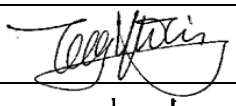
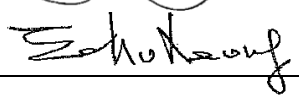
China Harbour Engineering Company Limited

Contract No. HY/2010/02

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

Quarterly EM&A Summary Report for March 2016 – May 2016

[12/2016]

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

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RAMBOLL ENVIRON

Ref.: HYDHZMBEEM00_0_4906L.17

5 January 2017

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 March 2016 to May 2016

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for March 2016 to May 2016 certified by the ET Leader (ET's ref.: "60249820/C/RMKY16122802" dated 28 December 2016) and provided to us via e-mail on 28 December 2016.

We are pleased to inform you that we have no adverse comment on the captioned Quarterly Environmental Monitoring & Audit Report for March 2016 to May 2016.

Please be reminded that our verification to your report does not release any of your obligations in the EM&A Manual under the applicable Environmental Permit(s) for this Project.

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. Vico Cheung	(By Fax: 3188 6614)
	HyD	Mr. Wai-Ping Lee	(By Fax: 3188 6614)
	AECOM	Ms. Echo Leong	(By Fax: 2317 7609)
	CHEC	Mr. Lim Kim Chuan	(By Fax: 2578 0413)

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EXECUTIVE SUMMARY

Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works (here below, known as "the Contract") 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 11 April 2016 (EP-353/2009/K) 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 Contract).

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

Ramboll Environ Hong Kong Limited. 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 Contract 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 2017. 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 March 2016 and 31 May 2016. As informed by the Contractor, major activities in the reporting quarter were:-

Marine-base

- Sloping Seawalls
- Rubble Mound Seawall
- Rock fill
- Maintenance of silt curtain & silt screen at sea water intake of HKIA (As informed by the Contractor, the silt curtain at NE Airport Cooling Water Intake has been removed on 10 May 2016.)

Land-base

- Surcharge removal & laying
- Deep Cement Mixing
- Installations of Precast Culverts except sloping outfalls
- Construction of Sloping Outfalls
- 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	16 sessions
1-hour TSP monitoring	16 sessions
Noise monitoring	13 sessions
Impact water quality monitoring	38 sessions
Impact dolphin monitoring	6 surveys
Joint Environmental site inspection	13 sessions

Breaches of Action and Limit Levels for Air Quality

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

Breaches of Action and Limit Levels for Noise

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

Breaches of Action and Limit Levels for Water Quality

For water quality monitoring, one (1) Limit level impact water quality monitoring exceedance at monitoring station SR(4)N has been recorded on 20 May 2016 during flood tide. 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.

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 environmental complaint, notification of summons or prosecution was received in the reporting period

1 INTRODUCTION

1.1 Background

1.1.1 Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works (here below, known as "the Contract") 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).

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), January 2015 (EP-353/2009/H), July 2015 (EP-353/2009/I), February 2016 (EP-353/2009/J) and April 2016 (EP-353/2009/K). 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 11 April 2016 (EP-353/2009/K) and 13 March 2015 (EP-354/2009/D) (for TMCLKL Southern Landfall Reclamation only).

1.1.5 A Contract Specific EM&A Manual, which included all Contract -relation contents from the original EM&A Manuals for the Contract, 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 Contract).

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

1.1.8 Ramboll Environ Hong Kong Limited 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 Contract 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 2017.

1.1.11 According to the Contract 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 Contract commenced on 12 March 2012.

1.2 Scope of Report

1.2.1 This is the seventeenth 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 Contract from 1 March 2016 to 31 May 2016.

1.3 Contract Organization

1.3.1 The Contract 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	Paul Appleton	3698 5889	2698 5999
IEC / **ENPO** (Ramboll Environ Hong Kong Limited)	Independent Environmental Checker	Raymond Dai	3465 2888	3465 2899
	Environmental Project Office Leader	Y. H. Hui	3547 2133	3465 2899
Contractor (China Harbour Engineering Company Limited)	Environmental Officer	Louie Chan	36932254	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-base

- Sloping Seawalls
- Rubble Mound Seawall
- Rock fill
- Maintenance of silt curtain & silt screen at sea water intake of HKIA (As informed by the Contractor, the silt curtain at NE Airport Cooling Water Intake has been removed on 10 May 2016.)

Land-base

- Surcharge removal & laying
- Deep Cement Mixing
- Installations of Precast Culverts except sloping outfalls
- Construction of Sloping Outfalls
- 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 Contract is shown in Appendix B.

1.4.4 The general layout plan of the Contract 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 Contract 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 Contract 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 Contract 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 Contract Specific EM&A Manual. However, for monitoring location NMS3 (Ho Yu College), as proposed in the Contract 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 As informed by the premises owner of (AMS7A) - Chu Kong Air-Sea Union Transportation Co. LTD would not grant us the permission to install air quality monitoring equipment (High volume sampler) and conduct 1-hour TSP/24 hour TSP monitoring at the premises of Chu Kong Air-Sea Union Transportation Co. LTD after December 2015. In order to fulfil the EM&A requirement of this Contract, as permission to conduct impact air quality monitoring at the premise of Hong Kong SkyCity Marriott Hotel has been granted in December 2015, ET proposed relocation of air quality monitoring station (AMS7A) on 15 December 2015, with no further comment received from IEC on 15 December 2015 and no particular comment received from EPD on 21 December 2015, the impact air quality monitoring station AMS7A (Chu Kong Air-Sea Union Transportation Company Limited) has been relocated to AMS7 (Hong Kong SkyCity Marriott Hotel) on 30 December 2015. The impact air quality monitoring for December 2015 was conducted before the relocation of AQM Station from AMS7A to AMS7. The impact air quality monitoring has been conducted at AMS7 (Hong Kong SkyCity Marriott Hotel) since 1 January 2016, Action Level for air quality, as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel will be adopted for this air quality monitoring location.

2.1.5 In accordance with the Contract 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.

2.1.6 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.

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

2.1.8 The Contract 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/K 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 Contract 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).

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 As informed by the premises owner of (AMS7A) - Chu Kong Air-Sea Union Transportation Co. LTD would not grant us the permission to install air quality monitoring equipment (High volume sampler) and conduct 1-hour TSP/24 hour TSP monitoring at the premises of Chu Kong Air-Sea Union Transportation Co. LTD after December 2015. In order to fulfil the EM&A requirement of this Contract, as permission to conduct impact air quality monitoring at the premise of Hong Kong SkyCity Marriott Hotel has been granted in December 2015, ET proposed relocation of air quality monitoring station (AMS7A) on 15 December 2015, with no further comment received from IEC on 15 December 2015 and no particular comment received from EPD on 21 December 2015, the impact air quality monitoring station AMS7A (Chu Kong Air-Sea Union Transportation Company Limited) has been relocated to AMS7 (Hong Kong SkyCity Marriott Hotel) on 30 December 2015. The impact air quality monitoring for December 2015 was conducted before the relocation of AQM Station from AMS7A to AMS7. The impact air quality monitoring for this report quarter were conducted at AMS7 (Hong Kong SkyCity Marriott Hotel), Action Level for air quality, as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel will be adopted for this air quality monitoring 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		
		March 16	April 16	May 16
1-hr TSP	AMS2	15	18	15
	AMS3B	15	18	15
	AMS7	15	18	15
24-hr TSP	AMS2	5	6	5
	AMS3B	5	6	5
	AMS7	5	6	5

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

Monitoring Parameter	Location	Level of Exceedance	Numbers of Exceedance		
			March 16	April 16	May 16
1-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0
	AMS3B	Action	0	0	0
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
		Total	***0***	***0***	***0***
24-hr TSP	AMS2	Action	0	0	0
		Limit	0	0	0

	AMS3B	Action	0	0	0
		Limit	0	0	0
	AMS7	Action	0	0	0
		Limit	0	0	0
		Total	***0***	***0***	***0***

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

3.1.7 The event action plan is annexed in Appendix K.

3.1.8 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 March 2016, April 2016 and May 2016 respectively.

3.1.9 Due to electricity failure, the 24-hour TSP Monitoring at Station AMS3B - Site Boundary of Site Office (WA2) was rescheduled from 23 May 2016 - 24 May 2016 to 24 May 2016 - 25 May 2016.

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		
		March 16	April 16	May 16
	NMS2	4	4	5
	NMS3B	4	4	5

Table 3.4 Summary of Number of Monitoring Exceedances for Impact Noise

Monitoring Parameter	Location	Level of Exceedance	Level of Exceedance		
			March 16	April 16	May 16
	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.

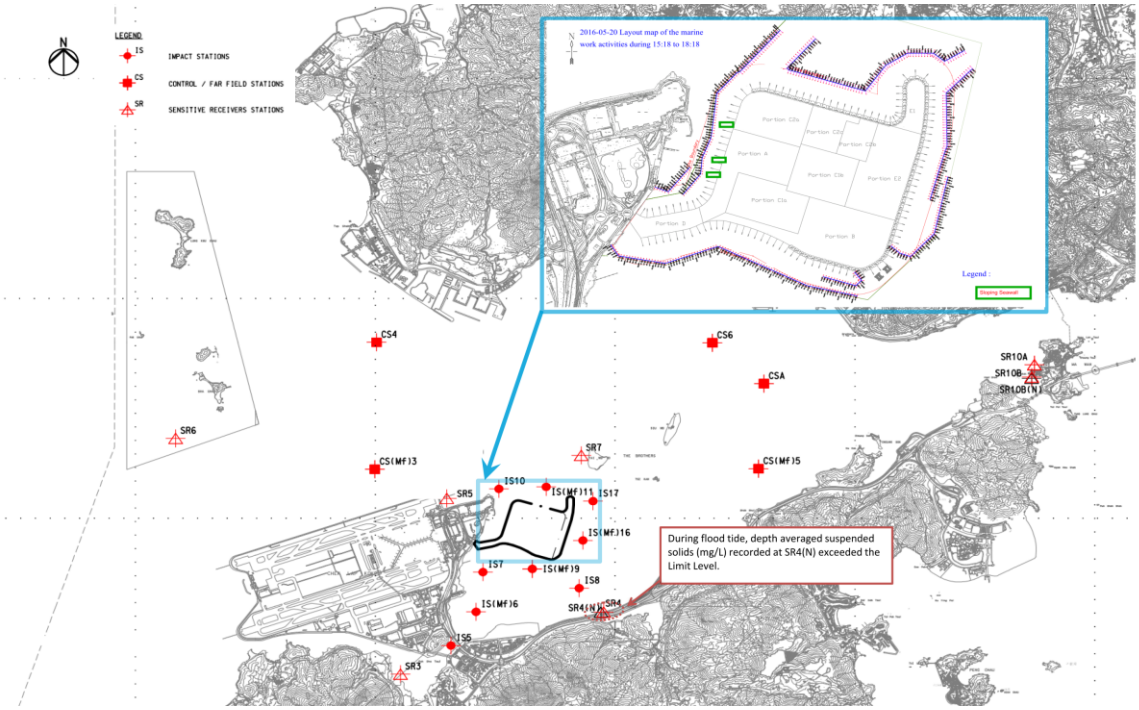
Table 3.5 Summary of Water Quality Exceedances in March 2016 – May 2016

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	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS10	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)11	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)16	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS17	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR3	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR4(N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	**1 20 May 16**	0	**1 20 May 16**
SR5	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10A	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10B (N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
Total	**Action**	0	0	0	0	0	0	0	0	0	
	Limit	0	0	0	0	0	0	0	**1 20 May 16**	**1 20 May 16**	

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

3.3.2 For the limit Level Exceedance of Suspended Solids at water quality monitoring station SR4(N) was measured on 20 May 2016 during flood tide. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

3.3.2.1 Below layout map shows that marine based construction works such as box culverts and seawall construction was carried out at Portion D and Portion A of HKBCF Reclamation Works.

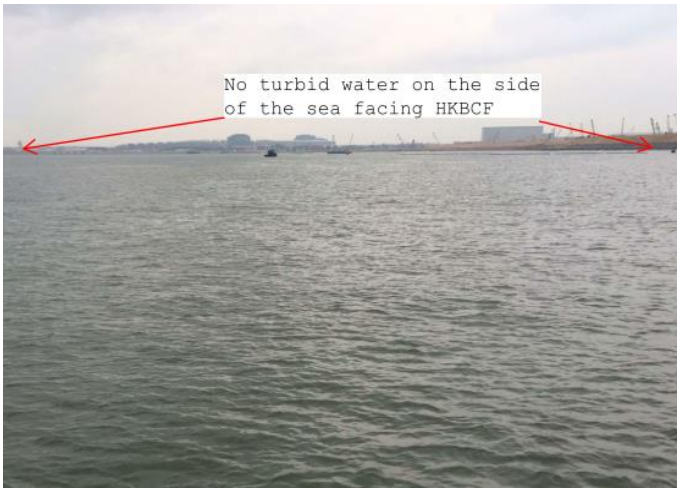


3.3.2.2 Exceedances recorded at SR4(N) during mid-flood tide are unlikely due to marine based construction activities of the Contract because:

3.3.2.3 With reference to the silt curtain checking record, no defect was observed at southern and southeastern parts of the perimeter silt curtain which are facing SR4(N).

3.3.2.4 With referred to the attached layout map, marine based construction works such as seawall construction were conducted at Portion A and Portion C2A, 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 Photo record 1 for sea condition observed on 20 May 2016 during flood tide.)

3.3.2.5 Photo record 1 which shows the sea condition at southern and southeastern part of the HKBCF reclamation works during flood tide on 20 May 2016. No turbid water was observed.



3.3.2.6 Also, turbidity and suspended solids levels recorded at IS7, IS8, IS(Mf)9 and IS(Mf)16 were below the action and limit level. This indicates that the turbidity and suspended solids levels recorded at monitoring stations closer to the active works, were not adversely affected. As such, the exceedances recorded at SR4(N) were unlikely attribute to the active works of this Contract.

3.3.2.7 With referred to the photo record 2 taken at monitoring station SR4(N) on 20 May 2016 (also see attached photo record) turbid water was observed at this area. However, with referred to the photo record 1 taken at southern and southeastern part of the HKBCF reclamation works during flood tide on 20 May 2016, turbid water was not noted. Photo record 2 shows that vessel activities was observed when monitoring was conducted at monitoring location SR4(N), as confirmed with the Contractor of HY/2010/02, this Contract did not have any construction vessels working outside the site boundary of Contract HY/2010/02 on 20 May 2016 (also refer to the above layout map).

3.3.2.8 Photo record 2 which shows the sea condition taken on 20 May 2016 at near monitoring location SR4(N) and facing monitoring station SR4(N), turbid water was observed at this area.

3.3.2.9 The exceedances were likely due to local effects in the vicinity of SR4(N).

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

3.3.2.11 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 suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor, ER and EPD were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, actions 5-7 under the EAP are not considered applicable.

3.3.2.12 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.

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

3.3.2.14 The Contractor was reminded to adhere to the environmental permit requirement and undertake the necessary mitigation measures after the realignment of the perimeter silt curtain near sourtheastern corner of HKBCF Reclamation Works, as necessary.

3.3.2.15 No exceedance was recorded at all other monitoring stations in the reporting period.

3.3.3 The Impact Water Quality Monitoring originally scheduled on 27 May 2016 was cancelled due to Tropical Cyclone Warning Signal No.3 was hoisted.

3.3.4 The event action plan is annexed in Appendix K.

3.4 Dolphin Monitoring

3.4.1 In accordance with the Contract 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 March 2016 – May 2016

Number of Impact Surveys Completed^	6
Survey Distance Travelled under Favourable On- Effort Condition	633.6km
Number of Sightings	15 sightings (6 sightings are ”on effort” (which are all under favourable condition), 9 sightings are “opportunistic”)
Number of dolphin individual sighted	59 individuals (the best estimated group size)
Dolphin Encounter Rate#	NEL: 0 NWL: 1.4
Dolphin Group Size	Average of NEL: 0 Average of NWL: 3.8 Varied from 1-8 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 March 2016 – May 2016

	NEL	NWL	Level Exceeded
STG*	0	1.4	Limit
ANI**	0	4.6	

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

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

3.5 Environmental Site Inspection and Audit

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

3.5.2 Particular observations during the site inspections are described below:

Air Quality

3.5.3 Breaker was observed without dust suppression measures at TKO sorting facility, the Contractor was reminded to provide dust suppression measure such as watering during the operation of breaker. The Contractor subsequently provided watering during operation of breaker. (Closed)

3.5.4 The Contractor was reminded to affix a proper exception/approval label to the power pack at Portion E2 under NRMM regulation. The Contractor subsequently rectified the situation. (Closed)

Noise

3.5.5 No relevant adverse impact was observed in the reporting quarter.

Water Quality

3.5.6 Turbid water was observed at Portion D, it is noted that the source of turbid water was originated from the wheel washing facility at Portion D managed by another Contract. The Contractor of Contract HY/2010/02 was advised to liaise with another Contract so that recurrence of the situation could be prevented. (Reminder)

3.5.7 It was observed that the overlapping of the perimeter silt curtain maybe insufficient at the northeast access. The Contractor was advised to provide sufficient length of overlapping at the northeast marine access. The Contractor subsequently extended to overlapping at the northeast marine access. (Closed)

Chemical and Waste Management

3.5.8 Water and oil mixture was observed accumulated inside drip tray at TKO sorting facility, the Contractor was reminded to properly clear the water accumulated inside drip tray. The Contract subsequently cleared the water accumulated inside drip tray. (Closed)

3.5.9 Water was observed accumulated inside a bunded area on barge FTB19. The Contractor was reminded to regularly clear the water inside bunding to prevent potential oil spillage/runoff. The Contractor subsequently rectified the situation by clearing the water accumulated inside bunding. (Closed)

3.5.10 Oil was observed stored without measure to prevent oil leakage or spillage on barge Tung Fu 18, the Contractor was reminded to provide measures to prevent oil leakage or spillage. The Contractor subsequently provided measure barge Tung Fu 18 to prevent oil leakage or spillage. (Closed)

3.5.11 The Contractor was reminded to keep the site tidy at Portion D. Sorting was subsequently observed onsite, the Contractor was reminded to continue to keep the site tidy at Portion D. (Closed)

3.5.12 General refuse was observed, near box culvert area at Portion D, at the edge of the land area when inspection was conducted on barge FTP24, at other area of Portion D, the Contractor was reminded to regularly remove the general refuse on site to keep the site clean and tidy. The Contractor subsequently removed the general refuse and kept the site clean and tidy. (Closed)

3.5.13 Chemical waste container was observed without drip tray, the Contractor was reminded to place the chemical waste container onto the drip tray. The Contractor subsequently place the chemical waste container onto drip tray. (Closed)

3.5.14 The Contractor was reminded to dispose of general refuse regularly at Portion E2 properly. The Contractor subsequently cleared the generation refuse at Portion E2. (Closed)

3.5.15 The Contractor was reminded to provide drip tray for the moveable light generator at Portion E2. The Contractor subsequently provided drip tray to the moveable light generator. (Closed)

3.5.16 Oil drum was observed without drip tray. The Contractor was reminded to provide drip tray to oil drum. The Contractor subsequently removed from oil drum. (Closed)

Landscape and Visual Impact

3.5.17 No relevant adverse impact was observed in the reporting quarter.

Others

3.5.18 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, 128239.5 m^3 of inert C&D Materials generated and reused in other Projects; 97381m^3 of surplus surcharge exported to Macau; 102329m^3 of Imported fill; 532kg paper/cardboard packaging, 489.7 m^3 other C&D waste such as 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.

4.1.5 The treated marine sediment and/or treated excavated filling material specified by Contract no. HY/2013/01 has been received as public fill for Contract no. HY/2010/02's reclamation filling works since January 2015. As informed by the Contractor in the last reporting quarter, such site arrangement has been discontinued since 24 February 2016.

4.1.6 After checking with the Contractor, surcharge material was removed off site to Macau from 27 April 2016 and it is continued in the reporting quarter. Surplus surcharge was exported to Macau during the reporting quarter. The Contractor was reminded to ensure consistency in quantities in case of any C&D material disposed off-site and/or no surcharge material removed off site.

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 reporting period.

5.1.7 As informed by the Contractor, the perimeter silt curtain near Portion B of HKBCF has been arranged on 3 February 2016. A notification on the concerned site arrangement of the perimeter silt curtain of Contract HY/2010/02 was sent to IEC/ENPO by the ET for their review on 8 March 2016, IEC/ENPO issued comments on 10 March 2016 and the notification of realignment of perimeter silt curtain is under ET's further review in the reporting quarter. The concerned notification on the concerned site arrangement of the perimeter silt curtain of Contract HY/2010/02 will be sent to the Authority once the review is completed.

5.1.8 As informed by the Contractor on 16 February 2016, a MMWG meeting was held among the representatives of Airport Authority (AA), Arup (RSS of Contract HY/2010/02) and CHEC (the Contractor of Contract HY/2010/02) on 15 February 2016. In the meeting, it was mentioned that in order to facilitate the site investigation (SI) works of the AA's contractor in the vicinity of the concerned location, removal of the concerned silt curtain at the NE Cooling Water Intake of Hong Kong International Airport was discussed. The environmental aspect of the proposed removal of the silt curtain at NE Airport Cooling Water Intake (WSR25) was reviewed by the ET and no adverse comment was received from IEC/ENPO on 21 March 2016. As informed by the Contractor, the silt curtain at NE Airport Cooling Water Intake has been removed on 10 May 2016.

5.1.9 Further to our letter (ET's letter's ref.: 60249820/rmky16033001) dated 20 March 2016 regarding the notification of silt curtain removal programme and arrangement, as informed by RSS on 18 May 2016, the Contractor provided an updated programme on 17 May 2016 to indicate the current site situation. According to CHEC's latest removal programme, stage 1 (southern section of Portion B) removal work is scheduled to be carried out in mid-June 2016 while the associated section of the seawall should have been substantially completed. Tentative completion dates for the subsequent stages have also been updated, while the overall phasing arrangement has not changed. A notification letter was being prepared in the reporting quarter and should be sent to IEC/ENPO in the

next reporting quarter to inform them that the removal of perimeter silt curtain of Stages 1, 2, 3 and 4 has been rescheduled and removal works will be commenced tentatively on 15 June 2016, 18 August 2016, 7 November 2016 and 1 December 2016 respectively subject to the site progress. The arrangement is currently under ET's review in the reporting quarter.

5.1.10 IEC/ENPO observed that one Floating Concrete Batching Plant and two Floating Grout Production Facilities anchored at Portion C2b and Portion E2 respectively at around 9:13 am on 25 April 2016. IEC/ENPO opined that a review should be conducted by ET to assess if Condition 3.26A of EP-353/2009/K for HZMB HKBCF Project is complied, after investigation, two number of FGP barges DL-4 and DL-5 were under BCF contract. The FGP barges were servicing Contract No.HY/2010/02, but the observed FGP barges were berthing at the concerned location for upcoming works but were not operated on 25 April 2016. In addition, after further review, no floating grout production was in operation at any time in March and April 2016 for Contract No.HY/2010/02; 1 floating grout production was in operation at any time in May 2016 for Contract No.HY/2010/02. Condition 3.26A of EP-353/2009/K for Contract No.HY/2010/02 is complied with during the reporting quarter.

6 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

6.1 Summary of Exceedances of the Environmental Quality Performance Limit

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

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

6.1.3 For water quality monitoring, one (1) Limit level impact water quality monitoring exceedance at monitoring station SR(4)N has been recorded on 20 May 2016 during flood tide. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract.

6.1.4 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.

6.1.5 No environmental complaint, notification of summons or prosecution was received in the reporting period

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

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

8.3.4 For water quality monitoring, one (1) Limit level impact water quality monitoring exceedance at monitoring station SR(4)N has been recorded on 20 May 2016 during flood tide. 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 13 times in the reporting quarter. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.

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

8.3.8 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.

8.3.9 The recommended environmental mitigation measures effectively minimize the potential environmental impacts from the Contract. 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.

8.3.10 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.

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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

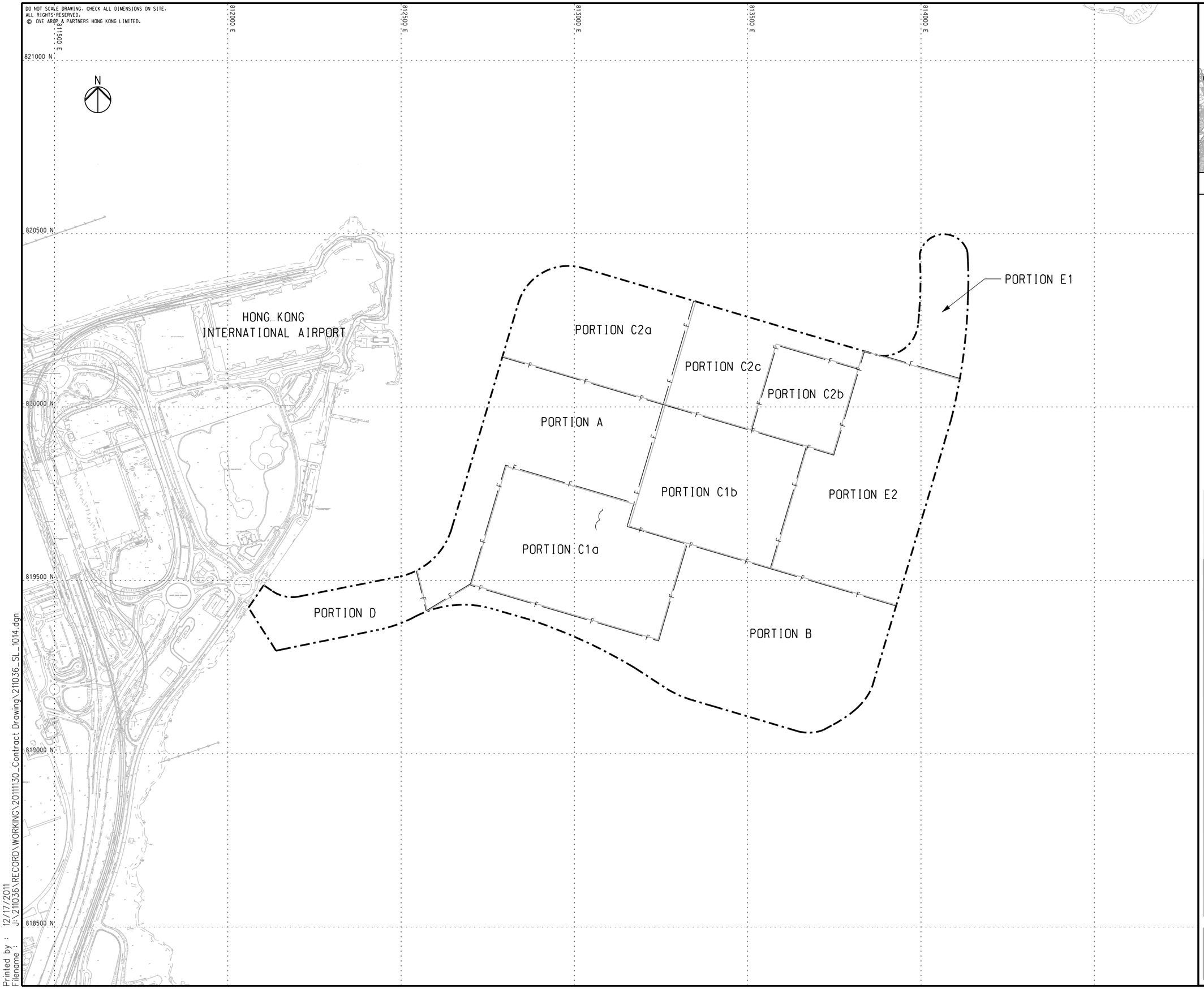
Drawing title

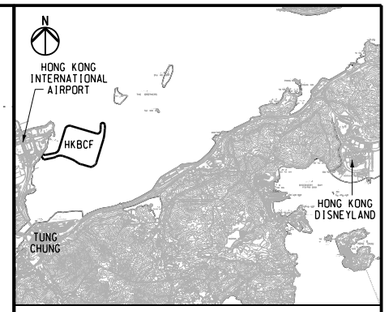
KEY PLAN

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

Printed by : 12/17/2011
Filename : J:\211036\RECORD\WORKING\20111130_Contract Drawing\211036_SL_1014.dgn

Plot File by: Mankyr 11/02/2015
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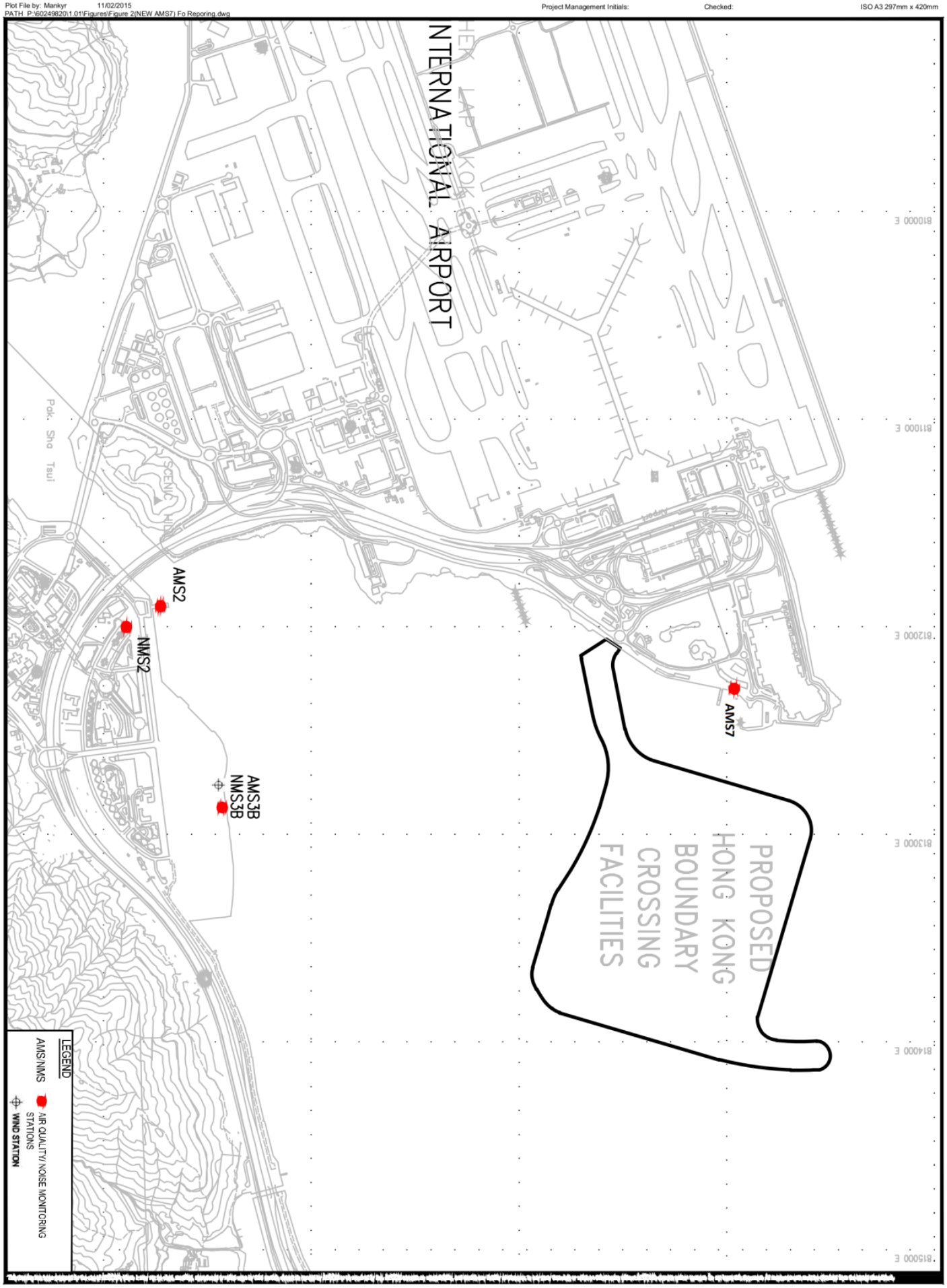
Project Management Initials: Checked: ISO A3 297mm x 420mm



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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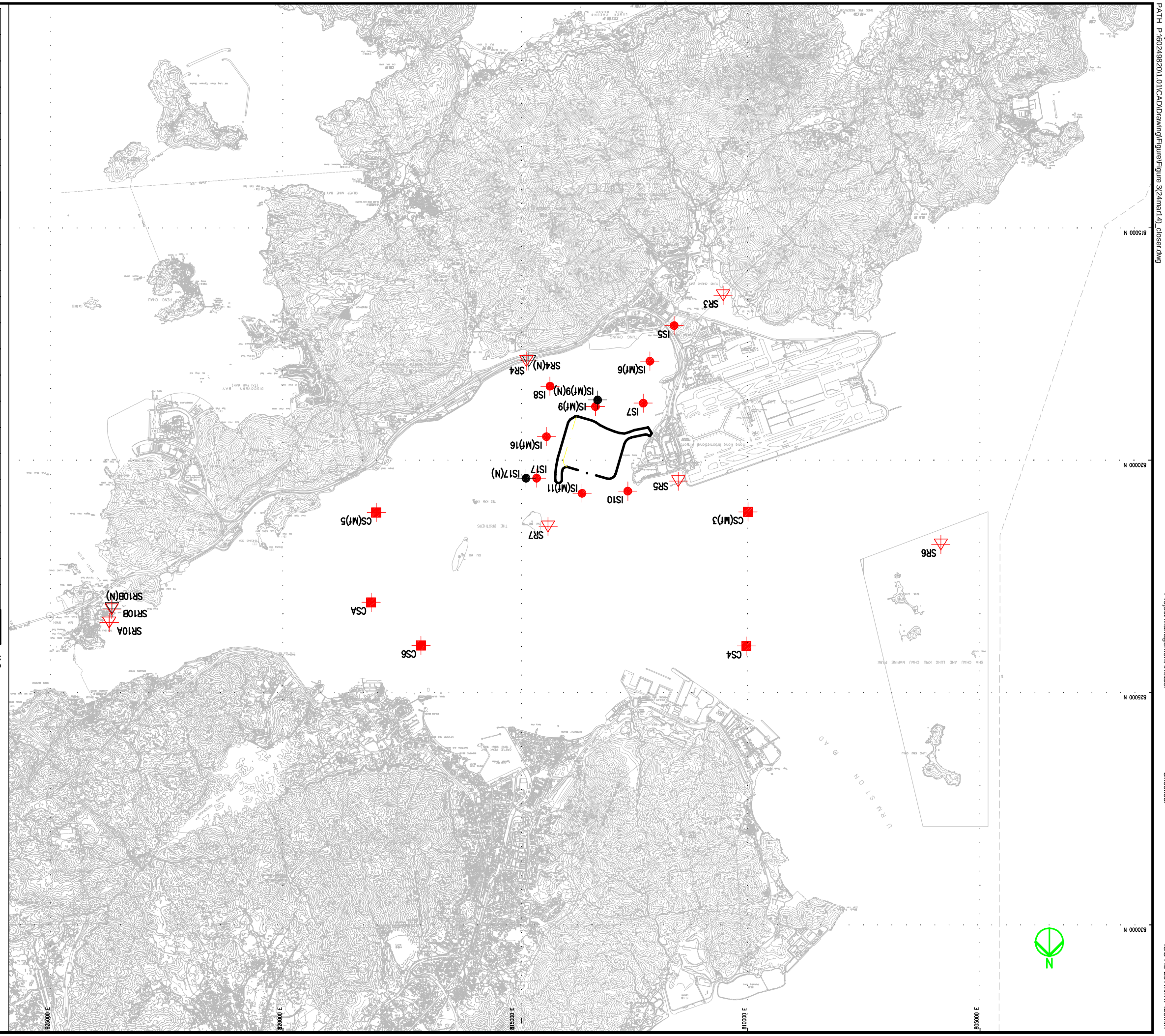
25/03/2014

Project Management Initials:

Checked:

ISO A3 297mm x 420mm



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

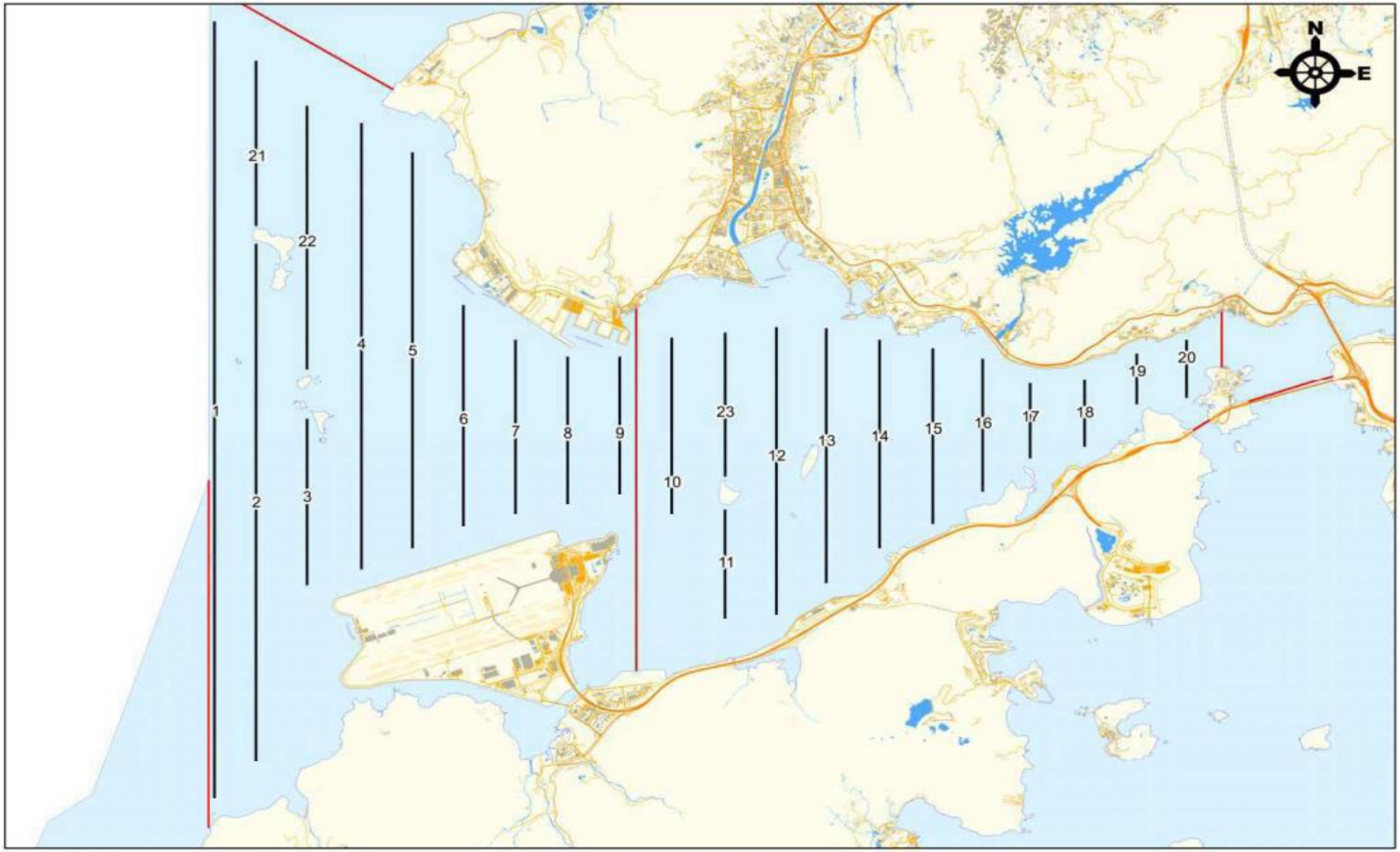
Project No.: -

Date: MAR 2014

WATER QUALITY MONITORING STATION

AECOM

Figure 3



Remarks:

***Transect 10 is now 3.6km in length due to the HKBCF construction site.**

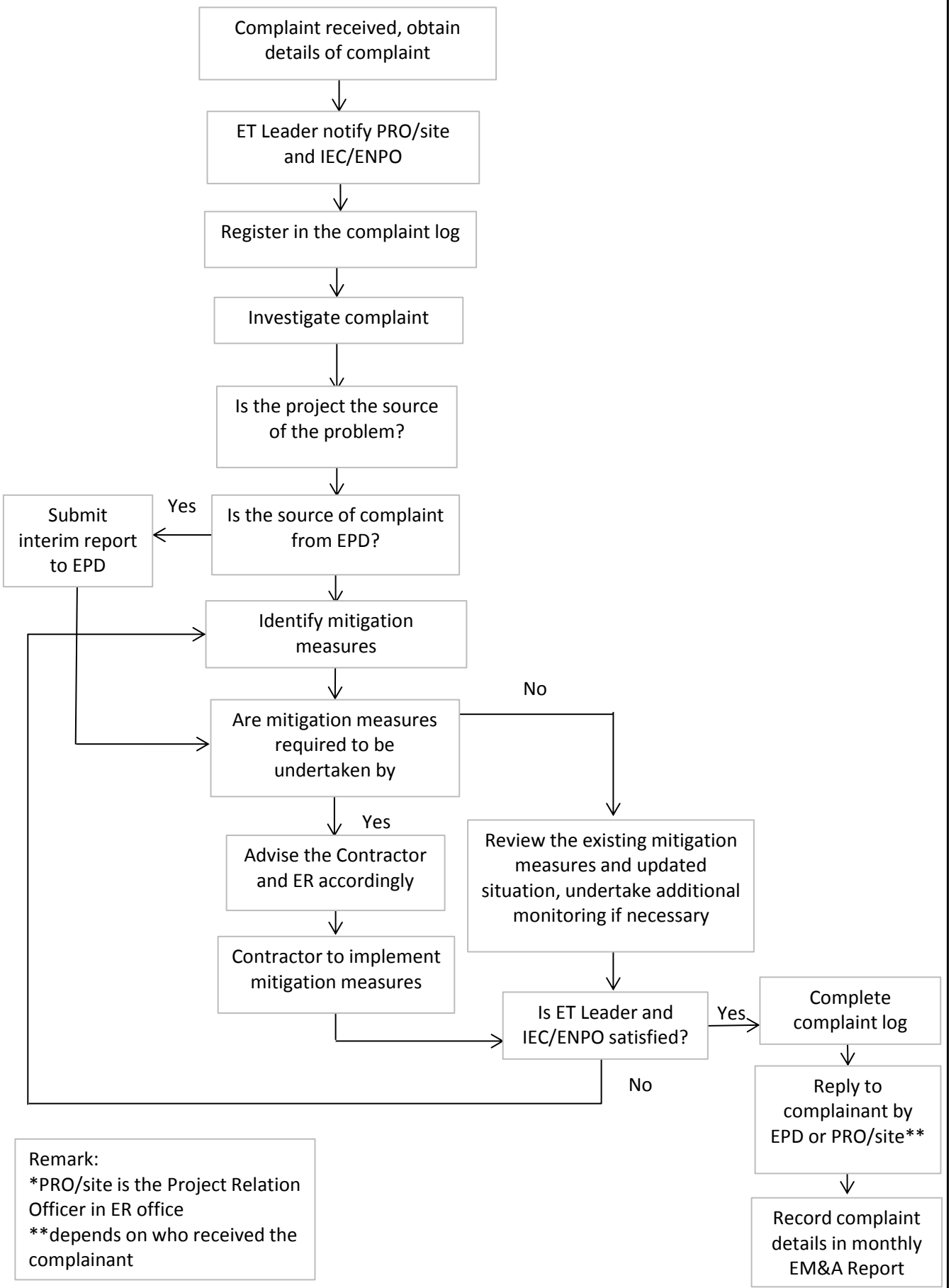
^Coordinates for transect lines 1, 2, 7, 8, 9 and 11 have been updated in respect to the Proposal for Alteration of Transect Line for Dolphin Monitoring approved by EPD on 19 August 2015. The total transect length for both NEL and NWL combined is 108km.

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS
Project No.: 60249820 Date: November 2015

Impact Dolphin Monitoring
Line Transect Layout Map

AECOM

Figure 4



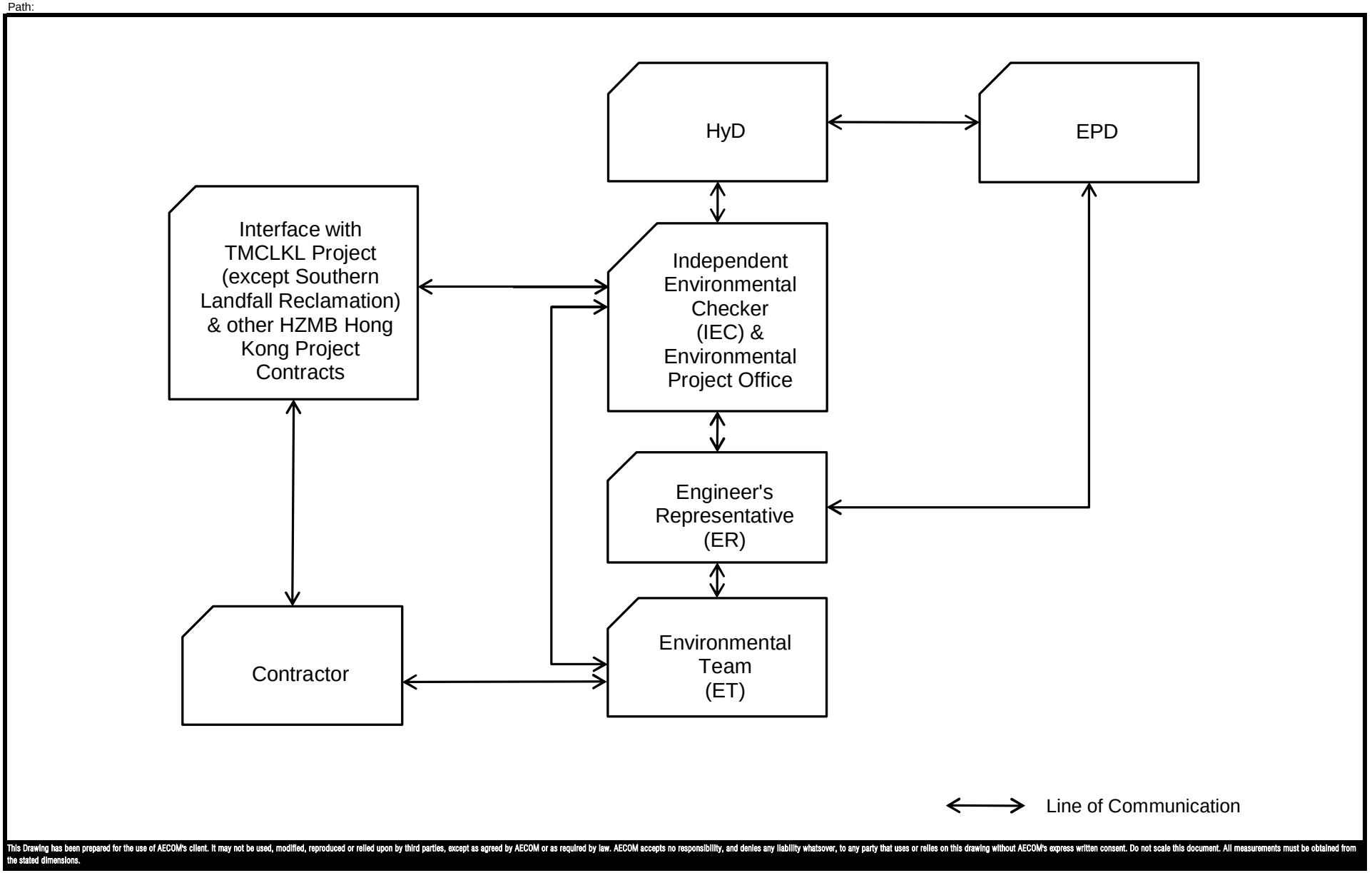
HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CORSSING FACILITIES
- RECLAMATION WORKS

AECOM

Environmental Complaint Handling Procedure

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

Figure 5



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

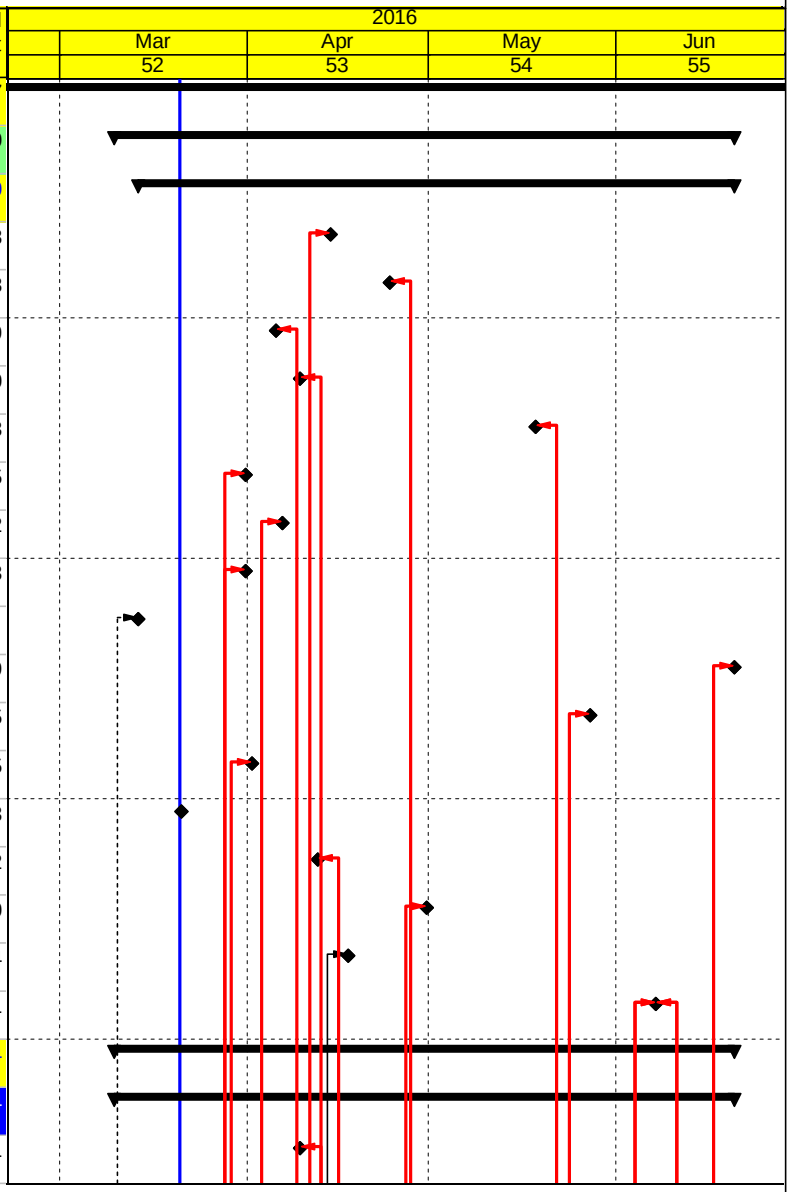
Contract Organisation for

Environmental Works

AECOM

Appendix A

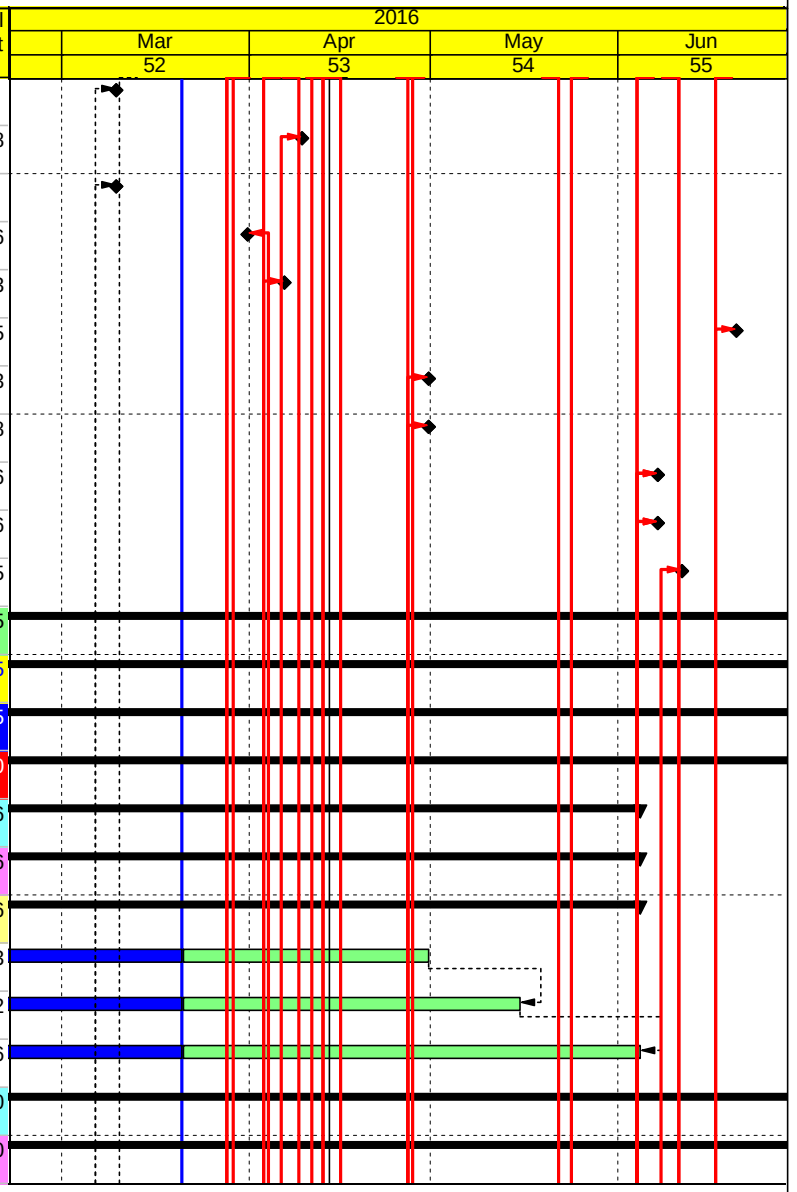
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
52nd_8 Monthly Progress Report Status as on 2		1773	21-May-12 A	28-Feb-17	247
Contract Key Dates		92	10-Mar-16 A	20-Jun-16	-10
Key Dates for achievement of Stages and completion		92	14-Mar-16 A	20-Jun-16	-10
G1072	KD-05, Completion of Section D EC1-1 to EC1-6 10Aug2015 SA3	0		14-Apr-16*	-248
G1073	KD-05, Completion of Section D EC1-7 to EC1-8 10Aug2015 SA3	0		24-Apr-16*	-258
G1075	KD-05, Completion of Section D Connection to Existing 10Aug2015 SA3	0		05-Apr-16*	-239
G1086	KD-06C3 Completion of SEction BC3 Main Area East-N 21Nov2015 SA4	0		09-Apr-16*	-140
G1088	KD-06C4TM, Completion of Section BC4TM Edge Area K047 - K052 23Sep2014 w DCM SA4	0		18-May-16*	-603
G1090	KD-07C3, Completion of Section C1aC3 6Jan2016 SA4	0		31-Mar-16*	-85
G1092	KD-07C4, Completion of Section C1aC4 22Sep2014 SA4	0		06-Apr-16*	-562
G1102	KD-08C3, Completion of Section C1bC3 North East 30Sep2015 SA4	0		31-Mar-16*	-183
G1103	KD-08C3, Completion of Section C1bC3 North West 30Sep2015 SA4	0		14-Mar-16 A	
G1109	KD-09C1, Completion of Section C2aC1 Main Area South 30Sep2014 SA4	0		20-Jun-16*	-629
G1110	KD-09C2, Completion of Section C2aC2 Main Area North 30Sep2014 SA4	0		27-May-16*	-605
G1112	KD-09C2, Completion of Section C2aC2 Edge Area C110 - C112 28Nov2015 SA3 0-43m	0		01-Apr-16*	-125
G1117	KD-09C2, Completion of Section C2aC2 Edge Area C104 - C109 28Nov2015 SA3 0-43M	0		21-Mar-16*	-113
G1130	KD-11TM, Completion of Section E2TM Main Area North 05Feb2015 SA4	0		12-Apr-16*	-432
G1131	KD-11TM, Completion of Section E2TM Main Area South 05Feb2015 SA4	0		30-Apr-16*	-450
G1133	KD-11C3, Completion of Section E2C3 Main Area South 10Jun2016 SA4	0		17-Apr-16*	54
G1140	KD-12C3, Completion of Section C2bC3 Main Area 18Mar2016 SA4	0		07-Jun-16*	-81
Supplementary Agreement		81	10-Mar-16 A	20-Jun-16	-64
SA4		81	10-Mar-16 A	20-Jun-16	-64
SA4-KD06-010	KD-06C3 Completion of Section BC3 21Nov2015	0		09-Apr-16*	-141



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

TASK filter: Three Month Rolling.

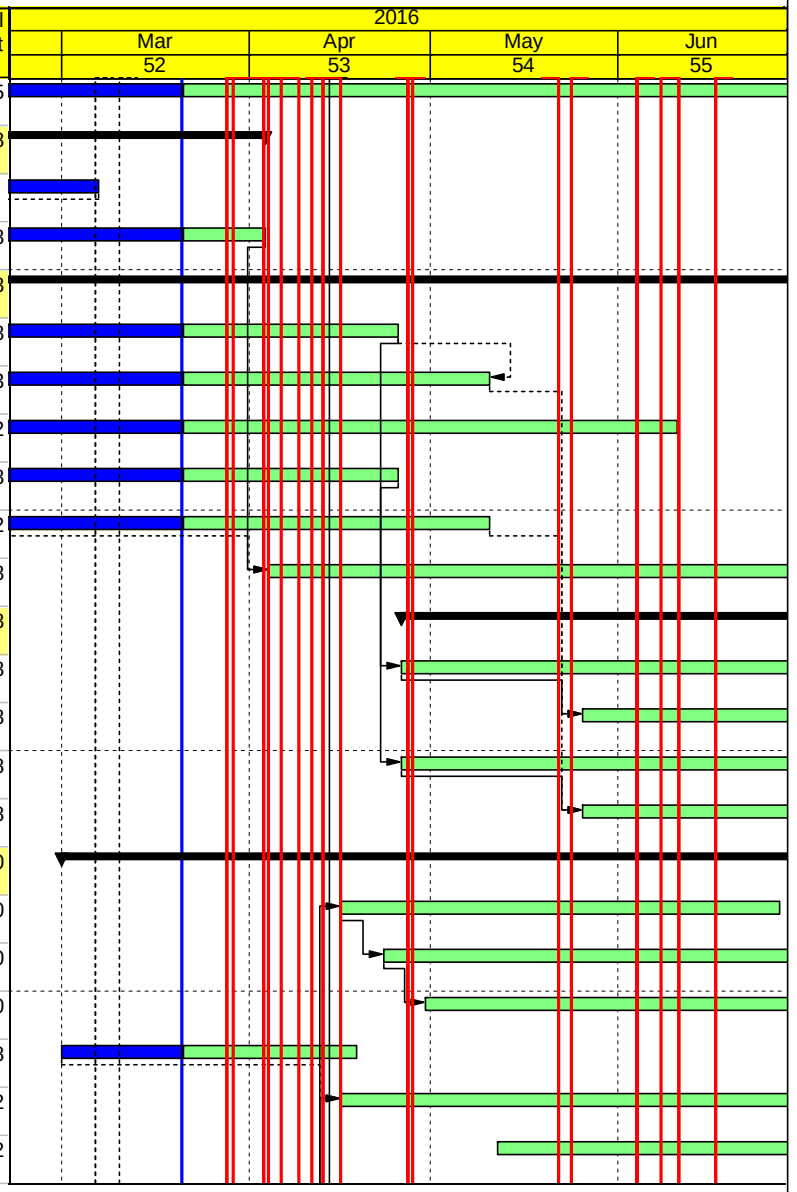
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
SA4-KD06-020	KD-06C8E Completion of Section BC8E 17Jun2015	0		10-Mar-16 A	
SA4-KD06-030	KD-06C8N Completion of Section BC8N 17Jun2015	0		09-Apr-16*	-298
SA4-KD06-040	KD-06C8NE Completion of Section BC8NE 17Jun2015	0		10-Mar-16 A	
SA4-KD07-010	KD-07C3 Completion of Section C1aC3 6Jan2016	0		31-Mar-16*	-86
SA4-KD07-020	KD-07C4 Completion of Section C1aC4 22Sep2014	0		06-Apr-16*	-563
SA4-KD09-020	KD-09C1C3 Completion of Section C2aC1C3 19Dec2015	0		20-Jun-16*	-185
SA4-KD11-020	KD-11C8N Completion of Section E2C8N 18Jan2016	0		30-Apr-16*	-103
SA4-KD11-030	KD-11C8S Completion of Section E2C8S 22Feb2016	0		30-Apr-16*	-68
SA4-KD12-020	KD-12C8N Completion of Section C2bC8N 13Jan2016	0		07-Jun-16*	-146
SA4-KD12-030	KD-12C8S Completion of Section C2bC8S 13Jan2016	0		07-Jun-16*	-146
SA4-KD13-030	KD-13C8W Completion of Section C2cC8W 17Apr2016	0		11-Jun-16*	-55
Work Zone, as defined in PS Clause 1.03(6)		511	21-Jul-15 A	12-Dec-16	325
Portion A, B, C & E		511	21-Jul-15 A	12-Dec-16	325
Portion A, B, C & E		511	21-Jul-15 A	12-Dec-16	325
Seawall		359	12-Oct-15 A	08-Oct-16	390
Optimizing Rubble Mound Seawalls		205	09-Nov-15 A	04-Jun-16	516
Rock Armour		205	09-Nov-15 A	04-Jun-16	516
Seawall Portion A C120-C134 Ch5+050 - Ch5+650		205	09-Nov-15 A	04-Jun-16	516
RFA0-010	PA at C118 - C134 Removal of Temporary Rockfill (170,000m3, 1,500m3/day)	140	09-Nov-15 A	30-Apr-16	523
RFA0-020	PA at C118 - C134 Underlayer (21,600m3 1,000m3/day)	179	15-Nov-15 A	15-May-16	522
RFA0-030	PA at C118 - C134 Rock Armour (1-3ton 30,840m3 & 0.3-1ton 14,466m3 244m3/day)	183	01-Dec-15 A	04-Jun-16	516
Conforming Sloping Seawalls		359	12-Oct-15 A	08-Oct-16	390
Rock Armour - Before Surcharge Period		359	12-Oct-15 A	08-Oct-16	390



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

TASK filter: Three Month Rolling.

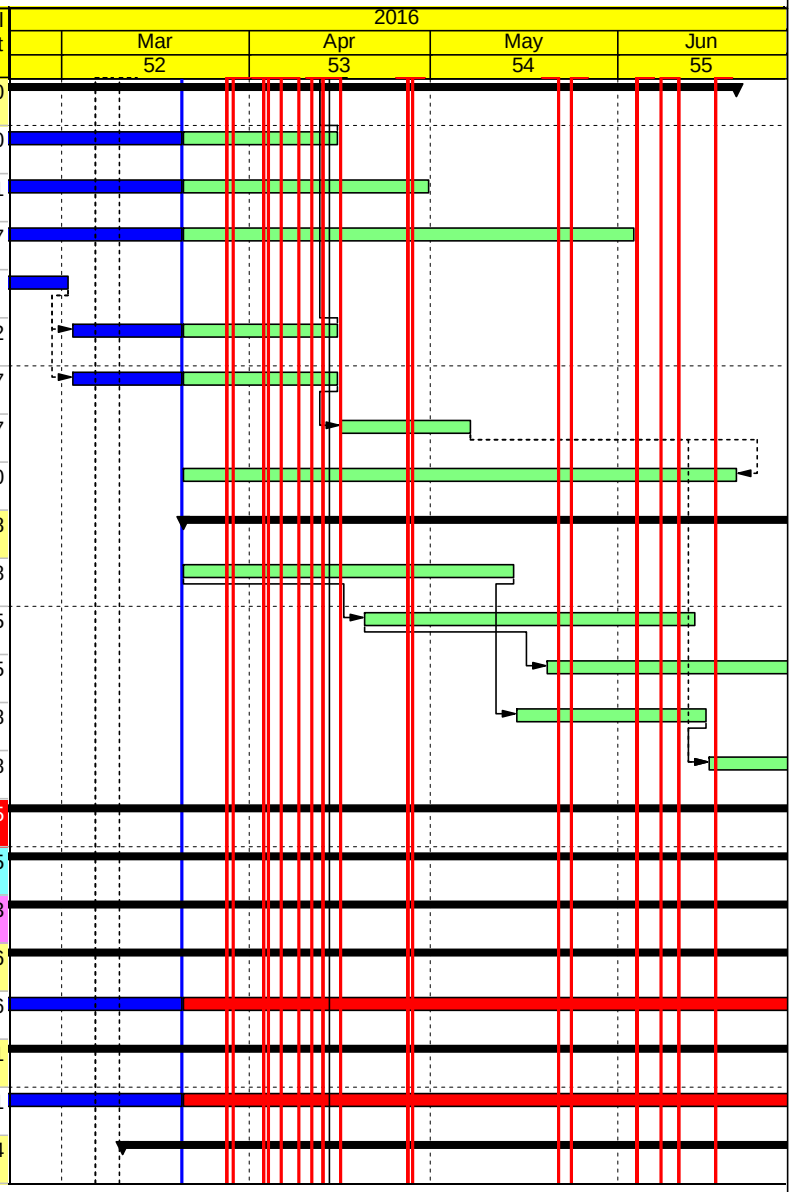
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
ACP1-00030	Precasting Accropode (18,092nos), 120nos/day	224	16-Nov-15 A	15-Jul-16	445
Portion B At K028 - K039 (Ch1+102 - Ch1+600)		136	02-Nov-15 A	03-Apr-16	378
BF-RFB1-050	PB at K028 - K039 in front of cells Geotextile & Underlayer 10-60kg 15m/day	123	02-Nov-15 A	07-Mar-16 A	
BF-RFB1-060	PB at K028 - K039 in front of cells Rock Armour 0.3-1ton 11,244m3 244m3/day	107	01-Dec-15 A	03-Apr-16	378
Portion E2 At K049 - C067 (Ch1+990 - Ch2+800)		273	12-Oct-15 A	14-Jul-16	378
BF-RFE2-012	PE2 at K049 - K067 on cells Removal of temporary rockfill	193	12-Oct-15 A	25-Apr-16	398
BF-RFE2-014	PE2 at K049 - K067 on cells Geotextile & Underlayer 10-60kg 11,733m3 200m3/day	203	17-Oct-15 A	10-May-16	413
BF-RFE2-030	PE2 at K049 - K067 on cells Rock Armour 1-3ton 31,820m3 237m3/day	189	01-Dec-15 A	10-Jun-16	412
BF-RFE2-040	PE2 at K049 - K067 in front of cells Removal of temporary rockfill 25,648m3	143	01-Dec-15 A	25-Apr-16	398
BF-RFE2-050	PE2 at K049 - K067 in front of cells Geotextile & Underlayer 10-60kg 15m/day	127	01-Jan-16 A	10-May-16	392
BF-RFE2-060	PE2 at K049 - K067 in front of cells Rock Armour 1-3ton 32,060m3 237m3/day	102	04-Apr-16	14-Jul-16	378
Portion E1 At C068 - C076 (Ch2+800 - Ch3+160)		128	26-Apr-16	31-Aug-16	398
BF-RFE1a-010	PE1 at K068 - K076 on cells Removal of temporary rockfill	98	26-Apr-16	01-Aug-16	398
BF-RFE1a-020	PE1 at K068 - K076 on cells Geotextile & Underlayer 10-60kg 5,557m3 200m3/day	98	26-May-16	31-Aug-16	398
BF-RFE1a-040	PE1 at K068 - K076 in front of cells Removal of temporary rockfill 12149m3	98	26-Apr-16	01-Aug-16	398
BF-RFE1a-050	PE1 at K068 - K076 in front of cells Geotextile & Underlayer 10-60kg 15m/day	98	26-May-16	31-Aug-16	398
Portion E1 At C077 - C090 (Ch3+160 - Ch3+800)		222	01-Mar-16 A	08-Oct-16	390
BF-RFE1b-010	PE1 at C077 - C090 on cells Removal of temporary rockfill	73	16-Apr-16	27-Jun-16	390
BF-RFE1b-020	PE1 at C077 - C090 on cells Geotextile & Underlayer 10-60kg 14,544m3 200m3/day	73	23-Apr-16	04-Jul-16	390
BF-RFE1b-030	PE1 at C077 - C090 on cells Rock Armour 2-5ton m3 35,855m3 221m3/day	162	30-Apr-16	08-Oct-16	390
BF-RFE1b-040	PE1 at C077 - C090 in front of cells Removal of temporary rockfill 48336m3	49	01-Mar-16 A	18-Apr-16	428
BF-RFE1b-050	PE1 at C077 - C090 Accropode 7,432nrs 60nrs/day	124	16-Apr-16	17-Aug-16	412
BF-RFE1b-060	PE1 at C077 - C090 in front of cells Rock Armour 2-5ton 28,238m3 221m3/day	128	12-May-16	16-Sep-16	412



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

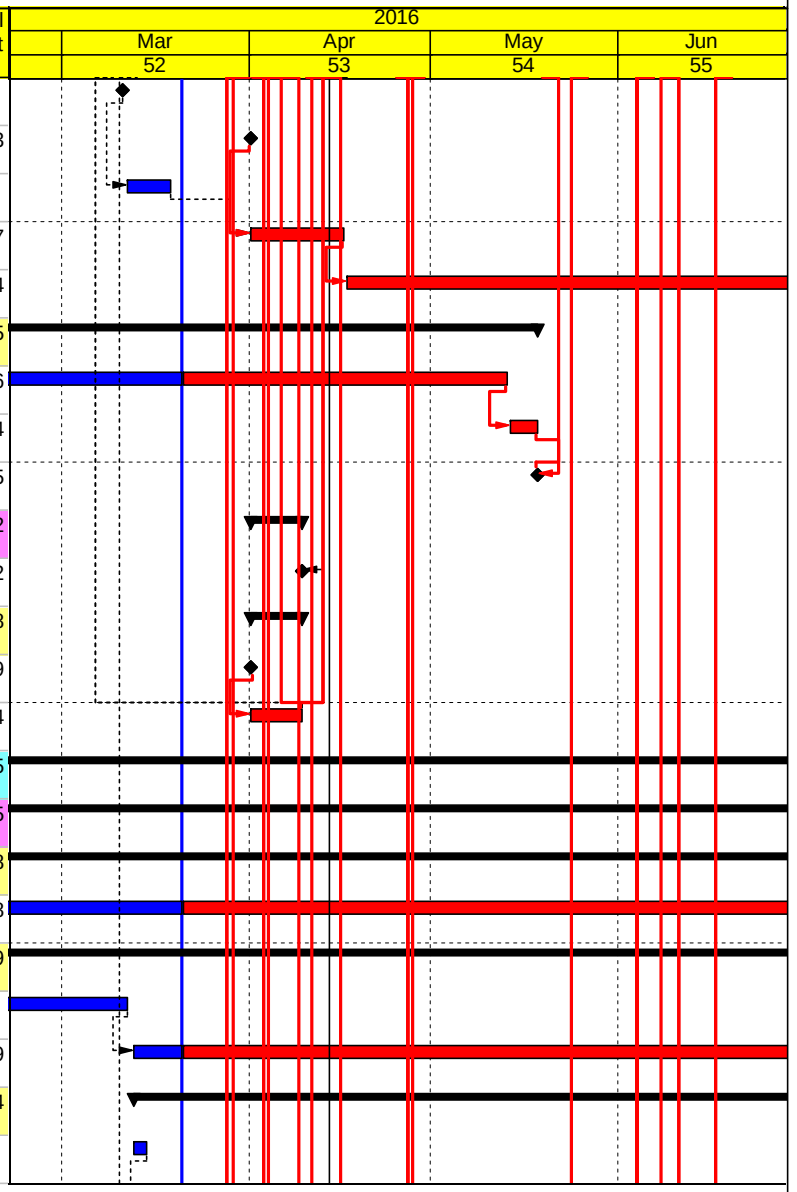
TASK filter: Three Month Rolling.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Portion C2c & C2b At C091 - C101 (Ch3+800 - Ch4+262)		148	21-Jan-16 A	20-Jun-16	500
BF-RFC2c-010	PC2c at C091 - C101 on cells Removal of temporary rockfill	62	21-Jan-16 A	15-Apr-16	390
BF-RFC2c-020	PC2c at C091 - C101 on cells Geotextile & Underlayer 10-60kg 12,393m3 200m3/day	62	28-Jan-16 A	30-Apr-16	551
BF-RFC2c-030	PC2c at C091 - C101 on cells Rock Armour 2-5ton m3 25771m3 221m3/day	117	04-Feb-16 A	03-Jun-16	517
BF-RFC2c-054	PC2c at C091 - C101 Accropode Installation Stg2 900nrs 30nrs/day	16	16-Feb-16 A	02-Mar-16 A	
BF-RFC2c-056	PC2c at C091 - C101 Accropode Installation Stg3a 1,500nrs 50nrs/day	44	03-Mar-16 A	15-Apr-16	412
BF-RFC2c-057	PC2c at C091 - C101 Accropode Installation Stg3b 1,500nrs 50nrs/day	44	03-Mar-16 A	15-Apr-16	427
BF-RFC2c-058	PC2c at C091 - C101 Accropode Installation Stg4 1,262nrs 60nrs/day	22	16-Apr-16	07-May-16	427
BF-RFC2c-060	PC2c at C091 - C101 in front of cells Rock Armour 2-5ton 20,296m3 221m3/day	92	21-Mar-16	20-Jun-16	500
Portion C2a At C102 - C112 (Ch4+262 - Ch4+710)		174	21-Mar-16	10-Sep-16	418
BF-RFC2a-010	PC2a at C102 - C112 on cells Removal of temporary rockfill	55	21-Mar-16	14-May-16	388
BF-RFC2a-020	PC2a at C102 - C112 on cells Geotextile & Underlayer 10-60kg 10907m3 200m3/day	55	20-Apr-16	13-Jun-16	475
BF-RFC2a-030	PC2a at C102 - C112 on cells Rock Armour 2-5ton m3 25,210m3 221m3/day	57	20-May-16	15-Jul-16	475
BF-RFC2a-040	PC2a at C102 - C112 in front of cells Removal of temporary rockfill 31,987m3	32	15-May-16	15-Jun-16	388
BF-RFC2a-050	PC2a at C102 - C112 Accropode 5,226nrs 60nrs/day	87	16-Jun-16	10-Sep-16	388
Surcharge		511	21-Jul-15 A	12-Dec-16	325
Land Portion B		333	17-Oct-15 A	13-Sep-16	415
Edge Areas		333	17-Oct-15 A	13-Sep-16	-733
at K013 - K027		240	09-Jan-16 A	04-Sep-16	-736
SUEB0-040	PB Edge Area K013-K027 Sand Surcharge Period at +11.5mPD 8mths (4Sep2016)	240	09-Jan-16 A	04-Sep-16	-736
at K028 - K035		150	20-Feb-16 A	18-Jul-16	-701
SUEB0-090	PB Edge Area K028-K035 Sand Surcharge Period +11.5mPD 5mths	150	20-Feb-16 A	18-Jul-16	-701
at K036 - K039		177	11-Mar-16 A	13-Sep-16	-744



