Issue No.	:	Issue 6
Issue Date	:	April 2022
Project No.	:	1825

SILT CURTAIN & COFFERDAM DEPLOYMENT PLAN

FOR

PORT SHELTER PHASE 3, PO TOI O SEWERAGE TREATMENT PLANT EM&A

COMMERCIAL-IN-CONFIDENCE

Certified by:

Timmy WONG
Environmental Team Leader

Verified by:

F.C. TSANG
Independent Environmental Checker

Allied Environmental Consultants Limited
Member of AEC Group (HKEX Stock Code: 8320.HK)
27/F, Overseas Trust Bank Building, 160 Gloucester Road, Wan Chai, Hong Kong
www.asecg.com T: +852 2815 7028 F: +852 2815 5399

沛然環境評估工程顧問有限公司
沛然環保集團成員（港交所股份代號：8320.HK）
香港灣仔告士打道 160 號海外信託銀行大廈 27 樓

ACUITY
SUSTAINABILITY
CONSULTING LIMITED

Website: www.acuityhk.com

Unit E, 12/F., Ford Glory Plaza,
Nos. 37-39 Wing Hong Street,
Cheung Sha Wan, Kowloon, HK

Tel. : (852) 2698 6833
Fax.: (852) 2698 9383

Our Ref: PL-202204037

Drainage Services Department
Special Duty Division
42/F, Revenue Tower, 5 Gloucester Road,
Wan Chai, Hong Kong.

Attention: Ms. Janet YUEN

25 April 2022

Dear Janet,

Sewerage Works at Po Toi O
Silt Curtain and Cofferdam Deployment Plan

I refer to the email from the ET concerning the captioned. I have no adverse comment on the Silt Curtain and Cofferdam Deployment Plan (Issue 6). In accordance with Condition 2.13 of the Environmental Permit with permit No EP-516/2016, I hereby verify that this document has conformed to the relevant information, requirements and recommendations contained in the approved EIA Report (Register No. AEIAR-206/2017).

Yours faithfully,

F.C. Tsang
Independent Environmental Checker

cc. ETL – Timmy WONG

Silt Curtain and Cofferdam Deployment Plan (Po Toi O)

DC/2019/09 – Provision of Village Sewerage in Sai Kung

Revision	Date	Description
4	29/06/2021	Initial Issue
4a	19/04/2022	Para. 2 and Figures of Section 2.2, Table of Section 2.3, Para.1 of Section 2.6, Para. 1 of Section 3.1, Section 3.2, Pt. 2 of Section 3.3, Para. 1 & 5 of Section 3.4, Location Plan (Location A & C) of Appendix B, Appendix D, Appendix E and Appendix G have been amended.

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- 3.3 Installation and Removal of Cofferdam
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Part A – General

Construction of the submarine outfall will be by means of horizontal directional drilling from the rising mains at the rocky shore through the seabed. A diffuser will be installed on top of a riser shaft extending about 1m above the seabed at the end of the submarine outfall. An area of 500 m^2 will be fully enclosed by sheet pile cofferdam at the diffuser point.

About 500m2 seabed will be dredged to remove the sediments in the seabed temporarily in order to ensure the stability of the seabed for the installation of the diffuser. Most of the area will be backfilled with rockfill and the permanent area lost at the diffuser is about 5 m^2. After the backfilling work is completed, the cofferdam will be removed.

Marine-based construction works (i.e. installation & extraction of sheeting pile cofferdam by vibratory action) would cause minor displacement of marine sediment. With erection and maintenance of silt curtain, the displaced sediment will settle quickly and will not significantly increase the suspended solid level in water. Prior to the erection of temporary platform at the rocky shore and the cofferdam for diffuser, silt curtains will be deployed until the works have completed. Besides, an additional silt curtain will be deployed at the outlet of a box culvert prior to the construction of PTO Sewerage Treatment Plant and will be removed upon the completion of the construction of PTOSTP.

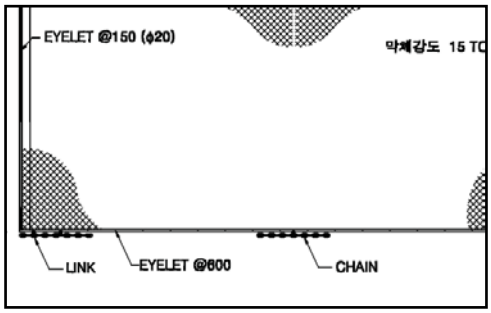
This deployment plan includes construction programme, details on the design, method of installation, operation and maintenance of silt curtains and cofferdam, and other associated information.

Part B – Deployment of Silt Curtain

2.1 Details of the Proposed Silt Curtain

In general, silt curtain "GEONIA® Silt Protector - DSP 15" (or equivalent) will be deployed to fully enclose the cofferdam and the outlet of the box culvert prior to commencement of works. With reference to the location of deployment, distance to the coast, and the maximum depth of seabed, the silt curtain specialist suggested that the silt curtain with tensile strength150 kN/m would be suitable for deployment at Location A and B, whilst less tensile strength shall be considered for the silt curtain deployed at Location C..

The proposed silt curtain applies a durable fabric for the float device by using high tenacity colored yarn, which was improved to solve the problem of fault construction, poor visibility caused by a damaged PVC coated fabric, and marine pollution of a broken PVC coated fabric. The size of each silt curtain will be 10m in length and various sizes in depth. The silt curtain will be connected by using 10mm-diameter PP ropes. A chain (5kg/m) will be installed at the bottom of the silt curtain to ensure the straightness of silt curtain at Location A and B. No gaps will be retained between the seabed and the silt curtain.



Detail of Chain

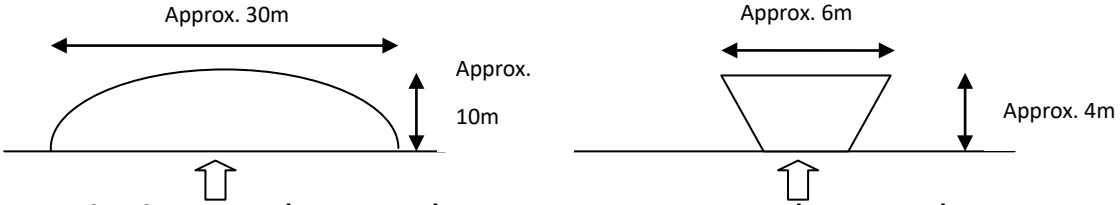
Ton bags with size 1.5mx1.5mx1.5m will be adopted as the anchorage points to fix the silt curtains at Location A and B.

The typical section, connection details, material properties, certificates and job reference of the proposed silt curtain (including anchor block) is attached in ***Appendix A – Specification of Silt Curtain***.

2.2. Location Plan of Anchor Blocks and Silt Curtain

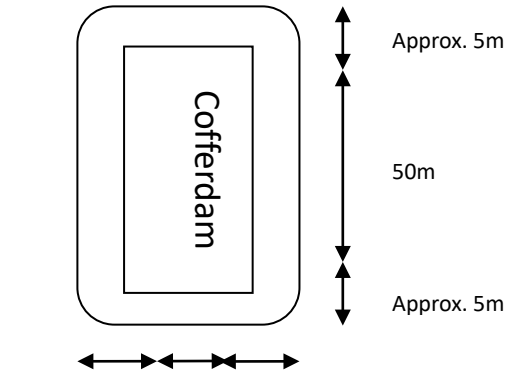
During the installation and extraction works of temporary steel cofferdam, as well as the construction of submarine outfall by Horizontal Directional Drilling (HDD), silt curtains will be deployed around the cofferdam (Location B) and rocky shore area (Location A) respectively. In addition, silt curtains will be also deployed near the outlet of the box culvert to avoid overflowing of construction wastewater from Po Toi O Sewerage Treatment Plant (PTOSTP) (Location C).

At the recommendation of the silt curtain specialist, sufficient buffer zone would be provided to avoid leakage of wastewater to the sea. For location A, the farthest point of the silt curtain to the rocky shore would be about 10m, and the maximum width would be about 30m. For location C, the layout plan for silt curtain deployment at Location C was made based on the actual site condition. According to the layout plan (see ***Layout Plan for Silt Curtain at Location C*** in Appendix B), the maximum width would be about 6m, and the farthest point of the silt curtain to the existing outlet would be about 4m.



Rocky Shore Area (Location A) **PTOSTP (Location C)**

For location B, silt curtain shall be about 5m away from the 10m x 50m cofferdam.



Cofferdam (Location B)

In these connections, the total lengths of silt curtains at Location A, B, and C were calculated, which were 50m, 160m, and 10m respectively.

The proposed arrangement of the silt curtain and anchor blocks is illustrated in ***Appendix B – Location Plan of Silt Curtain and Anchor Blocks.***

2.3. Summary of Silt Curtain

The below table summarizing relevant information regarding the silt curtains and anchor blocks to be deployed at the three proposed locations:

LOCATION / INFO	Location A: Rocky Shore	Location B: Cofferdam	Location C: PTOSTP
Length of Each Silt Curtain	10m		
Total Length of Silt Curtain *[1]	50m	160m	14m
Proposed Nos. of Silt Curtain *[1]	5	16	1.4
Proposed Nos. of Anchor Blocks	17	48	3
	(Please kindly refer to anchor details in Appendix A and layout plan in Appendix B for easier understanding of the numbers of anchorblock)		
Type of Silt Curtain and Connection	Durable Tube Type (DSP 15) (Please kindly refer to Appendix A) *Less tensile strength shall be considered for Location C.		
Size of Silt Curtain	10m (length) x 1m ~ 12m (height) (Please kindly refer to Appendix A)		
Size of Anchor Block	1.5m x 1.5m x 1.5m for Location A and B 1.0m x 1.0m x 1.0m for Location C (Please kindly refer to Appendix A)		
Location of Anchor Blocks	(Please kindly refer to Appendix B)		

Notes:

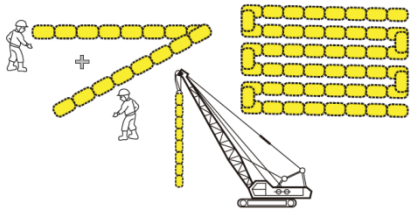
1. Length estimated from the layout plan attached in ***Appendix B***

2.4. Installation Sequence

Installation of silt curtains will mainly follow the below steps.

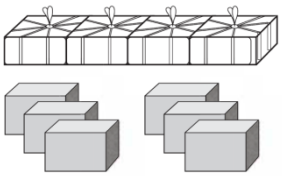
Step 0:
Preparation work - Before fabrication, necessary survey and inspection will be carried out to confirm the depth of silt curtain.

Step 1:



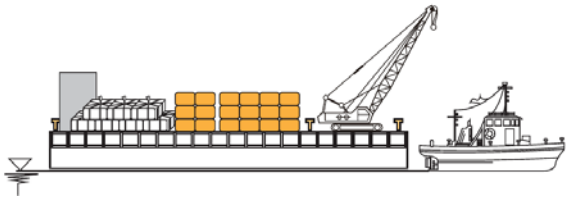
Checking – Checking of product will be carried out before assembly;
Assembly – Connect each unit of silt curtain on shore;

Step 2:



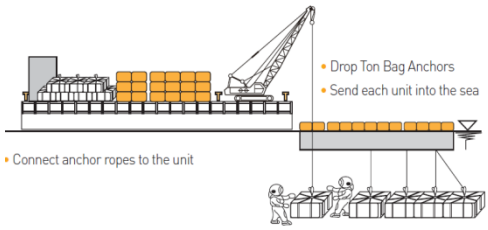
Anchor Blocks – Prepare Ton Bag Anchors for further use;

Step 3:



Transportation – All the materials will be loaded on the barge or truck and transported to the proposed locations.

Step 4:



Deployment –Surveyor will help to set out the location of deployment. Ton Bag Anchors will be deployed on the seabed and silt curtain units will be unloaded in the sea. Then, diver / worker will connect the anchor ropes to the units (please refer to Appendix A for the connection details). Dive checking would be carried out to ensure the components were well installed in the right positions.

The typical inspection checklist for installation of silt curtain is attached in ***Appendix C - Inspection Checklists for Silt Curtain***.

2.5. Maintenance

The silt curtain should be visually monitored weekly by patrol during the period it is placed in the water. The patrol is performed on the boat for the purpose of preventing ships from running against the unit and of finding abnormality in earlier phase. Visual inspection shall be once per day before commencement of works and the checklist will be signed by appropriate parties and ready for checking on-site.

In addition to visual inspection on the boat, dive to check the unit thoroughly. Diving inspection shall be at least once per every three months. The checklist will be signed by the Contractor and ready for checking on-site.

After Typhoon Signal No. 3 or above, and/or Black Rainstorm Warning Signal informed by the Hong Kong Observatory, check the unit for the purpose of finding possible damages or troubles earlier. This check is performed basically on the boat (visual inspection), but dive to check the unit if necessary (diving inspection).

Related works will be suspended immediately if the silt curtain is found damaged. A new silt curtain will be installed to surround the broken one and will be well connected to the anchor blocks. Then the broken one would be untied and removed by grab barge.

To avoid collision caused by vessels, waterproof flash lanterns will be mounted on the float tubes.

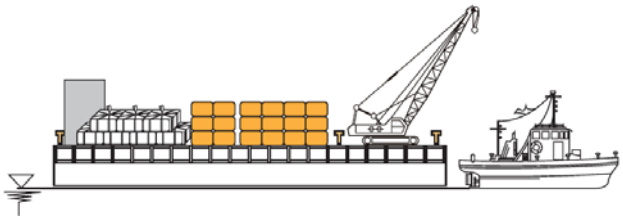
The typical inspection checklists (Visual and Diving) is attached in ***Appendix C - Inspection Checklists for Silt Curtain.***

The inspecting person shall be delegated by the Specialist Sub-contractor in Marine Works, who shall complete the training about silt curtain by the supplier, and have experiences about the similar checking and inspection works.

2.6. Silt Curtain Removal/Repositioning

In order to reduce negative impact on water quality during the demolition or removal works of the cofferdam and temporary platform at the rocky shore. Silt Curtain will be removed after completion of construction works (i.e. removal of temporary platform at the rocky shore and removal of cofferdam at the submarine outfall) in rocky shore and submarine outfall.

Silt curtain removal will be carried out by derrick lighter barges. After the removal of temporary steel cofferdam, granular fill and anti-scour concrete mattress will be placed on the seabed before the placement of sorted marine deposits. Only insignificant sediment loss would be expected during the silt curtain removal.



Tentatively, there will not be any plan for repositioning of silt curtain. The actions upon re-deployment will be submitted separately if necessary.

Part C – Deployment of Cofferdam

3.1. Details of Temporary Steel Cofferdam

The purpose for the temporary steel cofferdam is to minimize the water quality impact due to the dredging and filling works. The temporary steel cofferdam will be installed (from the seabed up to a height above the high water mark) to fully enclose the entire dredging / filling areas before carrying out any dredging/filling works. All dredging and filling works shall be carried out inside the cofferdam.

Ground investigation will be carried out to verify the seabed geological condition to ensure a safe and reliable design for cofferdam. During design, lateral forces induced by the sea water would be considered, and sufficient toe-in below the seabed will be required to ensure the stability of cofferdam. Before installation, the design will be checked certified by the Independent Checking Engineer. In addition, the Independent Checking Engineer will also check the as-constructed cofferdam to comply with the design.

The proposed size of the cofferdam will be about 10m x 50m on plan, and approximate 17m in depth. Approximate 5m toe-in will be required. Lateral loading from wave and water pressure will be resisted by struts and walings system, which form part of the cofferdam.

Details on the Cofferdam Design and the location plan are attached in ***Appendix D – Cofferdam Details*** and ***Appendix E– Sectional Properties of The Proposed Sheet Pile***.

Typical Arrangement of Cofferdam with Sheetpiles and Struts

3.2. Details of HDD Entry Pit Cofferdam

In order to prevent falling of debris into the sea, a cofferdam shored up by sheet piles would be installed at the entry pit, where HDD drill rig would be inserted and would drill through the rock layer below the sea. On top of that, as the HDD entry pit is in the inner part of a temporary working platform, this could provide a sufficient buffer zone to avoid debris from falling into the sea.

Details on the Cofferdam Design and the location plan are attached in ***Appendix D – Cofferdam Details*** and ***Appendix E– Sectional Properties of The Proposed Sheet Pile***.

3.3 Installation and Removal of Cofferdam

Installation and extraction of sheet piles will be conducted by vibratory action. This will cause minor displacement of marine sediment, which will quickly settle without significant increase in suspended solids.

Installation/Extraction of Sheetpile by Vibratory Method

The installation and removal of cofferdam will basically follow the below steps:

1. After the deployment of silt curtain at the proposed diffuser location, sheetpile will be driven by vibratory hammer along the alignment with sheetpiles interlocked until the desired depth has reached.

2. The installation arrangement will start from the Southwest corner of the cofferdam and will proceed in clockwise direction. The installation of sheet piles for cofferdam at the manifold is scheduled to commence from May 2023 and will last for about 40 working days. The proposed construction arrangement of cofferdam is

also shown in the drawing Po Toi O – Cofferdam Layout Plan in ***Appendix D – Cofferdam Details***;

3. Wailing and strut will be installed by derrick barge and weld and cutting set accordingly; A dive inspection will be conducted to confirm if the cofferdam is intact with no leakage after installation. Sufficient flash lanterns will be installed on the cofferdam to alert the workers, and reliable anchorages will be adopted to stabilized the barges.

4. Marine dredging and construction of diffuser will be proceeded upon the completion of cofferdam. Sediment confined within the cofferdam would be dredged by closed-grab and stored in sealed compartment of the barge anchored outside the cofferdam.

5. Backfilling works will be confined within the cofferdam. No opening of cofferdam is required and thus there will be no release of sediment into water bodies. Increase in suspended solids is not likely to happen and no significant water quality impact is expected.

