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 December 2013- February 2014

[06/2014]

	Name	Signature
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Ref.: HYDHZMBEEM00_0_2035L.14 26 June 2014

Engineer's Representative By Fax (3698 5999) and By Post
Ove Arup & Partners
Chief Resident Engineer's Office
5 Ying Hei Road, Tung Chung, Lantau
Hong Kong

Attention: Mr. Roger Marechal

Dear Mr. Marechal,

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 Dec 2013 to Feb 2014

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for December 2013 to February 2014 (letter ref. 60249820/C/RMKY14062603 dated 26 June 2014) copied to us by E-mail on 21 May 2014. Please be advised that we have no further comment at this stage.

We would, however, like to draw your attention that the ET shall supplement the Quarterly EM&A Report with respect to the following observation:

1. Multi-parameter analytical approach for dolphin monitoring as per commitment by the ET in their R-t-C to ENPO-E0026 since 24 Dec 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

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. Lim Kim Chuan	(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 December 2013 and 28 February 2014. 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
- Band drain installation
- Backfill cellular structure
- Geotechnical Instrumentation works
- Construction of temporary seawall
- Ground investigation
- Surcharge laying
- Precast Yard setup
- Seawall blocks for temporary construction
- Construction of temporary assess from Portion D to Portion A
- Construction of temporary pier at Portion A
- Sand Drain
- Vibro-compaction on surcharge
- Rubble mound seawall construction

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
- Installed sand bag 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 results were below the Action and Limit Level in the reporting quarter. Six (6) 24-hour TSP results recorded among AMS2, AMS3A and AMS7 exceeded the Action Level and two (2) 24-hour TSP results recorded at AMS3A exceeded the Limit Level at in the reporting quarter. Investigation results show that the exceedances were not related to Project.

Breaches of Action and Limit Levels for Noise

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

Breaches of Action and Limit Levels for Water Quality

Ten (10) Action Level Exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting quarter. Three (3) Limit Level Exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting quarter.

Investigation result shows that the Action Level Exceedance recorded at SR5 and Limit Level Exceedance recorded at IS10 on 18 Dec 13 were related to Project. Investigation result shows that other water quality exceedances were unlikely to be project-related.

Breaches of Action and Limit Levels for Impact Dolphin Monitoring

Two (2) Action Level exceedances were recorded for Chinese White Dolphin monitoring in the reporting quarter.

Triggering of Event and Action Plan for Impact Dolphin Monitoring

Event and Action Plan for Impact Dolphin Monitoring was triggered. For the detail of investigation, please refer to appendix L.

Implementation Status and Review of Environmental Mitigation Measures

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

The recommended environmental mitigation measures effectively minimized the potential environmental impacts from the Project. The EM&A programme effectively monitored the environmental impacts from the construction activities and ensured 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 environmental impacts were kept minimal and recommended environmental mitigation measures were implemented effectively.

Complaint, Notification of Summons and Successful Prosecution

As informed by the Contractor on 5 Dec 13, there was one (1) noise complain related to a barge moving through the southern channel of HyD's construction site after 23:00 on 8.11.2013. Site daily for barges was requested from the Contractor. Referring to the site daily provided by the Contractor, there was no barge operated after 18:25 on 08 Nov 13. The complaint is therefore considered unlikely to be related to the construction works.

As informed by the Contractor on 12 Dec 13. A complaint involves the leakage of sand from barges causing water discoloration at sea near Tuen Mun Pierhead Garden and sand material without properly covered was blown to the inside of the residential area which caused disturbance to residence. With refer to available information provided and monitoring data recorded on 09 Dec 13, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract

As informed by the Contractor on 6 Jan 14. A complaint involves barges loaded with sand material without properly covered was blown to the inside of the residential area of Tuen Mun Pierhead Garden which caused disturbance to residence. With refer to available information provided, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract.

EPD referred a complaint from complainant who advised that blackish mud was found along the edge of the construction site of Hong Kong-Zhuhai-Macao Bridge Hong Kong Project near the airport in the morning of 18 January 2014. Therefore in accordance with the investigation results, the complaint is therefore considered as not related to contract HY/2010/02.

No notification of summons and successful prosecution was received in the reporting period.

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 eighth 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 December 2013 and 28 February 2014.

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
- Band drain installation
- Backfill cellular structure
- Geotechnical Instrumentation works
- Construction of temporary seawall
- Ground investigation
- Surcharge laying
- Precast Yard setup
- Seawall blocks for temporary construction
- Construction of temporary assess from Portion D to Portion A
- Construction of temporary pier at Portion A
- Sand Drain
- Vibro-compaction on surcharge
- Rubble mound seawall construction

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
- Installed sand bag 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		
		December 13	January 14	February 14
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		
			December 13	January 14	February 14
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	1	2	0
		Limit	0	2	0
	AMS7	Action	1	2	0
		Limit	0	0	0
		Total	***2***	***6***	***0***

3.1.5 All 1-Hour TSP results were below the Action and Limit Level in the reporting quarter. Six (6) 24-hour TSP results recorded among AMS2, AMS3A and AMS7 exceeded the Action Level and two (2) 24-hour TSP results recorded at AMS3A exceeded the Limit Level at in the reporting quarter. Investigation results show that the exceedances were not related to Project.

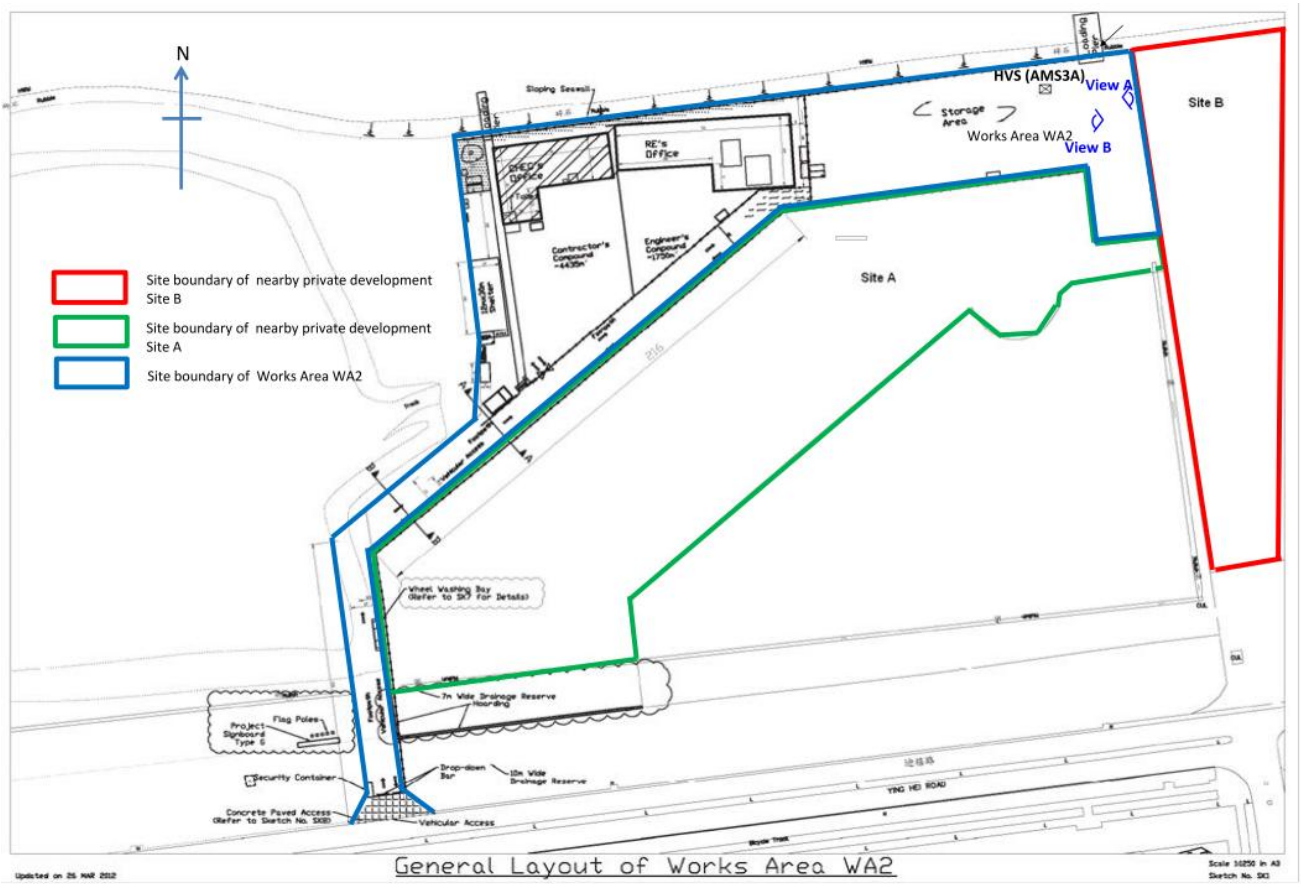
3.1.6 For the 24Hr TSP Action Level exceedance recorded at AMS3A, a result of 212μg/m^3 was recorded on 11 Dec 13 (24-hr TSP).

3.1.6.1 According to information provided by the Contractor, land-based construction activity such as installation of sand bags, delivery of band drain material and stitching of Type 2 geotextile were being undertaken at Works Area WA2 during the monitoring period.

3.1.6.2 Functional checking on HVS at AMS3A was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.6.3 Photo records shows vehicle parking activities were observed inside an area at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA2. (Please also see photo and layout map attached for reference of site conditions (View A.))

3.1.6.4 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 10 and 11 Dec 13 (as attached) east winds was prevailing during the monitoring period. Traffic activities at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA 2 may contribute to the measured dust levels at the monitoring station AMS3A.



Conditions of the construction sites near Works Area WA2:

View A: (Parking lot observed at nearby construction site which do not belongs to this Contract):

View B (Hard paved surface observed at Works Area WA2)

3.1.6.5 The 1-hr TSP values recorded at AMS3A on 11 Dec 13, which are within the monitoring period of the 24-hr TSP, were 84μg/m3, 88μg/m3 and 86μg/m3 respectively. All measured values are well below the Action and Limit Levels.

3.1.6.6 The measured 24-hr TSP values recorded at AMS2 and AMS7 (which are closer to the marine-based works areas) on the same monitoring date were 155μg/m3 and 165μg/m3 respectively, which are below the Action and Limit Levels.

3.1.6.7 The following dust mitigation measures have been implemented at Works Area WA2:

1. Works Area WA2's surface was hard-paved, compacted or hydro-seeded (Please refer to attached layout map and photo record (View B))
2. Vehicle washing facility was provided at vehicle exit points,
3. Measures for preventing fugitive dust emission are provided, e.g. canvas/tarpaulin covers.

3.1.6.8 The dust exceedance was therefore considered not to be due to the Project works.

3.1.6.9 The Contractor was recommended to continue implementing existing dust mitigation measures.

3.1.7 For the 24Hr TSP Action Level exceedance recorded at AMS7, a result of 186μg/m^3 was recorded on 27 Dec 13 (24-hr TSP).

3.1.7.1 According to information provided by the Contractor during the monitoring period. Marine-based construction activity such as band drain, stone column installation and cellular structure installation was being undertaken at C2a, portion D and portion A.

3.1.7.2 Stone column was being installed at the seabed therefore it is considered that stone column installation at Portion D and Portion A is unlikely to contribute to the recorded 24hr-TSP exceedance.

3.1.7.3 Both band drain and cellular structure installation conducted at C2a, portion D and portion A are unlikely to contribute to the recorded 24hr-TSP exceedance due to no significant fugitive dust was expected to be generated in the process.

3.1.7.4 Excavators and generators were operated by ultra low sulphur diesel (ULSD) to minimize the possibility of air pollution have been implemented at throughout the construction site.

3.1.7.5 Photo record below shows that the Contractor implemented dust control measures on works area of Portion A:

3.1.7.6 Functional checking on HVS at AMS7 was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS7. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.7.7 The 1-hr TSP values recorded at AMS7 on 27 Dec 13, which are within the monitoring days of the 24-hr TSP, were 89μg/m^3, 89μg/m^3 and 88μg/m^3 respectively. All measured values are well below the Action and Limit Levels.

3.1.7.8 The measured 24-hr TSP values recorded at AMS2 and AMS3A on the same monitoring date were 93μg/m^3 and 160 μg/m^3 respectively, which are below the Action and Limit Levels.

3.1.7.9 On the other hand, according to observation made at the monitoring station AMS7, there was no non-project potential cause/activity at the surrounding of monitoring station AMS7 which might potentially contribute to the dust action level exceedance.

3.1.7.10 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 27 and 28 Dec 13 (as attached) southwest winds was prevailing during the monitoring period. Construction works carried out by this Contract is unlikely to cause dust exceedance at AMS7 under South-southwest prevailing wind direction.
The dust exceedance was therefore considered not to be due to the Project works.

3.1.7.11 The Contractor was recommended to continue implementing existing dust mitigation measures and the Contractor was reminded ensure to undertake watering at least 8 times per day on all exposed soil within the Project site and associated work areas throughout the construction phase.

3.1.8 For the 24Hr TSP Limit Level exceedance recorded at AMS3A, a result of 502μg/m^3 was recorded on 07 Jan 14 (24-hr TSP).

3.1.8.1 According to information provided by the Contractor, land-based construction activity such as stitching and transloading of Type 2 geotextile were being undertaken at Works Area WA2 during the monitoring period.

3.1.8.2 Functional checking on HVS at AMS3A was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.8.3 Photo records shows fugitive dust were generated by vehicle activities observed inside an area at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA2. (Please also see photo and layout map attached for reference of site conditions (View A.))

View A (fugitive dust were observed at the parking lot of the nearby construction site which do not belongs to this Contract)

3.1.8.4 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 06 and 07 Jan 14 (as attached) Southeast wind was prevailing during the monitoring period. Traffic activities at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA 2 may contribute to the measured dust levels at the monitoring station AMS3A.

3.1.8.5 The 1-hr TSP values recorded at AMS3A on 7 Jan 14, which are within the monitoring period of the 24-hr TSP, were 84μg/m3, 83μg/m3 and 83μg/m3 respectively. All measured values are well below the Action and Limit Levels.

3.1.8.6 The measured 24-hr TSP values recorded at AMS7 (which are closer to the marine-based works areas) on the same monitoring date was133μg/m3, which are below the Action and Limit Levels.

3.1.8.7 The measured 24-hr TSP values recorded at AMS3A on next monitoring date were 154μg/m3, which was below the Action and Limit Level.

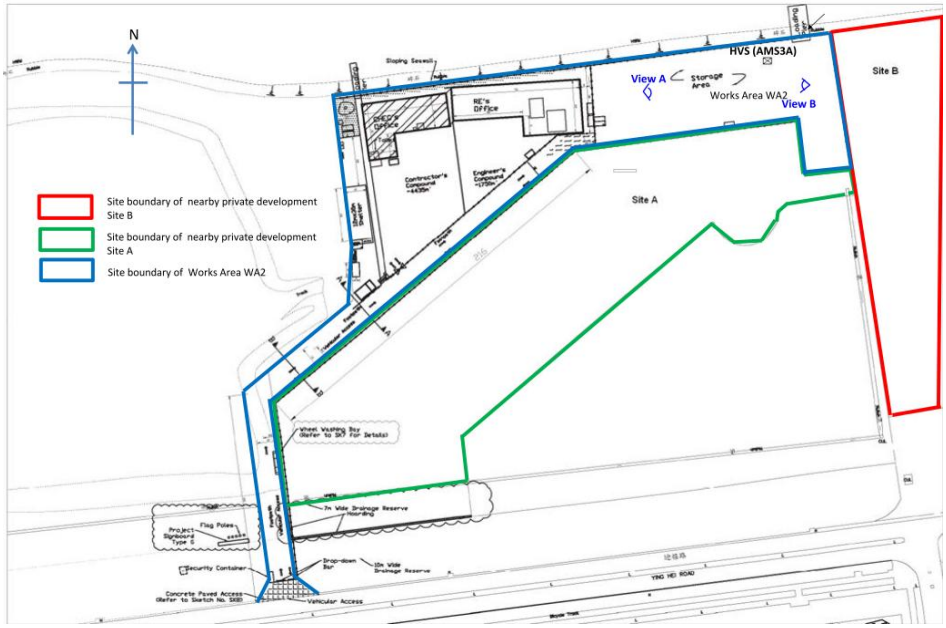
3.1.8.8 The following dust mitigation measures have been implemented at Works Area WA2:

1. Works Area WA2's surface was hard-paved, compacted or hydro-seeded (Please refer to attached layout map and photo record (View B))
2. Vehicle washing facility was provided at vehicle exit points,
3. Measures for preventing fugitive dust emission are provided, e.g. canvas/tarpaulin covers.

3.1.8.9 The Contractor was recommended to continue implementing existing dust mitigation measures.

View B (Hard paved surface observed at Works Area WA2)

The following figure is the General Layout of Works Area WA2



3.1.9 For the 24Hr TSP Action Level exceedance recorded at AMS2, a result of 185μg/m^3 was recorded on 08 Jan 14 (24-hr TSP).

3.1.9.1 According to information provided by the Contractor during the monitoring period. Marine-based construction activity such as band drain, stone column installation and cellular structure installation was being undertaken at C2a, C2c, C1a, C1b, D, E1, E2, A and B.

3.1.9.2 Stone column was being installed at the seabed therefore it is considered that stone column installation at Portion E1, E2 and Portion B is unlikely to contribute to the recorded 24hr-TSP exceedance.

3.1.9.3 Both band drain or cellular structure installation conducted at C2a, C2b, C2c, C1a, C1b, E1, E2, A and B are unlikely to contribute to the recorded 24hr-TSP exceedance due to no significant fugitive dust was expected to be generated in the process.

3.1.9.4 Checking record of Jan 14 shows that plant engine is operated by ULSD.

3.1.9.5 With reference to the weekly joint site inspection records of 2, 9, 16, 22 and 29 of Jan 14, no dark smoke of was observed and this indicates that plant engines are properly maintained.

3.1.9.6 Excavators and generators were operated by ultra low sulphur diesel (ULSD) to minimize the possibility of air pollution have been implemented at throughout the construction site.

3.1.9.7 Functional checking on HVS at AMS2 was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS2. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.9.8 The 1-hr TSP values recorded at AMS2 on 7 Jan 14, were 84μg/m^3, 83μg/m^3 and 85μg/m^3 respectively. All measured values are well below the Action and Limit Levels.

3.1.9.9 The measured 24-hr TSP values recorded at AMS7 (which is located closer to active works than AMS2) on 7 Jan 14 was 133μg/m^3, which was below the Action and Limit Levels.

3.1.9.10 On the other hand, according to observation made at the monitoring station AMS2, there was no non-project potential cause/activity at the surrounding of monitoring station AMS2 which might potentially contribute to the dust action level exceedance.

3.1.9.11 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 7 and 8 Jan 14 (as attached), East-southeast winds were prevailing during the monitoring period. Construction works carried out by this Contract are unlikely to cause dust exceedance at AMS2 under the abovementioned prevailing wind directions.

3.1.9.12 The dust exceedance was therefore considered not to be due to the Project works.

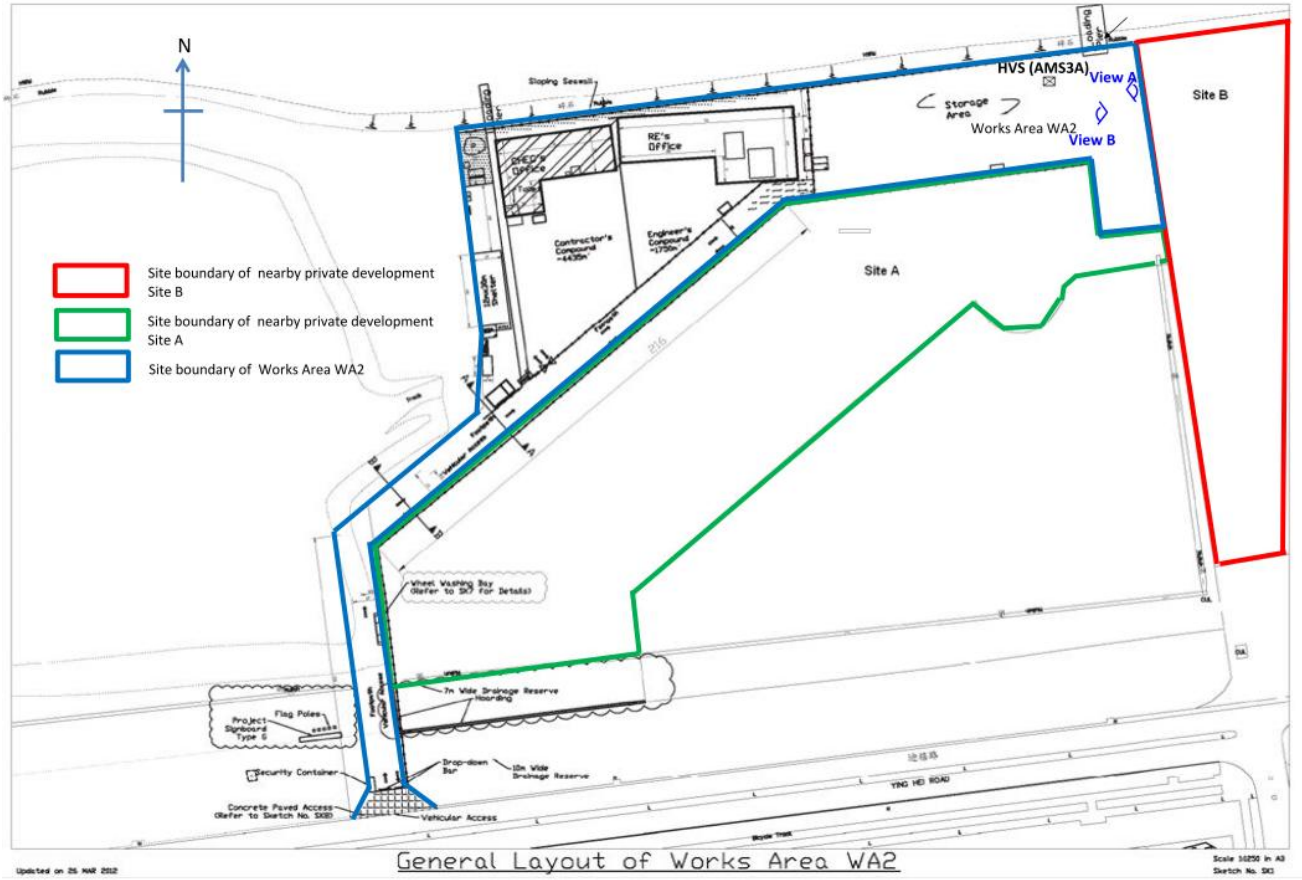
3.1.9.13 The Contractor was recommended to continue implementing existing dust mitigation measures and the Contractor was reminded ensure to undertake watering at least 8 times per day on all exposed soil within the Project site and associated work areas throughout the construction phase.

3.1.10 For the 24Hr TSP Action Level exceedance recorded at AMS3A, a result of 175μg/m^3 was recorded on 18 Jan 14 (24-hr TSP).

3.1.10.1 According to information provided by the Contractor, land-based construction activities such as transloading land band equipment, accessories and installed sand bags were being undertaken at Works Area WA2 during the monitoring period.

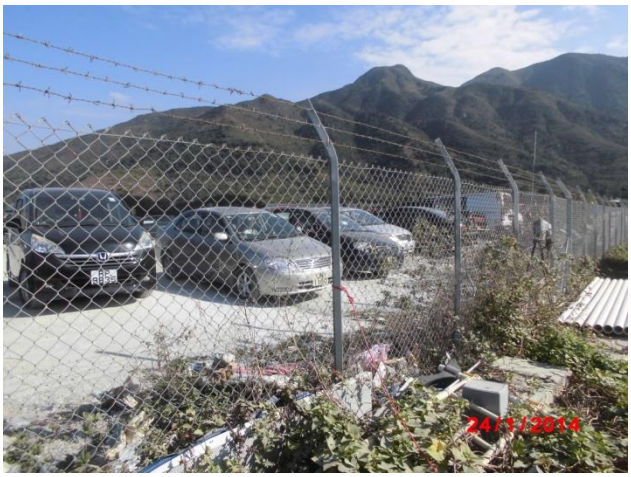
3.1.10.2 Functional checking on HVS at AMS3A was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.10.3 Photo records shows vehicle parking activities were observed inside an area at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA2. (Please also see photo and layout map attached for reference of site conditions (View A.))



General Layout of Works Area WA2

View A (parking lot observed at nearby construction site which do not belongs to this Contract)



3.1.10.4 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 17 and 18 Jan 14 (as attached) South-southeast winds was prevailing during the monitoring period. Traffic activities at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA 2 may contribute to the measured dust levels at the monitoring station AMS3A.

3.1.10.5 The 1-hr TSP values recorded at AMS3A on 18 Jan 14, which are within the monitoring period of the 24-hr TSP, were 84μg/m^3, 83μg/m^3 and 85μg/m^3 respectively. All measured values are well below the Action and Limit Levels.

3.1.10.6 The measured 24-hr TSP values recorded at AMS2 (which are closer to the marine-based works areas) on the same monitoring date were 124μg/m^3, which were below the Action and Limit Levels.

3.1.10.7 The following dust mitigation measures have been implemented at Works Area WA2:

1. Works Area WA2's surface was hard-paved, compacted or hydro-seeded (Please refer to attached layout map and photo record (View B))
2. Vehicle washing facility was provided at vehicle exit points,
3. Measures for preventing fugitive dust emission are provided, e.g. canvas/tarpaulin covers.

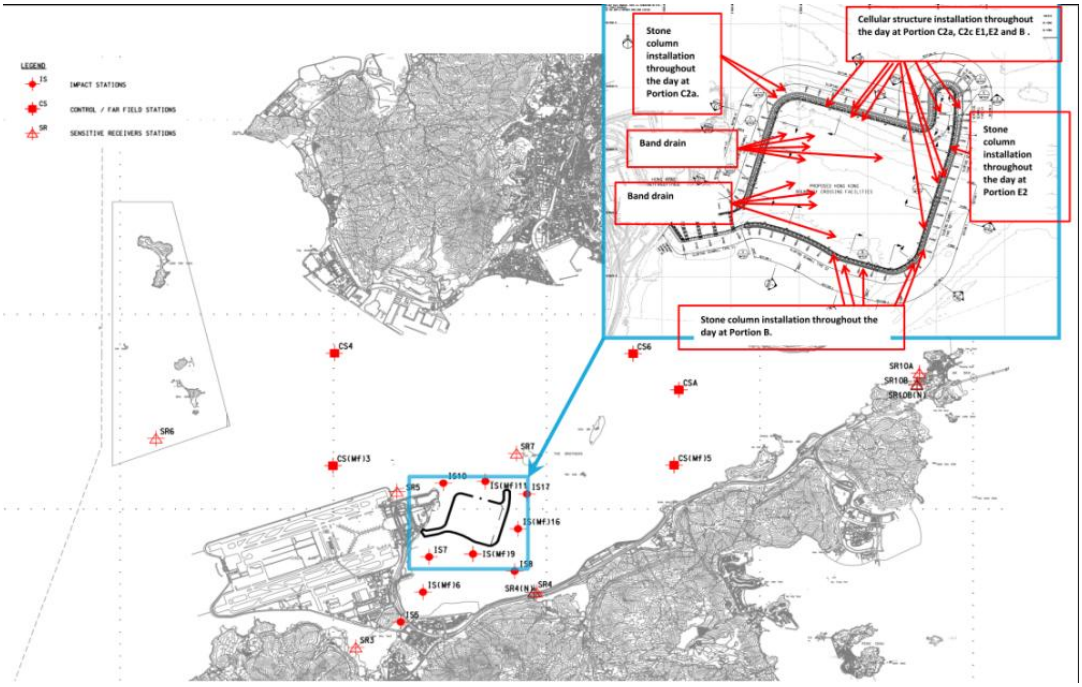
View B (Hard paved surface observed at Works Area WA2)

3.1.10.8 The dust exceedance was therefore considered not to be related to the Project works.

3.1.11 For the 24Hr TSP Action Level exceedance recorded at AMS7, a result of 207μg/m^3 was recorded on 18 Jan 14 (24-hr TSP).

3.1.11.1 According to information provided by the Contractor during the monitoring period. Marine-based construction activity such as band drain, stone column installation and cellular structure installation was being undertaken at all area except Portion D.

3.1.11.2 Stone column was being installed at the seabed therefore it is considered that stone column installation at Portion C2a, Portion E2 and Portion B are unlikely to contribute to the recorded 24hr-TSP exceedance. For active works carried out on 18 Jan 14, please refer to the below layout map.



3.1.11.3 Both band drain or cellular structure installation which was conducted during the monitoring period are considered unlikely to contribute to the recorded 24hr-TSP exceedance due to no significant fugitive dust was expected to be generated in the process.

3.1.11.4 Excavators and generators were operated by ultra low sulphur diesel (ULSD) to minimize the possibility of air pollution have been implemented at throughout the construction site.

3.1.11.5 Checking record of Jan 14 shows that plant engine was operated by ULSD.

3.1.11.6 With reference to the weekly joint site inspection records of 2, 9, 16, 22 and 29 of Jan 14, no dark smoke of was observed and this indicates that plant engines are properly maintained.

3.1.11.7 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 23 and 24 Jan 14, South-southeast winds was prevailing during the monitoring period. However, photo record attached shows that dust control measures was implemented by the Contractor.

Photo record showed that the Contractor implemented dust control measures on pelican barge loaded with rock/sand. The Contractor was reminded to continue to provide dust control measures on pelican barge loaded with rock/sand.

Photo record showed that the Contractor implemented dust control measures such as wind-board installed on pelican barge. The Contractor was reminded to continue to provide such dust control measure.

3.1.11.8 Functional checking on HVS at AMS7 was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.11.9 The 1-hr TSP values recorded at AMS7 on 18 Jan 14, which are within the monitoring days of the 24-hr TSP, were 84μg/m^3, 83μg/m^3 and 83μg/m^3 respectively. All measured values are well below the Action and Limit Levels.

3.1.11.10 The measured 24-hr TSP values recorded at AMS2 and AMS3A on the same monitoring date were 93μg/m^3 and 160μg/m^3 respectively, which are below the Action and Limit Levels.

3.1.11.11 On the other hand, according to observation made at the monitoring station AMS7, there was no non-project potential cause/activity at the surrounding of monitoring station AMS7 which might potentially contribute to the dust action level exceedance.

Photo shows the conditions of the surrounding near the monitoring station AMS7:

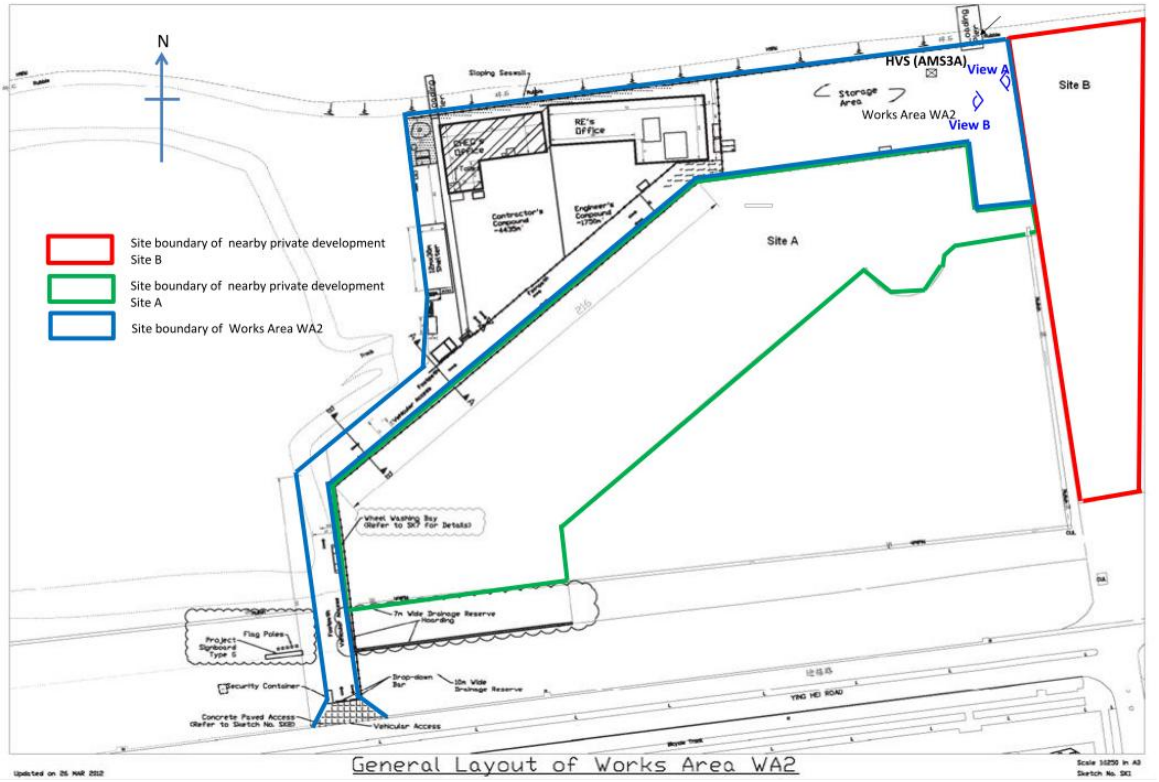
3.1.11.12 The dust exceedance was therefore considered not to be due to the Project works.

3.1.12 For the 24Hr TSP limit Level exceedance recorded at AMS3A, a result of 374μg/m^3 was recorded on 24 Jan 14 (24-hr TSP).

3.1.12.1 According to information provided by the Contractor, land-based construction activities such as transloading band drain material, sand bags and tidy up and clearance of site area were being undertaken at Works Area WA2 during the monitoring period.

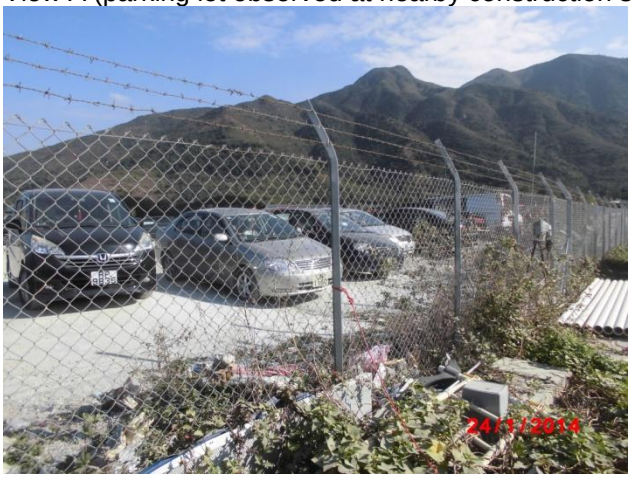
3.1.12.2 Functional checking on HVS at AMS3A was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.12.3 Photo records shows vehicle parking activities were observed inside an area at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA2. (Please also see photo and layout map attached for reference of site conditions (View A.))



General Layout of Works Area WA2

View A (parking lot observed at nearby construction site which do not belongs to this Contract)



3.1.12.4 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 23 and 24 Jan 14 (as attached) Southeast winds was prevailing during the monitoring period. Traffic activities at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA 2 may contribute to the measured dust levels at the monitoring station AMS3A.

3.1.12.5 The 1-hr TSP values recorded at AMS3A on 24 Jan 14, which are within the monitoring period of the 24-hr TSP, were 84μg/m^3, 82μg/m^3 and 81μg/m^3 respectively. All measured values are well below the Action and Limit Levels.

3.1.12.6 The measured 24-hr TSP values recorded at AMS2 and AMS7 (which are closer to the marine-based works areas) on the same monitoring date were 66μg/m3 and109μg/m3, which are below the Action and Limit Levels.

3.1.12.7 The measured 24-hr TSP value recorded at AMS3A on next monitoring date was 183μg/m3, which exceeded the Action Level (The dust exceedance was considered not to be due to the Project works after investigation).

3.1.12.8 The following dust mitigation measures have been implemented at Works Area WA2:

1. Works Area WA2's surface was hard-paved, compacted or hydro-seeded (Please refer to attached layout map and photo record (View B))
2. Vehicle washing facility was provided at vehicle exit points,
3. Measures for preventing fugitive dust emission are provided, e.g. canvas/tarpaulin covers.

View B (Hard paved surface observed at Works Area WA2)

3.1.12.9 The dust exceedance was therefore considered not to be due to the Project works.

3.1.13 For the 24Hr TSP Action Level exceedance recorded at AMS3A, a result of 183μg/m^3 was recorded on 28 Jan 14 (24-hr TSP). And the 24hr-TSP results received on 4 Feb 14.

3.1.13.1 According to information provided by the Contractor, land-based construction activity such removing batch/rolls of materials off site area was being undertaken at Works Area WA2 during the monitoring period.

3.1.13.2 Functional checking on HVS at AMS3A was done. Air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS3A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.13.3 Photo records shows vehicle parking activities were observed inside an area at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA2. (Please also see photo and layout map attached for reference of site conditions (View A.))

View A (parking lot observed at nearby construction site which do not belongs to this Contract)

3.1.13.4 As refer to the wind data collected at wind station at Works Area WA2 during the monitoring period on 28 and 29 Jan 14 (as attached) South-southeast winds was prevailing during the monitoring period. Traffic activities at construction sites of nearby private development project which are close to the monitoring station AMS3A but beyond the site boundary of Works Area WA 2 may contribute to the measured dust levels at the monitoring station AMS3A.

3.1.13.5 The 1-hr TSP values recorded at AMS3A on 29 Jan 14, which are within the monitoring period of the 1-hr TSP, were 83μg/m^3, 84μg/m^3 and 82μg/m^3 respectively. All measured values are well below the Action and Limit Levels.

3.1.13.6 The measured 24-hr TSP values recorded at AMS2 and AMS7 (which are closer to the marine-based works areas) on the same monitoring date were 106μg/m^3 and129μg/m^3, which are below the Action and Limit Levels.

3.1.13.7 The measured 24-hr TSP values recorded at AMS3A on next monitoring date were 79μg/m3, which did not exceed the Action or Limit Level.

3.1.13.8 The following dust mitigation measures have been implemented at Works Area WA2:

1. Works Area WA2's surface was hard-paved, compacted or hydro-seeded (Please refer to attached layout map and photo record (View B))
2. Vehicle washing facility was provided at vehicle exit points,
3. Measures for preventing fugitive dust emission are provided, e.g. canvas/tarpaulin covers.

View B (Hard paved surface observed at Works Area WA2)

3.1.13.9 The dust exceedance was therefore considered not to be due to the Project works.

3.1.14 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.

3.1.15 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 No Action or 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		
		December 13	January 14	February 14
	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		
			December 13	January 14	February 14
	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 Ten (10) Action Level Exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting Quarter. Three (3) Limit Level exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting quarter.

Table 3.5 Summary of Water Quality Exceedances in Dec 13- Feb 14

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	0	0	0	0	**(1) 10 Jan14**	0	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS8	Action	0	0	0	0	0	0	0	**(1) 6 Jan14**	0	**1**
	Limit	0	0	0	0	0	0	0	**(1) 20 Dec13**	0	**1**
IS(Mf)9	Action	0	0	0	0	0	0	0	**(1) 18 Dec13, (2) 6, 15 Jan14**	0	**3**
	Limit	0	0	0	0	0	0	0	**(1) 17 Jan14**	0	**1**
IS10	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	**(1) 18 Dec13**	0	**1**
IS(Mf)11	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)16	Action	0	0	0	0	0	0	0	**(1) 21 Feb14**	0	**1**
	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) 10 Jan14**	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	0	0	0	0
SR5	Action	0	0	0	0	0	0	0	**(1) 18 Dec 13**	0	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
SR6	Action	0	0	0	0	0	0	0	**(1) 3 Jan14**	0	**1**
	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	**(1) 6 Dec13**	0	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
SR10B (N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
Total	**Action**	0	0	0	0	0	0	0	**10**	**10**	
	Limit	0	0	0	0	0	0	0	**3**	**3**	

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

3.3.3 One (1) Action Level exceedance at measured Suspended Solids (mg/L) was recorded on 06 Dec 2013 at monitoring station SR10A at Mid-flood tide. For Action Level exceedances at measured Suspended Solids (mg/L), 28.2 mg/L was recorded at Monitoring Station SR10A.

3.3.3.1 For locations and type of active works carried out on 6 Dec 13, please refer to the above layout map.

3.3.3.2 IS(Mf)11 and IS10 are located downstream and closer to the active works than monitoring station SR10A during flood tide. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during flood tide on the same day at IS(Mf)11 and IS10 were below the Action and Limit Level which indicates project work is unlikely to contribute to the action level exceedance recorded at SR10A.

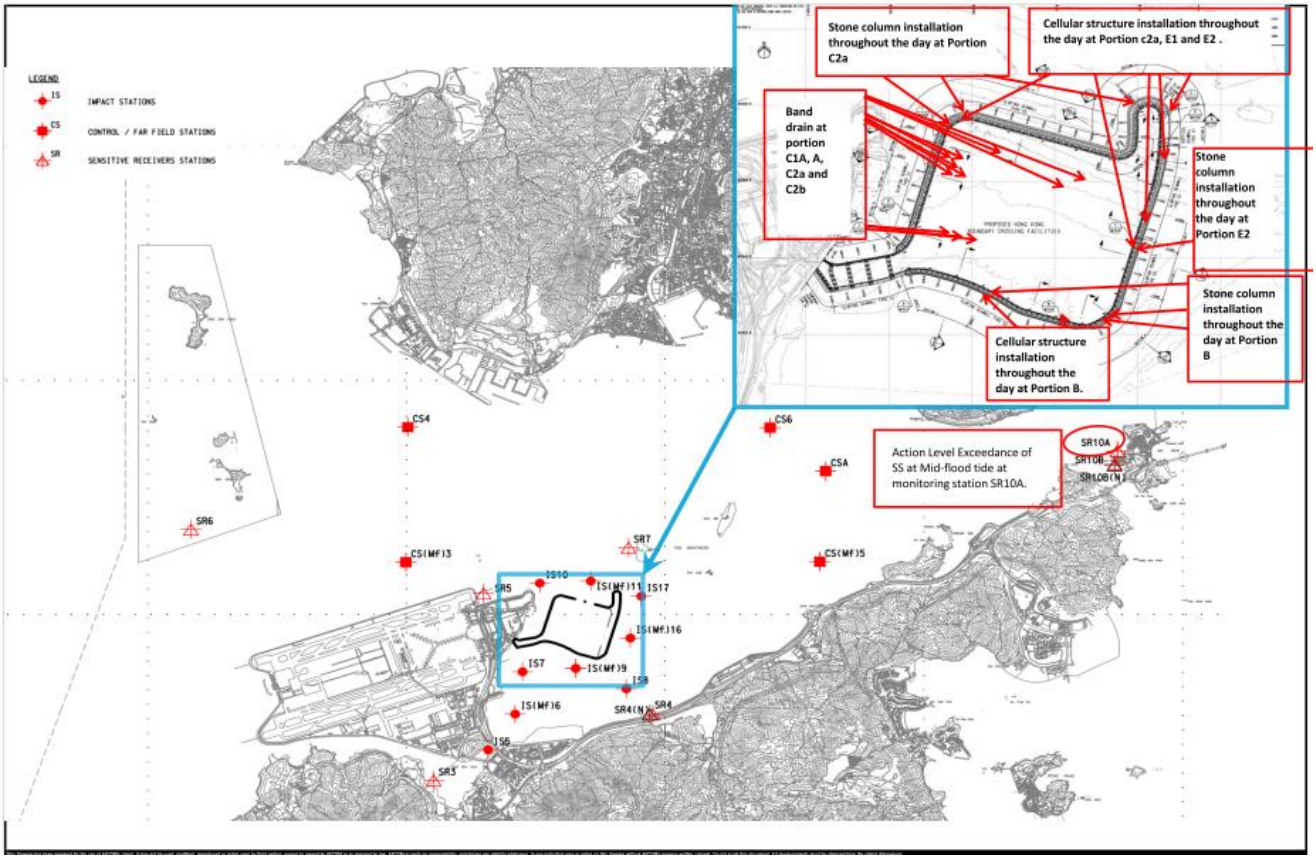
3.3.3.3 The monitoring location of monitoring station SR10A are considered upstream and remote to the active works of this project during flood tide. Therefore it was unlikely that the exceedance recorded at SR10A during flood tide was due to active construction activities of this project.

3.3.3.4 The depth averaged SS (in mg/L) and depth averaged turbidity (in NTU) at CS(Mf)5 is 12mg/L and 18.7NTU respectively which is below the action and limit levels. This indicates that water quality at area closer to active works was not adversely affected.

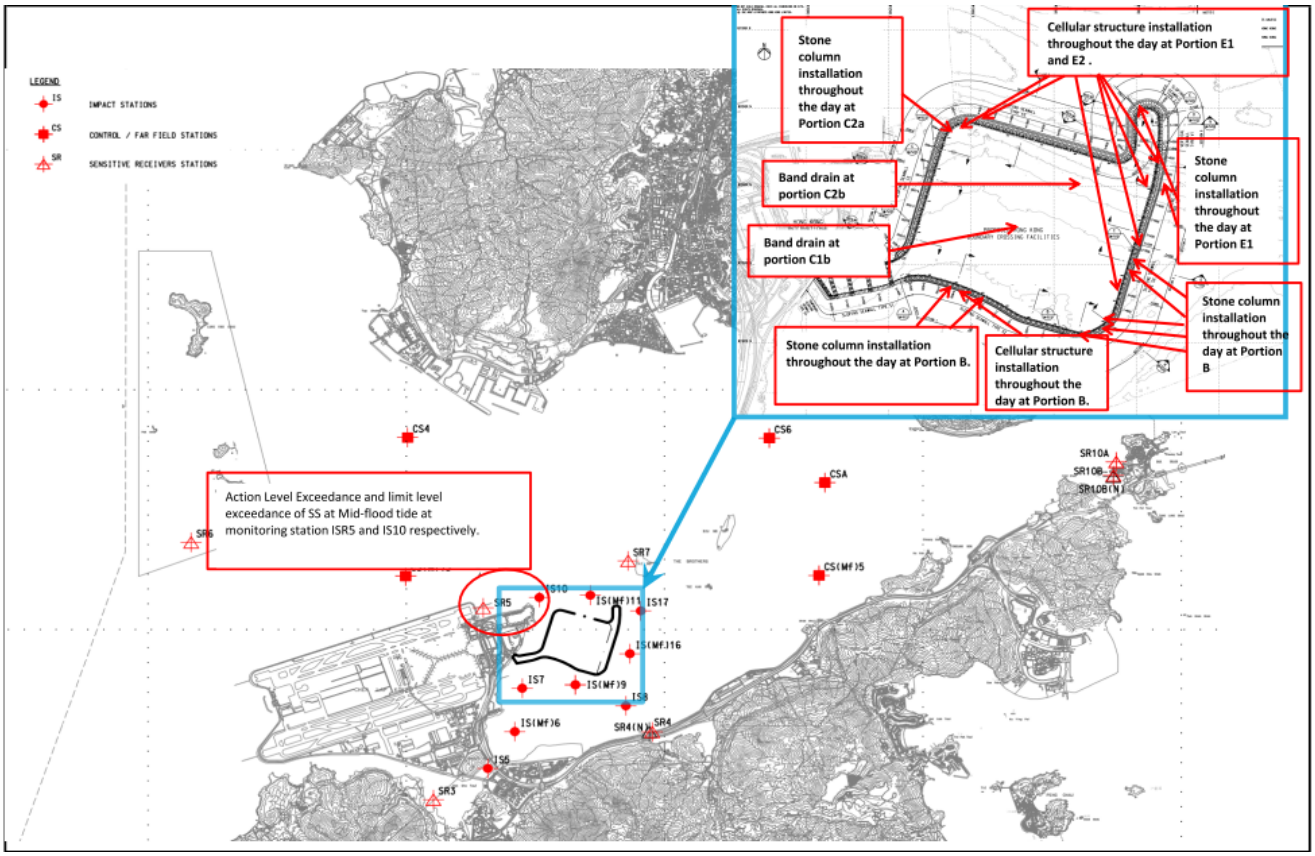
3.3.3.5 The exceedance was likely due to local effects in the vicinity of SR10A.

3.3.3.6 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.

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



3.3.4 One (1) action level exceedances at measured Suspended Solids (mg/L) was recorded on 18 Dec 2013 at monitoring station SR5 at Mid-flood tide and one (1) limit level exceedance at measured Suspended Solids (mg/L) was recorded on 18 Dec 2013 at monitoring station IS10 at Mid-flood tide. For Action Level exceedance at measured Suspended Solids (mg/L), 33.2mg/L were recorded at Monitoring Station SR5. For limit level exceedance at measured Suspended Solids (mg/L), 34.9 mg/L was recorded at Monitoring Station IS10.



3.3.4.1 For locations and type of active works carried out on 18 Dec 13, please refer to the above layout map.

3.3.4.2 Exceedances recorded at SR5 and IS10 are likely due to marine based construction activities of the Project because:

3.3.4.3 With refer to monitoring record, appearance of water was not clear at IS10 and SR5 when compared with the appearance of water at IS(Mf)11 and IS17 during monitoring during Mid-flood tide on 18 Dec 13. This indicates the source of exceedance may not due to works activities at portion E1and E2 which is directly upstream of IS(Mf)11 and IS17. The relatively turbid water observed at IS10 and SR5 may due to activities at Portion C2a during flood tide.

3.3.4.4 As informed by the Contractor, active works like stone column and cellular structure installation were carried out at Portion C2a, E1, E2 and B on18 and 20 Dec 13. With review of the information provided by the Contactor, active works like stone column and cellular structure installation were both carried out at Portion C2a, E1, E2 and B on 16, 18 and 20 Dec 13 at almost the same location but no exceedance was recorded at monitoring station SR5, IS10 and IS(Mf)9 on 16 and 20 Dec 13 during mid flood tide. This indicates stone column and cellular structure installation were unlikely to cause the exceedance at monitoring station SR5, IS10 and IS(Mf)9 on 18 Dec 13.

3.3.4.5 With refer to the silt curtain condition on 18 Dec 13, defects of the perimeter silt curtain was observed at northwest of the construction site.

3.3.4.6 As such, the exceedances recorded at IS10 and SR5 were considered as project related.

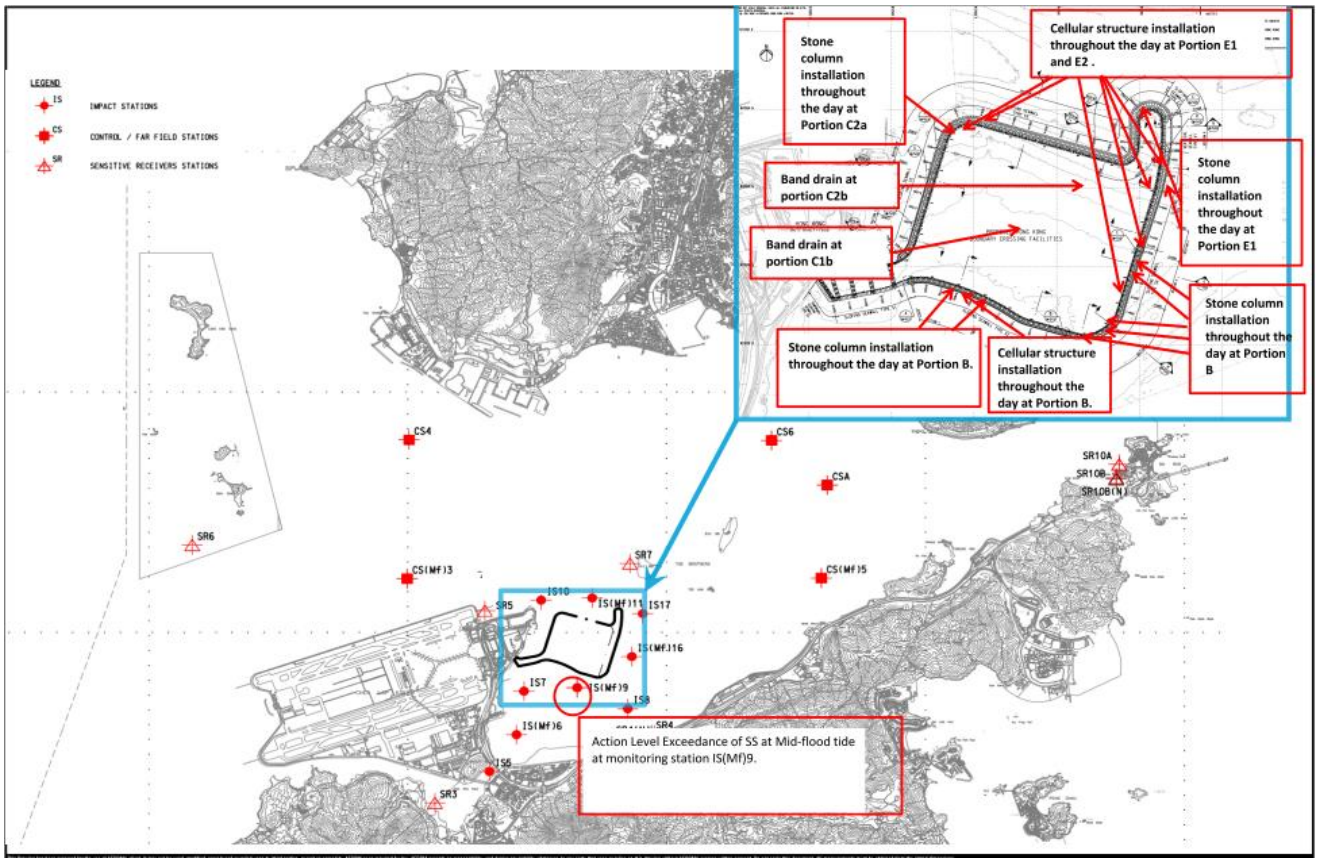
3.3.4.7 For action required under the action plan, please refer to Appendix L - Event Action Plan

3.3.4.8 Action taken under the action plan

1 Water sample was taken on site and was delivered to the laboratory and the SS was not measured in-situ, as a result it is not applicable to “Repeat in situ measurement to confirm findings”
2 With refer to the joint site inspection audit conducted on 19 Dec 13, sources of impact is likely due to the turbine activities and/or movement of vessel at shallow water (at near the entrance at southwestern of the Construction site and/or when vessel’s propeller was turn on at shallow water). The dispersion of turbid water from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain is potentially due to defects of perimeter silt curtain at certain sections.
3 IEC, contractor, ER and EPD were informed on 3 January 13 through notification of exceedance via email;
4 Monitoring data was reviewed, plant, equipment and Contractor's working methods was checked during joint site inspection audit conducted on 19 Dec 13;
5 The Contractor was reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.
6 As informed by the Contractor maintenance work for the defects of the northwest part of the perimeter silt curtain was conducted on 4 January 13.
7 Monitoring results show no recurrence of exceedance of SS at IS10 and SR5 on 20, 23 and 25 of Dec 2013.

3.3.4.9 The exceedances note at IS10 and SR5 on 18 Dec 13 were considered as project related. Although the silt curtain integrity checking record on 4 January 13 shows that the disconnected silt curtain observed on 18 Dec 13 at northwest of HKBCF were rectified, the effectiveness of such rectification will be closely monitored through impact water quality monitoring and inspected through regular site inspection audit. The Contractor was further reminded to ensure provision of ongoing maintenance to the silt curtains and to carry out maintenance work once defects were found.

3.3.5 One (1) action level exceedances at measured Suspended Solids (mg/L) was recorded on 18 Dec 2013 at monitoring station IS(Mf)9 at Mid-flood tide. For the Action Level exceedances at measured Suspended Solids (mg/L), 23.9 mg/L was recorded at Monitoring Station IS(Mf)9.



3.3.5.1 For locations and type of active works carried out on 18 Dec 13, please refer to the above layout map.

3.3.5.2 Exceedance recorded at IS(Mf)9 is unlikely due to marine based construction activities of the Project because:

3.3.5.3 With refer to the silt curtain condition on 18 Dec 13, no defects of the perimeter silt curtain was observed at south and southeast of the construction site.

3.3.5.4 The Depth averaged turbidity (in NTU) and depth averaged SS (in mg/L) of nearby monitoring station, such as IS7, IS8 and IS(Mf)16 were below the action and limit level, indicating the water quality at area nearby IS(Mf)9 was not adverse affected.

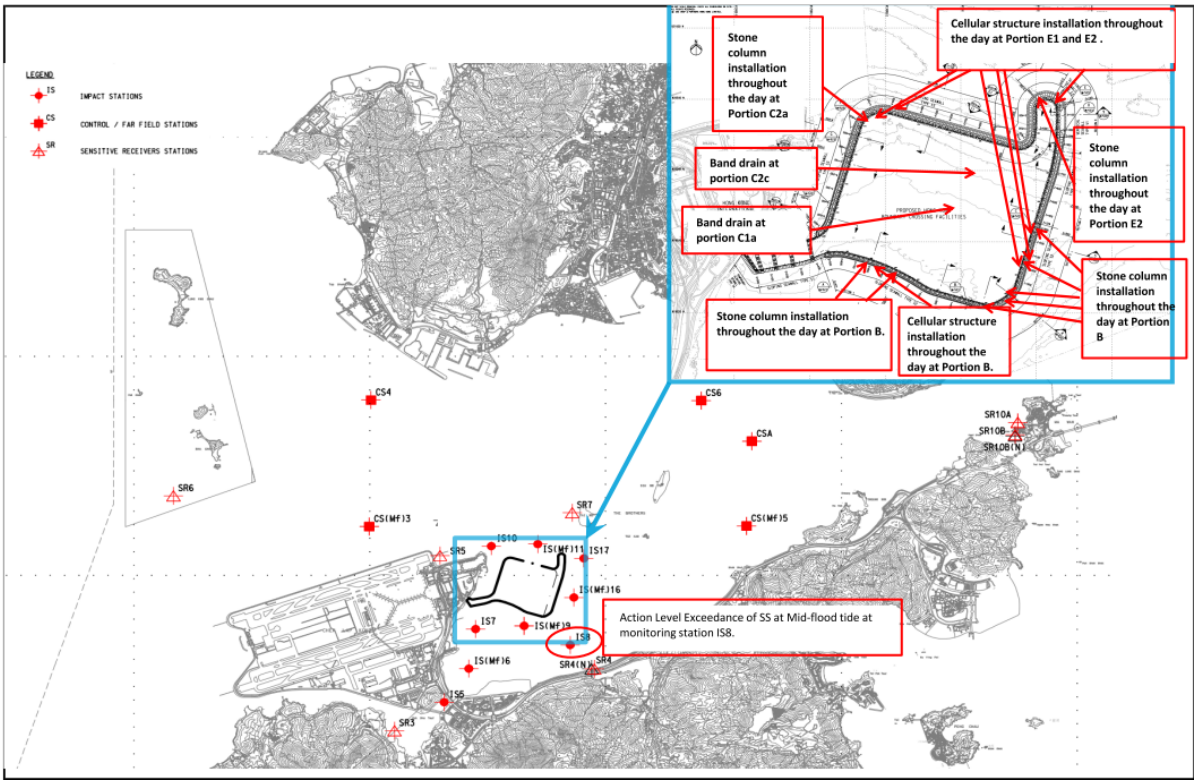
3.3.5.5 With referred to monitoring record, no turbid water or silt plume was observed when monitoring was conducted IS(Mf)9. (Please refer to the attached photo record for reference of sea condition)

3.3.5.6 As such, the exceedance recorded at IS(Mf)9 is considered to be non-project related.

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

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

3.3.6 One (1) Limit Level exceedance at measured Suspended Solids (mg/L) was recorded on 20 Dec 2013 at monitoring station IS8 at Mid-flood tide. For limit exceedance at measured Suspended Solids (mg/L), 44.1 mg/L was recorded at Monitoring Station IS8.



3.3.6.1 For locations and type of active works carried out on 20 Dec 13, please refer to the above layout map.

3.3.6.2 IS(Mf)9 and IS(Mf)16 are located closer to the active works than monitoring station IS8. Depth Average Suspended Solids (SS) values (in mg/L) recorded during the flood tide on the same day at IS(Mf)9 and IS(Mf)16 were below the Action and Limit Level which shows that the water quality closer to active works were not adversely affected.

3.3.6.3 The monitoring location of monitoring station IS8 are considered located upstream to the active works of this project during flood tide. Therefore it was unlikely that the exceedances recorded at IS8 was due to active construction activities of this project.

3.3.6.4 When impact water quality monitoring was carried out during mid flood tide at monitoring location IS8 on 20 Dec 13, no defects of the perimeter silt curtain was observed and no silty plume were observed to flow from the inside to the outside of the site boundary. (For reference, please see attached photo):

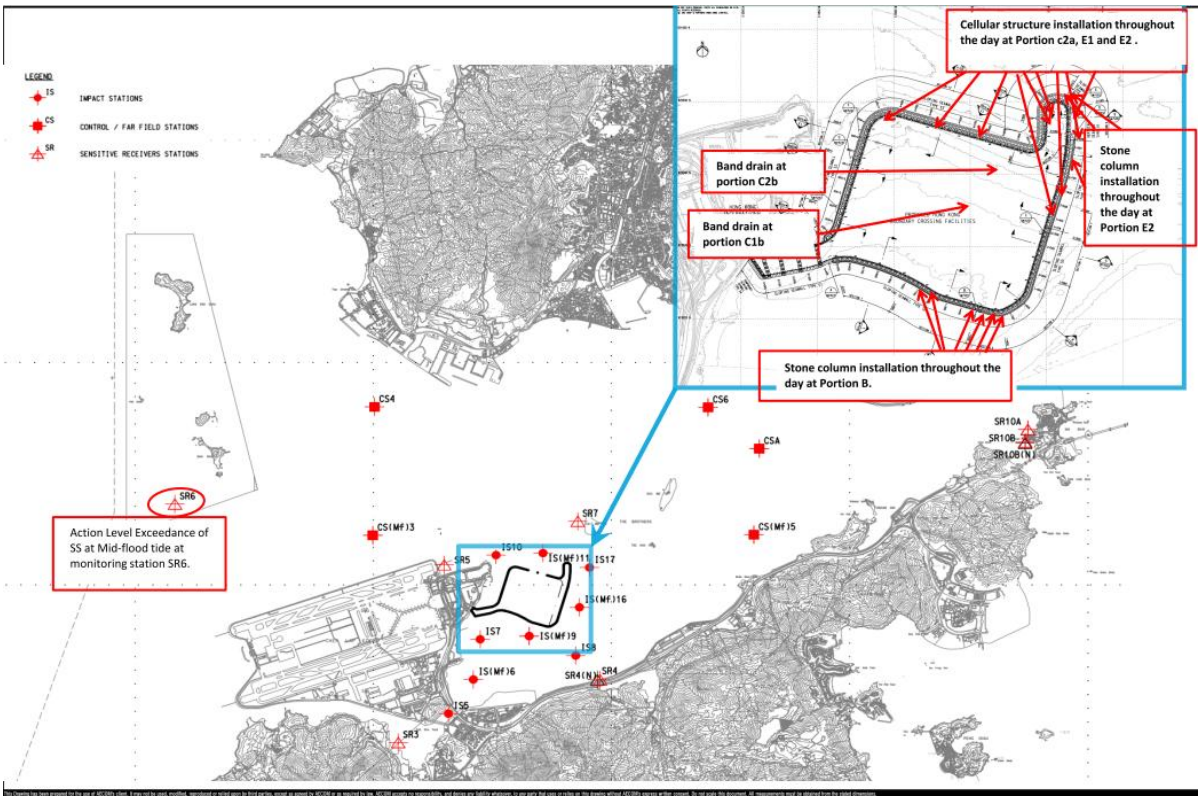
3.3.6.5 Turbidity level (NTU) result recorded on 20 Dec 13 at IS8 during flood tide is 22.3 NTU which is below the Action and Limit Level, this indicates turbidity level was not adversely affected.

3.3.6.6 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.

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

3.3.6.8 The exceedance was likely due to local effects in the vicinity of IS8.

3.3.7 One (1) Action Level exceedance at measured Suspended Solids (mg/L) was recorded on 03 Jan 2014 at monitoring station SR6 at Mid-flood tide. For Action Level exceedances at measured Suspended Solids (mg/L), 23.9 mg/L was recorded at Monitoring Station SR6.



3.3.7.1 For locations and type of active works carried out on 03 Jan 14, please refer to the above layout map.

3.3.7.2 When impact water quality monitoring was carried out during mid flood tide at monitoring location IS10, SR5 and SR6 on 3 Jan 14, no silty plume were observed to flow from the inside to the outside of the nortwestern part of the perimeter silt curtain.

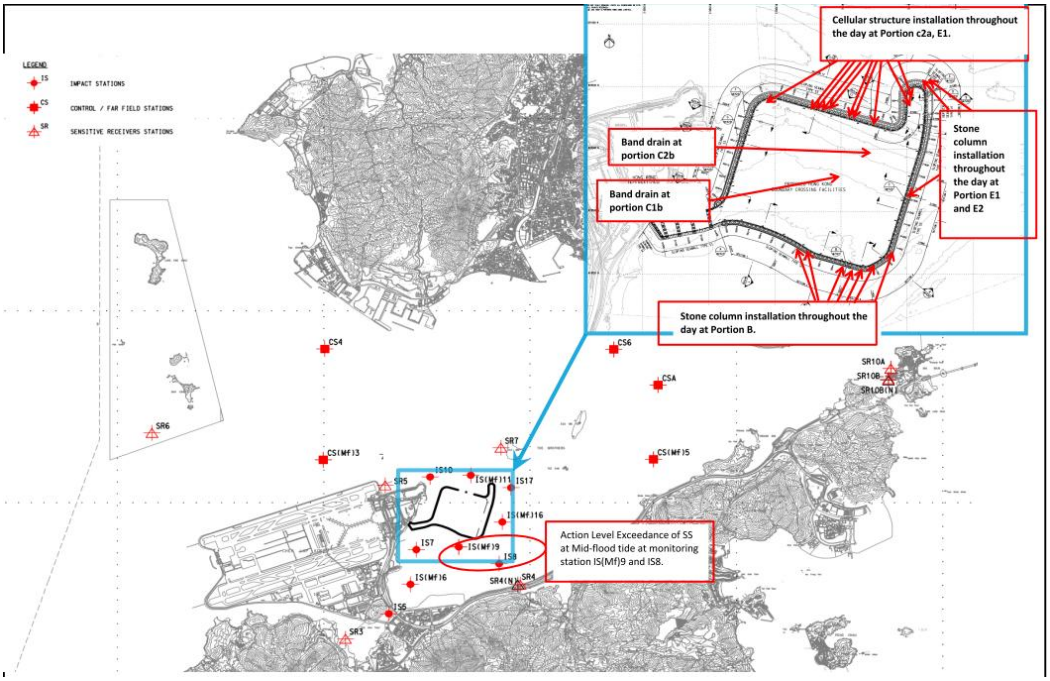
3.3.7.3 IS10, SR5 (located outside northwest part of the perimeter silt curtain) and IS(Mf)11 (located outside north part of the perimeter silt curtain) which are closer to the active works than monitoring station SR6. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during the flood tide on the same day at IS10, SR5 and IS(Mf)11 were below the Action and Limit Level which shows that the water quality closer to active works was not adversely affected.

3.3.7.4 Turbidity level (NTU) results recorded on 03 Jan 14 at SR6, SR5, IS10 and IS(Mf)11 during flood tide are 20.8 NTU, 18.6 NTU, 17.8 NTU and 17.3 NTU which are below the Action and Limit Level, this indicates turbidity level of the area nearby was not adversely affected.

3.3.7.5 The exceedance was likely due to local effects in the vicinity of SR6.

3.3.8 Two (2) action level exceedances at measured Suspended Solids (mg/L) were recorded on 06 Jan 2014 at monitoring station IS(Mf)9 and at monitoring station IS8 at Mid-flood tide. For Action Level exceedance at measured Suspended Solids (mg/L), 24.4mg/L were recorded at Monitoring Station IS(Mf)9 and 25.4mg/L were recorded at Monitoring Station IS8.

3.3.8.1 For works activities carried out on 06 Jan 14, please refer to the attached layout map.



3.3.8.2 The Depth averaged turbidity (in NTU) and depth averaged SS (in mg/L) of nearby monitoring station, such as IS7 and IS(Mf)16 were below the action and limit level, indicating the water quality at area nearby IS(Mf)9 and IS8 was not adverse affected.

3.3.8.3 The turbidity level (in NTU) at IS(Mf)9, IS8, IS7 and IS(Mf)16 were below the action and limit level and no silt plume was observed when monitoring was conducted IS(Mf)9 and IS8, this indicates that the turbidity level (in NTU) at IS(Mf)9, IS8, IS7 and IS(Mf)16 were not adversely affected.

3.3.8.4 Also, with refer to the silt curtain condition on 06 Jan 14, no defects of the perimeter silt curtain was observed at south and southeast of the construction site.

3.3.8.5 The exceedances were likely due to local effects in the vicinity of IS(Mf)9 and IS8.

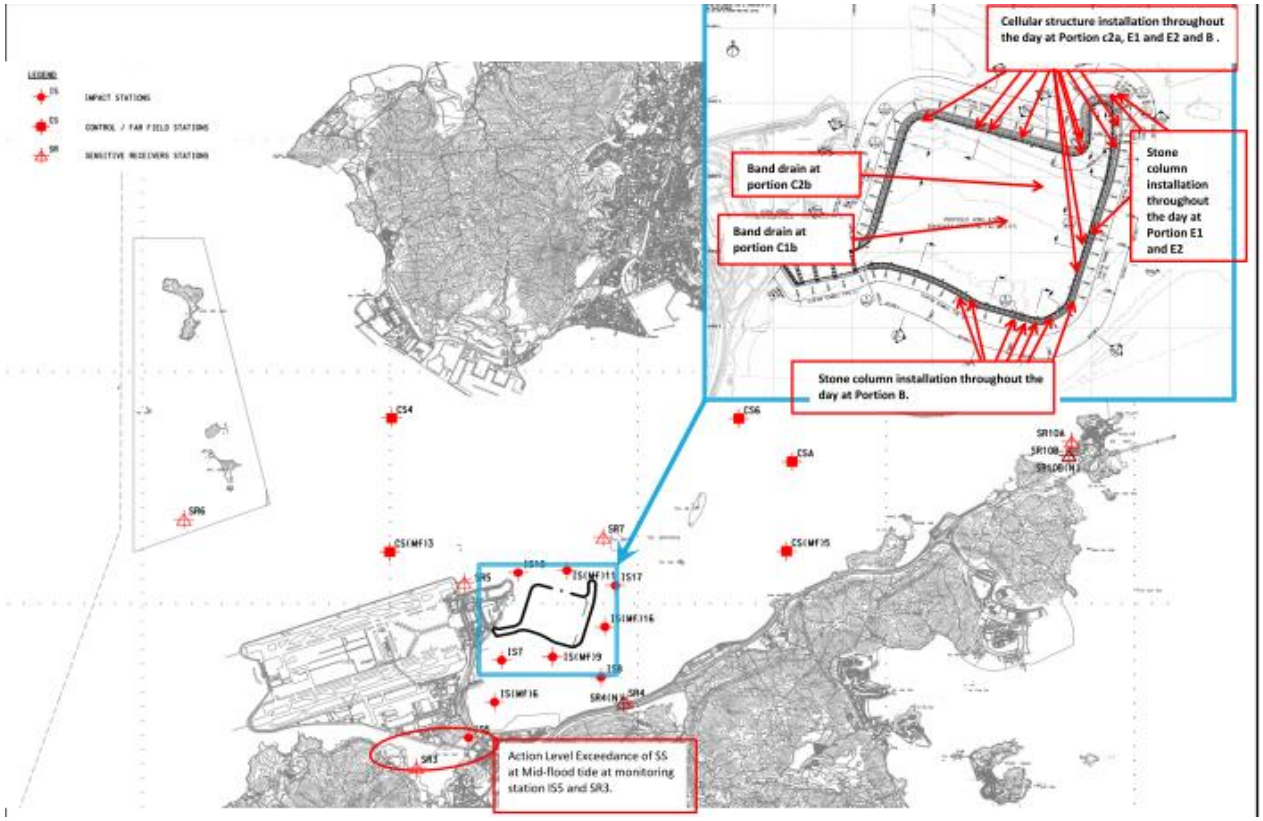
3.3.8.6 As such, the exceedances recorded at IS(Mf)9 and IS8 are considered non-project related.