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

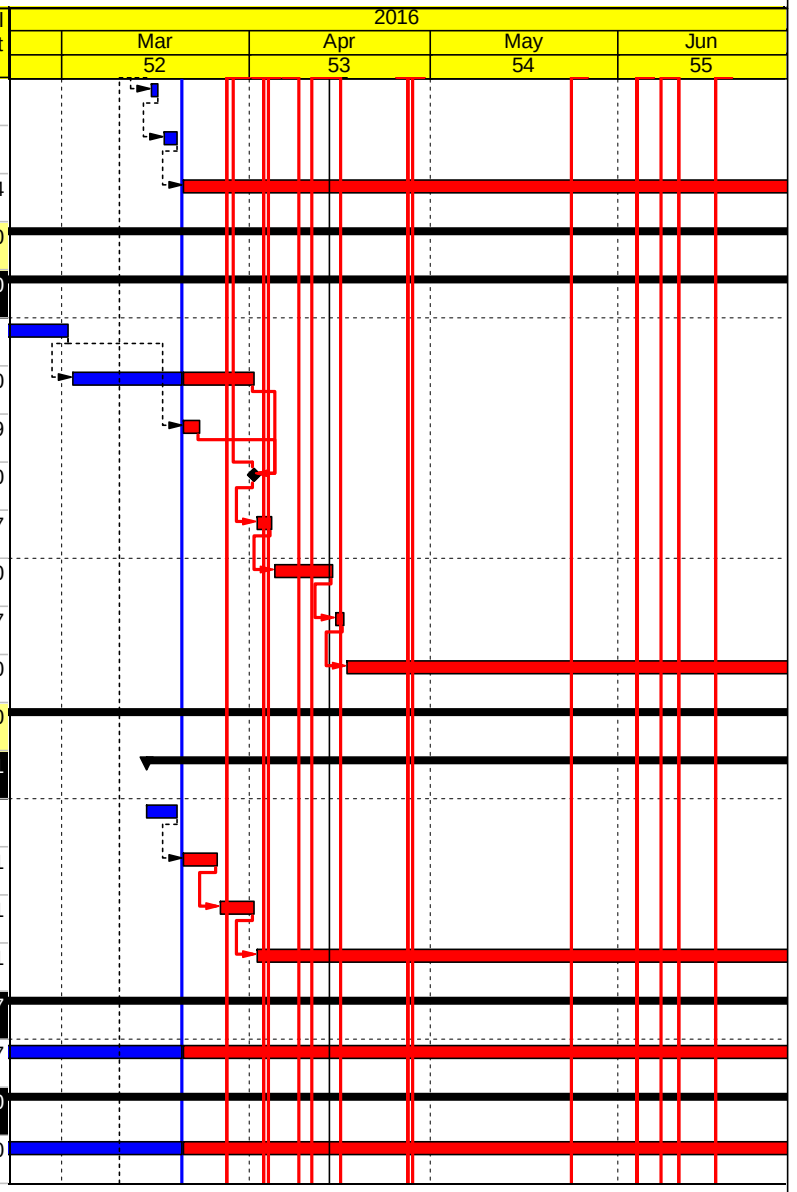
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
SUEB0-131	PB Edge Area Ch1+420-1+470 (K036) Sand Surcharge Laying Instruction from RE	0	11-Mar-16 A		
SUEB0-135	PB Edge Area K037-K039 Sand Surcharge Laying Instruction from RE	0	01-Apr-16*		-743
SUEB0-136	PB Edge Area Ch1+420-1+470 (K036) Sand Surcharge Laying upto +11.5mPD	6	12-Mar-16 A	19-Mar-16 A	
SUEB0-140	PB Edge Area K037-K039 Sand Surcharge Laying up to 11.5mPD 30,293m3 5,000m3/day by Dump Trucks	14	01-Apr-16	16-Apr-16	-637
SUEB0-150	PB Edge Area K036-K039 Sand Surcharge Period +11.5mPD 5mths	150	17-Apr-16	13-Sep-16	-744
at K047 - K052 (w Deep Cement Mixing)		215	17-Oct-15 A	18-May-16	-615
DCM-2070	PB Edge Area K047-K052 36-73m Surcharge Period 7mths (13May2016)	210	17-Oct-15 A	13-May-16	-616
DCM-2080	PB Edge Area K047-K052 36-73m Surcharge Removal 20,000m3	5	14-May-16	18-May-16	-564
DCM-2090	PB Edge Area K047-K052 Completion (Target Date = 31Dec2014)	0		18-May-16*	-615
Reclamation Areas		9	01-Apr-16	09-Apr-16	572
SURB4-099	Completion of Section B in Reclamation Areas	0		09-Apr-16	572
at North- East of Main Area		9	01-Apr-16	09-Apr-16	-298
SURB3-032	PB Main Area North Sand Surcharge Removal instructed by the Engineer	0	01-Apr-16*		-299
SURB3-040	PB Main Area North Sand Surcharge Removal 60,000m3 10,000m3/day	9	01-Apr-16	09-Apr-16	-274
Land Portion C2a		450	20-Sep-15 A	12-Dec-16	-385
Edge Areas		395	14-Nov-15 A	12-Dec-16	-385
Deep Cement Mixing Works at C101 - C103		240	17-Dec-15 A	12-Aug-16	-688
DCM-3070	PC2a Edge Area C101-C103 Surcharge Period 8mths (Land Side) (12Aug2016)	240	17-Dec-15 A	12-Aug-16	-688
VO - Deep Cement Mixing Works at C104 - C107		287	26-Jan-16 A	07-Nov-16	-599
DCM-4170	PC2a Edge Area C104-C107 Filling up to +11.5mPD Surcharge (30m width, 16889m3 5,000m3/day at DCM	41	26-Jan-16 A	12-Mar-16 A	
DCM-4180	PC2a Edge Area C104-C107 Surcharge Period 8mths (Land Side)	240	13-Mar-16 A	07-Nov-16	-599
VO - Deep Cement Mixing Works at C108 - C109		247	13-Mar-16 A	15-Nov-16	-604
DCM-5150	PC2a Edge Area C108-C109 Filling up to +8.5mPD Surcharge (30m width,8445m3 5,000m3/day at DCM	2	13-Mar-16 A	15-Mar-16 A	



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

TASK filter: Three Month Rolling.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
DCM-5160	PC2a Edge Area C108-C109 Surcharge CPT Test	2	16-Mar-16 A	17-Mar-16 A	
DCM-5170	PC2a Edge Area C108-C109 Filling up to +11.5mPD Surcharge (30m width,8445m3 5,000m3/day at DCM	2	18-Mar-16 A	20-Mar-16 A	
DCM-5180	PC2a Edge Area C108-C109 Surcharge Period 8mths (Land Side)	240	21-Mar-16	15-Nov-16	-604
at C110 - C112 Cellular Seawall		332	16-Jan-16 A	12-Dec-16	-630
VO - Deep Cement Mixing Works at C110 - C112		332	16-Jan-16 A	12-Dec-16	-630
DCM-4210	PC2a Edge Area C110-C112 23m width Installation 597nrs 15nrs/day (w CNY)	47	16-Jan-16 A	02-Mar-16 A	
DCM-4220	PC2a Edge Area C110-C112 Hardening & Pause Period	30	03-Mar-16 A	01-Apr-16	-630
DCM-4230	PC2a Edge Area C110-C112 Filling up to +5.5mPD Type D (73m width, 12,820m3) 5,000m3/day at DCM	3	21-Mar-16	23-Mar-16	-529
DCM-4240	PC2a Edge Area C110-C112 Completion of 0-23m with DCM	0		01-Apr-16	-630
DCM-4250	PC2a Edge Area C110-C112 Filling up to +8.5mPD Surcharge (50m width, 12,667m3 10,000m3/day at DCM	2	02-Apr-16	04-Apr-16	-537
DCM-4260	PC2a Edge Area C110-C112 Surcharge CPT Test	10	05-Apr-16	14-Apr-16	-630
DCM-4270	PC2a Edge Area C110-C112 Filling up to +11.5mPD Surcharge (50m width, 12,667m3 10,000m3/day at DCM	2	15-Apr-16	16-Apr-16	-537
DCM-4280	PC2a Edge Area C110-C112 Surcharge Period 8mths (Land Side)	240	17-Apr-16	12-Dec-16	-630
CH4+710 - CH5+110 Rubble Mound Seawall		380	14-Nov-15 A	27-Nov-16	-370
Deep Cement Mixing at CH4+710 - CH4+880		258	15-Mar-16 A	27-Nov-16	-371
DCM-5040	PC2a Ch4+710 - Ch4+880 Filling up to +5.5mPD Type D 30,000m3	6	15-Mar-16 A	20-Mar-16 A	
DCM-5050	PC2a Ch4+710 - Ch4+880 Surcharge Filling up to +8.5mPD 30,000m3	6	21-Mar-16	26-Mar-16	-371
DCM-5060	PC2a Ch4+710 - Ch4+880 Surcharge Filling up to +11.5mPD 30,000m3	6	27-Mar-16	01-Apr-16	-371
DCM-5070	PC2a Ch4+710 - Ch4+880 Surcharge Monitoring 8mths	240	02-Apr-16	27-Nov-16	-371
10-73m Ch4+880 - Ch5+010		240	21-Dec-15 A	16-Aug-16	-267
SUEC2a-1120	PC2a Ch4+880 - Ch5+010 Surcharge Sand Period 8mths (16Aug2016)	240	21-Dec-15 A	16-Aug-16	-267
73-120m		240	14-Nov-15 A	10-Jul-16	-230
SUEC2a-2090	PC2a C113-C117 73m-120m Surcharge Sand Period 8mths (10Jul2016)	240	14-Nov-15 A	10-Jul-16	-230



Remaining Level of Effort
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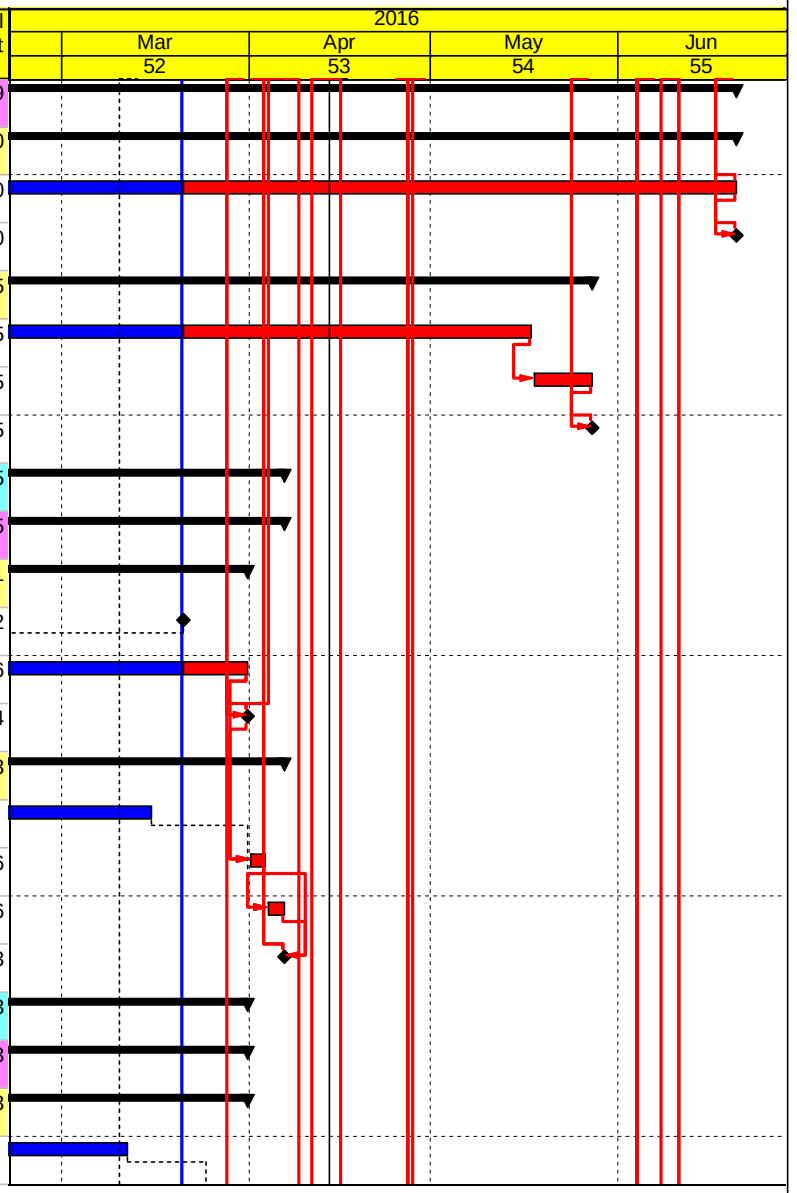
TASK filter: Three Month Rolling.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Reclamation Areas		275	20-Sep-15 A	20-Jun-16	-629
C2aC1		240	25-Oct-15 A	20-Jun-16	-630
SURC2aC1-070	PC2a C2aC1 Sand Surcharge Period 8mths (20Jun2016)	240	25-Oct-15 A	20-Jun-16	-630
SURC2aC1-090	Completion of Section PC2a in C2aC1 Main Areas	0		20-Jun-16	-630
C2aC2		251	20-Sep-15 A	27-May-16	-605
SURC2aC2-070	PC2a C2aC2 Sand Surcharge Period 8mths (17May2016)	241	20-Sep-15 A	17-May-16	-605
SURC2aC2-080	PC2a C2aC2 Sand Surcharge Removal	10	18-May-16	27-May-16	-605
SURC2aC2-090	Completion of Section PC2a in C2aC2 Main Areas	0		27-May-16	-605
Land Portion C1a		261	21-Jul-15 A	06-Apr-16	575
Reclamation Areas		261	21-Jul-15 A	06-Apr-16	575
C3		113	10-Dec-15 A	31-Mar-16	581
SURC1a-035	PC1a North West Land Area Sand Surcharge Instruction Removal by RE	0	21-Mar-16*		592
SURC1a-040	PC1a North West Land Area Sand Surcharge Removal 297,616m3 10,000m3/day	101	10-Dec-15 A	31-Mar-16	-516
SURC1a-050	Completion of Section C1aC3	0		31-Mar-16	-564
C4		261	21-Jul-15 A	06-Apr-16	-563
SURC1a-150	PC1a South West Land Area Sand Surcharge Period at +11.5mPD 8mths (16Mar2016)	240	21-Jul-15 A	16-Mar-16 A	
SURC1a-160	PC1a South East Land Area Sand Surcharge Removal	3	01-Apr-16	03-Apr-16	-516
SURC1a-170	PC1a South West Land Area Sand Surcharge Removal	3	04-Apr-16	06-Apr-16	-516
SURC1a-180	Completion of Section C1aC4	0		06-Apr-16	-563
Land Portion C1b		229	16-Aug-15 A	31-Mar-16	-183
Reclamation Areas		229	16-Aug-15 A	31-Mar-16	-183
North Side close to Portion C2b		229	16-Aug-15 A	31-Mar-16	-183
SURC1b-1030	PC1b Main Area Sand Surcharge Period as +11.5mPD 7mths (12Mar2016)	210	16-Aug-15 A	12-Mar-16 A	



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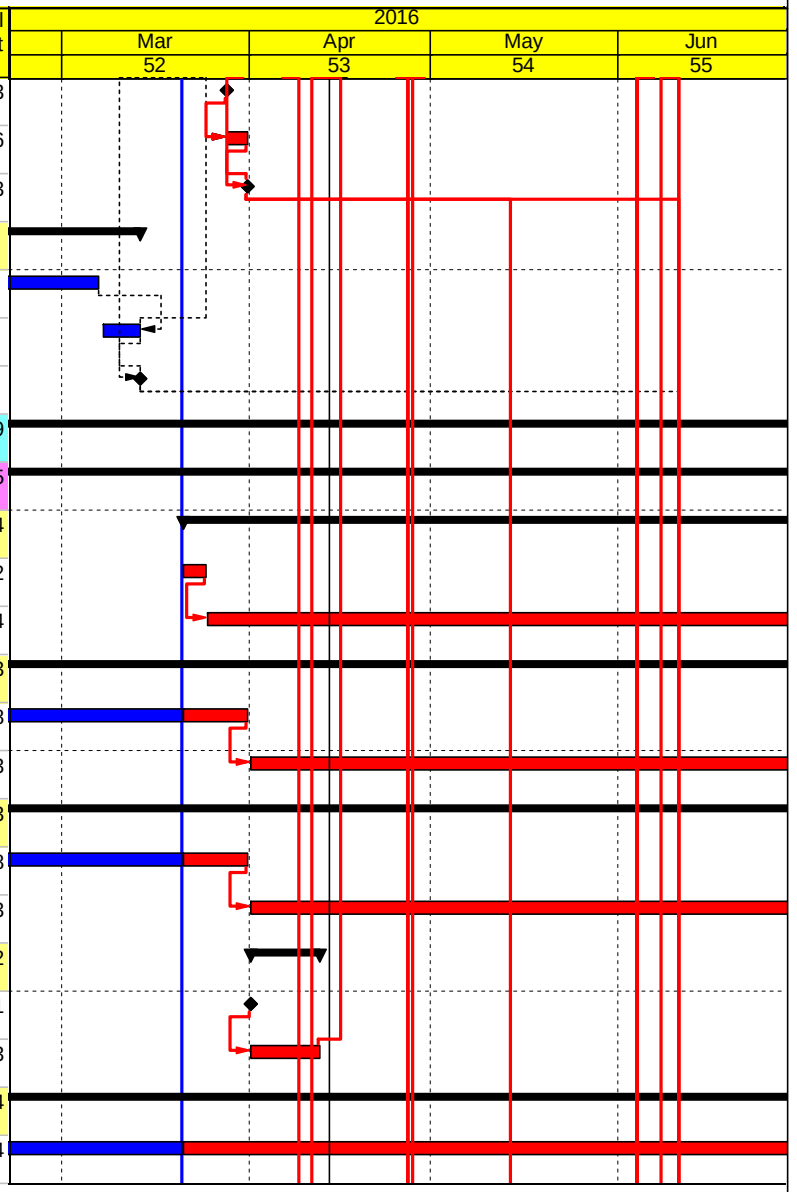
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
SURC1b-1032	PC1b Main Area Sand Surcharge Removal instructed by the Engineer	0	28-Mar-16*		-183
SURC1b-1040	PC1b Main Area Sand Surcharge Removal 40,000m3 10,000m3/day	4	28-Mar-16	31-Mar-16	-166
SURC1b-1050	Completion of Section PC1b at Reclamation Area close to C2b	0		31-Mar-16	-183
North Side close to Portion C2c		205	01-Sep-15 A	14-Mar-16 A	
SURC1b-1080	PC1b Main Area Sand Surcharge Period as +11.5mPD 7mths (28Mar2016)	189	01-Sep-15 A	07-Mar-16 A	
SURC1b-1090	PC1b Main Area Sand Surcharge Removal 56,468m3 10,000m3/day	15	08-Mar-16 A	14-Mar-16 A	
SURC1b-1100	Completion of Section PC1b at Reclamation Area close to C2c	0		14-Mar-16 A	
Land Portion E2		379	16-Aug-15 A	28-Aug-16	-79
North Part		221	21-Jan-16 A	28-Aug-16	-95
Edge Areas - North (C3)		139	21-Mar-16	06-Aug-16	-224
SUEE2-340	PE2 North Edge C3 Sand Surcharge Laying up to 8.5mPD 18,248m3 5,000m3/day	4	21-Mar-16*	24-Mar-16	-192
SUEE2-350	PE2 North Edge C3 Sand Surcharge Period as +8.5mPD 4.5mths	135	25-Mar-16	06-Aug-16	-224
Edge Areas - North (TM)		215	27-Jan-16 A	28-Aug-16	-573
SUEE2-470	PE2 North Edge TM Sand Surcharge Laying up to +11.5mPD 18,248m3 5,000m3/day	56	27-Jan-16 A	31-Mar-16	-488
SUEE2-480	PE2 North Edge TM Sand Surcharge Period as +11.5mPD 5mths	150	01-Apr-16	28-Aug-16	-573
Edge Areas - East (TM) C064-C067		215	27-Jan-16 A	28-Aug-16	-573
SUEE2-140	PE2 East Edge C064-C067 Sand Surcharge Laying up to +11.5mPD 18,249m3 5,000m3/day	56	27-Jan-16 A	31-Mar-16	-488
SUEE2-150	PE2 East Edge C064-C067 Sand Surcharge Period as +11.5mPD 5mths	150	01-Apr-16	28-Aug-16	-573
Land Areas - East (TM) C057 - C063 Ch2+300 to Ch2+600		12	01-Apr-16	12-Apr-16	-432
SURE2-055	PE2 Land C057-C063 Removal of Surcharge instructed by the Engineer	0	01-Apr-16*		-431
SURE2-060	PE2 Land C057-C063 Tunnel Sand Surcharge Removal at tunnel area 107,437m3 10,000m3/day	11	01-Apr-16	12-Apr-16	-393
Land Areas - West (C3)		210	21-Jan-16 A	17-Aug-16	-84
SURE2-180	PE2 Land C061-C064 Non-Tunnel Sand Surcharge Period as +11.5mPD non tunnel area 7mths	210	21-Jan-16 A	17-Aug-16	-84



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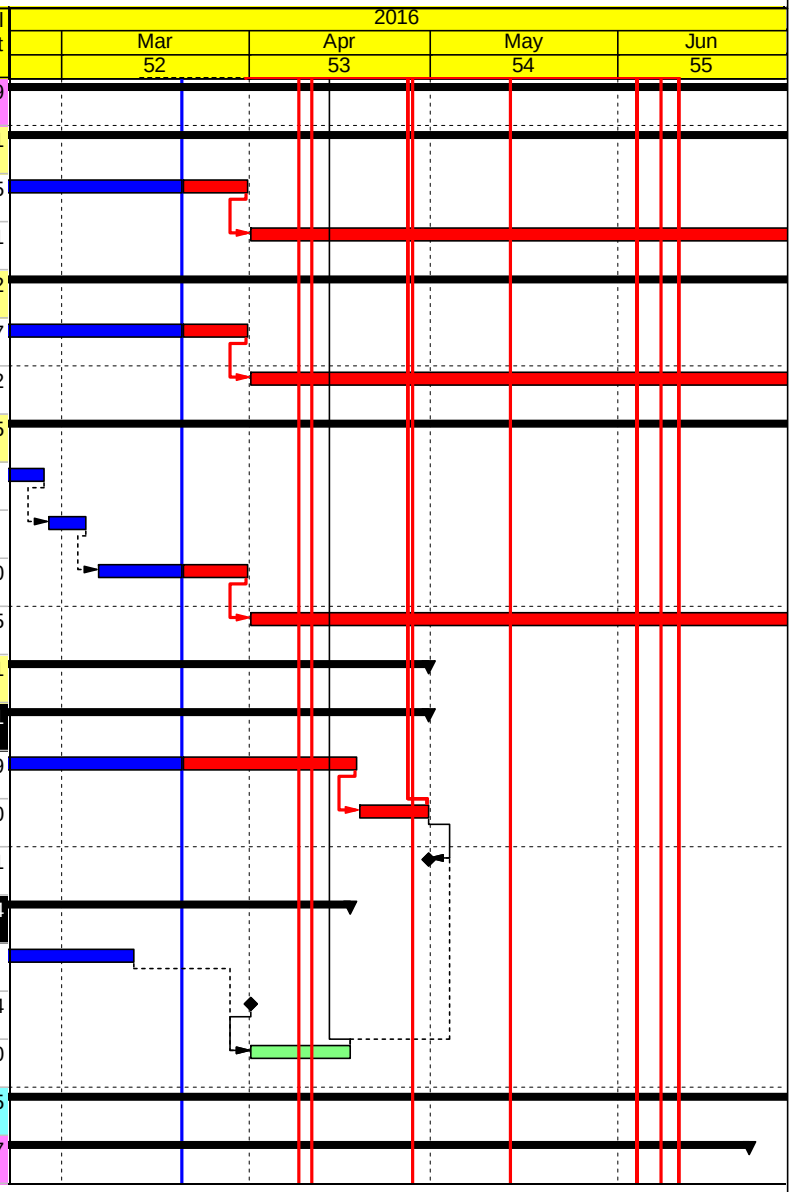
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
South Part		379	16-Aug-15 A	28-Aug-16	-79
Edge Areas East C058 to C063		215	27-Jan-16 A	28-Aug-16	-581
SUEE2-030	PE2 Edge C058-C063 Sand Surcharge Laying up to +11.5mPD 62259m3 5,000m3/day	56	27-Jan-16 A	31-Mar-16	-495
SUEE2-040	PE2 Edge C058-C063 Sand Surcharge Period as +11.5mPD 5mths	150	01-Apr-16	28-Aug-16	-581
VO DCM Edge Areas East C056 to C057		210	01-Feb-16 A	28-Aug-16	-572
DCM-4370	PE2 Edge C056-C057 Filling up to +11.5mPD Surcharge (30m width, 8,547m3 5,000m3/day at DCM by Dump Trucks	52	01-Feb-16 A	31-Mar-16	-487
DCM-4380	PE2 Edge C056-C057 Surcharge Period 7mths (Land Side)	150	01-Apr-16	28-Aug-16	-572
Edge Areas East C052 to C055		318	16-Oct-15 A	28-Aug-16	-575
SURE2-420	PE2 Edge C052-C055 300m Zone Sand Surcharge Pause Period at 8.5mPD 4.5mths (27Feb2016)	135	16-Oct-15 A	27-Feb-16 A	
SURE2-425	PE2 Edge C052-C055 300m Zone Sand Surcharge CPT Test at 8.5mPD	7	28-Feb-16 A	05-Mar-16 A	
SURE2-430	PE2 Edge C052-C055 300m Zone Sand Surcharge Laying upto 11.5mPD 49,801m3 5,000m3/day	22	07-Mar-16 A	31-Mar-16	-490
SURE2-440	PE2 Edge C052-C055 300m Zone Sand Surcharge Period as +11.5mPD 5mths	150	01-Apr-16	28-Aug-16	-575
Land Areas		259	16-Aug-15 A	30-Apr-16	41
300m to 100m Zone		222	22-Sep-15 A	30-Apr-16	41
SURE2-530	PE2 Land C052-C056 300m Zone Sand Surcharge Period as +11.5mPD 7mths 18Apr2016	210	22-Sep-15 A	18-Apr-16	-449
SURE2-540	PE2 Land C052-C056 300m Zone Sand Surcharge Removal 105,782m3 10,000m3/day	11	19-Apr-16	30-Apr-16	-410
SURE2-550	Completion of Section PE2 in Land C052-C056 300m Zone Reclamation Area	0		30-Apr-16	41
Out of K052 300m		246	16-Aug-15 A	17-Apr-16	54
SURE2-020	PE2 Land C052-C060 Non-Tunnel Sand Surcharge Period as +11.5mPD 7mths 13Mar2016	211	16-Aug-15 A	13-Mar-16 A	
SURE2-022	PE2 Land C052-C060 Non-Tunnel Sand Surcharge Removal instructed by the Engineer	0	01-Apr-16*		54
SURE2-030	PE2 Land C052-C060 Non-Tunnel Sand Surcharge Removal 158,673m3 + 28,116m3(C1b) 10,000m3/day	16	01-Apr-16	17-Apr-16	50
Land Portion E1		299	01-Jan-16 A	25-Oct-16	-645
Deep Cement Mixing C077 - C080 150m (Exclude VB & RS)		138	06-Feb-16 A	22-Jun-16	-657



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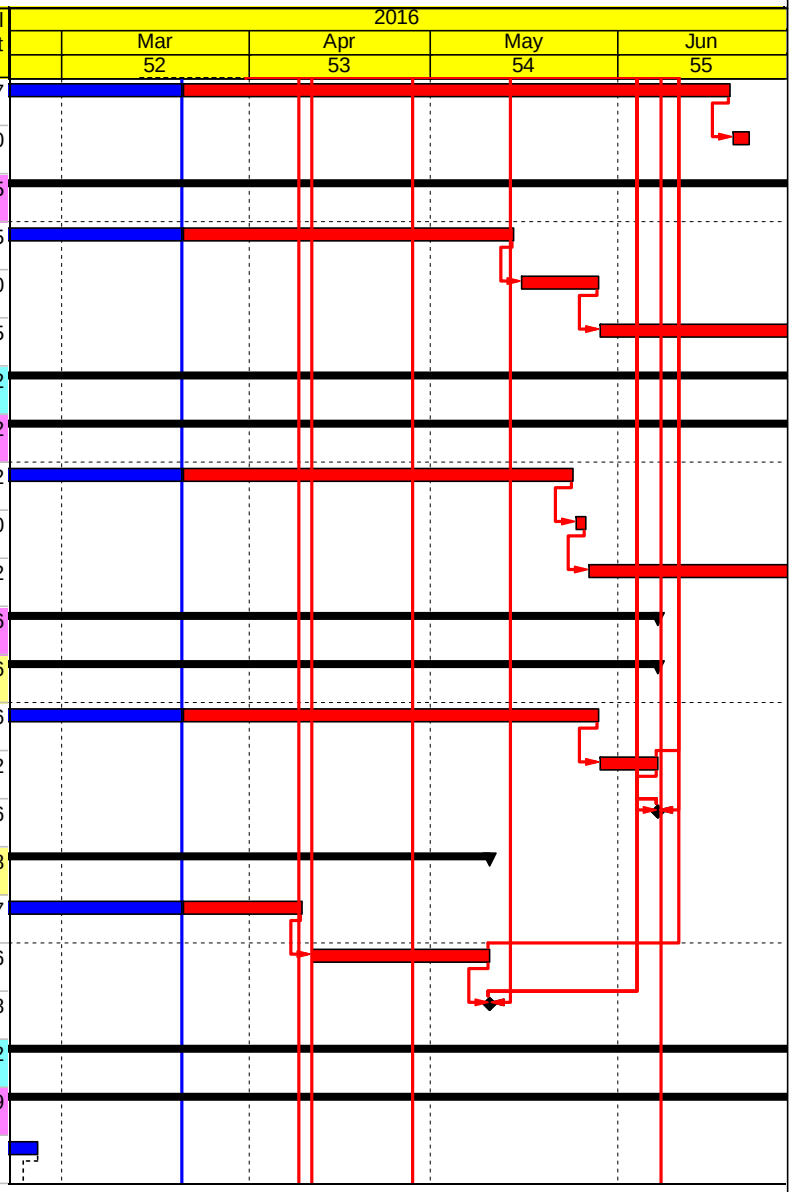
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
DCM-4083	PE1 Edge Area Surcharge Pause Period 4.5mths at interface of non DCM area	135	06-Feb-16 A	19-Jun-16	-657
DCM-4085	PE1 Edge Area Surcharge Filling up to +11.5mPD (10,000m3) 10,000m3/day at interface of non DCM area	3	20-Jun-16	22-Jun-16	-560
Edge Areas Excluded 150m of DCM Area		299	01-Jan-16 A	25-Oct-16	-645
SUEE1-020	PE1 Edge Sand Surcharge Period +8.5mPD 4.5mths	135	01-Jan-16 A	14-May-16	-645
SUEE1-030	PE1 Edge Sand Surcharge Laying up to +11.5mPD 119,976m3 10,000m3/day	12	16-May-16	28-May-16	-550
SUEE1-040	PE1 Edge Sand Surcharge Period as +11.5mPD 5mths	150	29-May-16	25-Oct-16	-645
Land Portion C2b		408	12-Sep-15 A	23-Oct-16	-222
Edge Areas		287	11-Jan-16 A	23-Oct-16	-222
SUEC2b-060	PC2b Edge Area Surcharge Period as +8.5mPD 4.5mths	135	11-Jan-16 A	24-May-16	-222
SUEC2b-070	PC2b Edge Area Sand Surcharge Laying upto 11.5mPD 12,054m3 10,000m3/day	2	25-May-16	26-May-16	-190
SUEC2b-080	PC2b Edge Area Sand Surcharge Period as +11.5mPD 5mths	150	27-May-16	23-Oct-16	-222
Reclamation Areas		270	12-Sep-15 A	07-Jun-16	-146
North		220	01-Nov-15 A	07-Jun-16	-146
SURC2b-020	PC2b Main Area North Public Surcharge Period as +11.5mPD 7mths (28May2016)	210	01-Nov-15 A	28-May-16	-146
SURC2b-030	PC2b Main Area North Public Surcharge Removal 42,609m3 5,000m3/day	9	29-May-16	07-Jun-16	-132
SURC2b-040	Completion of Section PC2b at Reclamation Area North	0		07-Jun-16	-146
South		242	12-Sep-15 A	10-May-16	-118
SURC2b-034	PC2b Main Area South PBF Surcharge Period as +11.5mPD 7mths (9Apr2016)	211	12-Sep-15 A	09-Apr-16	-117
SURC2b-036	PC2b Main Area South PBF Surcharge Removal 137,244m3 5,000m3/day	28	11-Apr-16	10-May-16	-106
SURC2b-050	Completion of Section PC2b at Reclamation Area South	0		10-May-16	-118
Land Portion C2c		296	27-Oct-15 A	17-Aug-16	-122
Edge Areas		173	20-Jan-16 A	10-Jul-16	-249
SUEC2c-010	PC2c Edge Area PBF Surcharge w compaction upto 8.5mPD 43,395m3 5,000m3/day	32	20-Jan-16 A	26-Feb-16 A	



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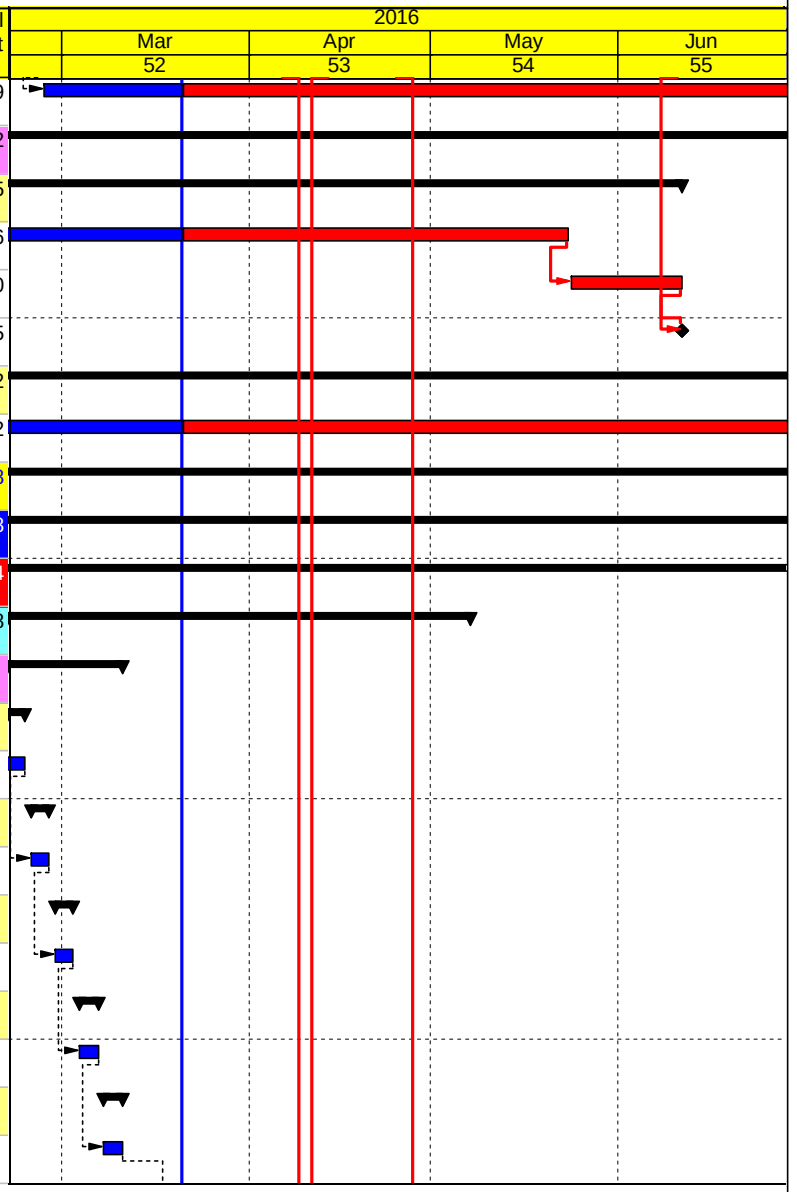
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
SUEC2c-020	PC2c Edge Area PBF Surcharge Period +8.5mPD 4.5mths	135	27-Feb-16 A	10-Jul-16	-249
Reclamation Areas		296	27-Oct-15 A	17-Aug-16	-122
West		229	27-Oct-15 A	11-Jun-16	-55
SURC2c-W030	PC2c Main Area PBF Surcharge Period 7mths (23May2016)	210	27-Oct-15 A	23-May-16	-76
SURC2c-W040	PC2c Main Area PBF Surcharge Removal 90162m3 10,000m3/day	18	24-May-16	11-Jun-16	-70
SURC2c-W050	Completion of Section PC2c at Reclamation Area	0		11-Jun-16	-55
East		210	21-Jan-16 A	17-Aug-16	-142
SURC2c-E030	PC2c Main Area PBF Surcharge Period 7mths (17Aug2016)	210	21-Jan-16 A	17-Aug-16	-142
Portion D		139	15-Feb-16 A	02-Jul-16	488
Site Construction		139	15-Feb-16 A	02-Jul-16	488
C1 to C4		139	15-Feb-16 A	02-Jul-16	-184
Installations of Precast Culverts except sloping outfalls		77	21-Feb-16 A	07-May-16	-128
Culvert C1		19	21-Feb-16 A	11-Mar-16 A	
C1-2		3	21-Feb-16 A	24-Feb-16 A	
PD-C1-2-120	PD C1-2 Backfill Manhole upto +5.5mPD	4	21-Feb-16 A	24-Feb-16 A	
C1-3		3	25-Feb-16 A	28-Feb-16 A	
PD-C1-3-120	PD C1-3 Backfill Manhole upto +5.5mPD	4	25-Feb-16 A	28-Feb-16 A	
C1-4		3	29-Feb-16 A	03-Mar-16 A	
PD-C1-4-120	PD C1-4 Backfill Manhole upto +5.5mPD	4	29-Feb-16 A	03-Mar-16 A	
C1-5		3	04-Mar-16 A	07-Mar-16 A	
PD-C1-5-120	PD C1-5 Backfill Manhole upto +5.5mPD	4	04-Mar-16 A	07-Mar-16 A	
C1-6		3	08-Mar-16 A	11-Mar-16 A	
PD-C1-6-120	PD C1-6 Backfill Manhole upto +5.5mPD	4	08-Mar-16 A	11-Mar-16 A	



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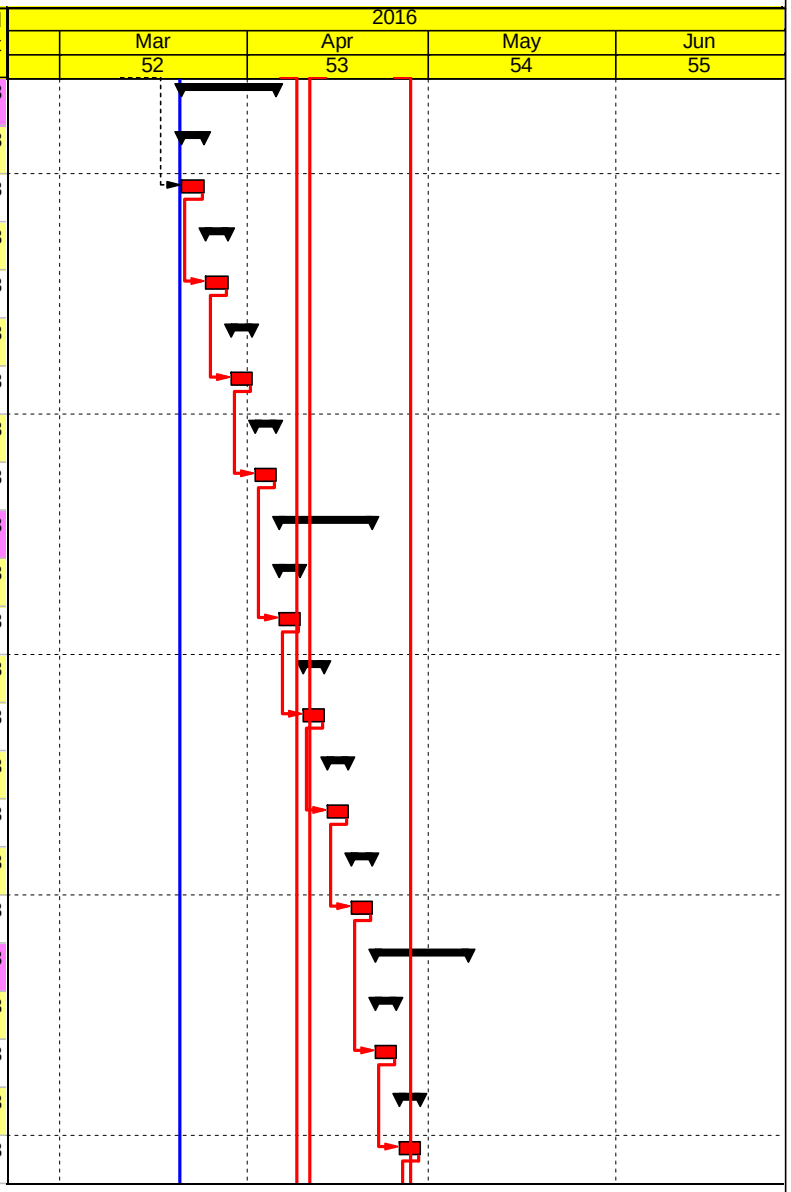
Culvert C2		16	21-Mar-16	05-Apr-16	-128
C2-2		4	21-Mar-16	24-Mar-16	-128
PD-C2-2-120	PD C2-2 Backfill Manhole upto +5.5mPD	4	21-Mar-16	24-Mar-16	-128
C2-3		4	25-Mar-16	28-Mar-16	-128
PD-C2-3-120	PD C2-3 Backfill Manhole upto +5.5mPD	4	25-Mar-16	28-Mar-16	-128
C2-4		4	29-Mar-16	01-Apr-16	-128
PD-C2-4-120	PD C2-4 Backfill Manhole upto +5.5mPD	4	29-Mar-16	01-Apr-16	-128
C2-5		4	02-Apr-16	05-Apr-16	-128
PD-C2-5-120	PD C2-5 Backfill Manhole upto +5.5mPD	4	02-Apr-16	05-Apr-16	-128
Culvert C3		16	06-Apr-16	21-Apr-16	-128
C3-2		4	06-Apr-16	09-Apr-16	-128
PD-C3-2-120	PD C3-2 Backfill Manhole upto +5.5mPD	4	06-Apr-16	09-Apr-16	-128
C3-3		4	10-Apr-16	13-Apr-16	-128
PD-C3-3-120	PD C3-3 Backfill Manhole upto +5.5mPD	4	10-Apr-16	13-Apr-16	-128
C3-4		4	14-Apr-16	17-Apr-16	-128
PD-C3-4-120	PD C3-4 Backfill Manhole upto +5.5mPD	4	14-Apr-16	17-Apr-16	-128
C3-5		4	18-Apr-16	21-Apr-16	-128
PD-C3-5-120	PD C3-5 Backfill Manhole upto +5.5mPD	4	18-Apr-16	21-Apr-16	-128
Culvert C4		16	22-Apr-16	07-May-16	-128
C4-2		4	22-Apr-16	25-Apr-16	-128
PD-C4-2-120	PD C4-2 Backfill Manhole upto +5.5mPD	4	22-Apr-16	25-Apr-16	-128
C4-3		4	26-Apr-16	29-Apr-16	-128
PD-C4-3-120	PD C4-3 Backfill Manhole upto +5.5mPD	4	26-Apr-16	29-Apr-16	-128



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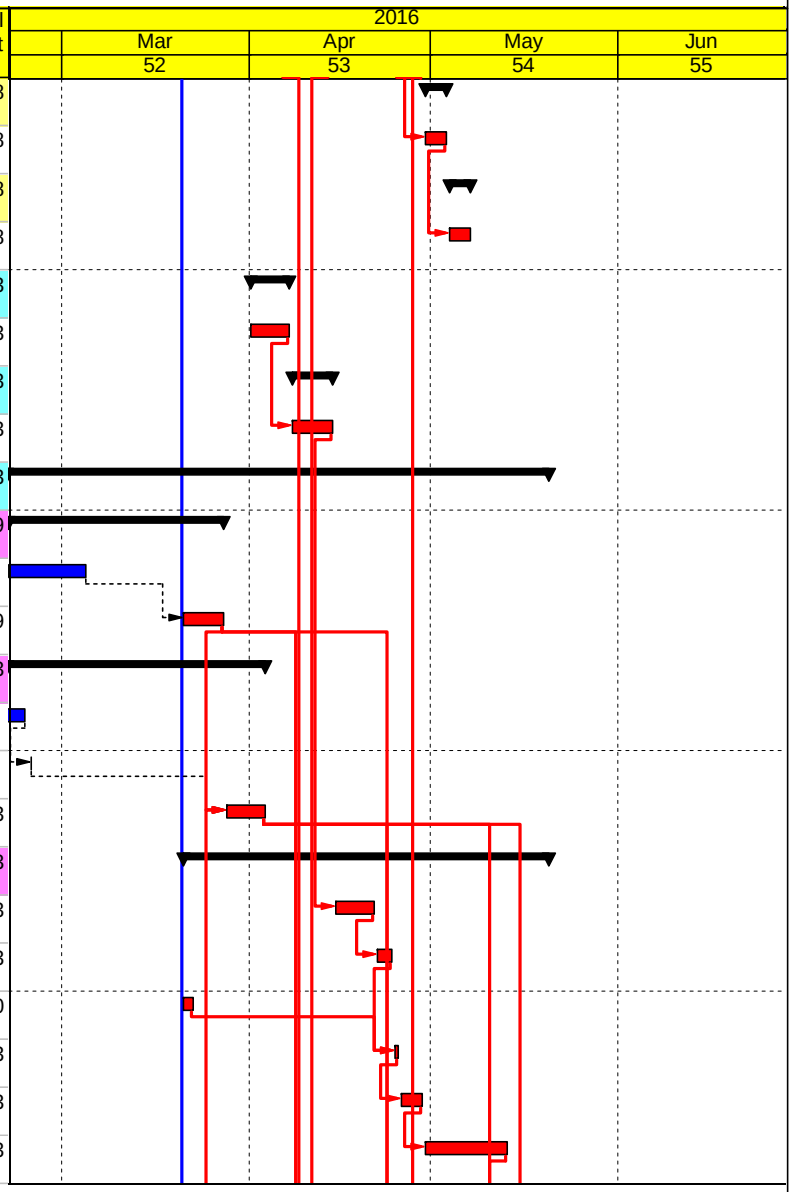
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
C4-4		4	30-Apr-16	03-May-16	-128
PD-C4-4-120	PD C4-4 Backfill Manhole upto +5.5mPD	4	30-Apr-16	03-May-16	-128
C4-5		4	04-May-16	07-May-16	-128
PD-C4-5-120	PD C4-5 Backfill Manhole upto +5.5mPD	4	04-May-16	07-May-16*	-128
Permanent Access to Portion A		7	01-Apr-16	07-Apr-16	-453
PD-A2100	PD - C3 Divert Access	7	01-Apr-16*	07-Apr-16	-453
Removal of Temporary Access to Portion A		7	08-Apr-16	14-Apr-16	-453
PD-A1120	PD C3 - Removal of Temporary Access	7	08-Apr-16	14-Apr-16	-453
Construction of Sloping Outfalls		90	21-Feb-16 A	20-May-16	-453
Culvert C1 Sloping Outfall		43	21-Feb-16 A	27-Mar-16	-449
PD-C1-0150	PD C1-1 Outfall Insitu Concrete	43	21-Feb-16 A	05-Mar-16 A	
PD-C1-0160	PD C1-1 Outfall Backfill	7	21-Mar-16	27-Mar-16	-449
Culvert C2 Sloping Outfall		18	21-Feb-16 A	03-Apr-16	-433
PD-C2-0140	PD C2-1 Outfall Removal of Buoyancy & Bulkhead	4	21-Feb-16 A	24-Feb-16 A	
PD-C2-0150	PD C2-1 Outfall Insitu Concrete	14	25-Feb-16 A	25-Feb-16 A	
PD-C2-0160	PD C2-1 Outfall Backfill	7	28-Mar-16	03-Apr-16	-433
Culvert C3 Sloping Outfall		61	21-Mar-16	20-May-16	-453
PD-C3-0110	PD C3-1 Outfall Excavation	7	15-Apr-16	21-Apr-16	-453
PD-C3-0120	PD C3-1 Outfall Formation	3	22-Apr-16	24-Apr-16	-453
PD-C3-0125	PD C3-1 Buoyancy	2	21-Mar-16	22-Mar-16	-420
PD-C3-0130	PD C3-1 Outfall Installation (10Mar2016)	1	25-Apr-16*	25-Apr-16	-453
PD-C3-0140	PD C3-1 Outfall Removal of Buoyancy & Bulkhead	4	26-Apr-16	29-Apr-16	-453
PD-C3-0150	PD C3-1 Outfall Insitu Concrete	14	30-Apr-16	13-May-16	-453

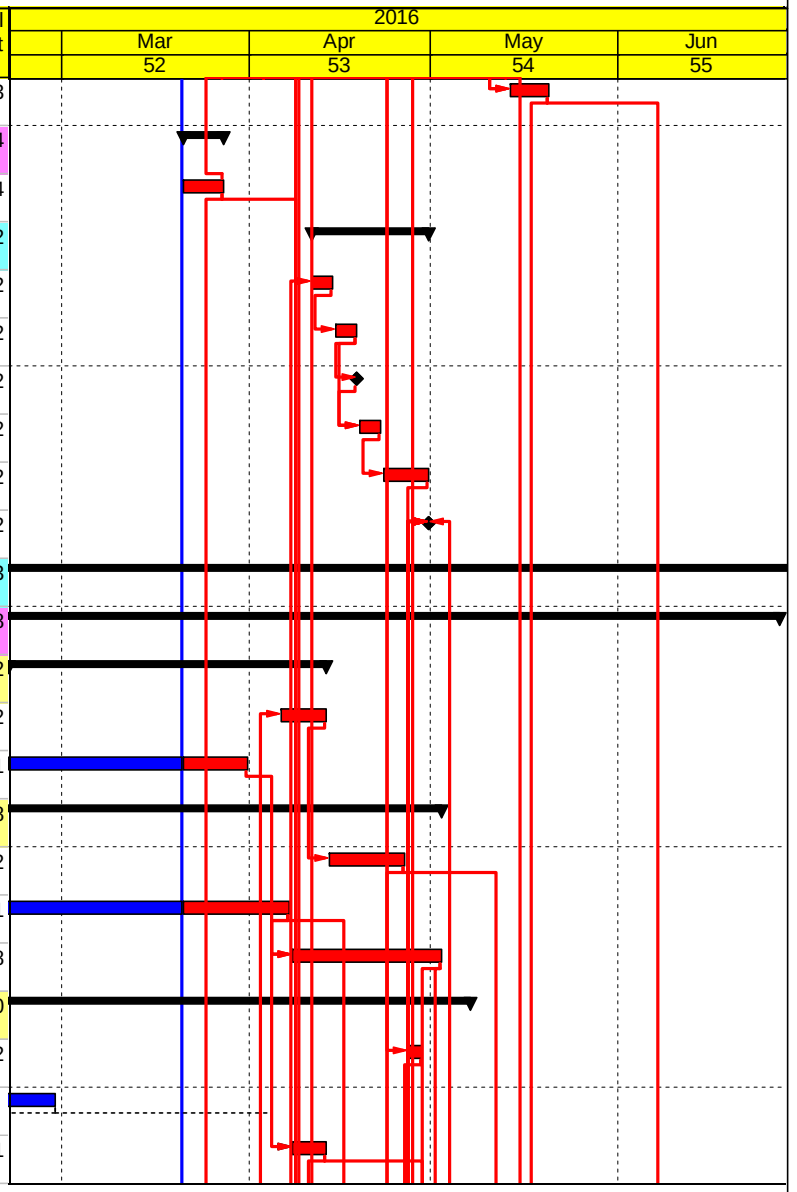


Remaining Level of Effort ◆ Milestone
Actual Level of Effort Summary
Actual Work
Remaining Work
Critical Remaining Work

TASK filter: Three Month Rolling.

Primavera Systems, Inc.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
PD-C3-0160	PD C3-1 Outfall Backfill	7	14-May-16	20-May-16	-453
Culvert C4 Sloping Outfall		7	21-Mar-16	27-Mar-16	-464
PD-C4-0160	PD C4-1 Outfall Backfill	7	21-Mar-16	27-Mar-16	-464
Removal of Temporary Bridge and Channel Beside Existing Seawall		19	11-Apr-16	30-Apr-16	-242
PD-TD1-0010	PD EC1 Beside Existing Seawall - Removal of Temporary Channel	4	11-Apr-16	14-Apr-16	-242
PD-TD1-0020	PD EC1 Beside Existing Seawall - Backfill & Compaction	4	15-Apr-16	18-Apr-16	-242
PD-TD1-0030	PD EC1 Beside Existing Seawall - Diversion Access from temporary bridge	0		18-Apr-16	-242
PD-TD1-0040	PD EC1 Beside Existing Seawall - Removal of Temporary bridge, concrete blocks & Ramp	4	19-Apr-16	22-Apr-16	-242
PD-TD1-0050	PD EC1 Beside Existing Seawall - Reinstatement	7	23-Apr-16	30-Apr-16	-242
PD-TD1-0999	Completion of PD EC1	0		30-Apr-16	-242
Construction of Permanent Seawall		130	15-Feb-16 A	02-Jul-16	-423
Vertical Seawall Type V2 6+136 to 5+650		125	15-Feb-16 A	27-Jun-16	-498
Foundation Leveling		49	21-Feb-16 A	13-Apr-16	-472
PD-V2-0050	PD C1 West - Vertical Seawall V2 VSOP22-20 Foundation Leveling 3,000m2 and Geotextile	7	06-Apr-16	13-Apr-16	-472
PD-V2-920	PD C4 East - Vertical Seawall V2 VSOP04-01 Foundation Leveling 3,000m2 and Geotextile	23	21-Feb-16 A	31-Mar-16	-481
Seawall Blocks Installation		73	15-Feb-16 A	02-May-16	-478
PD-V2-0070	PD C1 West - Vertical Seawall Blocks V2 VSPD22-20 Type 2E & 2A 352nrs (30nrs/day)	12	14-Apr-16	26-Apr-16	-472
PD-V2-0130	PD C3/C4 - Vertical Seawall Blocks V2 VSOP10-05 Type 2A x4, 2AC 905nrs (30nrs/day)	61	15-Feb-16 A	07-Apr-16	-491
PD-V2-0150	PD C4 East - Vertical Seawall Blocks V2 VSOP04-01 Type 2A2, 2A1 & 2B 548nrs (24nrs/day)	23	08-Apr-16	02-May-16	-488
Rockfill Type 2 behind seawall		78	15-Feb-16 A	07-May-16	-480
PD-V2-0180	PD C1 West - Vertical Seawall V2 Rockf ill Type 2 VSOP22-20 1,400m3	3	27-Apr-16	29-Apr-16	-472
PD-V2-0200	PD C2/C3 - Vertical Seawall V2 Rockf ill Type 2 VSOP15-11 3,400m3	34	15-Feb-16 A	29-Feb-16 A	
PD-V2-0210	PD C3/C4 - Vertical Seawall V2 Rockf ill Type 2 VSOP10-05 2,500m3	5	08-Apr-16	13-Apr-16	-491



Remaining Level of Effort ◆ Milestone
Actual Level of Effort Summary
Actual Work
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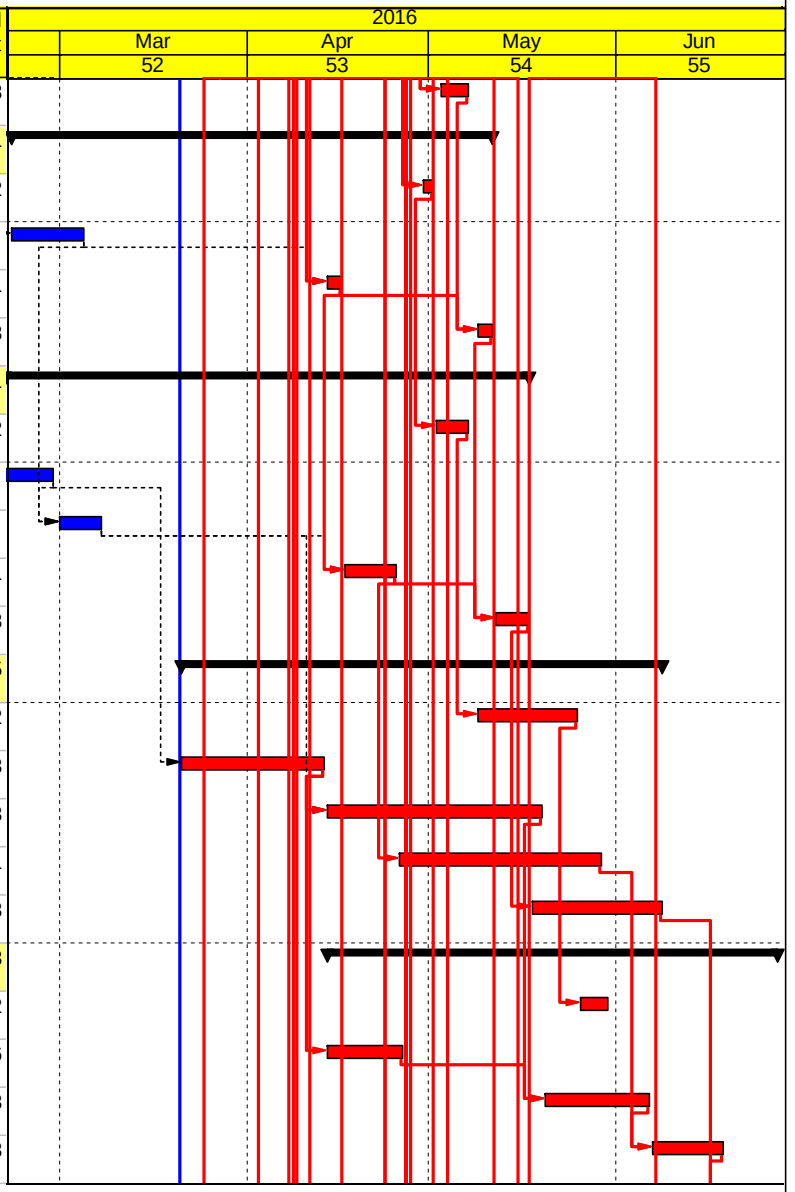
TASK filter: Three Month Rolling.

Primavera Systems, Inc.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
PD-V2-0220	PD C4 East - Vertical Seawall V2 Rockf ill Type 2 VSOP04-01 2,500m3	5	03-May-16	07-May-16	-488
Geotextile Type 1		48	22-Feb-16 A	11-May-16	-481
PD-V2-0230	PD C1 West - Vertical Seawall V2 Geotextile Type 1 VSOP22-20 1,000m2	2	30-Apr-16	01-May-16	-472
PD-V2-0250	PD C2/C3 - Vertical Seawall V2 Geotextile Type 1 VSOP15-11 2,400m2	5	22-Feb-16 A	05-Mar-16 A	
PD-V2-0260	PD C3/C4 - Vertical Seawall V2 Geotextile Type 1 VSOP10-05 1,700m2	3	14-Apr-16	16-Apr-16	-491
PD-V2-0270	PD C4 East - Vertical Seawall V2 Geotextile Type 1 VSOP04-01 1,700m2	3	09-May-16	11-May-16	-488
Reclamation upto +3.25mPD		54	21-Feb-16 A	17-May-16	-481
PD-V2-0280	PD C1 West - Vertical Seawall V2 backfill with compaction upto +3.25mPD VSOP22-20	6	02-May-16	07-May-16	-472
PD-V2-0290	PD C1/C2 - Vertical Seawall V2 backfill with compaction upto +3.25mPD VSOP20-16	8	21-Feb-16 A	29-Feb-16 A	
PD-V2-0300	PD C2/C3 - Vertical Seawall V2 backfill with compaction upto +3.25mPD VSOP16-11	8	01-Mar-16 A	08-Mar-16 A	
PD-V2-0310	PD C3/C4 - Vertical Seawall V2 backfill with compaction upto +3.25mPD VSOP11-05	8	17-Apr-16	25-Apr-16	-491
PD-V2-0320	PD C4 East - Vertical Seawall V2 backfill with compaction upto +3.25mPD VSOP05-01	6	12-May-16	17-May-16	-488
Insitu Concrete Coping		74	21-Mar-16	08-Jun-16	-485
PD-V2-0330	PD C1 West - Vertical Seawall V2 Insitu Coping VSOP22-20 8bays	16	09-May-16	25-May-16	-472
PD-V2-0340	PD C1/C2 - Vertical Seawall V2 Insitu Coping VSOP20-16 11bays	22	21-Mar-16	13-Apr-16	-498
PD-V2-0350	PD C2/C3 - Vertical Seawall V2 Insitu Coping VSOP16-11 17bays	34	14-Apr-16	19-May-16	-498
PD-V2-0360	PD C3/C4 - Vertical Seawall V2 Insitu Coping VSOP11-05 16bays	32	26-Apr-16	29-May-16	-491
PD-V2-0370	PD C4 East - Vertical Seawall V2 Insitu Coping VSOP05-01 10bays	20	18-May-16	08-Jun-16	-488
Reclamation upto +5.5mPD		70	14-Apr-16	27-Jun-16	-498
PD-V2-0380	PD C1 West - Vertical Seawall V2 backfill with compaction upto +5.5mPD VSOP22-20	5	26-May-16	30-May-16	-472
PD-V2-0390	PD C1/2 - Vertical Seawall V2 backfill with compaction upto +5.5mPD VSOP20-16	12	14-Apr-16	26-Apr-16	-476
PD-V2-0400	PD C2/3 - Vertical Seawall V2 backfill with compaction upto +5.5mPD VSOP16-11	16	20-May-16	06-Jun-16	-498
PD-V2-0410	PD C3/4 - Vertical Seawall V2 backfill with compaction upto +5.5mPD VSOP11-05	12	07-Jun-16	18-Jun-16	-498



Remaining Level of Effort
Actual Level of Effort
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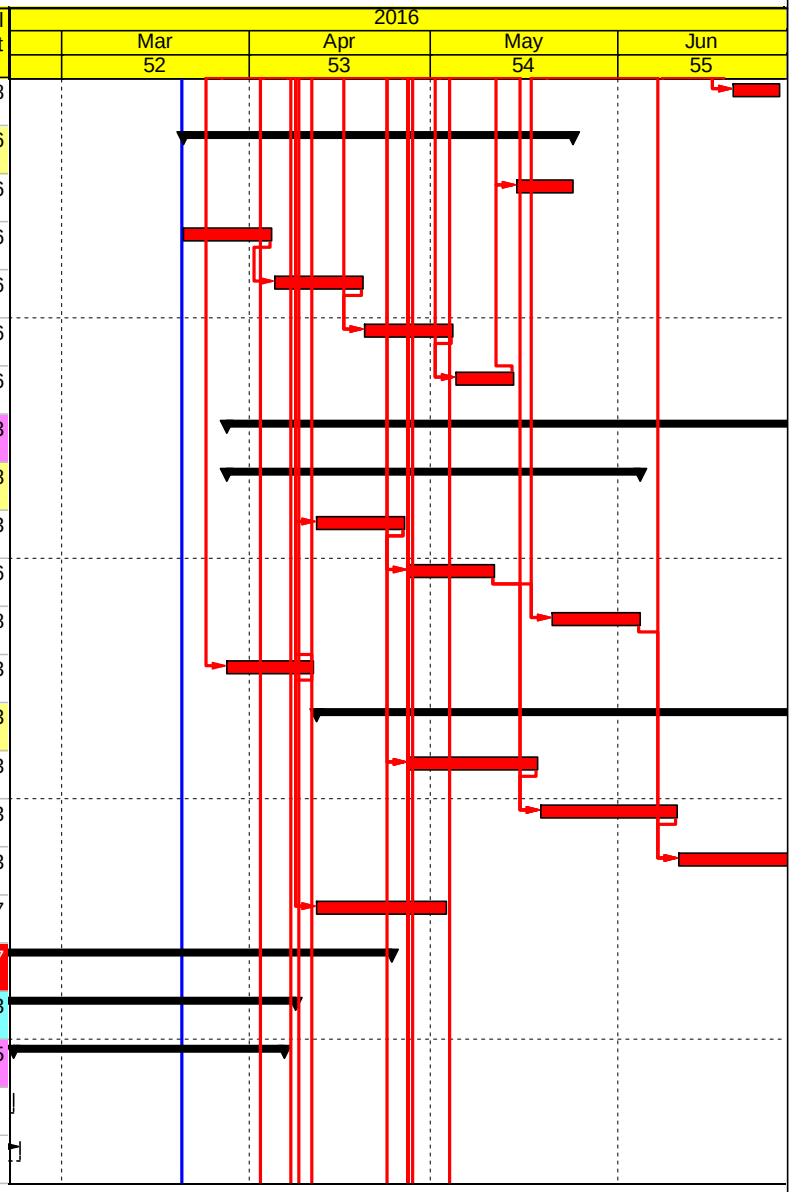
Milestone
Summary

TASK filter: Three Month Rolling.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
PD-V2-0420	PD C4 East - Vertical Seawall V2 backfill with compaction upto +5.5mPD VSOP05-01	8	20-Jun-16	27-Jun-16	-498
Rock Armour		60	21-Mar-16	24-May-16	-466
PD-V2-0910	PD C1 West - Vertical Seawall V2 Armour VSOP22-20	9	15-May-16	24-May-16	-466
PD-V2-0920	PD C1/2 - Vertical Seawall V2 Armour VSOP20-16	14	21-Mar-16	04-Apr-16	-466
PD-V2-0930	PD C2/3 - Vertical Seawall V2 Armour VSOP16-11	14	05-Apr-16	19-Apr-16	-466
PD-V2-1000	PD C3/4 - Vertical Seawall V2 Armour VSOP11-05	14	20-Apr-16	04-May-16	-466
PD-V2-990	PD C4 East - Vertical Seawall V2 Armour VSOP05-01	9	05-May-16	14-May-16	-466
Sloping Seawall Type S1 0+000 to 0+420		91	28-Mar-16	02-Jul-16	-423
Removal of South Temporary Seawall S1		65	28-Mar-16	04-Jun-16	-418
PD-S1-0010	PD C1 - Removal of S1 Temporary seawall West1 0+000 to 0+100	14	12-Apr-16	26-Apr-16	-423
PD-S1-0015	PD C2 - Removal of S1 Temporary seawall West2 0+100 to 0+200	14	27-Apr-16	11-May-16	-416
PD-S1-0020	PD C3 - Removal of S1 Temporary Seawall East1 0+200 to 0+300	14	21-May-16	04-Jun-16	-418
PD-S1-0025	PD C4 - Removal of S1 Temporary Seawall East1 0+300 to 0+400	14	28-Mar-16	11-Apr-16	-423
S1 Rockfill Type 1		77	12-Apr-16	02-Jul-16	-423
PD-S1-1010	PD C1 - Sloping Seawall Type S1 0+000 to 0+100 Reconstruction	21	27-Apr-16	18-May-16	-423
PD-S1-1020	PD C2 - Sloping Seawall Type S1 0+100 to 0+200 Reconstruction	21	19-May-16	10-Jun-16	-423
PD-S1-1030	PD C3 - Sloping Seawall Type S1 0+200 to 0+300 Reconstruction	21	11-Jun-16	02-Jul-16	-423
PD-S1-1040	PD C4 - Sloping Seawall Type S1 0+300 to 0+400 Reconstruction	21	12-Apr-16	03-May-16	-367
Extension Culvert EC1		68	17-Feb-16 A	24-Apr-16	557
Insitu Concrete		54	17-Feb-16 A	08-Apr-16	573
EC1-1		49	22-Feb-16 A	06-Apr-16	575
PD-EC1-1-080	PD EC1-1 External Wall Insitu Concrete	1	22-Feb-16 A	22-Feb-16 A	
PD-EC1-1-090	PD EC1-1 External Wall Formwork Removal	1	23-Feb-16 A	23-Feb-16 A	



Remaining Level of Effort
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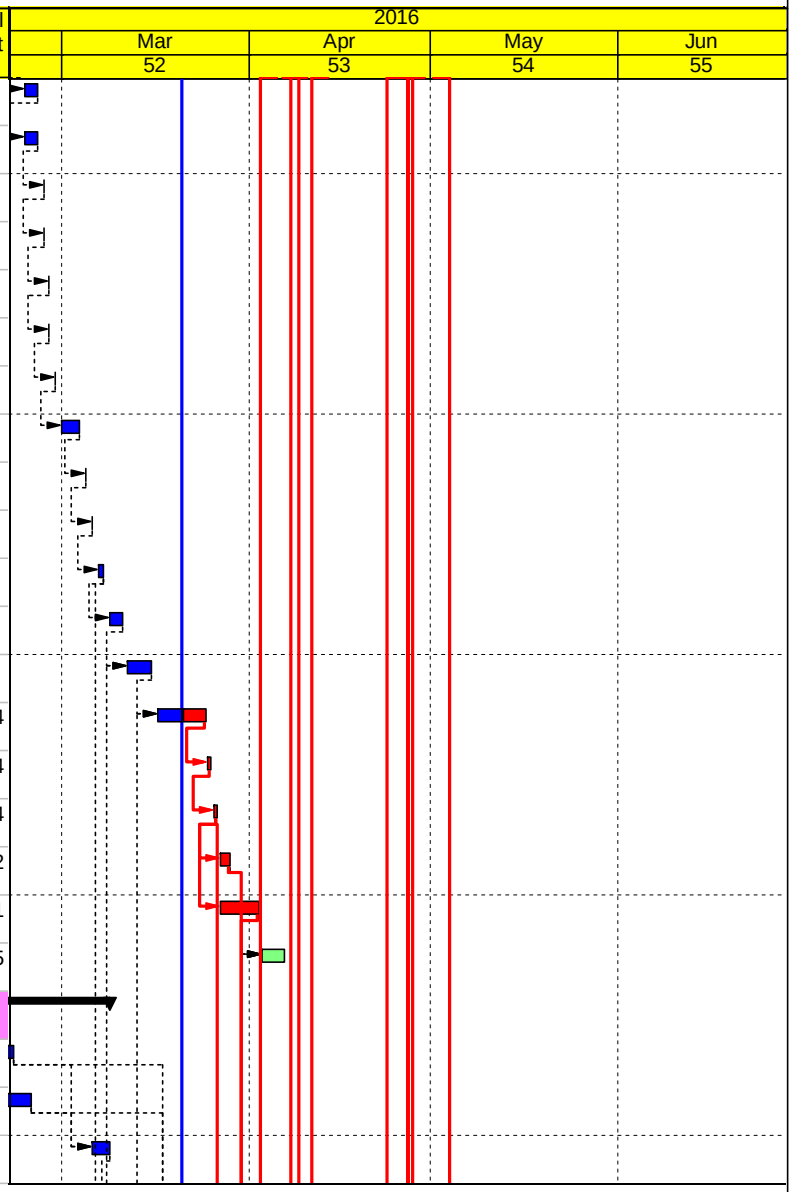
TASK filter: Three Month Rolling.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
PD-EC1-1-100	PD EC1-1 External Wall Support Framework Removal	3	24-Feb-16 A	26-Feb-16 A	
PD-EC1-1-110	PD EC1-1 Internal Wall Cleaning	3	24-Feb-16 A	26-Feb-16 A	
PD-EC1-1-120	PD EC1-1 Internal Wall Rebar Fixing	1	27-Feb-16 A	27-Feb-16 A	
PD-EC1-1-130	PD EC1-1 Internal Chamfer Formwork Installation	1	27-Feb-16 A	27-Feb-16 A	
PD-EC1-1-140	PD EC1-1 Internal Chamfer Rebar & Formwork Checking	1	28-Feb-16 A	28-Feb-16 A	
PD-EC1-1-150	PD EC1-1 Internal Wall Chamfer & Baseslab Concrete	1	28-Feb-16 A	28-Feb-16 A	
PD-EC1-1-160	PD EC1-1 Internal Wall Chamfer Formwork Removal	1	29-Feb-16 A	29-Feb-16 A	
PD-EC1-1-170	PD EC1-1 Internal Wall Formwork Installation	4	01-Mar-16 A	04-Mar-16 A	
PD-EC1-1-180	PD EC1-1 Internal Wall Rebar & Formwork Checking	1	05-Mar-16 A	05-Mar-16 A	
PD-EC1-1-190	PD EC1-1 Internal Wall Concrete	1	06-Mar-16 A	06-Mar-16 A	
PD-EC1-1-200	PD EC1-1 Internal Wall Formwork Removal	2	07-Mar-16 A	08-Mar-16 A	
PD-EC1-1-210	PD EC1-1 Top Slab Support	3	09-Mar-16 A	11-Mar-16 A	
PD-EC1-1-220	PD EC1-1 Top Slab Formwork	5	12-Mar-16 A	16-Mar-16 A	
PD-EC1-1-230	PD EC1-1 Top Slab Rebar Fixing	5	17-Mar-16 A	24-Mar-16	-504
PD-EC1-1-240	PD EC1-1 Top Slab Rebar & Formwork Checking	1	25-Mar-16	25-Mar-16	-504
PD-EC1-1-250	PD EC1-1 Top Slab Insitu Concrete	1	26-Mar-16	26-Mar-16	-504
PD-EC1-1-260	PD EC1-1 Top Slab Side Formwork Removal	2	27-Mar-16	28-Mar-16	-232
PD-EC1-1-270	PD EC1-1 Top Slab Curing	7	27-Mar-16	02-Apr-16	-241
PD-EC1-1-280	PD EC1-1 Removal of top slab Formwork	4	03-Apr-16	06-Apr-16	575
EC1-2		19	19-Feb-16 A	09-Mar-16 A	
PD-EC1-2-260	PD EC1-2 Top Slab Side Formwork Removal	2	21-Feb-16 A	22-Feb-16 A	
PD-EC1-2-270	PD EC1-2 Top Slab Curing	7	19-Feb-16 A	25-Feb-16 A	
PD-EC1-2-280	PD EC1-2 Removal of top slab Formwork	4	06-Mar-16 A	09-Mar-16 A	



Remaining Level of Effort
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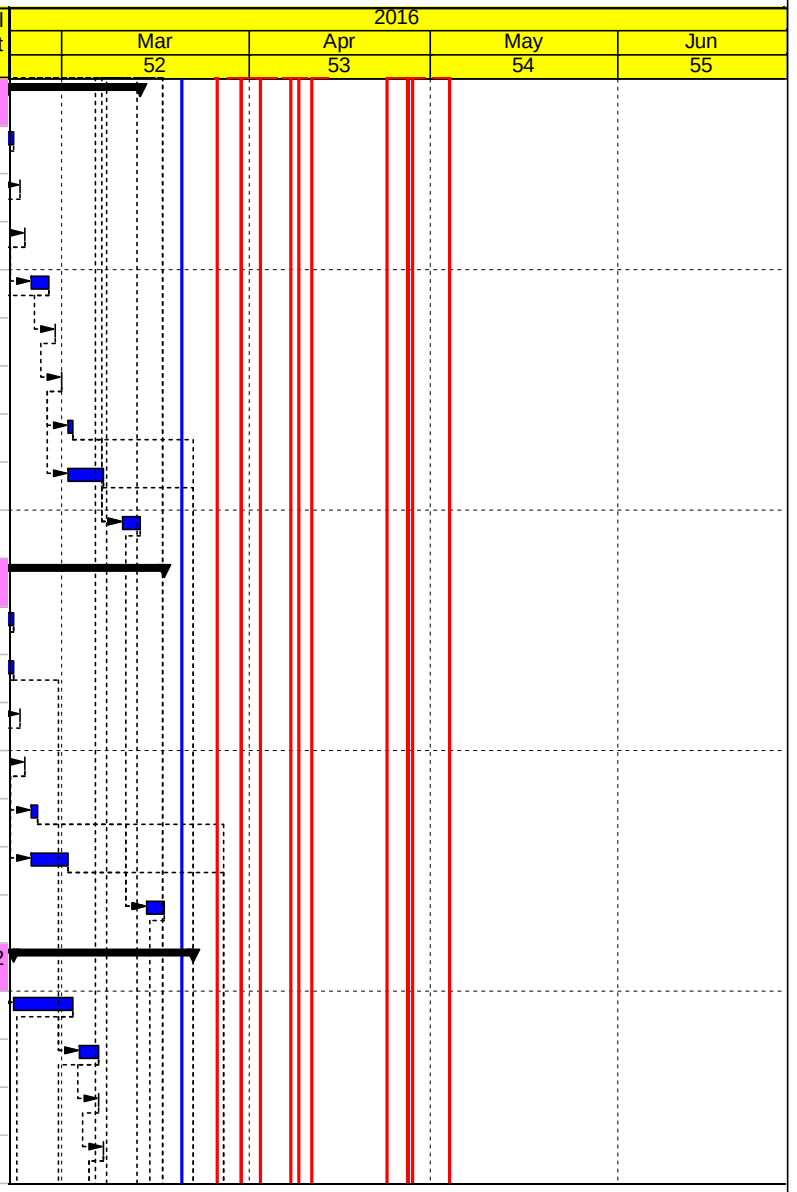
Summary

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
EC1-3		22	21-Feb-16 A	14-Mar-16 A	
PD-EC1-3-200	PD EC1-3 Internal Wall Formwork Removal	2	21-Feb-16 A	22-Feb-16 A	
PD-EC1-3-210	PD EC1-3 Top Slab Support	1	23-Feb-16 A	23-Feb-16 A	
PD-EC1-3-220	PD EC1-3 Top Slab Formwork	1	24-Feb-16 A	24-Feb-16 A	
PD-EC1-3-230	PD EC1-3 Top Slab Rebar Fixing	4	25-Feb-16 A	28-Feb-16 A	
PD-EC1-3-240	PD EC1-3 Top Slab Rebar & Formwork Checking	1	29-Feb-16 A	29-Feb-16 A	
PD-EC1-3-250	PD EC1-3 Top Slab Insitu Concrete	1	01-Mar-16 A	01-Mar-16 A	
PD-EC1-3-260	PD EC1-3 Top Slab Side Formwork Removal	2	02-Mar-16 A	03-Mar-16 A	
PD-EC1-3-270	PD EC1-3 Top Slab Curing	7	02-Mar-16 A	08-Mar-16 A	
PD-EC1-3-280	PD EC1-3 Removal of top slab Formwork	4	11-Mar-16 A	14-Mar-16 A	
EC1-4		37	17-Feb-16 A	18-Mar-16 A	
PD-EC1-4-220	PD EC1-4 Top Slab Formwork	6	17-Feb-16 A	22-Feb-16 A	
PD-EC1-4-230	PD EC1-4 Top Slab Rebar Fixing	4	19-Feb-16 A	22-Feb-16 A	
PD-EC1-4-240	PD EC1-4 Top Slab Rebar & Formwork Checking	1	23-Feb-16 A	23-Feb-16 A	
PD-EC1-4-250	PD EC1-4 Top Slab Insitu Concrete	1	24-Feb-16 A	24-Feb-16 A	
PD-EC1-4-260	PD EC1-4 Top Slab Side Formwork Removal	2	25-Feb-16 A	26-Feb-16 A	
PD-EC1-4-270	PD EC1-4 Top Slab Curing	7	25-Feb-16 A	02-Mar-16 A	
PD-EC1-4-280	PD EC1-4 Removal of top slab Formwork	4	15-Mar-16 A	18-Mar-16 A	
EC1-5		36	22-Feb-16 A	22-Mar-16	582
PD-EC1-5-220	PD EC1-5 Top Slab Formwork	11	22-Feb-16 A	03-Mar-16 A	
PD-EC1-5-230	PD EC1-5 Top Slab Rebar Fixing	4	04-Mar-16 A	07-Mar-16 A	
PD-EC1-5-240	PD EC1-5 Top Slab Rebar & Formwork Checking	1	07-Mar-16 A	07-Mar-16 A	
PD-EC1-5-250	PD EC1-5 Top Slab Insitu Concrete	1	08-Mar-16 A	08-Mar-16 A	



