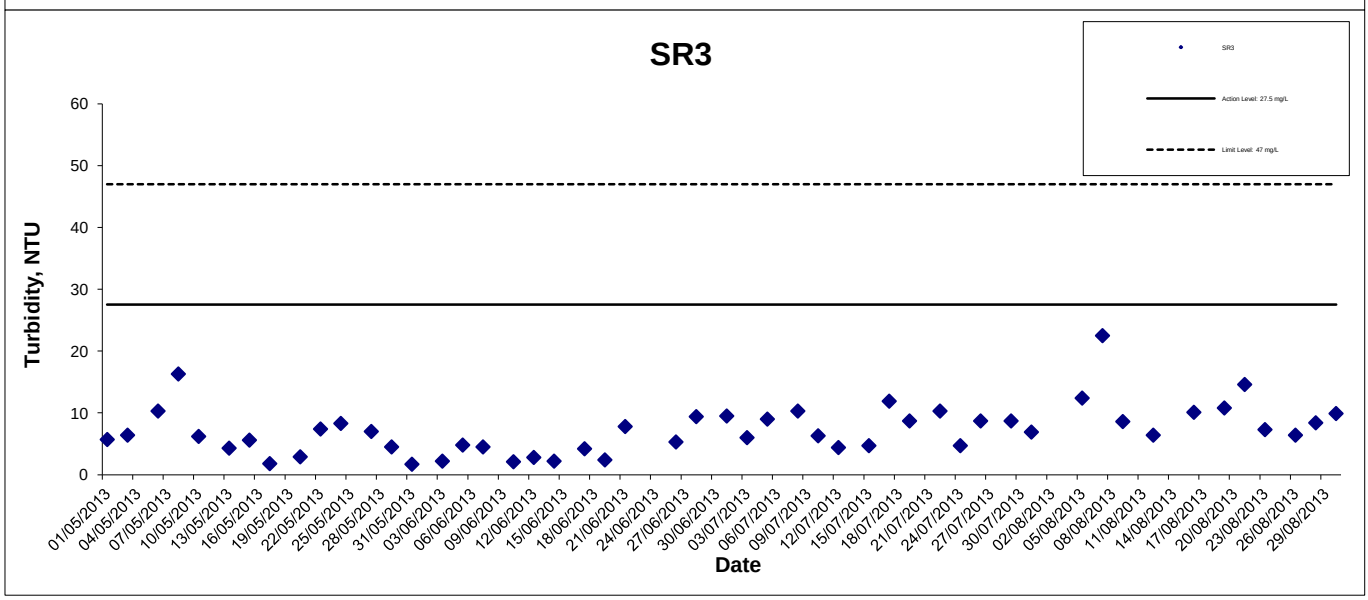




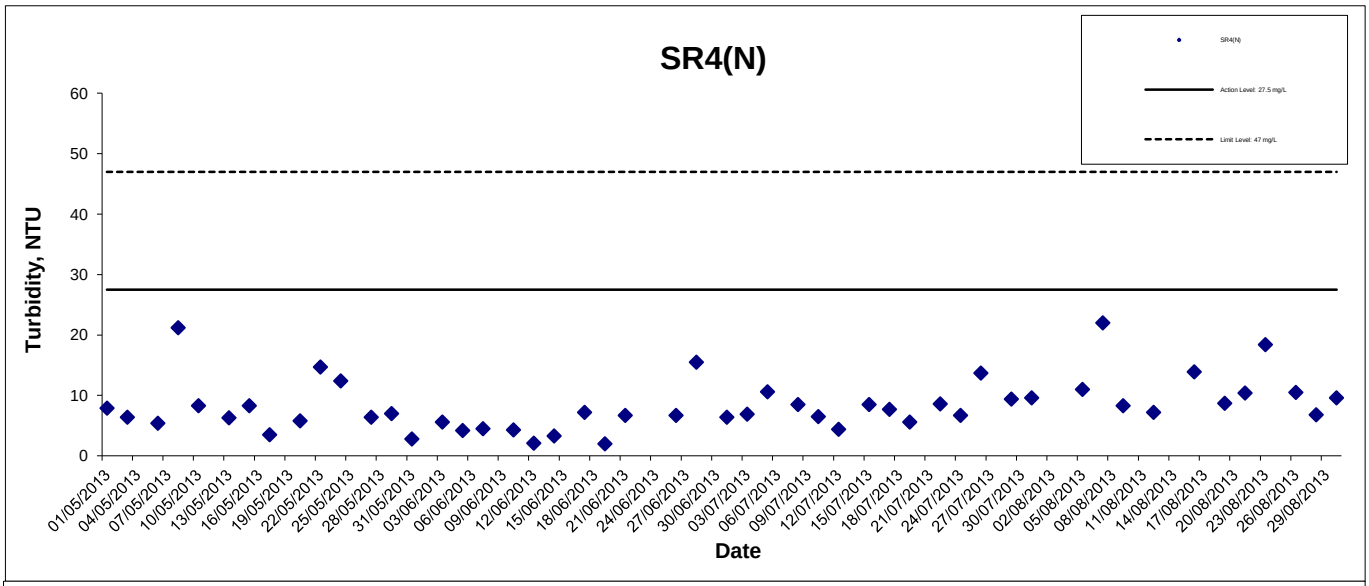
Turbidity at Mid-Flood Tide

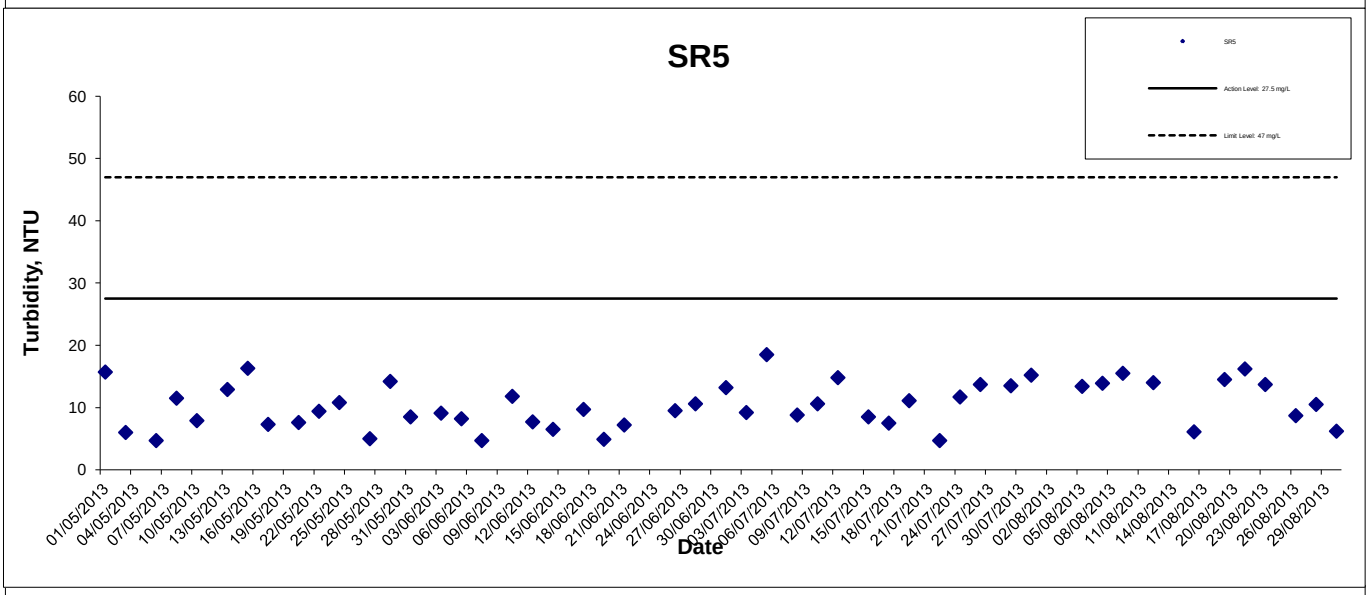


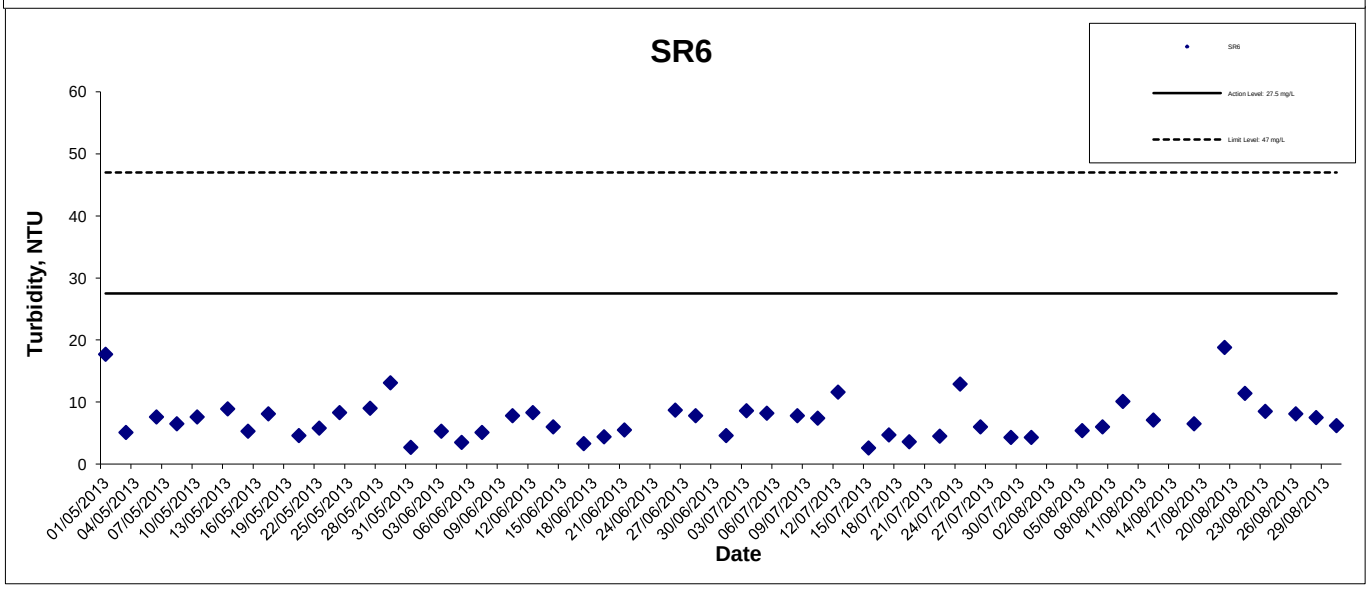




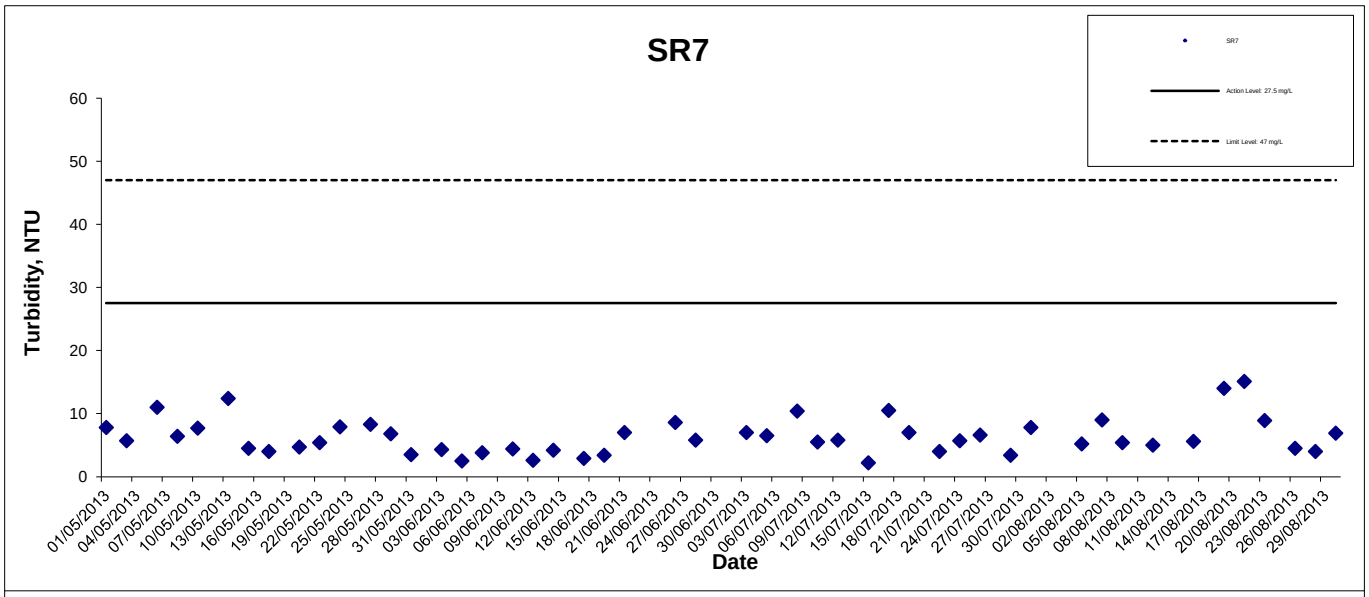
Turbidity at Mid-Flood Tide

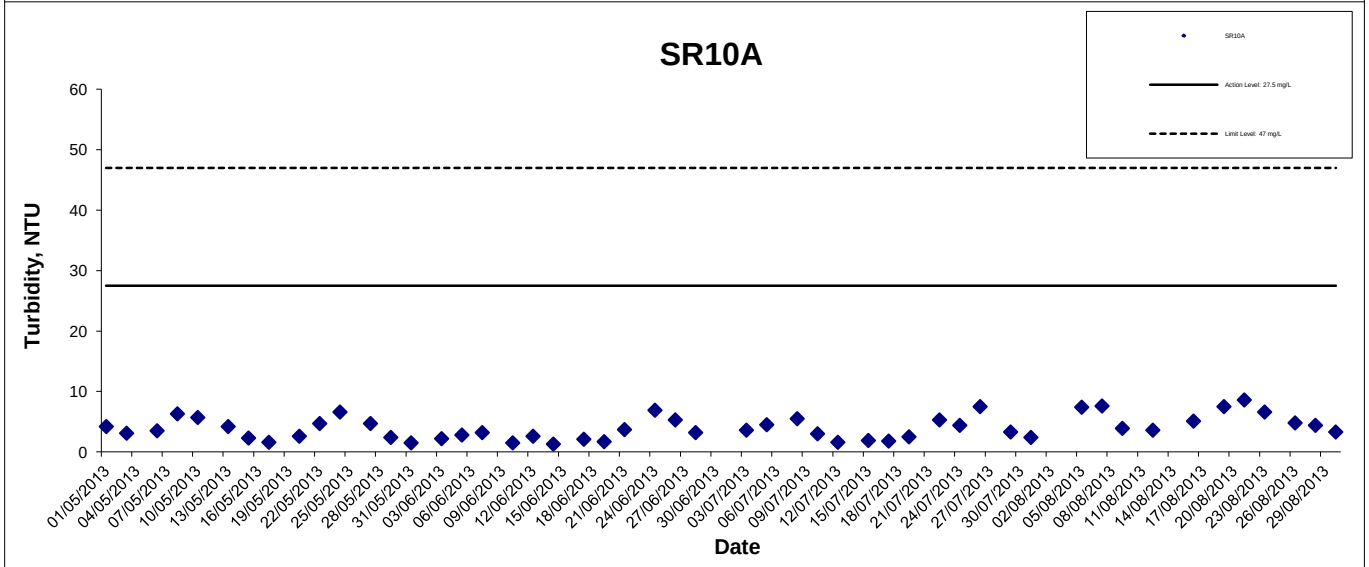


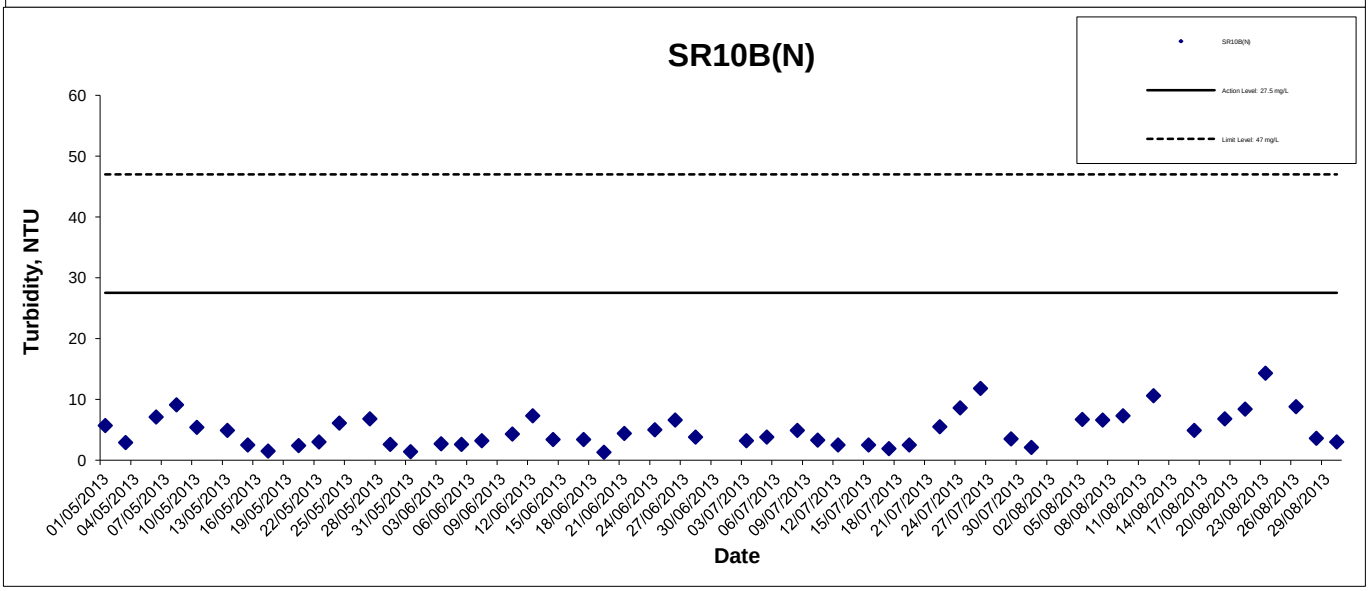




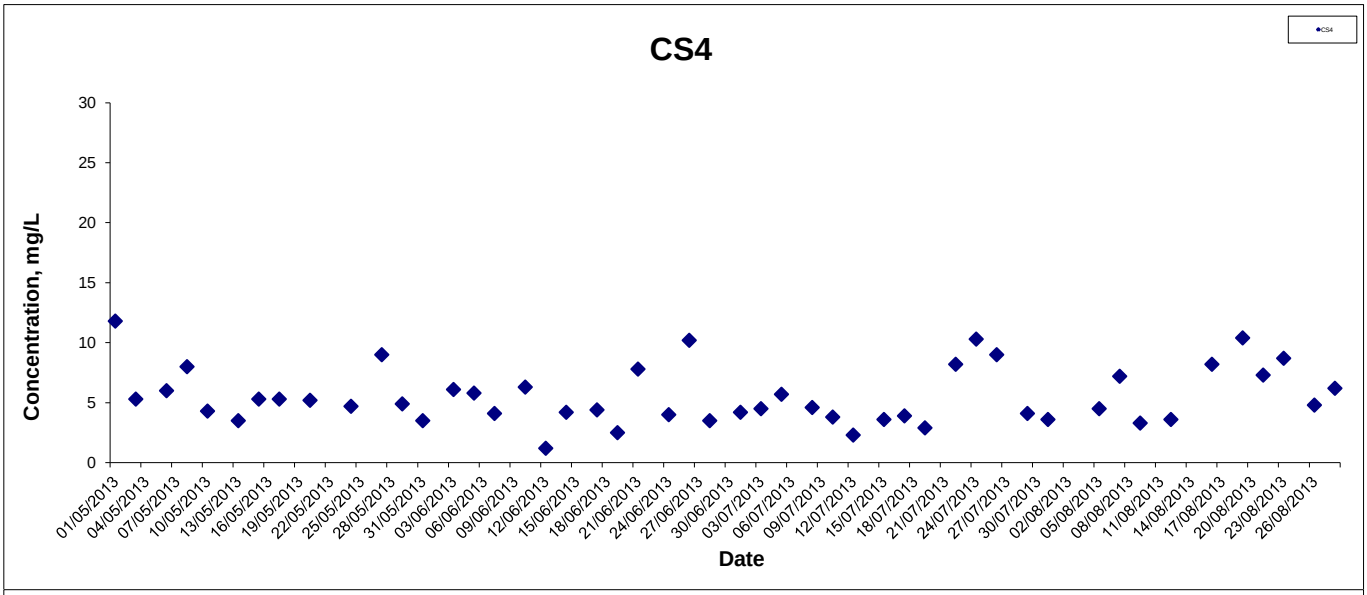
Turbidity at Mid-Flood Tide

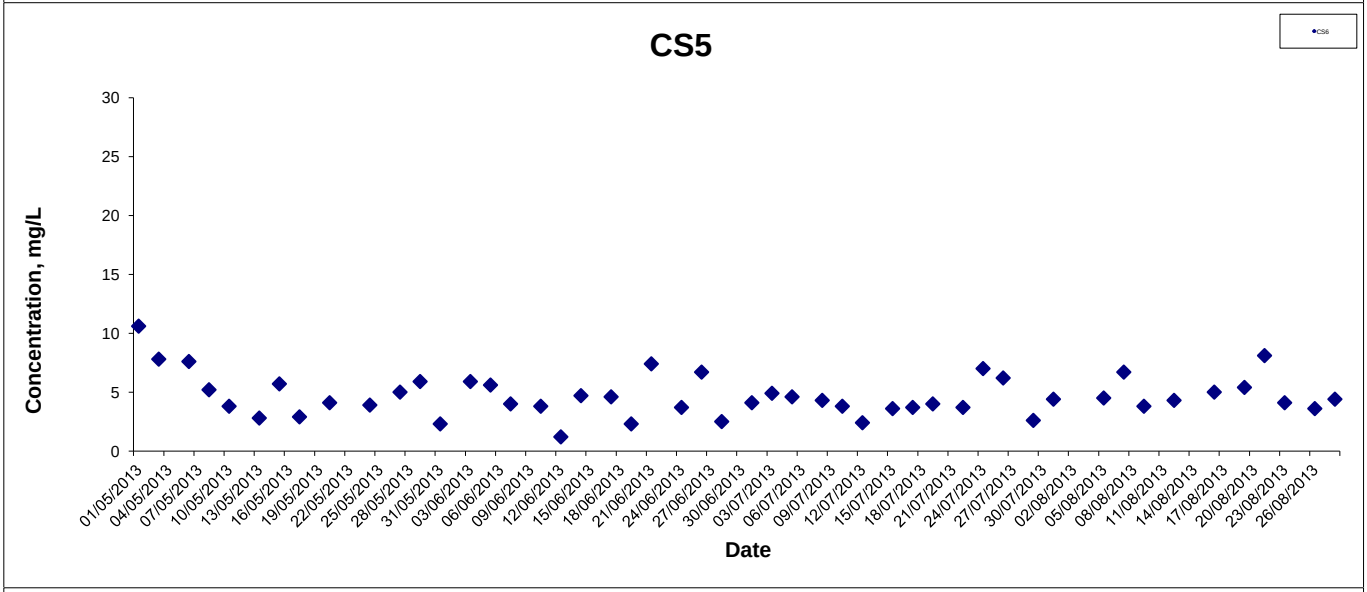


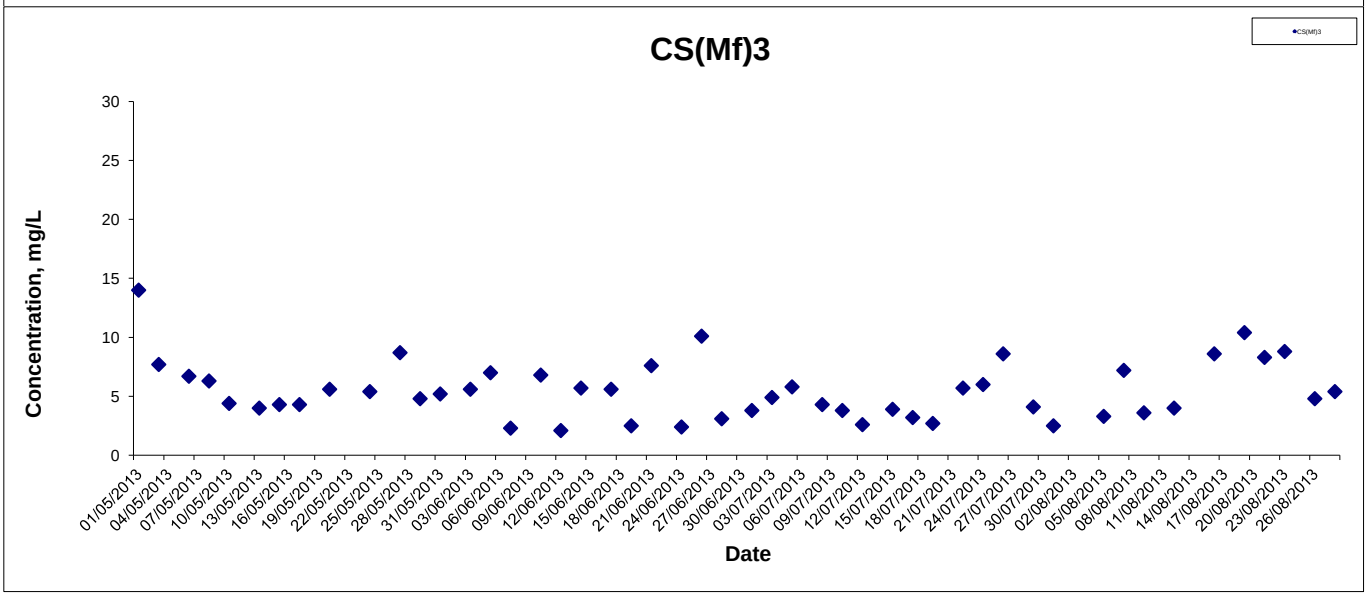




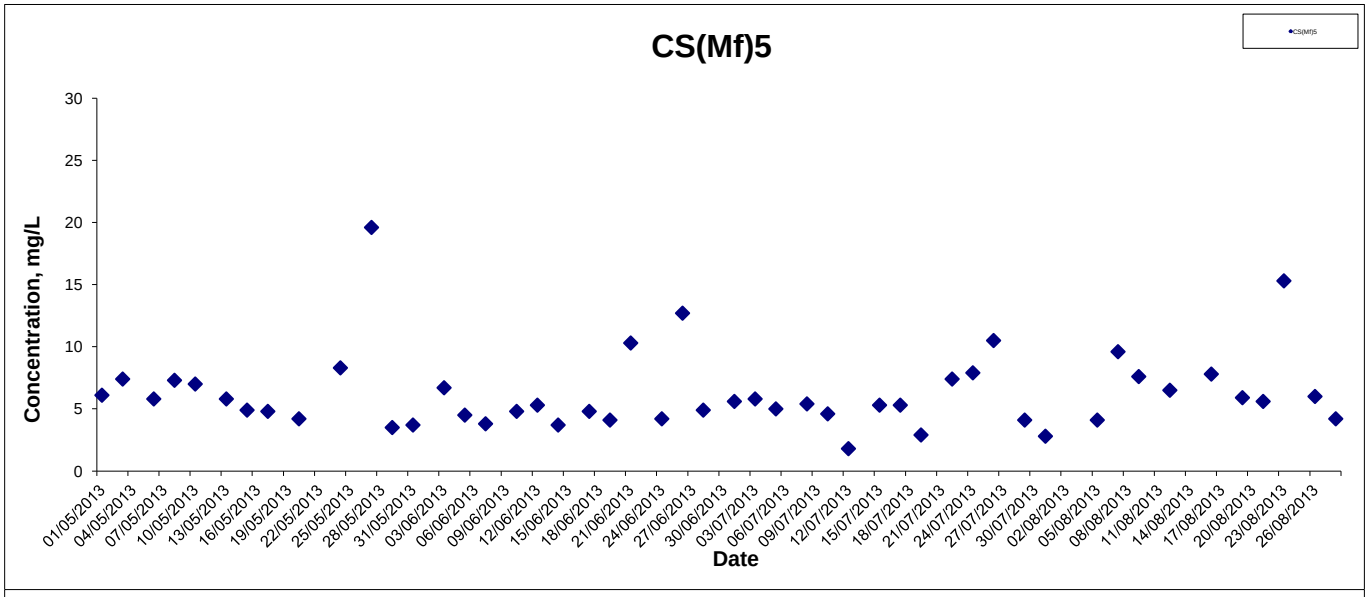
Suspended Solids at Mid-Ebb Tide

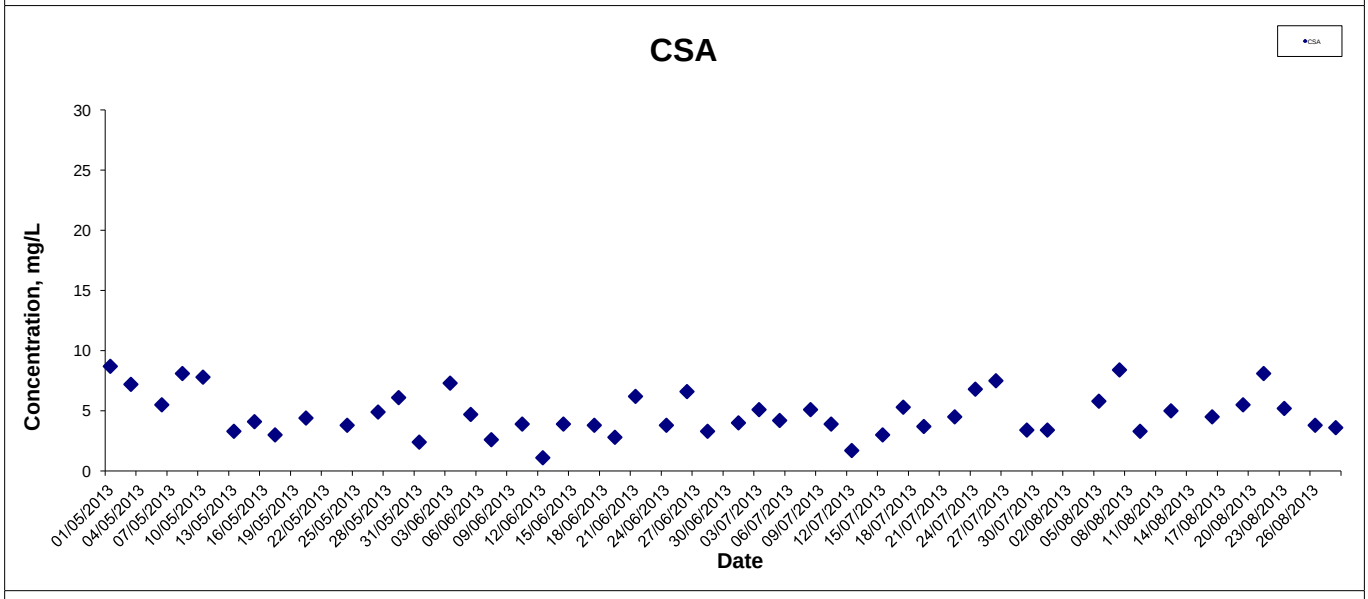


