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Report No.: 0394/13/ED/0307A

Quarterly EM&A Report

August 2015 - October 2015

Client : China International Water & Electric Corporation

Project: Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel – CV/2013/04

Report No.: 0394/13/ED/0307A

Project Proponent:

Civil Engineering & Development Department
101 Princess Margaret Road,
Homantin,
Kowloon, Hong Kong.

Prepared by: Cyrus Lai

Reviewed by: Vincent Chan

Certified by: _____
Colin Yung
Environmental Team Leader for
MateriaLab Consultants Limited

RAMBOLL ENVIRON

Ref.: CEDDWKTBEM00_0_0227L.15

24 December 2015
By Post and Fax (2419 6218)

Mott MacDonald Hong Kong Ltd.
20/F, AIA Kowloon Tower,
Landmark East,
100 How Ming Street,
Kwun Tong, Kowloon

Attention: Ir Chau T C, Felix, Engineer's Representative

Dear Ir Chau,

Re: Agreement No. CE 63/2008 (CE)
Dredging Works in Kwai Tsing Container Basin and its Approach Channel – Investigation, Design and Construction)

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Verification of Quarterly EM&A Report for August 2015 to October 2015

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report for August 2015 to October 2015 (ET's Report. No. 0394/13/ED/0307A) received by e-mail on 22 December 2015.

We write to verify the captioned report in accordance with Section 12.4 iii of EM&A Manual (AEIAR-156/2010).

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

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

Y H Hui
Independent Environmental Checker

Cc:	MMHK	Mr. C M Howley	2827 1823 (by fax)
	MateriaLab	Mr. Colin Yung	2450 6138 (by fax)
	CIWE	Mr. K.O. Leung and Mr. Lam Wai-hung	2419 6028 (by fax)

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EXECUTIVE SUMMARY

i. This is the Sixth Quarterly Environmental Monitoring Audit (EM&A) Report – August 2015 - October 2015 for Contract No. CV/2013/04 – Dredging Works in Kwai Tsing and its Approach Channel (CE63/2008 – Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel). The dredging works commenced on 23 April 2014. This report presents the environmental monitoring and audit works conducted from 23 July 2015 to 22 October 2015.

ii. Construction Activities for the Reporting Period
During this reporting period, the principal work activities included:

August 2015	September 2015	October 2015
• Dredging at Portion A / Zone 2A1, 2B2, 2C1 and 2C2 and Zone 3A in EP • Dredging at Portion B / Zone 6A in EP • Dredging at Portion C / Zone 9, Zone 10 and Zone 12 in EP	• Dredging at Portion A / Zone 2A1, 2B1, 2B2, 2C1 and Zone 3B in EP • Dredging at Portion B / Zone 6A, 6C and 6D and Zone 7 in EP • Dredging at Portion C / Zone 9, Zone 10 and Zone 12 in EP	• Dredging at Portion A / Zone 2A1, 2A2, 2A3, 2B1, 2B2, 2C2, 2C3 and Zone 3B in EP • Dredging at Portion B / Zone 6B and 6C in EP • Dredging at Portion C / Zone 9, Zone 10 and Zone 12 in EP

iii. Water Quality Monitoring
Routine impact water quality monitoring at 22 designated monitoring stations namely C1, C2, C3, G1, G2, G3, G4, G5, G6, SR1, SR2, SR3, SR4, SR5, SR6, SR7, SR8, SR9, SR10, SR11, SR12 and SR13 were conducted during the reporting period. Exceedances of DO (B), TIN (in-situ & lab) and Suspended Solids were recorded at various monitoring stations, detail of exceedance are summarized in **Table I and II**. However, investigation indicated these exceedances were not related to the Project works.

Table I Summary of Water Quality Exceedances – Routine Impact Monitoring (In-situ)

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR1	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR3	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	2	3	2	3
	Limit	0	0	0	0	0	0	-	-	-	-	28	28	28	28
SR6	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	1	1	0	0	-	-	-	-	-	-	1	1
SR7	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	4	4	0	0	-	-	-	-	-	-	4	4
SR8	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	3	3	0	0	-	-	-	-	-	-	3	3
SR9	Action	0	0	0	0	0	0	-	-	-	-	10	10	10	10

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
	Limit	0	0	0	0	0	0	-	-	-	-	11	10	11	10
SR10	Action	0	0	0	0	0	0	-	-	-	-	5	8	5	8
	Limit	0	0	0	0	0	0	-	-	-	-	5	4	5	4
SR11	Action	0	0	0	0	0	0	-	-	-	-	5	5	5	5
	Limit	0	0	0	0	0	0	-	-	-	-	2	2	2	2
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	0	0	0	22	26	48	
	Limit	0	0	8	8	0	0	0	0	0	0	46	44	106	

Table II Summary of Water Quality Exceedances – Routine Impact Monitoring (Laboratory Analysis)

Station	Exceedance Level	Suspended Solids		BOD_5		*E. coli*		NH_3-N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR1	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	5	3	0	0	0	0	0	0	0	0	0	0	-	-	5	3
SR2	Action	1	2	-	-	-	-	0	0	0	0	-	-	-	-	1	2
	Limit	1	0	-	-	-	-	0	0	0	0	-	-	-	-	1	0
SR3	Action	1	0	-	-	-	-	0	0	0	0	-	-	-	-	1	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR5	Action	1	0	-	-	-	-	-	-	-	-	-	-	2	3	3	3
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	28	28	28	28
SR6	Action	1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR7	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR8	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR9	Action	1	3	-	-	-	-	-	-	-	-	-	-	10	10	11	13
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	11	10	11	10
SR10	Action	0	0	-	-	-	-	-	-	-	-	-	-	5	8	5	8
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	5	4	5	4
SR11	Action	0	0	-	-	-	-	-	-	-	-	-	-	5	5	5	5
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	2	2	2	2
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	4	0	0	0	0	0	0	0	0	0	0	-	-	0	4
SR13	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Total	Action	5	7	0	0	0	0	0	0	0	0	0	0	22	26	60	
	Limit	7	8	0	0	0	0	0	0	0	0	0	0	46	44	105	

Among the 22 monitoring stations, supplementary 24-hr water quality monitoring was also conducted at 7 of the stations, which are SR4, SR5, SR9, SR10, SR11, SR12 and SR13. One (1) exceedance of DO was recorded, detail of exceedance is summarized in **Table III**. However, investigation indicated the exceedance was not related to the Project works.

Table III Summary of the Exceedances Recorded in Reporting Quarter – 24-hr Monitoring

Station	Exceedance Level	Turbidity	DO	NH_3-N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR9	Action	0	0	-	0
	Limit	0	0	-	0
SR10	Action	0	1	-	1
	Limit	0	0	-	0
SR11	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	1	0	1
	Limit	0	0	0	0

iii. Waste Management

iv. There was marine sediment (Type 1 – Open Sea Disposal and Type 2 – Confined Marine Disposal) disposed to East Sha Chau Pit IVc or Va and South of Brothers CMP1 or CMP2. No inert or non-inert C&D material related to dredging works and a small amount of general refuse were disposed off site in the reporting period.

v. Non-Compliance, Complaints, Notifications of Summons and Successful Prosecutions
No complaint, notification of prosecutions or summons was received in the reporting period.

A leakage incident was reported to occur at around 7:35 am, of 2nd October 2015 at TMTA Grid C045 in Portion C (EP Zone 10). Malfunctioning hydraulic joint of the loading compartment of split hopper barge HH139 (B141479) caused partially open of the compartment and dredged At L sediment (Type I) leaked through the opening at the dredging location. The problem was rectified by mechanics on the board at around 9:00 am. The vessel then resumed normal operation at around 10:00am. Preventive measures were implemented afterwards. Adequate corrective measures shall be implemented by the Contractor to avoid recurrence of such incident. Incident report on the leakage is under review and will be provided in subsequent EM&A report.

vi. Site Inspections and Audit
The Environmental Team conducted 14 site inspections in the reporting period. The Contractor was reminded to remove stagnant water in the top surface of the container and the drip tray, to store the general refuse in enclosed bin and to store the chemical containers properly with clear labeling. Also general house keeping such as weeding shall be implemented in the two side of drainage area in Portion F.

According to Contractor, no archaeological deposit was found during reporting period.

vii. Compliance with Specific EP conditions

Implementation of contractor's mitigation for dredging work and the associated dredging records were checked. It was concluded that the dredging is conducted orderly in compliance with the EP requirements on site mitigation measures in general.

viii. Construction Activities for the Coming Reporting Period

During the coming reporting period, the principal work activities include:

- Dredging at Portion A / Zone 2A1, 2A2, 2A3, 2B1, 2B2, 2C2, 2C3 and Zone 3B in EP
- Dredging at Portion B / Zone 6B and 6C in EP
- Dredging at Portion C / Zone 9, Zone 10 and Zone 12 in EP

Future Key Issues include:

- Regular inspection on silt curtain deployment
- Regular inspection on silt screen deployment
- Implementation of EM&A Programme
- Maintain dredging below allowable dredging rate in EP.
- Cleaning of excess material from the decks and exposed fittings of barges and dredgers before the vessel is moved.
- Barge loading shall be monitored to ensure material is not lost during transportation.
- Conditions in dumping permit shall be followed strictly.

1. INTRODUCTION

1.1 Background

1.1.1 The Project objective is to dredge approximately 4.0 million cubic metres of sediment from the seabed of Kwai Tsing Container Basin, as well as portions of Northern Fairway and Western Fairway, to provide sufficient depth of container basin and approach channel to Kwai Tsing Container Terminal (KTCT) for the safe navigation of Ultra Large Container Ships (ULCS).

1.1.2 The environmental monitoring and audit works of this Project is governed by Environmental Permit (EP) No. EP-426/2011/A, EM&A Manual (AEIAR-156/2010) and EM&A TIN (EPD Letter Ref: (34) in Ax(1) to EP2/N3/C/57Pt.7)).

1.1.3 The project proponent was the Civil Engineering & Development Department, HKSAR (CEDD). The Project General Layout is shown in **Figure 1**.

1.1.4 Mott MacDonald Hong Kong Ltd. (MMHK) was commissioned by CEDD as the Engineer for the Project. Ramboll Environ Hong Kong Limited (REHK) was employed as the Independent Environmental Checker (IEC) in the Project.

1.1.5 China International Water & Electric Corporation Limited (CIW&E) was appointed as the main contractor for the dredging works.

1.1.6 MateriaLab Consultants Limited (MCL) was appointed as the Environmental Team (ET) to implement the Environmental Monitoring and Audit (EM&A) programme for the Project.

1.1.7 The construction phase of the Project under the EP was commenced on 23 April 2014.The impact EM&A programme of the Project commenced on 23 April 2014.

1.2 Purpose of the Report

1.2.1 This Sixth Quarterly EM&A Report is prepared by MCL. This report presents a summary of the environmental monitoring and audit works, list of activities and mitigation measures proposed by the ET for the Project in 23 July 2015 to 22 October 2015.

1.3 Structure of the Report

1.3.1 The structure of this report is as follows:

Section 1: Introduction, including background, purpose and structure of the report
Section 2: Basic Project Information – summaries background and scope of the Contract, site description, project organization and contract details, construction programme, the construction works undertaken and the status of Environmental Permits/Licenses during the reporting period.
Section 3: Routine Impact Water Quality Monitoring – summaries the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency,

monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 4: 24-hr Water Quality Monitoring – summaries the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 5: Environmental Site Inspection – summaries the audit findings of the weekly site inspections undertaken within the reporting period.

Section 7: Non-Compliance, Complaints, notifications of summons and Prosecution – summaries any environmental complaints, environmental summons and successful prosecutions within the reporting period.

Section 8: Conclusions and Recommendation

2. BASIC PROJECT INFORMATION

2.1 Project Organizations

2.1.1 The Project Organization structure is shown in **Appendix A**. The key personnel contact names and numbers are summarized in **Table 2.1**.

Table 2-1 Key Personnel Contact of the Contract

Party	Position	Name	Telephone	Fax
Engineer's Representative (MMHK)	Senior Resident Engineer	Ir. Felix Chau	2419 6008	2419 6218
Independent Environmental Checker (REHK)	Independent Environmental Checker	Mr. YH Hui	3465 2888	3465 2899
Contractor (CIW&E)	Site Agent	Mr. KO Leung	2419 6008	2419 6218
	Environmental Officer	Mr. WH Lam	2419 6008	2419 6218
Environmental Team (MCL)	Environmental Team Leader	Mr. Colin Yung	3565 4114	3565 4160

2.2 Construction Programme and Synopsis of Work

2.2.1 The construction phase of the Project under the EP commenced on 23 April 2014.

2.2.2 The construction programme of the Project is shown in **Appendix B**.

2.2.3 The environmental mitigation measures implementation schedule is presented in **Appendix F**.

2.3 Works undertaken during the quarter

During the reporting period, according to the Contractor, the principal work activities include:

August 2015	September 2015	October 2015
• Dredging at Portion A / Zone 2A1, 2B2, 2C1 and 2C2 and Zone 3A in EP • Dredging at Portion B / Zone 6A in EP • Dredging at Portion C / Zone 9, Zone 10 and Zone 12 in EP	• Dredging at Portion A / Zone 2A1, 2B1, 2B2, 2C1 and Zone 3B in EP • Dredging at Portion B / Zone 6A, 6C and 6D and Zone 7 in EP • Dredging at Portion C / Zone 9, Zone 10 and Zone 12 in EP	• Dredging at Portion A / Zone 2A1, 2A2, 2A3, 2B1, 2B2, 2C2, 2C3 and Zone 3B in EP • Dredging at Portion B / Zone 6B and 6C in EP • Dredging at Portion C / Zone 9, Zone 10 and Zone 12 in EP •

Daily dredging quantity in the reporting period is provided in **Table 2.2**.

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Table 2-2 Detail Dredging Quantity

Date	Dredged Quantity (in-situ, m^3)				
	Portion A			Portion B	Portion C
	Zone (Maximum Allowable Daily Dredged Rate)			Max Allowable Daily Dredged Rate=4000	
7/23/2015	0	0	0	0	2400
7/24/2015	2C1: 800(1550)	2C2: 400(2050)	0	0	800
7/25/2015	0	0	0	0	0
7/26/2015	2C2: 800(2050)	0	0	0	1200
7/27/2015	2C2: 554(2050)	0	0	0	400
7/28/2015	2C2: 1600(2050)	0	0	800	0
7/29/2015	2A1: 800(2000)	2C2: 400(2050)	0	0	400
7/30/2015	2C1: 800(1550)	0	0	0	800
7/31/2015	2C1: 400(1550)	3A: 400(3440)	0	0	800
8/1/2015	2C2: 400(2050)	0	0	0	1600
8/2/2015	0	0	0	0	0
8/3/2015	2A1: 1200(2000)	0	0	0	800
8/4/2015	0	0	0	400	1200
8/5/2015	2B2: 400(1450)	0	0	400	800
8/6/2015	2B2: 800(1450)	2C1: 800(1550)	0	0	800
8/7/2015	2C1: 400(1550)	0	0	0	2000
8/8/2015	2B2: 400(1450)	0	0	0	400
8/9/2015	0	0	0	0	0
8/10/2015	2B2: 400(1450)	0	0	0	1600
8/11/2015	2B2: 800(1450)	0	0	0	1600
8/12/2015	0	0	0	0	2400
8/13/2015	0	0	0	0	2000
8/14/2015	0	0	0	0	2400
8/15/2015	0	0	0	0	800
8/16/2015	0	0	0	0	0
8/17/2015	0	0	0	0	0
8/18/2015	0	0	0	0	0
8/19/2015	0	0	0	0	0
8/20/2015	2B2: 800(1450)	0	0	0	800
8/21/2015	2B2: 800(1450)	0	0	0	2000
8/22/2015	0	0	0	0	1200

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Date	Dredged Quantity (in-situ, m^3)				
	Portion A			Portion B	Portion C
	Zone (Maximum Allowable Daily Dredged Rate)			Max Allowable Daily Dredged Rate=4000	
8/23/2015	2C1: 800(1550)	0	0	0	1200
8/24/2015	2B2: 800(1450)	0	0	0	1200
8/25/2015	2B2: 800(1450)	0	0	800	0
8/26/2015	2B2: 400(1450)	3B: 800(3440)	0	0	1200
8/27/2015	0	0	0	400	2000
8/28/2015	2B1: 800(800)	0	0	0	800
8/29/2015	0	0	0	0	2400
8/30/2015	2B1: 800(800)	2B2: 400(1450)	0	0	1200
8/31/2015	0	0	0	0	400
9/1/2015	0	0	0	0	0
9/2/2015	2B1: 800(800)	0	0	0	800
9/3/2015	2B1: 800(800)	2B2: 800(1450)	0	0	0
9/4/2015	2B1: 800(800)	0	0	400	1200
9/5/2015	0	0	0	0	2400
9/6/2015	0	0	0	800	400
9/7/2015	2B1: 800(800)	0	0	0	1200
9/8/2015	2B1: 400(800)	0	0	0	800
9/9/2015	2B2: 800(1450)	0	0	1200	0
9/10/2015	2B2: 800(1450)	0	0	1200	0
9/11/2015	2B2:1200(1450)	0	0	0	0
9/12/2015	2B2:1200(1450)	0	0	0	0
9/13/2015	2B2: 800(1450)	0	0	800	0
9/14/2015	2A1: 1500(2000)	0	0	400	1200
9/15/2015	2B2: 1200(1450)	0	0	0	1500
9/16/2015	2B2: 1200(1450)	0	0	0	2000
9/17/2015	2B2: 400(1450)	0	0	0	2000
9/18/2015	2B2: 1200(1450)	0	0	0	2000
9/19/2015	2B2: 800(1450)	0	0	0	2000
9/20/2015	2B2: 400(1450)	0	0	0	1500
9/21/2015	2B2: 800(1450)	0	0	0	2600
9/22/2015	2B2: 800(1450)	0	0	0	2200

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Date	Dredged Quantity (in-situ, m^3)				
	Portion A			Portion B	Portion C
	Zone (Maximum Allowable Daily Dredged Rate)			Max Allowable Daily Dredged Rate=4000	
9/23/2015	2B2: 1000 (1450)	0	0	0	2000
9/24/2015	2B2: 500 (1450)	0	0	500	0
9/25/2015	2B2: 500 (1450)	0	0	500	0
9/26/2015	2B2: 1000 (1450)	0	0	0	0
9/27/2015	2B2: 1000 (1450)	0	0	0	0
9/28/2015	2B2: 1423 (1450)	0	0	0	0
9/29/2015	2B2: 1442 (1450)	2C2: 481 (2050)	0	0	0
9/30/2015	2B2: 500 (1450)	0	0	0	2000
10/1/2015	2B1: 500 (800)	2B2: 500 (1450)	0	1000	0
10/2/2015	0	0	0	0	2500
10/3/2015	0	0	0	0	0
10/4/2015	0	0	0	0	0
10/5/2015	2B2: 1077 (1450)	0	0	0	0
10/6/2015	2A1: 538 (2000)	2B2: 538 (1450)	0	0	0
10/7/2015	2A1: 1077 (2000)	0	0	0	0
10/8/2015	2C2: 538 (2050)	0	0	0	2154
10/9/2015	2A2: 1077 (1450)	2C3: 538 (4000)	0	0	1615
10/10/2015	3B: 538 (3440)	0	0	0	1615
10/11/2015	0	0	0	0	1615
10/12/2015	0	0	0	0	3231
10/13/2015	2C3: 1077 (4000)	3B: 538 (3440)	0	0	538
10/14/2015	0	0	0	0	1615
10/15/2015	2C3: 538 (4000)	0	0	0	1615
10/16/2015	0	0	0	0	2154
10/17/2015	0	0	0	0	1615
10/18/2015	2A2: 538 (1450)	2A3: 538 (2900)	0	0	1077
10/19/2015	0	0	0	0	1615
10/20/2015	3B: 1077 (3440)	0	0	0	1077
10/21/2015	3B: 538 (3440)	0	0	0	1615
10/22/2015	0	0	0	0	1615

3. EM&A REQUIREMENTS – ROUTINE IMPACT MONITORING

3.1 Monitoring Parameters

3.1.1 The monitoring parameters and frequency for both in-situ measurement and laboratory analysis are summarised in **Table 3.1**. Parameters for each monitoring station are specified in **Table 3.2**.

Table 3-1 **Monitoring Parameters and Frequency**

Parameters	Monitoring Frequency
In-situ Measurement Turbidity (in NTU), pH, Dissolved Oxygen (in mg/L and %), Temperature (in °C), Salinity (in ppt), [1]Ammonia-N (in mg/L-N and UIA); [2]TIN: Ammonia-N (in mg/L), Nitrite (in mg/L), Nitrate (in mg/L) Laboratory Analysis [1]Ammonia-N (in mg/L-N and UIA), Suspended Solids (SS), [2]BOD_5, [2]*E.coli*, [2]Synthetic Detergent; [2]TIN: Ammonia-N (in mg/L), Nitrite (in mg/L), Nitrate (in mg/L)	3 days per week, at mid-flood and mid-ebb tides (except detergent which shall be taken one day per month, at mid-flood and mid-ebb) 36 hours interval was allowed between subsequent sets of measurement.

Notes:

1. Ammonia measurements and samples were taken at SR1, SR2, SR3, SR4, SR12, C1, C2, C3 only; UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH_3-N, temperature, pH and salinity; Laboratory determined unionized ammonia was calculated from analysed NH_3-N from water samples and in-situ measurement of temperature, pH and salinity;
2. Total Inorganic Nitrogen (TIN) measurements and samples were taken at SR5, SR9, SR10, SR11, G1, G2, G3, G4, G5, G6 only;
3. BOD_5, *E.coli* and Synthetic Detergent samples were taken at SR1, SR4, SR12, C1, C2, C3 only.

Table 3-2 **Water Quality Monitoring Parameters**

ID	In-situ Measurement							Laboratory Analysis					
	pH	Temperature	Salinity	Turbidity	Dissolved Oxygen / Dissolved Oxygen%	NH_3-N / UIA	TIN (NH_3-N, NO_2 & NO_3)	Suspended Solids	BOD_5	*E. coli*	NH_3-N / UIA	Synthetic Detergent	TIN (NH_3-N, NO_2 & NO_3)
SR1	O	O	O	O	O	O		O	O	O	O	O	
SR2	O	O	O	O	O	O		O			O		
SR3	O	O	O	O	O	O		O			O		
SR4	O	O	O	O	O	O		O	O	O	O	O	
SR5	O	O	O	O	O		O	O					O
SR6	O	O	O	O	O			O					
SR7	O	O	O	O	O			O					
SR8	O	O	O	O	O			O					
SR9	O	O	O	O	O		O	O					O
SR10	O	O	O	O	O		O	O					O
SR11	O	O	O	O	O		O	O					O
SR12	O	O	O	O	O	O		O	O	O	O	O	
SR13	O	O	O	O	O			O					
G1	O	O	O	O	O		O	O					O
G2	O	O	O	O	O		O	O					O
G3	O	O	O	O	O		O	O					O
G4	O	O	O	O	O		O	O					O
G5	O	O	O	O	O		O	O					O
G6	O	O	O	O	O		O	O					O
C1	O	O	O	O	O	O		O	O	O	O	O	
C2	O	O	O	O	O	O		O	O	O	O	O	
C3	O	O	O	O	O	O		O	O	O	O	O	

Note:

1. UIA: In-situ unionized ammonia was calculated from in-situ measurement of NH_3-N, temperature, pH and salinity; laboratory determined unionized ammonia was calculated from analysed NH_3-N from water samples taken and in-situ measurement of temperature, pH and salinity.

3.2 Monitoring Locations

3.2.1 Impact water quality monitoring was conducted at 22 locations, including 13 sensitive receivers (SR1-13), 6 gradient stations (G1-6) and 3 control stations (C1-3). The locations of the stations are also shown in **Figure 3**.

3.2.2 Revisions on monitoring locations were proposed in previous submission (MateriaLab Report No. Ref: 0394/13/ED/0103 – WATER QUALITY MONITORING LOCATION) and were agreed among AFCD, EMSD, WSD and EPD.

3.3 Results and Observations

3.3.1 Impact water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. Impact water quality monitoring results graphical presentations are provided in **Appendix D**.

3.3.2 Due to adverse weather condition and the issuance of Red Rainstorm Signal on 15th of August 2015 and the issuance of Typhoon Signal No.3 on 3rd of October 2015, the impact monitoring for mid-flood and mid-ebb tide on 15th of August 2015 and 3rd of October 2015 were cancelled.

3.3.3 During the reporting period, some adverse weather conditions, including Rainstorm Warnings and Thunderstorm Warning, were also reported. Heavy marine traffic (not associated with the Project) was commonly observed nearby the Project site and its vicinity, that the propeller wash from vessels could lead to potential disturbance of seabed sediment and affect the water quality.

3.3.4 Exceedances were recorded for DO (B), TIN (in-situ & lab) and Suspended Solids. Number of exceedances recorded in the reporting quarter at each impact station is summarized in **Table 3-5 and 3-6**.

Table 3-3 Summary of Water Quality Exceedance (In-situ Measurement)

Station	Exceedance Level	DO (S&M)		DO (B)		Turbidity		NH3-N		UIA		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR1	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR2	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR3	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR5	Action	0	0	0	0	0	0	-	-	-	-	2	3	2	3
	Limit	0	0	0	0	0	0	-	-	-	-	28	28	28	28
SR6	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	1	1	0	0	-	-	-	-	-	-	1	1
SR7	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	4	4	0	0	-	-	-	-	-	-	4	4
SR8	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	3	3	0	0	-	-	-	-	-	-	3	3
SR9	Action	0	0	0	0	0	0	-	-	-	-	10	10	10	10
	Limit	0	0	0	0	0	0	-	-	-	-	11	10	11	10
SR10	Action	0	0	0	0	0	0	-	-	-	-	5	8	5	8
	Limit	0	0	0	0	0	0	-	-	-	-	5	4	5	4
SR11	Action	0	0	0	0	0	0	-	-	-	-	5	5	5	5
	Limit	0	0	0	0	0	0	-	-	-	-	2	2	2	2
SR12	Action	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	0	0	0	0	0	0	0	0	0	-	-	0	0
SR13	Action	0	0	0	0	0	0	-	-	-	-	-	-	0	0
	Limit	0	0	0	0	0	0	-	-	-	-	-	-	0	0
Total	Action	0	0	0	0	0	0	0	0	0	0	22	26	48	
	Limit	0	0	8	8	0	0	0	0	0	0	46	44	106	

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Table 3-4 Summary of Water Quality Exceedance (Laboratory Analysis)

Station	Exceedance Level	Suspended Solids		BOD_5		*E. coli*		NH_3-N		UIA		Synthetic Detergent		TIN		Total	
		E	F	E	F	E	F	E	F	E	F	E	F	E	F	E	F
SR1	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	5	3	0	0	0	0	0	0	0	0	0	0	-	-	5	3
SR2	Action	1	2	-	-	-	-	0	0	0	0	-	-	-	-	1	2
	Limit	1	0	-	-	-	-	0	0	0	0	-	-	-	-	1	0
SR3	Action	1	0	-	-	-	-	0	0	0	0	-	-	-	-	1	0
	Limit	0	0	-	-	-	-	0	0	0	0	-	-	-	-	0	0
SR4	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	1	1	0	0	0	0	0	0	0	0	0	0	-	-	1	1
SR5	Action	1	0	-	-	-	-	-	-	-	-	-	-	2	3	3	3
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	28	28	28	28
SR6	Action	1	2	-	-	-	-	-	-	-	-	-	-	-	-	1	2
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR7	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR8	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
SR9	Action	1	3	-	-	-	-	-	-	-	-	-	-	10	10	11	13
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	11	10	11	10
SR10	Action	0	0	-	-	-	-	-	-	-	-	-	-	5	8	5	8
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	5	4	5	4
SR11	Action	0	0	-	-	-	-	-	-	-	-	-	-	5	5	5	5
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	2	2	2	2
SR12	Action	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	0
	Limit	0	4	0	0	0	0	0	0	0	0	0	0	-	-	0	4
SR13	Action	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Limit	0	0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Total	Action	5	7	0	0	0	0	0	0	0	0	0	0	22	26	60	
	Limit	7	8	0	0	0	0	0	0	0	0	0	0	46	44	105	

3.3.5 During the reporting period, 16 LL exceedances for DO (B), 48 AL and 90 LL exceedances for TIN (in-situ), 12 AL and 15 LL exceedances for Total Suspended Solids, and 48 AL and 90 LL exceedances for TIN (lab) were recorded.

3.3.6 According to the investigations, the exceedances were considered caused by influences in the vicinity of the station or changes in ambient conditions and not related to the Project.

4. EM&A REQUIREMENTS – 24-HR WATER QUALITY MONITORING

4.1 Monitoring Parameters

4.1.1 Dissolved oxygen, temperature and turbidity are recorded every 5 minutes, 24 hours a day 7 days a week during dredging works.

4.1.2 In-situ NH_3-N at WSD Flushing Water Intake is measured every 20 minutes, 24 hours a day 7 days a week during works.

4.1.3 The water quality parameters measured at particular locations are shown in **Table 4.1**.

Table 4-1 24-hr Water Quality Monitoring Parameters

ID	Description	Parameters				
		Temperature	Turbidity	DO (mg/L)	DO%	NH_3-N
SR4	Tsuen Wan, WSD Flushing Water Intake	O	O	O	O	O
SR5	Ma Wan, Fish Culture Zone	O	O	O	O	
SR9	Cheung Sha Wan, Fish Culture Zone	O	O	O	O	
SR10	Lo Tik Wan, Fish Culture Zone	O	O	O	O	
SR11	Sok Kwu Wan, Fish Culture Zone	O	O	O	O	
SR12	Tsing Yi, WSD Flushing Water Intake	O	O	O	O	O
SR13	EMSD Cooling Water Intake for Kwai Chung Hospital	O	O	O	O	

4.2 Monitoring Locations

4.2.1 As shown in Table 4.1, the 24 hours water quality monitoring works are performed at SR4, SR5, SR9, SR10, SR11, SR12 and SR13.

4.2.2 Revisions on monitoring locations were proposed in previous submission (MateriaLab Report No. Ref: 0394/13/ED/0103 – WATER QUALITY MONITORING LOCATION) and were agreed among AFCD, EMSD, WSD and EPD.

4.3 Results and Observations

4.3.1 24-hr water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. Monitoring result graphical presentations are provided in **Appendix E**.

4.3.2 During the reporting period, some adverse weather conditions, including Rainstorm Warnings and Thunderstorm Warning, were also reported. Heavy marine traffic (not associated with the Project) was also commonly observed nearby the Project site and its vicinity, that the propeller wash from vessels could lead to potential disturbance of seabed sediment and affect the water

quality. The above conditions may affect monitoring results. Furthermore, the fish culturing or other activities occurring on the fish rack may cause adverse impact on the receiving water.

4.3.3 Exceedance was recorded for turbidity. Number of exceedances recorded in the reporting period at each impact station is summarized in Table 4.2.

Table 4-2 Summary of Water Quality Exceedance (24-hr Monitoring)

Station	Exceedance Level	Turbidity	DO	NH_3-N	Total
SR4	Action	0	0	0	0
	Limit	0	0	0	0
SR5	Action	0	0	-	0
	Limit	0	0	-	0
SR9	Action	0	0	-	0
	Limit	0	0	-	0
SR10	Action	0	1	-	1
	Limit	0	0	-	0
SR11	Action	0	0	-	0
	Limit	0	0	-	0
SR12	Action	0	0	0	0
	Limit	0	0	0	0
SR13	Action	0	0	-	0
	Limit	0	0	-	0
Total	Action	0	1	0	1
	Limit	0	0	0	0

4.3.4 1 AL exceedance for DO was recorded in the reporting quarter.

4.3.5 According to the investigations, the exceedance was considered caused by influences in the vicinity of the station or changes in ambient conditions and not related to the Project.

5. ENVIRONMENTAL SITE INSPECTION AND AUDIT

5.1 Site Inspections

5.1.1 The Environmental Team conducted 14 site inspections in the reporting period.

5.1.2 The Environmental Team conducted 14 site inspections in the reporting period. The Contractor was reminded to remove stagnant water in the top surface of the container and the drip tray, to store the general refuse in enclosed bin and to store the chemical containers properly with clear labeling. Also general house keeping such as weeding shall be implemented in the two side of drainage area in Portion F.

5.1.3 According to Contractor, no archaeological deposit was found during reporting period.

5.2 Implementation Status of Environmental Mitigation Measures

5.2.1 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in **Appendix F**. Most of the necessary mitigation measures were implemented properly.

5.2.2 The mitigation measures recommended in the EIA report and required by the EP are considered effective in minimizing environmental impacts. The Contractor has implemented the recommended mitigation measures except those mitigation measures not applicable at this stage. The Contractor should be reminded to keep the mitigation measures implemented effectively, especially the installation and maintenance of silt screen and silt curtain, and to maintain good condition of hopper barge and grab dredger to ensure their intended effects are fully achieved.

5.3 Summary of Action taken

5.3.1 The exceedances recorded were considered not related to the Project, follow-up actions are not required.

5.4 Advice on the Solid and Liquid Waste Management Status

5.4.1 According to the Contractor, 30m^3 general refuse were generated and disposed of in the reporting period. Summary of waste flow table is detailed in **Appendix G**.

5.4.2 There was marine sediment (Type 1, Open Sea Disposal and Type 2, Confined Marine Disposal) disposed to East Sha Chau Pit IVc or Va and South of Brothers – CMP1 or CMP2. The details can be referred to the **Table 5-1.**

Table 5-1 Waste Quantities of Dredging Works

Month	Marine Sediment Type	Quantity Generated in this month (m^3)	Cumulative-to-date (m^3)	Disposal / Dumping Ground
August 2015	Type 1 – Open Sea Disposal	36960	1321730	South of Brothers CMP1 or CMP2
	Type 2 – Confined Marine Disposal	21520	320630	South of Brothers CMP1 or CMP2
	Type 3 – Special Treatment / Disposal	0	0	NA
September 2015	Type 1 – Open Sea Disposal	49270	1371000	South of Brothers CMP1 or CMP2
	Type 2 – Confined Marine Disposal	32500	353130	South of Brothers CMP1 or CMP2
	Type 3 – Special Treatment / Disposal	0	0	NA
October 2015	Type 1 – Open Sea Disposal	41200	1412200	South of Brothers CMP1 or CMP2
	Type 2 – Confined Marine Disposal	27550	380680	South of Brothers CMP1 or CMP2
	Type 3 – Special Treatment / Disposal	0	0	NA

5.5 Review of Action and Limit Level

5.5.1 Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015. The Action and Limit Level is given in **Appendix C**.

5.6 Quarterly Review of Constructional Impacts on Water Quality

5.6.1 The construction impact on water quality was assessed by comparing the quarterly mean values with the relevant ambient or baseline mean values. Results showed that the quarterly mean values of DO (B) and TSS at all clusters of monitoring stations, and TIN (in-situ) at cluster 2 stations were below the 1.3 x baseline (higher than 0.7 x baseline for DO) value.

Cluster stations with higher quarterly impact data are statistically compared to 1.3 x baseline levels or other relevant levels to assess the constructional impacts.

5.6.2 Quarterly means of cluster 1 station of TIN (In-situ) and TIN (Lab) and cluster 2 stations of TIN (Lab) are compared to 1.3 x baseline data respectively. Results show the quarterly mean of cluster 1 of TIN (In-situ) is not significantly different than the 1.3 x baseline level ($p>0.05$), indicating that project impact is not significant. While the quarterly mean of cluster 1 TIN (Lab) and cluster 2 TIN (Lab) are significantly greater than the 1.3 x baseline level ($p<0.05$). As TIN is not detected at Control stations, quarterly mean of impact station is further compared to the quarterly mean of gradient stations (G2, G3 and G4 are gradient stations in vicinity of cluster 1 stations; G1 is the most upstream location at the gradient station among all impact stations at ebb tide, thus is used to compare to cluster 2 stations). Data from ebb tide are compared for cluster 2 while data from flood tide are compared for cluster 1 as according to their relative position to the Project (data analysed for relative tide where clustered monitoring stations situate at downstream position and may be subject to project impact, reference made to Figure 3.). For cluster 1, at flood tide, results show TIN (Lab) of gradient station (G2, G3 & G4) is significantly smaller from that of the impact station (SR5) ($p<0.05$), indicating the trend is not increasing towards the project area and project impact is not significant. For cluster 2, at ebb tide, results show TIN (Lab) of impact station (SR9, SR10 & SR11) is significantly smaller from that of the gradient station G1 (the most upstream location at the gradient station) ($p<0.05$), indicating background TIN level is high, and Project impact is not significant. The summary of key statistical analysis is provided in Table 5.3. Details of key statistical analysis results are provided in **Appendix H**.

5.6.3 As 24-hr monitoring is to supplement the routine WQM activities (EM&A Manual Section 2.1.10) and there is no baseline value and/or control / gradient value for a meaningful statistical analysis. Thus no statistical analysis was done for 24-hr monitoring. Also, statistical analysis was not performed for some parameters without exceendances (DO (S&M) and Turbidity, NH_3-N for both in-situ and lab results, UIA for both in-situ and lab results, *E.coli*, BOD_5 and Synthetic Detergent) in the reporting quarter.

Table 5-2 Comparison of Quarterly Mean to Baseline Mean

		DO (B)						TIN (In-situ)					
		Baseline	Baseline x 0.7	Average	Aug - Oct 2015	Average	Smaller than Baseline x 0.7	Wet Season Baseline	Baseline x 1.3	Average	Aug - Oct 2015	Average	Larger than Baseline x 1.3
Control (Flood)	C1	6.32	4.42	NA	4.99	NA	no	NA	NA	NA	NA	NA	NA
	C2	7.31	5.12		4.81		yes						
	C3	6.89	4.82		4.96		no						
Control (Ebb)	C1	6.32	4.42	NA	4.96	NA	no	NA	NA	NA	NA	NA	NA
	C2	7.23	5.06		4.73		yes						
	C3	6.94	4.86		4.93		no						
Gradient (Flood)	G1	6.37	4.46	NA	5.02	NA	no	0.59	0.77	NA	0.75	NA	yes
	G2	6.34	4.44		5.42		no	0.56	0.73		0.70		yes
	G3	6.34	4.44		4.71		no	0.44	0.57		0.45		yes
	G4	5.83	4.08	NA	4.67	NA	no	0.69	0.90		0.48		no
	G5	7.61	5.33		4.73		yes	0.38	0.49		0.48		yes
	G6	7.00	4.90		4.92		no	0.23	0.30		0.39		yes
Gradient (Ebb)	G1	6.33	4.43	NA	5.00	NA	no	0.57	0.74	NA	0.76	NA	yes
	G2	6.35	4.45		5.49		no	0.48	0.62		0.67		yes
	G3	6.50	4.55		4.72		no	0.37	0.48		0.46		yes
	G4	6.00	4.20	NA	4.71	NA	no	0.66	0.85		0.50		no
	G5	7.71	5.40		4.69		yes	0.30	0.39		0.47		yes
	G6	7.09	4.96		4.95		yes	0.24	0.31		0.39		yes
Cluster 1 (Flood)	SR1	4.70	3.29	3.28	6.01	5.69	no	NA	NA	0.64	NA	0.75	yes
	SR2	4.46	3.12		5.62			NA	NA		NA		
	SR3	4.97	3.48		5.65			NA	NA		NA		
	SR4	4.85	3.40		5.92			NA	NA		NA		
	SR5	4.42	3.09		5.62			0.49	0.64		0.75		
	SR12	4.72	3.30		5.29			NA	NA		NA		
Cluster 1 (Ebb)	SR1	4.65	3.26	3.27	6.02	5.57	no	NA	NA	0.67	NA	0.74	yes
	SR2	4.45	3.12		5.56			NA	NA		NA		
	SR3	5.01	3.51		5.61			NA	NA		NA		
	SR4	4.73	3.31		5.61			NA	NA		NA		
	SR5	4.46	3.12		5.64			0.52	0.67		0.74		
	SR12	4.74	3.32		4.98			NA	NA		NA		
Cluster 2 (Flood)	SR6	5.48	3.84	3.79	4.85	5.22	no	NA	NA	0.35	NA	0.35	no
	SR7	4.75	3.33		5.14			NA	NA		NA		
	SR8	5.08	3.56		5.32			NA	NA		NA		
	SR9	7.05	4.94		5.08			0.33	0.43		0.45		
	SR10	5.01	3.51		5.50			0.24	0.31		0.32		
	SR11	5.07	3.55		5.45			0.23	0.30		0.27		
Cluster 2 (Ebb)	SR6	5.43	3.80	3.77	4.83	5.20	no	NA	NA	0.35	NA	0.34	no
	SR7	4.76	3.33		5.14			NA	NA		NA		
	SR8	5.04	3.53		5.28			NA	NA		NA		
	SR9	6.98	4.89		5.06			0.34	0.44		0.44		
	SR10	5.01	3.51		5.52			0.24	0.31		0.31		
	SR11	5.08	3.56		5.37			0.23	0.30		0.28		
Cluster 3 (Flood)	SR13	4.02	2.81	2.81	5.02	5.02	no	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	4.01	2.81	2.81	5.03	5.03	no	NA	NA	NA	NA	NA	NA

NA: Not Applicable

- Control and Gradient stations are compared on individual stations for reference, no clustering analysis was performed. Impact stations are compared in clusters of stations, or
- Parameter is not monitored at the station.
- With reference to Review of Action and Limit Levels (0394/13/ED/0175C), the baseline results of DO (S&M) and DO (B) in stations of Cluster 1, Cluster 2 and Cluster 3 in dry season are multiplying the relevant wet/dry season ratio to obtain the wet season baseline values.

		TSS						TIN (Lab)					
		Baseline	1.3 x Baseline	Average	Aug - Oct 2015	Average	Larger than Baseline x 1.3	Wet Season Baseline	1.3 x Baseline	Average	Aug - Oct 2015	Average	Larger than Baseline x 1.3
Control (Flood)	C1	7	9	NA	7	NA	no	NA	NA	NA	NA	NA	NA
	C2	4	6		4		no						
	C3	4	5		4		no						
Control (Ebb)	C1	6	7	NA	8	NA	yes	NA	NA	NA	NA	NA	NA
	C2	5	7		5		no						
	C3	4	5		4		no						
Gradient (Flood)	G1	7	10	NA	7	NA	no	0.42	0.55	NA	0.76	NA	yes
	G2	5	7		5		no	0.39	0.51		0.70		yes
	G3	6	8		4		no	0.31	0.40		0.45		yes
	G4	8	10		5		no	0.43	0.56		0.49		yes
	G5	6	8		6		no	0.22	0.29		0.48		yes
	G6	4	5		4		no	0.14	0.18		0.38		yes
Gradient (Ebb)	G1	5	7	NA	7	NA	no	0.40	0.52	NA	0.76	NA	yes
	G2	5	7		5		no	0.36	0.47		0.67		yes
	G3	5	7		4		no	0.26	0.34		0.45		yes
	G4	7	9		5		no	0.42	0.55		0.49		yes
	G5	5	7		6		no	0.20	0.26		0.47		yes
	G6	4	5		4		no	0.14	0.18		0.38		yes
Cluster 1 (Flood)	SR1	7	9	8.67	6	5.33	no	NA	NA	0.48	NA	0.76	yes
	SR2	5	7		5			NA	NA		NA		
	SR3	5	7		5			NA	NA		NA		
	SR4	7	9		5			NA	NA		NA		
	SR5	6	8		5			0.37	0.48		0.76		
	SR12	9	12		6			NA	NA		NA		
Cluster 1 (Ebb)	SR1	7	9	7.33	6	5.67	no	NA	NA	0.46	NA	0.75	yes
	SR2	5	7		6			NA	NA		NA		
	SR3	5	6		6			NA	NA		NA		
	SR4	5	7		4			NA	NA		NA		
	SR5	5	6		6			0.35	0.46		0.75		
	SR12	7	9		6			NA	NA		NA		
Cluster 2 (Flood)	SR6	5	6	6.17	5	4.17	no	NA	NA	0.20	NA	0.34	yes
	SR7	6	8		4			NA	NA		NA		
	SR8	4	5		4			NA	NA		NA		
	SR9	5	7		5			0.19	0.25		0.45		
	SR10	5	7		4			0.14	0.18		0.31		
	SR11	3	4		3			0.14	0.18		0.26		
Cluster 2 (Ebb)	SR6	4	6	5.83	5	4.33	no	NA	NA	0.20	NA	0.34	yes
	SR7	6	8		4			NA	NA		NA		
	SR8	4	5		4			NA	NA		NA		
	SR9	4	6		5			0.19	0.25		0.45		
	SR10	4	5		4			0.13	0.17		0.31		
	SR11	4	5		4			0.13	0.17		0.26		
Cluster 3 (Flood)	SR13	16	21	21.00	6	6.00	no	NA	NA	NA	NA	NA	NA
Cluster 3 (Ebb)	SR13	10	14	14.00	5	5.00	no	NA	NA	NA	NA	NA	NA

NA: Not Applicable

- Control and Gradient stations are compared on individual stations for reference, no clustering analysis was performed. Impact stations are compared in clusters of stations, or
- Parameter is not monitored at the station.

Table 5-3 Summary of Statistical Analysis

Parameter	Cluster	Compared against	Results and Conclusions
TIN (In-situ)	Cluster 1	Quarterly Mean at Impact Stations (Flood tide) against 1.3 x Baseline Level (Flood tide)	Quarterly mean (Flood tide) is not significantly different than 1.3 x Baseline mean (Flood tide) ($p>0.05$), meaning Project impact is not significant
TIN (Lab)	Cluster 1	Quarterly Mean at Impact Stations (Flood tide) against 1.3 x Baseline Level (Flood tide) Quarterly Mean at Impact Stations (Flood tide) against Quarterly Mean at Gradient Stations (Flood tide)	Quarterly mean (Flood tide) is significantly higher than 1.3 x Baseline mean (Flood tide) ($p<0.05$). Gradient Mean (Flood tide) is significantly smaller than Impact Mean (Flood tide) ($p<0.05$), meaning the trend is not increasing towards the project area, and Project impact is not significant
	Cluster 2	Quarterly Mean at Impact Stations (Ebb tide) against 1.3 x Baseline Level (Ebb tide) Quarterly Mean at Impact Stations (Ebb tide) against Upstream Gradient Station (Ebb tide)	Quarterly mean (Ebb tide) is significantly higher than 1.3 x Baseline mean (Ebb tide) ($p<0.05$). Impact Mean (Ebb tide) is significantly smaller than Upstream Gradient (G1) Mean (Ebb tide) ($p<0.05$), indicating background TIN level is high, and Project impact is not significant

5.6.4 Exceedance are considered to be due to change in ambient conditions or influences in the vicinity of the stations. Mitigation measures for dredging works were implemented in accordance with EP and EIA requirements.

6. NON-COMPLIANCE, COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTION

6.1.1 In this reporting period, no complaint, inspection notice, notification of summons or prosecution was received. Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Tables 7.1, 7.2 and 7.3**.

Table 6-1 Environmental Complaints Log

Complaint Log No.	Date of Receipt	Received From and Received By	Nature of Complaint	Date Investigated	Outcome	Date of Reply
Nil	-	-	-	-	-	-

Table 6-2 Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Period	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

Table 6-3 Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Prosecutions This Period	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

6.1.2 A leakage incident was reported to occur at around 7:35 am, of 2nd October 2015 at TMTA Grid C045 in Portion C (EP Zone 10). Malfunctioning hydraulic joint of the loading compartment of split hopper barge HH139 (B141479) caused partially open of the compartment and dredged At L sediment (Type I) leaked through the opening at the dredging location. The problem was rectified by mechanics on the board at around 9:00 am. The vessel then resumed normal operation at around 10:00am. Preventive measures were implemented afterwards. Adequate corrective measures shall be implemented by the Contractor to avoid recurrence of such incident. Incident report on the leakage is under review and will be provided in subsequent EM&A report.

7. CONCLUSIONS

7.1.1 The dredging works was commenced on 23 April 2014. The EM&A programme was carried out in accordance with the EM&A Manual requirements. As per the EM&A Manual, water quality impact monitoring was conducted during the dredging works.

7.1.2 During the reporting period, exceedances were record for DO (B), TIN (in-situ & lab) and Suspended Solids in the routine impact monitoring. Exceedance was also recorded in 24-hr monitoring. Investigation found that the exceedances were not project related and were considered caused by influences in the vicinity of the stations or change in ambient conditions.

7.1.3 14 environmental site inspections were carried out weekly in the reporting period.

7.1.4 No environmental complaint was received and followed up by Environmental Team in the reporting period.

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

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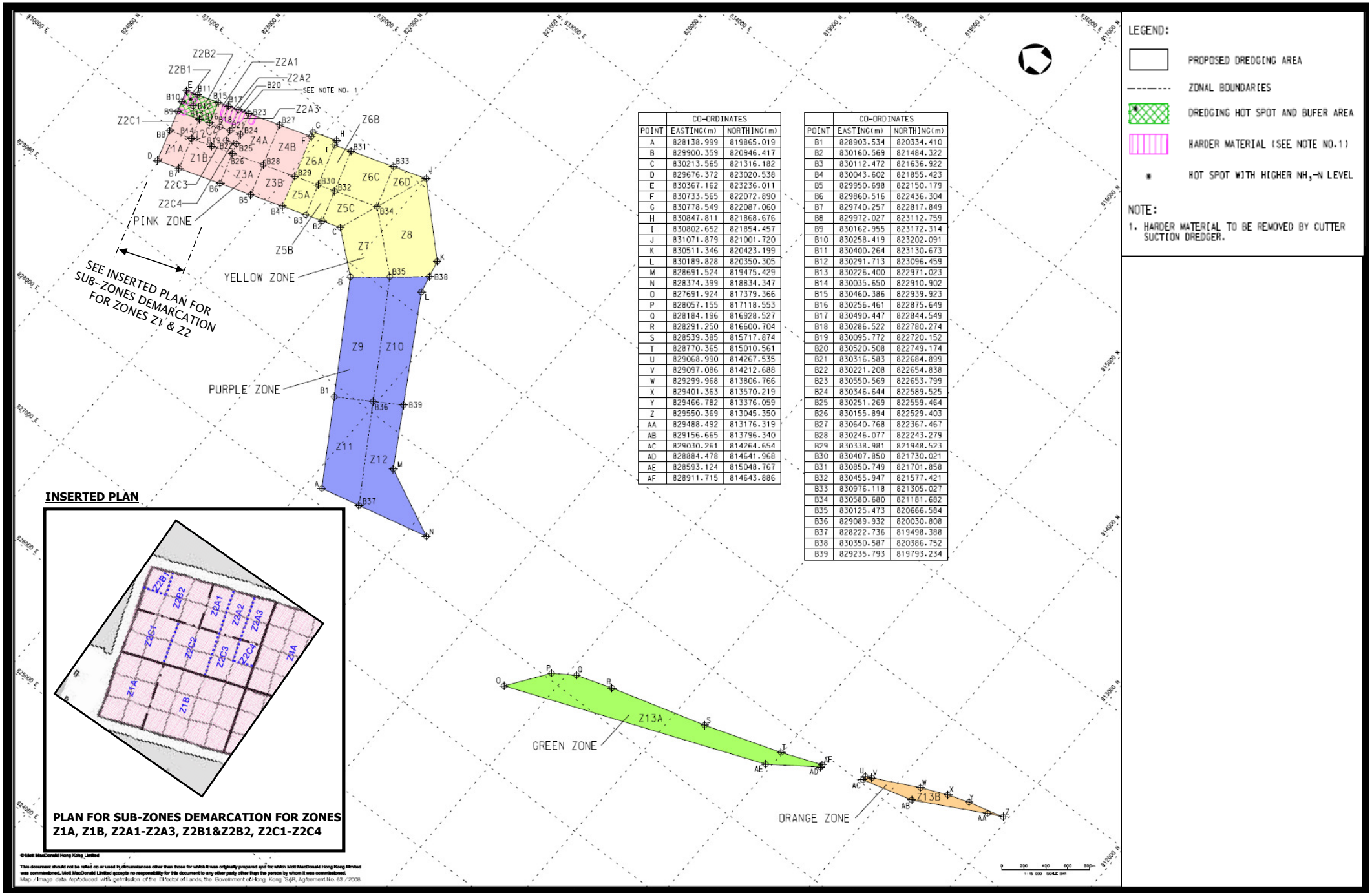
Figure 1

Project General Layout



	CO-ORDINATES	
POINT	EASTING(m)	NORTHING(m)
A	828138.999	819865.019
B	829900.359	820946.417
C	830213.565	821316.182
D	829676.372	823020.538
E	830367.162	823236.011
F	830733.565	822072.890
G	830778.549	822087.060
H	830847.811	821868.676
I	830802.652	821854.457
J	831071.879	821001.720
K	830511.346	820423.199
L	830189.828	820350.305
M	828691.524	819475.429
N	828374.399	818834.347
O	827691.924	817379.366
P	828057.155	817118.553
Q	828184.196	816928.527
R	828291.250	816600.704
S	828539.385	815717.874
T	828770.365	815010.561
U	829068.990	814267.535
V	829097.086	814212.688
W	829299.968	813806.766
X	829401.363	813570.219
Y	829466.782	813376.059
Z	829550.369	813045.350
AA	829488.492	813176.319
AB	829156.665	813796.340
AC	829030.261	814264.654
AD	828884.478	814641.968
AE	828593.124	815048.767
AF	828911.715	814643.886

	CO-ORDINATES	
POINT	EASTING(m)	NORTHING(m)
B1	828903.534	820334.410
B2	830160.569	821484.322
B3	830112.472	821636.922
B4	830043.602	821855.423
B5	829950.698	822150.179
B6	829860.516	822436.304
B7	829740.257	822817.849
B8	829972.027	823112.759
B9	830162.955	823172.314
B10	830258.419	823202.091
B11	830400.264	823130.673
B12	830291.713	823096.459
B13	830226.400	822971.023
B14	830035.650	822910.902
B15	830460.386	822939.923
B16	830256.461	822875.649
B17	830490.447	822844.549
B18	830286.522	822780.274
B19	830095.772	822720.152
B20	830520.508	822749.174
B21	830316.583	822684.899
B22	830221.208	822654.838
B23	830550.569	822653.799
B24	830346.644	822589.525
B25	830251.269	822559.464
B26	830155.894	822529.403
B27	830640.768	822367.467
B28	830246.077	822243.279
B29	830338.981	821948.523
B30	830407.850	821730.021
B31	830850.749	821701.858
B32	830455.947	821577.421
B33	830976.118	821305.027
B34	830580.680	821181.682
B35	830125.473	820666.584
B36	829089.932	820030.808
B37	828222.736	819498.388
B38	830350.587	820386.752
B39	829235.793	819793.234

INSERTED PLAN

PLAN FOR SUB-ZONES DEMARCATION FOR ZONES Z1A, Z1B, Z2A1-Z2A3, Z2B1&Z2B2, Z2C1-Z2C4

Project Title: Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

Figure 2: Zones and Sub-zone of Dredging Plan Layout (Extracted from Figure 2 of Justification for the Proposed Demarcation of the Dredging Zones)

Environmental Permit No.:

EP-426/2011/A

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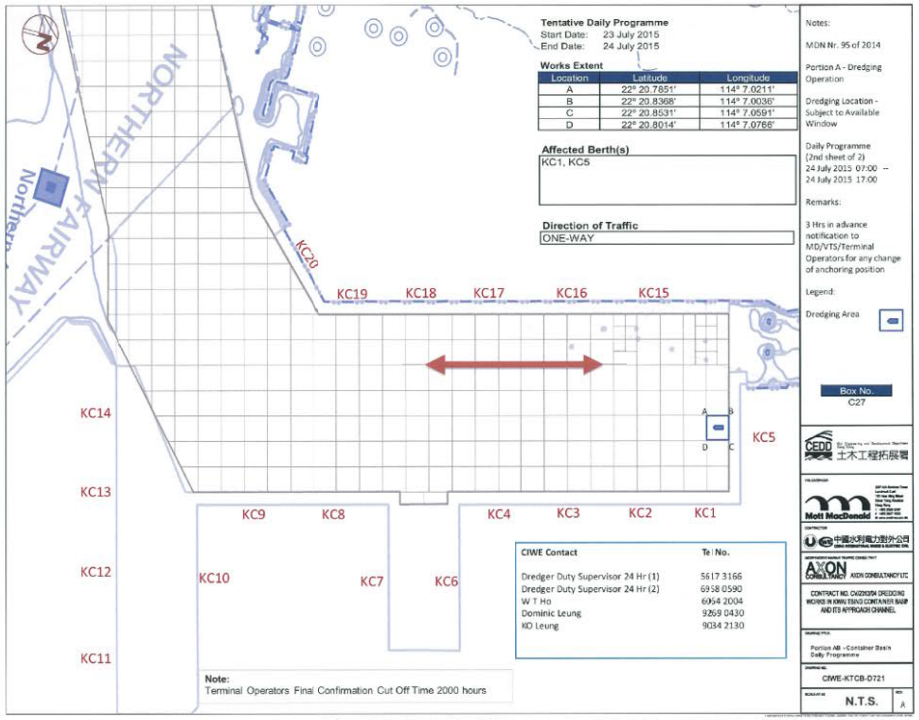
Figure 2

Dredging Work Location during the Reporting Period



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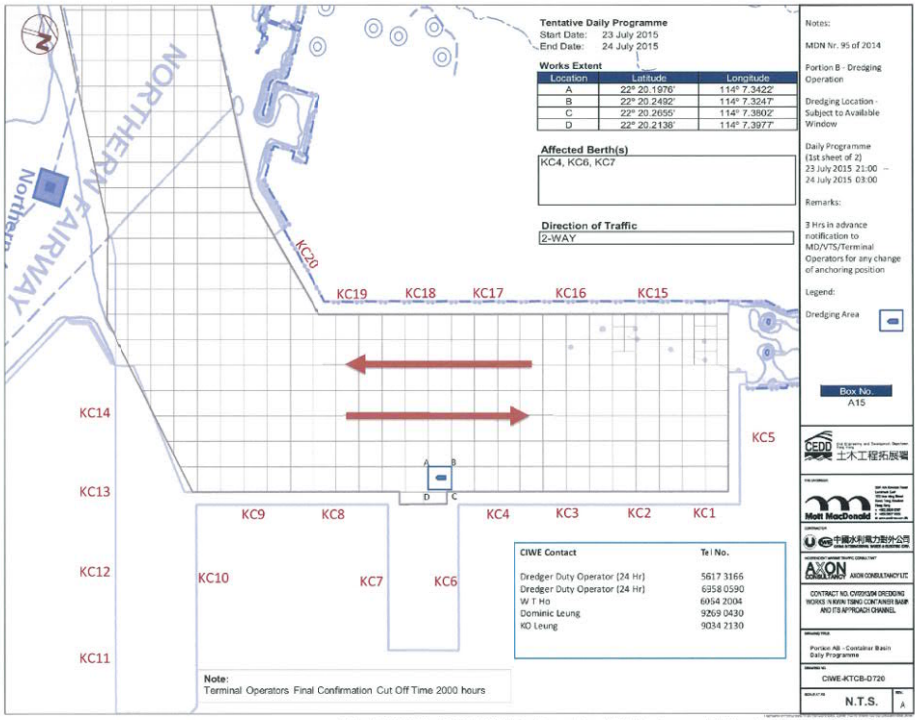

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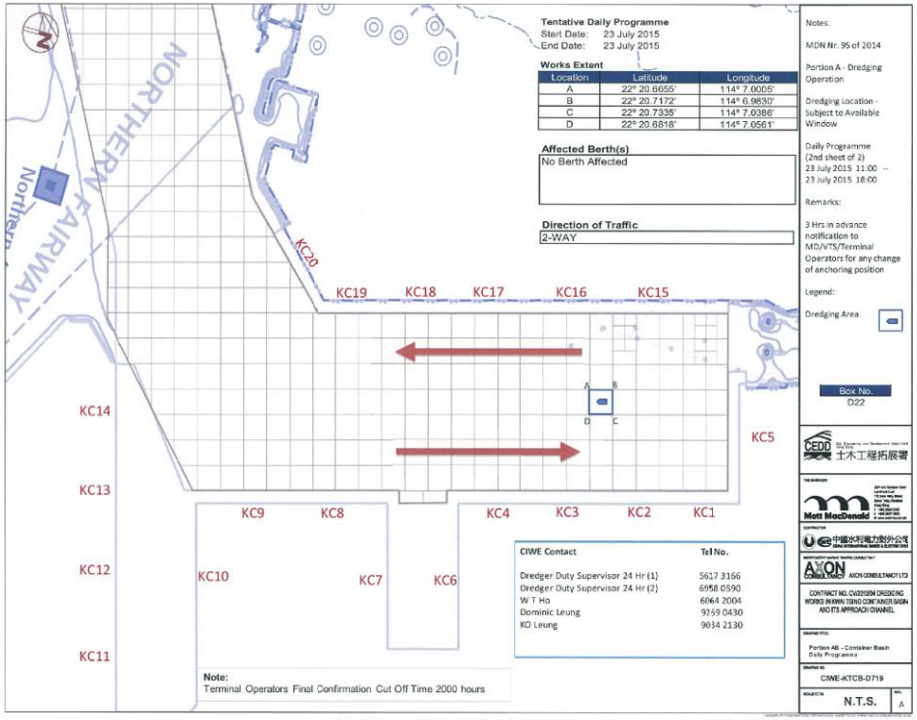

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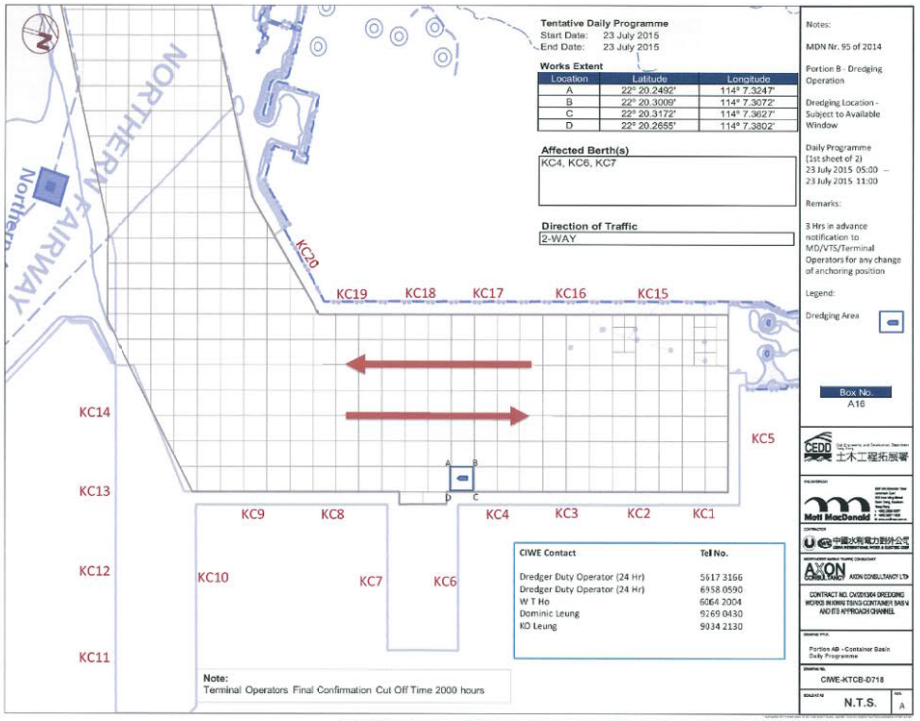

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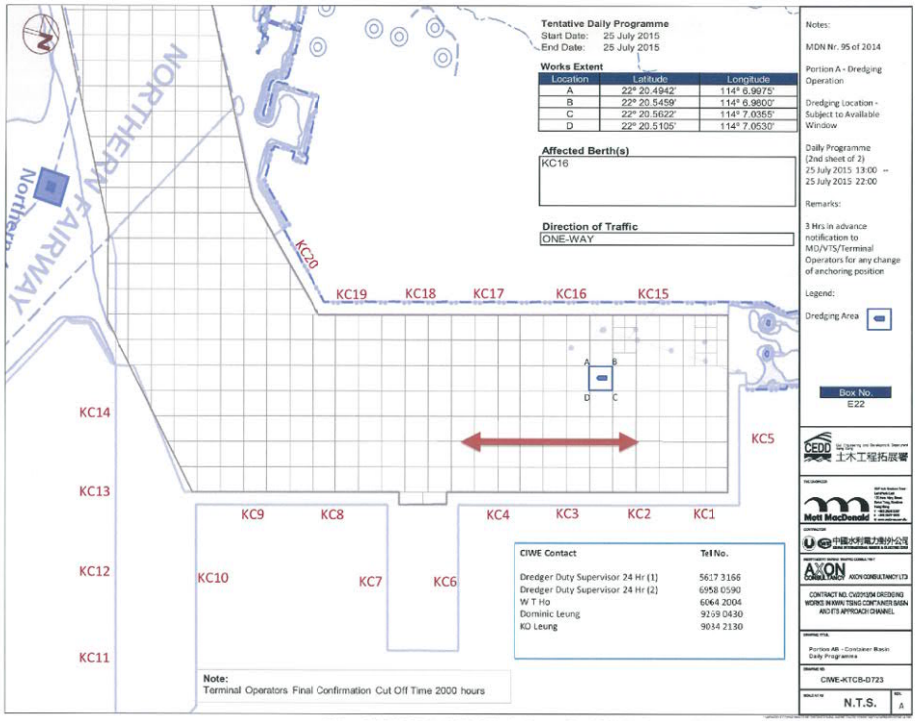

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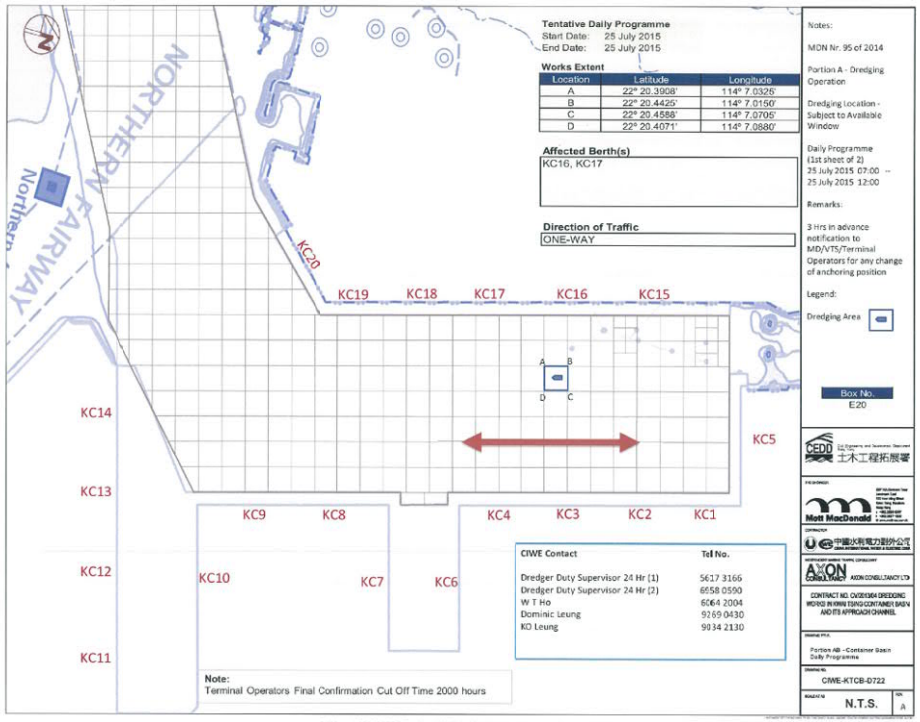

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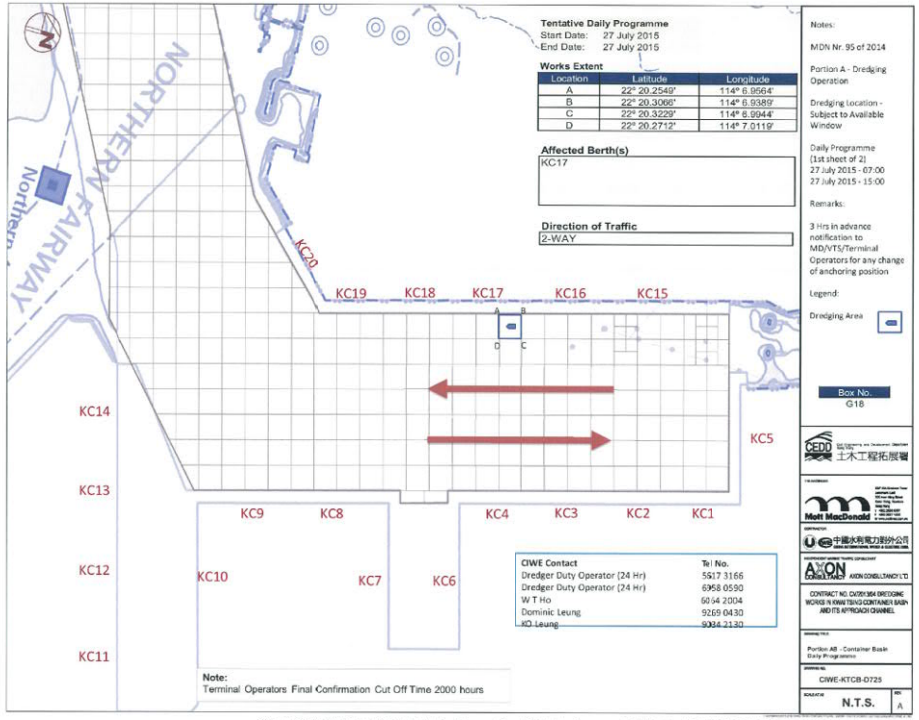

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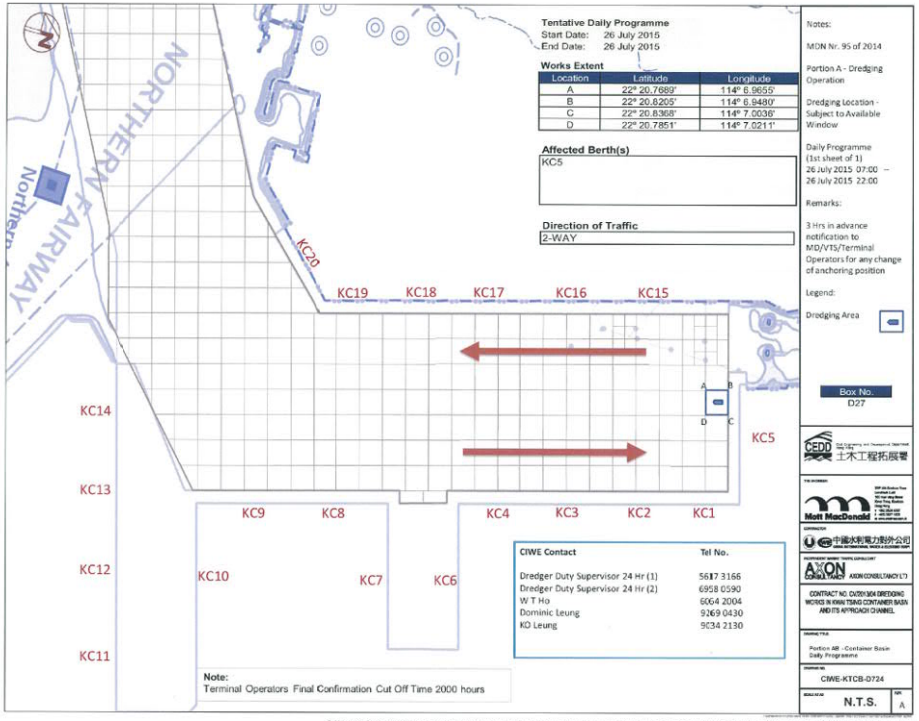

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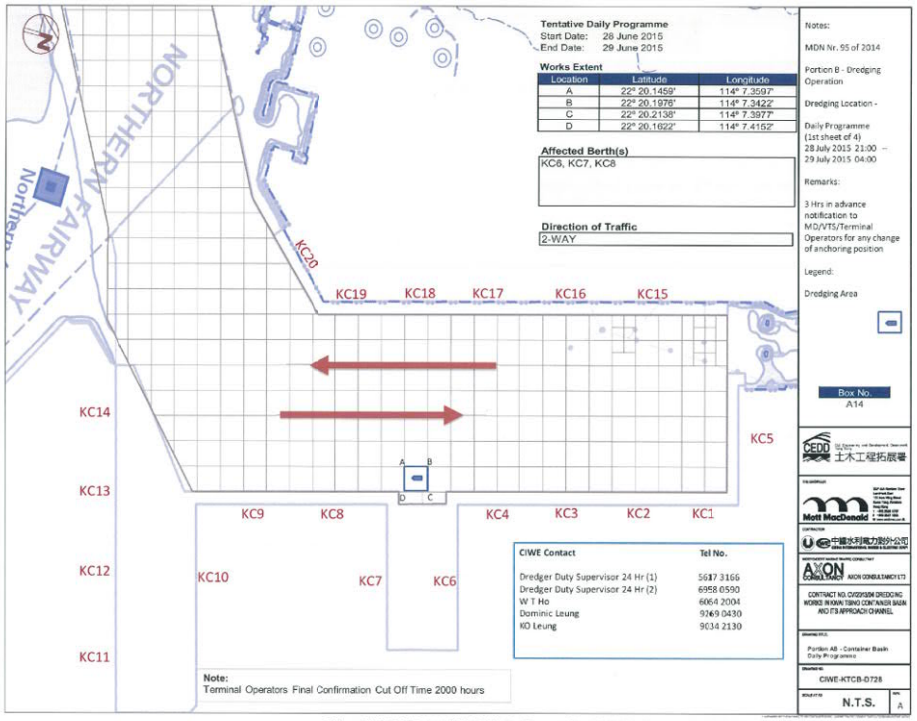

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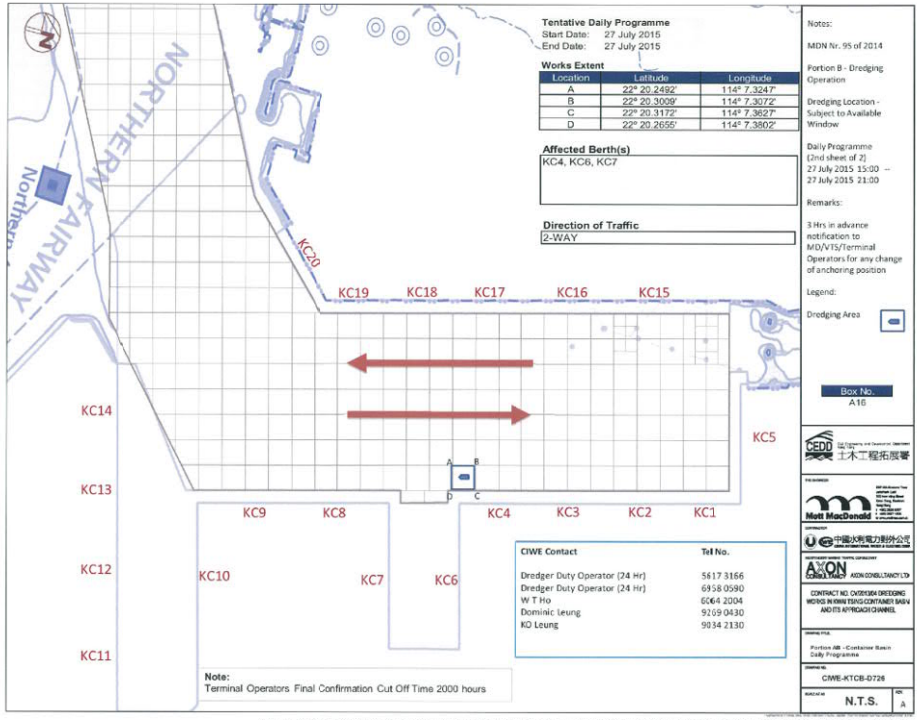

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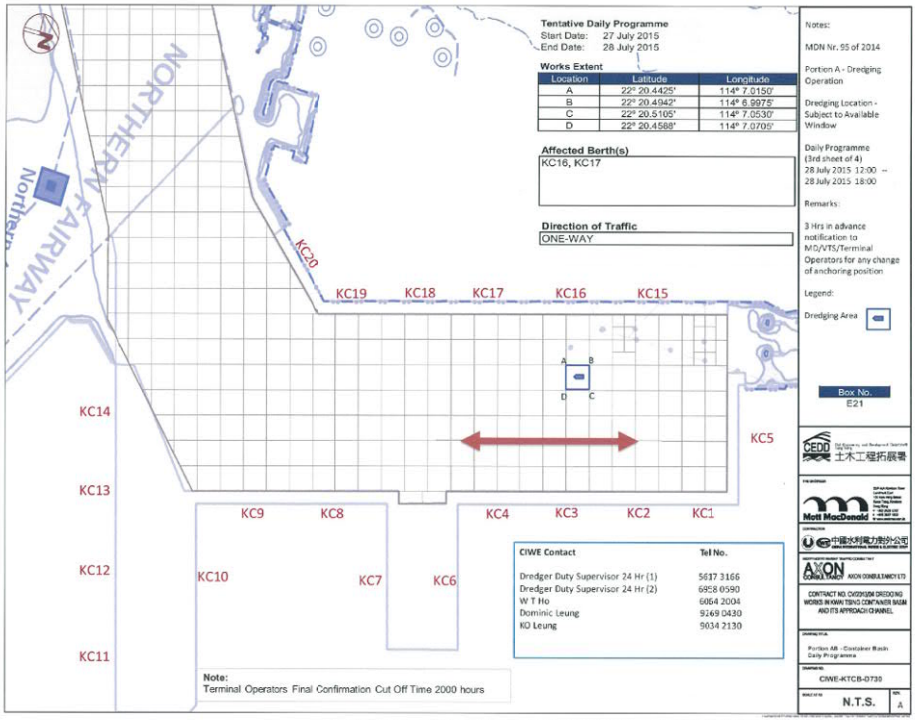

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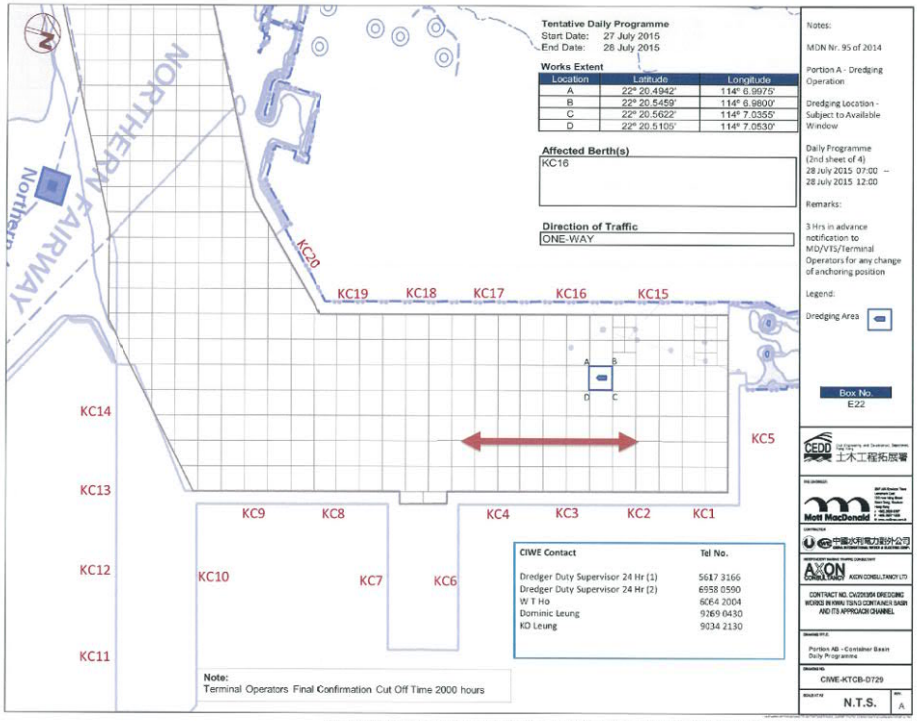

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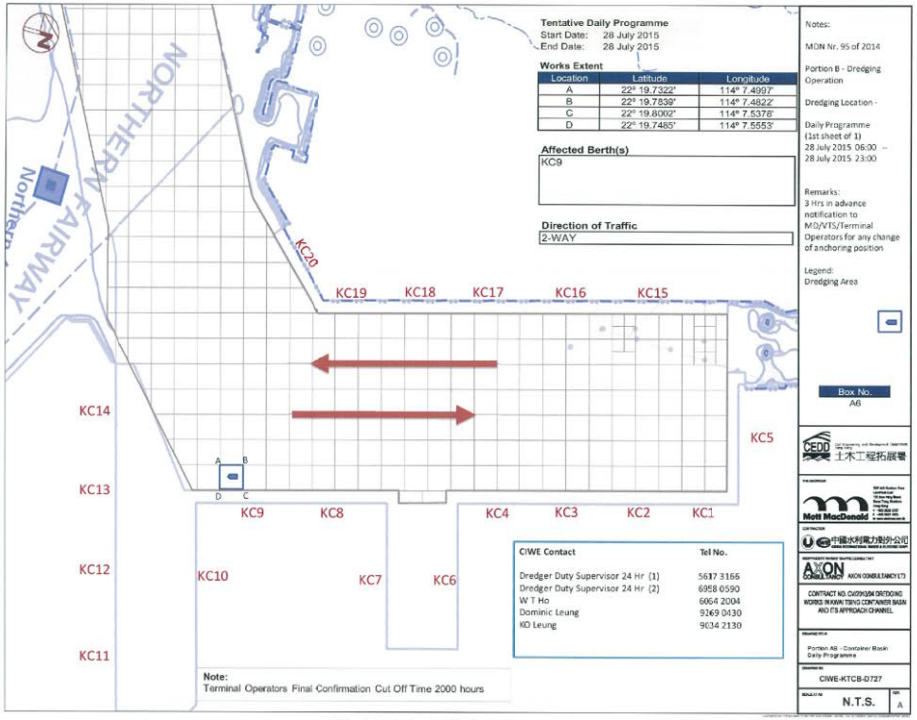

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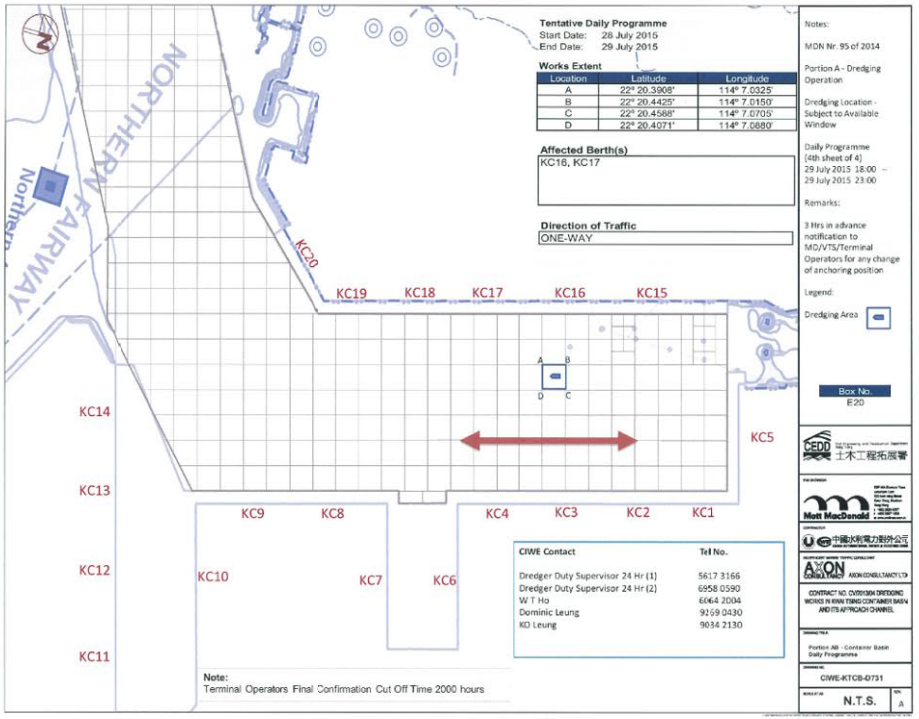

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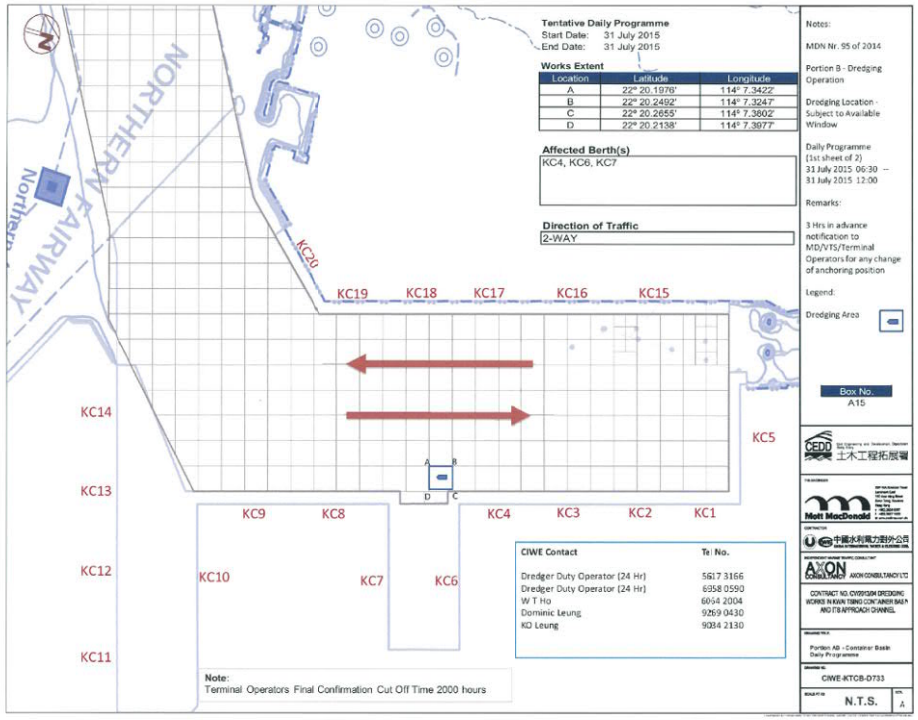

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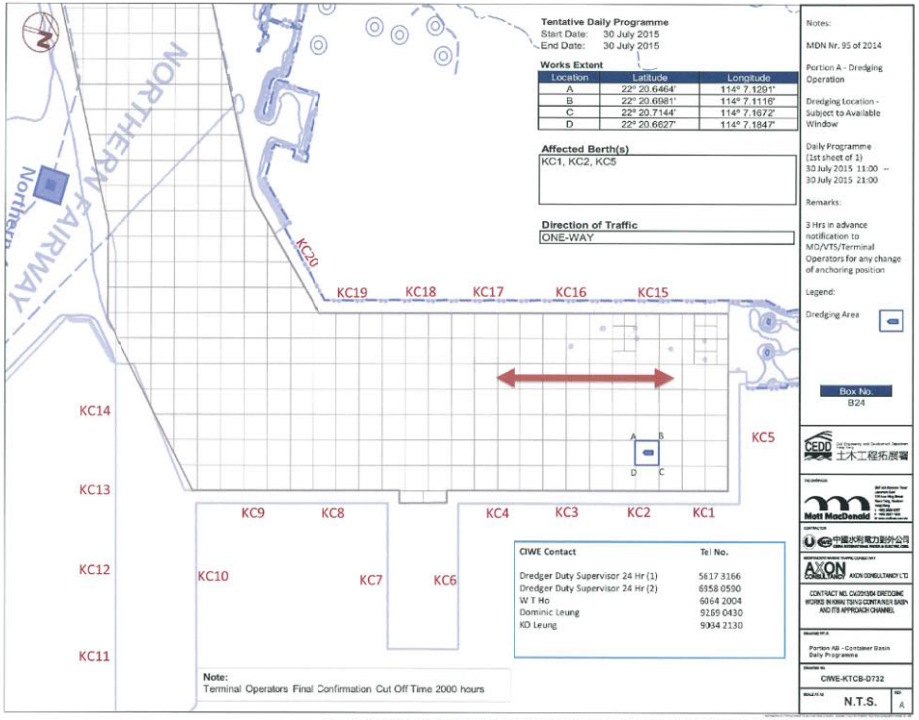

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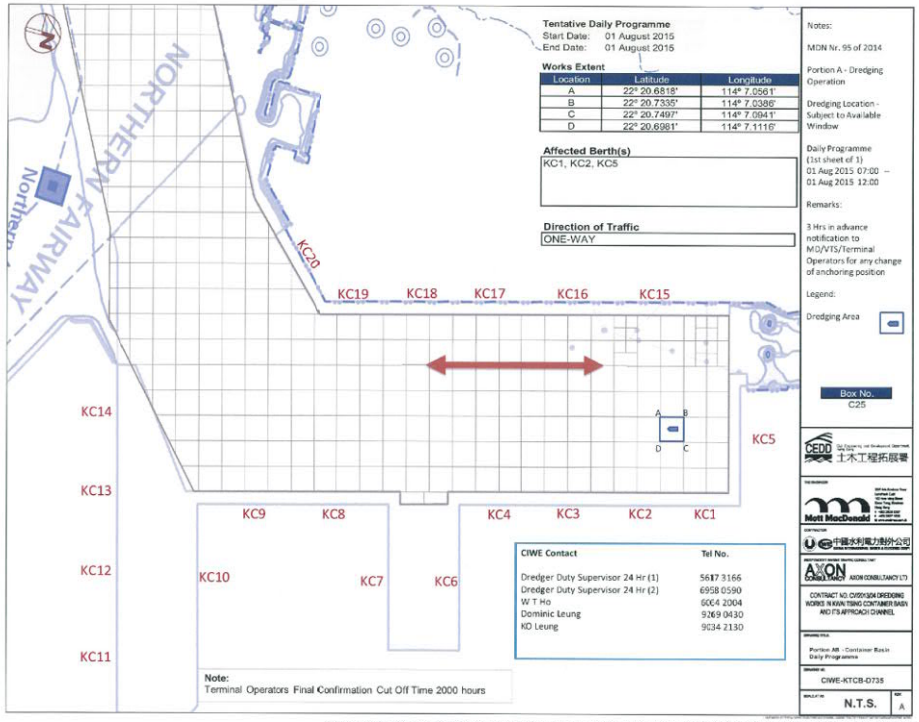

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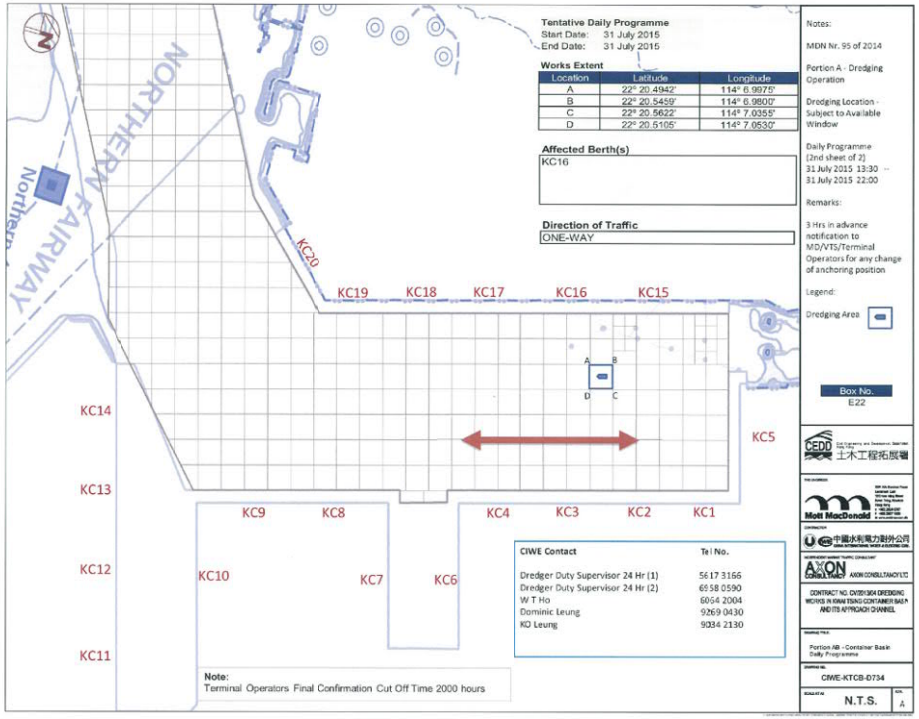

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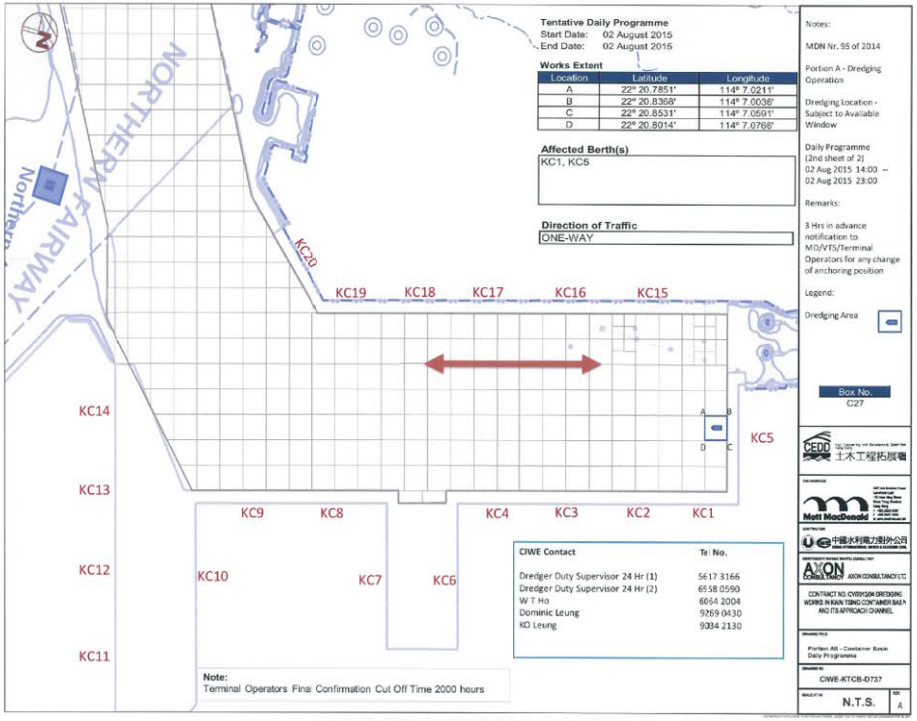

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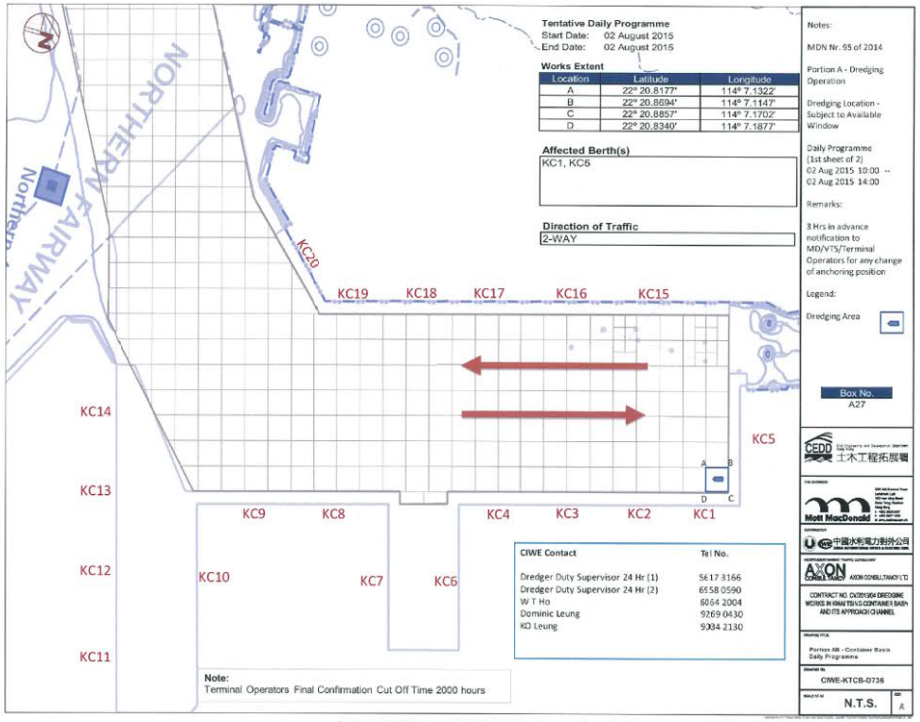

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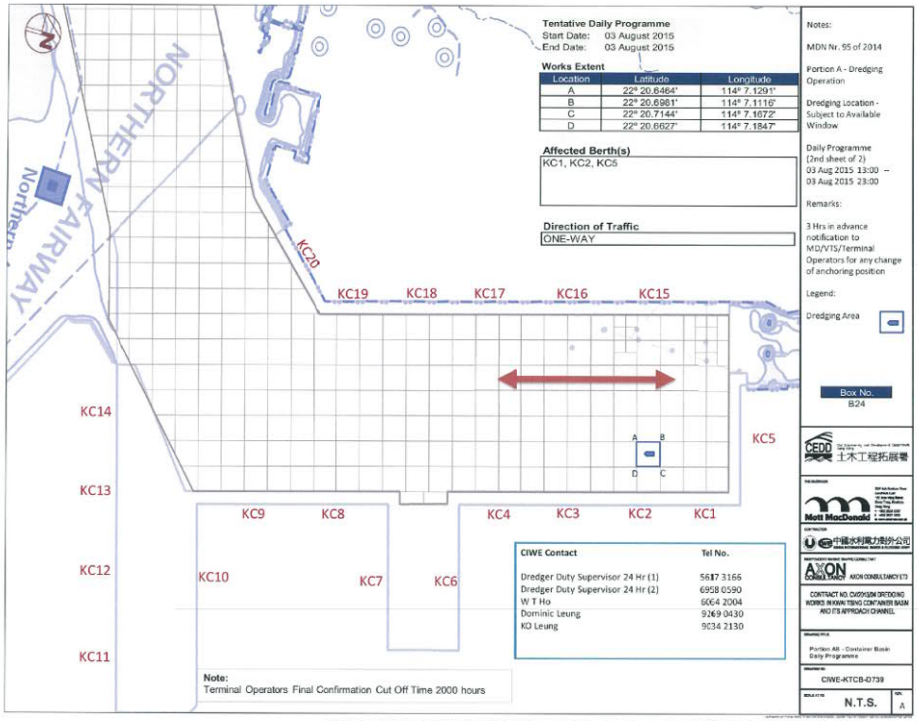

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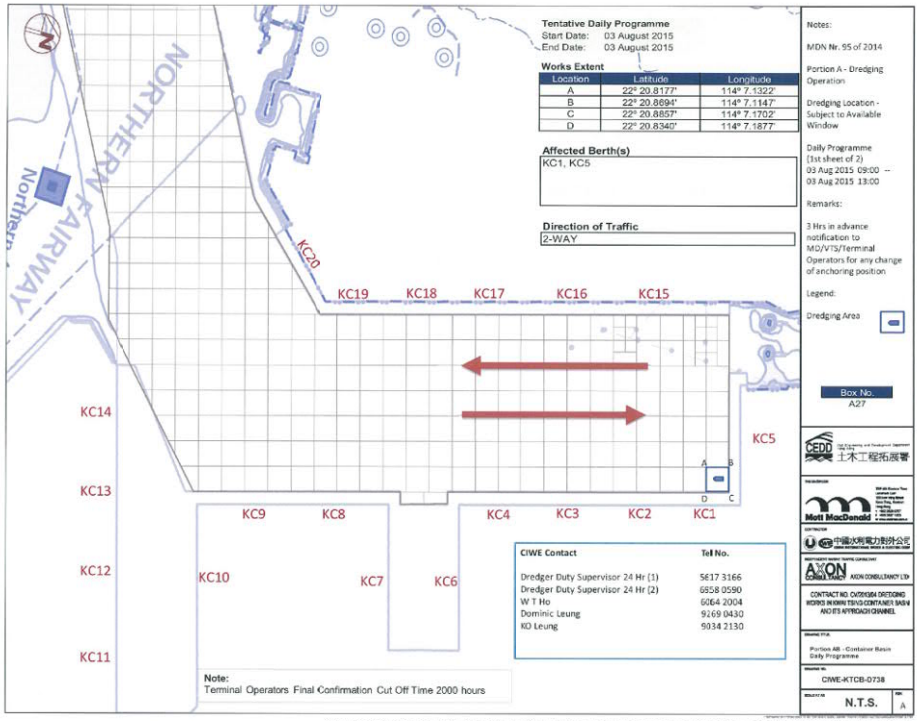

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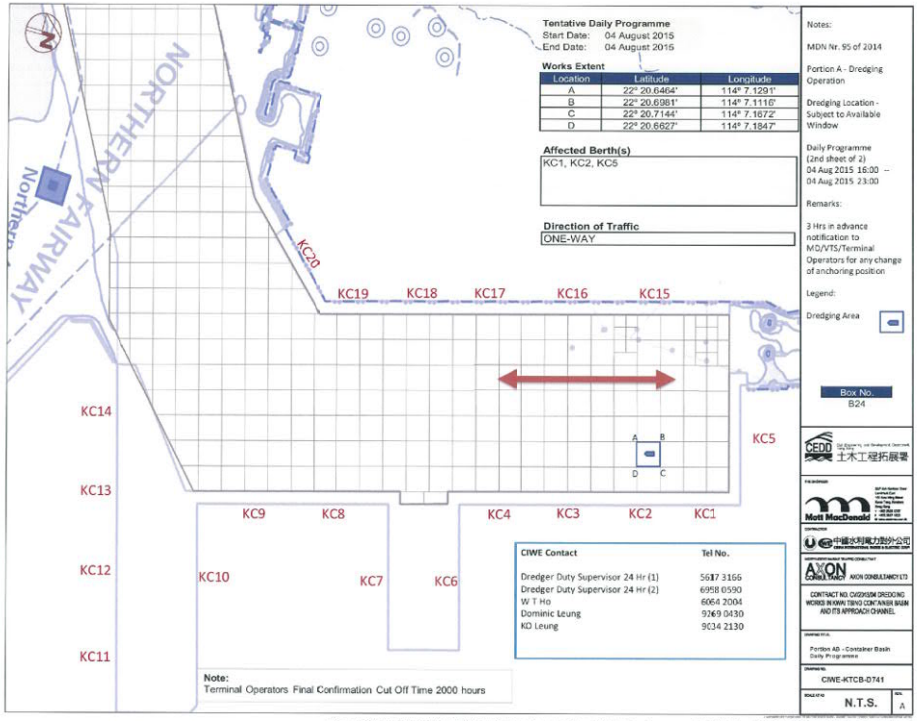

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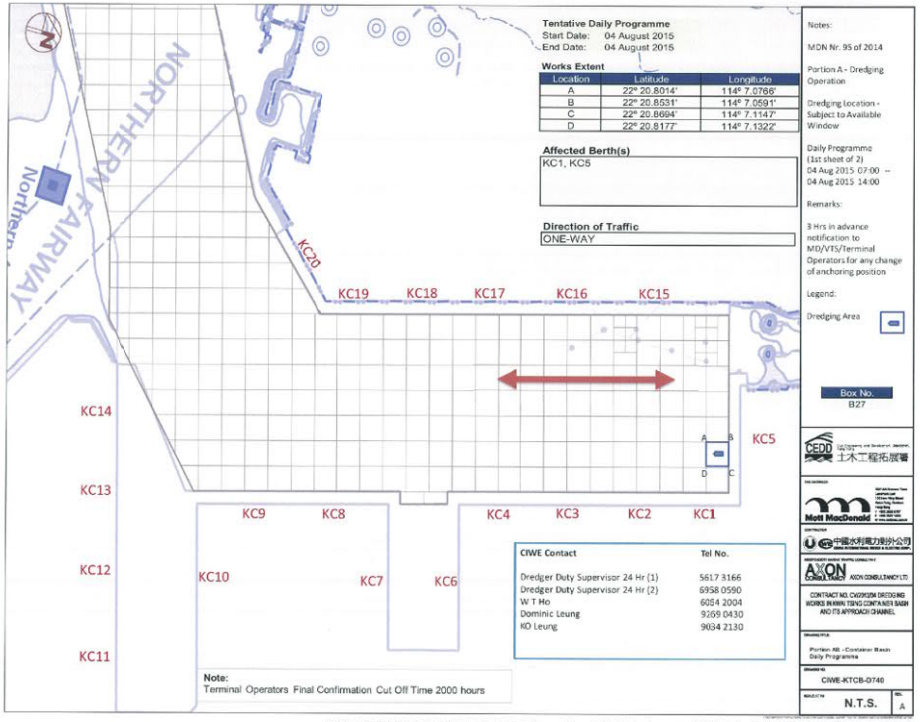

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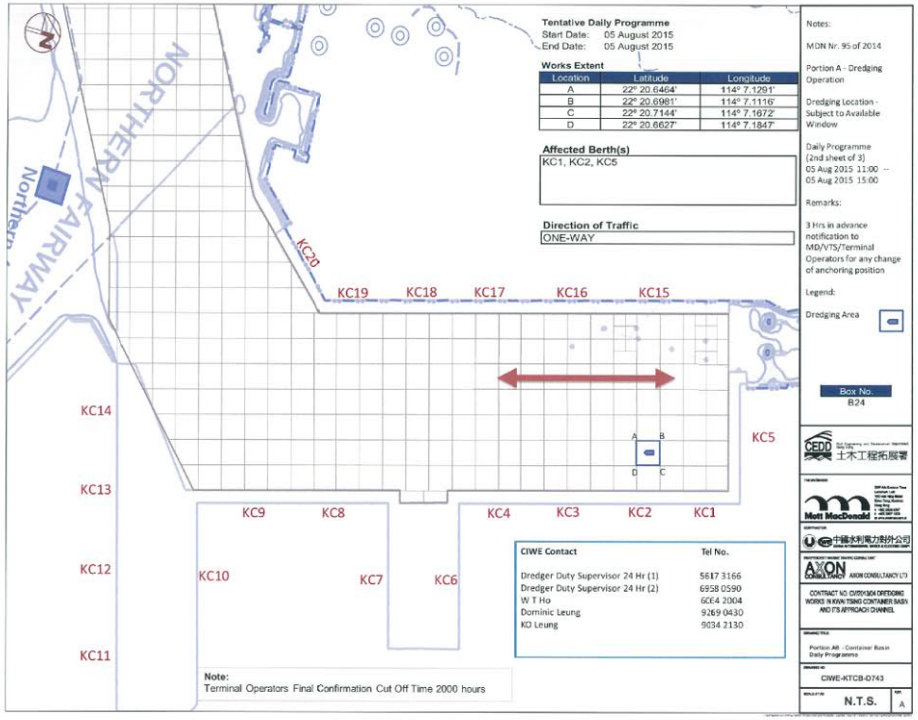

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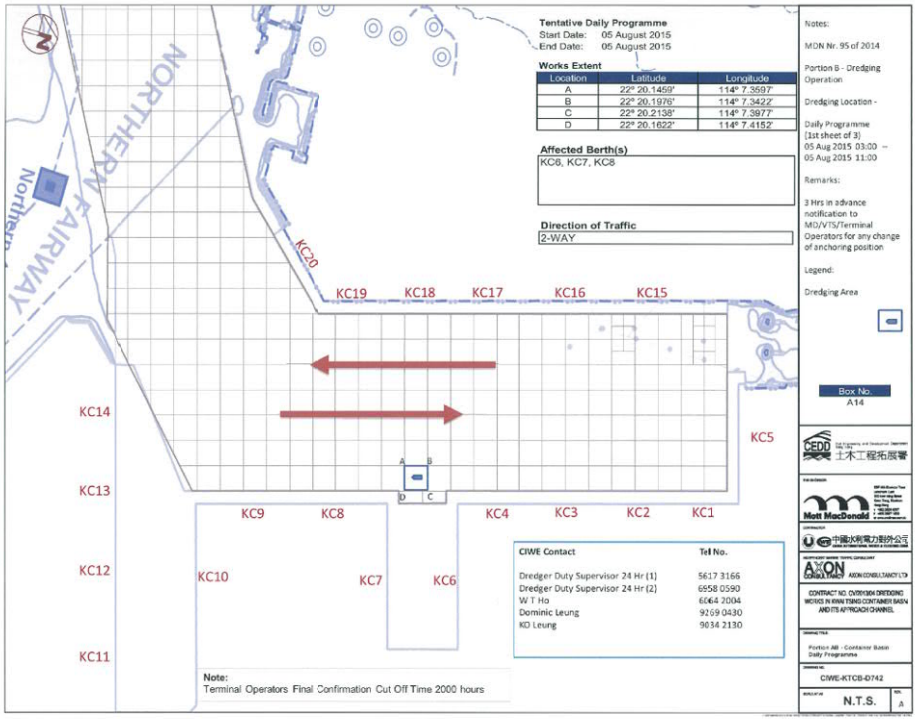

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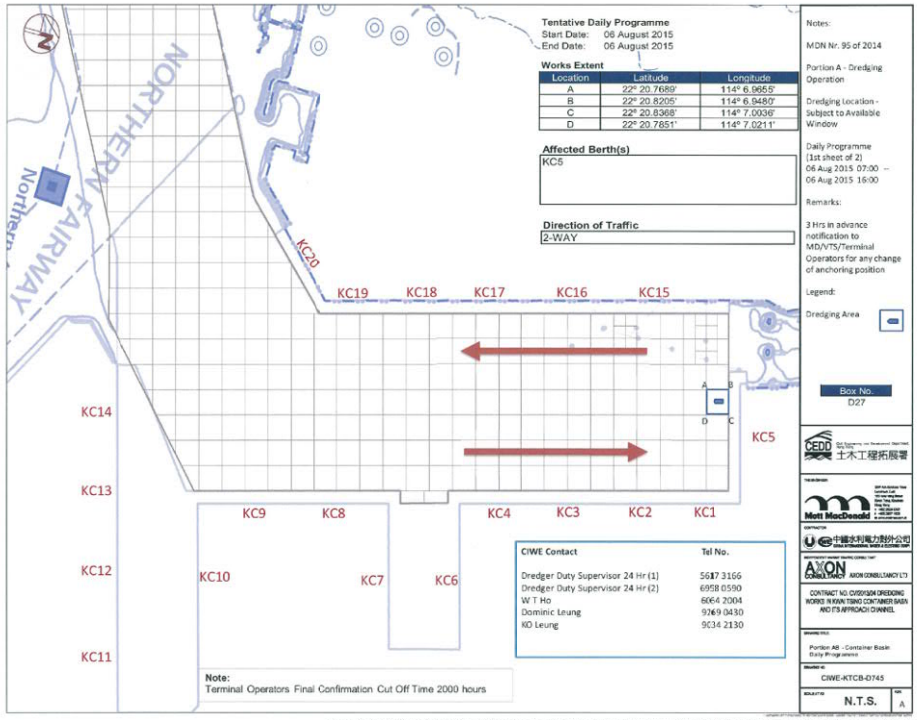

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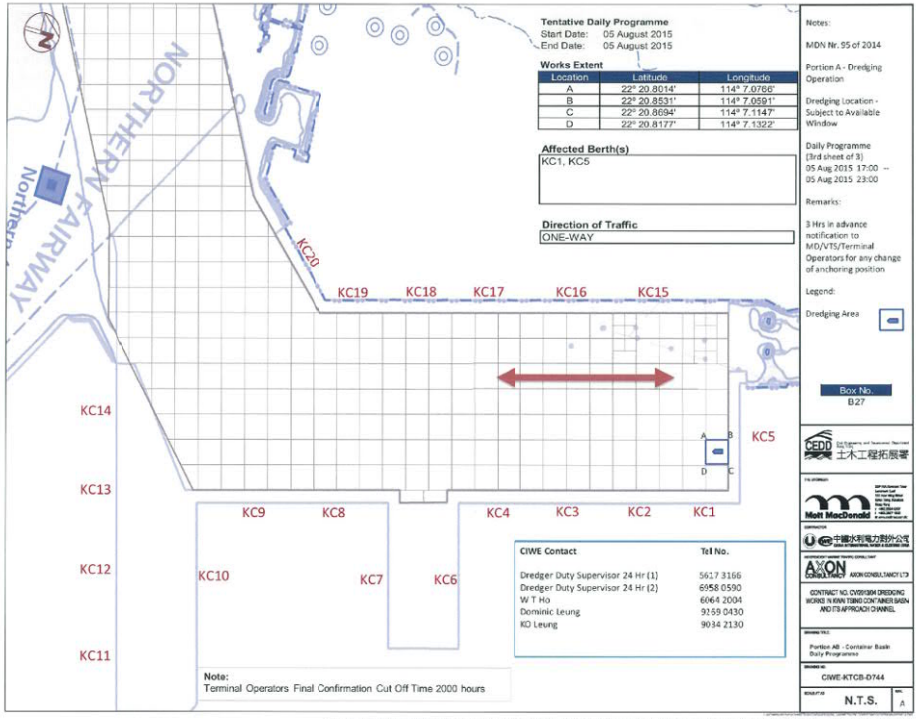

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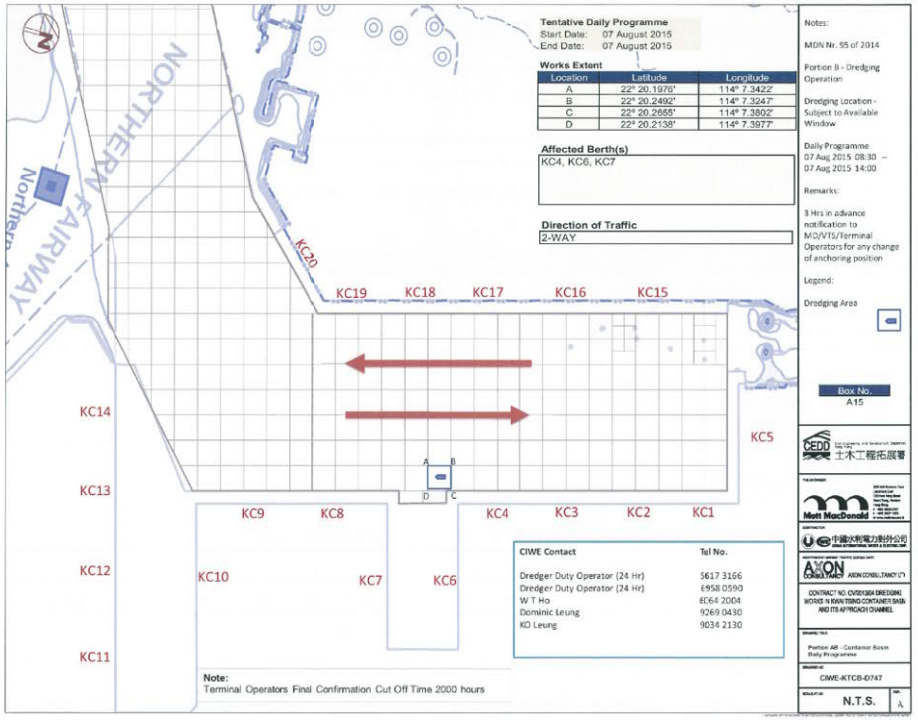

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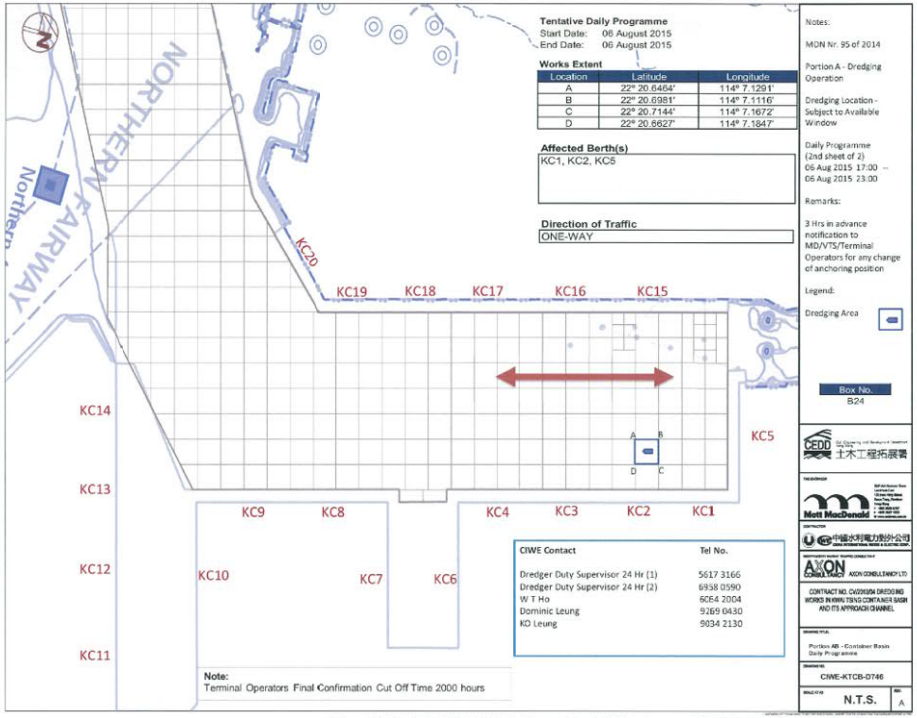

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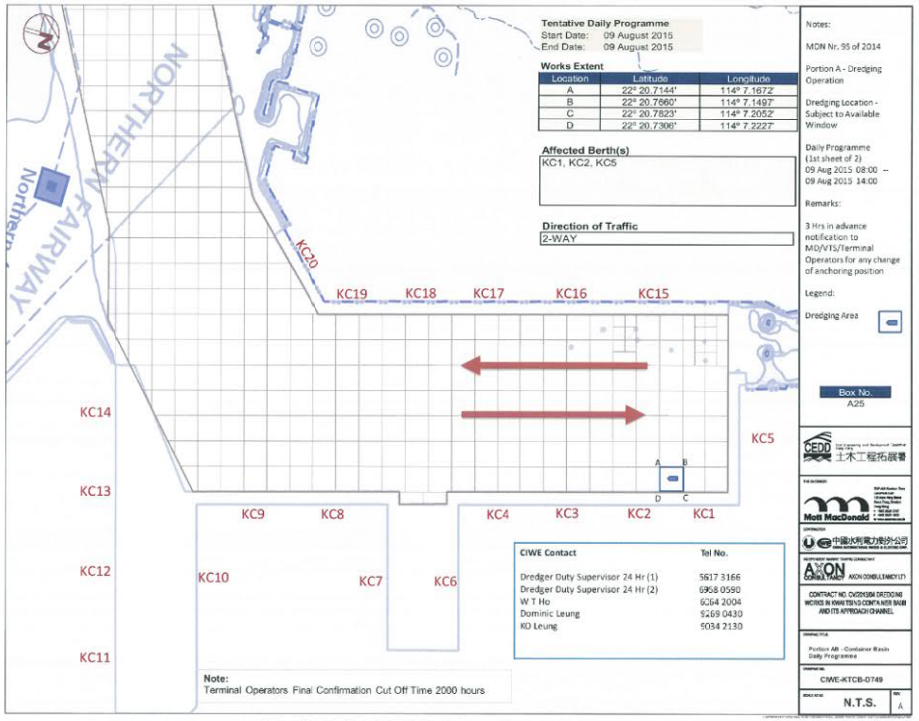

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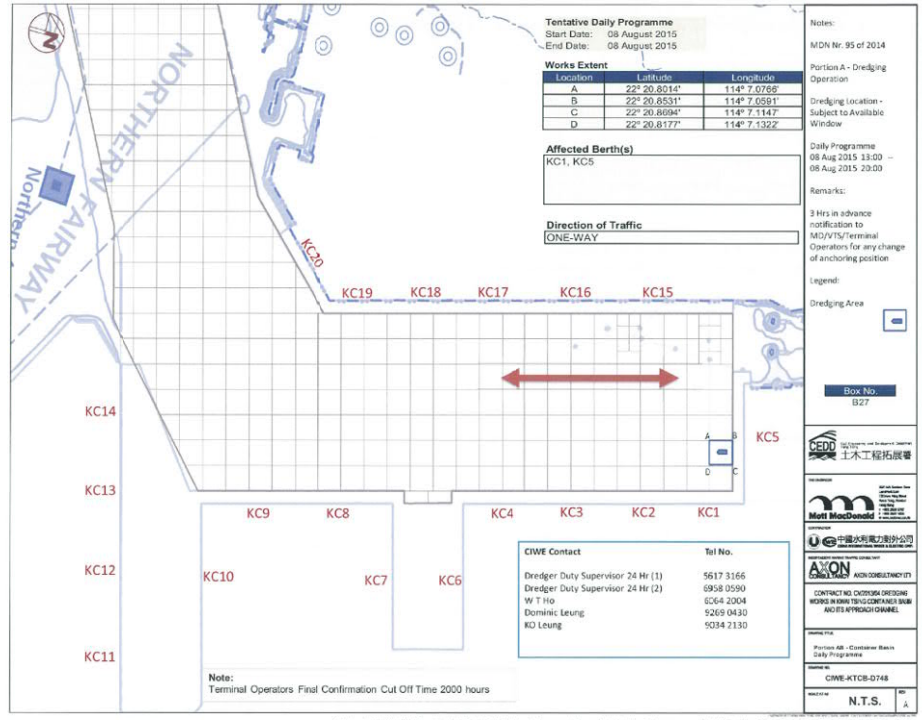