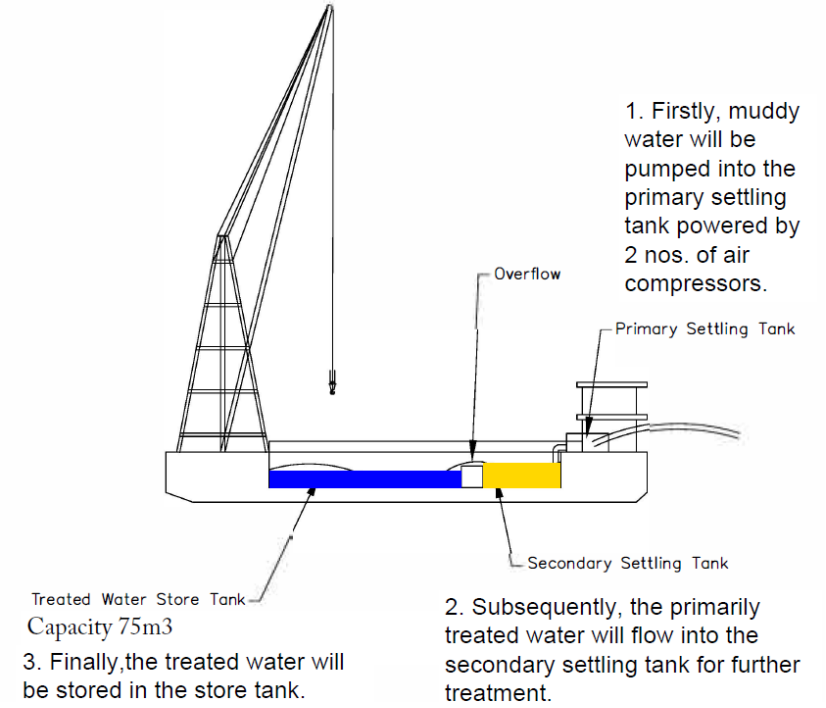
6. Wailing and strut will be demolished step by step after backfilling;

7. Sheetpiles of the cofferdam will be extracted during ebb tide at the final stage with vibratory hammer, and stored on the barge. Extraction of sheetpile will basically follow the steps in Bullet Point 2. The size of barge is about 12m x 25m.

A Works Programme is attached in ***Appendix G – Works Prgramme for Po Toi O***.

3.4 Wastewater Treatment Facility on the Barge

After erection of cofferdam, water pumped out from the cofferdam will be stored in the settling tanks of the barge for settling suspended solids. The capacity of the store tank will be about 75m3 (design flow 75m3 per day, sedimentation reaction time 24 hours).



Barge with Wastewater Treatment Facility

Firstly, muddy water will be pumped into the primary settling tank powered by 2 nos. of air compressors. Subsequently, the primarily treated water will flow into the secondary settling tank for further treatment. The treated water will be stored in the store tank. The treated water will be visually monitored by patrol daily.

The treated water will be checked in accordance with the checklist attached in ***Appendix H – Inspection Checklist for Treated Water***. After checking against Appendix H, the treated water will be discharged to the designated discharge point.

CCTV system will be installed to closely monitor the cofferdam and water condition. In case of emergency cases, construction works will be stopped immediately. Site staffs will be delegated to the frontline to investigate in the leakage and coordinate the remedial works.

If seawater trapped inside the casing and cofferdam shall be pumped out, it should be directed to the sedimentation tank or settling devices before discharge to the designated discharge point.

The Contractor should ensure the effluent from the sedimentation tank meet the WPCO/TM requirements before discharge. If failure in visual inspection, discharge shall be ceased immediately and investigation in the whole facility shall be carried out to figure out the reason.

The proposed discharge point is indicated in the drawing Po Toi O – Cofferdam Layout Plan in ***Appendix D – Drawings for Cofferdam Details***;

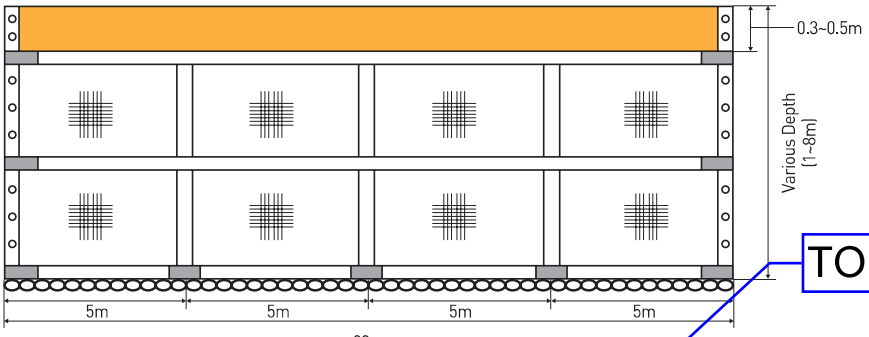
The proposed wastewater treatment facility on the barge is attached in ***Appendix F – Wastewater Treatment Facility on the Barge***.

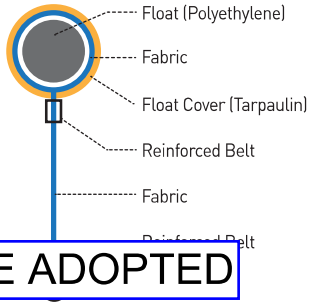
Appendix A – Specification of Silt Curtain

TYPES

• Tube Type

High external force of tide, wave and wind





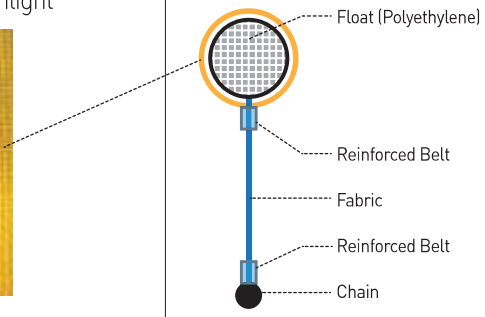
TO BE ADOPTED

• Durable Tube Type

High external force of tide, wave and wind + long resistance from the sunlight

A broken PVC coated fabric in a part of the float

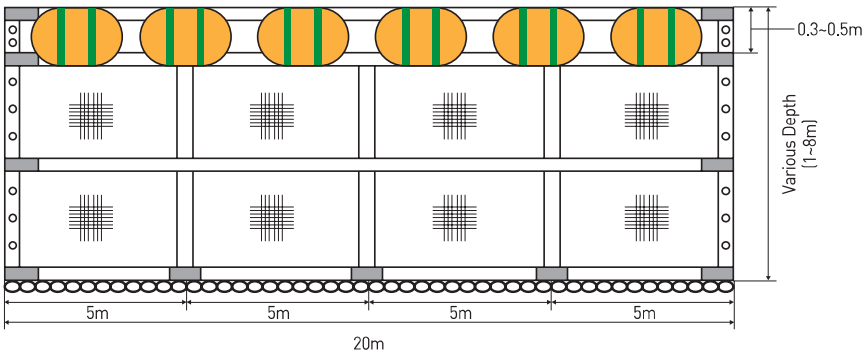
A durable fabric for the float using high tenacity colored yarn

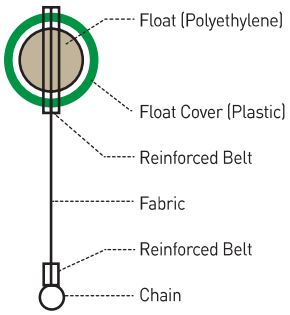


Durable Tube Type GEONIA® Silt Protector applies a durable fabric for the float device by using high tenacity colored yarn, which was improved to solve the problem of fault construction, poor visibility caused by a damaged PVC coated fabric, and marine pollution of a broken PVC coated fabric.

• Covering Head Type

Less external force than tube type / easy to install



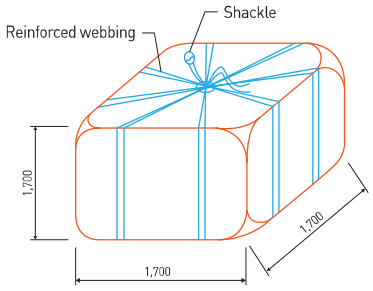


SPECIFICATION

TO BE ADOPTED

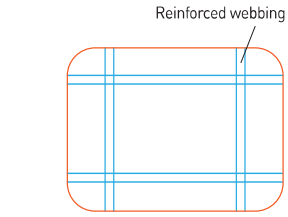
GEONIA® Silt Protector

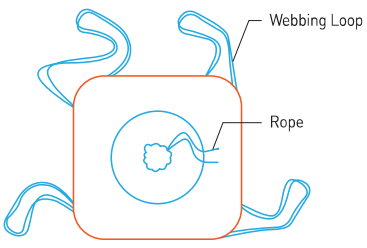
Property	Unit	TEST METHOD	DSP 15	DSP 20	DSP 25	DSP 30
Fabric Unit Weight	g/m2	ASTM D 5261	450	650	750	900
Fabric Tensile Strength	kN/m	ASTM D 4595	150	200	250	300
Fabric Elongation	%	ASTM D 4595	20	20	25	25
Fabric Permeability	cm/s	ASTM D 4491	α X $10^{-2\sim-4}$ (α=1~9.9)			
Rate of Contraction	%	ISO 7771	± 0.2			
Material of Fabric		ASTM D 276	Polyester			
Float Diameter			300 mm ~ 500 mm			

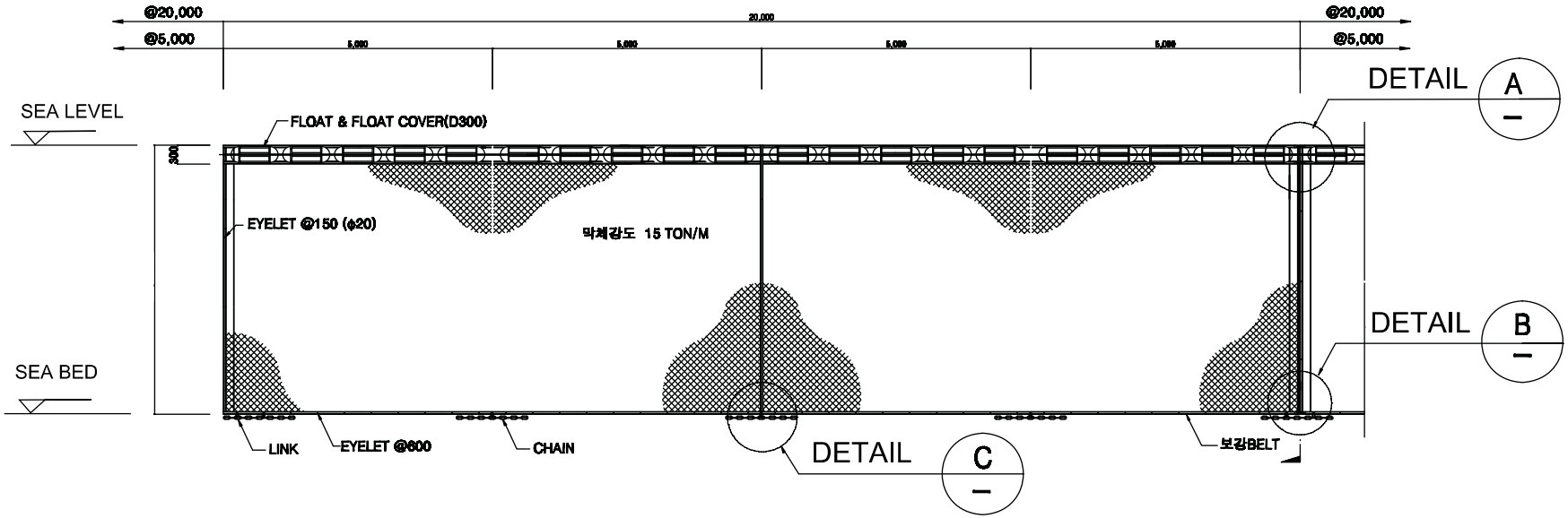


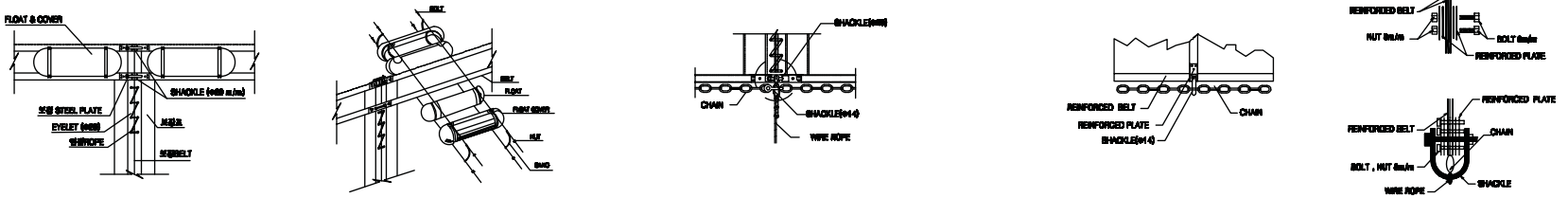
GEONIA® Ton Bag Anchor

Property	Unit	Ton Bag Anchor	TEST METHOD
Fabric Weight	g/m2	350	ASTM D 5261
Fabric Tensile Strength	kN/m	100	ASTM D 4595
Fabric Elongation	%	30	ASTM D 4595
Fabric Permeability	cm/sec	α X $10^{-2\sim-4}$ (α=1~9.9)	ASTM D 4491
Raw Material		Polypropylene	ASTM D 276
Size	m	1.5 X 1.5 X 1.5 1.6 X 1.6 X 1.6 1.7 X 1.7 X 1.7	









DETAIL A

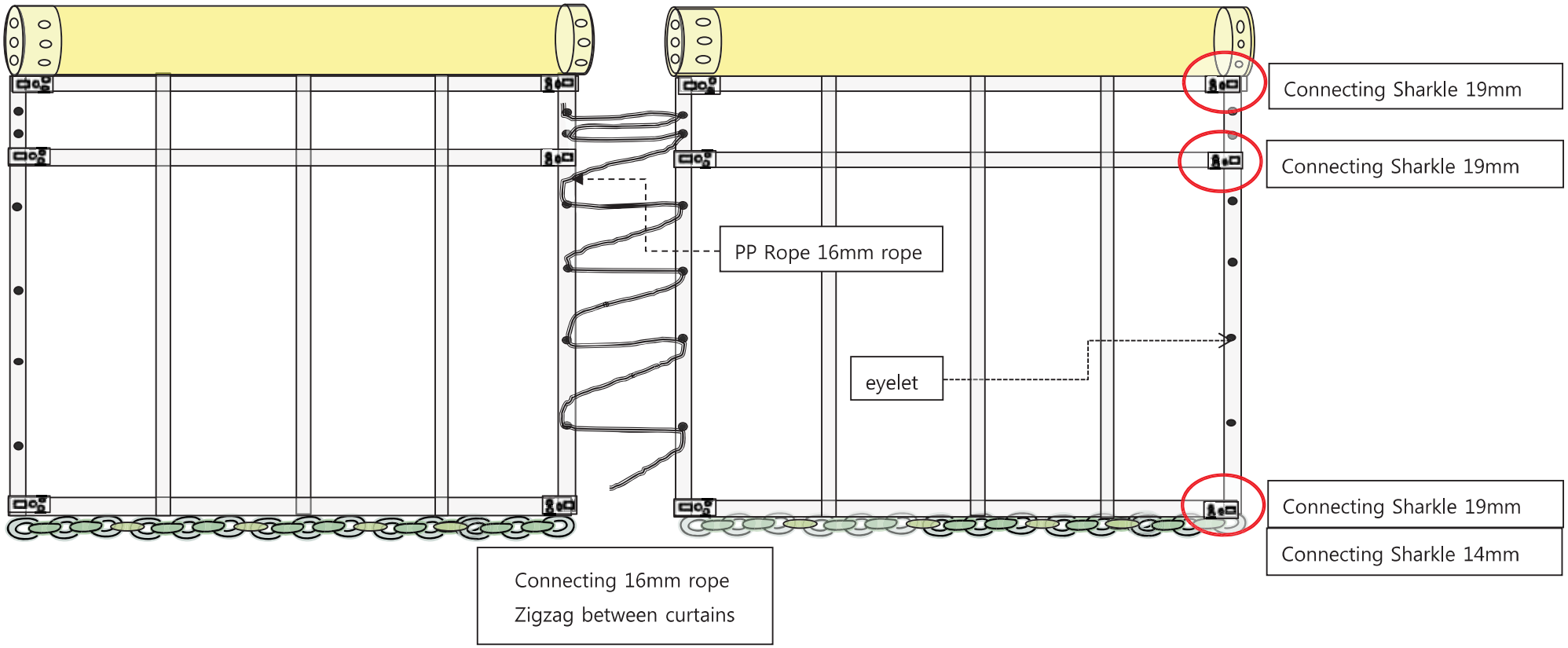
DETAIL B

DETAIL C

발 주 자	설 계 자	설 계 DESIGNED BY	심 사 CHECKED	예열기술자 CHIEF ENG'R	승 인 APPROVED BY	도면구분 SERIAL NO.	공 사 명 PROJECT
	대광산업사	제 도 DRAWN BY	축 척 SCALE 축척	일 자 DATE	일 자 DATE	도면번호 SHEET NO. 도면번호	도 면 명 TITLE 오탁방지막 상세도

DAEYOUN GEOTECH
GEONIA

Installation Guide (Connecting curtain and curtain)



* Number of connections(between curtain and curtain)

	19mm sharkle	No. of eyelet
2m height of curtain	3	6
3m height of curtain	4	9
4m height of curtain	4	12
5m height of curtain	5	15
6m height of curtain	5	18