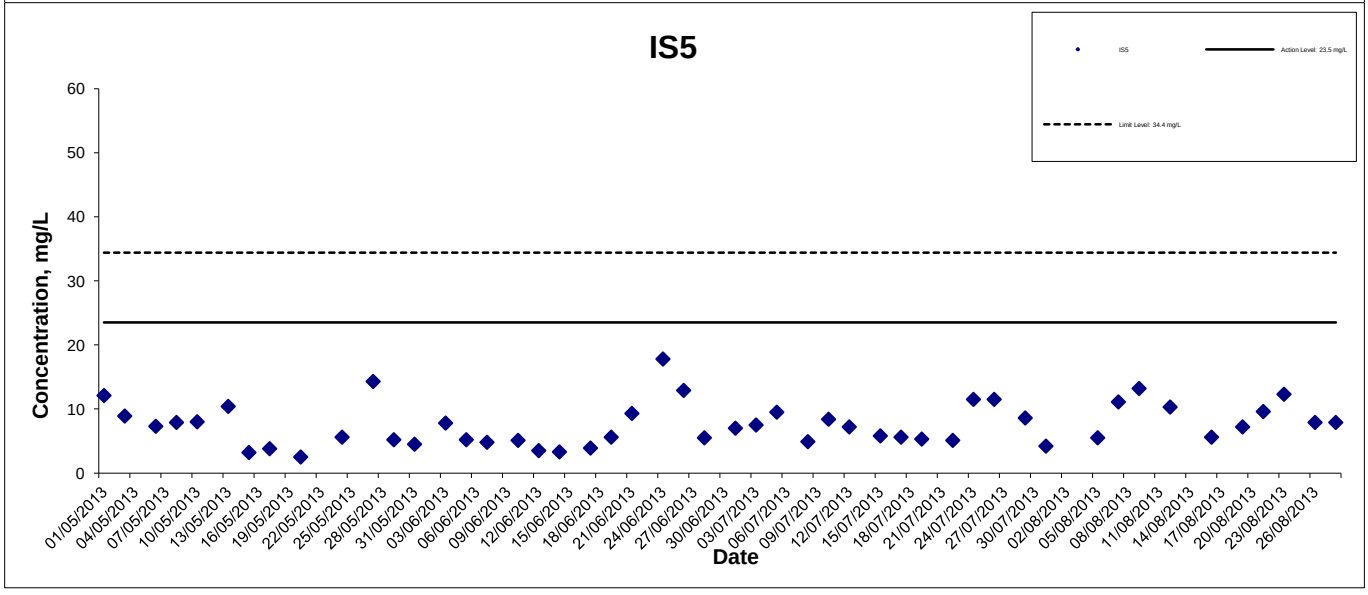




Suspended Solids at Mid-Ebb Tide







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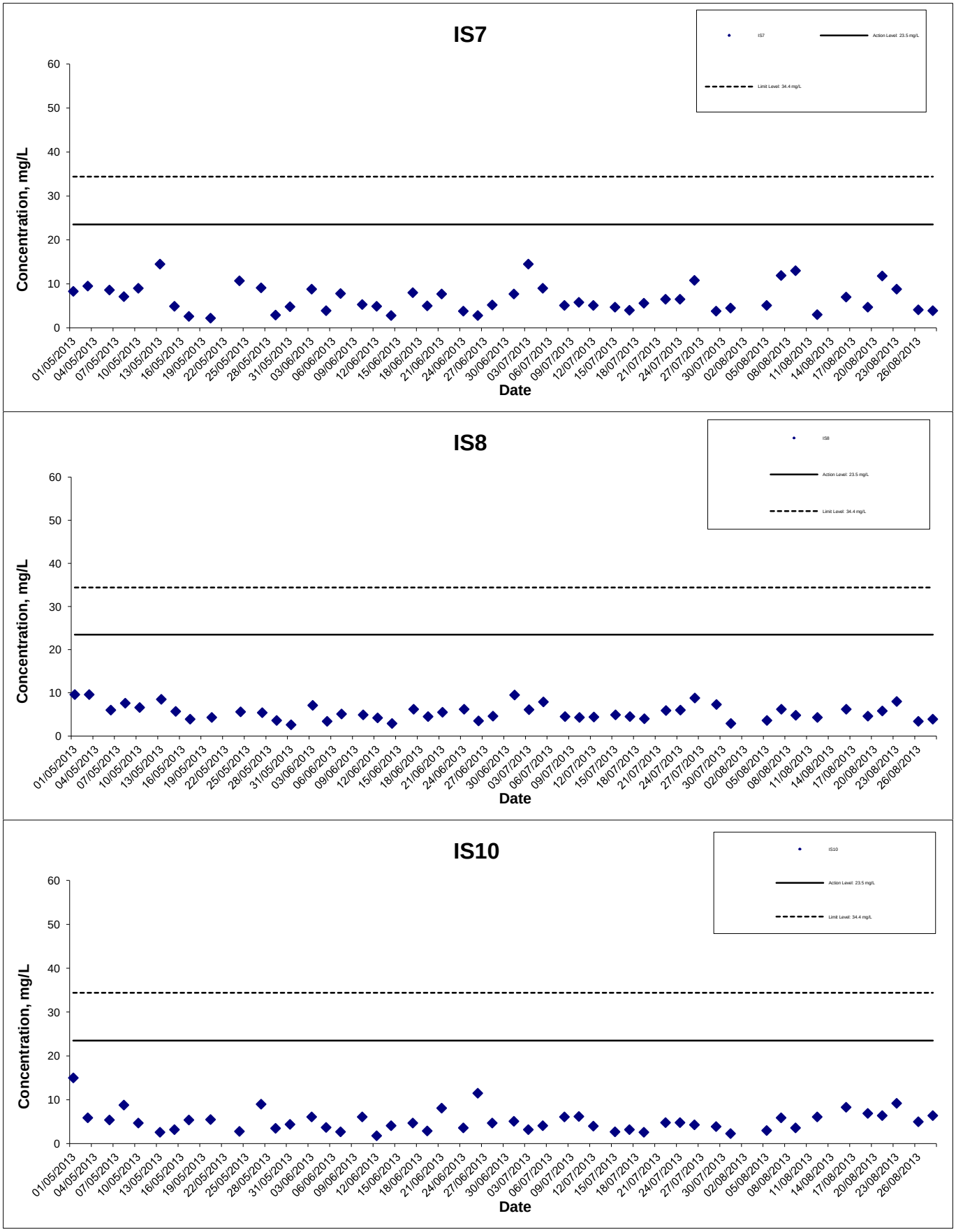
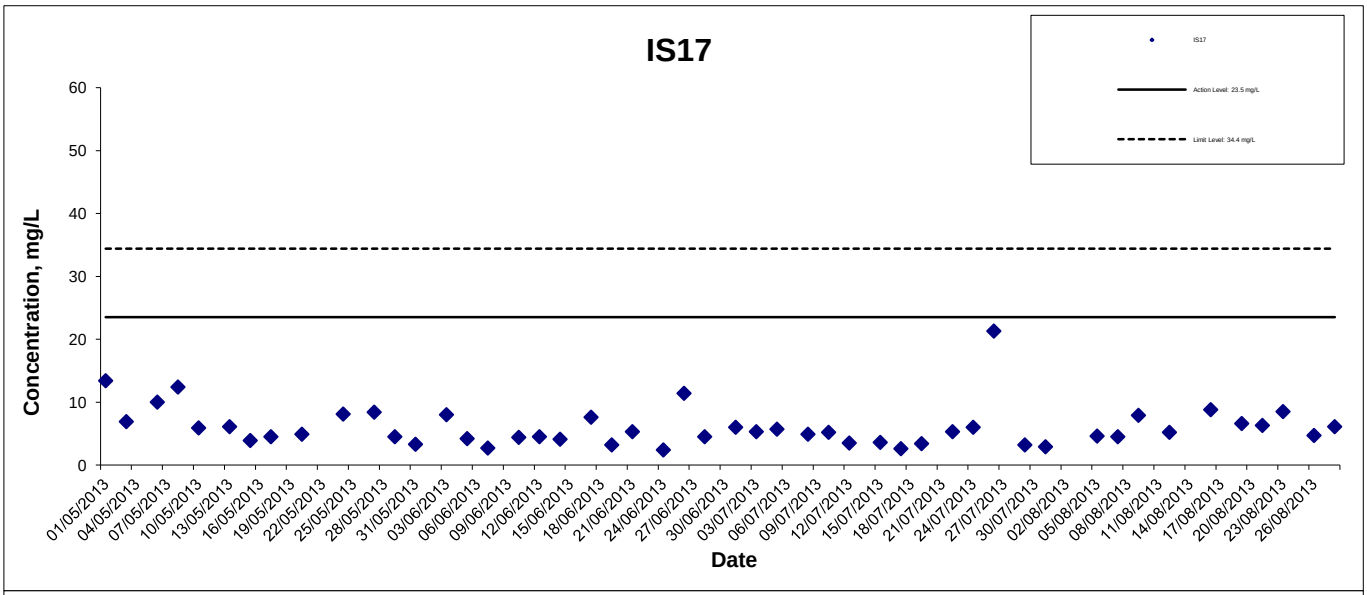
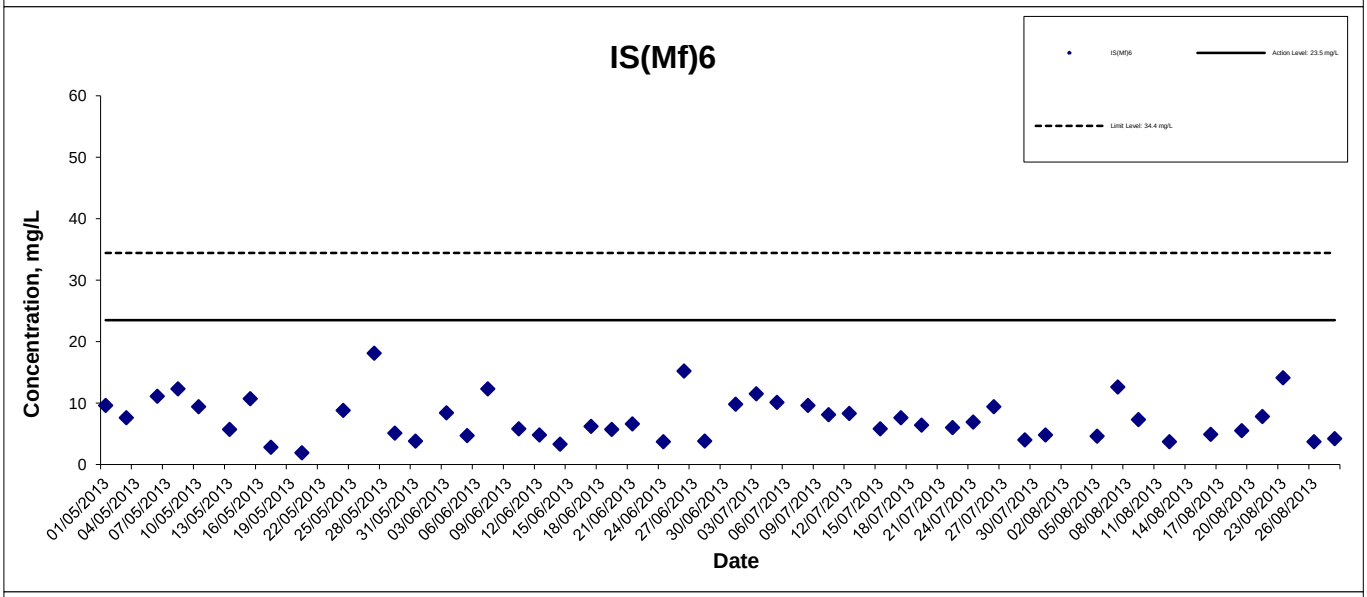
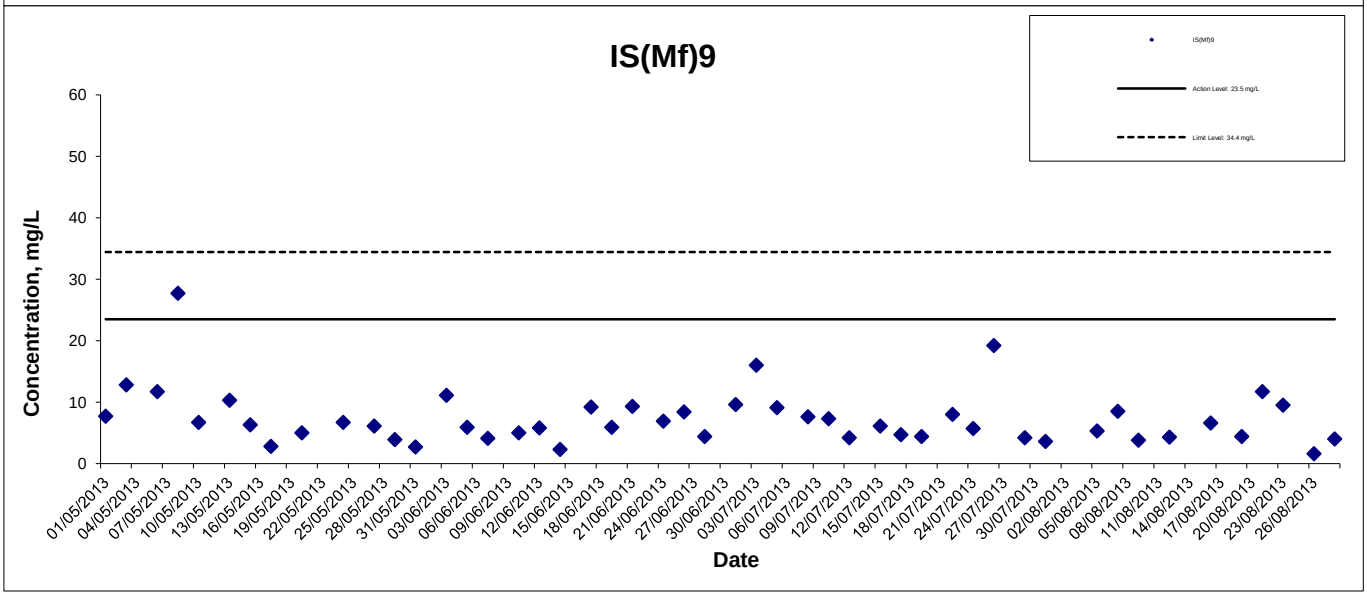


Suspended Solids at Mid-Ebb Tide







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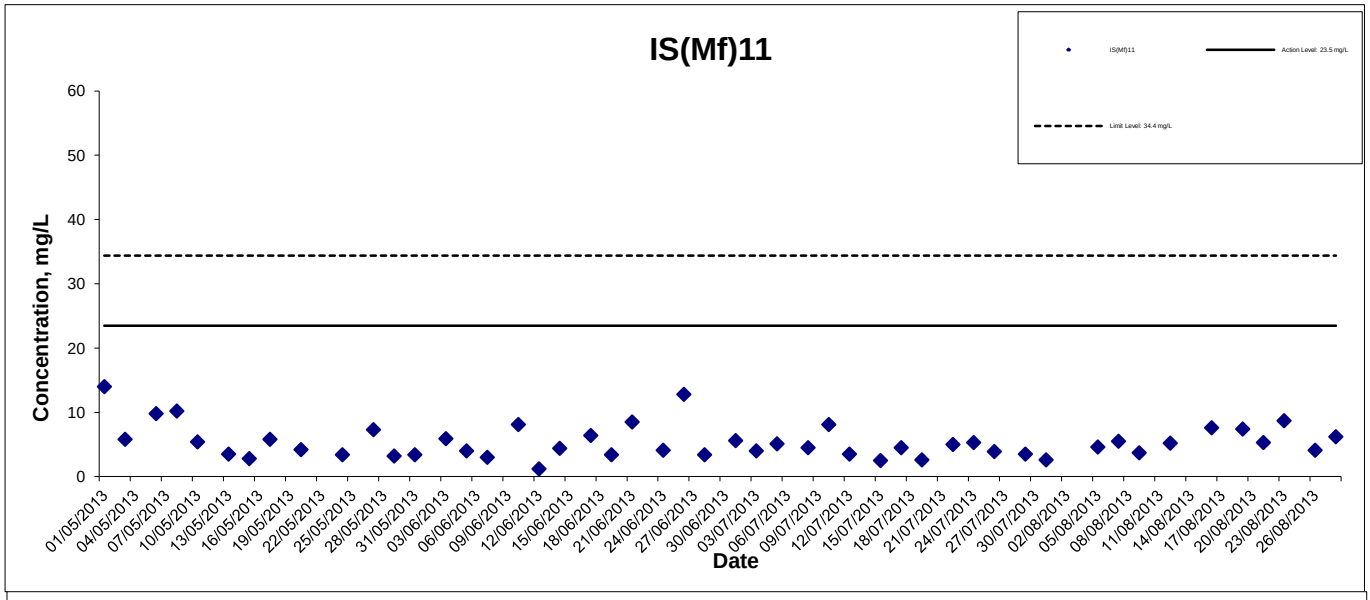
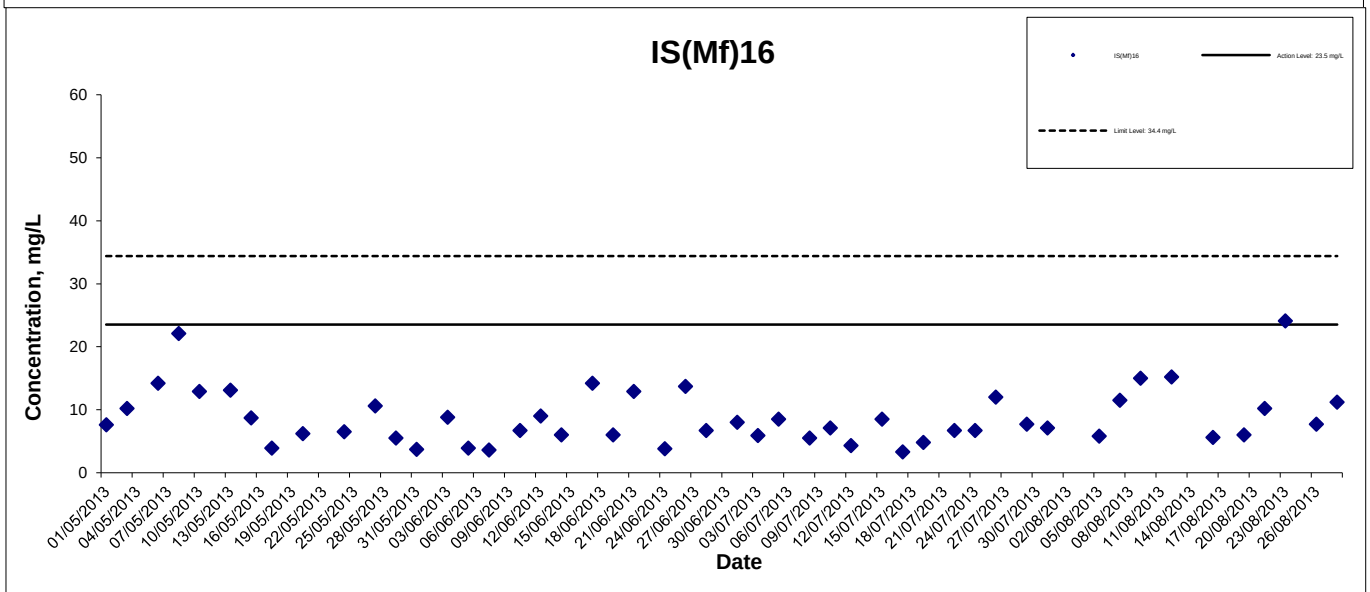
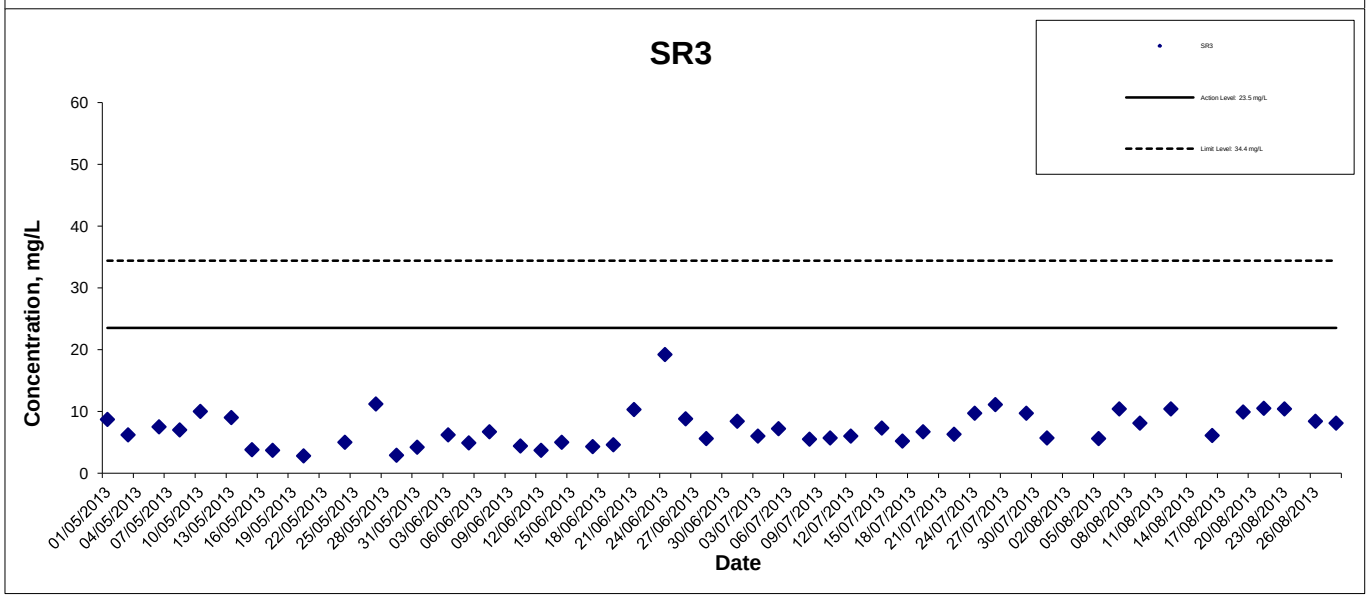
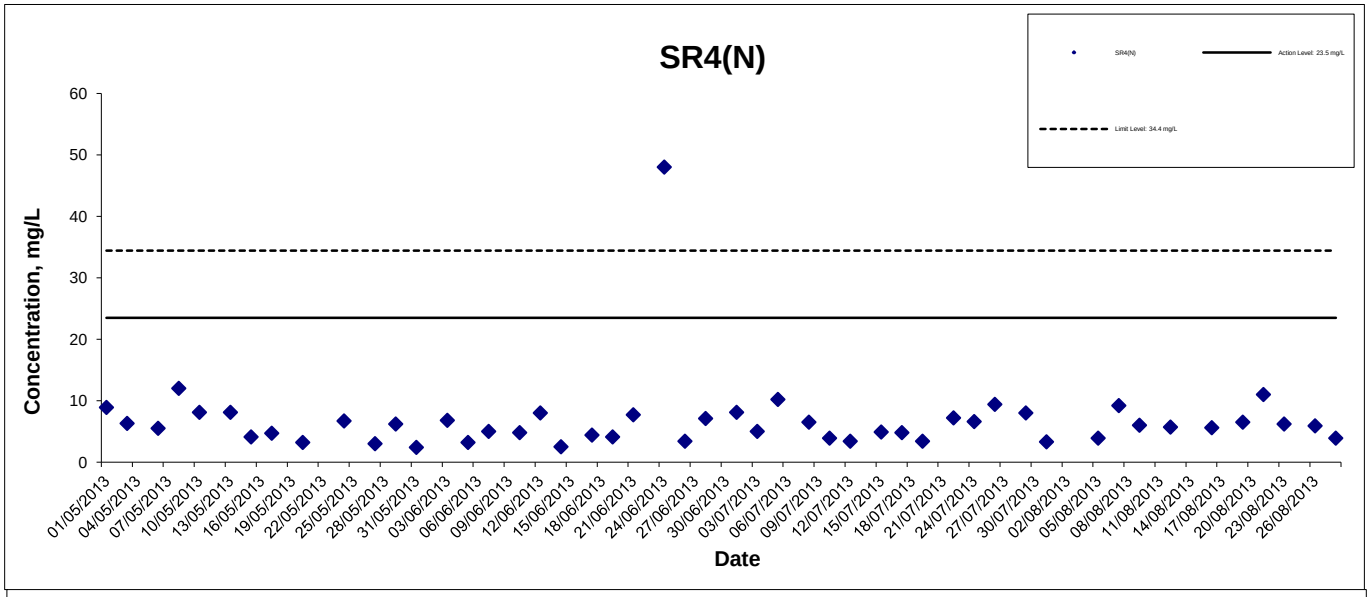
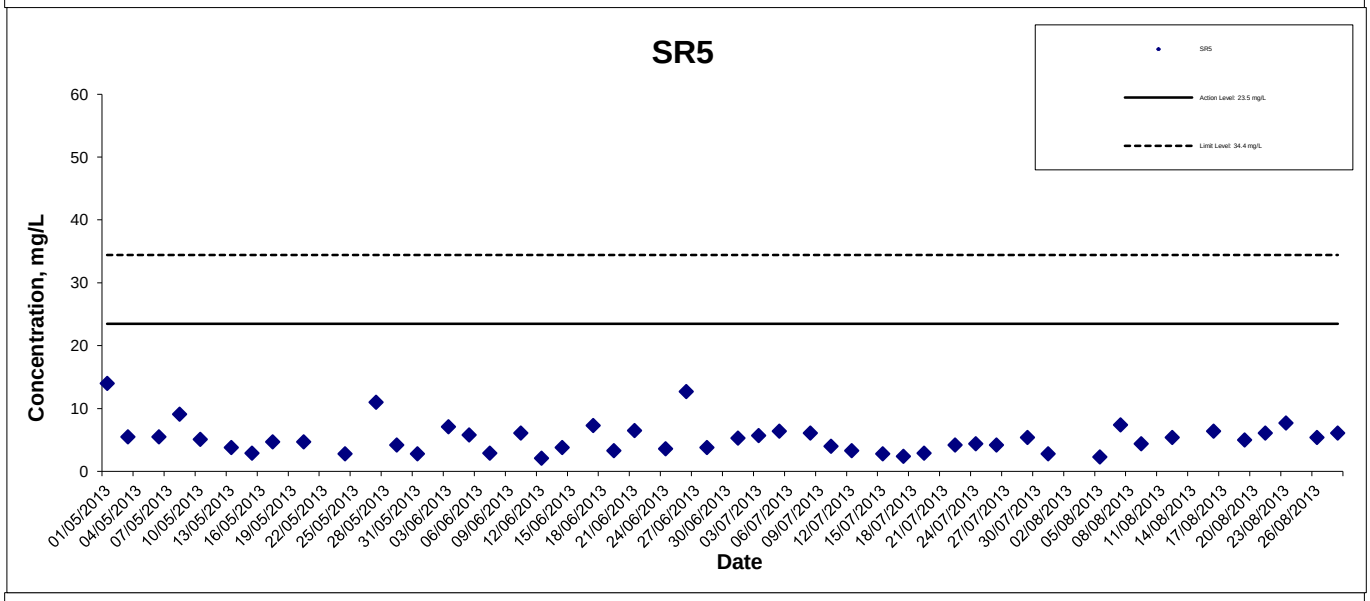