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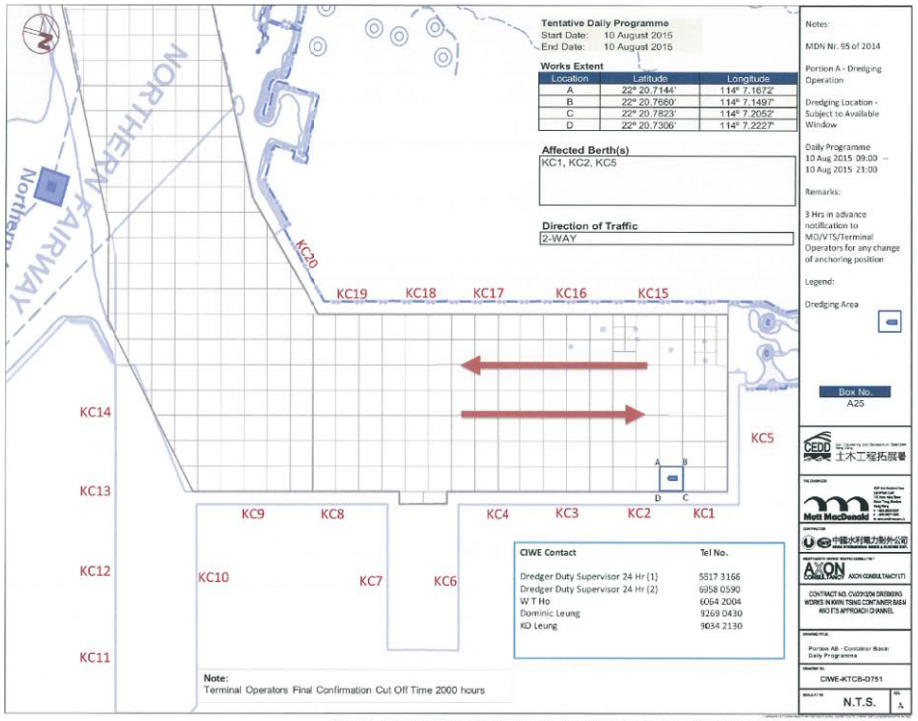

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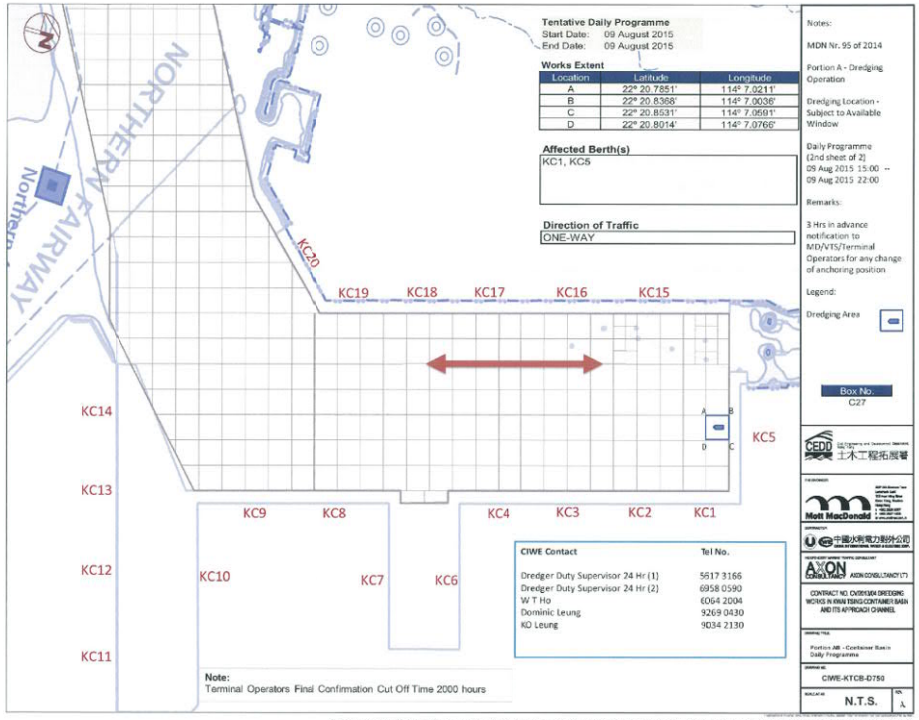

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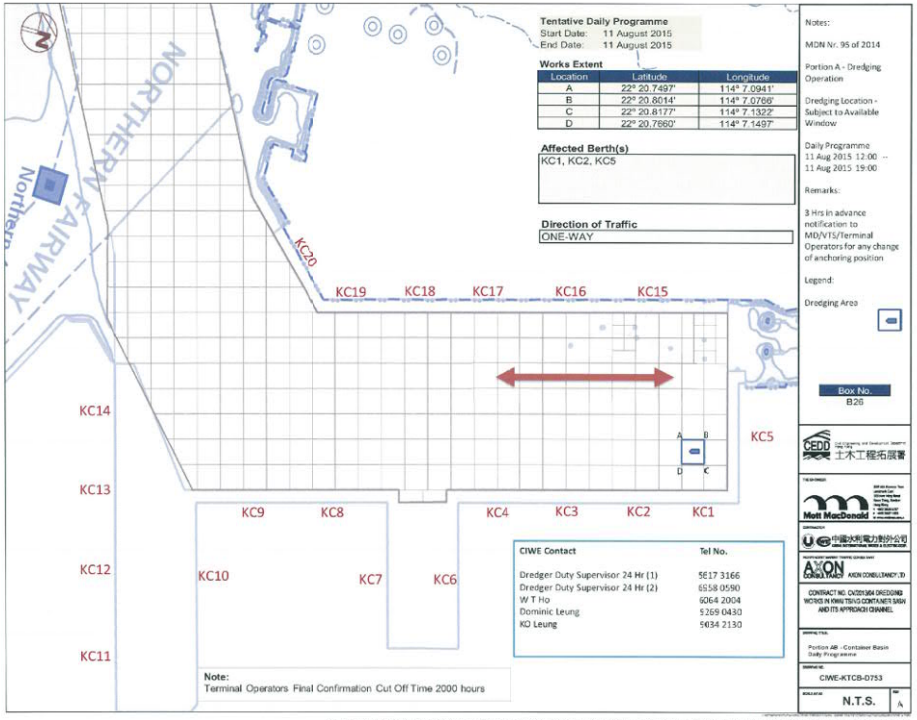

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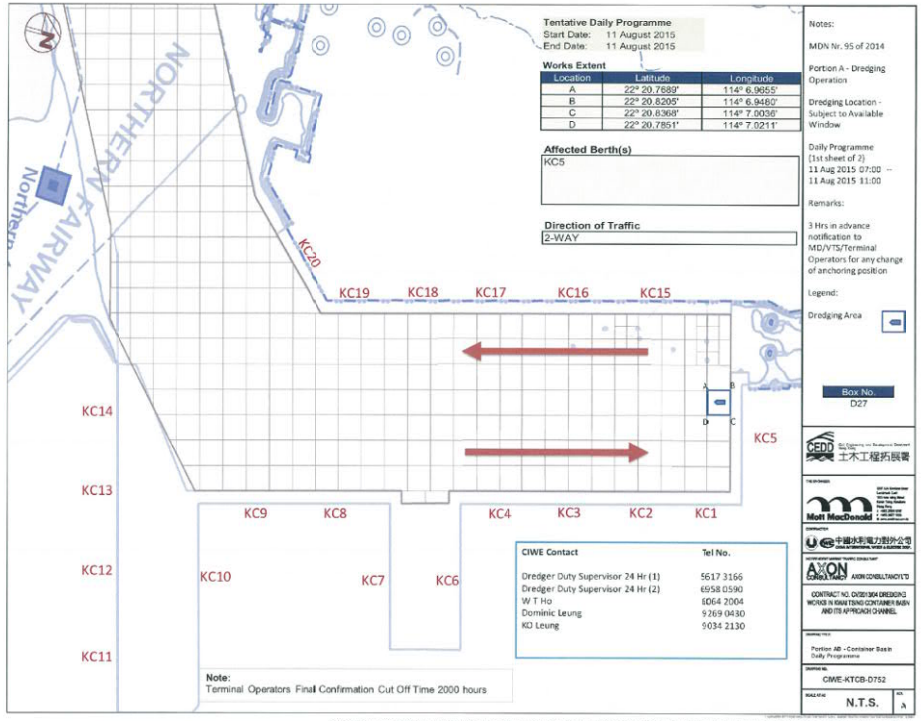

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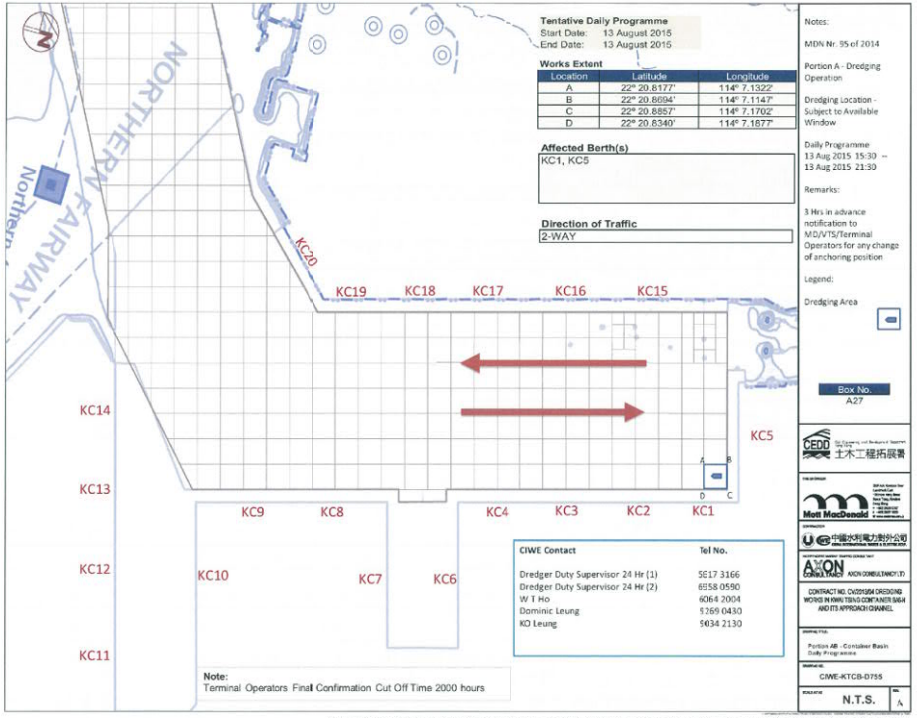

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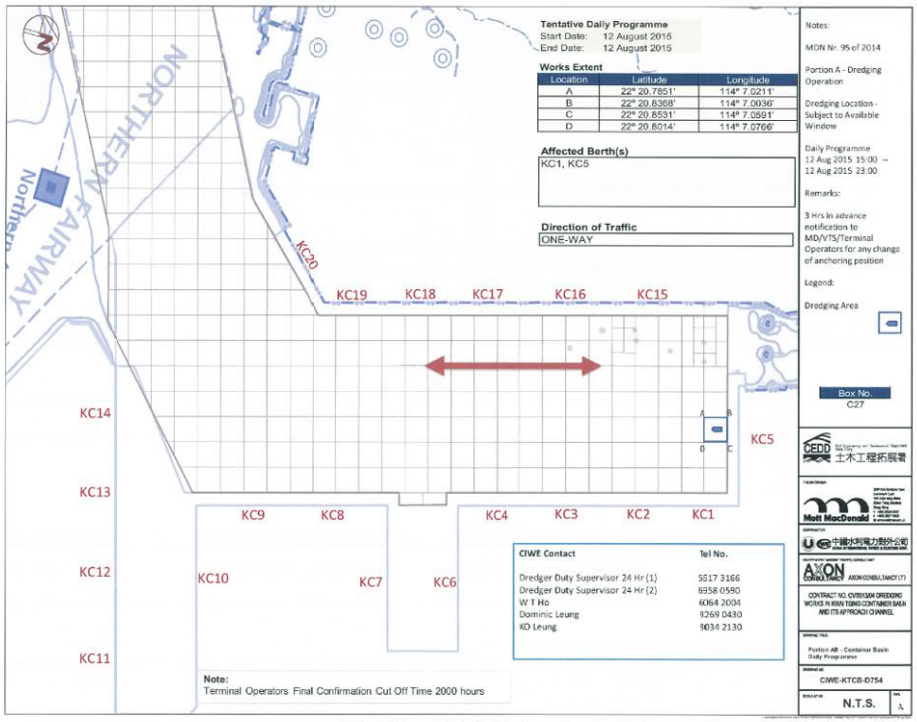

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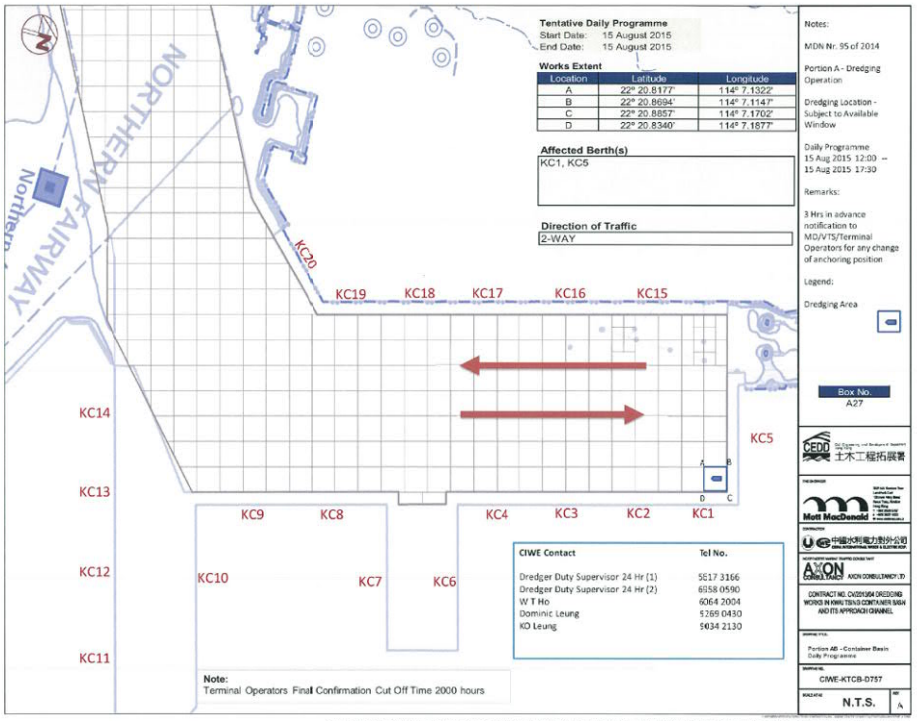

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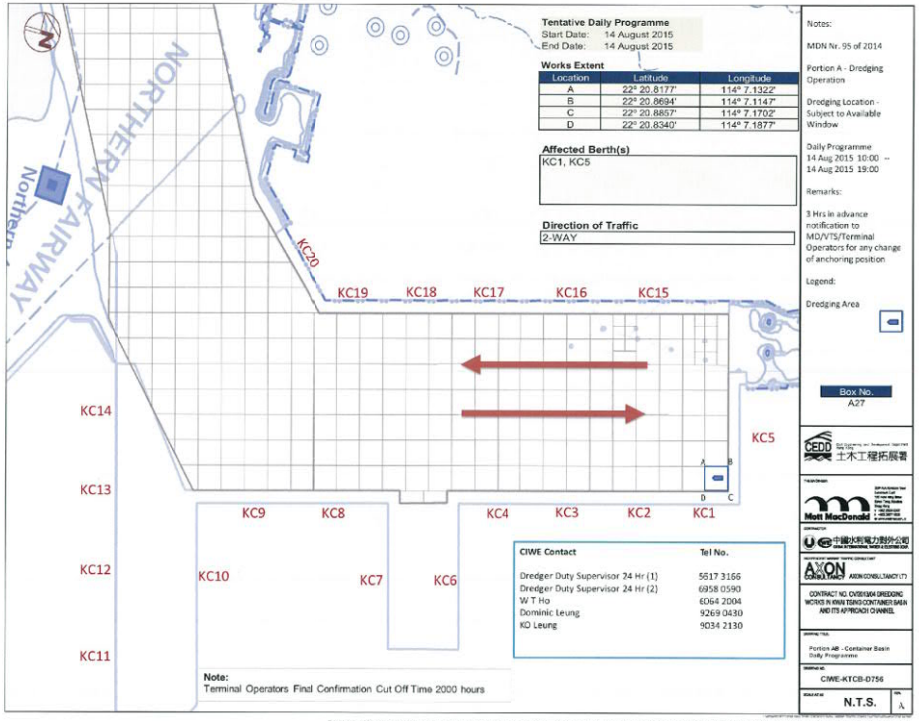

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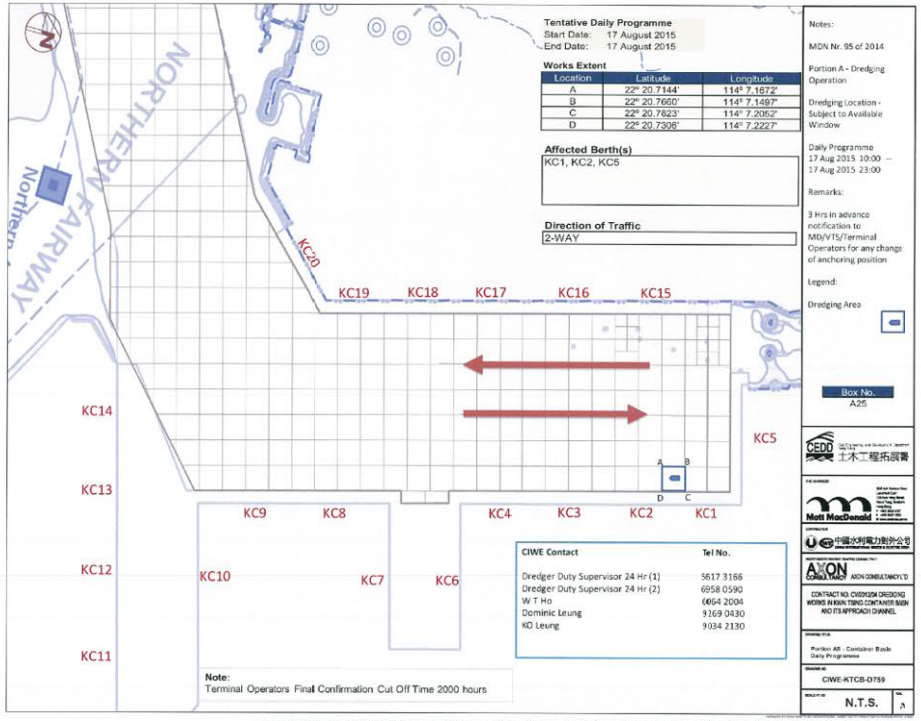

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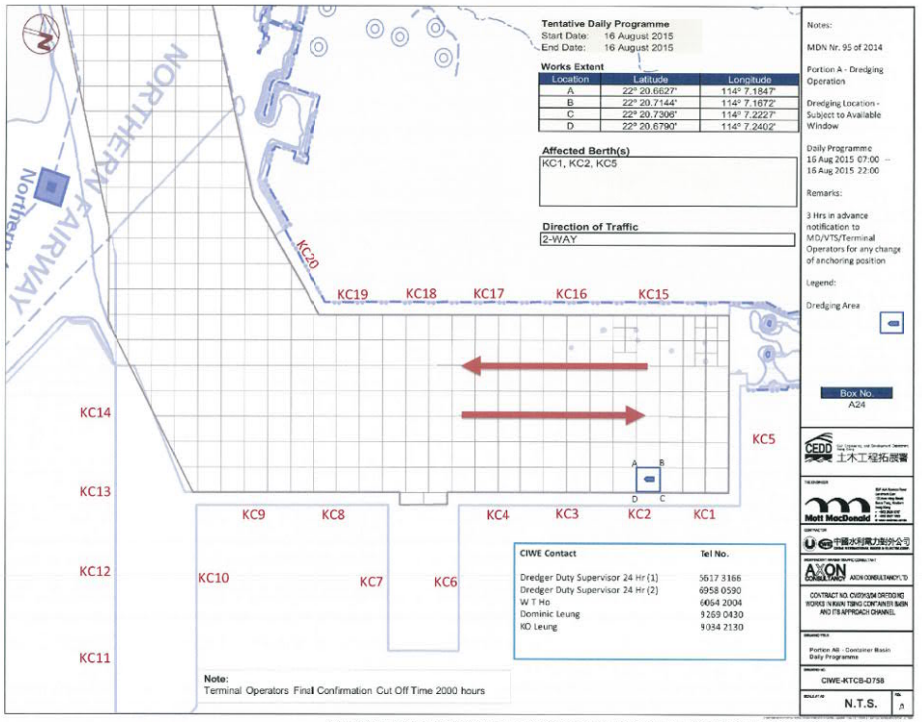

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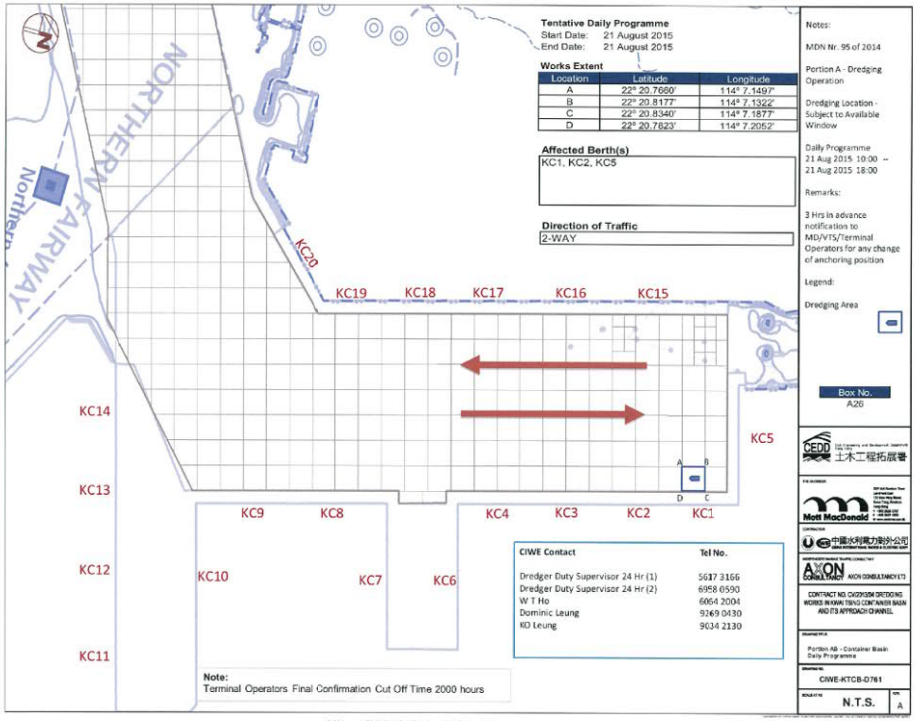

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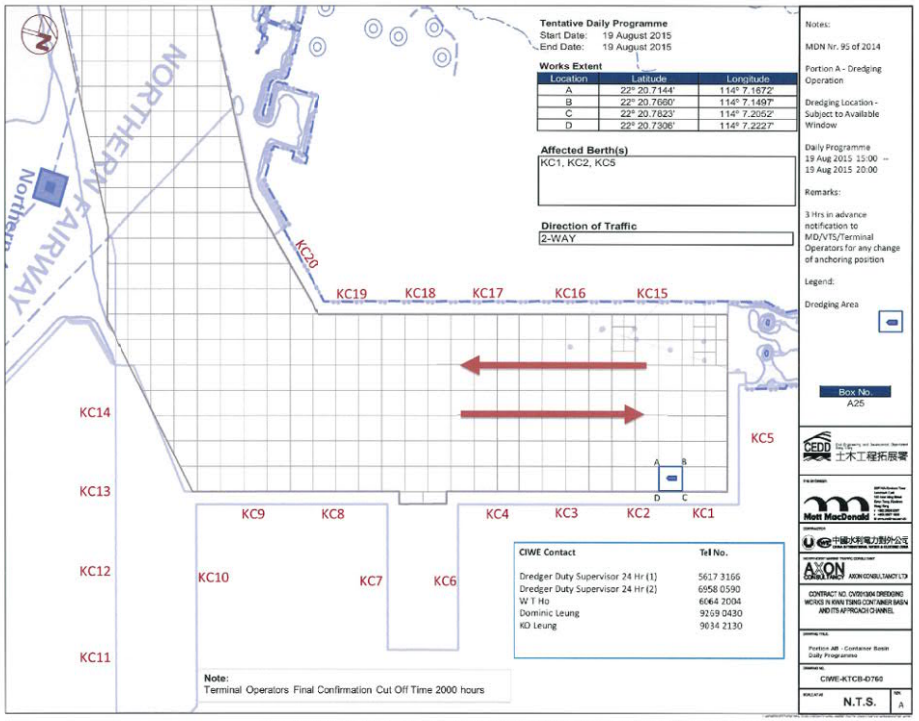

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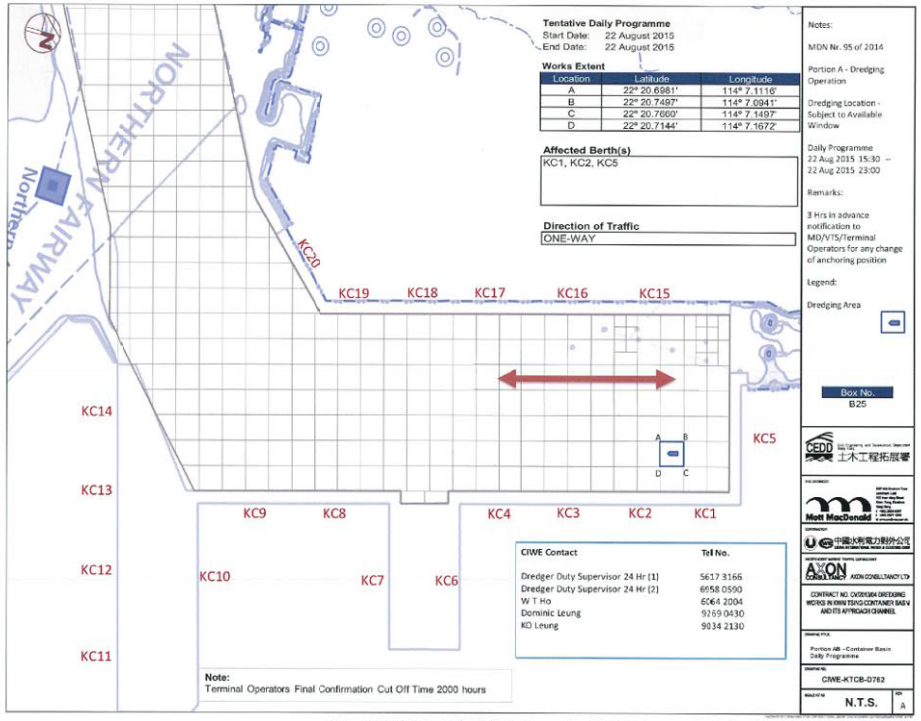

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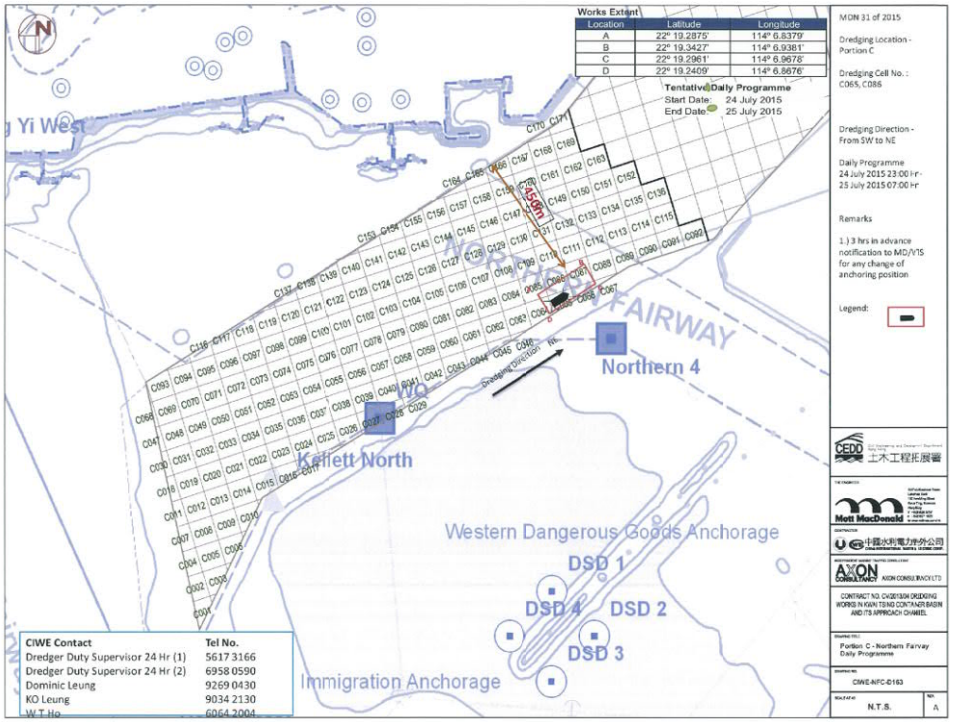

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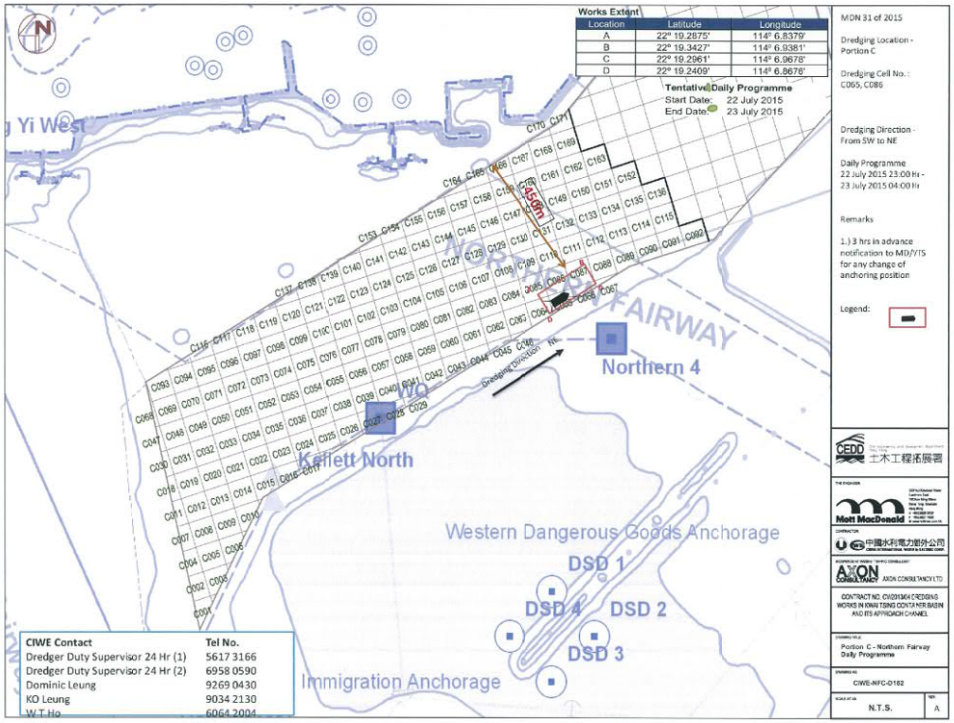

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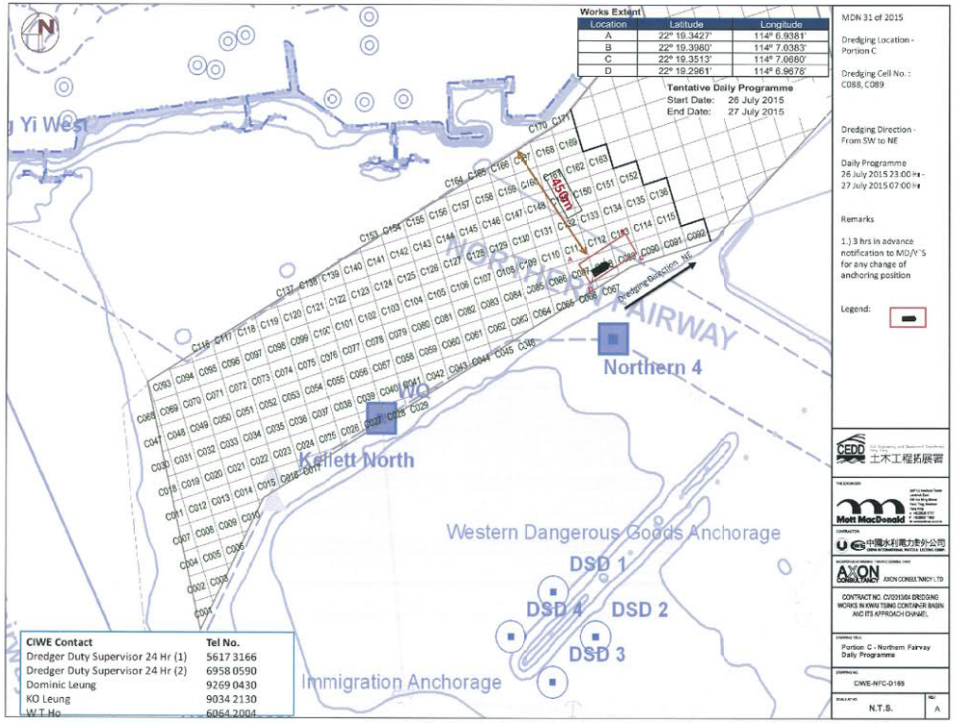

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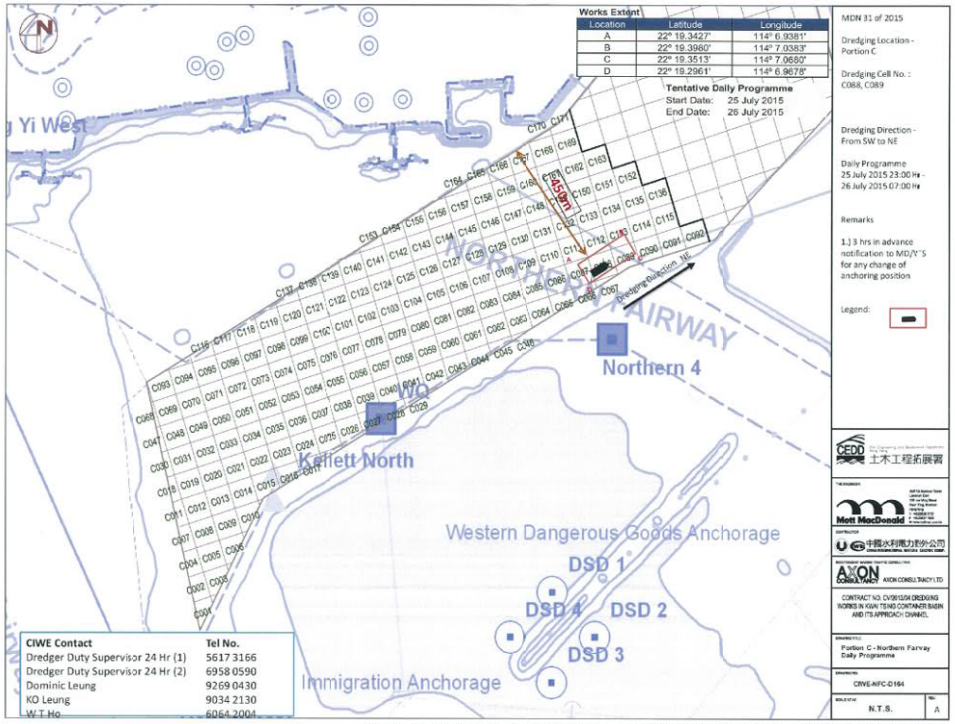

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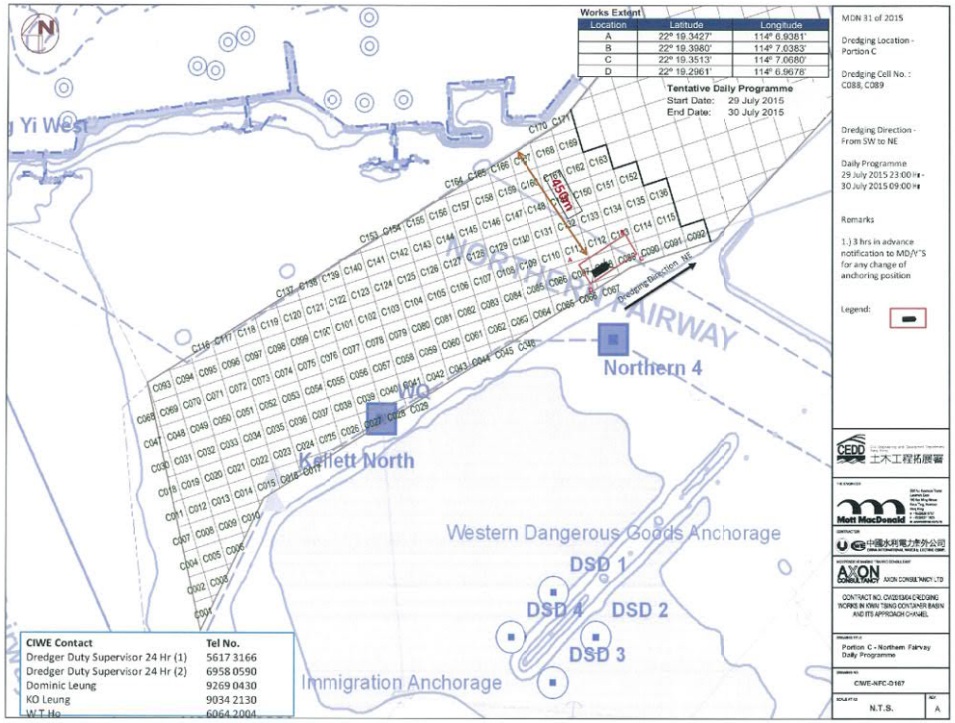

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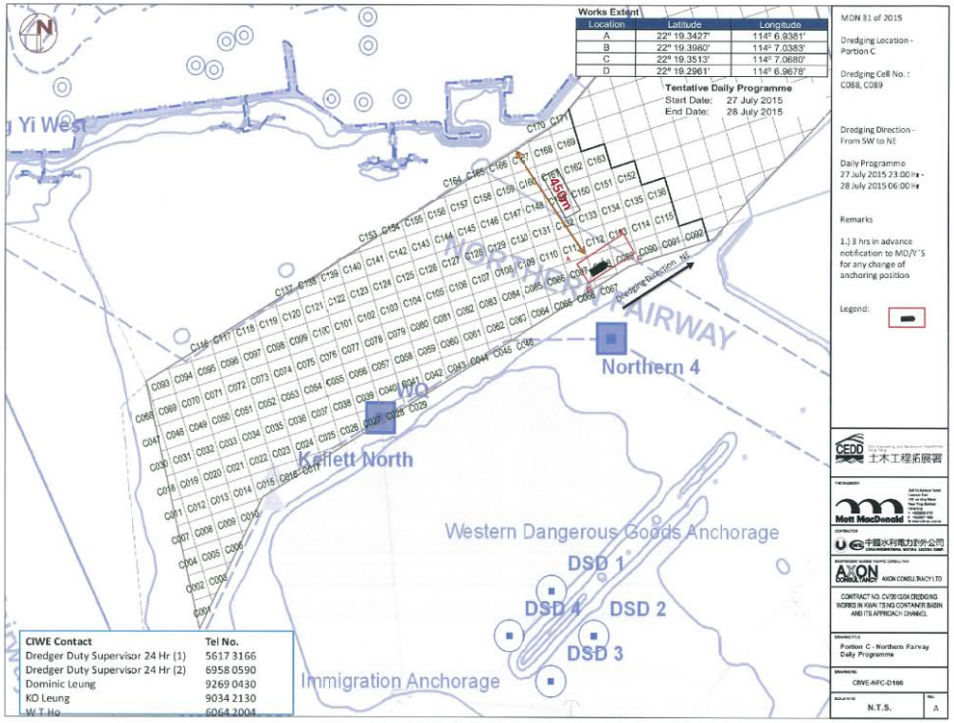

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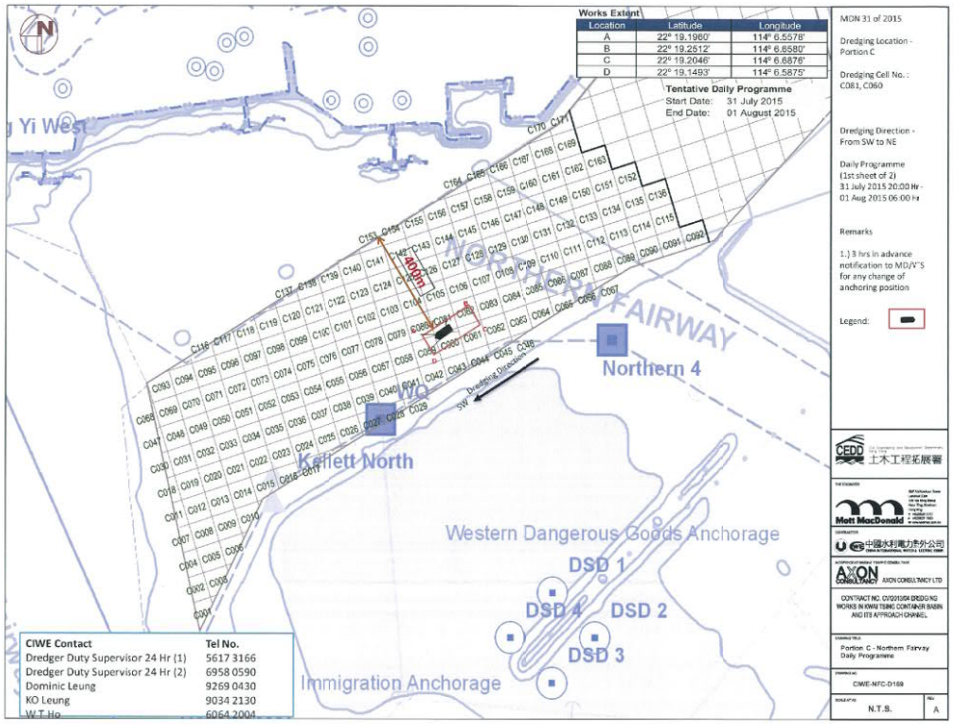

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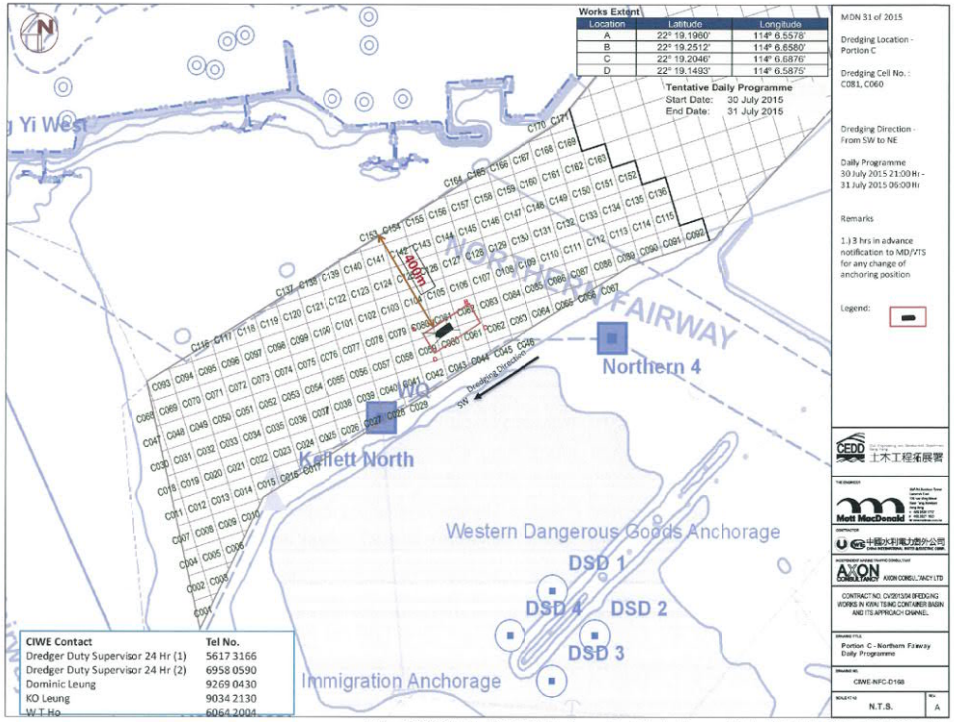

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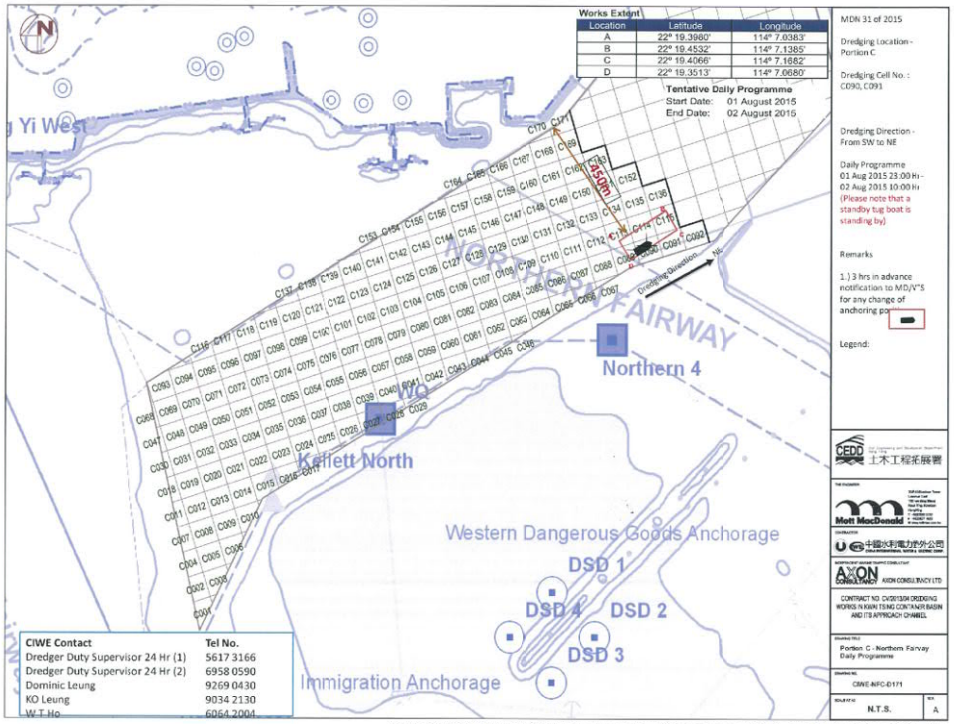

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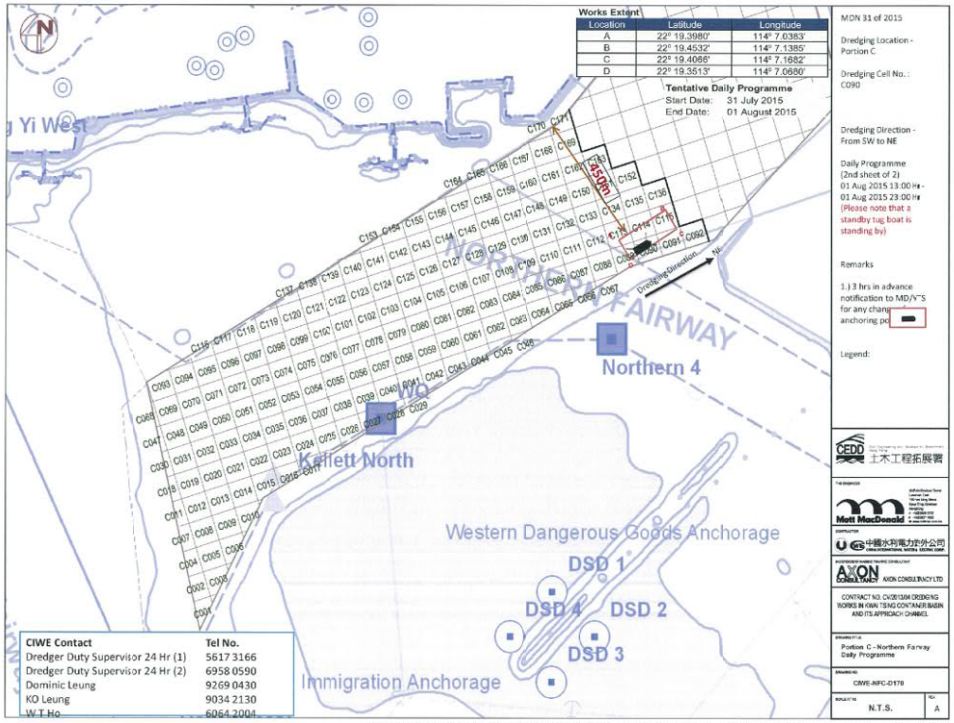

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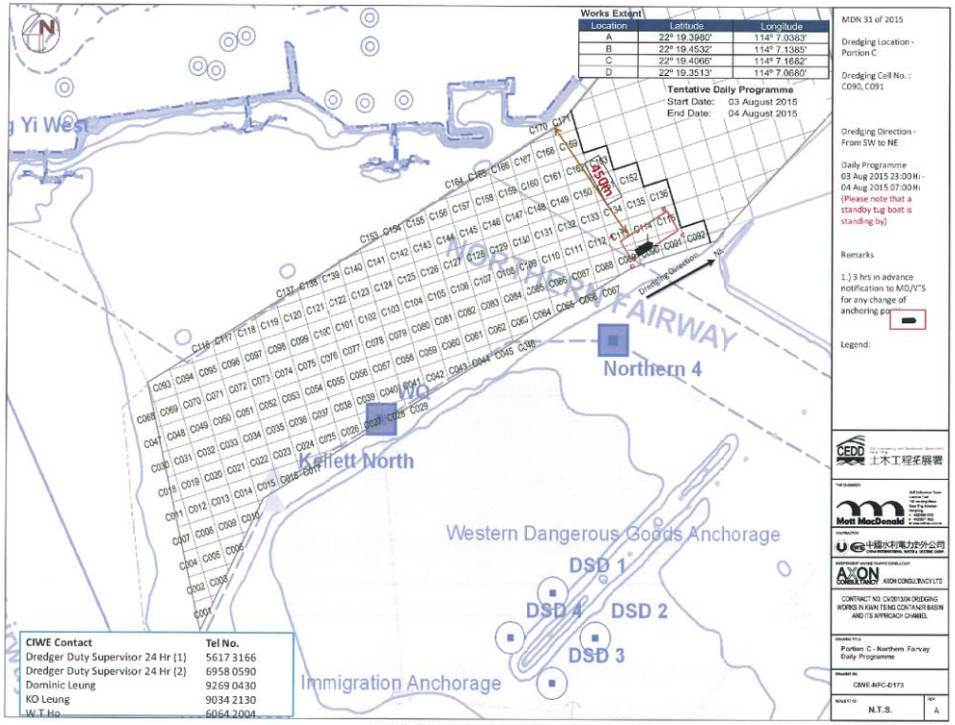

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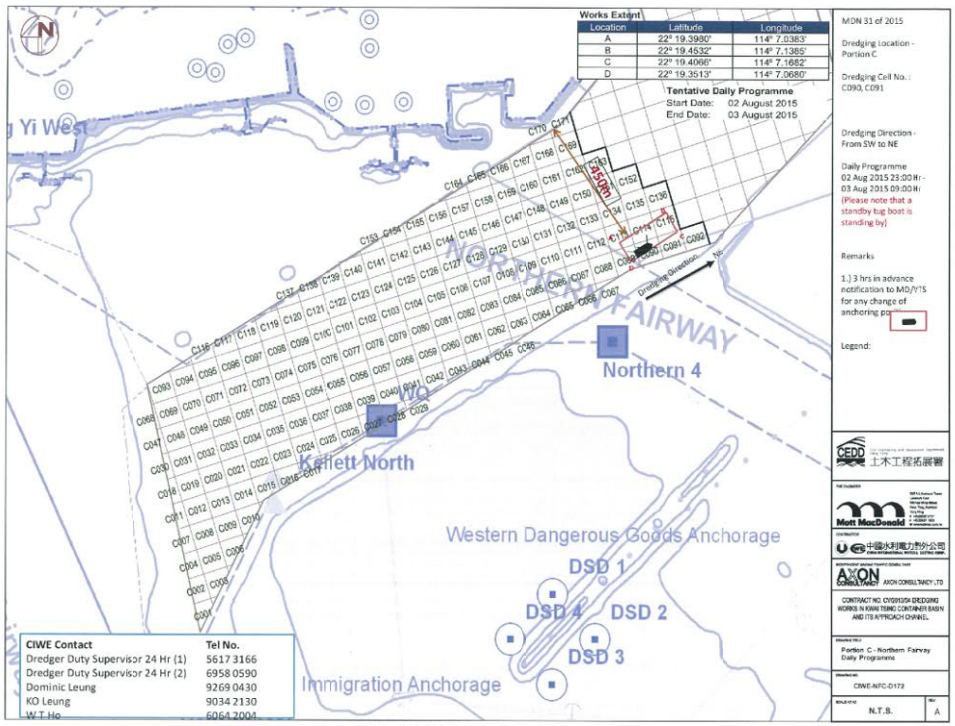

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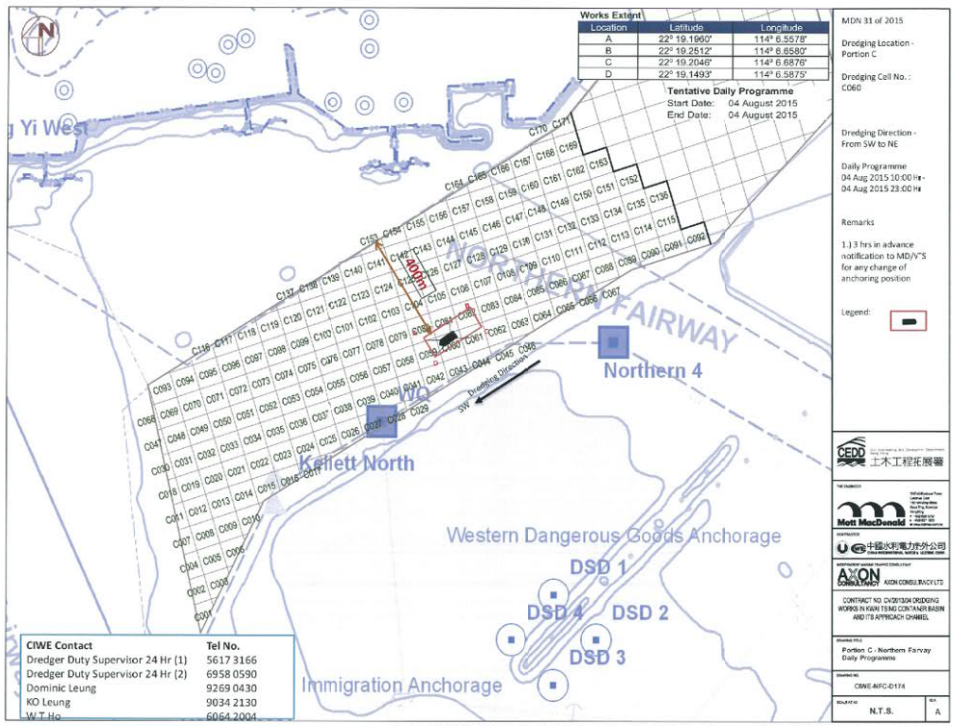

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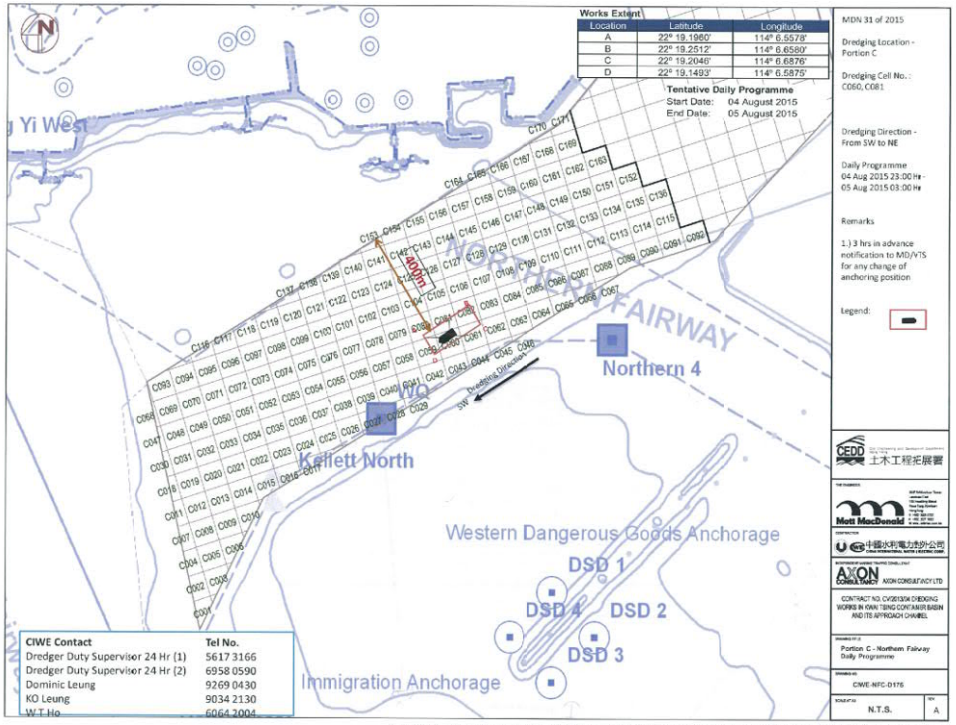

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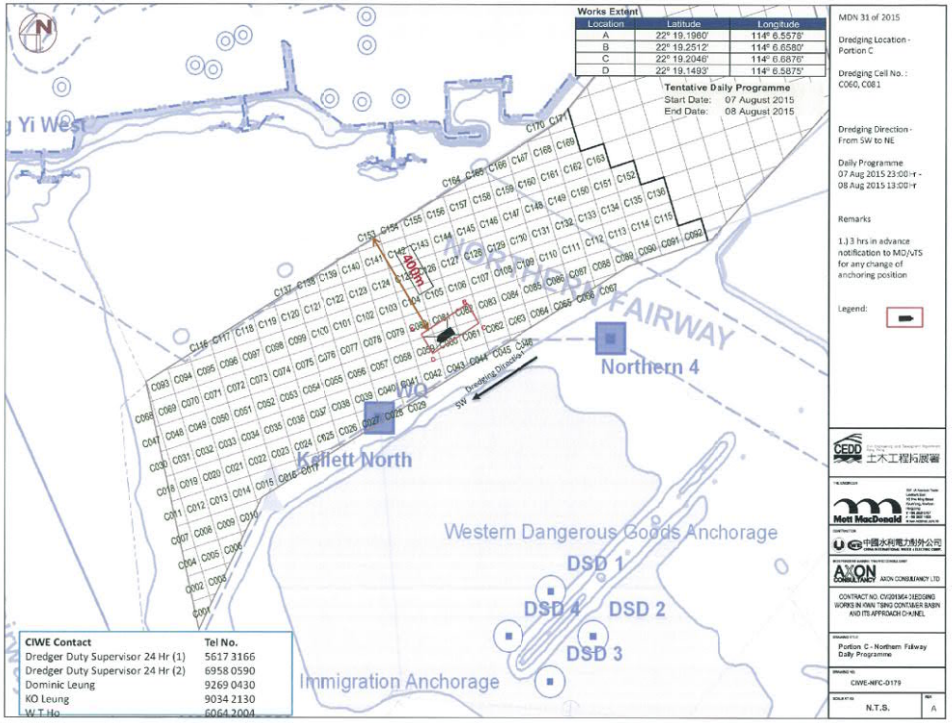

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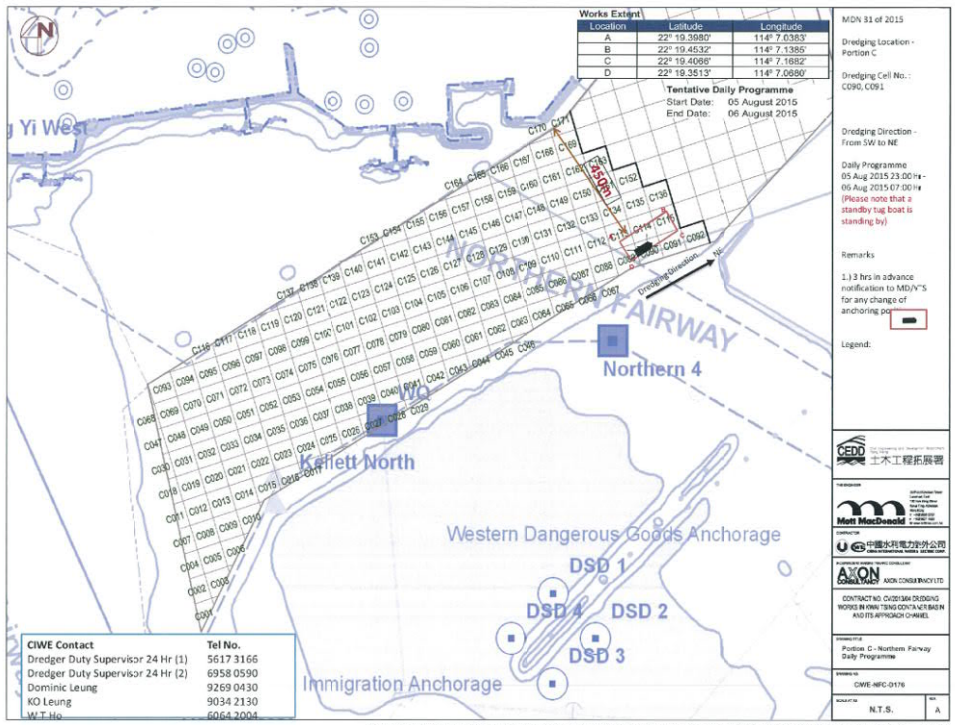

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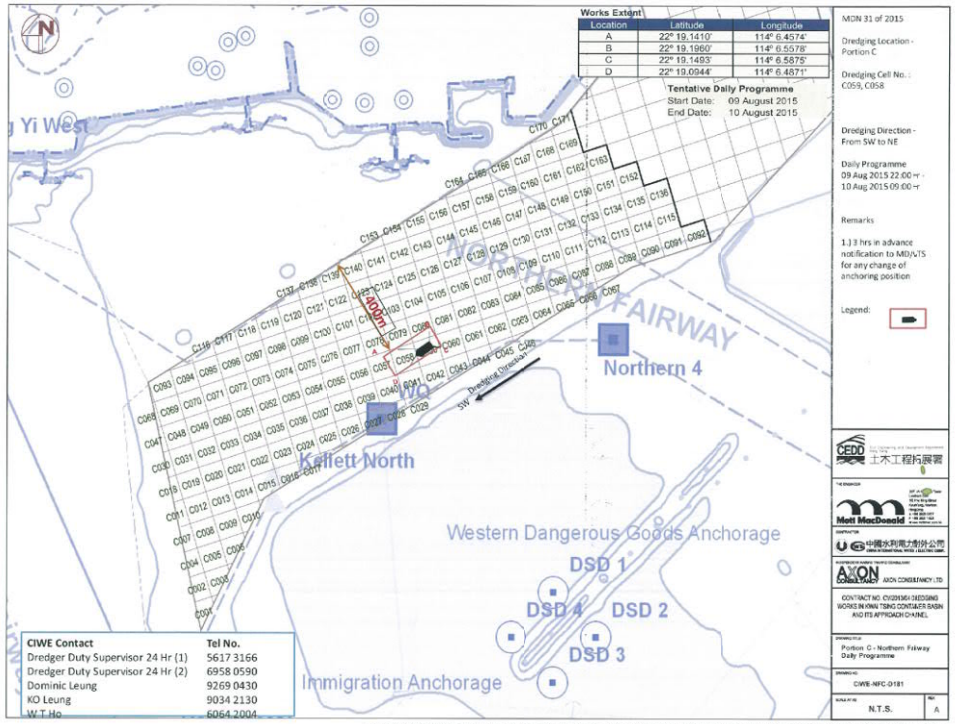

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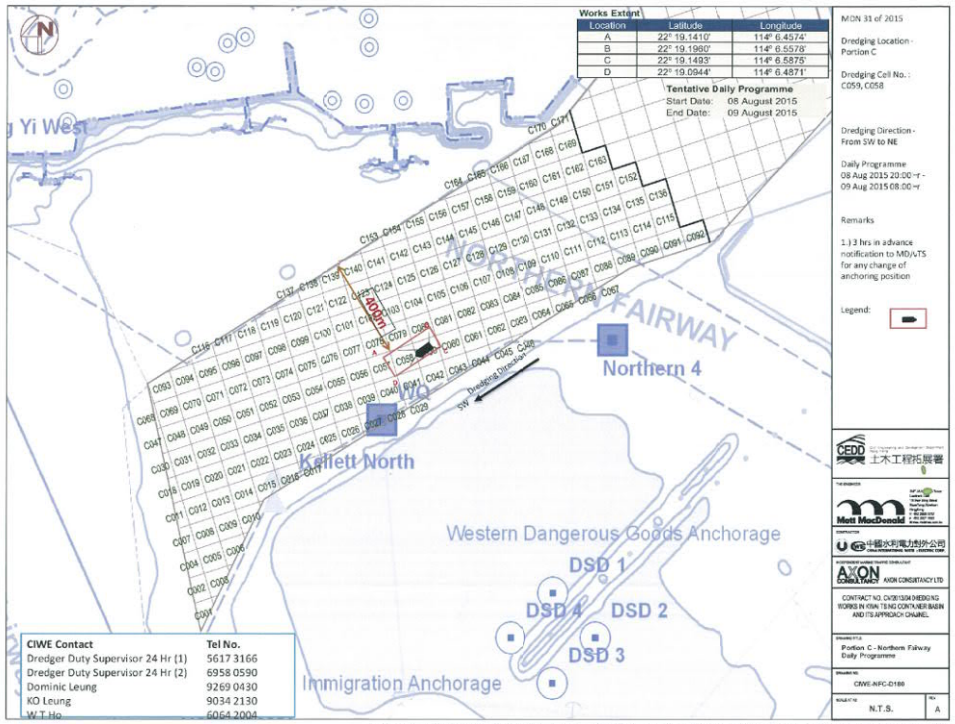

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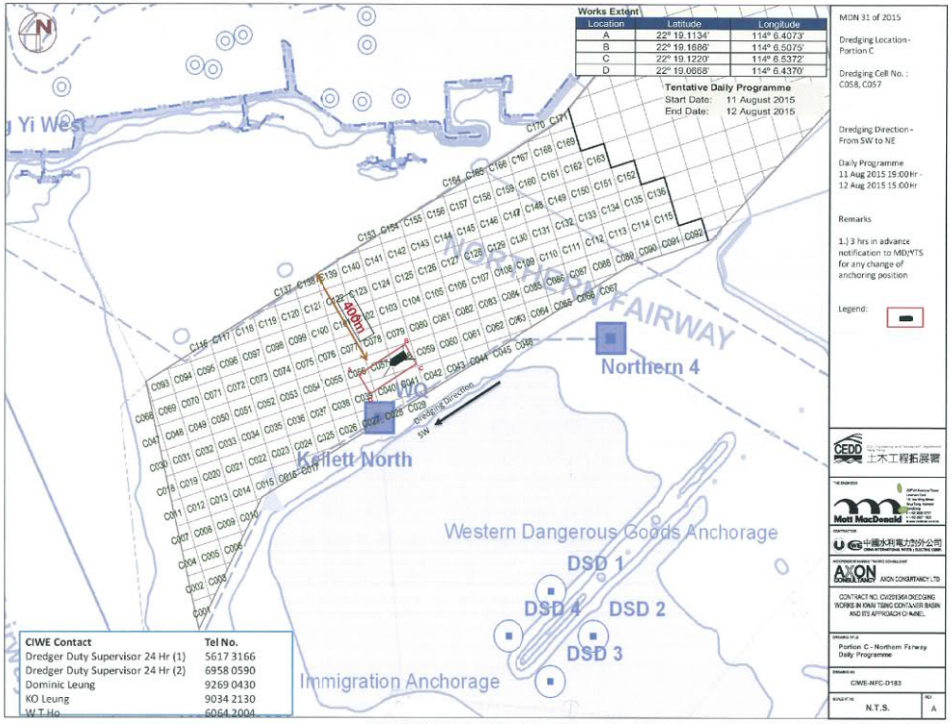

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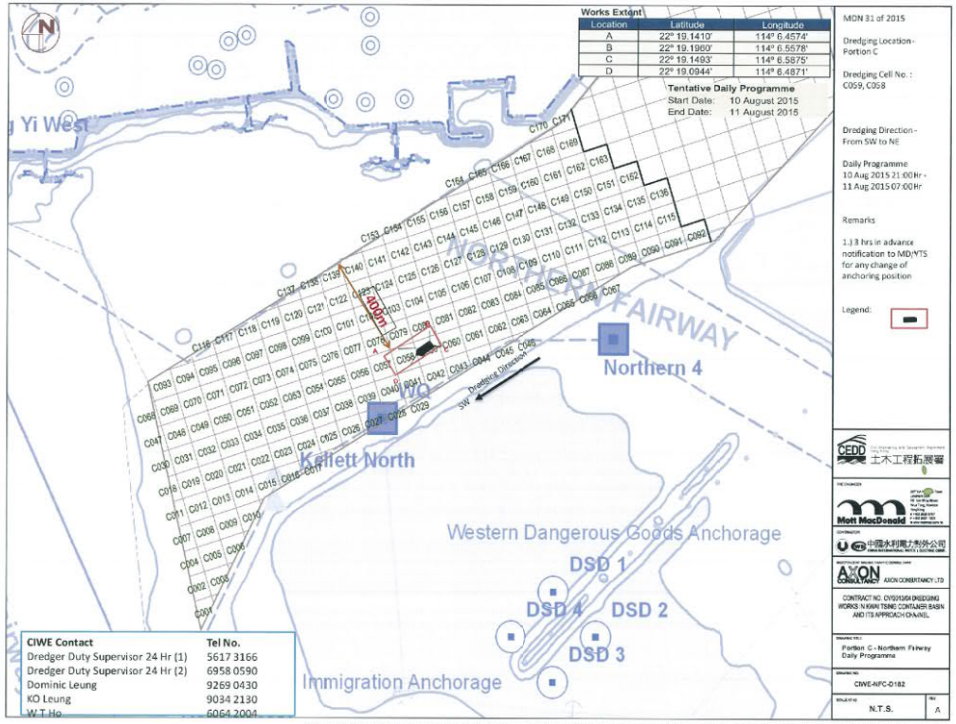

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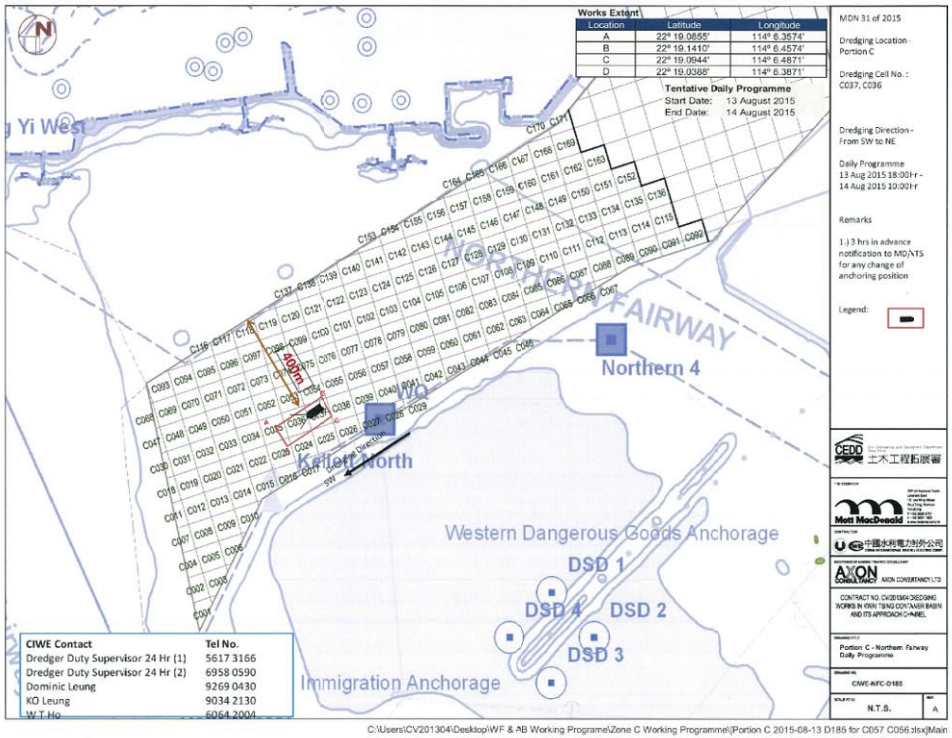

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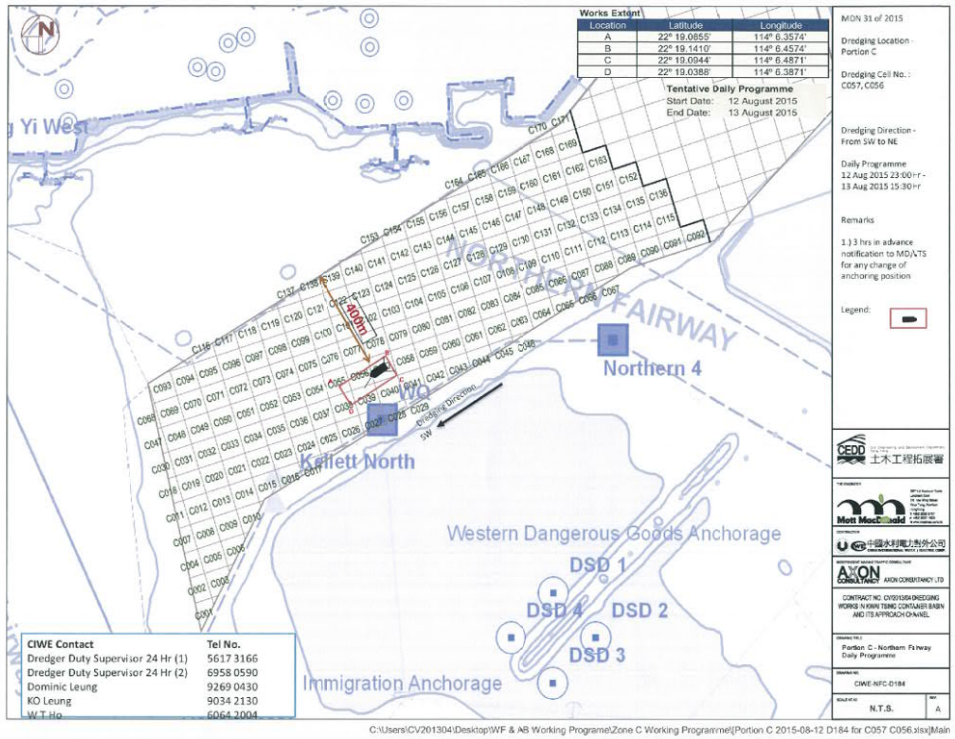

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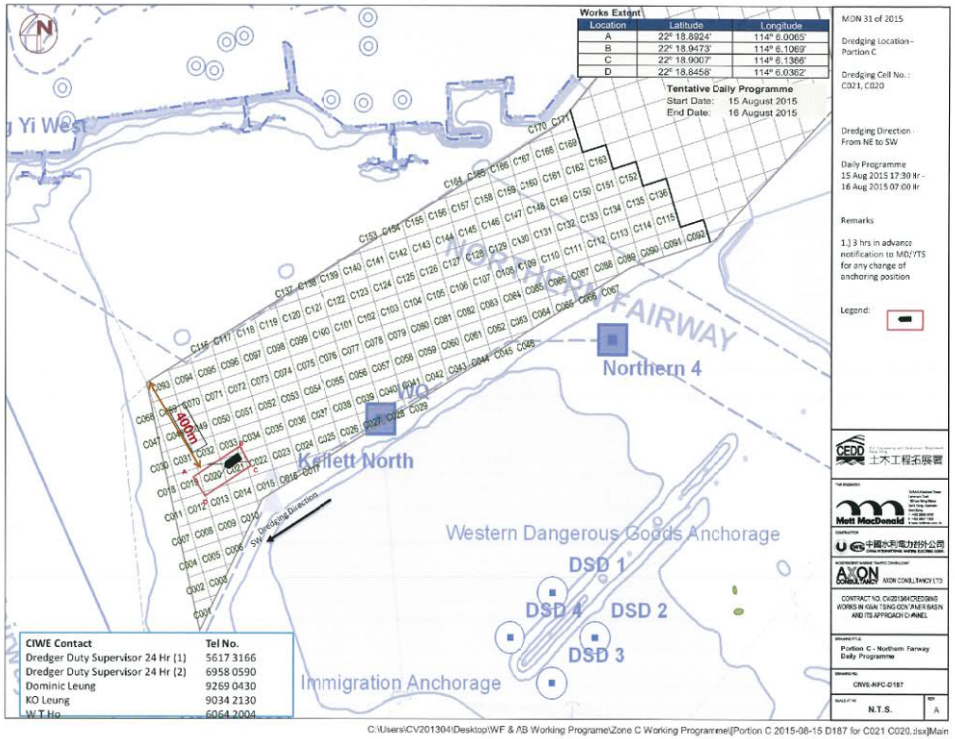

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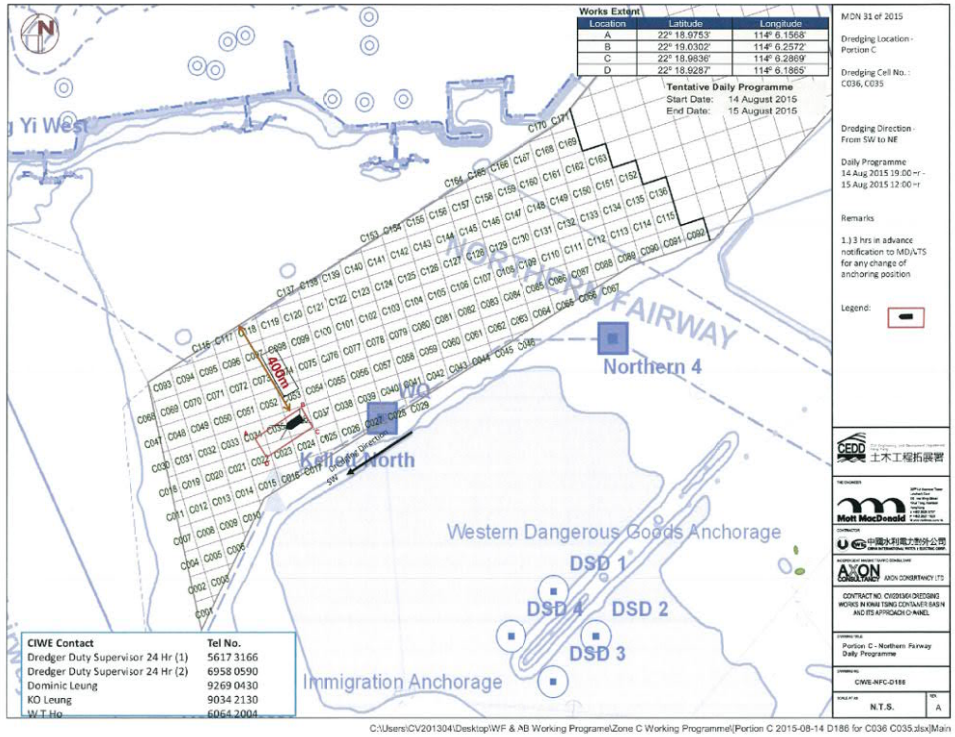

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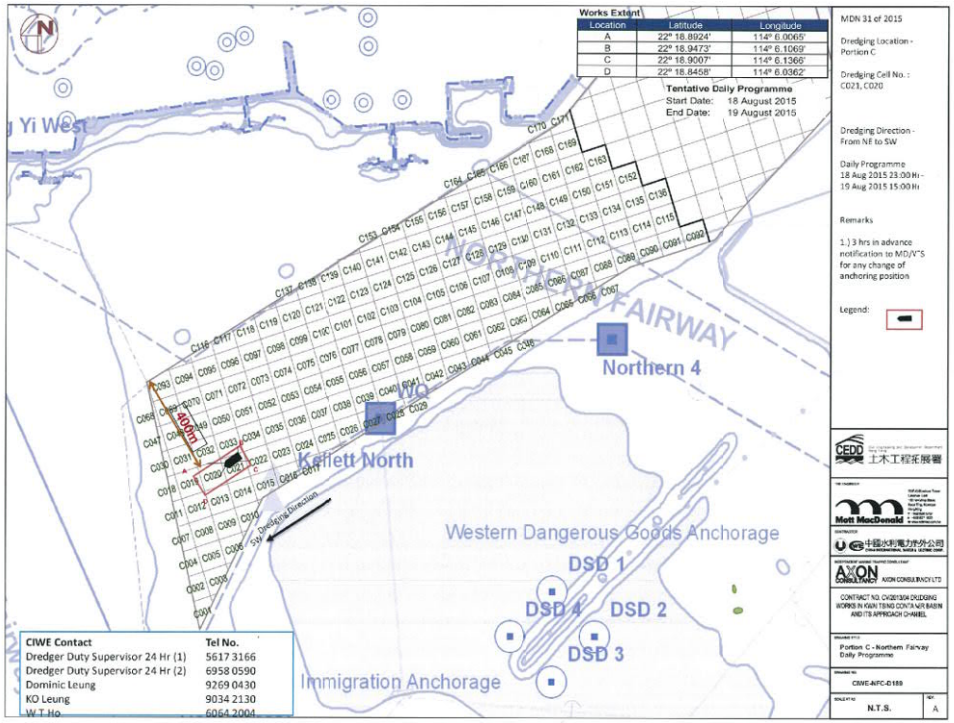

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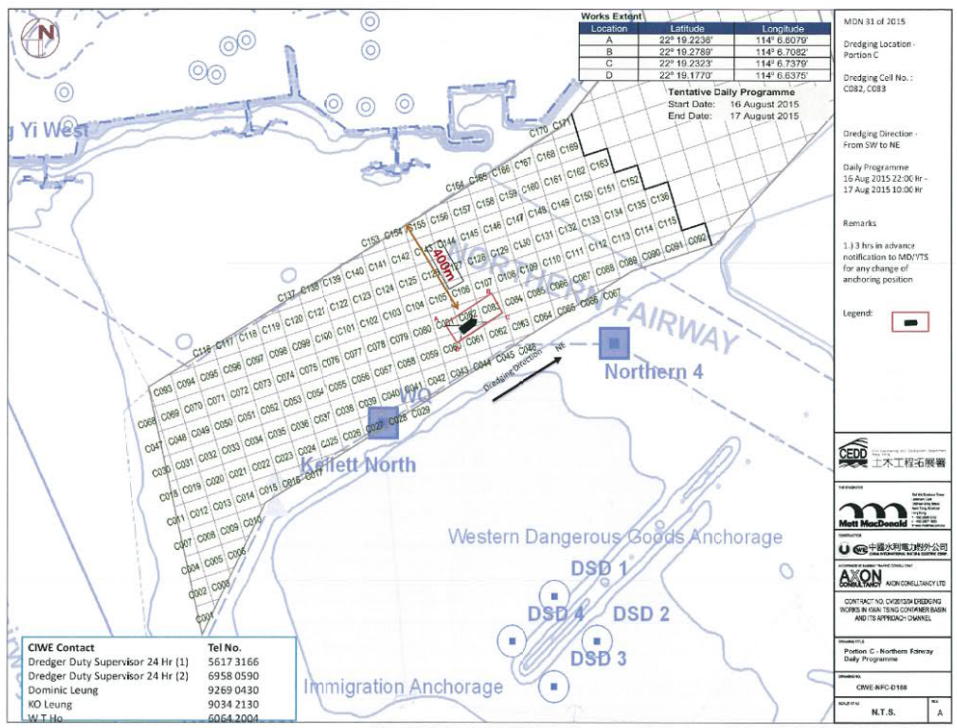

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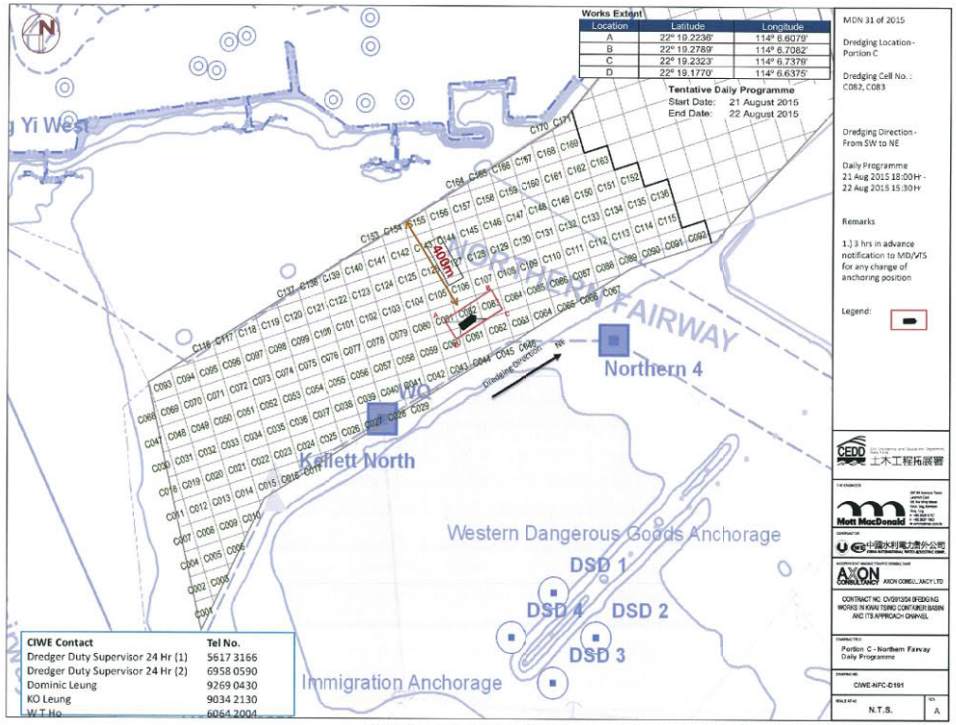

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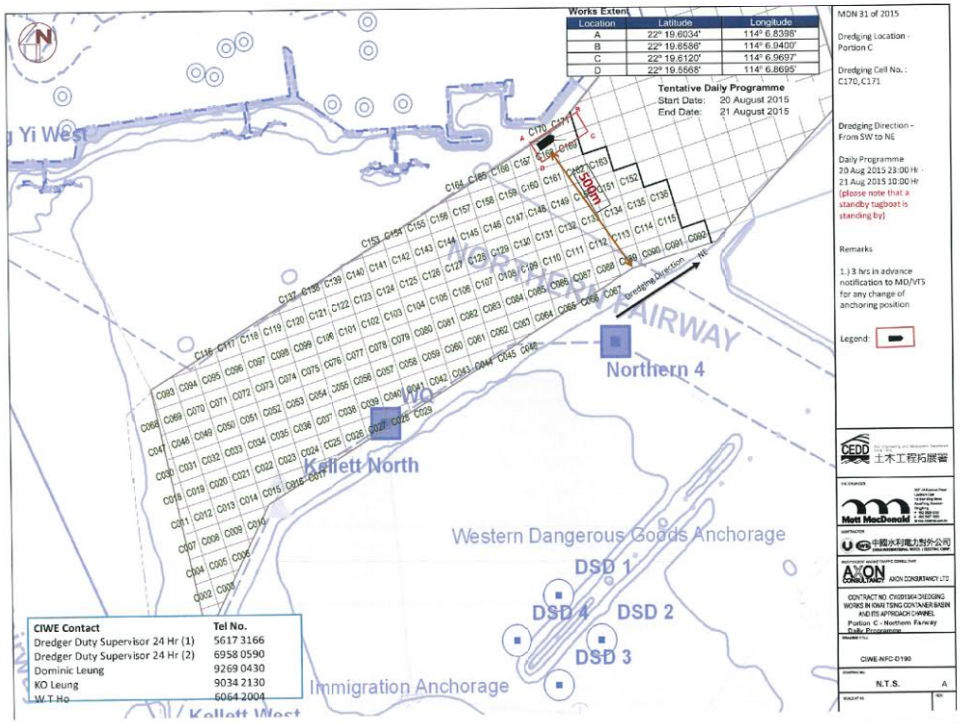

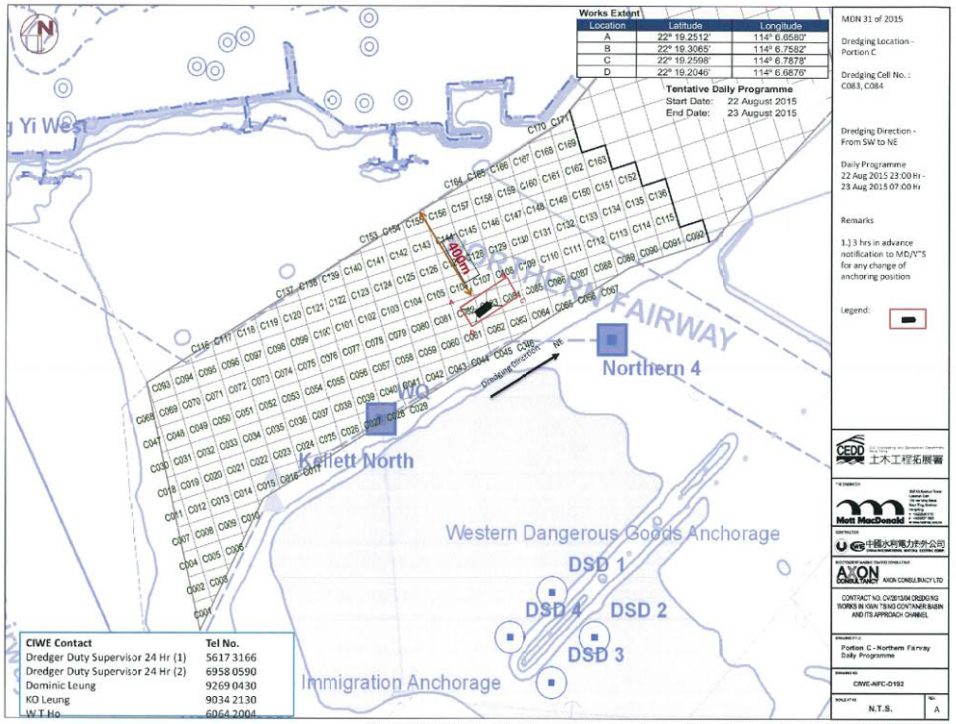

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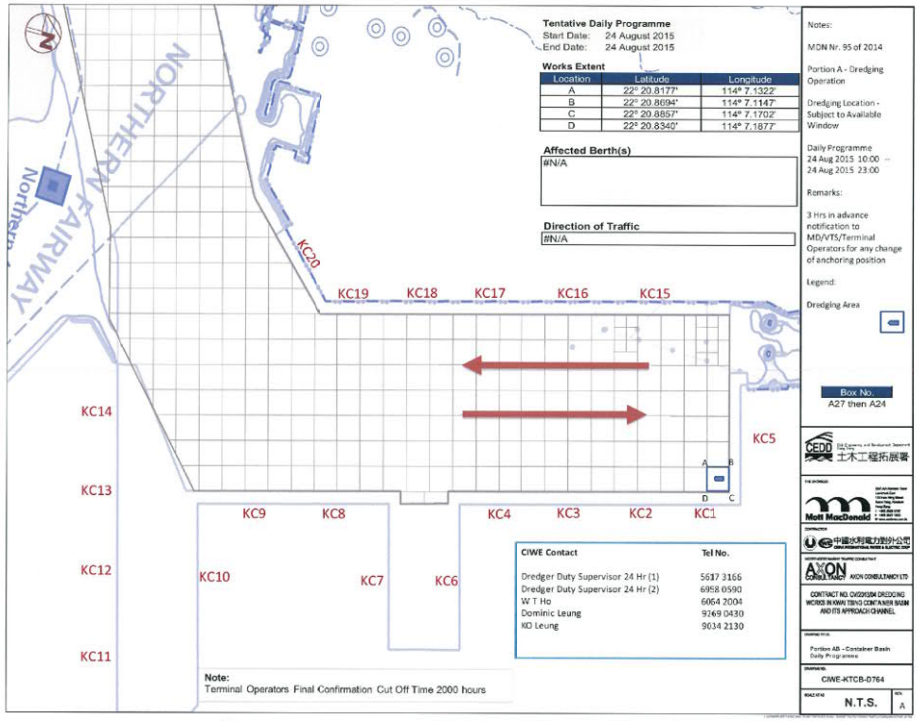

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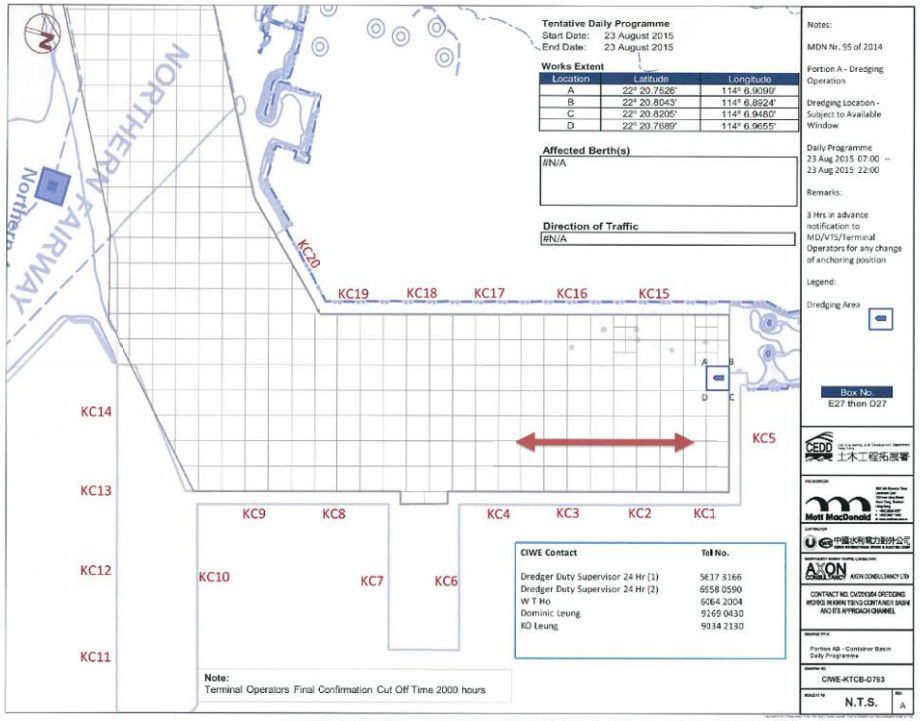

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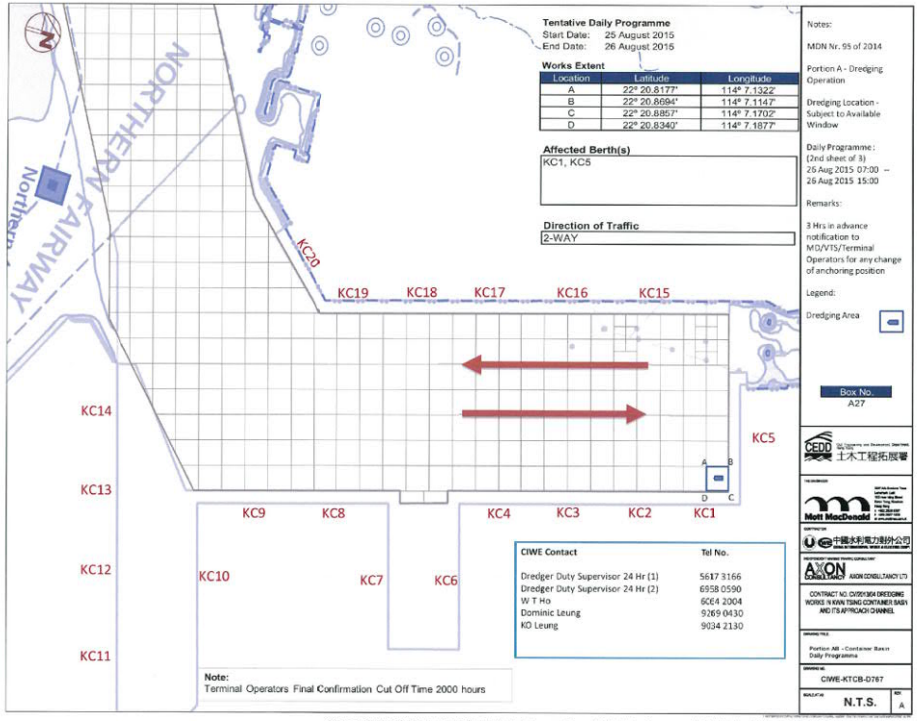

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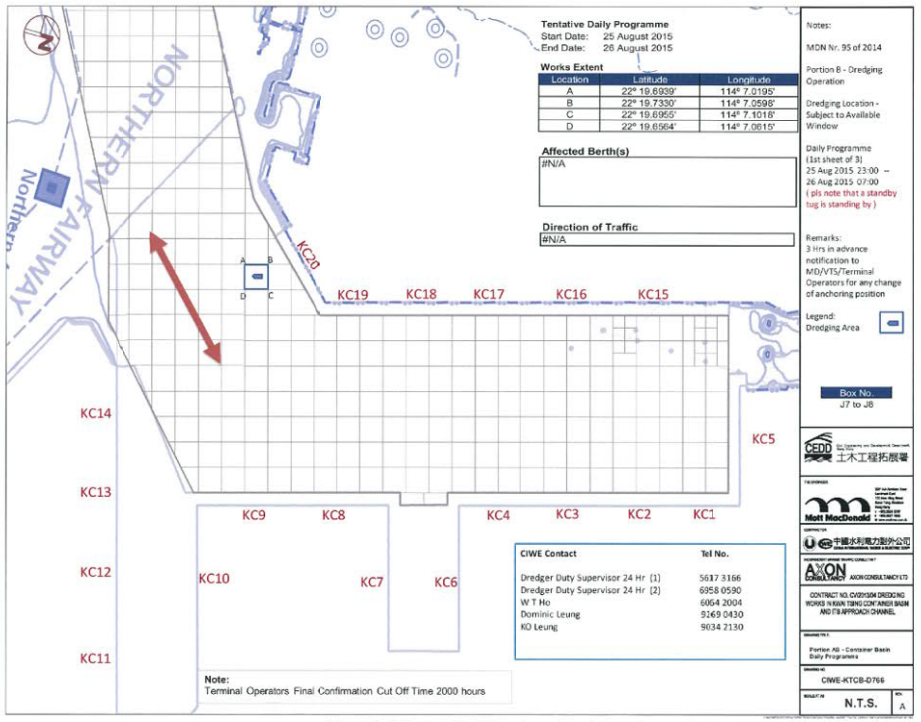

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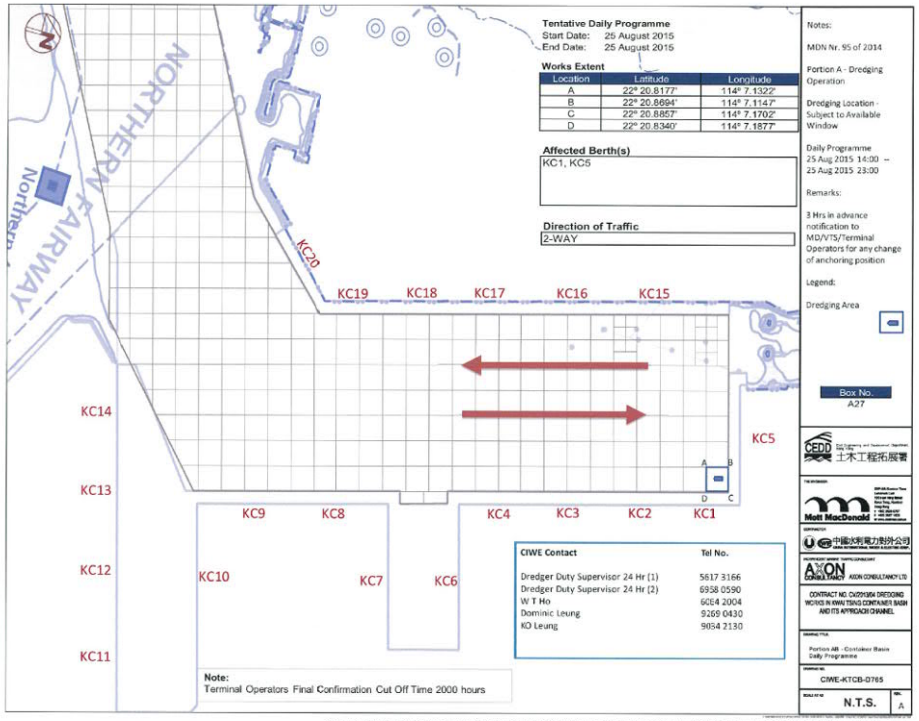

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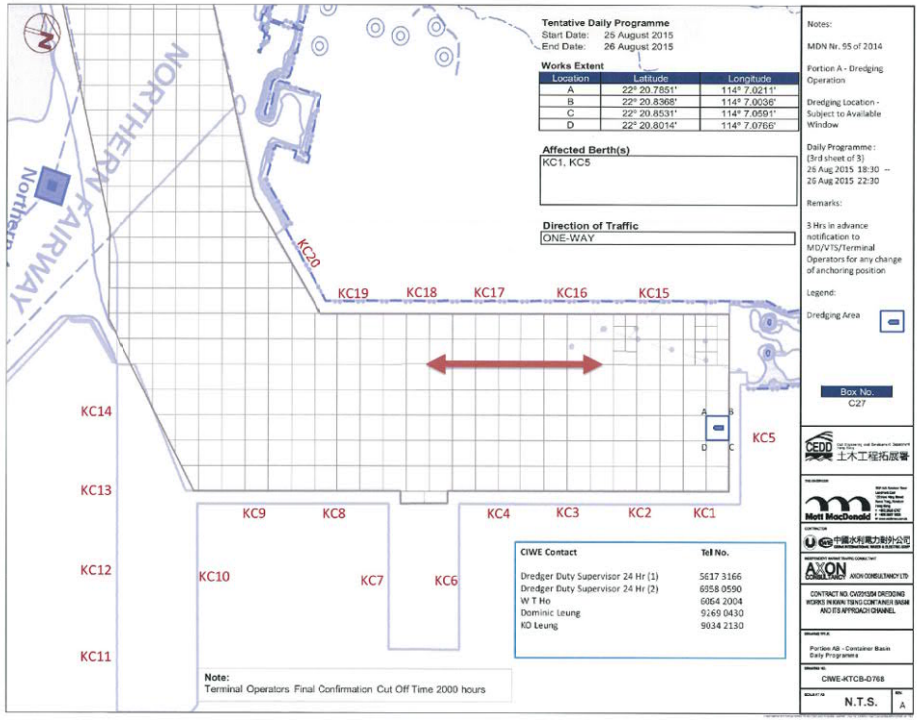

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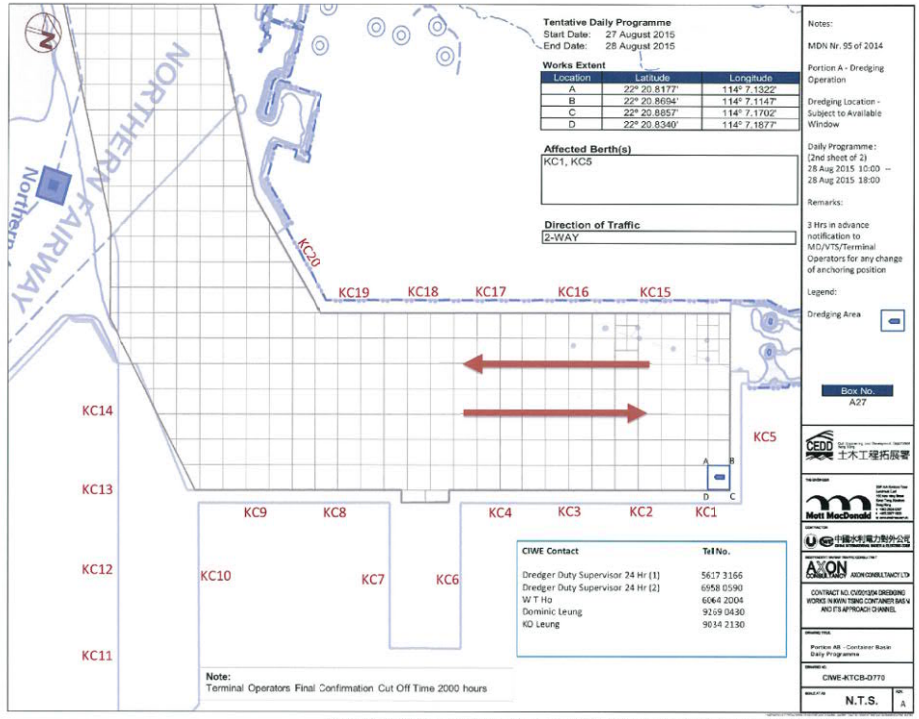

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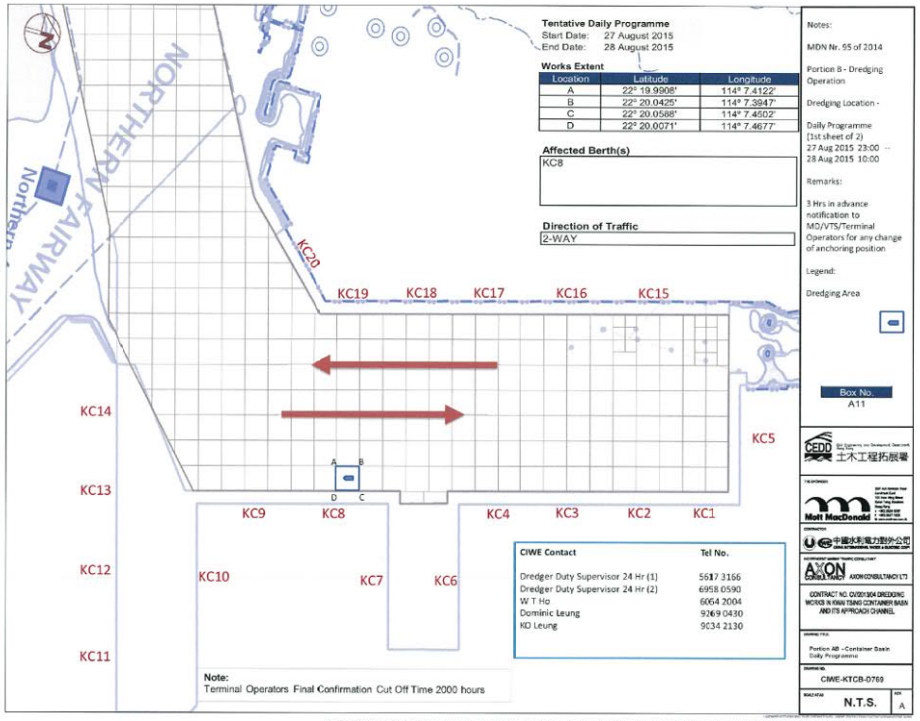

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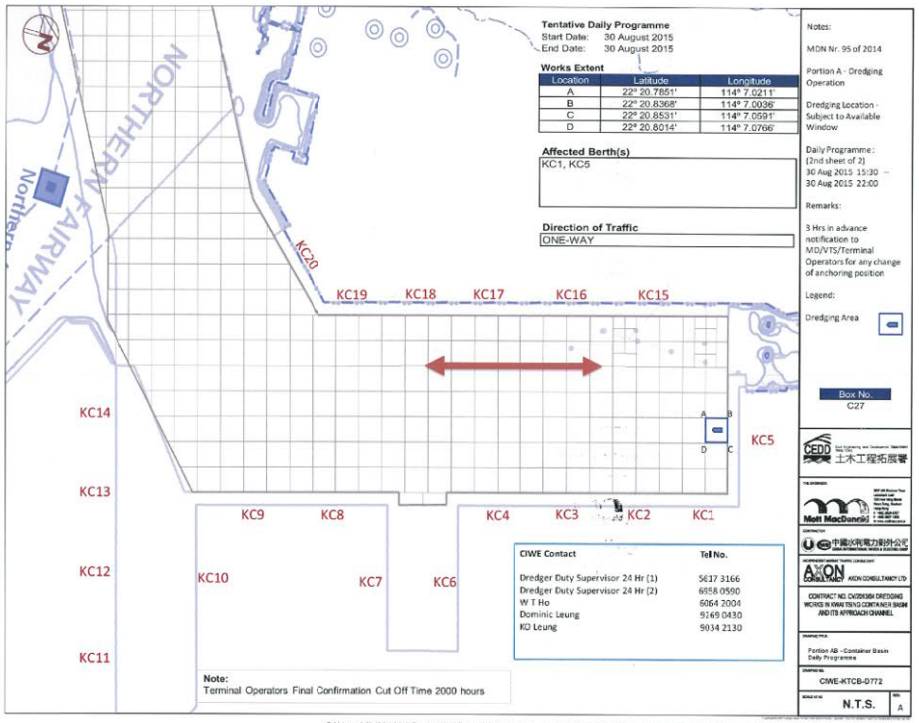

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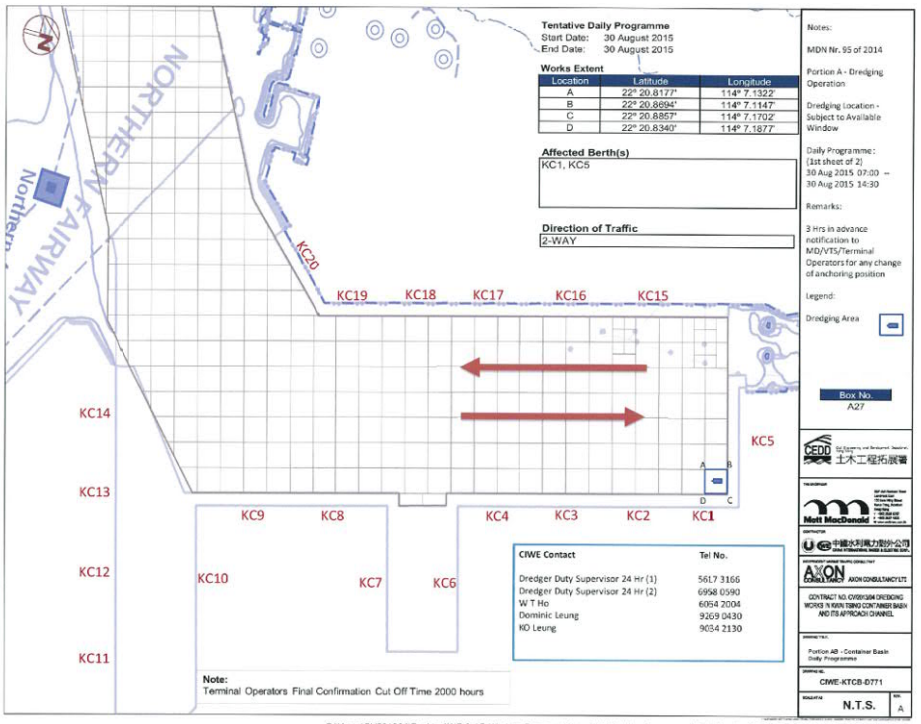

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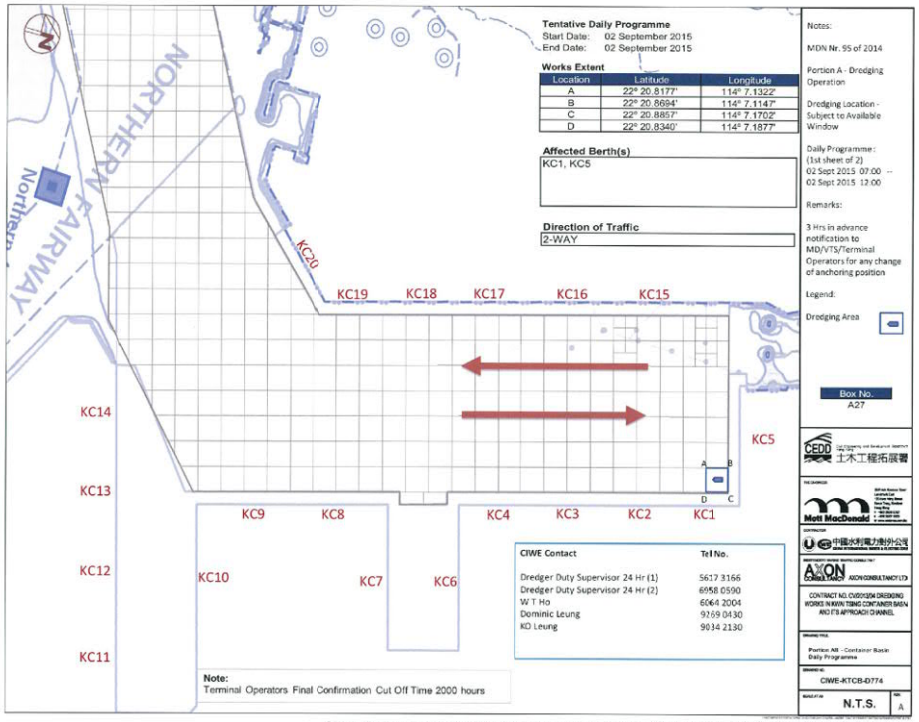

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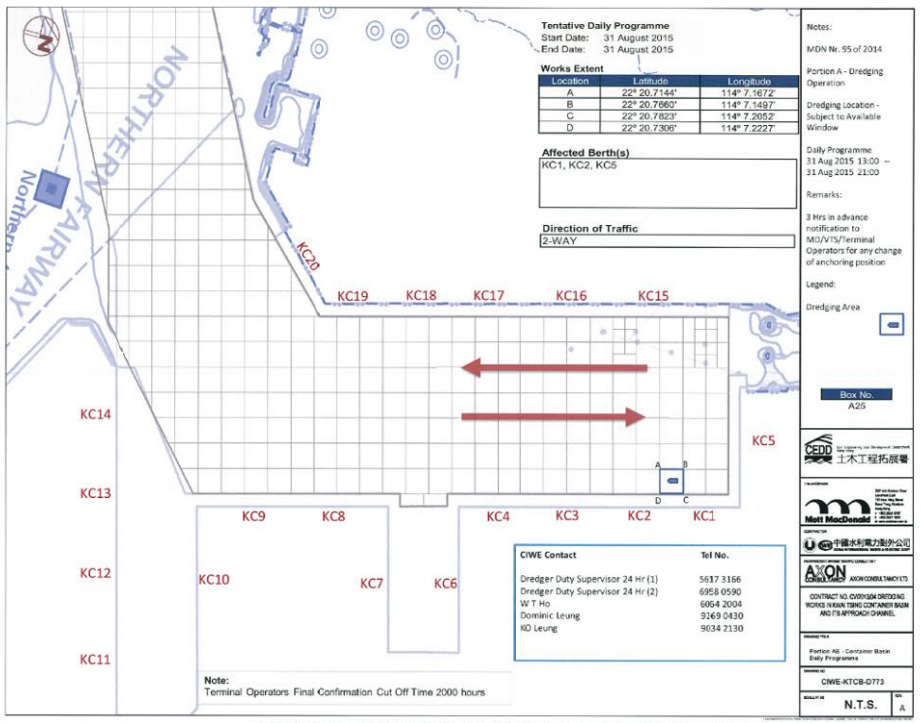

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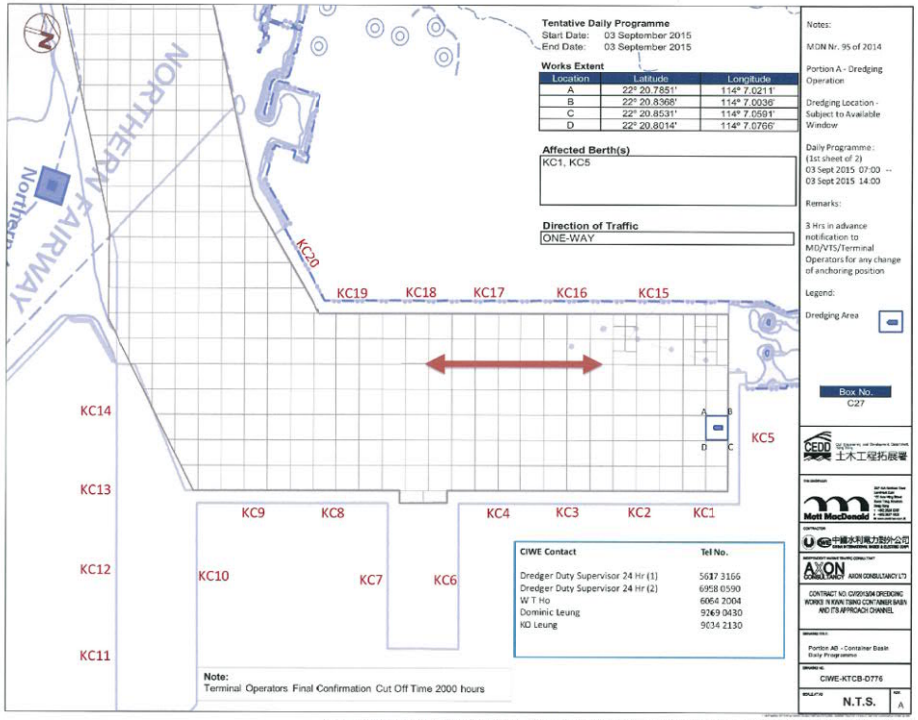

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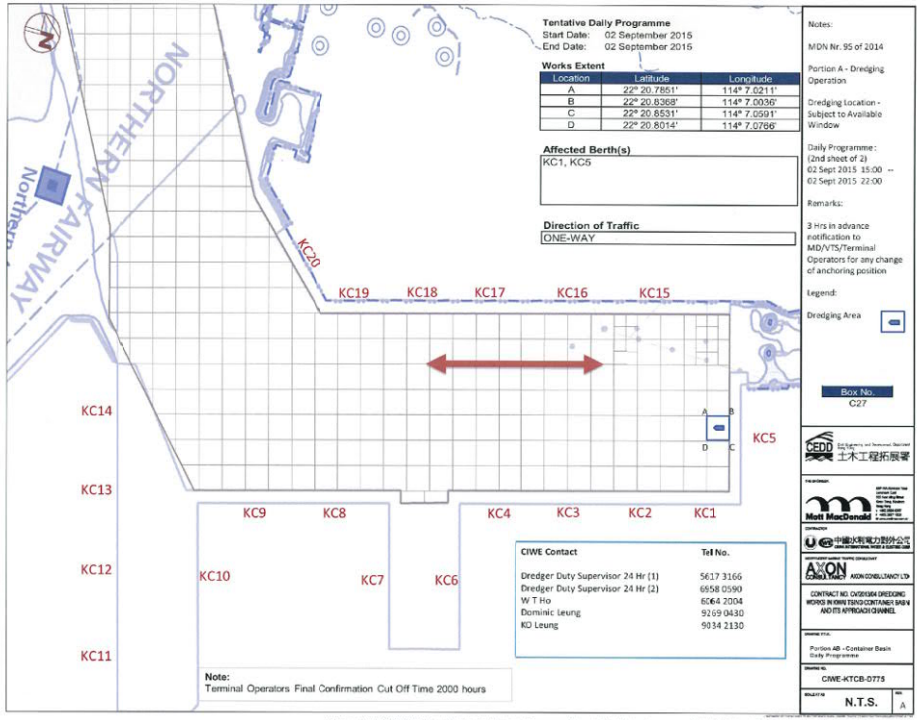

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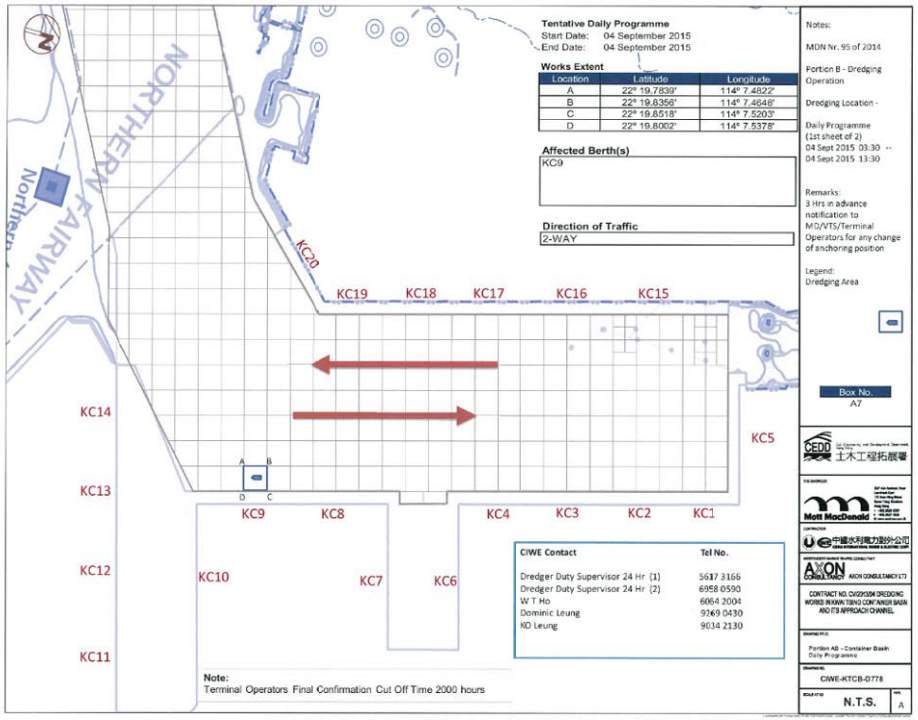