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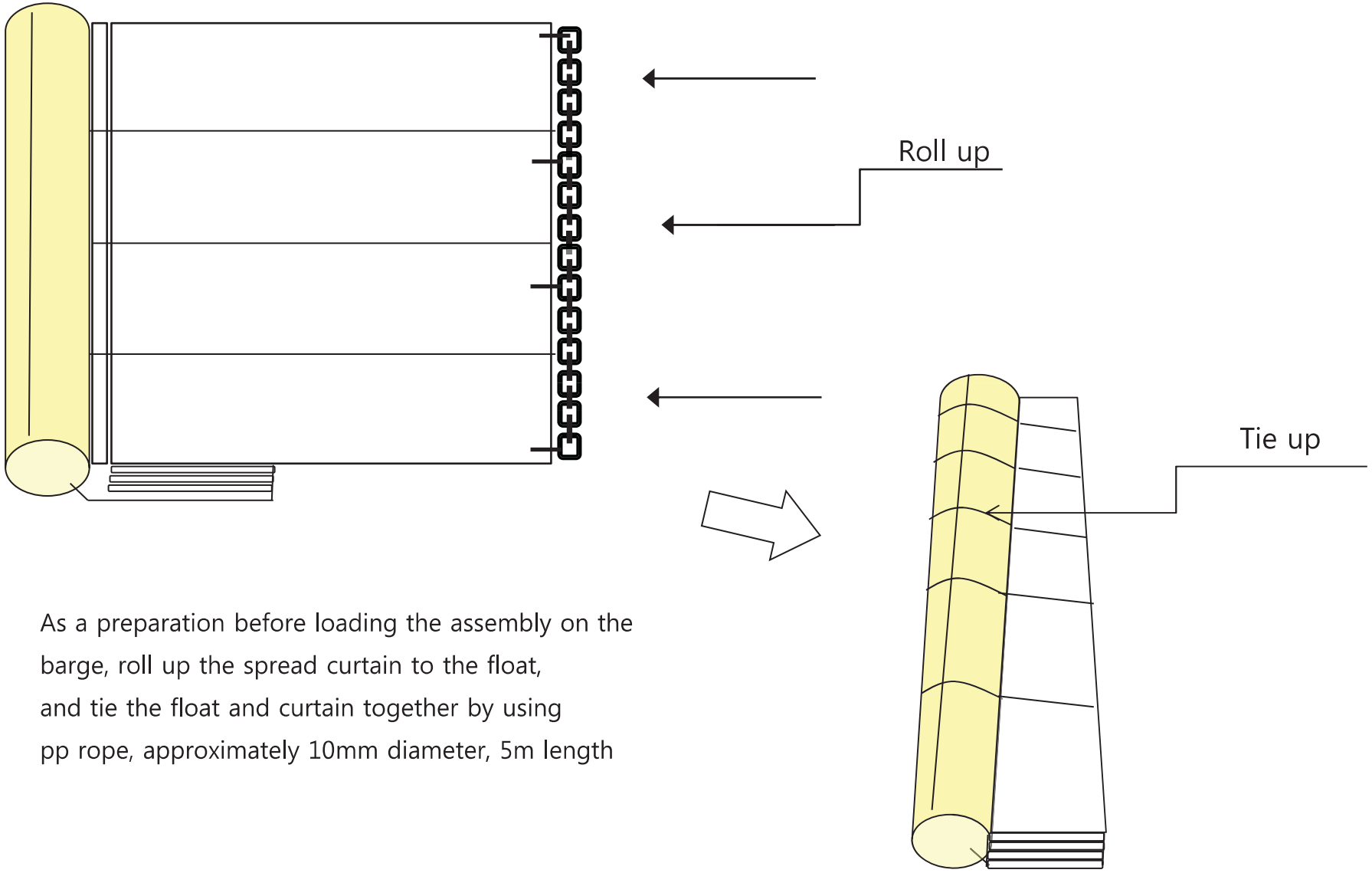
GEONIA®

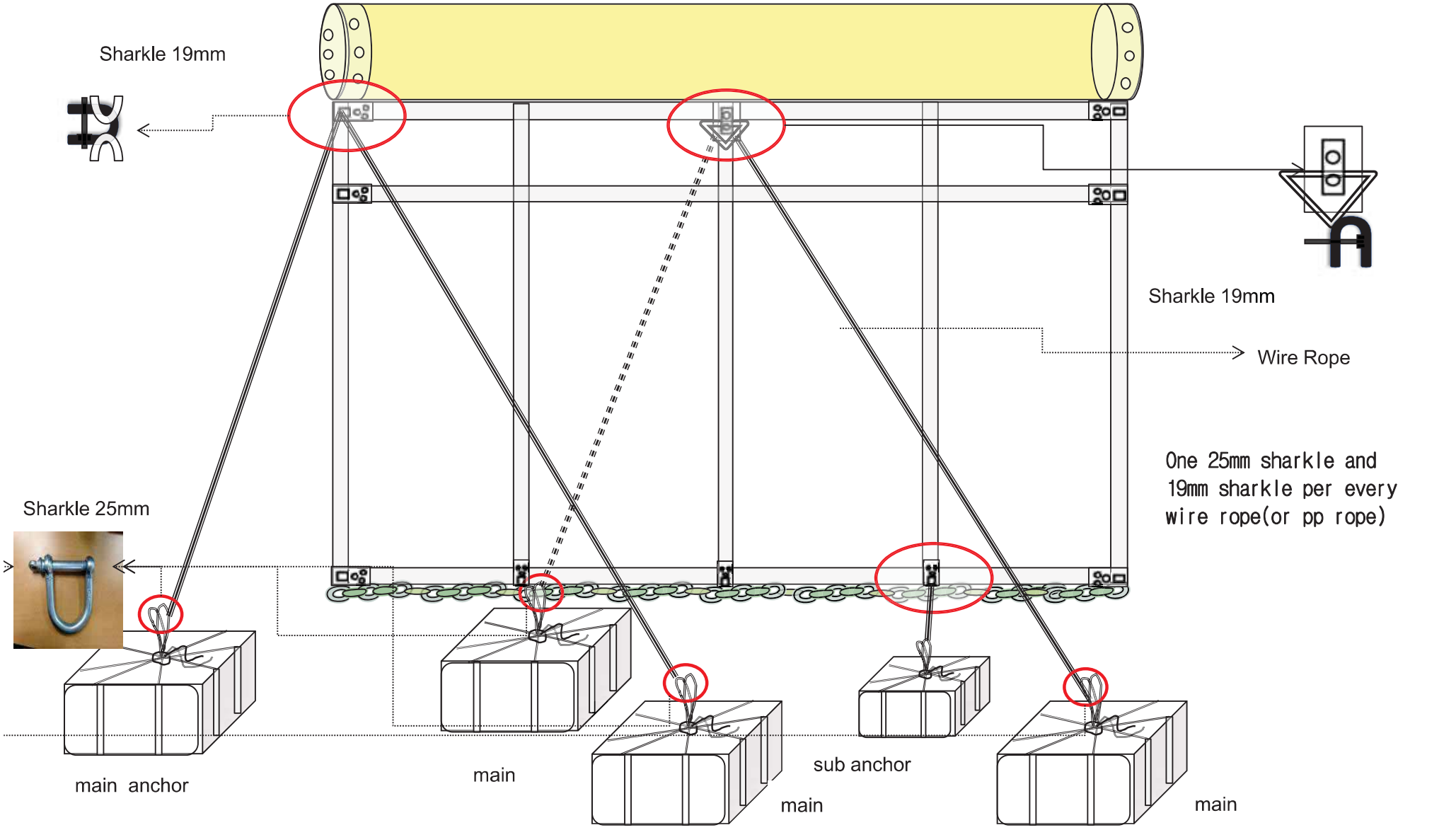
Installation Guide (Tempory tying curtains)



As a preparation before loading the assembly on the barge, roll up the spread curtain to the float, and tie the float and curtain together by using pp rope, approximately 10mm diameter, 5m length

DAEYOUN GEOTECH
GEONIA

Installation Guide (Connecting Curtain and Anchor)



Daeyoun Geotech

GEONIA Silt Protector

Certificate

TRANSPACIFIC CERTIFICATIONS LIMITED

Certificate of Registration

This is to certify that

Environmental Management System

of

DAEYOUN GEOTECH CO., LTD.

55-2, Dogog-ri, Gyrye-myeon, Gimcheon-city,
Gyeongsangbuk-do, Korea.

complies with the requirements of

ISO 14001:2004

This certificate is valid concerning all activities related to:

Manufacture and Servicing of Industrial Fabrics
(PET Woven Geotextile, PP Woven Geotextile, Geotextiles,
Geocomposite and Base Cloth) & Twisted Yarn.

ANZSIC Code: C 2212, C 2229

E1356	Aug. 31, 2013	Sep. 26, 2014
Certificate No.	Date of this Certificate	Certificate Expiry Date
Oct. 11, 2010	Sep. 26, 2016	
Date of Initial Registration	*Recertification Due Date	Managing Director/Director

TRANSPACIFIC CERTIFICATIONS LIMITED

Website : www.tclcertifications.com E-mail : info@tclcertifications.com

Accreditation by Joint Accreditation System of Australia and New Zealand (Accreditation No. E3560506IN)

11, London Circuit, Canberra, Act 2600, AUSTRALIA

www.jas-anz.com.au/register

* Lack of fulfillment of conditions set out for the issuance of the certificate and timely completion of periodic surveillance audits may render the certificate invalid.

Version 1.07

TRANSPACIFIC CERTIFICATIONS LIMITED

Certificate of Registration

This is to certify that

Quality Management System

of

DAEYOUN GEOTECH CO., LTD.

55-2, Dogog-ri, Gyrye-myeon, Gimcheon-city,
Gyeongsangbuk-do, Korea.

complies with the requirements of

ISO 9001:2008

This certificate is valid concerning all activities related to:

Manufacture and Servicing of Industrial Fabrics
(PET Woven Geotextile, PP Woven Geotextile,
Geotextiles, Geocomposite and Base Cloth)
& Twisted Yarn.

ANZSIC Code: C 2212, C 2229

9466	Aug. 31, 2013	Sep. 26, 2014
Certificate No.	Date of this Certificate	Certificate Expiry Date
Oct. 11, 2010	Sep. 26, 2016	
Date of Initial Registration	*Recertification Due Date	Managing Director/Director

TRANSPACIFIC CERTIFICATIONS LIMITED

Website : www.tclcertifications.com E-mail : info@tclcertifications.com

Accreditation by Joint Accreditation System of Australia and New Zealand (Accreditation No. S2640303IN)

11, London Circuit, Canberra, Act 2600, AUSTRALIA

www.jas-anz.com.au/register

* Lack of fulfillment of conditions set out for the issuance of the certificate and timely completion of periodic surveillance audits may render the certificate invalid.

Version 1.11

ZERTIFIKAT

Certification Body CE 1213
SKZ – TeConA GmbH
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany

EC Certificate of Factory Production Control
1213–CPD–5431

In compliance with Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (the Construction Products Directive or CPD), as later amended, it has been stated that the construction products

Geonia DM-10, Geonia DM-15, Geonia DM-20, Geonia DM-25, Geonia DML-10, Geonia DML-20, Geonia DML-30, Geonia DML-40

Geotextile, woven; Raw material: PET
used for the function: S + R

placed on the market by

Daeyoun Geotech Co. Ltd.

#1121, Poonglim Bldg
404, Gongduch-dong
Mapo-gu
Seoul
South Korea

and produced in the factory

Gyeongsangbuk-do

are submitted by the manufacturer to the initial type-testing of the products, a factory production control (FPC) and to the further testing of samples taken at the factory in accordance with a prescribed test plan and that the notified body No. 1213 - SKZ – TeConA GmbH, Würzburg, Germany - has performed the initial inspection of the factory and of the FPC and performs the continuous surveillance, assessment and approval of the FPC.
This certificate attests that all provisions concerning the attestation of FPC described in Annex ZA of the standard

EN 13249:2000/A1:2005; EN 13250:2000/A1:2005; EN 13251:2000/A1:2005; EN 13257:2000/A1:2005

were applied.
This certificate was first issued on 2012-12-19 and remains valid as long as the conditions laid down in the harmonised standard in reference or the manufacturing conditions in the factory or the FPC itself are not modified significantly.

SKZ - TeConA GmbH SKZ Zertifizierungsstelle

Würzburg, 19 December 2012

i. V.

Dipl.-Ing. Helmut Zanzinger
Certification Body

DAEYOUN GEOTECH CO LTD
NO. 1121 POONGLIM BLDG GONGDEOK-DONG
MAPO-GU SEOUL 121-718
SOUTH KOREA
TEL: +82 2 539 9700 FAX: +82 2 539 9710

DATE: April 1, 2014

CONFORMANCE CERTIFICATE

The undersigned supplier DAEYOUN GEOTECH CO LTD, hereby states under his responsibility that the following product complies with the indicated technical properties:

LC no. / date: LC302NL1401356 / March 27, 2014

PO no. / date: 140325 (HY/2012/07) / March 25, 2014

Delivery docs /date: PACKING LIST DY14-0328-1 / March 28, 2014

ITEM:

DSP15 SILT CURTAIN (150/150KN/M) EXCLUDING FLOATING PART / WITH EYELETS

1) 24 SPANS DEPTH EQUAL TO 6M, SPAN EQUAL TO 20M LENGTH
2) 10 SPANS DEPTH EQUAL TO 7M, SPAN EQUAL TO 20M LENGTH
3) 10 SPANS DEPTH EQUAL TO 9M, SPAN EQUAL TO 20M LENGTH