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

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

3.3.9 Two (2) action level exceedances at measured Suspended Solids (mg/L) were recorded on 10 Jan 2014 at monitoring station IS5 and at monitoring station SR3 at Mid-flood tide. For Action Level exceedances at measured Suspended Solids (mg/L), 25.1 mg/L was recorded at Monitoring Station IS5 and 24.8 mg/L was recorded at Monitoring Station SR3.

3.3.9.1 For site activities carried out on 10 Jan 14, please refer to the below layout map.



3.3.9.2 Suspended solids values recorded at Impact Station IS(Mf) 6, IS(Mf)9 and IS7 located downstream and closer to active wor k than SR3 and IS5 were below the Action and Limit Level during the same tide on the same day. As such, active works is unlikely to cause exceedance to IS5 and SR3.

3.3.9.3 Same type of works was carried out at the same locations on 8, 10 and 13 Jan 14 but Suspended Solids values recorded at SR3 and IS5 on 8 and 13 Jan 14 are all below the Action and Limit Level during the same tide on the these days. As such, active works conducted on 10 Jan 14 are unlikely to cause exceedance to IS5 and SR3.

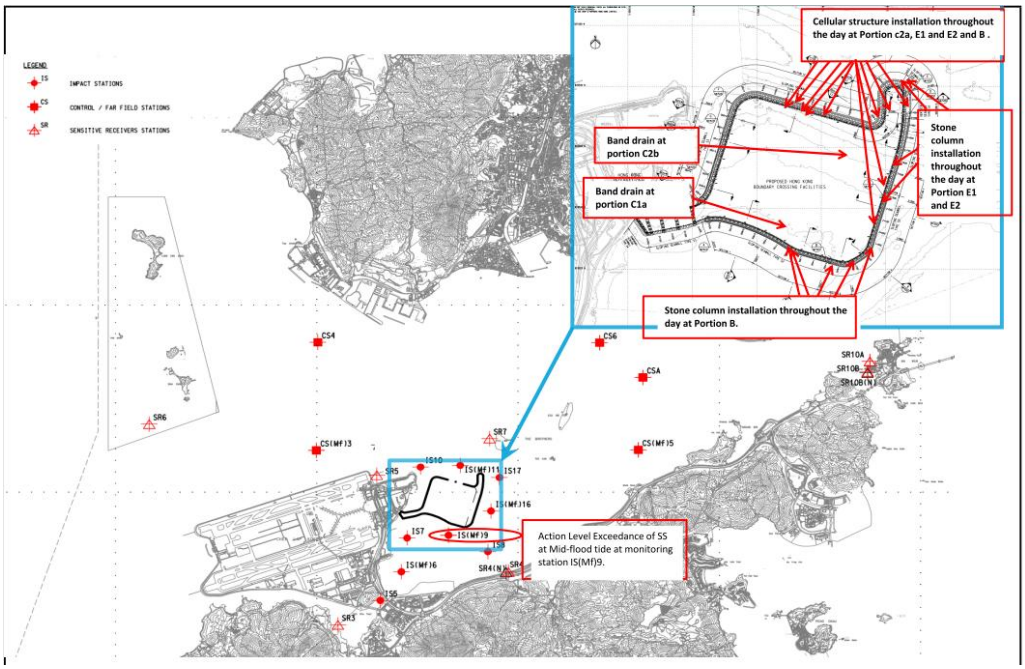
3.3.9.4 Turbidity level recorded at IS7, IS(Mf)6 and IS(Mf)9 were below the action and limit level. This indicated that area closer to active works was not adversely affected.

3.3.9.5 The exceedances were likely due to local effects in the vicinity of IS5 and SR3.

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

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

3.3.10 One (1) Action Level exceedance at measured Suspended Solids (mg/L) was recorded on 15 Jan 2014 at monitoring station IS(Mf)9 at Mid-flood tide. For the Action Exceedance at measured Suspended Solids (mg/L), 26.6 mg/L was recorded at Monitoring Station IS(Mf)9.



3.3.10.1 The Depth averaged turbidity (in NTU) and depth averaged SS (in mg/L) of nearby monitoring station, such as IS8, IS7 and IS(Mf)16 were below the action and limit level, indicating the water quality at area nearby IS(Mf)9 was not adverse affected.

3.3.10.2 Since the turbidity level (in NTU) at IS(Mf)9, IS8, IS7 and IS(Mf)16 were below the action and limit level and no silt plume was observed when monitoring was conducted IS(Mf)9, this indicates that the turbidity level (in NTU) at IS(Mf)9, IS8, IS7 and IS(Mf)16 were not adversely affected. Please refer to the photo record attached for sea condition recorded on 15 Jan 14 at southeast vessel entrance of the perimeter silt curtain (near monitoring station IS(Mf)9).

3.3.10.3 Also, with refer to the silt curtain condition on 15 Jan 14, no defects of the perimeter silt curtain was observed at south and southeast of the construction site.

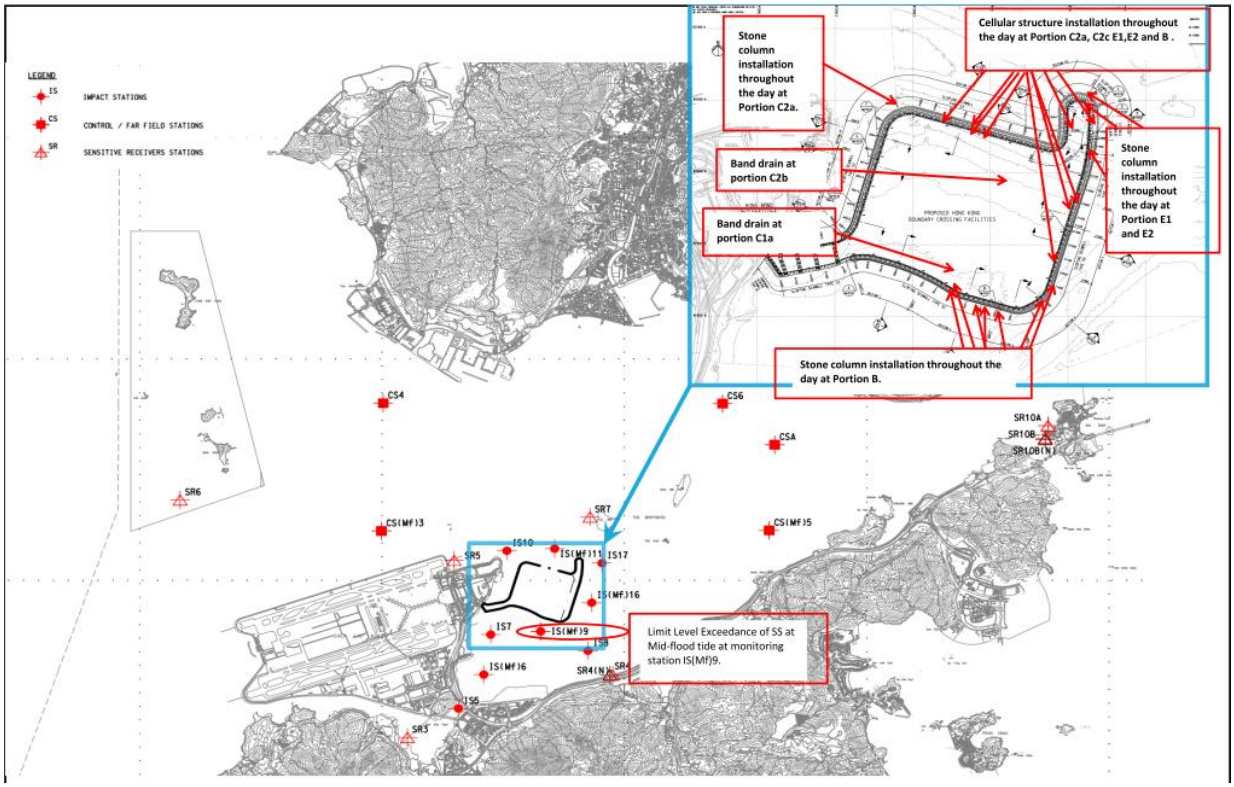
3.3.10.4 The exceedance was likely due to local effects in the vicinity of IS(Mf)9.

3.3.10.5 As such, the action level exceedance recorded at IS(Mf)9 is considered non-project related.

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

3.3.10.7 The Contractor was reminded that, with reference to EM&A manual Clause 9.1.1, the vessel access opening of the perimeter silt curtain would be formed by two piece of silt-curtain with overlapping length of 150m minimum and a separation distance of about 50m.

3.3.11 One (1) Limit Level exceedance at measured Suspended Solids (mg/L) was recorded on 17 Jan 2014 at monitoring station IS(Mf)9 at Mid-flood tide. For action exceedance at measured Suspended Solids (mg/L), 36.8 mg/L was recorded at Monitoring Station IS(Mf)9.



3.3.11.1 The Depth averaged turbidity (in NTU) and depth averaged SS (in mg/L) of nearby monitoring station, such as IS8, IS7 and IS(Mf)16 were below the action and limit level, indicating the water quality at area nearby IS(Mf)9 was not adverse affected.

3.3.11.2 Since the turbidity level (in NTU) at IS(Mf)9, IS8, IS7 and IS(Mf)16 were below the action and limit level and no silt plume was observed when monitoring was conducted at IS(Mf)9. Please refer to the photo record below for sea condition near IS(Mf)9 on 17 Jan 14.

3.3.11.3 Also, with refer to the silt curtain condition on 17 Jan 14, no defects of the perimeter silt curtain was observed at south and southeast of the construction site.

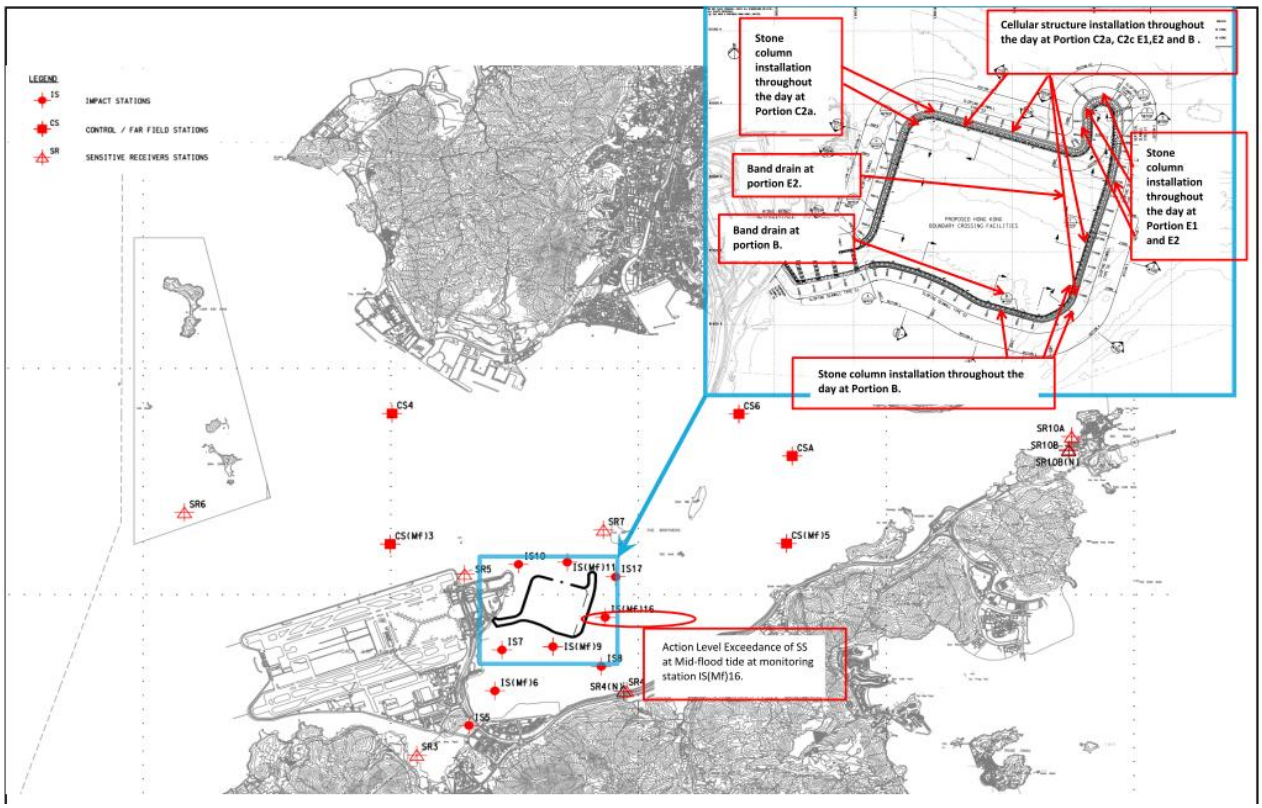
3.3.11.4 The exceedance was likely due to local effects in the vicinity of IS(Mf)9.

3.3.11.5 As such, the limit level exceedance recorded at IS(Mf)9 is considered non-project related.

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

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

3.3.12 One (1) Action Level Exceedance of measured Suspended Solids at 28.5 mg/L for Water Quality was recorded at IS(Mf)16 during Mid-flood tide on 21 Feb 14.



3.3.12.1 For active works carried out on 21 Feb 14, please refer to the above layout map.

3.3.12.2 Same type of works was carried out at the same location on 19, 21 and 24 Feb 14 but Suspended Solids values recorded at IS(Mf)16 on 19 and 24 Feb 14 were all below the Action and Limit Level during the same tide on the same day.

3.3.12.3 Location of IS(Mf)16 is located upstream to active works during mid flood tide, therefore it is unlikely that the exceedance was caused by active works which is located downstream to IS(Mf)16.

3.3.12.4 Suspended Solids values recorded at Impact Station nearest to monitoring station IS(Mf)16 such as IS17 and IS(Mf)9 were all below the Action and Limit Level during the same tide on the same day. This indicates that the SS level near IS(Mf)16 was not adversely affected.

3.3.12.5 Turbidity (in NTU) recorded at Impact Station IS(Mf)16, IS17 and IS(Mf)9 were all below the Action and Limit Level during the same tide on the same day. This indicates that the turbidity (in NTU) at the area close to IS(Mf)16 was not adversely affected.

3.3.12.6 Mitigation measures such as localised silt curtain for stone column installation was implemented on 21 Feb 14.

3.3.12.7 With refer to the daily silt curtain integrity checking record of 21 Feb 14, no defects was observed along the part of the perimeter silt curtain located east of HKBCF-reclamation site which is next to IS(Mf)16. For the condition of the perimeter silt curtain condition near monitoring station IS(Mf)16, please refer to the photo record below:

3.3.12.8 The exceedance was likely due to local effects in the vicinity of IS(Mf)16.

3.3.12.9 The exceedance is considered as non-project related.

3.3.12.10 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.

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

3.3.13 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 Dec 2013- Feb 2014

Number of Impact Surveys Completed^	6
Survey Distance Travelled under Favourable On- Effort Condition	626.8km
Number of Sightings	26 sightings (21 sightings are ”on effort” (which are all under favourable condition), 5 “sightings are opportunistic”)
Number of dolphin individual sighted	107 individuals (the best estimated group size)
Dolphin Encounter Rate#	NEL: 0.5 NWL: 4.8
Dolphin Group Size	Average of NEL: 1 Average of NWL: 4.2 Varied from 1-13 individuals
Most Often frequent dolphin sighting area	Sha Chau and Lung Kwu Chau Marine Park, the western limit of NWL and one area to the north of the Hong Kong International Airport platform.

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 were recorded in the reporting quarter. The investigation results showed that there is no evidence that exceedances are related to Project works are annexed in Appendix L. 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 Summary of STG and ANI encounter rates in Dec 2013- Feb 2014

	NEL	NWL	Level Exceeded
STG*	0.5	4.5	Action
ANI**	0.5	20.7	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 Dark smoke was observed generating from an excavator at works area of Portion A. The Contractor should provided maintenance to the machineries used on-site. (Closed)

3.5.4 Fugitive dust was observed when moisten rock material is being transferred by a barge installed with conveyor belt. The Contractor was reminded to enhanced dust control measures to prevent generation of fugitive dust. (Reminder)

3.5.5 Dry sand surface was observed on works area of Portion A. The Contractor was reminded to provide sufficient dust control measures. The Contractor provided dust control measures. The Contractor was reminded to continued to provide dust control measures on works area of Portion A. (Reminder)

3.5.6 An idle air compressor was observed without drip tray on steel cell. The Contractor was reminded to provide mitigation measures such as drip tray to air compressor prior to operation. An idle air compressor was observed without drip tray on steel cell. The Contractor should provide mitigation measures such as drip tray to air compressor prior to operation. (Closed)

3.5.7 Dark smoke was observed generating from an excavator and a loader at works area of Portion A. The machine was turned off. The Contractor is reminded to provide maintenance to the machineries used on-site so that emission of dark smoke could be effectively prevented. (Reminder)

Noise

3.5.8 Noise decoupling measure was observed to be missing from the generators on Hong Fai and SHB205 and on barge SHB210. Noise decoupling measures should be provided to the concerned generators. (Closed)

3.5.9 Insufficient acoustically decoupling measure of generator and water pumps was observed on barge FTB19, two generators on SHB 210 and 2 generators on FTB 21. The Contractor was advised to provide sufficient acoustic decoupling measure(s) such as acoustic mat to noisy equipments. The Contractor was reminded that insufficient/inadequate mitigation measures must be swiftly rectified. (Closed)

Chinese White Dolphin

3.5.10 No adverse observation was identified in the reporting month.

Water Quality

3.5.11 Turbid water was observed at the southwestern silt curtain entrance area. Refer to the photo taken and site observations, sources of impact likely due to the turbine activities and/or movement of vessel at shallow water (at near the entrance at southwestern of the Construction site and/or when vessel's propeller was turn on at shallow water). The dispersion of turbid water from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain is potentially due to defects of perimeter silt curtain at certain sections and/or insufficient overlapping at entrance/exit of the perimeter silt curtain. (Closed)

3.5.12 The Contractor was advised to regularly evaluate the integrity of the perimeter silt curtain by reviewing the results obtained from daily checking or/and monthly diver inspections specified by the Silt Curtain Deployment Plan. The Contractor was advised to provide sufficient mitigation measures and swiftly carry out maintenance once defects of the perimeter silt curtain are found during the above mentioned daily checking and/or monthly diver inspection. (Closed)

3.5.13 Oil drums, chemical containers and generator were observed without the provision of drip trays at Portion, on barge 天駿 3, on barge SHB205, on temporary rock bund and on Portion A. The Contractor provided drip trays to oil drums, chemical container and generator to retain leakage, if any. (Closed)

3.5.14 An oil drum was observed to be not properly plugged at works area of Portion A. The Contractor provided measures to seal the opening of oil drums to avoid leakage. (Closed)

3.5.15 Containers of chemical to be used and chemical waste were misplaced together in Hong Fai. The Contractor should store the chemical and chemical waste separately. (Closed)

3.5.16 Movable lighting machineries were observed to be placed on bare ground of Portion D, on SHB205 and at works area at Portion A without the provision of drip trays. It was observed that drip trays were provided to movable lighting machineries at temporary rock bund and at works area at portion A and on SHB205. The contractor was advised to continue to provide drip tray or equivalent measures to retain potential oil leakage to movable lighting machineries. (Closed)

3.5.17 Trays of oil drums were found to be placed near to the shore. The Contractor should secure the oil drums with drip tray away from the shore to ensure no washing off of oil occurs. (Closed)

3.5.18 Oil stain was observed on barge FTB19 and SHB205. The Contractor was advised to clear the oil stain using absorbent material. (Closed)

3.5.19 Waste water was observed accumulated inside drip trays on FTB21 and the Contractor was reminded to clear the waste water regularly to prevent runoff or accidental spillage (Reminder)

3.5.20 Defect was observed within a bunding and waste oil water mixture was observed on the barge surface. The Contractor was reminded to rectify the defects observed and cleared the oil waste using chemical absorbent material and dispose the chemical absorbent material as chemical waste. (Closed)

3.5.21 Oil stain was observed on temporary rock bund. The Contractor was advised to clear the oil stain using absorbent material. (Closed)

3.5.22 During site inspection audit, sandfilling seem to be conducted at one end of the temporary rock bund. The Contractor was reminded to conduct sandfilling behind at least 200m leading temporary rock bund/seawall. (Reminder)

3.5.23 Disconnected silt curtain was observed at the western side of the silt curtain. The Contractor was advised to provide sufficient mitigation measures and swiftly carry out maintenance once defects of the perimeter silt curtain are found during the daily checking and/or monthly diver inspection. (Closed)

3.5.24 Localised silt curtain was not observed when stone column installation. The Contractor was reminded to provide mitigation measures such as localized silt curtain to active stone column installation points. (Closed)

3.5.25 Gap was observed between the bunding and the barge surface. The Contractor was reminded to properly seal the gap between the bunding and barge surface to prevent potential oil leakage. (Closed)

3.5.26 Oil stain was observed on temporary rock bund, The Contractor was reminded to clear the oil stain on temporary rock bund. (Closed)

Chemical and Waste Management

3.5.27 Rubbish bin was observed without being covered; the Contractor was reminded to properly store general waste and covers all rubbish bins. The Contractor properly store general waste and covers all rubbish bins. (Closed).

3.5.28 General refuse was scattered on sea water and along the shore near Portion D. The Contractor was reminded to clear the refuse in timely manner and keep site clean and tidy. The Contractor cleared the refuse in timely manner and keeps site clean and tidy. (Closed)

3.5.29 Movable lighting machineries were observed to be placed on bare ground of Portion D without the provision of drip trays. Drip trays were observed to be provided to movable lighting machineries at temporary rock bund and at works area at portion A. The contractor was advised to continue to provide drip tray or equivalent measures to retain potential oil leakage to movable lighting machineries. An ineffective leakage preventive measure for movable lighting machineries at Portion D was pending for Contractor's rectification. (Closed)

3.5.30 Defect was observed within a bunding and waste oil water mixture was observed on the barge surface. The Contractor was reminded to rectify the defects observed and cleared the oil waste using chemical absorbent material and dispose the chemical absorbent material as chemical waste. (Closed)

3.5.31 Litter and general refuse was observed on sea and land at works area of Portion D and at the edge of the works area of Portion A and in the water within and adjacent to the works site between steel cell# 37 and steel cell# 38. The Contractor was reminded to regularly clear the litter and general refuse at this area. The Contractor was cleared the litter and general refuse at these areas. (Closed)

3.5.32 Construction waste such as band drain was observed along the northern edge of works area at Portion A and on edge of temporary rock bund. The Contractor was advice to properly store and dispose construction waste such as band drain. (Closed)

3.5.33 Construction waste such as band drain was observed along the northern edge of works area at Portion A and on edge of temporary rock bund. The Contractor was advice to properly store and disposes construction waste such as band drain. (Closed)

3.5.34 Bags of general refuses were observed stored on barge surface. The Contractor was reminded to regularly collect and dispose the general refuse regular. (Reminder)

Landscape and Visual Impact

3.5.35 No relevant works was carried out in the reporting Quarter.

Others

3.5.36 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, 3,437,422.6 m^3 of fill were imported for the Project use in the reporting period. 420 kg of paper/ carboard packaging and 100 kg of metal were generated, 4 tonnes of chemical waste and 110.5 m^3 of general refuse were generated and disposed of in the reporting period. Monthly summary of waste flow table is detailed in Appendix M.

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.

6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

6.1 Summary of Exceedances of the Environmental Quality Performance Limit

6.1.1 All 1-Hour TSP results were below the Action and Limit Level in the reporting quarter. Six (6) 24-hour TSP results recorded among AMS2, AMS3A and AMS7 exceeded the Action Level and two (2) 24-hour TSP results recorded at AMS3A exceeded the Limit Level at in the reporting quarter. Investigation results show that the exceedances were not related to Project.

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

6.1.3 Ten (10) Action Level Exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting quarter. Three (3) Limit Level Exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting quarter.

6.1.4 Investigation results shows that the Action Level Exceedance recorded at SR5 and Limit Level Exceedance recorded at IS10 on 18 Dec 13 were related to project. Investigation results show that other water quality exceedances unlikely to be non-project related.

6.1.5 Two (2) Action level exceedances of Chinese White Dolphin monitoring were recorded in the reporting quarter. Investigation results show that there is no evidence that exceedances are related to Project works. Event and Action Plan for Impact Dolphin Monitoring was triggered. For detail of investigation, please refer to appendix L.

6.1.6 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 As informed by the Contractor on 5 Dec 13, one (1) noises related complain of a barge moving through the southern channel of HyD's construction site after 23:00 on 8.11.2013. Site daily for barges was requested from the Contractor and as refer to the site daily provided by the Contractor, there was no barge operated after 18:25 on 08 Nov 13. The complaint is therefore considered not likely to be related to the construction works.

7.1.2.1 The Contractor was remind to continue to properly implement the existing noise mitigation measures i.e. to well maintain all plant and equipment in good condition to avoid noise generation and to turn off or throttled down idle equipment. The Contractor was reminded to inform related parties when environmental complain was received to ensure future timely reporting of any complaints/ enquiry.

7.1.3 As informed by the Contractor on 12 Dec 13. A complaint involves the leakage of sand from barges causing water discoloration at sea near Tuen Mun Pierhead Garden and sand material without properly covered was blown to the inside of the residential area which caused disturbance to residence.

7.1.3.1 Regarding the leakage from work barges causing water pollution near Tuen Mun Pierhead Garden , it is noted that all project related vessels (including sand barges) are designated with a regular marine travel route to the site, but the regular travel route plan of this project does not specify the travel route passing through the at area at sea near Tuen Mun Pierhead Garden and with refer to photo record, Contractor would water the sand material to keep the sand material wet to prevent generation of fugitive dust.

7.1.3.2 With refer to available information provided and monitoring data recorded on 09 Dec 13, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract.

7.1.3.3 The Contractor was advised to ensure the regular travel routes for all project related vessels (including sand barges) were being strictly followed and all vessels should have regular maintenance to ensure that all Sand Barge functioning well.

7.1.3.4 The Contractor was advised to ensure to continue the provision of fugitive dust mitigation measures to barges loaded with filling material such as watering to sand filling material on sand barges to keep the surface of stockpile of filling material wet.

7.1.3.5 Photo record shows that watering equipment is provided on pelican barge loaded with sand for watering of sand filling material to keep the sand material wet.

7.1.4 As informed by the Contractor on 6 Jan 14. A complaint involves barges loaded with sand material without properly covered was blown to the inside of the residential area of Tuen Mun Pierhead Garden which caused disturbance to residence. With refer to available information provided, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract.

7.1.6.1 Site visit was conducted on 9 Jan 14 and it was observed during the site investigation that watering equipment was provided on pelican barge loaded with sand for watering of sand filling material to keep the surface of sand material wet. This is consistent with HyD's reply to Oriental Daily Newspaper that the Contractor would water the sand material to keep the sand material wet to prevent generation of fugitive dust.

7.1.6.2 Photo record shows that watering equipment is provided on pelican barge loaded with sand for watering of sand filling material.

7.1.6.3 During the follow-up site visit conducted on 9 Jan 14, after interview with the skipper of the pelican barge, it was noted that pelican barge is designated with a regular marine travel route to the site, however the regular travel route plan of this project does not specify the travel route passing through the at area at sea near Tuen Mun Pierhead Garden.

7.1.6.4 Therefore it is considered the complaint is unlikely to be related to this project.

7.1.7 EPD referred a complaint from complainant who advised that blackish mud was found along the edge of the construction site of Hong Kong-Zhuhai-Macao Bridge Hong Kong Project near the airport in the morning of 18 January 2014

7.1.7.1 With refer to the site daily of 16, 17 and 18 Jan 14 provided by the Contractor (China Harbour Engineering Company Ltd), no excavation and dredging activities were conducted on site. This indicates that the blackish mud found along the edge of the construction site of this contract near the airport in the morning of 18 January 2014 was unlikely related to this project.

7.1.7.2 A follow up joint site inspection with the representatives of the Contractor, Residential Engineer and IEC/ENPO was conducted on 22 Jan 2014. Excavation and dredging activities were not observed within the site boundary of HKBCF during the joint site inspection audit.

7.1.7.3 Therefore in accordance with the abovementioned observations, the complaint is therefore considered as not related to contract HY/2010/02.

7.1.8 No notification of summons and successful prosecution was received in the reporting period.

7.1.9 No environmental notification of Summons and Successful Prosecutions was received in the reporting quarter.

7.1.10 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

8.1.6 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

8.2.6 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.

8.2.7 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 results were below the Action and Limit Level in the reporting quarter. Six (6) 24-hour TSP results recorded among AMS2, AMS3A and AMS7 exceeded the Action Level and two (2) 24-hour TSP results recorded at AMS3A exceeded the Limit Level at in the reporting quarter. Investigation results show that the exceedances were not related to Project.

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

8.3.4 Ten (10) Action Level Exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting quarter. Three (3) Limit Level Exceedances were recorded at measured suspended solids (SS) values (in mg/L) in the reporting quarter.

8.3.5 Investigation results shows that the Action Level Exceedance of SS recorded at SR5 and Limit Level Exceedance recorded at IS10 on 18 Dec 13 were related to project. Investigation results show that other water quality exceedances unlikely to be non-project related.

8.3.6 Two (2) Action Level exceedances were recorded for Chinese White Dolphin monitoring in the reporting quarter. Investigation results show that there is no evidence that exceedances are related to Project works.

8.3.7 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.

8.3.8 As informed by the Contractor on 5 Dec13, one complaint was noted on 12 Nov regarding a barge moving through the southern channel. After investigation, the noise complaint was considered as non-project related.

8.3.9 As informed by the Contractor, complaint received from Penta-Ocean – Gitanes Joint Venture (CV/2012/03) mentioned that the formation works of the Contaminated Mud Pit CMP1 to the South of the Brothers (CMP1 of SB) which has been completed in mid-August 2013 and the pit has been commissioned for receiving contaminated marine mud from other projects starting from 16 August 2013. However, it was recently observed that some of the project vessels of HY/2010/02 (photos taken on 20 Nov 2013 are attached) had berthed within the said pit and those anchorages would likely cause disruption to the underlying contaminated mud and thus induce unfavourable contamination impact to the surrounding marine environment. In this regard, they reminded the contractor to avoid berthing of their vessels within the boundary of CMP1 of SB thereafter for the sake of environmental concern. After investigation, the complaint was considered as non-project related

8.3.10 As informed by the Contractor on 12 Dec 13. A complaint involves the leakage of sand from barges causing water discoloration at sea near Tuen Mun Pierhead Garden and sand material without properly covered was blown to the inside of the residential area which caused disturbance to residence. With refer to available information provided and monitoring data recorded on 09 Dec 13, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract.

8.3.11 As informed by the Contractor on 27 Dec 13. A complaint involves barges loaded with sand material without properly covered was blown to the inside of the residential area of Tuen Mun Pierhead Garden which caused disturbance to residence. With refer to available information provided, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract.

8.3.12 As informed by the Contractor on 6 Jan 14. A complaint involves barges loaded with sand material without properly covered was blown to the inside of the residential area of Tuen Mun Pierhead Garden which caused disturbance to residence. With refer to available information provided. It is considered the complaint is unlikely to be related to this project.

8.3.13 EPD referred a complaint from complainant who advised that blackish mud was found along the edge of the construction site of Hong Kong-Zhuhai-Macao Bridge Hong Kong Project near the airport in the morning of 18 January 2014. After receipt of the complaint, site daily was reviewed and follow-up investigation has been conducted and excavation and dredging activities were not observed within the site boundary of HKBCF during the joint site inspection audit. Therefore in accordance with the investigation results, the complaint is considered as not related to contract HY/2010/02.

8.3.14 No notification of summons and successful prosecution was received in the reporting period.

8.3.15 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.

8.3.16 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.

8.3.17 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.

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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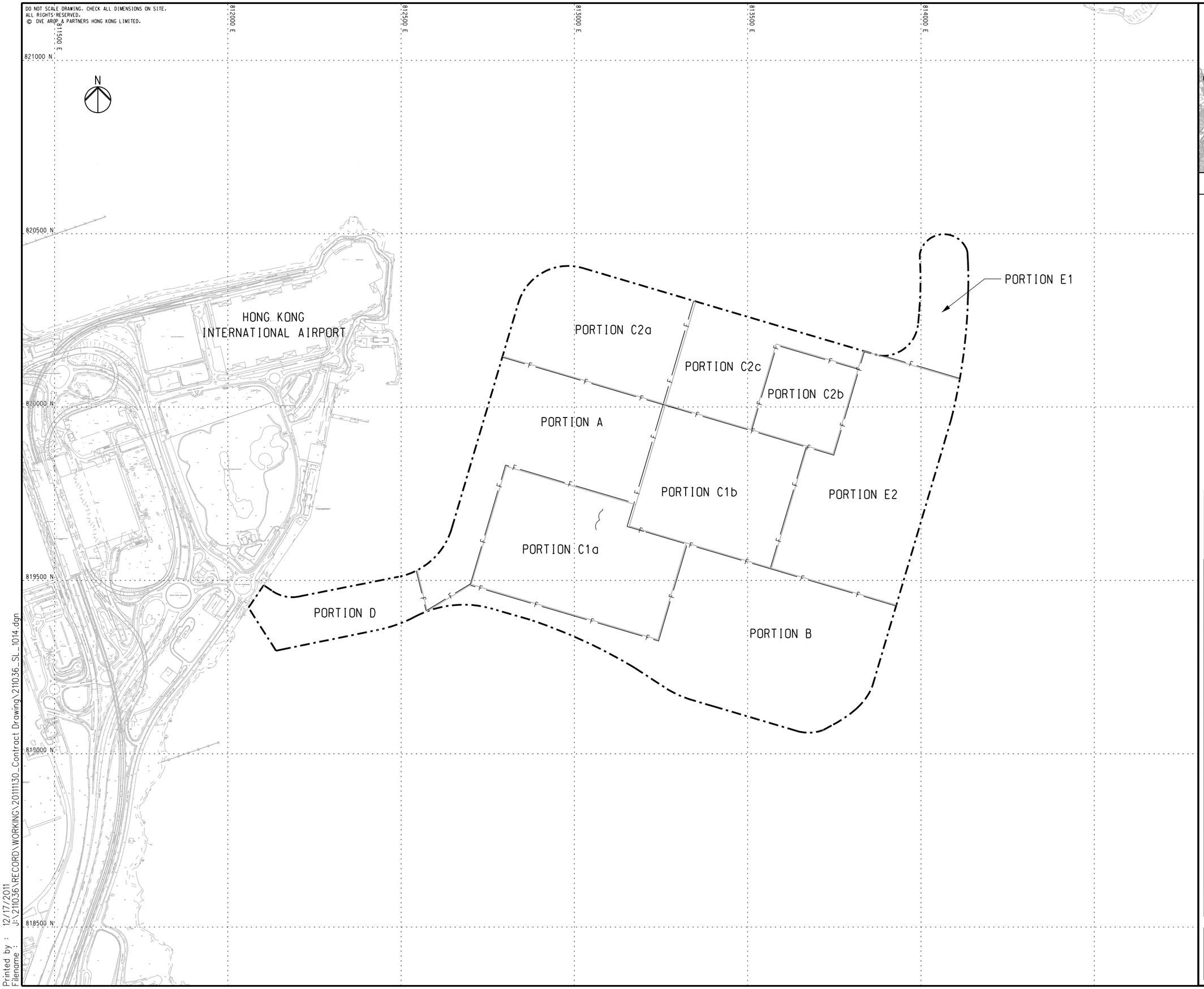

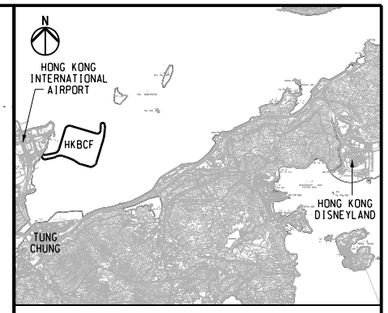

KEY PLAN

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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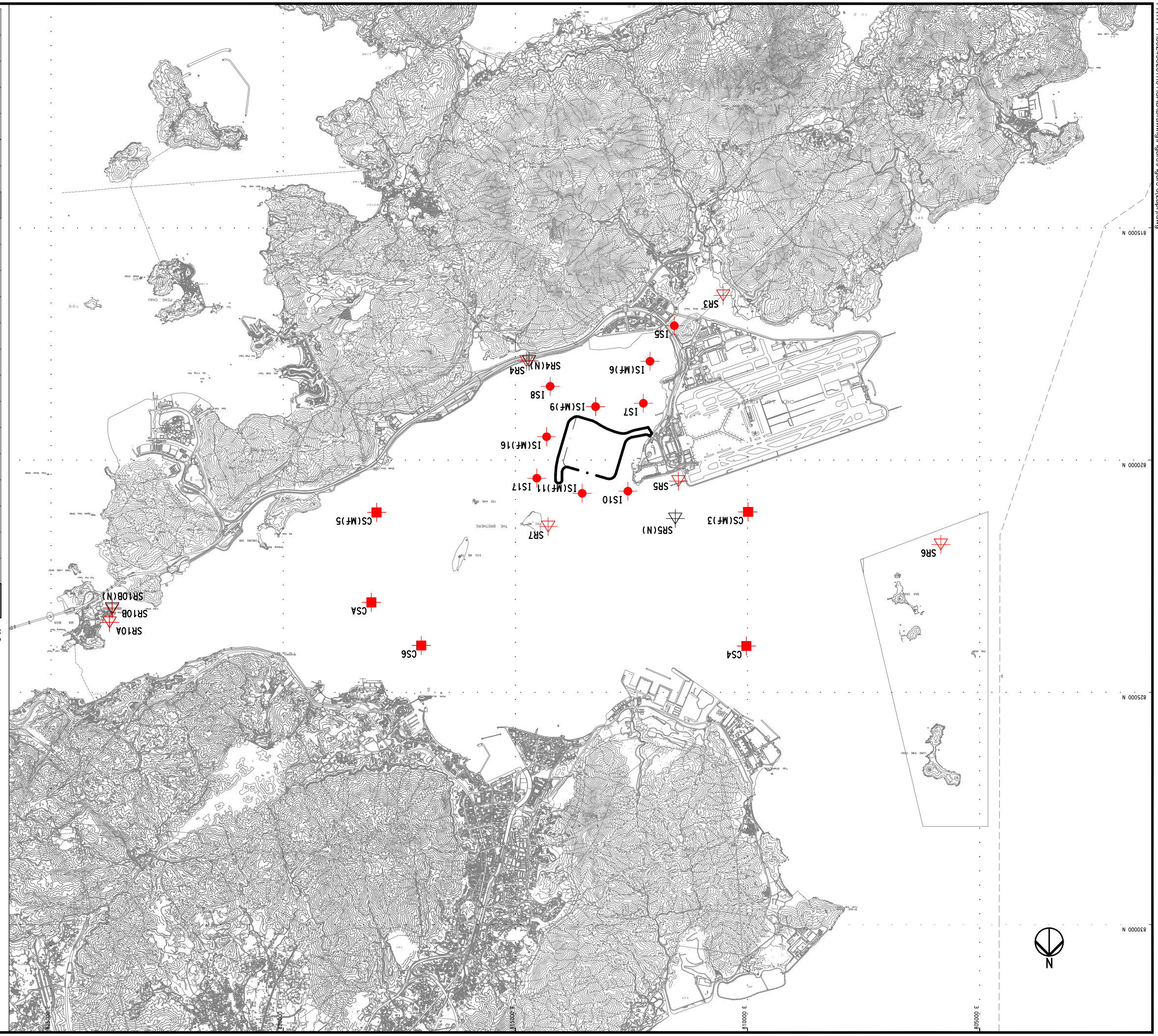
13/04/2012

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)

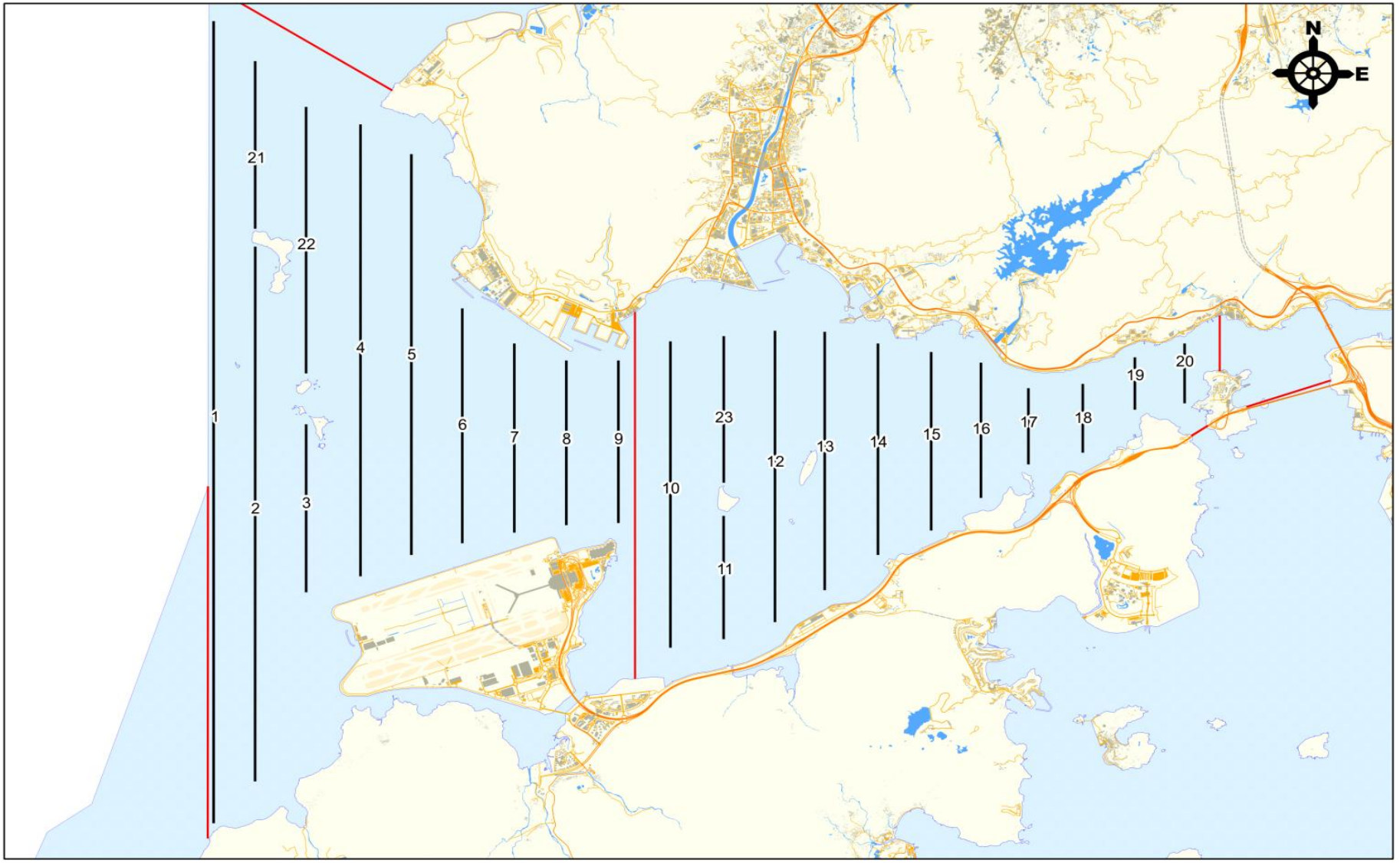
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

Project No.: 60249820 Date: APR 2012

IMPACT WATER QUALITY MONITORING STATIONS

AECOM

Figure 3



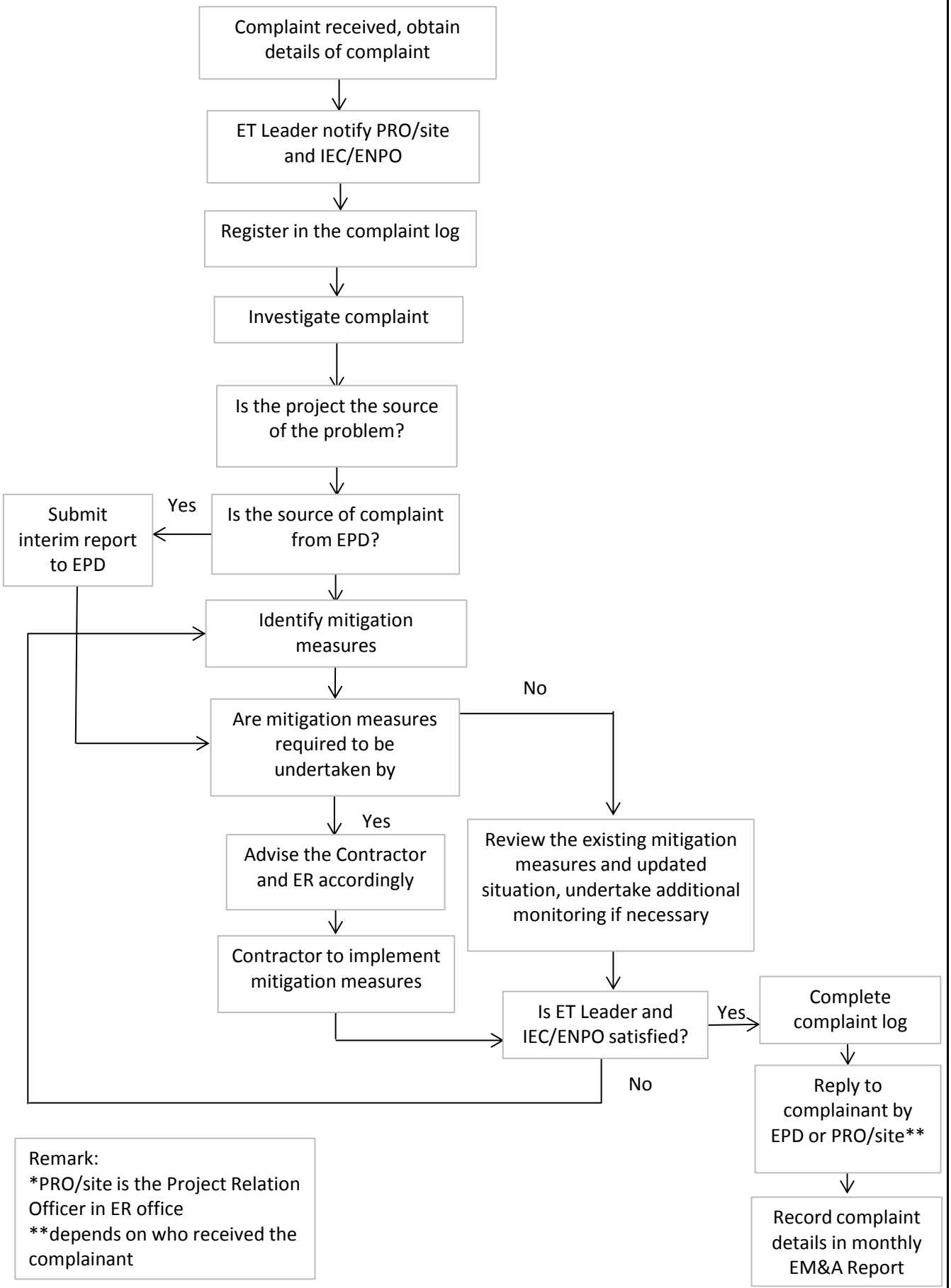
***Remark: Transect 10 is now 3.6km in length due to the HKBCF construction site. The total transect length for both NEL and NWL combined is 111km.**

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



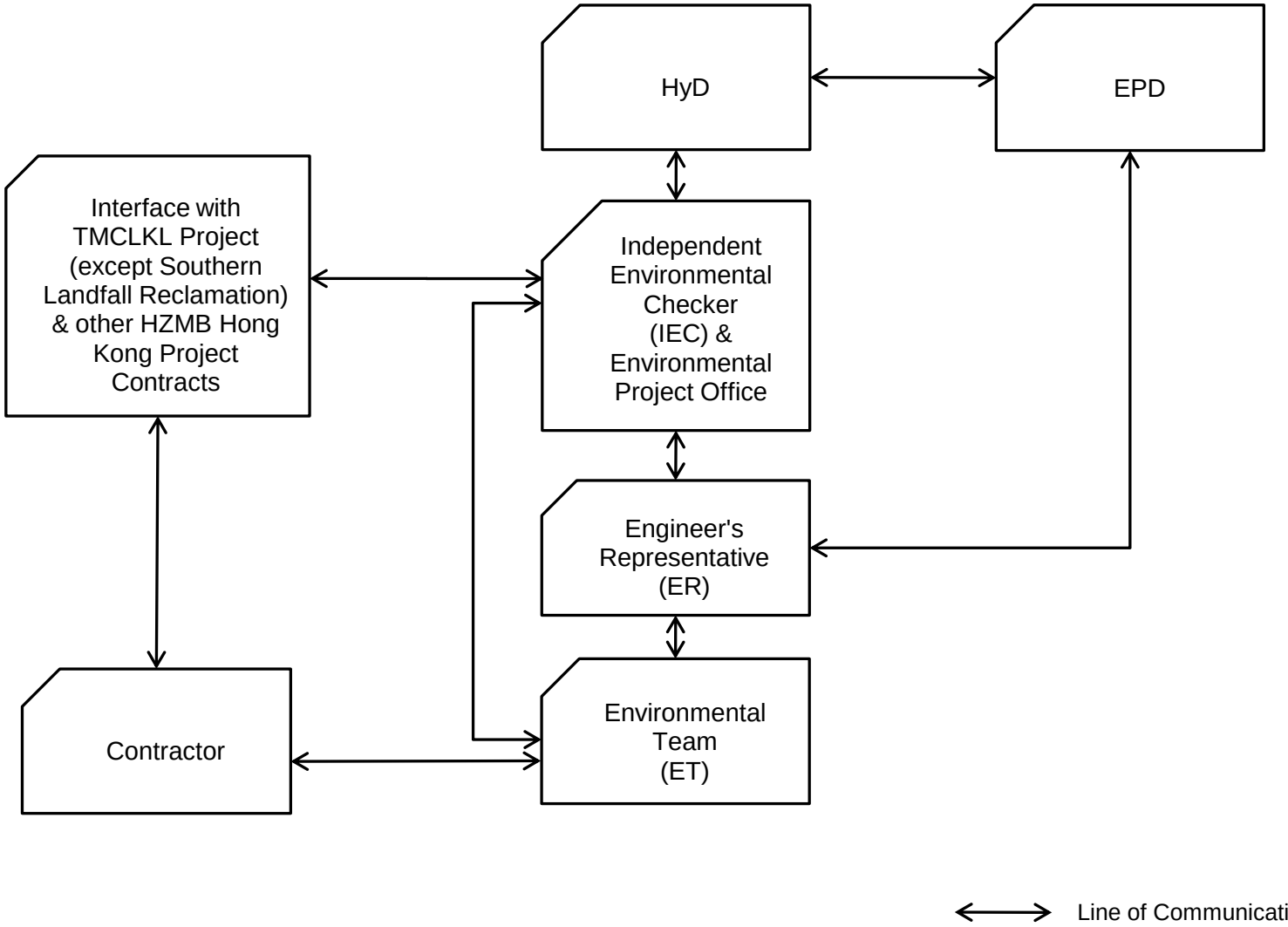
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

AECOM

Environmental Complaint Handling Procedure

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

Figure 5



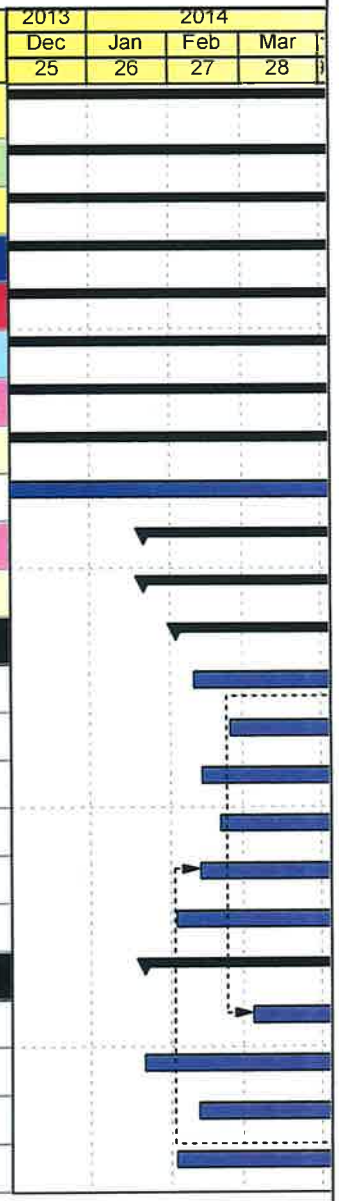
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
--RECLAMATION WORKS
Project No.: 60249820 Date: April 2013

Project Organisation for Environmental Works

AECOM

Appendix A

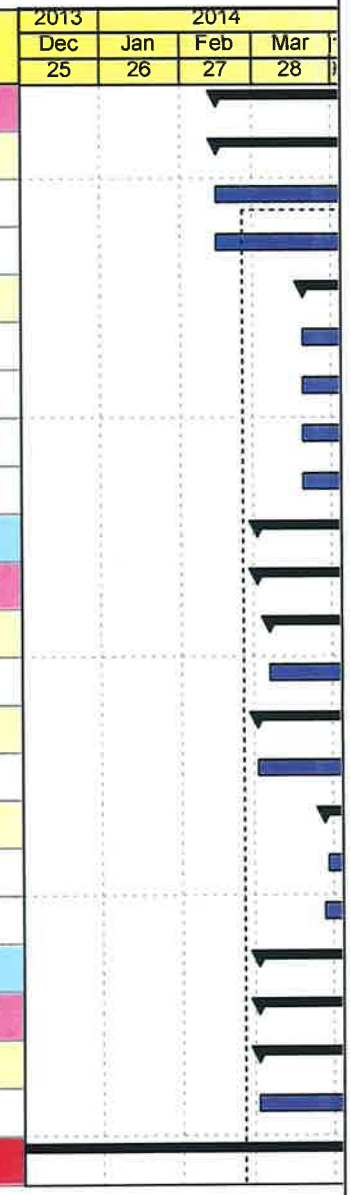
Activity ID	Activity Name	Actual Duration	Start	Finish
29th Monthly Progress Report Status as on 21Apr2014 Ver.4G1		700	21-May-12 A	28-Feb-17
Work Zone, as defined in PS Clause 1.03(6)		241	23-Aug-13 A	10-Jun-14
Portion B, C & E		241	23-Aug-13 A	10-Jun-14
Portion B, C & E		241	23-Aug-13 A	10-Jun-14
Seawall		161	11-Nov-13 A	30-May-14
Ground Treatment		145	11-Nov-13 A	30-May-14
Stone Columns for Rubble Mound Seawall by Marine Plant		145	11-Nov-13 A	10-May-14
Portion C2a C113 - C117 5Cells 3,258Nos		145	11-Nov-13 A	10-May-14
SC0A-1090	PC2A Stone Columns outermost C113 - C115 5cells 1,614nrs (19nrs/day) FTB17	145	11-Nov-13 A	10-May-14
Stone Columns Outside cellular Structures by Marine Plant		78	22-Jan-14 A	30-May-14
Seawall Portion E1 at C068 - C091 24cells 6,428nrs		78	22-Jan-14 A	30-May-14
C068 - C079		70	04-Feb-14 A	30-May-14
SCOE1-A010	PE1 Stone Columns C068 - C071 Row 01-11 273nrs (14nrs/day) FTB19	63	11-Feb-14 A	22-Apr-14
SCOE1-A020	PE1 Stone Columns C068 - C078 Row 12-14 325nrs (8nrs/day) FTB16	50	25-Feb-14 A	10-May-14
SCOE1-A030	PE1 Stone Columns C072 - C075 Row 01-11 769nrs (14nrs/day) FTB18	60	14-Feb-14 A	30-May-14
SCOE1-A040	PE1 Stone Columns C076 - C076 Row 01-11 385nrs (14nrs/day) FTB20	54	21-Feb-14 A	22-Apr-14
SCOE1-A050	PE1 Stone Columns C077 - C077 Row 01-11 390nrs (6nrs/day) AP7	61	13-Feb-14 A	08-May-14
SCOE1-A060	PE1 Stone Columns C078 - C079 Row 01-11 780nrs (14nrs/day) FTB19	70	04-Feb-14 A	23-Apr-14
C080 - C091		78	22-Jan-14 A	30-May-14
SCOE1-B010	PE1 Stone Columns C080 - C080 Row 01-11 390nrs (14nrs/day) FTB19	43	05-Mar-14 A	03-May-14
SCOE1-B020	PE1 Stone Columns C081 - C083 Row 01-11 479nrs (14nrs/day) FTB18	78	22-Jan-14 A	30-Apr-14
SCOE1-B040	PE1 Stone Columns C085 - C090 Row 01-11 284nrs (18nrs/day) FTB18	62	12-Feb-14 A	27-Apr-14
SCOE1-B060	PE1 Stone Columns C079 - C091 Row 12-14 279nrs (6nrs/day) FTB20	70	04-Feb-14 A	30-May-14



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

TASK filters: As Build Record for Previous 3mths, Work Programme.

Activity ID	Activity Name	Actual Duration	Start	Finish
Stone Columns Inside cells by Land Plant 2,640nrs		59	15-Feb-14 A	30-May-14
Seawall Portion B at K028 - K051 24cells 1,920nrs		59	15-Feb-14 A	19-May-14
SCIB0-070	PB Stone Columns inside cells K044 - K046 136nrs (5nrs/day) LB-AP3	59	15-Feb-14 A	03-May-14
SCIB0-080	PB Stone Columns inside cells K047 - K050 267nrs (5nrs/day) LB-AP1	59	15-Feb-14 A	19-May-14
Seawall Portion E2 at K052 - C060 9cells 720nrs		28	21-Mar-14 A	30-May-14
SCIE2-020	PE2 Stone Columns inside cells K052 - K055 320nrs (5nrs/day) LB-AP2	28	21-Mar-14 A	30-May-14
SCIE2-030	PE2 Stone Columns inside cells K056 - C056 80nrs (3nrs/day) LB-BC1	28	21-Mar-14 A	30-May-14
SCIE2-040	PE2 Stone Columns inside cells K057 - C059 240nrs (3nrs/day) LB-BV1	28	21-Mar-14 A	30-May-14
SCIE2-050	PE2 Stone Columns inside cells C061 - C062 240nrs (3nrs/day) LB-BV2	28	21-Mar-14 A	30-May-14
Cellular Structures		39	03-Mar-14 A	28-May-14
Connecting Arcs		39	03-Mar-14 A	28-May-14
Portion E2 between K051/K052 to C066/C067 16arcs		34	08-Mar-14 A	20-Apr-14 A
CAE2-018	PE2 Final backfill cellular cells & Arcs K051/K052 to C061/C062 Type_C 48,652m3	34	08-Mar-14 A	20-Apr-14 A
Portion C2c between C091/C092 to C102/C103 12arcs		39	03-Mar-14 A	23-May-14
CAC2c-034S	PC2c Connecting Arc C087/C088 - C093/C094 Seaside upper arcs splicing 7nrs (210)	39	03-Mar-14 A	23-May-14
Portion E1 between C073/C074 to C090/C091 18arcs		16	29-Mar-14 A	28-May-14
CAE1-016L	PE1 Connecting Arc C080/C081 - C083/C084 Landside upper arcs splicing 4nrs (HF)	15	30-Mar-14 A	21-May-14
CAE1-044L	PE1 Connecting Arc C067/C068 - C071/C072 Landside upper arcs splicing 5nrs (401)	16	29-Mar-14 A	28-May-14
Conforming Sloping Seawalls		36	03-Mar-14 A	11-Apr-14 A
Rockfill		36	03-Mar-14 A	11-Apr-14 A
Seawall Portion B at K028 - K040		36	03-Mar-14 A	11-Apr-14 A
RFB1-000	PB Rockfill at K028 - K040 Rockfill 13cells	36	03-Mar-14 A	11-Apr-14 A
Reclamation		241	23-Aug-13 A	10-Jun-14



Remaining Level of Effort
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Actual Work
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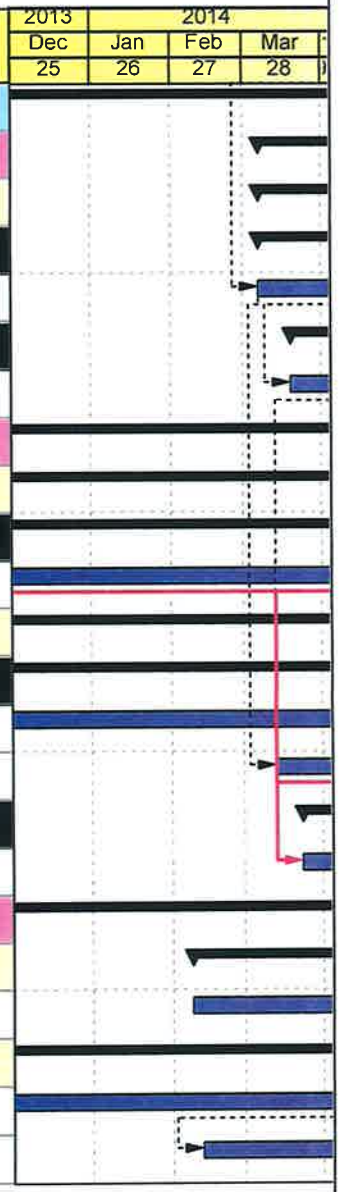
Summary

TASK filters: As Build Record for Previous 3mths, Work Programme.

Activity ID	Activity Name	Actual Duration	Start	Finish
Ground Treatment		241	23-Aug-13 A	10-Jun-14
Geotextile		40	08-Mar-14 A	02-May-14
Existing Seabed above -5mPD		40	08-Mar-14 A	02-May-14
Land Portion B		40	08-Mar-14 A	02-May-14
GERB0-020	PB Geotextile for sand blanket at K041 - K051	40	08-Mar-14 A	02-May-14
Land Portion E2 Southern Part		29	20-Mar-14 A	27-Apr-14
GERE2-012	PE2 Geotextile for sand blanket Southern (seabed above -5mPD)	29	20-Mar-14 A	27-Apr-14
Sand Blankets		154	01-Nov-13 A	10-Jun-14
Existing Seabed below -5mPD		154	01-Nov-13 A	10-Jun-14
Land Portion E2 Northern Part		154	01-Nov-13 A	10-Jun-14
SABRE2-010	Sand Blankets at PE2 142,000m3 5,000m3/day North	154	01-Nov-13 A	10-Jun-14
Existing Seabed Above -5mPD		154	01-Nov-13 A	09-May-14
Land Portion B		154	01-Nov-13 A	08-May-14
SABRB0-020	Sand Blankets at PB Main K028 - K051 200,550m3 5,000m3/day	154	01-Nov-13 A	08-May-14
SABRB0-030	Sand Blankets at PB Edge K028 - K051 200,550m3 10,000m3/day	34	14-Mar-14 A	05-May-14
Land Portion E2 Southern Part		25	24-Mar-14 A	09-May-14
SABRE2-012	Sand Blankets at PE2 142,000m3 5,000m3/day South	25	24-Mar-14 A	09-May-14
Vertical Band Drains by Marine Plant		218	23-Aug-13 A	31-May-14
Land Portion C2c 62,400nrs		65	09-Feb-14 A	10-May-14
VBDC2c-020	Vertical Band Drains 22,208nrs by marine plant at PC2c (750nrs/ady)	65	09-Feb-14 A	10-May-14
Land Portion C2b 62,400nrs		218	23-Aug-13 A	31-May-14
VBDC2b-010	Vertical Band Drains 12,896nrs by marine plant at PC2b upto 10Dec2013	218	23-Aug-13 A	27-Apr-14
VBDC2b-020	Vertical Band Drains 49,504nrs by marine plant at PC2b (750nrs/day)	61	13-Feb-14 A	31-May-14



Remaining Level of Effort
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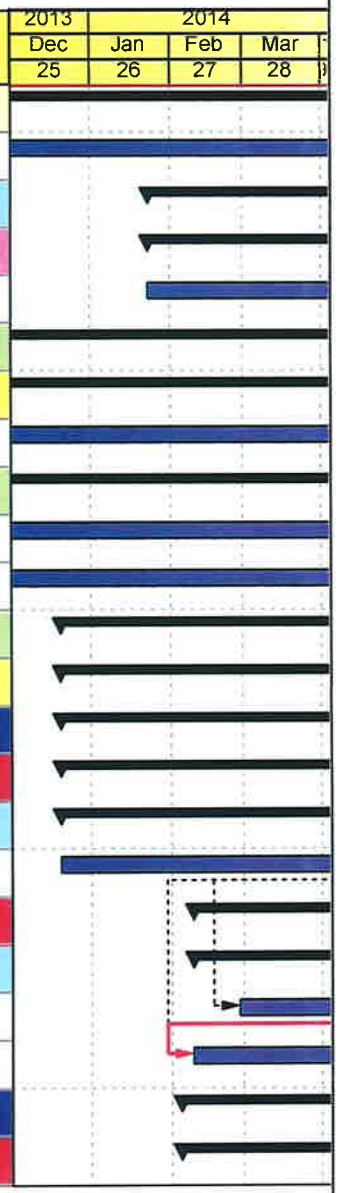
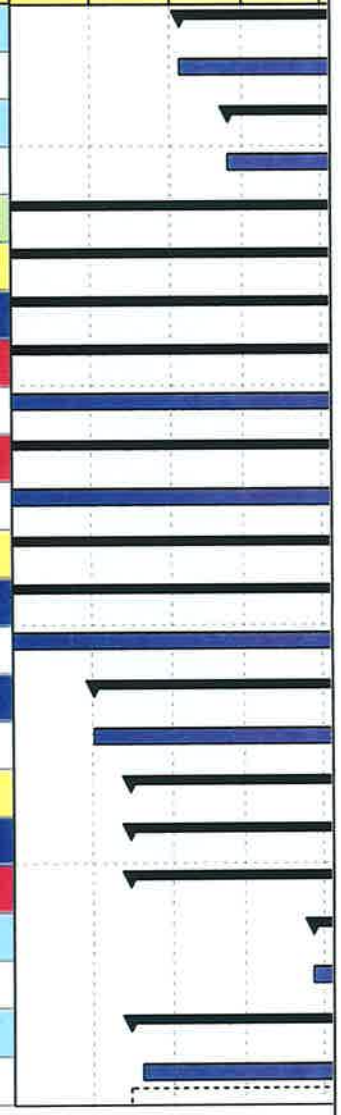
TASK filters: As Build Record for Previous 3mths, Work Programme.

Activity ID	Activity Name	Actual Duration	Start	Finish
	Land Portion E2 Northern Part 84,746nrs	182	02-Oct-13 A	31-May-14
VBDE2-010	Vertical Band Drains 23,032nrs by marine plant at PE2 upto 5Dec2013	182	02-Oct-13 A	31-May-14
	Marine Fill	76	24-Jan-14 A	20-Apr-14 A
	Land Portion C1b	76	24-Jan-14 A	20-Apr-14 A
MFC1b-010	Marine Fill Type A Sand 100% at PC1b west 477,472m3 15,000m3/day	76	24-Jan-14 A	20-Apr-14 A
	Works Area WA2 (Tung Chung)	573	21-May-12 A	28-Feb-17
	Zone A	573	21-May-12 A	28-Feb-17
A1880	Maintenance of Engineer's Accommodation	573	21-May-12 A	28-Feb-17
	Works Area TKO Fill Bank	466	25-Sep-12 A	30-Nov-16
WA-TKO-1040	Operate and Maintain Public Fill Sorting Facilities in Zone A, B1 & B2	466	25-Sep-12 A	30-Nov-16
WA-TKO-1050	Maintainance of Site in Zone C	466	25-Sep-12 A	22-Aug-14
	Portion A	122	20-Dec-13 A	09-Jun-14
	Portion A	122	20-Dec-13 A	09-Jun-14
	Reclamation	108	20-Dec-13 A	19-May-14
	Portion A Marine Fill upto +2.5mPD	102	20-Dec-13 A	14-Apr-14 A
	Land Portion A	102	20-Dec-13 A	14-Apr-14 A
MFA0-070	Marine Fill Type A Sand 100% at PA Edge Area at C127 - C134 265,005m3 30,000m3/day CLP Substation	102	20-Dec-13 A	14-Apr-14 A
	Portion A Land Band Drain	64	10-Feb-14 A	19-May-14
	Land Portion A 233,590nrs	64	10-Feb-14 A	19-May-14
VBDA0-060	Vertical Band Drains 66,700nrs by Land plant at PA Stg3 3,000nrs/day w CLP substation	47	28-Feb-14 A	19-May-14
VBDA0-070	Vertical Band Drains 36,915nrs by Land plant at PA Edge Side 3,000nrs/day	64	10-Feb-14 A	06-May-14
	Portion A Surcharge	75	05-Feb-14 A	09-Jun-14
	Main Reclamation Areas	75	05-Feb-14 A	09-Jun-14



Activity ID	Activity Name	Actual Duration	Start	Finish
PCB East		75	05-Feb-14 A	20-May-14
SURA0-120	Surcharge Period at PA PCB East 3.5mths (8-4.5=3.5mths)	75	05-Feb-14 A	20-May-14
PCB West		56	24-Feb-14 A	09-Jun-14
SURA0-220	Surcharge Period at PA PCB West 3.5mths (8-4.5=3.5mths)	56	24-Feb-14 A	09-Jun-14
Portion D		496	11-Dec-12 A	29-May-14
Submission		496	11-Dec-12 A	24-Apr-14
Method Statement Submission		496	11-Dec-12 A	24-Apr-14
Seawall		496	11-Dec-12 A	24-Apr-14
PD-MTD-01040	MTD for Temporary Seawall Construction - Approval	496	11-Dec-12 A	24-Apr-14
Float & Sink installation of Culvert C1 - C4		496	11-Dec-12 A	24-Apr-14
PD-MTD-07020	MTD for Float & Sink of culvert C1 - C4 - Approval	496	11-Dec-12 A	24-Apr-14
Precast Yard for Seawall Blocks & Culverts		367	19-Apr-13 A	29-May-14
Concrete Blocks		366	19-Apr-13 A	20-Apr-14 A
PD-PY1-0100	Seawall Blocks for Temporary construction 1,190nrs	366	19-Apr-13 A	20-Apr-14 A
Culverts		109	02-Jan-14 A	29-May-14
PD-PY-0100	Precast Yard Setup	109	02-Jan-14 A	29-May-14
Site Construction		83	16-Jan-14 A	20-Apr-14 A
Seawall Construction		77	16-Jan-14 A	14-Apr-14 A
Temporary Seawall		77	16-Jan-14 A	14-Apr-14 A
Temporary Seawall CH5+900 - CH5+800 (100m)		11	28-Mar-14 A	10-Apr-14 A
PDTS-30060	V2 East1 Temporary Seawall Seawall blocks installation 350nrs	11	28-Mar-14 A	10-Apr-14 A
Temporary Seawall CH5+800 - CH5+650 (150m)		77	16-Jan-14 A	14-Apr-14 A
PDTS-40030	S1 East2 Temporary Seawall Rockfill type1 14,600m3	73	21-Jan-14 A	14-Apr-14 A



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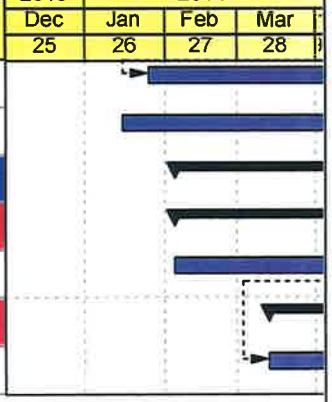
TASK filters: As Build Record for Previous 3mths, Work Programme.