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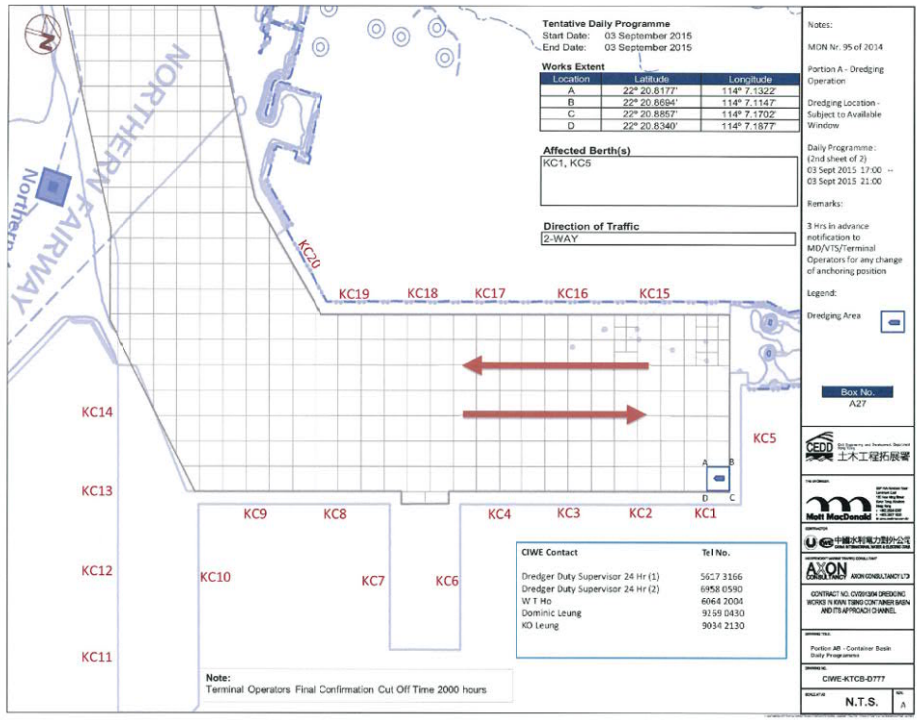

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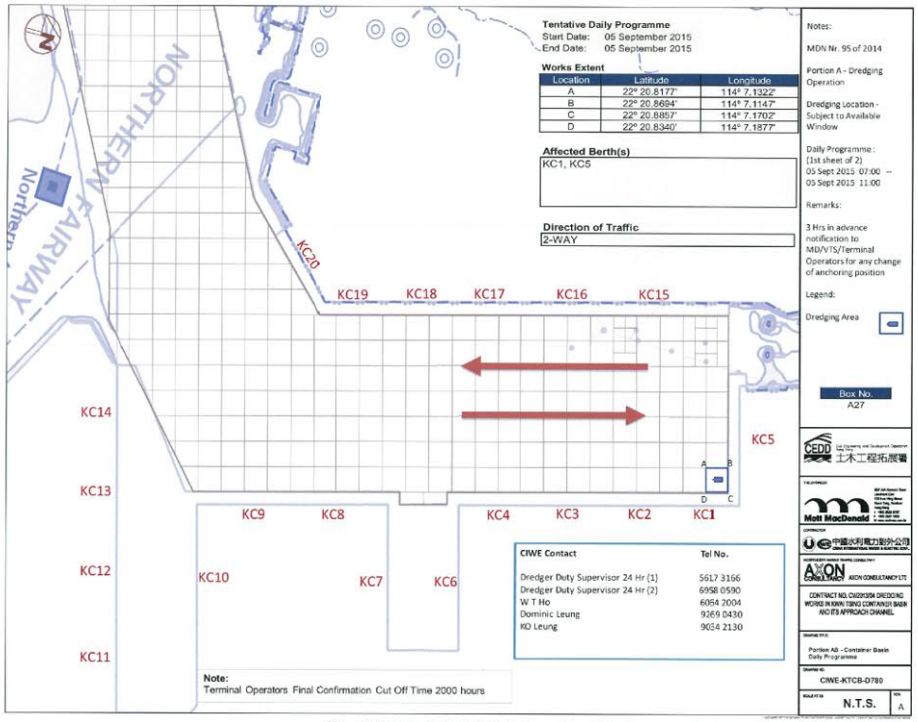

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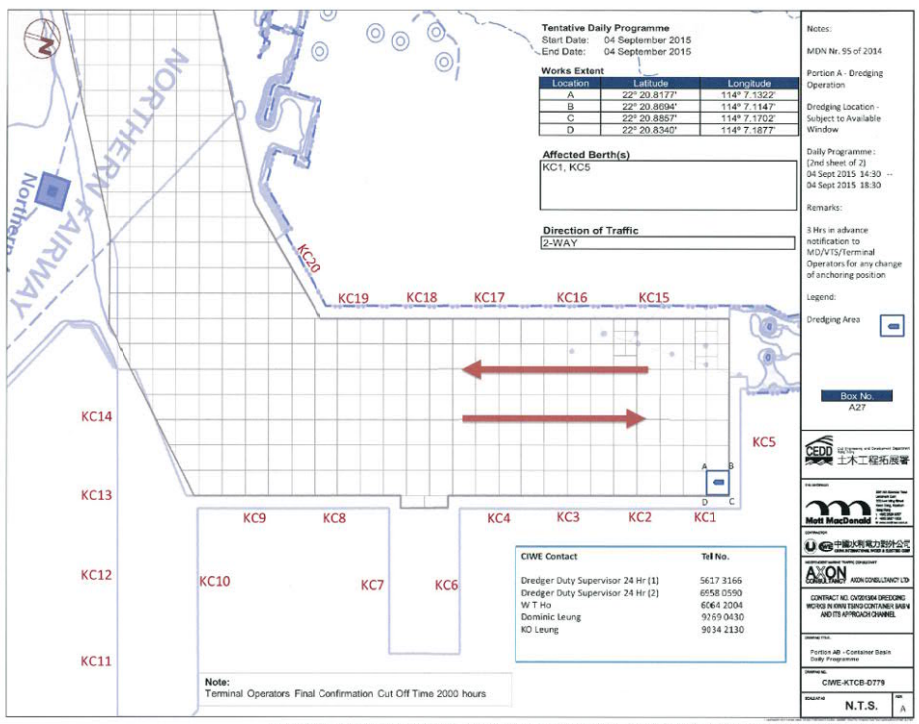

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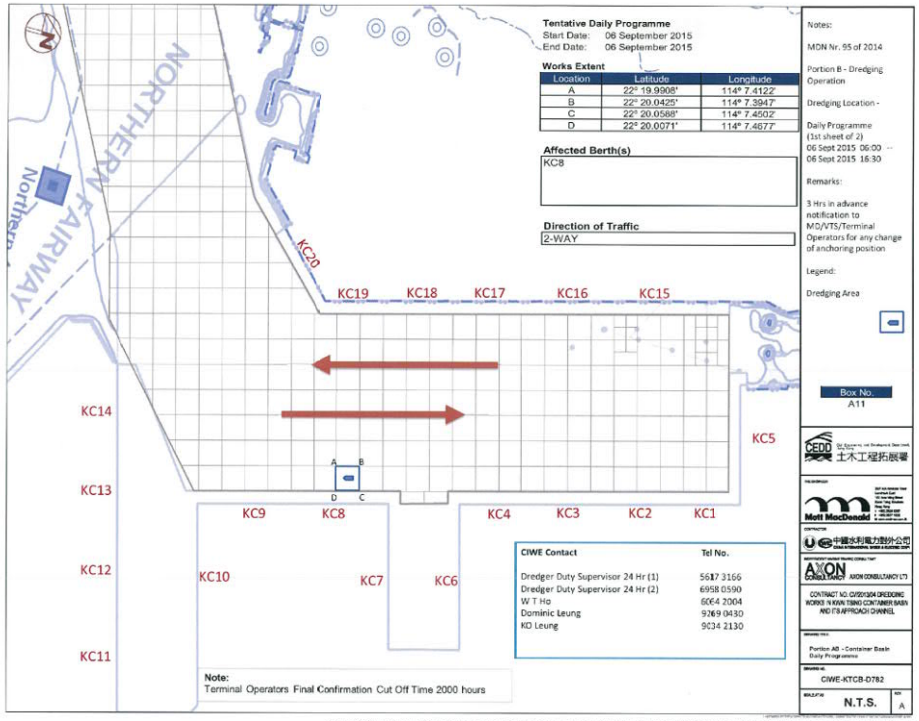

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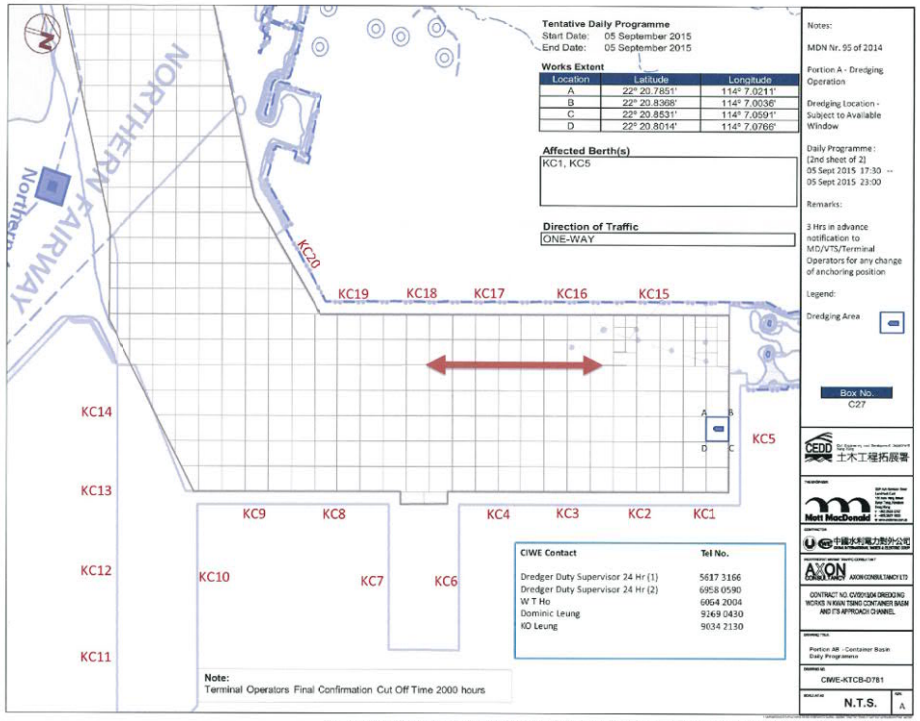

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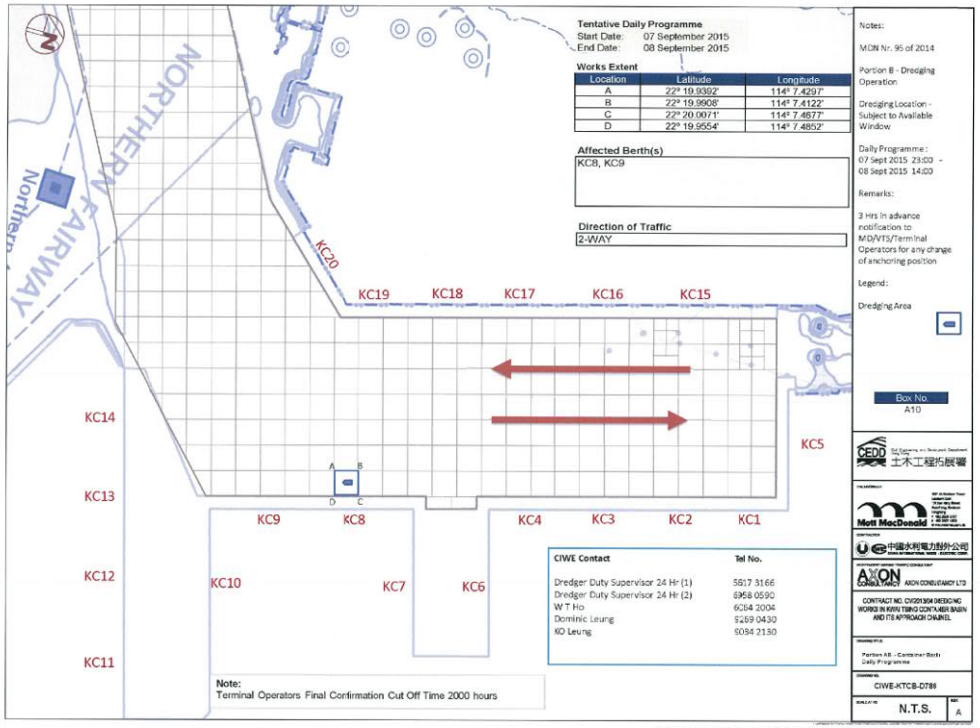

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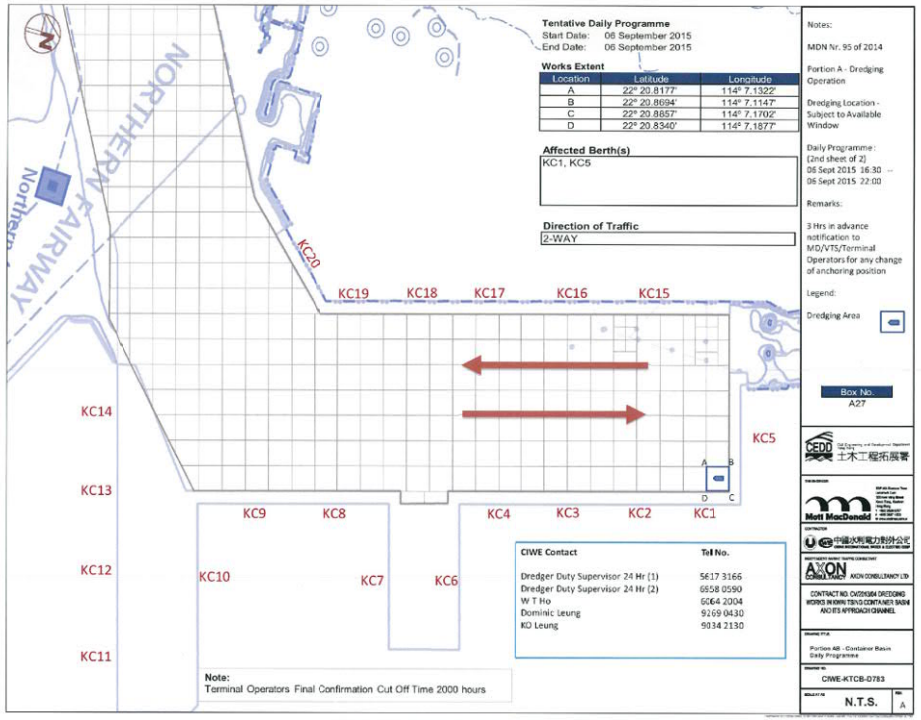

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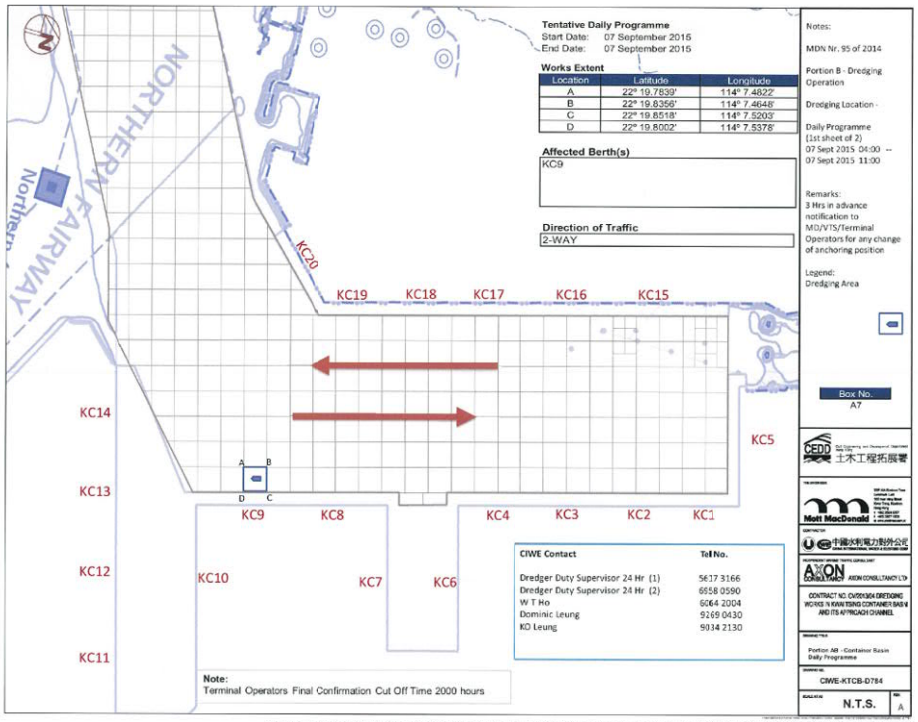

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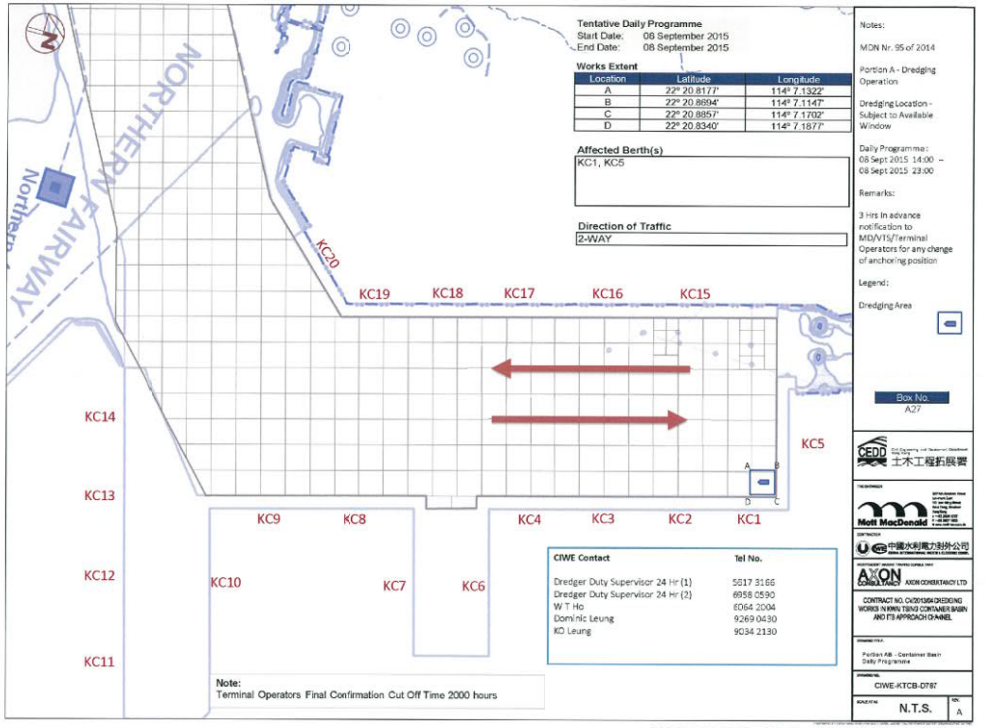

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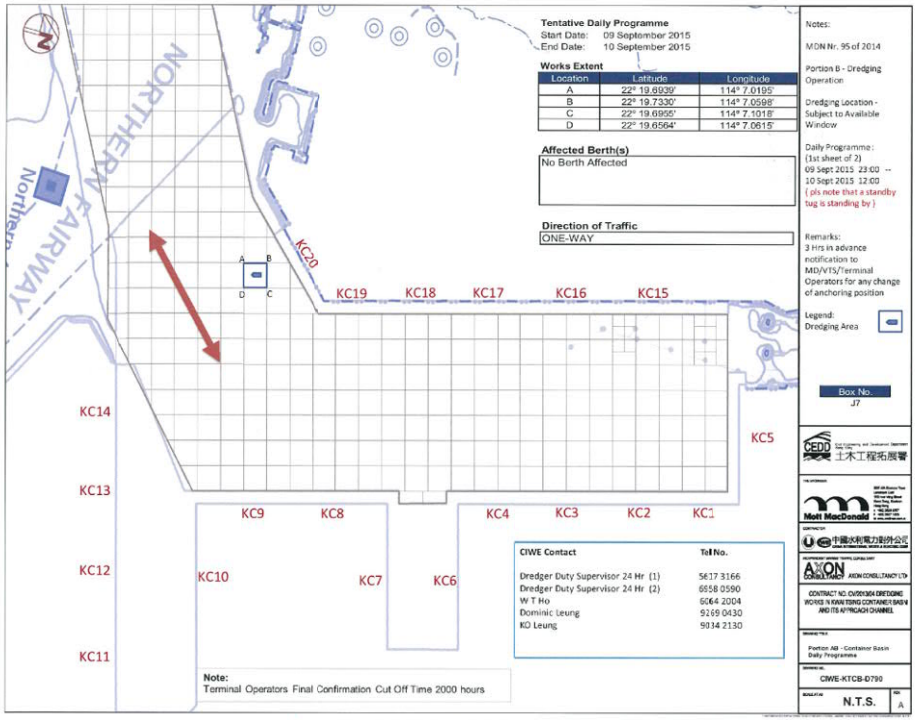

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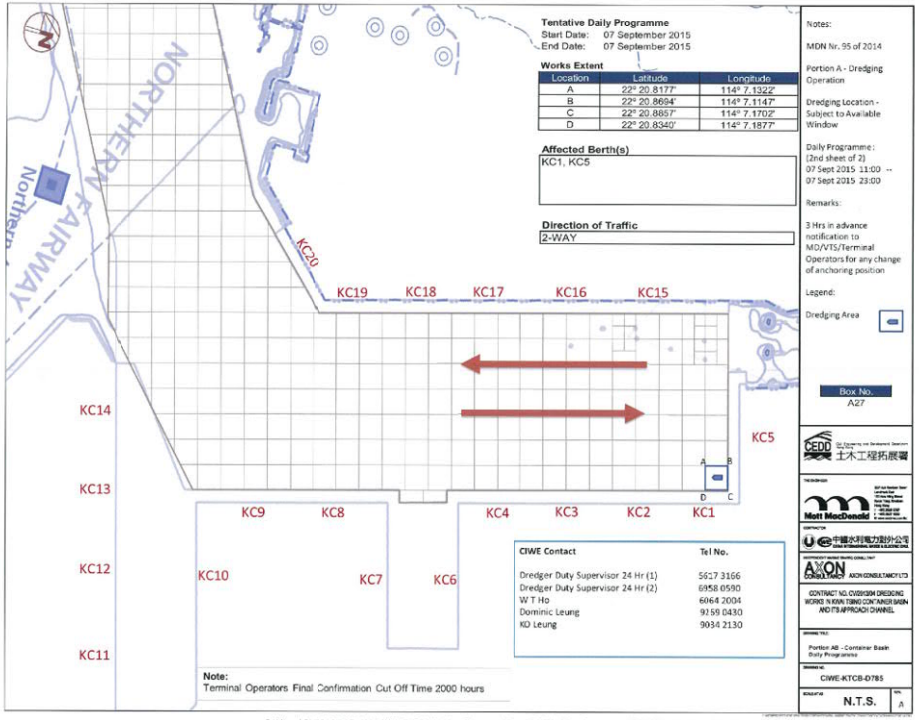

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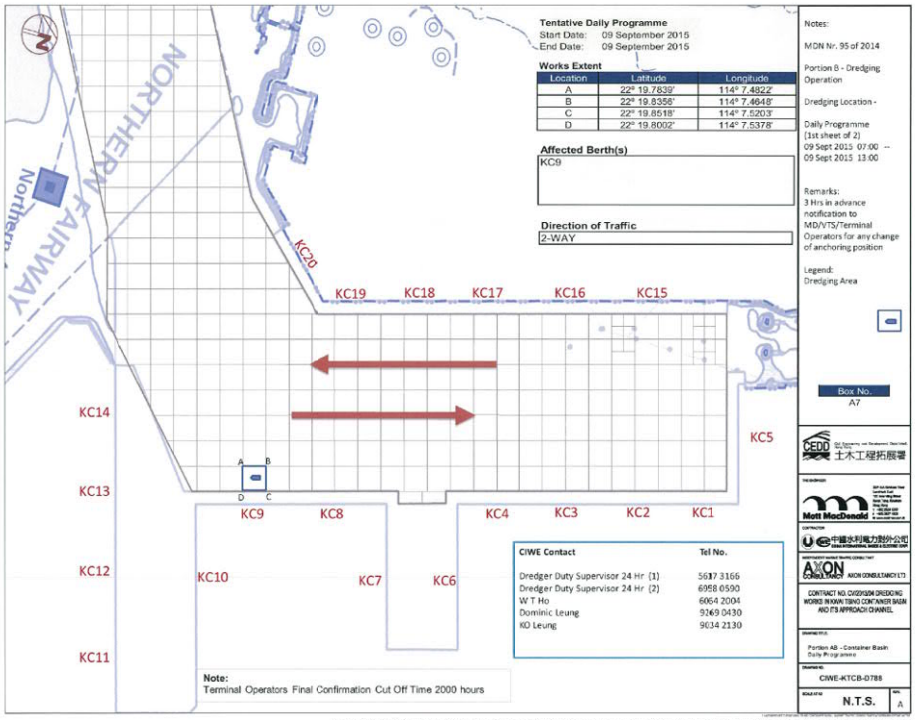

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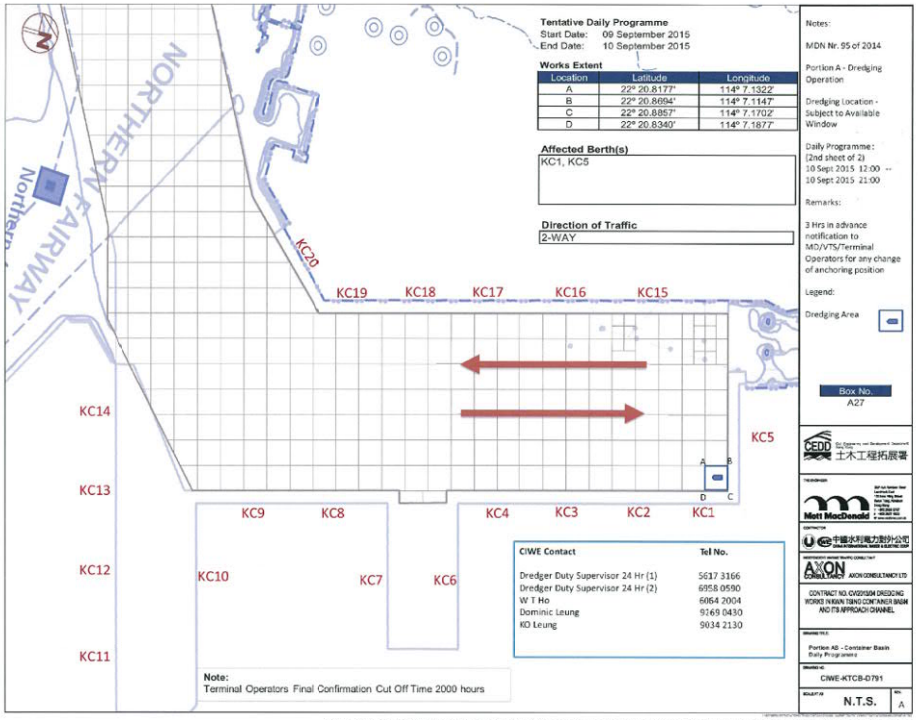

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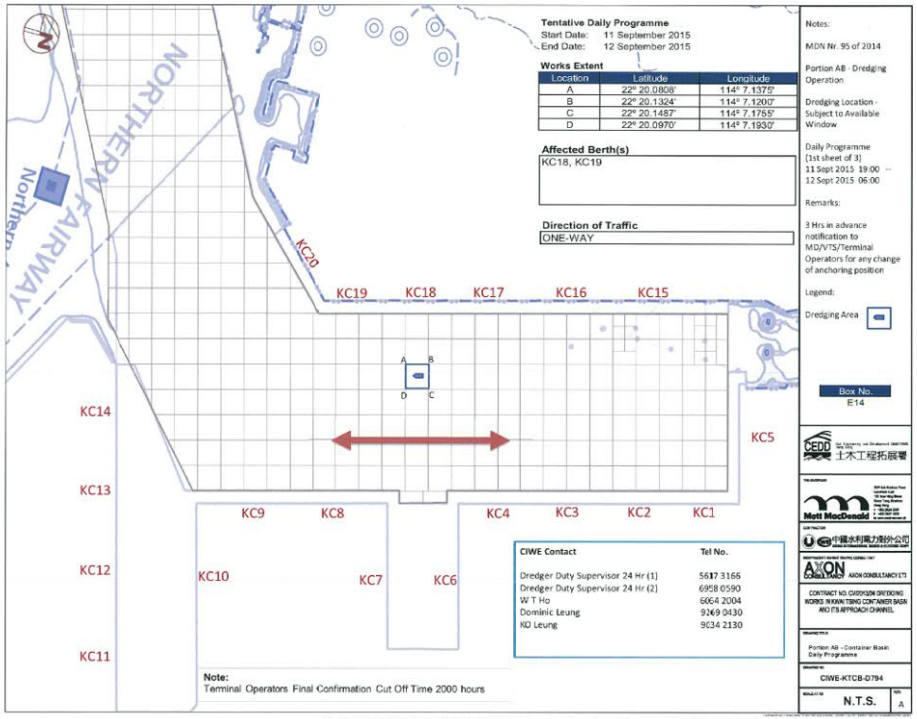

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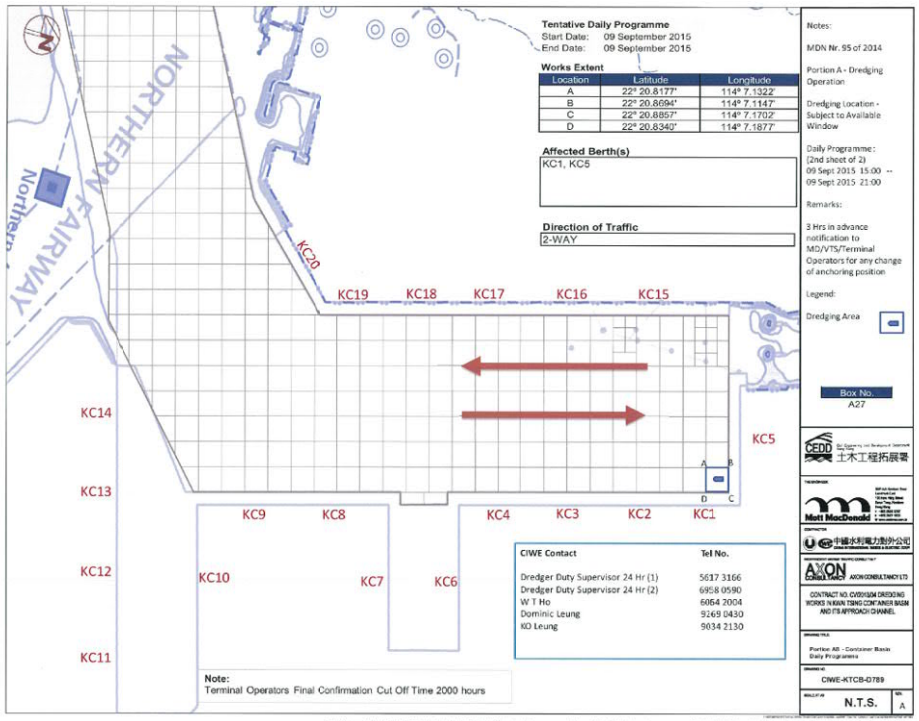

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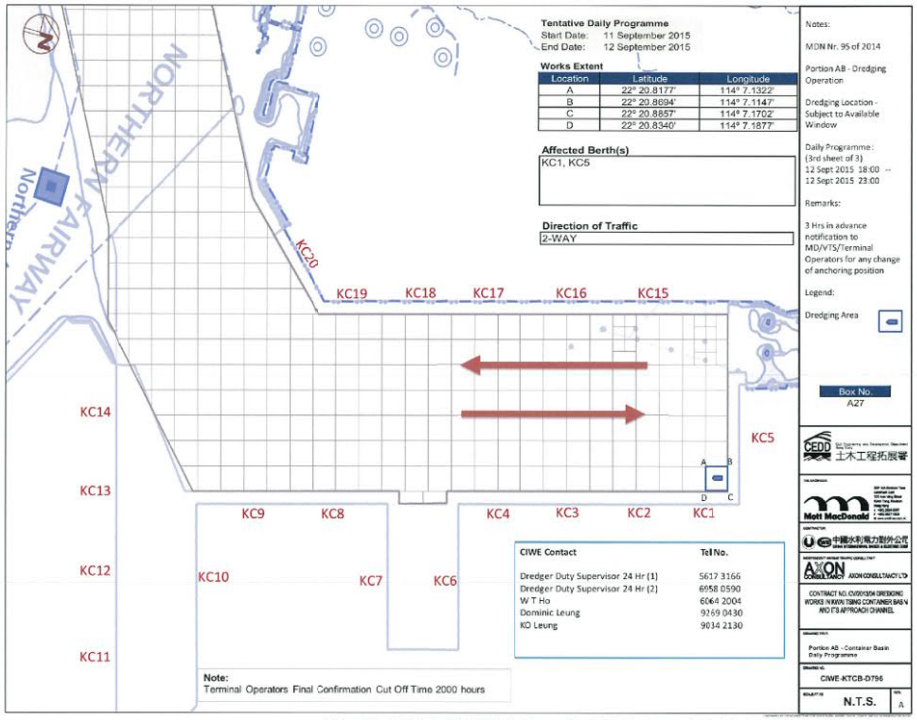

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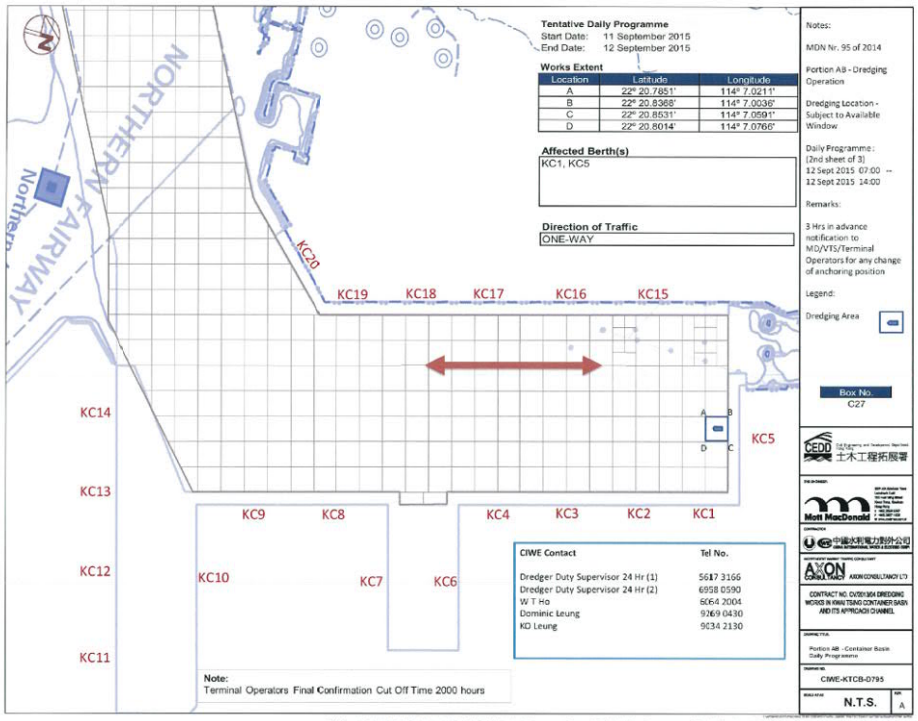

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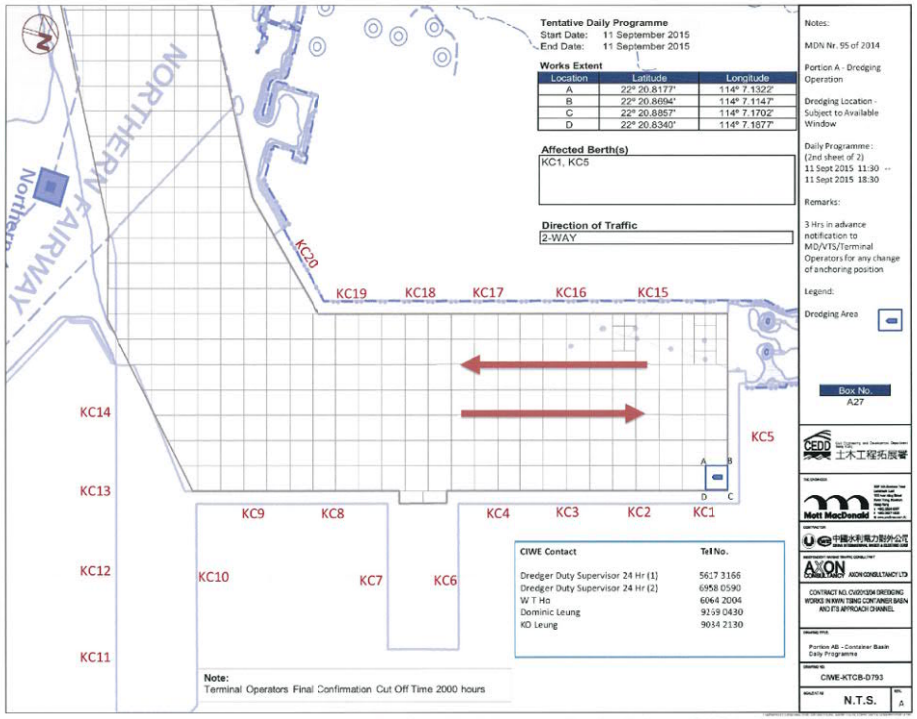

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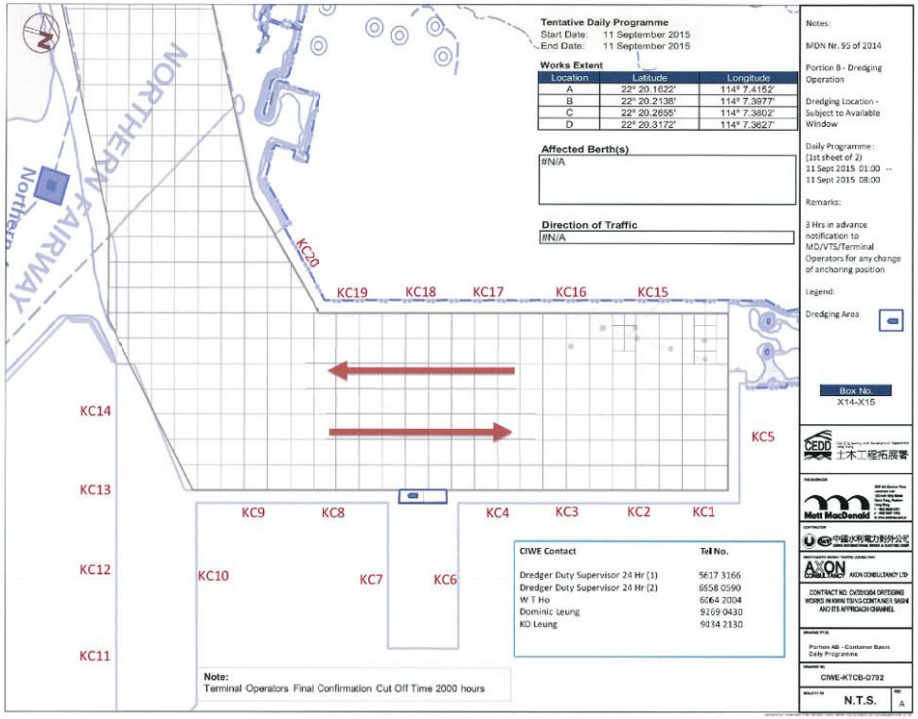

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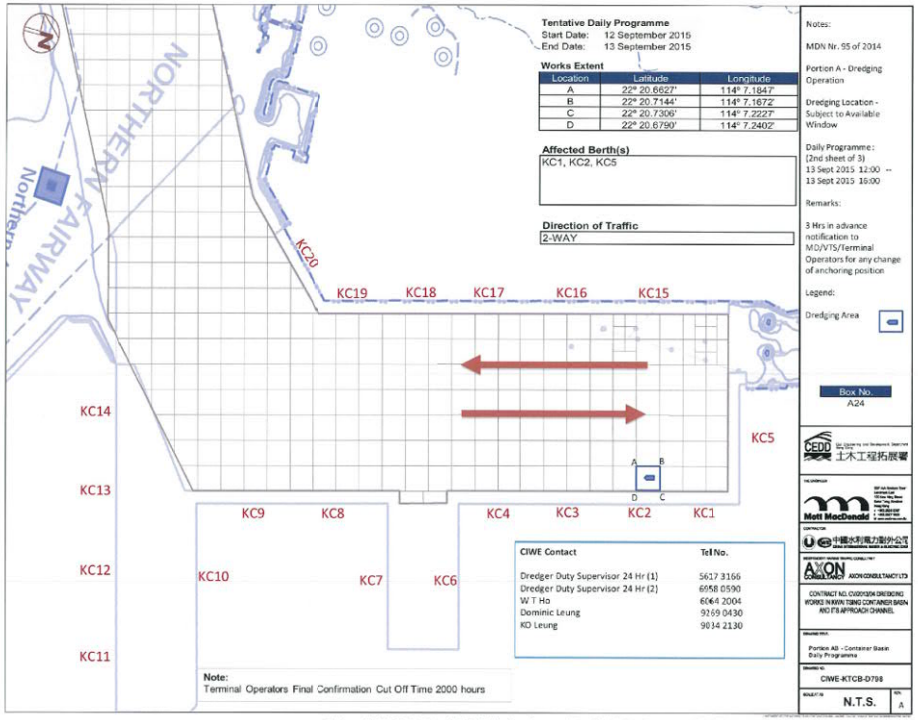

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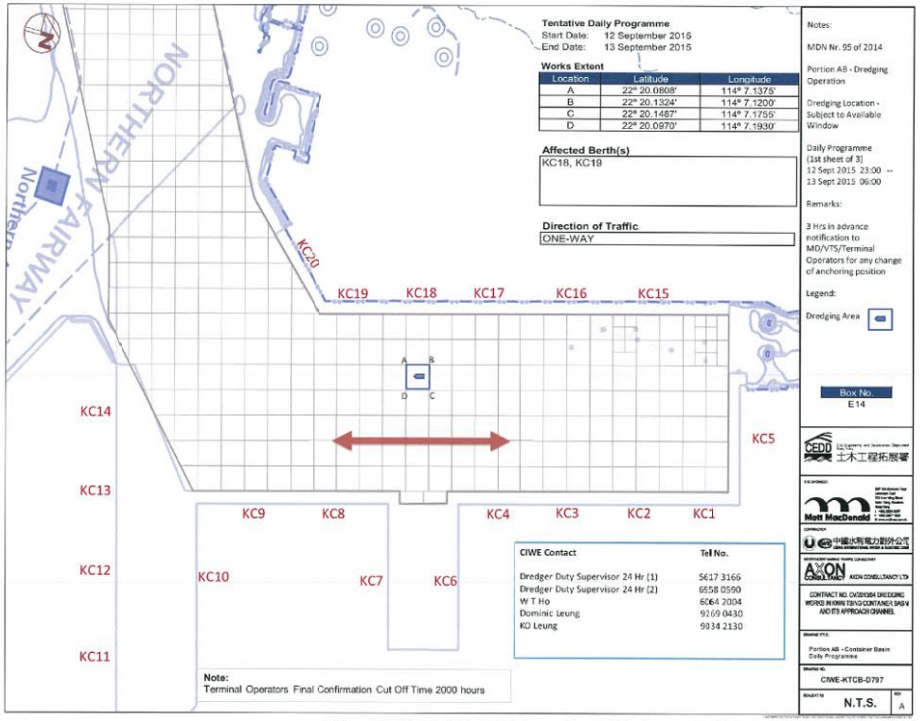

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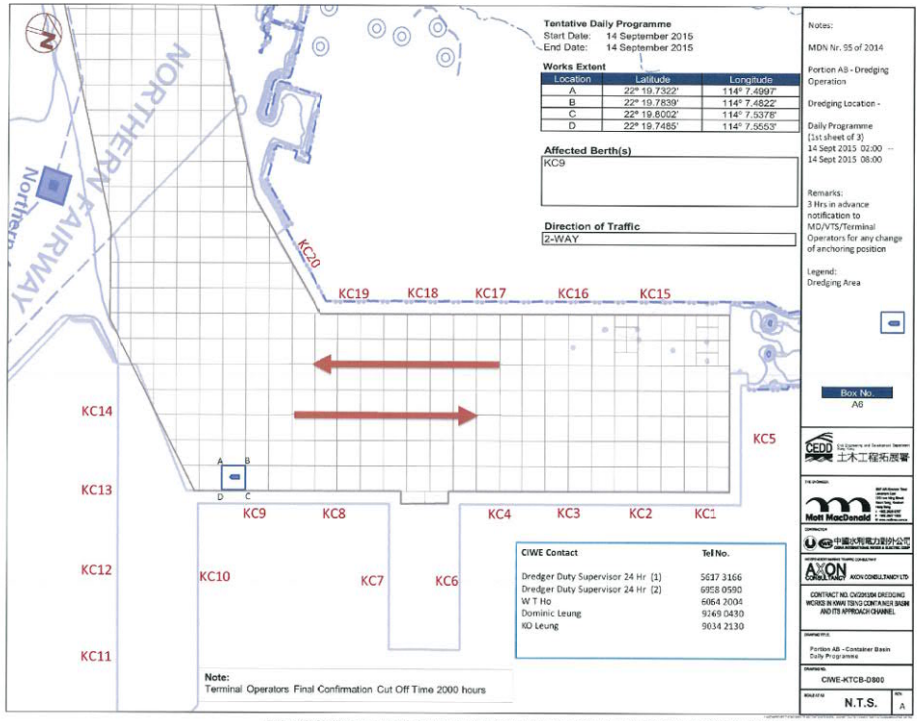

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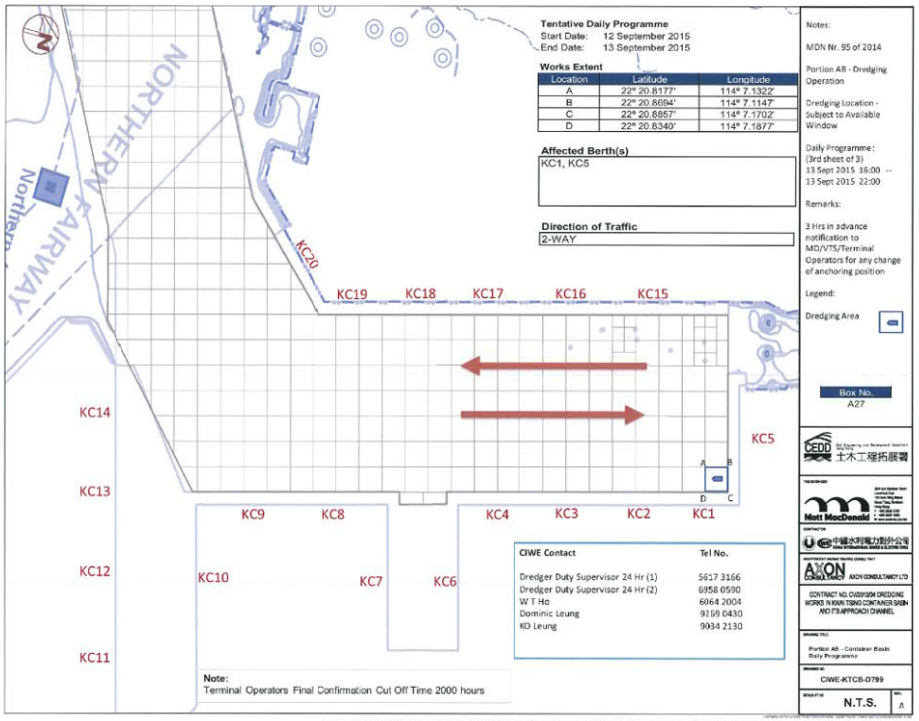

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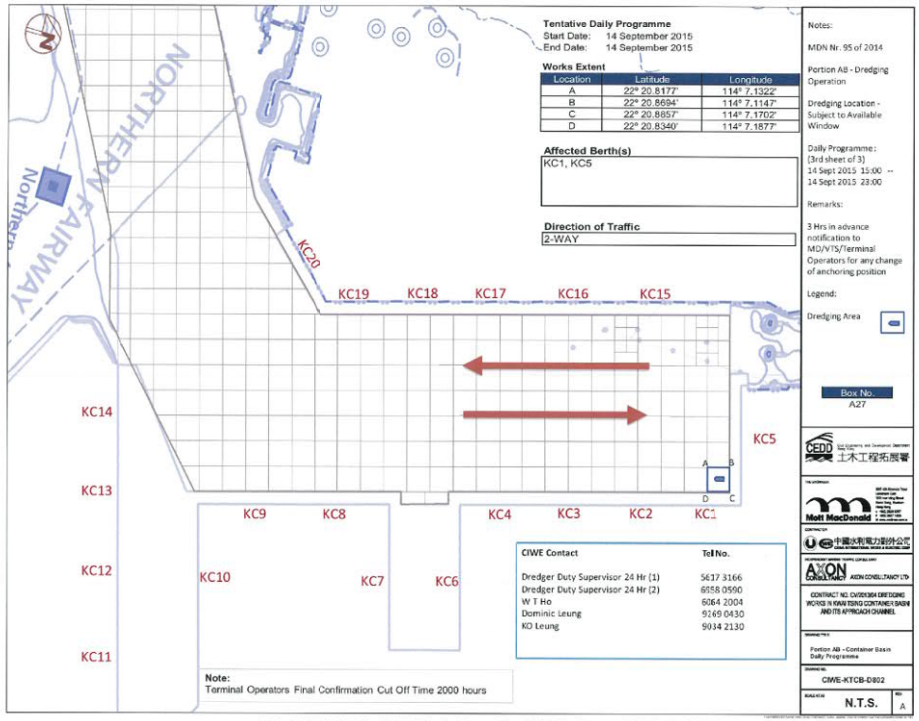

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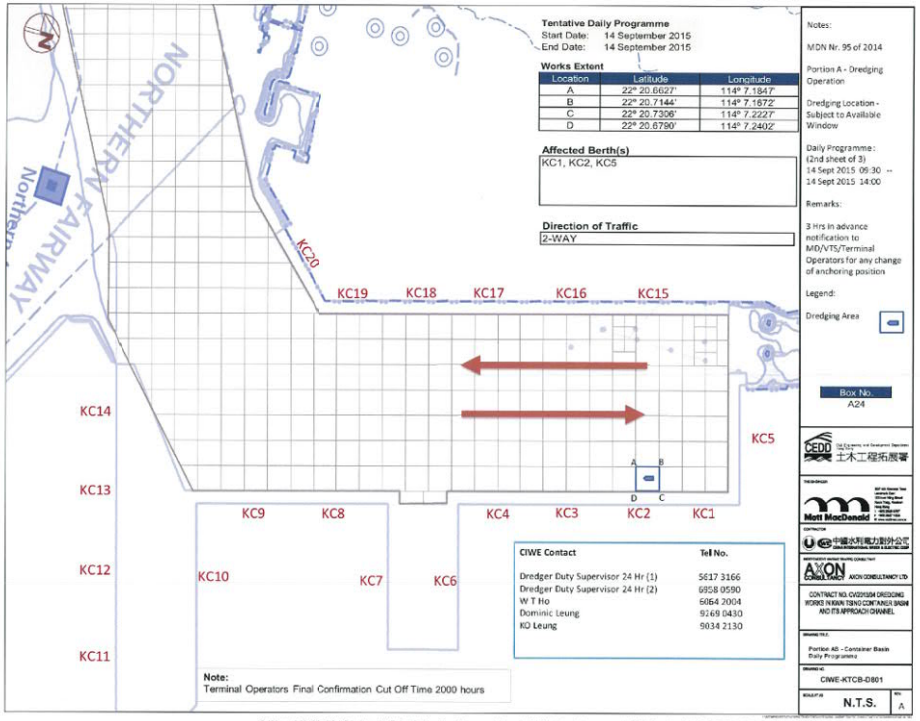

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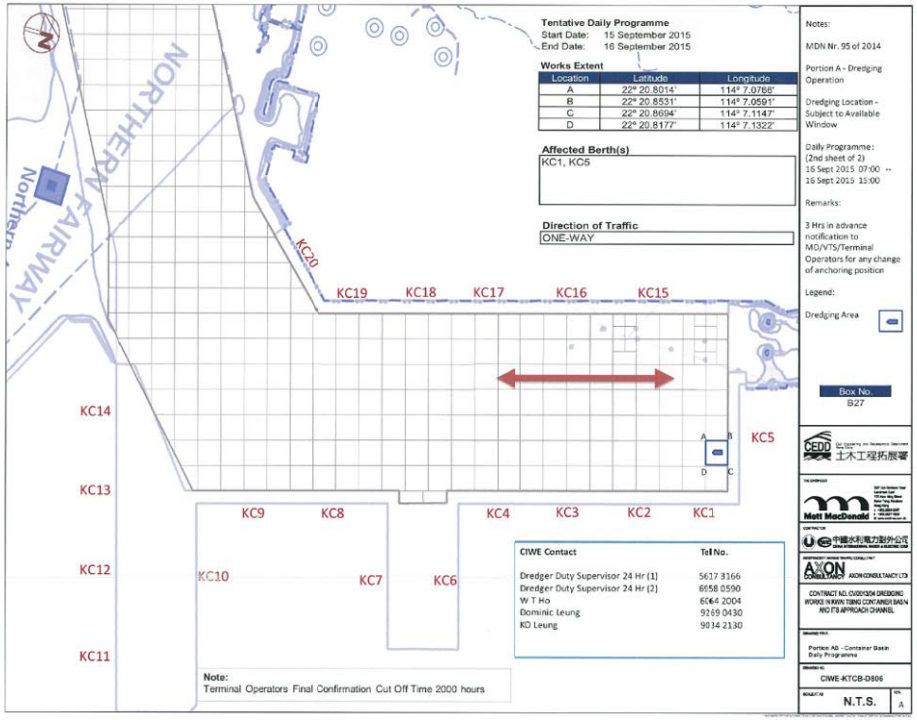

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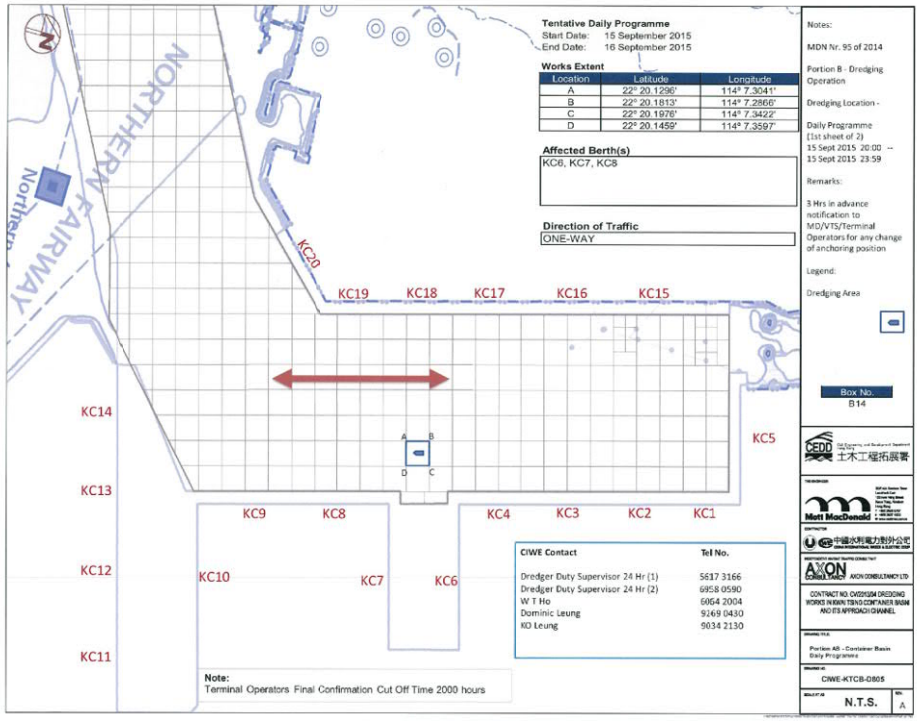

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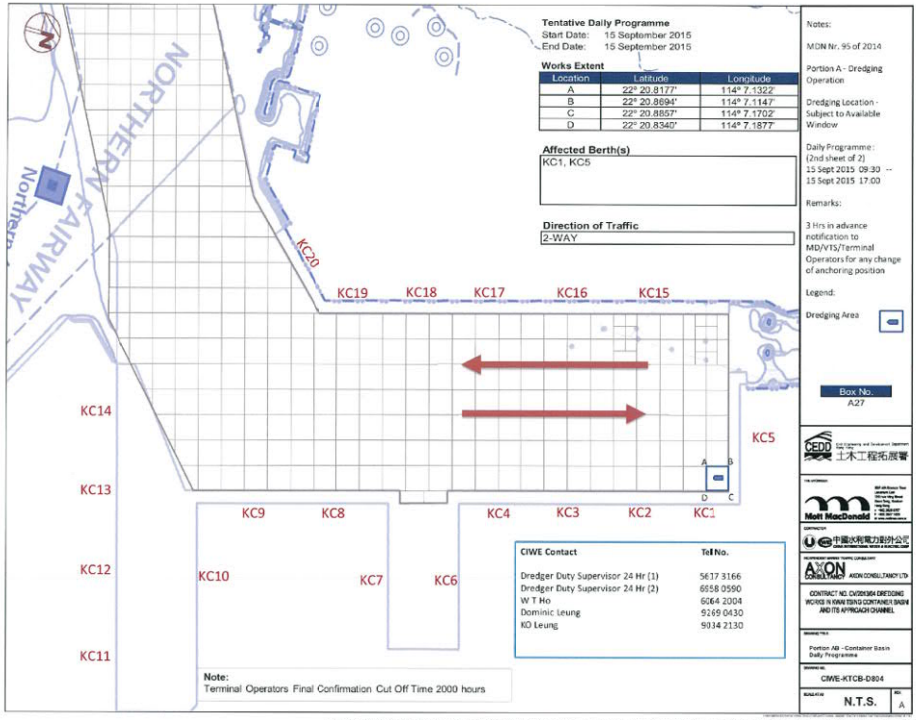

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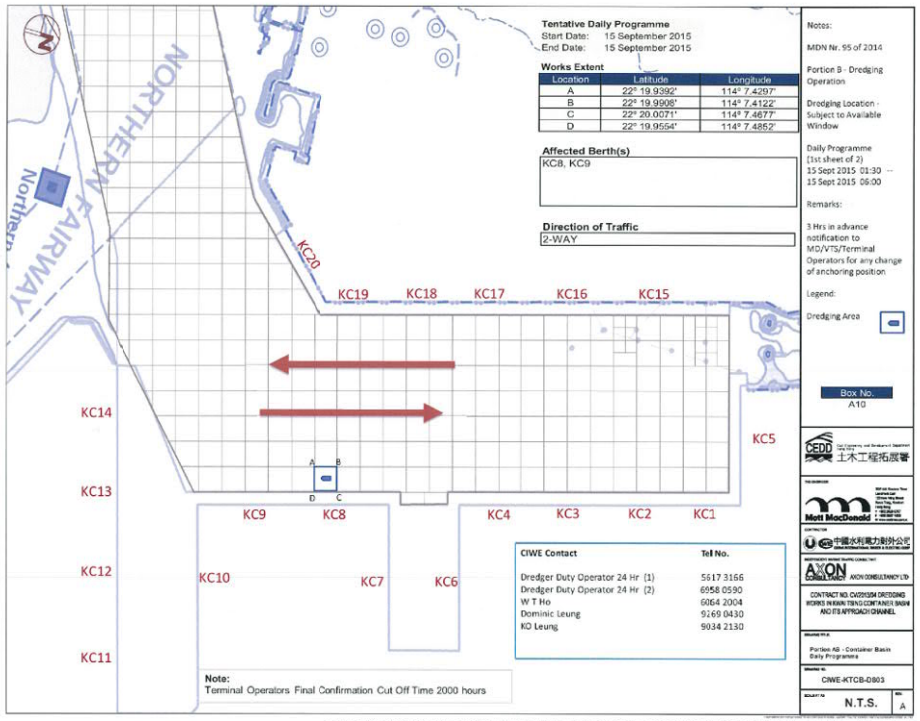

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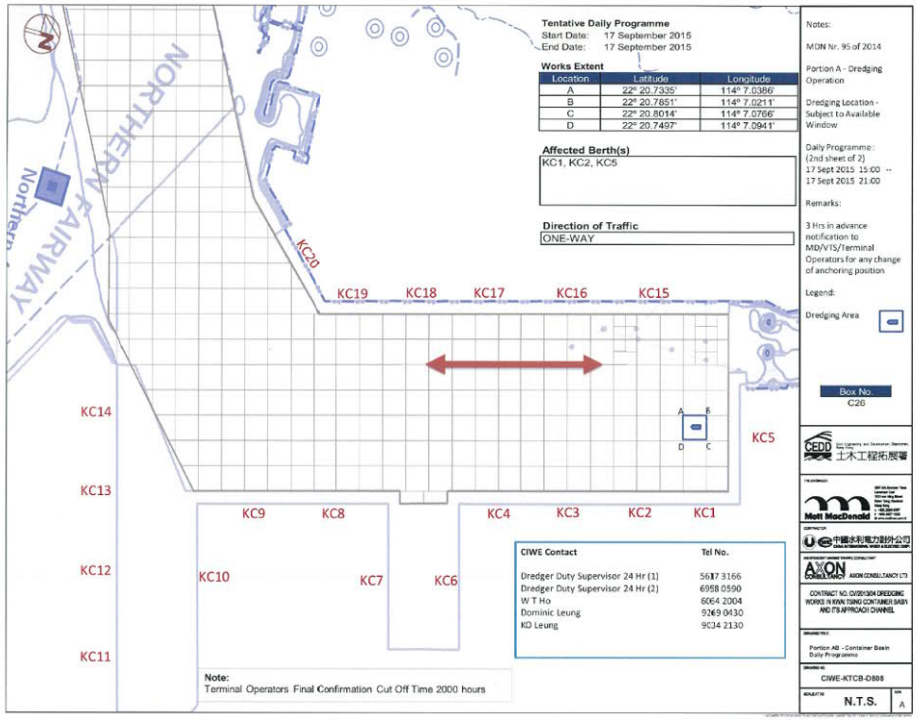

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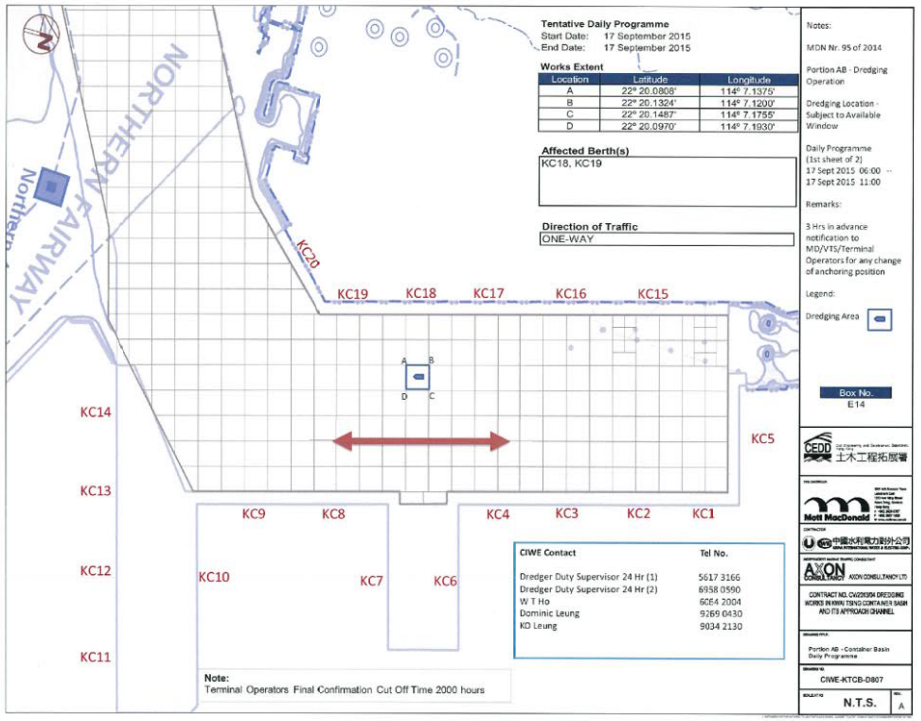

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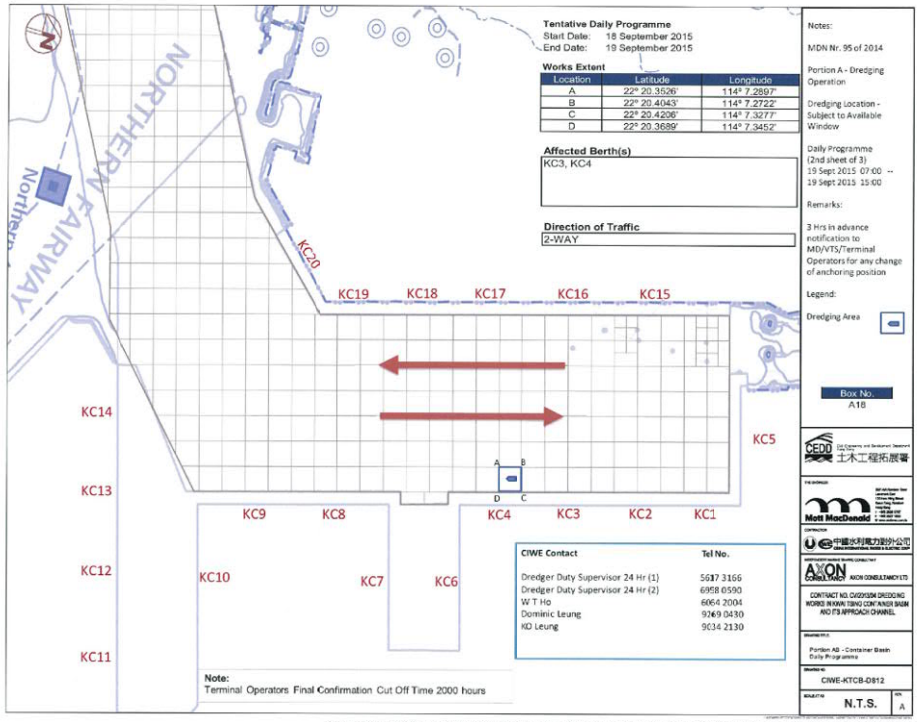

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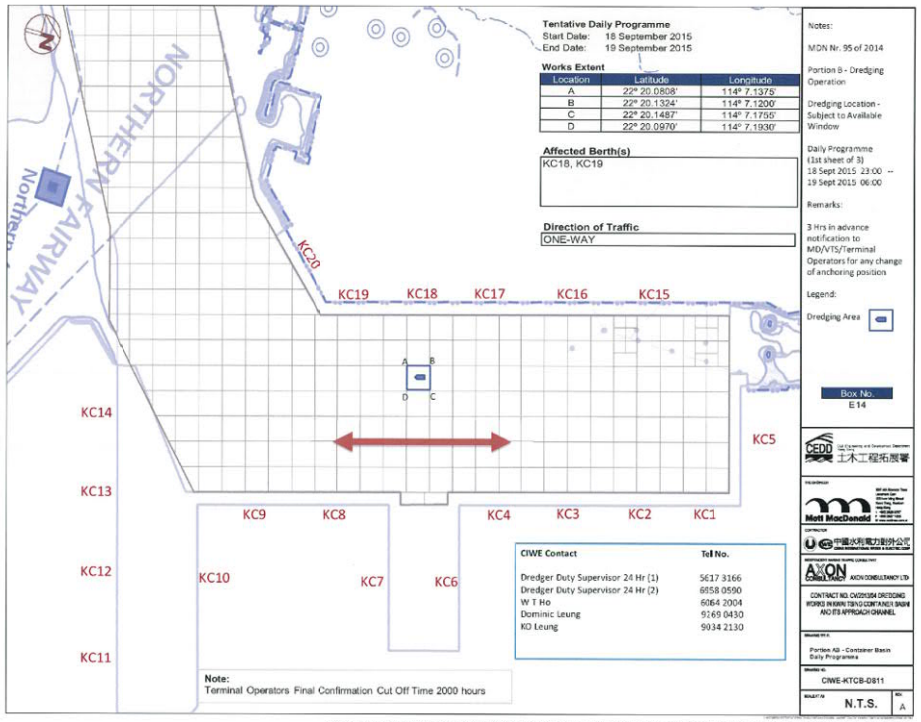

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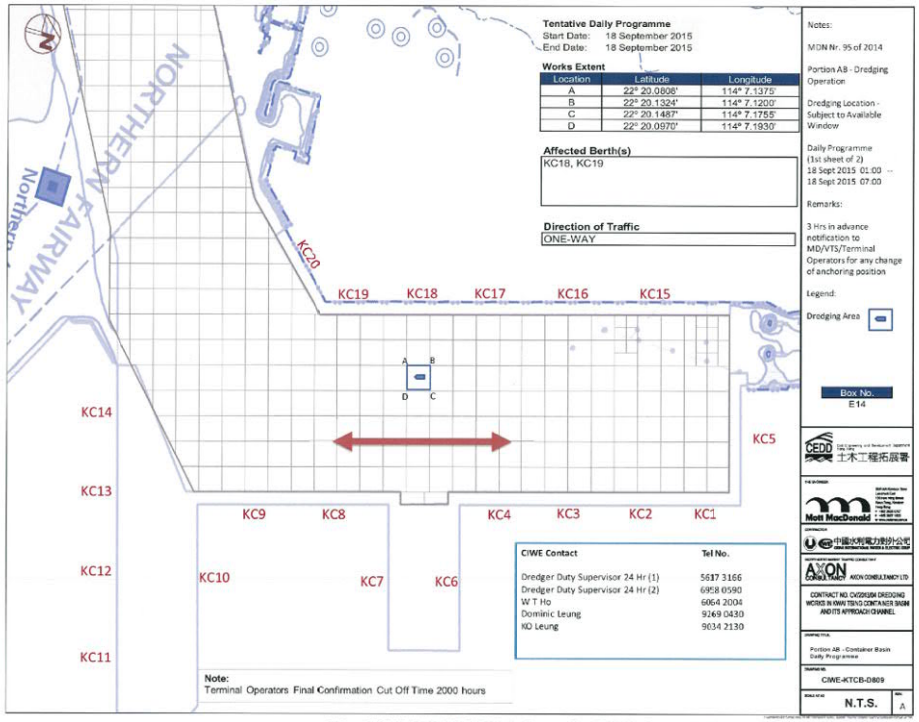

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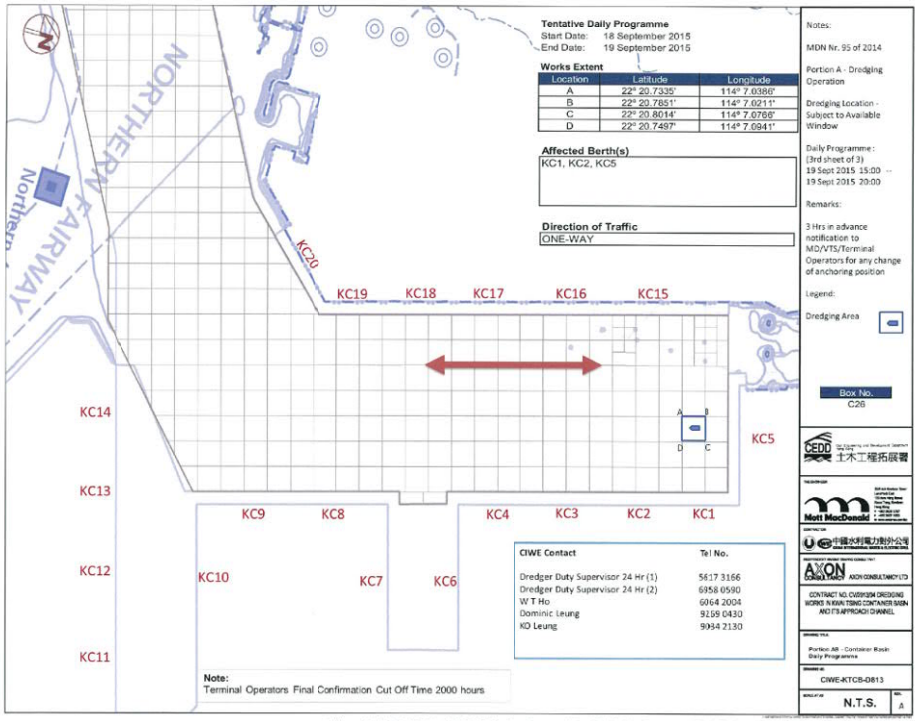

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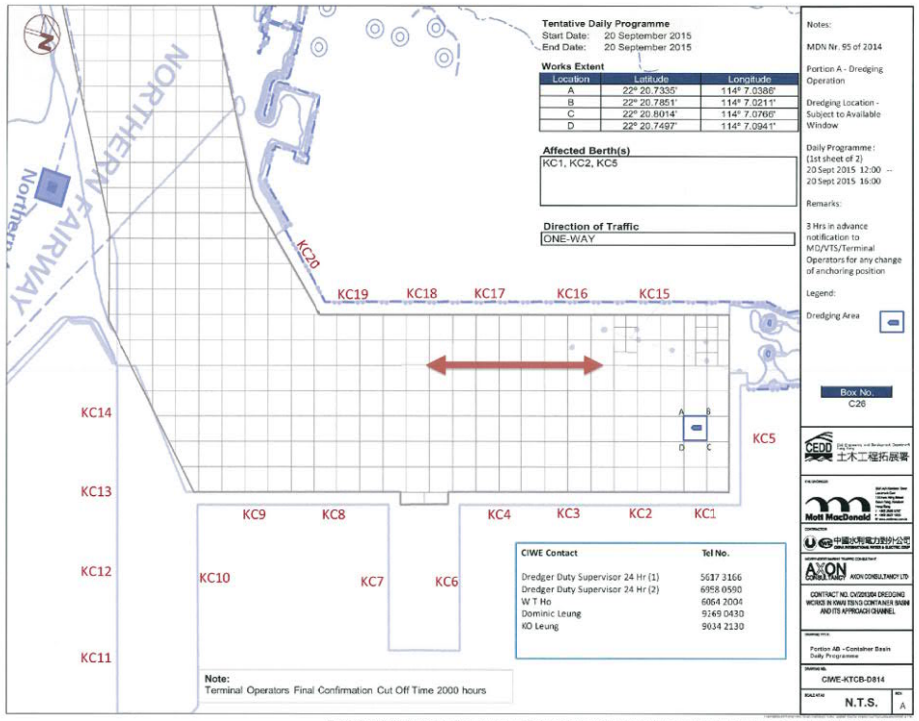

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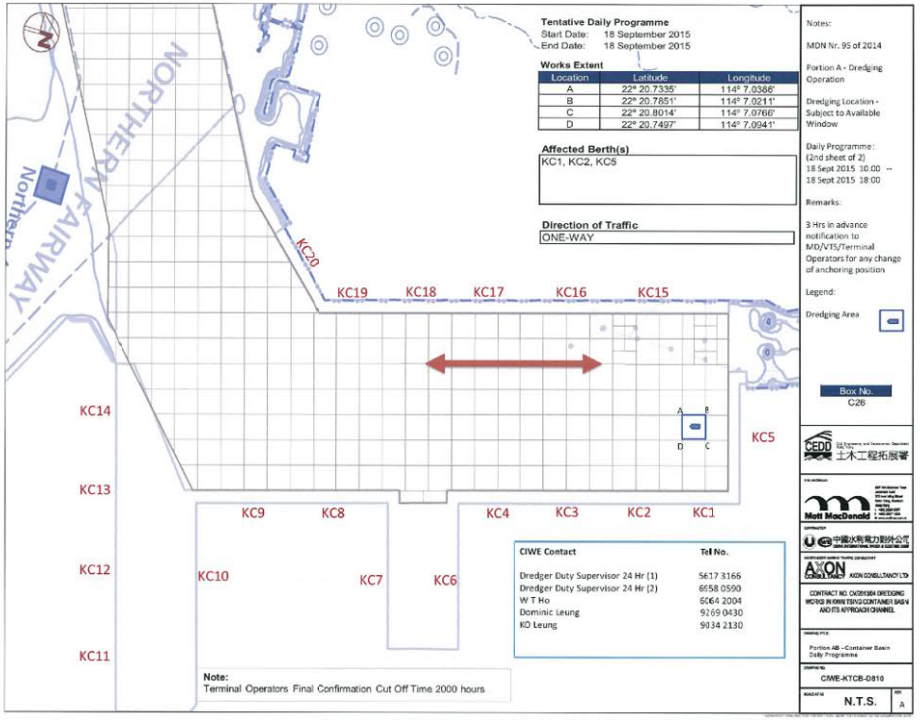

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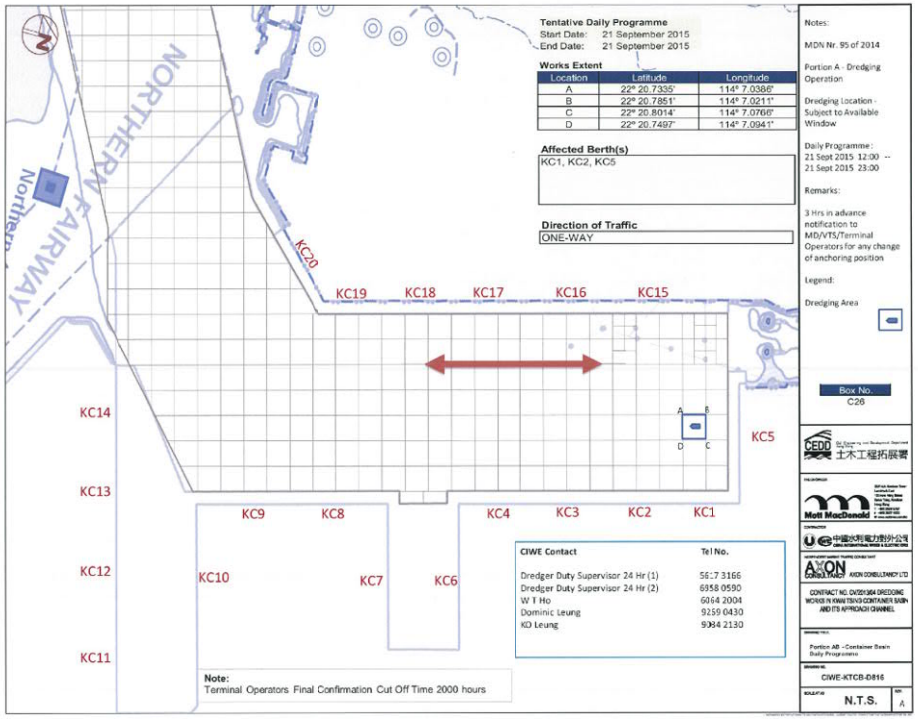

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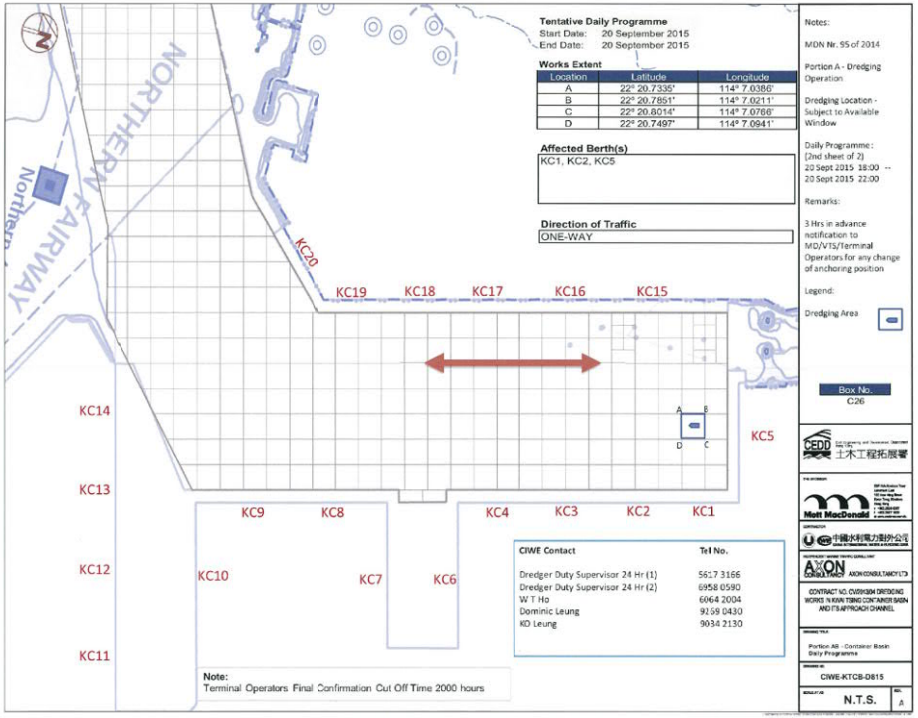

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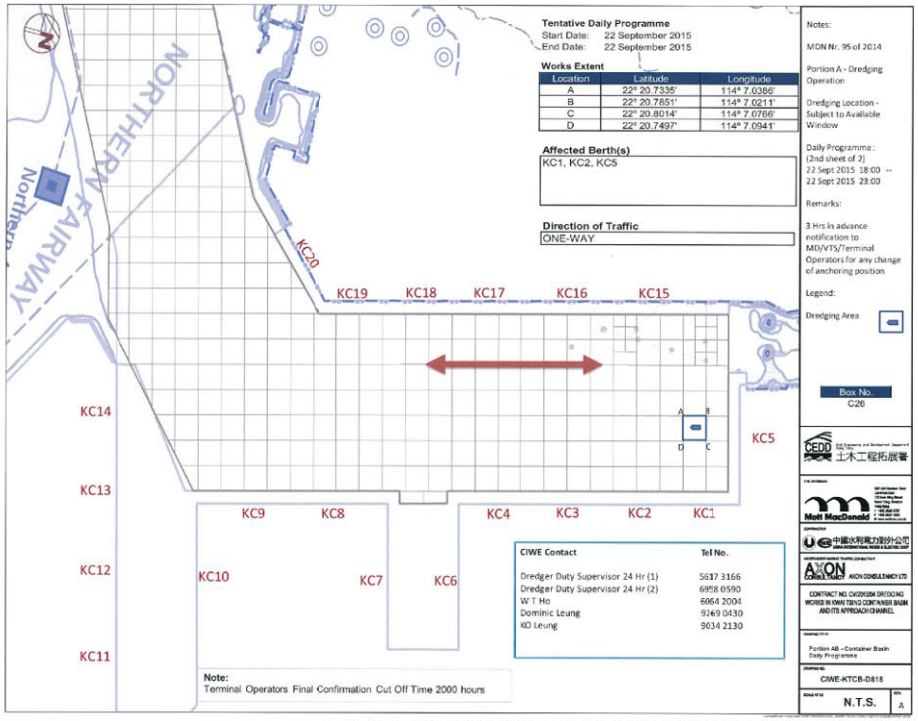

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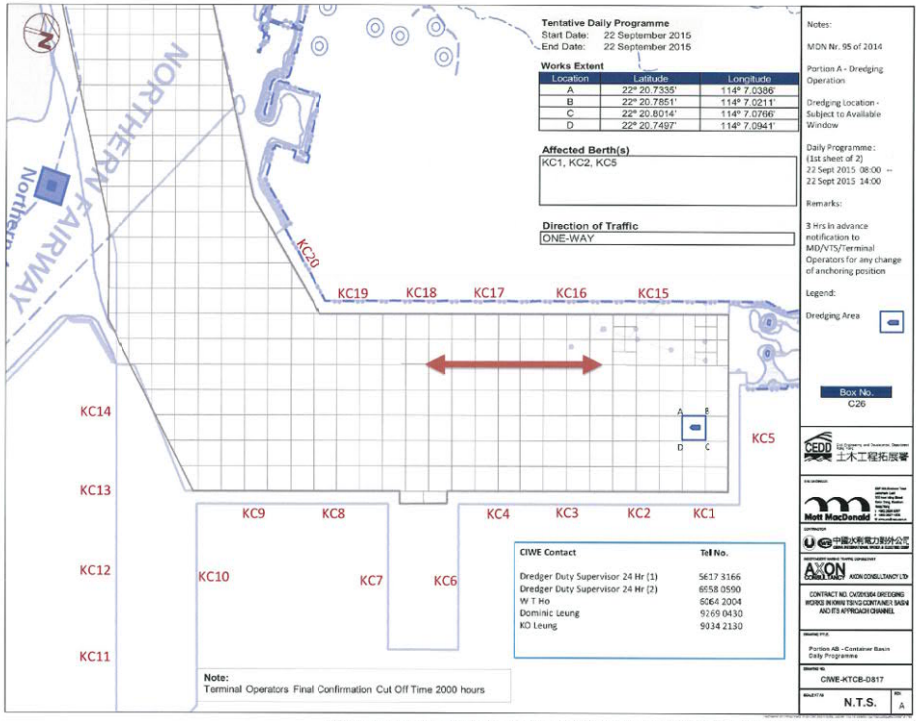

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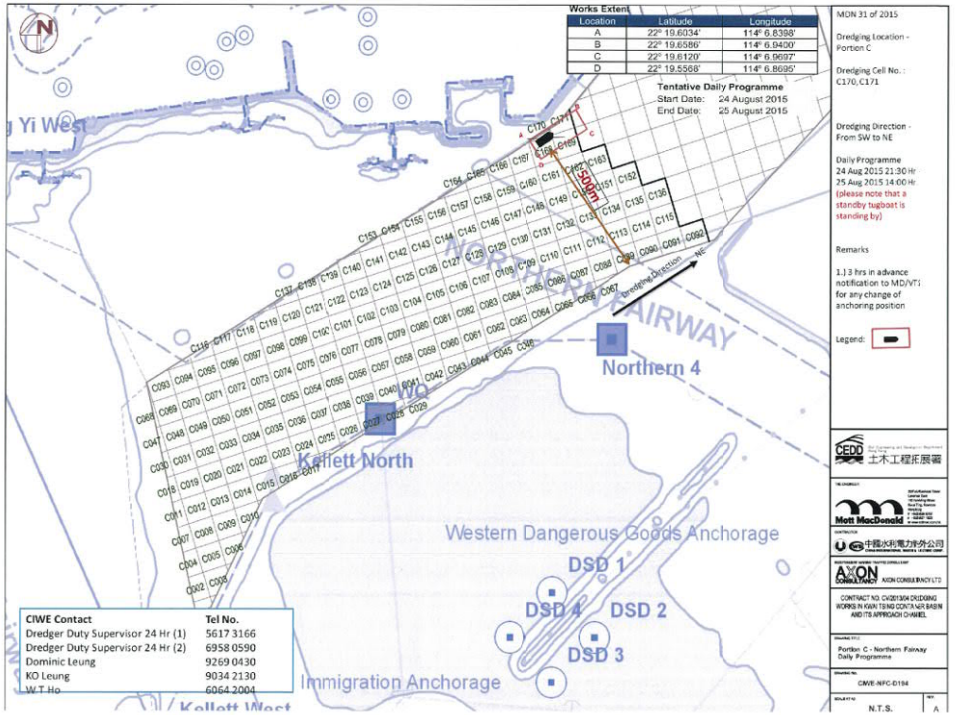

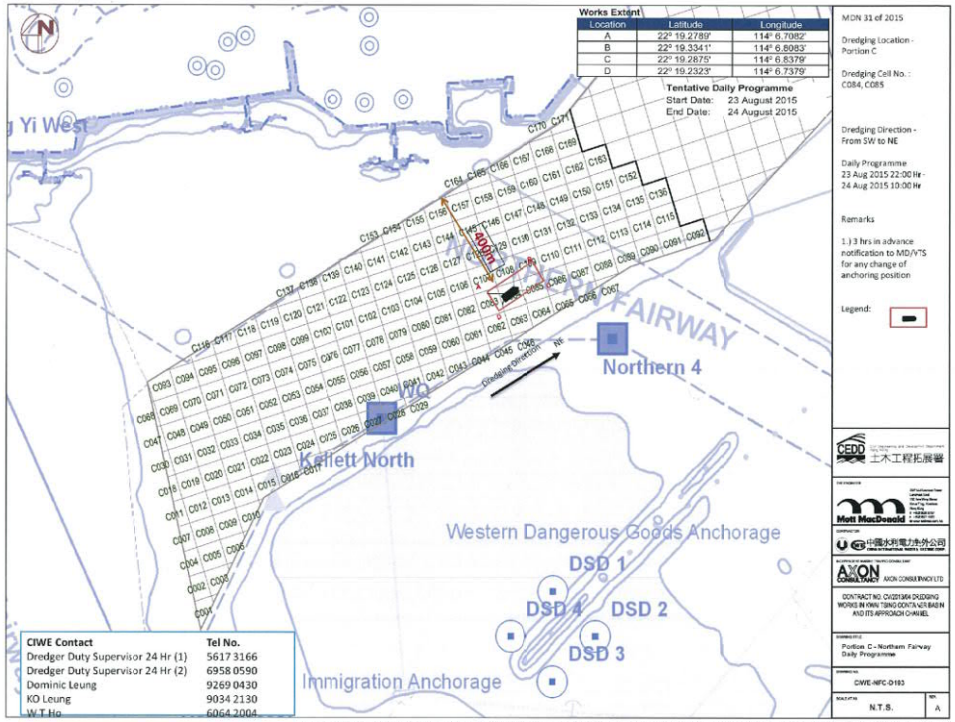

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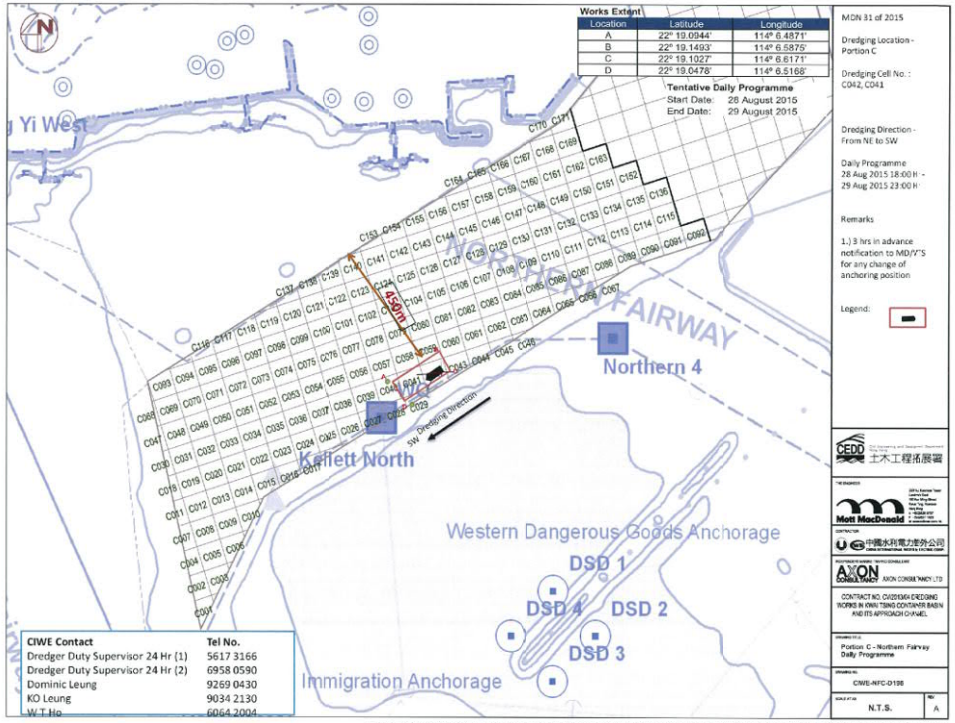

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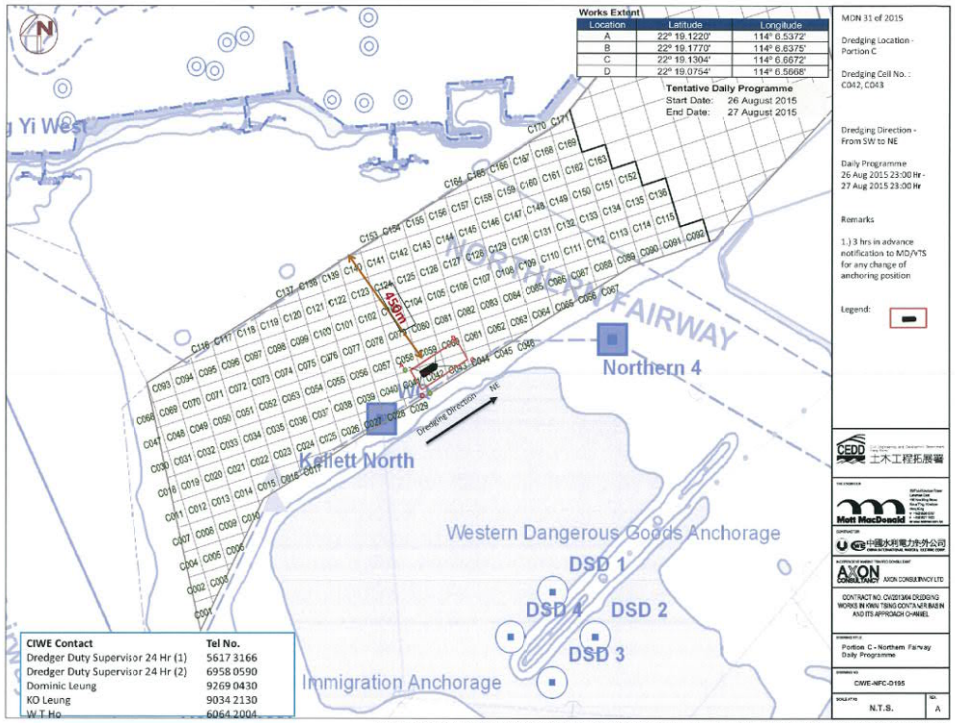

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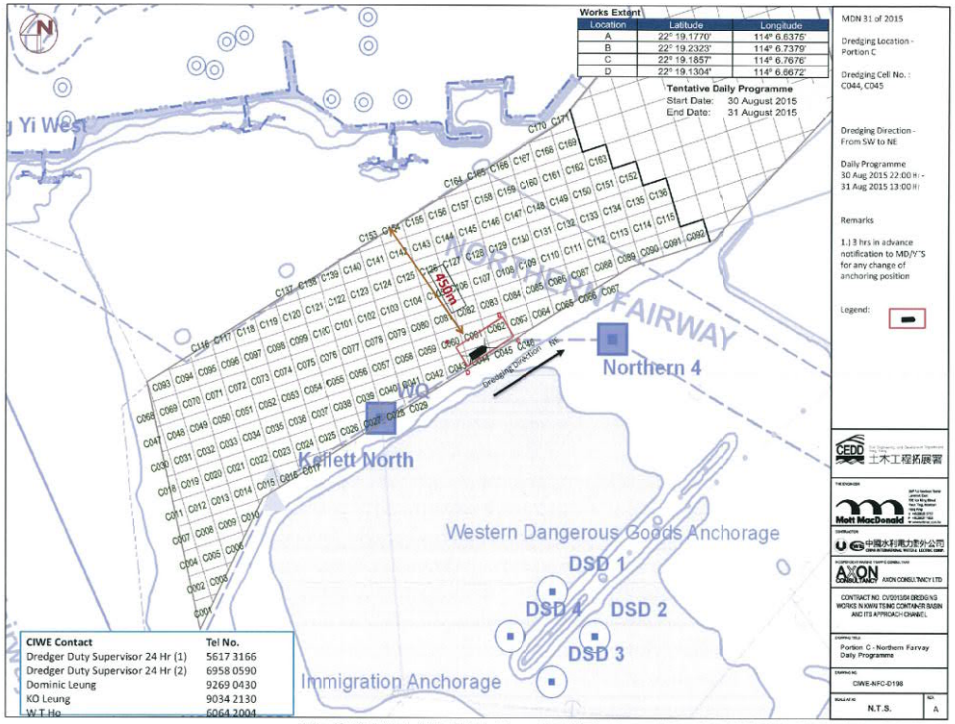

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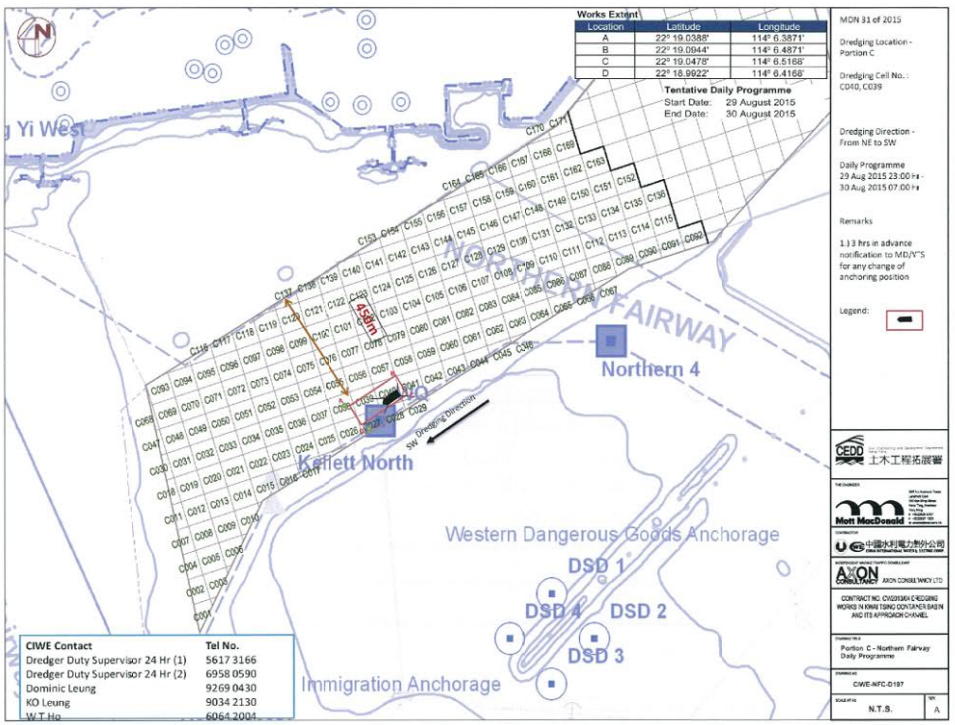

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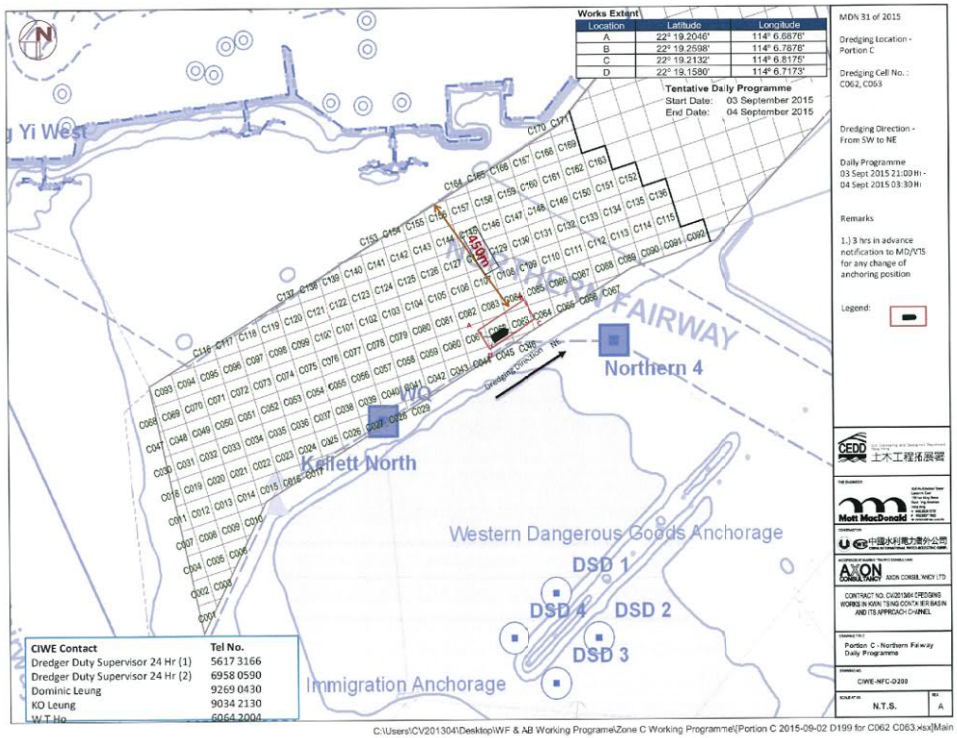

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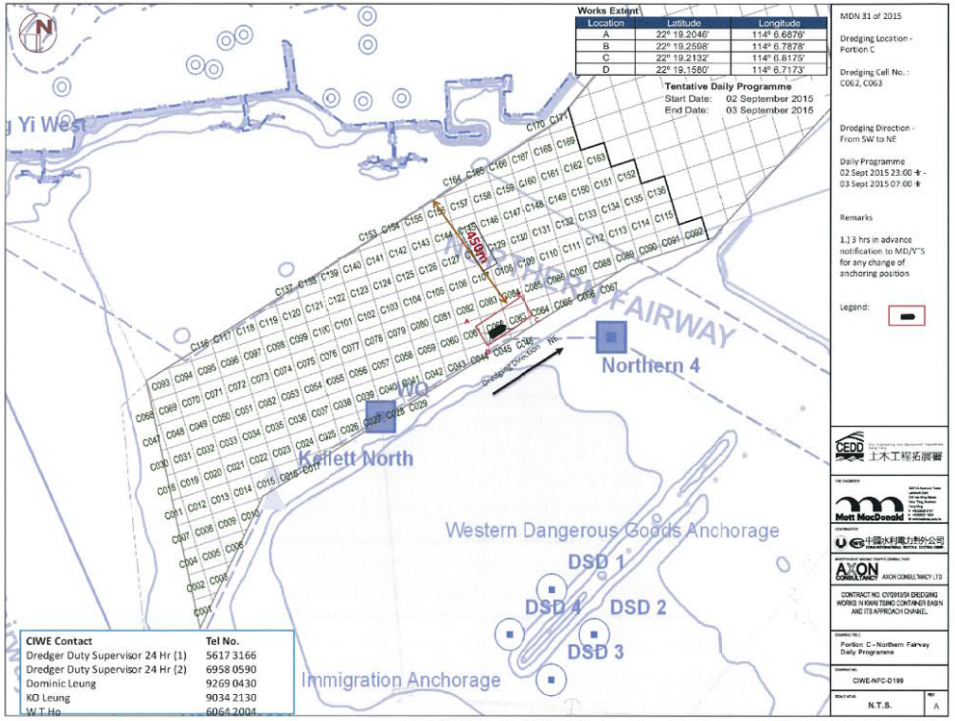

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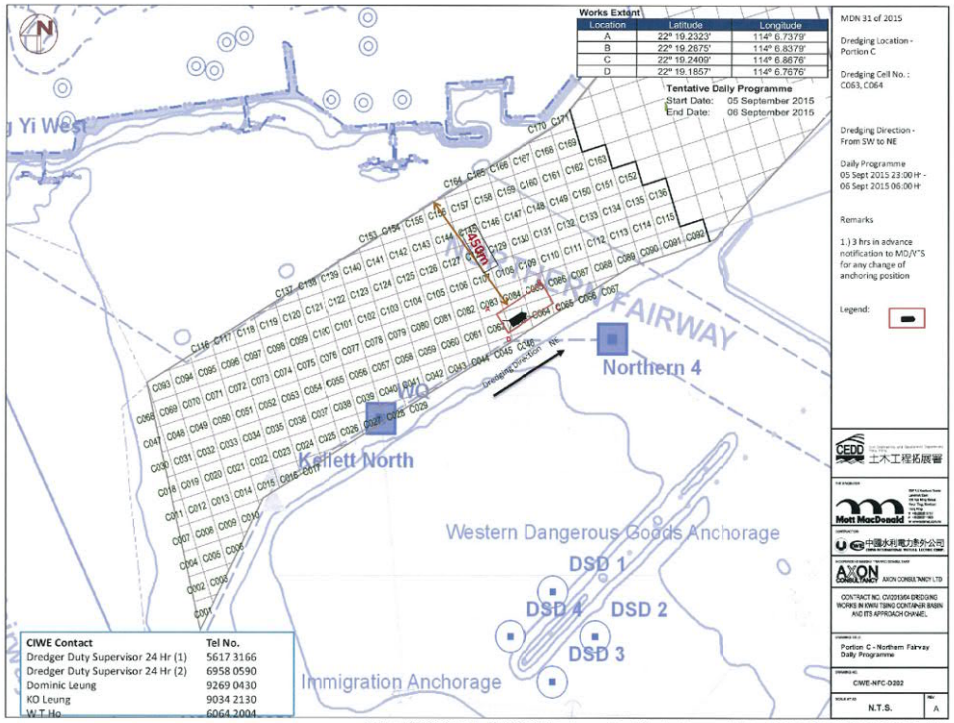

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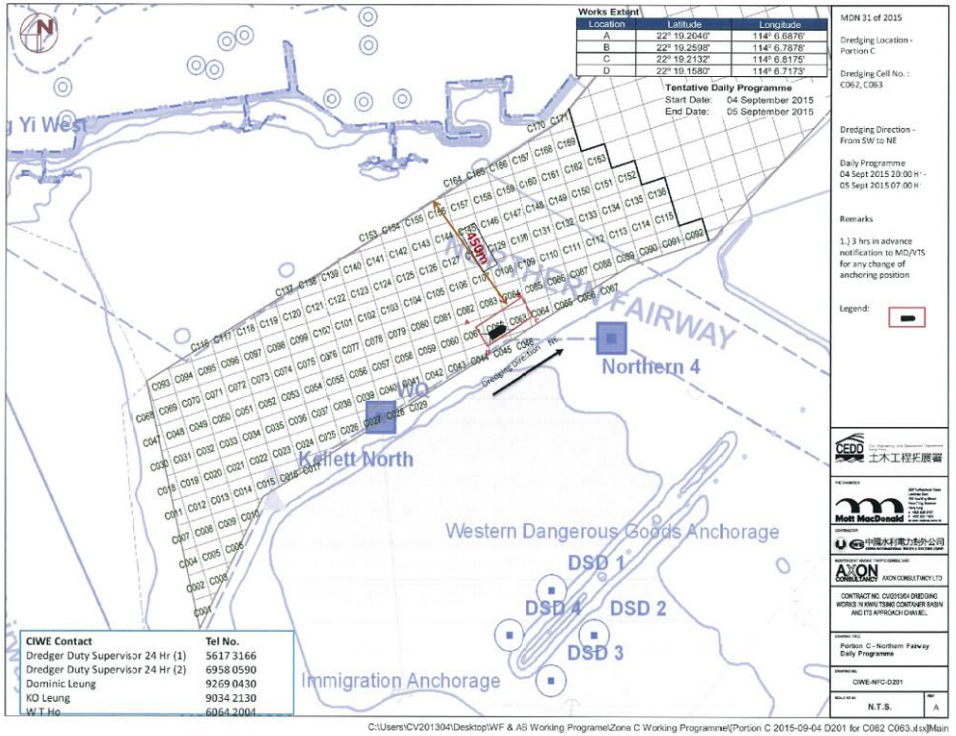

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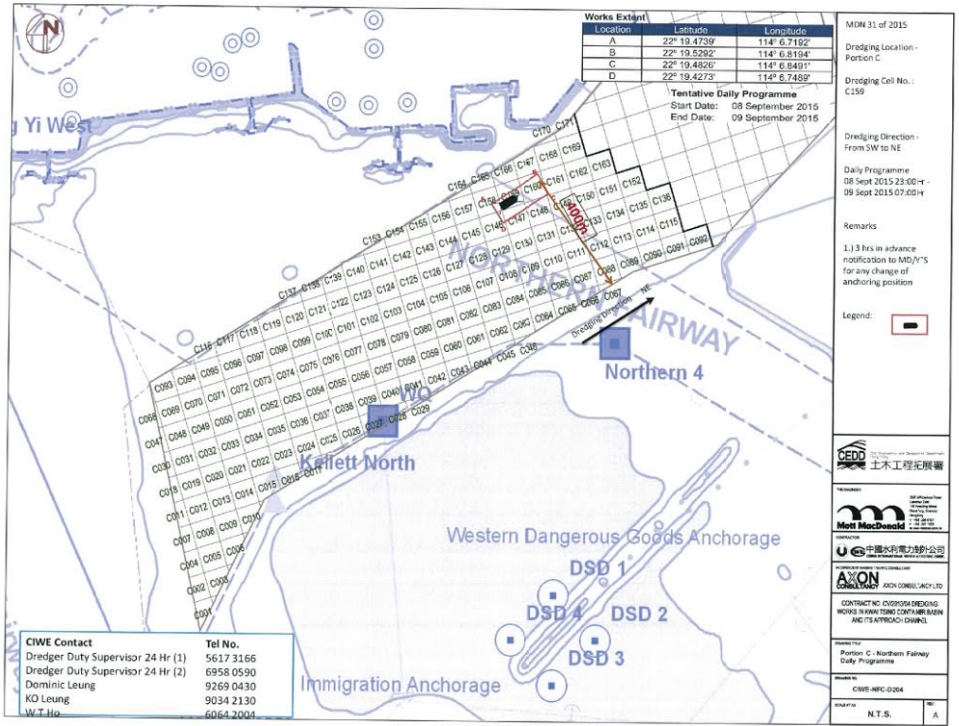

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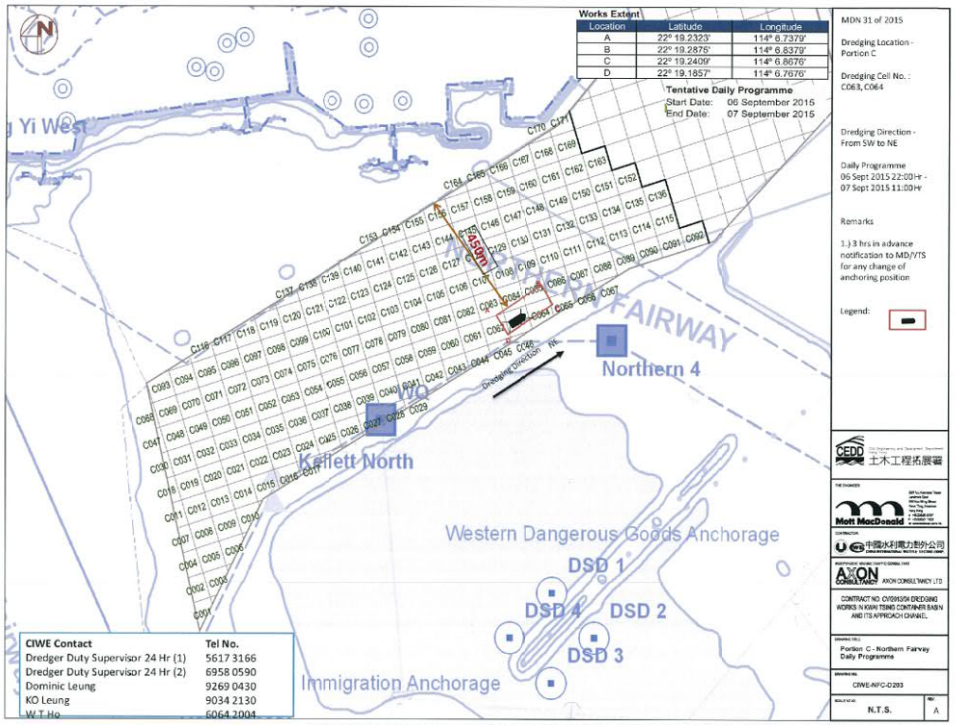

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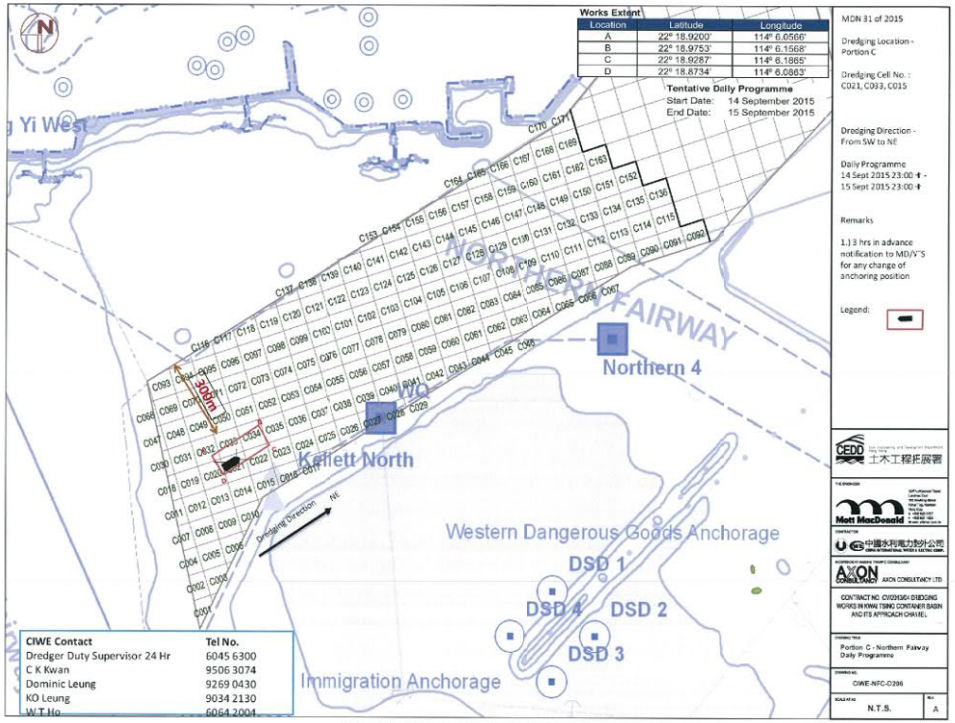

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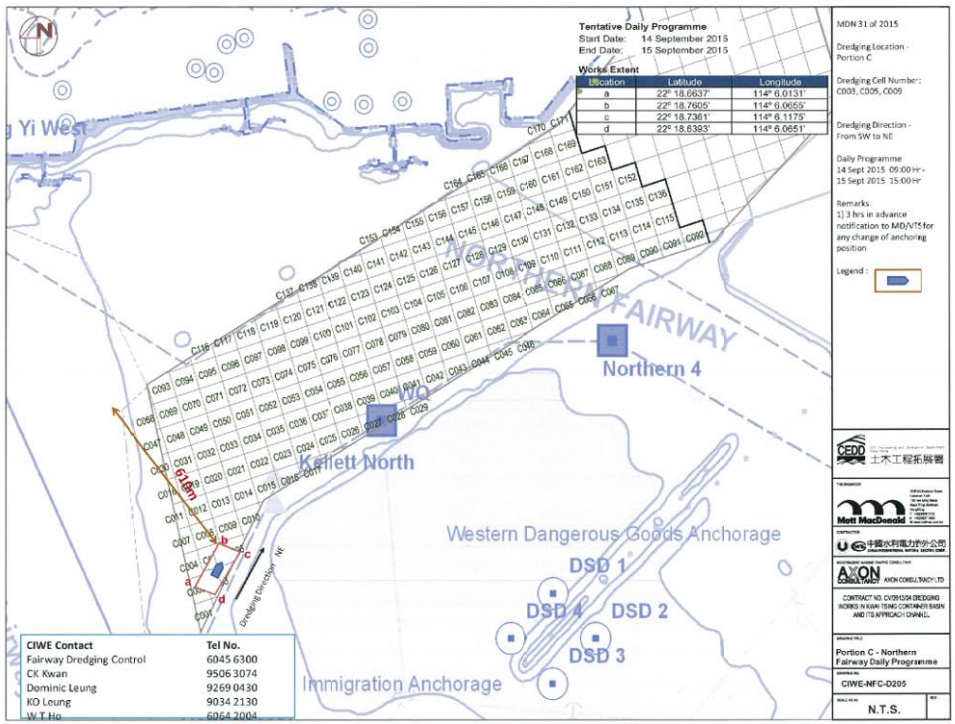

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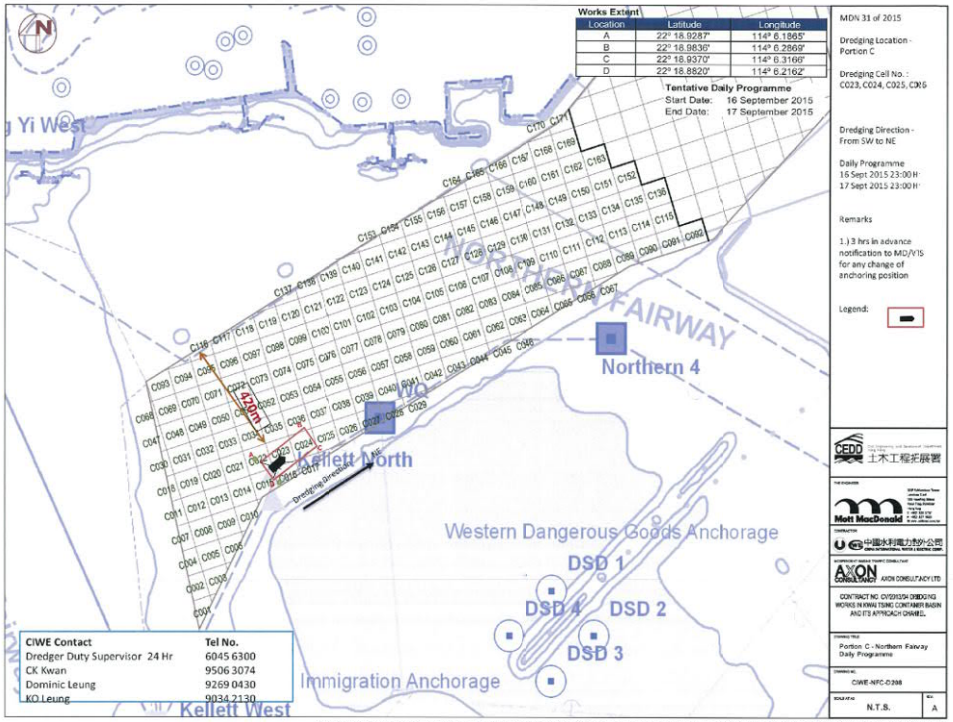

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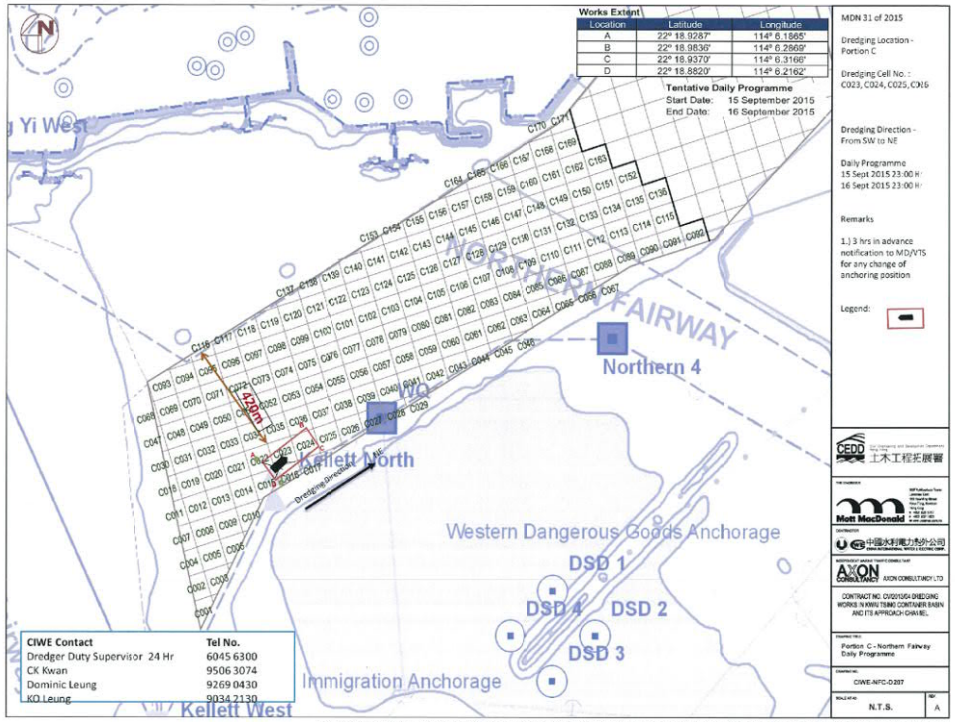

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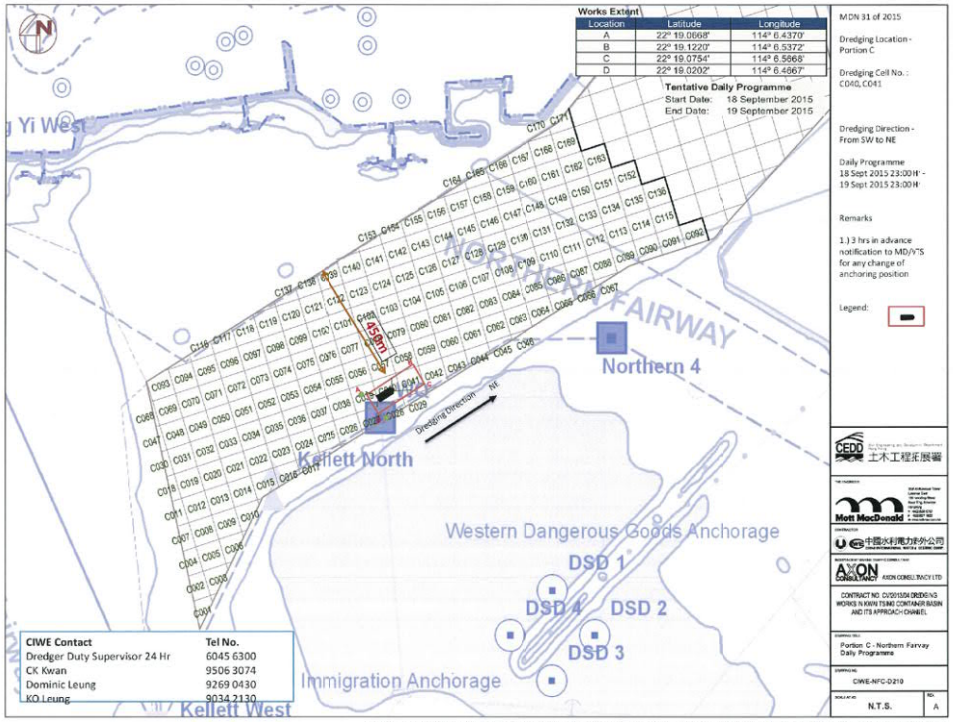