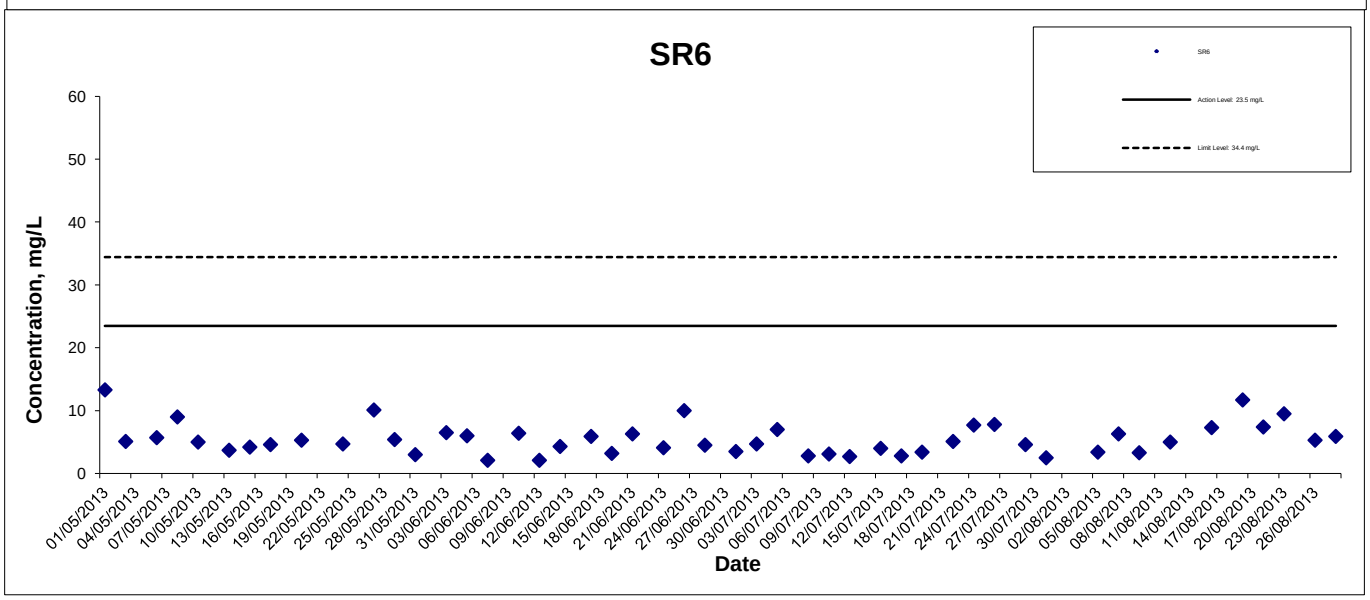




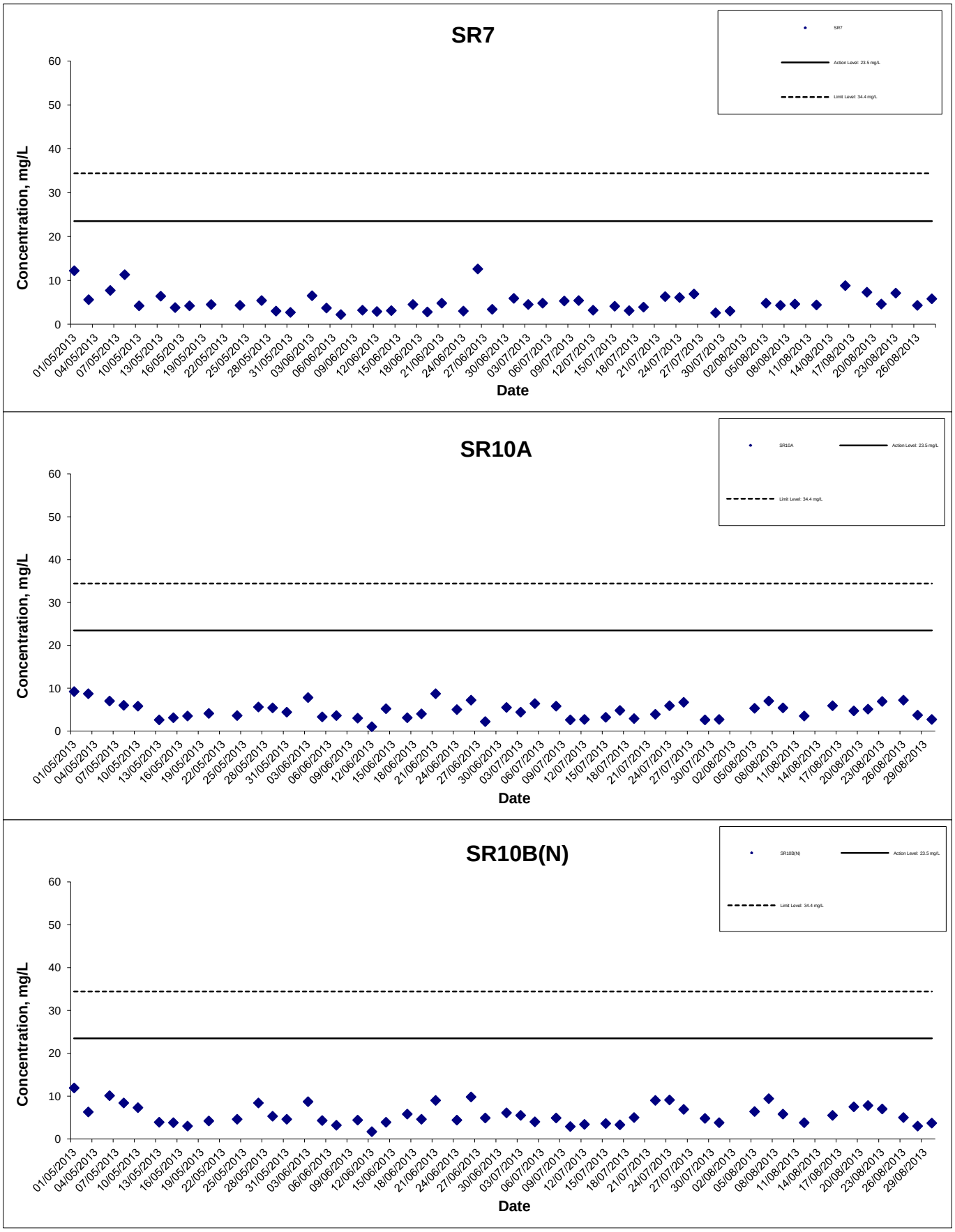
Suspended Solids at Mid-Ebb Tide



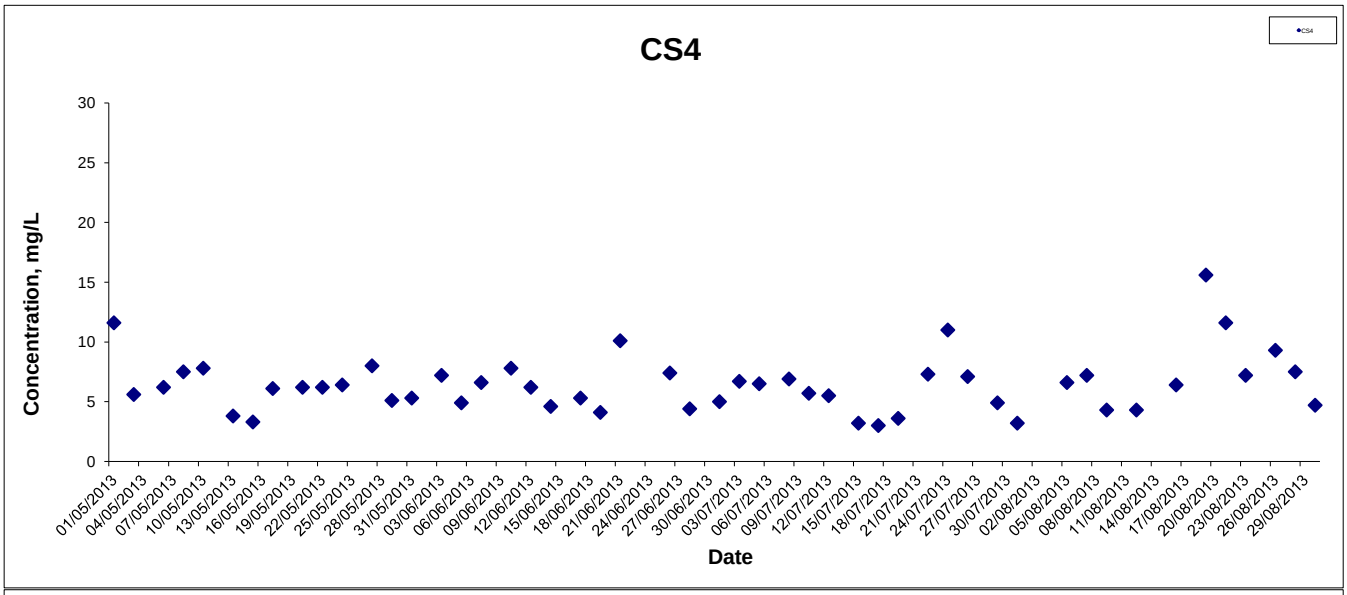


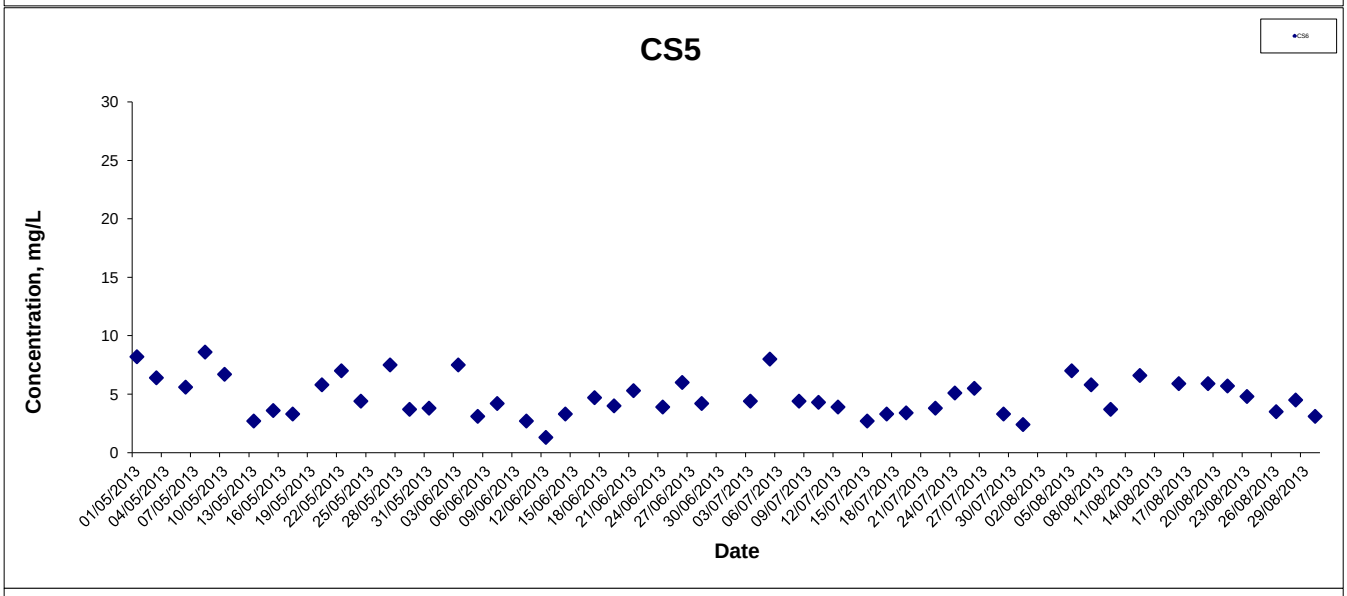


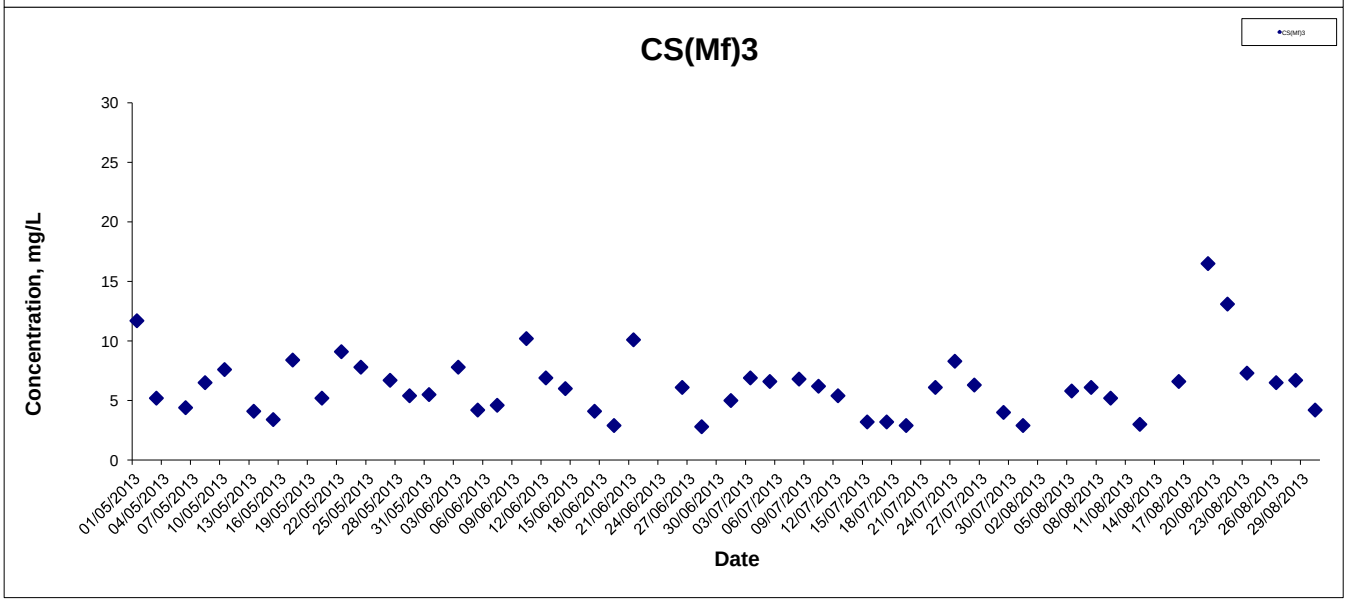
Suspended Solids at Mid-Ebb Tide



Suspended Solids at Mid-Flood Tide







HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

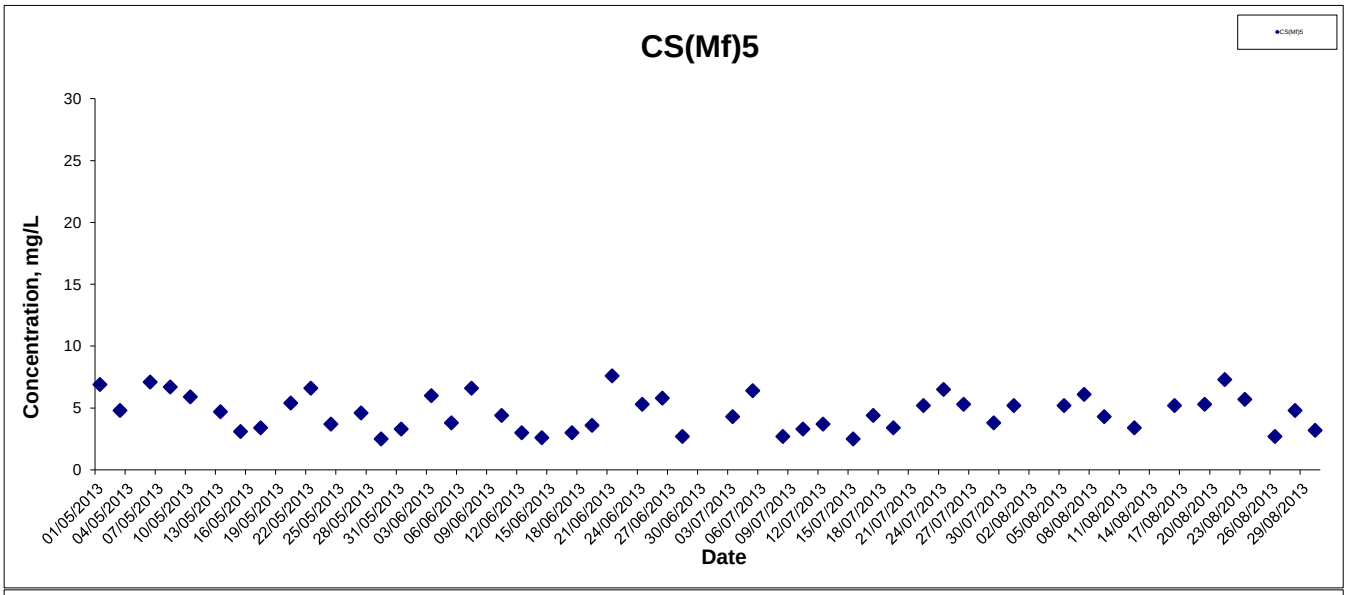
AECOM

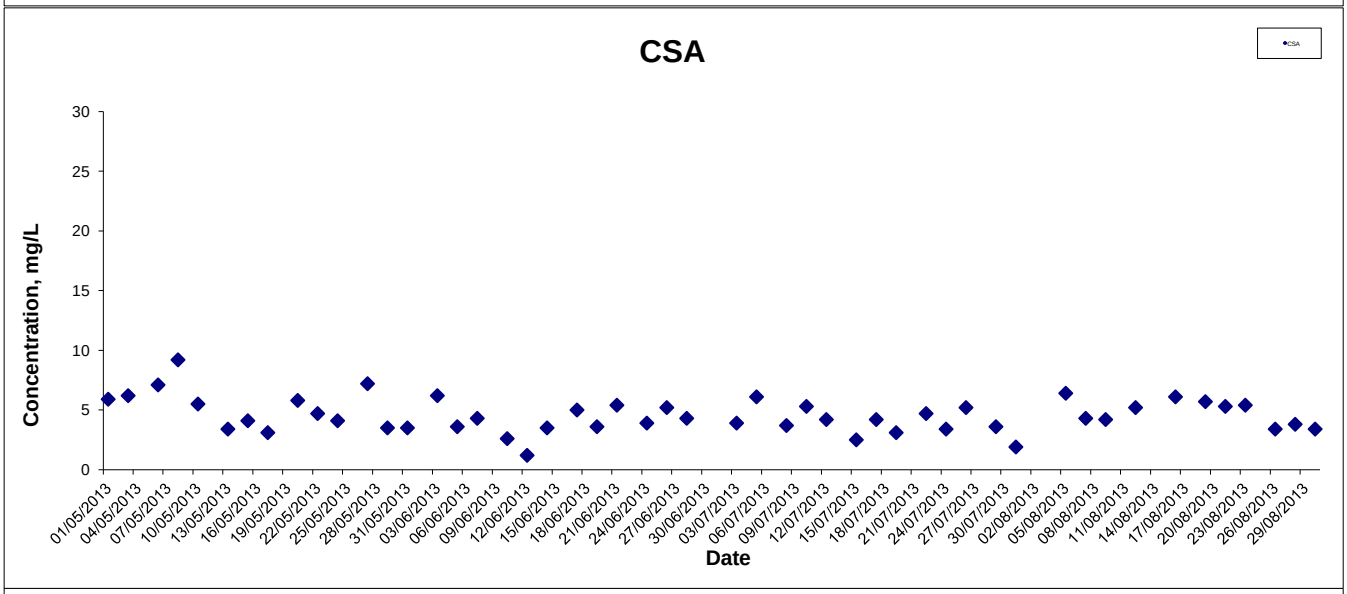
Graphical Presentation of Impact Water Quality Monitoring Results