Remaining Level of Effort
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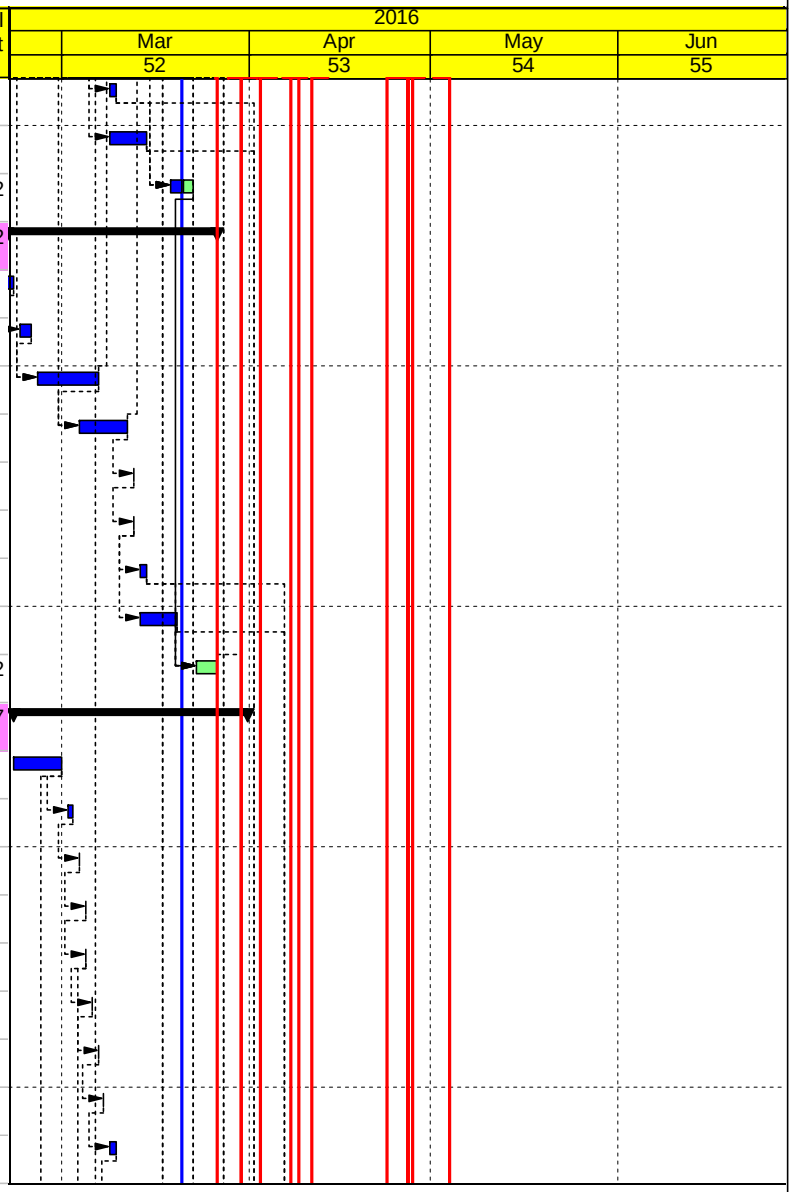
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
PD-EC1-5-260	PD EC1-5 Top Slab Side Formwork Removal	2	09-Mar-16 A	10-Mar-16 A	
PD-EC1-5-270	PD EC1-5 Top Slab Curing	7	09-Mar-16 A	15-Mar-16 A	
PD-EC1-5-280	PD EC1-5 Removal of top slab Formwork	4	19-Mar-16 A	22-Mar-16	582
EC1-6		35	21-Feb-16 A	26-Mar-16	582
PD-EC1-6-200	PD EC1-6 Internal Wall Formwork Removal	2	21-Feb-16 A	22-Feb-16 A	
PD-EC1-6-210	PD EC1-6 Top Slab Support	3	23-Feb-16 A	25-Feb-16 A	
PD-EC1-6-220	PD EC1-6 Top Slab Formwork	11	26-Feb-16 A	07-Mar-16 A	
PD-EC1-6-230	PD EC1-6 Top Slab Rebar Fixing	9	04-Mar-16 A	12-Mar-16 A	
PD-EC1-6-240	PD EC1-6 Top Slab Rebar & Formwork Checking	1	13-Mar-16 A	13-Mar-16 A	
PD-EC1-6-250	PD EC1-6 Top Slab Insitu Concrete	1	13-Mar-16 A	13-Mar-16 A	
PD-EC1-6-260	PD EC1-6 Top Slab Side Formwork Removal	2	14-Mar-16 A	15-Mar-16 A	
PD-EC1-6-270	PD EC1-6 Top Slab Curing	7	14-Mar-16 A	20-Mar-16 A	
PD-EC1-6-280	PD EC1-6 Removal of top slab Formwork	4	23-Mar-16	26-Mar-16	582
EC1-7		39	22-Feb-16 A	31-Mar-16	577
PD-EC1-7-130	PD EC1-7 Internal Chamfer Formwork Installation	9	22-Feb-16 A	01-Mar-16 A	
PD-EC1-7-140	PD EC1-7 Internal Chamfer Rebar & Formwork Checking	2	02-Mar-16 A	03-Mar-16 A	
PD-EC1-7-150	PD EC1-7 Internal Wall Chamfer & Baseslab Concrete	1	04-Mar-16 A	04-Mar-16 A	
PD-EC1-7-160	PD EC1-7 Internal Wall Chamfer Formwork Removal	1	05-Mar-16 A	05-Mar-16 A	
PD-EC1-7-170	PD EC1-7 Internal Wall Formwork Installation	1	05-Mar-16 A	05-Mar-16 A	
PD-EC1-7-180	PD EC1-7 Internal Wall Rebar & Formwork Checking	1	06-Mar-16 A	06-Mar-16 A	
PD-EC1-7-190	PD EC1-7 Internal Wall Concrete	1	07-Mar-16 A	07-Mar-16 A	
PD-EC1-7-200	PD EC1-7 Internal Wall Formwork Removal	1	08-Mar-16 A	08-Mar-16 A	
PD-EC1-7-210	PD EC1-7 Top Slab Support	2	09-Mar-16 A	10-Mar-16 A	



Remaining Level of Effort
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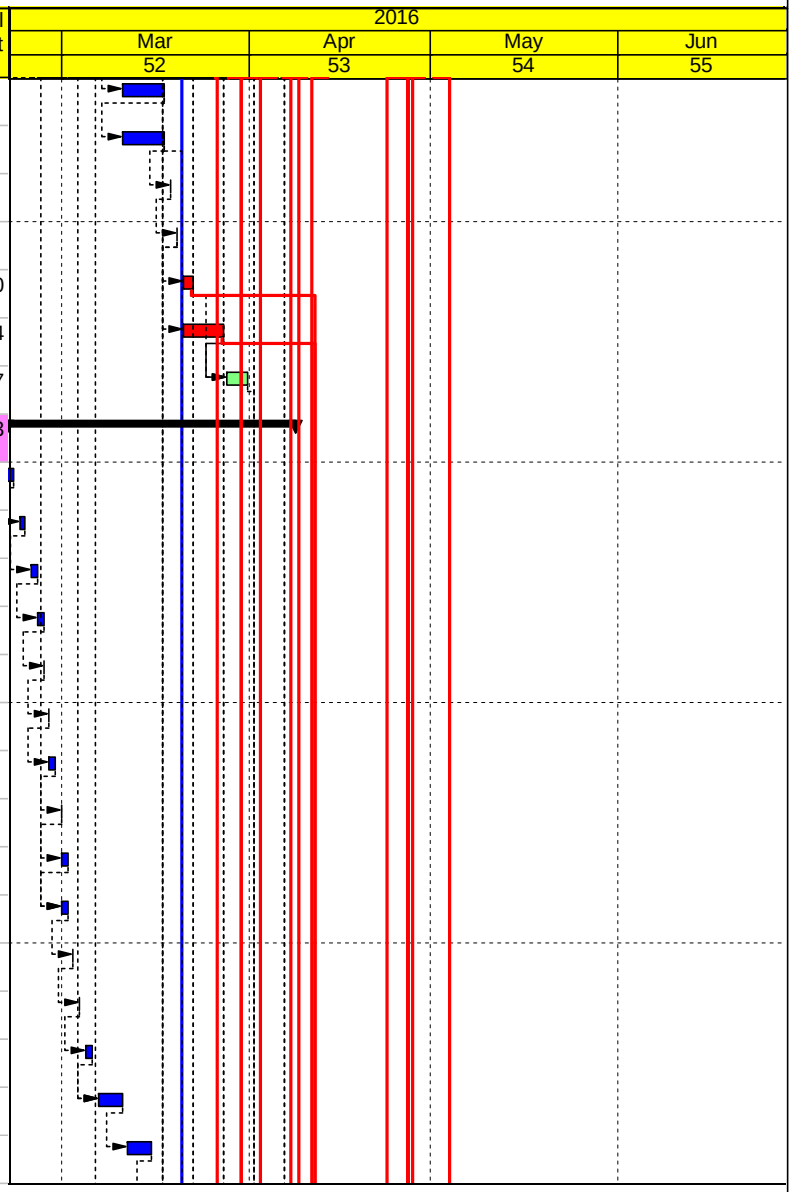
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
PD-EC1-7-220	PD EC1-7 Top Slab Formwork	8	11-Mar-16 A	18-Mar-16 A	
PD-EC1-7-230	PD EC1-7 Top Slab Rebar Fixing	8	11-Mar-16 A	18-Mar-16 A	
PD-EC1-7-240	PD EC1-7 Top Slab Rebar & Formwork Checking	1	19-Mar-16 A	19-Mar-16 A	
PD-EC1-7-250	PD EC1-7 Top Slab Insitu Concrete	1	20-Mar-16 A	20-Mar-16 A	
PD-EC1-7-260	PD EC1-7 Top Slab Side Formwork Removal	2	21-Mar-16	22-Mar-16	-430
PD-EC1-7-270	PD EC1-7 Top Slab Curing	7	21-Mar-16	27-Mar-16	-444
PD-EC1-7-280	PD EC1-7 Removal of top slab Formwork	4	28-Mar-16	31-Mar-16	577
EC1-8		19	21-Feb-16 A	08-Apr-16	573
PD-EC1-8-045	PD EC1-8 External Wall Frameworks	3	21-Feb-16 A	22-Feb-16 A	
PD-EC1-8-050	PD EC1-8 External Wall Rebar Fixing	3	23-Feb-16 A	24-Feb-16 A	
PD-EC1-8-060	PD EC1-8 External Wall Formwork Installation	4	25-Feb-16 A	26-Feb-16 A	
PD-EC1-8-070	PD EC1-8 External Wall Rebar & Formwork Checking	1	26-Feb-16 A	27-Feb-16 A	
PD-EC1-8-080	PD EC1-8 External Wall Insitu Concrete	1	27-Feb-16 A	27-Feb-16 A	
PD-EC1-8-090	PD EC1-8 External Wall Formwork Removal	1	28-Feb-16 A	28-Feb-16 A	
PD-EC1-8-100	PD EC1-8 External Wall Support Framework Removal	3	28-Feb-16 A	29-Feb-16 A	
PD-EC1-8-110	PD EC1-8 Internal Wall Cleaning	3	01-Mar-16 A	01-Mar-16 A	
PD-EC1-8-120	PD EC1-8 Internal Wall Rebar Fixing	4	01-Mar-16 A	02-Mar-16 A	
PD-EC1-8-130	PD EC1-8 Internal Chamfer Formwork Installation	4	01-Mar-16 A	02-Mar-16 A	
PD-EC1-8-140	PD EC1-8 Internal Chamfer Rebar & Formwork Checking	1	03-Mar-16 A	03-Mar-16 A	
PD-EC1-8-150	PD EC1-8 Internal Wall Chamfer & Baseslab Concrete	1	04-Mar-16 A	04-Mar-16 A	
PD-EC1-8-160	PD EC1-8 Internal Wall Chamfer Formwork Removal	2	05-Mar-16 A	06-Mar-16 A	
PD-EC1-8-170	PD EC1-8 Internal Wall Formwork Installation	4	07-Mar-16 A	11-Mar-16 A	
PD-EC1-8-180	PD EC1-8 Internal Wall Rebar & Formwork Checking	1	12-Mar-16 A	16-Mar-16 A	

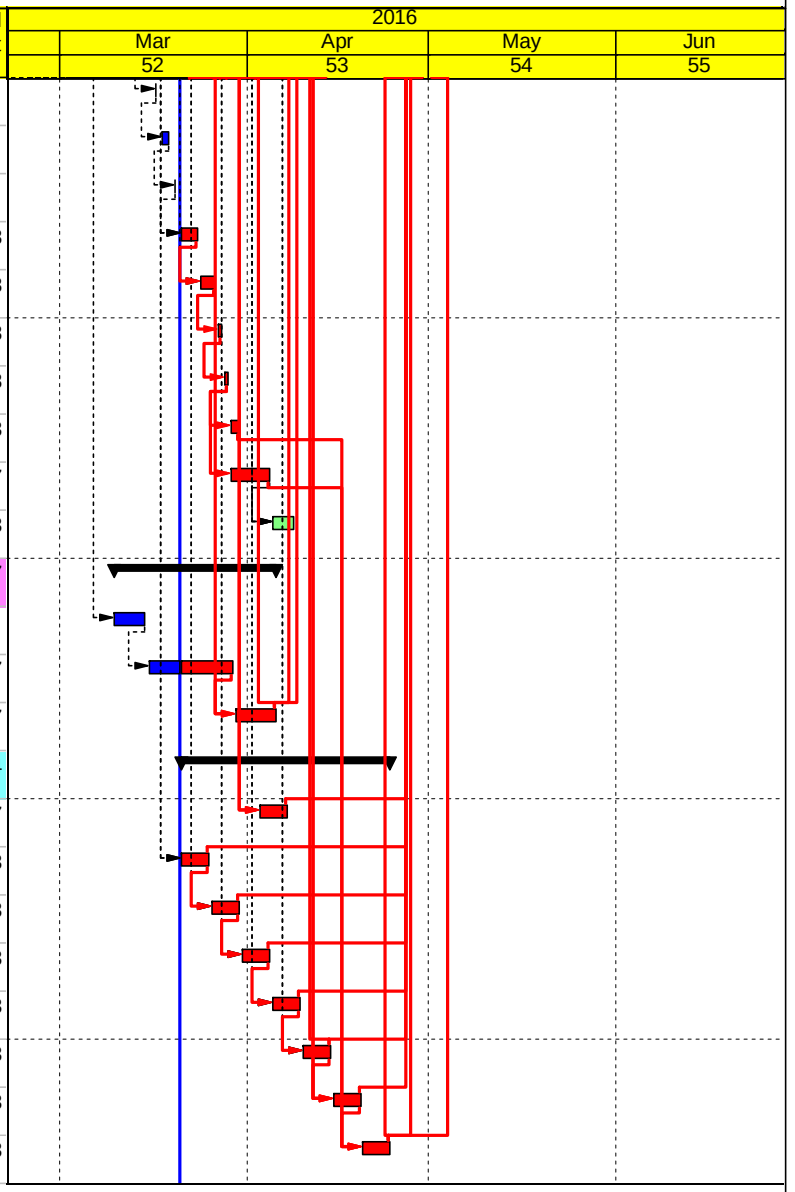


Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

TASK filter: Three Month Rolling.

Primavera Systems, Inc.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
PD-EC1-8-190	PD EC1-8 Internal Wall Concrete	1	17-Mar-16 A	17-Mar-16 A	
PD-EC1-8-200	PD EC1-8 Internal Wall Formwork Removal	2	18-Mar-16 A	19-Mar-16 A	
PD-EC1-8-210	PD EC1-8 Top Slab Support	3	20-Mar-16 A	20-Mar-16 A	
PD-EC1-8-220	PD EC1-8 Top Slab Formwork	3	21-Mar-16	23-Mar-16	-438
PD-EC1-8-230	PD EC1-8 Top Slab Rebar Fixing	3	24-Mar-16	26-Mar-16	-438
PD-EC1-8-240	PD EC1-8 Top Slab Rebar & Formwork Checking	1	27-Mar-16	27-Mar-16	-438
PD-EC1-8-250	PD EC1-8 Top Slab Insitu Concrete	1	28-Mar-16	28-Mar-16	-438
PD-EC1-8-260	PD EC1-8 Top Slab Side Formwork Removal	2	29-Mar-16	30-Mar-16	-433
PD-EC1-8-270	PD EC1-8 Top Slab Curing	7	29-Mar-16	04-Apr-16	-447
PD-EC1-8-280	PD EC1-8 Removal of top slab Formwork	4	05-Apr-16	08-Apr-16	573
Connection to the Existing Culvert		16	10-Mar-16 A	05-Apr-16	-507
PD-EC1-0-10	PD EC1-0 South Wall Insitu Concrete	7	10-Mar-16 A	15-Mar-16 A	
PD-EC1-0-20	PD EC1-0 North Wall Insitu Concrete	7	16-Mar-16 A	29-Mar-16	-507
PD-EC1-0-30	PD EC1-0 Top Slab Insitu Concrete	7	30-Mar-16	05-Apr-16	-507
Backfilling & Reclamation		35	21-Mar-16	24-Apr-16	-254
PD-EC1-0100-020	PD EC1-1 Backfill and Compaction	5	03-Apr-16	07-Apr-16	-237
PD-EC1-0100-030	PD EC1-2 Backfill and Compaction	5	21-Mar-16	25-Mar-16	-453
PD-EC1-0100-040	PD EC1-3 Backfill and Compaction	5	26-Mar-16	30-Mar-16	-453
PD-EC1-0100-050	PD EC1-4 Backfill and Compaction	5	31-Mar-16	04-Apr-16	-453
PD-EC1-0100-060	PD EC1-5 Backfill and Compaction	5	05-Apr-16	09-Apr-16	-453
PD-EC1-0100-070	PD EC1-6 Backfill and Compaction	5	10-Apr-16	14-Apr-16	-453
PD-EC1-0100-080	PD EC1-7 Backfill and Compaction	5	15-Apr-16	19-Apr-16	-453
PD-EC1-0100-090	PD EC1-8 Outfall Backfill and Compaction	5	20-Apr-16	24-Apr-16	-453

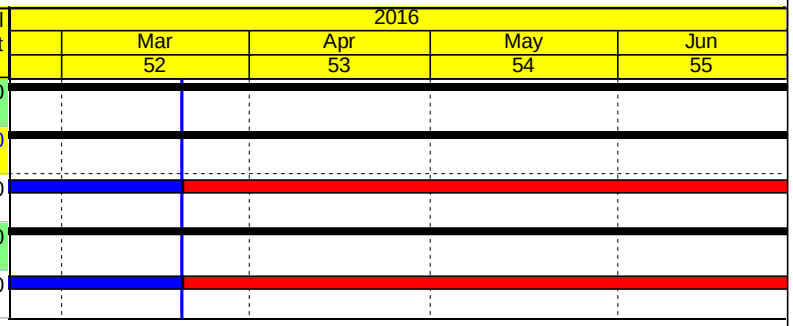


Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

TASK filter: Three Month Rolling.

Primavera Systems, Inc.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Works Area WA2 (Tung Chung)		1458	21-May-12 A	28-Feb-17	0
Zone A		1458	21-May-12 A	28-Feb-17	0
A1880	Maintenance of Engineer's Accommodation	1458	21-May-12 A	28-Feb-17	0
Works Area TKO Fill Bank		1278	25-Sep-12 A	30-Nov-16	0
WA-TKO-1040	Operate and Maintain Public Fill Sorting Facilities in Zone A, B1 & B2	1278	25-Sep-12 A	30-Nov-16	0



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 $\mu g/m^3$	500 $\mu g/m^3$
AMS3B*	368 $\mu g/m^3$	500 $\mu g/m^3$
AMS6	360 $\mu g/m^3$	500 $\mu g/m^3$
AMS7	370 $\mu g/m^3$	500 $\mu g/m^3$

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

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

Location	Action Level	Limit Level
AMS2	176 $\mu g/m^3$	260 $\mu g/m^3$
AMS3B*	167 $\mu g/m^3$	260 $\mu g/m^3$
AMS6	173 $\mu g/m^3$	260 $\mu g/m^3$
AMS7	183 $\mu g/m^3$	260 $\mu g/m^3$

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

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

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

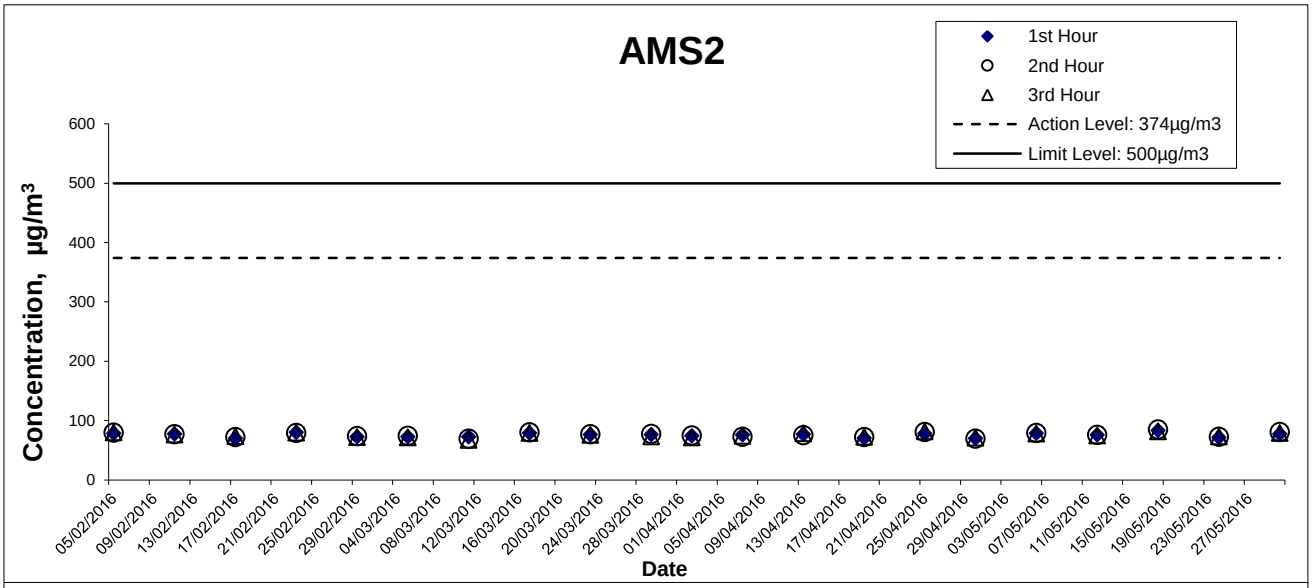
Table 5(a) Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL):

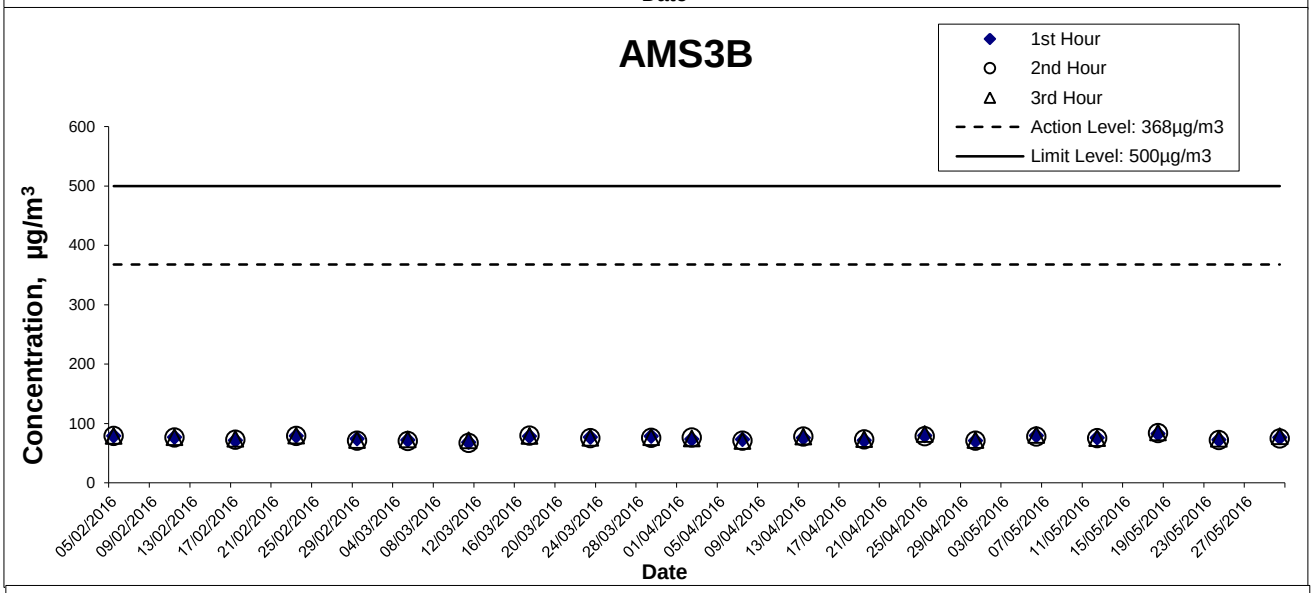
	North Lantau Social Cluster	
	NEL	**NWL**
Action Level	(STG < 70% of baseline) & (ANI < 70% of baseline)	(STG < 70% of baseline) & (ANI < 70% of baseline)
Limit Level	[(STG < 40% of baseline) & (ANI < 40% of baseline)] AND [(STG < 40% of baseline) & (ANI < 40% of baseline)]	

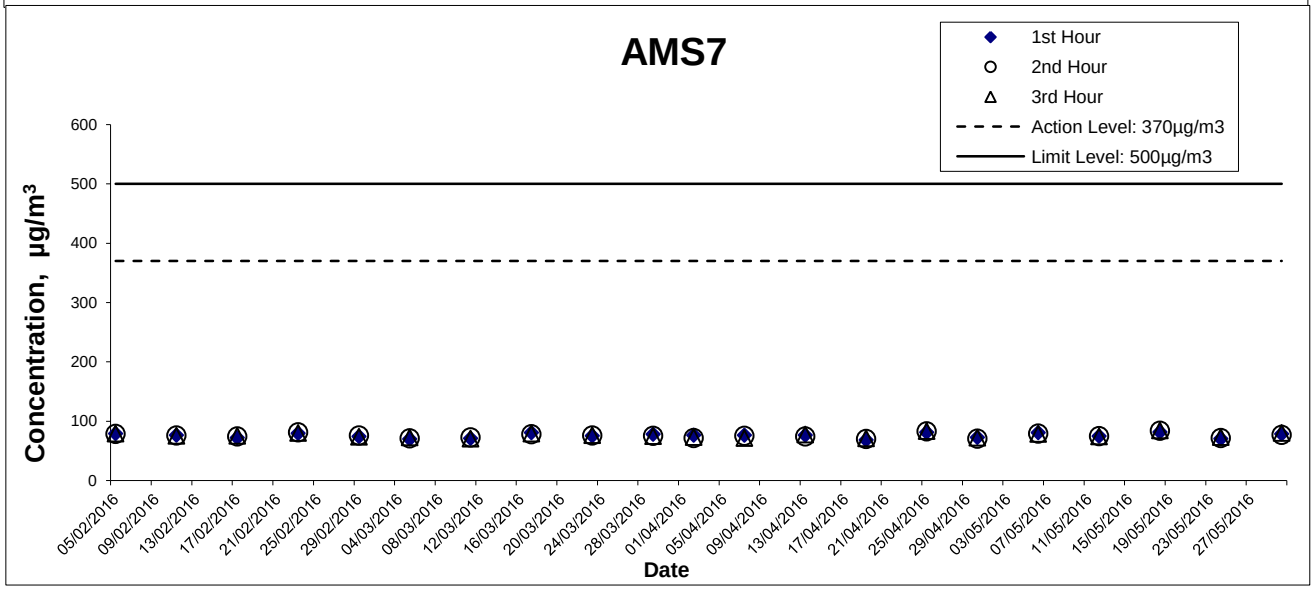
For North Lantau Social Cluster, action level will be trigger if either NEL **or** NWL fall below the criteria; limit level will be triggered if both NEL **and** NWL fall below the criteria.

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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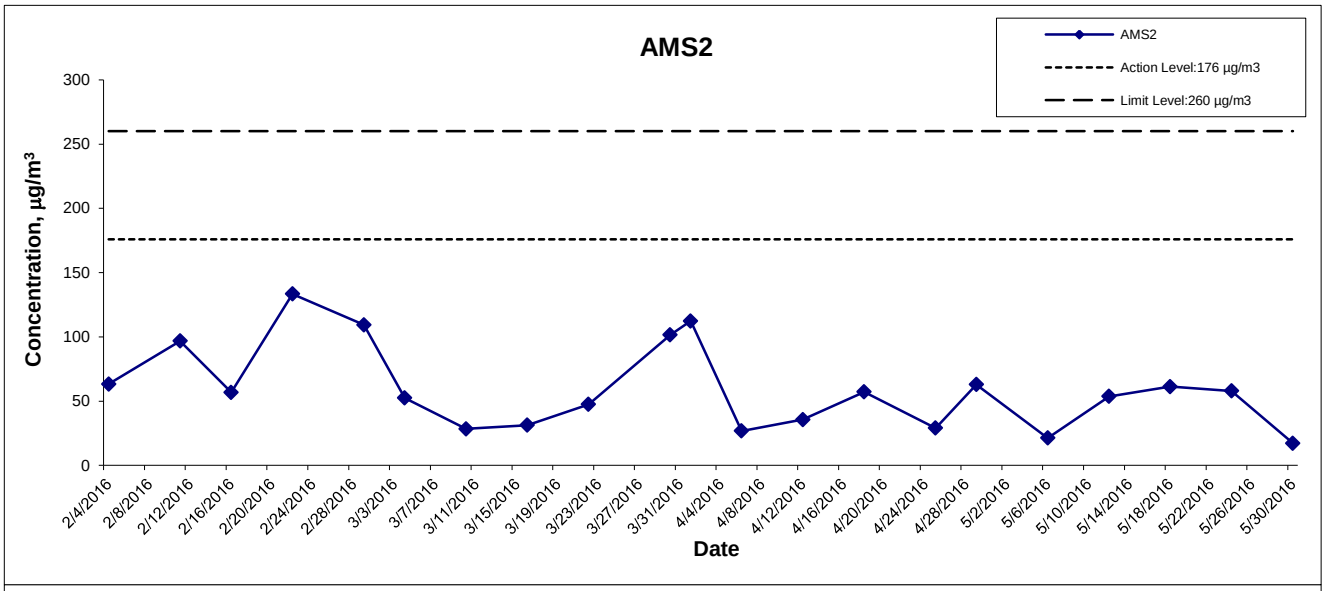
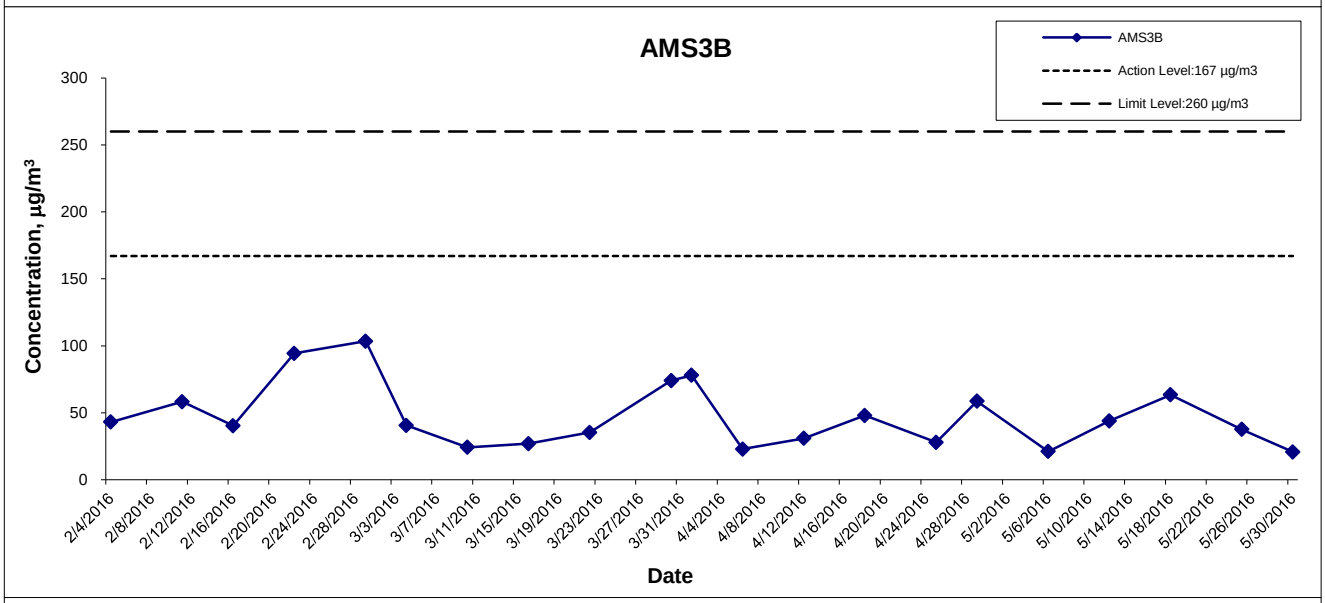
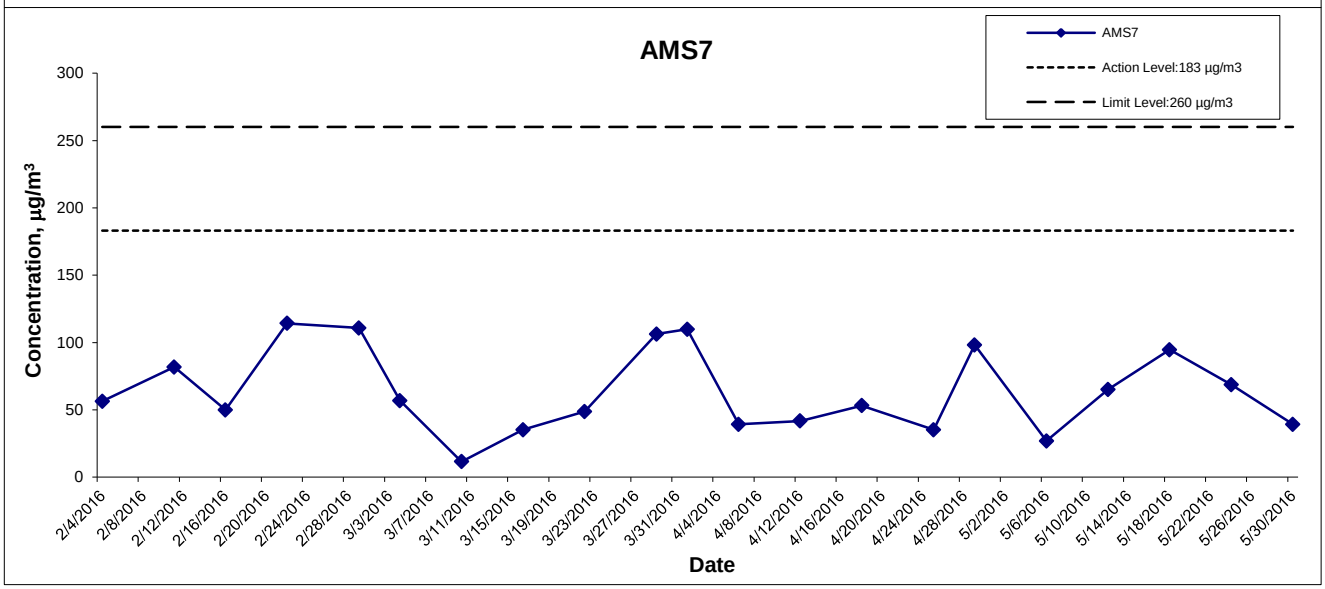
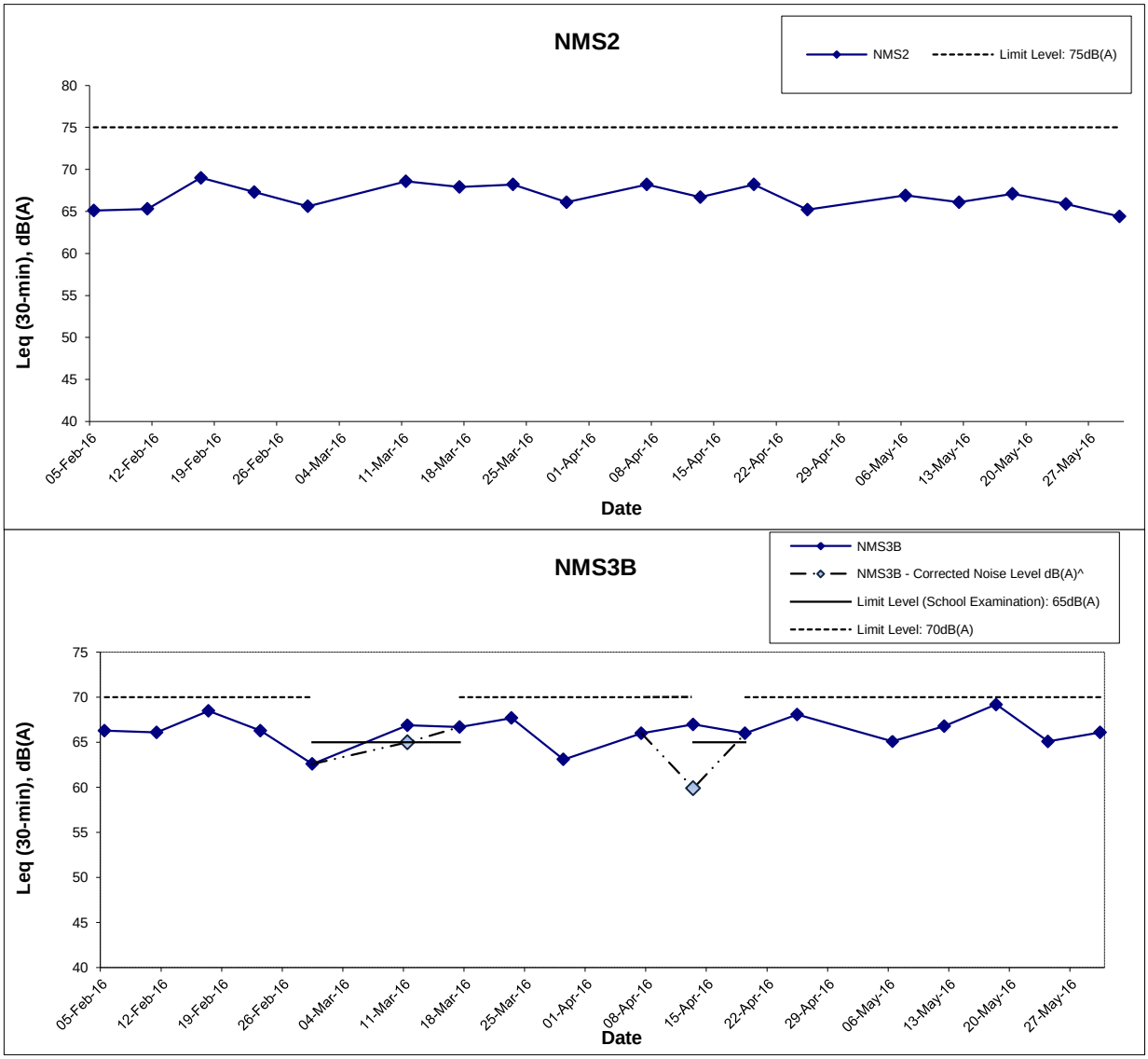
Appendix E







Remarks: Due to electricity failure, the 24-hour TSP Monitoring at Station AMS3B - Site Boundary of Site Office (WA2) was rescheduled from 23 May 2016 - 24 May 2016 to 24 May 2016 - 25 May 2016.



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.

> The measured noise level on 11 March 2016 exceeded the noise level of 65dB(A) during examination period on 11 March 2016 and it is higher than the baseline level. Therefore, baseline correction was carried out and the corrected noise level which solely represent the noise level of Constrcution works is 65 dB(A), no exceedance after correction. As such the EAP was not triggered.

< Since the measured noise level on 13 April 2016 is 66.3dB(A) and is equal to the baseline level, therefore it is considered that the measured noise level is same as the background, therefore it is not considered as an exceedance. As such the EAP was not triggered.

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Graphical Presentation of Impact Daytime Construction Noise Monitoring Results

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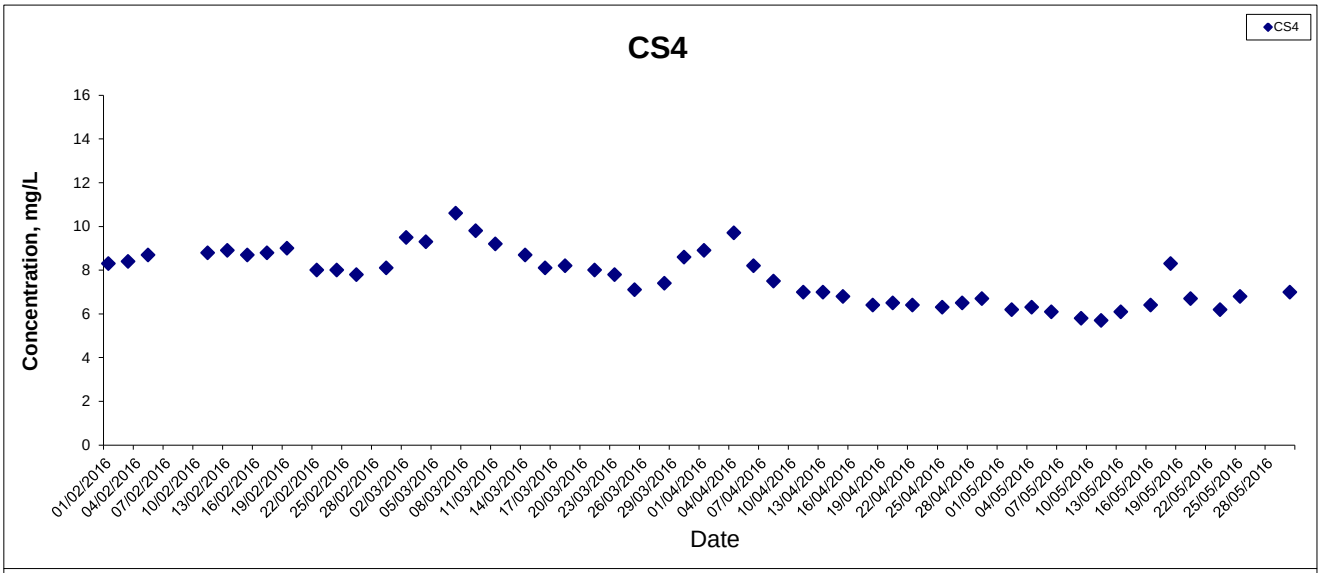
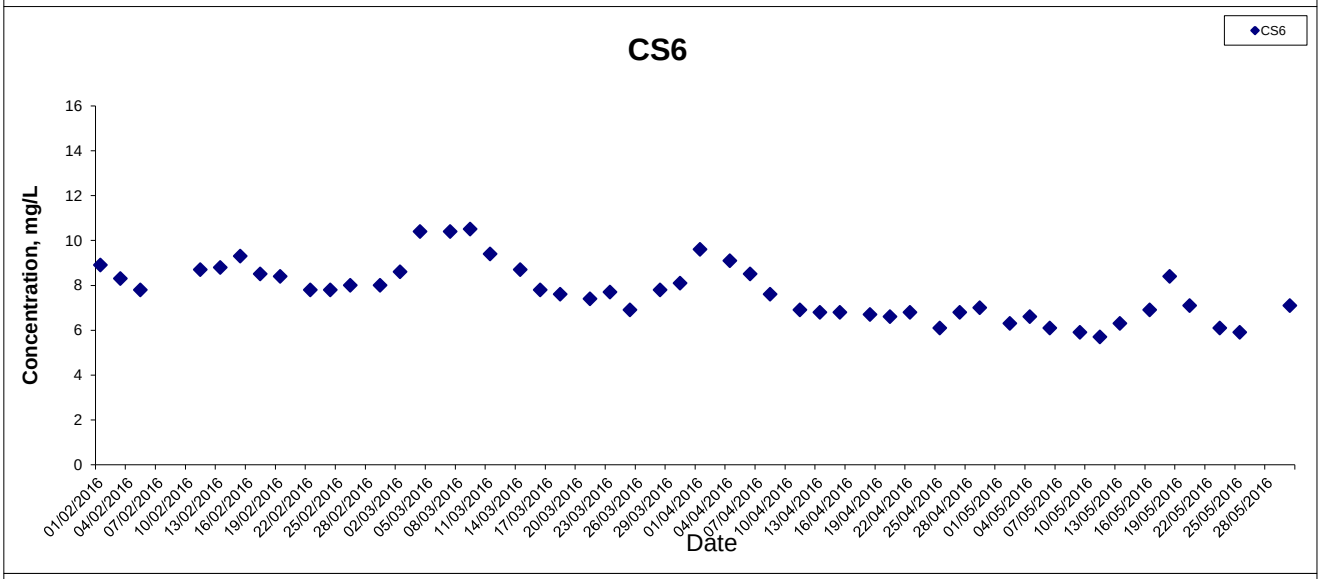
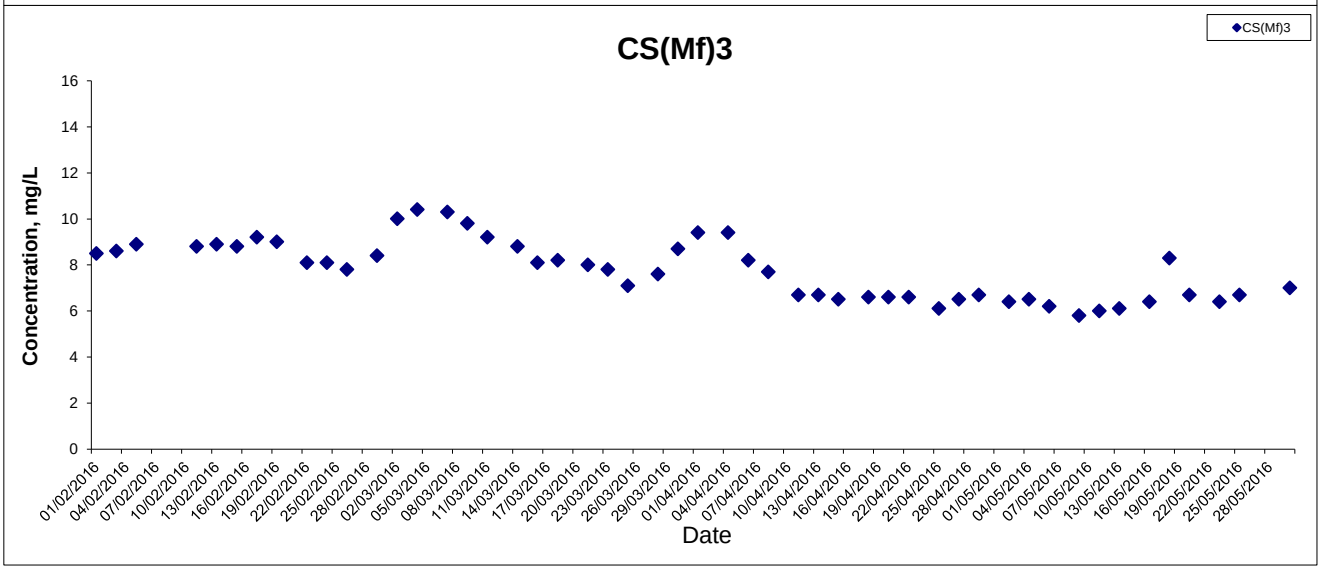
Appendix F

For details of the major activities carried out, weather conditions and other significant factors that might affect the monitoring results during monitoring periods from March 2016 to May 2016, please refer to the Monthly EM&A Reports for March 2016, April 2016 and May 2016 and their Appendix G respectively.

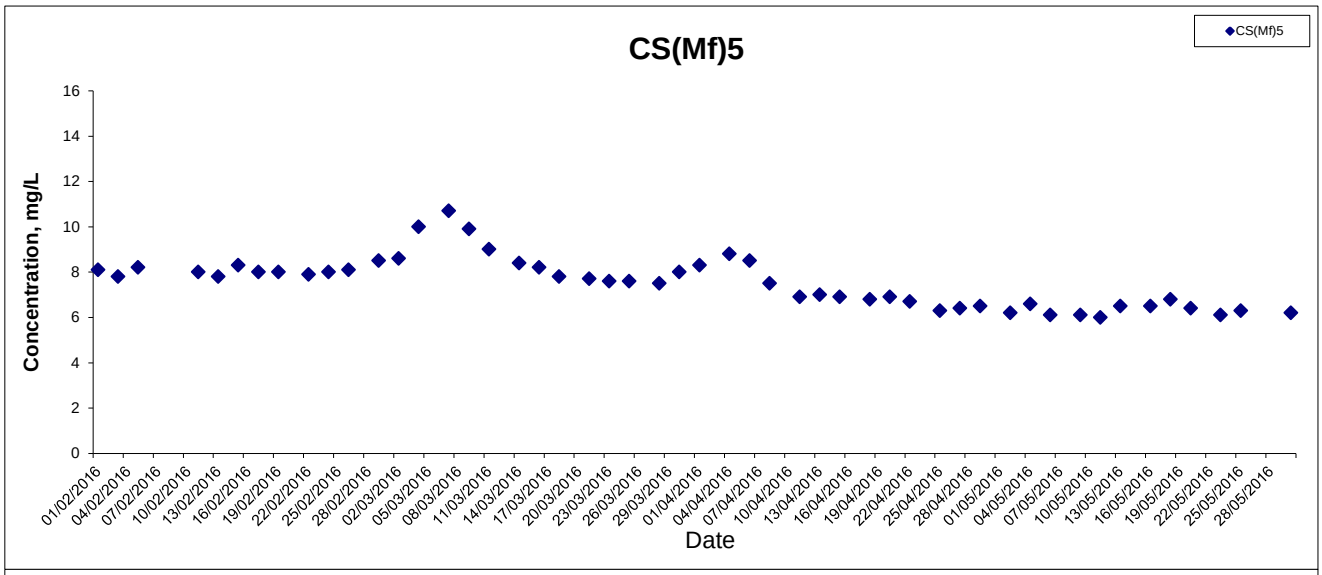
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

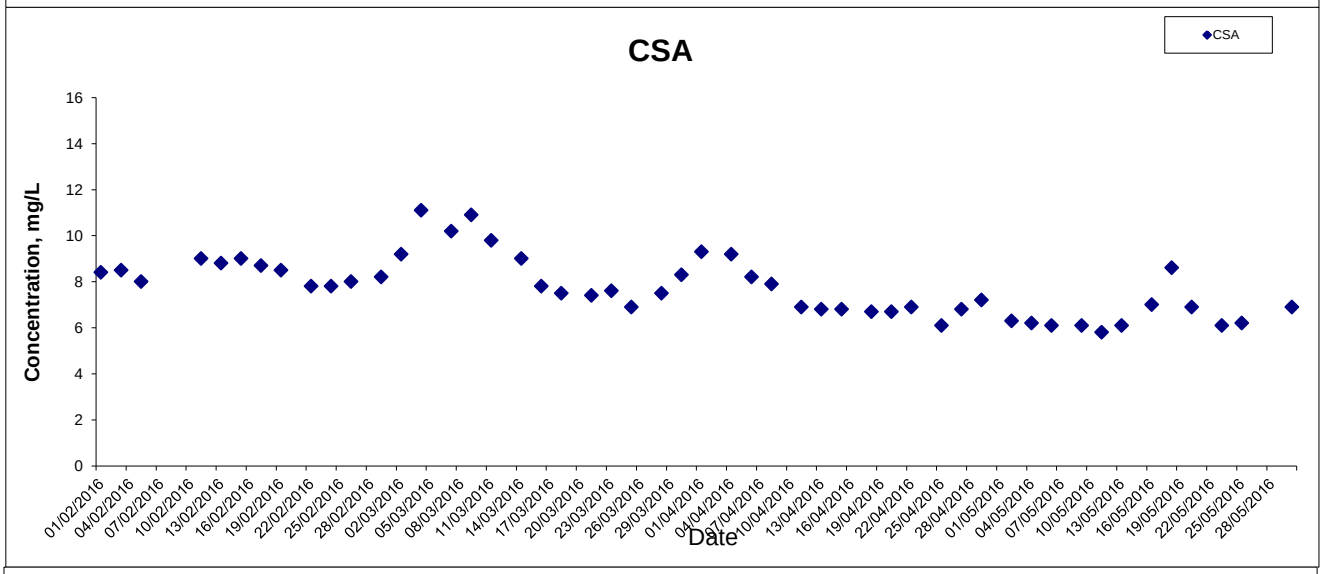


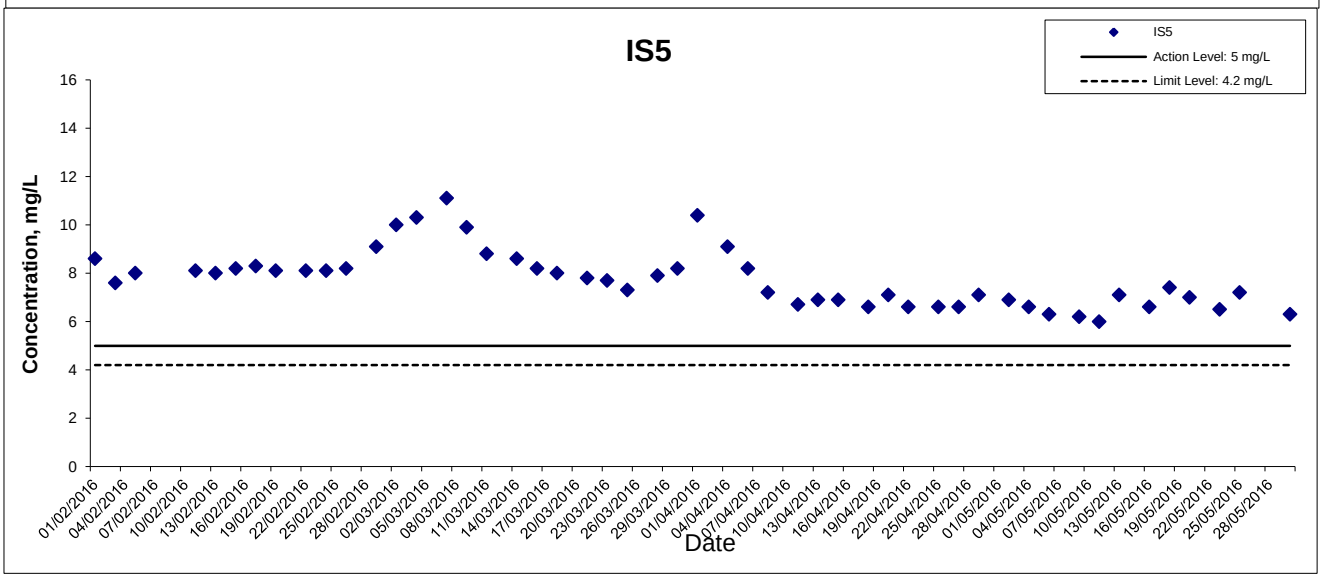




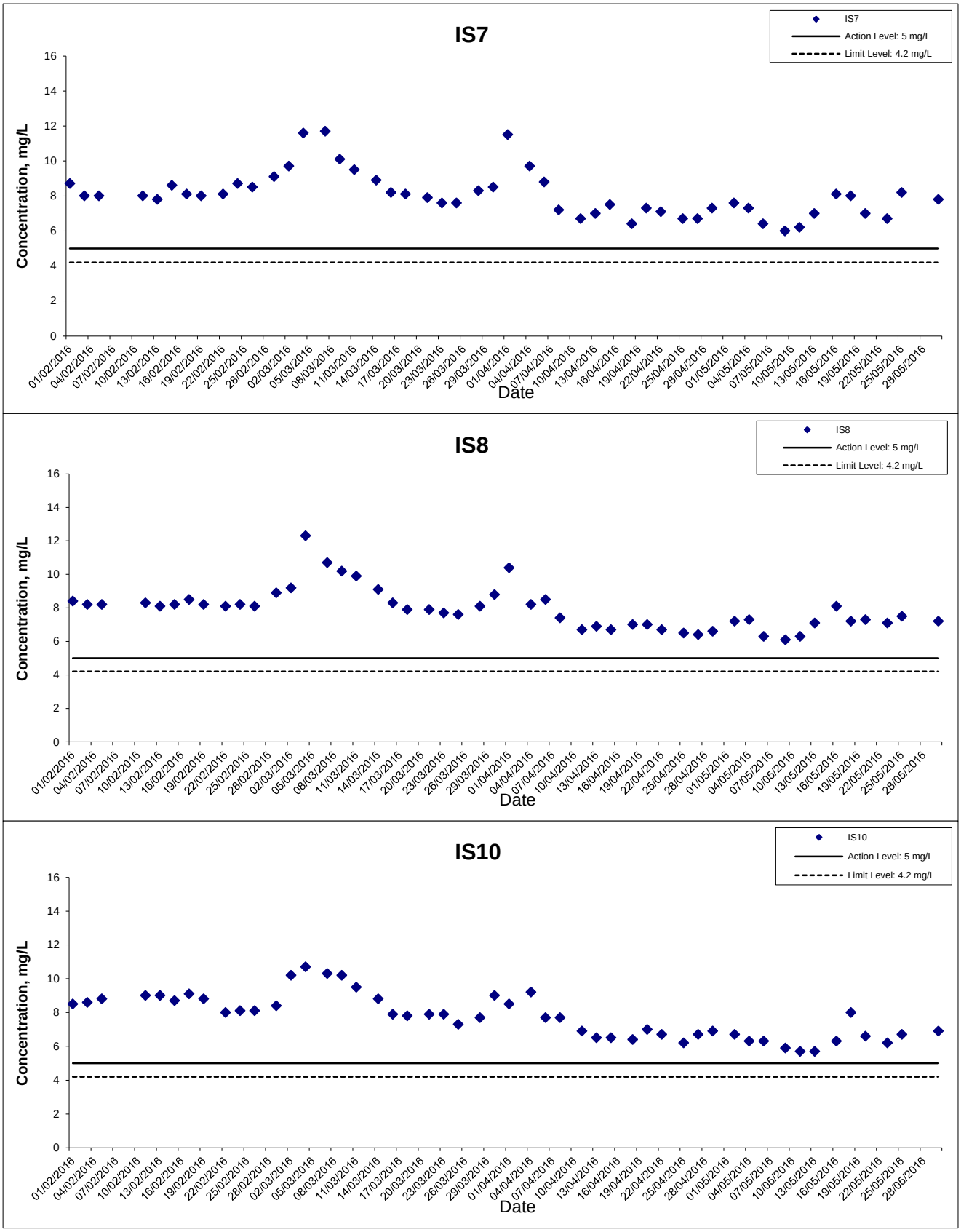
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



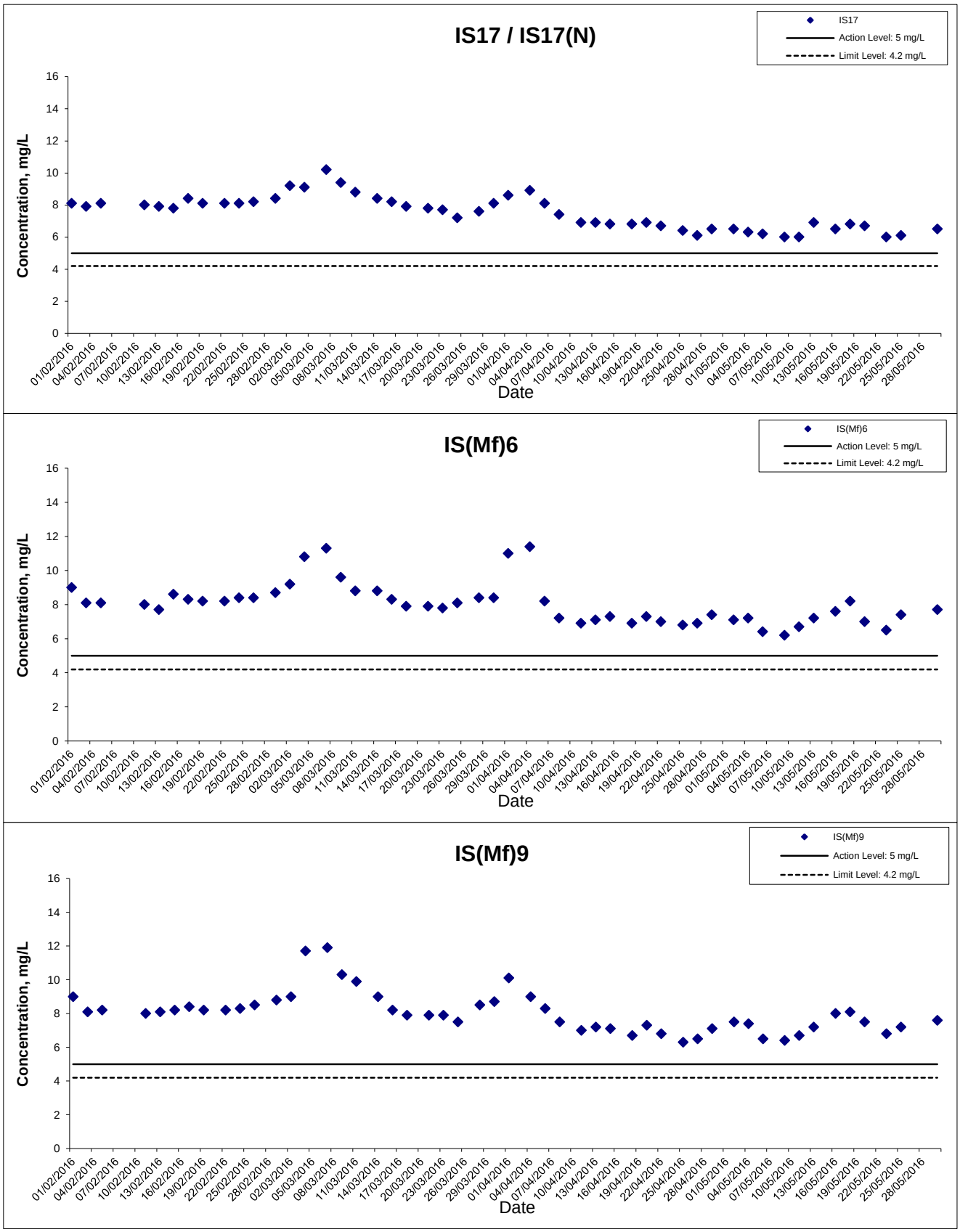


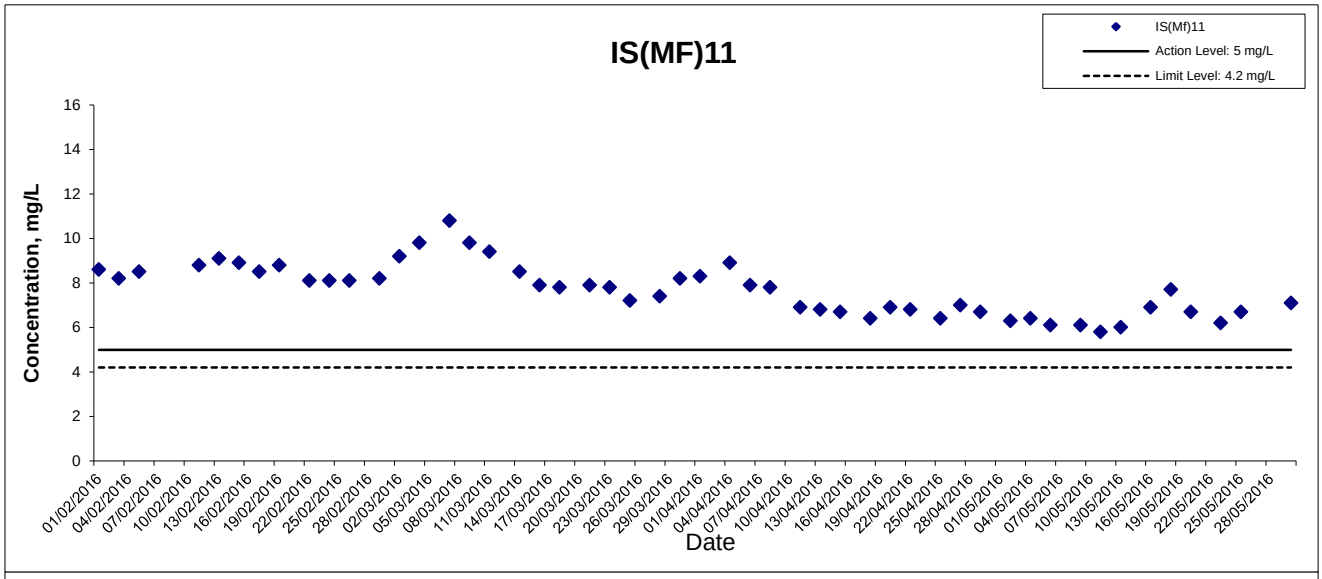


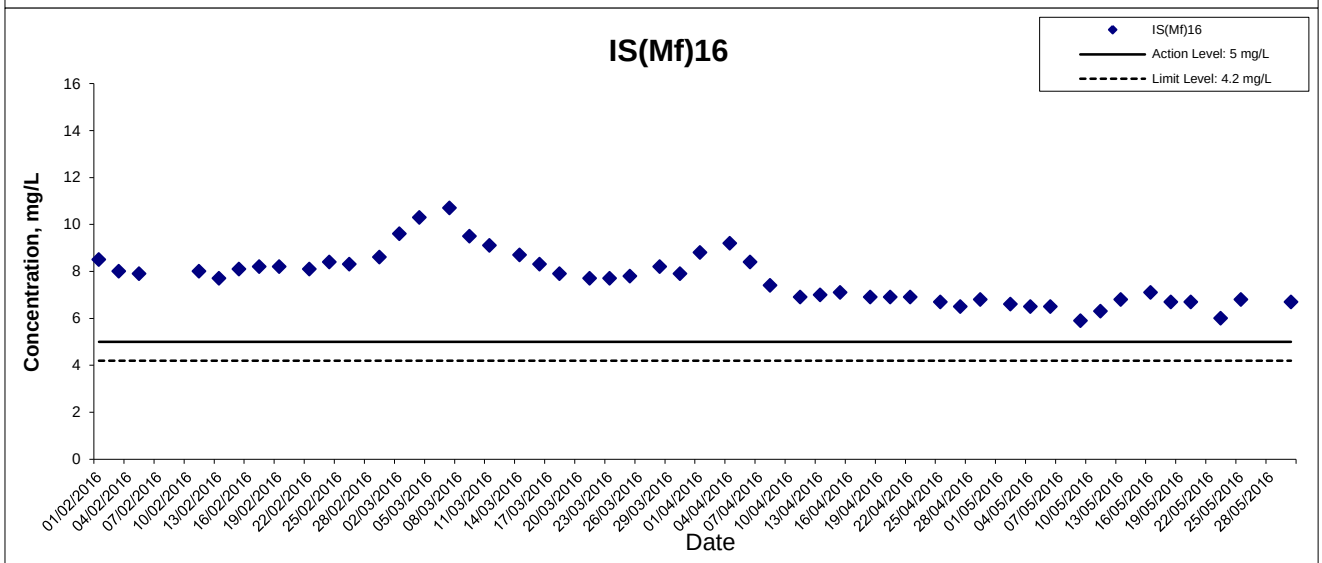
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

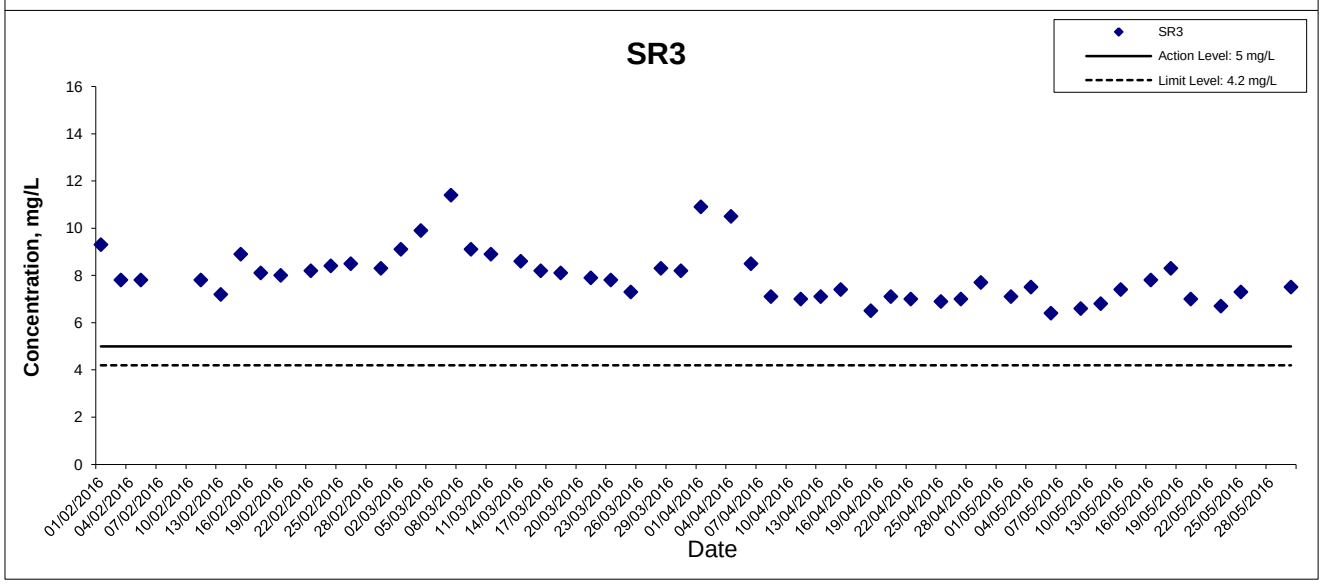


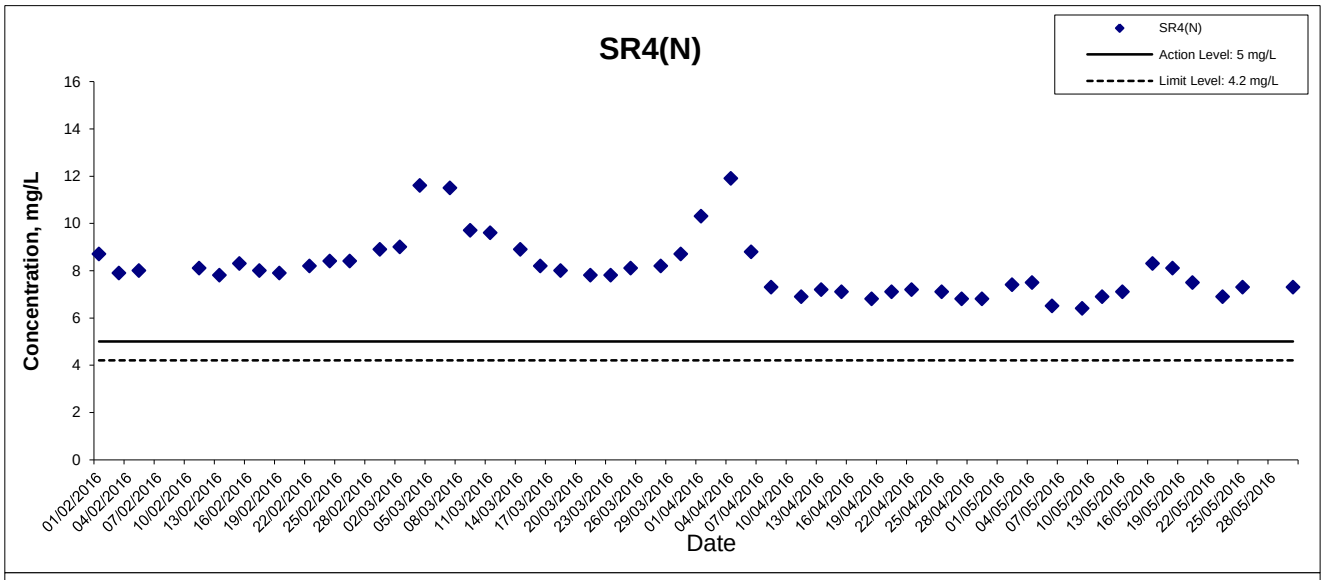
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

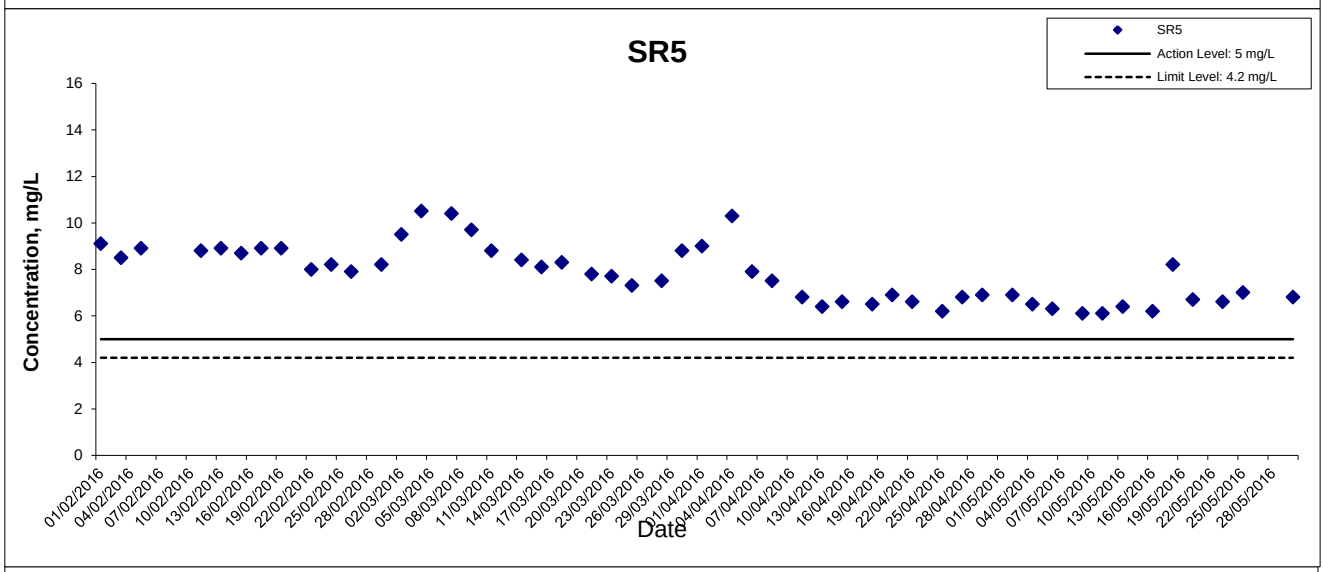


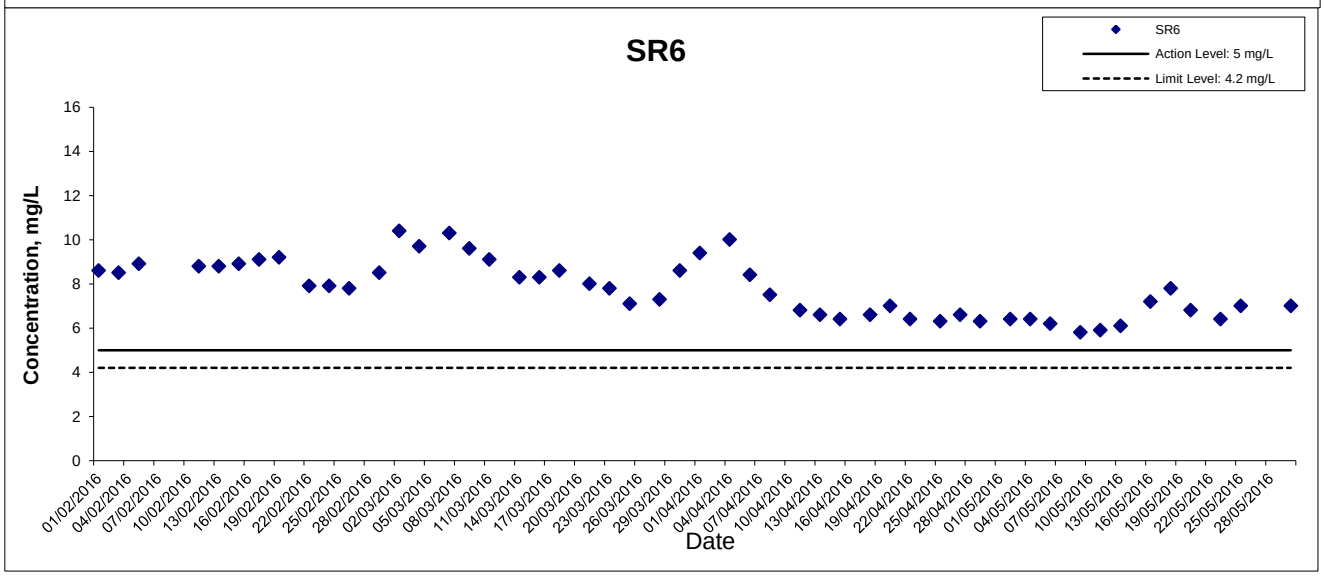












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Graphical Presentation of Impact Water Quality Monitoring Results