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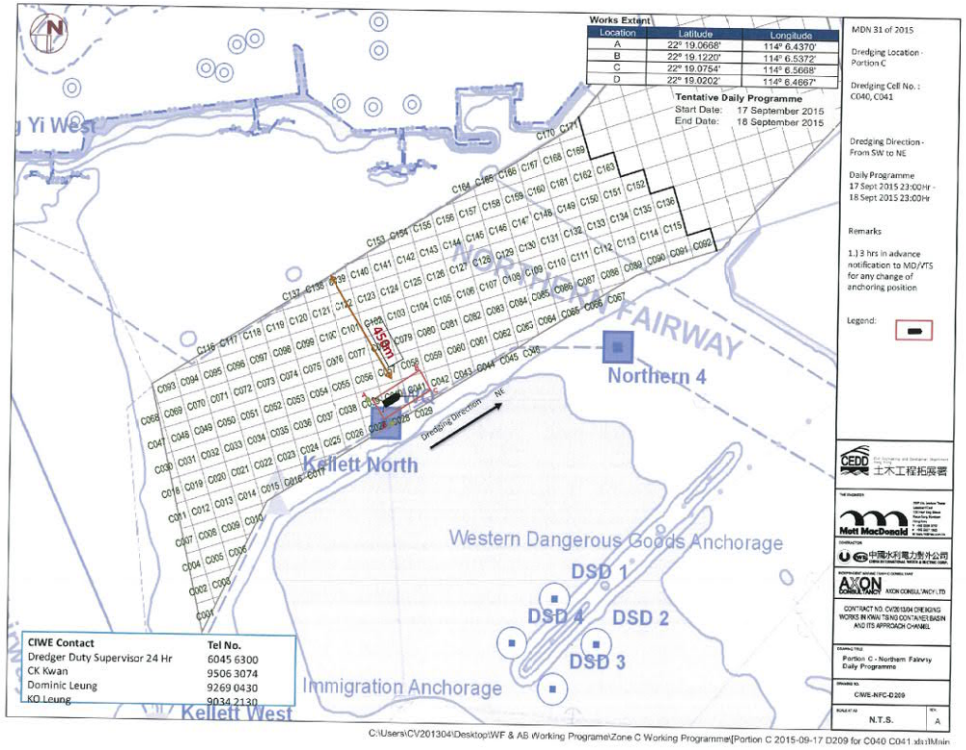

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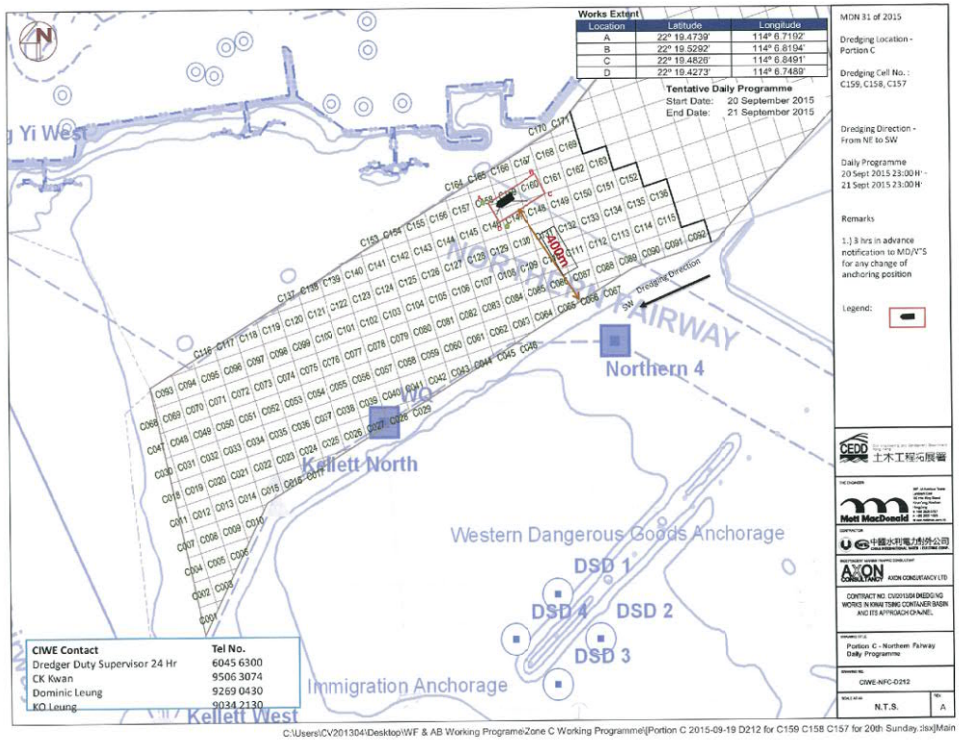

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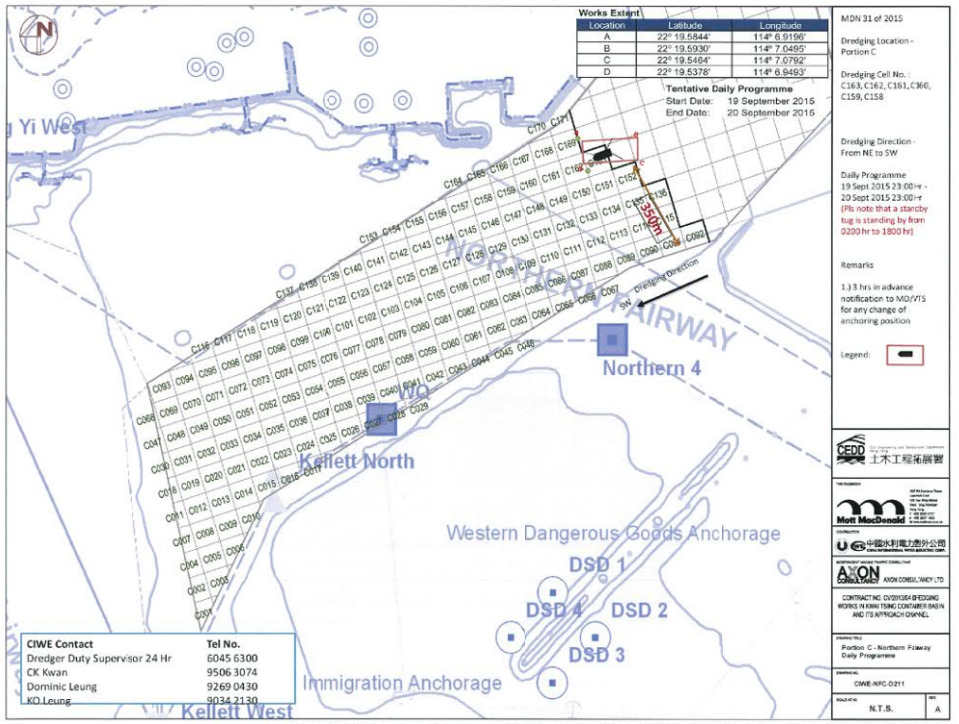

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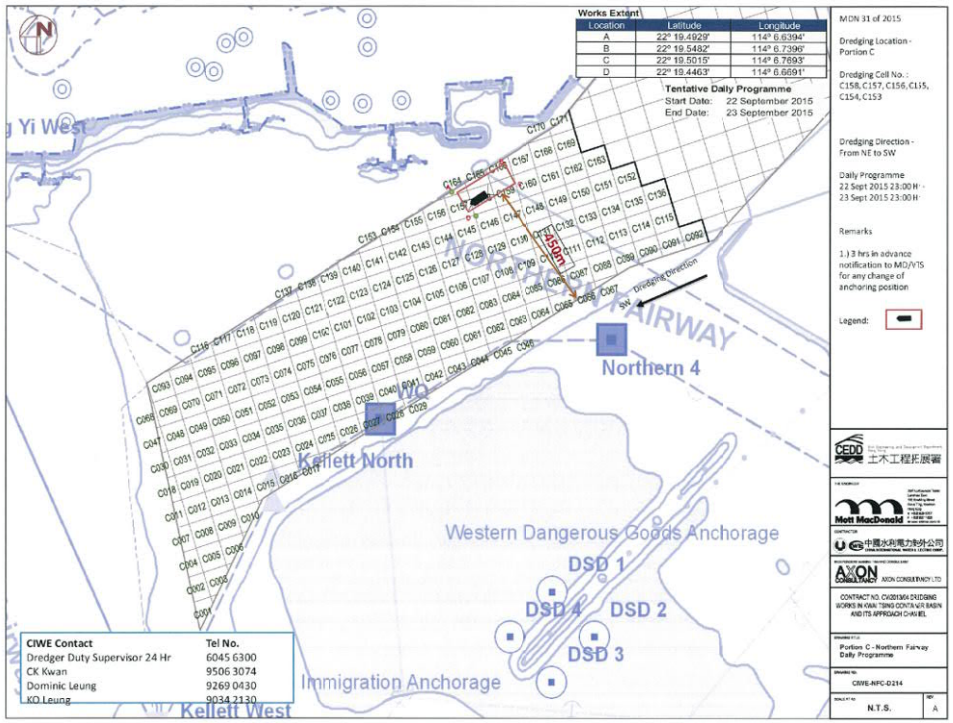

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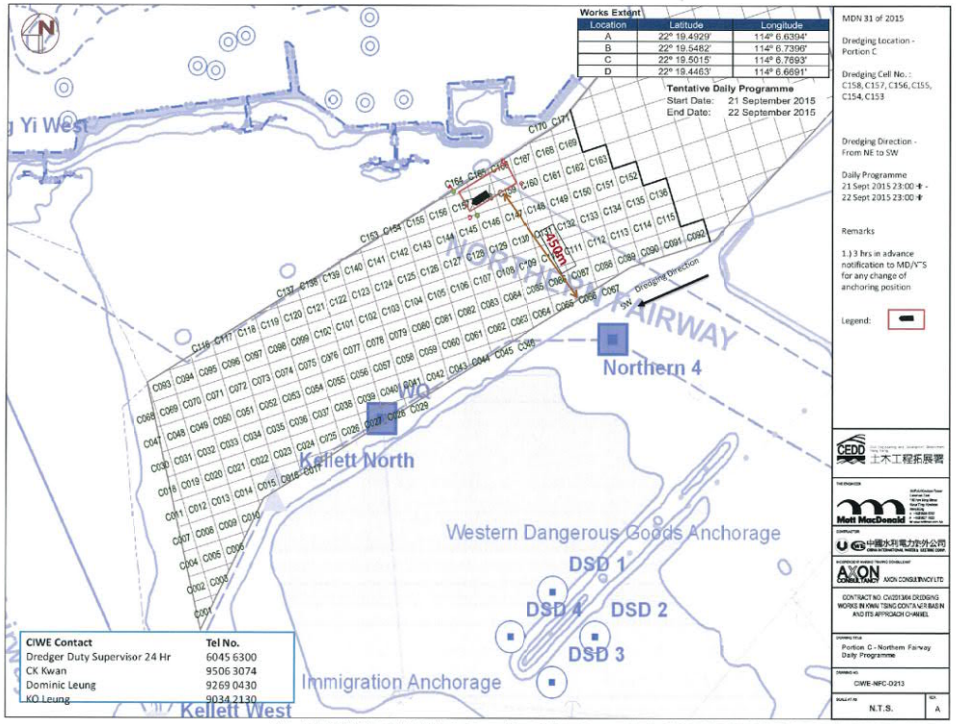

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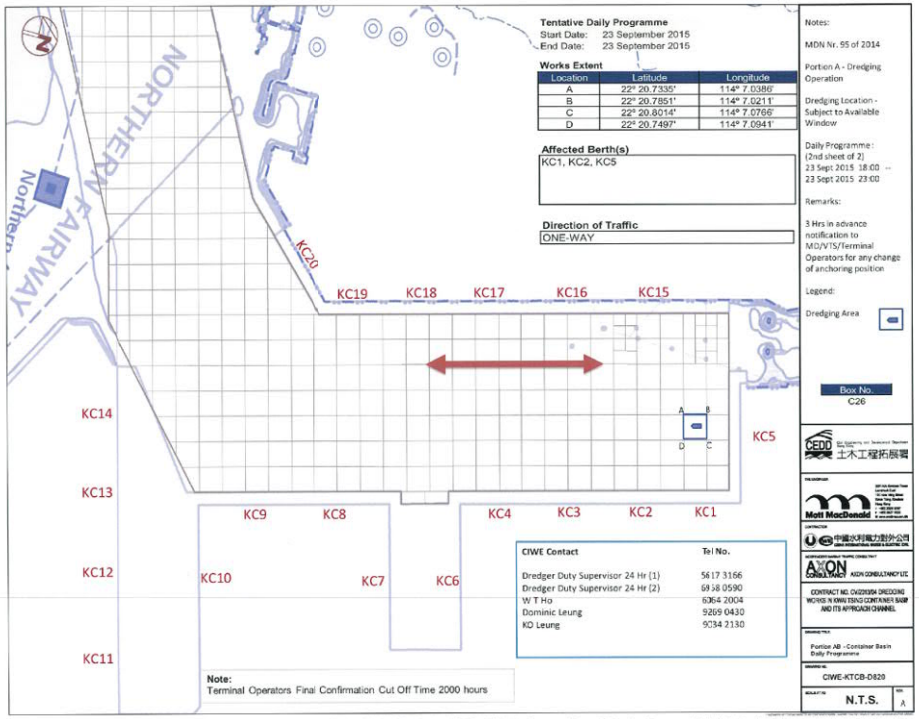

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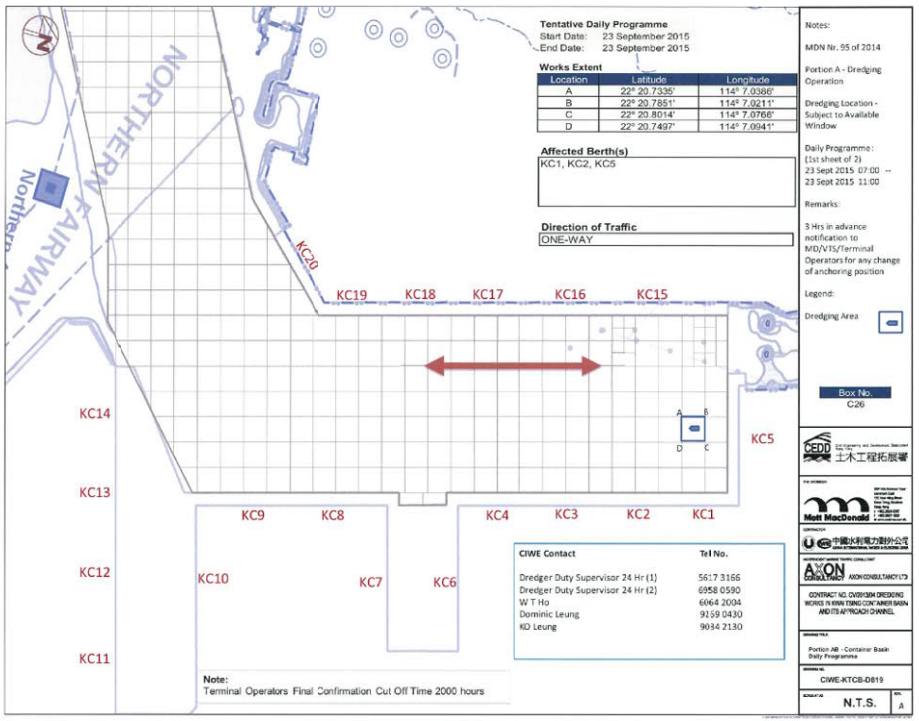

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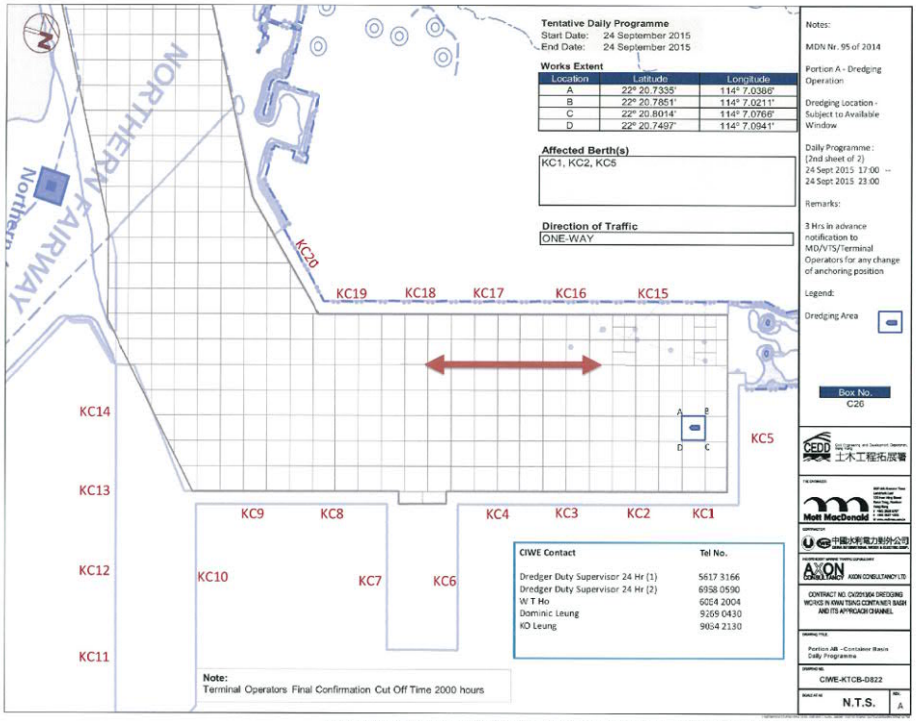

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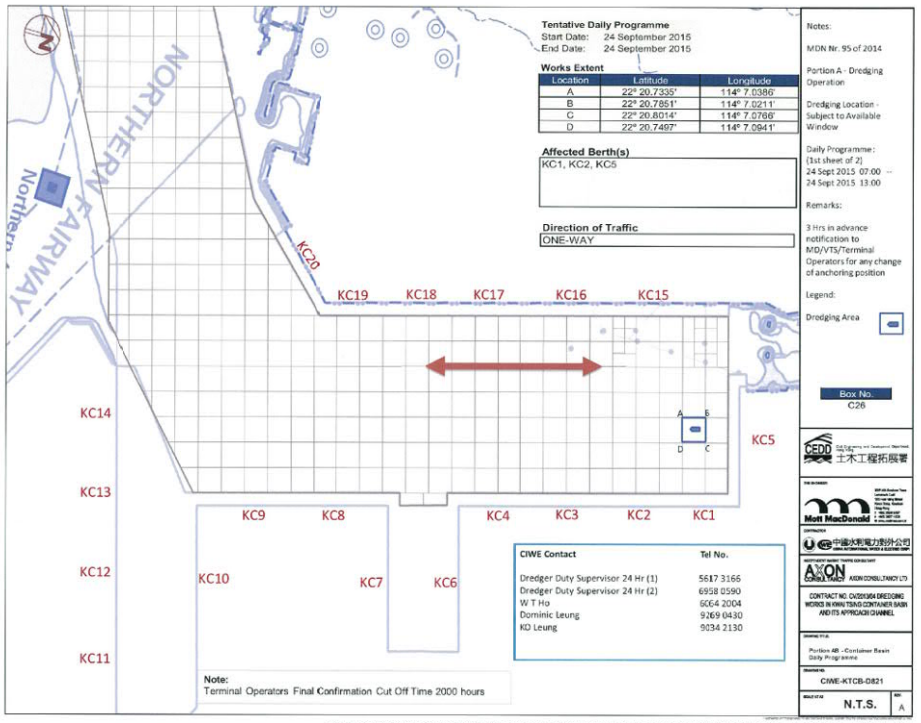

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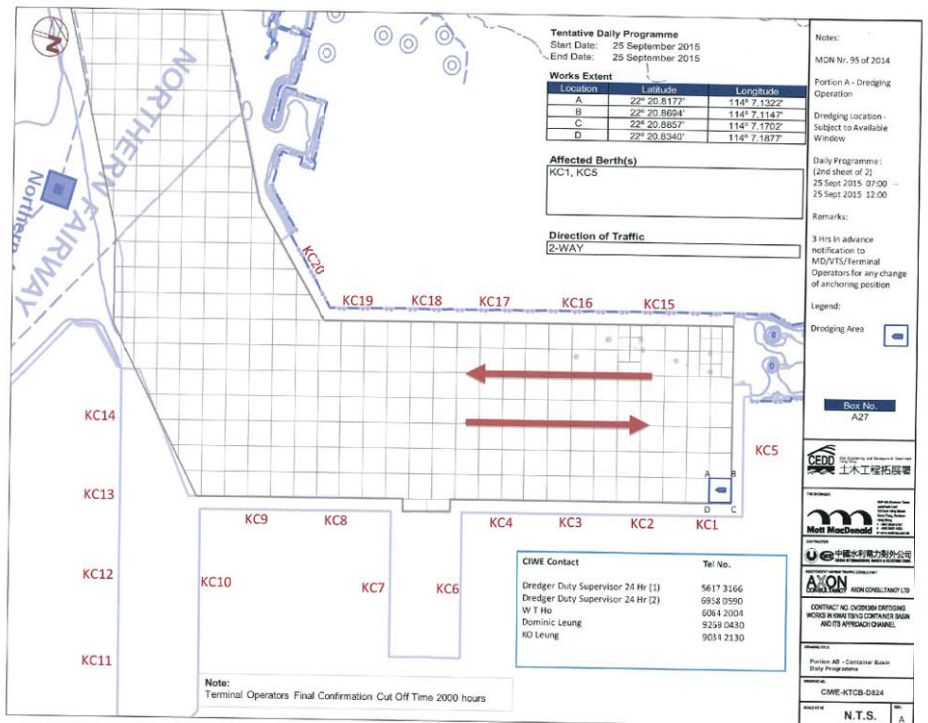

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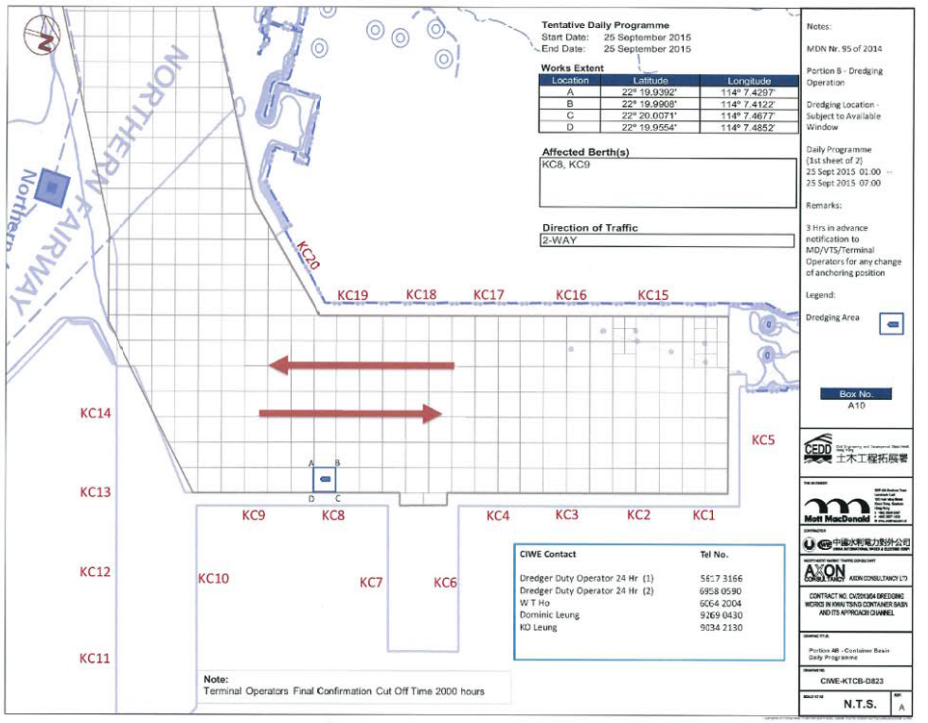

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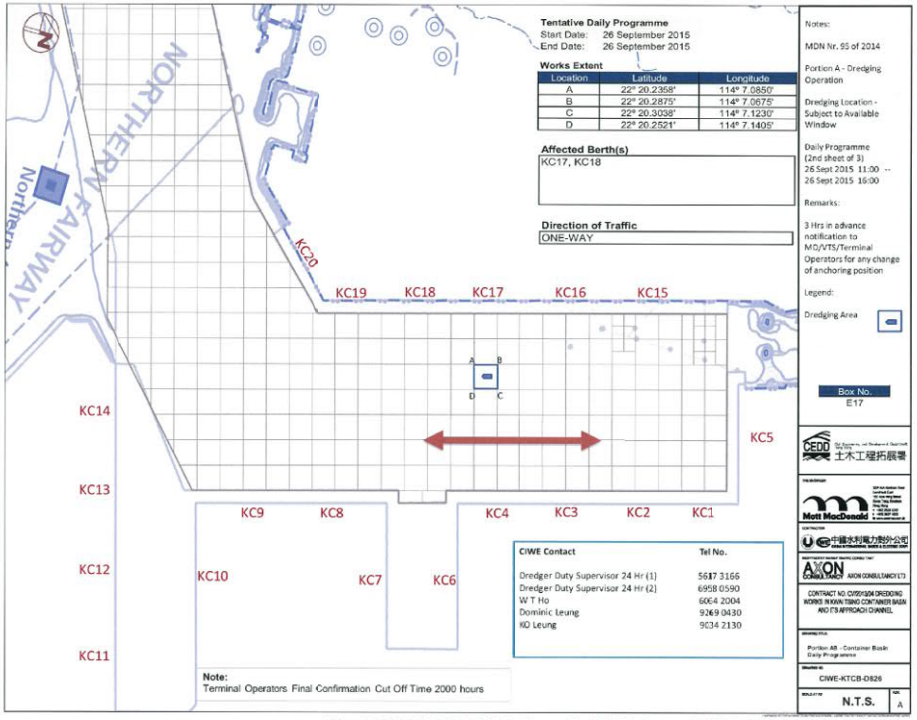

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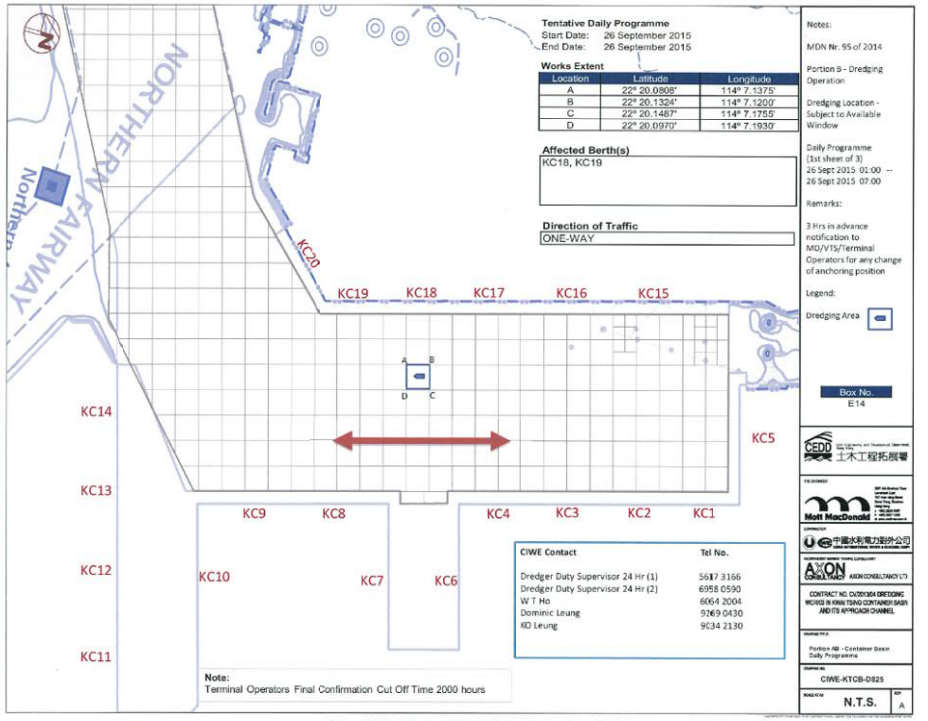

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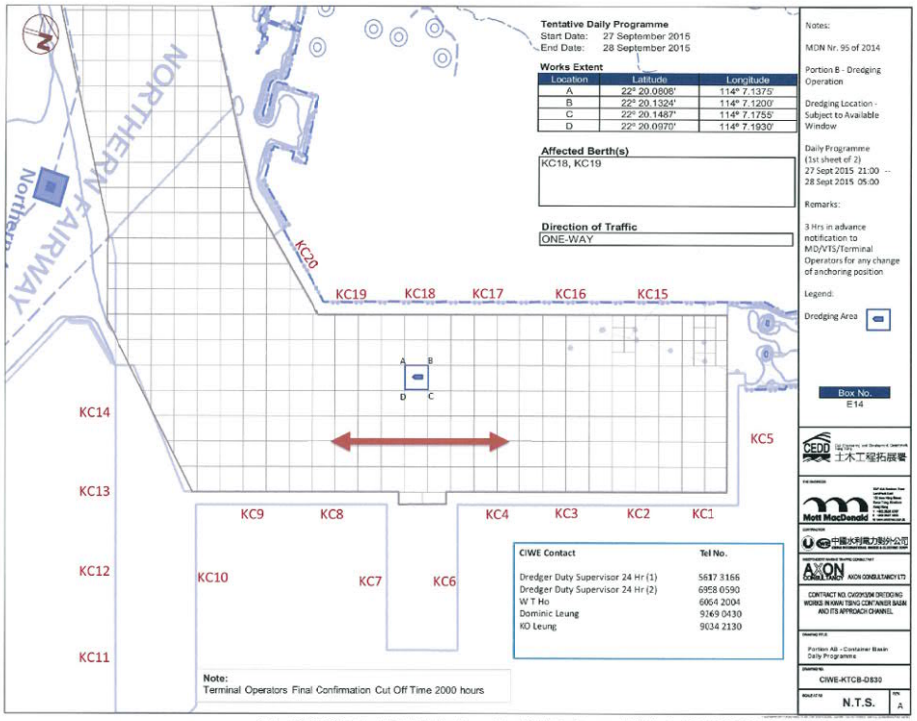

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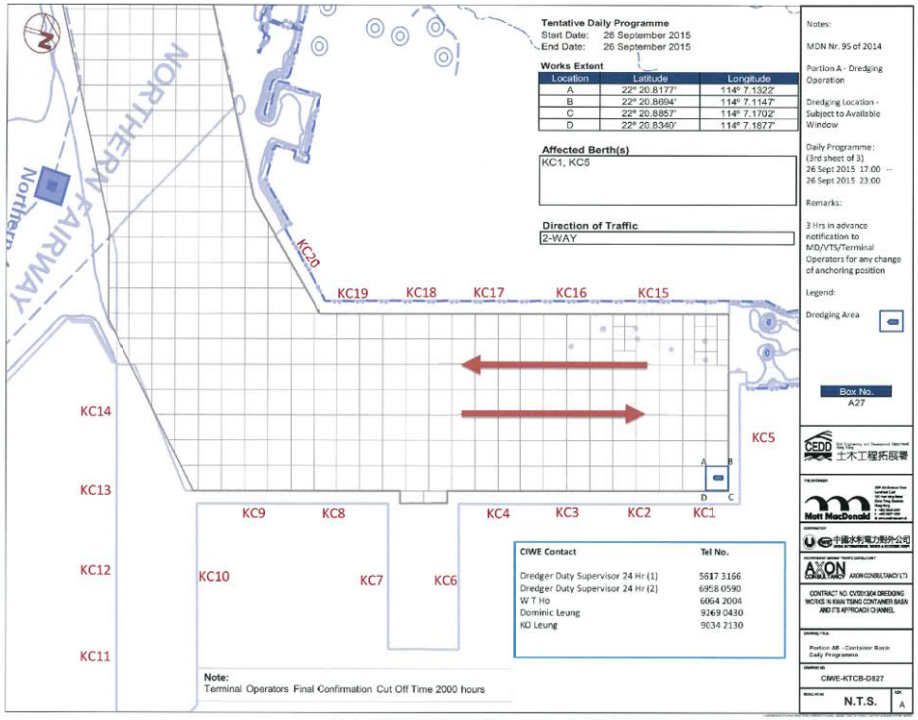

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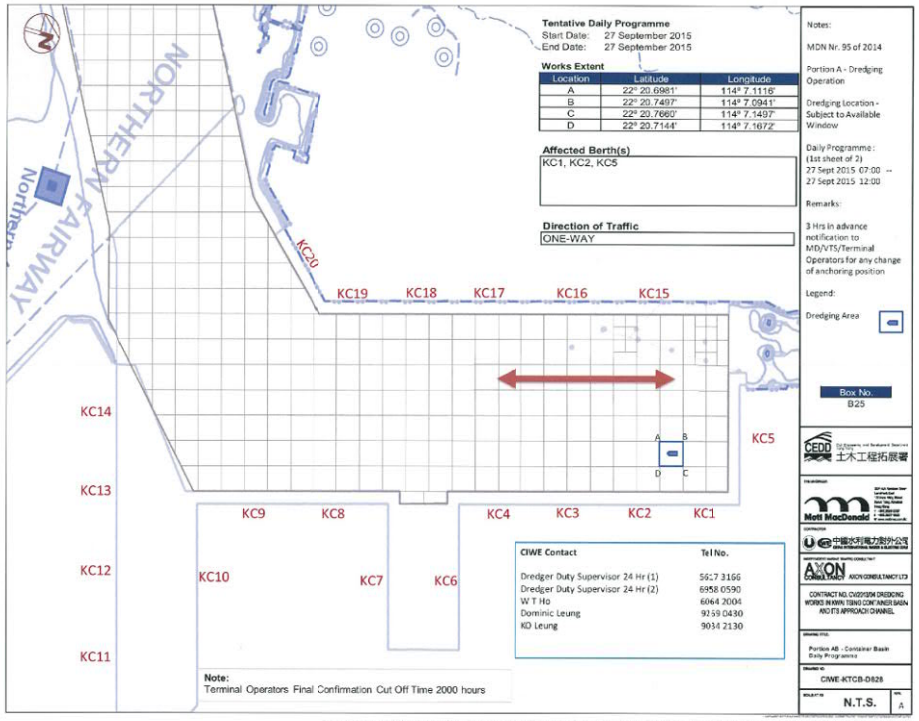

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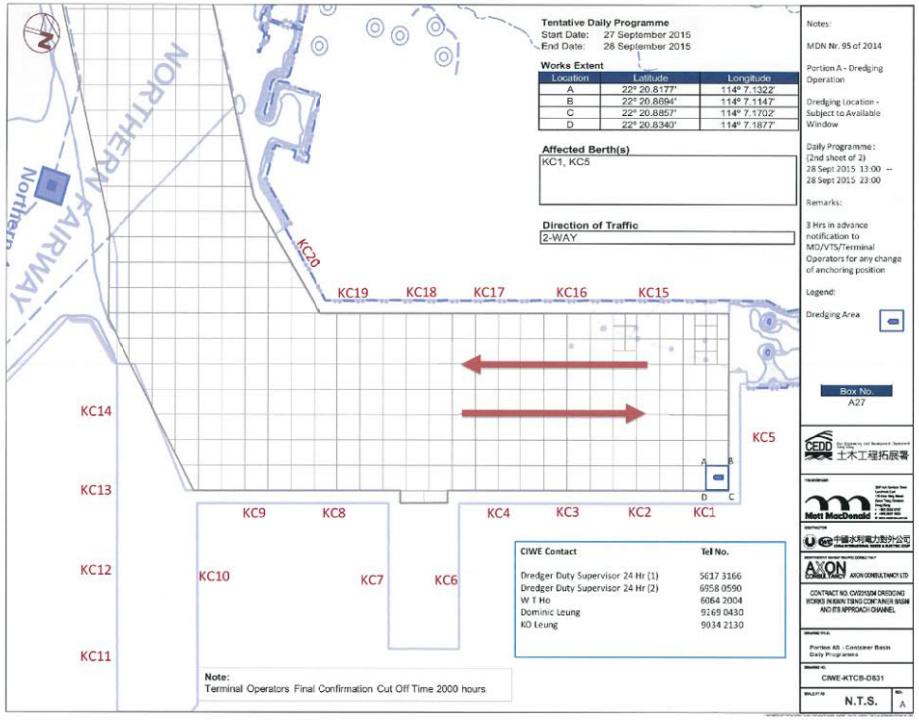

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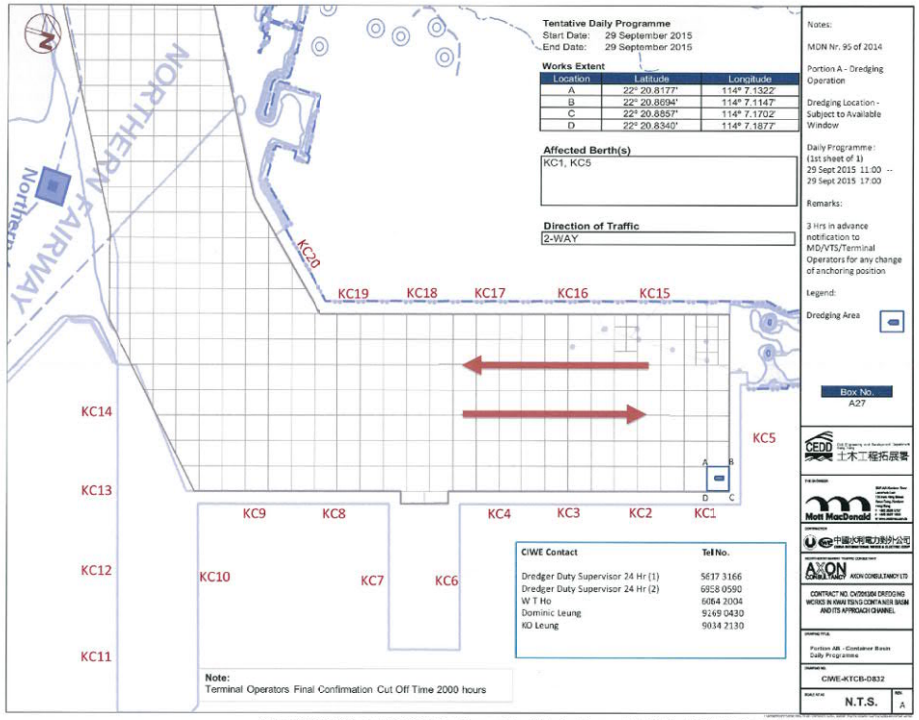

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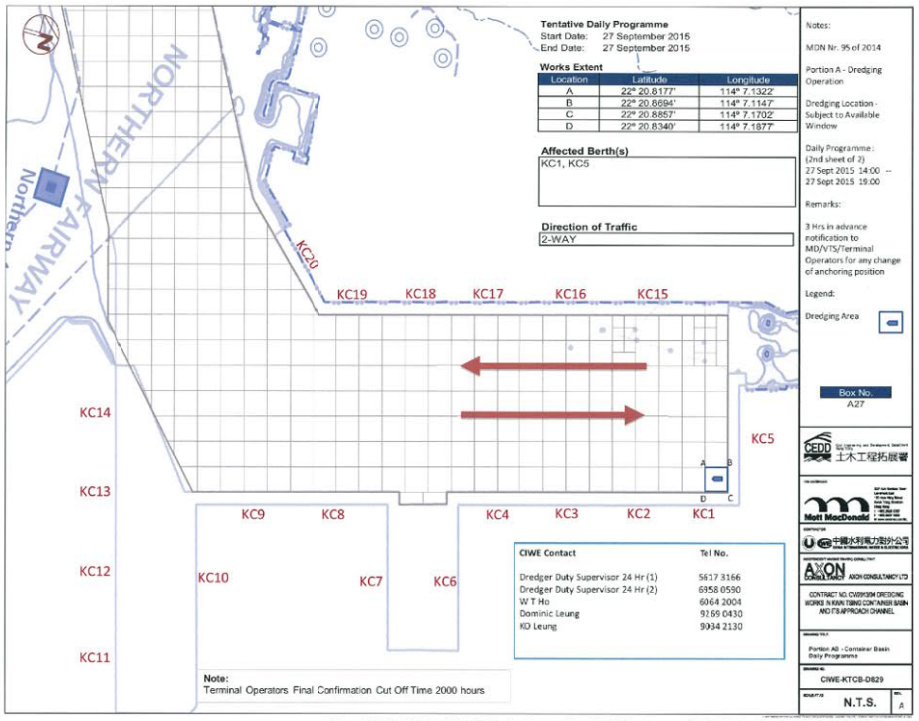

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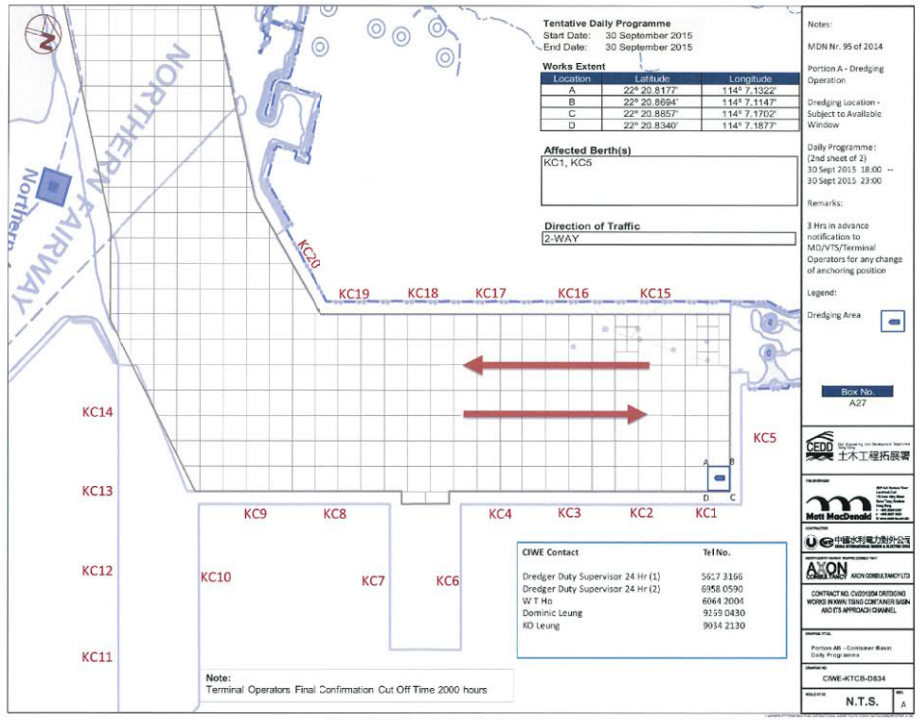

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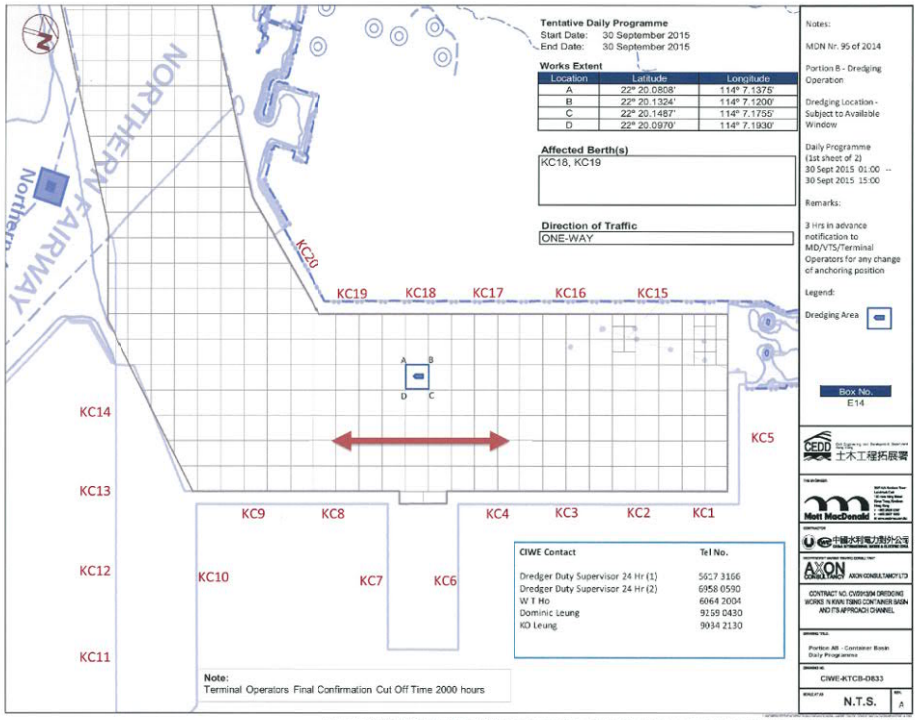

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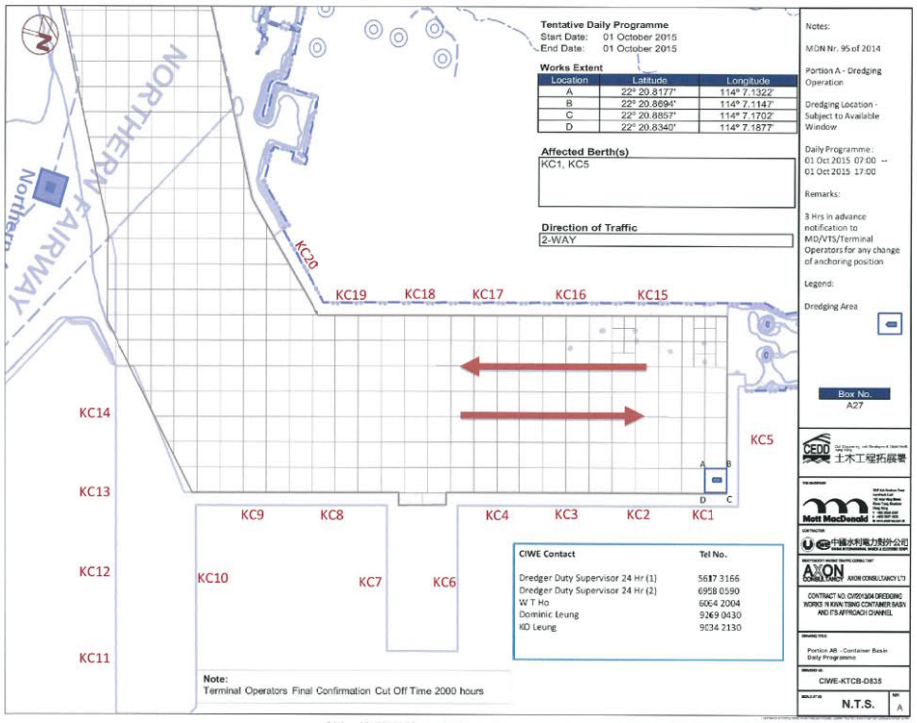

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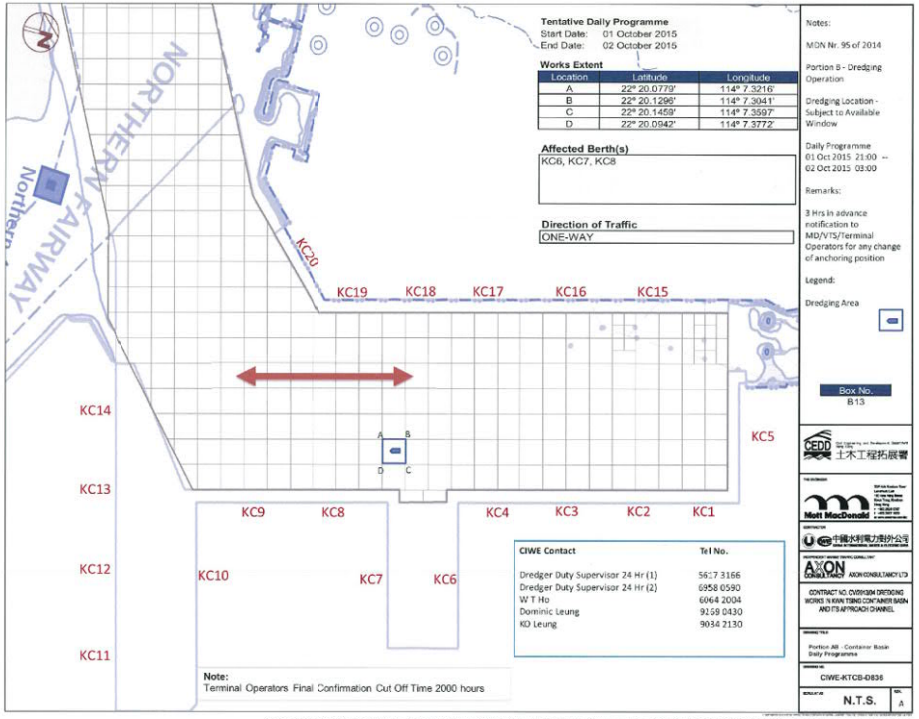

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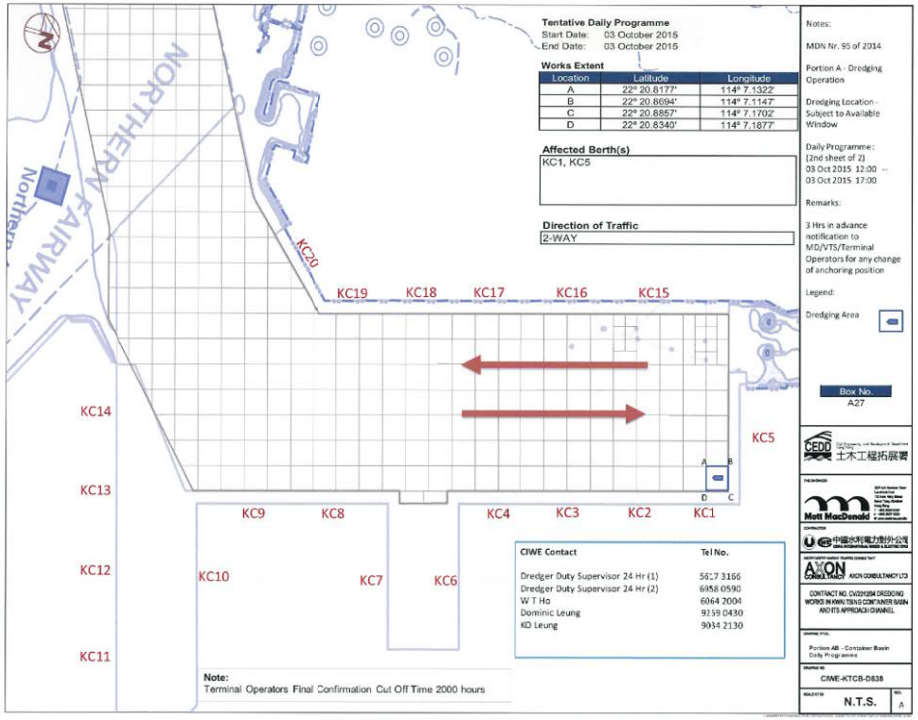

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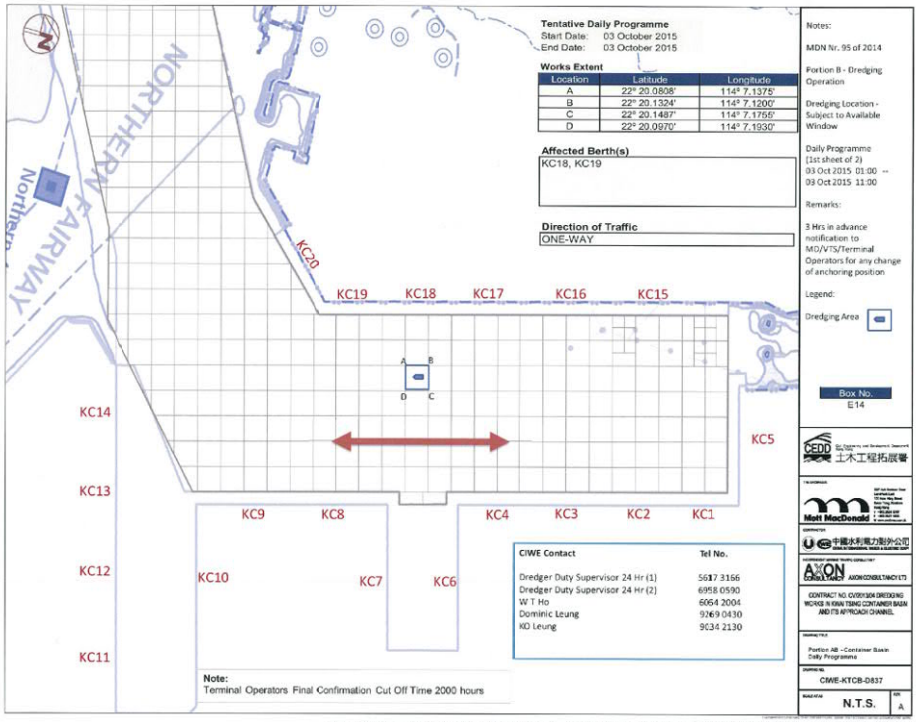

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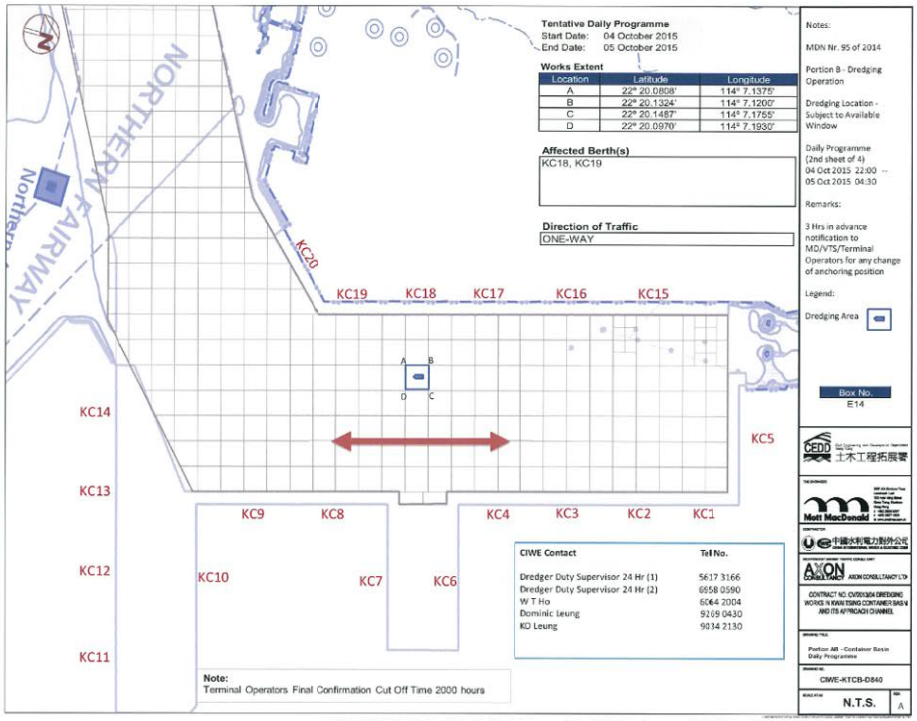

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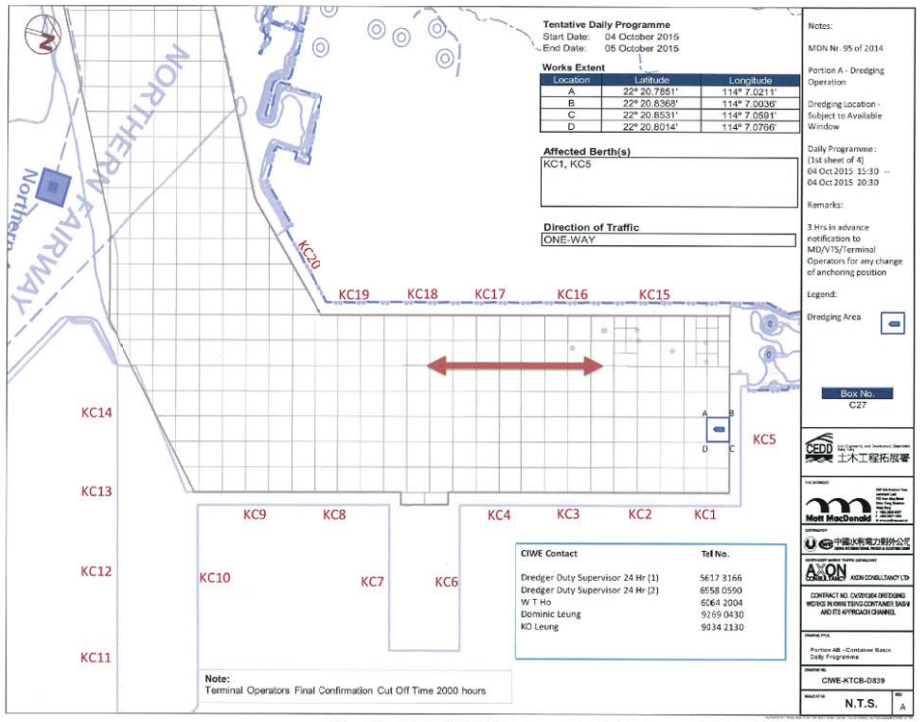

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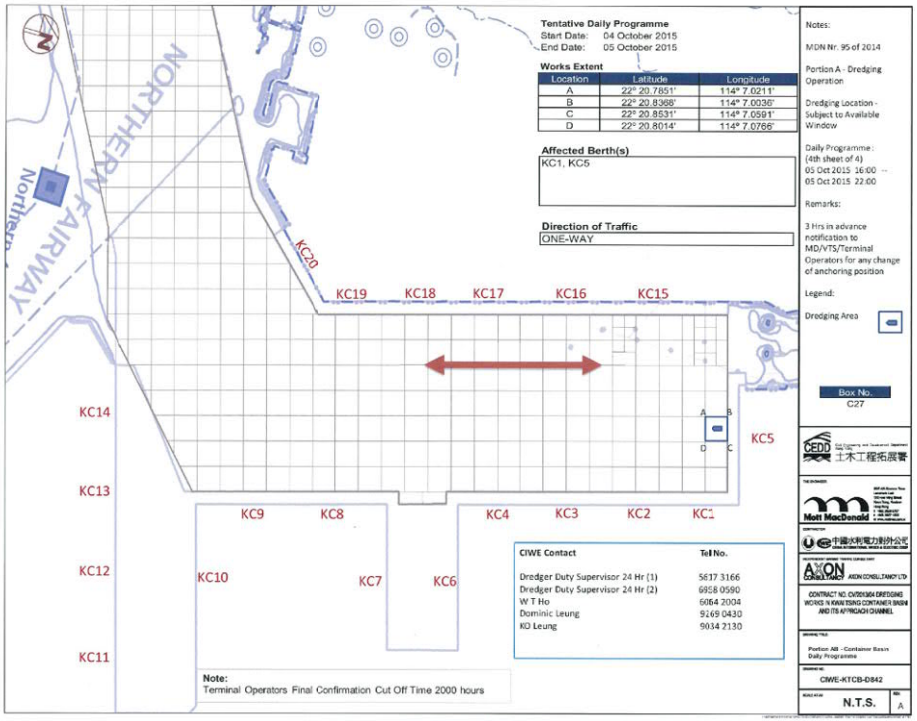

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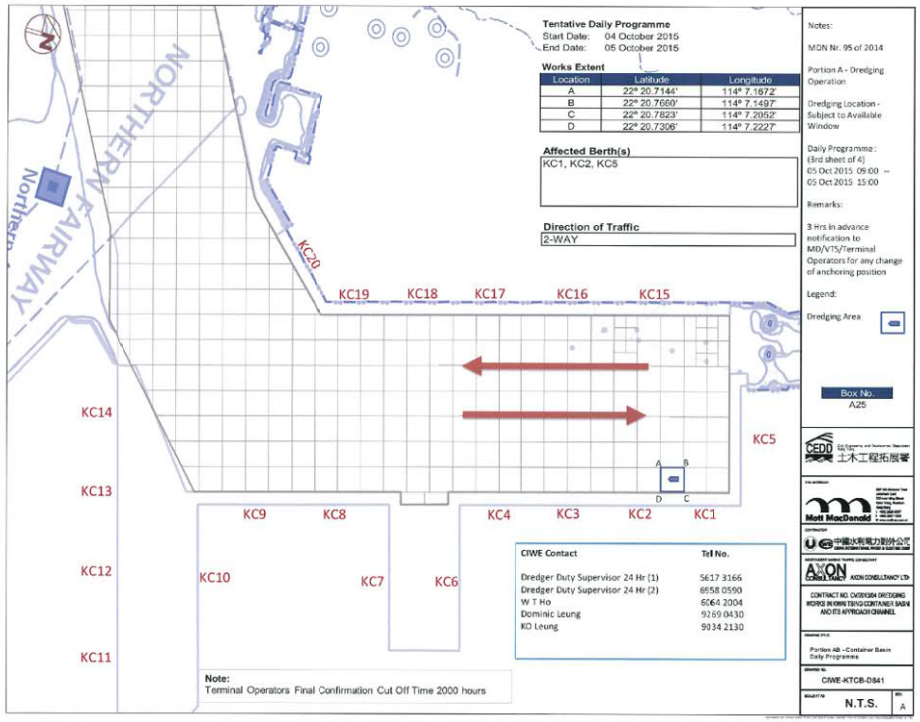

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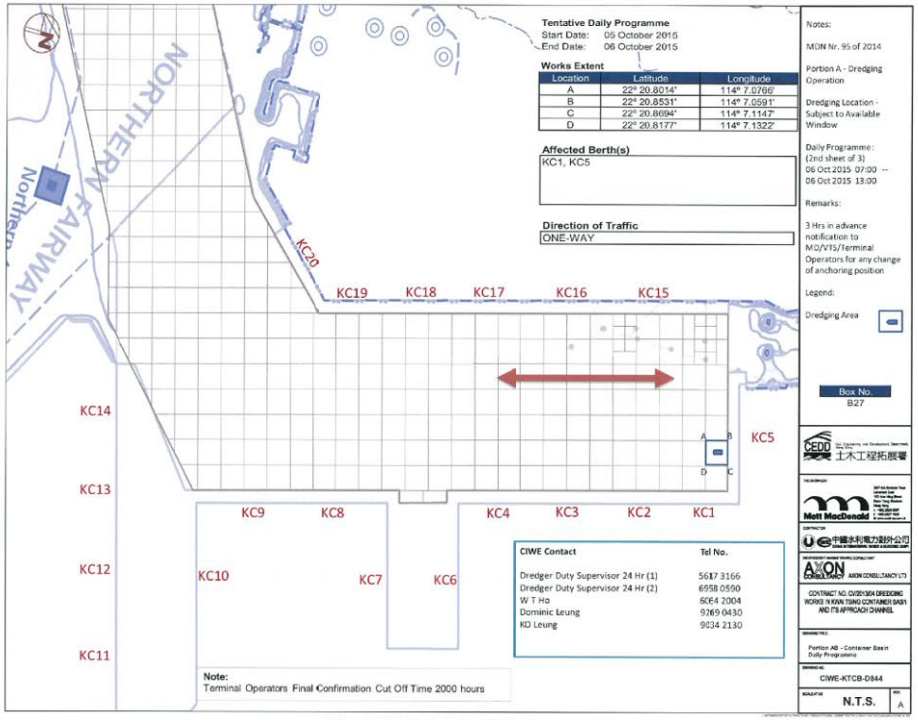

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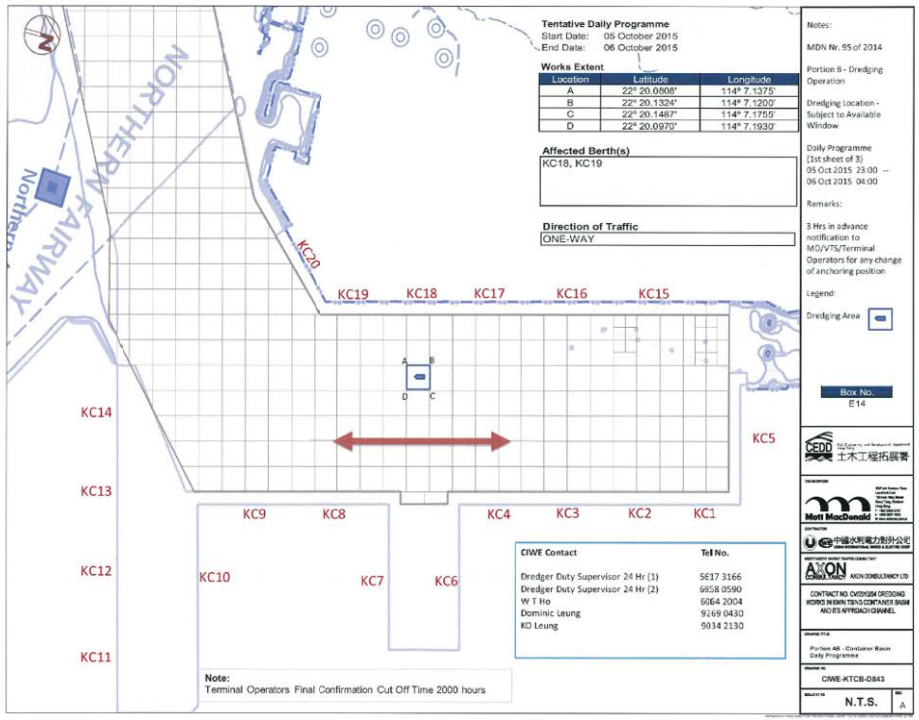

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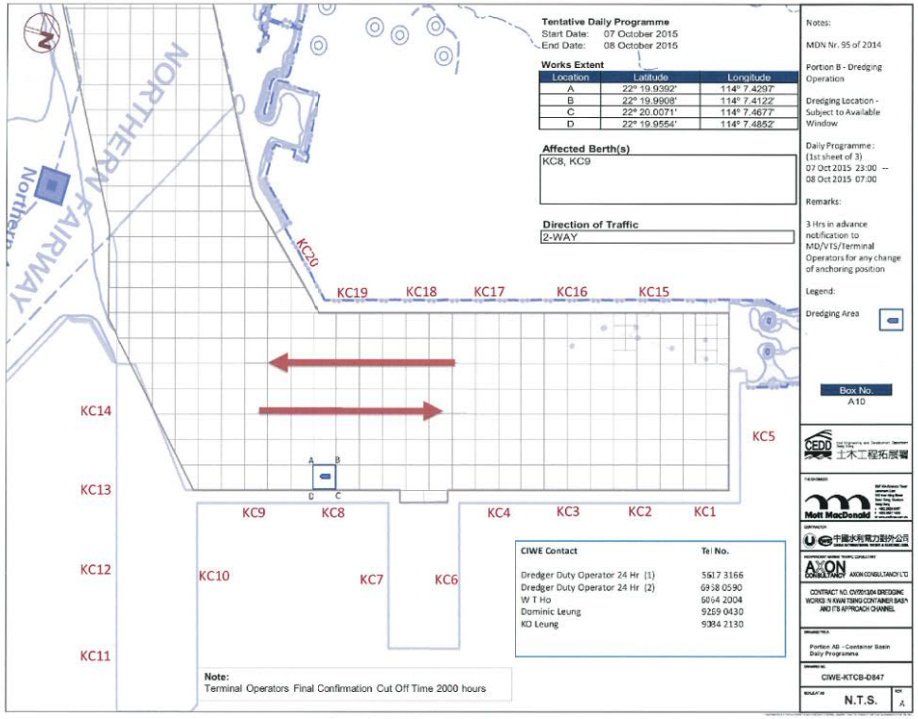

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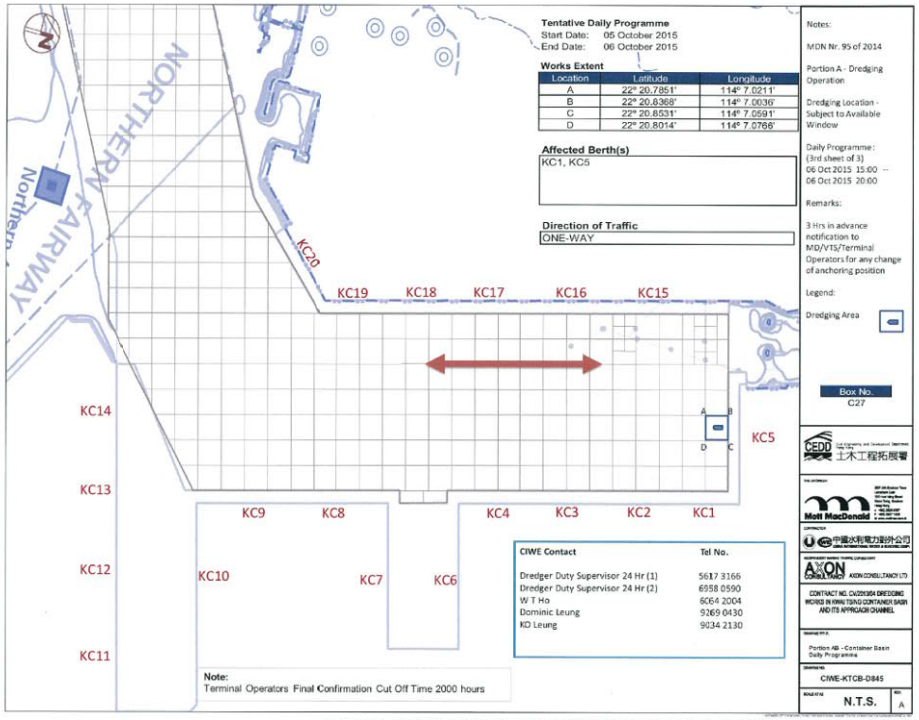

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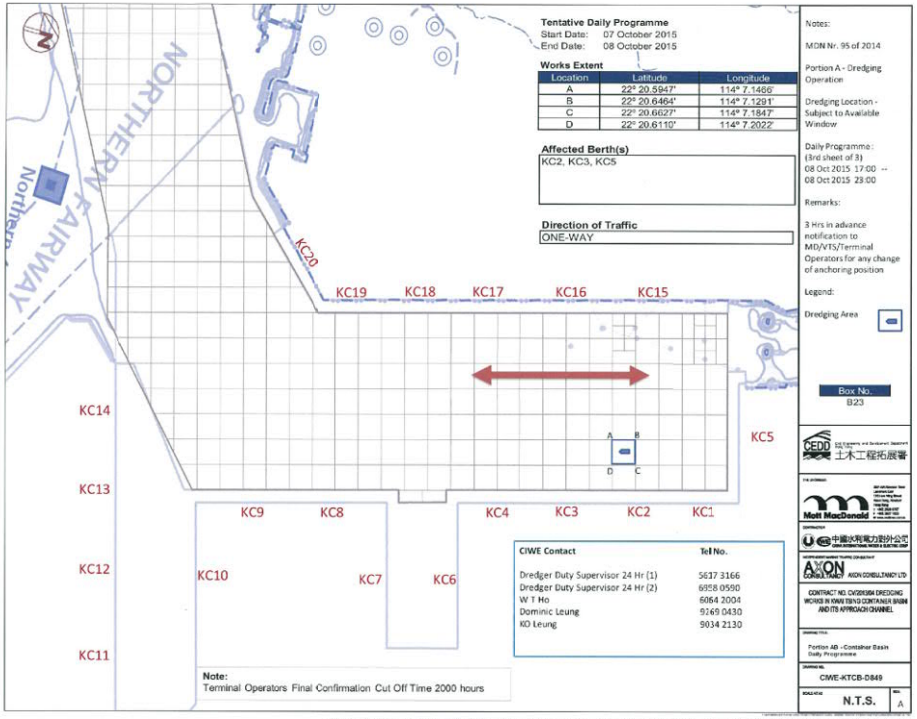

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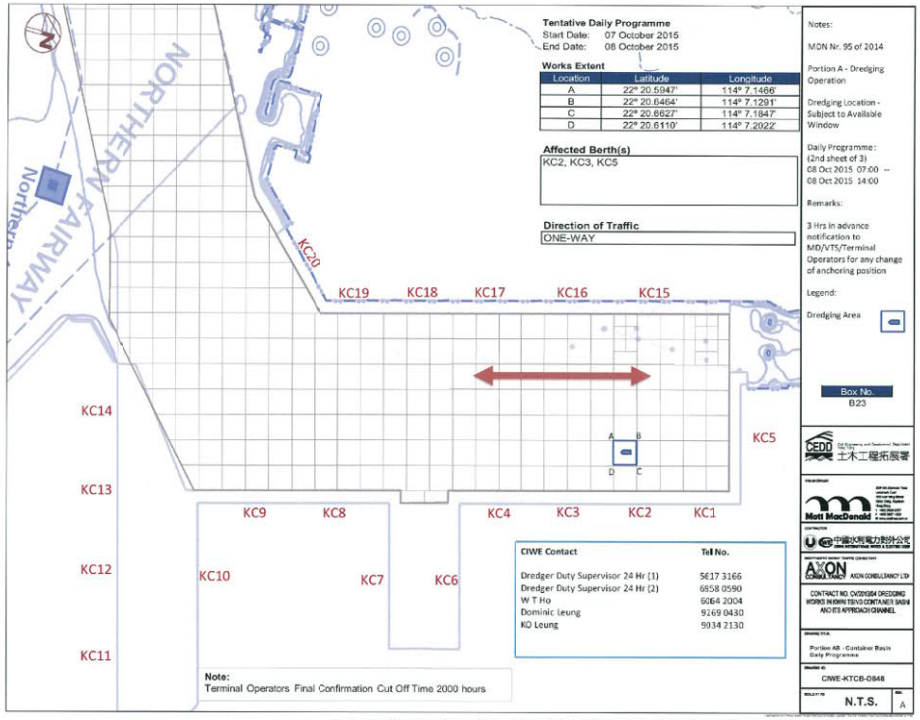

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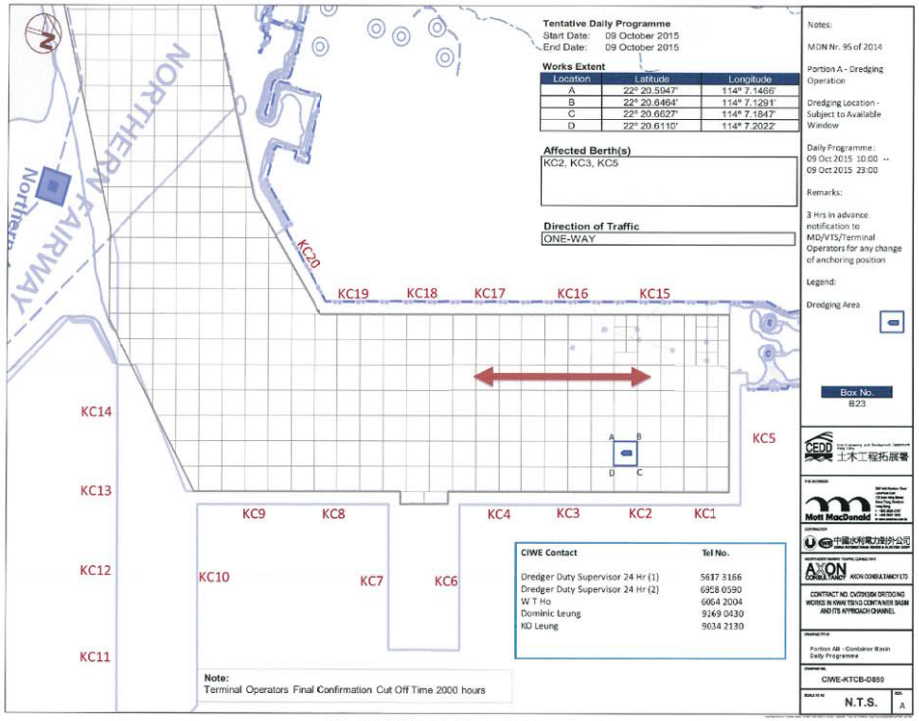

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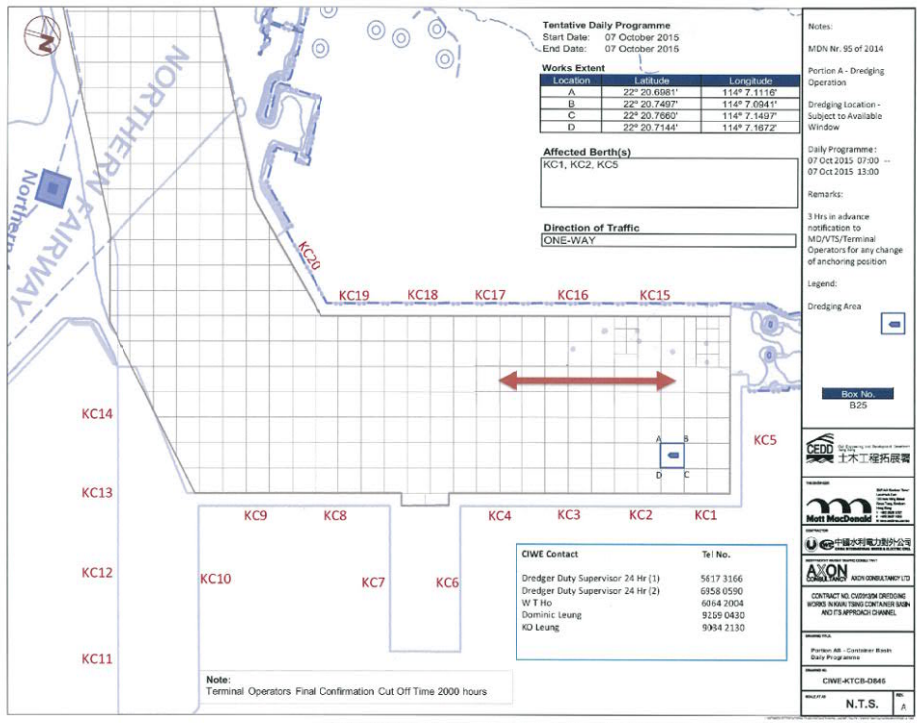

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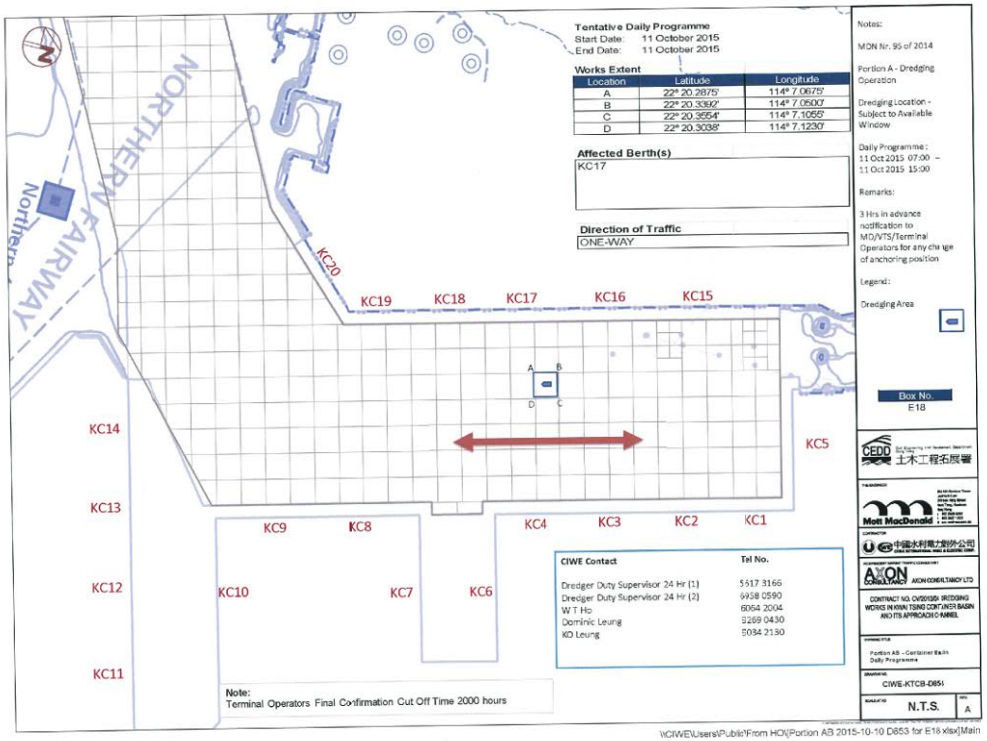
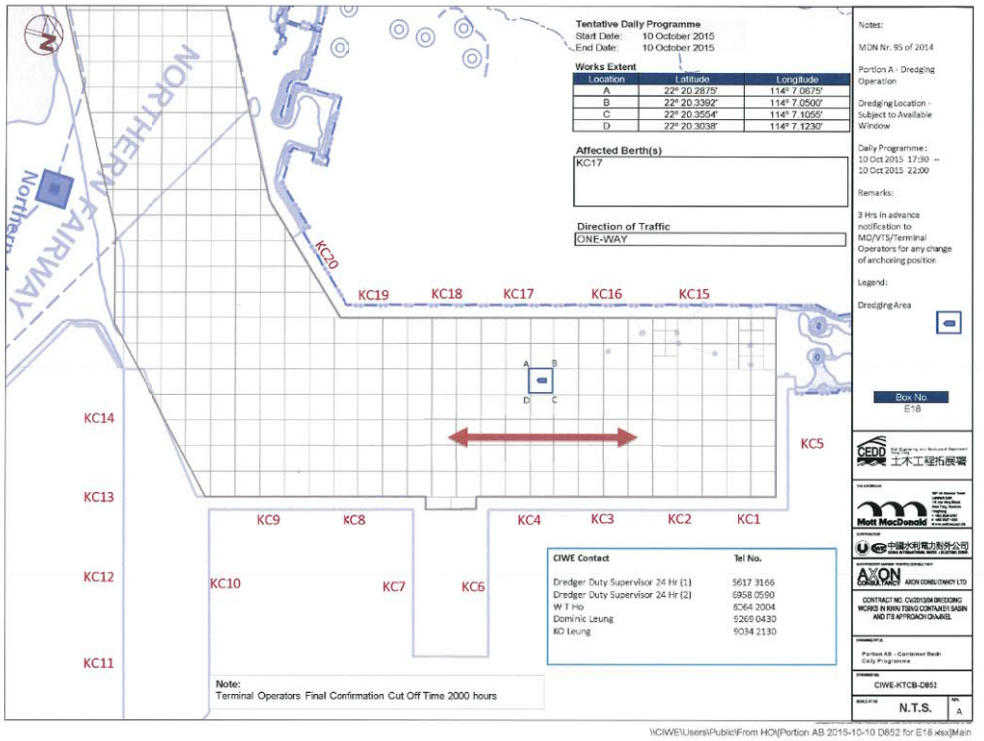

Tentative Daily Programme
Start Date: 11 October 2015
End Date: 11 October 2015
Works Extent
Location | Latitude | Longitude
A | 22° 20.2875' | 114° 7.0675'
B | 22° 20.3392' | 114° 7.0500'
C | 22° 20.3554' | 114° 7.1055'
D | 22° 20.3038' | 114° 7.1230'
Affected Berth(s)
KC17
Direction of Traffic
ONE-WAY
Notes:
MDN Nr. 95 of 2014
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme: 11 Oct 2015 07:00 -- 11 Oct 2015 15:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area
Box No. E18
KC20 KC19 KC18 KC17 KC16 KC15 KC14 KC13 KC12 KC11 KC10 KC9 KC8 KC7 KC6 KC5 KC4 KC3 KC2 KC1
CIWE Contact | Tel No.
Dredger Duty Supervisor 24 Hr (1) 5617 3166
Dredger Duty Supervisor 24 Hr (2) 6958 0590
W T Ho 6064 2004
Dominic Leung 9269 0430
KO Leung 9034 2130
Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours
CIWE-KTCB-D853
N.T.S.
\\CIWE\Users\Public\From HO\[Portion AB 2015-10-10 D853 for E18.xlsx]Main


Tentative Daily Programme
Start Date: 10 October 2015
End Date: 10 October 2015
Works Extent
Location | Latitude | Longitude
A | 22° 20.2875' | 114° 7.0675'
B | 22° 20.3392' | 114° 7.0500'
C | 22° 20.3554' | 114° 7.1055'
D | 22° 20.3038' | 114° 7.1230'
Affected Berth(s)
KC17
Direction of Traffic
ONE-WAY
Notes:
MDN Nr. 95 of 2014
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme: 10 Oct 2015 17:30 -- 10 Oct 2015 22:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area
Box No. E18
KC20 KC19 KC18 KC17 KC16 KC15 KC14 KC13 KC12 KC11 KC10 KC9 KC8 KC7 KC6 KC5 KC4 KC3 KC2 KC1
CIWE Contact | Tel No.
Dredger Duty Supervisor 24 Hr (1) 5617 3166
Dredger Duty Supervisor 24 Hr (2) 6958 0590
W T Ho 6064 2004
Dominic Leung 9269 0430
KO Leung 9034 2130
Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours
CIWE-KTCB-D852
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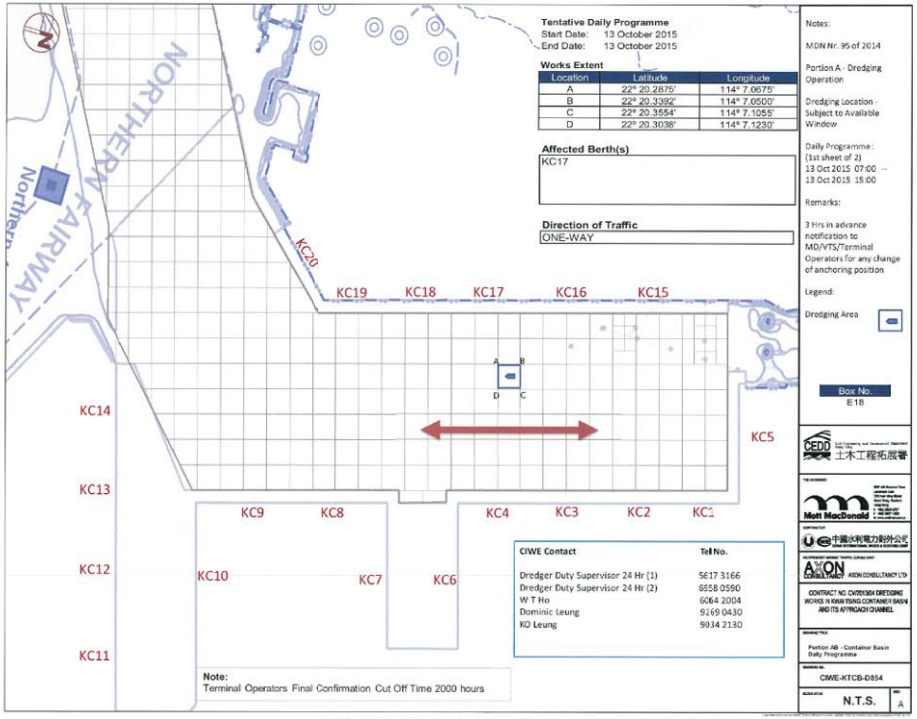
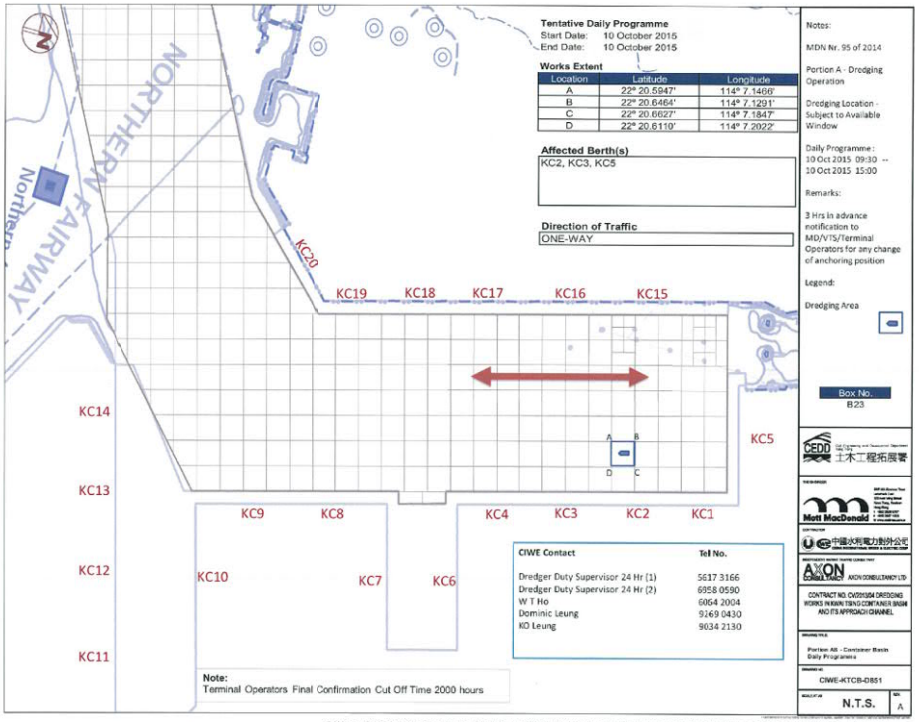

Tentative Daily Programme
Start Date: 13 October 2015
End Date: 13 October 2015
Works Extent
Location | Latitude | Longitude
A | 22° 20.2875' | 114° 7.0675'
B | 22° 20.3392' | 114° 7.0500'
C | 22° 20.3554' | 114° 7.1055'
D | 22° 20.3038' | 114° 7.1230'
Affected Berth(s)
KC17
Direction of Traffic
ONE-WAY
Notes:
MDN Nr. 95 of 2014
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme: (1st sheet of 2) 13 Oct 2015 07:00 -- 13 Oct 2015 15:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area
Box No. E18
KC20 KC19 KC18 KC17 KC16 KC15 KC14 KC13 KC12 KC11 KC10 KC9 KC8 KC7 KC6 KC5 KC4 KC3 KC2 KC1
CIWE Contact | Tel No.
Dredger Duty Supervisor 24 Hr (1) 5617 3166
Dredger Duty Supervisor 24 Hr (2) 6958 0590
W T Ho 6064 2004
Dominic Leung 9269 0430
KO Leung 9034 2130
Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours
CIWE-KTCB-D854
N.T.S.
C:\Users\CV201304\Desktop\WF & AB Working Programe\Zone AB Working Programme\Daily\[Portion AB 2015-10-12 D854 for E19.xlsx]Main


Tentative Daily Programme
Start Date: 10 October 2015
End Date: 10 October 2015
Works Extent
Location | Latitude | Longitude
A | 22° 20.5947' | 114° 7.1466'
B | 22° 20.6464' | 114° 7.1291'
C | 22° 20.6627' | 114° 7.1847'
D | 22° 20.6110' | 114° 7.2022'
Affected Berth(s)
KC2, KC3, KC5
Direction of Traffic
ONE-WAY
Notes:
MDN Nr. 95 of 2014
Portion A - Dredging Operation
Dredging Location - Subject to Available Window
Daily Programme: 10 Oct 2015 09:30 -- 10 Oct 2015 15:00
Remarks:
3 Hrs in advance notification to MD/VTS/Terminal Operators for any change of anchoring position
Legend:
Dredging Area
Box No. B23
KC20 KC19 KC18 KC17 KC16 KC15 KC14 KC13 KC12 KC11 KC10 KC9 KC8 KC7 KC6 KC5 KC4 KC3 KC2 KC1
CIWE Contact | Tel No.
Dredger Duty Supervisor 24 Hr (1) 5617 3166
Dredger Duty Supervisor 24 Hr (2) 6958 0590
W T Ho 6064 2004
Dominic Leung 9269 0430
KO Leung 9034 2130
Note:
Terminal Operators Final Confirmation Cut Off Time 2000 hours
CIWE-KTCB-D851
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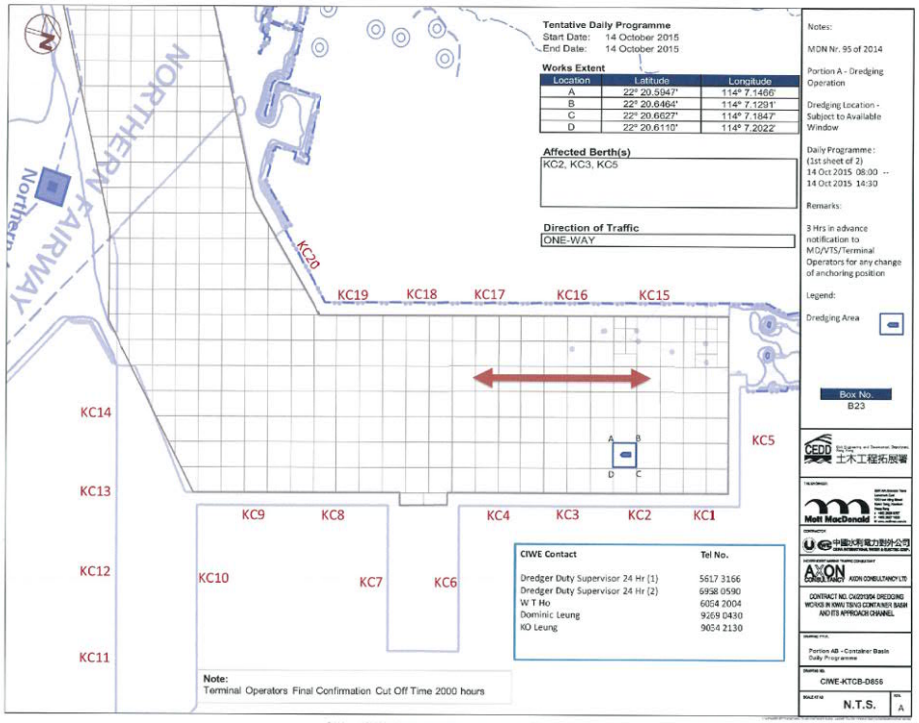

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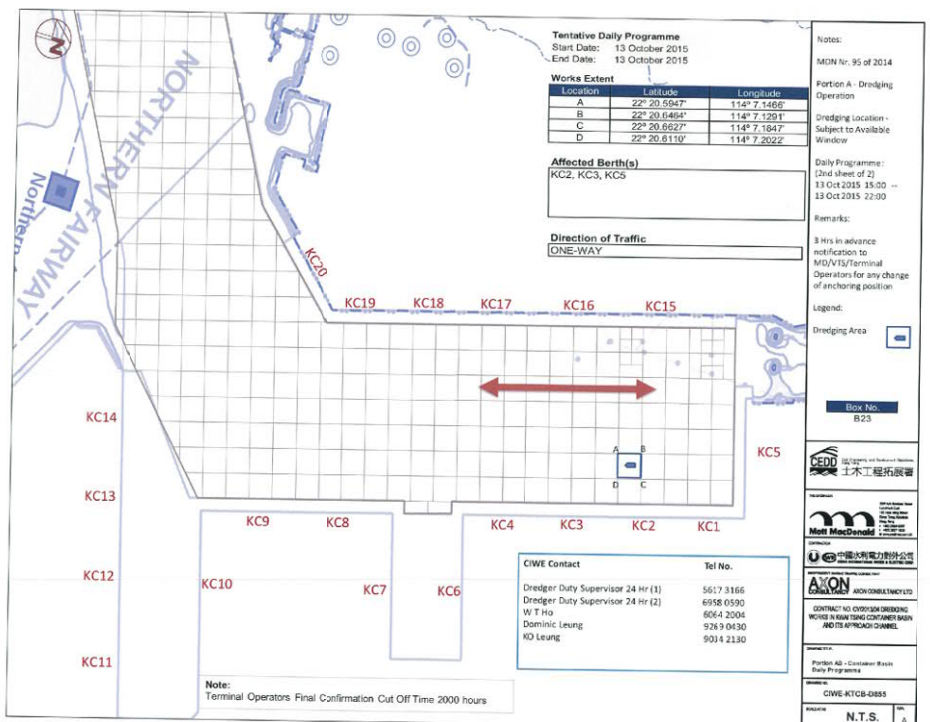

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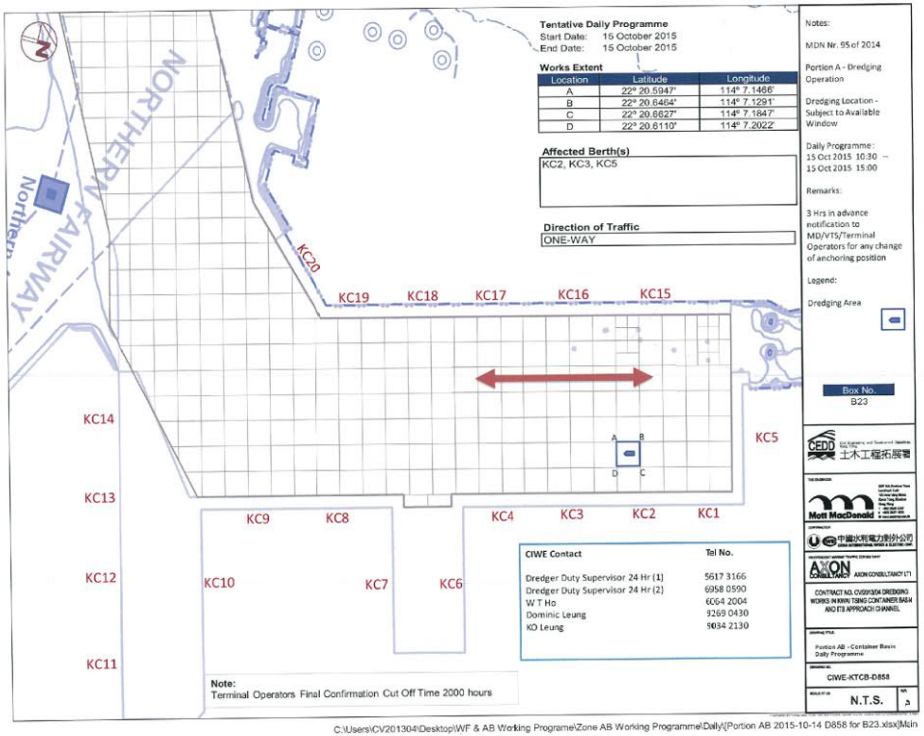

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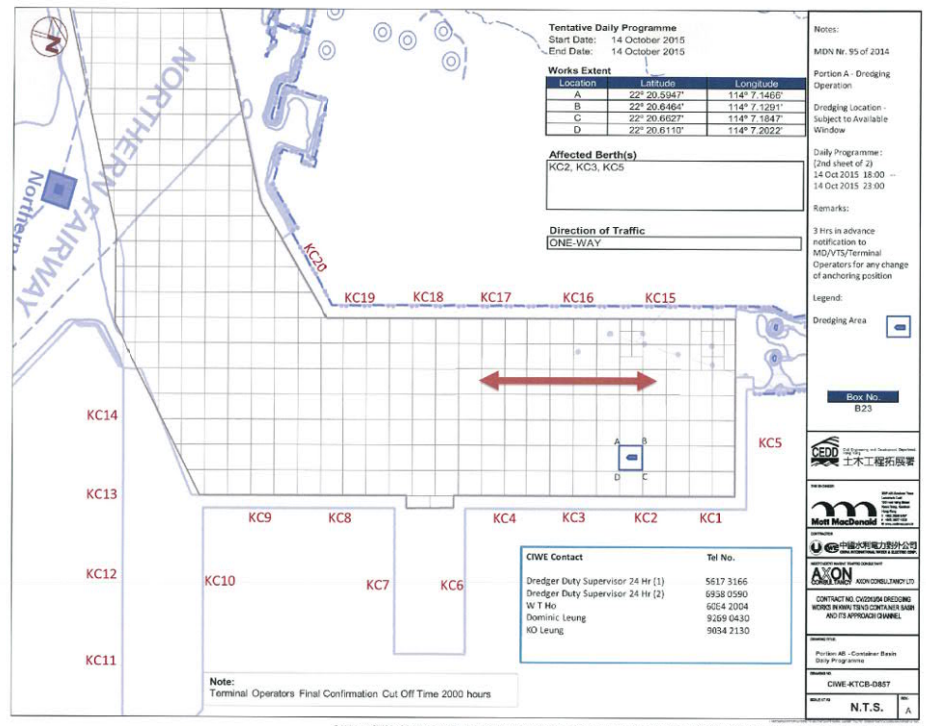

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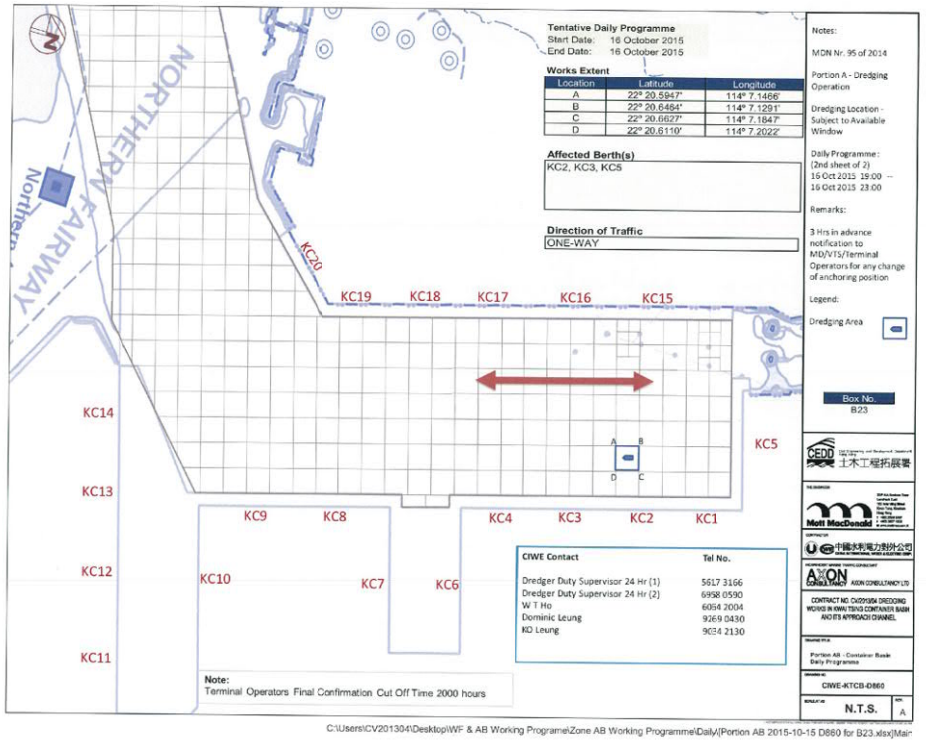

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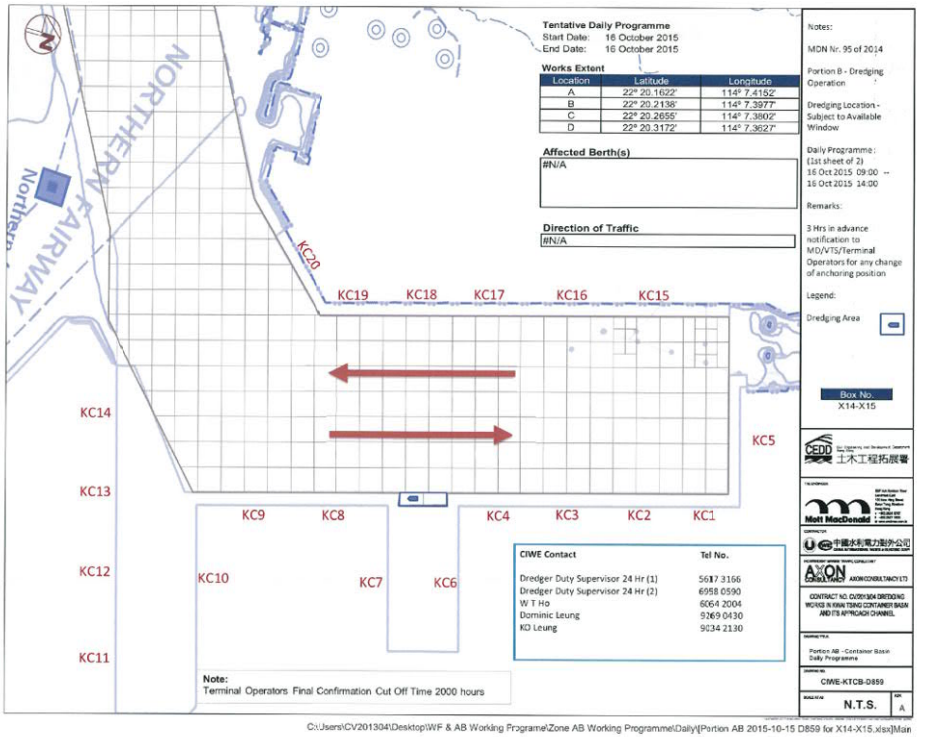

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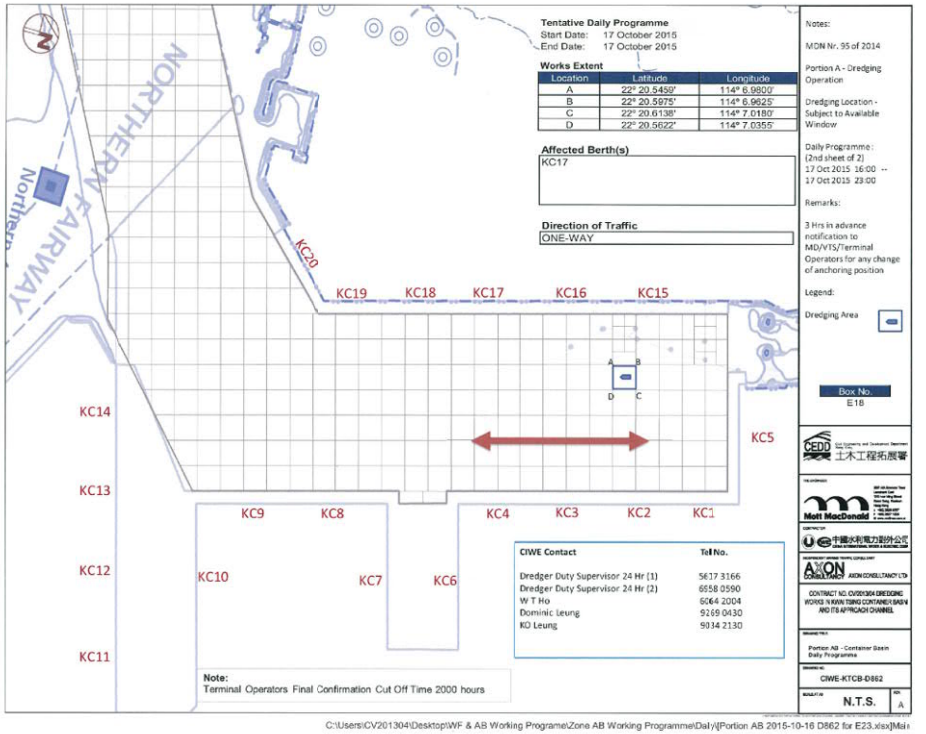

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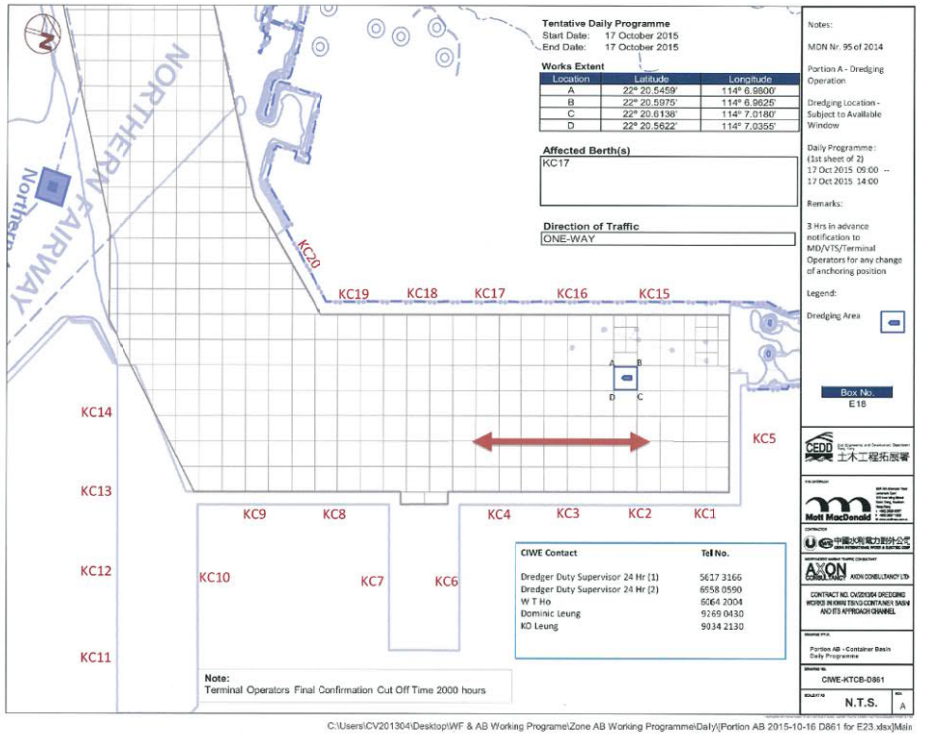

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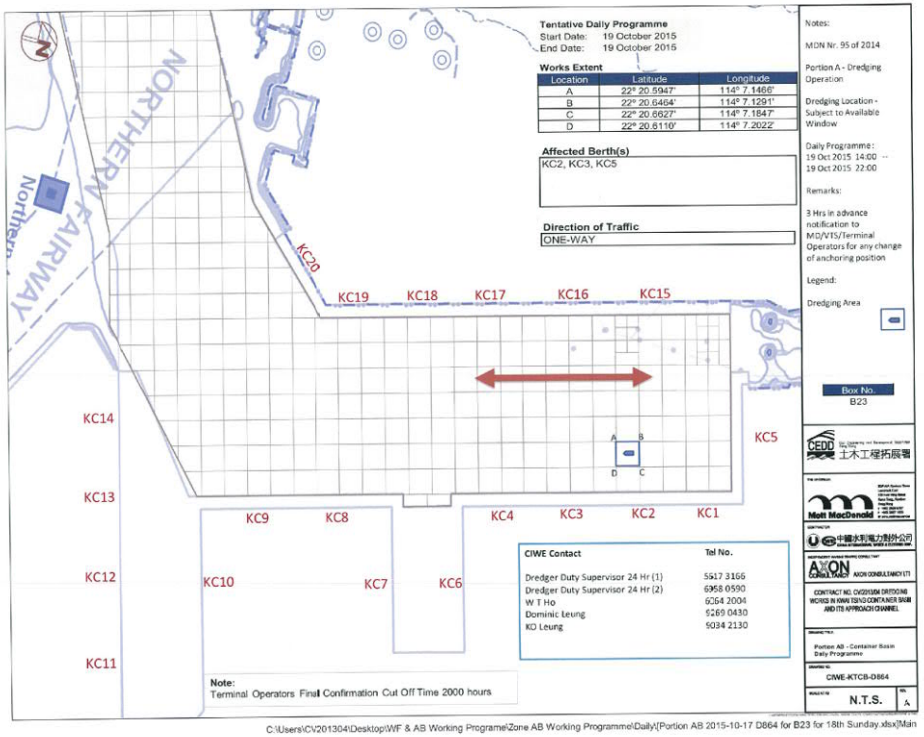

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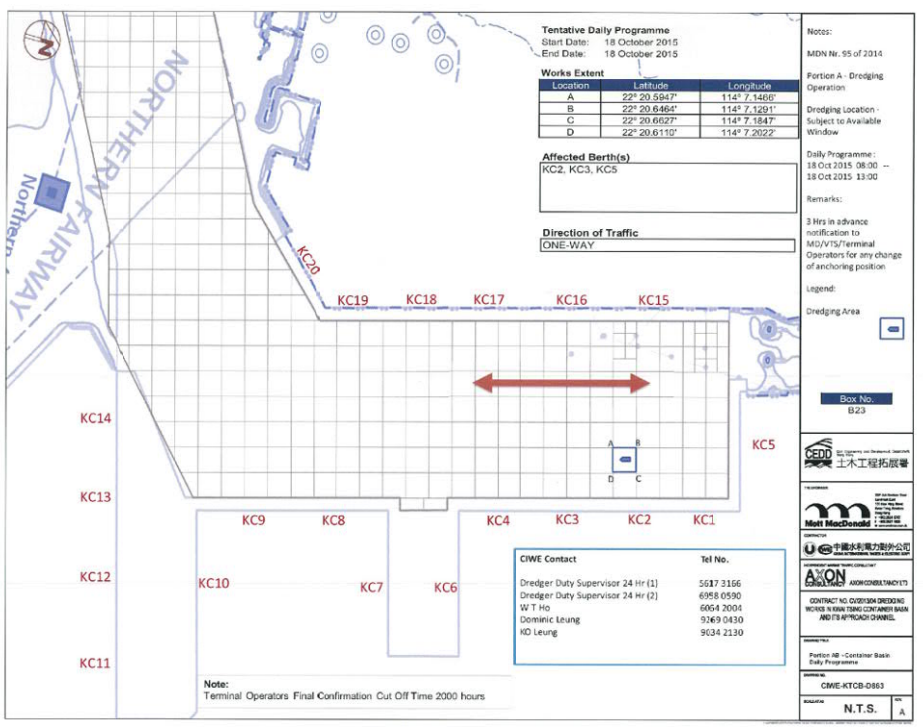

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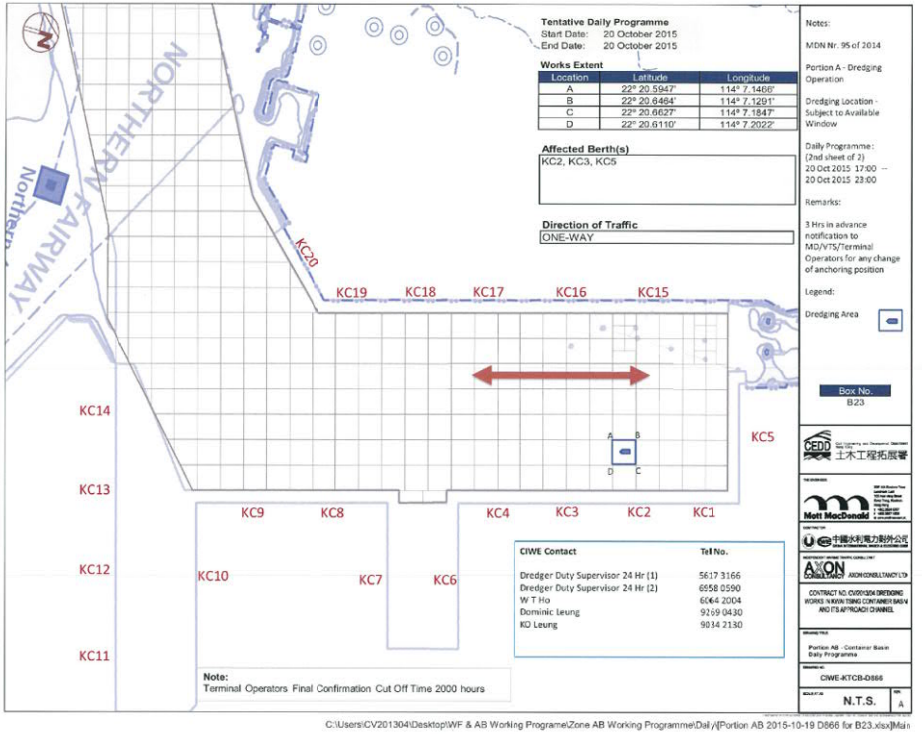

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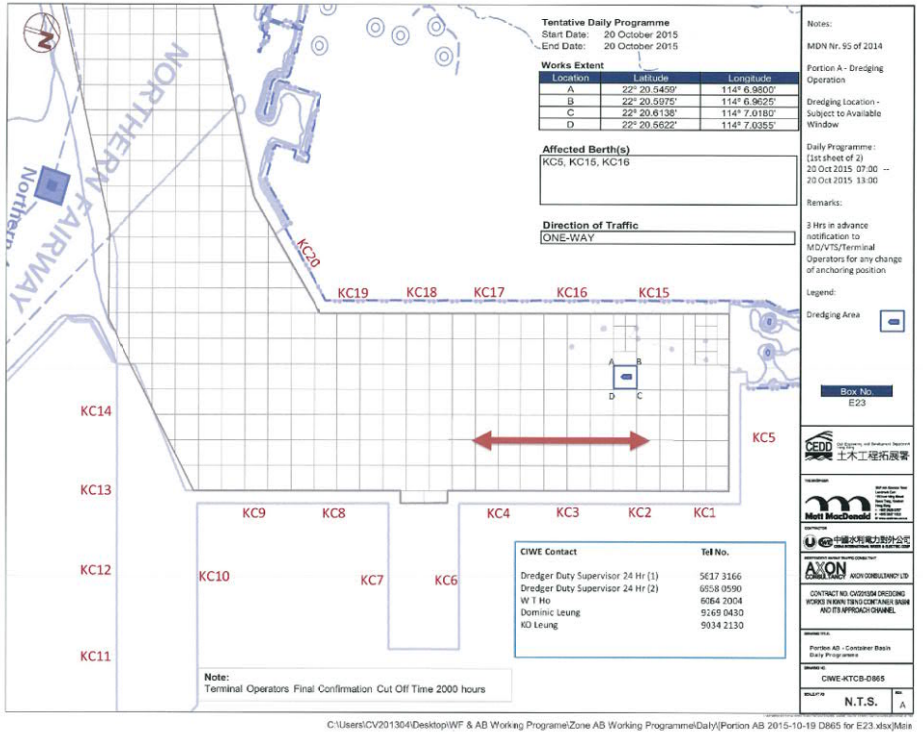

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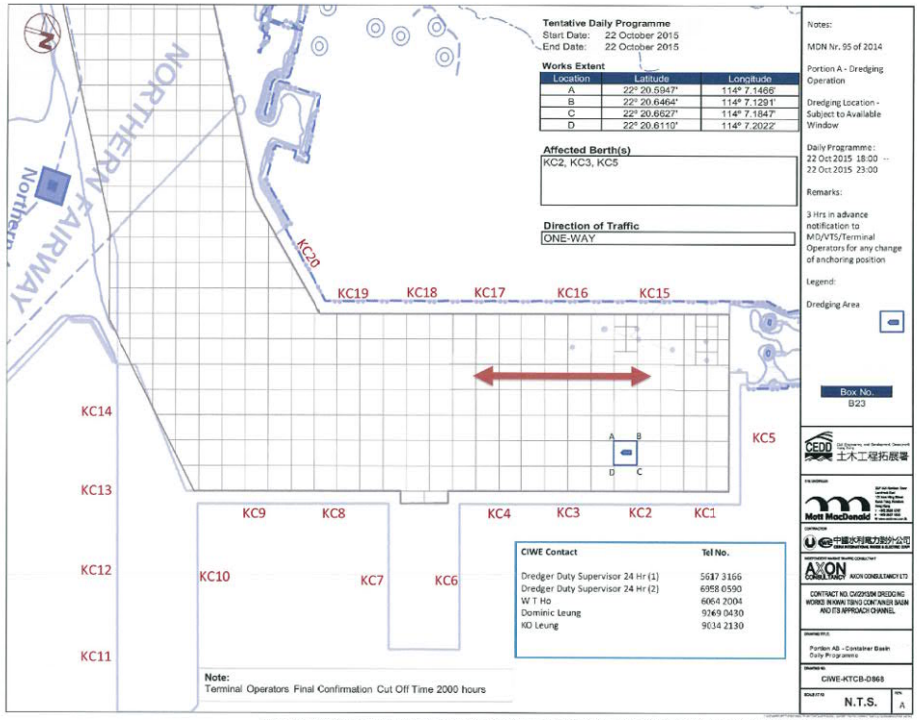

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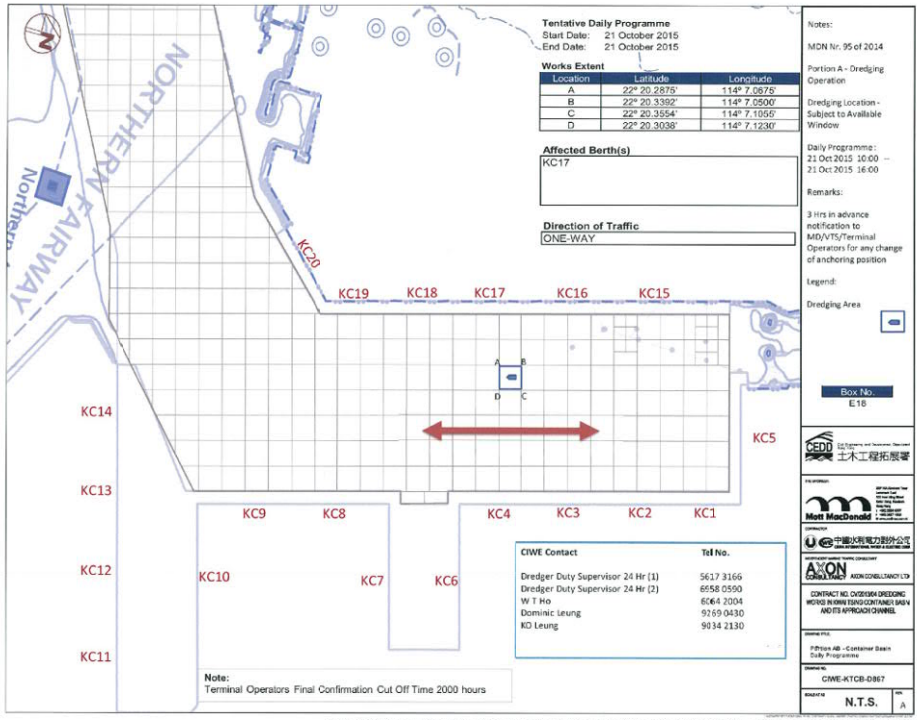

