



UDL – Gitanes Joint Venture



Date: 4 December 2019

Our Ref.: UGJV/18_8005/191204-00

The Hongkong Electric Co., Ltd.
Hongkong Electric Centre,
44 Kennedy Road,
Hong Kong

Fax: 2810 0506
Email: mail@hkelectric.com

Attention: Mr. C. K. Lau – General Manager (Projects)

Dear Sirs,


Contract No. 18/8005
Lamma Power Station
Navigation Channel Improvement 2019
Silt Curtain Deployment Plan for Dredging Works

We would like to submit Silt Curtain Deployment Plan for the required dredging works for the captioned contract project.

For any queries, please contact the undersigned at 9750 6438.

Thank you for your attention.

Yours faithfully,
For and on behalf of
UDL – Gitanes Joint Venture



Ian Li Kam Wa
Joint Venture Representative



Room 703, 7/F, Aitken Vanson Centre, 61 Hoi Yuen Road, Kwun Tong, Kowloon, Hong Kong
香港九龍觀塘開源道 61 號金米蘭中心 7 樓 703 室
Tel: (852) 2709 9931 Fax: (852) 2754 8879

THE HONGKONG ELECTRIC CO., LTD.

Contract No. 18/8005

Lamma Power Station Navigation Channel Improvement 2019

Silt Curtain Deployment Plan

November 2019 (Revised)

CONTENTS

1	Introduction	Page 1
2	Water Pollution Mitigation by the Silt Curtain	Page 2
3	The Silt Curtain Layout and Installation	Page 2
4.	Checking and Maintenance of the Silt Curtain	Page 4

Appendix

Appendix A: Catalogue of the silt curtain materials

Appendix B: Construction programme of proposed silt curtain

Appendix C: Drawing / Sketch for silt curtain frame

Appendix D: Layout plan showing locations by TSHD & Grab Dredger

Appendix E: Silt curtain report by HKE past dredging project

Appendix F: Monthly, Weekly and daily Inspection Form

Appendix G: Reply to EPD's comments on silt curtain deployment plan

INTRODUCTION

The Site is the Lamma Navigation Channel adjacent to the Lamma Power Station in Hong Kong West Lamma Channel including the side slopes.

This project of Lamma Power Station navigation channel improvement works involves dredging works for the navigation channel as well as jetty berth region.

This silt curtain deployment plan shall be prepared and submitted under EP condition 2.15 (EP-535/2017) for approval not more than 2 months before commencement of the dredging activities. The plan shall contain construction programme, details on the design, operation and maintenance of the proposed silt curtain.

The majority of dredging work is to be carried out by Trailer Suction Hopper Dredger (TSHD) whereas the minority of dredging work for remedial trimming and near the existing jetty structure is to be carried out by grab dredger. No silt curtain will be made for the works done by TSHD. A layout plan showing the locations involved TSHD and grab dredger is attached in Appendix D.

When the proposed dredging activity is going underway by grab dredger, only cage type silt curtain will be used so as to control water turbidity during the dredging work. The construction programme for dredging activities is attached in Appendix B.

In view of the works nature of the project involving time-to-time and dynamic demobilization of vessels off the navigation channel so as not to affect incoming and outgoing navigation of the coal transportation vessels, cage type silt curtain adhered to the dredger will be adopted so as to contain fully the grabber operation, and at the same time to allow easy tow away demobilization of curtain frame together with the grab dredger.

2 WATER POLLUTION MITIGATION BY THE SILT CURTAIN

As the first measure to mitigate water pollution nuisance, the cage type silt curtain is designed to enclose local pollution caused by the grab dredger. This frame type silt curtain is made by a steel frame with floating buoy fixed on the top frame such that it is floating on water. A silt curtain membrane is mounted on the four sides of the steel frame so as to cover the entire water column.

The dredging works by the grab dredger would then be carried out within the frame type silt curtain. The position of this frame type silt curtain would be maintained by a chain fixed between the frame structure of silt curtain and the dredger.



3 THE SILT CURTAIN LAYOUT AND INSTALLATION

A total of two numbers of silts curtains will be provided for the dredging works (to allow one number of grab dredgers on site for working and the other one is for stand-by purpose as contingency).

The upper part of each of the silt curtains consists of a floating hollow frame from 4 tubular floats. The silt curtain frame is of 18m x 15m fabricated with member size of approx. 1m diameter 12mm thick pipe section. The silt curtain design is attached in Appendix C.

After the floating frame of the curtain being fabricated, silt curtain membrane (type #800 from Taiyo Kygyo or equivalent and the silt curtain membrane information is attached in Appendix A) will be mounted to the four sides of the floating frame and that the membrane would enclose the water column, with the length of membrane to suit site conditions such as tidal, current, seabed, etc. Ballast chain will be installed act as weight in the bottom end of the membrane, which shall be anchored to between 30cm and 50cm above the seabed so that

adequate depth of the silt curtain shall be given to cater for tidal changes even during high tides. It forms a Cage-type silt curtain (at least 10m depth) for the grab dredger options of dredging construction and operation in accordance with the requirement contained in the approved EIA Report (register No. AEIAR-212/2017) Chapter 3 Clause 3.8.

The silt curtains will be installed at the bow of the dredger with connection by using steel chains. Work boat will be engaged to assist the connection works.



sizing and installation position of silt curtain frame to be carefully decided and adjusted so as not to affect hopper barges berthing

The proposed silt curtain is a cage-type around the grab dredger which was used over The Hongkong Electric Co., Ltd. (HKE) past dredging projects and proved to be effective in reducing possible sea-water pollution from the dredging process.

A past report of silt curtain is provided in Appendix E for seawater quality measurement across cage-type silt curtain under HKE's previous project. According to the measurement results showed in Table 3.2 of the report (page 10 of the report refers), it concluded that the silt curtain was successful in containing the turbidity and suspended solid with average efficiency 87% and 91% respectively from the dredging process.

Given the proposed methodology and set up arrangement for silt curtain to be used for grab dredger is the same as successful past project with efficiency more than 75% , the modelling assumption of silt curtain efficiency as stated in EIA report is met.

CHECKING AND MAINTENANCE OF THE SILT CURTAIN

As the silt curtain is being floated on water during the course of work, visual inspection would be conducted before the commencement of dredging works in each working day so as to check for any damage to the floating frame as well as curtain mounting. Weekly dive inspection or inspection by lifting up for condition checking of silt curtain will be carried out. In case having such the defect / damage inspected, necessary repair works can be arranged at the earlier stage. Checking and maintenance records will be recorded and kept for inspection and review. Weekly and daily inspection forms are to be used are attached in Appendix F.

An initial check to the site curtain is to be conducted before the day on commencement of dredging works. Monthly detail checking to the silt curtain will be arranged by lifting up of the curtain frame by using a derrick barge or grab dredger itself and to make necessary checking and repair if so required. Before lifting up the curtain for monthly checking, precaution measures such as visual inspection will be taken to check for any damage to the floating frame as well as condition of the curtain mounting. Also, sufficient time is allowed to ensure all dredged and silt materials inside the cage type silt curtain are fully settled down before lifting up the silt curtain for the subsequent regular check. Monthly checklist and inspection form is attached in Appendix F.

In case minor repair (like fixing of the loosen mounting for the curtain) is required, a work boat and technicians will be engaged for the repair work at the spot.

For damage such as serious floating frame deformation or detachment of the whole section of curtain material, whole unit replacement would be preferred instead of on site repair, and that a spare silt curtain floating frame will be allow off the site as standby so as to cater quick recover of silt curtain installation and resume of dredging works.

In case of damage curtain or silty plume outside the cage observed during the dredging operation, the dredging works shall cease immediately for carrying out condition check of the curtain. Work boat will be engaged to assist the connection works and/or make necessary repair works. Sufficient time is allowed to ensure all dredged and silty materials inside the cage type silt curtain are fully settled down against dispersion of silty materials over the sea before lifting up the silt curtain for maintenance or replacement. Such replacement works shall be by

another one silt curtain which will be stand-by on site for contingency. Dredging works will resume upon completion of repair work and no observation of silty plume outside the cage.