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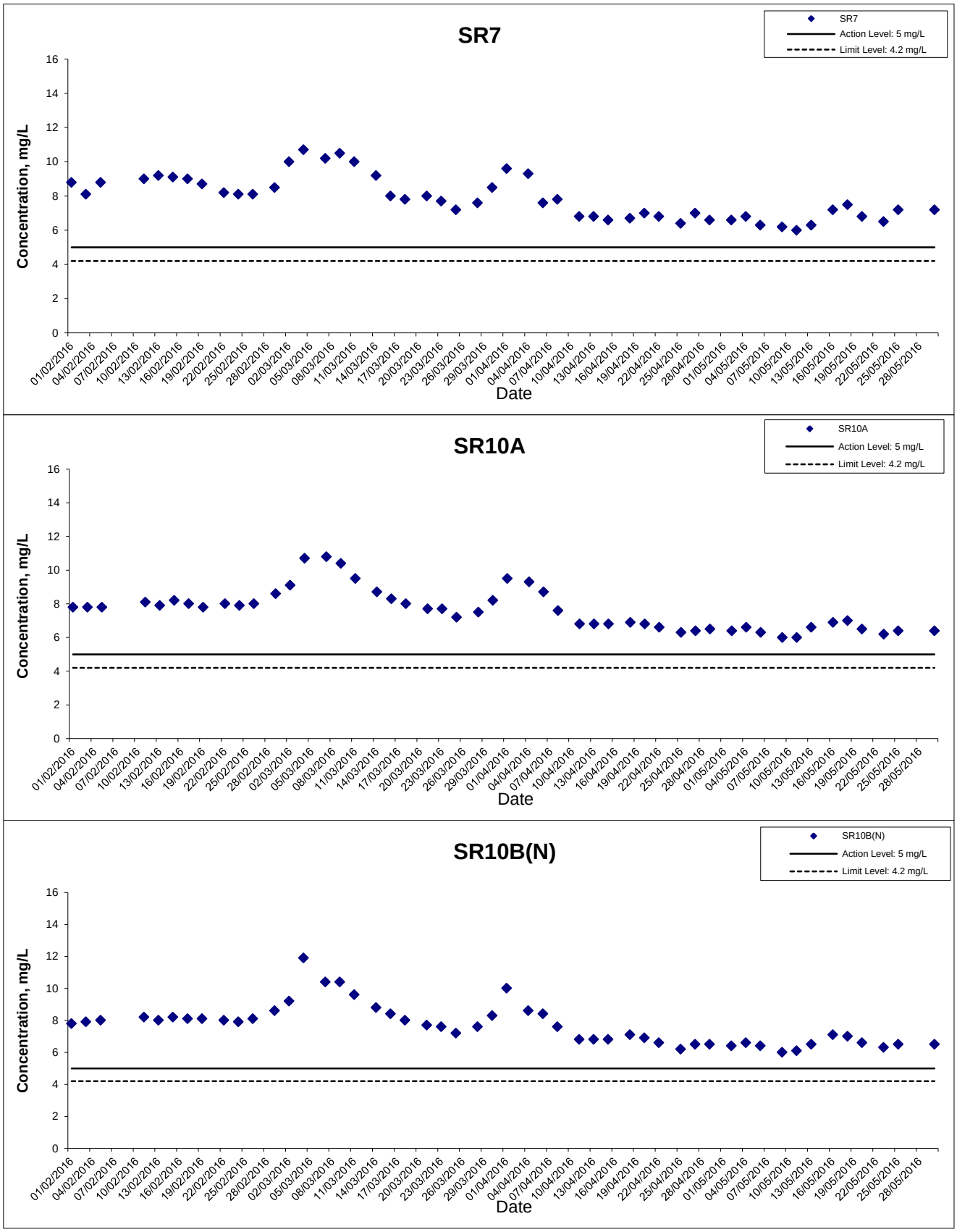

HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
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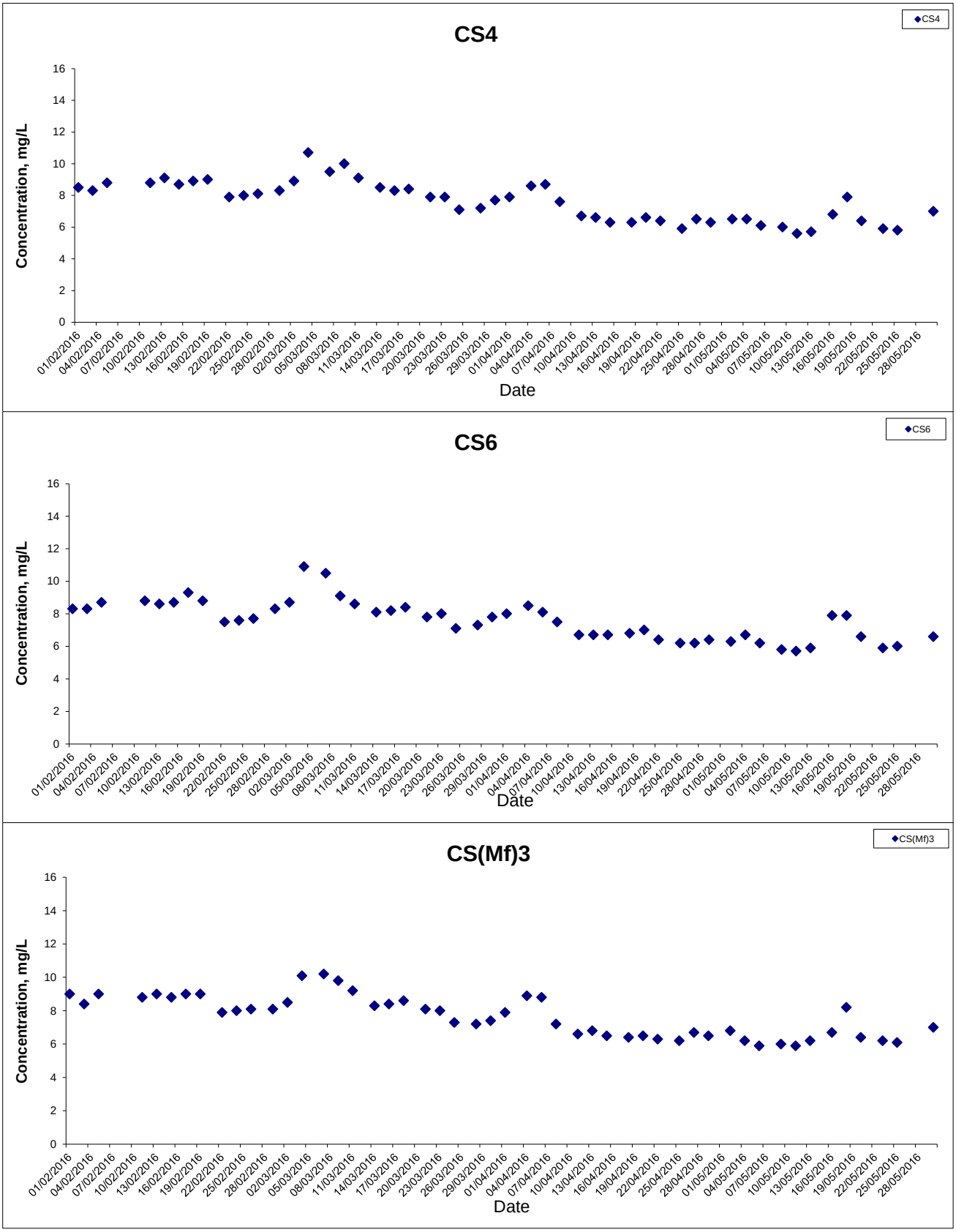
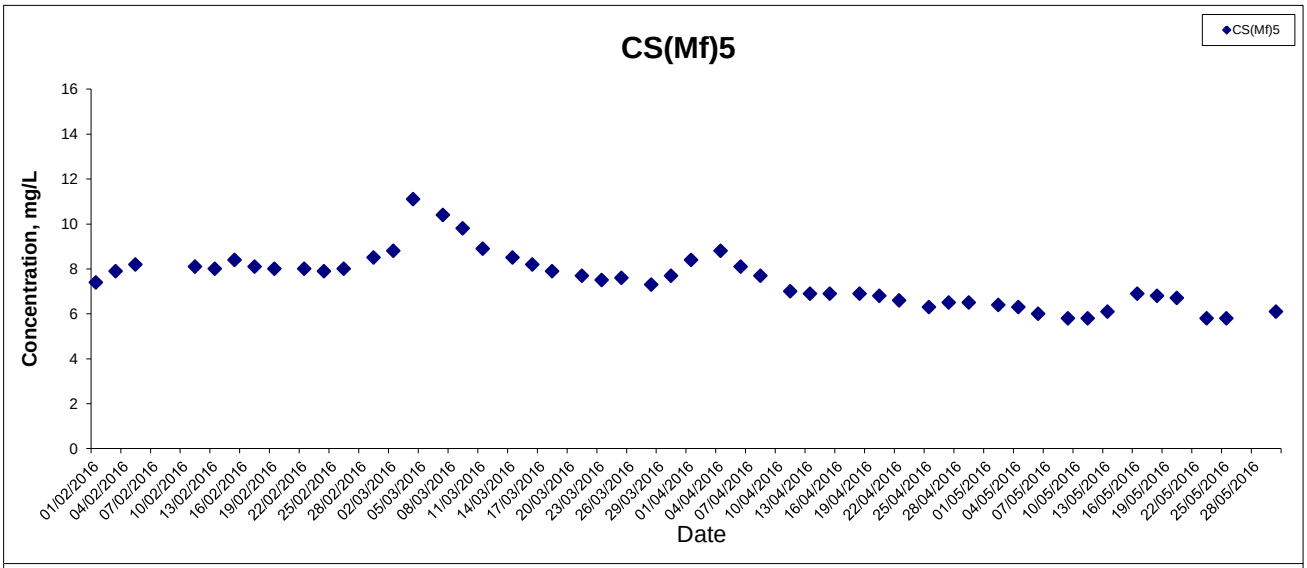
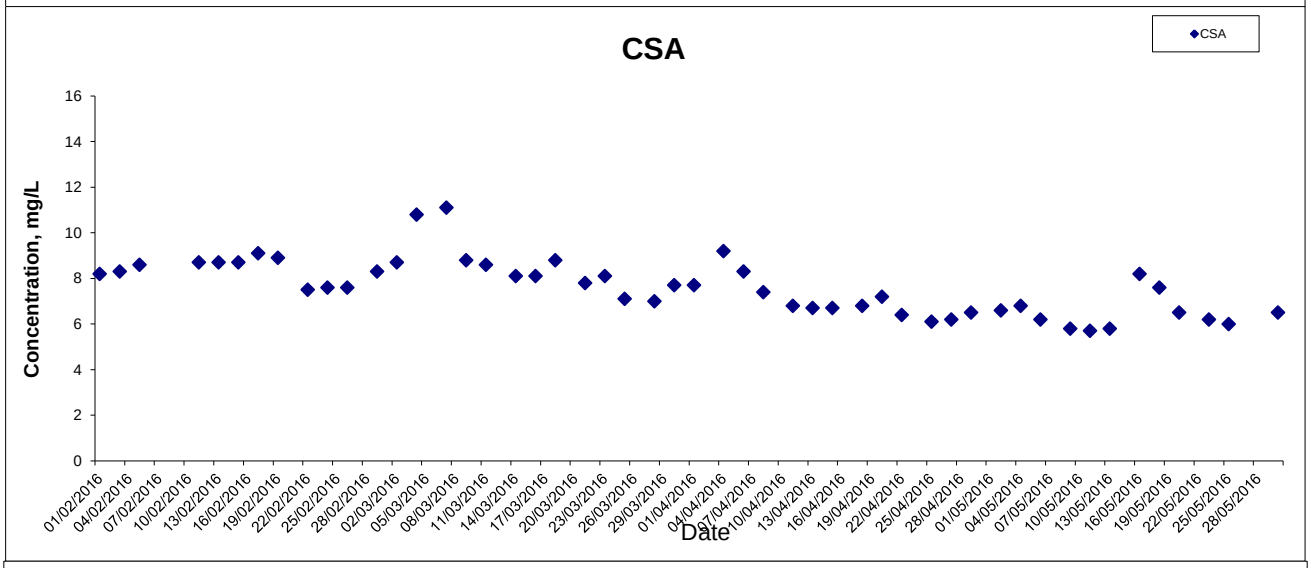
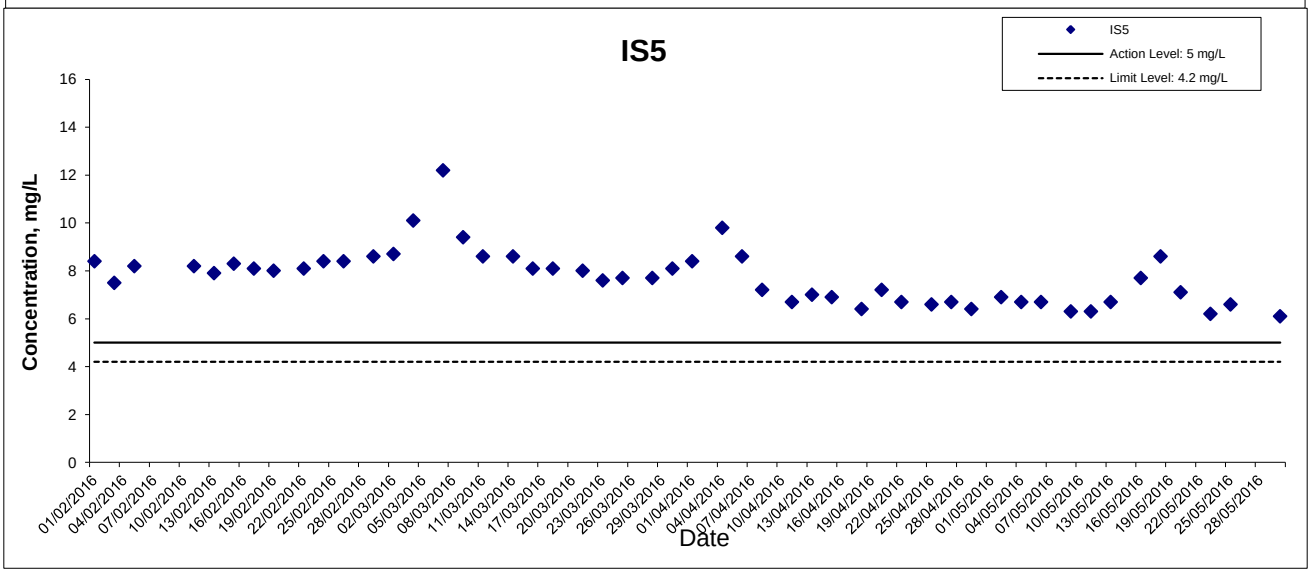
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



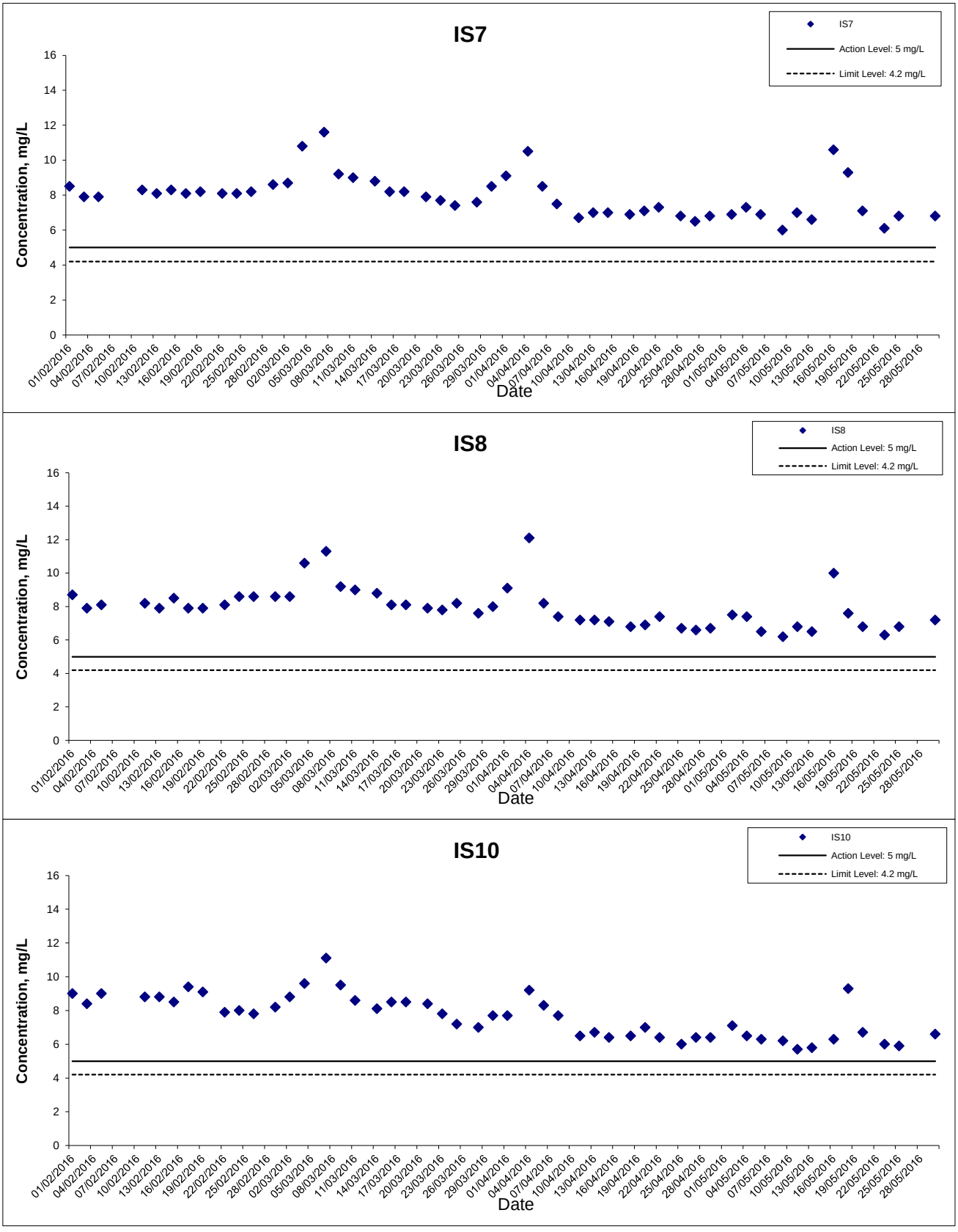
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide







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



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HONG KONG BOUNDARY CROSSING FACILITIES
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Graphical Presentation of Impact Water Quality Monitoring Results

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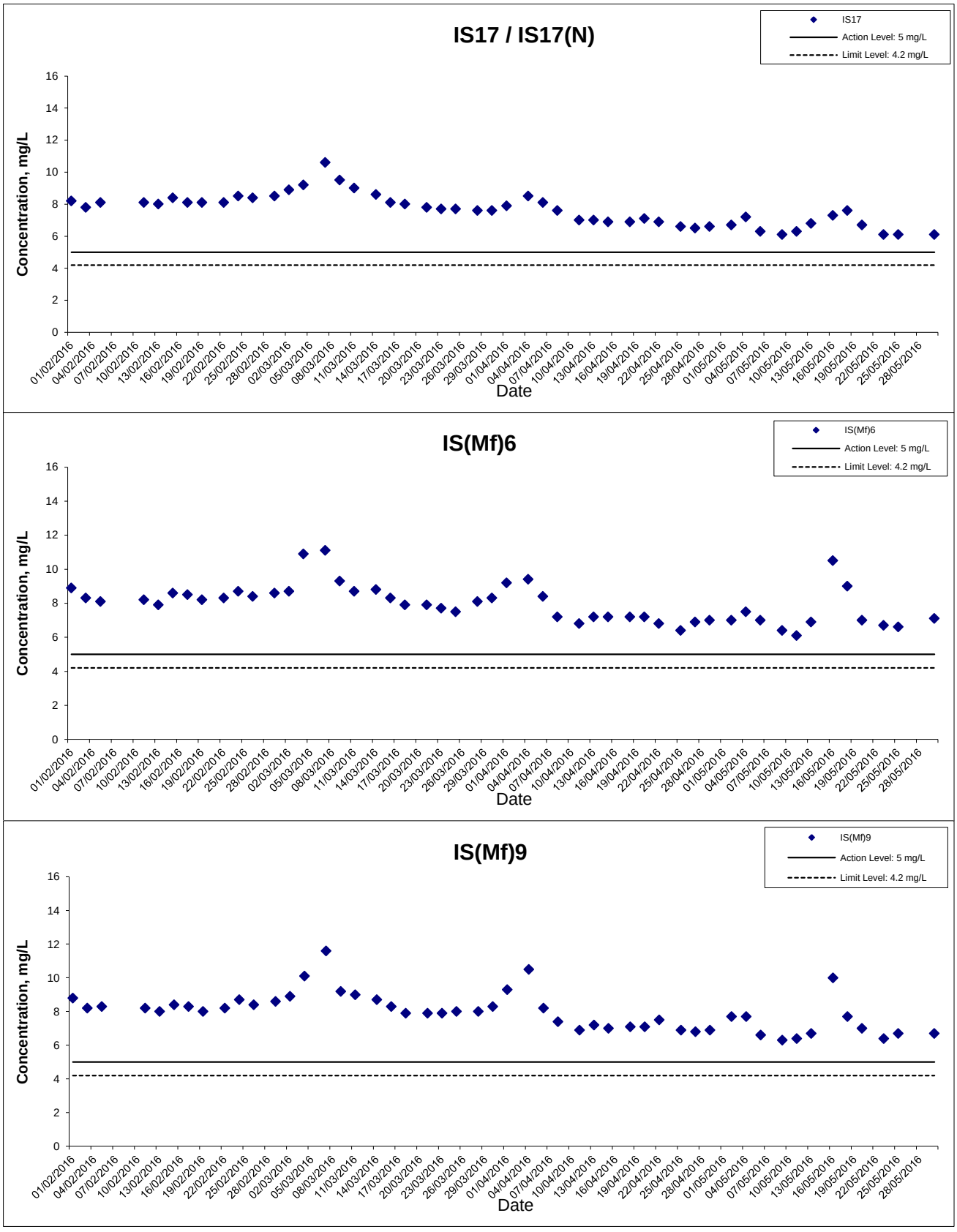
Appendix G

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



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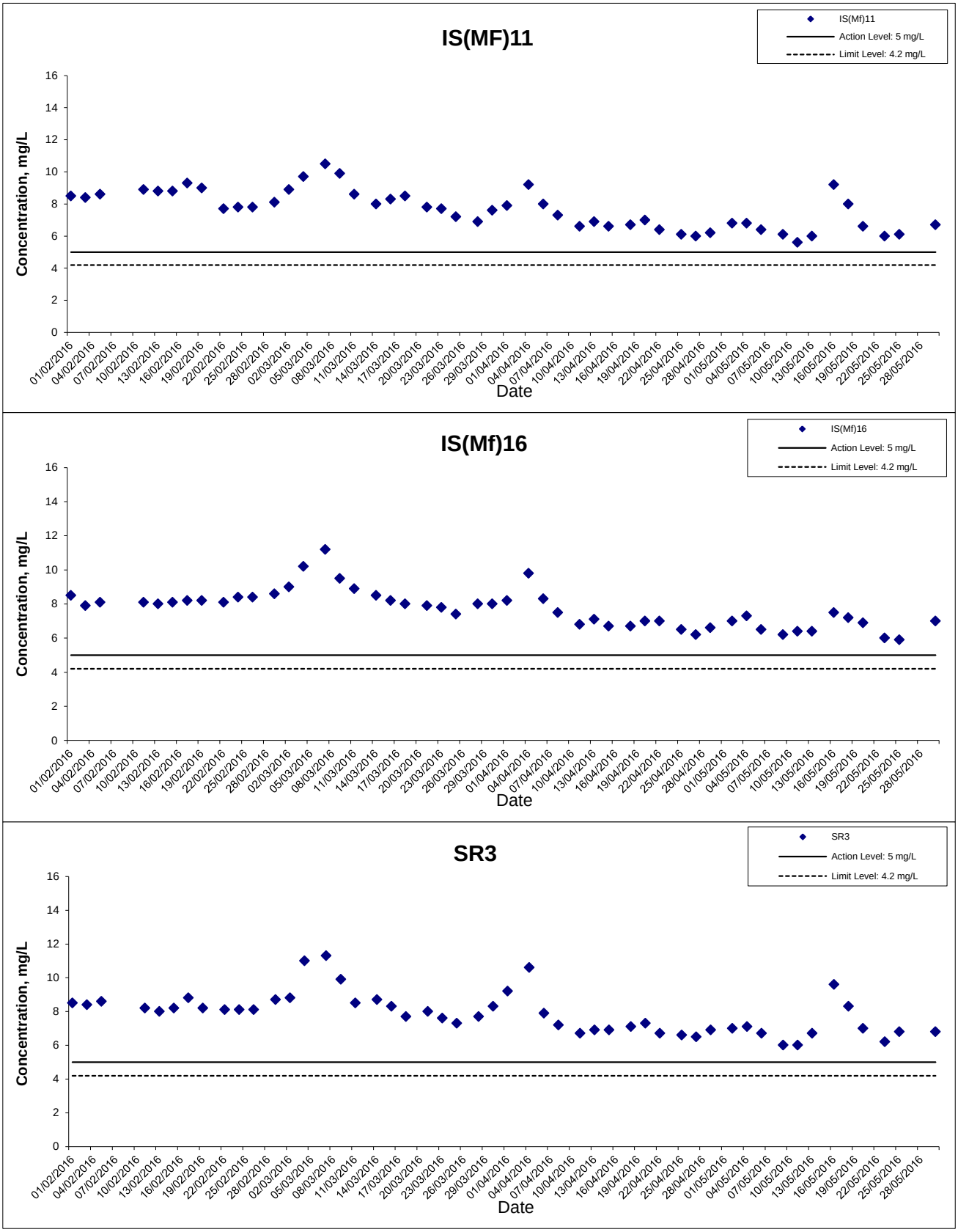
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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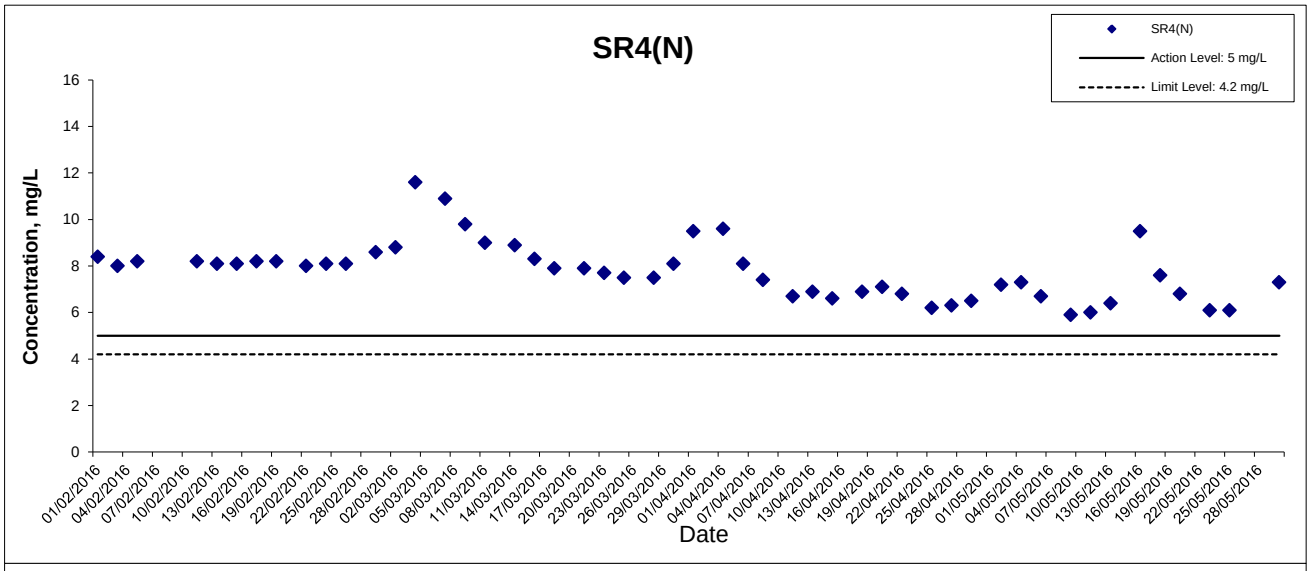
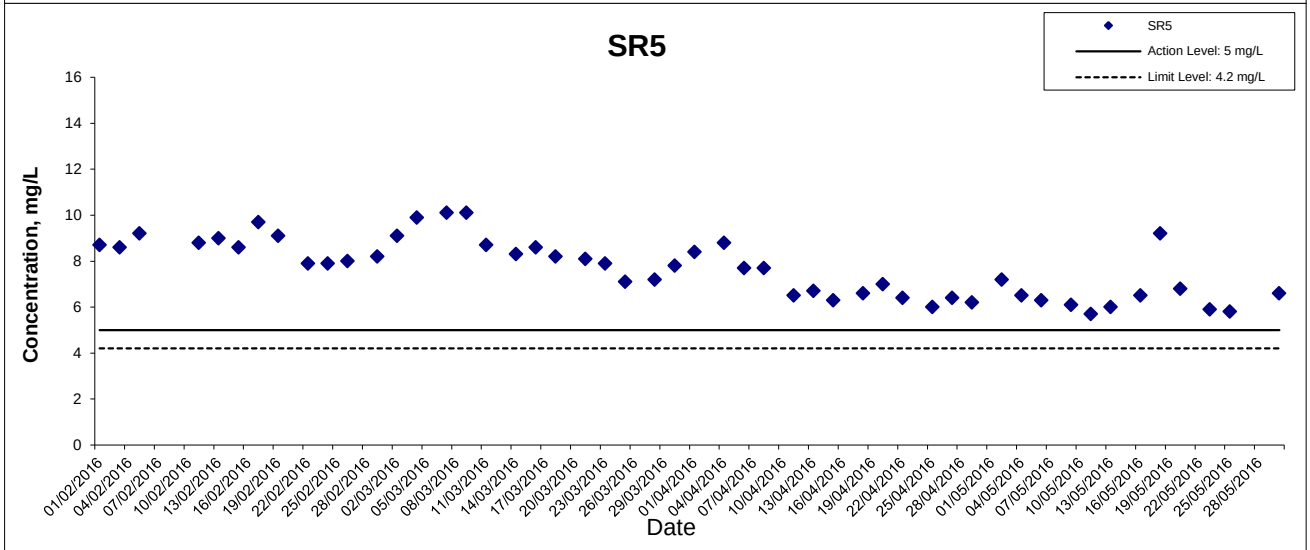
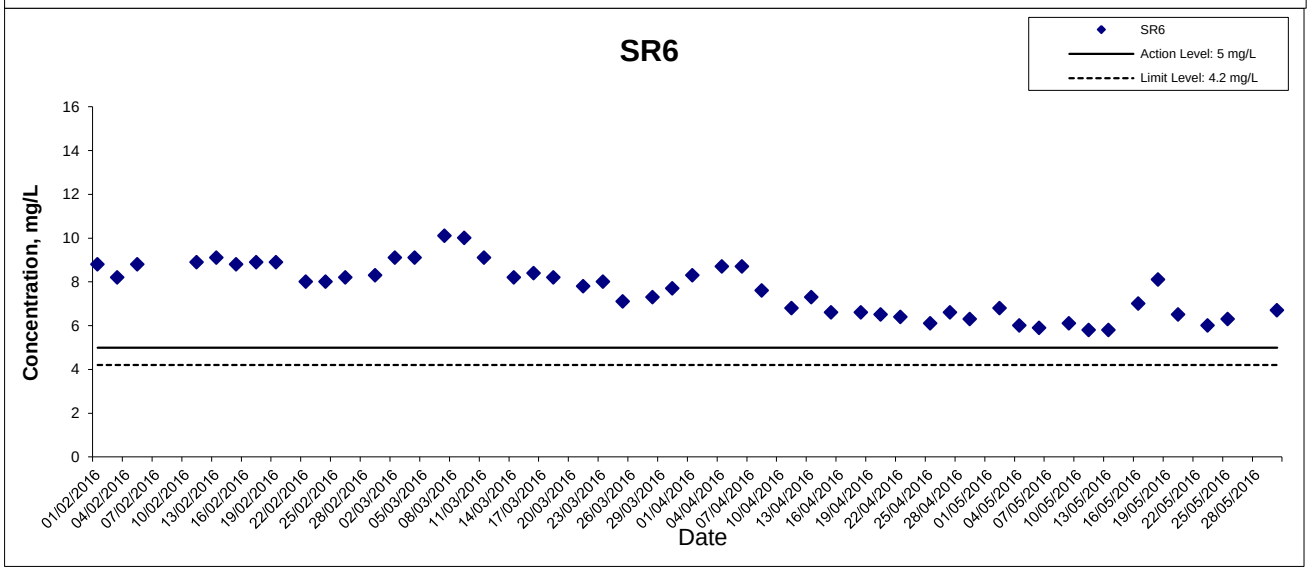
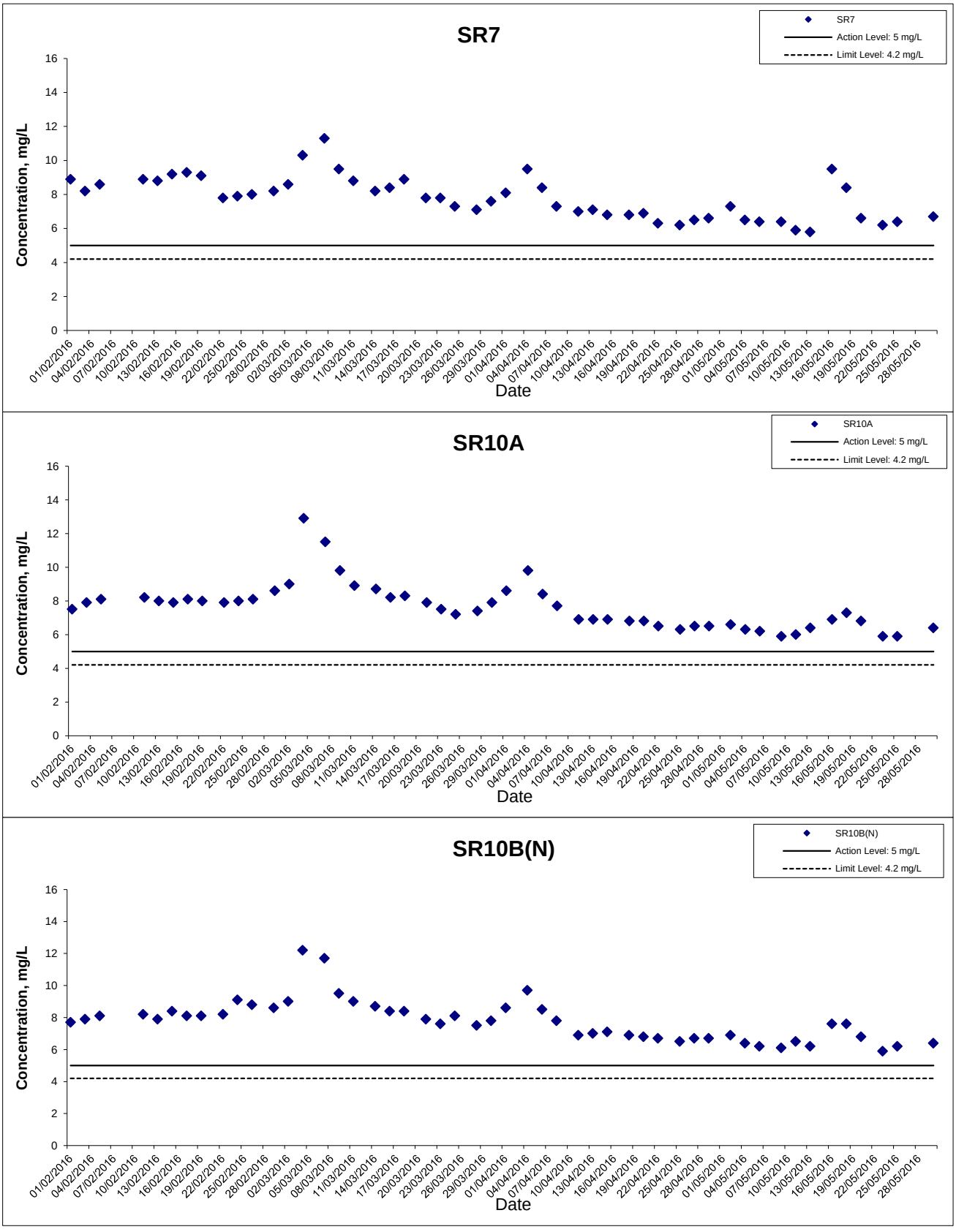
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide







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



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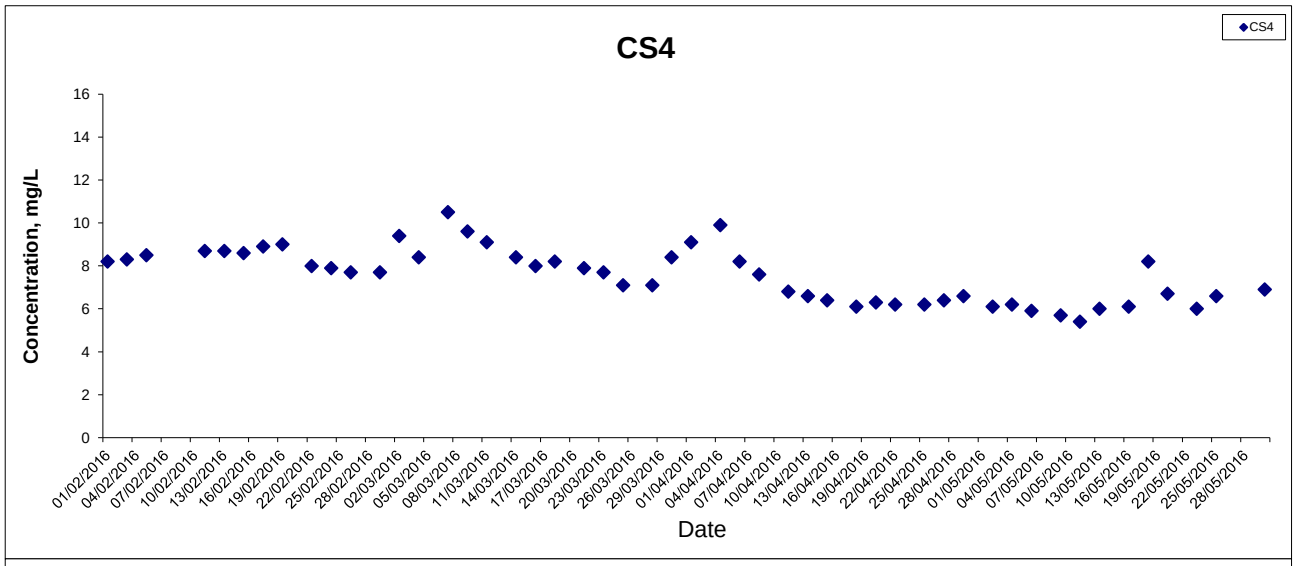
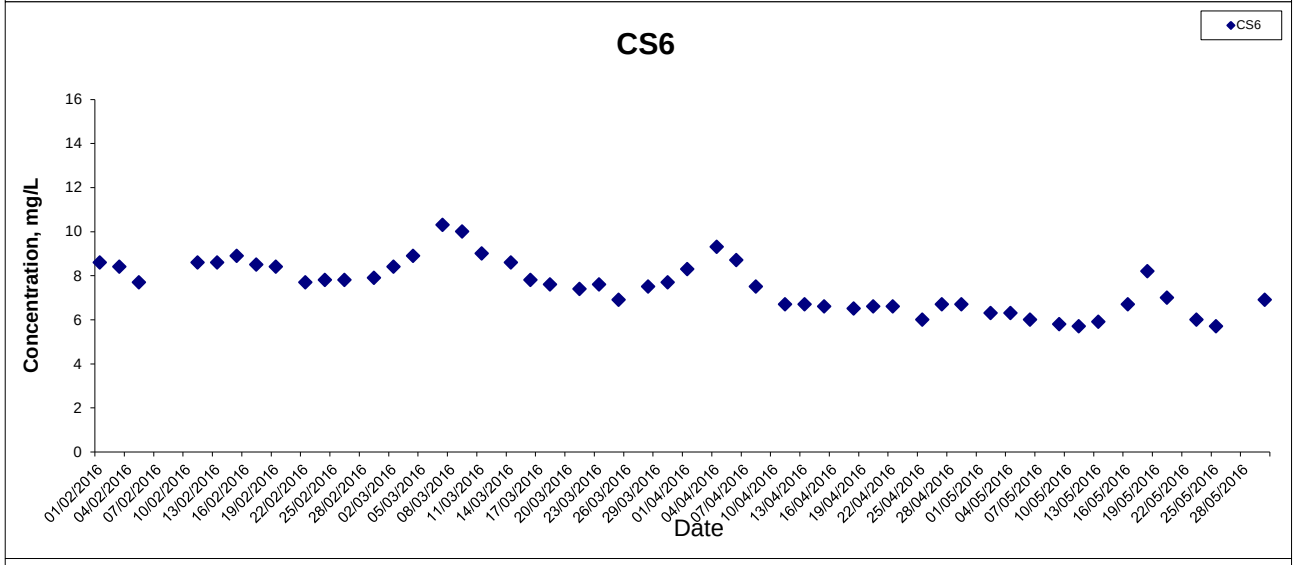
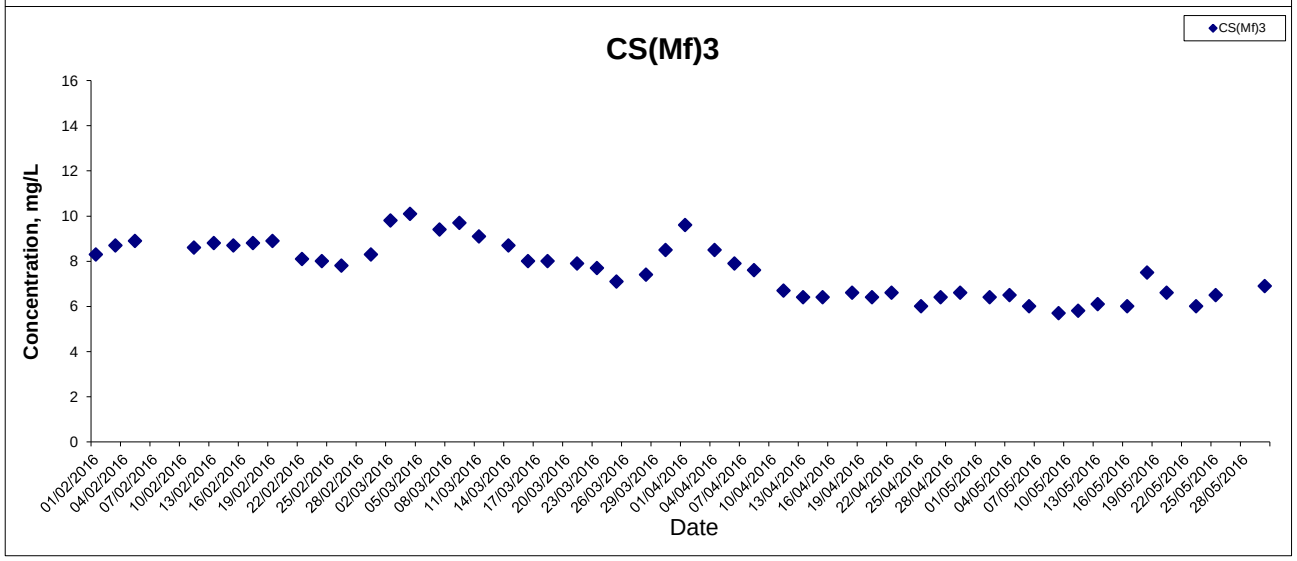
Dissolved Oxygen (Bottom) at Mid-Ebb Tide







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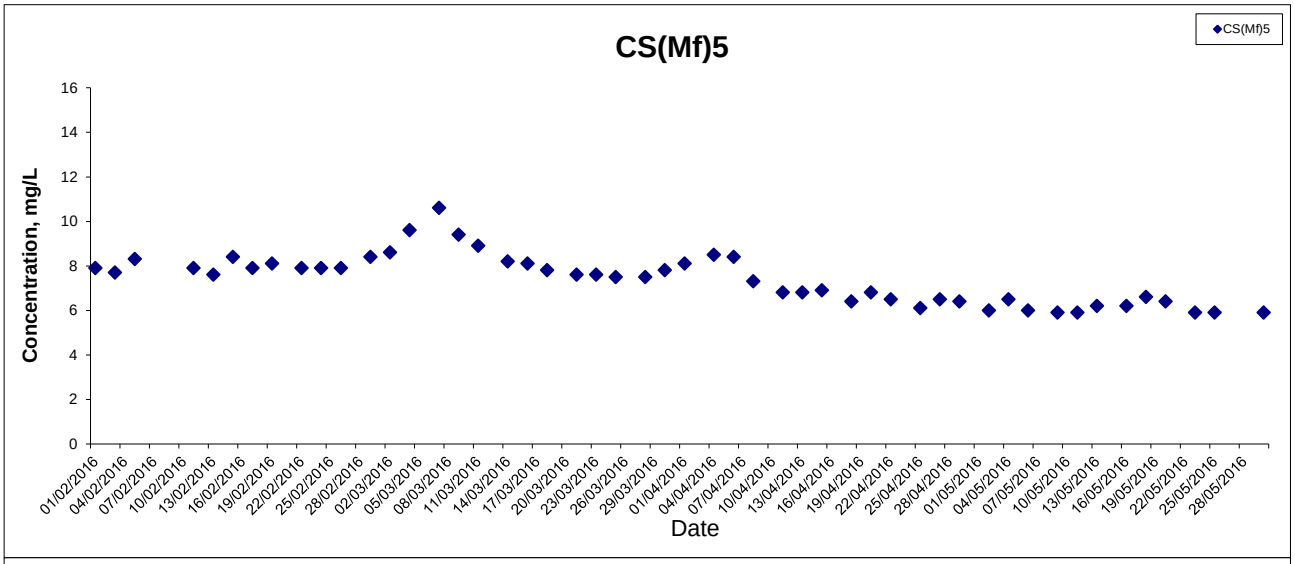
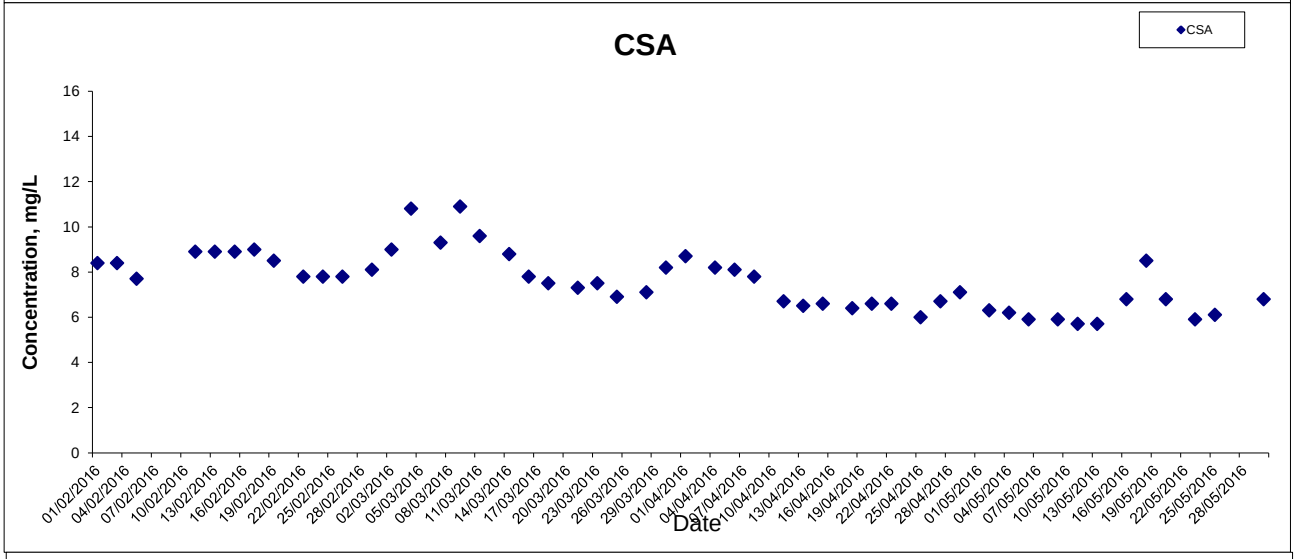
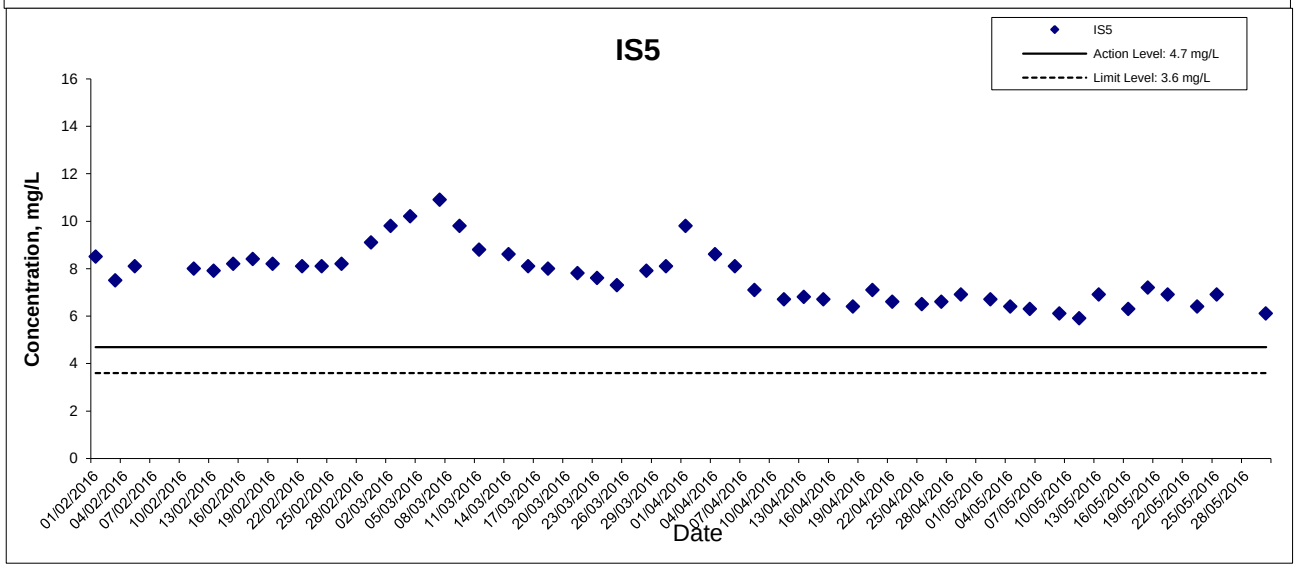
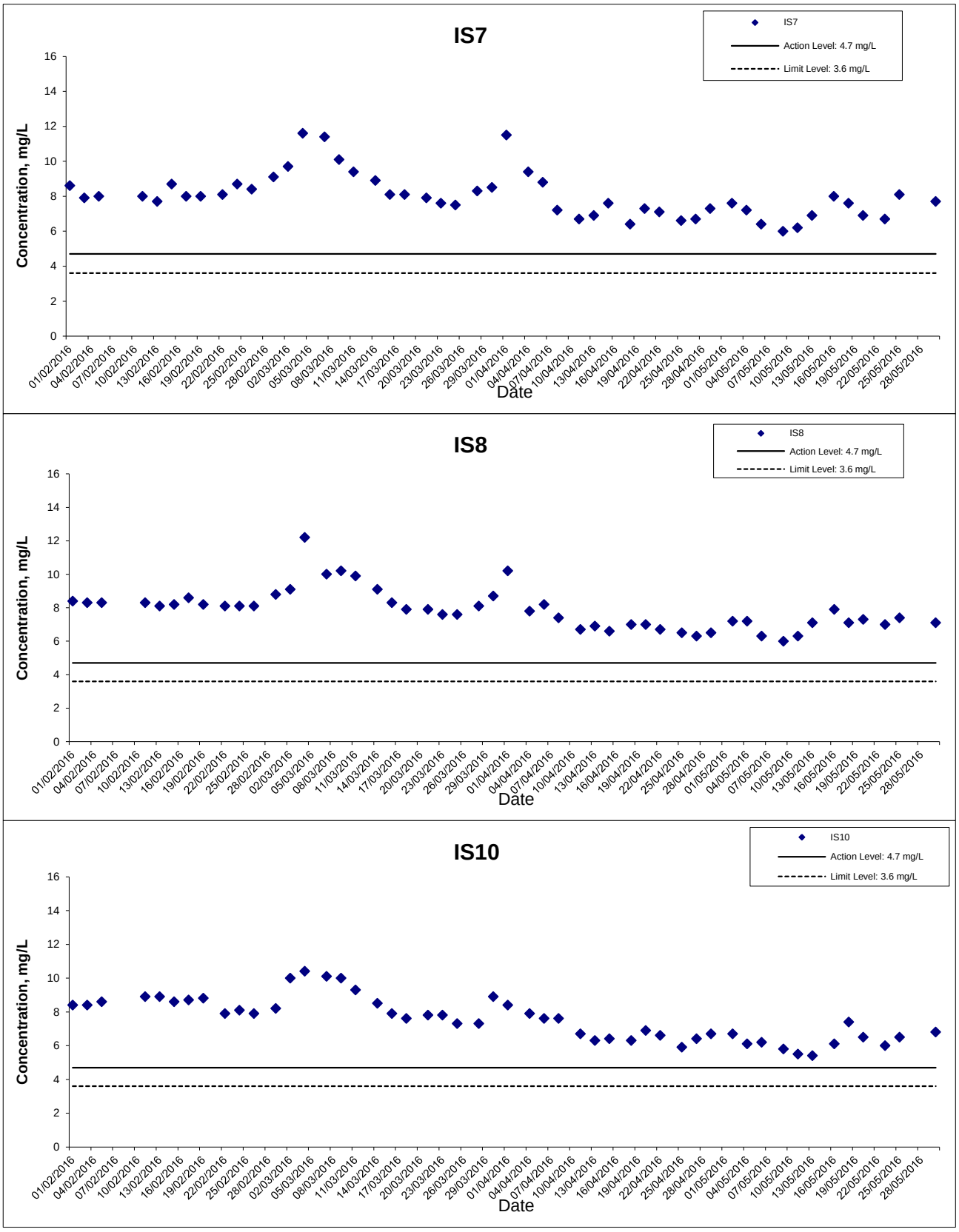
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



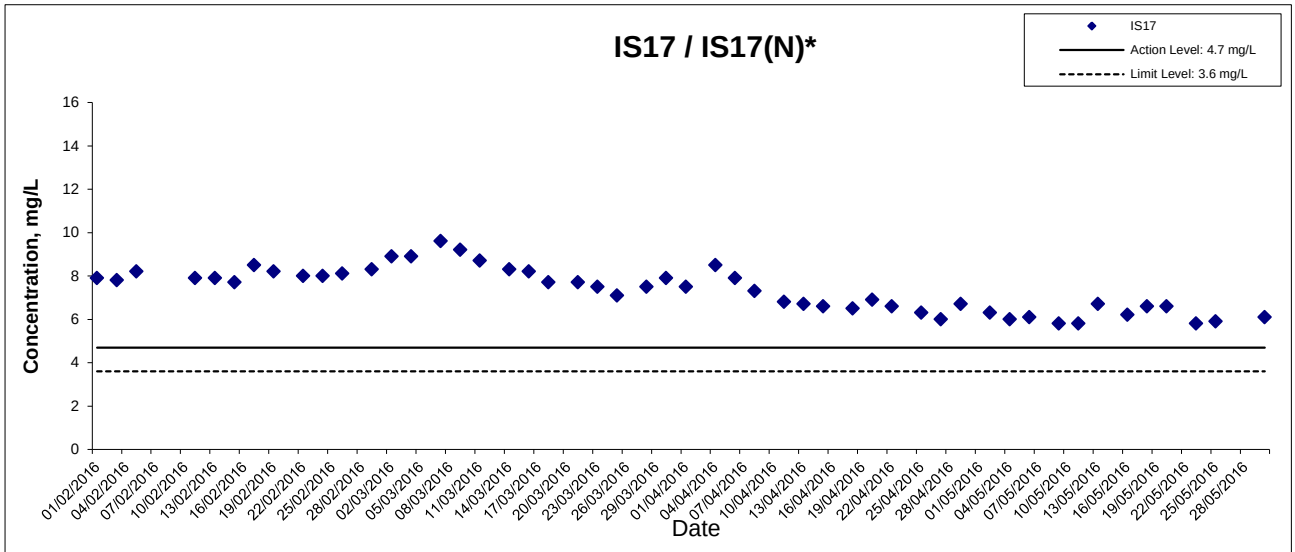


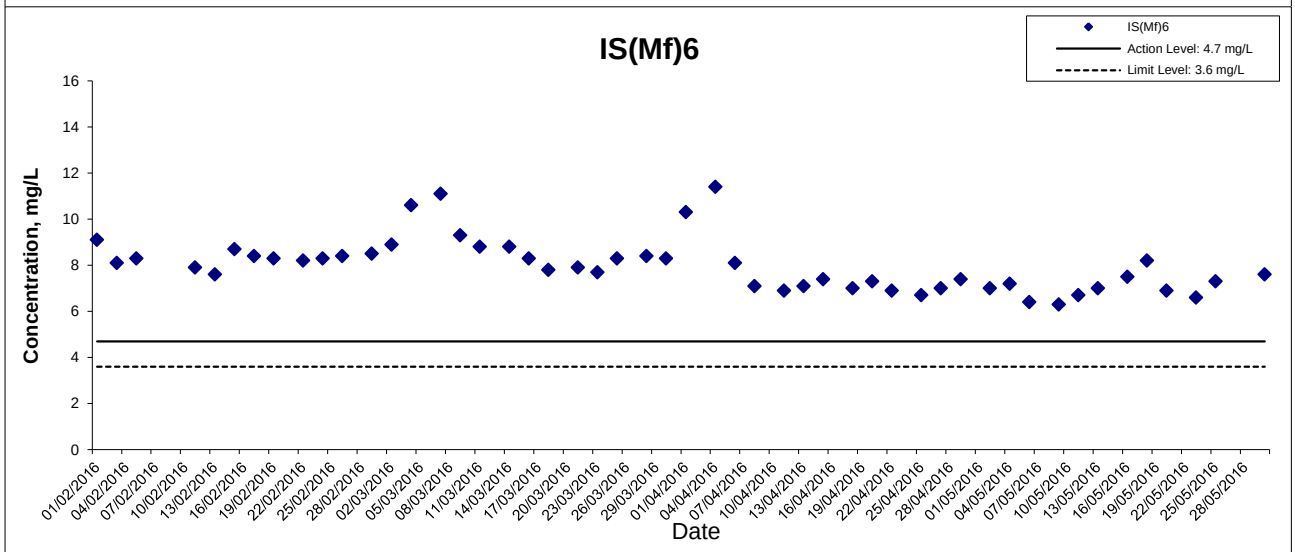


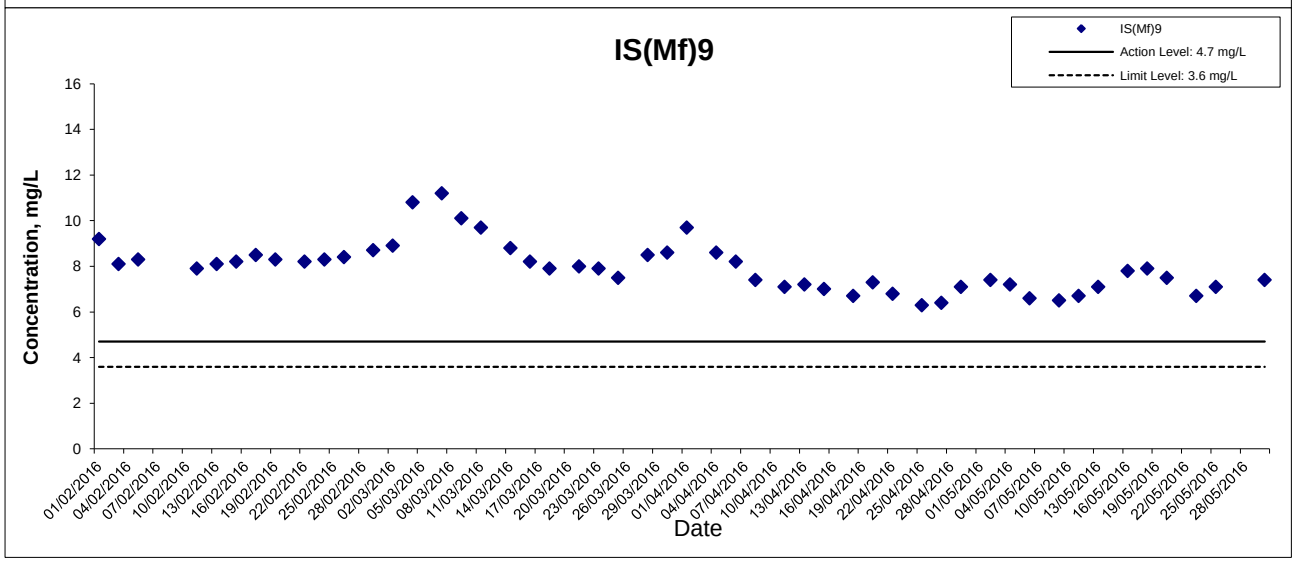
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



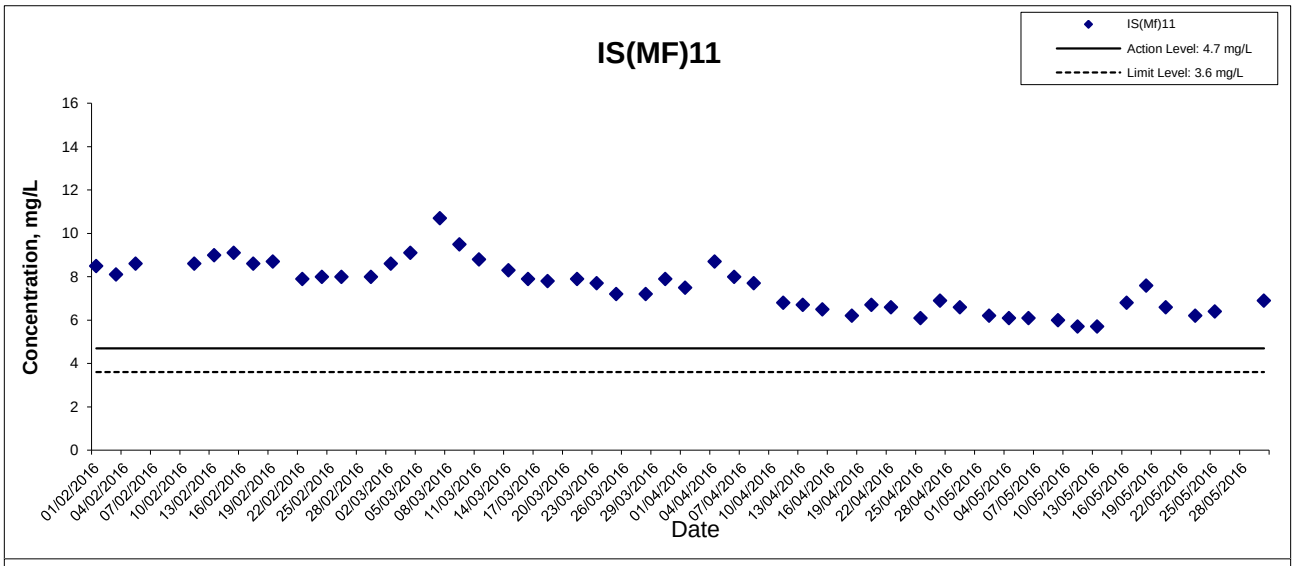
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

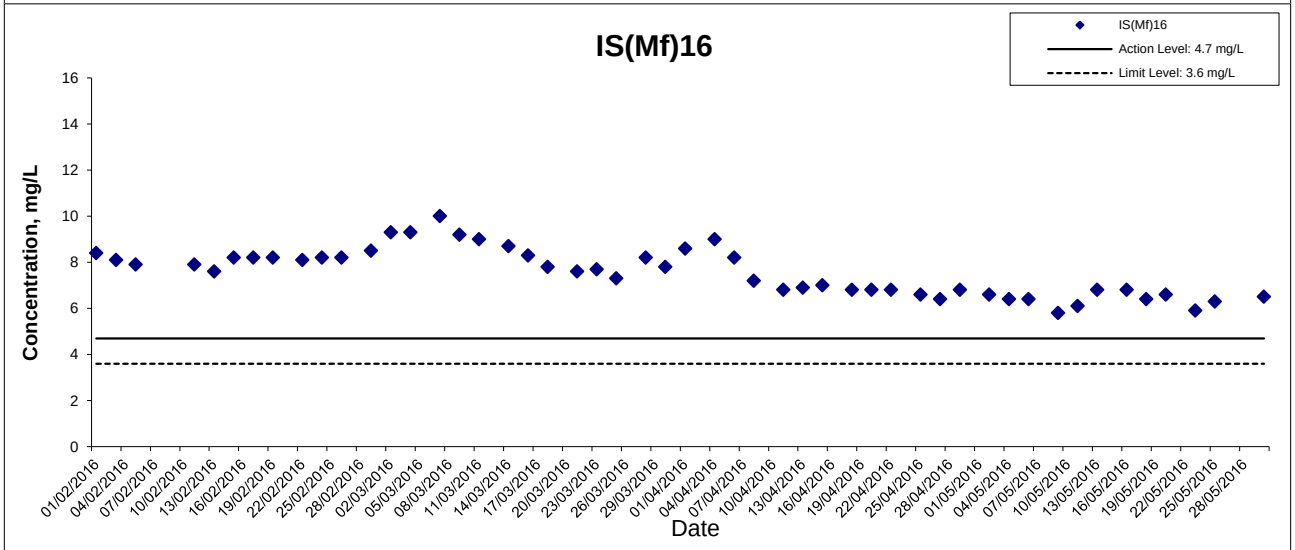


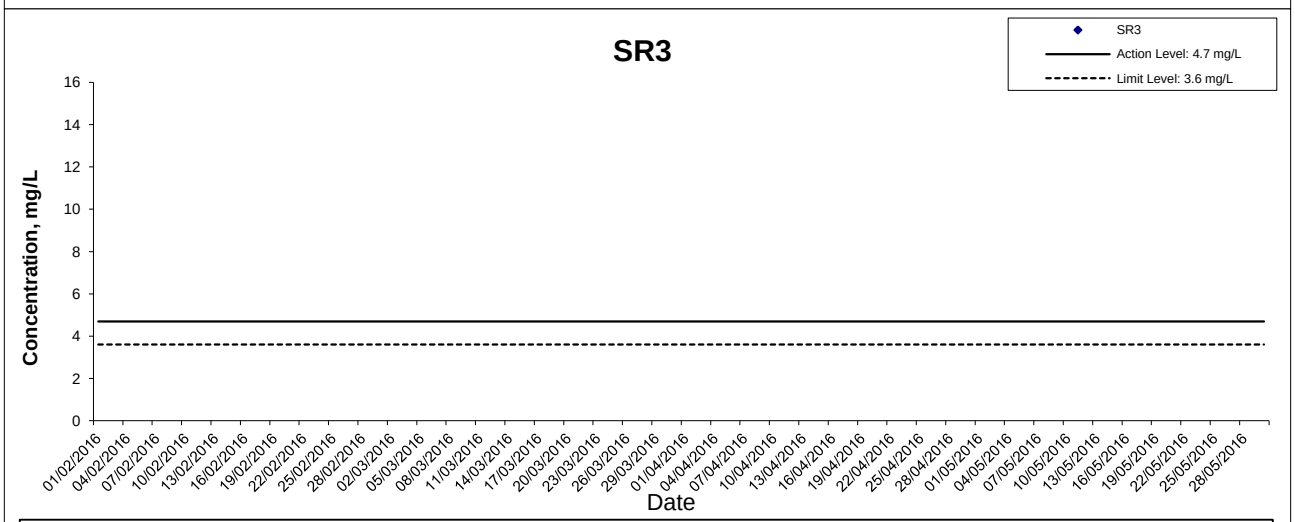




Dissolved Oxygen (Bottom) at Mid-Ebb Tide

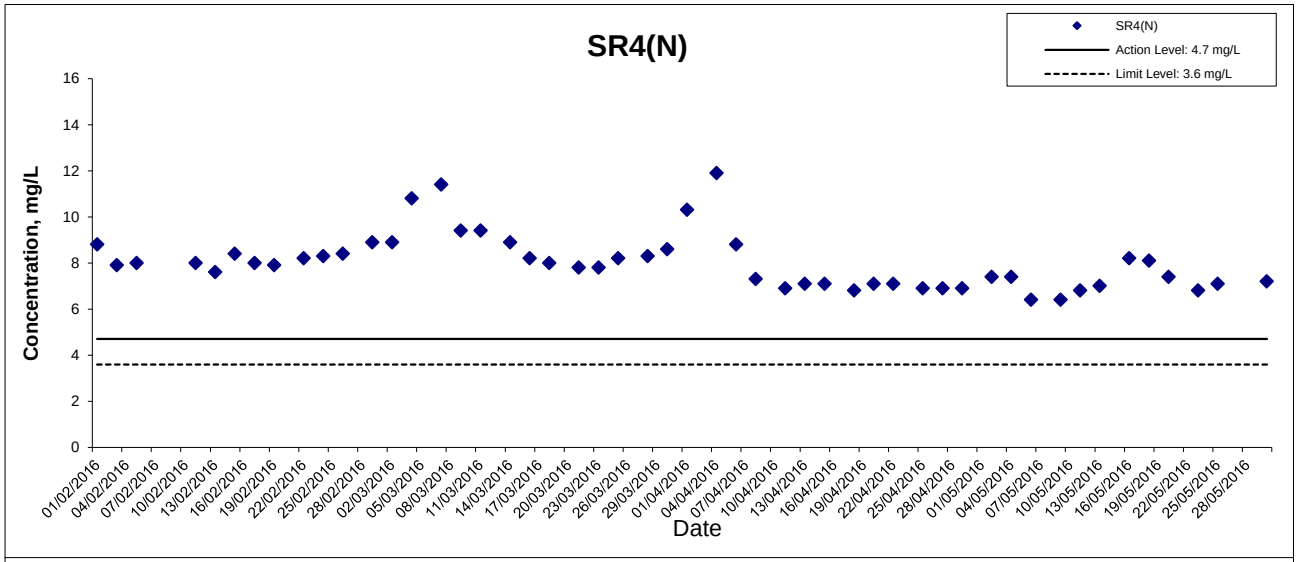


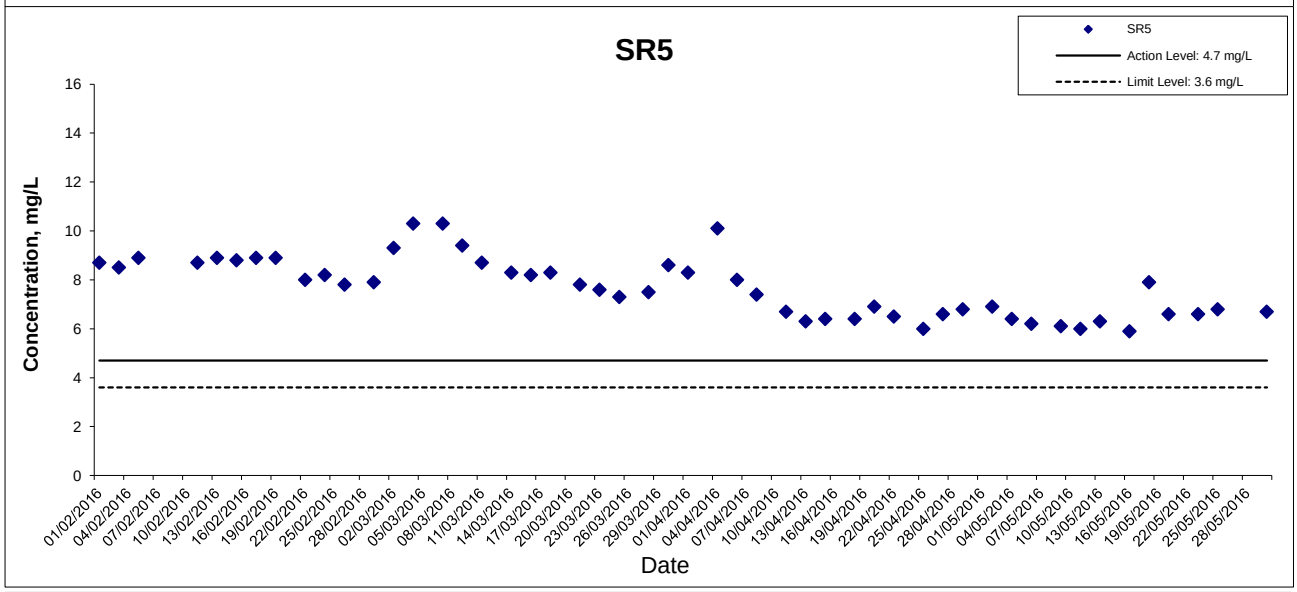


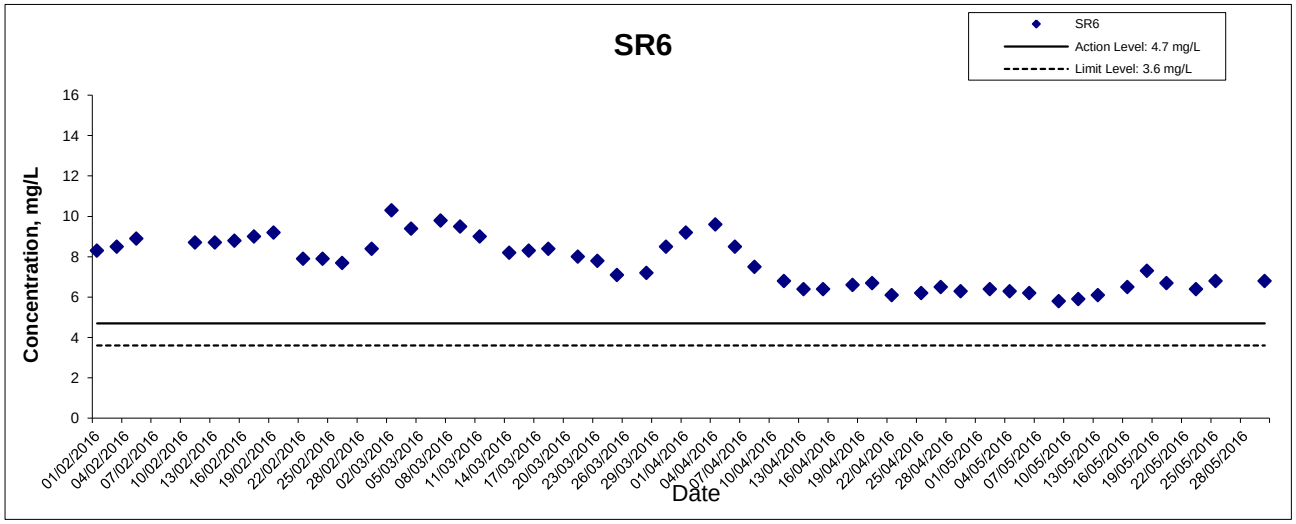


As the measured water depths were less than 3 m during all monitoring days, water samples are collected at mid-depth only .