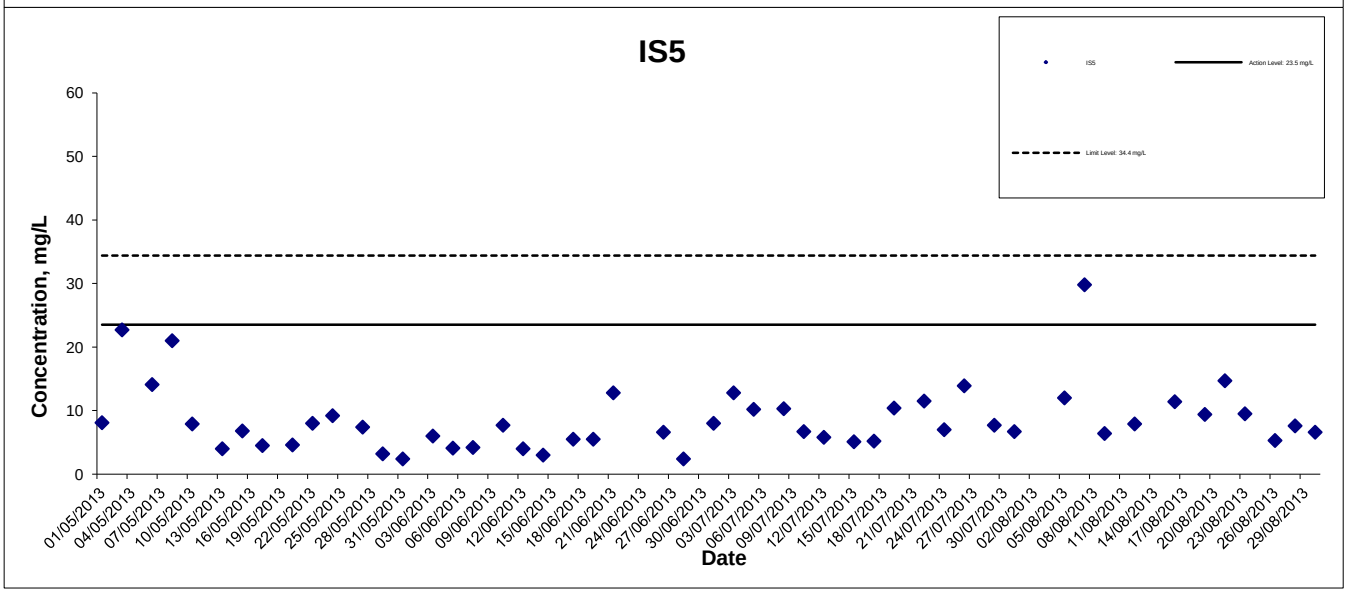
Project No.: 60249820 Date: Sep 2013

Appendix G

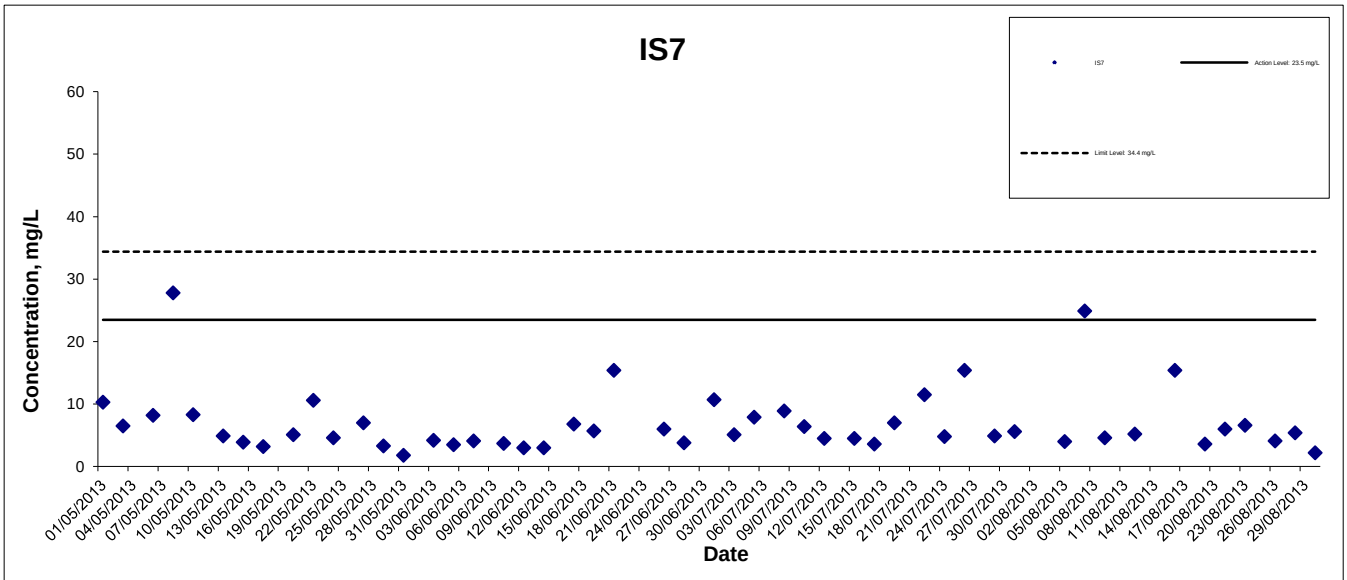
Suspended Solids at Mid-Flood Tide

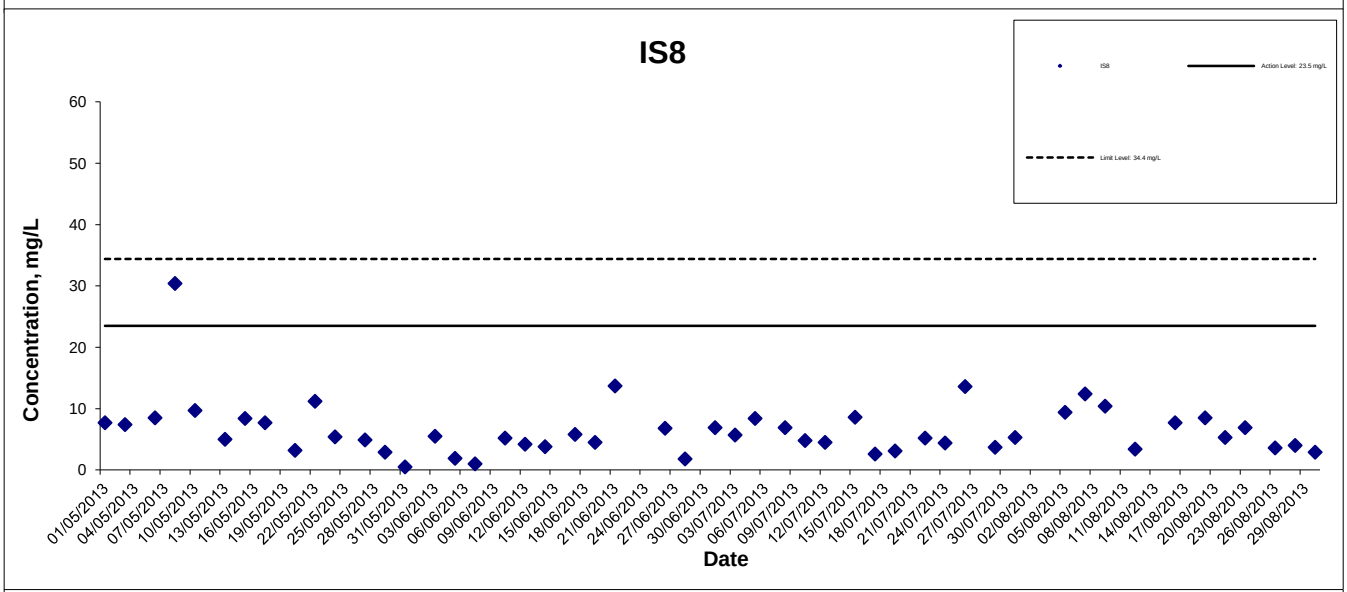


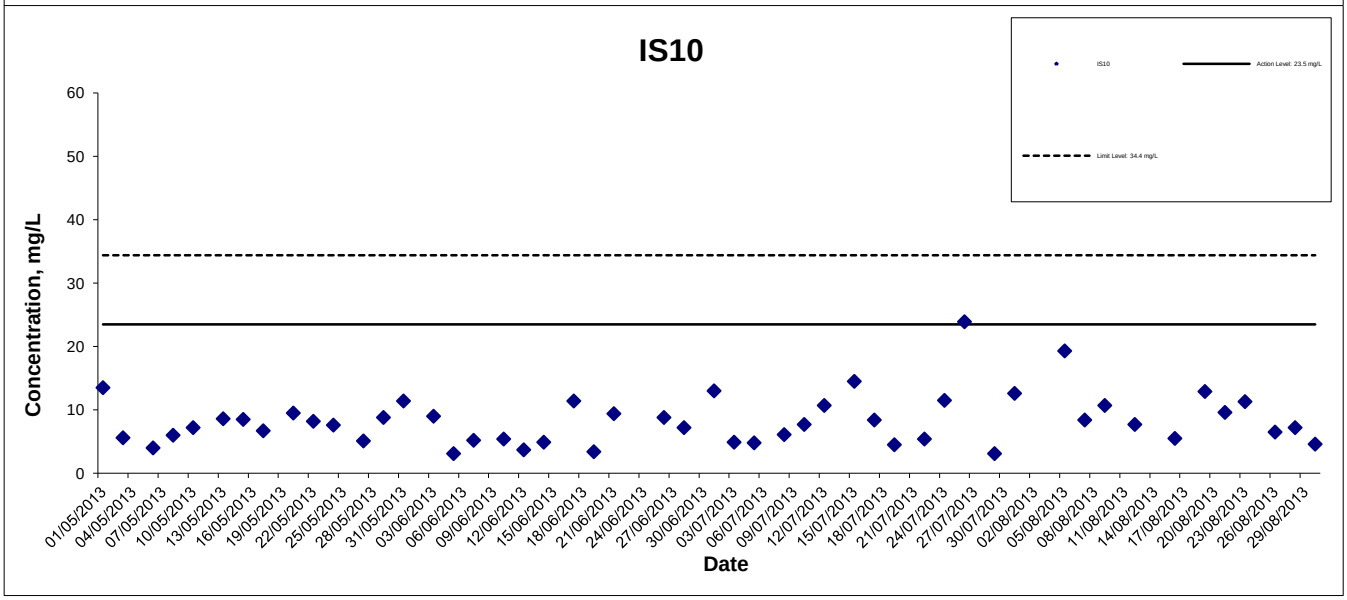




Suspended Solids at Mid-Flood Tide







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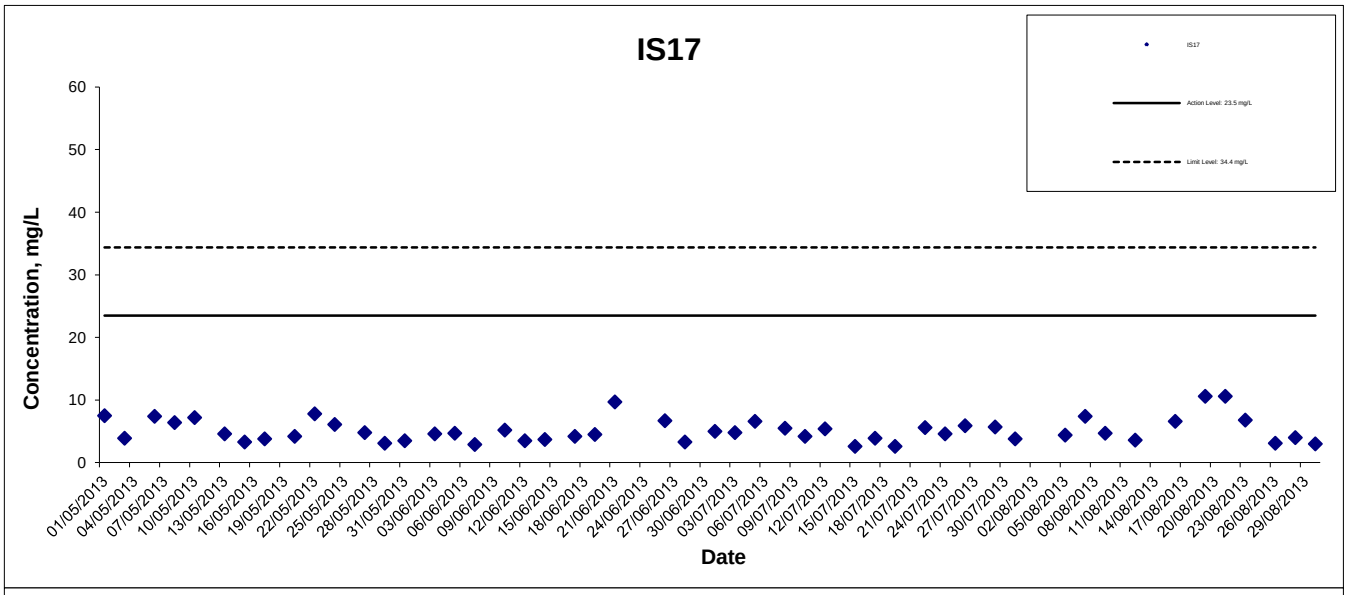
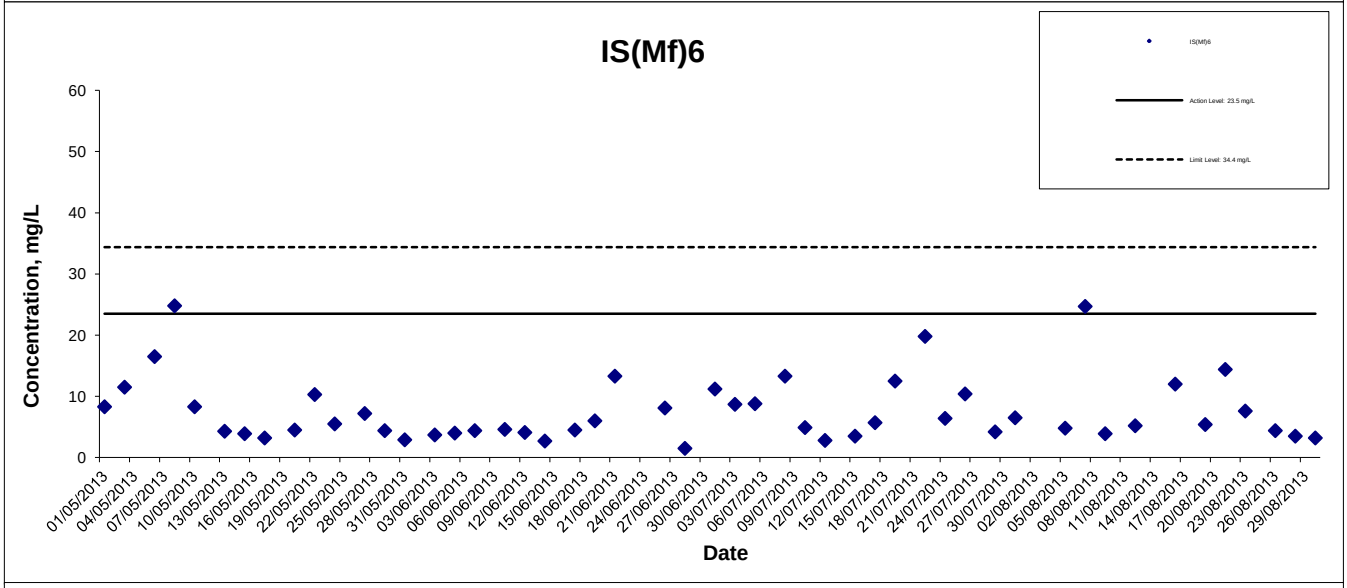
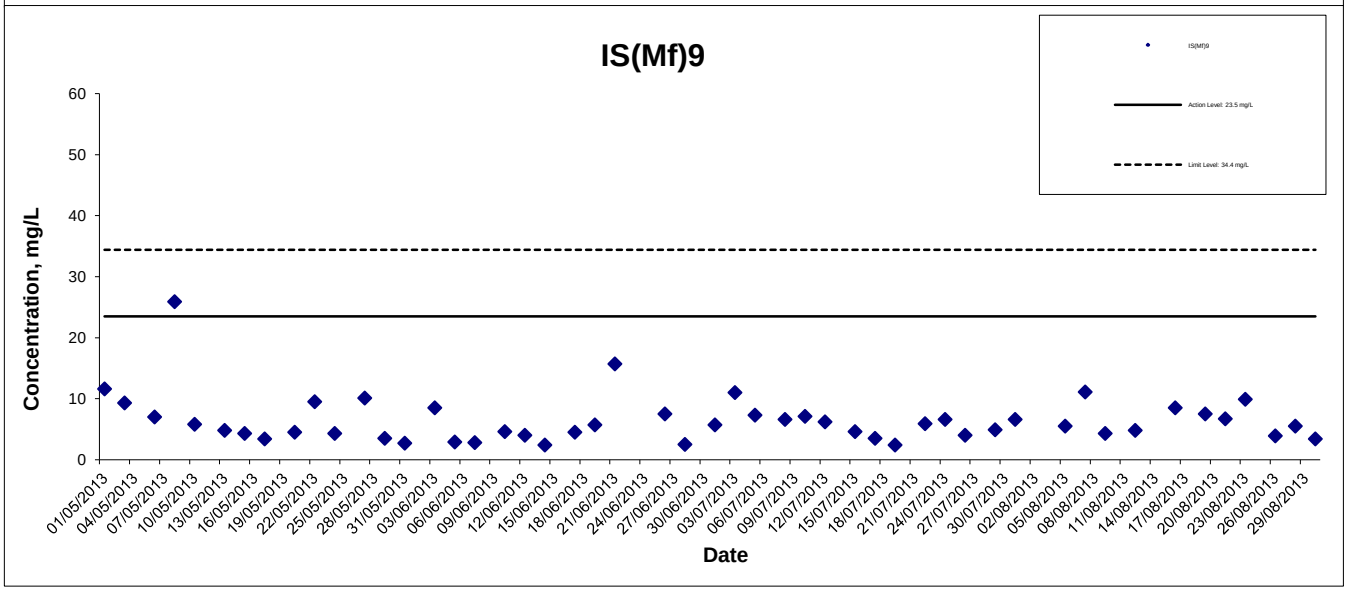
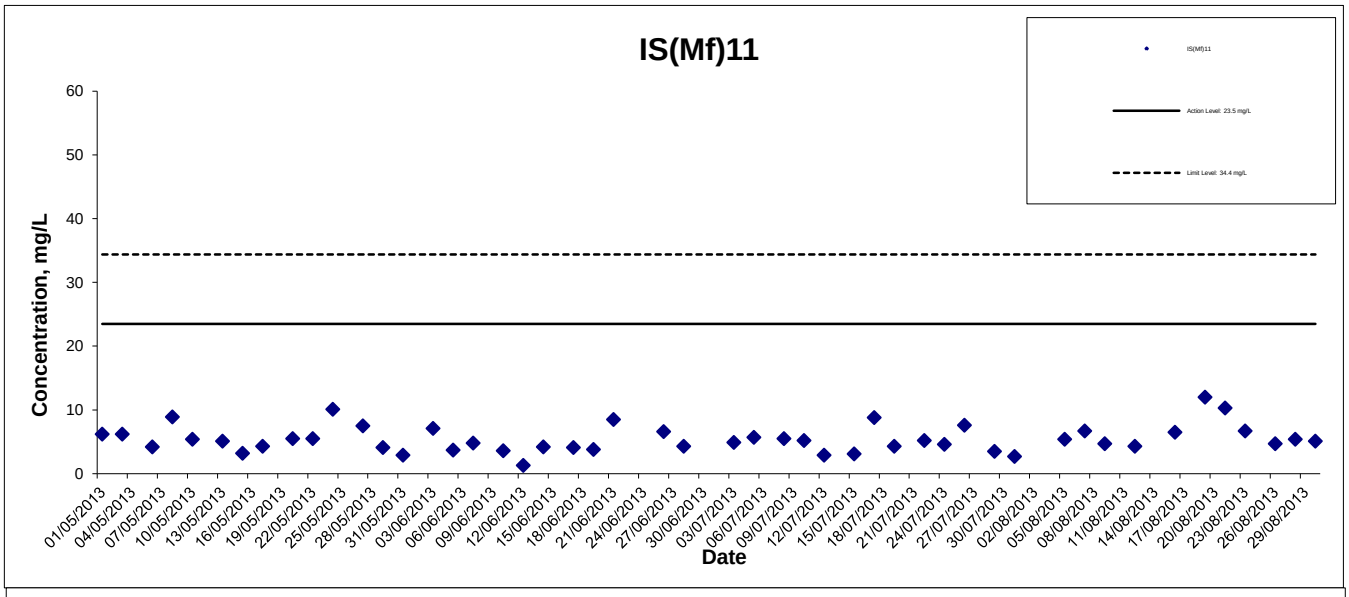
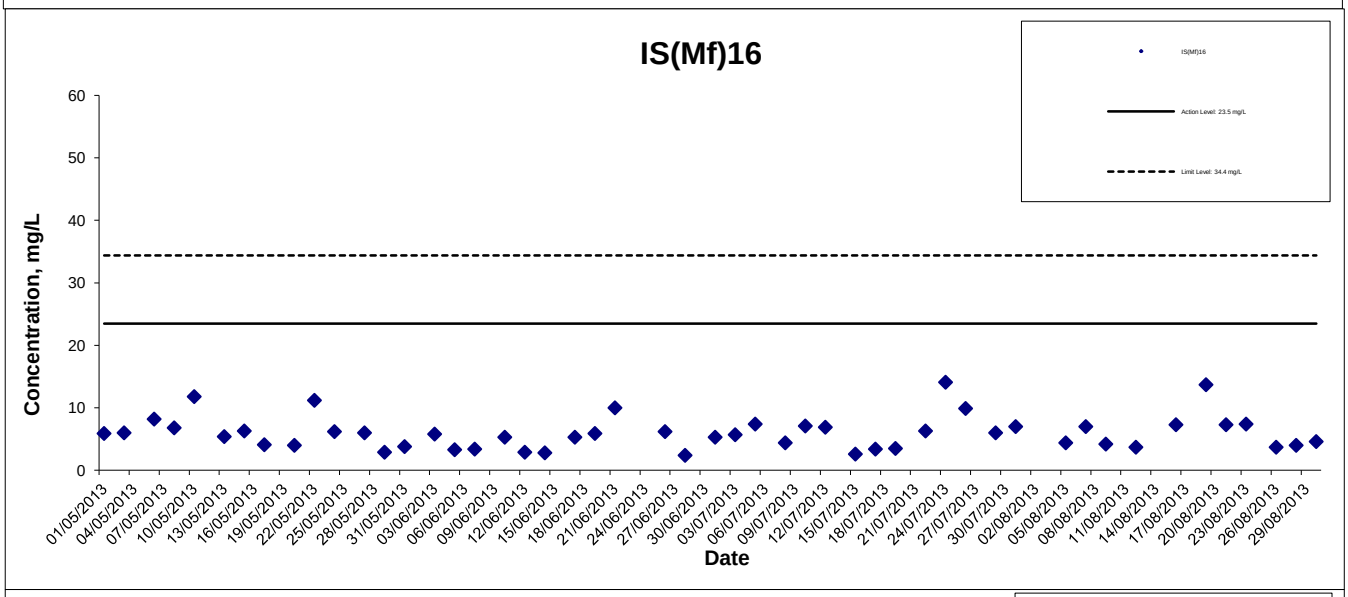


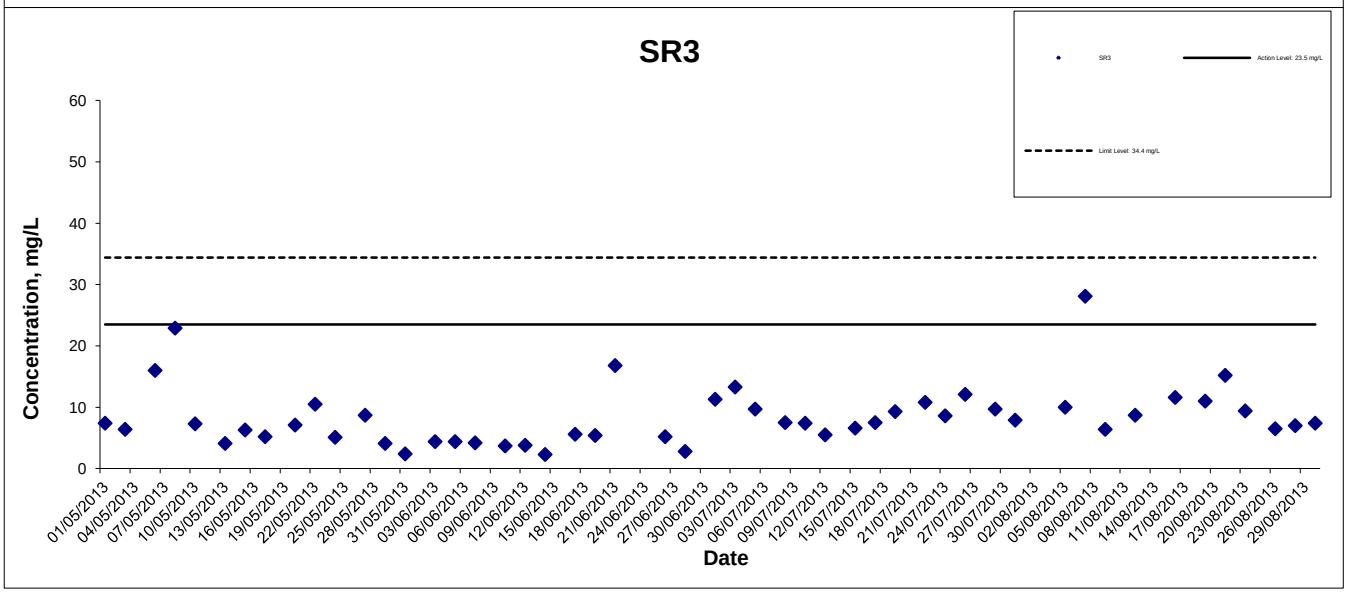




Suspended Solids at Mid-Flood Tide







HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

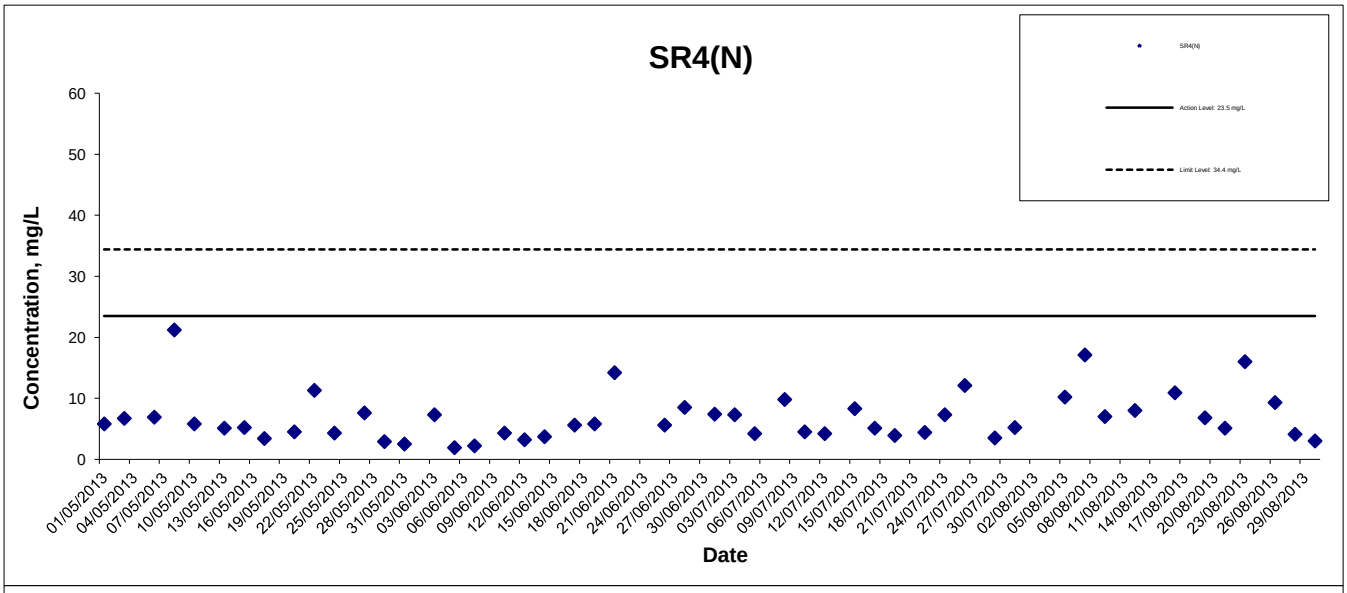
AECOM

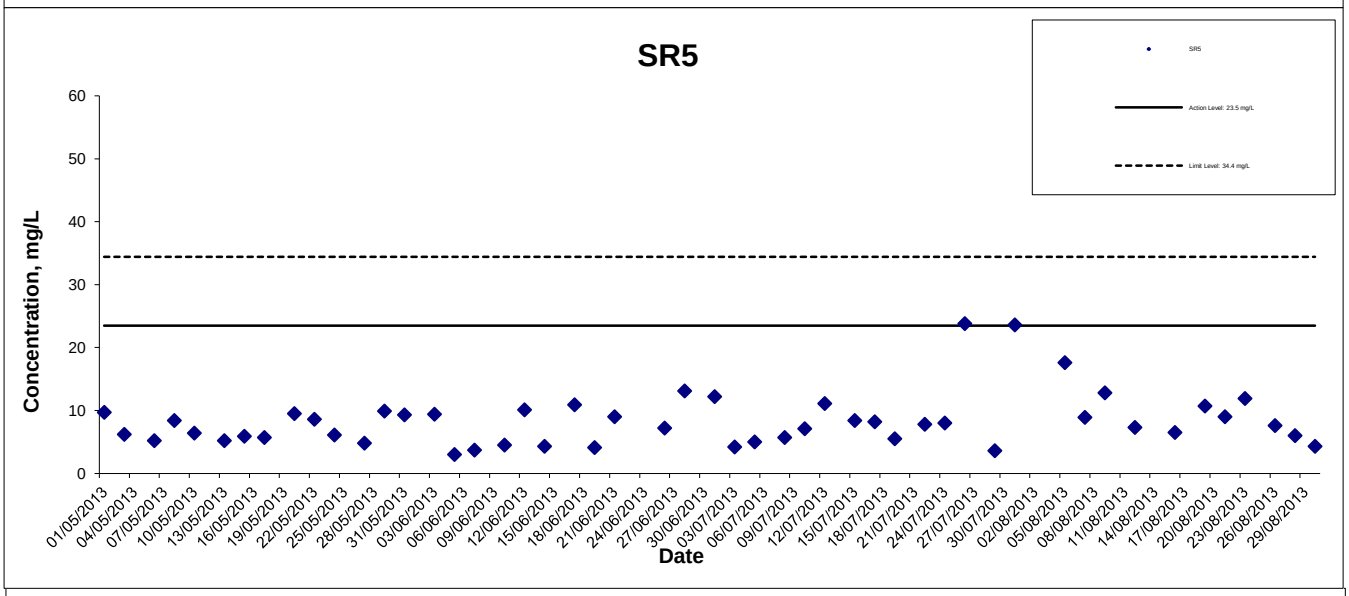
Graphical Presentation of Impact Water Quality Monitoring Results

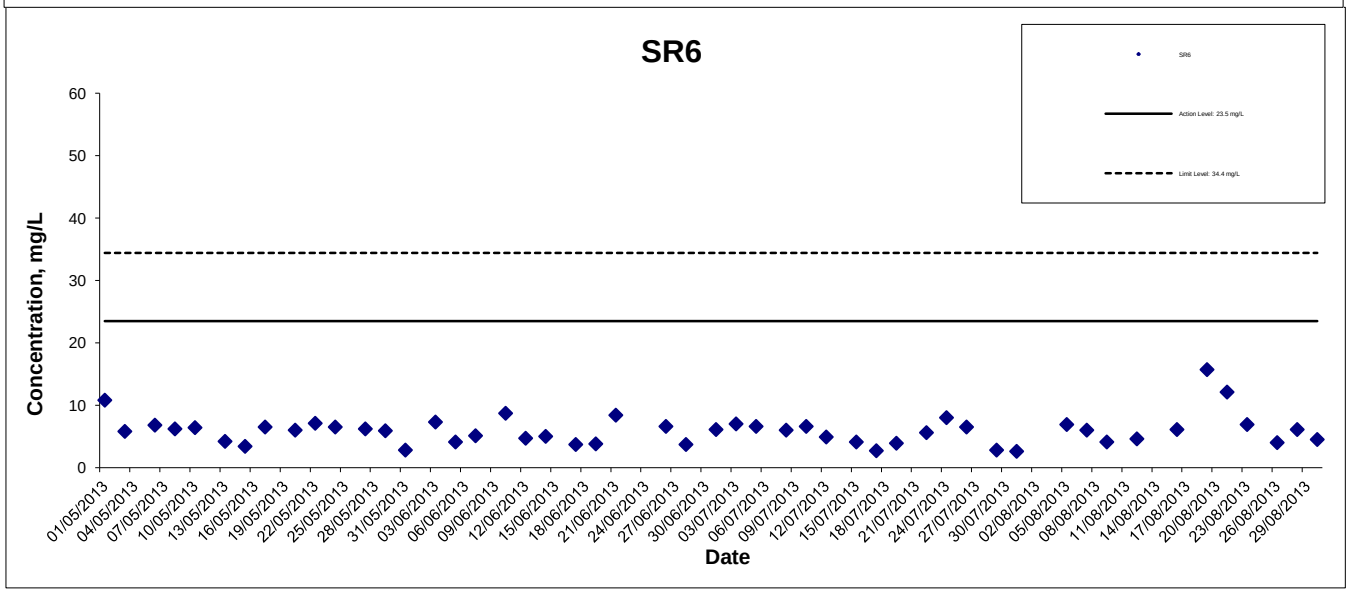
Project No.: 60249820 **Date: Sep 2013**

Appendix G

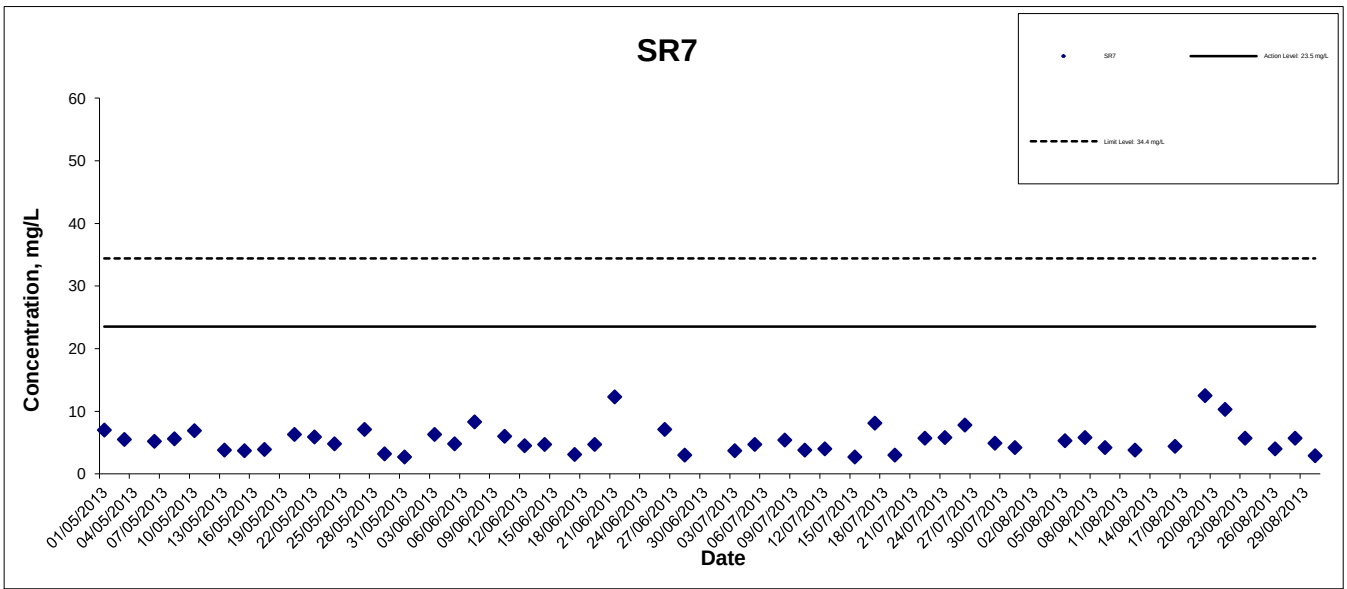
Suspended Solids at Mid-Flood Tide

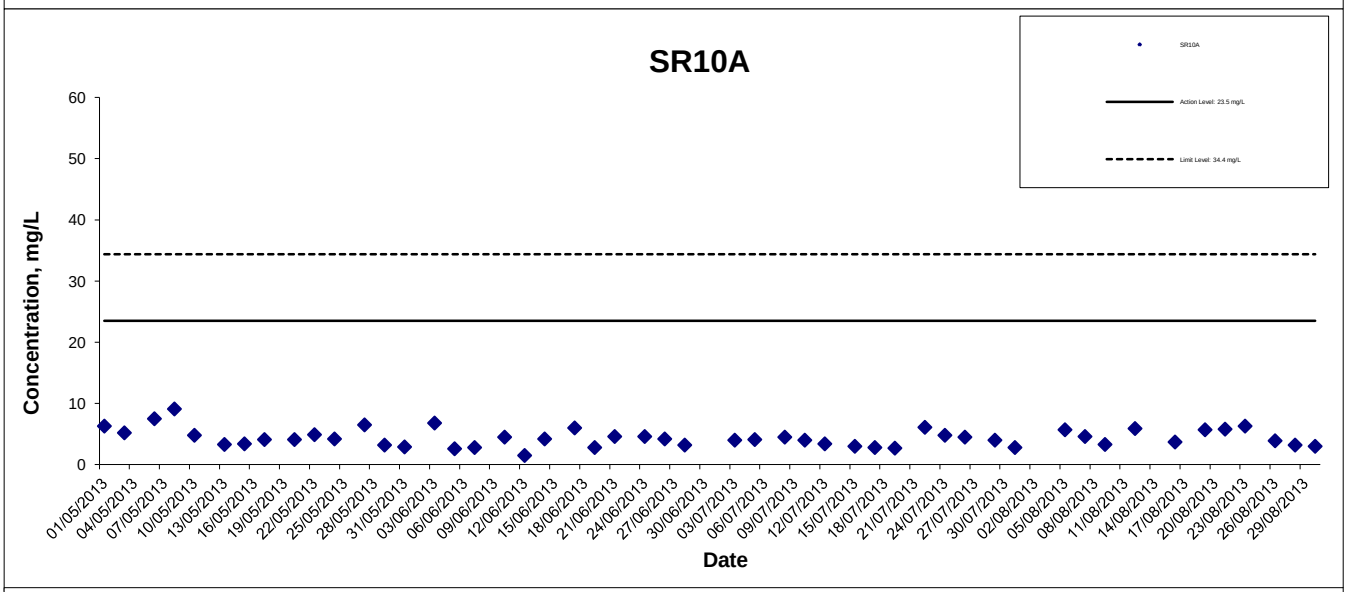


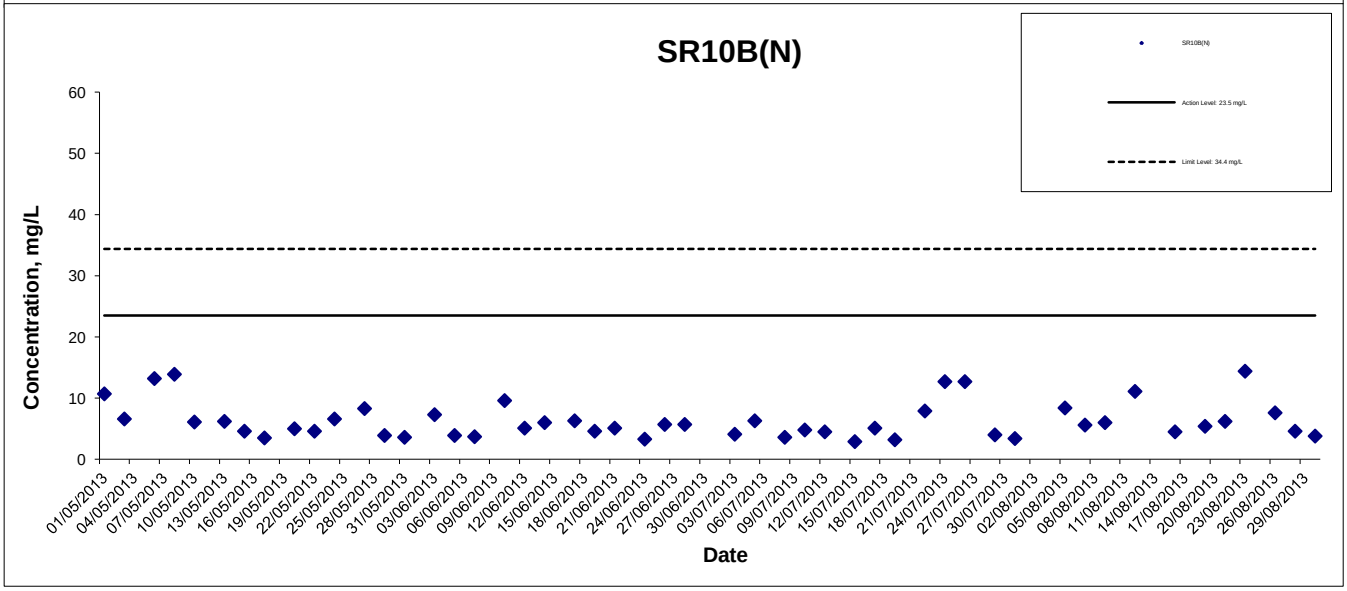




Suspended Solids at Mid-Flood Tide







APPENDIX H
IMPACT DOLPHIN MONITORING SURVEY FINDINGS AND ANALYSIS

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities-Reclamation Works

June - August 2013
Quarterly Report

Dolphin Impact Monitoring

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ANNEXES

1. Introduction

In March 2012, construction for the Hong Kong-Zhuhai-Macao Bridge (HZMB) began in Hong Kong territorial waters. In Hong Kong, the HZMB comprises three projects; the Hong Kong Boundary Crossing Facilities (HKBCF) Project; the Hong Kong Link Road (HKLR) Project and; the Tuen Mun-Chek Lap Kok Link (TM-CLKL) Project. The HKBCF, the first of the HZMB projects to commence in Hong Kong, requires the total reclamation of approximately 149 hectares (ha); which consists of 130 ha for the HKBCF artificial island and 19 ha for the TM-CLKL southern landfall (Fig. 1).