The silt curtain separates the dredging zone from the nearby waters to minimize water pollution nuisance

In case of emergency case due to any reason such as adverse weather condition etc., the dredging works shall cease when Typhoon Signal No. 1 is hoisted. When Typhoon Signal No. 3 or above is hoisted, such silt curtain membrane will be folded upwards attaching to the floating frame and demobilized together with the grab dredger vessels to the typhoon shelters as soon as practicable. Re-mobilization will be taken within 2 hours after Typhoon Signal No. 3 is lowered down as announcement by Hong Kong Observatory.

It is understood that the silt curtain shall be thoroughly inspected after these emergency situations to ensure intact structure for resumption of the dredging works.

APPENDIX A – CATALOGUE OF THE SILT CURTAIN
MATERIAL

SILT PROTECTOR®

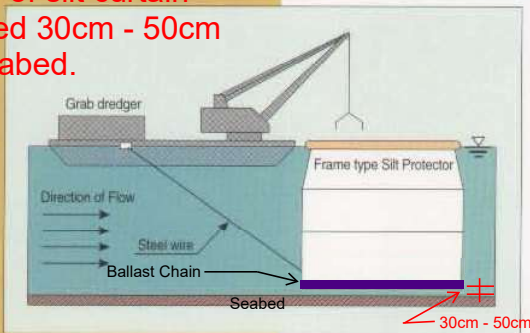


PREVENT DIFFUSION
OF SILT IN WATER

More Types

● Frame type Silt Protector

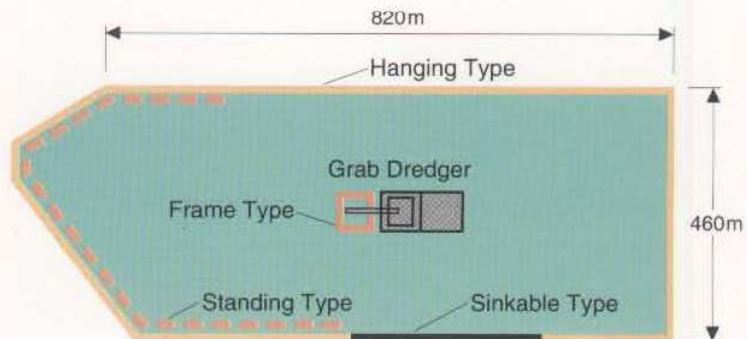
This type has been designed to enclose local pollution caused by the grab dredging. It consists of floats (usually discharge pipes are used), curtain and ballast at the bottom. Mid-ballast may be added as necessary. Many of this type is made so that the length of the curtain can be changed according to the depth by using a winch and wire rope. The length of the curtain is made ~~less than 1.5m for use with the grab dredger~~ so that the ballast at the bottom of silt curtain shall be placed 30cm - 50cm above the seabed.



● Combined installation

(Not Applicable to this project)

~~Frame type Silt Protector is, in many cases, installed together with hanging type to avoid turbid water when dredger moves, tucking the curtain. For deep sea like 20m water depth, combined installation of hanging type and standing type is sometimes used. In case, heat passing is necessary, sinkable hanging type is used in open port.~~



■ Specifications for the curtain material

SPO-#800

Tensile strength 800kgf/3cm



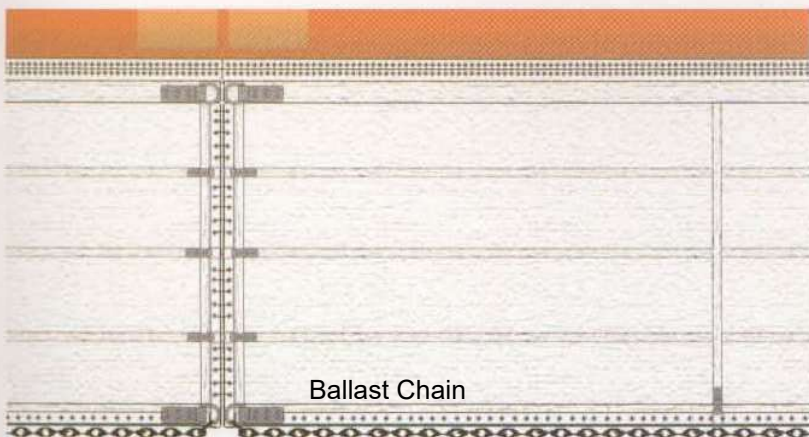
SPO-#500

Tensile strength 500kgf/3cm



SPO-#300

Tensile strength 300kgf/3cm



Ballast Chain

Seabed

30cm - 50cm

● Material for curtain and float components

The curtain and inner cover for the float are made of high strength polyester synthetic fiber that has been studied and developed to give excellent durability, cold-resistance, chemical resistance and light resistance.

The float cover (outermost cover) is made of high strength polyester tarpaulin with superior UV (ultra violet ray) resistance in addition to the features of the polyester synthetic fiber.

The float is made of solid cylindrical styrene foam with high weather resistance. Since the material will not absorb water, the buoyancy of the float is not reduced. The float adapts to the wave well thanks to the advantage of the material.