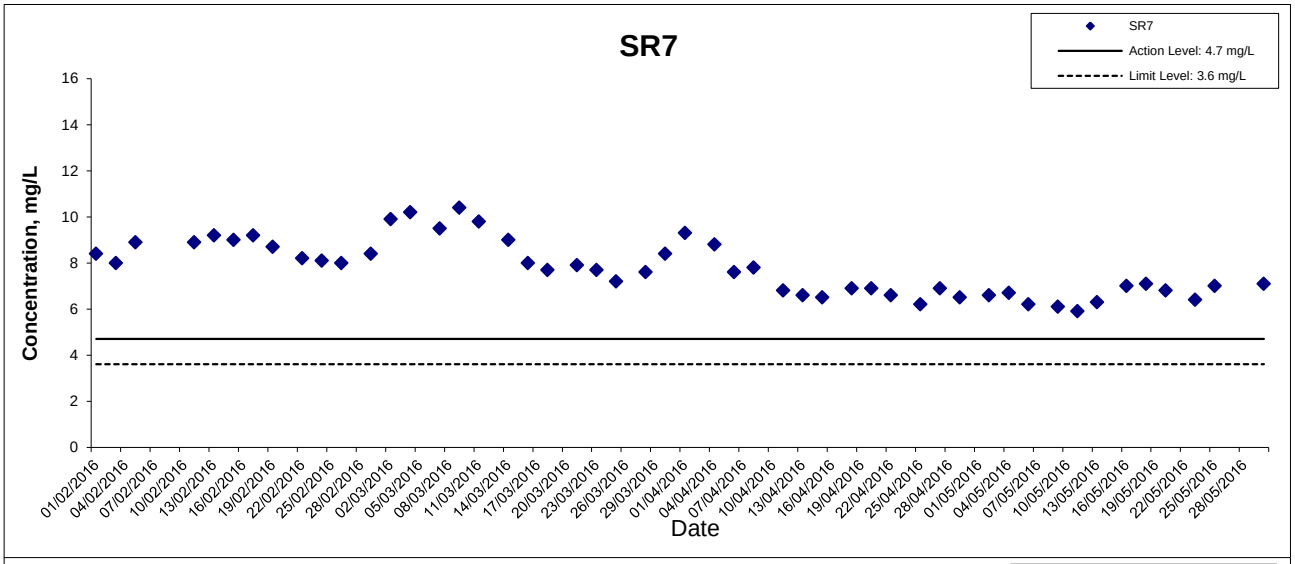
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

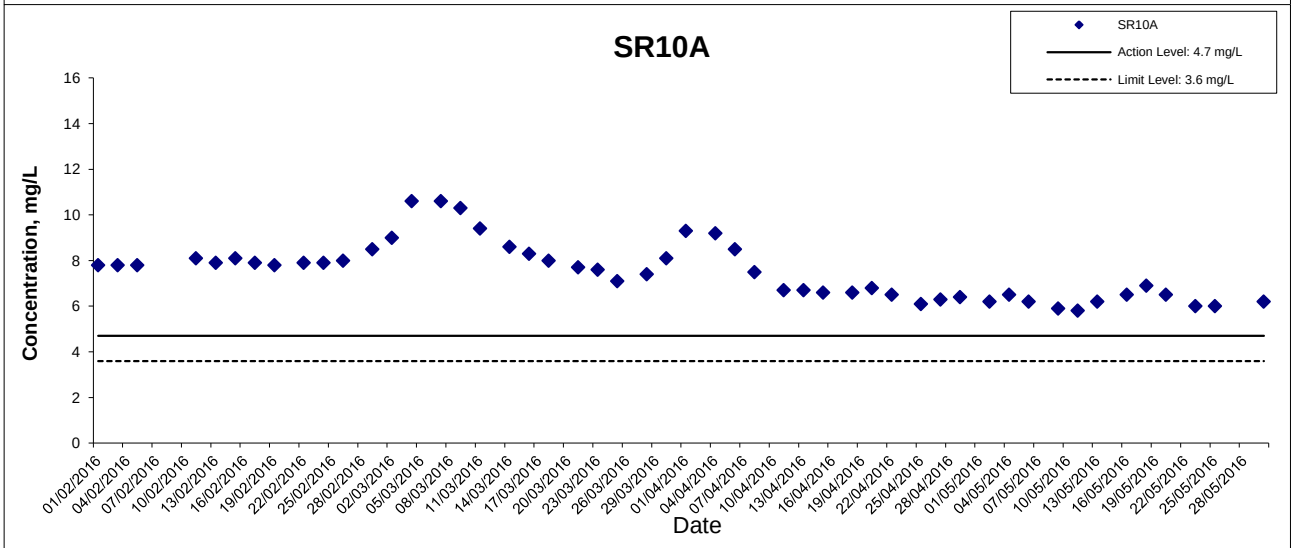


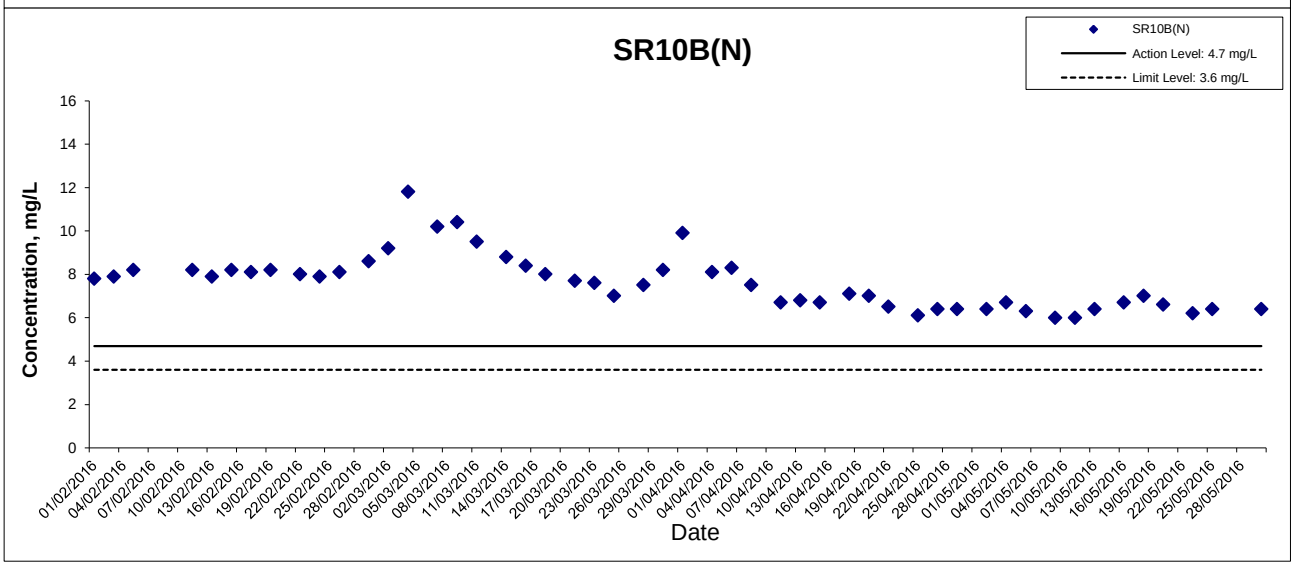




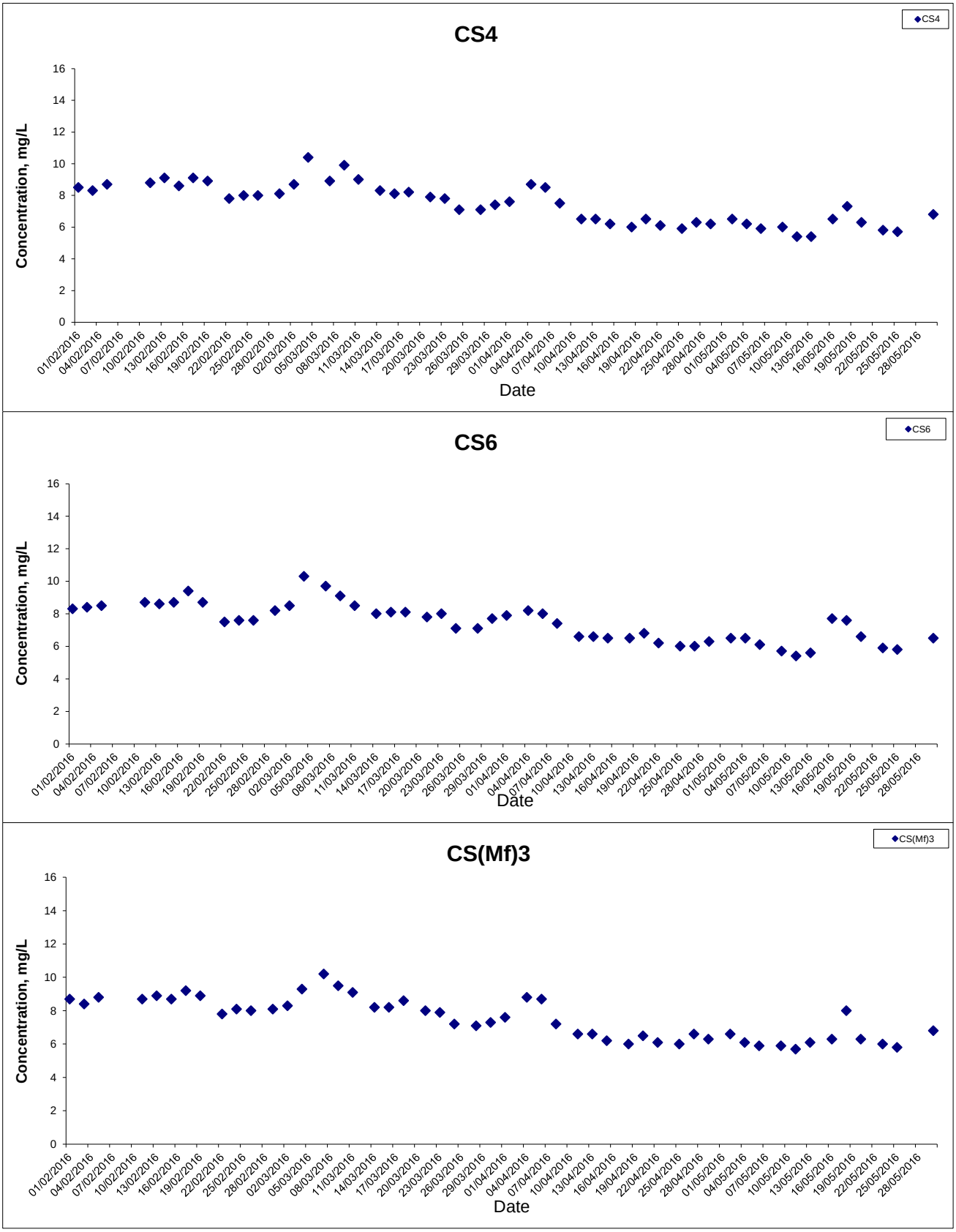
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



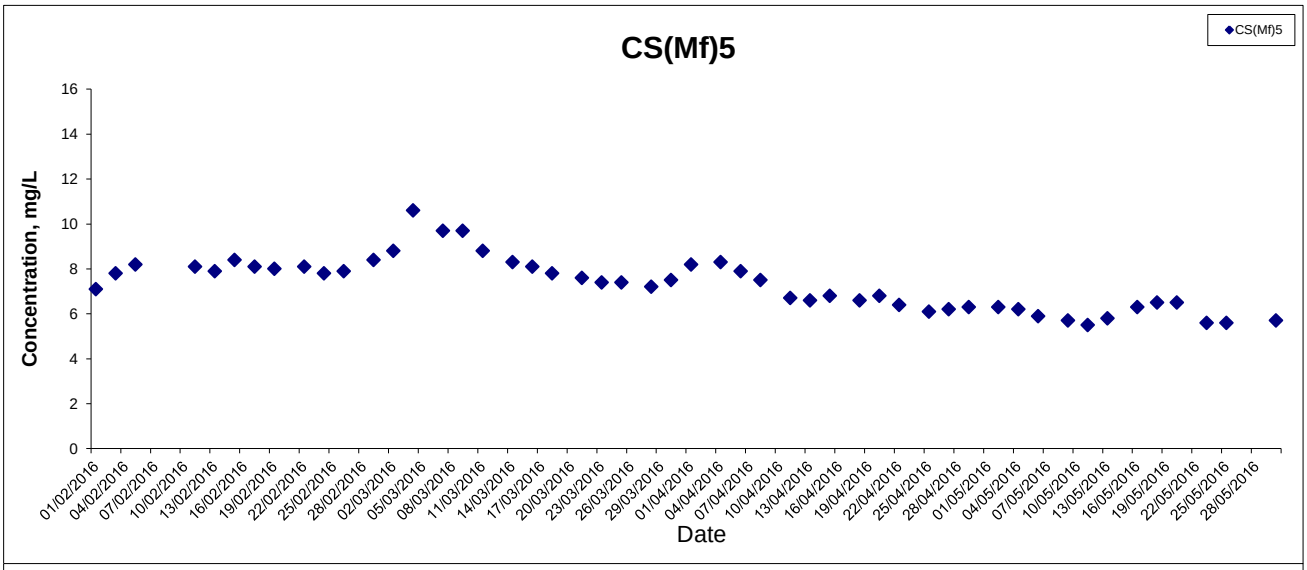


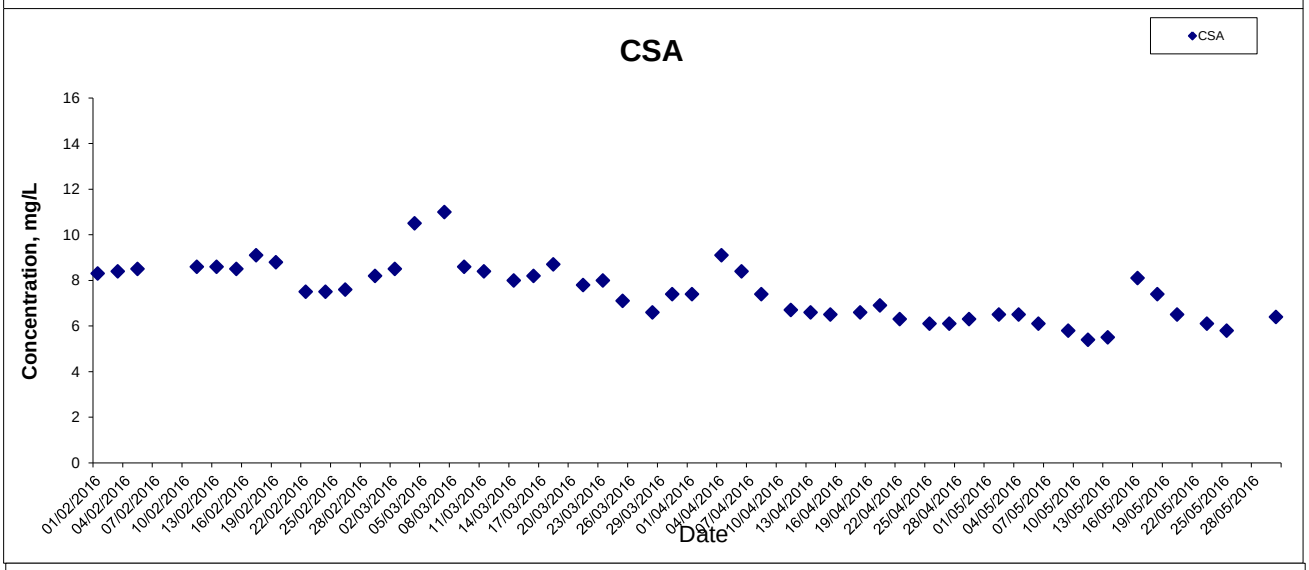


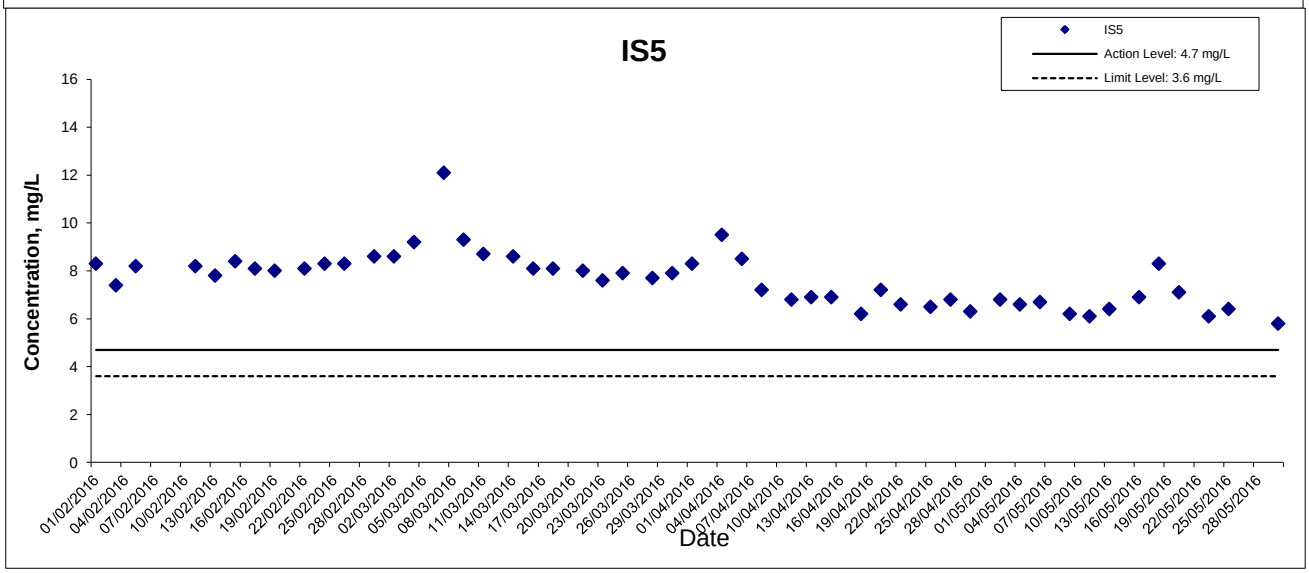
Dissolved Oxygen (Bottom) at Mid-Flood Tide



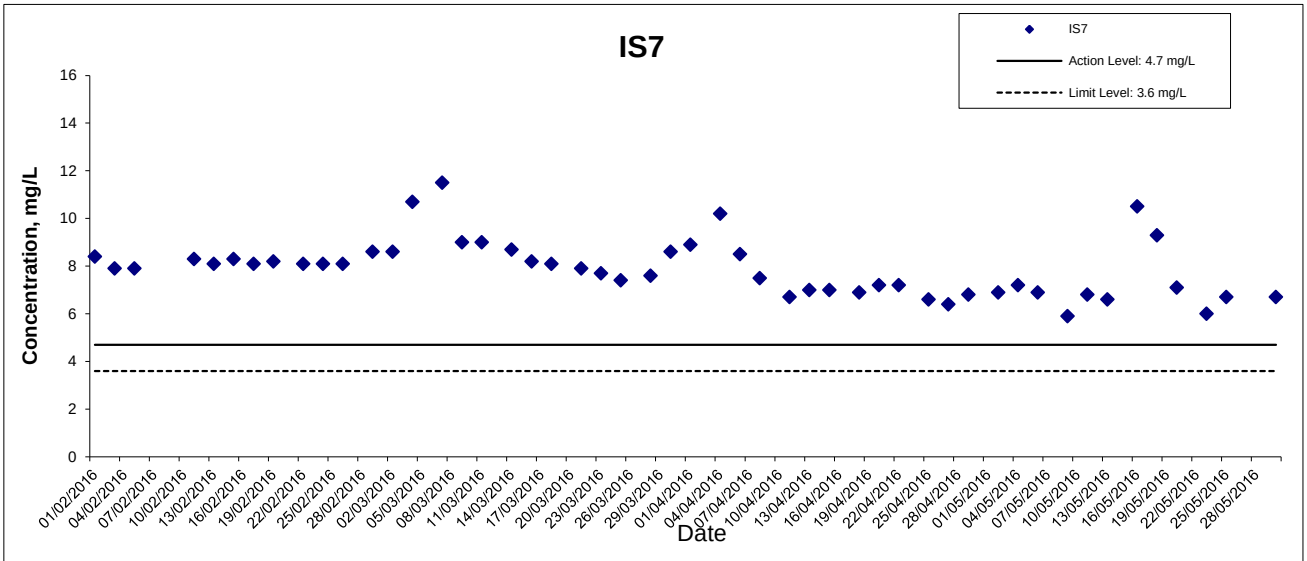
Dissolved Oxygen (Bottom) at Mid-Flood Tide

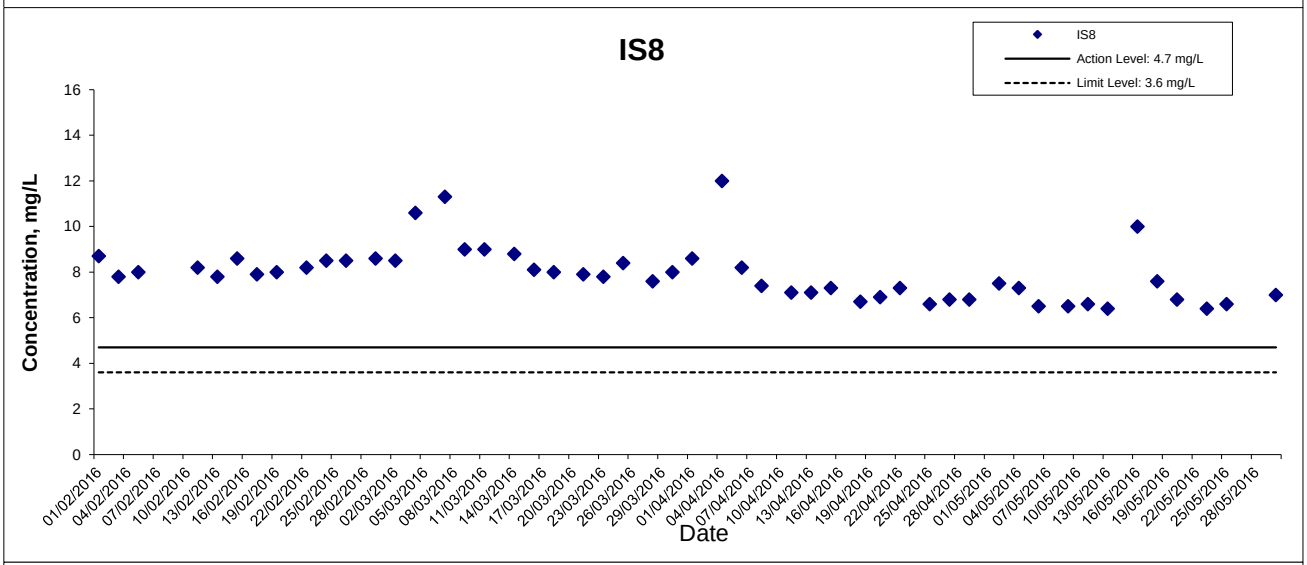


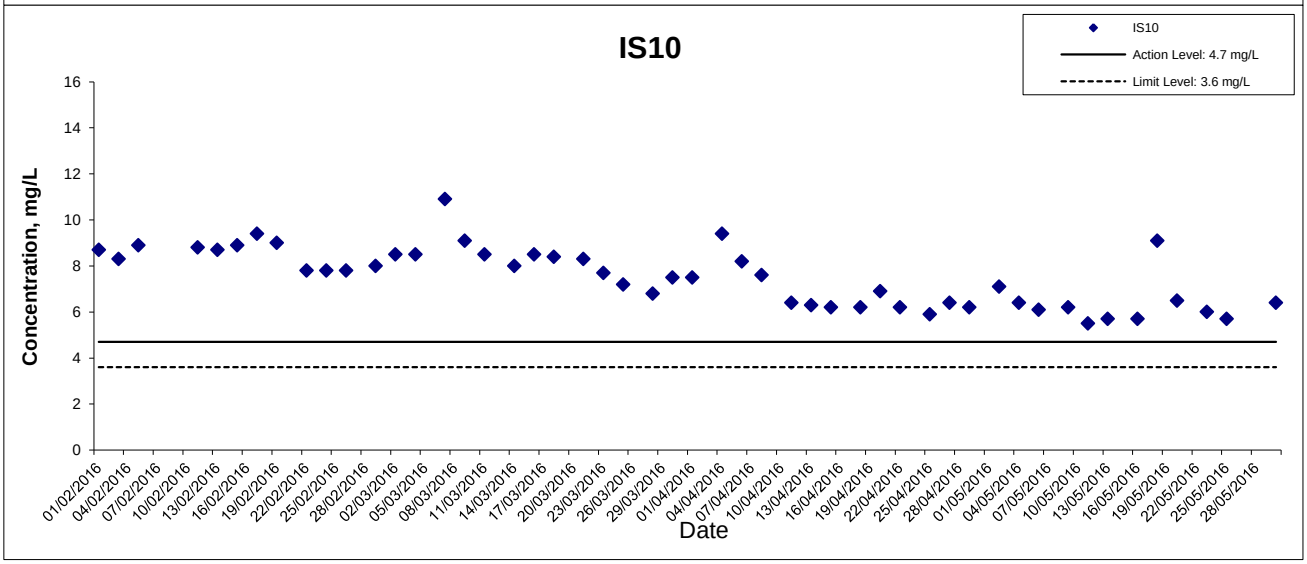




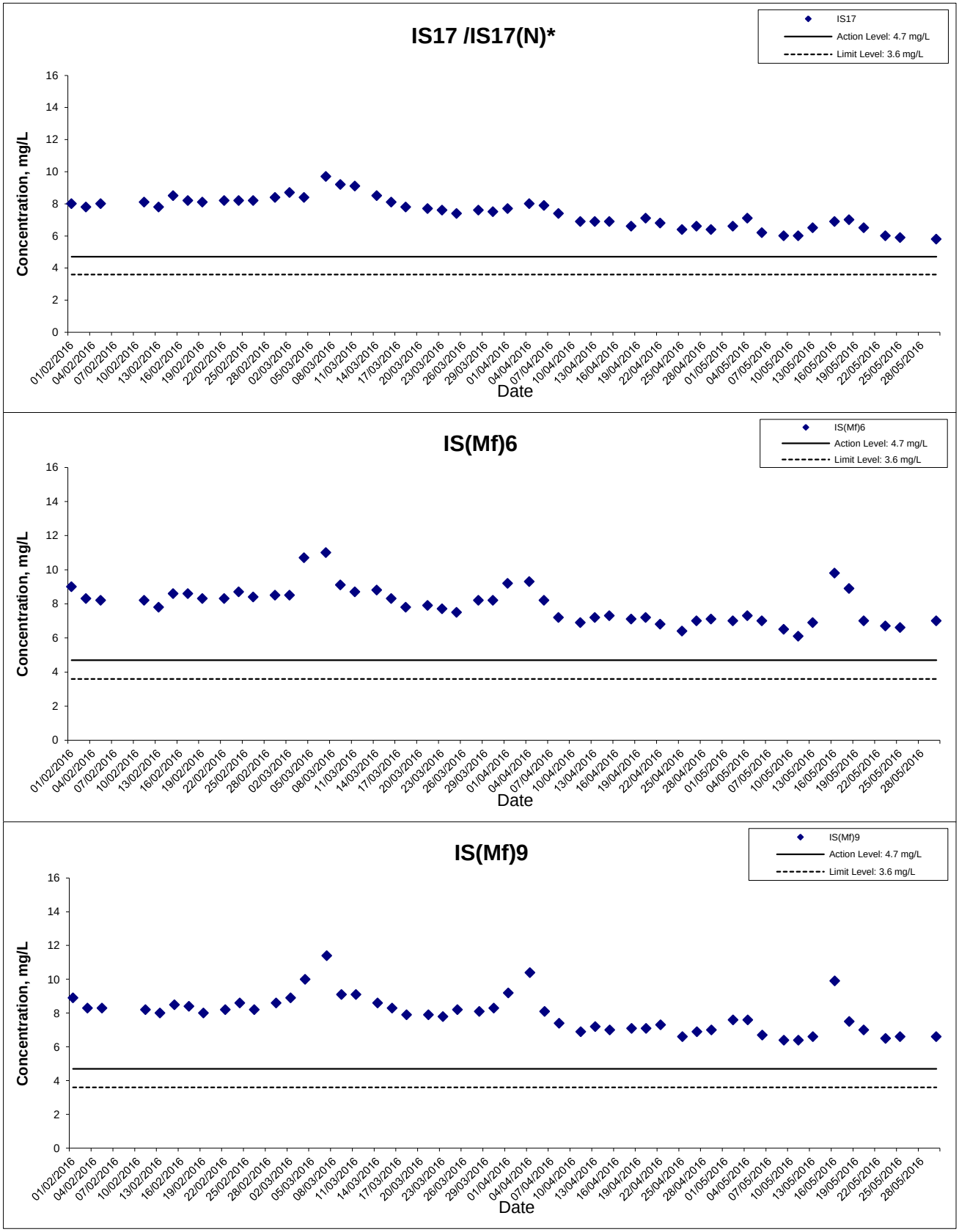
Dissolved Oxygen (Bottom) at Mid-Flood Tide



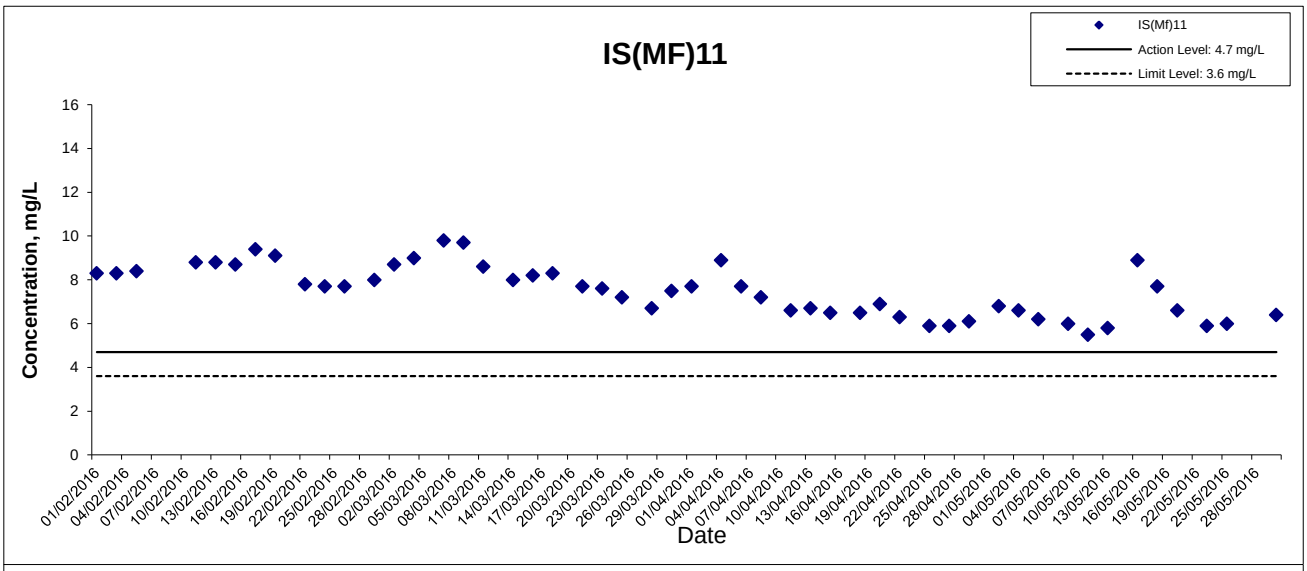


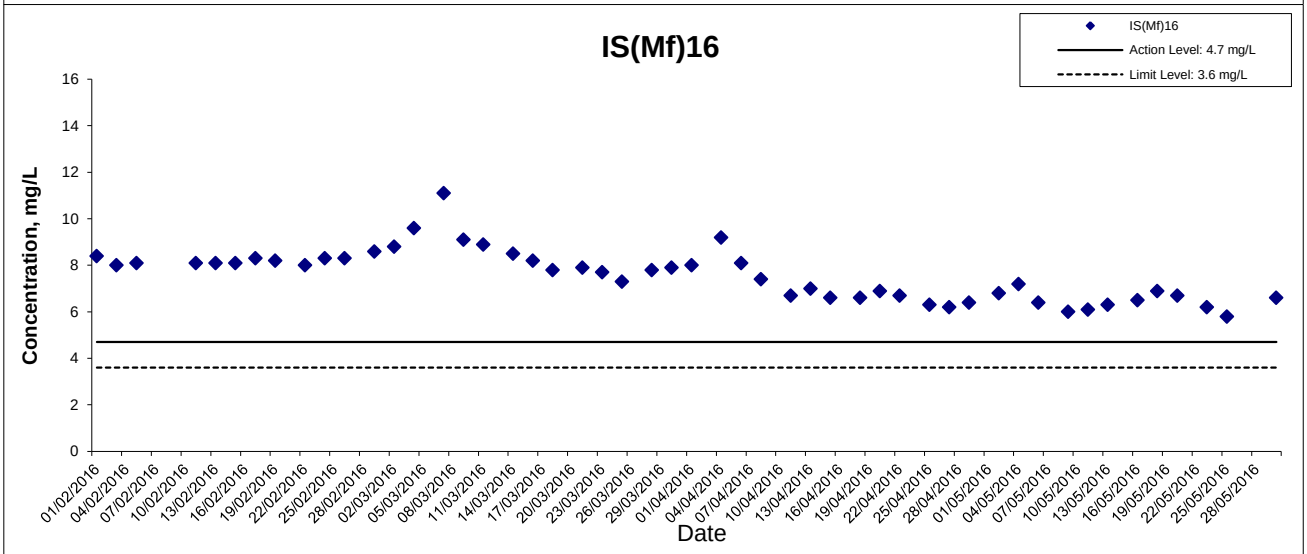


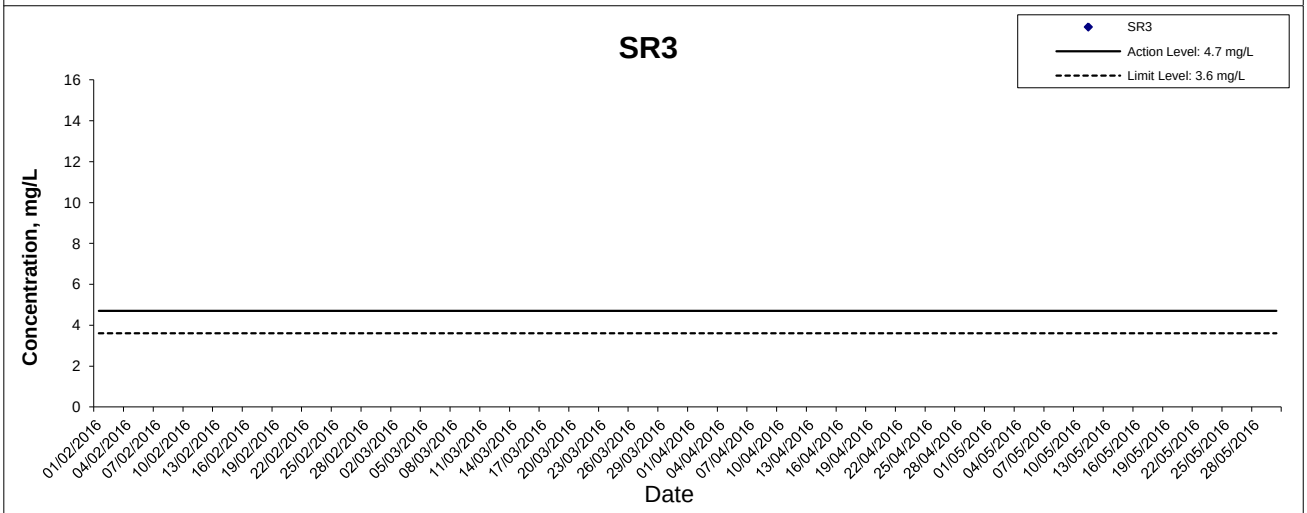
Dissolved Oxygen (Bottom) at Mid-Flood Tide



Dissolved Oxygen (Bottom) at Mid-Flood Tide

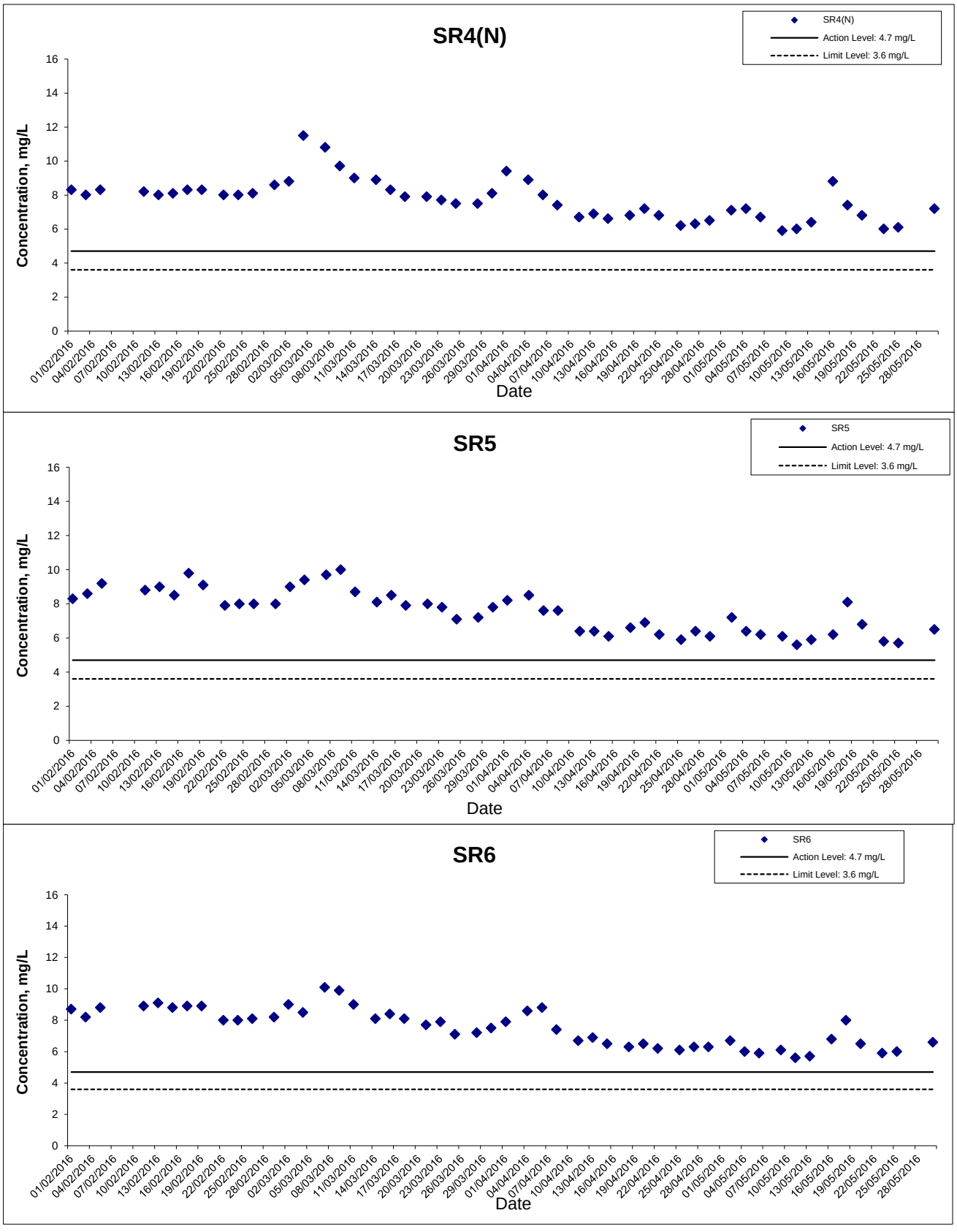




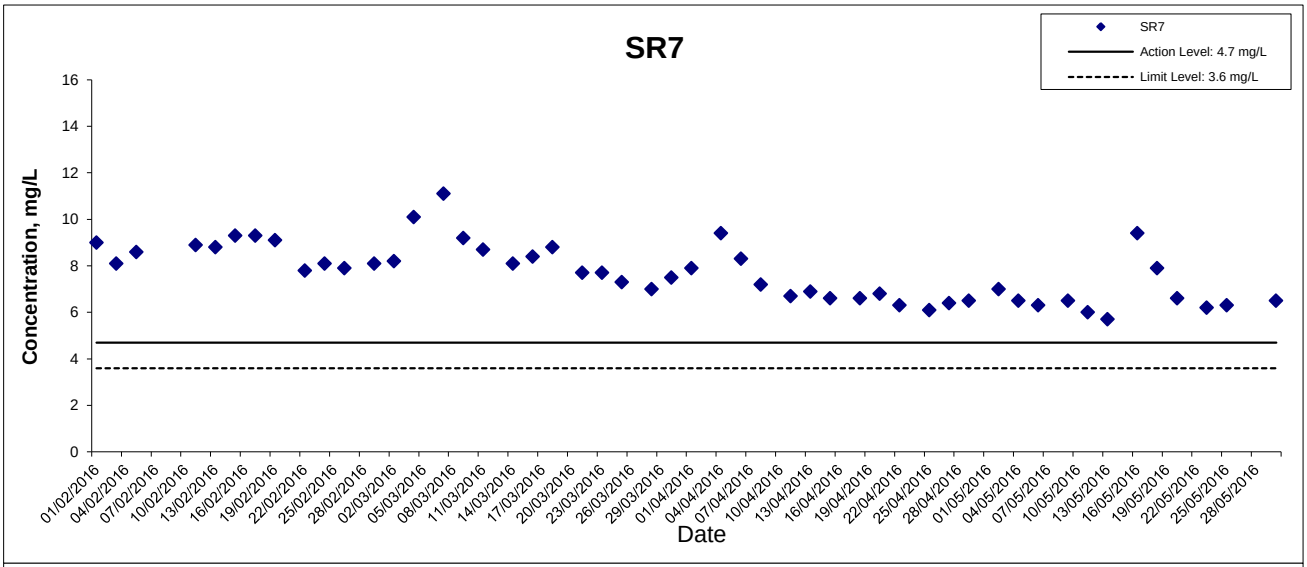


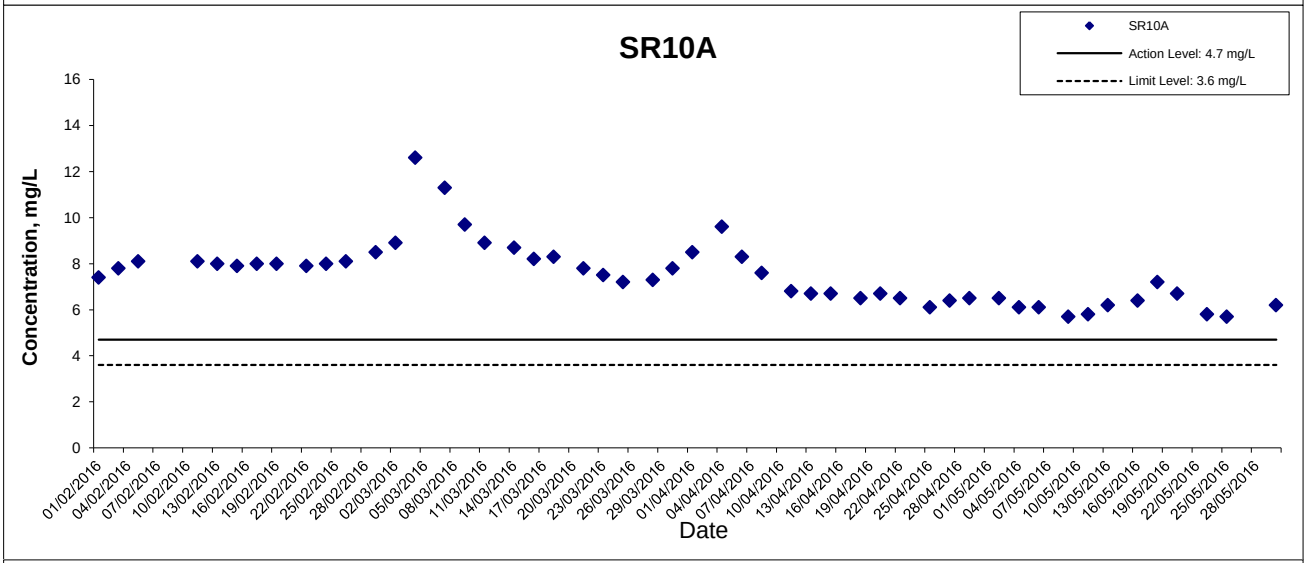
As the measured water depths were less than 3 m during all monitoring days, water samples are collected at mid-depth only .

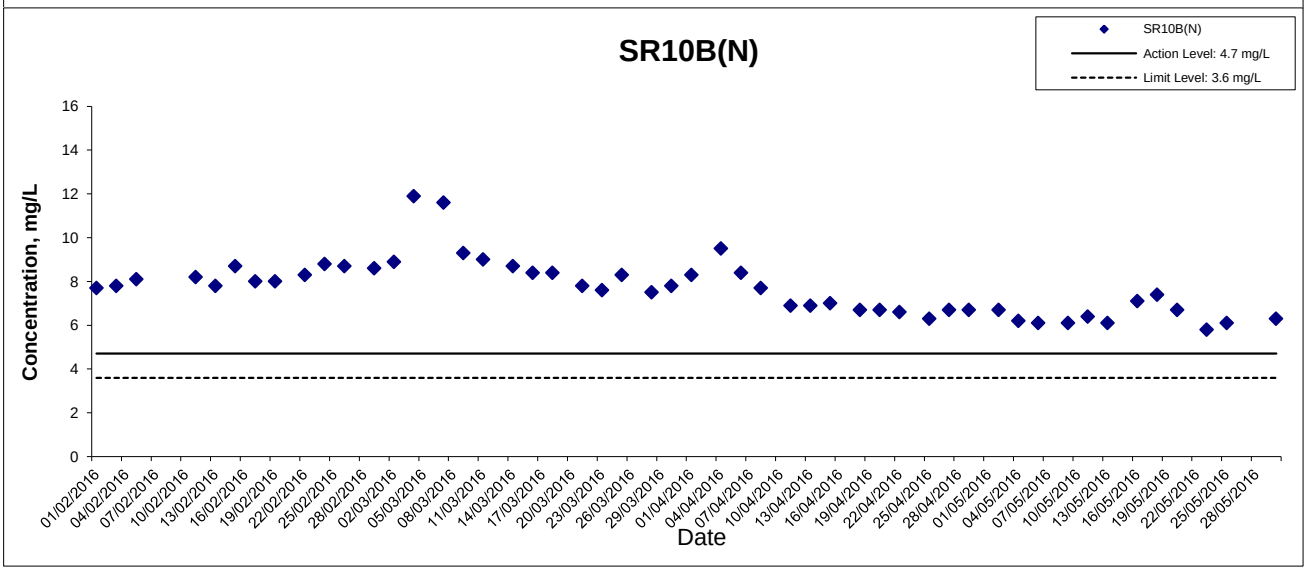
Dissolved Oxygen (Bottom) at Mid-Flood Tide



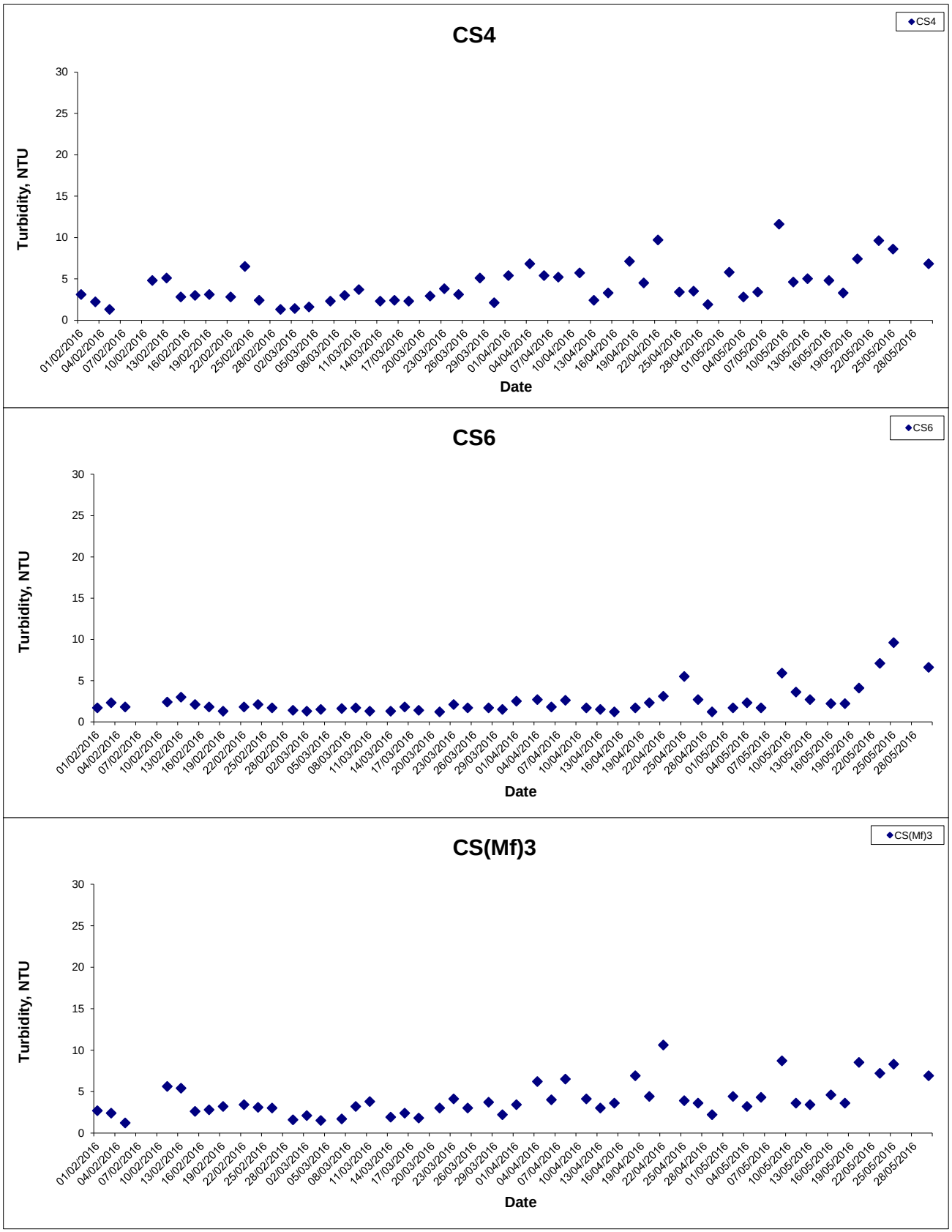
Dissolved Oxygen (Bottom) at Mid-Flood Tide







Turbidity at Mid-Ebb Tide



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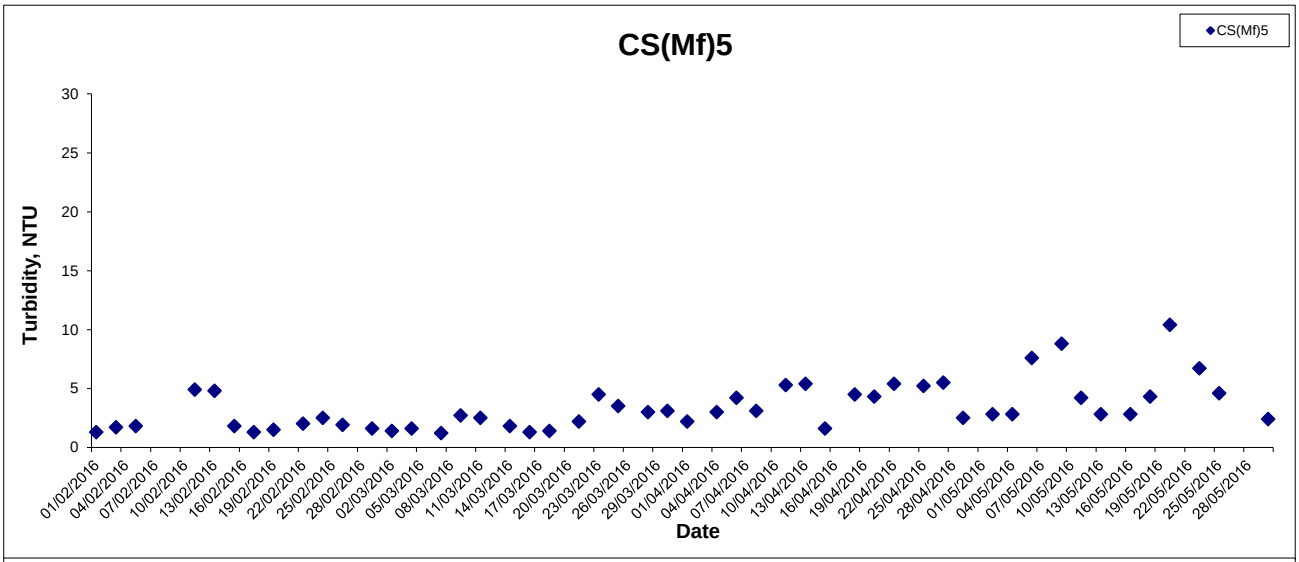
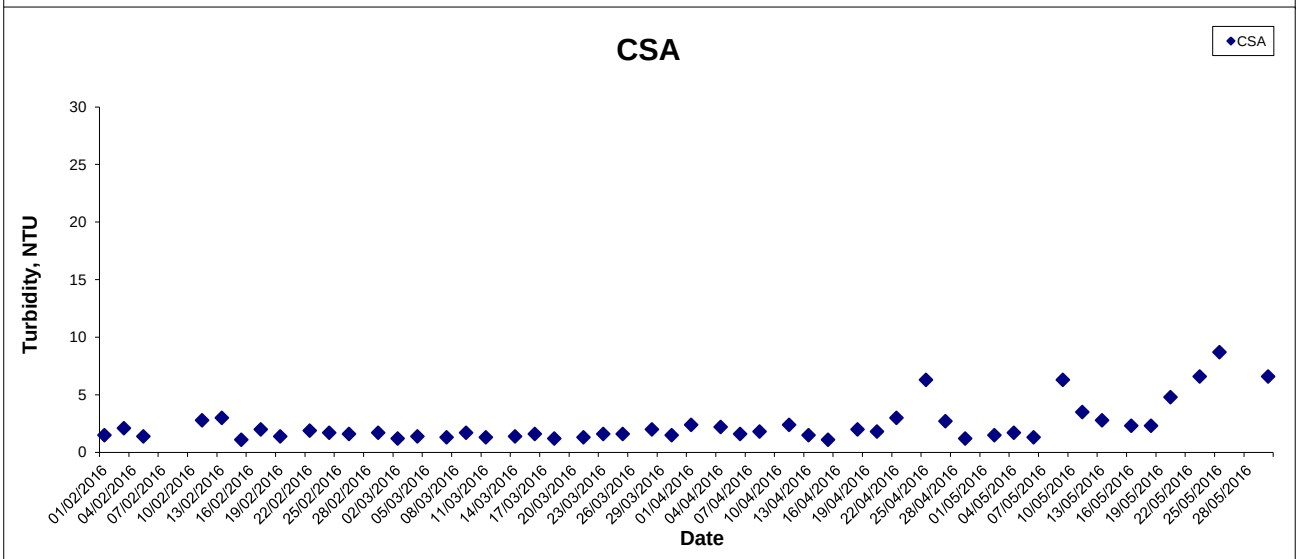
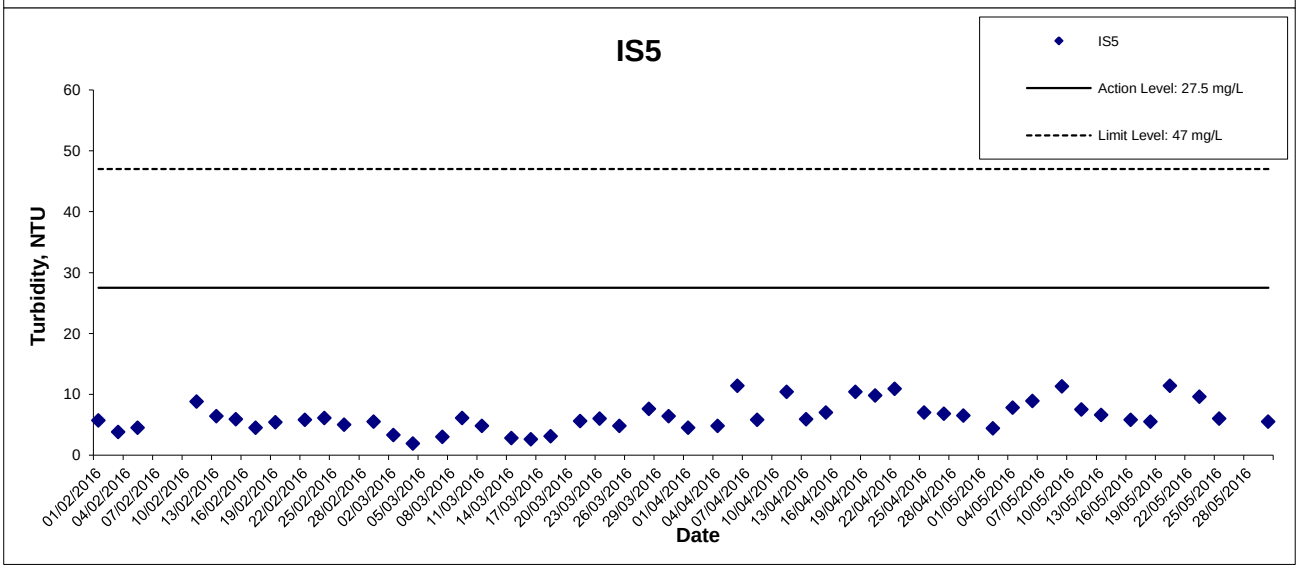
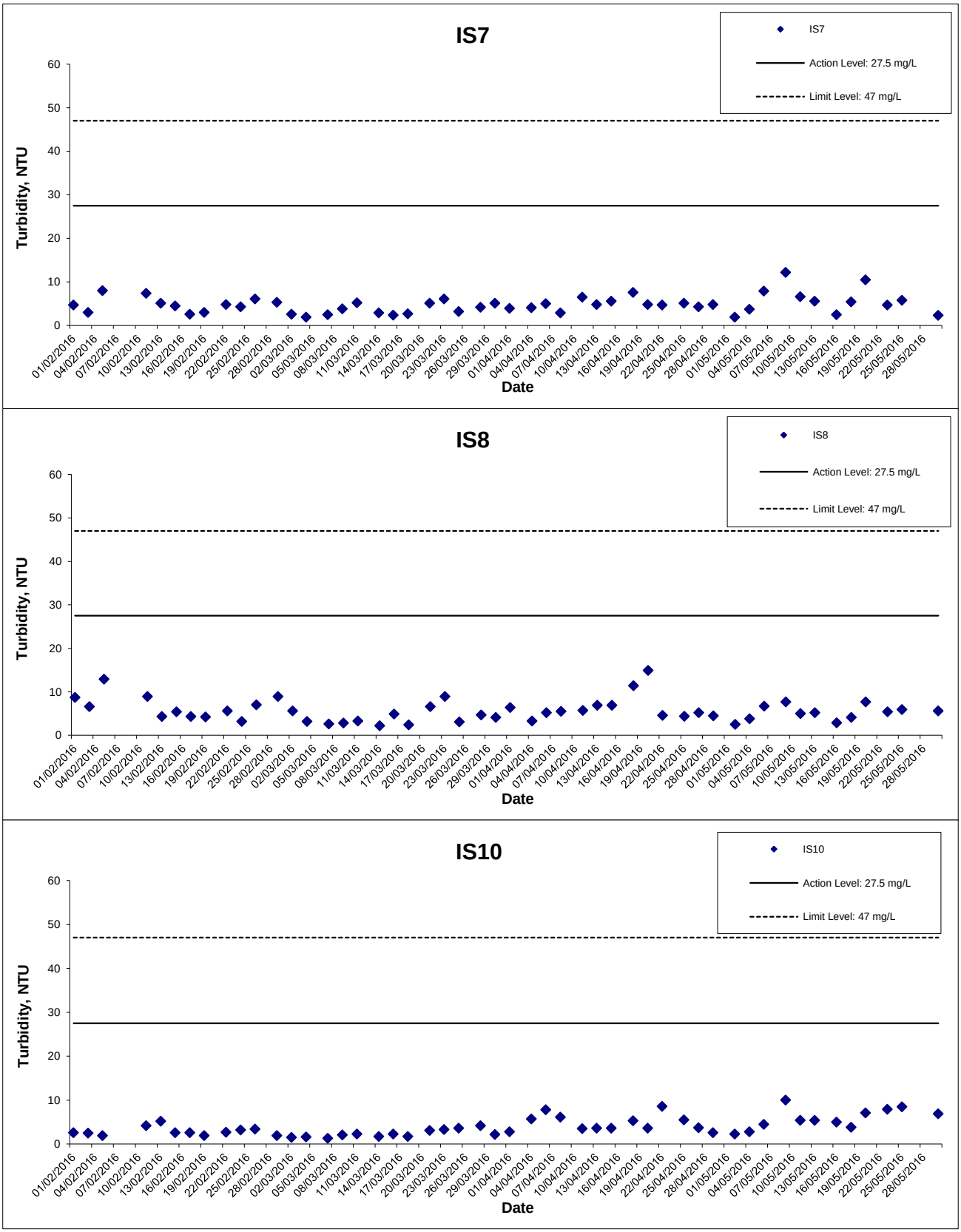
Turbidity at Mid-Ebb Tide







Turbidity at Mid-Ebb Tide



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HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

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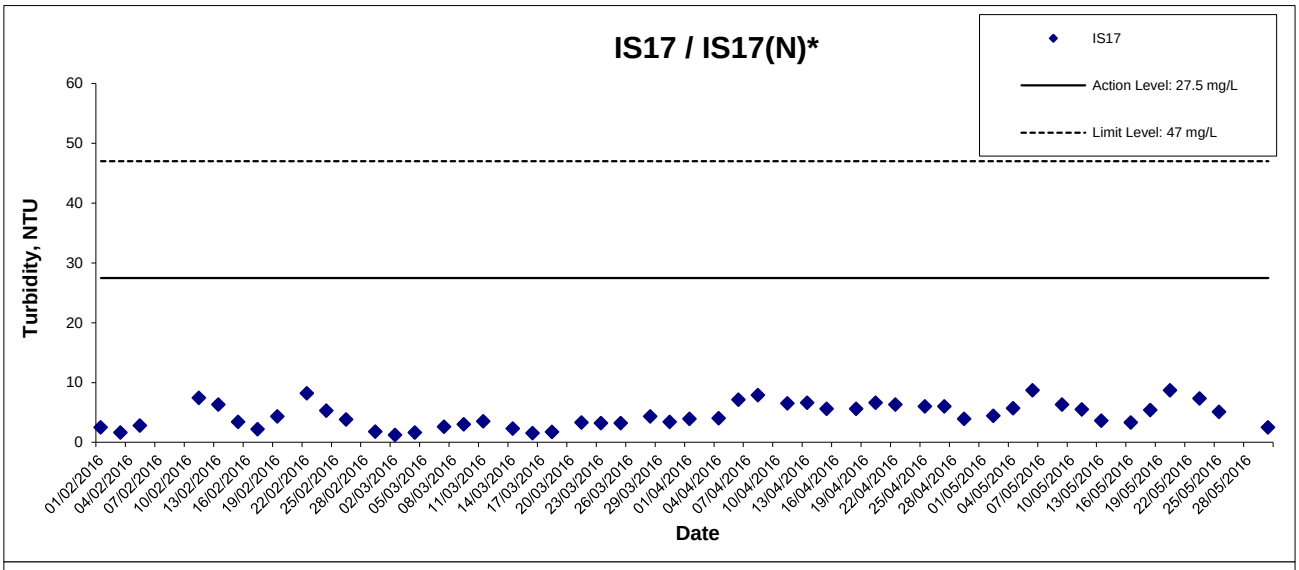
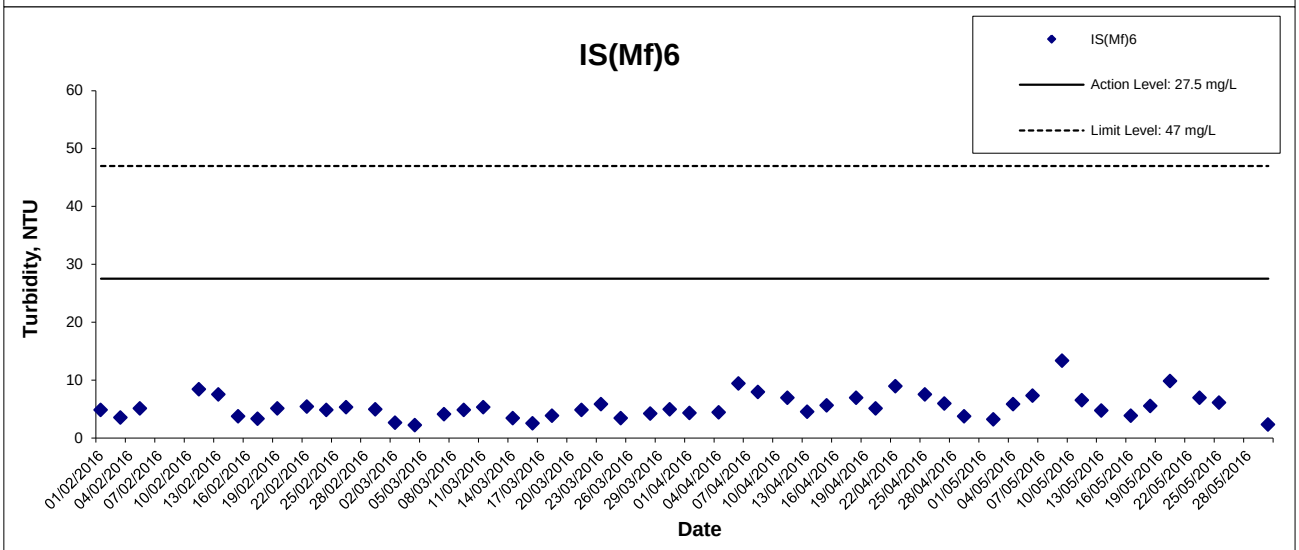
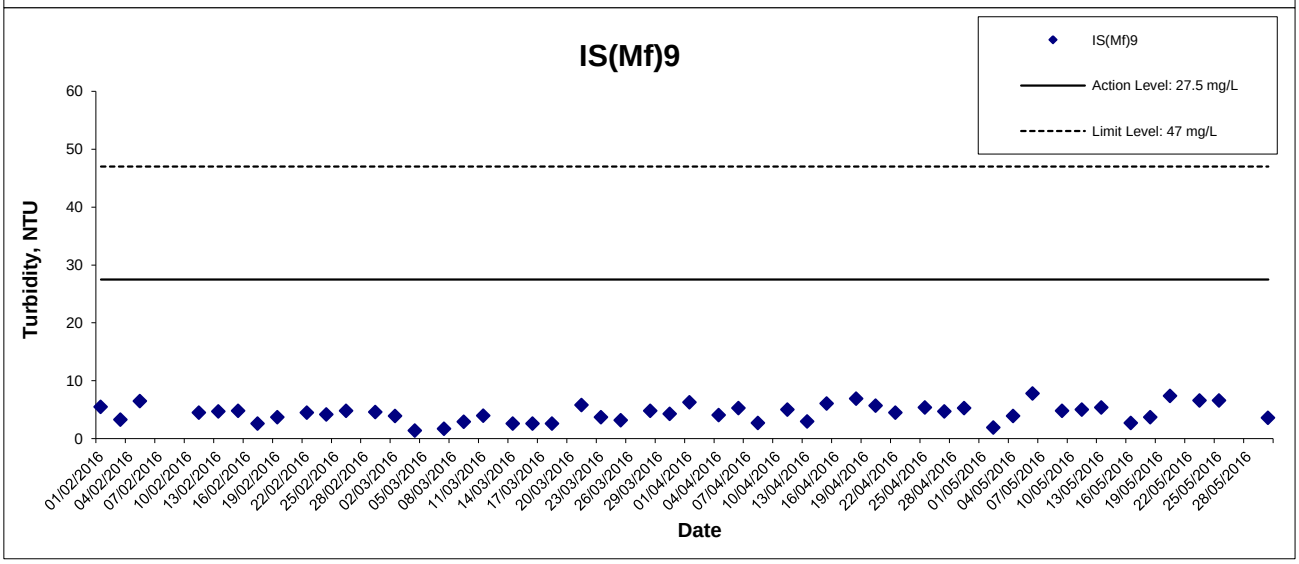
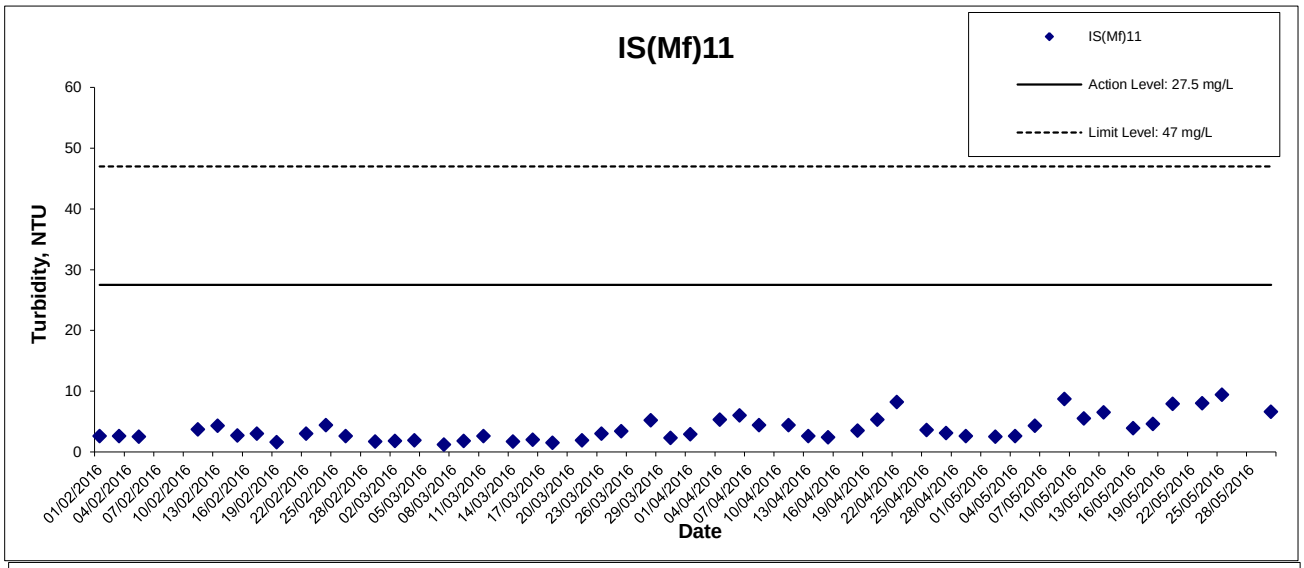
Turbidity at Mid-Ebb Tide