Manufacturer: DAEYOUN GEOTECH CO LTD

DAEYOUN GEOTECH CO LTD
Sangki Lee
PRESIDENT S. K. LEE

DAEYOUN GEOTECH CO LTD

Daeyoun Geotech

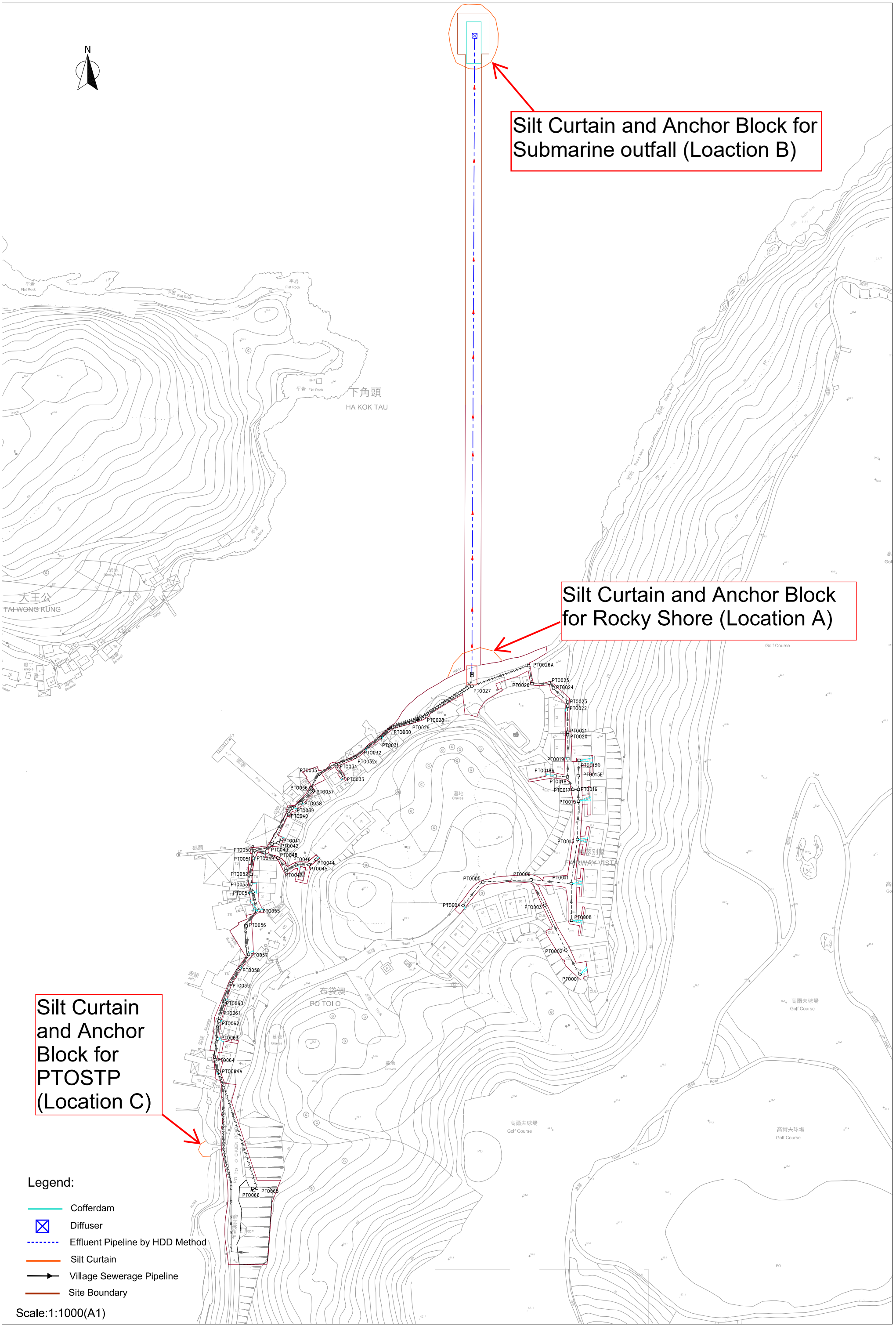
GEONIA Silt Protector

Project Reference

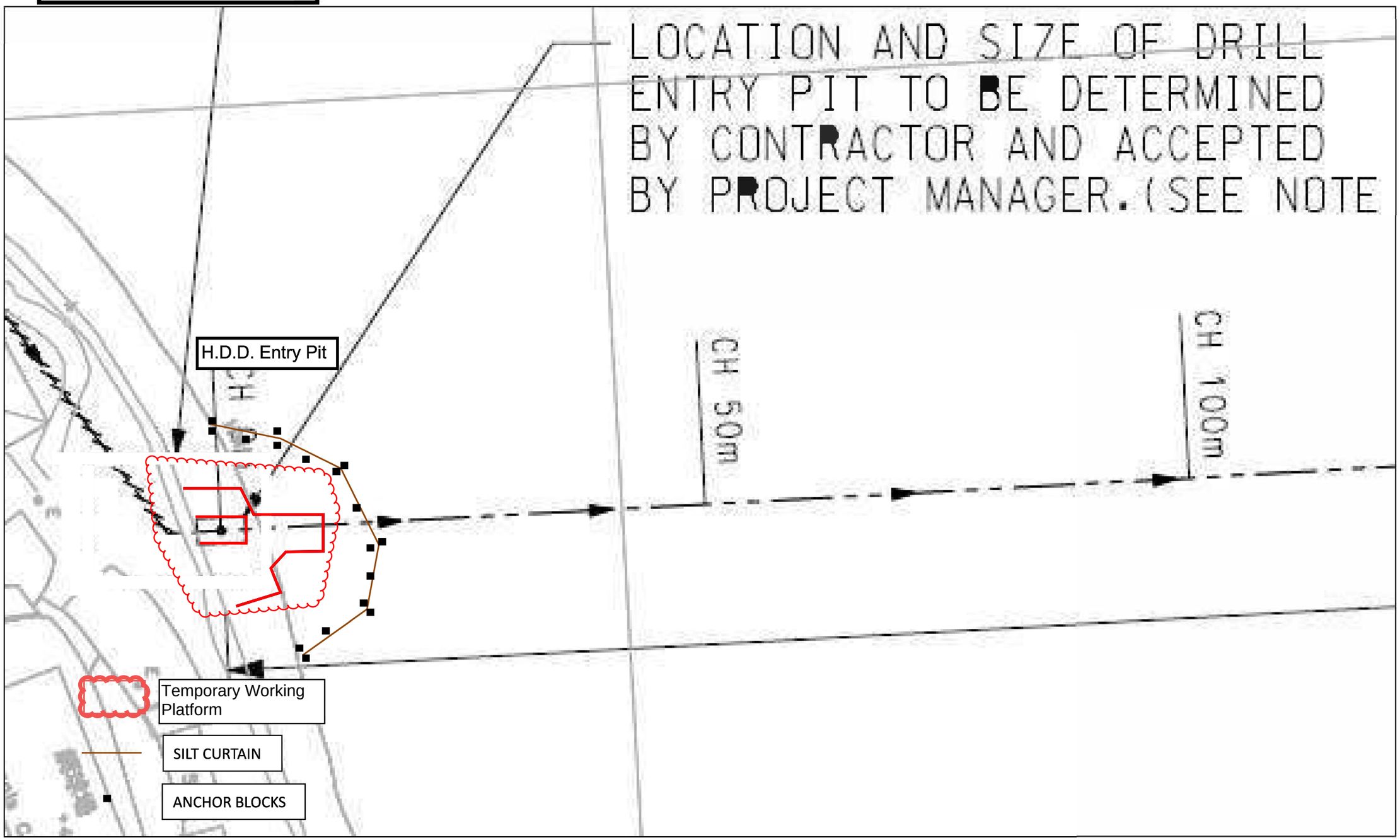
Daeyoun Geotextile Silt Protector

Date	Project	Client	Consultant	Model	Span	Qty / span
Jun-05	CV/2002/04 Penny's Bay Reclamation Stage 2	Gammon Construction Ltd	Scott Wilson Ltd		5 x 20m 5 x 10m	86 256
May-13	DC/2011/01 Drainage Maintenance and Construction in Mainland South Districts (2011-2015)	World Diamond Eng Ltd	Drainage Services Department	GSP 15	5x20m 3x5m 3x2m 3x13m	1 10 1 4
Apr-14	HY/2012/07 Dual 2-lane carriageway between HZMB BCF and North Lantau Highway	Gammon Construction Ltd	AECOM Asia Co Ltd	DSP15	6m 7m 9m	24 10 10

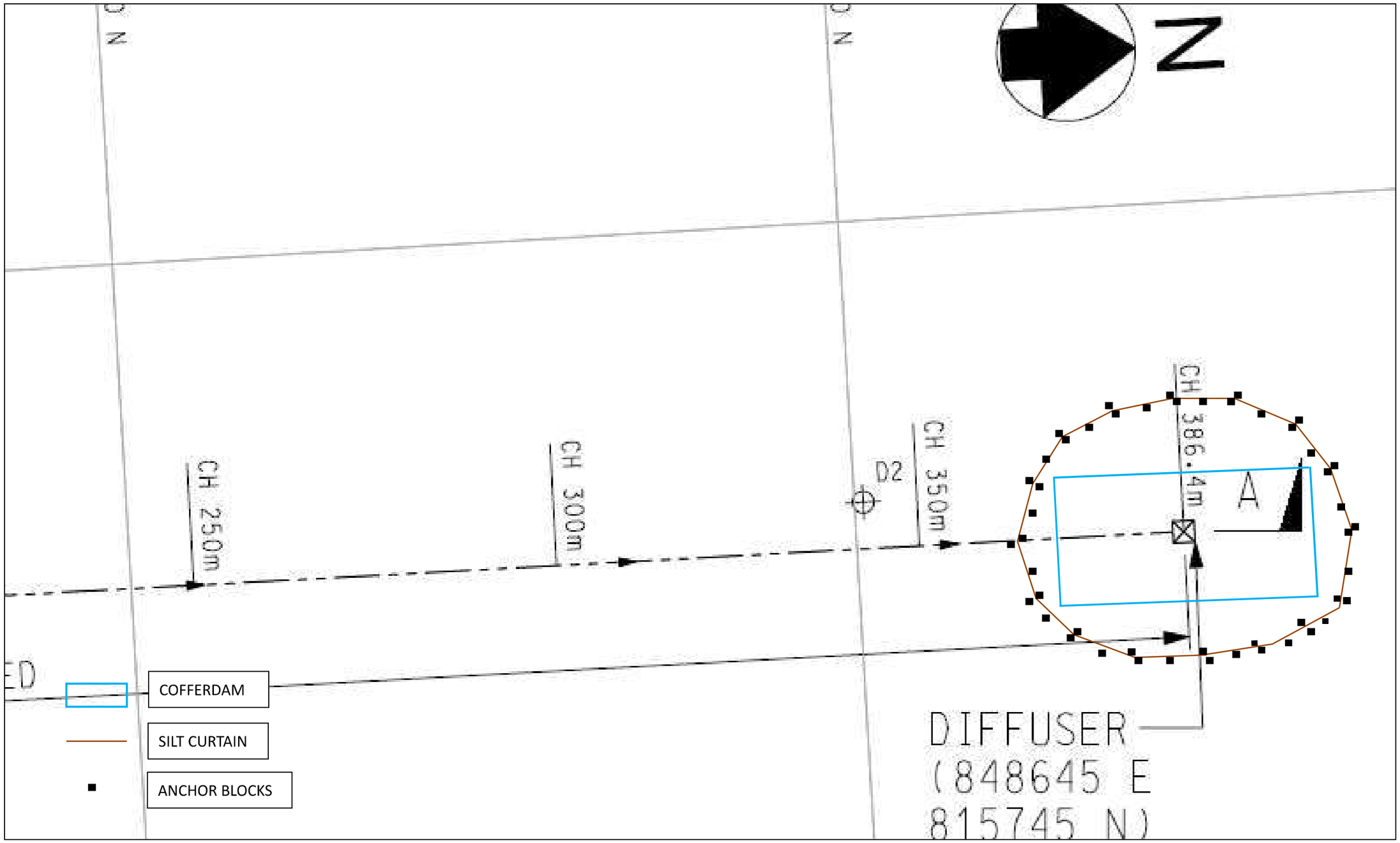
Appendix B – Location Plan of Silt Curtain and Anchor Block


N
Silt Curtain and Anchor Block for Submarine outfall (Loaction B)
Silt Curtain and Anchor Block for Rocky Shore (Location A)
Silt Curtain and Anchor Block for PTOSTP (Location C)
下角頭
HA KOK TAU
大王公
TAI WONG KUNG
布袋澳
PO TOI O
Golf Course
FAIRWAY VISTA
Legend:
Cofferdam
Diffuser
Effluent Pipeline by HDD Method
Silt Curtain
Village Sewerage Pipeline
Site Boundary
Scale:1:1000(A1)

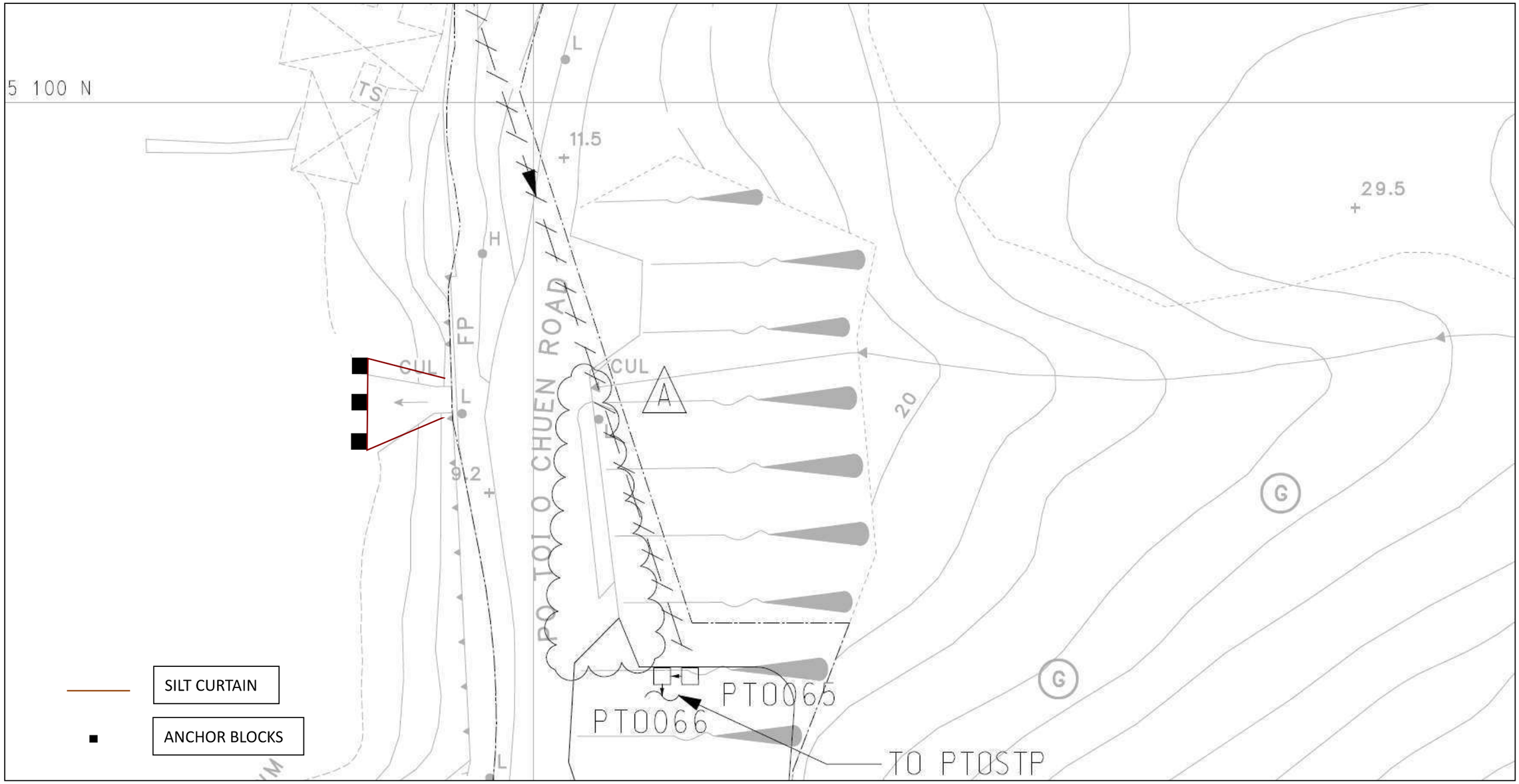
Temporary Working Platform



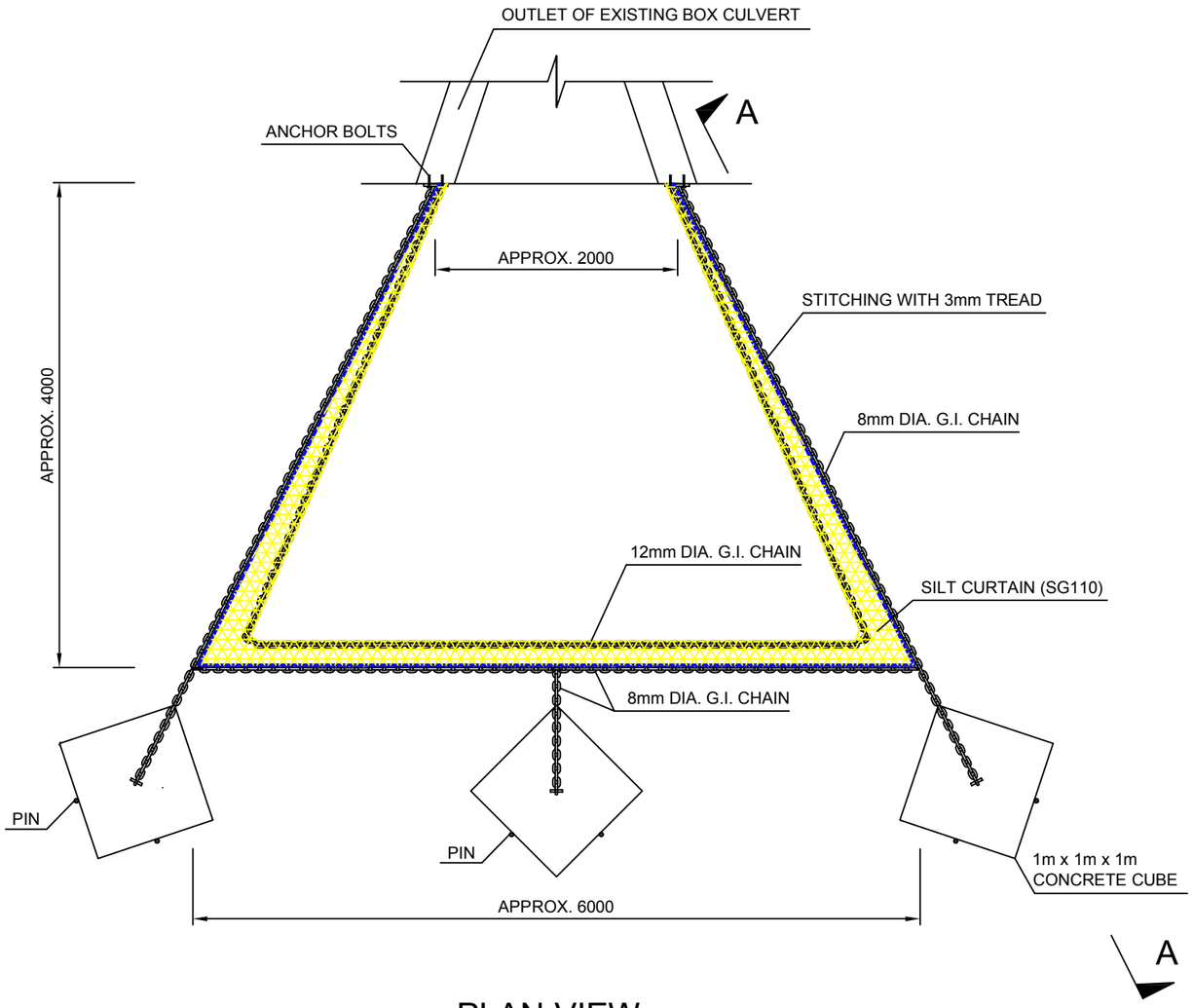
Location Plan of Silt Curtain and Anchor Block for Rocky Shore (Location A)



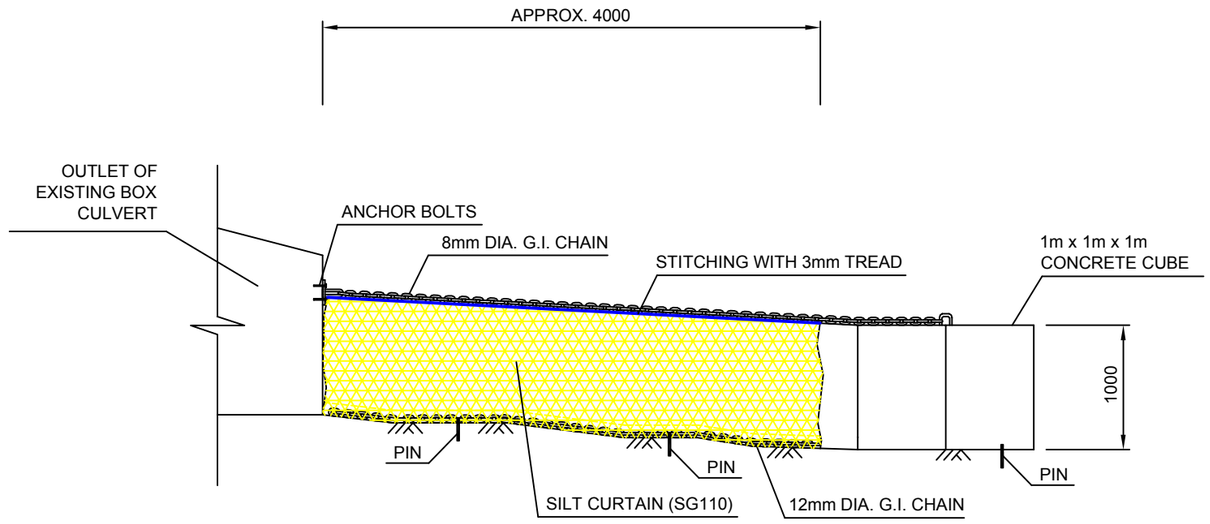
Location Plan of Silt Curtain Anchor block for submarine outfall (loaction B)



Location Plan of Silt Curtain and Anchor Block for PTOSTP (Location C)



PLAN VIEW



SECTION A - A

NOTES:

1. NO EXCAVATION OF THE SEABED SHALL BE ALLOWED;
2. NO GAPS SHALL BE LEFT BETWEEN SILT CURTAIN AND SEABED;
3. LENGTH OF SILT CURTAIN TO BE APPROX. 15m, AND THE HEIGHT OF SILT CURTAIN TO BE APPROX. 1m – 1.5m;

Deployment Plan for Silt Curtain at Location C

Appendix C – Inspection Checklists for Silt Curtain

Visual Inspection Checklist for Silt Curtain

Location: _____

Inspection Date: _____

Inspected by: _____

Checked by: _____

Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Any floating debris / refuse within the silt curtain? 隔泥幕內有沒有漂浮的垃圾？					
2	Buoys in good condition? 浮泡情況是否良好？					
3	Tying rope(above sea) in good condition? 水面之繩索情況是否良好？					
4	Water in good condition? 海水情況是否良好？					
5	Others (please specify): 其他（請註明）：					

*The checklist shall be properly signed by the Contractor.