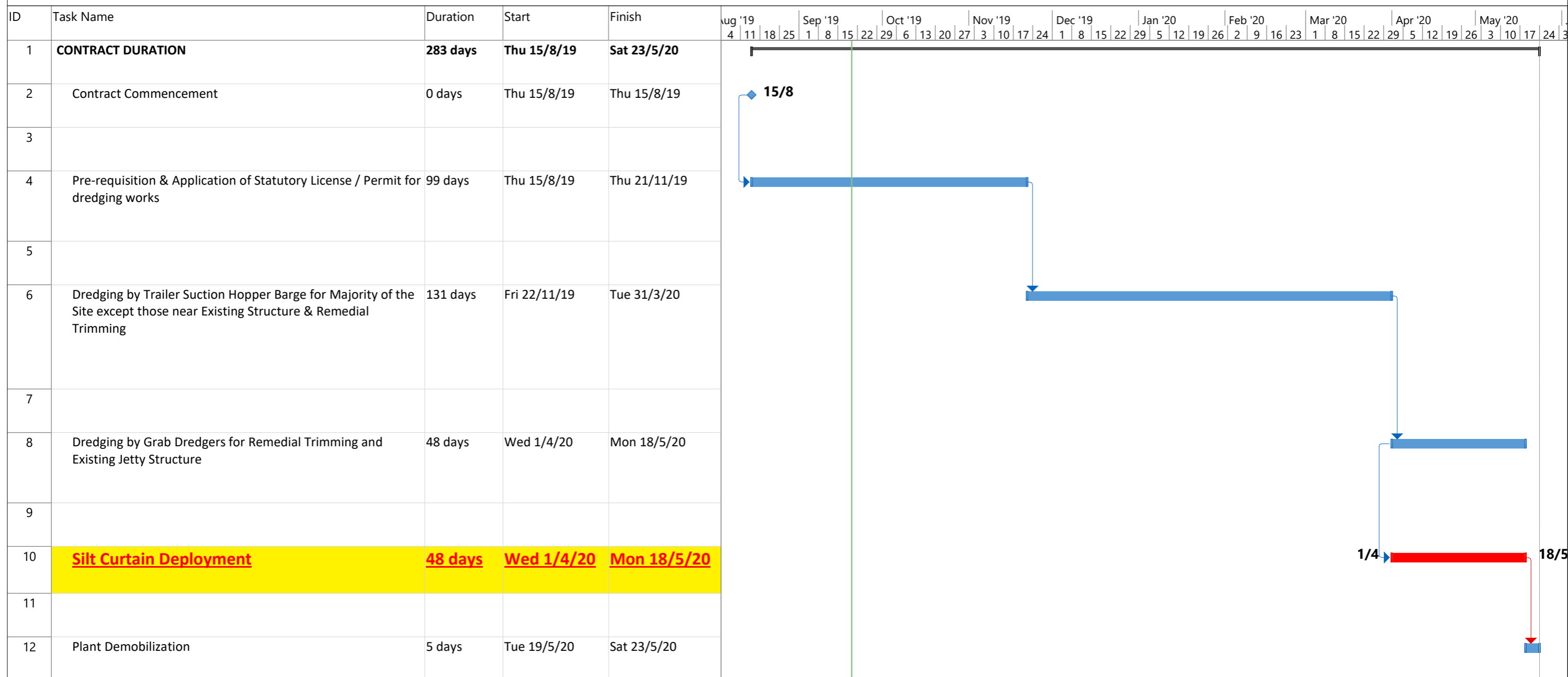
Material

APPENDIX B – CONSTRUCTION PROGRAMME OF
PROPOSED SILT CURTAIN

LOA : 14 June 2019
 Contract Commencement :
 15 August 2019

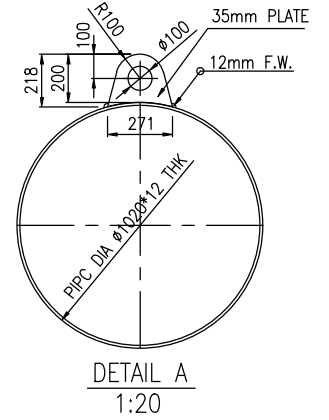
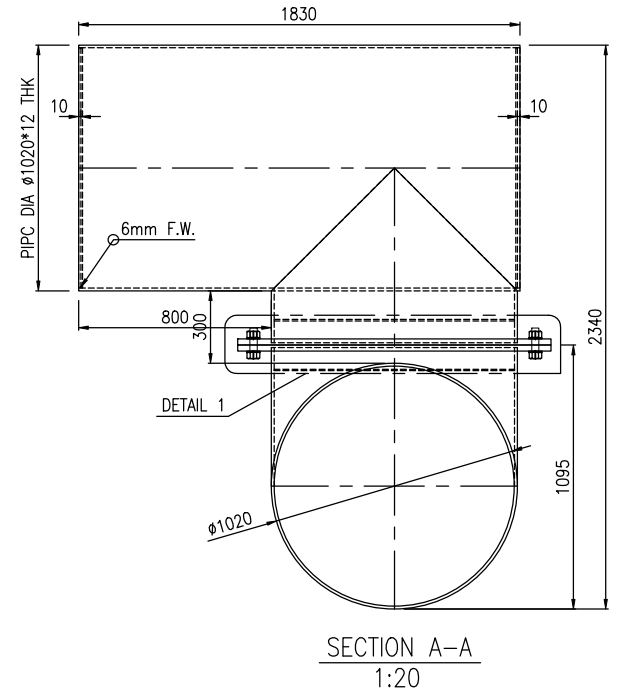
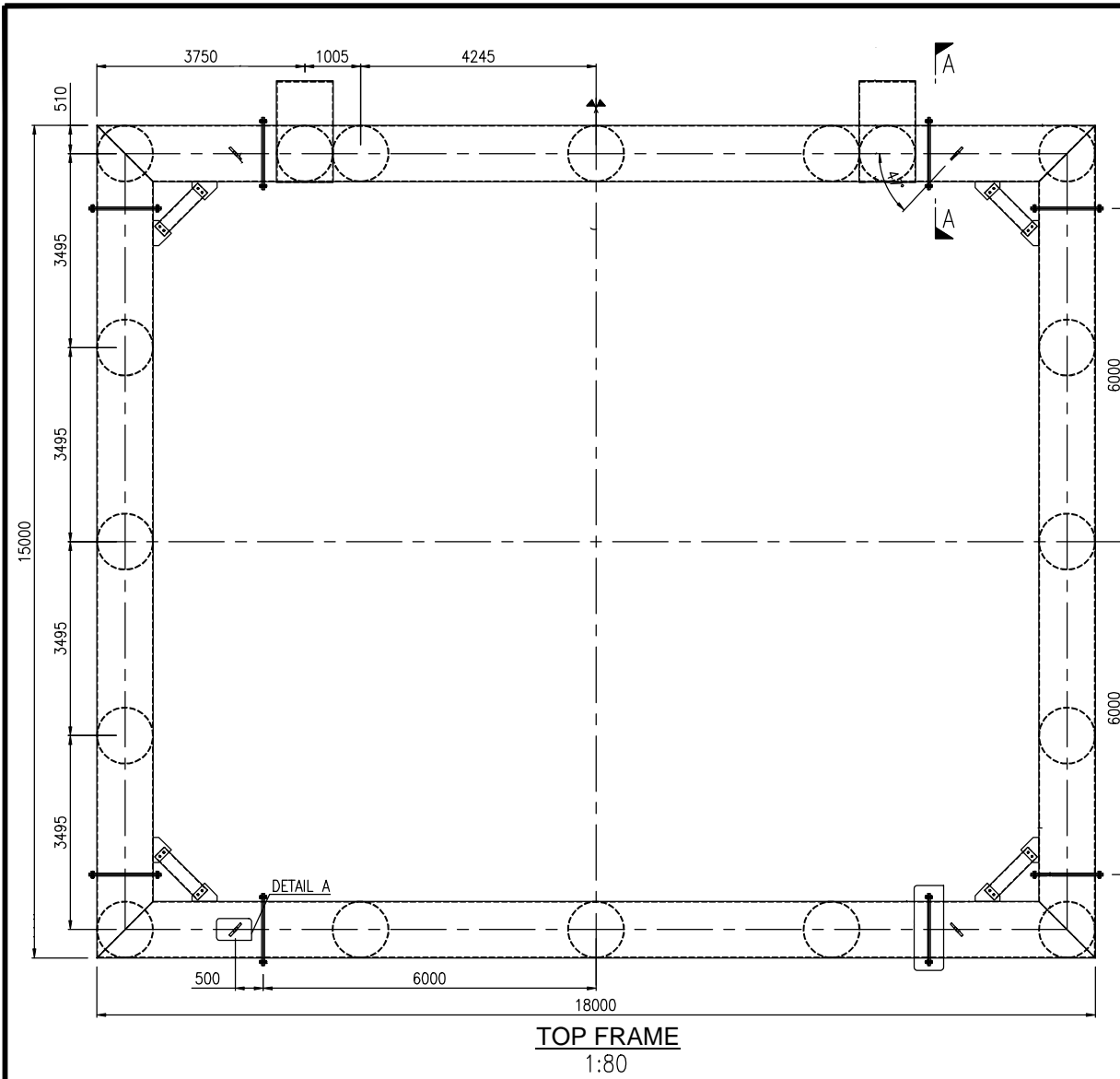
UDL - Gitanes Joint Venture

Contract No. 18/8005
The Hong Kong Electric Co., Ltd.
Lamma Power Station Navigation Channel Improvement 2019
(Master Programme - Silt Curtain Deployment Works)



HKE Works Programme - Silt Curtain Deployment Works Date: 19 September 2019	Task		Project Summary		Manual Task		Start-only		Deadline	
	Split		Inactive Task		Duration-only		Finish-only		Progress	
	Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
	Summary		Inactive Summary		Manual Summary		External Milestone			