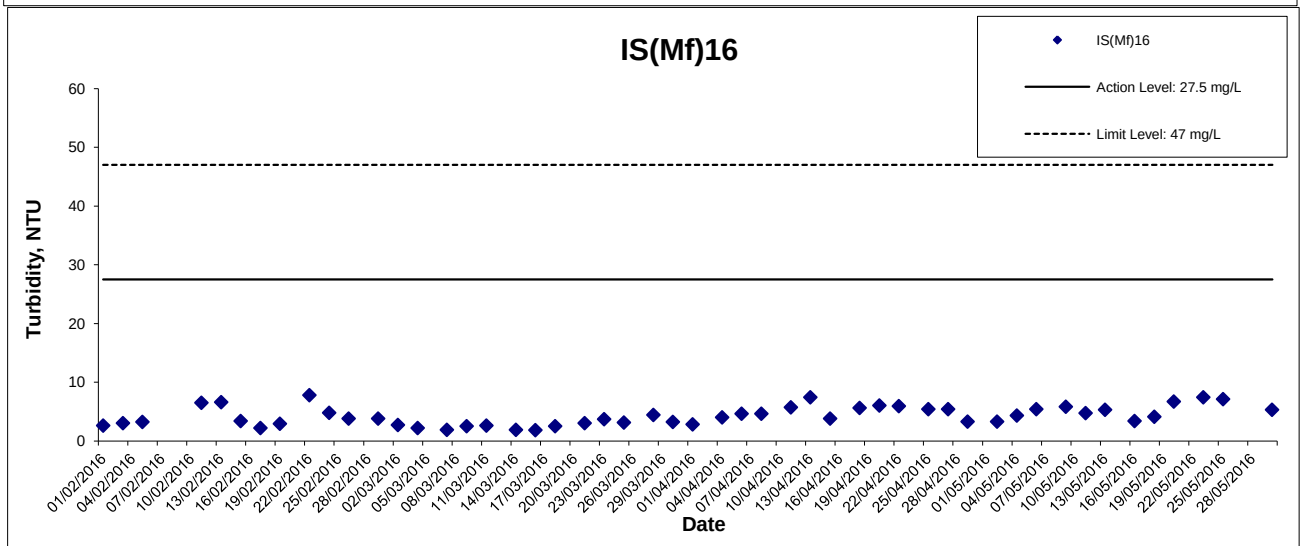


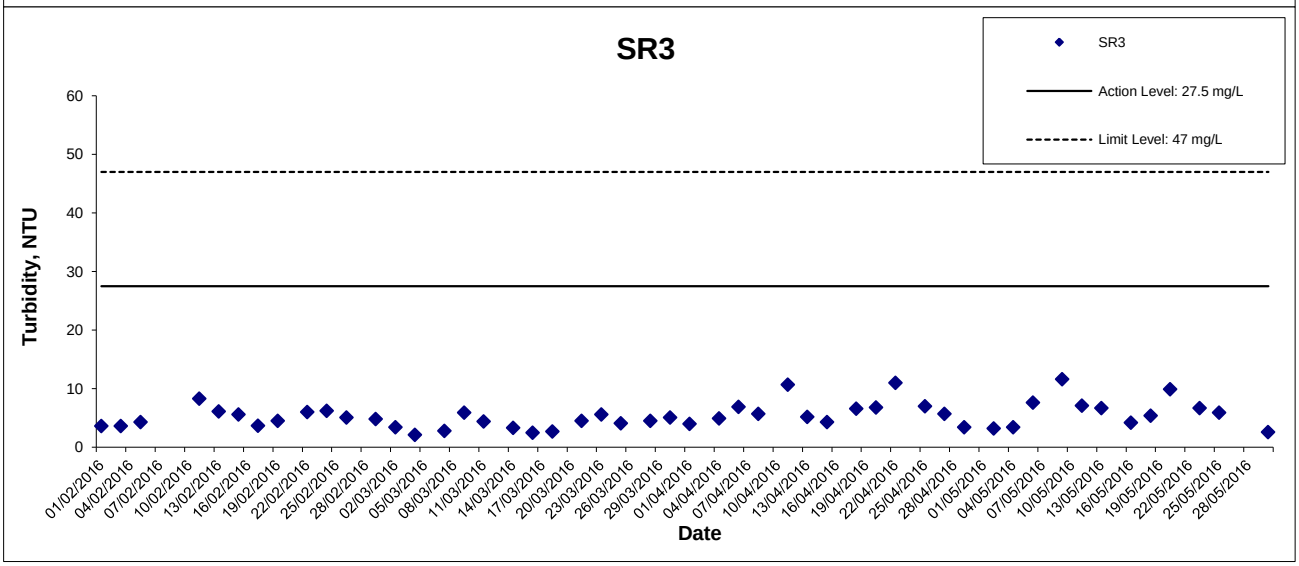




Turbidity at Mid-Ebb Tide







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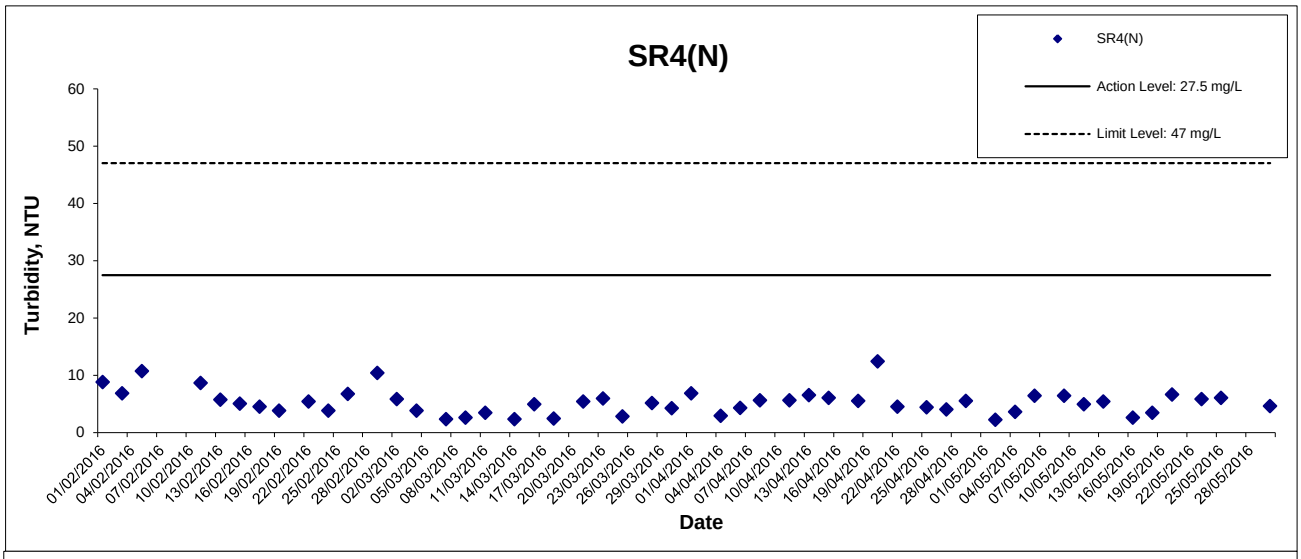
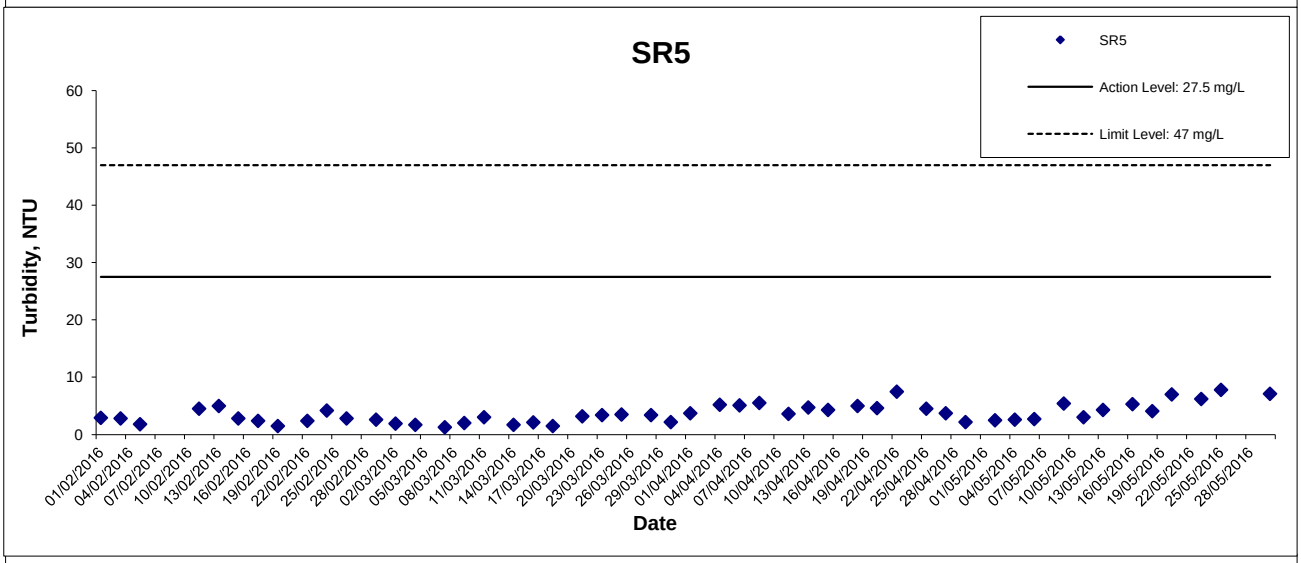
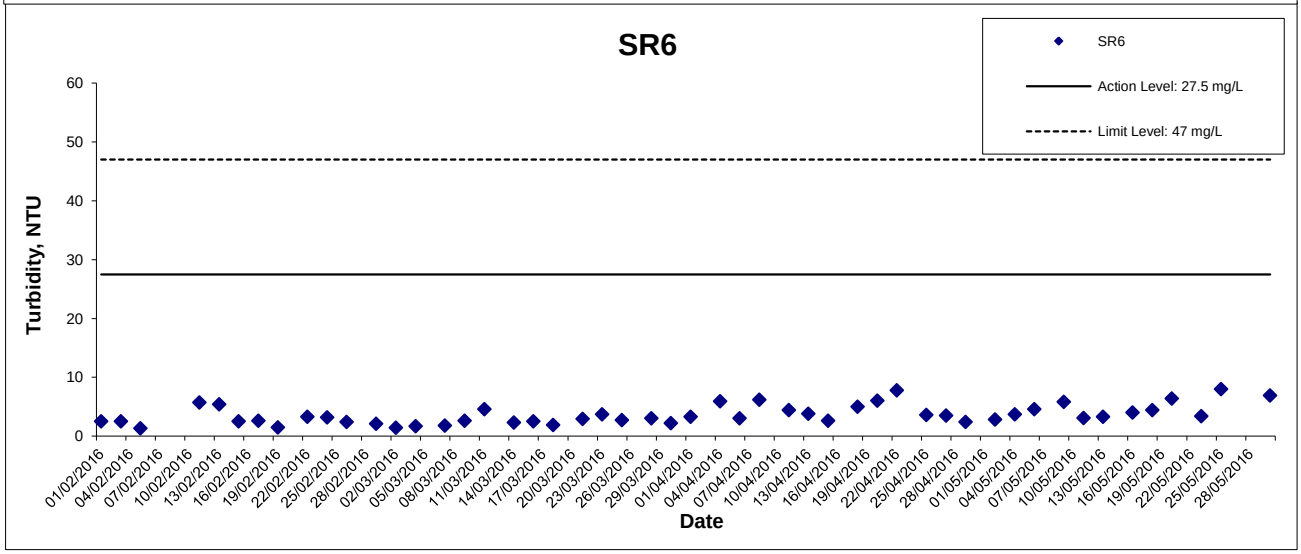
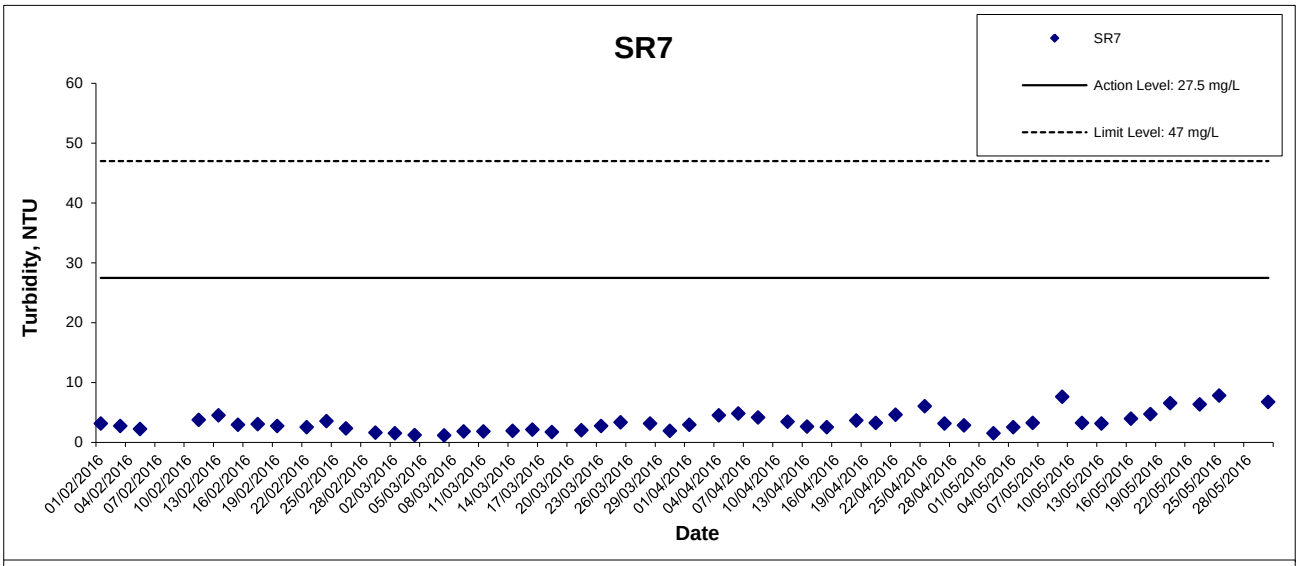
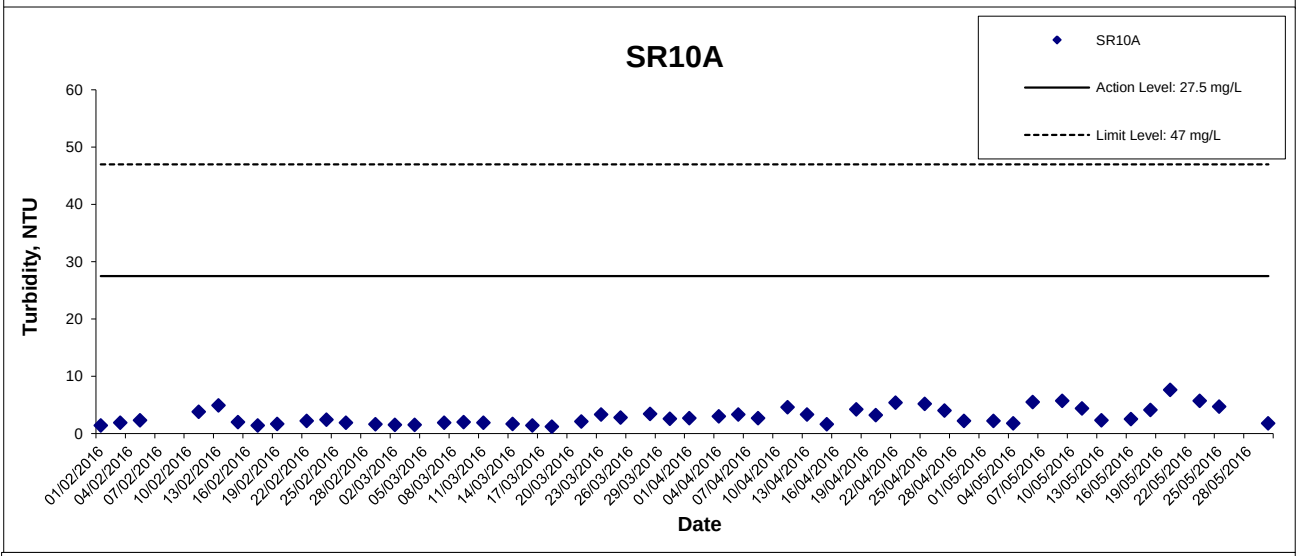


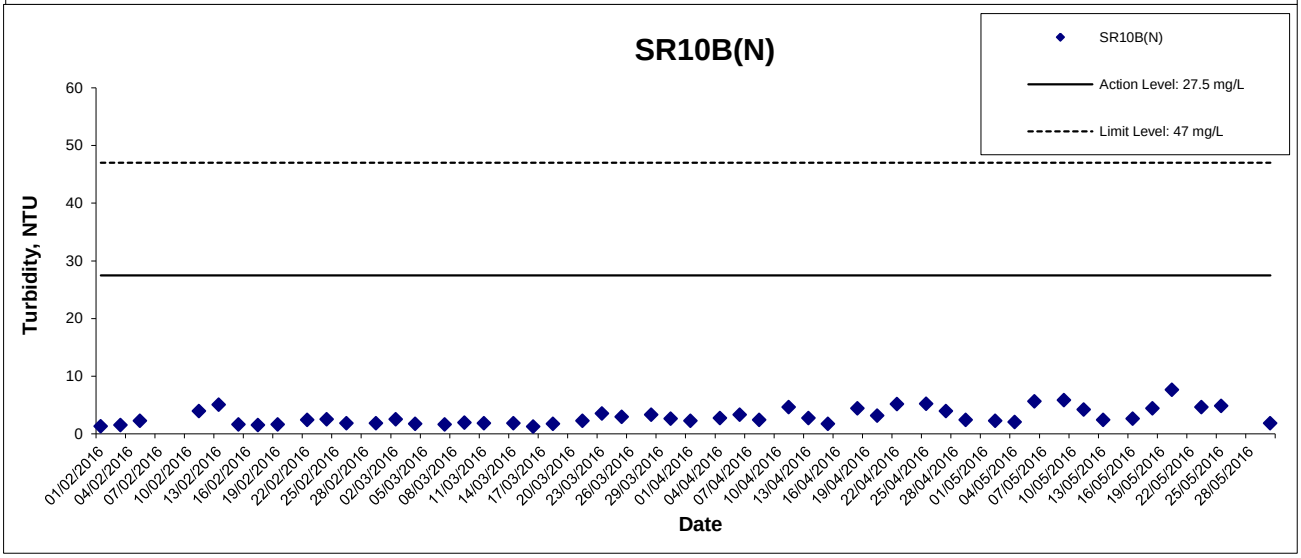




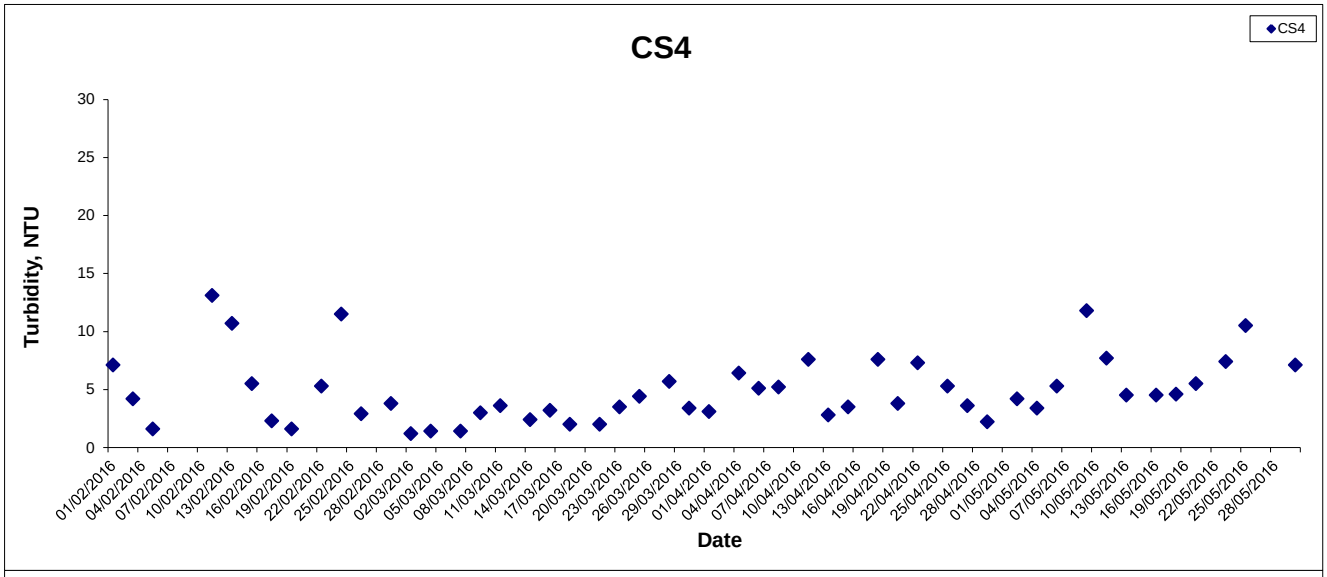
Turbidity at Mid-Ebb Tide

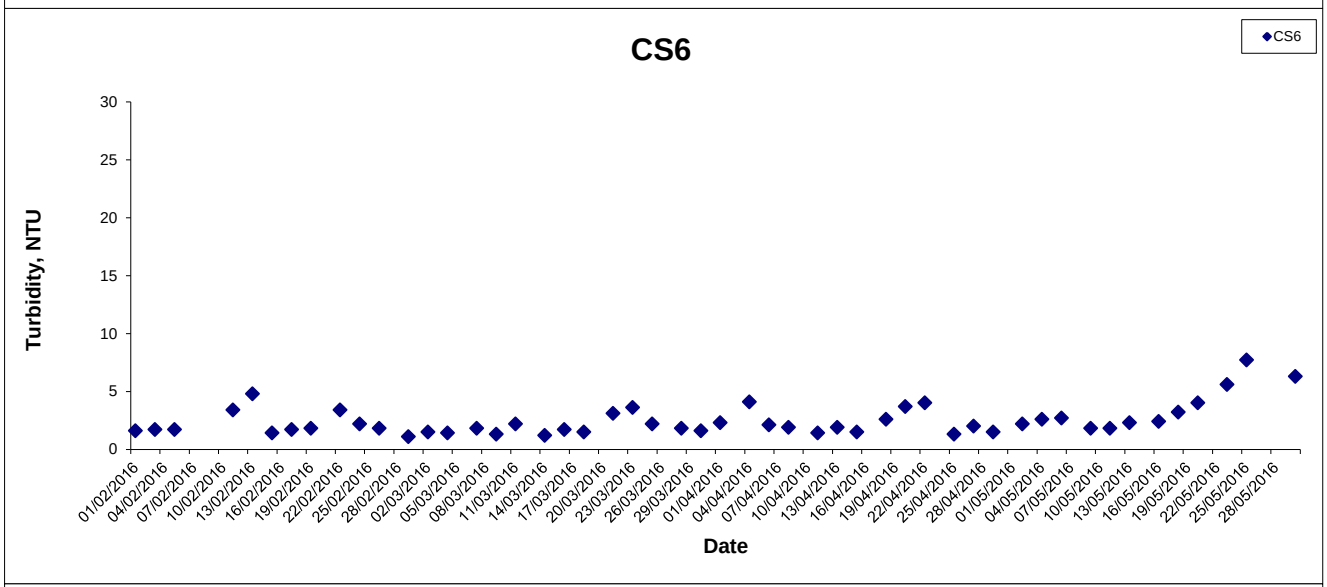


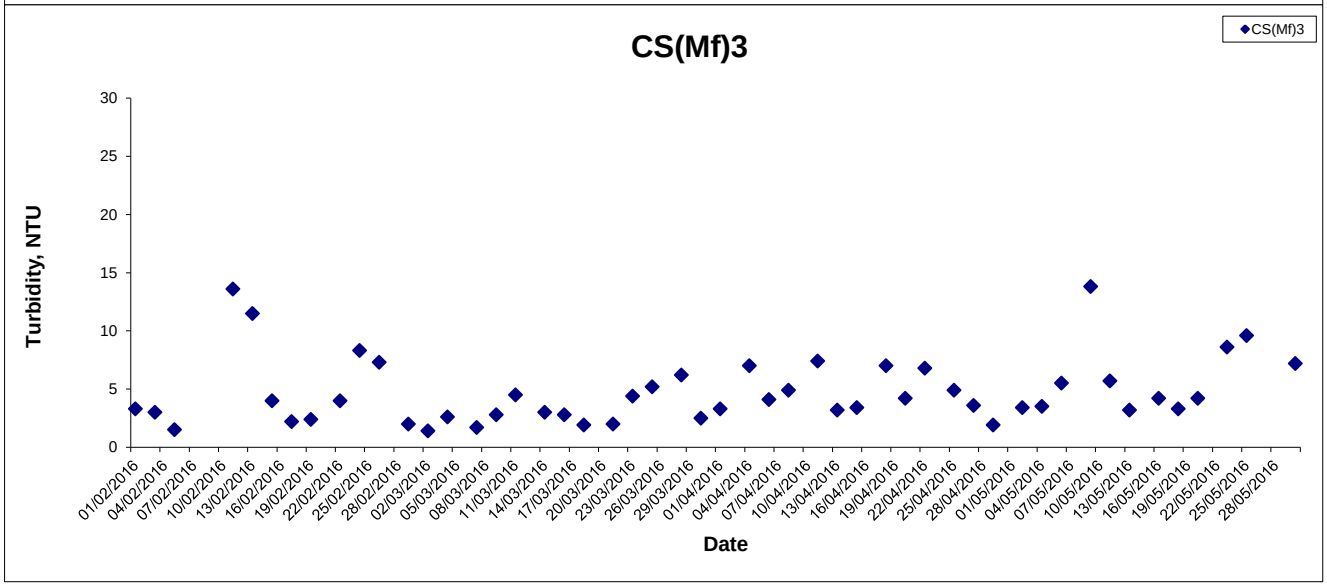




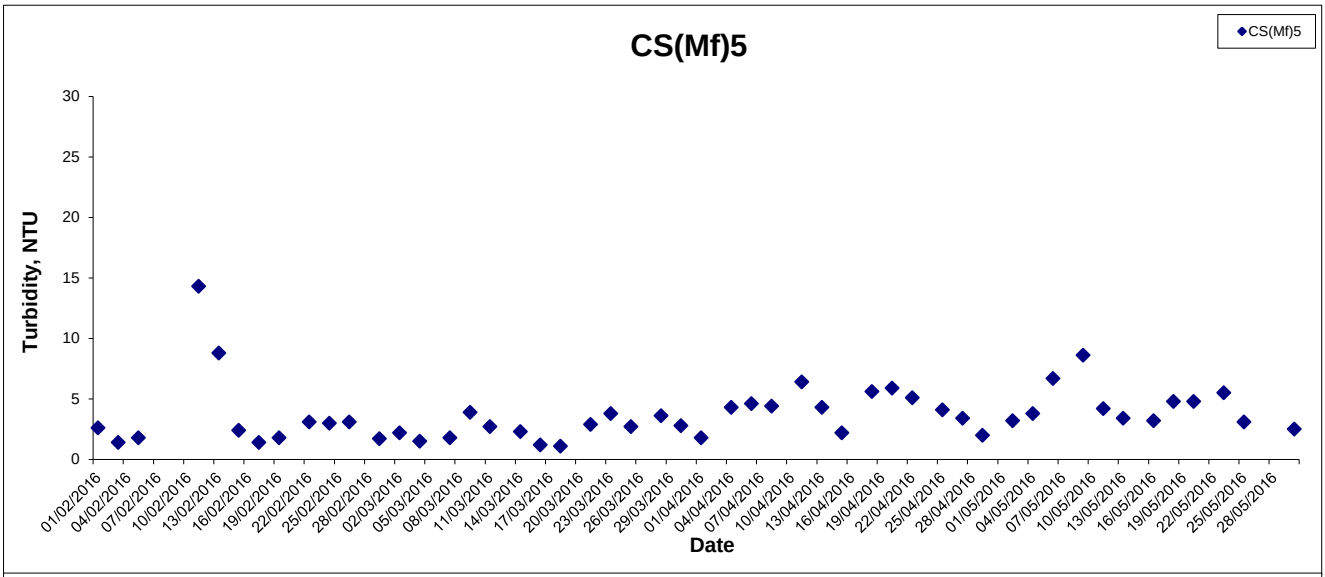
Turbidity at Mid-Flood Tide

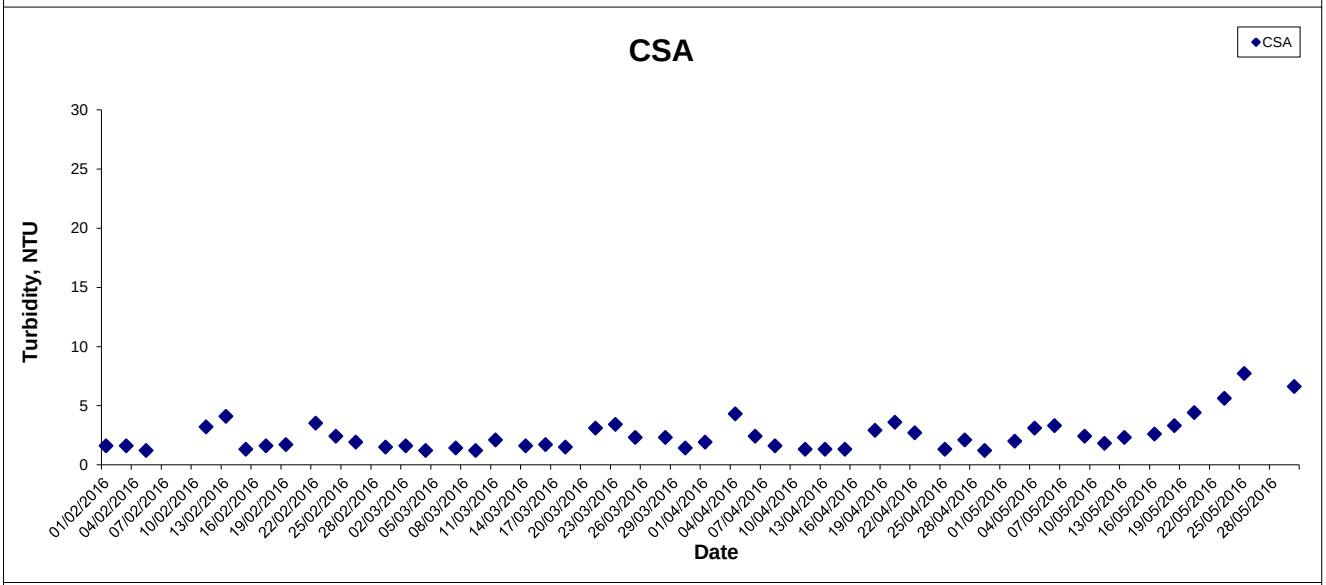


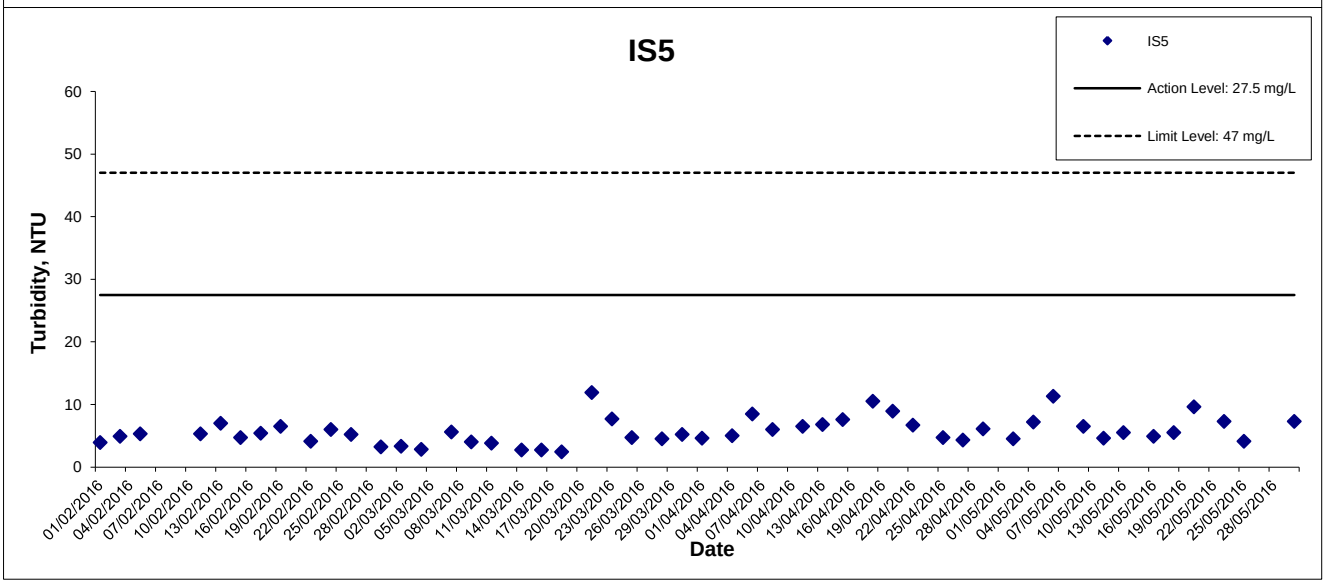




Turbidity at Mid-Flood Tide







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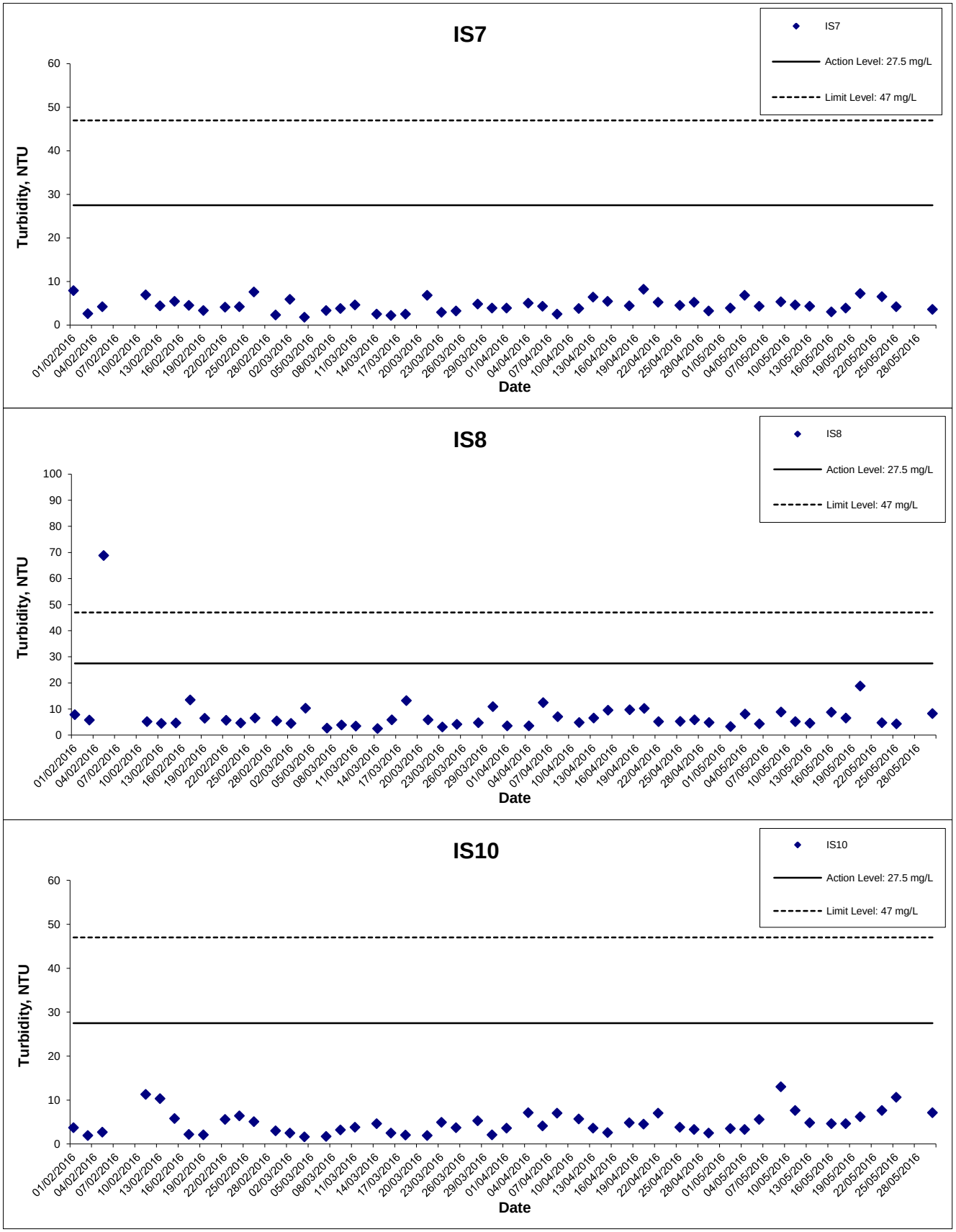
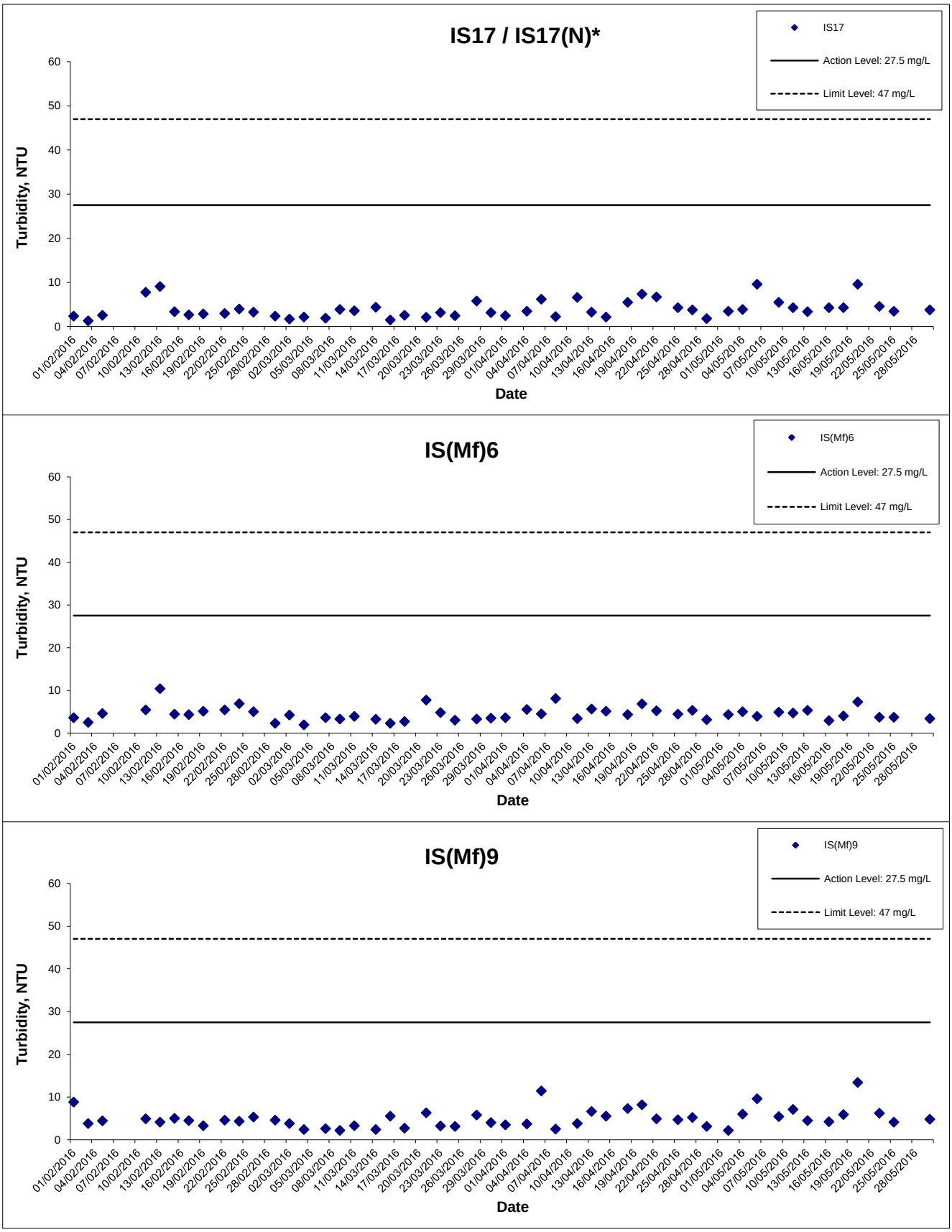
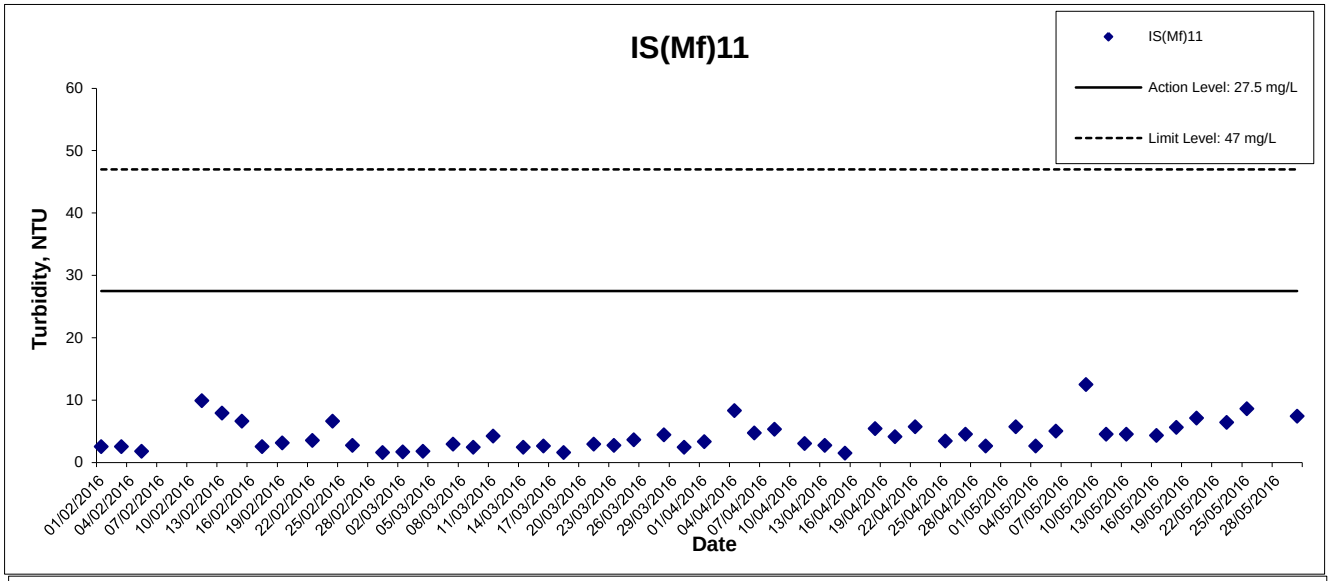
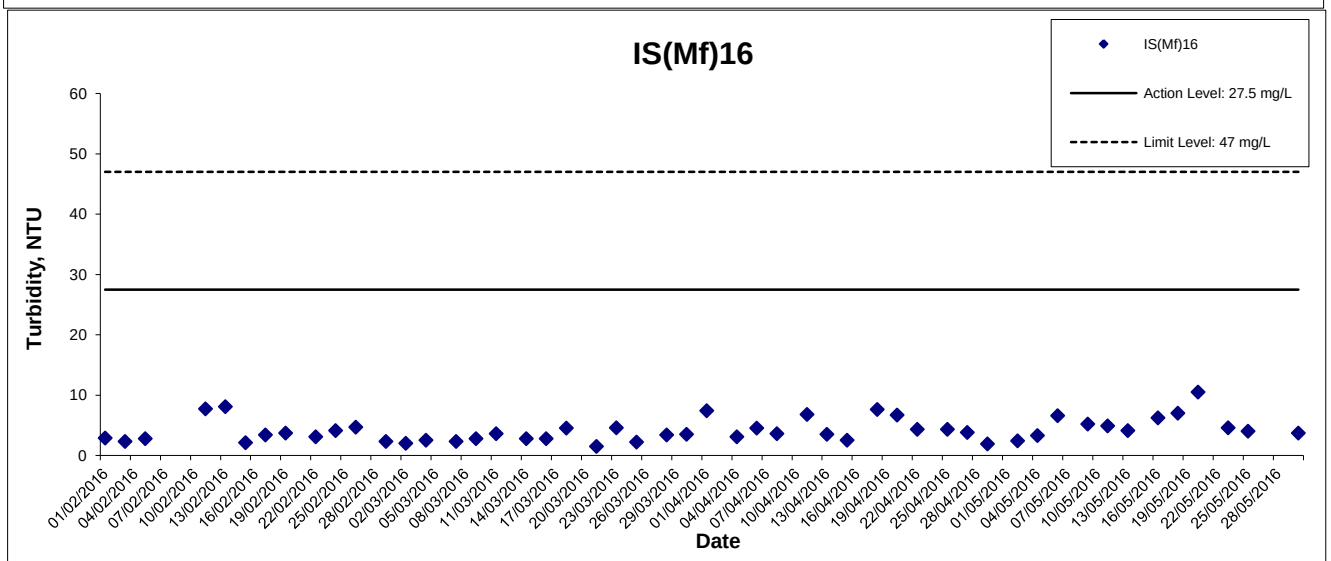


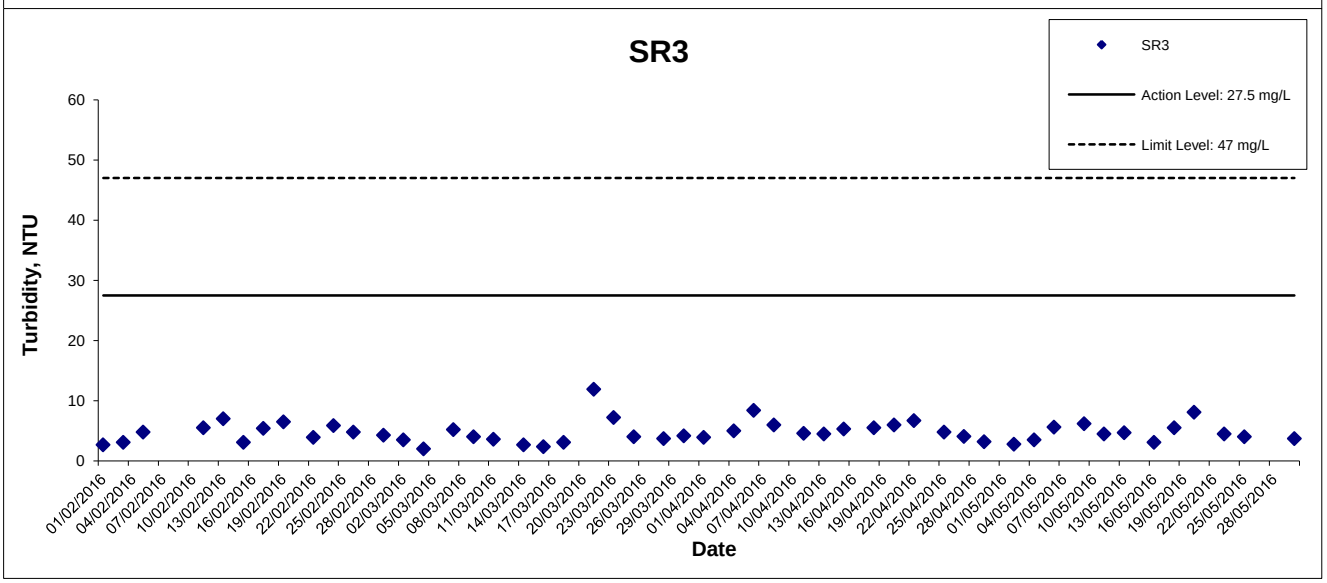
Turbidity at Mid-Flood Tide



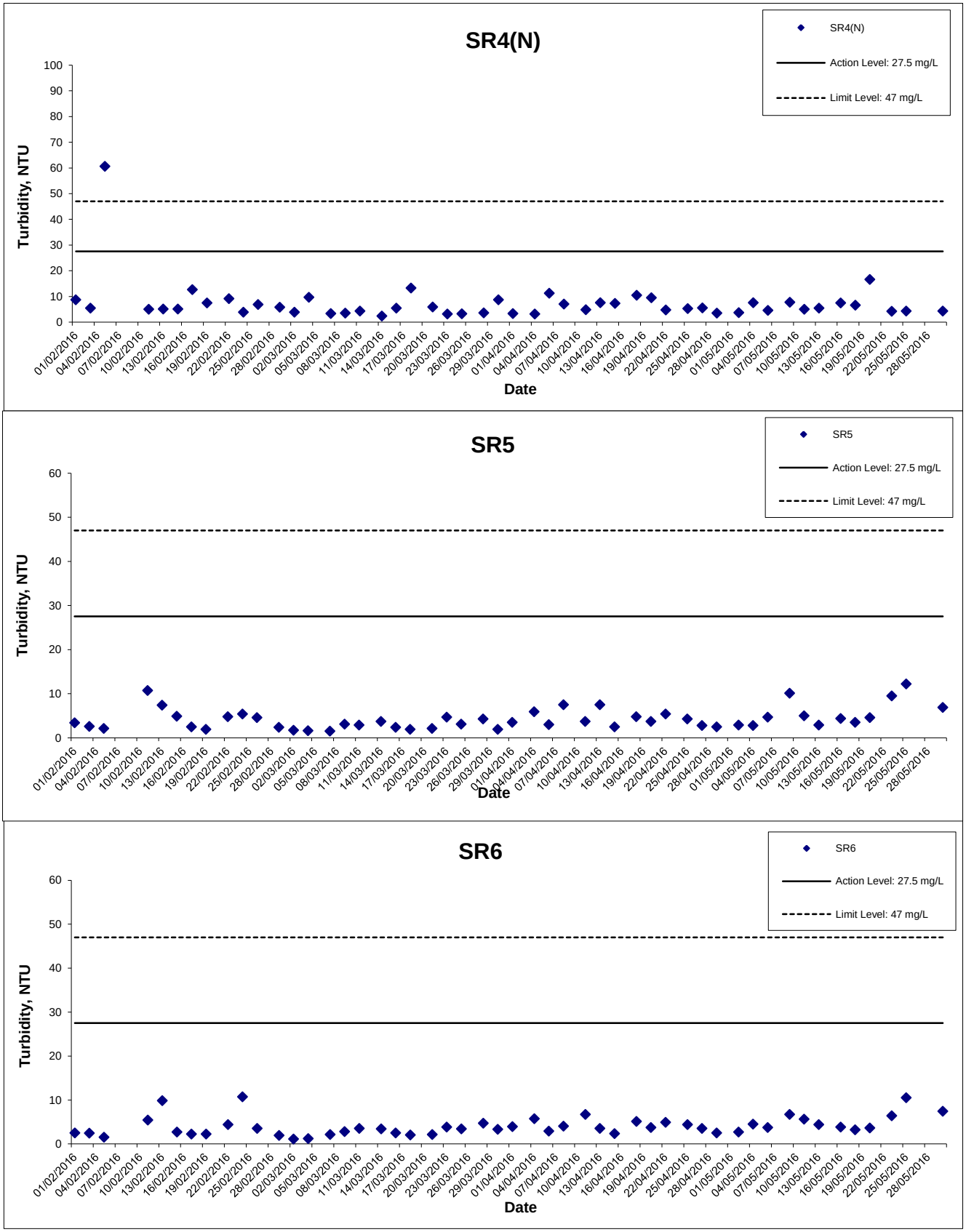
Turbidity at Mid-Flood Tide







Turbidity at Mid-Flood Tide



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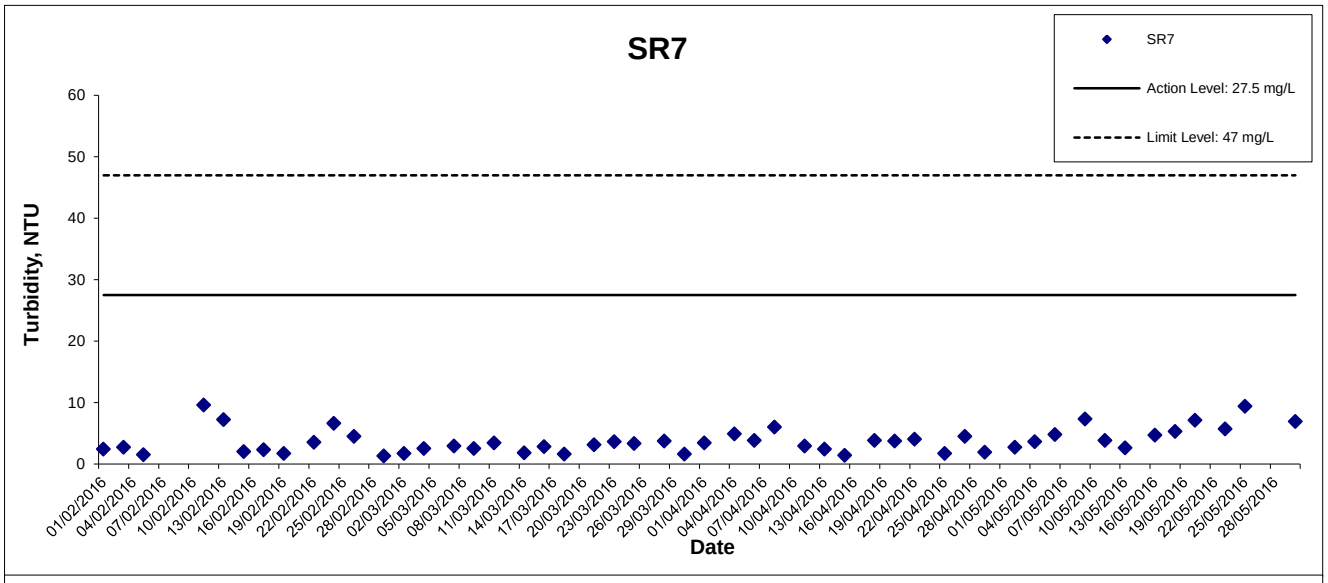
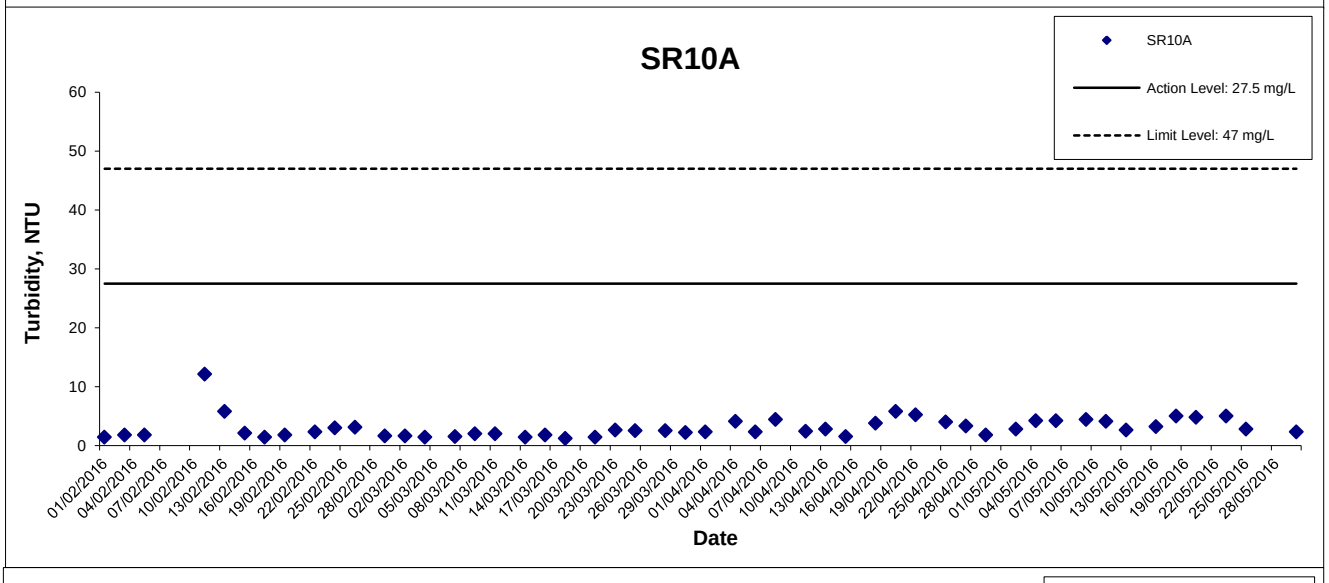
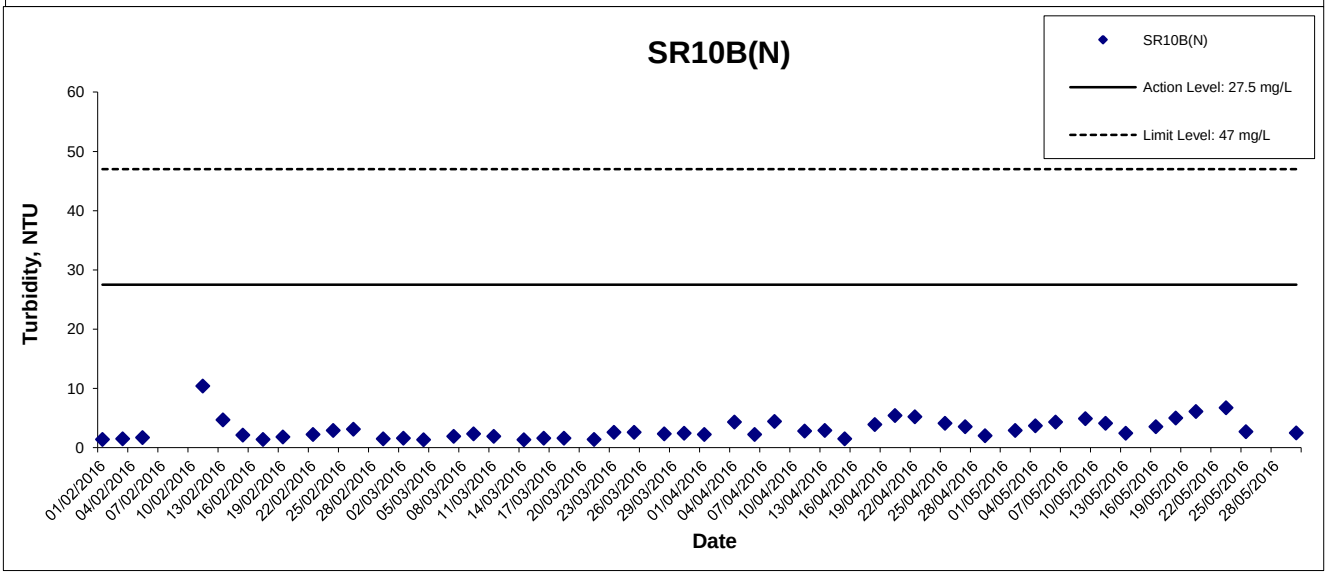
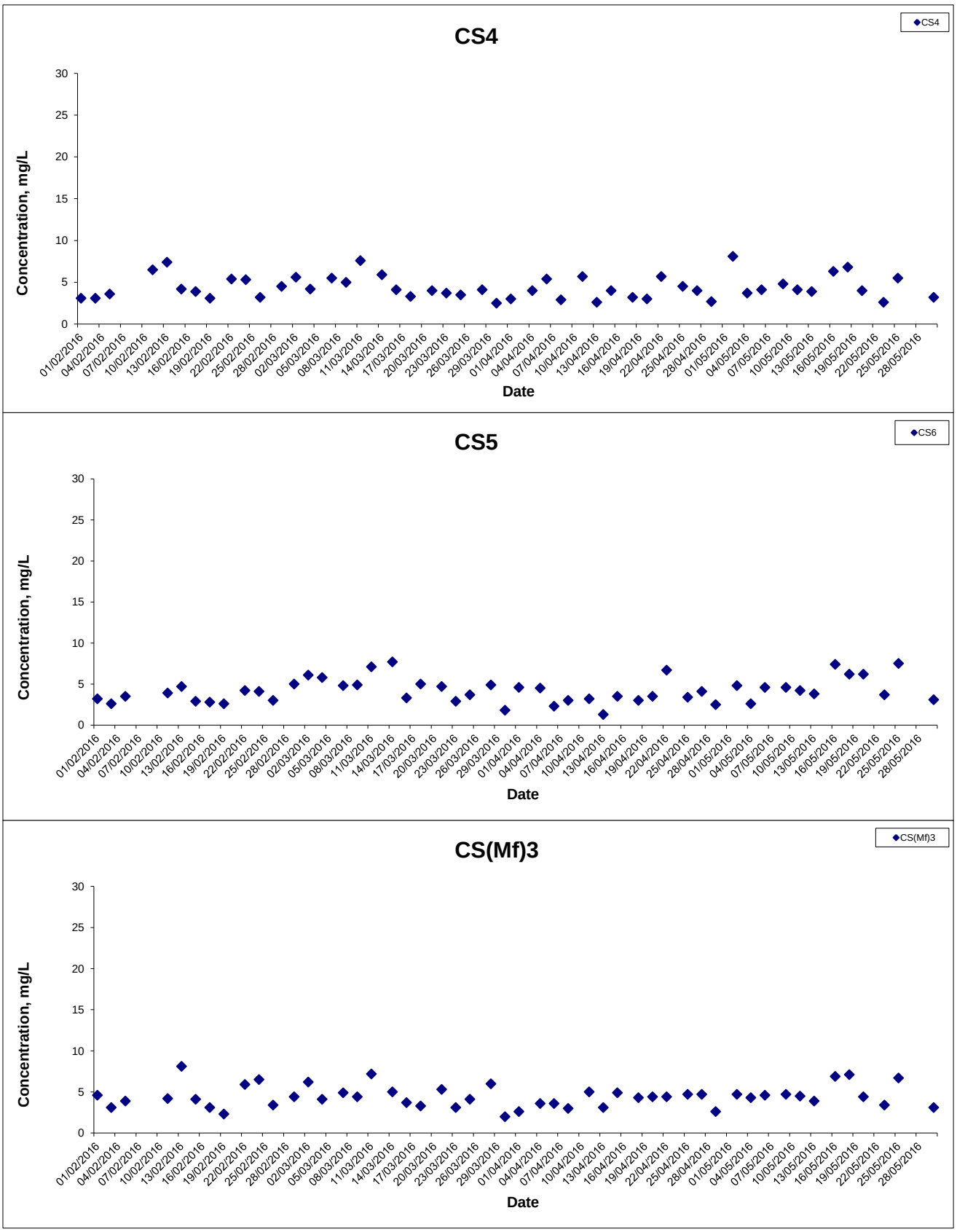


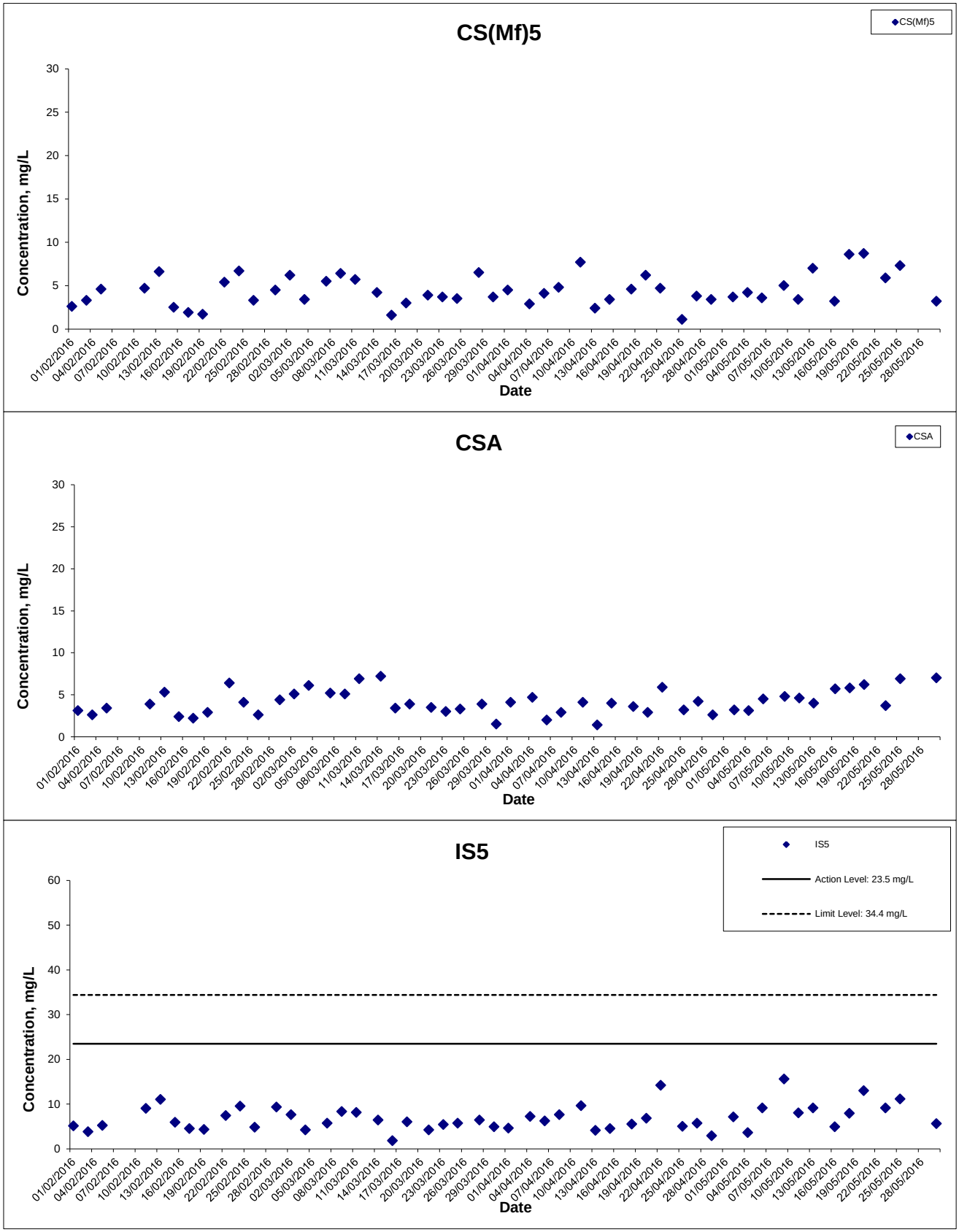




Suspended Solids at Mid-Ebb Tide



Suspended Solids at Mid-Ebb Tide



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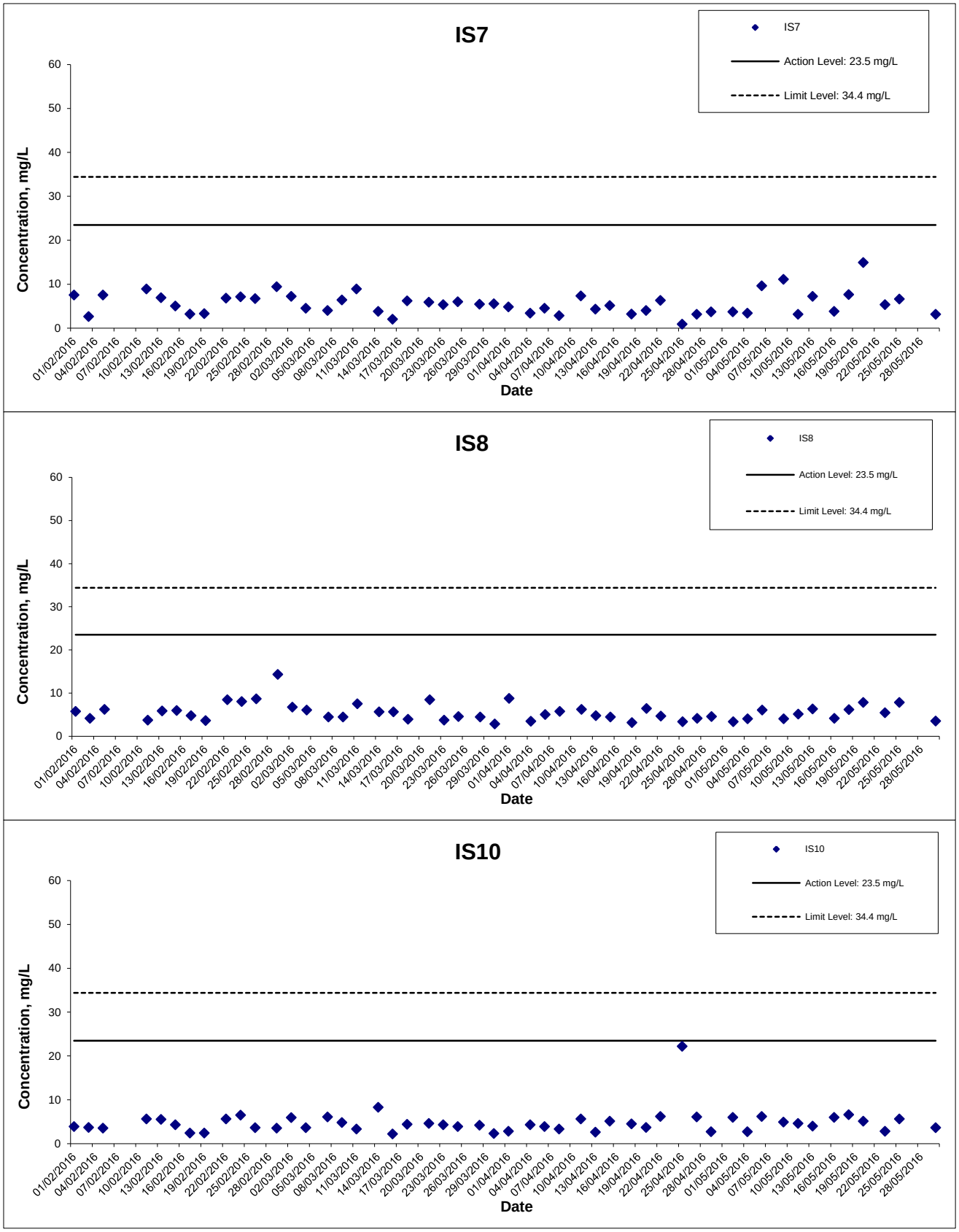
Suspended Solids at Mid-Ebb Tide



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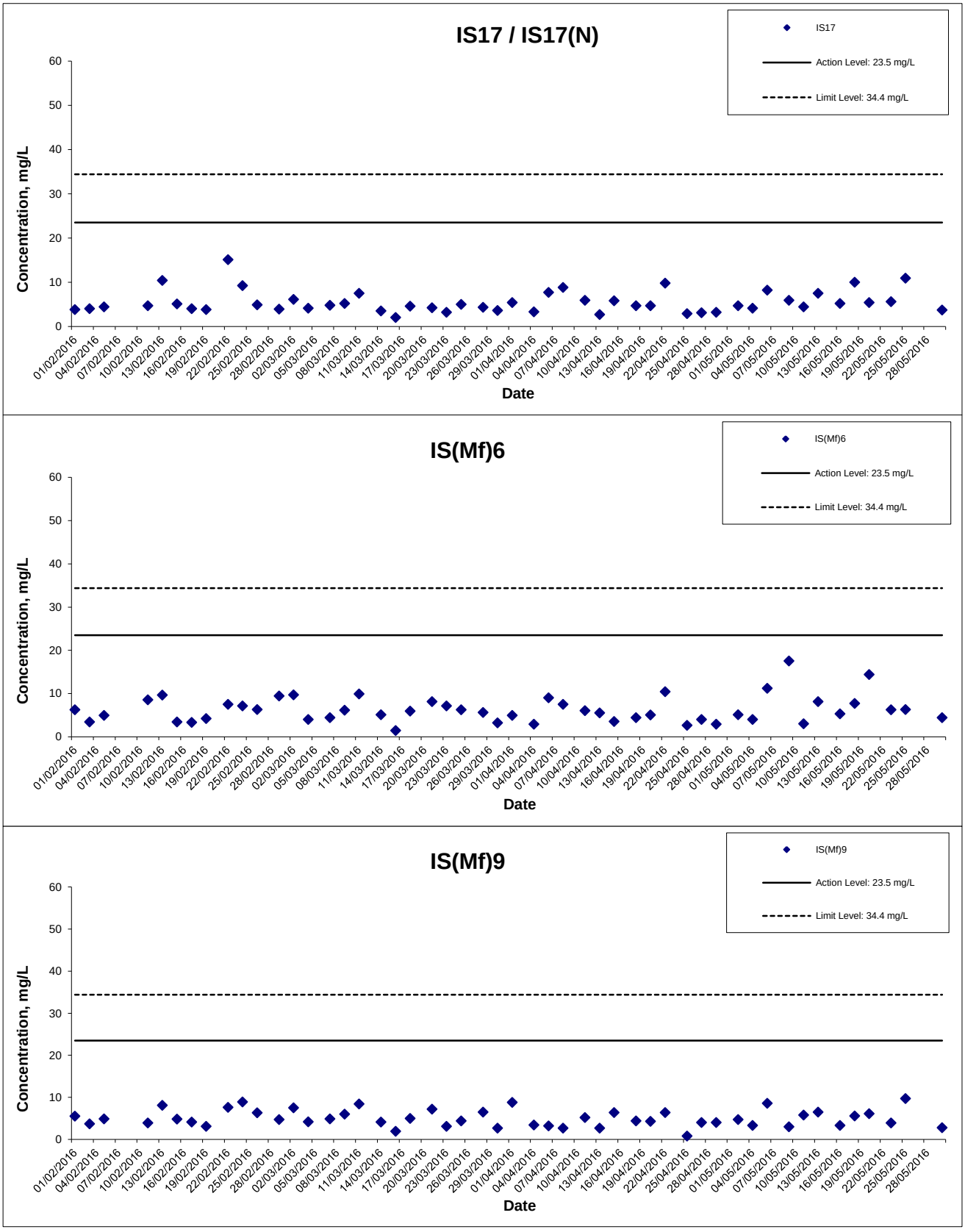
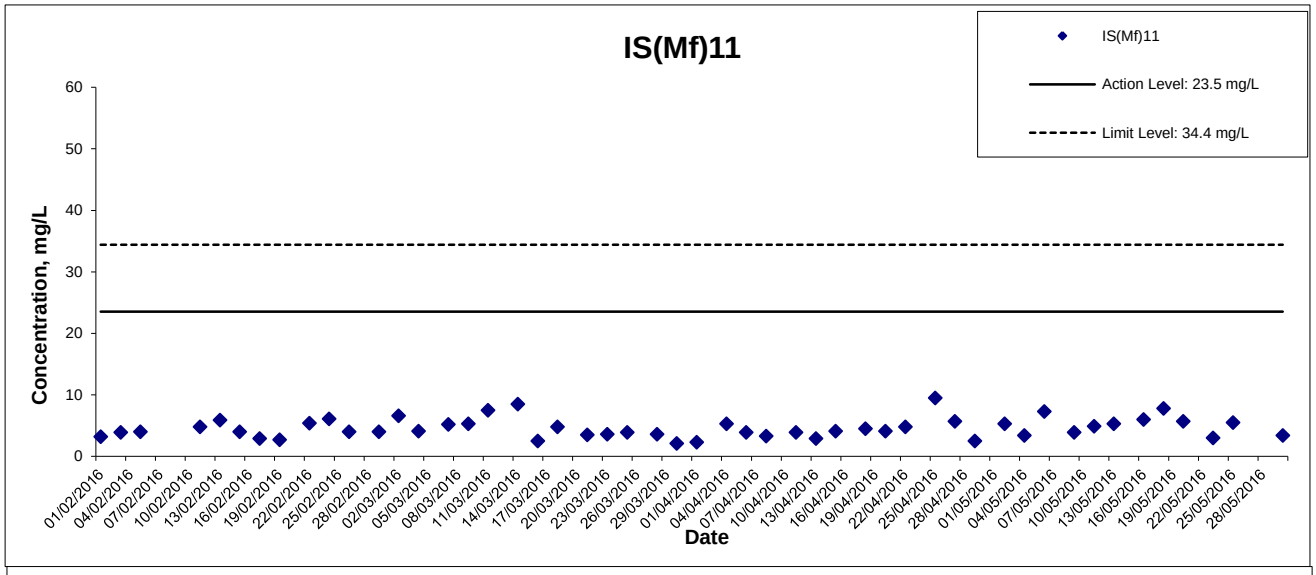
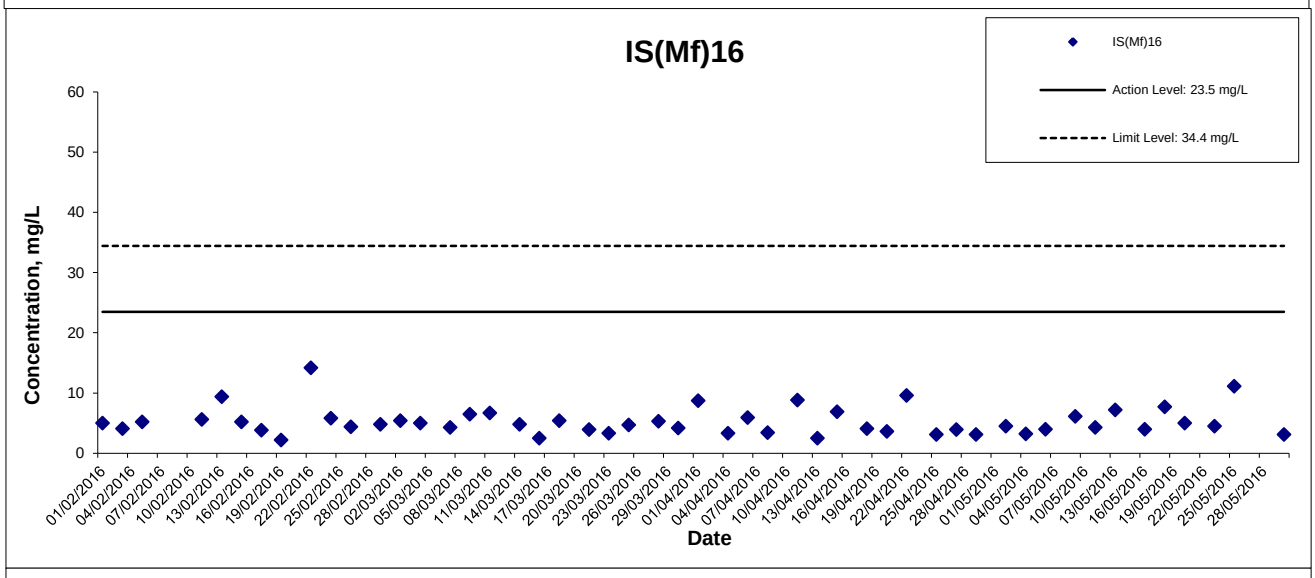
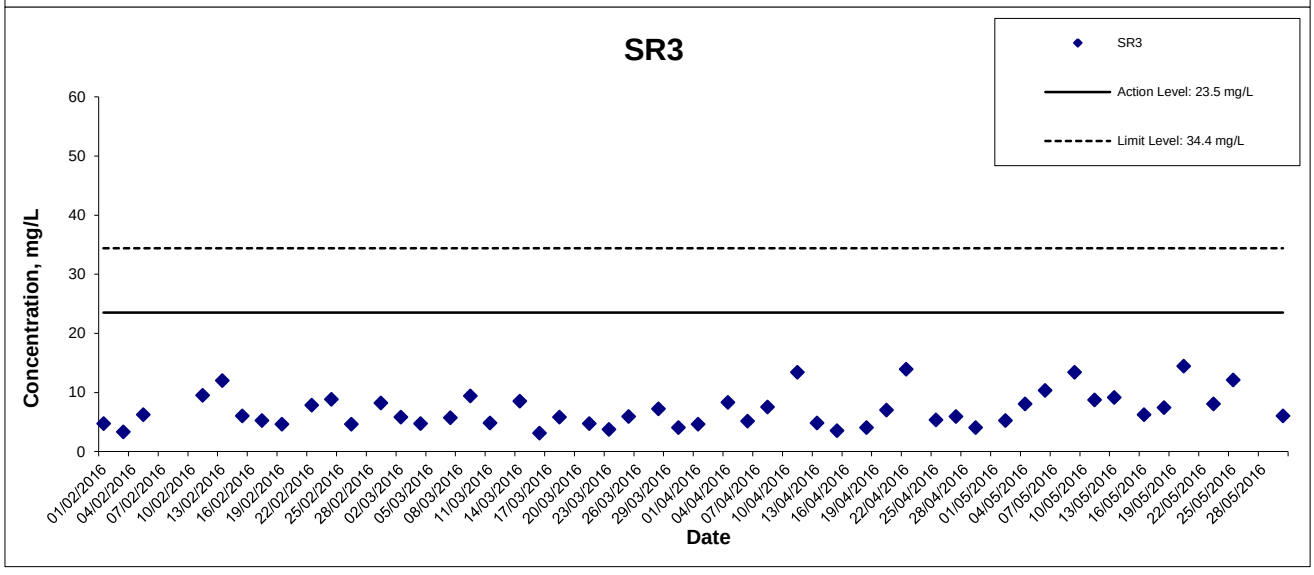


Suspended Solids at Mid-Ebb Tide







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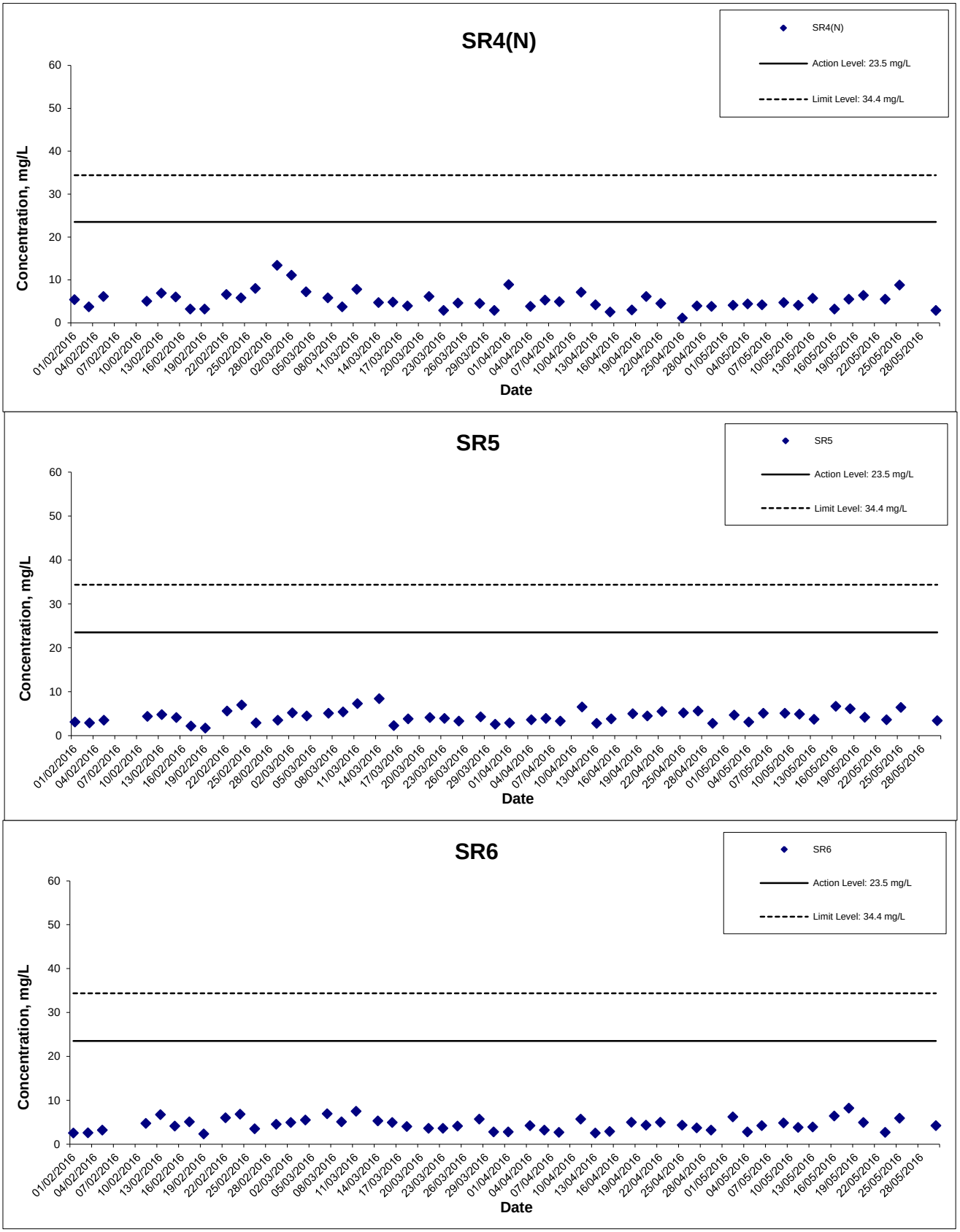

