Improvement Dredging for Lamma Power Station Navigation Channel

Environmental Permit No. EP-535/2017

EP Condition 2.8

Construction and Operation Works Schedule and Location Plans

March 2023
(Revised)

EP-535/2017 – EP Condition 2.8 Construction and Operation Works Schedule and Location Plans (Revised, January 2023)

1. Background and Purpose of this Document

A 'Construction and Operation Works Schedule and Location Plans' was submitted in accordance with EP Condition 2.8 in August 2019. Upon completion of the dredging, it was identified that there remains some residual channel bed roughness left by the dredging works, which necessitates minor re-profiling works to be carried out. Hence the construction schedule needs to be extended to cover the re-profiling works.

This document provides the updated construction schedule, works location plan and proposed equipment for carrying out the re-profiling works.

2. Updated Construction Schedule

Annex A shows the updated construction schedule with the proposed re-profiling works planned to commence within Q1 2023 and expected to be completed within 6 months. The Project Proponent will notify EPD prior to the actual commencement date for re-profiling works, and will also notify EPD on completion.

3. Updated Location Plan

Annex B shows the updated location plan for the areas requiring re-profiling (areas in red cover the residual high spots above -16.35 mCD (-16.5 mPD) which need to be re-profiled to meet this target level and areas in pink are required to be re-profiled to meet the design side slope profiles)

3. Proposed Equipment

The proposed re-profiling works will deploy a specialised seabed leveller, which will be slowly dragged along the channel bed to level it out. Specifications of the equipment to be deployed are shown in **Annex C**.

Key attributes of the proposed re-profiling works and the specialised seabed leveller include:

- The equipment primarily comprises a blade in contact with the seabed, which is pulled along the high spots by a tug boat.
- The seabed leveller method will rely only on the weight of the blade and no water suction or discharge will be deployed.
- Levelling will focus on the high spot areas and disturbance to the seabed not having high spot will be kept to the minimum if not nil.
- Only one seabed leveller will be used.
- No dredging and thus no disposal of marine sediment is required.
- Travel speed of the seabed leveller will not exceed 10 knots within the Project site boundary.

4. Maximum Allowable Levelling Rate

According to published literature[1], the sediment suspension factor (S) associated with a seabed leveller is 6 kg/m^3. Using the same approach as adopted in the approved EIA report for calculating the maximum permissible suspended solid release rate during dredging using TSHD (as its nature of disturbance to seabed and potential suspended solids release, which is confined to near the seabed level, is similar for seabed leveller), the calculated maximum allowable levelling rate using a seabed leveller is presented in **Table 1**.

[1] Joh.G.S. Pennekamp, R.J.C. Epskamp, W.F.Rosenbrand, A. Mullié, G.L.Wessel, T. Arts, and I.K. Deibel (1996) Turbidity Caused by Dredging; Viewed in Perspective, published in Terra et Aqua, Number 64, September 1996

Table 1: Calculated maximum allowable levelling rate for seabed leveller

	Dry Season				Wet Season			
Levelling Zone*	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
m^3/s	0.61	1.06	1.33	0.49	1.02	0.61	0.50	0.17
m^3/hr	2,190	3,822	4,776	1,758	3,684	2,190	1,806	618
m^3/day	52,560	91,728	114,624	42,192	88,416	52,560	43,344	14,832

Note: compliance with the maximum allowable levelling rate shall base on the values in m^3/hr.
*Refer to the Updated EM&A Manual Figure 2.1 for the zone boundaries.

5. Water Quality Compliance Monitoring

For monitoring the compliance of the seabed leveller during construction phase with respect to compliance with the maximum allowable levelling rate in m^3/hr for each zone and season as shown in **Table 1**, a system of real-time volume calculation of seabed material disturbed is proposed by the contractor, which primarily involves setting up an algorithm to record and process the following data:

- Time (*time variable*)
- The dimensions of the blade in contact with the seabed (*pre-fixed variable*)
- Depth (Z_0) to seabed before levelling
- Depth (Z_{max}) of the blade below the waterline (*fixed/adjustable variable*)
- Tide and vessel draft (*pre-determined/pre-programmed variable*)
- GPS (X,Y) track of the seabed leveller (*real-time record*)

Collection of the above data enables mapping of *X*, *Y* and Z_{max} which represents a 3-dimensional 'cutting' volume made by the seabed leveller. The bathymetry before levelling (i.e. the XYZ_0) is pre-determined before construction via bathymetry survey. The depth difference ΔZ (= Z_0 - Z_{max}) at that XY position then represents the maximum thickness of seabed material which has been 'cut' (i.e. levelled) at that particular position during the levelling operation. From the sum of $XY\Delta Z$ data (counting only 'cutting' data whereby $Z_0 < Z_{max}$), the total volume of seabed material which has been cut in the area of operations at a particular period in time can be calculated.