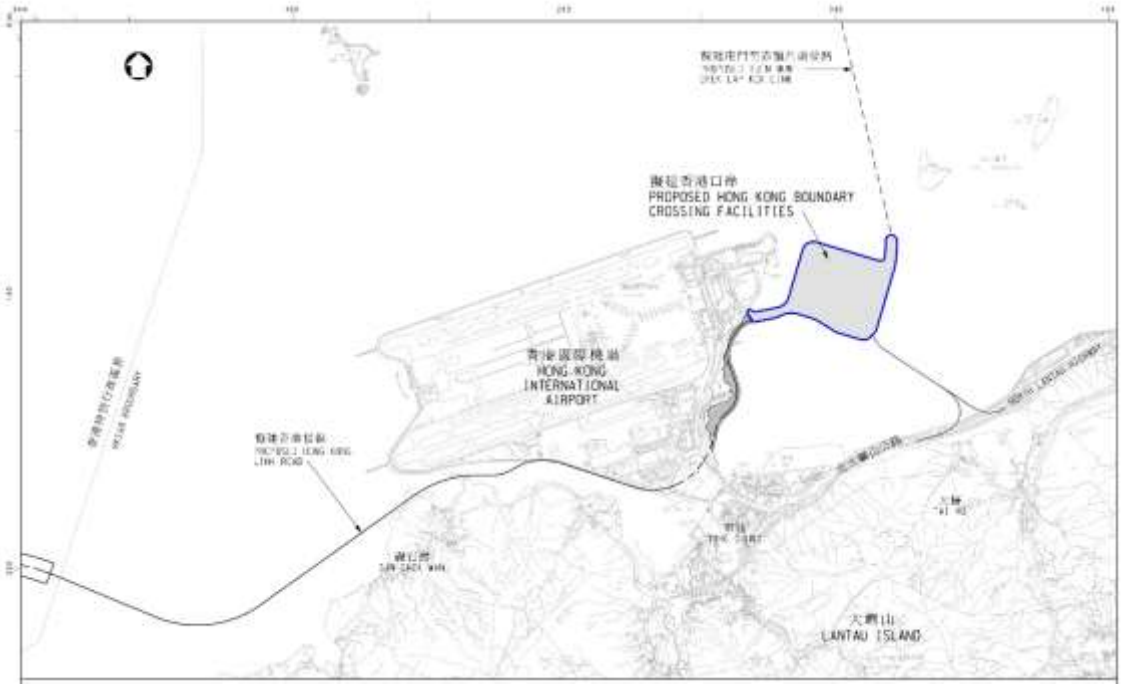

Figure 1. The Hong Kong Boundary Crossing (HKBCF) Reclamation Sites, North Lantau, Hong Kong (http://www.hzmb.hk/eng/img/overview/about_overview03_p01l.jpg**)**

The EM&A Manuals and Environmental Permits (EP) associated with all three projects have special provision for Chinese white dolphins (CWD) as they occur regularly in the waters which will be affected by the HZMB development. This report comprises the sixth quarterly (June-August 2013) summary of data associated with the impact monitoring conducted for contract HY/2010/02, HKBCF-Reclamation Works. The format of this report follows as closely as possible the outline provided for the Baseline Monitoring Report. The baseline monitoring was conducted during a different period from this quarter September to November (in 2011) and is thus not directly comparable as the there is a documented seasonal variation of habitat use and behaviour within the Hong Kong habitat. Where appropriate, information from previous reports, data provided by the Hong Kong Highways Department (HyD) and data from the Agriculture, Fisheries and Conservation Department (AFCD) Marine Mammal Annual Monitoring reports have also been incorporated[1]

[1]http://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/con_mar_chi_chi.html

2. OBJECTIVES AND METHODOLOGY

2.1. Objectives of the Present Study

The EM&A Manual for HZMB states that "A dolphin monitoring programme at North Lantau and West Lantau waters, in particular the dolphin sighting hotspots (e.g. Brothers Islands) and areas where juveniles have been sighted (e.g. West Lantau waters), should be set up to verify the predictions of impacts and to ensure that there are no unforeseen impacts on the dolphin population during construction phase". For HKBCF the study area known as West Lantau was not included in the site specific EM&A Manual for construction phase survey work. As such, for HKBCF, vessel-based dolphin surveys to monitor impact are conducted in the areas known as Northeast Lantau (NEL) and Northwest Lantau (NWL). These surveys are conducted twice monthly and for the duration of the construction phase of HKBCF. The HZMB baseline study (incorporating HKBCF, TM-CLK and HKLR phases of the bridge development), indicates that the data gathered from these surveys are intended to monitor impacts by;

providing ongoing assessment of the spatial and temporal distribution patterns and habitat use of CWD during the construction phase of the HKBCF project.

identifying individual CWD by their natural marks, coloration and scars for comparison with the baseline data and to assess individual distribution patterns and habitat use.

comparing impact survey data to that gathered during the baseline data period so that any changes deemed to be of a significant nature can be assessed and mitigated appropriately.

The baseline monitoring report includes distribution analysis, encounter rate analysis, behavioural analysis, quantitative grid analysis and ranging pattern analysis. Protocols for data interpretation and analyses methods were provided in the baseline monitoring report.

2.2. Line-transect Vessel Surveys

The co-ordinates for the transect lines and layout map were provided by AFCD, however, these have been modified as the construction works at HKBCF has shortened one of the transect lines (Table 1; Figure 2). The study area now incorporates 23 transects (totalling ~111km) which are surveyed twice per month by boat. Line transect surveys should be conducted systematically and lines travelled in sequence (Buckland *et al* 2001). When the start of a transect line is reached, "on effort" survey begins. When the vessel is travelling between transect lines and to and from the study area, it is deemed to be "off effort". The transect line is surveyed at a speed of 7-8 knots (13-15 km/hr). During some periods, tide and current flow in the study site exceeds 7 knots and thus the vessel travels at the same speed as the current during these periods. A minimum of four marine mammal observers (MMOs) are present on each survey, rotating through four positions; observers (2), data recorder (1) and rest (1). Rotations occur every 30 minutes or at the end of dolphin sightings. The data recorder enters vessel effort, observer effort, weather and sightings information directly onto the programme Logger[2] and is not part of the observer team. This is not standard line transect survey procedure, however, the baseline study was conducted this way thus it has been requested that only two observers be used for impact surveys.

[2] Logger is purpose built software which automatically collects and stores GPS data and contains a user configurable interface for the manual entry of the data required for line transect and other cetacean research studies (Gillespie *et al* 2010).

When the boat is travelling along the transect line ("on effort"), observers search the area in front of the boat between 90° and 270° abeam (bow being 0°). When a group of dolphins is sighted, position, bearing and distance data are recorded immediately onto Logger and, after a short observation, an estimate is made of group size[3]. This is an "on effort" sighting. These input parameters are linked to the time-GPS-ships data which are automatically stored in Logger throughout the survey period. In this manner, information on heading, position, speed, weather, effort and sightings are stored in an interlinked database which can be subsequently used in a variety of analytical software packages.

Once the vessel leaves the transect line, it is deemed to be "off-effort". The dolphins are approached with the purpose of taking high resolution images. Then the vessel returns to the transect line at the point of departure and is again "on effort". If another group of dolphins is seen while travelling back to the transect line, or when with the first group of dolphins, the sightings are considered as "opportunistic" and noted accordingly.

2.2.1 Baseline Survey Data and Data from 2011

Data from the baseline and 2011 has been provided by (Highways Department, January 2013. Provided in excerpt form as Annex I). Using the data set provided, encounter rates are calculated using "on effort" sightings made under favourable conditions only. For the data collected for this quarterly report, the sightings table is included as Annex II.

[3] Group size is defined as an aggregation of dolphins within 100m of each other involved in similar behaviour (Connor *et al* 1998).

Table 1. The Dolphin Monitoring Transect Co-Ordinates for HKBCF Monthly Monitoring

ID	x	y	Long	Lat	ID	x	y	Long	Lat
1	804671	814577	113.870308	22.269741	12	815542	824882	113.975647	22.362962
1	804671	831404	113.869975	22.421696	13	816506	819480	113.985072	22.314192
2	805475	815457	113.878087	22.277704	13	816506	824859	113.985005	22.362771
2	805477	826654	113.877896	22.378814	14	817537	820220	113.995070	22.320883
3	806464	819435	113.887615	22.313643	14	817537	824613	113.995018	22.360556
3	806464	822911	113.887550	22.345030	15	818568	820735	114.005071	22.325550
4	807518	819771	113.897833	22.316697	15	818568	824433	114.005030	22.358947
4	807518	829230	113.897663	22.402113	16	819532	821420	114.014420	22.331747
5	808504	820220	113.907397	22.320761	16	819532	824209	114.014390	22.356933
5	808504	828602	113.907252	22.396462	17	820451	822125	114.023333	22.338117
6	809490	820466	113.916965	22.323003	17	820451	823671	114.023317	22.352084
6	809490	825352	113.916884	22.367128	18	821504	822371	114.033556	22.340353
7	810499	820690	113.926752	22.325043	18	821504	823761	114.033544	22.352903
7	810499	824613	113.926688	22.360464	19	822513	823268	114.043340	22.348458
8	811508	820847	113.936539	22.326475	19	822513	824321	114.043331	22.357971
8	811508	824254	113.936486	22.357241	20	823477	823402	114.052695	22.349680
9	812516	820892	113.946329	22.326894	20	823477	824613	114.052686	22.360610
9	812516	824254	113.946279	22.357255	21	805476	827081	113.877878	22.382668
10	813525	818270	113.956156	22.303225	21	805476	830562	113.877811	22.414103
10*	813525	824657	113.956065	22.360912	22	806464	824033	113.887520	22.355164
11	814556	818449	113.966160	22.304858	22	806464	829598	113.887416	22.405423
11	814556	820992	113.966125	22.327820	23	814559	821739	113.966142	22.334574
12	815542	818807	113.975726	22.308109	23	814559	824768	113.966101	22.361920

*Transect 10 is now 3.6km in length due to the HKBCF construction site. The total transect length for both NEL and NWL combined is 111km

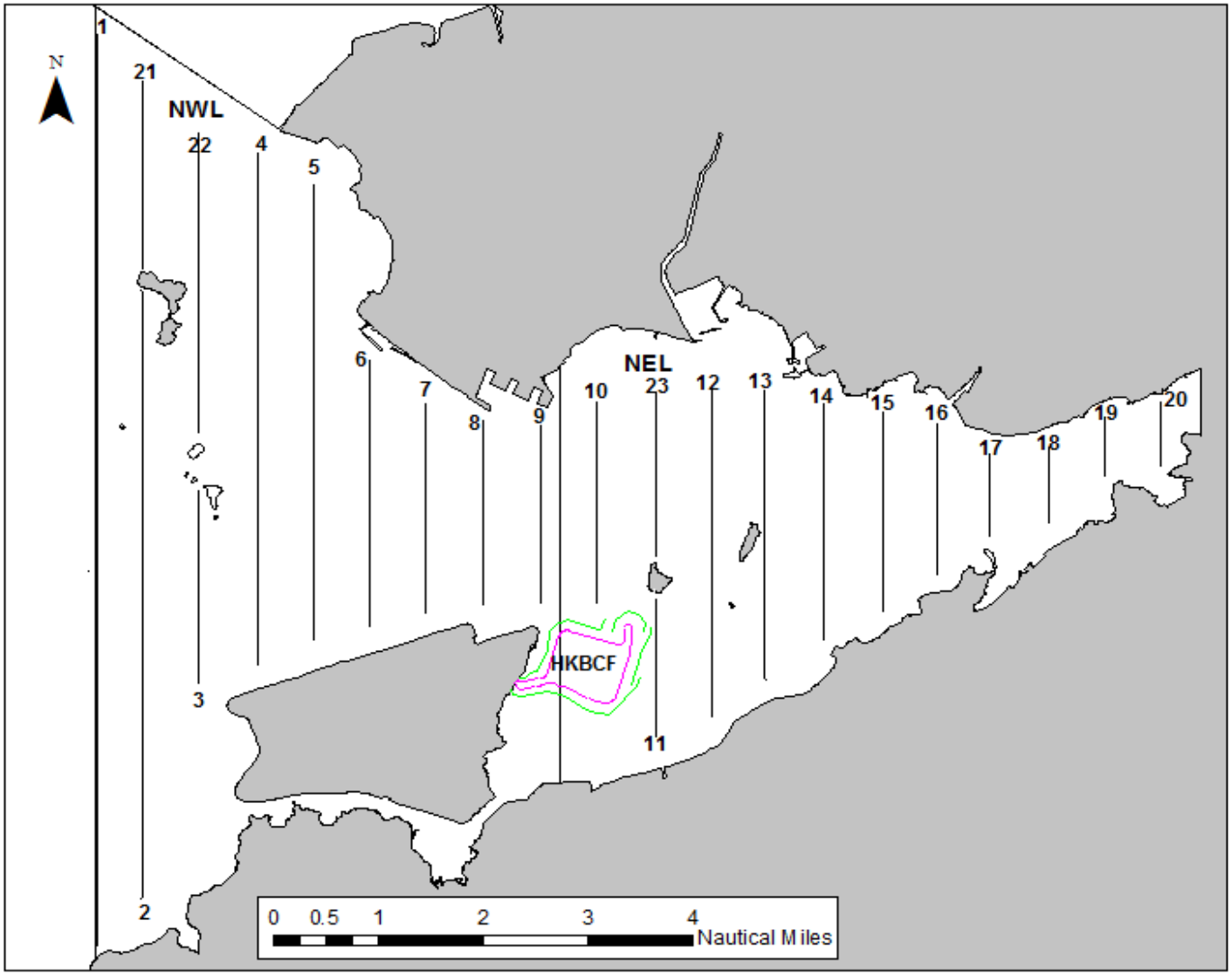

Figure 2 **Location of the Transect Lines for Baseline and Impact Monitoring during HKBCF (modified to accommodate HKBCF)**

2.3. Photo-identification

When a dolphin(s) is sighted, the vessel leaves the transect line and slowly approaches the group or individual. Attempts are made to photograph every individual sighted although close approaches to mother and calf pairs are not attempted. A digital SLR camera (Nikon D90) using long lenses (Nikor 80-200mm and fixed length 300mm) are used to obtain high resolution images. Effort is made to ensure consistency of image quality, e.g., no shadow and at an angle perpendicular to the dorsal fin. Polarising filters are used to minimise glare. In this manner, the best image clarity is achieved and image sorting and matching is more consistent. Images are sorted according to clarity and presence/absence of identifying features (nicks/cuts/deformities/injury/pigmentation). Only images deemed to be of suitable quality and as containing sufficient markings for unambiguous identification are included in the photo-identification catalogue.

2.4. Data Analyses

2.4.1. Distribution pattern analysis

Dolphin sightings data are mapped in the Geographic Information System (GIS) ArcView© 10.1.

2.4.2. Encounter rate analysis

For this report, the baseline encounter rates were re-calculated using the revised data provided (as presented in Annex I) rather than quoting directly from the baseline report. Calculation followed the EM&A Manuel methodology ("on-effort" sightings made during favourable weather and visibility conditions).

2.4.3. Quantitative grid analysis of habitat use

Quantitative grid analysis is performed by mapping both sighting and dolphin densities plotted onto 1kmx1km grid squares. Only "on effort" sightings made while on a transect line and under favourable conditions should be included in grid analyses. These densities are standardised by effort by calculating survey coverage in each line transect survey to determine the number of times the grid has been surveyed. Densities are calculated using the following formulae;

SPSE and DPSE:

$$SPSE = (S/E \times 100)/SA\%$$
$$DPSE = (D/E \times 100)/SA\%$$

Where;

S= total number "on effort" sightings
D = total number dolphins from "on effort" sightings
E = total number units survey effort
SA% = percentage of sea area

2.4.4. Behavioural analysis

When dolphins are sighted during vessel surveys, their behaviour is observed. Different activities are categorised (i.e. feeding, traveling, socialising, surface active, associated with boats, unknown) and recorded in the sighting data form of Logger. The sightings form is integrated with survey effort and positional data and can be subsequently mapped to examine distribution and behavioural trends. All sightings data ("on-effort" and "opportunistic") are used in this analysis.

2.4.5. Ranging pattern analysis

Home ranges for individual dolphins can be calculated using a variety of software (Worton 1989). In the baseline monitoring report, the program Animal Movement Analyst Extension, created by the Alaska Biological Science Centre, USGS was used in conjunction with ArcView© 3.1 and Spatial Analyst 2.0. Using the fixed kernel method, kernel density estimates and kernel density plots are created using all sightings. In the baseline monitoring, data from other studies and from outside the baseline monitoring period were used to map individual ranges. It is important to maximize the number of sightings used as kernel analyses cannot be conducted unless more than 20 independent sightings are made for an individual although it is recommended that a minimum of 70 resightings are used before kernel analyses has any accuracy (Wauters *et al* 2007; Kauhala and Auttila 2010). AFCD Annual Reports use a minimum of 15 resightings for kernel analyses (AFCD 2012). To date, too few data on individual dolphins exist from impact monitoring alone, i.e., 15 or more independent resightings per individual, to map utilisation densities using the fixed kernel method. The most resightings for an individual dolphin in the impact monitoring period (18 months) is ten (HZMB 041)

3. RESULTS AND DISCUSSIONS

3.1. Summary of survey effort and dolphin sightings

From June – August 2013, 14 vessel surveys were conducted in NEL and NWL survey areas (Annex III). A total of 665.4km of "on-effort" transect lines were conducted, of which 663.8km were under favourable conditions. Therefore, 99.8% of vessel surveys were conducted under favorable conditions (Annex IV). Only those periods of "on-effort" survey conducted under favourable conditions were included in quantitative analyses. During June – August 2013, 45 groups of dolphins, numbering 125 (min 119: max 128[4]) individuals, were sighted from the vessel surveys. Of these, 29 groups were "on-effort" and the remaining 16 "opportunistic" (Annex II).

Of the 45 sightings, 38 groups were located in NWL and 7 in NEL. The baseline report, conducted during September-November 2011, notes a total of 44 groups, 34 of which occurred in NWL and 10 in NEL. For period June – August 2012, a total of 62 groups were sighted, 42 of which were located in NWL and 20 in NEL, and for the period June – August 2011, a total of 37 groups were sighted, 25 of which were located in NWL and 12 in NEL. There are differences between the number of sightings made during baseline compared to the summer periods of 2011, 2012 and 2013, however, there is known to be seasonal variation of dolphin occurrence in north Lantau, indeed within Hong Kong (AFCD 2012). When a comparison is made between June – August 2011; 2012 and the same period in 2013, the numbers of dolphin groups seen in NWL in 2012 and 2013 (both years when HKBCF was a working site) are similar and more than that recorded in 2011 (the year before work was initiated at HKBCF) (NWL; 38 vs. 42 vs. 25). In NEL. when a comparison is made between June – August 2011; 2012 and the same period in 2013, there is a marked difference between 2013 and 2012 (both years when construction activity at HKBCF occurred), 7 compared to 20, however, only 12 groups were seen in the same period, 2011 (the year prior to HKBCF commencement). Maps depicting location of sightings which have not been corrected for effort or survey track length are included as Figs. 3;4;5;6.

[4] During sightings a minimum, maximum and best estimate of group size is noted; the range stated represents the minimum and maximum numbers estimated)

Table 2. A Comparison of Total Sightings Recorded in NEL and NWL Areas During Sep – Nov 2011, June – August 2011; 2012 and 2013

Monitoring Period	Total Dolphin Sighting in NWL	Total Dolphin Sighting in NEL
	Number of Groups	Number of Groups
Sep – Nov 2011** (Baseline Monitoring)	34	10
Jun – Aug 2011* (Advanced Monitoring)	25	12
Jun – Aug 2012** (Impact Monitoring)	42	20
Jun – Aug 2013** (Impact Monitoring)	38	7

* Surveys conducted once per month

** Surveys conducted twice per month (and three times in June and July 2012 only as compensatory surveys)

Compared to baseline monitoring, is a similar absolute number of sightings in NEL and NWL combined in June – August 2012 (representing pre and during construction periods). When June – August 2011, the year prior to HKBC construction, is compared to 2013, there is a similar absolute number of sightings in NEL and NWL combined. No correction for effort is made with these numbers, this is calculated in section 3.3.

Table 3. A Comparison of "On Effort" Sightings Recorded in NEL and NWL Combined During Sep – Nov 2011 and June – August 2011;2012 and 2013.

Monitoring Period	Groups of Dolphin sighted in NEL and NWL
Sep - Nov 2011 (Baseline Monitoring)	44
June – August 2011 (Advanced Monitoring)	30
June – August 2012 (Impact Monitoring)	47
June – August 2013 (Impact Monitoring)	29

3.2. Distribution

During the baseline survey, approximately three quarters of all on effort sightings were made in NWL. For June – August 2011 (pre construction) and in both 2012 and 2013 (during construction) approximately two thirds of all "on effort" sightings were seen in NWL. The similarities between the three summer periods is noted, however, there is no correction for effort (Table 4). Throughout June – August 2013, areas of most use are the western most area of NWL, within and adjacent to the Shau Chau and Lung Kwu Chau Marine Park (SCLKCMP) and Tai O. In NEL, sightings were to the east of the Brothers Islands and along the northern coast of Lantau Island (Fig. 6). These areas are highlighted consistently throughout AFCD annual monitoring reports as well as during pre construction monitoring. SCLKCMP is frequented all year round by dolphins and is perceived to be critical habitat whereas the use of NEL is regarded as more seasonal.

Table 4. A Comparison of "On Effort" Sightings Recorded in NEL and NWL During Sep – Nov 2011, June – August 2011; 2012 and 2013.

Monitoring Period	No. of Dolphin Groups sighted in NWL	No. of Dolphin Groups sighted in NEL
Sep - Nov 2011 (Baseline Monitoring)**	34	10
June – August 2011 (Advanced Monitoring)	19	11
June – August 2012 (Impact Monitoring)	30	17
June – August 2013 (Impact Monitoring)	25	4

3.3. Encounter rate

As the survey periods have different transect lengths, variation in sightings occurrence was quantified by correcting for the different amount of effort (number and distance of transect lines surveyed, i.e., km spent "on-effort"), to obtain an encounter rate. The baseline study (Sep-Nov 2011) reports that a total of 545.6km[5] of survey effort was conducted under favourable conditions in the NEL and NWL survey areas. In NEL and NWL combined, 331.0km, 916.2km and 663.8km of track-line were conducted under favourable conditions during the periods June – August 2011; 2012 and 2013, respectively. In NEL, there is a decline in encounter rate within the pre construction period (June – November 2011), i.e., 7 to 5.4. There is a continued decline during impact monitoring periods June – August 2012 and 2013, i.e., 5.2 and 1.8. There is a notable trend in downward encounter rate the year before construction at HKBCF. This trend continues after HKBCF construction starts. In NWL, there is a decline in encounter rate within the pre construction period (June – November 2011), i.e., 11 to 9.5. In June – August 2012, the encounter rate continues to decline from the previous year, but increases slightly in June – August 2013 (Table 5).

Table 5. A Comparison of Encounter Rates* in NEL and NWL Areas for Baseline Period (Sept – Nov 2011), June – August 2011; 2012 and 2013.

Monitoring Period	Encounter Rate NEL	Encounter Rate NWL (*)
June – August 2011 (Advanced Monitoring)	7.0	11
Sept-Nov 2011 (Baseline Monitoring)	5.4	9.5
June – August 2012 (Impact Monitoring)	5.2	5.1
June – August 2013 (Impact Monitoring)	1.8	5.7

The AFCD Annual Reports describe variation in spatial distribution between areas and between seasons in NEL and NWL. For the last sixteen years, it is reported that overall **annual encounter rate** for NEL varies between 1.6 and 6.2 and the **annual encounter rate** for NWL varies between 5.8 and 17.0. The encounter rate for June – August 2013 (1.8) is within the limits recorded for NEL previously. The encounter rate for NWL in June – August 2013 (5.7) is just below the lower encounter limit recorded for NWL historically but is higher than that recorded for the same period in 2012. Historically, there have been both up and down movements within these limits, however, the general trend in yearly encounter rate for dolphins in all areas of Hong Kong is that of significant decline

[5] Updated data set provided April 2013

over the last decade and prior to new development projects in the Lantau area (AFCD 2013). The known decline in the population, on top of the highly variable encounter rate noted historically, makes it problematic to discern any additional influence HKBCF and other projects may have on the dolphin population encounter rate.

3.4. Group size

During impact monitoring, group size of all sightings varied from 1 to 12 individuals with an overall average of 2.8. For baseline monitoring, the NWL average group size was 4.5 and in June – August 2011; 2012 and 2013 it was 4.3, 2.8 and 2.9, respectively. For baseline monitoring, the NEL average group size was 3.5 and in June – August 2011; 2012 and 2013 it was 2.8, 3.8 and 2.3, respectively (Table 6). There is a smaller group size noted during impact monitoring in NWL but no apparent trend in NEL. A map depicting group size distribution shows that larger groups occur at SCLKCMP and Tai O and two of the three groups containing calves were in these larger groups (Fig. 7).

