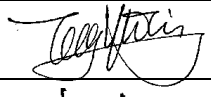
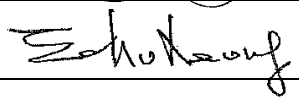
China Harbour Engineering Company Limited

Contract No. HY/2010/02

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

Quarterly EM&A Report for December 2014- February 2015

[10/2015]

	Name	Signature
Prepared & Checked:	Y T Tang	
Reviewed, Approved and Certified:	Echo Leong (ETL)	

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AECOM Asia Co. Ltd.
15/F, Grand Central Plaza, Tower 1, 138 Shatin Rural Committee Road, Shatin, NT, Hong Kong
Tel: (852) 3922 9000 Fax: (852) 2317 7609 www.aecom.com

RAMBOLL ENVIRON

Ref.: HYDHZMBEEM00_0_3527L.15

30 October 2015

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. Paul Appleton

Dear Sir,

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 – HZMB HKBCF – Reclamation Works
Quarterly EM&A Report for December 2014 to February 2015

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for December 2014 to February 2015 certified by the ET Leader (ET's ref.: "60249820/C/RMKY15103002" dated 30 October 2015) and provided to us via e-mail on 30 October 2015.

We are pleased to inform you that we have no adverse comment on the captioned Quarterly Environmental Monitoring & Audit Report for December 2014 to February 2015.

Please ensure the detailed density surface modelling report be separately provided as per the timeframe stated in this report.

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

Yours faithfully,
For and on behalf of
Ramboll Environ Hong Kong Limited

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)

Internal: DY, YH, LP, CL, ENPO Site

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Ramboll Environ Hong Kong Limited 英環香港有限公司
Rm 2403, 24/F., Jubilee Centre, 18 Fenwick Street, Wanchai, Hong Kong Tel: 852.3465 2888 Fax: 852.3465 2899
www.Ramboll-Environ.com

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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 19 January 2015 (EP-353/2009/H) and 13 March 2015 (EP-354/2009/D) (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 2014 and 28 February 2015. As informed by the Contractor, major activities in the reporting quarter were:-

Marine-based Works

- Cellular structure installation
- Capping Beams structures
- Conforming sloping seawalls
- Rock filling
- Sand filling
- Public filling
- Band drain installation
- Surcharge remove & laying
- Deep Cement Mixing
- Geotechnical Instrumentation works
- Precast Yard for seawall blocks & culverts
- Maintenance of silt curtain & silt screen at sea water intake of HKIA

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- 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	17 sessions
1-hour TSP monitoring	17 sessions
Noise monitoring	13 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

Three (3) action level exceedances of 24-hr TSP were recorded AMS2, AMS3B and AMS7A on 12 February 2015. After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract. No 24-hr TSP Action and Limit Level exceedances were recorded on other monitoring date in the reporting period. All 1-Hour TSP results were below the Action and Limit Level in the reporting period.

Breaches of Action and Limit Levels for Noise

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

Breaches of Action and Limit Levels for Water Quality

A total of (17) seventeen exceedances were recorded in this reporting quarter:

One (1) limit level exeedance and one (1) action level exceedance were recorded at monitoring station IS17 and IS(Mf)9 respectively on 5 December 2014 during mid ebb tide; one (1) action level exceedance was recorded at IS10 and one (1) action level exceedance was recorded at SR5 respectively on 12 January 2015 during flood tide; one (1) action level exceedance was recorded at IS17 on 16 January 2015 during ebb tide; one (1) action level exceedance was recorded at IS17, SR5, SR6 and IS10 respectively, on 21 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11, SR10B(N) and SR7 respectively on 23 January 2015 during flood tide. One (1) limit level exceedance was recorded at SR10A and SR6 respectively on 23 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11 on 26 January 2015 during flood tide; one (1) Limit Level Exceedance of SS at IS(Mf)11 and one (1) Action Level Exceedance of SS at SR7 during Flood tide recorded on 23 February 2015.

After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

Breaches of Action and Limit Levels for Impact Dolphin Monitoring

One (1) Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. Event Action Plan for Impact Dolphin Monitoring was triggered. For detail of investigation, please refer to appendix L. Event Action Plan for Impact Dolphin Monitoring was triggered. For detail of investigation, please refer to appendix L.

Implementation Status and Review of Environmental Mitigation Measures

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

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

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

Complaint, Notification of Summons and Successful Prosecution

No complaint, notification of summons or prosecution was received in the reporting quarter.

1 INTRODUCTION

1.1 Background

1.1.1 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 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), August 2013 (EP-353/2009/G) and January 2015 (EP-353/2009/H). 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), January 2014 (EP-354/2009/B), December 2014 (EP-354/2009/C) and March 2015 (EP-354/2009/D).

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 19 January 2015 (EP-353/2009/H) and 13 March 2015 (EP-354/2009/D) (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 twelfth 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 2014 to 28 February 2015.

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
- Capping Beams structures
- Conforming sloping seawalls
- Laying geo-textile
- Rock filling
- Sand filling
- Public filling
- Band drain installation
- Surcharge remove & laying
- Deep Cement Mixing
- Geotechnical Instrumentation works
- Precast Yard for seawall blocks & culverts
- Maintenance of silt curtain & silt screen at sea water intake of HKIA

Land-based Works

- Maintenance works of Site Office at Works Area WA2
- Maintenance works of Public Works Regional Laboratory at Works Area WA3
- 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 (AMS3B) 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 (NMS3B) 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. Reference is made to ET's proposal of relocation of air quality monitoring station (AMS7) dated on 2 February 2015, with no further comment received from IEC on 2 February 2015 and no objection received from EPD on 5 February 2015, the impact air quality monitoring station AMS7 (Hong Kong SkyCity Marriott Hotel) has been relocated to AMS7A (Chu Kong Air-Sea Union Transportation Company Limited) on 3 February 2015. Action Level for air quality, as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel, was adopted for this alternative air quality 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/H and EP-354/2009/D) (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, AMS3B, AMS6 and AMS7/AMS7A).

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 Reference is made to ET's proposal of relocation of air quality monitoring station (AMS7/AMS7A) dated on 2 February 2015, with no further comment received from IEC on 2 February 2015 and no objection received from EPD on 5 February 2015, the impact air quality monitoring station AMS7 (Hong Kong SkyCity Marriott Hotel) has been relocated to AMS7A (Chu Kong Air-Sea Union Transportation Company Limited) on 3 February 2015. Action Level for air quality, as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel, was adopted for this alternative air quality location.

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

3.1.5 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 14	January 15	February 15
1-hr TSP	AMS2	18	18	15
	AMS3B	18	18	15
	AMS7/7A*	18	18	15
24-hr TSP	AMS2	6	6	5
	AMS3B	6	6	5
	AMS7/7A*	6	6	5

* The impact air quality monitoring station AMS7 has been relocated to AMS7A on 3 February 2015.

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

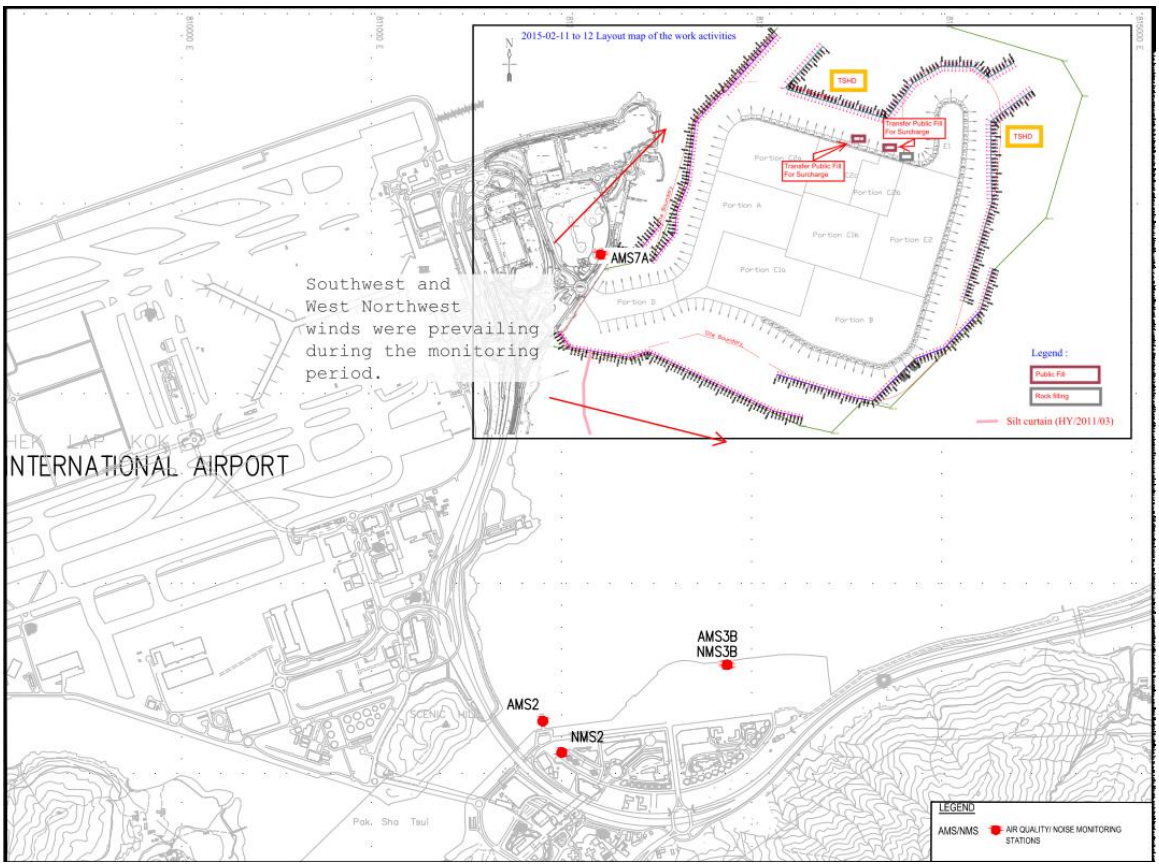
Monitoring Parameter	Location	Level of Exceedance	Numbers of Exceedance		
			December 14	January 15	February 15
1-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3B	Action	0	0	0
		Limit	0	0	0
	AMS7/7A*	Action	0	0	0
		Limit	0	0	0
		Total	***0***	***0***	***0***
24-hr TSP	AMS2	Action	0	0	1
		Limit	0	0	0
	AMS3B	Action	***0***	0	1
		Limit	0	0	0
	AMS7/7A*	Action	0	0	1
		Limit	0	0	0
		Total	***0***	***0***	***3***

* The impact air quality monitoring station AMS7 has been relocated to AMS7A on 3 February 2015.

3.1.6 Three action level exceedances of 24-hr TSP were recorded AMS2, AMS3B and AMS7A on 12 February 2015. After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract. No 24-hr TSP Action and Limit Level exceedances were recorded on other monitoring date in the reporting month. All 1-Hour TSP results were below the Action and Limit Level in the reporting month.

3.1.7 For the three action level exceedances of 24-hr TSP were recorded AMS2, AMS3B and AMS7A on 12 February 2015:

3.1.7.1 According to information provided by the Contractor, construction activities such as rock filling, transferring of public fill for surcharge and operation of TSHD for filling activity were undertaken at north of HKBCF reclamation works on 11 and 12 February 2015. Also refer to layout map below for location of works activities and monitoring stations AMS2, AMS3B and AMS7A on 11 and 12 February 2015.



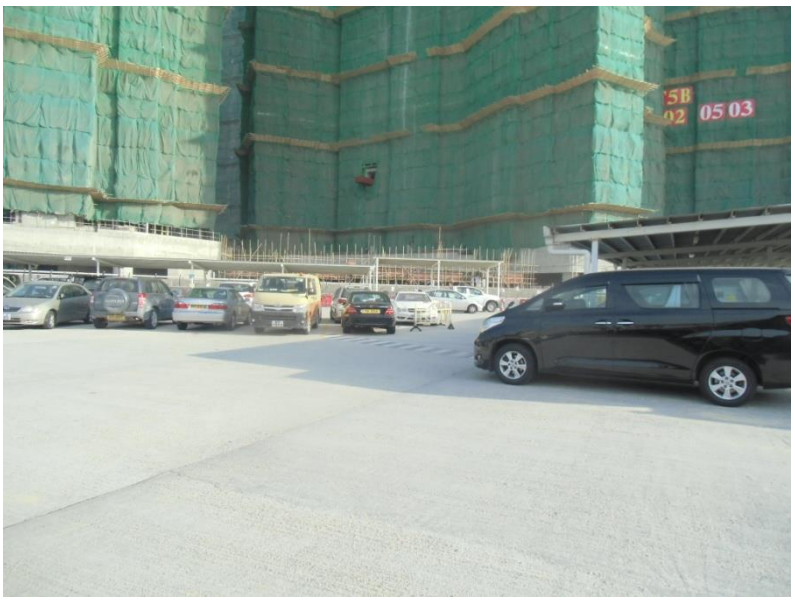
3.1.7.2 Checking of Mitigation measures:

3.1.7.3 Watering record was checked and it shows that watering was implemented on HKBCF Reclamation works on 11 and 12 February 2015. Also refer to attached photo record taken on 9 February 2015 which shows implementation of dust control measure such as watering on HKBCF reclamation site.

3.1.7.4 Photo record taken on 12 February 2015 shows that roads were paved with hard surface and kept clear of dusty materials at Works Area at WA2.

3.1.7.5 Photo record taken on 5 February 2015 below showed that the Contractor implemented dust control measures at HKBCF reclamation works such as watering on exposed soil. The Contractor was reminded to continue to provide such dust control measure.

3.1.7.6 Photo record taken on 12 February 2015 showed that the Contractor implemented dust control measures such as hard paved roads at WA2. The Contractor was reminded to continue to provide such dust control measure.



3.1.7.7 Checking record shows that plant engine is operated by using ultra low sulphur diesel (ULSD) and these minimize the possibility of air pollution via plant operation.

3.1.7.8 Also, with reference to the weekly joint site inspection records of 5 and 12 February 2015, generation of dark smoke or fugitive dust was not observed and this indicates that plant engines were properly maintained and unlikely that work activities have contributed to the dust action level exceedance recorded on 12 February 2015.

3.1.7.9 Other references:

3.1.7.10 Functional checking on High Volume Sampler (HVS) at AMS2, AMS3B and AMS7A was done, air flow of the HVS was checked and the flow was steady during the 24-hr TSP sampling at AMS2, AMS3B and AMS7A. The filter paper was re-weighted by the assigned HOKLAS laboratory and the result was reconfirmed.

3.1.7.11 The 1-hr TSP values recorded on 12 February 2015 which are within the monitoring days of the 24-hr TSP, were 73μg/m^3, 75μg/m^3 and 75μg/m^3 respectively at AMS2; 76μg/m^3, 77μg/m^3 and

74μg/m^3 respectively at AMS3B; 75μg/m^3, 77μg/m^3 and 73μg/m^3 respectively at AMS7A. All measured values are well below the Action and Limit Levels.

3.1.7.12 The wind data collected at wind station at Works Area WA2 during the monitoring period on 11 and 12 February 2015 shows that Southwest and West Northwest winds were prevailing during the monitoring period. This indicates that source of exceedance was unlikely to attribute to HKBCF Reclamation Works.

3.1.7.13 Information available on government's AQHI website shows that the short-term health risk of air pollution is very high in Tung Chung (with max value 9 to 10) on 11 and 12 February 2015 respectively indicating the air pollution at the background is relatively high during the monitoring period. The high level of background air pollution on 11 and 12 February 2015 may contribute to the high level of TSP recorded. Information available online: http://www.aqhi.gov.hk/epd/ddata/html/history/2015/201502_Eng.csv

3.1.7.14 After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract.

3.1.7.15 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 The event action plan is annexed in Appendix K.

3.1.9 Meteorological information collected from the wind station during the monitoring periods on the monitoring dates, as shown in Figure 2, including wind speed and wind direction, is annexed in Appendix H of monthly EM&A report December 2014, January and February 2015 respectively.

3.2 Noise Monitoring

3.2.1 Impact noise monitoring was conducted at the 2 monitoring stations (NMS2 and NMS3B) 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 14	January 15	February 15
	NMS2	5	4	4
	NMS3B	5	4	4

Table 3.4 Summary of Number of Monitoring Exceedances for Impact Noise

Monitoring Parameter	Location	Level of Exceedance	Level of Exceedance		
			December 14	January 15	February 15
	NMS2	Action	0	0	0
		Limit	0	0	0
	NMS3B	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 K.

3.3 Water Quality Monitoring

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

3.3.2 A total of (17) seventeen exceedances were recorded in this reporting quarter:

3.3.3 One (1) limit level exeedance and one (1) action level exceedance were recorded at monitoring station IS17 and IS(Mf)9 respectively on 5 December 2014 during mid ebb tide. One (1) action level exceedance was recorded at IS10 and one (1) action level exceedance was recorded at SR5 respectively on 12 January 2015 during flood tide; one (1) action level exceedance was recorded at IS17 on 16 January 2015 during ebb tide; one (1) action level exceedance was recorded at IS17, SR5, SR6 and IS10 respectively, on 21 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11, SR10B(N) and SR7 respectively on 23 January 2015 during flood tide. One (1) limit level exceedance was recorded at SR10A and SR6 respectively on 23 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11 on 26 January 2015 during flood tide. One (1) Limit Level Exceedance of SS at IS(Mf)11 and one (1) Action Level Exceedance of SS at SR7 during Flood tide recorded on 23 February 2015. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

Table 3.5 Summary of Water Quality Exceedances in December 2014 – February 2015

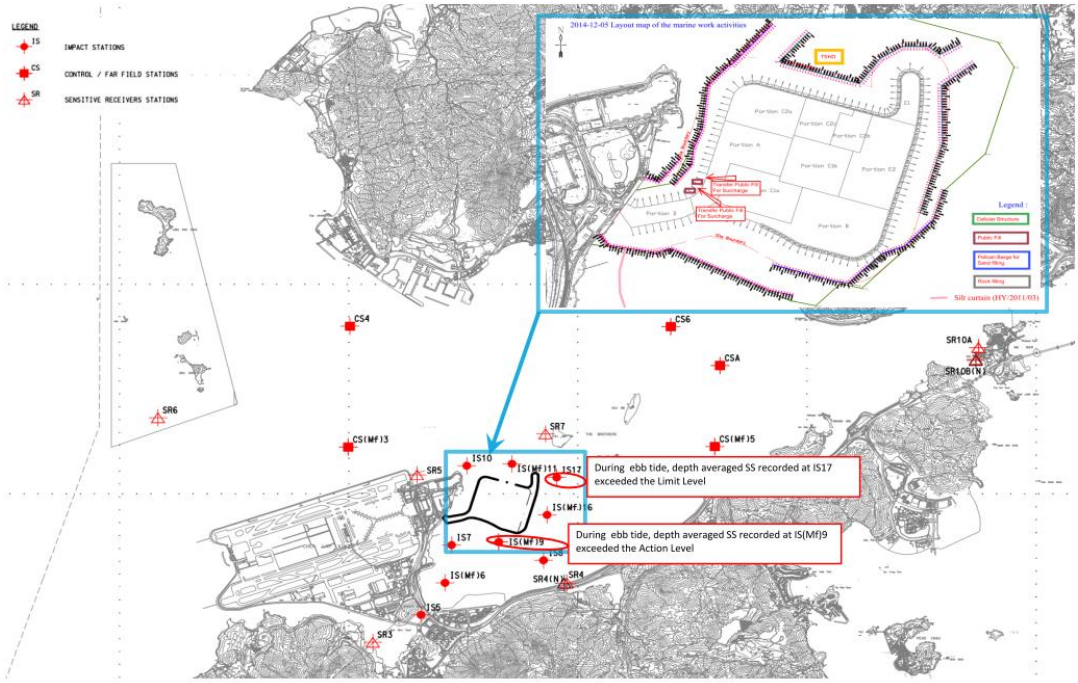
Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
IS5	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS8	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)9	Action	0	0	0	0	0	0	**(1) 5 Dec 14**	0	**1**	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS10	Action	0	0	0	0	0	0	0	**(2) 12 & 21 Jan 15**	0	**2**
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)11	Action	0	0	0	0	0	0	0	**(2) 23 & 26 Jan 15**	0	**2**
	Limit	0	0	0	0	0	0	0	**(1) 23 Feb 15**	0	**1**
IS(Mf)16	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS17	Action	0	0	0	0	0	0	**(1) 16 Jan 15**	**(1) 21 Jan 15**	**1**	**1**
	Limit	0	0	0	0	0	0	**(1) 5 Dec 14**	0	**1**	0
SR3	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
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	**(2) 12 & 21 Jan 15**	0	**2**
	Limit	0	0	0	0	0	0	0	0	0	0
SR6	Action	0	0	0	0	0	0	0	**(1) 21 Jan 15**	0	**1**
	Limit	0	0	0	0	0	0	0	**(1) 23 Jan 15**	0	**1**
SR7	Action	0	0	0	0	0	0	0	**(2) 23 Jan 15 and 23 Feb 15**	0	**2**
	Limit	0	0	0	0	0	0	0	0	0	0
SR10A	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	**(1) 23 Jan 15**	0	**1**
SR10B (N)	Action	0	0	0	0	0	0	0	**(1) 23 Jan 15**	0	**1**
	Limit	0	0	0	0	0	0	0	0	0	0
Total	Action	0	0	0	0	0	0	**2**	**11**	**13**	
	Limit	0	0	0	0	0	0	**1**	**3**	**4**	

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

3.3.4 For water quality, one (1) action level and one (1) limit level exceedace were recorded at IS(Mf)9 and IS17 respectively on 5 December 2014 during mid ebb tide. No exceedance was recorded at all other monitoring stations in the reporting month. The exceedances were confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.4.1 Layout map below shows active works conducted on 5 December 2014 during ebb tide.



3.3.4.2 Exceedances recorded at IS17 and IS(Mf)9 during ebb tide are unlikely due to marine based construction activities of the Project because:

3.3.4.3 With refer to monitoring record, appearance of water was relatively more turbid at IS17 and IS(Mf)9 when compared with the appearance of water at IS(Mf)11, IS10, IS(Mf)16, IS7 and IS8 during monitoring at ebb tide on 05 December 2014.

3.3.4.4 However, with refer to the layout map attached, only public fill was being transferred as surcharge at near Portion A and since no marine filling was conducted during ebb tide on 5 December 2014, therefore, they are unlikely contribute to the exceedance of SS at IS17 and IS(Mf)9.

3.3.4.5 The location and type of active works conducted were almost the same on 5 and 8 December 2014 during ebb tide but no exceedance was recorded a IS17 and IS(Mf)9 on 8 December 2014. This indicates that the exceedances at monitoring station IS17 and IS(Mf)9 were unlikely to be contributed by active works.

3.3.4.6 In addition, with referred to monitoring record, no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain during ebb tide on 5 December 2014. (Please refer to photo record taken during ebb tide on 5 December 2015)

3.3.4.7 Photo record which shows the sea condition near Portion B, the southeast part of the HKBCF reclamation works at ebb tide on 5 December 2014.

3.3.4.8 Photo record which shows the sea condition near Portion E, the northeast part of the HKBCF reclamation works at ebb tide on 5 December 2014

3.3.4.9 Turbidity level recorded at IS17, IS(Mf)11, IS(Mf)16, IS(Mf)9, IS7 and IS8 on 5 December 2014 were below the action and limit level. This indicates the turbidity level at area near IS17 and IS(Mf)9 were not adversely affected.

3.3.4.10 The exceedances were likely due to local effects in the vicinity of IS17 and IS(Mf)9.

3.3.4.11 As such, the exceedances recorded at IS17 and IS(Mf)9 are unlikely to be project related.

3.3.4.12 Action taken under the action plan

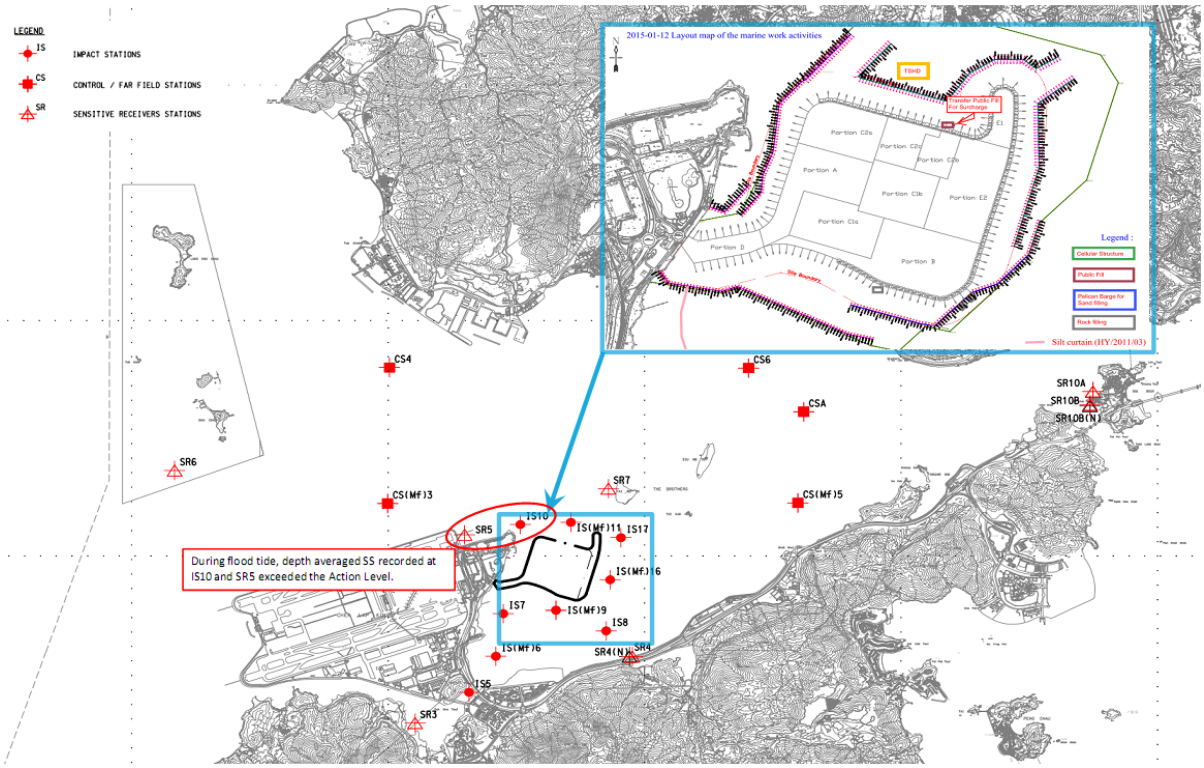
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedances were attributed to active construction activities of this Contract;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

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

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

3.3.5 For water quality, one (1) action level exceedance was recorded at IS10 and one (1) action level exceedance was recorded at SR5 respectively on 12 January 2015 during flood tide. The exceedances were confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.5.1 Attached layout map shows active works conducted on 12 January 2015. No marine based construction works such as filling were conducted at northwest part of the HKBCF Reclamation Works



3.3.5.2 Exceedance recorded at IS10 and SR5 during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.5.3 With reference to the silt curtain checking record, defects was not observed at northwest part of the perimeter silt curtain which are close to the IS10 and SR5.

3.3.5.4 No filling activities was observed in progress and no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted at IS10 and SR5. (Also see attached for sea condition observed on 12 January 2015 during flood tide.)

3.3.5.5 Photo record which shows the sea condition near Portion C2a, the northwest part of the HKBCF

3.3.5.6 Photo record which shows the sea condition near Portion C2a, the northwest part of the HKBCF

3.3.5.7 Also, turbidity level recorded at SR5, IS10 and IS(Mf)11 were below the action and limit level. This indicates the turbidity level at area near SR5 and IS10 was not adversely affected.

3.3.5.8 The exceedance was likely due to local effects in the vicinity of SR5 and IS10.

3.3.5.9 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.5.10 Action taken under the action plan

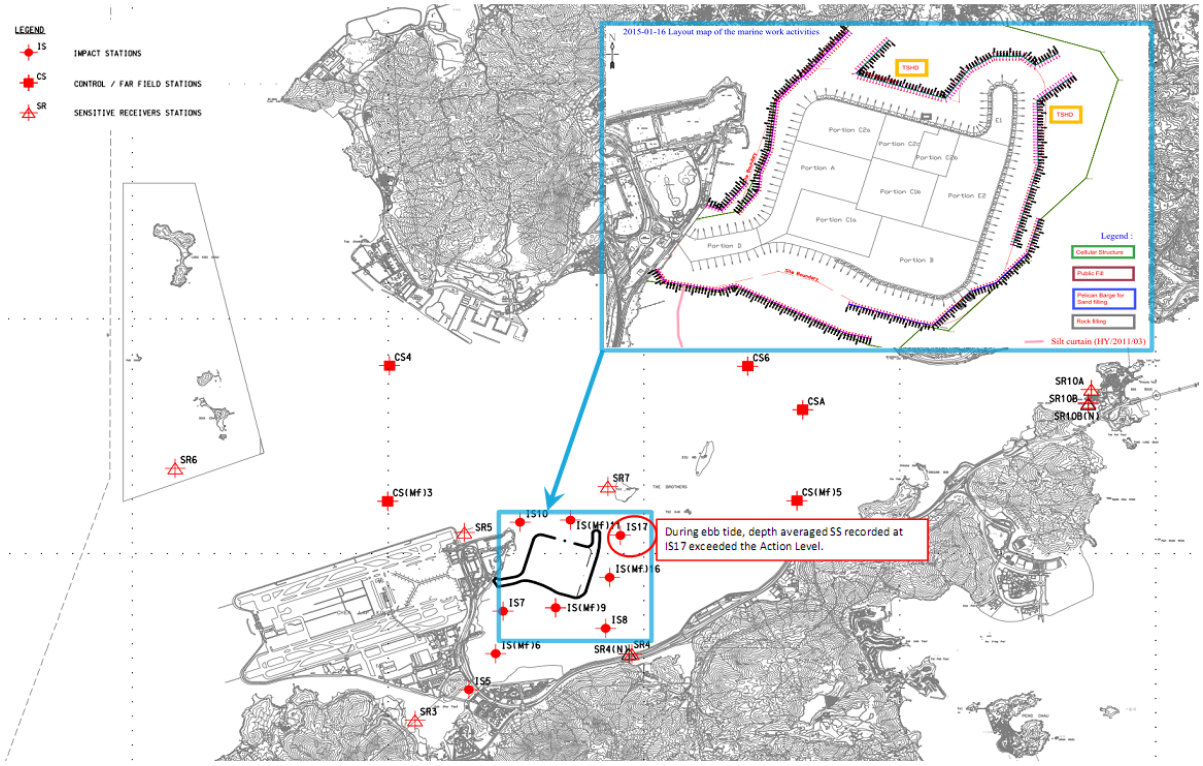
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedances were attributed to active construction activities of this Contract;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

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

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

3.3.6 For water quality, one (1) action level exceedance was recorded at IS17 on 16 January 2015 during ebb tide. The exceedance was confirmed after checking against relevant control station(s) during ebb tide i.e. CS4 and CS(Mf)3 following the Action and Limit Levels for Water Quality.

3.3.6.1 Attached layout map shows active works conducted on 16 January 2015. Marine based construction activities such as rock filling was conducted at north part of the HKBCF Reclamation Works.



3.3.6.2 Exceedance recorded at IS17 during ebb tide is unlikely due to marine based construction activities of the Project because:

3.3.6.3 Turbidity level recorded at IS17, IS(Mf)11, IS(Mf)16, IS(Mf)9, IS7 and IS8 on 16 January 2015 were below the action and limit level. This indicates the turbidity level at area near IS17 were not adversely affected.

3.3.6.4 With refer to the layout map attached, rock filling is the only marine based construction works conducted during ebb tide on 16 January 2015 at portion C2C which realtively far away from IS17, as such, it is unlikely to cause the exceedance of SS at IS17.

3.3.6.5 The location and type of active works conducted were almost the same on 19 January 2015 during ebb tide but no exceedance was recorded at IS17 on 19 January 2015. This indicates that the exceedances at monitoring station IS17 was unlikely to be contributed by active work.

3.3.6.6 In addition, with referred to monitoring record, no sediment plume has been observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain during ebb tide on 16 January 2015. (Please refer to photo record taken during ebb tide on 16 January 2015)

3.3.6.7 The exceedance was likely due to local effects in the vicinity of IS17.

3.3.6.8 As such, the exceedance recorded at IS17 is unlikely to be project related.

3.3.6.9 Action taken under the action plan

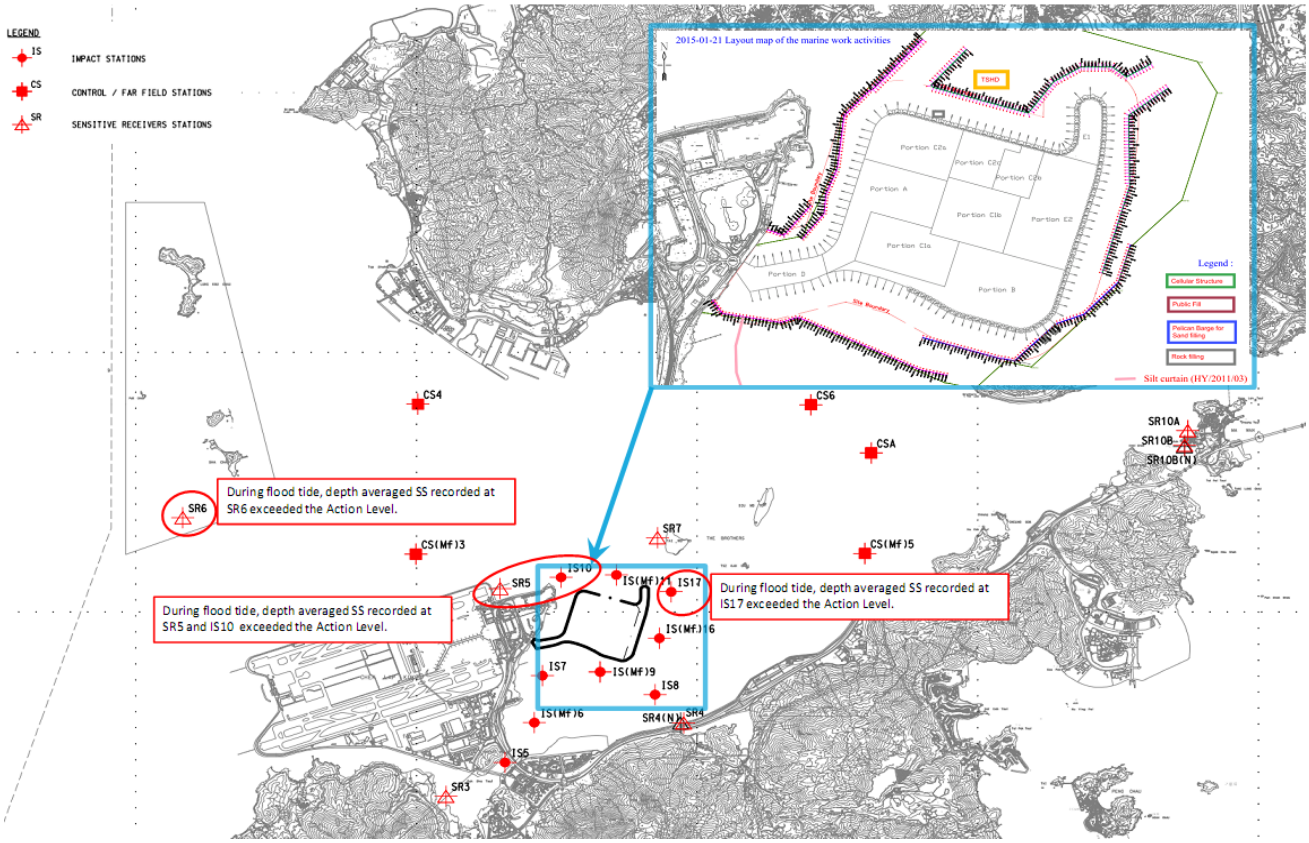
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this Contract;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

3.3.6.10 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.

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

3.3.7 For water quality, one (1) action level exceedance was recorded at IS17, SR5, SR6 and IS10 respectively, on 21 January 2015 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.7.1 Attached layout map shows active works conducted on 21 January 2015. Construction works such as rock filling was conducted near portion C2a of the HKBCF Reclamation Works on 21 January 2015.



3.3.7.2 Exceedances recorded at IS10, SR5 and SR6 during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.7.3 With reference to the silt curtain checking record, defects were not observed at northwest part of the perimeter silt curtain which are close to the IS10 and SR5.

3.3.7.4 Rock filling was conducted near portion C2a during flood tide, but no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted. (Also see attached photo record for sea condition taken at west side of the HKBCF Reclamation Works on 21 January 2015 during flood tide.)

3.3.7.5 Also, turbidity level recorded at IS10, SR5, SR6 were below the action and limit level. This indicates the turbidity level at area near IS10, SR5, SR6 and IS17 were not adversely affected.

3.3.7.6 The exceedances were likely due to local effects in the vicinity of IS10, SR5 and SR6.

3.3.7.7 Exceedance recorded at IS17 during mid-flood tide is unlikely due to marine based construction activities of the Project because:

3.3.7.8 With reference to the silt curtain checking record, defects were observed at northeast part of the silt curtain.

3.3.7.9 Although rock filling was conducted near portion C2a during flood tide, no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted. (Also see attached photo record for sea condition on 21 January 2015 during northwest side of the HKBCF Reclamation Works during flood tide.)

3.3.7.10 Photo record which shows the sea condition near at northeast side of HKBCF Reclamation Works at flood tide on 21 January 2015.

3.3.7.11 Photo record which shows the sea condition near at west side of HKBCF Reclamation Works at flood tide on 21 January 2015.

3.3.7.12 Also, turbidity level recorded at IS(Mf)11, IS17 and IS(Mf)16 were below the action and limit level. This indicates the turbidity level at area near IS17 was not adversely affected.

3.3.7.13 The exceedance was likely due to local effects in the vicinity of IS17.

3.3.7.14 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.7.15 Action taken under the action plan

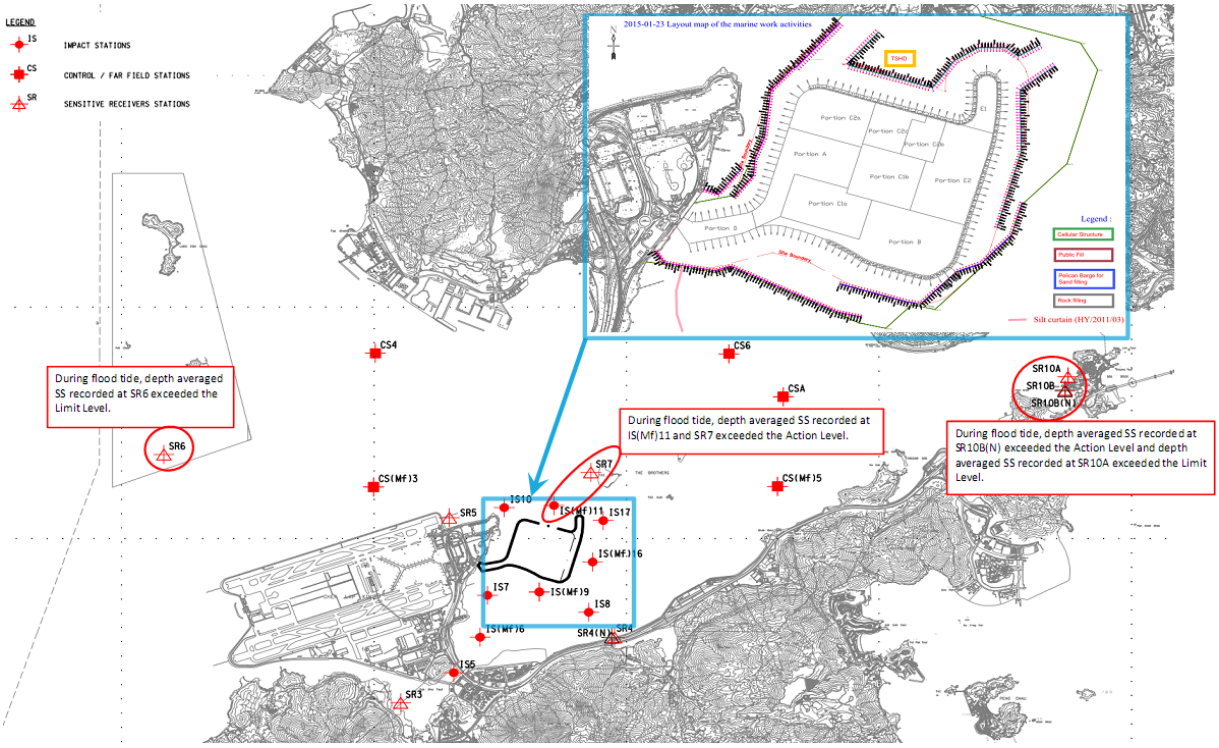
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedances were attributed to active construction activities of this Contract;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedances are unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

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

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

3.3.8 For water quality, one (1) action level exceedance was recorded at IS(Mf)11, SR10B(N) and SR7 respectively on 23 January 2015 during flood tide. One (1) limit level exceedance was recorded at SR10A and SR6 respectively on 23 January 2015 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.8.1 Attached layout map shows active works conducted on 23 January 2015. Marine based construction works such rock filling were conducted at southeast part of HKBCF Reclamation Works.



3.3.8.2 Exceedances recorded at SR10A and SR10B(N) during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.8.3 IS17, IS(Mf)16, CS6, CSA and CS(Mf)5 are closer to the active works than monitoring station SR10A and SR10B(N) during flood tide. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during flood tide on the same day at IS17, IS(Mf)16, CS6, CSA and CS(Mf)5 were below the Action and Limit Level which indicates HKBCF reclamation works is unlikely to contribute to the action level exceedances recorded at SR10A and SR10B(N).

3.3.8.4 The monitoring location of monitoring station SR10B(N) are considered upstream and remote to the active works of this project during flood tide. Therefore it was unlikely that the exceedances recorded at SR10A and SR10B(N) during flood tide was due to HKBCF Reclamation Works.

3.3.8.5 The exceedances were likely due to local effects in the vicinity of SR10A and SR10B(N).

3.3.8.6 Exceedance recorded at SR6 during mid-flood tide is unlikely due to marine based construction activities of the Project because:

3.3.8.7 IS10 and SR5 are downstream and closer to the HKBCF Reclamation Works than monitoring station SR6 during flood tide. Depth Averaged Suspended Solids (SS) values (in mg/L) recorded during flood tide on the same day at IS10 and SR5 were below the Action and Limit Level which indicates HKBCF reclamation works is unlikely to contribute to the action level exceedance recorded at SR6.

3.3.8.8 The monitoring location of monitoring station SR6 are considered remote to the HKBCF Reclamation Works. Therefore it was unlikely that the exceedance recorded at SR6 during flood tide was due to HKBCF Reclamation Works.

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

3.3.8.10 Exceedances recorded at IS(Mf)11 and SR7 during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.8.11 With reference to the silt curtain checking record, defects were observed at north and northwest part of the perimeter silt curtain which are close IS11.

3.3.8.12 With referred to the attached layout map, marine based construction works such rock filling were conducted at southeast part of the site, however no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted during flood tide. (Also see attached for sea condition observed on 23 January 2015 during flood tide.)

3.3.8.13 Photo record which shows the sea condition at northeast part of the HKBCF reclamation works during flood tide on 23 January 2015.

3.3.8.14 Photo record which shows the sea condition at the east part of the HKBCF reclamation works during flood tide on 23 January 2015.

3.3.8.15 Also, turbidity level recorded at IS(Mf)11, SR7, IS10 and IS17 were below the action and limit level. This indicates the turbidity level at or near IS(Mf)11 and SR7 was not adversely affected.

3.3.8.16 The exceedances were likely due to local effects in the vicinity of IS(Mf)11 and SR7.

3.3.8.17 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.8.18 Action taken under the action plan

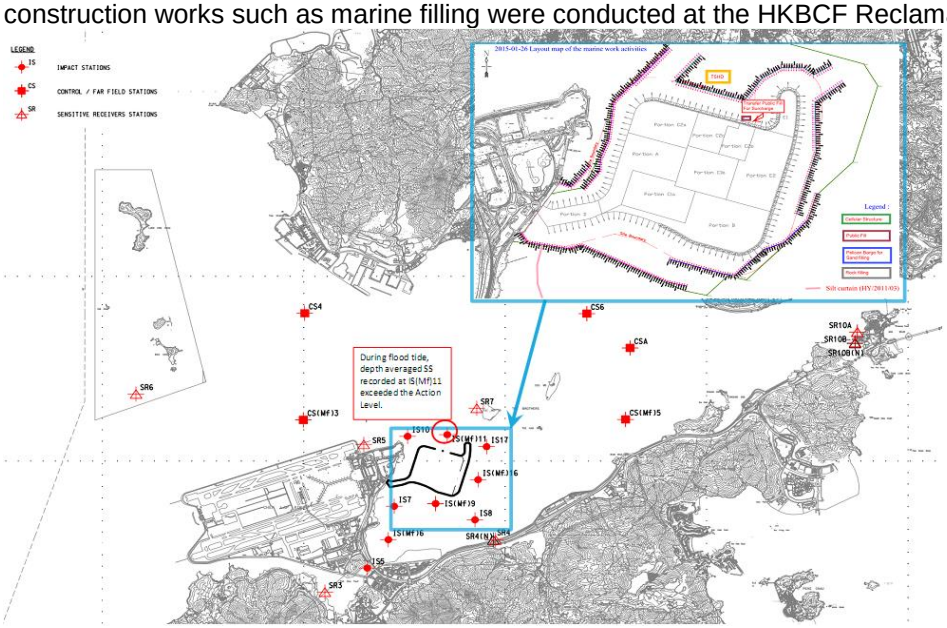
1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedances were attributed to active construction activities of this Contract;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedances are unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

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

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

3.3.9 For water quality, one (1) action level exceedance was recorded at IS(Mf)11 on 26 January 2015 during flood tide. The exceedance was confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.9.1 Attached layout map shows active works conducted on 26 January 2015. No marine based construction works such as marine filling were conducted at the HKBCF Reclamation Works.



3.3.9.2 Exceedance recorded at IS(Mf)11 during mid-flood tide are unlikely due to marine based construction activities of the Project because:

3.3.9.3 With reference to the silt curtain checking record, defect was observed at north part of the perimeter silt curtain which are close to the IS(Mf)11.

3.3.9.4 No filling activities was observed in progress and no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted at IS(Mf)11. (Also see attached for sea condition observed on 26 January 2015 during flood tide.

3.3.9.5 Photo record which shows the sea condition at north part of the HKBCF reclamation works during flood tide on 26 January 2015.

3.3.9.6 Also turbidity level recorded at IS(Mf)11, IS10, IS17 and SR7 were below the action and limit level. In addition, SS results at IS10, IS17 and SR7 were below the action and limit level. This indicates the turbidity and SS level at area near IS(Mf)11 were not adversely affected.

3.3.9.7 The exceedance was likely due to local effects in the vicinity of IS(Mf)11.

3.3.9.8 After investigation, there is no adequate information to conclude the recorded exceedance is related to this Contract.

3.3.9.9 Action taken under the action plan

1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedance was attributed to active construction activities of this Contract;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

3.3.9.10 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.

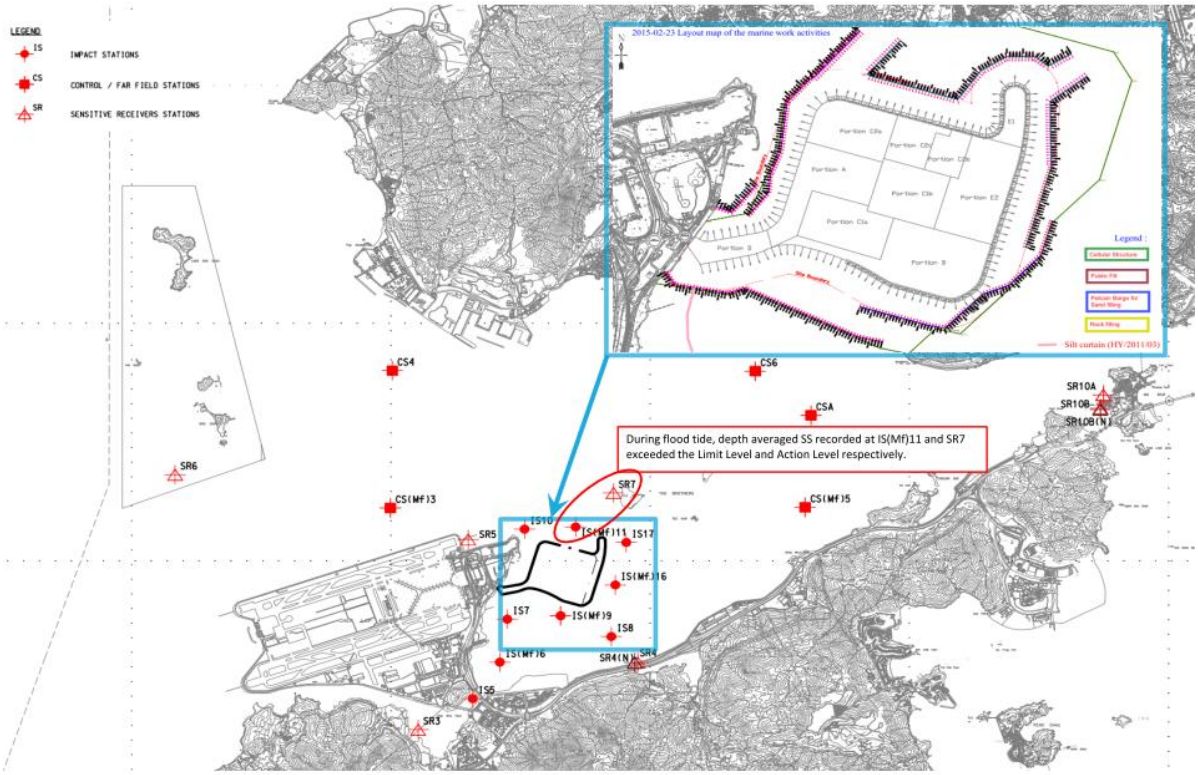
3.3.9.11 Maintenance work of the silt curtain was carried out by the Contractor on a daily basis except Sunday and public holiday.

3.3.10 For water quality, one (1) Limit Level Exceedance of SS at IS(Mf)11 and one (1) Action Level Exceedance of SS at SR7 during Flood tide recorded on 23 February 2015. The exceedances were confirmed after checking against relevant control station(s) during flood tide i.e. CS6, CSA and CS(Mf)5 following the Action and Limit Levels for Water Quality.

3.3.10.1 Exceedances recorded at IS(Mf)11 and SR7 during mid-flood tide on 23 February 2015 are unlikely due to marine based construction activities of the Project because:

3.3.10.2 With reference to the silt curtain checking record, defects were observed at north and northwest part of the perimeter silt curtain which are close IS(Mf)11.

3.3.10.3 With referred to the layout map below, no marine based construction work was conducted on site on 23 February 2015 and no silt plume was observed to flow from the inside of the perimeter silt curtain to the outside of the perimeter silt curtain when monitoring was conducted during flood tide. (Also see below photo record for sea condition observed on 23 February 2015 during flood tide.



3.3.10.4 Photo record which shows the sea condition at north part of the HKBCF reclamation works during flood tide on 23 February 2015:

3.3.10.5 Also, turbidity level recorded at IS(Mf)11, SR7, IS10 and IS17 were 24.9(NTU), 14.7(NTU), 5.7(NTU) and 23.9(NTU) respectively; Suspended solids level recorded at IS10 and IS17 were 23.2mg/L and 7.9mg/L respectively, which were all below the action and limit level. This indicates the turbidity level at or near IS(Mf)11 and SR7 and Suspended Solids level near IS(Mf)11 and SR7 were not adversely affected.

3.3.10.6 The exceedances were likely due to local effects in the vicinity of IS(Mf)11 and SR7.

3.3.10.7 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.10.8 Action taken under the action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above mentioned investigation results, it appears that it was unlikely that the SS exceedances were attributed to active construction activities of this Contract;
3. IEC, contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the SS exceedance is unlikely to be project related, as such, actions 5-7 under the EAP are not considered applicable.

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

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

3.3.11 The event action plan is annexed in Appendix K.

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 December 2014 – February 2015

Number of Impact Surveys Completed^	6
Survey Distance Travelled under Favourable On- Effort Condition	657.6km
Number of Sightings	15 sightings (9 sightings are ”on effort” (which are all under favourable condition), 6 “sightings are opportunistic”)
Number of dolphin individual sighted	42 individuals (the best estimated group size)
Dolphin Encounter Rate#	NEL: 0 NWL: 2.1
Dolphin Group Size	Average of NEL: 0 Average of NWL: 2.8 Varied from 1-10 individuals
Most Often frequent dolphin sighting area	Northern Sha Chau and Lung Kwu Chau Marine Park, the western limit of NWL and Tai O area.

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 One (1) Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. Event Action Plan for Impact Dolphin Monitoring was triggered. For detail of investigation, please refer to appendix L.

Table 3.7 Summary of STG and ANI encounter rates in December 2014 - February 2015

	NEL	NWL	Level Exceeded
STG*	0	2.1	Limit
ANI**	0	4.3	

*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.

3.4.7 A review of survey conditions was conducted. The works at lines 1 and 2 are progressing and permanent in water structures are in place. Given that these lines are now truncated due to these structures, it is advised that the start/end points of these lines be revised to reflect the new navigation required. A draft proposal to alter transect lines 1 and 2 was submitted to IEC/ENPO on 23 January 2015 to account for the permanent structures in the water. Further comments were given by IEC/ENPO on 26 February 2015 and the draft proposal was under ET's review in February 2015.

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 A material storage tank of an idle grout production facility was observed not fully enclosed. Please be advised that the material storage tanks of a grout production facility should be fully covered / enclosed. The Contractor enclosed the grout production facility (Closed).

3.5.4 Recycle glass cullet for earthwork was observed stored on Portion C2a with and it is fully covered with tarpaulin or impervious sheets. The Contractor was reminded to continue to provide effective dust suppression measures. (Reminder)

3.5.5 Dark smoke from TSHD was observed. The Contractor was reminded ensure plants are kept in good condition and dark smoke emission from plant/equipment is avoided. The Contractor rectified the situation and kept plants in good condition and dark smoke emission from plant is avoided. (Closed)

Noise

3.5.6 In general, please provide acoustic decoupling measures to air compressors and other noisy equipment when they are mounted on construction vessels. (Reminder)

Chinese White Dolphin

3.5.7 No adverse observation was identified in the reporting quarter.

Water Quality

3.5.8 No adverse observation was identified in the reporting month.

Chemical and Waste Management

3.5.9 Oil drum was observed without label on barge SHB 209 and Portion D, the Contractor was reminded to provide proper labeling to oil drum. The Contractor provided labeling to oil drum on barge SHB 209. (Closed)

3.5.10 Oil and water mixture was observed accumulated inside drip tray. The Contractor was reminded to regularly clear it to prevent potential runoff. The Contractor cleared the oil and water mixture. (Closed)

3.5.11 Maintenance work of machine was observed. The Contactor was reminded to provide effective measures to contain potential oil spillage of leakage before handling oil on site and waste oil should be collected and dispose of as chemical waste. (Reminder)

3.5.12 Sand and equipment materials deposited inside the drip tray was observed at Portion C2A. The Contractor was reminded to clear the deposited sand and store the equipment materials properly. Contractor cleared the deposited materials and provided drip tray to the mechanical equipment. (Closed)

3.5.13 Oil drums were observed without drip tray at Portion C1a, on barge Sun Hung Ming, on floating grout production facility. The Contractor was reminded to provide drip tray to all oil drums. The Contractor provide drip tray to oil drums or removed the oil drums from the area. (Closed)

3.5.14 Water and oil mixture was observed full at one side of the drip tray on barge SHE7. The Contractor was advised to clear the water inside trip tray. The Contractor cleared the water inside trip tray. (Closed)

3.5.15 A gap was observed within the frame of the drip tray on barge SHE7. The Contractor was reminded to provide rectification and ensure no gap within the frame of drip tray. The Contractor provided rectification and ensures no gap within the frame of drip tray. (Closed)

3.5.16 It was observed that a generator was not put inside a drip tray. The Contractor was reminded to provide mitigation measures such as to put all generator inside drip tray. The Contractor provided mitigation measures such as to put all generator inside drip tray. (Closed)

3.5.17 General refuse were observed at Portion A, D, B, E1, C2a and other areas. The Contractor was reminded to regularly collect and dispose general refuse properly to keep the site clean and tidy. The Contractor cleared the general refuse and kept the site clean and tidy. (Closed)

3.5.18 Sand and equipment materials deposited inside the drip tray was observed at Portion C2A. The Contractor was reminded to clear the deposited sand and store the equipment materials properly. Contractor cleared the deposited materials and provided drip tray to the mechanical equipment. (Closed)

3.5.19 General refuse observed at sea area at south part of the HKBCF reclamation works, on land area of portion D and portion A. The Contractor was reminded to regularly clear general refuse within the site to keep the site clean and tidy. The Contractor rectified the situation and cleared general refuse at sea area within the site to keep the site clean and tidy. (Closed)

3.5.20 Defective drip trays such as drip tray with insufficient size or deformed frame were observed at portion B and on floating grout production facility, the Contractor is advised to properly provide mitigation measures such as drip trays to all PMEs. The Contractor rectified the situation and removed the generator from the area or from the defective drip tray or provided mitigation measures such as drip trays with sufficient size to the generator. (Closed)

3.5.21 Bags of dry cement were observed on barge SHB 402, the Contractor was reminded to properly handle them or dispose of properly. The Contractor removed and cleared the bags of dry cement. (Closed)

Landscape and Visual Impact

3.5.22 No relevant adverse impact was observed in the reporting month.

Others

3.5.23 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, 4,504,117m^3 of fill were imported for the Project use in the reporting period. 1.5kg of metal, 811kg of paper/cardboard packaging, 6,401kg plastics, 2,400kg of chemical waste and 149.5m^3 of general refuse were generated and disposed of in the reporting period. Monthly summary of waste flow table is detailed in Appendix I.

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

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

5 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

5.1 Implementation Status of Environmental Mitigation Measures

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

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

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

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

5.1.5 Acoustic decoupling measures on noisy plants on construction vessels were checked regularly and the Contractor was reminded to ensure provision of ongoing maintenance to noisy plants and to carry out improvement work once insufficient acoustic decoupling measures were found.

5.1.6 Frequency of watering per day on exposed soil was checked; with reference to the record provided by the Contract, watering was conducted at least 8 times per day on reclaimed land. The frequency of watering is the mainly refer to water truck. Sprinklers are only served to strengthen dust control measure for busy traffic at the entrance of Portion D. As informed by the Contractor, during the mal-function period of sprinkler, water truck will enhance watering at such area. The Contractor was reminded to ensure provision of watering of at least 8 times per day on all exposed soil within the Project site and associated works areas throughout the construction phase.

5.1.7 As informed by the Contractor via email at 15:06 on 8 December 2014, oil was observed at sea area near western waters within the silt curtain at 15:00 on 8 December 2014. Following the spill response plan ET, IEC and the RSS were informed of the incident by the Contractor.

5.1.7.1 Investigation actions:

- Details of the oil spillage incident (8 December 2014) including size, location, time of the spillage and Contractor's action taken in response to the spill incident, have been reviewed.
- Joint site inspection was conducted on 11 December 2014 with the Contactor and RSS to observe the sea condition near sea area nearby western waters within the silt curtain.
- Impact water quality monitoring records of 8 and 10 December 2014 have been reviewed.

5.1.7.2 The oil spill was visually identified by the Contractor and RSS on 8 December 2014 as discrete, non-continuous source with approximately 25m^2 spread. (Also refer to photo record below)

5.1.7.3 The oil stain was no longer found when the emergency boat arrived the area about 15mins after the observation. And no sign of oil spillage was found on the nearby waters after. (Please see below photo record for reference).

5.1.7.4 The oil stain observed was limited at nearby western sea area within the silt curtain.

5.1.7.5 An joint site inspection was conducted with ET, Contractor and RSS on 11 December 2014 at perimeter of HKBCF Reclamation Works and no oil spillage was observed on site. (Also refer to photo record below).

5.1.7.6 Impact water quality monitoring records of 8 and 10 December 2014 have been reviewed; the IWQN location close to the oil spill is IS10, IS(Mf)11, SR5 and SR7. There is no exceedance of IWQM recorded at IS10, IS(Mf)11, SR5 and SR7 on 8 on 10 December 2014.

5.1.7.7 The contractor was reminded to continue to follow the spill response plan in the event of accidental oil spillage.

6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

6.1 Summary of Exceedances of the Environmental Quality Performance Limit

6.1.1 Three (3) action level exceedances of 24-hr TSP were recorded AMS2, AMS3B and AMS7A on 12 February 2015. After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract. No 24-hr TSP Action and Limit Level exceedances were recorded on other monitoring date in the reporting period. All 1-Hour TSP results were below the Action and Limit Level in the reporting period.

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

6.1.3 A total of (17) seventeen exceedances were recorded in this reporting quarter: One (1) limit level exeedance and one (1) action level exceedance were recorded at monitoring station IS17 and IS(Mf)9 respectively on 5 December 2014 during mid ebb tide; one (1) action level exceedance was recorded at IS10 and one (1) action level exceedance was recorded at SR5 respectively on 12 January 2015 during flood tide; one (1) action level exceedance was recorded at IS17 on 16 January 2015 during ebb tide; one (1) action level exceedance was recorded at IS17, SR5, SR6 and IS10 respectively, on 21 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11, SR10B(N) and SR7 respectively on 23 January 2015 during flood tide. One (1) limit level exceedance was recorded at SR10A and SR6 respectively on 23 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11 on 26 January 2015 during flood tide; one (1) Limit Level Exceedance of SS at IS(Mf)11 and one (1) Action Level Exceedance of SS at SR7 during Flood tide recorded on 23 February 2015.

6.1.4 After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

6.1.5 One (1) Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. Event 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 Complaints, Notification of Summons and Successful Prosecutions

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

7.1.2 No complaint, notification of summons or prosecution was received in the reporting quarter.

7.1.3 Statistics on complaints, notifications of summons and successful prosecutions are summarized in Appendix N.

8 COMMENTS, RECOMMENDATIONS AND CONCLUSIONS

8.1 Comments on mitigation measures

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

Air Quality Impact

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

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.
- 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.
- Control night-time lighting and glare by hooding all lights.

8.2 Recommendations on EM&A Programme

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

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

8.3 Conclusions

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

8.3.2 Three (3) action level exceedances of 24-hr TSP were recorded AMS2, AMS3B and AMS7A on 12 February 2015. After investigation, there is no adequate information to conclude the recorded action level exceedances are related to this Contract. No 24-hr TSP Action and Limit Level exceedances were recorded on other monitoring date in the reporting period. All 1-Hour TSP results were below the Action and Limit Level in the reporting period.

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

8.3.4 A total of (17) seventeen exceedances were recorded in this reporting quarter: One (1) limit level exeedance and one (1) action level exceedance were recorded at monitoring station IS17 and IS(Mf)9 respectively on 5 December 2014 during mid ebb tide; one (1) action level exceedance was recorded at IS10 and one (1) action level exceedance was recorded at SR5 respectively on 12 January 2015 during flood tide; one (1) action level exceedance was recorded at IS17 on 16 January 2015 during ebb tide; one (1) action level exceedance was recorded at IS17, SR5, SR6 and IS10 respectively, on 21 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11, SR10B(N) and SR7 respectively on 23 January 2015 during flood tide. One (1) limit level exceedance was recorded at SR10A and SR6 respectively on 23 January 2015 during flood tide; one (1) action level exceedance was recorded at IS(Mf)11 on 26 January 2015 during flood tide; one (1) Limit Level Exceedance of SS at IS(Mf)11 and one (1) Action Level Exceedance of SS at SR7 during Flood tide recorded on 23 February 2015. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

8.3.5 One (1) Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter. After investigation, it was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. Event Action Plan for Impact Dolphin Monitoring was triggered. For detail of investigation, please refer to appendix L.

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

8.3.7 No complaint, notification of summons or prosecution was received in the reporting quarter.

8.3.8 As informed by the Contractor via email at 15:06 on 8 December 2014, oil was observed at sea area near western waters within the silt curtain at 15:00 on 8 December 2014. Following the spill response plan ET, IEC and the RSS were informed of the incident by the Contractor.