An initial period for setting up and calibrating the calculated volume of seabed material disturbed against actual surveyed volumes (pre- and post-seabed levelling within a fixed area) would be carried out by the contractor to ensure the reliability of the real-time volume calculations. Thereafter, the contractor will use the real-time system calculations to provide regular self-checking of the compliance with the maximum allowable levelling rate, and submit the results to the Environmental Team (ET) Leader and Independent Environmental Checker (IEC) for checking.

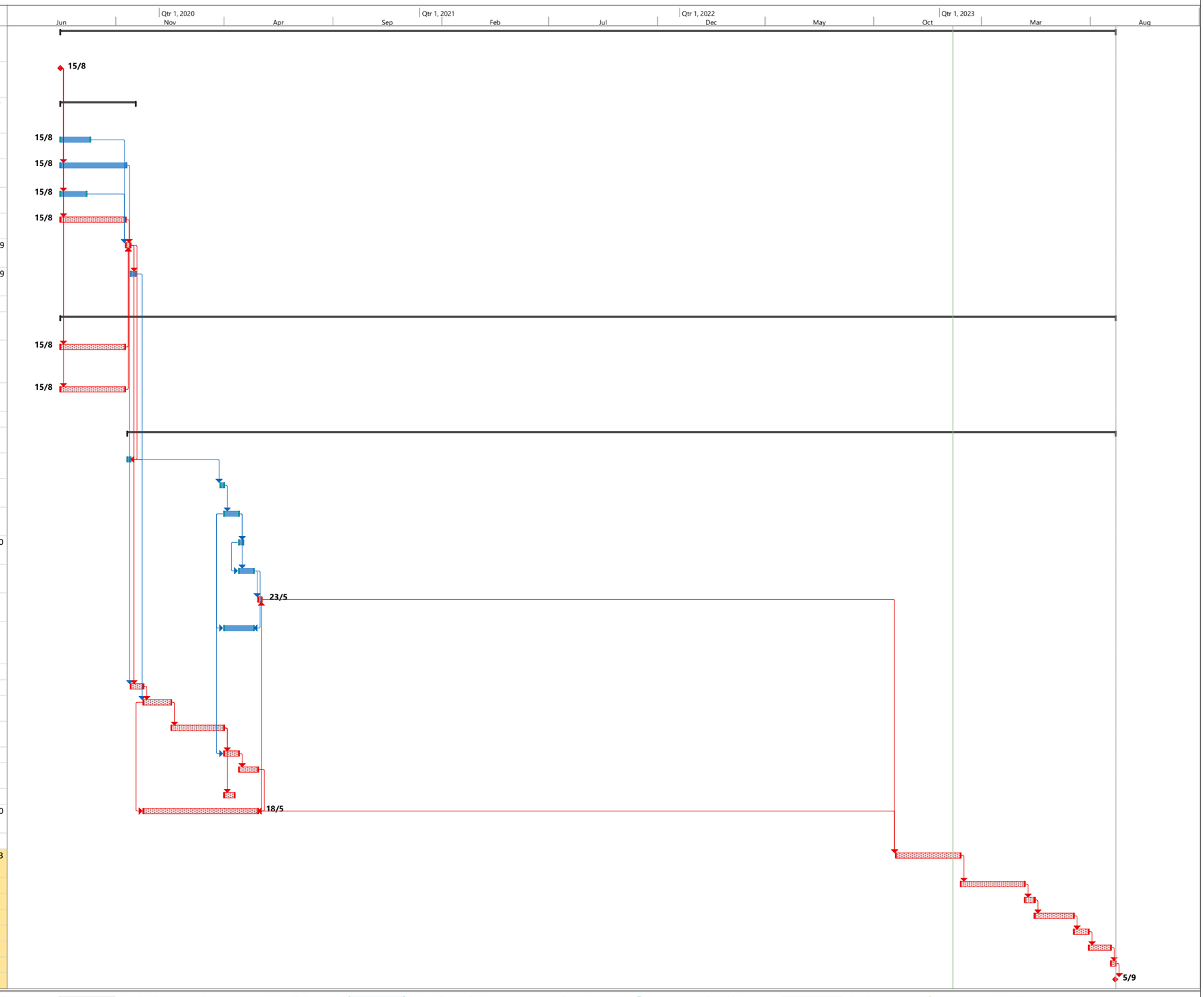
In addition, the regular water quality monitoring and other requirements specified in the Updated EM&A Manual will be carried out by the ET, IEC and contractor where applicable during construction (and post-construction) phase.