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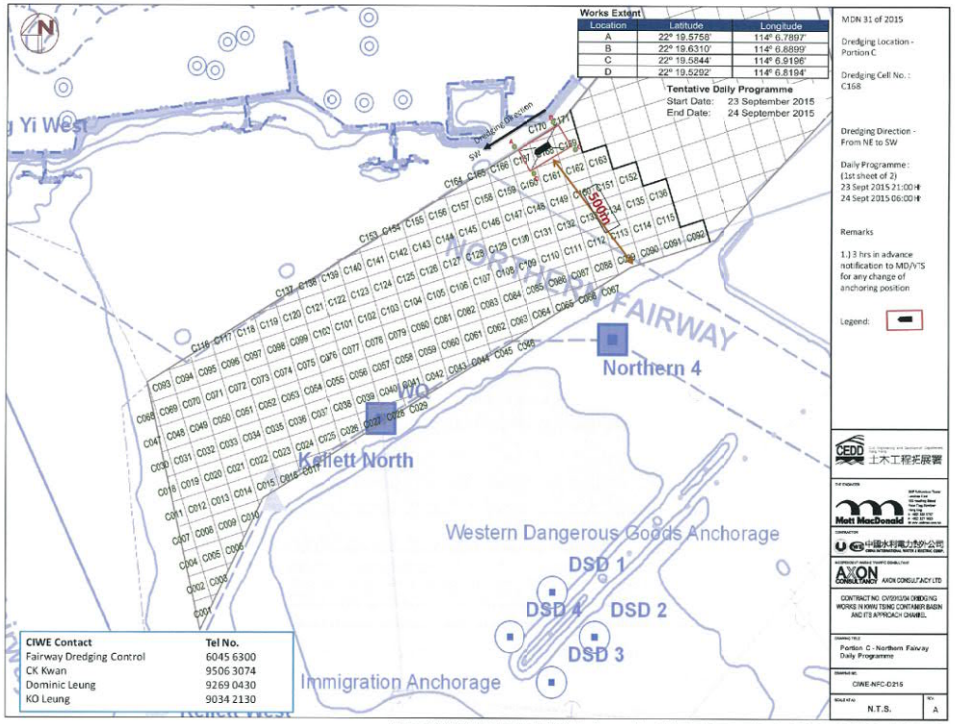

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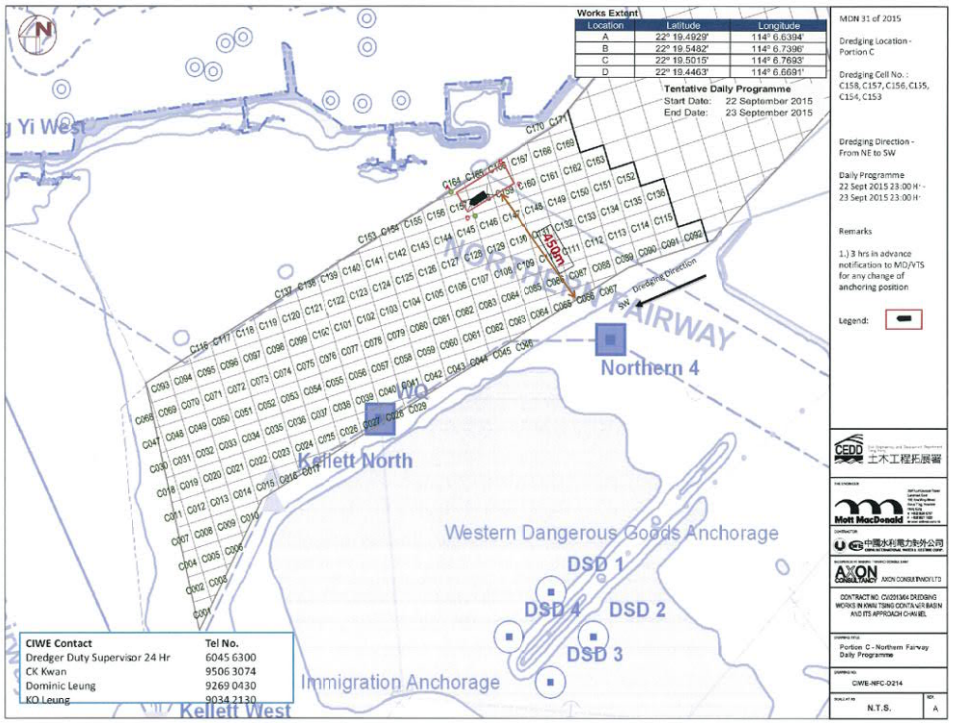

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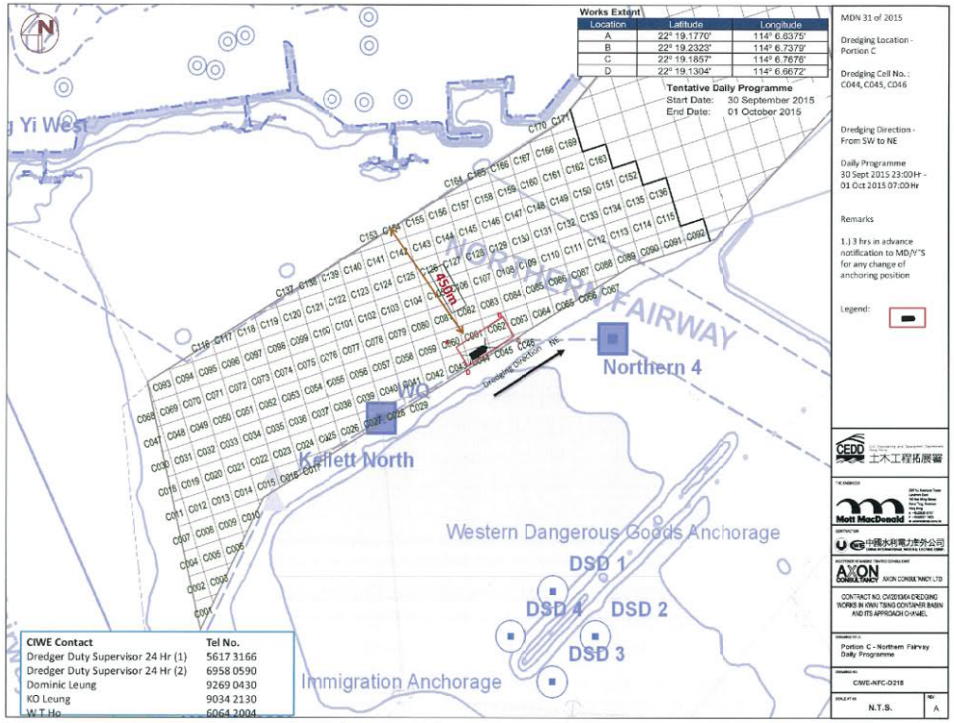

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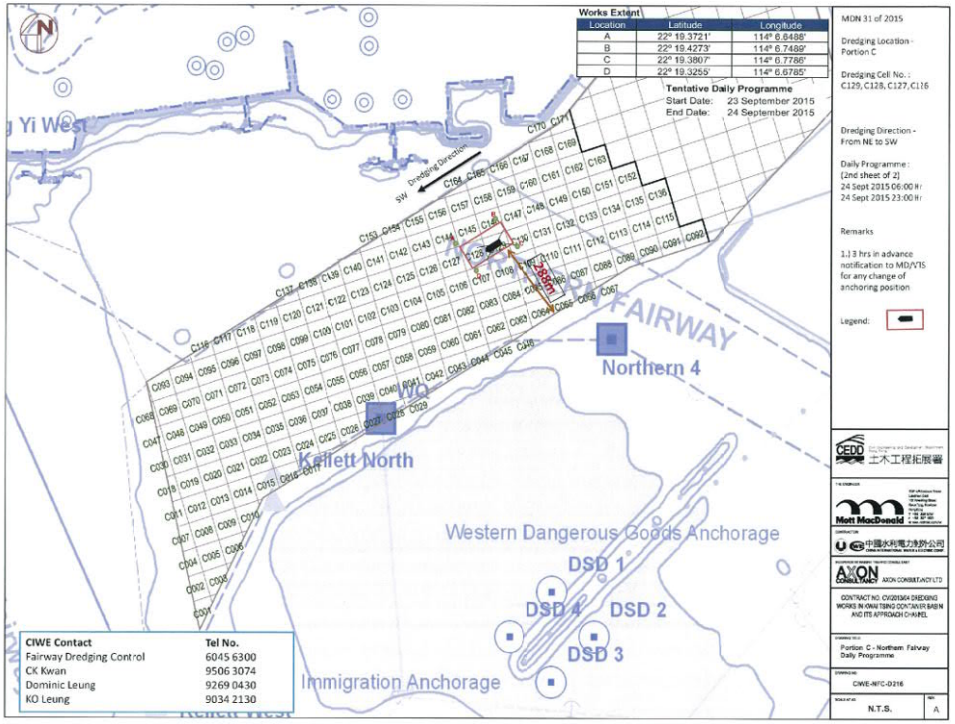

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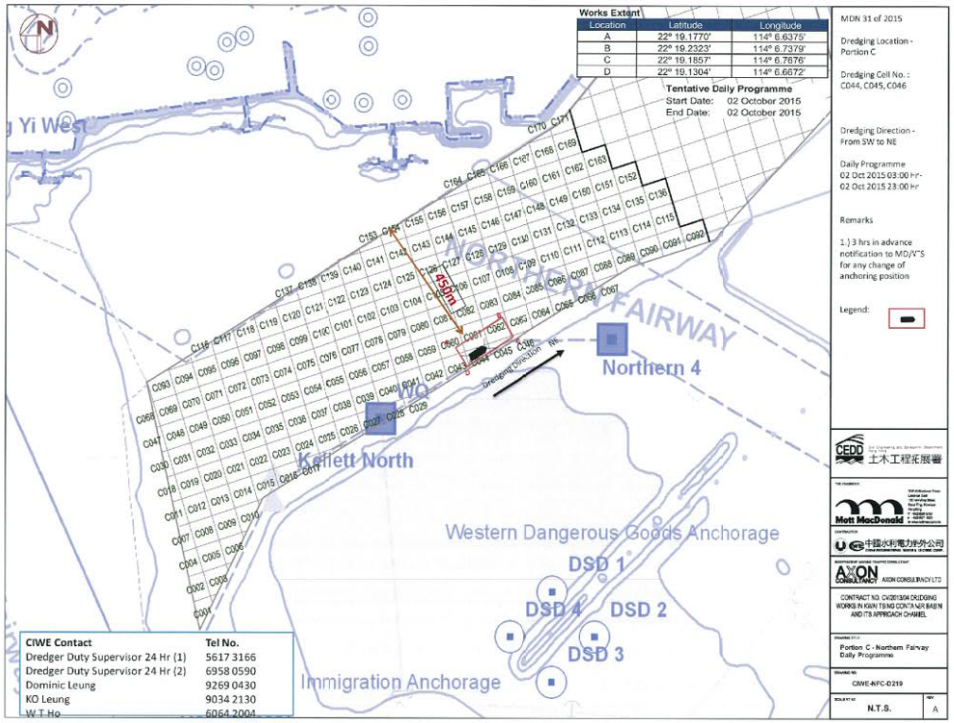

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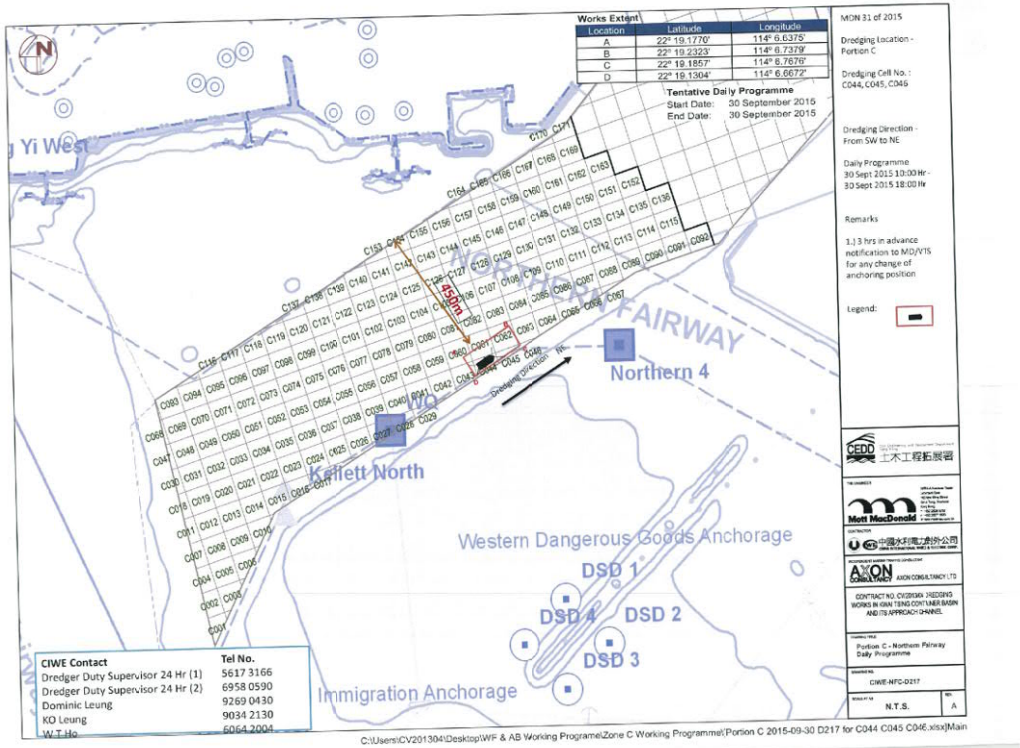

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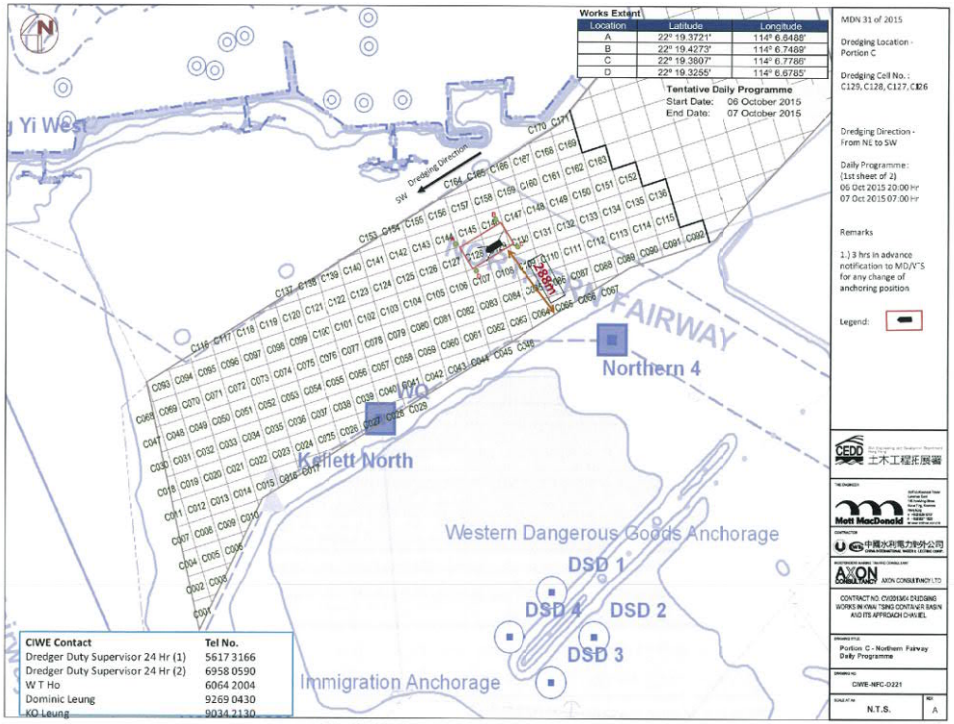

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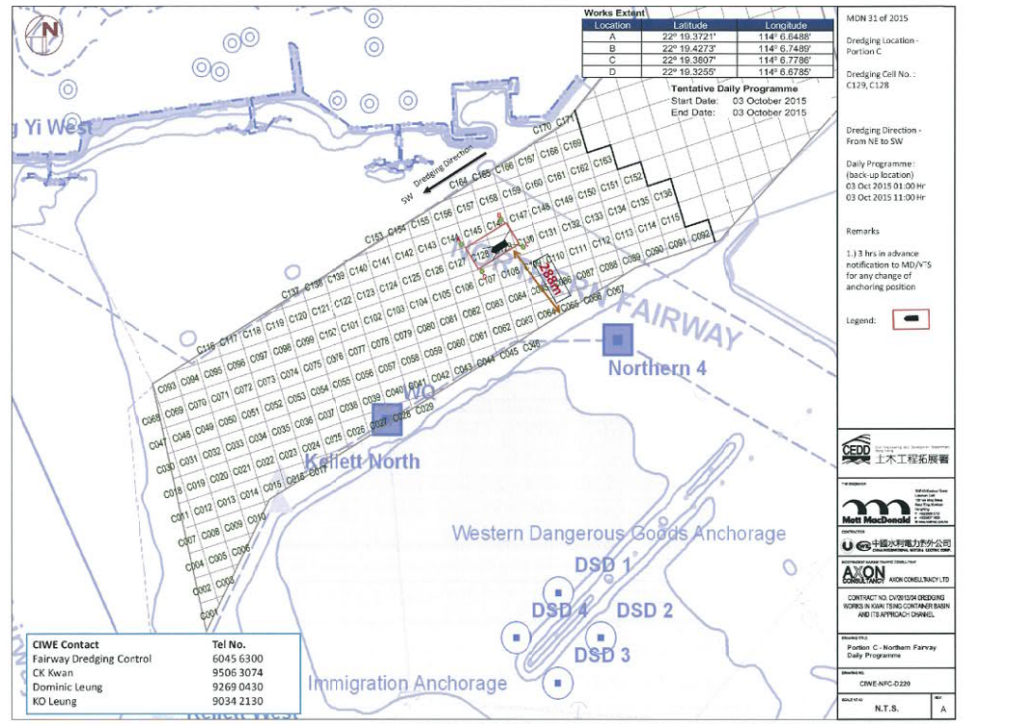

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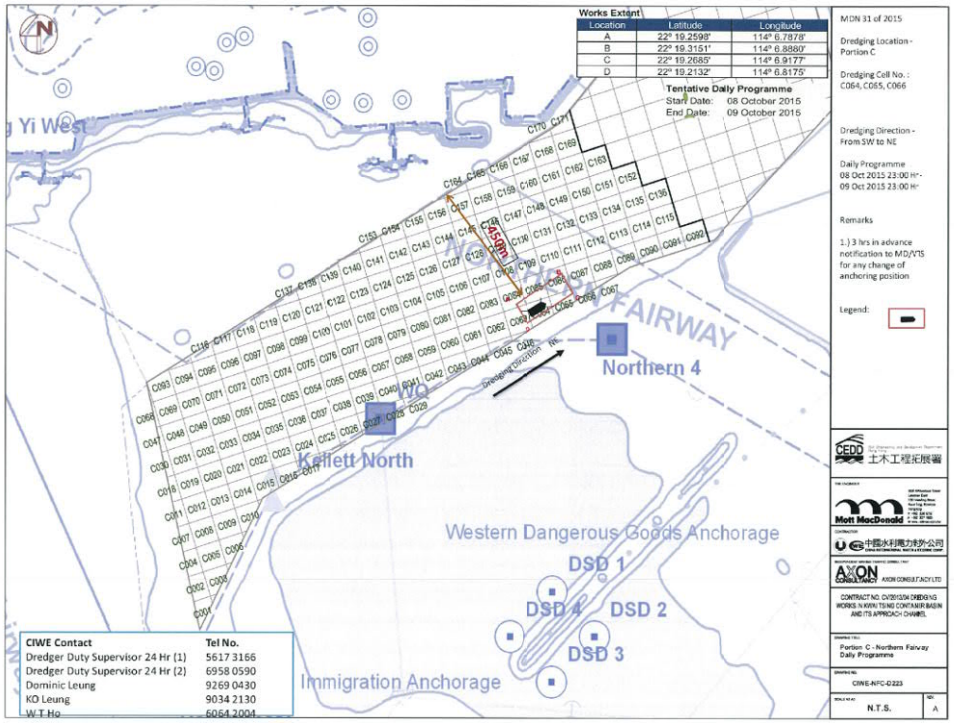

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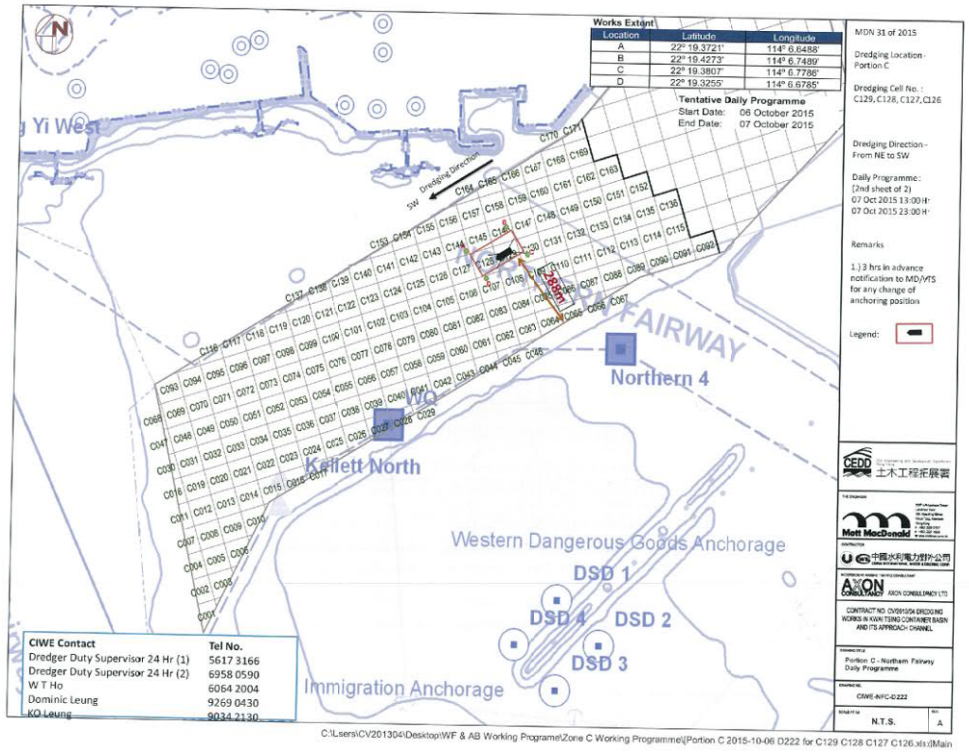

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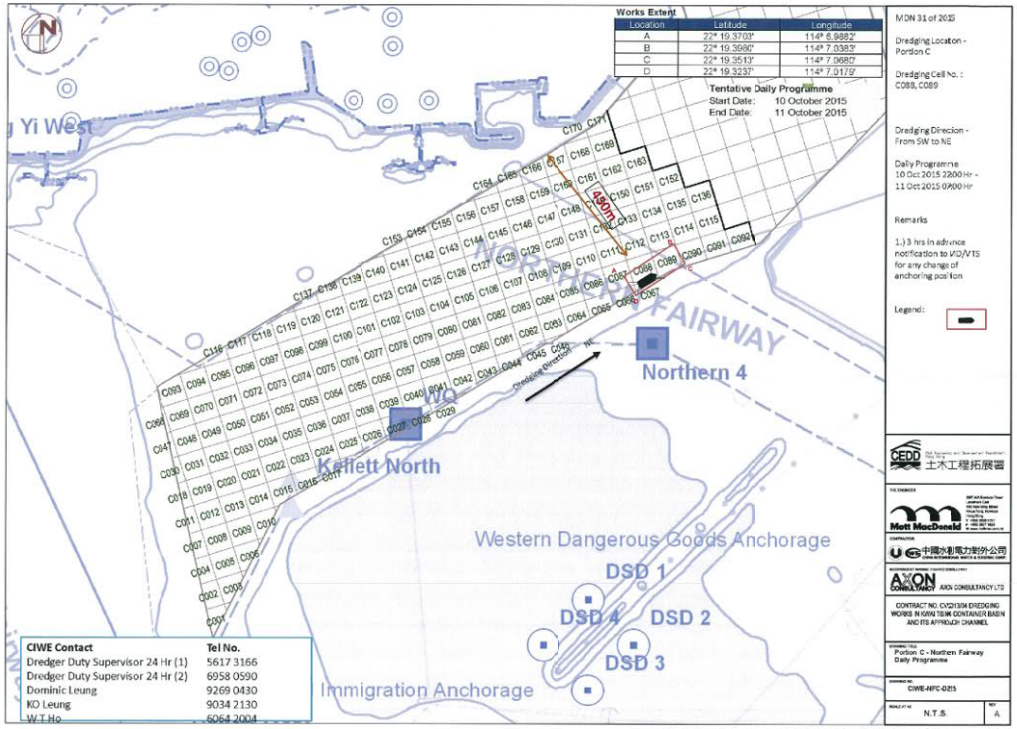

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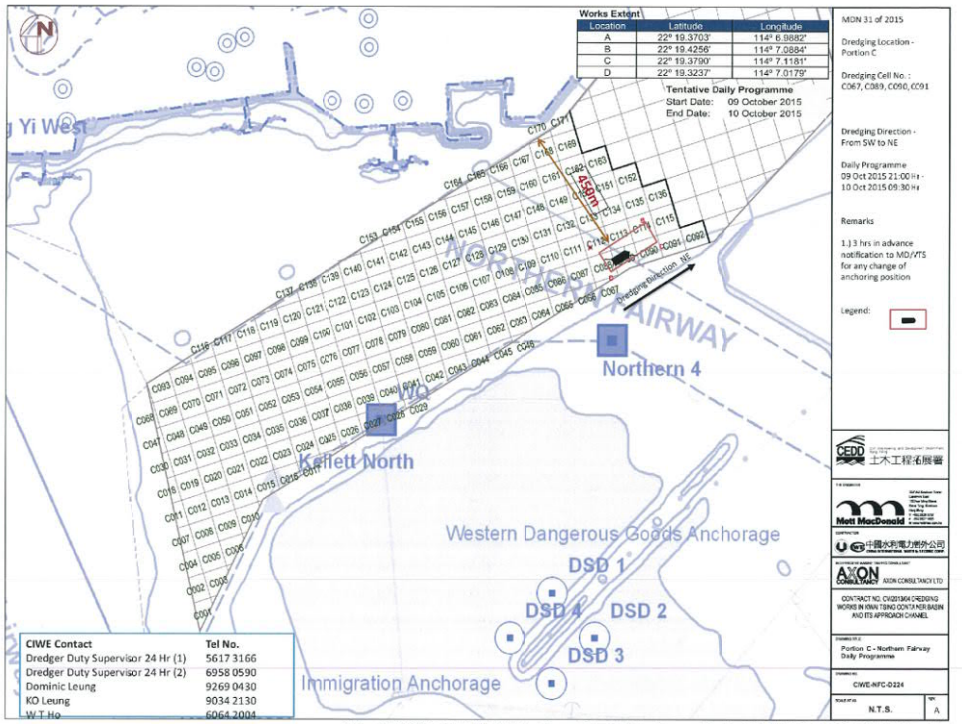

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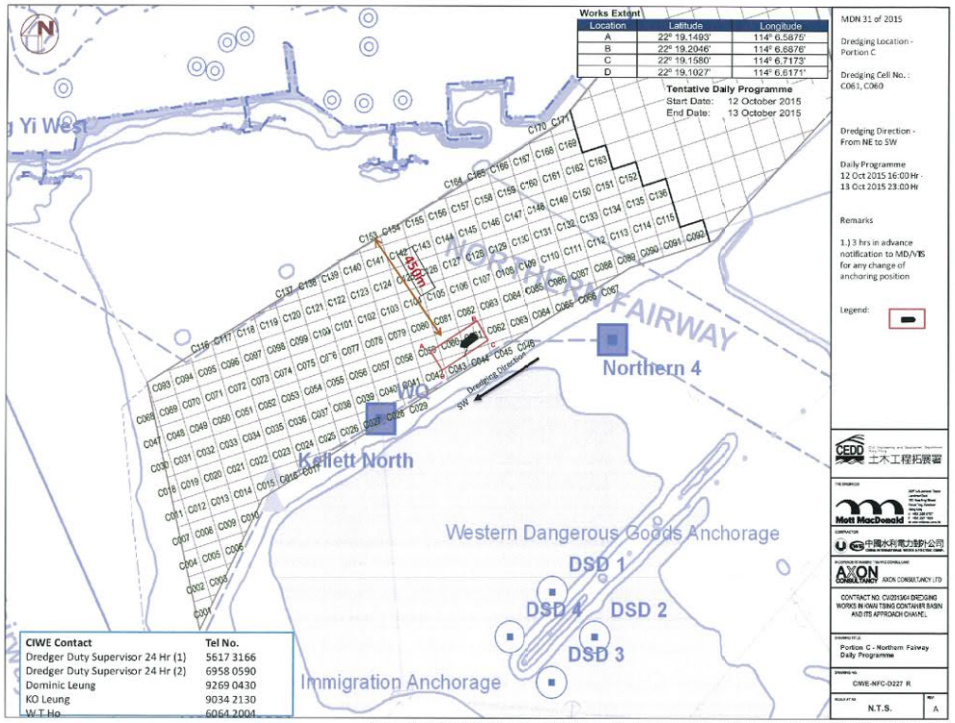

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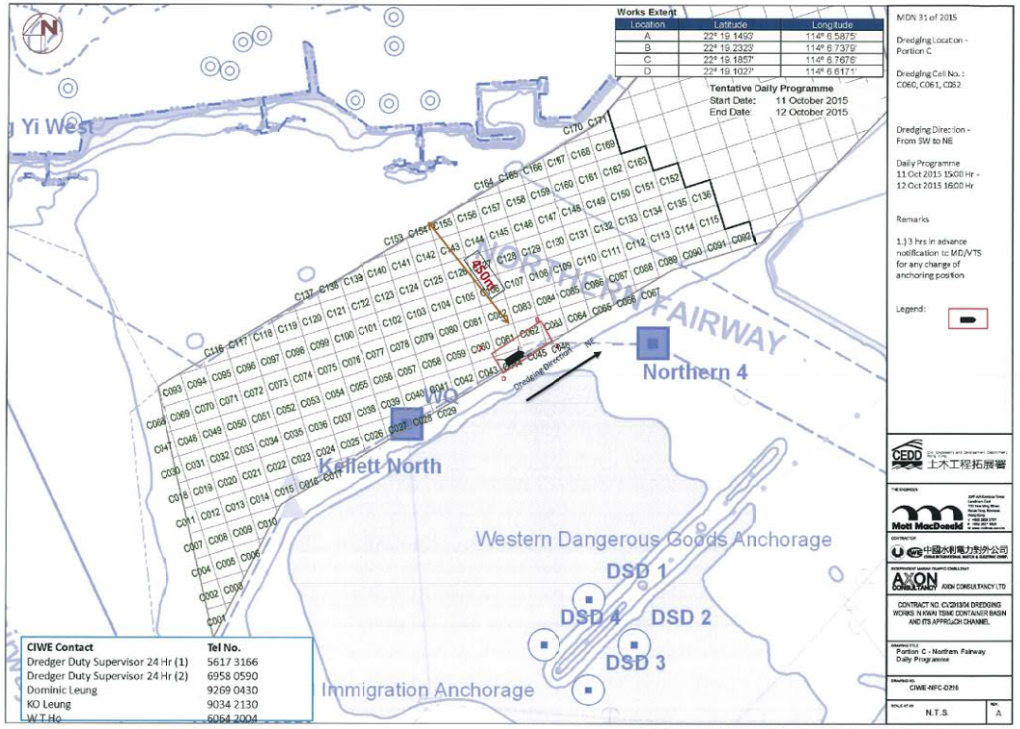

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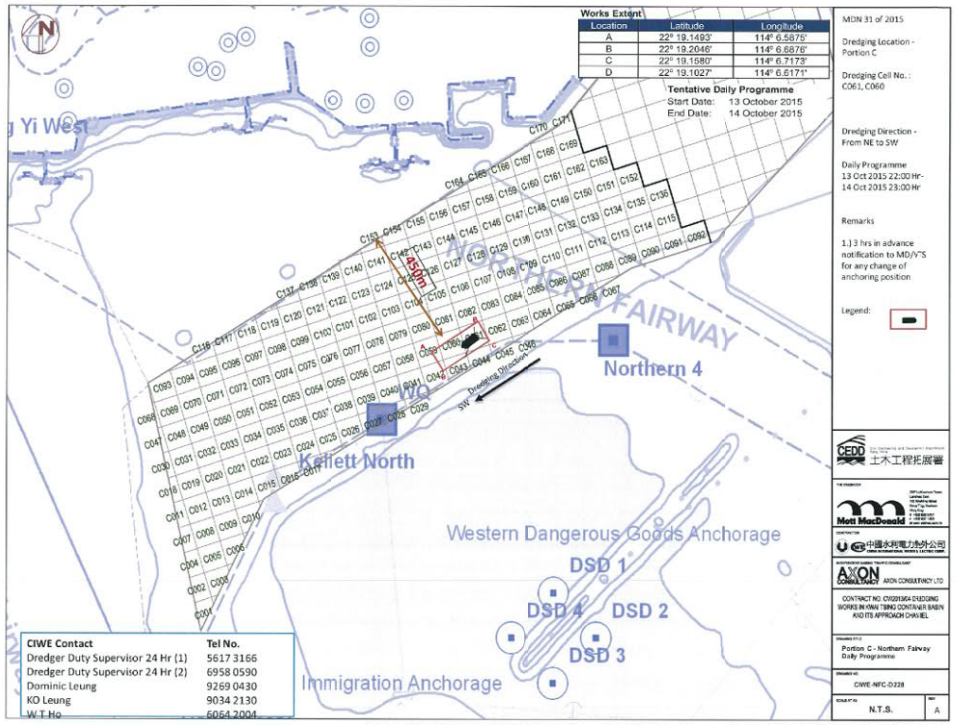

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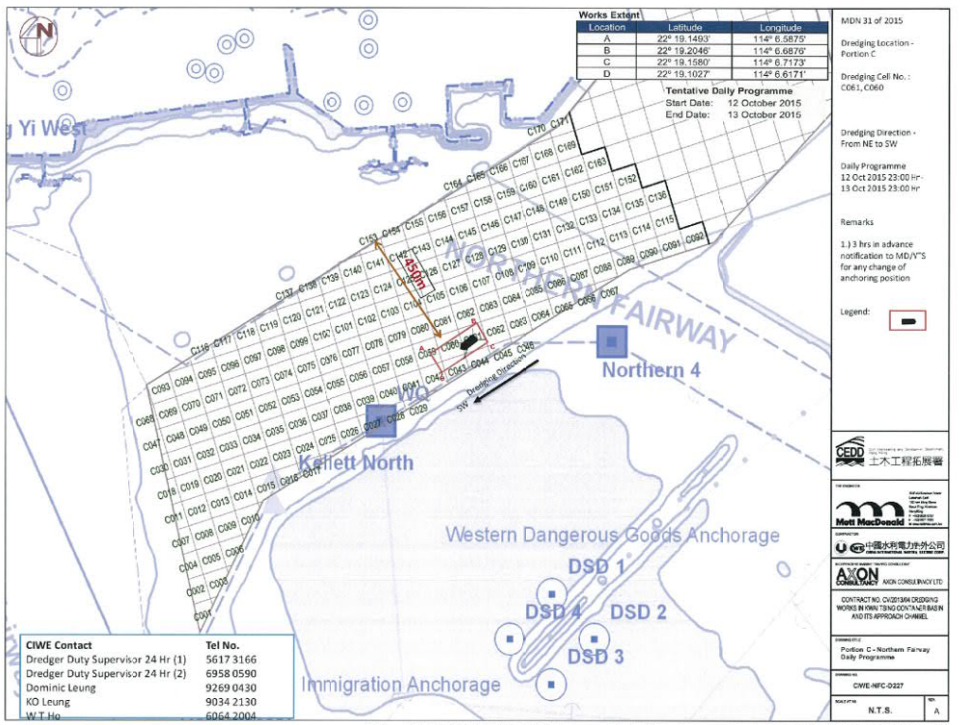

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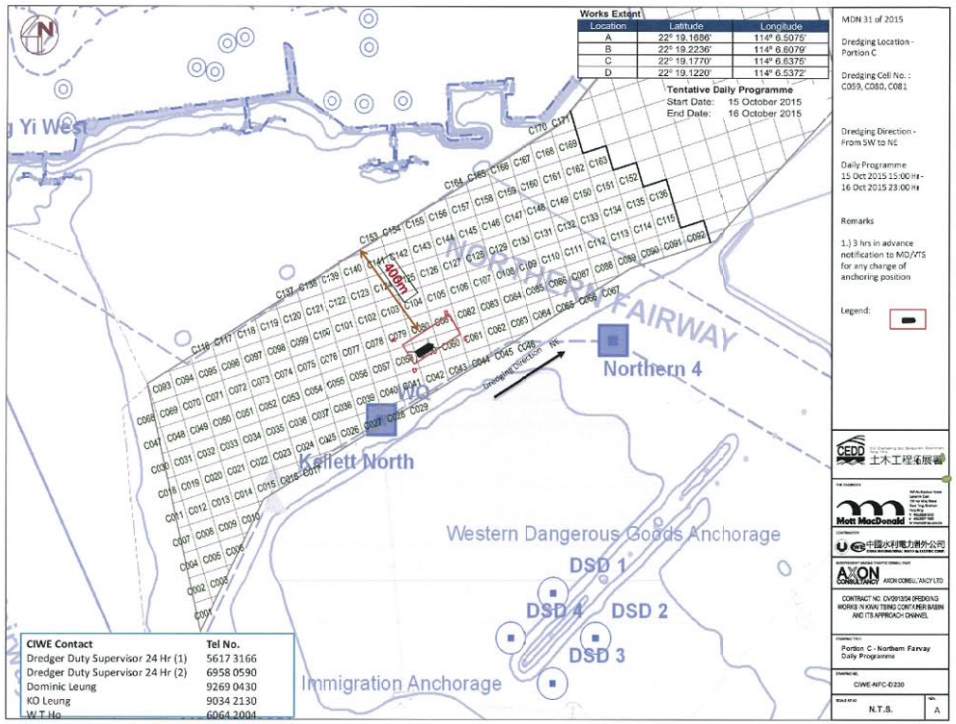

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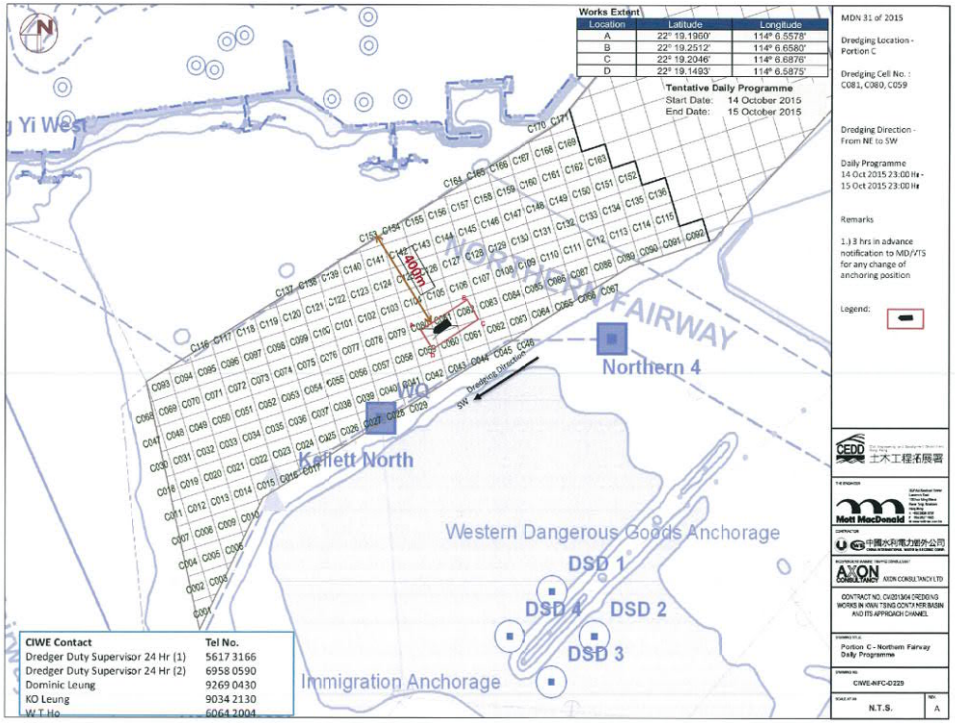

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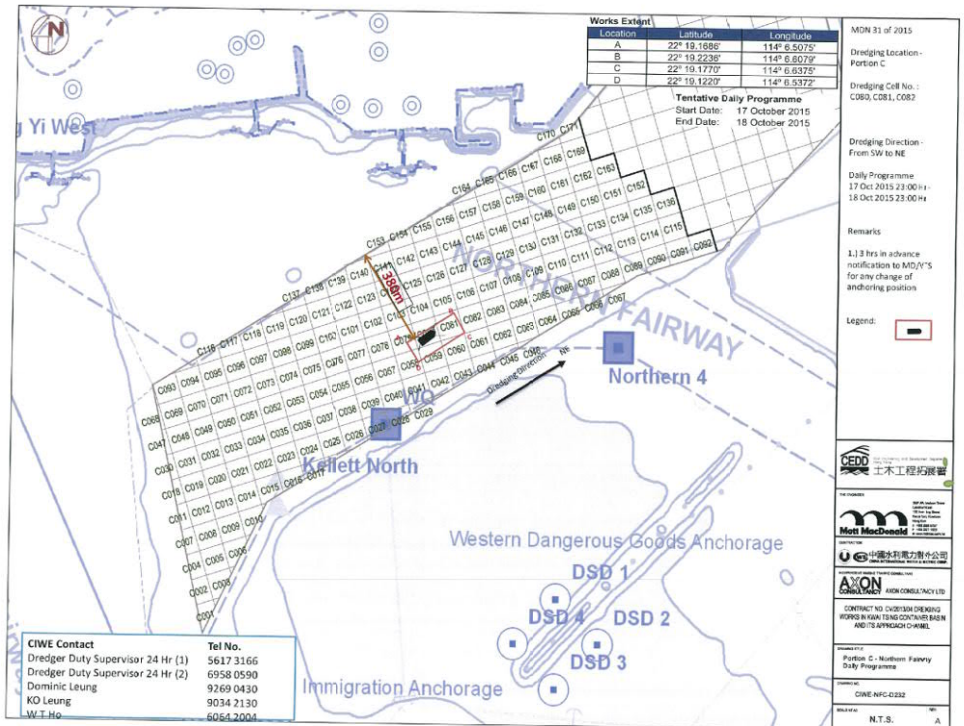

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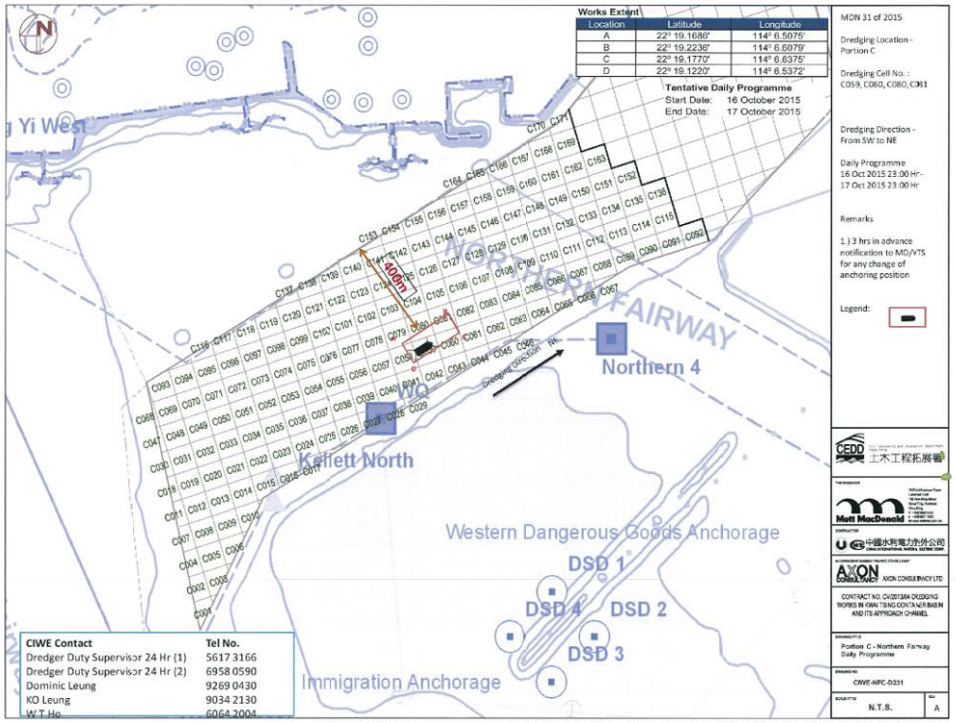

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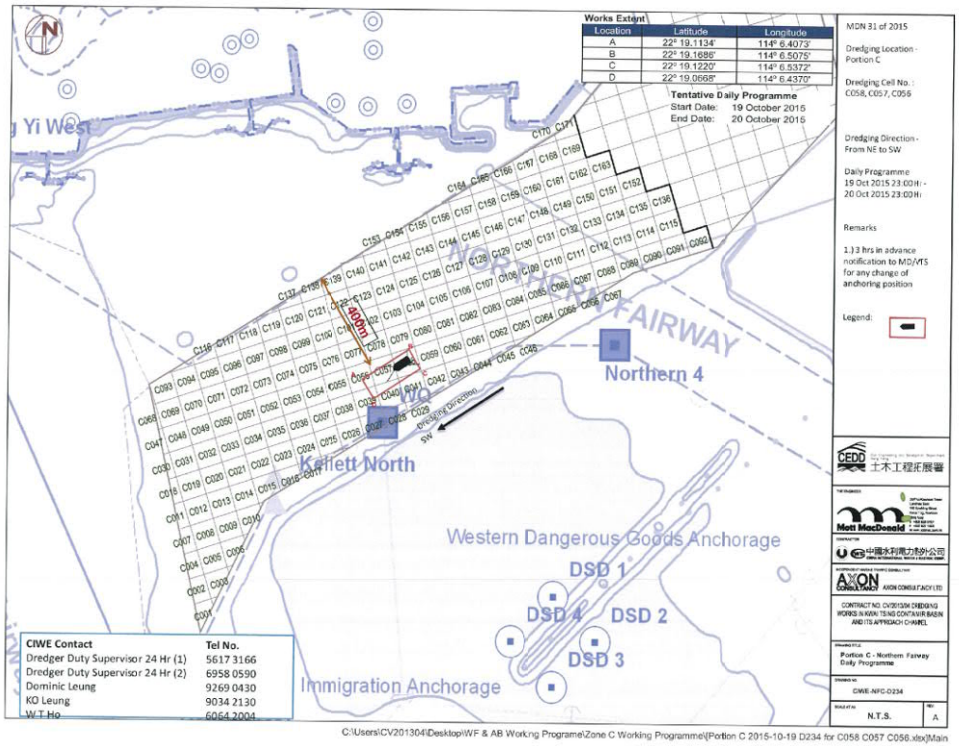

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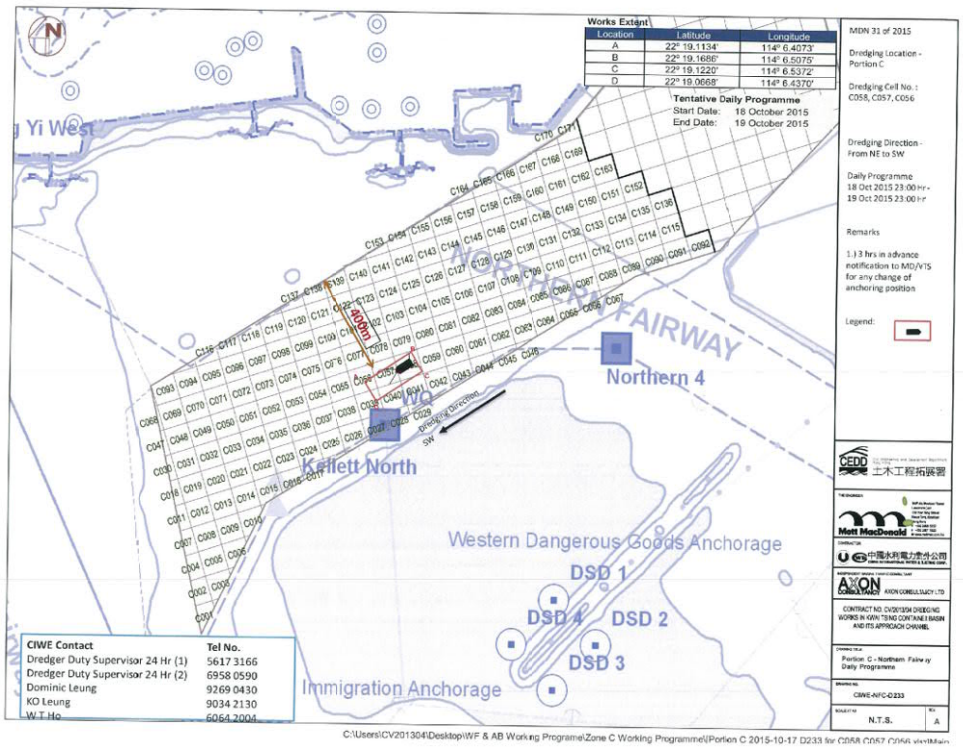

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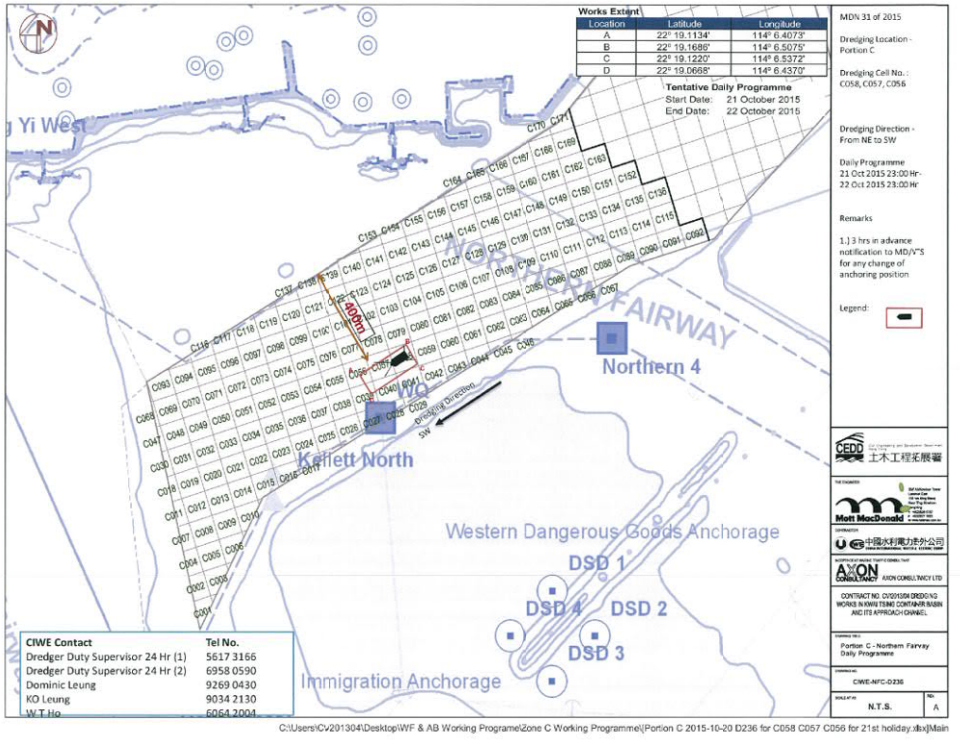

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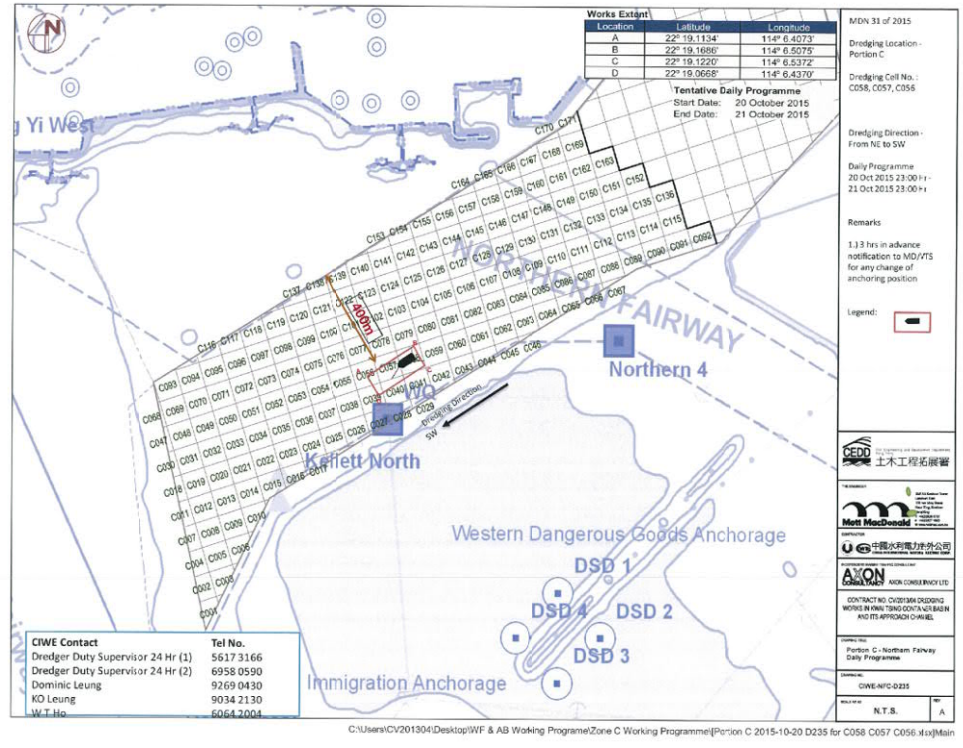

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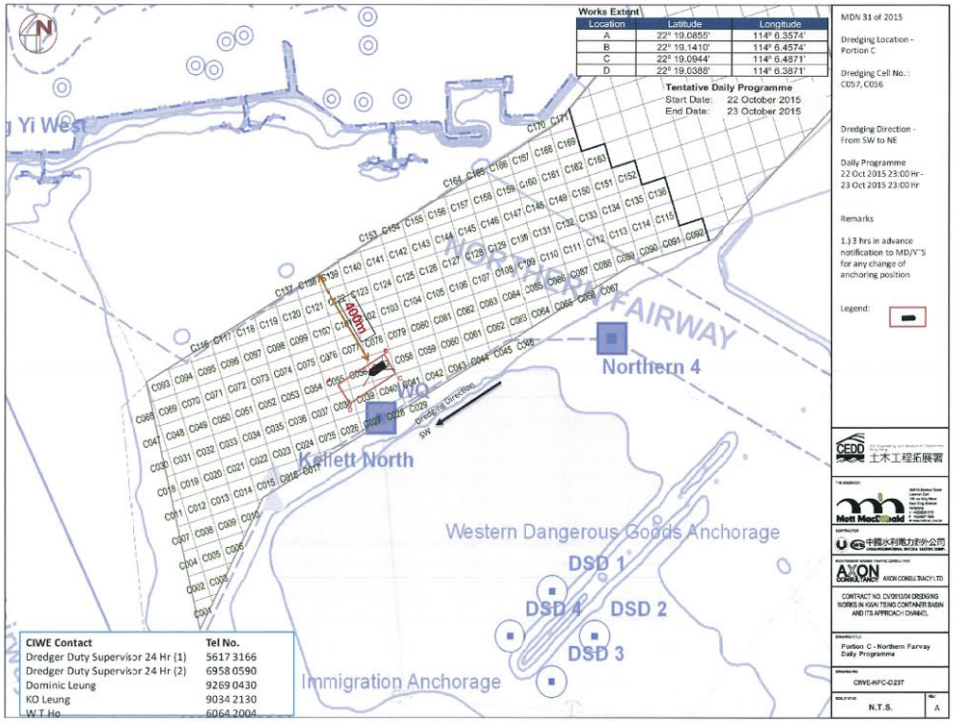

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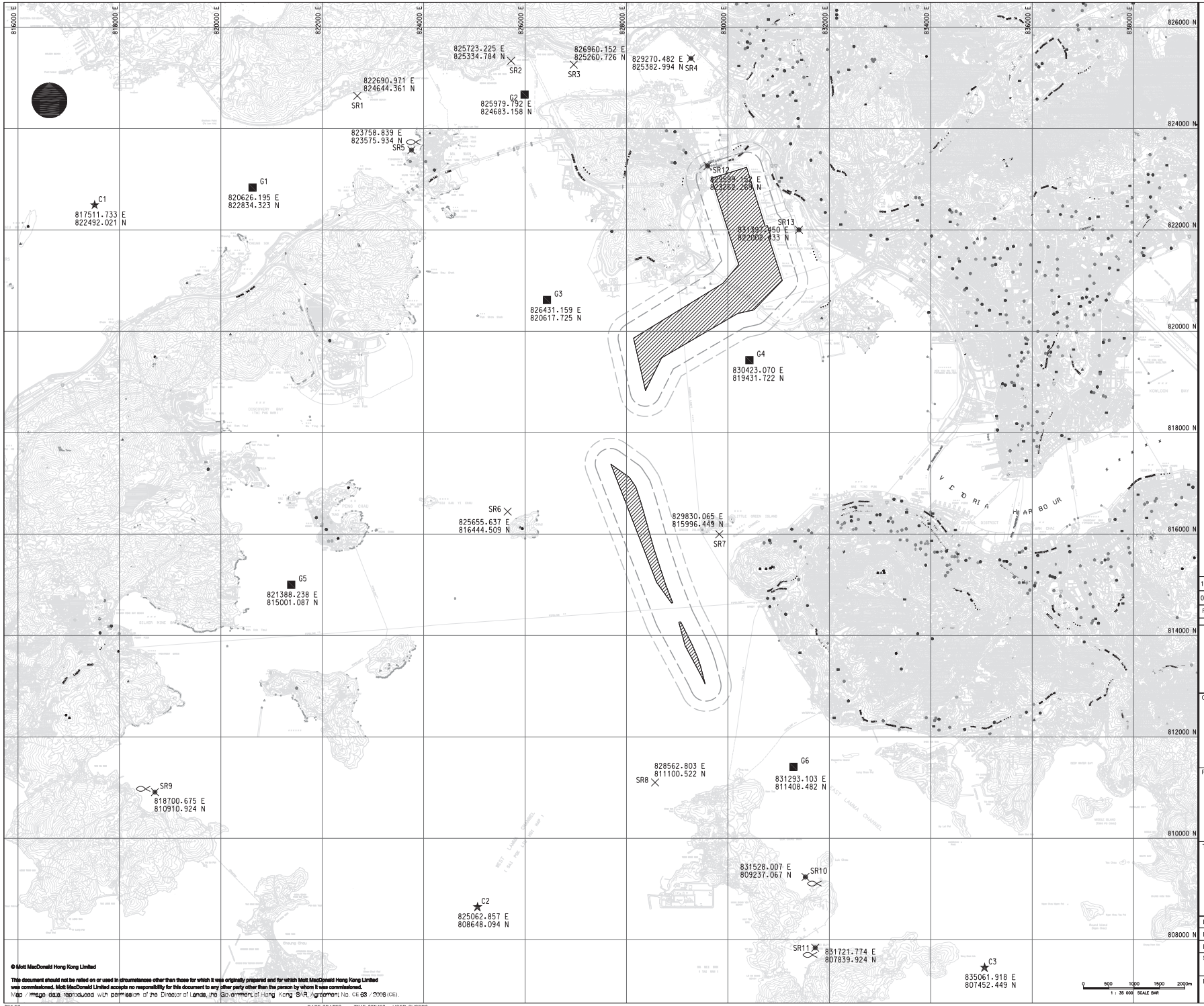
Fax : (852)-24508032
Email : mcl@fugro.com.hk

Figure 3

Locations of Water Quality Monitoring Stations



NOTES:

1. ALL COORDINATES ARE IN HONG KONG METRIC GRID (1980).
2. THE CONTRACTOR SHALL REFER TO RELEVANT SECTION(S) AND APPENDICES OF THE PARTICULAR SPECIFICATION REGARDING THE WATER QUALITY MONITORING.

LEGEND:

- SITE BOUNDARY
- MONITORING STATION
- CONTROL STATION
- GRADIENT STATION
- 24-HRS MONITORING STATION
- FISH CULTURE ZONE

Rev	Date	Drawn	Description	Ch'k'd	App'd
1	APR 13	WH	TENDER ADDENDUM NO. 1	SL	CMH
0	APR 13	WH	TENDER DRAWING	SL	CMH

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W www.mottmac.com.hk

Client

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

CONTRACT NO. : CV/2013/04
DREDGING WORKS IN KWAI TSING CONTAINER BASIN AND ITS APPROACH CHANNEL

Title

PROVISIONAL LOCATION OF WATER QUALITY MONITORING STATIONS

Designed	FC		Eng check	SL	
Drawn	WH		Coordination	TF	
Dwg check	FC		Approved	CMH	
Scale at A1	1:35000	Status	TEN	Rev	2

Drawing Number

MMH/259053/EM/403

$FILES DATE:$DATES TIME:$TIME$ USER:$USER$

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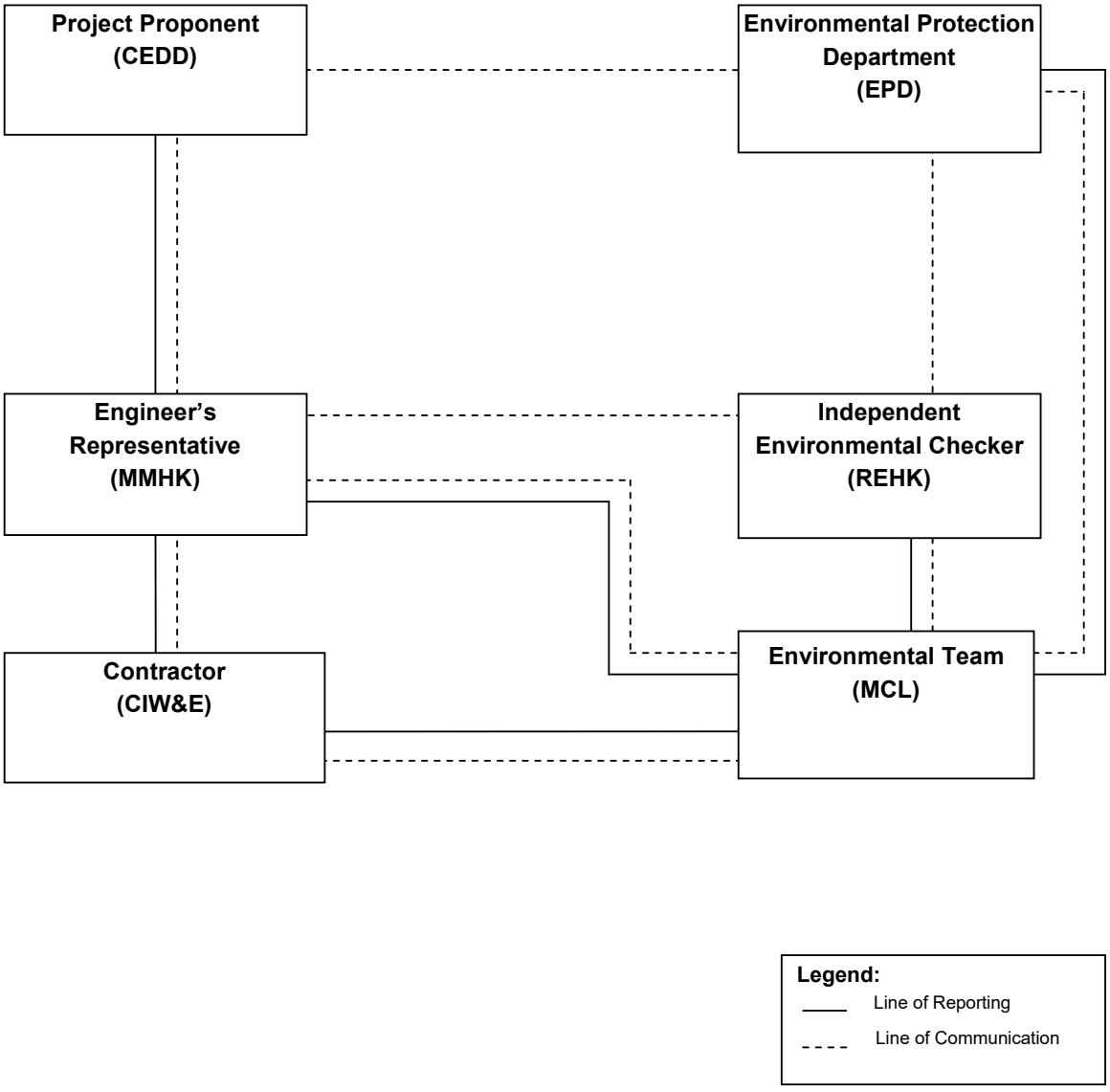
Fax : (852)-24508032
Email : mcl@fugro.com.hk

Appendix A

Project Organization Chart


Project Proponent
(CEDD)
Environmental Protection
Department
(EPD)
Engineer's
Representative
(MMHK)
Independent
Environmental Checker
(REHK)
Contractor
(CIW&E)
Environmental Team
(MCL)
Legend:
Line of Reporting
Line of Communication

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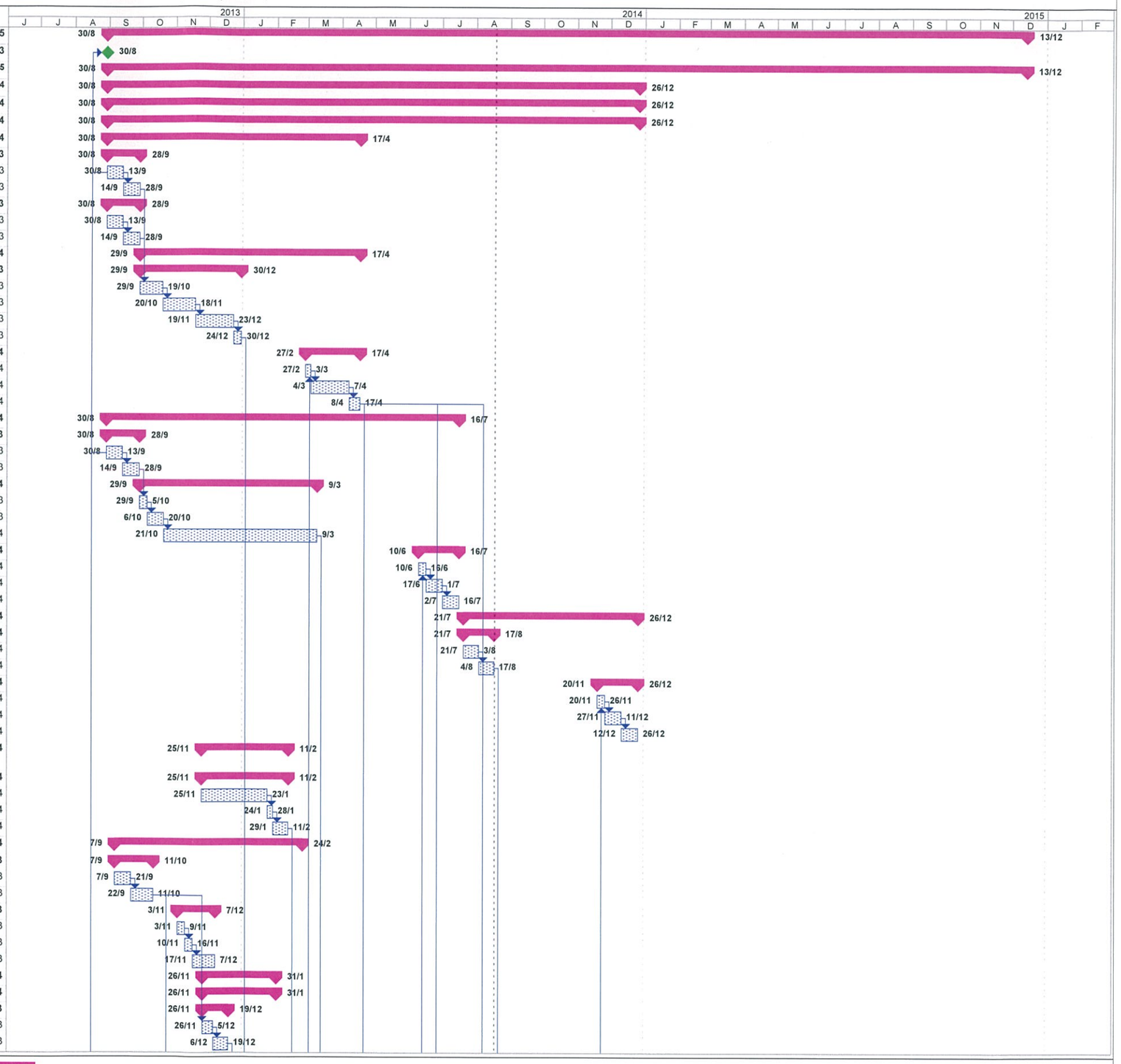
Appendix B

Construction Programme

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Clause 16 Programme (Version 7)

Date: 18 August 2014

ID	Task Name	Duration	Start	Finish
1	**Contract Period**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
2	**Contract Commencement Date**	**0 days**	**Fri 30/8/13**	**Fri 30/8/13**
3	**Section 1**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
4	**Submission**	**484 days**	**Fri 30/8/13**	**Fri 26/12/14**
5	**Routine Monitoring / Temporary Marine Traffic Management**	**484 days**	**Fri 30/8/13**	**Fri 26/12/14**
6	**Environmental Management**	**484 days**	**Fri 30/8/13**	**Fri 26/12/14**
7	**Baseline monitoring**	**231 days**	**Fri 30/8/13**	**Thu 17/4/14**
8	**ETL and relevant site personal**	**30 days**	**Fri 30/8/13**	**Sat 28/9/13**
9	Preparation and submission	15 days	Fri 30/8/13	Fri 13/9/13
10	Comment and approval	15 days	Sat 14/9/13	Sat 28/9/13
11	**Test Lab**	**30 days**	**Fri 30/8/13**	**Sat 28/9/13**
12	Preparation and submission	15 days	Fri 30/8/13	Fri 13/9/13
13	Comment and approval	15 days	Sat 14/9/13	Sat 28/9/13
14	**Monitoring (Location see Drg No. EM/401)**	**201 days**	**Sun 29/9/13**	**Thu 17/4/14**
15	**Plan**	**93 days**	**Sun 29/9/13**	**Mon 30/12/13**
16	Preparation and submission to Mott and IEC	21 days	Sun 29/9/13	Sat 19/10/13
17	Comment and resubmission	30 days	Sun 20/10/13	Mon 18/11/13
18	Approval by Mott and ICE	35 days	Tue 19/11/13	Mon 23/12/13
19	Approval by EPD	7 days	Tue 24/12/13	Mon 30/12/13
20	**Report**	**50 days**	**Thu 27/2/14**	**Thu 17/4/14**
21	Preparation of report	5 days	Thu 27/2/14	Mon 3/3/14
22	Approval by Mott and IEC	35 days	Tue 4/3/14	Mon 7/4/14
23	Approval by EPD	10 days	Tue 8/4/14	Thu 17/4/14
24	**Grab sample (Portions A, B & C)**	**321 days**	**Fri 30/8/13**	**Wed 16/7/14**
25	**Grab sample specialist**	**30 days**	**Fri 30/8/13**	**Sat 28/9/13**
26	Preparation and submission	15 days	Fri 30/8/13	Fri 13/9/13
27	Comment and approval by Mott	15 days	Sat 14/9/13	Sat 28/9/13
28	**Sediment testing and sampling plan**	**162 days**	**Sun 29/9/13**	**Sun 9/3/14**
29	Prepararion and submission	7 days	Sun 29/9/13	Sat 5/10/13
30	Approval by Mott	15 days	Sun 6/10/13	Sun 20/10/13
31	Approval by EPD	140 days	Mon 21/10/13	Sun 9/3/14
32	**Sediment report**	**37 days**	**Tue 10/6/14**	**Wed 16/7/14**
33	Preparation of report	7 days	Tue 10/6/14	Mon 16/6/14
34	Approval by Mott	15 days	Tue 17/6/14	Tue 1/7/14
35	Approval by EPD	15 days	Wed 2/7/14	Wed 16/7/14
36	**Vibro-coring (Portions A, B & C)**	**159 days**	**Mon 21/7/14**	**Fri 26/12/14**
37	**Sediment testing and sampling plan**	**28 days**	**Mon 21/7/14**	**Sun 17/8/14**
38	Prepararion and submission	14 days	Mon 21/7/14	Sun 3/8/14
39	Approval by Mott	14 days	Mon 4/8/14	Sun 17/8/14
40	**Sediment report**	**37 days**	**Thu 20/11/14**	**Fri 26/12/14**
41	Preparation of report	7 days	Thu 20/11/14	Wed 26/11/14
42	Approval by Mott	15 days	Thu 27/11/14	Thu 11/12/14
43	Approval by EPD	15 days	Fri 12/12/14	Fri 26/12/14
44	**24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)**	**79 days**	**Mon 25/11/13**	**Tue 11/2/14**
45	**Instrumentation**	**79 days**	**Mon 25/11/13**	**Tue 11/2/14**
46	Preparation and submission	60 days	Mon 25/11/13	Thu 23/1/14
47	Approval by Mott and IEC	5 days	Fri 24/1/14	Tue 28/1/14
48	Approval by EPD	14 days	Wed 29/1/14	Tue 11/2/14
49	**Survey**	**171 days**	**Sat 7/9/13**	**Mon 24/2/14**
50	**Surveyor**	**35 days**	**Sat 7/9/13**	**Fri 11/10/13**
51	Preparation and submission	15 days	Sat 7/9/13	Sat 21/9/13
52	Approval by Mott	20 days	Sun 22/9/13	Fri 11/10/13
53	**Geophysicist**	**35 days**	**Sun 3/11/13**	**Sat 7/12/13**
54	Prepararion and submission	7 days	Sun 3/11/13	Sat 9/11/13
55	Approval by Mott	7 days	Sun 10/11/13	Sat 16/11/13
56	Approval by Marine Department	21 days	Sun 17/11/13	Sat 7/12/13
57	**Land Survey (Container Basin & DSD Tsing Yi Plant)**	**67 days**	**Tue 26/11/13**	**Fri 31/1/14**
58	**Settlement markers**	**67 days**	**Tue 26/11/13**	**Fri 31/1/14**
59	**Method Statement for Installation and Monitoring**	**24 days**	**Tue 26/11/13**	**Thu 19/12/13**
60	Preparation and submission	10 days	Tue 26/11/13	Thu 5/12/13
61	Approval by Mott	14 days	Fri 6/12/13	Thu 19/12/13



China International Water & Electric Corp.

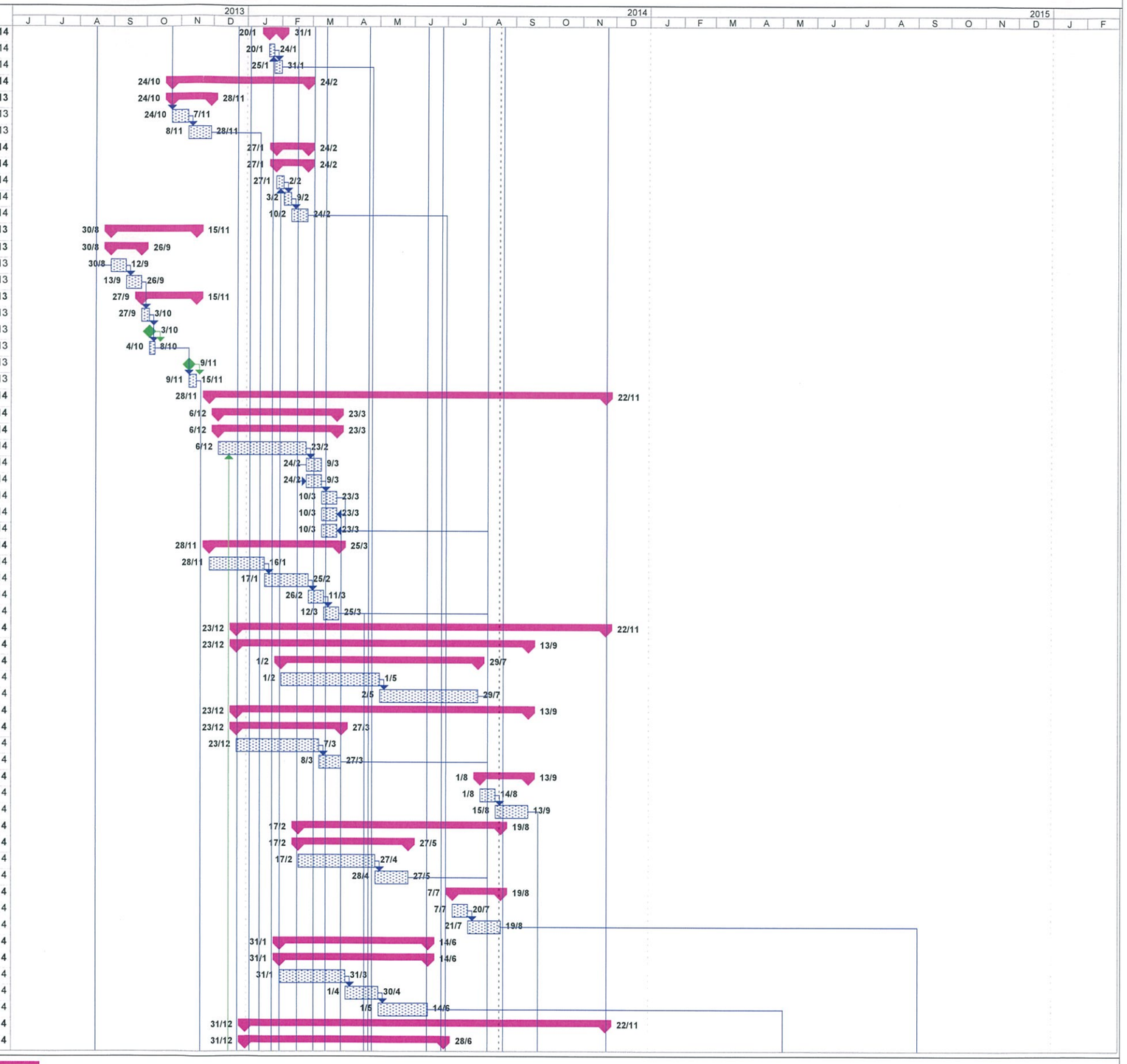
Task | Critical Task | Milestone | Summary

* Subject to availabity of working windows (ID 199 & 200)

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Clause 16 Programme (Version 7)

Date: 18 August 2014

ID	Task Name	Duration	Start	Finish
62	**Initial report**	**12 days**	**Mon 20/1/14**	**Fri 31/1/14**
63	Preparation and submission	5 days	Mon 20/1/14	Fri 24/1/14
64	Approval by Mott	7 days	Sat 25/1/14	Fri 31/1/14
65	**Hydrographic Survey (Portions A to E)**	**124 days**	**Thu 24/10/13**	**Mon 24/2/14**
66	**Method Statement**	**36 days**	**Thu 24/10/13**	**Thu 28/11/13**
67	Preparation and submission	15 days	Thu 24/10/13	Thu 7/11/13
68	Approval by Mott	21 days	Fri 8/11/13	Thu 28/11/13
69	**Initial survey**	**29 days**	**Mon 27/1/14**	**Mon 24/2/14**
70	**Report**	**29 days**	**Mon 27/1/14**	**Mon 24/2/14**
71	Preparation and submission	7 days	Mon 27/1/14	Sun 2/2/14
72	Approval by Mott	7 days	Mon 3/2/14	Sun 9/2/14
73	Approval by Marine Department	15 days	Mon 10/2/14	Mon 24/2/14
74	**Temporary Marine Traffic Management (Portions A to E)**	**78 days**	**Fri 30/8/13**	**Fri 15/11/13**
75	**Consultant, Risk Manager and Marine Traffic Engineer**	**28 days**	**Fri 30/8/13**	**Thu 26/9/13**
76	Preparation and submission	14 days	Fri 30/8/13	Thu 12/9/13
77	Approval by Mott	14 days	Fri 13/9/13	Thu 26/9/13
78	**Webbase software and Trial Run**	**50 days**	**Fri 27/9/13**	**Fri 15/11/13**
79	Preparation and submission of methodology	7 days	Fri 27/9/13	Thu 3/10/13
80	Comment recevied by Mott	0 days	Thu 3/10/13	Thu 3/10/13
81	Rectification	5 days	Fri 4/10/13	Tue 8/10/13
82	Final submission	0 days	Sat 9/11/13	Sat 9/11/13
83	Approval by Mott	7 days	Sat 9/11/13	Fri 15/11/13
84	**Dredging Works (Portions A to E)**	**360 days**	**Thu 28/11/13**	**Sat 22/11/14**
85	**Silt screen (Location see Drg No. EM/401)**	**108 days**	**Fri 6/12/13**	**Sun 23/3/14**
86	**Method statement**	**108 days**	**Fri 6/12/13**	**Sun 23/3/14**
87	Preparation and submission	80 days	Fri 6/12/13	Sun 23/2/14
88	Approval by Mott	14 days	Mon 24/2/14	Sun 9/3/14
89	Approval by IEC	14 days	Mon 24/2/14	Sun 9/3/14
90	Approval by WSD	14 days	Mon 10/3/14	Sun 23/3/14
91	Approval by EMSD	14 days	Mon 10/3/14	Sun 23/3/14
92	Approval by EPD	14 days	Mon 10/3/14	Sun 23/3/14
93	**Dredging method statement and silt curtain deployment plan**	**118 days**	**Thu 28/11/13**	**Tue 25/3/14**
94	Preparation and submission	50 days	Thu 28/11/13	Thu 16/1/14
95	Approval by Mott	40 days	Fri 17/1/14	Tue 25/2/14
96	Approval by IEC	14 days	Wed 26/2/14	Tue 11/3/14
97	Approval by EPD	14 days	Wed 12/3/14	Tue 25/3/14
98	**Dredging Works at Portions A and B**	**335 days**	**Mon 23/12/13**	**Sat 22/11/14**
99	**General seabed**	**265 days**	**Mon 23/12/13**	**Sat 13/9/14**
100	**Marine Notice approval by Marine Departemnt**	**179 days**	**Sat 1/2/14**	**Tue 29/7/14**
101	Preparation and submission	90 days	Sat 1/2/14	Thu 1/5/14
102	Approval by MD	89 days	Fri 2/5/14	Tue 29/7/14
103	**Noise Permit**	**265 days**	**Mon 23/12/13**	**Sat 13/9/14**
104	**General**	**95 days**	**Mon 23/12/13**	**Thu 27/3/14**
105	Preparation and submission	75 days	Mon 23/12/13	Fri 7/3/14
106	Approval by EPD	20 days	Sat 8/3/14	Thu 27/3/14
107	**Portion A from 11pm to 7am next day**	**44 days**	**Fri 1/8/14**	**Sat 13/9/14**
108	Preparation and submission	14 days	Fri 1/8/14	Thu 14/8/14
109	Approval by EPD	30 days	Fri 15/8/14	Sat 13/9/14
110	**Dumping Permit**	**184 days**	**Mon 17/2/14**	**Tue 19/8/14**
111	**Type 1 and Tpye 2 Sediment**	**100 days**	**Mon 17/2/14**	**Tue 27/5/14**
112	Preparation and submission	70 days	Mon 17/2/14	Sun 27/4/14
113	Approval by EPD	30 days	Mon 28/4/14	Tue 27/5/14
114	**Type 3 Sediment**	**44 days**	**Mon 7/7/14**	**Tue 19/8/14**
115	Preparation and submission	14 days	Mon 7/7/14	Sun 20/7/14
116	Approval by EPD	30 days	Mon 21/7/14	Tue 19/8/14
117	**Type 3 Cat Hf Sediment (Portion A)**	**135 days**	**Fri 31/1/14**	**Sat 14/6/14**
118	**Method statement for disposal**	**135 days**	**Fri 31/1/14**	**Sat 14/6/14**
119	Preparation and submission	60 days	Fri 31/1/14	Mon 31/3/14
120	Approval by Mott and IEC	30 days	Tue 1/4/14	Wed 30/4/14
121	Approval by EPD	45 days	Thu 1/5/14	Sat 14/6/14
122	**Hot Spot (Portion A)**	**327 days**	**Tue 31/12/13**	**Sat 22/11/14**
123	**Proposal for field trial at Zone Z2C**	**180 days**	**Tue 31/12/13**	**Sat 28/6/14**



China International Water & Electric Corp.

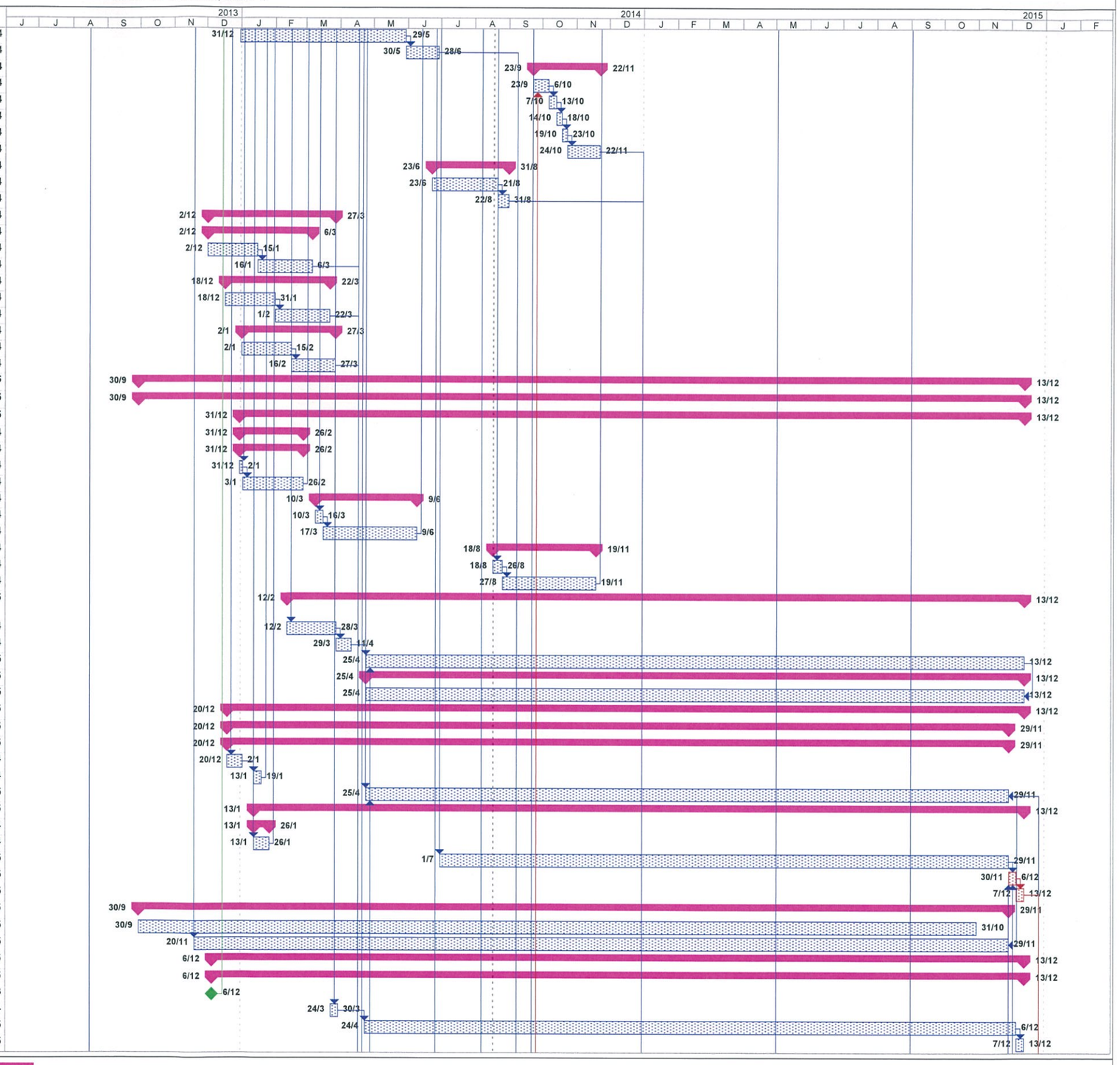
Task | Critical Task | Milestone | Summary

* Subject to availability of working windows (ID 199 & 200)

Contract No. CV/2013/04
Dredging Works in Kwai Tsing Container Basin and its Approach Channel
Clause 16 Programme (Version 7)

Date: 18 August 2014

ID	Task Name	Duration	Start	Finish
124	Preparation and submission	150 days	Tue 31/12/13	Thu 29/5/14
125	Approval by Mott	30 days	Fri 30/5/14	Sat 28/6/14
126	**Method statement for dredging works at Zone Z2B**	**61 days**	**Tue 23/9/14**	**Sat 22/11/14**
127	Preparation and submission	14 days	Tue 23/9/14	Mon 6/10/14
128	Approval by Mott	7 days	Tue 7/10/14	Mon 13/10/14
129	Endorsed by ETL	5 days	Tue 14/10/14	Sat 18/10/14
130	Verified by IEC	5 days	Sun 19/10/14	Thu 23/10/14
131	Approval by EPD	30 days	Fri 24/10/14	Sat 22/11/14
132	**Method staement for dredging hard material**	**70 days**	**Mon 23/6/14**	**Sun 31/8/14**
133	Preparation and submission	60 days	Mon 23/6/14	Thu 21/8/14
134	Approval by Mott	10 days	Fri 22/8/14	Sun 31/8/14
135	**Dredging Works at Portions C, D and E**	**116 days**	**Mon 2/12/13**	**Thu 27/3/14**
136	**Marine Notice approval by Marine Departemnt**	**95 days**	**Mon 2/12/13**	**Thu 6/3/14**
137	Preparation and submission	45 days	Mon 2/12/13	Wed 15/1/14
138	Approval by MD	50 days	Thu 16/1/14	Thu 6/3/14
139	**Noise Permit**	**95 days**	**Wed 18/12/13**	**Sat 22/3/14**
140	Preparation and submission	45 days	Wed 18/12/13	Fri 31/1/14
141	Approval by EPD	50 days	Sat 1/2/14	Sat 22/3/14
142	**Dumping Permit**	**85 days**	**Thu 2/1/14**	**Thu 27/3/14**
143	Preparation and submission	45 days	Thu 2/1/14	Sat 15/2/14
144	Approval by EPD	40 days	Sun 16/2/14	Thu 27/3/14
145	**Works**	**805 days**	**Mon 30/9/13**	**Sun 13/12/15**
146	**Routine Monitoring / Temporary Marine Traffic Management**	**805 days**	**Mon 30/9/13**	**Sun 13/12/15**
147	**Environmental Management**	**713 days**	**Tue 31/12/13**	**Sun 13/12/15**
148	**Baseline monitoring**	**58 days**	**Tue 31/12/13**	**Wed 26/2/14**
149	**Monitoring (Location see Drg No. EM/401)**	**58 days**	**Tue 31/12/13**	**Wed 26/2/14**
150	Mobilization	3 days	Tue 31/12/13	Thu 2/1/14
151	Field works and Lab Test	55 days	Fri 3/1/14	Wed 26/2/14
152	**Grab sample (Portions A, B & C)**	**92 days**	**Mon 10/3/14**	**Mon 9/6/14**
153	Grab sample specialist mobilization	7 days	Mon 10/3/14	Sun 16/3/14
154	Grab sample (field works) and Lab Test	85 days	Mon 17/3/14	Mon 9/6/14
155	**Vibro-coring (Portions A, B & C)**	**94 days**	**Mon 18/8/14**	**Wed 19/11/14**
156	Vibro-coring specialist mobilization	9 days	Mon 18/8/14	Tue 26/8/14
157	Vibro-coring (field works) and Lab Test	85 days	Wed 27/8/14	Wed 19/11/14
158	**24 Hours monitoring station and TIN Measuring Device (Location see Drg No. EM/401)**	**670 days**	**Wed 12/2/14**	**Sun 13/12/15**
159	Procurement and delivery	45 days	Wed 12/2/14	Fri 28/3/14
160	Installation	14 days	Sat 29/3/14	Fri 11/4/14
161	Monitoring	598 days	Fri 25/4/14	Sun 13/12/15
162	**Impact monitoring (Location see Drg No. EM/401)**	**598 days**	**Fri 25/4/14**	**Sun 13/12/15**
163	Impact monitoring and report submission	598 days	Fri 25/4/14	Sun 13/12/15
164	**Survey**	**724 days**	**Fri 20/12/13**	**Sun 13/12/15**
165	**Land Survey (Container Basin & DSD Tsing Yi Plant)**	**710 days**	**Fri 20/12/13**	**Sun 29/11/15**
166	**Settlement markers**	**710 days**	**Fri 20/12/13**	**Sun 29/11/15**
167	Installation	14 days	Fri 20/12/13	Thu 2/1/14
168	Initial survey	7 days	Mon 13/1/14	Sun 19/1/14
169	Interim monitoring	584 days	Fri 25/4/14	Sun 29/11/15
170	**Hydrographic Survey (Portions A to E)**	**700 days**	**Mon 13/1/14**	**Sun 13/12/15**
171	**Initial survey**	**14 days**	**Mon 13/1/14**	**Sun 26/1/14**
172	Field works	14 days	Mon 13/1/14	Sun 26/1/14
173	Interim survey	517 days	Tue 1/7/14	Sun 29/11/15
174	Final survey	7 days	Mon 30/11/15	Sun 6/12/15
175	Final survey report	7 days	Mon 7/12/15	Sun 13/12/15
176	**Temporary Marine Traffic Management (Portions A to E)**	**791 days**	**Mon 30/9/13**	**Sun 29/11/15**
177	Organizing meeting for information collection	762 days	Mon 30/9/13	Sat 31/10/15
178	Temporary marine traffic management and TMTM meeting	740 days	Wed 20/11/13	Sun 29/11/15
179	**Dredging Works (Portions A to E)**	**738 days**	**Fri 6/12/13**	**Sun 13/12/15**
180	**Silt screen (Location see Drg No. EM/401)**	**738 days**	**Fri 6/12/13**	**Sun 13/12/15**
181	Receiving of as-built record of water intake from WSD/EMSD	0 days	Fri 6/12/13	Fri 6/12/13
182	Installation of silt screen	7 days	Mon 24/3/14	Sun 30/3/14
183	Maintenance of silt screen	592 days	Thu 24/4/14	Sun 6/12/15
184	Removal of silt screen	7 days	Mon 7/12/15	Sun 13/12/15



China International Water & Electric Corp.

Task | Critical Task | Milestone | Summary

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Contract No. CV/2013/04
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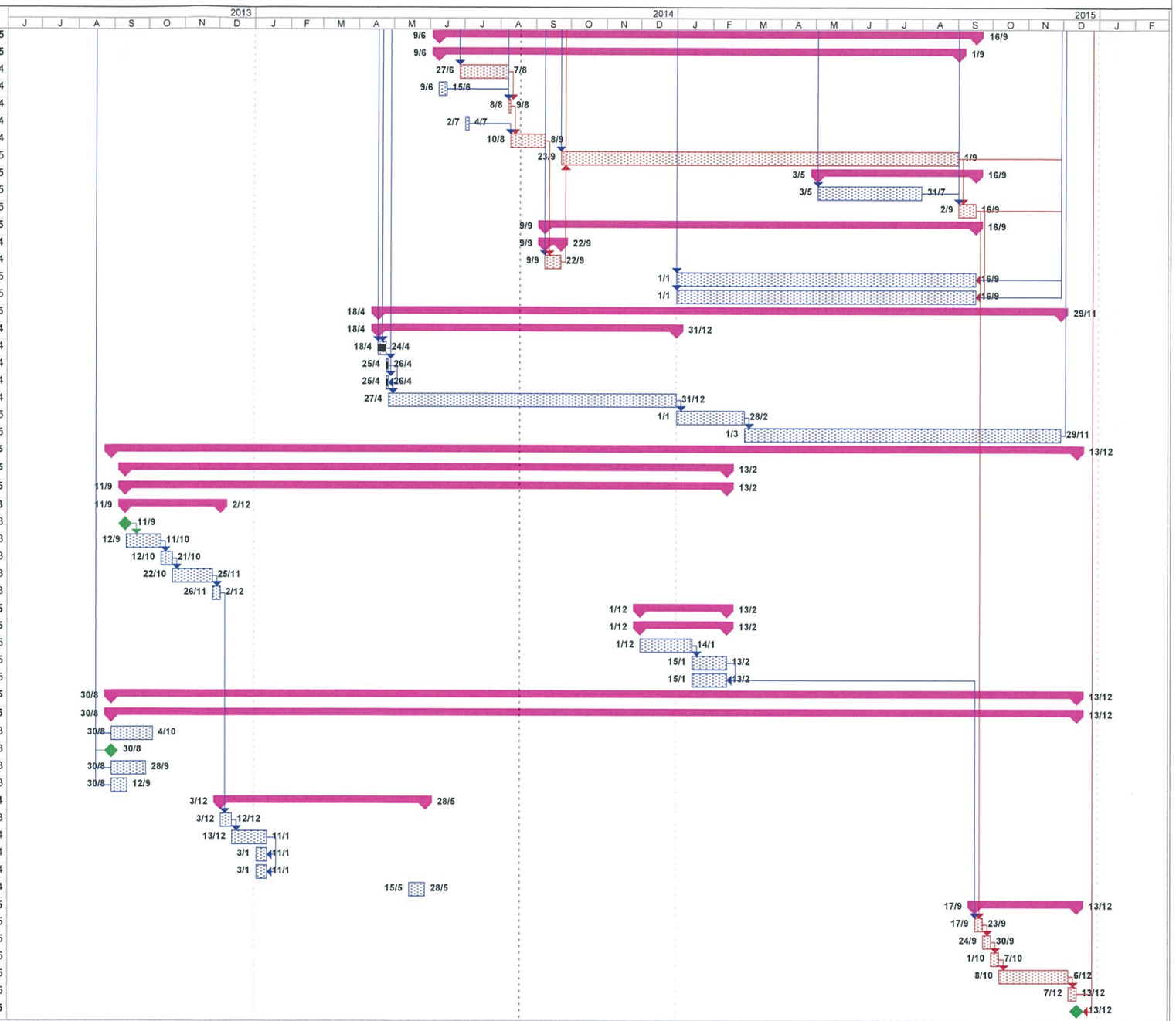
Clause 16 Programme (Version 7)

Date: 18 August 2014

ID	Task Name	Duration	Start	Finish
185	**Dredging Works at Portions A and B**	**465 days**	**Mon 9/6/14**	**Wed 16/9/15**
186	**General seabed**	**450 days**	**Mon 9/6/14**	**Tue 1/9/15**
187	Mobililzation	42 days	Fri 27/6/14	Thu 7/8/14
188	Fabrication of silt curtain	7 days	Mon 9/6/14	Sun 15/6/14
189	Pilot test for silt curtain	2 days	Fri 8/8/14	Sat 9/8/14
190	Monitoring brief for unidentified sonar contacts & masked areas	3 days	Wed 2/7/14	Fri 4/7/14
191	Dredging works 1 (subject to availability of working windows)	30 days	Sun 10/8/14	Mon 8/9/14
192	Dredging works 2 (subject to availability of working windows)	344 days	Tue 23/9/14	Tue 1/9/15
193	**Type 3 Cat Hf Sediment (Portion A)**	**137 days**	**Sun 3/5/15**	**Wed 16/9/15**
194	Procurement and delivery of Geo-container	90 days	Sun 3/5/15	Fri 31/7/15
195	Dredging works	15 days	Wed 2/9/15	Wed 16/9/15
196	**Hot Spot (Portion A)**	**373 days**	**Tue 9/9/14**	**Wed 16/9/15**
197	**Proposal for field trial at Zone Z2C**	**14 days**	**Tue 9/9/14**	**Mon 22/9/14**
198	Field trial at Zone Z2C	14 days	Tue 9/9/14	Mon 22/9/14
199	Dredging works at Z2B *	259 days	Thu 1/1/15	Wed 16/9/15
200	Dredging of hard material *	259 days	Thu 1/1/15	Wed 16/9/15
201	**Dredging Works for Portions C, D and E**	**591 days**	**Fri 18/4/14**	**Sun 29/11/15**
202	**Dredging Works for Portion D**	**258 days**	**Fri 18/4/14**	**Wed 31/12/14**
203	Mobililzation	7 days	Fri 18/4/14	Thu 24/4/14
204	Pilot test of silt curtain	2 days	Fri 25/4/14	Sat 26/4/14
205	Trial dredging	2 days	Fri 25/4/14	Sat 26/4/14
206	Dredging works	249 days	Sun 27/4/14	Wed 31/12/14
207	Dredging Works for Portion E	59 days	Thu 1/1/15	Sat 28/2/15
208	Dredging Works for Portion C	274 days	Sun 1/3/15	Sun 29/11/15
209	**Section 2**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
210	**Submission**	**521 days**	**Wed 11/9/13**	**Fri 13/2/15**
211	**Preliminaries (Portion F)**	**521 days**	**Wed 11/9/13**	**Fri 13/2/15**
212	**Engineer Principal Accommodation**	**83 days**	**Wed 11/9/13**	**Mon 2/12/13**
213	Preparation and submisssion of location and layout	0 days	Wed 11/9/13	Wed 11/9/13
214	Approval of location and layout	30 days	Thu 12/9/13	Fri 11/10/13
215	Preparation of calculation	10 days	Sat 12/10/13	Mon 21/10/13
216	Comment and resubmission of calculation	35 days	Tue 22/10/13	Mon 25/11/13
217	Approval of calculation	7 days	Tue 26/11/13	Mon 2/12/13
218	**Outfall Modification Works (Location see Drg No. S202)**	**75 days**	**Mon 1/12/14**	**Fri 13/2/15**
219	**Method statement**	**75 days**	**Mon 1/12/14**	**Fri 13/2/15**
220	Preparation and submission	45 days	Mon 1/12/14	Wed 14/1/15
221	Approval by Mott	30 days	Thu 15/1/15	Fri 13/2/15
222	Approval by DSD	30 days	Thu 15/1/15	Fri 13/2/15
223	**Works**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
224	**Preliminaries (Portion F)**	**836 days**	**Fri 30/8/13**	**Sun 13/12/15**
225	Contractor's mobilization	36 days	Fri 30/8/13	Fri 4/10/13
226	Security Guard	0 days	Fri 30/8/13	Fri 30/8/13
227	Temporary electricity power supply	30 days	Fri 30/8/13	Sat 28/9/13
228	Engineer's Initial Temporary Accommodation	14 days	Fri 30/8/13	Thu 12/9/13
229	**Engineer Principal Accommodation**	**177 days**	**Tue 3/12/13**	**Wed 28/5/14**
230	Material ordering and delivery	10 days	Tue 3/12/13	Thu 12/12/13
231	Construction	30 days	Fri 13/12/13	Sat 11/1/14
232	Computer installation	9 days	Fri 3/1/14	Sat 11/1/14
233	Furniture and office equipment	9 days	Fri 3/1/14	Sat 11/1/14
234	Car Park	14 days	Thu 15/5/14	Wed 28/5/14
235	**Outfall Modification Works (Location see Drg No. S202)**	**88 days**	**Thu 17/9/15**	**Sun 13/12/15**
236	Dye test	7 days	Thu 17/9/15	Wed 23/9/15
237	Video filming	7 days	Thu 24/9/15	Wed 30/9/15
238	Dredging works	7 days	Thu 1/10/15	Wed 7/10/15
239	Modification works	60 days	Thu 8/10/15	Sun 6/12/15
240	As-built video submission	7 days	Mon 7/12/15	Sun 13/12/15
241	**Contract Completion Date**	**0 days**	**Sun 13/12/15**	**Sun 13/12/15**



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Task | Critical Task | Milestone | Summary

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Appendix C

Action and Limit Levels

Action and Limit Levels for Routine Water Quality Monitoring (Dry Season)

Monitoring Station	DO (mg/L) Surface & Middle		DO (mg/L) Bottom		Turbidity (NTU) Depth-Averaged		Suspended Solids (mg/L) Depth-averaged		BOD5(mg/L) Depth- averaged		E.coli (CFU /100mL) Depth-averaged		NH3-N (mg/L) Depth-averaged		UIA (mg/L) Depth-averaged		Synthetic Detergent as MBAS (mg/L) Depth- averaged		TIN (mg/L) Depth Averaged	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
Seawater Intake																				
SR1	2	2	2	2	<10	<10	<10	<10	<10	<10	<20,000	<20,000	<1	<1	0.021	0.021	<5	<5	NA	NA
SR4																				
SR12																				
Fish Culture Zone																				
SR5	5.45	5.39#	5.43	5.27+	6.7 or 120%C*	10.1 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.36	0.39
SR9	6.11	6.02#	6.11	6.04+	2.9 or 120%C*	4.8 or 130%C^	9 or 120%C*	18 or 130%C^											0.22	0.29
SR10																				
SR11																				
Gazetted Beach																				
SR2	5.45	5.39#	5.43	5.27+	6.7 or 120%C*	10.1 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	0.21 or 120%C*	0.24 or 130%C^	0.021	0.021	NA	NA	NA	NA
SR3																				
Corals																				
SR6	6.11	6.02#	6.11	6.04+	2.9 or 120%C*	4.8 or 130%C^	9 or 120%C*	18 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SR7																				
SR8																				
EMSD Cooling Water Intake																				
SR13	5.31	5.22#	5.29	5.12+	13.1 or 120%C*	15.7 or 130%C^	23 or 120%C*	38 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note:
* Or 120% of upstream control station at the same tide of the day
^ Or 130% of upstream control station at the same tide of the day
# According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations.
+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data
For DO measurement, non-compliance occurs when monitoring result is lower than the limits;
For TIN, UIA, NH_3-N, SS, BOD_5, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;
AL/LL of TIN and NH_3-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.
Dry Season: November to March

Action and Limit Levels for Routine Water Quality Monitoring (Wet Season)

Monitoring Station	DO (mg/L) Surface & Middle		DO (mg/L) Bottom		Turbidity (NTU) Depth-Averaged		Suspended Solids (mg/L) Depth-averaged		BOD5 (mg/L) Depth- averaged		E.coli (CFU /100mL) Depth-averaged		NH3-N (mg/L) Depth-averaged		UIA (mg/L) Depth-averaged		Synthetic Detergent as MBAS (mg/L) Depth-averaged		TIN (mg/L) Depth Averaged	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
Seawater Intake																				
SR1 SR4 SR12	2	2	2	2	<10	<10	<10	<10	<10	<10	<20,000	<20,000	<1	<1	0.021	0.021	<5	<5	NA	NA
Fish Culture Zone																				
SR5	5.00#	5.00#	4.11	4.04+	10.8 or 120%C*	15.0 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.45	0.50
SR9 SR10 SR11	5.00	5.00#	4.41	4.25+	4.0 or 120%C*	8.7 or 130%C^	9 or 120%C*	18 or 130%C^											0.37	0.49
Gazetted Beach																				
SR2 SR3	4.68	4.62#	4.11	4.04+	10.8 or 120%C*	15.0 or 130%C^	12 or 120%C*	19 or 130%C^	NA	NA	NA	NA	0.21 or 120%C*	0.24 or 130%C^	0.021	0.021	NA	NA	NA	NA
Corals																				
SR6 SR7 SR8	5.00	4.82#	4.41	4.25+	4.0 or 120%C*	8.7 or 130%C^	9 or 120%C*	18 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EMSD Cooling Water Intake																				
SR13	4.24	4.17#	3.70	3.58+	13.1 or 120%C*	15.7 or 130%C^	23 or 120%C*	38 or 130%C^	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note:
* Or 120% of upstream control station at the same tide of the day
^ Or 130% of upstream control station at the same tide of the day
# According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations. (5%ile & 1 %ile determined from wet season baseline data for cluster 1 (4.68mg/L & 4.62mg/L) and cluster 2 (5.00mg/L & 4.82mg/L) are 5mg/L or below, thus 5mg/L was adopted as the AL & LL for the SR in FCZ)
+ According to EM&A Manual, LL of DO (bottom) is 2 mg/L or 1 percentile of baseline data
Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015.
For DO measurement, non-compliance occurs when monitoring result is lower than the limits;
For TIN, UIA, NH_3-N, SS, BOD_5, E.coli, synthetic detergent and turbidity, non-compliance of water quality results when monitoring results is higher than the limits;
AL/LL of TIN and NH_3-N are determined from laboratory results for better accuracy and reliability. These AL/LL will be applied to both laboratory and in-situ measurements at impact stage.
Wet season: April to October

Action and Limit Levels for 24-hr Water Quality Monitoring (Dry Season)

Monitoring Station	DO (mg/L) Surface		Turbidity (NTU) Surface		Ammonia-N (mg/L) Surface	
	AL	LL	AL	LL	AL	LL
WSD Seawater Intake						
SR4	2	2	<10	<10	<1	<1
SR12						
Fish Culture Zone						
SR5	5.46	5.39	6.0	7.9	NA	NA
SR9	6.12	5.97	2.8	4.7		
SR10						
SR11						
EMSD Cooling Water Intake						
SR13	5.28	5.22	11.9	13.3	NA	NA

Note: According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ**;** 4 mg/L or 1 percentile of baseline data in other impact monitoring stations.

Dry Season: November to March.

Action and Limit Levels for 24-hr Water Quality Monitoring (Wet Season)

Monitoring Station	DO (mg/L) Surface		Turbidity (NTU) Surface		Ammonia-N (mg/L) Surface	
	AL	LL	AL	LL	AL	LL
WSD Seawater Intake						
SR4	2	2	<10	<10	<1	<1
SR12						
Fish Culture Zone						
SR5	5.24	5.13	9.7	14.4	NA	NA
SR9	5.13	5.00#	5.9	7.1		
SR10						
SR11						
EMSD Cooling Water Intake						
SR13	4.23	4.17	11.9	13.3	NA	NA

Note: # According to EM&A Manual, LL of DO (surface & middle) is 5 mg/L or 1 percentile of baseline data in FCZ; 4 mg/L or 1 percentile of baseline data in other impact monitoring stations. (1 %ile determined from wet season baseline data for cluster 2 (4.78mg/L) is below 5mg/L, thus 5mg/L was adopted as the DO (surface) LL for the SR in FCZ in cluster 2 stations)

Referring to the ER Letter ref. (CV/2013/04)/M45/400/1247 dated 19 March 2015, a Revised Baseline Water Quality Monitoring Test Methodology – Review of Action and Limit Levels has been submitted to EPD by ER in March 2015. The Action and Limit Level for the wet season (April – October) was effected and applied to the water quality monitoring data from 1 April 2015.