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

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

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

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

TSZ KAN CHAU

SIU MO TO

TAI MO TO

TO KAU WAN

CHEUNG SOK

LUK KENG BAY

YAM TSAI BAY

SHAM SHUI

SIU HO WAN

SAM PAK AU

LAI PIK SHAN

SZE WAN AU

TAI SHAN

PENNY'S BAY

DISCOVERY BAY (TAI PAK WAN)

YI PAK WAN

TUNG CHUNG BAY

POR KAI SHAN

TUNG CHUNG NEW TOWN EXTENSION

TUNG CHUNG NORTH EXTENSION COUNTRY PARK

TAI HO WAN

TUNG CHUNG CROSS ISLAND HIGHWAY

TUNG CHUNG EAST

TUNG CHUNG WEST

PEARL ISLAND

GOLDEN BEACH

DRAGON BEACH

PENG CHAU

TUNG WAN

NGAN CHAU

HUNG FA NGAN

SILVER MINE BAY BEACH

HONG KONG DISNEYLAND

TUNG CHUNG

N

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

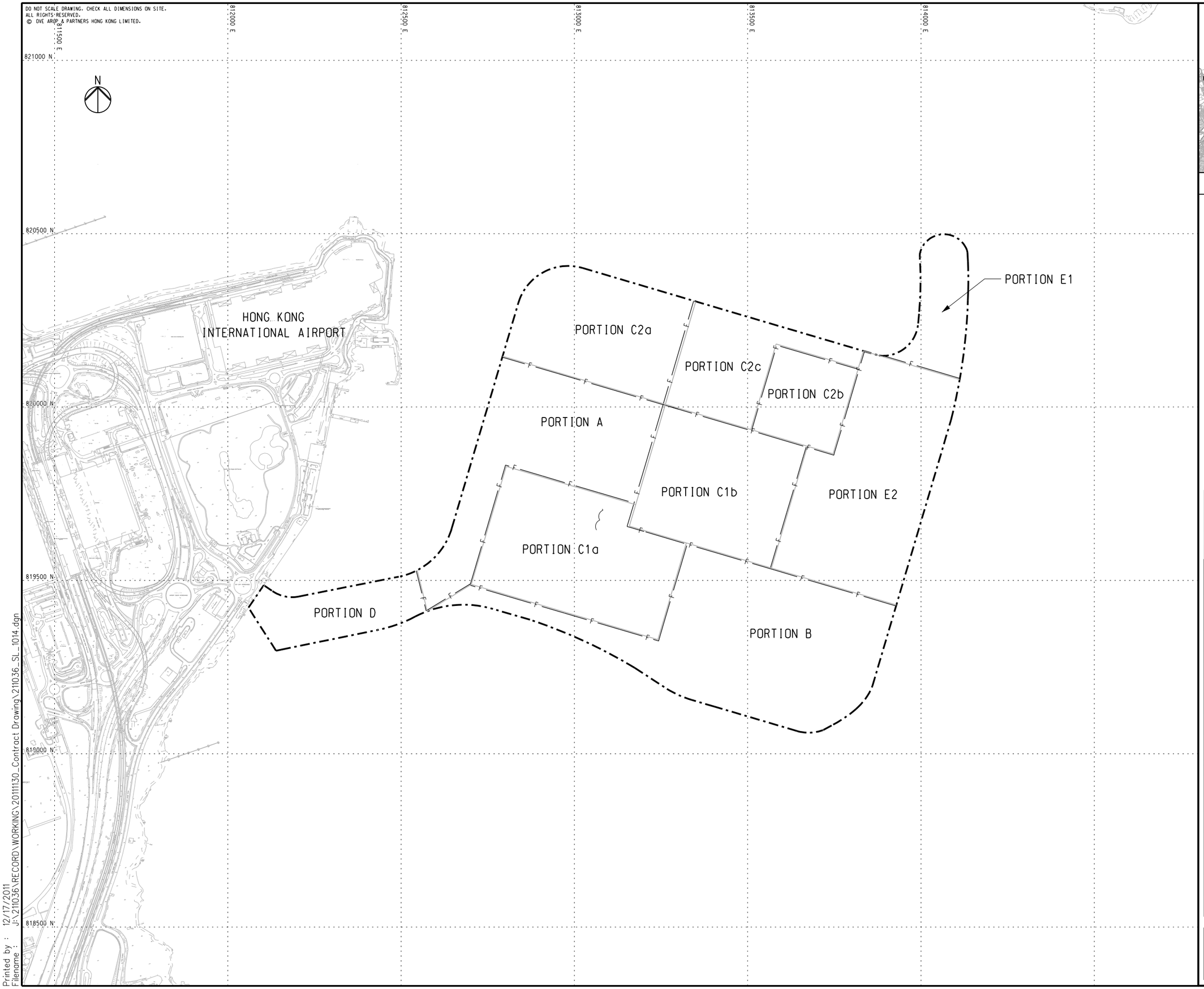
Drawing title

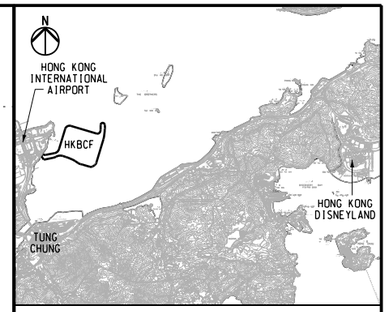
KEY PLAN

Drawing no.		Rev.
211036/SL/1001		-
Drawn: RL	Date: 11/09	Checked: KKY	Approved: 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
Filename : J:\211036\RECORD\WORKING\20111130_Contract Drawing\211036_SL_1001.dgn





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

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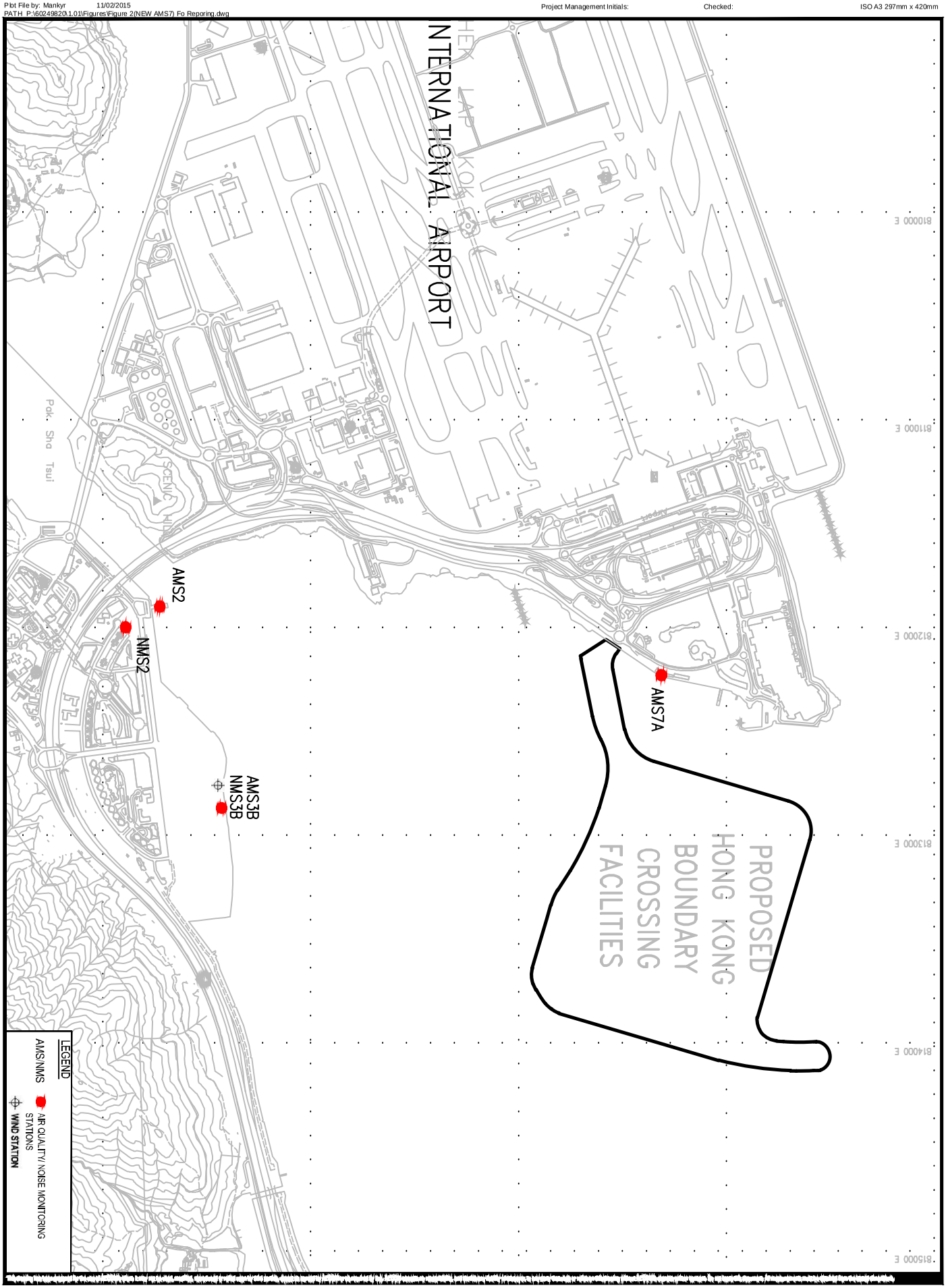

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS
Project No.: - Date: JANUARY 2015

AIR QUALITY AND NOISE MONITORING STATIONS FOR HKBCF

AECOM

Figure 2

Plot File by: Kwwkhc
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25/03/2014

Project Management Initials:

Checked:

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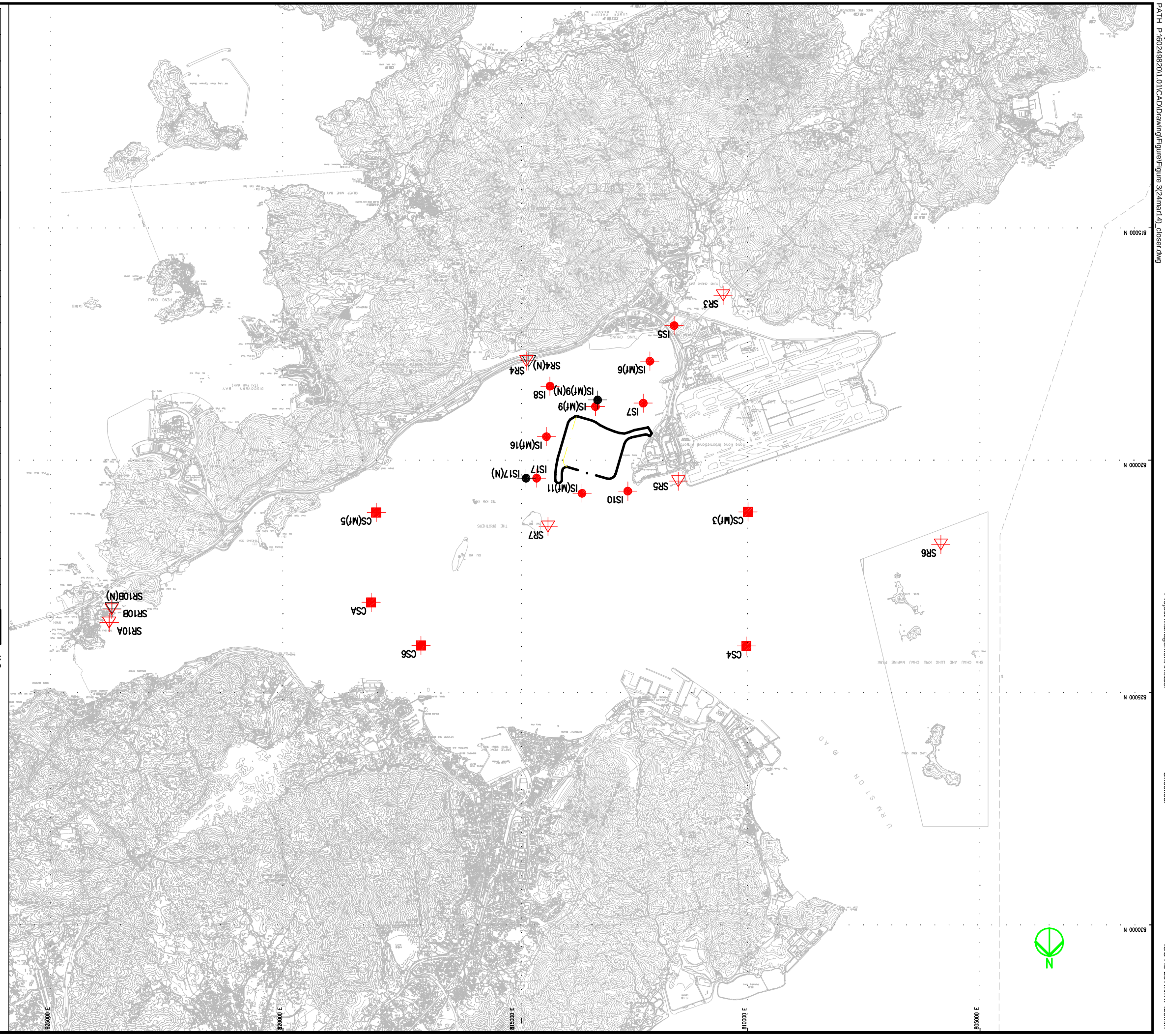


SETTING OUT SCHEDULE

MONITORING STATIONS	CO-ORDINATES	
	EASTING	NORTHING
IS5	811579	817106
IS(M)6	812101	817873
IS7	812244	818777
IS8	814251	818412
IS(M)9	813273	818850
IS(M)9(N)	813226	818708
IS10	812577	820670
IS(M)11	813562	820716
IS(M)16	814328	819497
IS17	814539	820391
IS17(N)	814767	820391
SR3	810525	816456
SR4(N)	814705	817859
SR5	811489	820455
SR6	805837	821818
SR7	814293	821431
SR10A	823741	823495
SR10B(N)	823683	823187
CS(M)3	809989	821117
CS(M)5	817990	821129
CS4	810025	824004
CS6	817028	823992
CSA	818103	823064

LEGEND

- IS — IMPACT STATIONS
- CS — CONTROL / FAR FIELD STATIONS
- SR — SENSITIVE RECEIVERS STATIONS
- SR — SENSITIVE RECEIVERS STATIONS (RELOCATED)
- IS — IMPACT STATIONS (RELOCATED)

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

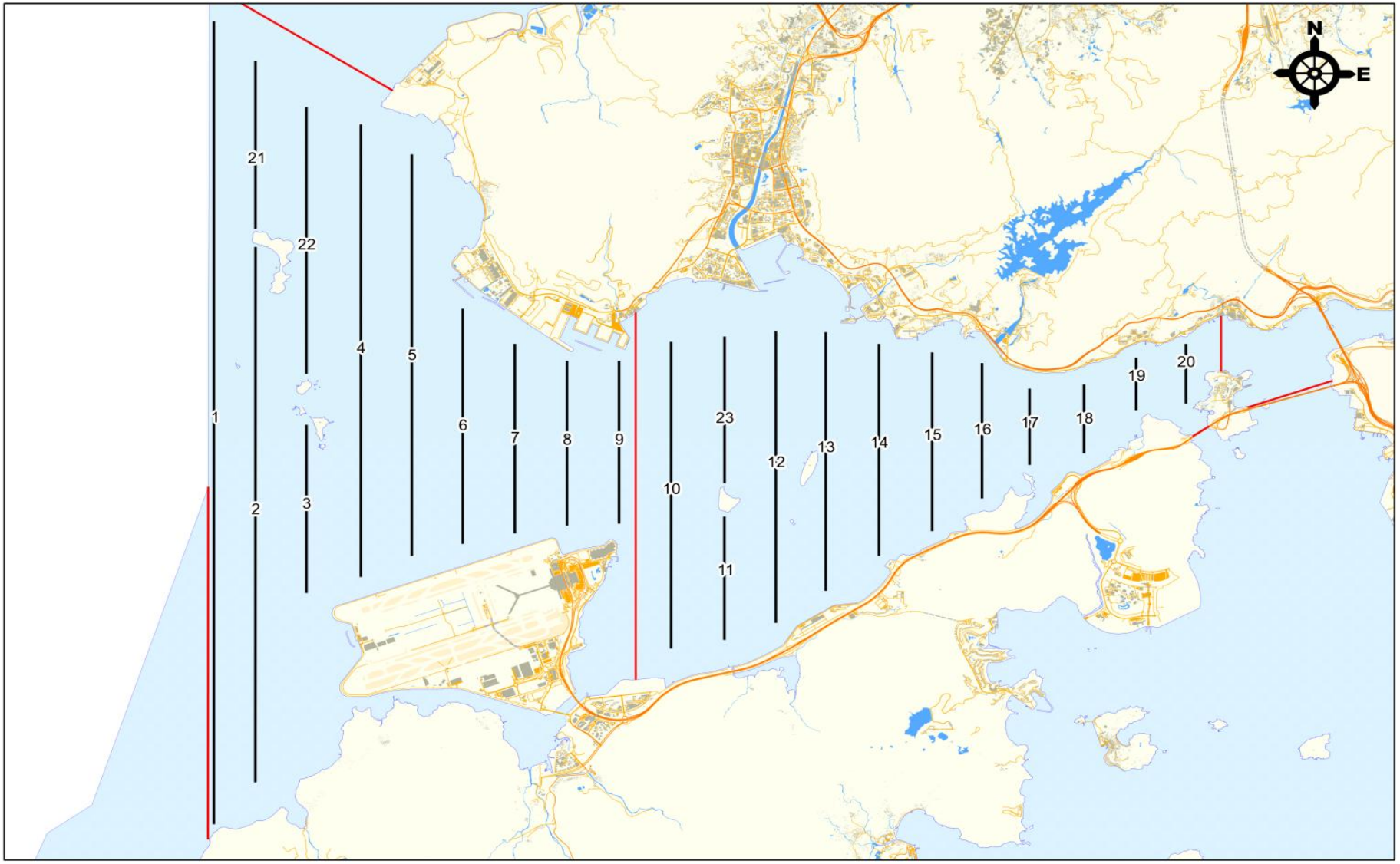
Project No.: -

Date: MAR 2014

WATER QUALITY MONITORING STATION

AECOM

Figure 3



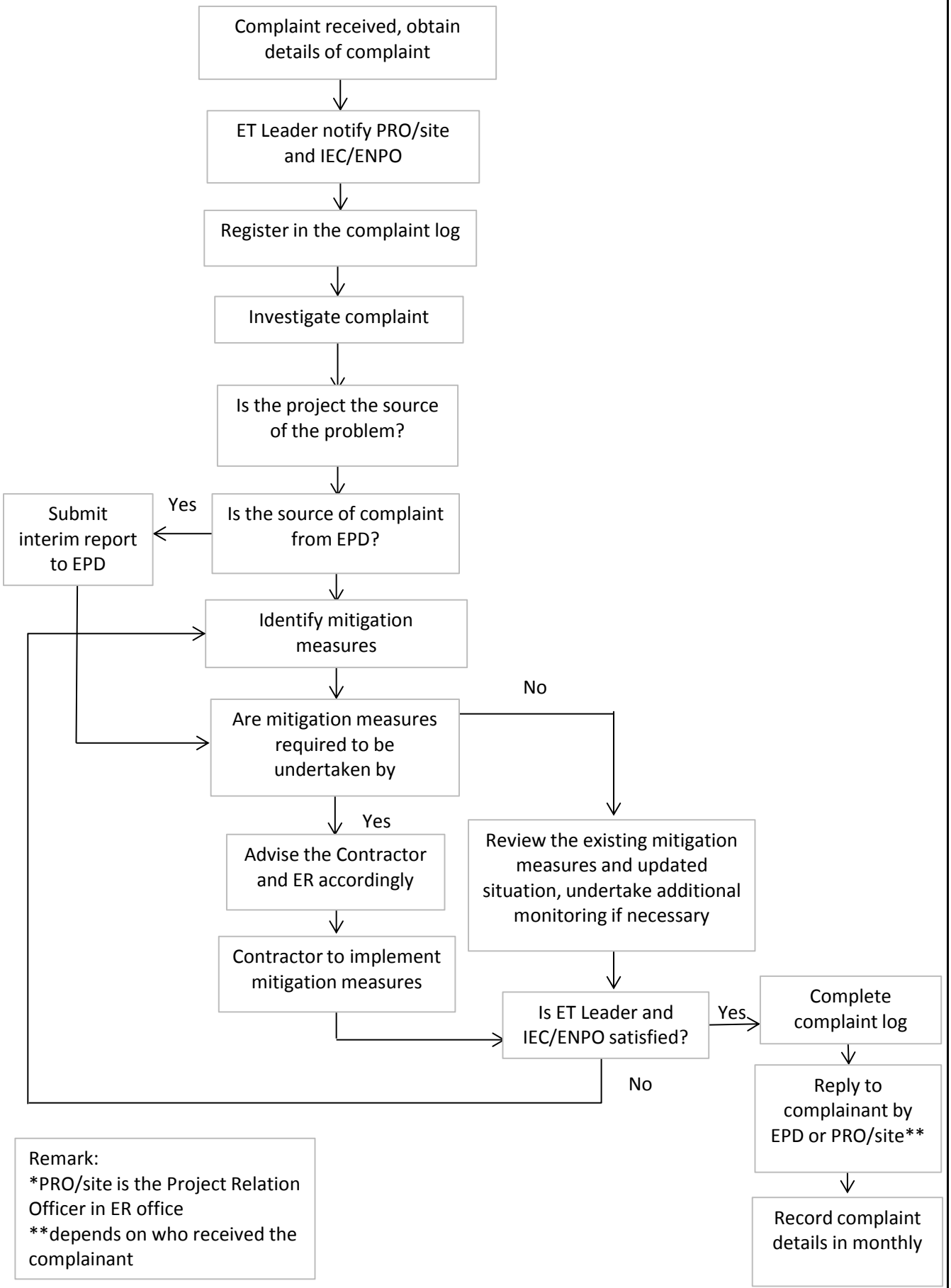
***Remark: Transect 10 is now 3.6km in length due to the HKBCF construction site. The total transect length for both NEL and NWL combined is 111km.**

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

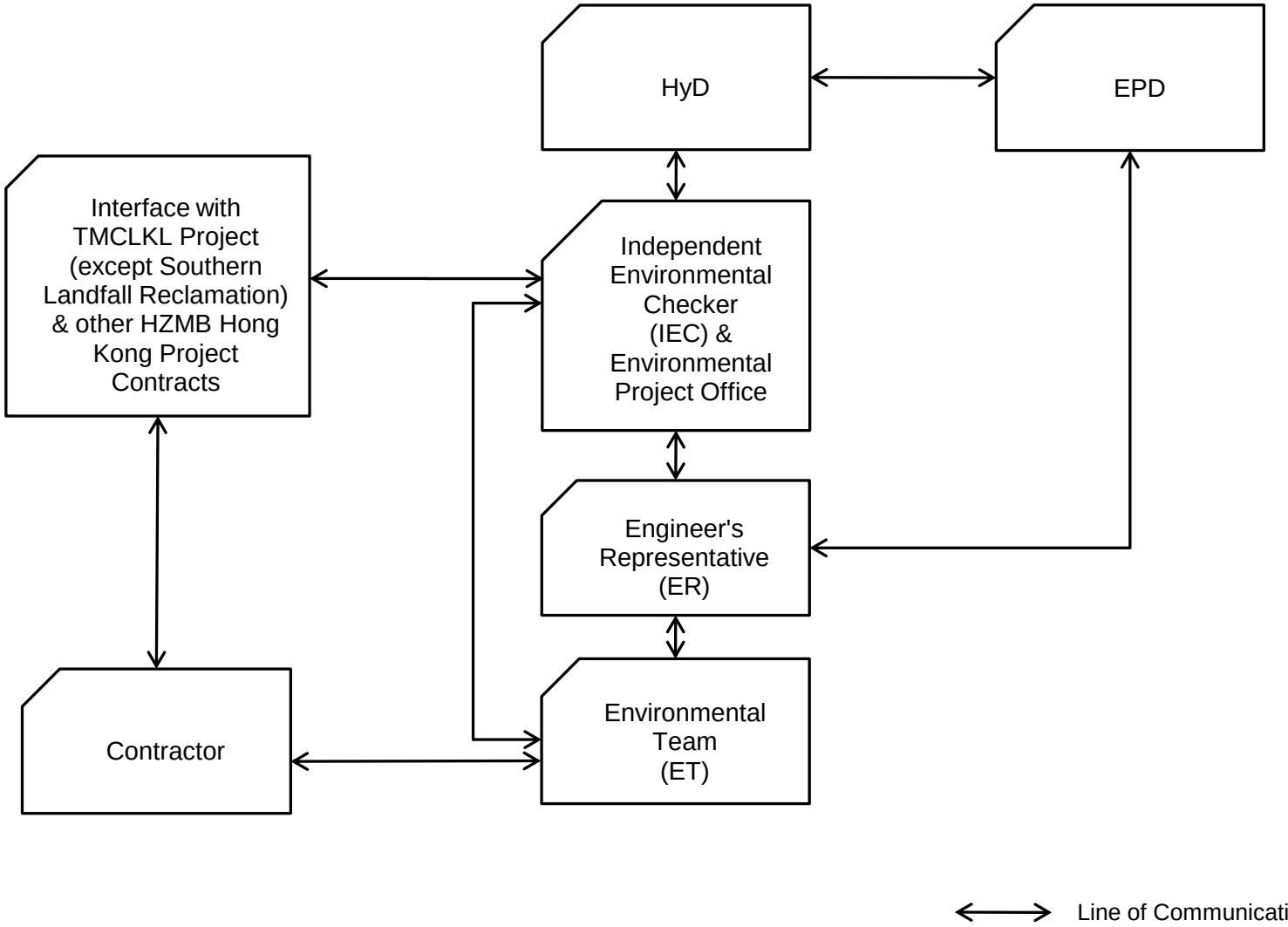


HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

AECOM

Environmental Complaint Handling Procedure

Project No.: 60249820 **Date: July 2012** **Figure 6**



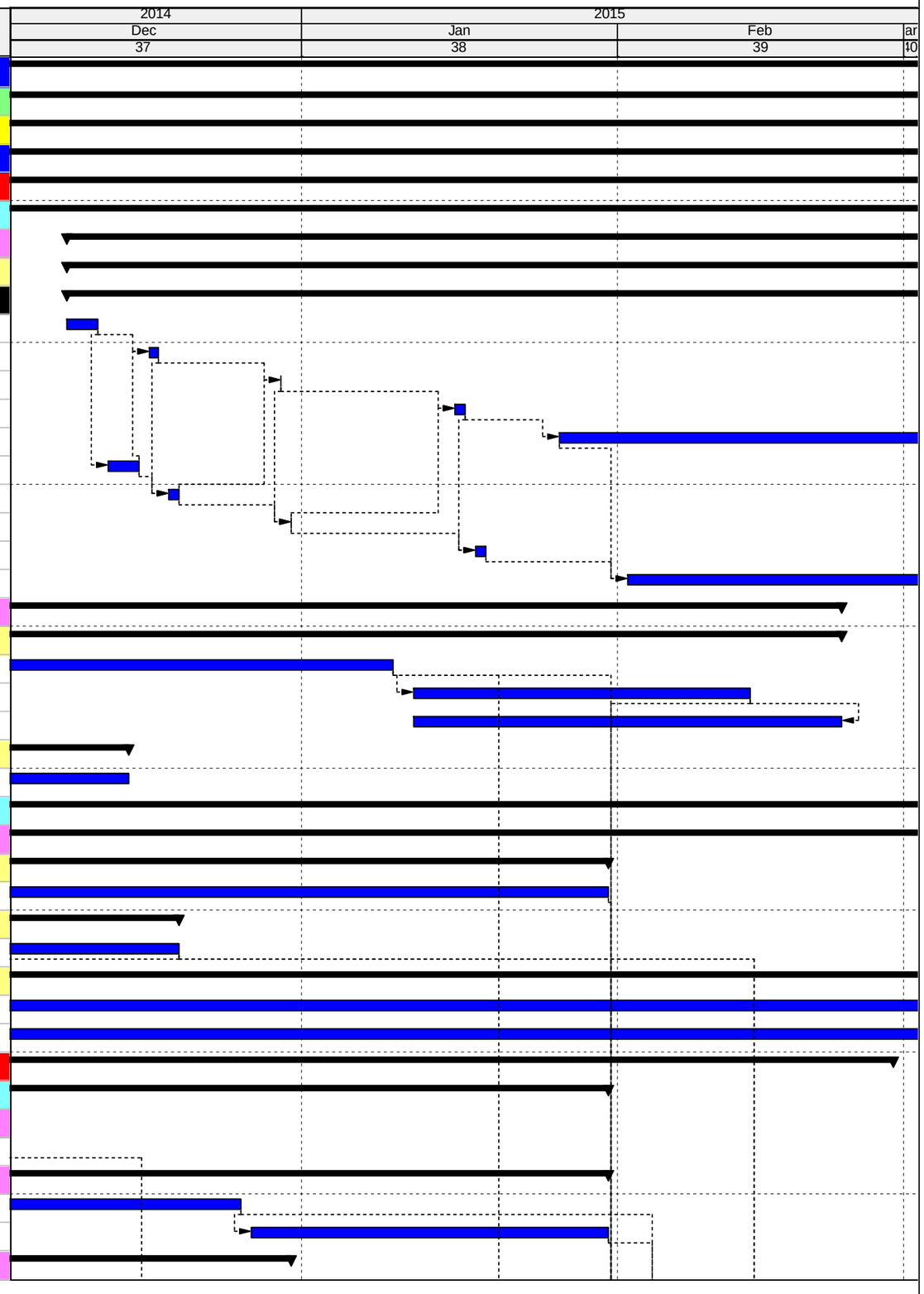
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
--RECLAMATION WORKS
Project No.: 60249820 Date: April 2013

Project Organisation for Environmental Works

AECOM

Appendix A

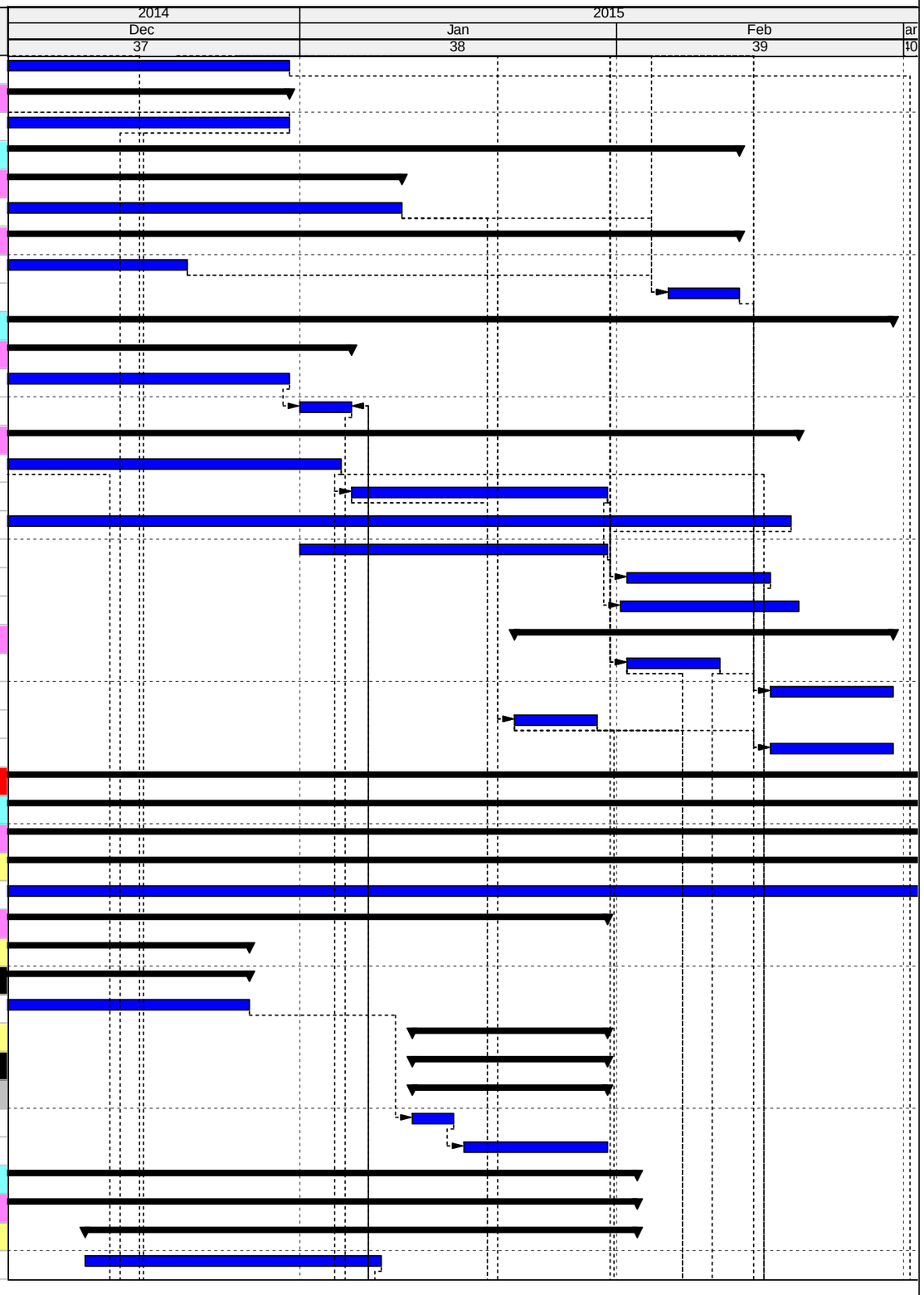
Activity ID	Activity Name	Start	Finish
41st Monthly Progress Report Status as on 21Apr2015		02-Apr-14 A	28-Mar-15 A
Work Zone, as defined in PS Clause 1.03(6)		02-Apr-14 A	28-Mar-15 A
Portion A, B, C & E		02-Apr-14 A	28-Mar-15 A
Portion A, B, C & E		02-Apr-14 A	28-Mar-15 A
Seawall		04-Aug-14 A	28-Mar-15 A
Cellular Structures		04-Aug-14 A	14-Mar-15 A
Cellular Main Cells 85cells		09-Dec-14 A	14-Mar-15 A
Full Guide Frames Method 85cells		09-Dec-14 A	14-Mar-15 A
Portion E1 C078 & C079 & Portion E2 C065 & C066 4cells		09-Dec-14 A	14-Mar-15 A
CSE1-040-0010	PE1 C078 Temp Piles Installation	09-Dec-14 A	12-Dec-14 A
CSE1-040-0020	PE1 C078 Temp Underwater Guard Ring Installation	17-Dec-14 A	18-Dec-14 A
CSE1-040-0030	PE1 C078 Temp Guide Frame Installation	30-Dec-14 A	30-Dec-14 A
CSE1-040-0040	PE1 C078 Crane Installation	16-Jan-15 A	17-Jan-15 A
CSE1-040-0050	PE1 C078 Sheetpiles Collection	26-Jan-15 A	12-Mar-15 A
CSE1-040-1010	PE1 C079 Temp Piles Installation	13-Dec-14 A	16-Dec-14 A
CSE1-040-1020	PE1 C079 Temp Underwater guard Ring Installation	19-Dec-14 A	20-Dec-14 A
CSE1-040-1030	PE1 C079 Temp Guide Frame Installation	31-Dec-14 A	31-Dec-14 A
CSE1-040-1040	PE1 C079 Crane Installation	18-Jan-15 A	19-Jan-15 A
CSE1-040-1050	PE1 C079 Sheetpiles Collection	02-Feb-15 A	14-Mar-15 A
Capping Beams		04-Aug-14 A	23-Feb-15 A
Portion E2 between K057 to C067 Capping Beams		04-Aug-14 A	23-Feb-15 A
CBE2-000	PE2 Capping Beams structure K057 to C062 6cells 8days/cell	04-Aug-14 A	10-Jan-15 A
CBE2-005	PE2 Capping Beams structure K063 to C064 2cells 8days/cell	12-Jan-15 A	14-Feb-15 A
CBE2-010	PE2 Capping Beams structure C065 to C067 3cells 8days/cell	12-Jan-15 A	23-Feb-15 A
Portion E1 between C090 to C074 Capping Beams		03-Nov-14 A	15-Dec-14 A
CBE1-010	PE1 Capping Beams structure C090 to C081 10cells 4days/cell	03-Nov-14 A	15-Dec-14 A
Conforming Sloping Seawalls		10-Sep-14 A	28-Mar-15 A
Rockfill		10-Sep-14 A	28-Mar-15 A
Seawall Portion C2a at C112 - C103 10cells		01-Dec-14 A	31-Jan-15 A
RFC2a-130	PC2a Temporary Rockfill at C112- C103	01-Dec-14 A	31-Jan-15 A
Seawall Portion E2 at K052 - C067 16cells		10-Sep-14 A	20-Dec-14 A
RFE2-020	PE2 Rockfill at C063 - C067 5cells	10-Sep-14 A	20-Dec-14 A
Seawall Portion E1 at C068 - C090 23cells		01-Nov-14 A	28-Mar-15 A
RFE1-010	PE1 Rockfill at C090 - C081 10cells	01-Nov-14 A	20-Mar-15 A
RFE1-030	PE1 Rockfill at C076 - C068 9cells	01-Nov-14 A	28-Mar-15 A
Reclamation		11-Aug-14 A	28-Feb-15 A
Marine Fill		11-Aug-14 A	31-Jan-15 A
Land Portion C2a		25-Nov-14 A	01-Dec-14 A
MFC2a-030	PC2a Main Area West Marine Fill Sand 100% 60,000m3 stg2 15,000m3/day by Pumping barge	25-Nov-14 A	01-Dec-14 A
Land Portion E2		01-Dec-14 A	31-Jan-15 A
MFE2-020	PE2 North-W Marine Sand Fill upto +2.5mPD 259,312m3 10,000m3/day by TSHD	01-Dec-14 A	26-Dec-14 A
MFE2-040	PE2 North-E Marine Sand Fill upto +2.5mPD 257,093m3 10,000m3/day by TSHD 4nrs	27-Dec-14 A	31-Jan-15 A
Land Portion C2b		11-Aug-14 A	31-Dec-14 A



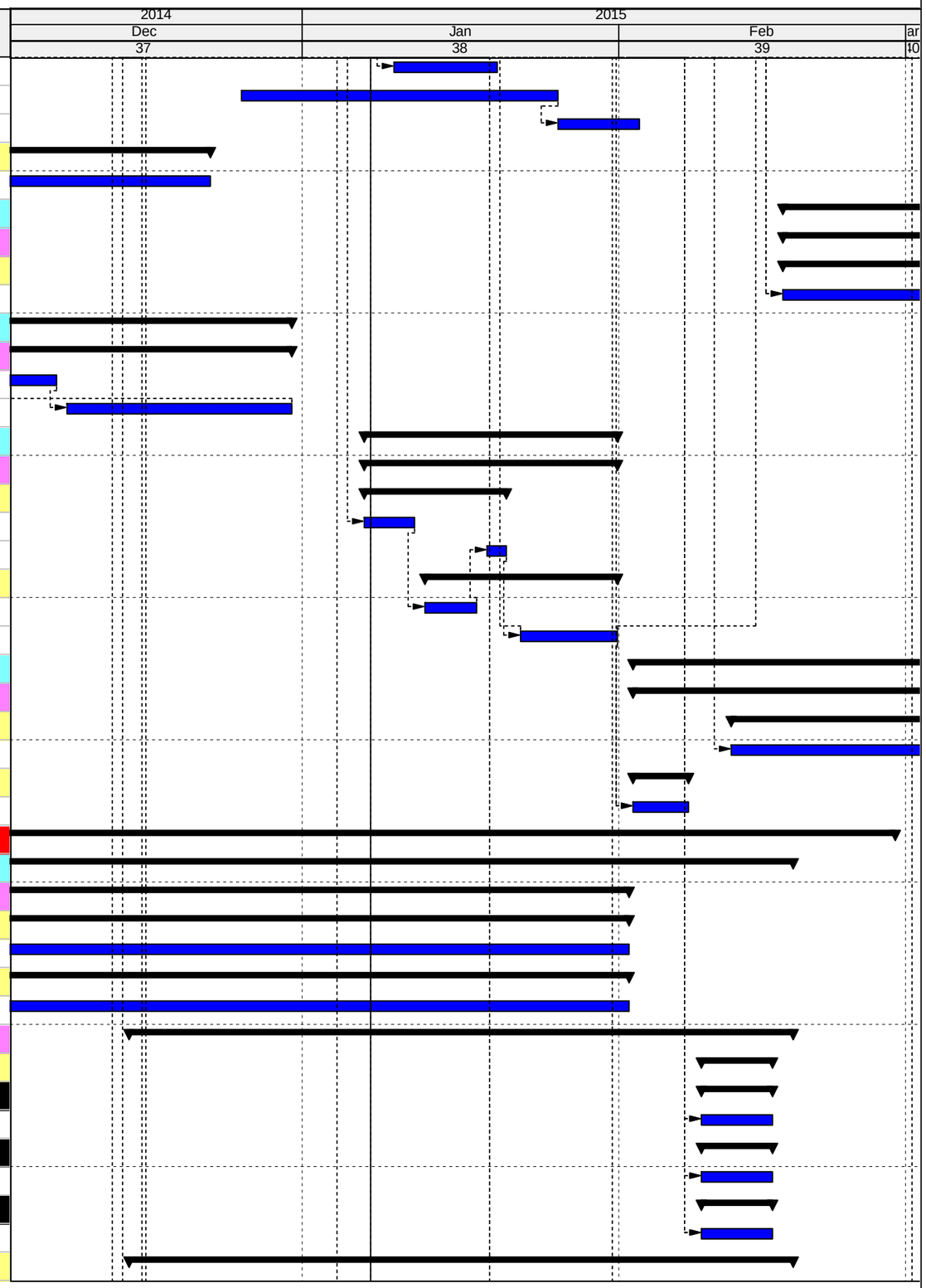
Remaining Level of Effort | Actual Work | Critical Remaining W...
Actual Level of Effort | Remaining Work | Milestone

TASK filters: No Accropode Tetrapod, Period Dec 2014 to Feb 2015.

Activity ID	Activity Name	Start	Finish
MFC2b-010	PC2b Marine Fill Type A Public fill 100% 166,636m3 2,000m3/day	11-Aug-14 A	31-Dec-14 A
Land Portion C2c		01-Oct-14 A	31-Dec-14 A
MFC2c-020	PC2c Marine Fill Type A Public fill 100% 185,589m3 2,000m3/day	01-Oct-14 A	31-Dec-14 A
Vertical Band Drains by Land Plant		01-Dec-14 A	13-Feb-15 A
Land Portion C2a 111,740nrs by Land		02-Dec-14 A	11-Jan-15 A
VBDC2a-040	Vertical Band Drains outstanding 8,000nrs by land plant at PC2a West 300nrs/day (1HP+5VP)	02-Dec-14 A	11-Jan-15 A
Land Portion E2 Southern Part 84,746nrs		01-Dec-14 A	13-Feb-15 A
VBDE2-012	Vertical Band Drains 15,851nrs by land plant at PE2 South 600nrs/day (3HP)	01-Dec-14 A	21-Dec-14 A
VBDE2-014	Vertical Band Drains 2,878nrs by land plant at PE2 North-East 400nrs/day (2HP)	06-Feb-15 A	13-Feb-15 A
Earthwork Fill		01-Dec-14 A	28-Feb-15 A
Land Portion C1b		01-Dec-14 A	06-Jan-15 A
EFC1b-010	PC1b West Type D Sand Fill upto +5.5mPD 147,555m3 45,000m3/day by TSHD	01-Dec-14 A	31-Dec-14 A
EFC1b-020	PC1b East Type D Sand Fill upto +5.5mPD 442,664m3 45,000m3/day by TSHD	01-Jan-15 A	06-Jan-15 A
Land Portion C2a		02-Dec-14 A	18-Feb-15 A
EFC2a-010	PC2a Main Area East Earthwork Fill Type D Sand 100% 180,000m3 15,000m/day by Pumping b	02-Dec-14 A	05-Jan-15 A
EFC2a-030	PC2a Main Area West Earthwork Fill Type D Sand 100% 198,257m3 15,000m/day by Conveyor	06-Jan-15 A	31-Jan-15 A
EFC2a-040	PC2a Edge Area Testing	02-Dec-14 A	18-Feb-15 A
EFC2a-045	PC2a Edge Area West Earthwork Fill Type D Sand 100% stg1 30,450m3 10,000m/day by Conv	01-Jan-15 A	31-Jan-15 A
EFC2a-050	PC2a Edge Area North Earthwork Fill Type D Sand 100% 60,900m3 10,000m/day by Conveyor	02-Feb-15 A	16-Feb-15 A
EFC2a-060	PC2a Main Area SRT testing	01-Feb-15 A	18-Feb-15 A
Land Portion E2		22-Jan-15 A	28-Feb-15 A
EFE2-010	PE2 South-Edge 100m Type D Earthwork Sand Fill upto +5.5mPD 110,000m3 20,000m3/day by	02-Feb-15 A	11-Feb-15 A
EFE2-020	PE2 North-Edge 100m Type D Earthwork Sand Fill upto +5.5mPD 110,000m3 20,000m3/day	16-Feb-15 A	28-Feb-15 A
EFE2-030	PE2 South-Main Type D Earthwork Sand Fill upto +5.5mPD 221,051m3 20,000m3/day by TSHD	22-Jan-15 A	30-Jan-15 A
EFE2-040	PE2 North-Main Type D Earthwork Sand Fill upto +5.5mPD 221,050m3 36,000m3/day by TSHD	16-Feb-15 A	28-Feb-15 A
Surcharge		05-Sep-14 A	18-Mar-15 A
Portion A Surcharge		05-Sep-14 A	04-Mar-15 A
Main Reclamation Areas		05-Sep-14 A	04-Mar-15 A
A2 East		05-Sep-14 A	04-Mar-15 A
SURA0-420	PA A2 East Surcharge Period as +11.5mPD 6mths (8-2=6mths)	05-Sep-14 A	04-Mar-15 A
Edge Area From SOL offset within 180m to 50m		01-Dec-14 A	31-Jan-15 A
CH5+110 to 5+440 Portion A North		01-Dec-14 A	27-Dec-14 A
Area of 50m to 120 from Offset		01-Dec-14 A	27-Dec-14 A
SUEA1-0110	PA North 120m-40m from Offset Surcharge Sand Laying upto +11.5mPD 113,160m3 5,000m3/d	01-Dec-14 A	27-Dec-14 A
CH5+440 to 5+650 Portion A South		12-Jan-15 A	31-Jan-15 A
Area of 40m - 120m from Offset (other CLP area)		12-Jan-15 A	31-Jan-15 A
Upto +8.5mPD Area		12-Jan-15 A	31-Jan-15 A
SUEA3-0050	PA South 70m - 40m from SOL Surcharge Sand Laying upto +8.5mPD 22,680m3 5,000m3/day	12-Jan-15 A	16-Jan-15 A
SUEA3-0100	Testing	17-Jan-15 A	31-Jan-15 A
Land Portion B		24-Nov-14 A	03-Feb-15 A
Edge Areas		24-Nov-14 A	03-Feb-15 A
Deep Cement Mixing at K040 - K046		11-Dec-14 A	03-Feb-15 A
DCM-1010	PB Edge Area K040-K046 Delivery (1st 3 plants)	11-Dec-14 A	09-Jan-15 A



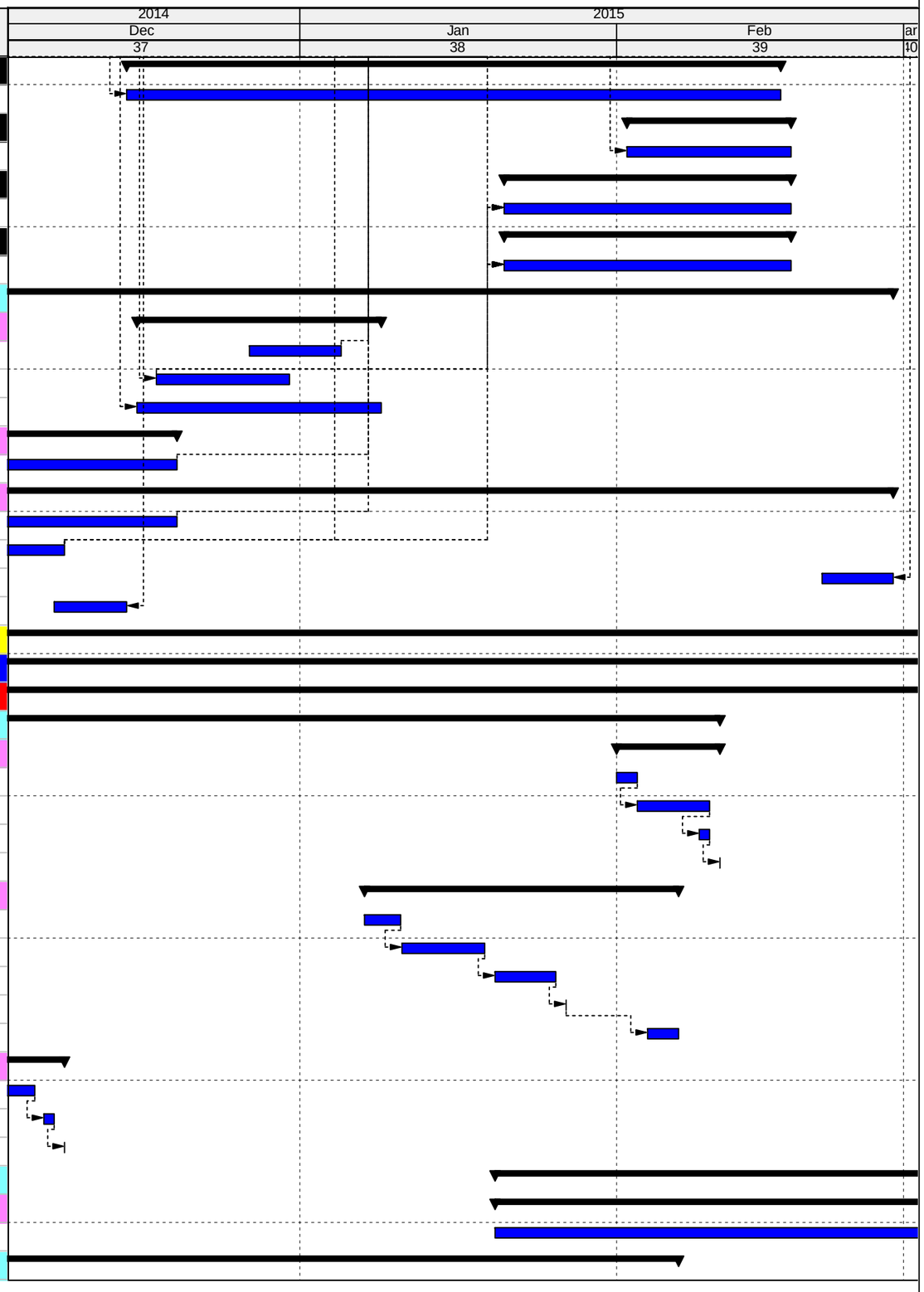
Activity ID	Activity Name	Start	Finish
DCM-1020	PB Edge Area K040-K046 Setup (1st 3 plants)	10-Jan-15 A	20-Jan-15 A
DCM-1030	PB Edge Area K040-K046 Delivery (2nd 3 plants)	26-Dec-14 A	26-Jan-15 A
DCM-1040	PB Edge Area K040-K046 Setup (2nd 3 plants)	26-Jan-15 A	03-Feb-15 A
at K013 - K027		24-Nov-14 A	23-Dec-14 A
SUEB0-005	PB Edge Area K013-K027 Period +5.5mPD 1mth	24-Nov-14 A	23-Dec-14 A
Land Portion C2a		17-Feb-15 A	18-Mar-15 A
Edge Areas		17-Feb-15 A	18-Mar-15 A
at C104 - C107 Cellular Seawall		17-Feb-15 A	18-Mar-15 A
SUEC2a-005	PC2a Edge Area C104-C107 Sand Surcharge Period +5.5mPD 1mth	17-Feb-15 A	18-Mar-15 A
Land Portion C1a		21-Nov-14 A	31-Dec-14 A
Reclamation Areas		21-Nov-14 A	31-Dec-14 A
SURC1a-015	PC1a Main Area Sand Surcharge upto 8.5mPD 522,945m3 50,000m3/day by TSHD	21-Nov-14 A	08-Dec-14 A
SURC1a-018	PC1a Main Area Sand Surcharge upto 11.5mPD 522,944m3 30,000m3/day by TSHD	09-Dec-14 A	31-Dec-14 A
Land Portion C1b		07-Jan-15 A	31-Jan-15 A
Reclamation Areas		07-Jan-15 A	31-Jan-15 A
West (1/4 Areas)		07-Jan-15 A	21-Jan-15 A
SURC1b-010	PC1b West Sand Surcharge upto 8.5mPD 141,745m3 45,000m3/day by TSHD	07-Jan-15 A	12-Jan-15 A
SURC1b-015	PC1b West Sand Surcharge upto 11.5mPD 141,745m3 40,000m3/day by TSHD	19-Jan-15 A	21-Jan-15 A
East (3/4 Areas)		13-Jan-15 A	31-Jan-15 A
SURC1b-040	PC1b East Sand Surcharge upto 8.5mPD 425,233m3 40,000m3/day by TSHD	13-Jan-15 A	18-Jan-15 A
SURC1b-045	PC1b East Sand Surcharge upto 11.5mPD 425,233m3 40,000m3/day by TSHD 4nrs	22-Jan-15 A	31-Jan-15 A
Land Portion E2		02-Feb-15 A	11-Mar-15 A
South Part		02-Feb-15 A	11-Mar-15 A
Edge Areas		12-Feb-15 A	11-Mar-15 A
SUEE2-005	PE2 South Edge Sand Period as +5.5mPD 1mth	12-Feb-15 A	11-Mar-15 A
Reclamation Areas		02-Feb-15 A	07-Feb-15 A
SURE2-010	PE2 South Main Sand Surcharge Laying upto 8.5mPD 293,063m3 50,000m3/day by TSHD 4nrs	02-Feb-15 A	07-Feb-15 A
Geotechnical Instrumentation Works		02-Apr-14 A	28-Feb-15 A
Geotechnical Instrumentation Works for Seawalls		02-Apr-14 A	18-Feb-15 A
Cluster Type SA 2nrs Piezometer, Extensometer and Settlement Marker Cluster inside Cells		02-Apr-14 A	02-Feb-15 A
SA-1 K048 Portion B		02-Apr-14 A	02-Feb-15 A
CTSA1-020	Montioring of SA-1 C048 PB by weekly for subsequent 10mths	02-Apr-14 A	02-Feb-15 A
SA-2 C113 Portion C2a		02-Apr-14 A	02-Feb-15 A
CTSA2-020	Monitoring of SA-2 C113 PC2a by weekly for subsequent 10mths	02-Apr-14 A	02-Feb-15 A
Cluster Type SD 26nrs Instrumentation and CPT Cluster behind cells		15-Dec-14 A	18-Feb-15 A
Portion E2		09-Feb-15 A	16-Feb-15 A
SD-10 K056		09-Feb-15 A	16-Feb-15 A
CTSD-100	Installation of SD-10 (K056) PE2	09-Feb-15 A	16-Feb-15 A
SD-11 C061		09-Feb-15 A	16-Feb-15 A
CTSD-110	Installation of SD-11 (C061) PE2	09-Feb-15 A	16-Feb-15 A
SD-12 C066		09-Feb-15 A	16-Feb-15 A
CTSD-120	Installation of SD-12 (C066) PE2	09-Feb-15 A	16-Feb-15 A
Portion C2a		15-Dec-14 A	18-Feb-15 A



Remaining Level of Effort | Actual Work | Critical Remaining W...
Actual Level of Effort | Remaining Work | Milestone

TASK filters: No Accropode Tetrapod, Period Dec 2014 to Feb 2015.

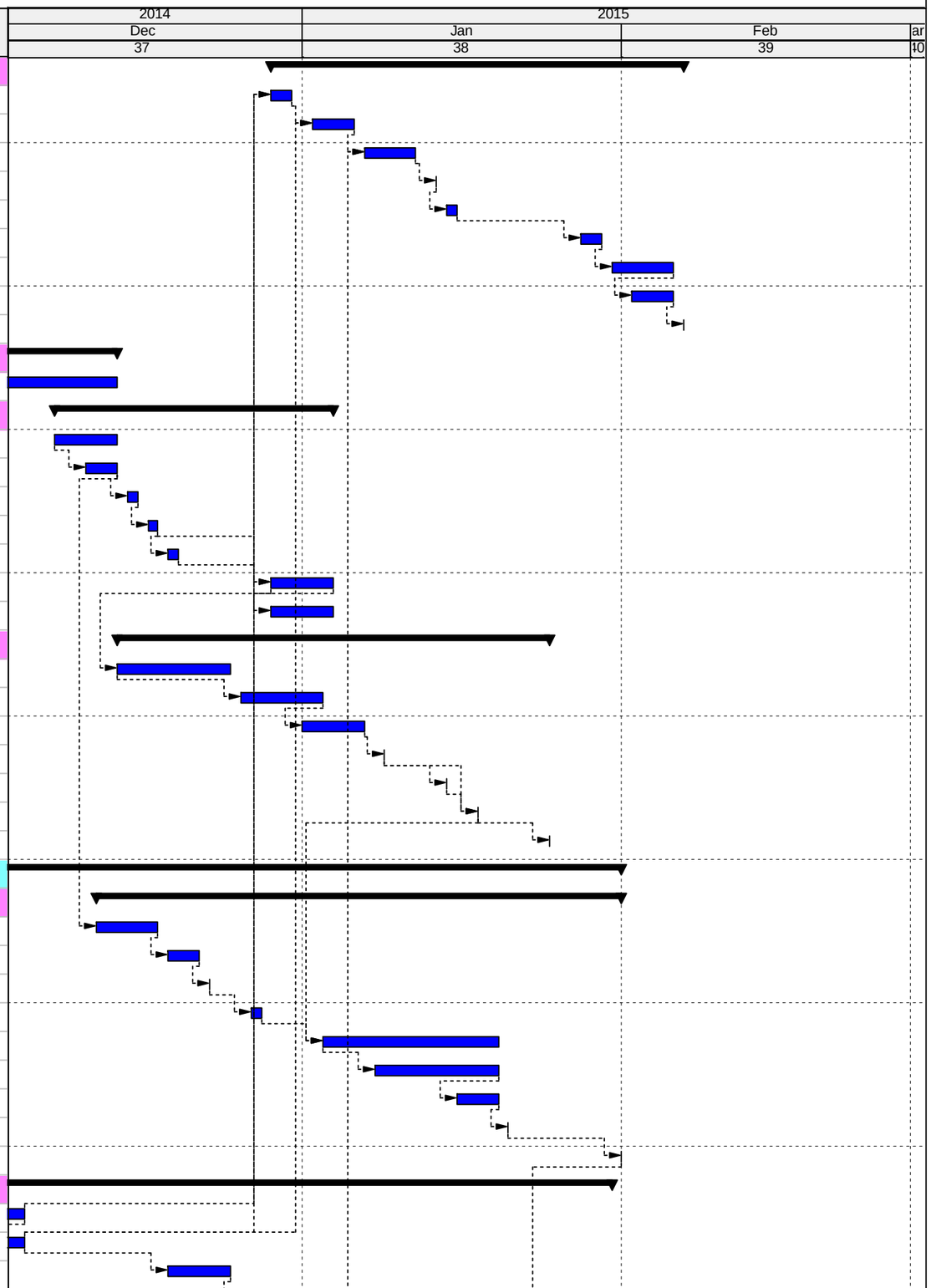
Activity ID	Activity Name	Start	Finish
SD-20 C104		15-Dec-14 A	17-Feb-15 A
CTSD-200	Installation of SD-20 (C104) PC2a	15-Dec-14 A	17-Feb-15 A
SD-21 C108		02-Feb-15 A	18-Feb-15 A
CTSD-210	Installation of SD-21 (C108) PC2a	02-Feb-15 A	18-Feb-15 A
SD-22 C113		21-Jan-15 A	18-Feb-15 A
CTSD-220	Installation of SD-22 (C113) PC2a	21-Jan-15 A	18-Feb-15 A
SD-23 C118		21-Jan-15 A	18-Feb-15 A
CTSD-230	Installation of SD-23 (C118) PC2a	21-Jan-15 A	18-Feb-15 A
Geotechnical Instrumentation Works for Reclamation RA & RB		01-Nov-14 A	28-Feb-15 A
RA		16-Dec-14 A	09-Jan-15 A
CTRA-060	Installation of RA 6sets at PC1b	27-Dec-14 A	05-Jan-15 A
CTRA-070	Installation of RA 4sets at PC2a	18-Dec-14 A	31-Dec-14 A
CTRA-090	Installation of RA 4sets at PC2c	16-Dec-14 A	09-Jan-15 A
RB		01-Nov-14 A	20-Dec-14 A
SMT1-060	Installation of RB at PC1b	01-Nov-14 A	20-Dec-14 A
Settlement Marker Type 2		01-Nov-14 A	28-Feb-15 A
SMT2-060	M2 - Installation of Settlement Marker Type2 at PC1b	01-Nov-14 A	20-Dec-14 A
SMT2-070	M2 - Installation of Settlement Marker Type2 at PC2a	02-Dec-14 A	09-Dec-14 A
SMT2-080	M2 - Installation of Settlement Marker Type2 at PC2b	21-Feb-15 A	28-Feb-15 A
SMT2-090	M2 - Installation of Settlement Marker Type2 at PC2c	08-Dec-14 A	15-Dec-14 A
Portion D		18-Sep-14 A	04-Mar-15 A
Precast Yard for Seawall Blocks & Culverts		18-Sep-14 A	04-Mar-15 A
Culverts		18-Sep-14 A	04-Mar-15 A
Culverts C1		27-Nov-14 A	11-Feb-15 A
C1-2		01-Feb-15 A	11-Feb-15 A
PY-C1-2010	PD C01-2 - Foundation Platform	01-Feb-15 A	03-Feb-15 A
PY-C1-2020	PD C01-2 - Foundation Rebar Fixing	03-Feb-15 A	10-Feb-15 A
PY-C1-2030	PD C01-2 - Foundation Formwork	09-Feb-15 A	10-Feb-15 A
PY-C1-2040	PD C01-2 - Foundation Concrete	11-Feb-15 A	11-Feb-15 A
C1-4		07-Jan-15 A	07-Feb-15 A
PY-C1-4010	PD C01-4 - Foundation Platform	07-Jan-15 A	10-Jan-15 A
PY-C1-4020	PD C01-4 - Foundation Rebar Fixing	11-Jan-15 A	19-Jan-15 A
PY-C1-4030	PD C01-4 - Foundation Formwork	20-Jan-15 A	26-Jan-15 A
PY-C1-4040	PD C01-4 - Foundation Concrete	27-Jan-15 A	27-Jan-15 A
PY-C1-4050	PD C01-4 - Foundation Formwork Removal	04-Feb-15 A	07-Feb-15 A
C1-5		27-Nov-14 A	09-Dec-14 A
PY-C1-5030	PD C01-5 - Foundation Formwork	27-Nov-14 A	06-Dec-14 A
PY-C1-5040	PD C01-5 - Foundation Concrete	07-Dec-14 A	08-Dec-14 A
PY-C1-5050	PD C01-5 - Foundation Formwork Removal	09-Dec-14 A	09-Dec-14 A
Culverts C2		20-Jan-15 A	04-Mar-15 A
C2-3		20-Jan-15 A	04-Mar-15 A
PY-C2-3010	PD C02-3 - Foundation Platform	20-Jan-15 A	04-Mar-15 A
Culverts C3		18-Sep-14 A	07-Feb-15 A



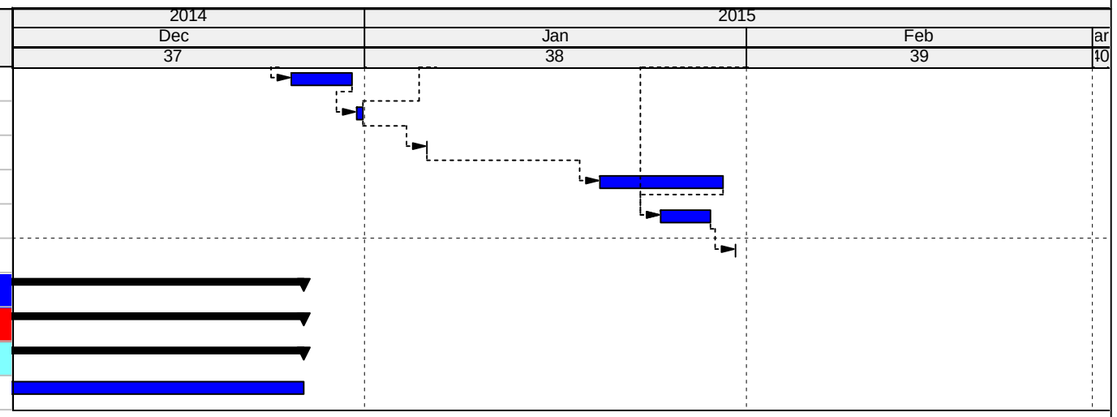
Remaining Level of Effort | Actual Work | Critical Remaining W...
Actual Level of Effort | Remaining Work | Milestone

TASK filters: No Accropode Tetrapod, Period Dec 2014 to Feb 2015.

Activity ID	Activity Name	Start	Finish
C3-2		29-Dec-14 A	07-Feb-15 A
PY-C3-2010	PD C03-2 - Foundation Platform	29-Dec-14 A	31-Dec-14 A
PY-C3-2020	PD C03-2 - Foundation Rebar Fixing	02-Jan-15 A	06-Jan-15 A
PY-C3-2030	PD C03-2 - Foundation Formwork	07-Jan-15 A	12-Jan-15 A
PY-C3-2040	PD C03-2 - Foundation Concrete	14-Jan-15 A	14-Jan-15 A
PY-C3-2050	PD C03-2 - Foundation Formwork Removal	15-Jan-15 A	16-Jan-15 A
PY-C3-2060	PD C03-2 - Wall internal Formwork	28-Jan-15 A	30-Jan-15 A
PY-C3-2070	PD C03-2 - Wall Rebar Fixing	31-Jan-15 A	06-Feb-15 A
PY-C3-2080	PD C03-2 - Wall External Formwork	02-Feb-15 A	06-Feb-15 A
PY-C3-2090	PD C03-2 - Wall Concrete	07-Feb-15 A	07-Feb-15 A
C3-3		18-Sep-14 A	14-Dec-14 A
PY-C3-3000	PD C03-3 (38.84m) Casting	18-Sep-14 A	14-Dec-14 A
C3-4		08-Dec-14 A	04-Jan-15 A
PY-C3-4060	PD C03-4 - Wall internal Formwork	08-Dec-14 A	14-Dec-14 A
PY-C3-4070	PD C03-4 - Wall Rebar Fixing	11-Dec-14 A	14-Dec-14 A
PY-C3-4080	PD C03-4 - Wall External Formwork	15-Dec-14 A	16-Dec-14 A
PY-C3-4090	PD C03-4 - Wall Concrete	17-Dec-14 A	18-Dec-14 A
PY-C3-4100	PD C03-4 - Wall External Formwork Removal	19-Dec-14 A	20-Dec-14 A
PY-C3-4110	PD C03-4 - Wall Internal Formwork Removal	29-Dec-14 A	04-Jan-15 A
PY-C3-4120	PD C03-4 - Top Slab Formwork Removal	29-Dec-14 A	04-Jan-15 A
C3-5		14-Dec-14 A	25-Jan-15 A
PY-C3-5060	PD C03-5 - Wall internal Formwork	14-Dec-14 A	25-Dec-14 A
PY-C3-5070	PD C03-5 - Wall Rebar Fixing	26-Dec-14 A	03-Jan-15 A
PY-C3-5080	PD C03-5 - Wall External Formwork	01-Jan-15 A	07-Jan-15 A
PY-C3-5090	PD C03-5 - Wall Concrete	09-Jan-15 A	09-Jan-15 A
PY-C3-5100	PD C03-5 - Wall External Formwork Removal	15-Jan-15 A	15-Jan-15 A
PY-C3-5110	PD C03-5 - Wall Internal Formwork Removal	18-Jan-15 A	18-Jan-15 A
PY-C3-5120	PD C03-5 - Top Slab Formwork Removal	25-Jan-15 A	25-Jan-15 A
Culverts C4		02-Dec-14 A	01-Feb-15 A
C4-2		12-Dec-14 A	01-Feb-15 A
PY-C4-2020	PD C04-2 - Foundation Rebar Fixing	12-Dec-14 A	18-Dec-14 A
PY-C4-2030	PD C04-2 - Foundation Formwork	19-Dec-14 A	22-Dec-14 A
PY-C4-2040	PD C04-2 - Foundation Concrete	23-Dec-14 A	23-Dec-14 A
PY-C4-2050	PD C04-2 - Foundation Formwork Removal	27-Dec-14 A	28-Dec-14 A
PY-C4-2060	PD C04-2 - Wall internal Formwork	03-Jan-15 A	20-Jan-15 A
PY-C4-2070	PD C04-2 - Wall Rebar Fixing	08-Jan-15 A	20-Jan-15 A
PY-C4-2080	PD C04-2 - Wall External Formwork	16-Jan-15 A	20-Jan-15 A
PY-C4-2090	PD C04-2 - Wall Concrete	21-Jan-15 A	21-Jan-15 A
PY-C4-2100	PD C04-2 - Wall External Formwork Removal	01-Feb-15 A	01-Feb-15 A
C4-5		02-Dec-14 A	31-Jan-15 A
PY-C4-5010	PD C04-5 - Foundation Platform	02-Dec-14 A	05-Dec-14 A
PY-C4-5020	PD C04-5 - Foundation Rebar Fixing	02-Dec-14 A	05-Dec-14 A
PY-C4-5030	PD C04-5 - Foundation Formwork	19-Dec-14 A	25-Dec-14 A



Activity ID	Activity Name	Start	Finish
PY-C4-5040	PD C04-5 - Foundation Concrete	26-Dec-14 A	31-Dec-14 A
PY-C4-5050	PD C04-5 - Foundation Formwork Removal	31-Dec-14 A	31-Dec-14 A
PY-C4-5060	PD C04-5 - Wall internal Formwork	06-Jan-15 A	06-Jan-15 A
PY-C4-5070	PD C04-5 - Wall Rebar Fixing	20-Jan-15 A	30-Jan-15 A
PY-C4-5080	PD C04-5 - Wall External Formwork	25-Jan-15 A	29-Jan-15 A
PY-C4-5090	PD C04-5 - Wall Concrete	31-Jan-15 A	31-Jan-15 A
Site Construction		10-Nov-14 A	27-Dec-14 A
Surcharge		10-Nov-14 A	27-Dec-14 A
East2 Portion		10-Nov-14 A	27-Dec-14 A
A2258	PD East2 - Surcharge Laying upto +11.5mPD 42,843m3 5,000m3/day	10-Nov-14 A	27-Dec-14 A



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 than 2.4m high should be provided as far as practicable along the site boundary	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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 on the top and the 3 sides; • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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 system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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; • 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 construction sites	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• 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 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	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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 EIA report at all construction sites	V
S6.4.14 of HKBCFEIA	N5	Sequencing operation of construction plants where practicable.	All construction sites where practicable	V
S5.1 of	N6	Implement a noise monitoring under EM&A programme.	Selected	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
TMCLKLEIA			representative noise monitoring station	
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; • 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;	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• 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 TMCLKLEIA	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 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	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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 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	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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 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	All construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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.		
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:	During filling	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• 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 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		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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 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	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:	All land-based construction sites	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
TMCLKLEIA		• 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 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		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		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 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;		

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• 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 and S6.10 of TMCLKLEIA	W3	Implement a water quality monitoring programme	At identified monitoring location	V
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	Seawall, reclamation area	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		• Good site practices • Strict enforcement of no marine dumping • Site runoff control • Spill response plan		
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
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	E6	• Control vessel speed	Marine traffic	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
HKBCFEIA and S8.14 of TMCLKLEIA		• Skipper training • Predefined and regular routes for working vessels; avoid Brothers Islands		
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 • Strict enforcement of no marine dumping • Spill response plan	Seawall, reclamation area	V
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	All construction site areas	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Location	Implementation Status
		rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of new coastline.		
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				
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 μg/m^3	500 μg/m^3
AMS3B*	368 μg/m^3	500 μg/m^3
AMS6	360 μg/m^3	500 μg/m^3
AMS7/7A^	370 μg/m^3	500 μg/m^3

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

^ Action Level set out at AMS7 Hong Kong SkyCity Marriot Hotel is adopted

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

Location	Action Level	Limit Level
AMS2	176 μg/m^3	260 μg/m^3
AMS3B*	167 μg/m^3	260 μg/m^3
AMS6	173 μg/m^3	260 μg/m^3
AMS7/7A^	183 μg/m^3	260 μg/m^3

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

^ Action Level set out at AMS7 Hong Kong SkyCity Marriot Hotel 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)
NMS3B		*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.

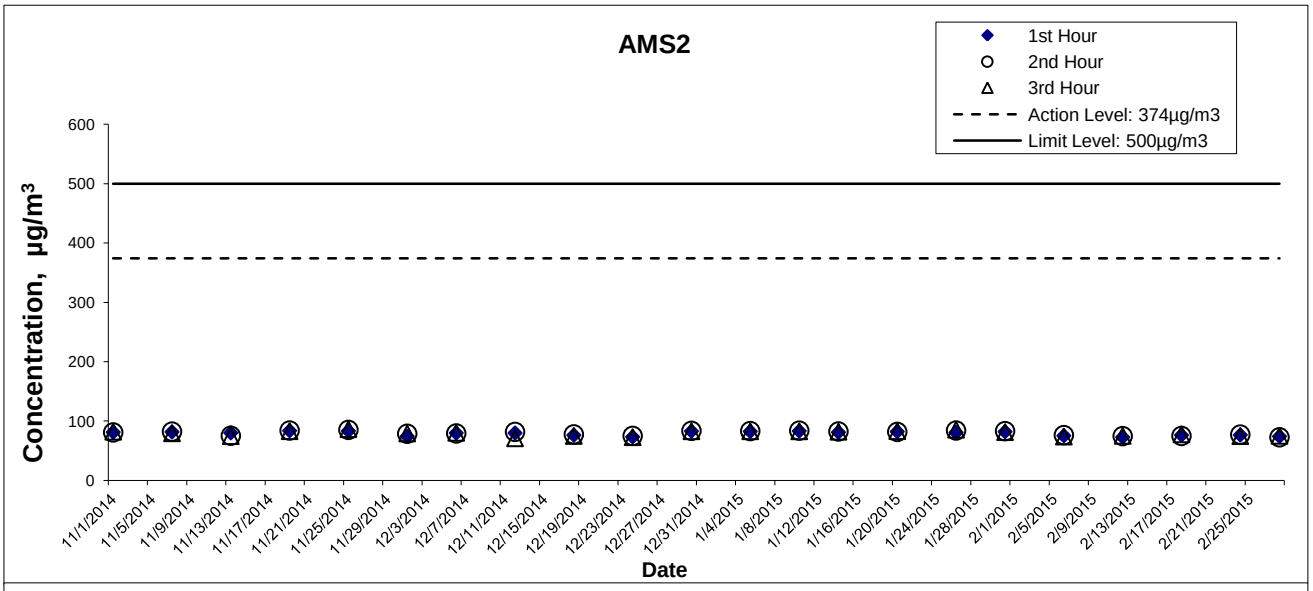
Table 5(a) Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL):

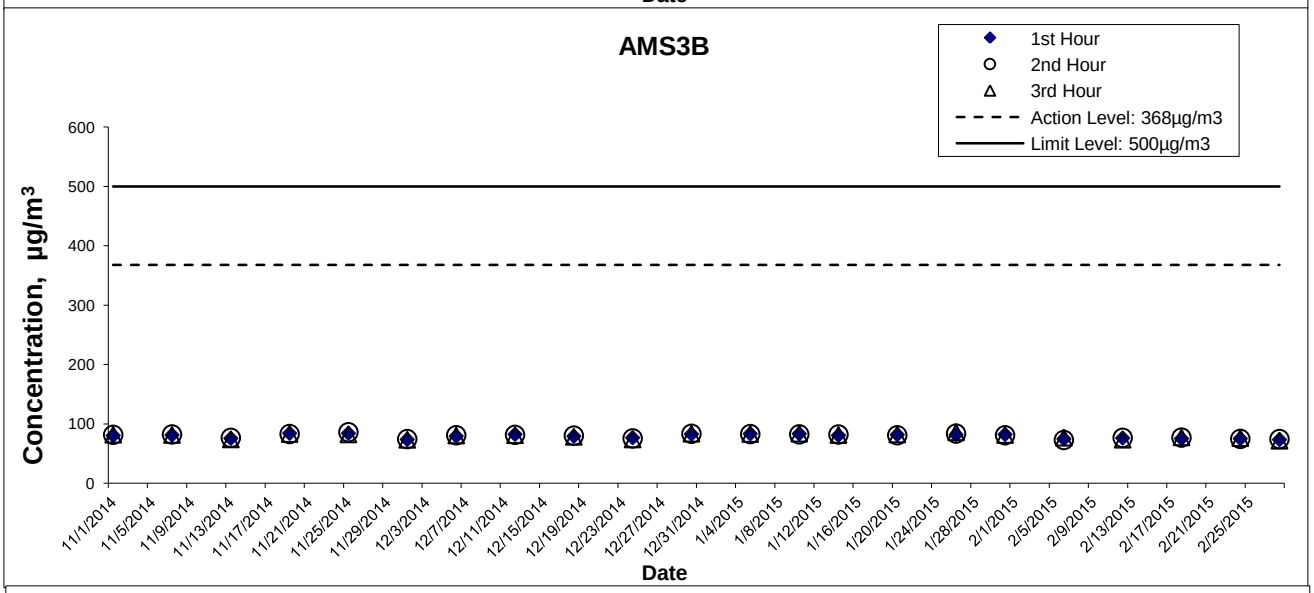
	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG < 70% of baseline) & (ANI < 70% of baseline)	(STG < 70% of baseline) & (ANI < 70% of baseline)
Limit Level	[(STG < 40% of baseline) & (ANI < 40% of baseline)] AND [(STG < 40% of baseline) & (ANI < 40% of baseline)]	

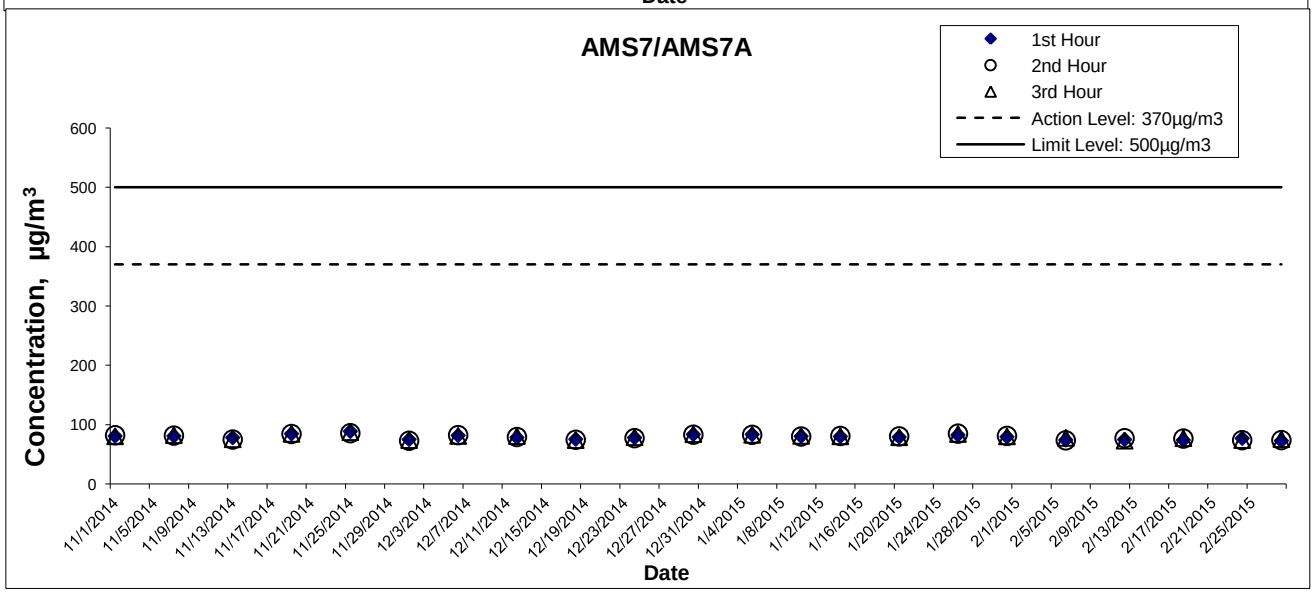
For North Lantau Social Cluster, action level will be trigger if either NEL **or** NWL fall below the criteria; limit level will be triggered if both NEL **and** NWL fall below the criteria.