LOA : 14 June 2019
Contract Commencement :
15 August 2019

Tender for Contract No. 18/8005
The Hong Kong Electric Co., Ltd.
Lamma Power Station Navigation Channel Improvement 2019
(Master Programme - EPD Submission)

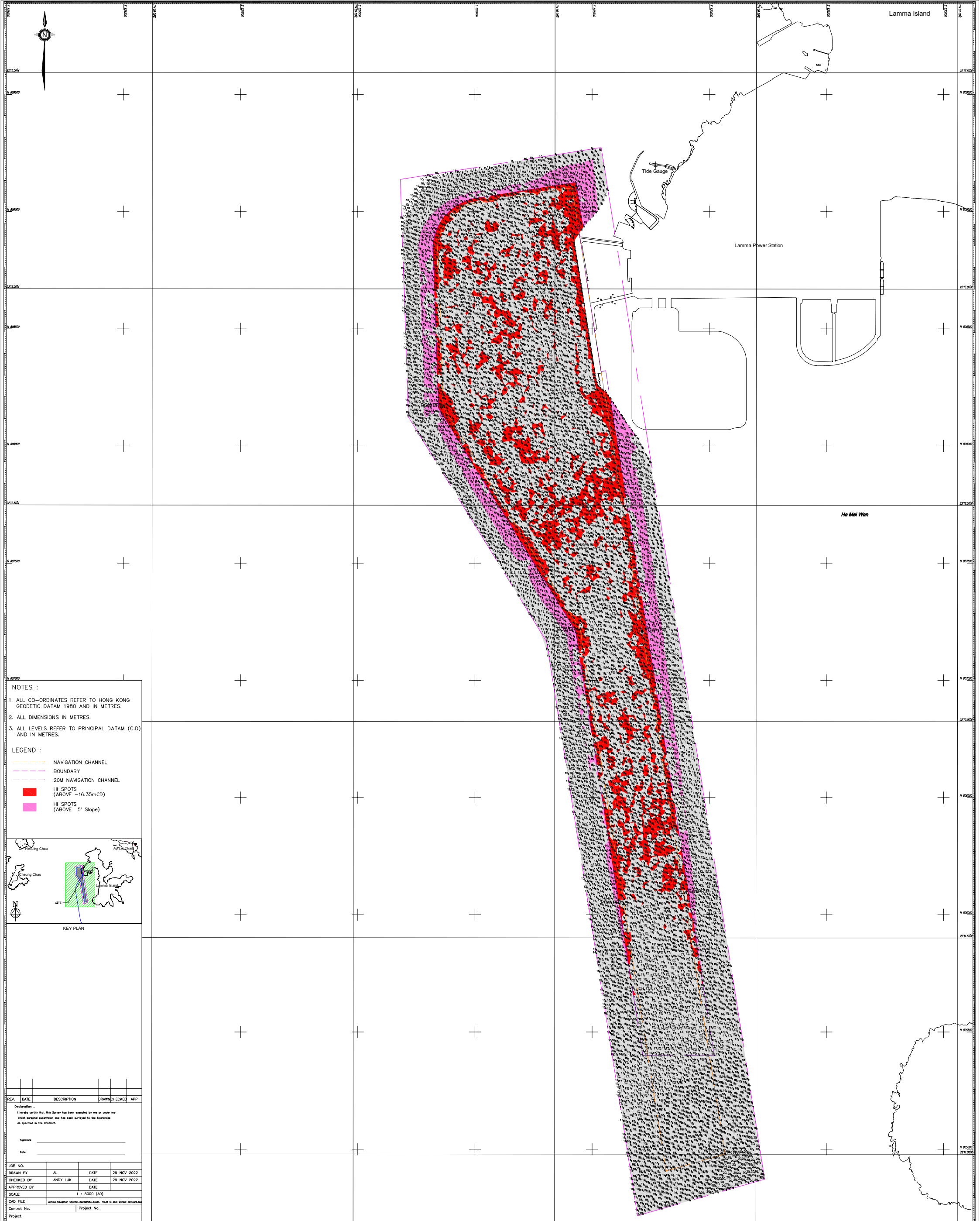
UDL - Gitanes Joint Venture

ID	Task Name	Duration	Start	Finish
1	**CONTRACT DURATION**	**1483 days**	**Thu 15/8/19**	**Tue 5/9/23**
2	**Contract Commencement**	**0 days**	**Thu 15/8/19**	**Thu 15/8/19**
3	**Pre-requisition preparation to dredging works**	**106 days**	**Thu 15/8/19**	**Thu 28/11/19**
4	Application of Marine Dumping Permit from EPD and Issuance	42 days	Thu 15/8/19	Wed 25/9/19
5	FEMU installation to TSHD and Add TSHD to dumping permit	93 days	Thu 15/8/19	Fri 15/11/19
6	Application of Contruction Noise Permit from EPD and Issuance	37 days	Thu 15/8/19	Fri 20/9/19
7	Application of Marine Department Notice from Marine Department and Issuance	92 days	Thu 15/8/19	Thu 14/11/19
8	Issuance & confirmation of conditions letter	7 days	Fri 15/11/19	Thu 21/11/19
9	Publish of Marine Department Notice	7 days	Fri 22/11/19	Thu 28/11/19
10				
11	**Dredging works carried out by TSHD except those localized area adjacent to existing jetty and structures**	**1483 days**	**Thu 15/8/19**	**Tue 5/9/23**
12	Application of local operating license of TSHD including supplementary and amended submission to deal with comments from HKMD and Issuance	91 days	Thu 15/8/19	Wed 13/11/19
13	Application of working permit / visa for officers and crews on board of TSHD and Issuance	91 days	Thu 15/8/19	Wed 13/11/19
14				
15	**Physical Site Works**	**1389 days**	**Sun 17/11/19**	**Tue 5/9/23**
16	Pre-works initial hydrographic Survey	5 days	Sun 17/11/19	Thu 21/11/19
17	Mobilization for Grab Dredger	5 days	Fri 27/3/20	Tue 31/3/20
18	Dredging in berthing box of coal jetty to the designated level by Grab Dredger	21 days	Wed 1/4/20	Tue 21/4/20