Diving Inspection Checklist for Silt Curtain

Location: _____

Inspection Date: _____

Inspected by: _____

Checked by: _____

Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Tying rope (submarine) in good condition? 水下繩索情況是否良好？					
2	Filter material intact and in good condition? 隔網是否完整？情況是否良好？					
3	Sinkers in good condition? 墜重物狀況是否良好？					
4	Any Obstruction to water flow between the filter material? 隔網之間是否有物件阻礙水的流動？					
5	Any sea shells to be removed? 是否有貝殼需要清理？					
6	Others (please specify): 其他（請註明）：					

*The checklist shall be properly signed by the Contractor.

Inspection Checklist for Installation of Silt Curtain

Location: _____

Inspection Date: _____

Inspected by: _____

Checked by: _____

Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Any defects on the product and if the components are complete before installation? 安裝前產品是否有問題，部件是否完整？					
2	Are the anchor blocks and silt curtains in the right positions? 墜重物和隔網是否安放在正確位置？					
3	Are the anchor blocks and silt curtains in good conditions? 墜重物和隔網的狀況是否良好？					
4	Are the connections between the anchor blocks and the silt curtains in good conditions? 墜重物和隔網的連接狀況是否良好？					
5	Others (please specify): 其他（請註明）：					

*The checklist shall be properly signed by the Contractor.

Appendix D –Drawings for Cofferdam Details

N

ANCHORAGE OF BARGE

BARGE

WESTERN SIDE:
LENGTH OF SHEETPILE WALL: 50 M;
NOS. OF SHEET PILES: APPROX. 100 PCS;
DURATION: 15 DAYS

ANCHORAGE OF BARGE

INSTALLATION OF SHEET PILES TO BE COMMENCED FROM HERE, AND THEN FOLLOWS THE ARROW SIGNS IN CLOCKWISE DIRECTION.

PROPOSED COMMENCEMENT DATE:
May 2023 (TENTATIVE)

NORTHERN SIDE:
LENGTH OF SHEETPILE WALL: 10 M;
NOS. OF SHEET PILES: APPROX. 20 PCS;
DURATION: 5 DAYS

ANCHORAGE OF BARGE

PROPOSED DISCHARGE POINT

BARGE (WITH WASTEWATER TREATMENT FACILITY)

EASTERN SIDE:
LENGTH OF SHEETPILE WALL: 50 M;
NOS. OF SHEET PILES: APPROX. 100 PCS;
DURATION: 15 DAYS

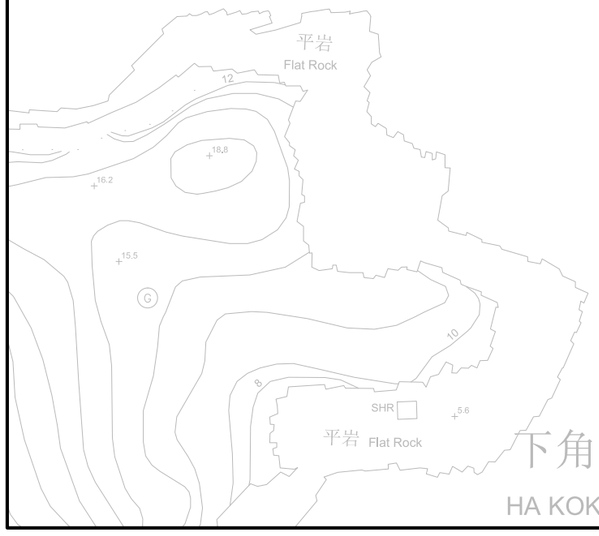
ANCHORAGE OF BARGE

DIFFUSER
(848645 E
815745 N)

SOUTHERN SIDE:
LENGTH OF SHEETPILE WALL: 10 M;
NOS. OF SHEET PILES: APPROX. 20 PCS;
DURATION: 5 DAYS

LEGEND:

- EFFLUENT PIPELINE
- FINAL EFFLUENT PIPELINE BY TRENCHLESS METHOD
- WORKS LIMIT
- DIFFUSER
- PROPOSED DISCHARGE POINT
- SEQUENCE OF INSTALLATION
- SILT CURTAIN



Contract no.
DC/2019/09

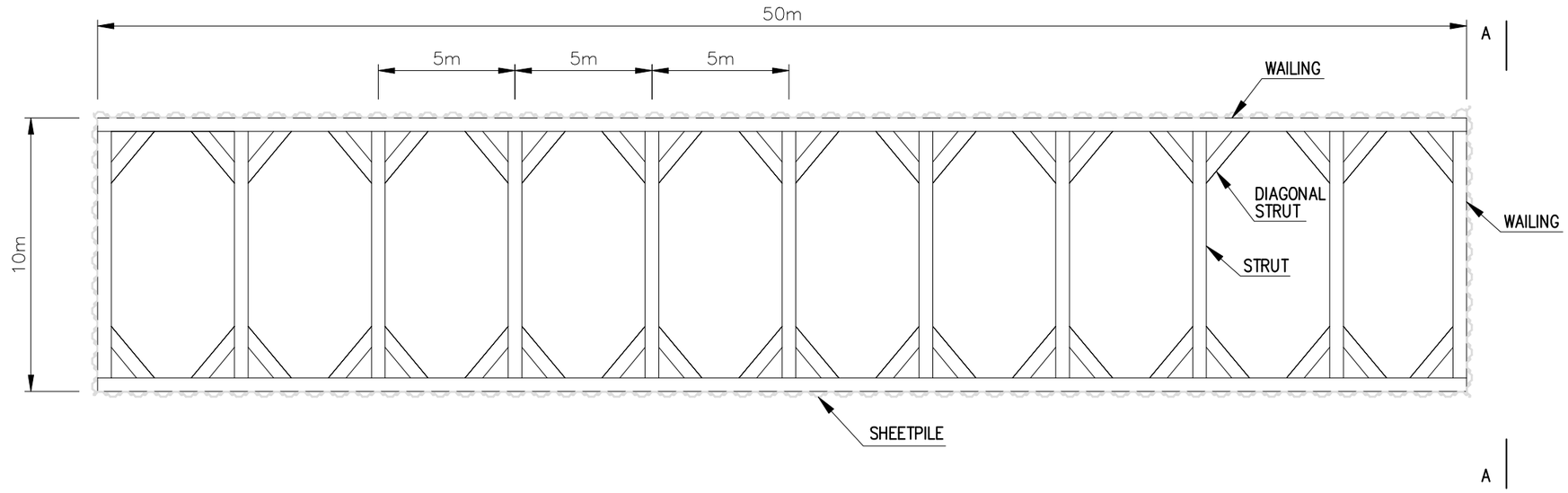
Contract title
PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

Drawing title
PO TOI O –
COFFERDAM LAYOUT PLAN

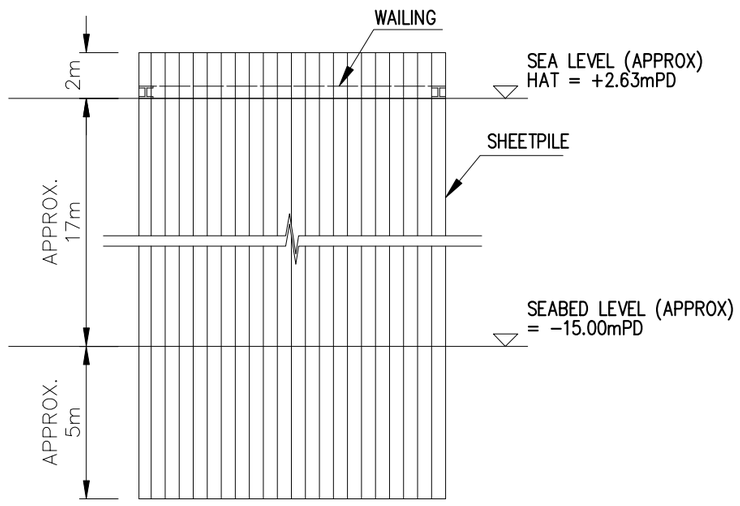
Drawing no.

Revision

Scale



PLAN VIEW



SECTION A-A

NOTES:
1. TYPE OF SHEETPILE: NSP-IVw;
2. TYPE OF WAILING, STRUT, AND DIAGONAL STRUT: 356x406x634 UC;
3. BASE ON THE ACTUAL SITUATION, THE DEPTH OF TOE-IN MAY SUBJECT TO CHANGE.

Contract no.
DC/2019/09

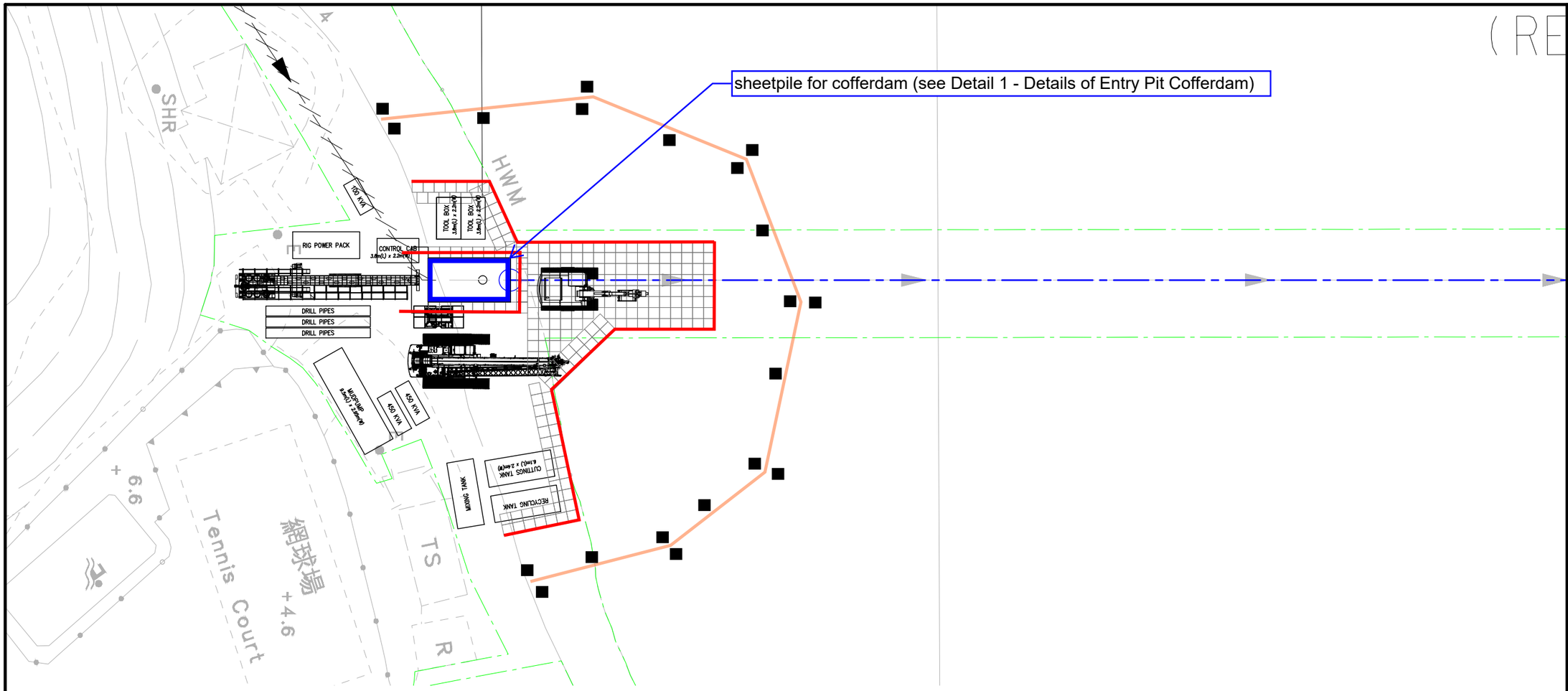
Contract title
PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

Drawing title
PO TOI O -
DETAILS OF COFFERDAM DESIGN

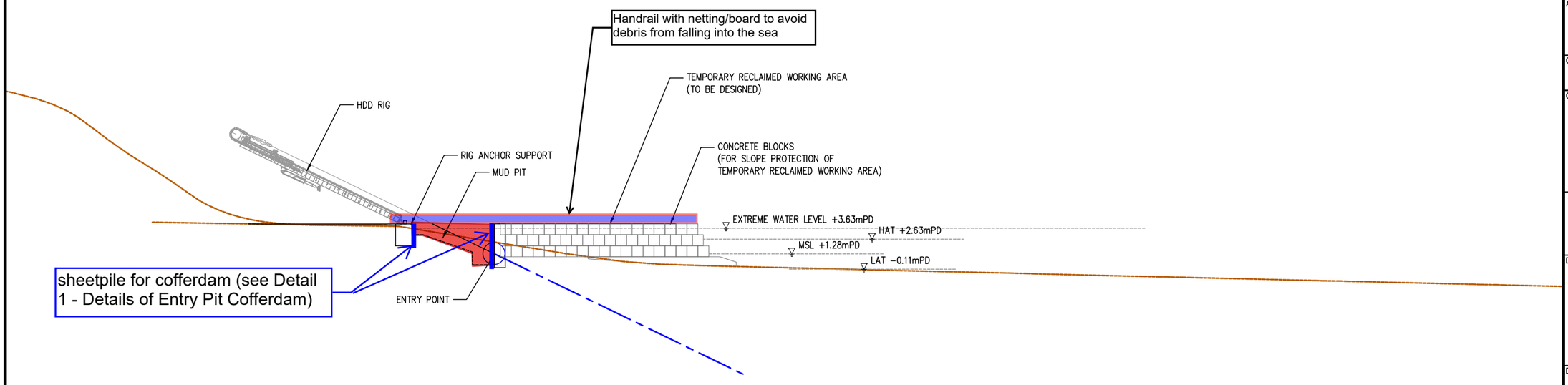
Drawing no.

Revision

Scale



PROPOSED EQUIPMENT LAYOUT PLAN – ON SHORE SIDE



PROPOSED RIG SET UP PLAN – SECTION VIEW

LEGENDS:

- PROPOSED HDD PROFILE FOR SUBMARINE OUTFALL PIPE
- GROUND PROFILE
- HAT — HIGHEST ASTRONOMICAL TIDE
- LAT — LOWEST ASTRONOMICAL TIDE
- MSL — MEAN SEA LEVEL
- WORKS LIMIT
- Handrail with Netting/Board
- Silt Curtain
- Anchor Block

HDD Subcontractor

MERSING (CHINA) CONSTRUCTION & ENGINEERING LIMITED

Project Consultant

binnies

Main Contractor

中国地质工程集团有限公司 CHINA GEO-ENGINEERING CORPORATION

Rev.	Date	Description	Checked	Drawn
A	24/01/22	Issued for review.	IH	ATY

Approved

Contract no.: DC/2019/09

Contract title: PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

香港特別行政區政府渠務署 THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION DRAINAGE SERVICES DEPARTMENT

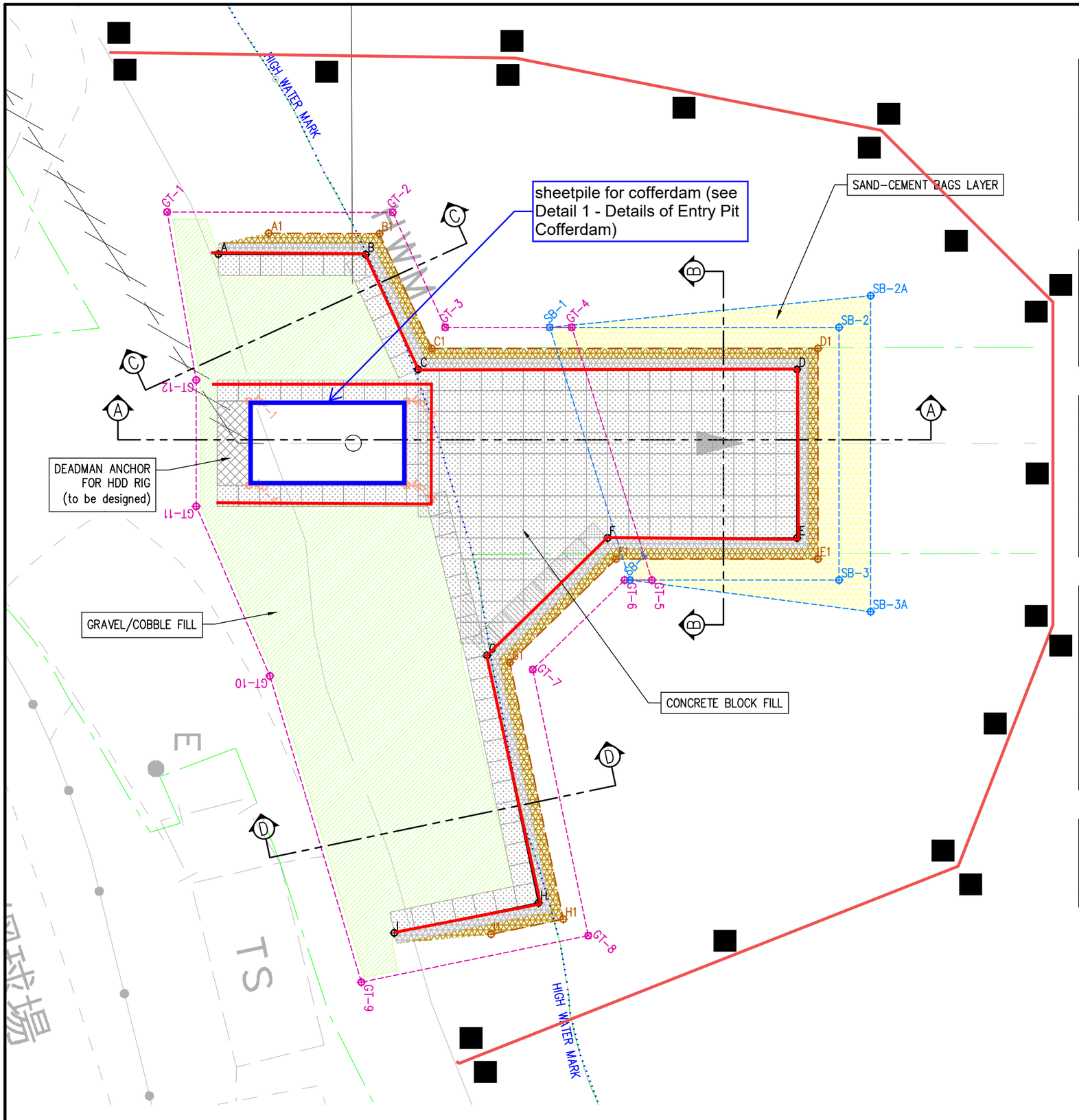
Drawing title: PROPOSED SITE LAYOUT PLAN