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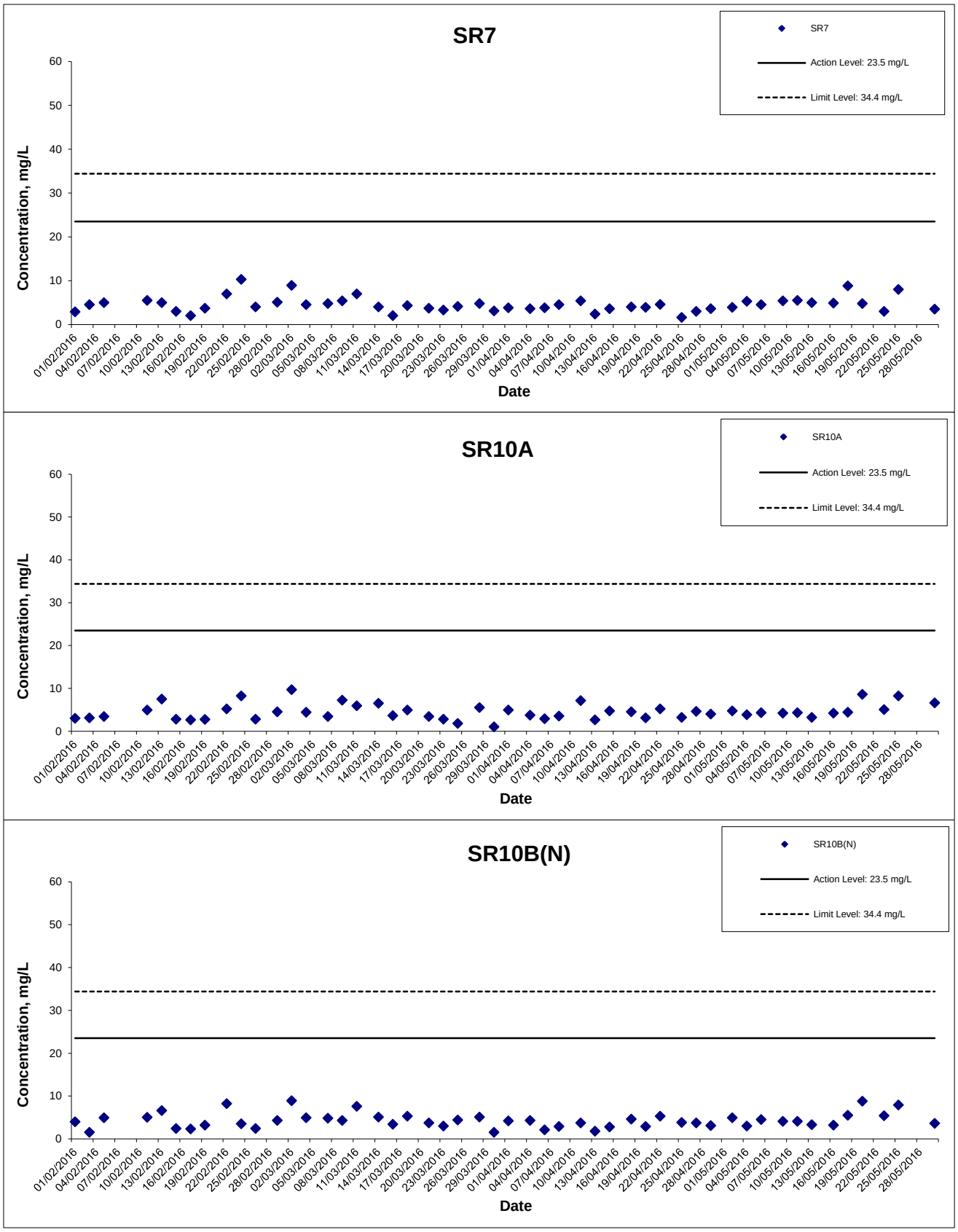

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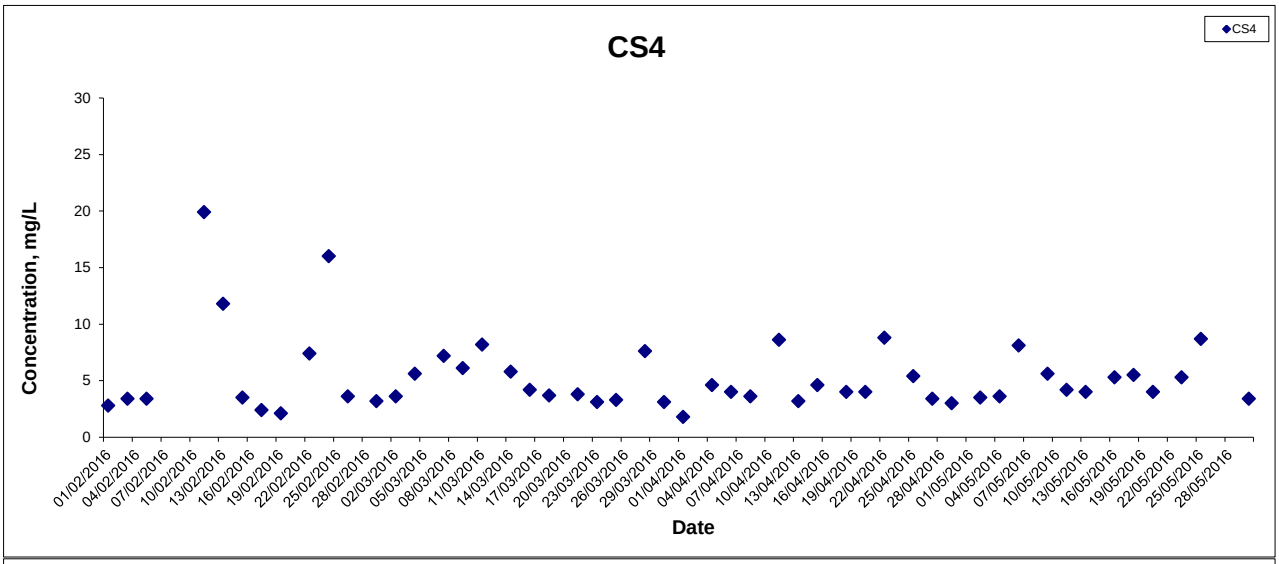
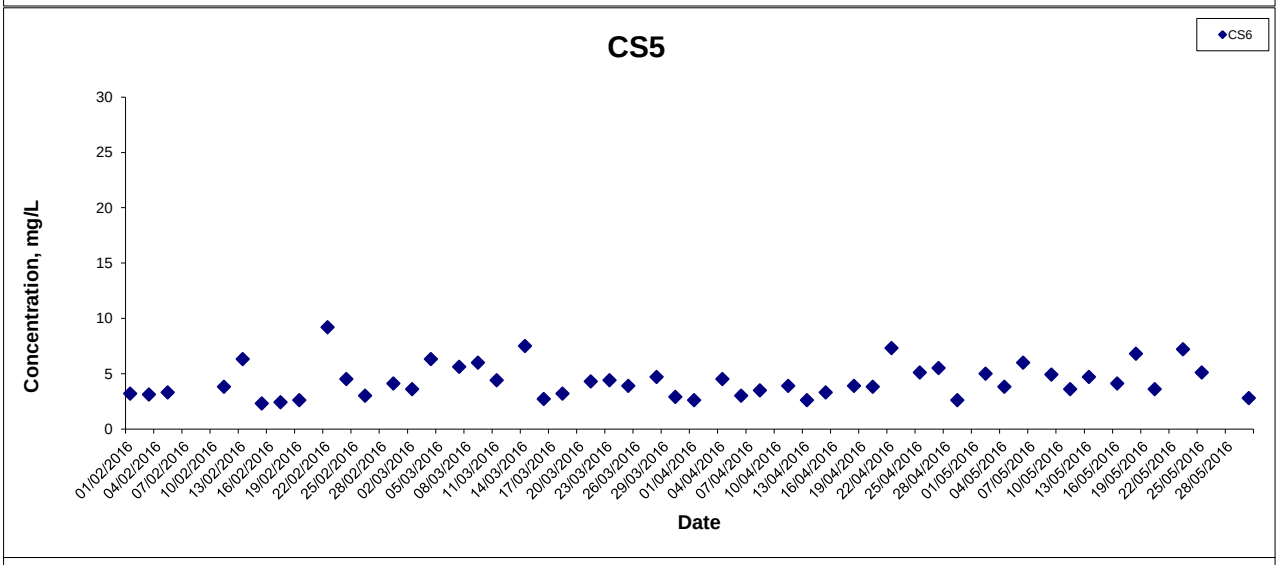
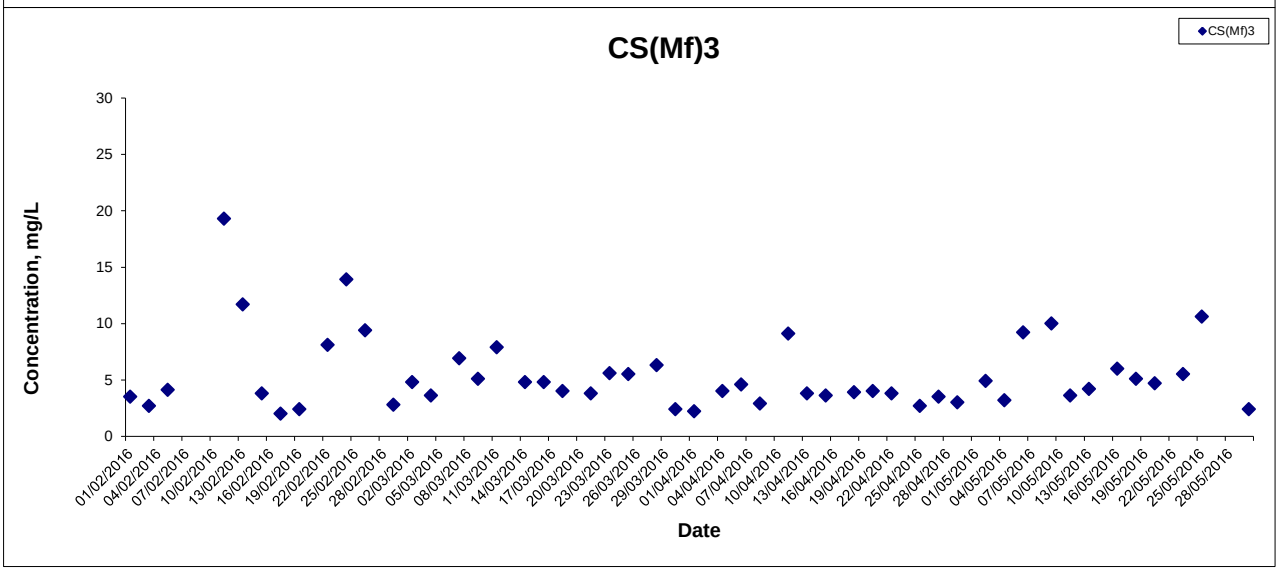






HONG KONG - ZHUHAI - MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- RECLAMATION WORKS

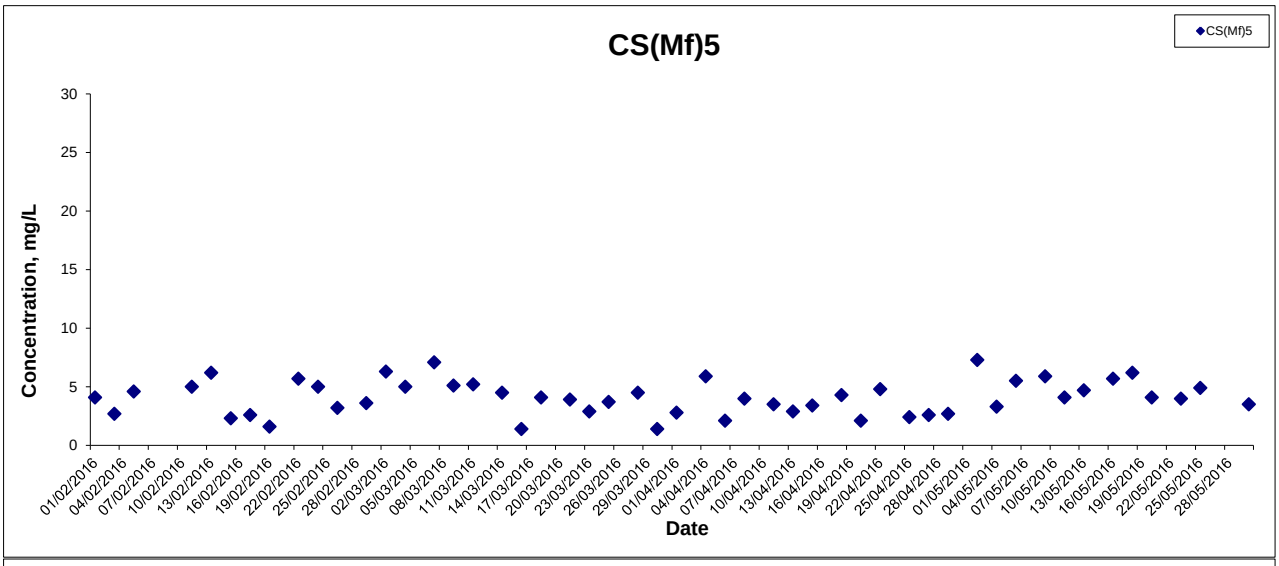
AECOM

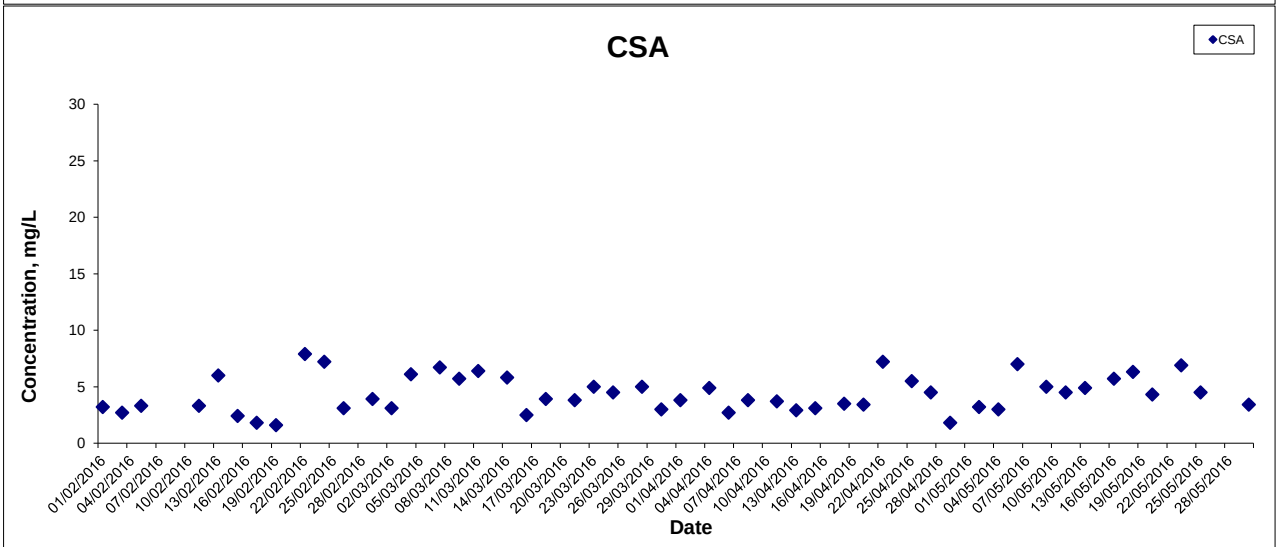
Graphical Presentation of Impact Water Quality Monitoring Results

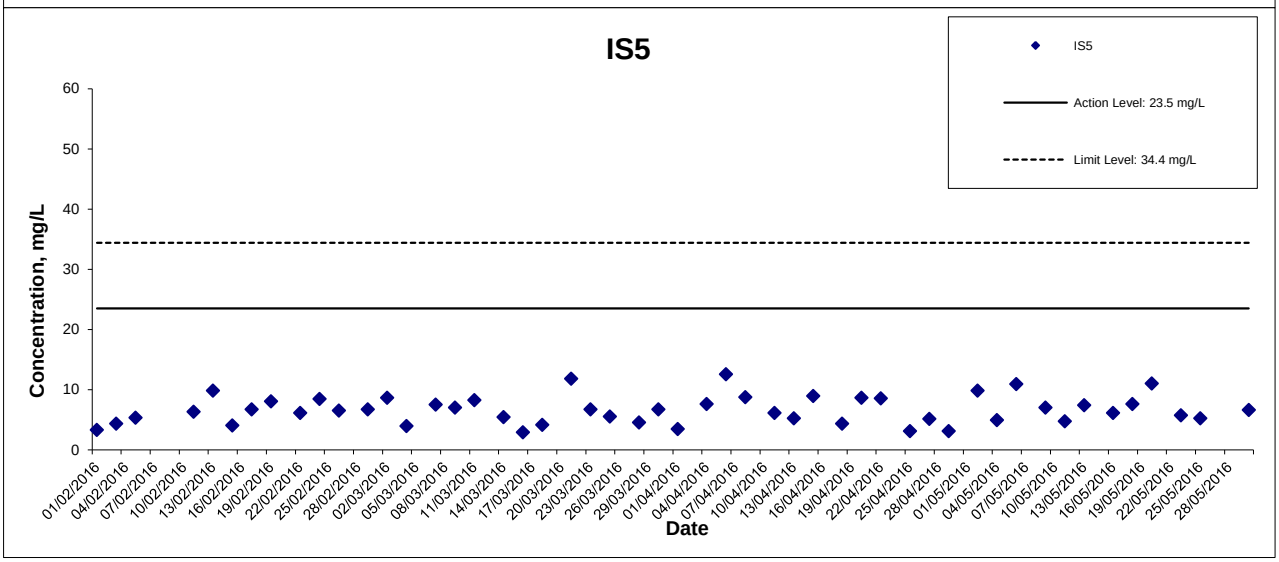
Project No.: 60249820 Date: June 2016

Appendix G

Suspended Solids at Mid-Flood Tide







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Graphical Presentation of Impact Water Quality Monitoring Results

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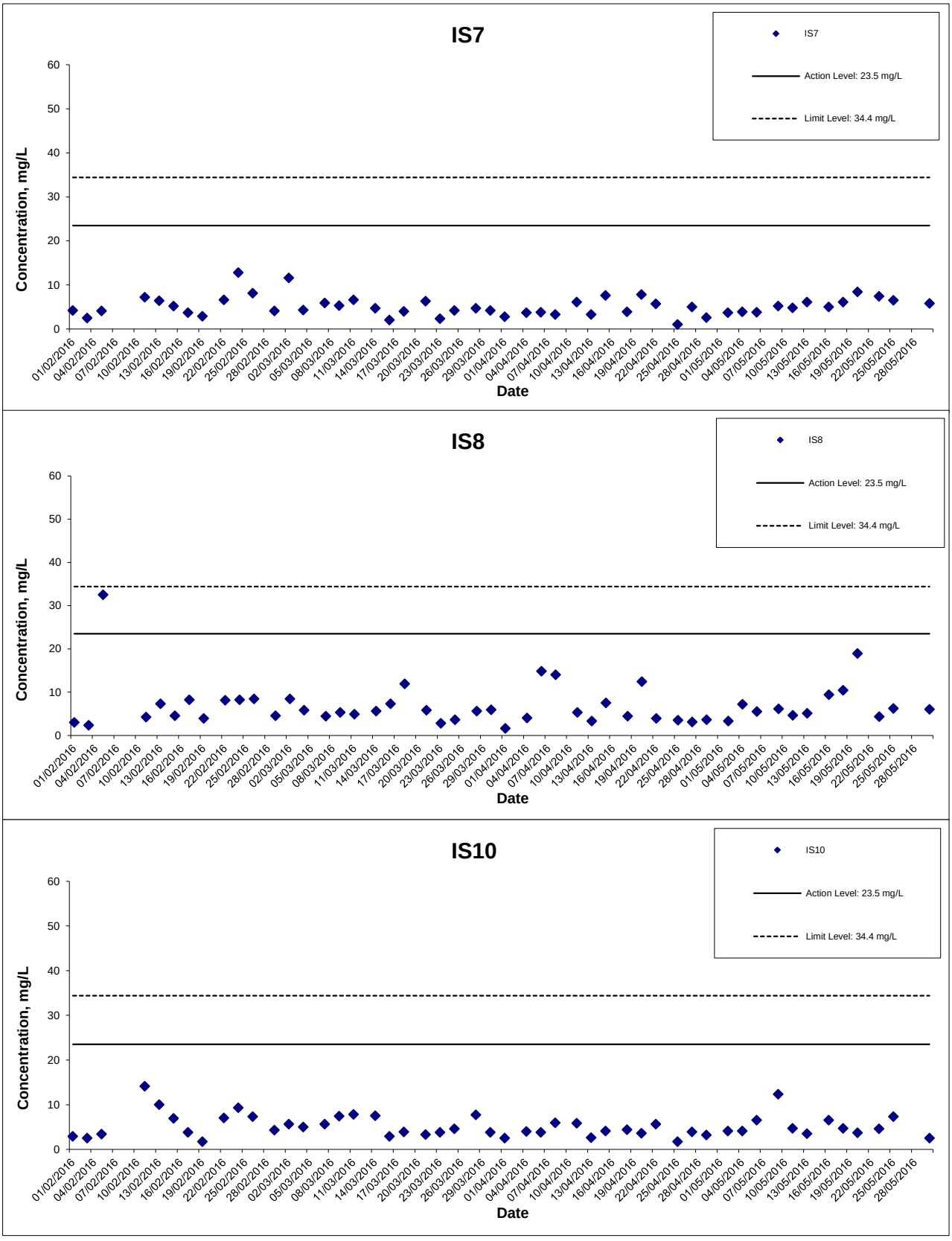

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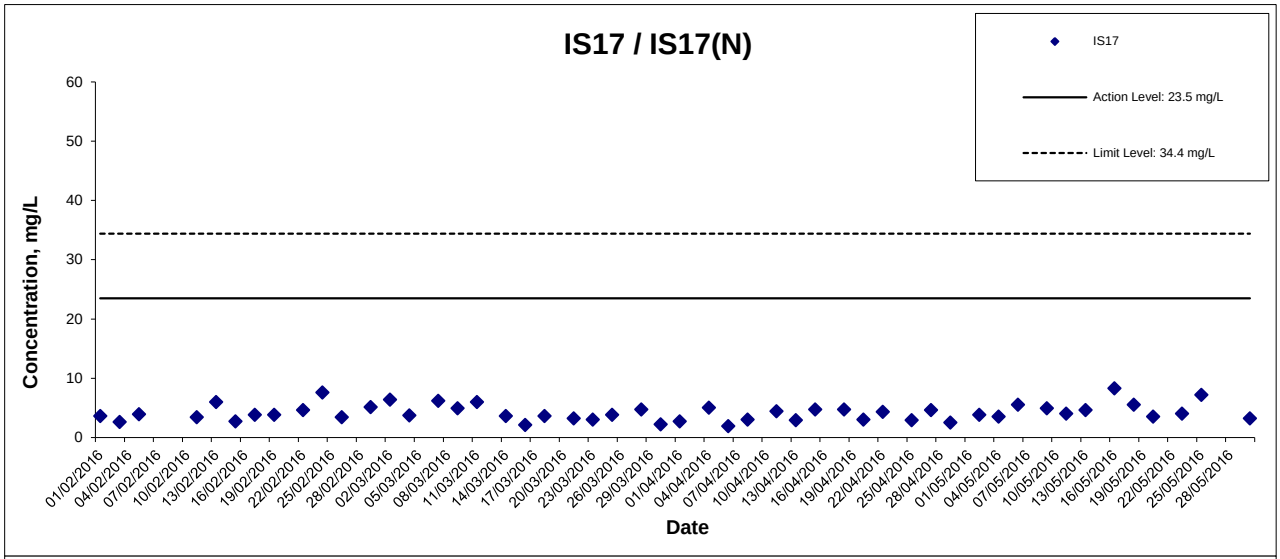

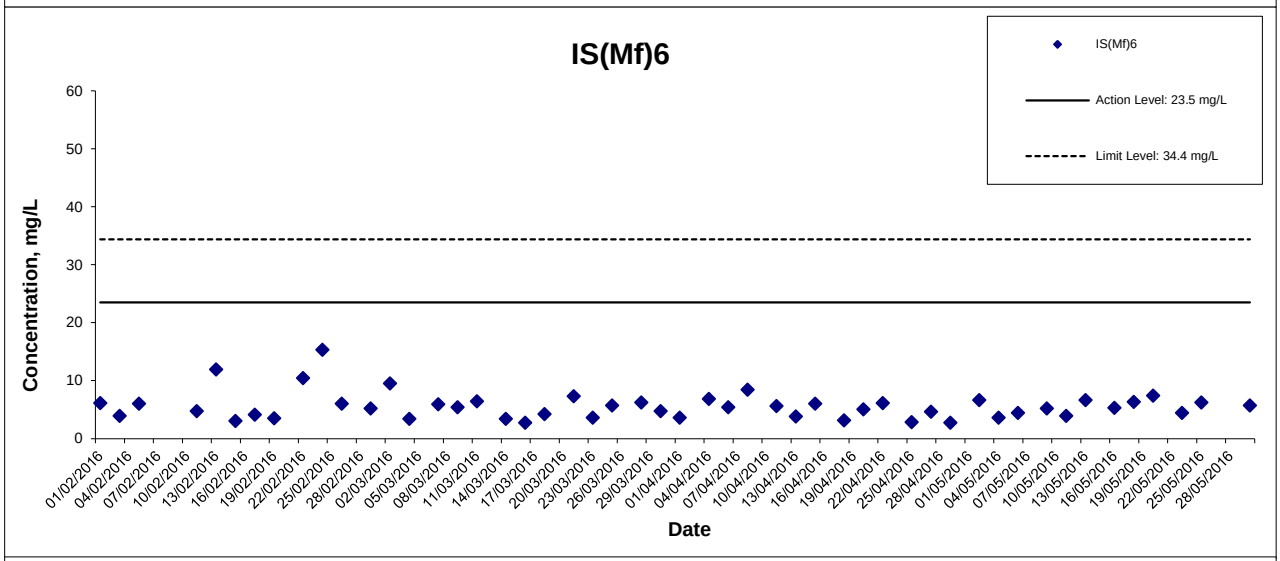

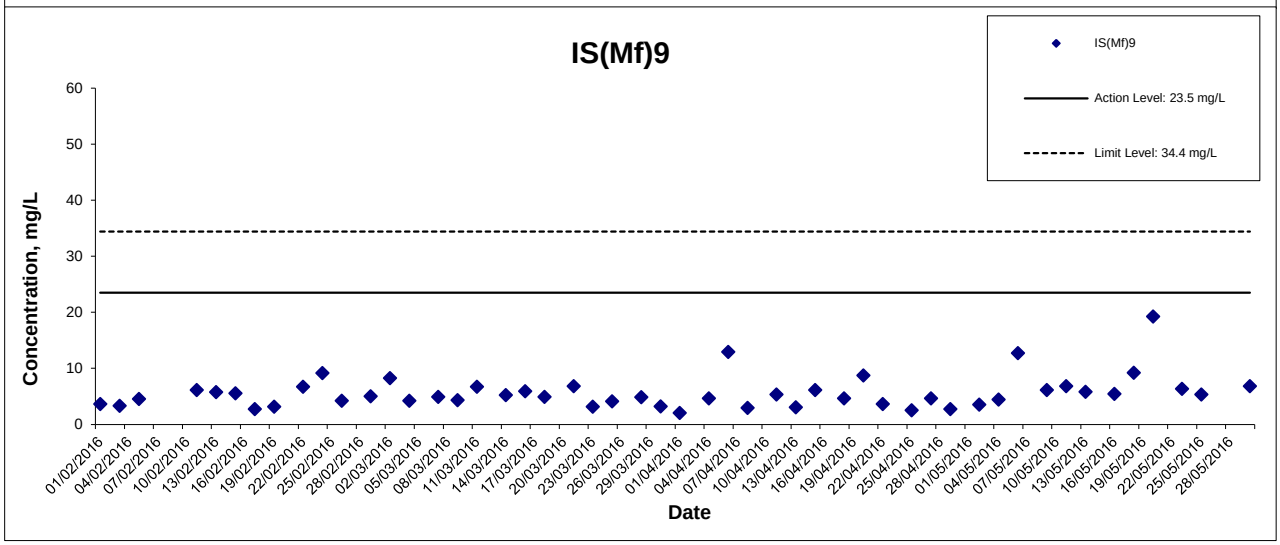

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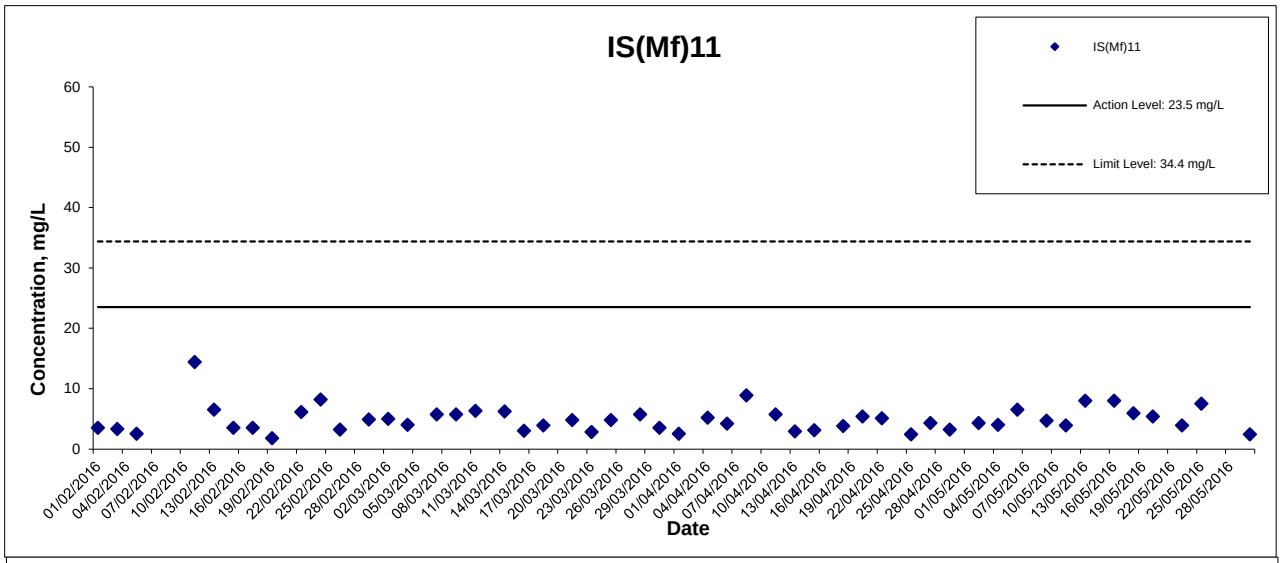

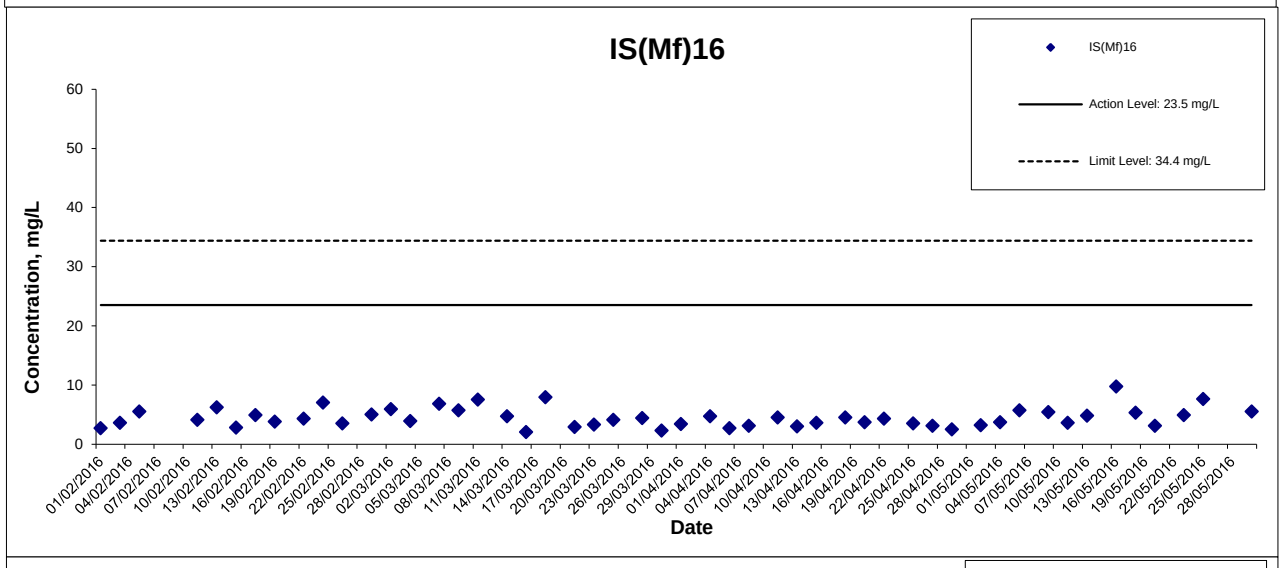

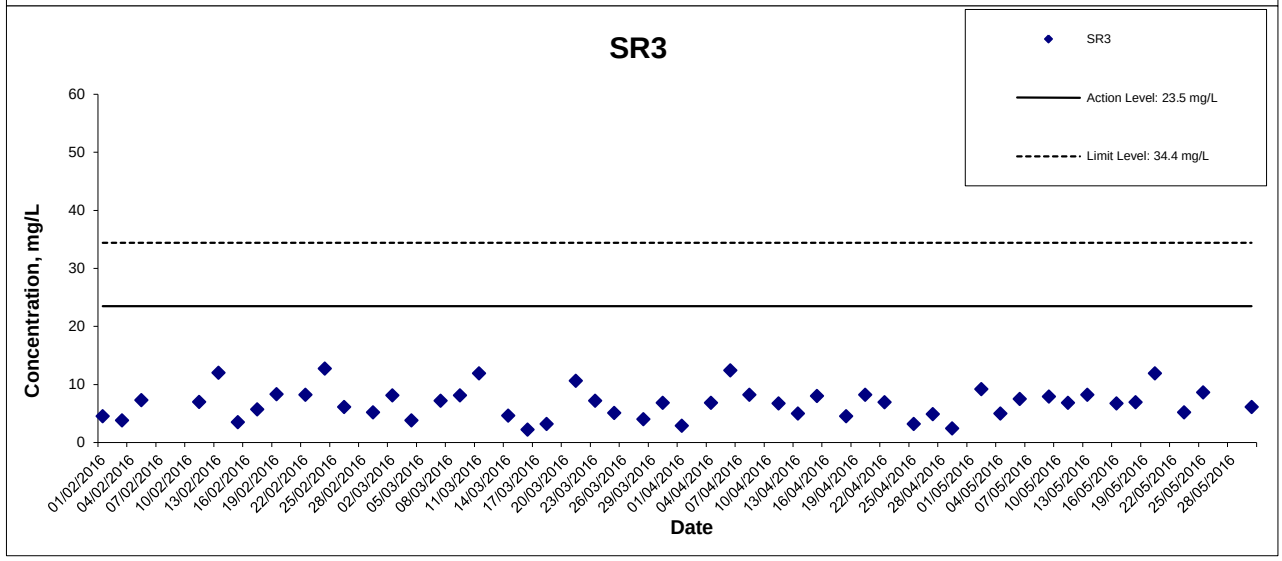

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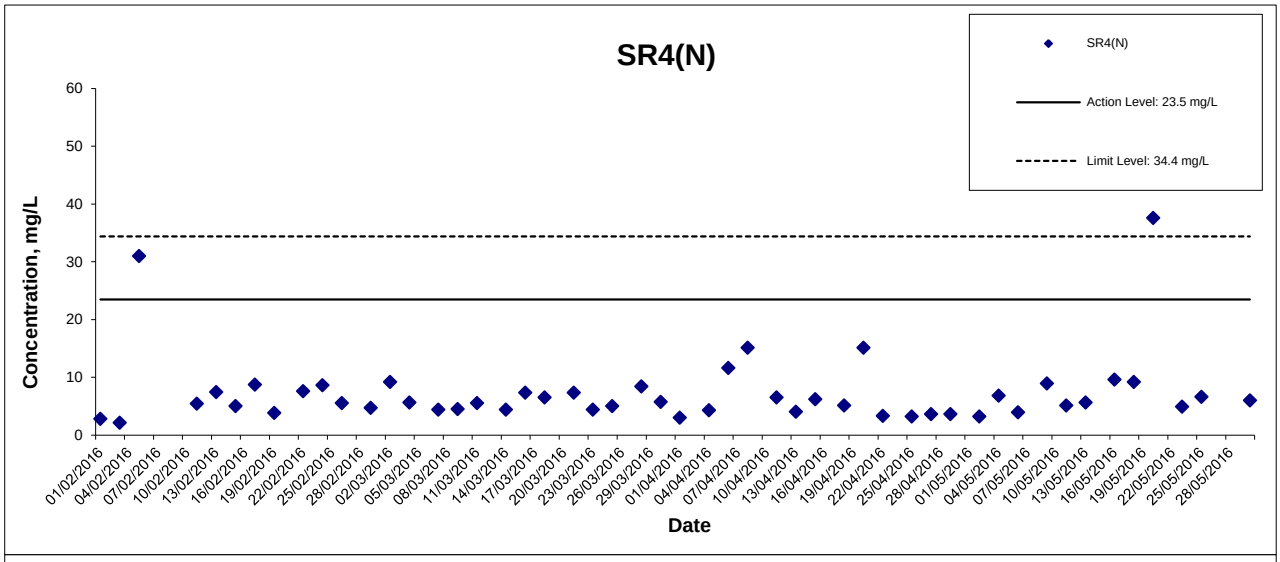

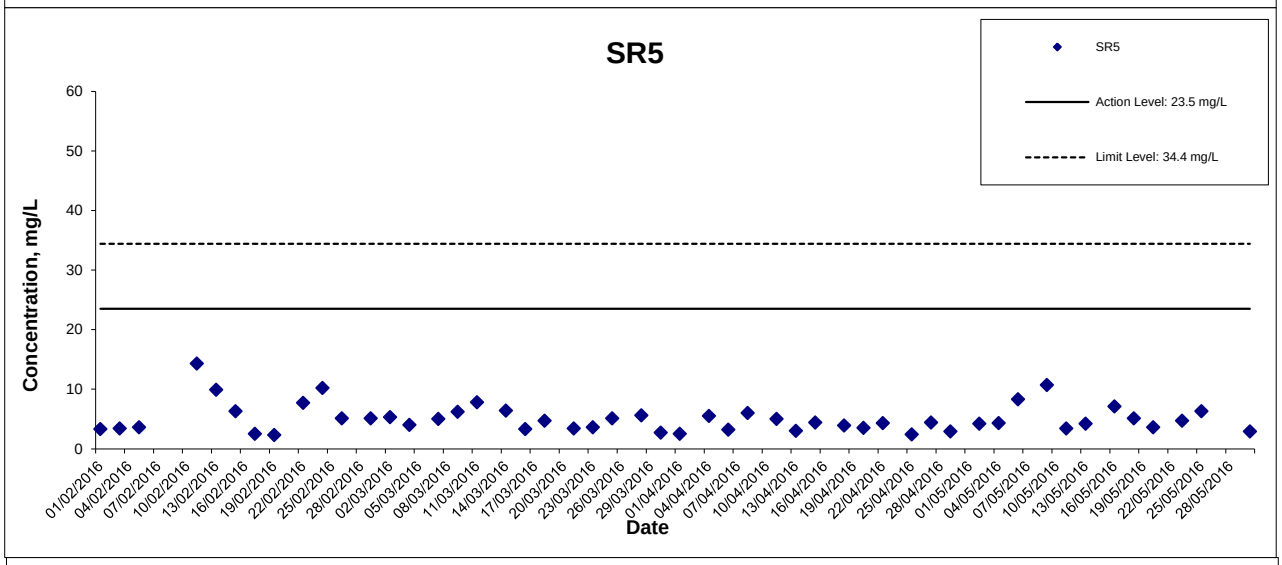

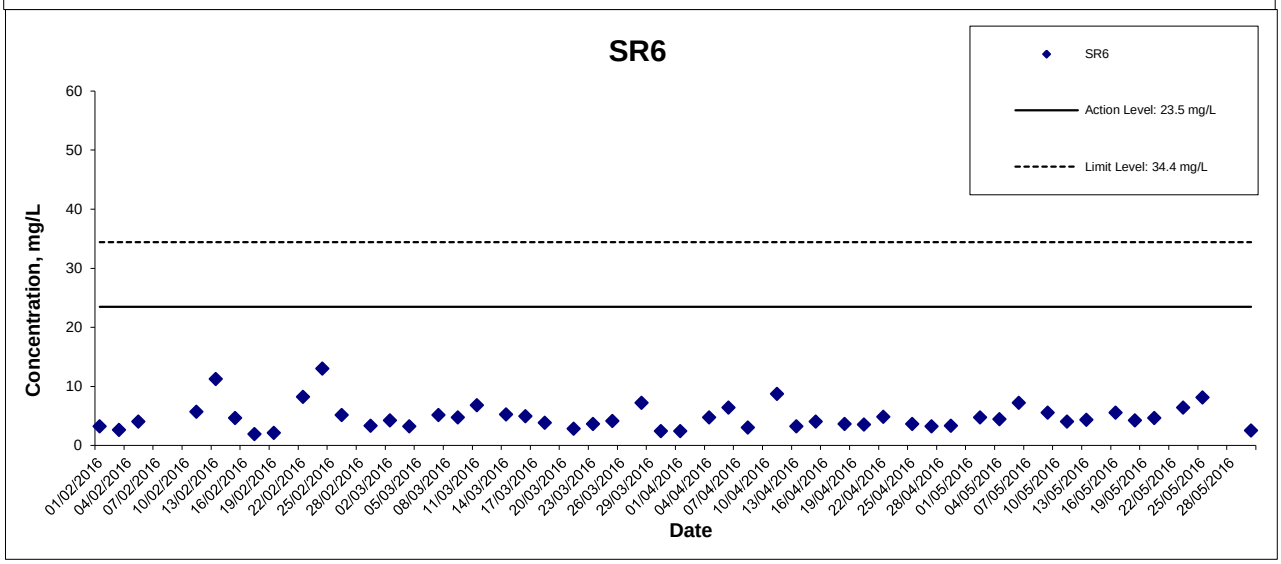

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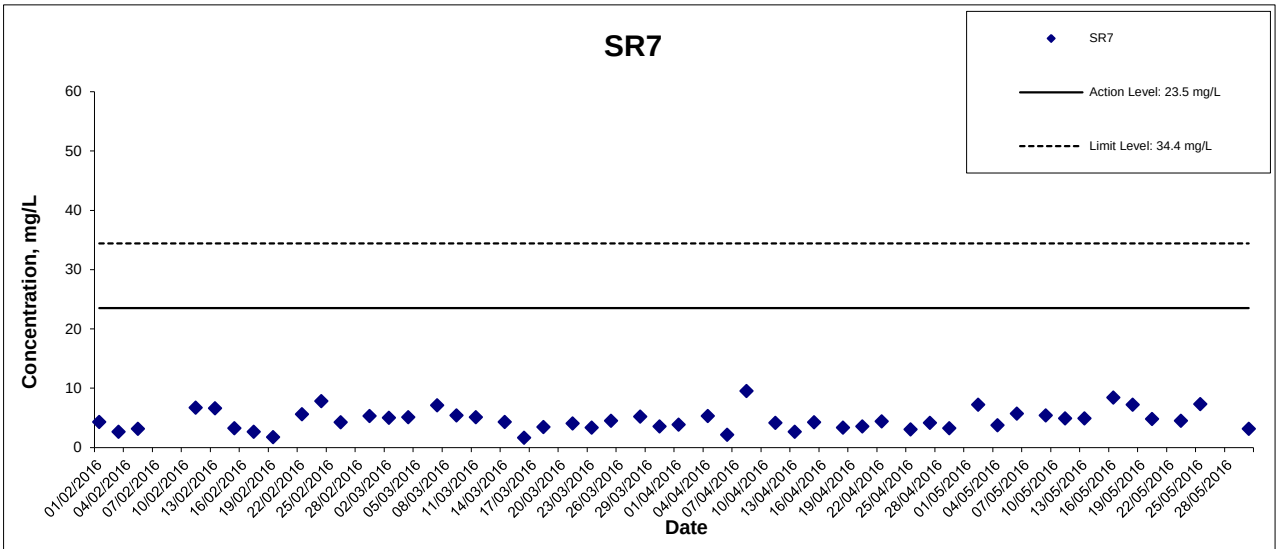

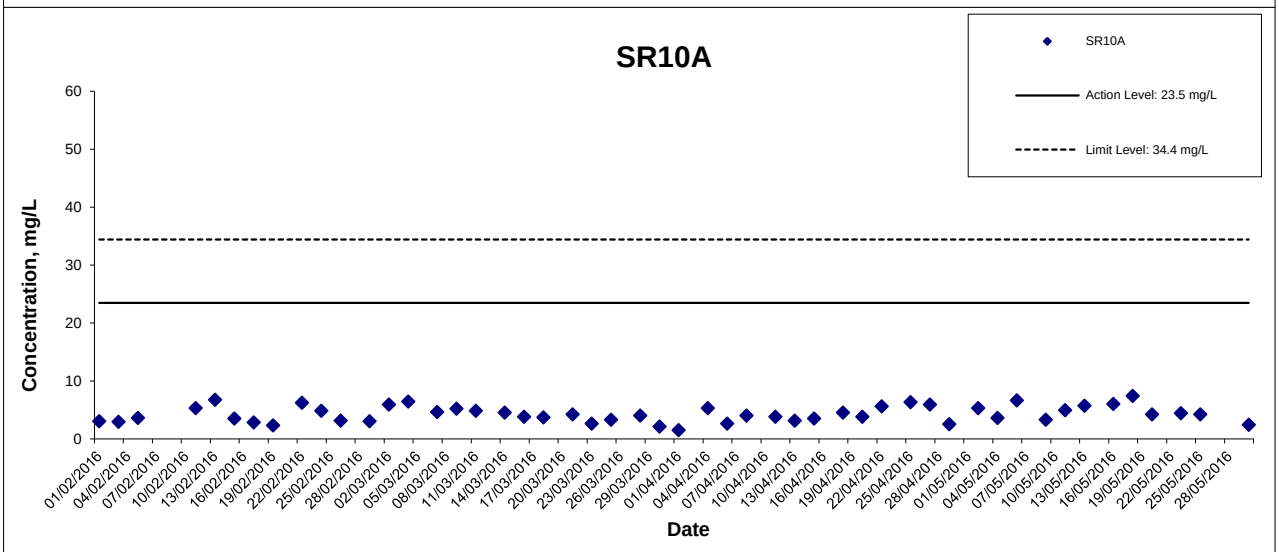

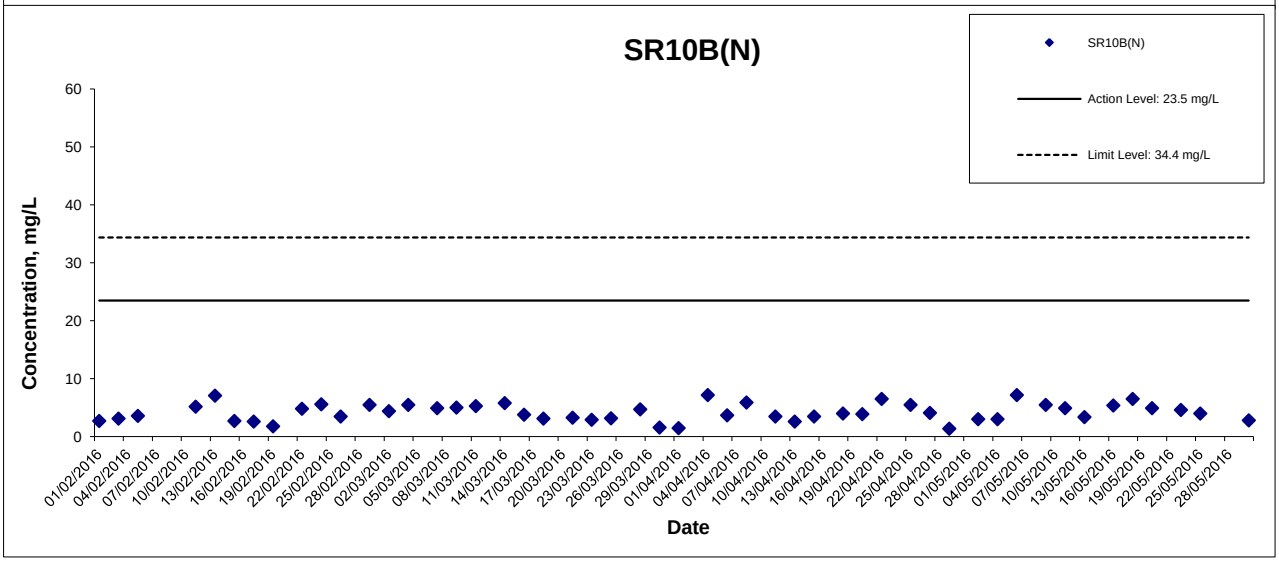

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Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities-Reclamation Works

March – May 2016
Quarterly Report

Dolphin Impact Monitoring

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ANNEXES

1. Introduction

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

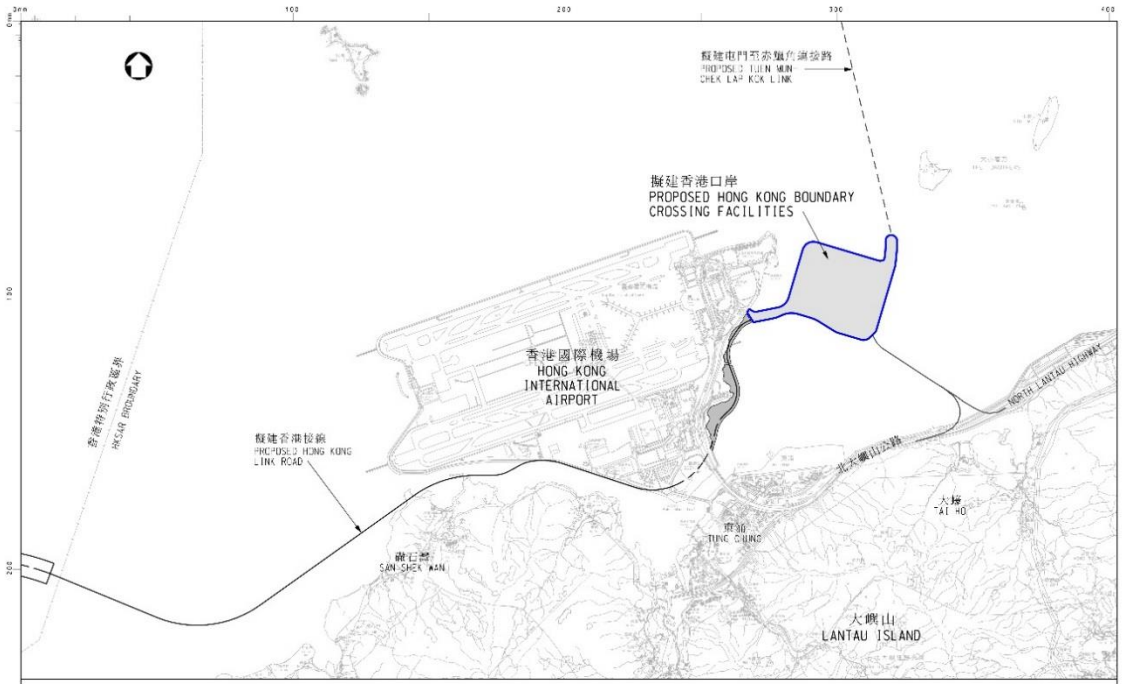

Figure 1. The Hong Kong Boundary Crossing (HKBCF) Reclamation Sites, North Lantau, Hong Kong (http://www.hzmb.hk/eng/img/overview/about_overview03_p01l.jpg**)**

The EM&A Manuals and Environmental Permits (EP) associated with all three projects have special provision for Chinese white dolphins (CWD) as they occur regularly in the waters which will be affected by the HZMB development. This report comprises the seventeenth quarterly (March – May 2016) 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 (the "autumn" months of September to November, 2011), however, some monitoring was conducted in the period March – May prior to HZMB project commencement therefore, March – May 2011, March – May 2012, March – May 2013, March – May 2014 and March – May 2015 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 conducted in the areas known as Northeast Lantau (NEL) and Northwest Lantau (NWL). These surveys are conducted twice monthly and for the duration of the construction phase of HKBCF. The HZMB baseline study (incorporating HKBCF, TM-CLK and HKLR phases of the bridge development), indicates that the data gathered from these surveys are intended to monitor impacts by;

- providing ongoing assessment of the spatial and temporal distribution patterns and habitat use of CWD during the construction phase of the HKBCF project.
- identifying individual CWD by their natural marks, coloration and scars for comparison with the baseline data and to assess individual distribution patterns and habitat use.
- comparing impact survey data to that gathered during the baseline data period so that any changes deemed to be of a significant nature can be assessed and mitigated appropriately.

The baseline monitoring report includes distribution analysis, encounter rate analysis, behavioural analysis, quantitative grid analysis and ranging pattern analysis. Protocols for data interpretation and analyses methods were provided in the baseline monitoring report 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, as HZMB construction works have progressed, some transect lines have been blocked, temporarily or permanently, either by the working vessels or the bridge structure itself. These are detailed in monthly submissions to ENPO. For this reporting quarter, the surveys were conducted over 23 transects (totalling ~108km) which were surveyed twice per month by boat (Table 1; Figure 2). 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.

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

[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).

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 original 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 and densities recalculated from the data provided. For impact monitoring, detailed datasets are available online via the ENPO website.

[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	815456	113.87029	22.2777	12	815542	824882	113.97565	22.3630
1	804671	831404	113.86998	22.4217	13	816506	819480	113.98507	22.3142
2	805475	815913	113.87808	22.2818	13	816506	824859	113.98501	22.3628
2	805477	826654	113.87790	22.3788	14	817537	820220	113.99507	22.3209
3	806464	819435	113.88762	22.3136	14	817537	824613	113.99502	22.3606
3	806464	822911	113.88755	22.3450	15	818568	820735	114.00507	22.3256
4	807518	819771	113.89783	22.3167	15	818568	824433	114.00503	22.3589
4	807518	829230	113.89766	22.4021	16	819532	821420	114.01442	22.3317
5	808504	820220	113.90740	22.3208	16	819532	824209	114.01439	22.3569
5	808504	828602	113.90725	22.3965	17	820451	822125	114.02333	22.3381
6	809490	820466	113.91697	22.3230	17	820451	823671	114.02332	22.3521
6	809490	825352	113.91688	22.3671	18	821504	822371	114.03356	22.3404
7	810499	820880	113.92675	22.3268	18	821504	823761	114.03354	22.3529
7	810499	824613	113.92669	22.3605	19	822513	823268	114.04334	22.3485
8	811508	821123	113.93654	22.3290	19	822513	824321	114.04333	22.3580
8	811508	824254	113.93649	22.3572	20	823477	823402	114.05270	22.3497
9	812516	821303	113.94632	22.3306	20	823477	824613	114.05269	22.3606
9	812516	824254	113.94628	22.3573	21	805476	827081	113.87788	22.3827
10	813525	820827	113.95611	22.3263	21	805476	830562	113.87781	22.4141
10	813525	824657	113.95607	22.3609	22	806464	824033	113.88752	22.3552
11	814556	818853	113.96616	22.3049	22	806464	829598	113.88742	22.4054
11	814556	820992	113.96613	22.3278	23	814559	821739	113.96614	22.3346
12	815542	818807	113.97573	22.3081	23	814559	824768	113.96610	22.3619

The total transect length for NEL and NWL combined is 108km (approved 19-08-2015)

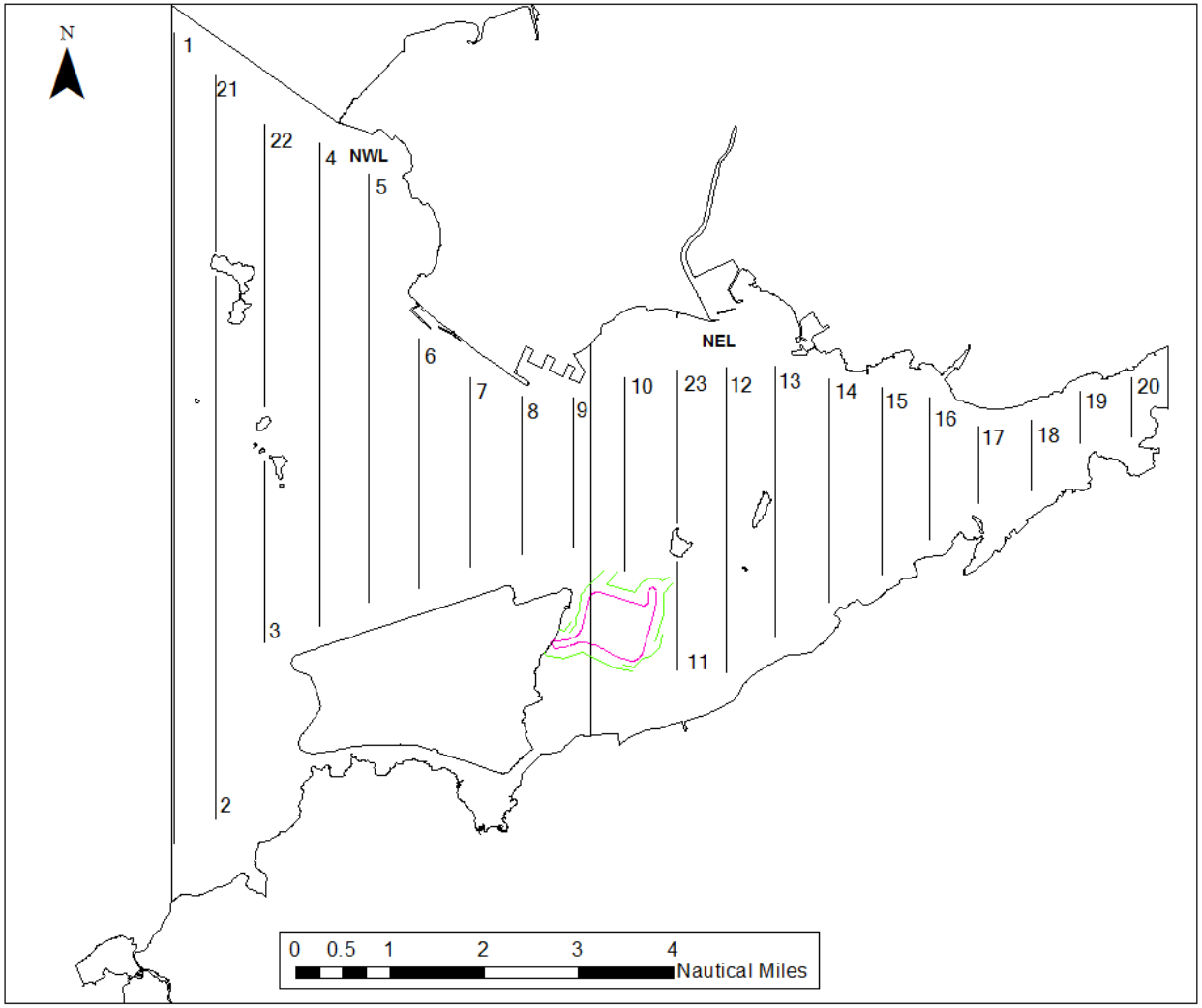

Figure 2 Location of Transect Lines for Impact Monitoring during HKBCF (modification approved 19-08-2015)

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© 10.3.

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

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[4]. 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; de Faria Oshima and de Oliveira Santos, 2016.). AFCD Annual Reports use a minimum of 15 resightings for kernel analyses (AFCD 2012). For the purposes of reporting on this project, 15 or more independent resightings per individual will be used to map utilisation densities using the fixed kernel method. At the time of this report, only 12 independent resightings have been recorded for one dolphin since impact monitoring began. Home range analysis shall be conducted once 15 resightings have been recorded so that results can be compared directly to the AFCD Annual Reports.

3. RESULTS AND DISCUSSIONS

3.1. Summary of survey effort and dolphin sightings

From March – May 2016, 12 vessel surveys were conducted in NEL and NWL survey areas. A total of 653.5 km of "on-effort" transect lines were conducted, 633.6km (97%) of which were conducted under favourable conditions (Beaufort 3 or better) (Annex II). During March – May 2016, 15 groups of dolphins, numbering 59 (min 57: max 64[5]) individuals, were sighted from the vessel surveys. Of these, six groups were "on-effort" and the remaining nine groups were "opportunistic" (Annex III).

All 15 sightings were sighted while NWL was being surveyed. 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 spring (March – May) period and as dolphin occurrence is known to change seasonally within Hong Kong waters, the same periods for 2011, 2012, 2013, 2014 and 2015 are also included for comparative purposes (Table 2). During March – May 2011 (the advanced monitoring period), 20 groups were seen in NWL and 9 in NEL. During March – May 2012, which was the first three months of the HKBCF works, 19 groups and a single group were recorded in NWL and NEL, respectively. For March – May 2013, 22 groups were seen in NWL and none in NEL. In March – May 2014, 15 groups were seen in NWL and, again, none, in NEL. And in March – May 2015, ten groups were seen in NWL and none in NEL. For the periods March – May, from one year prior to HKBCF works to 2014, there have been approximately the same number of dolphin groups sighted in NWL (15 to 22 groups). March – May 2015 recorded the lowest number of dolphin groups in NWL at 10 and this quarter, March – May 2016, the number of dolphin groups in NWL has risen to 15, an increase from last years low. For NEL, there were fewer groups encountered during impact monitoring than during the same period the year before works started. These data have not been corrected for effort. Maps depicting location of sightings, also not corrected for effort, are included as Figs. 3;4;5;6.

[4] In ArcGIS versions 9.2 and later, kernel range density calculation tools are integrated in the toolbox section and a separate extension is no longer required

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

Table 2. A Comparison of Total Sightings Recorded in NEL and NWL Areas During Sep – Nov 2011; March – May 2011; 2012; 2013; 2014; 2015 and 2016.

Monitoring Period	Total Dolphin Sighting in NWL	Total Dolphin Sighting in NEL
	Number of Groups	Number of Groups
March – May 2011 (Advanced Monitoring)	20	9
Sep – Nov 2011 (Baseline Monitoring)	34	10
March – May 2012 (Impact Monitoring)	19	1
March – May 2013 (Impact Monitoring)	22	0
March – May 2014 (Impact Monitoring)	15	0
March – May 2015 (Impact Monitoring)	10	0
March – May 2016 (Impact Monitoring)	15	0

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 baseline and the months March – May 2011, 2012, 2013, 2014, 2015 and 2016 were compared. The baseline study had considerably more "on effort" sightings compared to the March to May period prior to works commencement as well as the following five March to May periods. It is noted, again, that seasonal patterns must be considered when assessing differences between years. When compared to baseline data, there is a noted decrease in absolute numbers of "on effort" groups seen between the March to May period during advanced monitoring (prior to works commencement) and the five years after works commencement, although the trend is not consistent (Table 3). No correction for effort is made with these numbers, this is calculated in section 3.3.

Table 3. A Comparison of "On Effort" Sightings Recorded in NEL and NWL Combined During Sep – Nov 2011; March – May 2011; 2012; 2013; 2014, 2015 and 2016

Monitoring Period	Groups of Dolphin sighted in NEL and NWL
March – May 2011 (Advanced Monitoring)	22
Sep - Nov 2011 (Baseline Monitoring)	44
March – May 2012 (Impact Monitoring)	12
March – May 2013 (Impact Monitoring)	17
March – May 2014 (Impact Monitoring)	11
March – May 2015 (Impact Monitoring)	7
March – May 2016 (Impact Monitoring)	6

3.2. Distribution

During the baseline survey, ~77% of all "on effort" sightings were made in NWL. During the March – May periods 2011, 2012, 2013, 2014, 2015 and 2016, 68%, 100%, 100%, 100%, 100% and 100% of all "on effort" sightings were made in NWL, respectively. Between Advanced and Baseline monitoring, prior to construction at HKBCF, there was a trend for an increased use of NWL habitat. An increase in use of habitat over the winter months is a previously documented trend in the long term monitoring of this population (AFCD 2010; 2011; 2012). After construction activities commenced, for the period March – May, there was a slight increase in the first two years followed by a more marked decrease in absolute number of "on effort" encounters with dolphins. Again, there is no correction for effort for these group sightings (Table 4). The majority of sightings occurred in the northern section of NWL and are either within or adjacent to the Sha Chau Lung Kwu Chau Marine Park (SCLKCMP). Since 1995, this area has been consistently highlighted as important to some, but not all, of the dolphins which frequent Hong Kong waters. A few sightings occurred near the southern section of NWL and adjacent waters (Fig. 6).

Table 4. A Comparison of "On Effort" Sightings Recorded in NEL and NWL During Sep – Nov 2011; March – May 2011, 2012, 2013, 2014, 2015 and 2016.

Monitoring Period	No. of Dolphin Groups sighted in NWL	No. of Dolphin Groups sighted in NEL
March-May 2011 (Advanced Monitoring)	15	7
Sep - Nov 2011 (Baseline Monitoring)**	34	10
March-May 2012 (Impact Monitoring)	12	0
March-May 2013 (Impact Monitoring)	17	0
March-May 2014 (Impact Monitoring)	11	0
March-May 2015 (Impact Monitoring)	7	0
March-May 2016 (Impact Monitoring)	6	0

3.3. Encounter rate

As some of the survey periods have different transect lengths, variation in sightings occurrence was quantified by correcting for effort (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[6] of survey effort was conducted under favourable conditions in the NEL and NWL survey areas. In NEL, a decrease in encounter rates has been documented before construction activities started at HKBCF and this has been attributed, largely, to the fast ferries which traverse this area (Marcotte *et al* 2015). Since commencement of the HKBCF, a marked decrease has been noted in dolphin occurrence in NEL for the periods March – May. In NWL, looking only at the period March – May, a decrease is noted in encounter rates. The baseline monitoring encounter rate is the highest calculated, although it is noted that this is a different season compared to the quarter covered by this report (Table 5).

[6] Updated data set provided April 2013

Table 5. A Comparison of Encounter Rates* in NEL and NWL Areas During Sep – Nov 2011; March – May 2011, 2012, 2013, 2014, 2015 and 2016.

Monitoring Period	Encounter Rate NEL	Encounter Rate NWL
March - May 2011* (Advanced Monitoring)	7.5	8.8
Sept-Nov 2011 (Baseline Monitoring)	5.4	9.5
March - May 2012 (Impact Monitoring)	0.0	5.8
March - May 2013 (Impact Monitoring)	0.0	3.1
March - May 2014 (Impact Monitoring	0.0	2.5
March - May 2015 (Impact Monitoring	0.0	1.6
March - May 2016 (Impact Monitoring	0.0	1.4

* 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 spring period during the first year of construction (March – May 2012) is within the annual limits recorded for this area previously, however, for the subsequent four years (March – May 2013; 2014; 2015 and 2016), the encounter rate falls below the lowest previously recorded annual encounter rate in AFCD records. For NEL, all encounter rates in the March-May period from 2012 to date is below the annual average for this 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 2013; 2014; 2015). As the impact of the work at HKBCF continues, other works associated with the bridge have increased both in intensity and in geographical area. Other projects not associated with the HZMB Project have also been ongoing in the NEL and NWL areas, and other adjacent areas. It is likely that all activities contribute to the ongoing decline in dolphin numbers from Hong Kong areas NEL and NWL.

3.4. Group size

During March – May 2016, group size of all sightings varied from 1 to 8 individuals with an average of 3.8 in NWL. For baseline monitoring, average group size was 4.5 and 3.5, in NWL and NEL. For the periods March – May 2011, 2012, 2013; 2014 and 2015 the group size in NWL is approximately the same, varying between 3.1 and 3.3 individuals. The group size in this quarter is the highest recorded when compared to both advanced and previous quarters of impact monitoring at 3.8. The NWL group size was highest during baseline, however, this was a different season (4.5). No groups have been noted in NEL in the periods March – May 2013, 2014, 2015 and 2016 (Table 6). There is no particular habitat preference for larger (>5) group sizes (Fig. 7). It has been noted previously that significantly larger groups are noted behind active fishing trawlers (Jefferson 2000). As trawlers no longer operate in Hong Kong waters, group size averages may have decreased due to this.

Table 6. A Comparison of Sightings Group Size Averages Recorded in NEL and NWL Areas During Baseline (Sept – Nov 2011); March – May 2011; 2012; 2013; 2014, 2015 and 2016

Monitoring Period	Average Group Size (NWL)	Average Group Size (NEL)
March-May 2011 (Advanced Monitoring)	3.1	2.3
Sept – Nov 2011 (Baseline Monitoring)	4.5	3.5
March-May 2012 (Impact Monitoring)	3.2	1
March-May 2013 (Impact Monitoring)	3.3	0
March-May 2014 (Impact Monitoring)	3.1	0
March-May 2015 (Impact Monitoring)	3.1	0
March-May 2016 (Impact Monitoring)	3.8	0

3.5. Habitat use

Quantitative grid analyses indicate that the most often frequented area in NWL is the SCLKCMP. Previous high use of the area in the southern portion of NWL has not been noted this quarter (Figs. 8; 9). SCLKCMP has been consistent in the long term and continues to be so. Habitat use between March – May 2012 to 2016, the first five years of construction at HKBCF, were compared. The density of individual dolphins (DSPE) using the NEL and NWL habitat in 2012, the first year of HKBCF construction, shows relatively widespread use with areas along the northeast of the airport platform, northeast Lung Kwu Chau, south west Sha Chau, the western maritime border and Tai O all as areas of use, although not high density use. In 2013, year two HKBCF, the area of highest use was the marine park area at SCLKC and the density of dolphins was higher when compared with the first year of monitoring. In 2014, the area usage is the same as 2013, however, the density of dolphins using the habitat has decreased. In 2015, there is a higher density use of the northern section of NWL and in 2016, two higher densitry areas ae calculated to the south and west of SCLKC (Figure 10). For groups of dolphins (SPSE), there are obvious parallels with DSPE, however, it is noted the density of individuals using the habitat of SCLKCMP increased between year 2012 and 2013. The density of individual use remained similar between 2013 and 2014 but then increased in 2015. Fewer areas of high density use are noted between 2015 and 2016. This indicates that, in general, the dolphins overall habitat use has decreased but within the habitat used, the dolphins are using certain areas more intensively than previously (i.e., dolphin occurrence is spatially more compact) (Fig. 11). In summary, during the first year of HKBCF work, there was widespread use of the NWL habitat in a lower density compared to the higher, more concentrated habitat use calculated for 2013 onwards.

3.6. Mother-calf pairs

Only one group observed contained a mother and calf pair. The group was sighted in NWL (Fig. 12). This was a new born calf and was not closely approached and the adult with it, assumed to be its mother, was not identified. The same season last year (March - May 2015) did not record any calves.

3.7. Activities

Of the 15 groups sighted (using all sightings), two (13.3%) were engaged in feeding activities (including association with active and anchored fishing vessels) which is slightly less than the frequency noted last quarter (14.2%); six (40%) were travelling which is approximately the same as that observed in the last quarter (42.9%); five

groups (33.3%) was feeding/travelling/surface active which is more than the last quarter (28.6%) and, two (13.3%) groups were engaged in other activities, that is, avoidance behavior and milling. Travelling is the predominant activity during daylight hours in March – May 2016 (Fig. 13). In NWL, travelling and multiple activities occurred throughout all areas in which dolphins were sighted (Fig. 14).

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. All dolphins including those sighted only in the baseline are included. 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. Four new dolphins have been identified in the last quarter and the catalogue now stands at 123 individuals. The HZMB catalogue has identified 14 dolphins that were seen in both baseline and impact monitoring period. Two further dolphins have been identified during impact monitoring which have been matched to the AFCD photo ID data held on the AFCD website[7].

There are 15 dolphins which have been sighted six times or more during impact monitoring, nine (9) of which are known from the AFCD catalogue (HZMB 001 [WL46]; HZMB 002 [WL111]; HZMB 011 [EL01]; HZMB 041 [NL24]; HZMB 044 [NL98]; HZMB 51 [NL213]; HZMB 054 [CH34]; HZMB 083 [NL136]; HZMB 098 [NL104]) (Table 7). The highest number of re-sightings recorded during impact monitoring surveys is 13 (HZMB 022 and HZMB 054), excluding multiple sightings made on the same day (Annex IV).

Table 7. Dolphins Frequently Recorded During Impact Monitoring Surveys.

HZMB ID	AFCD ID	SEEN IN BASELINE	No. DAYS SIGHTED IMPACT MONITORING
HZMB 022	unknown	N	13
HZMB 054	CH34	Y	13
HZMB 002	WL111	Y	12
HZMB 044	NL98	Y	12
HZMB 023	unknown	*	10
HZMB 098	NL104	Y	8
HZMB 051	NL213	N	7
HZMB 001	WL46	N	7
HZMB 005	unknown	*	7
HZMB 041	NL24	Y	7
HZMB 083	NL136	Y	7
HZMB 011	EL01	Y	6
HZMB 040	unknown	*	6
HZMB 064	unknown	*	6
HZMB 094	unknown	*	6

* cannot be determined

[7] www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Photoid_Booklet.pdf

4. CONCLUSION

The data from March – May 2016, shows some consistencies with the baseline data (conducted during a different season) and with the same periods in 2011, 2012, 2013, 2014 and 2015. Habitat use and behavioural trends all fall within those reported in AFCD Long Term Monitoring reports although as sightings numbers decrease, such patterns are difficult to compare. The quarterly encounter rates for both NEL and NWL is lower than that reported for **annual** rates published previously and the seasonal trend for these two areas is of a declining encounter rate. Density distribution maps depicted key areas of frequent use within NWL, in particular, SCLKMP, and with higher use of smaller areas becoming apparent in the northern section of NWL. Areas to the south of SCLKCMP and Tai O have seen diminished use since 2013 and this trend continues to date. A very large and widely dispersed continuous series of groups (sighted 23 May 2016) is noted and in this group, several adults that had not been encountered in some years were resighted. A new born calf was also noted in May 2016, the first live sighting of a new born for several years. In the same period in 2016, AFCD records show that two neonate strandings were retrieved from the study area. It is noted that habitat use, as indicated by dolphin density, is decreased in northern NWL. It has been some time since any dolphin was sighted in NEL. These observations are only for the period March to May, however, these trends are apparent year round now.

The decreases in encounter rates in both NEL and NWL are noted. HKBCF monthly reporting notes that the conditions of EM&A Manuel have been consistently upheld and that all measures stipulated to minimise disturbance to dolphins remain in place. Although it is likely that ongoing HKBCF activities are having an effect on dolphin encounter rates in NEL, it is also noted that other HZMB projects are ongoing in both NEL and NWL (and south of NWL into adjacent WL waters). In addition, extensive marine works which are not part of HKBCF have been ongoing in NEL and also in parts of NWL throughout this current quarter period and new projects have been initiated along the airport platform area. Some collaboration with cross border authorities has been initiated, with regards to sharing photo ID catalogues, and at recent meetings held between all environmental teams for HZMB, it was noted that some of the dolphins previously recorded in Hong Kong waters but which have been absent in 2015, have been recorded, at least occasionally, in adjacent waters. An additional study initiated by ENPO and conducted in the Southwest Lantau (reported separately by others on the ENPO website) details further individual dolphin movement in Hong Kong waters. Therefore, the information current to this project indicates that the dolphins have shifted distribution, to the west (and beyond).

At this stage, the intensity of in water marine works associated with the HKBCF is decreasing, however, the drivers behind the population decline stated in the AFCD long term monitoring programme for Hong Kong waters and independent studies for adjacent Pearl River Estuary (PRE) waters (Huang *et al* 2012) remain uncertain. Recent work indicates that habitat abandonment of NEL waters prior to HKBCF initiation was partially driven by the increase in high speed ferry traffic (Marcotte *et al* 2015) and that toxin burden may have a greater impact than initially predicted (Gui *et al.* 2014). Therefore, the HZMB Project was initiated at a time when there was already a widespread and long term reduction in the number of dolphins within what is believed to be their entire range of the PRE. The strict mitigation initiatives at HKBCF aim to minimize the localised impact of HKBCF construction, however, this in itself will not be sufficient to ameliorate the myriad of other impacts throughout the dolphins habitat.