Activity ID	Activity Name	Actual Duration	Start	Finish
PDTS-40040	S1 East2 Temporary Seawal Stone Aggregate 43,527m3 2,500m3/day	68	26-Jan-14 A	14-Apr-14 A
PDTS-40050	V2 East2 Temporary Seawal Stone Aggregate 45,198m3 2,500m3/day	77	16-Jan-14 A	14-Apr-14 A
Vertical Band Drain by Land Base		69	05-Feb-14 A	20-Apr-14 A
West2 (South CH 100 -225 & North CH6000 - 5900)		63	05-Feb-14 A	14-Apr-14 A
A2150	PD - Install vertical band drain 6,170nrs at West2 by Land Plant 520nrs/day	63	05-Feb-14 A	14-Apr-14 A
East1 (North CH 225 - 325 & CH 5900 - 5800)		34	14-Mar-14 A	20-Apr-14 A
A1636	PD - Install vertical band drain 6,170nrs drain at East1 by Land Plant 520nrs/day	34	14-Mar-14 A	20-Apr-14 A



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Primavera Systems, Inc.

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

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.

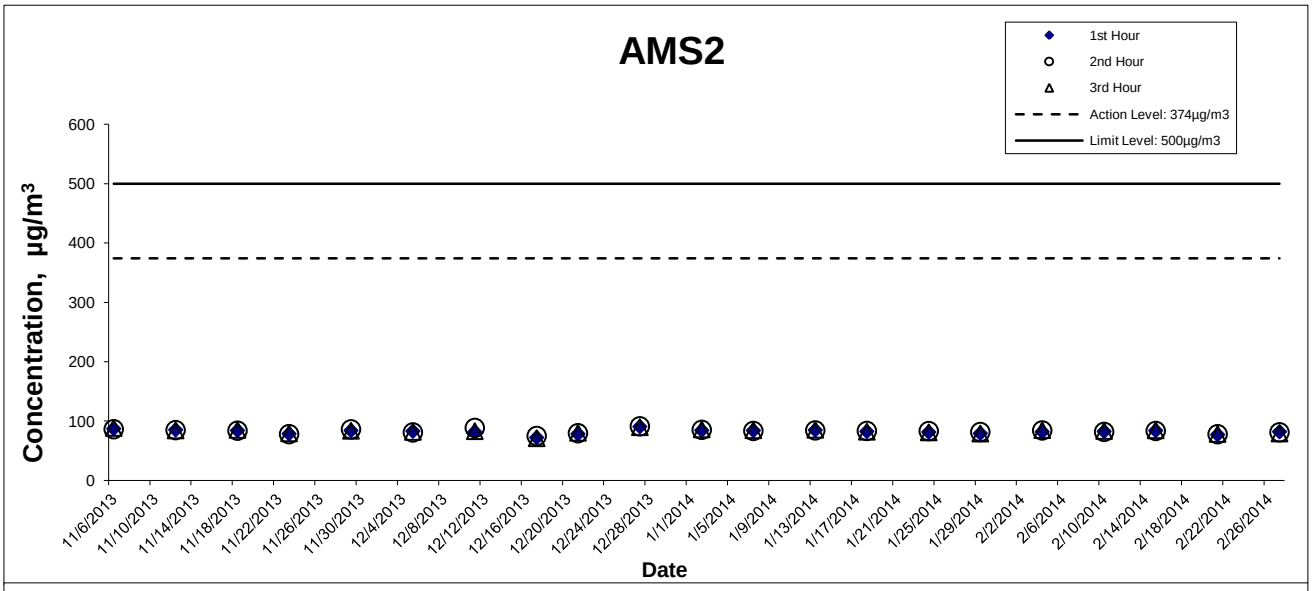
Table 5(a) Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL):

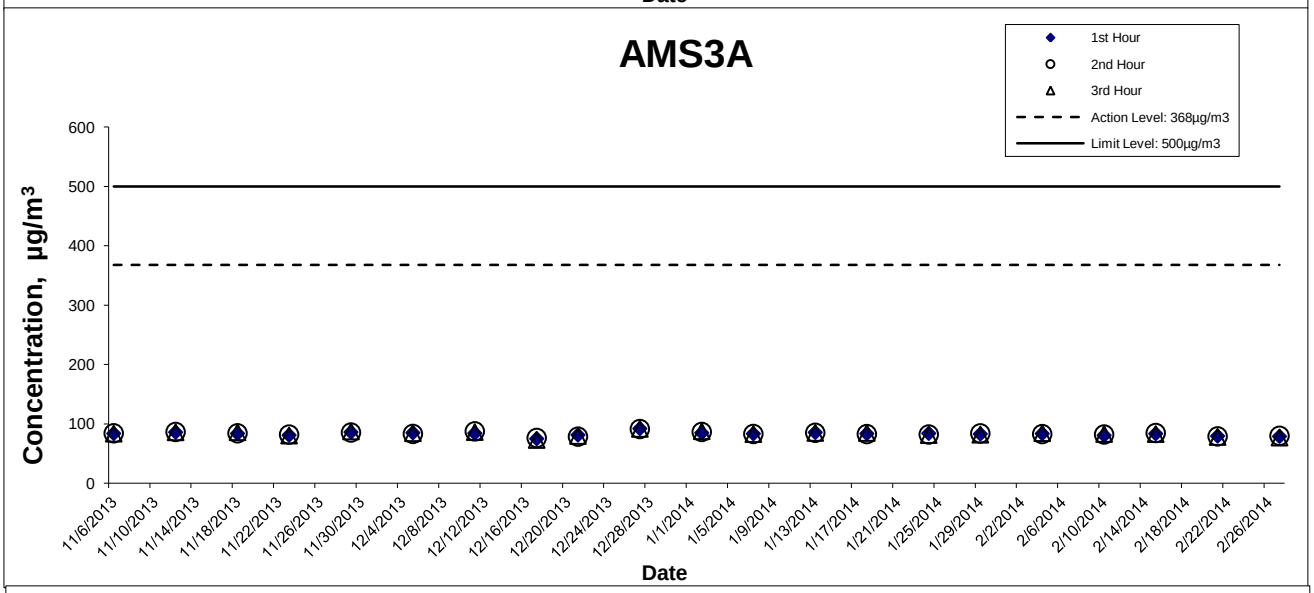
	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG < 70% of baseline) & (ANI < 70% of baseline)	(STG < 70% of baseline) & (ANI < 70% of baseline)
Limit Level	[(STG < 40% of baseline) & (ANI < 40% of baseline)] AND [(STG < 40% of baseline) & (ANI < 40% of baseline)]	

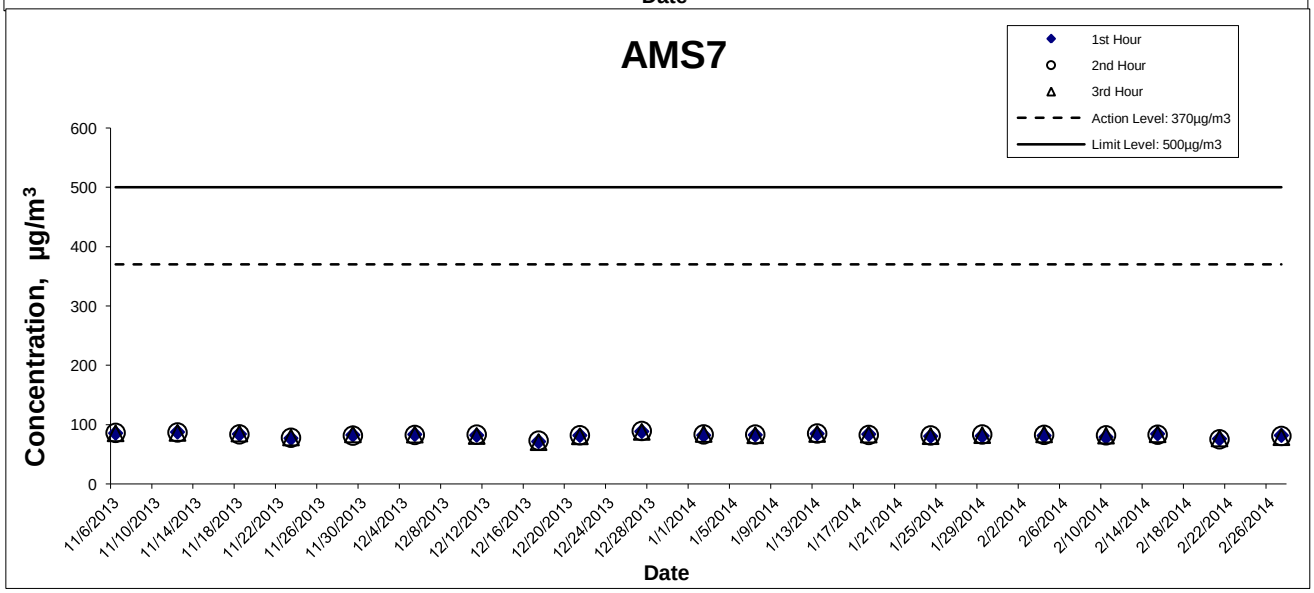
For North Lantau Social Cluster, action level will be trigger if either NEL **or** NWL fall below the criteria; limit level will be triggered if both NEL **and** NWL fall below the criteria.

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)]	







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Graphical Presentation of Impact 1-hour TSP Monitoring Results

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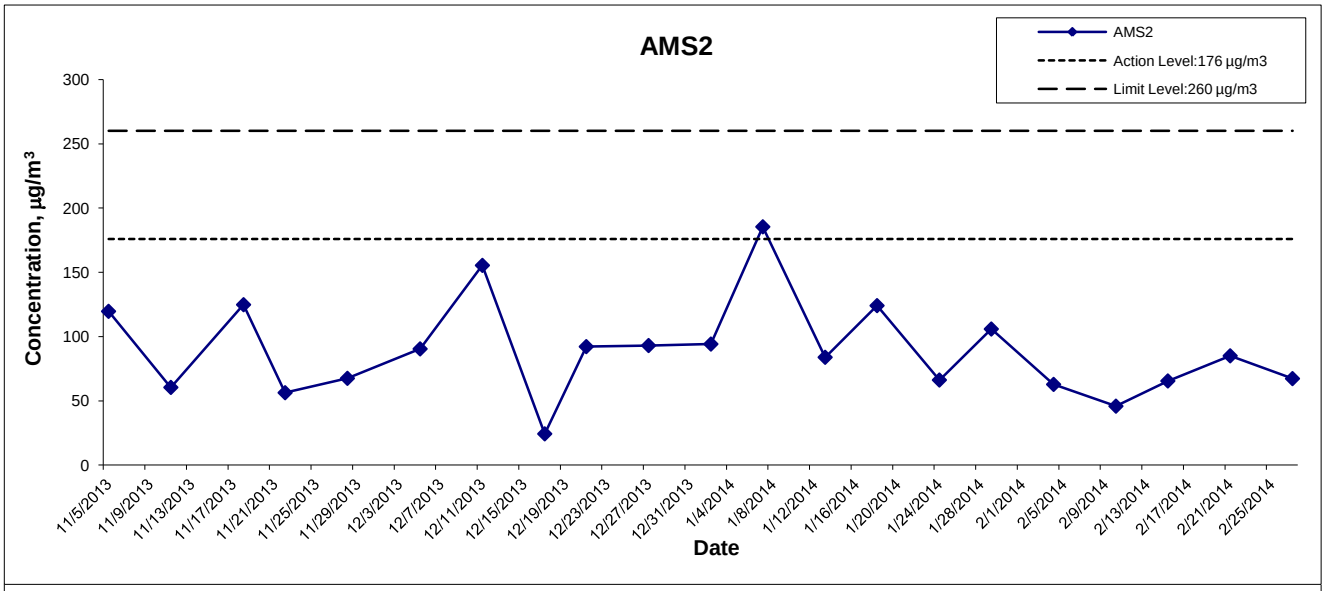
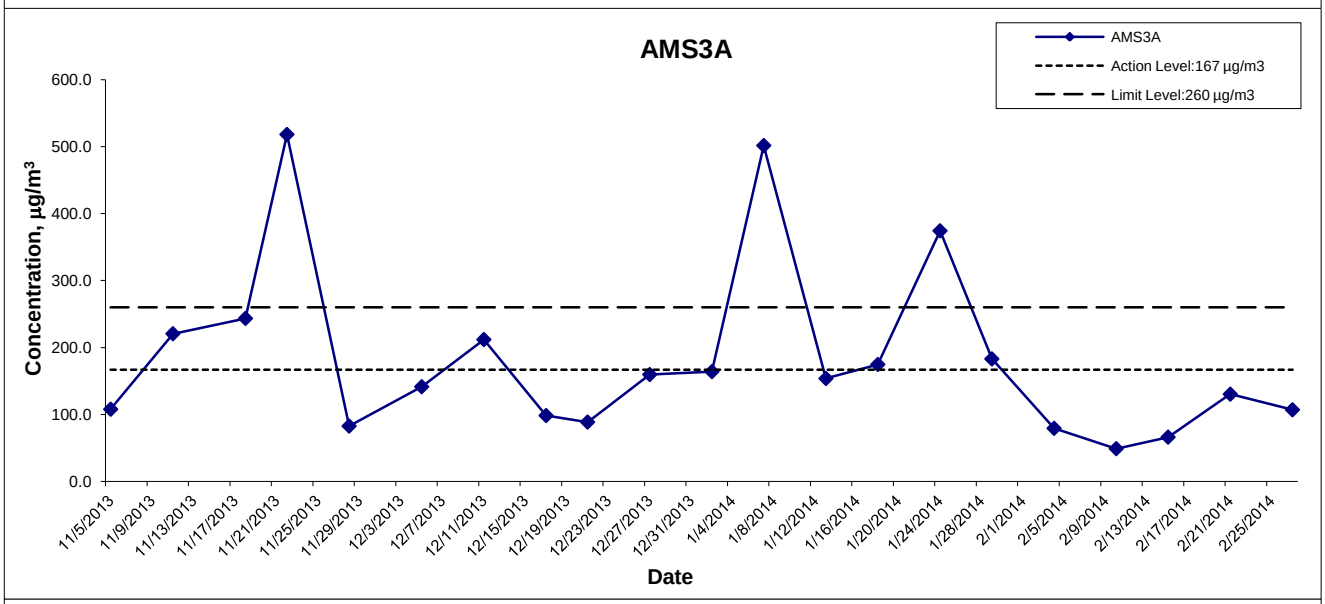
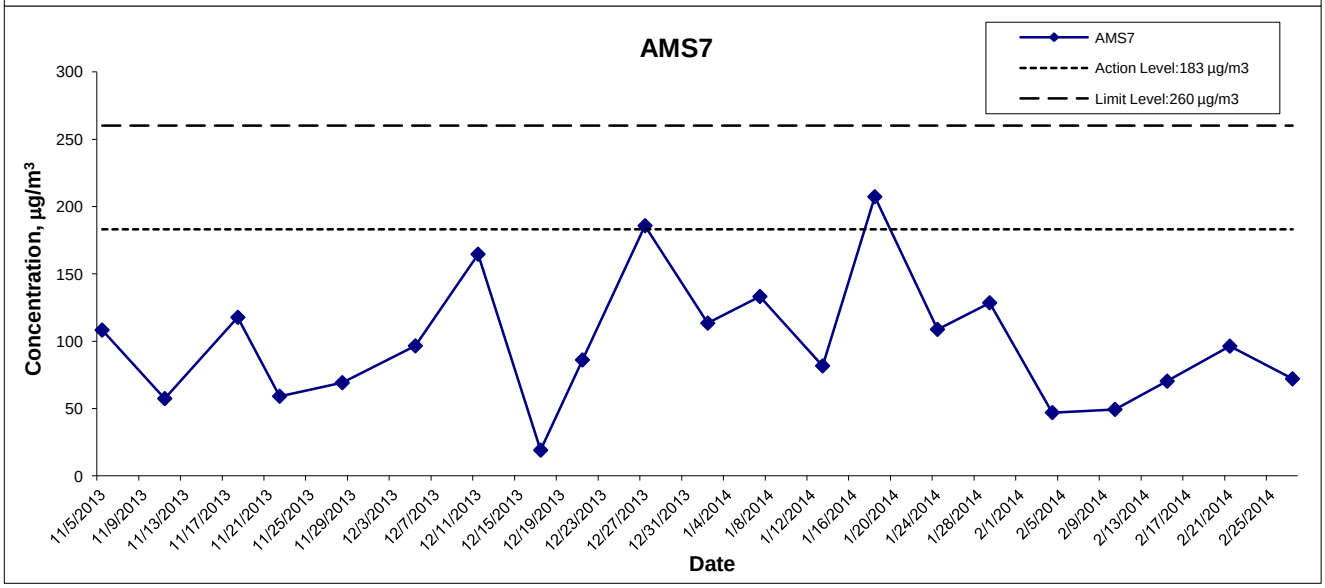
Appendix E







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Graphical Presentation of Impact 24-hour TSP Monitoring Results

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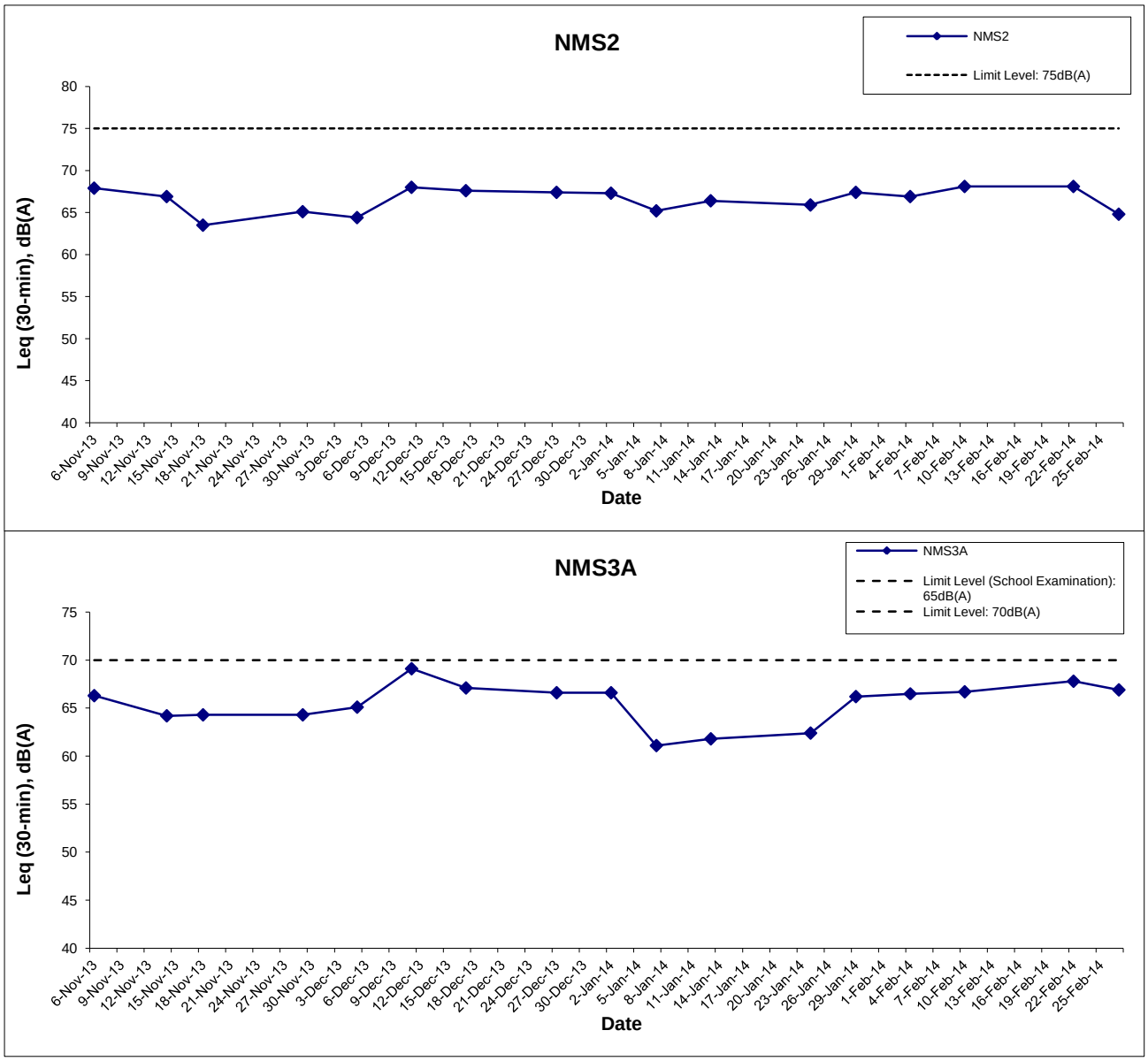
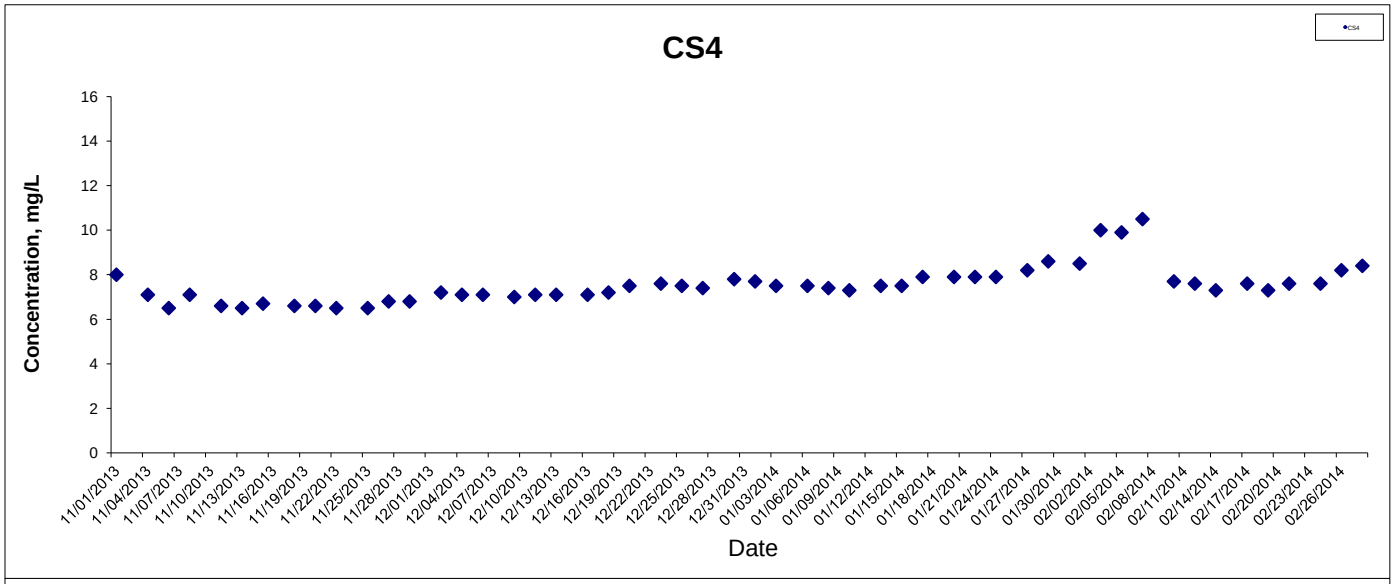
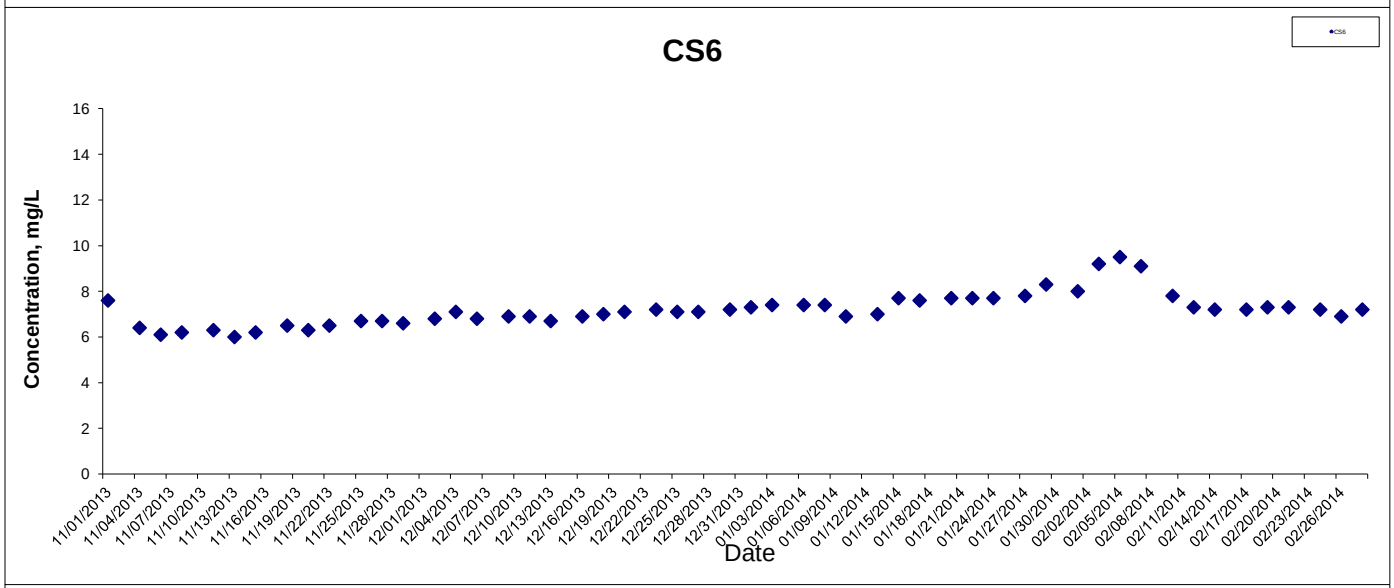
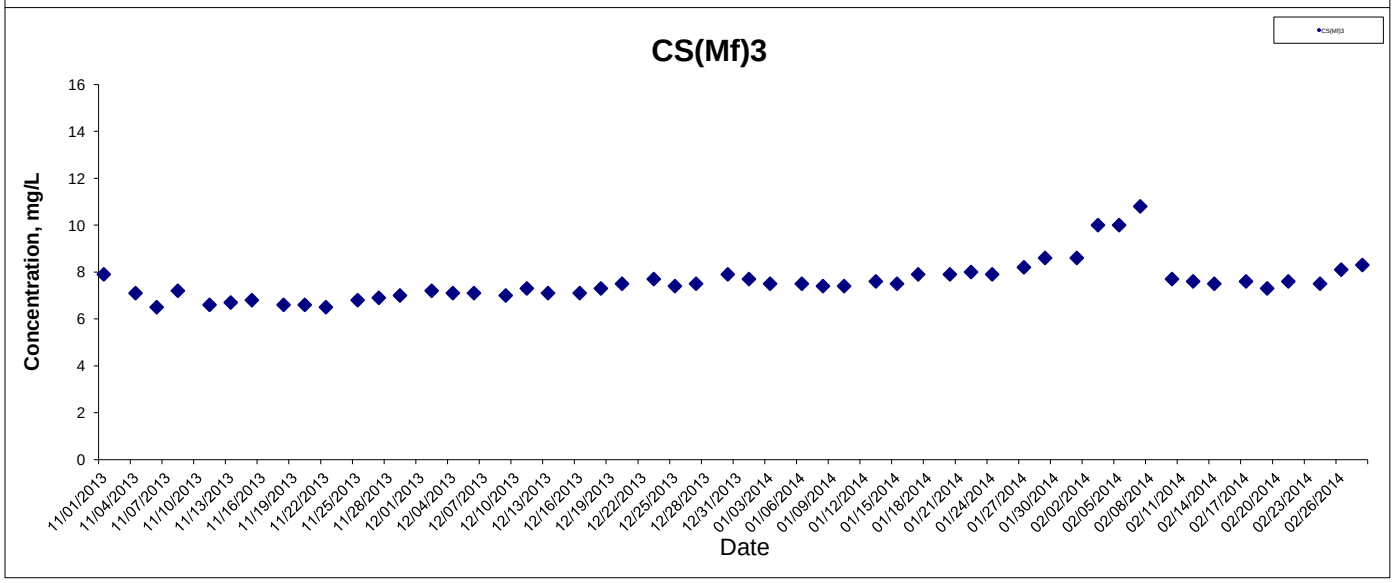


Remarks: Effective from July 2012, the Limit Level at NMS3A was revised to 70dB(A). Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65dB(A) applies during school examination period.

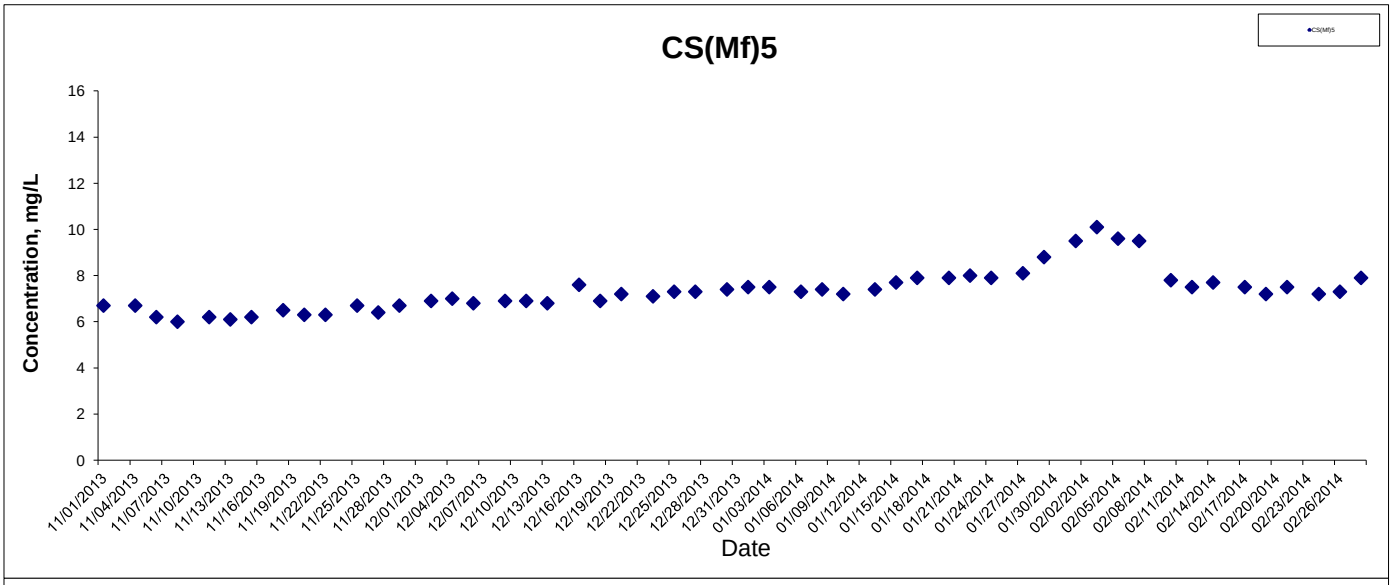
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

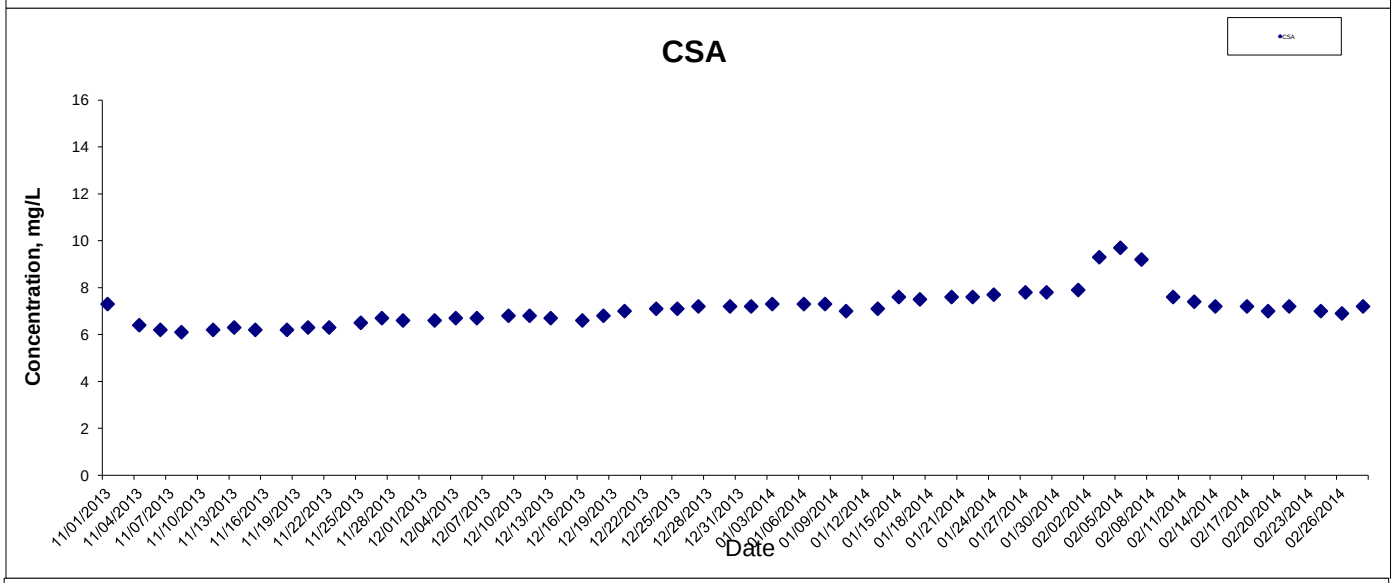


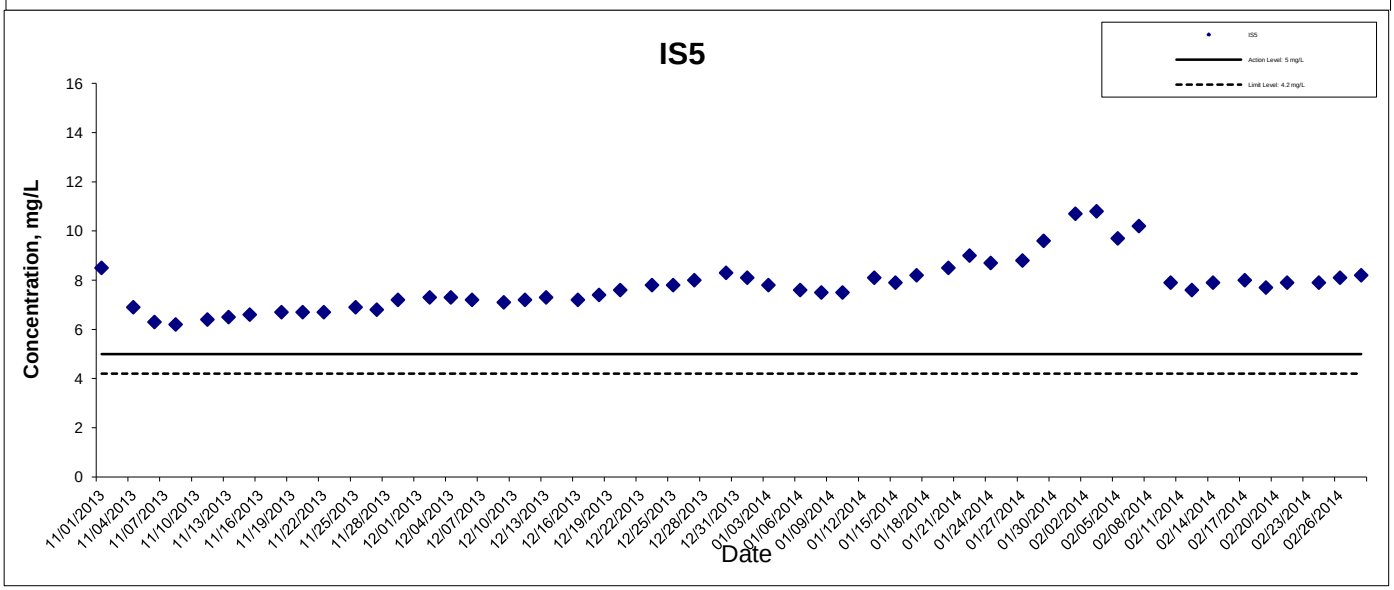




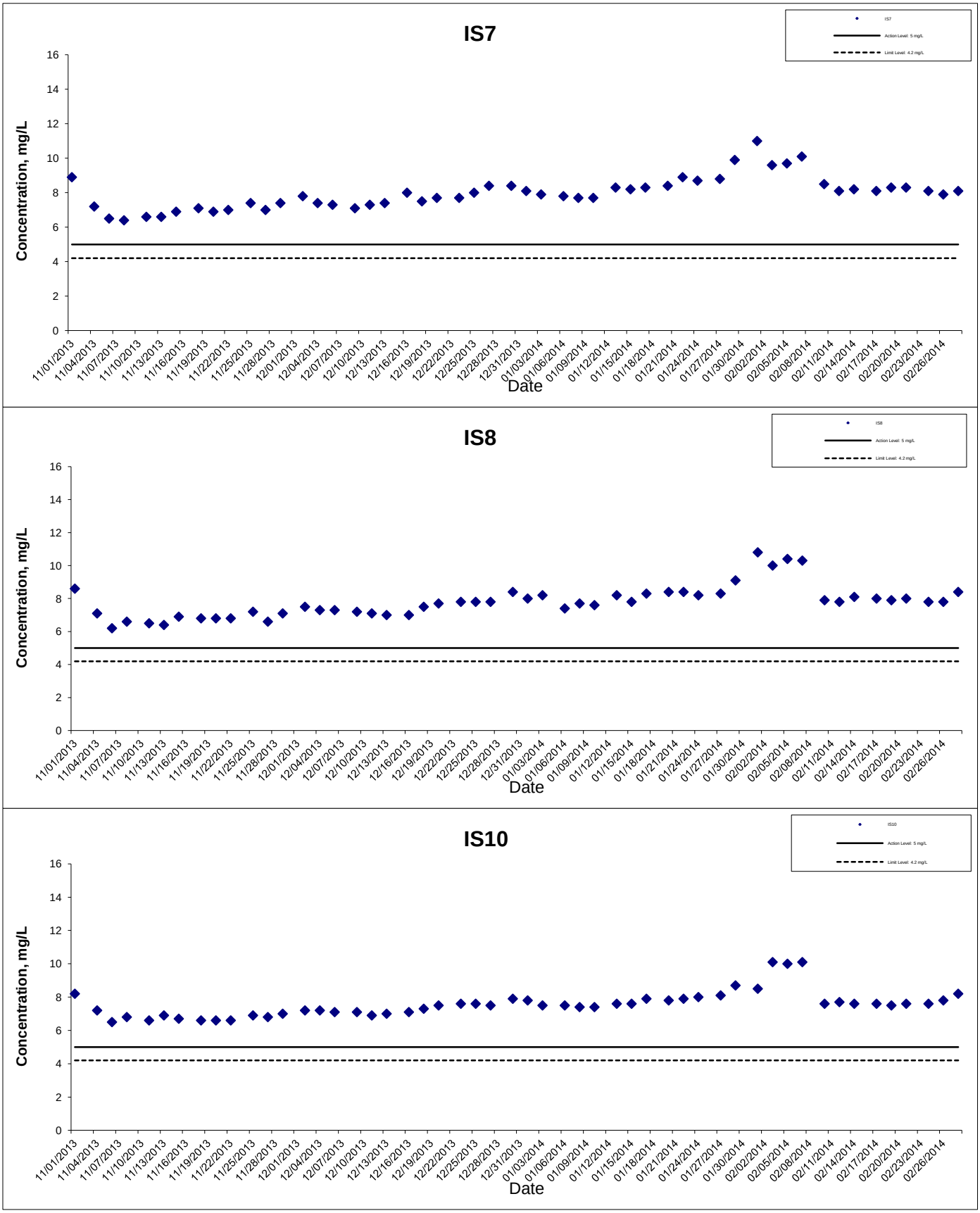
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



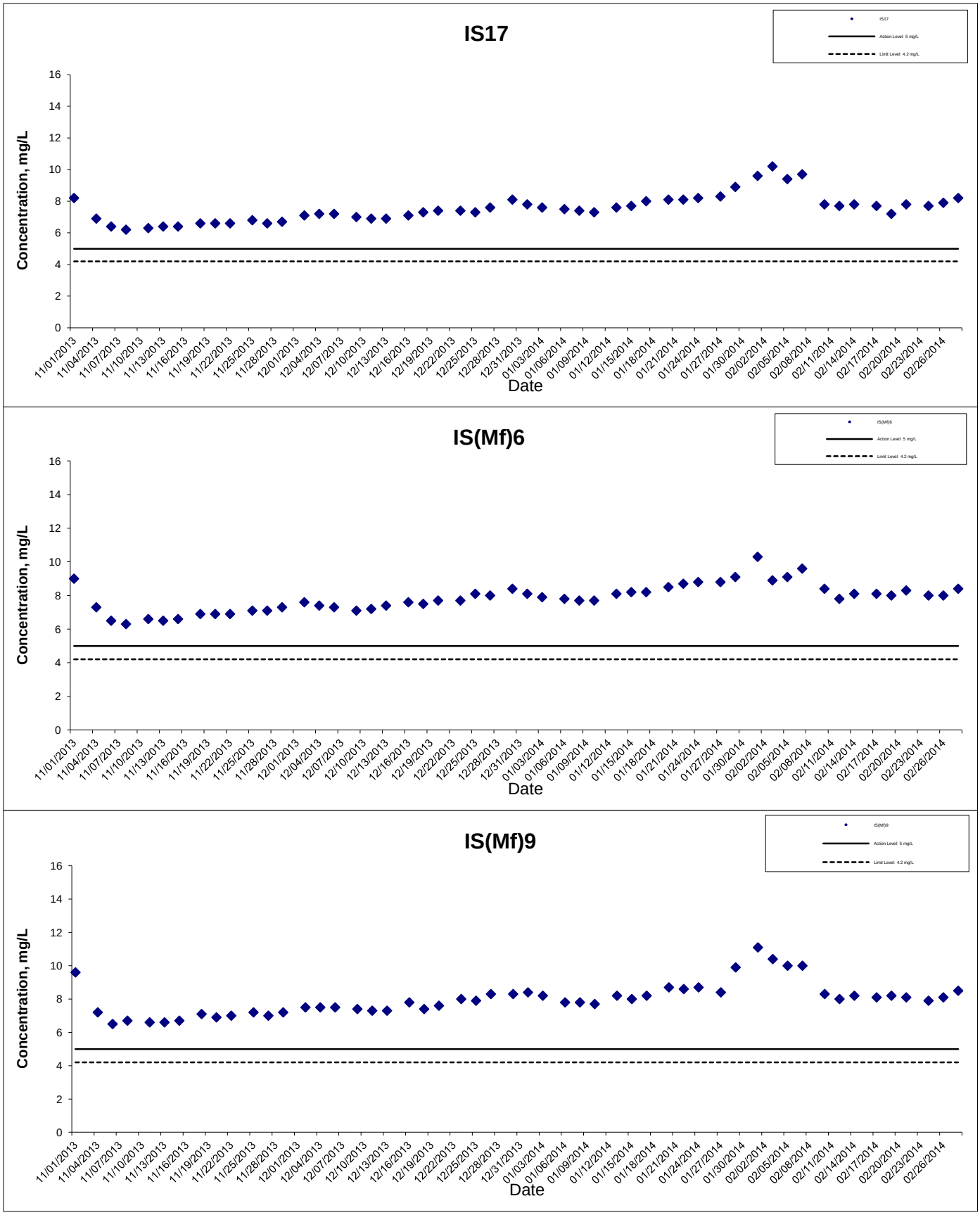




Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



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



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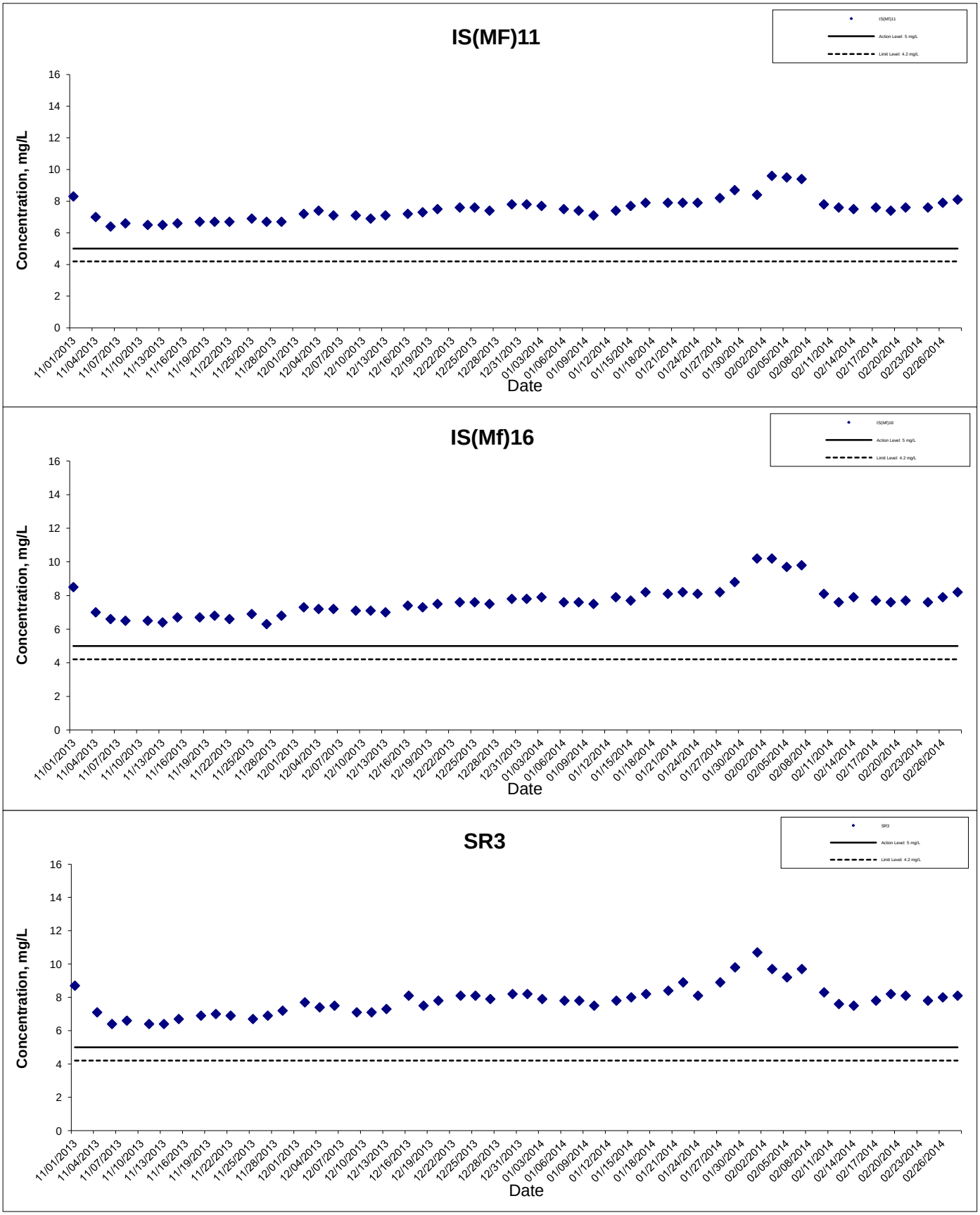
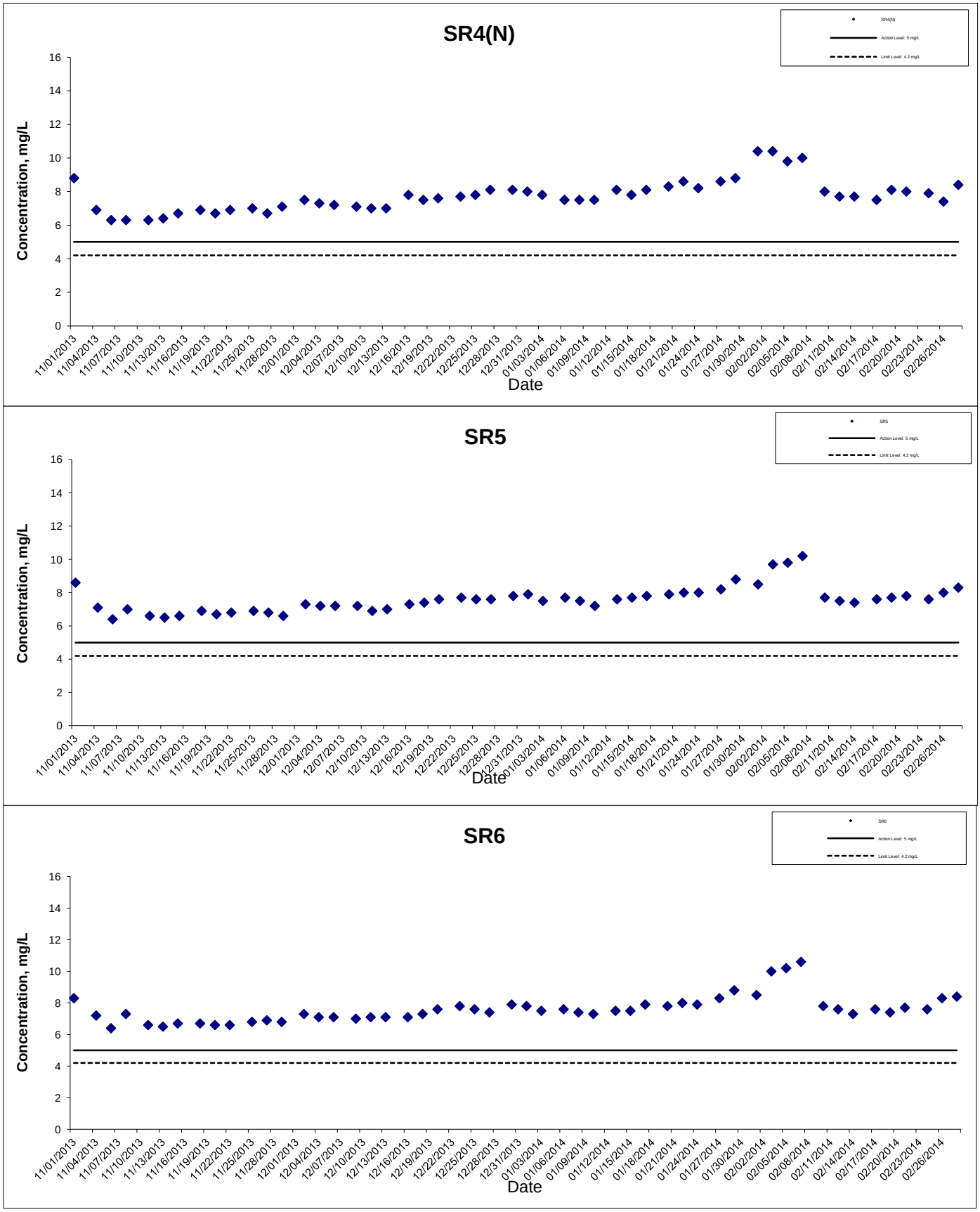


Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



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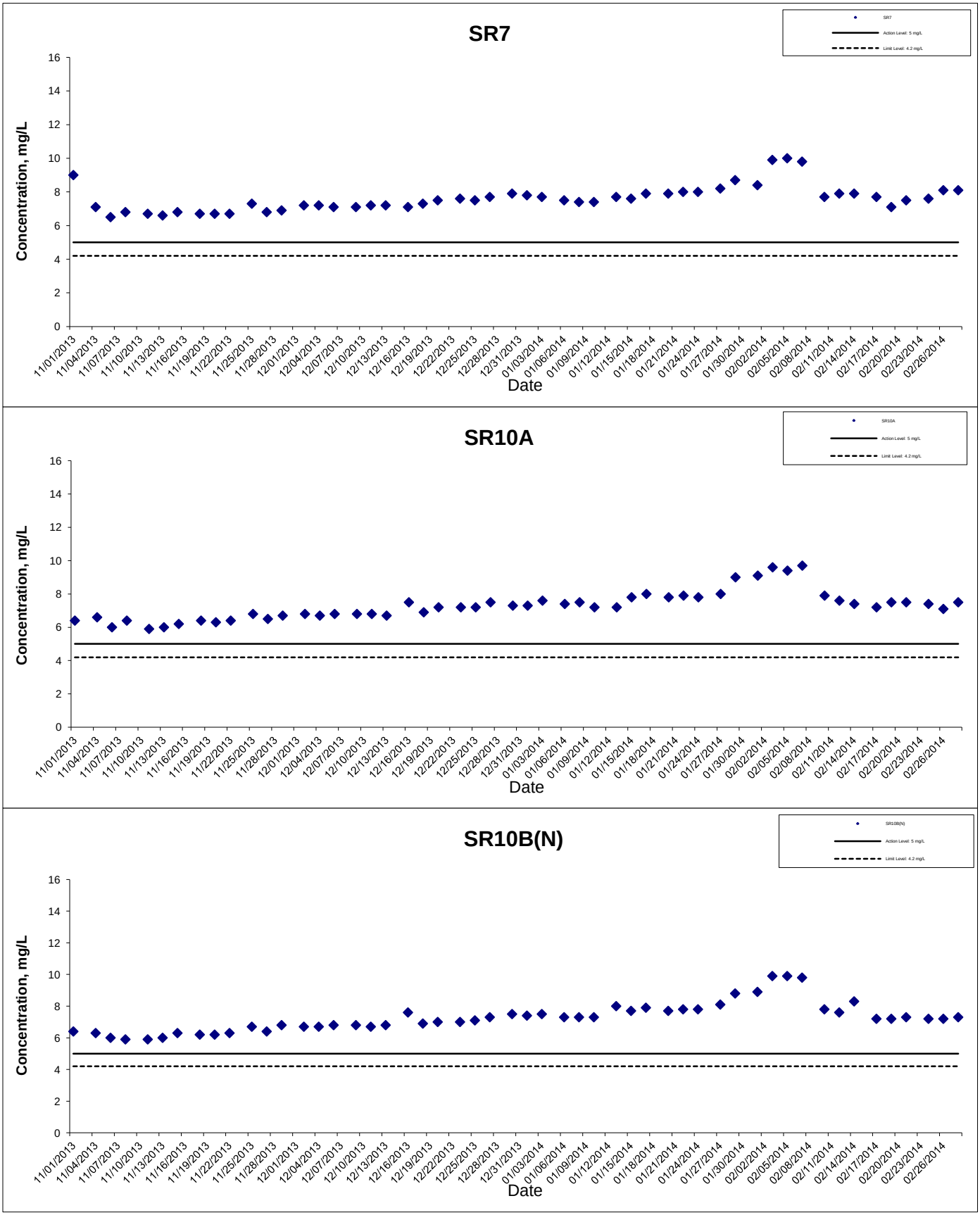
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



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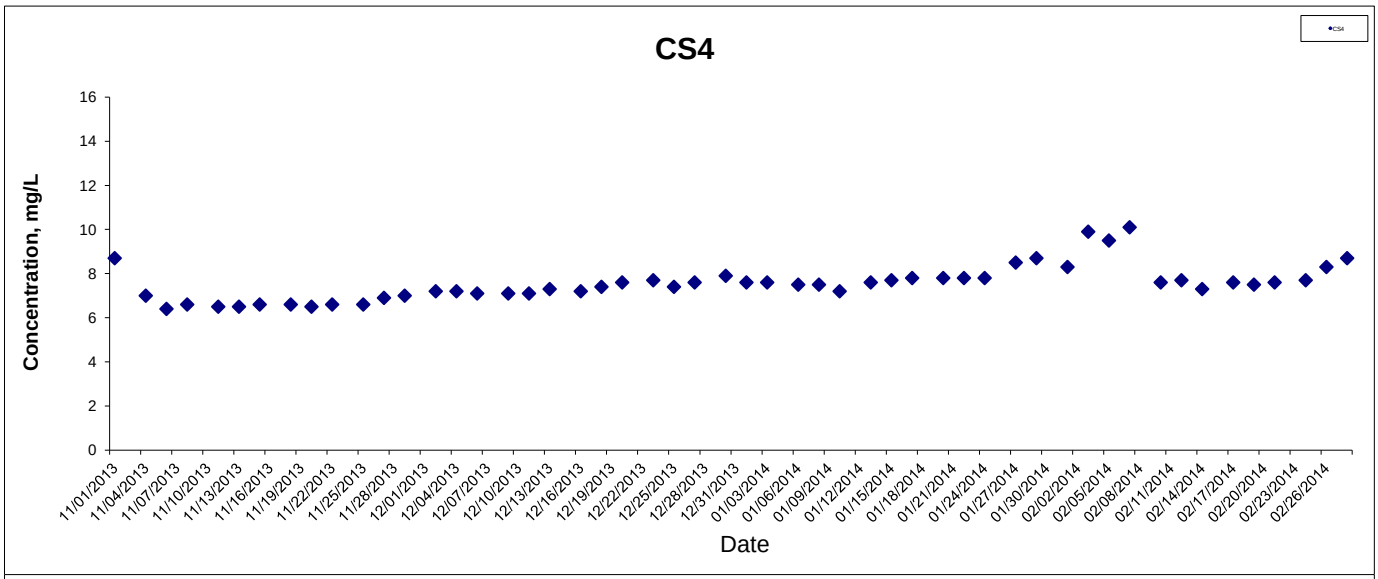
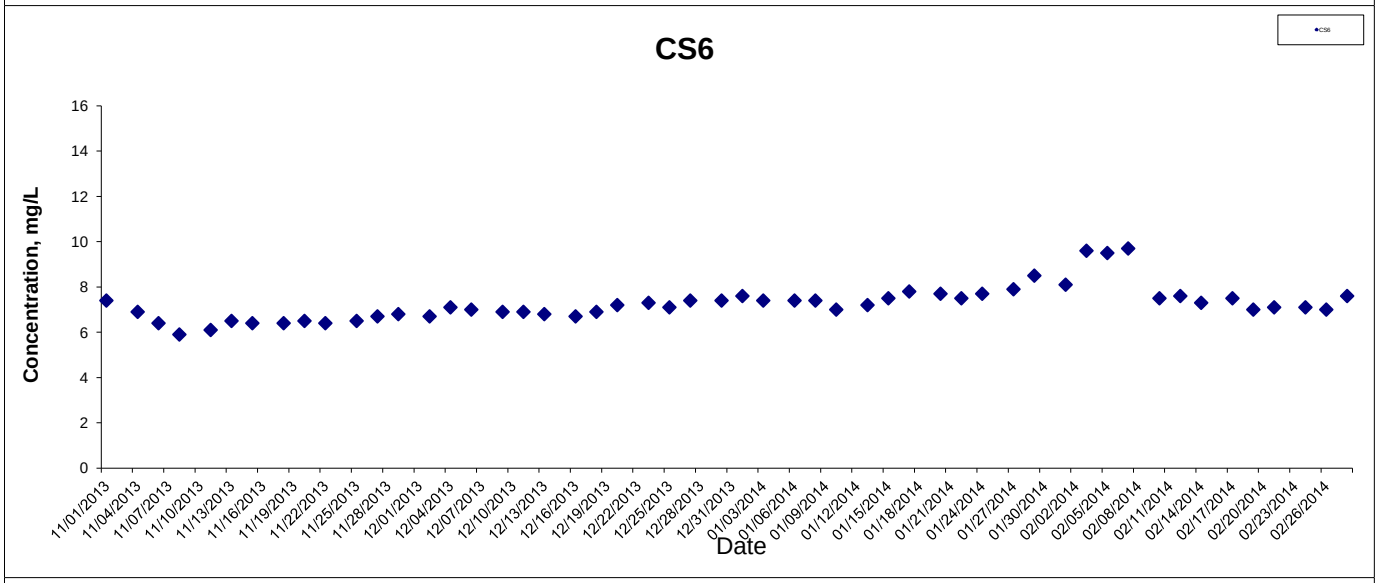
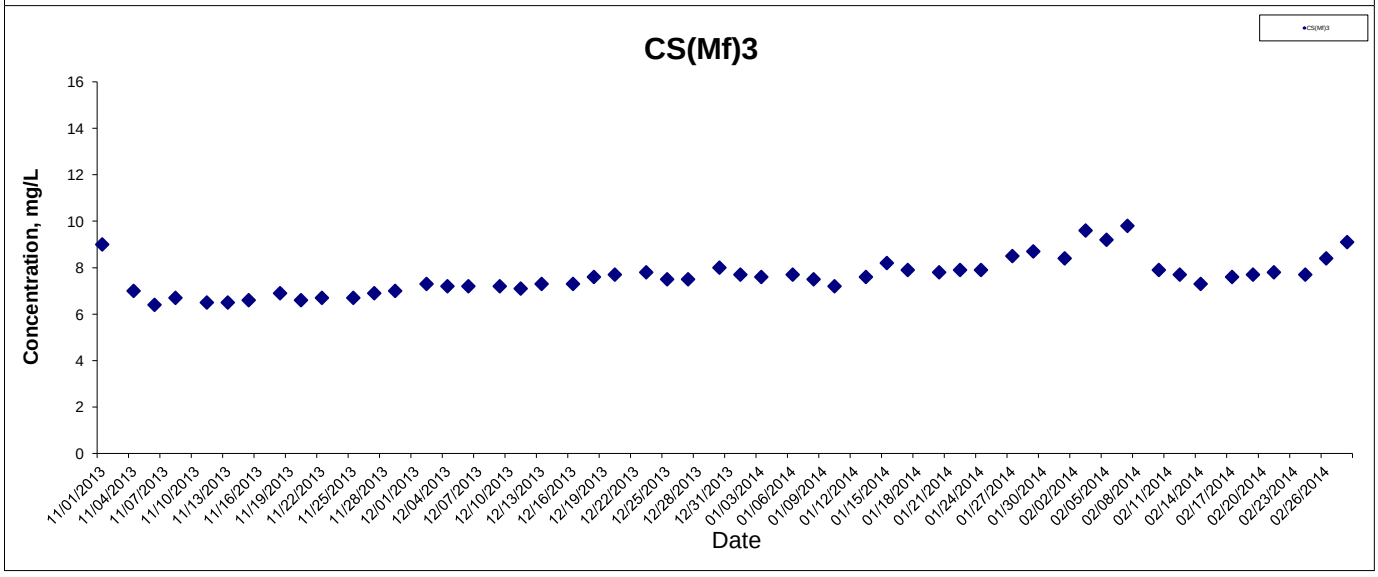
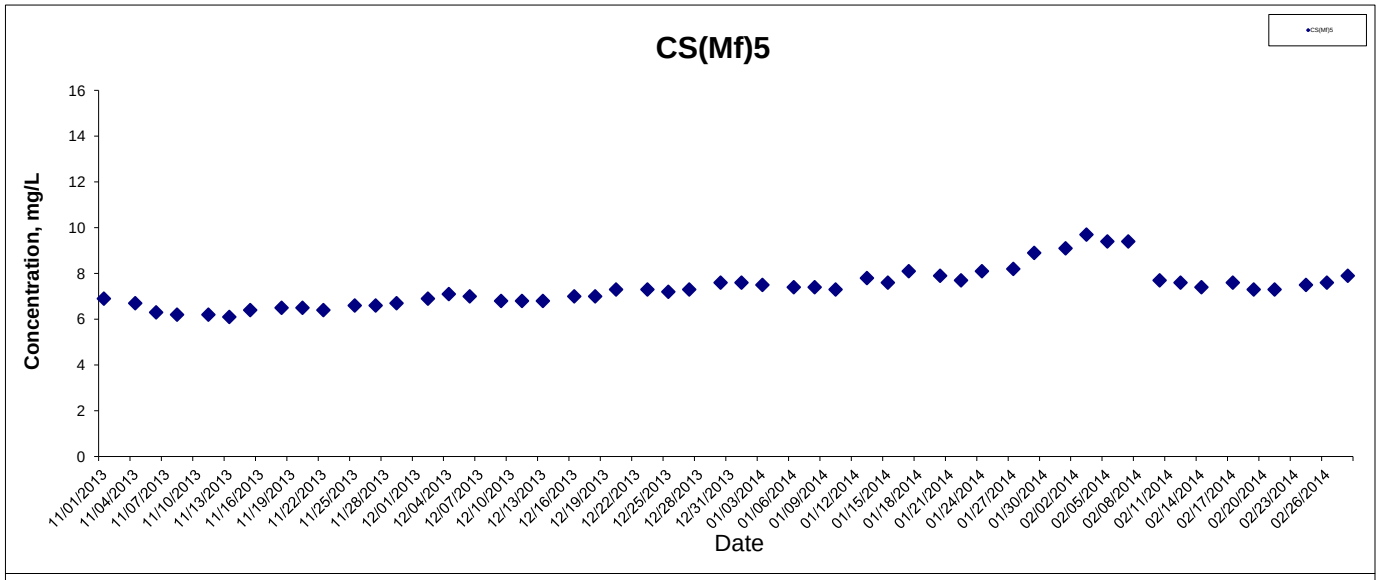
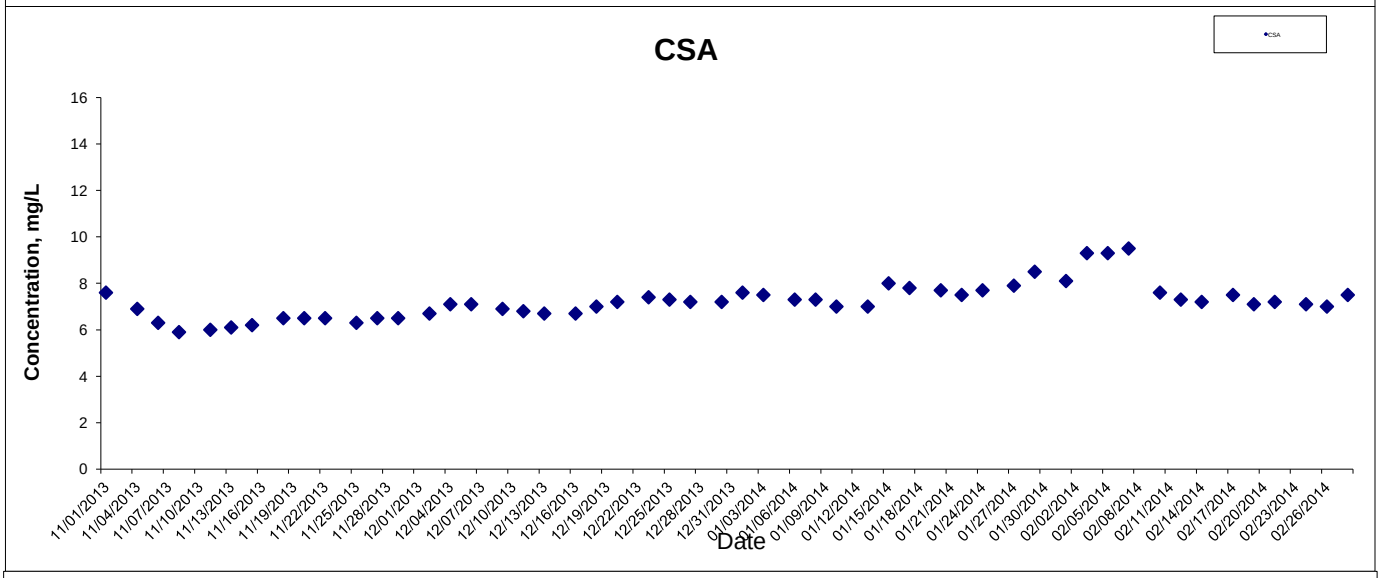