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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HONG KONG BOUNDARY CROSSING FACILITIES
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AECOM

Graphical Presentation of Impact 1-hour TSP Monitoring Results

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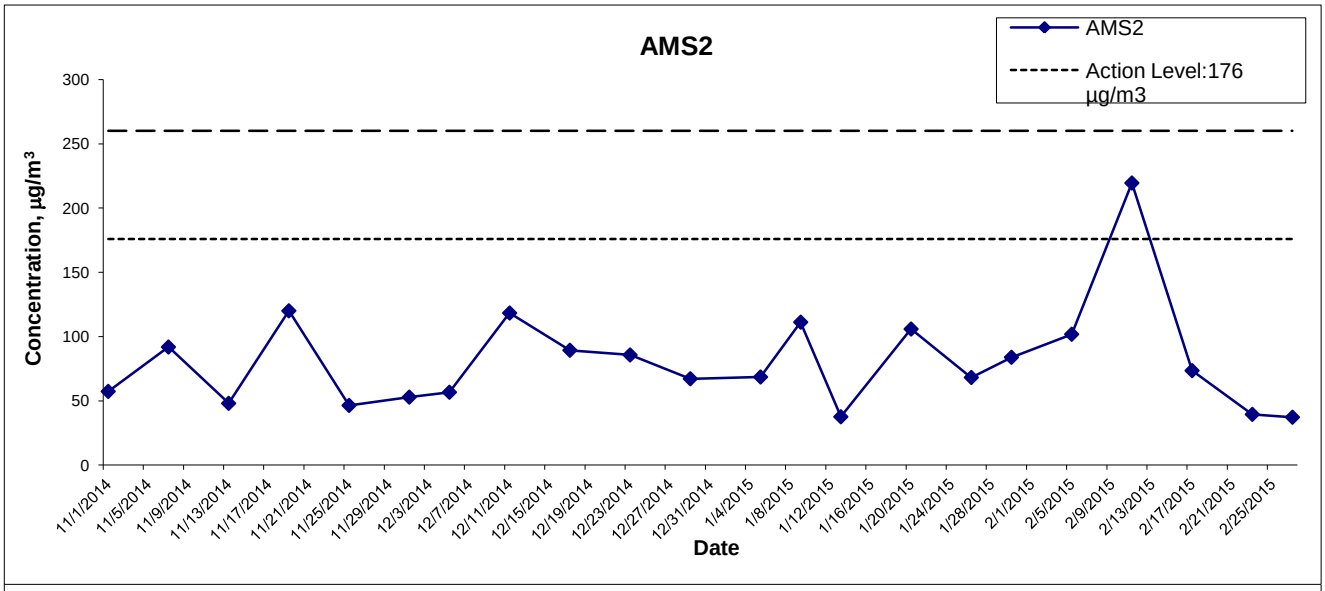
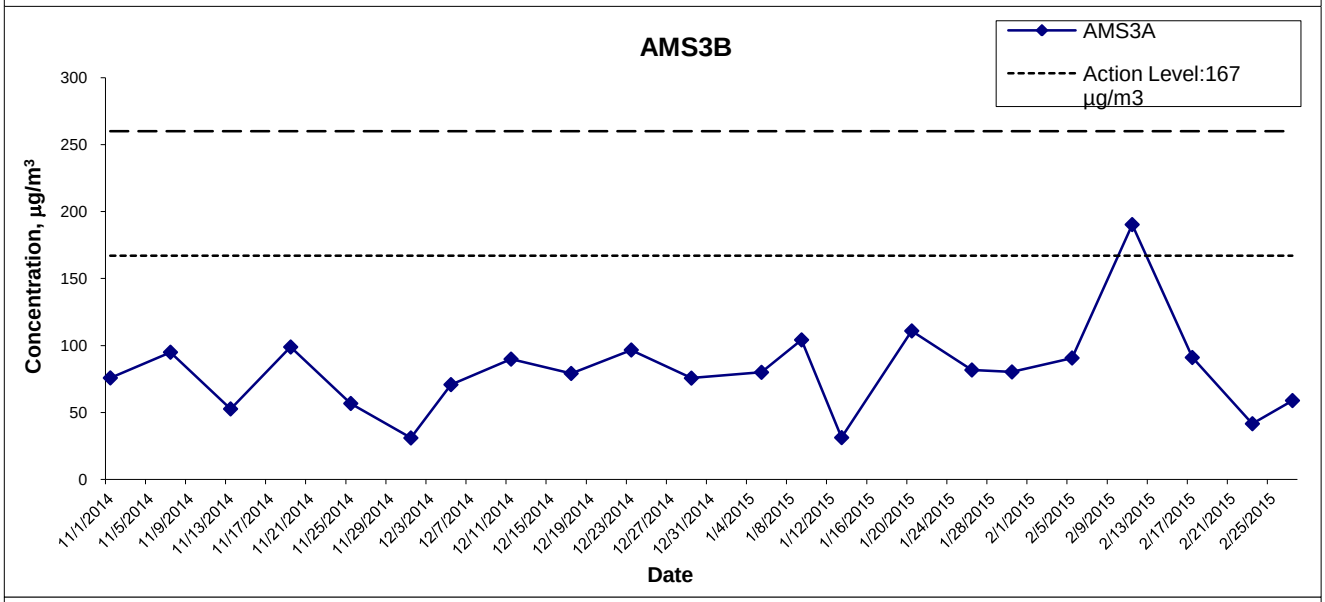
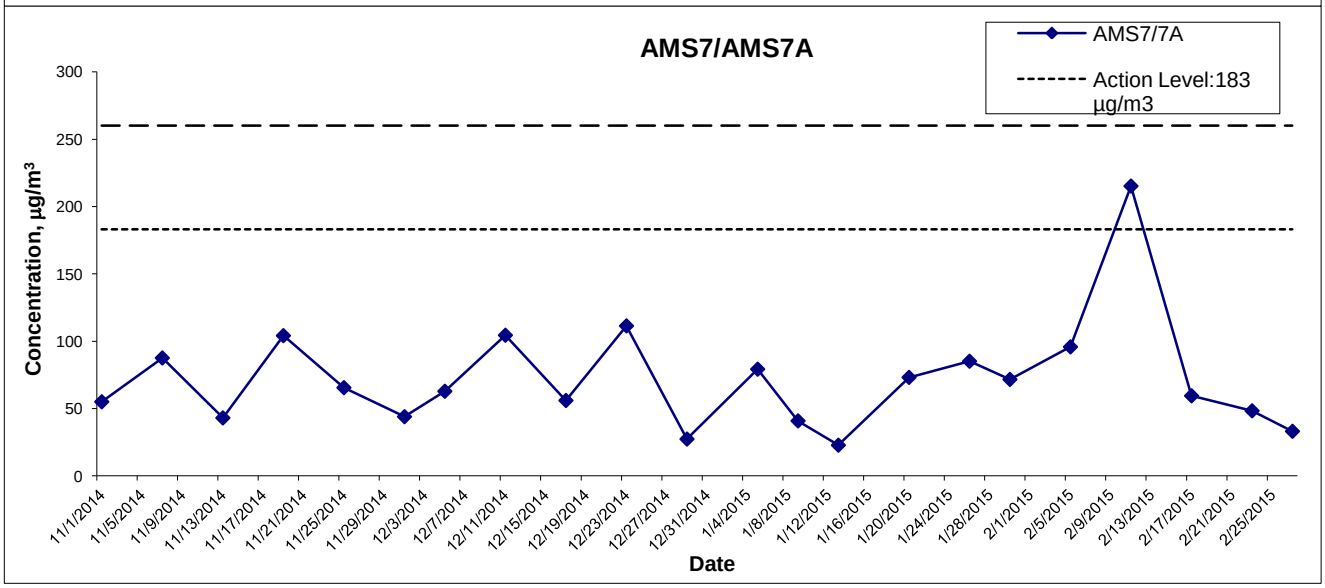
Appendix E







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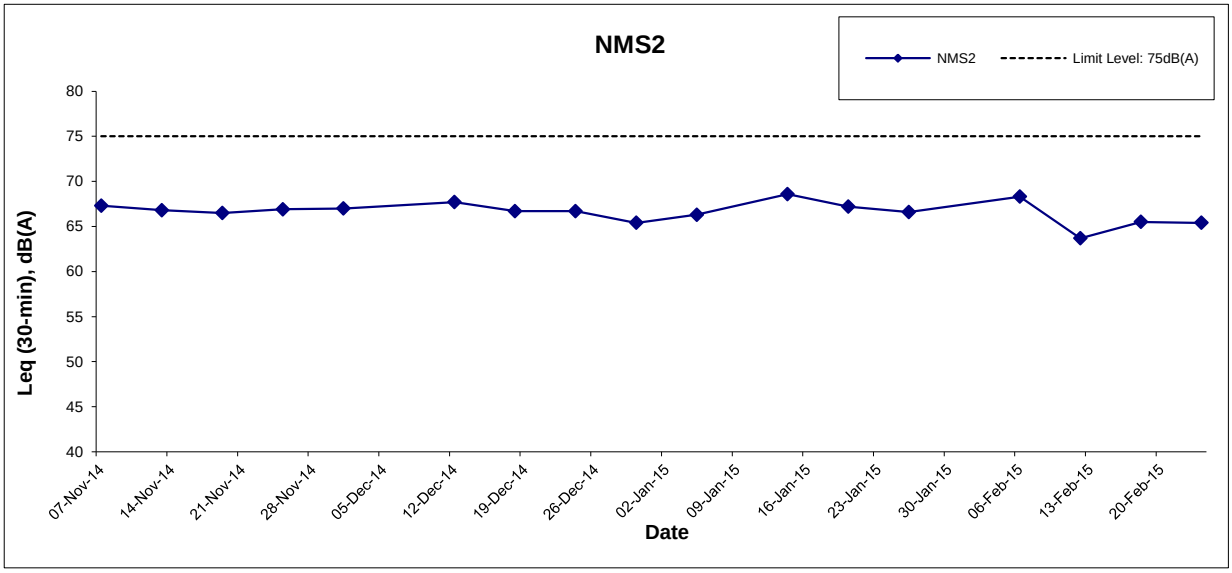
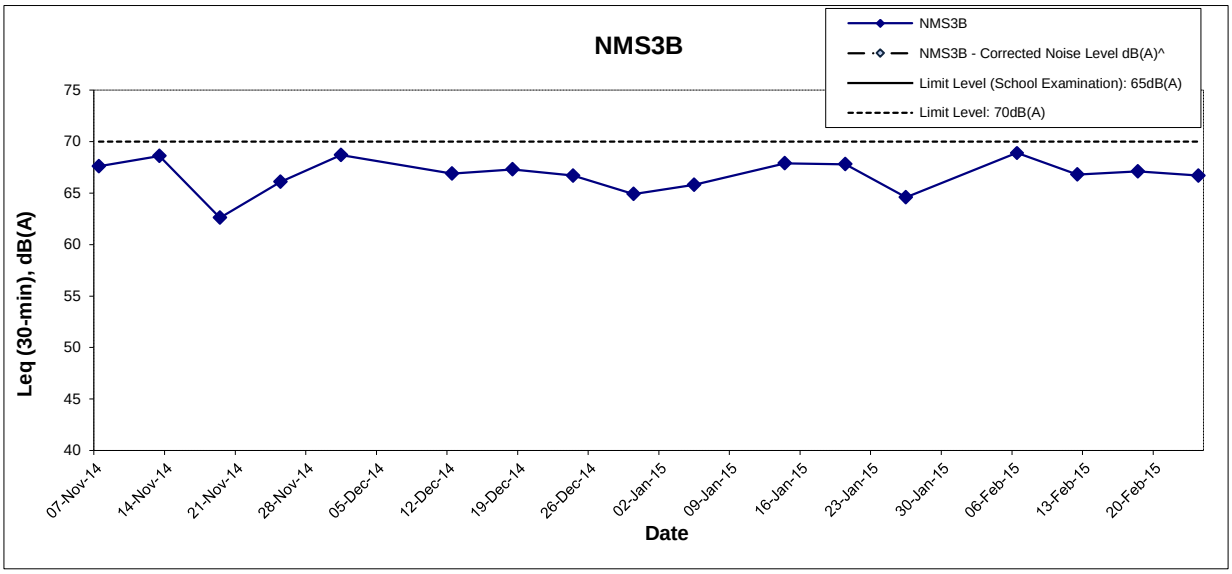
AECOM

Graphical Presentation of Impact 24-hour TSP Monitoring Results

Project No.: 60249820 **Date: March 2015**

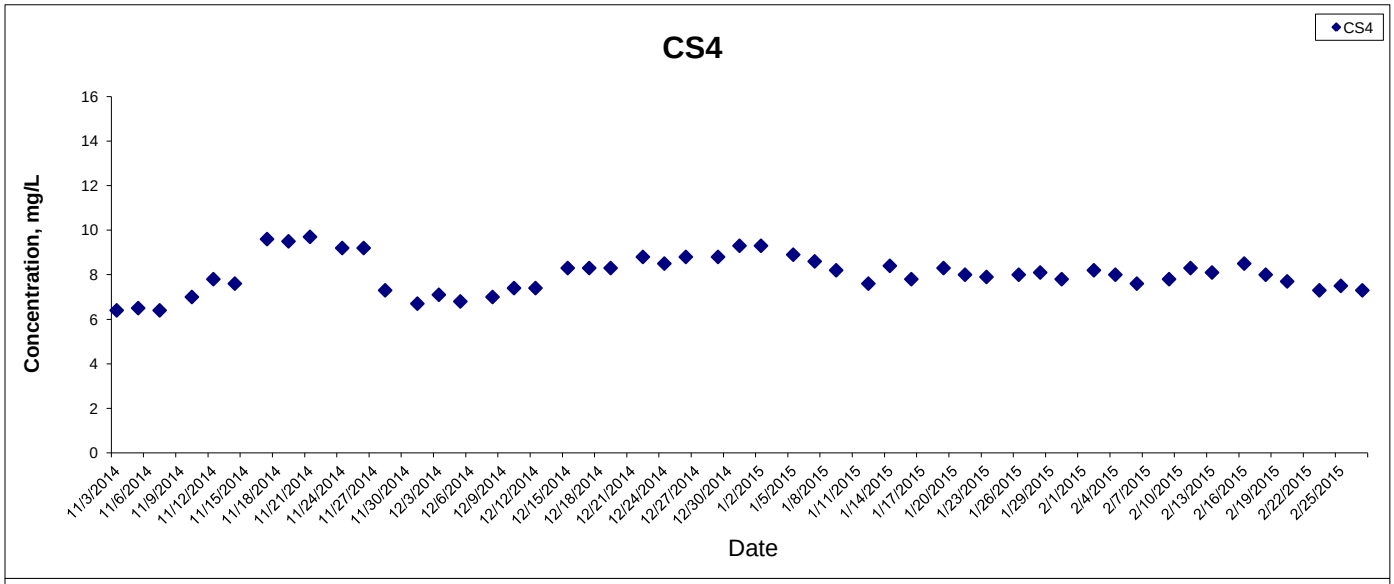
Appendix E

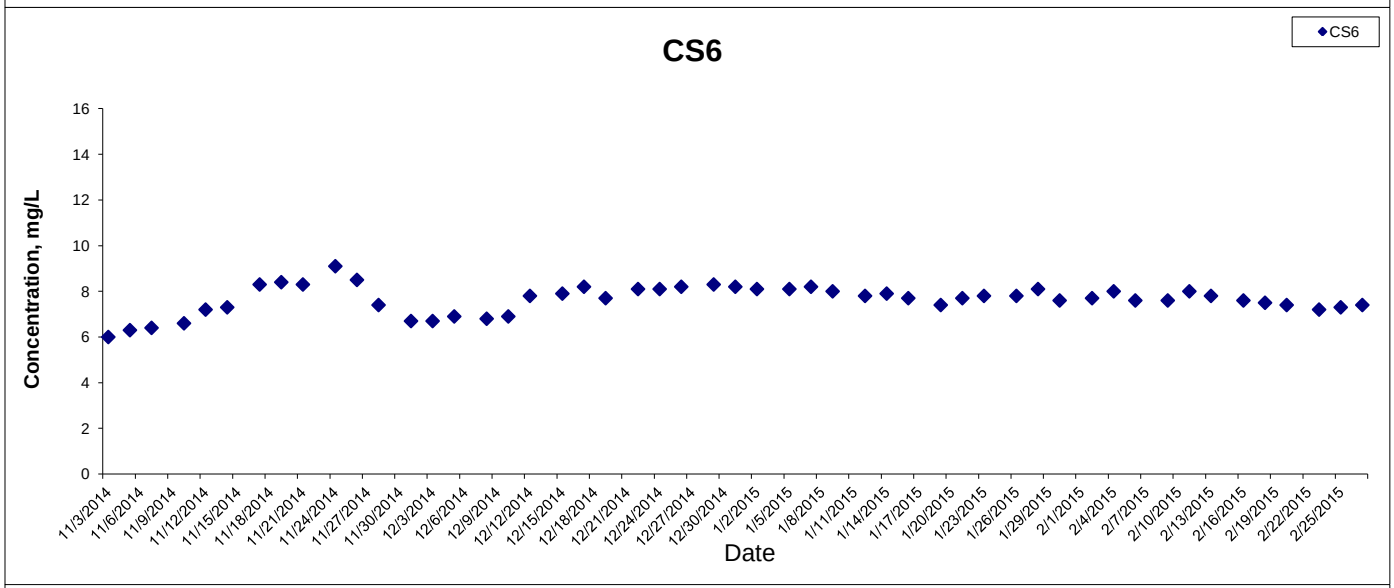


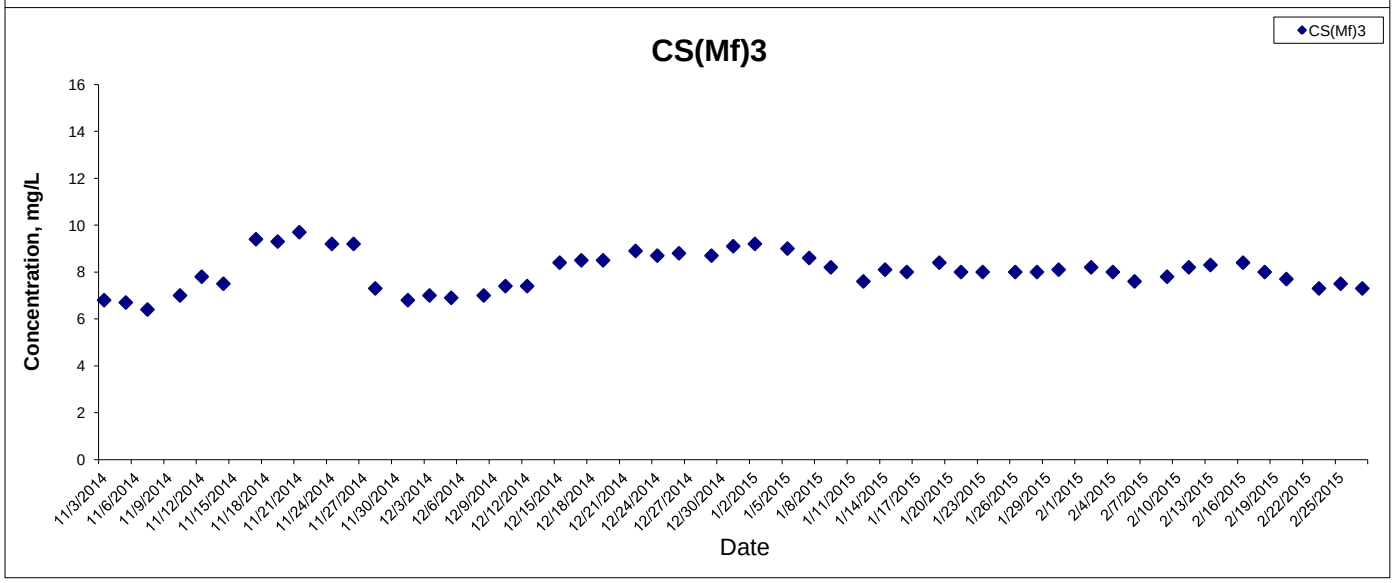


Remarks: Effective from July 2012, the Limit Level at NMS3A was revised to 70dB(A). Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65dB(A) applies during school examination period.

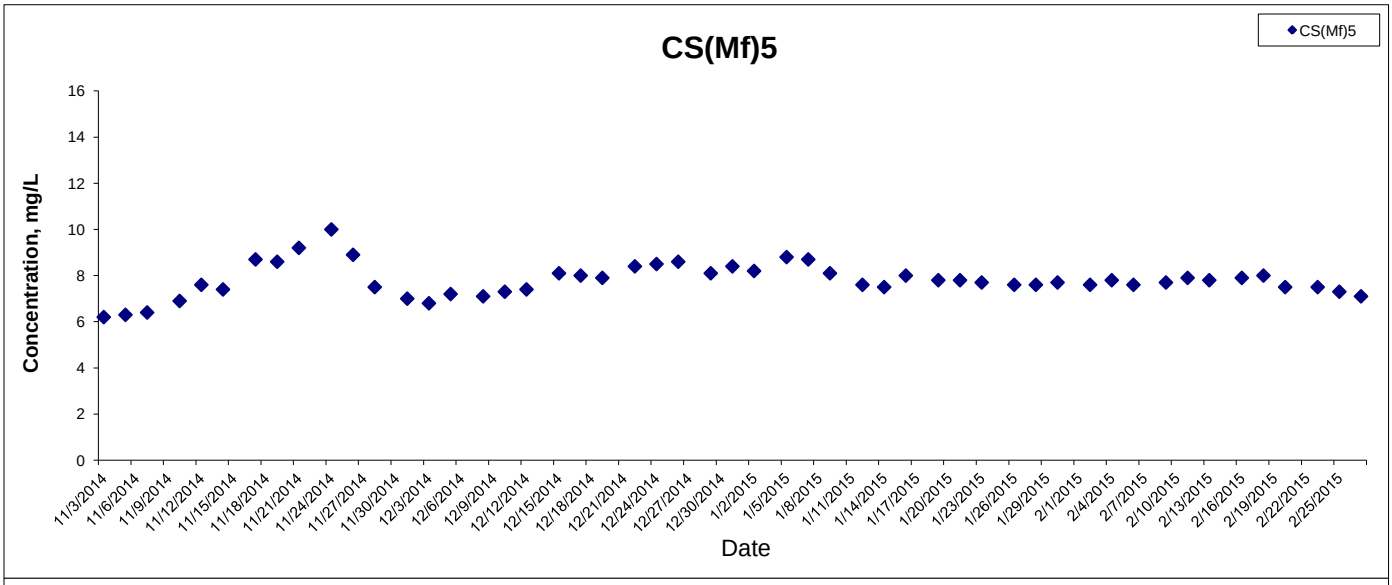
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

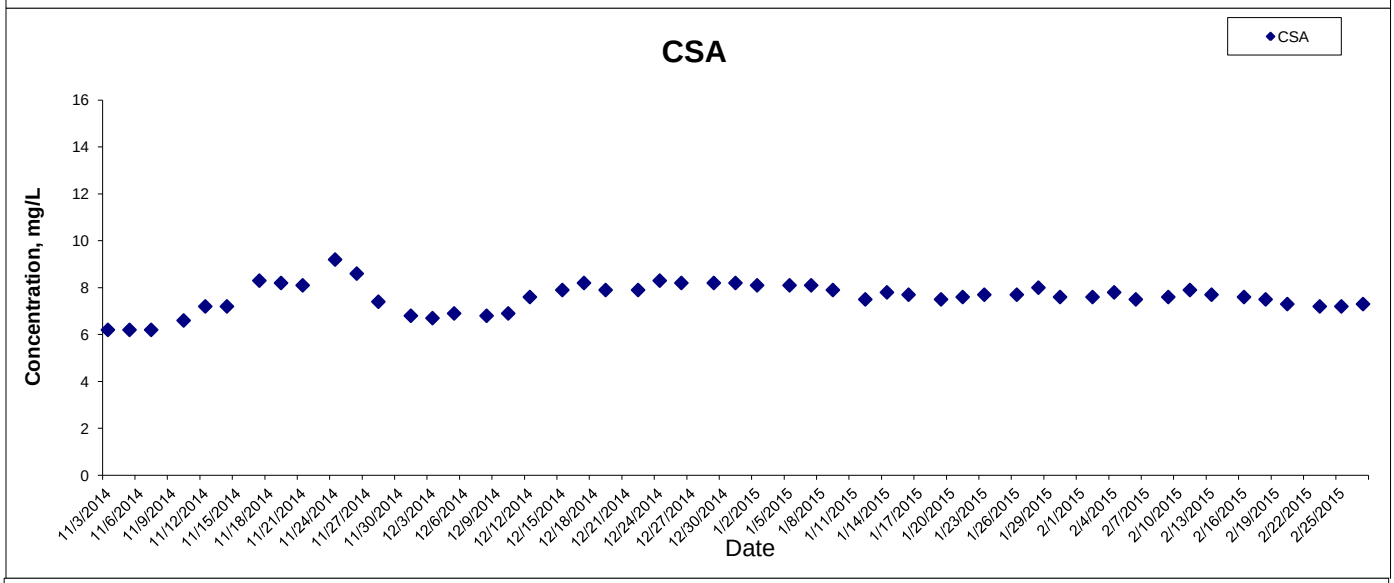


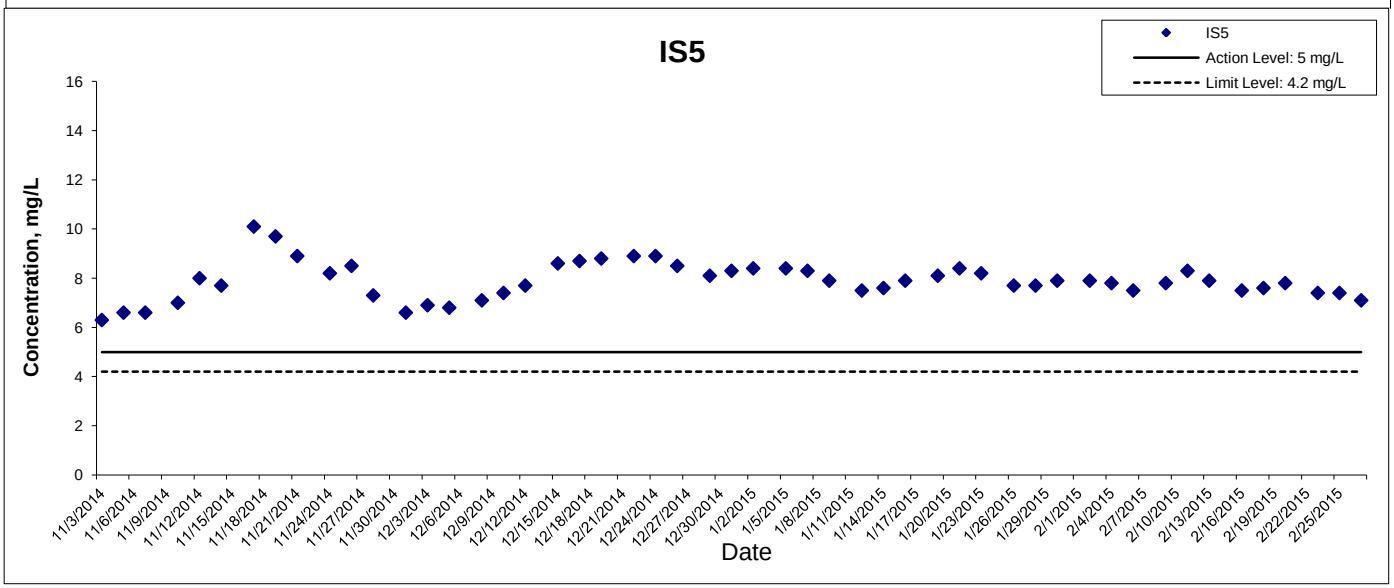




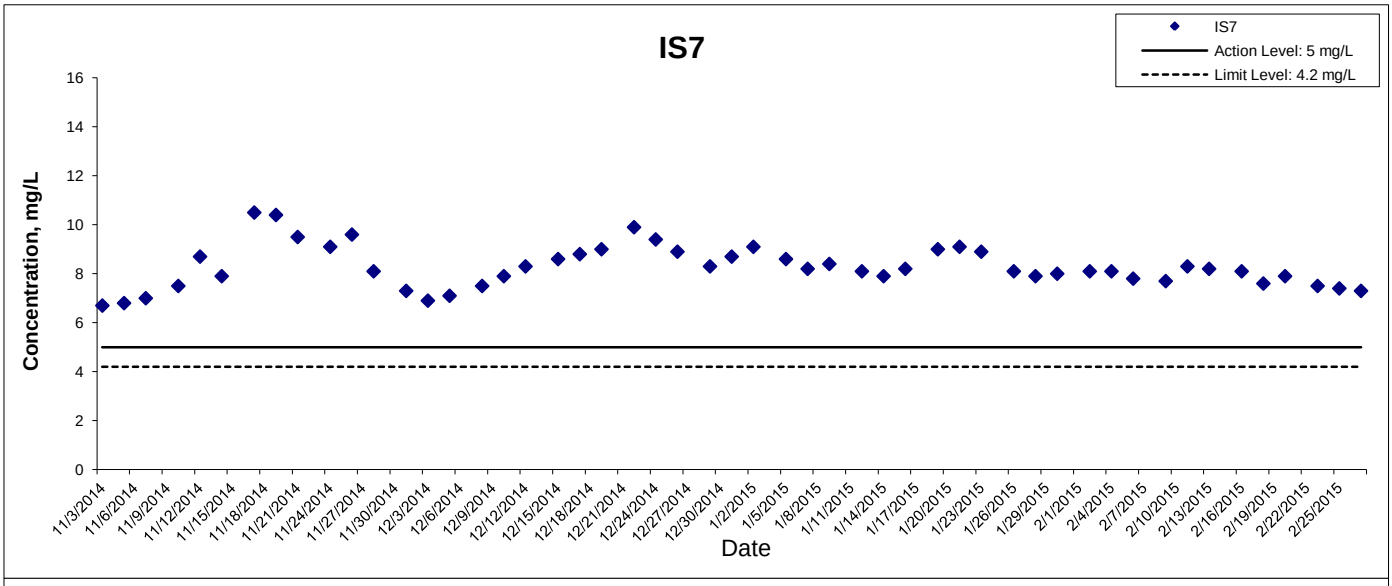
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

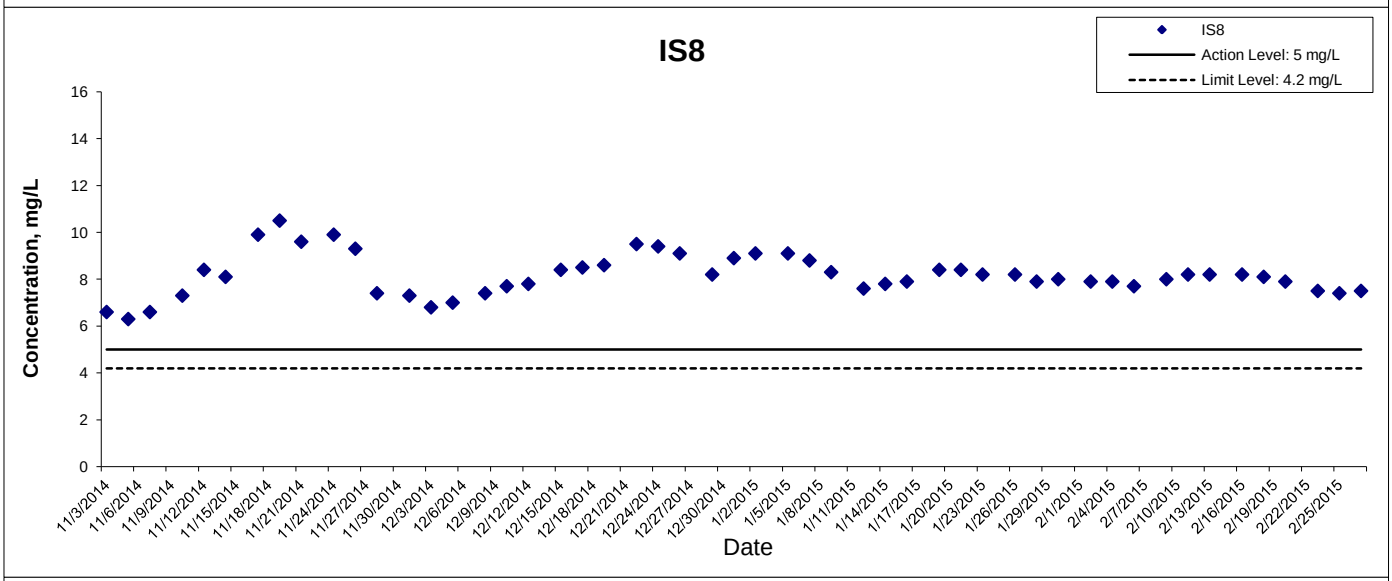


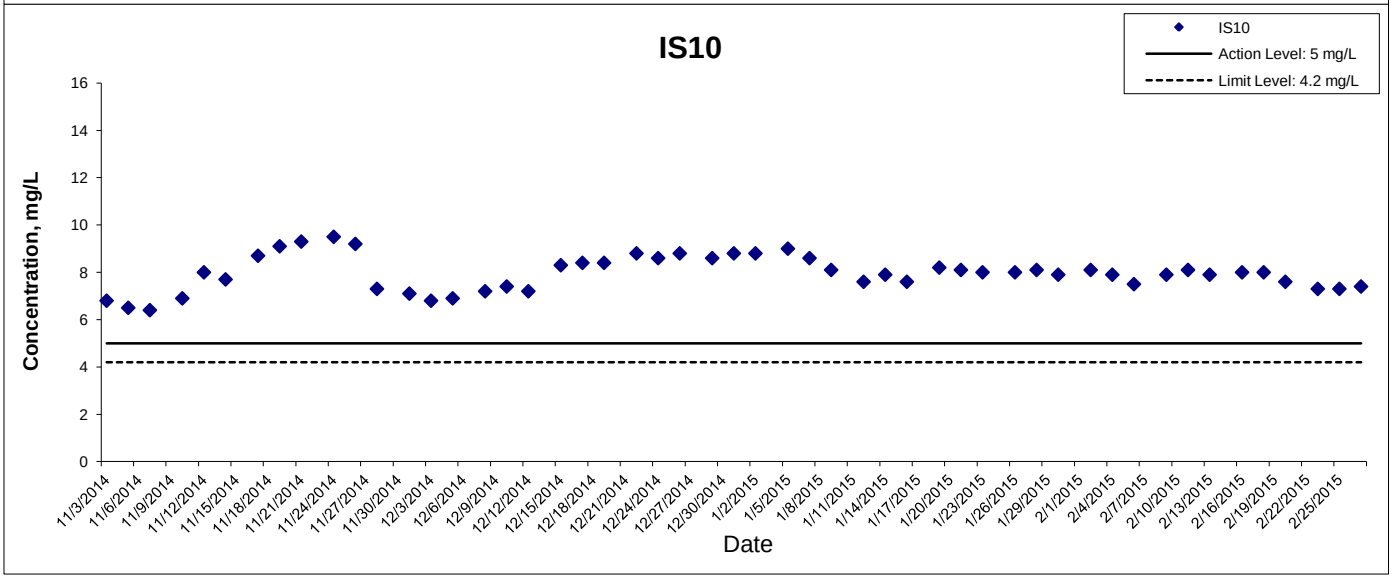




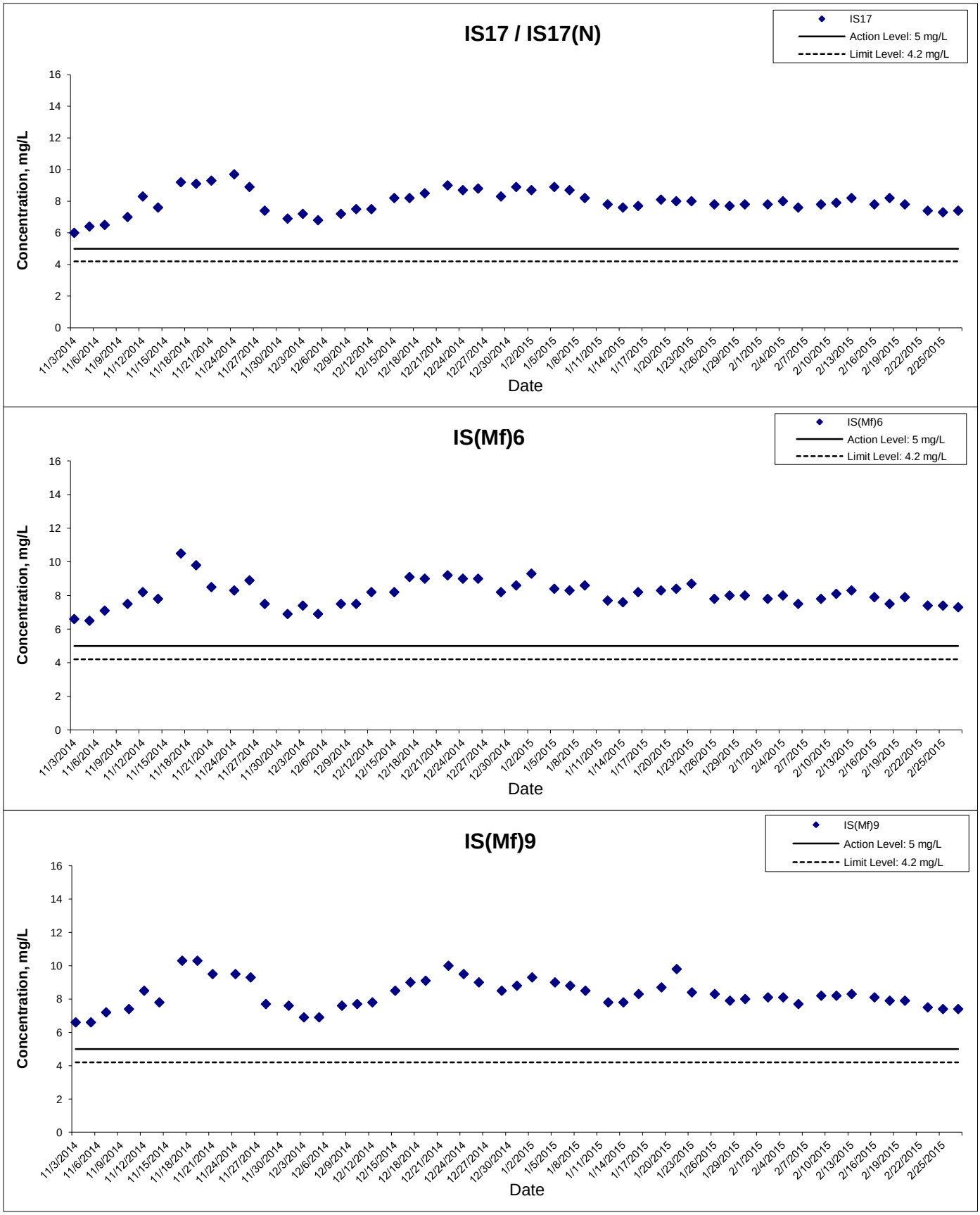
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

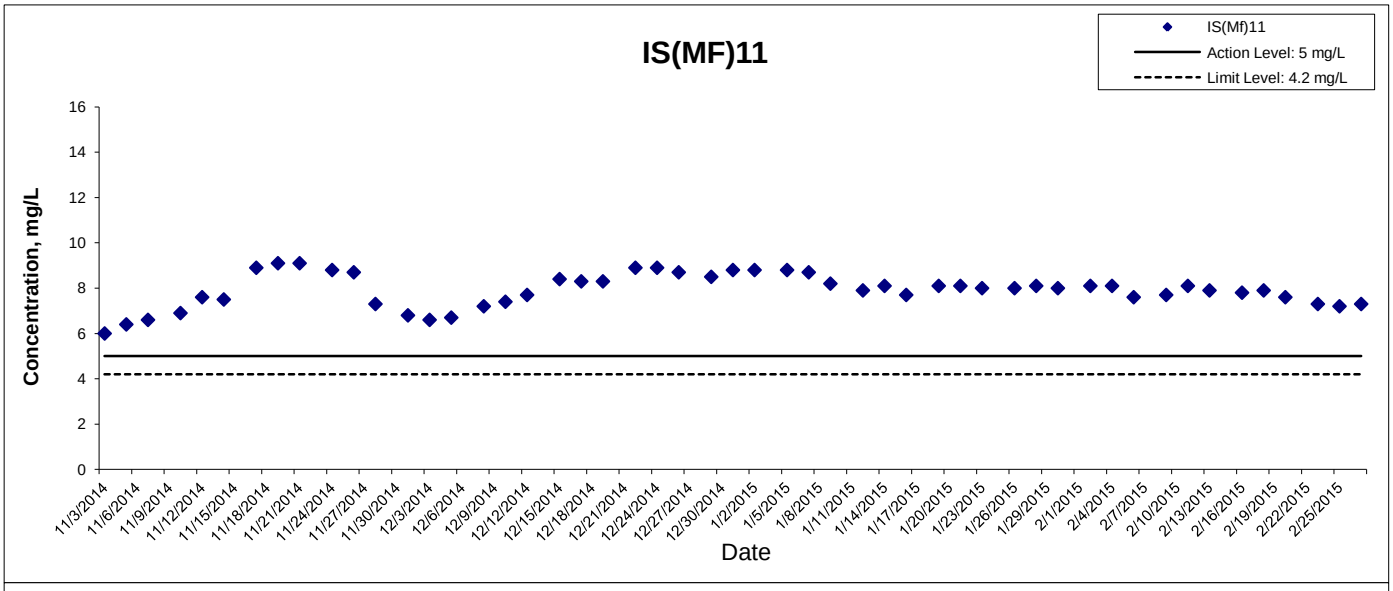


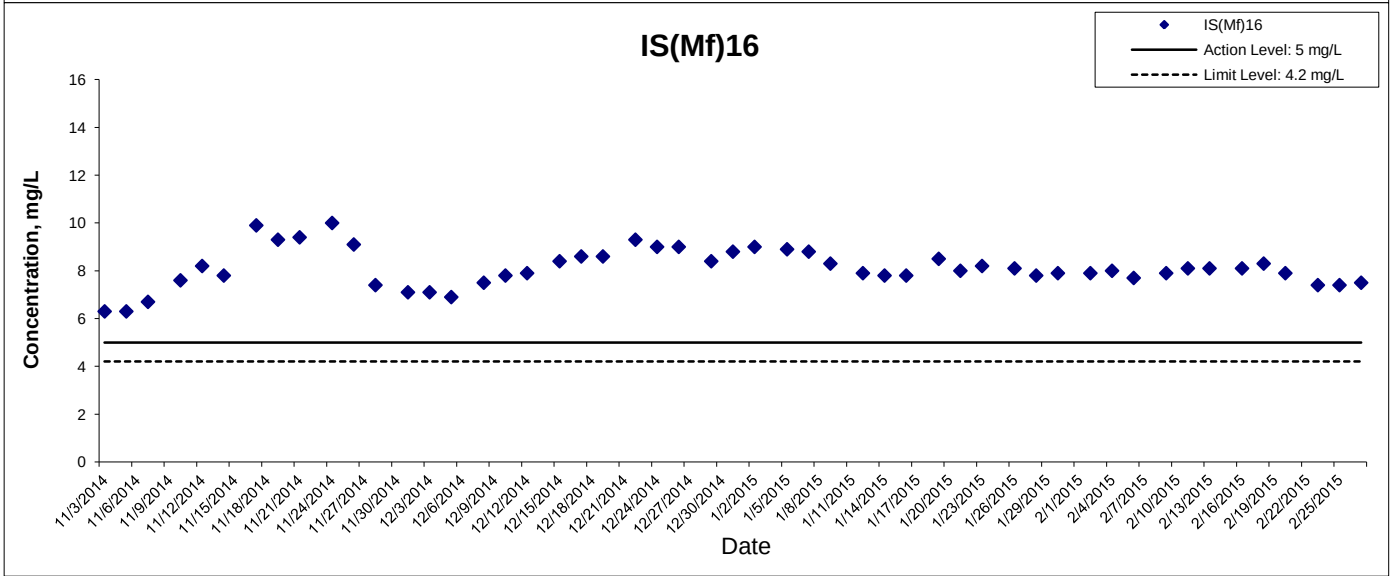


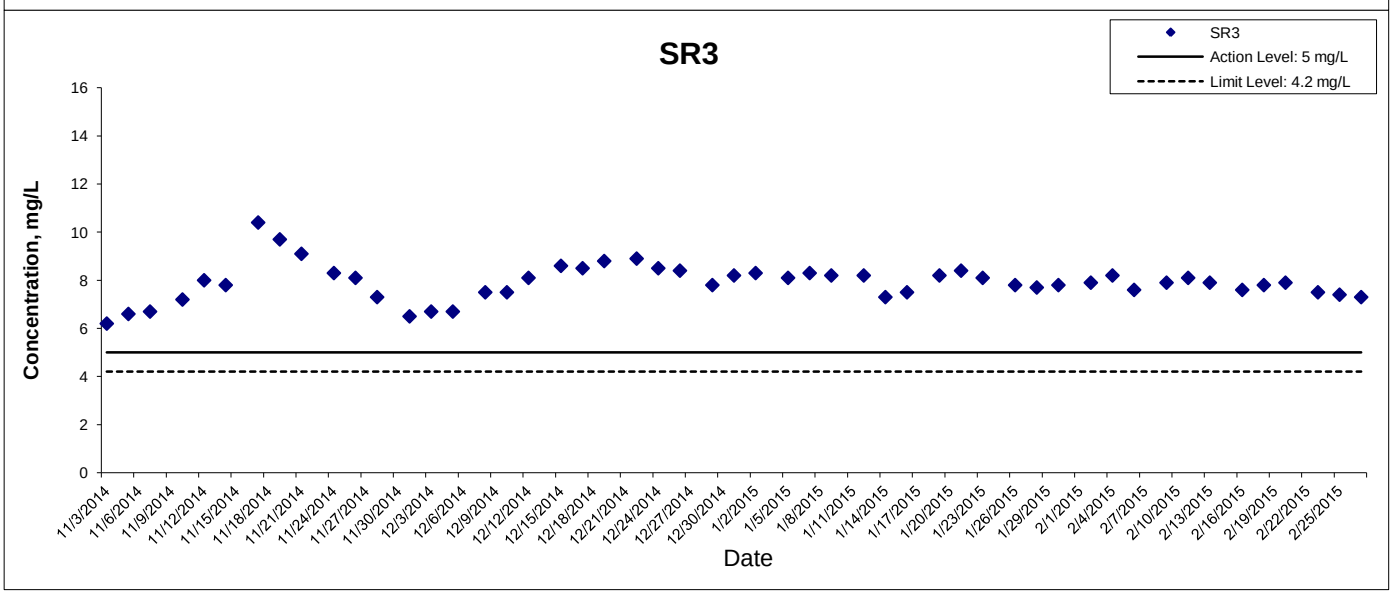


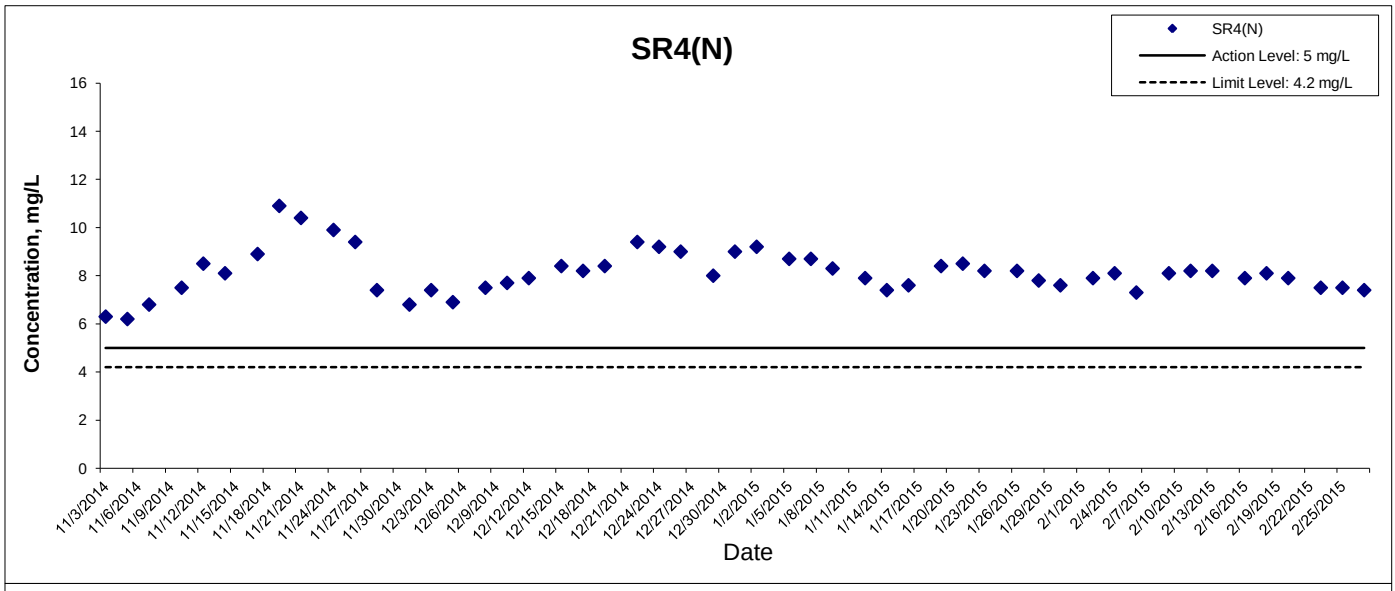
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

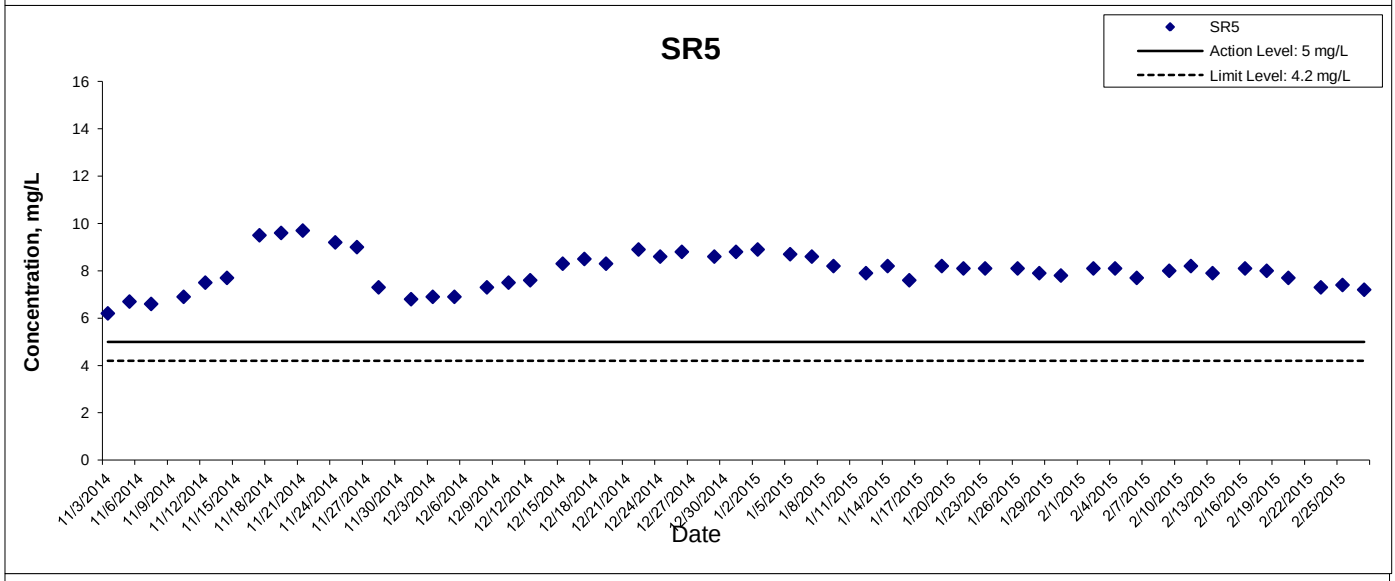


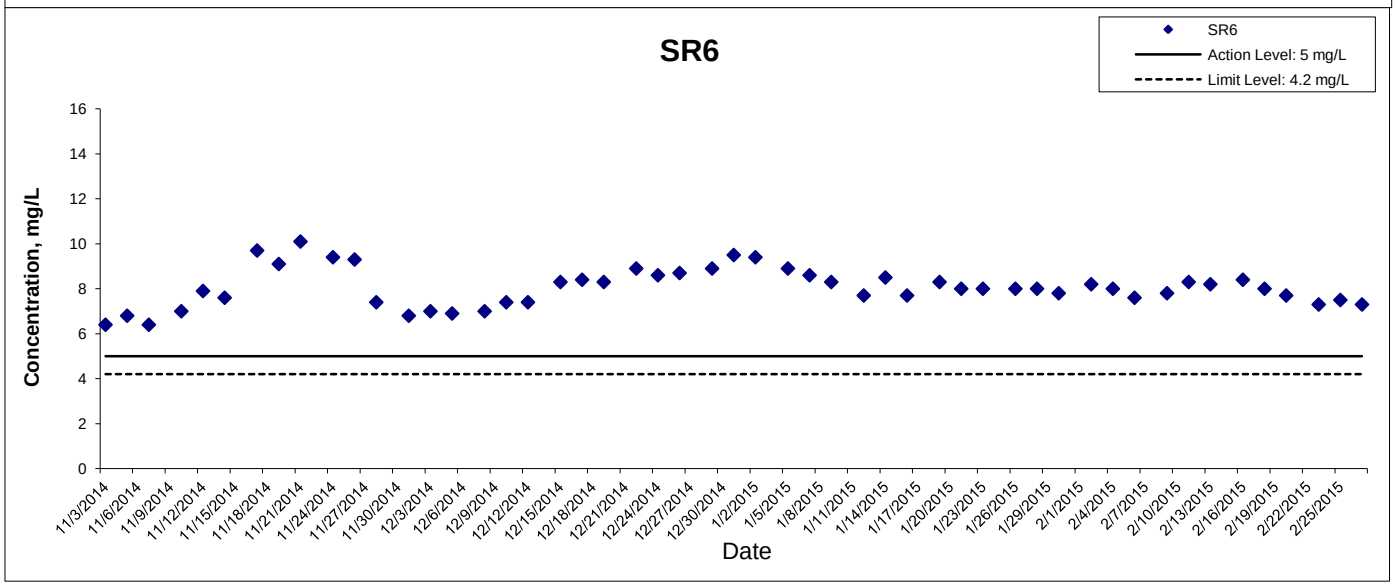


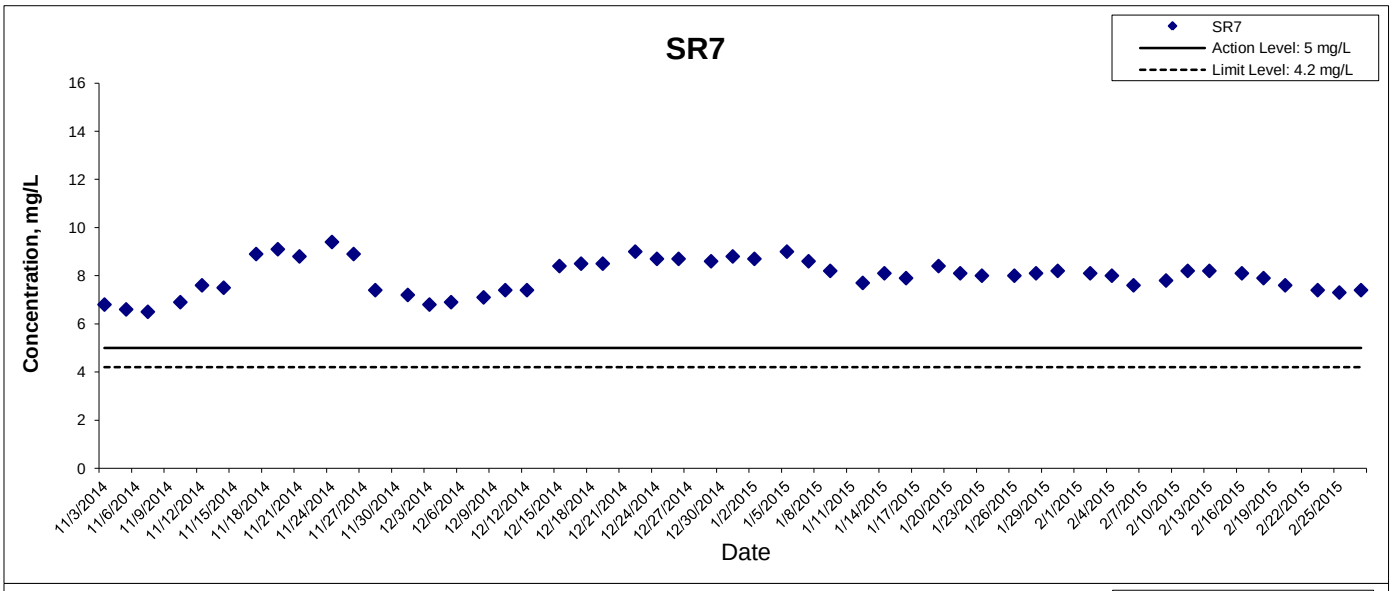


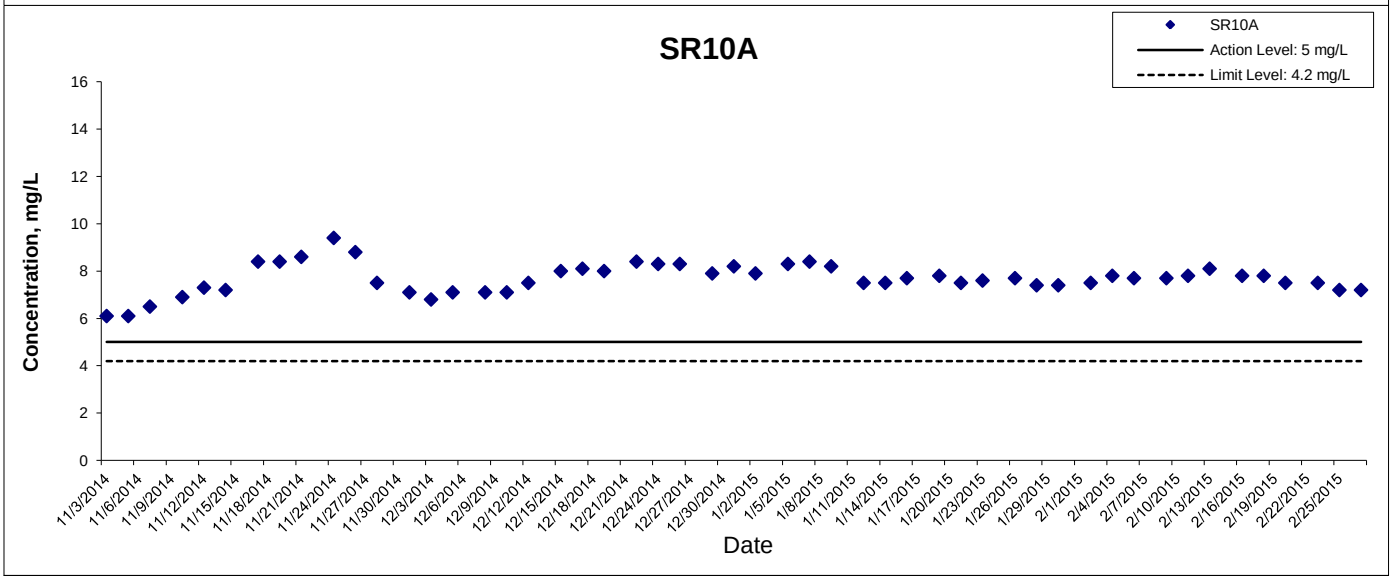


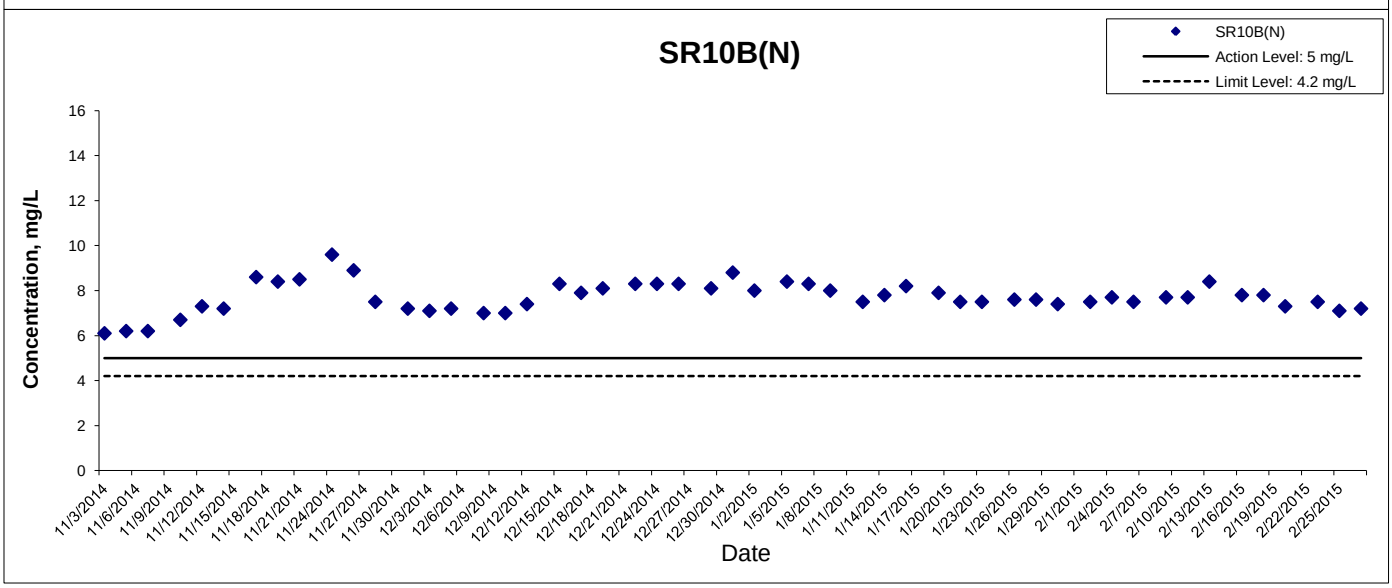




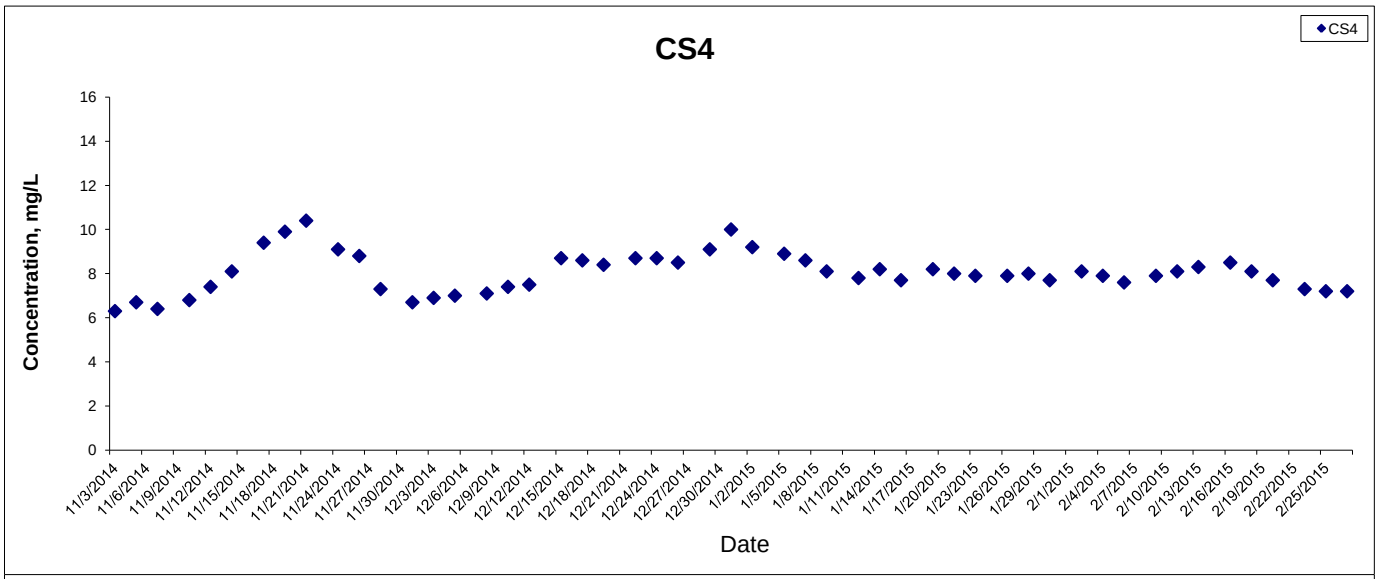


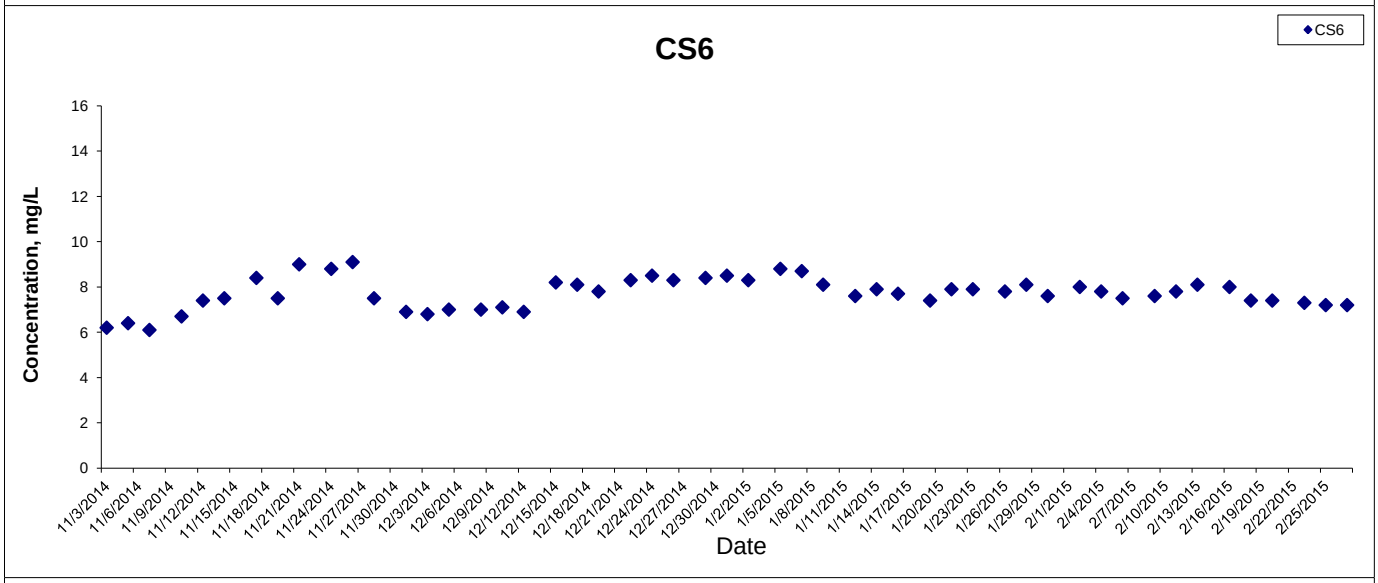


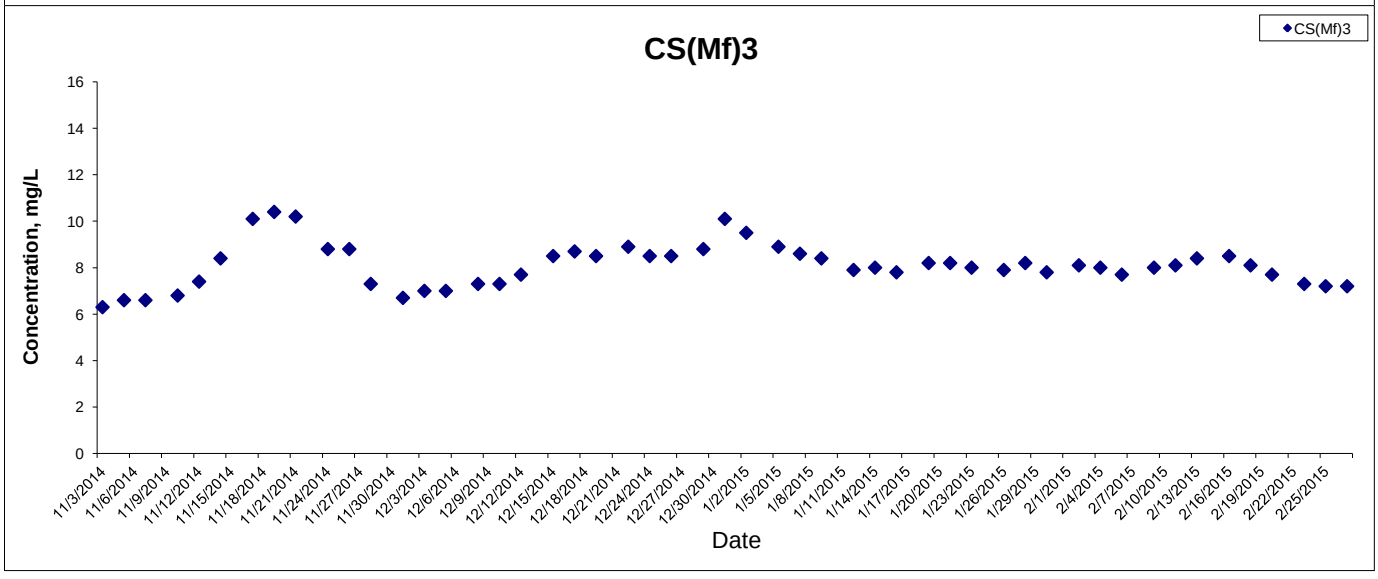




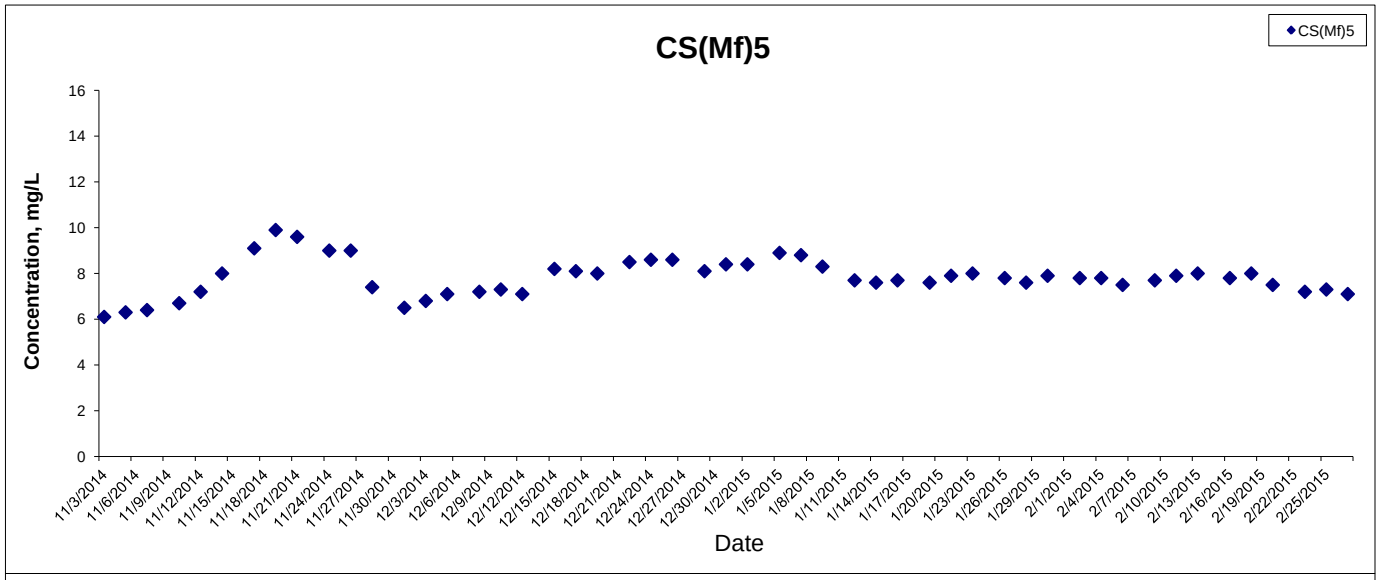
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

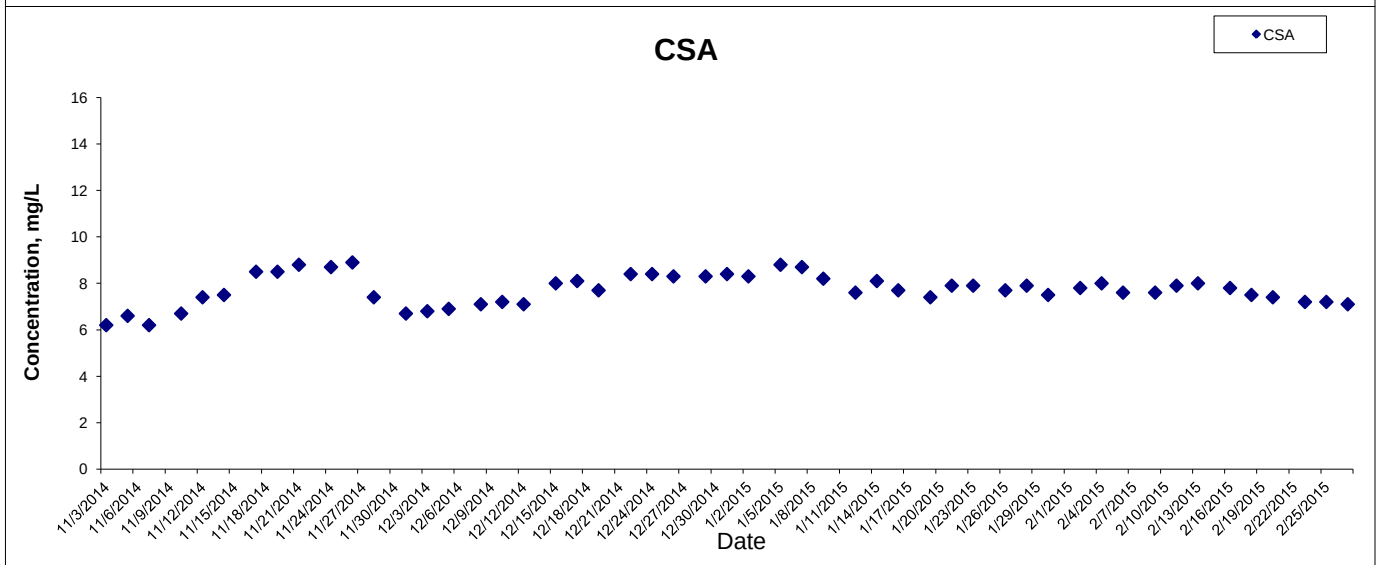


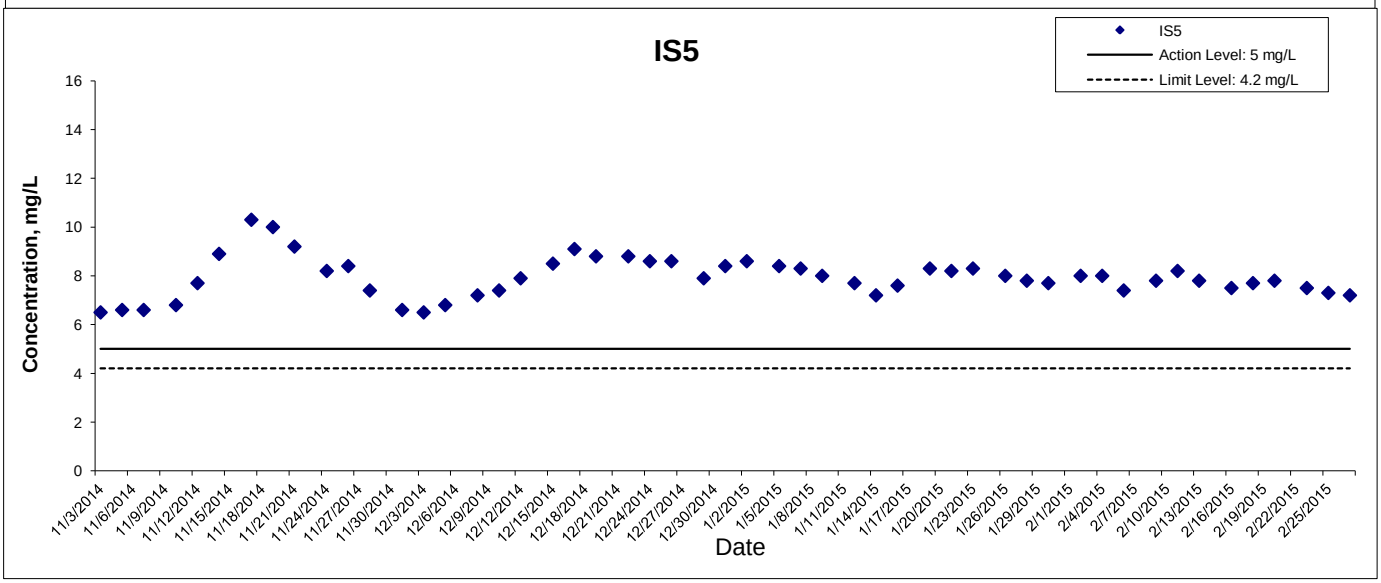




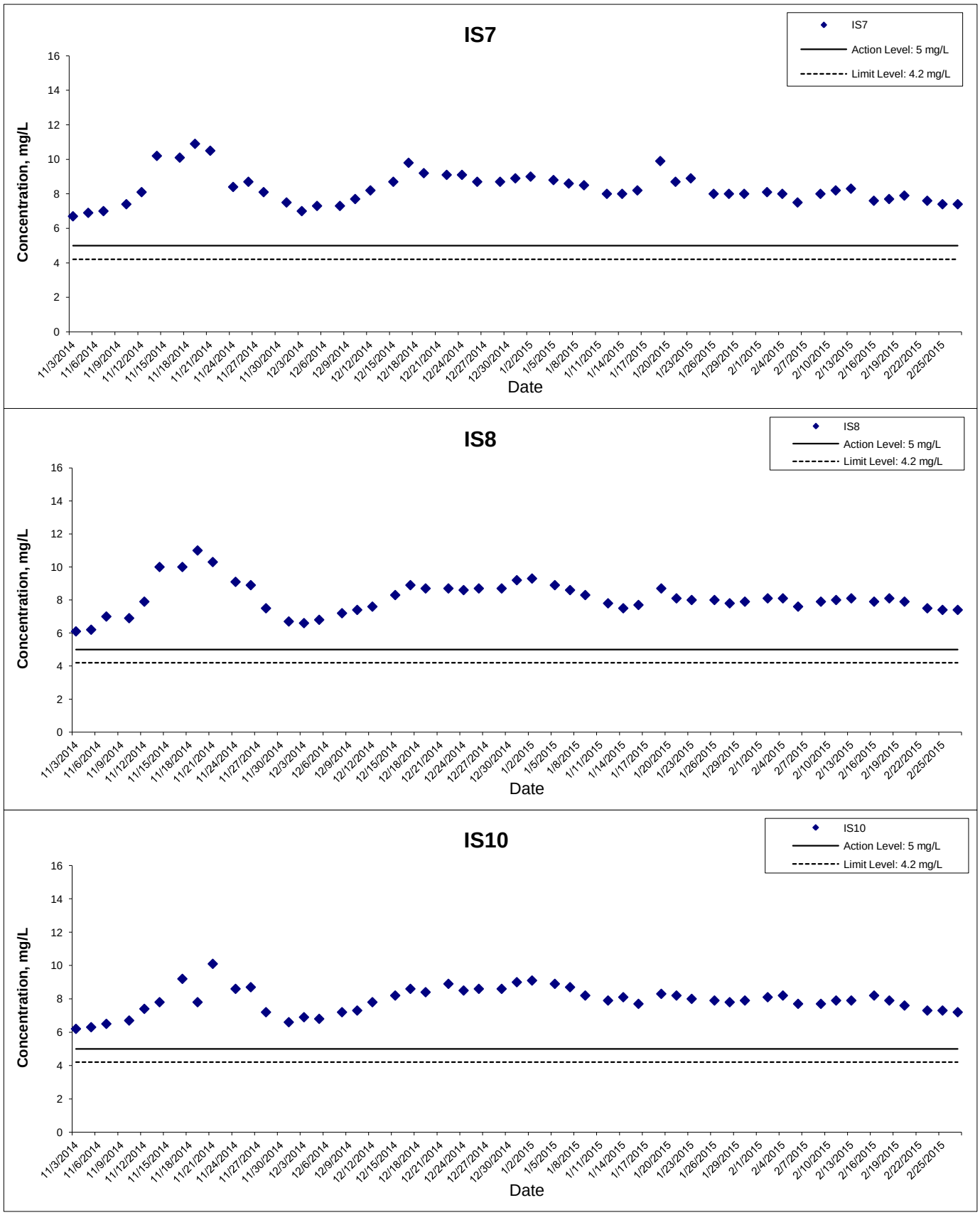
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide







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



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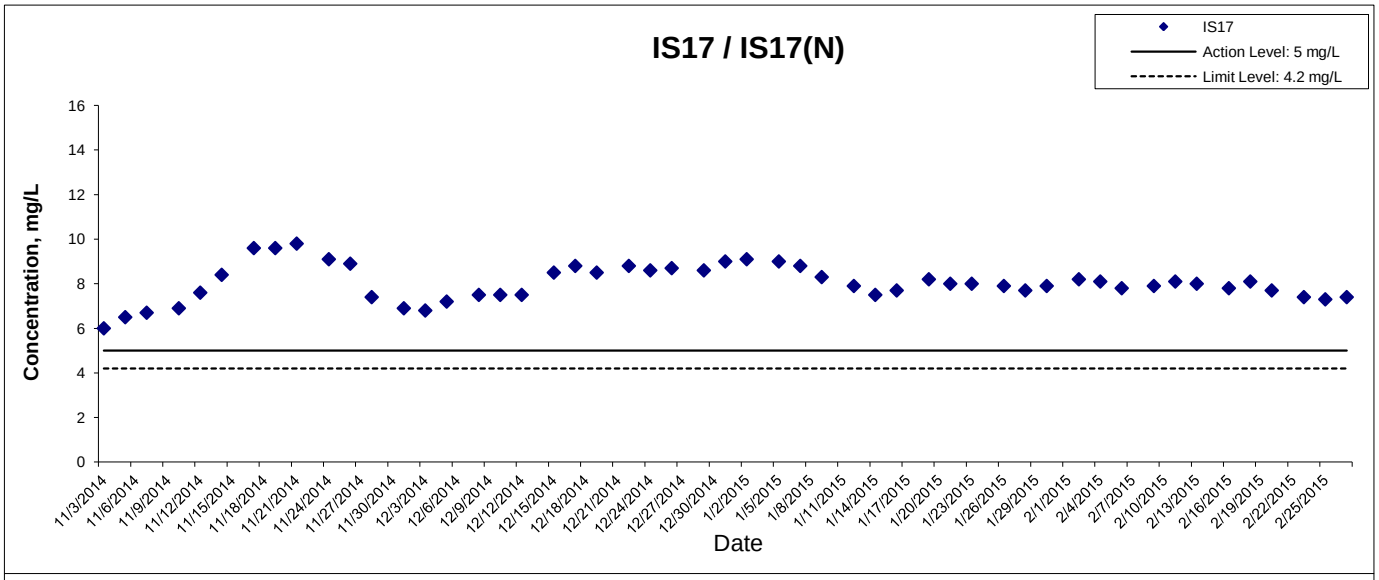
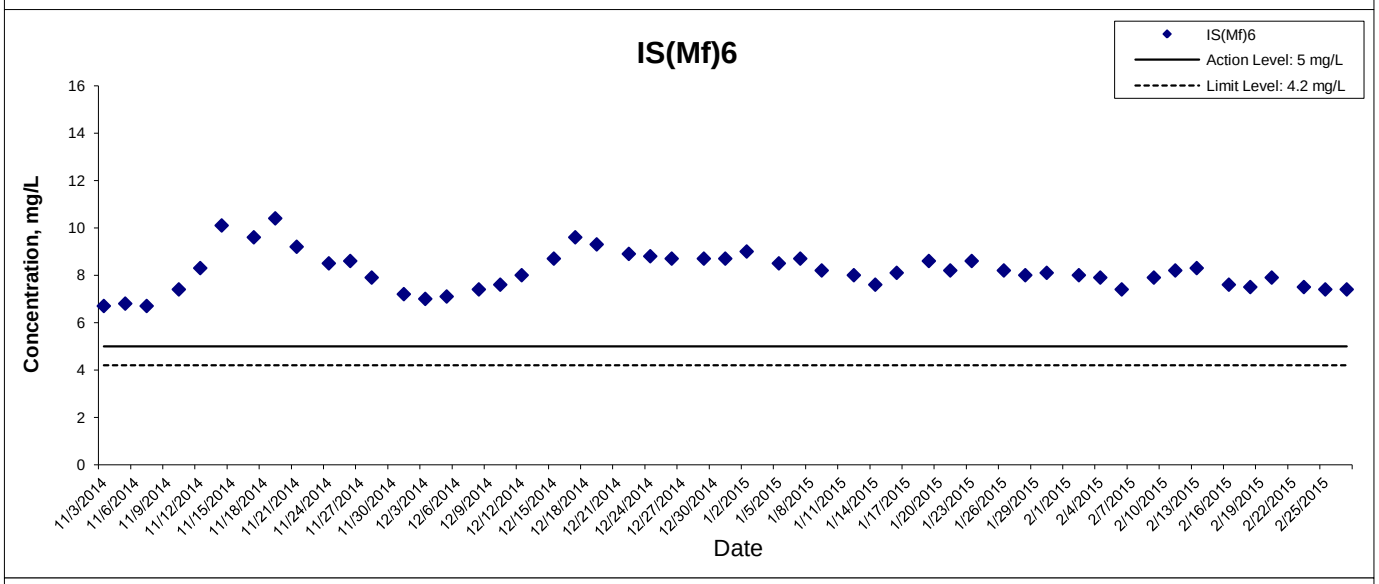
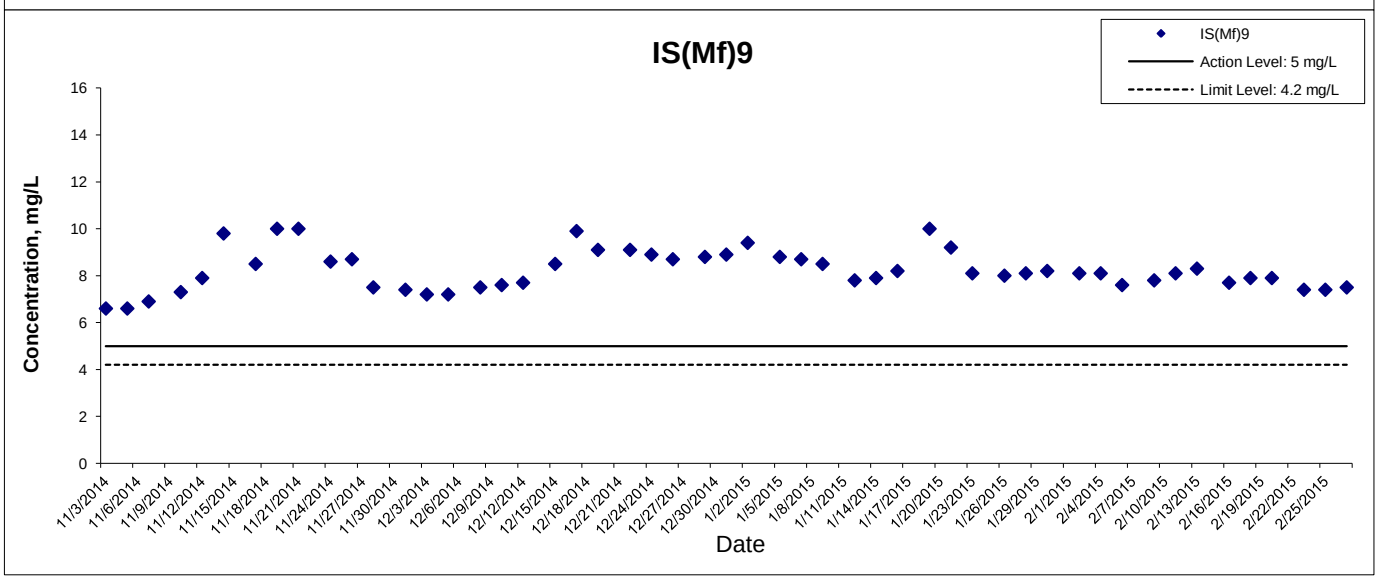
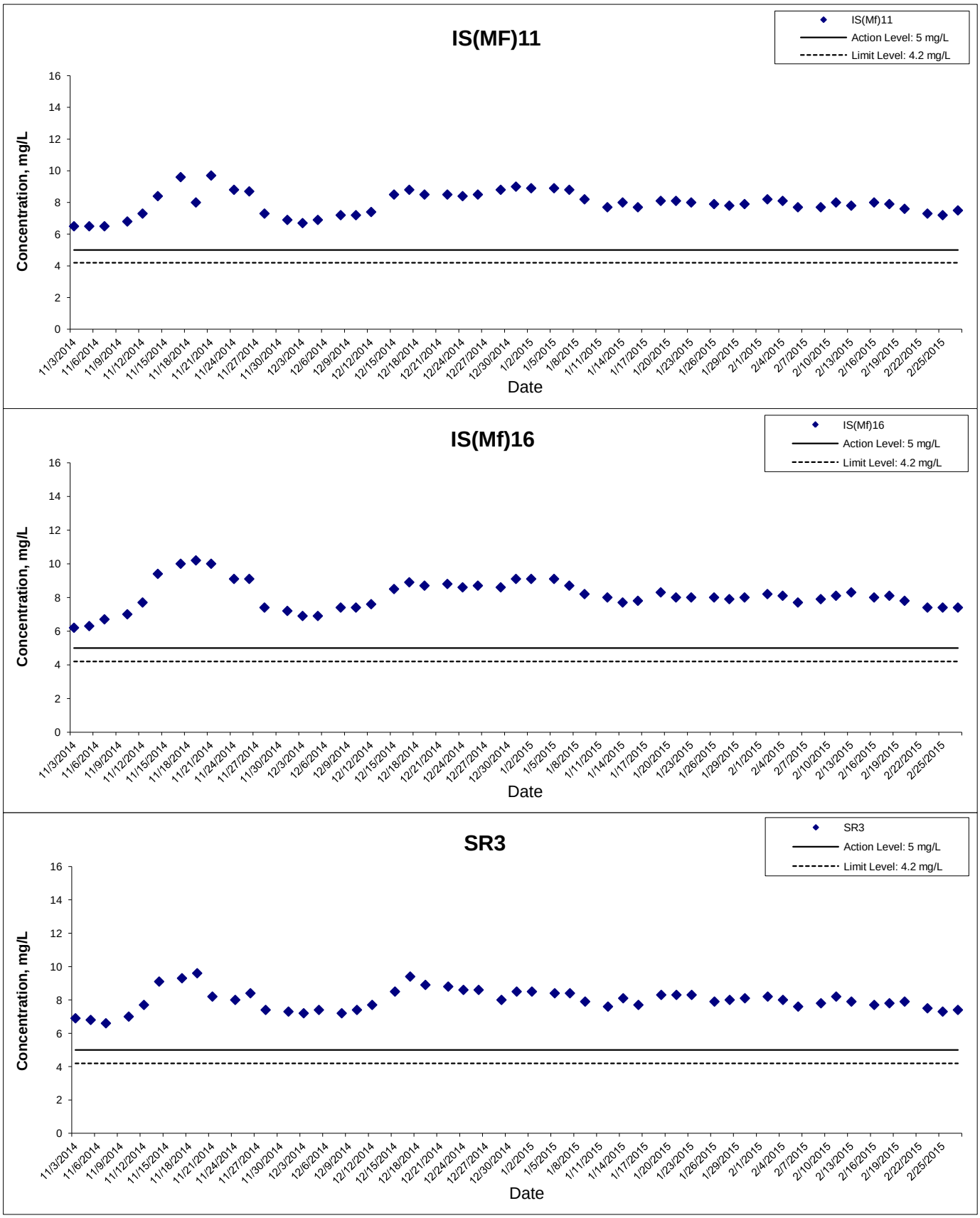
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide







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



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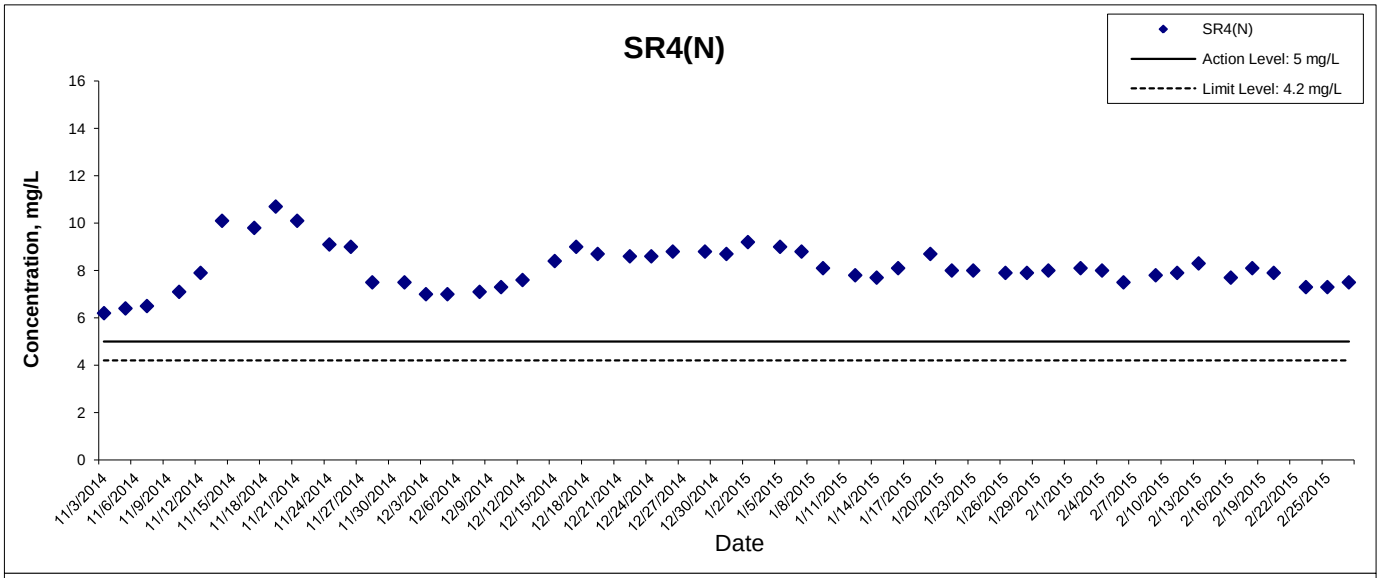
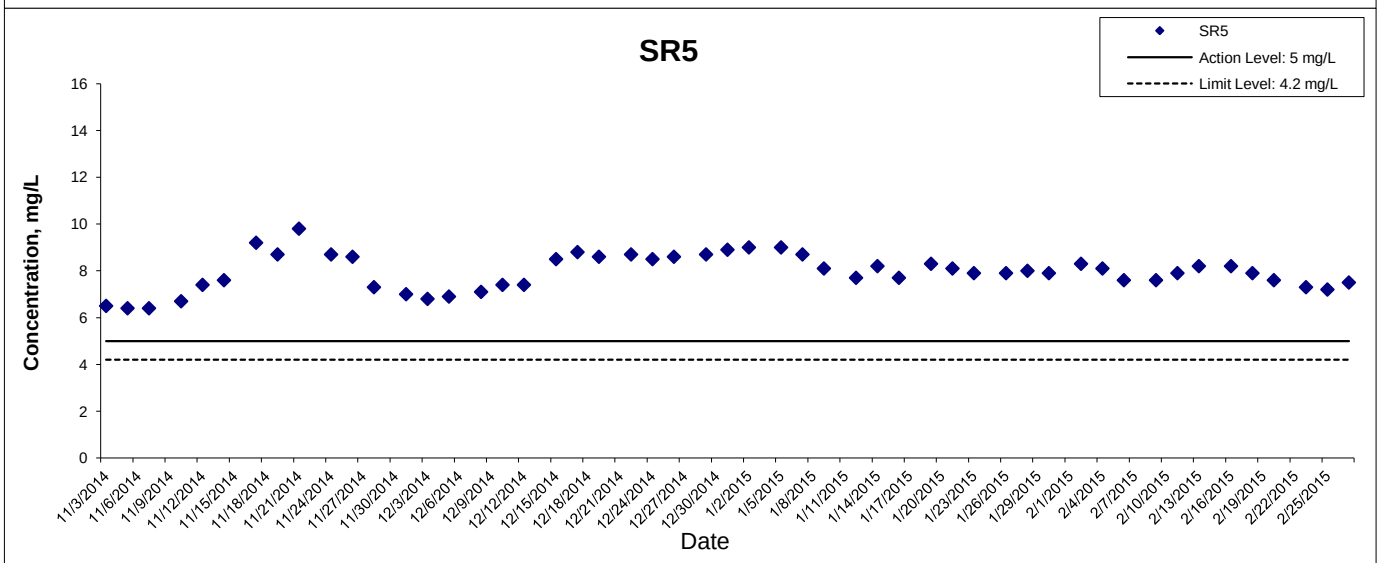
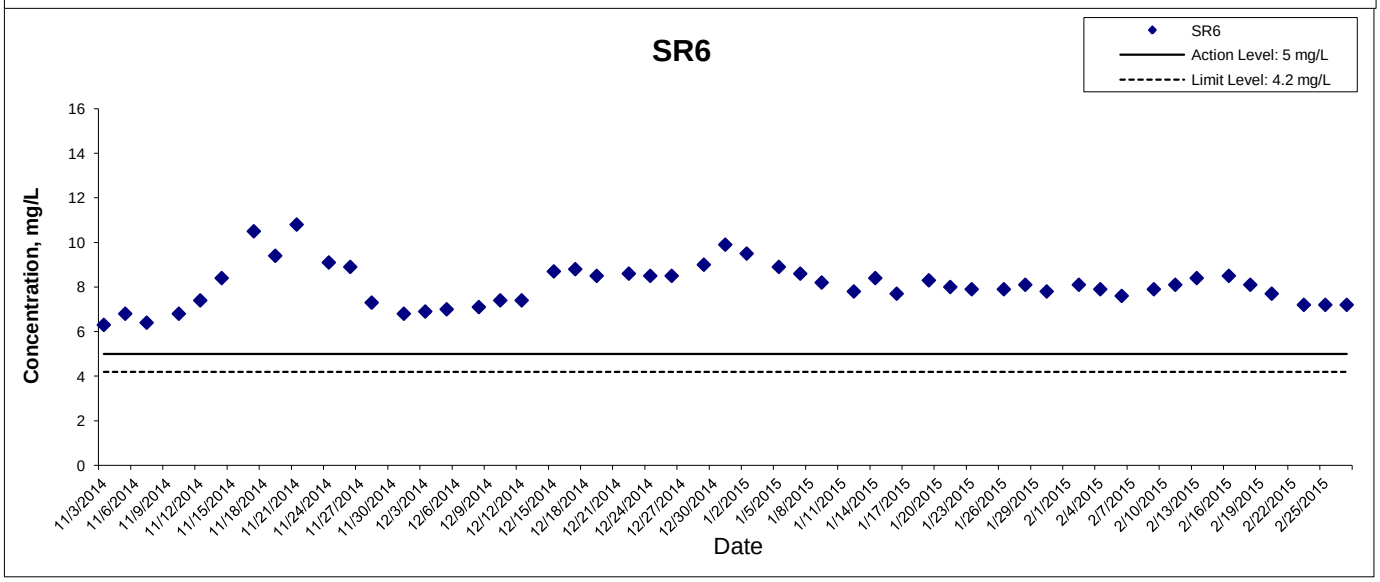
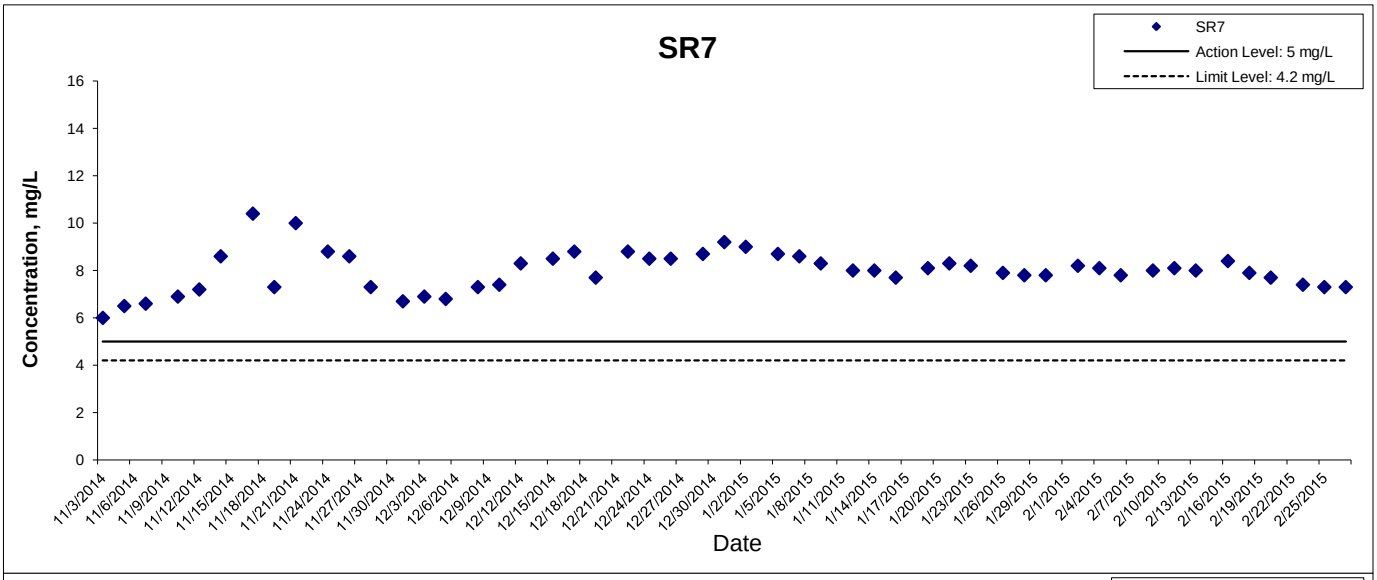
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

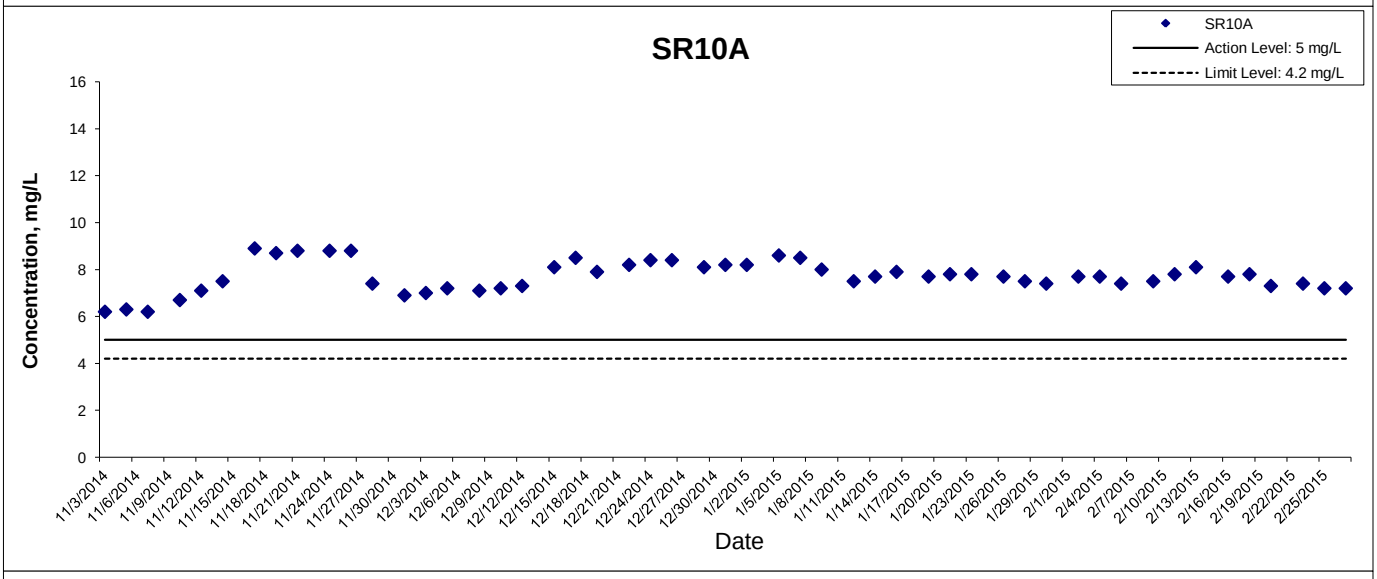


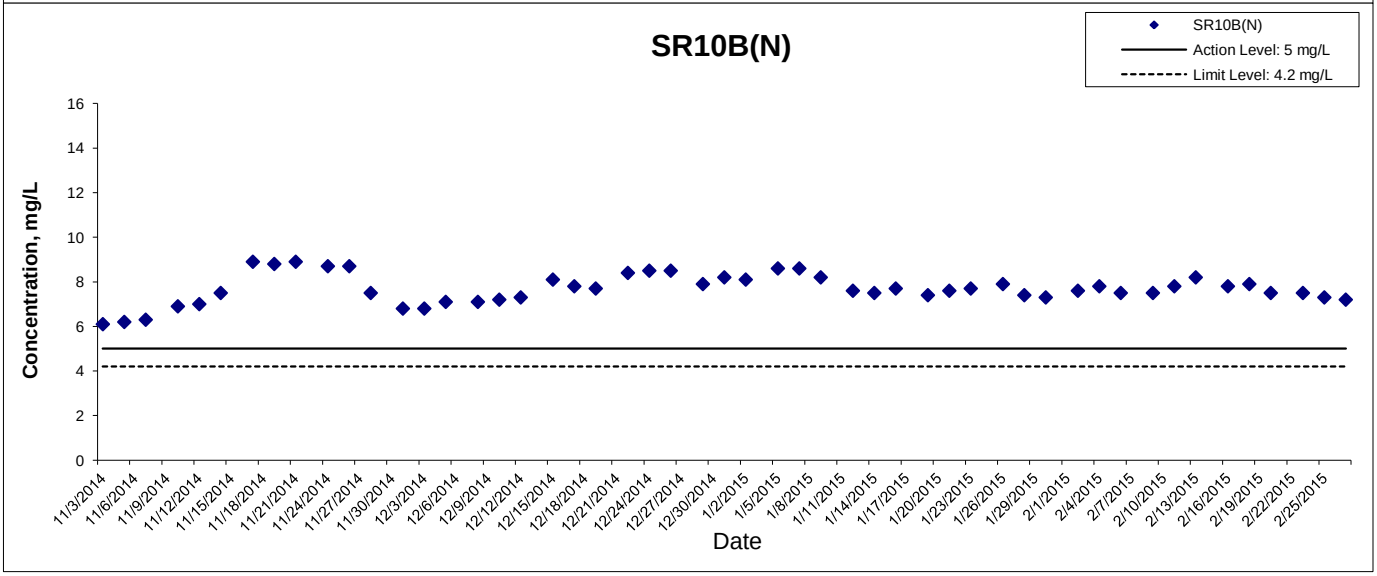




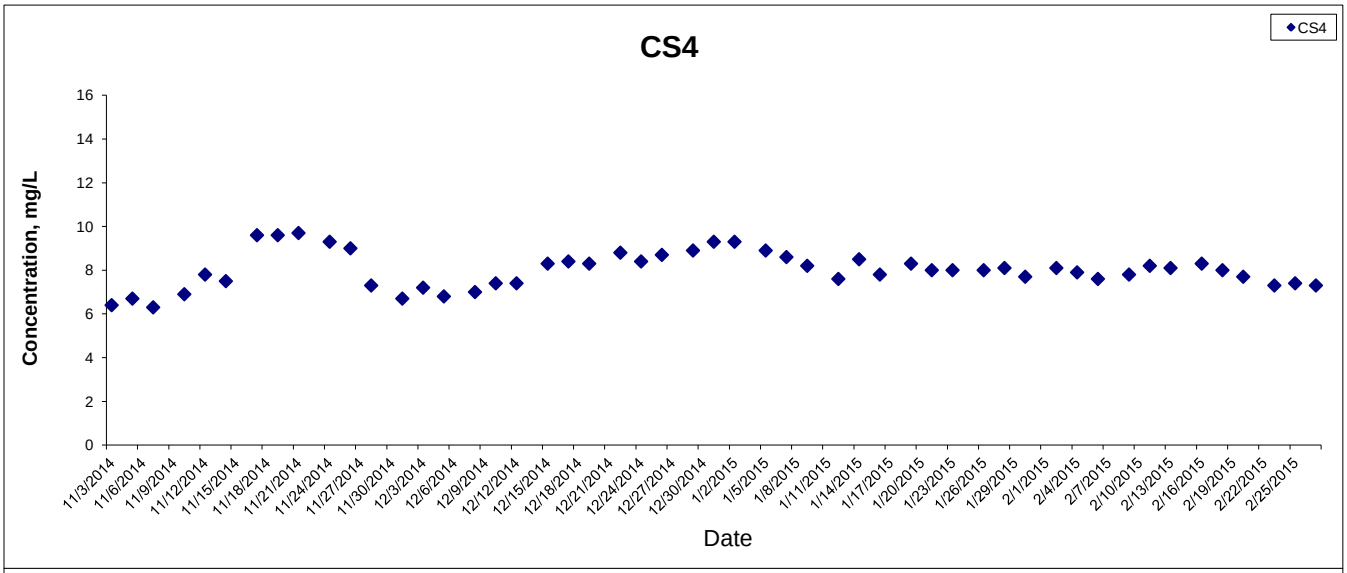
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

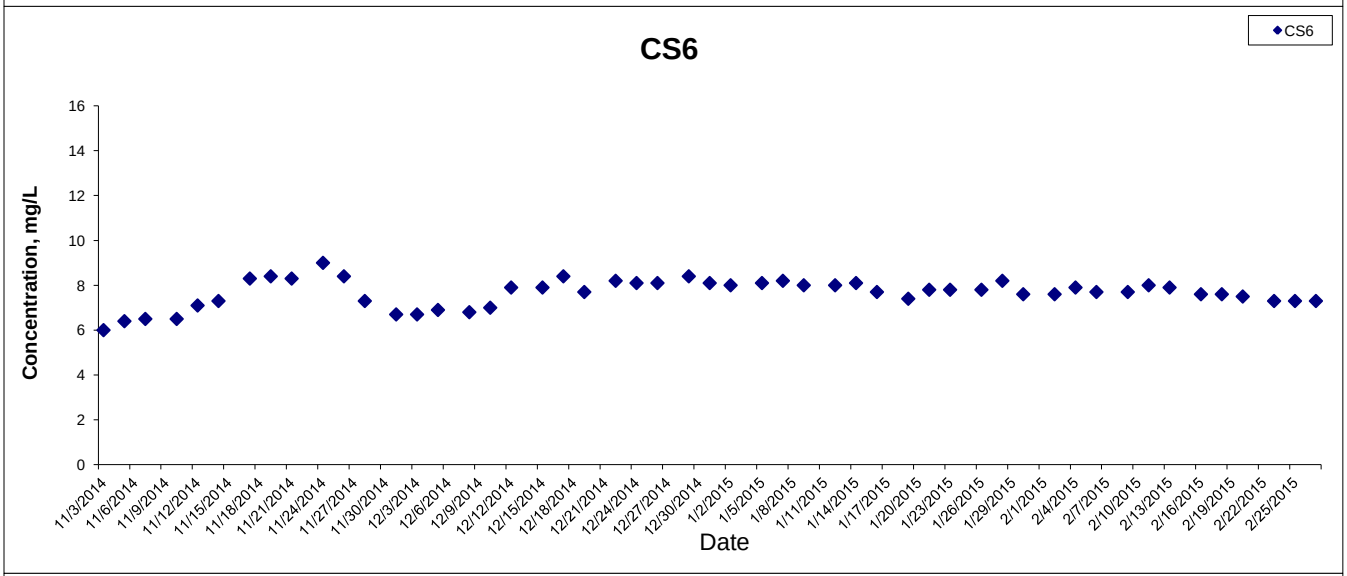


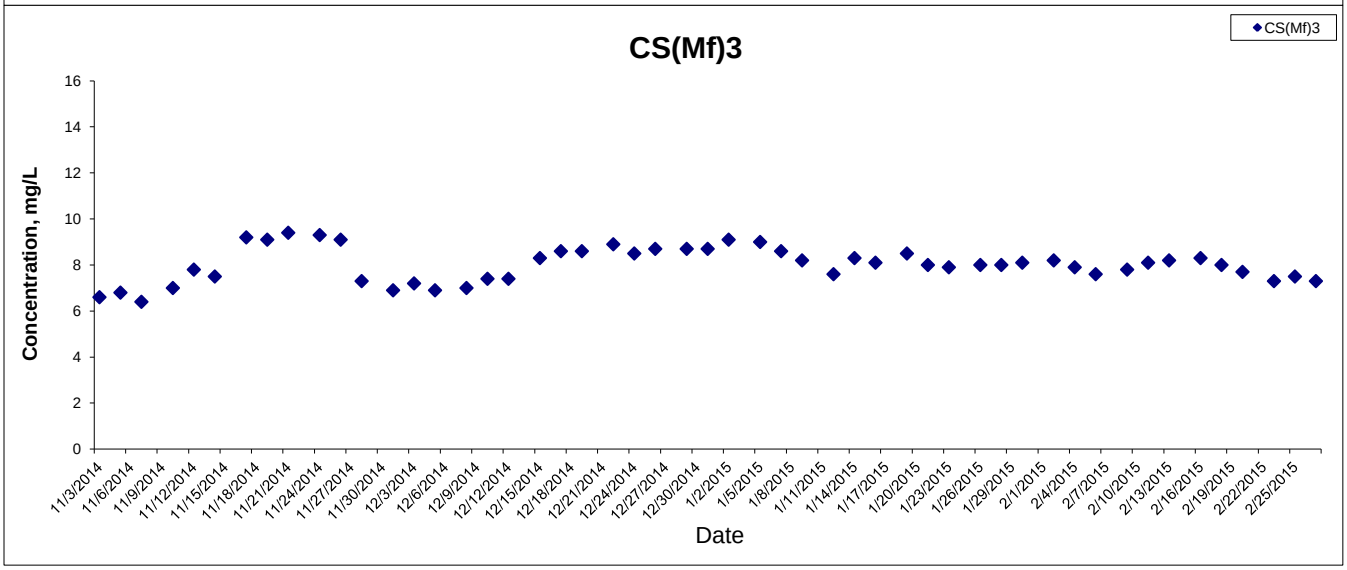




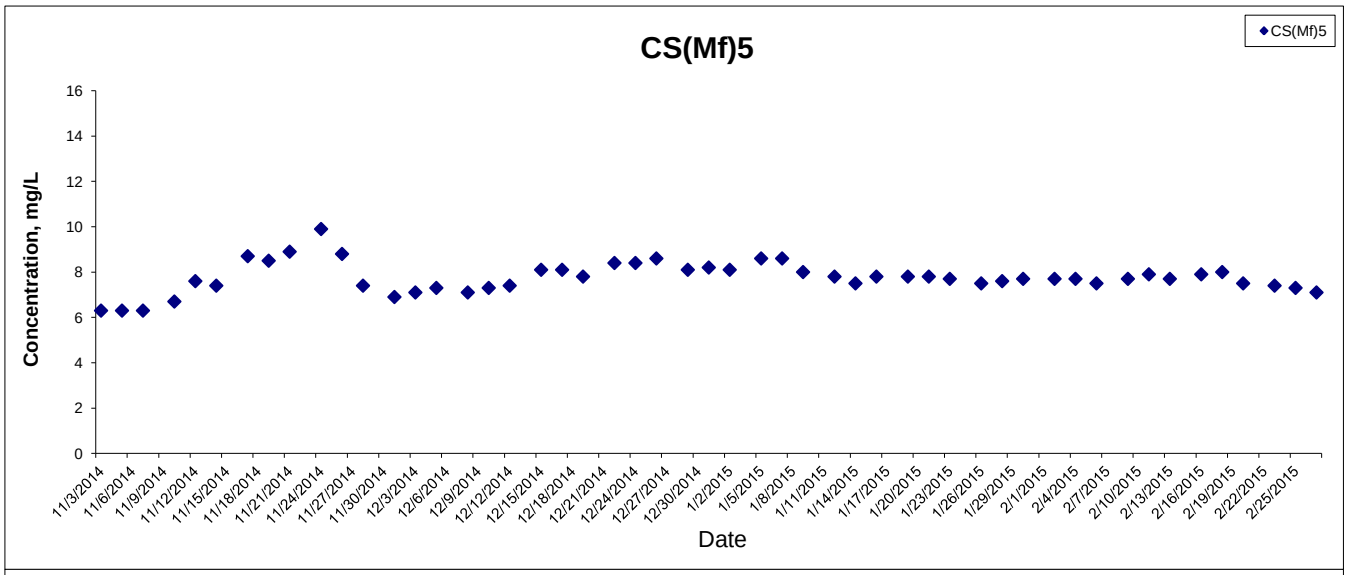
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

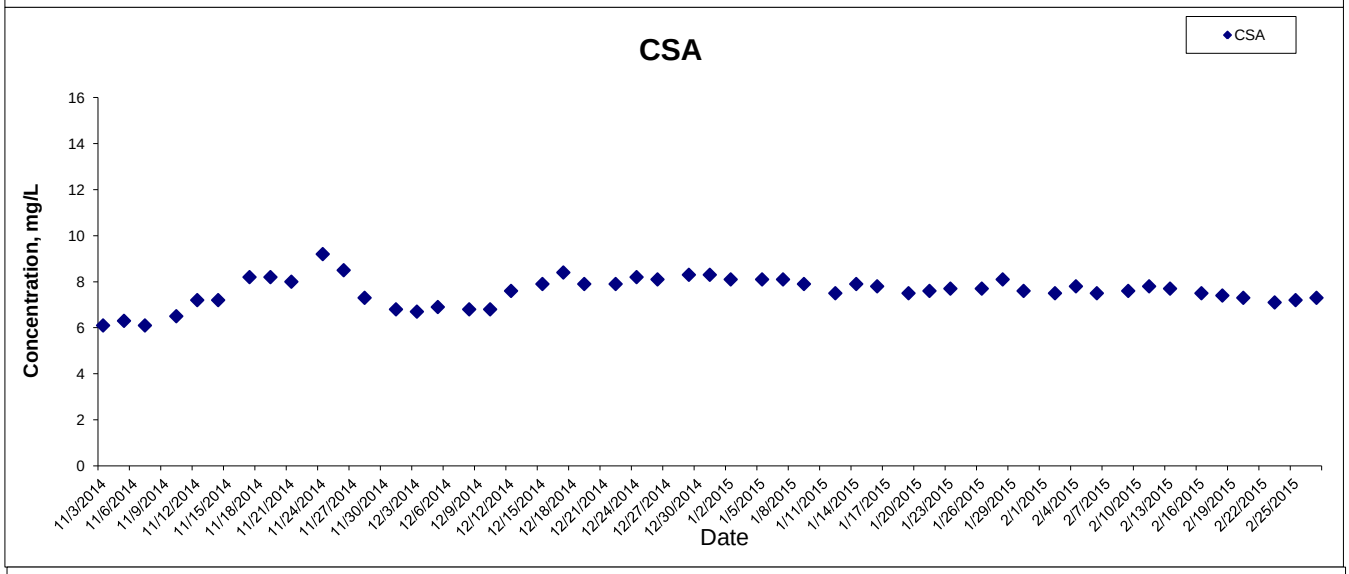


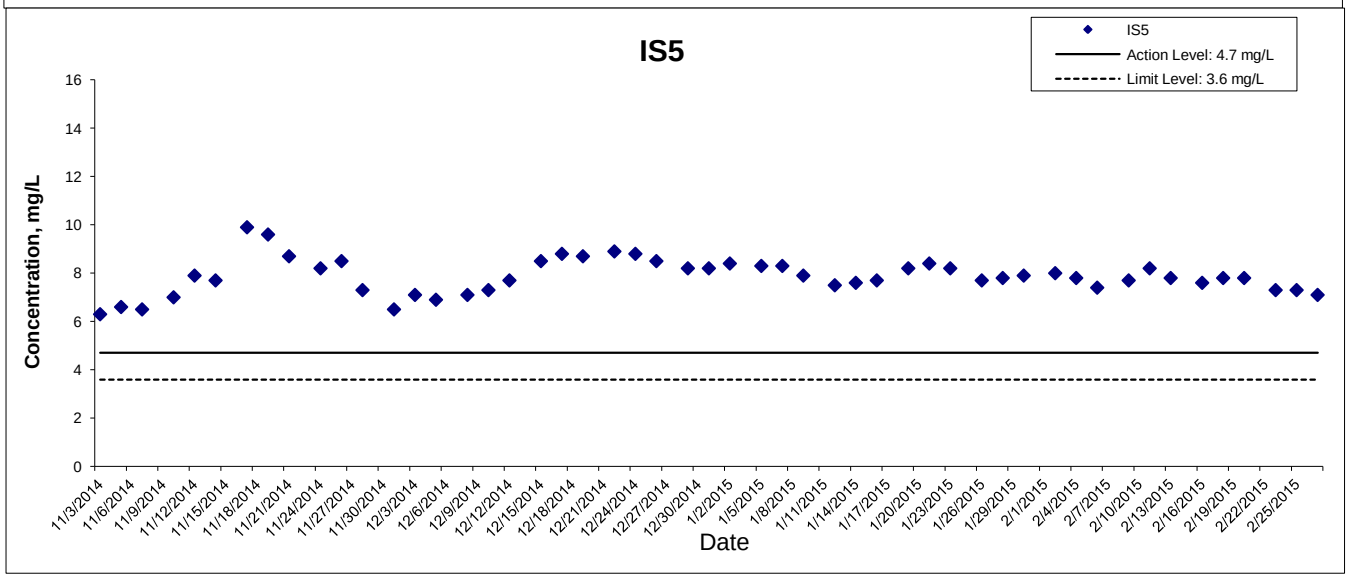




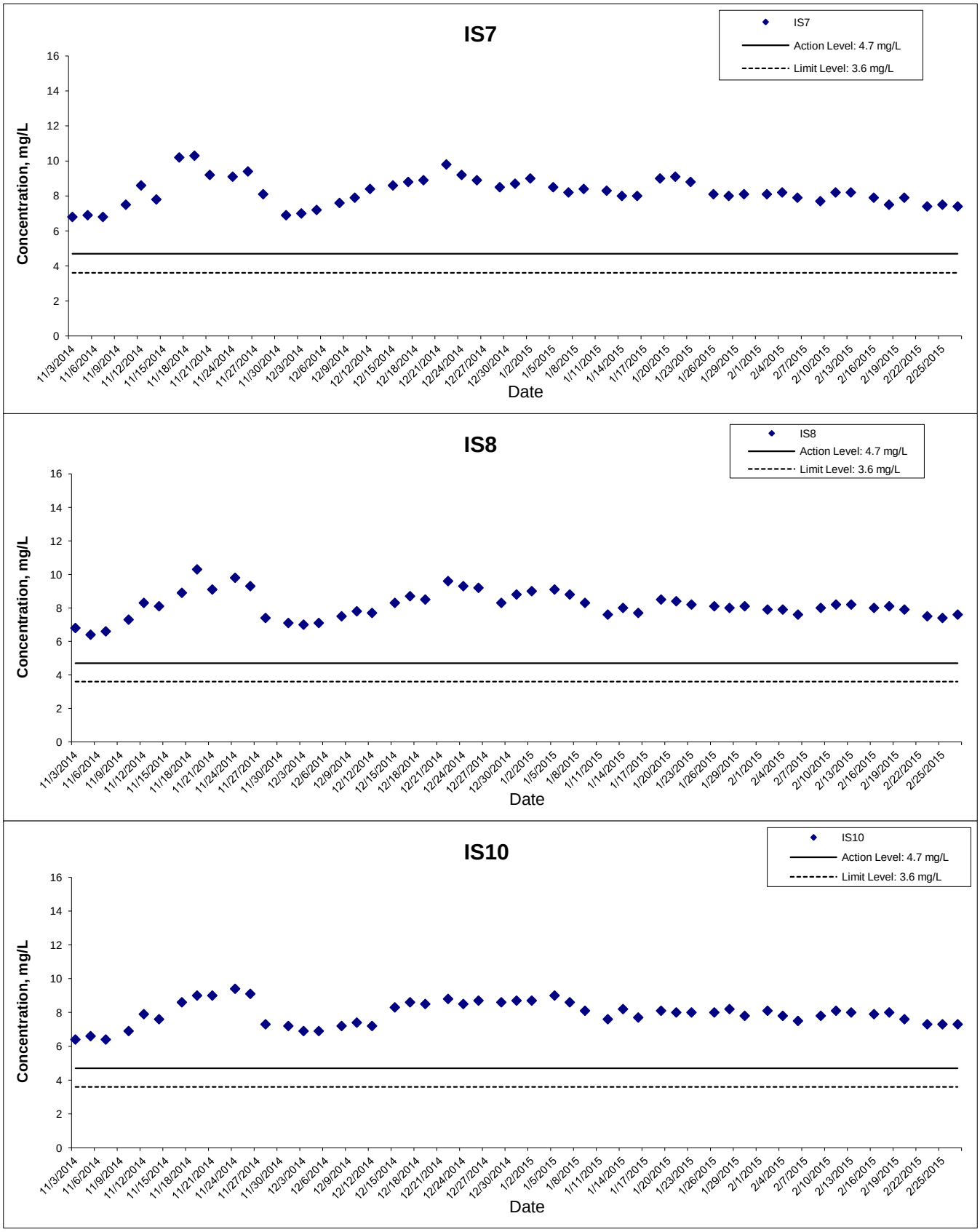
Dissolved Oxygen (Bottom) at Mid-Ebb Tide







Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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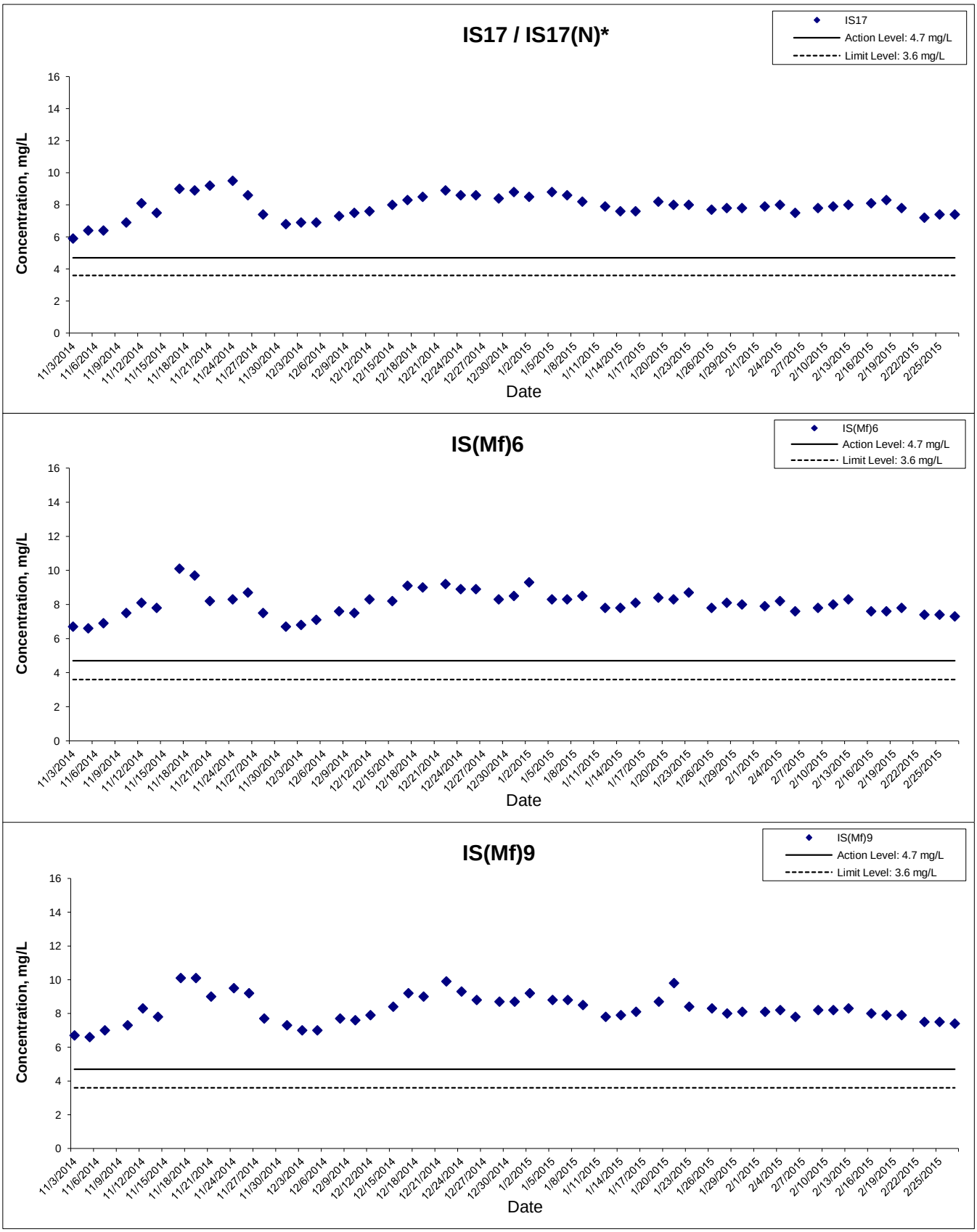
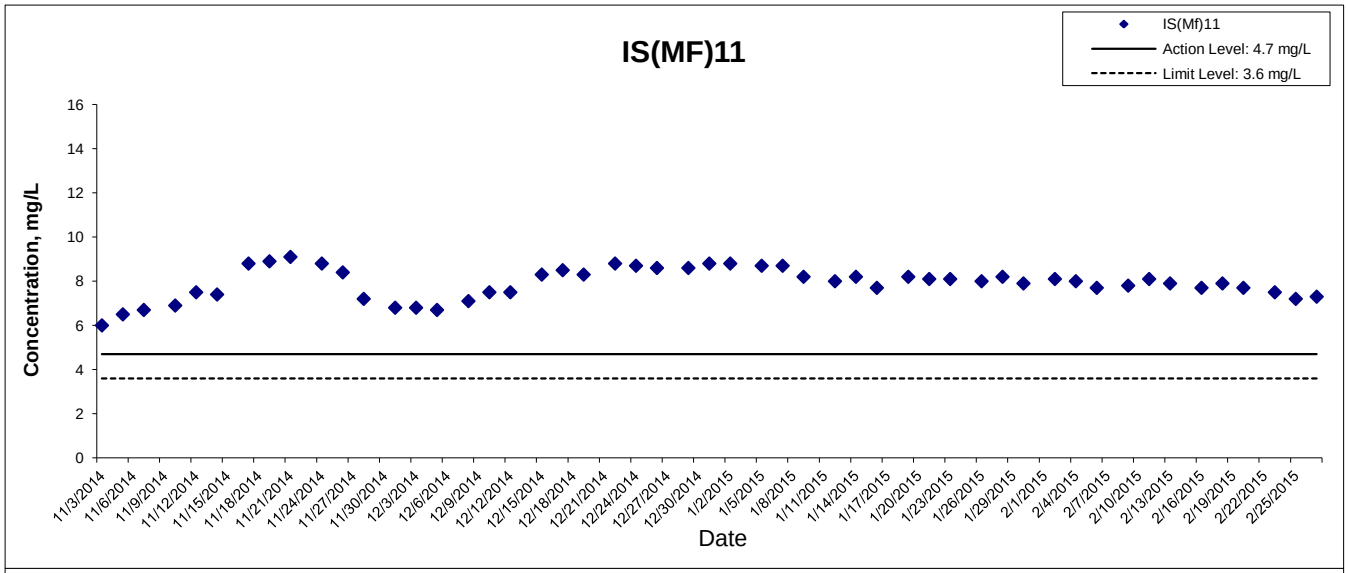
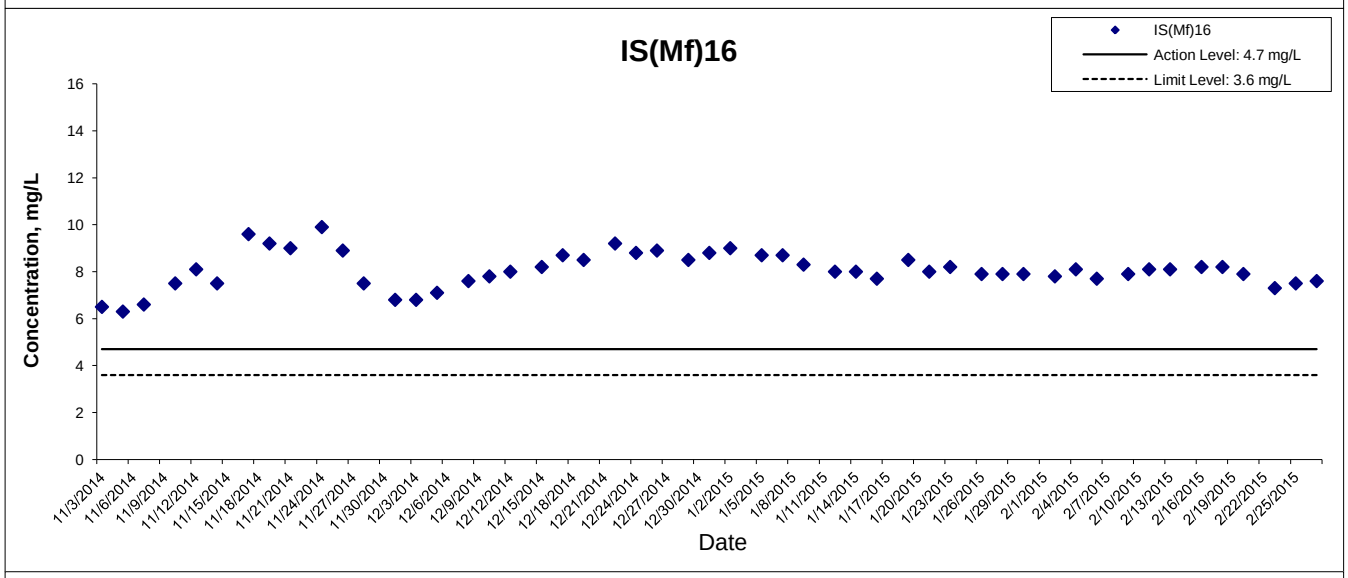
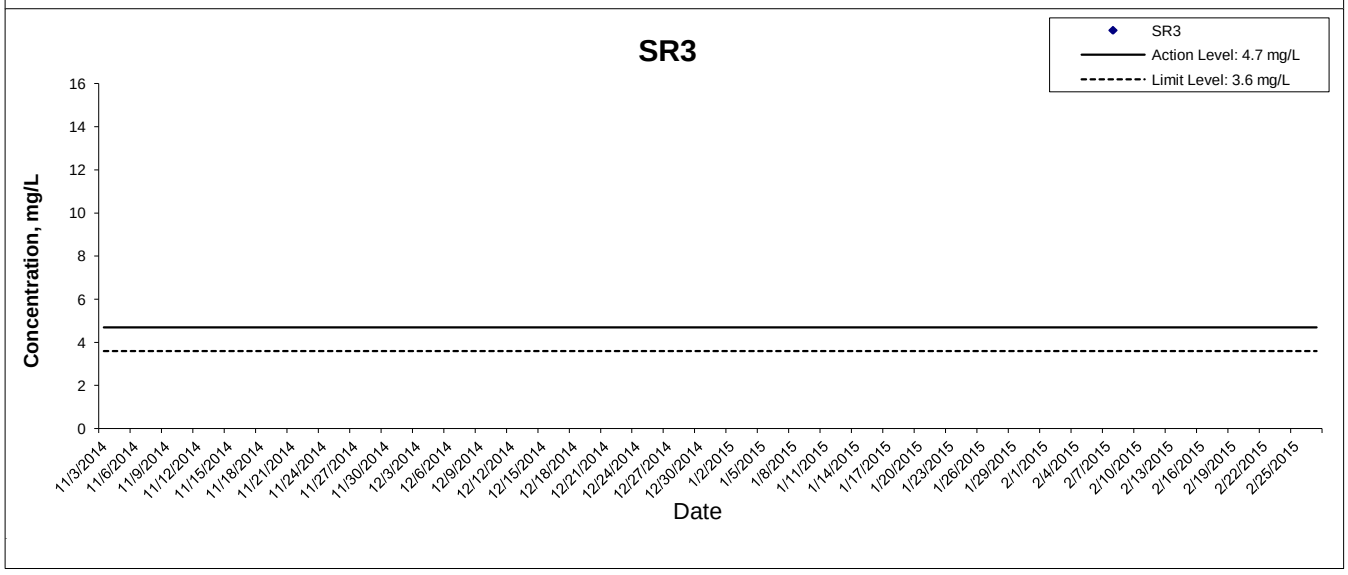
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



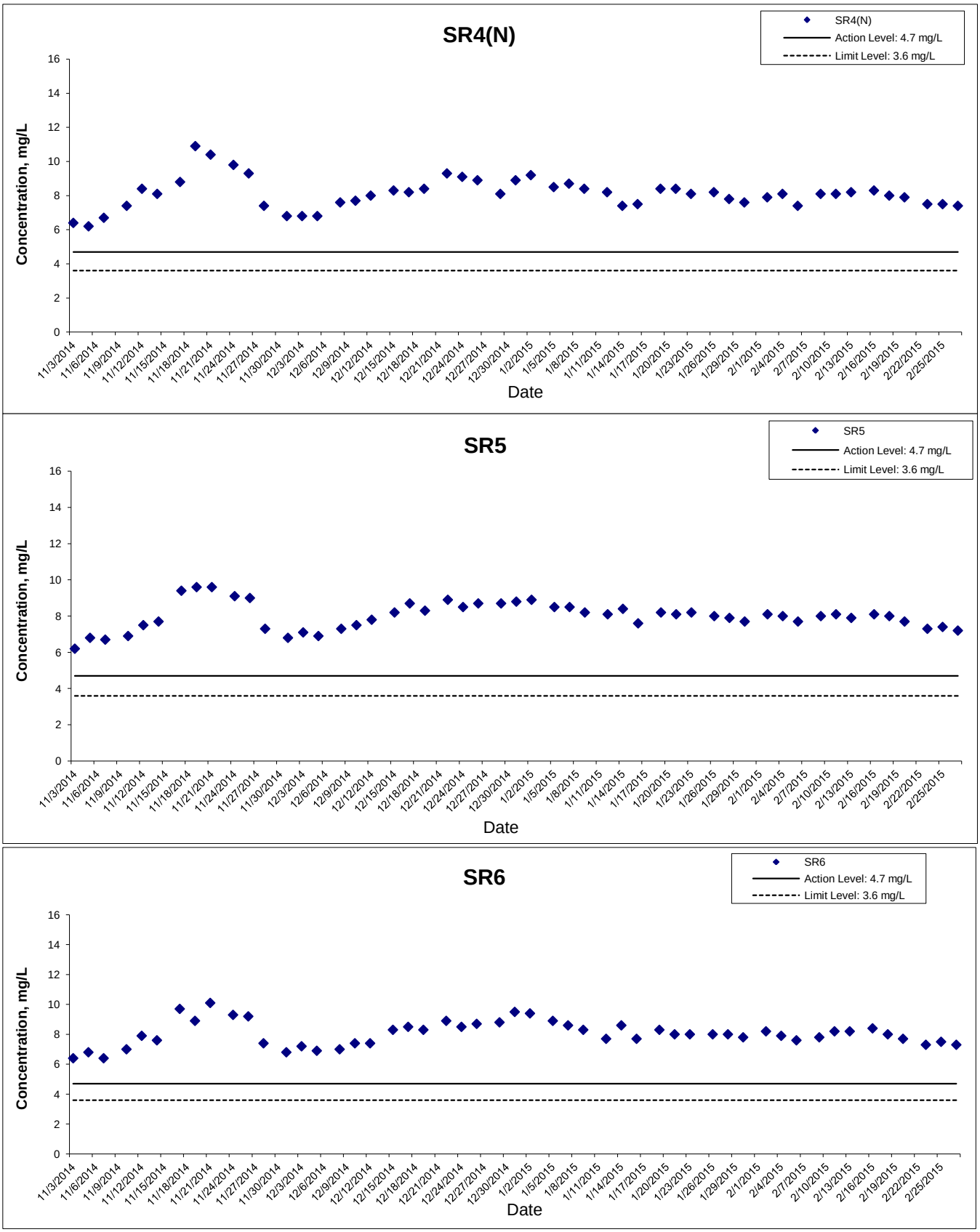
Dissolved Oxygen (Bottom) at Mid-Ebb Tide







Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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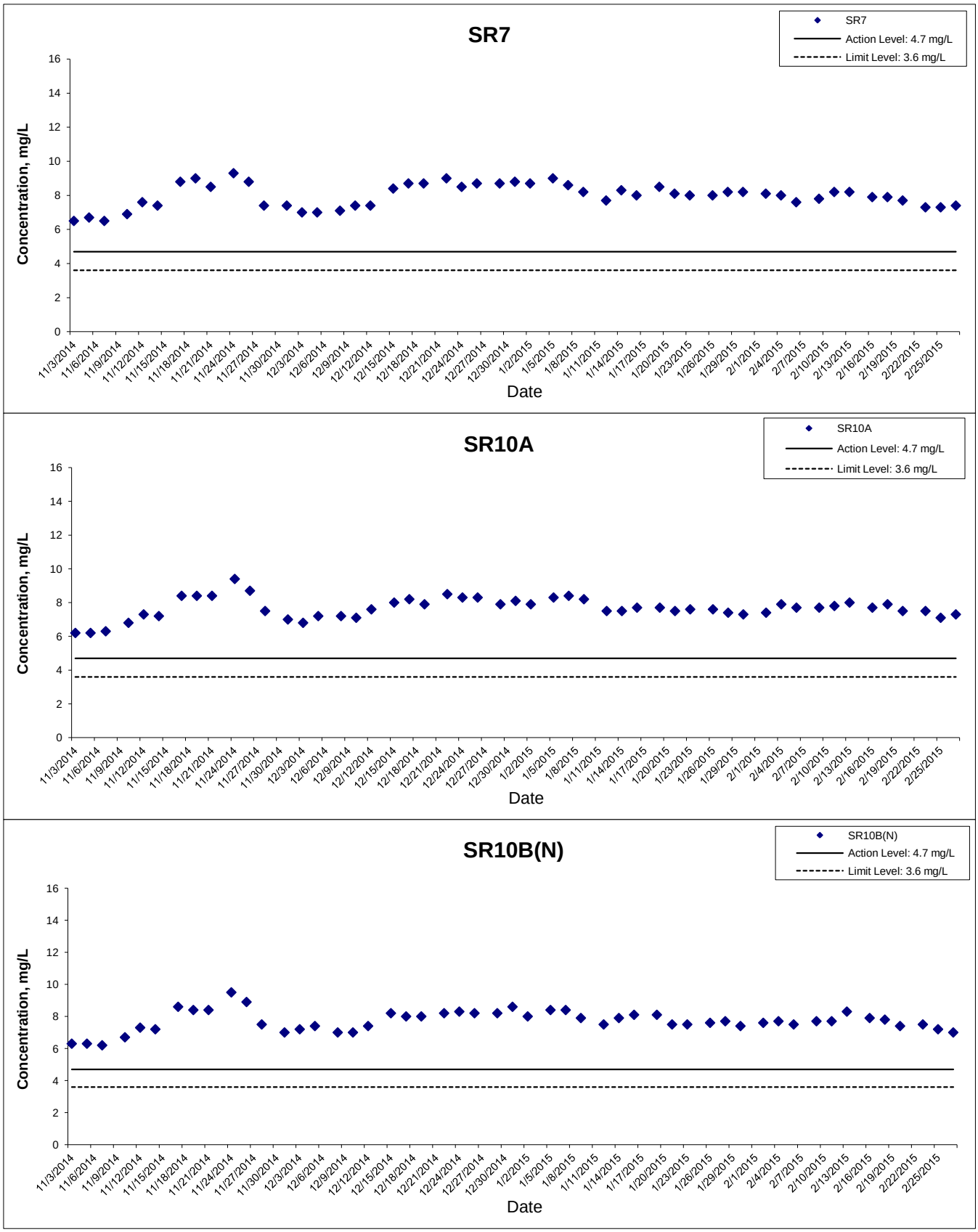
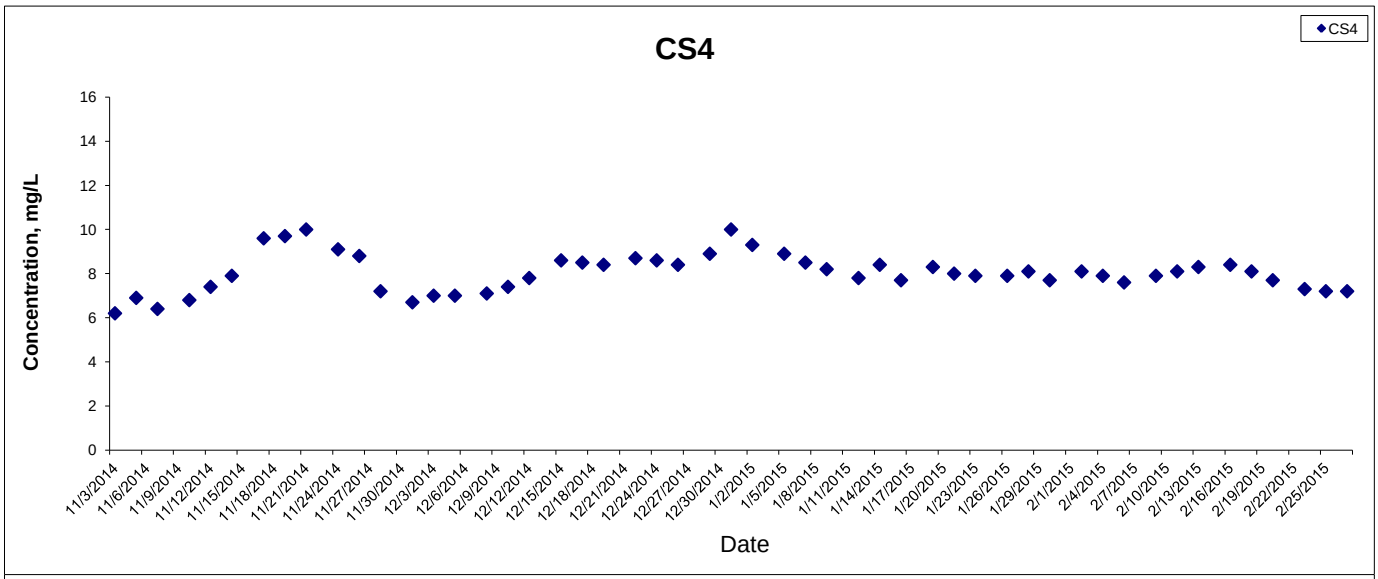
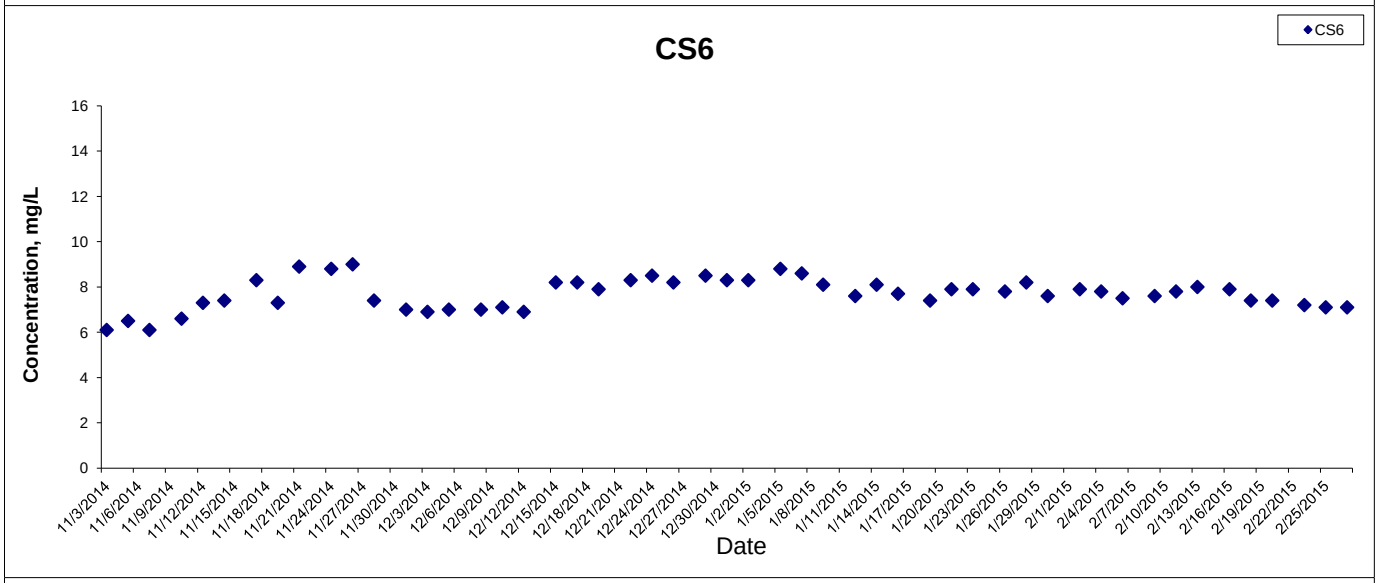
Appendix G

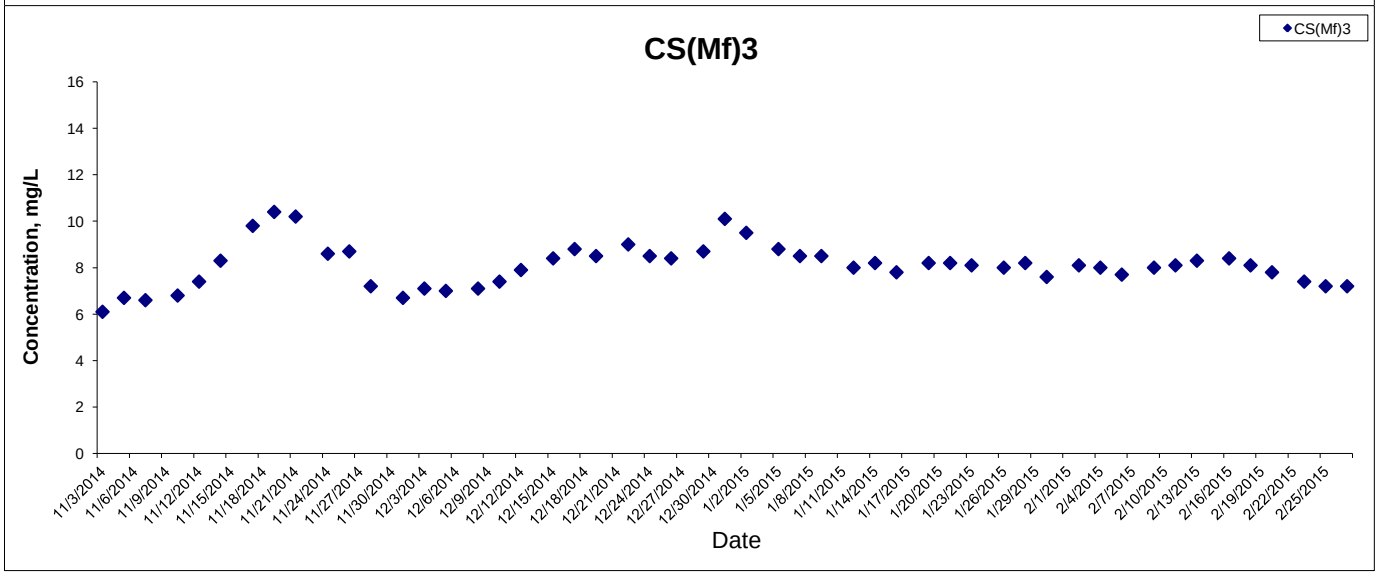
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



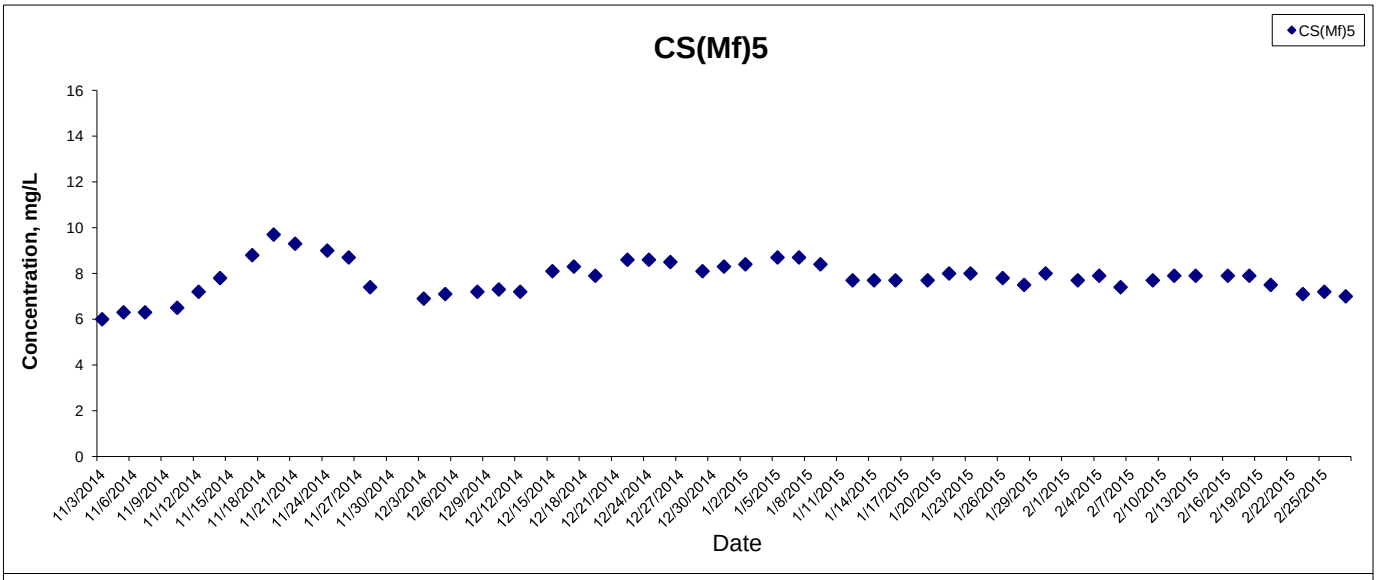
Dissolved Oxygen (Bottom) at Mid-Flood Tide