Table 6. A Comparison of Sightings Group Size Averages Recorded in NEL and NWL Areas During Sep – Nov 2011, June – August 2011; 2012 and 2013

Monitoring Period	Average Group Size (NWL)	Average Group Size (NEL)
Sep - Nov 2011 (Baseline Monitoring)	4.5	3.5
June – August 2011 (Advanced Monitoring)	4.3	2.8
June – to August 2012 (Impact Monitoring)	2.8	3.8
June – August 2013 (Impact Monitoring)	2.9	2.3

As encounter rate and group size are both subject to variation, the use of other more powerful analyses may be more appropriate to discern differences over the shorter term, such as multi-variate analyses (Taylor *et al* 2007). This is important so that project impact can be monitored over relevant time scales. Alternative analyses have been developed and are currently being processed to determine if additional statistical tools allow for a more detailed data interpretation for the shorter time periods considered during impact monitoring. This was reported in the last quarterly report and the proposed analyses are now complete for the impact monitoring period alone. These results can be compared to baseline monitoring only when the requested full baseline dataset is provided.

3.5. Habitat use

Quantitative grid analyses indicates that the most often frequented areas in NWL were the SCLKCMP, the western limit of NWL and areas to the north of the Hong Kong International Airport (HKIA) platform. In NEL, areas to the east of the Brothers Islands are highlighted both for DPSE and SPSE. Density in NEL has increased since the last quarter, as seems typical of the summer season in NEL (Figs. 8; 9). The grid analyses from this quarter shows a similar distribution in NWL to that published in the AFCD long term monitoring reports and the baseline monitoring report. These areas of high use have been consistent in the long term and continue to be so.

3.6. Mother-calf pairs

Three of the groups sighted contained mother and calf pairs. All groups were sighted in NWL (Fig. 10). Calves comprised 2.5% of all dolphins sighted, much lower than that reported in the last two quarterly report (10.5% and 5.6%). Calf mortality has been reported during the summer and spring periods, however, no formal figures are as yet available.

3.7. Activities

Of the 45 groups sighted (using all sightings), 18 (40%) were engaged in feeding activities; two (4%) were associated with fishing vessels; seven (16%) were travelling; ten (22%) were feeding/travelling/socialising; two (4%) were surface active and it was not possible to define the behavior of six (16%) groups. Feeding was the predominant activity during daylight hours in June to August with surface active/multiple behaviours (which includes surface active) increasing towards the end of the quarter (Fig. 11). In NWL, feeding occurred most often at east SCLKCMP and the western limits of NWL. Some dolphin groups were noted with active trawlers just across the limit of the NWL survey area (Fig. 12).

3.8. Photo-identification work

The photo-identification catalogue was regularly updated and re-sightings of dolphins previously identified were recorded. The project specific photo-identification catalogue for the impact monitoring period is presented in Annex V. There are now a total of 101 individually identified dolphins in the stand alone catalogue prepared for HKBCF (one of which is deceased and not included in Annex V). Not all dolphins sighted have sufficient scarring, injury or pigmentation uniqueness to be unambiguously identified; to date an estimated 64% of the dolphins sighted have clear and identifying characteristics. During the baseline survey, 96 individuals were noted in the NEL, NWL and WL areas. Of these, 57 were noted in the NEL and NWL area. To date, 17 individuals seen during baseline in NEL and NWL have been re-sighted (one of which is now deceased) and 40 have not. The most number of re-sightings is of HZMB 051 seen now seven times. Seen six times are HZMB 074 and HZMB 073, who have been consistently sighted in the same group, and HZMB 011, 022, 023 and 044. Even when pooled with baseline data, the highest number of re-sightings is nine (HZMB 054 and 009) and this does not consider independence of sightings, a critical assumption in kernel analyses. The rate of discovery of newly identified individuals is decreasing. (Annex V; Fig. 1,Table1).

4. CONCLUSION

The data from June – August 2013 shows some consistencies with the results reported in the same period 2011; 2012 and the baseline (conducted during a different season). Habitat use, encounter rates, group size and behavioural trends all fall within those reported in AFCD Long Term Monitoring reports including an increased usage of NEL on a seasonal basis. The existing long term data set does show an inherent variation in all patterns and rates as well as an apparent decrease in abundance estimates observed across the areas NEL and NWL (AFCD 2013). Density distribution maps depicted key areas of frequent use within NWL, in particular, SCLKMP, Tai O and areas east of the Brothers Islands. Behavioural patterns were broadly similar, with an increase in socialising behavior in August and feeding still the main activity which peaks in frequency of occurrence in July. It is noted that the Hong Kong trawl ban commenced on 31 December 2012 and that the only dolphins sighted following active trawlers have been on the western limit of the NWL area. This is not part of the impact monitoring designated area. It is also noted that preparation works for other, non HKBCF Projects started in January 2013 and have steadily increased throughout June – August 2013. As such, there is increased boat traffic and underwater works in the southern sector of NWL which may cause disturbance to dolphins. Compared to the same period in 2012, the grids named G20 and G22 are no longer used (0 use) after having DPSE and SPSE values of frequent use and very high use, respectively (Second Quarterly Report HKBCF p 17-18).

The decrease in encounter rate in NEL is noted although no link can be found between this and specific activities at HKBCF. A significant decline in dolphin throughout the last ten years prior to construction commencement has been published by AFCD.

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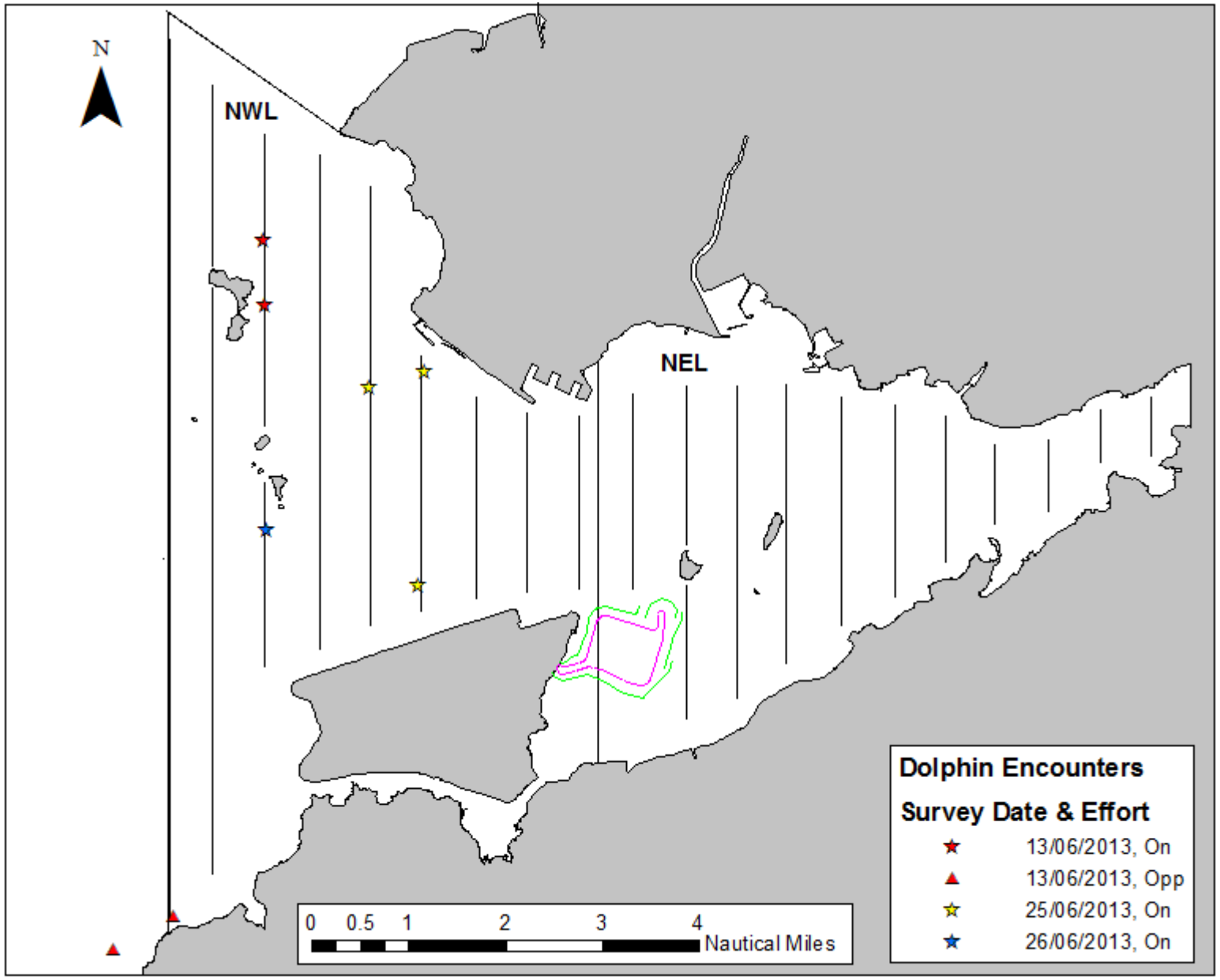

Figure 3 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (June 2013)

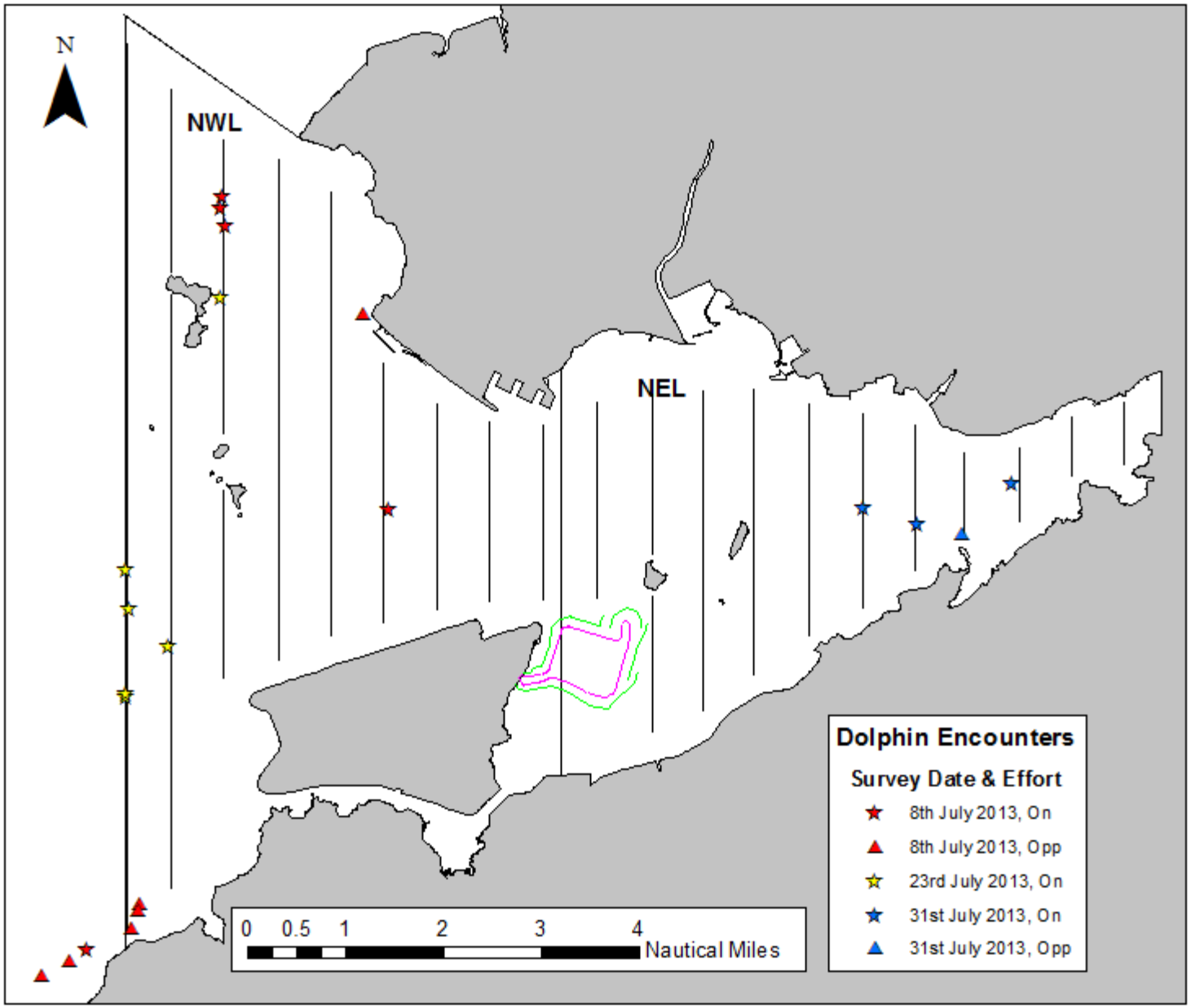

Figure 4 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (July 2013)

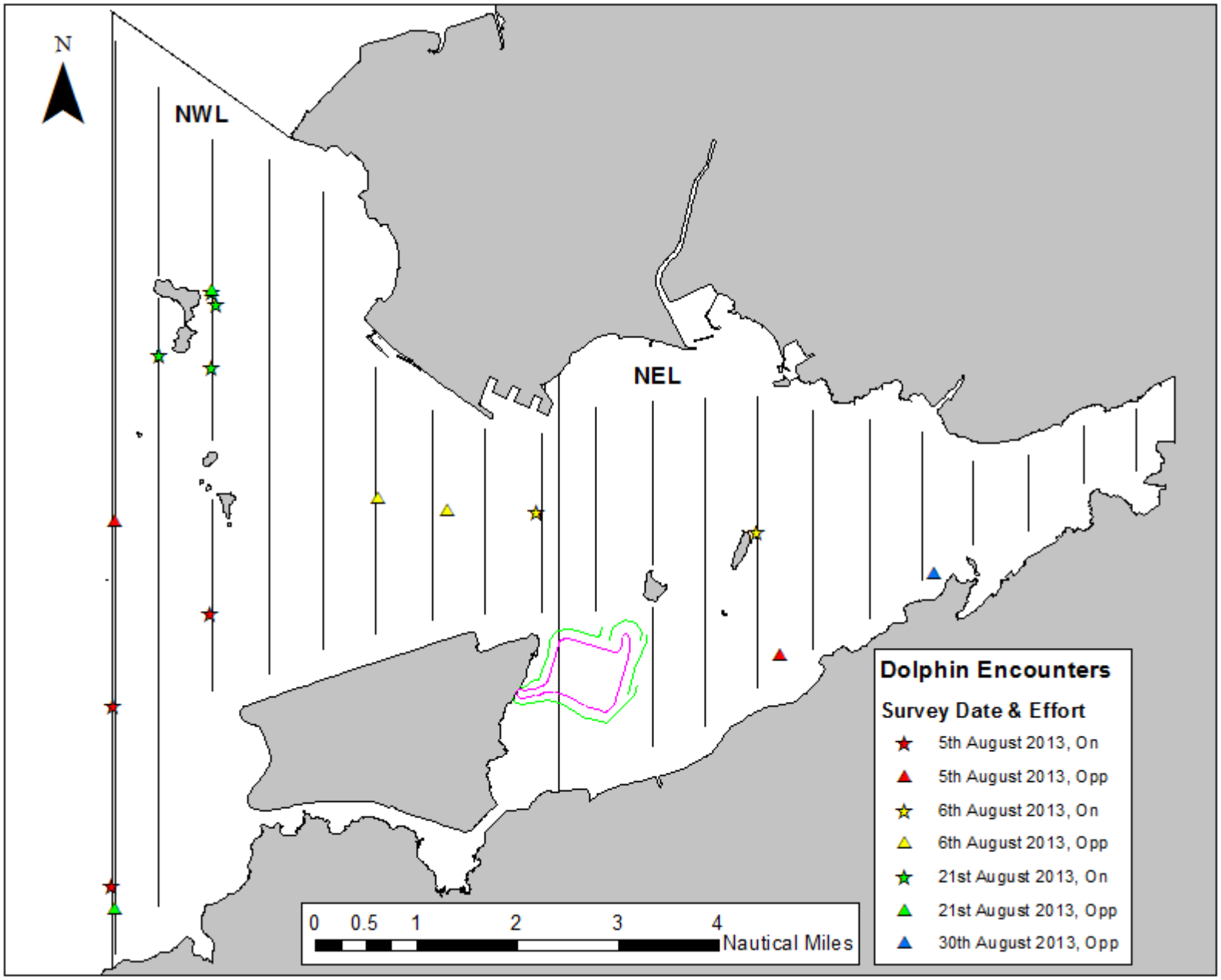

Figure 5 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (August 2013)

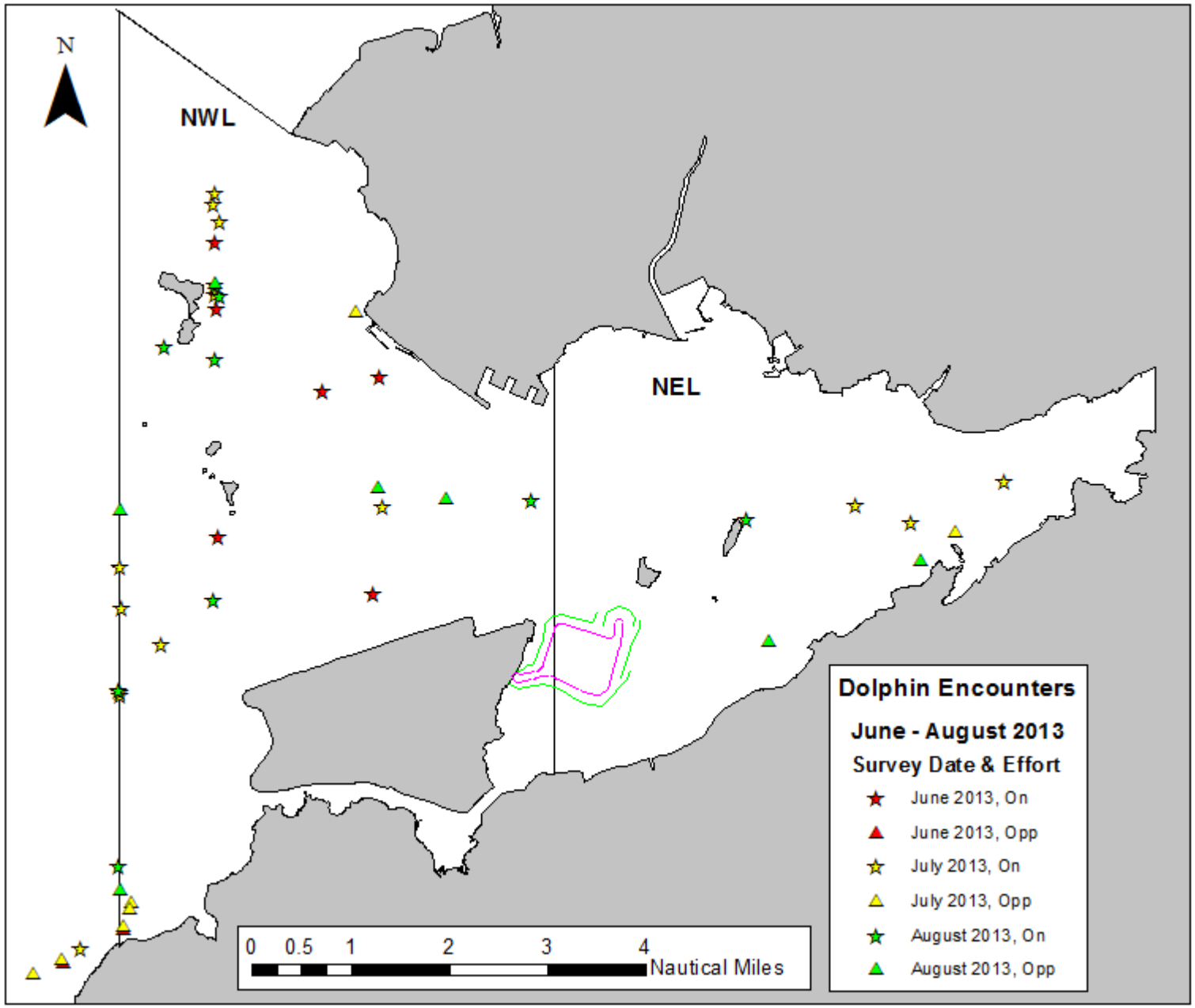

Figure 6. Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (June-August 2013)

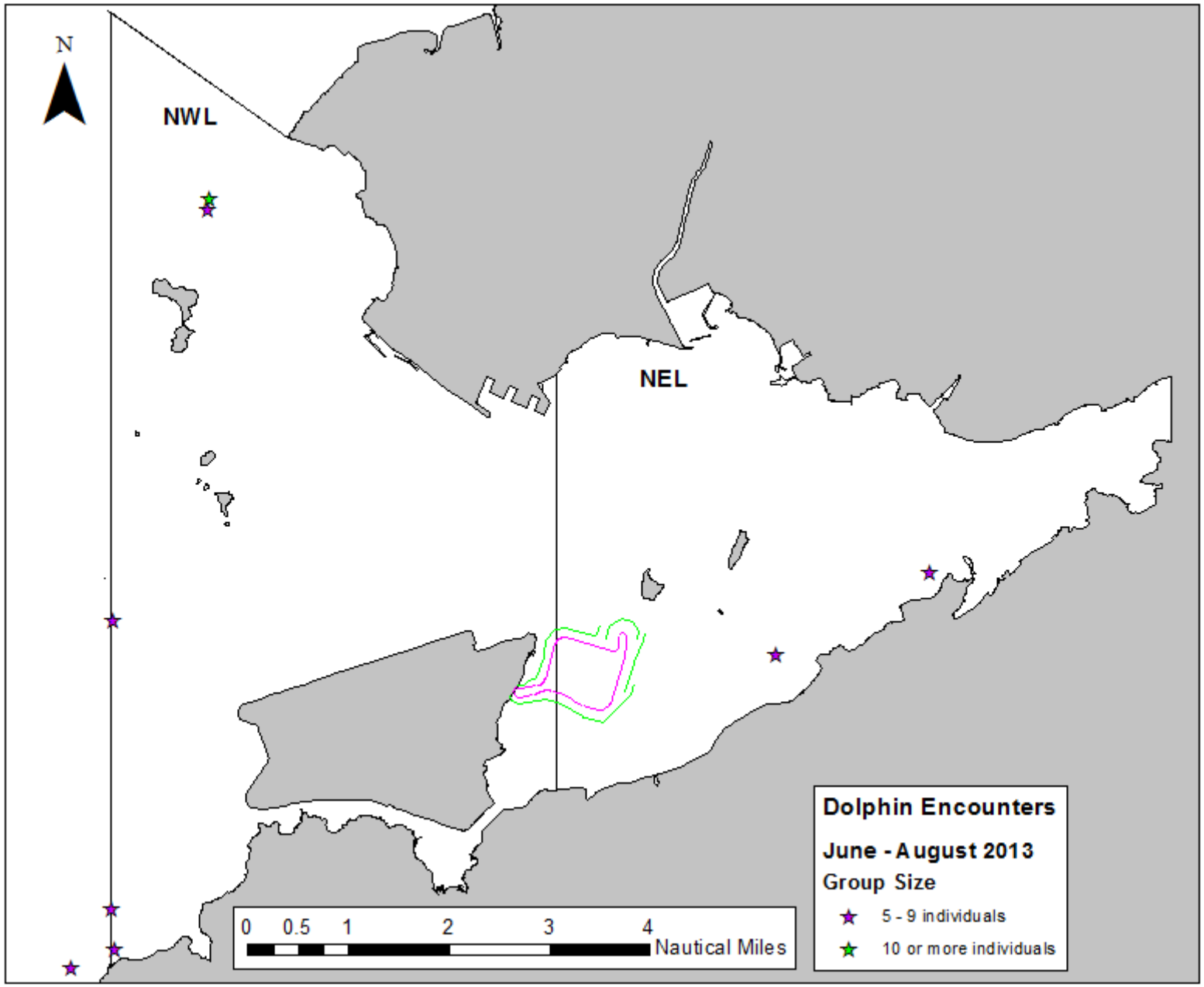

Figure 7. The Location of Dolphin Groups Numbering 5 and Above Individuals (June-August 2013)

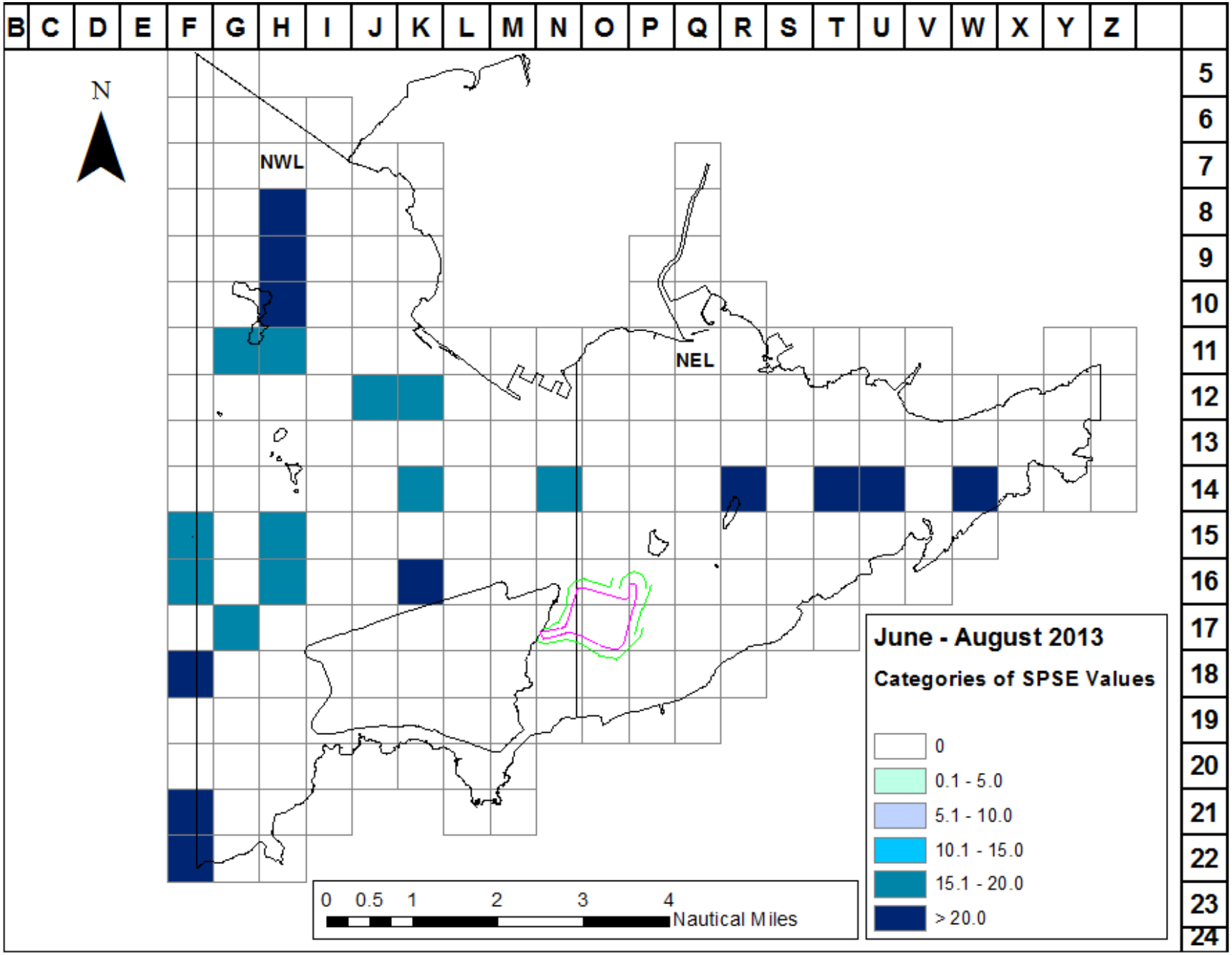

Figure 8. Sighting density SPSE (number of on-effort sightings per 100 units of survey effort) for June - August 2013.