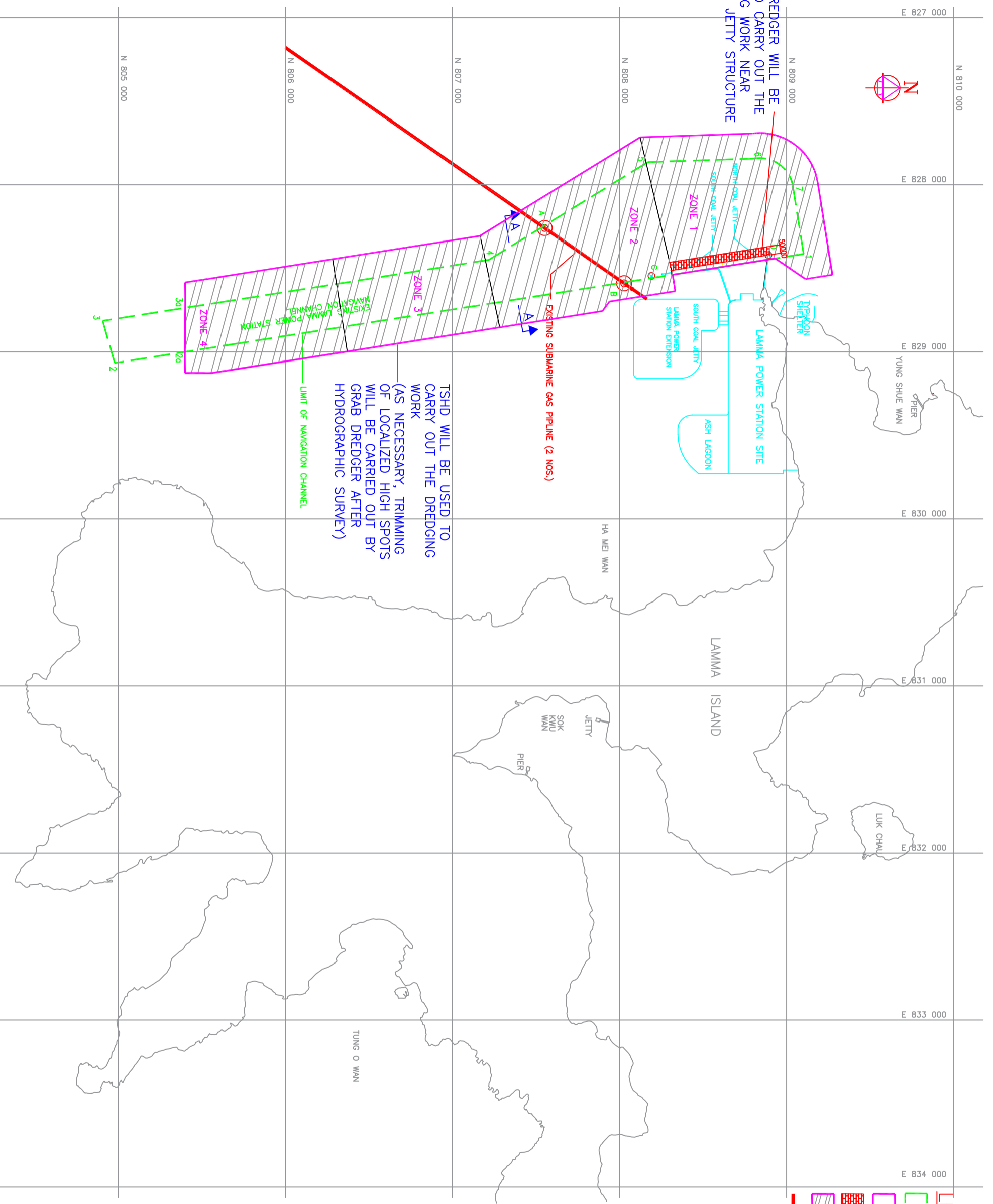
APPENDIX C – DRAWING / SKETCH FOR SILT CURTAIN FRAME



Floating Frame 15X18M								For Information only	

**APPENDIX D – LAYOUT PLAN SHOWING LOCATIONS
BY TSHD & GRAB DREDGER**

GRAB DREDGER WILL BE USED TO CARRY OUT THE DREDGING WORK NEAR EXISTING JETTY STRUCTURE



LEGEND:—

- [---] Limit of Navigation Channel
- [---] Project Boundary
- Grab Dredger Area
- TSHD Area
- [---] Existing Submarine Gas Pipeline

**APPENDIX E – SILT CURTAIN REPORT by HKE PAST DREDGING
PROJECT**



NATURE & TECHNOLOGIES (HK) LIMITED
科技環保(香港)有限公司

Unit 2 & 3, 4/F., Wellborne Commercial Centre, 8 Java Road, North Point, Hong Kong.
香港北角渣華道8號威邦商業中心4樓2及3室 Tel電話 : (852) 2877 3122 Fax傳真 : (852) 2511 0922
Email電郵: enquiry@nt.com.hk Web page網址 : <http://www.nt.com.hk>

The Hong Kong Electric Co., Ltd

**Report for
Seawater Quality Measurement across
Silt Curtain for the
Construction of Coal jetty at Lamma
Power Station**

(Ref No. 3.11/005/2001)

April 2001

Executive Summary

In order to minimize environmental impact to seawater due to the dredging works for the coal jetty at Lamma Power Station, HEC has employed a silt curtain around the dredger to screen the dredged sediments. Despite the hostile conditions, seawater quality measurements on 18 April 2001 at locations inside and outside the silt curtain were made to provide information on the effectiveness of the silt curtain in reducing pollution due to the dredging works. Observations from the results showed that the silt curtain was effective in containing the turbidity and SS from the dredging process.

CONTENTS

Executive Summary

1. Introduction
2. Water Quality Measurement Methodology

Measurement Locations

Water Quality Measurement Parameters & Equipment

Measurement Procedure

Measurement Schedule

Setting up Baseline

3. Results and Discussions
4. Concluding Remarks

Appendices

Appendix A: Calibration certificates

Appendix B: Quality Control (QC) report

Appendix C: Water quality measurement results

1. Introduction

- 1.1 The Hongkong Electric Co., Ltd. ["HEC"] has commenced to perform dredging works for the construction of coal jetty extension at Lamma Power Station from December 2000.
- 1.2 In order to minimize environmental impact to seawater during the period of dredging works, HEC has employed a silt curtain around the dredger to screen the dredged sediments such as shown in Figure 1.1.
- 1.3 Nature and Technologies (HK) Limited ["N&T"], in association with ALS Technichem (HK) Pty Ltd. ["ALS"] is commissioned by The Hongkong Electric Co., Ltd. ["HEC"] to carry out seawater quality sampling at four designated locations, both inside and outside the silt curtain around the dredger.
- 1.4 The purpose of this measurement is to provide information on the effectiveness of the silt-curtain in reducing possible pollution from the dredging process. This report also serves as documentation for the measurements exercise.



Figure 1.1 Silt curtain around the dredger

2. Water Quality Measurement Methodology

Measurement Locations

- 2.1 Seawater quality was measured at four measurement locations, for which one of them is inside the silt curtain (M1) and the remaining three are outside the silt curtain (M2, M3 & M4) as given in Figure 2.1.