Drawing no.: MCCE-DSD-PTO-HDD-002

Revision: A

Scale: AS SHOWN (A3)

Sheet no.: 1/1



PROPOSED RIG PAD LAYOUT PLAN

SURVEY POINTS

RIG PAD PERIMETER LAYOUT COORDINATES

Pt. ID	E	N	Z (mPD)	REMARKS
A	848634.6714	815352.2332	+4.03	Finished level
B	848634.7161	815359.2331	+4.03	Finished level
C	848640.1843	815361.7028	+4.03	Finished level
D	848640.2617	815379.7026	+4.03	Finished level
E	848648.2617	815379.6682	+4.03	Finished level
F	848648.2229	815370.6683	+4.03	Finished level
G	848653.7767	815364.91	+4.03	Finished level
H	848665.5343	815367.3099	+4.03	Finished level
I	848666.9291	815360.4519	+4.03	Finished level

SAND-CEMENT BAG LAYER COORDINATES

Pt. ID	E	N	Z (mPD)	REMARKS
SB-1	848638.2112	815367.9609	+1.03	Finished level
SB-2	848638.2704	815381.7112	+1.03	Finished level
SB-3	848650.2703	815381.6596	+1.03	Finished level
SB-4	848650.2275	815371.7203	+1.03	Finished level
SB-2A	848638.2704	815381.7112		Verify actual sea bed level
SB 3A	848650.2703	815381.6596		Verify actual sea bed level

CONCRETE BLOCK FOUNDATION PERIMETER LAYOUT COORDINATES

Pt. ID	E	N	Z (mPD)	REMARKS
A1	848633.6867	815354.6269	+2.03	Finished level
B1	848633.7203	815359.8805	+2.03	Finished level
C1	848639.187	815362.3496	+2.03	Finished level
D1	848639.2661	815380.7069	+2.03	Finished level
E1	848649.266	815380.6639	+2.03	Finished level
F1	848649.2247	815371.0701	+2.03	Finished level
G1	848654.1151	815365.9996	+2.03	Finished level
H1	848666.3148	815368.4898	+2.03	Finished level
I1	848667.0138	815365.0529	+2.03	Finished level

GEOTEXTILE LAYER PERIMETER LAYOUT COORDINATES

Pt. ID	E	N	Z (mPD)	REMARKS
GT-1	848632.6562	815349.8069		Verify actual sea bed level
GT-2	848632.7244	815360.528		Verify actual sea bed level
GT-3	848638.1898	815362.9965		Verify actual sea bed level
GT-4	848638.2157	815369.0101		Verify actual sea bed level
GT-5	848650.232	815372.7695		Verify actual sea bed level
GT 6	848650.2264	815371.472		Verify actual sea bed level
GT-7	848654.4534	815367.0893		Verify actual sea bed level
GT-8	848667.0953	815369.6698		Verify actual sea bed level
GT-9	848669.2631	815358.8799		Verify actual sea bed level
GT-10	848654.7027	815354.5939		Verify actual sea bed level
GT-11	848646.6388	815351.128		Verify actual sea bed level
GT-12	848640.6388	815351.1538		Verify actual sea bed level

MUD PIT PERIMETER LAYOUT COORDINATES

Pt. ID	E	N	Z (mPD)	REMARKS
MP 1	848641.6496	815353.6495	+4.03	Finished level
MP-2	848641.6819	815361.1494	+4.03	Finished level
MP-3	848645.6818	815361.1322	+4.03	Finished level
MP-4	848645.6496	815353.6323	+4.03	Finished level

LEGENDS:

- PROPOSED HDD PROFILE FOR SUBMARINE OUTFALL PIPE
- WORKS LIMIT
- Handrail with Netting/Board
- Silt Curtain
- Anchor Block

HDD Subcontractor: MERSING (CHINA) CONSTRUCTION & ENGINEERING LIMITED

Project Consultant: binnies

Main Contractor: 中国地质工程集团有限公司 CHINA GEO-ENGINEERING CORPORATION

Rev.	Date	Description	Checked	Drawn
A	24/01/22	Issued for review.	IH	ATY

Approved

Contract no.: DC/2019/09

Contract title: PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

香港特別行政區政府渠務署 THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION DRAINAGE SERVICES DEPARTMENT

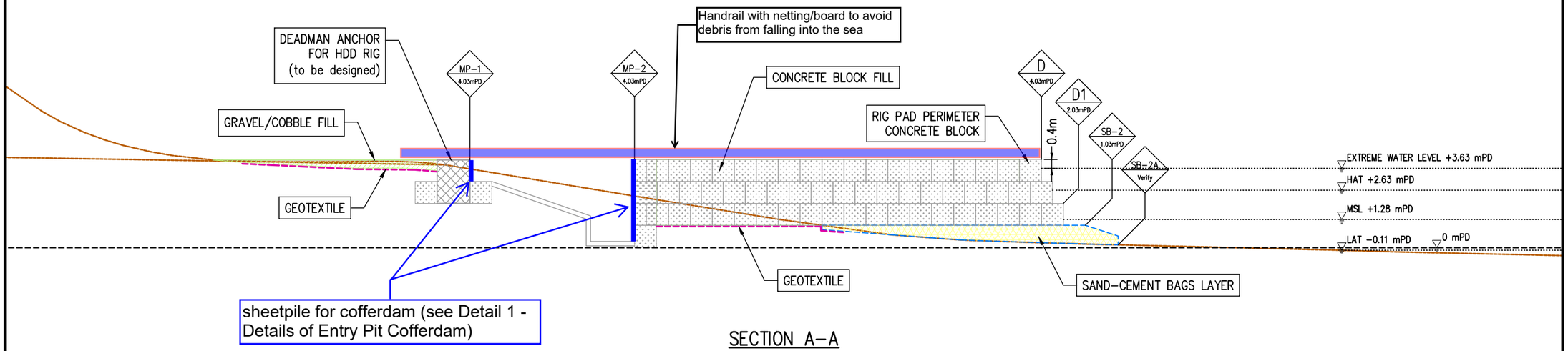
Drawing title: PROPOSED RIG PAD DETAILS

Drawing no.: MCCE-DSD-PTO-HDD-004

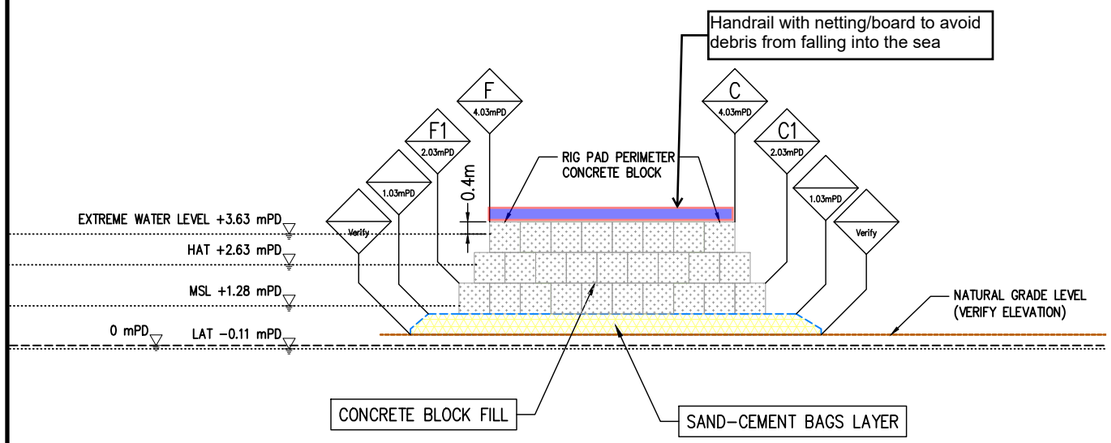
Revision: A

Scale: AS SHOWN (A3)

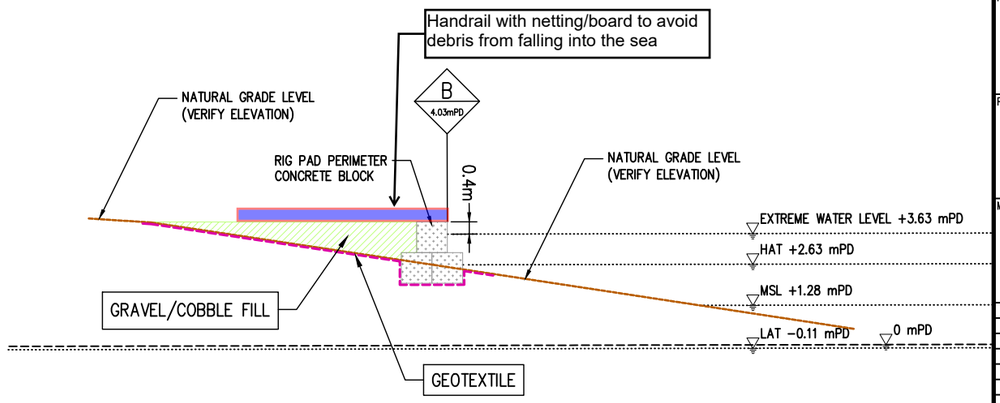
Sheet no.: 1/1



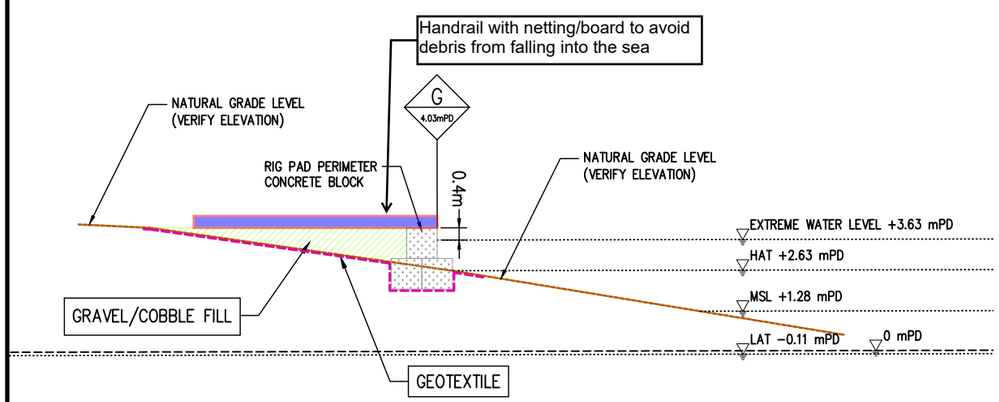
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

LEGENDS:

PROPOSED HDD PROFILE FOR SUBMARINE OUTFALL PIPE

WORKS LIMIT

HDD Subcontractor

MERSING (CHINA) CONSTRUCTION & ENGINEERING LIMITED

Project Consultant

binnies

Main Contractor

中国地质工程集团有限公司 CHINA GEO-ENGINEERING CORPORATION

Rev.	Date	Description	Checked	Drawn
A	24/01/22	Issued for review.	IH	ATY

Approved

Contract no.

DC/2019/09

Contract title

PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

香港特別行政區政府渠務署 THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION DRAINAGE SERVICES DEPARTMENT

Drawing title

PROPOSED RIG PAD DETAILS

Drawing no.

MCCE-DSD-PTO-HDD-004

Revision

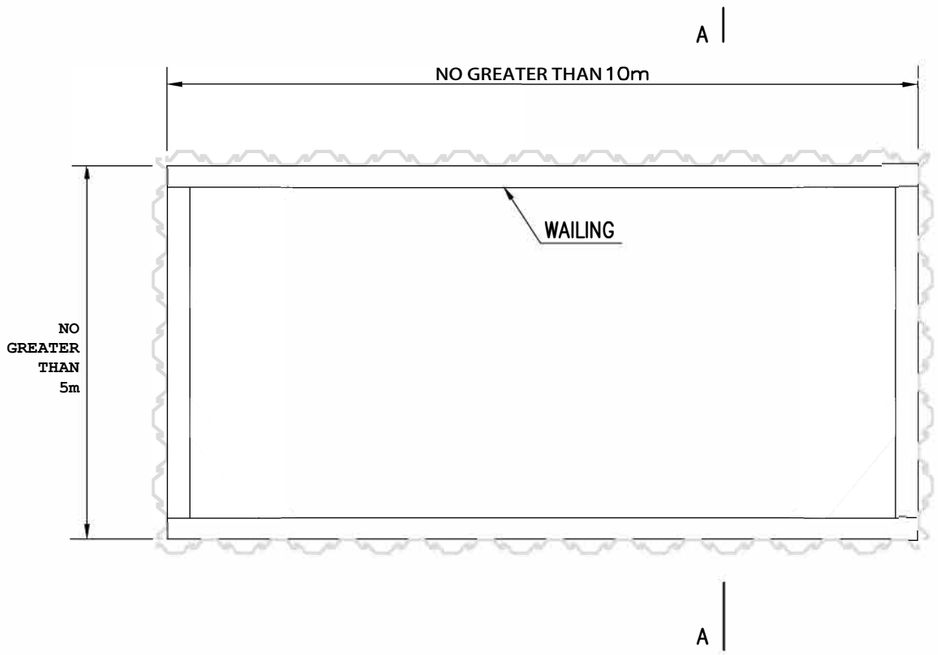
A

Scale

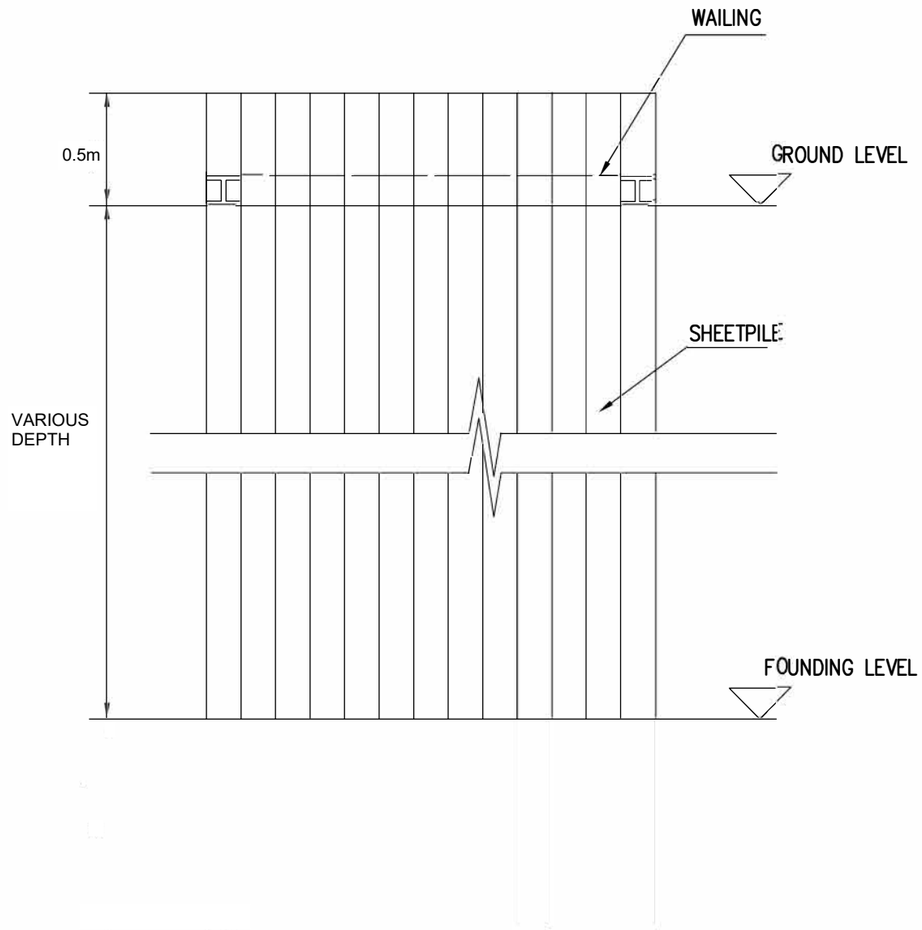
AS SHOWN (A3)

Sheet no.

1/1



PLAN VIEW



SECTION A–A

NOTES:
1. TYPE OF SHEETPILE: LSP–3B;
2. TYPE OF WAILING AND STRUT: 100X50X10kg/m CHANNEL

DC/2019/09

PROVISION OF VILLAGE SEWERAGE IN SAI KUNG

Drawing title

Detail 1 - Details of Entry Pit Cofferdam

Drawing no.