19	Interim survey of coal jetty berthing box by independent survey company appointed by UGJV	6 days	Wed 22/4/20	Mon 27/4/20
20	Trimming of remaining localized high spots by Grab Dredger as necessary	21 days	Wed 22/4/20	Tue 12/5/20
21	Demobilization for Grab Dredger	5 days	Tue 19/5/20	Sat 23/5/20
22	Disposal of marine sediment by split hopper barges to designated dumping area within the exhausted Mud Pit CMP V d of the Confined Marine Sediment Disposal Facility to the East Sha Chau	42 days	Wed 1/4/20	Tue 12/5/20
23				
24	Mobilization for TSHD	18 days	Fri 22/11/19	Mon 9/12/19
25	Dredging of seabed (location Zone 3 & Zone 4) to the designated level & profile by TSHD & Trimming by Grab Dredger	39 days	Tue 10/12/19	Fri 17/1/20
26	Dredging of seabed (location Zone 1 & Zone 2) to the designated level & profile by TSHD	74 days	Sat 18/1/20	Tue 31/3/20
27	Survey & review related to trimming	21 days	Wed 1/4/20	Tue 21/4/20
28	Trimming of remaining localized high spots by Grab Dredger as necessary	27 days	Wed 22/4/20	Mon 18/5/20
29	Demobilization for TSHD	15 days	Wed 1/4/20	Wed 15/4/20
30	Disposal of marine sediment to designated dumping area at South of Cheung Chau Open Sea Sediment Disposal Area	161 days	Tue 10/12/19	Mon 18/5/20
31				
32	Preparation of information for high spot trimming by seabed leveller to EPD	91 days	Tue 1/11/22	Mon 30/1/23
33	Preparation and mobilization of equipment	90 days	Tue 31/1/23	Sun 30/4/23
34	Trial for high spot trimming by seabed leveller	14 days	Mon 1/5/23	Sun 14/5/23
35	High spot trimming works by seabed leveller	55 days	Mon 15/5/23	Sat 8/7/23
36	Survey check and review of high spot trimming results	21 days	Sun 9/7/23	Sat 29/7/23
37	Outstanding works of high spot trimming by seabed leveller	31 days	Sun 30/7/23	Tue 29/8/23
38	Final Hydrograhic Survey Submission	7 days	Wed 30/8/23	Tue 5/9/23
39	**Project Contract Completion**	**0 days**	**Tue 5/9/23**	**Tue 5/9/23**