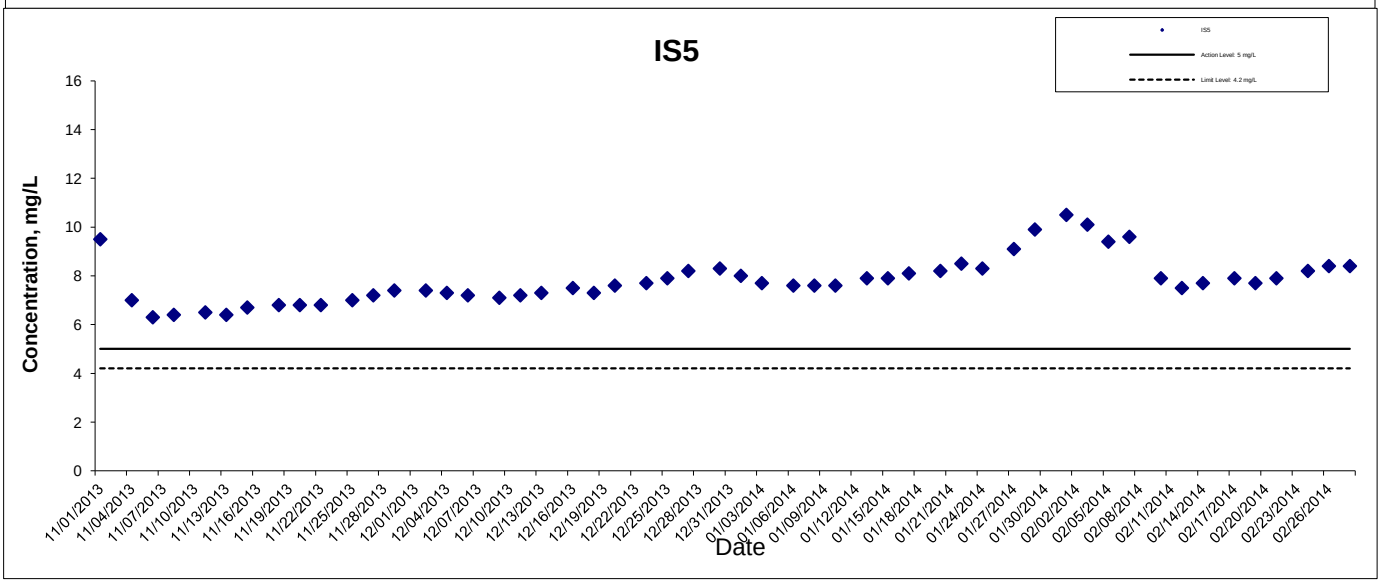




Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide







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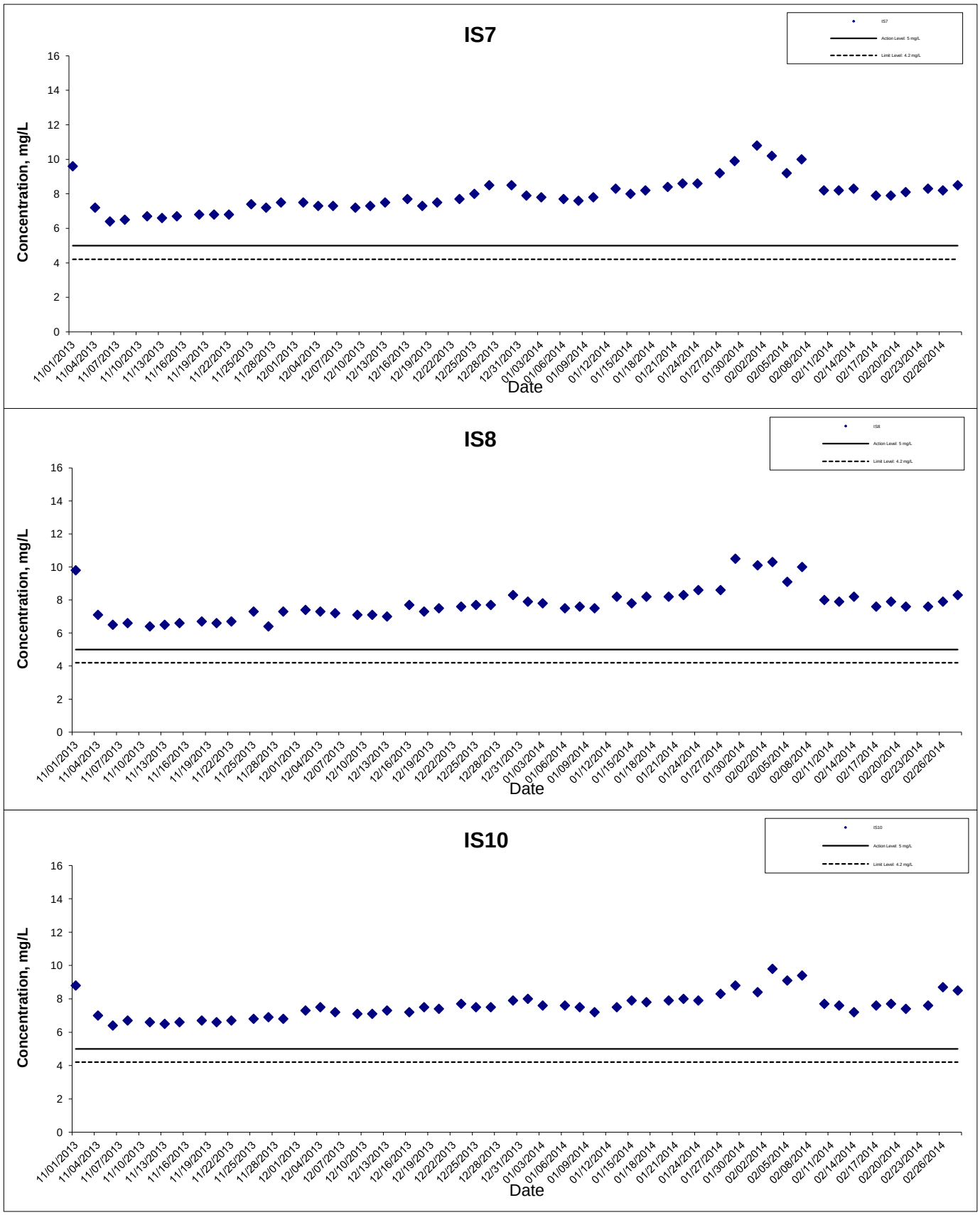
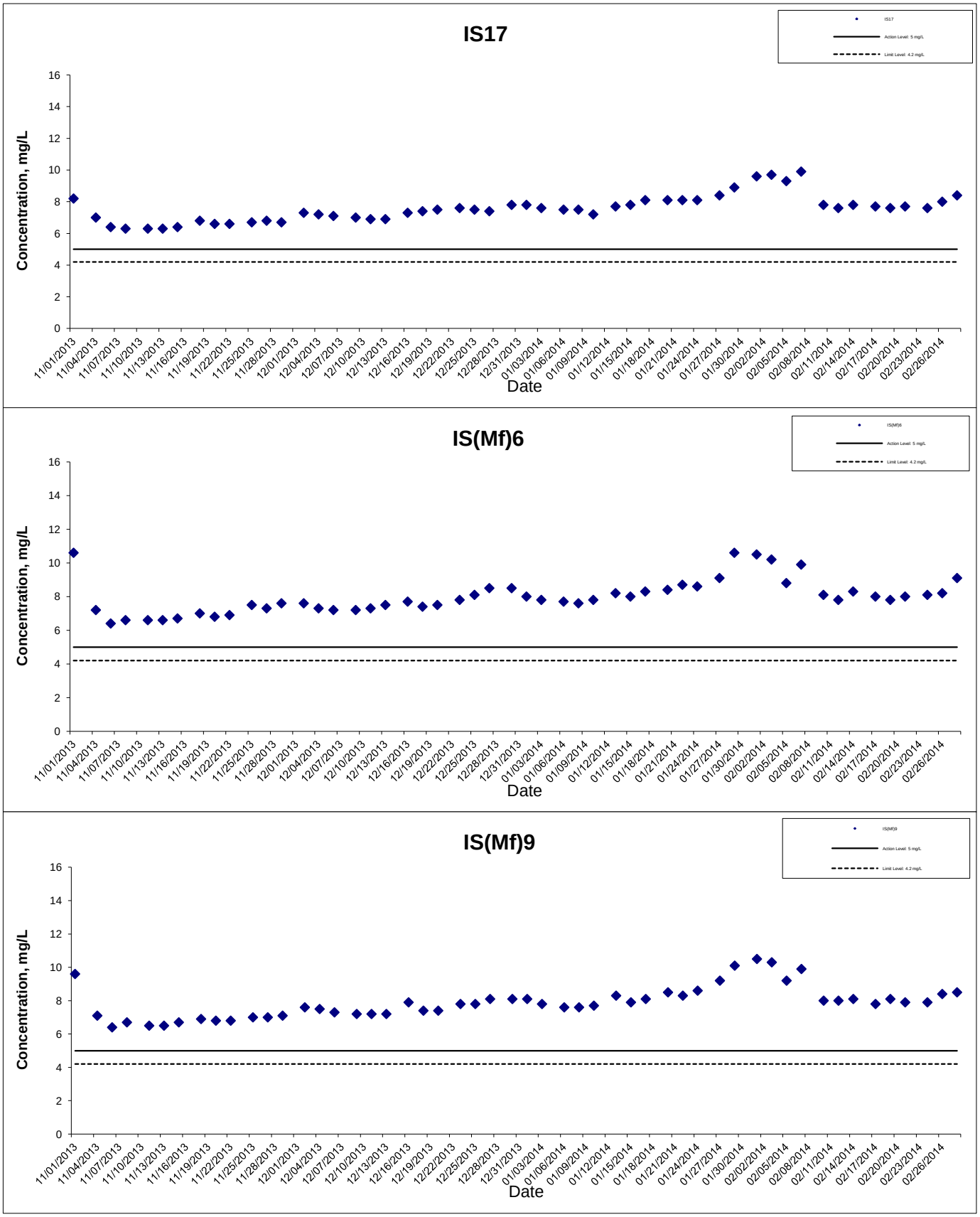


Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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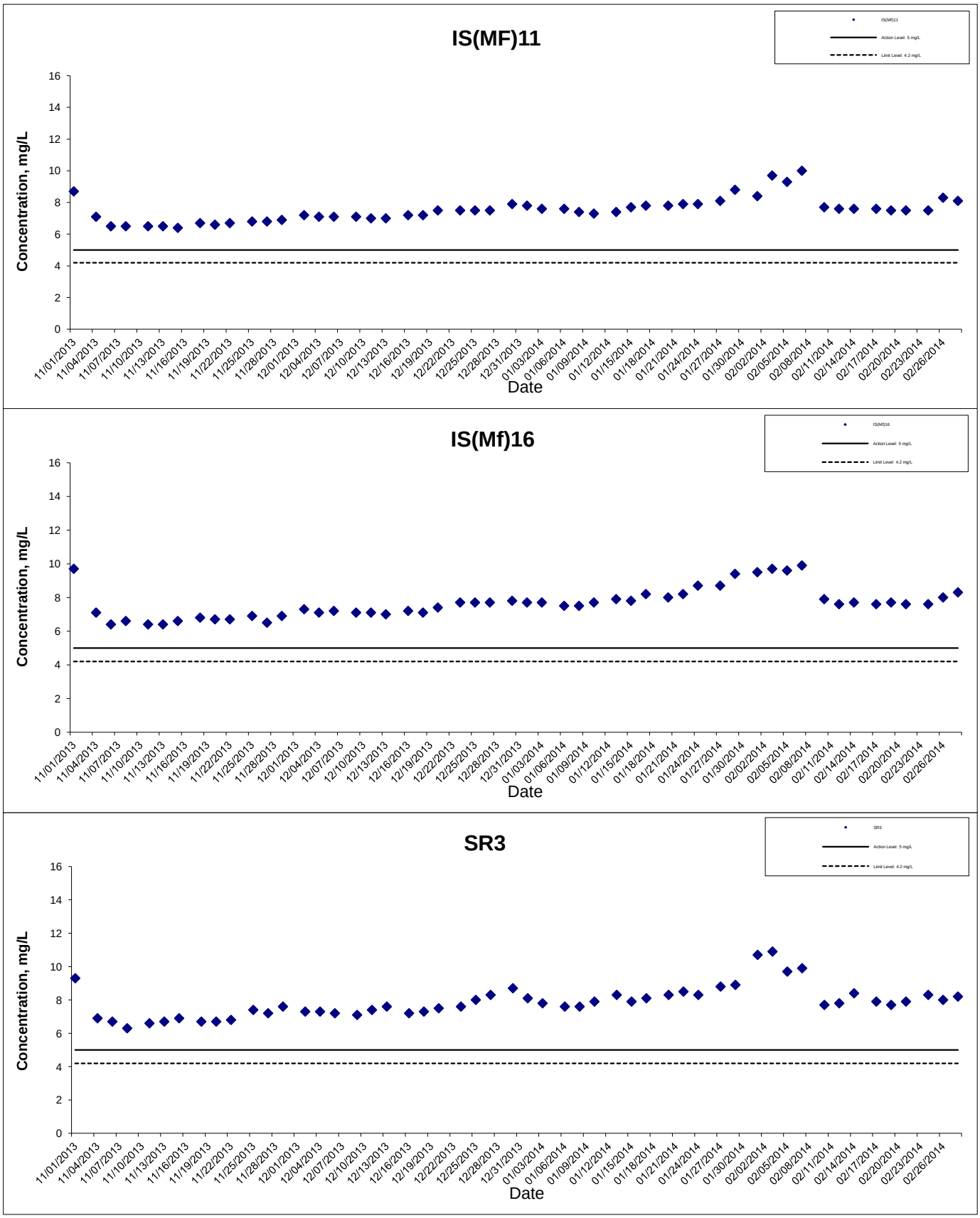

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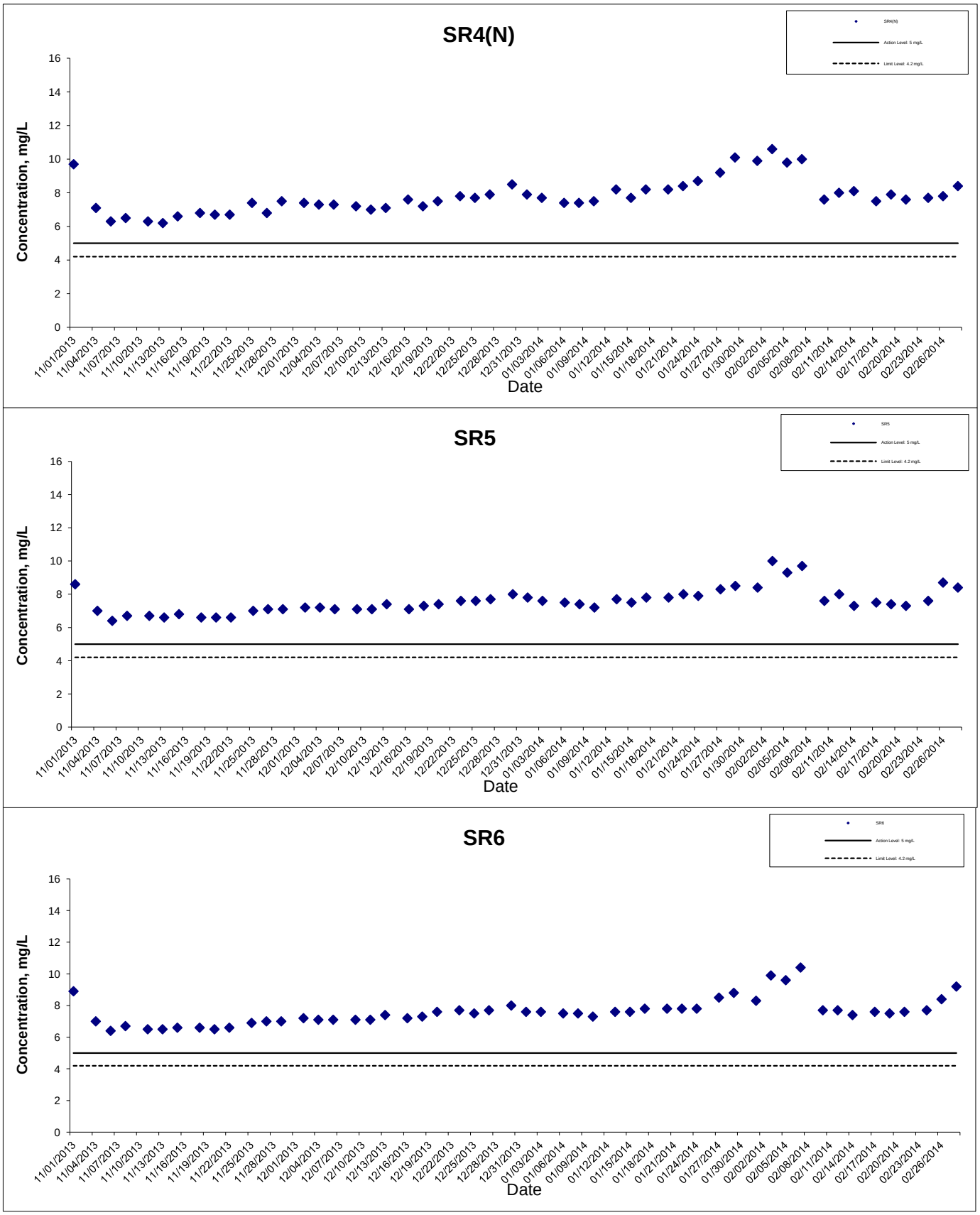
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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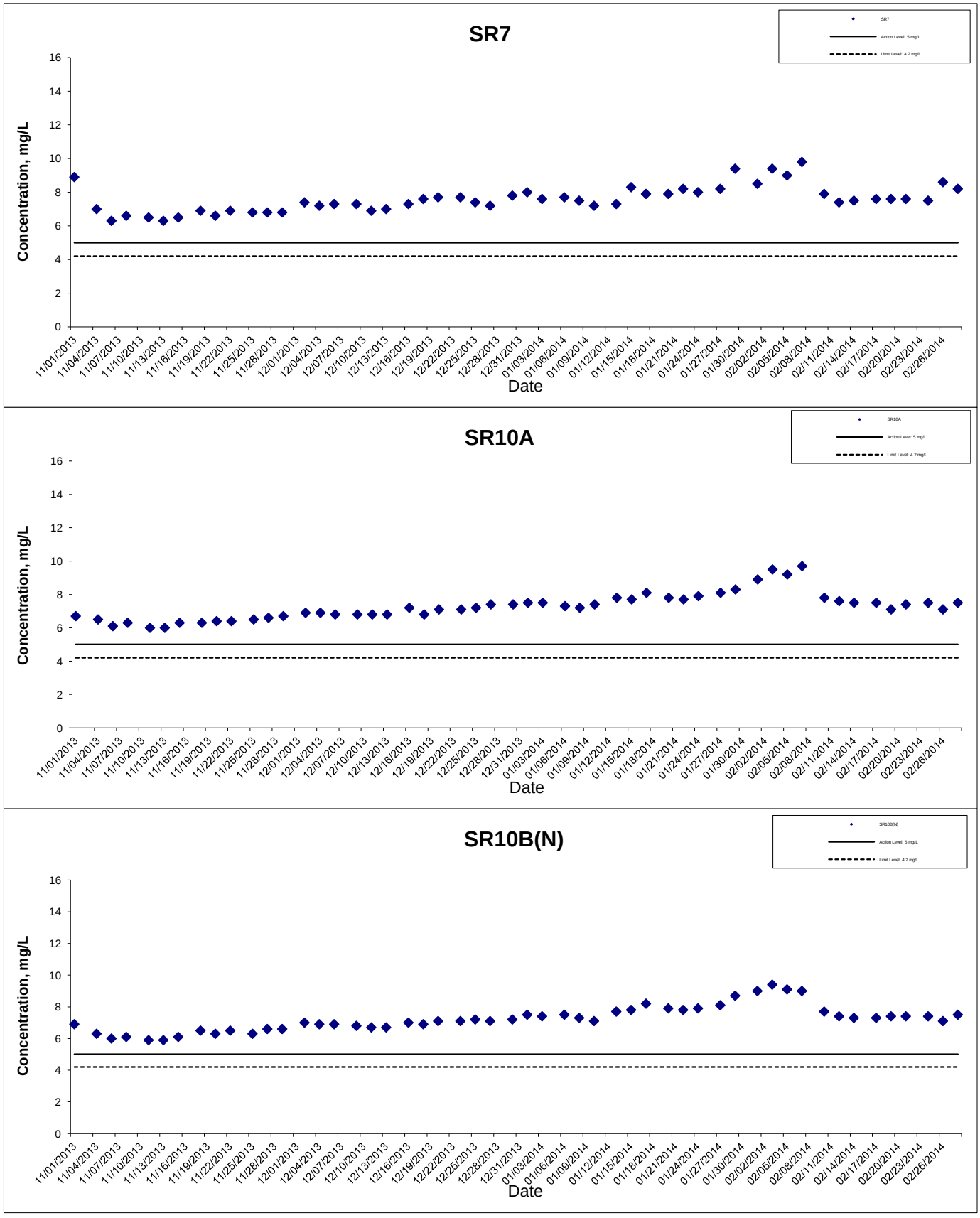
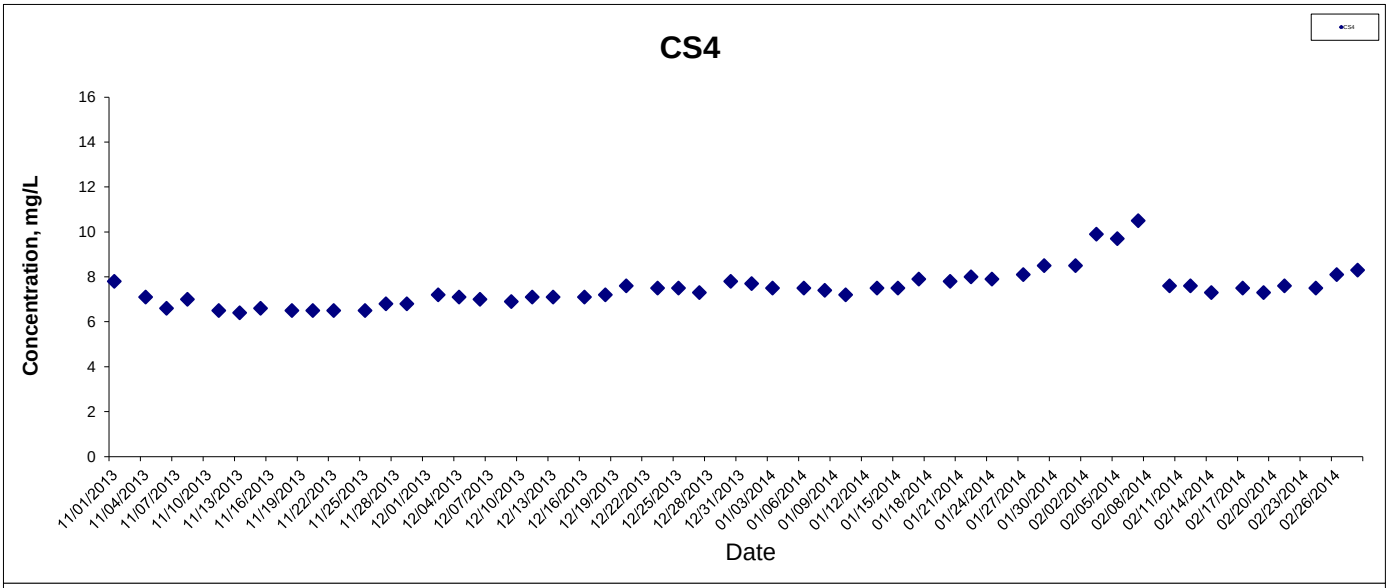
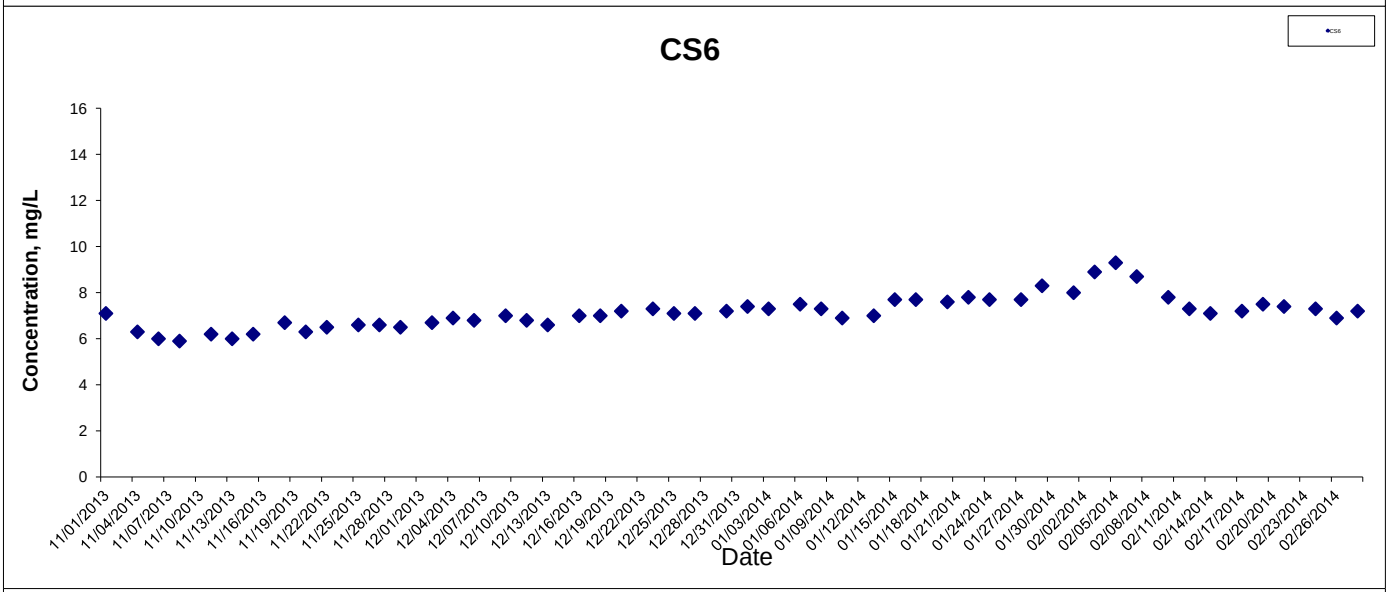
Appendix G

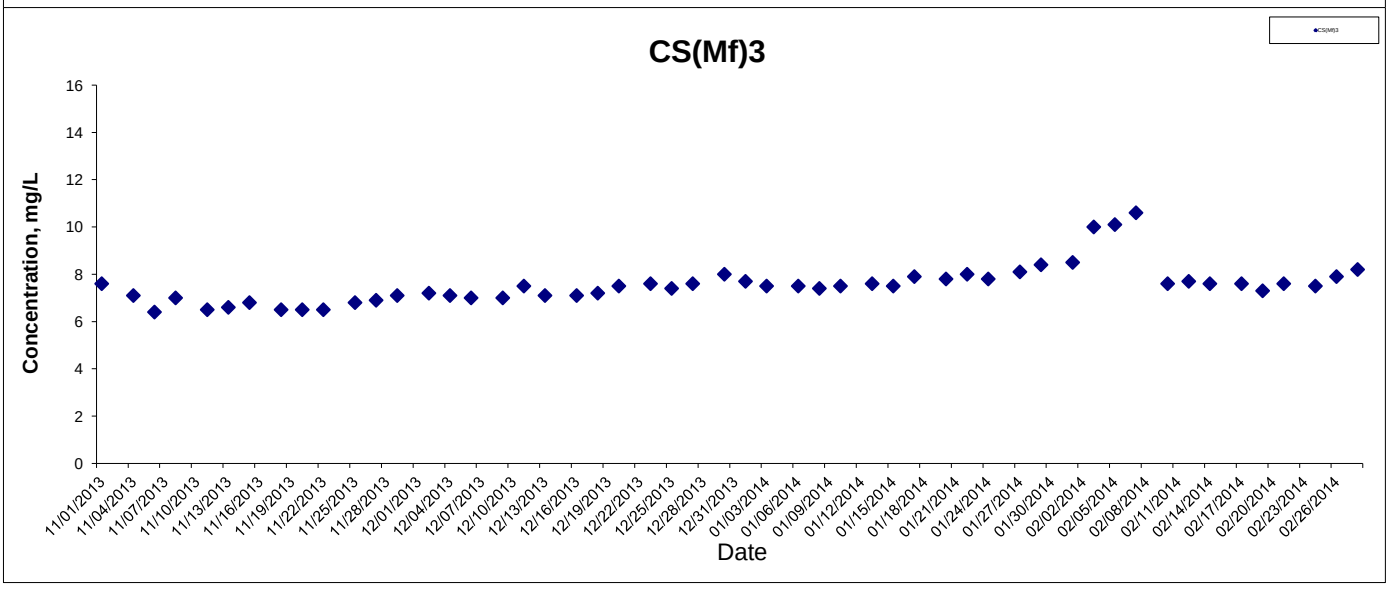
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



Dissolved Oxygen (Bottom) at Mid-Ebb Tide







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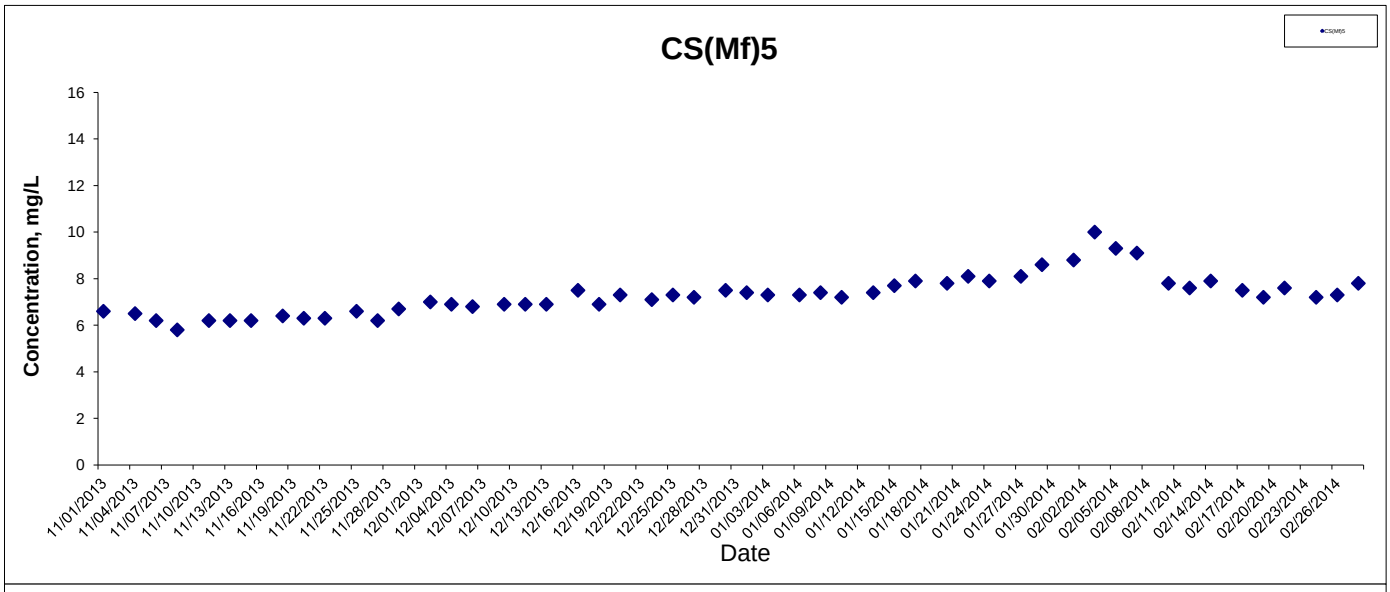
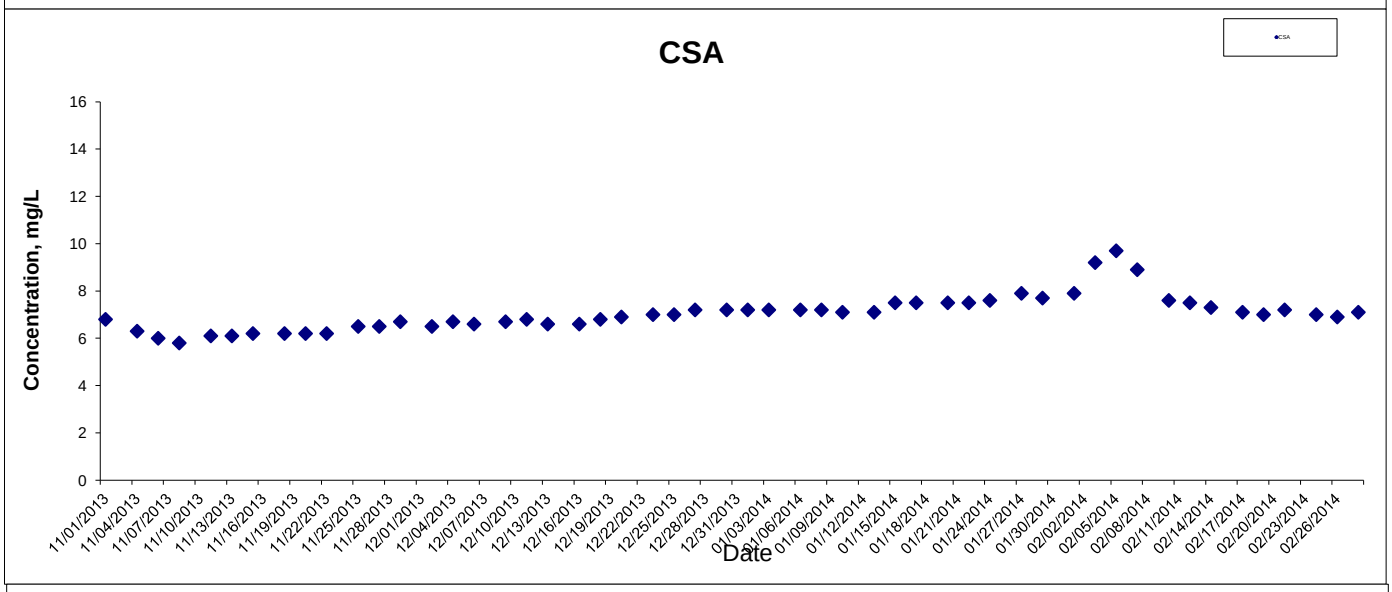
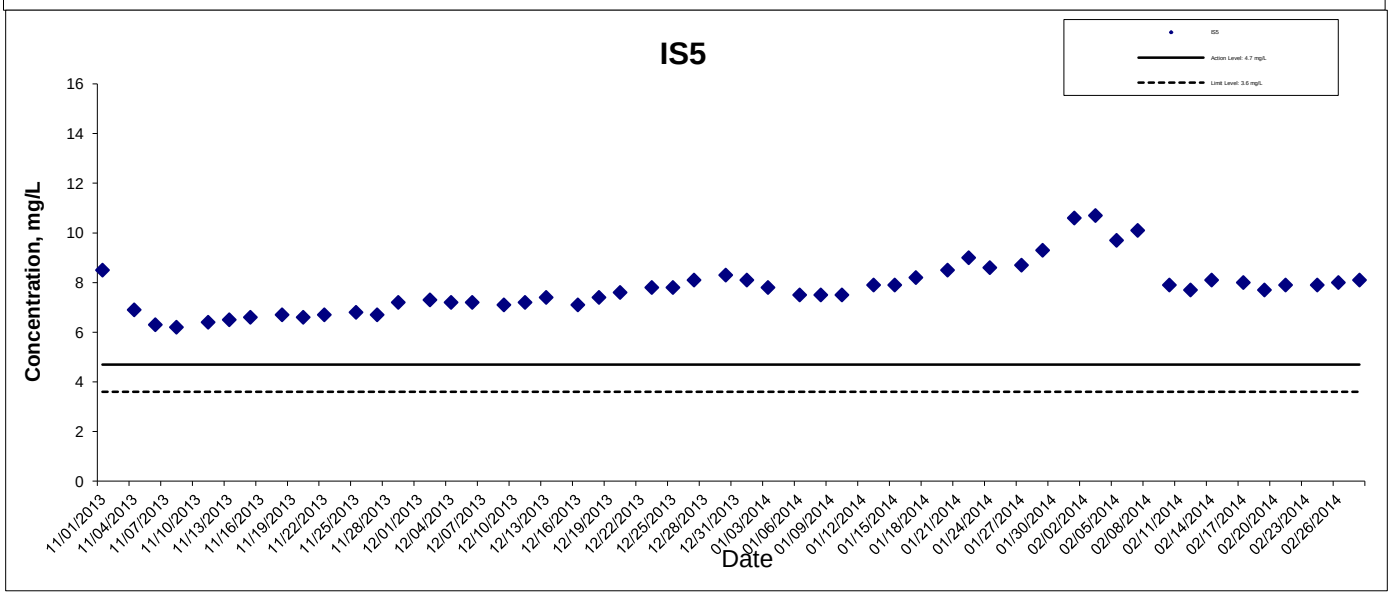
Appendix G

Dissolved Oxygen (Bottom) at Mid-Ebb Tide







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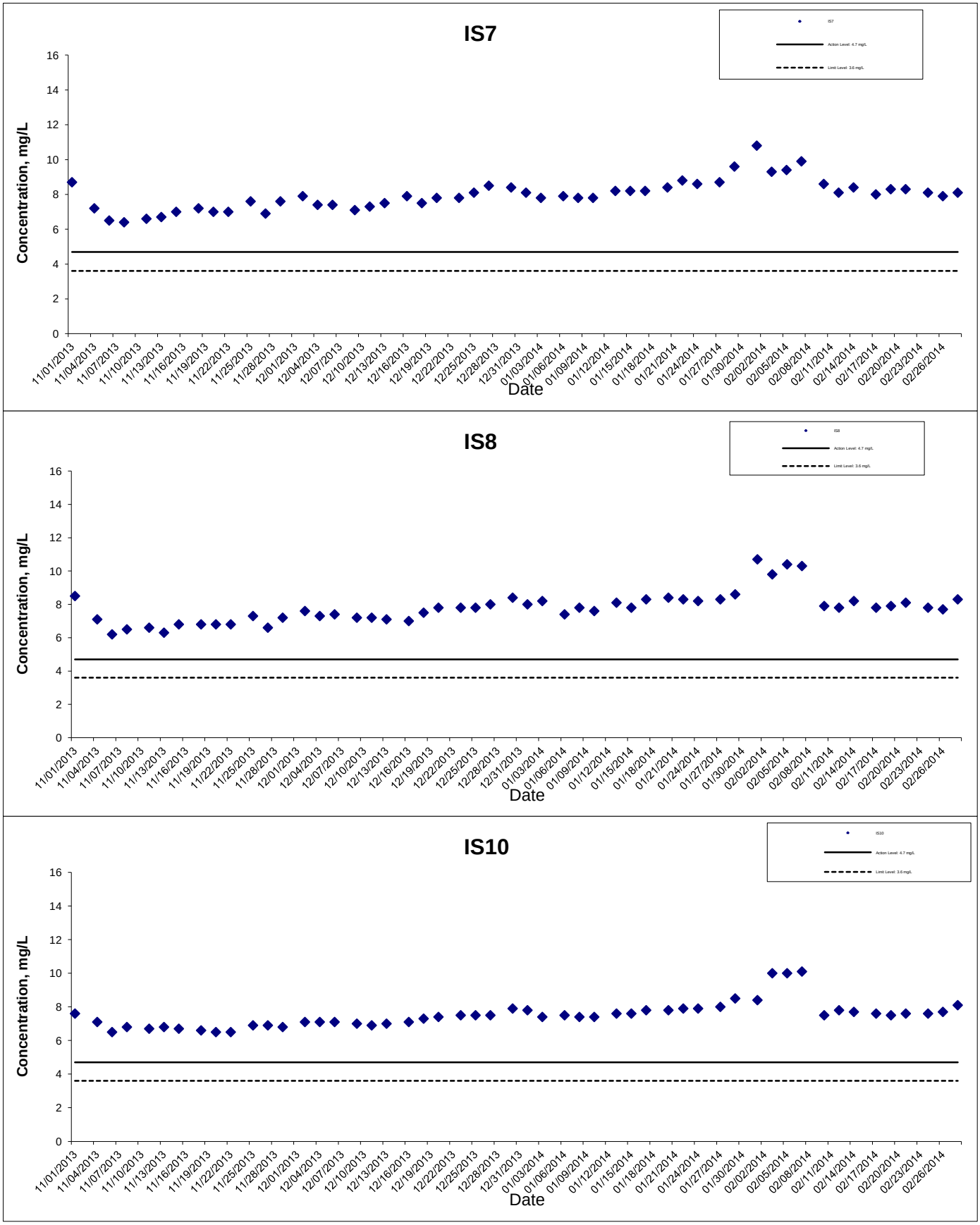
Appendix G

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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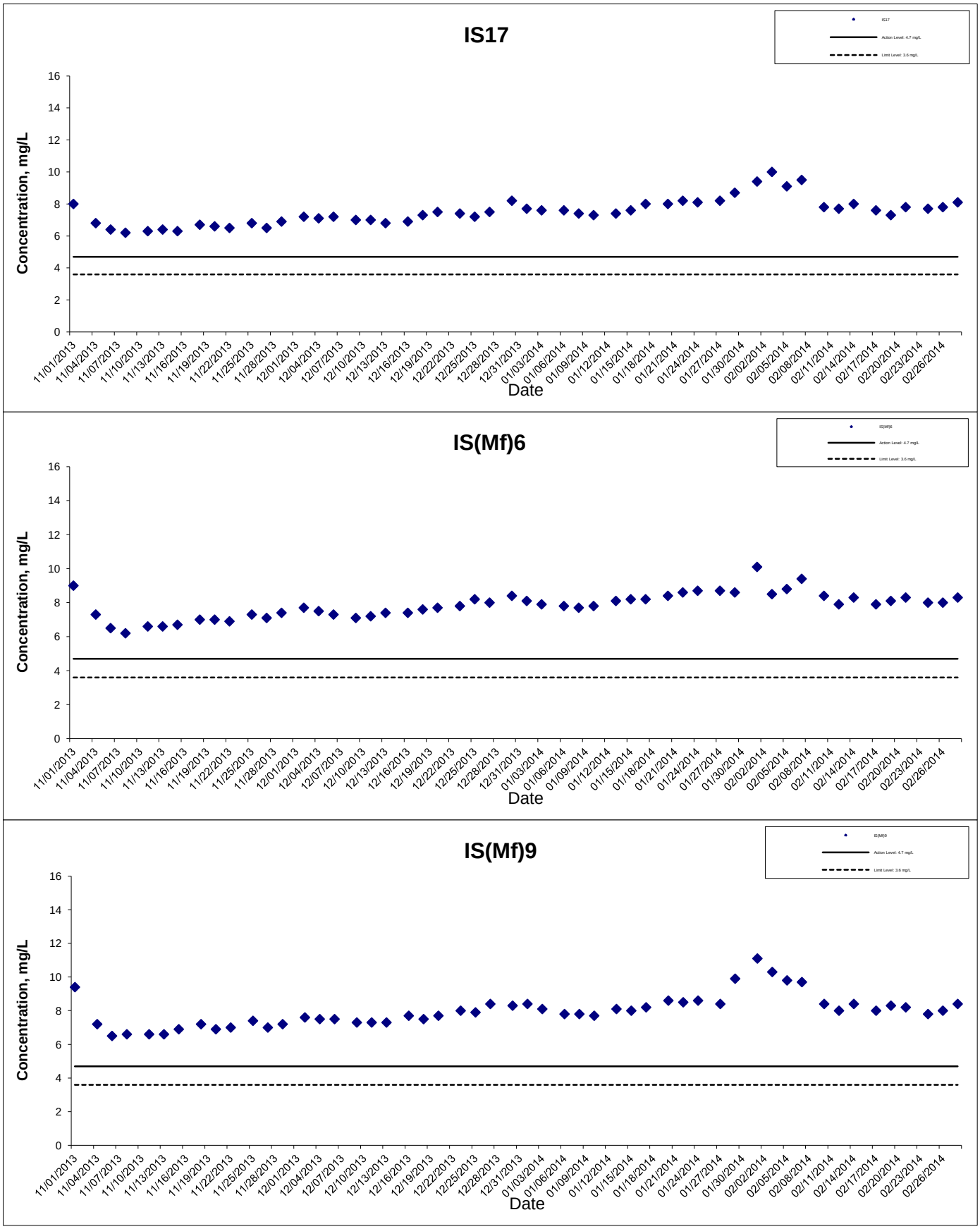
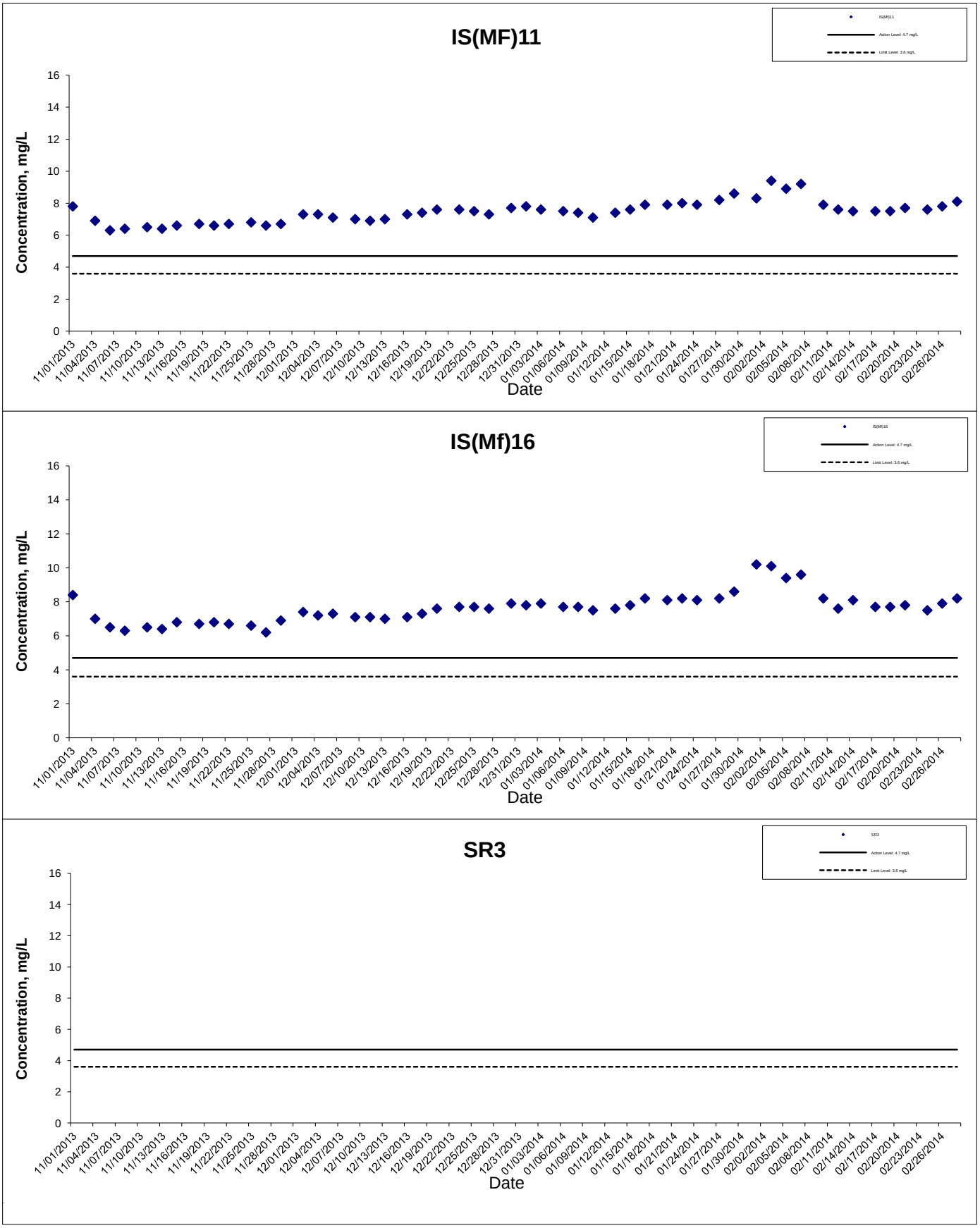
Appendix G

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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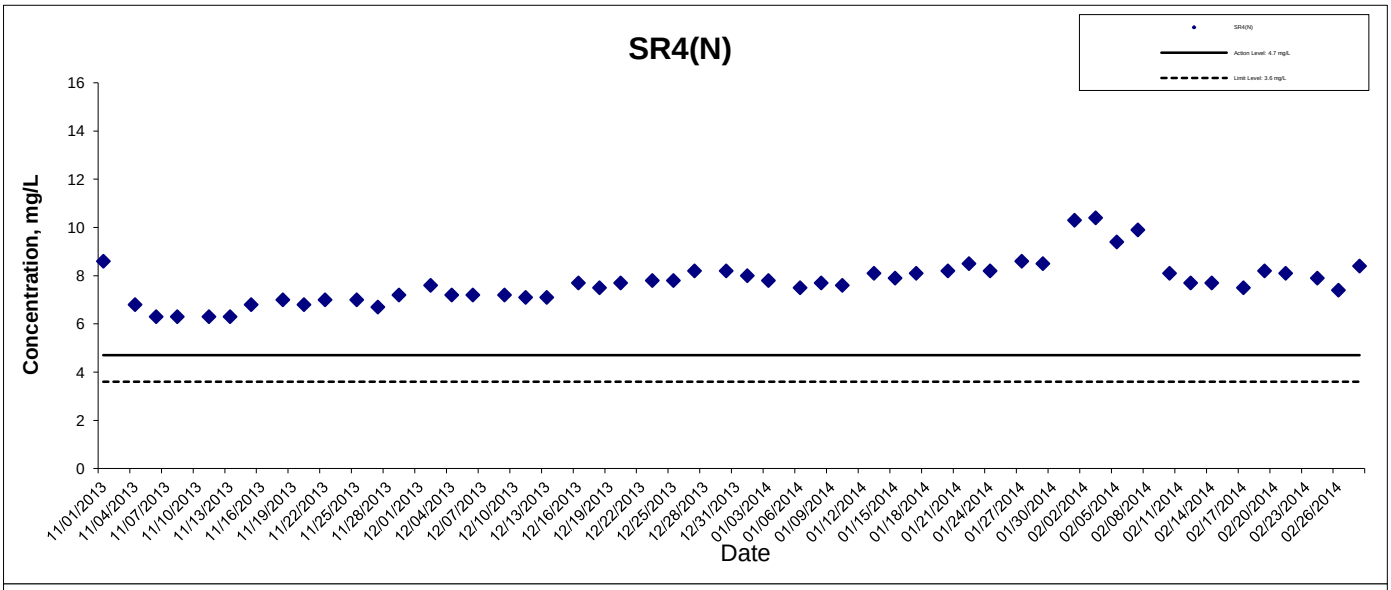
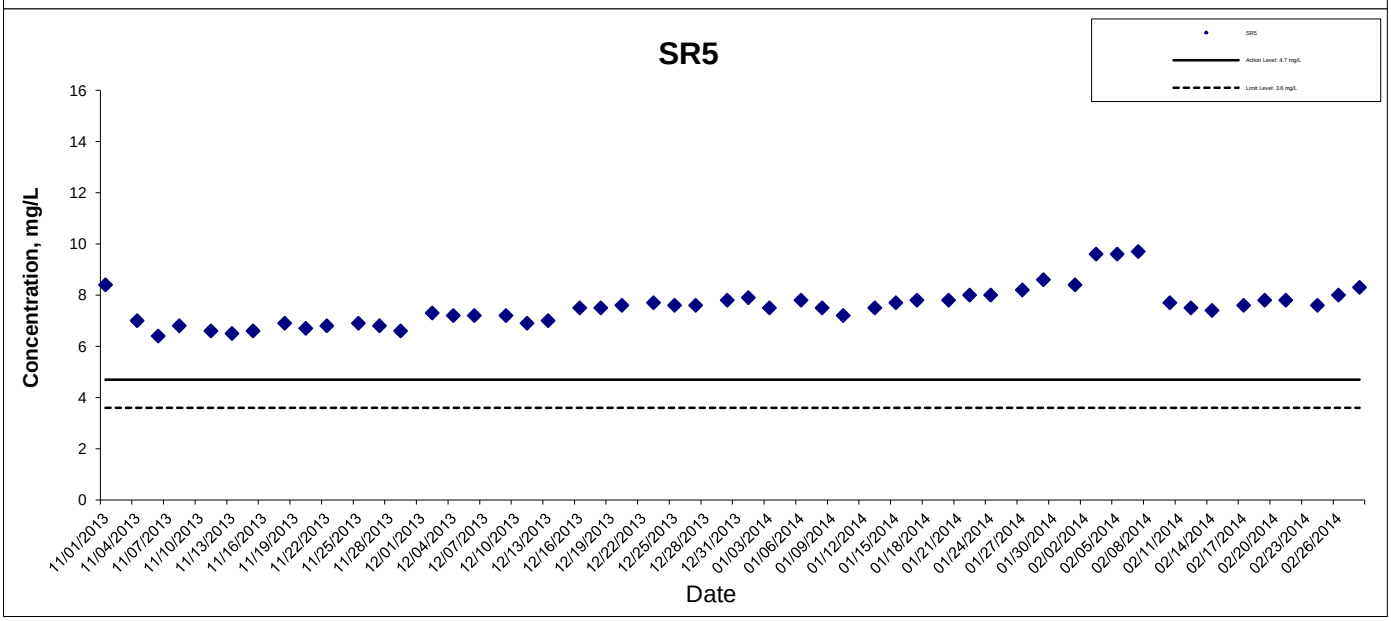
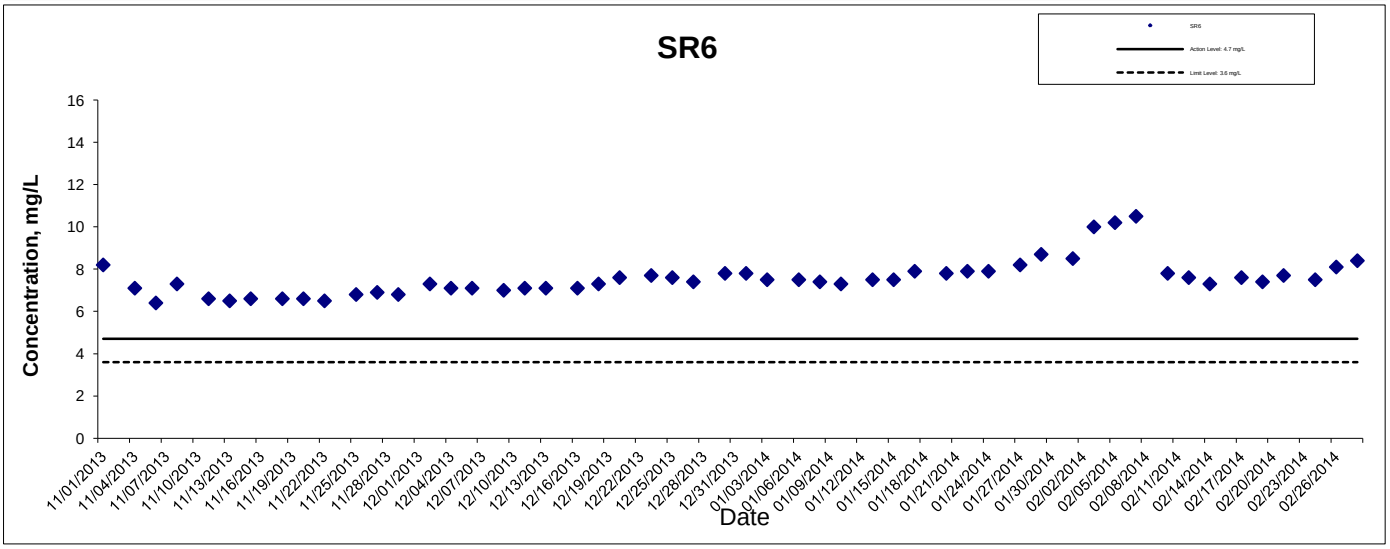
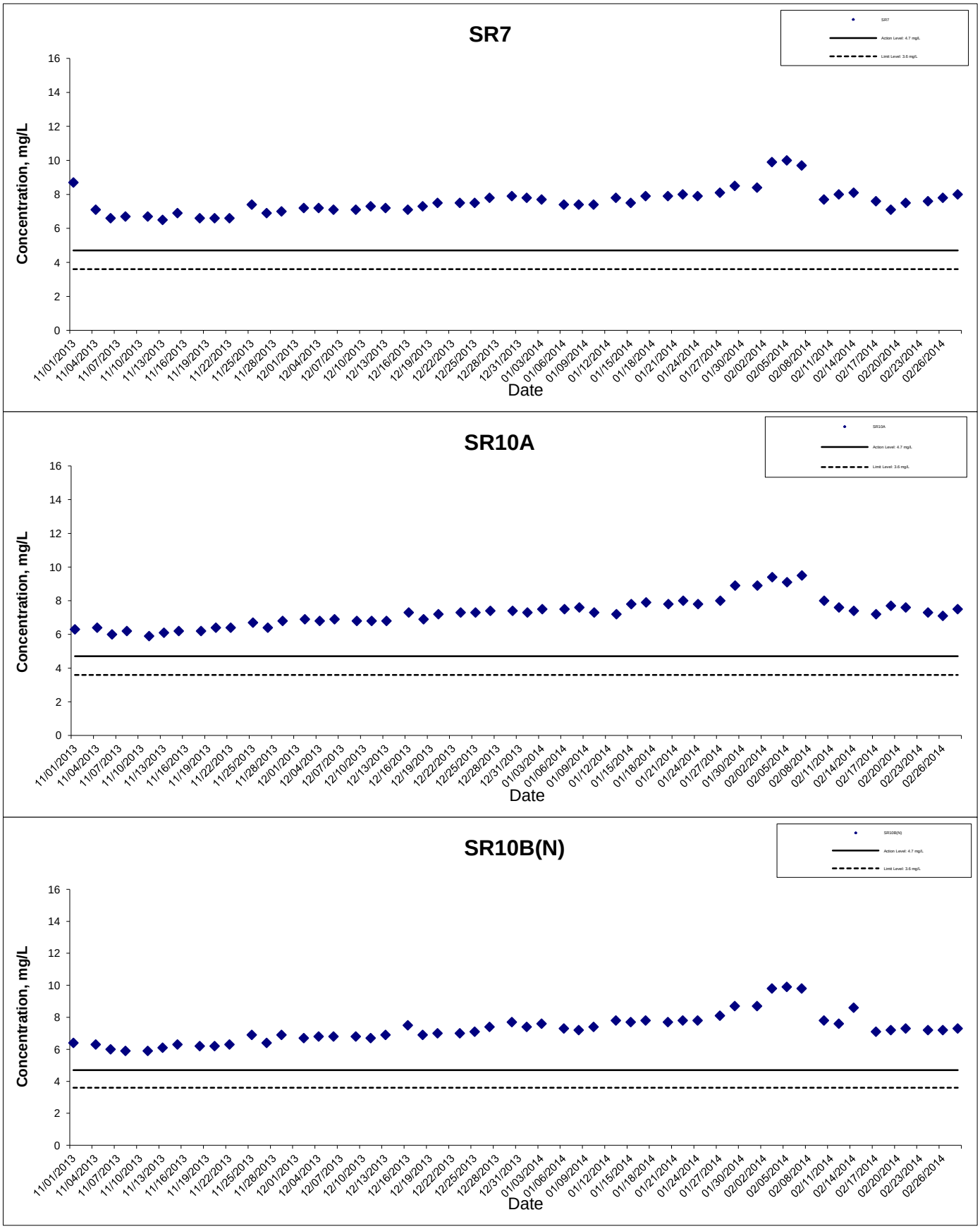
Dissolved Oxygen (Bottom) at Mid-Ebb Tide







Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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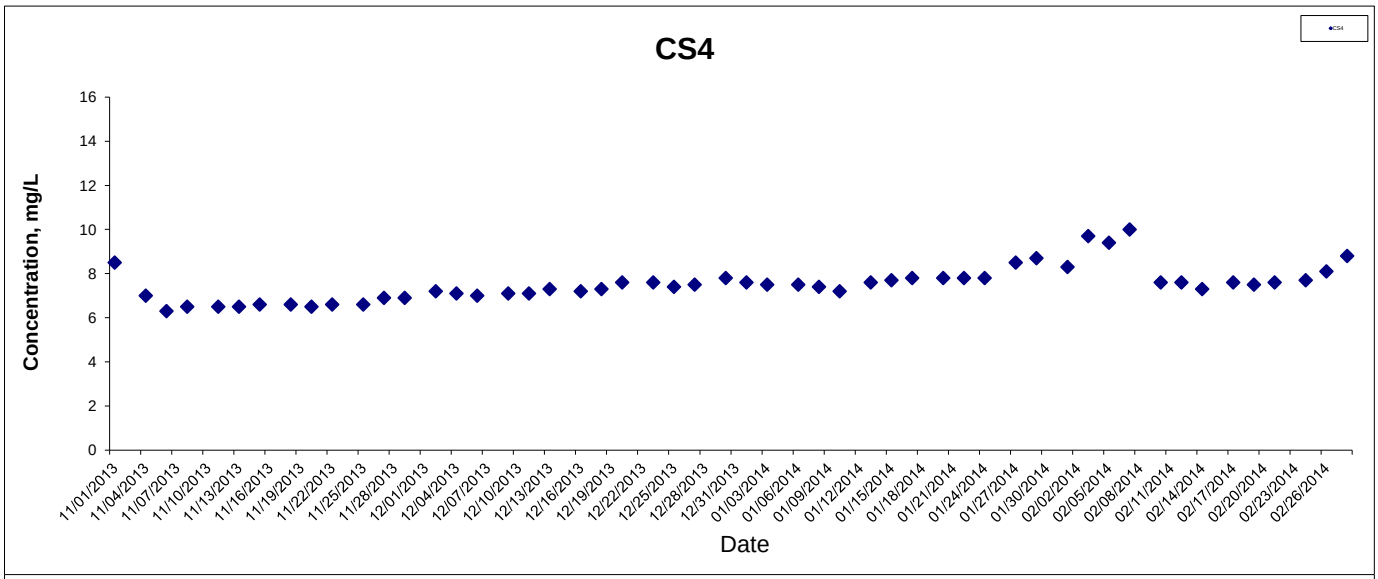
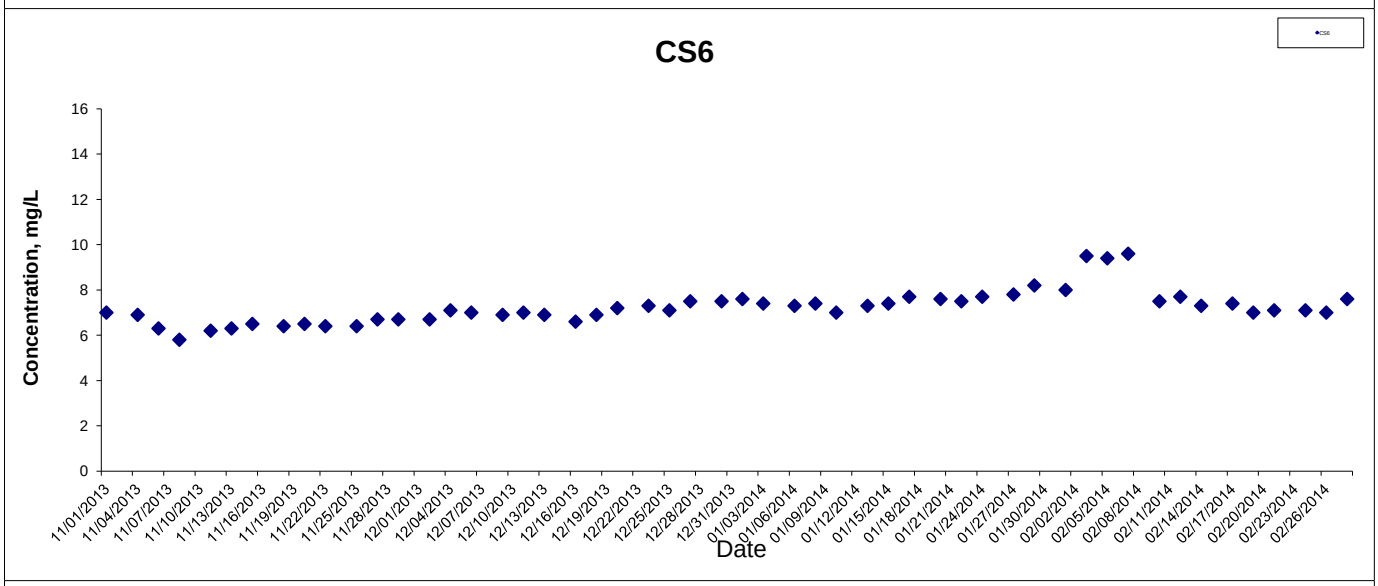
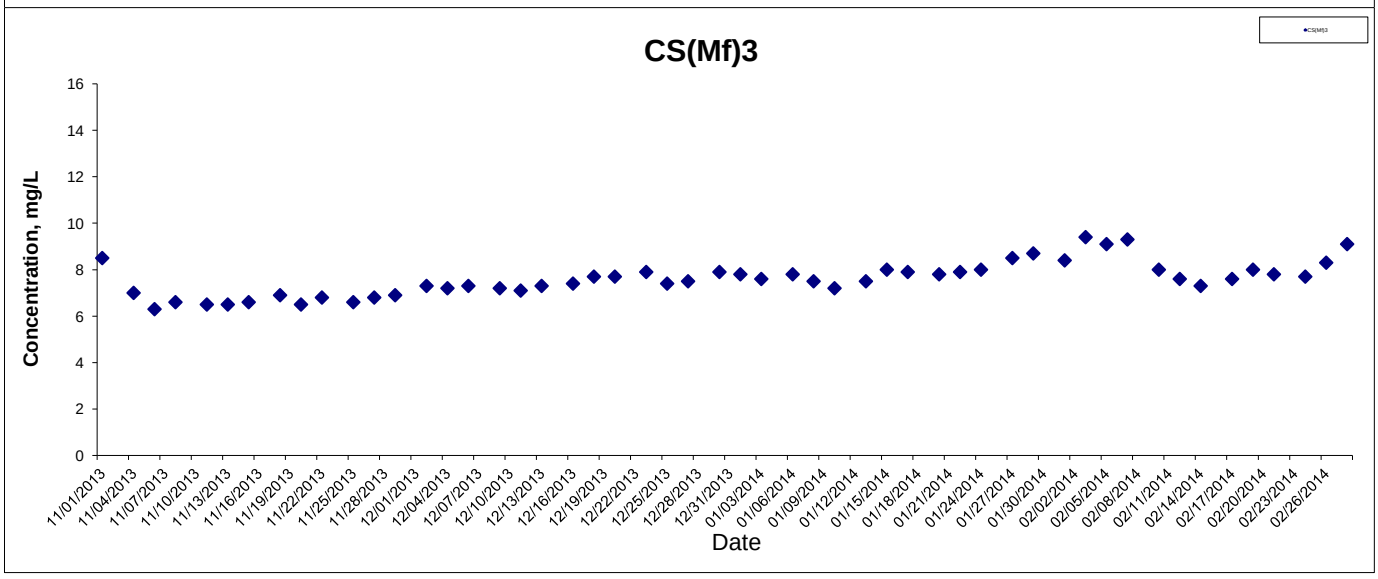
Appendix G

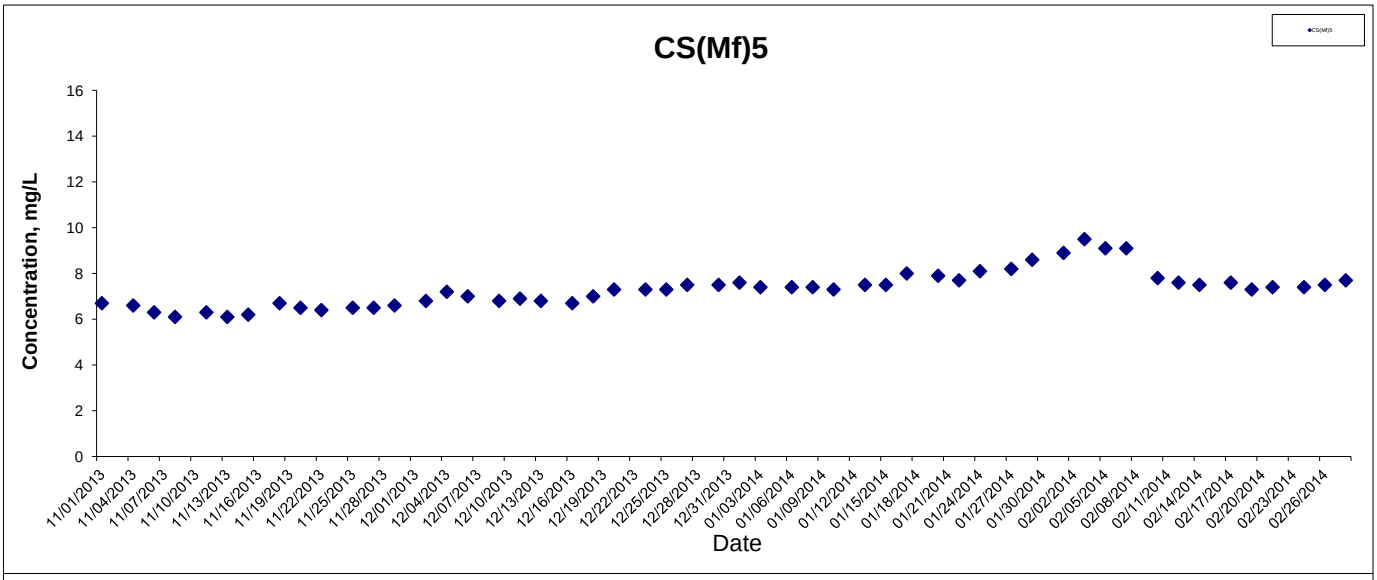
Dissolved Oxygen (Bottom) at Mid-Flood Tide