Wet Season: April to October

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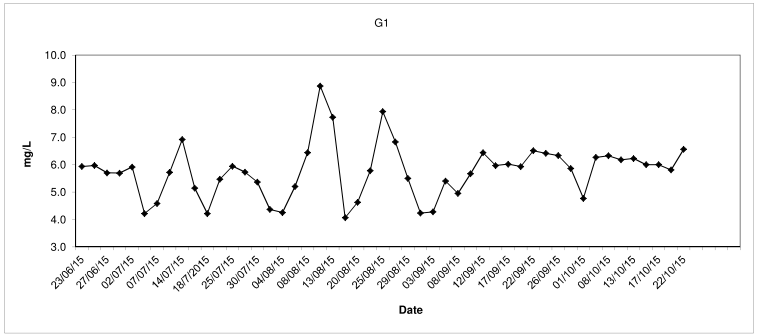
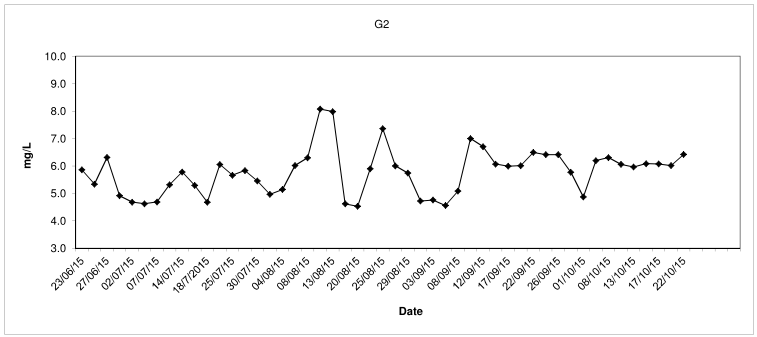
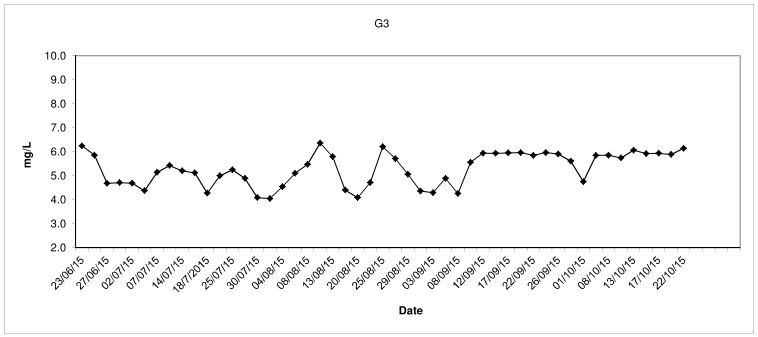
Appendix D

Graphical Presentation – Routine Impact Monitoring Results

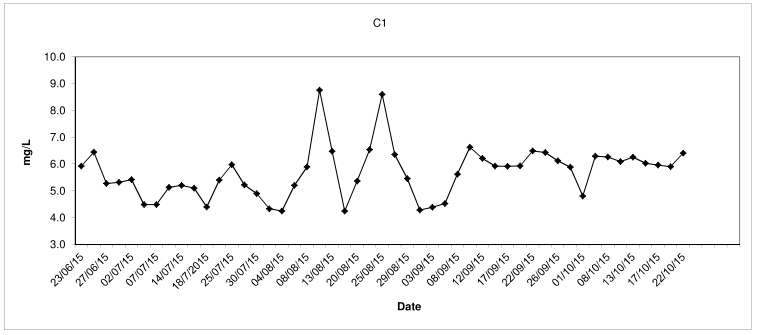
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

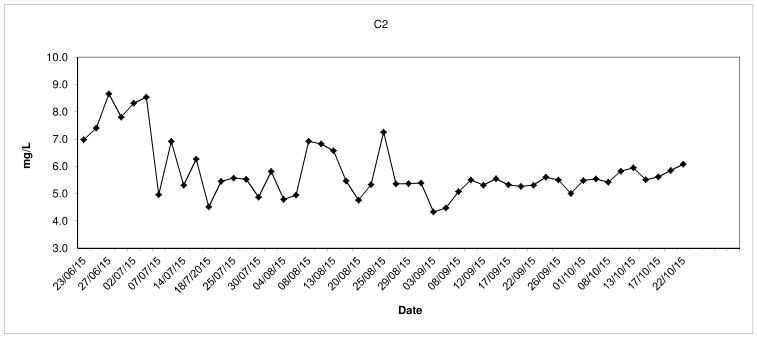


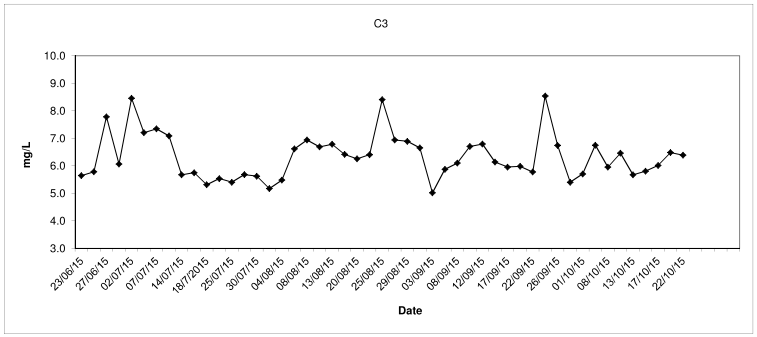




Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

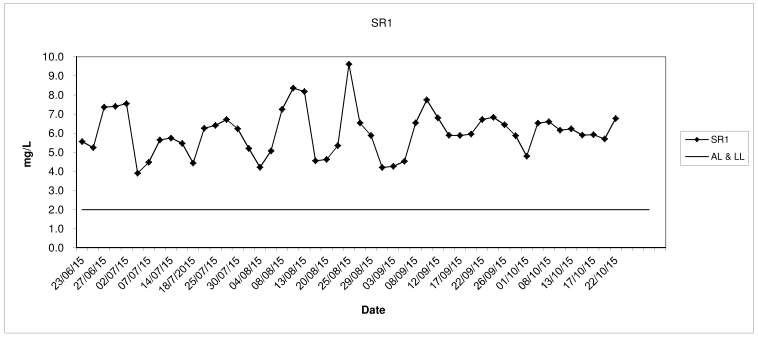


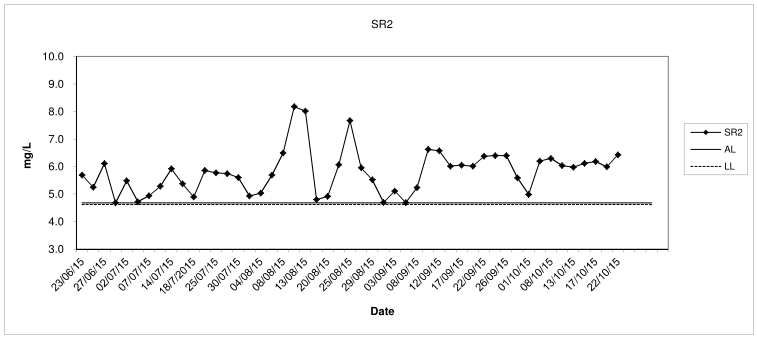


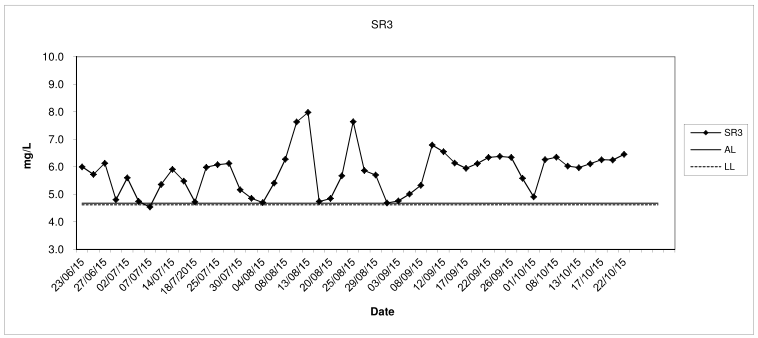


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

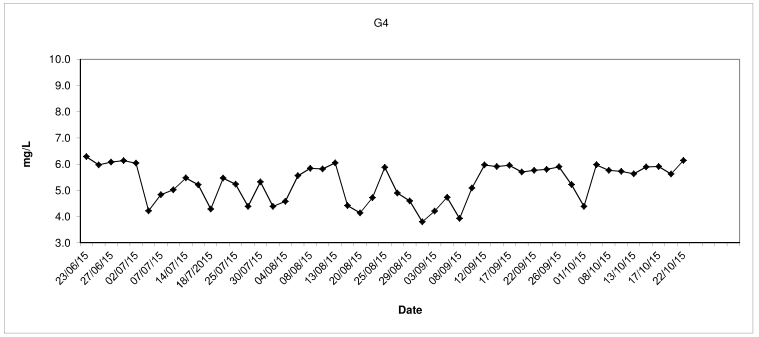
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

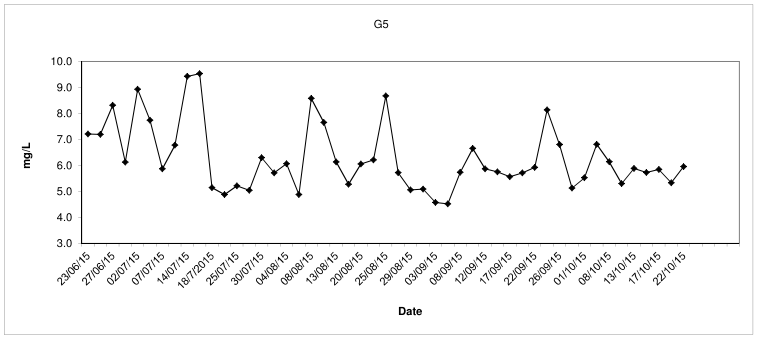


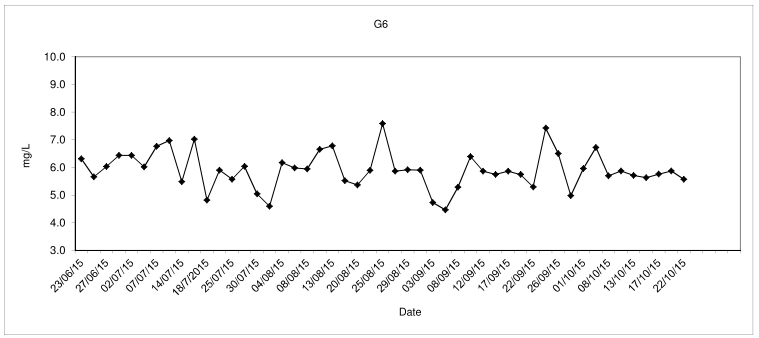




Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

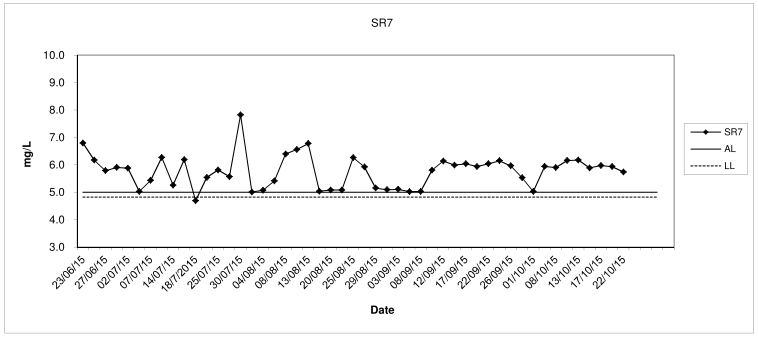


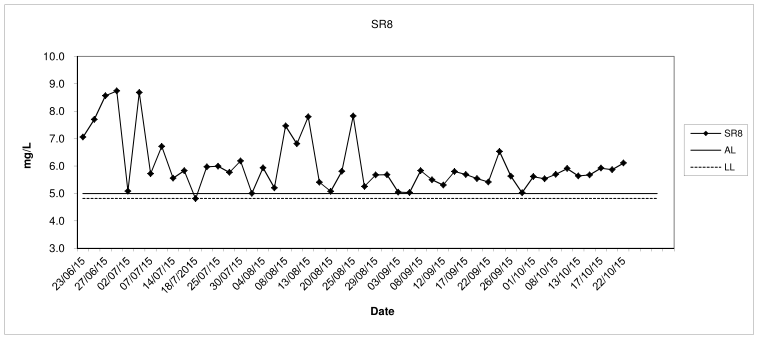


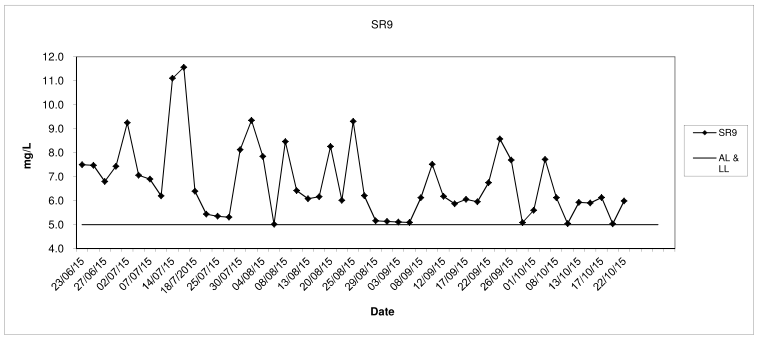


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

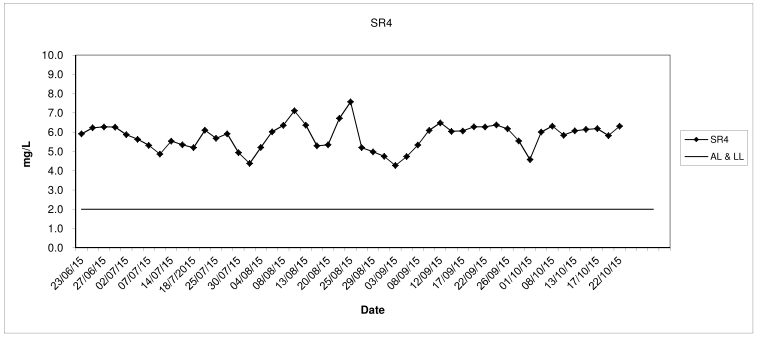
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

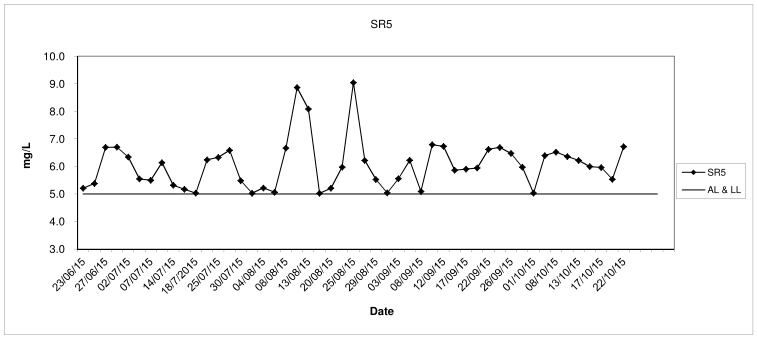


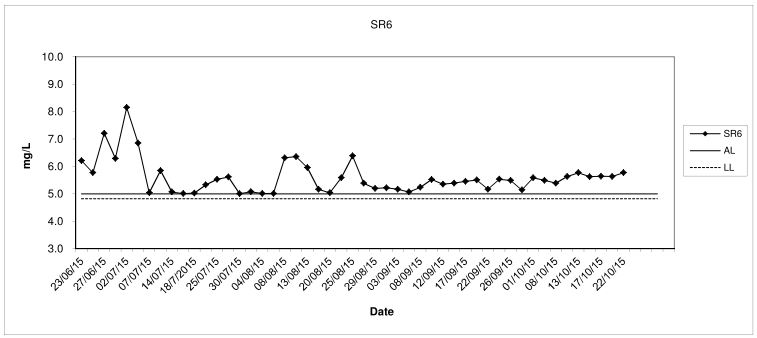




Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide

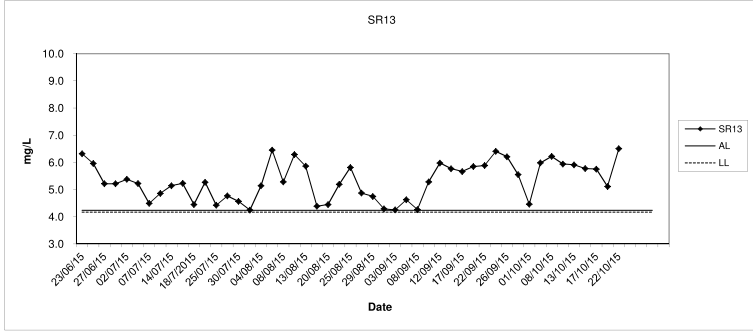




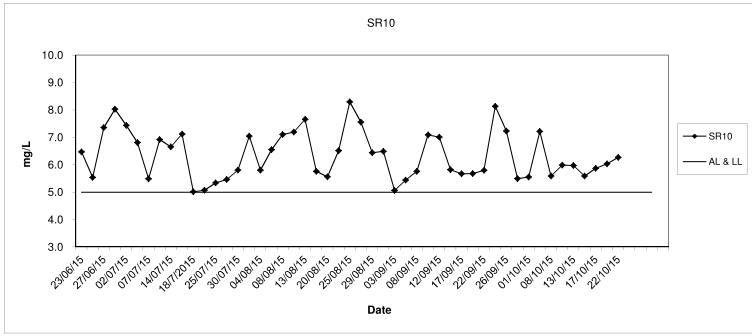


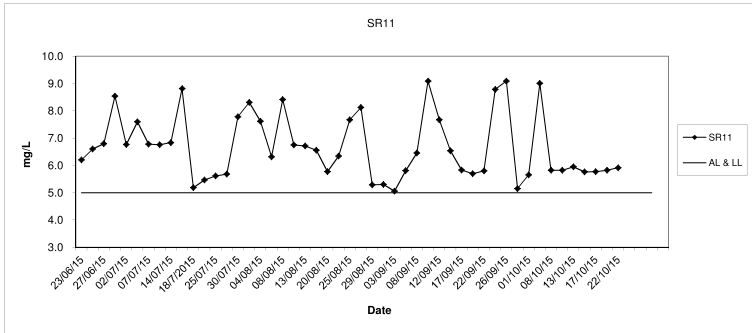
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

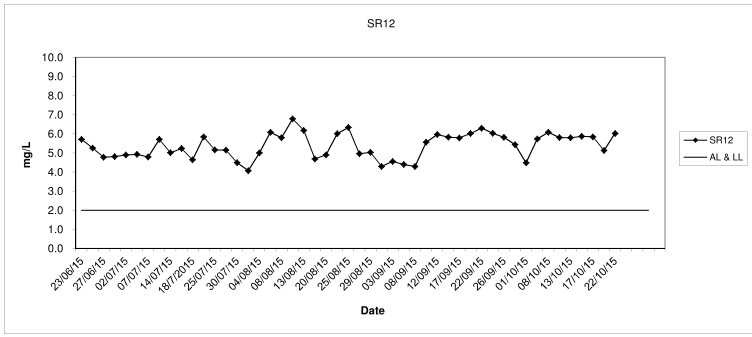
Dissolved Oxygen (Surface and Middle) at Mid-Ebb Tide



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

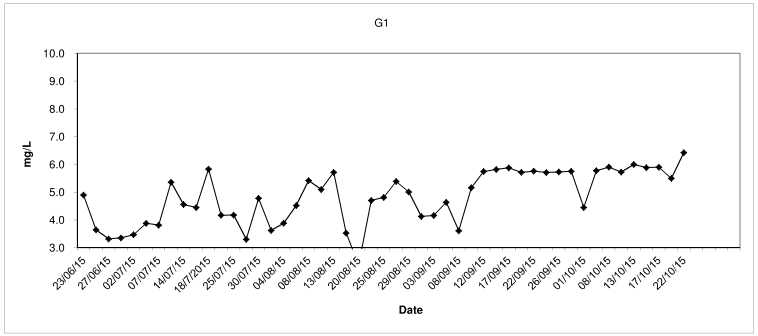


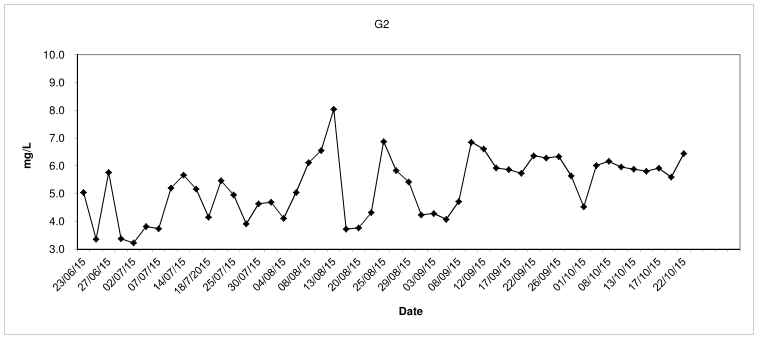


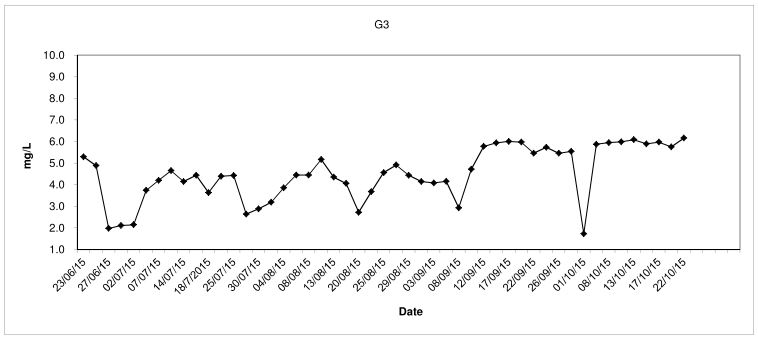


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

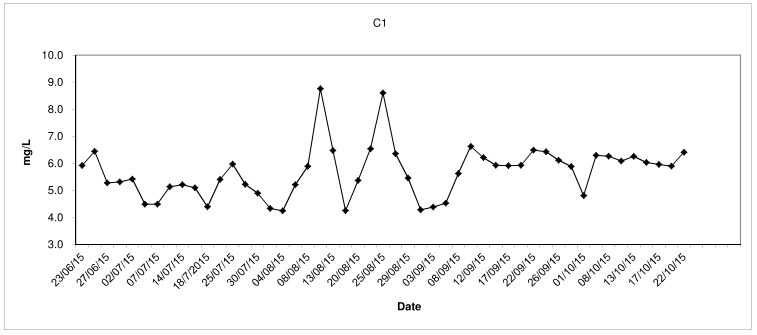
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

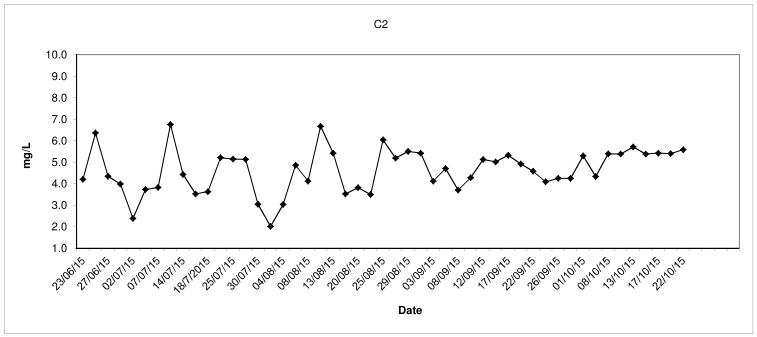


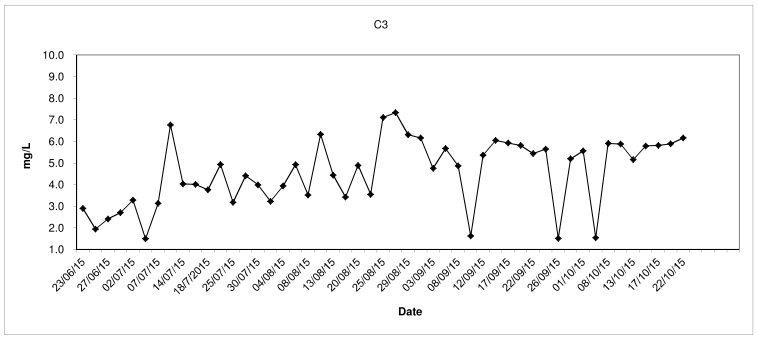




Dissolved Oxygen (Bottom) at Mid-Ebb Tide

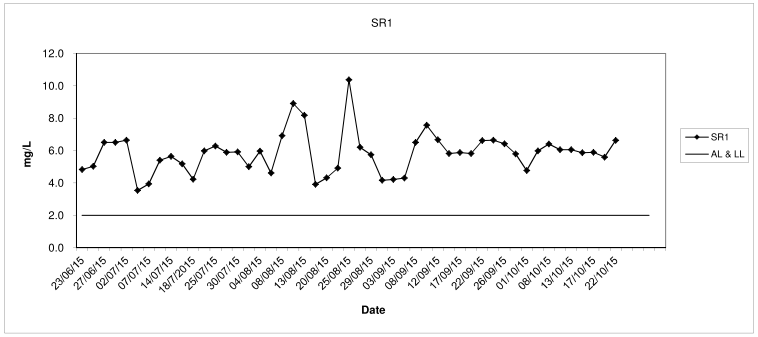


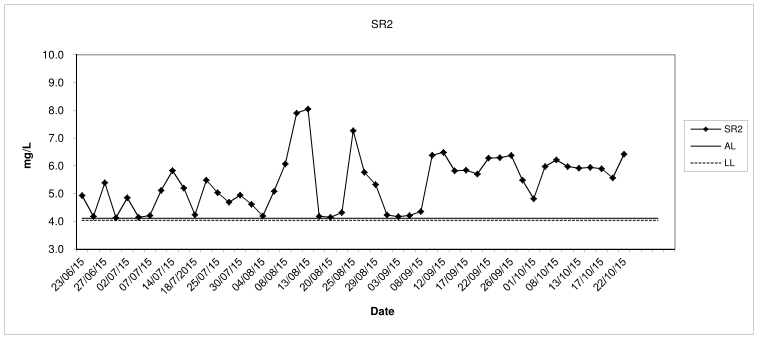


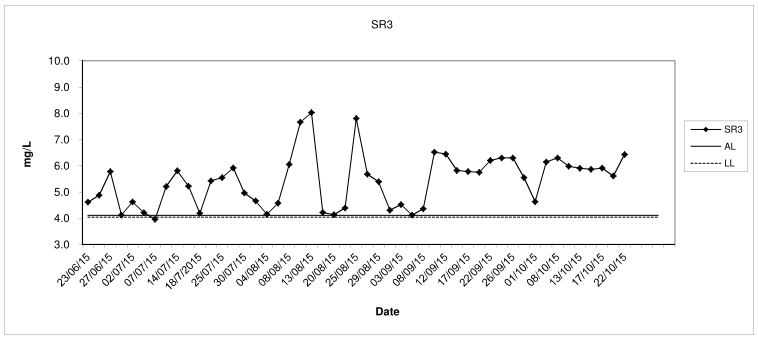


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

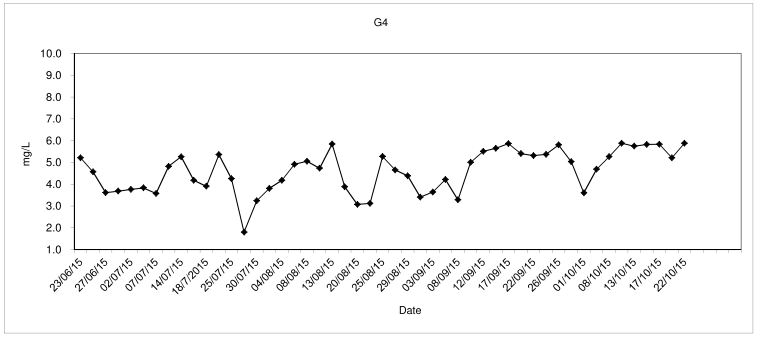
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

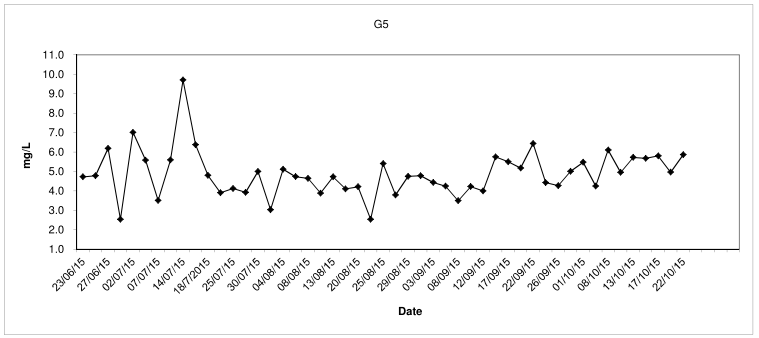


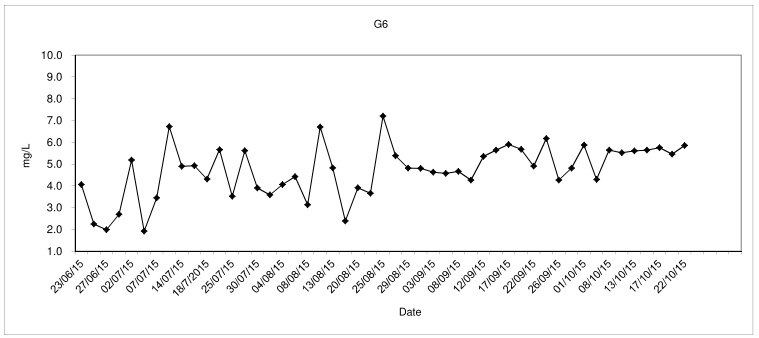




Dissolved Oxygen (Bottom) at Mid-Ebb Tide

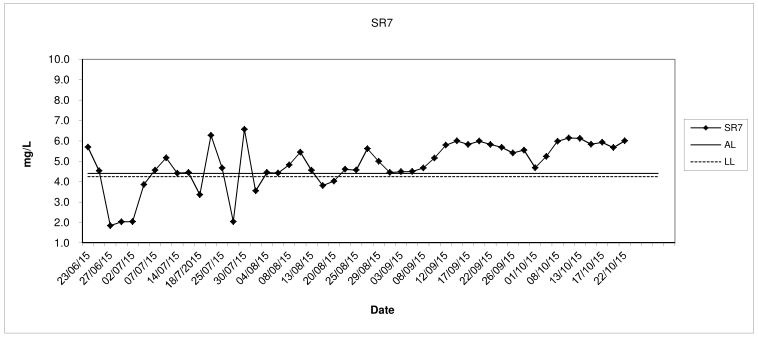


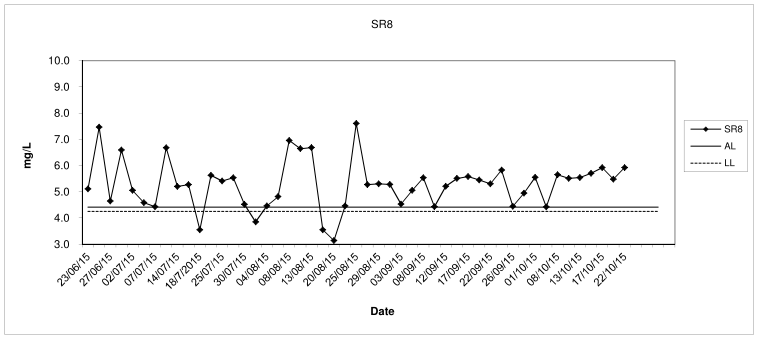


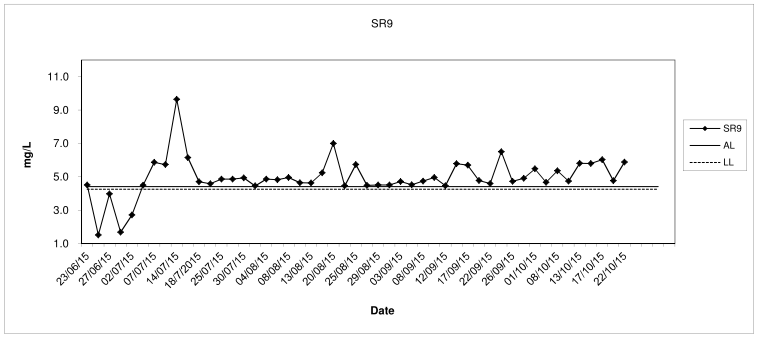


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

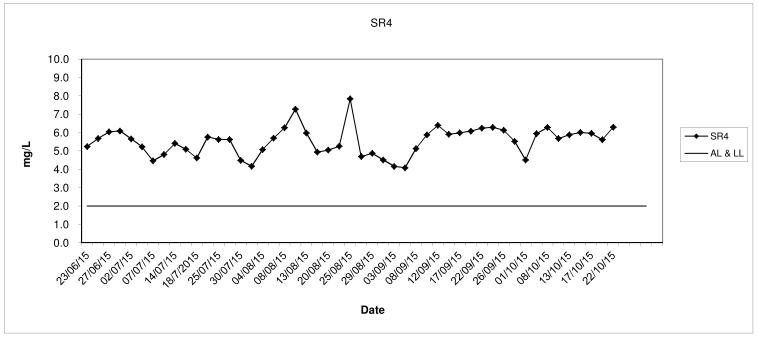
Dissolved Oxygen (Bottom) at Mid-Ebb Tide

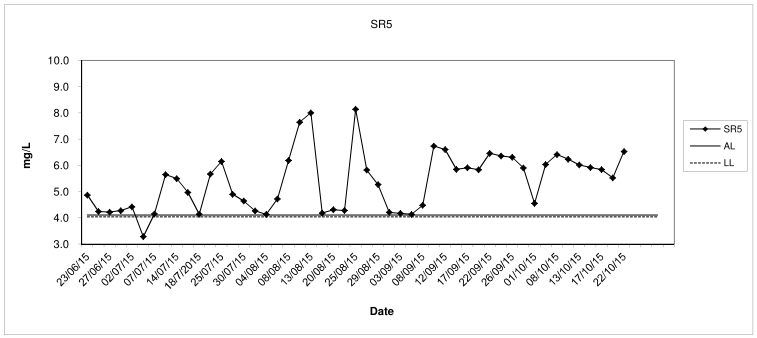


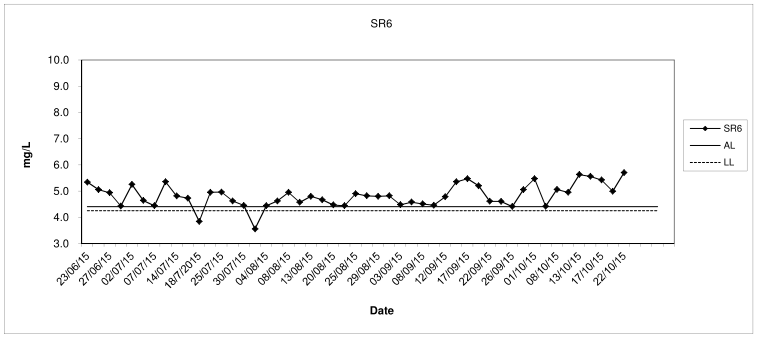




Dissolved Oxygen (Bottom) at Mid-Ebb Tide

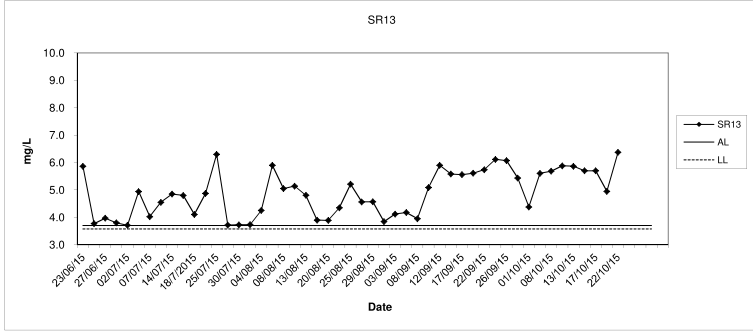




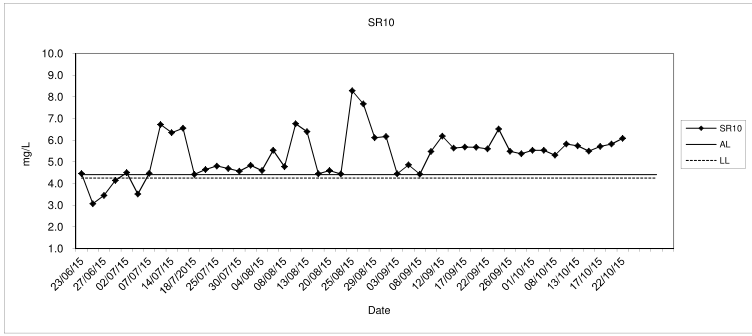


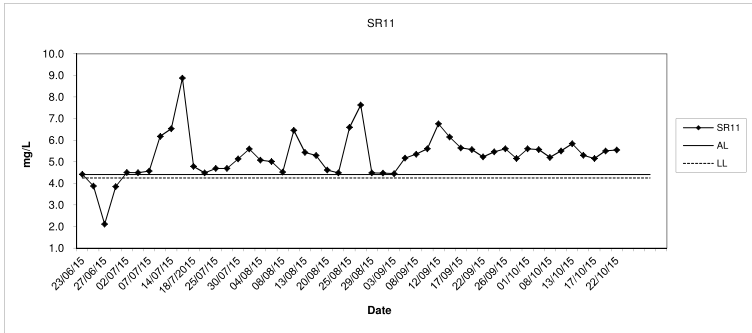
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

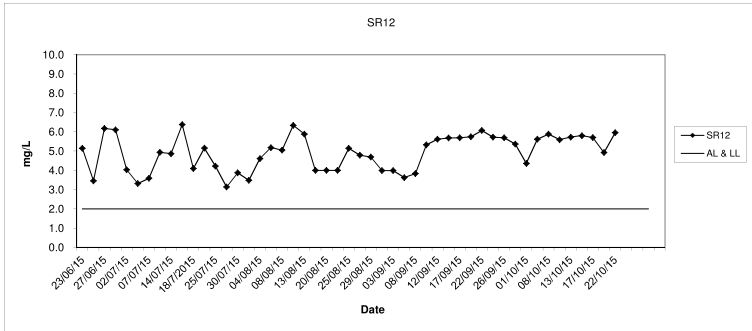
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



Dissolved Oxygen (Bottom) at Mid-Ebb Tide

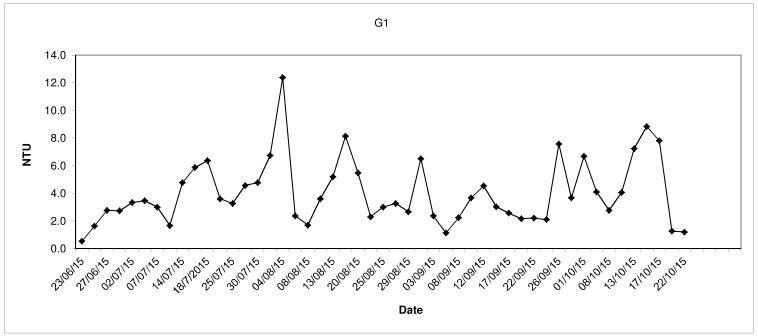


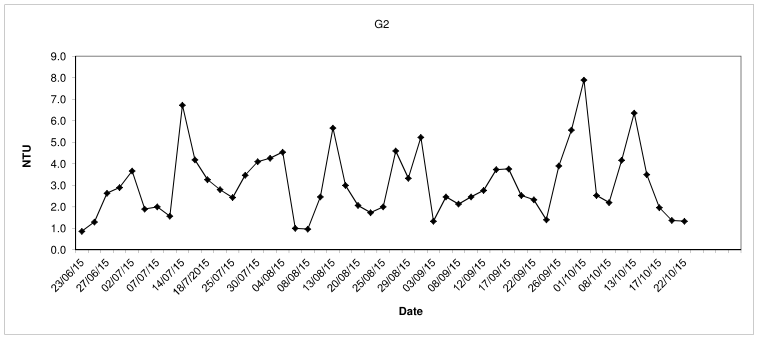


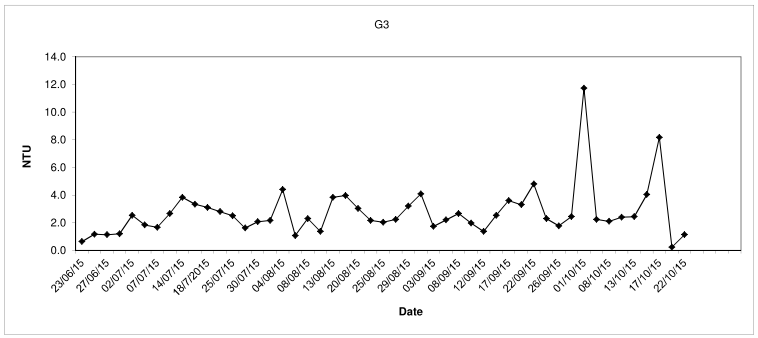


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

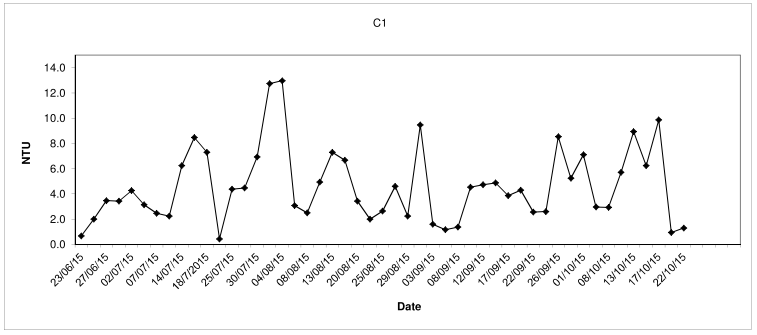
Turbidity (Depth average) at Mid-Ebb Tide

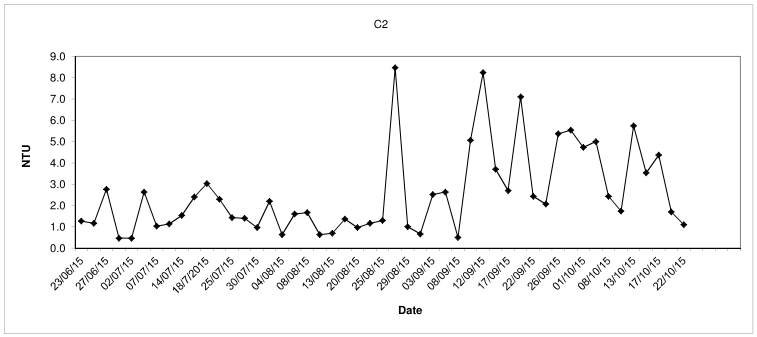


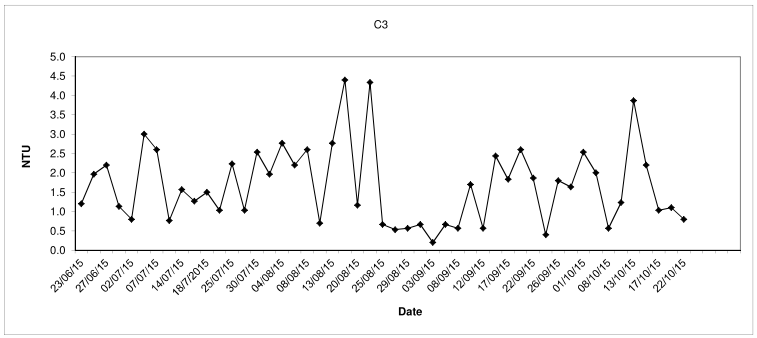




Turbidity (Depth average) at Mid-Ebb Tide

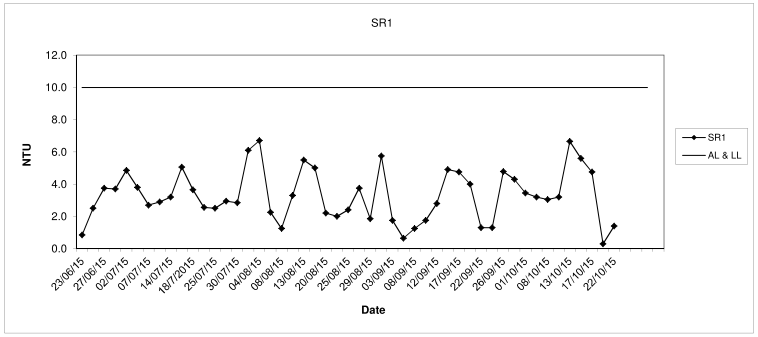


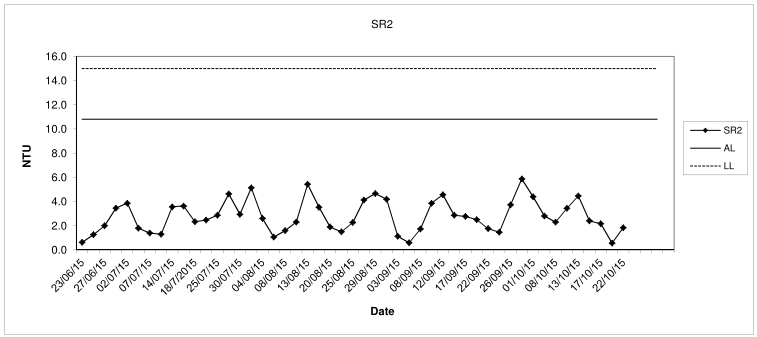


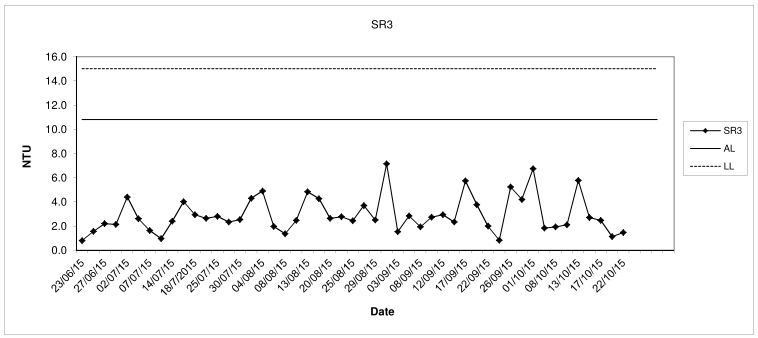


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

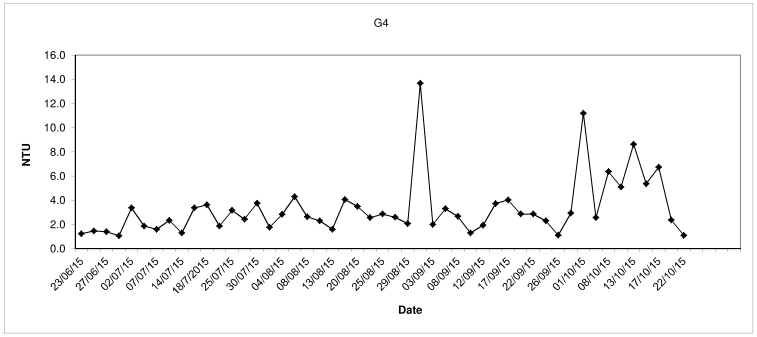
Turbidity (Depth average) at Mid-Ebb Tide

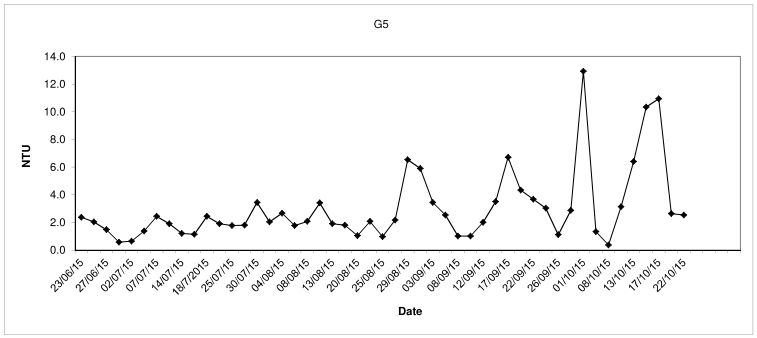


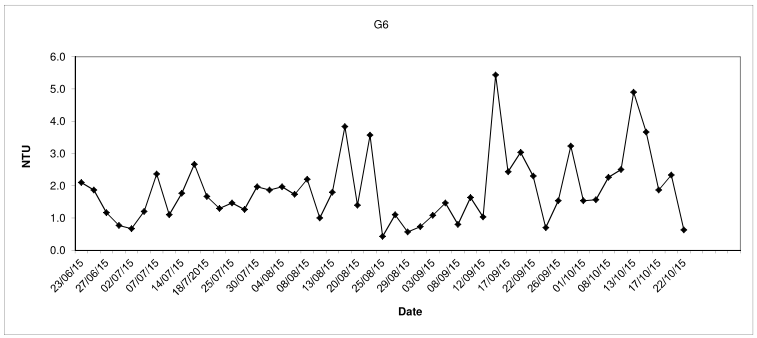




Turbidity (Depth average) at Mid-Ebb Tide

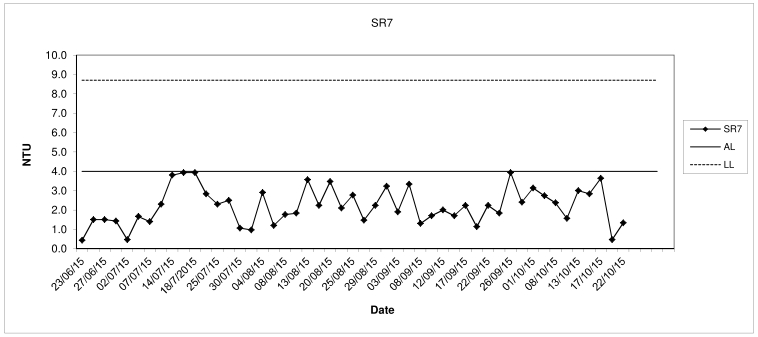


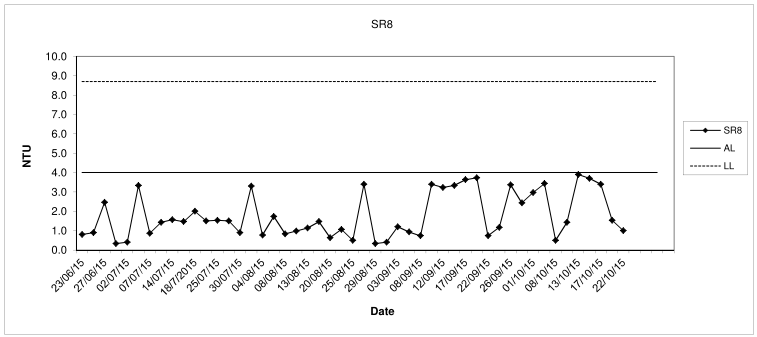


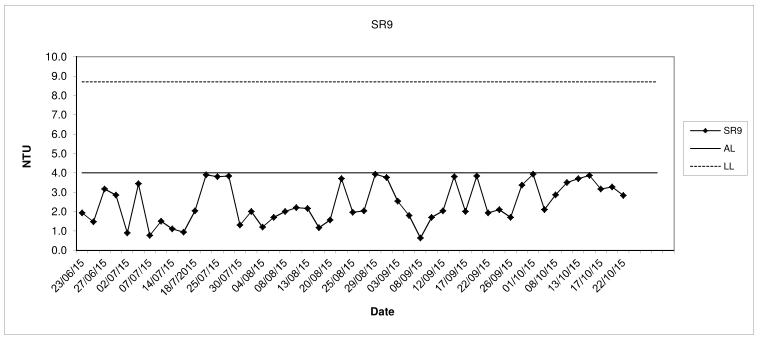


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

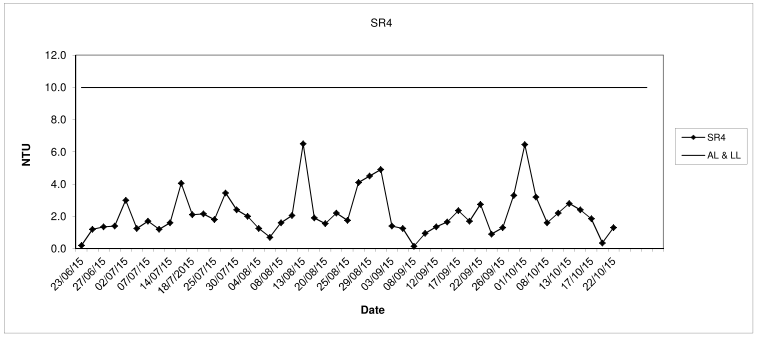
Turbidity (Depth average) at Mid-Ebb Tide

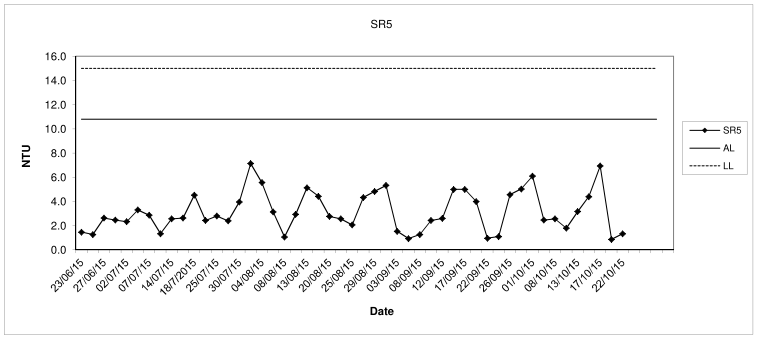


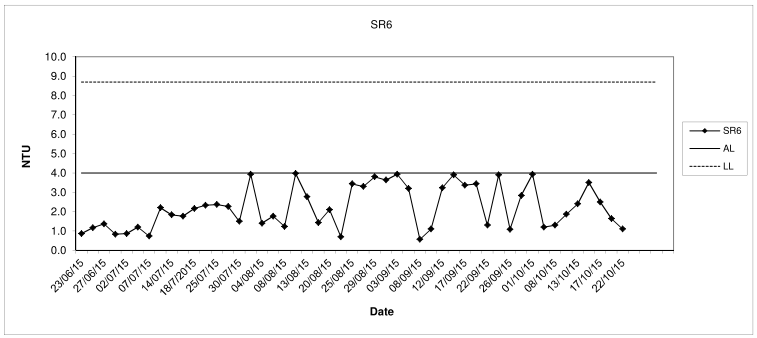




Turbidity (Depth average) at Mid-Ebb Tide

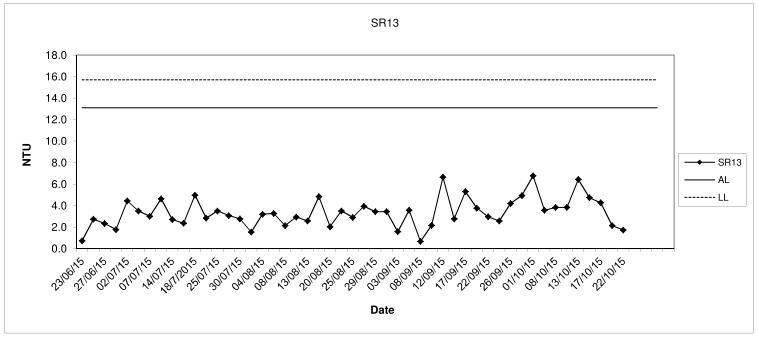




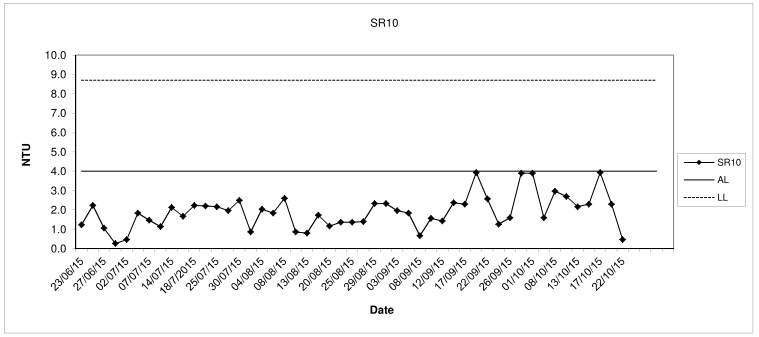


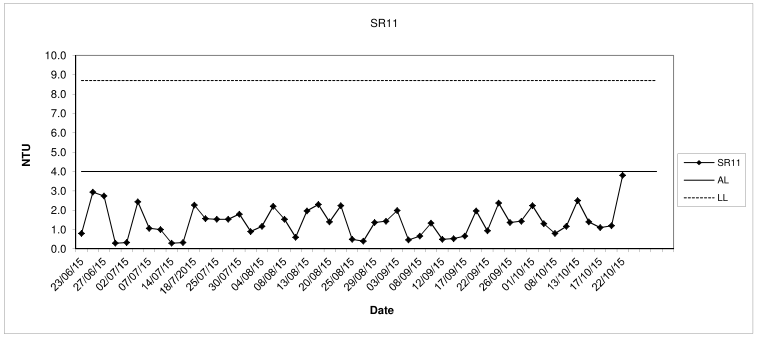
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

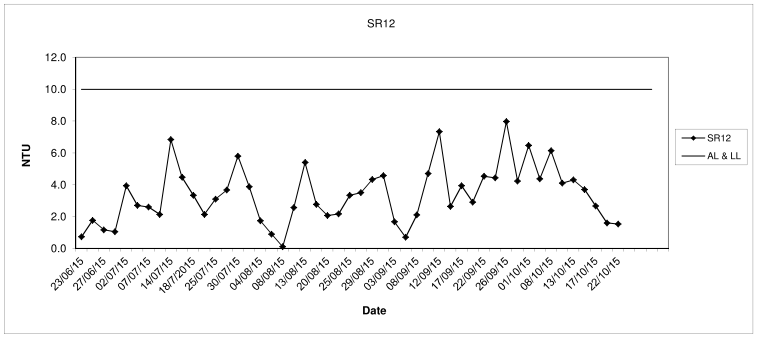
Turbidity (Depth average) at Mid-Ebb Tide



Turbidity (Depth average) at Mid-Ebb Tide

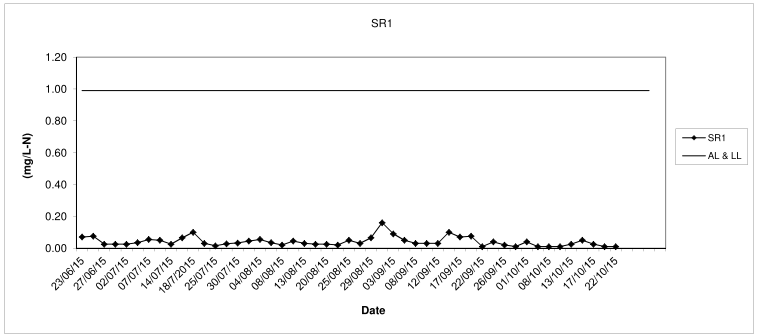


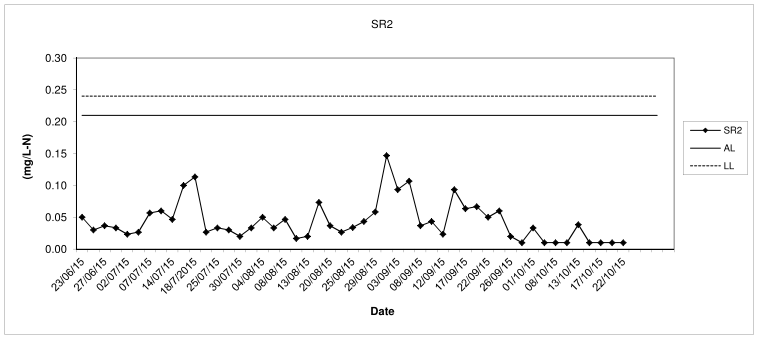


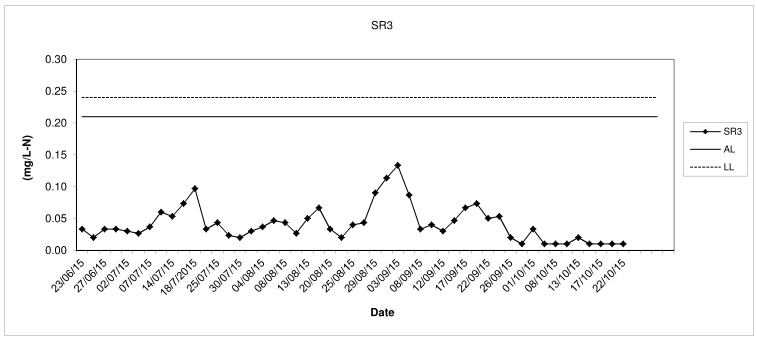


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

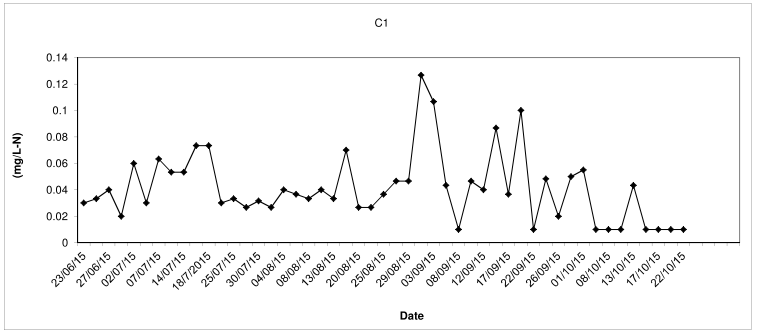
In-situ Ammonia (Depth average) at Mid-Ebb Tide

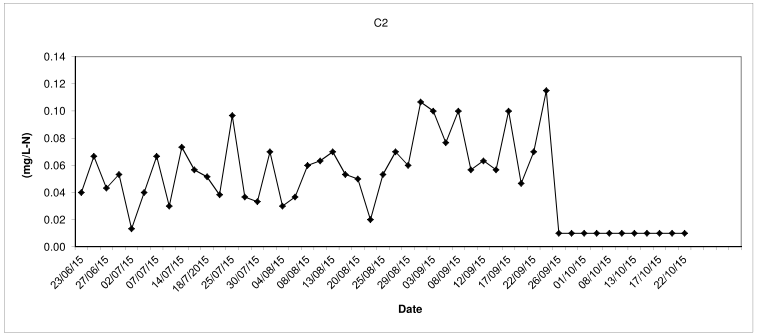


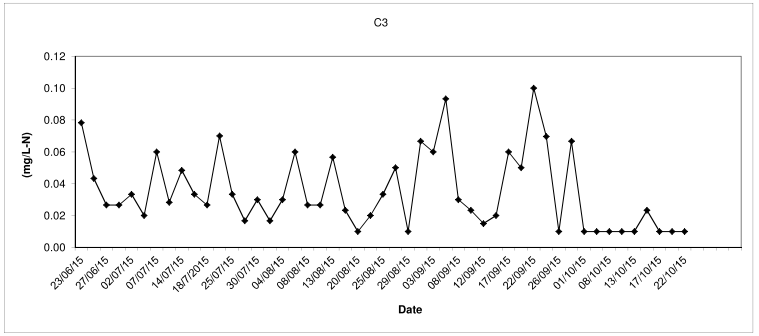




In-situ Ammonia (Depth average) at Mid-Ebb Tide

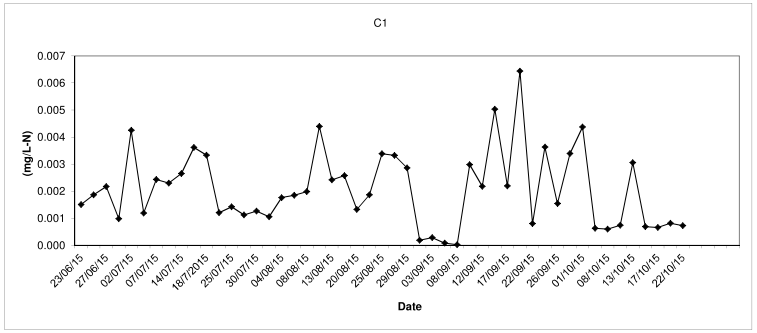


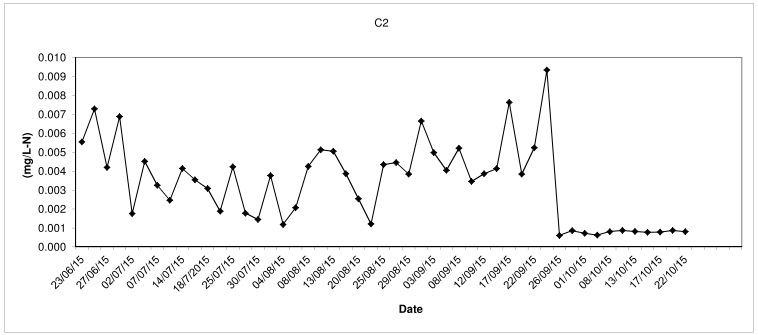


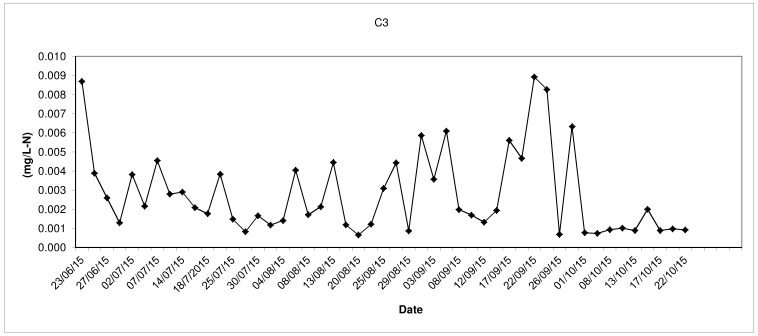


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

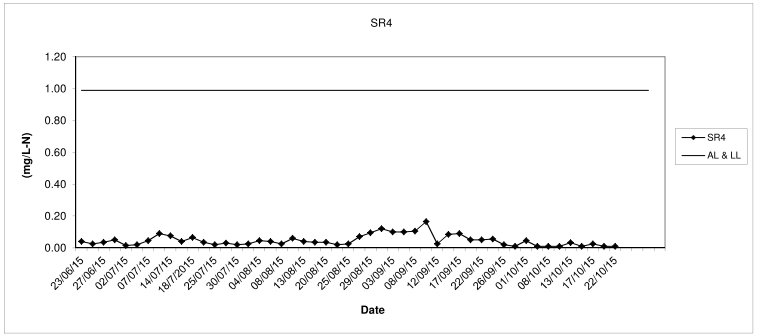
In-situ UIA (Depth average) at Mid-Ebb Tide

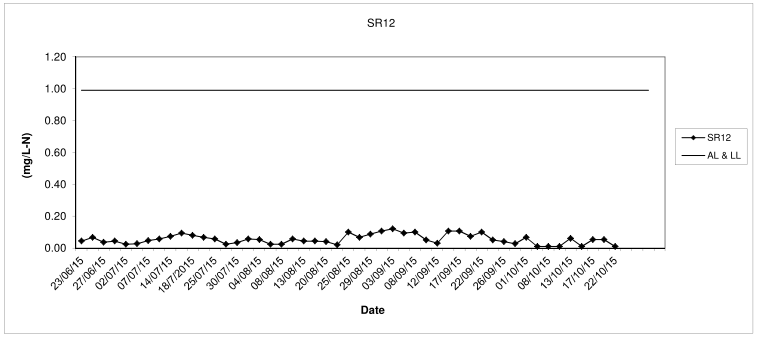






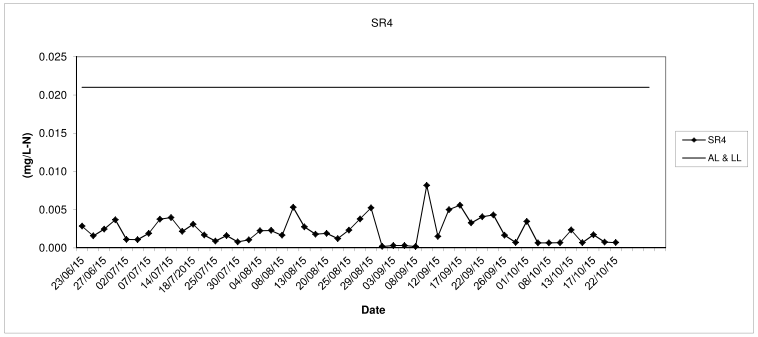
In-situ Ammonia (Depth average) at Mid-Ebb Tide

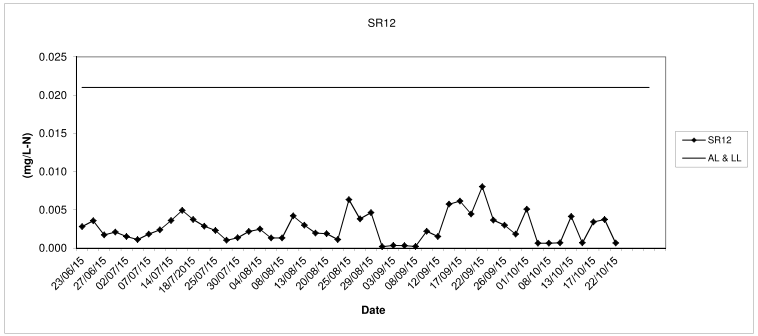




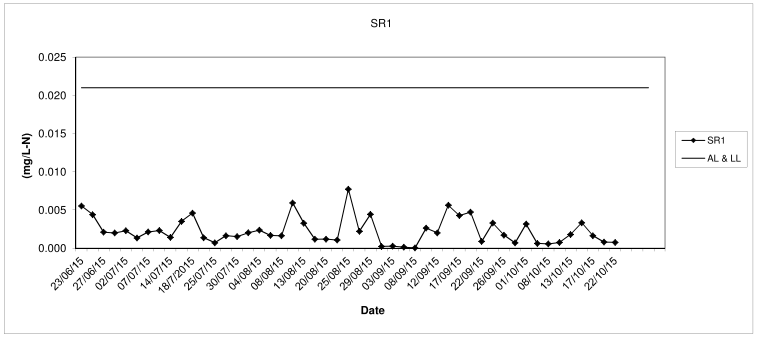
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

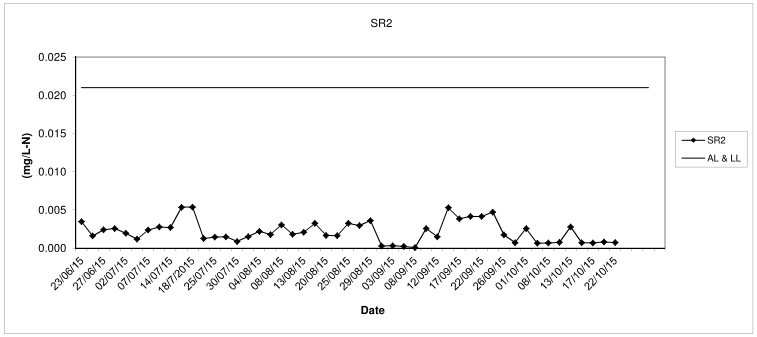
In-situ UIA (Depth average) at Mid-Ebb Tide

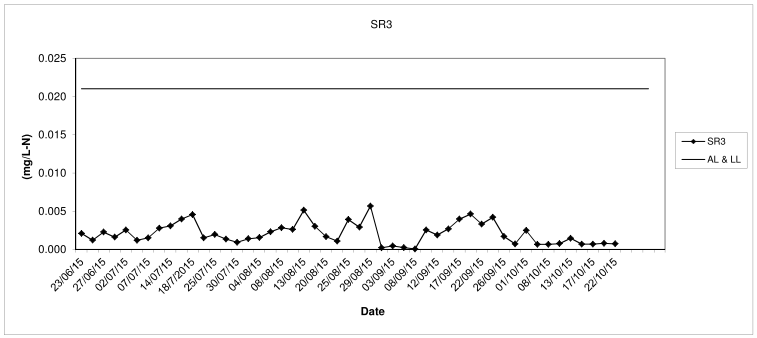




In-situ UIA (Depth average) at Mid-Ebb Tide

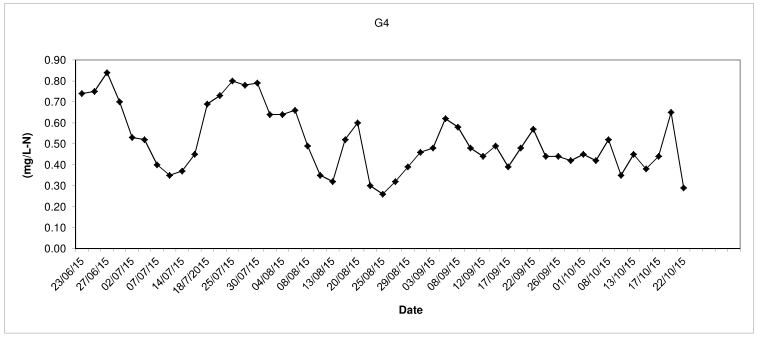


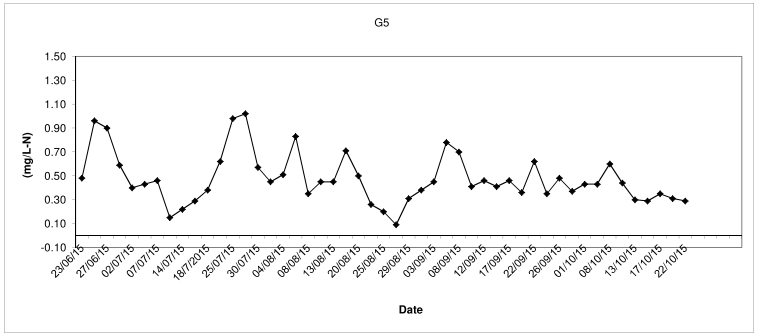


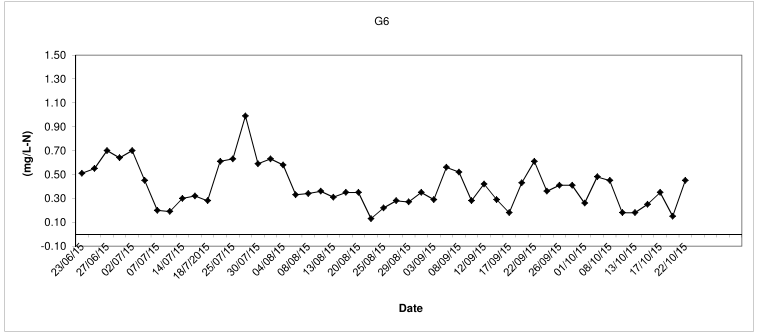


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

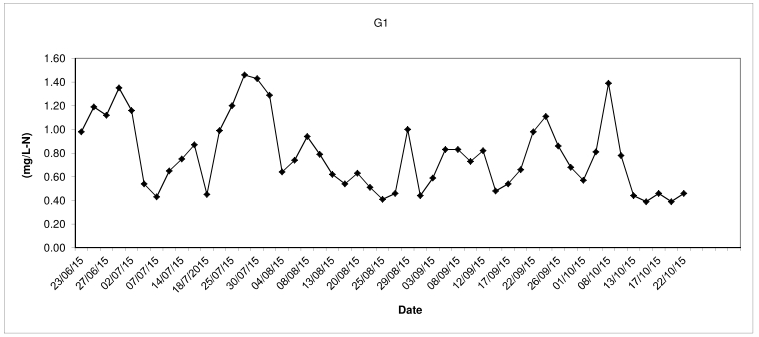
In-situ TIN (Depth average) at Mid-Ebb Tide

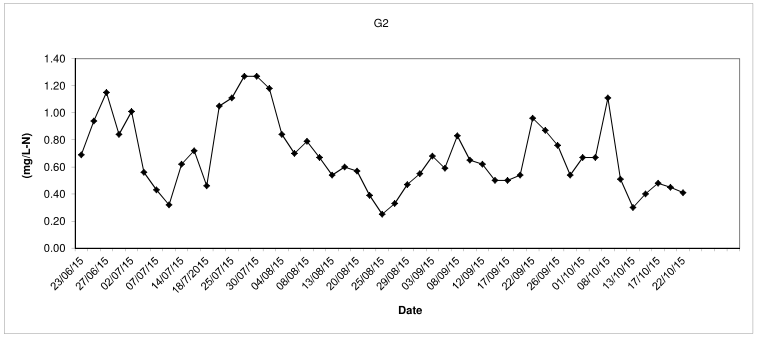


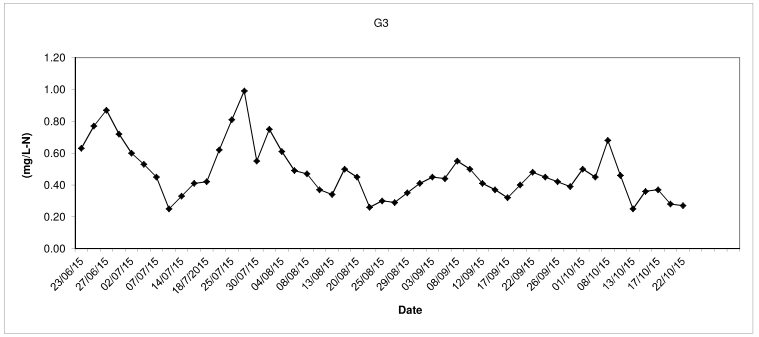




In-situ TIN (Depth average) at Mid-Ebb Tide

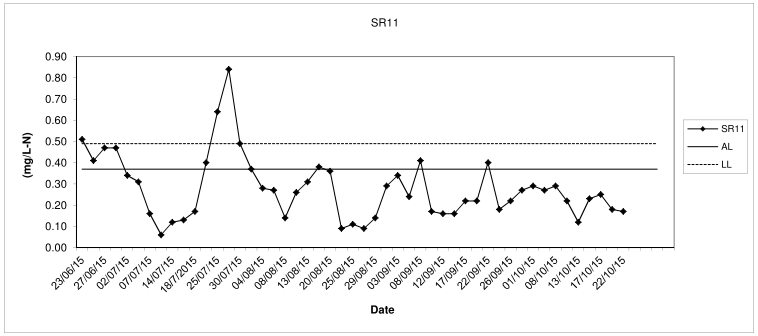




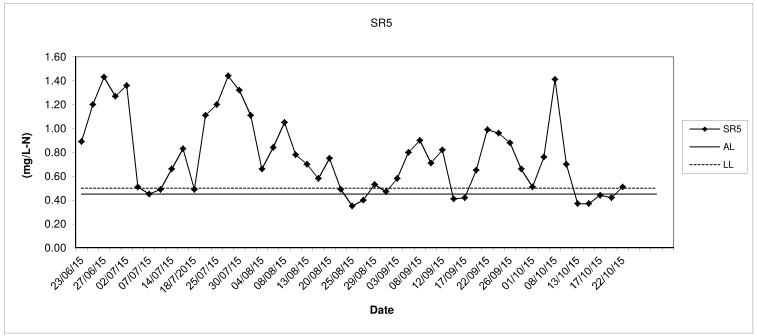


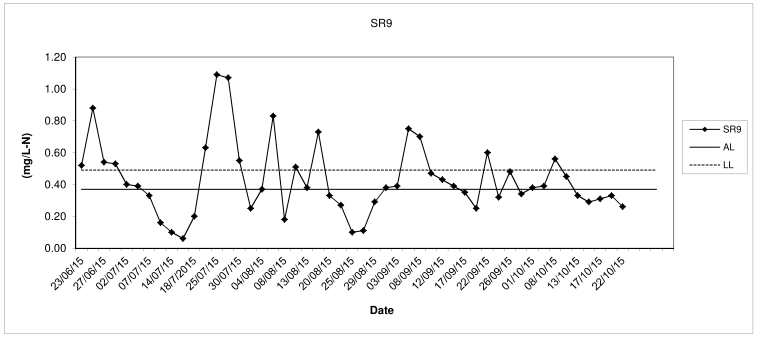
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

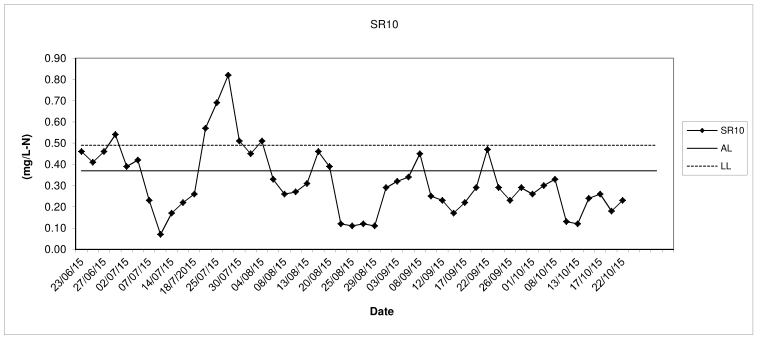
In-situ TIN (Depth average) at Mid-Ebb Tide



In-situ TIN (Depth average) at Mid-Ebb Tide

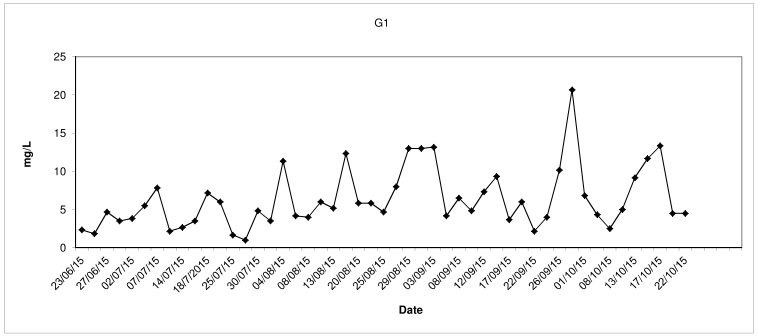


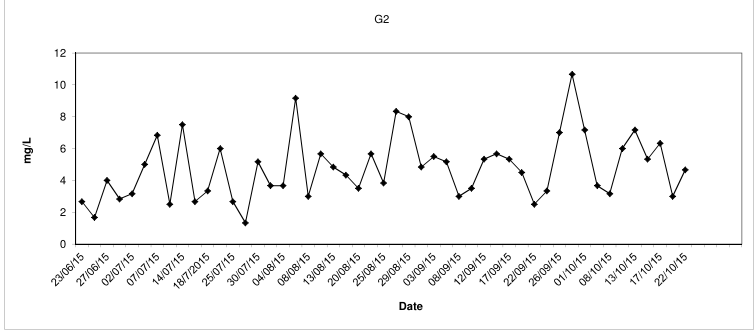


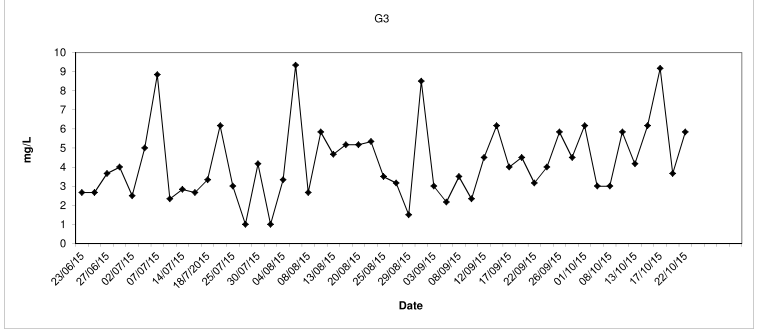


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

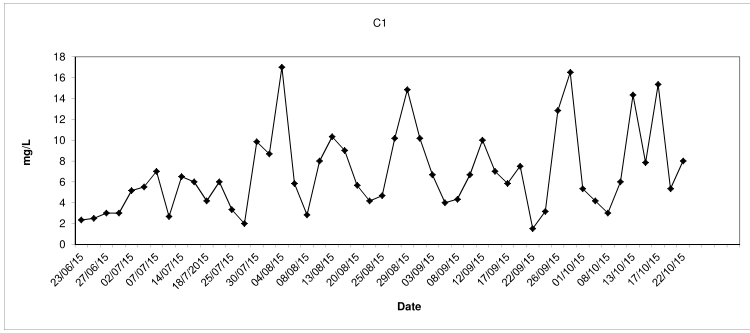
Total Suspended Solids (Depth average) at Mid-Ebb Tide

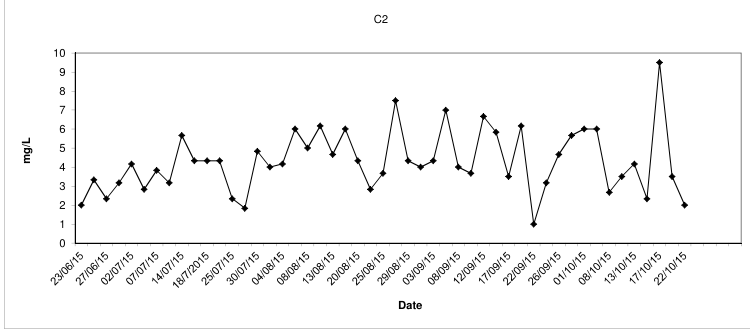


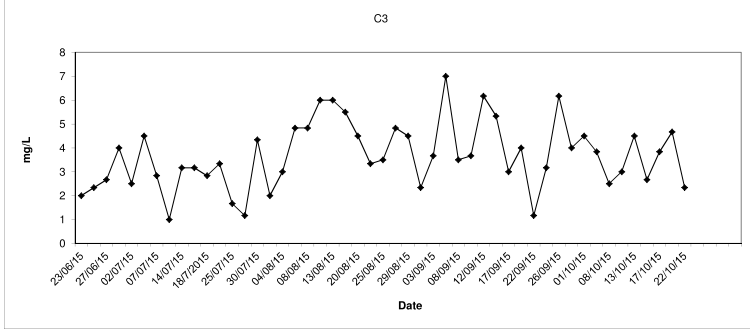




Total Suspended Solids (Depth average) at Mid-Ebb Tide

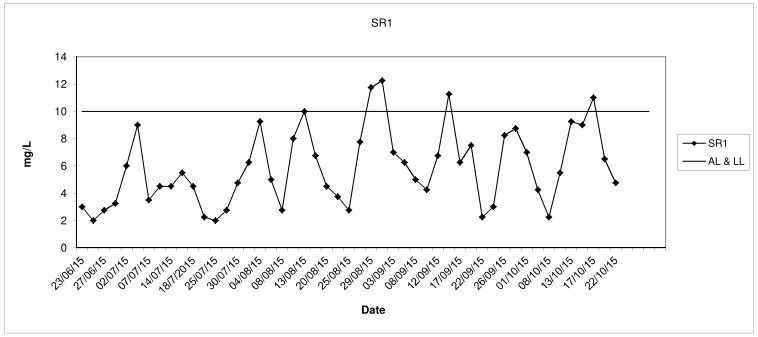


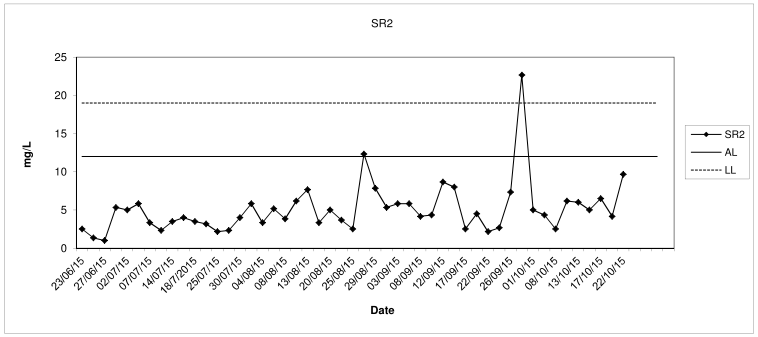


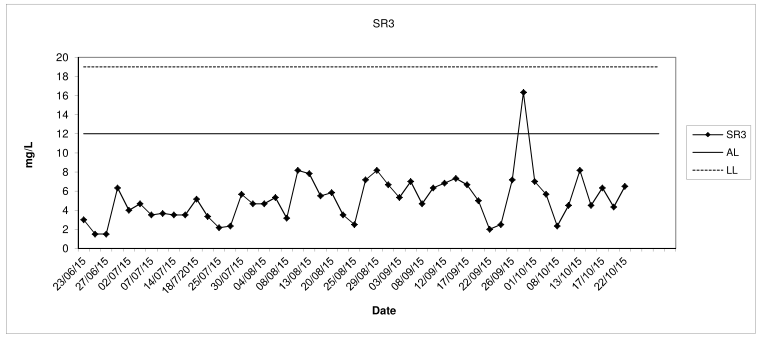


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

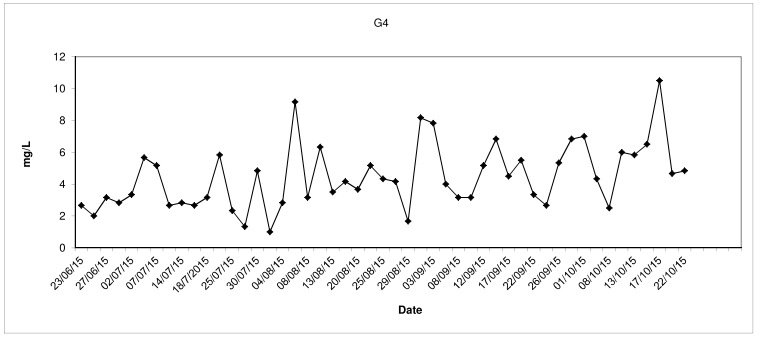
Total Suspended Solids (Depth average) at Mid-Ebb Tide

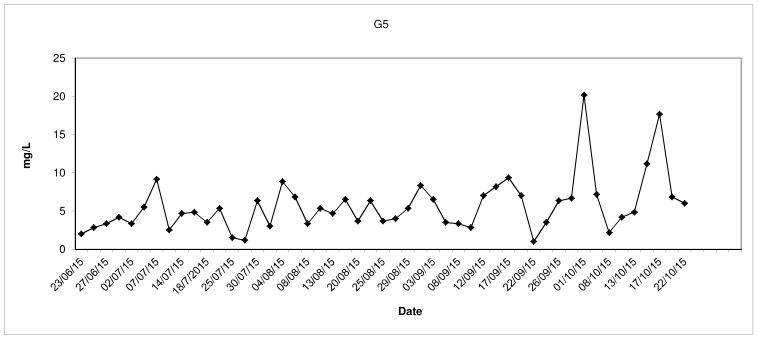


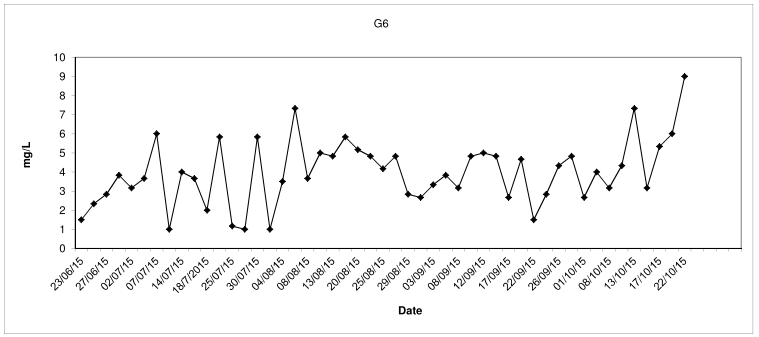




Total Suspended Solids (Depth average) at Mid-Ebb Tide

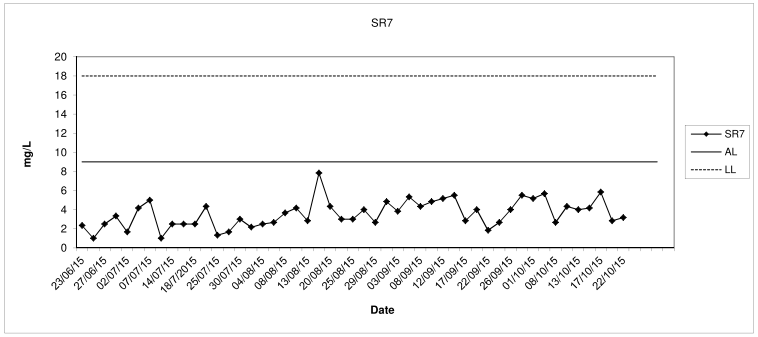


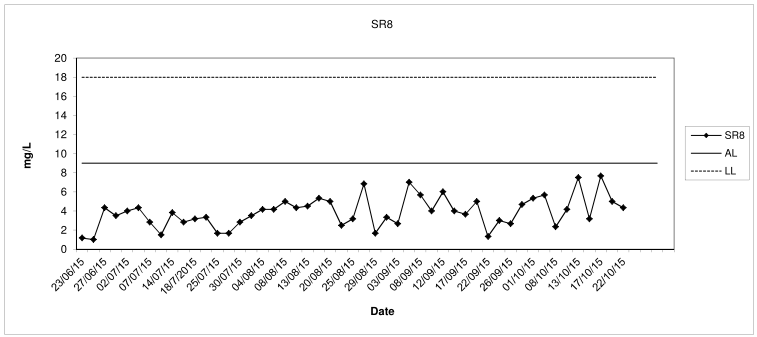


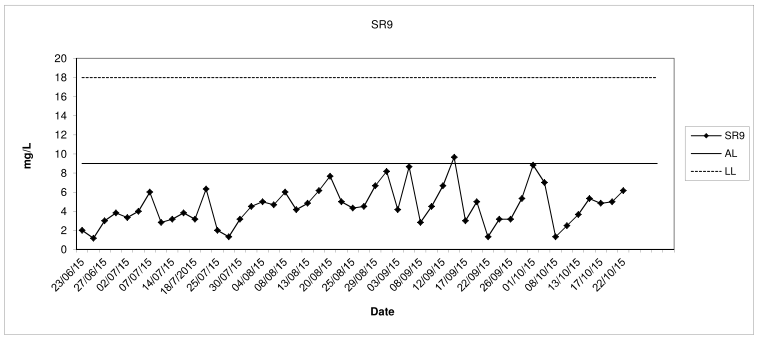


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

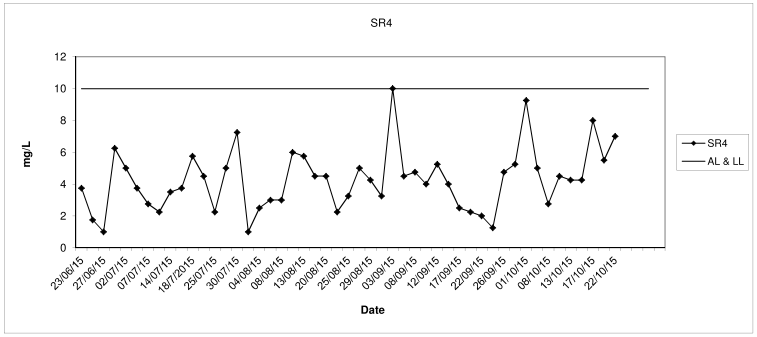
Total Suspended Solids (Depth average) at Mid-Ebb Tide

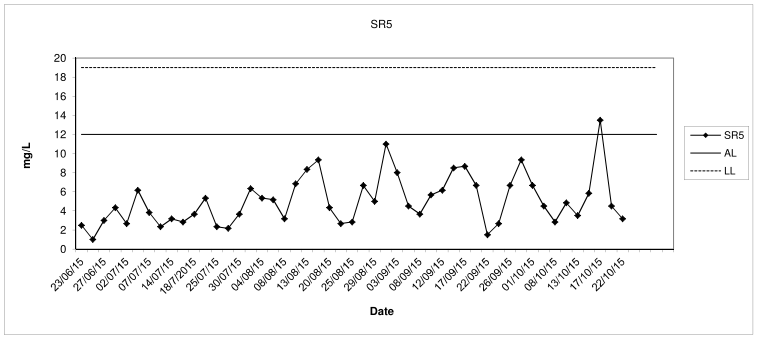


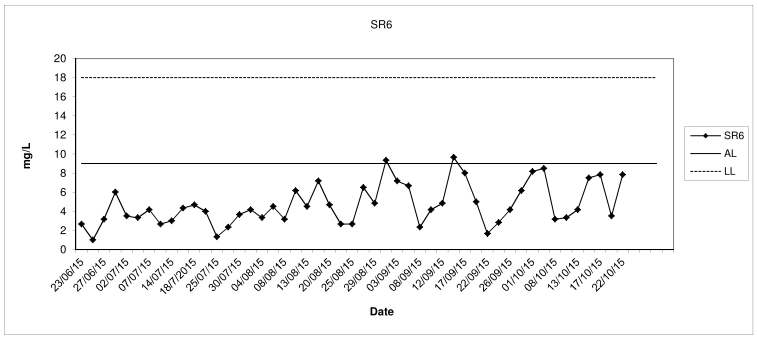




Total Suspended Solids (Depth average) at Mid-Ebb Tide

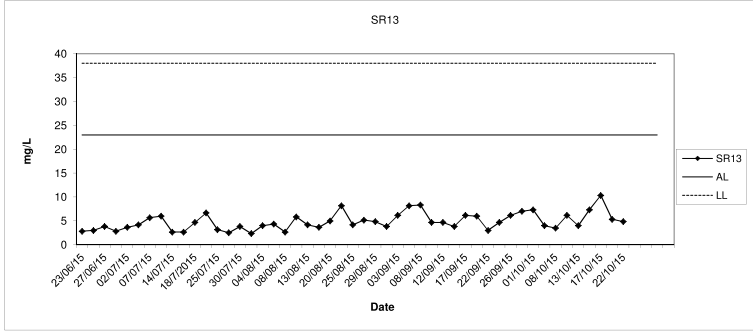




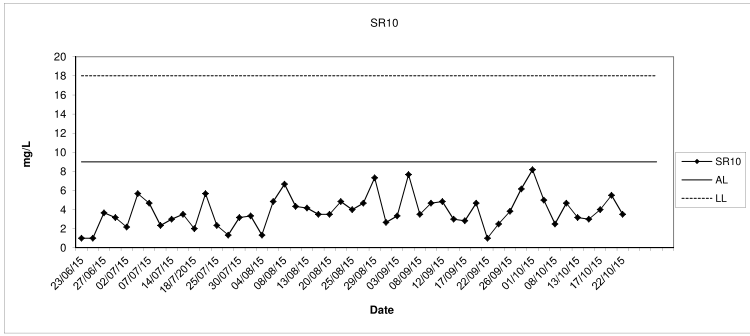


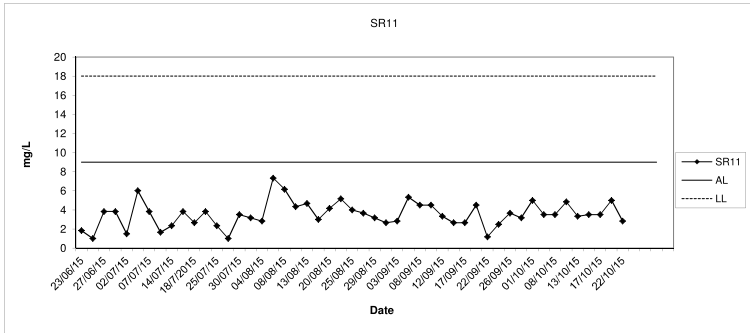
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

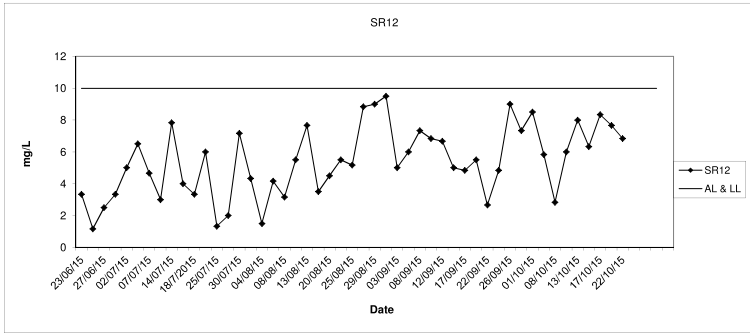
Total Suspended Solids (Depth average) at Mid-Ebb Tide



Total Suspended Solids (Depth average) at Mid-Ebb Tide

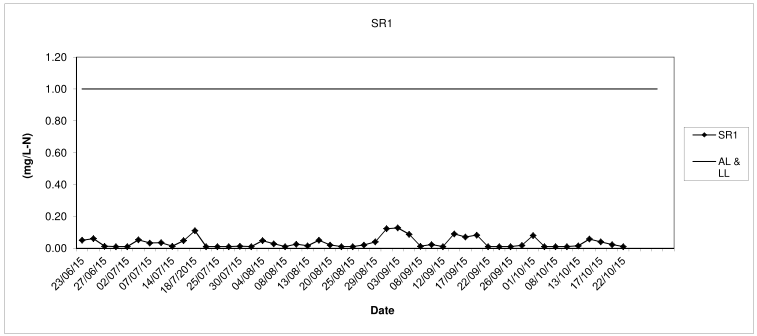


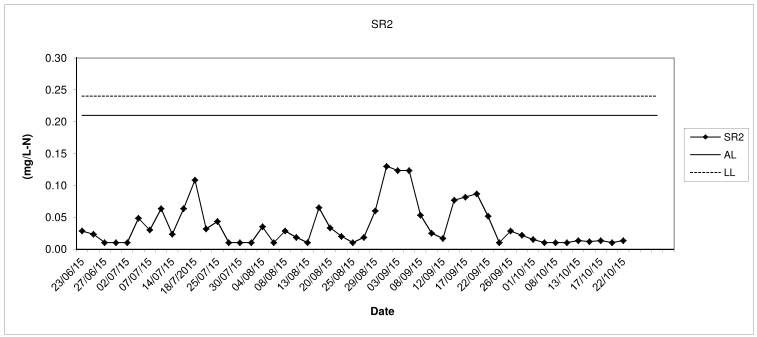


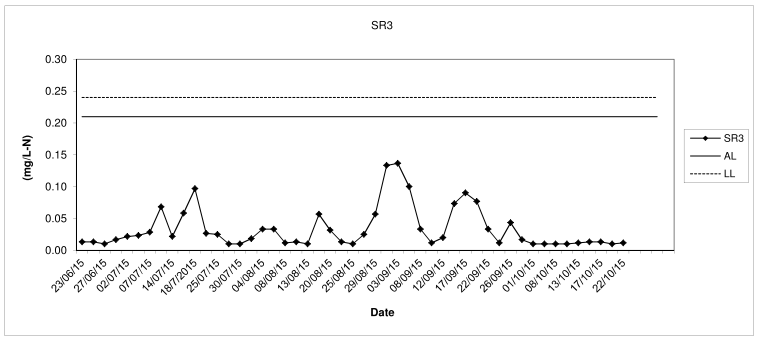


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

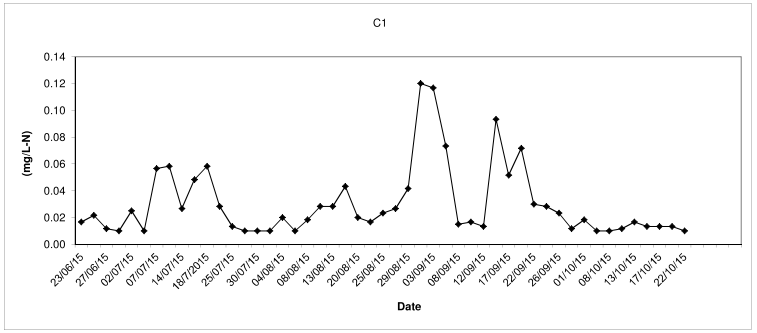
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

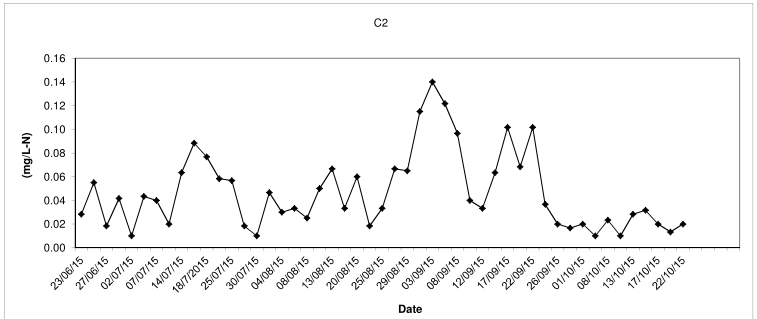


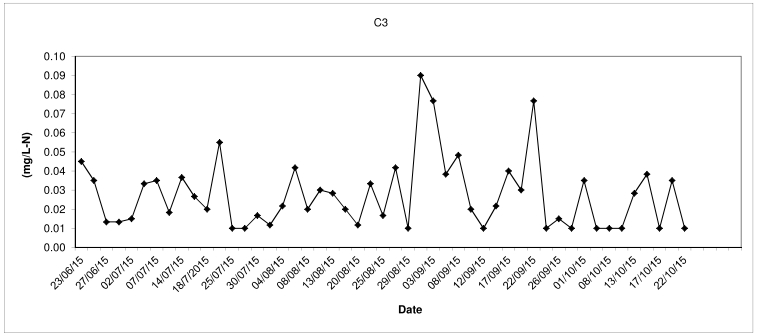




Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

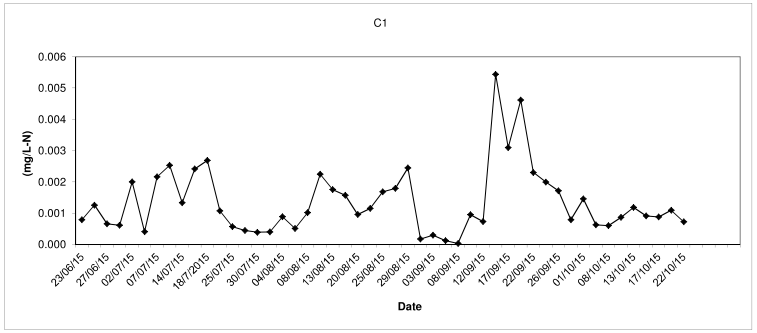


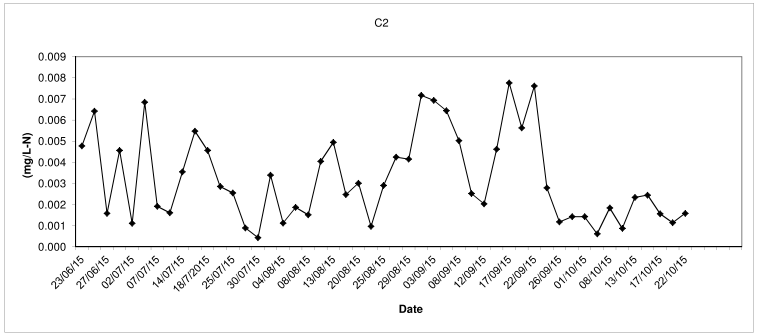


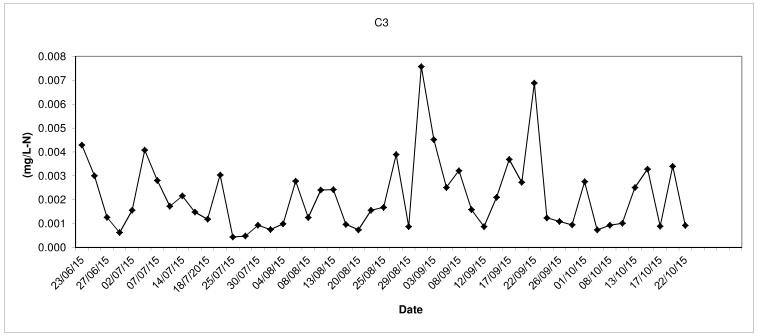


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

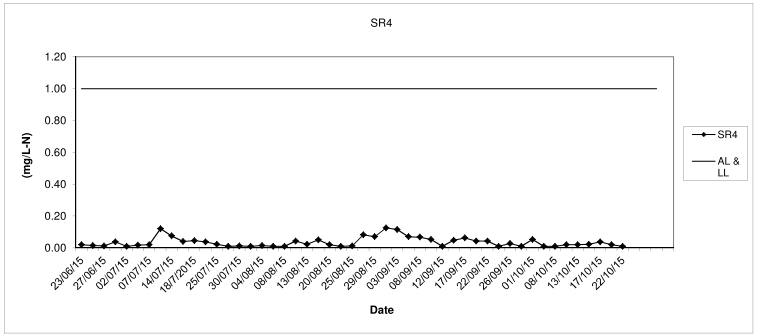
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

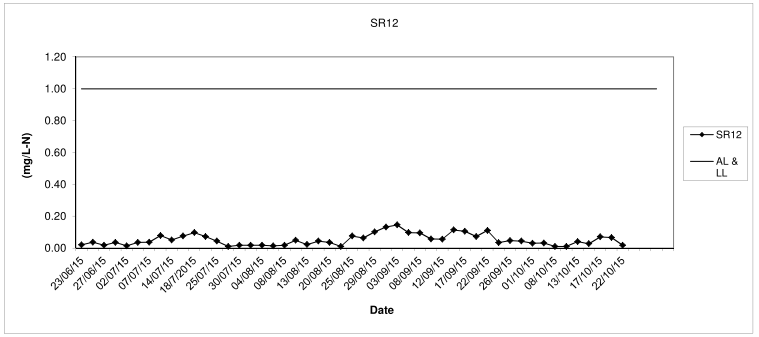






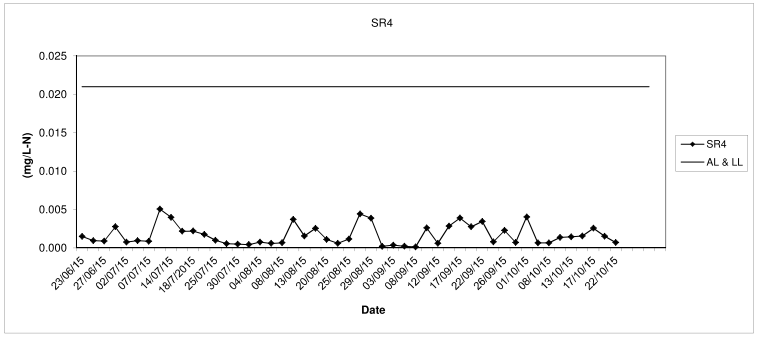
Ammonia Nitrogen (Depth average) at Mid-Ebb Tide

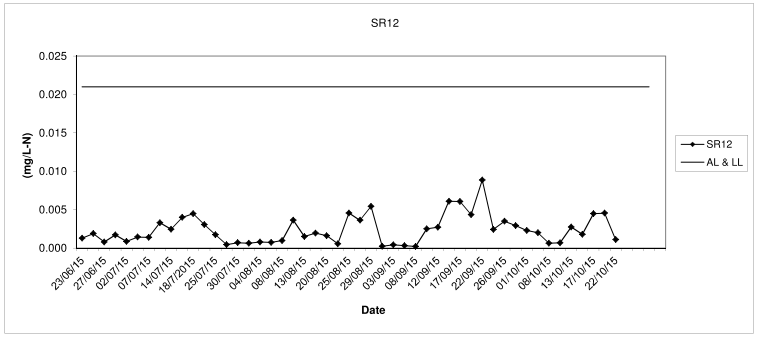




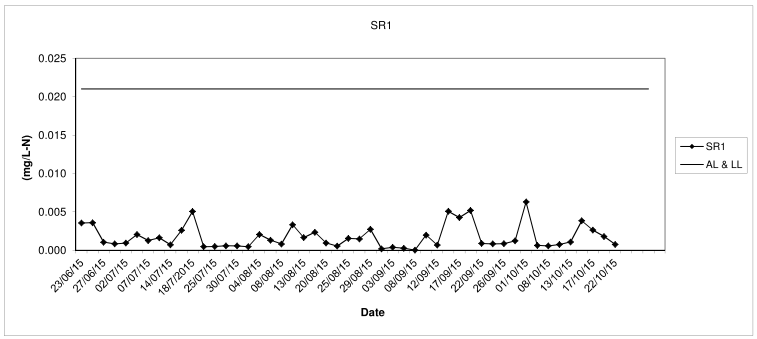
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

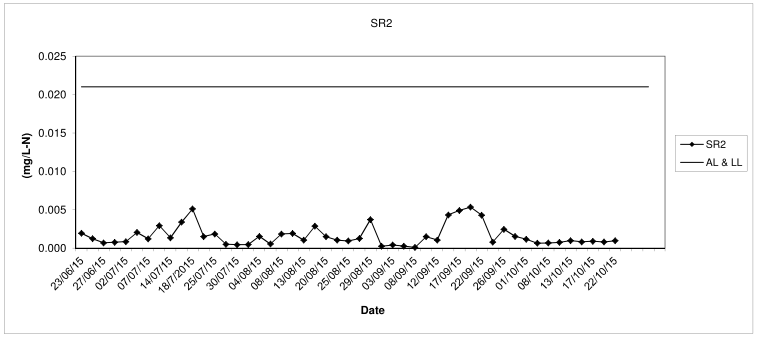
Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

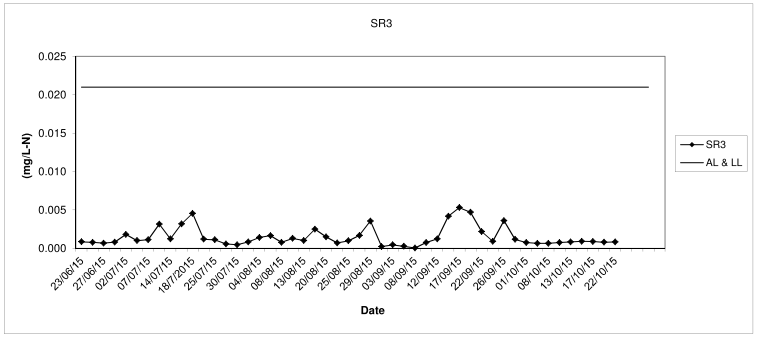




Laboratory Analysis UIA (Depth average) at Mid-Ebb Tide

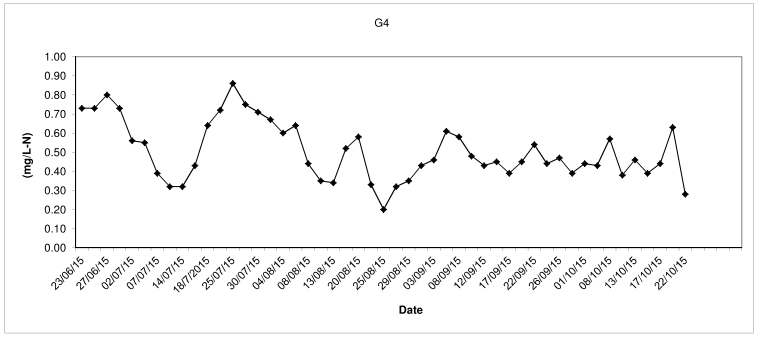


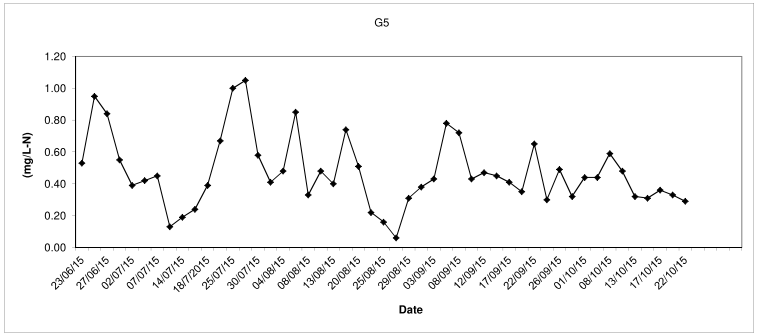


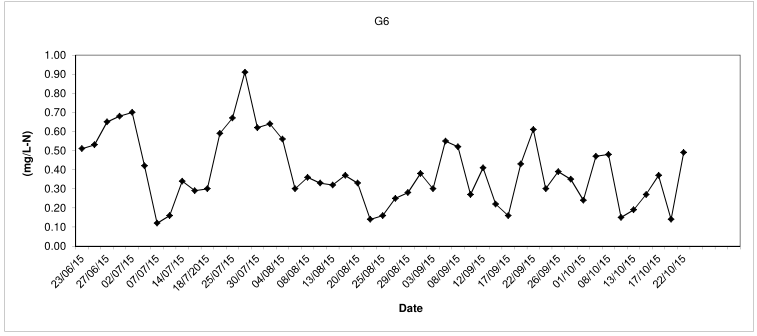


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

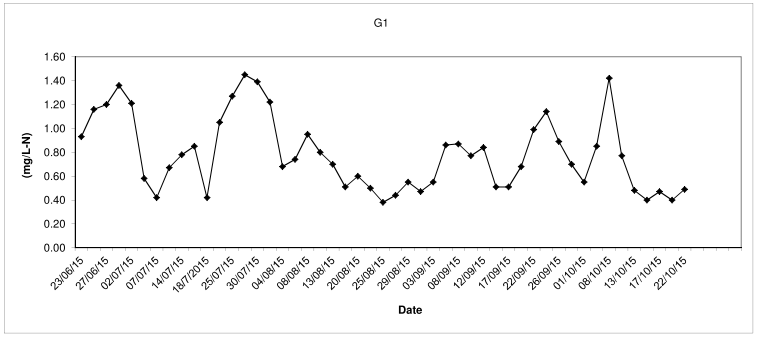
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

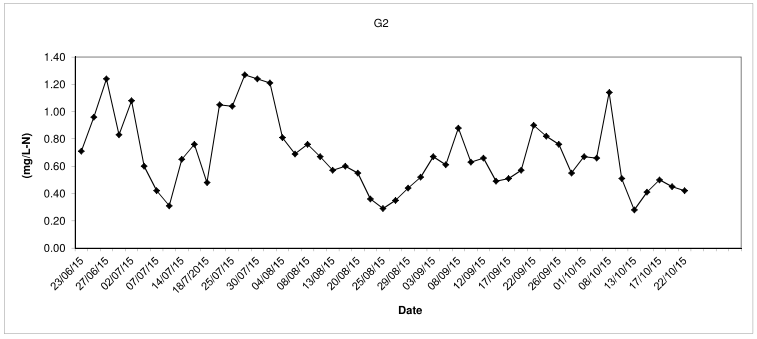


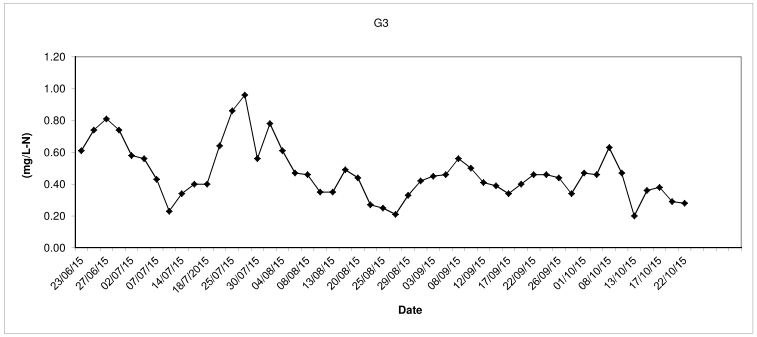




Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

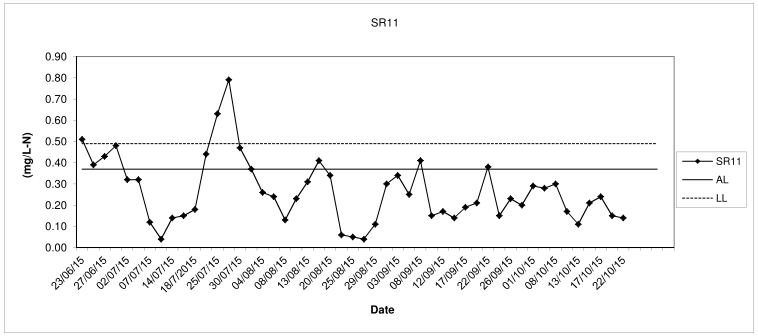




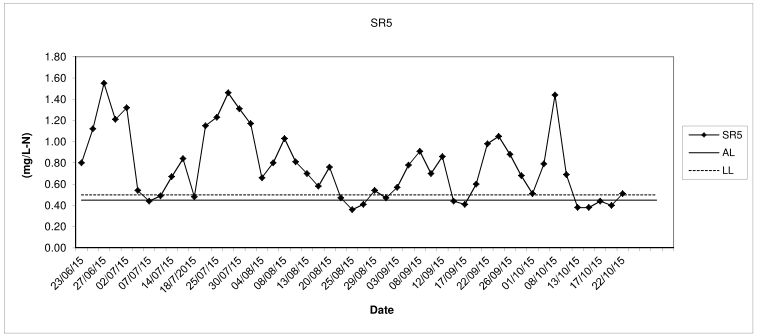


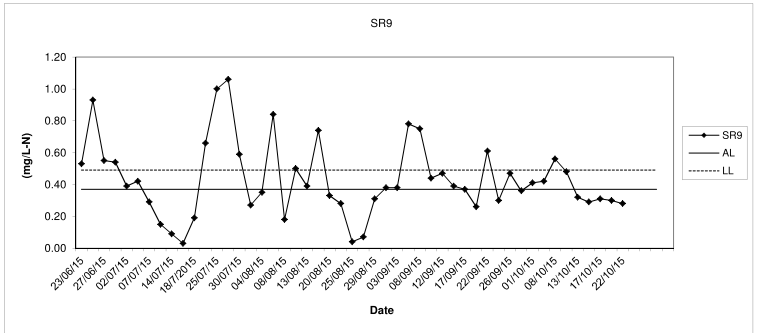
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

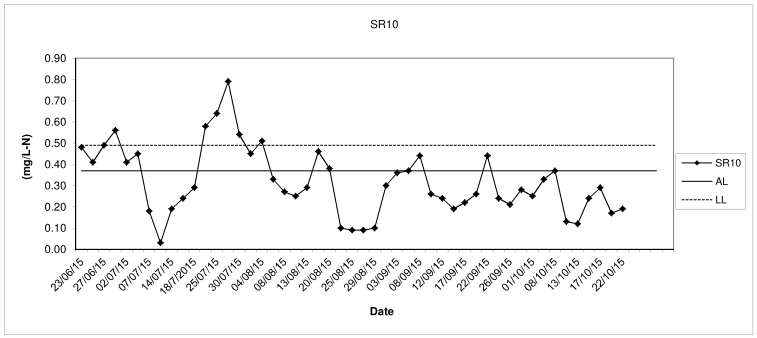
Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide



Laboratory Analysis TIN (Depth average) at Mid-Ebb Tide

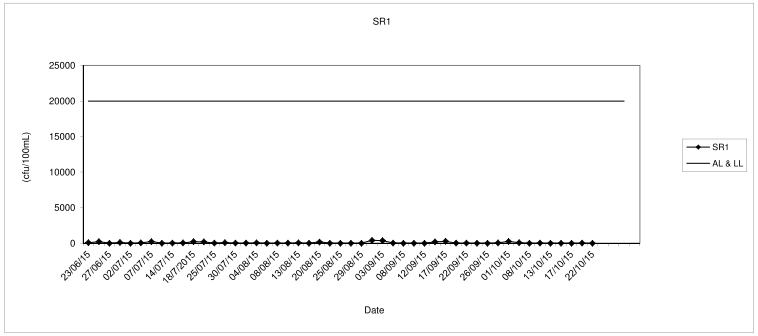


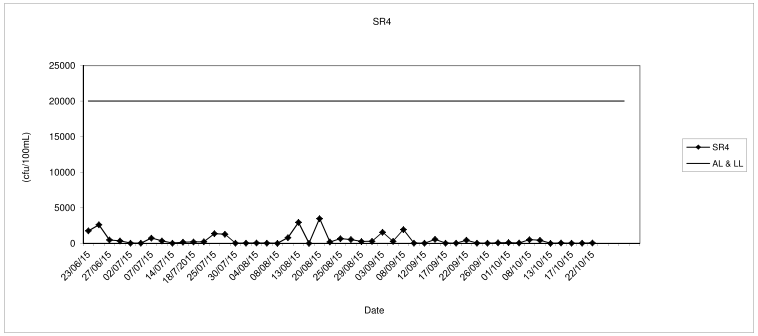


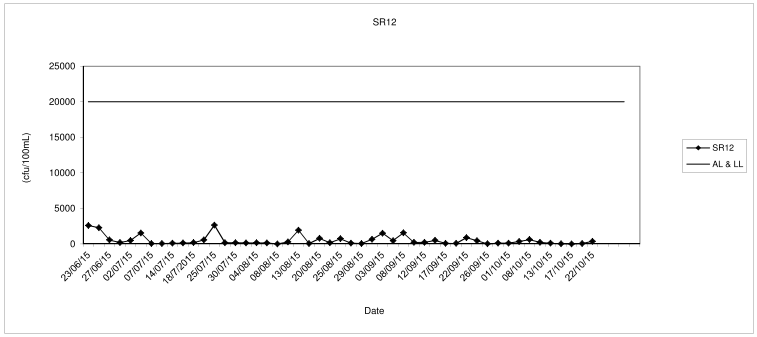


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

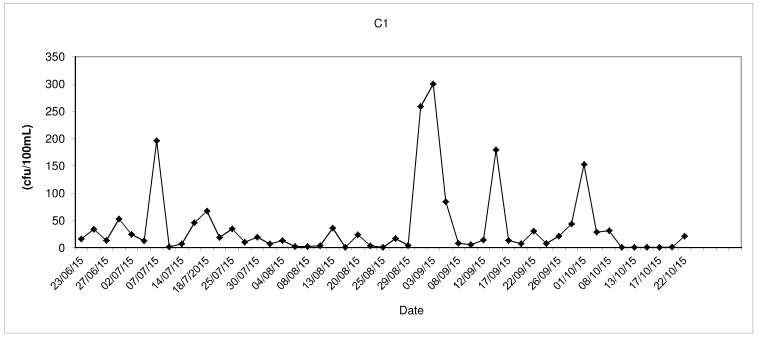
E.coli (Depth average) at Mid-Ebb Tide

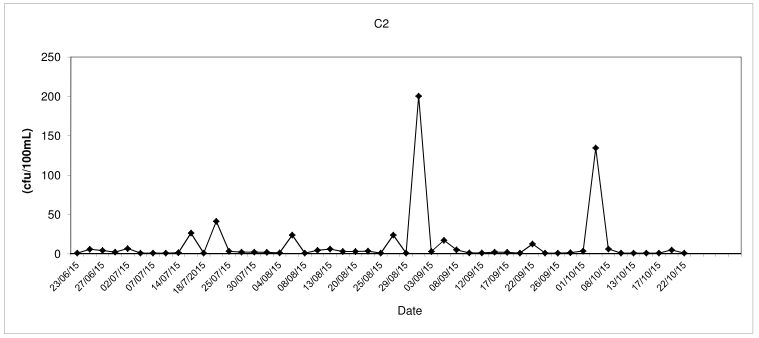


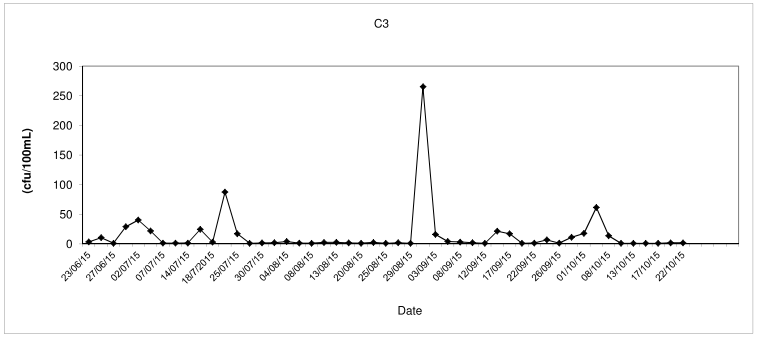




E.coli (Depth average) at Mid-Ebb Tide

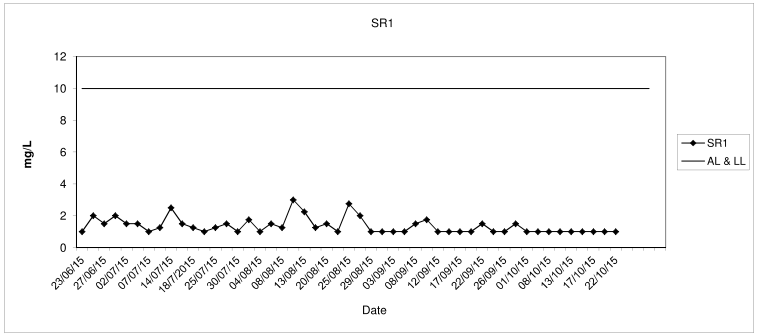


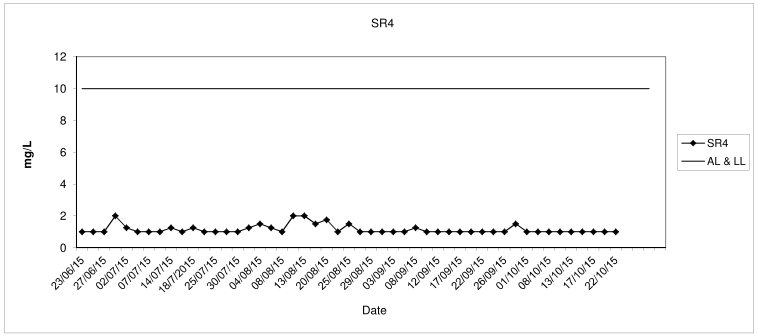


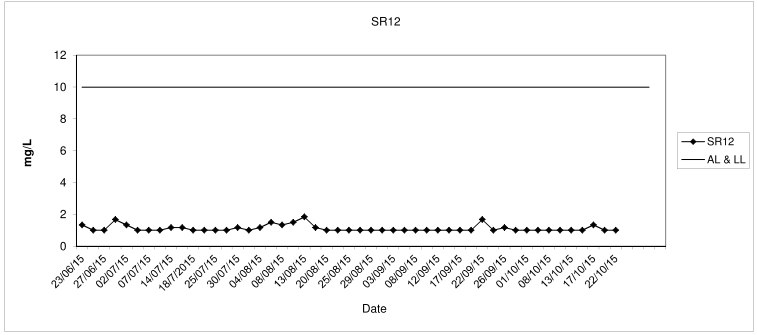


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

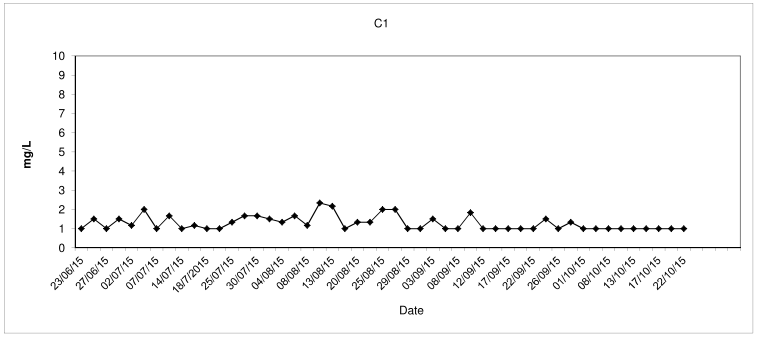
BOD_5 (Depth average) at Mid-Ebb Tide

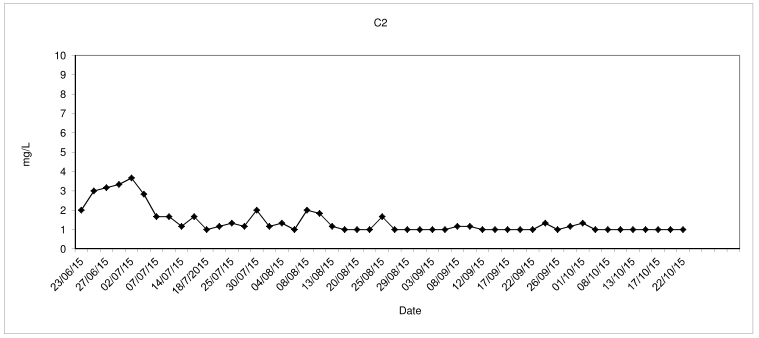


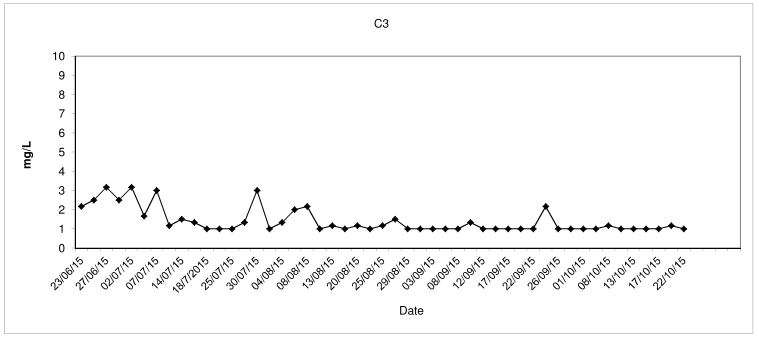




BOD_5 (Depth average) at Mid-Ebb Tide

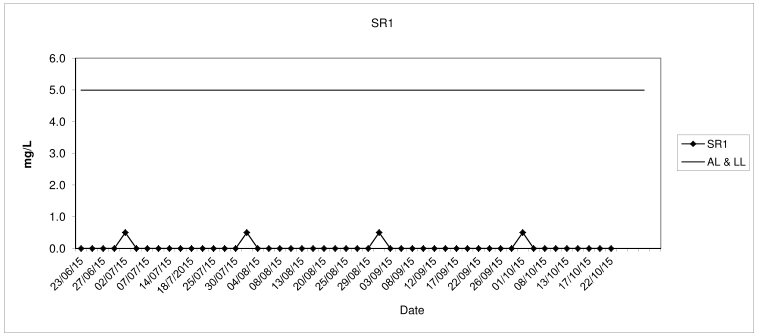


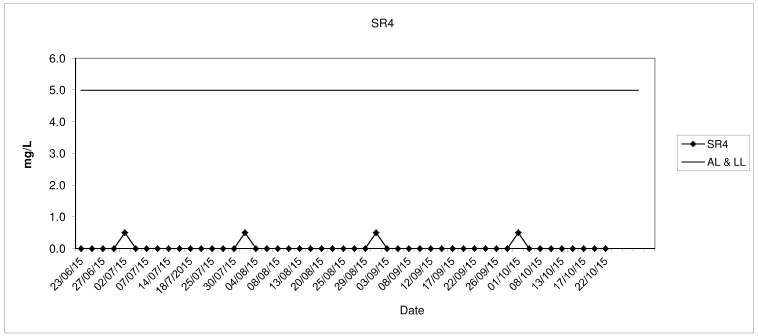


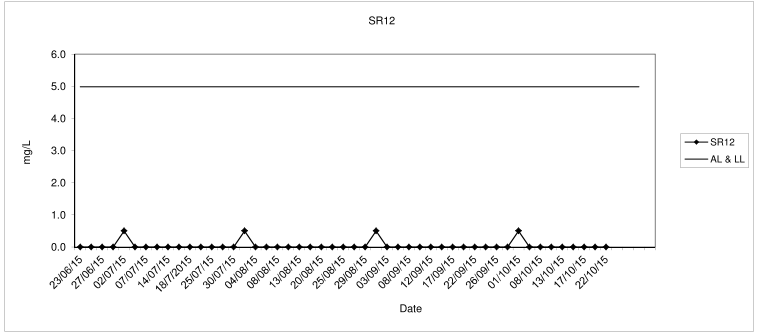


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

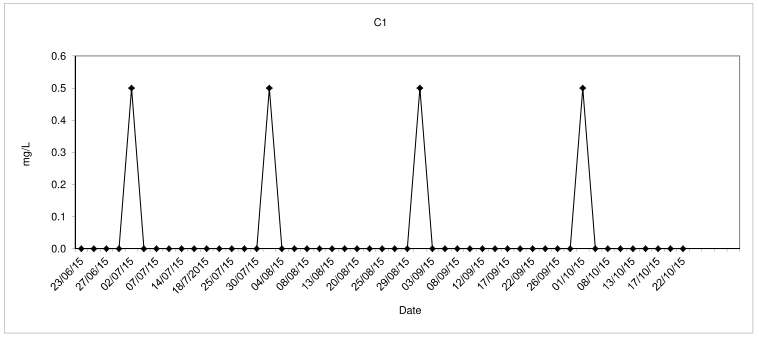
Synthetic Detergent (Depth average) at Mid-Ebb Tide