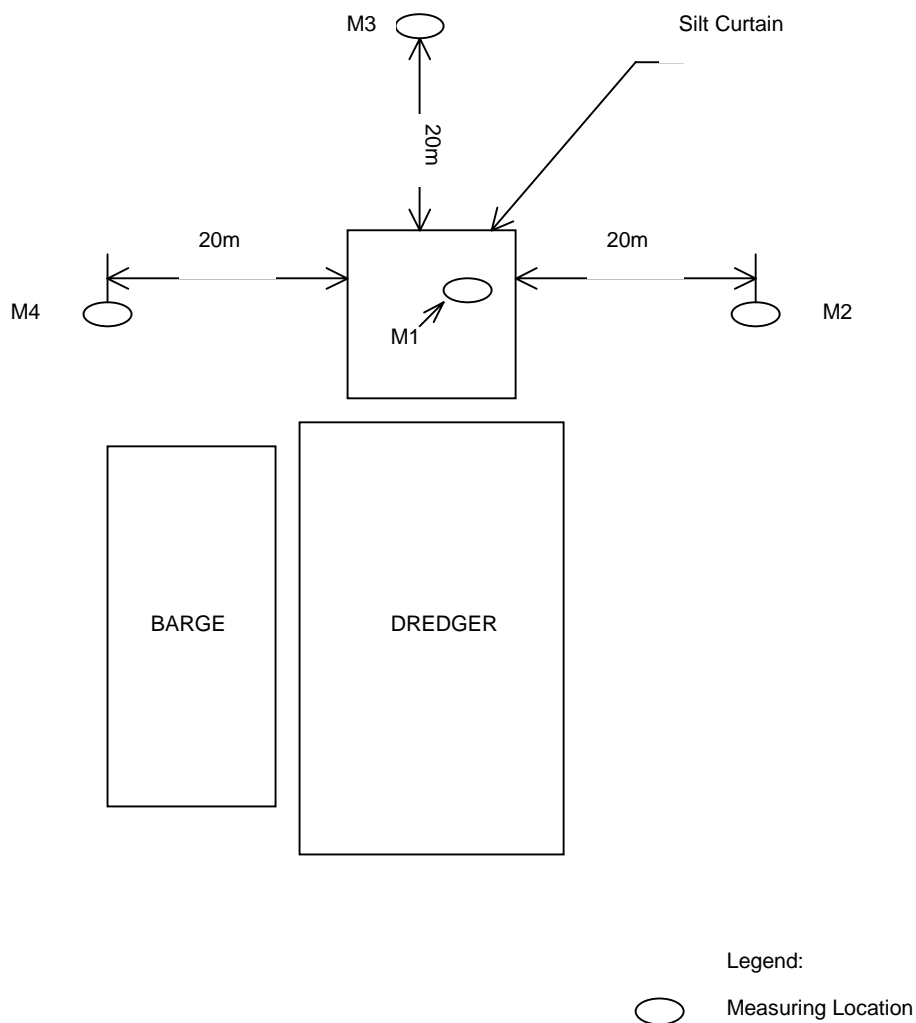


Figure 2.1 Plan for Seawater Measurement Location

2.2 Measurements at Station M1 would give the water quality within the dredging area, while those at stations M2, M3 & M4, the water quality at the distance approximately 20 metres from the edge of the silt curtain. These three locations are situated outside the silt curtain.

2.3 At each measurement location, sampling and measurements were made at the following depths:

- 1m above the sea bed;
- 1m below the sea surface;
- mid-depth

Water Quality Measurement Parameters & Equipment

2.4 The measurement parameters are listed in Table 2.1.

Table 2.1 Measurement Parameters of all three measuring stages

	Parameter	Unit
1	Positioning	(N/A)
2	Water depth of sampling station	M
3	Temperature	°C
4	Dissolved oxygen	mg/l
5	PH	(N/A)
6	Salinity	ppt
7	Turbidity	NTU
8	Total suspended solids	mg/l

2.5 The measuring equipment used for seawater measurement is listed in Table 2.2. Wildco 2.2-Litre water sampler is used to collect water sample for total suspended solids determination in the laboratory.

Table 2.2 Measuring equipment used

	Parameter	Measuring Equipment	Reference Method
1	Positioning Device	Magellan GPS Tracker	N/A
2	Water depth of sampling station	Humming Bird 100SX	N/A
3	Temperature	YSI 30	(in house)
4	Dissolved oxygen ["DO"]	YSI 30	APHA (18 th ed.) 4500-0A-D
5	PH	Hanna pH Tester	(in house)
6	Salinity	YSI 30	APHA (18 th ed.) 2520A, B
7	Turbidity	HACH 2100P Turbidimeter	APHA (18 th ed.) 2130B
8	Total suspended solids ["SS"]	N/A	(in-house, based on APHA (18 th ed.) 2540D)

Measurement procedure

- 2.6 Before measurement started, all measurement instruments were checked, calibrated and certified by ALS, a laboratory accredited under HOKLAS, and subsequently re-calibrated throughout the water quality measurement period. The calibration certificates of the equipment used are contained in Appendix A.
- 2.7 For sampling at each location, two replicates each for DO, turbidity, water temperature, pH values and salinity were measured in-situ to ensure that the deviation of the two measurements was not greater than 25%; while a set of water sample at each measurement point was collected for laboratory determination of SS.
- 2.8 The total suspended solids measurement was subject to separate quality control (QC) checks of at least one repeat laboratory measurement for every ten measurements to ensure confidence in the measured data. QC reports are presented in Appendix B.
- 2.9 For sampling at M1 (within the dredging area), it was originally proposed to install a platform on the top of the silt curtain to allow sampling personnel to gain access to the region enclosed by the silt curtain. However, such platform was not available, and after a few trials with other means, it was decided that to employ two wind-surfer boards ganged together. The surfer boards were carried in the usual sampling boat. When the boat arrived the silt curtain, the wind-surfer boards with two sampling personnel were lowered onto the sea. The sampling personnel then moved to the silt curtain with the wind-surfer boards, carried the boards over the silt curtain and continued to move to the M1 location to perform sampling. This was finally done on 18 April 2001, and is illustrated in Figure 2.1.



(a) maneuvering the wind-surfer boards over the silt curtain



(b) Sampling personnel moved the wind-surfer boards to M1 position

Figure 2.1 Sampling at M1 using wind-surfer boards

- 2.10 It is worth to mention that, as it was not practicable to take sample inside the silt curtain while dredging was in progress, dredging work was temporary halted for 15 minutes during sampling at M1.
- 2.11 For sampling at M2, M3 and M4 locations outside the dredging area, a 20-metre long rope with a hook was used to locate the sampling locations. This was done by hooking the rope to the edge of the silt curtain, and maneuvering the sampling boat away from the silt curtain until the rope was slightly tight. Figure 2.2 shows the above method in locating M2 to M4. The actual grid references of M2 to M4 for each measurement were recorded by the GPS and converted into Northing and Easting coordinates.



Figure 2.2 Hooking the rope to the edge of silt curtain

2.12 The whole sampling process approximately lasted for 45 minutes.

3. Results and Discussions

3.1 The measured and the corrected coordinates of M2, M3 and M4 for each measurement are shown in Table 3.1. M1 was located inside the silt curtain. It needs to be stressed that the measured and corrected coordinates are purely for reference only as the position measurement by GPS and the subsequent conversion are inherently crude.

Table 3.1 Measurement station grid reference

Station	Tide	Grid Locations			
		Easting	Northing	Longitude	Latitude
		18 April 2001			
M2	Mid-Ebb	828193	808470	114°05'46"	22°12'59"
M3	Mid-Ebb	828165	808501	114°05'45"	22°13'00"
M4	Mid-Ebb	828107	808501	114°05'43"	22°13'00"

3.2 The detailed results of the sampling are given in Appendix C. Table 3.2 summarizes the results of seawater measurements.