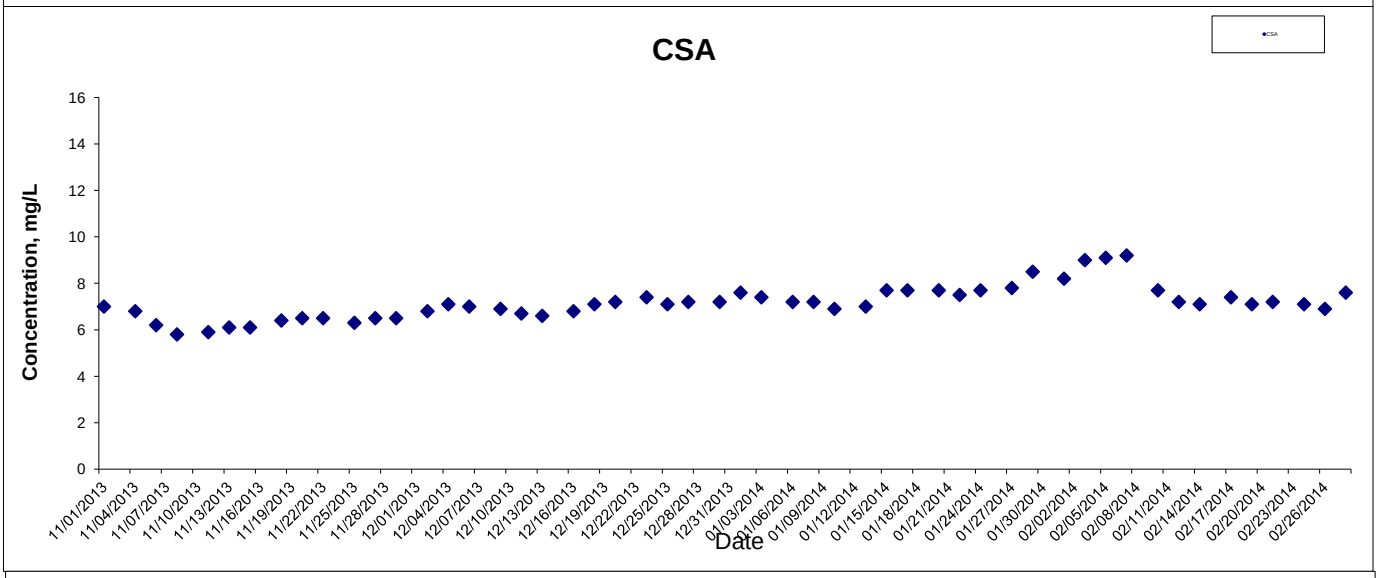


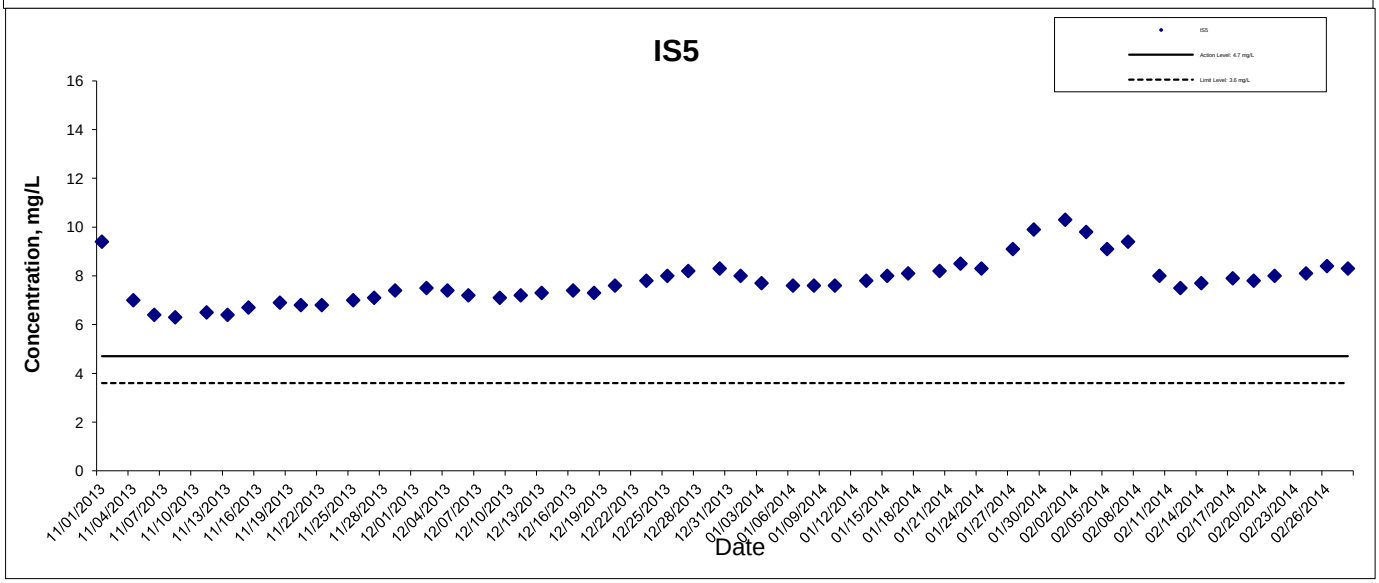




Dissolved Oxygen (Bottom) at Mid-Flood Tide







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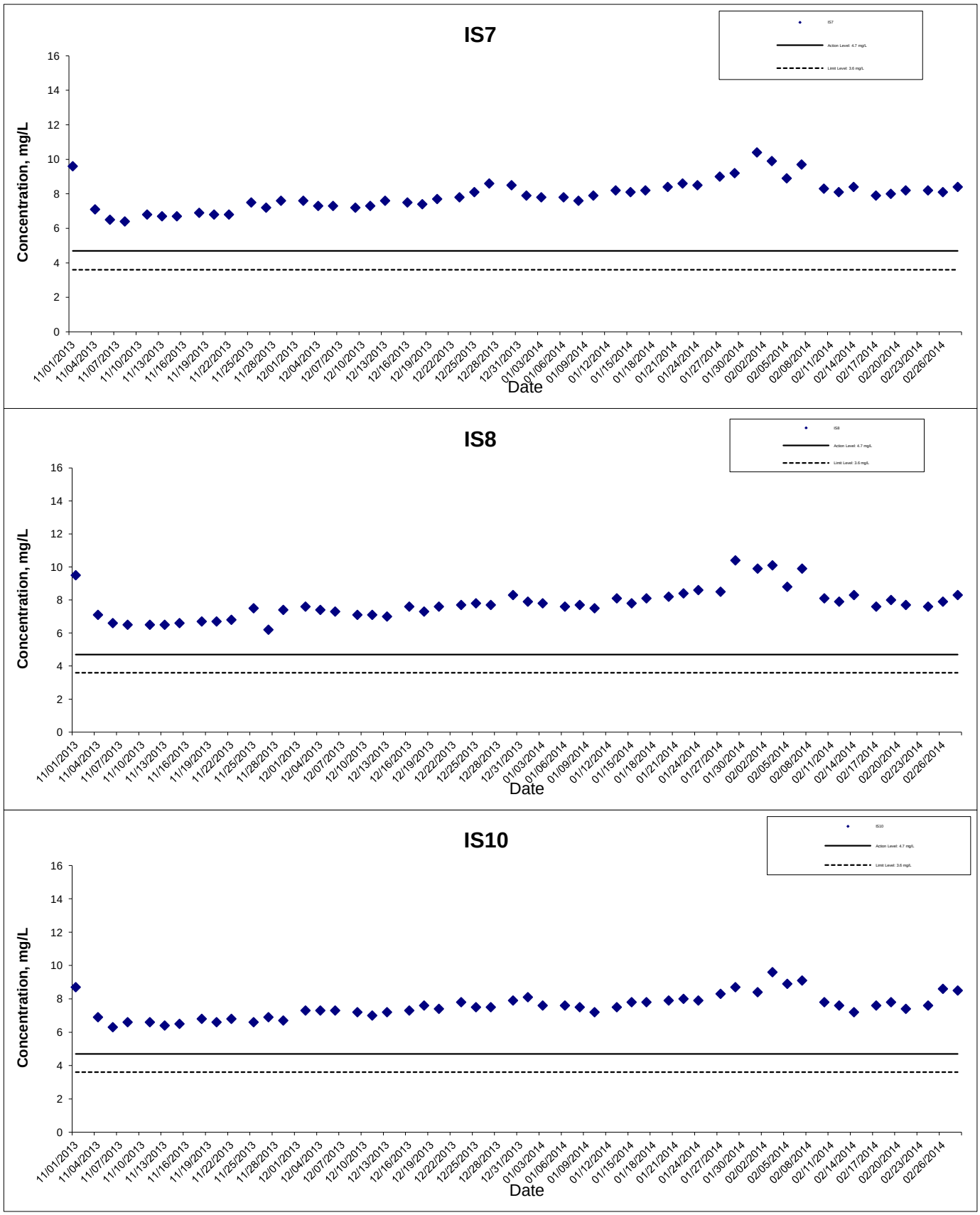
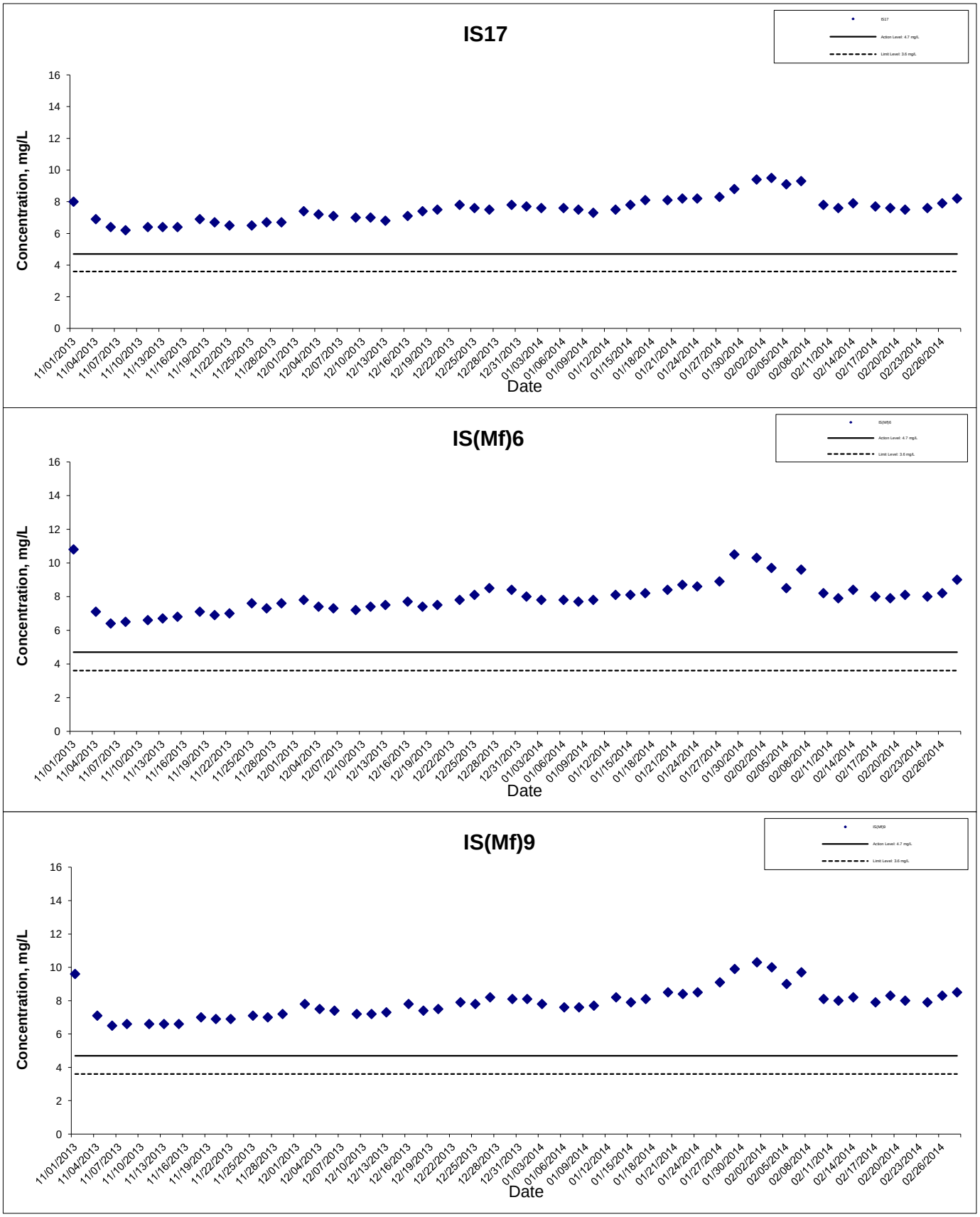
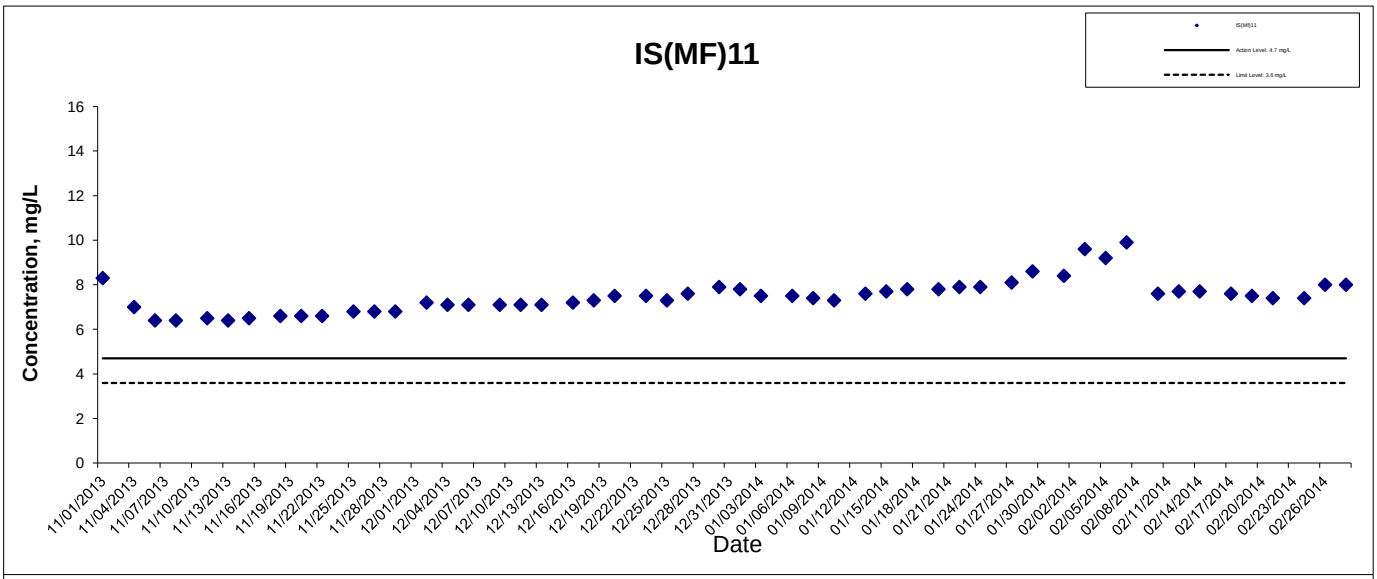
Dissolved Oxygen (Bottom) at Mid-Flood Tide

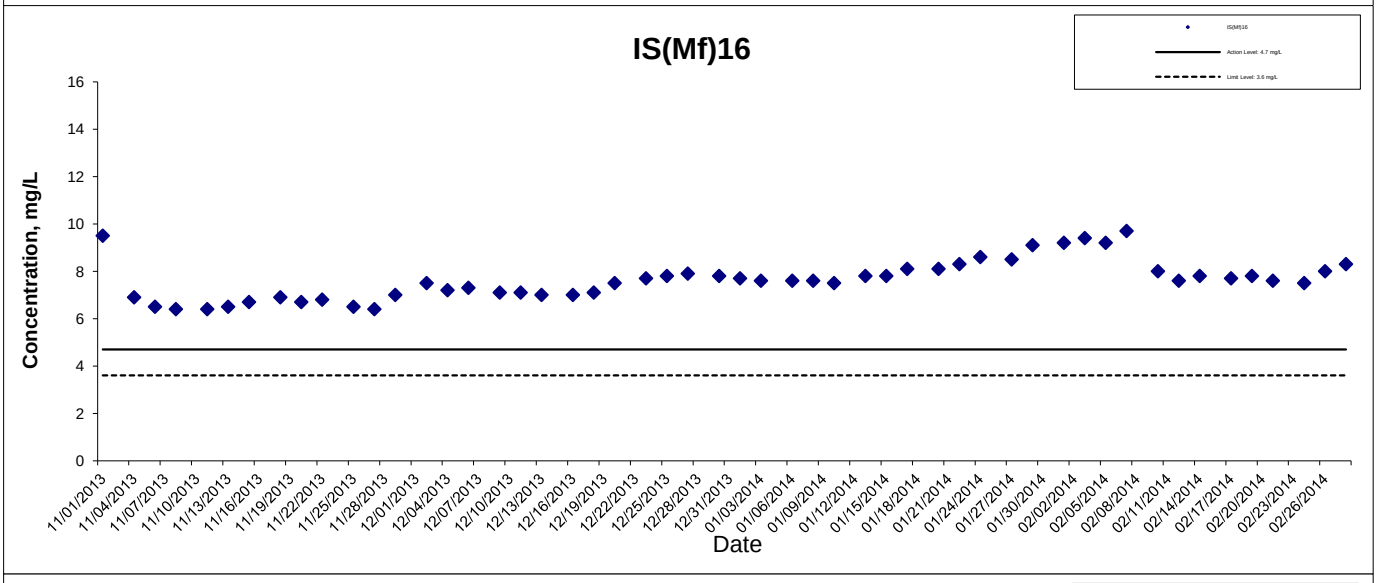


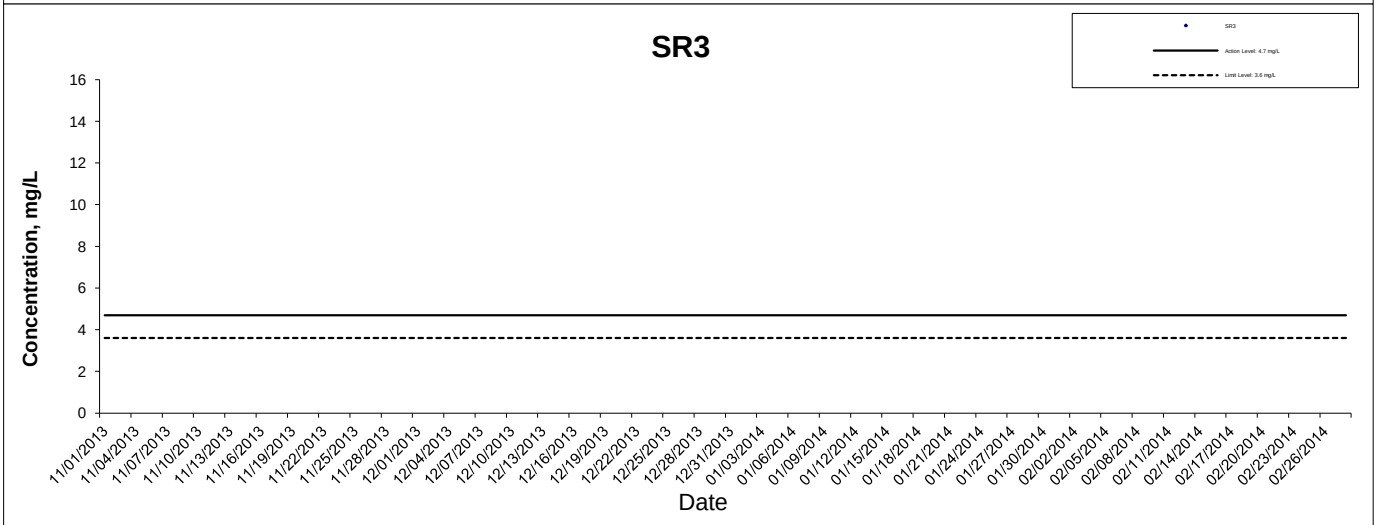
Dissolved Oxygen (Bottom) at Mid-Flood Tide



Dissolved Oxygen (Bottom) at Mid-Flood Tide

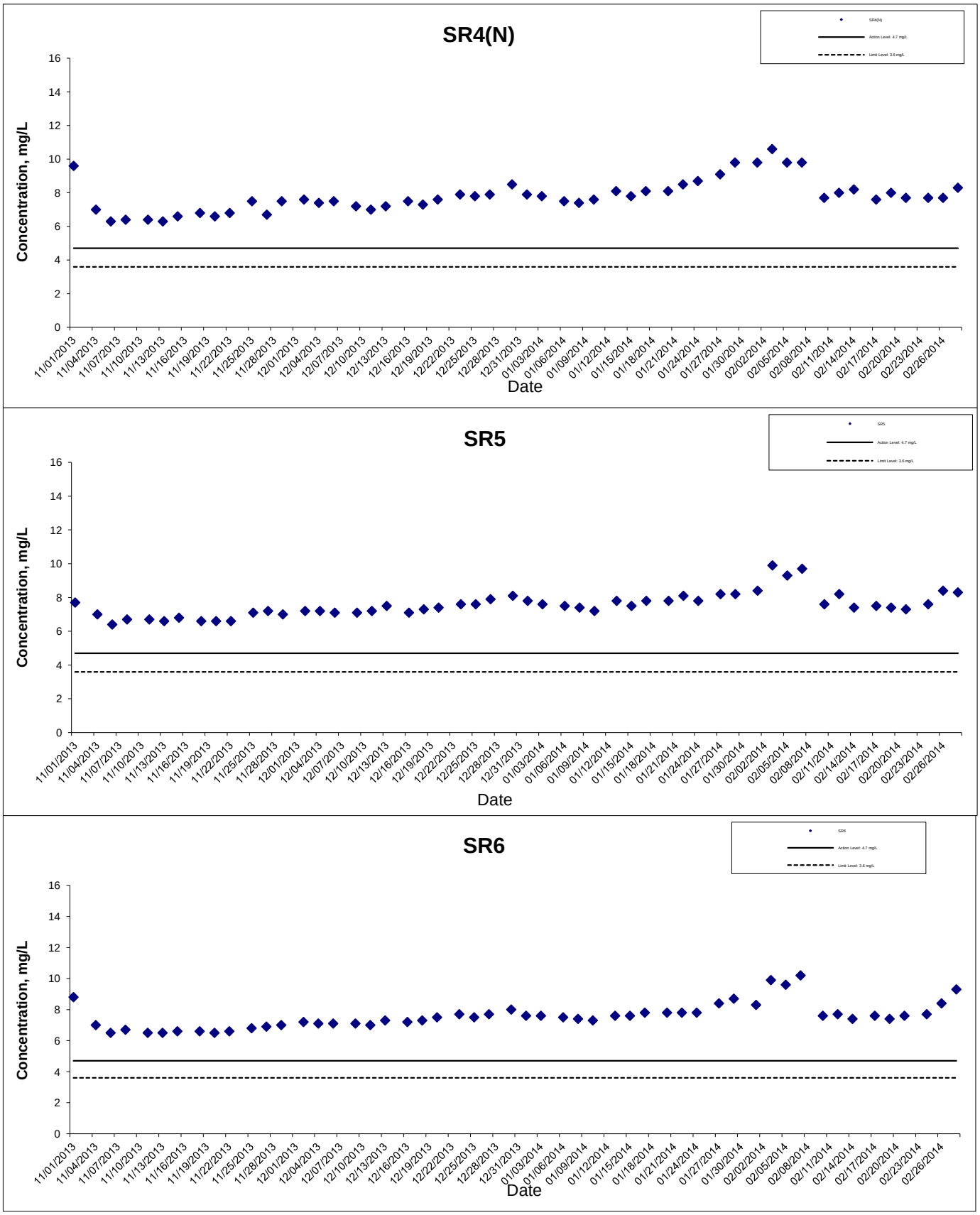




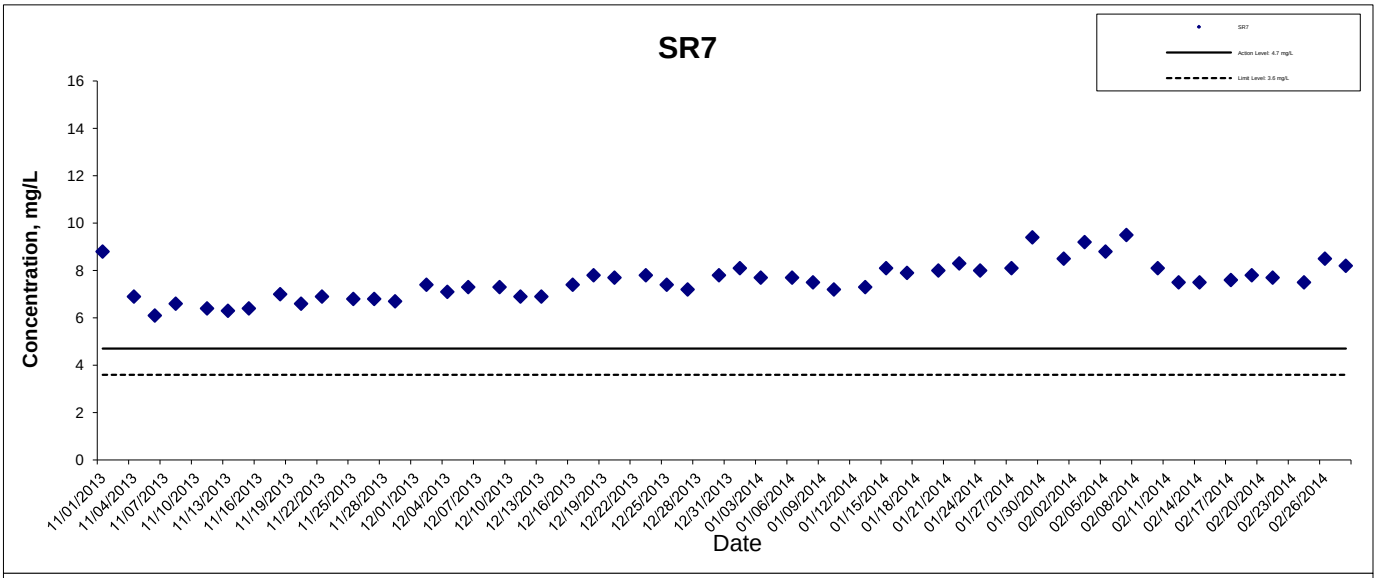


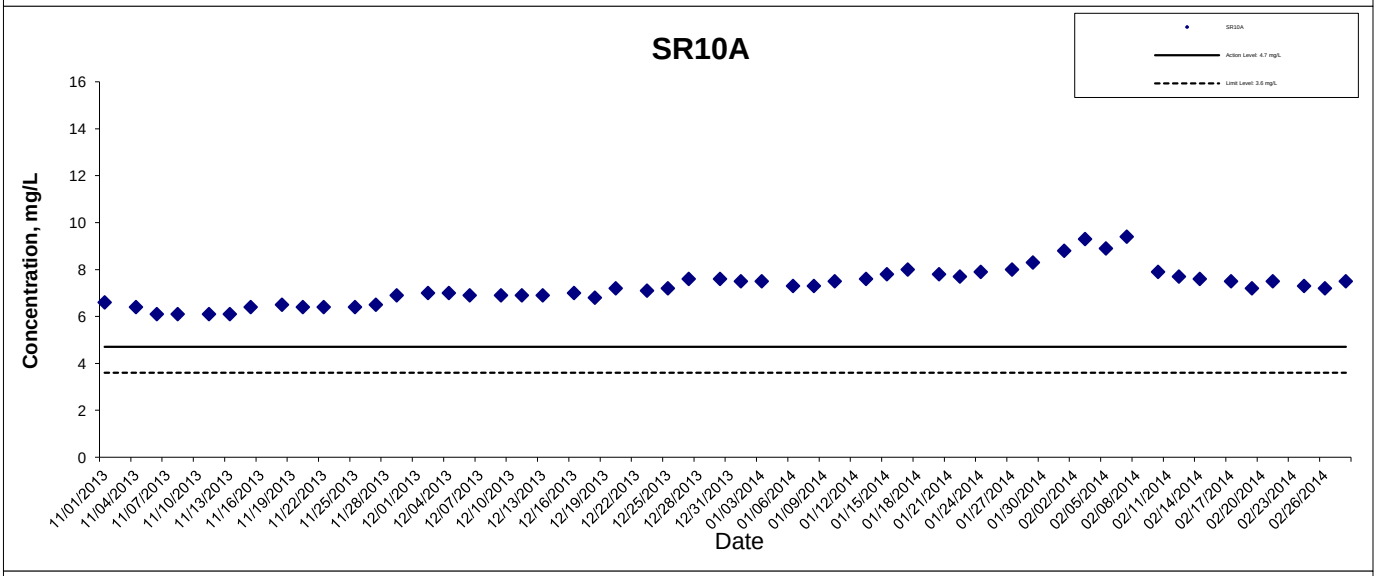
As the measured water depths were less than 3 m during all monitoring days, water samples are collected at mid-depth only .

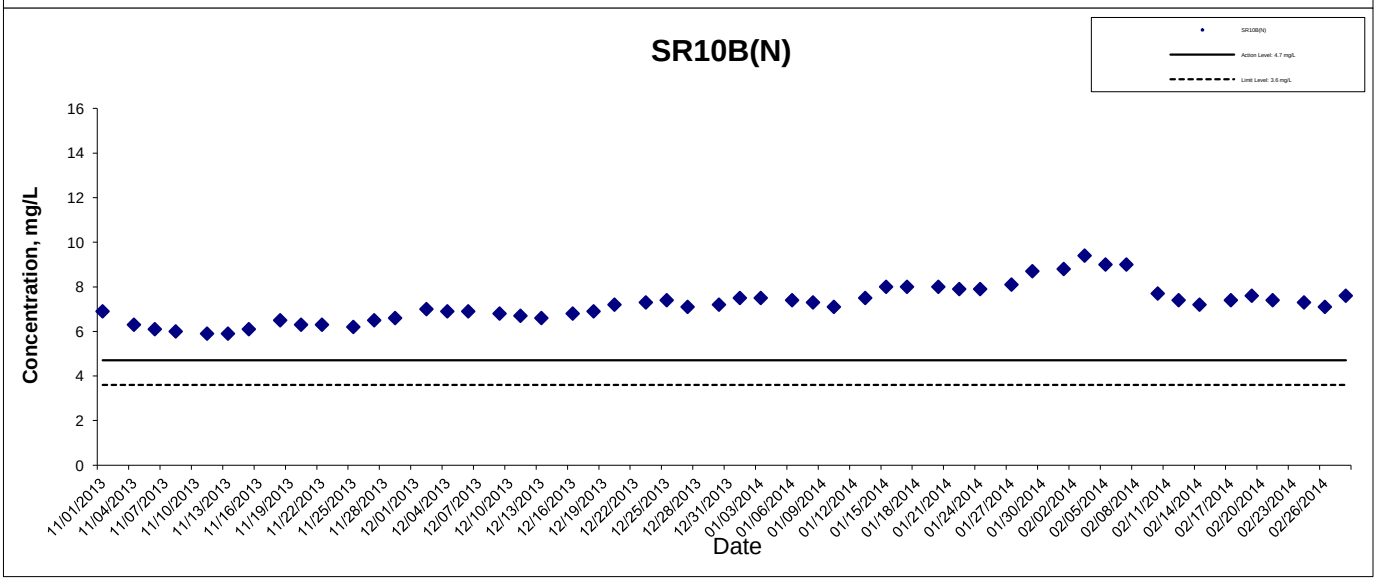
Dissolved Oxygen (Bottom) at Mid-Flood Tide



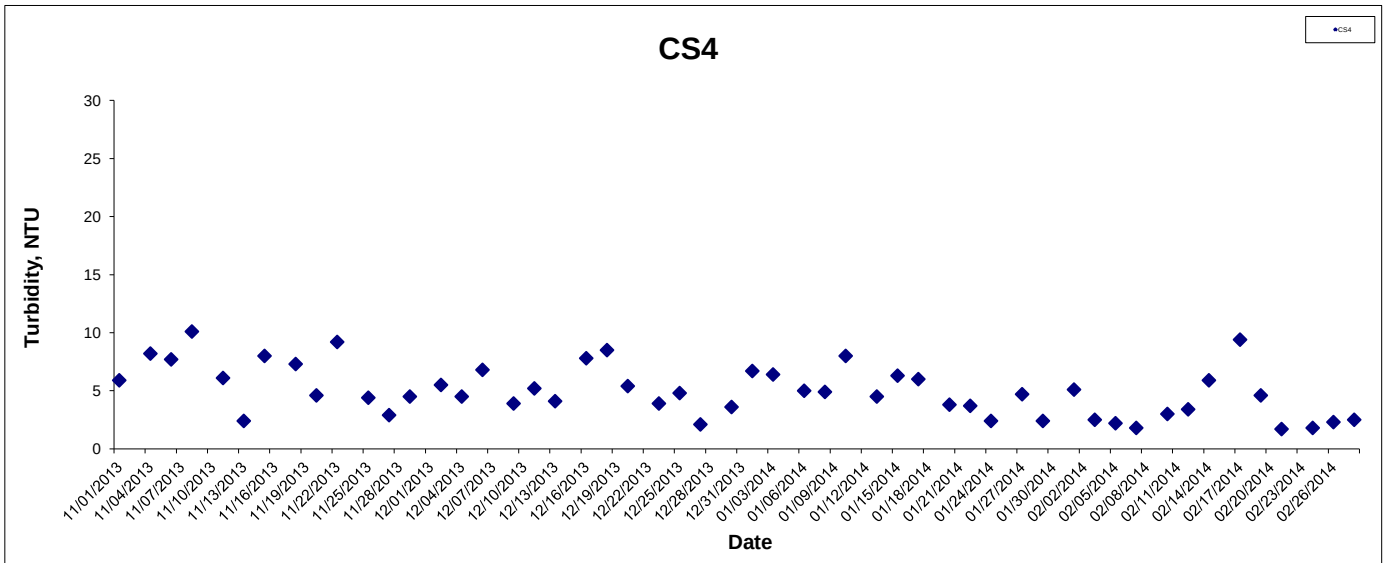
Dissolved Oxygen (Bottom) at Mid-Flood Tide