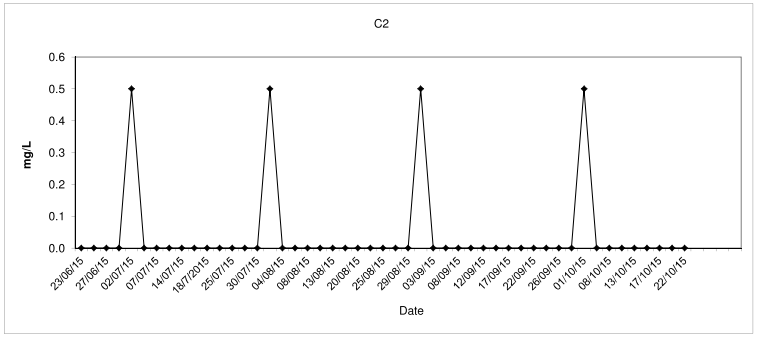


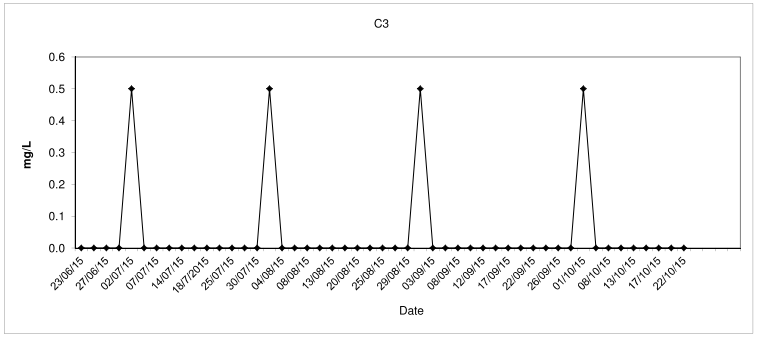




Synthetic Detergent (Depth average) at Mid-Ebb Tide

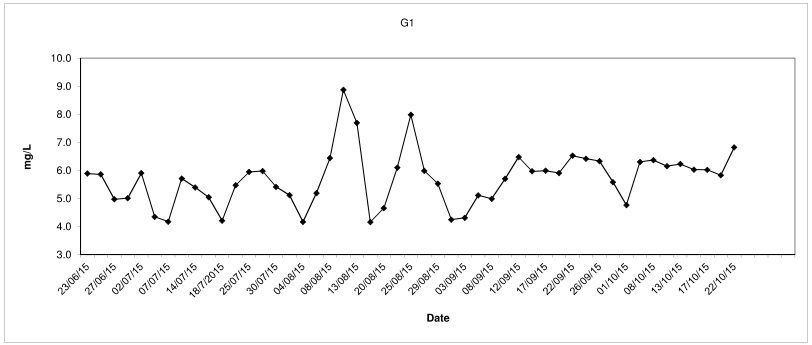


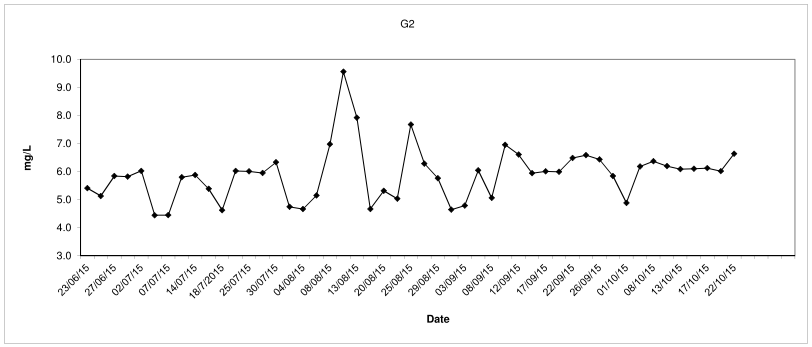


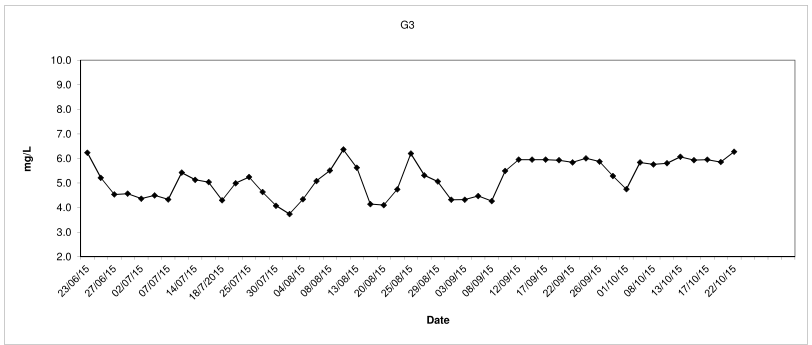


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

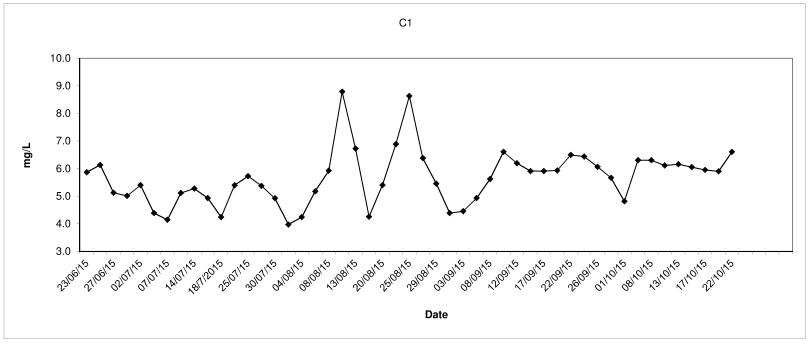
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

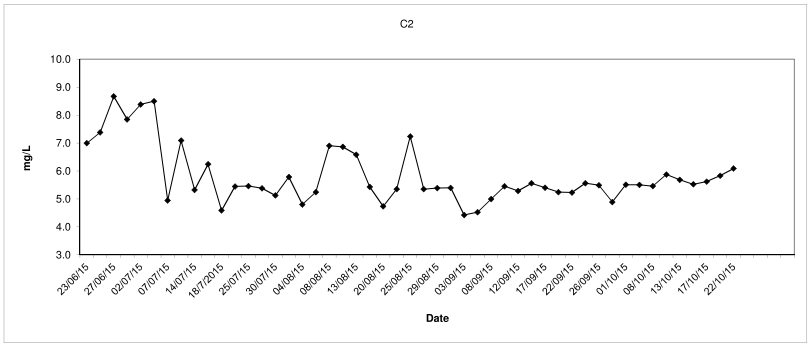


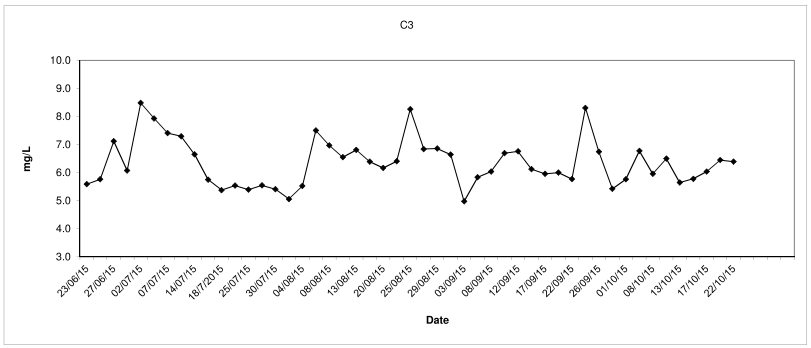




Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

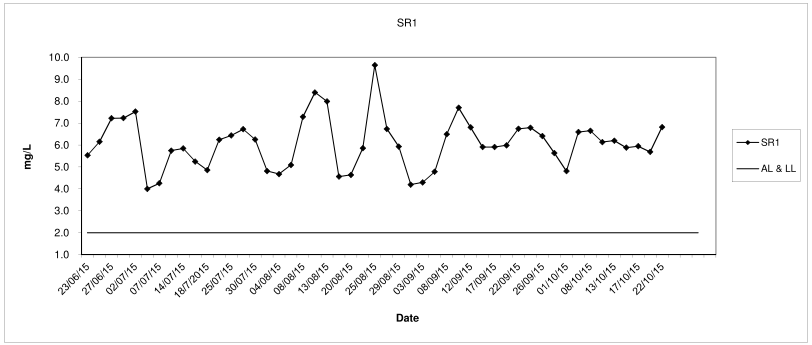


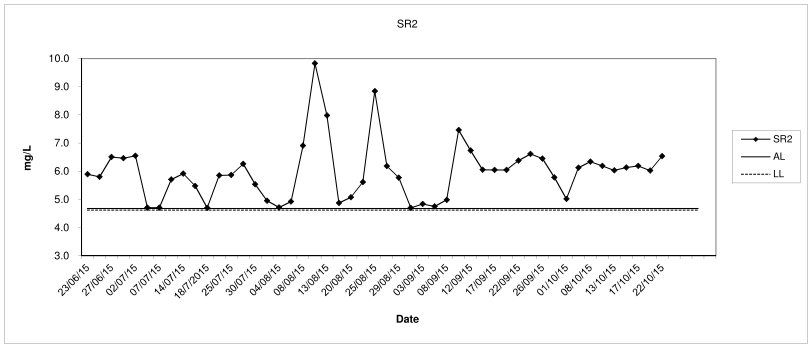


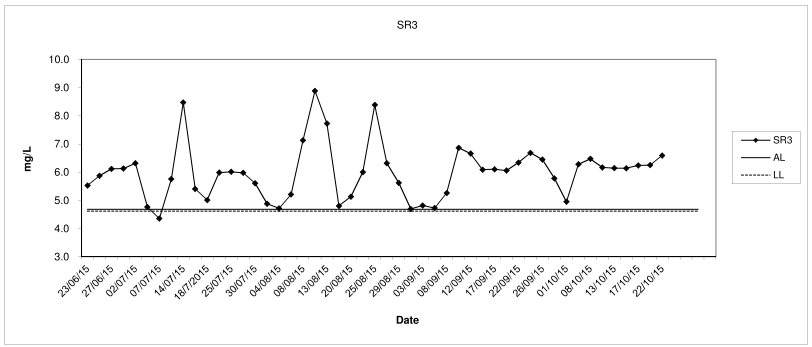


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

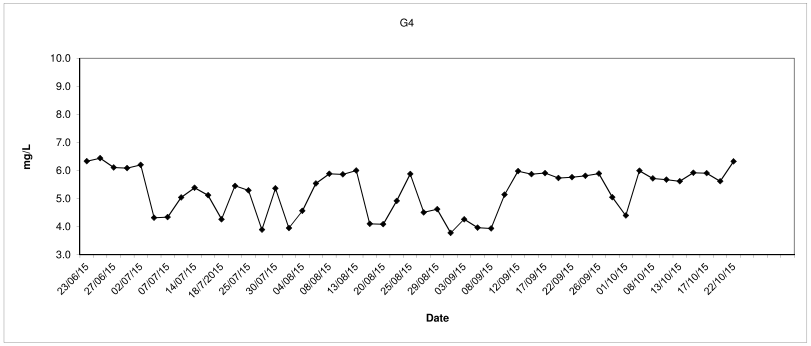
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

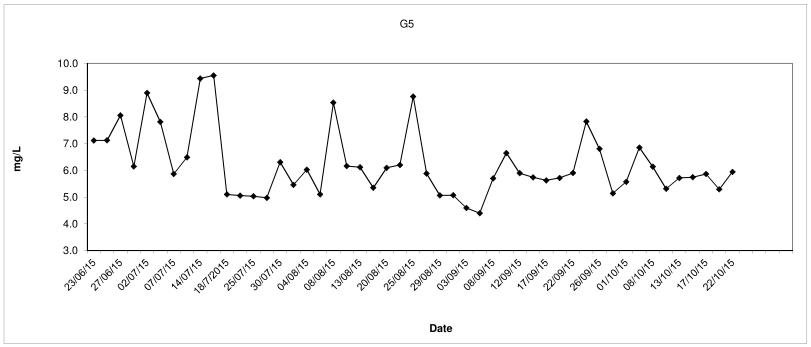


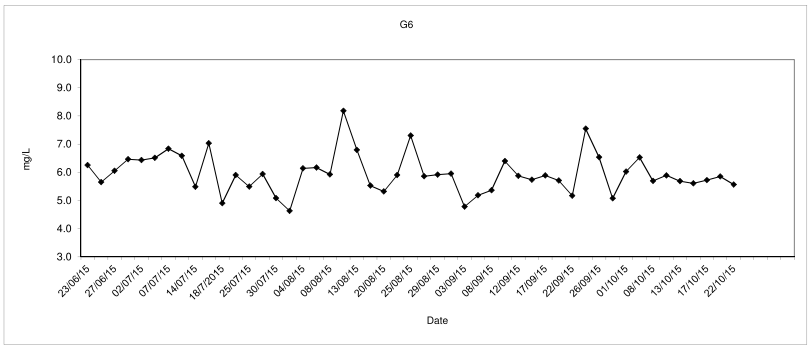




Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

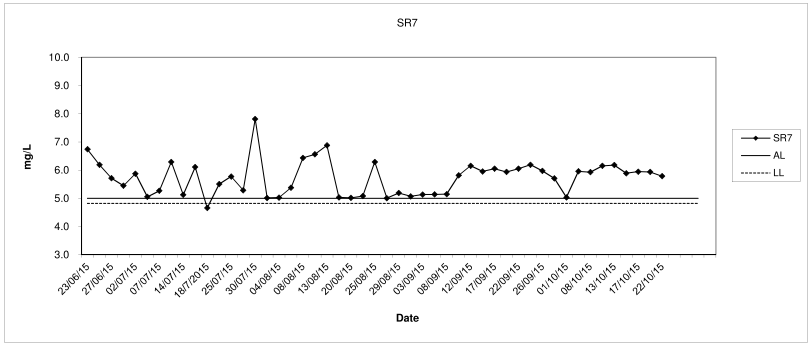


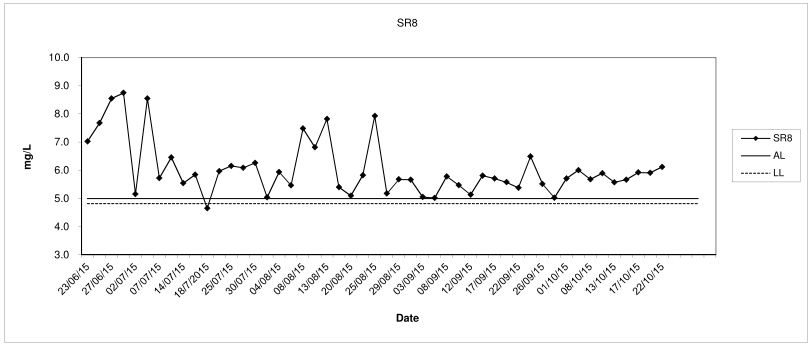


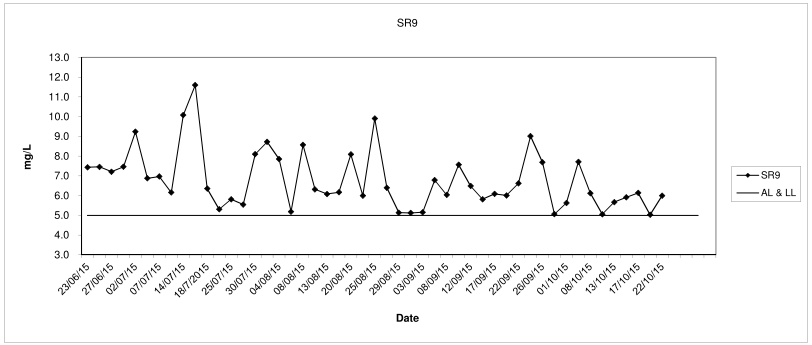


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

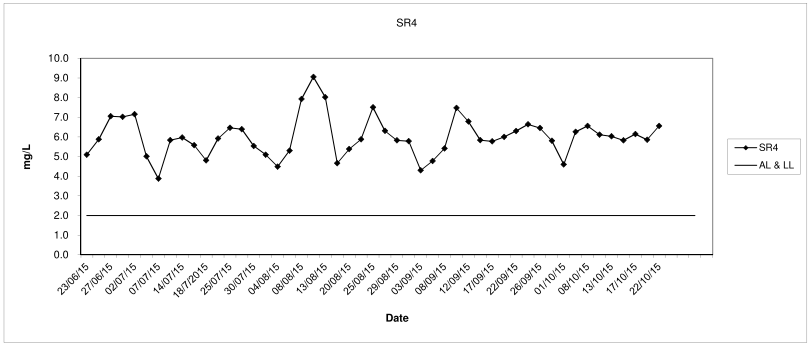
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

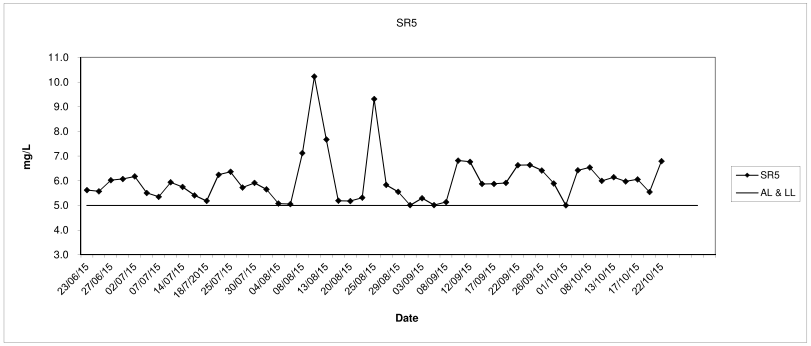


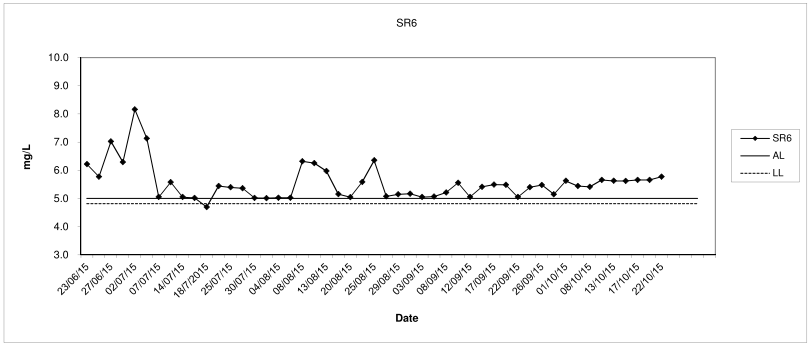




Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide

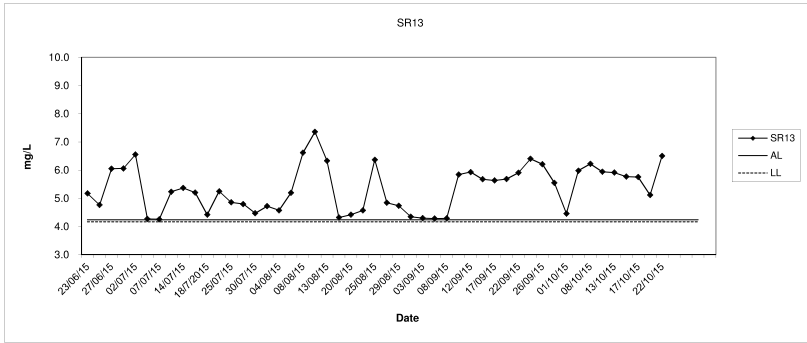




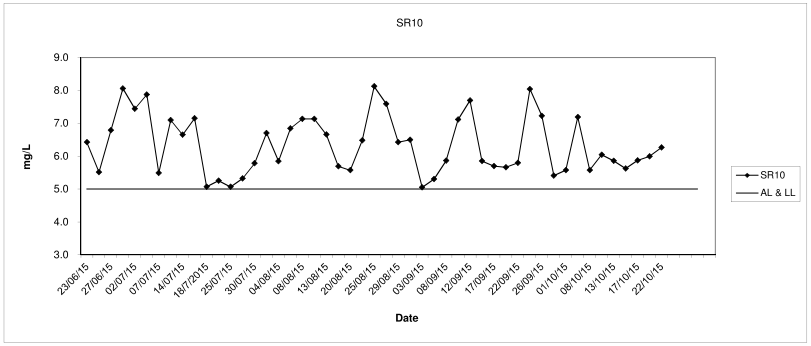


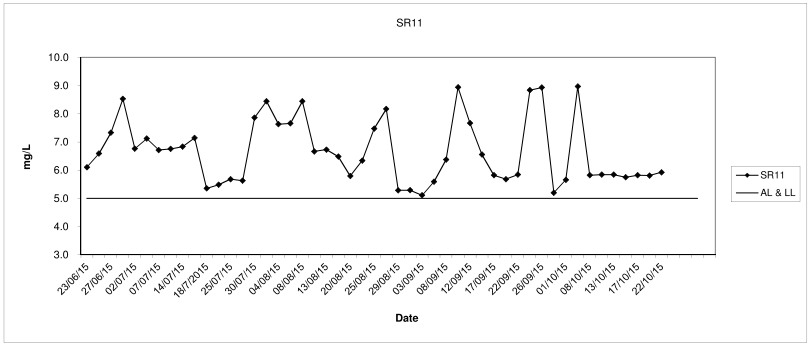
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

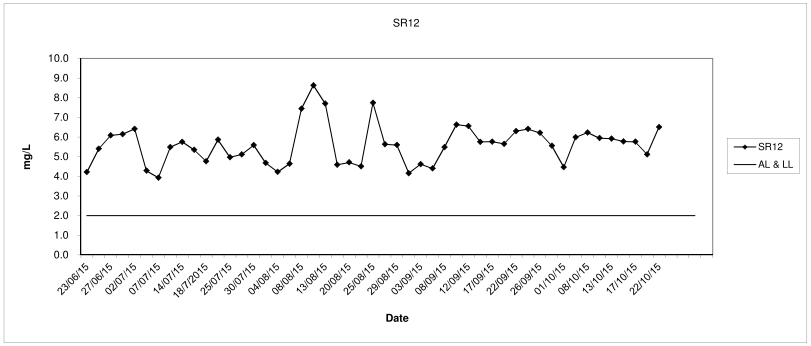
Dissolved Oxygen (Surface and Middle) at Mid-Flood Tide



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

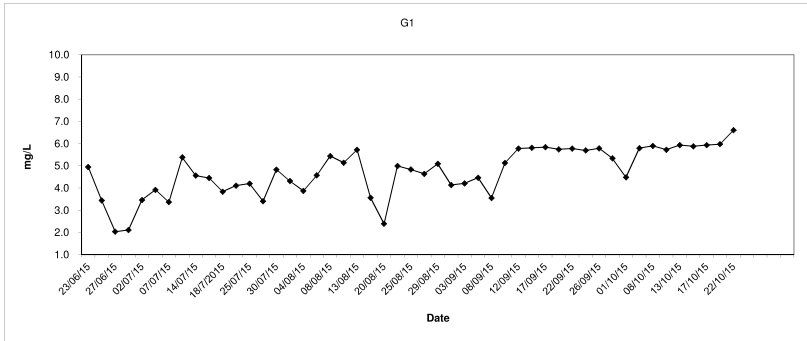


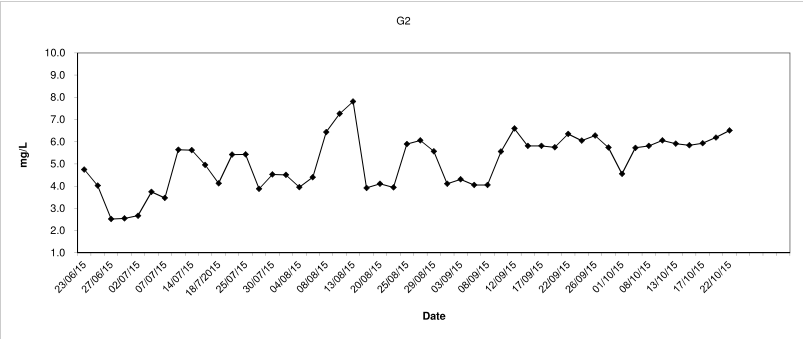


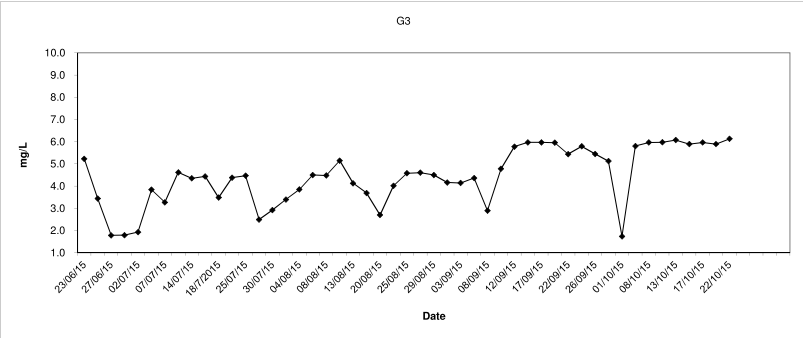


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

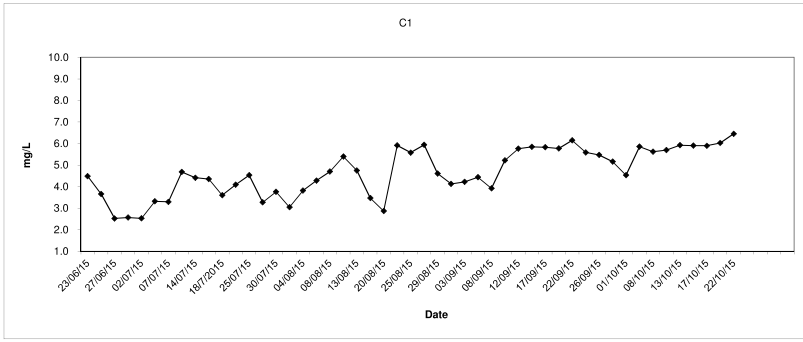
Dissolved Oxygen (Bottom) at Mid-Flood Tide

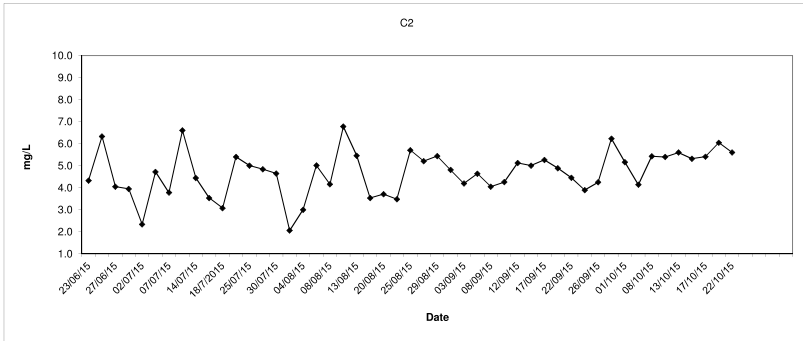


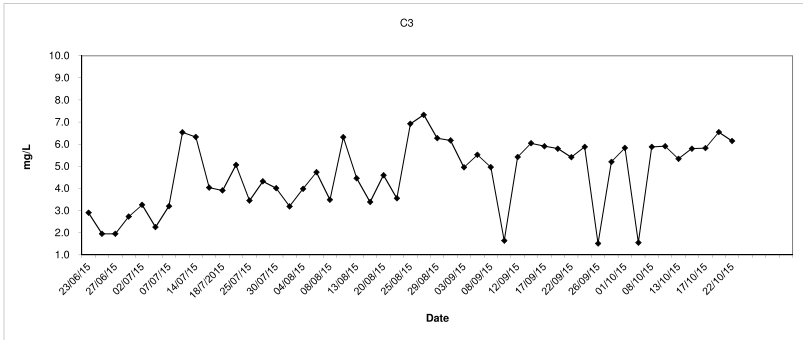




Dissolved Oxygen (Bottom) at Mid-Flood Tide

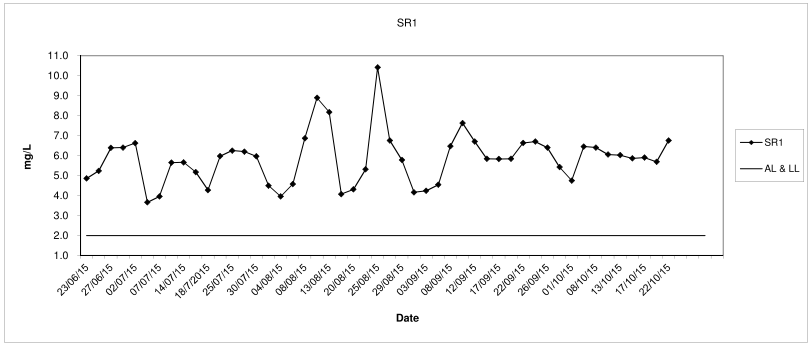


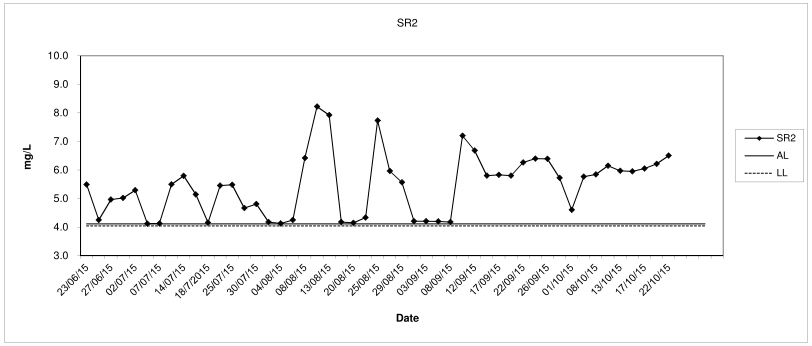


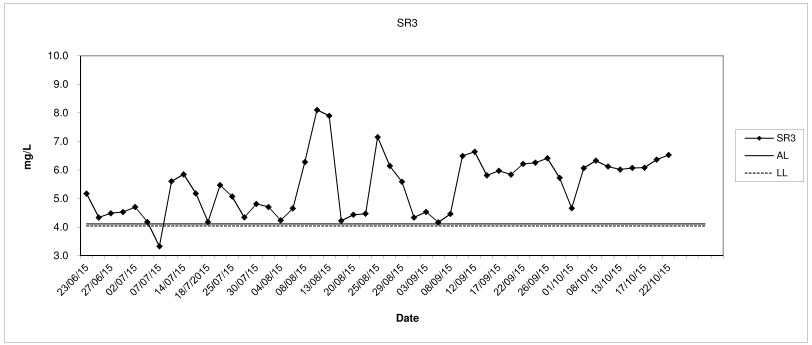


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

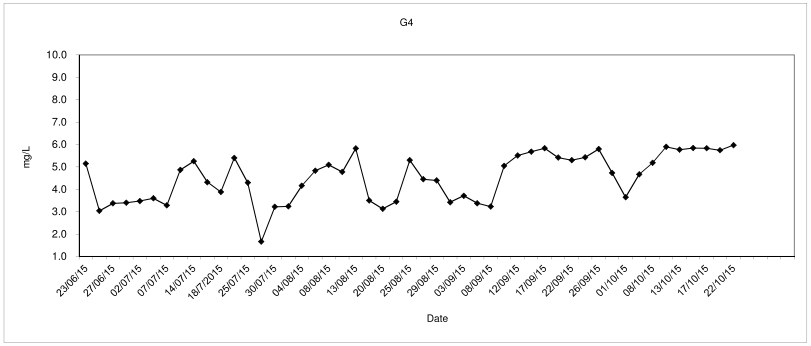
Dissolved Oxygen (Bottom) at Mid-Flood Tide

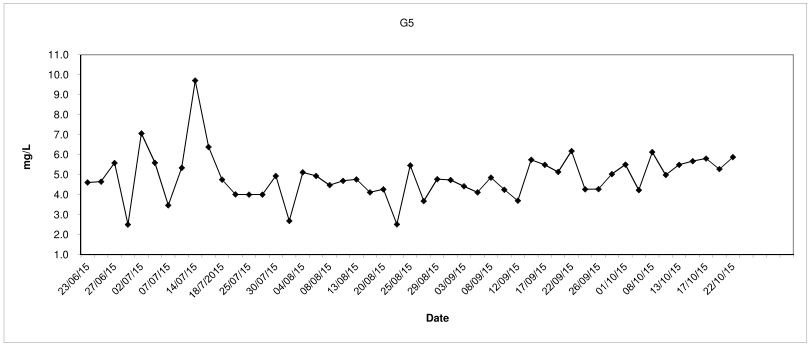


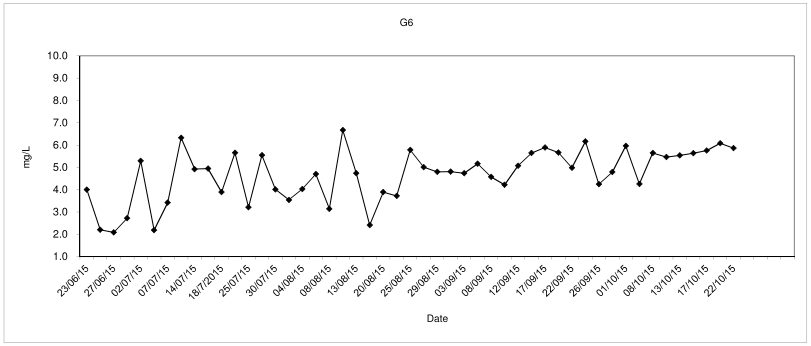




Dissolved Oxygen (Bottom) at Mid-Flood Tide

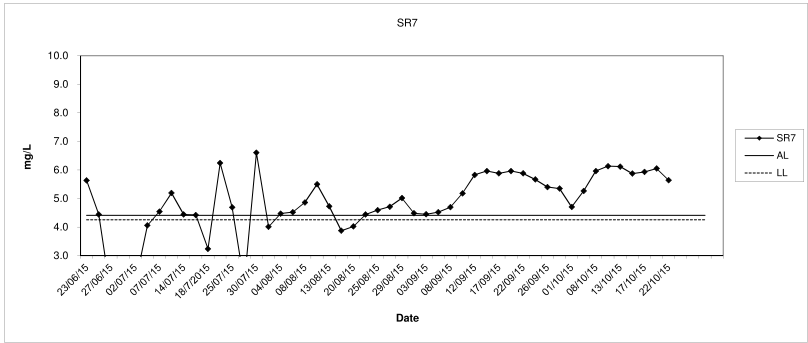


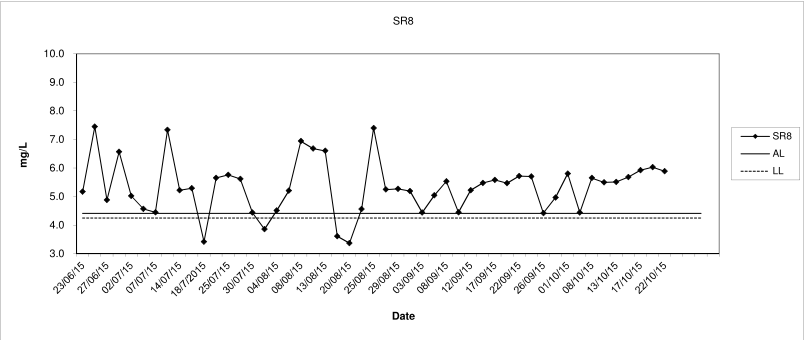


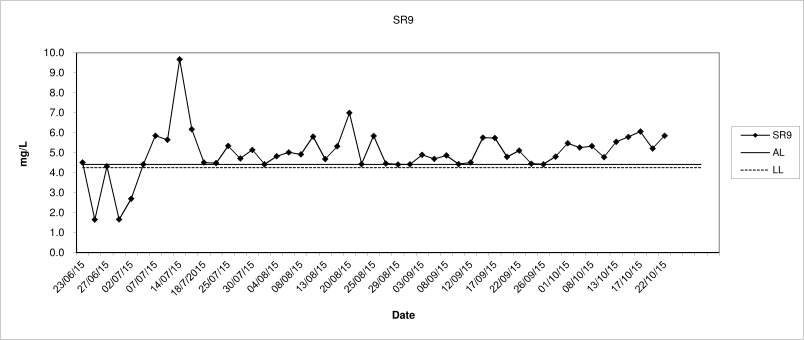


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

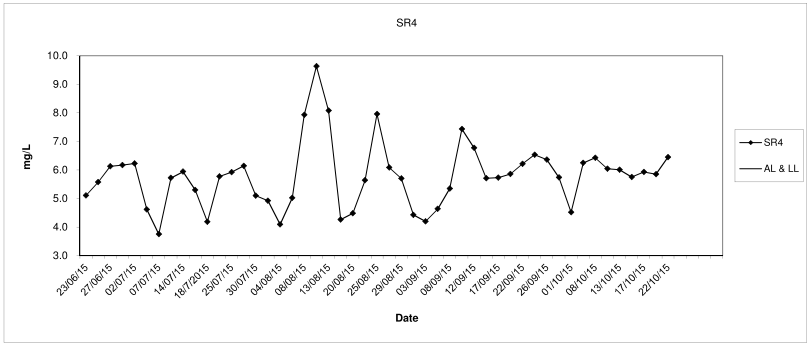
Dissolved Oxygen (Bottom) at Mid-Flood Tide

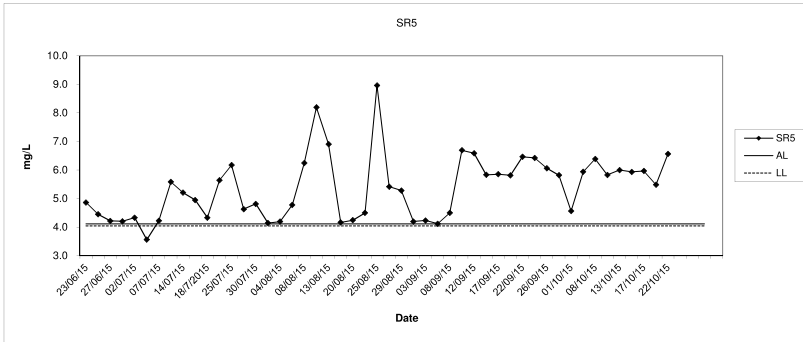


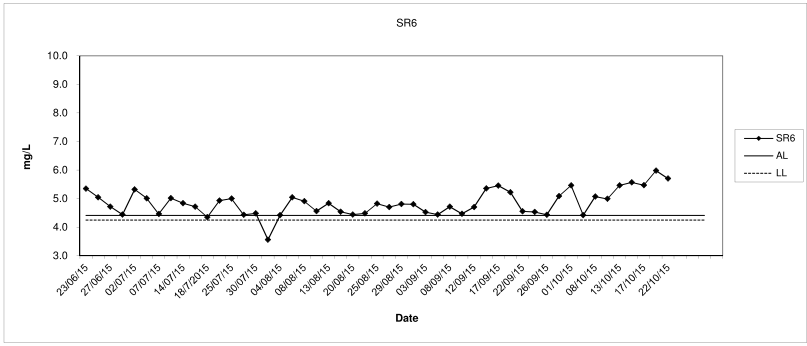




Dissolved Oxygen (Bottom) at Mid-Flood Tide

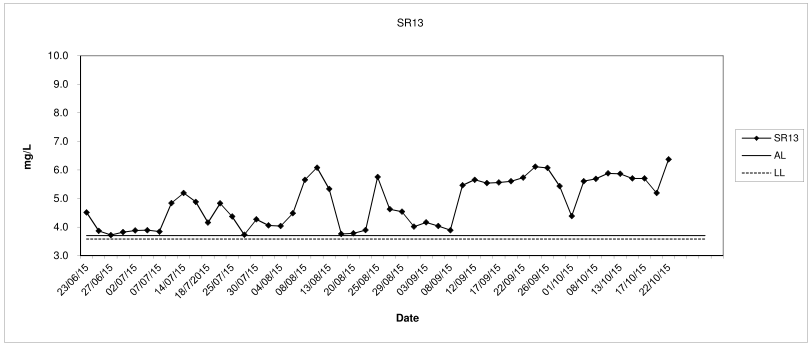




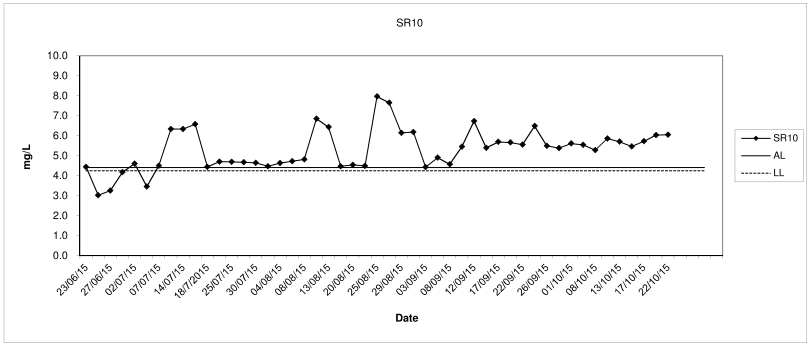


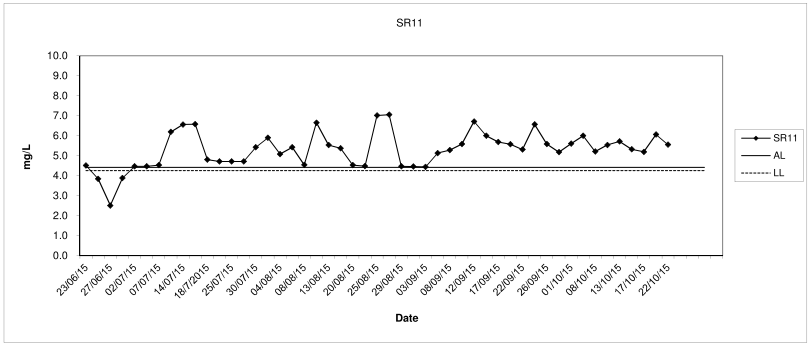
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

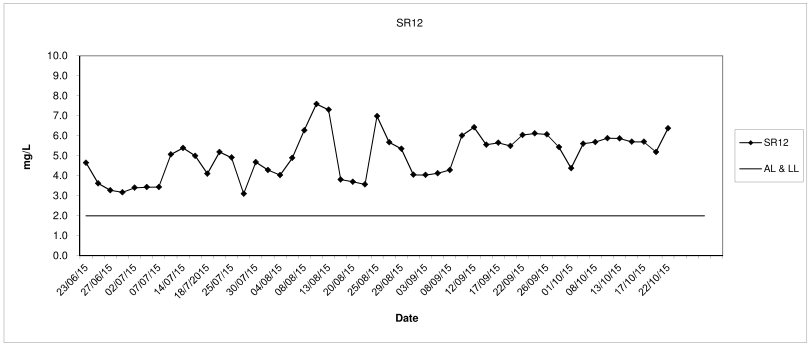
Dissolved Oxygen (Bottom) at Mid-Flood Tide



Dissolved Oxygen (Bottom) at Mid-Flood Tide

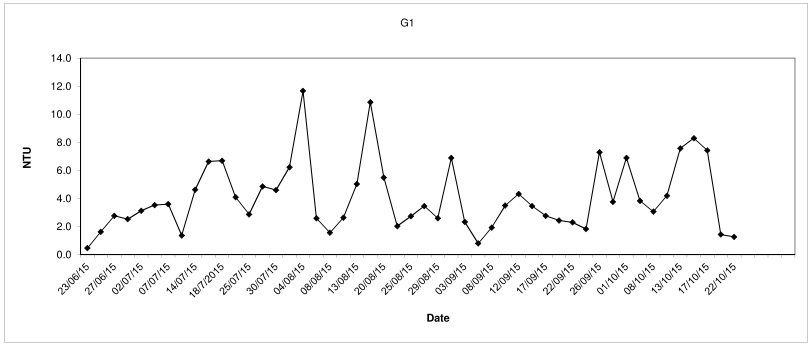


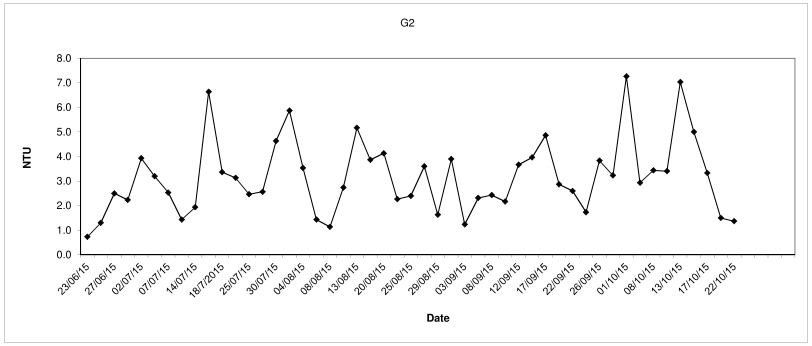


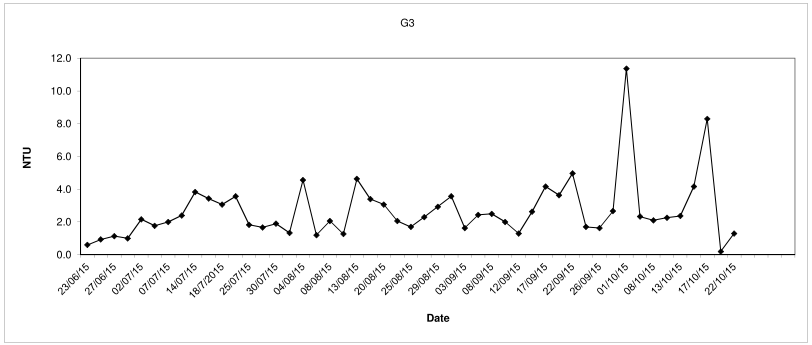


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

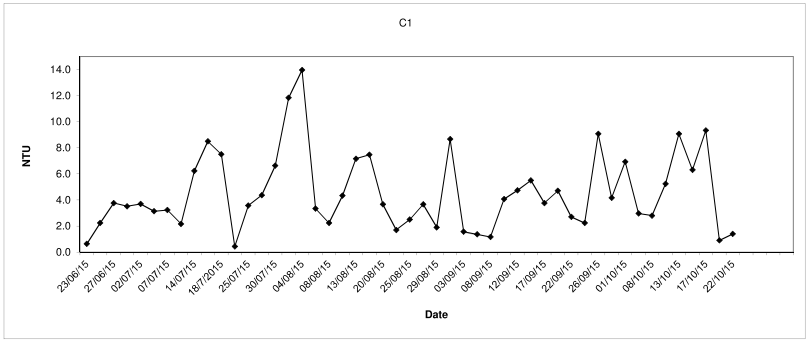
Turbidity (Depth average) at Mid-Flood Tide

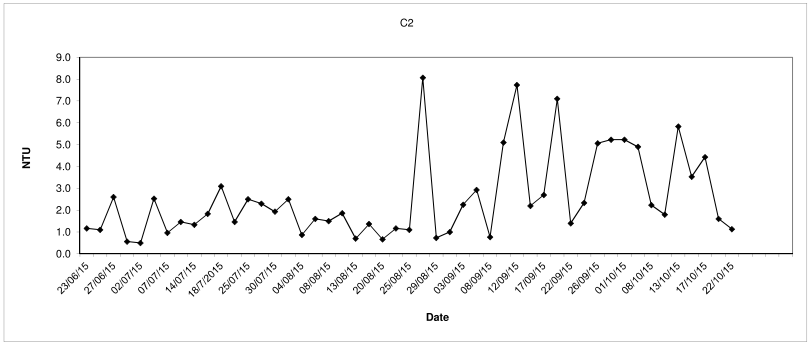


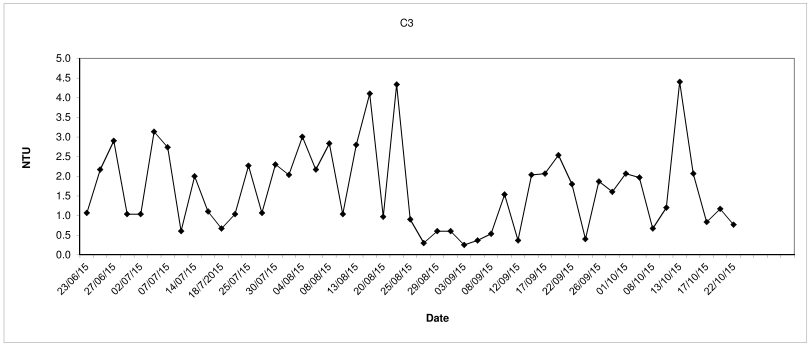




Turbidity (Depth average) at Mid-Flood Tide

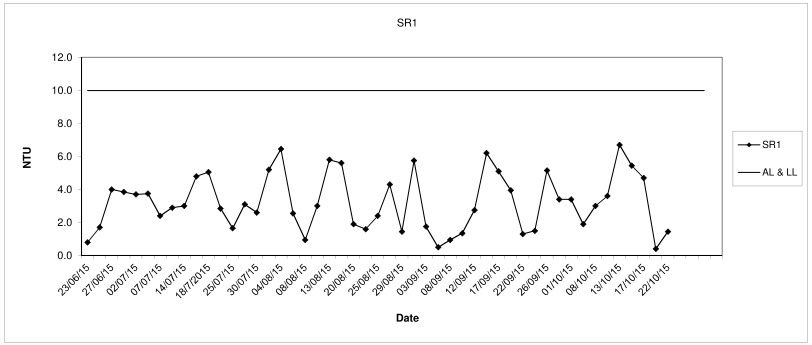


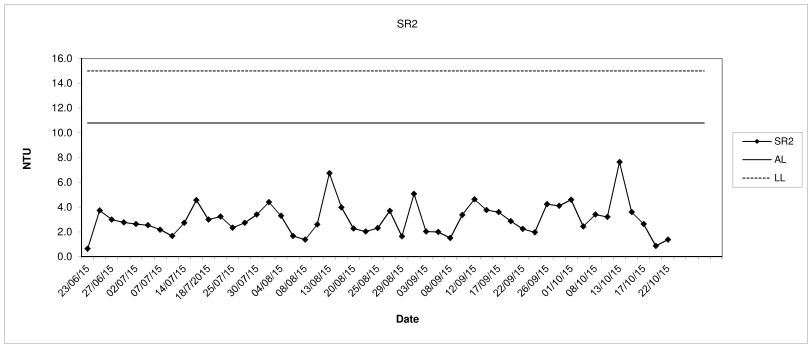


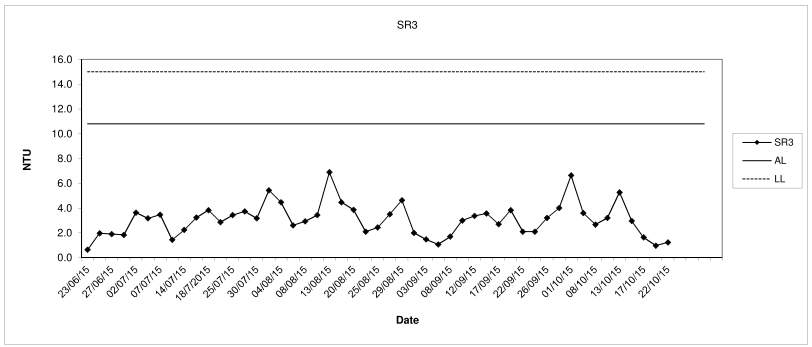


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

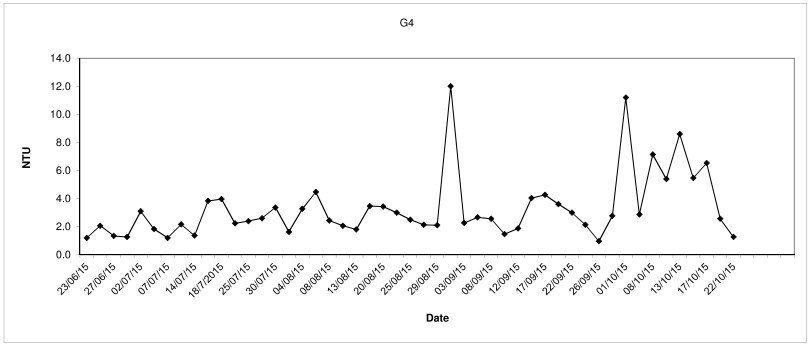
Turbidity (Depth average) at Mid-Flood Tide

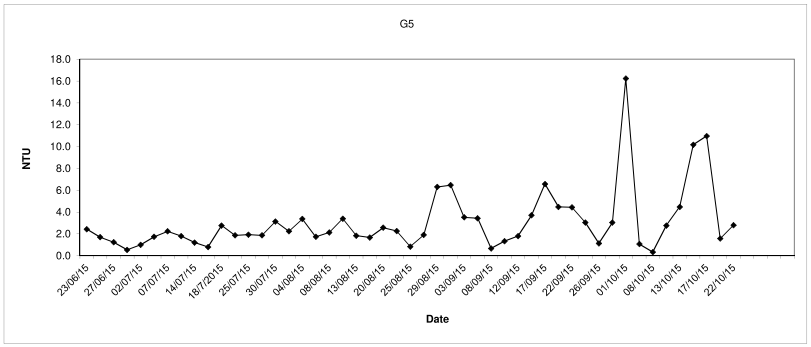


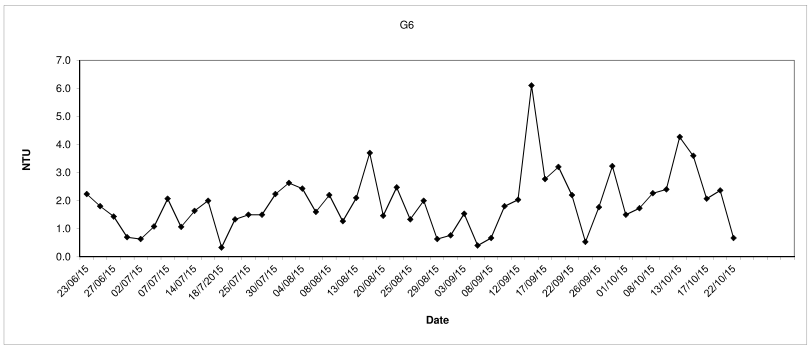




Turbidity (Depth average) at Mid-Flood Tide

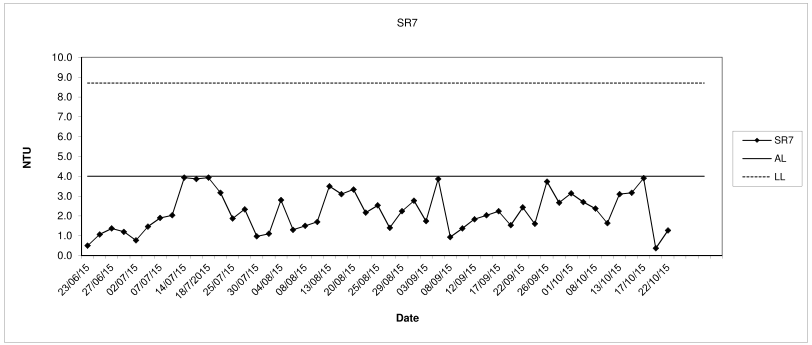


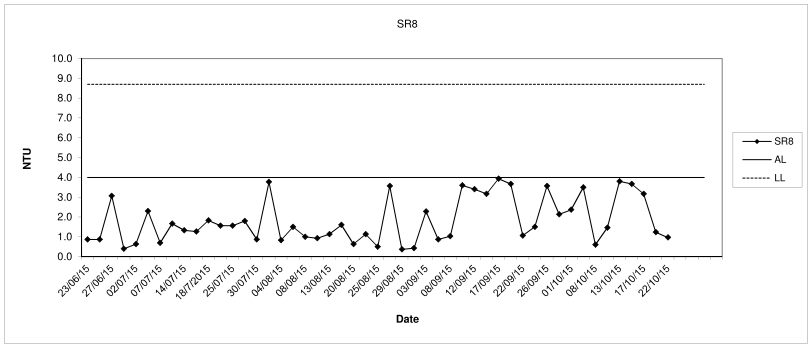


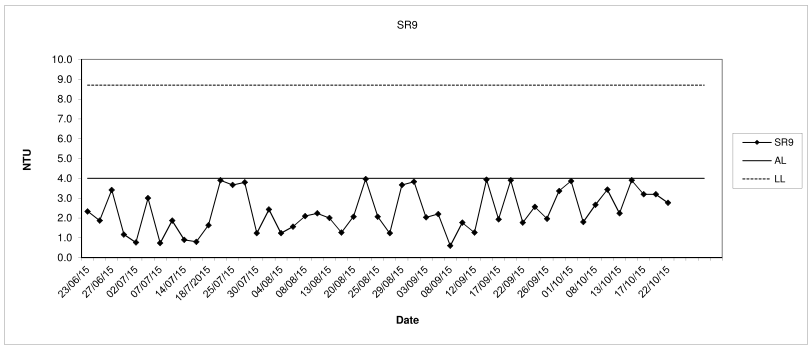


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

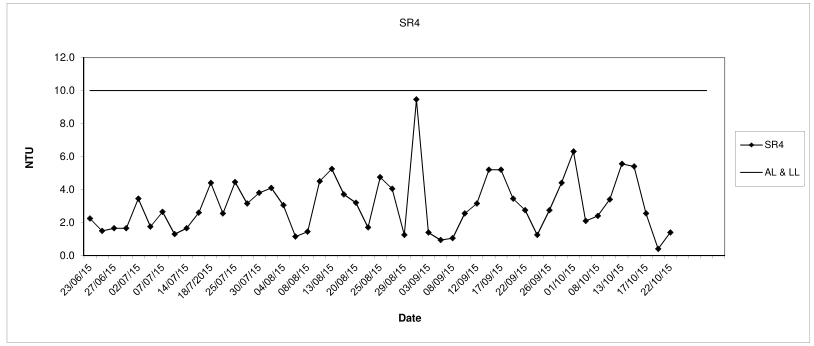
Turbidity (Depth average) at Mid-Flood Tide

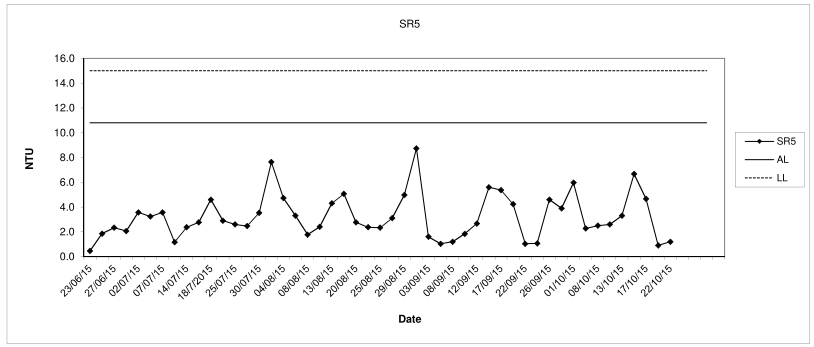


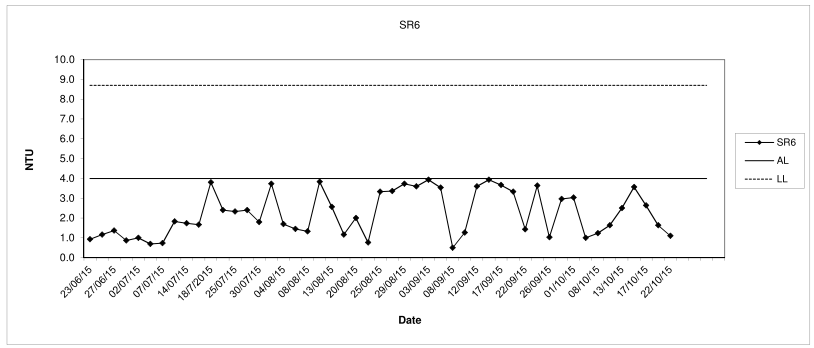




Turbidity (Depth average) at Mid-Flood Tide

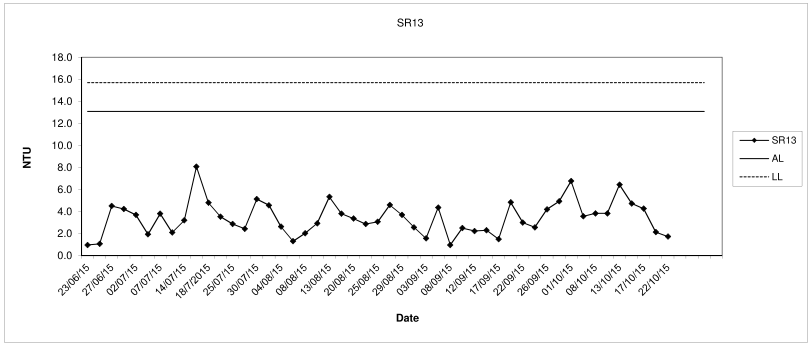




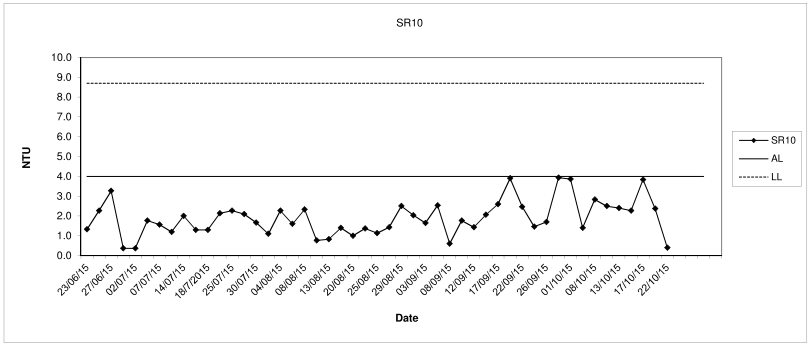


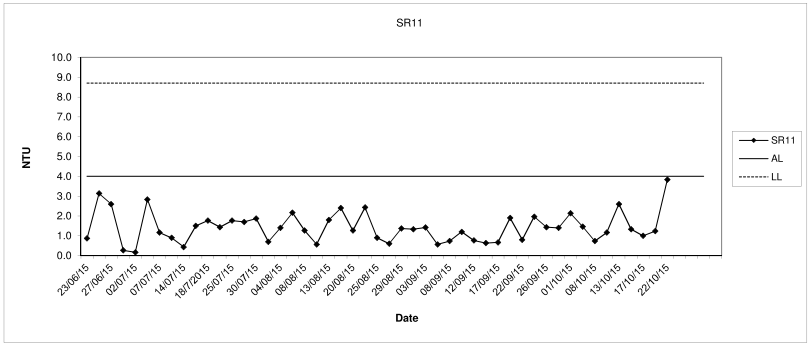
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

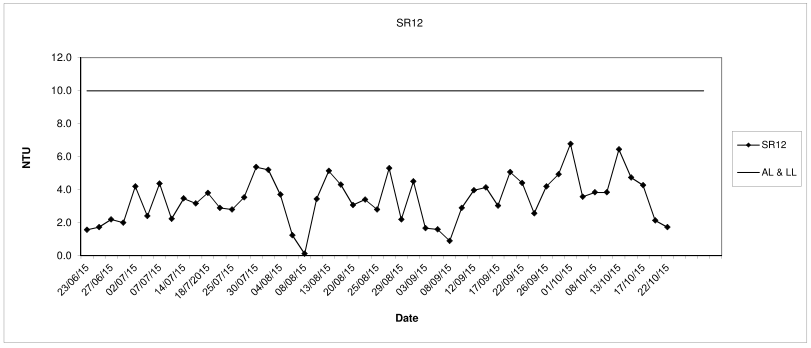
Turbidity (Depth average) at Mid-Flood Tide



Turbidity (Depth average) at Mid-Flood Tide

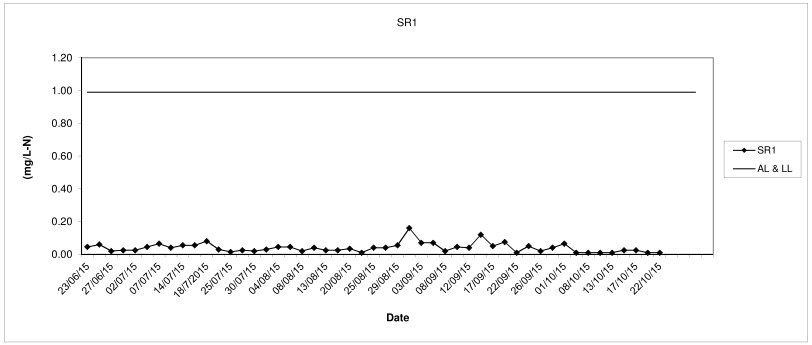


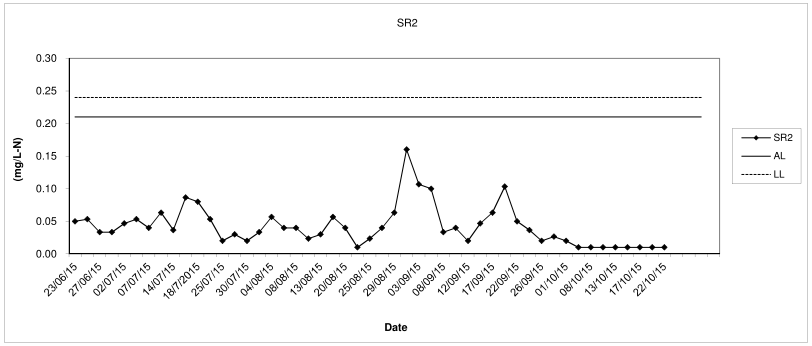


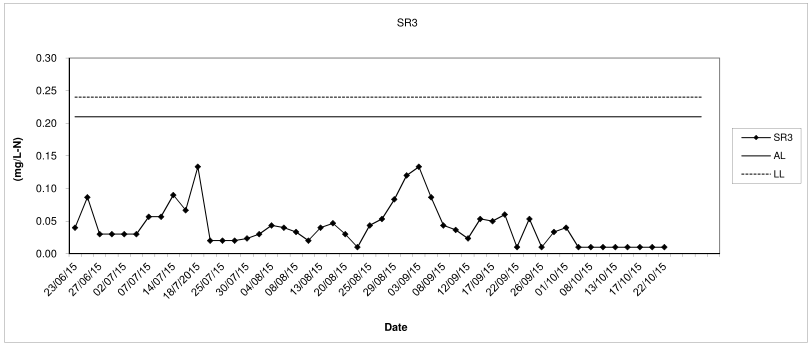


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

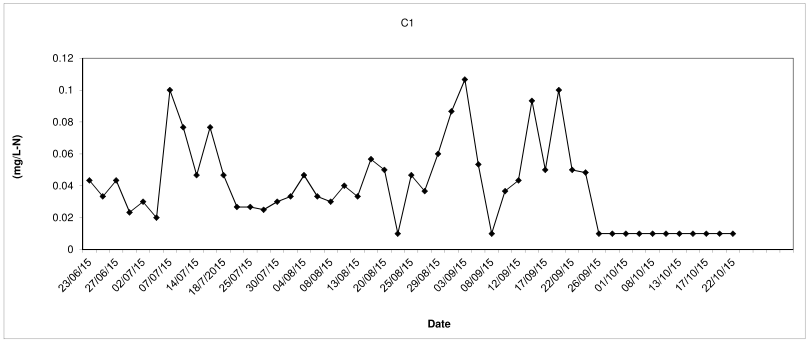
In-situ Ammonia (Depth average) at Mid-Flood Tide

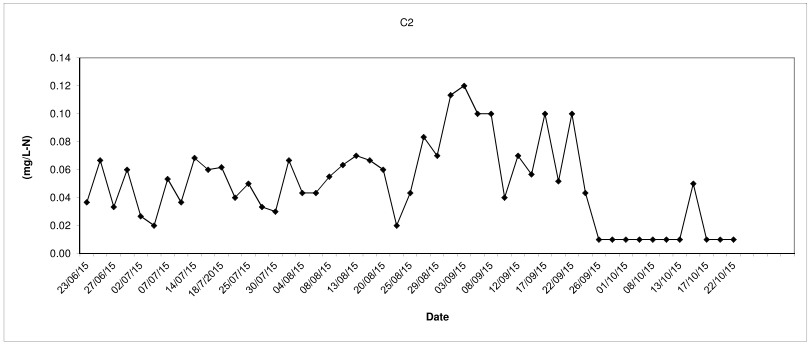


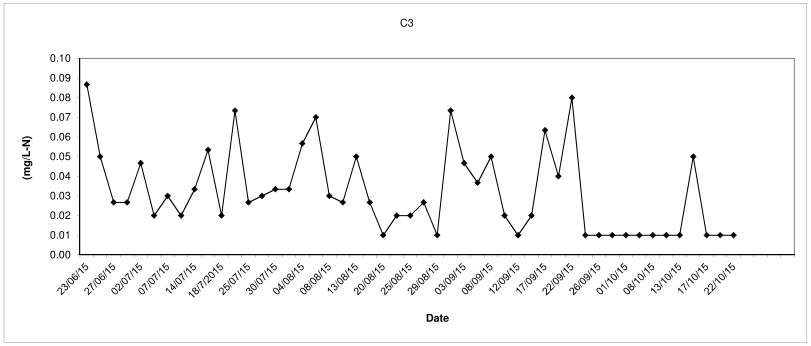




In-situ Ammonia (Depth average) at Mid-Flood Tide

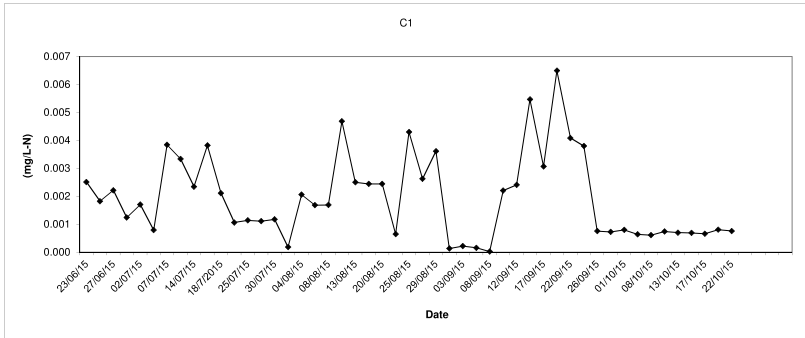


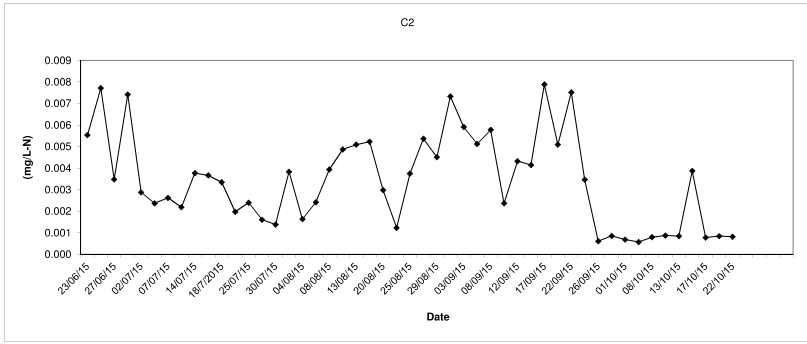


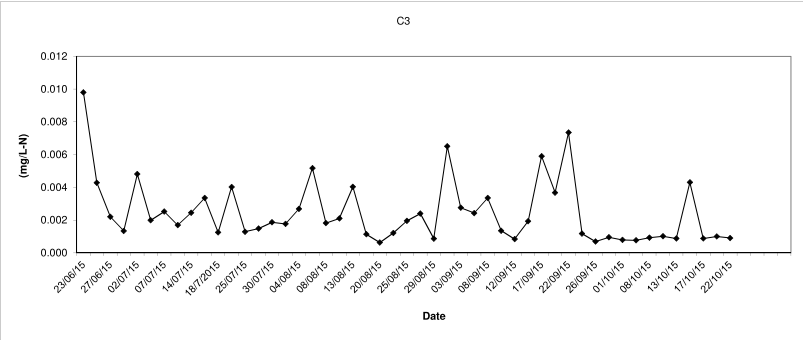


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

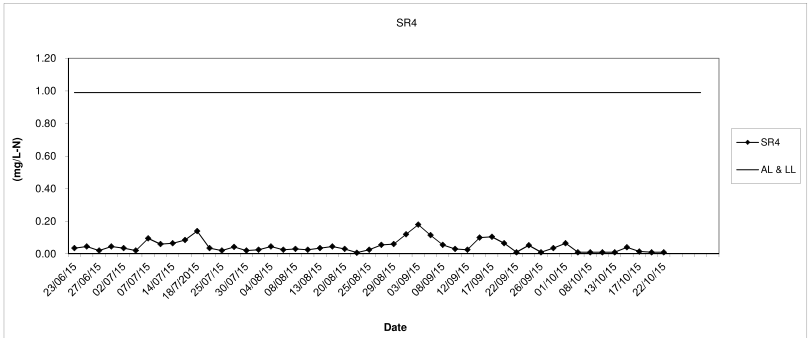
In-situ UIA (Depth average) at Mid-Flood Tide

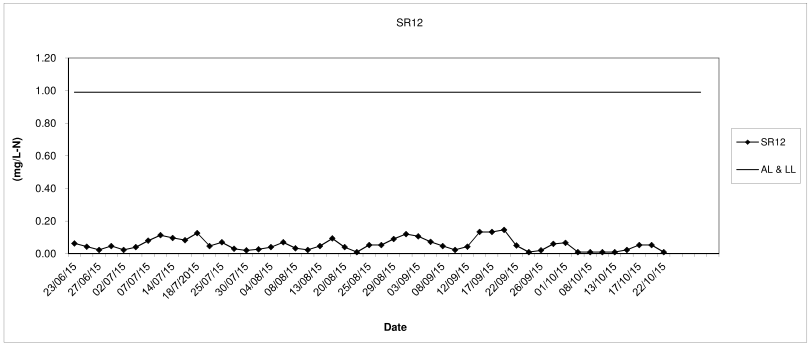






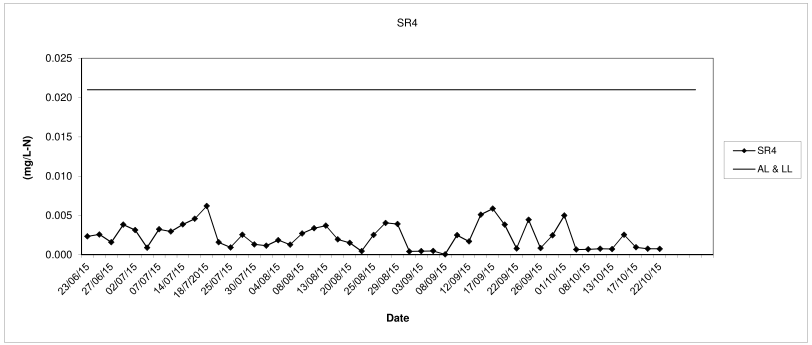
In-situ Ammonia (Depth average) at Mid-Flood Tide

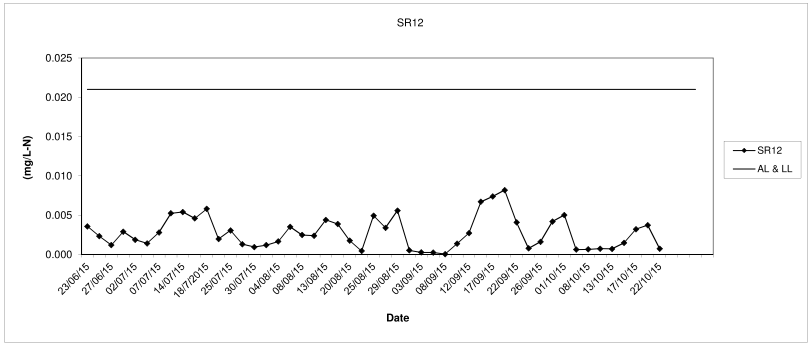




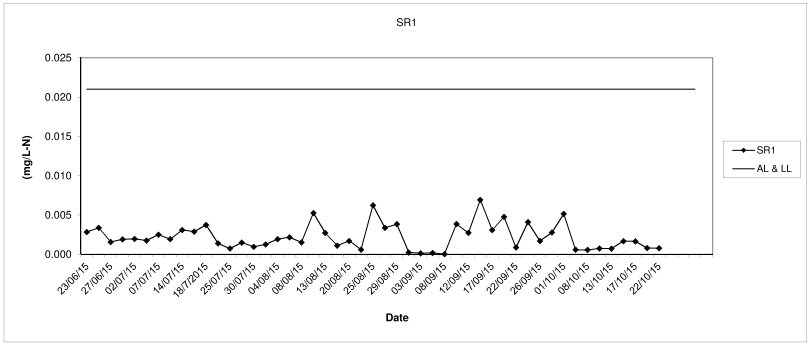
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

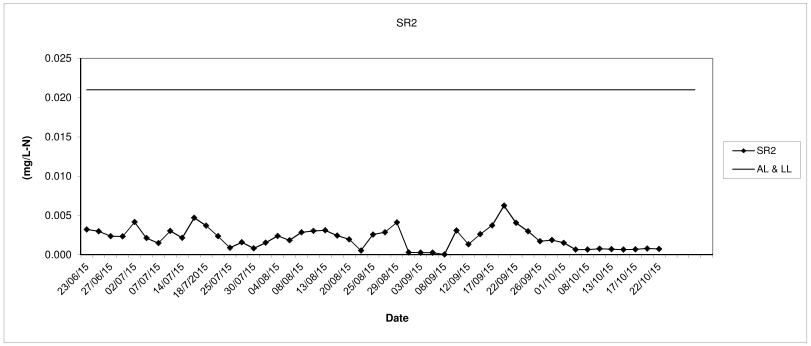
In-situ UIA (Depth average) at Mid-Flood Tide

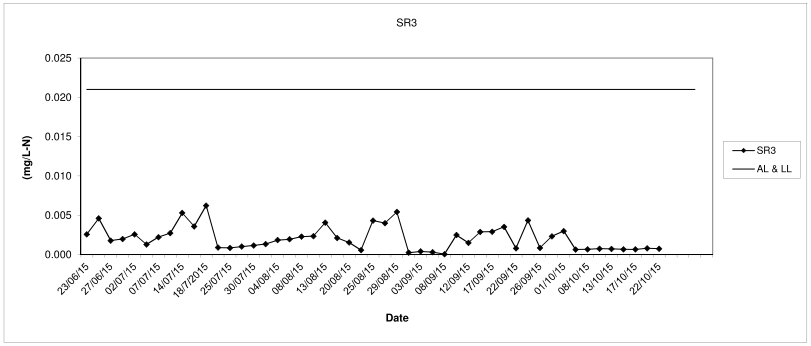




In-situ UIA (Depth average) at Mid-Flood Tide

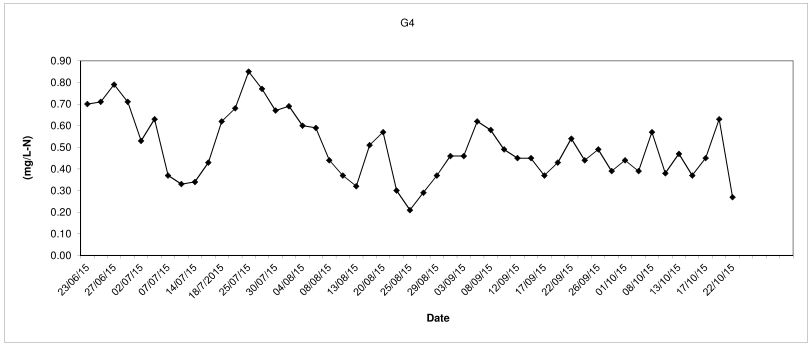


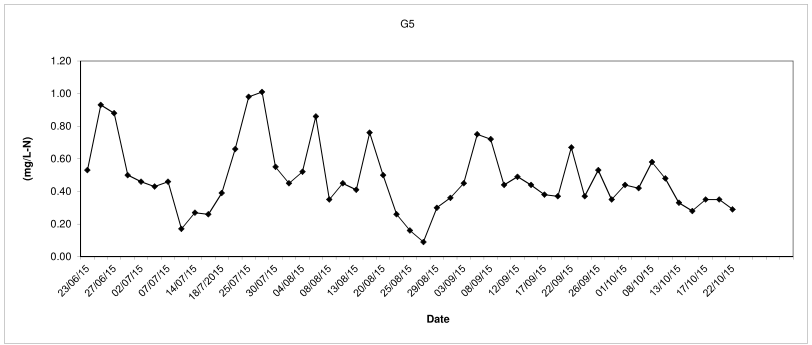


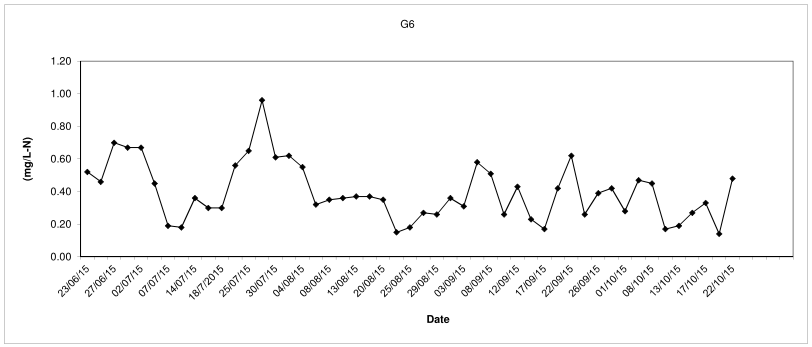


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

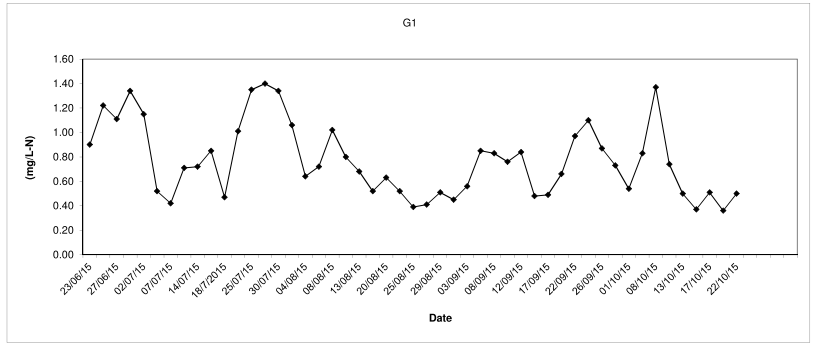
In-situ TIN (Depth average) at Mid-Flood Tide

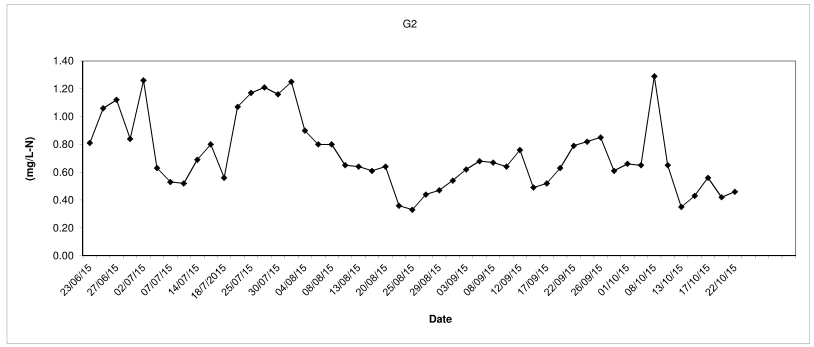


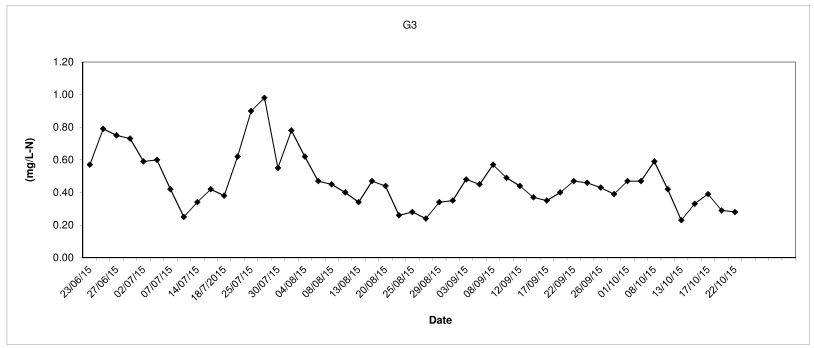




In-situ TIN (Depth average) at Mid-Flood Tide

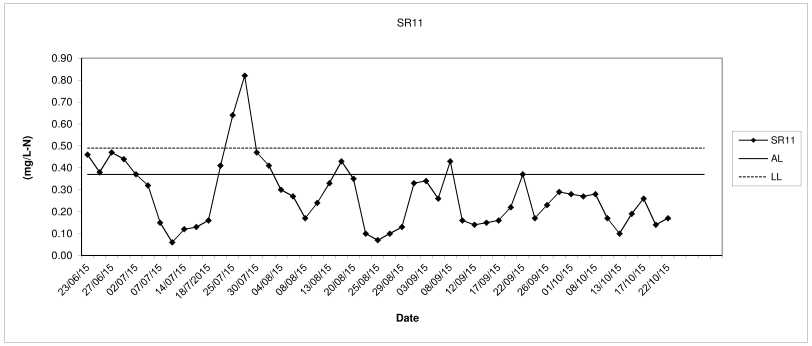




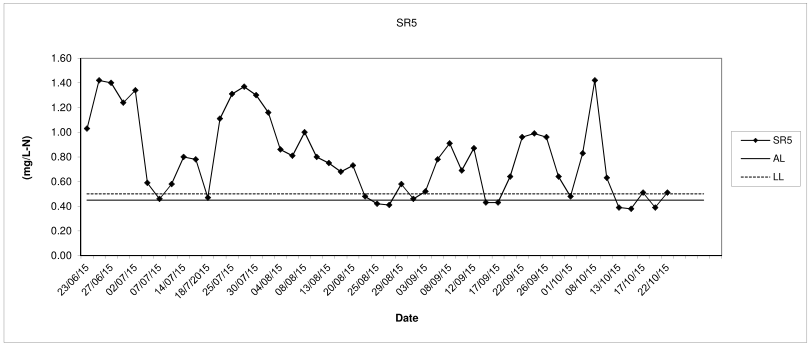


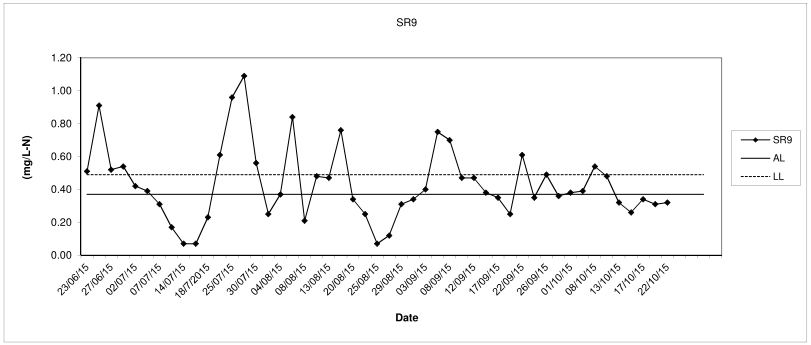
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

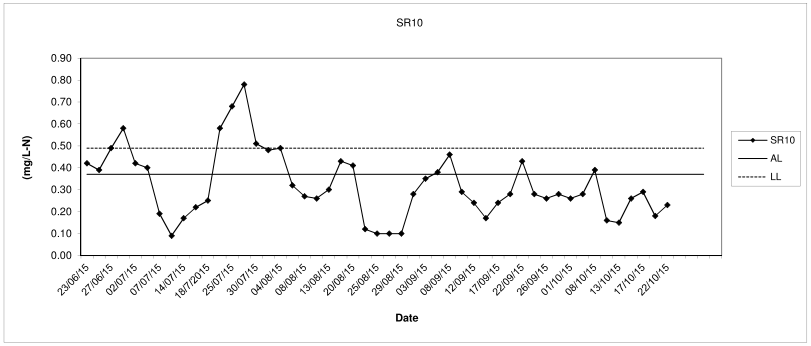
In-situ TIN (Depth average) at Mid-Flood Tide



In-situ TIN (Depth average) at Mid-Flood Tide

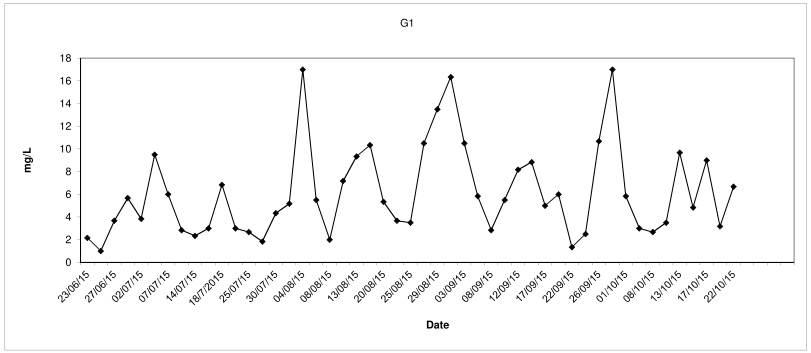


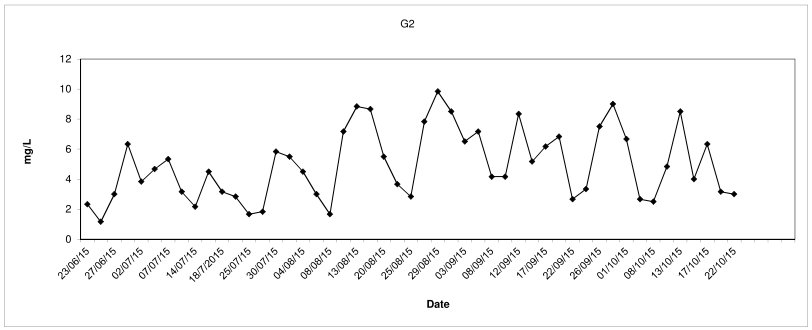


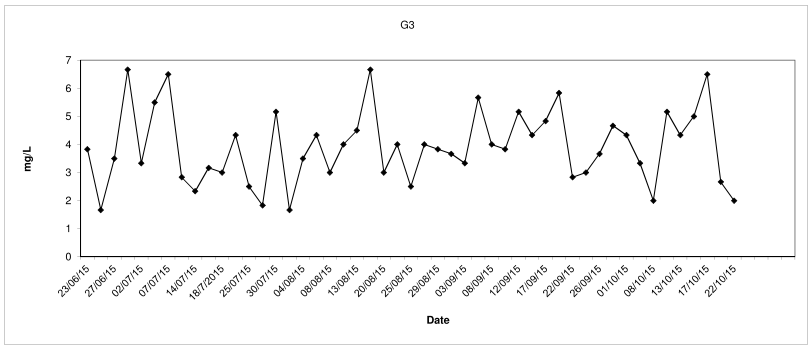


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

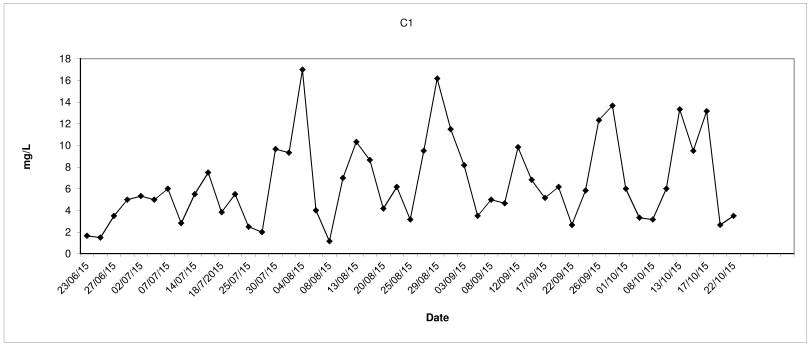
Total Suspended Solids (Depth average) at Mid-Flood Tide

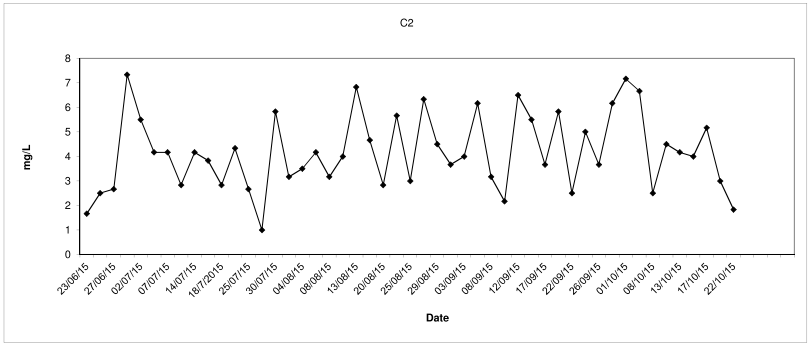


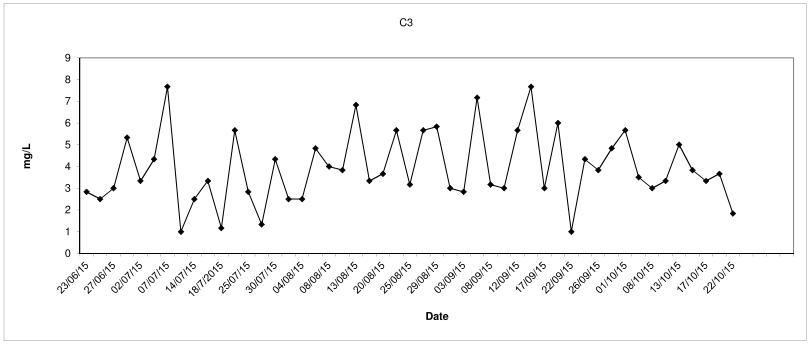




Total Suspended Solids (Depth average) at Mid-Flood Tide

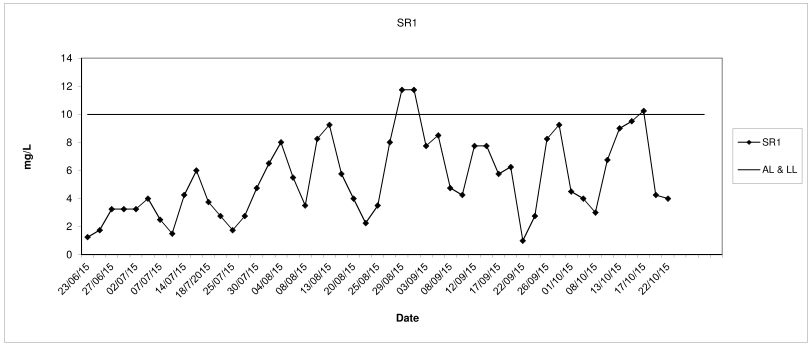


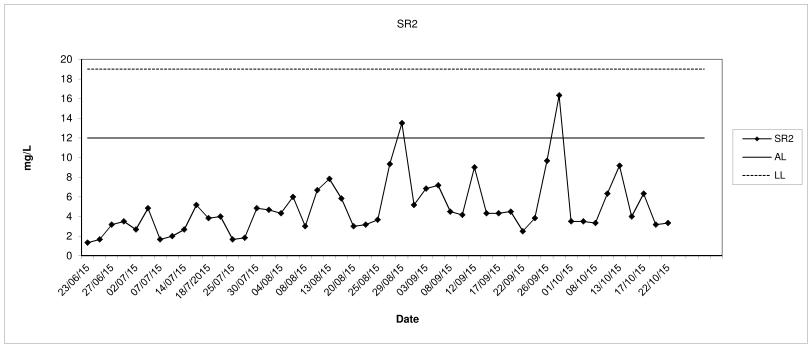


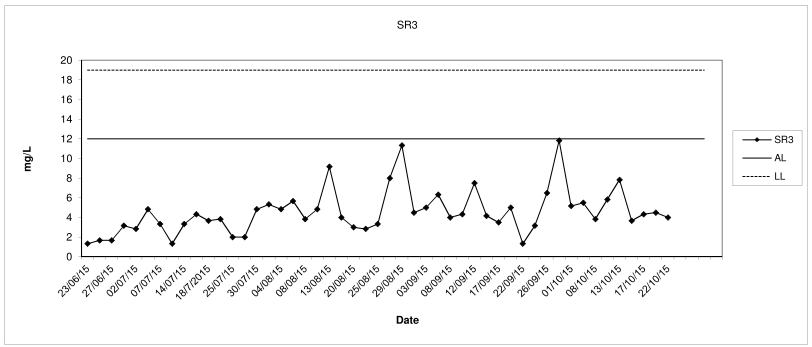


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

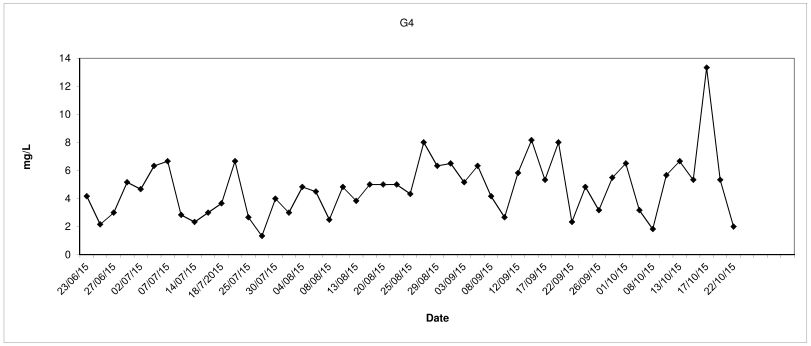
Total Suspended Solids (Depth average) at Mid-Flood Tide

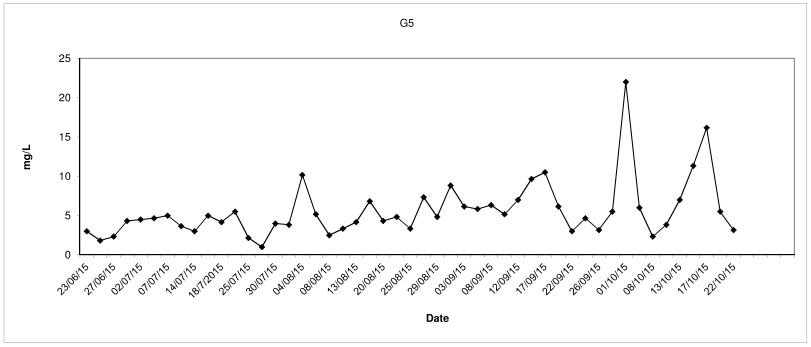


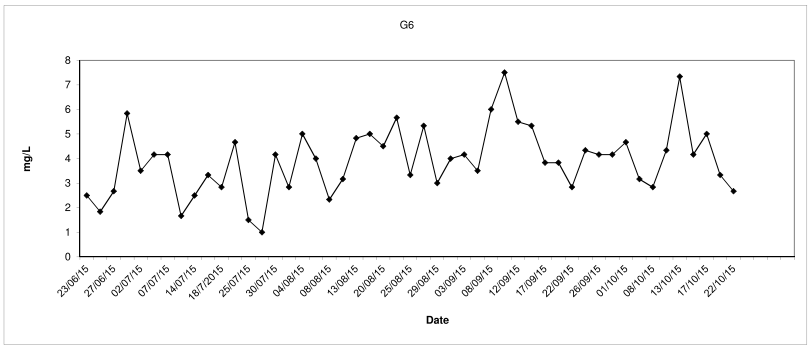




Total Suspended Solids (Depth average) at Mid-Flood Tide

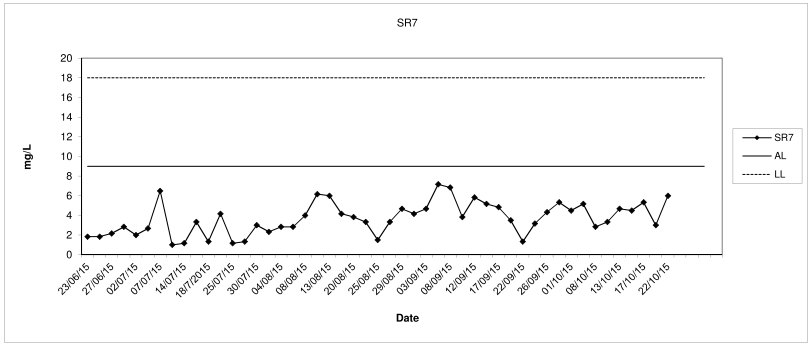


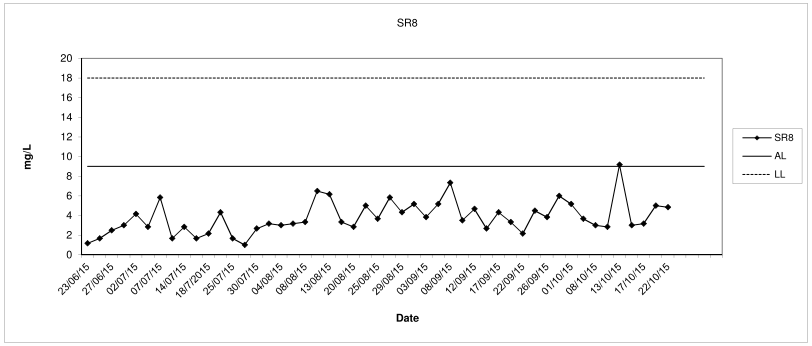


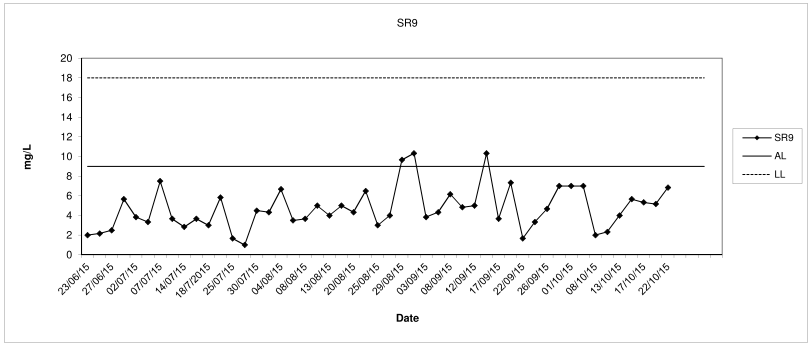


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

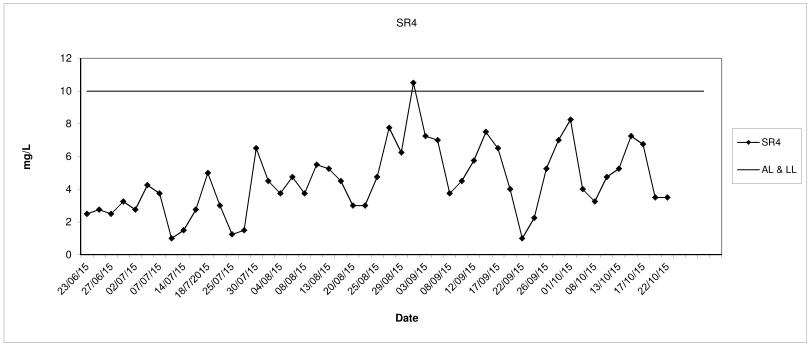
Total Suspended Solids (Depth average) at Mid-Flood Tide

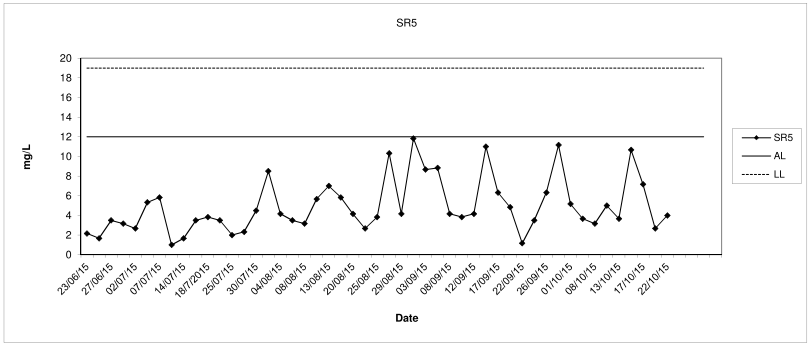


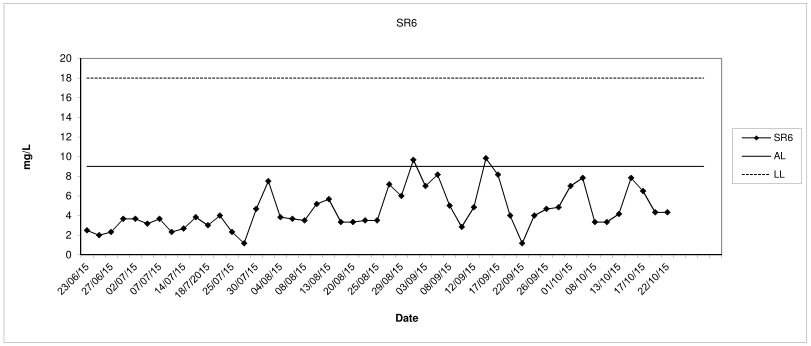




Total Suspended Solids (Depth average) at Mid-Flood Tide

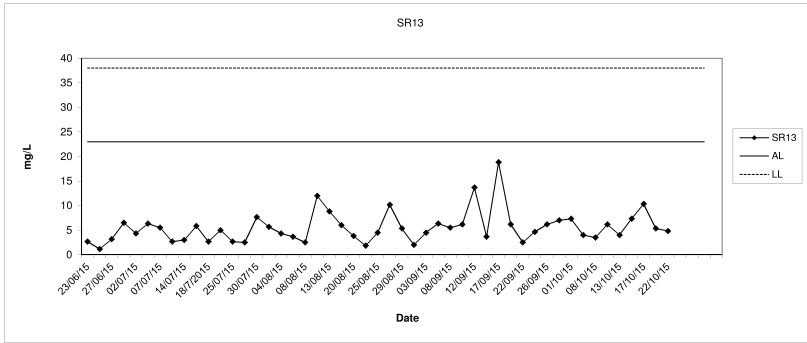




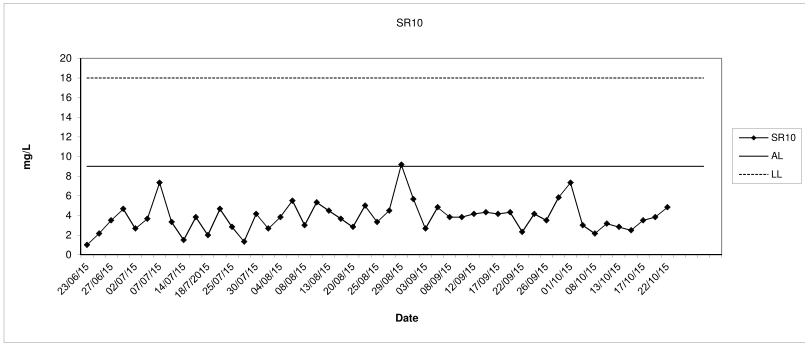


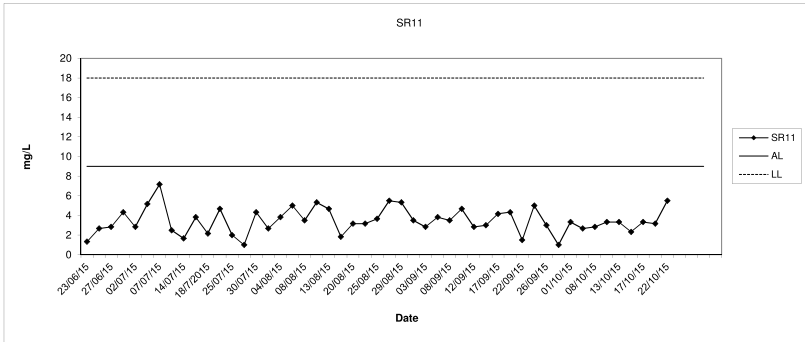
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

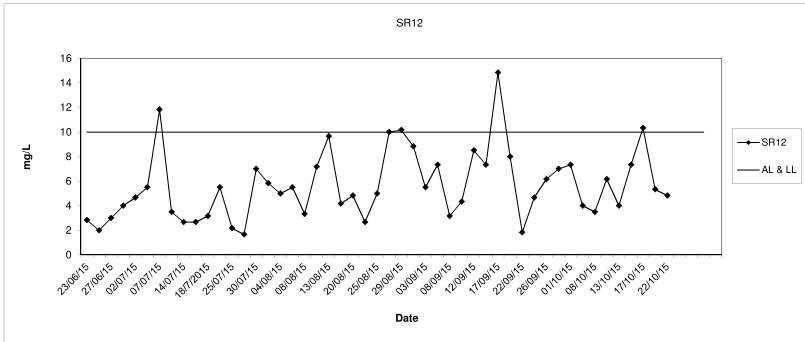
Total Suspended Solids (Depth average) at Mid-Flood Tide



Total Suspended Solids (Depth average) at Mid-Flood Tide

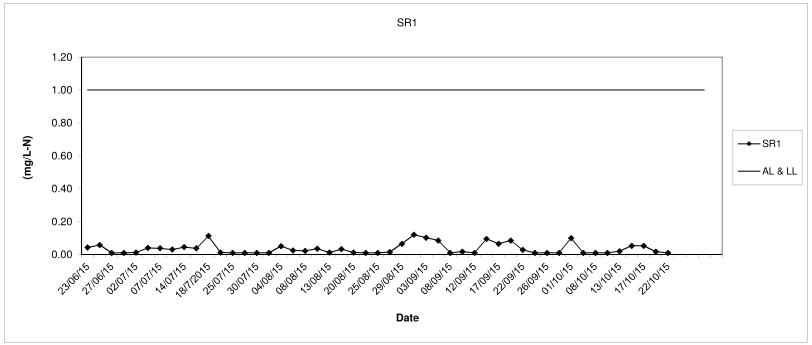


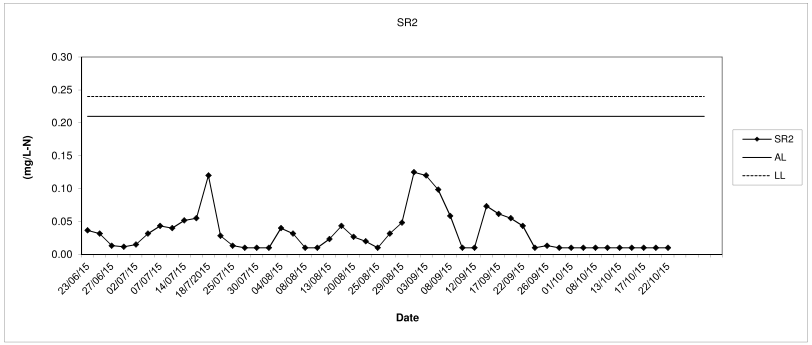


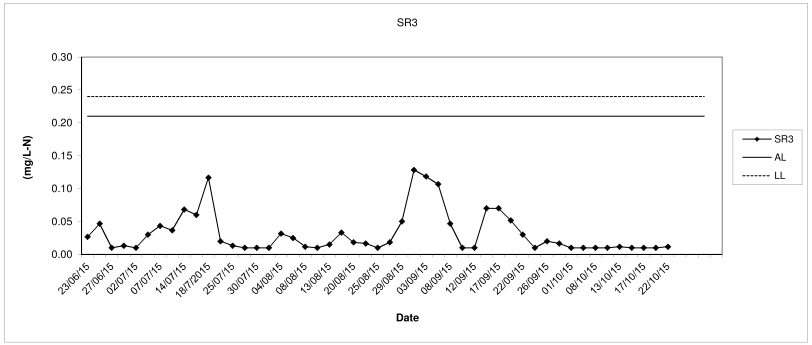


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

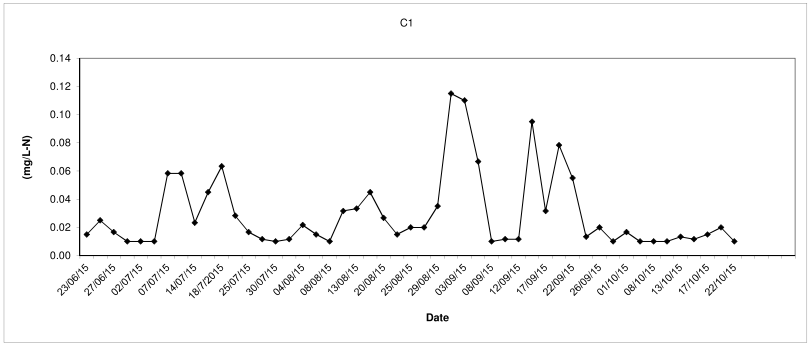
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

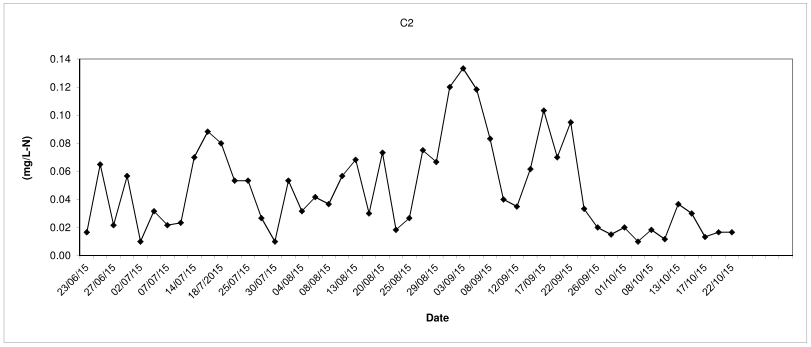


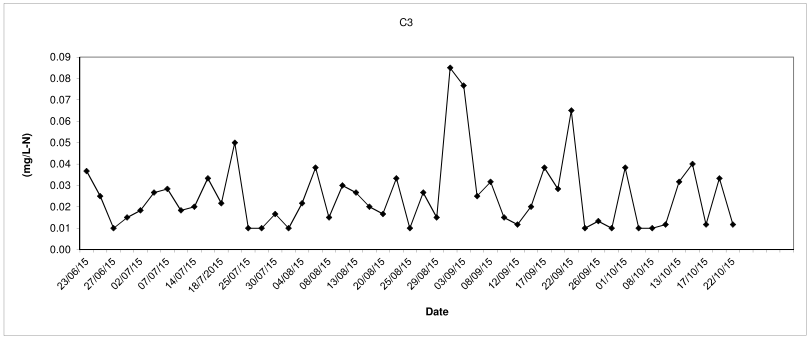




Ammonia Nitrogen (Depth average) at Mid-Flood Tide

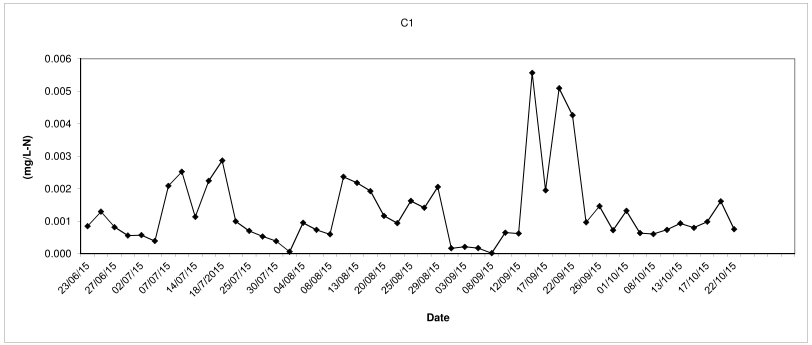


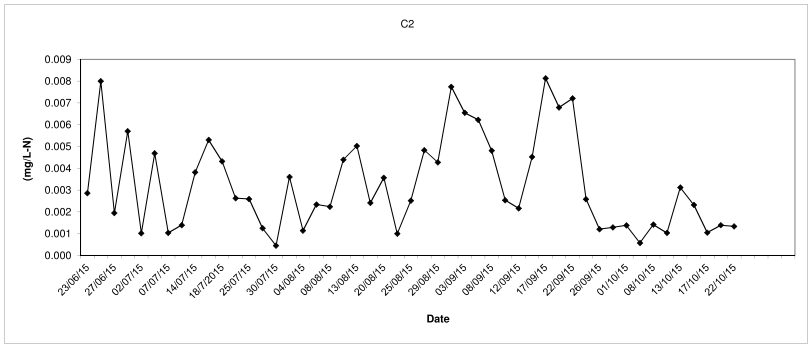


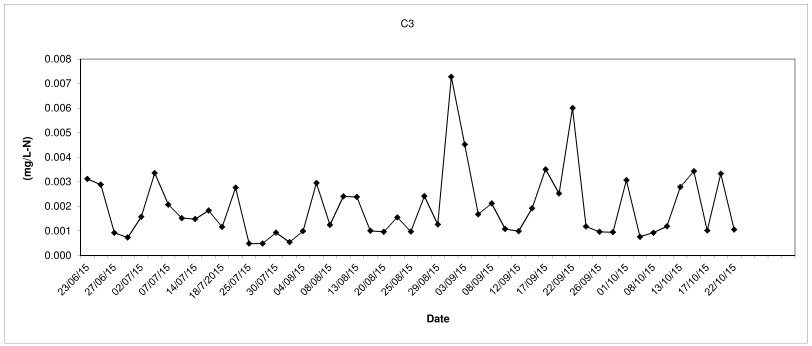


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

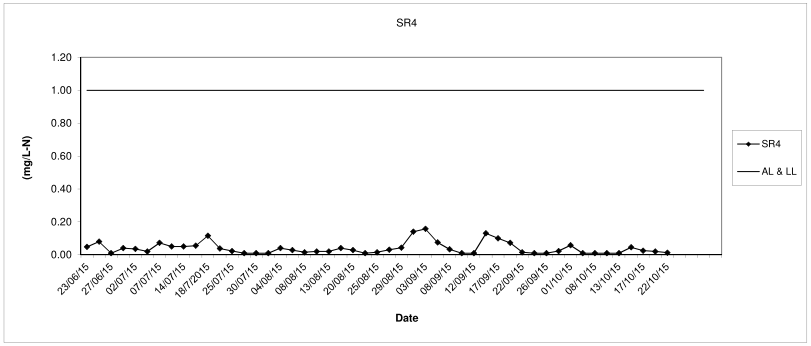
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

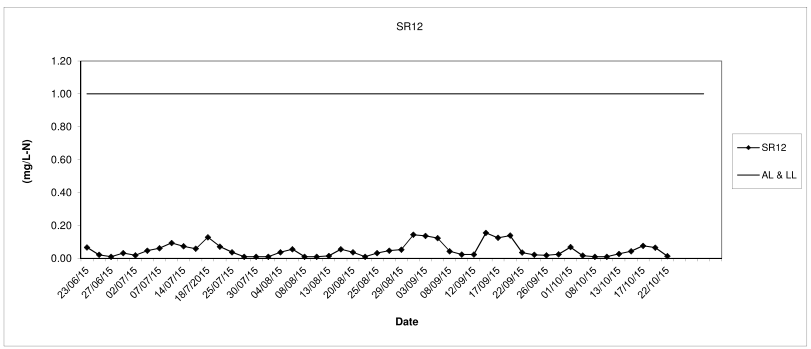






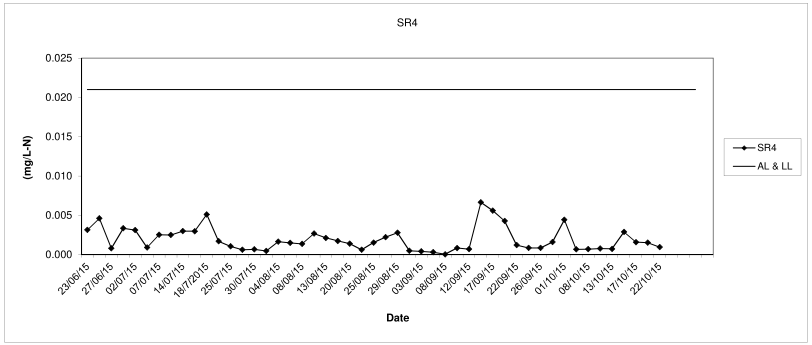
Ammonia Nitrogen (Depth average) at Mid-Flood Tide