HKE Master Programme
(Rev. T2)
Date: 19 January 2023

Task, Milestone, Project Summary, Inactive Milestone, Manual Task, Manual Summary Rollup, Start-only, External Tasks, Deadline, Manual Progress
Split, Summary, Inactive Task, Inactive Summary, Duration-only, Manual Summary, Finish-only, External Milestone, Progress



NOTES :

1. ALL CO-ORDINATES REFER TO HONG KONG GEODETIC DATAM 1980 AND IN METRES.
2. ALL DIMENSIONS IN METRES.
3. ALL LEVELS REFER TO PRINCIPAL DATAM (C.D) AND IN METRES.

LEGEND :

- NAVIGATION CHANNEL
- BOUNDARY
- 20M NAVIGATION CHANNEL
- HI SPOTS (ABOVE -16.35mCD)
- HI SPOTS (ABOVE 5° Slope)

KEY PLAN

REV.	DATE	DESCRIPTION	DRAWN	CHECKED	APP

Declaration ,

I hereby certify that this Survey has been executed by me or under my direct personal supervision and has been surveyed to the tolerances as specified in the Contract.

Signature _____

Date _____

JOB NO.			
DRAWN BY	AL	DATE	29 NOV 2022
CHECKED BY	ANDY LUK	DATE	29 NOV 2022
APPROVED BY		DATE	
SCALE	1 : 5000 (A0)		
CAD FILE	Lamma Navigation Channel_20210925c_5000_-16.35 HI spot without contours.dwg		
Contrat No.		Project No.	

Project

THE HONG KONG ELECTRIC CO., LTD.
LAMMA POWER STATION
NAVIGATION CHANNEL IMPROVEMENT 2019

Drawing title

HYDROGRAPHIC SURVEY PLAN
SHOAL- BIASED SOUNDINGS
(SURVEYED AT 25 SEP 2021)