Table 3.2 Summary of averaged value of measured parameters

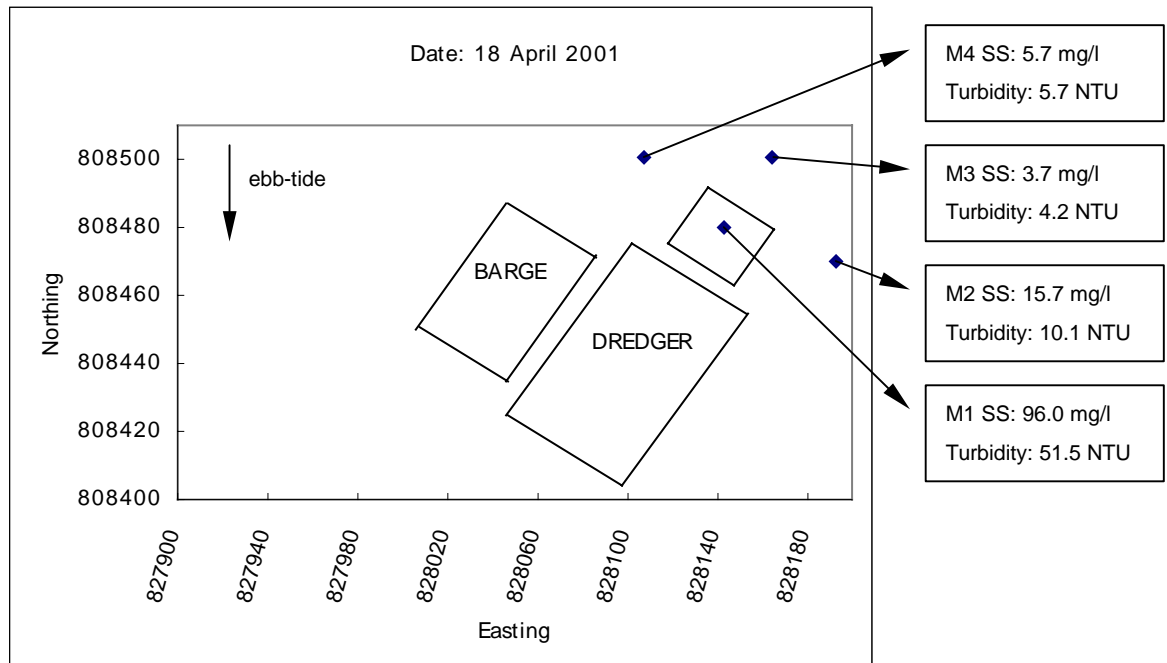
Station	Inside or outside of the silt curtain	Temperature (°C)	
M1	Inside the silt curtain	23.6	
M2	Outside the silt curtain	22.6	
M3		22.7	
M4		22.7	
		Salinity (ppt)	
M1	Inside the silt curtain	34.9	
M2	Outside the silt curtain	35.4	
M3		35.4	
M4		35.5	
		pH	
M1	Inside the silt curtain	8.2	
M2	Outside the silt curtain	8.2	
M3		8.2	
M4		8.2	
		Turbidity (NTU)	
M1	Inside the silt curtain	51.5	
M2	Outside the silt curtain	10.1	
M3		4.2	
M4		5.7	
		Suspended Solid (mg/l)	
M1	Inside the silt curtain	96.0	
M2	Outside the silt curtain	15.7	
M3		3.7	
M4		5.7	
		Dissolved Oxygen (mg/l) *	
		S&M	B
M1	Inside the silt curtain	7.2	7.0
M2	Outside the silt curtain	7.5	7.1
M3		7.7	7.3
M4		7.8	7.5

Average E= 87%

Average E=91%

* S&M stands for Surface and Middle levels average value; B stands for Bottom level average value

3.3 The averaged turbidity levels outside the silt curtain measured at M2 to M4 ranges from 4.2 to 10.1 NTU (10.1 NTU downstream at M2, 5.7 NTU upstream at M4 and 4.2 NTU along side at M3) while 51.5 NTU was recorded at M1. The corresponding SS concentrations measured at M2 to M4 ranges from 3.7 to 15.7 mg/l (15.7 mg/l downstream at M2, 5.7 mg/l upstream at M4 and 3.7 mg/l along side at M3) while 96.0 mg/l was recorded at M1. This is illustrated in Figure 3.1.



Remark: The sketch of silt curtain, barge and dredger is not-to-scale

Figure 3.1 SS & Turbidity results at various locations

3.4 Very high turbidity and SS levels were found inside the silt curtain compared to the sampling location outside the silt curtain on 18 April 2001 when sampling was made immediately after the completion of the dredging activities. The measurement results clearly demonstrate that the silt curtain was very effective in preventing silt from spreading during dredging. With the silt curtain around the dredger, pollution caused by the dredging process, mainly turbidity and SS, were localized inside the silt curtain, where the silt will settle. Neighbouring areas as close as 20 m away downstream, were not noticeably affected.

3.5 Other than turbidity and SS, no apparent differences in the other measured parameters are observed between the locations inside and outside the silt curtain.

4. Conclusions

- 4.1 Measurements on the seawater quality were carried out to provide information on the effectiveness of the silt curtain employed for prevention water pollution from the Lamma Power Station coal jetty dredging on 18 April 2001 after several preliminary trials at sea.

- 4.2 Observations from the results showed that the silt curtain would be able to reduce the turbidity and SS pollution due to the dredging process.

Appendix A: Calibration certificates



ANALYTICAL REPORT

CONTACT: DR GABRIEL LAM CLIENT: NATURE & TECHNOLOGIES (HK) LTD ADDRESS: UNIT 2 & 3, 4/F, WELLBRONE COMM CTR 8 JAVA RD, NORTH POINT HONG KONG	LABORATORY: HONG KONG BATCH NUMBER: HK11111 SUB BATCH: 1 No. OF SAMPLES: -- DATE RECEIVED: 29/03/01 DATE COMPLETED: 27/04/01
--	---

ORDER No.: SAMPLE TYPE: CALIBRATION REPORT PROJECT:

Calibration of Temperature System

Item : YSI Model 30 Handheld Salinity , Conductivity & Temperature System

Serial No. : 99G0526 (Meter)

Equipment No. : HK255

Reference Thermometer : HK256

Calibration Method : In House

Result	Reference Temp. (°C)	Recorded Temp. (°C)
	11.4	11.3
	22.7	22.8
	30.2	30.4
	41.8	41.9
	Allowing Deviation	±0.5°C

Date of Calibration : 29 Mar,2001

Richard L.C. Fung
 Richard L.C. Fung
 General Manager - Hong Kong

COMMENTS:

- The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

This is the Final Report which supersedes any preliminary reports with this batch number.

• Results apply to sample(s) as submitted by client.

Hong Kong
Phone 852-2610 1044 Facsimile 852-2610 2021

Bangkok
Phone 66-2-292 1645 Facsimile 66-2-292 1646

Singapore
Phone 65-743 4311 Facsimile 65-746 0292

Brisbane
Phone 61-7-3243 7222 Facsimile 61-7-3243 7218

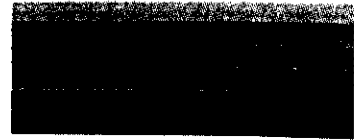
Lumpur
Phone 60-3368 6367 Facsimile 60-3368 9778

Sydney
Phone 61-2-841 9500 Facsimile 61-2-841 9530

Bahru

Melbourne

ALS Technichem (HK) Pty Ltd
 Unit 6, G/F, Trans Asia Centre,
 18 Kin Hong Street,
 Kwai Chung, H.K.



ANALYTICAL REPORT

CONTACT: DR GABRIEL LAM
 CLIENT: NATURE & TECHNOLOGIES (HK) LTD
 ADDRESS: UNIT 2 & 3, 4/F, WELLBRONE COMM CTR
 8 JAVA RD, NORTH POINT
 HONG KONG

LABORATORY: HONG KONG
 BATCH NUMBER: HK11111
 SUB BATCH: 1
 No. OF SAMPLES: --
 DATE RECEIVED: 29/03/01
 DATE COMPLETED: 27/04/01

ORDER No.: SAMPLE TYPE: CALIBRATION REPORT PROJECT:

Calibration of Dissolved Oxygen Meter

Item : YSI Model 30 Handheld Salinity , Conductivity & Temperature System
 Serial No. : 99G0526 (Meter)
 Equipment No. : HK255
 Calibration Method : This meter was calibrated in accordance with standard method APHA (18th Ed.) 4500-0A, B, C and D,

Result	Expected Reading	Recorded Reading
	2.68 mg/L	2.75 mg/L
	5.47 mg/L	5.38 mg/L
	6.33 mg/L	6.43 mg/L
	8.53 mg/L	8.50 mg/L
	Allowing Deviation	±0.2mg/L
Date of Calibration	: 29 Mar,2001	


 Richard L.C. Fung
 General Manager - Hong Kong

COMMENTS:

- The laboratory is HOKLAS accredited for dissolved oxygen analysis in water and wastewater samples. The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

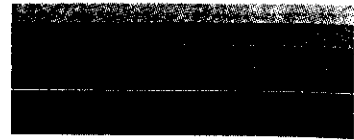
This is the Final Report which supersedes any preliminary reports with this batch number.

• Results apply to sample(s) as submitted by client.

Hong Kong
 Phone 852-2610 1044 Facsimile 852-2610 2021
Singapore
 Phone 65-743 4311 Facsimile 65-746 0292
Lumpur
 Phone 60-3368 6367 Facsimile 60-3368 9778
Bahru

Bangkok
 Phone 66-2-292 1645 Facsimile 66-2-292 1646
Brisbane
 Phone 61-7-3243 7222 Facsimile 61-7-3243 7218
Sydney
 Phone 61-2-841 9500 Facsimile 61-2-841 9530
Melbourne

ALS Technichem (HK) Pty Ltd
 Unit 6, G/F, Trans Asia Centre,
 18 Kin Hong Street,
 Kwai Chung, H.K.