Revision

Scale

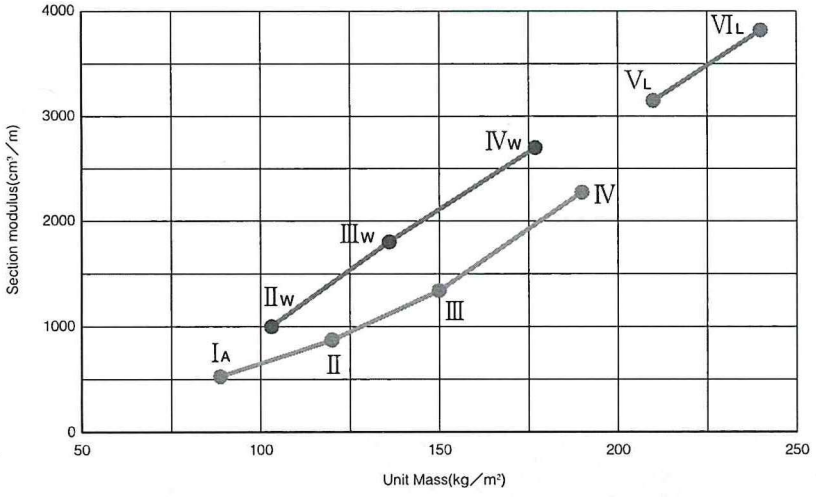
20

Appendix E –Sectional Properties of Sheetpile, Wailing and Strut

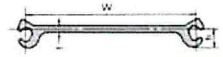
SECTIONAL PROPERTIES

U-type Sheet Pile

Type	Dimension			Per pile				Per 1 m of pile wall width			
	Effective width mm	Effective height mm	Thickness mm	Sectional area cm²/m	Moment of inertia cm⁴	Section modulus cm³	Unit mass kg/m	Sectional area cm²/m	Moment of inertia cm⁴/m	Section modulus cm³/m	Unit mass kg/m²
FSP- I_A	400	85	8.0	45.21	598	88.0	35.5	113.0	4,500	529	88.8
FSP- II	400	100	10.5	61.18	1,240	152	48.0	153.0	8,740	874	120
FSP- III	400	125	13.0	76.42	2,220	223	60.0	191.5	16,800	1,340	150
FSP- IV	400	170	15.5	96.99	4,670	362	76.1	242.5	38,600	2,270	190
FSP- V_L	500	200	24.3	133.8	7,960	520	105	267.6	63,000	3,150	210
FSP- VI_L	500	225	27.6	153.0	11,400	680	120	306.0	86,000	3,820	240
NSP- II_W	600	130	10.3	78.70	2,110	203	61.8	131.2	13,000	1,000	103
NSP- III_W	600	180	13.4	103.9	5,220	376	81.6	173.2	32,400	1,800	136
NSP- IV_W	600	210	18.0	135.3	8,630	539	106	225.5	56,700	2,700	177

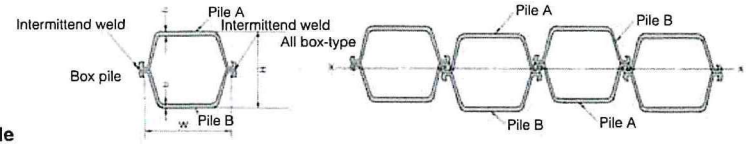


Straight Web-type Sheet Pile



Type	Dimension			Per pile				Per 1 m of pile wall width			
	Effective width mm	Effective height mm	Thickness mm	Sectional area cm²/m	Moment of inertia cm⁴	Section modulus cm³	Unit mass kg/m	Sectional area cm²/m	Moment of inertia cm⁴/m	Section modulus cm³/m	Unit mass kg/m²
YSP-FL	500	44.5	9.5	78.57	184	45.7	61.7	157.1	396	89	123
YSP-FXL	500	47.0	12.7	98.36	245	60.3	77.2	196.7	570	121	154

Note:1. The straight web-type sheet pile of SYW295 and SY295 offers joint strengths of 4MN/m and over for YSP-FL and 6MN/m and over for YSP-FXL.



Box-type Sheet Pile

Type		Dimension				Per pile					Per 1 m of pile wall width			
Pile A	Pile B	Effective width mm	Effective height mm	Thickness t_1 mm	Thickness t_2 mm	Sectional area cm²	Moment of inertia cm⁴	Section modulus cm³	Statical moment cm³	Unit mass kg/m	Sectional area cm²/m	Moment of inertia cm⁴/m	Section modulus cm³/m	Unit mass kg/m²
FSP- IV	**FSP-** IV	400	387	15.5	15.5	194.0	41,600	2,150	1,250	152	485.0	104,000	5,380	380
FSP- V_L	**FSP-** V_L	500	445	24.3	24.3	267.6	80,500	3,620	2,050	210	535.2	161,000	7,240	420
FSP- VI_L	**FSP-** V_L	500	471	27.6	24.3	286.8	92,500	3,850	2,320	225	573.6	185,000	7,700	450
FSP- VI_L	**FSP-** VI_L	500	497	27.6	27.6	306.0	108,000	4,350	2,560	240	612.0	216,000	8,700	480

Note:1. The statical moment in the above table is the values required for determining weld lengths. These values represent statical moments of area about the neutral axis for one side of a box pile.
2. In addition to the box-type piles (pile A × pile B)shown above, the following 10 box-type piles area also available:
FSP-I_A×FSP-I_A, FSP-II×FSP-II, FSP-III×FSP-II, FSP-III×FSP-III, FSP-IV×FSP-III, NSP-II_W×NSP-II_W, NSP-III_W×NSP-II_W, NSP-III_W×NSP-III_W, NSP-IV_W×NSP-III_W, NSP-IV_W×NSP-IV_W.

Corner Sheet Pile

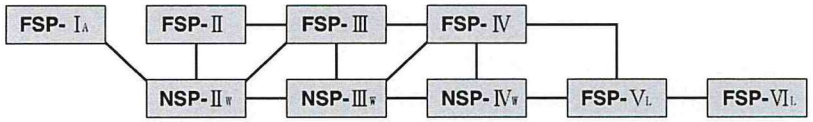
Type	Dimension			Per pile			
	Width mm	Height mm	Thickness mm	Section area cm²	Unit mass kg/m	Moment of inertia cm⁴	Section modulus cm³
FSP-C III	400	125	13	79.63	62.5	2,330	237
FSP-C IV	400	170	15.5	96.76	76.0	4,630	377

COMPATIBILITY AND SWING ANGLES OF SHEET PILES

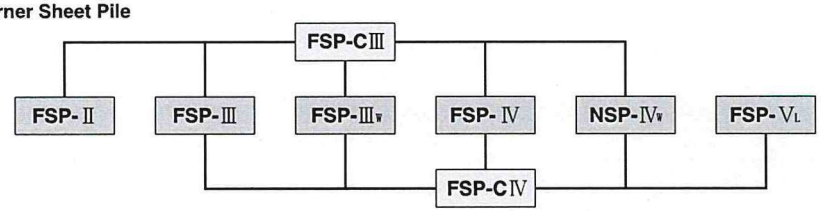
Compatibility in interlocking

The joints of sheets piles of identical type and of the sheet piles indicated by solid lines in the figure below can be interlocked.

● **U-type Sheet Pile**

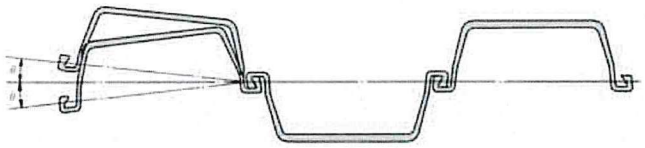


● **Corner Sheet Pile**



Standard angles of swing

The standard angles of swing for interlocking sheet piles of identical type are shown in the figure below.



(1) U-type sheet pile ····· $\theta = \pm 6°$
(2) Straight web-type sheet pile YSP-FL····· $\theta = \pm 12.5°$
YSP-FXL ····· $\theta = \pm 10°$

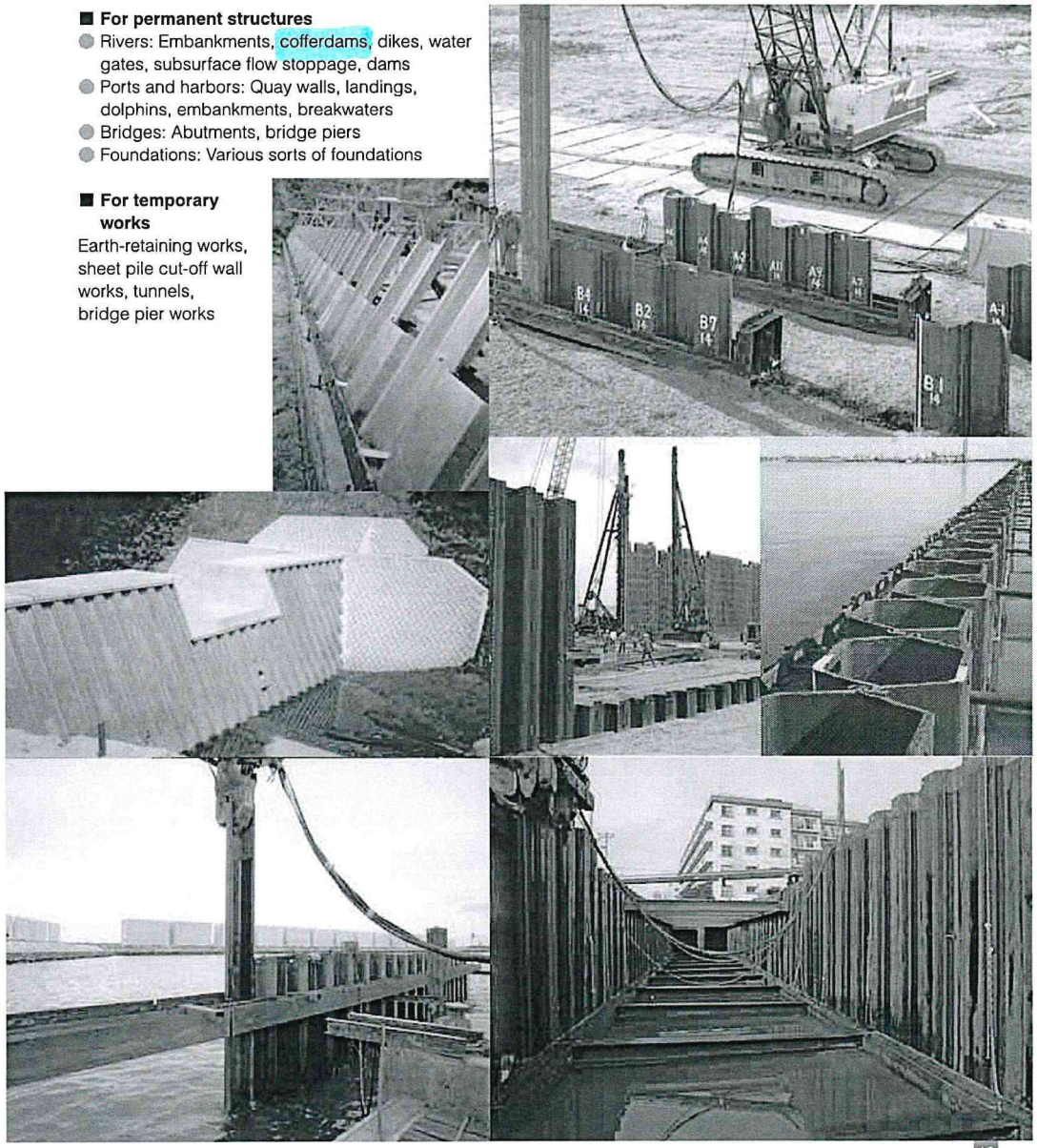
APPLICATIONS

■ **For permanent structures**

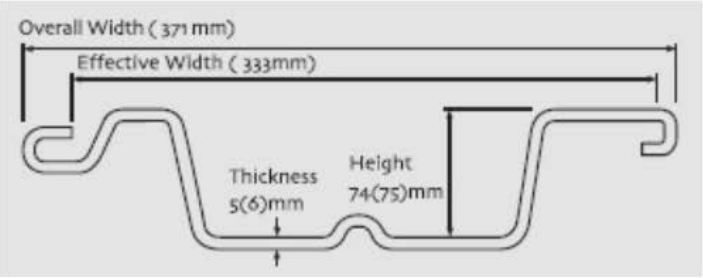
- Rivers: Embankments, cofferdams, dikes, water gates, subsurface flow stoppage, dams
- Ports and harbors: Quay walls, landings, dolphins, embankments, breakwaters
- Bridges: Abutments, bridge piers
- Foundations: Various sorts of foundations

■ **For temporary works**

Earth-retaining works, sheet pile cut-off wall works, tunnels, bridge pier works



Light Sheet Piling (SK-LSP-3B)



SK-LSP-3B

Section No.	Thickness (mm)	Effective Width (mm)	Height (mm)	Section Area (cm^2)	Unit Weight (kg/m)	Moment of Intertia Ix-Cm4
SK-LSP-3B	5.0	333	74	27.51	21.6	212
	6.0	333	75	33.01	25.9	254
Section No.	**Thickness (mm)**	**Setion Modulus Zx-cm^3**	**Radius of Gyration ix-cm**	**Kg/m^2**	**Moment of Inertia ix-cm4/m**	**Setion Modulus Zx-cm 3/m**
SK-LSP-3B	5.0	57.0	2.77	64.8	636	171
	6.0	68.0	2.78	7.77	762	204

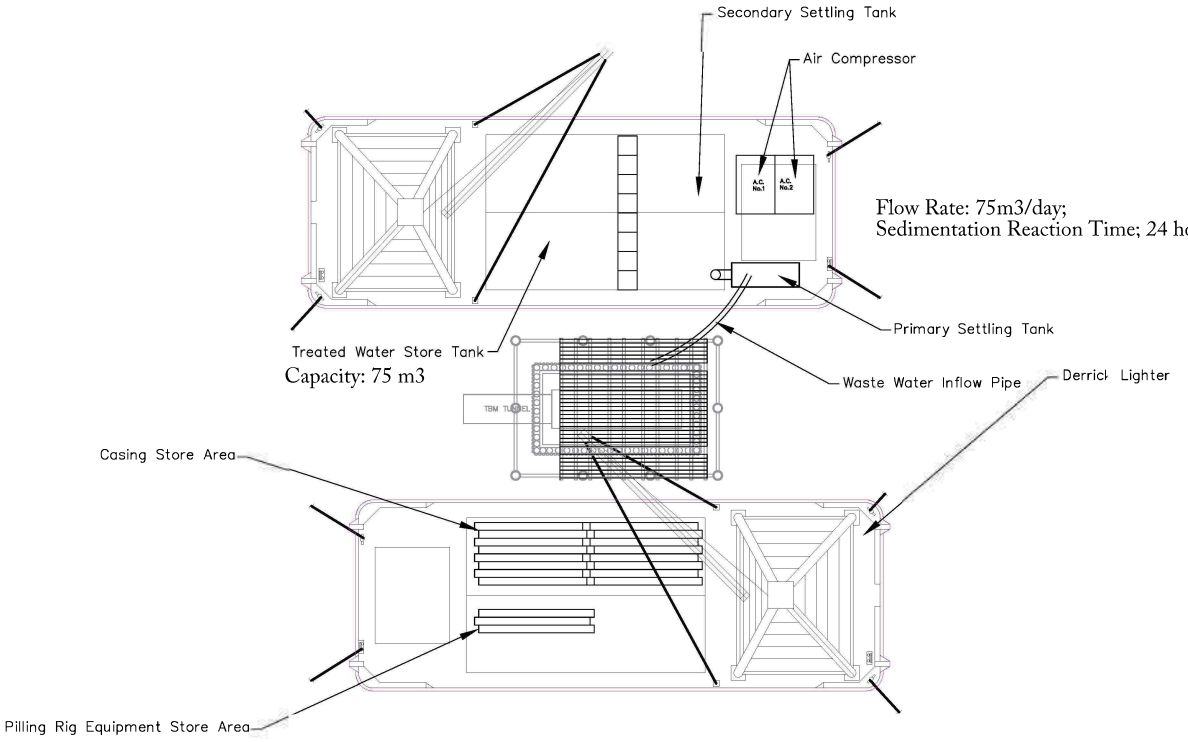
Universal Columns to BS4 Part1 1993 - Dimensions & Properties