Drawing No.	Rev.
LNC / 20210925 / 007	0

Client 香港電燈有限公司 The Hongkong Electric Co., Ltd. 港燈 HK Electric
Projects Division

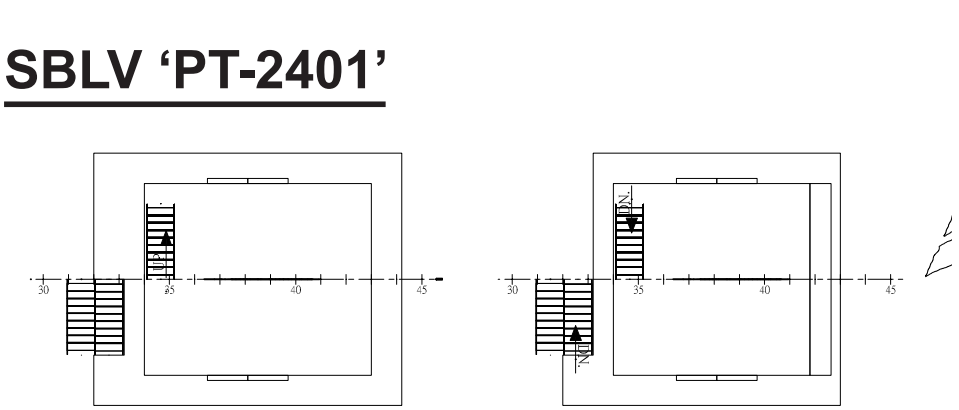
Contrator UDL DREDGING LIMITED

Surveyor WISE

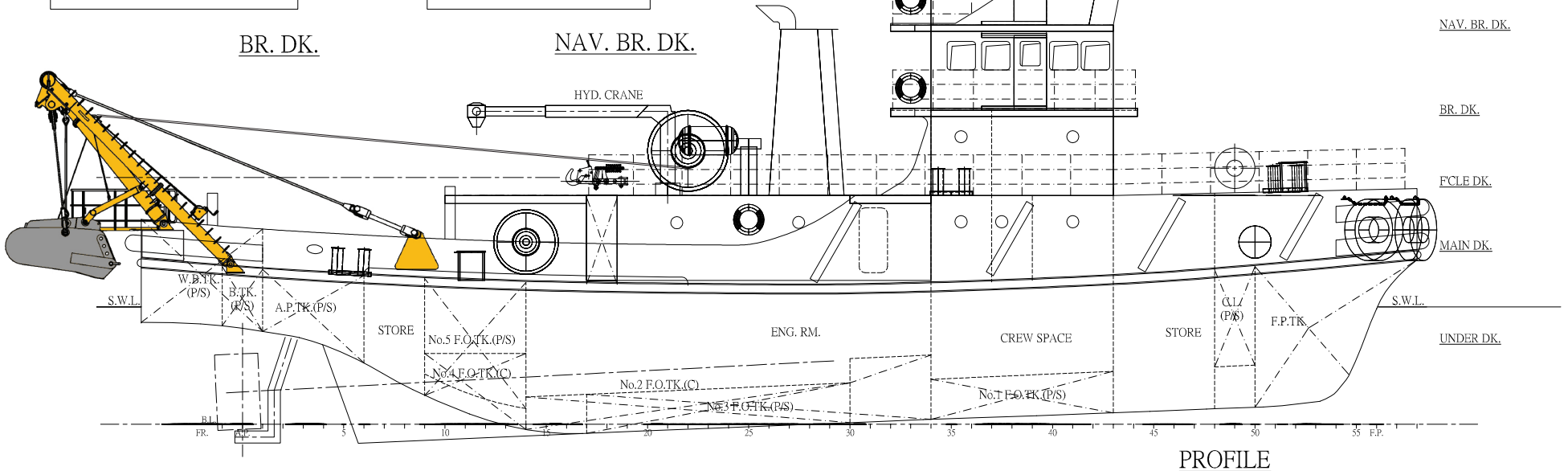
SBLV ‘PT-2401’

PRINCIPAL DIMENSIONS

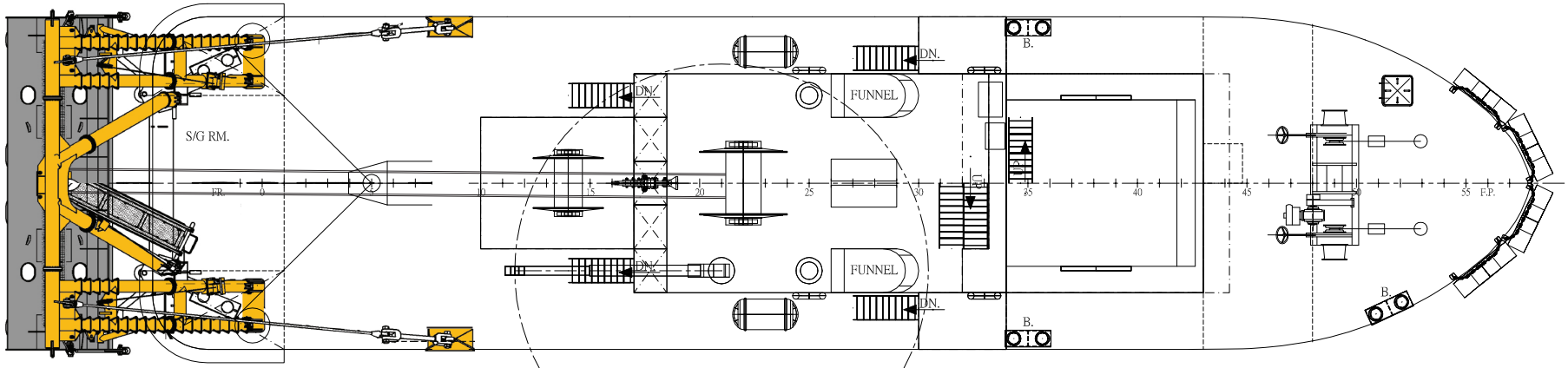
LENGTH O.A.	31.50 m
LENGTH B.P.	28.00 m
BREADTH (MLD.)	7.60 m
DEPTH (MLD.)	3.50 m
DESIGN DRAFT (MLD.)	2.90 m
CLASS	RINA
NAVIGATION AREA	GREATER COASTING SERVICE
GROSS TONNAGE	268 GT
MAIN ENGINE	1200 PS x 2
CREW	10P



BR. DK. NAV. BR. DK.



PROFILE



POOP DK. F'CLE DK.

Annex C