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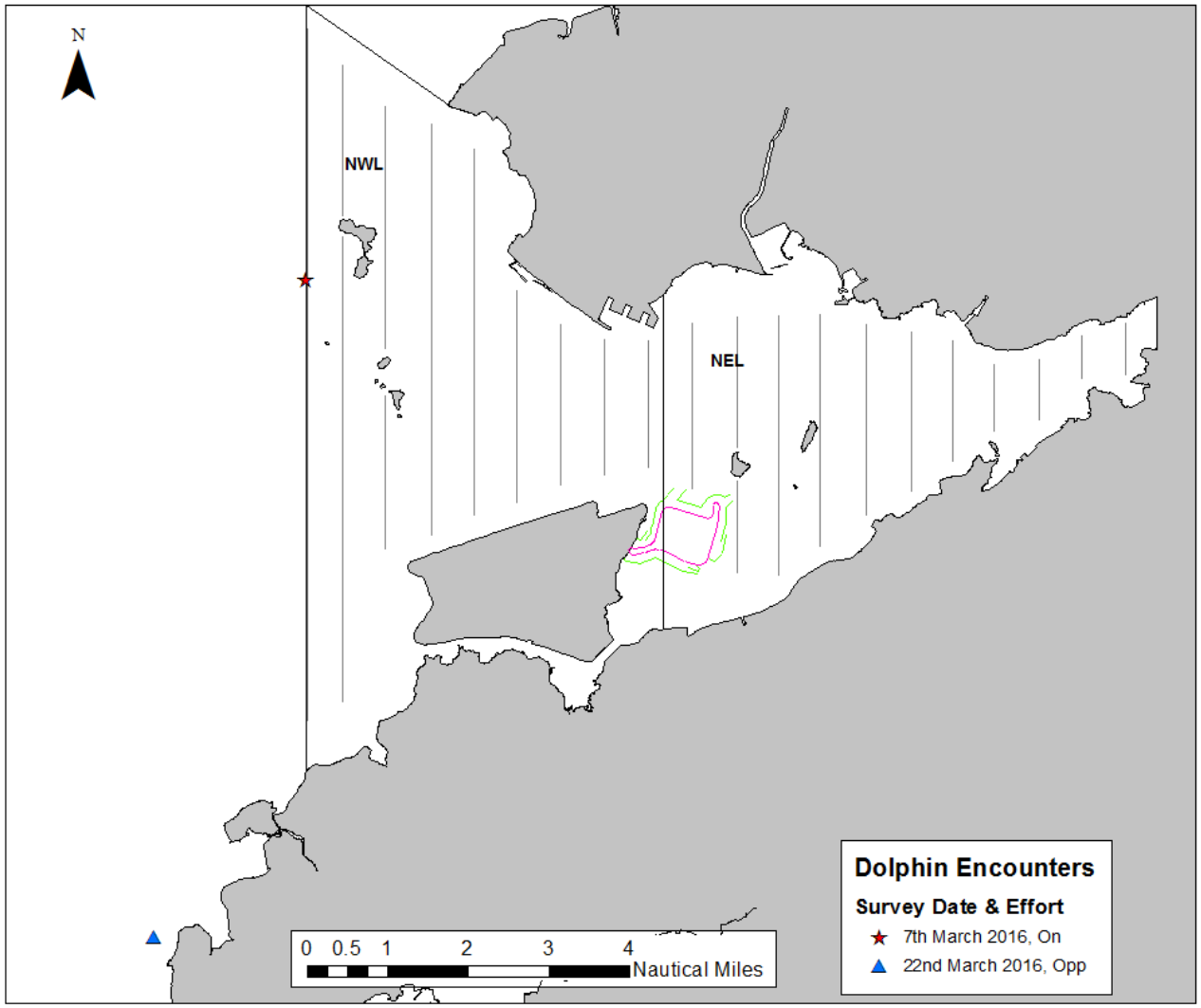

Figure 3 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (March 2016)

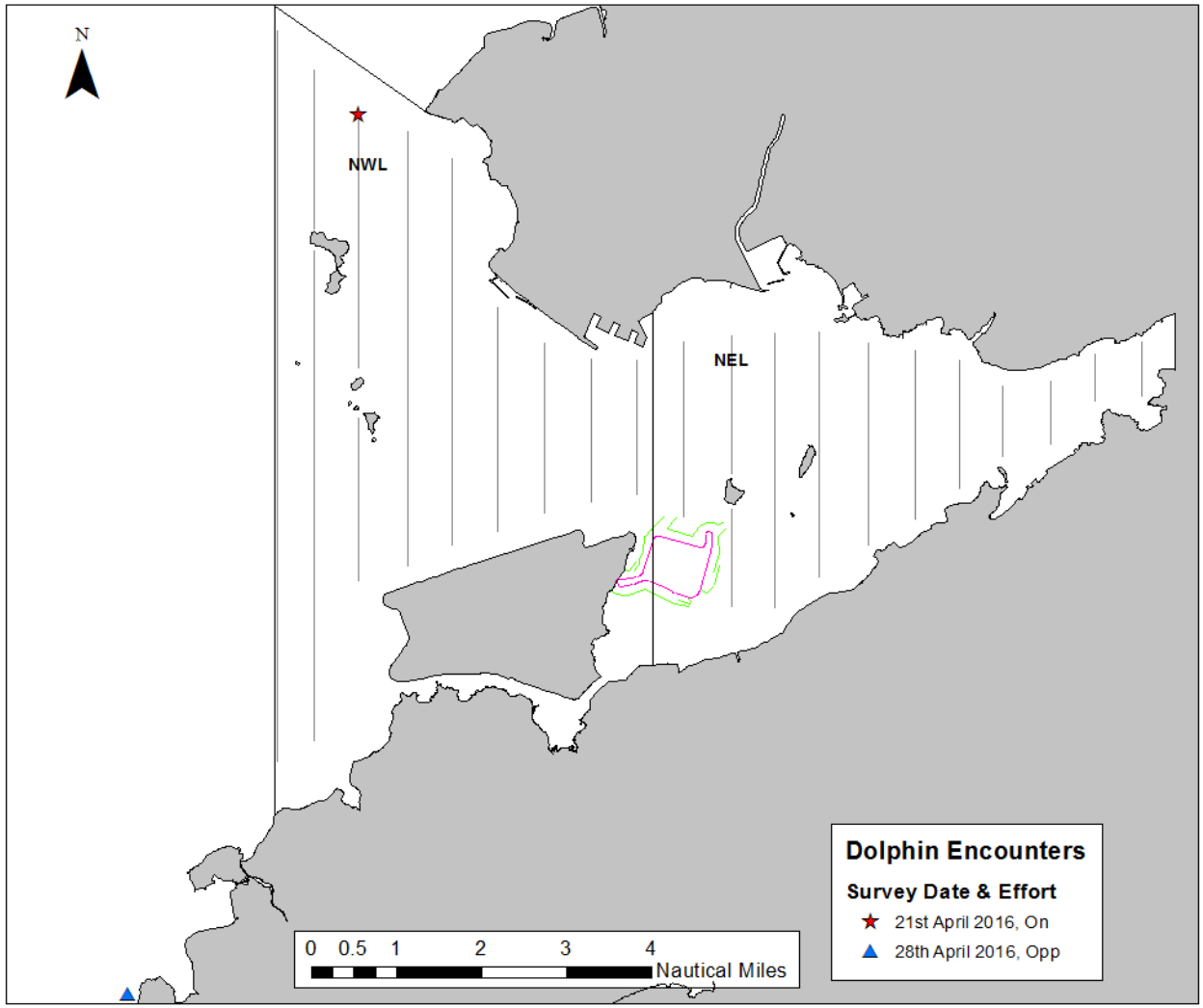

Figure 4 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (April 2016)

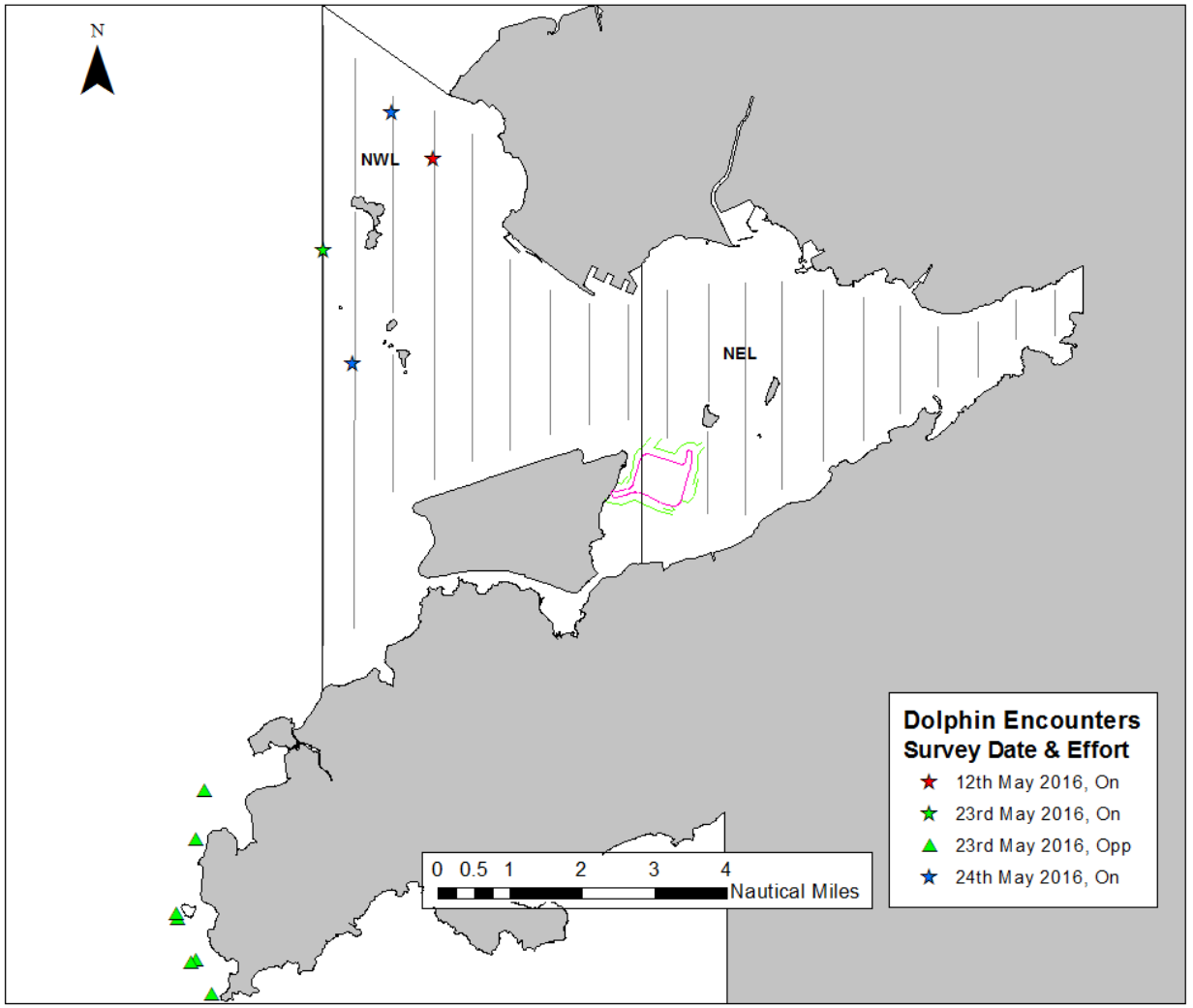

Figure 5 Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (May 2016)

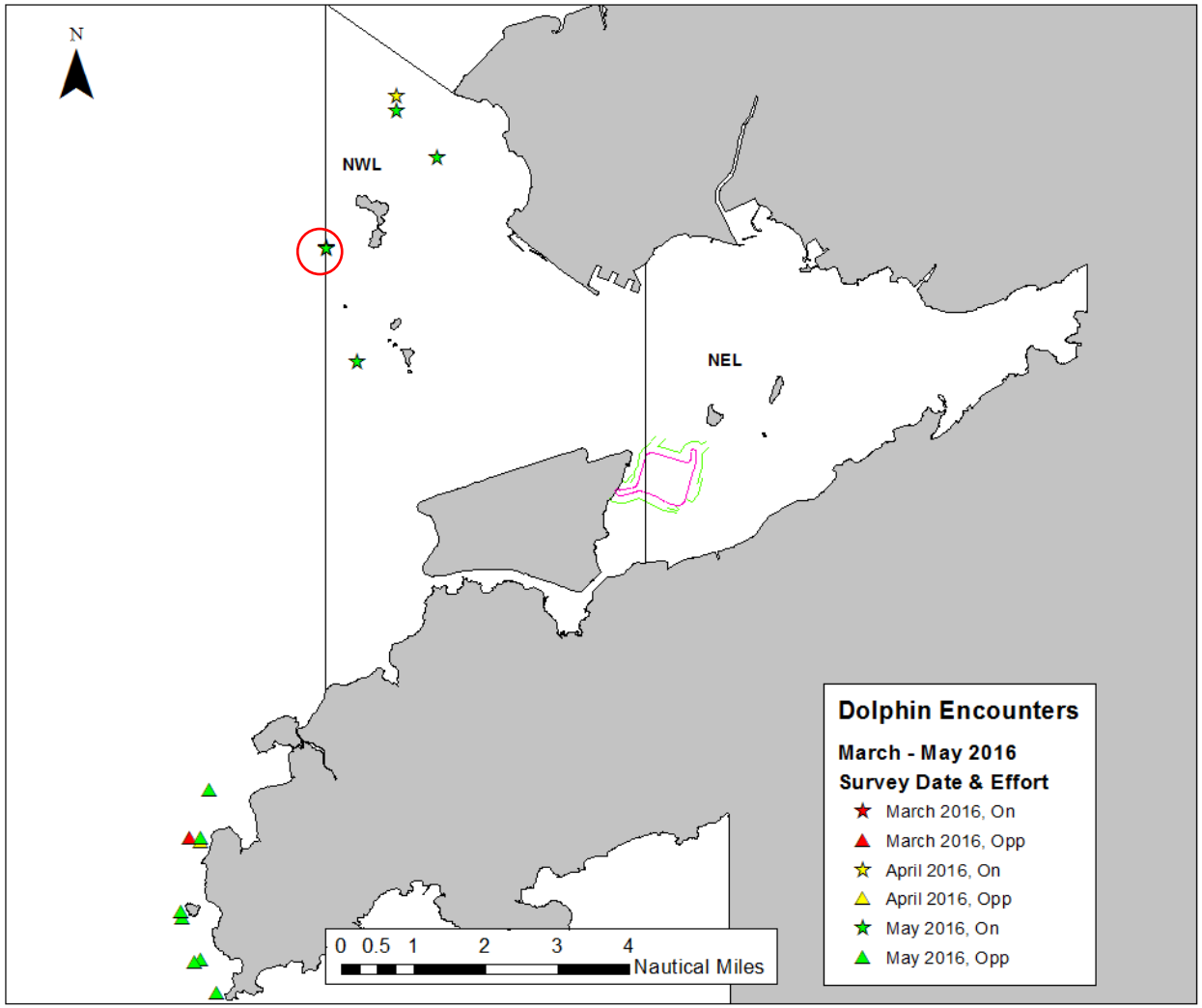

Figure 6. Distribution of Sightings Recorded During Impact Monitoring Surveys for HKBCF (March – May 2016)

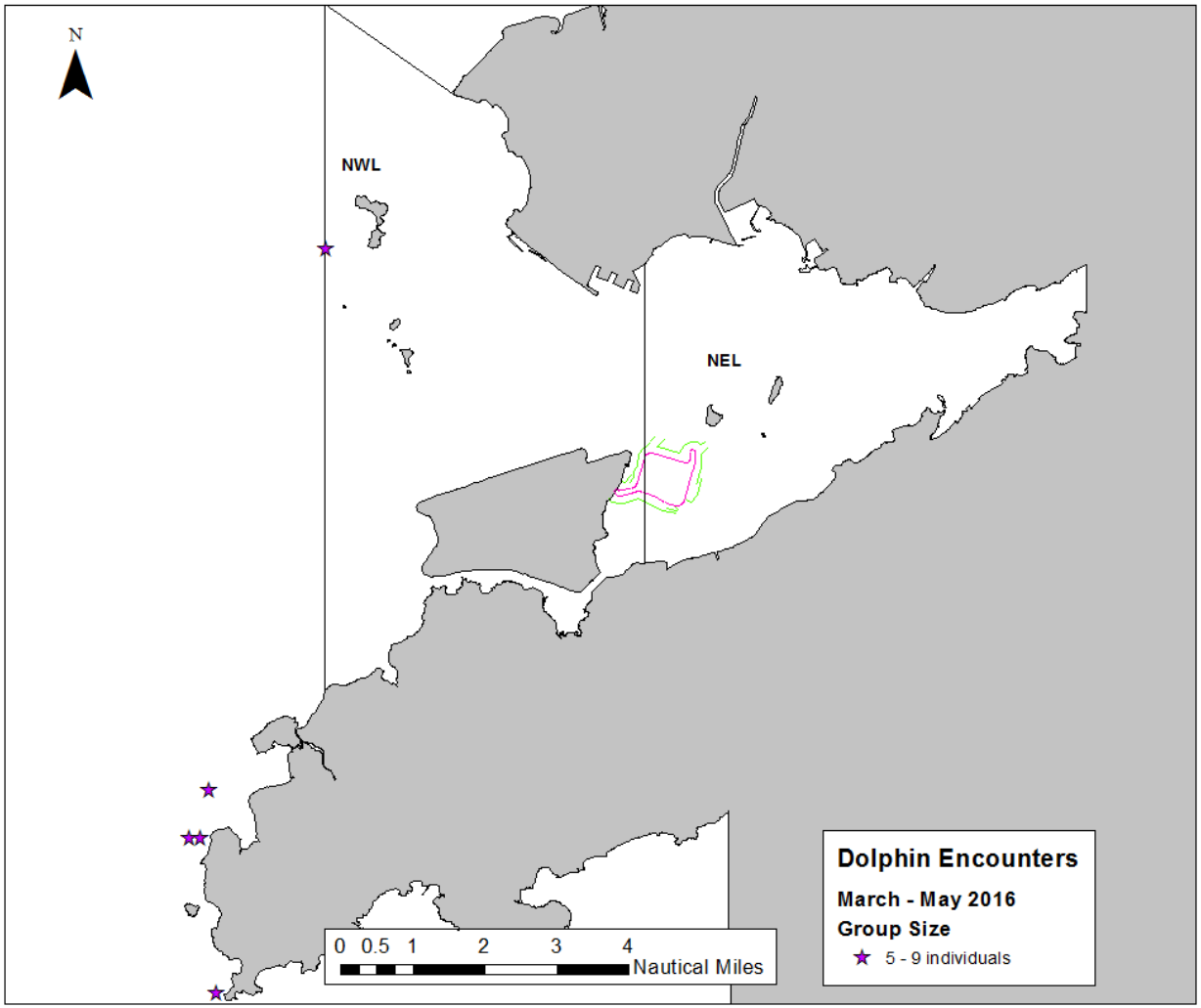

Figure 7. The Location of Dolphin Groups Numbering Five and Above Individuals (March – May 2016)

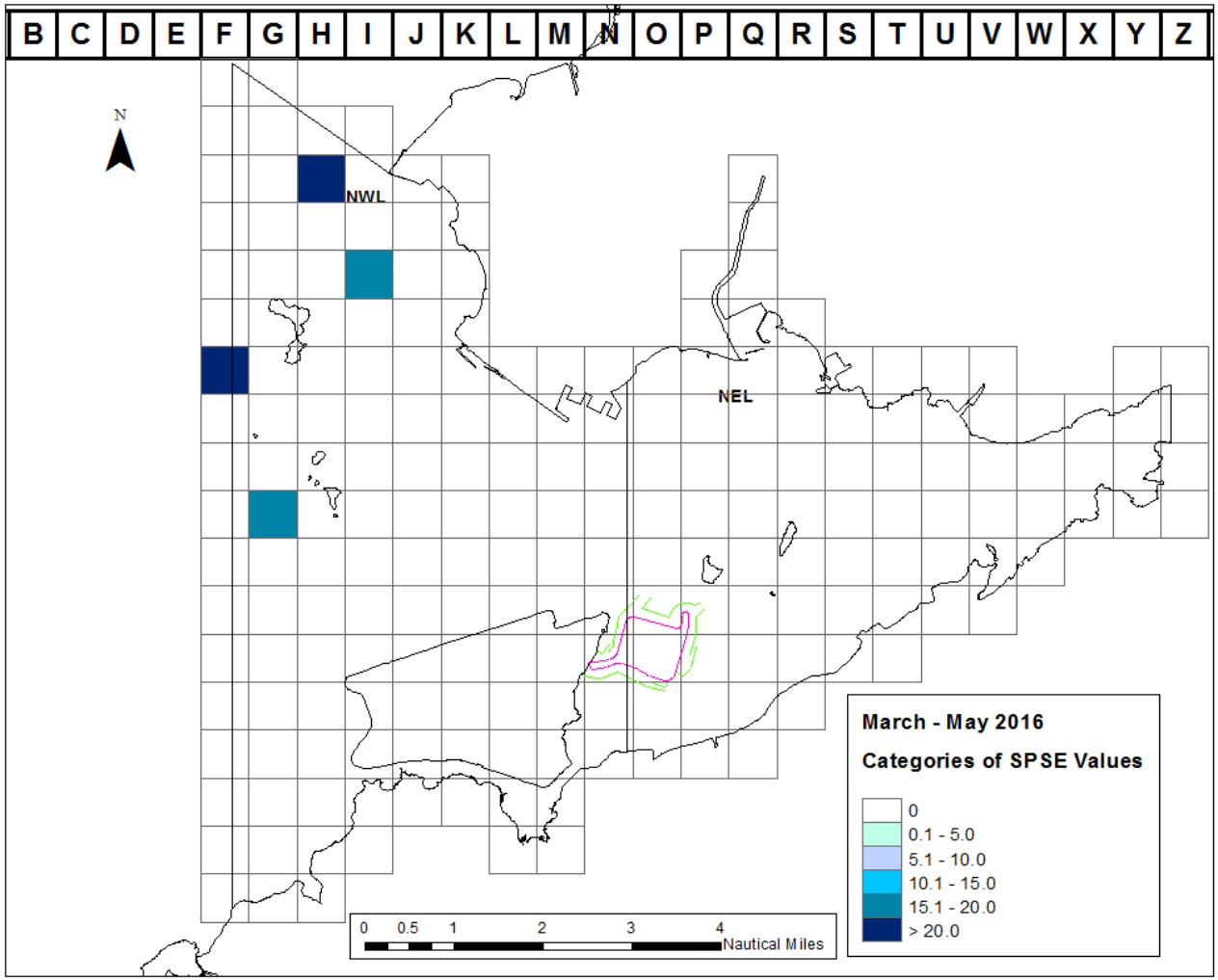

Figure 8. Sighting density SPSE (number of on-effort sightings per 100 units of survey effort) for March – May 2016

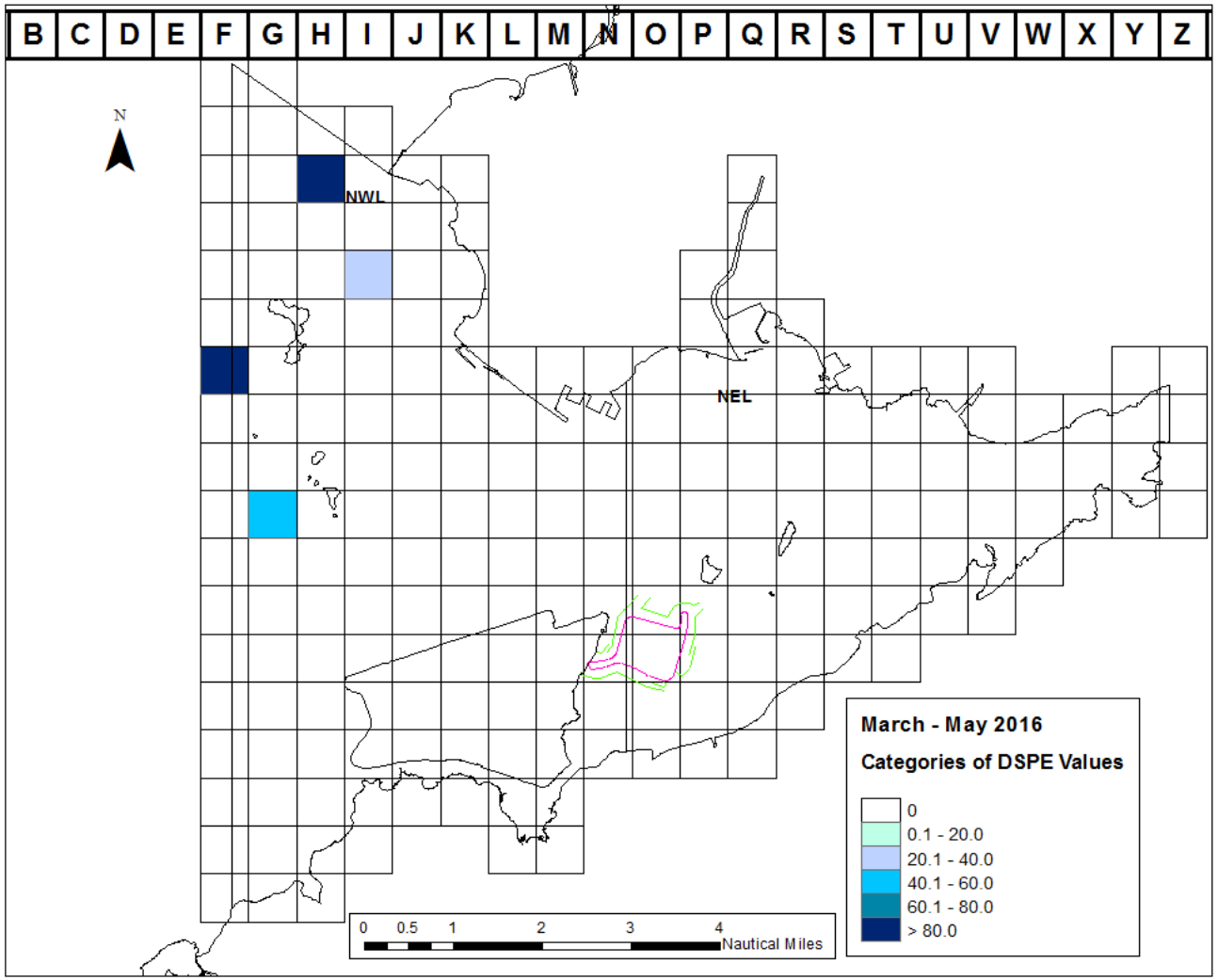

Figure 9. Dolphin density DPSE (number of dolphins per 100 units of survey effort) for March – May 2016.

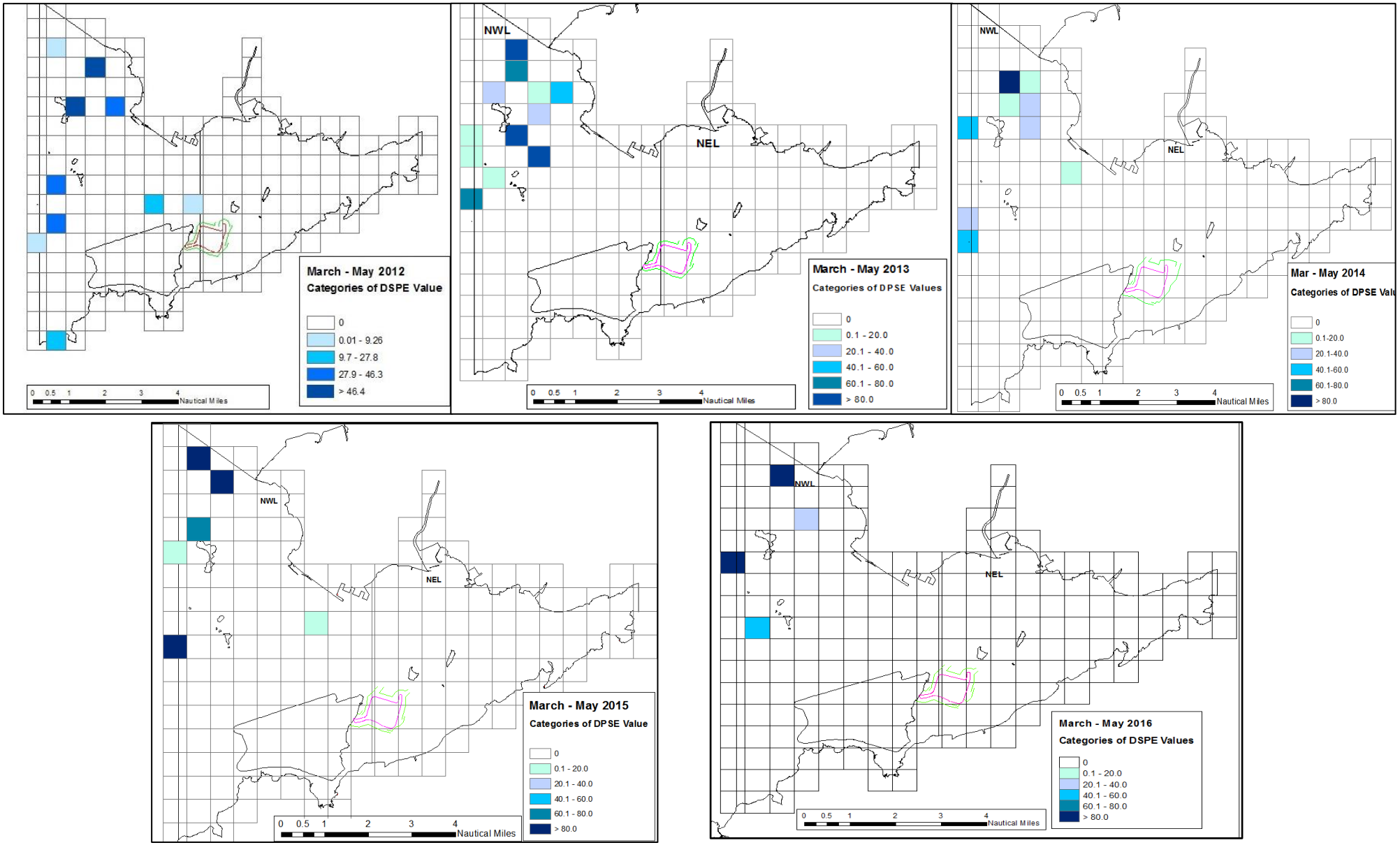

Figure 10. DSPE Shifts from NEL to NWL Waters during the Periods March – May 2012 - 2016

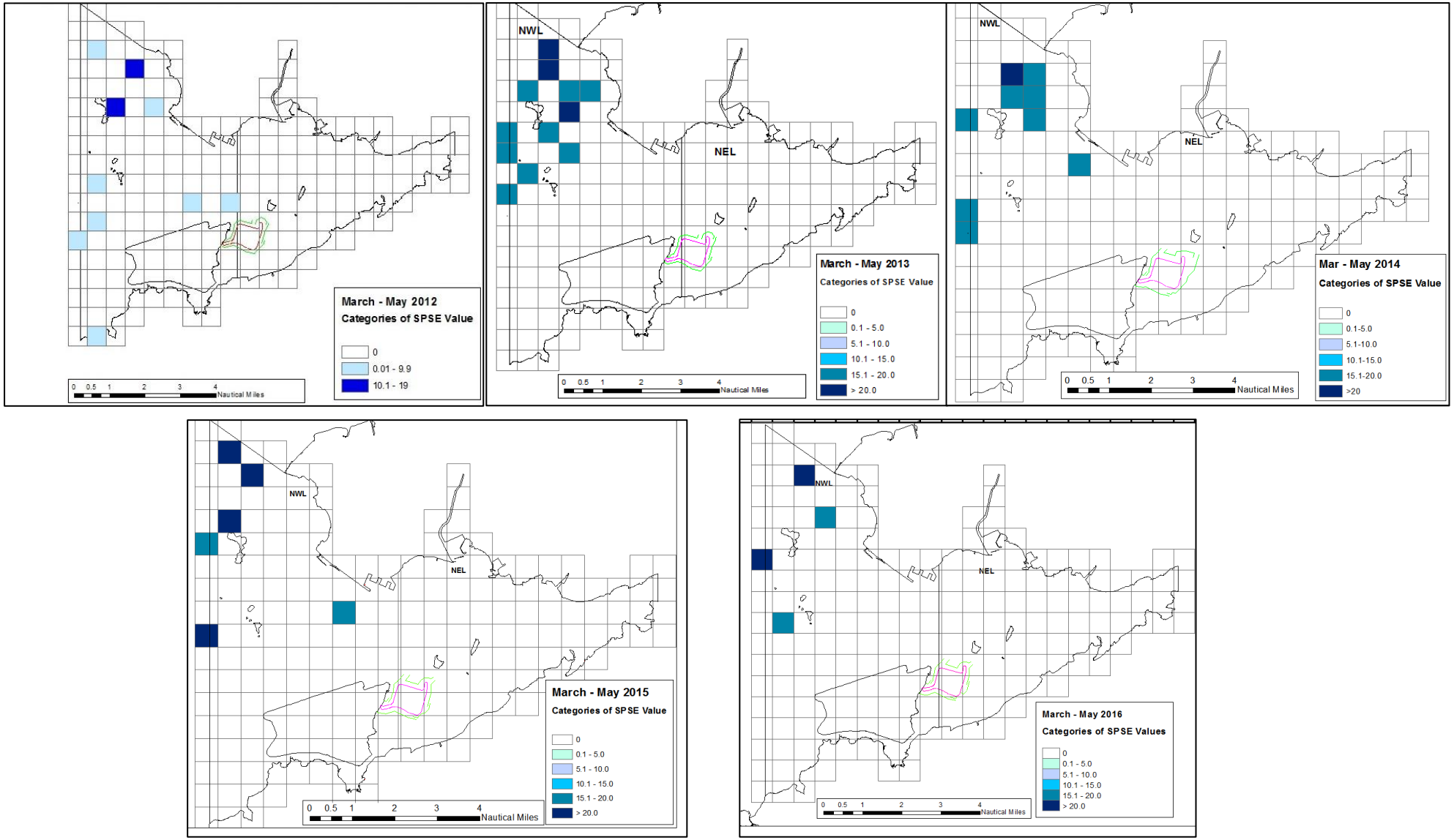

Figure 11. SPSE Shifts from NEL to NWL Waters during the Periods March – May 2012 - 2016

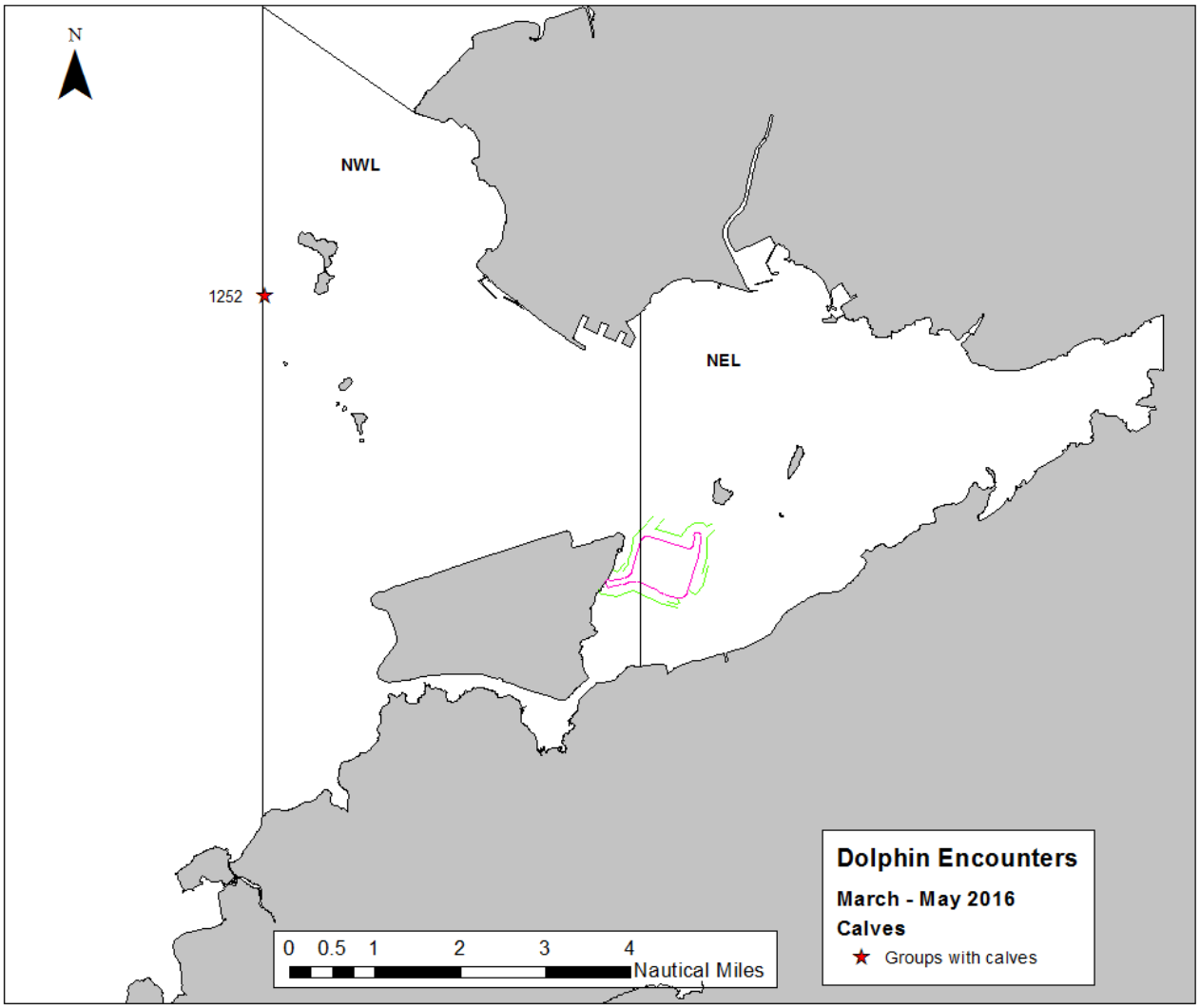

Figure 12. Location of the group containing a mother and calf pair during March – May 2016.

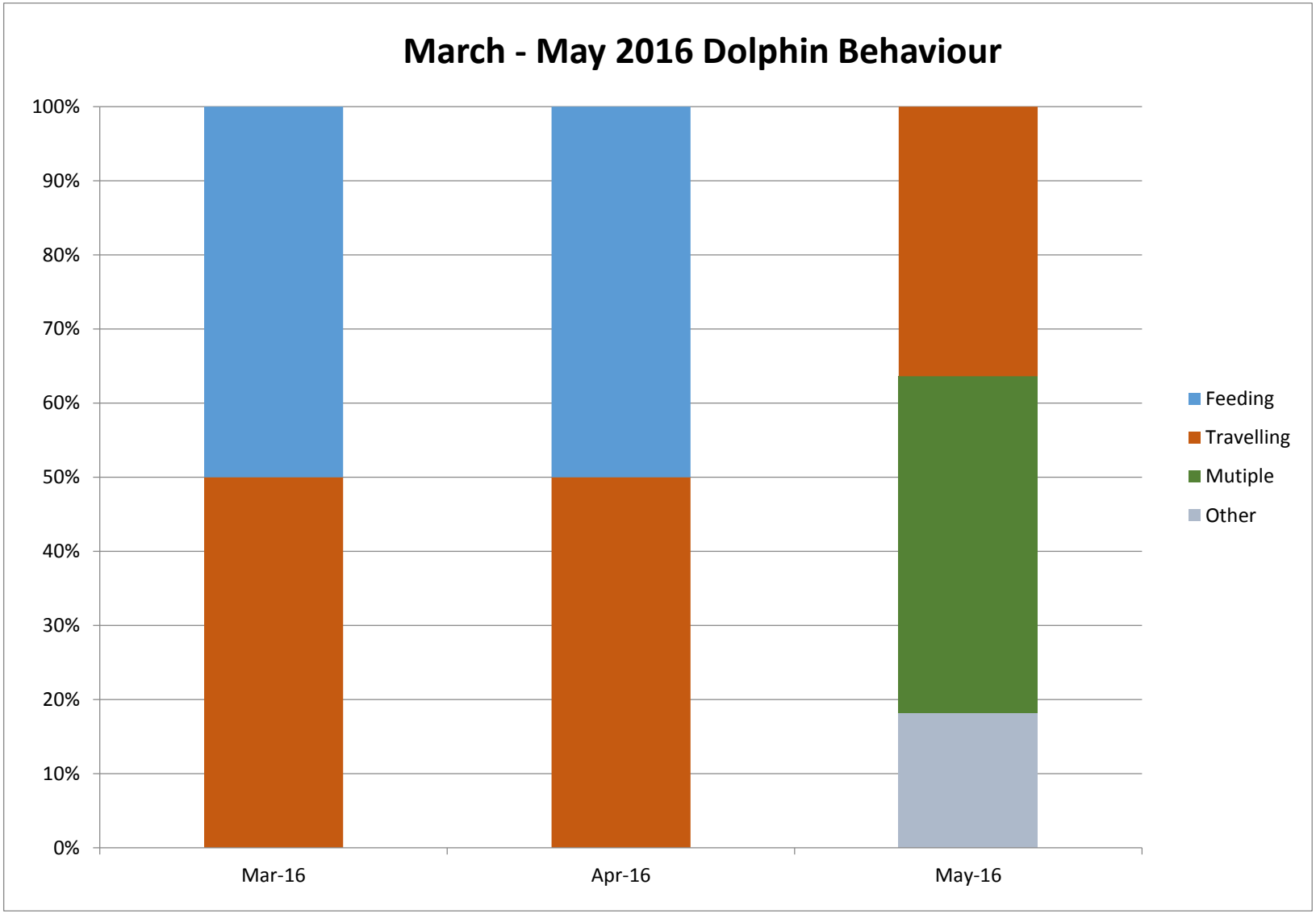

Figure 13. Activity Budget for Dolphin Behaviour March – May 2016.

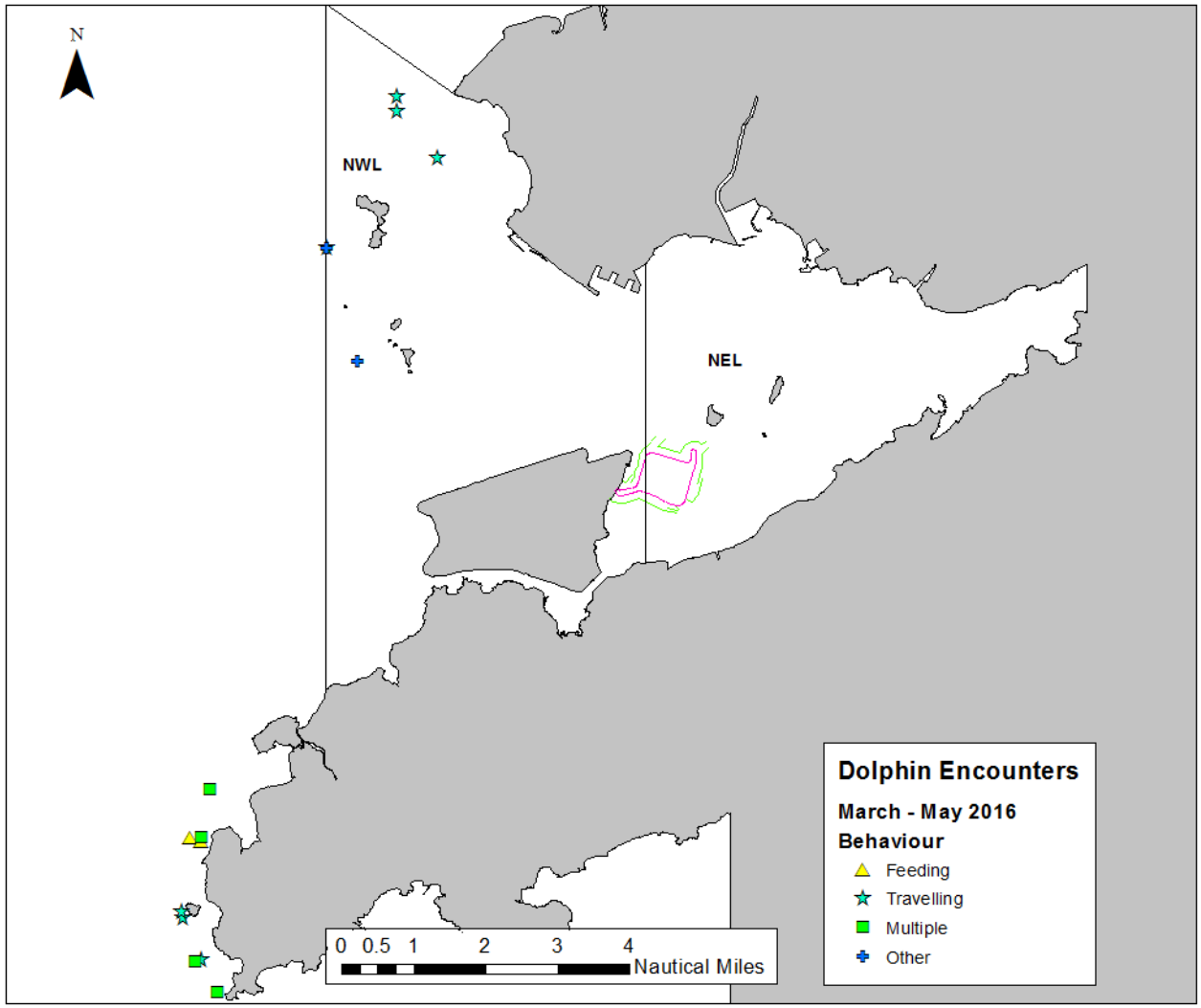

Figure 14. The Location of Different Behavioural Activities March – May 2016

Annex I. Impact Monitoring Survey Schedule and Details (March – May 2016)

Date	Location of Survey	No. Sightings ON	No. Sightings Opp	Total km ON EFFORT (favourable conditions)
03/07/2016	NWL (1-7, 21, 22)	1	0	66.3
03/08/2016	NE and NW Lantau (8-20,23)	0	0	42.7
03/21/2016	NE and NW Lantau (5-20,23)	0	0	59.8
03/22/2016	NWL (1-4, 21, 22)	0	1	48.8
04/21/2016	NWL (1-10, 21, 22)	1	0	75.9
04/22/2016	NE and NW Lantau (11-20,23)	0	0	33.0
04/27/2016	NE and NW Lantau (5-20,23)	0	0	60.6
04/28/2016	NWL (1-4, 21, 22)	0	1	48.8
05/12/2016	NWL (1-6, 21, 22)	1	0	62.3
05/13/2016	NE and NW Lantau (7-20,23)	0	0	46.3
05/23/2016	NWL (1)	1	7	16.2
05/24/2016	NWL (2-8, 21, 22)	2	0	53.3
05/25/2015	NE and NW Lantau (9-20,23)	0	0	39.5

Annex II. Impact Monitoring Survey Effort Summary (March – May 2016)

Date	Area	Sea State (on effort)	Effort (km)	Season	Vessel	Type
03/07/2016	NWL	1	36	SPRING	HKDW	IMPACT
03/07/2016	NWL	2	30.3	SPRING	HKDW	IMPACT
03/08/2016	NWL	1	6.4	SPRING	HKDW	IMPACT
03/08/2016	NEL	1	32.4	SPRING	HKDW	IMPACT
03/08/2016	NEL	2	3.9	SPRING	HKDW	IMPACT
03/21/2016	NWL	2	1	SPRING	HKDW	IMPACT
03/21/2016	NWL	3	12.8	SPRING	HKDW	IMPACT
03/21/2016	NWL	4	9.8	SPRING	HKDW	IMPACT
03/21/2016	NEL	1	2.3	SPRING	HKDW	IMPACT
03/21/2016	NEL	2	18.1	SPRING	HKDW	IMPACT
03/21/2016	NEL	3	15.8	SPRING	HKDW	IMPACT
03/22/2016	NWL	1	7.1	SPRING	HKDW	IMPACT
03/22/2016	NWL	2	20.1	SPRING	HKDW	IMPACT
03/22/2016	NWL	3	11.5	SPRING	HKDW	IMPACT
03/22/2016	NWL	4	10.1	SPRING	HKDW	IMPACT
04/21/2016	NWL	1	60.5	SPRING	HKDW	IMPACT
04/21/2016	NWL	2	11.5	SPRING	HKDW	IMPACT
04/21/2016	NEL	1	3.9	SPRING	HKDW	IMPACT
04/22/2016	NEL	1	27	SPRING	HKDW	IMPACT
04/22/2016	NEL	2	6	SPRING	HKDW	IMPACT
04/27/2016	NWL	1	23.2	SPRING	HKDW	IMPACT
04/27/2016	NEL	1	37.3	SPRING	HKDW	IMPACT
04/27/2016	NEL	2	0.1	SPRING	HKDW	IMPACT
04/28/2016	NWL	1	29.1	SPRING	HKDW	IMPACT
04/28/2016	NWL	2	19.7	SPRING	HKDW	IMPACT
05/12/2016	NWL	1	12.3	SPRING	HKDW	IMPACT
05/12/2016	NWL	2	50	SPRING	HKDW	IMPACT
05/13/2016	NWL	1	6.8	SPRING	HKDW	IMPACT
05/13/2016	NWL	2	3	SPRING	HKDW	IMPACT
05/13/2016	NEL	1	30	SPRING	HKDW	IMPACT
05/13/2016	NEL	2	5.2	SPRING	HKDW	IMPACT
05/13/2016	NEL	3	1.3	SPRING	HKDW	IMPACT
05/23/2016	NWL	1	16.2	SPRING	HKDW	IMPACT
05/24/2016	NWL	1	45.4	SPRING	HKDW	IMPACT
05/24/2016	NWL	2	7.9	SPRING	HKDW	IMPACT
05/25/2015	NWL	2	3.1	SPRING	HKDW	IMPACT
05/25/2015	NEL	1	4.4	SPRING	HKDW	IMPACT
05/25/2015	NEL	2	13.6	SPRING	HKDW	IMPACT
05/25/2015	NEL	3	18.4	SPRING	HKDW	IMPACT

Annex III. Impact Monitoring Sighting Database (March – May 2016)

Project	Contract	Date	Sighting No.	Time	Group Size	Area	Beaufort	PSD	Effort	Type	Latitude	Longitude	Season	Boat Association
HKBCF	HY/2010/02	07-Mar-16	1208	10:13:01 AM	4	NWL	1	258	On	Impact	22.36963	113.8698	Spring	No
HKBCF	HY/2010/02	22-Mar-16	1215	2:27:27 PM	6	NWL	1	N/A	Opp	Impact	22.23297	113.8363	Spring	No
HKBCF	HY/2010/02	21-Apr-16	1219	12:27:15 PM	2	NWL	1	303	On	Impact	22.40527	113.8870	Spring	No
HKBCF	HY/2010/02	28-Apr-16	1220	1:59:25 PM	3	NWL	1	N/A	Opp	Impact	22.23221	113.8390	Spring	No
HKBCF	HY/2010/02	12-May-16	1238	1:11:36 PM	2	NWL	2	55	On	Impact	22.39106	113.8975	Spring	No
HKBCF	HY/2010/02	23-May-16	1244	10:08:36 AM	9	NWL	1	N/A	Opp	Impact	22.19699	113.8429	Spring	No
HKBCF	HY/2010/02	23-May-16	1245	11:01:57 AM	3	NWL	1	N/A	Opp	Impact	22.20494	113.8389	Spring	No
HKBCF	HY/2010/02	23-May-16	1246	11:16:54 AM	4	NWL	1	N/A	Opp	Impact	22.20438	113.8376	Spring	No
HKBCF	HY/2010/02	23-May-16	1247	11:39:14 AM	1	NWL	1	N/A	Opp	Impact	22.21464	113.8343	Spring	No
HKBCF	HY/2010/02	23-May-16	1248	11:45:52 AM	1	NWL	1	N/A	Opp	Impact	22.21586	113.8340	Spring	No
HKBCF	HY/2010/02	23-May-16	1249	12:02:21 PM	5	NWL	1	N/A	Opp	Impact	22.23304	113.8388	Spring	No
HKBCF	HY/2010/02	23-May-16	1251	12:31:06 PM	7	NWL	1	N/A	Opp	Impact	22.24425	113.8409	Spring	No
HKBCF	HY/2010/02	23-May-16	1252	2:29:34 PM	8	NWL	1	9	On	Impact	22.36975	113.8700	Spring	No
HKBCF	HY/2010/02	24-May-16	1256	10:53:49 AM	3	NWL	1	122	On	Impact	22.34348	113.8775	Spring	No
HKBCF	HY/2010/02	24-May-16	1257	1:03:04 PM	1	NWL	1	17	On	Impact	22.40183	113.8872	Spring	No

Annex IV

March 2012– May 2016

(and Baseline September – November 2011)

Photo Identification Information

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 134		2016/05/23	1251	NWL
HZMB 133		2016/05/23	1249	NWL
HZMB 132		2016/05/23	1244	NWL
HZMB 131		2016/03/22	1215	NWL
HZMB 130		2016/02/04	1199	NWL
HZMB 129		2016/01/07	1189	NWL
		2015/10/22	1156	NWL
		2015/09/07	1143	NWL
		2015/08/25	1138	NWL
HZMB 128		2015/01/03	1056	NWL
HZMB 127		2015/01/03	1056	NWL
HZMB 126		2016/05/23	1244	NWL
		2015/02/23	1068	NWL
		2015/01/03	1054	NWL
HZMB 125		2016/03/07	1208	NWL
		2014/10/13	1019	NWL
HZMB 124		2014/09/22	1005	NWL
HZMB 123		2014/08/25	998	NWL
HZMB 122		2015/10/22	1156	NWL
		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		2015/11/05	1162	NWL
		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		2016/01/18	1193	NWL
		2013/10/15	812	NWL
HZMB 108		2015/06/11	1118	NWL
		2013/08/30	780	NEL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 107		2015/07/28	1126	NWL
		2014/10/13	1019	NWL
		2014/05/31	951	NWL
		2013/08/21	770	NWL
HZMB 106		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
		2011/11/07	Baseline	NWL
		2011/11/05	Baseline	NWL
		2011/11/05	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/10/28	Baseline	NWL
		2011/09/23	Baseline	NWL
		2011/09/16	Baseline	NWL
HZMB 097		2013/05/09	647	NWL
HZMB 096		2013/04/01	621	NWL
HZMB 095		2013/08/30	780	NEL
		2013/06/25	697	NWL
		2013/06/13	682	NWL
		2013/04/01	621	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
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		2015/04/20	1097	NWL
		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	2015/03/19	1086	NWL
		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	2015/12/01	1180	NWL
		2015/05/11	1104	NWL
		2013/12/19	863	NWL
		2013/03/28	607	NWL
		2013/02/15	579	NWL
		2013/01/28	568	NWL
		2013/01/28	564	NWL
		2012/04/19	267	NWL
		2011/10/28	Baseline	NWL
		2011/10/28	Baseline	NWL
		2011/10/10	Baseline	NEL
		2011/09/06	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
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
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		2015/06/04	1116	NWL
		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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 066	NL93	2013/01/28	559	NWL
		2012/12/11	537	NWL
		2012/10/24	475	NWL
		2012/10/12	466	NWL
		2011/11/07	Baseline	NWL
		2011/11/05	Baseline	NWL
HZMB 064		2015/03/19	1086	NWL
		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
HZMB 056		2012/09/18	442	NWL
		2012/09/05	433	NEL
HZMB 055		2012/09/04	425	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 054	CH34	2016/05/12	1238	NWL
		2015/12/01	1180	NWL
		2015/04/20	1097	NWL
		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	2015/05/11	1104	NWL
		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		2015/10/09	1151	NWL
		2014/07/29	982	NWL
		2012/09/03	419	NWL
HZMB 048		2012/09/03	419	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 047		2015/04/28	1100	NWL
		2012/09/03	412	NWL
HZMB 046		2012/09/03	412	NWL
HZMB 045		2016/05/23	1249	NWL
		2014/02/17	910	NWL
		2013/06/13	682	NWL
		2013/02/15	579	NWL
		2012/11/01	495	NWL
HZMB 044	NL98	2016/05/23	1247	NWL
		2016/01/18	1194	NWL
		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
		2011/11/07	Baseline	NWL
		2011/11/06	Baseline	NEL
		2011/11/01	Baseline	NEL
		2011/10/06	Baseline	NEL
HZMB 043		2012/09/03	407	NWL
HZMB 042	NL260	2015/10/22	1156	NWL
		2013/12/19	863	NWL
		2012/11/01	495	NWL
		2011/11/07	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
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		2016/05/23	1246	NWL
		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
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

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
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		2015/10/09	1153	NWL
		2015/10/09	1152	NWL
		2015/04/20	1097	NWL
		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		2016/04/21	1219	NWL
		2015/09/07	1143	NWL
		2015/04/20	1097	NWL
		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	2016/03/22	1215	NWL
		2012/07/10	330	NWL
		2011/09/16	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 020		2012/07/10	330	NWL
HZMB 019		2012/07/10	330	NWL
HZMB 018		2014/02/17	910	NWL
		2013/05/09	647	NWL
		2013/02/21	594	NEL
		2012/12/10	529	NEL
		2012/07/10	330	NWL
HZMB 017		2012/07/10	330	NWL
HZMB 016		2013/07/08	706	NWL
		2012/12/11	539	NWL
		2012/09/18	446	NWL
		2012/09/04	421	NWL
		2012/07/10	330	NWL
HZMB 015		2012/07/10	330	NEL
HZMB 014	NL176	2015/08/25	1139	NWL
		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		2015/03/19	1084	NWL
		2012/05/28	281	NWL
HZMB 008		2015/07/06	1122	NWL
		2012/05/28	281	NWL
HZMB 007	NL246	2012/12/10	529	NEL
		2011/11/06	Baseline	NEL
		2011/09/16	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 006		2015/10/22	1158	NWL
		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		2015/07/28	1126	NWL
		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
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
		2011/11/02	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
HZMB 001	WL46	2016/05/23	1251	NWL
		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
	NL46	2011/10/28	Baseline	NWL
	CH153	2011/10/11	Baseline	NWL
	NL48	2001/11/07	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/09/16	Baseline	NWL
	NL75	2011/09/16	Baseline	NWL
		2011/09/16	Baseline	NWL
		2011/11/01	Baseline	NEL
	NL80	2011/11/02	Baseline	NWL
	NL118	2011/09/06	Baseline	NWL
	NL120	2011/11/06	Baseline	NEL
		2011/10/10	Baseline	NWL
	NL123	2011/11/06	Baseline	NEL
		2011/10/10	Baseline	NWL
		2011/10/06	Baseline	NWL
	NL139	2011/11/01	Baseline	NEL
		2011/10/10	Baseline	NEL
		2011/09/16	Baseline	NWL
	NL165	2011/11/05	Baseline	NWL
		2011/11/02	Baseline	NWL
	NL170	2011/10/06	Baseline	NEL
	NL188	2011/11/07	Baseline	NWL
		2011/11/01	Baseline	NWL
		2011/10/28	Baseline	NWL
	NL191	2011/09/07	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	NL202	2011/11/07	Baseline	NWL
		2011/10/28	Baseline	NWL
	NL210	2011/11/07	Baseline	NWL
		2011/11/05	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/09/07	Baseline	NWL
	NL214	2011/11/05	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/10/28	Baseline	NWL
	NL220	2011/10/10	Baseline	NEL
	NL224	2011/10/28	Baseline	NWL
	NL226	2011/11/05	Baseline	NWL
		2011/10/17	Baseline	WL
	NL230	2011/11/02	Baseline	NWL
		2011/10/17	Baseline	WL
	NL233	2011/10/28	Baseline	NWL
		2011/10/06	Baseline	NWL
		2011/09/16	Baseline	NWL
	NL241	2011/11/07	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/09/16	Baseline	NWL
	NL244	2011/11/01	Baseline	NEL
		2011/11/01	Baseline	NWL
		2011/09/05	Baseline	WL
	NL256	2011/11/02	Baseline	NWL
	NL258	2011/09/16	Baseline	NWL
		2011/09/05	Baseline	WL
	NL259	2011/11/07	Baseline	NWL
	NL261	2011/11/01	Baseline	NEL
	NL264	2011/11/06	Baseline	NEL
		2011/10/06	Baseline	NEL
		2011/09/23	Baseline	NWL
	NL269	2011/11/02	Baseline	NWL
	NL272	2011/11/05	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/10/28	Baseline	NWL
		2011/09/16	Baseline	NWL
	NL278	2011/11/02	Baseline	NWL
	NL279	2011/11/02	Baseline	NWL
	SL42	2011/11/02	Baseline	NWL

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	SL43	2011/10/28	Baseline	NWL
	WL04	2011/11/05	Baseline	NWL
		2011/11/02	Baseline	NWL
		2011/10/17	Baseline	WL
		2011/10/10	Baseline	NWL
		2011/09/16	Baseline	NWL
	WL05	2011/11/01	Baseline	NEL
		2011/11/01	Baseline	NEL
	WL11	2011/11/07	Baseline	NWL
	WL25	2011/10/17	Baseline	WL
		2011/09/23	Baseline	WL
		2011/09/16	Baseline	NWL
	WL88	2011/11/02	Baseline	WL
		2011/09/16	Baseline	NWL
	WL116	2011/09/16	Baseline	NWL
	WL124	2011/11/02	Baseline	NWL
	WL156	2011/10/28	Baseline	NWL
		2011/09/23	Baseline	WL
	WL162	2011/09/16	Baseline	NWL
	NL275	*2011/09/23*	*Baseline*	*WL*
	SL48	*2011/11/02*	*Baseline*	*WL*
		2011/10/17	*Baseline*	*WL*
		2011/09/23	*Baseline*	*WL*
	CH108	*2011/11/02*	*Baseline*	*WL*
		2011/11/02	*Baseline*	*WL*
	CH157	*2011/11/02*	*Baseline*	*WL*
	NL206	*2011/10/07*	*Baseline*	*WL*
	WL28	*2011/09/23*	*Baseline*	*WL*
	WL42	*2011/11/02*	*Baseline*	*WL*
		2011/09/05	*Baseline*	*WL*
	WL47	*2011/10/17*	*Baseline*	*WL*
	WL61	*2011/10/17*	*Baseline*	*WL*
		2011/09/23	*Baseline*	*WL*
	WL66	*2011/11/07*	*Baseline*	*WL*
	WL68	*2011/09/05*	*Baseline*	*WL*
		2011/09/05	*Baseline*	*WL*
	WL72	*2011/11/02*	*Baseline*	*WL*
		2011/11/02	*Baseline*	*WL*
		2011/09/23	*Baseline*	*WL*
	WL87	*2011/09/23*	*Baseline*	*WL*

Identification Number	Baseline Identification Number	Date (YYYY-MM-DD)	Sighting Number	Area Sighted
	WL88	*2011/11/02*	*Baseline*	*WL*
		2011/09/16	*Baseline*	*WL*
	WL116	*2011/09/16*	*Baseline*	*WL*
	WL118	*2011/11/02*	*Baseline*	*WL*
		2011/11/02	*Baseline*	*WL*
	WL123	*2011/11/02*	*Baseline*	*WL*
	WL124	*2011/11/02*	*Baseline*	*WL*
	WL128	*2011/11/07*	*Baseline*	*WL*
		2011/11/02	*Baseline*	*WL*
	WL131	*2011/11/02*	*Baseline*	*WL*
		2011/11/02	*Baseline*	*WL*
		2011/09/23	*Baseline*	*WL*
	WL132	*2011/09/23*	*Baseline*	*WL*
	WL137	*2011/11/02*	*Baseline*	*WL*
	WL138	*2011/11/02*	*Baseline*	*WL*
	WL144	*2011/11/02*	*Baseline*	*WL*
	WL145	*2011/09/05*	*Baseline*	*WL*
	WL146	*2011/10/17*	*Baseline*	*WL*
	WL153	*2011/11/07*	*Baseline*	*WL*
	WL157	*2011/09/23*	*Baseline*	*WL*
	WL158	*2011/09/23*	*Baseline*	*WL*
	WL163	*2011/11/07*	*Baseline*	*WL*
		2011/11/02	*Baseline*	*WL*
	WL165	*2011/10/17*	*Baseline*	*WL*
	WL167	*2011/10/17*	*Baseline*	*WL*
	WL170	*2011/11/07*	*Baseline*	*WL*
	WL171	*2011/10/28*	*Baseline*	*WL*

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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

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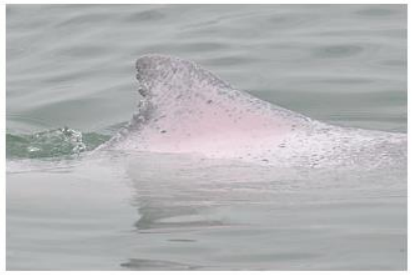

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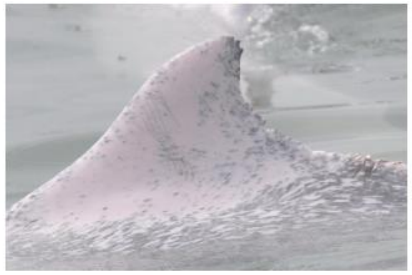

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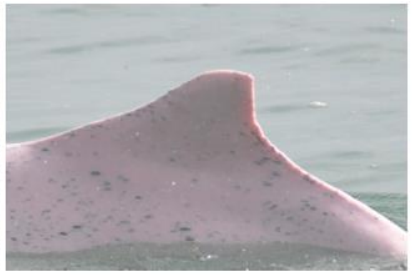

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HZMB 013 2012-05-28_09-11-04_01

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

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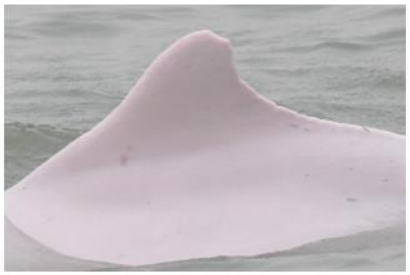

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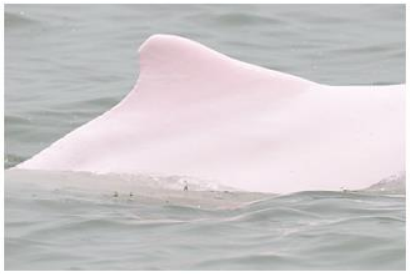

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HZMB 031 2012-08-25_11-58-40_01

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

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

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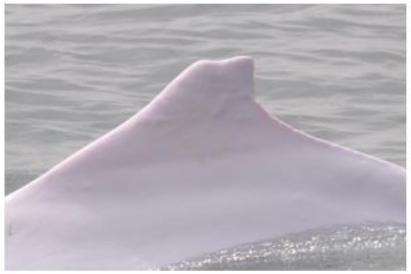

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HZMB 043 2012-09-03_08-54-50_02

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

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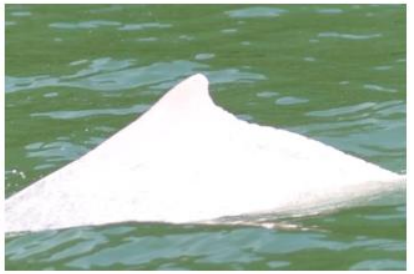

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HZMB 052 2012-09-04_10-33-08

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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

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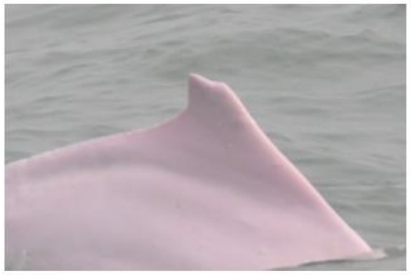
HZMB 060 2012-09-18_14-57-50_01



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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

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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

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

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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

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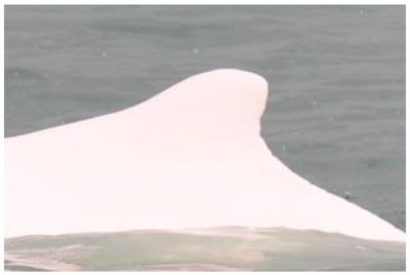

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HZMB 087 2013-02-15_15-00-34_05

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

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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

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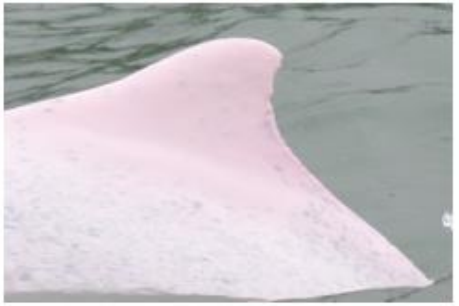

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HZMB 104 2013-07-08_14-08-35 _02

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

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

HZMB 116 2014-07-14 12-40-48

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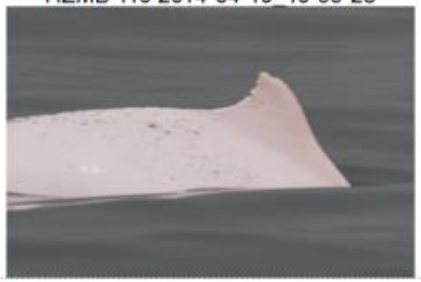
HZMB 119 2014-04-19_10-55-28



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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

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HZMB 130 2016-02-04_14-10-27_01 MED

HZMB 131 2016-03-22_14-38-08 Med

HZMB 132 2016-05-23_10-49-54_01 MED

HZMB 132 2016-05-23_10-53-54 MED

HZMB 133 LL 2016-05-23_12-14-02_01 MED

HZMB 134 LL 2016-05-23_12-35-03 MED

HZMB 134 LL 2016-05-23_12-37-35 MED

For details of the major activities carried out, weather conditions and other significant factors that might affect the monitoring results during monitoring periods from March 2016 to May 2016, please refer to the Monthly EM&A Reports for March 2016, April 2016 and May 2016 and their Appendix I respectively.

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for May / 2016 (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	Surplus Surcharge exported to Macau	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 '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan-16	0.0000	0.0000	0.0000	3.0720	0.0000	0.0000	52.4729	0.0000	0.2520	0.0000	0.8000	0.0520
Feb-16	0.0000	0.0000	0.0000	6.3366	0.0000	0.0000	6.1333	0.0000	0.0000	6.0800	0.0000	0.0520
Mar-16	0.0000	0.0000	0.0000	56.1071	0.0000	0.0000	38.3187	0.0000	0.3080	0.0000	0.0000	0.0520
Apr-16	0.0000	0.0000	0.0000	47.2724	3.5710	0.0000	18.7380	0.0000	0.2240	0.0000	0.0000	0.3662
May-16	0.0000	0.0000	0.0000	24.8600	93.8100	0.0000	45.2723	0.0000	0.0000	0.0000	0.0000	0.0715
Jun-16												
Sub-total	0.0000	0.0000	0.0000	137.6481	97.3810	0.0000	160.9352	0.0000	0.7840	6.0800	0.8000	0.5937
Jul-16												
Aug-16												
Sep-16												
Oct-16												
Nov-16												
Dec-16												
Total	0.0000	0.0000	0.0000	137.6481	97.3810	0.0000	160.9352	0.0000	0.7840	6.0800	0.8000	0.5937

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

(2) Plastics refer to plastic bottles / containers / sheets / foam / barrier 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”.

For details of the major activities carried out, weather conditions and other significant factors that might affect the monitoring results during monitoring periods from March 2016 to May 2016, please refer to the Monthly EM&A Reports for March 2016, April 2016 and May 2016 and their Appendix J respectively.

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

Cumulative statistics on Exceedances

		Total no. recorded in this month	Total no. recorded since project commencement
1-Hour TSP	Action	-	-
	Limit	-	-
24-Hour TSP	Action	-	-
	Limit	-	-
Noise	Action	-	-
	Limit	-	-
Water Quality	Action	-	2
	Limit	-	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	-	-	-	-	35
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. **D013**
Monitoring Period **March 2016 - May 2016**

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	1.4	4.6	

[#] 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.
- Current mitigation measures are being upheld. Dolphin Watching Plan has been implemented from the start of works of the Project.
- There has been no failure or reduction of dolphin-specific mitigation measures.
- Meetings were held on 9 December 2014, 27 April 2015, 10 July 2015, 6 October 2015, 15 January 2016, 20 April 2016 and 22 July 2016 between ENPO, project ET for this and other HZMB projects and engineer representatives, to discuss dolphin encounter rates during the period September-November 2014, December 2014-February 2015, March 2015-May 2015, June 2015-August 2015, September 2015 - November 2015, December 2015 - February 2016 and March 2016 - May 2016. It was concluded that the HZMB construction work is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to individual HZMB contracts and processes 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

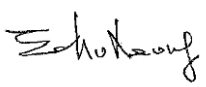
1. Statistical data analysis has been repeated to confirm findings;
2. All available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A have been reviewed;
3. Identification of souce of impact was carried out;
4. The IEC, ER and Contractor have 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 20 April 2016 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. On a meeting held on 6 October 2015, ENPO stated an extension of survey work into waters outside the three currently surveyed areas for this project was underway to investigated expanded habitat use of dolphins outside the project area.
- The joint meeting with ENPO, project ET for this and other HZMB projects and engineer representatives on 22 July 2016 suggested that the protection measures (e.g., speed limit control) for the proposed Brothers 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 Reclamation Works 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 and it is noted that sand filling and vessel traffic now at minimal activity.



ET Leader Signature & Date: 19-Dec-16

Report No. **D013**
Monitoring Period **March 2016 - May 2016**

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 Friday 22 July 2016, a meeting was held between ENPO, ET for this contract and other HZMB contracts and engineer representatives following the limit level/action level exceedances for Chinese white dolphin encounter rate during the period March-May 2016. 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. Previously, ENPO presented the preliminary findings of the HZMBA interim survey on CWD sighting and photo-identification works which provided solid evidence that some CWD that were previously more often sighted in HK waters have expanded their ranges into mainland waters and some with reduced usage in Hong Kong waters. The AFCD low abundance figure for both NEL and NWL for the period 2015-16 was also discussed (note: the AFCD Annual Dolphin Monitoring Report 2015-16 has not been released to the public as yet). Previous data on changes in CWD ranges partially explains the decline in sightings North Lantau waters.

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 reiterated at this latest meeting that there are also concurrent works ongoing in both NEL and NWL, some of which are not part of the HZMB 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.

For water quality monitoring, one (1) limit level impact water quality monitoring exceedance at monitoring station SR4(N) has been recorded on 20 May 2016 during flood tide. After investigation, there is no adequate information to conclude the recorded exceedance is related to this Contract. No exceedance at other monitoring stations in the reporting period. After investigation, there is no adequate information to conclude the recorded exceedances are related to this Contract. IWQM exceedance were at location which dolphins have not been noted previously, i.e., close to Tung Ching Public pier and it is unlikely that short-lived and localised increased sedimentation would affect dolphins when it is not their usual habitat.

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;2015). 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). This paper also states that caution should be exercised when interpreting these preliminary findings and further analysis is encouraged. Noting the preliminary findings of Marcotte *et al* (2015) It is noted that the high speed ferries from NEL have been re-routed to travel to the east and north of Sha Chau Lung Kwu Chau Marine Park (SCLKCMP) during the reporting period resulting in increased high speed ferry traffic adjacent to an area that the dolphins have traditionally used frequently. . A reduction in the number of sightings in the northern SCLKCMP area has been noted since December 2015 and this observation supports the preliminary findings of Marcotte *et al* (2015) that dolphin declines may be correlated with an increase in the frequency of HSF. This was discussed during the meeting held on 20 April 2016, and all ETs agreed that there is likely a relationship between increased HSF and decreased dolphin density. 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 HSF. 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), including vibratory piling which was conducted as part of the HZMB construction (Wang *et al* 2014; Yang *et al* 2015). Activities which are stressful to dolphins are usually associated with increased underwater noise levels and this includes vessel traffic (from all construction works in the proximity of North Lantau). It is also noted that Hong Kong and adjacent ports are the world's busiest commercial shipping area with heavy shipping traffic.

As discussed in previous meetings, 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. Protective measures (e.g., speed limit control) for the proposed Brothers Marine Park (BMP) are underway.

Other non-project related works and activities around the HZMB project area may contribute to changes in dolphin distribution and include, but may not be limited to;

- Shift in distribution or change in composition of prey resources (Buchary *et al.* 2003).
- 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)
- Recent publications suggest that the health status of cetaceans in Hong Kong and adjacent waters may be compromised due to the toxic levels of perfluorinated sulfonic acids (PFSAs) recorded in the livers of *Sousa chinensis* (Lam *et al* 2016)

[1] Boats travelling at over 15kmph
[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.

3. ***Repeat review to ensure all the dolphin protective measures are fully and properly***

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., DEZ/DWP for silt curtain deployment and all other Project activities, respectively.

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

These factors were reported in D005, D006, D007, D008, D009, D010, D011 and D012, 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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