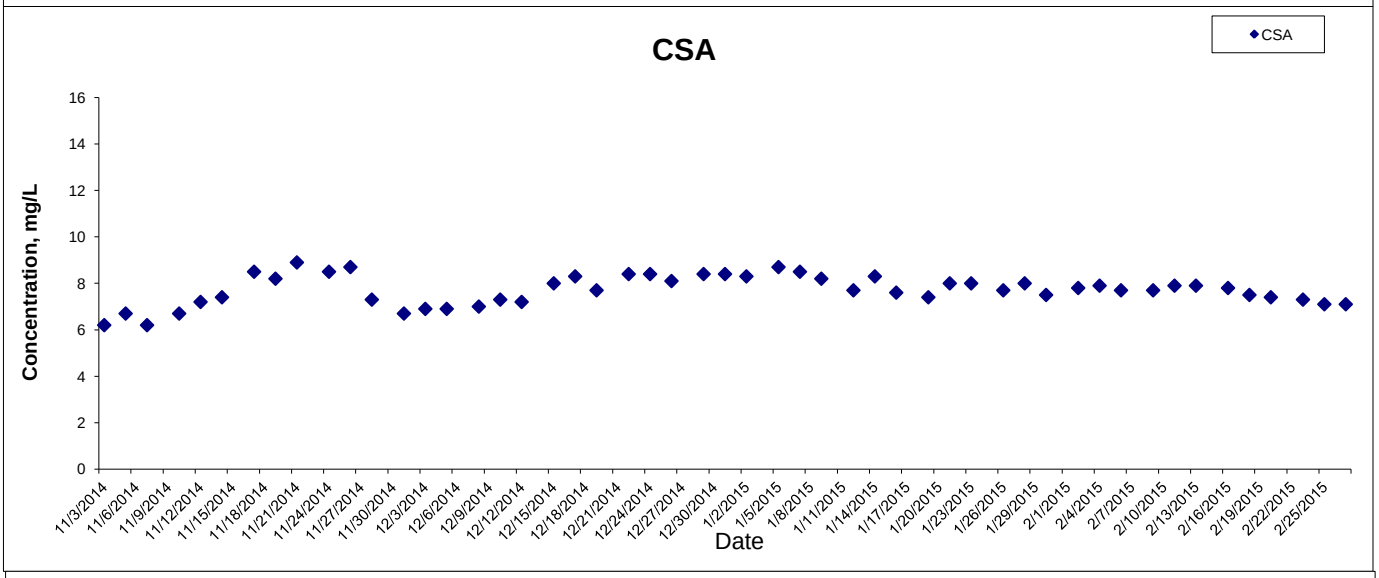


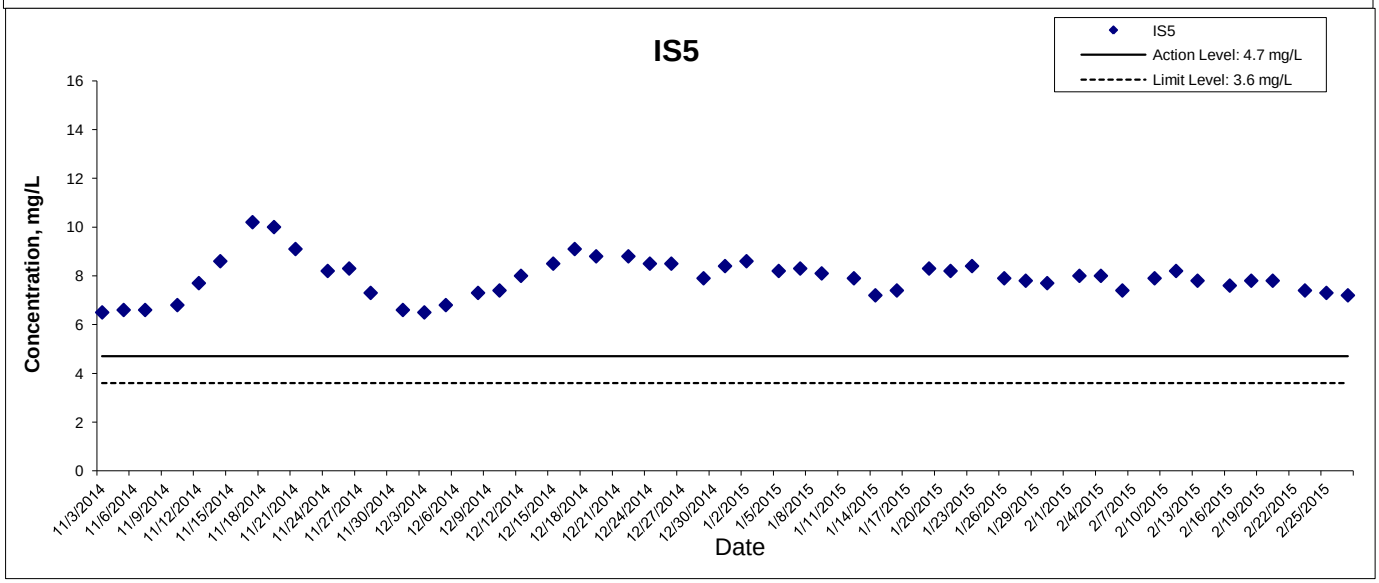




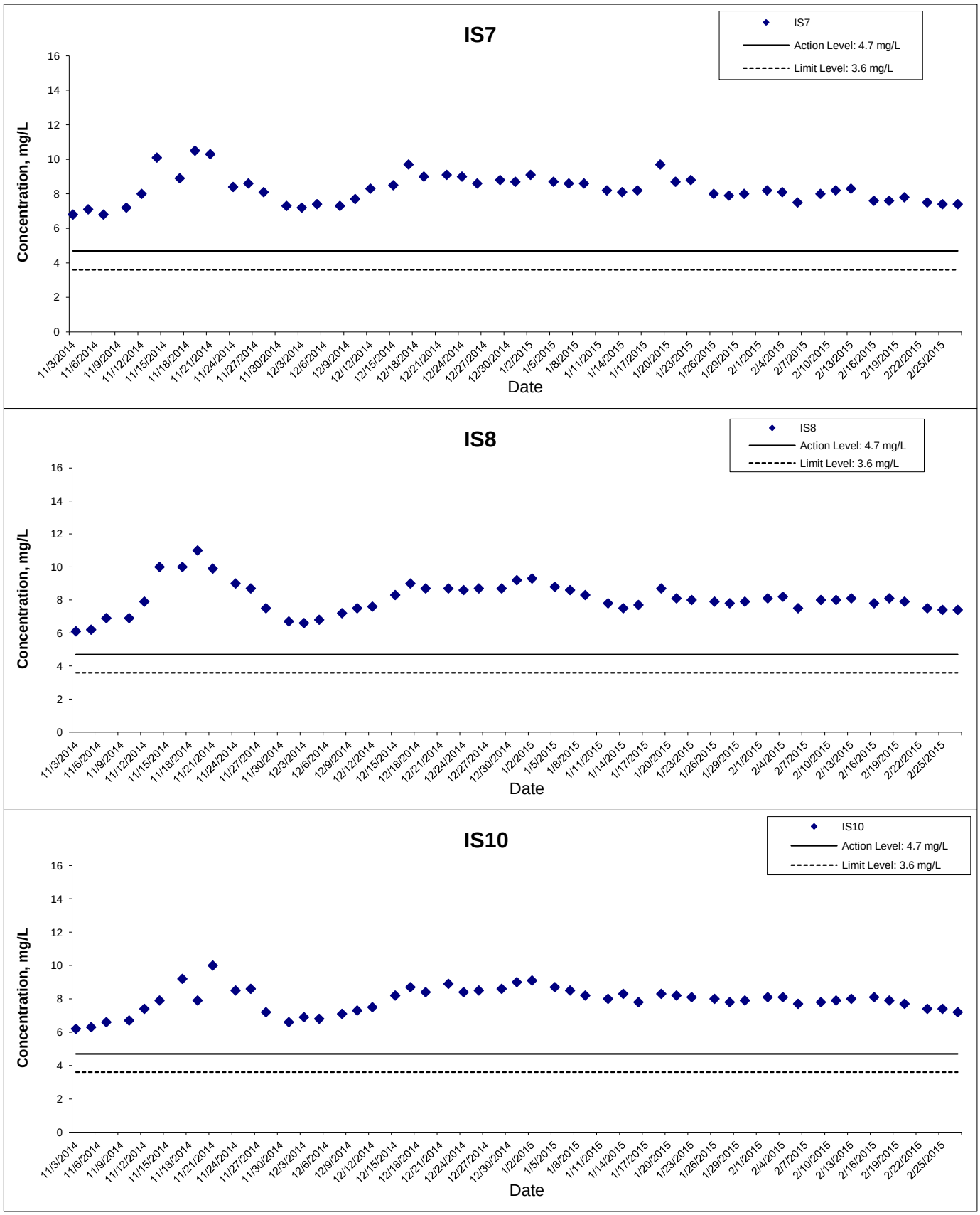
Dissolved Oxygen (Bottom) at Mid-Flood Tide



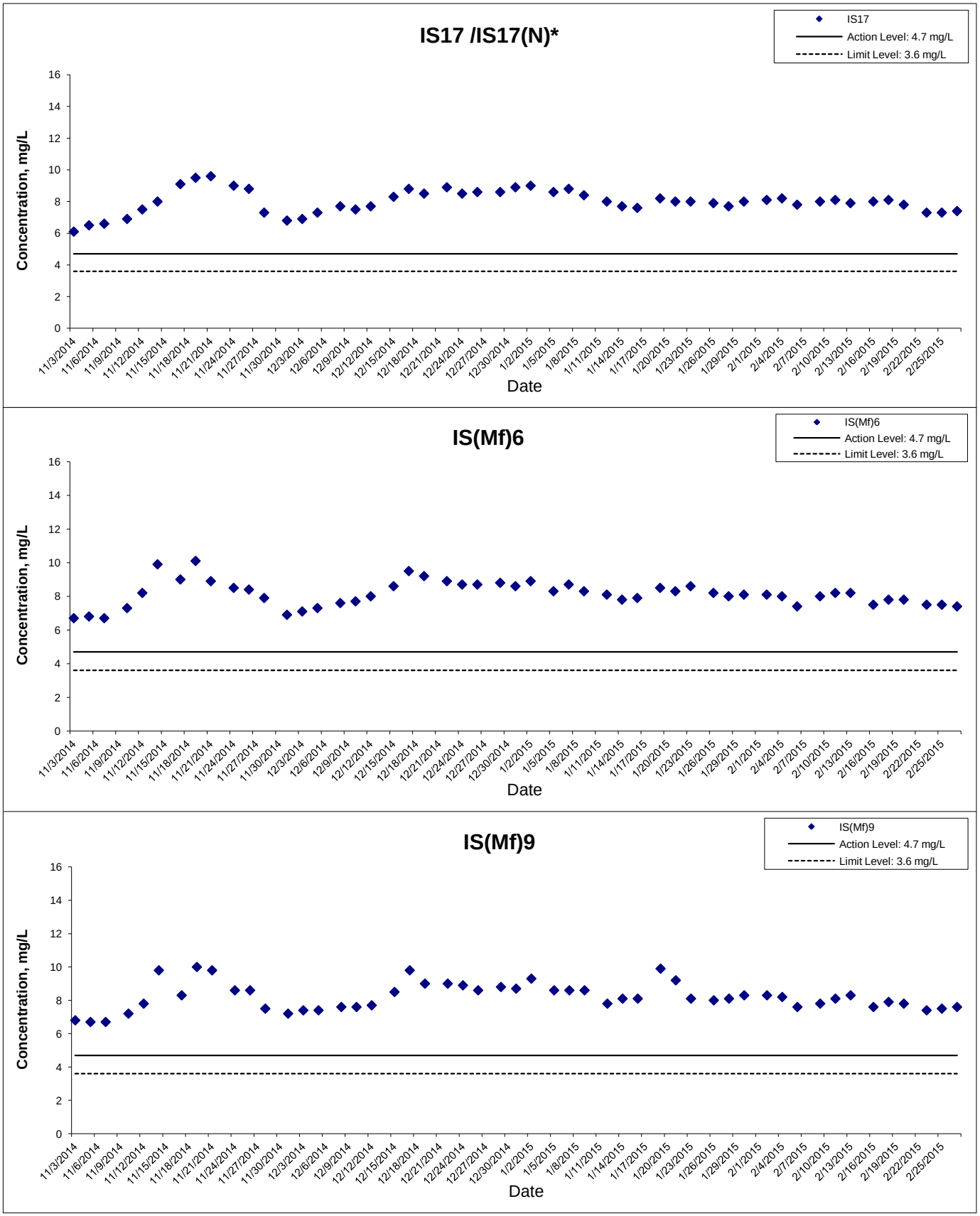




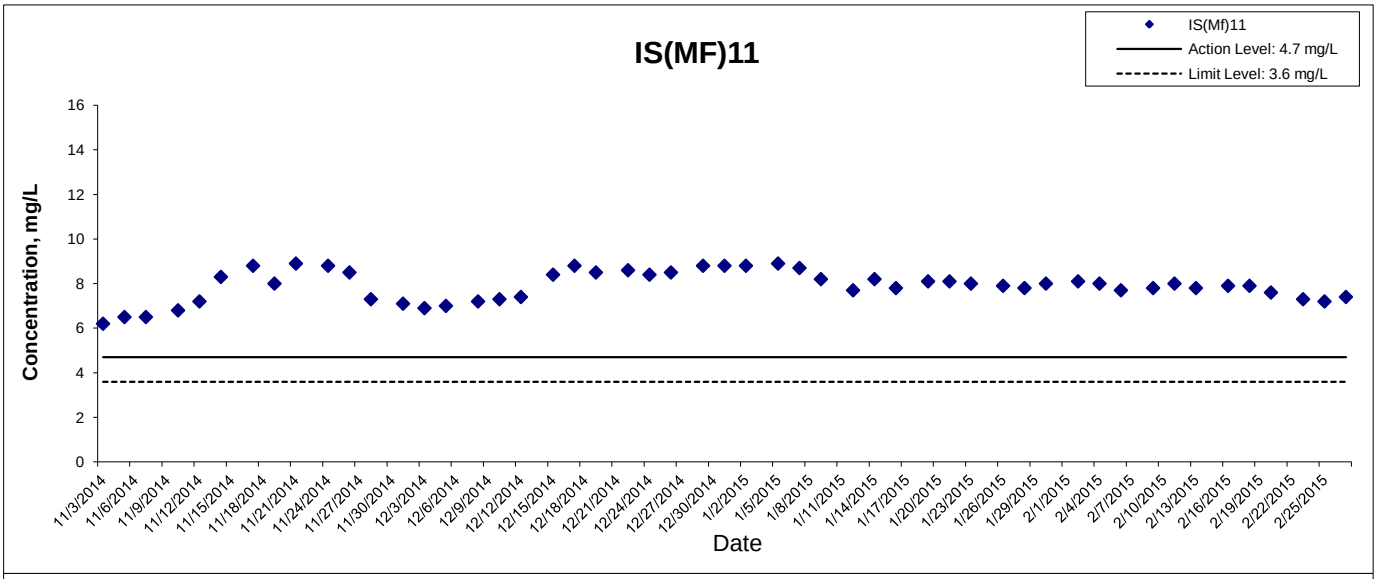
Dissolved Oxygen (Bottom) at Mid-Flood Tide

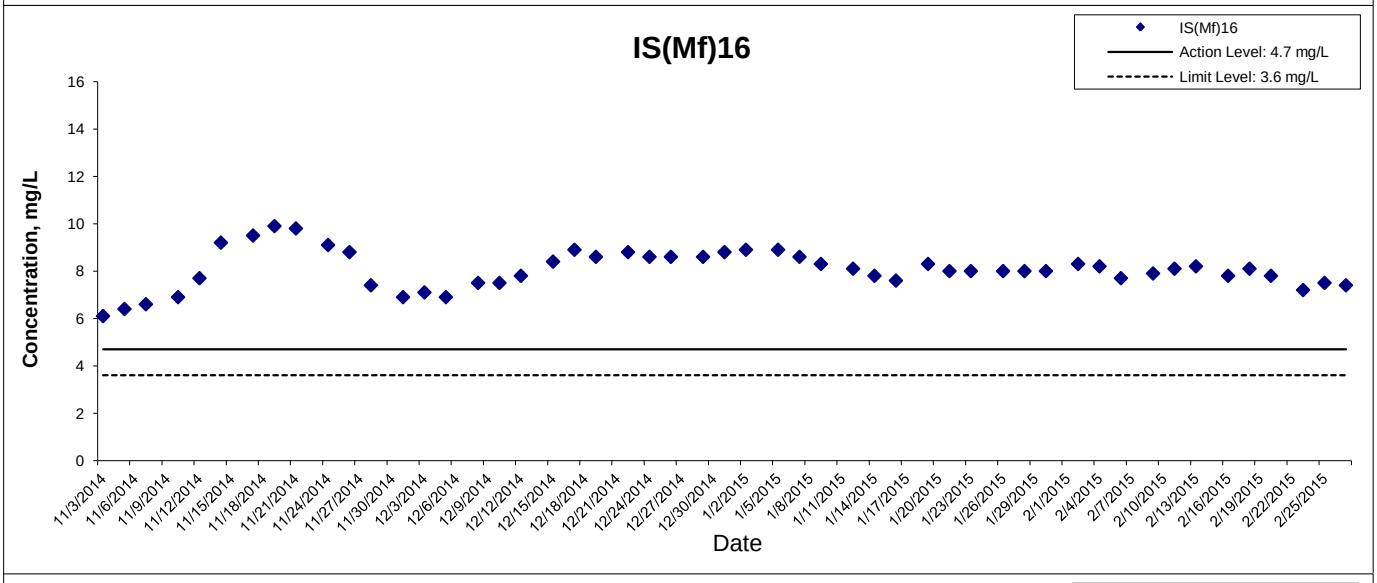


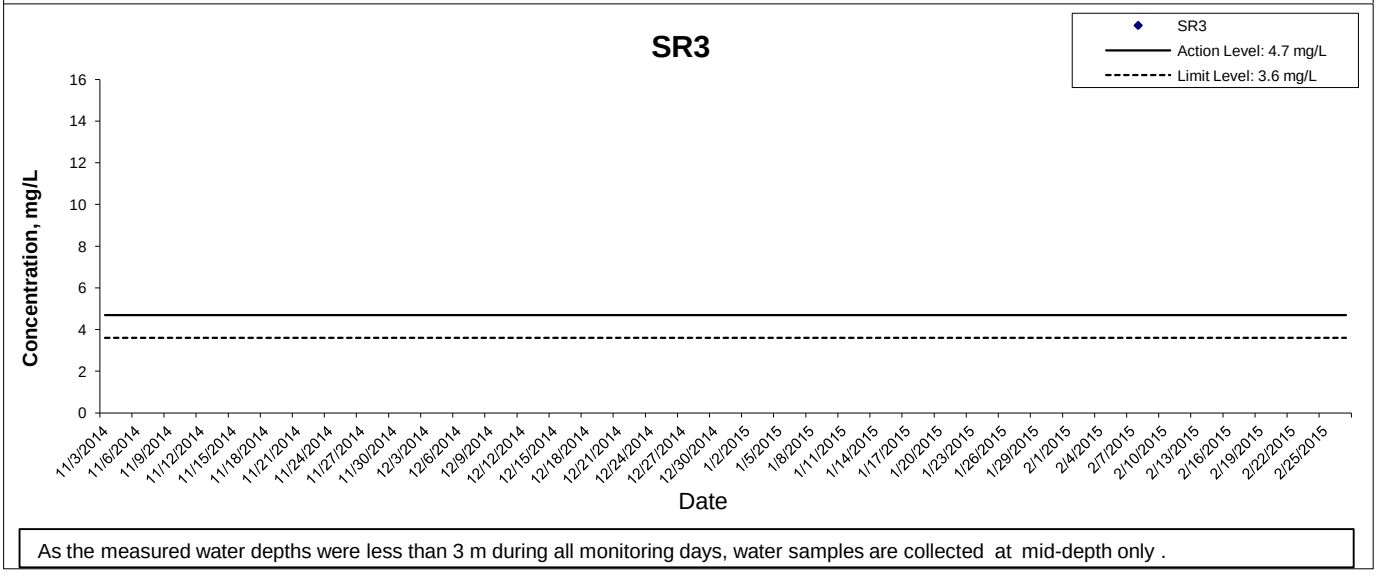
Dissolved Oxygen (Bottom) at Mid-Flood Tide



Dissolved Oxygen (Bottom) at Mid-Flood Tide

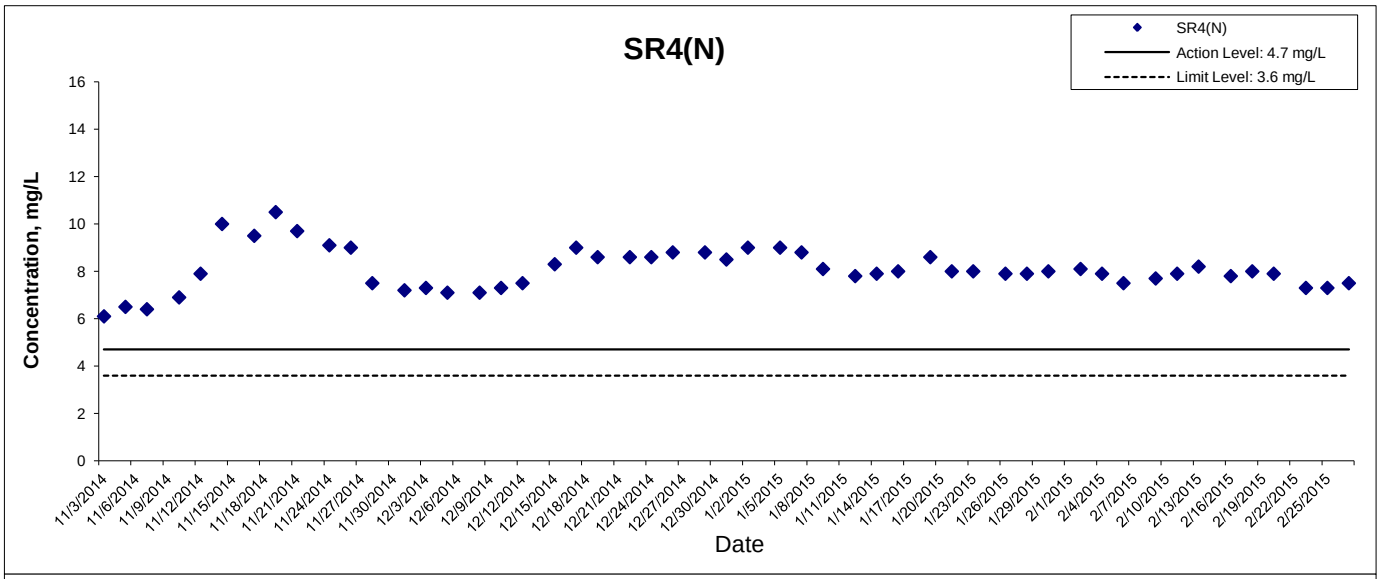


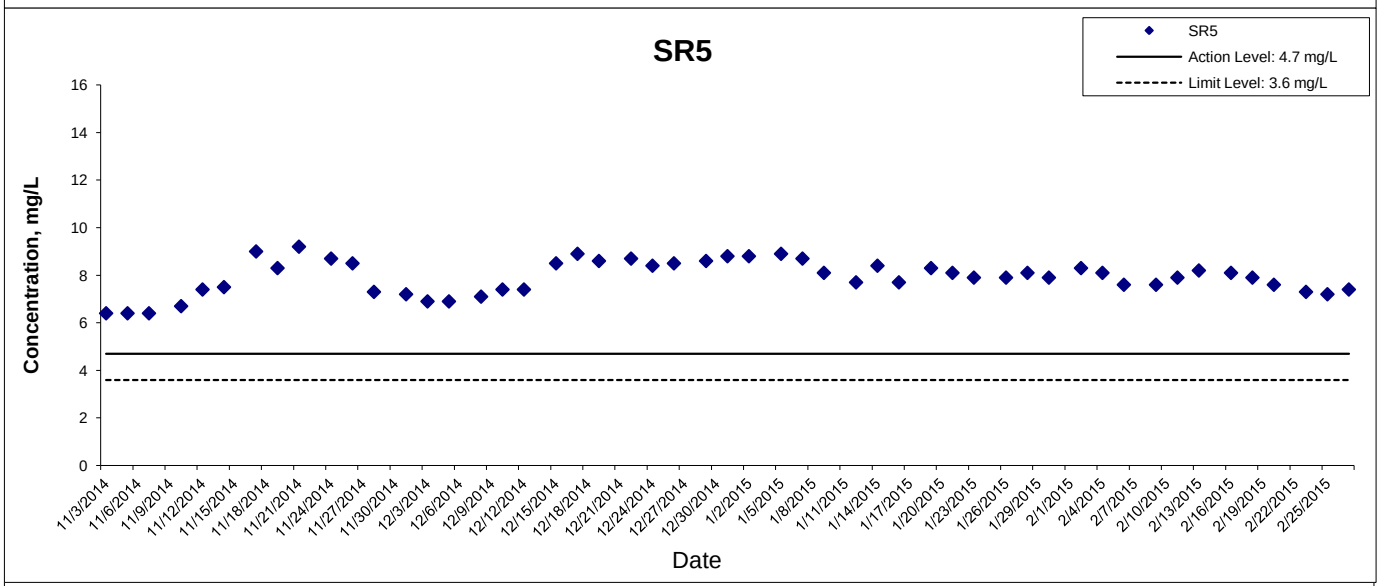


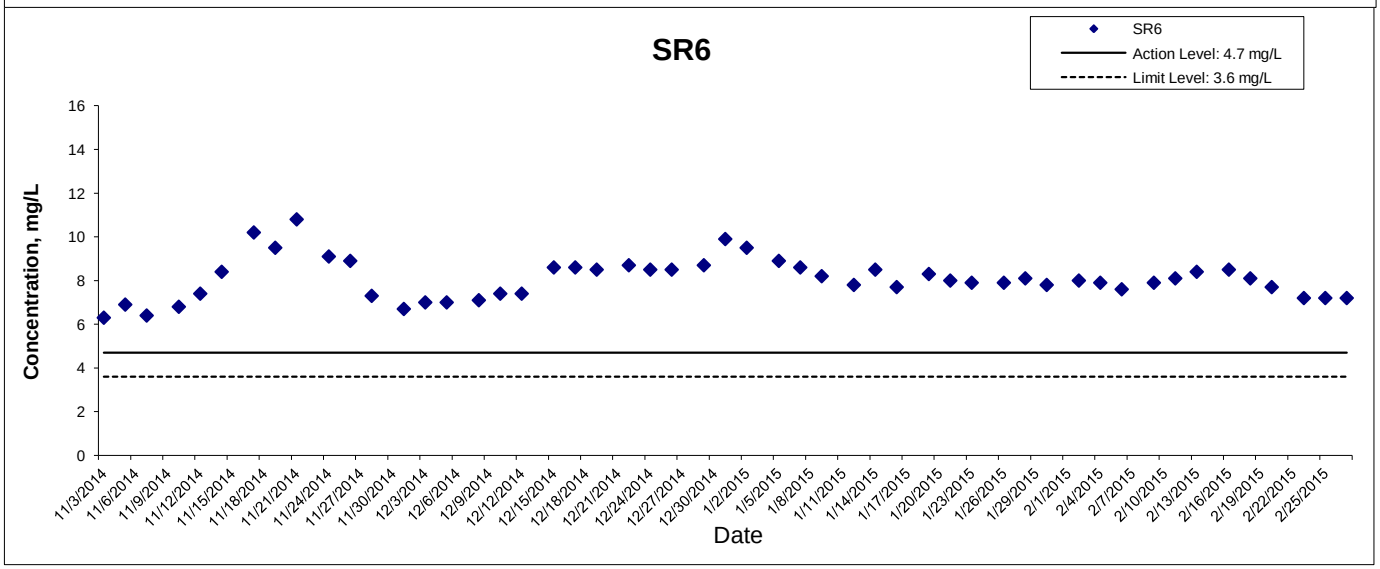


As the measured water depths were less than 3 m during all monitoring days, water samples are collected at mid-depth only .

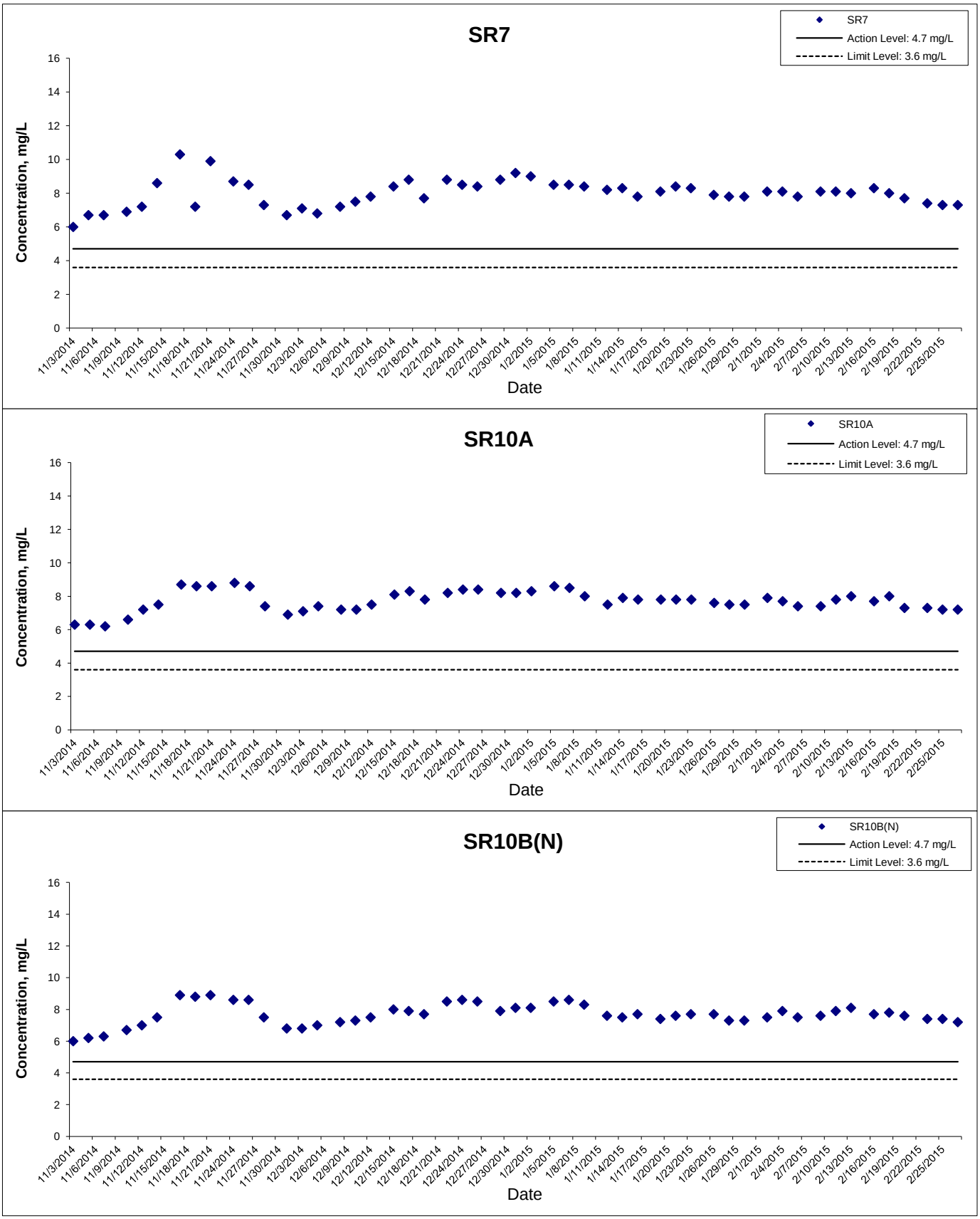
Dissolved Oxygen (Bottom) at Mid-Flood Tide



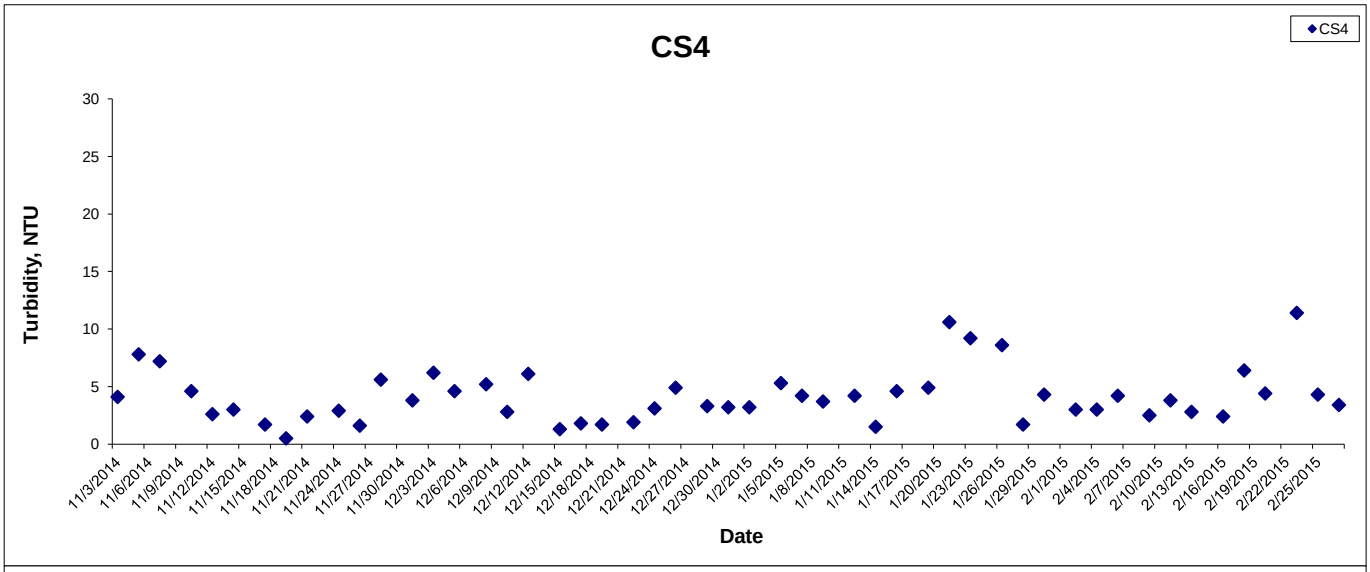


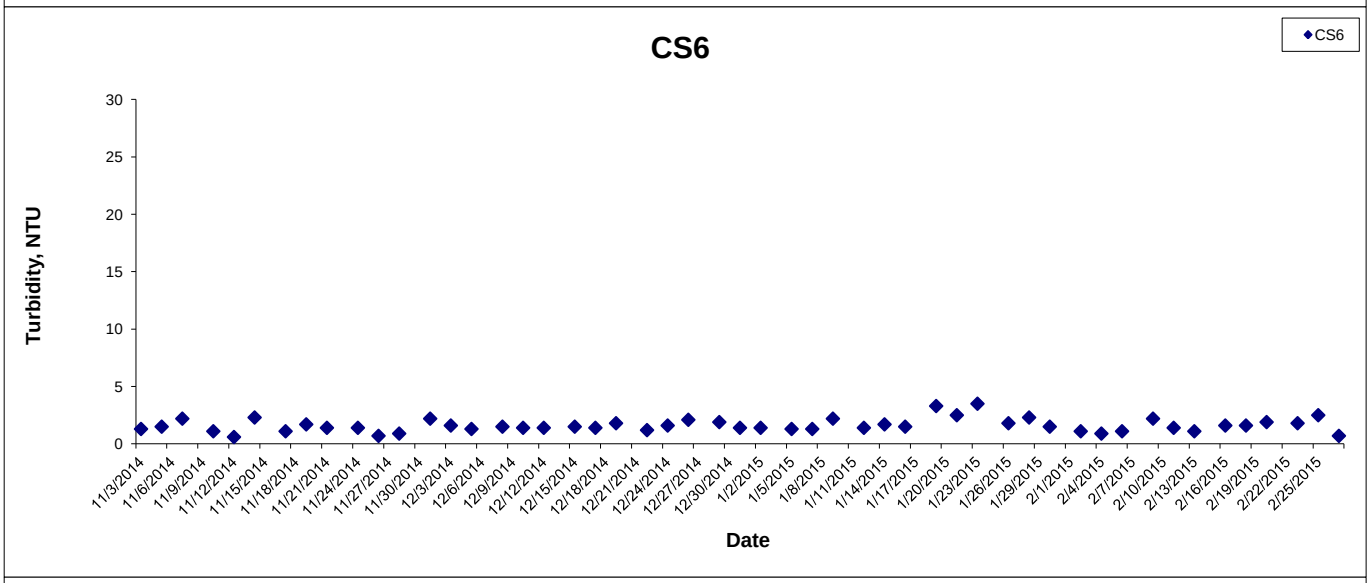


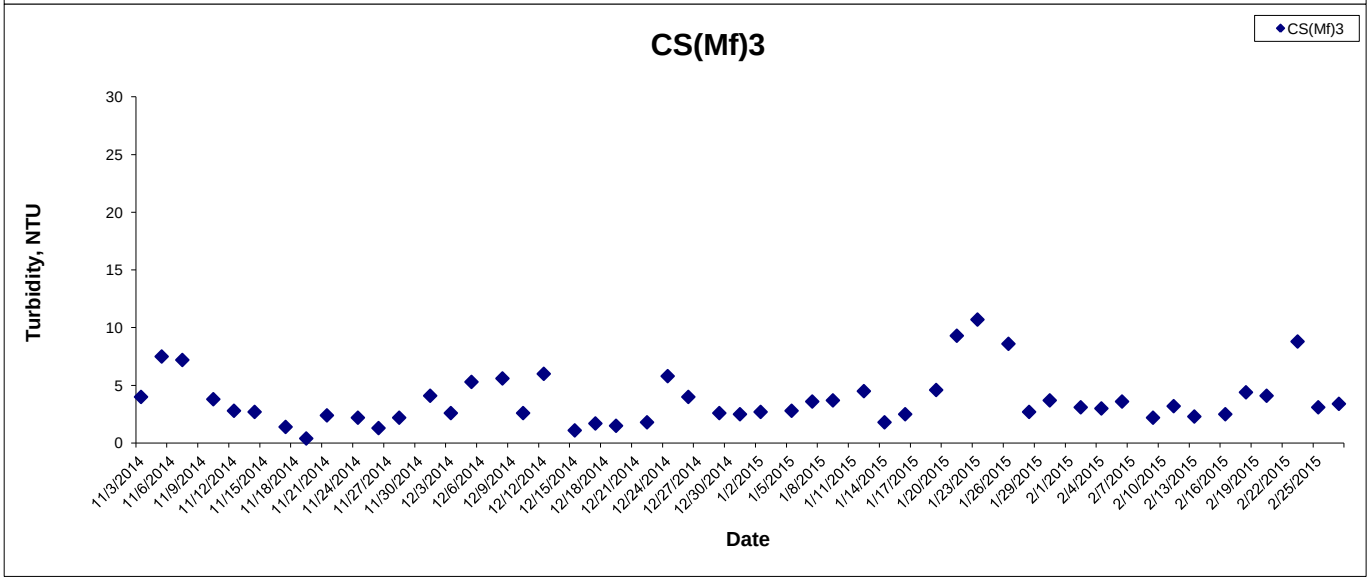
Dissolved Oxygen (Bottom) at Mid-Flood Tide



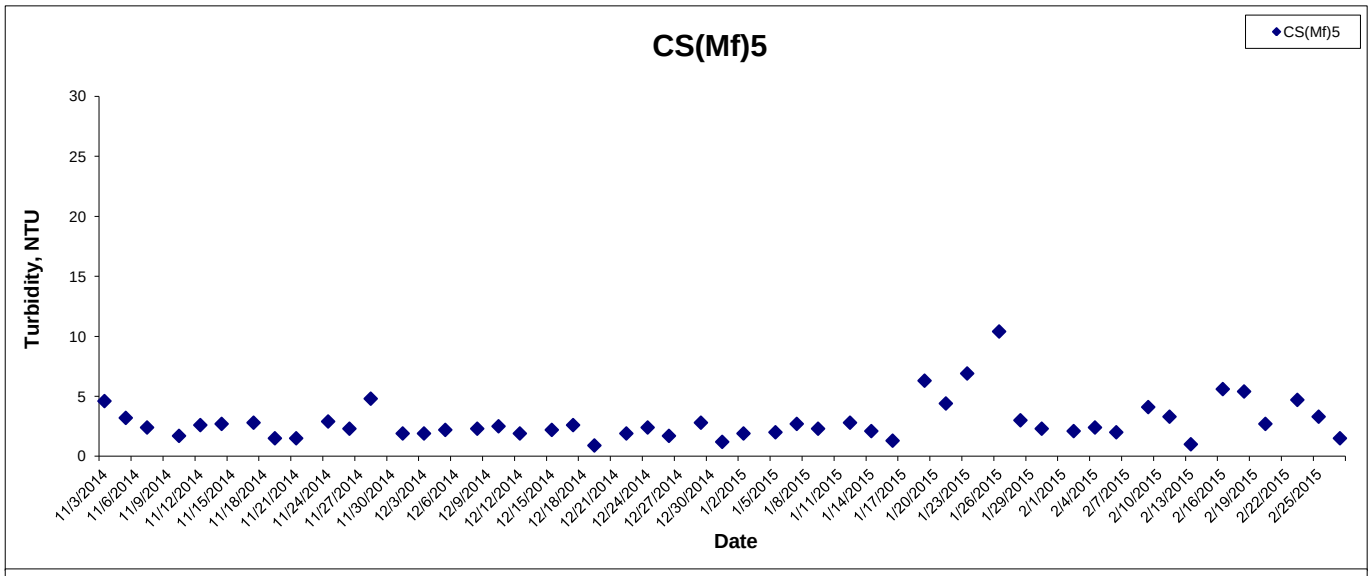
Turbidity at Mid-Ebb Tide

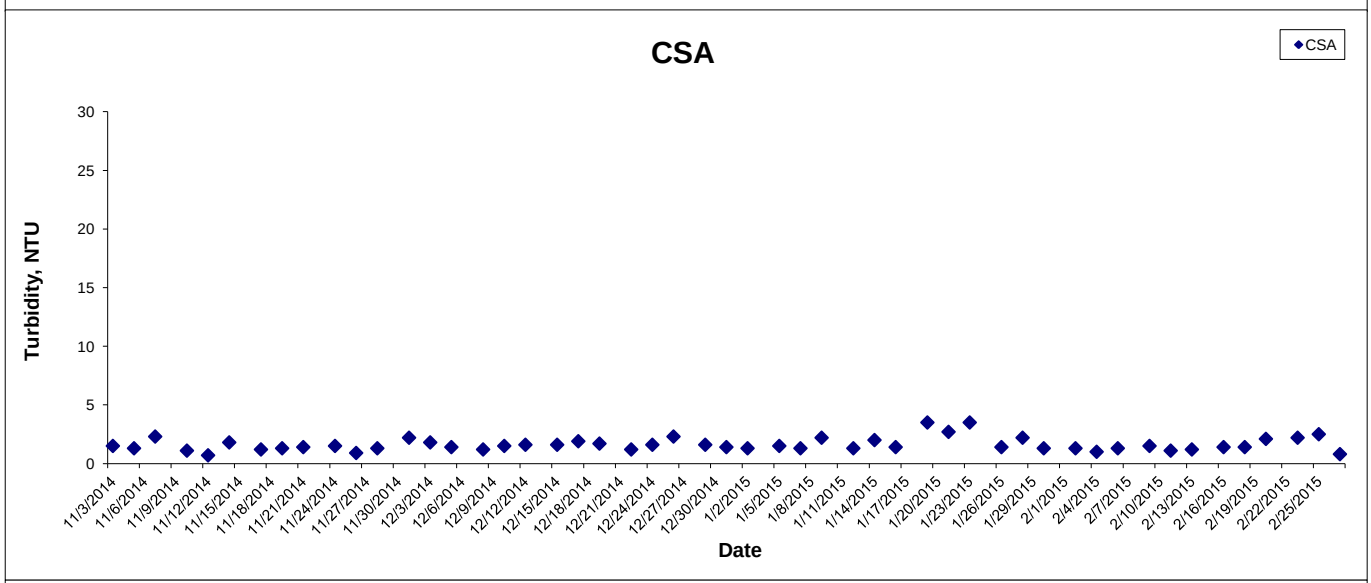


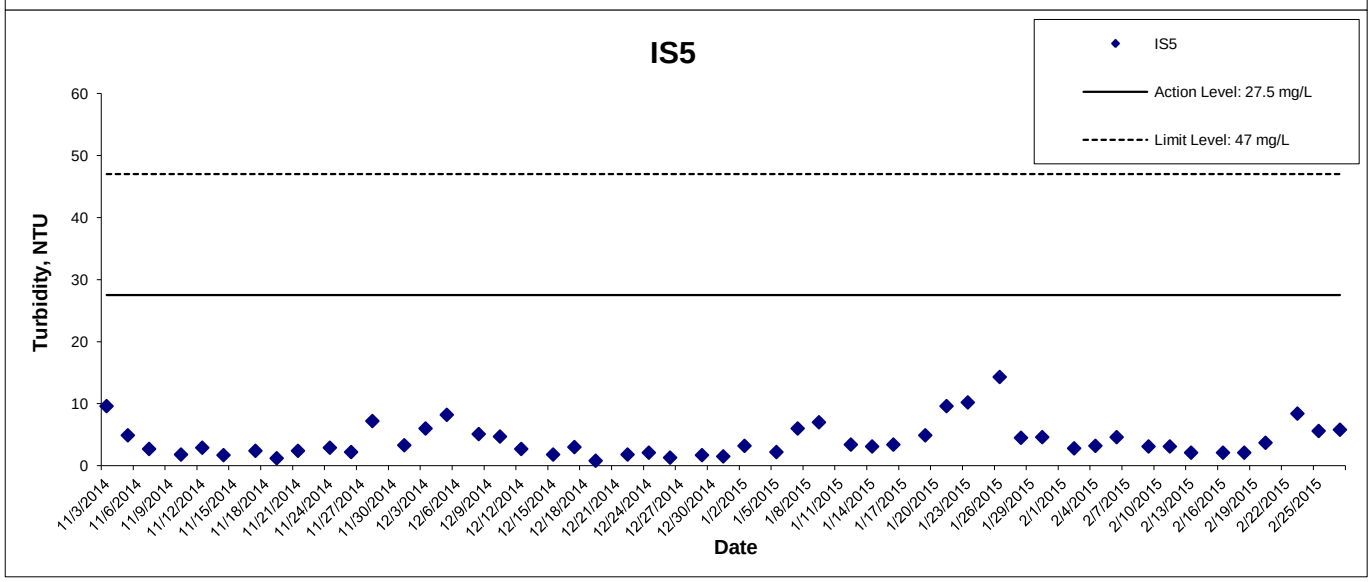




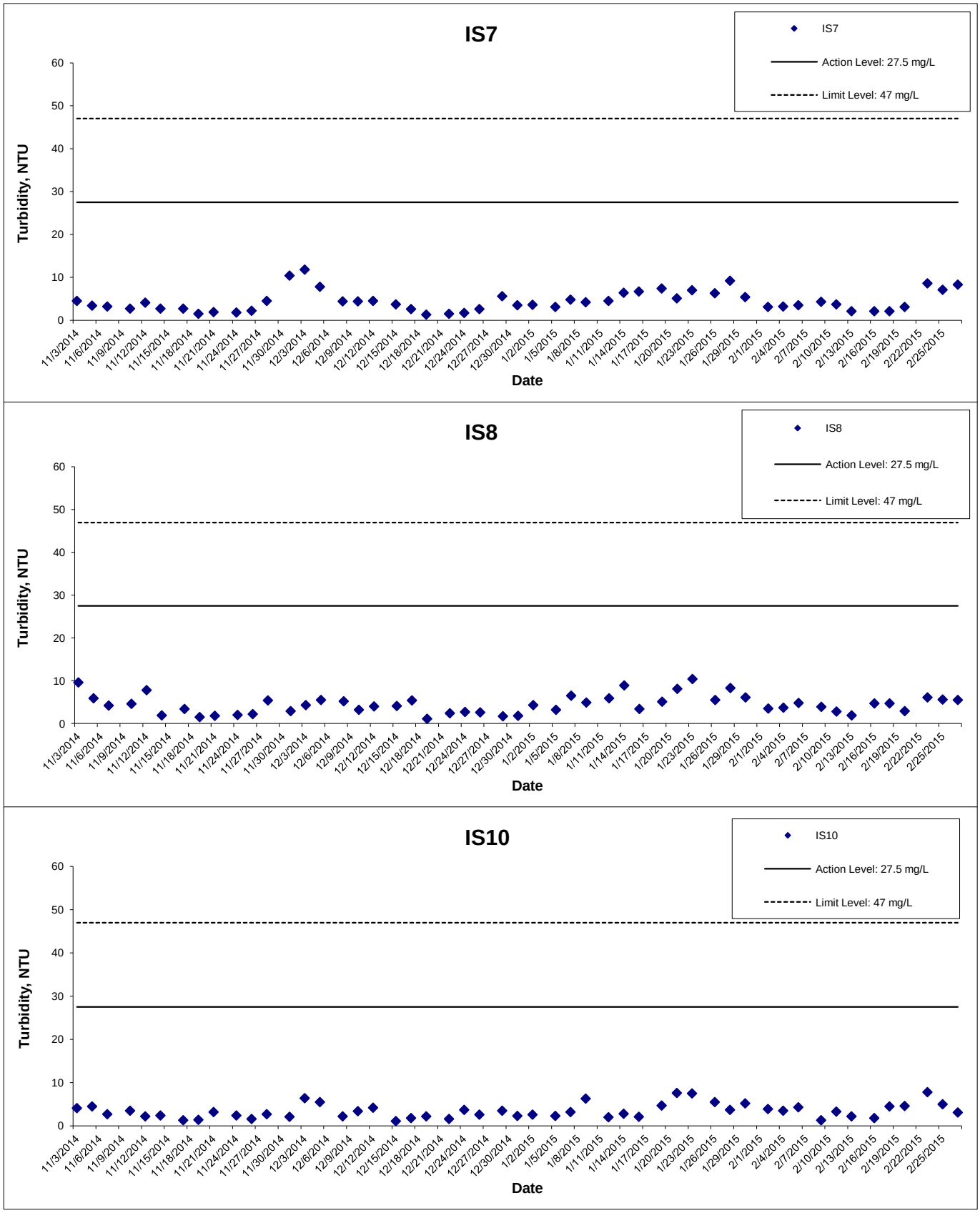
Turbidity at Mid-Ebb Tide



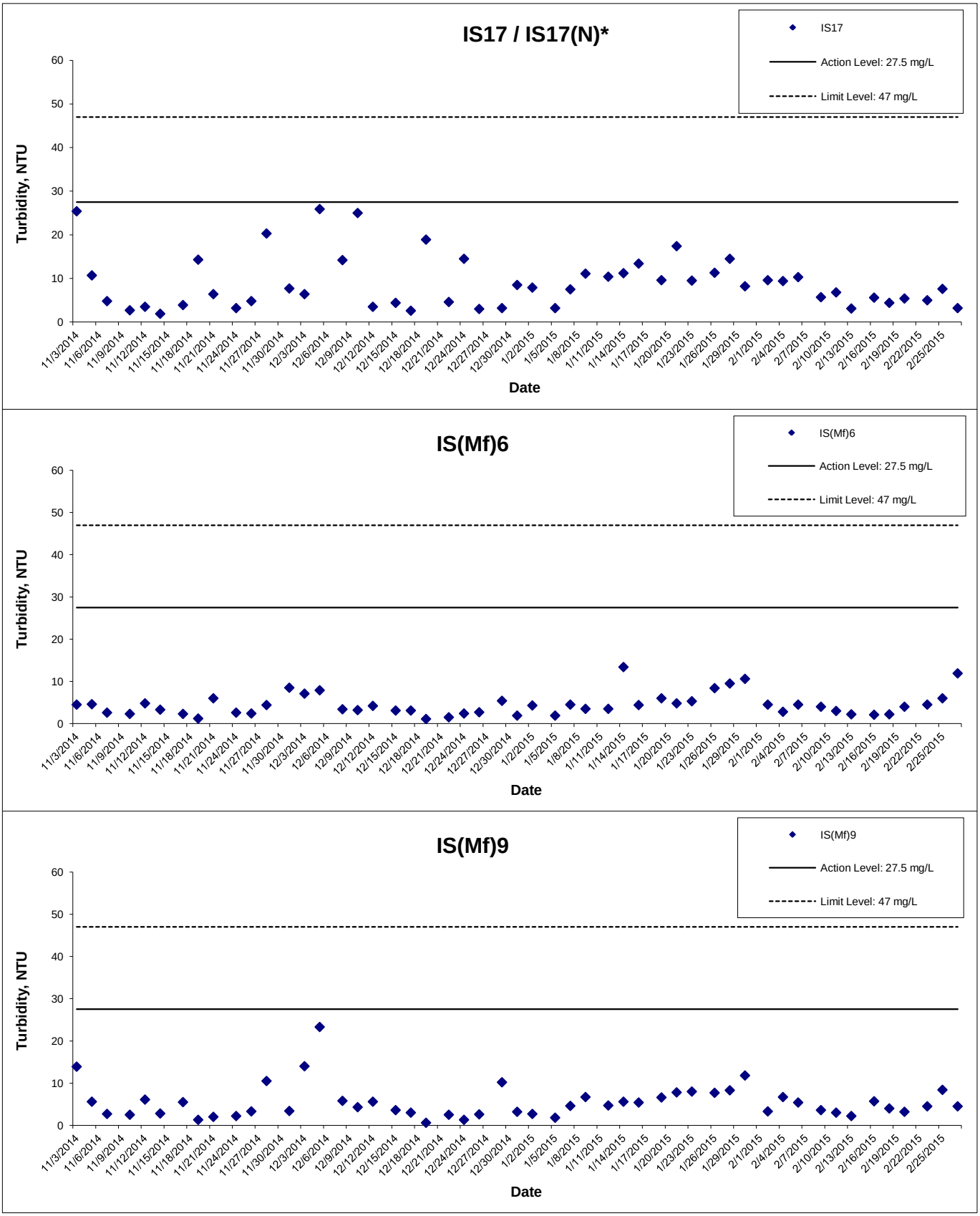




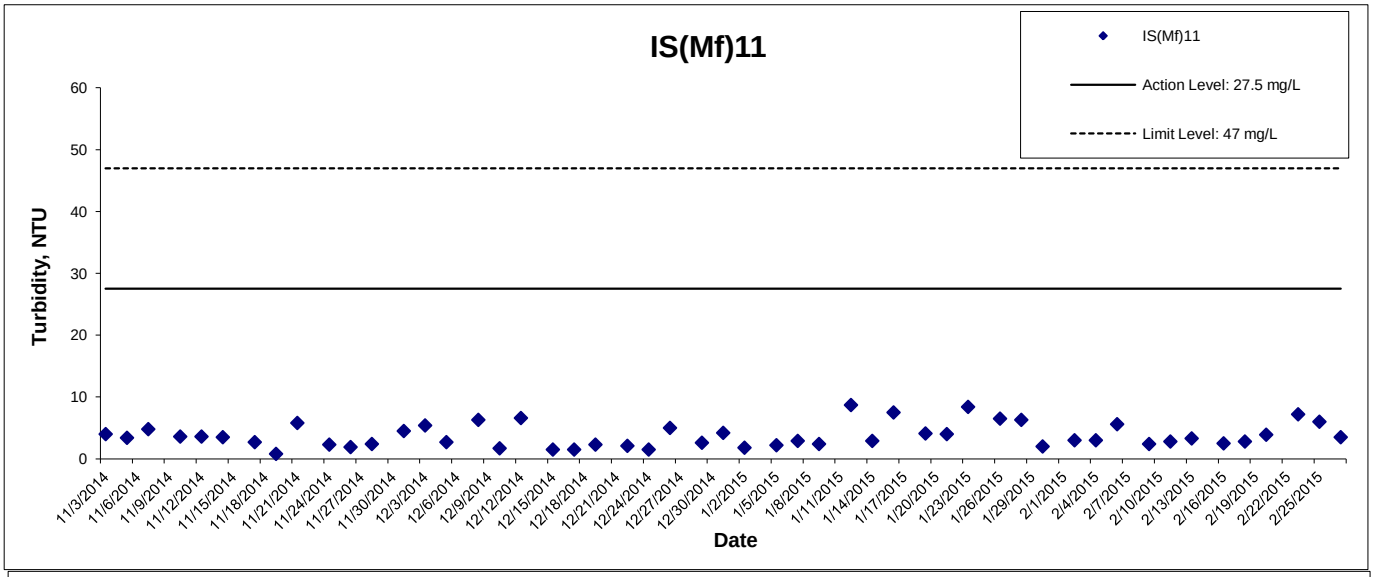
Turbidity at Mid-Ebb Tide

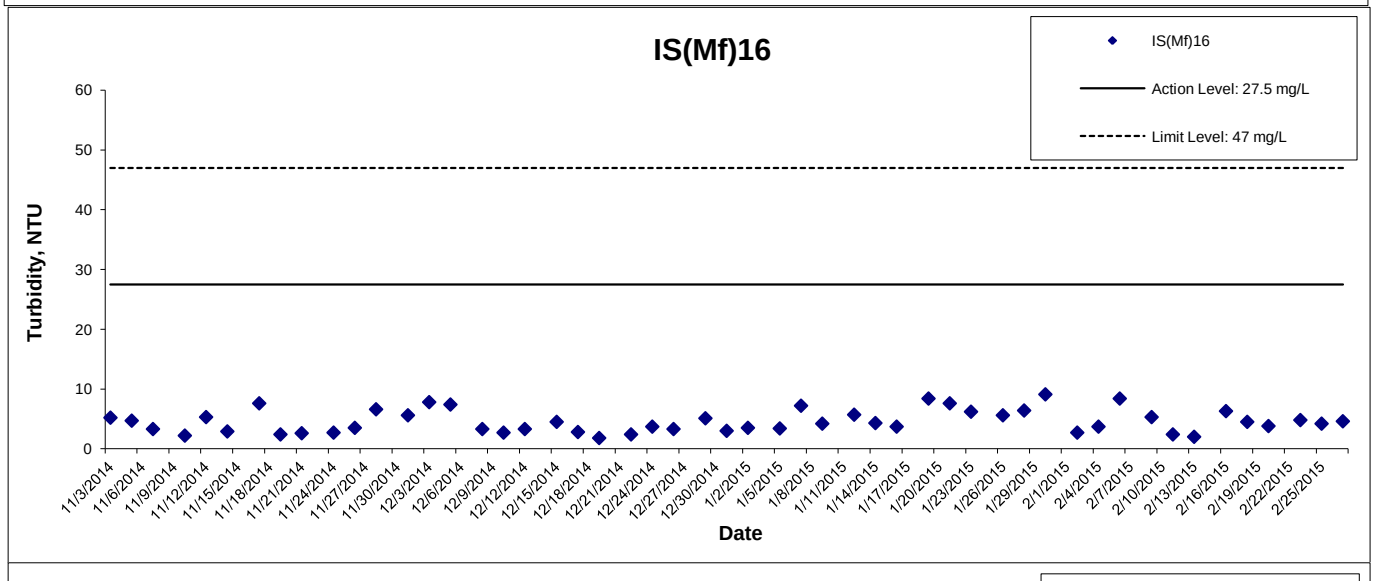


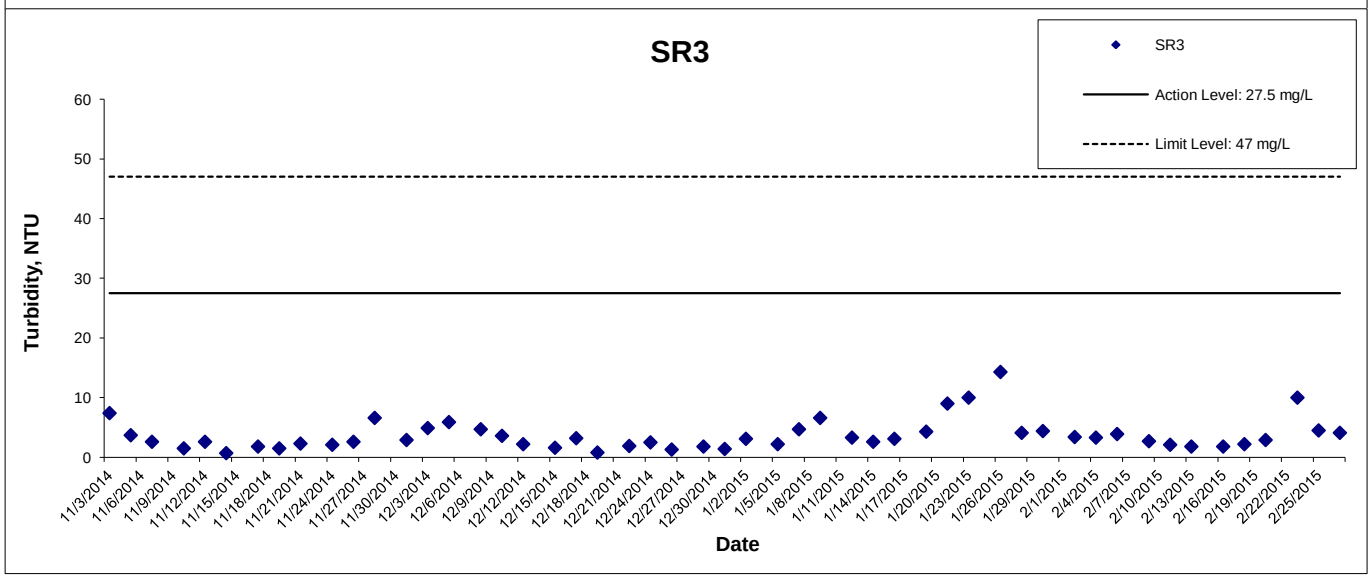
Turbidity at Mid-Ebb Tide



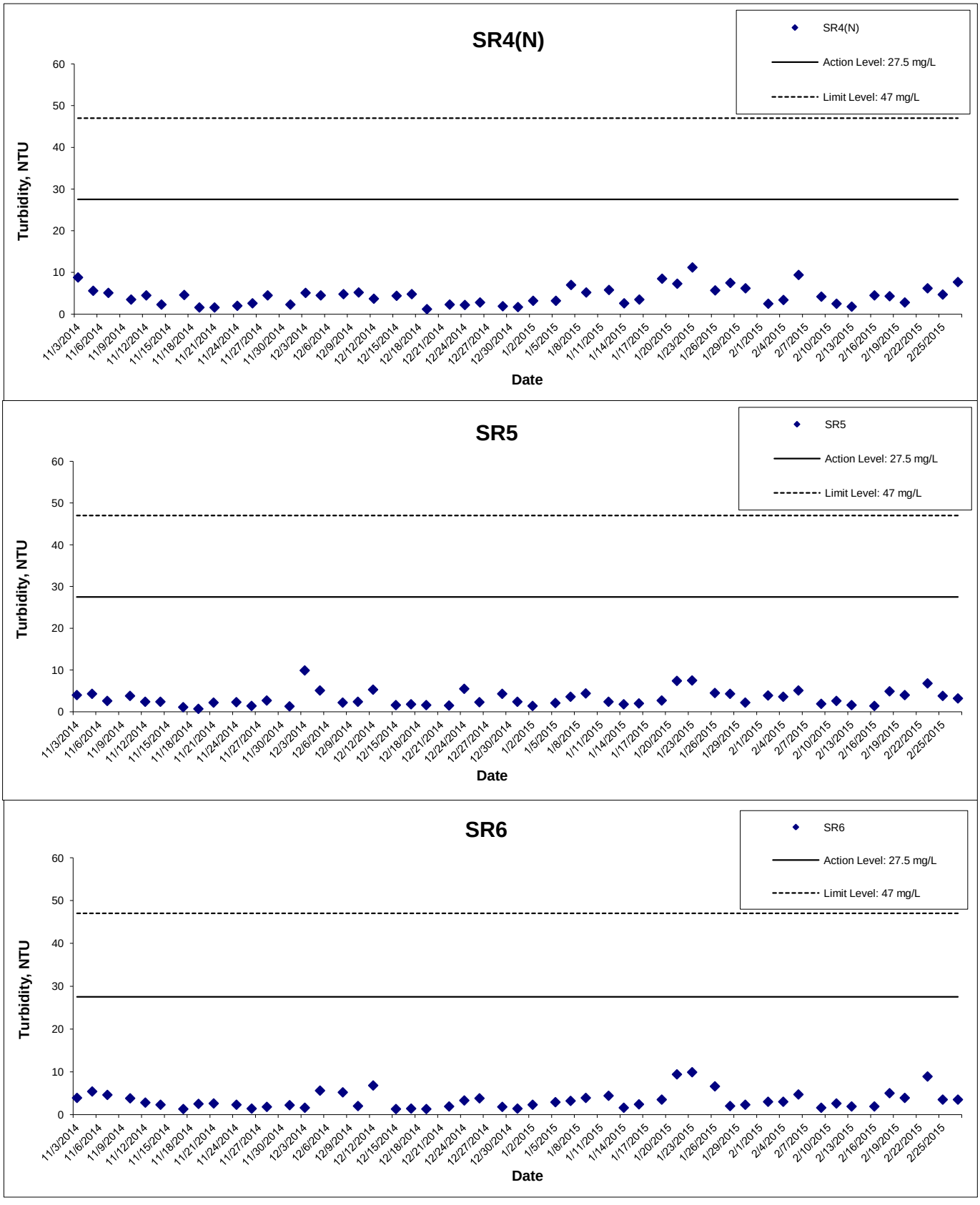
Turbidity at Mid-Ebb Tide



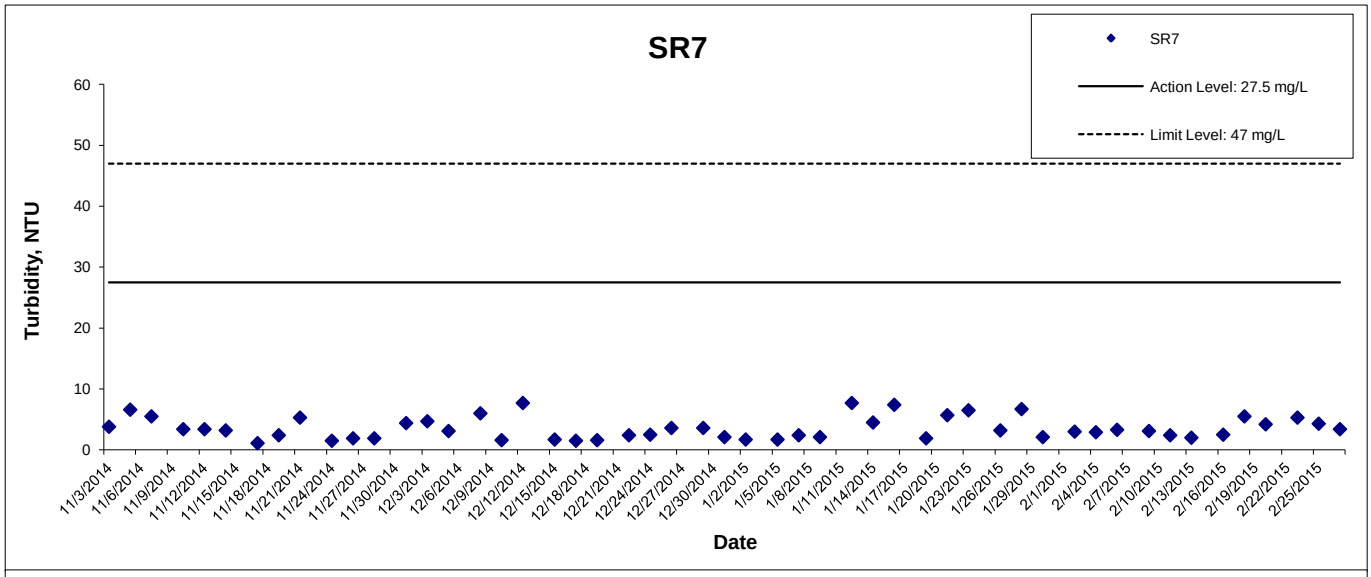


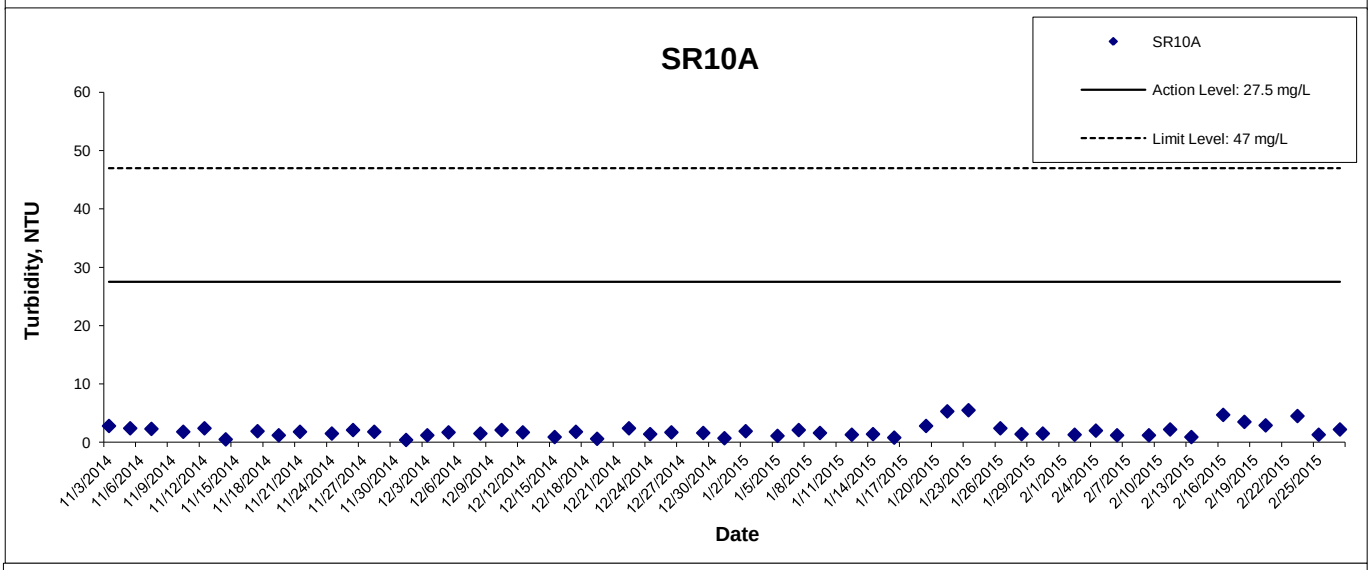


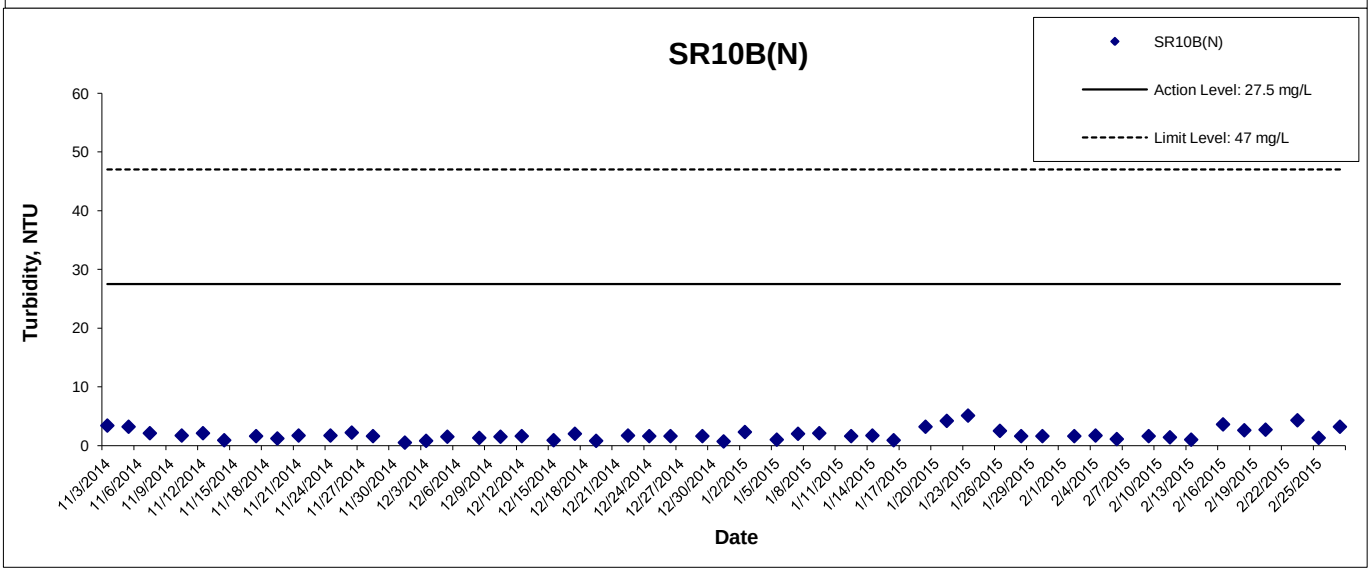
Turbidity at Mid-Ebb Tide



Turbidity at Mid-Ebb Tide







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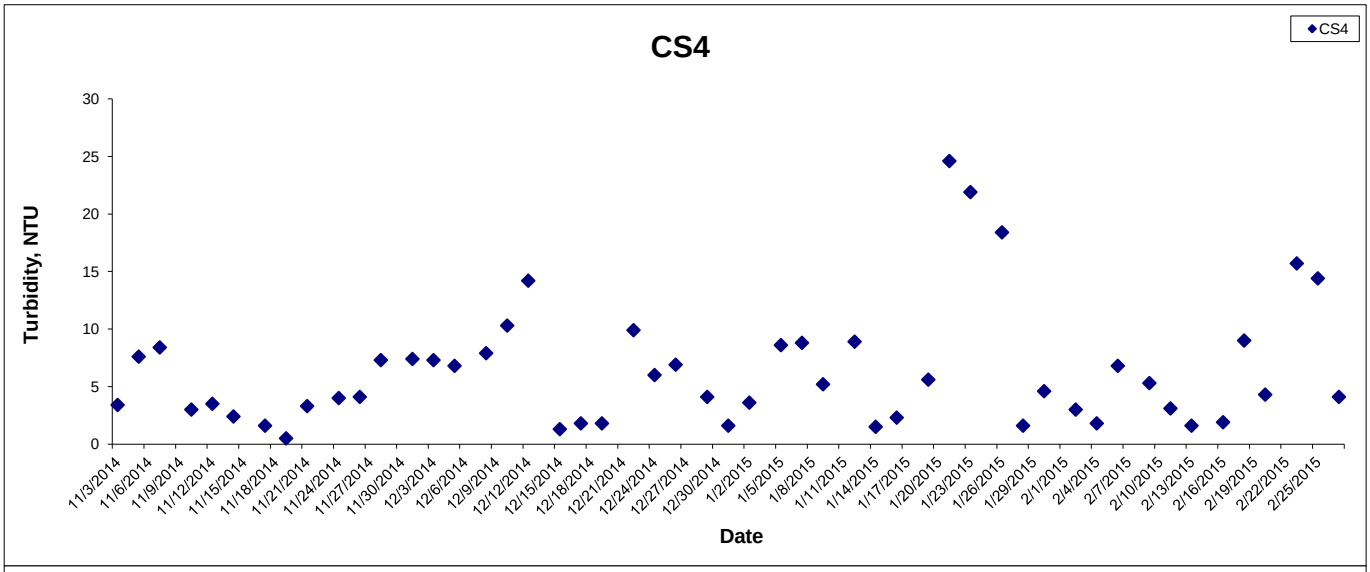
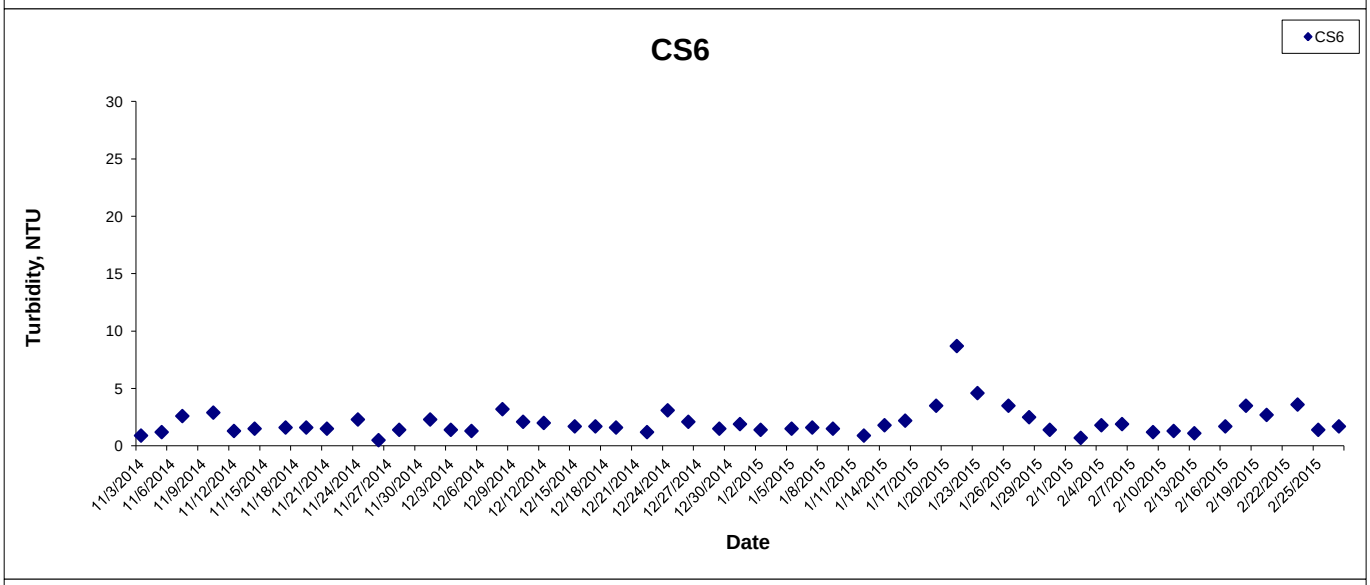
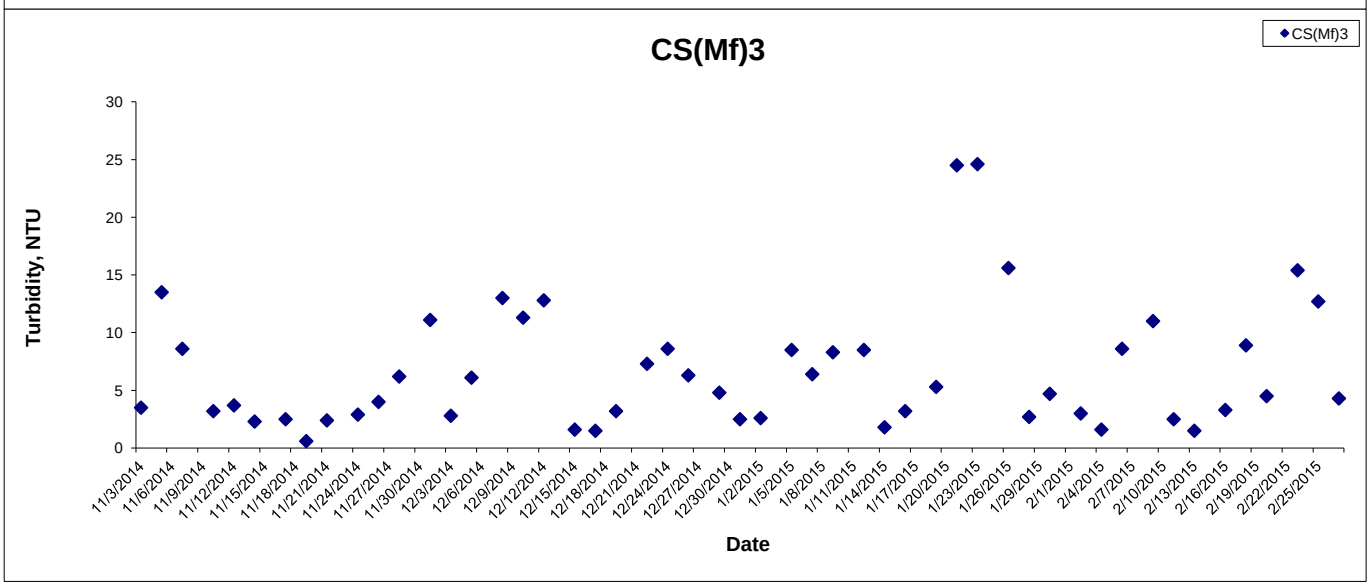
Appendix G