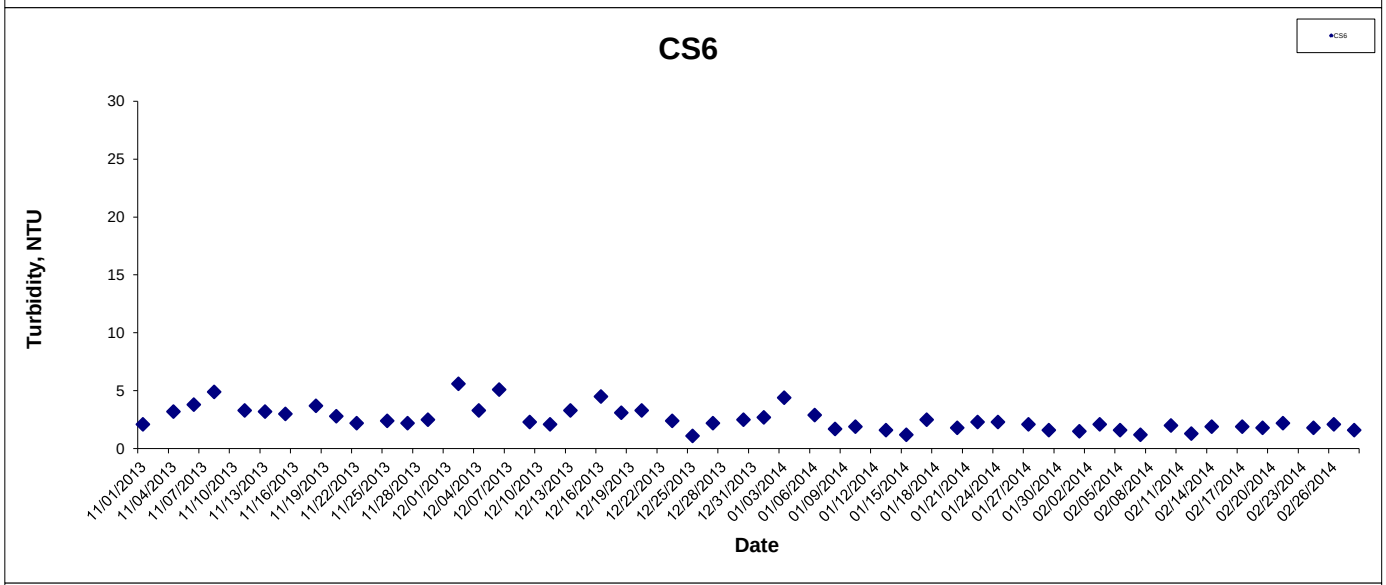


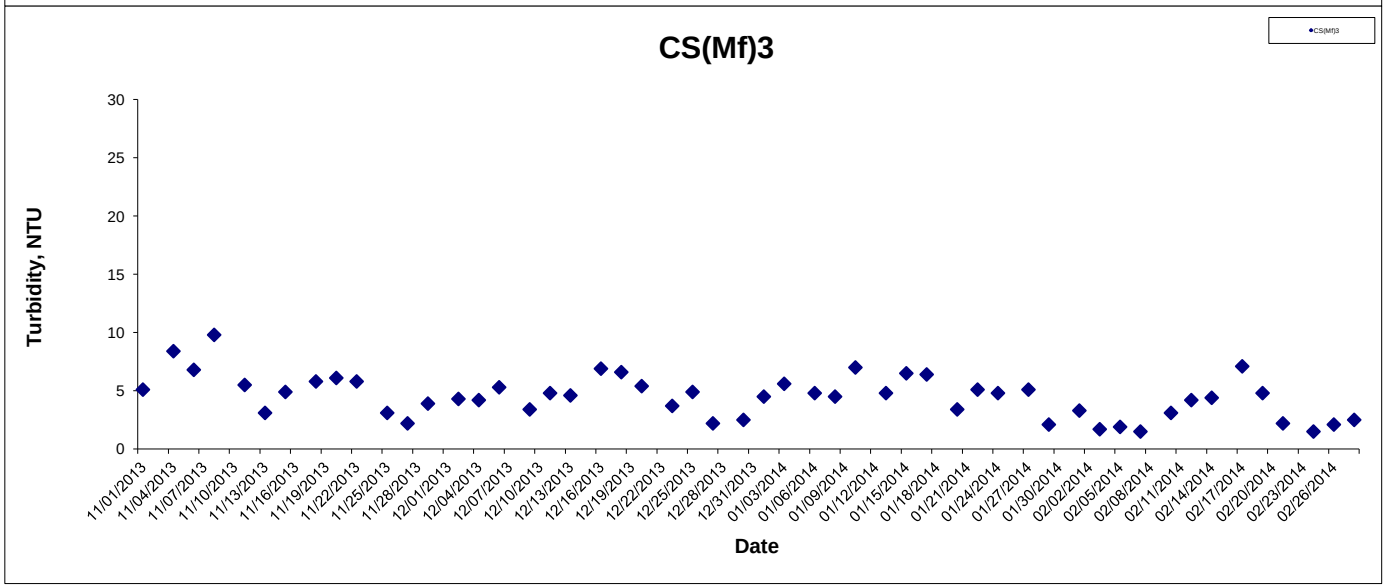




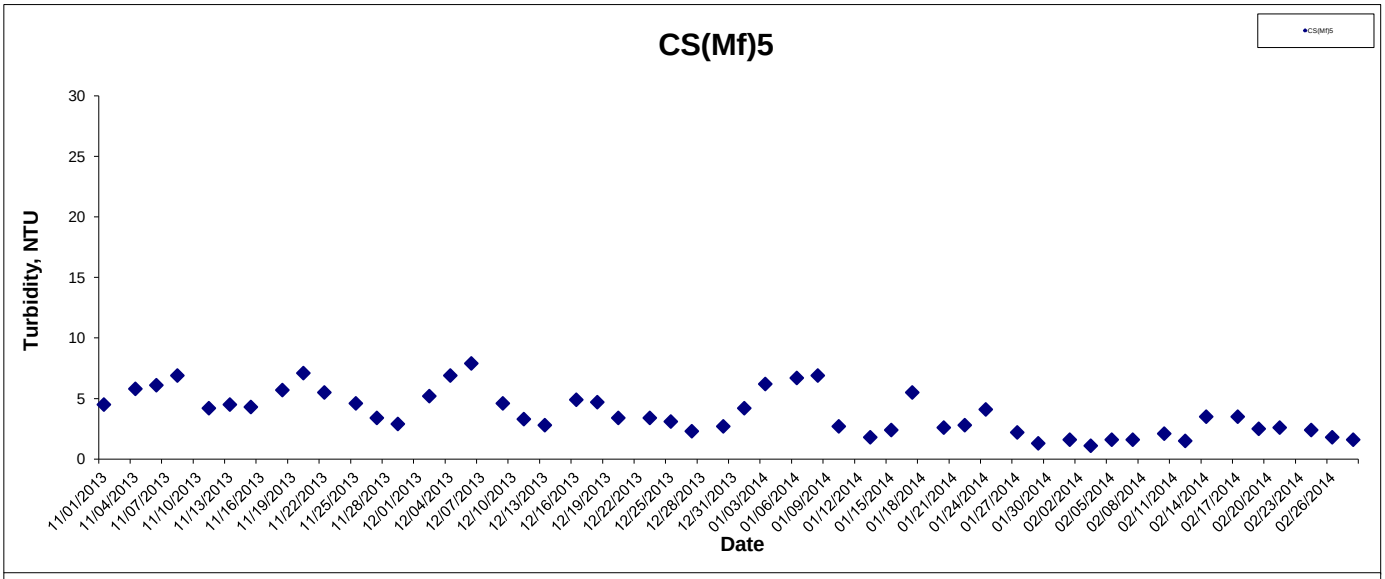
Turbidity at Mid-Ebb Tide

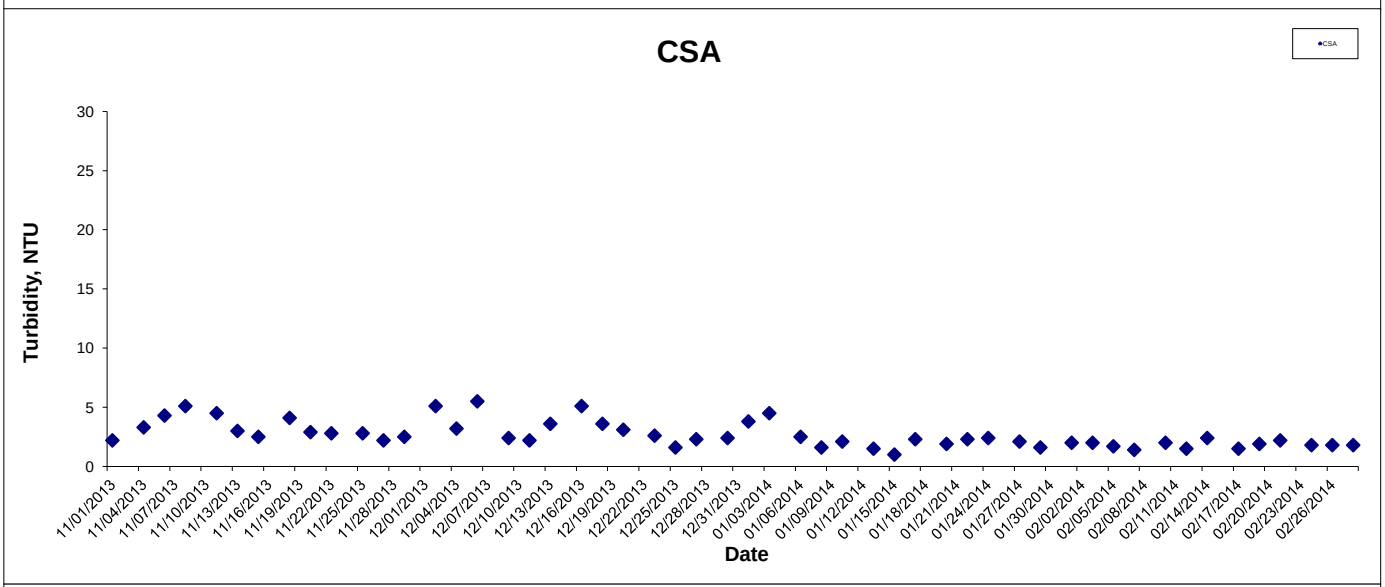


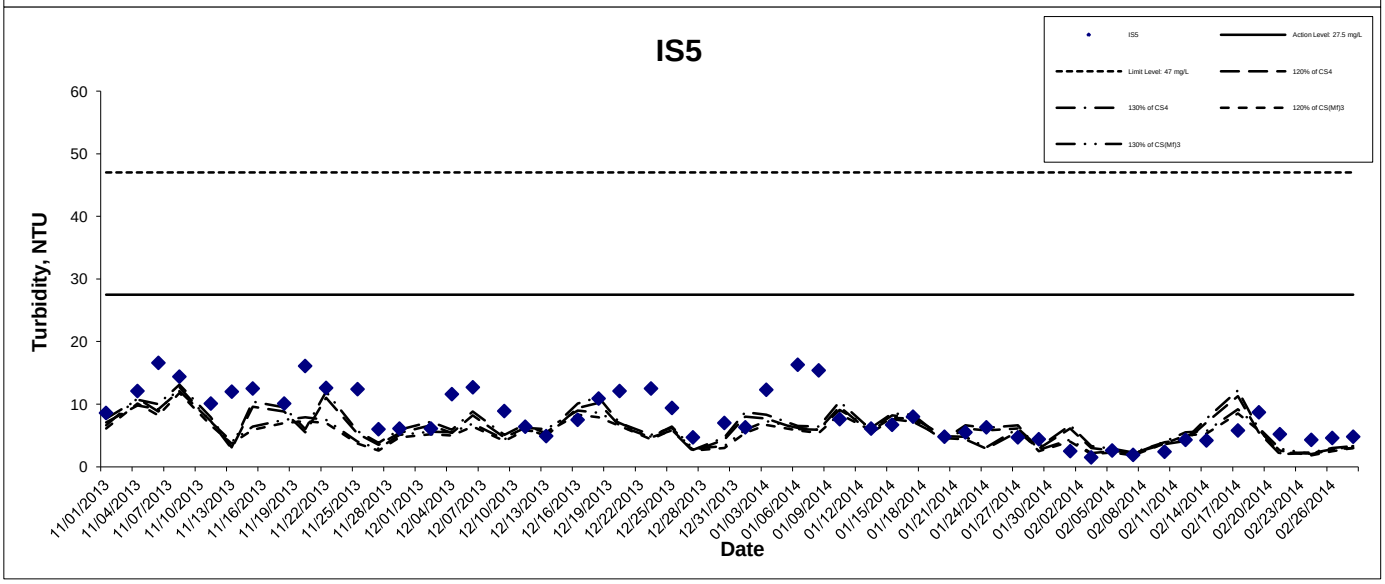




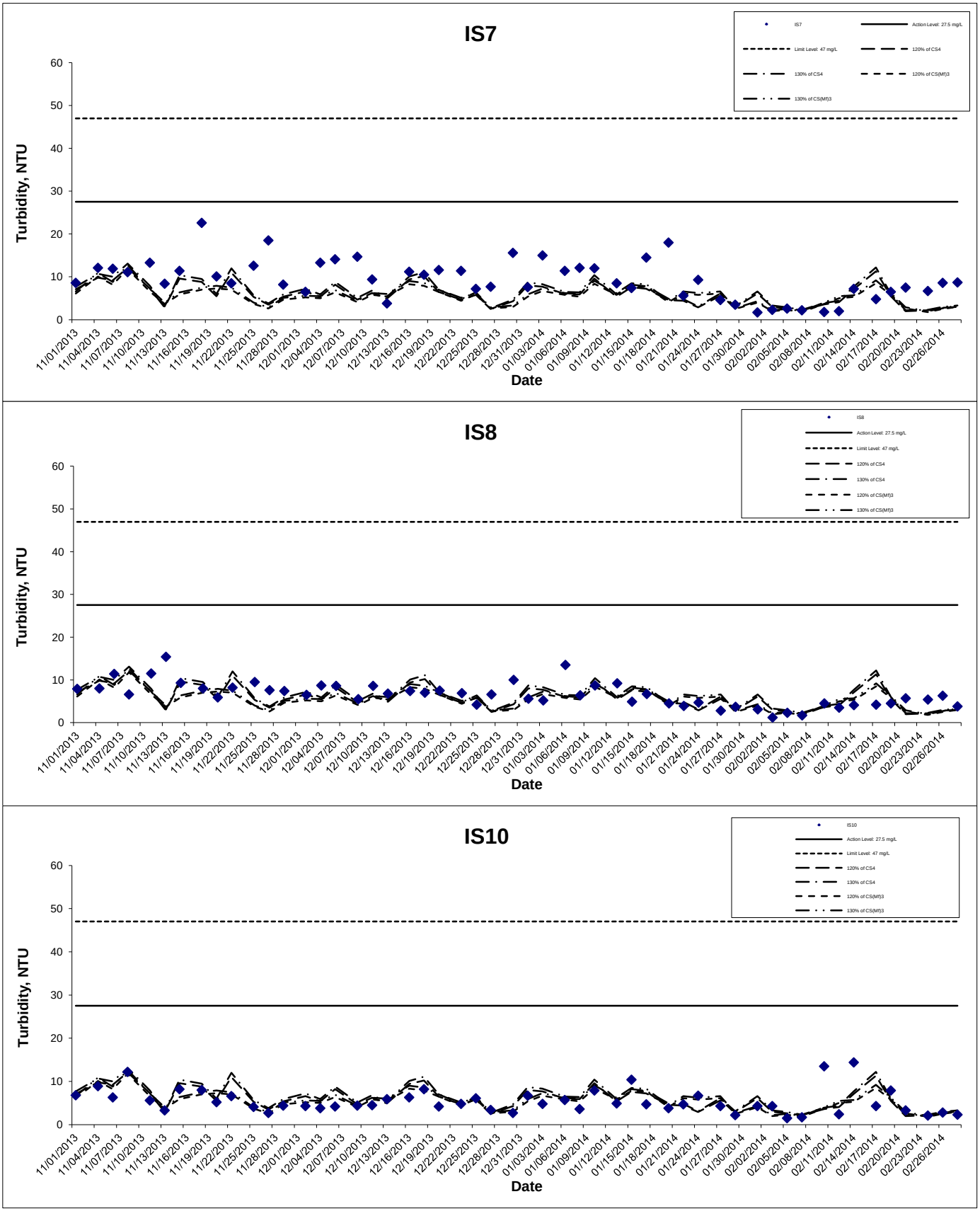
Turbidity at Mid-Ebb Tide



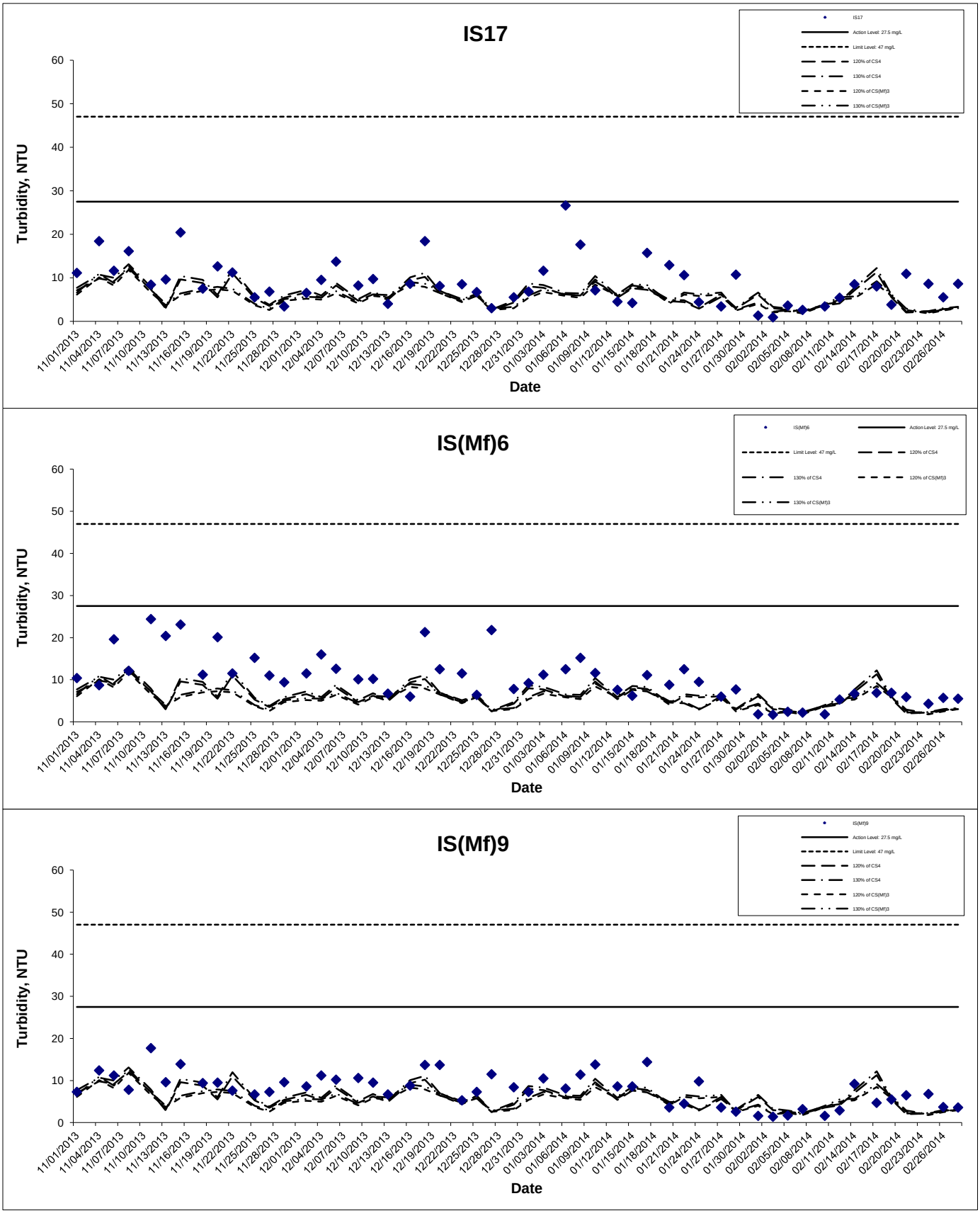




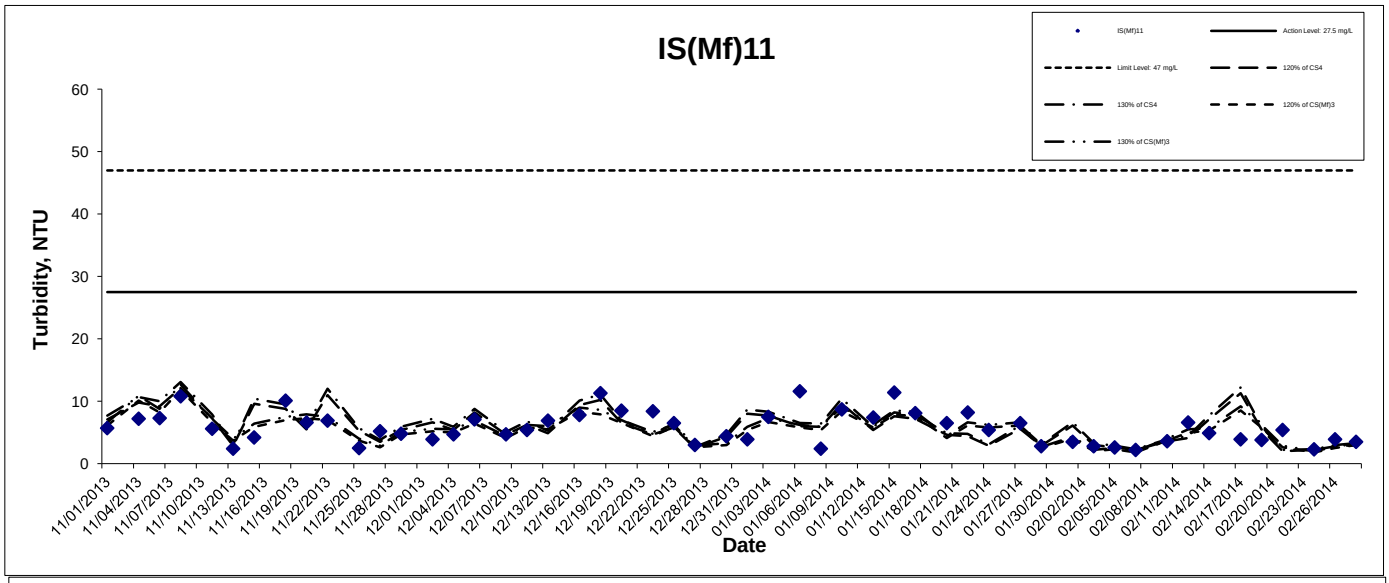
Turbidity at Mid-Ebb Tide

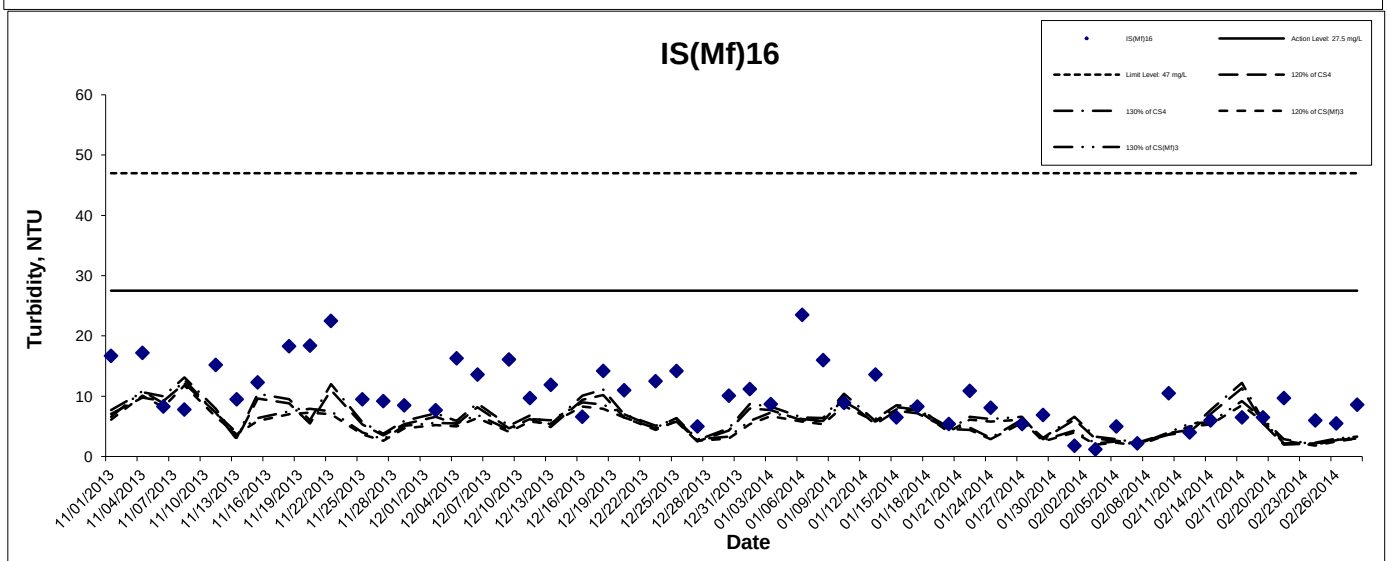


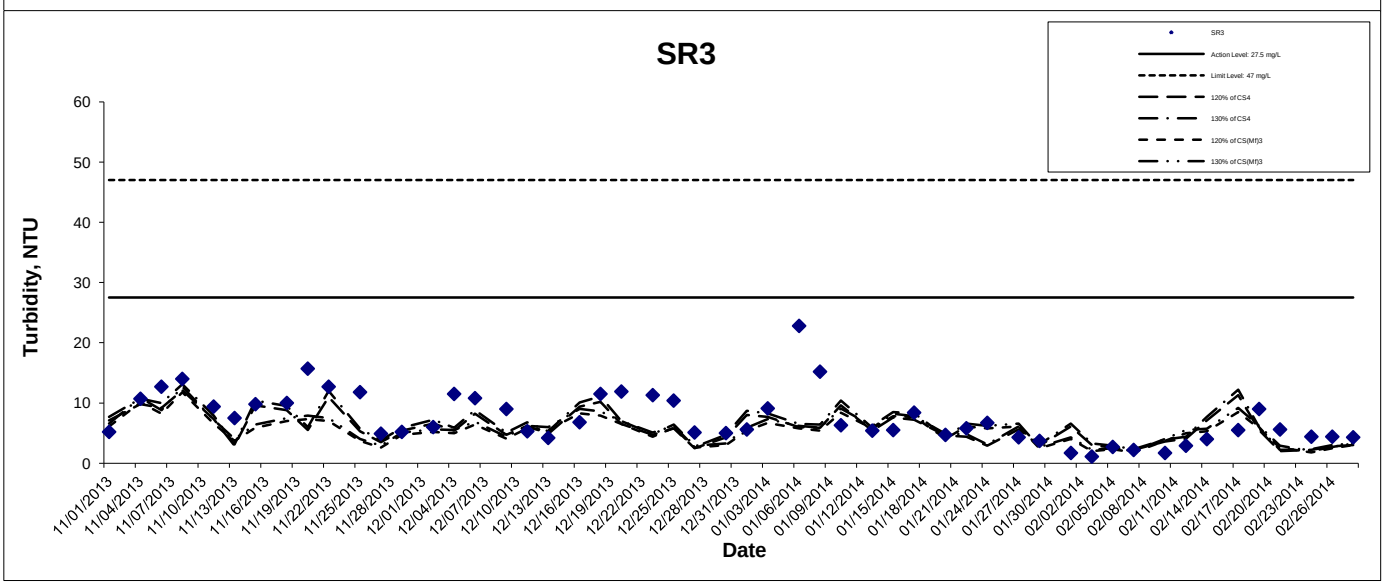
Turbidity at Mid-Ebb Tide



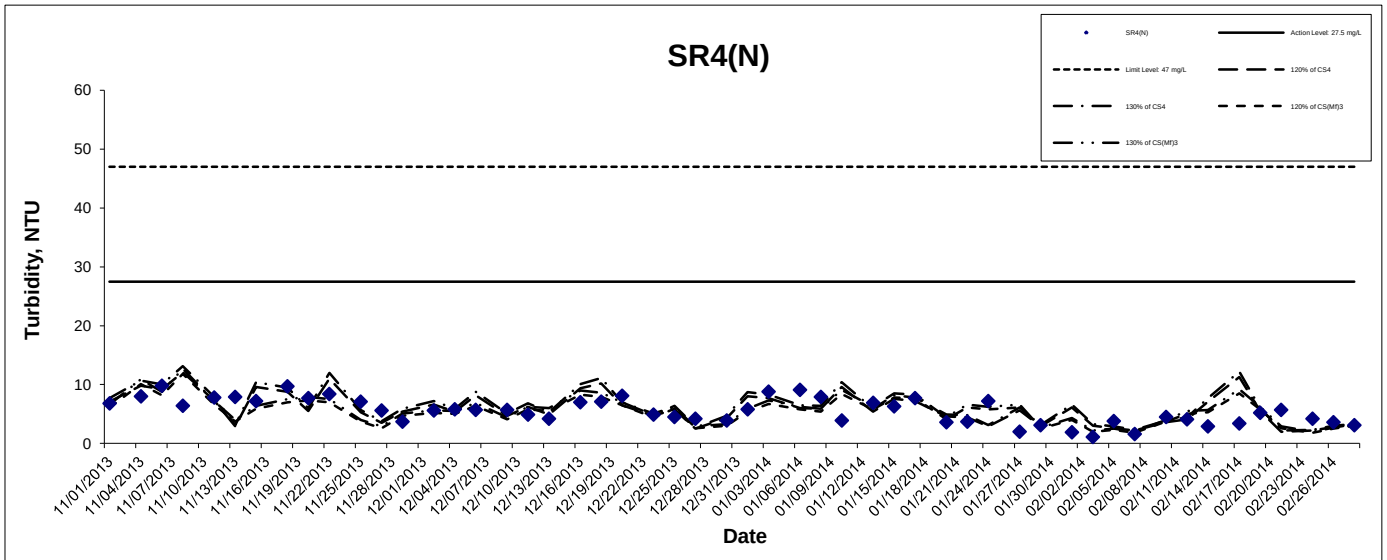
Turbidity at Mid-Ebb Tide

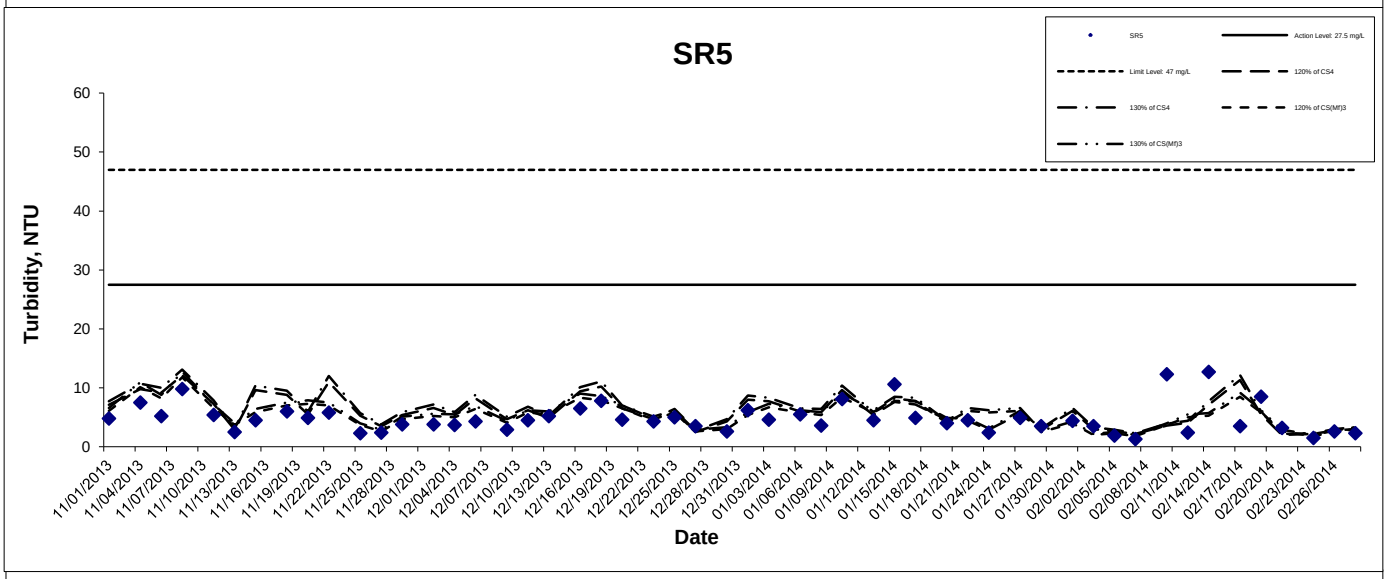


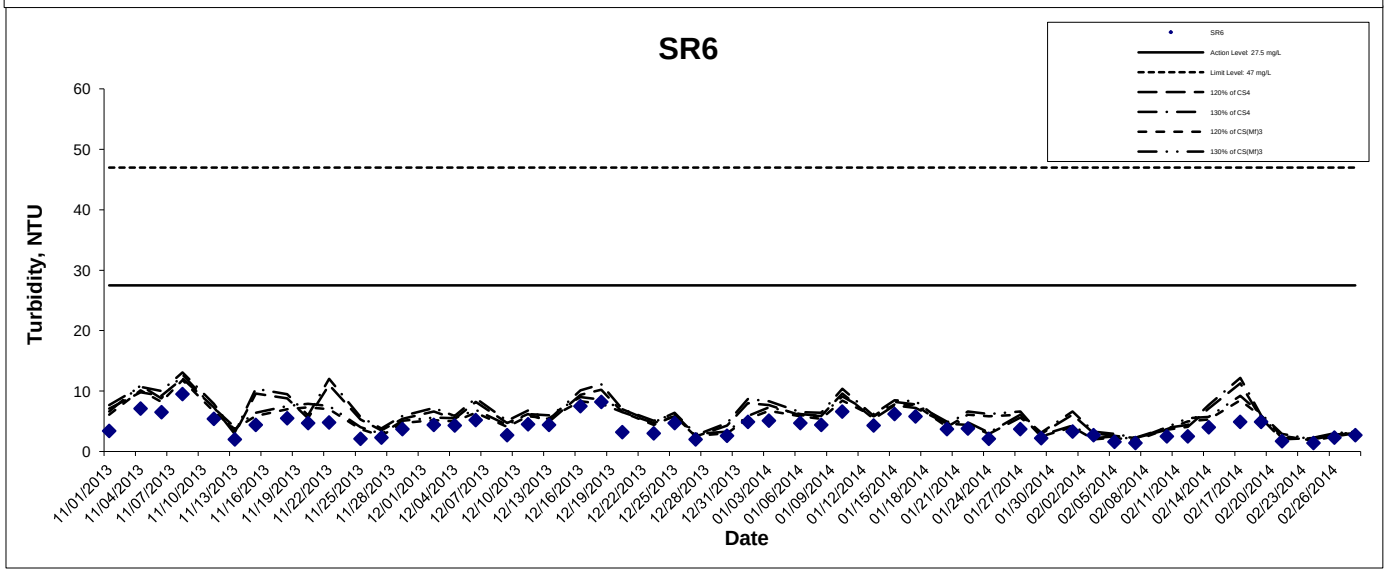




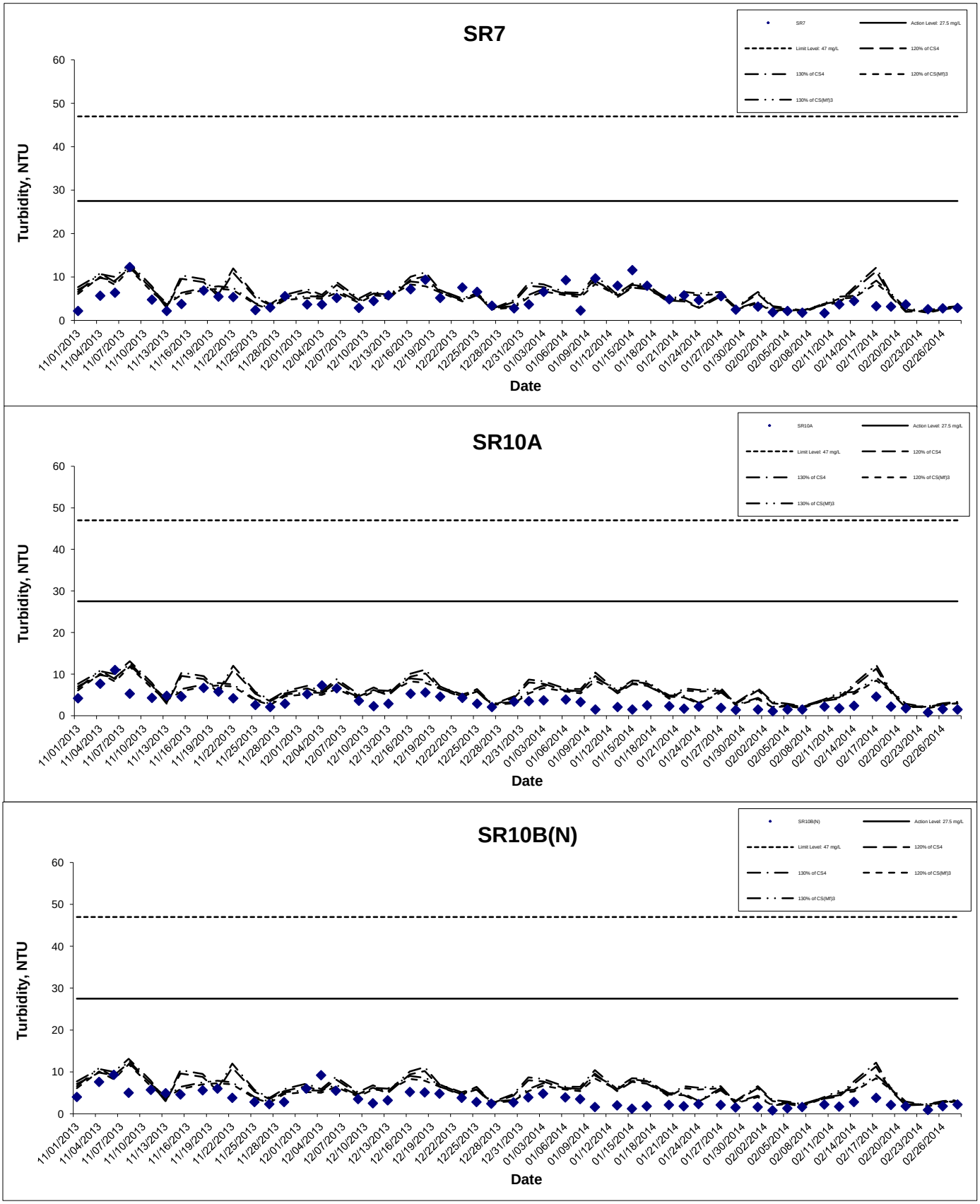
Turbidity at Mid-Ebb Tide



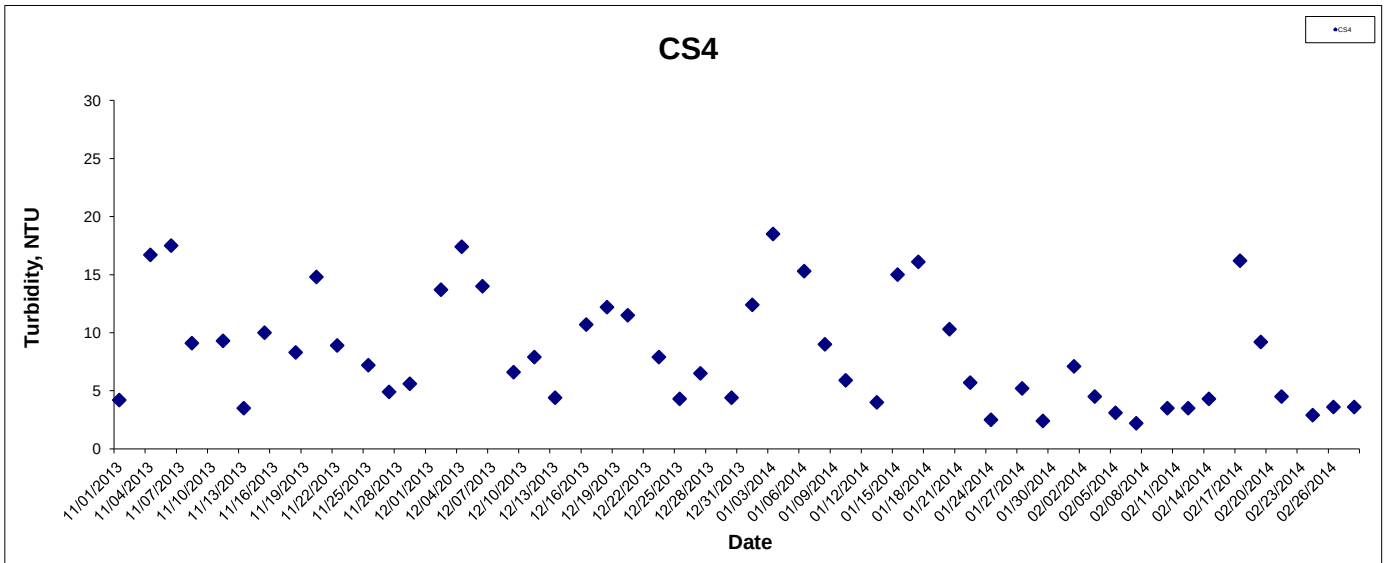


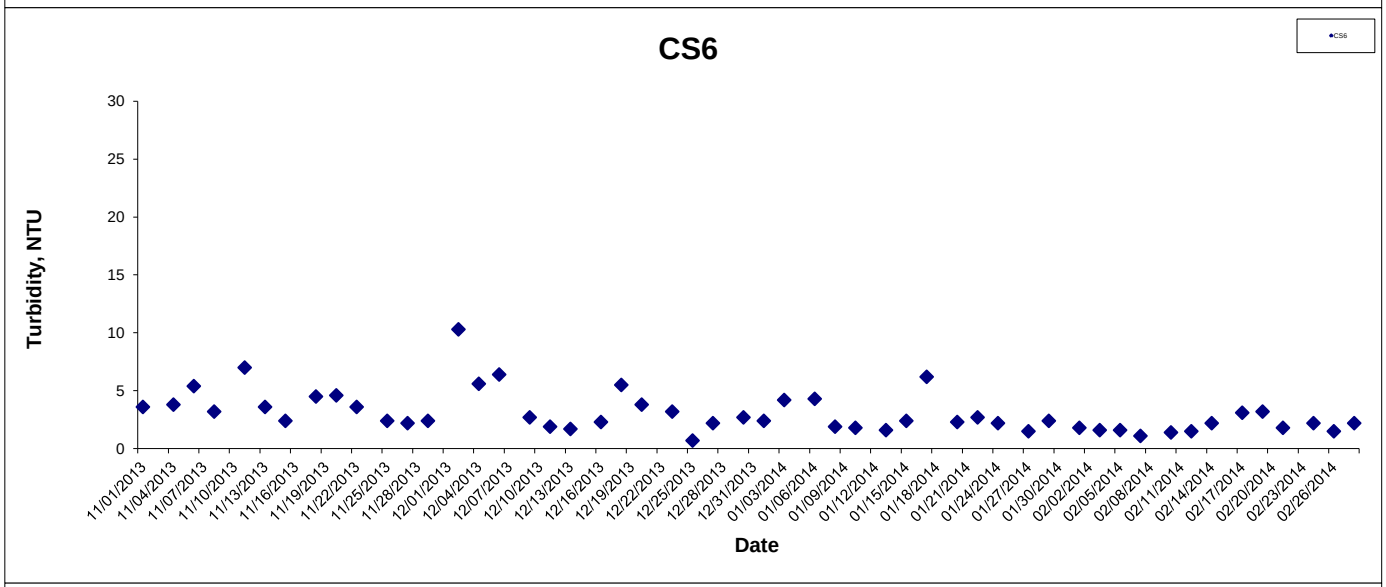


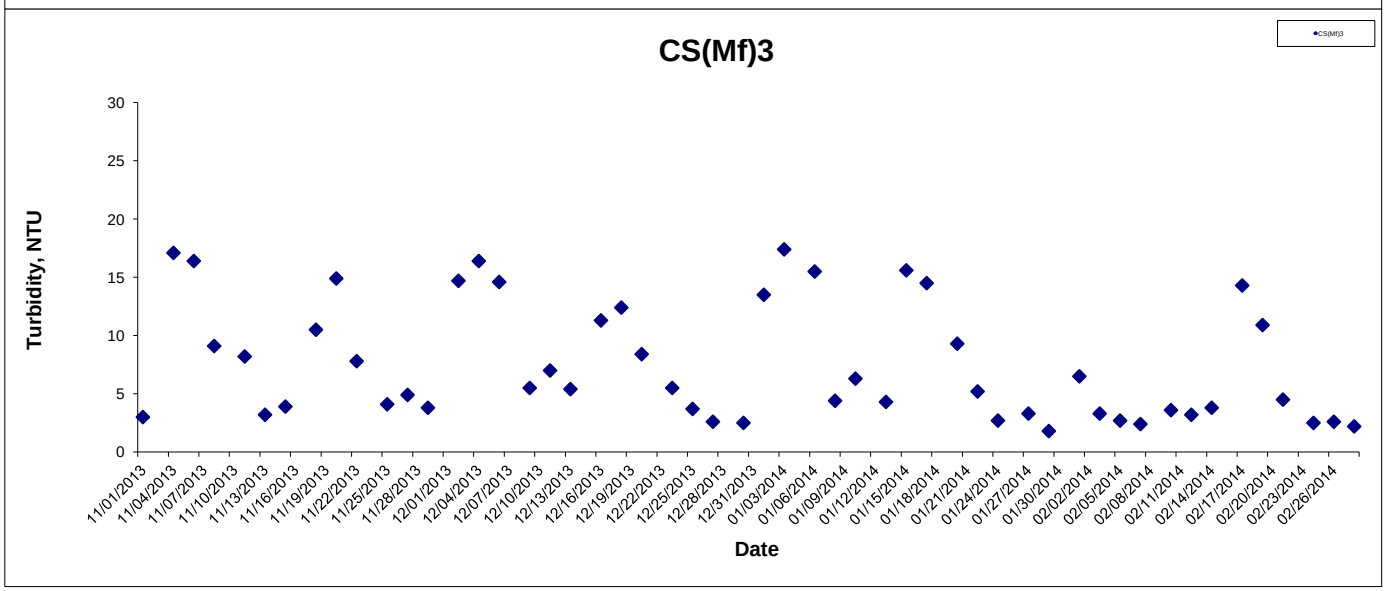
Turbidity at Mid-Ebb Tide



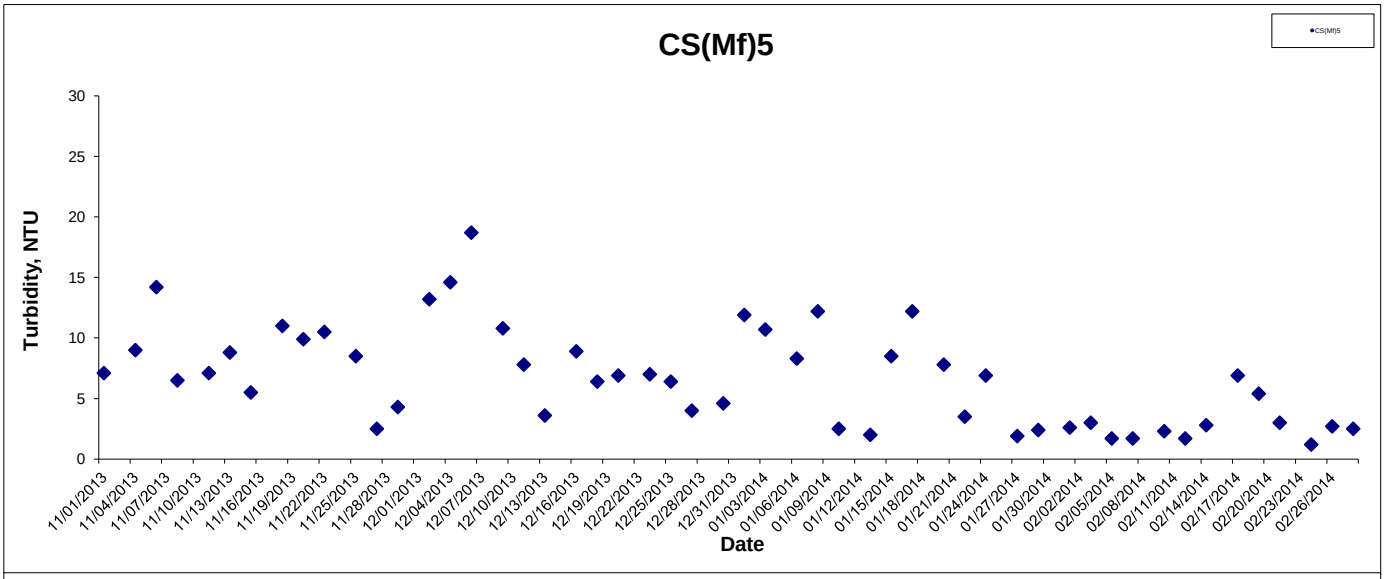
Turbidity at Mid-Flood Tide

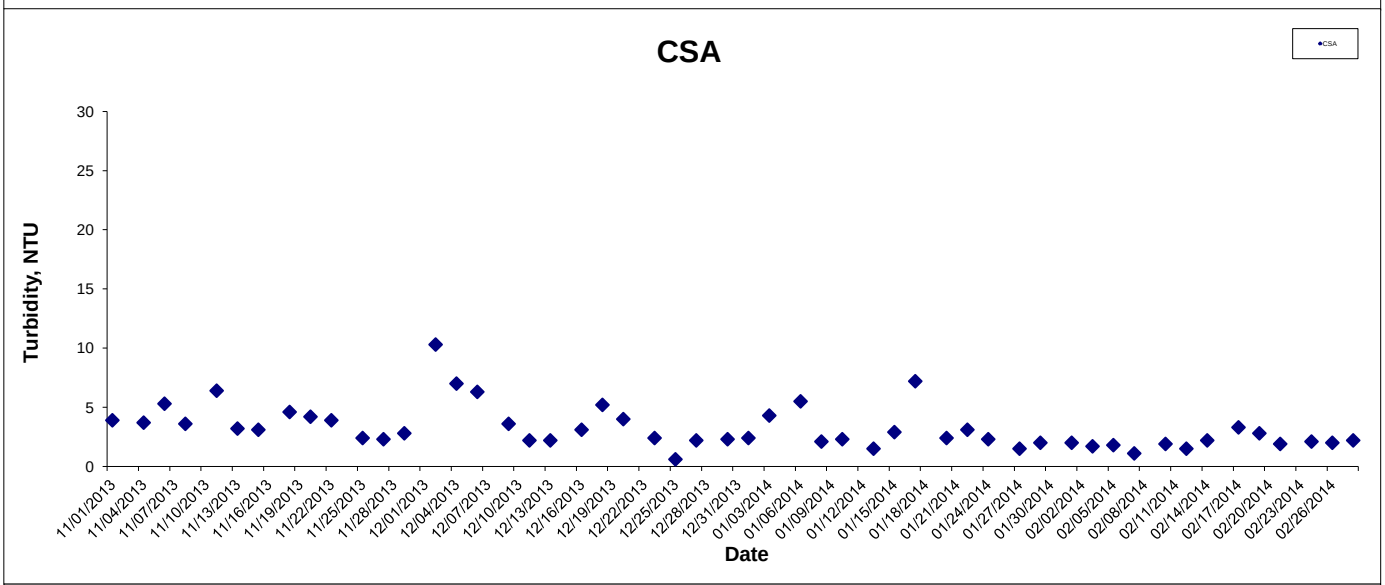


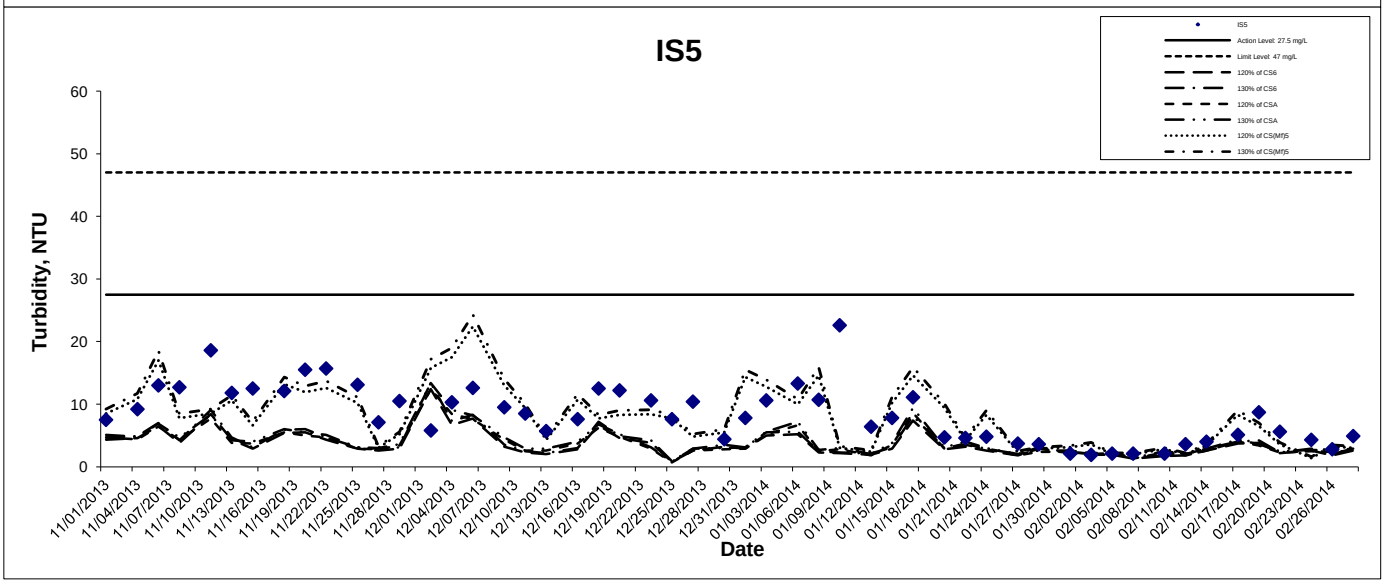




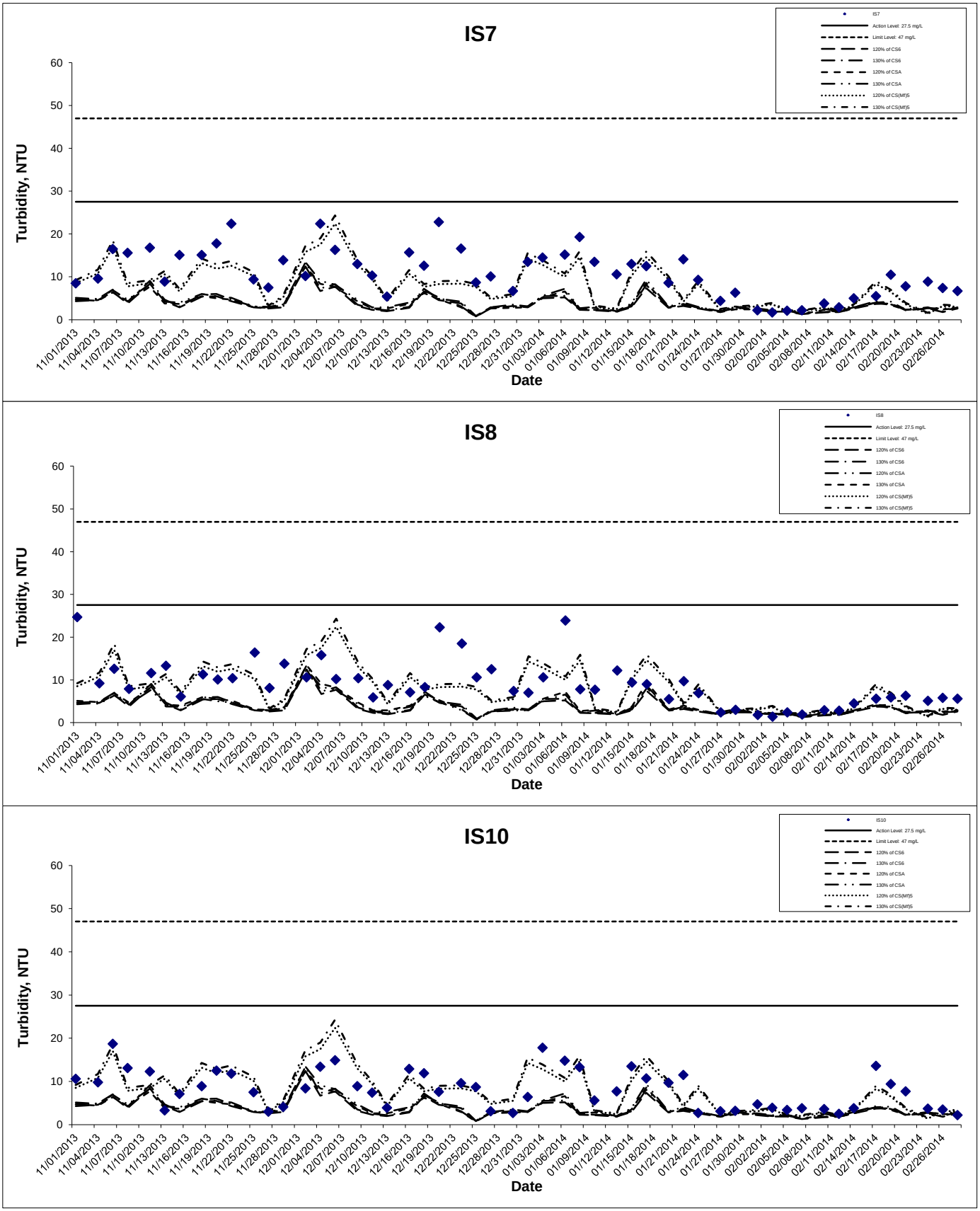
Turbidity at Mid-Flood Tide



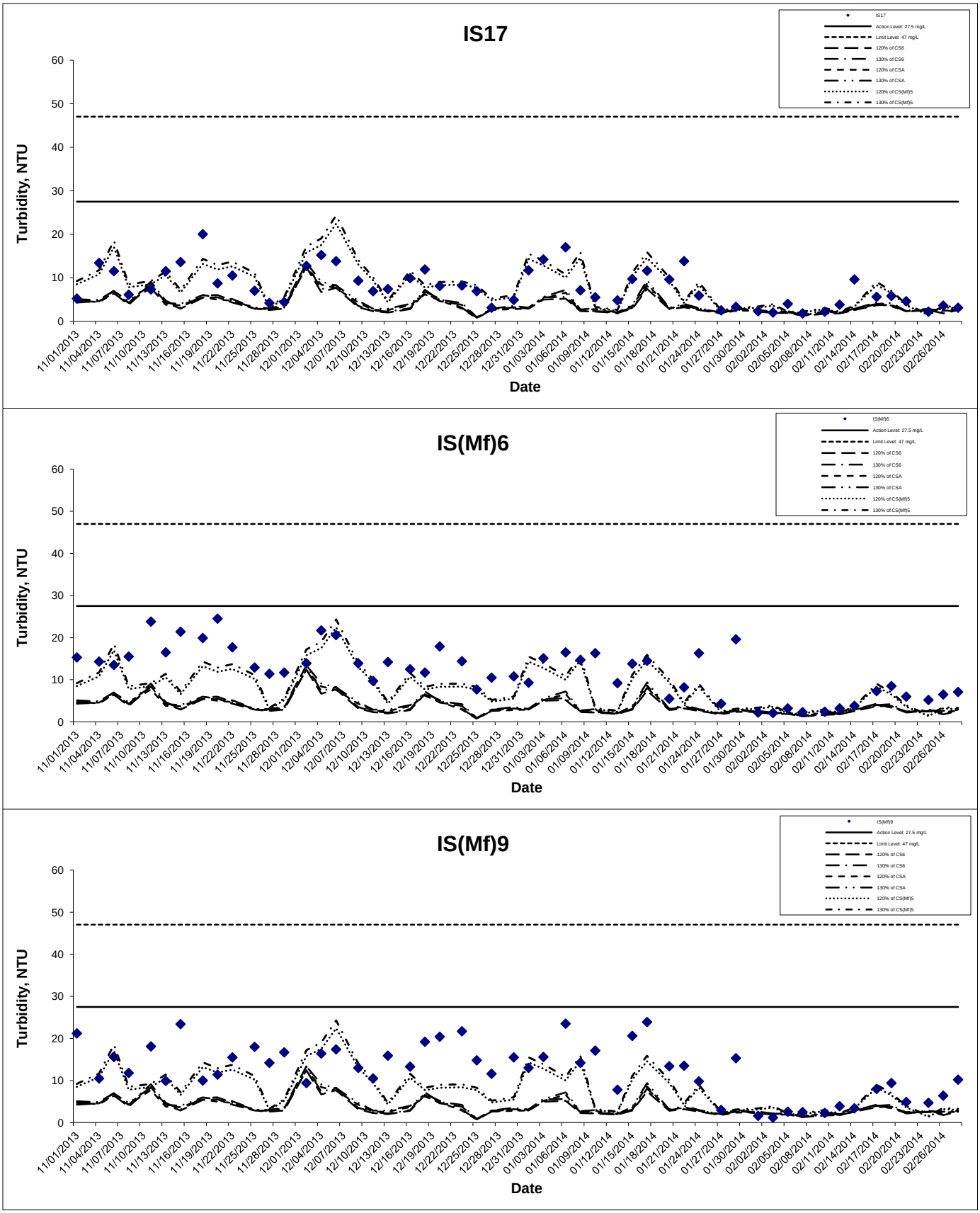




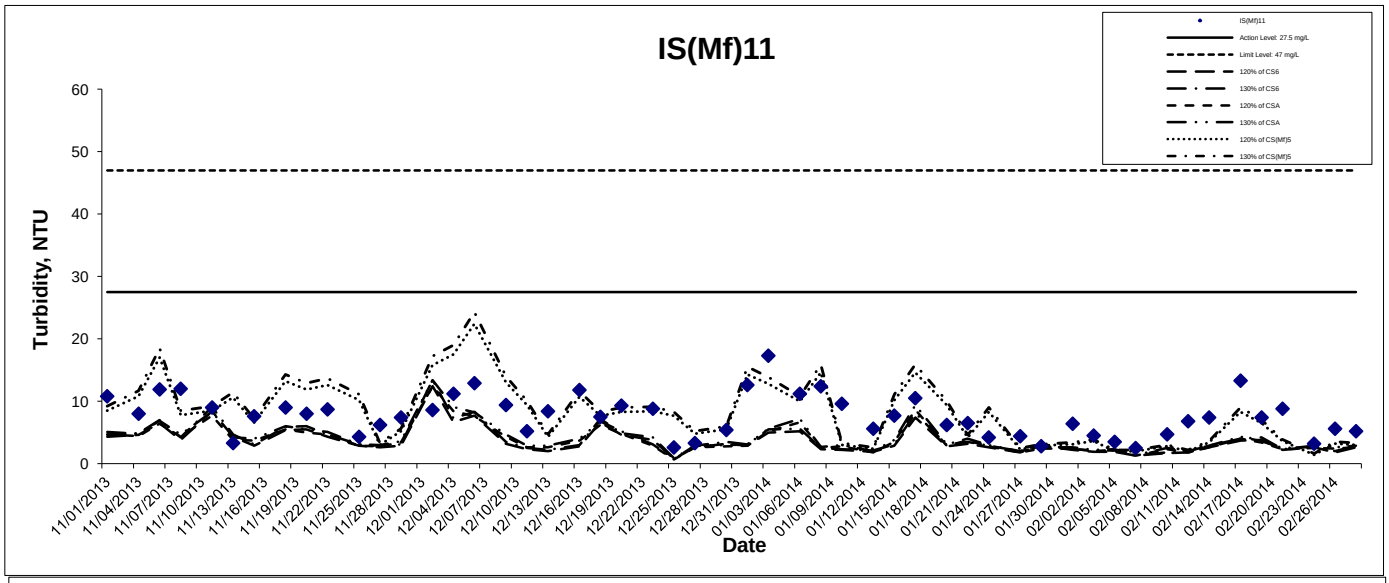
Turbidity at Mid-Flood Tide

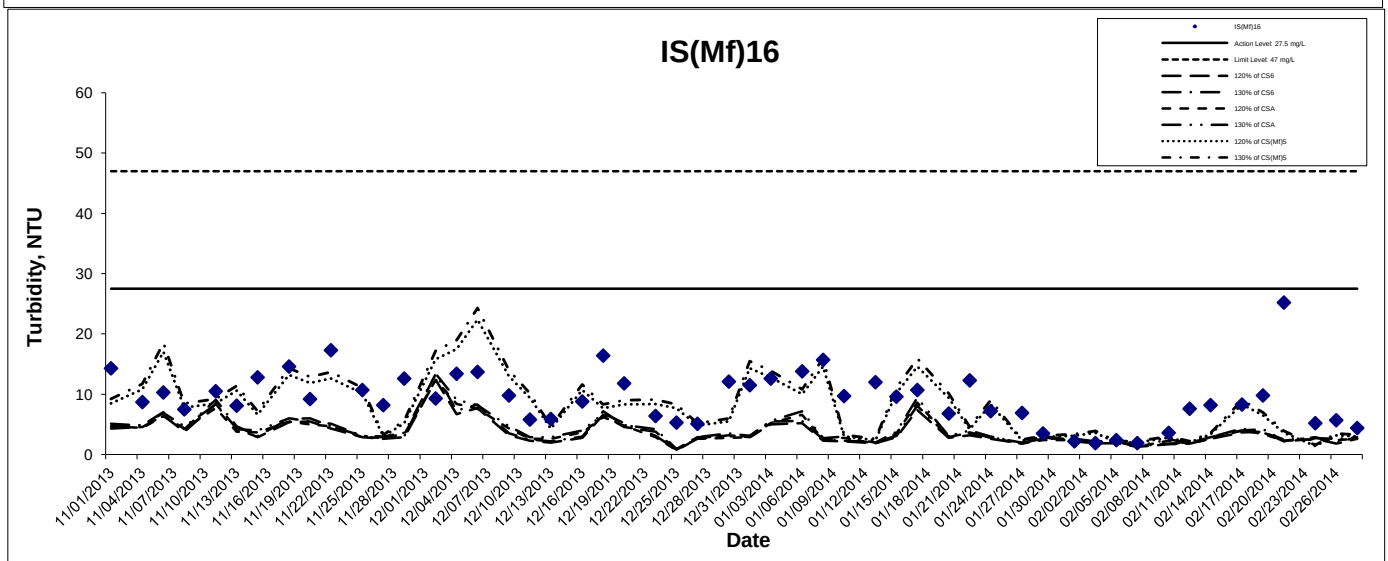


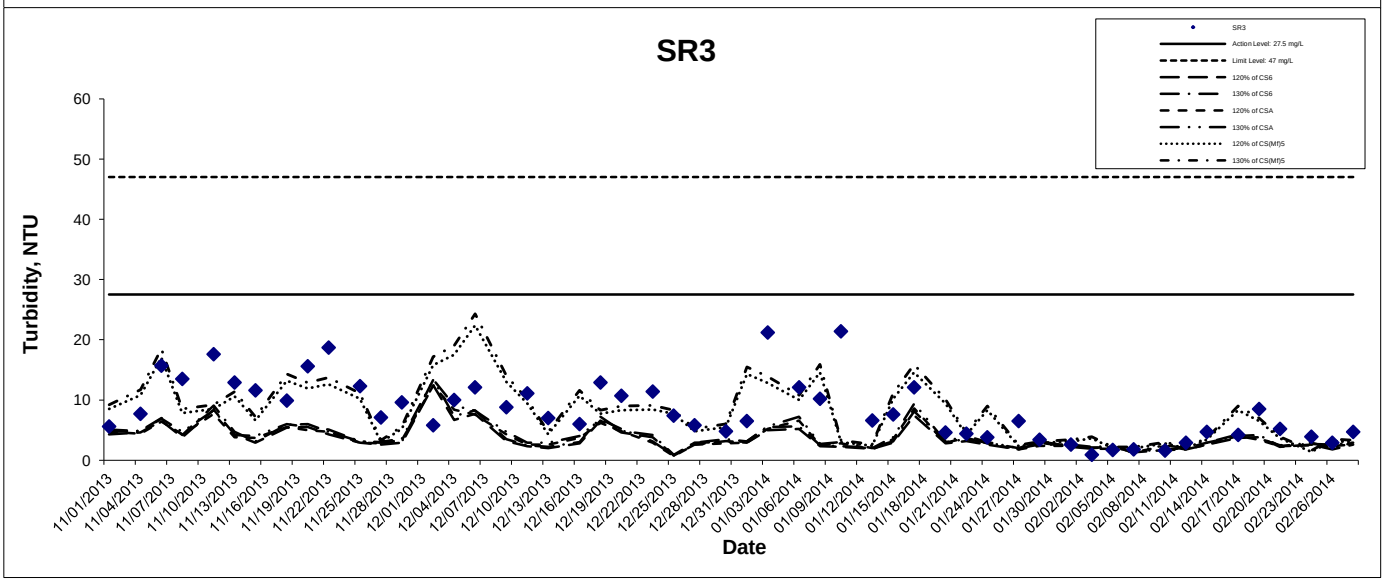
Turbidity at Mid-Flood Tide



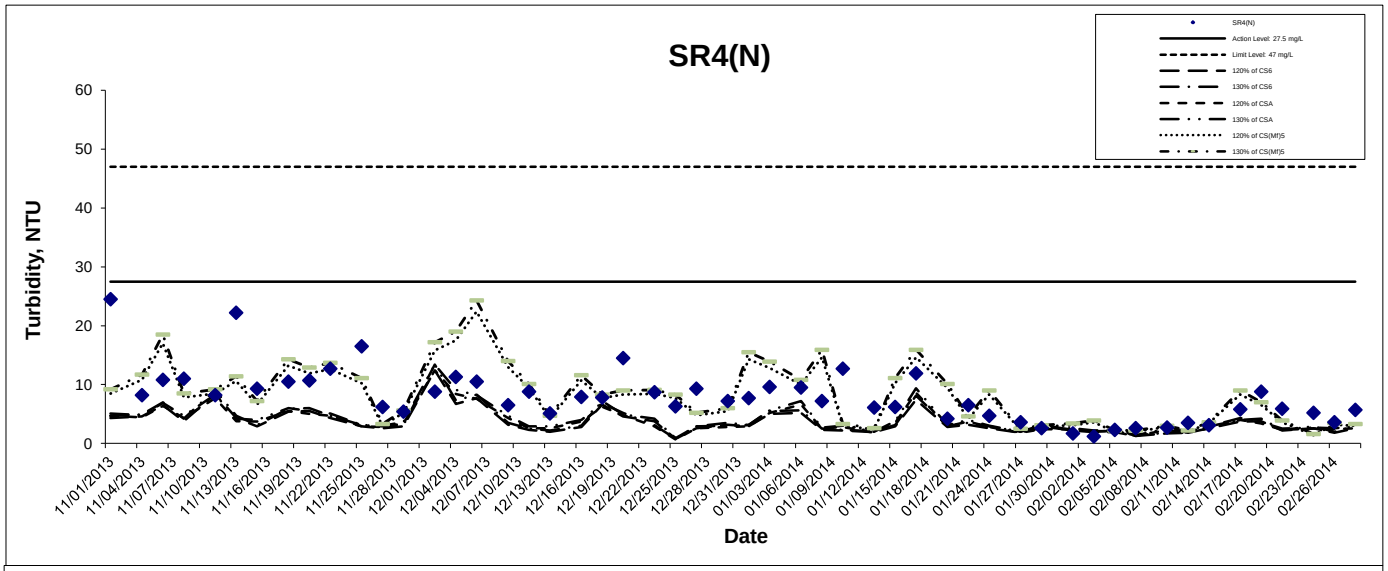
Turbidity at Mid-Flood Tide

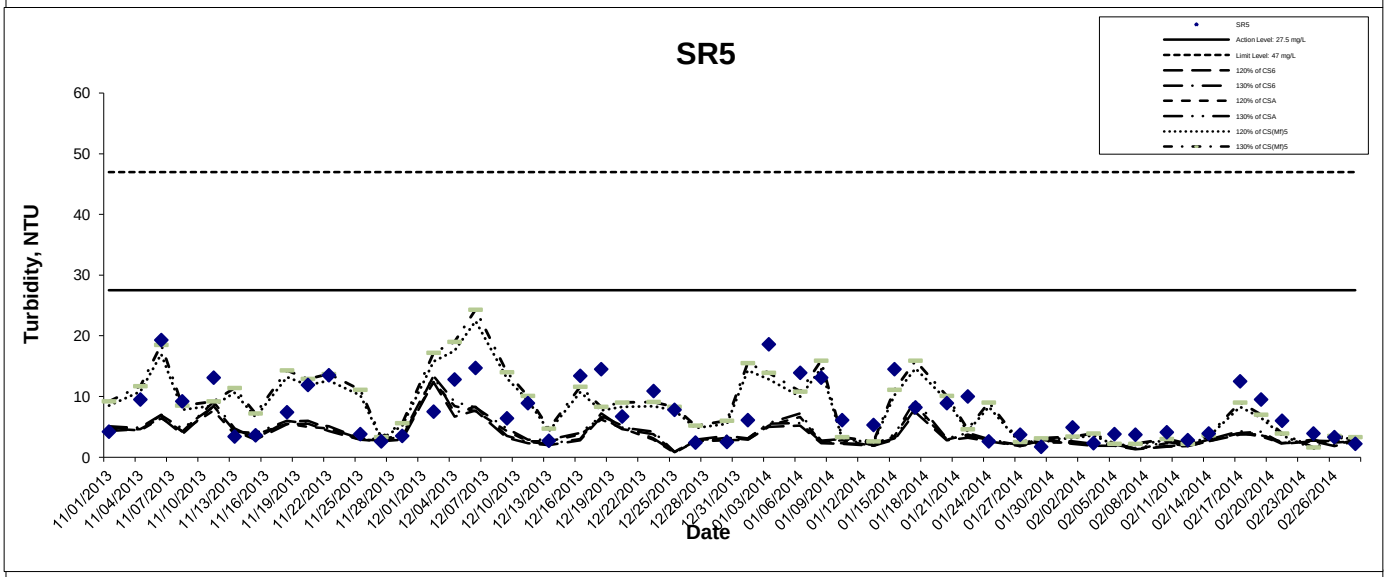


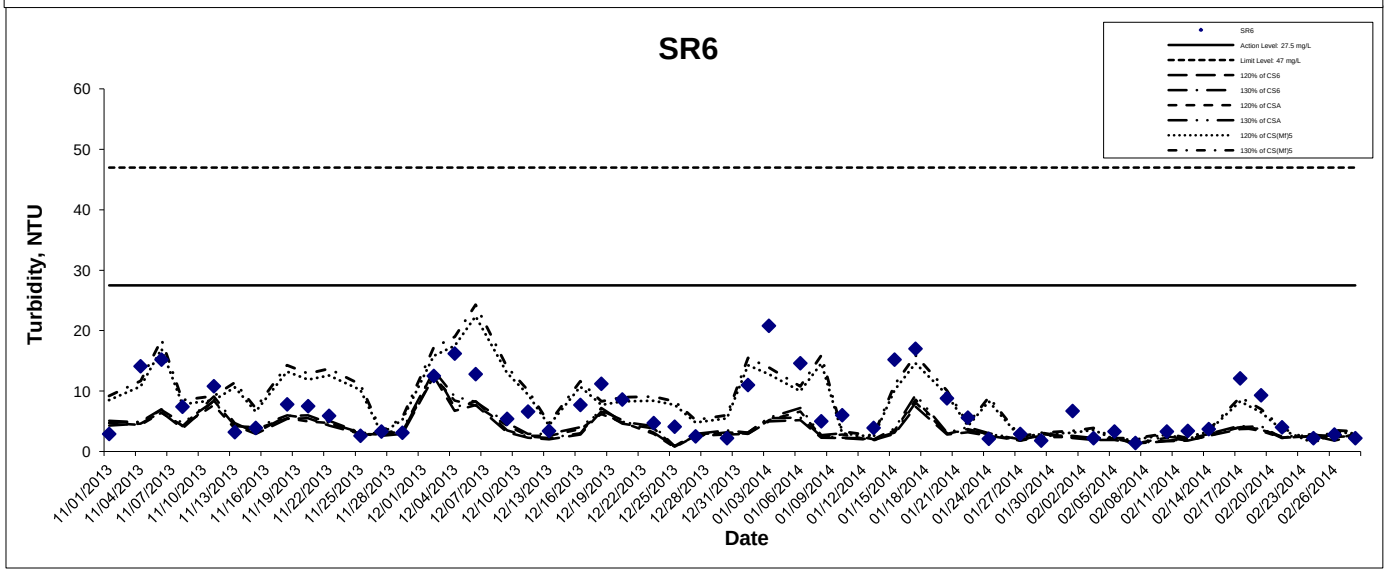




Turbidity at Mid-Flood Tide







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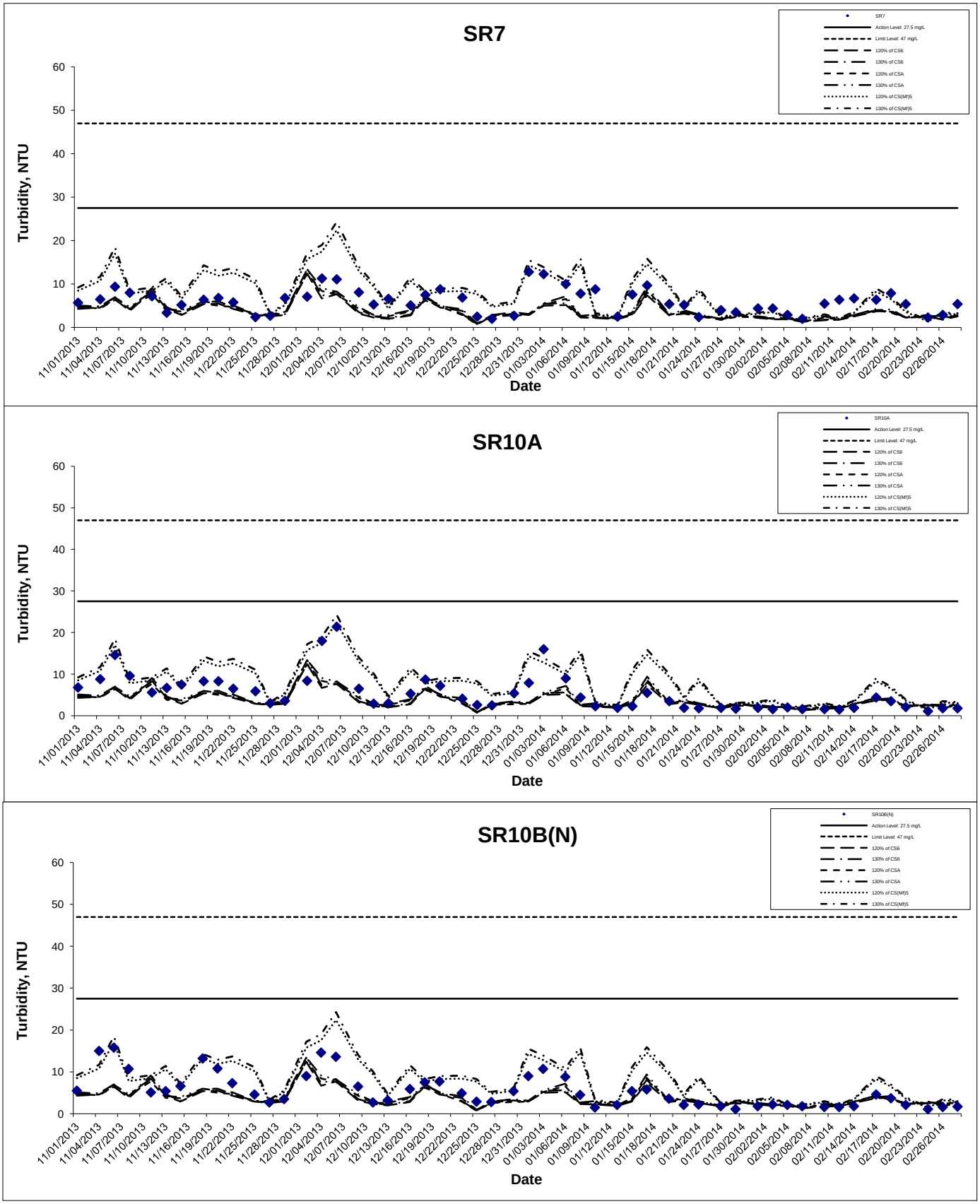

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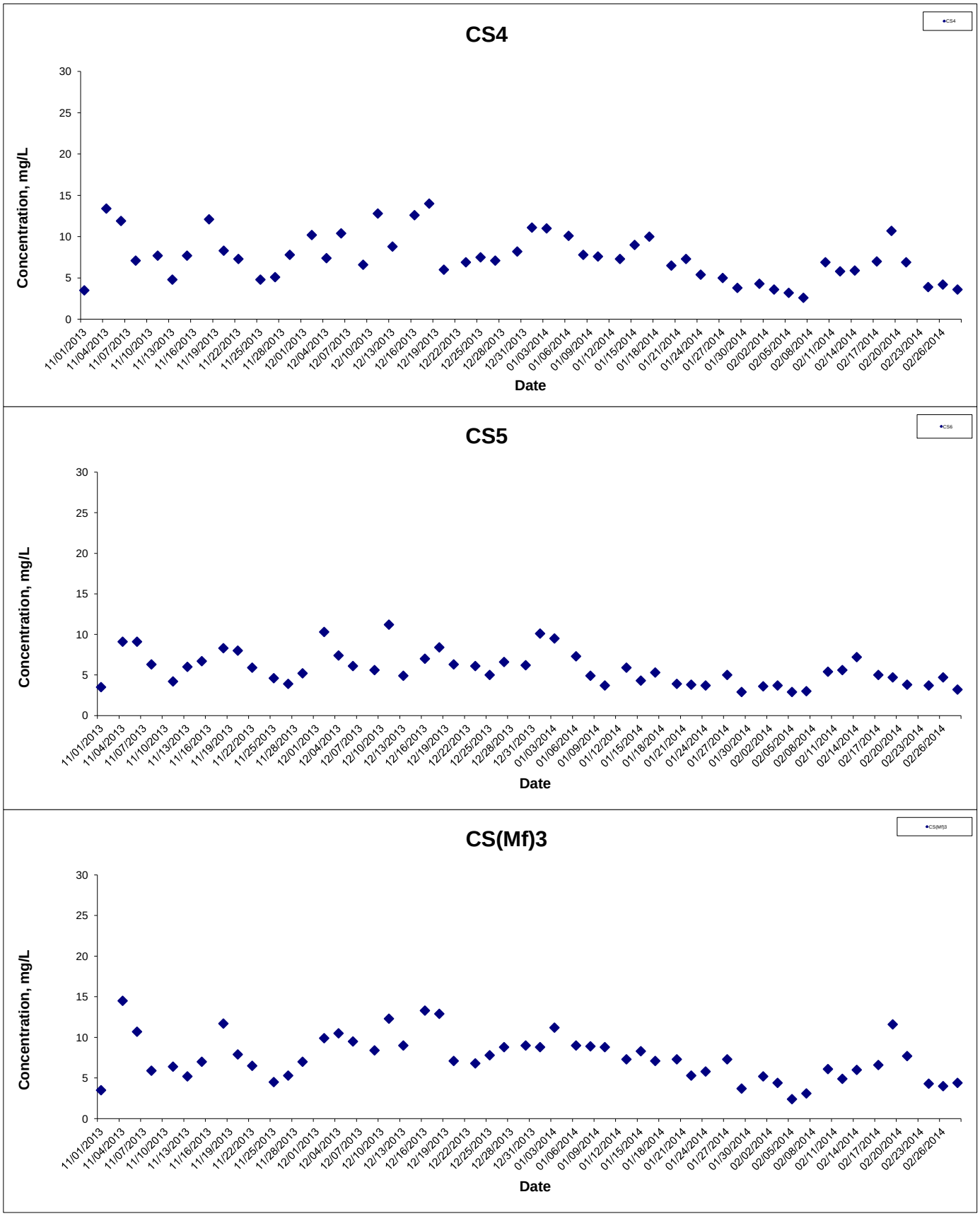

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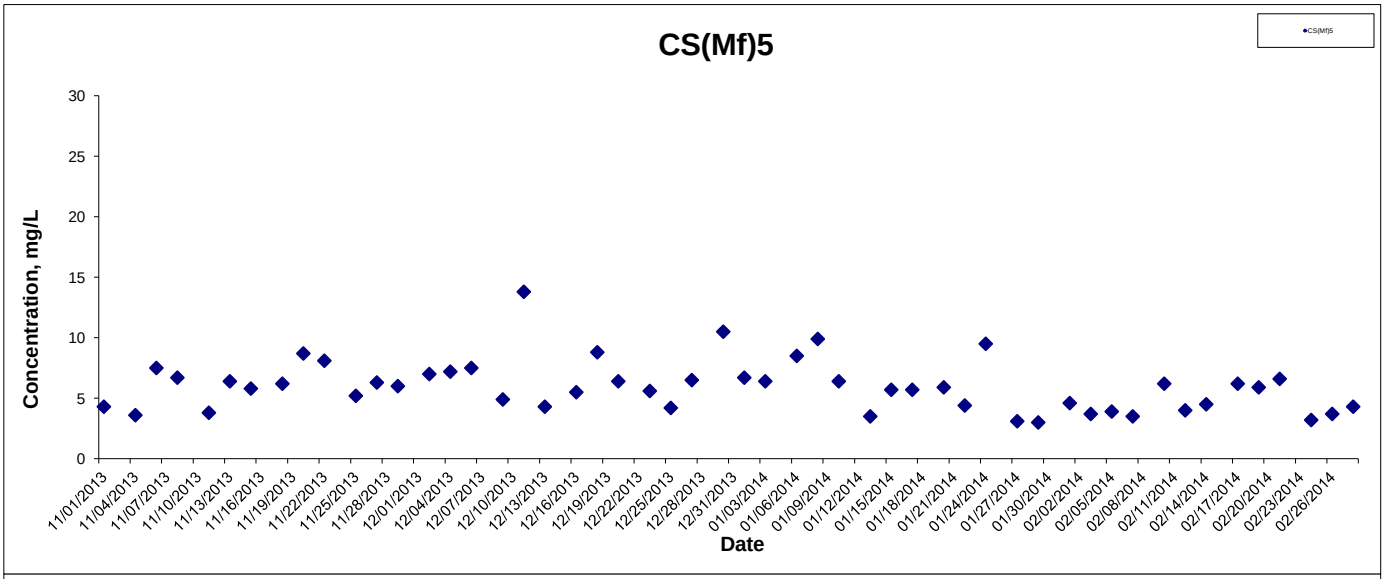

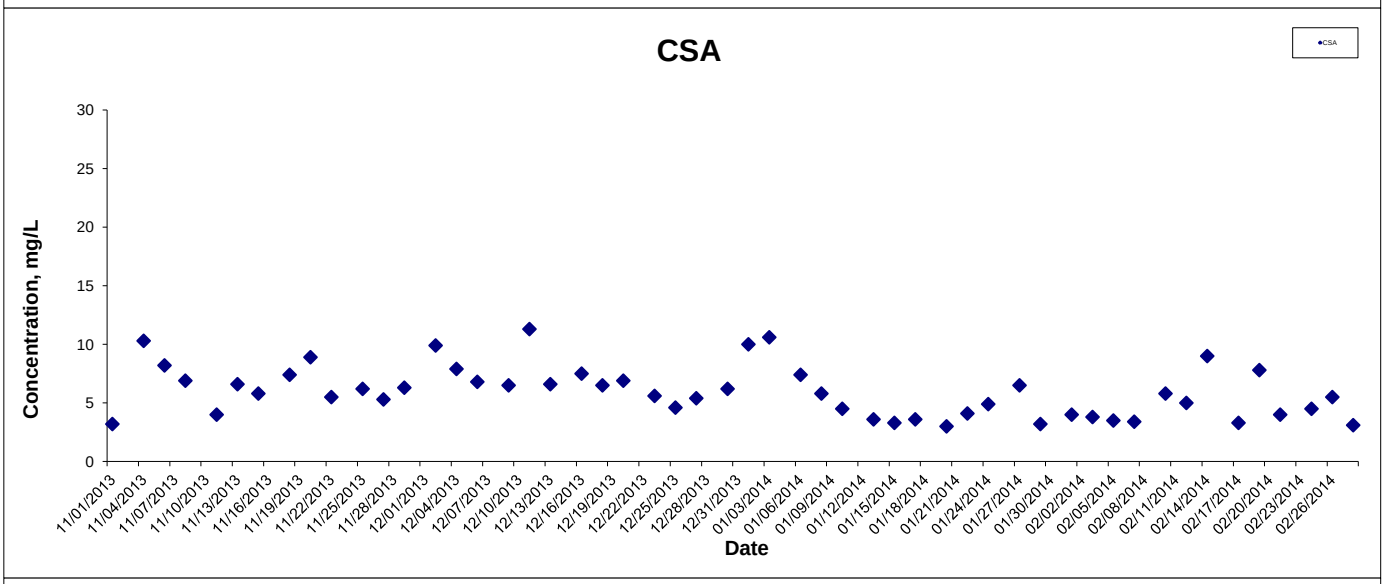

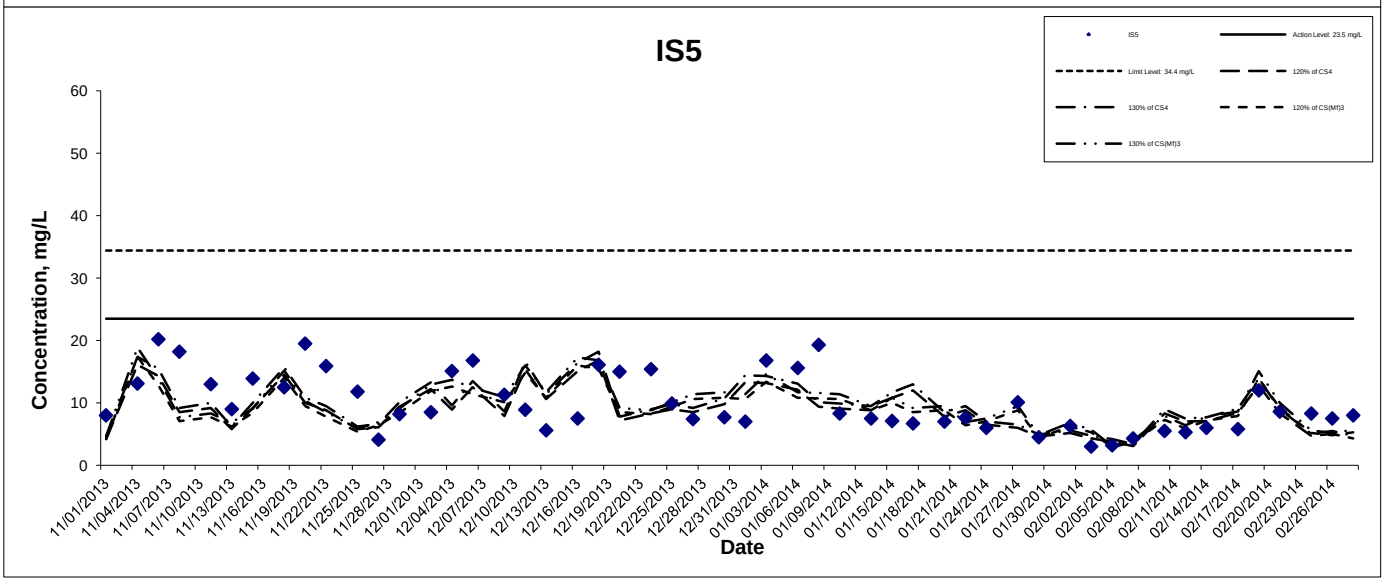

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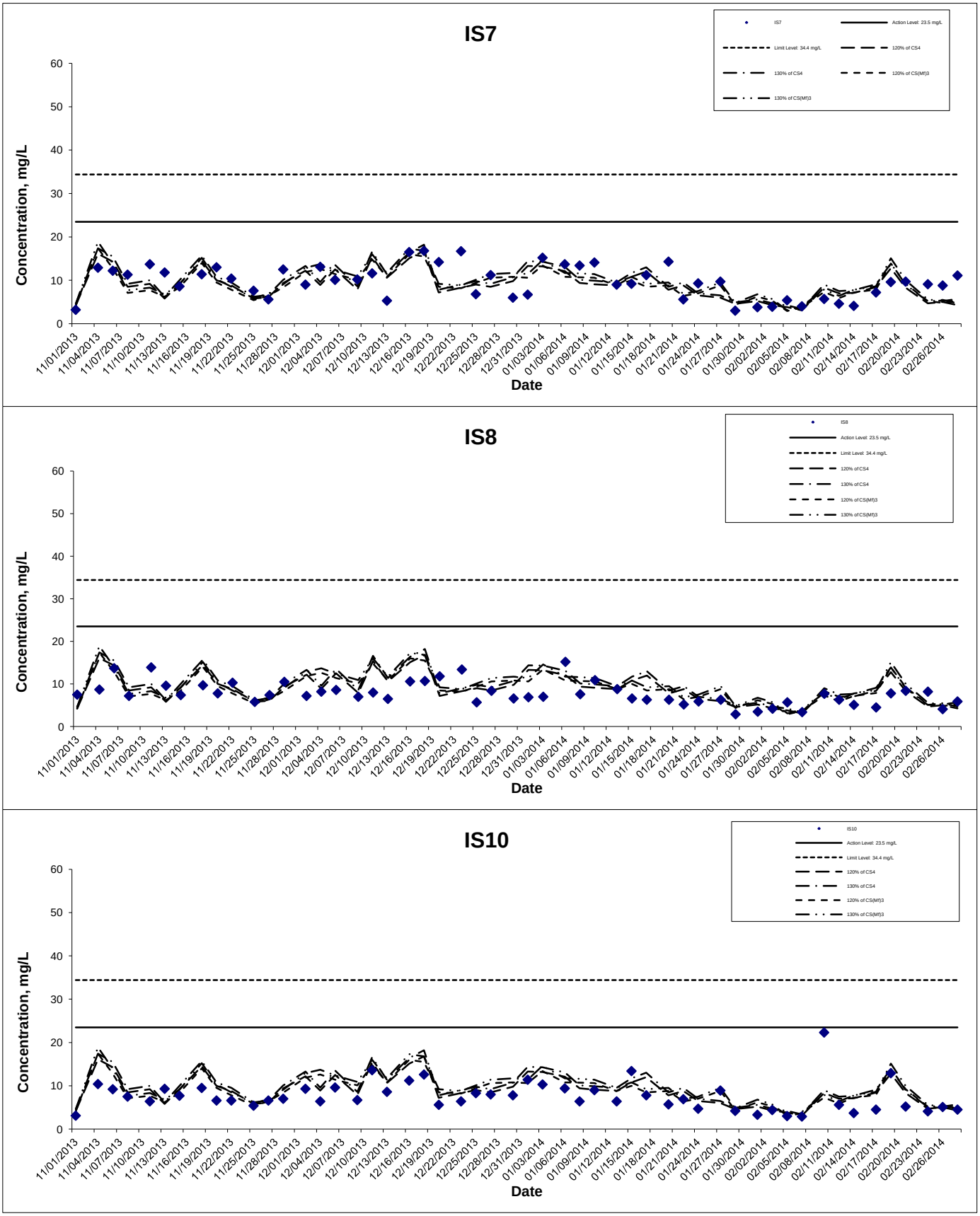

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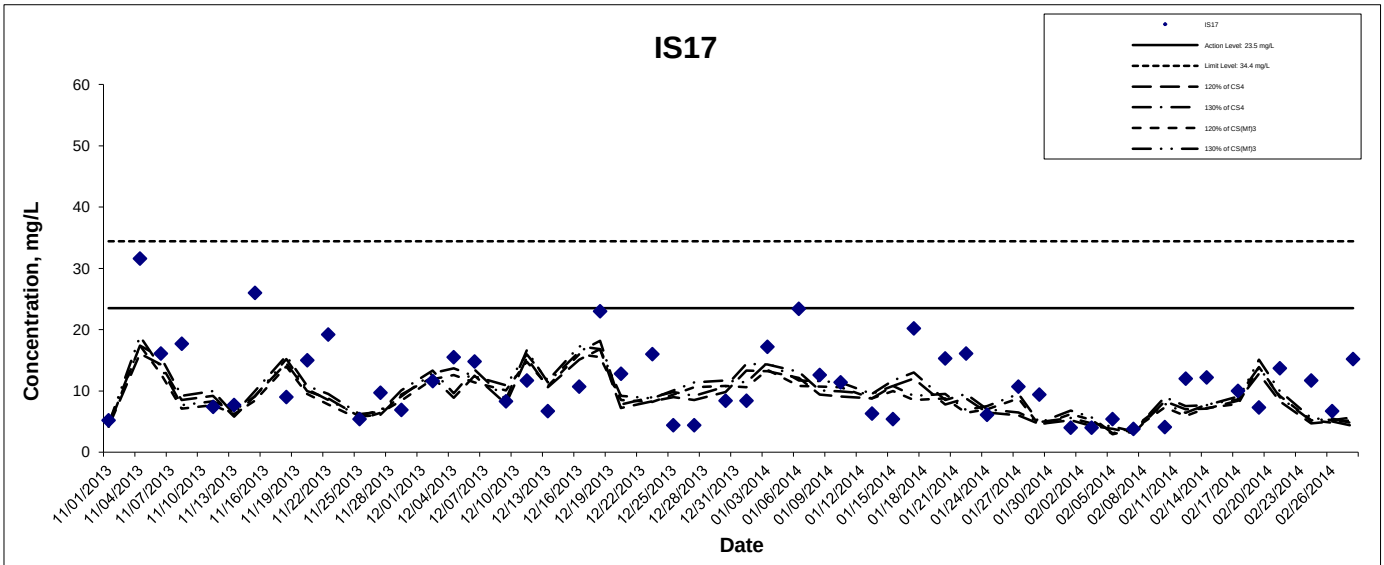

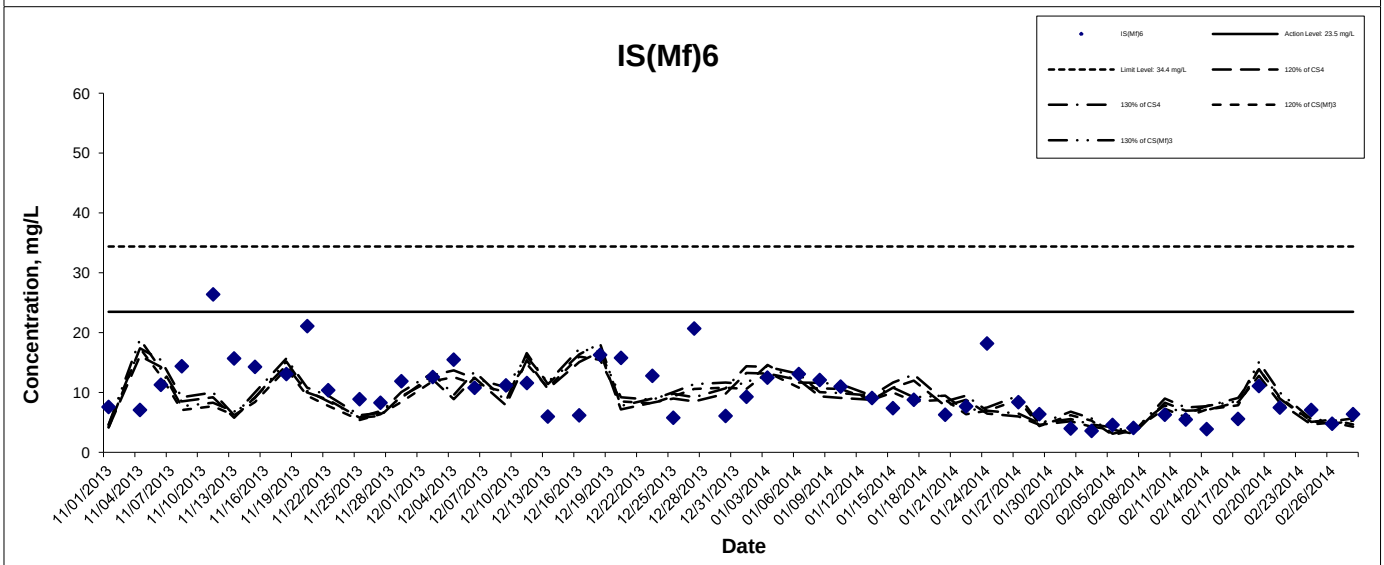

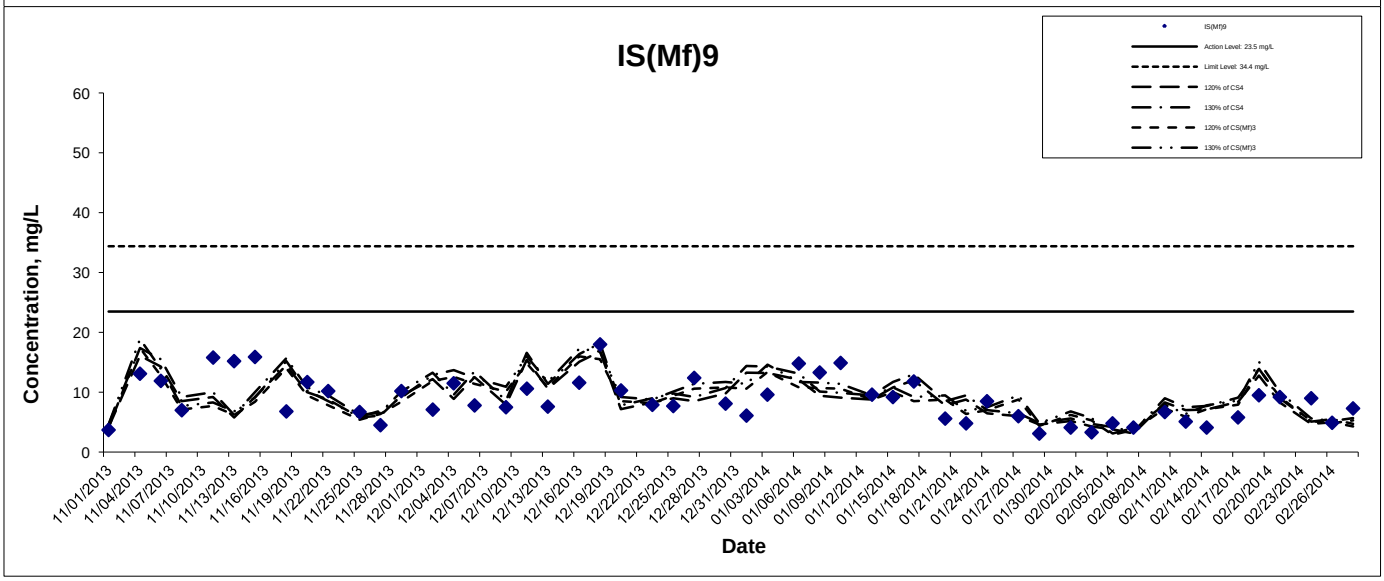

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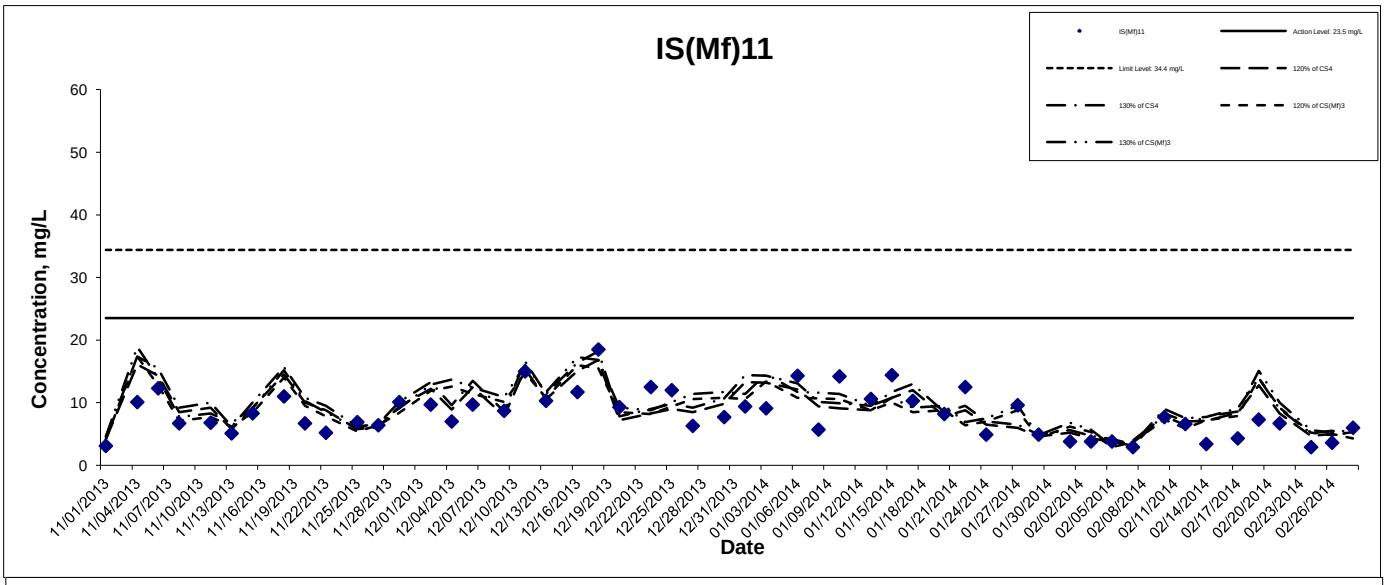

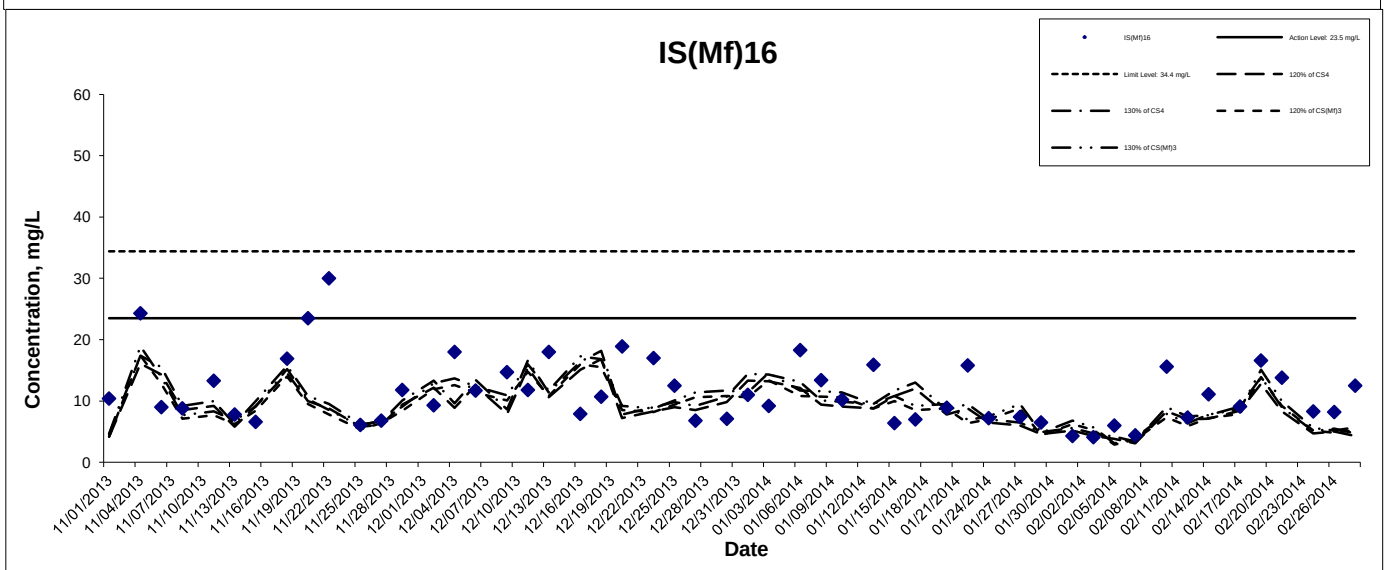

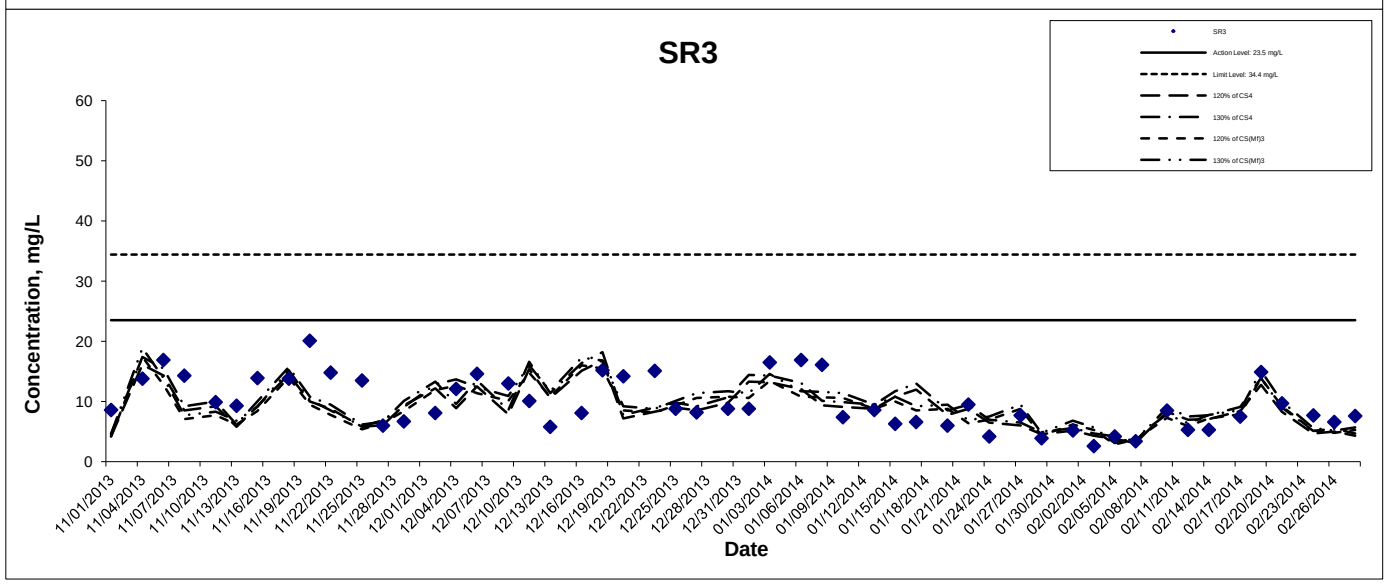

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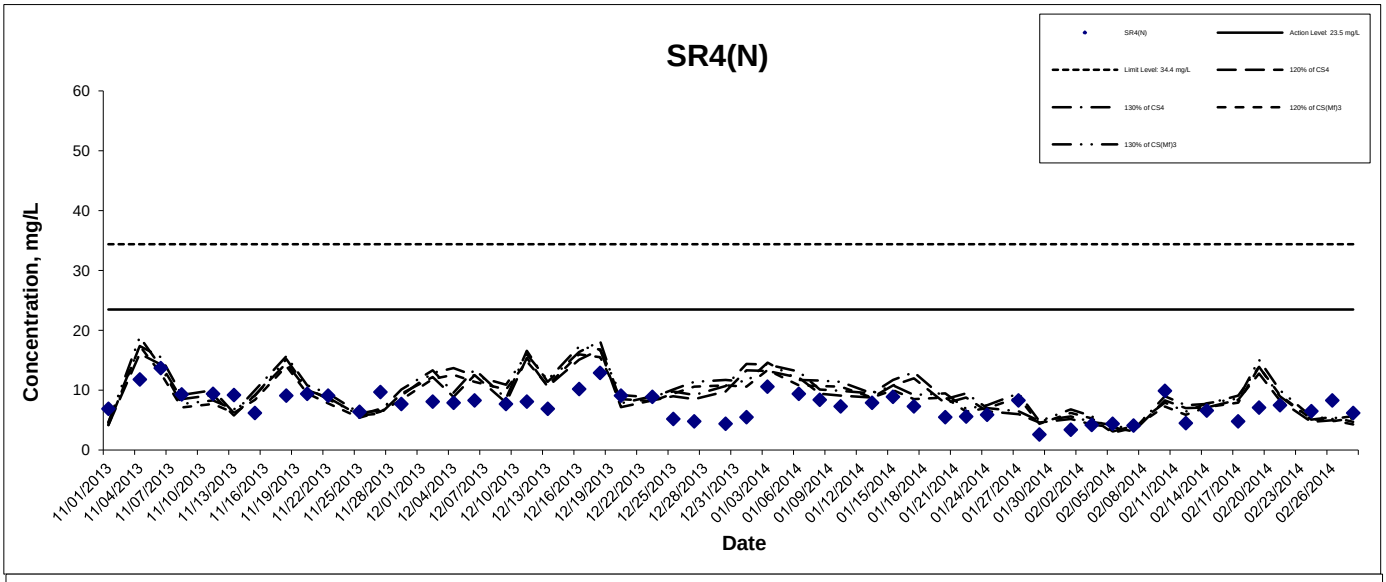