ANALYTICAL REPORT

CONTACT: DR GABRIEL LAM
 CLIENT: NATURE & TECHNOLOGIES (HK) LTD
 ADDRESS: UNIT 2 & 3, 4/F, WELLBRONE COMM CTR
 8 JAVA RD, NORTH POINT
 HONG KONG

LABORATORY: HONG KONG
 BATCH NUMBER: HK11111
 SUB BATCH: 1
 No. OF SAMPLES: --
 DATE RECEIVED: 29/03/01
 DATE COMPLETED: 27/04/01

CALIBRATION REPORT

ORDER No.:

SAMPLE TYPE:

PROJECT:

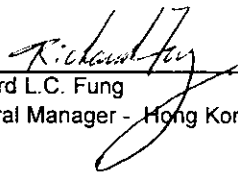
Calibration of Salinity System

Item : YSI Model 30 Handheld Salinity , Conductivity & Temperature System
 Serial No. : 99G0526 (Meter)
 Equipment No. : HK255
 Calibration Method : This meter was calibrated in accordance with standard method APHA (18th Ed.) 2520A, B

Result	Expected Reading	Recorded Reading
	5‰	5.1‰
	10‰	10.7‰
	20‰	20.8‰
	30‰	31.5‰
	40‰	39.6‰

Allowing Deviation ±10%

Date of Calibration : 29 Mar, 2001


 Richard L.C. Fung
 General Manager - Hong Kong

COMMENTS:

- The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

This is the Final Report which supersedes any preliminary reports with this batch number.

• Results apply to sample(s) as submitted by client.

Hong Kong
 Phone 852-2610 1044 Facsimile 852-2610 2021

Bangkok
 Phone 66-2-292 1645 Facsimile 66-2-292 1646

Singapore
 Phone 65-743 4311 Facsimile 65-746 0292

Brisbane
 Phone 61-7-3243 7222 Facsimile 61-7-3243 7218

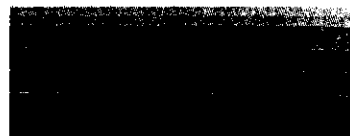
Lumpur
 Phone 60-3368 6367 Facsimile 60-3368 9778

Sydney
 Phone 61-2-841 9500 Facsimile 61-2-841 9530

Bahru
 Phone 60-73 540 004 Facsimile 60-73 540 554

Melbourne
 Phone 61-3 9593 5200 Facsimile 61-3 9593 0700

ALS Technichem (HK) Pty Ltd
 Unit 6, G/F, Trans Asia Centre,
 18 Kin Hong Street,
 Kwai Chung, H.K.



ANALYTICAL REPORT

CONTACT: DR GABRIEL LAM
 CLIENT: NATURE & TECHNOLOGIES (HK) LTD
 ADDRESS: UNIT 2 & 3, 4/F, WELLBRONE COMM CTR
 8 JAVA RD, NORTH POINT
 HONG KONG

LABORATORY: HONG KONG
 BATCH NUMBER: HK11111
 SUB BATCH: 1
 No. OF SAMPLES: --
 DATE RECEIVED: 29/03/01
 DATE COMPLETED: 27/04/01

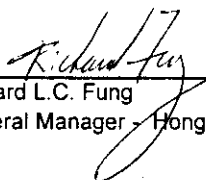
ORDER No.: SAMPLE TYPE: CALIBRATION REPORT PROJECT:

Calibration of Turbidimeter

Item : HACH 2100P TURBIDIMETER
 Serial No. : 961200012835
 Equipment No. : HK254
 Calibration Method : This meter was calibrated in accordance with standard method APHA (18th Ed.) 2130 B

Result	Expected	Recorded
	0 NTU	0.00NTU
	2 NTU	2.20NTU
	4 NTU	4.32NTU
	16 NTU	16.7NTU
	40NTU	39.9NTU
	80 NTU	77.3NTU
	Allowing Deviation	±10%

Date of Calibration : 29 Mar,2001


 Richard L.C. Fung
 General Manager - Hong Kong

COMMENTS:

- The laboratory is HOKLAS accredited for turbidity analysis in water and wastewater samples.
- The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

This is the Final Report which supersedes any preliminary reports with this batch number.

• Results apply to sample(s) as submitted by client.

Hong Kong
 Phone 852-2610 1044 Facsimile 852-2610 2021

Bangkok
 Phone 66-2-292 1645 Facsimile 66-2-292 1646

Singapore
 Phone 65-743 4311 Facsimile 65-746 0292

Brisbane
 Phone 61-7-3243 7222 Facsimile 61-7-3243 7218

Lumpur
 Phone 60-3368 6367 Facsimile 60-3368 9778

Sydney
 Phone 61-2-841 9500 Facsimile 61-2-841 9530

Bahru
 Phone 65-73 540 604 Facsimile 65-73 540 554

Melbourne
 Phone 61-2-9852 5000 Facsimile 61-2-9852 5720


ALS Technichem (HK) Pty Ltd
 Unit 6, G/F, Trans Asia Centre,
 18 Kin Hong Street,
 Kwai Chung, H.K.

Appendix B: Quality Control (QC) report

QC Report
Seawater Monitoring Around The Silt Curtain

Date	Station	Flood (F)/ Ebb (E)	SS mg/L
18/04/01	M4-S	E	12
	M4-B	E	4

Prepared By

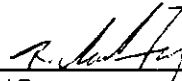

Richard Fung
General Manager - Hong Kong

Appendix C: Water quality measurement results

Seawater Monitoring Around The Silt Curtain

Date	Station	Mid-ebb
18/04/01	M1	9:30
	M2	9:50
	M3	10:00
	M4	10:10

Prepared By

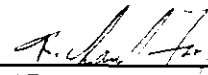


Richard Fung
General Manager - Hong Kong

Seawater Monitoring Around The Silt Curtain

Date	Station	Mid-ebb
18/04/01	M1	15
	M2	16
	M3	14
	M4	14

Prepared By



Richard Fung
General Manager - Hong Kong

Seawater Monitorind Around The Silt Curtain

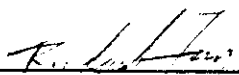


ALS Technichem (HK) Pty Ltd

Batch No.: HK11111
Parameter: Temperature (°C)

Date	Station	Mid-ebb					
		1m below Surface		Mid-depth		1m above bottom	
		Meas. #1	Meas. #2	Meas. #1	Meas. #2	Meas. #1	Meas. #2
18/04/01	M1	24.0	24.0	23.5	23.5	23.2	23.2
	M2	23.5	23.5	22.1	22.1	22.3	22.3
	M3	23.5	23.5	22.3	22.3	22.4	22.4
	M4	23.3	23.3	22.2	22.2	22.6	22.6

Prepared By


 Richard Fung
 General Manager - Hong Kong

Seawater Monitoring Around The Silt Curtain



Batch No.: HK11111
 Parameter: Dissolved Oxygen (mg/L)

Date	Station	Mid-ebb					
		1m below Surface		Mid-depth		1m above bottom	
		Meas. #1	Meas. #2	Meas. #1	Meas. #2	Meas. #1	Meas. #2
18/04/01	M1	7.3	7.3	7.1	7.1	7.0	7.0
	M2	7.8	7.8	7.2	7.2	7.1	7.1
	M3	7.8	7.8	7.6	7.7	7.3	7.3
	M4	7.9	7.9	7.8	7.8	7.5	7.5