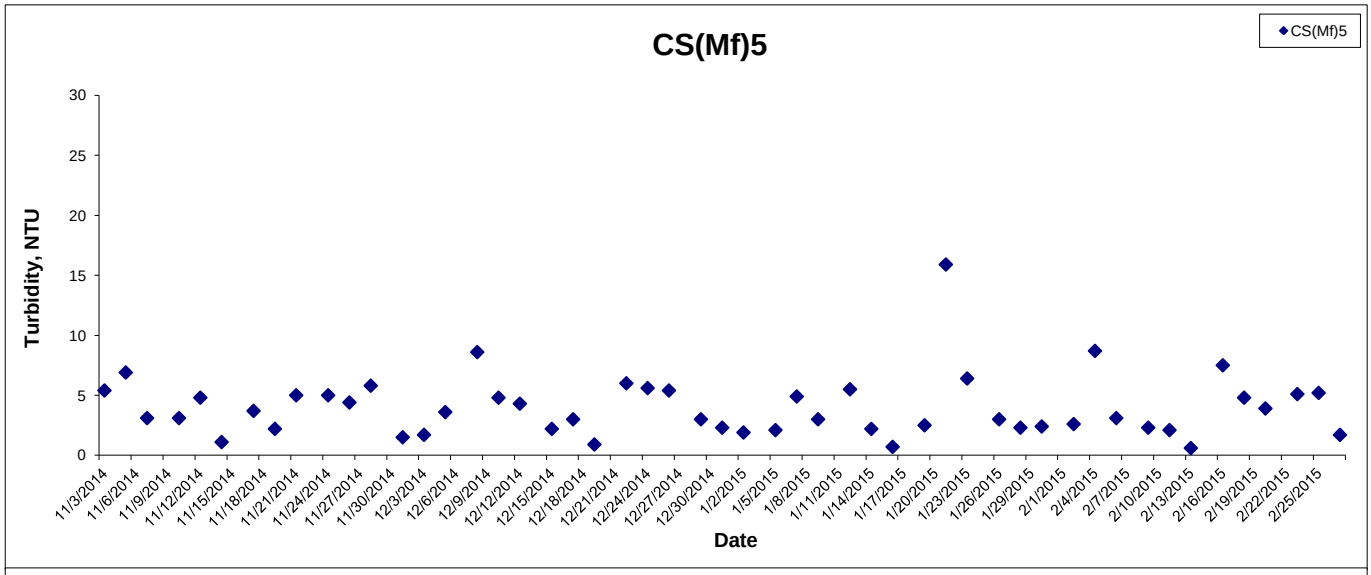
Turbidity at Mid-Flood Tide

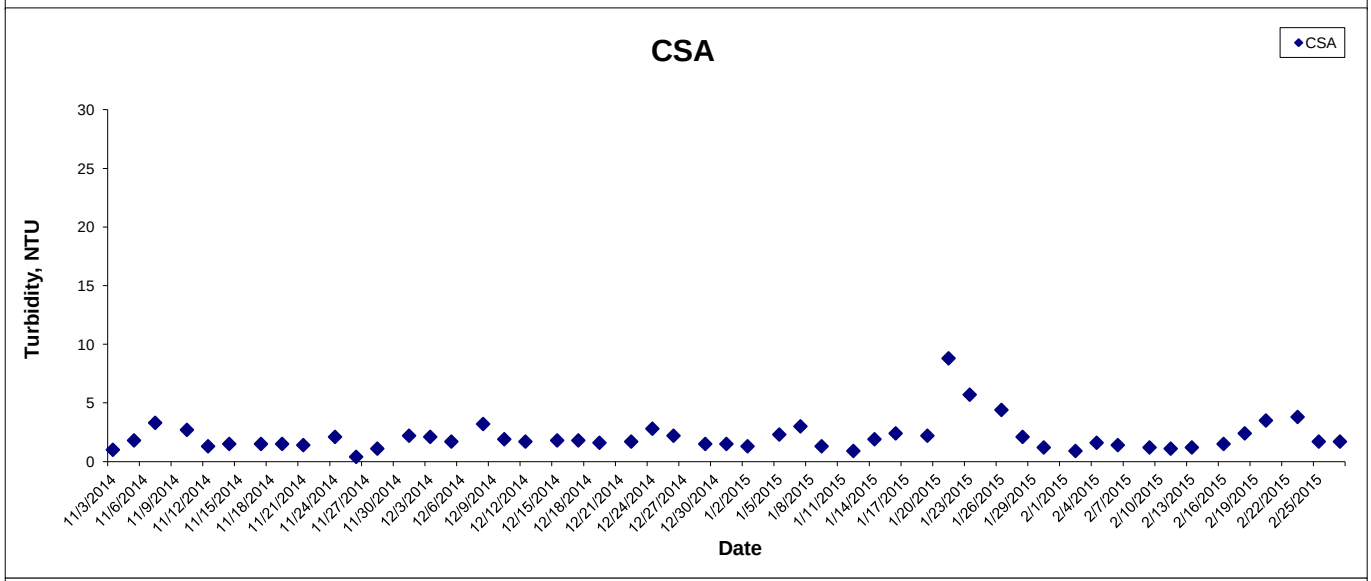


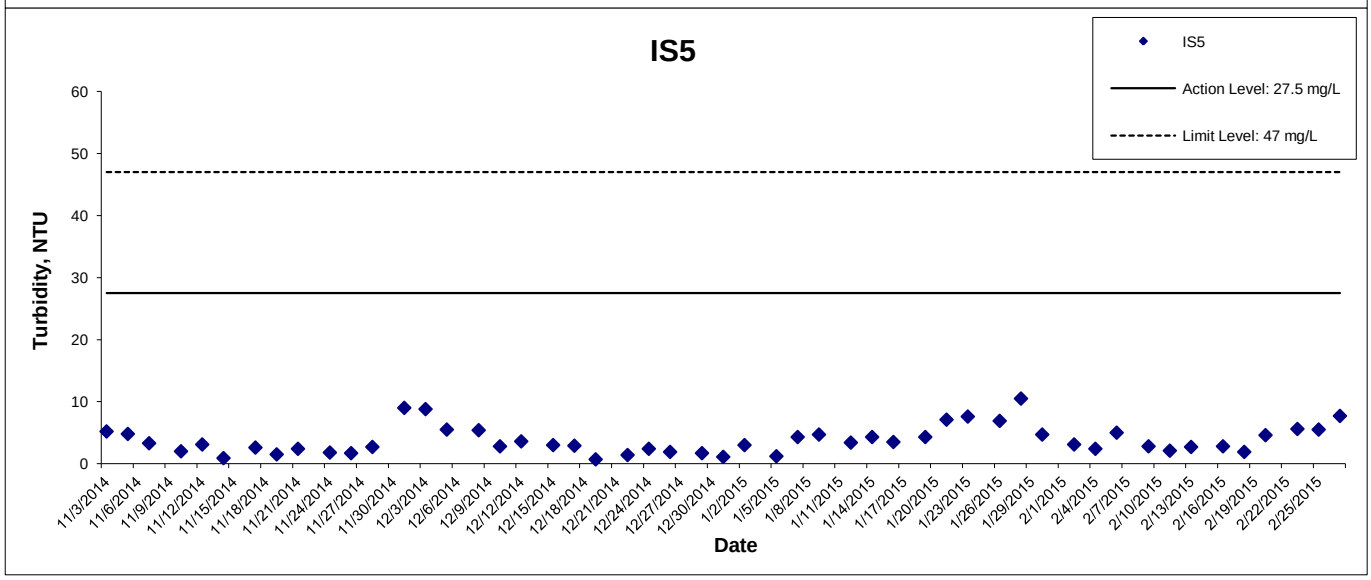




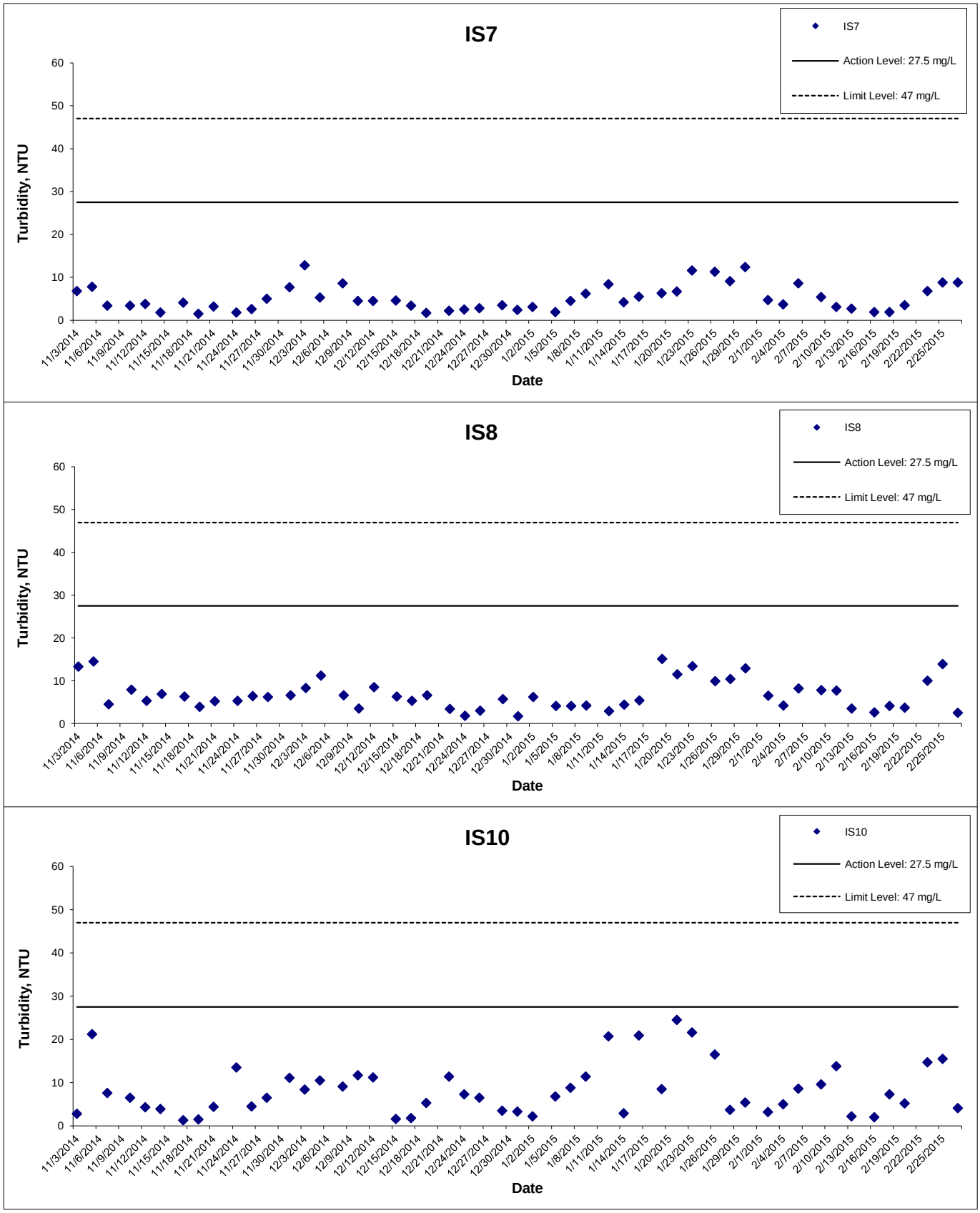
Turbidity at Mid-Flood Tide



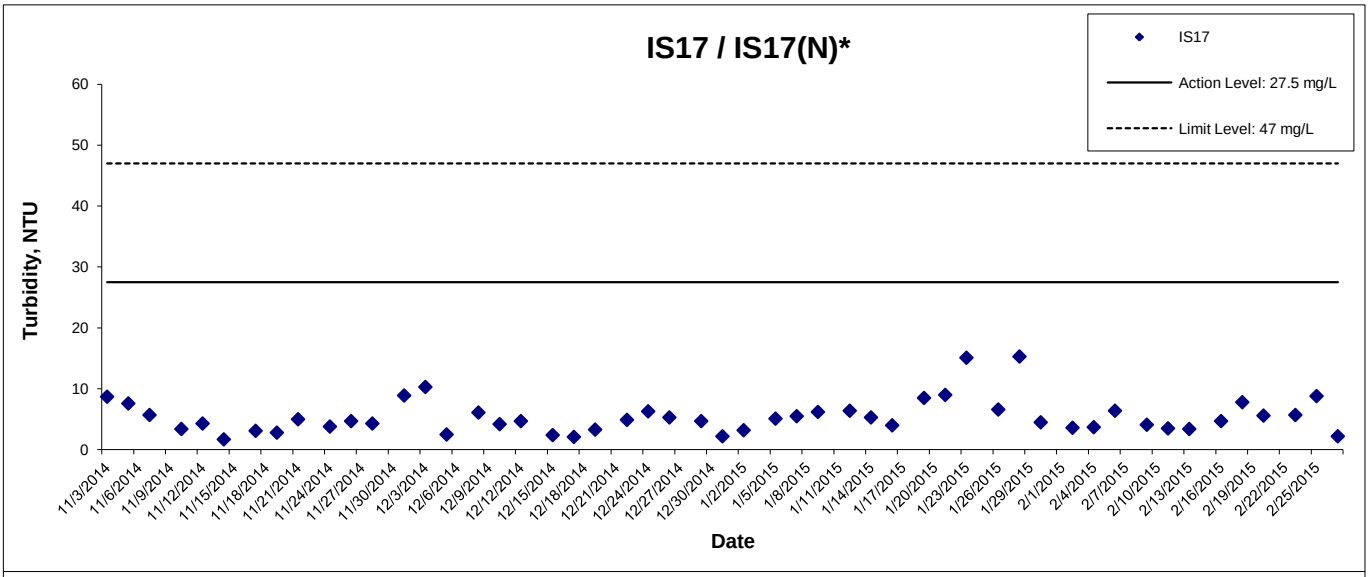


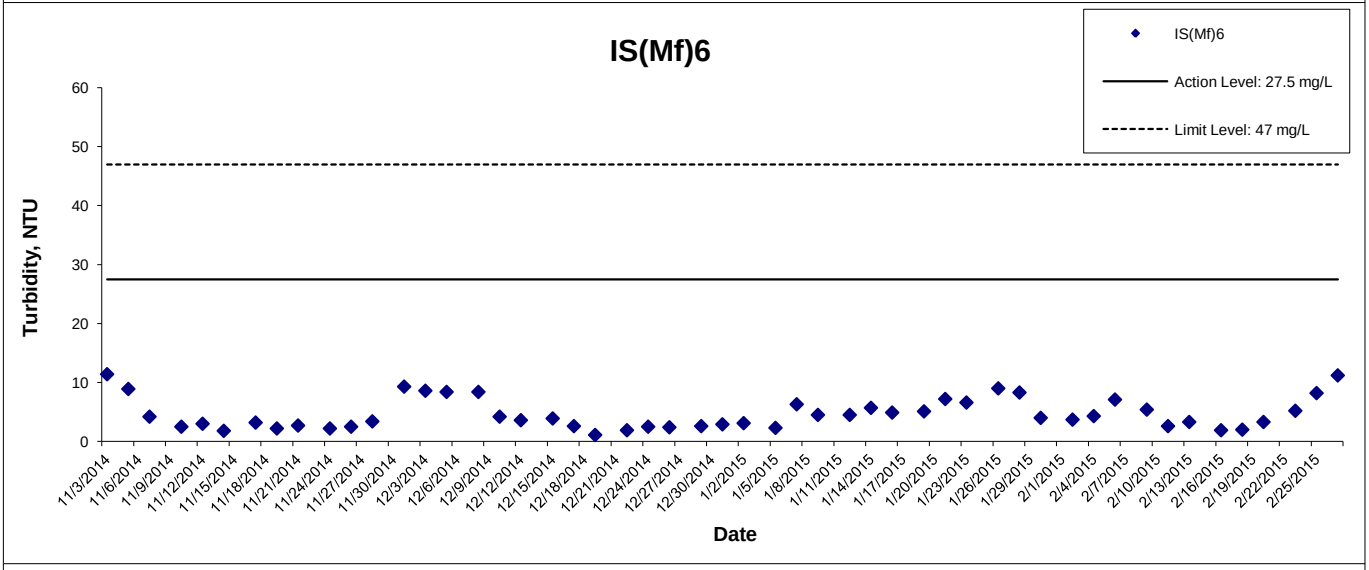


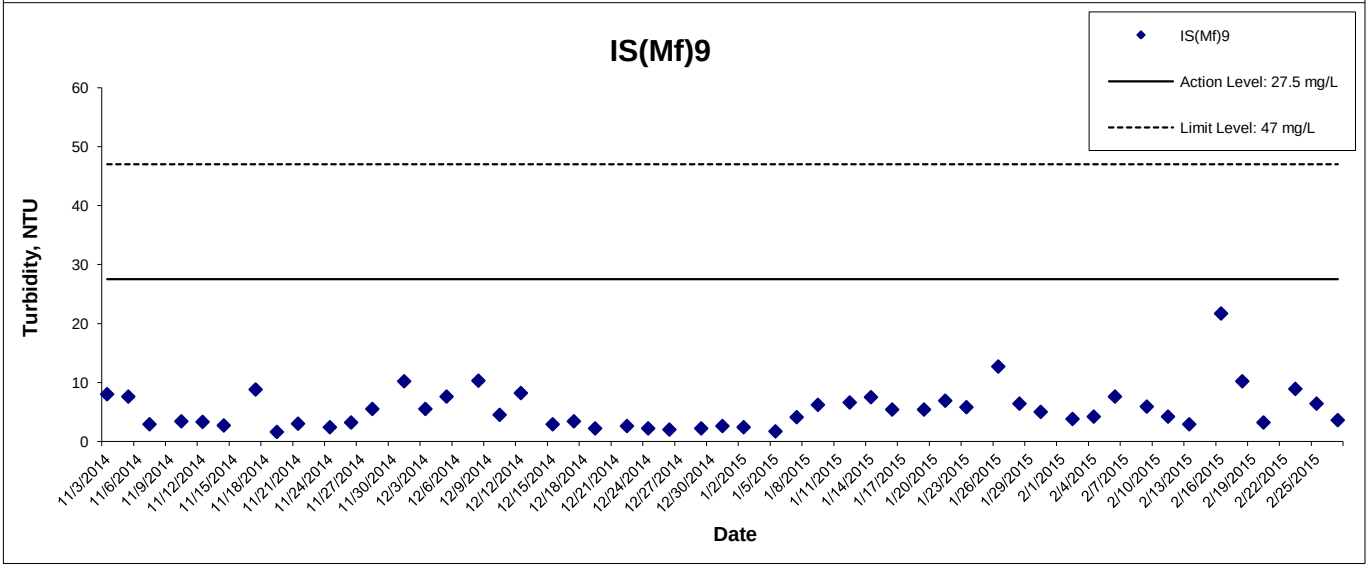
Turbidity at Mid-Flood Tide



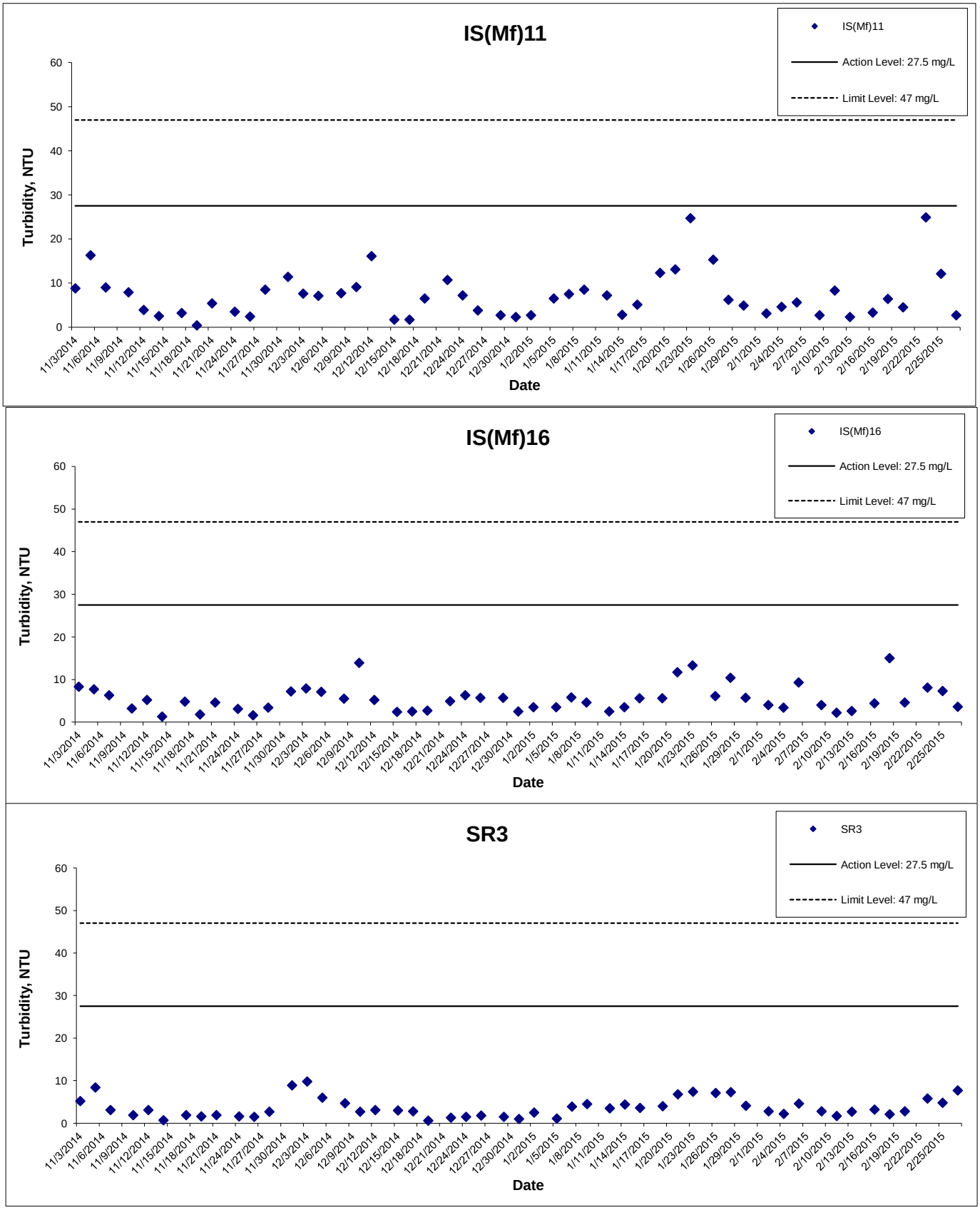
Turbidity at Mid-Flood Tide



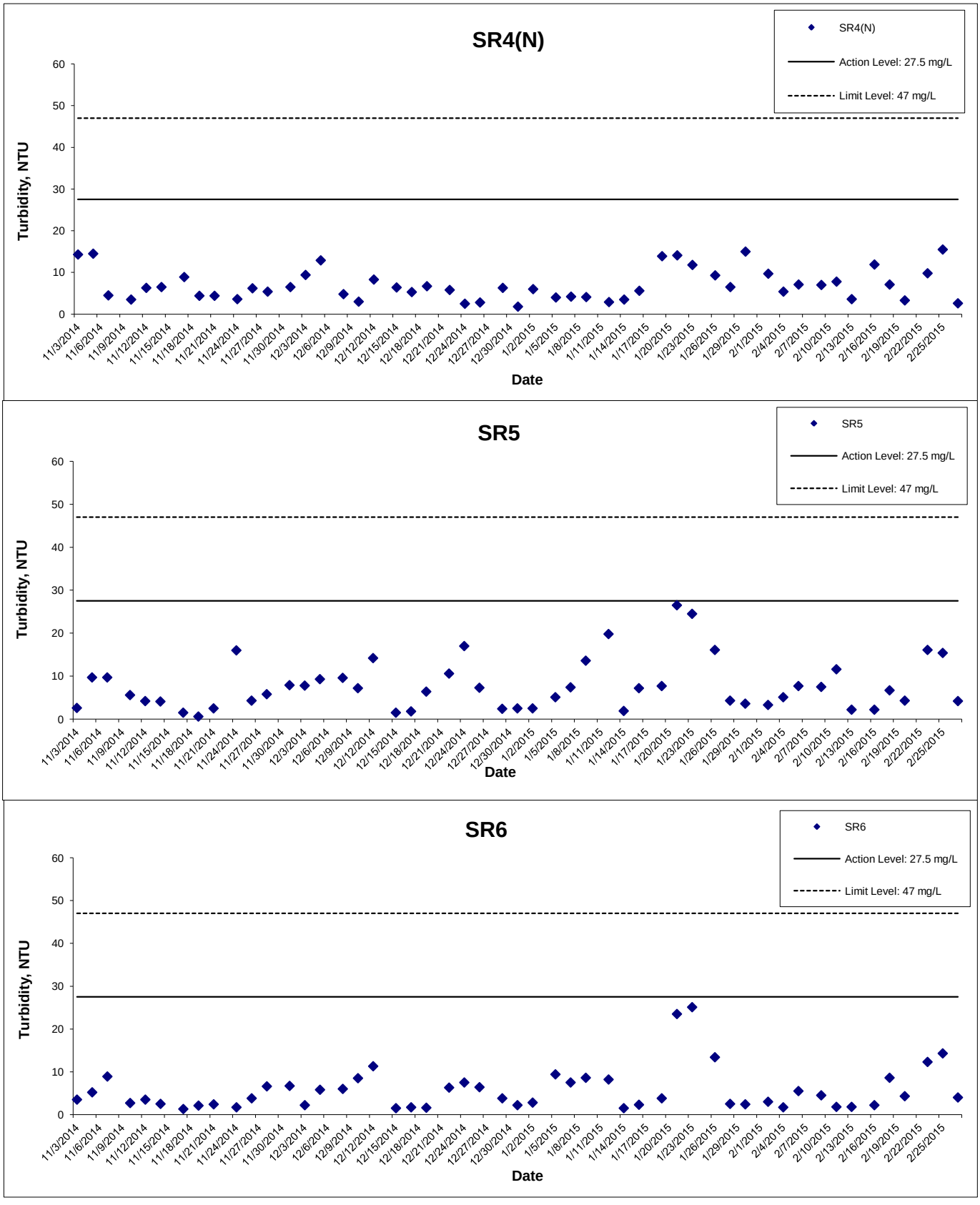




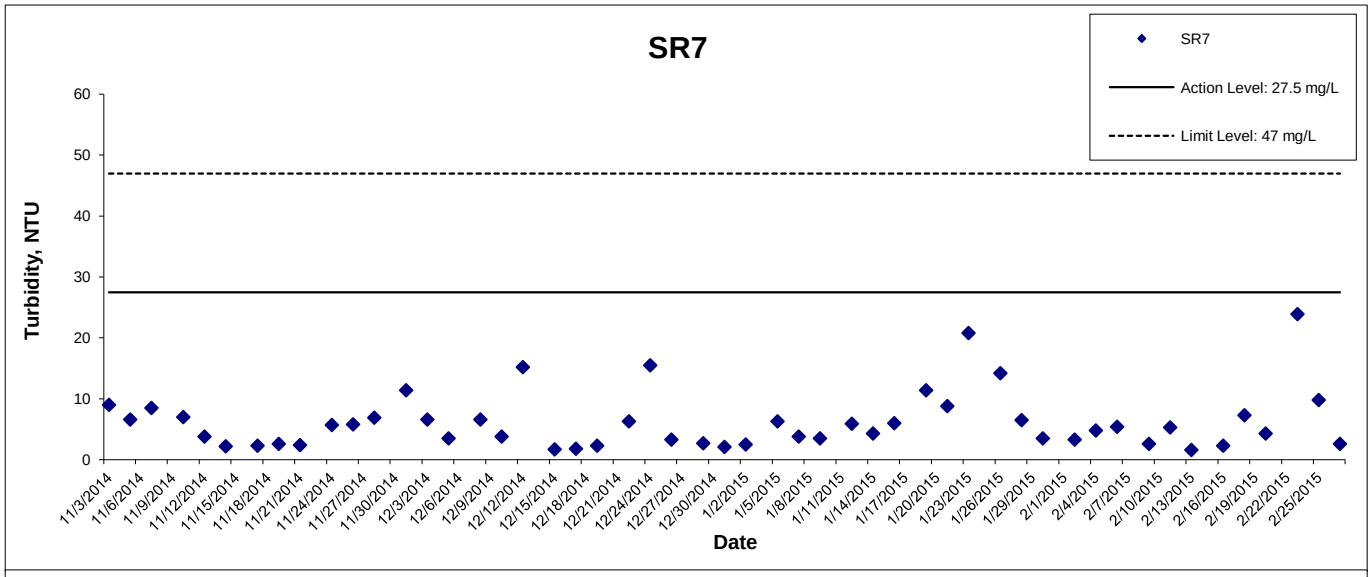
Turbidity at Mid-Flood Tide

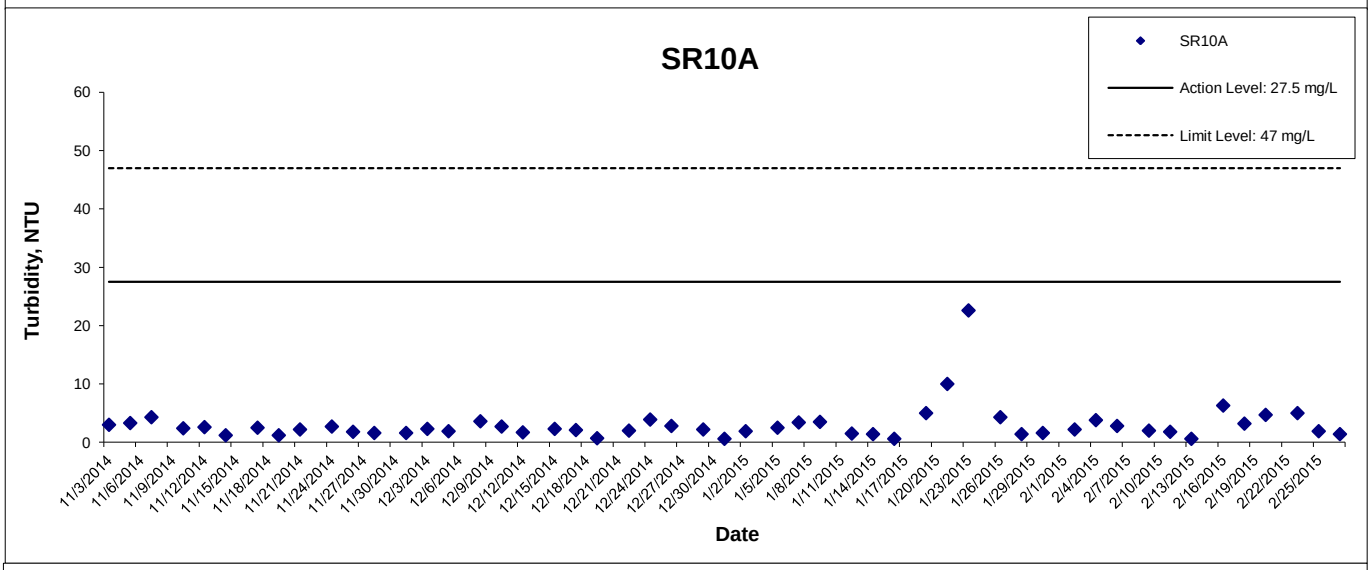


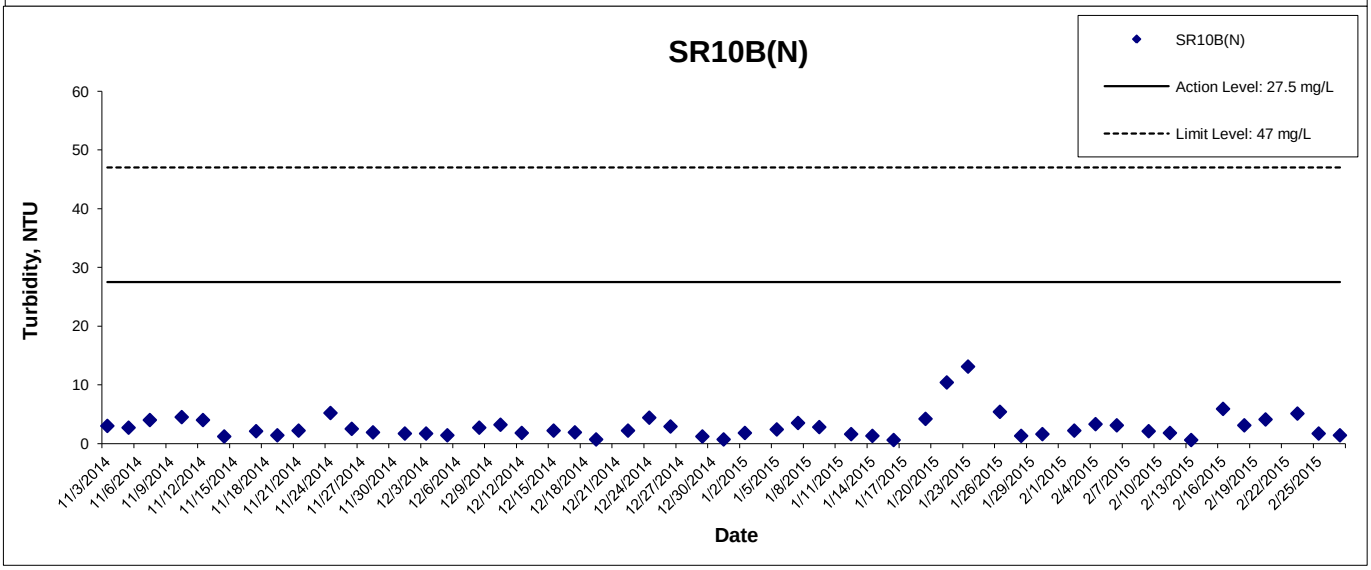
Turbidity at Mid-Flood Tide



Turbidity at Mid-Flood Tide







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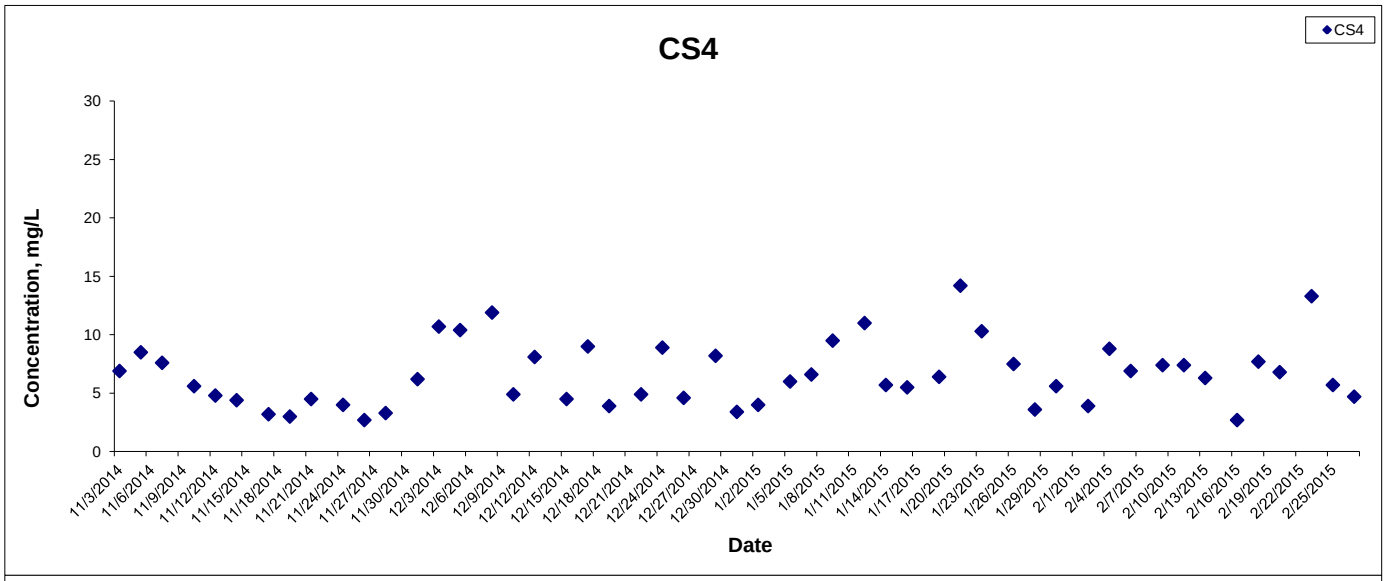
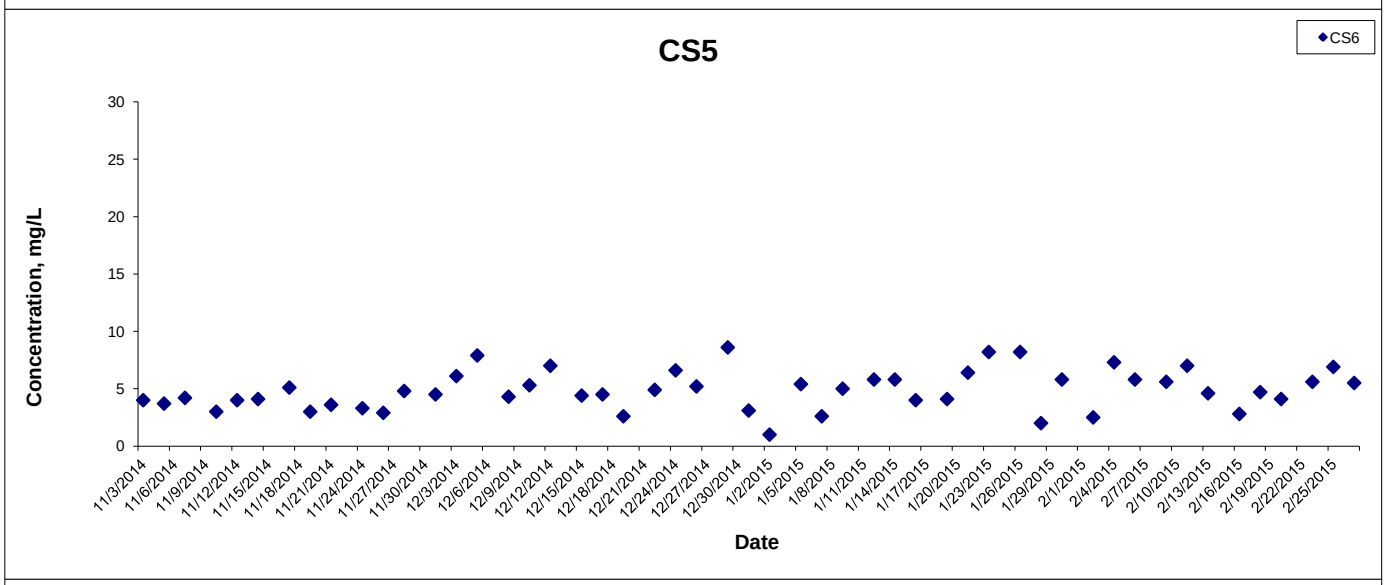
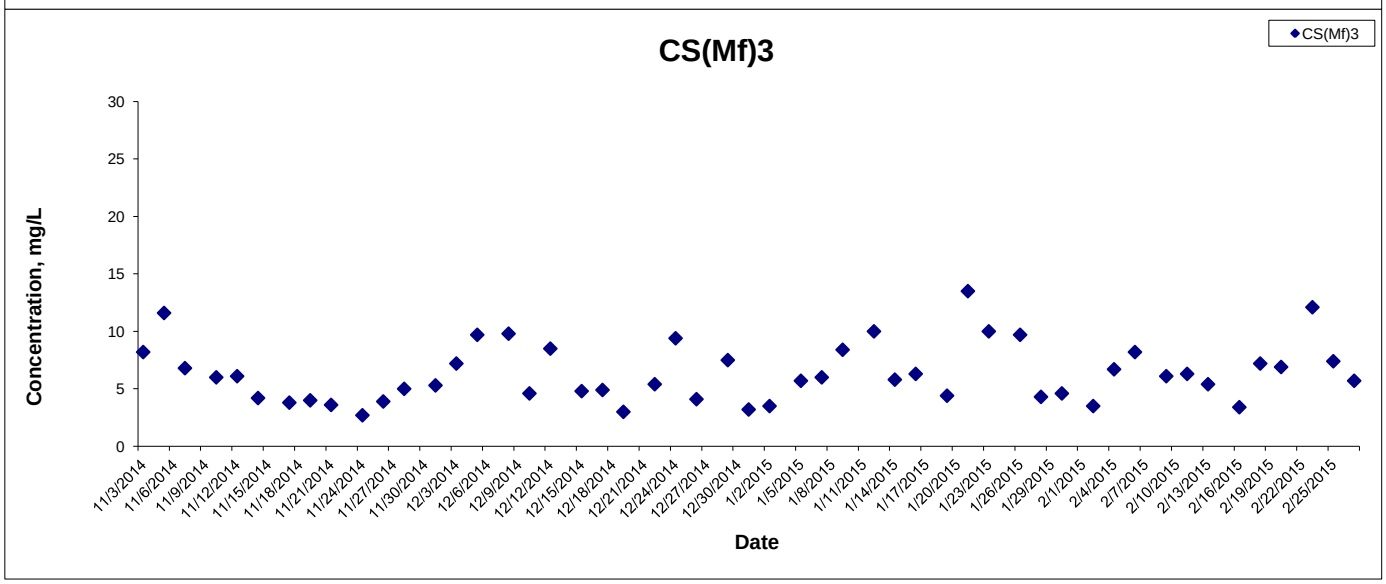
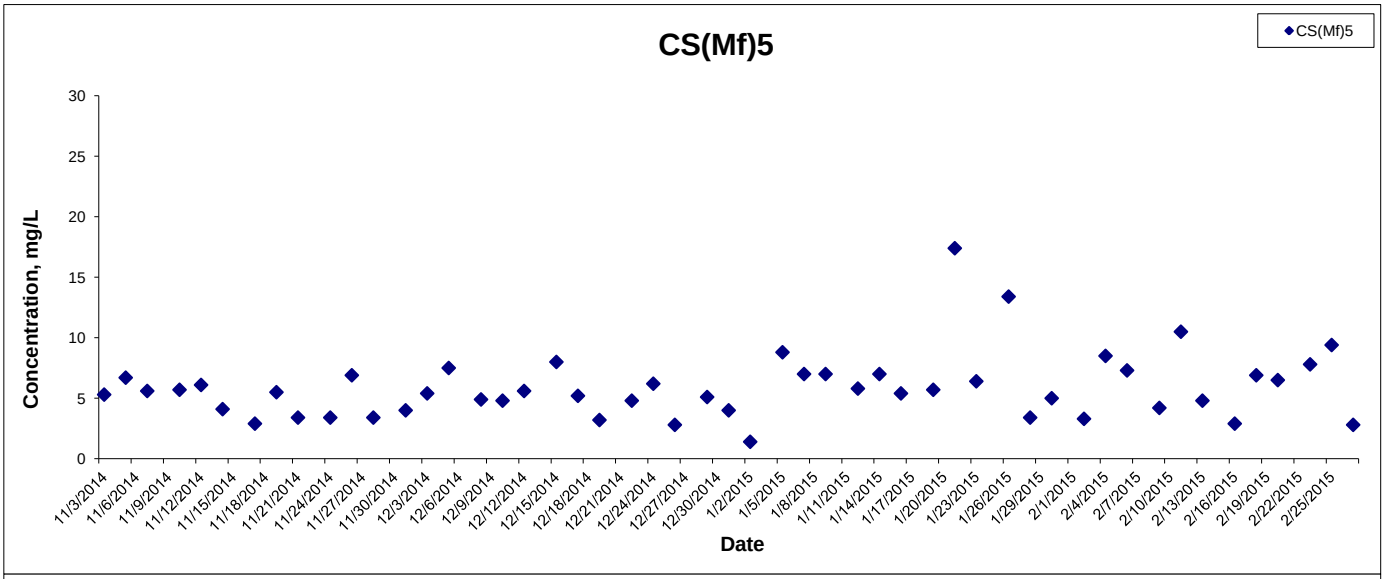
Suspended Solids at Mid-Ebb Tide

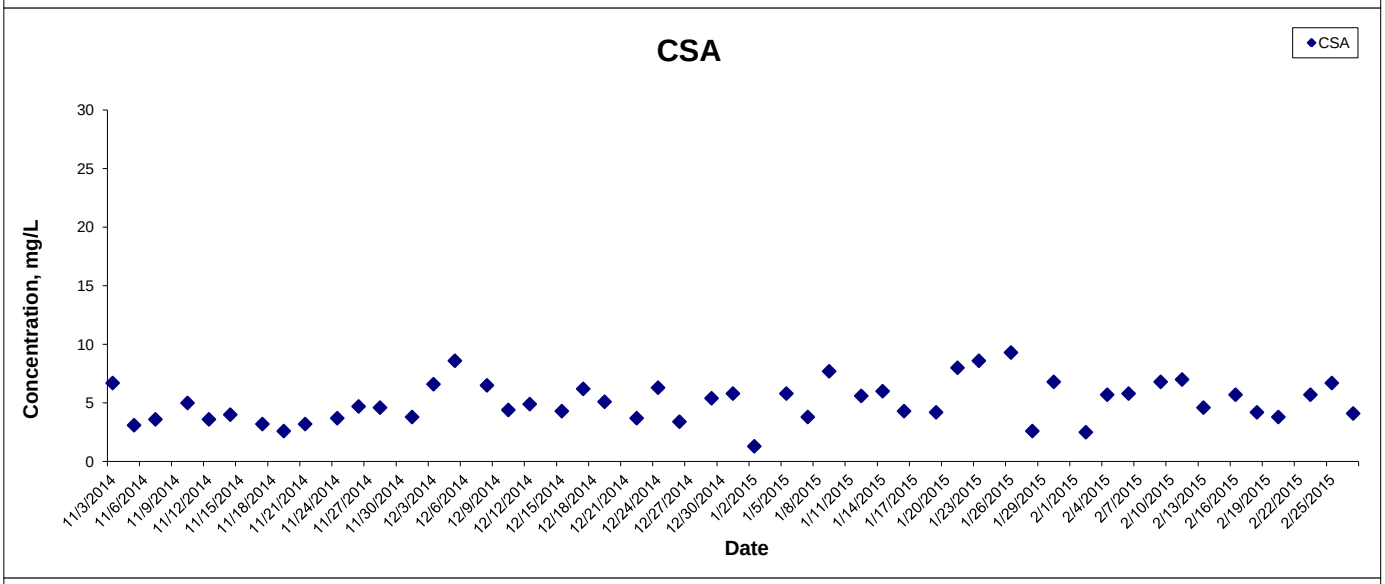


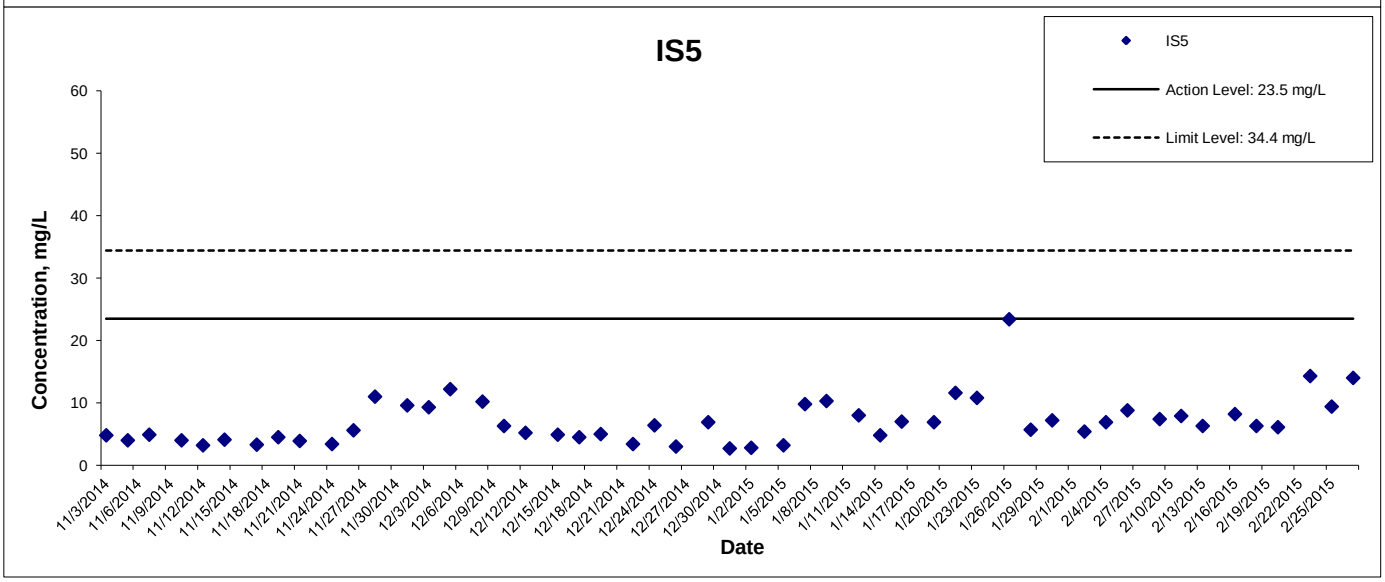




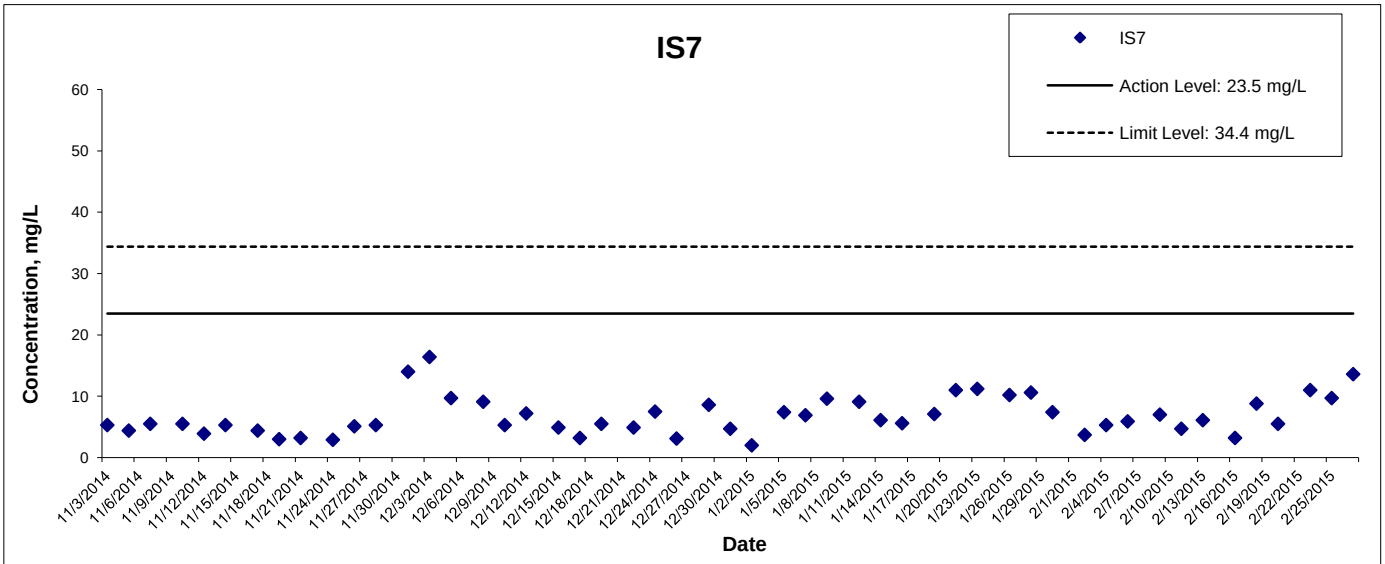
Suspended Solids at Mid-Ebb Tide

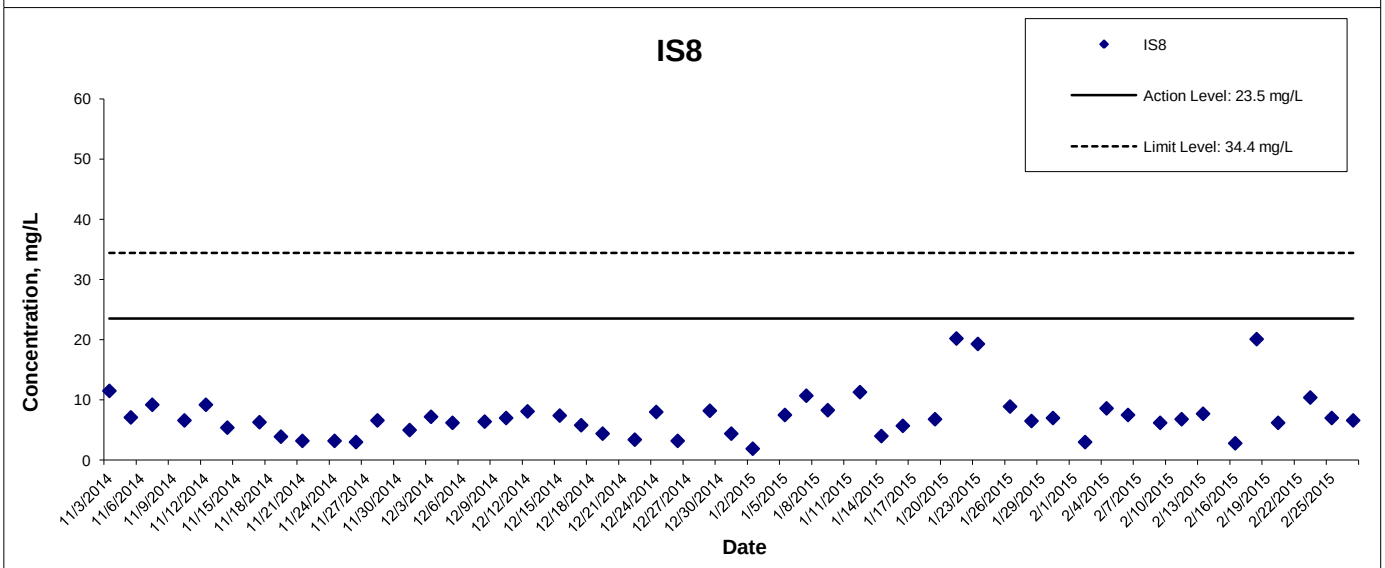


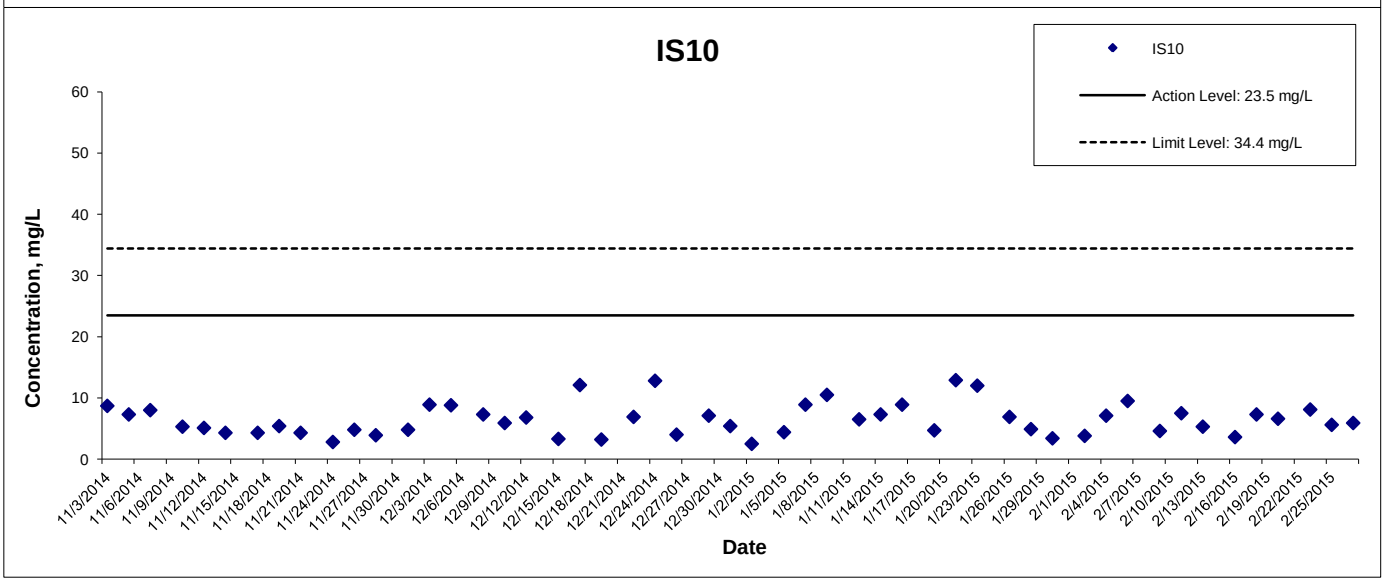




Suspended Solids at Mid-Ebb Tide







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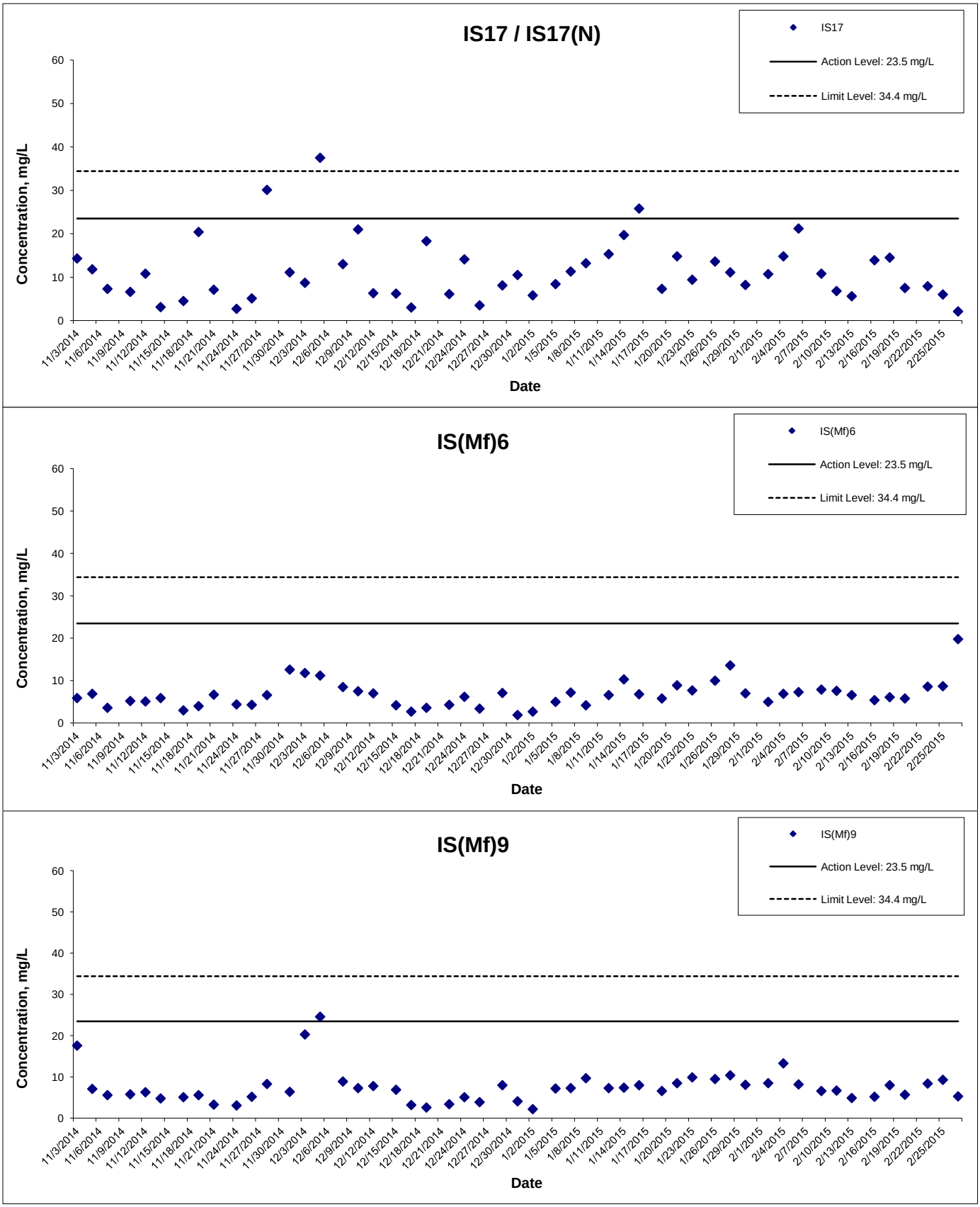

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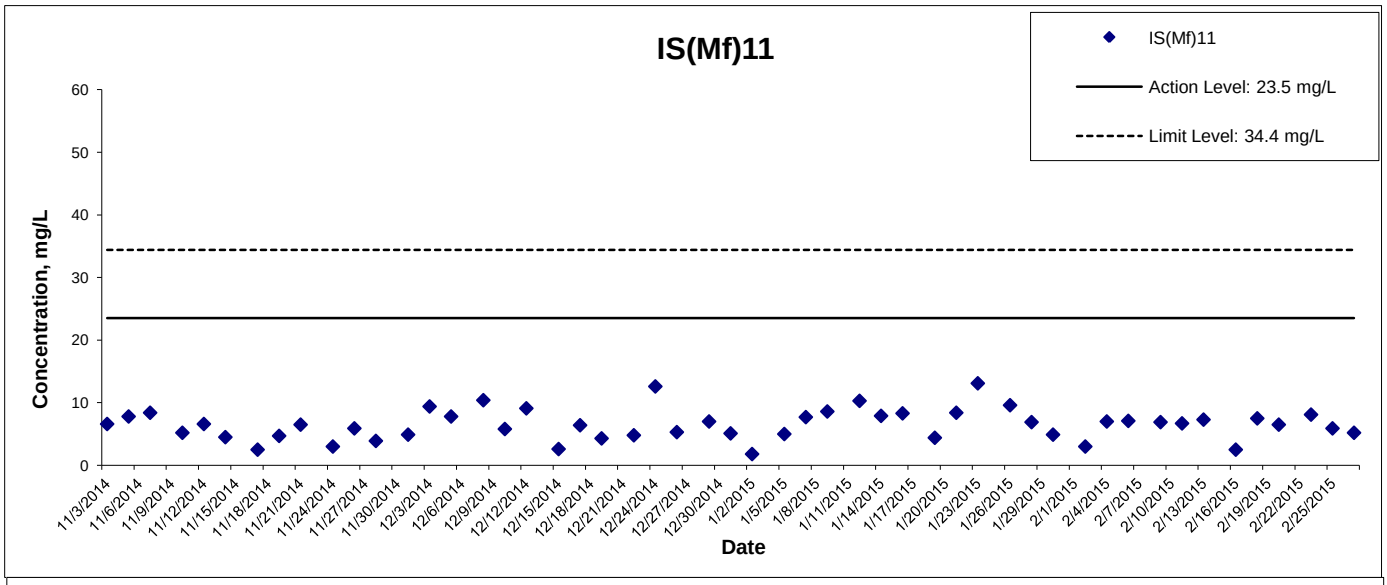

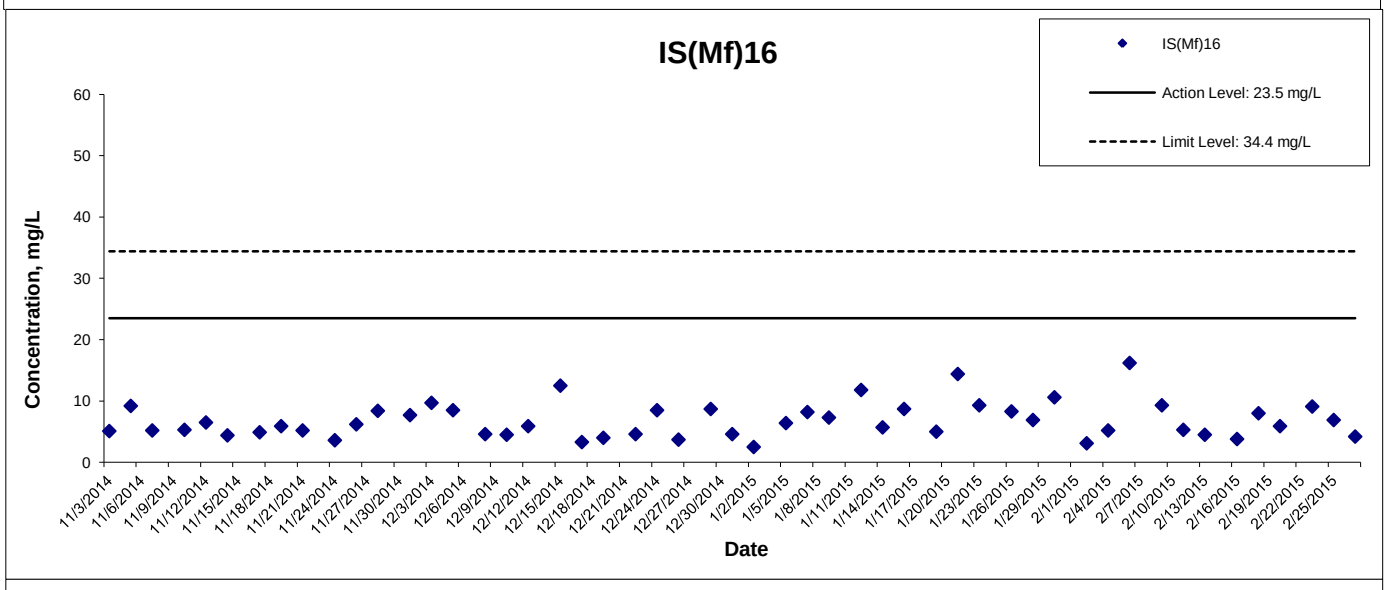

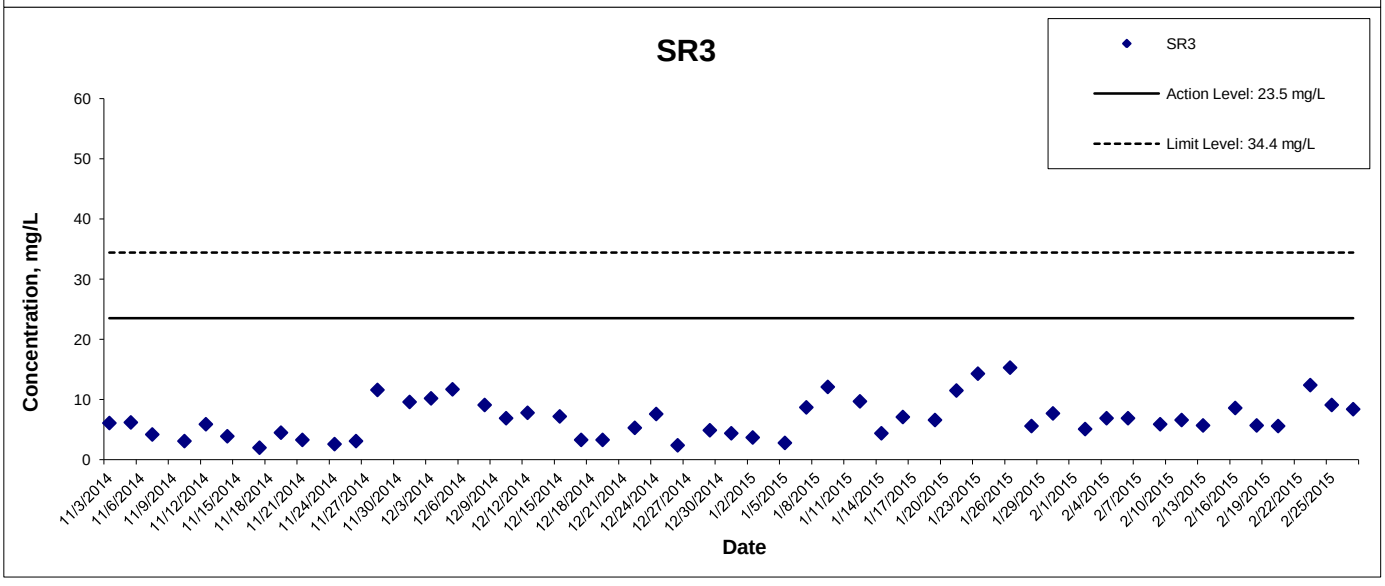

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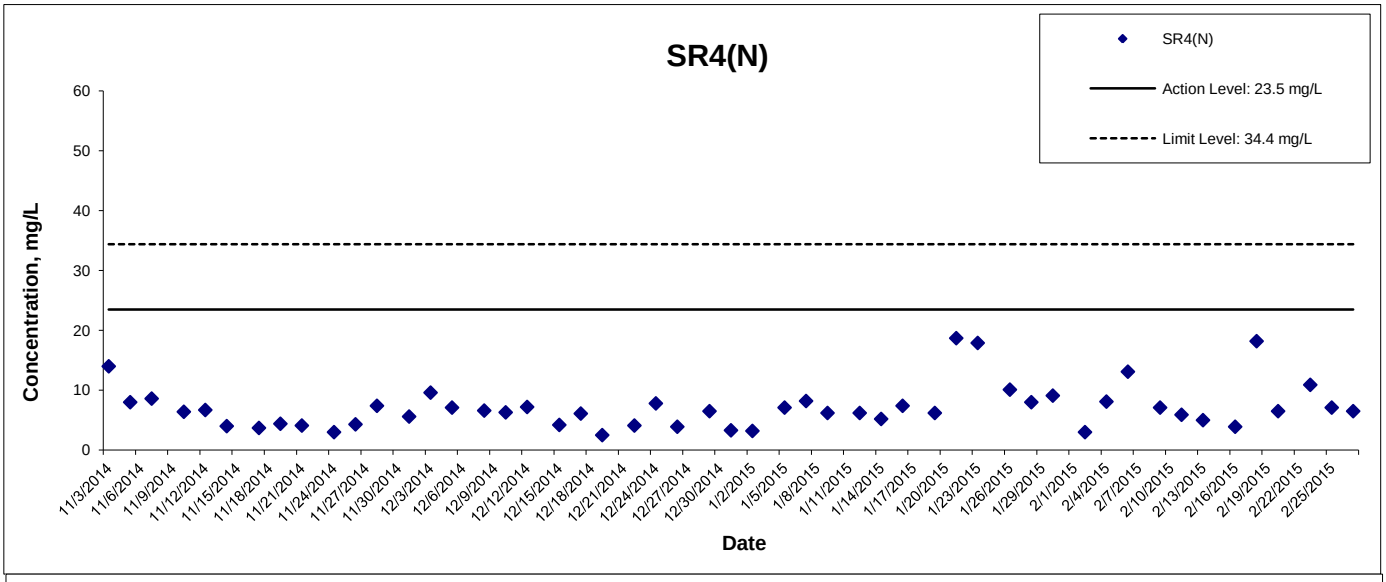