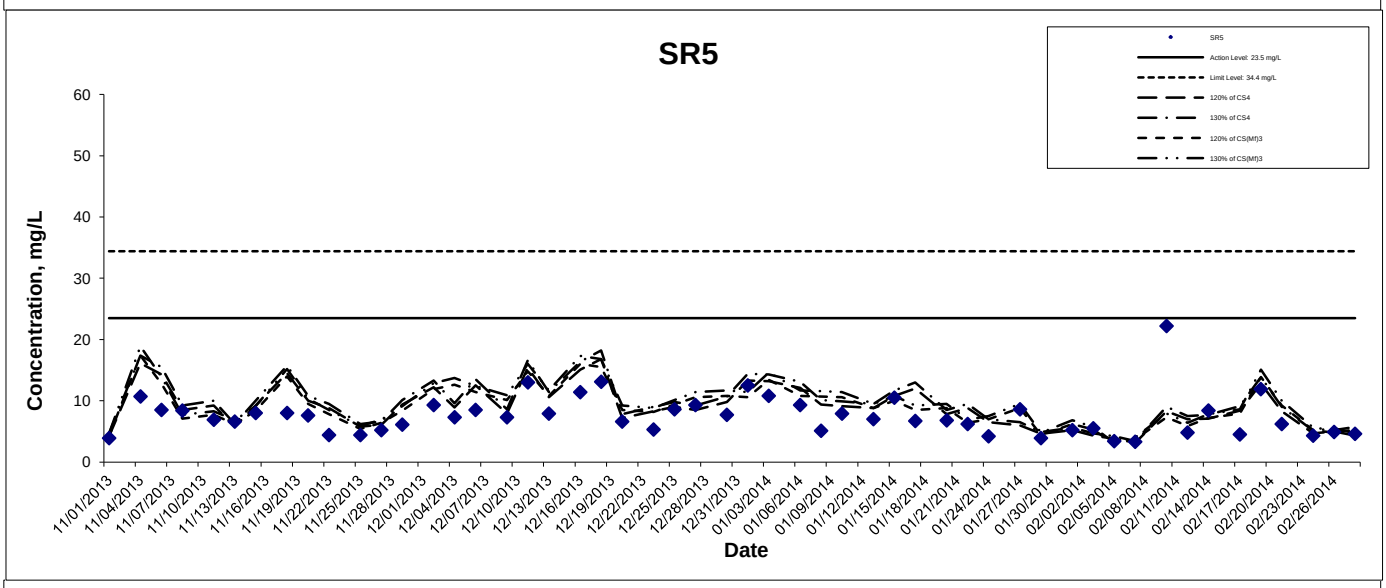

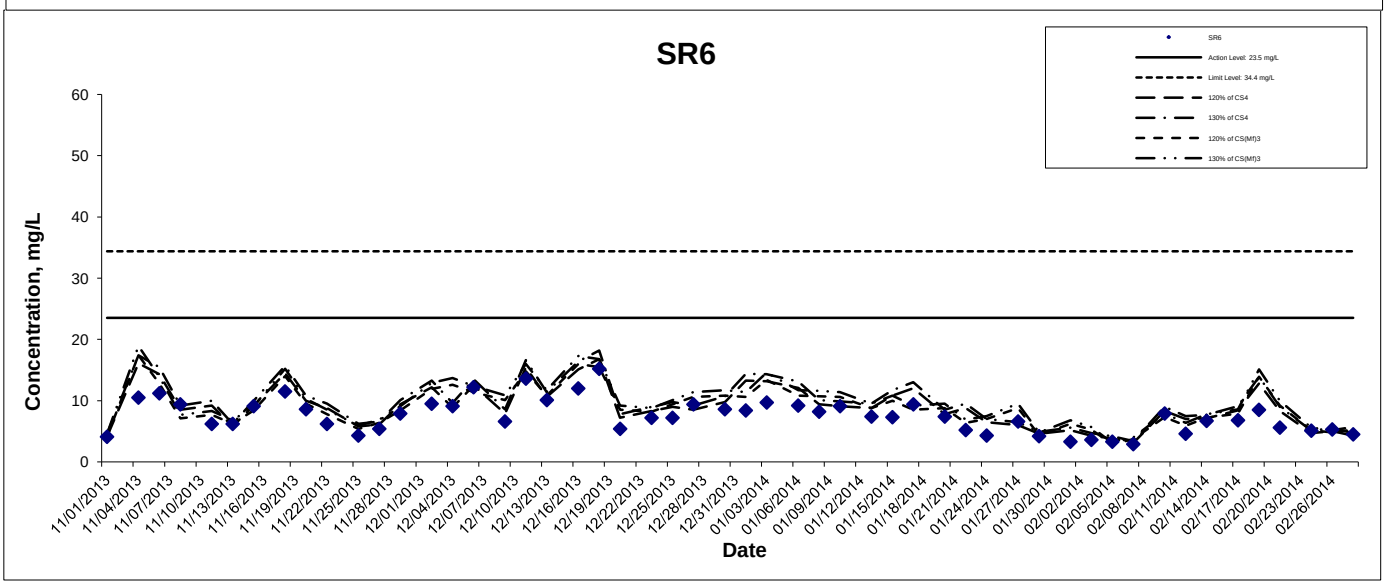

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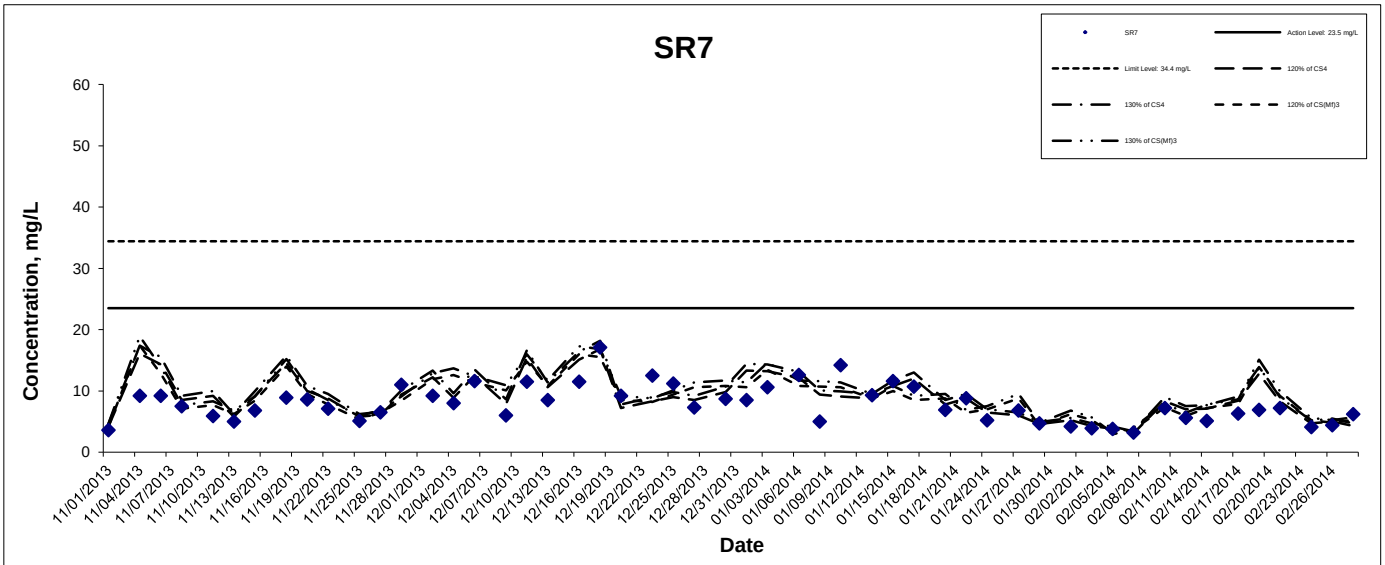

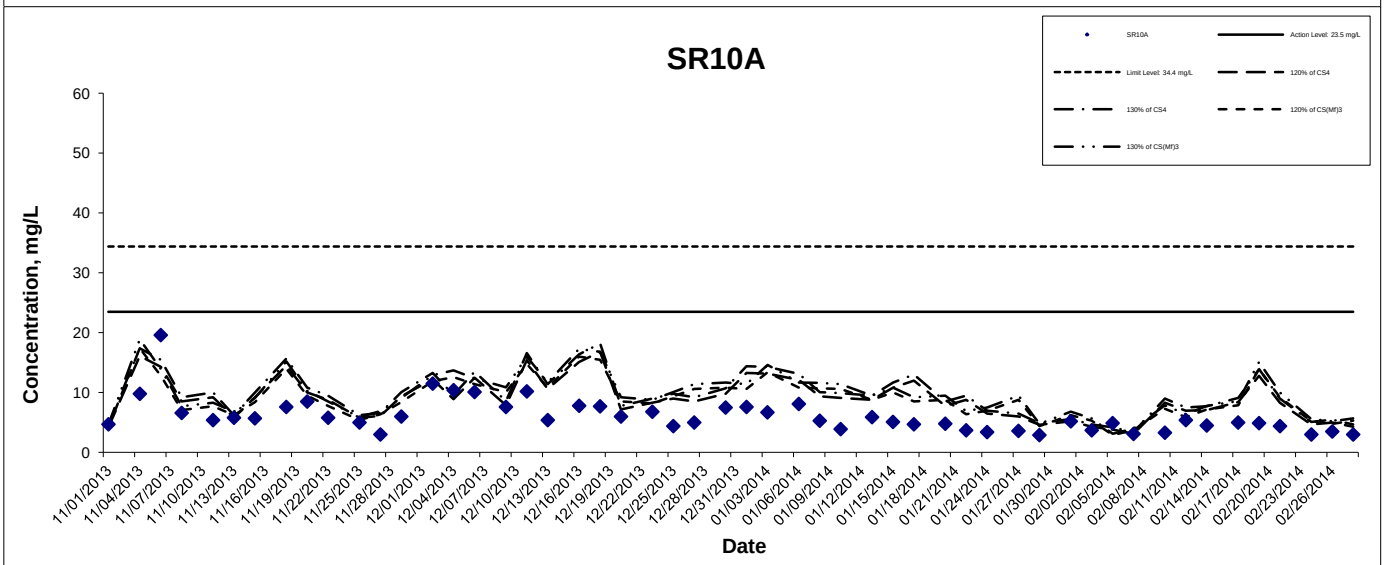

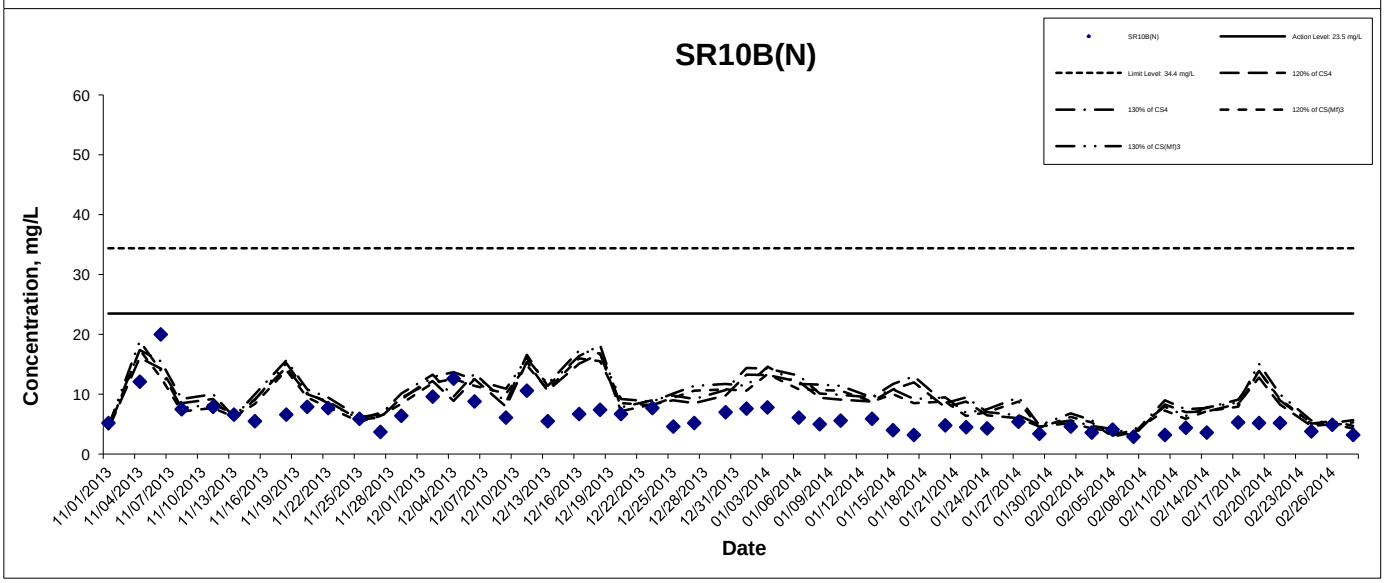

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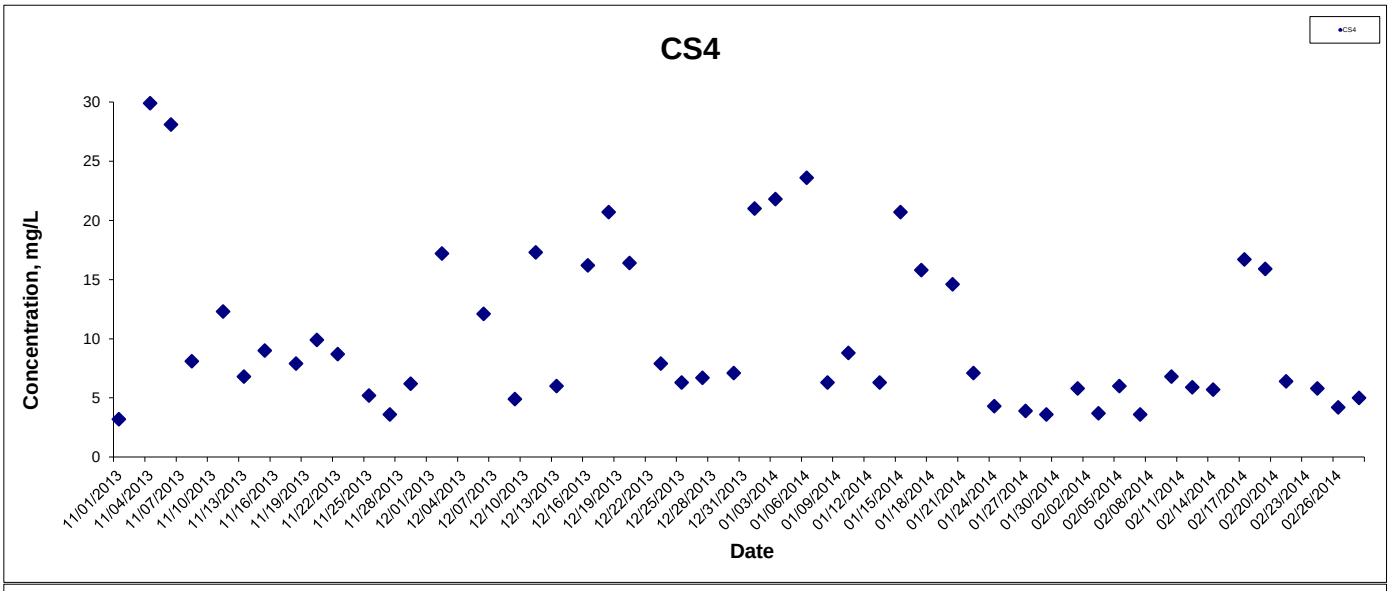

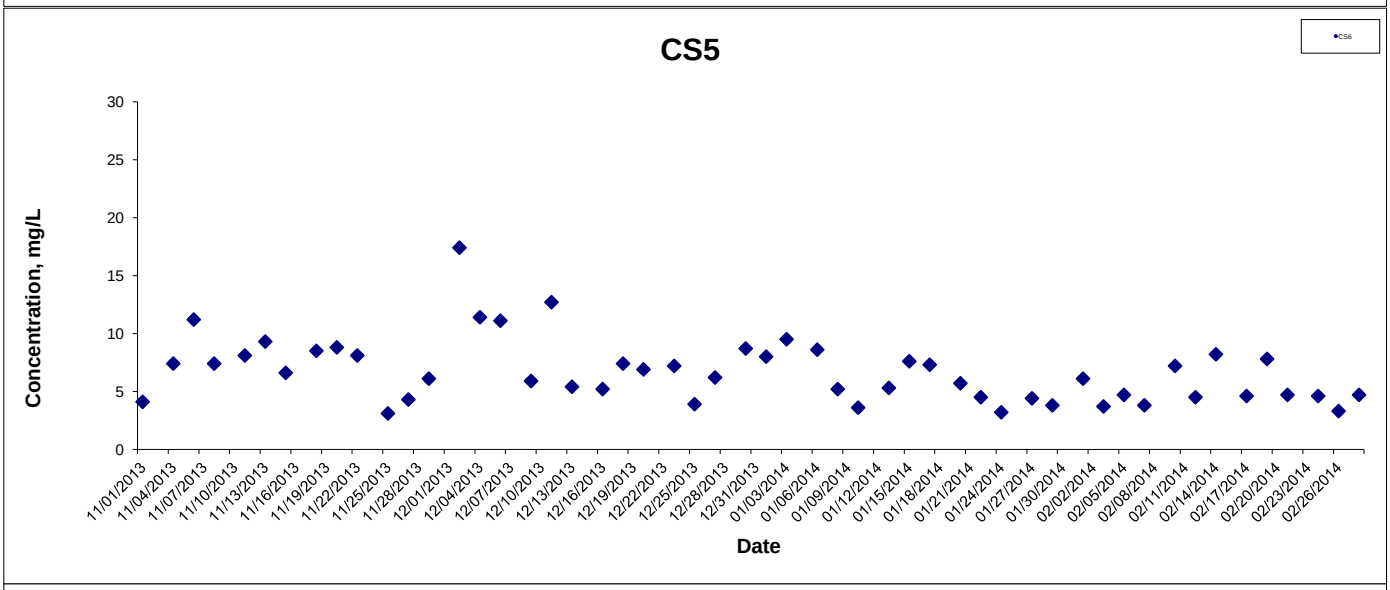

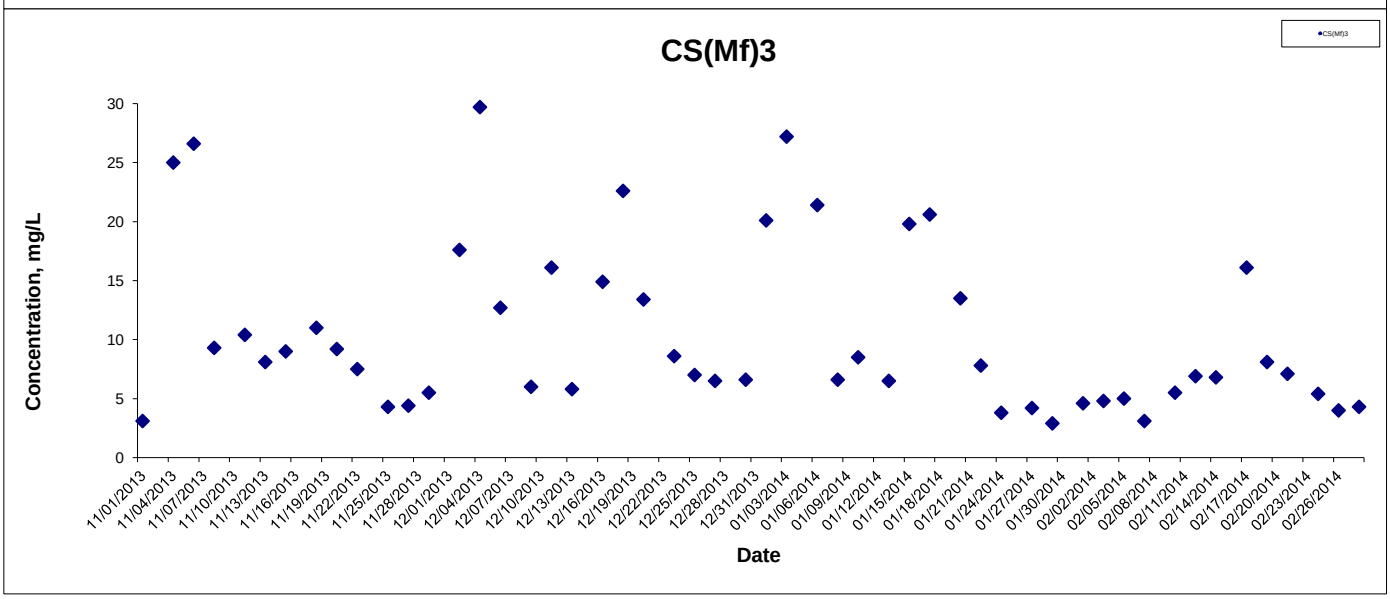

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

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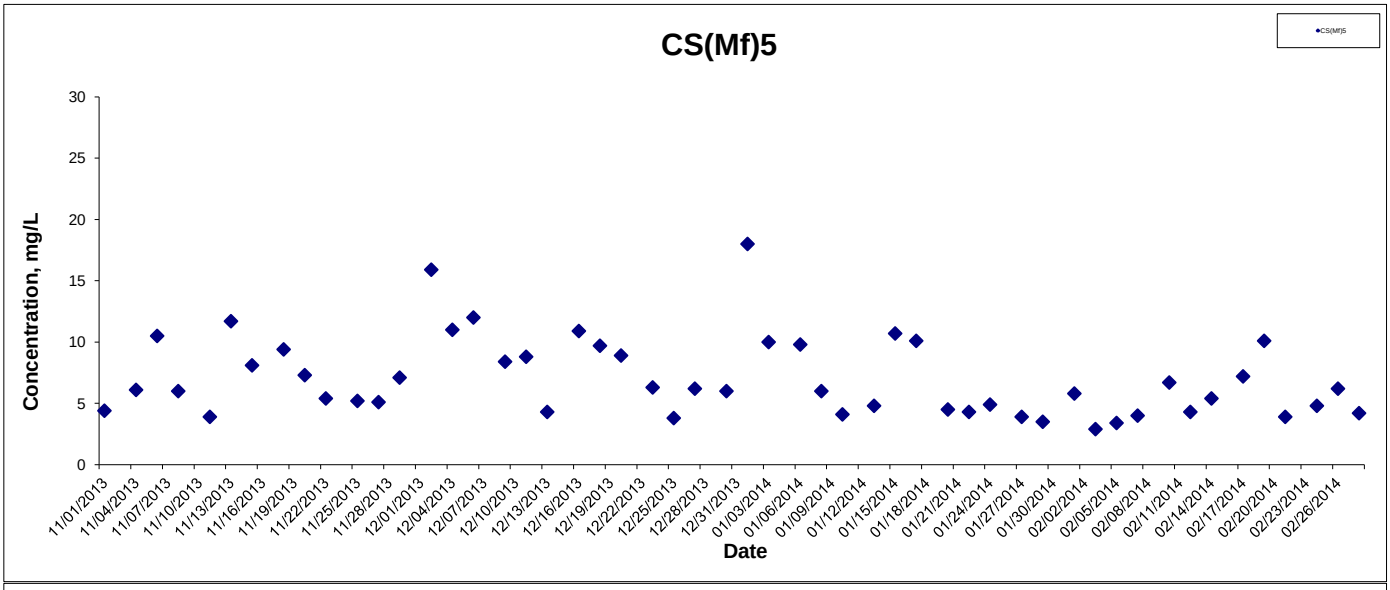
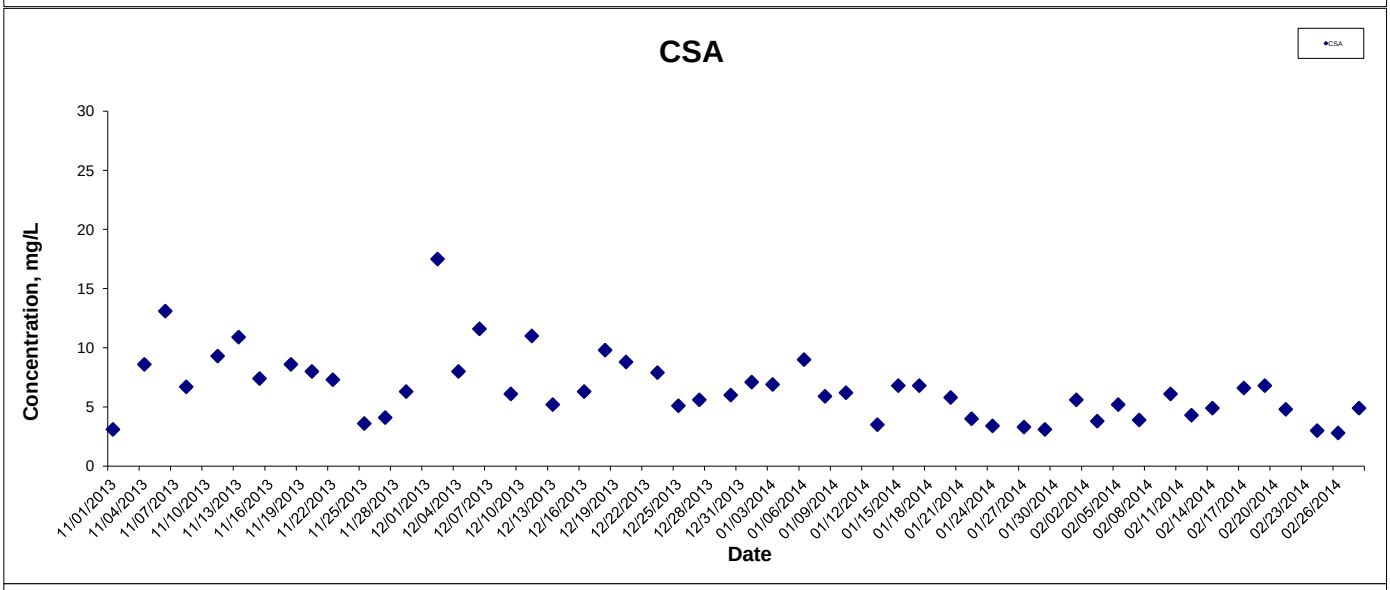
Graphical Presentation of Impact Water Quality Monitoring Results

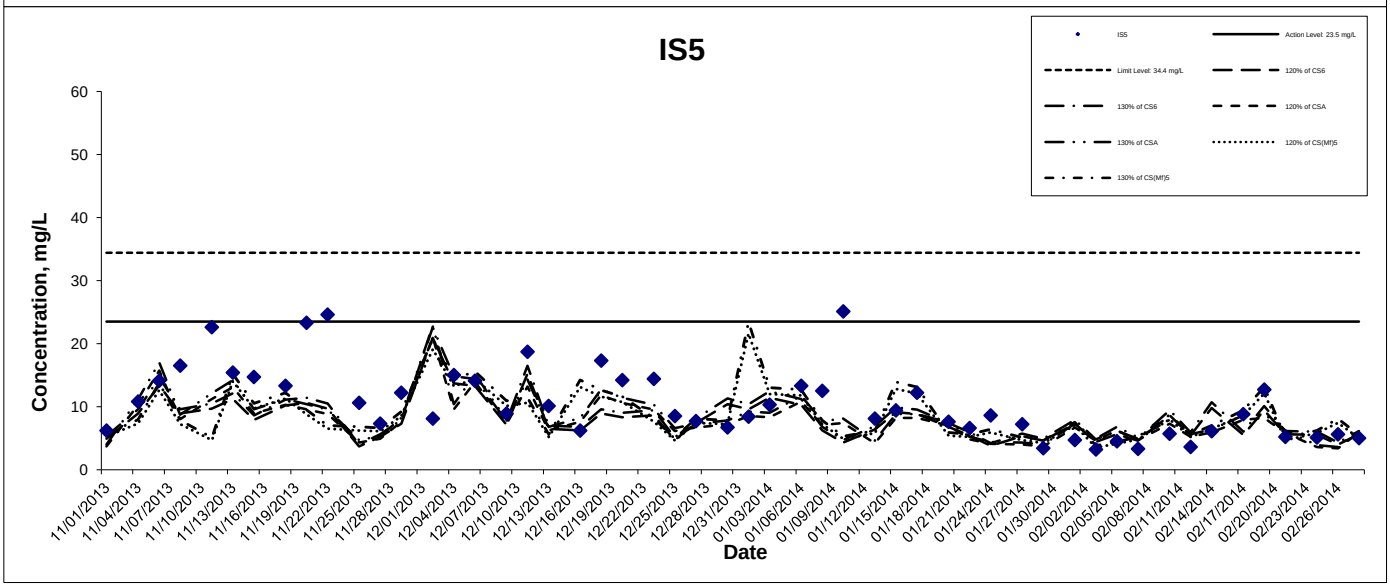
Project No.: 60249820 Date: Mar 2014

Appendix G

Suspended Solids at Mid-Flood Tide







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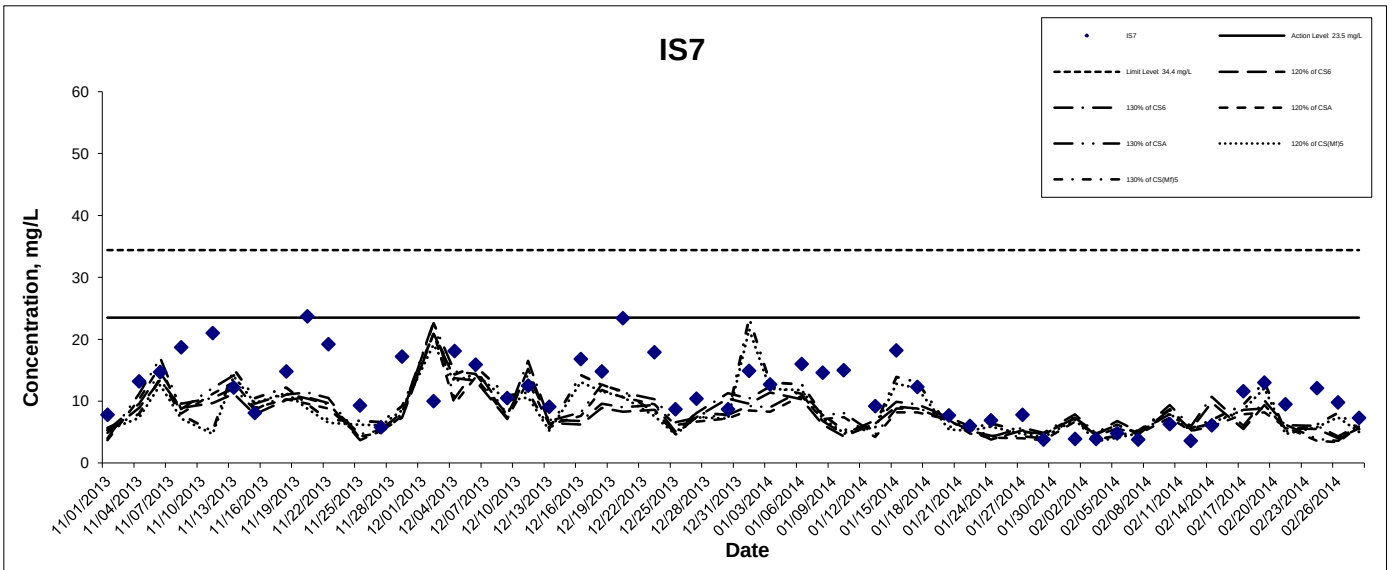

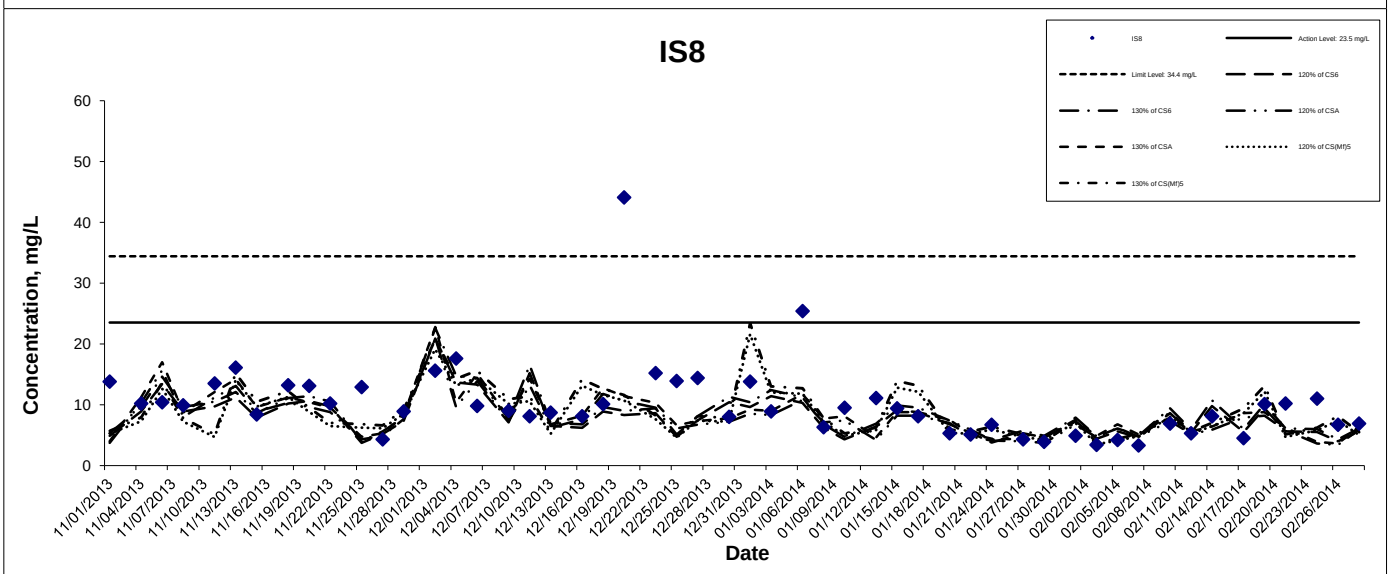

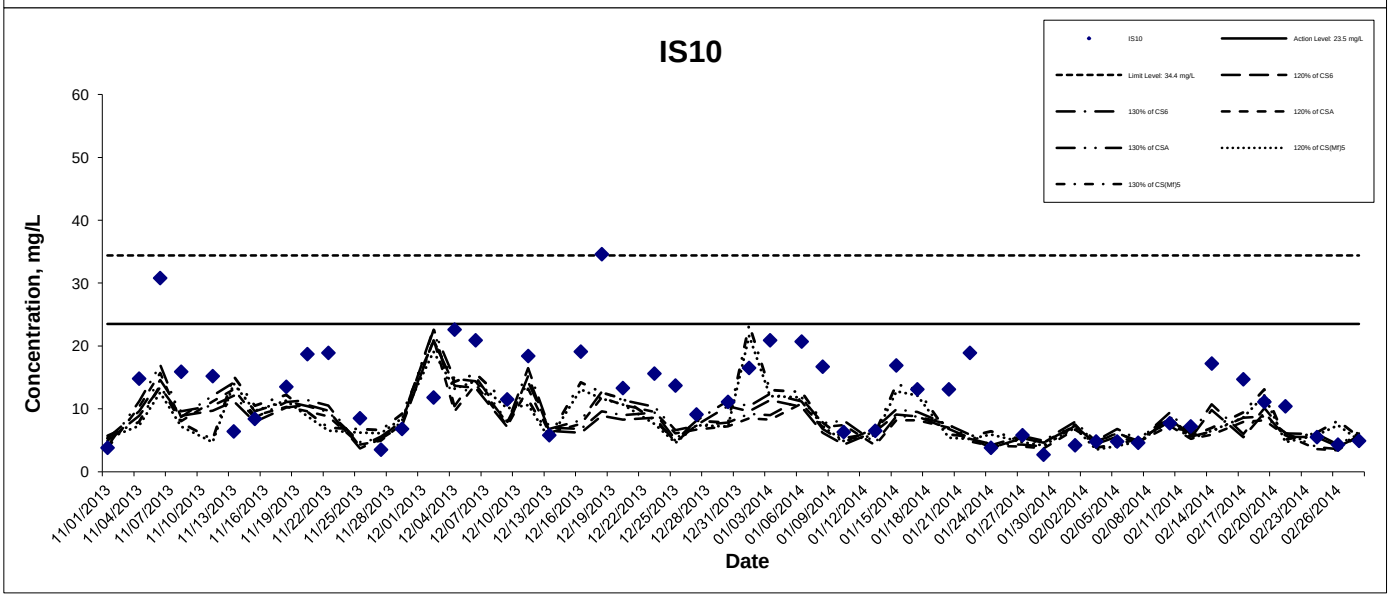

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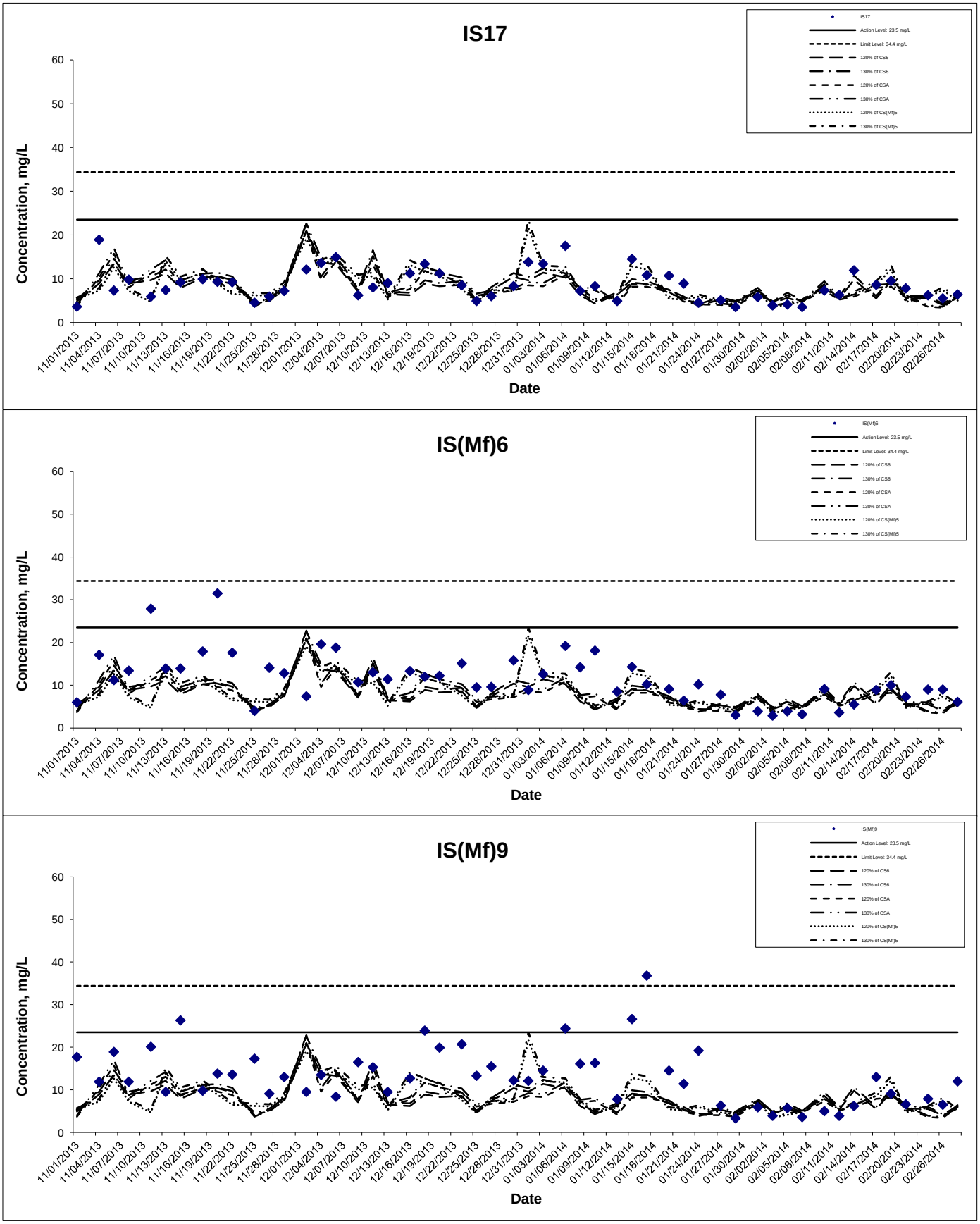

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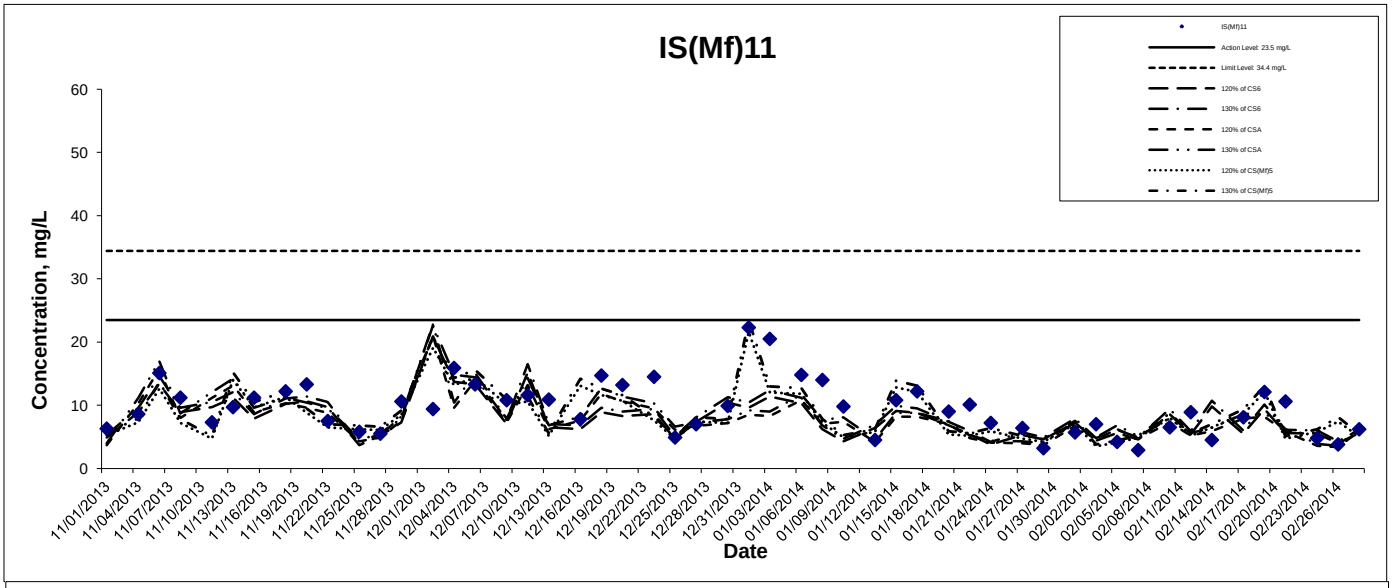

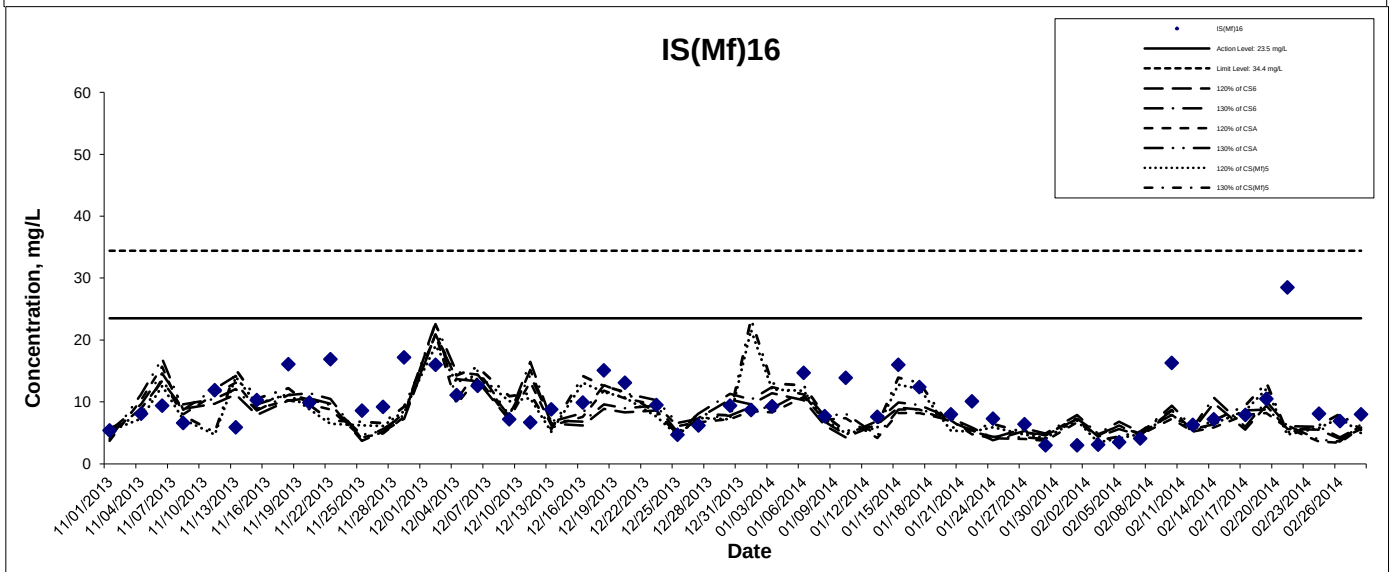

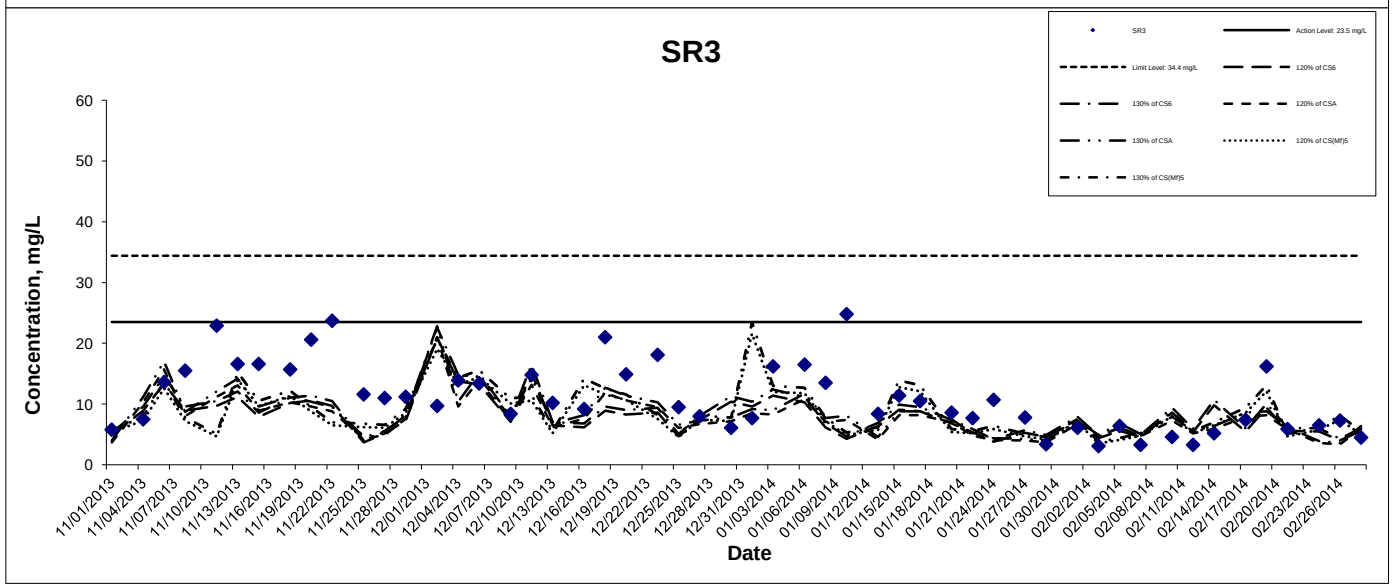

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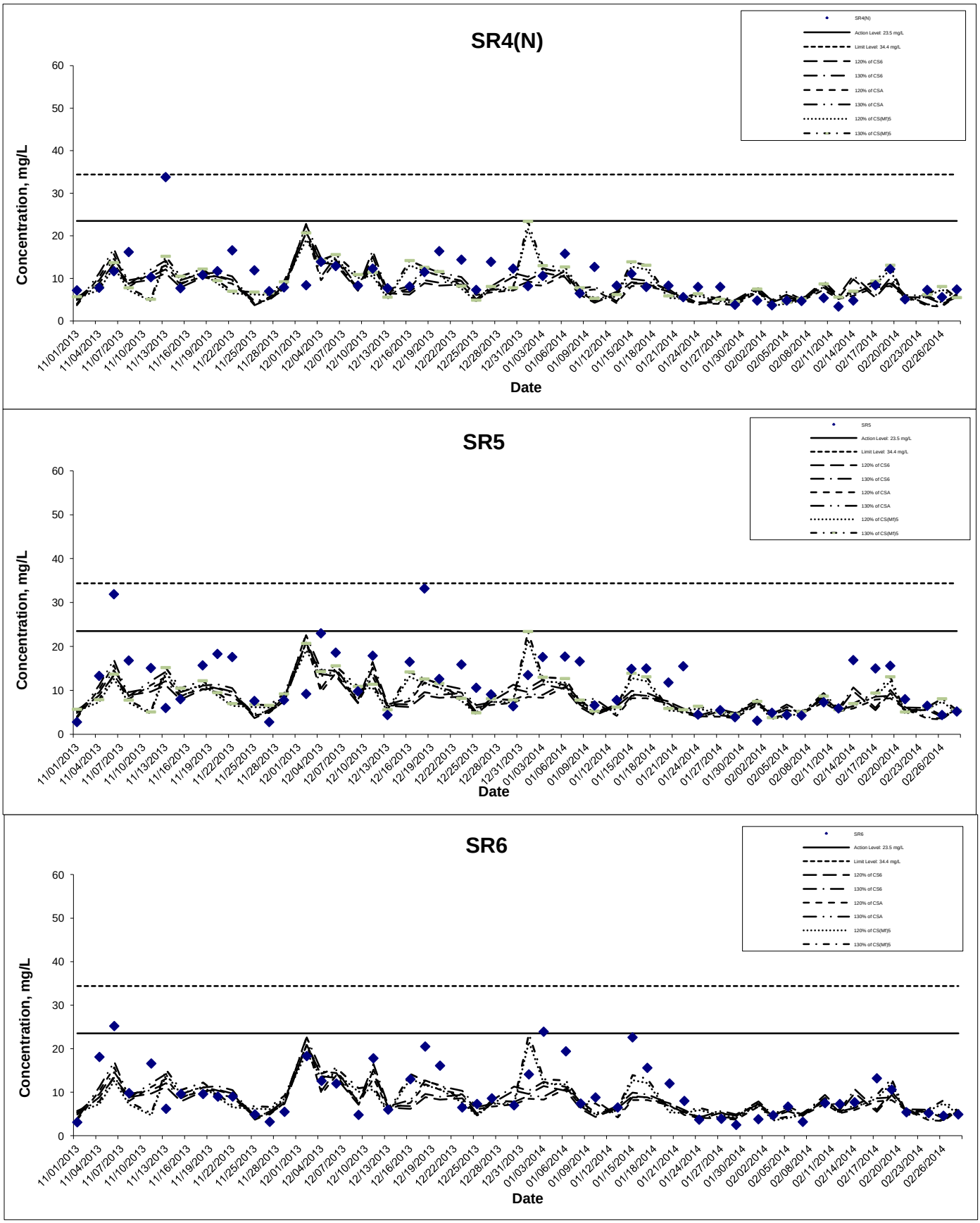

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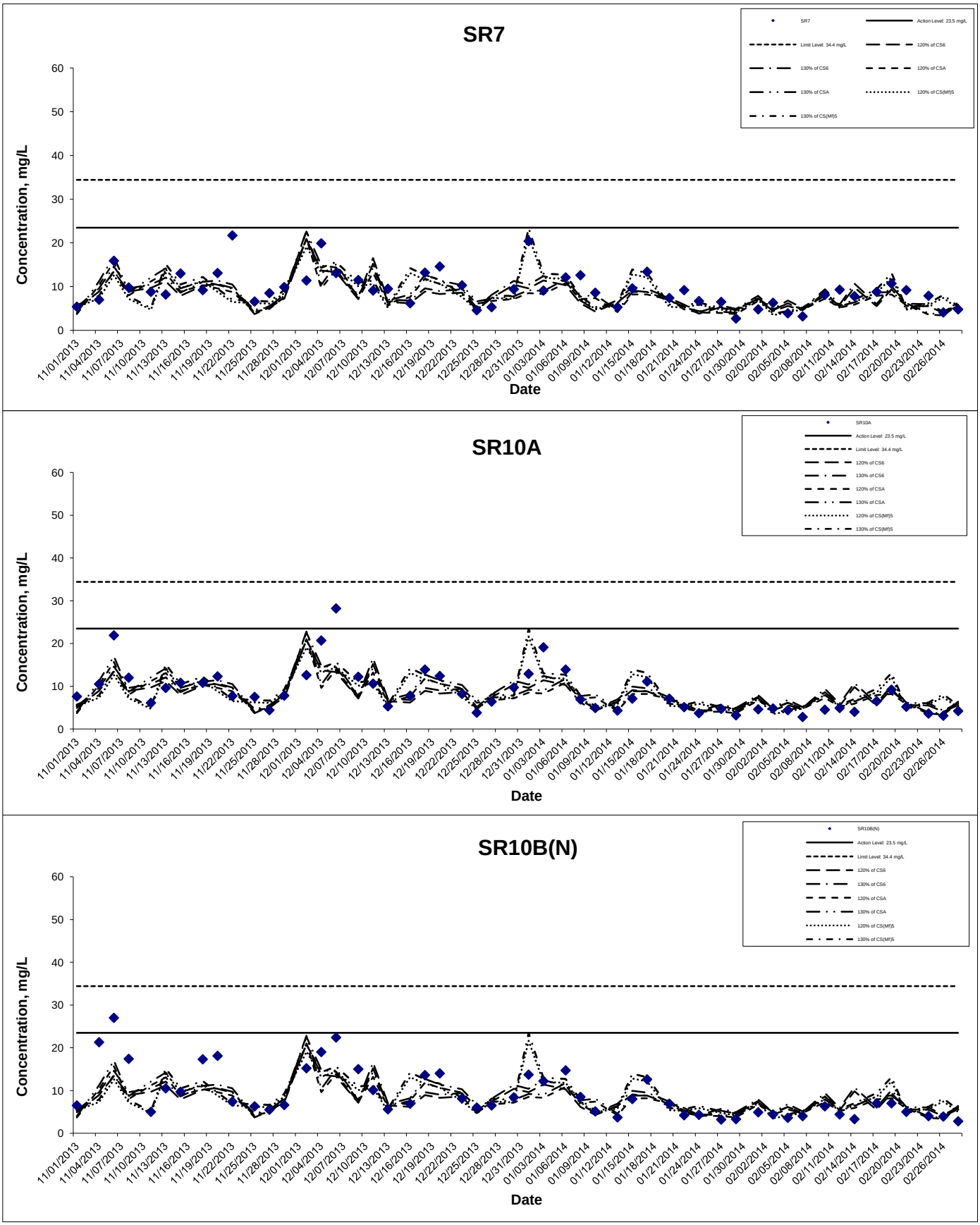

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities-Reclamation Works

December 2013 – February 2014
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).

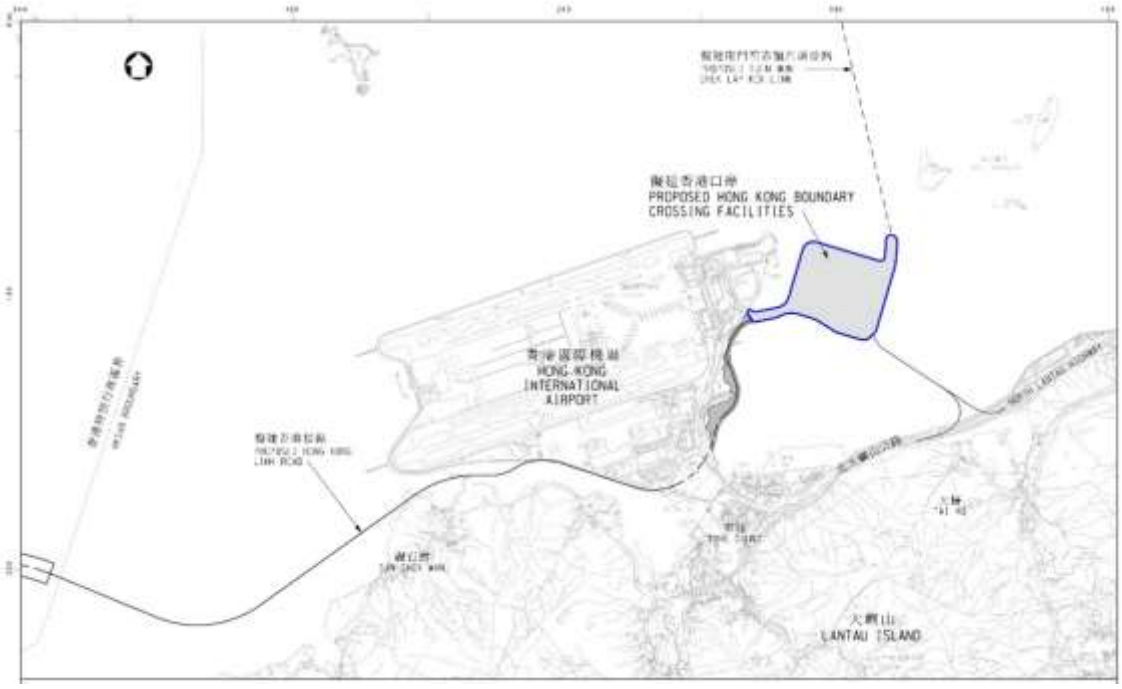

Figure 1. The Hong Kong Boundary Crossing (HKBCF) Reclamation Sites, North Lantau, Hong Kong (http://www.hzmb.hk/eng/img/overview/about_overview03_p01l.jpg**)**

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 seventh quarterly (September – November 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 at the same as this quarter thus three years of quarterly monitoring can be compared in this report; 2011; 2012 and 2013. 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 Impact Monitoring

Data from the baseline was provided by the Highways Department (January 2013) and data has been reported monthly throughout the impact monitoring period. For ease of reference, these data have been summarised from that previously reported and encounter rate calculations are provided (Annex I).

[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

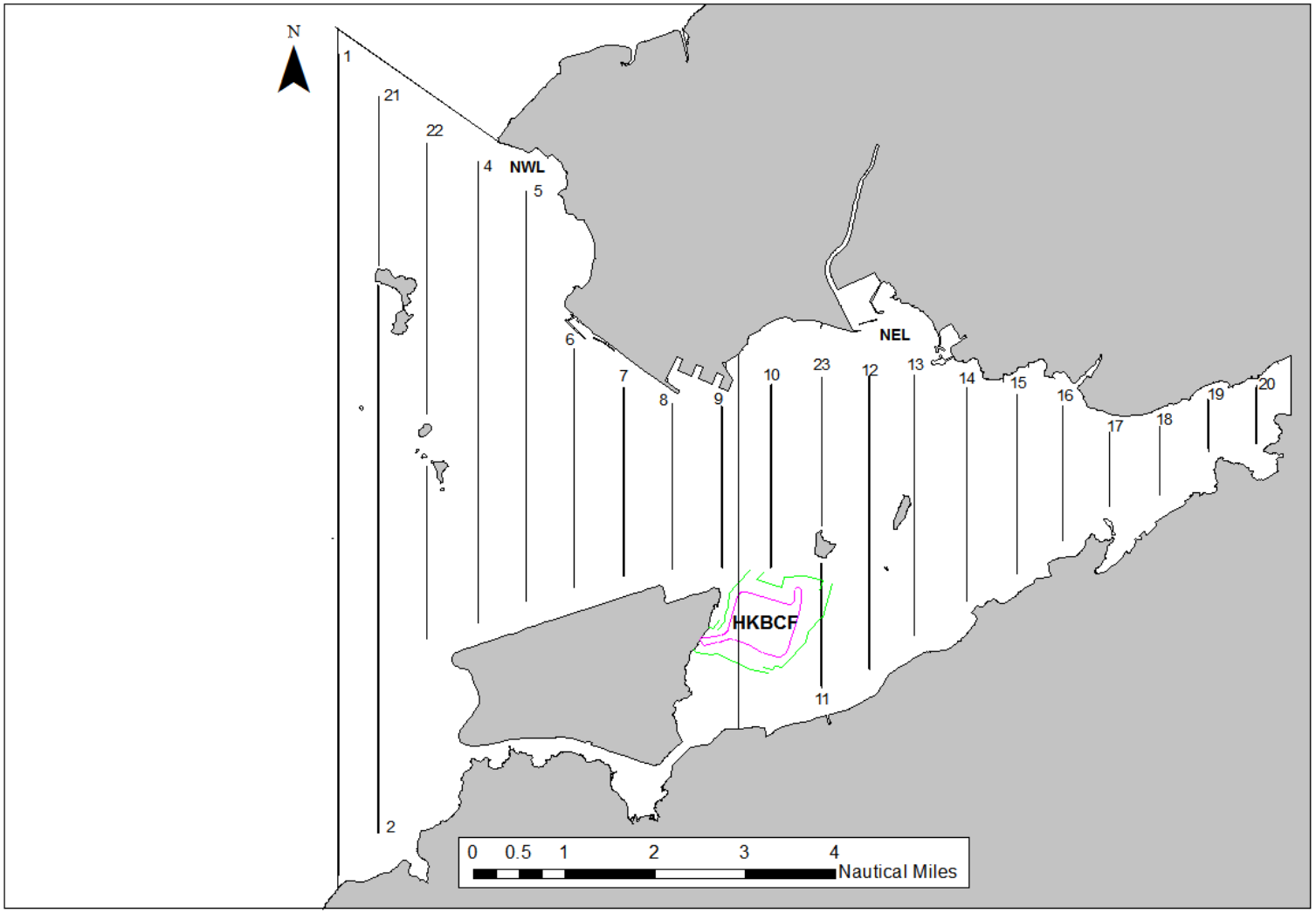

Figure 2 Location of the Transect Lines for Baseline and Impact Monitoring during HKBCF (modified to accommodate HKBCF)

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, 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 baseline and impact monitoring period combined is thirteen (HZMB 054) split across baseline (seven sightings) and impact monitoring (6 sightings). A comparison of baseline and impact sightings using kernel analyses will require longer term data collection.

3. RESULTS AND DISCUSSIONS

3.1. Summary of survey effort and dolphin sightings

From December 2013 – February 2014, 12 vessel surveys were conducted in NEL and NWL survey areas (Annex II). A total of 664.9 km of "on-effort" transect lines were conducted, of which 626.8 km were under favourable conditions (Beaufort 3 or better). Therefore, 94.3% of vessel surveys were conducted under favorable conditions (Annex III). Only those periods of "on-effort" survey conducted under favourable conditions were included in quantitative analyses. During December 2013 – February 2014, 26 groups of dolphins, numbering 107 (min 105: max 116[4]) individuals, were sighted from the vessel surveys. Of these, 21 groups were "on-effort" and the remaining five "opportunistic" (Annex IV).

Of the 26 sightings, 25 groups were located in NWL and 1 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. The baseline surveys were conducted outside the winter period, however, single surveys were conducted for an advanced monitoring period during Dec2011- Jan 2012. Although these surveys only lasted two months, it is still useful to add them to this comparison so that a temporal perspective from a time prior to the onset of the HZMB project might be gained. During December 2011 – Jan 2012, six and three groups were recorded in NWL and NEL, respectively. For period December 2012-February 2013, a total of 50 groups were sighted, 38 of which were located in NWL and 12 in NEL. There are differences between the number of sightings made during baseline compared to winter 2012-13 and 2013-14. For both NEL and NWL, the number of groups during baseline was less than that recorded during winter 2012-13, but more than that recorded during the following winter of 2013-14[5] (Table 2). 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)

[5] As the advanced surveys were far fewer during this time, absolute numbers of groups are not compared but will be incorporated into encounter rate calculations

Table 2. A Comparison of Total Sightings Recorded in NEL and NWL Areas During Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013 and Dec 2013 – Feb 2014

Monitoring Period	Total Dolphin Sighting in NWL	Total Dolphin Sighting in NEL
	Number of Groups	Number of Groups
Dec 2011 – Jan 2012* (Advanced Monitoring)	6	3
Sep – Nov 2011 (Baseline Monitoring)	34	10
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	38	12
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	25	1

* Survey conducted once per month

As per the EM&A manual, only "on effort" sightings can be used for some analyses therefore the combined number of "on effort" sightings for the three periods baseline, winter 2012-13 and winter 2013-14 were compared (as the advanced monitoring period in winter 2011-12 only covered two months and had half the number of surveys, the number of on effort sightings are tabled for reference and will be used in quantitative effort calculations later). From baseline to the following two winter periods[6], there is a decrease in absolute numbers of on effort sightings recorded. 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; Dec 2011 – Jan 2012; Dec 2012- Feb 2013 and Dec 2013 – Feb 2014.

Monitoring Period	Groups of Dolphin sighted in NEL and NWL
Dec 2011 – Jan 2012* (Advanced Monitoring)	9
Sep – Nov 2011 (Baseline Monitoring)	44
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	34
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	21

* Survey conducted once per month

3.2. Distribution

During the baseline survey, ~77% of all on effort sightings were made in NWL. During the winter periods 2011-12, 2012-13 and 2013-14, 66%, 85% and 95% of all sightings were made in NWL, respectively. There is a general trend of an increasing proportion of on effort sightings occurring in NWL during the winter period from advanced monitoring to date, however, if the baseline proportion is included, the trend is not consistent. It has been previously documented that a seasonal trend in dolphin occurrence occurs in the waters of NEL and NWL, therefore, it is perhaps more useful to consider trends across like-seasons. Again, there is no correction for effort in these observations (Table 4). All of the sightings, except one, cluster around the northern section of NWL and are either within or adjacent to the Sha Chau Lung Kwu Chau Marine Park (SCLKCMP). Since 1995, this area has been consistently highlighted as important to some, but not all, of the dolphins which frequent Hong Kong waters. A single sighting occurred at the north

[6] Please note this does not incorporate any seasonal trend in between the winter periods

eastern corner of the airport platform, again, this area has been shown to be an area of high use in the past but usage has been declining since the mid 2000's and has been related to the increasing number of high speed ferries that depart from here (Fig. 6).

Table 4. A Comparison of "On Effort" Sightings Recorded in NEL and NWL During Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013 and Dec 2013 – Feb 2014.

Monitoring Period	No. of Dolphin Groups sighted in NWL	No. of Dolphin Groups sighted in NEL
Dec 2011 – Jan 2012* (Advanced Monitoring)	6	3
Sep – Nov 2011 (Baseline Monitoring)	34	10
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	29	5
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	20	1

* Survey conducted once per month

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[7] of survey effort was conducted under favourable conditions in the NEL and NWL survey areas. In NEL, there has been a decrease in encounter rates over the three winter periods 2011-12, 2012-13 and 2013-14, however, the baseline period (Sept – Nov 2013) has a higher encounter rate than the previous winter period. These data indicate a decreasing trend in encounter rate in NEL over the winter period but does not account for trends during other seasonal periods. In NWL, there is no consistent trend, as encounter rate increases during the first winter (2012-13) of impact monitoring compared to advanced monitoring (winter 2011-12) and then decreases again in winter 2013-14. The baseline monitoring encounter rate is the highest calculated but it is noted this is from a different season compared to this quarter (Table 5).

Table 5. A Comparison of Encounter Rates* in NEL and NWL Areas During Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013 and Dec 2013 – Feb 2014.

Monitoring Period	Encounter Rate NEL	Encounter Rate NWL (*)
Dec 2011 – Jan 2012* (Advanced Monitoring)	4.6	6.1
Sep – Nov 2011 (Baseline Monitoring)	5.4	9.5
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	2.3	6.6
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	0.5	4.8

* Survey conducted once per month

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. Both the encounter rates for NEL and NWL for this quarter (Dec 2013- Feb 2014) are lower than the yearly average.

[7] Updated data set provided April 2013

Historically, there have been both up and down movements within **yearly** encounter rate limits, however, the general trend in yearly encounter rate for dolphins in all areas of Hong Kong is that of significant decline 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 individual projects, such as HKBCF and others, may have on the dolphin population encounter rate. As the impact of the work at HKBCF extends in addition to new dredging and other projects being initiated in both NEL and NWL, it is likely that all activities have had a cumulative effect on overall encounter rates.

3.4. Group size

During Dec 2013- Feb 2014, group size of all sightings varied from 1 to 13 individuals with an average of 4.2 in NWL and 1 in NEL. For baseline monitoring, the NWL average group size was 4.5 and the NEL average group size was 3.5. For the winter periods 2011-12 and 2012-13, the NWL average group sizes were 2 and 3.6, respectively, and in NEL, for the same two periods, they were 4.3 and 2.8, respectively (Table 6). The group size in NEL over the winter period since 2011 shows a decrease. The group size in NWL for the same seasons is variable. A map depicting group size distribution shows that almost half of all groups seen had more than five individuals. The largest group (n=13) contained one calf (Fig. 7).

Table 6. A Comparison of Sightings Group Size Averages Recorded in Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013 and Dec 2013 – Feb 2014.

Monitoring Period	Average Group Size (NWL)	Average Group Size (NEL)
Dec 2011 – Jan 2012* (Advanced Monitoring)	2	4.3
Sep – Nov 2011 (Baseline Monitoring)	4.5	3.5
Dec 2012 – Feb 2013 (HKBCF Fourth Quarter)	3.6	2.8
Dec 2013 – Feb 2014 (HKBCF Eighth Quarter)	4.2	1

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). In the last quarterly report a methodology was proposed for such modelling. Both habitat and environmental data for the NEL and NWL regions are required and, to date, all information from the 2011 advanced and baseline period (Dec 2011 – Jan 2012) and impact monitoring (March 2012 – Dec 2012) have been reformatted and entered into the model database. EPD have informed this project that the remaining EPD environmental data from 2013 (to compete the year impact survey period Mar 2012 – Feb 2013) will be made available as soon as it has been verified by EPD internal auditing processes[8].

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 one area to the north of the Hong Kong International Airport (HKIA) platform (Figs. 8; 9). This is the same pattern as was observed in the last quarter and highlights areas of high density as has been published previously in the AFCD Annual Reports and the baseline monitoring report. These areas of high use have been consistent in the long term and continue to be so. When compared to the grid analyses from Dec 2012 – Feb 2013 (Fig 10) it is noted that the previously

[8] The co operation of EPD and other government departments in obtaining these data is gratefully acknowledged.

recorded areas of high density located to the east of HKBCF and to the north of the Link Road Project are absent. The general trend in the last few quarters has been for these area closest to two ongoing HZMB construction sites being less frequented by dolphins, with the exception of the area to the north of HKBCF.

3.6. Mother-calf pairs

Ten of the groups sighted contained mother and calf pairs. All groups were sighted in NWL (Fig. 11). Calves comprised 10.3% of all dolphins sighted, higher than that reported in the last two quarterly reports (6.7% and 2.5%, respectively). Several of the new born calves from the last quarter have been sighted consistently in NWL this quarter as well as older (nearing year old) calves.

3.7. Activities

Of the 26 groups sighted (using all sightings), eight (31%) were engaged in feeding activities which is less than the frequency noted last quarter; eight (31%) were travelling which is a marked increase from last quarter; six (23%) were feeding/travelling/surface active which is similar to the last quarter; two (8%) were milling (other) and it was not possible to define the behavior of two (8%) groups. Feeding and travelling were the predominant activities during daylight hours in Dec 2013 – Feb 2014 (Fig. 12). In NWL, feeding occurred most often at east SCLKCMP and the western limits of NWL. (Fig. 13).