Prepared By

Richard Fung
 General Manager - Hong Kong

Seawater Monitoring Around The Silt Curtain




ALS Technichem (HK) Pty Ltd

Batch No.: HK11111
Parameter: pH

Date	Station	Mid-ebb					
		1m below Surface		Mid-depth		1m above bottom	
		Meas. #1	Meas. #2	Meas. #1	Meas. #2	Meas. #1	Meas. #2
18/04/01	M1	8.2	8.2	8.2	8.2	8.2	8.2
	M2	8.2	8.2	8.2	8.2	8.2	8.2
	M3	8.2	8.2	8.2	8.2	8.2	8.2
	M4	8.2	8.2	8.2	8.2	8.2	8.2

Prepared By


 Richard Fung
 General Manager - Hong Kong

Seawater Monitoring Around The Silt Curtain



ALS Technichem (HK) Pty Ltd

Batch No.: HK11111
Parameter: Salinity (ppt)

Date	Station	Mid-ebb					
		1m below Surface		Mid-depth		1m above bottom	
		Meas. #1	Meas. #2	Meas. #1	Meas. #2	Meas. #1	Meas. #2
18/04/01	M1	34.6	34.6	35.0	35.0	35.2	35.2
	M2	35.0	35.0	35.6	35.6	35.6	35.6
	M3	35.2	35.2	35.5	35.5	35.4	35.4
	M4	35.4	35.4	35.6	35.6	35.4	35.4

Prepared By

Richard Fung

General Manager - Hong Kong

Seawater Monitoring Around The Silt Curtain

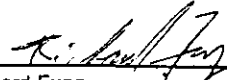


ALS Technichem (HK) Pty Ltd

Batch No.: HK11111
Parameter: Turbidity (NTU)

Date	Station	Mid-ebb					
		1m below Surface		Mid-depth		1m above bottom	
		Meas. #1	Meas. #2	Meas. #1	Meas. #2	Meas. #1	Meas. #2
18/04/01	M1	3.6	3.5	76.5	76.5	74.2	74.6
	M2	3.6	3.4	7.7	7.7	18.7	19.4
	M3	3.3	3.1	3.9	3.5	5.8	5.6
	M4	9.2	9.3	3.7	3.4	4.3	4.5

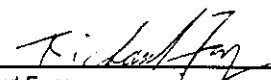
Prepared By


 Richard Fung
 General Manager - Hong Kong

Seawater Monitoring Around the Silt Curtain

Date	Station	Mid-ebb		
		1m below Surface	Mid-depth	1m above bottom
18/04/01	M1	4	149	135
	M2	5	13	29
	M3	3	3	5
	M4	10	3	4

Prepared By


Richard Fung
General Manager - Hong Kong

APPENDIX F – MONTHLY, WEEKLY AND DAILY INSPECTION FORM

Diver Weekly Inspection Checklist for Silt Curtains

Date & Time : _____
 Weather : _____

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Coordinate/ Locations of Affected Section(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
Geotextile						
Curtain remains intact and without gap	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain in upright position	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain has no loose / flapping parts	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain is securely attached at joints	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain fittings (e.g. chains, bands, plates, joint connectors etc.) are intact and in position	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Diver Weekly Inspection Checklist for Silt Curtains

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Coordinate/ Locations of Affected Section(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
Curtain extends to between 30cm - 50cm above seabed level	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Ancillary Components						
Anchors are undamaged and positions are correct	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Anchor lines are properly attached to the buoys / connectors of the silt curtain	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
No parts are detached from the silt curtain system	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Checked By : _____

淤泥屏障 - 每日視察檢查表

淤泥屏障位置： _____

檢查日期及時間： _____

	合適	不合適	備注
1. 目測工作區域外面的水質, 以確保底泥污染物沒有流出			
2. 開工前目測淤泥屏障沒有損毀			
3. 淤泥屏障是否布置適當位置			
4. 淤泥屏障保持在良好狀態			

* 檢查狀況 ✓ 合適 或 ✕ 不合適

檢查員簽名： _____

Monthly Inspection Checklist (or Initial Check) for Silt Curtains after Lifting Up of Curtain Frame

Date & Time : _____

Weather : _____

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Coordinate/ Locations of Affected Section(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
Geotextile						
Curtain remains intact, without gap and free of defect/ damage	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain remains free of debris or acceptable clean enough to use	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain remains proper functioning that no significant mud materials allowed passing through the system	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Connection or joints between geotextile and curtain frame tightly fix and free of distortion	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Sufficient material of geotextile ready for use or keep on site for emergency replacement in case of damage observed	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Monthly Inspection Checklist (or Initial Check) for Silt Curtains after Lifting Up of Curtain Frame

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Coordinate/ Locations of Affected Section(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
In case of malfunction of curtain found, rectification measures shall be done before lifting down for works						
If defects found, new pieces of geotextile with sufficient overlapping length (~0.5m) has been attached to the existing curtain	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
If very serious damage found, new layer of geotextile has been replaced or installed attaching to the existing curtain	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Installation of curtain has been completed and checked by supervisor	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Checked By : _____

**APPENDIX G – REPLY TO EPD’S COMMENTS ON SILT CURTAIN
DEPLOYMENT PLAN**

Reply to EPD's Comments on the Silt Curtain Deployment Plan
(EPD's letter ref. () in EP 2/N9/C/152 Pt.3 dated 18 October 2019)

Item	EPD's Comments	Reply to EPD's Comments
a	Part 1: It is mentioned that the Project involves dredging works for the navigation channel as well as jetty berth region, and grab dredging will be carried out near the existing jetty structure. Please provide a layout plan showing the locations involved TSHD and grab dredger operation.	A layout plan showing the locations involved TSHD and grab dredger operation is attached in Appendix D of the revised Silt Curtain Deployment Plan.
b	Part 3: Since the modelling assumption of silt curtain efficiency in EIA study was 75%, please provide supporting information for verifying the efficiency of the proposed silt curtain and quote successful past projects for reference.	<p>The proposed silt curtain is a cage-type around the grab dredger which was used over HKE past dredging projects and proved to be effective in reducing possible sea-water pollution from the dredging process.</p> <p>Please find attached the Report (Appendix E) for seawater quality measurement across cage-type silt curtain at locations inside and outside of the silt curtain under HKE's previous project. According to the measurement results showed in Table 3.2 of the Report (page 10 of the report refers), it concluded that the silt curtain was successful in containing the turbidity and suspended solid with average efficiency 87% and 91% respectively from the dredging process.</p> <p>Given the proposed methodology and set up arrangement for silt curtain to be used for grab dredger is the same as successful past project with efficiency more than 75%, the modelling assumption of silt curtain efficiency as stated in EIA report is met.</p> <p>(Please refer to Part 3 of the revised Silt Curtain Deployment Plan)</p>

Item	EPD's Comments	Reply to EPD's Comments
c	Part 3: Please elaborate more on "...the membrane (silt curtain) would enclose the water column, with the length of membrane to suit site conditions such as tidal, current seabed, etc.". Adequate depth of silt curtain should be given during high tide so that the silt curtain could take effect near the bottom of the seabed.	Part 3 of the silt curtain deployment plan is amended and attached. The base of the silt curtain shall be fixed to between 30cm and 50cm above the seabed so that adequate depth of the silt curtain shall be given to cater for tidal changes even during high tides.
d	Part 4, the 1st para: Please supplement the inspection record form for the inspection and maintenance as mentioned.	Weekly and Daily Inspection forms to be used are attached in Appendix F of the revised Silt Curtain Deployment Plan.
e	Part 4, the 5th para: Please add "Dredging works will be resumed upon completion of repair works and no observation of silty plume outside the cage" at the end.	Para 5 of Part 4 of the silt curtain deployment plan is amended with adding the statements accordingly.
f	Part 4, the last para: Under adverse weather or hoisting of Typhoon Signal No. 1, the silt curtain will not lifted up and folded. It is suggested to thoroughly inspect the silt curtain after these emergency situations to ensure intact structure before resuming dredging works.	Last para of Part 4 of the silt curtain deployment plan is amended with adding the statements accordingly.
g	Appendix A: Please explain why "the length of the curtain is made less than 15m for easier used on the grab dredger" and review the diagram in conjunction with the above comment about the depth of the silt curtain.	Similar to item c) above, details in Appendix A is amended accordingly.