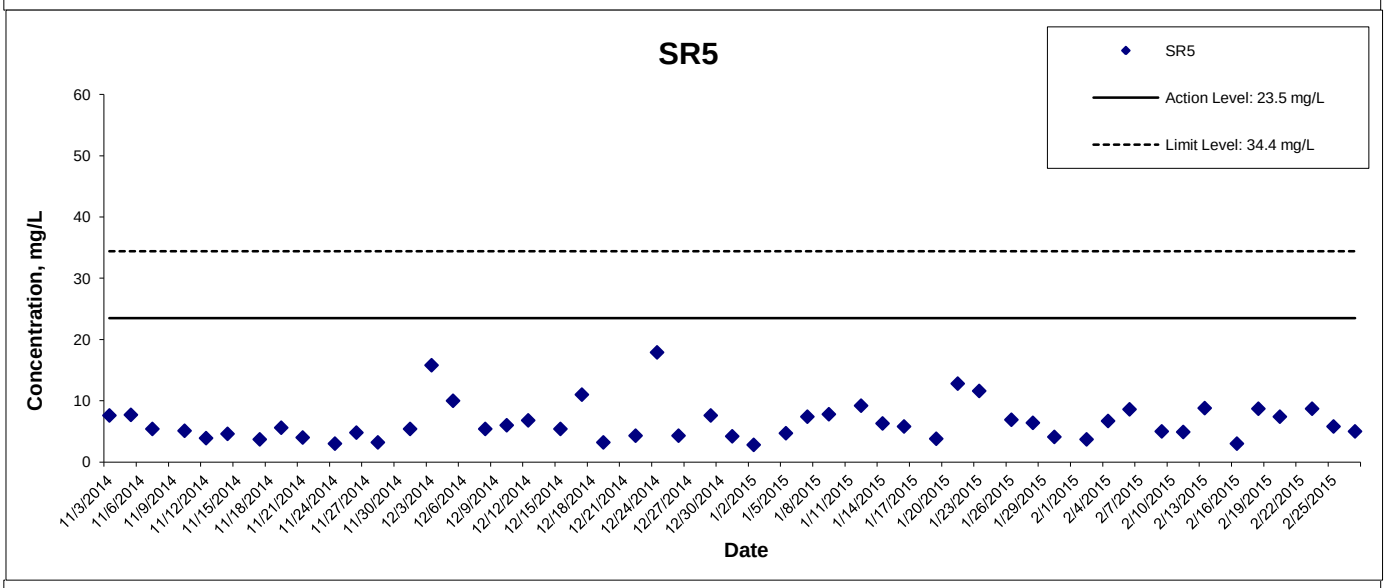

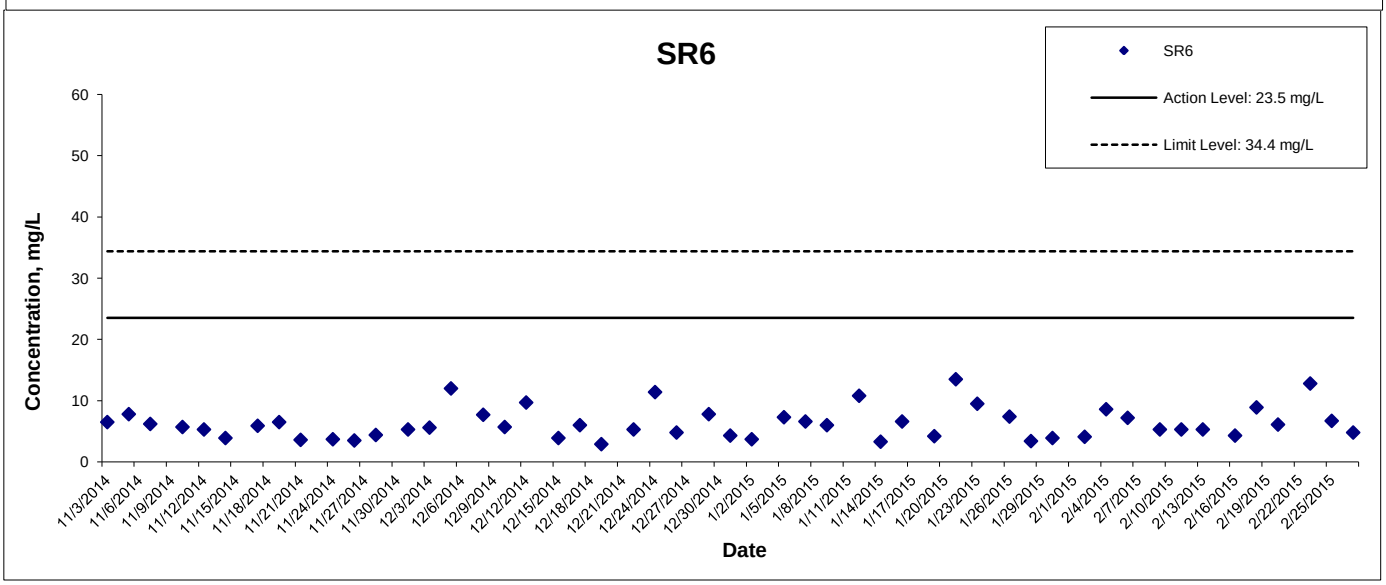

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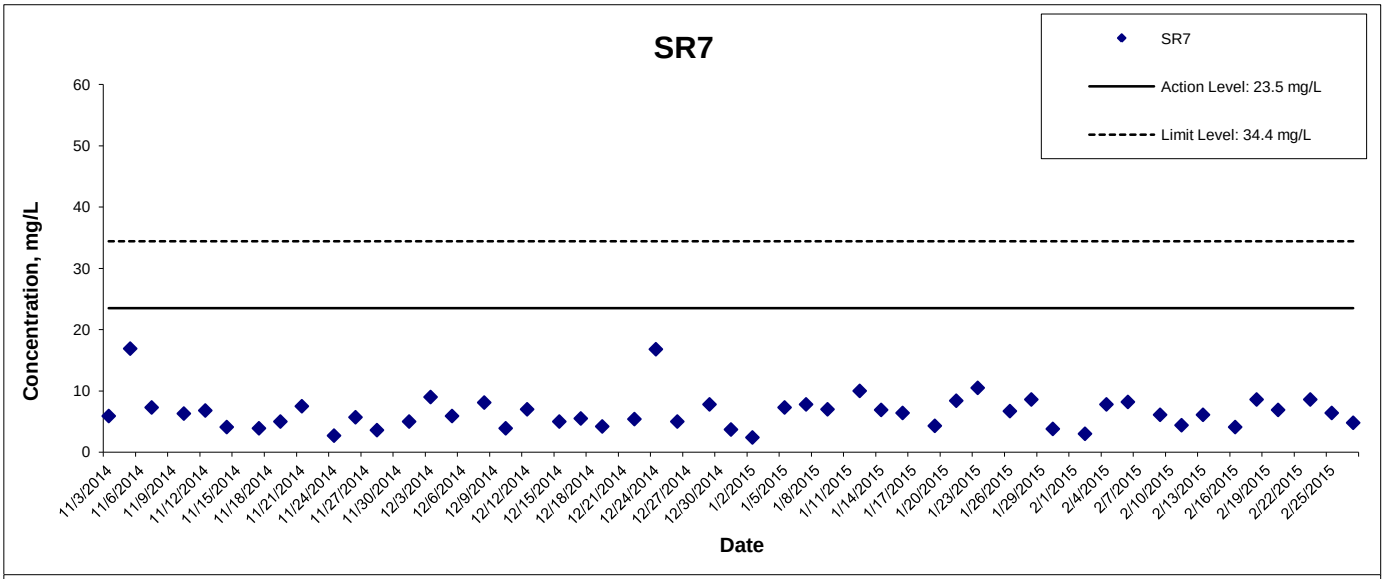

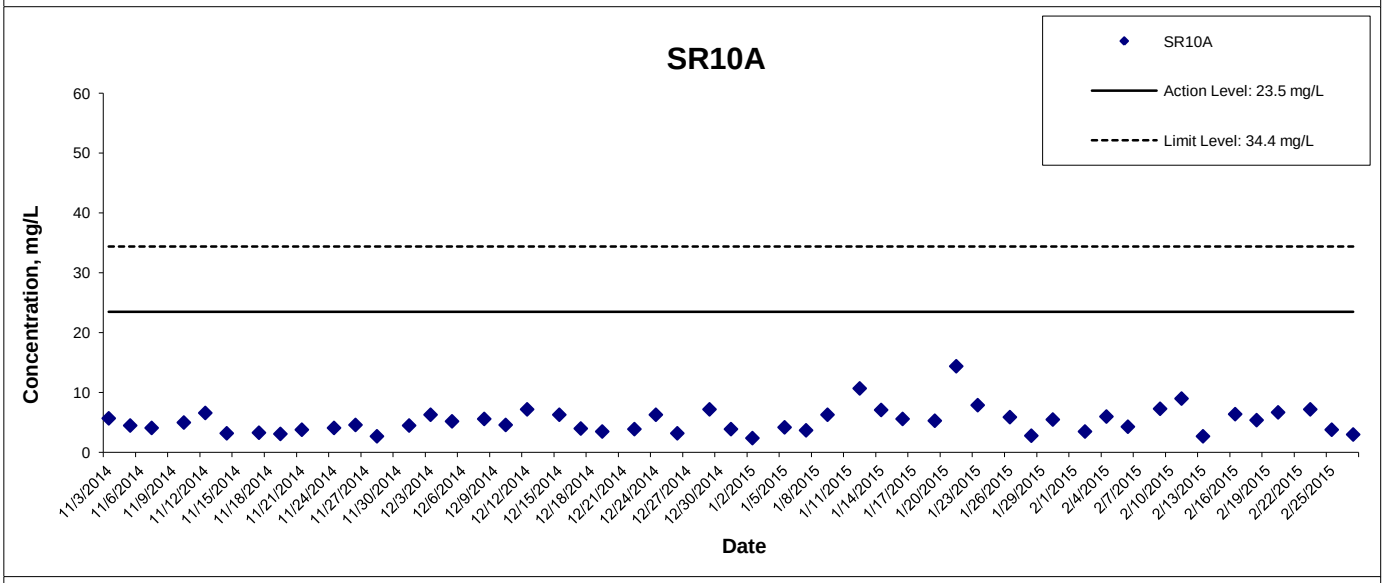

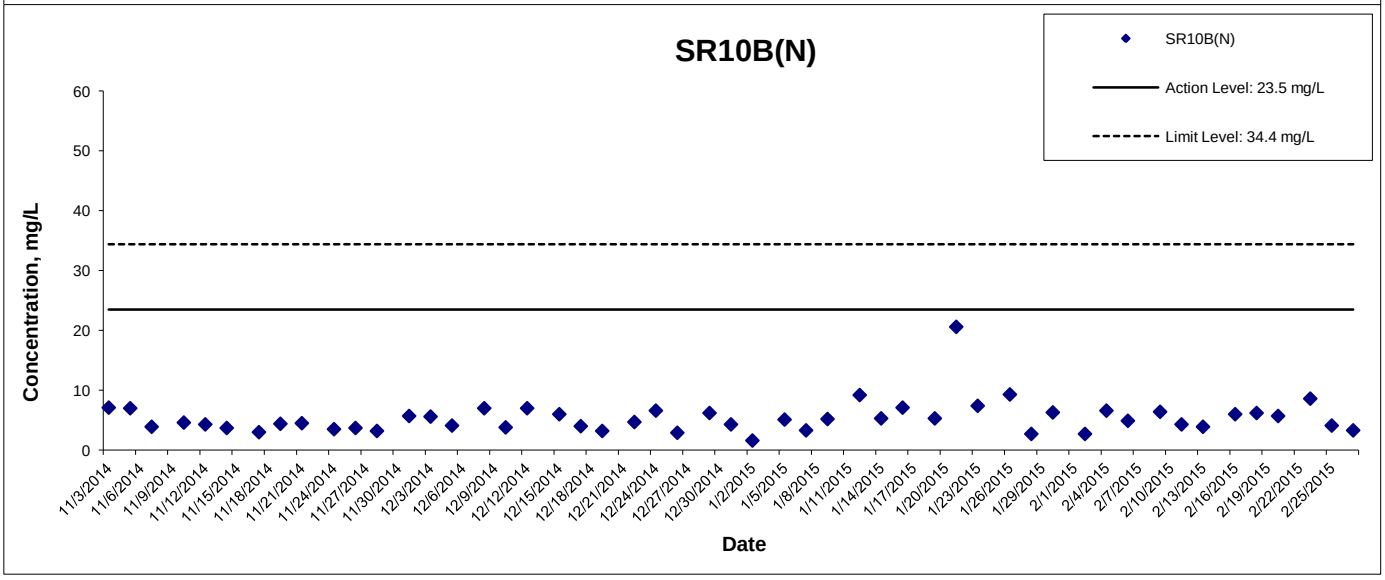

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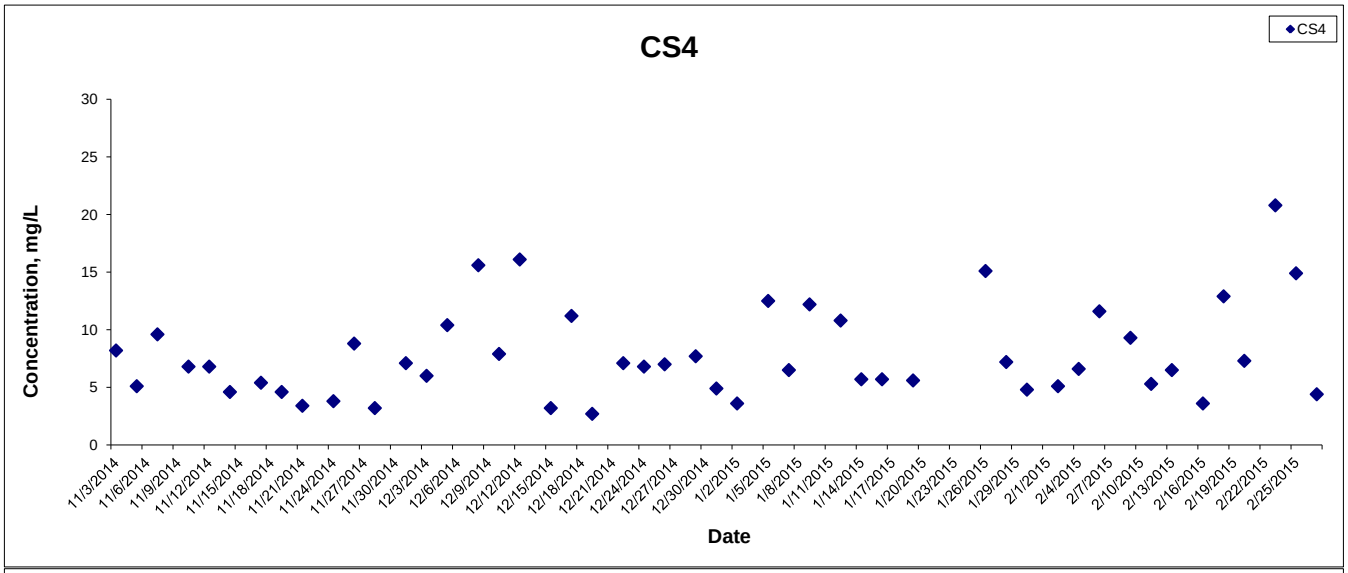

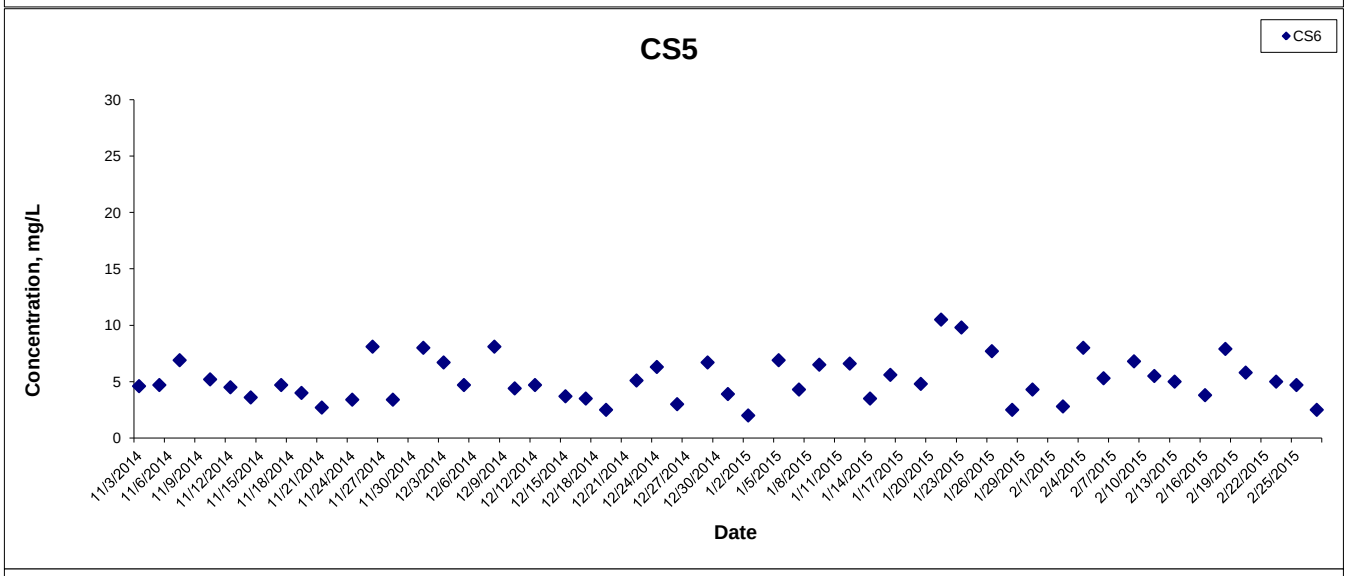

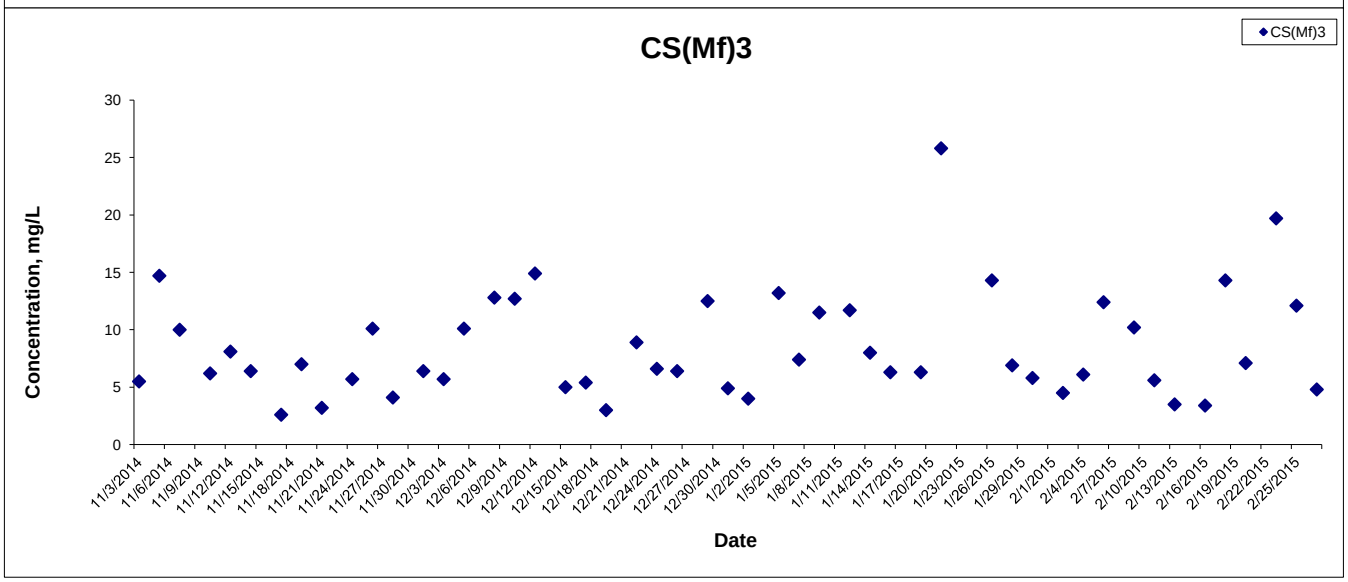

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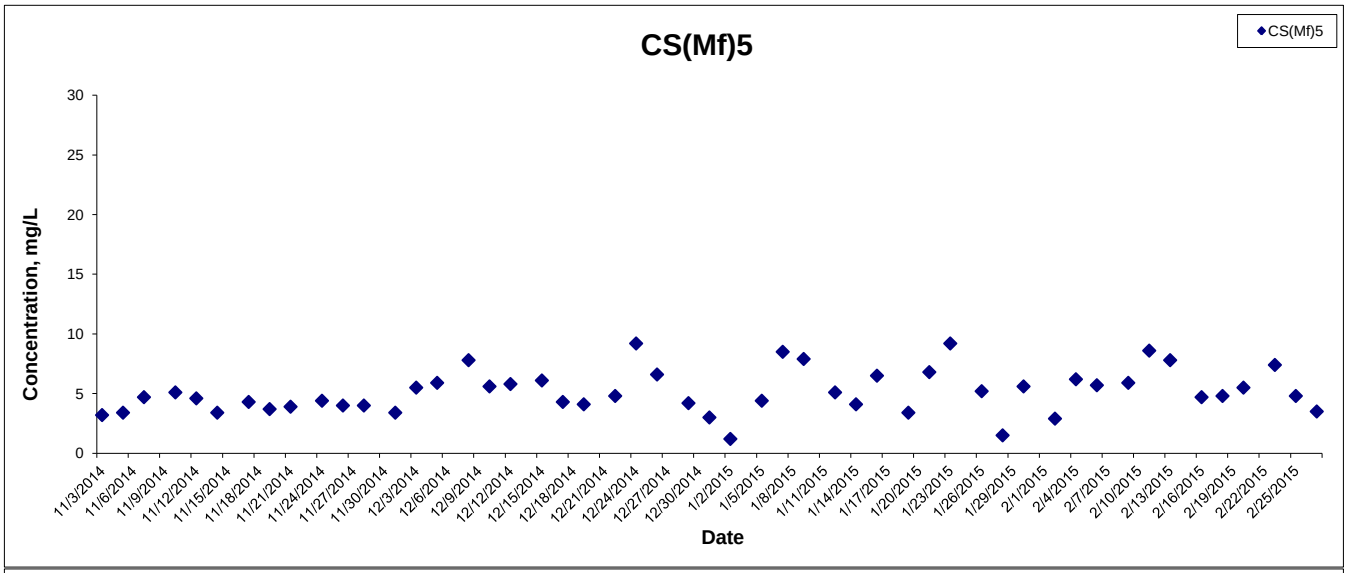

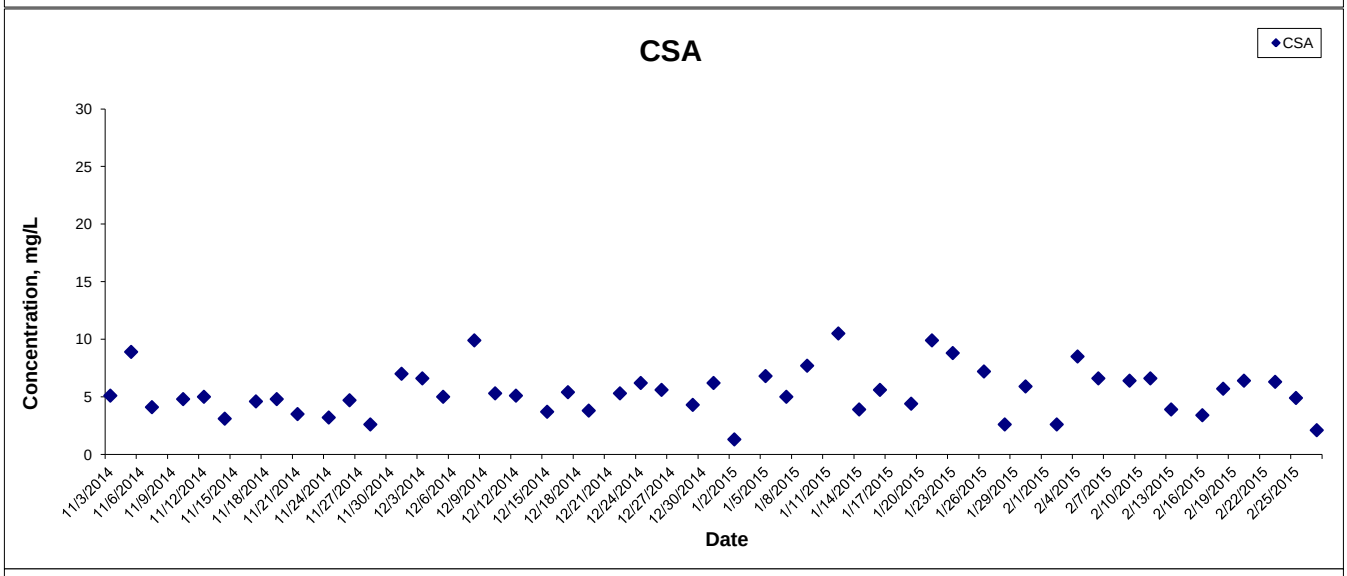

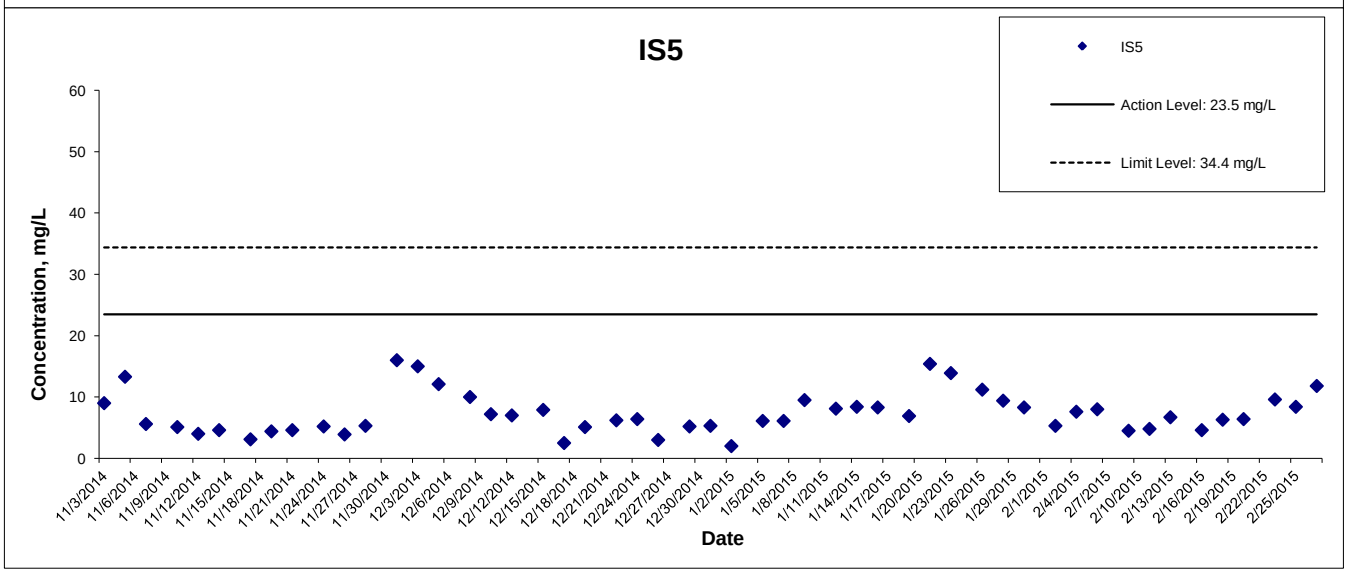

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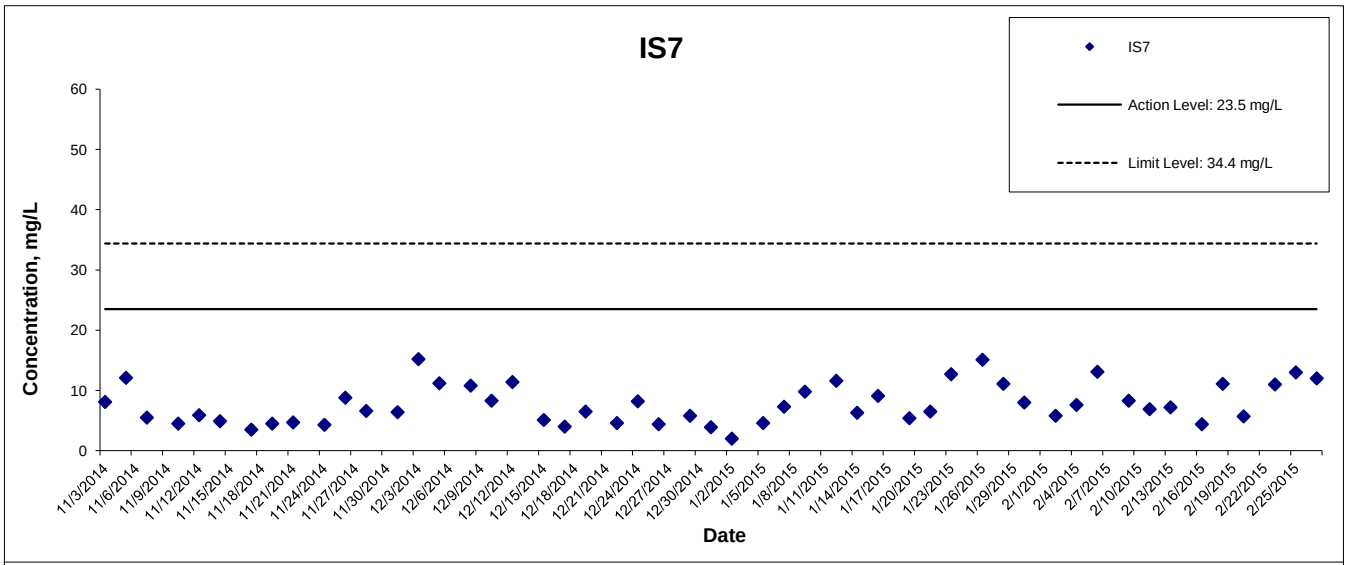

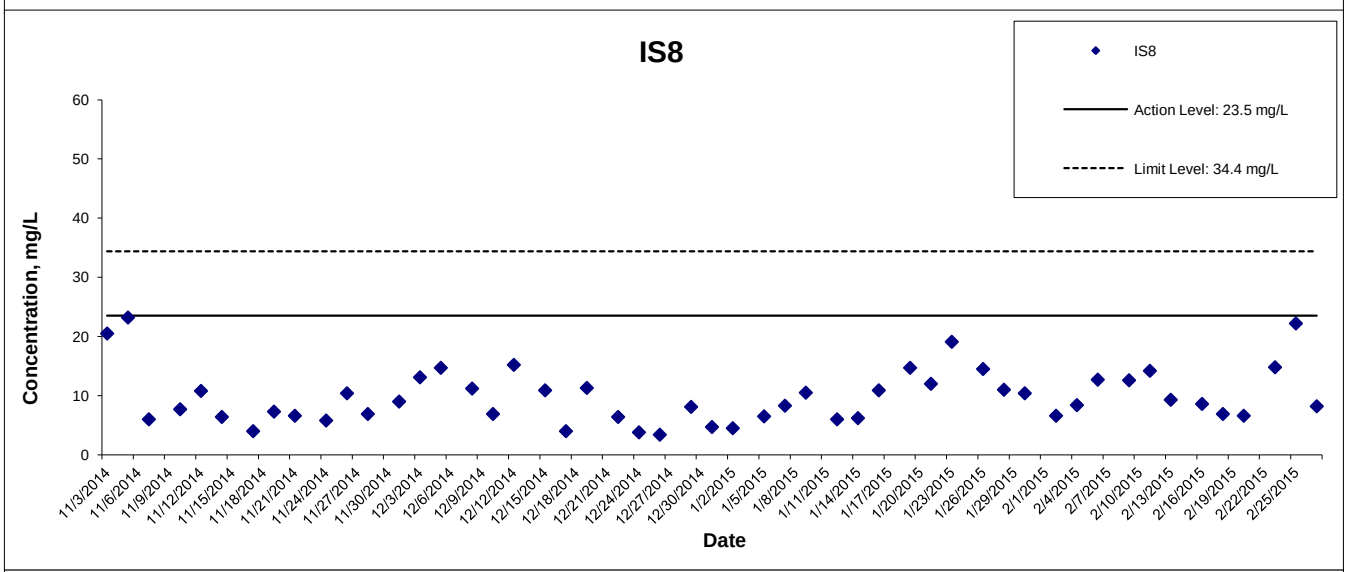

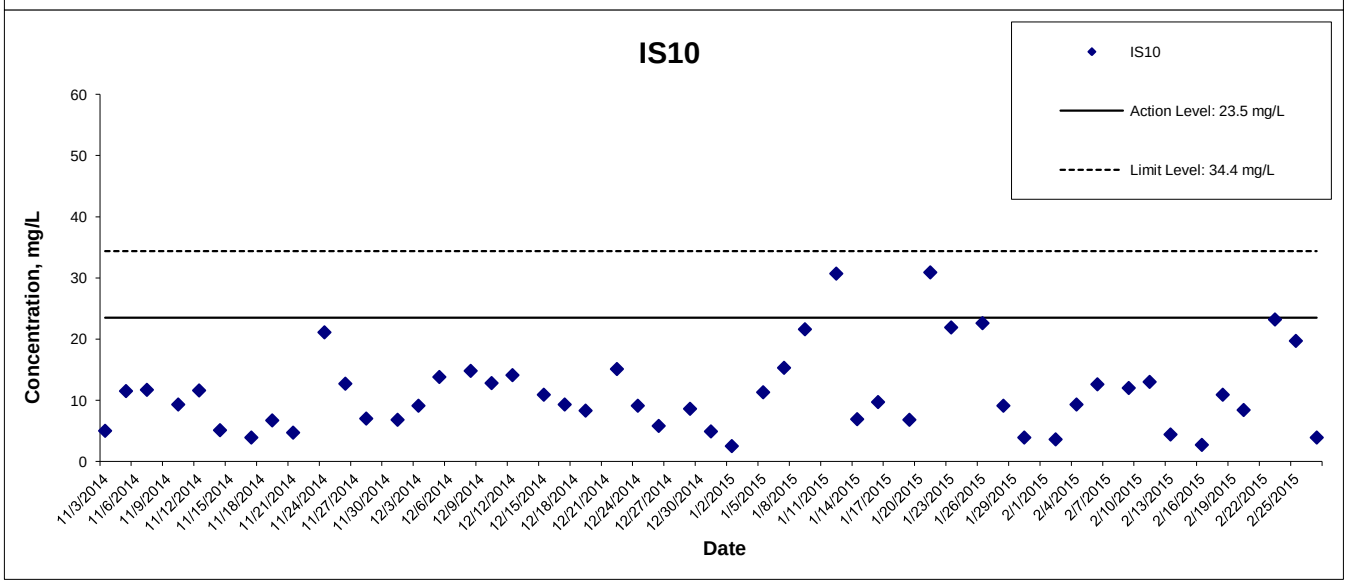

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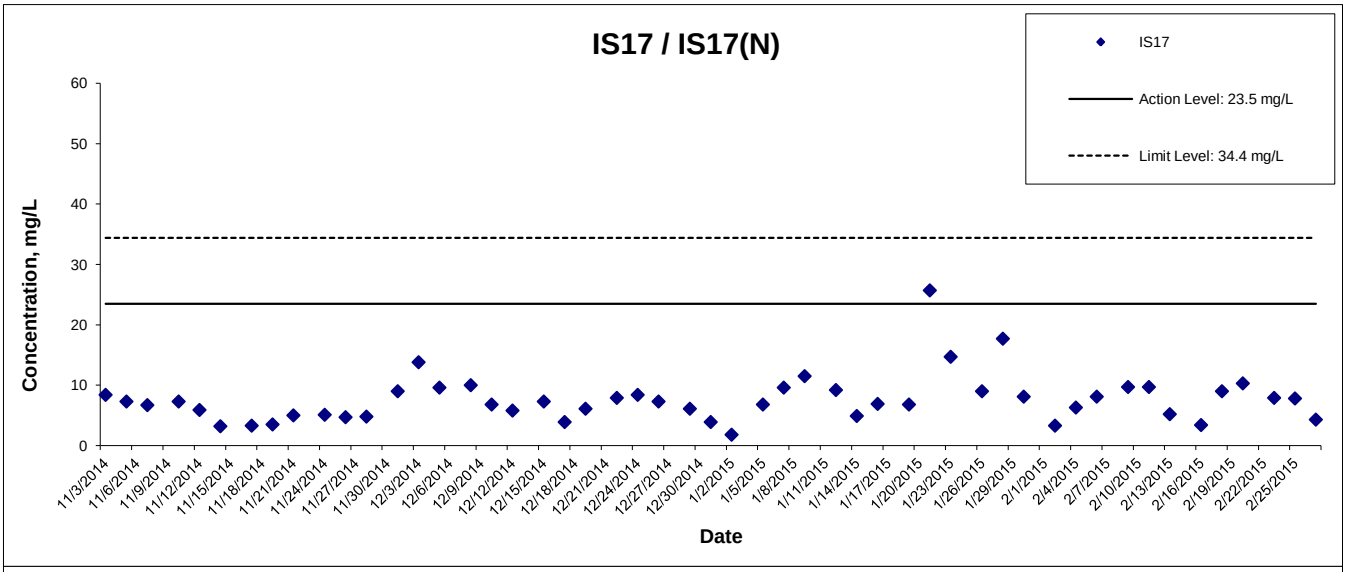

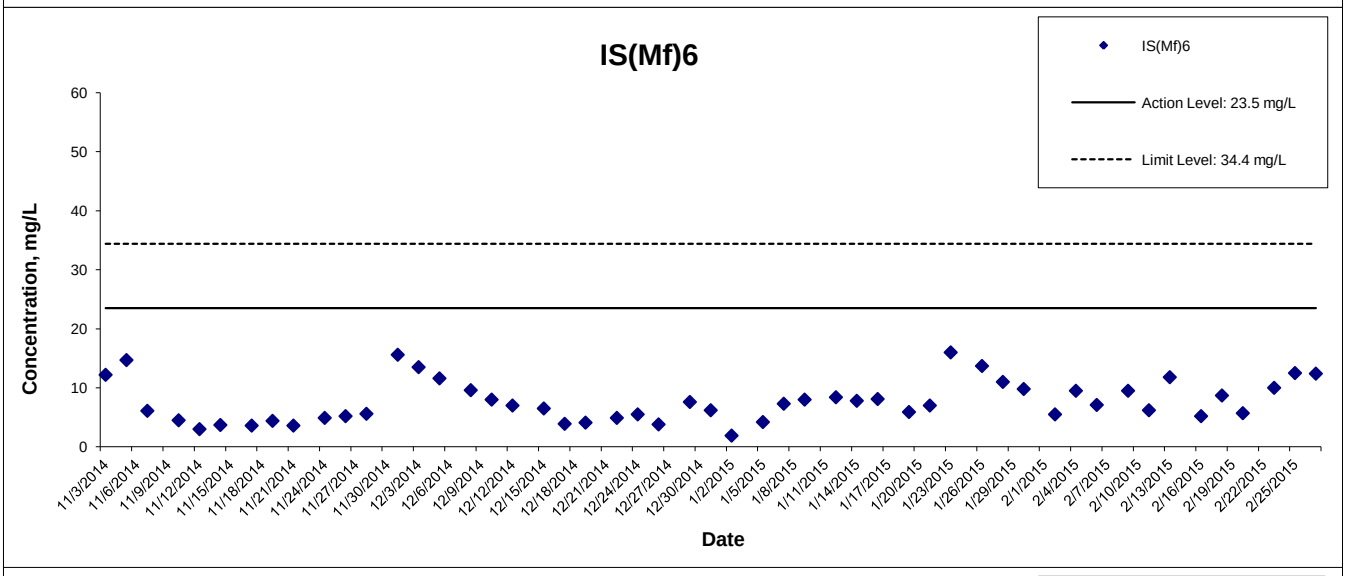

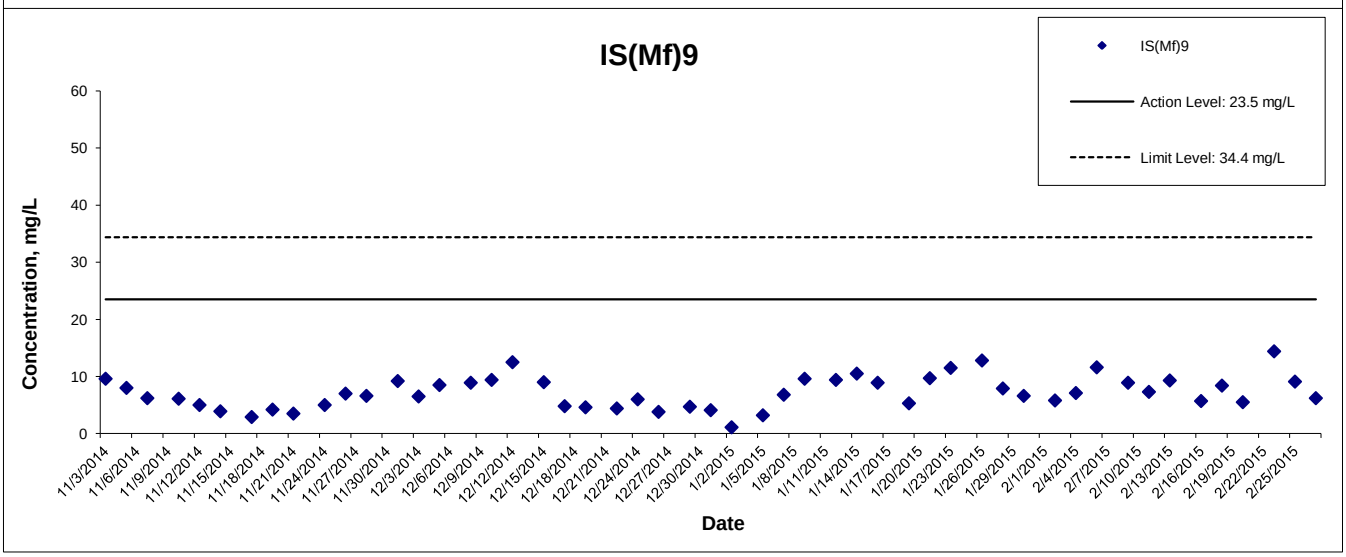

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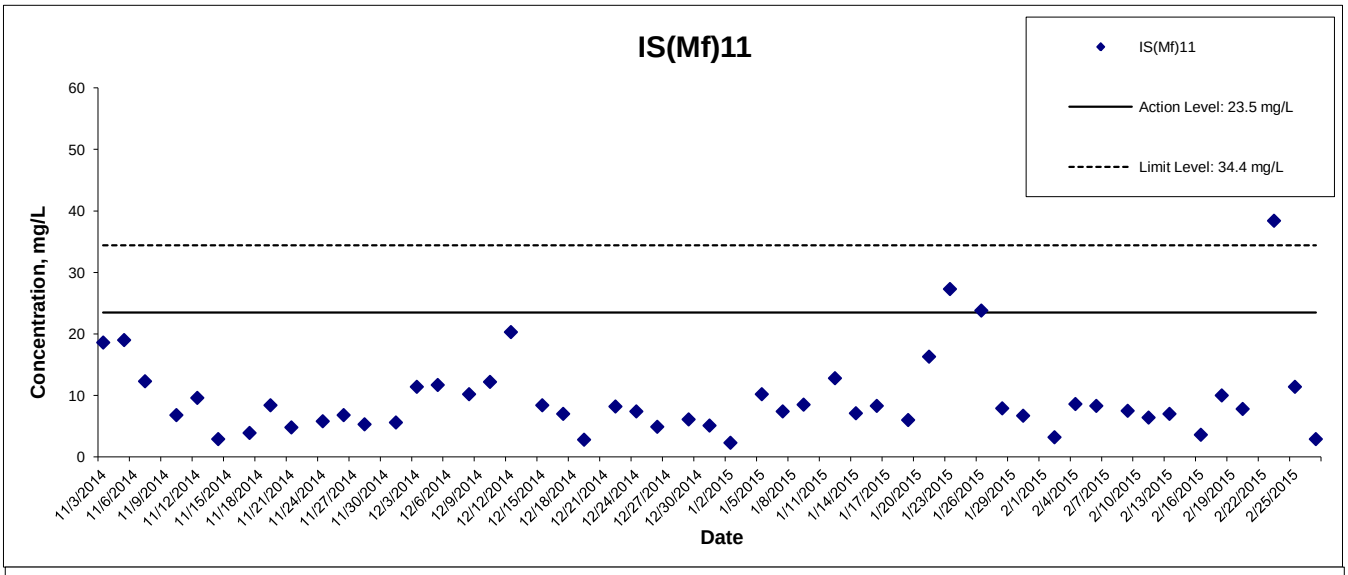

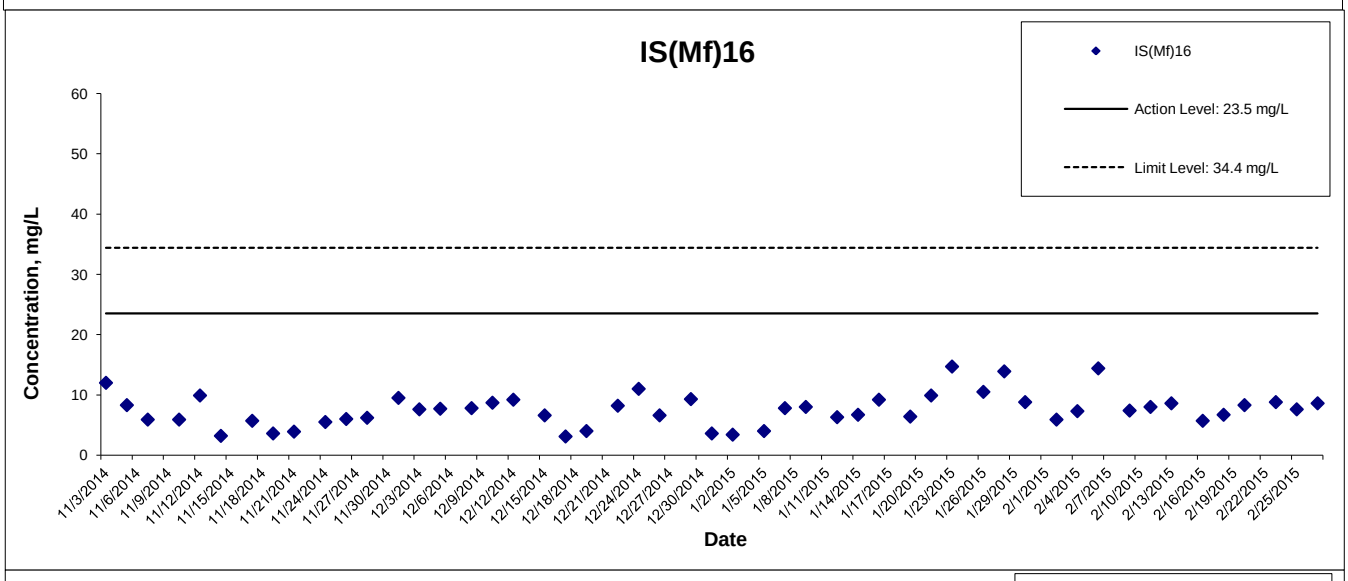

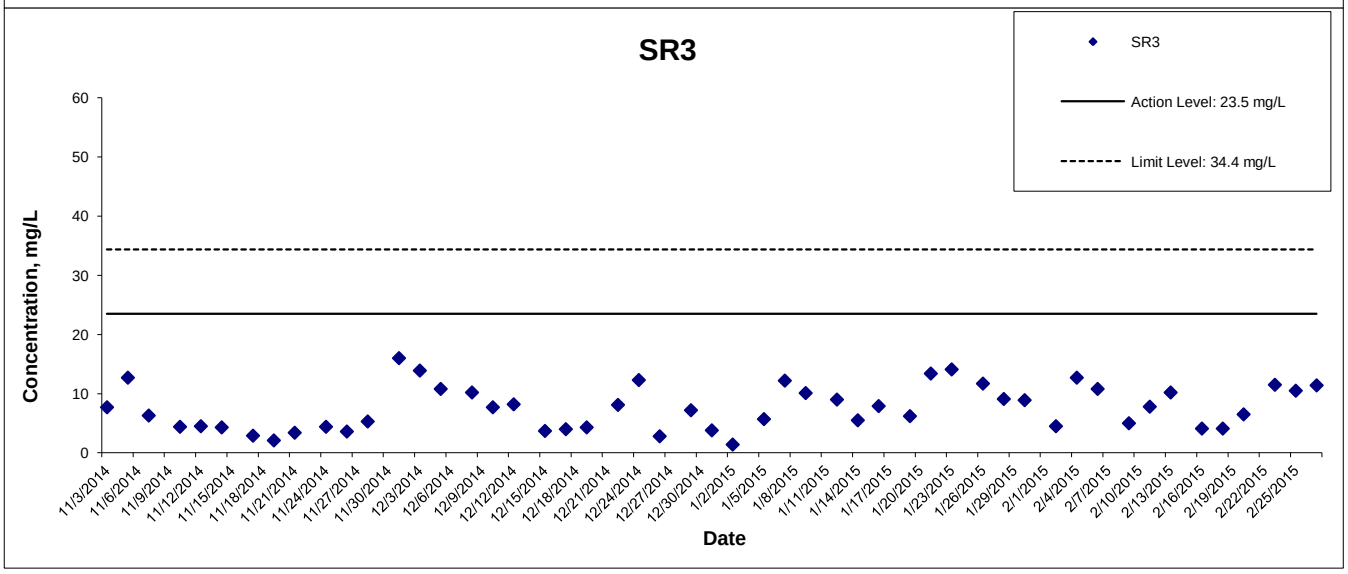

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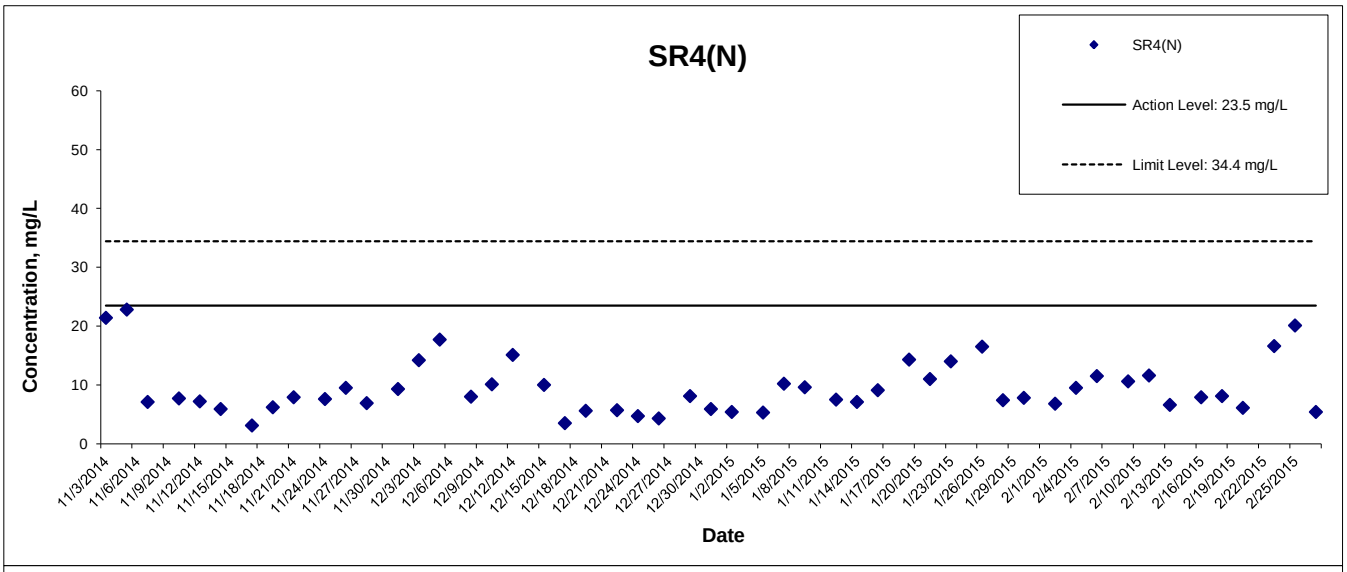

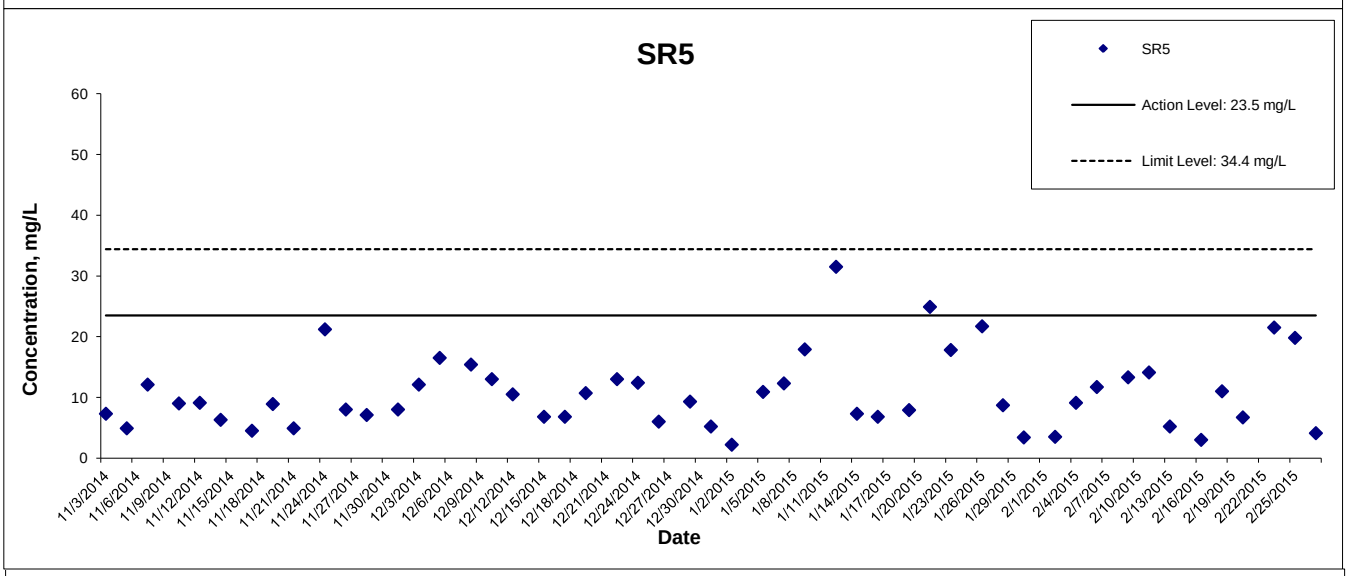

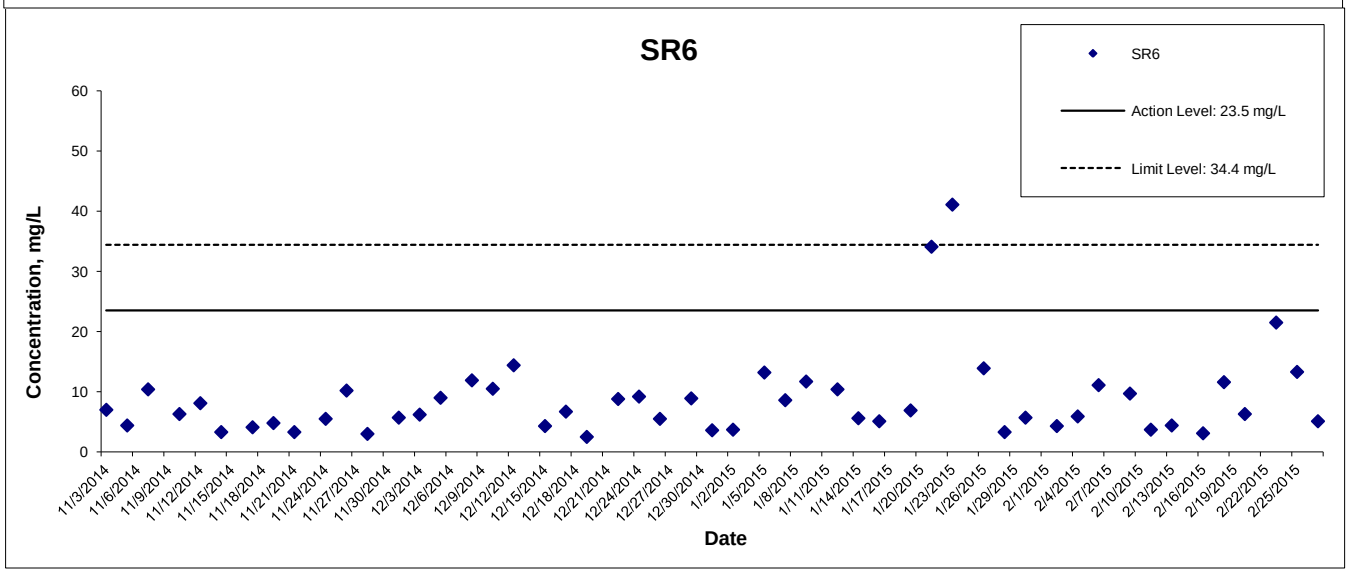

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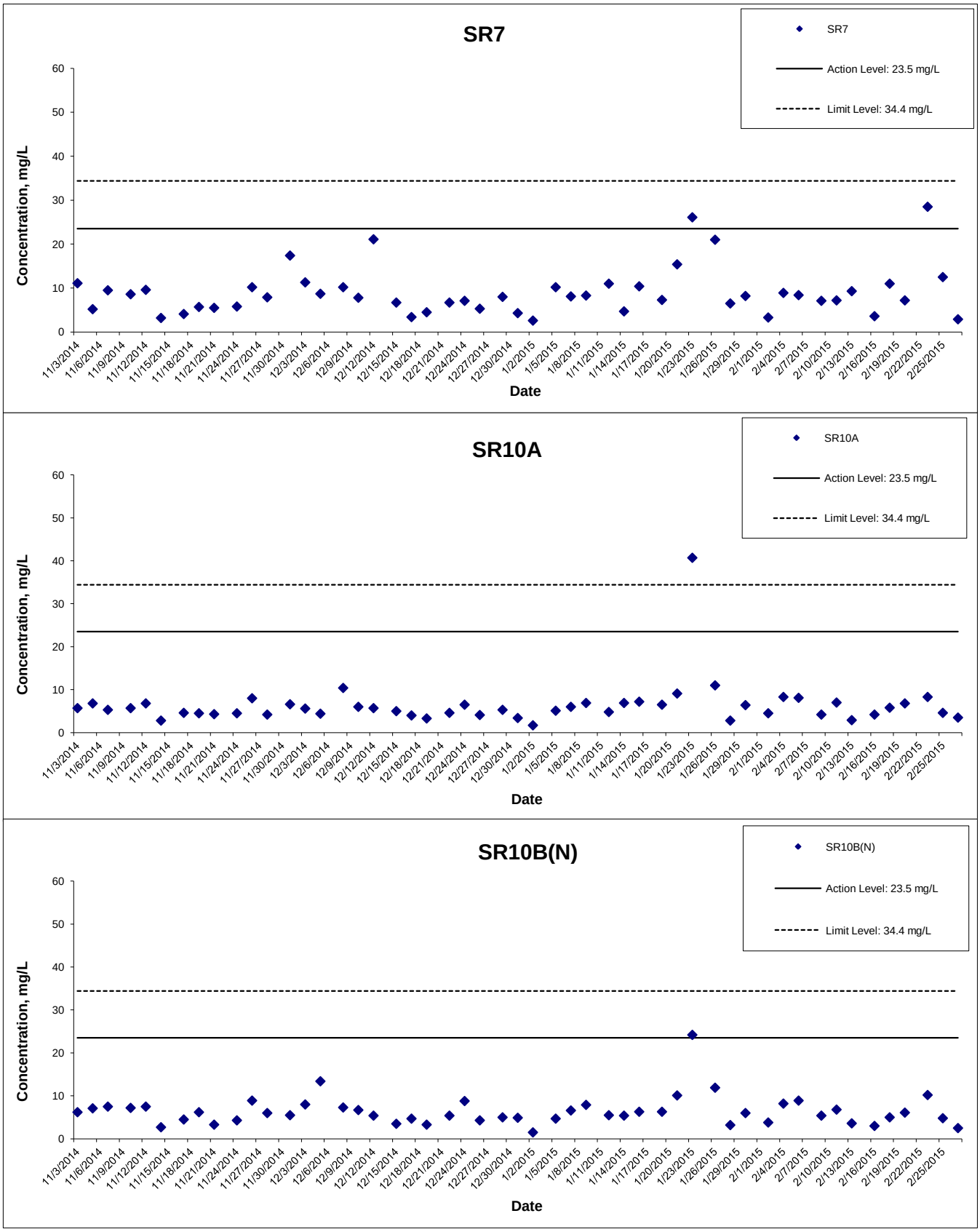

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities-Reclamation Works

December 2014 – February 2015
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 main 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 landfall (Fig. 1).

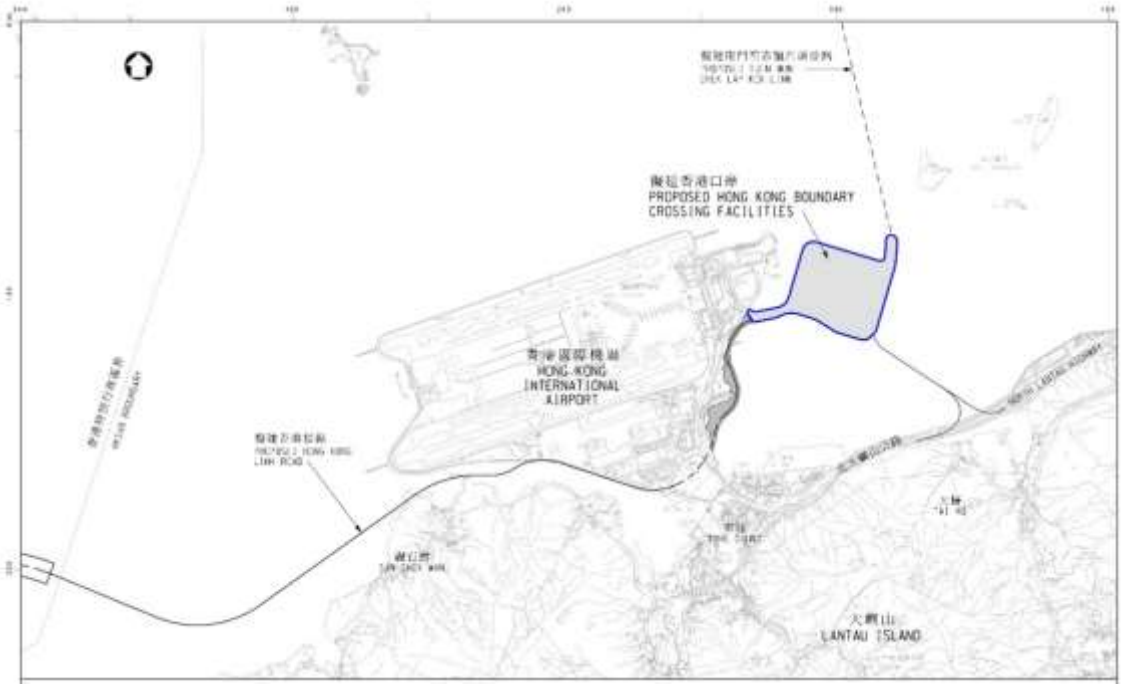

Figure 1. The Hong Kong Boundary Crossing (HKBCF) Reclamation Sites, North Lantau, Hong Kong (http://www.hzmb.hk/eng/img/overview/about_overview03_p01l.jpg**)**

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 twelfth quarterly (December 2014 – February 2015) summary of data associated with the impact monitoring conducted for contract HY/2010/02, HKBCF-Reclamation Works. The format of this report follows as closely as possible the outline provided for the Baseline Monitoring Report. The baseline monitoring was conducted during a different season (autumn), however, some monitoring was conducted in the winter prior to HZMB project commencement therefore, December 2011-January 2012, December 2012-February 2013 and December 2013–February 2014 can be compared directly to this reporting period as well as referencing the baseline data. 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 restricted 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 and are used herein solely for comparative purposes.

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. The study area now incorporates 23 transects (totalling ~111km) which are surveyed twice per month by boat (Table 1; Figure 2). As HZMB construction works have progressed, some transect lines have been temporarily blocked either by the working vessels or the bridge structure itself. These are detailed in monthly submissions to ENPO. Extensive HZMB works in NWL have resulted in the permanent blockages of some lines. Line transect surveys should be conducted systematically (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". As per EM&A protocols, the boat travels at a speed of 7-8 knots (13-15 km/hr), except during some periods when tide and current flow exceeds 7 knots and thus the vessel travels at the same speed as the current. 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 ideal 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). These data were extracted from the baseline survey as the baseline survey encompassed a wider area than that stipulated in the EM&A Manual for the HKBCF Project, as such, a subset of the baseline data set was provided and appropriate rates recalculated. This study could not verify the subset of data provided and processed it at face value. For impact monitoring, detailed datasets are available online via the ENPO website. A summary of the survey schedule and transects completed is referenced in 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	824657	113.956066	22.360908	21	805476	830562	113.877811	22.414103
10*	813525	820827	113.956112	22.326321	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.

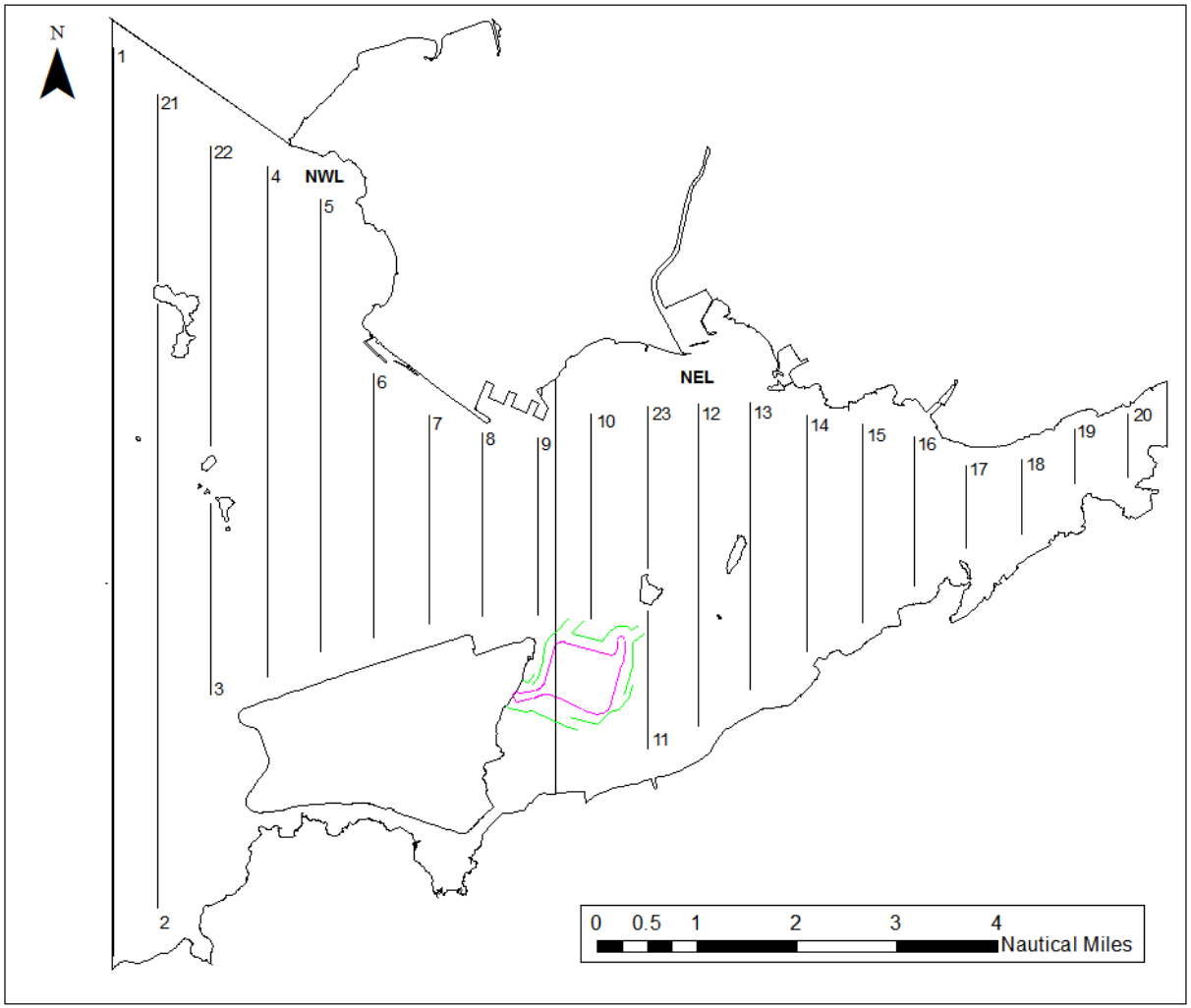

Figure 2 Location of the Transect Lines for Baseline and Impact Monitoring during HKBCF

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. Digital SLR cameras (Nikon D90; D7100) using long lenses (Nikor 80-400mm 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. A recent review of photo identification techniques was referred to ensure that current protocols for this monitoring conform to internationally recognised best practises. Recommendations from this review will be considered for future analyses (Urian *et al* 2014).

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 rather than quoting directly from the baseline report. Calculation followed the EM&A Manuel methodology ("on-effort" sightings made during favourable weather and good 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). Only during this quarter, at the end of the third year of construction, has one individual been resighted 16 times. Such a long time periods do not capture distribution shifts of individuals which may be attributed to short term impact factors. 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.

2.4.6 Density Surface Modelling

As per Section 9.5.3 of the E M & A Manual, the use of robust statistical analyses for comparing differences in dolphin densities between baseline and impact monitoring is required. A proposal outlining various statistical methodologies to estimate density surfaces was presented previously. The approach deemed most suitable for the survey protocol which had already been implemented, i.e., the line transect methodology presented in 2.2, is Generalized Linear Model (GLM) and Generalized Additive Model (GAM) analyses which have been widely utilised in other studies which also seek to discern significant distributional change in cetacean species (Campbell *et al* 2015; Correia *et al 2*015*;* Williams *et al* 2006*)*. For these models, data sets comprising information on environmental variables which may impact dolphin distribution are added to data of effort (length line surveyed over time) and on effort dolphin sightings. These variables are referred to as explanatory variables as they are chosen as with regards to influence on dolphin distribution either directly, e.g., depth, distance from shore, or as proxies for unavailable biological information such as prey, e.g., temperature. Environmental variables also act as time markers to capture the variability in seasonal trends which has been previously documented in AFCD reports and other studies.

Following the October 2015 CWD trend meeting, ENPO suggested that the brief information regarding density surface modelling presented in Quarterly EM&A Reports and Annual EM&A Review Reports be provided as a separate report with details for review before incorporating it into the EM&A reports. This ET agreed all such data and results be provided separately for review before incorporating into this and subsequent reports. It is anticipated that the detailed density surface modelling report will be ready for review in early 2016.

3. RESULTS AND DISCUSSIONS

3.1. Summary of survey effort and dolphin sightings

From December 2014 – February 2015, 12 vessel surveys were conducted in NEL and NWL survey areas (Annex II). A total of 657.6 km of “on-effort” transect lines were conducted, 100% of which were under favorable conditions (Beaufort 3 or better) (Annex II). Only those periods of “on-effort” survey conducted under favourable conditions were included in quantitative analyses. During December 2014 – February 2015, 15 groups of

dolphins, numbering 42 (min 41: max 46[4]) individuals, were recorded. Of these, nine groups were "on-effort" and the remaining six "opportunistic" (Annex III).
Of the 15 sightings, all groups were located in NWL. 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 Dec 2011- Jan 2012. Although this monitoring only comprised two surveys over 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. For period December 2013- February 2014, a total of 26 groups were sighted, 25 of which were located in NWL and 1 in NEL. There are differences between the number of sightings made during baseline compared to winter 2012-13, 2013-14 and 2014-15. 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 winters of 2013-14 and 2014-15[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.

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, Dec 2013 - Feb 14 and Dec 2014 – Feb 2015

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
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	15	0

* 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 four periods baseline, winter 2012-13, winter 2013-14 and winter 2014-15 were compared. From baseline to the following three 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.

[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 less frequent that subsequent monitoring, absolute numbers of groups are not compared directly but are incorporated into later encounter rate calculations
[6] Please note this does not incorporate any seasonal trend in between the winter periods

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, Dec 2013 – Feb 2014 and Dec 2014 – Feb 2015.

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
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	9

* Survey conducted once per month

3.2. Distribution

During the baseline survey, approximately three quarters of all on effort sightings were made in NWL. During the winter periods 2011-12, 2012-13 and 2013-14, 67%, 85% and 95% of all sightings were made in NWL, respectively. In this period, Dec 2014- Feb 2015, all sightings were made in NWL; during the winter periods since 2011-12, dolphin sightings have occurred less frequently in the NEL habitat and indeed, since January 2014, no on effort encounters with dolphins have been noted in NEL. Again, there is no correction for effort in these observations (Table 4). The sightings, cluster around two locations, the northern section of NWL and are either within or adjacent to the Sha Chau Lung Kwu Chau Marine Park (SCLKCMP) and adjacent to Tai O in south NWL (Fig. 6). These areas are highlighted consistently throughout AFCD annual monitoring reports as well as during pre-construction monitoring. SCLKCMP is frequented all year round by dolphins and is perceived to be critical habitat. Tai O has always been frequently used by dolphins and appears to be increasingly so in this last quarter compared to the 2014 autumn period.

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, Dec 2013 – Feb 2014 and Dec 2014 – Feb 2015.