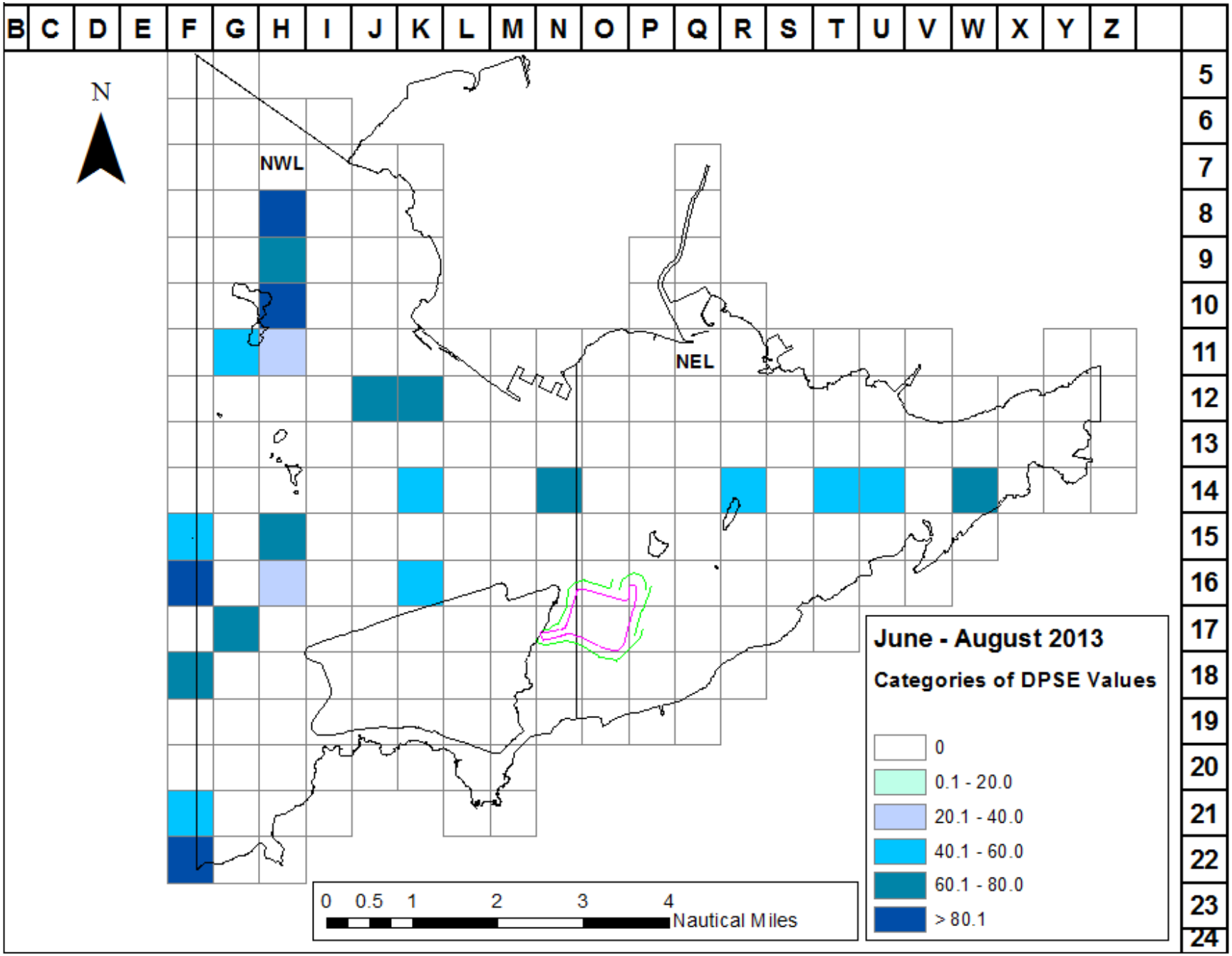

Figure 9. Dolphin density DPSE (number of dolphins per 100 units of survey effort) for June to August 2013.

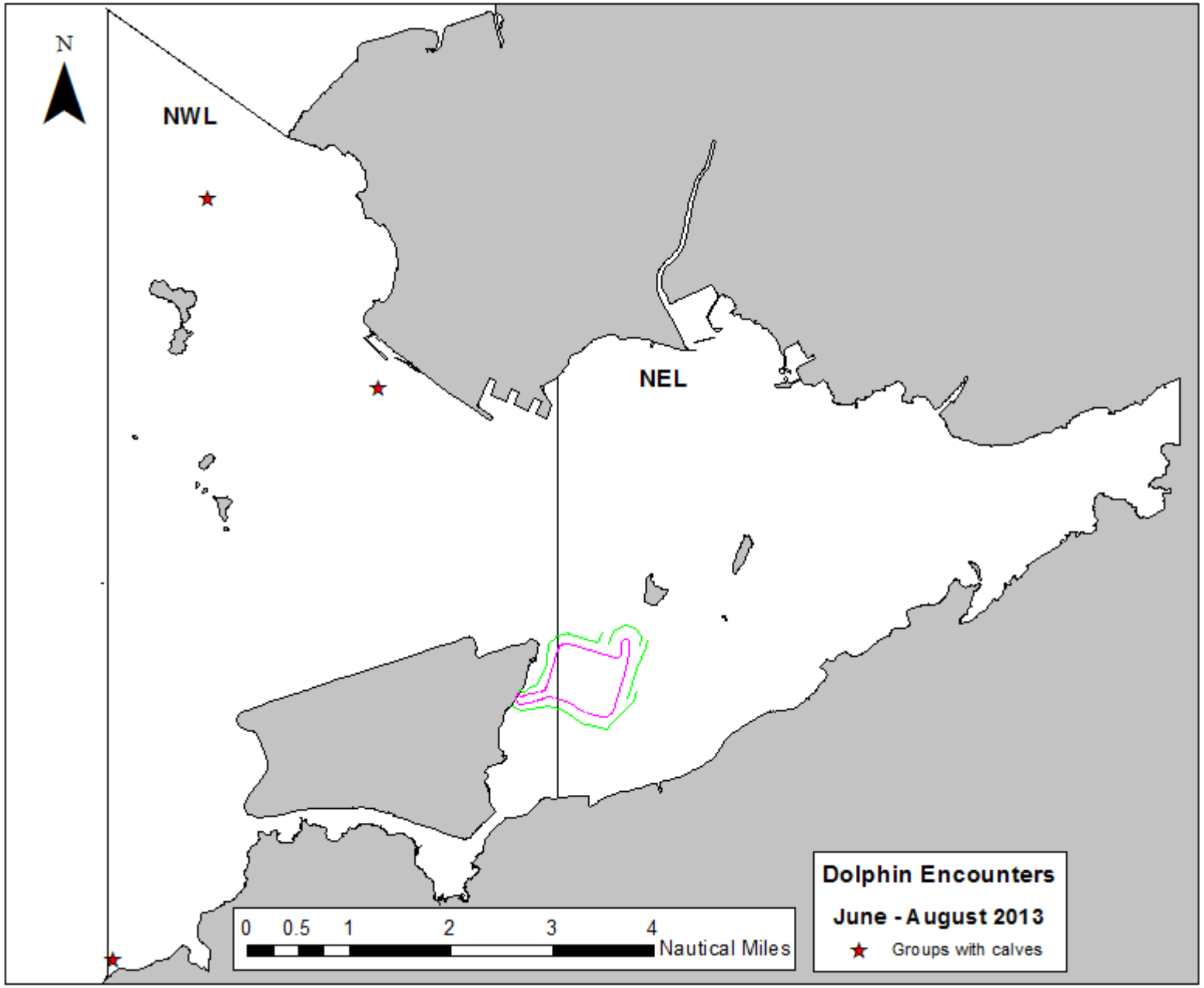

Figure 10. Location of groups containing mother and calf pairs during June to August 2013.

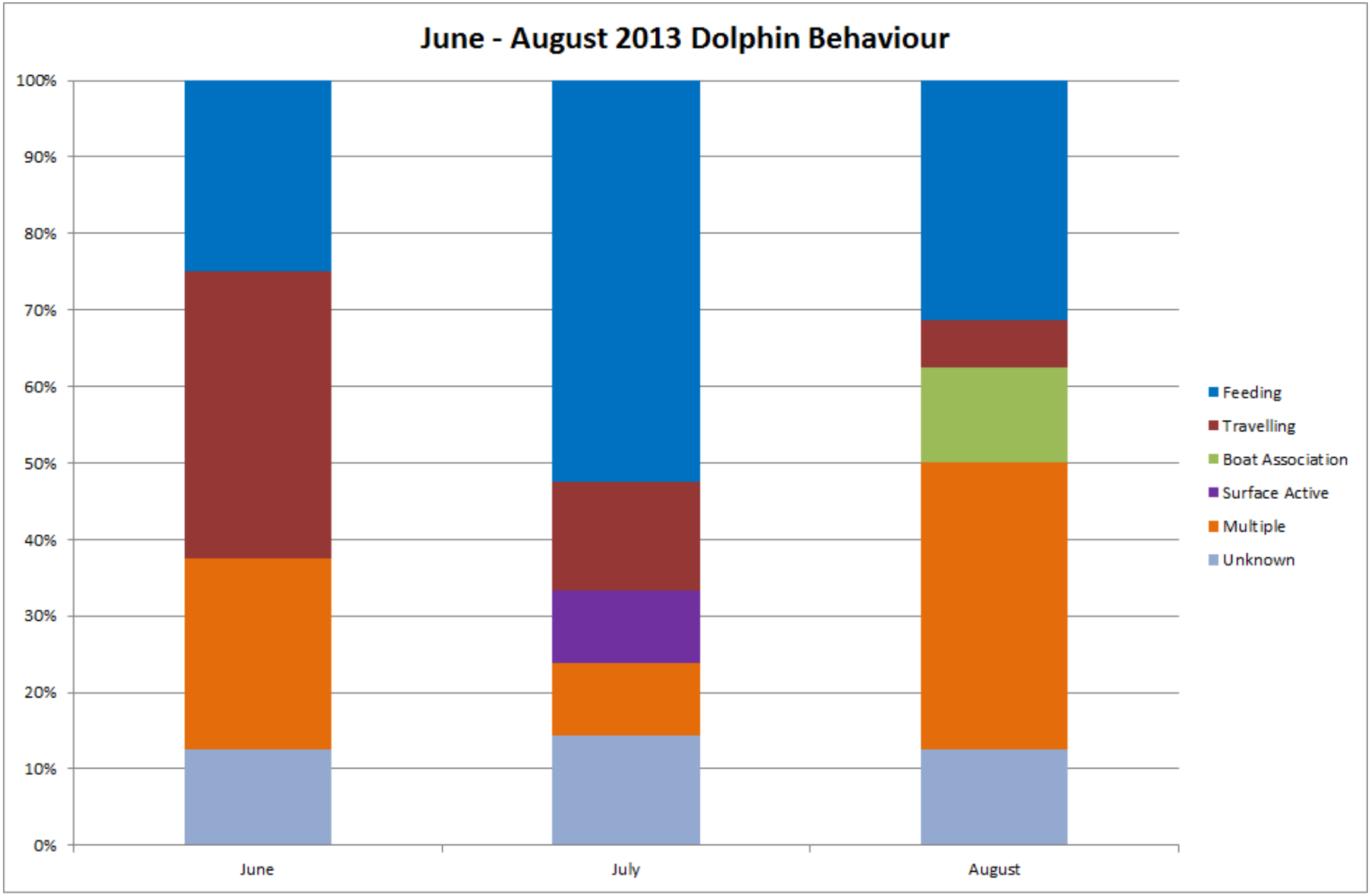

Figure 11. Activity Budget for Dolphin Behaviour June to August 2013.

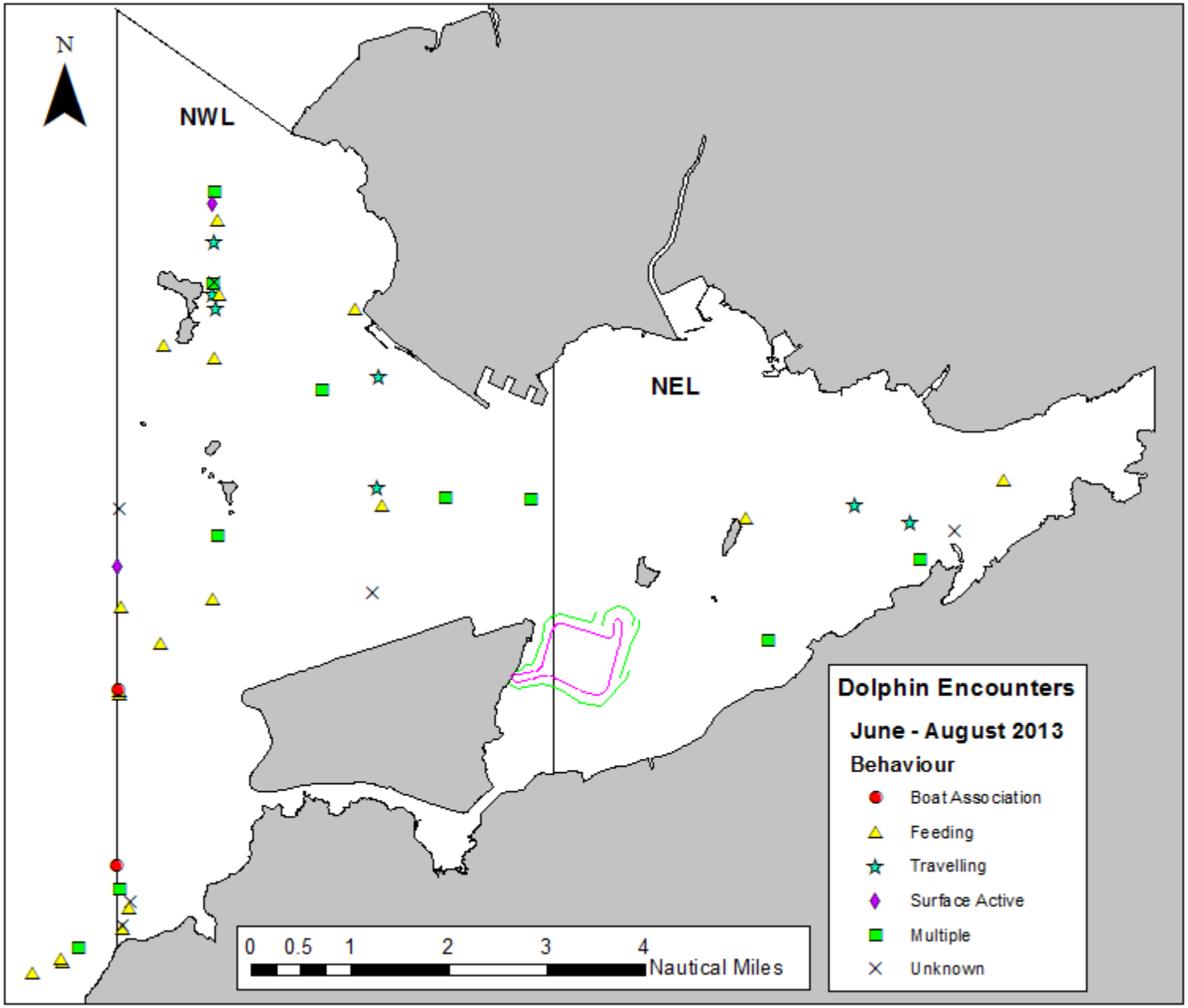

Figure 12. The Location of Different Behavioural Activities June to August 2103

Annex I Excerpt from the HYD-HZMB Edited 2011 / Baseline data (provided January 2013):

Baseline September – November 2011 Sightings and Trackline

AREA	DATE	TIME	HRD SZ	BEAU	PSD
NE LANTAU	7-Sep-11	1657	1	2	179
NE LANTAU	6-Oct-11	1306	5	2	57
NE LANTAU	10-Oct-11	1629	3	2	167
NE LANTAU	13-Oct-11	1459	2	2	42
NE LANTAU	1-Nov-11	1405	4	2	350
NE LANTAU	1-Nov-11	1505	8	2	277
NE LANTAU	1-Nov-11	1612	4	2	159
NE LANTAU	5-Nov-11	1516	4	1	195
NE LANTAU	5-Nov-11	1537	2	1	136
NE LANTAU	5-Nov-11	1614	2	2	193

Area	Groups	Individuals	Trackline (KM)	Encounter rate
All	44	188		
NEL	10	35	175.7	5.7
NWL	34	153	359.0	9.5

AREA	DATE	TIME	HRD SZ	BEAU	PSD
NW LANTAU	7-Sep-11	1055	2	2	349
NW LANTAU	16-Sep-11	1013	2	2	330
NW LANTAU	16-Sep-11	1038	4	2	87
NW LANTAU	16-Sep-11	1102	2	1	59
NW LANTAU	16-Sep-11	1144	3	2	157
NW LANTAU	16-Sep-11	1204	1	2	4
NW LANTAU	16-Sep-11	1210	9	2	73
NW LANTAU	16-Sep-11	1406	3	2	295
NW LANTAU	23-Sep-11	1517	4	3	26
NW LANTAU	23-Sep-11	1538	2	3	137
NW LANTAU	6-Oct-11	1455	2	1	236
NW LANTAU	10-Oct-11	1009	3	3	183
NW LANTAU	10-Oct-11	1207	9	3	382
NW LANTAU	17-Oct-11	1548	1	2	583
NW LANTAU	28-Oct-11	953	1	2	662
NW LANTAU	28-Oct-11	1044	8	3	0
NW LANTAU	28-Oct-11	1117	7	3	160
NW LANTAU	28-Oct-11	1129	4	3	93
NW LANTAU	1-Nov-11	1021	4	2	161
NW LANTAU	1-Nov-11	1135	2	1	524
NW LANTAU	1-Nov-11	1156	5	2	161
NW LANTAU	2-Nov-11	1501	2	2	30
NW LANTAU	2-Nov-11	1513	18	2	282
NW LANTAU	2-Nov-11	1555	3	2	262
NW LANTAU	2-Nov-11	1601	12	2	263
NW LANTAU	5-Nov-11	1018	1	2	204
NW LANTAU	5-Nov-11	1025	4	2	220
NW LANTAU	5-Nov-11	1110	2	2	220
NW LANTAU	5-Nov-11	1121	1	2	534
NW LANTAU	5-Nov-11	1153	7	1	248
NW LANTAU	5-Nov-11	1208	5	1	21
NW LANTAU	5-Nov-11	1321	8	2	312
NW LANTAU	7-Nov-11	1116	8	2	790
NW LANTAU	7-Nov-11	1136	4	2	59

Annex II. Impact Monitoring Sighting Database (June – August 2013)

Project	Contract	Date	Sighting No.	Time	Group Size	Area	Beaufort	PSD	Effort	Type	Latitude	Longitude	Season	Boat Association
HKBCF	HY/2010/02	6/13/2013	680	9:39	5	NWL	1	NA	Opp	Impact	22.27046	113.8709	Summer	No
HKBCF	HY/2010/02	6/13/2013	681	9:57	2	NWL	1	NA	Opp	Impact	22.26480	113.8599	Summer	No
HKBCF	HY/2010/02	6/13/2013	682	13:33	4	NWL	2	102	On	Impact	22.37612	113.8879	Summer	No
HKBCF	HY/2010/02	6/13/2013	683	14:10	2	NWL	2	93	On	Impact	22.38732	113.8875	Summer	No
HKBCF	HY/2010/02	6/25/2013	696	14:03	1	NWL	2	697	On	Impact	22.32760	113.9165	Summer	No
HKBCF	HY/2010/02	6/25/2013	697	14:42	4	NWL	3	0	On	Impact	22.36463	113.9176	Summer	No
HKBCF	HY/2010/02	6/25/2013	698	16:03	4	NWL	2	2	On	Impact	22.36194	113.9072	Summer	No
HKBCF	HY/2010/02	6/26/2013	703	14:59	3	NWL	3	94	On	Impact	22.33713	113.8882	Summer	No
HKBCF	HY/2010/02	7/8/2013	705	9:13	3	NWL	1	NA	Opp	Impact	22.27501	113.8725	Summer	No
HKBCF	HY/2010/02	7/8/2013	706	9:13	3	NWL	1	NA	Opp	Impact	22.27396	113.8722	Summer	No
HKBCF	HY/2010/02	7/8/2013	707	9:27	1	NWL	1	NA	Opp	Impact	22.27088	113.8709	Summer	No
HKBCF	HY/2010/02	7/8/2013	708	10:01	6	NWL	1	200	On	Impact	22.26722	113.8630	Summer	No
HKBCF	HY/2010/02	7/8/2013	709	10:04	4	NWL	1	NA	Opp	Impact	22.26526	113.8597	Summer	No
HKBCF	HY/2010/02	7/8/2013	710	10:10	3	NWL	1	NA	Opp	Impact	22.26273	113.8545	Summer	No
HKBCF	HY/2010/02	7/8/2013	711	13:46	12	NWL	1	28	On	Impact	22.39575	113.8874	Summer	No
HKBCF	HY/2010/02	7/8/2013	712	14:36	2	NWL	1	49	On	Impact	22.39083	113.8882	Summer	No
HKBCF	HY/2010/02	7/8/2013	713	14:48	5	NWL	1	198	On	Impact	22.39384	113.8873	Summer	No
HKBCF	HY/2010/02	7/8/2013	714	16:45	1	NWL	1	NA	Opp	Impact	22.37568	113.9132	Summer	No
HKBCF	HY/2010/02	7/8/2013	715	17:12	2	NWL	1	72	On	Impact	22.34242	113.9182	Summer	No
HKBCF	HY/2010/02	23/07/2013	731	9:13	1	NWL	2	10	On	Impact	22.31040	113.8702	Summer	No
HKBCF	HY/2010/02	23/07/2013	732	9:36	1	NWL	1	25	On	Impact	22.31083	113.8702	Summer	No
HKBCF	HY/2010/02	23/07/2013	733	9:43	5	NWL	1	233	On	Impact	22.32521	113.8705	Summer	No
HKBCF	HY/2010/02	23/07/2013	735	10:25	2	NWL	1	241	On	Impact	22.33206	113.8701	Summer	No
HKBCF	HY/2010/02	23/07/2013	736	11:53	4	NWL	2	22	On	Impact	22.31898	113.8779	Summer	No
HKBCF	HY/2010/02	23/07/2013	737	13:40	2	NWL	2	109	On	Impact	22.37856	113.8874	Summer	No
HKBCF	HY/2010/02	31/07/2013	750	16:27	1	NEL	1	47	On	Impact	22.34271	114.0050	Summer	No

Project	Contract	Date	Sighting No.	Time	Group Size	Area	Beaufort	PSD	Effort	Type	Latitude	Longitude	Season	Boat Association
HKBCF	HY/2010/02	31/07/2013	751	16:50	1	NEL	2	218	On	Impact	22.33997	114.0151	Summer	No
HKBCF	HY/2010/02	31/07/2013	752	17:20	1	NEL	2	NA	Opp	Impact	22.33820	114.0231	Summer	No
HKBCF	HY/2010/02	31/07/2013	753	17:56	1	NEL	2	2	On	Impact	22.34694	114.0322	Summer	No
HKBCF	HY/2010/02	8/5/2013	755	9:22	1	NWL	1	594	On	Impact	22.28114	113.8699	Summer	HT
HKBCF	HY/2010/02	8/5/2013	756	9:38	1	NWL	1	566	On	Impact	22.31121	113.8701	Summer	Sh
HKBCF	HY/2010/02	8/5/2013	757	9:54	2	NWL	1	NA	Opp	Impact	22.34181	113.8702	Summer	No
HKBCF	HY/2010/02	8/5/2013	758	12:06	1	NWL	1	2454	On	Impact	22.32643	113.8873	Summer	No
HKBCF	HY/2010/02	8/5/2013	760	15:57	5	NEL	2	NA	Opp	Impact	22.31973	113.9891	Summer	No
HKBCF	HY/2010/02	8/6/2013	762	9:17	4	NWL	1	87	On	Impact	22.34351	113.9456	Summer	No
HKBCF	HY/2010/02	8/6/2013	763	9:39	4	NWL	1	NA	Opp	Impact	22.34385	113.9298	Summer	No
HKBCF	HY/2010/02	8/6/2013	764	10:05	2	NWL	1	NA	Opp	Impact	22.34568	113.9174	Summer	No
HKBCF	HY/2010/02	8/6/2013	765	12:16	1	NEL	1	115	On	Impact	22.34033	113.9850	Summer	No
HKBCF	HY/2010/02	8/21/2013	769	9:31	5	NWL	1	NA	Opp	Impact	22.27725	113.8703	Summer	No
HKBCF	HY/2010/02	8/21/2013	770	11:43	2	NWL	1	155	On	Impact	22.36954	113.8782	Summer	No
HKBCF	HY/2010/02	8/21/2013	771	13:54	1	NWL	1	39	On	Impact	22.36746	113.8876	Summer	No
HKBCF	HY/2010/02	8/21/2013	772	14:11	1	NWL	1	151	On	Impact	22.37810	113.8884	Summer	No
HKBCF	HY/2010/02	8/21/2013	774	14:26	2	NWL	1	106	On	Impact	22.38015	113.8874	Summer	No
HKBCF	HY/2010/02	8/21/2013	775	14:36	1	NWL	1	NA	Opp	Impact	22.38037	113.8876	Summer	No
HKBCF	HY/2010/02	8/30/2013	780	15:38	6	NEL	2	NA	Opp	Impact	22.33340	114.0167	Summer	No

***** Perpendicular Sighting Distance

Annex III. Impact Monitoring Survey Schedule and Details (June – August 2013)

Date	Location of Survey	No. Sightings ON	No. Sightings Opp	Total km ON EFFORT (favourable conditions)
13-06-13	NW Lantau	2	2	67.0
14-06-13	NW and NE Lantau	0	0	10.1
19-06-13	NE Lantau	0	0	33.2
25-06-13	NW and NE Lantau	3	0	59.9
26-06-13	NW Lantau	1	0	49.3
08-07-13	NW Lantau	5	6	63.5
09-07-13	NW and NE Lantau	0	0	47.7
23-07-13	NW Lantau	6	0	58.4
31-07-13	NW and NE Lantau	3	1	52.4
05-08-13	NW Lantau	3	2	70.9
06-08-13	NW and NE Lantau	2	2	40.2
21-08-13	NW Lantau	4	2	63.4
28-08-13	NW and NE Lantau	0	0	26.1
30-08-13	NE Lantau	0	1	21.7

Annex IV. Impact Monitoring Survey Effort Summary (June - August 2013)

Date	Area	Sea State (on effort)	Effort (km)	Season	Vessel	Type
13-06-13	NWL	1	28.1	SUMMER	HKDW	IMPACT
13-06-13	NWL	2	31.7	SUMMER	HKDW	IMPACT
13-06-13	NWL	3	7.2	SUMMER	HKDW	IMPACT
14-06-13	NWL	1	6.6	SUMMER	HKDW	IMPACT
14-06-13	NEL	1	3.5	SUMMER	HKDW	IMPACT
19-06-13	NEL	1	33.2	SUMMER	HKDW	IMPACT
25-06-13	NEL	1	16.2	SUMMER	HKDW	IMPACT
25-06-13	NEL	2	18.6	SUMMER	HKDW	IMPACT
25-06-13	NEL	3	2.0	SUMMER	HKDW	IMPACT
25-06-13	NWL	2	8.2	SUMMER	HKDW	IMPACT
25-06-13	NWL	3	14.9	SUMMER	HKDW	IMPACT
25-06-13	NWL	4	1.6	SUMMER	HKDW	IMPACT
26-06-13	NWL	2	14.0	SUMMER	HKDW	IMPACT
26-06-13	NWL	3	35.3	SUMMER	HKDW	IMPACT
08-07-13	NWL	1	29.9	SUMMER	HKDW	IMPACT
08-07-13	NWL	2	22.1	SUMMER	HKDW	IMPACT
08-07-13	NWL	3	11.5	SUMMER	HKDW	IMPACT
09-07-13	NWL	1	10.0	SUMMER	HKDW	IMPACT
09-07-13	NEL	1	27.2	SUMMER	HKDW	IMPACT
09-07-13	NEL	2	9.2	SUMMER	HKDW	IMPACT
09-07-13	NEL	3	1.3	SUMMER	HKDW	IMPACT
23-07-13	NWL	0	3.8	SUMMER	HKDW	IMPACT
23-07-13	NWL	1	32.6	SUMMER	HKDW	IMPACT
23-07-13	NWL	2	22.0	SUMMER	HKDW	IMPACT
31-07-13	NWL	2	12.3	SUMMER	HKDW	IMPACT
31-07-13	NWL	3	3.2	SUMMER	HKDW	IMPACT
31-07-13	NEL	1	2.0	SUMMER	HKDW	IMPACT
31-07-13	NEL	2	25.9	SUMMER	HKDW	IMPACT
31-07-13	NEL	3	9.0	SUMMER	HKDW	IMPACT
05-08-13	NWL	1	63.0	SUMMER	HKDW	IMPACT
05-08-13	NWL	2	7.9	SUMMER	HKDW	IMPACT
06-08-13	NWL	1	3.1	SUMMER	HKDW	IMPACT
06-08-13	NEL	1	22.4	SUMMER	HKDW	IMPACT
06-08-13	NEL	2	9.3	SUMMER	HKDW	IMPACT
06-08-13	NEL	3	5.4	SUMMER	HKDW	IMPACT
21-08-13	NWL	1	46.2	SUMMER	HKDW	IMPACT
21-08-13	NWL	2	17.2	SUMMER	HKDW	IMPACT
28-08-13	NWL	1	10.7	SUMMER	HKDW	IMPACT
28-08-13	NEL	1	15.4	SUMMER	HKDW	IMPACT
30-08-13	NEL	1	14.6	SUMMER	HKDW	IMPACT
30-08-13	NEL	2	7.1	SUMMER	HKDW	IMPACT

Annex V. Photo ID Images (June –August 2013)

Table 1. Sightings of Individually Identified Chinese White Dolphin (*Sousa chinensis*) between March 2012 – August 2013 and Baseline sightings