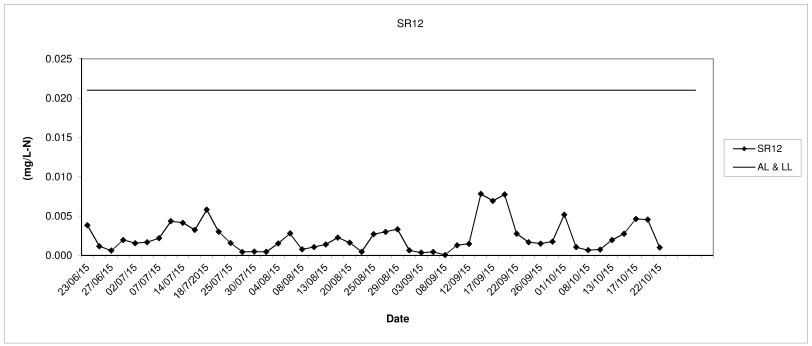




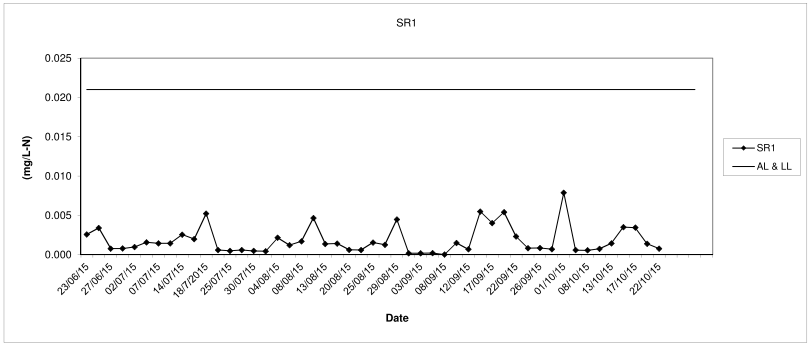
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

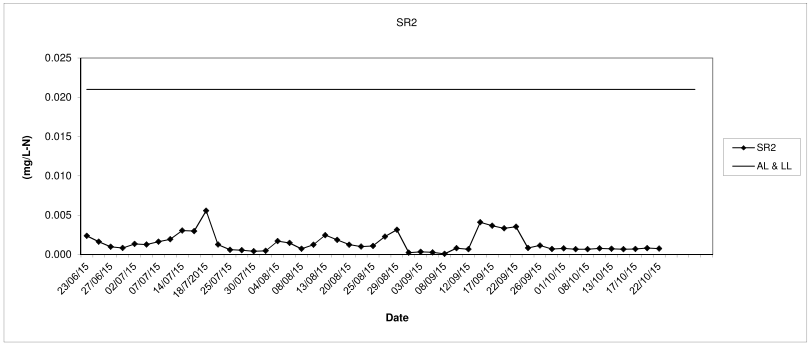
Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

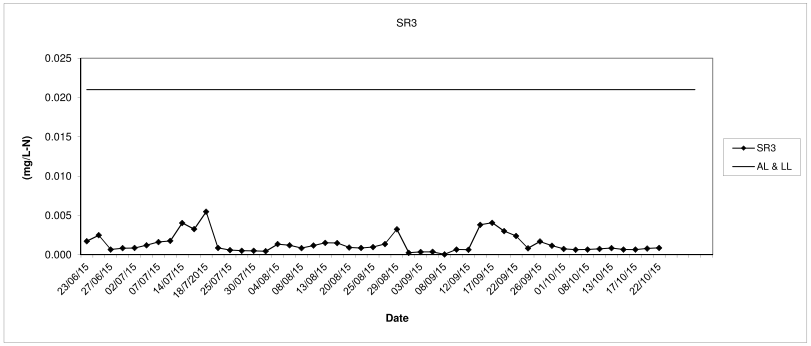




Laboratory Analysis UIA (Depth average) at Mid-Flood Tide

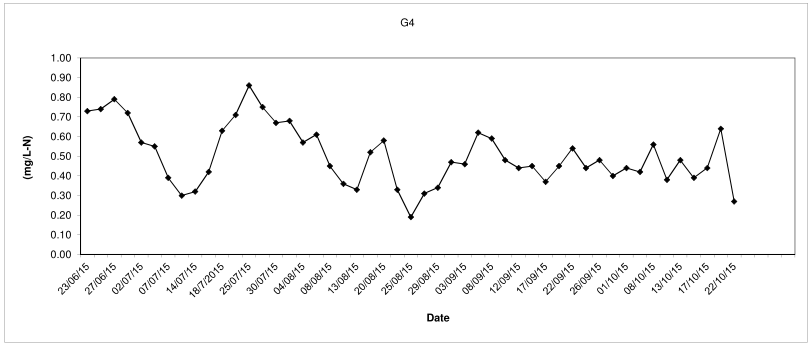


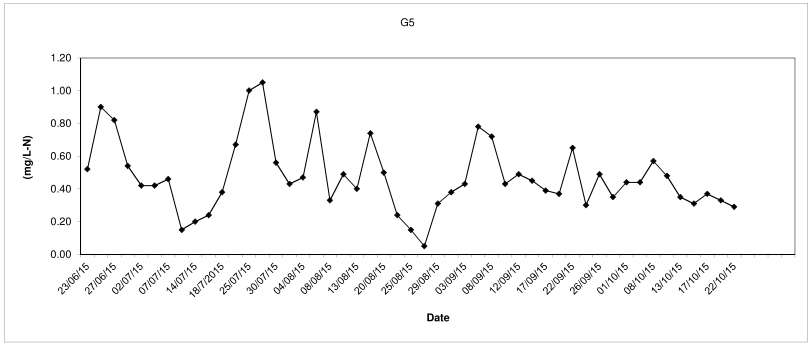


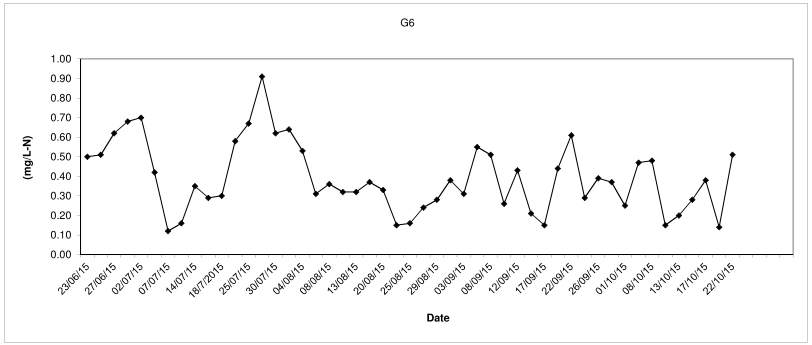


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

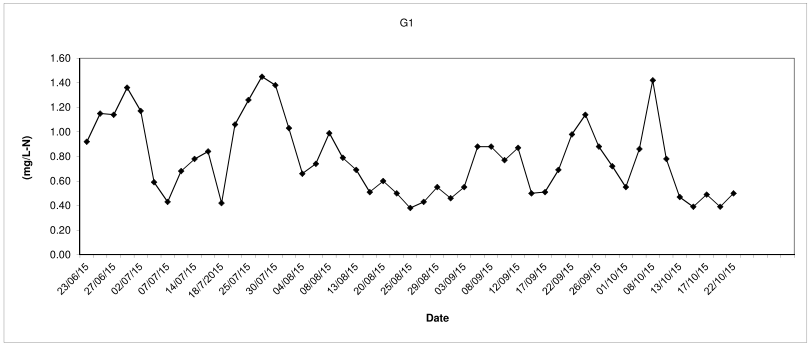
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide

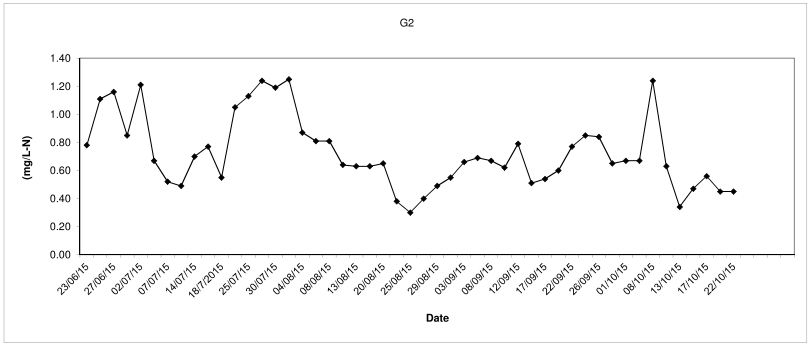


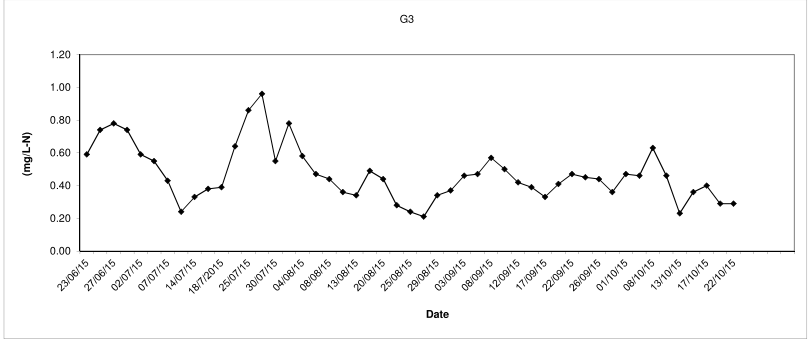




Laboratory Analysis TIN (Depth average) at Mid-Flood Tide

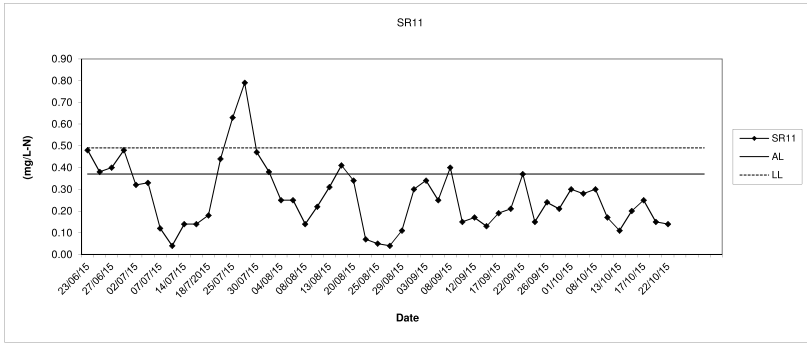




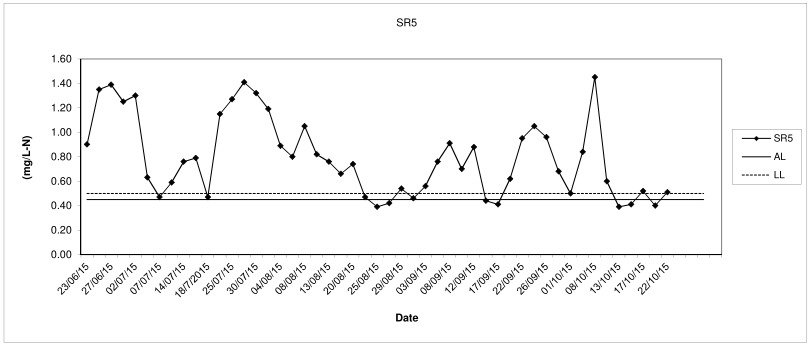


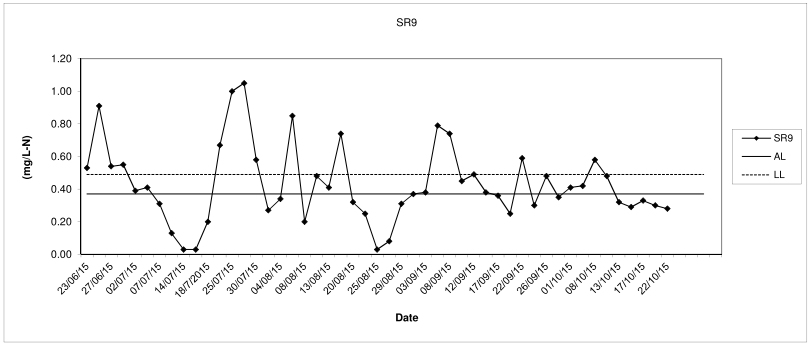
Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

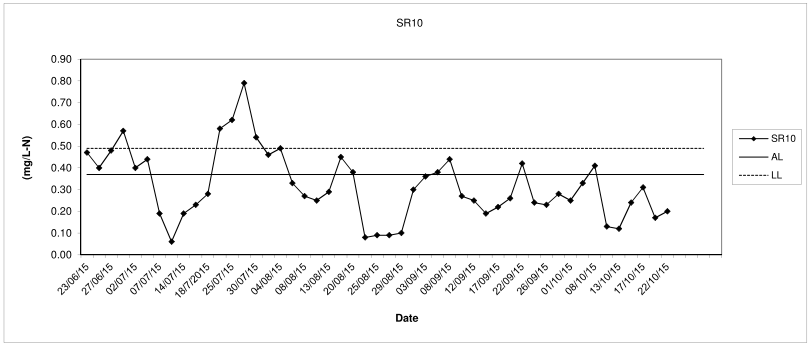
Laboratory Analysis TIN (Depth average) at Mid-Flood Tide



Laboratory Analysis TIN (Depth average) at Mid-Flood Tide

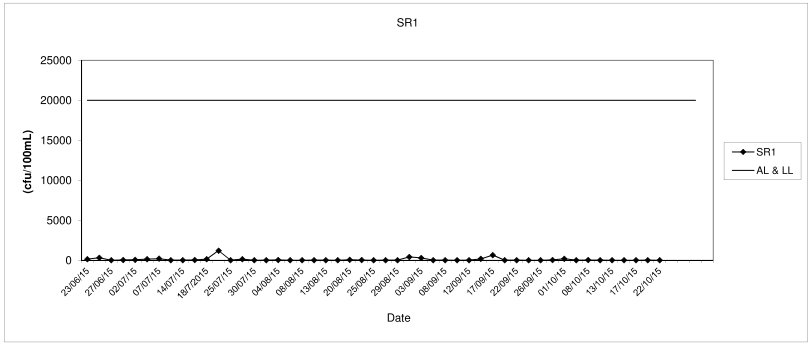


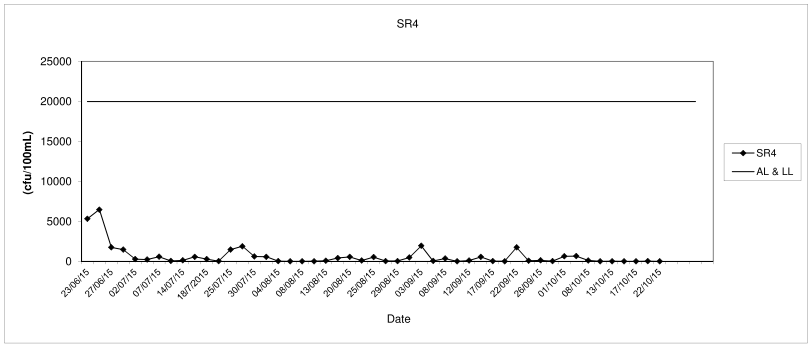


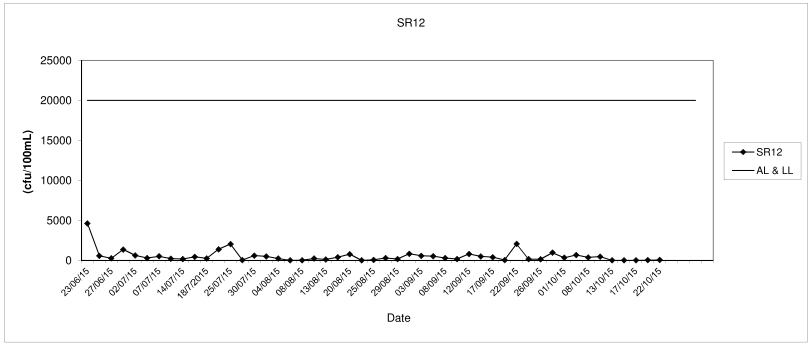


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

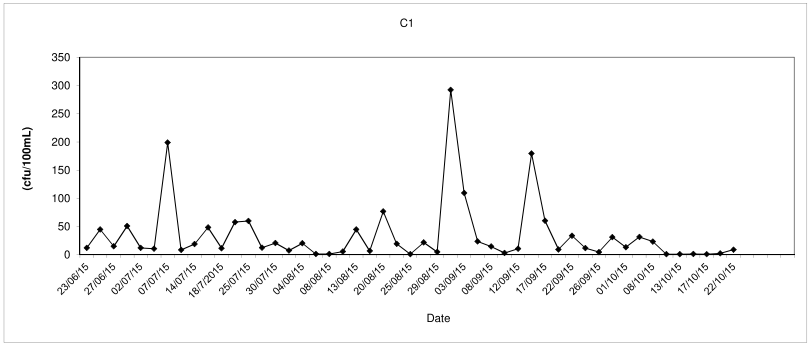
***E.coli* (Depth average) at Mid-Flood Tide**

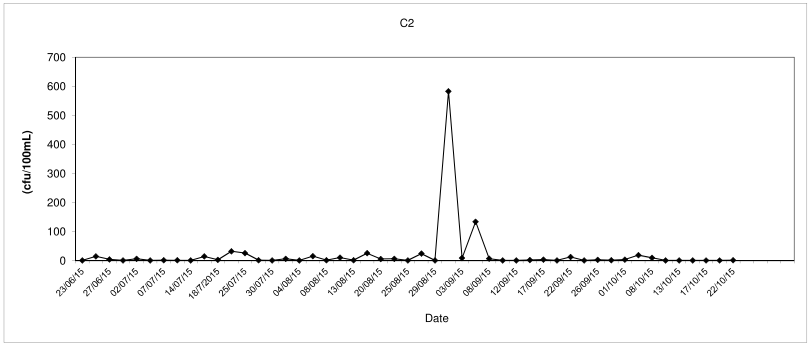


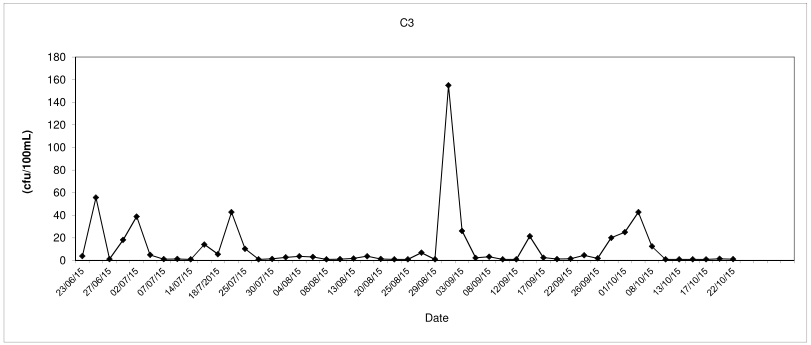




***E.coli* (Depth average) at Mid-Flood Tide**

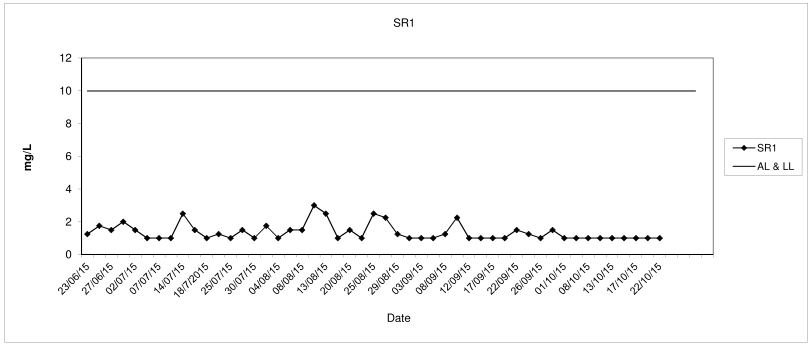


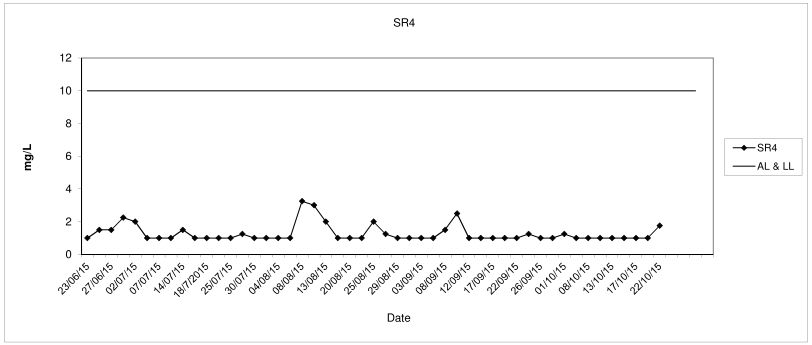


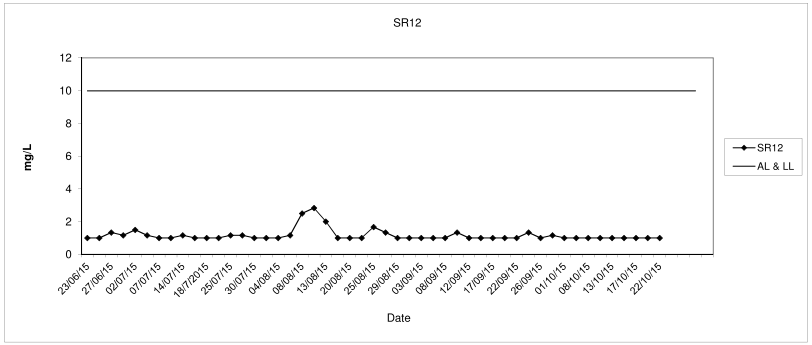


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

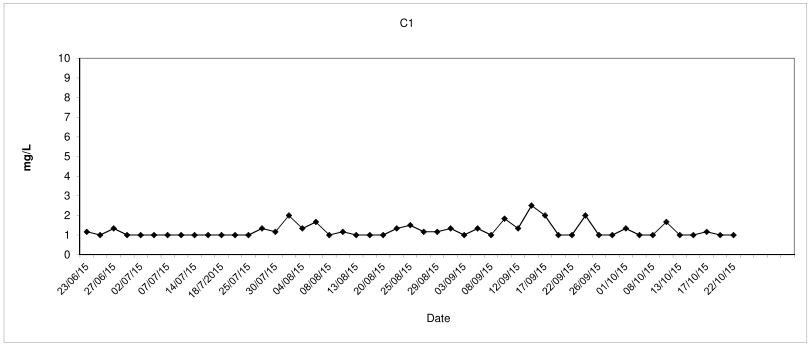
BOD_5 (Depth average) at Mid-Flood Tide

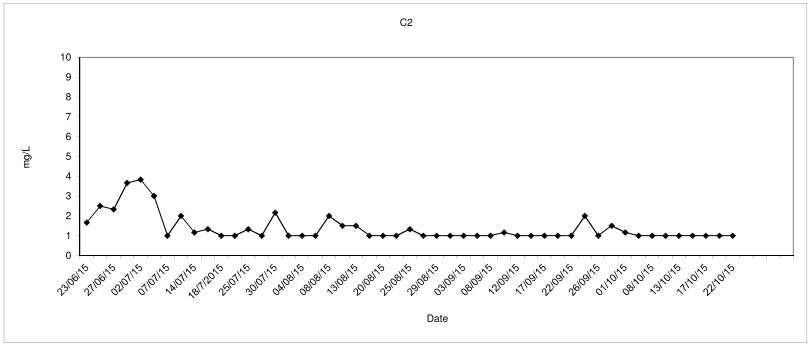


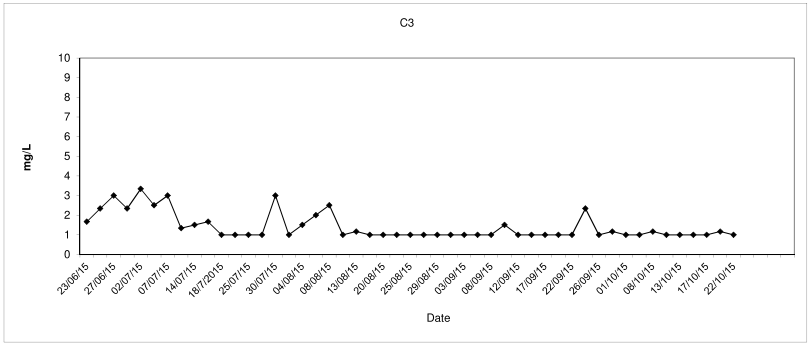




BOD_5 (Depth average) at Mid-Flood Tide

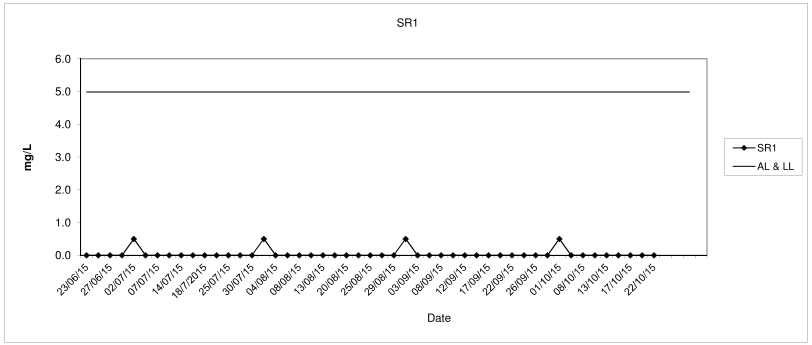


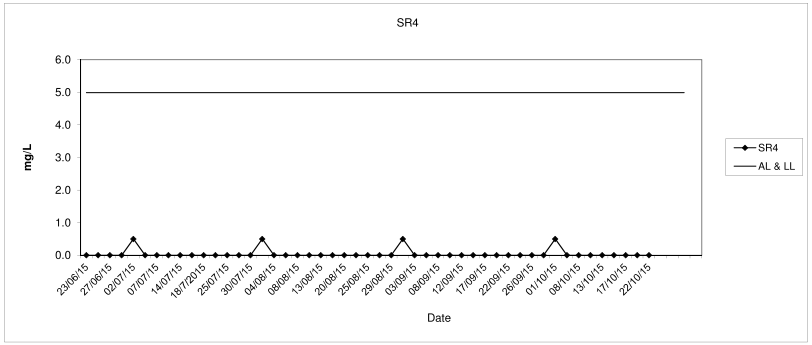


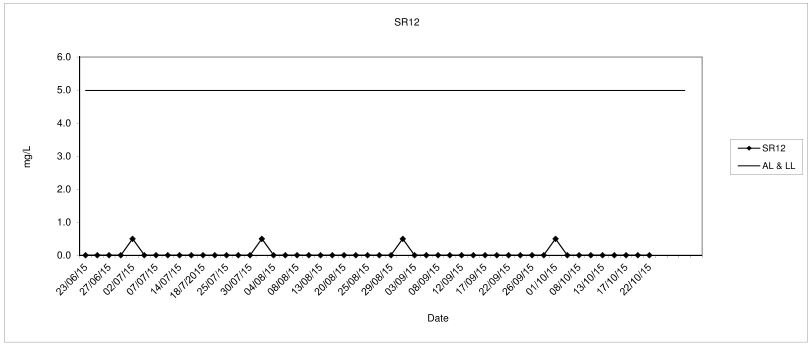


Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

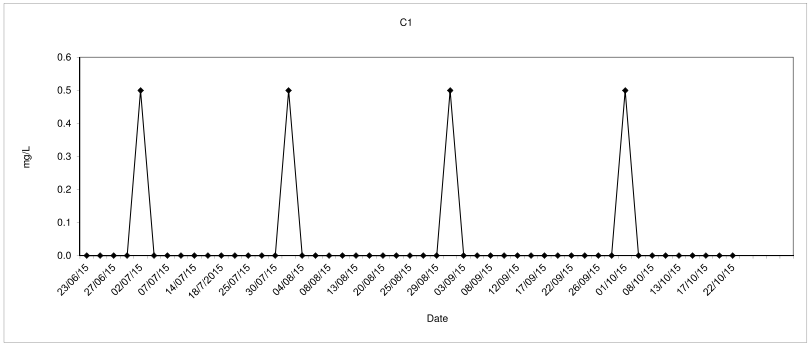
Synthetic Detergent (Depth average) at Mid-Flood Tide

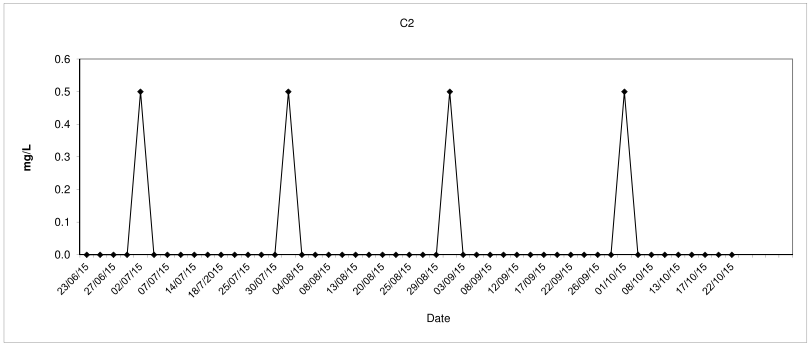


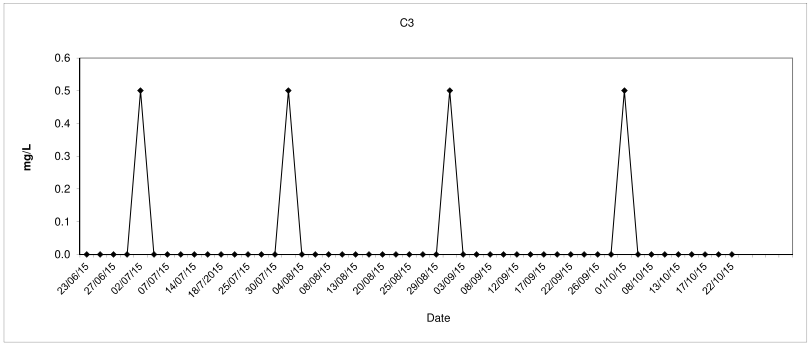




Synthetic Detergent (Depth average) at Mid-Flood Tide







Providing Sufficient Water Depth for Kwai Tsing Container Basin and its Approach Channel

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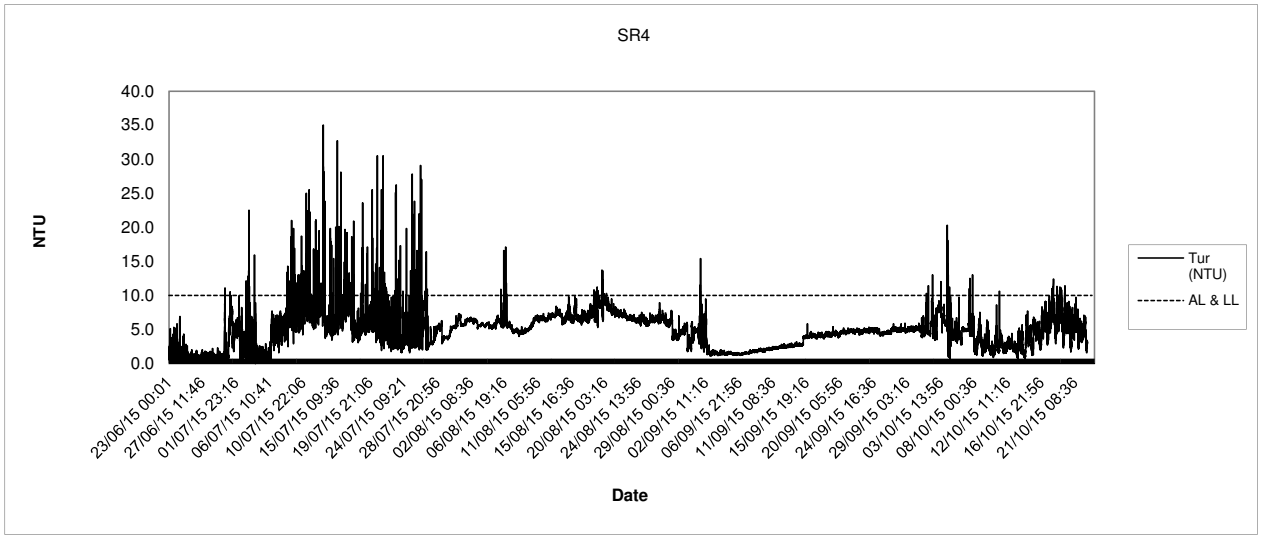
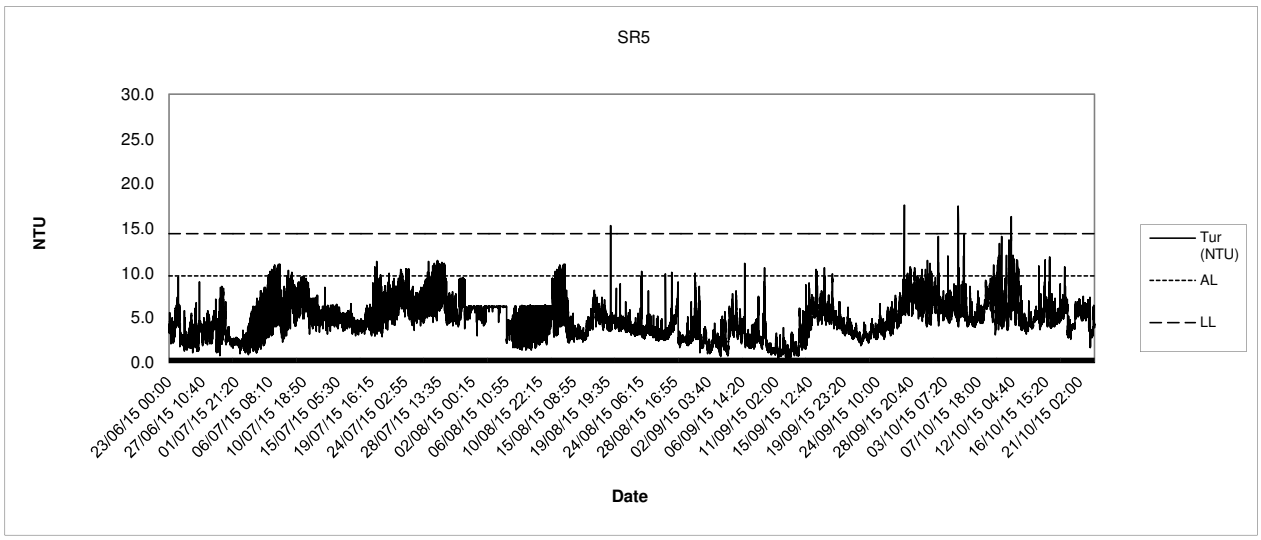
Fax : (852)-24508032
Email : mcl@fugro.com.hk

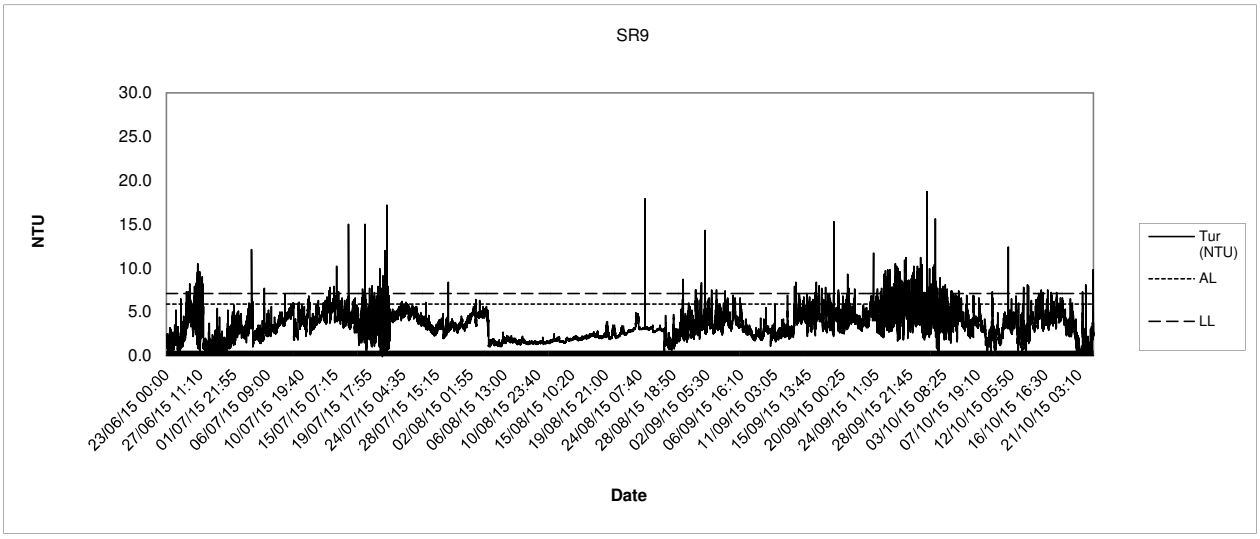
Appendix E

Graphical Presentation – 24-hr Monitoring Results

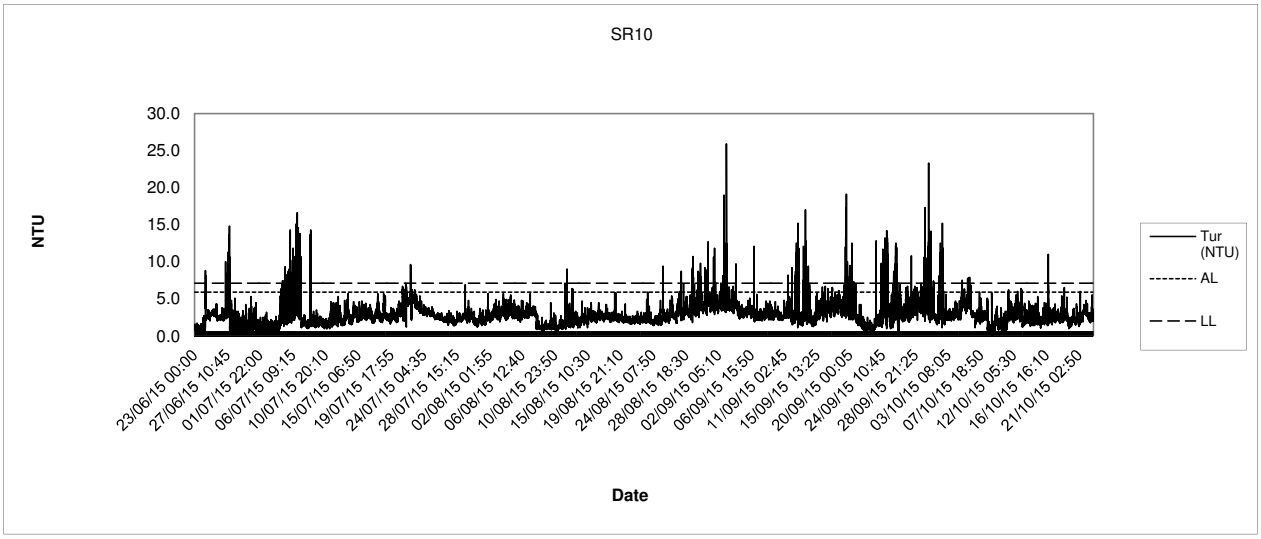
Turbidity
24-hr Water Quality Monitoring

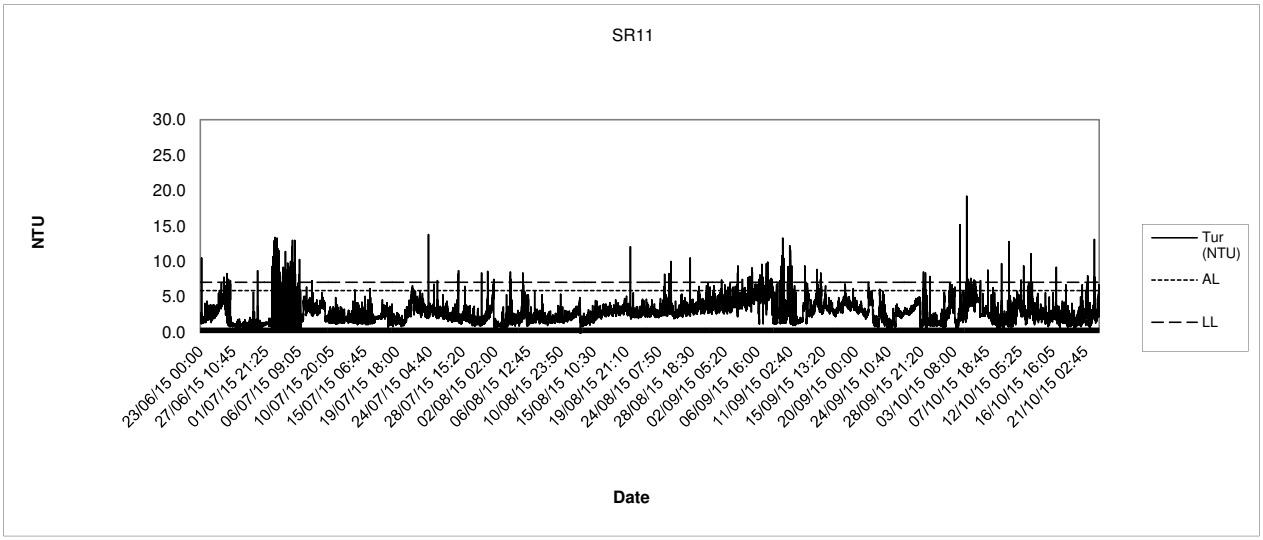


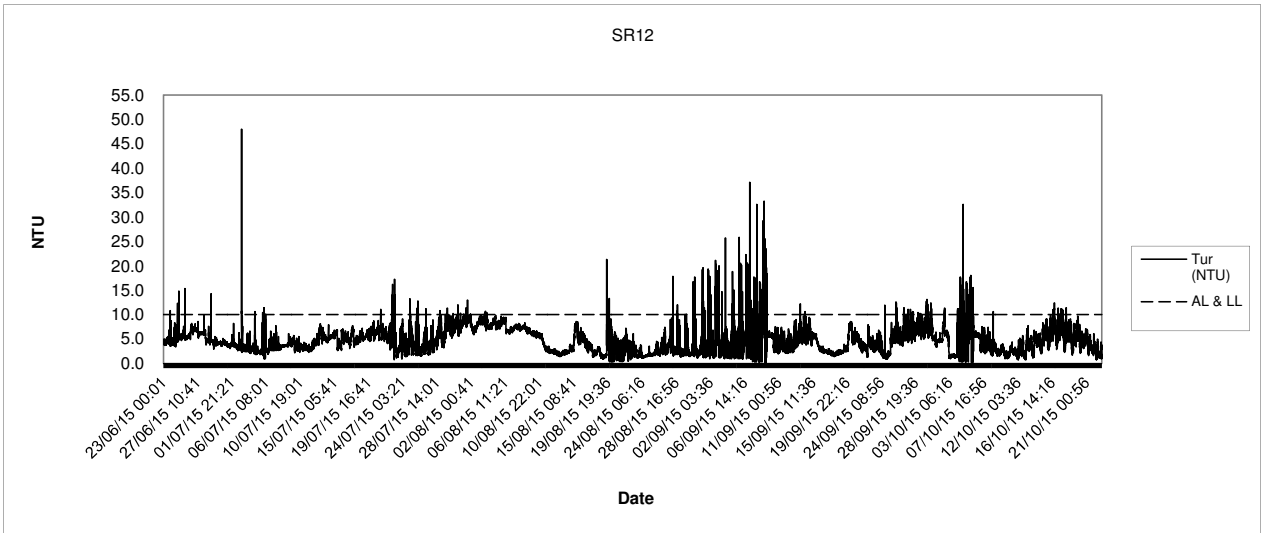




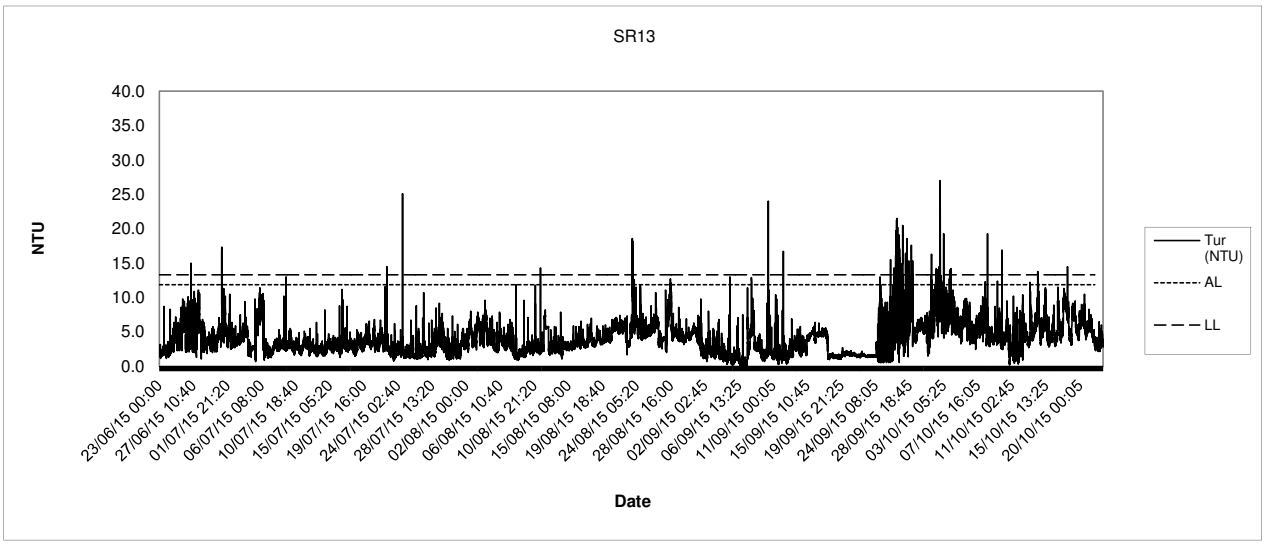
Turbidity
24-hr Water Quality Monitoring



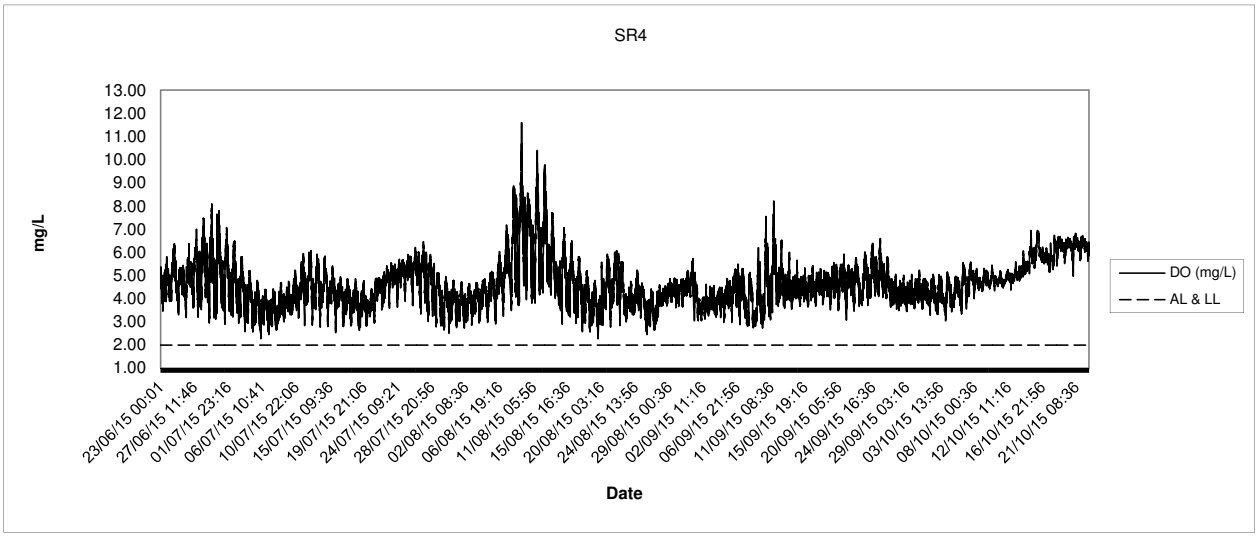


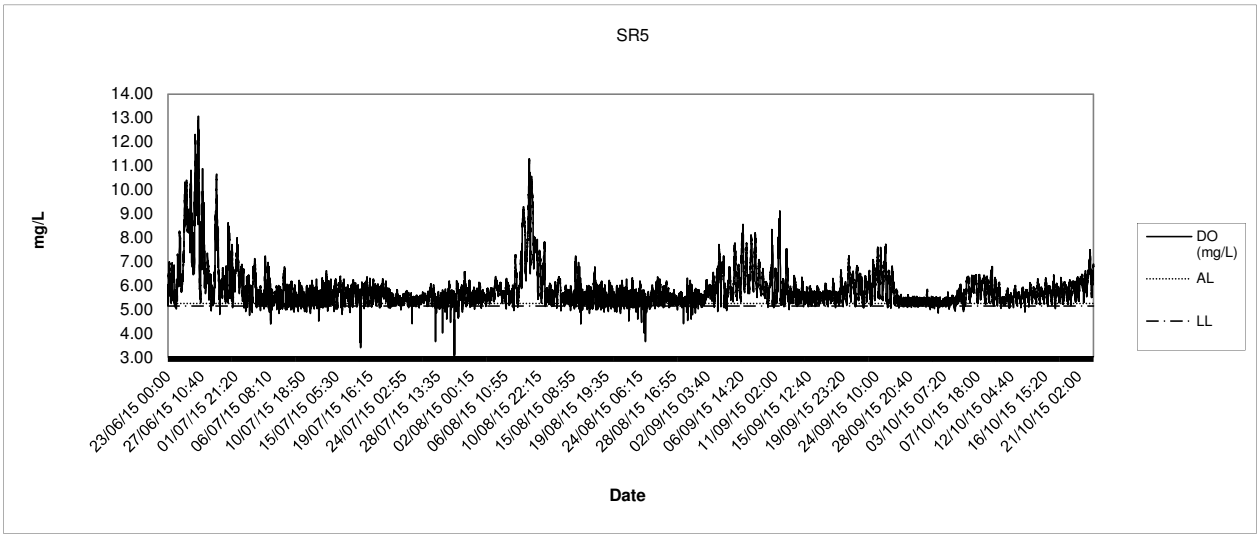


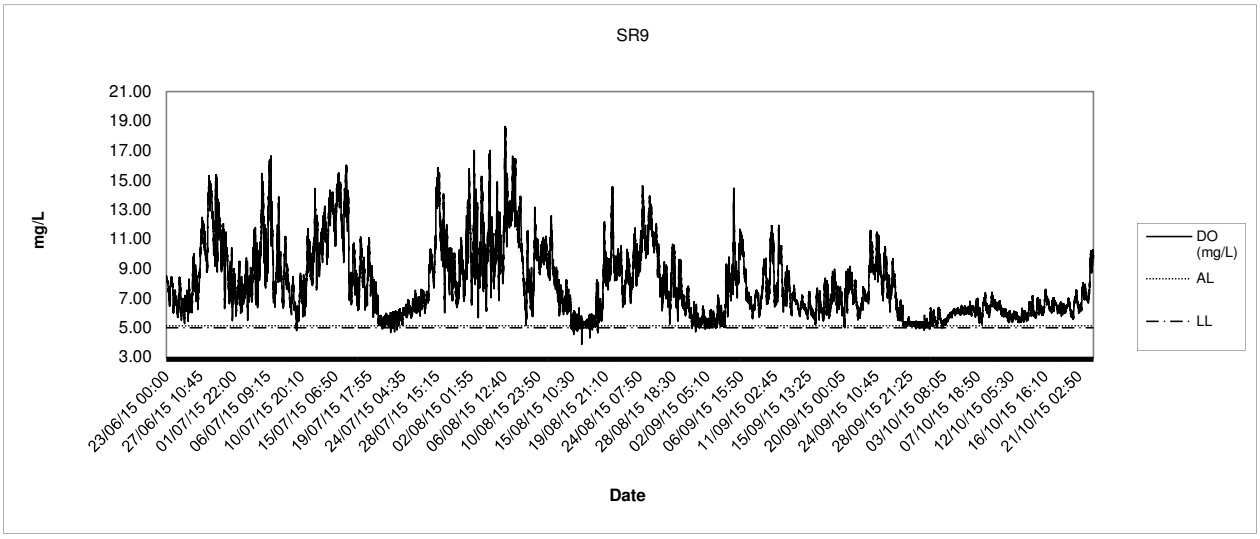
Turbidity
24-hr Water Quality Monitoring



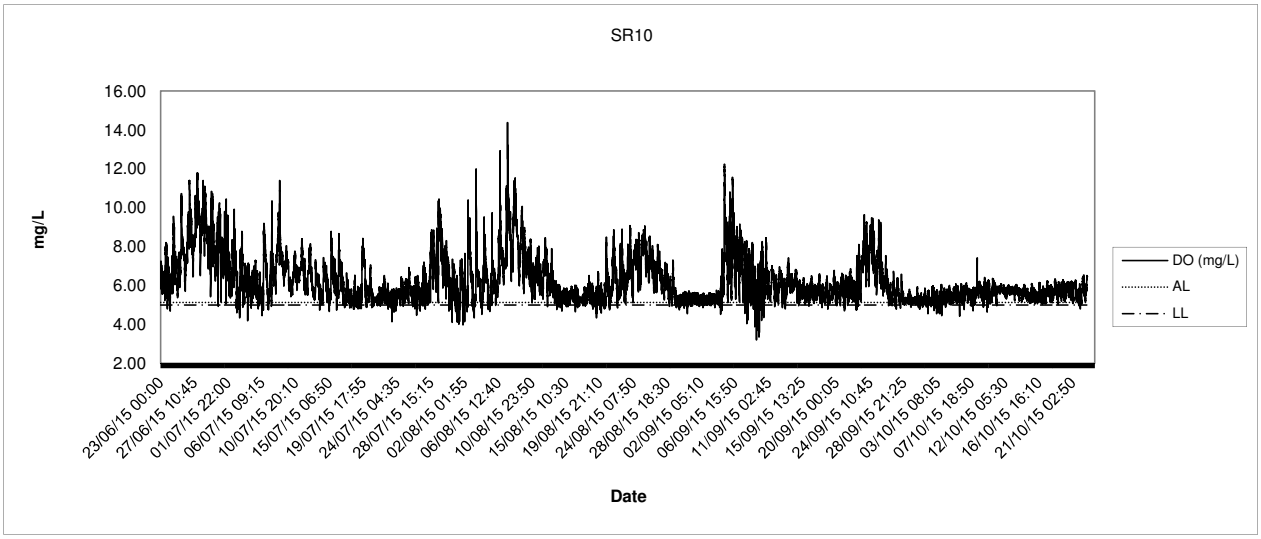
Dissolved Oxygen
24-hr Water Quality Monitoring

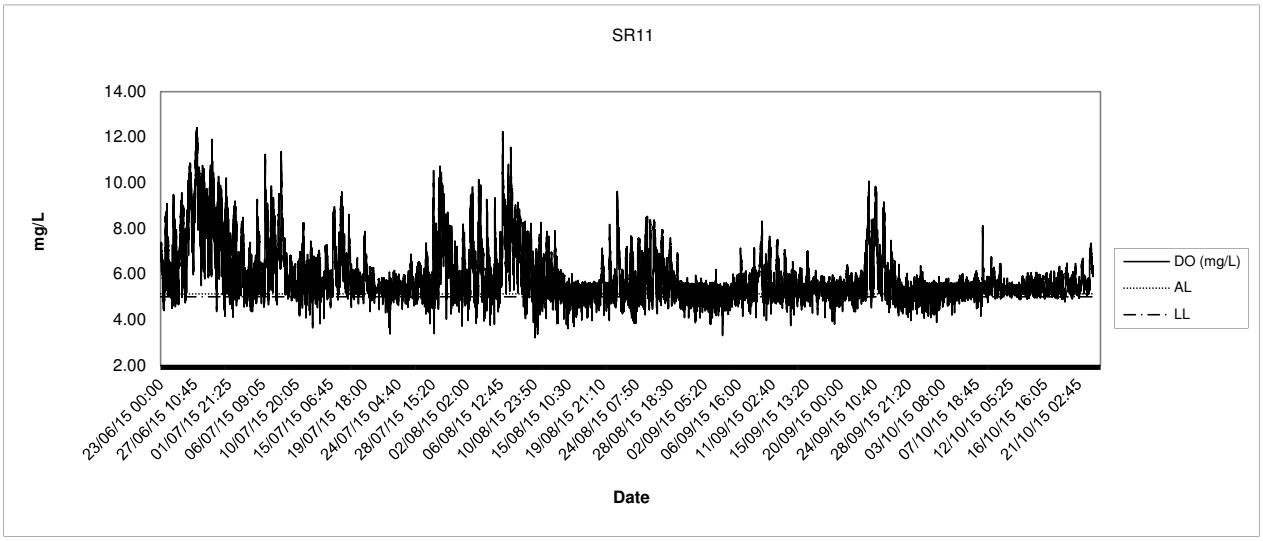


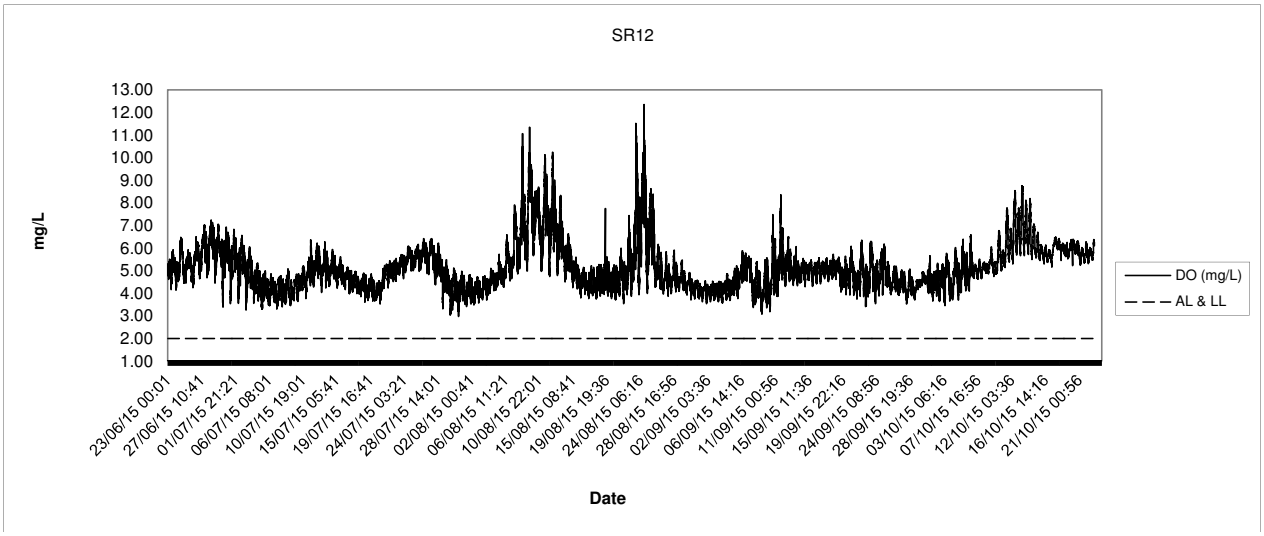




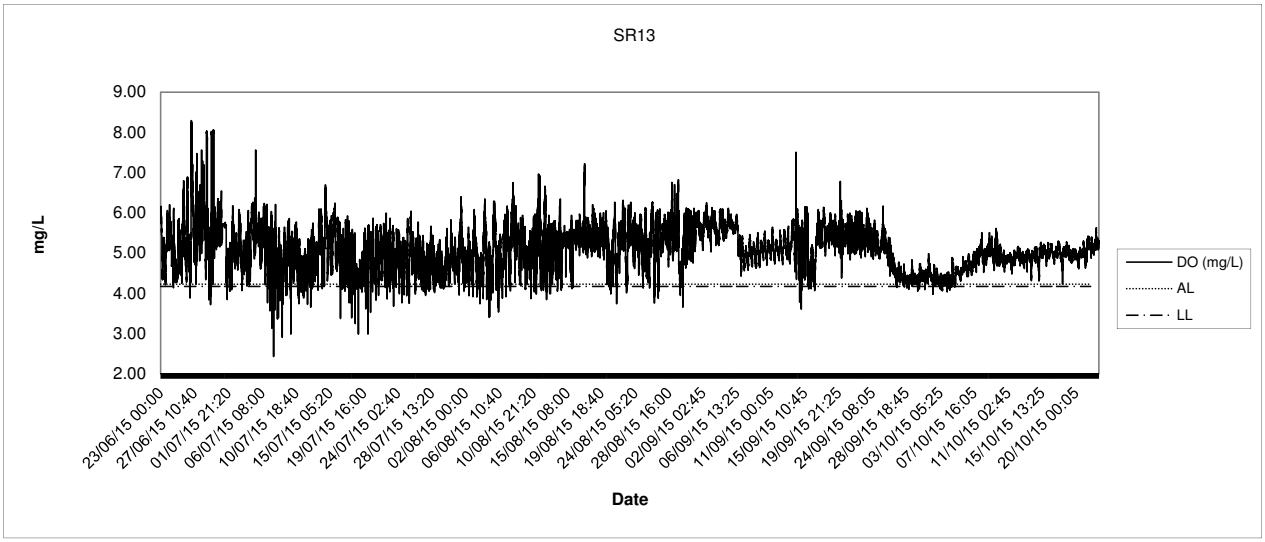
Dissolved Oxygen
24-hr Water Quality Monitoring



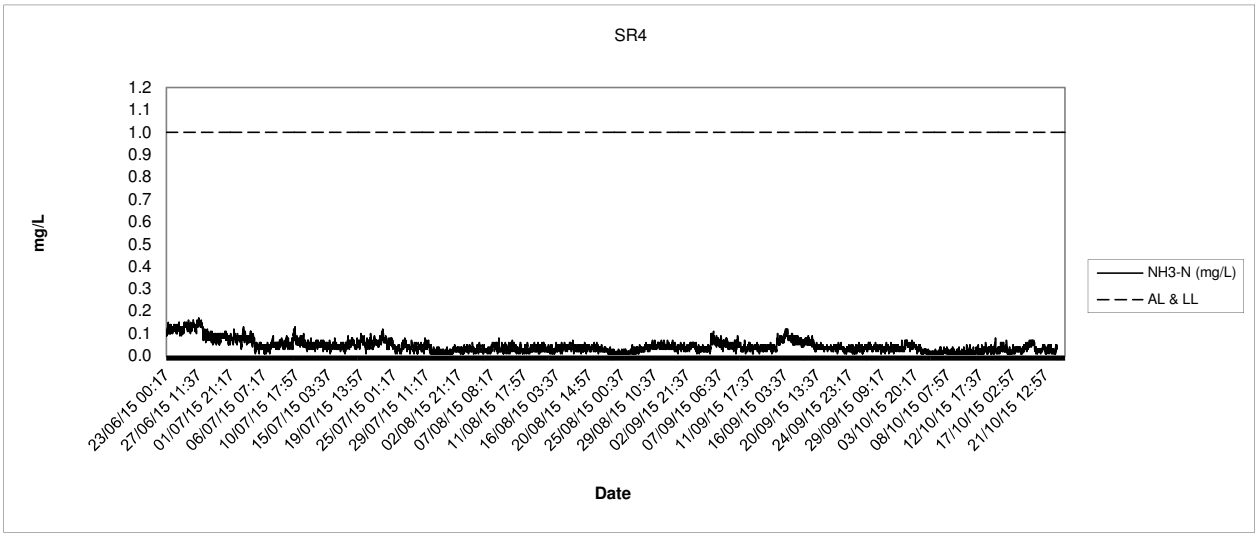


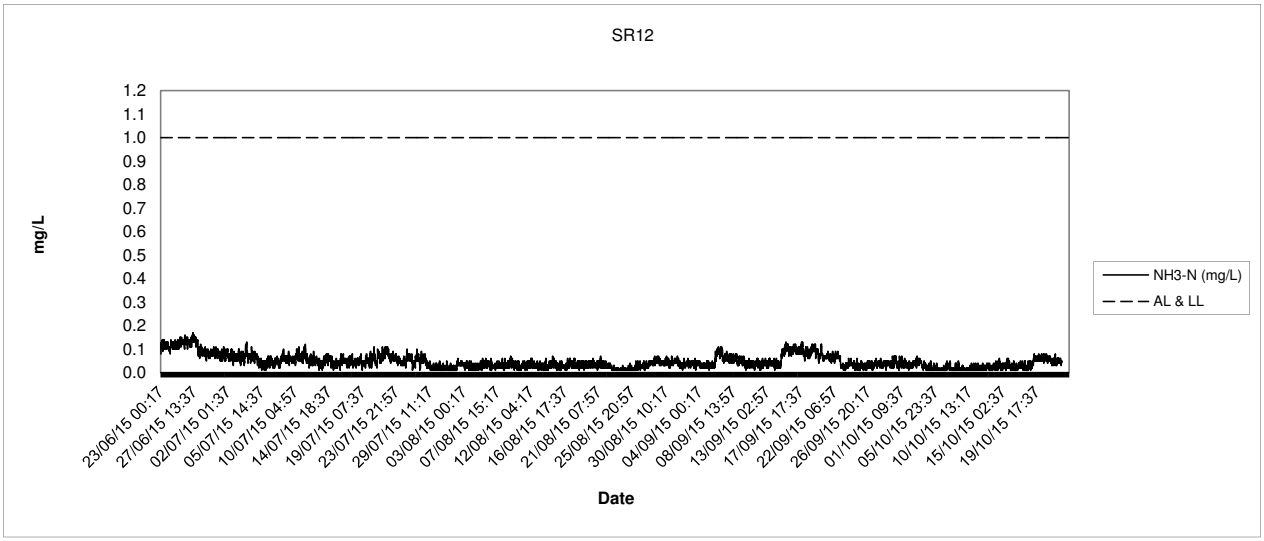


Dissolved Oxygen
24-hr Water Quality Monitoring



Ammonia-N
24-hr Water Quality Monitoring





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Appendix F

Environmental Mitigation Implementation Schedule

EIA Ref	EM&A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
		A	Water Quality					
3.8	2.9		Use of Silt Screens	Minimize the effect of potential increase in SS levels at the seawater intakes	Contractor	WSD8, WSD9 and EMSD1	Construction Phase	
		A1	Silt Screens shall be installed at the flushing water intakes WSRs WSD1, WSD8~~, WSD9~~ and EMSD1 to minimise the effect of potential increase in SS levels at the seawater intakes.					Implemented
3.8	2.9		Use of Silt Curtains	Minimize the release of suspended soil from the dredging area	Contractor	Construction Work Sites	Construction Phase	
		A2	To minimize the potential SS impact from dredging, deployment of silt curtains around the grab dredgers is recommended; and Before commencement of dredging works, the holder of the Environmental Permit shall submit detailed proposal of the design and arrangement of the frame type silt curtain to EPD for approval.					Implemented
3.10	2.9	A3	Water Quality Monitoring Program	Perform water quality monitoring at sensitive receivers during construction phase	ET	Monitoring Locations as stated in Table 2.1 of the EM&A Manual	Construction Phase	
			Water quality monitoring shall be carried out in accordance with Section 2 of the Environmental Monitoring and Audit (EM&A) Manual. Event and Action Plan (EAP) for water quality shall be followed in case of any exceedance in action and limit level.					Implemented
3.8 (EP Ref 3)	-		Dredging Operation	Minimize potential adverse effect as a result of dredging activities	Contractor	Construction Work Sites	Construction Phase	
		A4	Only two types of dredgers are allowed for this Project: (a) grab dredger with closed grab, and (b) ~~cutter suction dredger~~ spud pole grab dredger.					Implemented
		A5	The speed of any construction vessels shall not exceed 10 knots when passing through the area of the Project.					Implemented
		A6	No more than ~~three~~ two grab dredgers with closed grab ~~(or one cutter suction dredger with two closed grab dredgers)~~ shall be operated within the Project Area at any one time for the Project.					Implemented
		A7	Only one closed grab dredger ~~or one cutter suction dredger~~ shall be operated in Zone 2B and during which no other closed grab dredger shall be allowed in other zones within the Project Area.					Implemented
		A8	No more than one grab dredger with closed ~~grab (or one cutter suction dredger)~~ shall be operated within each of the five main zones at any one time for the ~~Project in which the cutter suction dredger shall only be operated in Zones 2 and 4 with maximum dredging rate of 700 m³ in 30 minutes in any given hour (max. 8,400 m³/day, based on a 12-hour operation per day)~~.					Implemented
		A9	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 1 to 2 (subzones Z1A, Z1B, Z2A, Z2B and Z2C) shall follow the Dredging Plan for the Hotspot, as shown in EP-426/2011/A.					Implemented
		A10	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 3 to 4 (subzones Z3A to Z4B) shall not exceed 1,600 m³ per day during dry season or 3,440 m³ per day during wet season as shown in EP-426/2011/A.					Implemented
		A11	The maximum dredging rate for closed grab dredger at Rambler Channel – Zones 5 to 6 (subzones Z5A, Z5B and Z6A) shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					Implemented
		A12	The maximum dredging rate for closed grab dredger at Rambler Channel –					Implemented

EIA Ref	EM&A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			Zones 5 to 8 (subzones Z5C, Z6B, Z6C, Z6D, Z7 and Z8) shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					
		A13	The maximum dredging rate for closed grab dredger at Northern Fairway – Zones 9 to 12 shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					Implemented
		A14	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13A shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works completed
		A15	The maximum dredging rate for closed grab dredger at Western Fairway – Zone 13B shall not exceed 4,000 m³ per day during both dry and wet seasons as shown in EP-426/2011/A.					NA-Dredging works completed
		A16	~~The dredging pump of cutter suction dredger shall be operated during cutting to reduce the sediment loss to water body.~~					NA-no CSD employed
		A17	Project dredging works within Zone 1 to 6 (including sub-zones) of the Container Basin shall not be carried out at the same time with Terminal Operator's maintenance dredging activities.					NA-No Terminal Operator's maintenance dredging carried out
		A18	~~Cutter suction dredger is only to be deployed for the removal of harder material during daytime only (07:00 to 19:00) in Zone 2 (including subzones) of the Container Basin.~~					NA-no CSD employed
		A19	In case of rainstorm warning in effect during dredging works, the dredged material on barge shall be covered properly before transportation to disposal site.					Implemented
		A20	In case of exceedance of SS and NH3-N at the Tsing Yi WSD flushing intake due to dredging operation is evidenced, the Contractor shall propose mitigation measures not limited to reducing dredging rate. If exceedance persists, the Contractor shall propose not to undertake dredging operation in close proximity to the Tsing Yi flushing water intake during flood tide. The Contractor shall liaise with the ETL, IEC, ER, EPD and WSD for the proposed mitigation measures.					NA-no exceedance due to dredging operation
		A21	If further mitigation measures are required due to continuous exceedance of SS and NH_3-N, consideration shall then be given to dredge only on the state of the tide which would avoid migration of SS towards the WSD and EMSD intakes.					NA-no exceedance due to dredging operation
		A22	Dredging sub-zone Z2B where high NH_3-N in sediment is found shall be isolated with dredging works to be carried out towards the end of construction programme.					Implemented
		A23	Administrative control in terms of dredging rate adjustment in controlling the release of contaminants shall be employed as mitigation measures.					Implemented
		A24	Field trials shall be carried out to propose the most effective dredging process and rate to control the release of ammoniacal nitrogen and UIA into the water column and achieve compliance at the WSD1 seawater intake (NH_3-N) and at the beaches for UIA. Capital dredging works in dredging sub-zone Z2B (Figure 1.2h refers)					Implemented

EIA Ref	EM&A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			should not therefore be carried out until the proposed method and rate are confirmed.					
		A25	Detailed dredging plan shall be prepared providing details of individual dredging subzones and dredging rate taking into account of the field trial results.					Implemented
3.8	-		Other Good Site Practices for Dredging	Minimize potential adverse effect as a result of dredging activities	Contractor	Construction Work Sites	Construction Phase	
		A26	All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.					Implemented
		A27	The speed of all Contractor's vessels should be controlled within the works area to prevent propeller wash from stirring up the seabed sediments.					Implemented
		A28	All barges / dredgers used should be fitted with tight fitting seals to their bottom openings to prevent leakage of material.					Implemented
		A29	Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds.					Implemented
		A30	No overflow of dredged mud should be allowed. Barges or hopper should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation.					Implemented
		B	**Waste Management**					
			Good Site Practices	Minimize potential adverse effect arising from the handling of dredged material	Contractor	Construction Work Sites (General)	Construction Phase	
4.5	3.3	B1	Obtain the profile of different sediment categories and careful planning of sediment removal.					Implemented
		B2	Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site.					Implemented
		B3	Training of site personnel in proper waste management and chemical handling procedures.					Implemented
		B4	Provision of sufficient waste disposal points and regular collection of waste.					Implemented
		B5	Well planned delivery programme for offsite disposal such that adverse environmental impact from transporting sediment material is not anticipated.					Implemented
		B6	Use well maintained PME on site.					Implemented
			General Refuse	Minimize the adverse effect arising from the handling of site general refuse	Contractor	Construction Work Sites (General)	Construction Phase	
4.5	3.3	B7	General refuse should be stored in enclosed bins. A reputable waste collector should be employed by the contractor to remove general refuse from the site.					Implemented
			Chemical Waste	Minimize the adverse effect arising from the handling of site chemical waste	Contractor	Construction Work Site	Construction Phase	
4.5	3.3	B8	If chemical wastes are produced at the construction site, the Contractor shall be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes shall be used, and incompatible chemicals should be stored separately. Appropriate labels shall be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive,					Implemented

EIA Ref	EM&A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
			flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the approved Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.					
4.5	3.3		Marine Dredged Sediment	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality	Contractor	Construction Work Site	Construction Phase	
		B9	Control of transportation and disposal of dredged material in a manner to minimize potential impacts on water quality.					Implemented
		B10	Bottom opening of barges will be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and dredgers before the vessel is moved.					Implemented
		B11	Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the EPD.					Implemented
		B12	Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.					Implemented
		B13	Sediment Quality Report shall be prepared and submit to EPD under DASO.					Implemented
		B14	If disposal of Type 3 sediment is identified, agreement with EPD shall be reached regarding the treatment of sediment before disposal.					NA – no type 3 material disposed
		B15	Project works shall not be carried out before obtaining confirmation from MFC on disposal option.					Implemented
		B16	Follow strictly all conditions stipulated in the dumping permit.					Implemented
		C	**Marine Ecology**	Review and assess the potential adverse effect on marine ecology	Contractor	Construction Work Sites	Construction Phase	
5.7	4.1	C1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to marine ecology due to dredging operation.					Implemented
		D	**Fisheries**	Review and assess the potential adverse effect on fisheries	Contractor	Construction Work Sites	Construction Phase	
6.7	5.1	D1	Water quality monitoring results shall be reviewed from time to time to assess if there were any impact to fisheries due to dredging operation.					Implemented
		E	**Hazard to Life**		Contractor	Construction Work Sites (General)	Construction Phase	
7.8.2	6.2	E1	Sound communication channel shall be established with the oil companies, Marine Department, and Fire Services Department for effective notification and emergency evacuation in case of accidents.					Implemented
		E2	Proper safety and emergency training shall be given to the relevant operation staff at the dredging site. Emergency plans and procedures should be prepared and drills should be performed periodically.					Implemented
		F	**Landscape Visual and Glare**	Minimize landscape and visual impacts during construction phase	Contractor	Construction activities' area	Throughout design, construction phase	
8.9 Table 8-3 & 8-6	7.2	F1	Visa shields to the lights of dredgers shall be provided.					Implemented
		F2	The light source shall not point directly to any VSRs.					Implemented
		F3	Lights shall be switched off if they are not in use.					Implemented
		G	**Cultural Heritage**	Minimize potential marine archaeological	Contractor	Locations of the 20	During Construction	
9.5	8		Monitoring Brief					

EIA Ref	EM& A Ref	No.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to Address	Who to implement the measure	Location of the measure	When to implement the measure?	Implementation Status
		G1	A monitoring brief shall be conducted during the dredging. It shall only be required during dredging at the locations of the 20 unidentified sonar contacts and masked areas and does not need to cover all of the dredging activities. Dredging staff should be briefed about the possibility of locating archaeological objects and a marine archaeologist shall be available to monitor the dredged spoil and provide advice. If material indicative of archaeological remains is retrieved, the AMO should be contacted as soon as possible.	impact during dredging activities		unidentified sonar contacts and masked areas	works	NA- no archaeological deposit was found during reporting period.
		H	**Noise**					
10.8	9		Good Site Practices	Control and minimize the generation of undue noise nuisance	Contractor	Construction Work Sites (Along the alignment of dredging	Construction Phase	
		H1	Only well-maintained plant shall be operated on-site and plant should be serviced regularly during the construction program.					Implemented
		H2	Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.					Implemented
		H3	Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from nearby NSRs.					Implemented
		H4	If dredging is to be carried out during restricted hours, work locations close to NSRs shall be avoided.					Implemented
		I	**Construction Dust**					
11.7	10		Dust Control	Good site practice to control dust and odour impact to the nearby sensitive receivers	Contractor	Construction Work Sites (General)	Construction Phase	
		I1	Requirements of the Air Pollution Control (Construction Dust) Regulation, where relevant, shall be adhered to during the construction period.					Implemented
			Odour		Contractor	Construction Work Sites (General)	Construction Phase	
		I2	To minimize potential odour emissions, if dredged sediment is anticipated to be placed on barge for more than a day the load shall be properly covered as far as practicable to minimise the exposed area and potential odour.					NA-no work in such condition
		I3	If dredged sediment is found to be malodorous it shall be removed from site as soon as possible within one hour after the barge being filled up.					NA-no work in such condition

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Appendix G

Waste Generation in Reporting Period

Name of Department : Civil Engineering and Development Department
Contract No. : CV/2013/04

Monthly Summary Waste Flow Table for _2015__ (year)

Year	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete (see Note 4)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m^3)
Jan	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Feb	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Mar	nil	nil	nil	nil	nil	nil	nil	nil	0.6	0.01
Apr	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
May	nil	nil	nil	nil	nil	nil	nil	nil	11.4	0.01
Jun	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Jul	nil	nil	nil	nil	nil	nil	nil	nil	2.4	0.01
Aug	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Sep	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Oct	nil	nil	nil	nil	nil	nil	nil	nil	nil	0.01
Nov										
Dec										
Total	nil	nil	nil	nil	nil	nil	nil	nil	14.4	0.10

Notes:

(1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

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

(3) Broken concrete for recycling into aggregates

Yearly Summary Waste Flow Table

Year	Estimated Annual Quantities of Inert C&D Materials (in '000m^3)										Estimated Annual of C&D Wastes									
	Total Quantity Generated		Broken Concrete (see Note 3)		Reused in the Contract		Reused in other Projects		Disposed as Public Fill		Metals		Paper/cardboard packaging		Plastics (see Note 2)		Chemical Waste		Others, e.g. general refuse	
	(a)		(b)		(c)		(d)		(a-b-c-d)		(in '000 kg)		(in '000 kg)		(in '000 kg)		(in '000 kg)		(in '000 m^3)	
	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.
2013	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.003	0.01
2014	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.2	0.16
2015	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	-	Nil	-	13	-	0.2	-
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020																				
2021																				
Grand Total	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.403	0.17

Notes: (1) The performance targets are given in sub-clause (14) of this Appendix to the PS.

(2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material

(4) Broken concrete for recycling into aggregates.

Monthly Summary of Sediment Disposal (2014-2015)

Marine Sediment Type	Type 1 – Open Sea Disposal	Type 2 – Confined Marine Disposal	Type 3 – Special Treatment / Disposal
Month	Monthly Quantity (m3)	Monthly Quantity (m3)	Monthly Quantity (m3)
2014			
Jan	nil	nil	nil
Feb	nil	nil	nil
Mar	nil	nil	nil
Apr	nil	nil	nil
May	3,700	nil	nil
Jun	66,950	nil	nil
Jul	80,600	nil	nil
Aug	79,600	nil	nil
Sep	100,700	nil	nil
Oct	60,450	50,400	nil
Nov	72,990	38,540	nil
Dec	84,440	10,720	nil
2015			
Jan	126750	47580	nil
Feb	153770	12440	nil
Mar	101370	65870	nil
Apr	173760	29840	nil
May	99,550	29,180	nil
June	49,460	9,360	nil
July	30,680	5,180	nil
August	36,960	21,520	nil
September	49,270	32,500	nil
October	41,200	27,550	nil
Total	1,412,200	380,680	nil

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Appendix H

Quarterly Assessment of Construction Impact

Cluster 1 TIN(Insitu)
1.3 x Baseline vs Impact

1.3 x Baseline TIN (Insitu) (mg/L) data			
SR5	1/4/2014	Mid-Flood	0.48
SR5	1/7/2014	Mid-Flood	0.61
SR5	1/9/2014	Mid-Flood	0.64
SR5	1/11/2014	Mid-Flood	0.83
SR5	1/14/2014	Mid-Flood	0.68
SR5	1/16/2014	Mid-Flood	0.55
SR5	1/18/2014	Mid-Flood	0.56
SR5	1/21/2014	Mid-Flood	0.50
SR5	1/23/2014	Mid-Flood	0.61
SR5	1/25/2014	Mid-Flood	0.88
SR5	1/27/2014	Mid-Flood	0.77
SR5	1/29/2014	Mid-Flood	0.61

Impact TIN (Insitu) (mg/L) data			
SR5	7/23/2015	Mid-Flood	1.11
SR5	7/25/2015	Mid-Flood	1.31
SR5	7/28/2015	Mid-Flood	1.37
SR5	7/30/2015	Mid-Flood	1.30
SR5	8/1/2015	Mid-Flood	1.16
SR5	8/4/2015	Mid-Flood	0.86
SR5	8/6/2015	Mid-Flood	0.81
SR5	8/8/2015	Mid-Flood	1.00
SR5	8/11/2015	Mid-Flood	0.80
SR5	8/13/2015	Mid-Flood	0.75
SR5	8/18/2015	Mid-Flood	0.68
SR5	8/20/2015	Mid-Flood	0.73
SR5	8/22/2015	Mid-Flood	0.48
SR5	8/25/2015	Mid-Flood	0.42
SR5	8/27/2015	Mid-Flood	0.41
SR5	8/29/2015	Mid-Flood	0.58
SR5	9/1/2015	Mid-Flood	0.46
SR5	9/3/2015	Mid-Flood	0.52
SR5	9/5/2015	Mid-Flood	0.78
SR5	9/8/2015	Mid-Flood	0.91
SR5	9/10/2015	Mid-Flood	0.69
SR5	9/12/2015	Mid-Flood	0.87
SR5	9/15/2015	Mid-Flood	0.43
SR5	9/17/2015	Mid-Flood	0.43
SR5	9/19/2015	Mid-Flood	0.64
SR5	9/22/2015	Mid-Flood	0.96
SR5	9/24/2015	Mid-Flood	0.99
SR5	9/26/2015	Mid-Flood	0.96
SR5	9/29/2015	Mid-Flood	0.64
SR5	10/1/2015	Mid-Flood	0.48
SR5	10/6/2015	Mid-Flood	0.83
SR5	10/8/2015	Mid-Flood	1.42
SR5	10/10/2015	Mid-Flood	0.63
SR5	10/13/2015	Mid-Flood	0.39
SR5	10/15/2015	Mid-Flood	0.38
SR5	10/17/2015	Mid-Flood	0.51
SR5	10/20/2015	Mid-Flood	0.39
SR5	10/22/2015	Mid-Flood	0.51

Cluster 1 TIN(Insitu)
1.3 x Baseline vs Impact

Baseline (Insitu) x 1.3		Impact (Insitu)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	12	Number of Valid Observations	38
Number of Distinct Observations	12	Number of Distinct Observations	32
Minimum	0.477	Minimum	0.38
Maximum	0.883	Maximum	1.42
Mean of Raw Data	0.643	Mean of Raw Data	0.752
Standard Deviation of Raw Data	0.127	Standard Deviation of Raw Data	0.3
Kstar	22.19	Kstar	6.236
Mean of Log Transformed Data	-0.458	Mean of Log Transformed Data	-0.36
Standard Deviation of Log Transformed Data	0.191	Standard Deviation of Log Transformed Data	0.395
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.968	Correlation Coefficient R	0.967
Shapiro Wilk Test Statistic	0.93	Shapiro Wilk Test Statistic	0.917
Shapiro Wilk Critical (0.95) Value	0.859	Shapiro Wilk Critical (0.95) Value	0.938
Approximate Shapiro Wilk P Value	0.407	Approximate Shapiro Wilk P Value	0.00879
Lilliefors Test Statistic	0.186	Lilliefors Test Statistic	0.123
Lilliefors Critical (0.95) Value	0.256	Lilliefors Critical (0.95) Value	0.144
Data appear Normal at (0.05) Significance Level		Data not Normal at (0.05) Significance Level	

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options	
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Impact (Insitu)
Background Data: Baseline (Insitu) x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	38	12
Number of Distinct Observations	32	12
Minimum	0.38	0.477
Maximum	1.42	0.883
Mean	0.752	0.643
Median	0.71	0.614
SD	0.3	0.127
SE of Mean	0.0486	0.0366

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1005
WMW Test U-Stat	0.806
WMW Critical Value (0.050)	1.645
P-Value	0.21

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

Cluster 1 TIN(Lab)
1.3 x Baseline vs Impact

1.3 x Baseline TIN (lab) (mg/L) data			
SR5	1/4/2014	Mid-Flood	0.48
SR5	1/7/2014	Mid-Flood	0.52
SR5	1/9/2014	Mid-Flood	0.48
SR5	1/11/2014	Mid-Flood	0.53
SR5	1/14/2014	Mid-Flood	0.35
SR5	1/16/2014	Mid-Flood	0.43
SR5	1/18/2014	Mid-Flood	0.59
SR5	1/21/2014	Mid-Flood	0.32
SR5	1/23/2014	Mid-Flood	0.55
SR5	1/25/2014	Mid-Flood	0.47
SR5	1/27/2014	Mid-Flood	0.40
SR5	1/29/2014	Mid-Flood	0.66

Impact TIN (lab) (mg/L) data			
SR5	7/23/2015	Mid-Flood	1.15
SR5	7/25/2015	Mid-Flood	1.27
SR5	7/28/2015	Mid-Flood	1.41
SR5	7/30/2015	Mid-Flood	1.32
SR5	8/1/2015	Mid-Flood	1.19
SR5	8/4/2015	Mid-Flood	0.89
SR5	8/6/2015	Mid-Flood	0.80
SR5	8/8/2015	Mid-Flood	1.05
SR5	8/11/2015	Mid-Flood	0.82
SR5	8/13/2015	Mid-Flood	0.76
SR5	8/18/2015	Mid-Flood	0.66
SR5	8/20/2015	Mid-Flood	0.74
SR5	8/22/2015	Mid-Flood	0.47
SR5	8/25/2015	Mid-Flood	0.39
SR5	8/27/2015	Mid-Flood	0.42
SR5	8/29/2015	Mid-Flood	0.54
SR5	9/1/2015	Mid-Flood	0.46
SR5	9/3/2015	Mid-Flood	0.56
SR5	9/5/2015	Mid-Flood	0.76
SR5	9/8/2015	Mid-Flood	0.91
SR5	9/10/2015	Mid-Flood	0.70
SR5	9/12/2015	Mid-Flood	0.88
SR5	9/15/2015	Mid-Flood	0.44
SR5	9/17/2015	Mid-Flood	0.41
SR5	9/19/2015	Mid-Flood	0.62
SR5	9/22/2015	Mid-Flood	0.95
SR5	9/24/2015	Mid-Flood	1.05
SR5	9/26/2015	Mid-Flood	0.96
SR5	9/29/2015	Mid-Flood	0.68
SR5	10/1/2015	Mid-Flood	0.50
SR5	10/6/2015	Mid-Flood	0.84
SR5	10/8/2015	Mid-Flood	1.45
SR5	10/10/2015	Mid-Flood	0.60
SR5	10/13/2015	Mid-Flood	0.39
SR5	10/15/2015	Mid-Flood	0.41
SR5	10/17/2015	Mid-Flood	0.52
SR5	10/20/2015	Mid-Flood	0.40
SR5	10/22/2015	Mid-Flood	0.51

Cluster 1 TIN(Lab)
1.3 x Baseline vs Impact

Baseline (Lab) x 1.3		Impact (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	12	Number of Valid Observations	38
Number of Distinct Observations	12	Number of Distinct Observations	34
Minimum	0.324	Minimum	0.39
Maximum	0.661	Maximum	1.45
Mean of Raw Data	0.482	Mean of Raw Data	0.76
Standard Deviation of Raw Data	0.0971	Standard Deviation of Raw Data	0.308
Kstar	19.61	Kstar	6.057
Mean of Log Transformed Data	-0.749	Mean of Log Transformed Data	-0.353
Standard Deviation of Log Transformed Data	0.208	Standard Deviation of Log Transformed Data	0.401
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.994	Correlation Coefficient R	0.967
Shapiro Wilk Test Statistic	0.986	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical (0.95) Value	0.859	Shapiro Wilk Critical (0.95) Value	0.938
Approximate Shapiro Wilk P Value	0.993	Approximate Shapiro Wilk P Value	0.00774
Lilliefors Test Statistic	0.108	Lilliefors Test Statistic	0.115
Lilliefors Critical (0.95) Value	0.256	Lilliefors Critical (0.95) Value	0.144
Data appear Normal at (0.05) Significance Level		Data not Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	C:\Users\achoi\Desktop\TIN C1 lab vs 1.3 x Baseline (data input).xls.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Impact (Lab)
Background Data: Baseline (Lab) x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	38	12
Number of Distinct Observations	34	12
Minimum	0.39	0.324
Maximum	1.45	0.661
Mean	0.76	0.482
Median	0.72	0.48
SD	0.308	0.0971
SE of Mean	0.0499	0.028

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1095
WMW Test U-Stat	2.851
WMW Critical Value (0.050)	1.645
P-Value	2.18E-03

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Cluster 1 TIN(Lab)
Gradient vs Impact

Gradient TIN (lab) (mg/L) data							
G2	7/23/2015	Mid-Flood	1.05	G4	7/23/2015	Mid-Flood	0.71
G2	7/25/2015	Mid-Flood	1.13	G4	7/25/2015	Mid-Flood	0.86
G2	7/28/2015	Mid-Flood	1.24	G4	7/28/2015	Mid-Flood	0.75
G2	7/30/2015	Mid-Flood	1.19	G4	7/30/2015	Mid-Flood	0.67
G2	8/1/2015	Mid-Flood	1.25	G4	8/1/2015	Mid-Flood	0.68
G2	8/4/2015	Mid-Flood	0.87	G4	8/4/2015	Mid-Flood	0.57
G2	8/6/2015	Mid-Flood	0.81	G4	8/6/2015	Mid-Flood	0.61
G2	8/8/2015	Mid-Flood	0.81	G4	8/8/2015	Mid-Flood	0.45
G2	8/11/2015	Mid-Flood	0.64	G4	8/11/2015	Mid-Flood	0.36
G2	8/13/2015	Mid-Flood	0.63	G4	8/13/2015	Mid-Flood	0.33
G2	8/18/2015	Mid-Flood	0.63	G4	8/18/2015	Mid-Flood	0.52
G2	8/20/2015	Mid-Flood	0.65	G4	8/20/2015	Mid-Flood	0.58
G2	8/22/2015	Mid-Flood	0.38	G4	8/22/2015	Mid-Flood	0.33
G2	8/25/2015	Mid-Flood	0.30	G4	8/25/2015	Mid-Flood	0.19
G2	8/27/2015	Mid-Flood	0.40	G4	8/27/2015	Mid-Flood	0.31
G2	8/29/2015	Mid-Flood	0.49	G4	8/29/2015	Mid-Flood	0.34
G2	9/1/2015	Mid-Flood	0.55	G4	9/1/2015	Mid-Flood	0.47
G2	9/3/2015	Mid-Flood	0.66	G4	9/3/2015	Mid-Flood	0.46
G2	9/5/2015	Mid-Flood	0.69	G4	9/5/2015	Mid-Flood	0.62
G2	9/8/2015	Mid-Flood	0.67	G4	9/8/2015	Mid-Flood	0.59
G2	9/10/2015	Mid-Flood	0.62	G4	9/10/2015	Mid-Flood	0.48
G2	9/12/2015	Mid-Flood	0.79	G4	9/12/2015	Mid-Flood	0.44
G2	9/15/2015	Mid-Flood	0.51	G4	9/15/2015	Mid-Flood	0.45
G2	9/17/2015	Mid-Flood	0.54	G4	9/17/2015	Mid-Flood	0.37
G2	9/19/2015	Mid-Flood	0.60	G4	9/19/2015	Mid-Flood	0.45
G2	9/22/2015	Mid-Flood	0.77	G4	9/22/2015	Mid-Flood	0.54
G2	9/24/2015	Mid-Flood	0.85	G4	9/24/2015	Mid-Flood	0.44
G2	9/26/2015	Mid-Flood	0.84	G4	9/26/2015	Mid-Flood	0.48
G2	9/29/2015	Mid-Flood	0.65	G4	9/29/2015	Mid-Flood	0.40
G2	10/1/2015	Mid-Flood	0.67	G4	10/1/2015	Mid-Flood	0.44
G2	10/6/2015	Mid-Flood	0.67	G4	10/6/2015	Mid-Flood	0.42
G2	10/8/2015	Mid-Flood	1.24	G4	10/8/2015	Mid-Flood	0.56
G2	10/10/2015	Mid-Flood	0.63	G4	10/10/2015	Mid-Flood	0.38
G2	10/13/2015	Mid-Flood	0.34	G4	10/13/2015	Mid-Flood	0.48
G2	10/15/2015	Mid-Flood	0.47	G4	10/15/2015	Mid-Flood	0.39
G2	10/17/2015	Mid-Flood	0.56	G4	10/17/2015	Mid-Flood	0.44
G2	10/20/2015	Mid-Flood	0.45	G4	10/20/2015	Mid-Flood	0.64
G2	10/22/2015	Mid-Flood	0.45	G4	10/22/2015	Mid-Flood	0.27
G3	7/23/2015	Mid-Flood	0.64				
G3	7/25/2015	Mid-Flood	0.86				
G3	7/28/2015	Mid-Flood	0.96				
G3	7/30/2015	Mid-Flood	0.55				
G3	8/1/2015	Mid-Flood	0.78				
G3	8/4/2015	Mid-Flood	0.58				
G3	8/6/2015	Mid-Flood	0.47				
G3	8/8/2015	Mid-Flood	0.44				
G3	8/11/2015	Mid-Flood	0.36				
G3	8/13/2015	Mid-Flood	0.34				
G3	8/18/2015	Mid-Flood	0.49				
G3	8/20/2015	Mid-Flood	0.44				
G3	8/22/2015	Mid-Flood	0.28				
G3	8/25/2015	Mid-Flood	0.24				
G3	8/27/2015	Mid-Flood	0.21				
G3	8/29/2015	Mid-Flood	0.34				
G3	9/1/2015	Mid-Flood	0.37				
G3	9/3/2015	Mid-Flood	0.46				
G3	9/5/2015	Mid-Flood	0.47				
G3	9/8/2015	Mid-Flood	0.57				
G3	9/10/2015	Mid-Flood	0.50				
G3	9/12/2015	Mid-Flood	0.42				
G3	9/15/2015	Mid-Flood	0.39				
G3	9/17/2015	Mid-Flood	0.33				
G3	9/19/2015	Mid-Flood	0.41				
G3	9/22/2015	Mid-Flood	0.47				
G3	9/24/2015	Mid-Flood	0.45				
G3	9/26/2015	Mid-Flood	0.44				
G3	9/29/2015	Mid-Flood	0.36				
G3	10/1/2015	Mid-Flood	0.47				
G3	10/6/2015	Mid-Flood	0.46				
G3	10/8/2015	Mid-Flood	0.63				
G3	10/10/2015	Mid-Flood	0.46				
G3	10/13/2015	Mid-Flood	0.23				
G3	10/15/2015	Mid-Flood	0.36				
G3	10/17/2015	Mid-Flood	0.40				
G3	10/20/2015	Mid-Flood	0.3				
G3	10/22/2015	Mid-Flood	0.29				

Impact TIN (lab) (mg/L) data			
SR5	7/23/2015	Mid-Flood	1.15
SR5	7/25/2015	Mid-Flood	1.27
SR5	7/28/2015	Mid-Flood	1.41
SR5	7/30/2015	Mid-Flood	1.32
SR5	8/1/2015	Mid-Flood	1.19
SR5	8/4/2015	Mid-Flood	0.89
SR5	8/6/2015	Mid-Flood	0.80
SR5	8/8/2015	Mid-Flood	1.05
SR5	8/11/2015	Mid-Flood	0.82
SR5	8/13/2015	Mid-Flood	0.76
SR5	8/18/2015	Mid-Flood	0.66
SR5	8/20/2015	Mid-Flood	0.74
SR5	8/22/2015	Mid-Flood	0.47
SR5	8/25/2015	Mid-Flood	0.39
SR5	8/27/2015	Mid-Flood	0.42
SR5	8/29/2015	Mid-Flood	0.54
SR5	9/1/2015	Mid-Flood	0.46
SR5	9/3/2015	Mid-Flood	0.56
SR5	9/5/2015	Mid-Flood	0.76
SR5	9/8/2015	Mid-Flood	0.91
SR5	9/10/2015	Mid-Flood	0.70
SR5	9/12/2015	Mid-Flood	0.88
SR5	9/15/2015	Mid-Flood	0.44
SR5	9/17/2015	Mid-Flood	0.41
SR5	9/19/2015	Mid-Flood	0.62
SR5	9/22/2015	Mid-Flood	0.95
SR5	9/24/2015	Mid-Flood	1.05
SR5	9/26/2015	Mid-Flood	0.96
SR5	9/29/2015	Mid-Flood	0.68
SR5	10/1/2015	Mid-Flood	0.50
SR5	10/6/2015	Mid-Flood	0.84
SR5	10/8/2015	Mid-Flood	1.45
SR5	10/10/2015	Mid-Flood	0.60
SR5	10/13/2015	Mid-Flood	0.39
SR5	10/15/2015	Mid-Flood	0.41
SR5	10/17/2015	Mid-Flood	0.52
SR5	10/20/2015	Mid-Flood	0.40
SR5	10/22/2015	Mid-Flood	0.51

Cluster 1 TIN(Lab)
Gradient vs Impact

Impact (Lab)		Gradient (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	38	Number of Valid Observations	114
Number of Distinct Observations	34	Number of Distinct Observations	59
Minimum	0.39	Minimum	0.19
Maximum	1.45	Maximum	1.25
Mean of Raw Data	0.76	Mean of Raw Data	0.547
Standard Deviation of Raw Data	0.308	Standard Deviation of Raw Data	0.22
Kstar	6.057	Kstar	6.883
Mean of Log Transformed Data	-0.353	Mean of Log Transformed Data	-0.676
Standard Deviation of Log Transformed Data	0.401	Standard Deviation of Log Transformed Data	0.379
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.967	Correlation Coefficient R	0.949
Shapiro Wilk Test Statistic	0.915	Approximate Shapiro Wilk Test Statistic	0.892
Shapiro Wilk Critical (0.95) Value	0.938	Approximate Shapiro Wilk P Value	1.23E-11
Approximate Shapiro Wilk P Value	0.00774	Lilliefors Test Statistic	0.137
Lilliefors Test Statistic	0.115	Lilliefors Critical (0.95) Value	0.083
Lilliefors Critical (0.95) Value	0.144	Data not Normal at (0.05) Significance Level	
Data not Normal at (0.05) Significance Level			

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
Full Precision	95%
Confidence Coefficient	0%
Substantial Difference	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Selected Null Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median
Alternative Hypothesis	

Area of Concern Data: Impact (Lab)
Background Data: Gradient (Lab)

Raw Statistics

	Site	Background
Number of Valid Observations	38	114
Number of Distinct Observations	34	59
Minimum	0.39	0.19
Maximum	1.45	1.25
Mean	0.76	0.547
Median	0.72	0.48
SD	0.308	0.22
SE of Mean	0.0499	0.0206

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3828
WMW Test U-Stat	3.915
WMW Critical Value (0.050)	1.645
P-Value	4.53E-05

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Cluster 2 TIN(Lab)
1.3 x Baseline vs Impact

Baseline x 1.3 TIN (lab) (mg/L)			
SR9	1/4/2014	Mid-Ebb	0.17
SR9	1/7/2014	Mid-Ebb	0.27
SR9	1/9/2014	Mid-Ebb	0.63
SR9	1/11/2014	Mid-Ebb	0.66
SR9	1/14/2014	Mid-Ebb	0.38
SR9	1/16/2014	Mid-Ebb	0.36
SR9	1/18/2014	Mid-Ebb	0.22
SR9	1/21/2014	Mid-Ebb	0.07
SR9	1/23/2014	Mid-Ebb	0.06
SR9	1/25/2014	Mid-Ebb	0.04
SR9	1/27/2014	Mid-Ebb	0.04
SR9	1/29/2014	Mid-Ebb	0.04
SR10	1/4/2014	Mid-Ebb	0.21
SR10	1/7/2014	Mid-Ebb	0.22
SR10	1/9/2014	Mid-Ebb	0.22
SR10	1/11/2014	Mid-Ebb	0.23
SR10	1/14/2014	Mid-Ebb	0.16
SR10	1/16/2014	Mid-Ebb	0.14
SR10	1/18/2014	Mid-Ebb	0.15
SR10	1/21/2014	Mid-Ebb	0.13
SR10	1/23/2014	Mid-Ebb	0.17
SR10	1/25/2014	Mid-Ebb	0.09
SR10	1/27/2014	Mid-Ebb	0.10
SR10	1/29/2014	Mid-Ebb	0.13
SR11	1/4/2014	Mid-Ebb	0.21
SR11	1/7/2014	Mid-Ebb	0.20
SR11	1/9/2014	Mid-Ebb	0.22
SR11	1/11/2014	Mid-Ebb	0.24
SR11	1/14/2014	Mid-Ebb	0.17
SR11	1/16/2014	Mid-Ebb	0.14
SR11	1/18/2014	Mid-Ebb	0.12
SR11	1/21/2014	Mid-Ebb	0.15
SR11	1/23/2014	Mid-Ebb	0.21
SR11	1/25/2014	Mid-Ebb	0.14
SR11	1/27/2014	Mid-Ebb	0.08
SR11	1/29/2014	Mid-Ebb	0.11

Impact TIN (lab) (mg/L)							
SR9	7/23/2015	Mid-Ebb	0.67	SR11	7/23/2015	Mid-Ebb	0.44
SR9	7/25/2015	Mid-Ebb	1.00	SR11	7/25/2015	Mid-Ebb	0.63
SR9	7/28/2015	Mid-Ebb	1.05	SR11	7/28/2015	Mid-Ebb	0.79
SR9	7/30/2015	Mid-Ebb	0.58	SR11	7/30/2015	Mid-Ebb	0.47
SR9	8/1/2015	Mid-Ebb	0.27	SR11	8/1/2015	Mid-Ebb	0.38
SR9	8/4/2015	Mid-Ebb	0.34	SR11	8/4/2015	Mid-Ebb	0.25
SR9	8/6/2015	Mid-Ebb	0.85	SR11	8/6/2015	Mid-Ebb	0.25
SR9	8/8/2015	Mid-Ebb	0.20	SR11	8/8/2015	Mid-Ebb	0.14
SR9	8/11/2015	Mid-Ebb	0.48	SR11	8/11/2015	Mid-Ebb	0.22
SR9	8/13/2015	Mid-Ebb	0.41	SR11	8/13/2015	Mid-Ebb	0.31
SR9	8/18/2015	Mid-Ebb	0.74	SR11	8/18/2015	Mid-Ebb	0.41
SR9	8/20/2015	Mid-Ebb	0.32	SR11	8/20/2015	Mid-Ebb	0.34
SR9	8/22/2015	Mid-Ebb	0.25	SR11	8/22/2015	Mid-Ebb	0.07
SR9	8/25/2015	Mid-Ebb	0.03	SR11	8/25/2015	Mid-Ebb	0.05
SR9	8/27/2015	Mid-Ebb	0.08	SR11	8/27/2015	Mid-Ebb	0.04
SR9	8/29/2015	Mid-Ebb	0.31	SR11	8/29/2015	Mid-Ebb	0.11
SR9	9/1/2015	Mid-Ebb	0.37	SR11	9/1/2015	Mid-Ebb	0.30
SR9	9/3/2015	Mid-Ebb	0.38	SR11	9/3/2015	Mid-Ebb	0.34
SR9	9/5/2015	Mid-Ebb	0.79	SR11	9/5/2015	Mid-Ebb	0.25
SR9	9/8/2015	Mid-Ebb	0.74	SR11	9/8/2015	Mid-Ebb	0.40
SR9	9/10/2015	Mid-Ebb	0.45	SR11	9/10/2015	Mid-Ebb	0.15
SR9	9/12/2015	Mid-Ebb	0.49	SR11	9/12/2015	Mid-Ebb	0.17
SR9	9/15/2015	Mid-Ebb	0.38	SR11	9/15/2015	Mid-Ebb	0.13
SR9	9/17/2015	Mid-Ebb	0.36	SR11	9/17/2015	Mid-Ebb	0.19
SR9	9/19/2015	Mid-Ebb	0.25	SR11	9/19/2015	Mid-Ebb	0.21
SR9	9/22/2015	Mid-Ebb	0.59	SR11	9/22/2015	Mid-Ebb	0.37
SR9	9/24/2015	Mid-Ebb	0.30	SR11	9/24/2015	Mid-Ebb	0.15
SR9	9/26/2015	Mid-Ebb	0.48	SR11	9/26/2015	Mid-Ebb	0.24
SR9	9/29/2015	Mid-Ebb	0.35	SR11	9/29/2015	Mid-Ebb	0.21
SR9	10/1/2015	Mid-Ebb	0.41	SR11	10/1/2015	Mid-Ebb	0.30
SR9	10/6/2015	Mid-Ebb	0.42	SR11	10/6/2015	Mid-Ebb	0.28
SR9	10/8/2015	Mid-Ebb	0.58	SR11	10/8/2015	Mid-Ebb	0.30
SR9	10/10/2015	Mid-Ebb	0.48	SR11	10/10/2015	Mid-Ebb	0.17
SR9	10/13/2015	Mid-Ebb	0.32	SR11	10/13/2015	Mid-Ebb	0.11
SR9	10/15/2015	Mid-Ebb	0.29	SR11	10/15/2015	Mid-Ebb	0.20
SR9	10/17/2015	Mid-Ebb	0.33	SR11	10/17/2015	Mid-Ebb	0.25
SR9	10/20/2015	Mid-Ebb	0.30	SR11	10/20/2015	Mid-Ebb	0.15
SR9	10/22/2015	Mid-Ebb	0.28	SR11	10/22/2015	Mid-Ebb	0.14
SR10	7/23/2015	Mid-Ebb	0.58				
SR10	7/25/2015	Mid-Ebb	0.62				
SR10	7/28/2015	Mid-Ebb	0.79				
SR10	7/30/2015	Mid-Ebb	0.54				
SR10	8/1/2015	Mid-Ebb	0.46				
SR10	8/4/2015	Mid-Ebb	0.49				
SR10	8/6/2015	Mid-Ebb	0.33				
SR10	8/8/2015	Mid-Ebb	0.27				
SR10	8/11/2015	Mid-Ebb	0.25				
SR10	8/13/2015	Mid-Ebb	0.29				
SR10	8/18/2015	Mid-Ebb	0.45				
SR10	8/20/2015	Mid-Ebb	0.38				
SR10	8/22/2015	Mid-Ebb	0.08				
SR10	8/25/2015	Mid-Ebb	0.09				
SR10	8/27/2015	Mid-Ebb	0.09				
SR10	8/29/2015	Mid-Ebb	0.10				
SR10	9/1/2015	Mid-Ebb	0.30				
SR10	9/3/2015	Mid-Ebb	0.36				
SR10	9/5/2015	Mid-Ebb	0.38				
SR10	9/8/2015	Mid-Ebb	0.44				
SR10	9/10/2015	Mid-Ebb	0.27				
SR10	9/12/2015	Mid-Ebb	0.25				
SR10	9/15/2015	Mid-Ebb	0.19				
SR10	9/17/2015	Mid-Ebb	0.22				
SR10	9/19/2015	Mid-Ebb	0.26				
SR10	9/22/2015	Mid-Ebb	0.42				
SR10	9/24/2015	Mid-Ebb	0.24				
SR10	9/26/2015	Mid-Ebb	0.23				
SR10	9/29/2015	Mid-Ebb	0.28				
SR10	10/1/2015	Mid-Ebb	0.25				
SR10	10/6/2015	Mid-Ebb	0.33				
SR10	10/8/2015	Mid-Ebb	0.41				
SR10	10/10/2015	Mid-Ebb	0.13				
SR10	10/13/2015	Mid-Ebb	0.12				
SR10	10/15/2015	Mid-Ebb	0.24				
SR10	10/17/2015	Mid-Ebb	0.31				
SR10	10/20/2015	Mid-Ebb	0.17				
SR10	10/22/2015	Mid-Ebb	0.2				

Cluster 2 TIN(Lab)
1.3 x Baseline vs Impact

Baseline (Lab) x 1.3		Impact (Lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	36	Number of Valid Observations	114
Number of Distinct Observations	33	Number of Distinct Observations	53
Minimum	0.0437	Minimum	0.03
Maximum	0.665	Maximum	1.05
Mean of Raw Data	0.192	Mean of Raw Data	0.339
Standard Deviation of Raw Data	0.137	Standard Deviation of Raw Data	0.198
Kstar	2.412	Kstar	2.862
Mean of Log Transformed Data	-1.852	Mean of Log Transformed Data	-1.262
Standard Deviation of Log Transformed Data	0.652	Standard Deviation of Log Transformed Data	0.648
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.876	Correlation Coefficient R	0.957
Shapiro Wilk Test Statistic	0.777	Approximate Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical (0.95) Value	0.935	Approximate Shapiro Wilk P Value	5.68E-09
Approximate Shapiro Wilk P Value	8.73E-07	Lilliefors Test Statistic	0.119
Lilliefors Test Statistic	0.22	Lilliefors Critical (0.95) Value	0.083
Lilliefors Critical (0.95) Value	0.148	Data not Normal at (0.05) Significance Level	
Data not Normal at (0.05) Significance Level			

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Impact (Lab)
Background Data: Baseline (Lab) x 1.3

Raw Statistics

	Site	Background
Number of Valid Observations	114	36
Number of Distinct Observations	53	33
Minimum	0.03	0.0437
Maximum	1.05	0.665
Mean	0.339	0.192
Median	0.3	0.164
SD	0.198	0.137
SE of Mean	0.0185	0.0229

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	9710
WMW Test U-Stat	4.852
WMW Critical Value (0.050)	1.645
P-Value	6.13E-07

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

Cluster 2 TIN(Lab)
G1 vs Impact

G1 TIN (lab) (mg/L)			
G1	7/23/2015	Mid-Ebb	1.06
G1	7/25/2015	Mid-Ebb	1.26
G1	7/28/2015	Mid-Ebb	1.45
G1	7/30/2015	Mid-Ebb	1.38
G1	8/1/2015	Mid-Ebb	1.03
G1	8/4/2015	Mid-Ebb	0.66
G1	8/6/2015	Mid-Ebb	0.74
G1	8/8/2015	Mid-Ebb	0.99
G1	8/11/2015	Mid-Ebb	0.79
G1	8/13/2015	Mid-Ebb	0.69
G1	8/18/2015	Mid-Ebb	0.51
G1	8/20/2015	Mid-Ebb	0.60
G1	8/22/2015	Mid-Ebb	0.50
G1	8/25/2015	Mid-Ebb	0.38
G1	8/27/2015	Mid-Ebb	0.43
G1	8/29/2015	Mid-Ebb	0.55
G1	9/1/2015	Mid-Ebb	0.46
G1	9/3/2015	Mid-Ebb	0.55
G1	9/5/2015	Mid-Ebb	0.88
G1	9/8/2015	Mid-Ebb	0.88
G1	9/10/2015	Mid-Ebb	0.77
G1	9/12/2015	Mid-Ebb	0.87
G1	9/15/2015	Mid-Ebb	0.50
G1	9/17/2015	Mid-Ebb	0.51
G1	9/19/2015	Mid-Ebb	0.69
G1	9/22/2015	Mid-Ebb	0.98
G1	9/24/2015	Mid-Ebb	1.14
G1	9/26/2015	Mid-Ebb	0.88
G1	9/29/2015	Mid-Ebb	0.72
G1	10/1/2015	Mid-Ebb	0.55
G1	10/6/2015	Mid-Ebb	0.86
G1	10/8/2015	Mid-Ebb	1.42
G1	10/10/2015	Mid-Ebb	0.78
G1	10/13/2015	Mid-Ebb	0.47
G1	10/15/2015	Mid-Ebb	0.39
G1	10/17/2015	Mid-Ebb	0.49
G1	10/20/2015	Mid-Ebb	0.39
G1	10/22/2015	Mid-Ebb	0.50

Impact TIN (lab) (mg/L)							
SR9	7/23/2015	Mid-Ebb	0.67	SR11	7/23/2015	Mid-Ebb	0.44
SR9	7/25/2015	Mid-Ebb	1.00	SR11	7/25/2015	Mid-Ebb	0.63
SR9	7/28/2015	Mid-Ebb	1.05	SR11	7/28/2015	Mid-Ebb	0.79
SR9	7/30/2015	Mid-Ebb	0.58	SR11	7/30/2015	Mid-Ebb	0.47
SR9	8/1/2015	Mid-Ebb	0.27	SR11	8/1/2015	Mid-Ebb	0.38
SR9	8/4/2015	Mid-Ebb	0.34	SR11	8/4/2015	Mid-Ebb	0.25
SR9	8/6/2015	Mid-Ebb	0.85	SR11	8/6/2015	Mid-Ebb	0.25
SR9	8/8/2015	Mid-Ebb	0.20	SR11	8/8/2015	Mid-Ebb	0.14
SR9	8/11/2015	Mid-Ebb	0.48	SR11	8/11/2015	Mid-Ebb	0.22
SR9	8/13/2015	Mid-Ebb	0.41	SR11	8/13/2015	Mid-Ebb	0.31
SR9	8/18/2015	Mid-Ebb	0.74	SR11	8/18/2015	Mid-Ebb	0.41
SR9	8/20/2015	Mid-Ebb	0.32	SR11	8/20/2015	Mid-Ebb	0.34
SR9	8/22/2015	Mid-Ebb	0.25	SR11	8/22/2015	Mid-Ebb	0.07
SR9	8/25/2015	Mid-Ebb	0.03	SR11	8/25/2015	Mid-Ebb	0.05
SR9	8/27/2015	Mid-Ebb	0.08	SR11	8/27/2015	Mid-Ebb	0.04
SR9	8/29/2015	Mid-Ebb	0.31	SR11	8/29/2015	Mid-Ebb	0.11
SR9	9/1/2015	Mid-Ebb	0.37	SR11	9/1/2015	Mid-Ebb	0.30
SR9	9/3/2015	Mid-Ebb	0.38	SR11	9/3/2015	Mid-Ebb	0.34
SR9	9/5/2015	Mid-Ebb	0.79	SR11	9/5/2015	Mid-Ebb	0.25
SR9	9/8/2015	Mid-Ebb	0.74	SR11	9/8/2015	Mid-Ebb	0.40
SR9	9/10/2015	Mid-Ebb	0.45	SR11	9/10/2015	Mid-Ebb	0.15
SR9	9/12/2015	Mid-Ebb	0.49	SR11	9/12/2015	Mid-Ebb	0.17
SR9	9/15/2015	Mid-Ebb	0.38	SR11	9/15/2015	Mid-Ebb	0.13
SR9	9/17/2015	Mid-Ebb	0.36	SR11	9/17/2015	Mid-Ebb	0.19
SR9	9/19/2015	Mid-Ebb	0.25	SR11	9/19/2015	Mid-Ebb	0.21
SR9	9/22/2015	Mid-Ebb	0.59	SR11	9/22/2015	Mid-Ebb	0.37
SR9	9/24/2015	Mid-Ebb	0.30	SR11	9/24/2015	Mid-Ebb	0.15
SR9	9/26/2015	Mid-Ebb	0.48	SR11	9/26/2015	Mid-Ebb	0.24
SR9	9/29/2015	Mid-Ebb	0.35	SR11	9/29/2015	Mid-Ebb	0.21
SR9	10/1/2015	Mid-Ebb	0.41	SR11	10/1/2015	Mid-Ebb	0.30
SR9	10/6/2015	Mid-Ebb	0.42	SR11	10/6/2015	Mid-Ebb	0.28
SR9	10/8/2015	Mid-Ebb	0.58	SR11	10/8/2015	Mid-Ebb	0.30
SR9	10/10/2015	Mid-Ebb	0.48	SR11	10/10/2015	Mid-Ebb	0.17
SR9	10/13/2015	Mid-Ebb	0.32	SR11	10/13/2015	Mid-Ebb	0.11
SR9	10/15/2015	Mid-Ebb	0.29	SR11	10/15/2015	Mid-Ebb	0.20
SR9	10/17/2015	Mid-Ebb	0.33	SR11	10/17/2015	Mid-Ebb	0.25
SR9	10/20/2015	Mid-Ebb	0.30	SR11	10/20/2015	Mid-Ebb	0.15
SR9	10/22/2015	Mid-Ebb	0.28	SR11	10/22/2015	Mid-Ebb	0.14
SR10	7/23/2015	Mid-Ebb	0.58				
SR10	7/25/2015	Mid-Ebb	0.62				
SR10	7/28/2015	Mid-Ebb	0.79				
SR10	7/30/2015	Mid-Ebb	0.54				
SR10	8/1/2015	Mid-Ebb	0.46				
SR10	8/4/2015	Mid-Ebb	0.49				
SR10	8/6/2015	Mid-Ebb	0.33				
SR10	8/8/2015	Mid-Ebb	0.27				
SR10	8/11/2015	Mid-Ebb	0.25				
SR10	8/13/2015	Mid-Ebb	0.29				
SR10	8/18/2015	Mid-Ebb	0.45				
SR10	8/20/2015	Mid-Ebb	0.38				
SR10	8/22/2015	Mid-Ebb	0.08				
SR10	8/25/2015	Mid-Ebb	0.09				
SR10	8/27/2015	Mid-Ebb	0.09				
SR10	8/29/2015	Mid-Ebb	0.10				
SR10	9/1/2015	Mid-Ebb	0.30				
SR10	9/3/2015	Mid-Ebb	0.36				
SR10	9/5/2015	Mid-Ebb	0.38				
SR10	9/8/2015	Mid-Ebb	0.44				
SR10	9/10/2015	Mid-Ebb	0.27				
SR10	9/12/2015	Mid-Ebb	0.25				
SR10	9/15/2015	Mid-Ebb	0.19				
SR10	9/17/2015	Mid-Ebb	0.22				
SR10	9/19/2015	Mid-Ebb	0.26				
SR10	9/22/2015	Mid-Ebb	0.42				
SR10	9/24/2015	Mid-Ebb	0.24				
SR10	9/26/2015	Mid-Ebb	0.23				
SR10	9/29/2015	Mid-Ebb	0.28				
SR10	10/1/2015	Mid-Ebb	0.25				
SR10	10/6/2015	Mid-Ebb	0.33				
SR10	10/8/2015	Mid-Ebb	0.41				
SR10	10/10/2015	Mid-Ebb	0.13				
SR10	10/13/2015	Mid-Ebb	0.12				
SR10	10/15/2015	Mid-Ebb	0.24				
SR10	10/17/2015	Mid-Ebb	0.31				
SR10	10/20/2015	Mid-Ebb	0.17				
SR10	10/22/2015	Mid-Ebb	0.2				

Cluster 2 TIN(Lab)
G1 vs Impact

Impact (Lab)		G1 (lab)	
Raw Statistics		Raw Statistics	
Number of Valid Observations	114	Number of Valid Observations	38
Number of Distinct Observations	53	Number of Distinct Observations	29
Minimum	0.03	Minimum	0.38
Maximum	1.05	Maximum	1.45
Mean of Raw Data	0.339	Mean of Raw Data	0.755
Standard Deviation of Raw Data	0.198	Standard Deviation of Raw Data	0.299
Kstar	2.862	Kstar	6.539
Mean of Log Transformed Data	-1.262	Mean of Log Transformed Data	-0.353
Standard Deviation of Log Transformed Data	0.648	Standard Deviation of Log Transformed Data	0.383
Normal Distribution Test Results		Normal Distribution Test Results	
Correlation Coefficient R	0.957	Correlation Coefficient R	0.96
Approximate Shapiro Wilk Test Statistic	0.91	Shapiro Wilk Test Statistic	0.907
Approximate Shapiro Wilk P Value	5.68E-09	Shapiro Wilk Critical (0.95) Value	0.938
Lilliefors Test Statistic	0.119	Approximate Shapiro Wilk P Value	0.00386
Lilliefors Critical (0.95) Value	0.083	Lilliefors Test Statistic	0.149
Data not Normal at (0.05) Significance Level		Lilliefors Critical (0.95) Value	0.144
		Data not Normal at (0.05) Significance Level	

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Greater Than or Equal to Background Mean/Median (Form 2)
Alternative Hypothesis	Site or AOC Mean/Median Less Than Background Mean/Median

Area of Concern Data: Impact (Lab)
Background Data: G1 (Lab)

Raw Statistics

	Site	Background
Number of Valid Observations	114	38
Number of Distinct Observations	53	29
Minimum	0.03	0.38
Maximum	1.05	1.45
Mean	0.339	0.755
Median	0.3	0.705
SD	0.198	0.299
SE of Mean	0.0185	0.0485

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC >= Mean/Median of Background

Site Rank Sum W-Stat	6955
WMW Test U-Stat	-7.512
WMW Critical Value (0.050)	-1.645
P-Value	2.91E-14

Conclusion with Alpha = 0.05
Reject H0, Conclude Site < Background
P-Value < alpha (0.05)