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 VI. Not all dolphins sighted have sufficient scarring, injury or pigmentation uniqueness to be unambiguously identified. 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. No new dolphins which have been identified in the last quarter are from the baseline study and the catalogue no stands at 107 individuals. There are 13 dolphins which have been sighted six or more times, seven of which are known from the AFCD catalogue (HZMB 002 [WL111]; HZMB 011 [EL01]; HZMB 041 [NL24]; HZMB 044 [NL98]; HZMB 051 [NL213]; HZMB 054 [CH34]; HZMB 098 [NL104]). Two of these well known individuals were not seen during the baseline study (HZMB 002 AND HZMB 044). When both baseline and impact monitoring data is pulled, HZMB 54 has been seen the most in 14 different sighting groups. HZMB 002 has been sighted 11 times; HZMB 044 and HZMB 041 have been sighted nine times and HZMB 011 has been sighted eight times. Even when pooled with baseline data, the highest number of re-sightings is 14 (HZMB 054) and this does not consider independence of sightings, a critical assumption in kernel analyses. (Annex VI; Table1).

4. CONCLUSION

The data from Dec 2013 – Feb 2014 shows some consistencies with the baseline data (conducted during a different season) and with the same periods in Winter 2011-12 and 2012-13. Habitat use, group size and behavioural trends all fall within those reported in AFCD Long Term Monitoring reports. The quarterly encounter rates for both NEL and NWL is lower than that reported for **annual** rates published previously and the seasonal trend for these two areas is of a declining encounter rate. Density distribution maps depicted key areas of frequent use within NWL, in particular, SCLKMP, and NEL at the northern edge of the airport platform, however, previously important areas to the east of HKBCF construction site and to the north of the Link Road construction area at NWL have not been frequented by dolphins this quarter. There has been a high resighting rate of calves, compared to previous months.

The decreases in encounter rates in both NEL and NWL is noted. HKBCF monthly reporting notes that the conditions of EM&A Manuel have been consistently upheld and that all measures published to minimise disturbance to dolphins remain in place. Although

it is likely that the increase in HKBCF activities is having an effect on dolphin encounter rates in NEL, it is also noted that other HZMB projects have increased activities over the last quarter. In addition, extensive dredging has been on going in NEL and also in parts of NWL. Further, new projects have been initiated along the airport platform area. The modelling proposed herein will provide insight to specific areas of habitat use and density change which cannot be assigned to environmental variation. At this stage when there is an ongoing and increasing number of activities occurring in the dolphins habitat, other analyses may also be useful. These may include extending the area of impact survey areas, e.g., to south of Lantau, to assess if dolphins habitat use has shifted within Hong Kong waters. A cumulative analysis may also provide a better understanding of what the potentially greatest impacts are and what the summary of these effects may be on the dolphins. It is noted, however, that a significant decline in the dolphin population throughout the last ten years and prior to construction commencement has been established by AFCD (2013). All analyses must take into account this long term trend the cause of which has not yet been quantified.

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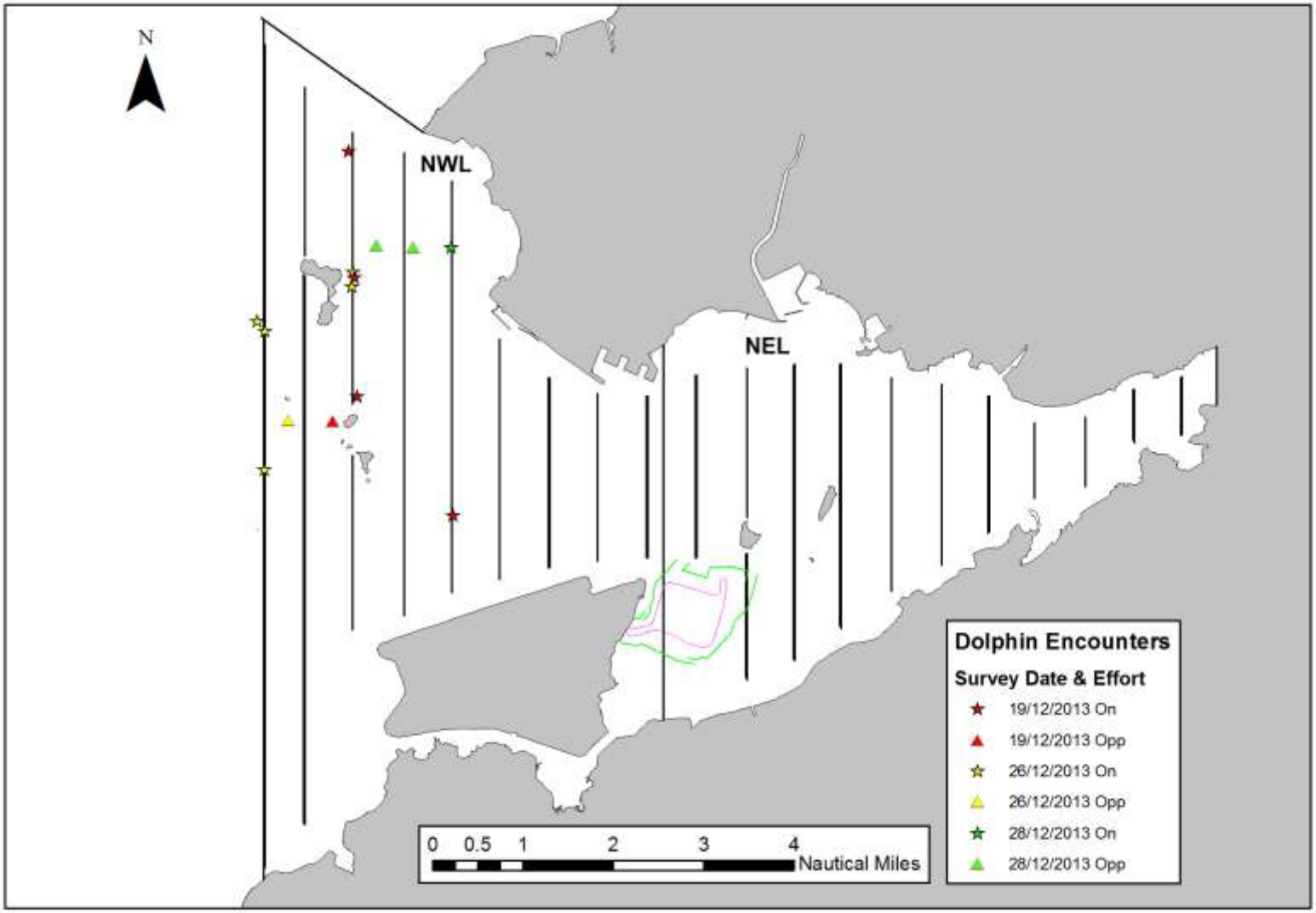

Figure 3 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (December 2013)

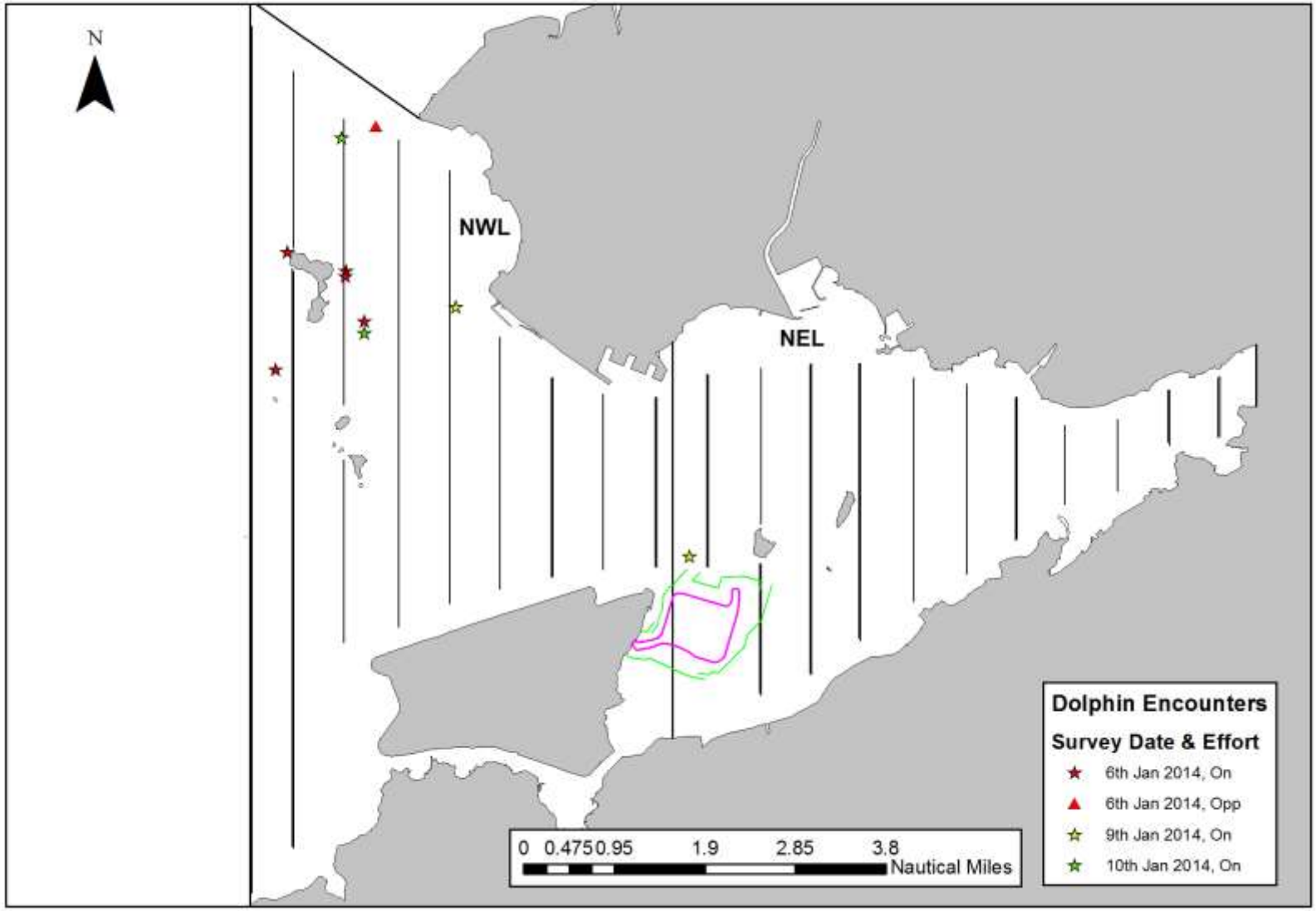

Figure 4 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (January 2014)

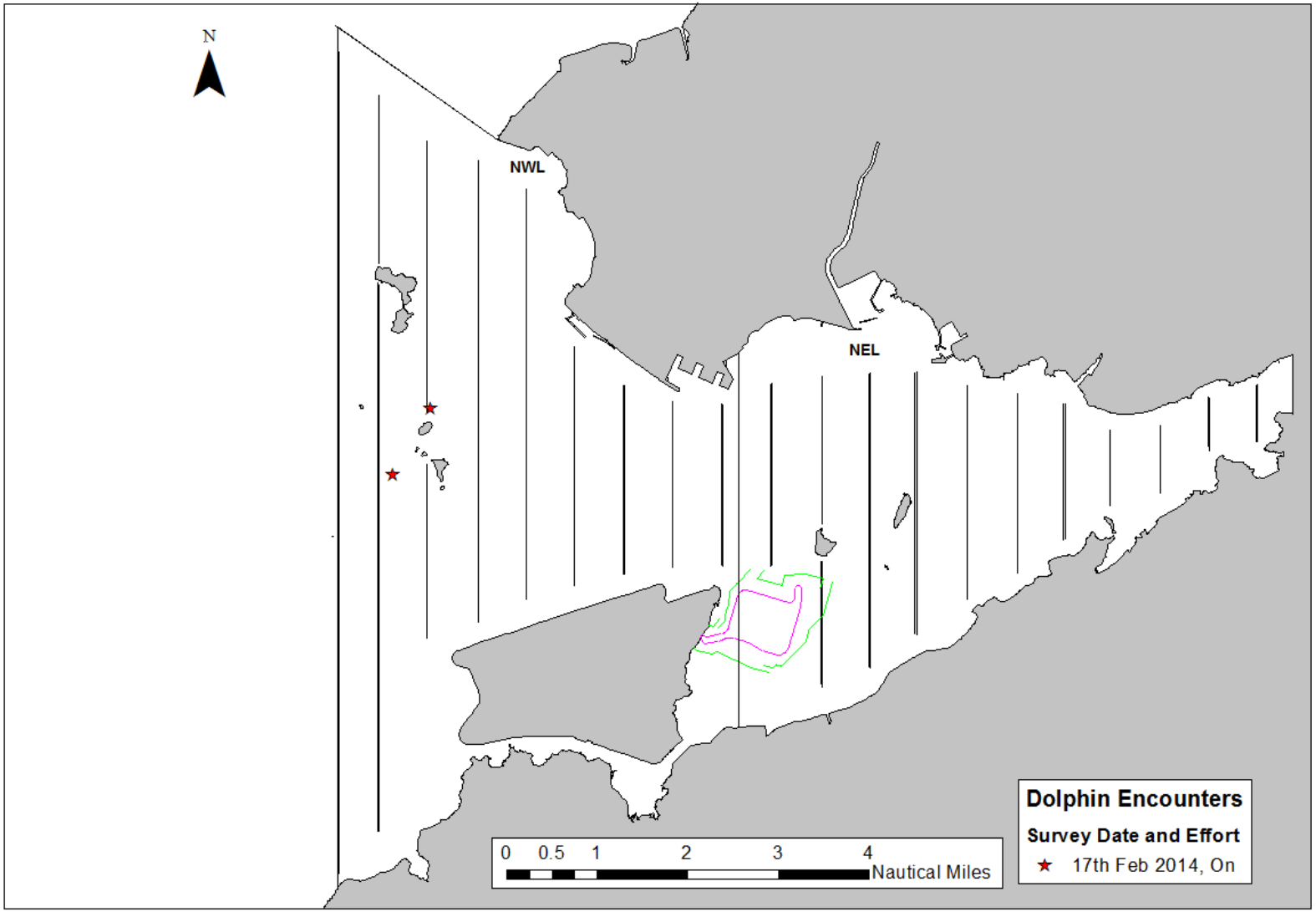

Figure 5 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (February 2014)

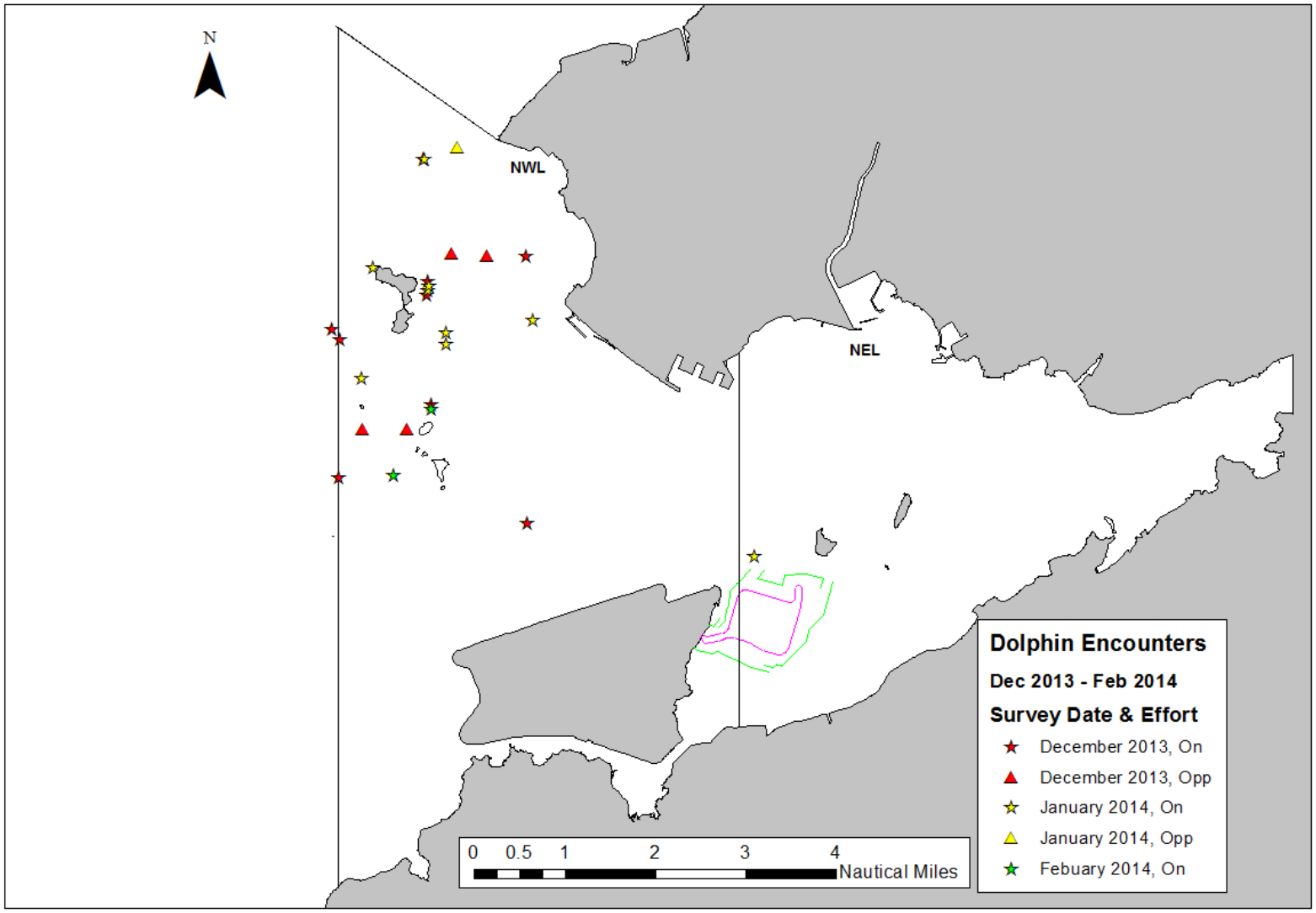

Figure 6. Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (December 2013 – February 2014)

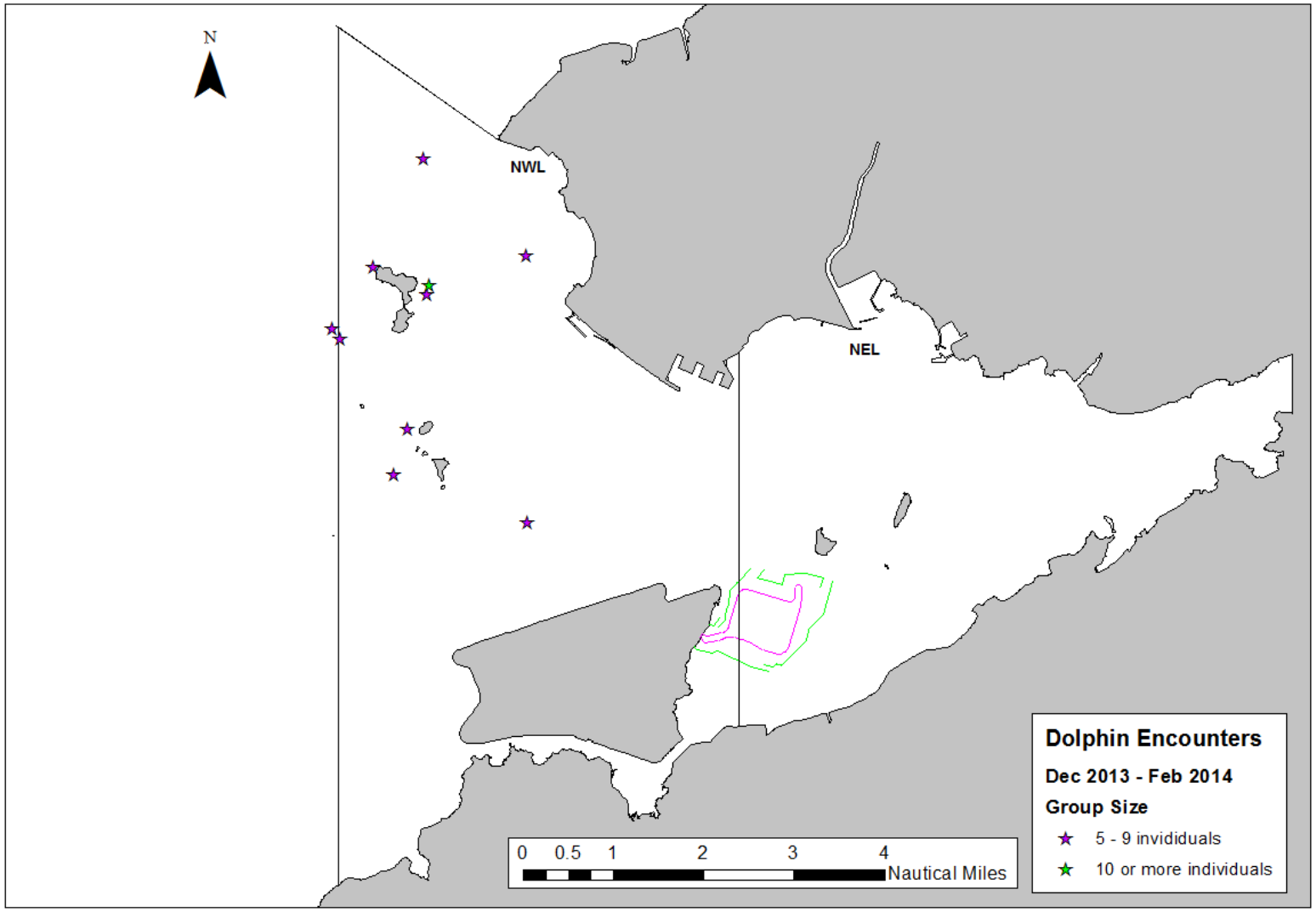

Figure 7. The Location of Dolphin Groups Numbering 5 and Above Individuals (December 2013 – February 2014)

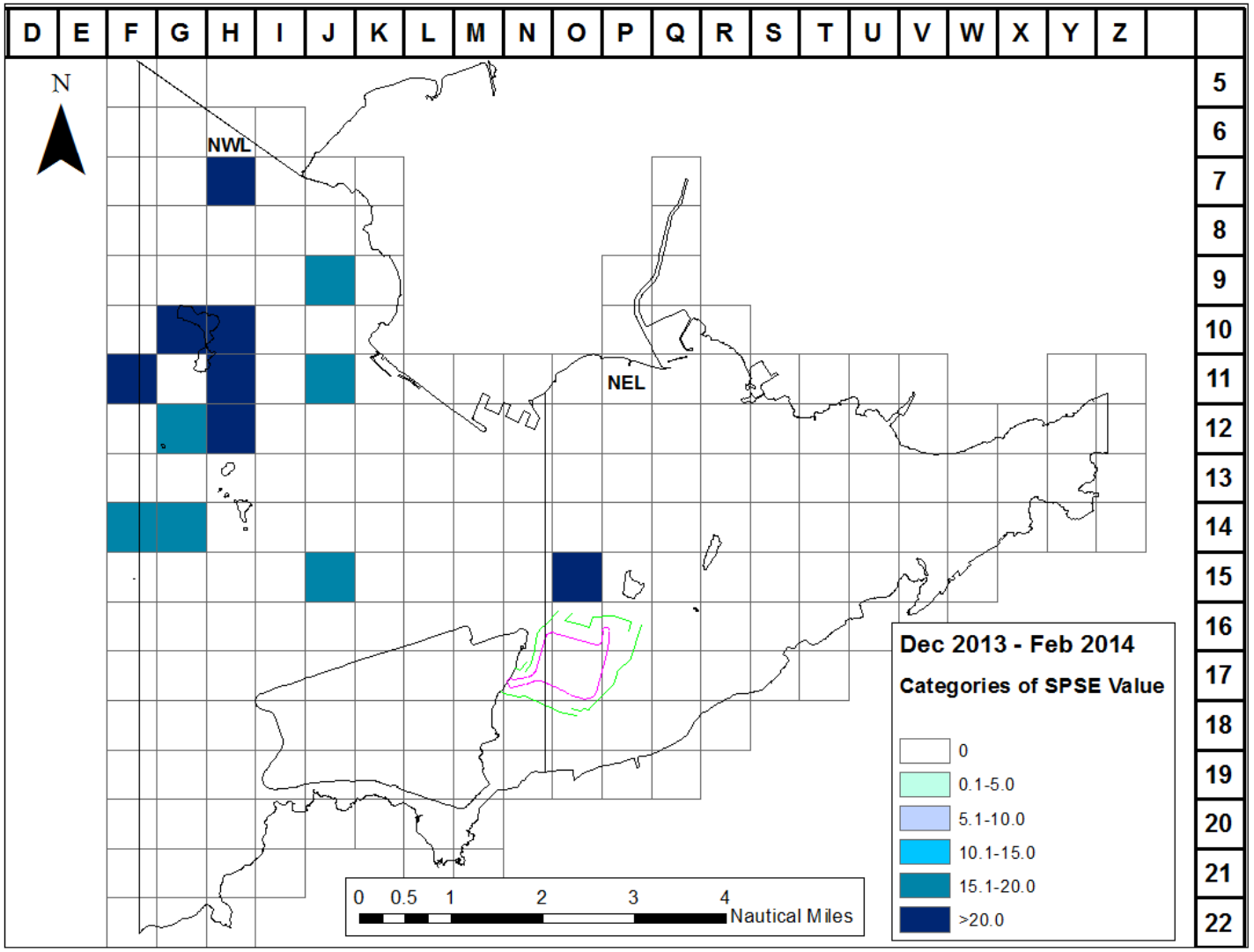

Figure 8. Sighting density SPSE (number of on-effort sightings per 100 units of survey effort) for December 2013 – February 2014

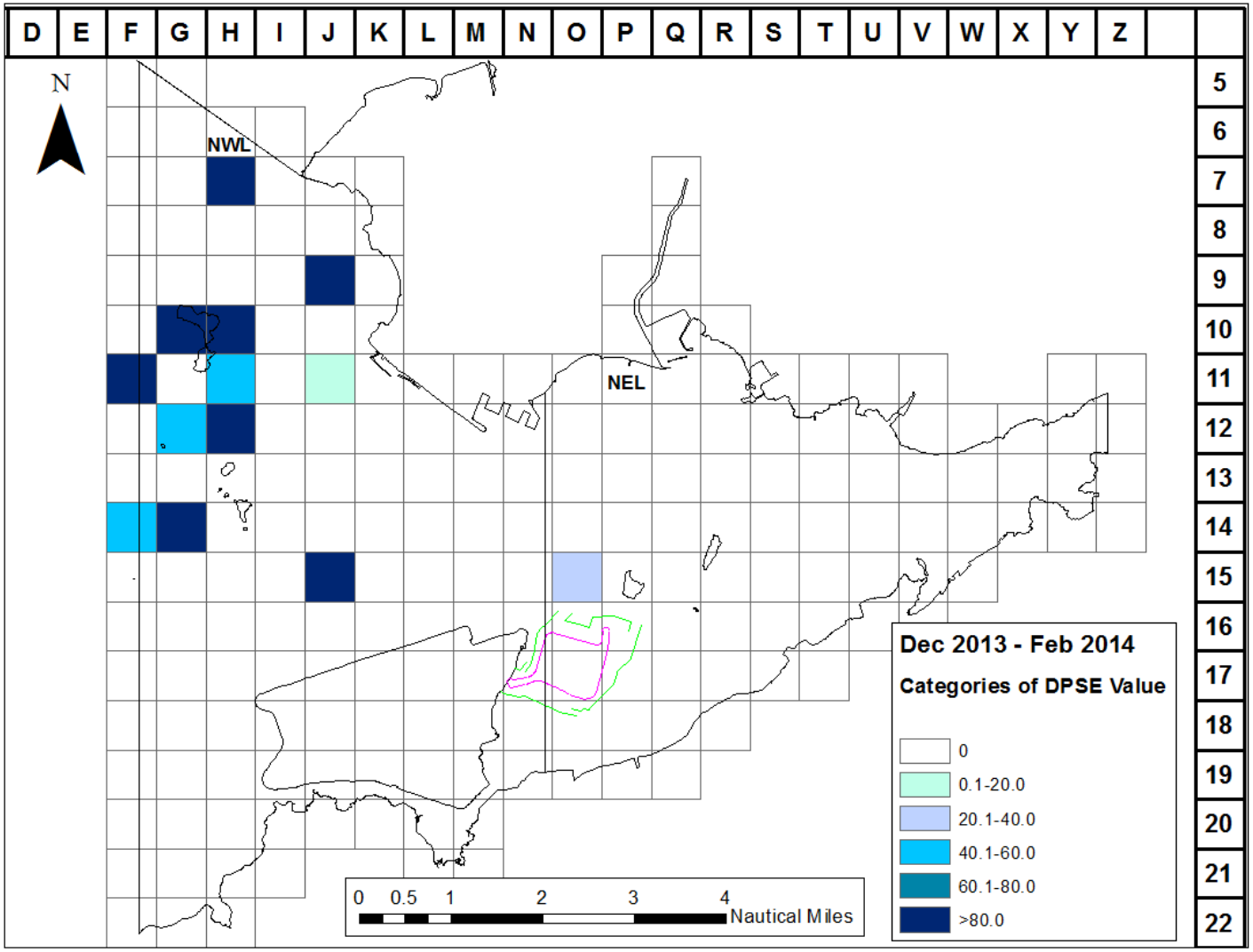

Figure 9. Dolphin density DPSE (number of dolphins per 100 units of survey effort) for December 2013 – February 2014.

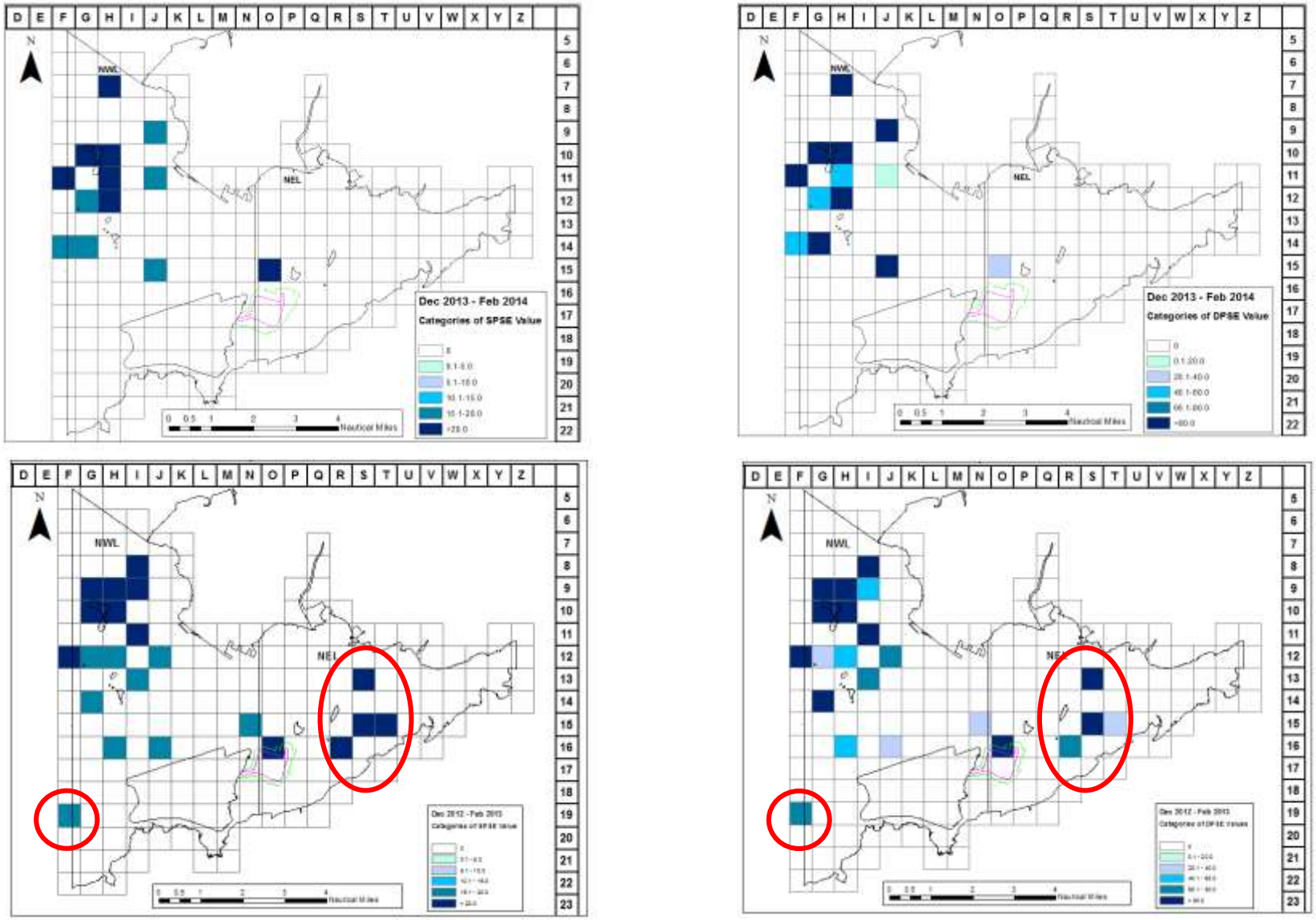

Figure 10. A comparison of dolphin density DPSE/SPSE (number of dolphins/sightings per 100 units of survey effort) for winter periods December 2012 – February 2013 and December 2013 – February 2014, highlighting decrease in habitat use.

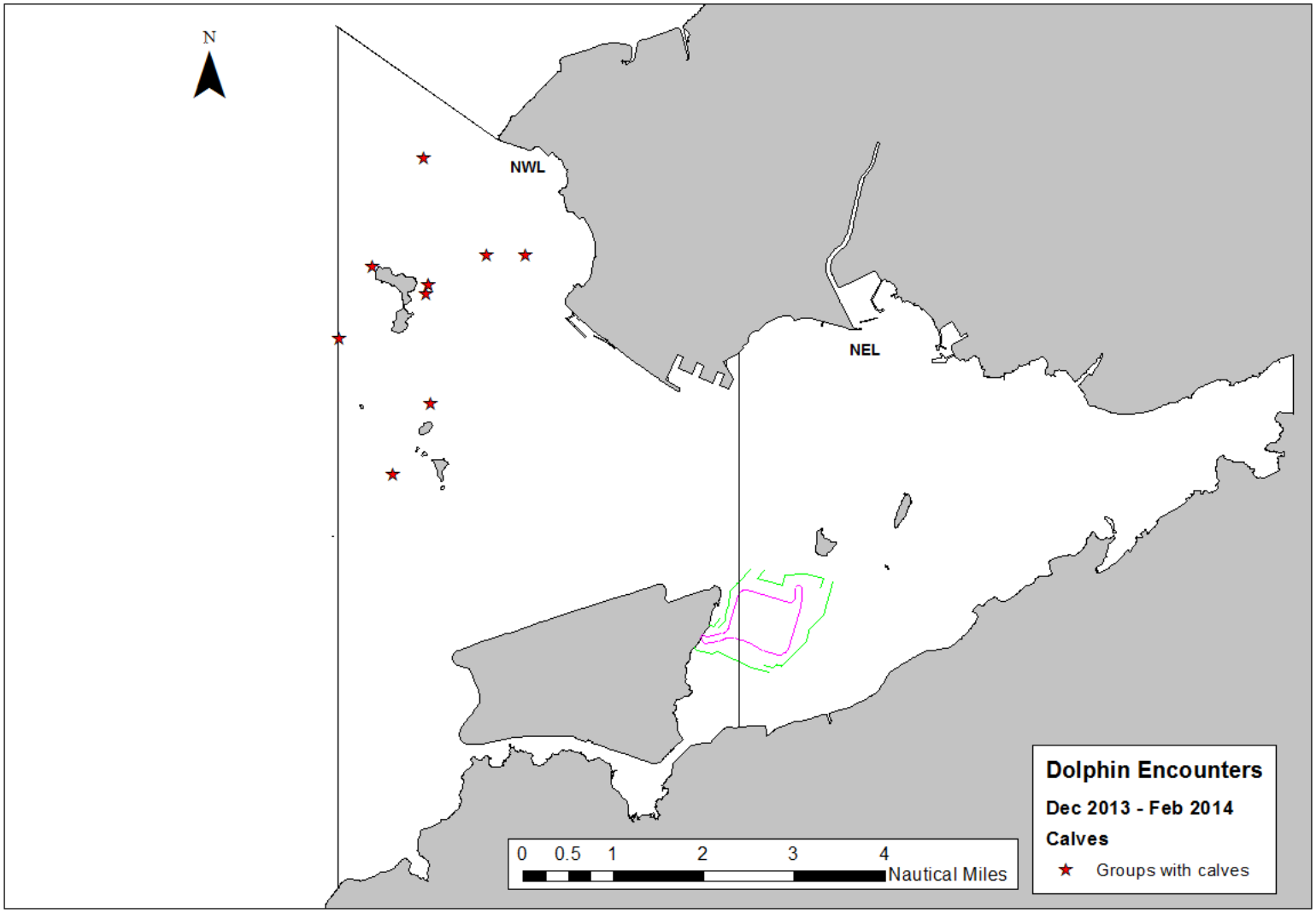

Figure 11. Location of groups containing mother and calf pairs during December 2013 – February 2014.

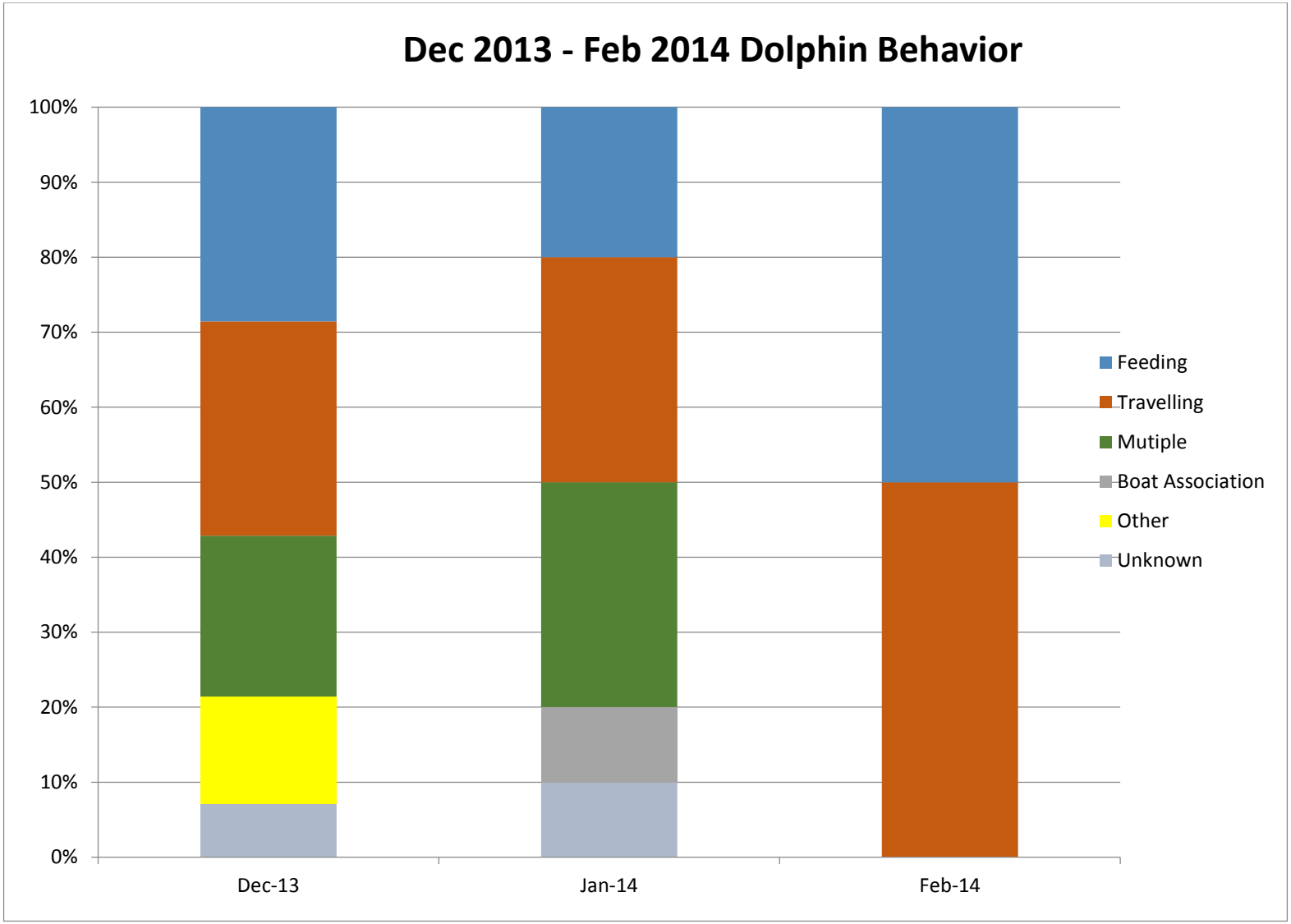

Figure 12. Activity Budget for Dolphin Behaviour December 2013 – February 2014.

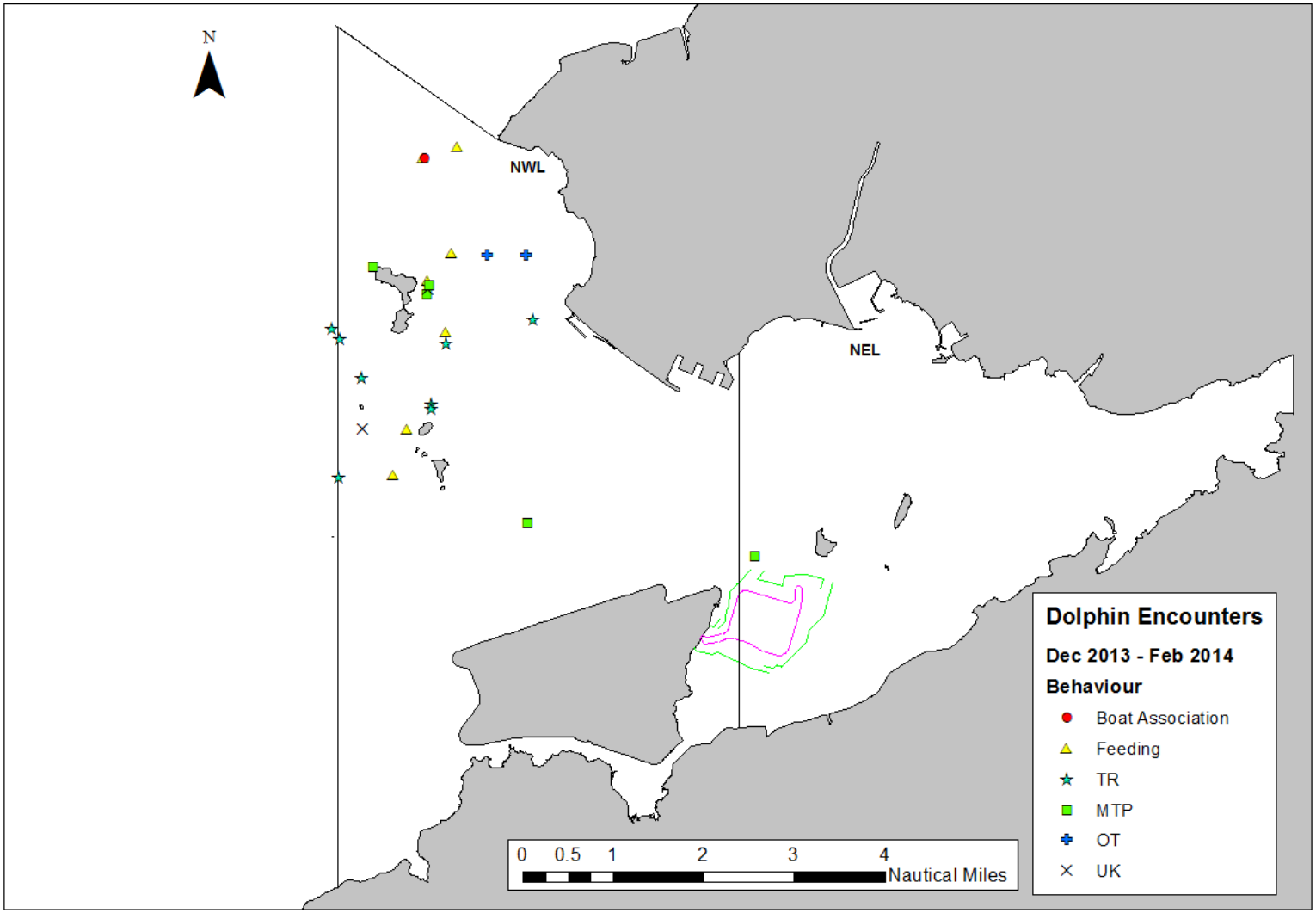

Figure 13. The Location of Different Behavioural Activities December 2013 – February 2014

Annex I. Impact Monitoring Survey Schedule and Details (December 2013 – February 2014)

Date	Location of Survey	No. Sightings ON	No. Sightings Opp	Total km "on effort"
12/19/2013	NWL (1-6,21,22)	4	1	62.1
12/21/2013	NE and NW Lantau (7-20,23)	0	0	46.8
12/26/2013	NWL (1-4, 21,22)	5	1	52.7
12/28/2013	NE and NW Lantau (5-20,23)	1	2	59.6
01/06/2014	NWL (1-4,21,22)	5	1	51.5
01/07/2014	NE and NW Lantau (5-20,23)	0	0	59.6
01/09/2014	NE and NW Lantau (5-20,23)	2	0	59.2
01/10/2014	NWL (1-4,21,22)	2	0	50.0
02/10/2014	NWL (1-7,21,22)	0	0	68.0
02/11/2014	NE and NW Lantau (8-20,23)	0	0	43.7
02/17/2014	NWL (1-5,21,22)	2	0	52.3
02/20/2014	NE and NW Lantau (6-20,23)	0	0	59.4
	Total	**21**	**5**	**664.9**

All effort in all sea states is listed

Annex II. Impact Monitoring Survey Effort Summary (December 2013 – February 2014)

Date	Area	Sea State (on effort)	Effort (km)	Season	Vessel	Type
12/19/2013	NWL	2	40.5	WINTER	HKDW	IMPACT
12/19/2013	NWL	3	21.6	WINTER	HKDW	IMPACT
12/21/2013	NWL	2	7.9	WINTER	HKDW	IMPACT
12/21/2013	NWL	3	2.1	WINTER	HKDW	IMPACT
12/21/2013	NEL	1	8.3	WINTER	HKDW	IMPACT
12/21/2013	NEL	2	20.9	WINTER	HKDW	IMPACT
12/21/2013	NEL	3	7.6	WINTER	HKDW	IMPACT
12/26/2013	NWL	2	35.8	WINTER	HKDW	IMPACT
12/26/2013	NWL	3	16.9	WINTER	HKDW	IMPACT
12/28/2013	NWL	1	4.8	WINTER	HKDW	IMPACT
12/28/2013	NWL	2	11.7	WINTER	HKDW	IMPACT
12/28/2013	NWL	3	6.9	WINTER	HKDW	IMPACT
12/28/2013	NEL	1	25	WINTER	HKDW	IMPACT
12/28/2013	NEL	2	11.2	WINTER	HKDW	IMPACT
01/06/2014	NWL	2	27.6	WINTER	HKDW	IMPACT
01/06/2014	NWL	3	23.9	WINTER	HKDW	IMPACT
01/07/2014	NWL	2	10.6	WINTER	HKDW	IMPACT
01/07/2014	NWL	3	12.5	WINTER	HKDW	IMPACT
01/07/2014	NEL	1	1.7	WINTER	HKDW	IMPACT
01/07/2014	NEL	2	33.1	WINTER	HKDW	IMPACT
01/07/2014	NEL	3	1.7	WINTER	HKDW	IMPACT
01/09/2014	NEL	1	20	WINTER	HKDW	IMPACT
01/09/2014	NEL	2	15.5	WINTER	HKDW	IMPACT
01/09/2014	NWL	2	23.7	WINTER	HKDW	IMPACT
01/10/2014	NWL	2	40.6	WINTER	HKDW	IMPACT
01/10/2014	NWL	3	9.4	WINTER	HKDW	IMPACT
02/10/2014	NWL	1	0.3	WINTER	HKDW	IMPACT
02/10/2014	NWL	2	4.9	WINTER	HKDW	IMPACT
02/10/2014	NWL	3	37.8	WINTER	HKDW	IMPACT
02/10/2014	NWL	4	25	WINTER	HKDW	IMPACT
02/11/2014	NWL	3	3.7	WINTER	HKDW	IMPACT
02/11/2014	NWL	4	2.4	WINTER	HKDW	IMPACT
02/11/2014	NEL	1	1.4	WINTER	HKDW	IMPACT
02/11/2014	NEL	3	26.9	WINTER	HKDW	IMPACT
02/11/2014	NEL	4	9.3	WINTER	HKDW	IMPACT
02/17/2014	NWL	2	15.7	WINTER	HKDW	IMPACT

Annex II. Impact Monitoring Survey Effort Summary (December 2013-February 2014) (con)

Date	Area	Sea State (on effort)	Effort (km)	Season	Vessel	Type
02/17/2014	NWL	3	42.3	WINTER	HKDW	IMPACT
02/17/2014	NWL	4	1.4	WINTER	HKDW	IMPACT
02/20/2014	NWL	1	0.1	WINTER	HKDW	IMPACT
02/20/2014	NWL	3	14.7	WINTER	HKDW	IMPACT
02/20/2014	NEL	1	0.1	WINTER	HKDW	IMPACT
02/20/2014	NEL	2	11	WINTER	HKDW	IMPACT
02/20/2014	NEL	3	26.4	WINTER	HKDW	IMPACT

Annex III. Impact Monitoring Sighting Database (December 2013 – February 2014)

Project	Contract	Date	Sighting No.	Time	Group Size	Area	Beaufort	PSD	Effort	Type	Latitude	Longitude	Season	Boat (Assoc)
HKBCF	HY/2010/02	19-Dec-13	863	12:02	5	NWL	2	54	Opp	Impact	22.35220	113.8836	Winter	No
HKBCF	HY/2010/02	19-Dec-13	864	12:34	4	NWL	2	106	On	Impact	22.35680	113.8884	Winter	No
HKBCF	HY/2010/02	19-Dec-13	865	13:03	4	NWL	2	20	On	Impact	22.37883	113.8879	Winter	No
HKBCF	HY/2010/02	19-Dec-13	866	13:29	8	NWL	2	73	On	Impact	22.40230	113.8866	Winter	No
HKBCF	HY/2010/02	19-Dec-13	867	14:44	5	NWL	3	662	On	Impact	22.33484	113.9076	Winter	No
HKBCF	HY/2010/02	26-Dec-13	874	9:47	3	NWL	2	394	On	Impact	22.34324	113.8700	Winter	No
HKBCF	HY/2010/02	26-Dec-13	875	10:13	2	NWL	2	NA	Opp	Impact	22.35231	113.8748	Winter	No
HKBCF	HY/2010/02	26-Dec-13	876	10:28	5	NWL	2	299	On	Impact	22.36897	113.8701	Winter	No
HKBCF	HY/2010/02	26-Dec-13	878	11:02	6	NWL	2	30	On	Impact	22.37073	113.8685	Winter	No
HKBCF	HY/2010/02	26-Dec-13	879	13:44	8	NWL	2	161	On	Impact	22.37721	113.8873	Winter	No
HKBCF	HY/2010/02	26-Dec-13	880	14:21	1	NWL	2	151	On	Impact	22.37979	113.8876	Winter	No
HKBCF	HY/2010/02	28-Dec-13	882	10:44	5	NWL	3	332	On	Impact	22.38444	113.9071	Winter	No
HKBCF	HY/2010/02	28-Dec-13	883	11:03	3	NWL	3	NA	Opp	Impact	22.38444	113.8995	Winter	No
HKBCF	HY/2010/02	28-Dec-13	884	11:30	2	NWL	2	NA	Opp	Impact	22.38482	113.8923	Winter	No
HKBCF	HY/2010/02	6-Jan-14	887	9:59	3	NWL	3	48	On	Impact	22.36165	113.8745	Winter	No
HKBCF	HY/2010/02	6-Jan-14	888	11:20	8	NWL	2	81	On	Impact	22.38225	113.8767	Winter	No
HKBCF	HY/2010/02	6-Jan-14	890	13:35	1	NWL	3	111	On	Impact	22.37011	113.8913	Winter	No
HKBCF	HY/2010/02	6-Jan-14	891	14:10	1	NWL	2	191	On	Impact	22.37802	113.8876	Winter	No
HKBCF	HY/2010/02	6-Jan-14	892	14:15	13	NWL	2	173	On	Impact	22.37895	113.8878	Winter	No
HKBCF	HY/2010/02	6-Jan-14	893	15:20	2	NWL	2	NA	Opp	Impact	22.40439	113.8934	Winter	No
HKBCF	HY/2010/02	9-Jan-14	897	12:57	1	NEL	2	NA	On	Impact	22.32890	113.9527	Winter	No
HKBCF	HY/2010/02	9-Jan-14	898	14:34	1	NWL	2	43	On	Impact	22.37264	113.9085	Winter	No
HKBCF	HY/2010/02	10-Jan-14	900	11:20	4	NWL	2	178	On	Impact	22.40239	113.8869	Winter	HT
HKBCF	HY/2010/02	10-Jan-14	901	11:59	2	NWL	2	33	On	Impact	22.36806	113.8913	Winter	No
HKBCF	HY/2010/02	17-Feb-14	910	1:42	8	NWL	2	50	On	Impact	22.34384	113.8810	Winter	No
HKBCF	HY/2010/02	17-Feb-14	911	5:04	2	NWL	2	210	On	Impact	22.35606	113.8884	Winter	No

Annex IV

March 2012– February 2014

(and Baseline September – November 2011)

Photo Identification Information

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 118		2014/01/06	890	NWL
HZMB 117		2014/01/06	888	NWL
HZMB 116		2013/12/26	879	NWL
HZMB 115		2013/12/26	879	NWL
HZMB 114		2013/10/24	827	NWL
HZMB 113		2013/10/24	827	NWL
HZMB 112		2013/10/15	815	NWL
HZMB111		2013/10/15	815	NWL
HZMB 110		2013/10/15	812	NWL
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	2014/01/06	888	NWL
		2013/11/02	849	NWL
		2013/11/02	845	NWL
		2013/10/24	831	NWL
		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		2014/02/17	910	NWL
		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**
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**	**2013/12/19**	**863**	**NWL**
		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		**2013/12/26**	**878**	**NWL**
		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**
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		2013/11/01	839	NWL
		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 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 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
HZMB 056		2012/09/18	442	NWL
		2012/09/05	433	NEL
HZMB 055		2012/09/04	425	NWL
HZMB 054	CH34	2014/01/06	888	NWL
		2013/11/07	854	NWL
		2013/11/02	845	NWL
		2013/10/24	831	NWL
		2013/08/30	780	NEL
		2013/07/08	711	NWL
		2013/09/18	448	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		2014/01/10	900	NWL
		2014/01/06	888	NWL
		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
HZMB 045		2014/02/17	910	NWL
		2013/06/13	682	NWL
		2013/02/15	579	NWL
		2012/11/01	495	NWL
HZMB 044	NL98	2014/02/17	910	NWL
		2013/12/19	864	NWL
		2013/11/02	845	NWL
		2013/11/01	842	NWL
		2013/10/15	819	NWL
		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	2013/12/19	863	NWL
		2012/11/01	495	NWL
		2011/11/07	Baseline	NWL
HZMB 041	NL24	2014/02/17	910	NWL
		2013/11/02	845	NWL
		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		2014/02/17	910	NWL
		2014/01/06	893	NWL

		2013/10/15	821	NWL
		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
HZMB 027		2013/12/19	863	NWL
		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
		2012/12/06	525	NEL
		2012/10/11	457	NWL
		2012/06/13	295	NEL
HZMB 024		2013/03/18	601	NWL
		2012/06/13	295	NEL
HZMB 023		2014/01/06	888	NWL
		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		2014/01/06	888	NWL
		2013/10/24	827	NWL
		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		2014/02/17	910	NWL
		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
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	2013/12/26	880	NWL
		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		2013/11/09	860	NWL
		2013/11/07	858	NWL
		2013/10/15	813	NWL
		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

HZMB 003	**NL179**	**2014/10/15**	**812**	**NWL**
		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**	**2013/12/26**	**878**	**NWL**
		2013/12/19	**863**	**NWL**
		2013/11/01	**839**	**NWL**
		2013/10/15	**819**	**NWL**
		2013/09/24	**798**	**NWL**
		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**

HZMB 001 2012-03-18_10-52-16

HZMB 001 2012-03-18_11-07-00

HZMB 002 2012-03-18_10-53-38

HZMB 002 2013-02-14_15-41-58_02

HZMB 003 2012-03-18_10-54-02_02

HZMB 003 2012-12-10_11-20-34_02

HZMB 004 2012-03-18_10-54-28_01

HZMB 004 2012-09-04_09-24-54

HZMB 005 2012-03-18_10-51-26_01

HZMB 005 2012-12-10_15-49-53_04

HZMB 006 2012-03-18_11-17-54

HZMB 006 2012-03-18_11-21-16_02

HZMB 007 2012-03-18_11-06-40_01

HZMB 007 2012-12-10_11-21-27

HZMB 008 2012-05-28_09-14-06

HZMB 009 2012-05-28_09-15-02

HZMB 011 2012-03-10_13-19-04_01

HZMB 011 2012-03-10_13-22-52

HZMB 012 2012-05-28_09-15-44_01

HZMB 013 2012-05-28_09-11-04_01

HZMB 013 2012-05-28_09-19-30_01

HZMB 014 2012-06-13_12-57-56_02 1C

HZMB 015 2012-07-10_10-22-28_02

HZMB 016 2012-07-10_10-23-28_02 9A

HZMB 016 2012-12-11_12-26-46_01

HZMB 017 2012-07-10_10-31-34_03

HZMB 018 2012-07-10_10-34-36_03

HZMB 018 2012-12-10_11-14-55

HZMB 019 2012-07-10_10-42-50_01

HZMB 020 2012-07-10_10-43-22_02

HZMB 021 WL 2012-07-10_10-23-30

HZMB 022 2013-02-15_14-59-12_01

HZMB 022 2013-04-01_10-38-57_03

HZMB 023 2012-07-10_10-42-20_02

HZMB 023 2013-04-01_10-43-27

HZMB 024 2012-06-14_13-09-40_03

HZMB 024 2012-06-14_13-12-02_01

HZMB 025 2012-06-13_12-51-58

HZMB 025 2013-02-21_16-49-44

HZMB 026 2012-06-13_12-59-46_01 2C

HZMB 027 2012-06-14_13-33-40

HZMB 028 2012-08-08_13-53-56

HZMB 028 2012-08-08_13-59-08_05

HZMB 029 2012-08-25_11-57-08_01

HZMB 030 2012-08-25_11-57-04_03

HZMB 031 2012-08-25_11-58-40_01

HZMB 032 2012-10-24_13-58-34_02

HZMB 032 2012-12-11_11-37-06_01

HZMB 033 2012-08-15_11-08-02_03

HZMB 033 2012-10-12_14-55-22_06

HZMB 034 2012-11-01_13-30-58_02

HZMB 035 2012-11-01_11-59-54

HZMB 036 2012-09-03_08-53-14_01

HZMB 036 2012-11-01_11-37-20_01

HZMB 037 2012-11-01_11-47-18_03

HZMB 038 2012-11-01_11-40-32_01

HZMB 040 2012-11-01_13-22-54_03

HZMB 040 2013-02-21_13-27-55_01

HZMB 041 2013-02-15_14-41-58_01

HZMB 041 2013-02-15_14-45-08_02

HZMB 042 2012-11-01_17-01-20_02

HZMB 043 2012-09-03_08-54-50_02

HZMB 044 2013-02-15_14-41-06_01

HZMB 044 2013-02-15_14-46-22

HZMB 045 2013-02-15_14-58-16_01

HZMB 046 2012-09-03_10-21-44_03

HZMB 047 2012-09-03_10-11-52_01

HZMB 048 2012-09-03_15-33-04_03

HZMB 049 2012-09-03_15-39-04_02

HZMB 050 2013-02-15_14-59-04_03

HZMB 050 2013-02-15_15-00-34_01

HZMB 051 2013-01-28_10-57-38

HZMB 051 2013-02-15_15-56-54_04

HZMB 052 2012-09-04_10-33-08

HZMB 053 2012-09-04_11-08-56_01

HZMB 054 2012-09-05_11-06-42_04

HZMB 055 2012-09-04_11-21-04_01

HZMB 056 2012-09-18_09-56-52

HZMB 056 2012-09-18_10-01-04

HZMB 057 2012-09-18_08-44-30

HZMB 059 2013-02-21_16-49-34_02

HZMB 060 2012-09-18_14-57-50_01

HZMB 061 2012-09-18_17-17-58_01

HZMB 063 2012-10-12_14-54-50_03

HZMB 064 2012-10-12_14-54-48_01

HZMB 064 2012-10-24_14-02-40_05

HZMB 067 2012-10-24_14-40-28_01

HZMB 068 2012-10-24_14-32-56_02

HZMB 069 2012-10-24_14-37-06

HZMB 070 2012-10-24_14-38-06

HZMB 072 2012-10-24_14-37-52_03_9A

HZMB 073 2012-12-10_11-13-02

HZMB 073 2012-12-10_11-20-33

HZMB 074 2013-02-21_17-11-59_03

HZMB 075 2012-12-06_11-40-11_01

HZMB 076 2012-12-11_13-11-24_01

HZMB 077 2012-12-11_13-02-24

HZMB 078 2013-01-08_13-44-00_02

HZMB 078 2013-02-15_15-03-16_03

HZMB 079 WL_2013-01-28_09-38-49

HZMB 080 WL_2013-01-28_09-46-26_01

HZMB 081 2013-01-28_10-04-13_01

HZMB 082 2013-01-28_12-59-32_01

HZMB 082 WL 2013-02-15_14-57-44_02

HZMB 083 2013-01-28_13-22-47

HZMB 083 2013-02-15_15-00-38_03

HZMB 084 2013-02-14_15-54-46

HZMB 085 2013-02-15_14-45-40_02

HZMB 085 2013-02-15_14-46-42_01

HZMB 086 2013-02-15_14-46-14_02

HZMB 087 2013-02-15_14-58-54_04

HZMB 087 2013-02-15_15-00-34_05

HZMB 088 2013-02-15_14-57-08_02

HZMB 089 2013-02-15_15-00-46_01

HZMB 090 2013-02-15_14-58-22_02

HZMB 091 2013-02-15_15-02-52_01

HZMB 092 2013-02-15_15-41-04_01

HZMB 092 2013-02-21_13-28-55

HZMB 092 2013-05-29_14-16-23

HZMB 093 2013-05-24_13-47-19_01

HZMB 094 2013-03-18_14-11-49

HZMB 094 2013-05-29_12-43-45 _01

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

HZMB 096 GA_2013-04-01_12-54-16

HZMB 097 2013-05-09_12-00-05_01

HZMB 097 2013-05-09_12-04-09

HZMB 098 2013-04-29_10-57-14_03

HZMB 098 WL_2013-07-12_10-08-01_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

HZMB 110 2013-10-15_09-39-45

HZMB 111 2013-10-15_10-21-46 _01

HZMB 112 2013-10-15_10-20-30

HZMB 113 2013-10-24_11-04-54 _01

HZMB 114 2013-10-24_11-06-19

HZMB 115 2013-12-26_13-54-54 _01

HZMB 116 2013-12-26_13-59-59

HZMB 117 2014-01-06_11-39-43 _03

HZMB 118 2014-01-06_13-40-50 _01

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for December / 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	0.0000	0.0000	0.0000	0.0000	0.0000	565.0243	0.0140	0.1400	0.0000	1.2000	0.0260
Oct-13	0.0000	0.0000	0.0000	0.0000	0.0000	800.3190	0.0000	0.1960	0.0000	0.0000	0.0325
Nov-13	0.0000	0.0000	0.0000	0.0000	0.0000	797.2930	0.0000	0.1960	0.0000	0.0000	0.0195
Dec-13	0.0000	0.0000	0.0000	0.0000	0.0000	1213.8441	0.0103	0.0000	0.0000	2.0000	0.0260
Total	0.0000	0.0000	0.0000	0.0000	0.0000	5466.6890	0.0243	0.5360	0.5501	13.6000	0.2795

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”.

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for February / 2014 (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-14	0.0000	0.0000	0.0000	0.0000	0.0000	1158.9828	0.0000	0.1680	0.0000	2.0000	0.0325
Feb-14	0.0000	0.0000	0.0000	0.0000	0.0000	1064.5957	0.0000	0.2520	0.0000	0.0000	0.0520
Mar-14											
Apr-14											
May-14											
Jun-14											
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	2223.5785	0.0000	0.4200	0.0000	2.0000	0.0845
Jul-14											
Aug-14											
Sep-14											
Oct-14											
Nov-14											
Dec-14											
Total	0.0000	0.0000	0.0000	0.0000	0.0000	2223.5785	0.0000	0.4200	0.0000	2.0000	0.0845

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

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	2	2
	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 quarter	Total no. received since project commencement
Environmental complaints	5 Dec13	As informed by the Contractor on 5 Dec 13, one complaint was noted on 12 Nov regarding a barge moving through the southern channel. After investigation, the noise complaint was considered as non-project related.	Closed	1	12
	12 Dec13	As informed by the Contractor on 12 Dec 13. A complaint involves the leakage of sand from barges causing water discoloration at sea near Tuen Mun Pierhead Garden and sand material without properly covered was blown to the inside of the residential area which caused disturbance to residence. With refer to available information provided and monitoring data recorded on 09 Dec 13, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract	Closed	2	13
	6 Jan 14	As informed by the Contractor on 6 Jan, A complaint involves barges loaded with sand material without properly covered was blown to the inside of the residential area of Tuen Mun Pierhead Garden which caused disturbance to residence	Closed	3	14

		was received on 27 Dec 13. With refer to available information provided, it cannot indicate that the water quality impact and air quality impact were caused by the vessel of this Contract and therefore the complaint could not be concluded as related to this Contract.			
	21 Jan 14	EPD referred a complaint from complainant who advised that blackish mud was found along the edge of the construction site of Hong Kong-Zhuhai-Macao Bridge Hong Kong Project near the airport in the morning of 18 January 2014. After receipt of the complaint, site daily was reviewed and follow-up investigation has been conducted and excavation and dredging activities were not observed within the site boundary of HKBCF during the joint site inspection audit. Therefore in accordance with the investigation results, the complaint is considered as not related to contract HY/2010/02	Closed	1	15
Notification of summons	-	-		-	1
Successful Prosecutions	-	-	-	-	1

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.

Report No. **D004**
Monitoring Period **December 2013- February 2014**

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	0.5	0.5	Action
NWL	4.5	20.7	Action

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

*Quarterly 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 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.

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.
- No direct relationship with Project construction activities can be found between either the increase or decrease of dolphin numbers in NEL.
- Other source of impact: the trawl ban in Hong Kong waters commenced on 31December 2012 and non-project related dredging activities have been observed in NEL since November 2012.
- Current mitigation measures are being upheld. Both day and night MMO and PAM systems have been fully implemented from the start of works of the Project.
- There has been no failure or reduction of dolphin-specific mitigation measures.

There is no evidence that exceedances are related to Project works.

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 souce 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, there was no evidence that indicated that the reduced number of dolphins in NWL and NEL was 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.

ET Leader Signature & Date: 30-Apr-14

Report No. **D004**
Monitoring Period **December 2013- February 2014**

Investigation Report Attachment

1. Review all available and relevant data (construction activities), including raw data and analyses of other parameters (air, noise, water and underwater acoustic) covered in the EM&A, to ascertain if differences are a result of natural variation or previously observed seasonal differences.

The data from noise levels and air quality from the reporting quarter were reviewed and no exceedence has occurred that are considered project related. For water quality, one (1) action level exceedances at measured Suspended Solids recorded at monitoring station SR5 at Mid-flood tide and one (1) limit level exceedance at measured Suspended Solids recorded at monitoring station IS10 at Mid-flood tide on 18 Dec 2013 were considered as project related (please refer to section 3.3.4 for details). Actions were taken under the action plan. Monitoring results were reviewed and showed no recurrence of exceedance of SS at IS10 and SR5 on 20, 23 and 25 of Dec 2013. The reported exceedances were short in duration and its effect was localised. The causes of the exceedances were promptly acted upon and no further exceedance has occurred that are considered project related. In addition, on review of recent AFCD annual monitoring reports (AFCD 2013; 2012; 2011), it is stated 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. A paper published which incorporates data from throughout the populations known extent, confirms the ongoing and severe decline of the dolphin population and estimates that 74.27% of the population will be lost within the next three generations. Moreover, it is predicted that the current calculated rate is likely to accelerate given what is understood from other cetacean population collapses in the South China Sea region. There was no similar population modeling conducted as part of the EIA for this Project, however, the EIA reports this decline and from information therein and the data currently available from elsewhere, there is a well-documented and substantial population decline. The isolated exceedences recorded for suspended solids was localised and there is no evidence to indicate a link between this Project related event and the encounter rates throughout the NWL and NEL area for Dec 2013 - Feb 2014.

2. Identify source(s) of impacts.

There is a documented significant population decline of the Hong Kong dolphin and, as yet, no detailed assessment of causal factors is available. Recent population modelling studies do show a significant and, possibly, accelerating population decline since 2000 (see 1) and, prior to 2008, an expert panel concluded that the anthropogenic activities which occur in the Hong Kong and adjacent habitat which have considerable potential to affect the PRE dolphin population through pollution, infection, lowered prey availability, intense and low noise levels, collisions, behavioural changes, disturbance, entanglement in fishing gear and habitat modification are; construction, dredging, sewage disposal, industrial effluent discharge, shipping, reclamation, fishing. Since this review, pro-active management by AFCD has resulted in a reduction of the negative impacts caused by non-sustainable fishing (as the trawling ban progresses "lowered prey availability" should alter) and a general reduction in fishing activities will reduce the potential for entanglement in fishing gear. Other identified impacts, however,

are ongoing and it is noted that construction activities and the high speed ferry traffic in NEL and NWL have both increased since 2008. It is known from studies elsewhere that dredging and piling activities cause significant disturbance to marine mammals (reported in D002 and D003). These activities do not occur as part of this Project but may do elsewhere in the NEL and NWL areas as well as in Hong Kong and adjacent habitat. Activities which are stressful to dolphins are usually associated with increased underwater noise levels. Sources of increased underwater noise levels in NEL and NWL include, but may not be limited to;

HZMB Project marine construction work (all areas, some areas involve piling)

Other marine works in Hong Kong waters (extensive dredging was reported in NWL as part of shipping lane maintenance)

Vessel traffic (this Project, HZMB projects, other infrastructure projects and, of course, Hong Kong and adjacent waters are the world's busiest port facility with heavy shipping traffic)

Other activities that may catalyse a shift in habitat use that is not noise related is an alteration in prey resources. And further, an analysis of the cumulative impact of all of these anthropogenic impacts has yet to be conducted.

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

Site inspection of the implementation of vessel speed limit, acoustic decoupling measures, spillage and runoff prevention measures on barges, training records related to regular marine travel routes for Contract's vessels, record of implementation of dolphin watching plan and silt curtain integrity checking record were conducted during weekly site inspection. The appropriate mitigation was in place depending on site activities, i.e., Dolphin Exclusive Zone for silt curtain laying (if any) and Dolphin Watching Plan for all other Project activities.

4. 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 to coincide with the observed 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 December 2013 - February 2014. NWL has seen increasing work activities not as part of this project works. Two known factors to cause disturbance to dolphins outside the Project did occur within NEL and NWL during this period; dredging works at the Brothers Islands and north NWL 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 this Project's specific impact on dolphins.