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
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	9	0

* 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

[7] Updated data set provided April 2013

conducted under favourable conditions in the NEL and NWL survey areas. In NEL, there was a slight increase in encounter rates between the winter periods 2011-12 (advanced monitoring) and 2012-13 (first year of construction), but a decrease is apparent in both winters 2013-14 and 2014-15 to rates far lower than the advanced monitoring period. In NWL, there is a similar pattern, an increase in encounter rate between advanced monitoring and the following winter period in 2012-13 (the first year of construction) and thereafter, a decrease to an encounter rate a third of that calculated for the advanced monitoring period (winter 2011-12). The baseline monitoring encounter rate is the highest calculated for both areas 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, Dec 2013 – Feb 2014 and Dec 2014 – Feb 2015.

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
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	0	2.1

* Survey conducted once per month

The AFCD Annual Reports describe variation in spatial distribution between areas and between seasons in both NEL and NWL. For years prior to the HZMB construction, it is reported that overall **annual encounter rate** for NEL varies between 1.6 and 6.2 and the **annual encounter rate** for NWL varies between 5.8 and 17.0. The encounter rate for NWL for the winter period during the first year of construction (December 2012- February 2013) is within the annual limits recorded for this area previously, however, for the subsequent two winters (December 2013- February 2014 and December 2014- February 2015), the encounter rate falls below the lowest previously recorded annual encounter rate in AFCD records. For NEL, the encounter rate in December 2012- February 2013 is at the lower end of that recorded previously for NEL and the following two winters (December 2013- February 2014 and December 2014- February 2015), are below the annual norms for the area. Historically, there have been both up and down movements within these limits, however, the general trend in yearly encounter rate for dolphins in all areas of Hong Kong is that of significant decline over the last decade and prior to new development projects in the Lantau area (AFCD 2012). A recent publication which reviews more than a decade of data (sourced from AFCD monitoring and other studies) prior to construction commencement of HZMB shows a direct link between the number of high speed ferries in north Lantau waters and reduced encounter rates with dolphins (Marcotte *et al*., 2015). In addition, other projects not associated with the HZMB Project have also been ongoing in the NEL and NWL areas since 2012. For the winter period, the most marked changes in encounter rates in NEL have been observed in years two and three of the construction works and for NWL, in year three. This is a similar trend to that observed in the autumn season (September – November).

3.4. Group size

During Dec 2014- Feb 2015, group size of all sightings varied from 1 to 10 individuals with an average of 2.8 in NWL and 0 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, 2012-13, 2013-14 and 2014-15, the NWL average group sizes were 2, 3.6, 4.2 and 2.8, respectively, and in NEL, for the same three periods, it was 4.3, 2.8, 1 and 0, respectively (Table 6). The group size in NEL over the winter period since 2011 shows a steady decrease. The group size in NWL for the same seasons is variable with the group size calculated for this quarter more than that of advanced monitoring (winter 2011-12) but less for the previous two winter periods. A map depicting group size distribution shows that only four groups seen had five or more individuals (Fig. 7).

Table 6. A Comparison of Sightings Group Size Averages Recorded in Sep – Nov 2011; Dec 2011 – Jan 2012; Dec 2012- Feb 2013, Dec 2013 – Feb 2014 and Dec 2014 - Feb 2015.

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
Dec 2014 – Feb 2015 (HKBCF Twelfth Quarter)	2.8	0

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). A population modelling approach has been previously proposed and extensive habitat and environmental has been sourced and incorporated.

3.5. Habitat use

Quantitative grid analyses indicates that the most often frequented area in NWL was to the north of the SCLKCMP (Figs. 8; 9). When the last three winter period are compared, a marked shift from NEL to NWL and then from NWL to the northern limit of NWL is apparent for both the number of groups and the number of individuals encountered (Fig. 10). The general trend in the last few quarters has been for the areas closest to the ongoing HZMB construction sites to be less frequented by dolphins.

3.6. Mother-calf pairs

Only one group contained a mother and calf pair and was sighted to the north of NWL (Fig. 11). Calves comprised 2.4% of all dolphins sighted, lower than that reported in the last three quarterly reports (10.3%, 6.7% and 2.5%, respectively). The sighted “calf” is the offspring of HZMB 098 (also known as NL104). This calf was first sighted with its mother in May 2013.

3.7. Activities

Of the 15 groups sighted (using all sightings), eight (53.3%) were engaged in feeding activities which is the same frequency noted in the last quarter (autumn 2014); three (20.1%) were travelling which is also the same as the last quarter; two (13.3%) were feeding/travelling/surface active which is less than the last quarter; the behavior of two

groups (13.3%) was unknown. Feeding was the dominant activity during daylight hours in Dec 2014 – Feb 2015 with an increase in the frequency of feeding encounters as the winter progressed (Fig. 12). In NWL, feeding occurred both at north SCLKCMP and all encounters at Tai O (south NWL) included feeding behaviour (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 IV. 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 identified in the last quarter were noted in the baseline study. The catalogue now stands at 117 individuals, eight of which were seen during the baseline study (HZMB 003 [NL179]; HZMB 011 [EL01]; HZMB 014 [NL176]; HZMB 021 [NL37]; HZMB 041 [NL24]; HZMB 042 [NL260]; HZMB 054 [CH34]; HZMB 086 [NL242]).

There are 14 dolphins which have been sighted six or more times, nine of which are known from the AFCD catalogue (HZMB 001 [WL46]; HZMB 002 [WL111]; HZMB 003 [NL179]; HZMB 011 [EL01]; HZMB 041 [NL24]; HZMB 044 [NL98]; HZMB 051 [NL213]; HZMB 054 [CH34]; HZMB 098 [NL104]). Five of these well-known individuals were not seen during the baseline study (HZMB 001; HZMB 002; HZMB 044; HZMB 051; HZMB 098). When both baseline and impact monitoring data is pulled, HZMB 54 has been seen the most on 16 different occasions. HZMB 002 has been sighted 12 times; HZMB 022, HZMB 041 and HZMB 044 have been sighted 10 times, HZMB 011, HZMB 023 and HZMB 098 have been sighted eight times, HZMB 005 has been sighted seven times and HZMB 001, HZMB 003, HZMB 040, HZMB 051 and HZMB 094 have been sighted six times. Even when pooled with baseline data, the highest number of re-sightings is 16 (HZMB 054) and this does not consider independence of sightings, a critical assumption in kernel analyses. (Annex IV).

4. CONCLUSION

The data from Dec 2014 – Feb 2015 shows some consistencies with the baseline data (conducted during a different season) and with the same periods in winter 2011-12; 2012-13 and 2013-14, including group size and behavioural trends. 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 to the north of SCLKMP. As each winter period has progressed, dolphin distribution has shifted from the Brothers Island and the northeast of the airport platform (winter 2012-13), to the west of NWL (winter 2013-14) to the north of NWL (winter 2014-15). Very few young (< 3 years old) have been recorded. Density surface modelling comparing April – September 2012 to the same period in 2013 indicates a significant decrease in dolphins occurring in NEL and NWL and a shift from NEL to NWL is indicated.

The decrease 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 throughout NEL and NWL since winter 2013-14. In addition, other works not related to the HZMB Project have been on going in NEL, NWL and adjacent waters including dredging, piling and other marine civil works activities known to disturb dolphins. Further, new projects have been initiated along the airport platform area. A recent cumulative analysis states definitively that the increasing number of high speed ferries that traverse Lantau waters has played a significant role in contributing to the decline of dolphins throughout Hong Kong waters prior to commencement of the HZMB Project.

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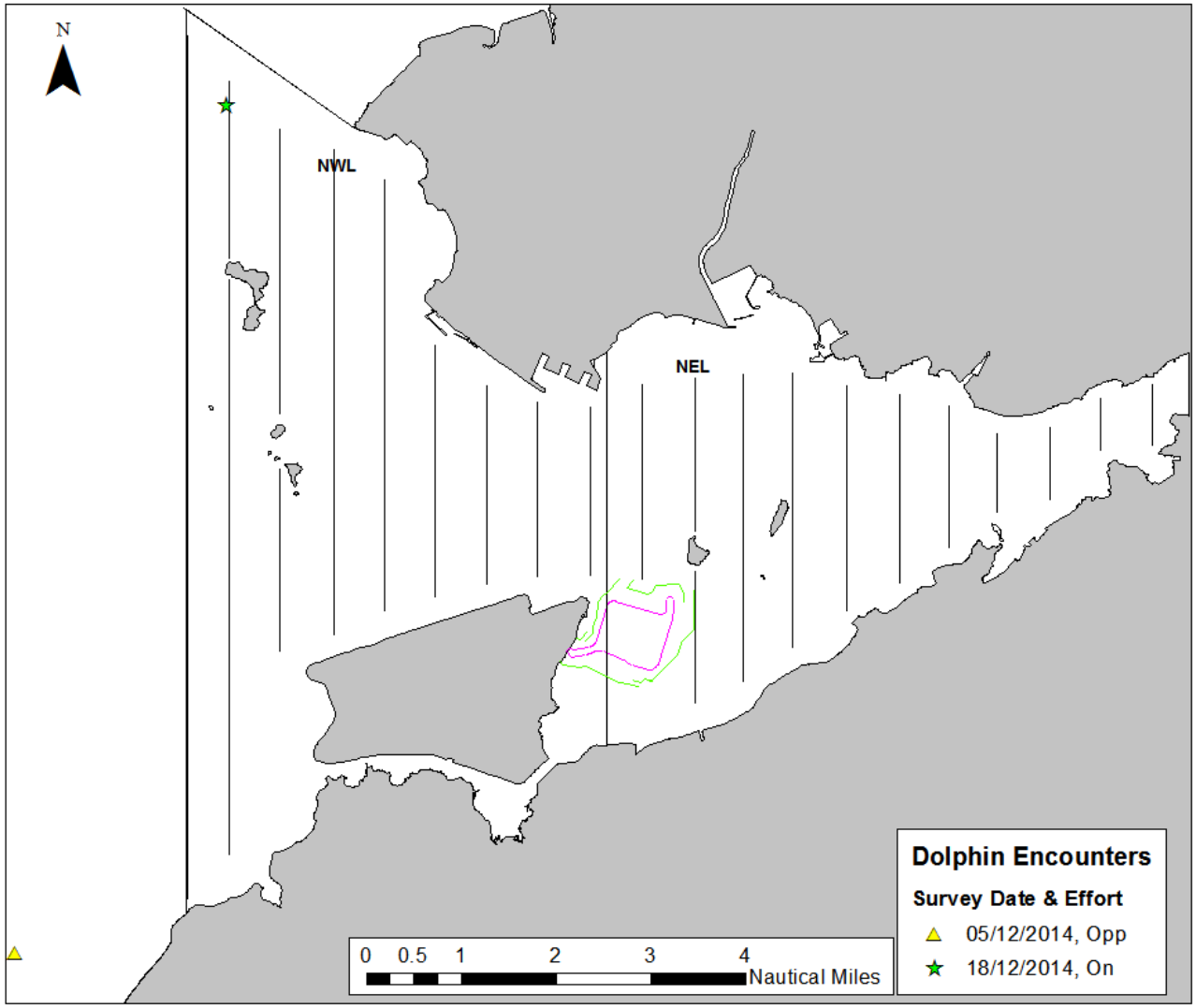


Figure 3 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (December 2014)

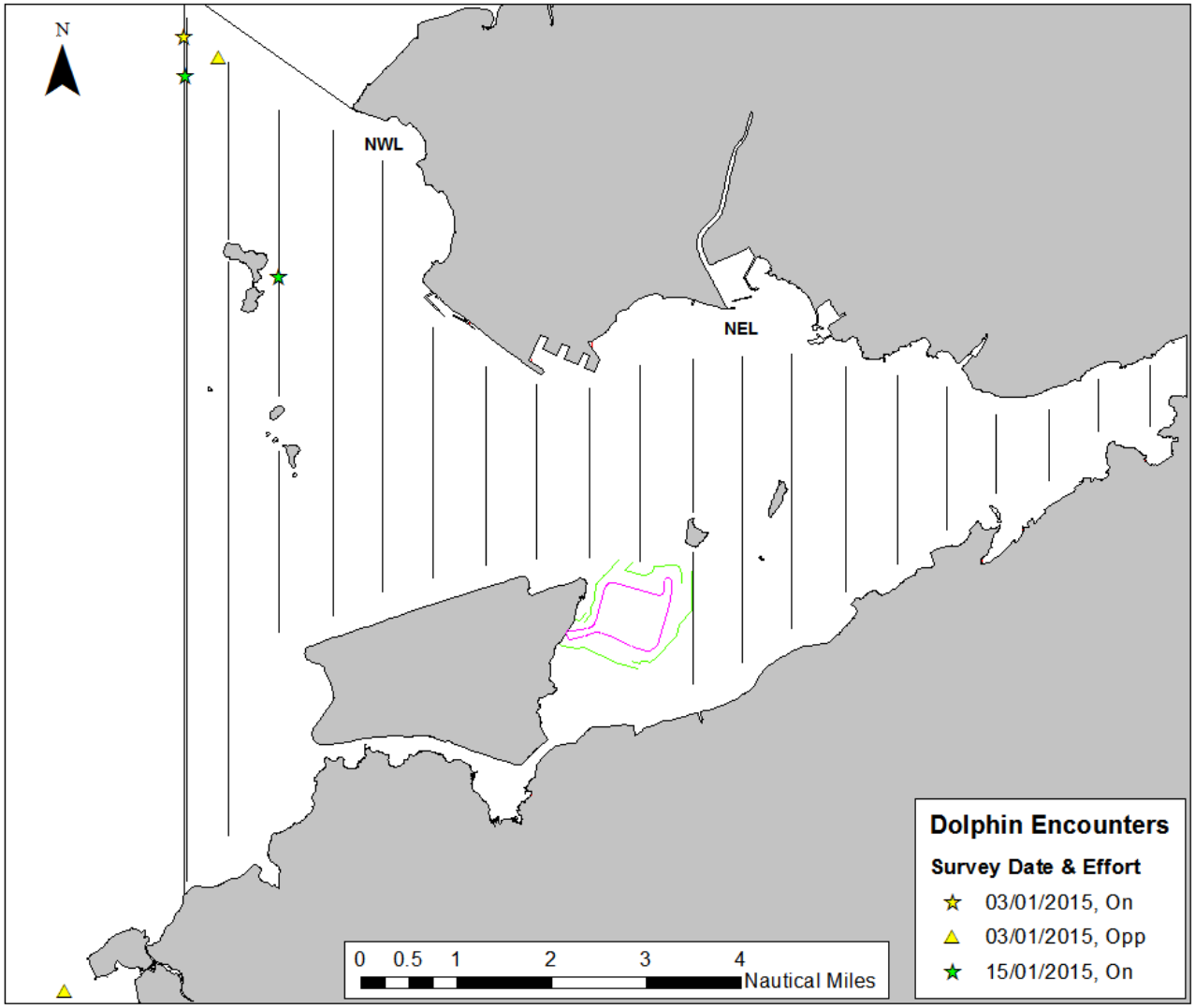


Figure 4 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (January 2015)

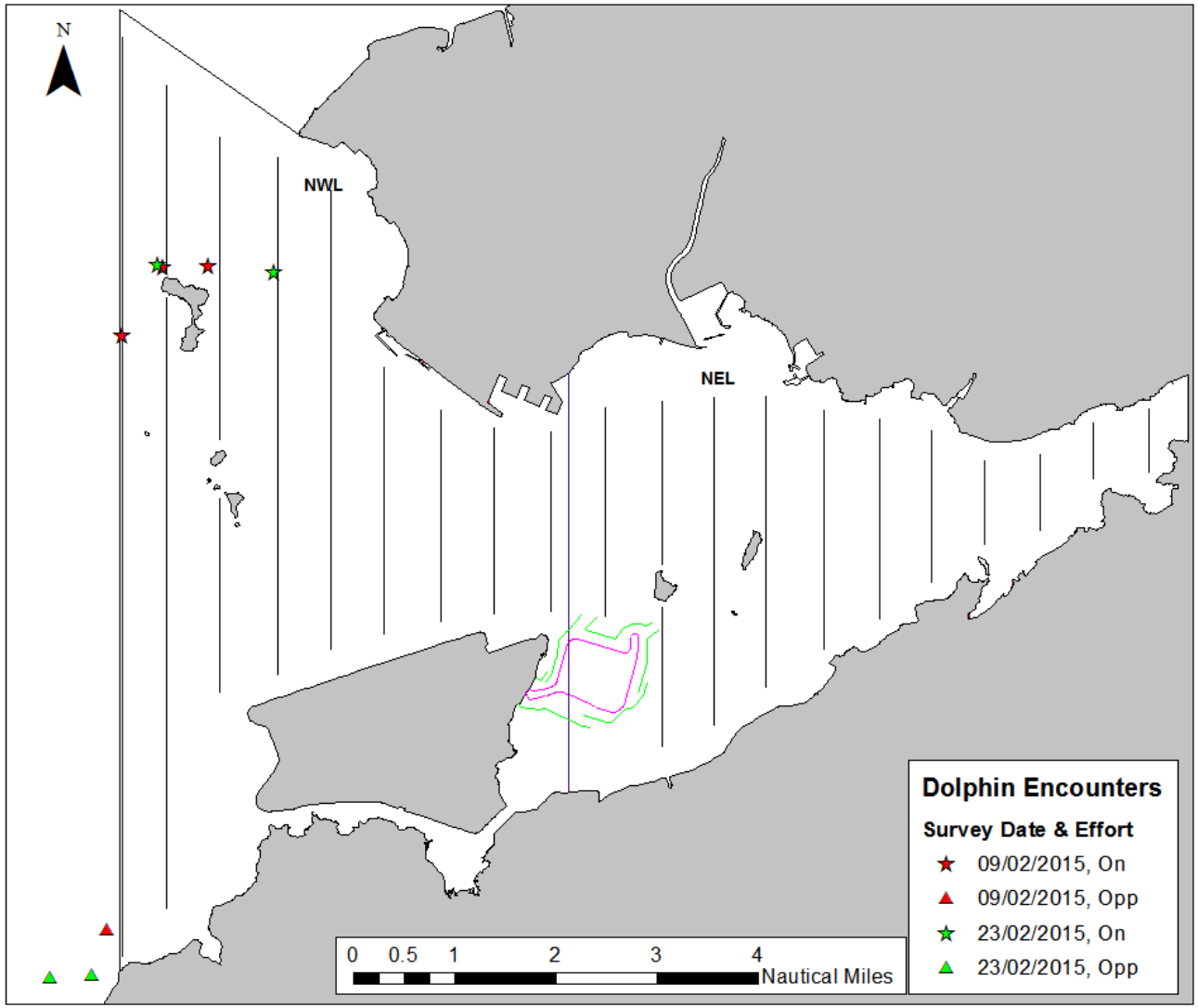


Figure 5 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (February 2015)

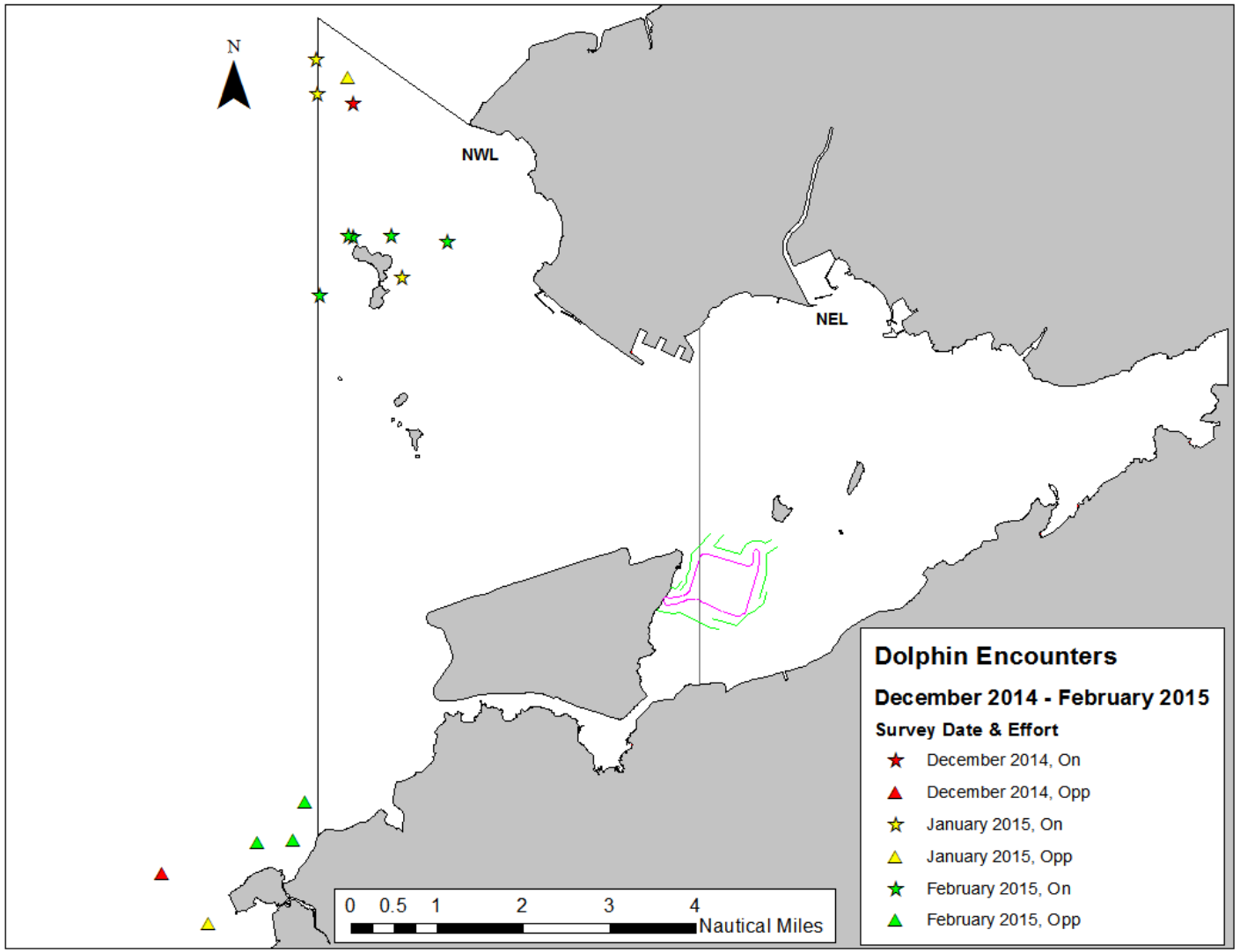


Figure 6. Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (December 2014 – February 2015)

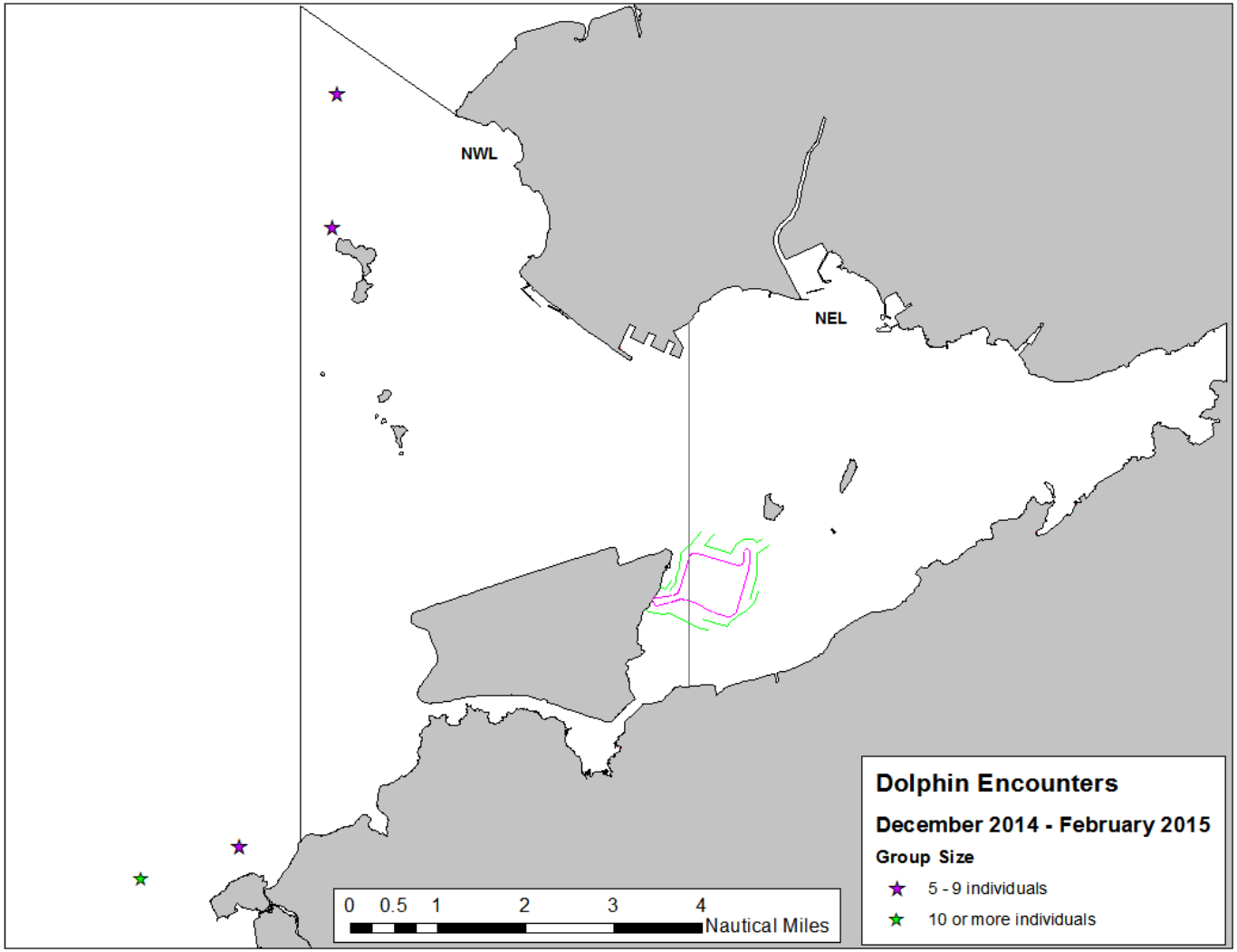


Figure 7. The Location of Dolphin Groups Numbering 5 and Above Individuals (December 2014 – February 2015)

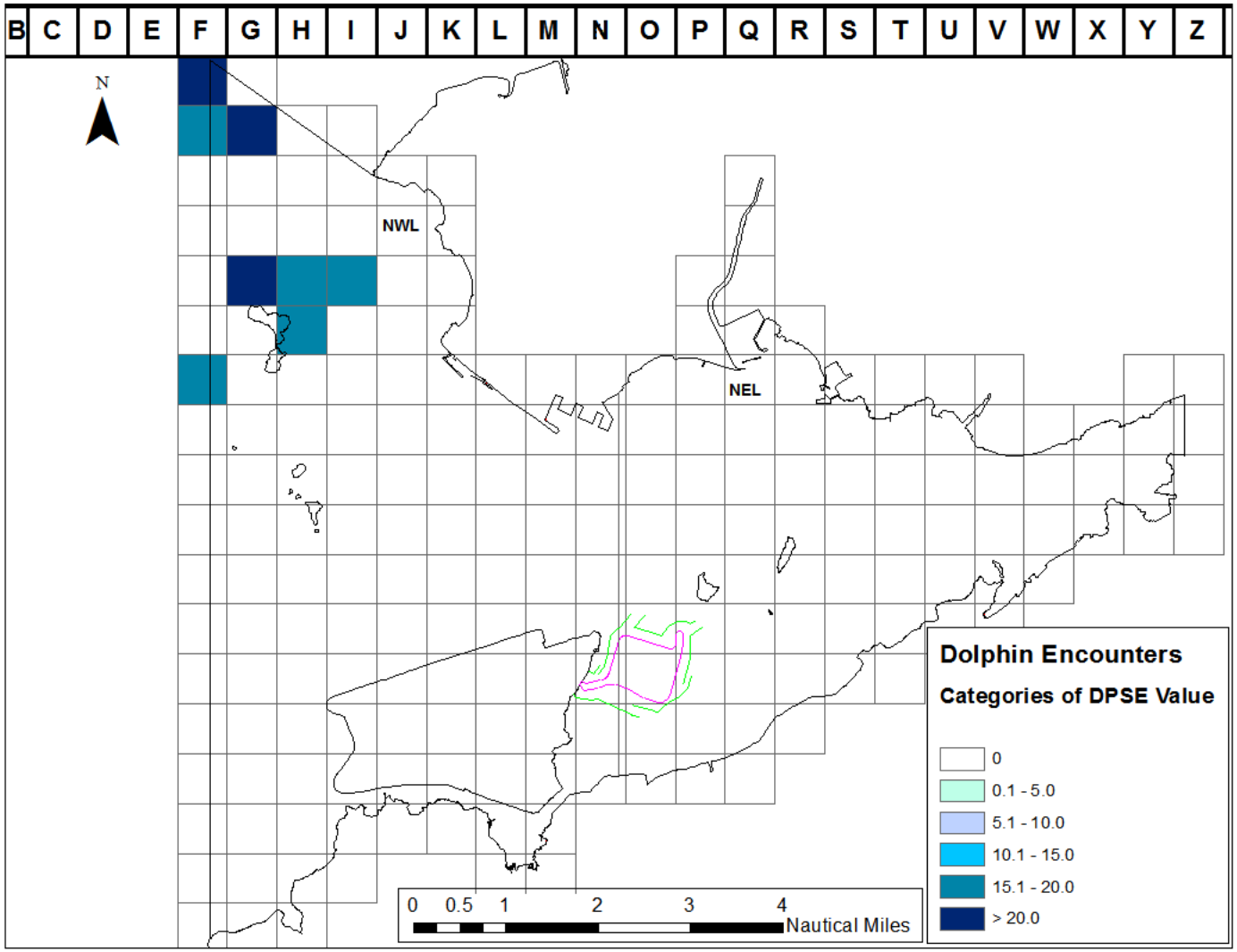


Figure 8. Sighting density SPSE (number of on-effort sightings per 100 units of survey effort) for December 2014 – February 2015

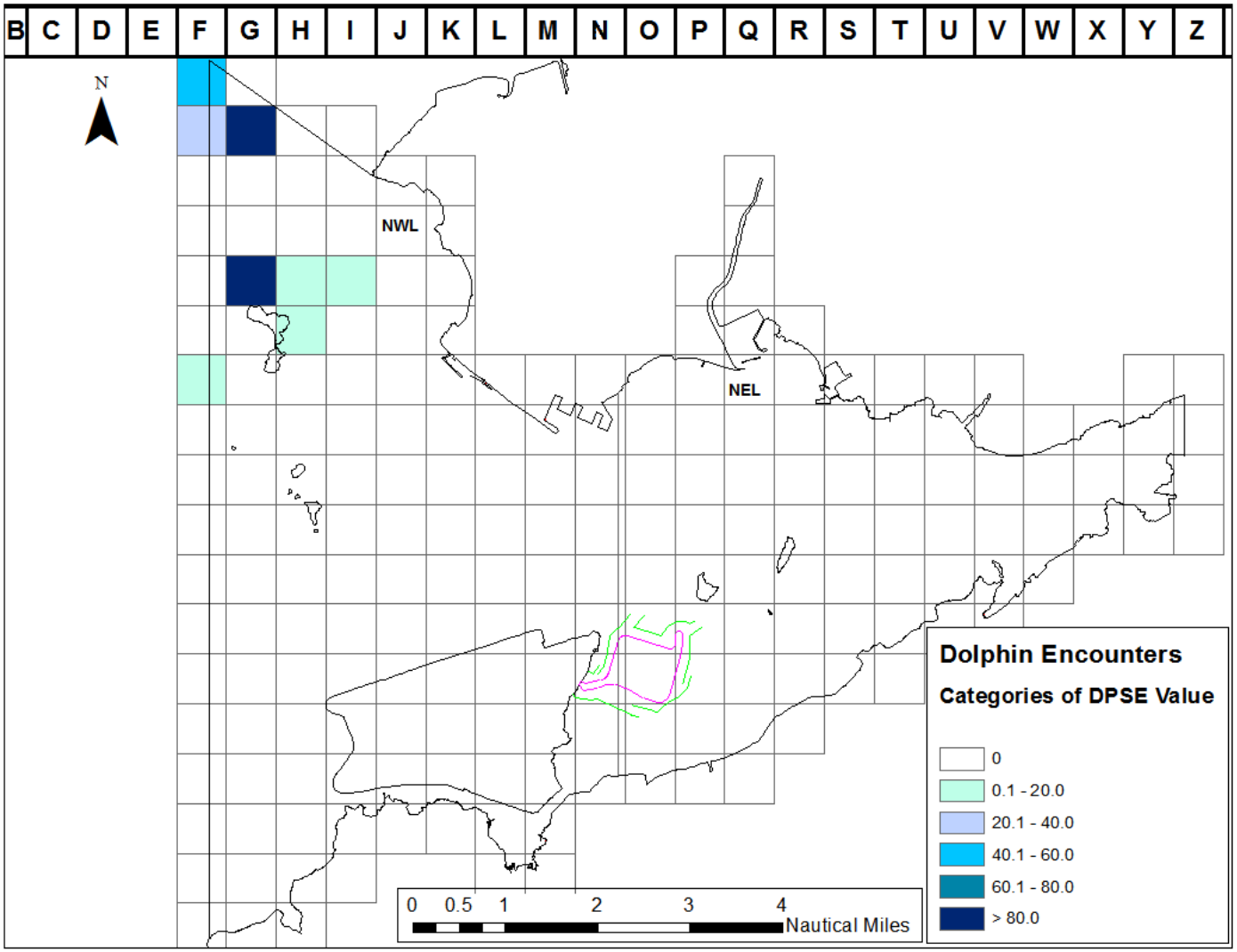


Figure 9. Dolphin density DPSE (number of dolphins per 100 units of survey effort) for December 2014 – February 2015.

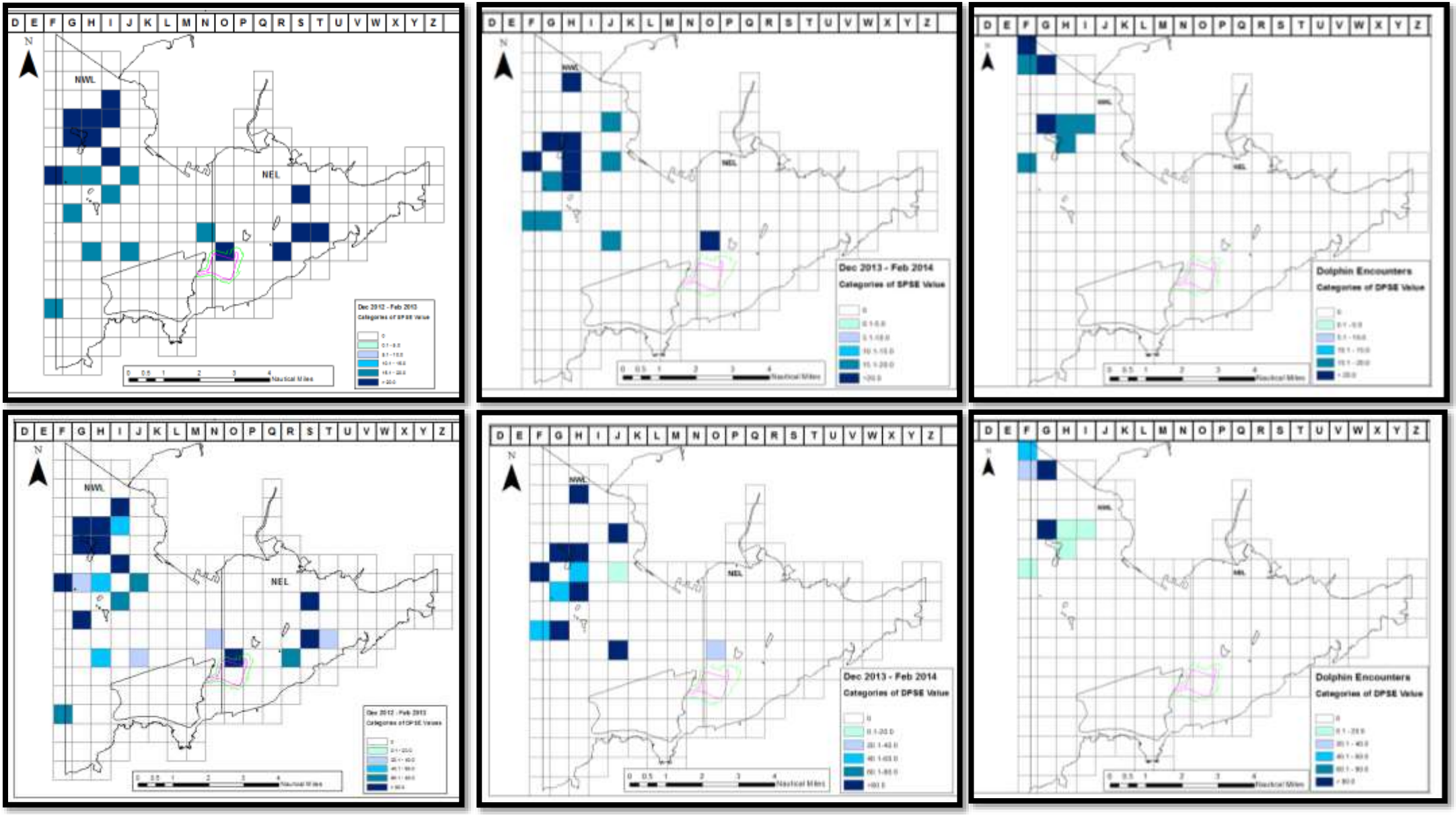


Figure 10. Changes in dolphin density SPSE (top row) and DPSE (bottom row) for winter periods December 2012 – February 2013; 2013-14 and 2014-15 (left to right) highlighting shift to the northwest in habitat use.

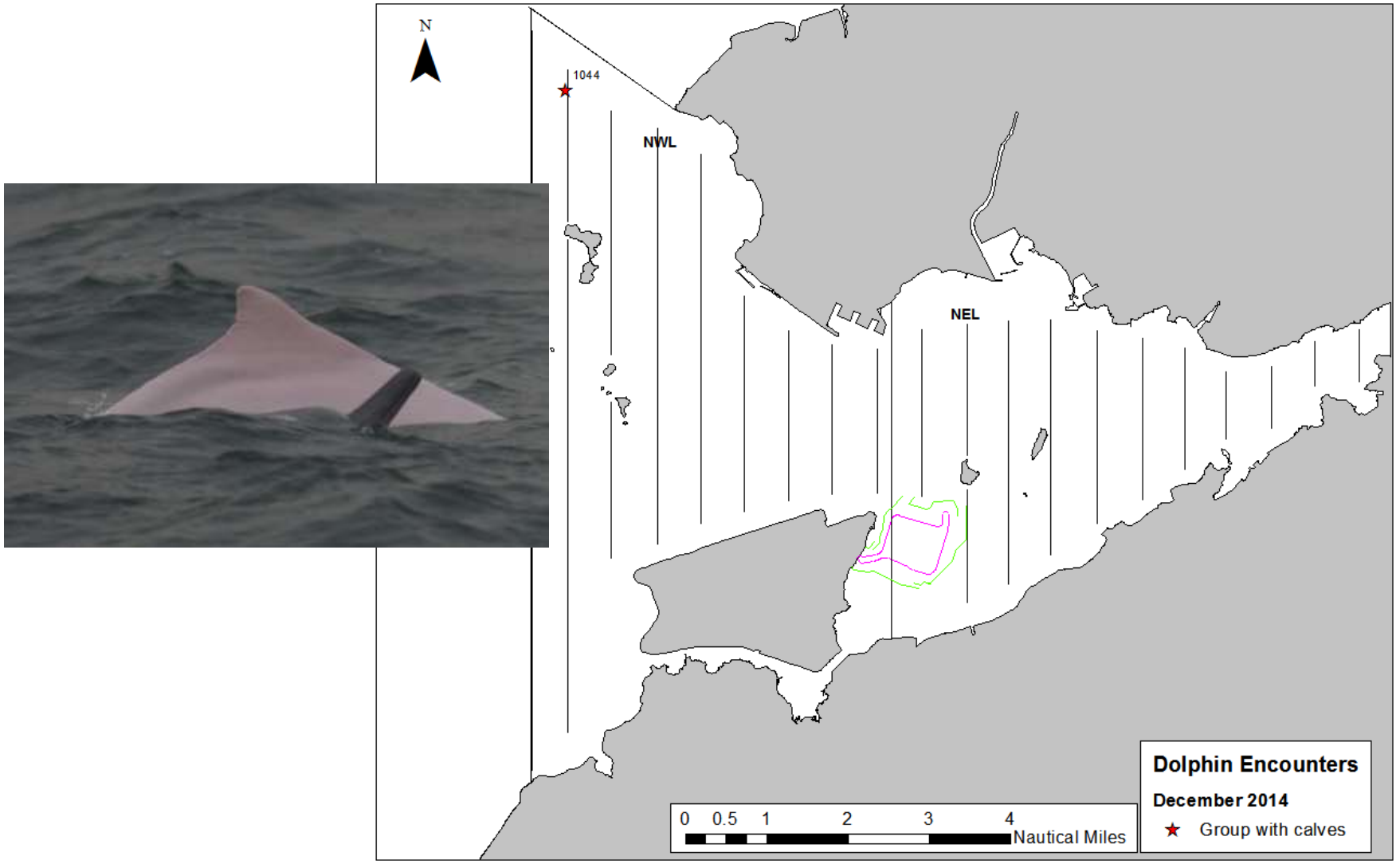


Figure 11. Location of the single mother and calf pair sighted during December 2014 – February 2015.

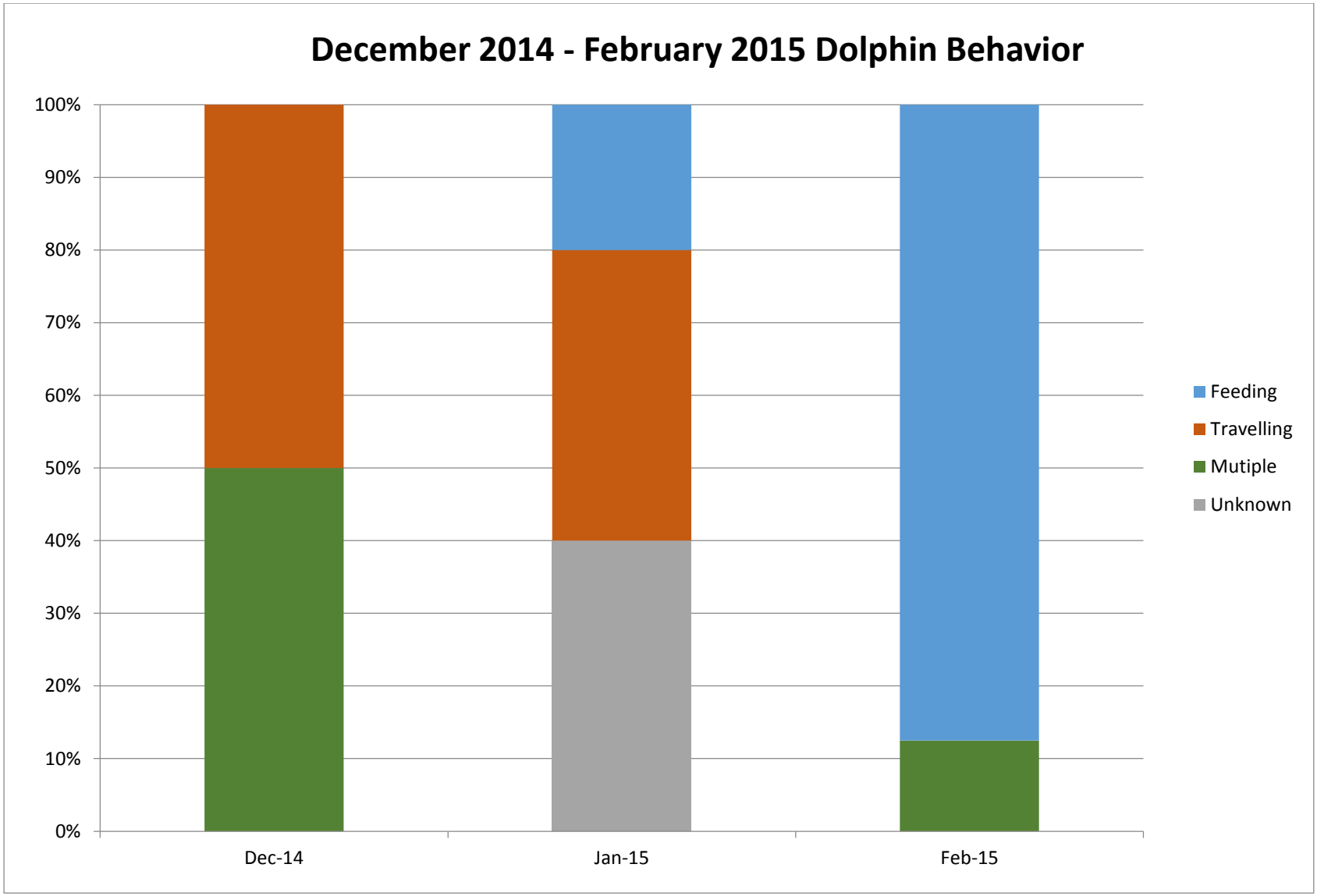


Figure 12. Activity Budget for Dolphin Behaviour December 2014 – February 2015.

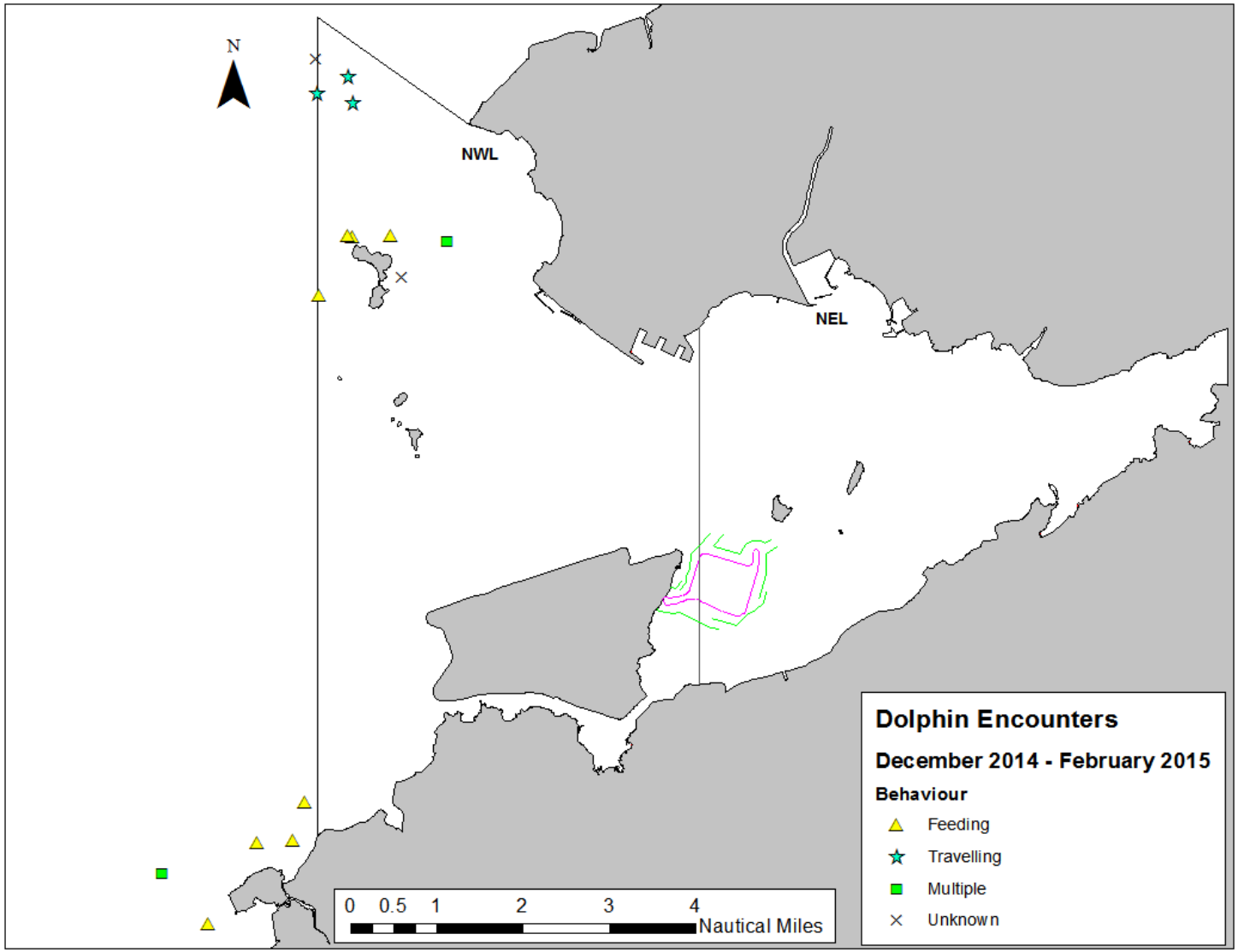


Figure 13. The Location of Different Behavioural Activities December 2014 – February 2015

Annex I. Impact Monitoring Survey Schedule and Details (December 2014 – February 2015)

Date	Location of Survey	No. Sightings On Effort	No. Sightings Opportunistic	Total km ON EFFORT (favourable conditions)
12/04/2014	NE and NW Lantau (5-20,23)	0	0	60.5
12/05/2014	NWL (1-4, 21, 22)	0	1	49.0
12/18/2014	NWL (1-6, 21, 22)	1	0	63.4
12/19/2014	NE and NW Lantau (7-20,23)	0	0	46.4
01/02/2015	NE and NW Lantau (7-20,23)	0	0	46.5
01/03/2015	NWL (1-6, 21, 22)	1	2	62.6
01/15/2015	NE and NW Lantau (1-5,21,22)	2	0	58.0
01/16/2015	NWL (6-20,23)	0	0	52.3
02/09/2015	NWL (1-6, 21, 22)	3	1	58.7
02/10/2015	NE and NW Lantau (7-20,23)	0	0	50.7
02/23/2015	NWL (1-4, 21, 22)	2	2	49.6
02/24/2015	NE and NW Lantau (5-20,23)	0	0	59.9

Annex II. Impact Monitoring Survey Effort Summary (December 2014 – February 2015)

Date	Area	Sea State (on effort)	Effort (km)	Season	Vessel	Type
12/04/2014	NWL	1	15.5	WINTER	HKDW	IMPACT
12/04/2014	NWL	2	8	WINTER	HKDW	IMPACT
12/04/2014	NEL	1	14.3	WINTER	HKDW	IMPACT
12/04/2014	NEL	2	19.1	WINTER	HKDW	IMPACT
12/04/2014	NEL	3	3.6	WINTER	HKDW	IMPACT
12/05/2014	NWL	1	23.7	WINTER	HKDW	IMPACT
12/05/2014	NWL	2	20.8	WINTER	HKDW	IMPACT
12/05/2014	NWL	3	4.5	WINTER	HKDW	IMPACT
12/18/2014	NWL	1	22.2	WINTER	HKDW	IMPACT
12/18/2014	NWL	2	29.7	WINTER	HKDW	IMPACT
12/18/2014	NWL	3	11.5	WINTER	HKDW	IMPACT
12/19/2014	NWL	2	9.9	WINTER	HKDW	IMPACT
12/19/2014	NEL	1	15.9	WINTER	HKDW	IMPACT
12/19/2014	NEL	2	20.6	WINTER	HKDW	IMPACT
01/02/2015	NWL	1	9.9	WINTER	HKDW	IMPACT
01/02/2015	NEL	1	26.8	WINTER	HKDW	IMPACT
01/02/2015	NEL	2	9.8	WINTER	HKDW	IMPACT
01/03/2015	NWL	1	29.7	WINTER	HKDW	IMPACT
01/03/2015	NWL	2	32.9	WINTER	HKDW	IMPACT
01/15/2015	NWL	1	14	WINTER	HKDW	IMPACT
01/15/2015	NWL	2	40.6	WINTER	HKDW	IMPACT
01/15/2015	NWL	3	3.4	WINTER	HKDW	IMPACT
01/16/2015	NWL	1	9.6	WINTER	HKDW	IMPACT
01/16/2015	NWL	2	5.5	WINTER	HKDW	IMPACT
01/16/2015	NEL	1	16.1	WINTER	HKDW	IMPACT
01/16/2015	NEL	2	21.1	WINTER	HKDW	IMPACT
02/09/2015	NWL	1	40	WINTER	HKDW	IMPACT
02/09/2015	NWL	2	12.8	WINTER	HKDW	IMPACT
02/09/2015	NWL	3	5.9	WINTER	HKDW	IMPACT
02/10/2015	NWL	2	14.6	WINTER	HKDW	IMPACT
02/10/2015	NEL	1	30.8	WINTER	HKDW	IMPACT
02/10/2015	NEL	2	5.3	WINTER	HKDW	IMPACT
02/23/2015	NWL	1	8.6	WINTER	HKDW	IMPACT
02/23/2015	NWL	2	36.7	WINTER	HKDW	IMPACT
02/23/2015	NWL	3	4.3	WINTER	HKDW	IMPACT
02/24/2015	NWL	1	3.1	WINTER	HKDW	IMPACT
02/24/2015	NWL	2	20.3	WINTER	HKDW	IMPACT
02/24/2015	NEL	1	14.4	WINTER	HKDW	IMPACT
02/24/2015	NEL	2	22.1	WINTER	HKDW	IMPACT

Annex III. Impact Monitoring Sighting Database (December 2014 – February 2015)

Project	Contract	Date	Sighting No.	Time	Group Size	Area	Beaufort	PSD	Effort	Type	Latitude	Longitude	Season	Boat Association
HKBCF	HY/2010/02	5-Dec-14	1041	14:11	10	NWL	1	N/A	Opp	Impact	22.26025	113.8376	Winter	No
HKBCF	HY/2010/02	18-Dec-14	1044	11:15	5	NWL	2	74	On	Impact	22.40983	113.8773	Winter	No
HKBCF	HY/2010/02	3-Jan-15	1054	9:56	1	NWL	1	N/A	Opp	Impact	22.25039	113.8475	Winter	No
HKBCF	HY/2010/02	3-Jan-15	1055	11:29	1	NWL	1	1027	On	Impact	22.41850	113.8694	Winter	No
HKBCF	HY/2010/02	3-Jan-15	1056	11:34	2	NWL	1	N/A	Opp	Impact	22.41490	113.8763	Winter	No
HKBCF	HY/2010/02	15-Jan-15	1062	11:30	2	NWL	2	108	On	Impact	22.41158	113.8698	Winter	No
HKBCF	HY/2010/02	15-Jan-15	1063	13:37	1	NWL	2	76	On	Impact	22.37618	113.8875	Winter	No
HKBCF	HY/2010/02	9-Feb-15	1068	9:36	1	NWL	1	N/A	Opp	Impact	22.27413	113.8676	Winter	No
HKBCF	HY/2010/02	9-Feb-15	1069	10:51	1	NWL	2	70	On	Impact	22.37263	113.8702	Winter	No
HKBCF	HY/2010/02	9-Feb-15	1070	11:52	1	NWL	1	26	On	Impact	22.38385	113.8773	Winter	No
HKBCF	HY/2010/02	9-Feb-15	1071	13:47	1	NWL	2	332	On	Impact	22.38410	113.8853	Winter	No
HKBCF	HY/2010/02	23-Feb-15	1075	9:54	6	NWL	2	N/A	Opp	Impact	22.26629	113.8576	Winter	No
HKBCF	HY/2010/02	23-Feb-15	1076	10:29	3	NWL	2	N/A	Opp	Impact	22.26674	113.8650	Winter	No
HKBCF	HY/2010/02	23-Feb-15	1077	12:12	6	NWL	1	29	On	Impact	22.38423	113.8763	Winter	No
HKBCF	HY/2010/02	23-Feb-15	1078	14:58	1	NWL	1	0	On	Impact	22.38307	113.8970	Winter	No

Annex IV

March 2012– February 2015

(and Baseline September – November 2011)

Photo Identification Information

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 128		2015/01/03	1056	NWL
HZMB 127		2015/01/03	1056	NWL
HZMB 126		2015/02/23	1068	NWL
		2015/01/03	1054	NWL
HZMB 125		2014/10/13	1019	NWL
HZMB 124		2014/09/22	1005	NWL
HZMB 123		2014/08/25	998	NWL
HZMB 122		2014/08/04	989	NWL
HZMB 121		2014/07/14	968	NWL
HZMB 120		2014/05/31	951	NWL
HZMB 119		2014/04/19	940	NWL
HZMB 118		2014/01/06	890	NWL
HZMB 117		2014/06/17	964	NWL
		2014/01/06	888	NWL
HZMB 116		2014/08/25	999	NWL
HZMB 115		2014/07/14	972	NWL
		2014/07/14	971	NWL
		2013/12/26	879	NWL
		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
HZMB 111		2013/10/15	815	NWL
HZMB 110		2013/10/15	812	NWL
HZMB 108		2013/08/30	780	NEL
HZMB 107		2014/10/13	1019	NWL
HZMB 106		2013/08/21	770	NWL
		2013/08/21	769	NWL
HZMB 105		2014/05/31	951	NWL
		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	2015/02/23	1077	NWL
		2014/12/18	1044	NWL
		2014/08/04	992	NWL
		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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
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		2014/10/13	1019	NWL
		2014/05/31	954	NWL
		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		2014/10/13	1019	NWL
		2014/05/31	954	NWL
HZMB 084		2013/06/26	703	NWL
		2013/02/15	579	NWL
		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		2014/10/20	1024	NWL
		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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
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		2014/10/20	1025	NWL
		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		2014/06/17	964	NWL
		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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 056		2012/09/18	442	NWL
		2012/09/05	433	NEL
HZMB 055		2012/09/04	425	NWL
HZMB 054	CH34	2015/01/15	1062	NWL
		2014/05/31	953	NWL
		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	2014/08/04	989	NWL
		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		2014/07/14	971	NWL
		2014/01/10	900	NWL
		2014/01/06	888	NWL
		2013/02/15	579	NWL
		2012/09/04	421	NWL
HZMB 049		2014/07/29	982	NWL
		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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 044	NL98	2014/10/13	1019	NWL
		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	2014/06/05	960	NEL
		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		2014/11/17	1035	NWL
		2013/04/01	625	NWL
		2012/08/06	373	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 027		2013/12/19	863	NWL
		2013/02/15	579	NWL
		2013/01/28	568	NWL
		2013/01/28	564	NWL
		2012/06/14	299	NWL
HZMB 026		2014/10/13	1018	NWL
		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		2014/12/18	1044	NWL
		2014/11/17	1035	NWL
		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		2014/12/18	1044	NWL
		2014/11/17	1035	NWL
		2014/08/04	991	NWL
		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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
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		2015/02/09	1070	NWL
		2015/02/09	1069	NWL
		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	2013/10/15	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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 002	WL111	2014/05/31	951	NWL
		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	2014/08/25	997	NWL
		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 098 2013-05-24_13-17-20_02

HZMB 098 2014-08-04_13-41-32

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 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 116 2014-07-14 12-40-48

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

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

HZMB 119 2014-04-19_10-55-28

HZMB 120 2014-05-31 09-50-10_02

HZMB 120 2014-05-31 09-50-27

HZMB 121 LL_2014-07-14 11-08-30 (4)

HZMB 122 2014-08-04_09-33-46_01

HZMB 122 2014-08-04_09-34-18_01

HZMB 123 2014-08-25#2

HZMB 124 LL 2014-09-22_09-33-30

HZMB 125 2014-10-13_13-58-29_04 M

HZMB 126 2015-01-03-10-02-25_02 MED

HZMB 126 2015-01-03-10-05-18_01 MED

HZMB 127 2015-01-03-11-39-50_01 MED

HZMB 127 2015-01-03-11-42-25_02 MED

HZMB 128 2015-01-03-11-39-52_01 MED

HZMB 128 2015-01-03-11-42-22_03 MED

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for December / 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 and 5)	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	0.0000	0.0000	0.0000	0.0000	0.0000	1111.9982	0.0000	0.0000	0.0000	1.4000	0.1690
Apr-14	0.0000	0.0000	0.0000	0.0000	0.0000	1294.8080	0.0000	0.0000	0.0000	0.0000	0.0845
May-14	0.0000	0.0000	0.0000	0.0000	0.0000	1181.4168	0.0400	0.0240	0.0000	1.0000	0.2250
Jun-14	0.0000	0.0000	0.0000	0.0000	0.0000	752.7711	0.0000	0.1400	0.0000	8.8000	0.1690
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	6564.5726	0.0400	0.5840	0.0000	13.2000	0.7320
Jul-14	0.0000	0.0000	0.0000	0.0000	0.0000	1252.4373	0.0030	0.0340	0.0010	0.2000	0.2145
Aug-14	0.0000	0.0000	0.0000	0.0000	0.0000	1427.9730	0.0000	0.1960	0.0000	0.0000	0.0650
Sep-14	0.0000	0.0000	0.0000	0.0000	0.0000	1370.5108	0.0000	0.2240	0.0000	0.0000	0.1365
Oct-14	0.0000	0.0000	0.0000	0.0000	0.0000	1750.7552	0.0030	0.0410	0.0000	1.2000	0.0650
Nov-14	0.0000	0.0000	0.0000	0.0000	0.0000	1788.6110	342.6220	0.1790	0.0010	0.0000	0.0585
Dec-14	0.0000	0.0000	0.0000	0.0000	0.0000	1608.6650	0.0015	0.2510	2.4010	0.0000	0.0650
Total	0.0000	0.0000	0.0000	0.0000	0.0000	15763.5249	342.6695	1.5090	2.4030	14.6000	1.3365

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”.

(5) About 60 Water-barriers were recycled (~40kg each, Total: ~2400kg or ~2.4 '000kg).

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for February / 2015 (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-15	0.0000	0.0000	0.0000	0.0000	0.0000	1774.7845	0.0000	0.4200	4.0000	2.4000	0.0455
Feb-15	0.0000	0.0000	0.0000	0.0000	0.0000	1120.6675	0.0000	0.1400	0.0000	0.0000	0.0390
Mar-15											
Apr-15											
May-15											
Jun-15											
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	2895.4520	0.0000	0.5600	4.0000	2.4000	0.0845
Jul-15											
Aug-15											
Sep-15											
Oct-15											
Nov-15											
Dec-15											
Total	0.0000	0.0000	0.0000	0.0000	0.0000	2895.4520	0.0000	0.5600	4.0000	2.4000	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 reporting quarter	Total no. recorded since project commencement
1-Hour TSP	Action	-	-
	Limit	-	-
24-Hour TSP	Action	-	-
	Limit	-	-
Noise	Action	-	-
	Limit	-	-
Water Quality	Action	0	2
	Limit	0	3
Dolphin Monitoring	Action	-	-
	Limit	-	-

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

Cumulative statistics on 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	-	-	-	-	27
Notification of summons	-	-	-	-	2
Successful Prosecutions	-	-	-	-	2

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. **D008**
Monitoring Period **December 2014 - February 2015**

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	0.0	0.0	Limit
NWL	2.1	4.3	

[#] 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 but this project activities may contribute to disturbance.
- It was observed that both NEL and NWL areas have been affected by construction and transport activities which are not related to this Contract. These activities may cause impact to marine mammals, usually manifested as a shift in distribution although we do not yet know the long term effect of these activities which are not part of this Contract.
- 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.
- On 27 April 2015, a meeting was held between ENPO, project ET for this and other HZMB projects and engineer representatives to discuss dolphin encounter rates during the period December 2014 to February 2015. It was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to individual HZMB contracts cannot be separated from the other activities within the dolphins habitat.

b) Action required under the action plan
Please refer to corresponding Event and Action Plan.

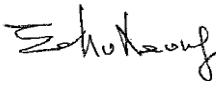
c) Action taken under the action plan
1. Statistical data analysis has been repeated to confirm findings;
2. All available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A have been reviewed;
3. Identification of souce of impact was carried 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 solely to Project works. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual contracts) cannot be quantified nor separate from the other stress factors.
Please also refer to the attachment for full investigation result.

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.

- It was considered that the current monitoring works under the EM&A programmes have already provided a high level of monitoring effort, and the joint meeting with ENPO, project ET for this and other HZMB projects and engineer representatives on 27 April 2015 concluded that additional monitoring in the three monitoring areas was not considered necessary as it may not generate additional information regarding dolphin distribution pattern in these three areas. Instead, it was considered that existing data can be reviewed and alternative analytical methods can be explored to see if it could provide new insight to the dolphin distribution pattern.
- The joint meeting with ENPO, project ET for this and other HZMB projects and engineer representatives on 27 April 2015 suggested that the protection measures (e.g., speed limit control) for the proposed Brothers Island Marine Park (BMP) be brought forward as soon as possible to reduce boat related impacts soonest. It was noted that under the Regular Marine Travel Route Plan, the contractors of HKBCF have committed to reduce the vessel speed in BMP.

e) Contractor's actions to implement the mitigation

- The Contractor was reminded to ensure relevant mitigation measures were fully implemented.
- It was recommended that the marine works of HZMB projects should be accelerated and completed as soon as possible so as to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible.
- It was also recommended that the marine works footprint to be reduced (e.g., reduce the size of peripheral silt curtain). It is noted that a phase plan proposal for perimeter silt curtain removal has been submitted to EPD on 27 October 2014, comments were issued by EPD on 9 December 2014 and it was under project team's review in the reporting quarter.
- It was also recommended that vessels for the marine works should be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible. The Contractor was already using large capacity sand barge so as to reduce the number of vessel traffic .

ET Leader Signature & Date:  29-Oct-15

Report No. D008
Monitoring Period December 2014 - February 2015

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.

On 27 April 2015, a meeting was held between ENPO, ET of this Contract for this and other HZMB projects and engineer representatives following the limit level/action level exceedances for Chinese white dolphin encounter rate during the period December 2014 to February 2015. After review of the AFCD annual monitoring data, it was advised that dolphins in Hong Kong waters may have re-distributed throughout Hong Kong waters and that data from all three monitoring sections, as well as areas from outside these, should be reviewed to give a better, overall picture of current dolphin distribution patterns and to monitor individual dolphin movement.

In the last year, there has been a consistent decrease of dolphins in the NEL and NWL areas. As stated in previous investigation reports, the HZMB works is one of the contributing factors affecting the dolphins and it was agreed at the meeting that there are also concurrent works ongoing in both NEL and NWL, some of which are not part of the HZMB Project . The AFCD data suggests that some dolphins have been distributed outside the range of the current monitoring for this Project. Further, it was noted that it is extremely difficult to attribute specific impacts from any single works or activity and also, it is not possible to separate the impact caused by one part of the HZMB project from another. It was noted that there has been consistently less dolphins adjacent to HZMB construction sites as all parts of the HZMB Project have been initiated. These are in addition to the existing pressures the dolphins faced in the Lantau habitat before the HZMB development started, e.g., boat traffic, habitat degradation, pollution, competition with fisheries. All ETs noted at the meeting that mitigation across individual HZMB sites has been fully implemented. The regular checking and auditing of all mitigation works at the HKBCF reclamation works, record that all dolphin mitigation measures in the form of vessel routes and speeds, etc., have been implemented and DEZ/DWP are in place. The meeting summarised that multiple factors, as listed above and including the HZMB project, have all contributed to dolphin distribution changes in Hong Kong.

The following water quality monitoring exceedances were recorded during the reporting quarter. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

1. One (1) limit level exeedance and one (1) action level exceedance of Suspended Solids (SS) were recorded at monitoring station IS17 and IS(Mf)9 respectively on 5 December 2014 during mid ebb tide;

2. One (1) action level exceedance of SS was recorded at IS10 and one (1) action level exceedance of SS was recorded at SR5 respectively on 12 January 2015 during flood tide;
3. One (1) action level exceedance of SS was recorded at IS17 on 16 January 2015 during ebb tide;
4. One (1) action level exceedance of SS was recorded at IS17, SR5, SR6 and IS10 respectively, on 21 January 2015 during flood tide;
5. One (1) limit level exceedance of SS was recorded at SR10A & SR6 respectively; one (1) action level exceedance of SS was recorded at IS(Mf)11, SR10B(N) and SR7 respectively, on 23 January 2015 during flood tide;
6. One (1) action level exceedance of SS was recorded at IS(Mf)11 on 26 January 2015 during flood tide;
7. One (1) Limit Level Exceedance of SS at IS(Mf)11 and one (1) Action Level Exceedance of SS at SR7 during Flood tide recorded on 23 February 2015.

Although no project related IWQM exceedances were recorded at all monitoring stations in the reporting quarter, exceedances of SS recorded on 5 December 2014, 16 January and 23 February 2015 were recorded on days which vessel based dolphin monitoring were conducted, therefore these exceedances should be further reviewed. In terms of its relative location with the transect line(s) for CWD monitoring, these IWQM exceedances were at locations close to southern end of transect line 10, transect line 11, northern end of transect line 3, southern end of transect line 20 and southern end of transect line 23. On the 5 December 2014 and 23 February 2015, the CWD line transect surveys were conducted in the western section of NWL. The exceedences noted were of a localised nature and in the area south of HKBCF (on the 5 December 2014), the northwest of the Brothers Island and at the Ma Wan Gap (far east of NEL). It is not anticipated that short duration local increased sedimentation would affect the dolphins which may have occurred in the western reached of NWL. On 16 January 2015, only one station recorded an action level exceedance adjacent to HKBCF. The CWD survey transect lines for that day covered lines, 6-20, 23 (east NWL and complete NEL). It is unlikely that this localised exceedance effected dolphin distribution within the surveyed areas on this day and on the day prior to this, dolphins were located in the northwest and southwest of NWL, distant to the exceedance site. It is therefore, unlikely that the LL exceedance in CWD monitoring was caused by these localised and short duration water quality exceedances which were observed in the reporting quarter.

2. Identify source(s) of impacts.

There is a documented significant population decline of the Hong Kong dolphin and, in 2008, an expert panel concluded that the anthropogenic activities which occur in the Hong Kong and adjacent habitat have the potential to affect the dolphin population through pollution, infection, lowered prey availability, intense and low noise levels, collisions, behavioural changes, disturbance, entanglement in fishing gear and habitat modification by activities such as 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, i.e., as the trawling ban progresses, more prey should be available to dolphins, and a general reduction in fishing activities will reduce the potential for entanglement in fishing gear. It is noted that other fishing activities are ongoing in Hong Kong waters which also pose a risk of entanglement, however, data from

strandings programme often cannot discern which type of fishery is (and/or net) is responsible for an individual entanglement . In other areas where coastal fisheries have been monitored by independent observers, it was noted that of trawling, purse seine and gill netting have the highest bycatch incidence for bottlenose dolphins, with trawling noted as having the greatest impact (Allen et al 2014). Globally, trawling fisheries are of the greatest conservation concern due to their high impact on small cetaceans (Ross and Isaac 2004), and although there may still be other fisheries in operation in Hong Kong which pose an entanglement risk to dolphins, none are as intensive or as widespread as the trawl fishery was. 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 (AFCD Annual Monitoring Reports 2009;2010;2011;2012;2013;2014). A recent publication incorporating data from AFCD assessed impacts known from Hong Kong between 1996 and 2013 and concluded that high speed ferries have significantly contributed to the decline in dolphins from NEL. This paper also suggests that there has been an overall decline of dolphins in the northern waters of Lantau Island (Marcotte *et al* 2015). Marcotte *et al* (2015) state, however, that caution should be exercised when interpreting these preliminary findings and further analysis is encouraged. A recent publication (Li *et al* 2015) examined the acoustic disturbance of high speed boats[1] on Chinese white dolphins and observed that frequencies of over >100kHz dominated. This is within the dolphins communication range. The recorded boat noise raised the ambient underwater noise levels from ~5 to 47 decibels, with louder levels recorded at higher speeds and at closer distances. In Hong Kong, similar vessels include small fishing boats, commonly referred to as “P4s” and high speed ferries. This study notes the potential impact these elevated levels have on Chinese white dolphins in southern China and it can be assumed that similar acoustic disturbance may occur in Hong Kong waters. It is known from studies elsewhere that dredging and marine piling activities cause significant disturbance to marine mammals (David 2006; Jefferson et al. 2009; Bailey et al 2010). In particular, Wang *et al* (2014) note the vibratory piling which occurs as part of HZMB construction in waters adjacent to Hong Kong (in fact, the worlds largest vibratory piling vessel) exceeded the cetacean safety exposure level on several occasions in 2013/14 (peak levels of 208.2 dB re. 1µPa at 1m were recorded [Yang *et al* 2015]).

The underwater noise levels were effected up to 3.5km distant from this piling site and thus would have been audible in Hong Kong waters. The elevated underwater noise levels caused by this piling activity would have resulted in auditory masking of dolphin whistles which may disrupt social behavior. Activities which are stressful to dolphins are usually associated with increased underwater noise levels. Other non project related works and activities around the HZMB project may contribute to increased underwater noise levels in NEL and NWL and include, but may not be limited to;

- HZMB Project marine construction work
- Vessel traffic (from all construction works in the proximity of North Lantau). Also the adjacent waters are one of the world’s busiest port facility with heavy shipping traffic.

[1] Boats travelling at over 15kmph

- Other activities that may catalyse a shift in habitat use that is not noise related is an alteration in prey resources.
- Recent publications suggest that the health status of the dolphins in Hong Kong and adjacent waters may be poor due to the long term accumulation of pollutants therefore, making them more susceptible to new stressors (Gui *et al*. 2014)

Following the meeting held on the 27 April 2015, the ET for HY/2010/02 advised that the contractor was already using large capacity sand barges so as to reduce the number of vessel traversing the north Lantau. Underwater noise levels from vessels are related to the horse power of the engine, the size and shape of the hull, the propeller type and the speed of the vessel. Although few quantitative comparative studies have been conducted, one such study investigates different sound sources from vessels of different lengths (Kipple and Gabriele, 2007). Vessels over 250 foot (approx. 76m) fall into the same sound source category (170 – dB re 1 microPa at 1 yard). As both the large capacity barge and the smaller capacity sand vessel it replaces are within the over 250 foot length category and fall into the same sound source category[2], a reduction in both the number of active vessels and the number of journeys across NEL per day will lead to a reduction in sources of underwater noise levels, therefore reducing the underwater noise attributable to sand barges. Further, the suggestion during the meeting that protective measures (e.g., speed limit control) for the proposed Brothers Island Marine Park (BMP) shall be brought forward as soon as possible is currently being considered.

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 monitoring was in place depending on site activities, i.e., Dolphin Exclusive Zone for silt curtain laying 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 single construction works associated with the HKBCF Project can be found to coincide with the observed reduction in dolphin encounter rates in NEL and NWL. As discussed at the series of meetings held, it was agreed that all HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to individual Projects cannot be quantified nor separate from the other stress factors. All mitigation measures as detailed in the EM&A are being upheld and additional measures to restrict traffic

[2] Please note, actual sound sources levels from Hong Kong vessels have not been measured but sound reduction assumption shave been inferred from measurements from similar vessels elsewhere.

number and routing have been proposed and, in some cases, already implemented for the HKBCF Project.

These factors were reported in D005, D006 and D007, and the conclusions therein are still valid, that is, there are ongoing construction works, both Project related and not, which are known to impact dolphins. At this time, the long term impacts of these works cannot be assessed although expanding the scope of monitoring areas will provide better data on impacts outside the NEL and NWL zones.

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