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 108		2013-08-30	780	NEL
HZMB 107		2013-08-21	770	NWL
HZMB 106		2013-08-21	769	NWL
HZMB 105		2013-07-08	711	NWL
HZMB 104		2013-07-08	711	NWL
HZMB 103		2013-07-08	711	NWL
HZMB 102		2013-07-08	706	NWL
HZMB 101		2013-07-08	706	NWL
HZMB 100		2013-07-08	706	NWL
HZMB 099		2013-06-13	681	NWL
		2013-06-13	680	NWL
HZMB 098	NL104	2013-07-08	711	NWL
		2013-05-24	659	NWL
HZMB 097		2013-05-09	647	NWL
HZMB 096		2013-04-01	621	NWL
HZMB 095		2013-08-30	780	NEL
		2013-06-25	697	NWL
		2013-06-13	682	NWL
		2013-04-01	621	NWL
HZMB 094		2013-06-26	703	NWL
		2013-06-25	698	NWL
		2013-03-18	601	NWL
HZMB 093		2013-05-24	657	NWL
		2013-02-21	587	NWL
HZMB 092		2013-02-21	589	NWL
		2013-02-15	581	NWL
HZMB 091		2013-02-15	579	NWL
HZMB 090		2013-06-25	697	NWL
		2013-06-13	682	NWL
		2013-02-15	579	NWL
HZMB 089		2013-02-15	579	NWL
HZMB 088		2013-02-15	579	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 087		2013-02-15	579	NWL
HZMB 086	NL242	2013-05-09	642	NWL
		2013-02-15	579	NWL
		2011-10-10	Baseline	NWL
HZMB 085		2013-06-26	703	NWL
		2013-02-15	579	NWL
HZMB 084		2013-02-14	575	NWL
HZMB 083	NL136	2013-03-28	607	NWL
		2013-02-15	579	NWL
		2013-01-28	568	NWL
		2012-01-28	564	NWL
HZMB 082		2013-02-21	587	NWL
		2013-02-15	579	NWL
		2013-01-28	563	NWL
HZMB 081		2013-01-28	559	NWL
		2013-01-28	557	NWL
HZMB 080		2013-01-28	556	NWL
HZMB 079		2013-01-28	556	NWL
HZMB 078		2013-02-15	579	NWL
		2013-01-08	552	NWL
HZMB 077		2013-07-08	706	NWL
		2012-12-11	541	NWL
HZMB 076		2013-07-08	706	NWL
		2012-12-11	541	NWL
HZMB 075		2012-12-06	525	NEL
HZMB 074		2013-05-09	647	NWL
		2013-04-01	623	NWL
		2013-04-01	621	NWL
		2013-02-21	594	NEL
		2012-12-10	529	NEL
		2012-12-06	525	NEL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 073		2013-05-09	647	NWL
		2013-04-01	623	NWL
		2013-04-01	621	NWL
		2013-02-21	594	NEL
		2012-12-10	529	NEL
		2012-12-06	525	NEL
HZMB 072		2012-10-24	476	NWL
HZMB 071		2012-10-24	475	NWL
		2012-10-12	466	NWL
HZMB 070		2012-10-24	476	NWL
HZMB 069		2013-08-21	774	NWL
		2013-07-08	711	NWL
		2012-10-24	476	NWL
HZMB 068		2012-10-24	476	NWL
HZMB 067		2012-10-24	475	NWL
HZMB 066	NL93	2013-01-28	559	NWL
		2012-12-11	537	NWL
		2012-10-24	475	NWL
		2012-10-12	466	NWL
HZMB 065		2012-10-12	466	NWL
HZMB 064		2013-05-09	647	NWL
		2013-01-28	561	NWL
		2012-10-24	475	NWL
		2012-10-12	466	NWL
HZMB 063		2013-05-09	647	NWL
		2012-10-12	466	NWL
HZMB 062		2012-12-06	525	NEL
		2012-10-11	457	NWL
HZMB 061		2012-09-18	448	NWL
HZMB 060		2012-09-18	447	NWL
HZMB 059		2013-02-21	591	NWL
		2012-09-18	445	NWL
HZMB 057		2012-09-18	440	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 056		2012-09-18	442	NWL
		2012-09-05	433	NEL
HZMB 055		2012-09-04	425	NWL
HZMB 054	CH34	2013-08-30	780	NEL
		2013-07-08	711	NWL
		2012-09-05	432	NEL
		2011-11-07	Baseline	NWL
		2011-11-05	Baseline	NWL
		2011-11-02	Baseline	NWL
		2011-11-01	Baseline	NEL
		2011-11-01	Baseline	NEL
		2011-10-28	Baseline	NWL
		2011-10-06	Baseline	NWL
HZMB 053		2012-09-04	425	NWL
HZMB 052		2012-09-04	423	NWL
HZMB 051	NL213	2013-05-09	644	NWL
		2013-04-01	622	NWL
		2013-02-15	582	NWL
		2013-02-15	581	NWL
		2013-01-28	559	NWL
		2013-01-28	556	NWL
		2012-09-04	422	NWL
HZMB 050		2013-02-15	579	NWL
		2012-09-04	421	NWL
HZMB 049		2012-09-03	419	NWL
HZMB 048		2012-09-03	419	NWL
HZMB 047		2012-09-03	412	NWL
HZMB 046		2012-09-03	412	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 045		2013-06-13	682	NWL
		2013-02-15	579	NWL
		2012-11-01	495	NWL
HZMB 044	NL98	2013-05-09	648	NWL
		2013-05-09	647	NWL
		2013-04-01	623	NWL
		2013-04-01	621	NWL
		2013-02-15	579	NWL
		2012-11-01	495	NWL
HZMB 043		2012-09-03	407	NWL
HZMB 042	NL260	2012-11-01	495	NWL
		2011-11-07	Baseline	NWL
HZMB 041	NL24	2013-05-09	648	NWL
		2013-05-09	647	NWL
		2013-04-01	623	NWL
		2013-04-01	621	NWL
		2013-02-15	579	NWL
		2012-11-01	495	NWL
		2011-11-06	Baseline	NEL
		2011-11-05	Baseline	NWL
		2011-11-05	Baseline	NWL
		2011-10-10	Baseline	NWL
HZMB 040		2013-07-08	714	NWL
		2013-07-08	711	NWL
		2013-02-21	589	NWL
		2012-11-01	493	NWL
HZMB 038		2012-11-01	490	NWL
HZMB 037		2012-11-01	490	NWL
HZMB 036		2012-09-03	407	NWL
		2012-11-01	490	NWL
HZMB 035		2013-02-15	579	NWL
		2012-11-01	490	NWL
HZMB 034		2012-11-01	493	NWL
HZMB 028		2013-04-01	625	NWL
		2012-08-06	373	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 027		2013-02-15	579	NWL
		2013-01-28	568	NWL
		2013-01-28	564	NWL
		2012-06-14	299	NWL
HZMB 026		2013-06-25	697	NWL
		2013-05-09	642	NWL
		2013-01-28	561	NWL
		2012-06-13	295	NEL
HZMB 025		2013-02-22	596	NEL
		2013-02-21	591	NWL
		2012-06-13	295	NEL
HZMB 024		2013-03-18	601	NWL
		2012-06-13	295	NEL
HZMB 023		2013-07-08	715	NWL
		2013-07-08	711	NWL
		2013-04-01	619	NWL
		2013-02-21	589	NWL
		2013-02-15	579	NWL
		2012-07-10	330	NWL
HZMB 022		2013-07-08	715	NWL
		2013-07-08	711	NWL
		2013-04-01	619	NWL
		2013-02-21	589	NWL
		2013-02-15	579	NWL
		2012-07-10	330	NWL
HZMB 021	NL37	2012-07-10	330	NWL
		2011-09-16	Baseline	NWL

HZMB 020		2012-07-10	330	NWL
HZMB 019		2012-07-10	330	NWL
HZMB 018		2013-05-09	647	NWL
		2013-02-21	594	NEL
		2012-12-10	529	NEL
		2012-07-10	330	NWL
HZMB 017		2012-07-10	330	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 016		2013-07-08	706	NWL
		2012-12-11	539	NWL
		2012-09-18	446	NWL
		2012-09-04	421	NWL
		2012-07-10	330	NWL
HZMB 015		2012-07-10	330	NEL
HZMB 014	NL176	2012-08-06	373	NWL
		2012-06-13	295	NEL
		2011-11-06	Baseline	NEL
		2011-11-01	Baseline	NEL
		2011-11-01	Baseline	NEL
HZMB 013		2012-05-28	281	NWL
HZMB 012		2012-05-28	281	NWL
HZMB 011	EL01	2013-02-22	597	NEL
		2013-02-21	592	NEL
		2013-02-14	572	NEL
		2012-11-06	517	NEL
		2012-09-19	452	NWL
		2012-03-31	261	NEL
		2011-11-02	Baseline	NWL
		2011-11-01	Baseline	NEL
HZMB 009		2012-05-28	281	NWL
HZMB 008		2012-05-28	281	NWL
HZMB 007	NL246	2012-12-10	529	NEL
HZMB 006		2013-02-21	594	NEL
		2012-12-11	539	NWL
		2012-11-01	495	NWL
		2012-03-29	250	NWL
HZMB 005		2012-12-10	532	NWL
		2012-08-06	374	NWL
		2012-05-28	287	NWL
HZMB 004		2012-09-04	421	NWL
		2012-03-31	262	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 003	NL179	2013-06-25	697	NWL
		2012-12-10	529	NEL
		2012-03-31	261	NWL
		2011-11-06	Baseline	NEL
		2011-09-16	Baseline	NWL
HZMB 002	WL111	2013-02-14	573	NWL
		2012-12-11	536	NWL
		2012-12-11	535	NWL
		2012-10-12	466	NWL
		2012-10-24	475	NWL
		2012-05-28	281	NWL
		2012-03-29	250	NWL
HZMB 001	WL46	2013-08-21	771	NWL
		2013-06-13	681	NWL
		2013-04-01	617	NWL
		2013-02-14	573	NWL
		2012-03-29	250	NWL
	CH98	2011-11-02	Baseline	NWL
	NL11	2011-11-02	Baseline	NWL
		2011-11-07	Baseline	NWL
	NL12	2011-11-02	Baseline	NWL
	NL33	2011-09-23	Baseline	NWL
		2011-11-01	Baseline	NEL
		2011-11-05	Baseline	NWL
		2011-11-07	Baseline	NWL
	NL37	2011-09-16	Baseline	NWL
	NL46	2011-10-28	Baseline	NWL
	NL48	2011-09-16	Baseline	NWL
		2011-11-02	Baseline	NWL
		2011-11-07	Baseline	NWL
	NL75	2011-09-16	Baseline	NWL
		2011-09-16	Baseline	NWL
		2011-11-01	Baseline	NEL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	NL80	2011-11-02	Baseline	NWL
	NL93	2011-11-05	Baseline	NWL
		2011-11-07	Baseline	NWL
	NL98	2011-10-06	Baseline	NEL
		2011-11-01	Baseline	NEL
		2011-11-06	Baseline	NEL
		2011-11-07	Baseline	NWL
	NL120	2011-10-10	Baseline	NWL
		2011-11-06	Baseline	NEL
	NL123	2011-10-06	Baseline	NWL
		2011-10-10	Baseline	NWL
		2011-11-06	Baseline	NEL
	NL214	2011-10-28	Baseline	NWL
		2011-11-02	Baseline	NWL
		2011-11-05	Baseline	NWL
	NL220	2011-10-10	Baseline	NEL
	NL224	2011-10-28	Baseline	NWL
	NL226	2011-11-05	Baseline	NWL
	NL230	2011-11-02	Baseline	NWL
	NL233	2011-09-16	Baseline	NWL
		2011-10-06	Baseline	NWL
		2011-10-28	Baseline	NWL
	NL241	2011-09-16	Baseline	NWL
		2011-11-02	Baseline	NWL
		2011-11-07	Baseline	NWL
	NL244	2011-11-01	Baseline	NWL
		2011-11-01	Baseline	NEL
	NL246	2011-09-16	Baseline	NWL
		2011-11-06	Baseline	NEL
	NL256	2011-11-02	Baseline	NWL
	NL258	2011-09-16	Baseline	NWL
	NL259	2011-11-07	Baseline	NWL
	NL261	2011-11-01	Baseline	NEL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	NL264	2011-09-23	Baseline	NWL
		2011-10-06	Baseline	NEL
		2011-11-06	Baseline	NEL
	NL269	2011-11-02	Baseline	NWL
	NL272	2011-09-16	Baseline	NWL
		2011-10-28	Baseline	NWL
		2011-11-02	Baseline	NWL
		2011-11-05	Baseline	NWL
	NL278	2011-11-02	Baseline	NWL
	NL279	2011-11-02	Baseline	NWL
	SL42	2011-11-02	Baseline	NWL
	SL43	2011-10-28	Baseline	NWL
	WL04	2011-09-16	Baseline	NWL
		2011-10-10	Baseline	NWL
		2011-11-02	Baseline	NWL
		2011-11-05	Baseline	NWL
	WL05	2011-11-01	Baseline	NEL
		2011-11-01	Baseline	NEL
	WL11	2011-11-07	Baseline	NWL
	WL25	2011-09-16	Baseline	NWL
	WL88	2011-09-16	Baseline	NWL
	WL111	2011-11-02	Baseline	NWL
	WL116	2011-09-16	Baseline	NWL
	WL124	2011-11-02	Baseline	NWL
	WL156	2011-10-28	Baseline	NWL
	WL162	2011-09-16	Baseline	NWL

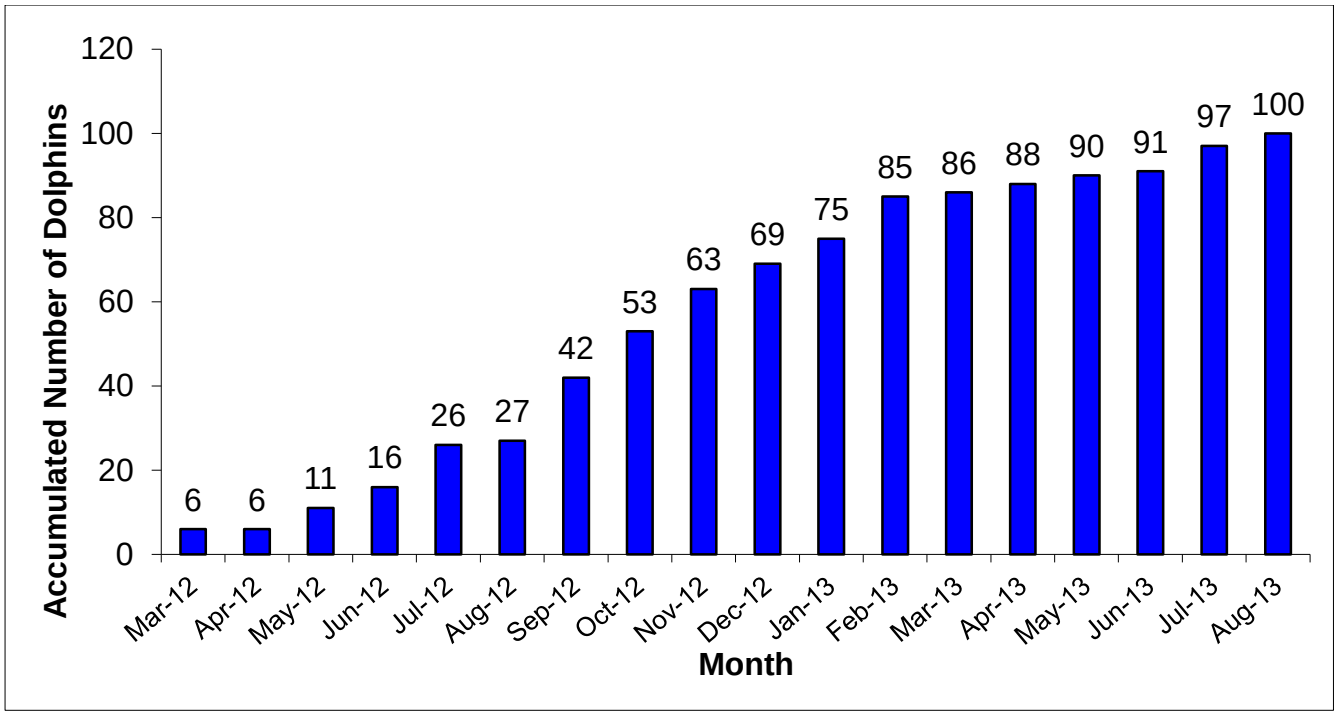

Figure 1. Accumulated Dolphin Identifications Since March 2012

HZMB 001 2013-06-13_10-08-27_01

HZMB 001 2013-08-21_13-58-34_02

HZMB 003 2013-06-25_15-07-37 _02

HZMB 016 2013-07-08_09-35-08 _03

HZMB 022 2013-07-08_13-48-13 _02

HZMB 023 2013-07-08_17-15-23 _02

HZMB 026 2013-06-25_14-55-26 _02

HZMB 040 2013-07-08_16-58-33 _01

HZMB 045 2013-06-13_13-41-07_03

HZMB 054 2013-07-08_13-49-28

HZMB 054 2013-08-30_15-50-10

HZMB 069 2013-07-08_14-12-01 _01

HZMB 069 WL_2013-08-21_14-35-22_01

HZMB 076 2013-07-08_09-35-42

HZMB 077 2013-07-08_09-45-55

HZMB 085 2013-06-26_15-17-59 _01

HZMB 090 2013-06-13_13-41-30_02

HZMB 090 2013-06-25_14-55-43 _01

HZMB 094 2013-06-25_16-08-36 _02

HZMB 094 2013-06-26_15-17-59 _01

HZMB 095 2013-06-13_13-39-12_03

HZMB 095 2013-06-25_15-14-57

HZMB 095 2013-08-30_16-04-12_01

HZMB 098 2013-07-08_14-01-37 _01

HZMB 098 2013-07-08_14-01-46 _03

HZMB 099 2013-06-13_10-00-15_01

HZMB 099 2013-06-13_10-00-39_01

HZMB 100 2013-07-08_09-34-44 _03

HZMB 100 2013-07-08_09-43-16 _03

HZMB 101 2013-07-08_09-35-35 _01

HZMB 101 WL 2013-07-08_09-42-35 _03

HZMB 102 2013-07-08_09-43-13

HZMB 103 2013-07-08_13-52-32 _02

HZMB 104 2013-07-08_14-00-59 _01

HZMB 104 2013-07-08_14-08-35 _02

HZMB 105 WL 2013-07-08_14-17-45

HZMB 106 WL_2013-08-21_09-37-43

HZMB 107 2013-08-21_11-54-23_02

HZMB 107 2013-08-21_12-01-31_01

HZMB 108 2013-08-30_16-04-04_02

APPENDIX I
QUARTERLY SUMMARY OF WASTE FLOW TABLE

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for August / 2013 (year)

Project : Hong Kong – Zhuhai – Macao Bridge, Hong Kong Boundary Crossing Facilities – Reclamation Works Contract No.: HY/2010/02

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete (see Note 1)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste (see Note 4)	Others, e.g. general refuse (see Note 3)
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan-13	0.0000	0.0000	0.0000	0.0000	0.0000	100.2272	0.0000	0.0000	0.0000	1.4000	0.0325
Feb-13	0.0000	0.0000	0.0000	0.0000	0.0000	49.3183	0.0000	0.0000	0.0000	0.2000	0.0195
Mar-13	0.0000	0.0000	0.0000	0.0000	0.0000	121.1545	0.0000	0.0000	0.0000	2.0000	0.0130
Apr-13	0.0000	0.0000	0.0000	0.0000	0.0000	197.7428	0.0000	0.0000	0.0000	0.0000	0.0260
May-13	0.0000	0.0000	0.0000	0.0000	0.0000	360.3733	0.0000	0.0000	0.0000	1.2000	0.0130
Jun-13	0.0000	0.0000	0.0000	0.0000	0.0000	415.9366	0.0000	0.0000	0.0000	0.0000	0.0130
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	1244.7528	0.0000	0.0000	0.0000	4.8000	0.1170
Jul-13	0.0000	0.0000	0.0000	0.0000	0.0000	397.7040	0.0000	0.0000	0.5501	4.0000	0.0260
Aug-13	0.0000	0.0000	0.0000	0.0000	0.0000	447.7517	0.0000	0.0040	0.0000	1.6000	0.0325
Sep-13											
Oct-13											
Nov-13											
Dec-13											
Total	0.0000	0.0000	0.0000	0.0000	0.0000	2090.2085	0.0000	0.0040	0.5501	10.4000	0.1755

Notes: (1) Broken concrete for recycling into aggregates.

(2) Plastics refer to plastic bottles/ containers, plastic sheets/ foam from packaging materials.

(3) Use the conversion factor : 1 full load of dumping truck being equivalent to 6.5m^3 by volume.

(4) Chemical waste refer to spent “battery” and “oil with water”.

APPENDIX J
CUMULATIVE STATISTICS ON EXCEEDANCES, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

Appendix J

Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

Cumulative statistics on Exceedances

		Total no. recorded in this month	Total no. recorded since project commencement
1-Hour TSP	Action	-	-
	Limit	-	-
24-Hour TSP	Action	-	-
	Limit	-	-
Noise	Action	-	-
	Limit	-	-
Water Quality	Action	-	-
	Limit	-	-
Dolphin Monitoring	Action	-	-
	Limit	-	-

Remarks: Exceedances which are not project-related are not presented in this table.

Cumulative statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

	Date Received	Subject	Status	Total no. received in this month	Total no. received since project commencement
Environmental complaints	-	-	-	-	8
Notification of summons	-	-		-	1
Successful Prosecutions	-	-	-	-	1

APPENDIX K EVENT ACTION PLAN FOR DOLPHIN MONITORING

Appendix K – Event Action Plan

Event / Action Plan for Air Quality

Event	Action			
	ET Leader	IEC	ER	Contractor
Action Level				
Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Limit Level				
Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Construction Noise

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Action Level	1. Notify IEC and Contractor; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Water Quality

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Action level being exceeded by one sampling day	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Repeat measurement on next day of exceedance to confirm findings.	1. Check monitoring data submitted by ET and Contractor's working methods; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of non-compliance in writing; 2. Discuss with IEC on the proposed mitigation measures; 3. Make agreement on mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER; 5. Implement the agreed mitigation measures. 6. Amend working methods if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Action level being exceeded by two or more consecutive sampling days	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Action level; 8. Repeat measurement on next day of exceedance to confirm findings.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of non-compliance in writing; 2. Discuss with IEC on the proposed mitigation measures; 3. Make agreement on mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER within 3 working days of notification; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Limit level being exceeded by one sampling day	1. Repeat *in-situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.

Event	Action			
	ET Leader	**IEC**	**ER**	**Contractor**
Limit level being exceeded by two or more consecutive sampling days	1. Repeat *in-situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the ER accordingly.	1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Make agreement on the mitigation measures to be implemented; 5. Ensure mitigation measures are properly implemented; 6. Assess the effectiveness of the implemented mitigation measures; 7. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Take immediate action to avoid further exceedance; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER; 6. Implement the agreed mitigation measures; 7. Resubmit proposals of mitigation measures if problem still not under control; 8. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

Event / Action Plan for Dolphin Monitoring

Event	ET Leader	IEC	ER / SOR	Contractor
Action Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor.	1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If ER/SOR is satisfied with the proposal of any other measures, ER/SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the ER/SOR; 3. Implement the agreed measures.
Limit Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor of findings; 5. Check monitoring data;	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If ER/SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring

	6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.	by ET and Contractor and advise ER/SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly.	3. Supervise the implementation of additional monitoring and/or any other mitigation measures.	and/or any other mitigation measures.

APPENDIX L INVESTIGATION REPORT ON CHINESE WHITE DOLPHIN SURVEY

Report No. **D002**
Monitoring Period **June 2013- August 2013**

The Action and Limit Levels of Chinese White Dolphin (CWD) monitoring which was extracted from the enhanced Event and Action Plan[#] are reproduced below:

	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG<4.2) & (ANI<15.5)	(STG<6.9) & (ANI<31.3)
Limit Level	[(STG<2.4) & (ANI<8.9)] AND [(STG<3.9) & (ANI<17.9)]	

Quarterly Encounter Rate

	STG*	ANI**	Level Exceeded
NEL	1.8	1.8	Action
NWL	5.7	16.6	Action

Investigation Results:

a) Causes of exceedance

- After review of all available and relevant data, including the raw data and analyses of other parameters included in the EM&A, no significant variation is detected in key environmental parameters. Further a summary of a regression analyses presented in the latest report (AFCD 2013) shows that there has been a significant decrease in dolphin abundance since the early 2000's, more than a decade prior to Project commencement. There is a long term analyses of significant population decline and review of available data suggests that this is the factor which is most manifest in encounter rate trends.
- No direct relationship with Project construction activities can be found between either the increase or decrease of dolphin numbers in NEL. It is known from other studies that dredging, piling and underwater demolition activities cause significant disturbance to marine mammals (Pirotta et al 2013; Bailey et al 2010; Gotz et al 2009) and none of these activities occur as part of this Project
- NWL has seen increasing work activities not as part of this project works. Two known factors to cause disturbance to dolphins outside the Project do occur within NEL and NWL during this period; dredging works at the Brothers Islands and; piling works within the NWL area and none of these activities occur as part of this Project.
- Current mitigation measures are being upheld.
- There has been no failure or reduction of dolphin-specific mitigation measures.

At this time it is not possible to make a conclusive assessment of the Project impact on dolphins.

b) Action required under the action plan

Please refer to corresponding Event and Action Plan.

c) Action taken under the action plan

1. Statistical data analysis has been repeated to confirm findings;
2. All available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A have been reviewed;
3. Identification of source of impact was carried out;
4. The IEC, ER and Contractor have been informed of findings;
5. Monitoring data have been checked
6. Repeated review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary;
7. After investigation, no evidence shows that exceedances are related to Project works.

d) ET's conclusions and recommendations for mitigation

Current mitigation measures for CWD are being implemented fully, and the Contractor has been reminded to consistently implement exisiting mitigation measures.

e) Contractor's actions to implement the mitigation

N/A

Please refer to the attachment for the full investigation result.

[#] Reference is made to the enhanced Event Action Plan for Chinese White Dolphin Monitoring accepted by EPD on 7 May 2013.

*Quarterly Average Encounter Rate of Number of Dolphin Sightings (STG) presents averaged encounter rates of the three monitored months in terms of groups per 100km per survey event.

**Quarterly Average Encounter Rate of Total Number of Dolphins (ANI) presents averaged encounter rates of the three monitored months in terms of individuals per 100km per survey event.

ET Leader Signature & Date: 23-Apr-14

Report No. **D002**
Monitoring Period **June 2013- August 2013**

Investigation Report Attachment

1. Repeat statistical data analysis to confirm findings.

Calculation of quarterly encounter rate of number of dolphin sightings (STG) and quarter encounter rate of total number of dolphins (ANI) were repeated to confirm the action level exceedances.

2. Review all available and relevant data, including raw data and analyses of other parameters covered in the EM&A, to ascertain if differences are a result of natural variation or previously observed seasonal differences.

From the data provided by CHEC and following ongoing discussion and review, it can be surmised that, since June 2013, there have been few differences in construction activities at the Project (HKBCF). New construction activities identified at HKBCF were rock fill for sloping seawall and sand fill reclamation which was conducted within the temporary seawall in portion A of the site. Any potential noise from this filling would have been truncated by the solid seawall. It therefore, seems unlikely that any additional underwater noise could have occurred within NEL due to these activities. In addition, there were no project related water quality exceedences reported for this period. On review of recent AFCD annual monitoring reports (AFCD 2013; 2012; 2011), it appears that a decline in dolphin density and abundance has been apparent in all areas of Hong Kong for some time. Further a summary of a regression analyses presented in the latest report (AFCD 2013) shows that there has been a significant decrease in dolphin abundance since the early 2000's, more than a decade prior to Project commencement. There is a long term analyses of significant population decline and review of available data suggests that this is the factor which is most manifest in encounter rate trends.

3. Identify source(s) of impacts.

Please see above re. long term population decline. As yet, little information is available on the causal factors of dolphin population decline in Hong Kong waters and how any construction activities may affect this. It is known from other studies that dredging, piling and underwater demolition activities cause significant disturbance to marine mammals (Pirotta *et al* 2013; Bailey *et al* 2010; Gotz *et al* 2009) and none of these activities occur as part of this Project but some may do elsewhere in the NEL and NWL areas as well as within other Hong Kong waters and adjacent areas. There is no published PVA or similar which predicts or models population dynamics so it is difficult to discern if the decline in numbers is within the bounds of the documented long term decline or if there are additional influences from other activities known to disturb marine mammals.

4. Check monitoring data.

Relevant data records such as suspended solids (SS) and dolphin monitoring data have been checked.

5. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise if additional measures are necessary.

Current mitigation measures are being upheld and that key environmental parameters have not significantly changed in this period. From June to August, skipper training was provided to captains, marine engineers and sailors and no on site chemical or other spills were reported.

6. Investigate whether the exceedance was caused by any of the construction activity associated with the works contract.

No construction works associated with the Project can be found that coincide with low dolphin encounter rates.

In summary, no causal relationship with any one construction activity at the Project site can be found to link directly with the reduced habitat use of NEL and NWL during the last quarter. NWL has seen increasing work activities not as part of this project works. Two known factors to cause disturbance to dolphins outside the Project do occur within NEL and NWL during this period; dredging works at the Brothers Islands and; piling works within the NWL area. Although no unacceptable changes in environmental parameters of this project have been measured, at this time it is not possible to make a conclusive assessment of the Project impact on dolphins.

Reference:

Pirotta, E., Laesser, B., Hardaker, A., Riddoch, N., Marcoux, M. and Lusseau, D. Dredging displaces bottlenose dolphins from an urbanised foraging patch. Mar. *Pollut. Bull*. 74 (2013) 396-402

Bailey, H., Senior, B., Simmons, D., Rusinb, J., Pickenc, G. and Thompson, P. Assessing underwater noise levels during pile-driving at an offshore windfarm and its potential effects on marine mammals. Mar. *Pollut. Bull* 60 (2010) 888–897

Götz, T., Hastie, G., Hatch, L.T., Raustein, O., Southall, B.L., Tasker, M. and Thomsen, F. (2009). Overview of the impacts of anthropogenic underwater sound in the marine environment. OSPAR Commission Biodiversity Series.