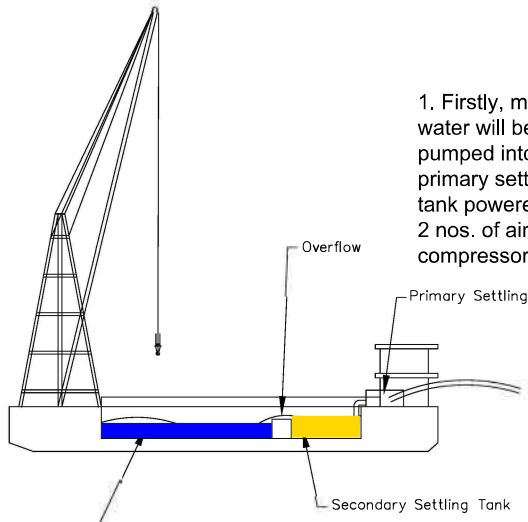
Designation	Mass Per metre	Depth of Section	Width of Section	Thickness		Root Radius	Depth between fillets	Ratios for Local Buckling		Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter
				Web	Flange			Flange	Web	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	
		h	b	s	t	r	d	b/2t	d/s	I_x	I_y	r_x	r_y	Z_x	Z_y	S_x	S_y	u
	kg/m	mm	mm	mm	mm	mm	mm			cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3	
356x406x634	634	474.6	424	47.6	77	15.2	290.2	2.75	6.1	274800	98130	18	11	11580	4629	14240	7108	0.843
356x406x551	551	455.6	418.5	42.1	67.5	15.2	290.2	3.1	6.89	226900	82670	18	11	9962	3951	12080	6058	0.841
356x406x467	467	436.6	412.2	35.8	58	15.2	290.2	3.55	8.11	183000	67830	18	11	8383	3291	10000	5034	0.839
356x406x393	393	419	407	30.6	49.2	15.2	290.2	4.14	9.48	146600	55370	17	11	6998	2721	8222	4154	0.837
356x406x340	340	406.4	403	26.6	42.9	15.2	290.2	4.7	10.9	122500	46850	17	10	6031	2325	6999	3544	0.836
356x406x287	287	393.6	399	22.6	36.5	15.2	290.2	5.47	12.8	99880	38680	17	10	5075	1939	5812	2949	0.835
356x406x235	235	381	394.8	18.4	30.2	15.2	290.2	6.54	15.8	79080	30990	16	10	4151	1570	4687	2383	0.834
356x368x202	202	374.6	374.7	16.5	27	15.2	290.2	6.94	17.6	66260	23690	16	9.6	3538	1264	3972	1920	0.844
356x368x177	177	368.2	372.6	14.4	23.8	15.2	290.2	7.83	20.2	57120	20530	16	9.5	3103	1102	3455	1671	0.844
356x368x153	153	362	370.5	12.3	20.7	15.2	290.2	8.95	23.6	48590	17550	16	9.5	2684	948	2965	1435	0.844
356x368x129	129	355.6	368.6	10.4	17.5	15.2	290.2	10.5	27.9	40250	14610	16	9.4	2264	793	2479	1199	0.844
305x305x283	283	365.3	322.2	26.8	44.1	15.2	246.7	3.65	9.21	78870	24630	15	8.3	4318	1529	5105	2342	0.855
305x305x240	240	352.5	318.4	23	37.7	15.2	246.7	4.22	10.7	64200	20310	15	8.2	3643	1276	4247	1951	0.854
305x305x198	198	339.9	314.5	19.1	31.4	15.2	246.7	5.01	12.9	50900	16300	14	8	2995	1037	3440	1581	0.854
305x305x158	158	327.1	311.2	15.8	25	15.2	246.7	6.22	15.6	38750	12570	14	7.9	2369	808	2680	1230	0.851
305x305x137	137	320.5	309.2	13.8	21.7	15.2	246.7	7.12	17.9	32810	10700	14	7.8	2048	692	2297	1053	0.851
305x305x118	118	314.5	307.4	12	18.7	15.2	246.7	8.22	20.6	27670	9059	14	7.8	1760	589	1958	895	0.85
305x305x97	96.9	307.9	305.3	9.9	15.4	15.2	246.7	9.91	24.9	22250	7308	13	7.7	1445	479	1592	726	0.85
254x254x167	167	289.1	265.2	19.2	31.7	12.7	200.3	4.18	10.4	30000	9870	12	6.8	2075	744	2424	1137	0.851
254x254x132	132	276.3	261.3	15.3	25.3	12.7	200.3	5.16	13.1	22530	7531	12	6.7	1631	576	1869	878	0.85
254x254x107	107	266.7	258.8	12.8	20.5	12.7	200.3	6.31	15.6	17510	5928	11	6.6	1313	458	1484	697	0.848
254x254x89	88.9	260.3	256.3	10.3	17.3	12.7	200.3	7.41	19.4	14270	4857	11	6.6	1096	379	1224	575	0.85
254x254x73	73.1	254.1	254.6	8.6	14.2	12.7	200.3	8.96	23.3	11410	3908	11	6.5	898	307	992	465	0.849
203x203x86	86.1	222.2	209.1	12.7	20.5	10.2	160.8	5.1	12.7	9449	3127	9.3	5.3	850	299	977	456	0.85
203x203x71	71	215.8	206.4	10	17.3	10.2	160.8	5.97	16.1	7618	2537	9.2	5.3	706	246	799	374	0.853
203x203x60	60	209.6	205.8	9.4	14.2	10.2	160.8	7.25	17.1	6125	2065	9	5.2	584	201	656	305	0.846
203x203x52	52	206.2	204.3	7.9	12.5	10.2	160.8	8.17	20.4	5259	1778	8.9	5.2	510	174	567	264	0.848

Parallel Flange Channels - Dimensions and Properties

											4	4														4	2
4 1 4	4 4	4	1	11	1	1	2	2	2	21 4	22	1	2	1 2		2 2	1222	1	4	1	22	21		2 1
1 4	4		1		1	1	1	1	2	1	4	14		1	2	2		1 1	4	2	21 2	1	4	
1 4	4		1		1	1	2		2	22		11	1	4	1		41	14	1 1	44	1	1		
41	41 4				1	12	24	1	2 2	21	4 4	11	2	4 1	1	2		114		4	1 4		2	2
2	4	2			14	12	2	4	2	4 2		1	2 2	4		2 4	42	1 2	1 14	42	1 2		2	44 4
2 2	2	2			12	12	212	2		1	1	1 1	2	2	4 4	2 1	2	2		2	2	2	11	1
2 2	2 2	2			14	12	1	4	2	1	4	2	2			2 2			1		1 1	2	1	41
2 2	2	2			12	12	1 1		2	2 4	1 1	1	2	2	4	2	2	2	1	4	1	1	11	2
2	2	2			14	12	14	4	21 1	2 2	14	1	2	2 2	4	12	2 1	4	2 24	4	12	2	1	
2 2	2 4	2			12	12	1 1		2 2	1	1	11	2	1		2 4	22		1		14	11	11 1	2
1 2	2 1	1			12	12	1 1	2	2 2	1 1	2	4	2	2 2	4 4	1	2 2		2	4	12	14	1	2
1 2	2	1			1	12	1	14	22	1	14	2	2	1 2	2	2 41	1	1	1 4	4	1		4	2
1 24	2	1			12	12	1 2		1	11 2	2	1	2	1	44 4		1		2		1		11	4
1 1	1	1			1	12	1		1	1	1 1	1	2 4	11	2	2	1 2	4 2	1 1	4	1 1		1	22
12 1	14	12				12	2	4	14	4			2		1	2 2		2	1	42	11 1	2	4 2	1
1 1	1 2	1							1	2	2	4	1	41		1	4	1	1 1	42	1		2	1

Appendix F –Wastewater Treatment Facility on the Barge





1. Firstly, muddy water will be pumped into the primary settling tank powered by 2 nos. of air compressors.

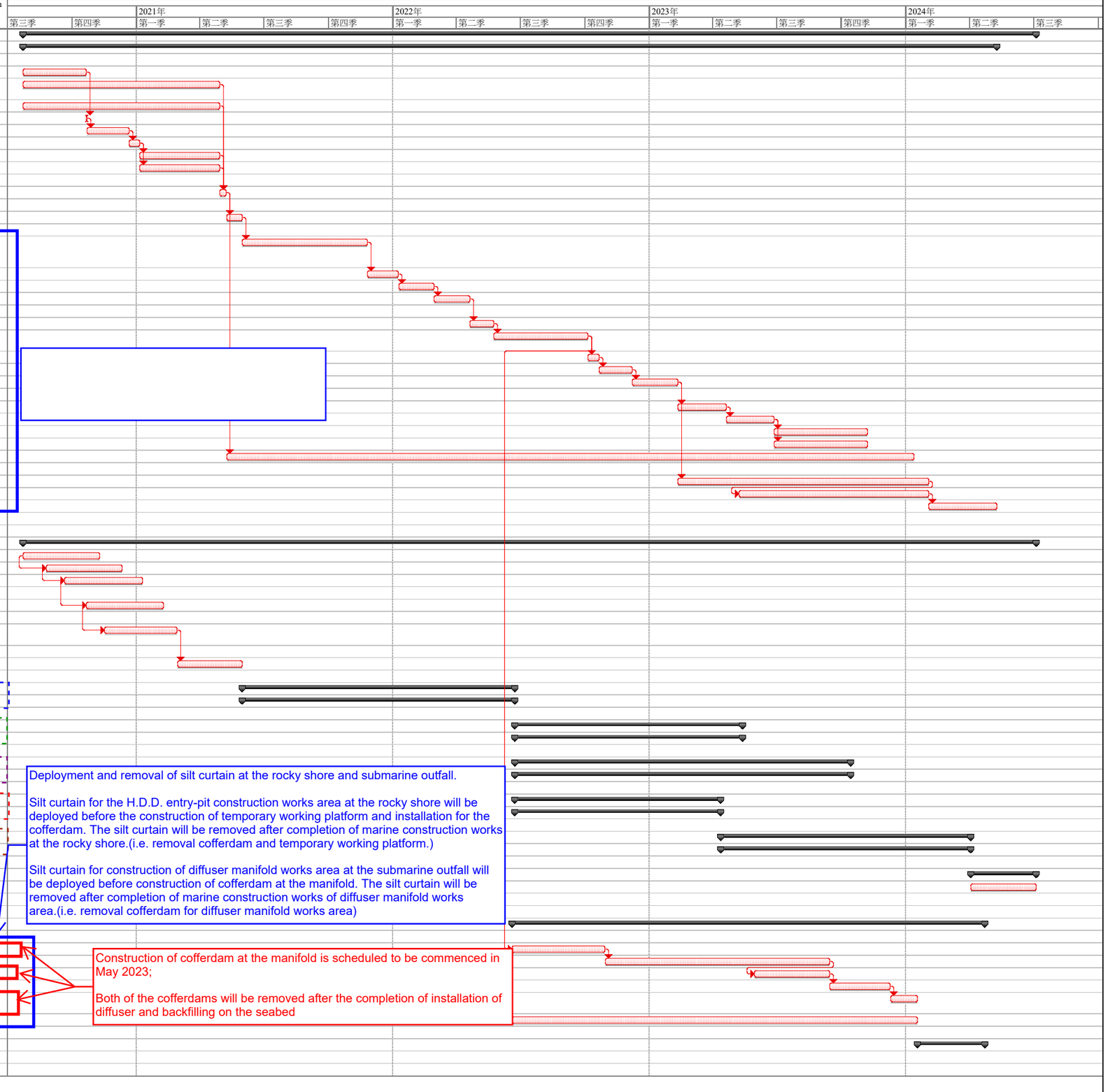
2. Subsequently, the primarily treated water will flow into the secondary settling tank for further treatment.

3. Finally,the treated water will be stored in the store tank.

Wastewater Treatment Facility on the barge

Appendix G – Works Programme for Po Toi O

識別碼	Task Name	Duration	Starting Date	ercentag of ompletic	Completion Date
1	**Section 2 - Village Sewerage Works at Po Toi O and PTOSTP**	**1173 days**	**2020/7/24**	**0%**	**2024/7/4**
2	**Po Toi O Sewage Treatment Plant (PTOSTP)**	**1128 days**	**2020/7/24**	**0%**	**2024/5/9**
3					
4	Liaise with the village representative works to ensure the possession of construction site	75 days	2020/7/24	0%	2020/10/21
5	Preperation works (i.e. TMLG meetings; Application for traffic advice for suspension of existing parking slot; Re-provision of existing RCP, etc.)	231 days	2020/7/24	0%	2021/4/29
6	Environmental submissions	231 days	2020/7/24	0%	2021/4/29
7	Possession of site (Access Date: 22nd October 2020)	1 day	2020/10/22	0%	2020/10/22
8	Installation of site hoardings at PTOSTP	50 days	2020/10/23	0%	2020/12/21
9	Mobilization of plant and equipment	10 days	2020/12/22	0%	2021/1/5
10	Site clearance	95 days	2021/1/6	0%	2021/4/29
11	Initial survey, UU detection and permit-to-dig	95 days	2021/1/6	0%	2021/4/29
12					
13	Preparation for geotechnical submissions	7 days	2021/4/30	0%	2021/5/8
14					
15	Liaison with PTO VR	18 days	2021/5/10	0%	2021/5/31
16					
17	Slope cutting (Total 2850 m3 solid materials to be removed, i.e. about 4275 m3 loosen materials. 23.8m3 loosen materials to be removed per day, i.e. 4 trips of dumping per day)(installation of silt curtain at the outlet of the box culvert)	148 days	2021/6/1	0%	2021/11/25
18	Installation of rock dowl (include drilling, rebar installation and grouting, etc.)	35 days	2021/11/26	0%	2022/1/8
19	Construction of anchorages for flexible barrier	40 days	2022/1/10	0%	2022/2/28
20	Installation of flexible barriers	40 days	2022/3/1	0%	2022/4/20
21					
22	Installation of sheetpile	28 days	2022/4/21	0%	2022/5/24
23	Excavation from +13.25 Mpd to -1.20 Mpd (Total 2150 m3 solid materials to be removed, i.e. about 3225m3 loosen materials. 23.8m3 loosen materials to be removed per day, i.e. 4 trips of dumping per day)	110 days	2022/5/25	0%	2022/10/5
24	Plate load test	14 days	2022/10/6	0%	2022/10/21
25	Construction of raft footing	40 days	2022/10/22	0%	2022/12/7
26	Construction of basement (below +13.25 mPD)	50 days	2022/12/8	0%	2023/2/10
27					
28	Construction of R.C. walls at 1st Floor	55 days	2023/2/11	0%	2023/4/20
29	Construction of rooftop (below + 17.75 mPD)	55 days	2023/4/21	0%	2023/6/27
30	External Finishes	110 days	2023/6/28	0%	2023/11/7
31	Internal Finishes (incl. installation of Door & Window etc)	110 days	2023/6/28	0%	2023/11/7
32	Landscape works & other associated works	797 days	2021/5/10	0%	2024/1/12
33					
34	E&M works	292 days	2023/2/11	0%	2024/2/2
35	T&C (Stage 1) + T&C (Stage 2)	223 days	2023/5/9	0%	2024/2/2
36	T&C (Stage 3)	75 days	2024/2/3	0%	2024/5/9
37					
38					
39	**Construction of PTO Village Sewerage**	**1173 days**	**2020/7/24**	**0%**	**2024/7/4**
40	Liaise with the village representatives	90 days	2020/7/24	0%	2020/11/9
41	Initial survey and photo-taking	90 days	2020/8/26	0%	2020/12/11
42	UU Detection and application for permit-to-dig	90 days	2020/9/21	0%	2021/1/9
43					
44	Trial pit excavation (Access Date of PTO-B1-01: 22nd Oct 2020)	90 days	2020/10/22	0%	2021/2/8
45					
46	Producing Layout plans showing the loction of terminal manholes, timber box and alignment of sewers and other associated preparation works	83 days	2020/11/17	0%	2021/2/27
47					
48	Liaison with PTO VR	77 days	2021/3/1	0%	2021/5/31
49					
50	**PTO-SW-01 (Open Trench, 18 nos. manholes (170m), and rising main(CH2+53.81 - CH4+36.66)**	**316 days**	**2021/6/1**	**0%**	**2022/6/23**
57	**Landscape works for PTO-SW-01**	**316 days**	**2021/6/1**	**0%**	**2022/6/23**
59					
60	**PTO-SW-02 (Open Trench, 16nos. Manhole(145m), and a Section of Rising Main)**	**263 days**	**2022/6/24**	**0%**	**2023/5/13**
67	**Landscape works for PTO-SW-02**	**263 days**	**2022/6/24**	**0%**	**2023/5/13**
69					
70	**PTO-SW-03 (Open Trench, 25 nos., Length: 360m)**	**390 days**	**2022/6/24**	**0%**	**2023/10/14**
77	**Landscape works for PTO-SW-03**	**390 days**	**2022/6/24**	**0%**	**2023/10/14**
79					
80	**PTO-Trenchless-01 (Trenchless, (Length: 75m) and related Rising Main)**	**237 days**	**2022/6/24**	**0%**	**2023/4/12**
87	**Landscape works for PTO-Trenchless-01**	**237 days**	**2022/6/24**	**0%**	**2023/4/12**
89					
90	**PTO-Trenchless-02 (Trenchless, (Length: 100m) and related Rising Main)**	**289 days**	**2023/4/13**	**0%**	**2024/4/2**
97	**Landscape works for PTO-Trenchless-02**	**289 days**	**2023/4/13**	**0%**	**2024/4/2**
99					
100	**Testing of PTO Village Sewerage**	**75 days**	**2024/4/3**	**0%**	**2024/7/4**
101	CCTV surveying, T&C (Stage 3)	75 days	2024/4/3	0%	2024/7/4
102					
103					
104	**Submarine Outfall by HDD Method with Cofferdam**	**546 days**	**2022/6/20**	**0%**	**2024/4/22**
106	Installation of silt curtain near the rocky shore and construction of temporary working platform	110 days	2022/6/20	0%	2022/10/29
107	Horizontal Directional Drilling	260 days	2022/10/31	0%	2023/9/14
108	Construction of Cofferdam (include installation of silt curtain around the cofferdam)	90 days	2023/5/31	0%	2023/9/14
109	Construction of diffuser manifold	71 days	2023/9/15	0%	2023/12/9
110	Removal of cofferdam at both the manifold and the entry pit (including removal of silt curtain after removal of cofferdam)	30 days	2023/12/11	0%	2024/1/17
111	**Landscape works**	471 days	2022/6/20	0%	2024/1/17
112					
113	**Testing of Submaine Outfall**	**75 days**	**2024/1/18**	**0%**	**2024/4/22**
115					
116	**Completion of Section 2**	0 days	2024/7/4	0%	2024/7/4



Deployment and removal of silt curtain at the rocky shore and submarine outfall.

Silt curtain for the H.D.D. entry-pit construction works area at the rocky shore will be deployed before the construction of temporary working platform and installation for the cofferdam. The silt curtain will be removed after completion of marine construction works at the rocky shore.(i.e. removal cofferdam and temporary working platform.)

Silt curtain for construction of diffuser manifold works area at the submarine outfall will be deployed before construction of cofferdam at the manifold. The silt curtain will be removed after completion of marine construction works of diffuser manifold works area.(i.e. removal cofferdam for diffuser manifold works area)

Construction of cofferdam at the manifold is scheduled to be commenced in May 2023;

Both of the cofferdams will be removed after the completion of installation of diffuser and backfilling on the seabed

Appendix H – Visual Inspection Checklists for Treated Water

DC/2019/09 Provision of Sewerage in Sai Kung

Visual Inspection Checklist for Treated Water

Location: _____

Inspection Date: _____

Inspected by: _____

Checked by: _____

Item	Description	Condition		Follow-up Actions?		Remarks
		Yes	No	Yes	No	
1	Any floating debris / refuse in the treated water? 經處理後的海水中有沒有漂浮的垃圾？					
2	Turbidity in the treated water ? 經處理後的海水是否渾濁？					
3	Any debris/refuse in the water body? 水體中是否有垃圾？					
4	Others (please specify): 其他（請註明）：					

*The checklist shall be properly signed by the Contractor.